

APPENDIX C: NATURESERVE CONSERVATION STATUS ASSESSMENT CRITERIA.

This methodology has been adapted for Idaho from a process developed and proposed by scientists at NatureServe (the international affiliate for natural heritage programs), as documented in:

Master, L. L., L. E. Morse, A. S. Weakley, G. A. Hammerson, and D. Faber–Langendoen. 2003. NatureServe Conservation Status Assessment Criteria. NatureServe, Arlington, Virginia, U.S.A.

NatureServe and its member programs and collaborators use the following criteria in assessing conservation status of species of plants, animals, and fungi, as well as ecological communities and systems. These criteria may be used in assessing NatureServe conservation status at global (rangelwide), national, or subnational (state/province) levels, as well for other clearly bounded geographical areas (e.g., a national park). When used globally, the criteria address conservation status throughout its native range; when used at a national or subnational level, the criteria address conservation status for its native range in the area of interest (nation, state, province, park, etc.).

Each criterion, except Other Considerations, has at least two data fields: one or more fields for a short code (with an associated word or short phrase), and a text comment field. Codes are all expressed as either single capital letters (e.g., A, B) or as letter combinations indicating the estimated range of uncertainty (e.g., AB, BCD, or BD).

Number of Local Populations. For the purposes of this document, a local population is defined as an area of land and/or water in which a species is, or was, present. A population should have practical conservation value for the species as evidenced by historical or potential continued presence and/or regular recurrence at a given location.

When appropriate, the local population, may be a portion of a population (e.g., long–distance dispersers) or a group of nearby populations (e.g., metapopulation). For many taxa, occurrences are similar to "subpopulations" as defined by IUCN (2001).

"Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less)." Note that IUCN also uses the concept of "location," referring to "a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may include part of one or many subpopulations."

Enter the code for the estimated, inferred, or suspected number of occurrences believed extant for the species in Idaho.

Select from the following values:

Z = 0 (zero)
A = 1–5
B = 6–20
C = 21–80
D = 81–300
E = >300
U = Unknown
Null = Criterion not assessed

Number of local populations with good viability or ecological integrity. Enter the code that describes the estimated number of local populations believed extant in Idaho that have excellent or good viability (i.e., at least a 95% probability of persistence for 20 yr or 5 generations, whichever is longer—up to 100 yr) in Idaho. Use comment field to provide specifics and additional information, such as the number of occurrences with fair or moderate viability.

When population viability assessments are available for individual local populations, population assessments of "A" or "B" indicate good (to excellent) viability. These assessments provide estimated viability, or probability of persistence (based on condition, size, and landscape context) of occurrences of a given species. In other words, these assessments provide the likelihood that if current conditions prevail, an occurrence will persist for a defined period of time, typically 20–100 yr. See NatureServe's "Element Occurrence Data Standard" (The Nature Conservancy and Association for Biodiversity Information 1999) for additional explanation of occurrence viability or ecological integrity assessment.

Select from the following values:

A = No occurrences with good (assessed as "A" or "B") viability
B = Very few (1–3) occurrences with good viability
C = Few (4–12) occurrences with good viability
D = Some (13–40) occurrences with good viability
E = Many (41–125) occurrences with good viability
F = Very many (>125) occurrences with good viability
U = Unknown what number of occurrences with good viability
Null = Criterion not assessed

Population size. Enter the code for the estimated current naturally occurring wild total population of the species within Idaho. Count or estimate the number of individuals of reproductive age or stage (at an appropriate time of the year), including mature but currently non-reproducing individuals.

As guidance, consider the following points (from IUCN 2001) when estimating population numbers:

- *Mature individuals that will never produce new recruits should not be counted (e.g., densities are too low for fertilization) [But see note below regarding long-persisting nonreproductive clones.]*
- *In the case of populations with biased adult or breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals, which takes this into account (e.g., the estimated effective population size).*
- *Where the population size fluctuates, use a lower estimate. In most cases this will be much less than the mean.*
- *Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone.*
- *In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.*
- *Re-introduced individuals must have produced viable offspring before they are counted as mature individuals.*

Also consider:

- For species that produce more than one generation per year, use the size of the smallest annual reproducing generation in estimations.
- For intermittently obvious organisms, consider population size to be the number of mature individuals in a typical "good" year, but not a "poor" year or an extraordinarily productive year. Although data will rarely be available, population size for such species should be conceptually considered the median of the population over a 10-yr or 3-generation (whichever is longer) timespan.
- For clone-forming organisms that persist or spread locally, but rarely if ever reproduce, consider the population size to be the number of distinct, self-maintaining clonal patches (approximating the number of genets), rather than the number of physiologically separate individuals (ramets).

Select from the following values:

- Z = Zero, no individuals known extant
- A = 1–50 individuals
- B = 50–250 individuals
- C = 250–1,000 individuals
- D = 1,000–2,500 individuals
- E = 2,500–10,000 individuals
- F = 10,000–100,000 individuals
- G = 100,000–1,000,000 individuals
- H = >1,000,000 individuals
- U = Unknown
- Null = Criterion not assessed

Range extent and area of occupancy.

Range extent is described by IUCN (2001) for taxa:

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary that can be drawn to encompass all the known, inferred, or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distribution of a taxon (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy').

Area of occupancy is described by IUCN (2001) for taxa as:

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition), which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. colonial nesting sites, feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data.

Figure 1 illustrates the differences between range extent and area of occupancy.

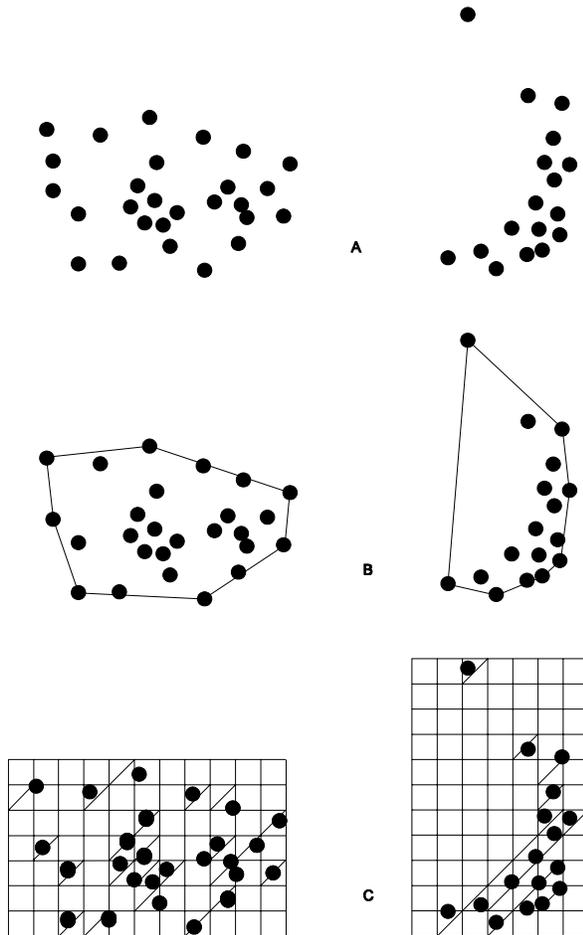


Figure 1. *Two examples of the distinction between range extent and area of occupancy. (A) is the spatial distribution of known, inferred, or projected sites of present occurrence. (B) shows one possible boundary to the range extent, which is the measured area within this boundary using a minimum convex polygon. [Note that Burgman and Fox (2001) strongly recommend the use of α -hulls rather than minimum convex polygons to estimate range extent as otherwise significant overestimates (e.g., right side of example B) may result.] (C) shows one measure of area of occupancy, which can be achieved by the sum of the occupied grid squares. The most recent advice from IUCN Red List Standards and Petition Committee is to tally all of the occupied 2 x 2 km grid cells, unless there are large areas of unsuitable habitat. For riverine species, the area of occupancy can be estimated by using the length multiplied by the average width, again excluding areas of unsuitable habitat and discontinuities.*

(From IUCN 2001)

Range Extent. Enter the code that best describes the estimated current range of the species in Idaho. See above definitions of range extent (extent of occurrence) as contrasted with area of occupancy.

Select from the following values:

- Z = Zero (no occurrences believed extant)
- A = <100 km² (less than about 40 square miles)
- B = 100–250 km² (about 40–100 square miles)
- C = 250–1,000 km² (about 100–400 square miles)
- D = 1,000–5,000 km² (about 400–2,000 square miles)
- E = 5,000–20,000 km² (about 2,000–8,000 square miles)
- F = 20,000–200,000 km² (about 8,000–80,000 square miles)
- G = 200,000–2,500,000 km² (about 80,000–1,000,000 square miles)
- H = > 2,500,000 km² (greater than 1,000,000 square miles)
- U = Unknown
- Null = Criterion not assessed

Area of occupancy. Enter the code for the estimated current area of occupancy of the species in Idaho. See above for differences between area of occupancy and range extent.

For species in linear habitats (e.g., riverine shoreline, or cliff-edge species), enter the code for the total length of all currently occupied habitat segments. The area can be estimated by multiplying the length by the average width.

For migratory species, enter the code (area or length) that reflects the current area of occupancy (or length of occupied area) at the time of the year when occupancy is most restricted.

Select from the following values:

Area:

- Z = Zero (no occurrences believed extant)
- A = $<0.4 \text{ km}^2$ (less than about 100 acres)
- B = $0.4\text{--}4 \text{ km}^2$ (about 100–1,000 acres)
- C = $4\text{--}20 \text{ km}^2$ (about 1,000–5,000 acres)
- D = $20\text{--}100 \text{ km}^2$ (about 5,000–25,000 acres)
- E = $100\text{--}500 \text{ km}^2$ (about 25,000–125,000 acres)
- F = $500\text{--}2,000 \text{ km}^2$ (about 125,000–500,000 acres)
- G = $2,000\text{--}20,000 \text{ km}^2$ (500,000–5,000,000 acres)
- H = $>20,000 \text{ km}^2$ (greater than 5,000,000 acres)
- U = Unknown

Length:

- Z = Zero (no occurrences believed extant)
- A = $<4 \text{ km}$ (less than about 2.5 miles)
- B = $4\text{--}40 \text{ km}$ (about 2.5–25 miles)
- C = $40\text{--}200 \text{ km}$ (about 25–125 miles)
- D = $200\text{--}1,000 \text{ km}$ (about 125–620 miles)
- E = $1,000\text{--}5,000 \text{ km}$ (about 620–3,000 miles)
- F = $5,000\text{--}20,000 \text{ km}$ (about 3,000–12,500 miles)
- G = $20,000\text{--}200,000 \text{ km}$ (about 12,500–125,000 miles)
- H = $>200,000 \text{ km}$ (greater than 125,000 miles)
- U = Unknown
- Null = Criterion not assessed

Long-term trend. Enter the code that best describes the observed, estimated, inferred, or suspected degree of change in population size, extent of occurrence, area of occupancy, and/or number or condition of occurrences over the long term (ca. 200 yr) in Idaho. Specify in the comments field the time period for the change noted, as well as a longer-term view (e.g., back to European exploration) if information is available. If there are data on more than one aspect, specify which aspect is most influential.

Select from the following values:

A = Very large decline (decline of >90%, with <10% of population size, range extent, area occupied, and/or number or condition of occurrences remaining)

B = Large decline (decline of 75–90%)

C = Substantial decline (decline of 50–75%)

D = Moderate decline (decline of 25–50%)

E = Relatively stable ($\pm 25\%$ change)

F = Increase (increase of >25%)

U = Unknown. Long-term trend in population, range extent, area occupied, or number or condition of occurrences unknown

Null = Criterion not assessed

Short-term trend. Enter the code that best describes the observed, estimated, inferred, suspected, or projected short-term trend in population size, extent of occurrence, area of occupancy, number of occurrences, and/or condition of occurrences, whichever most significantly affects the conservation status assessment in Idaho. Consider short-term historical trend within 10 yr or 3 generations (for long-lived taxa), whichever is the longer (up to a maximum of 100 yr).

The trend may be recent, current, or projected (based on recent past), and the trend may or may not be known to be continuing. Trends may be smooth, irregular, or sporadic. Fluctuations will not normally count as trends, but an observed change should not be considered as merely a fluctuation rather than a trend unless there is evidence for this.

In considering trends, do not consider newly discovered but presumably long existing occurrences, nor newly discovered individuals in previously little-known occurrences. Also, do not consider increases in the number of occurrences due to fragmentation of previously larger occurrences into more but smaller occurrences, but instead consider fragmentation of occurrences as indicative of decreasing an area of occupancy.

Specify what is known about various pertinent trends in the comments field, including trend information for particular criteria, more precise information, regional trends, etc. Also comment, if known, on whether the causes of decline, if any, are understood, reversible, and/or ceased. If the trend is known not to be continuing, specify that in the comments.

Select from the following values:

- A = Severely declining (decline of >70% in population, range, area occupied, and/or number or condition of occurrences)
- B = Very rapidly declining (decline of 50–70%)
- C = Rapidly declining (decline of 30–50%)
- D = Declining (decline of 10–30%)
- E = Stable (unchanged or remaining within $\pm 10\%$ fluctuation)
- F = Increasing (increase of >10% in population)
- U = Unknown (short-term trend unknown)
- Null = Criterion not assessed

Threats (severity, scope, and immediacy). Indicate the degree to which the species is observed, inferred, or suspected to be directly or indirectly threatened in Idaho. Use this field to evaluate the impact of extrinsic threats, which typically are anthropogenic but may be natural. The impact of human activity may be direct (e.g., destruction of habitat) or indirect (e.g., invasive species introduction). Effects of natural phenomena (e.g., fire, hurricane, flooding) may be especially important when the species is concentrated in one location or has few occurrences, which may be a result of human activity. Characteristics of the species or that make it inherently susceptible to threats should be considered under the criterion Intrinsic Vulnerability.

Threats considerations apply to the present and the future. Effects of past threats (whether or not continuing) should be addressed instead under the short-term trend and/or long-term trend criteria. For species known only historically in Idaho, but with significant likelihood of rediscovery in identifiable areas, current or foreseeable threats in those areas may be addressed here where appropriate if they would affect any extant (but unrecorded) occurrences of the species.

Threats may be observed, inferred, or projected to occur in the near term. They should be characterized in terms of severity (how badly and irreversibly the species population is affected), scope (what proportion of it is affected), and degree of imminence (how likely the threat is and how soon is it expected). "Magnitude" is sometimes used to refer to scope and severity collectively.

- Consider threats collectively, and for the foreseeable threat with the greatest impact (severity, scope, and immediacy combined as in Table 1), rate the severity, scope, and immediacy each as High, Moderate, Low, Insignificant, or Unknown, as briefly defined below. Identify in the comments field the threat to which severity, scope, and immediacy pertains, and discuss additional threats identified, or interactions among threats, including any high-magnitude threats considered insignificant in immediacy.

Severity

High: Loss of species population (all individuals) or destruction of species habitat in area affected, with effects essentially irreversible or requiring long-term recovery (>100 yr).

Moderate: Major reduction of species population or long-term degradation or reduction of habitat in area affected, requiring 50–100 yr for recovery.

Low: Low but nontrivial reduction of species population or reversible degradation or reduction of habitat in area affected, with recovery expected in 10–50 yr.

Insignificant: Essentially no reduction of population or degradation of habitat due to threats, or populations or habitats able to recover quickly (within 10 yr) from minor temporary loss. Note that effects of locally sustainable levels of hunting, fishing, logging, collecting, or other harvest from wild populations are generally considered Insignificant as defined here.

Scope

High: >60% of total population, occurrences, or area affected

Moderate: 20–60% of total population, occurrences, or area affected

Low: 5–20% of total population, occurrences, or area affected

Insignificant: <5% of total population or area affected

Immediacy

High: Threat is operational (happening now) or imminent (within a year).

Moderate: Threat is likely to be operational within 2–5 yr.

Low: Threat is likely to be operational within 5–20 yr.

Insignificant: Threat not likely to be operational within 20 yr.

The system will calculate a criterion value of A, B, C, D, E, F, or G, as shown in Table 2 below. If two of the three parameters are known, the criterion value will be calculated by treating the unknown (or not assessed [null]) parameter as "Low." If only one of the parameters is rated (as High, Moderate, or Low), the resulting overall threat assessment will be "U" (unknown). If any of the three parameters are considered "Insignificant," the resulting threat assessment will be "H" (unthreatened)."

Threat values, calculated from scope, severity, and immediacy, or unknown, may be considered as follows:

A = Substantial, imminent threat. Threat is moderate to severe and imminent for most (>60%) of the population, occurrences, or area.

B = Moderate and imminent threat. Threat is moderate to severe and imminent for a significant proportion (20–60%) of the population, occurrences, or area.

C = Substantial, non-imminent threat. Threat is moderate to severe but not imminent (>10 yr) for most of the population, occurrences, or area.

D = Moderate, non-imminent threat. Threat is moderate to severe but not imminent for a significant portion of the population, occurrences, or area.

E = Localized substantial threat. Threat is moderate to severe for a small but significant proportion of the population, occurrences, or area.

- F = Widespread, low–severity threat. Threat is of low severity but affects (or would affect) most or a significant portion of the population, occurrences, or area.
- G = Slightly threatened. Threats, while recognizable, are of low severity, or affecting only a small portion of the population, occurrences, or area.
- H = Unthreatened. Threats, if any, when considered in comparison with natural fluctuation and change, are minimal or localized, not leading to significant loss or degradation of populations, occurrences, or area even over a few decades' time. (Severity, scope, and/or immediacy of threat considered Insignificant.)
- U = Unknown. The available information is not sufficient to assign degree of threat as above. (Severity, scope, and immediacy are all unknown, or mostly [two of three] unknown or not assessed [null].)
- Null = Criterion not assessed, including instances in which the species is extinct (or extirpated from the area of interest).

Table 1. Calculation of overall threat assessment from values for Severity, Scope, and Immediacy subcriteria.

SEVERITY	SCOPE	IMMEDIACY	VALUE	DESCRIPTION
High High Moderate Moderate	High High High High	High Moderate High Moderate	= A	Moderate to severe, imminent threat for most (>60%) of population, occurrences, or area
High High Moderate Moderate	Moderate Moderate Moderate Moderate	High Moderate High Moderate	= B	Moderate to severe, imminent threat for a significant proportion (20–60%) of population, occurrences, or area
High Moderate	High High	Low Low	= C	Moderate to severe, non-imminent threat for most of population, occurrences, or area
High Moderate	Moderate Moderate	Low Low	= D	Moderate to severe, non-imminent threat for a significant proportion of population, occurrences, or area

High	Low	High	= E	Moderate to severe threat for small proportion of population, occurrences, or area
High	Low	Moderate		
High	Low	Low		
Moderate	Low	High		
Moderate	Low	Moderate		
Moderate	Low	Low		
Low	High	High	= F	Low severity threat for most or significant proportion of population, occurrences, or area
Low	High	Moderate		
Low	High	Low		
Low	Moderate	High		
Low	Moderate	Moderate		
Low	Moderate	Low		
Low	Low	High	= G	Low severity threat for a small proportion of population, occurrences, or area
Low	Low	Moderate		
Low	Low	Low		

Number of protected and managed occurrences. Enter the code that best describes the observed, estimated, inferred, or suspected number of occurrences that are appropriately protected and managed for the long-term persistence of the species in Idaho. Both criteria (protection and management) must be met to assign a given code. Assign the code that represents the most restrictive criteria. For example, if several occurrences are protected but none are appropriately managed, enter A.

Select from the following values:

- A = None. No occurrences appropriately protected and managed
- B = Few (1–3) occurrences appropriately protected and managed
- C = Several (4–12) occurrences appropriately protected and managed
- D = Many (13–40) occurrences appropriately protected and managed
- E = Very many (>40) occurrences appropriately protected and managed
- U = Unknown whether any occurrences are appropriately protected and managed
- Null = Criterion not assessed

Intrinsic vulnerability. Enter the appropriate letter code for the observed, inferred, or suspected degree to which intrinsic or inherent characteristics of the species (such as life history or behavioral characteristics of species) make it vulnerable or resilient to natural or anthropogenic stresses or catastrophes. Examples of such characteristics include reproductive rates and requirements, time to maturity, dormancy requirements, and dispersal patterns.

Since geographically or ecologically disjunct or peripheral occurrences may show additional vulnerabilities not generally characteristic of the species, these characteristics are to be assessed for the species throughout the area of interest, or at least for its better occurrences. Do not consider here such topics as population size, number of occurrences, area of occupancy, extent of occurrence, or environmental specificity; these are addressed as other status assessment criteria.

Note that the intrinsic vulnerability characteristics exist independent of human influence, but may make the species more susceptible to disturbance by human activities. The extent and effects of current or projected extrinsic influences themselves should be addressed in the Threats comments field.

Describe the reasons for your selection in the Intrinsic Vulnerability Comments field.

Select from the following values:

- A = Highly Vulnerable. Species is slow to mature, reproduces infrequently, and/or has low fecundity such that populations are slow (> 20 yr or 5 generations) to recover from decreases in abundance; or species has low dispersal capability such that extirpated populations are unlikely to become reestablished through natural recolonization (unaided by humans).

- B = Moderately Vulnerable. Species exhibits moderate age of maturity, frequency of reproduction, and/or fecundity such that populations generally tend to recover from decreases in abundance over a period of several years (on the order of 5–20 yr or 2–5 generations); or species has moderate dispersal capability such that extirpated populations generally become reestablished through natural recolonization (unaided by humans).
- C = Not Intrinsically Vulnerable. Species matures quickly, reproduces frequently, and/or has high fecundity such that populations recover quickly (<5 yr or 2 generations) from decreases in abundance; or species has high dispersal capability such that extirpated populations soon become reestablished through natural recolonization (unaided by humans).
- U = Unknown
- Null = Criterion not assessed

Environmental specificity. Enter the appropriate letter code for the observed, inferred, or suspected vulnerability or resilience of the species due to habitat preferences or restrictions or other environmental specificity or generality. Describe the reasons for your selection in the Environmental Specificity field. (For example, indicate in the comments field why environmental specificity affects vulnerability, but use the Habitat (species) field to record the specific habitat requirements.) This criterion is most important when the number of occurrences and the range extent or area of occupancy are largely unknown.

Select from the following values:

- A = Very Narrow. Specialist with key requirements scarce. Specific habitat(s), substrate(s), food type(s), hosts, breeding/nonbreeding microhabitats, or other abiotic and/or biotic factor(s) are used or required by the species in the area of interest, with these habitat(s) and/or other requirements furthermore being scarce within the generalized range of the species within the area of interest, and, the population (or the number of breeding attempts) expected to decline significantly if any of these key requirements become unavailable.
- B = Narrow. Specialist with key requirements common. Specific habitat(s) or other abiotic and/or biotic factors (see above) are used or required by the species, but these key requirements are common and within the generalized range of the species within the area of interest.
- C = Moderate. Generalist with some key requirements scarce. Broad-scale or diverse (general) habitat(s) or other abiotic and/or biotic factors are used or required by the species, but some key requirements are scarce in the generalized range of the species within the area of interest.
- D = Broad. Generalist with all key requirements common. Broad-scale or diverse (general) habitat(s) or abiotic and/or biotic factors are used or required by the species, with all key requirements common in the generalized range of the species in the area of interest. For example, if the preferred food(s) or breeding/nonbreeding microhabitat(s) become unavailable, the species switches to

an alternative with no resulting decline in numbers of individuals or number of breeding attempts.

U = Unknown

Null = Criterion not assessed

Other considerations. Provide and comment on any other information that should be considered in the assignment of conservation status, especially when the status resulting from the overall assessment is different from the status that the values for the formal status criteria, taken alone, would suggest. This (text only) field may also be used for other general notes pertinent to multiple criteria.

The following are some examples of Other Considerations:

- Preliminary status assessment does not necessarily reflect current status, since the assignment of status was done by inspection from review of published distribution and habitat information, or museum collection information.
- A population viability analysis may indicate that the species has x percent probability of surviving for y yr (or an equivalent number of generations) in the same area of interest (globe, nation, or subnation).
- NatureServe global conservation status is based on particular national or subnational status(es), or national status is based on particular subnational status(es).