

## The Natural Heritage Ranking System

Each of the plant and animal species and plant communities tracked by CNHP is considered an **element of natural diversity**, or simply an **element**. Each element is assigned a rank that indicates its relative degree of imperilment on a five-point scale (e.g., 1 = extremely rare/imperiled, 5 = abundant/secure). The primary criterion for ranking elements is the number of occurrences, i.e., the number of known distinct localities or populations. This factor is weighted more heavily because an element found in one place is more imperiled than something found in twenty-one places. Also considered in the ranking is the size of the geographic range, the number of individuals, trends in population and distribution, identifiable threats, and the number of already protected occurrences.

Element imperilment ranks are assigned both in terms of the element's degree of imperilment within Colorado (its State or S-rank) and the element's imperilment over its entire range (its Global or G-rank). Taken together, these two ranks indicate the degree of imperilment of an element. For example, the lynx, which is thought to be secure in Northern North America but is known from less than 5 current locations in Colorado, is ranked G5S1. *Naturita* milkvetch, which is known from 37 locations in the Four Corners Area, is ranked a G3S3, vulnerable both globally and in Colorado. Further, a tiger beetle that is only known from one location in the world at the Great Sand Dunes National Monument is ranked G1S1, critically imperiled both globally and in Colorado. CNHP actively collects, maps, and electronically processes specific occurrence information for elements considered extremely imperiled to vulnerable (S1 - S3). Those with a ranking of S3S4 are "watchlisted," meaning that specific occurrence data are collected and periodically analyzed to determine whether more active tracking is warranted. A complete description of each of the Natural Heritage ranks is provided in Table 1.

This single rank system works readily for all species except those that are migratory. Those animals that migrate may spend only a portion of their life cycles within the state. In these cases, it is necessary to distinguish between breeding, non-breeding, and resident species. As noted in Table 1, ranks followed by a "B", e.g., S1B, indicate that the rank applies only to the status of breeding occurrences. Similarly, ranks followed by an "N", e.g., S4N, refer to nonbreeding status, typically during migration and winter. Elements without this notation are believed to be year-round residents within the state.

## Legal Designations

**Natural Heritage imperilment ranks are not legal designations and should not be interpreted as such.** Although most species protected under state or federal endangered species laws are extremely rare, not all rare species receive legal protection. Legal status is designated by either the U.S. Fish and Wildlife Service under the Endangered Species Act or by the Colorado Division of Wildlife under Colorado Statutes 33-2-105 Article 2. State designations apply to animals only; Colorado has no legal list of threatened and endangered plant species (Buckner and Bunin 1992).

In addition, the U.S. Forest Service recognizes some species as "Sensitive," as does the Bureau of Land Management. Table 2 defines the special status assigned by these agencies and provides a key to the abbreviations used by CNHP.

Please note that the U.S. Fish and Wildlife Service has issued a Notice of Review in the February 28, 1996 Federal Register for plants and animal species that are "candidates" for listing as endangered or threatened under the Endangered Species Act. The revised candidate list replaces an old system that listed many more species under three categories: Category 1 (C1), Category 2 (C2), and Category 3 (including 3A, 3B, 3C). Beginning with the February 28, 1996 notice, the Service will recognize as candidates for listing most species that would have been included in the former Category 1. This includes those species for which the Service has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act.

Candidate species listed in the February 28, 1996 Federal Register are indicated with a "C". While obsolete legal status codes (Category 2 and 3) are no longer used, CNHP will continue to maintain them in its Biological and Conservation Data system for reference.

**Table 1. Definition of Colorado Natural Heritage Imperilment Ranks.**

Global imperilment ranks are based on the range-wide status of a species. State imperilment ranks are based on the status of a species in an individual state. State and Global ranks are denoted, respectively, with an "S" or a "G" followed by a character. **These ranks should not be interpreted as legal designations.**

<b>G/S1</b>	Critically imperiled globally/state because of rarity (5 or fewer occurrences in the world/state; or very few remaining individuals), or because some factor of its biology makes it especially vulnerable to extinction.
<b>G/S2</b>	Imperiled globally/state because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extinction throughout its range.
<b>G/S3</b>	Vulnerable throughout its range or found locally in a restricted range (21 to 100 occurrences).
<b>G/S4</b>	Apparently secure globally/state, though it might be quite rare in parts of its range, especially at the periphery.
<b>G/S5</b>	Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
<b>GX</b>	Presumed extinct.
<b>G#?</b>	Indicates uncertainty about an assigned global rank.
<b>G/SU</b>	Unable to assign rank due to lack of available information.
<b>GQ</b>	Indicates uncertainty about taxonomic status.
<b>G/SH</b>	Historically known, but not verified for an extended period.
<b>G#T#</b>	Trinomial rank (T) is used for subspecies or varieties. These species or subspecies are ranked on the same criteria as G1-G5.
<b>S#B</b>	Refers to the breeding season imperilment of elements that are not permanent residents.
<b>S#N</b>	Refers to the non-breeding season imperilment of elements that are not permanent residents. Where no consistent location can be discerned for migrants or non-breeding populations, a rank of SZN is used
<b>SZ</b>	Migrant whose occurrences are too irregular, transitory, and/or dispersed to be reliably identified, mapped, and protected.
<b>SA</b>	Accidental in the state.
<b>SR</b>	Reported to occur in the state, but unverified.
<b>S?</b>	Unranked. Some evidence that species may be imperiled, but awaiting formal rarity ranking.

Notes: Where two numbers appear in a state or global rank (e.g., S2S3), the actual rank of the element falls between the two numbers.

### **Element Occurrence Ranking**

Actual locations of elements, whether they be single organisms, populations, or plant communities, are referred to as element occurrences. The element occurrence is considered the most fundamental unit of conservation interest and is at the heart of the Natural Heritage Methodology. In order to prioritize element occurrences for a given species, an element occurrence rank (EO-Rank) is assigned according to the estimated viability or probability of persistence (whenever sufficient information is available). This ranking system is designed to indicate which occurrences are the healthiest and ecologically the most viable, thus focusing conservation efforts where they will be most successful. The EO-Rank is based on 3 factors:

**Size** – a quantitative measure of the area and/or abundance of an occurrence such as area of occupancy, population abundance, population density, or population fluctuation.

**Condition** – an integrated measure of the quality of biotic and abiotic factors, structures, and processes within the occurrence, and the degree to which they affect the continued existence of the occurrence. Components may include reproduction and health, development/maturity for communities, ecological processes, species composition and structure, and abiotic physical or chemical factors.

**Table 2. Federal and State Agency Special Designations.**

<b>Federal Status:</b>	
1.	U.S. Fish and Wildlife Service (58 Federal Register 51147, 1993) and (61 Federal Register 7598, 1996)
<b>LE</b>	Endangered; species or subspecies formally listed as endangered.
<b>E(S/A)</b>	Endangered due to similarity of appearance with listed species.
<b>LT</b>	Threatened; species or subspecies formally listed as threatened.
<b>P</b>	Potential Endangered or Threatened; species or subspecies formally listed as potentially endangered or threatened.
<b>PD</b>	Potential for delisting
<b>C</b>	Candidate: species or subspecies for which the U.S. Fish and Wildlife Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened.
2.	U.S. Forest Service (Forest Service Manual 2670.5) (noted by the Forest Service as "S")
<b>FS</b>	Sensitive: those plant and animal species identified by the Regional Forester for which population viability is a concern as evidenced by: a. Significant current or predicted downward trends in population numbers or density. b. Significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution.
3.	Bureau of Land Management (BLM Manual 6840.06D) (noted by BLM as "S")
<b>BLM</b>	Sensitive: those species found on public lands, designated by a State Director that could easily become endangered or extinct in a state. The protection provided for sensitive species is the same as that provided for C (candidate) species. This list does not include species that are listed endangered (LE) or threatened (LT).
<b>State Status:</b>	
1.	Colorado Division of Wildlife
	<b>CO-E</b> Endangered
	<b>CO-T</b> Threatened
	<b>CO-SC</b> Special Concern

**Landscape Context** – an integrated measure of the quality of biotic and abiotic factors, and processes surrounding the occurrence, and the degree to which they affect the continued existence of the occurrence. Components may include landscape structure and extent, genetic connectivity, and condition of the surrounding landscape.

Each of these factors is rated on a scale of A through D, with A representing an excellent grade and D representing a poor grade. These grades are then averaged to determine an appropriate EO-Rank for the occurrence. If there is insufficient information available to rank an element occurrence, an EO-Rank is not assigned. Possible EO-Ranks and their appropriate definitions are as follows:

- A** Excellent estimated viability.
- B** Good estimated viability.
- C** Fair estimated viability.
- D** Poor estimated viability.
- E** Viability has not been assessed.
- H** Historically known, but not verified for an extended period of time
- X** Extirpated

## Potential Conservation Areas

In order to successfully protect populations or occurrences, it is necessary to delineate conservation areas. These conservation areas focus on capturing the ecological processes that are necessary to support the continued existence of a particular element occurrence of biological diversity significance. Conservation areas may include a single occurrence of a rare element or a suite of rare element occurrences or significant features. Not all element occurrences are included in Potential Conservation Areas (PCAs). Sites are ordinarily drawn for A to C ranked G1 to G3 and S1 or S2 elements only. Other lower ranked element occurrences may fall geographically within the site boundaries, and are thus included, but would not warrant a PCA on their own. In addition, sites may be drawn for lower ranked species that are of local conservation interest, e.g. the Colorado River cutthroat trout or Black Swift.

The goal of the process is to identify a land area that can provide the habitat and ecological processes upon which a particular element occurrence or suite of element occurrences depends for its continued existence. The best available knowledge of each species' life history is used in conjunction with information about topographic, geomorphic, and hydrologic features, vegetative cover, as well as current and potential land uses.

In developing Potential Conservation Area boundaries, CNHP staff consider a number of factors that include, but are not limited to:

- the extent of current and potential habitat for the elements present, considering the ecological processes necessary to maintain or improve existing conditions;
- species movement and migration corridors;
- maintenance of surface water quality within the site and the surrounding watershed;
- maintenance of the hydrologic integrity of the groundwater, e.g., by protecting recharge zones;
- land intended to buffer the site against future changes in the use of surrounding lands;
- exclusion or control of invasive exotic species;
- land necessary for management or monitoring activities.

**The proposed boundary does not necessarily recommend the exclusion of all activity.** It is hypothesized that some activities will prove degrading to the element or the process on which the element depends, while others will not. Specific activities or land use changes proposed within or adjacent to the preliminary conservation planning boundary should be carefully considered and evaluated for their consequences to the element on which the conservation unit is based and other significant elements that fall within the site.

The boundaries presented here are for planning purposes. They delineate ecologically sensitive areas where land-use practices should be carefully planned and managed to ensure that they are compatible with protection goals for natural heritage resources and sensitive species. Please note that these boundaries are based primarily on our understanding of the ecological

systems. A thorough analysis of the human context and potential stresses was not conducted. All land within the conservation planning boundary should be considered an integral part of a complex economic, social, and ecological landscape that requires thoughtful land-use planning at all levels.

### **Off-Site Considerations**

It is often the case that all relevant ecological processes cannot be contained within a Potential Conservation Area of reasonable size. For instance, while a PCA for Colorado River cutthroat trout may be drawn to include only the riparian zone of a river or creek, it should be remembered that activities in the entire watershed can affect water quality, which will in turn affect the trout population. The boundaries illustrated in this report signify the immediate, and therefore most important, area in need of protection. Continued landscape level conservation efforts are needed. This will involve countywide efforts as well as coordination and cooperation with private landowners, neighboring land planners, and state and federal agencies.

## **Ranking of Potential Conservation Areas**

### **Biological diversity Rank**

One of the strongest ways that the CNHP uses element and element occurrence ranks is to assess the overall biological diversity significance of a site, which may include one or many element occurrences. If an element occurrence is unranked due to a lack of information, the element occurrence rank is considered a C rank. Similarly, if an element is a GU or G? it is treated as a G4. Based on these ranks, each site is assigned a **biological diversity rank (B rank)**:

- B1** Outstanding Significance: the only site known for an element or an excellent occurrence of a G1 species.
- B2** Very High Significance: one of the best examples of a community type, good occurrence of a G1 species, or excellent occurrence of a G2 or G3 species.
- B3** High Significance: excellent example of any community type, good occurrence of a G3 species, or a large concentration of good occurrences of state rare species.
- B4** Moderate or Regional Significance: good example of a community type, excellent or good occurrence of state-rare species.
- B5** General or Statewide Biological diversity Significance: good or marginal occurrence of a community type, S1, or S2 species.

## **Protection Urgency Ranks**

Protection urgency ranks (P-ranks) refer to the time frame in which conservation protection should occur in order to prevent the loss of the element. In most cases, this rank refers to the need for a major change of protective status (e.g., agency special area designations or ownership). The urgency for protection rating reflects the need to take legal, political, or other administrative measures to alleviate potential threats that are related to land ownership or designation. The following codes are used to indicate the urgency to protect the area:

- P1** May be immediately threatened by severely destructive forces, within 1 year of rank date; protect now or never!
- P2** Threat expected within 5 years.
- P3** Definable threat but not in the next 5 years.
- P4** No threat known for foreseeable future.
- P5** Land protection complete or adequate reasons exist not to protect the site; do not act on this site.

A protection action involves increasing the current level of legal protection accorded one or more tracts of a potential conservation area. Protection strategies on private lands may involve outright purchase, purchase of development rights, or creation of conservation easements. On public lands, they may include special designations such as Wilderness, Research Natural Areas, or Areas of Critical Environmental Concern (ACEC). They may also include activities such as educational or public relations campaigns or collaborative planning efforts with public or private entities to minimize adverse impacts to element occurrences at a site. Protection in this sense does not include management actions. Threats that may require a protection action are as follows:

- 1) Anthropogenic forces that threaten the existence of one or more element occurrences at a site; e.g., development that would destroy, degrade or seriously compromise the long-term viability of an element occurrence and timber, range, recreational, or hydrologic management that is incompatible with an element occurrence's existence;
- 2) The inability to undertake a management action in the absence of a protection action; e.g., obtaining a management agreement;
- 3) In extraordinary circumstances, a prospective change in ownership that will make future protection actions more difficult.

## **Management Urgency Ranks**

Management urgency ranks (M-ranks) indicate the time frame in which a change in management of the element or site must occur in order to ensure the element's future existence. Using best scientific estimates, this rank refers to the need for management in contrast to protection (e.g., increased fire frequency, decreased grazing, weed control, etc.). The urgency for management rating focuses on land use management or land stewardship action required to maintain element occurrences at the potential conservation area.

A management action may include biological management (prescribed burning, removal of exotics, mowing, etc.) or people and site management (building barriers, rerouting trails, patrolling for collectors, hunters, or trespassers, etc.). It may also include conducting further research or monitoring. Management action does not include legal, political, or administrative

measures taken to protect a potential conservation area. The following codes are used to indicate the action needed at the area:

- M1** Management action may be required immediately or element occurrences could be lost or irretrievably degraded within one year.
- M2** New management action may be needed within 5 years to prevent the loss of element occurrences.
- M3** New management action may be needed within 5 years to maintain current quality of element occurrences.
- M4** Although the element is not currently threatened, management may be needed in the future to maintain the current quality of element occurrences.
- M5** No serious management needs known or anticipated at the site.