The Alaska Species Ranking System (ASRS)
Expert Review

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Overview

The Alaska Species Ranking System (ASRS) is a tool to assist ADF&G's Threatened, Endangered, and Diversity Program with setting priorities for wildlife conservation. The ASRS provides a standardized procedure for evaluating the status of vertebrate taxa in Alaska with ranking criteria that are transparent, objective, and repeatable.

The ASRS has 17 variables grouped into 4 categories (Fig. 1). The first three categories identify a species' population status (Status), biological vulnerability (Biological), and current research and monitoring needs (Action). The fourth category (Supplemental) is not scored, but variables can be used to further group and compare species.

1. Status – 2 variables

This category measures the trend in a taxon's population status and distribution. Higher status scores acknowledge that taxa with known declining trends are of concern regardless of current population or range size.

2. Biological – 5 variables

This category measures aspects of a taxon's distribution, abundance and life history within the taxon's geographic range in Alaska. Higher biological scores suggest greater vulnerability to extirpation.

3. Action – 4 variables

This category qualifies the current state of knowledge and extent of conservation efforts directed toward a given taxon within Alaska. Higher scores denote greater information needs or conservation action.

4. Supplemental – 6 variables

This category is not used directly in the ranking process. Variables indicate taxonomic significance, percent of the global population in Alaska, season of occurrence, harvest and whether or not the taxon is peripheral in its range in Alaska. This category can be used to separate and sort taxa to answer specific biological or management questions.

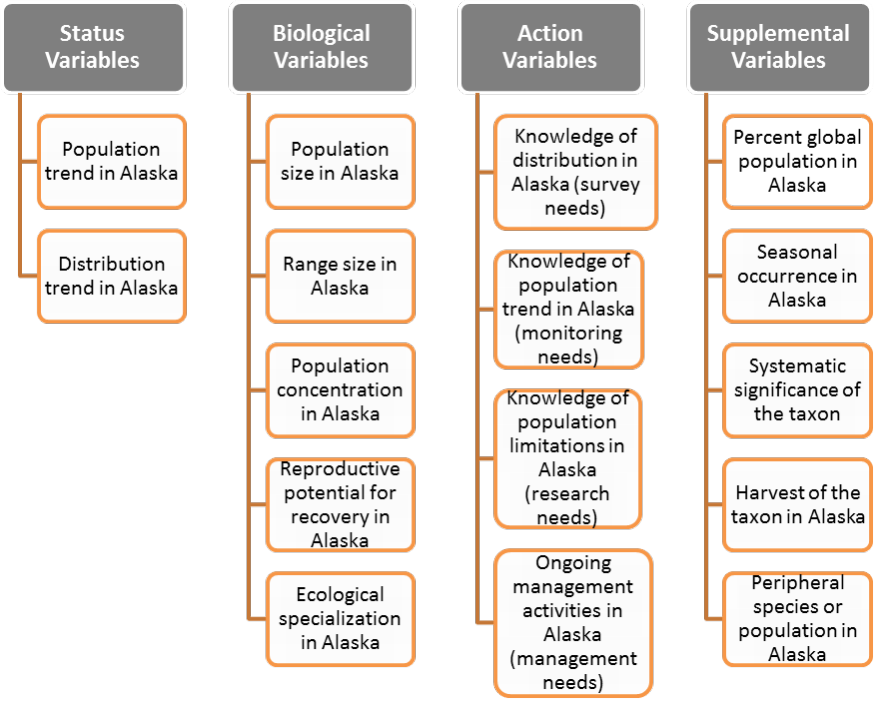

Figure 1. Overview of the categories and variables used in the Alaska Species Ranking System (ASRS). The Supplemental variables do not receive numerical scores.

Description of Scores

The ASRS is a negative to positive scoring system. Each variable has a potential value that ranges from -10 to +10. Negative scores indicate lower conservation concern and positive scores indicate higher concern. Missing data are assigned a value of 0. Multiple answers are allowed for certain variables; in these cases, we use a weighted average to calculate the final variable score.

Scores are additive within categories, but are not combined across categories. We have also devised a qualitative color-coded system (ranging from red to blue) to illustrate the level of conservation priority for each species.

Reviewer Instructions

We are looking for species experts to review our species reports prior to public release. We are seeking reviewers to help with the following:

1) Do you agree with our score, and the justification we provided?

2) If you disagree, why and how do you think it could be modified? We encourage reviewers to provide us with recent literature that would improve our assessments. Please note that our assessments are for Alaskan populations only, and have tried to focus on literature specific to these populations.

On the following pages, we provide a description of the 16 variables and how each is scored. You can use this as a guide when working through each species report.

Description of Status, Biological, Action, and Supplemental variables, and the criteria used to score each variable. Variables with unknown information are scored as 0.

Status Variables - *measure the trend in a taxon's population status or distribution.*	**Score**
1. Population trend: overall trend in Alaska over the last two decades.	
This variable acknowledges that taxa with declining population trends are a concern regardless of the current population size. Trends apply only to populations in Alaska.	
a. Population size known to be decreasing	10
b. Population size suspected to be decreasing	6
c. Population formerly experienced serious declines, but is presently stable or increasing	2
d. Population size stable or suspected to be stable or increasing	-6
e. Population size known to be increasing	-10
2. Distribution trend: percent historical change in distribution over the last 50 years in area occupied within Alaska.	
Distribution is the spatial extent occupied in Alaska, with consideration of habitat suitability. This variable assumes that taxa whose ranges have been fragmented or contracted are more vulnerable to extirpation than those with intact or expanding ranges. Species impacted by climate change or whose habitats have been fragmented or reduced as a result of anthropogenic activities were often scored A or B.	
a. Area occupied known to be decreasing	10
b. Area occupied suspected to be decreasing	6
c. Area occupied formerly experienced serious declines, but is presently stable or increasing	2
d. Area occupied is stable or suspected to be stable or increasing	-5
e. Area occupied is known to be increasing	-10
Biological Variables - *measure aspects of a taxon's distribution, abundance and life history.*	
3. Population size: known or suspected adult population size in Alaska.	
Population size refers to sexually mature individuals in Alaska. Multiple responses can be selected if the estimated population size spans multiple categories.	
a. 0 - 500	10
b. 501 - 1,000, or population is unknown but suspected small	6
c. 1,001 - 3,000	2
d. 3,001 - 10,000	-2
e. 10,001 - 25,000, or population is unknown but suspected to be large	-6
f. > 25,000	-10

4. Overall range size: size of the range within Alaska (total areal extent occupied with no consideration of habitat suitability) during the season when the range is most restricted.	
This variable gives the highest weight to taxa with smaller ranges, under the premise they are more vulnerable to extirpation than taxa with larger ranges.	
a. < 100 km^2 (< 1 township, St. Paul Island)	10
b. 100 - 1,000 km^2 (1-10 township, St. Paul Island to Etolin Island)	8
c. 1,001 - 10,000 km^2 (~1/1500 to 1/150 size of Alaska, Etolin Island to Kodiak Island)	4
d. 10,001 - 100,000 km^2 (~1/150 to 1/15 size of Alaska, Kodiak Island to Arctic National Wildlife Refuge)	-2
e. 100,001 - 400,000 km^2 (~1/15 to 1/4 size of Alaska, Arctic National Wildlife Refuge to Brooks Range + North Slope)	-8
f. > 400,000 km^2 (> 1/4 size of Alaska, Brooks Range + North Slope)	-10
5. Population concentration: degree to which populations aggregate at sites seasonally in Alaska (within the season when they aggregate the most).	
This variable assesses the degree to which individuals concentrate or aggregate seasonally at specific locations in Alaska (i.e., breeding sites, staging areas, hibernacula, haul-outs). It assumes that taxa that concentrate at some time in their lifecycle are more susceptible to losing a large portion of their population from a single mortality event. For taxa restricted to islands, we consider each island as one site. Species that are social but do not aggregate in large groups (e.g. small family units or small- to mid-sized roosts) often fell under choice D (population concentrates or occurs at > 250 sites or does not concentrate), as they do not typically involve many individuals concentrating in a specific area, so the number of sites is often large.	
a. Population concentrates or occurs at a single site	10
b. Population concentrates or occurs at 2 - 25 sites	2
c. Population concentrates or occurs at 25 - 250 sites	-6
d. Population concentrates or occurs at > 250 sites or does not concentrate	-10
6. Reproductive potential for recovery.	
A. Minimum age at which females typically first reproduce.	
This variable is an indication of a taxon's ability to rebound. Multiple responses can be chosen if the answer spans two categories (e.g. average breeding age is 3 to 4 years). Each category can be weighted accordingly.	
a. > 8 years	5
b. 4 - 8 years	1
c. 2 - 3 years	-3
d. < 2 years	-5

B. Average number of eggs or live young produced per adult female per year.

This variable is an indication of a taxon's ability to rebound. When a species has multiple reproductive events per year, the average number of young per event is multiplied by the number of events per year. Likewise, for species that do not reproduce annually, the number of offspring per year is reduced to account for the frequency of reproduction. Multiple responses can be chosen if the number of offspring spans two categories, and each category can be weighted accordingly. For example, if a species' litter size ranges from 2 to 5 offspring/year, B and C would be selected; B would receive a weight of 0.25 and C would receive a weight of 0.75.

a. < 1 offspring	5
b. 1 - 2 offspring	3
c. 3 - 9 offspring	1
d. 10 - 100 offspring	-3
e. > 100 offspring	-5

7. Ecological adaptability: degree to which the taxon is dependent on environmental factors.

A. Dietary specialization.

'Specialization' implies narrow ecological tolerance, and hence reduced adaptability to a changing environment. Taxa that are not adaptable (A) have narrow feeding niches and rely on a single food source, often to the exclusion of all other available food sources. Taxa that are moderately adaptable (B) consume only a few species or groups of species, but these food sources are fairly common (e.g., invertebrates, mollusks, small rodents, or conifer seeds). Highly adaptable, opportunistic feeders (C) consume a wide variety of foods and are able to adapt their diet based on the availability of foods. Examples of (C) include omnivores, generalist carnivores and generalist herbivores.

a. Not adaptable; dietary specialist with key requirements scarce	5
b. Moderately adaptable; dietary specialist with key requirements fairly common	1
c. Highly adaptable; opportunistic feeder	-5

B. Habitat adaptability (refers to the habitat used within the season that is most limiting in Alaska)

This variable gives higher scores to habitat specialists, assuming they are less capable of adapting to environmental changes than generalists. Taxa that are not adaptable (A) depend on specific habitat that is rare or vulnerable (e.g., icefields), or habitat that requires disturbances (e.g., fire, flooding) or another species. Moderately adaptable species (B) rely on features that are fairly common within their range (e.g., cliffs, boulder fields, talus slopes, buildings), specific forest types (e.g., old-growth, coniferous), marine features (e.g., continental shelf), moderately specialized breeding or nesting substrate (e.g., snags), and specific wetland types (e.g., muskeg, lakes surrounded by conifer forests). Highly adaptable taxa (C) use a mixture of habitat types (e.g., all types of forest, a variety of forested and open habitats) or a broad habitat type that is considered very common in Alaska (e.g., shrubs, tundra).

a. Not adaptable; habitat specialist with key requirements scarce	5
b. Moderately adaptable; habitat specialist with key requirements fairly common	1
c. Highly adaptable; habitat generalist	-5

Action Variables - *measure the current state of knowledge or extent of conservation efforts directed toward a given taxon within Alaska.*

8. Ongoing management activities (Management needs).

Current regulations and management plans for taxa are a prerequisite to effective conservation planning. This variable gives the most weight to taxa that are not currently managed. An intermediate score is given to taxa whose management is reactive in the form of conservation laws and regulations, while taxa that are actively managed receive the lowest scores. Species with most or all of their habitat in protected land (e.g., island subspecies with entire range protected as a National Wildlife Refuge) did not receive a higher ranking under this category unless there was a specific management plan in place for the taxa.

a. No conservation laws in place, have very liberal harvest regulations (no closed season and/or no bag limit), or does not have a management plan	10
b. Management primarily through enforcement of conservation laws or protected from harvest by laws (e.g. Migratory Bird Treaty Act, Marine Mammal Protection Act)	2
c. Some direct management activities in place, such as harvest regulations that prevent overharvest, a closed season at certain times or areas, ESA listed, or has a management plan	-10

9. Knowledge of distribution in Alaska (Survey needs).

Knowledge of a taxon's distribution within the state is a prerequisite to effective conservation management. This variable gives the highest score to taxa whose distribution in Alaska is not well known. Species whose distributions are fairly well known, but that have largely been surveyed or studied in only some parts their range (e.g., only in the Southeast or only on the North Slope) fell under response B.

a. Distribution is extrapolated from few locations or knowledge limited to general range maps	10
b. Broad range limits or habitat associations somewhat known, but distribution is not well understood throughout range	2
c. Distribution is well known throughout range with knowledge of habitat associations	-10

10. Knowledge of population trend in Alaska (Monitoring needs).

Knowledge of a taxon's population size or trend is an important component to effective management. Taxa that are not currently monitored receive the highest score for this variable. Monitoring over portions of the range or monitoring that is not amenable to statistical analysis was given a higher score than range-wide monitoring that yields statistically valid estimates of abundance or population trend. Examples of data that may be inadequate to monitor trends (B) include trapper questionnaires or bird surveys that cover only part of the species statewide range. Taxa that received the lowest score (D) were usually monitored using techniques that allowed for robust population estimates (e.g., photo-census or aerial surveys that count the number of individuals).

a. Not currently monitored	10
b. Monitored locally or statewide monitoring inadequate to detect trend	2
c. Statewide monitoring adequate to detect population trend	-2
d. Statewide monitoring based on population estimates, or nearly complete censuses	-10

11. Knowledge of Alaska population limitations (Research needs).

Effective conservation actions require knowledge of factors currently limiting populations. The highest scores for this variable are given to taxa whose major factors limiting population size and distribution are not well understood. Taxa receiving the highest score typically have had very little research, if any, focused on factors that regulate or limit their population in Alaska. Factors were either unknown or speculative based on similar taxa or general threats that may be affecting their habitats. Taxa with some information on limiting factors (B), typically had been the focus of some research on, but additional (or more current) research is necessary to determine the impact of these factors on demographic variables. Taxa that have been extensively studied in Alaska and/or for which there is broad consensus of the specific factors that limit them (C) received the lowest score.

a. Factors potentially affecting population size and distribution are speculative, with little awareness about which are limiting	10
b. Factors potentially affecting the population are known, with some agreement on which 2 or 3 are likely limiting	2
c. Factors limiting populations are known, and there is broad consensus about which are limiting	-10

Supplemental Variables – *do not receive numerical scores. These variables are used to sort taxa in relation to taxonomic significance, season of occurrence, harvest and whether or not the taxon is peripheral in its range.*

12. Harvest of the taxon in Alaska.

This variable identifies the extent of protection from harvest and take currently afforded under state and federal law and can be used to recognize highly vulnerable taxa that are not protected.

a. Harvest is substantial with no regulations in place

b. Harvest is substantial with regulations in place

c. Harvest is not substantial (minor subsistence take, accidental take, or harvest of nuisance animals)

d. Harvest is prohibited by regulation or the taxon is not harvested

13. Seasonal occurrence in Alaska.

Effective conservation planning and management requires knowledge of the period of residence of the taxon within the state. Alaska is home to a wide-variety of breeding birds during the summer, but many of these birds winter outside of the state; therefore, opportunities for management actions may be temporally limited. This variable allows sorting of taxa by season of occurrence or permanent residency.

a. Permanent year-round resident

b. Resident only during breeding season

c. Resident only during nonbreeding season

d. Transient

14. Systematic significance of the taxon.

This variable addresses the goal of promoting and sustaining wildlife biodiversity by recognizing that the more genetically distinct a taxon is, the greater its value is to overall species diversity. In this sorting variable, taxonomic categories are used as a gauge for genetic distinctiveness. Members of monotypic families (e.g., Pacific walrus) are considered of greater systematic significance than subspecies.

a. Monotypic family

b. Monotypic genus

c. Monotypic species

d. Disjunct population below the species level

e. Intergrading subspecies

The following two variables reflects Alaska's stewardship responsibility to the taxon and allows taxa to be sorted based on the percentage of the global population or range occurring within Alaska. This variable assumes that management actions within the state will have a greater impact on the global persistence of taxa that have high percentages of their global population and range within the state.

15. Percent of global range in Alaska

a. <10% of global range is in Alaska

b. >10% of global range is in Alaska

16. Percent of global population in Alaska

a. Taxa is endemic to Alaska

b. > 90% of global population occurs in Alaska

c. 75 - 90% of global population occurs in Alaska

d. 50 - 74% of global population occurs in Alaska

e. 25 - 49% of global population occurs in Alaska

f. < 25% of global population occurs in Alaska

17. Peripheral taxa: taxa at the edge of their range with less than 10% of their global range in Alaska.

A taxon may be considered rare in Alaska because it is at the periphery of its range, but the same taxon may be widespread and secure elsewhere. We define peripheral as any taxon at the edge of its range with less than 10% of its global range known to occur in Alaska and a population size in Alaska of less than 10 000 individuals (Bunnell et al. 2004).

a. Yes

b. No