WASHINGTON NATURAL HERITAGE PROGRAM

WASHINGTON DEPARTMENT OF NATURAL RESROUCES

ECOLOGICAL INTEGRITY ASSESSMENT GIS ATTRIBUTE GLOSSARY

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The Washington Natural Heritage Program (WNHP) Data Explorer presents available Ecological Integrity Assessment (EIA) GIS data. The following glossary presents information on how values in each attribute were derived. For additional background and detailed methodology, see *Ecological Integrity Assessments to Inform Prioritization of Protection and Restoration Actions and Monitor Progress in the Puget Sound Region* and WNHP EIA methodology.

GENERAL ACRONYMS

EIA
Ecological Integrity Assessment. A measure of current ecological condition as compared to a reference standard via a multi-metric index of biotic and abiotic measures of condition, size, and landscape context.

AA
Assessment Area. The spatial area in which the EIA was applied. The AA is "the entire area, subarea, or point of an occurrence" of an ecosystem type "with a relatively homogeneous ecology and condition".

Level 2 EIA

Project Name
Unique WNHP project name.

Protocol
Version # of EIA manual used in assessment. See this manual for more details on EIA methods and roll-up procedures.

AA ID
Unique name/identifier for the assessment area, within a given Project and Site.

Site Name
Unique survey site name.

Survey Date
Date of field survey.

Classification System
Vegetation classification system used to define the assessment area. The classification systems most frequently used by WNHP are the US National Vegetation Classification (usually at the Association or Group levels of the hierarchy, https://usnvc.org/) and Ecological Systems (https://www.natureserve.org/products/terrestrial-ecological-systems-united-states).

Ecosystem Unit
The ecosystem unit assessed within the chosen Classification System. Examples: Alnus rubra / Stachys chamissonis var. cooleyae - Tolmiea menziesii Riparian Forest (USNVC); North Pacific Lowland Riparian Forest and Shrubland (Ecological Systems). Full descriptions may be found at https://explorer.natureserve.org.

Element Code
The unique identifier for the ecosystem unit. Examples: CEGL003403 (USNVC); CES204.869 (Ecological Systems). Full descriptions may be found at https://explorer.natureserve.org.

Landscape MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of two MEFs within the Landscape Primary Rank Factor (PF). The Landscape MEF contains metrics that assess the integrity of the broader landscape surrounding the AA. Scores range from A+ to D, with A+ meaning 'Excellent' and D meaning 'Poor'. A's and B's are considered to be within the natural range of variability, while C's and D's are considered outside the natural range of variability. "

Buffer MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of two MEFs within the Landscape Primary Rank Factor (PF). The Buffer MEF contains metrics that assess the integrity of the buffer immediately surrounding (contiguous with) the AA. Scores range from A+ to D, with A+ meaning 'Excellent' and D meaning 'Poor'. A's and B's are considered to be within the natural range of variability, while C's and D's are considered outside the natural range of variability.

Vegetation MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of three MEFs within the Condition Primary Rank Factor (PF). The Vegetation MEF contains metrics that assess the integrity of the vegetation (structure, composition, regeneration etc.) within the AA. Scores range from A+ to D, with A+ meaning 'Excellent' and D meaning 'Poor'. A's and B's are considered to be within the natural range of variability, while C's and D's are considered outside the natural range of variability.

Hydrology MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of three MEFs within the Condition Primary Rank Factor (PF). The Hydrology MEF contains metrics that assess the integrity of the hydrology within the AA. Scores range from A+ to D, with A+ meaning 'Excellent' and D meaning 'Poor'. A's and B's are considered to be within the natural range of variability, while C's and D's are considered outside the natural range of variability.

Soil MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of three MEFs within the Condition Primary Rank Factor (PF). The Soil MEF contains a single metric that assess the integrity of the soil within the AA. Scores range from A+ to D, with A+ meaning 'Excellent' and D meaning 'Poor'. A's and B's are considered to be within the natural range of variability, while C's and D's are considered outside the natural range of variability.

Landscape PF, Size PF, EIA Rank, and EO Rank
Major Ecological Factors are grouped into two organizing "Primary Rank Factors" (PF): Landscape Context (outside the assessment area) and Condition (inside the assessment area). These two factors are integrated to form the EIA Rank--the overall ecological integrity of the AA. A third Primary Rank Factor, Size, is considered separately and not relevant to all applications. Size is integrated with EIA Rank to produce the EO Rank--the overall conservation significance of the AA. Scores range from A+ to D, with A+ meaning 'Excellent' and D meaning 'Poor'. A's and B's are considered to be within the natural range of variability, while C's and D's are considered outside the natural range of variability.

EIA Note
Miscellaneous notes regarding the methodology or other comments that may impact how the data are used.

Report Link
Link to relevant report

NWI Level 1 EIA

Overall Scores

EIA Score
A numeric value indicating the modeled ecological integrity of the AA. EIA scores integrate the Landscape Context and Condition Primary Rank Factors (PF). Calculation = LANDSCAPE CONTEXT PF * .6 + CONDITION PF *.4

EIA Rank
A rank value indicating the modeled ecological integrity of the AA. EIA scores ≥ 0.9 = A, ≥ 0.65 and <0.89 = B, ≥ 0.55 and <0.65 = C, <0.55 = D, with A meaning 'Excellent' and D meaning 'Poor'.

EO Rank Score
A numeric value indicating the modeled conservation significance of the AA. Calculation = EIA Score + Size Primary Rank Factor modifier. IMPORTANT: EO Rank scores do NOT indicate that the AA represents an element occurrence.

EO Rank
A rank value indicating the modeled conservation significance of the AA. EO Rank scores ≥ 0.9 = A, ≥ 0.65 and <0.89 = B, ≥ 0.55 and <0.65 = C, <0.55 = D, with A meaning 'Excellent' and D meaning 'Poor'. IMPORTANT: EO Ranks do NOT indicate that the AA represents an element occurrence.

Primary Rank Factors

Landscape Context
One of three Primary Rank Factors used to organize the Major Ecological Factors and calculate EIA and EO Rank scores. Landscape Context integrates the Landscape and Buffer MEFs, which assess the ecological integrity of the area surrounding the AA. Calculation = LAN*0.33+BUF*0.67. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Condition
One of three Primary Rank Factors used to organize the Major Ecological Factors and calculate EIA and EO Rank scores. Condition integrates the Vegetation, Hydrology, and Soil MEFs, which assess the ecological integrity within the AA. Calculation = LAN*0.33+BUF*0.67. For nonforested wetlands, calculation = MEAN(HYD,SOI). For forested wetlands, calcuation = .4*VEGǂ +.3*HYD+.3*SOI when vegetation metrics are applicable, otherwise MEAN(HYD,SOI). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ǂ = If scored / roll-up is conditional

Size
One of three Primary Rank Factors used to organize the Major Ecological Factors. Size is not used in the calculation of EIA ranks and is not relevant to all applications. Size is integrated with EIA Rank as a +/- modifier to produce the EO Rank--the overall conservation significance of the AA. Because there is only one size metric in the Level 1 EIA, we have not subdivided this Primary Rank Factory into component MEFs. Calculation = M13.

Major Ecological Factors

Landscape MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of two MEFs within the Landscape Primary Rank Factor (PF). The

Landscape MEF contains metrics that assess the integrity of the broader landscape surrounding the AA. Calculation = MEAN(M1, M2, M5ŧ)*.8 + M6*.2. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ŧ = If scored / roll-up is conditional

Buffer MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of two MEFs within the Landscape Primary Rank Factor (PF). The Buffer MEF contains metrics that assess the integrity of the buffer immediately surrounding (contiguous with) the AA. Calculation = MEAN(M4, M7ŧ)*.8 + M8*.2. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'."

ŧ = If scored / roll-up is conditional

Vegetation MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of three MEFs within the Condition Primary Rank Factor in the NWI Level 1 EIA. The Vegetation MEF contains a single metric that assesses the structural integrity of the vegetation within the AA. Calculation = M9ŧ?. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ŧ = If scored / roll-up is conditional

Hydrology MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of three MEFs within the Condition Primary Rank Factor in the NWI Level 1 EIA. The Hydrology MEF contains a single metric that assesses the integrity of the hydrology within the AA. Calculation = M10. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Soil MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of three MEFs within the Condition Primary Rank Factor in the NWI Level 1 EIA. The Soil MEF contains a single metric that assesses the integrity of the soil within the AA. Calculation = M11. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Metrics

M1. Landscape Connectivity
% Natural Land Cover w/i 500m. In a Level 2 EIA (LAN1), this would need to be contiguous natural land cover. In this case, because of the coarseness of the data, we simply weighted natural land cover closer to the AA higher than on the edge of the landscape buffer. Calculation

= (0.5(%NLC 50m buffer))+(0.3(%NLC 50- 250m))+(0.2(%NLC 250-500m buffer)). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M2. Landscape Land Use
Mean Land Use Score (LU) between 50-500 meters of the AA. Calculation = (0.65(Avg. LU 50-250m))+(0.35(Avg. LU 250-500m). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M4. Buffer Land Use
Land use score (LU) w/i 50m buffer of the AA. Calculation = Avg. LU w/i 50m. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M5. Landscape Structure
This metric asks, “If 25% of the area w/i 50-500m is forested, what proportion of that forested area is mature and/or old-growth?" GNN (OGSI80, OGSI200) pixels that fall within logged/disturbed/ otherwise developed land use classes in the composite land use layer were removed. Only included in the roll-up if the metric would increase the overall score of the AA AND the 25% threshold is cleared. Calculation = IF > 80% of 50-500m buffer is OG, score = 1, else 0.5*(% of forest that is OGSI80 but not OGSI200 w/i 50-500m) + % of forest that is OGSI200 w/i 50-500m. If the else calculation is used the maximum value is 0.8. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

> ***GNN***
> Gradient Nearest Neighbor. A forest structure data set produced by LEMMA (https://lemma.forestry.oregonstate.edu/data).
>
> ***OG***
> Old-growth forest. In the GNN structure map, OGSI200 pixels are considered old-growth and OGSI80 pixels are mature, non-old-growth.
>
> ***OGSI200***
> Old Growth Site Index – 200. Pixels with this attribute in the GNN forest structure data set represent forests that have progressed past maturation and achieved structure found in the later stages of succession commonly associated with old-growth in this region (http://www.fs.fed.us/pnw/pubs/pnw_gtr911.pdf).
>
> ***OGSI80***
> Old Growth Site Index – 80. Pixels with this attribute in the GNN forest structure data set (but not OGSI200) represent forests that have achieved structure commonly associated with mature forests in this region (http://www.fs.fed.us/pnw/pubs/pnw_gtr911.pdf).

M6. Landscape Hydrology
This metric asks, “Does the area w/in the 50-500m buffer overlap with an NWI polygon with an ‘artificially flooded’ water regime OR non-natural special modifiers (partly drained/ditched, managed, or diked/impounded) OR overlaps with non-natural NHD feature (Dam/Weir, Gate, Lock Chamber, Reservoir, Canal/Ditch, Flume, Levee).” Calculation = 0 if any of these criteria are met, otherwise 1. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

NHD
National Hydrography Data Set. A comprehensive hydrography data set produced by USGS (https://www.usgs.gov/national-hydrography/national-hydrography-dataset).

M7. Buffer Structure
This metric asks, "If 25% of the area w/i 50m buffer is forested, what proportion of that forested area is mature and/or old-growth?" GNN (OGSI80, OGSI200) pixels that fall within logged/disturbed/ otherwise developed land use classes in the composite land use layer were removed. Only included in the roll-up if the metric would increase the overall score of the AA AND the 25% threshold is cleared. Calculation = IF > 80% of 50m buffer is OG, score = 1, else 0.5*(% of forest that is OGSI80 but not OGSI200 w/i 50m) + % of forest that is OGSI200 w/i 50m. If the else calculation is used the maximum value should be 0.8. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M8. Buffer Hydrology
This metric asks, "Does the area w/i 50m buffer overlap with an NWI polygon with an 'artificially flooded' water regime OR non-natural special modifiers (partly drained/ditched, managed, or diked/impounded) OR overlaps with non-natural NHD feature (Dam/Weir, Gate, Lock Chamber, Reservoir, Canal/Ditch, Flume, Levee)." Calculation = 0 if any of these criteria are met w/i the 50m buffer, otherwise 1. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M9. Forest Structure
This metric asks, "If this is a forested NWI polygon, what proportion of that forested area is mature and/or old-growth?" GNN (OGSI80, OGSI200) pixels that fall within logged/disturbed/ otherwise developed land use classes in the composite land use layer were removed. Only included in the roll-up if the metric would increase the overall score of the AA. Calculation = 1 if OG polygon or if >80% of AA is OGSI200 else 0.5*(% of AA that is OGSI80 but not OGSI200) + % of AA that is OGSI200. If the else calculation is used, the maximum value is 0.8. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M10. Hydrology
This metric asks, "Does the AA have an 'artificially flooded' water regime OR non-natural special modifiers (partly drained/ditched, managed, or diked/impounded) OR does the AA contain a non-natural NHD feature (Dam/Weir, Gate, Lock Chamber, Reservoir, Canal/Ditch, Flume, Levee)." Calculation = 0 if any of these criteria are met w/i the AA. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M11. Soil Disturbance
This metric asks, "Does the AA have one of the following special modifiers: partly drained/ditched, farmed, artificial substrate, spoil, or excavated." Calculation = 0 if any of these criteria are met w/i the AA. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M13. Comparative Size
Size of the AA relative to spatial pattern (patch type) of ecosystem. > 10 ha = A (+0.25), 2-10 = B (+0.08), 0.5-2 = C (-0.08), < 0.5 = D (-0.25).

Classification Categories

Attribute
Cowardin classification code. See https://fwsprimary.wim.usgs.gov/decoders/wetlands.aspx

Wetland Type
General descriptor of wetland type

System Name
Cowardin System. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Subsystem
Cowardin Subsystem. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Class
Cowardin Class. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Subclass
Cowardin Subclass. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Split Class
Cowardin Split Class, used in situations where the wetland is attributed with more than one class. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Split Subclass
Cowardin Split Subclass, used in situations where the wetland is attributed with more than one subclass. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Water Regime Group
Cowardin Water Regime Group. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Water Regime
Cowardin Water Regime. See https://www.fws.gov/media/classification-wetlands-and-deepwater-habitats-united-states

Spatial Attributes

Hectares
Assessment area size in hectares.

Proportion Forested Landscape
Proportion of area between 50-500 meters of the AA that is forested. This measurement is used to determine whether M5 is included in the roll-up.

Proportion Forested Buffer
Proportion of area within 50m of the AA that is forested. This measurement is used to determine whether M7 is included in the roll-up.

NVC LEVEL 1 EIA

Overall Scores

EIA Score
A numeric value indicating the modeled ecological integrity of the AA. EIA scores integrate the Landscape Context and Condition Primary Rank Factors (PF). Calculation = LANDSCAPE CONTEXT PF * 0.6 + CONDITION PF * 0.4. NOTE: Condition PF is not available for all AAs; in those cases EIA Score = LANDSCAPE CONTEXT PF.

EIA Rank
A rank value indicating the modeled ecological integrity of the AA. EIA scores ≥ 0.91 = A, ≥ 0.83 and <0.9 = B, ≥ 0.35 and <0.83 = C, <0.35 = D, with A meaning 'Excellent' and D meaning 'Poor'.

EO Rank Score
A numeric value indicating the modeled conservation significance of the AA. EO Rank scores = EIA Score + Size Primary Rank Factor modifier. IMPORTANT: EO Rank scores do NOT indicate that the AA represents an element occurrence.

EO Rank
A rank value indicating the modeled conservation significance of the AA. EO Rank scores ≥ 0.91 = A, ≥ 0.83 and <0.9 = B, ≥ 0.35 and <0.83 = C, <0.35 = D, with A meaning 'Excellent' and D meaning 'Poor'. IMPORTANT: EO Ranks do NOT indicate that the AA represents an element occurrence.

Primary Rank Factors

Landscape Context
One of three Primary Rank Factors used to organize the Major Ecological Factors and calculate EIA and EO Rank scores. Landscape Context integrates the Landscape and Buffer MEFs, which assess the ecological integrity of the area surrounding the AA. The calculation varies by the spatial pattern (i.e. patch type) of the ecosystem: IF Matrix = LAN*.67 + BUF*.33; IF Large Patch = MEAN(LAN, BUF); IF Small Patch = LAN*.33+BUF*.67. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Condition
One of three Primary Rank Factors used to organize the Major Ecological Factors and calculate EIA and EO Rank scores. Condition integrates the Vegetation, Hydrology, Soil, and Fire MEFs, which assess the ecological integrity within the AA. For nonforested wetlands, calculation = MEAN(HYD,SOI). For forested wetlands, calculation = .4*VEGł +.3*HYD+.3*SOI when vegetation metrics are applicable, otherwise MEAN(HYD,SOI). For non-shrub-steppe uplands, calculation = VEG. For shrub-steppe, calculation = FIR. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ŧ = If scored / roll-up is conditional

Size
One of three Primary Rank Factors used to organize the Major Ecological Factors. Size is not used in the calculation of EIA ranks and is not relevant to all applications. Size is integrated with EIA Rank as a +/- modifier to produce the EO Rank--the overall conservation significance of the AA. Because there is only one size metric in the Level 1 EIA, we have not subdivided this Primary Rank Factory into component MEFs. Calculation = M13

Major Ecological Factors

Landscape MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of two MEFs within the Landscape Primary Rank Factor (PF). The Landscape MEF contains metrics that assess the integrity of the broader landscape surrounding the AA. For wetlands, calculation = MEAN(M1, M2, M5ŧ)*.8 + M6*.2. For uplands, calculation = MEAN(M1, M2, M5ŧ). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ŧ = If scored / roll-up is conditional

Buffer MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of two MEFs within the Landscape Primary Rank Factor (PF). The Buffer MEF contains metrics that assess the integrity of the buffer immediately surrounding (contiguous with) the AA. In upland ecosystems, this is referred to as the 'Edge'. For wetlands, calculation = MEAN(M4, M7ŧ)*.8 + M8*.2. For uplands, calculation = MEAN(M4, M7ŧ). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ŧ = If scored / roll-up is conditional

Vegetation MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of four MEFs within the Condition Primary Rank Factor in the NVC Level 1 EIA. The Vegetation MEF contains a single metric that assesses the structural integrity of the vegetation within the AA. Calculation = M9ŧ. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

ŧ = If scored / roll-up is conditional

Hydrology MEF
Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. This is one of four MEFs within the Condition Primary Rank Factor in the NVC Level 1 EIA. The Hydrology MEF contains a single metric that assesses the integrity of the hydrology

within the AA. This MEF is only applicable to wetlands. Calculation = M10. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Soil MEF

Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. The Soil MEF contains a single metric that assesses the integrity of the soil within the AA. Due to source data limitations, this MEF is only applicable to wetlands. Calculation = M11. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Fire MEF

Major Ecological Factors (MEF) characterize the ecological drivers and dynamics of the ecosystem that must be addressed when making management decisions to maintain ecological integrity. The Fire MEF contains a single metric that determines if there have been recent fires in the AA. This MEF is currently only applicable to shrub-steppe AAs, all of which represent mapping errors when found in western Washington. Calculation = M12. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

Metrics

M1. Landscape Connectivity

% Natural Land Cover w/i 500m. In a Level 2 EIA (LAN1), this would need to be contiguous natural land cover. In this case, because of the coarseness of the data, we simply weighted natural land cover closer to the AA higher than on the edge of the landscape buffer. Calculation = (0.5(%NLC 50m buffer))+(0.3(%NLC 50- 250m))+(0.2(%NLC 250-500m buffer)). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M2. Landscape Land Use

Mean Land Use Score (LU) between 50-500 meters of the AA. Calculation = (0.65(Avg. LU 50-250m))+(0.35(Avg. LU 250-500m). Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M4. Buffer Land Use

Land use score (LU) w/i 50m buffer of the AA. Calculation = Avg. LU w/i 50m. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M5. Landscape Structure

This metric asks, “If 25% of the area w/i 50-500m is forested, what proportion of that forested area is mature and/or old-growth?" GNN (OGSI80, OGSI200) pixels that fall within logged/disturbed/ otherwise developed land use classes in the composite land use layer were removed. Inclusion of this metric in rolled up scores is conditional. In ecosystems for which old-growth conditions in the surrounding landscape are a prime indicator of integrity (e.g. G240 North Pacific Maritime Douglas-fir - Western Hemlock Rainforest), this metric is always included. For ecosystems that may not be expected to occur in old-growth landscapes (e.g. G320 North Pacific Alpine-Subalpine Tundra), this metric is only included if it would increase the overall score of the AA. Calculation = IF > 80% of 50-500m buffer is OG, score = 1, else 0.5*(% of forest that is OGSI80 but not OGSI200 w/i 50-500m) + % of forest that is OGSI200 w/i 50-

500m. If the else calculation is used the maximum value is 0.8. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

GNN
Gradient Nearest Neighbor. A forest structure data set produced by LEMMA (https://lemma.forestry.oregonstate.edu/data).

OG
Old-growth forest. In the GNN structure map, OGSI200 pixels are considered old-growth and OGSI80 pixels are mature, non-old-growth.

OGSI200
Old Growth Site Index – 200. Pixels with this attribute in the GNN forest structure data set represent forests that have progressed past maturation and achieved structure found in the later stages of succession commonly associated with old-growth in this region (http://www.fs.fed.us/pnw/pubs/pnw_gtr911.pdf).

OGSI80
Old Growth Site Index – 80. Pixels with this attribute in the GNN forest structure data set (but not OGSI200) represent forests that have achieved structure commonly associated with mature forests in this region (http://www.fs.fed.us/pnw/pubs/pnw_gtr911.pdf).

M6. Landscape Hydrology
This metric asks, “Does the area w/in the 50-500m buffer overlap with an NWI polygon with an ‘artificially flooded’ water regime OR non-natural special modifiers (partly drained/ditched, managed, or diked/impounded) OR overlaps with non-natural NHD feature (Dam/Weir, Gate, Lock Chamber, Reservoir, Canal/Ditch, Flume, Levee).” Applied to wetland groups only. Calculation = 0 if any of these criteria are met, otherwise 1. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

NHD
National Hydrography Data Set. A comprehensive hydrography data set produced by USGS (https://www.usgs.gov/national-hydrography/national-hydrography-dataset).

M7. Buffer Structure
This metric asks, “If 25% of the area w/i 50m buffer is forested, what proportion of that forested area is mature and/or old-growth?" GNN (OGSI80, OGSI200) pixels that fall within logged/disturbed/ otherwise developed land use classes in the composite land use layer were removed. Inclusion of this metric in rolled up scores is conditional. In ecosystems for which old-growth conditions in the surrounding landscape are a prime indicator of integrity (e.g. G240 North Pacific Maritime Douglas-fir - Western Hemlock Rainforest), this metric is always included. For ecosystems that may not be expected to occur in old-growth landscapes (e.g. G320 North Pacific Alpine-Subalpine Tundra), this metric is only included if it would increase the overall score of the AA. Calculation = IF > 80% of 50m buffer is OG, score = 1, else 0.5*(% of forest that is OGSI80 but not OGSI200 w/i 50m) + % of forest that is OGSI200 w/i 50m. If the else calculation is used the maximum value should be 0.8. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M8. Buffer Hydrology
This metric asks, “Does the area w/i 50m buffer overlap with an NWI polygon with an ‘artificially flooded’ water regime OR non-natural special modifiers (partly drained/ditched, managed, or diked/impounded) OR overlaps with non-natural NHD feature (Dam/Weir, Gate, Lock Chamber, Reservoir, Canal/Ditch, Flume, Levee).” Applied to wetland groups only. Calculation = 0 if any of these criteria are met w/i the 50m buffer, otherwise 1. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M9. Forest Structure
This metric asks, “If this is a forested NVC polygon, what proportion of that forested area is mature and/or old-growth?” GNN (OGSI80, OGSI200) pixels that fall within logged/disturbed/ otherwise developed land use classes in the composite land use layer were removed. Inclusion of this metric in rolled up scores is conditional. In ecosystems for which old-growth conditions are a prime indicator of integrity (e.g. G240 North Pacific Maritime Douglas-fir - Western Hemlock Rainforest), this metric is always included. For ecosystems where a lack of old-growth conditions is not an indicator of degradation (e.g. G507 North Pacific Montane Riparian Woodland), this metric is only included if it would increase the overall score of the AA. Calculation = 1 if OG polygon or if >80% of AA is OGSI200 else 0.5*(% of AA that is OGSI80 but not OGSI200) + % of AA that is OGSI200. If the else calculation is used, the maximum value is 0.8. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M10. Hydrology
This metric asks, “Does the AA overlap with NWI polygons that have an ‘artificially flooded’ water regime OR non-natural special modifiers (partly drained/ditched, managed, or diked/impounded) OR does the AA contain a non-natural NHD feature (Dam/Weir, Gate, Lock Chamber, Reservoir, Canal/Ditch, Flume, Levee).” Applied to wetland groups only. Calculation = 0 if any of these criteria are met w/i the AA. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M11. Soil Disturbance
This metric asks, “Does the AA overlap with NWI polygons that have one of the following special modifiers: partly drained/ditched, farmed, artificial substrate, spoil, or excavated.” Applied to wetland groups only, due to data source limitations. Calculation = 0 if any of these criteria are met w/i the AA. Scores are binary (0 or 1) with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M12. Recent Fire
Applied to Intermountain Mesic Tall Sagebrush Steppe & Shrubland (G302) + Intermountain Mountain Big Sagebrush Steppe & Shrubland (G304) only. This is the % of the AA that does not overlap with a major fire since 2016. Fires before 2016 (LANDFIRE date) are presumably accounted for in the landcover mapping, because LANDFIRE tends to map burned shrub-steppe as grassland. Calculation = proportion of AA unburned. Scores range from 0 to 1, with 1 meaning 'Excellent' and 0 meaning 'Poor'.

M13. Comparative Size
Size of the AA relative to spatial pattern (patch type) of ecosystem: Matrix = >5000 ha = A (+0.50), 500-5000 = B (+0.17), 100-500 = C (-0.17), <100 = D (-0.50); Large Patch = >125 ha A

(+0.33), 25-125 ha = B (+0.11), 5-25 ha = C (-0.11), <5 ha = D (-0.33); Small Patch = > 10 ha = A (+0.25), 2-10 = B (+0.08), 0.5-2 = C (-0.08), < 0.5 = D (-0.25)

Classification Categories

Macrogroup Code
Unique identifier of USNVC Macrogroup represented by AA

Macrogroup Name
USNVC Macrogroup represented by the AA. Full descriptions may be found at https://explorer.natureserve.org.

Macrogroup Spatial Pattern
Refers to the scale at which an ecosystem naturally occurs on the landscape. For example, 'matrix' types of vegetation are dominant across the majority of a given landscape, while 'large patch' and 'small patch' types occur as distinctive patches within the larger 'matrix.'

Forest
Indicates whether the AA represents a forested ecosystem. This impacts which metrics are applied, as well as conditional roll-up calculations.

Wetland
Indicates whether the AA represents a wetland ecosystem. This impacts which metrics are applied, as well as conditional roll-up calculations.

Shrub-Steppe
Indicates whether the AA represents a shrub-steppe ecosystem. This impacts which metrics are applied, particularly M12. Recent Fire.

Old-Growth
Indicates whether the AA represents a polygon of old-growth forest. This impacts some of metric logic.

Spatial Attributes

Hectares
Assessment area size in hectares

Proportion Forested Landscape
Proportion of area between 50-500 meters of the AA that is forested. This measurement is used to determine whether M5 is included in the roll-up.

Proportion Forested Buffer
Proportion of area within 50m of the AA that is forested. This measurement is used to determine whether M7 is included in the roll-up.