

**Effects of SDEIS Alternatives on  
Selected Plants of Conservation Concern for the  
Interior Columbia Basin Ecosystem Management Project  
March 2000**  
*revised April 26, 2000*

**Lisa Croft  
and  
Wayne Owen**

**TABLE OF CONTENTS**

Executive Summary ..... Page P 3

Introduction ..... Page P 3

Methods ..... Page P 3

    Estimating Effects on Plants of Conservation Concern ..... Page P 3

        Species Selected for Analysis ..... Page P 3

        Qualitative Methods Used to Judge Effects ..... Page P 4

Results And Interpretation ..... Page P 5

    Effects on Plants of Conservation Concern ..... Page P 5

        Qualitative Judgments and Assumptions ..... Page P 5

        Additional Points of Consideration for Plants of Concern ..... Page P 6

Literature Cited ..... Page P 7

Table P-1. Plant species of concern which are considered broadly distributed because they occur in at least two administrative units. .... Page P 9

Table P-2. Qualitative assessment of plant species persistence in the Interior Columbia River Basin based on the effectiveness of the objectives, standards, and guidelines in the SDEIS. All determinations have been made relative to the current known distribution and are a projection to 100 years for species of conservation concern. .... Page P 13

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/or T1-T3) and location by state.. .... Page P 15

## EXECUTIVE SUMMARY

Analysis of the supplemental draft environmental impact statement (SDEIS) alternatives in relation to seven major groups of plants of conservation concern indicated the following:

- Vascular plant species in all major plant groups were judged to have a reduced likelihood of persistence under S1 relative to current conditions; this judgment was based on the absence of conservation strategies and lack of associated step-down procedures for most plants of conservation concern under S1.
- Vascular plant species in all major plant groups were judged to remain stable in their likelihood of persistence under S2 and S3 relative to current conditions; this judgment was based on the commitment of conservation strategies and supporting step-down procedures for these plant groups under S2 and S3.

## INTRODUCTION

This report provides estimated effects of the three alternatives of the supplemental draft environmental impact statement (SDEIS) on selected plant species of conservation concern for the Interior Columbia Basin Ecosystem Management Project (ICBEMP). We used earlier scientific assessments of vascular and nonvascular plants within the Columbia Basin along with expert advice to help with this evaluation. Specific previous assessments used heavily were Croft and others (1997) and Marcot and others (1997). In a separate report, Croft (1999) provides results of an evaluation of plants of tribal concern. An evaluation of the alternatives on soil biological crusts will be completed for the Final EIS, as one was not completed for the SDEIS.

## METHODS

### Estimating Effects on Plants of Conservation Concern

**Species Selected for Analysis**— Overall within the Interior Columbia Basin Ecosystem Management assessment area, approximately 900 plant taxa are either Globally (G1-3, T1-3) and /or State (S1-3) ranked by the Natural Heritage Program. G-Ranked species are those identified as imperiled or rare based on range-wide status; T-ranked species ranks are based on range-wide status of the subspecies; S-ranked species are ranked based on the State status (see appendix P-1 for further description of the ranking criteria). Of highest conservation concern in the Basin are those of G and/or T ranks of 1, 2, or 3. Three hundred thirty-three (333) total plant species fit in this category, 88 of which are nonvascular and 245 vascular plants (appendix P-1). Many are on the Regional Forester's sensitive species lists or are Bureau of Land Management (BLM) special status species.

We placed vascular and nonvascular taxa into major groups, based on our ability to analyze these plants according to their habitat affinities, their distribution, and how well their associated environmental

requirements could be mapped at the pixel size of 100 hectares (1-km<sup>2</sup>). If their habitat can be mapped at the one square km pixel size, they occur at the broad scale and are considered to occur in matrix habitat. If their habitat cannot be mapped at that scale, they occur in fine scale or patch habitat (10 hectare or less). In addition, a management criterion of broadly distributed (occurring on more than one administrative unit) was applied. Species were also grouped based on geographic distribution into groups of: local or regional endemic, or scattered, peripheral or disjunct endemics.

For this qualitative analysis of the effects of the alternatives, a broad scale distribution is defined as occurring on more than one administrative unit and is not a biological definition. A complete analysis of habitat preference (matrix versus fine scale), number of administrative units, and the geographic distribution for the taxa of range-wide conservation concern (333 taxa) has not been completed. Once this is complete, this preliminary list will be the list of taxa appropriate to assess at the ICBEMP project level. An initial list of some broadly distributed taxa that can be either matrix or fine scale and that meet the criterion of occurring in at least two or more administrative units is presented in the SDEIS Appendix for Objective B-047 and table P-1. From this current list of plant taxa of range-wide conservation concern, at least 113 occur on two or more administrative units (table P-1).

Soil biological crusts can also be considered to have a wide distribution and appropriate to analyze at the Basin scale, but are not analyzed in this report. Effects analysis for crusts was not conducted here but will be conducted for evaluation of the Final EIS.

**Qualitative Methods Used to Judge Effects**— The assessment of effects of SDEIS alternatives on plants of conservation concern was based on qualitative judgments; all judgments were made relative to the current known distribution and condition of the taxa of range wide conservation concern within the ICBEMP from current conditions to 100 years, based on the effectiveness of the objectives, standards, and guides in the SDEIS. This effects analysis was not based on habitat persistence.

Judgments of effects on the seven major plant groups were made by placing effects into two categories: decreasing likelihood of persistence relative to current period, and stable likelihood of persistence relative to current period. A determination of trend was based on generalized, current conditions, a taxon's geographic distribution, and projected conservation activities under existing management plans or the action alternatives.

Doing a habitat analysis for all individual species of range-wide conservation concern was not possible at this time. The analysis focused on their geographic distribution across the landscape. Some generalizations had to be made as some of these taxa are intrinsically rare and possibly may not persist in spite of active conservation and management. The highest likelihood of risk of extirpation due to natural stochastic events is for taxa with a limited or local distribution, though many of these taxa are rare due to past management activities. For many of these taxa, a significant portion, if not all, of their range is on federal lands, although some taxa have no occurrences on federal land. The assumption is made that the projection of trends of persistence is based on the capability of federal lands to manage their portion of the range where these taxa occur.

## RESULTS AND INTERPRETATION

### Effects on Plants of Conservation Concern

**Qualitative Judgments and Assumptions**— Analysis of SDEIS alternatives in relation to seven major groups of plants of conservation concern (Table P-2) indicated the following:

- Vascular plant species in all seven major plant groups were judged to have a reduced likelihood of persistence under S1 relative to current conditions; this judgment was based on the absence of conservation strategies and associated step-down procedures for most plants of conservation concern under S1.
- Vascular plant species in all seven major plant groups were judged to remain stable in their likelihood of persistence under S2 and S3 relative to current conditions; this judgment was based on the commitment of conservation strategies and associated step-down procedures for these plant groups under S2 and S3.
- Nonvascular plant species were judged to have a reduced likelihood of persistence under alternative S1 relative to current conditions; this judgment was based on the absence of conservation strategies and associated step-down procedures for most plants of conservation concern under alternative S1.
- Nonvascular plant species were judged to remain stable in their likelihood of persistence under alternatives S2 and S3 relative to current conditions; this judgment was based on the commitment of conservation strategies and associated step-down procedures for these plant groups under alternatives S2 and S3.

Key ecological and implementation assumptions on which these judgments were based include:

- The most favorable current state for a taxon would be to have its current distribution meet or exceed the taxon's historical range and be of sufficient quality to support the type and degree of within-population and metapopulation interactions that the taxon would characteristically engage in if it were not habitat-limited. When conditions are below this state, taxa are at some risk, varying from a low degree of risk to a high degree of risk for taxa that are very rare and isolated. Because we do not have current information on the distribution of each taxon, we were not able to estimate the current state.
- It is assumed that existing conservation strategies and agreements that have been adopted will continue to be implemented under all alternatives.
- It is assumed that existing agency policies, laws and regulations, and Forest and Resource Management Plans will be adequate for managing taxa that have a local or fine scale distribution,

exist on only one administrative unit, and are designated as agency sensitive or have special status.

- Projections of persistence trend are based on the direction in the SDEIS and the known effectiveness of implementation of conservation strategies. The lack of details regarding step-down processes and implementation procedures leaves some risk to taxa even though they may be rated as stable into the future.
- Existing policies and regulations under NFMA and FLPMA or in Land and Resource Management Plans provide sufficient direction for the conservation and protection of taxa that occur on only one administrative unit.
- Information on the distribution and status of rare plants within the ICBEMP is very dynamic. At the completion of each field season, it is assumed that this new information is incorporated and considered in new decisions. Following this process will help to minimize the risks to rare plants. Given the nature of the data, a list of species of concern can be a moving target, quickly outdated and in need of revision. The conservation of rare plants is better addressed through processes and criteria rather than through species-specific direction. Objectives, standards and guides, in combination with appropriate step-down processes, can be used to insure long term viability of plants of conservation concern.
- Conservation strategies are the most efficient method of long term conservation and management for rare plants as they meet the NFMA and ESA requirements for managing across the range of a species. Those taxa occurring in several administrative units are at the greatest risk of extirpation from all or part of their range if not managed consistently range wide through the development of conservation strategies. Providing direction to develop them is a positive step forward. Insuring viability will depend on implementation and monitoring strategies as well as a step-down process that addresses risks to these species. The long term viability of these taxa will be dependent upon the completeness of this forthcoming direction. It is assumed that existing conservation strategies and agreements that have been adopted will continue to be implemented under all alternatives.

**Additional Points of Consideration for Plants of Concern**— The following points would be helpful to consider during development and implementation of conservation strategies in the context of the above results and assumptions.

- For broadly distributed vascular plants, the taxonomic group with the most number of occurrences per different administrative units are the moonwort, or *Botrychium* species, with 80 occurrences on administrative units for nine species. As a group, these cryptic species are difficult to survey and identify. They are also very sensitive to ground disturbing activities and are one of the few old-forest associates. CT/SS changes for western redcedar-western hemlock (old forest single strata) project a downward trend for all alternatives at 100 years. Hence, these species are ideal candidates for the development of a conservation strategy/habitat management plan.
- Plant taxa that have a local geographic distribution or are fine scale taxa and have a State Natural

Heritage Program ranking of G1-G3 for vascular and S1-S3 for nonvascular plants are best addressed through step down processes as stated in the SDEIS standard B-S51. The long term viability of these taxa will be dependent upon the completeness of explicit direction that is included as part of a step down process that provides direction to meet their habitat and environmental requirements. Though a list will be included in the Appendix of the EIS, it is important to remember the dynamic nature of rare plant data.

- In general, for all plants--both broad and fine scale--potentially higher risk factors exist for plants that:
  - Do not occur in a "T" or "A" identified watershed
  - Occur where fire incidence will increase--either through timing or intensity of prescribed or natural fires
  - Do not occur in a CT/SS that has been identified as imperiled
  - Occur in areas identified as a high priority for ground disturbing restoration activities such as selective harvest or range and riparian restoration projects
- The SAG analysis was primarily concerned with approximately 333 plant taxa that are of conservation concern across their entire geographic range. These taxa are distributed at both the broad/matrix scale and the fine scale and are those with State Natural Heritage Program rankings of G1-G3 (appendix P-1).
- The plant species of concern which are considered broadly distributed was used to select the species for modeling the effects of the alternatives using Bayesian Belief Networks. Completion of the Bayesian modeling was not possible during this time frame. Preliminarily, we have selected 15 species that would be appropriate to model at the broad-scale, although we have not fully developed the models at this time. These species were not necessarily selected to be a representative subset of habitat types within the ICBEMP, although some species may be used as an index to matrix habitat types.
- To complete the plant BBN modeling and additional modeling, it is first necessary to resolve the problems with the State Natural Heritage data, as the models depend on this spatially explicit data. If this cannot be resolved, additional modeling can be done, but new models must be designed that are not based on the Heritage data or on the landscape vegetation data. The value of the modeling may be diminished without the use of spatially explicit data. Such models can still provide useful information on the effectiveness of the objectives, standards, and guides and the uncertainty of the effectiveness of step down processes.

## LITERATURE CITED

Croft, L. K., Owen, W. R., Shelly, J. S. 1997. Interior Columbia Basin Ecosystem Management Project analysis of vascular plants. Unpublished report. On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management; Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

Croft, L. K. 1999. Evaluation of SDEIS alternatives for tribal plants. Draft report. On file with: U.S. Department of Agriculture, Forest Service; U.S. Department of Interior, Bureau of Land Management; Interior Columbia Basin Ecosystem Management Project, 112 E. Poplar, Walla Walla, WA 99362.

Marcot, B. G., Castellano, M. A.; Christy, J. A.; Croft, L. K.; Lehmkuhl, J. F.; Naney, R. H.; Rosentreter, R. E.; Sandquist, R. E.; Zieroth, E.. 1997. Terrestrial ecology assessment. pp. 1497-1713 in: Quigley, T. M.; Arbelbide, S. J. tech. eds. An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. Volume III. General Technical Report PNW-GTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station.

Table P-1. Plant species of concern which are considered broadly distributed because they occur in at least two administrative units.

Taxa	Species	Global Rank <sup>a</sup>	Occurrences on different administrative units
N <sup>b</sup>	<i>Dicranella heteromalla</i>	G?	2
N	<i>Texosporium sancti-jacobi</i>	G2	2
V <sup>c</sup>	<i>Adiantum aleuticum subalpine ecotype</i>	G5?T2Q	3
V	<i>Allium madidum</i>	G3	2
V	<i>Allium tolmiei var persimile</i>	G4T3	3
V	<i>Arabis fecunda</i>	G2	3
V	<i>Arabis sparsiflora var atrorubens</i>	G5T3	2
V	<i>Artemisia ludoviciana ssp estesii</i>	G5T2	2
V	<i>Astragalus amblytropis</i>	G3	2
V	<i>Astragalus amnis-amissi</i>	G3	2
V	<i>Astragalus aquilonius</i>	G3	2
V	<i>Astragalus arrectus</i>	G2G3	2
V	<i>Astragalus diversifolius</i>	G3	2
V	<i>Astragalus jejunus var jejunus</i>	G3G4T3?	2
V	<i>Astragalus paysonii</i>	G3	6
V	<i>Astragalus peckii</i>	G3	3
V	<i>Astragalus tegetarioides</i>	G3	3
V	<i>Astragalus vexilliflexus var nubilus</i>	G4T2	3
V	<i>Bolandra oregana</i>	G3	3
V	<i>Botrychium ascendens</i>	G3	8
V	<i>Botrychium campestre</i>	G3	2
V	<i>Botrychium crenulatum</i>	G3	9
V	<i>Botrychium hesperium</i>	G3	3
V	<i>Botrychium lineare</i>	G1	2
V	<i>Botrychium montanum</i>	G3	13
V	<i>Botrychium paradoxum</i>	G2	10
V	<i>Botrychium pedunculosum</i>	G2?	4
V	<i>Botrychium pumicola</i>	G3	4
V	<i>Calamagrostis tweedyi</i>	G2G3	4
V	<i>Calochortus longebarbatus var longebarbatus</i>	G3T3	4
V	<i>Calochortus longebarbatus var peckii</i>	G3T3	2
V	<i>Calochortus macrocarpus var maculosus</i>	G5T2	4
V	<i>Calochortus nitidus</i>	G3	3

Table P-1. Plant species of concern which are considered broadly distributed because they occur in at least two administrative units, continued.

Taxa	Species	Global Rank <sup>a</sup>	Occurrences on different administrative units
V	<i>Cardamine constancei</i>	G3	4
V	<i>Carex stenoptila</i>	G3?	2
V	<i>Castilleja chlorotica</i>	G3	3
V	<i>Castilleja covilleana</i>	G3G4	2
V	<i>Chaenactis thompsonii</i>	G2G3	2
V	<i>Chrysothamnus parryi ssp montanus</i>	G5T1	2
V	<i>Collomia mazama</i>	G3	3
V	<i>Corydalis caseana ssp hastata</i>	G5T3	5
V	<i>Cymopterus douglassii</i>	G3	2
V	<i>Dasynotus daubenmirei</i>	G3	2
V	<i>Delphinium viridescens</i>	G2	2
V	<i>Douglasia idahoensis</i>	G2	2
V	<i>Draba globosa</i>	G3	5
V	<i>Draba trichocarpa</i>	G1G2	2
V	<i>Erigeron engelmannii var davisii</i>	G5T2	2
V	<i>Erigeron lackschewitzii</i>	G3Q	3
V	<i>Erigeron salmonensis</i>	G3	2
V	<i>Eriogonum capistratum var welshii</i>	G4T2	2
V	<i>Eriogonum meledonum</i>	G1	2
V	<i>Eriogonum prociduum</i>	G3	2
V	<i>Galium serpenticum ssp warnerense</i>	G4G5T2Q	2
V	<i>Grindelia howellii</i>	G3	4
V	<i>Hackelia davisii</i>	G3	4
V	<i>Halimolobos perplexa var perplexa</i>	G4T3	3
V	<i>Haplopappus hirtus var sonchifolius</i>	G4G5T3?	2
V	<i>Haplopappus insecticruris</i>	G3	2
V	<i>Haplopappus radiatus</i>	G3	2
V	<i>Howellia aquatilis</i>	G2	2
V	<i>Iliamna longisepala</i>	G3	2
V	<i>Juncus tweedyi</i>	G3	2
V	<i>Lepidium papilliferum</i>	G2	2
V	<i>Leptodactylon pungens ssp hazeliae</i>	G5T1	4
V	<i>Lesquerella carinata var languida</i>	G3G4T1	2
V	<i>Lesquerella paysonii</i>	G3	5

Table P-1. Plant species of concern which are considered broadly distributed because they occur in at least two administrative units, continued.

Taxa	Species	Global Rank <sup>a</sup>	Occurrences on different administrative units
V	<i>Lomatium geyeri</i>	G3G4	2
V	<i>Lomatium salmoniflorum</i>	G3	2
V	<i>Luina serpentina</i>	G2	2
V	<i>Mimulus patulus</i>	G2Q	3
V	<i>Mirabilis macfarlanei</i>	G2	3
V	<i>Oxytropis besseyi</i> var <i>salmonensis</i>	G5T3	2
V	<i>Oxytropis campestris</i> var <i>columbiana</i>	G5T3	2
V	<i>Penstemon barrettiae</i>	G2	3
V	<i>Penstemon glaucinus</i>	G3	3
V	<i>Penstemon idahoensis</i>	G1	2
V	<i>Penstemon lemhiensis</i>	G3	5
V	<i>Penstemon peckii</i>	G3	2
V	<i>Perideridia erythrorhiza</i>	G1	2
V	<i>Phacelia lyallii</i>	G3	4
V	<i>Phacelia minutissima</i>	G3	4
V	<i>Phlox kelseyi</i> var <i>missoulensis</i>	G2	4
V	<i>Physaria didymocarpa</i> var <i>lyrata</i>	G5T1	2
V	<i>Physaria integrifolia</i> var <i>monticola</i>	G3G4T2Q	2
V	<i>Plagiobothrys salsus</i>	G3G4	2
V	<i>Poa abbreviata</i> ssp <i>marshii</i>	G5T1	3
V	<i>Primula wilcoxiana</i>	G3	2
V	<i>Ribes oxycanthoides</i> ssp <i>irriguum</i>	G5T3T4	2
V	<i>Rorippa columbiae</i>	G3	2
V	<i>Rubus bartonianus</i>	G2	4
V	<i>Saussurea densa</i>	G3G5	2
V	<i>Saxifraga tempestiva</i>	G2	4
V	<i>Scribneria bolanderi</i>	G3G4	2
V	<i>Sidalcea oregana</i> var <i>calva</i>	G5T1	2
V	<i>Silene seelyi</i>	G1G2	2
V	<i>Silene spaldingii</i>	G2	2
V	<i>Sisyrinchium sarmentosum</i>	G2	2
V	<i>Sisyrinchium septentrionale</i>	G3G4	2
V	<i>Sullivantia hapemanii</i> var <i>hapemanii</i>	G3T3	2
V	<i>Synthyris platycarpa</i>	G3	2

Table P-1. Plant species of concern which are considered broadly distributed because they occur in at least two administrative units, continued.

Taxa	Species	Global Rank <sup>a</sup>	Occurrences on different administrative units
V	<i>Talinum sediforme</i>	G2G3	3
V	<i>Tauschia tenuissima</i>	G3	2
V	<i>Thelypodium brachycarpum</i>	G3	2
V	<i>Thelypodium eucosmum</i>	G2	3
V	<i>Thelypodium repandum</i>	G3	2
V	<i>Thlaspi idahoense var aileeniae</i>	G4T3	2
V	<i>Thlaspi parviflorum</i>	G3	5
V	<i>Trifolium douglasii</i>	G3G4	2
V	<i>Trifolium eriocephalum ssp arcuatum</i>	G4T3?	2
V	<i>Trifolium leibergii</i>	G2	2
V	<i>Trifolium thompsonii</i>	G2	2
V	<i>Waldsteinia idahoensis</i>	G3	4

<sup>a</sup>Global ranks are described in Appendix P-1

<sup>b</sup>N-Nonvascular plant

<sup>c</sup>V-Vascular plant

Table P-2. Qualitative assessment of plant species persistence in the Interior Columbia River Basin based on the effectiveness of the objectives, standards, and guidelines in the SDEIS. All determinations have been made relative to the current known distribution and are a projection to 100 years for species of conservation concern.

Species group	Alternative S1	Alternative S2	Alternative S3
Nonvascular Plants: broadly distributed	decrease	decrease	decrease
Nonvascular Plants: local distribution	decrease	stable, with explicit implementation direction per B-S51	stable, with explicit implementation direction per B-S51
Vascular Plants: local endemics	decrease	stable, if conservation strategies completed and implemented per B-S51	stable, if conservation strategies completed and implemented per B-S51
Vascular Plants: regional endemics	decrease	stable, if conservation strategies completed and implemented per B-047	stable, if conservation strategies completed and implemented per B-047
Vascular Plants: scattered, peripheral and disjunct endemics	decrease	stable, if conservation strategies completed and implemented per B-047	stable, if conservation strategies completed and implemented per B-047
Vascular Plants: broadly distributed	decrease	stable, if conservation strategies completed and implemented per B-047	stable, if conservation strategies completed and implemented per B-047
Vascular Plants: matrix habitat	decrease	stable, if conservation strategies completed and implemented per B-S51 and explicit implementation direction per B-047	stable, if conservation strategies completed and implemented per B-S51 and explicit implementation direction per B-047
Vascular Plants: fine scale habitat	decrease	stable, if conservation strategies completed and implemented per B-S51 and explicit implementation direction per B-047	stable, if conservation strategies completed and implemented per B-S51 and explicit implementation direction per B-047
Rare plant communities	decrease	stable, with explicit implementation direction per B-S51	stable, with explicit implementation direction per B-S51



**Appendix P-1.** Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/or T1-T3) and location by state.

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
N	<i>Aspicilia fruticulosa</i>	G3				X	
N	<i>Bryoria subdivergens</i>	G2			X		
N	<i>Bryoria tortuosa</i>	G?	X				
N	<i>Bryum calobryoides</i>	G3				X	
N	<i>Buxbaumia aphylla</i>	G3				X	
N	<i>Cladonia andereggi</i>	G1				X	
N	<i>Cladonia imbricarica</i>	G2G3				X	
N	<i>Cladonia luteoalba</i>	G2				X	
N	<i>Cladonia verruculosa</i>	G3				X	
N	<i>Collema curtisporum</i>	G1				X	
N	<i>Dermatocarpon lorenzianum</i>	G2				X	
N	<i>Dicranella heteromalla</i>	G?			X		
N	<i>Dicranum acutifolium</i>	G?			X		
N	<i>Grimmia mollis</i>	G3G5			X		
N	<i>Heterotheca barbata</i>	G1G3				X	
N	<i>Heterotheca villosa var depressa</i>	G5T3				X	
N	<i>Hygrohypnum cochlearifolium</i>	G?			X		
N	<i>Hypnum recurvatum</i>	G3G5			X		
N	<i>Lobaria scrobiculata</i>	G3G4				X	
N	<i>Meesia longiseta</i>	G3G4				X	
N	<i>Orthotrichum hallii</i>	G3G5				X	
N	<i>Orthotrichum holzingeri</i>	G2				X	
N	<i>Orthotrichum praemorsum</i>	G?			X		
N	<i>Pseudocrossidium obtusulum</i>	G?			X		
N	<i>Ramalina thrausta</i>	G?				X	
N	<i>Sphaerocarpos hians</i>	G2				X	
N	<i>Texasporium sancti-jacobi</i>	G2	X	X		X	
N	<i>Thamnolia vermicularis</i>	G?				X	
N	<i>Thelomma ocellatum</i>	G?				X	
N	<i>Tortula bartramii</i>	G2G4			X		
N	<i>Ulotia curvifolia</i>	G3G5				X	
N	<i>Ulotia megalospora</i>	G?				X	
N	<i>Umbilicaria vellea</i>	G3	X				

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
N	<i>Xanthoparmelia idahoensis</i>	G2				X	
V	<i>Achnatherum hendersonii</i>	G3		X			
V	<i>Achnatherum wallowaensis</i>	G2		X			
V	<i>Adiantum aleuticum subalpine ecotype</i>	G5?T2Q				X	
V	<i>Agastache cusickii</i>	G3G4		X			
V	<i>Allium aaseae</i>	G3				X	
V	<i>Allium columbianum</i>	G3			X		
V	<i>Allium constrictum</i>	G2	X				
V	<i>Allium dictuon</i>	G1	X				
V	<i>Allium madidum</i>	G3				X	
V	<i>Allium robinsonii</i>	G3		X			
V	<i>Allium tolmiei var persimile</i>	G4T3				X	
V	<i>Allium tolmiei var platyphyllum</i>	G4T3Q				X	
V	<i>Amsinckia carinata</i>	G2		X			
V	<i>Antennaria arcuata</i>	G2				X	X
V	<i>Antennaria densifolia</i>	G3			X		
V	<i>Arabis falcifracta</i>	G1G2					X
V	<i>Arabis fecunda</i>	G2			X		
V	<i>Arabis hastatula</i>	G1		X		X	
V	<i>Arabis lasiocarpa</i>	G1				X	
V	<i>Arabis sparsiflora var atrorubens</i>	G5T3		X			
V	<i>Artemisia campestris ssp borealis</i>	G5T1	X				
V	<i>Artemisia campestris var wormskioldii</i>	G5T1		X			
V	<i>Artemisia ludoviciana ssp estesii</i>	G5T2		X			
V	<i>Artemisia packardiae</i>	G3				X	X
V	<i>Artemisia papposa</i>	G3		X		X	X
V	<i>Aster jessicae</i>	G2	X			X	
V	<i>Astragalus amblytropis</i>	G3				X	
V	<i>Astragalus amnis-amissi</i>	G3				X	
V	<i>Astragalus anserinus</i>	G2				X	X
V	<i>Astragalus applegatei</i>	G1		X			
V	<i>Astragalus aquilonius</i>	G3				X	
V	<i>Astragalus arrectus</i>	G2G3	X				
V	<i>Astragalus atratus var inseptus</i>	G4T3				X	
V	<i>Astragalus atratus var owyheensis</i>	G4T3				X	

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Astragalus beckwithii</i> var <i>sulcatus</i>	G4T3				X	
V	<i>Astragalus camptopus</i>	G3				X	
V	<i>Astragalus ceramicus</i> var <i>apus</i>	G4T3				X	
V	<i>Astragalus collinus</i> var <i>laurentii</i>	G5T1		X			
V	<i>Astragalus columbianus</i>	G2	X				
V	<i>Astragalus cusickii</i> var <i>packardiae</i>	G5T1				X	
V	<i>Astragalus cusickii</i> var <i>sterilis</i>	G5T2				X	
V	<i>Astragalus diaphanus</i> var <i>diurnus</i>	G4T2		X			
V	<i>Astragalus diversifolius</i>	G3				X	
V	<i>Astragalus jejunus</i>	G3G4				X	
V	<i>Astragalus jejunus</i> var <i>jejunus</i>	G3G4T3?				X	
V	<i>Astragalus misellus</i> var <i>pauper</i>	G4T3	X				
V	<i>Astragalus mulfordiae</i>	G2		X		X	
V	<i>Astragalus oniciformis</i>	G3				X	
V	<i>Astragalus paysonii</i>	G3				X	
V	<i>Astragalus peckii</i>	G3		X			
V	<i>Astragalus pulsiferae</i> var <i>suksdorfii</i>	G4T3?	X				
V	<i>Astragalus purshii</i> var <i>ophiogenes</i>	G5T3				X	
V	<i>Astragalus riparius</i>	G2	X			X	
V	<i>Astragalus scaphoides</i>	G3				X	
V	<i>Astragalus sinuatus</i>	G1	X				
V	<i>Astragalus sterilis</i>	G2Q		X		X	
V	<i>Astragalus tegetarioides</i>	G3		X			
V	<i>Astragalus tyghensis</i>	G2		X			
V	<i>Astragalus vexilliflexus</i> var <i>nubilus</i>	G4T2				X	
V	<i>Astragalus yoder-williamsii</i>	G3				X	
V	<i>Bolandra oregana</i>	G3	X				
V	<i>Botrychium ascendens</i>	G3	X	X	X	X	
V	<i>Botrychium campestre</i>	G3	X	X	X		
V	<i>Botrychium crenulatum</i>	G3	X	X	X	X	
V	<i>Botrychium hesperium</i>	G3	X		X		
V	<i>Botrychium lineare</i>	G1	X	X	X	X	
V	<i>Botrychium montanum</i>	G3		X	X	X	
V	<i>Botrychium pallidum</i>	G2			X		
V	<i>Botrychium paradoxum</i>	G2	X	X	X	X	

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Botrychium pedunculatum</i>	G2?	X	X	X	X	
V	<i>Botrychium pumicola</i>	G3		X			
V	<i>Botrychium spathulatum</i>	G3G4			X		
V	<i>Calamagrostis tweedyi</i>	G2G3			X	X	
V	<i>Calochortus greenei</i>	G2		X			
V	<i>Calochortus longebarbatus var longebarbatus</i>	G3T3	X				
V	<i>Calochortus longebarbatus var peckii</i>	G3T3		X			
V	<i>Calochortus macrocarpus var maculosus</i>	G5T2	X	X		X	
V	<i>Calochortus nitidus</i>	G3	X			X	
V	<i>Camissonia palmeri</i>	G3G4				X	
V	<i>Camissonia pygmaea</i>	G3	X	X			
V	<i>Cardamine constancei</i>	G3				X	
V	<i>Carex lenticularis var dolia</i>	G5T3Q			X		
V	<i>Carex luzulina var atropurpurea</i>	G5T3				X	
V	<i>Carex parryana ssp idahoa</i>	G4T2			X	X	
V	<i>Carex stenoptila</i>	G3?			X		
V	<i>Castilleja cervina</i>	G3G4			X		
V	<i>Castilleja chlorotica</i>	G3		X			
V	<i>Castilleja christii</i>	G1				X	
V	<i>Castilleja covilleana</i>	G3G4			X		
V	<i>Castilleja cryptantha</i>	G2	X				
V	<i>Castilleja fraterna</i>	G2		X			
V	<i>Castilleja oresbia</i>	G3G4				X	
V	<i>Castilleja pilosa var steenensis</i>	G4?T3		X			
V	<i>Castilleja pulchella</i>	G3				X	
V	<i>Castilleja rubida</i>	G2		X			
V	<i>Castilleja thompsonii</i>	G3G4		X			
V	<i>Caulanthus major var nevadensis</i>	G3?T?		X			
V	<i>Cetraria subalpina</i>	G2G3				X	
V	<i>Chaenactis cusickii</i>	G2G3		X		X	
V	<i>Chaenactis thompsonii</i>	G2G3	X				
V	<i>Chrysothamnus parryi ssp montanus</i>	G5T1				X	
V	<i>Chrysothamnus parryi ssp salmonensis</i>	G5T3				X	
V	<i>Collomia debilis var camporum</i>	G5T3				X	

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Collomia macrocalyx</i>	G3G4	X				
V	<i>Collomia mazama</i>	G3		X			
V	<i>Collomia renacta</i>	G1Q		X			
V	<i>Corydalis caseana ssp hastata</i>	G5T3				X	
V	<i>Crepis bakeri ssp idahoensis</i>	G4T2				X	
V	<i>Cryptantha caespitosa</i>	G3				X	
V	<i>Cryptantha hypsophila</i>	G3G4				X	
V	<i>Cryptantha leucophaea</i>	G2G3	X	X			
V	<i>Cryptantha salmonensis</i>	G3				X	
V	<i>Cymopterus acaulis var greeleyorum</i>	G5T2				X	
V	<i>Cymopterus davisii</i>	G3				X	
V	<i>Cymopterus douglassii</i>	G3				X	
V	<i>Dasynotus daubenmirei</i>	G3				X	
V	<i>Delphinium viridescens</i>	G2	X				
V	<i>Douglasia idahoensis</i>	G2				X	
V	<i>Draba argyrea</i>	G3				X	
V	<i>Draba globosa</i>	G3				X	
V	<i>Draba macounii</i>	G3G4			X		
V	<i>Draba trichocarpa</i>	G1G2				X	
V	<i>Erigeron basalticus</i>	G1	X				
V	<i>Erigeron eatonii var lavandulus</i>	G5T3				X	
V	<i>Erigeron engelmannii var davisii</i>	G5T2		X		X	
V	<i>Erigeron lackschewitzii</i>	G3Q			X		
V	<i>Erigeron latus</i>	G2				X	X
V	<i>Erigeron piperianus</i>	G3	X				
V	<i>Erigeron radicans</i>	G3				X	
V	<i>Erigeron salishii</i>	G2	X				
V	<i>Erigeron salmonensis</i>	G3				X	
V	<i>Eriogonum capistratum var welshii</i>	G4T2				X	
V	<i>Eriogonum chrysops</i>	G1		X			
V	<i>Eriogonum codium</i>	G1	X				
V	<i>Eriogonum crosbyae</i>	G3		X			
V	<i>Eriogonum cusickii</i>	G2		X			
V	<i>Eriogonum desertorum</i>	G3G4				X	
V	<i>Eriogonum lewisii</i>	G3Q					X

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Eriogonum meledonum</i>	G1				X	
V	<i>Eriogonum ochrocephalum var calcareum</i>	G4T3				X	
V	<i>Eriogonum prociduum</i>	G3		X			
V	<i>Eriogonum salicornioides</i>	G3?		X		X	
V	<i>Eriogonum shockleyi var packardiae</i>	G5T2				X	
V	<i>Eriogonum sp. Nov. (War eagle mountain)</i>	G1Q				X	
V	<i>Erythronium grandiflorum ssp nudipetalum</i>	G5T3				X	
V	<i>Frasera albicaulis var idahoensis</i>	G5T3Q				X	
V	<i>Galium serpenticum ssp warnerense</i>	G4G5T2Q		X			
V	<i>Geum rossii var depressum</i>	G5T1	X				
V	<i>Gratiola heterosepala</i>	G3		X			
V	<i>Grindelia howellii</i>	G3			X	X	
V	<i>Hackelia cronquistii</i>	G2		X		X	
V	<i>Hackelia davisii</i>	G3				X	
V	<i>Hackelia diffusa var diffusa</i>	G4T2	X				
V	<i>Hackelia hispida var disjuncta</i>	G4T2T3	X				
V	<i>Hackelia ophiobia</i>	G2G3		X		X	
V	<i>Hackelia sp. Nov. (Sleeping deer mountain)</i>	G1Q				X	
V	<i>Hackelia venusta</i>	G1	X				
V	<i>Halimolobos perplexa var perplexa</i>	G4T3				X	
V	<i>Haplopappus aberrans</i>	G3			X	X	
V	<i>Haplopappus hirtus var sonchifolius</i>	G4G5T3?				X	
V	<i>Haplopappus insecticruris</i>	G3				X	
V	<i>Haplopappus integrifolius</i>	G3?				X	
V	<i>Haplopappus liatriliformis</i>	G2	X			X	
V	<i>Haplopappus radiatus</i>	G3		X		X	
V	<i>Haplopappus uniflorus var howellii</i>	G5T1				X	
V	<i>Heuchera grossulariifolia var tenuifolia</i>	G4T3?	X				
V	<i>Howellia aquatilis</i>	G2	X		X	X	
V	<i>Hymenoxys lemmonii</i>	G3?		X			
V	<i>Iliamna longisepala</i>	G3	X				
V	<i>Ipomopsis minutiflora</i>	G2G3			X		

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Ivesia rhypara</i> var <i>rhypara</i>	G2T1		X			
V	<i>Ivesia rhypara</i> var <i>shellyi</i>	G2T1		X			
V	<i>Ivesia rhypara</i> var. <i>Rhypara</i>	G2T2					X
V	<i>Ivesia shockleyi</i>	G3G4		X			
V	<i>Juncus kelloggii</i>	G3?	X				
V	<i>Juncus tweedyi</i>	G3				X	
V	<i>Juncus uncialis</i>	G3G4	X				
V	<i>Lathyrus grimesii</i>	G3					X
V	<i>Lepidium davisii</i>	G3		X		X	X
V	<i>Lepidium papilliferum</i>	G2				X	
V	<i>Leptodactylon glabrum</i>	G2				X	
V	<i>Leptodactylon pungens</i> ssp <i>hazeliae</i>	G5T1		X		X	
V	<i>Lesquerella carinata</i> var <i>languida</i>	G3G4T1			X		
V	<i>Lesquerella humilis</i>	G1			X		
V	<i>Lesquerella kingii</i> var <i>cobrensis</i>	G5T3?				X	
V	<i>Lesquerella multiceps</i>	G3				X	
V	<i>Lesquerella paysonii</i>	G3			X	X	
V	<i>Lesquerella tuplashensis</i>	G1	X				
V	<i>Limnanthes floccosa</i> ssp <i>bellingermana</i>	G4T2		X			
V	<i>Lomatium erythrocarpum</i>	G1		X			
V	<i>Lomatium geyeri</i>	G3G4			X		
V	<i>Lomatium greenmanii</i>	G1		X			
V	<i>Lomatium laevigatum</i>	G3	X				
V	<i>Lomatium ochocense</i>	G2G3		X			
V	<i>Lomatium packardiae</i>	G2?				X	
V	<i>Lomatium rollinsii</i>	G3	X			X	
V	<i>Lomatium salmoniflorum</i>	G3		X		X	
V	<i>Lomatium suksdorfii</i>	G3	X	X			
V	<i>Lomatium tuberosum</i>	G2	X				
V	<i>Luina serpentina</i>	G2		X			
V	<i>Lupinus lepidus</i> var <i>sellulus</i>	G4T2				X	
V	<i>Lupinus lyallii</i> ssp <i>alcis-temporis</i>	G5T1?				X	
V	<i>Lupinus sericeus</i> var <i>egglestonianus</i>	G5T2T4Q		X			
V	<i>Meconella oregana</i>	G2	X	X			
V	<i>Mentzelia mollis</i>	G2		X		X	

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Mentzelia packardiae</i>	G1		X			X
V	<i>Mentzelia torreyi var acerosa</i>	G4T3				X	
V	<i>Mimulus ampliatus</i>	G1				X	
V	<i>Mimulus evanescens</i>	G3?		X		X	
V	<i>Mimulus hymenophyllus</i>	G1		X		X	
V	<i>Mimulus jungermannioides</i>	G2	X	X			
V	<i>Mimulus patulus</i>	G2Q			X	X	
V	<i>Mirabilis macfarlanei</i>	G2		X		X	
V	<i>Musineon lineare</i>	G2				X	
V	<i>Myosurus sessilis</i>	G2		X			
V	<i>Oenothera psammophila</i>	G3				X	
V	<i>Orthocarpus bracteosus</i>	G3?	X				
V	<i>Oxytropis besseyi var salmonensis</i>	G5T3				X	
V	<i>Oxytropis campestris var columbiana</i>	G5T3	X		X		
V	<i>Oxytropis campestris var wanapum</i>	G5T1	X				
V	<i>Papaver radicum ssp kluanense</i>	G3?Q				X	
V	<i>Pedicularis contorta var rubicunda</i>	G5T2			X		
V	<i>Pedicularis rainierensis</i>	G2G3	X				
V	<i>Penstemon barrettiae</i>	G2	X	X			
V	<i>Penstemon compactus</i>	G2G3				X	
V	<i>Penstemon deustus var variabilis</i>	G5T2	X				
V	<i>Penstemon glaucinus</i>	G3		X			
V	<i>Penstemon idahoensis</i>	G1				X	
V	<i>Penstemon lemhiensis</i>	G3			X	X	
V	<i>Penstemon peckii</i>	G3		X			
V	<i>Perideridia erythrorhiza</i>	G1		X			
V	<i>Petrophyton cinerascens</i>	G1	X				
V	<i>Phacelia inconspicua</i>	G2				X	
V	<i>Phacelia lenta</i>	G2	X				
V	<i>Phacelia lutea var calva</i>	G4T2				X	
V	<i>Phacelia lutea var mackenzieorum</i>	G4T3		X			
V	<i>Phacelia lyallii</i>	G3				X	
V	<i>Phacelia minutissima</i>	G3	X	X		X	X
V	<i>Phlox idahonis</i>	G1				X	
V	<i>Phlox kelseyi var missoulensis</i>	G2			X		

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Physaria didymocarpa var lyrata</i>	G5T1				X	
V	<i>Physaria integrifolia</i>	G3G4				X	
V	<i>Physaria integrifolia var monticola</i>	G3G4T2Q				X	
V	<i>Plagiobothrys salsus</i>	G3G4		X			
V	<i>Pleuropogon oregonus</i>	G1		X			
V	<i>Poa abbreviata ssp marshii</i>	G5T1				X	
V	<i>Polemonium pectinatum</i>	G2	X				
V	<i>Potamogeton foliosus var fibrillosus</i>	G5T2T4		X			
V	<i>Primula alcalina</i>	G1				X	
V	<i>Primula brodheadae</i>	G2				X	
V	<i>Primula wilcoxiana</i>	G3				X	
V	<i>Ranunculus reconditus</i>	G2	X	X			
V	<i>Ribes cereum var colubrinum</i>	G5T3	X				
V	<i>Ribes oxyacanthoides ssp irriguum</i>	G5T3T4	X				
V	<i>Ribes velutinum var 1</i>	G5T3				X	
V	<i>Rorippa columbiae</i>	G3	X	X			
V	<i>Rubus bartonianus</i>	G2		X		X	
V	<i>Rubus nigerrimus</i>	G1	X				
V	<i>Salix tweedyi</i>	G3?	X				
V	<i>Saussurea densa</i>	G3G5			X		
V	<i>Saussurea weberi</i>	G3Q			X		
V	<i>Saxifraga bryophora var tobiasiae</i>	G5T1				X	
V	<i>Saxifraga tempestiva</i>	G2			X		
V	<i>Saxifragopsis fragarioides</i>	G3?	X				
V	<i>Scirpus rollandii</i>	G3Q				X	
V	<i>Scribneria bolanderi</i>	G3G4		X			
V	<i>Senecio ertterae</i>	G1		X			
V	<i>Senecio streptanthifolius var laetiflorus</i>	G5T3				X	
V	<i>Sidalcea oregana var calva</i>	G5T1	X				
V	<i>Silene seelyi</i>	G1G2	X				
V	<i>Silene spaldingii</i>	G2	X	X	X	X	
V	<i>Sisyrinchium sarmentosum</i>	G2	X				
V	<i>Sisyrinchium septentrionale</i>	G3G4	X				
V	<i>Spiranthes diluvialis</i>	G2	X			X	
V	<i>Stanleya confertiflora</i>	G1		X		X	

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

Taxa	Species	Global Rank <sup>a</sup>	WA	OR	MT	ID	NV
V	<i>Stephanomeria malheurensis</i>	G1		X			
V	<i>Sullivantia hapemanii</i>	G3				X	
V	<i>Sullivantia hapemanii var hapemanii</i>	G3T3				X	
V	<i>Synthyris platycarpa</i>	G3				X	
V	<i>Talinum sediforme</i>	G2G3	X				
V	<i>Tauschia hooveri</i>	G2	X				
V	<i>Tauschia tenuissima</i>	G3	X			X	
V	<i>Thelypodium brachycarpum</i>	G3		X			
V	<i>Thelypodium eucosmum</i>	G2		X			
V	<i>Thelypodium howellii ssp howellii</i>	G2?T1?		X			
V	<i>Thelypodium howellii ssp spectabilis</i>	G2?T1		X			
V	<i>Thelypodium paniculatum</i>	G2G3				X	
V	<i>Thelypodium repandum</i>	G3				X	
V	<i>Thlaspi idahoense var aileeniae</i>	G4T3				X	
V	<i>Thlaspi parviflorum</i>	G3			X		
V	<i>Trifolium douglasii</i>	G3G4	X	X			
V	<i>Trifolium eriocephalum ssp arcuatum</i>	G4T3?			X		
V	<i>Trifolium leibergii</i>	G2		X			X
V	<i>Trifolium owyheense</i>	G2G3		X		X	
V	<i>Trifolium plumosum var amplifolium</i>	G4T2				X	
V	<i>Trifolium thompsonii</i>	G2	X				
V	<i>Veratrum insolitum</i>	G3	X				
V	<i>Waldsteinia idahoensis</i>	G3			X	X	
V	<i>Zauschneria garrettii</i>	G?				X	

<sup>a</sup> The network of Natural Heritage Programs and Conservation Data Centers -- which currently consists of installations in all 50 states, several Canadian provinces, and several Latin American and Caribbean countries -- ranks the rangewide (GRANK or global rank) and state (SRANK or state rank) status of plants, animals, and plant communities on a scale of 1 to 5. The rank is primarily based on the number of known occurrences, but other factors such as habitat quality, estimated number of individuals, narrowness of range of habitat, trends in populations and habitat, threats to the element, and other factors are also considered. The ranking system is meant to exist alongside national and state rare species lists because these lists often include additional criteria (e.g., recovery potential, depth of knowledge) that go beyond assessing threats to extinction.

Appendix P-1. Plant species within the Basin with a Natural Heritage Global Rank of G1-G3 (and/ or T1-T3) and location by state (continued).

**COMPONENTS OF RANKS:**

**G**= Global rank indicator; denotes rank based on rangewide status.

**T**= Trinomial rank indicator; denotes rangewide status of intraspecific taxa.

**S**= State rank indicator; denotes rank based on status within a particular state.

**1**= Critically imperiled because of extreme rarity or because some factor of its biology makes it especially vulnerable to extinction (typically 5 or fewer occurrences).

**2**= Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (typically 6 to 20 occurrences).

**3**= Rare or uncommon but not imperiled (typically 21 to 100 occurrences).

**4**= Not rare and apparently secure, but with cause for long-term concern (usually more than 100 occurrences).

**5**= Demonstrably widespread, abundant, and secure.

**Q**= Indicates uncertainty about taxonomic status.

**?**= Not yet ranked.

**EXAMPLES OF USE:**

**G4T2**= species is apparently secure rangewide, but this particular subspecies or variety is imperiled.

