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# Definitions of Species EO Ranks

*From “Ranking Species Occurrences - A Generic Approach” Geoffrey A. Hammerson, Dale Schweitzer, Larry Master, and Jay Cordeiro, January 11, 2008*

Element occurrence (EO, hereafter simply "occurrence") ranks provide a succinct assessment of the estimated viability (probability of persistence) of occurrences of a given species. They provide an estimation of the likelihood that, if current conditions prevail, a species occurrence will persist for a period of time. Because occurrence ranks are used to represent the relative overall “quality” of an occurrence as it currently exists, they are based solely on criteria that reflect the present status of that occurrence. These criteria can be broadly specified as “rank factors,” namely size (including population size and/or occupied area), abiotic and biotic conditions, and landscape context. Future threats should not be used to “downgrade” an occurrence rank, but ongoing events (e.g., successional changes, periodic unfavorable management) that result in inexorable degradation of occurrence quality *should* be considered.

The generic approach to ranking species occurrences focuses on occurrences that are potentially rankable as A, B, C, and D. Many occurrences, such as those based solely on old museum records or on a recent observation with scant data, are not rankable as A, B, C, or D, but they could be ranked as E, H, X, U, F, or NR.

#### A: Excellent viability

Occurrence exhibits optimal or at least exceptionally favorable characteristics with respect to population size and/or quality and quantity of occupied habitat; and, if current conditions prevail, the occurrence is very likely to persist for the foreseeable future (i.e., at least 20-30 years) in its current condition or better. These occurrences have characteristics (e.g., size, condition, landscape context) that make them relatively invulnerable to extirpation or sustained population declines, even if they have declined somewhat relative to historical levels. For species associated with habitat patches or ephemeral or particularly dynamic habitats, occurrences warranting an **A** rank generally consist of metapopulations rather than single demes (unless exceptionally large and robust). Occurrences of this rank typically include at least 1,000 mature individuals but may be smaller (100s) or might require larger populations (10,000s), depending on the species and its demographic characteristics. However, occurrences can be ranked **A** even if population size is not known. For example, for occurrences lacking information on population size, an **A** rank may be appropriate under the following circumstances: the population is clearly very large but it is not known how large; the area of occupied habitat is exceptionally large; or the occurrence has excellent condition and landscape context and a long history of occurrence persistence. Occurrences with excellent estimated viability are ranked **A** even if one or more other occurrences have a much larger population size and/or much greater quantity of occupied habitat. In most cases, occurrences ranked **A** will occupy natural habitats. However, "natural" is an ambiguous concept, and occurrences in "unnatural" conditions (e.g., somewhat modified by human actions) may still be assigned a rank of **A** if they otherwise meet the criteria.

#### B: Good viability

Occurrence exhibits favorable characteristics with respect to population size and/or quality and quantity of occupied habitat; and, if current conditions prevail, the occurrence is likely to persist for the foreseeable future (i.e., at least 20-30 years) in its current condition or better. **B**-ranked occurrences have good estimated viability and, if protected, contribute importantly to maintaining or improving the conservation status of threatened or declining species. For species associated with habitat patches or ephemeral or particularly dynamic habitats, a high-quality occurrence may warrant a **B** rank if it consists of a single deme rather than a metapopulation (unless the single deme is exceptionally large and robust, in which case an **A** rank may be appropriate).

#### C: Fair viability

Occurrence characteristics (size, condition, and landscape context) are non-optimal such that occurrence persistence is uncertain under current conditions, or the occurrence does not meet **A** or **B** criteria but may persist for the foreseeable future with appropriate protection or management, or the occurrence is likely to persist but not necessarily maintain current or historical levels of population size or genetic variability. This rank may be applied to relatively low-quality occurrences with respect to size, condition, and/or landscape context if they still appear to have reasonable prospects for persistence for the foreseeable future (at least 20-30 years). Examples include very small non-degraded relict occurrences as well as some remnant occurrences of former landscape-level species such as many extant occurrences of tall-grass prairie insects. These occurrences represent the lower bound of occurrences worthy of protection.

#### D: Poor viability

If current conditions prevail, occurrence has a high risk of extirpation (because of small population size or area of occupancy, deteriorated habitat, poor conditions for reproduction, ongoing inappropriate management that is unlikely to change, or other factors). Questionably viable occurrences that could be restored to at least fair viability should not be ranked **D** if restoration is deemed feasible and plausible; in most such cases **CD** should be used. Very small occurrences that may be vulnerable to deleterious stochastic events may be ranked as follows: If the stochastic event is highly theoretical or of very low probability in the appropriate time frame (e.g., 20-30 years), then a **C** or **CD** rank may be appropriate. If a minority of other similar occurrences have disappeared as a result of, say, disease or inbreeding, then perhaps **CD** is best. If most of these small occurrences have been extirpated or are disappearing due to such events, then **D** is probably appropriate. The **D** rank also applies if the population is so small that there will inevitably be a year (or generation) in the near future in which by chance all adults will be the same gender.

#### E: Verified extant

Occurrence recently has been verified as still existing, but sufficient information on the factors used to estimate viability of the occurrence has not yet been obtained. Use of the **E** rank should be reserved for those situations in which the occurrence is thought to be extant, but an **A**, **B**, **C**, **D**, or combination rank cannot be assigned.

#### H: Historical

Recent field information verifying the continued existence of the occurrence is lacking. Examples of this rank include occurrences based only on historical collection data, or occurrences that previously were ranked **A**, **B**, **C**, **D**, or **E** but that are now, without field survey work, considered to be possibly extirpated due to general habitat loss or degradation of the environment in the area. **H** may be applied to recently verified occurrences if two or more competent subsequent efforts that should have found the species did not, or if there has been a known major disturbance since the last observation such that continued existence of the occurrence is in doubt (for example, an isolated Lepidoptera occurrence that was sprayed with Dimilin®).

In the absence of known disturbance and with the habitat still extant, **H** is generally recommended for occurrences that have not been reconfirmed for 20 or more years, but for many short-lived insects a shorter interval may be appropriate, and for unusually stable habitats (like undisturbed caves), or for certain plants whose seeds may persist and remain viable in the soil for decades, a longer interval, up to 40 years, may be used. With very few exceptions, occurrences are to be regarded as **H** after 40 years without confirmation, even with no effort to locate the species. The time frame for **H** occurrences is necessarily arbitrary, and the values specified here should be regarded as generally appropriate but somewhat flexible rules. The professional judgment of the assessor should determine when resurveys with negative results have been sufficient in quantity and quality to warrant updating an occurrence rank from **F** to **H** or from **H** to **X**. Deviations from the suggested time frame should be explained in the EO RANK Comment field.

In some cases, **H** may indicate occurrences with imprecise locational information such that it may be difficult or impossible to determine whether subsequent observations are of the same occurrence; many of these occurrences may remain **H** indefinitely. Nevertheless, occurrences with imprecise locational information sometimes may be mapped using an appropriate and reasonable indication of the degree of locational uncertainty.

####  F: Failed to find

Occurrence has not been found despite a search by an experienced observer at a time and under conditions appropriate for the Element at a location where it was previously reported, but the occurrence still might be confirmed to exist at that location with additional field survey efforts. For occurrences with vague locational information, the search must include areas of appropriate habitat within the range of locational uncertainty.

####  X: Extirpated

Adequate surveys by one or more experienced observers at times and under conditions appropriate for the species at the occurrence location, or other persuasive evidence, indicate that the species no longer exists there or that the habitat or environment of the occurrence has been destroyed to such an extent that it can no longer support the species.

#### Unrankable

An occurrence rank (including E) cannot be assigned due to lack of sufficient information on the occurrence. As currently defined, this category is not clearly distinguishable from **H**, and use of **U** is discouraged until this issue is resolved (perhaps by elimination of the **U** category). Occurrences that currently cannot be surveyed because of access issues (e.g., a cave entrance has been permanently sealed, or an uncooperative landowner denies access) may be ranked **A**, **B**, **C**, **D**, **E**, **F**, **H**, or **X** if the rank is based on recent survey data obtained when access was still possible. Currently inaccessible occurrences that are based only on old (historical) information should be ranked **H**. Note that access issues often are temporary and may be overcome by negotiation, change in ownership, use of novel survey techniques, or other methods. The **U** code sometimes has been used to indicate occurrences with "unknown" viability, but such occurrences generally should be coded as **H**, **F**, or **NR**, depending on the circumstances.

#### NR: Not ranked

An occurrence rank has not been assigned to the occurrence. This category may be used for occurrences that never have been ranked. Additionally, **NR** may be used for previously ranked occurrences that have been altered to such an extent that the previous rank likely no longer applies but the current appropriate rank is completely unknown. Note that **H** may be appropriate if there has been a major, presumably detrimental disturbance since the last observation such that continued existence of the occurrence is seriously in doubt (versus unknown).

### Dealing with Uncertainty

Note that certain combination ranks (i.e., AB, AC, BC, and CD) are encouraged and should be used to indicate the range of uncertainty regarding the appropriate rank for an occurrence. In fact, due to pervasive limited information about most occurrences, the appropriate rank for most occurrences will be a combination rank. It may be relatively easy to determine an appropriate rank by eliminating clearly inappropriate ranks (e.g., an occurrence is clearly not an A nor a D, so it's BC; or an occurrence appears to be viable and is clearly better than a D, but little else is known, so it's AC). The ranks AD and BD are uninformative regarding conservation value so their use is strongly discouraged; generally E should be used instead.

### Attaining Consistency in Occurrence Ranking

Occurrence ranking benefits from multiple opinions and may be accomplished most effectively in an "expert's workshop" setting. Occurrence ranks are best determined by persons who have a good understanding of the population characteristics of the species or who at least have good basic knowledge of the biology and ecology of the group of organisms to which the species belongs. Such knowledge allows the ranker to make a good forecast about the viability of a particular occurrence. The rationale for each rank should be recorded in the EO Rank Comments field in Biotics.

# Key for Ranking Species EOs using the Generic Approach

*From “Decision Key for Ranking Species Element Occurrences using the* *Generic Approach”[[1]](#footnote-2)*

*Adele Tomaino, Jay Cordeiro, Leah Oliver and Jennifer Nichols, December 15, 2008*

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | a | No attempt has been made to assess the viability of the EO, or the existing EO rank no longer applies. | NR: Not Ranked |
|   | b | An attempt has been made, or is being made, to assess the viability of the EO. | 2 |
| 2 | a | EO has been recently (i.e., within last 20 years or an appropriate interval for the taxon) verified as extant. | 3 |
|   | b | EO has not been recently (i.e., within last 20 years or an appropriate interval for the taxon) verified as extant  | 9 |
| 3 | a | Sufficient information (some aspect[s] of size, condition, and /or landscape context) is not available to assess EO viability. [Note: In this case, u se an E rank rather than the AD or BD combination ranks]. | E: Verified Extant |
|   | b | Sufficient information (some aspect[s] of size, condition, and /or landscape context) is available to assess EO viability. | 4 |
| 4 | a | If current conditions prevail, EO persistence for the foreseeable future (i.e., at least 20 - 30 years) is reasonably certain. EOs with low or declining quality may be included if they still appear to have reasonable prospects for persistence for the foreseeable future. In addition, EOs that may persist for the foreseeable future with appropriate protection or management may be included if that management or protection is currently ongoing. | AC: Excellent to Fair viability continue to 5 if rank may be further refined |
|   | b | If current conditions prevail, EO persistence for the foreseeable future (i.e., at least 20 - 30 years) is uncertain because of small population size or area of occupancy, deteriorated habitat, poor conditions for reproduction, ongoing inappropriate management that is unlikely to change, or other factors. | Fair to Poor viability continue to 6 if rank may be further refined |
| 5 | a | Some aspect(s) of size, condition, landscape context, population size and/or quality and quantity of occupied habitat are optimal, exceptional, or highly favorable. EO is expected to persist in its current condition or better. EO has highly favorable and higher - quality characteristics. | AB: Excellent to Good viability continue to 7 if rank may be further refined |
|   | b | Some aspect(s) of size, condition, landscape context, population size and/or quality and quantity of occupied habitat are not optimal or exceptional. EO may or may not persist in its current condition or better. EO has favorable to lower - quality characteristics. | BC: Good to Fair viability continue to 8 if rank may be further refined |
| 6 | a | EO has some risk of extirpation in the foreseeable future (i.e. , at least 20 - 30 years) but restoration is deemed feasible and plausible , or stochastic events that would extirpate the population are of low probability within 20 - 30 years | CD: Fair to Poor viability |
|   | b | EO has a high risk of extirpation in the foreseeable future (i.e., at least 20 - 30 years). Restoration is not feasible and/or not plausible. Stochastic events that would extirpate the population are expected to occur within 20 - 30 years. | D: Poor viability |
| 7 | a | Most aspects of size, condition, landscape context, population size and/or quality and quantity of occupied habitat are optimal or exceptionally favorable. EO is very likely to persist for the foreseeable future (i.e., at least 20 - 30 years). These EOs have characteristics that make them relatively invulnerable to extirpation or sustained population declines even if they have declined somewhat relative to historical levels. If population size is unknown, area of occupied habitat is exceptionally favorable; or the EO has excellent condition and landscape context and a long history of persistence. In most cases these EOs occupy natural habitats; however, EOs somewhat modified by human actions may still be included if they otherwise meet the criteria. | A: Excellent viability |
|   | b | Some aspect(s) of size, condition, landscape context, population size and/or quality and quantity of occupied habitat are favorable. EO is likely to persist for the foreseeable future (i.e., at least 20 - 30 years) in its current condition or better. This category includes EOs that contribute importantly to maintaining or improving the conservation status of declining or threatened species but do not meet A criteria. | B: Good viability |
| 8 | a | Some aspect(s) of size, condition, landscape context, population size and/or quality and quantity of occupied habitat are favorable. EO is likely to persist for the foreseeable future (i.e., at least 20 - 30 years) in its current condition or better. This category includes EOs that contribute importantly to maintaining or improving the conservation status of declining or threatened species but do not meet A criteria. | B: Good viability |
|   | b | Few aspect(s) of size, condition, landscape context, population size and/or quality and quantity of occupied habitat are favorable. There may be some uncertainty about the long - term persistence of the EO (i.e., for at least 20 - 30 years), or the EO may be expected to persist but not necessarily maintain its current quality. | C: Fair viability |
| 9 | a | Appropriate surveys or other persuasive evidence indicate the EO no longer exists. | X: Extirpated |
|   | b | EO may still exist. | 10 |
| 10 | a | An appropriate survey was conducted but the EO was not found. | 11 |
|   | b | No appropriate survey has been conducted but the EO is possibly extirpated due to a known major disturbance or general habitat loss/degradation, or the existence of the EO has not been reconfirmed for 40 or more years. This category includes EOs based on old information that cannot be surveyed because of access issues as well as EOs with locational information too imprecise to reconfirm. [Note: With very few exceptions, occurrences are to be regarded as H after 40 years without confirmation, even with no effort to locate the taxon. Exceptions can be found in the Generic EO Ranking Approach document]. | H: Historical |
| 11 | a | One to a few surveys have been conducted which failed to locate the EO, but additional negative survey (s) are needed to provide sufficient evidence that the EO should be considered historical or extirpated. | F: Failed to find |
|   | b | There have been sufficient surveys to justify considering the EO possibly extirpated. This category includes EOs that have not been reconfirmed for 20 or more years (or an appropriate interval for the taxon). [Note: With very few exceptions, occurrences are to be regarded as H after 40 years without confirmation, even with no effort to locate the taxon. Exceptions can be found in the Generic EO Ranking Approach document]. | H: Historical |

**Note:** In rare situations where there is a lack of sufficient information to rank an EO using the key above, the occurrence may be ranked **U: Unrankable**. However, use of this rank is discouraged. EOs with unknown viability should be ranked **H**, **F**, or **NR**, unless confirmed extant in which case the EO should be ranked **E**.

# Guidance for Application of Ecosystem Occurrences Ranks

*Don Faber-Langendoen (NatureServe), Bill Nichols (NH NHP), Joe Rocchio (WA NHP), Josh Cohen (MNFI),*

*April 10, 2015*

## The Basic Ecology A - D Ranks

The overall EORANK based on ecological integrity ratings will bring together our understanding of current status of ecological attributes and include threshold values for both the best conceivable occurrences and those having only fair integrity (NatureServe 2002). To ensure that the final ratings of ecological integrity have consistency wherever they are used, we provide a narrative summary of the different levels of integrity. The integration of individual metrics into overall ratings should help provide a perspective on ecological integrity ratings consistent with these definitions (Table 1).

We offer these definitions partly to provide a global perspective on ecological integrity. This means that the best occurrence in a particular jurisdiction or geographic area (e.g., ecoregion) may not be highly ranked or even viable. Information about local prioritization of EOs can be recorded in optional fields or existing comment fields.

The A through D rating presumes that a particular type is still recognizable at some level as “the type,” despite varying levels of change. That change could be due to natural succession or to anthropogenic stressors. At some point, a type will change to the point where it “crosses the line” (or be “transformed” in the words of SER 2004) into a separate type. In some state-and-transition models these may be treated as shifts to an “alternative state.” But, as a matter of practicality, classification rules are needed to decide when the current ecosystem has been lost. This requires working with a set of diagnostic classification criteria, based on composition, structure, abiotic factors, and processes.

For Ecological Types, we provide three sets of guidance, one very generic (Table 1), the other two (Tables 2, 3) more customized, because ecologists, more than species biologists, find it helpful to customize EORANKSPECS to either very broad categories of ecosystem types (floodplain and swamp forest, bog and fen, alpine, prairie, etc), or to more specific ecosystem types (tallgrass prairie, longleaf pine woodland, northern hardwood forest, etc). These two sets of more specific guidance follow two approaches – one metrics based (Table 2), the other narrative based (Table 3).

1. Generic EORANKSPECS table that serves as a general guide to ranking ecosystems (Table 1).
2. A general metrics-based approach to assessing ecological integrity and EO RANK of wetland types (Faber-Langendoen et al. 2016). A general metrics-based approach for uplands is now in development (NatureServe 2019). This approach can be further customized.
3. A customized, narrative set of EORANKSPECS for Southern Rocky Mountain Mountain-mahogany - Mixed Foothill Shrubland (G276). (Table 3). This approach can be generalized.

Ranking Ecology EOs using the Generic Approach

Table 1. Generic definitions of EORANKS based on ecological integrity concepts (adapted from Faber-Langendoen et al. 2009).

|  |  |
| --- | --- |
| **Rank**  | **Description** |
| A | Occurrence is believed, across the range of a type, to meet reference conditions with respect to key ecological attributes functioning within the bounds of natural disturbance regimes. Characteristics include: * **landscape context** contains natural habitats that are essentially unfragmented (reflective of intact ecological processes) and with little to no stressors;
* **size** is very large or much larger than the minimum dynamic area;
* **condition,** including vegetation structure and composition, soil status, and hydrological function are well within natural ranges of variation; exotics (non-natives) are essentially absent or have negligible negative impact; and a comprehensive set of key plant and animal indicators are present.
 |
| B | Occurrence is not among the highest quality examples***,*** but nevertheless exhibits favorable characteristics with respect to key ecological attributes functioning within the bounds of natural disturbance regimes. Characteristics include: * **landscape context** contains largely natural habitats that are minimally fragmented with few stressors;
* **size** is large or above the minimum dynamic area;
* **condition**, including vegetation structure and composition, soils, and hydrology are functioning within natural ranges of variation; invasives and exotics (non-natives) are present in only minor amounts, or have minor negative impact; and many key plant and animal indicators are present.
 |
| C | Occurrence has a number of unfavorable characteristics with respect to key ecological attributes and natural disturbance regimes. Characteristics include: * **landscape context** contains natural habitats that are moderately fragmented, with several stressors;
* **size** is small or below, but near the minimum dynamic area;
* **condition**, including vegetation structure and composition, soils, and hydrology are altered somewhat outside their natural range of variation; invasives and exotics (non-natives) may be a sizeable minority of the species abundance, or have moderately negative impacts; and many key plant and animal indicators are absent.

Some management is needed to maintain or restore[[2]](#footnote-3) these key ecological attributes. |
| D | Occurrence has severely altered characteristics (but still meets minimum criteria for the type), with respect to key ecological attributes. Characteristics include: * **landscape context** contains little natural habitat and is very fragmented, with many stressors;
* **size** is very small or well below the minimum dynamic area;
* **condition**, including vegetation structure and composition, soils, and hydrology are severely altered well beyond their natural range of variation; invasives or exotics (non-natives) exert a strong negative impact; and most, if not all, key plant and animal indicators are absent.

There may be little long‑term conservation value without restoration; which may be difficult or uncertain.[[3]](#footnote-4) |

## EXAMPLE: General Ecology EORANKSPECS:

## Metrics approach

## There are 14 core metrics and three optional metrics. Six metrics have variants based on particular wetland types (NVC Formation or HGM Class). Further information on the metrics and the application of variants is provided in Table 3 (next page).

|  |  |  |
| --- | --- | --- |
| **PRIMARY****RANK FACTOR** | **MAJOR ECOLOGICAL FACTOR** | **METRIC** |
| **NAME** |  | **VAR-IANTS** | **NVC or HGM** |
| LANDSCAPE CONTEXT | LANDSCAPE  | **LAN1**. Contiguous Natural Land Cover  |  |  |  |
| **LAN2**. Land Use Index |  |  |  |
| BUFFER | **BUF1**. Perimeter with Natural Buffer |  |  |  |
|  | **BUF2.** Width of Natural Buffer |  |  |  |
|  | **BUF3**. Condition of Natural Buffer |  |  |  |
| CONDITION | VEGETATION1 | **VEG1**. Native Plant Species Cover |  | Y | - |
|  |  | **VEG2**. Invasive Nonnative Plant Species Cover |  |  |  |
|  |  | **VEG3.** Native Plant Species Composition |  |  |  |
|  |  | **VEG4.** Overall Vegetation Structure |  | Y | NVC |
|  |  | **VEG5.** Woody Regeneration [opt.] |  | Y |  |
|  |  | **VEG6**. Coarse Woody Debris [opt.] |  | Y | NVC |
|  | HYDROLOGY1 | **HYD1.** Water Source |  | Y | HGM |
|  |  | **HYD2**. Hydroperiod |  | Y | HGM |
|  |  | **HYD3**. Hydrologic Connectivity |  | Y | HGM |
|  | SOIL  | **SOI1.** Soil Condition |  | Y | NVC |
| SIZE 2 | SIZE 2 | **SIZ1.** Comparative Size (Patch Type)2 |  |  |  |
|  |  | **SIZ2.** Change in Size [opt.] 2  |  | Y | - |

## Table 2. The standard set of wetland metrics based on the conceptual model of ecological integrity (Faber-Langendoen et al. 2016). Upland metrics are expected to largely follow the same structure.

EXAMPLE: Customized Ecology EOSPEC & EORANKSPECS

**Table 3. Customized EORANKSPECS using a narrative approach. Southern Rocky Mountain Mountain-mahogany - Mixed Foothill Shrubland (G276) /**

**Rocky Mountain Gambel Oak-Mixed Montane Shrubland (CES306.818)**

**TYPE DESCRIPTION**

Lower montane- foothills shrubland is a large patch system that is found in over 5% of the Southern Rocky Mountains ecoregion and well represented from the most northern latitudes to the most southern area of the ecoregion. This system is found between 5,000-9,000 feet in elevation and usually associated with rocky substrates. This system may have scattered trees but is a shrub dominated system with a variety of shrubs including *Cercocarpus montanus, Purshia tridentata, Rhus trilobata,* or *Ribes cereum.* The lower montane-foothills shrublands may occur as a mosaic of two or three plant associations often surrounded by grasslands or woodlands. Fires play an important role in this system as the dominant shrubs usually have a severe die back, although some plants will stump sprout (http://www.fs.fed.us/database/feis).

**EOSPECS**

**MINIMUM SIZE**: 1000 acres.

**SEPARATION DISTANCES:**

1) substantial barriers to natural processes or species movement, including cultural vegetation greater than 0.5 km (0.25 mile) wide, major highways, or urban development

2) different ecological system greater than 1 km (0.5 mile) wide.

Justification: Large patch, lower montane- foothills shrubland system is susceptible to

fragmentation by cultural vegetation or tree invasion. Primary criteria to be considered is

the invasion of trees, non- native forbs, seed dispersal by dominant species and the

dispersal behavior and requirements of shrubland fauna.

**EORANKSPECS**

**See Metrics Table on next page**

**RANK PROCEDURE:** 1) condition, 2) size, 3) landscape context. Weighting is equal

amongst these ranking factors.

**AUTHORSHIP**: Renée Rondeau, (modified for CMT training)

**Date:** July 2, 2000 (modified May 2018)

**Table 4. Metrics-based example Southern Rocky Mountain Mountain-mahogany - Mixed Foothill Shrubland (G276) /**

**Rocky Mountain Gambel Oak-Mixed Montane Shrubland (CES306.818).**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  |  | **METRIC RATING** |  |  |
| **RANK FACTOR** | **MAJOR ATTRIBUTE** | **METRIC** | **A** | **B** | **C** | **D** |
| **LANDSCAPE CONTEXT** | **Landscape** | **LAN1. Contiguous Natural Cover**  | Surrounded by at least 90% natural or semi-natural vegetation. | 60-90% natural or semi-natural vegetation.  | 20-60% natural or semi- natural vegetation.  | < 20% natural or semi- natural vegetation. |
|  |  | **LAN2. Land Use Index**  | Very little to no urban development or agriculture, or industrial forestry: LUI = 9.5-10.0 | Minor urban or agricultural development. LUI = 8.0-9.4 | Mosaic of agriculturalor semi-developed and natural lands.LUI = 4.0- 7.9 | Agriculturalor semi-developed lands dominant. LUI = < 4.0 |
| **CONDITION** | **Vegetation** | **VEG2. Invasive Nonnative Plant Species Cover** | Non-native species absent or very low. (< 1% absolute cover) | Native species dominant, non-native species present but in small amounts. (1-4%) | Herbaceous cover is co-dominated by native and non-native species. (5 – 30%) | Non-native species are dominant. >30%) |
|  |  | **VEG3. Native Plant Species Composition** | Native increasers e.g., *Yucca, Artemisia frigida,* and *Opuntia* spp*.,* < 10% relative cover. Species richness often high, native grasses, sedges (decreasers) dominant.  | Native increasers 10-60% | Native increasers > 60% |
|  |  | **VEG4. Vegetation Structure** | If trees present, widely scattered and mature. If trees present, these are widely scattered and mature. < 2% absolute cover | Trees species are present, but still controllable. <10% or > 10%; easy removal | Tree species >10%, and difficult to remove. Type conversion. |
|  | **Soils** | **SOI1. Soil Condition**  | No evidence of anthropogenic soil disturbance. | Minor evidence of anthropogenic soil disturbance. | Vehicle use or livestock present and moderately extensive. | Vehicle use or livestock grazing very extensive. |
|  | **Disturbance Regimes** | **FIRE, GRAZING** |  |  |  |  |
| **SIZE** | **Size** | **SIZ1. Comparative Size (Patch Type)** | Very large (> 5000 acres) | Large (1000 to 5000 acres) | Moderate (200 - 1000 ac) | Small (<200 ac) |

1Metrics for Vegetation and Hydrology are best applied when wetlands are classified at more specific levels (e.g., assessing alterations to vegetation composition is improved using NatureServe System or NVC Macrogroup or Group types, rather than at the higher NVC Formation level, even when variants based on Formation or HGM are provided.

2This factor and its metrics are not always used for EIA work, particularly when wetland AAs are based on points rather than polygons. Nonetheless, we recommend that crews routinely estimate the size of the wetland they are working in and provide a scoring for this metric.

1. Suggested citation: Tomaino, A., J. Cordeiro, L. Oliver, and J. Nichols. 2008. Key for ranking species element occurrences using the generic approach. NatureServe, Arlington, Virginia. [↑](#footnote-ref-2)
2. 5By ecological restoration, we mean “the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed… Restoration attempts to return an ecosystem to its historical trajectory” (SER 2004). . [↑](#footnote-ref-3)
3. D-ranked sites present challenges. For example, with respect to classification, a degraded type may bear little resemblance to examples in better condition. Whether a degraded type has “crossed the line” (“transformed” in the words of SER 2004) into a new ruderal or cultural type is a matter of classification criteria. Here we include D ranked examples as still identifiable to the type based on sufficient diagnostic criteria present. [↑](#footnote-ref-4)