

# Survey of State Criteria Used to Determine the Status of Plant Taxa

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## Abstract

*This paper is an organized summary discussion of the basic considerations (criteria) used by state-level organizations in determining the status of native taxa on an individual basis (such as endangered, threatened, extinct, or other lesser rankings). First, I discuss general criteria used when classifying plant species and then I highlight seven categories used for ranking plant status in the United States.*

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## Introduction

Consideration standards (criteria) used by individual states to rank their respective native taxa (species, subspecies or variety) can vary slightly from state to state. In this paper, I categorize and describe various listing options with associated criteria. General criteria used when assigning a plant taxon status for placement on one or more of the state-level lists include:

1) taxon must be native (indigenous) to that particular location (such as a state or range), even if no longer present in that location but historically known to be native there; verification of its past occurrence (such as through historical data) can be required;

2) research on the taxon needs to have been published in the scientific literature (e.g. Maine (Maine Critical Areas Program 1988));

3) total number of known viable populations and number of individuals within those populations occurring locally and globally, with both historical and current verification of distribution;

4) degree to which the continued existence of remaining populations have been scientifically deemed as currently or potentially threatened with endangerment or extinction from an identifiable cause; this crite-

tion includes the degree to which suitable habitat has been reduced to date, present size of remaining habitat, current and projected rate of habitat reduction, and other ecological and biological considerations including response of the taxon to disturbance;

5) number of its known populations (globally) believed to be securely protected in their remaining habitat;

6) geographic location of the state or habitat in regard to the taxon's entire main range and distribution, and if its occurrence in that state or habitat is locally endemic, regionally endemic, peripheral, or disjunct from its main range;

7) how phylogenetically close the plant is to its nearest relative(s), with the most distantly-related taxa assigned the highest priority while other undescribed, questionable, or hybrid species are generally given a lower priority; non-hybridizing taxa are given greater priority than taxa that hybridize.

The most widely used standardized ranking system in the United States is the one used by the state Heritage programs. These programs are part of a centralized information repository collectively known as The Network of Natural Heritage Programs and Conservation Data Cen-

ters, or simply The Natural Heritage Network. This network uses standard predetermined method for gathering, processing, and managing data about the occurrences of natural biological diversity, and a standard, predetermined criteria for determining and tracking or monitoring the various degrees of rarity of native species. Although this criteria and ranking system affords no legal protection, it is taken under consideration by land developers, government agencies, etc., especially when the status of a taxon on the list is deemed endangered or threatened throughout its entire range. In addition to the Natural Heritage Program's rankings, the various states may have one or more separate lists of taxa of concern that range from official (legally protected) to unofficial (no legal status) and are also taken under consideration in decisions.

Not all states maintain endangered species lists, however. West Virginia, for example, does not have an endangered species law. Instead they rely on the Federal Endangered Species Act and the Natural Heritage database to determine a species status (Defenders of Wildlife 2000). In addition, South Carolina has an official list of endangered and threatened species that includes animals only, no plants (South Carolina Heritage Trust 2000).

## General categories of state-level status-ranking criteria in the U.S.

Because there can be slight variation among states' status-ranking criteria used for assigning a certain status to a particular taxon, I have subdivided the following discussion of state-level criteria into seven categories: (1) endangered (including protected); (2) threatened; (3) rare; (4) proposals for status; (5) special concern, vulnerable, sensitive, uncommon, state special interest, watch list, review list, tentatively undetermined, special concern-possibly extirpated; (6) possibly extirpated, extirpated, extinct, historical occurrence; and (7) other.

### *Endangered*

In this discussion, "endangered" (E) refers to any state-native vascular plant taxon that, based on scientific research and field work, is believed to be or is in danger of becoming extinct or extirpated from all or a large part of the state in the immediate or foreseeable future if not given some type of protection or critical habitat designation (Arkansas Natural Heritage Commission 1987; Freeman et al 1979). This category includes native species and subspecies that are reproductively viable but are in immediate danger of extinction, threatened with extirpation from an identifiable cause(s), or their ability to sustain viable populations in the wild is being affected by one or more factors (Freeman et al. 1979; Idaho Natural Areas Council 1981).

Past and present criteria for designating a native taxon as state endangered can include the following: (1) its known occurrences in that state range from one to five extant sites, one to two known or estimated total occurrences, or one documented and recent occurrence; (2) it is federally listed as endangered, (3) the plant is a state-native species currently listed or proposed by the U.S. Fish and

Wildlife Service as federally endangered or threatened; or (4) it has between an average of six to 20 occurrences within the state. (Some states, however, consider a taxon with six to 20 occurrences as threatened.) Verified and documented recent occurrences (within the past 20 years or less) or historical occurrence of taxon in the specific state may be required for an endangered designation. In many states, plants that are federally listed as endangered are automatically listed as endangered on the state level.

In general, legally endangered taxa cannot be removed from private property without written permission of the landowner or a special permit from a state agent (Nevada Natural Heritage Program 2000). In states that allow propagation of endangered plants, these plants can be collected, sold, traded, and/or imported by permit. In Wisconsin, any endangered or threatened plants occurring on private property belong to the landowner and the ultimate fate of those plants is up to that landowner. However, the processing or selling of any listed species is prohibited without a valid endangered or threatened species permit (Wisconsin Department of Natural Resources 2000a), and the protection and management of these rare taxa is definitely encouraged (Wisconsin Department of Natural Resources 2000b). There is an exemption in such restrictions on public lands used for activities such as forestry, agriculture and utility (Wisconsin Department of Natural Resources 2000a). In Arizona, all protected native plants are prohibited from collection except under valid permit from the commission of agriculture and horticulture. Permits can be issued for scientific or educational purposes or if the plant is threatened by its location or a change in land usage (Arizona Commission of Agriculture and Horticulture 1981). (Issuance of

this permit means that permission for collection or removal of the protected plant[s] has been granted by the landowner or their agent). Minnesota's "Conservation of Certain Wild Flowers" statute says that "any persons may upon their own lands cultivate for sale and sell these flowers by registering the purpose to do the same with the commissioner" (Minnesota Department of Agriculture 1986a). Additionally, in Minnesota the accidental taking or killing of an endangered plant in cases where the existence of the plant isn't known at the time of the taking is not a violation of the prohibition-related part of their endangered and threatened species laws (Minnesota Department of Agriculture 1986b).

Other terms include "protected," which is used in one or more states to denote native taxa with current legal status or protection apparently comparable to legally endangered or threatened (Arizona Commission of Agriculture and Horticulture 1981). Protected also designates common taxa that could be exploited if not assigned protected status, or taxa deemed to be of cultural or historical value to the area or state in which they occur (Texas Parks and Wildlife Department 1983).

In one or more states the term "critically endangered" indicates that (1) a plant's occurrence is limited to anywhere from one to five extant sites, (2) population numbers are naturally low or have declined to critical levels, (3) its habitat has been drastically reduced or is threatened with destruction or severe modification, or (4) the taxa have been overexploited, or threatened by disease or other factors.

### *Threatened*

"Threatened" (T) refers to any state-native vascular plant taxon believed to be imperiled in its natural habitat due to various factors including rar-

ity or limited/uncommon occurrence (past and present interpretations of this criterion can range from two to 100 occurrences or sites). Threatened species include those (1) with restricted distribution (disjunct, peripheral, etc.) in the state but are locally abundant, (2) with a wide in-state distribution but comprise small populations, or (3) that exist within limited habitat that could be exploited within the foreseeable future. Threatened species include taxa that are (1) reproductively viable but shown by biological research and inventory to be rare or significantly declining within their partial or entire range, and (2) threatened in that state but whose populations are more common or stable elsewhere. In Rhode Island, a species can be listed as threatened if there are three to five known or estimated occurrences, or if the species has more than five known or estimated occurrences there but is especially vulnerable to loss of its habitat (Rhode Island Natural Heritage Program 1988).

As with endangered species, correctly documented and known recent in-state occurrences may also be a requirement for listing in this category. Some states, however, will include estimated occurrences(s) as a criterion for inclusion here.

Species with threatened status are generally considered not to be critically imperiled, but their status could change to endangered throughout all or a large part of their state range in the foreseeable future (Freeman et al. 1979; Arkansas Natural Heritage Commission 1987; Idaho Natural Areas Council 1981) if the continuing trend of threat(s) to their population and survival continues.

Potentially threatened status can include individual species that are not considered to be endangered or threatened in that state, but are either a proposed for federal E or T status, or are listed in the Federal Register

as being under review for such status (Ohio Department of Natural Resources 1988). Other types of potentially threatened species are those believed to be threatened, but more research and field work may be required to determine if this is so.

Taxa assigned state threatened status generally cannot be removed from private property without written permission of the landowner, and there can be rules by which threatened plants that are propagated can be sold or traded by permit.

### *Rare*

Depending on the state, most rare designations are unofficial and offer no legal protection. Across the states, definitions of rare vary somewhat and it isn't as easy to categorize as endangered or threatened. Past and present interpretation of rare can mean that known occurrence(s) for a particular state-native vascular plant taxon is (1) approximately ten or fewer sites; (2) limited to between 11 and 20 occurrences; (3) recorded 15 times or fewer in the state or recorded up to 20 times with known cases of extirpation; or (4) may rarely or uncommonly occur in small numbers or populations in-state but are found in substantial numbers elsewhere. This may mean that either its range is restricted and has never been far-reaching into that particular state, its requirements for survival in the wild are unique or unusual native habitat, and/or for other reasons has never occurred in substantial numbers there. In Idaho, for example, occurrence of less than ten locations greater than ten air miles apart is used as a general starting point for designating a species as rare (Idaho Natural Areas Council 1981). In Oklahoma, rare taxa are those whose numbers are small and not presently threatened with extinction but whose status could change to endangered if their environment continues to degrade (Smola and Teate 1975).

The ranking SR (significantly rare) can indicate rarity and necessity of population monitoring and conservation action (North Carolina Natural Heritage Program 2000). The terms "critically rare" and "very rare" can indicate taxa known or believed to be in danger or extirpation from the state for reasons such as extreme rarity or the habitat is seriously threatened.

Rare can imply that relative stability or viability of a taxon is not presently threatened, but concern is warranted due to threats that may not be readily apparent. In other words, as long as its status remains rare, it could be subject to a decline in numbers as long as it isn't monitored in its habitat on a continual basis.

### *Proposals for status*

Proposals for status (PFS) indicates a taxon currently without statutory protection but is under consideration for legal state and/or federal listing. These taxa may be variously referred to as proposed endangered, proposed threatened, primary proposed, or recommended for critically endangered with formal listing pending (Arkansas Natural Heritage Program 1987; O'Kane 1986; Killeffer unpublished manuscript; Morefield and Knight 1989; New York Natural Heritage Program 2000; South Carolina Wildlife and Marine Resources Department 1989; Tennessee Department of Environment and Conservation 2000; Virginia Natural Heritage Program 2000).

Such a candidate designation can indicate rarity and necessity of population monitoring and conservation action. Also included here are candidate taxa that may or may not yet be under consideration for state or federal listing, including taxa for which an organization (such as U.S. Fish and Wildlife Service) has sufficient information on biological vulnerability and threat(s) to support list-

ing proposals. Because candidate taxa may be given some kind of endangered or threatened status in the future, their consideration in environmental planning is encouraged.

*Special concern, etc.*

As with rare, most of special concern designations are generally unofficial (providing no legal protection). A special concern-type of classification can refer to vascular state-native taxa of concern that include: (1) relict species with declining populations that would be recommended E or T status if the decline continues; (2) species whose abundance is greater than previously believed or assumed; (3) species whose in-state numbers are small or whose distribution is either restricted or very specialized and could become threatened; (4) species whose in-state occurrence is sparse or distinctive and peripheral to its main range; (5) species whose rangewide viability is of known or suspected concern; and (6) rare species whose status should be monitored. Special concern also includes taxa that cannot be included within any of the aforementioned status subcategories but are subsequently given other additional types of status rankings (such as that of the Natural Heritage Network) to indicate where current monitoring may be required. In Maine, five to 10 recent and documented occurrences is a criterion for state special concern, and such taxa could potentially become threatened in the foreseeable future (Maine Critical Areas Program 1988).

Special concern status can be assigned to rare species that require monitoring to help self-sustaining populations avoid deterioration to threatened or endangered status, without application of voluntary or legal protection (Freeman et al. 1979).

Rare and special concern criteria are apparently comparable in situations where a taxon's distribution is restricted in that state for reasons including requirement of unique or unusual native

habitat for survival, or that it has never been common or abundant in that state or its entire range.

Special concern population status can comprise colonies, groups, or individual taxonomic specimens whose occurrence there has been determined to be unique and in need of protection, with criteria including degree of diversity within a certain population (including unisexuality) and if the habitat occurs in an unusual geographic location (Pennsylvania Natural Diversity Inventory 1987).

Undetermined-special concern status designates taxa that are: (1) rare and currently in need of monitoring because of their apparent potential for upgrading to endangered or threatened if alteration and destruction of their habitat is not curtailed; or (2) potentially rare taxa whose status is currently undetermined but when more information becomes available may show one or more of them to be in need of endangered or threatened status, or may show them to be so abundant or stable that they are deleted or dropped from consideration for listing. This status also includes taxa whose correct taxonomic classification is questionable and cannot be determined currently due to various physical characteristics or other factors which sets them apart from being an accurate or typical representative of any known and recognized species group as a whole. This taxonomic question coupled with other factors (such as insufficient data or inadequate historical records) means that the proper conservation of these taxa can be difficult, even when their populations are believed to be declining in numbers.

At this level of classification, there are several terms that are essentially synonymous: vulnerable (Pennsylvania (Pennsylvania Natural Diversity Inventory 1987), sensitive (Washington (Washington Natural

Heritage Program 1990)), state special interest (Rhode Island) (Rhode Island Natural Heritage Program 1988), and watch list (Oregon and Utah (Kagan et al. 1989; Stone 2000)).

Inclusion on a watch list can indicate a currently stable taxon and not in need of immediate monitoring or management but in the foreseeable future may become threatened in that state and therefore may require some type of continued monitoring (Kagan et al. 1989). A taxon on watch list can be regionally endemic but not of special concern rangewide (Stone 2000). Watch lists include species of concern whose occurrences in state are more than 10, and subspecies that qualify for listing in another category but belong to a species whose documented recent occurrences are more than 10 (Maine Critical Areas Program 1988). In addition, watch status can denote potentially vulnerable taxa requiring monitoring or additional information to determine status (Morefield and Knight 1989), or taxa whose abundance and distribution in state is uncertain and whose threats to the populations may or may not be currently defined (Morefield and Knight 1989).

Commercial or market value of a native taxon can be a factor in listing it on a state watch list. Though it may not be rare at the present time, its current 'value' may place its future viability in jeopardy, therefore monitoring of its population(s) can be justified.

*Extirpated, etc.*

Extirpated and extinct categories are assigned by states to their native taxa historically documented as occurring there but no longer occur in-state. In most cases their original sites of historical occurrence have been greatly altered or destroyed. This section includes (but is not limited to) taxa that have no known recent occurrences and the possibility of rediscovery is considered unlikely. Extirpated or extinct taxa include those for which recent field

surveys or searches have been unsuccessful in locating any populations (Sorrie 1987), but if found would automatically be upgraded to endangered (Rhode Island Natural Heritage Program 1988).

A taxon is believed extirpated when an occurrence has been found within the past twenty years but repeated efforts to relocate the occurrence have failed (Maine Critical Areas Program 1988). In Indiana, extirpated can mean the taxon has not been seen in state in over the last half century and the site(s) of historical occurrence have been field surveyed. However, there may be one or more endangered taxa assigned that are not known to be extant in the state but are listed as such because their historic sites haven't yet been adequately surveyed (Aldrich et al. 1986).

Like special concern, there are multiple terms and definitions for extinct or extirpated. In Washington, possibly extinct or extirpated taxa have a high priority for field survey, and the classification doesn't consider the status of that taxon's populations in other states (Washington Natural Heritage Program 1990). Presumed extirpated taxa in Ohio are those whose natural populations haven't been documented (no valid records) over the last 20 years (Ohio Division of Natural Areas 2000). Possibly extirpated taxa can also be those that haven't been seen in the state in the past two decades, or they have been documented as extirpated from all historically known sites there (Tennessee Department of Conservation 1986). Under favorable conditions, possibly extirpated taxa that still occur in other places could become re-established in-state (Wilson 1984). In Maryland, a taxon with endangered extirpated status would be upgraded to endangered if a self-sustaining naturally occurring population were to be found (Maryland Department of Natural Resources 1988).

Historical classifications include taxa presumed extinct or at least known only historically throughout their range, and taxa of historical occurrence that haven't been recently documented but for which suitable habitat still exists. If found, such taxa would be given an upgraded status ranking (Sorrie 1987). In North Carolina, historical taxa haven't been verified possibly the past 25 years but suspected to be still extant there (North Carolina Natural Heritage Program 2000). In South Dakota, "historical record only" can mean that a species hasn't been reported there for more than 50 years but habitat may still exist and rediscovery is possible (Houtcooper et al. 1985).

#### *Other*

Other descriptions or definitions used by the various states on their respective plant lists include:

**Disjunct:** a taxon whose occurrence or distribution in the state is separate or discontinuous from the contiguous population of its main distribution or range (Houtcooper et al. 1985).

**Endemic:** a taxon with limited or restricted range or distribution within unique or specialized habitat (Pennsylvania Natural Diversity Inventory 1987)); a species whose occurrence there represents all or a significant part of its range in the state or in the northern Great Plains region (Houtcooper et al. 1985).

**Peripheral:** a taxon with uncommon occurrence in state because its distribution there is at or near the borders of its entire natural range (Houtcooper et al. 1985); generally, peripheral can refer to taxa that are rare or uncommon in the state but are more common and widespread outside of state boundaries.

**Restricted:** a subclassification of plant species, which is composed of species found in specialized habitats or in habitats that are scarce within the state but may be common outside of that state (Pennsylvania Natural Diversity Inventory 1987).

## **Public participation**

When relaying sighting information about an identified or suspected plant taxon of concern to the proper local agencies, persons should be advised to not uproot the plant or remove any of its parts as this can damage and possibly kill it (especially so with small or delicate specimens). Although plant parts such as leaves, flowers, twigs and bark will aid in identification, generally the taking of any parts of a legally protected plant species is prohibited without permit. In addition, one should try to avoid trampling the site and disturbing the habitat (and again, especially if the plants are small or delicate). When contacting the agency, the following information will be requested:

- 1) common and scientific names of the taxon and the name of the Family to which it belongs;
- 2) specific location of the original sighting (county, township, range, section, longitude, latitude, etc.), date and time of observation, and a detailed map (e.g., topographic) of the site's location with directions to the site;
- 3) detailed description of the habitat in which it was seen (microclimate, etc.), the dominant vegetation and any other observed rare taxa ;
- 4) current land usage and activities, and other related observational data;
- 5) total or approximate number of specimens of that taxon seen at the location, their general overall condition and life stage (flowering, fruiting, etc.), and approximate ages;
- 6) where and when the plant sighting or collection last occurred and by whom, probable present range, and estimated present status (i.e., possibly extirpated, endangered, etc....or status unknown); and
- 7) property ownership information (name of owner[s] or their agent, contact information, etc.) and the name(s) [and contact information] of the person(s) who originally made the sighting or collection.

Documentation of any report with specimens (if they can be legally and ethically removed) or photographs (South Dakota Game Fish and Parks Department 2000) is extremely important. In California, "photography should be used to document plant identification whenever possible, but especially when the population cannot withstand collection or voucher specimens" (California Department of Fish and Game 2000). A photographic record is generally the least complicated route to documentation, because permits are required for collecting in locations such as parks, protected areas, and private lands.

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