

## Appendix L. Vulnerability Criteria for Scoring Arizona Wildlife

For Element 1 of Arizona’s Comprehensive State Wildlife Action Plan (SWAP), the Department must identify wildlife\* of conservation priority—described in Arizona as Species of Greatest Conservation Need (SGCN). For this purpose, all of Arizona’s native species of wildlife (ranging from big game species to macroinvertebrates) will be evaluated with the process described below. Those species that score a “1” for any vulnerability category, or score “0” under Unknown Status are included in the list of SGCN.

\* Note: The Department has statutory responsibility to manage “wildlife” as defined in Arizona Revised Statutes Title 17, which includes all vertebrate species, crustaceans and mollusks. The State Wildlife Grant (SWG) Program (developed in cooperation with the Teaming With Wildlife Committee and mandated by the U.S. Congress) identifies “wildlife” as all species of vertebrates and macroinvertebrates, including insects and arachnids. While many state wildlife agencies do not have legal responsibility for insects and arachnids, some of their SWAP partners—federal, tribal, and other state agencies do have management authority for these macroinvertebrates.

### SUMMARY OF THE TWO CONSERVATION NEED CATEGORIES

#### 1) Vulnerability

Species may arrive at a point of vulnerability in different ways, according to the stressors involved and the biology of each species in Arizona. Accordingly, the Department developed a set of criteria to capture these different types of vulnerability. Any one criterion can flag a species as vulnerable, so it does not matter whether a species ranks as ‘vulnerable’ on 1, 3, or all 9 criteria. Ranks are not additive. The rank is based on the following criteria:

- Federal or State legal status
- Extirpated
- Imperiled
- Declining status
- Disjunct status
- Demographic status
- Concentration status
- Fragmentation status
- Distribution status

#### 2) Unknown Status (based on the criteria scores for “Vulnerability”)

Species would be considered to have “unknown status” if there was insufficient information to determine the species’ vulnerability, i.e. if none of the 9 criteria were scored as “1”, but with one or more of the 9 categories scored as “0”.

The resulting list of SGCN were further categorized into 3 priority tiers as follows:

**Tier 1A:** Scored “1” for Vulnerability in at least one of the 9 categories, or matches at least one of the following:

- Federally listed as Endangered or Threatened under the Endangered Species Act (ESA)
- Candidate species
- Is specifically covered under a signed conservation agreement (CCA, CCAA)

- Protected under the Bald and Golden Eagle Protection Act
- Require post-delisting monitoring
- Is petitioned for listing

**Tier 1B:** Scored “1” for Vulnerability, but match none of the above criteria.

**Tier 1C:** Unknown status species.

**COMPONENT CRITERIA USED TO IDENTIFY CONSERVATION PRIORITY WILDLIFE**

For each of the 9 Vulnerability criteria, a ranking of ‘H’ (= High Priority), ‘M’ (= Medium Priority), or ‘L’ (= Low Priority) was assigned. Species lists (by taxonomic group: invertebrates, fish, amphibians, reptiles, birds, mammals) and evaluation scores were entered into and compiled in the Department’s SWAP database. Criteria scores were rated by Wildlife Management Division staff, (primarily Nongame, Game, Fisheries specialists) and reviewed by Regional staff, Development Branch staff, and external partners.

Extirpated Status

Description: Species that historically occurred in Arizona but are thought to be locally extinct throughout the state.

Vulnerability Rank	Criterion Score	Description – Extirpated
H	1	Extirpated
L	3	Not extirpated

Federal or State Legal Status

Description: Uses the legal status of each species, subspecies or Distinct Population Segment to evaluate management importance. High-ranking species include: those that are currently listed federally under ESA as endangered, threatened or candidates, including those populations considered nonessential experimental under section 10(j) of the ESA; recently de-listed species that are undergoing post-delisting monitoring; bald and golden eagles; species of mollusk, amphibian or reptile for which there is no open season in Arizona as identified in Commission Orders 41, 42 or 43. High-ranking species also include those that have been petitioned for listing under the ESA, and the USFWS has initiated a 12-month status review to determine if listing that species is warranted.

Vulnerability Rank	Criterion Score	ESA abbreviation	Federal (ESA) Description
H	1	LE	Listed Endangered
H	1	LE/XT	Endangered, nonessential experimental population
H	1	LT	Listed Threatened
H	1	C	Candidate
H	1	PD	Post-delisting evaluation not completed

H	1	CS	No Open Season in Arizona
H	1	P	Petitioned; 12-month status review initiated
L	3		No status

### Imperiled Status

Description: Refers to Heritage/IUCN ranking. High-ranking species are G1 (imperiled) and G2 (rare) species. Sub-national scores are already captured in the Department's 'Element occurrences' criterion, which can be much more up-to-date than the sub-national scoring.

Scoring: Heritage/IUCN global scores will be used directly from HDMS.

Vulnerability Rank	Criterion Score	Description – Imperiled Status (Heritage global rank)
	0	G? (rank unknown)
H	1	G1, Imperiled
H	1	G2, Rare
M	2	G3, Uncommon or restricted
L	3	G4, Apparently secure
L	3	G5, Demonstrably secure

### Declining Status

Description: Reflects extent to which population numbers or habitats were recently, are currently, or anticipated to be in decline.

Scoring: This follows the Heritage/IUCN ranking system for “observed, estimated, inferred, or suspected degree of change” over about 10 years or 3 generations, whichever is longer (up to a maximum of 100 years) in the area of interest.” The period of time overlaps with the present, so that declines in the immediate past (whether considered ongoing or not), continuing trends, and trends projected to begin immediately are all included.

Vulnerability Rank	Criterion Score	Description – Declining Status
	0	Insufficient data
H	1	Severely declining = Decline of >70%
H	1	Very Rapidly Declining = 50-70%
H	1	Substantial decline = 30-50%
M	2	Decline = 10-30%
L	3	Stable = Unchanged or within +/- 10% fluctuation
L	4	Increase of > 10%

### Disjunct Status

Description: High-ranking species are represented by populations that historically are geographically separated from the main population and vulnerable due to distance from other major population centers. Vulnerability of species populations that are disjunct as a result of anthropomorphic changes to the landscape are captured in Fragmentation Status.

Vulnerability Rank	Criterion Score	Description – Disjunct Status
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	0	Insufficient data
H	1	Disjunct population: 1 to few populations in Arizona separated by large relative distance from larger core distribution of the species outside of Arizona.
M	2	Peripheral populations: Arizona populations at the margins of the species distribution.
M	3	Isolated populations: the core of the species range is within Arizona, and consists of 1 to few populations that are disjunct from one another.
L	4	Continuous: the distribution of Arizona populations is within the core of the species' range.

### Demographic Status

Description: This criterion classifies the resilience of each species in light of current impacts to birth and death rates. These rates can be affected by low genetic fitness/diversity, generation time, reproductive vulnerability, demographic adaptability to environmental change, illegal harvest, disturbance, and disease. California condors are an example species with high demographic concerns.

Vulnerability Rank	Criterion Score	Description – Demographic Status
	0	Insufficient data
H	1	Demographically poor situation: Low birth rates or high death rates combined with small or declining population size. Also, this species' demographic rates are affected by disturbance, illegal harvest, genetic limitations or failure, or disease in parts of Arizona.
M	2	Demographically challenging situation: Low birth rates or high death rates combined with small population size. No anticipated worsening of these rates in next 10 years.
L	3	Demographically stable situation: Birth and death rates anticipated to contribute to normal population size variation in next 10 years.
L	4	Demographic growth situation: Birth and death rates anticipated to contribute to overall population growth over next 10 years.

### Concentration Status

Description: Species that have a portion of their life history in which they are aggregated and thus more vulnerable to local threats and catastrophic events (for example, migratory stopover sites, bat roosts / maternity sites, breeding aggregations).

Vulnerability Rank	Criterion Score	Description – Concentration Status
	0	Insufficient data
H	1	Colonial species: found in a limited number of groups at high concentration for all of their life cycle.
M	2	Aggregating species: found in a limited number of groups at high concentration for part of their life cycle.

L	3	Diffuse species: not found in a limited number of groups at high concentration for part or all of their life cycle.
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### Fragmentation Status

Description: Scoring reflects the extent to which populations are separated by human-created barriers to dispersal (examples include major highways, railroads, impoundments, dewatered streams, etc.). In other circumstances, these species would be capable of effective dispersal. Does not address species with inherent lack of ability to disperse. Chiricahua leopard frogs are an example species with populations that are highly fragmented.

Vulnerability Rank	Criterion Score	Description – Fragmentation Status
	0	Insufficient data
H	1	Within Arizona, fragmentation has resulted in populations that are small and isolated from one another.
M	2	Within Arizona, populations large but fragmentation has isolated them from one another.
L	3	Within Arizona, populations are not or have been little affected by human-created barriers to dispersal.

### Distribution Status

Description: This criterion is meant to assess the percentage of a species' reproducing population that occurs in Arizona. Because population data are difficult to compile, from an operational standpoint scoring reflects the percentage of a species geographical distribution that occurs in Arizona. Species that score high have a significant proportion of their global or U.S. breeding range within Arizona, even if locally abundant (e.g., Abert's towhee), thus indicating a high responsibility for maintaining viable populations in the state.

Vulnerability Rank	Criterion Score	Description – Distribution Status
	0	Insufficient data
H	1	Endemic: > 90% of the global species' breeding range is within Arizona.
H	1	Occurs primarily in Arizona: 70–90% of the global species' breeding range is within Arizona.
H	1	Southwestern: > 90% of the United States segment of the species' breeding range is within Arizona.
M	2	Southwestern: 50-90% of the United States segment of the species' breeding range is within Arizona.
L	3	< 50% of the species breeding range is within Arizona, or is widespread elsewhere.