# DETAILED PROCEDURES MANUAL

# GENERAL STATUS RANKS OF WILD SPECIES IN THE NORTHWEST TERRITORIES

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## Abstract

The report *NWT Species 2000 - General Status Ranks of Wild Species in the Northwest Territories* presents an overview of the guidelines used to evaluate the general status of wild species in the Northwest Territories (NWT). The present report gives a more detailed description of the methods and procedures used to list species, reference information, score indicators of species status, draft ranks, then review and publish final ranks for the year 2000 report. This report also provide a copy of unpublished documents that contain essential background information for a future understanding of the assumptions and guidelines used to rank the general status of species in the Northwest Territories.

The species ranked in year 2000 included mammals, birds, fishes, amphibians and reptiles, except marine fishes, and two families of vascular plants, orchids and ferns. Different decision processes were used to derive ranks for different groups of species. In general, a committee drafted ranks for mammals and freshwater fishes, one to two experts independently drafted ranks for birds, amphibians and reptiles, and one to two non-experts drafted ranks for orchids and ferns. All species ranks were reviewed by agencies responsible for wildlife management planning, review and implementation in the NWT. Individual contributions were the backbone to the General Status process and the number of personal contributions is expected to greatly increase for the publication of the next report in 2005.

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# Background

On November 30, 1996, Wildlife Ministers in Canada agreed to implement programs that would prevent species in Canada from becoming extinct as a consequence of human activities. The approach is outlined in the *Framework for the Conservation of Species at Risk in Canada and the Accord for the Protection of Species at Risk in Canada.*

In April 1998 at a meeting of the Wildlife Minister's Council of Canada, a National Monitoring Working Group tabled its interpretation some sections of the *Framework for the Conservation of Species at Risk in Canada*. The Working Group proposed recommendations to establish a *National General Status Assessment process*. The Group's recommendations were based on previous international and Canadian efforts. The Wildlife Ministers approved the Working Group's recommendations at the 1998 meeting. Subsequently, The Canadian Wildlife Director's Committee instructed the National Monitoring Working Group to detail its recommendations and start the implementation process

In 1998, the National Monitoring Working Group was composed of members from Alberta, British Columbia, Canadian Wildlife Service, Fisheries and Oceans, Nova Scotia and Ontario. In January 1999, the Northwest Territories (NWT) participated for the first time to a meeting of the National Monitoring Working Group, now renamed General Status Working Group. At that meeting, the Working Group's membership had been enlarged to include, in addition to the initial members, all the other Provinces and Territories, and the national non-governmental organizations that were members of the Committee on the Status of Wildlife in Canada (COSEWIC) in 1999.

The Working Group's tasks were to coordinate the general status determination of all species in Canada by:

- Reviewing and refining the General Status Assessment process
- Coordinating the use of a standard methodology by each participating jurisdictions.

- Tallying the information gathered by each jurisdiction and draft Canada-wide general status.
- Producing a report on their findings before the end of year 2000.

These tasks were initiated under three general principles (Appendix 1; Brechtel et al. 1999):

A- Responsibilities of each jurisdiction

"It must be recognized that all jurisdictions evaluate the status of the species for which they are responsible,…"

B- Resource allocation

"…and (all jurisdictions) prioritize management and data collection programs to meet a variety of both biological and socio-political needs". "…jurisdictions can apply this process in a variety of ways; including a large or limited public input process, or directing greater or lesser effort to the compilation (of) current data, knowledge, and information. To a large extent, this depends on the resources each jurisdiction has available and chooses to allocate to this task, and the utility each jurisdiction sees in the process for fulfilling its management responsibilities".

C- Capacity building

"…process should, whenever possible, build on … jurisdictional processes, and serve to integrate and strengthen current efforts."

This report describes how the Department of Resources, Wildlife and Economic Development (RWED), Government of the Northwest Territories, acting as the NWT member of the Working Group, adapted, detailed and implemented the General Status monitoring process within the NWT.

## NWT's participation - Objectives and Decision Process

From 1999 onward, the participation of RWED to the general status determination process was continuous. We participated in the development of a more detailed methodology -- standard to all jurisdictions -- while adapting the main objectives of the process to the NWT's specific needs.

The main objectives of the General Status process as applied in the NWT were to:

- **Prioritize species** for more detailed status assessment within the NWT,
- **Raise awareness** of the current status of individual species that were found to be sensitive to human activities, and those for which more information is needed;
- **Stimulate public input** into a common knowledge base to help in the next general status evaluation;

and

- Provide a clear evaluation system and species status ranks to **guide conservation and impact assessment decisions.**

Additional objectives were not explicitly described in the initial phase but emerged as the general status process was implemented in the NWT. Some of these objectives reflected challenges particular to the North. For example, Conservation Data Centres or any other similar institutions are absent from the NWT, Yukon and Nunavut. Also, a significant proportion of the information and expertise related to the taxonomy of species in the North reside in southern Canada or across borders.

Additional objectives were to

- Initiate and stimulate the integration of **local and traditional knowledge** into general status evaluation.
- Develop **official lists of species** known to exist in the NWT (and in Nunavut for the joint list) augmented by baseline information.
- Develop a **list of experts** who have specialized knowledge for groups of species and have studied species in the NWT and Nunavut.

First, we recognized early that the general status process had to produce a tool that would be useful to the diverse users of wildlife-related information in the NWT. Users included, among others, governmental wildlife management agencies, co-management boards, impact assessment agencies, industry, and all northerners making decisions related to wildlife during their daily activities. Some of the organizations have the capacity to actively gather wildlife information or have the authority to plan, review or implement wildlife management initiatives.

Given that context, RWED extended an invitation to widen the participation of other wildlife agencies acting in the NWT (Appendix 2). In addition, the Government of Nunavut was invited to share resources in drafting lists of species found in either or both Territories. Different organizations became part of a group that would share tasks in order to publish the NWT report on the results of the General Status ranking process for year 2000.

**Members of the NWT "ranking group" for year 2000:**

| Organization(s) | General tasks |
|---|---|
| RWED, Wildlife and Fisheries Division, Yellowknife, NT | Drafting species lists, drafting ranks, reviewing ranks, facilitating communications, drafting report, editing report, publication |
| RWED, South Slave, North Slave, Inuvik, Sahtu Regions | Drafting ranks, reviewing ranks, facilitating communications, drafting report (sections), editing report . |
| Canadian Wildlife Service, Regional Office, Yellowknife, NT | Drafting ranks, reviewing ranks, facilitating communications within agency, drafting report (section), editing report. |
| Department of Fisheries and Oceans, Government of Canada, Winnipeg, MB | Drafting ranks, reviewing ranks, facilitating communications within agency, drafting report (section), editing report. |
| Department of Fisheries and Oceans, Government of Canada, Regional Office, Inuvik, NT | Reviewing ranks, drafting report (section), editing report |
| Sahtu Renewable Resources Board, Tulita, NT | Reviewing ranks, editing report |
| Gwich'in Renewable Resource Board, Inuvik, NT | Reviewing ranks, drafting report, editing report |
| Wildlife Management Advisory Committee (NWT), Inuvik, NT | Reviewing ranks, editing report |
| Fisheries Joint Management Committee, Inuvik, NT | Reviewing ranks, drafting report, editing report |
| Department of Sustainable Development, Government of Nunavut, Iqaluit, NU | Drafting species lists, facilitating communications between NWT and Nunavut organizations. |

Scientists, naturalists and knowledgeable persons contributed greatly by drafting and reviewing ranks (Appendix 3). Many of these contributors were not associated with any of the agencies participating as a member of the NWT ranking group. Individual contributions were the backbone to the entire General Status process. The number of personal contributions is expected to greatly increase for the publication of the next report in 2005.

In contrast to many other jurisdictions, committees could not be created to evaluate ranks for most groups of species in the NWT. This would have made the project prohibitively expensive due to very high travelling costs or too time consuming for the experts. Consequently, we adopted a decision process mostly based on independent work and review.

The decision process for status ranking differed slightly amongst groups of species. Experts working independently first "drafted" the status ranks for most species. For drafting, each expert was given the same set of instructions and the same species list augmented with information (Appendix 5). These "draft ranks" then were "reviewed" by one or more other experts. Ranks were "finalised" when all experts independently agreed on a rank, or when a discussion group agreed by consensus on a rank, or when the majority in a group of experts agreed on a rank.

For mammals and fishes, a committee drafted, reviewed, and finalised the status ranks of most species, whereas other species were finalised by individual experts. For birds, amphibians and reptiles, two or more experts drafted, reviewed and finalised ranks independently. For plants, non-experts drafted status ranks using printed information only. In this case, further guidelines were used to help non-experts with their evaluation. The type of decision process used to rank each species was noted in the report "NWT Species 2000".

The time line in which each task was performed was short, but ranks were reviewed twice and were not finalized until late in the process (Table 1). This permitted longer discussions and gave more time to standardize the methodology within and across species groups (see Methodology below).

**Table 1. Time lines**

| Ranking | Reporting |
|---|---|
| **May - December 1999** - Drafting of species lists. | |
| | **December 1999** - Drafting the outline of a report, call for co-editors. |
| **January 2000** - Drafting of ranks for a first group of species - Amphibians and Reptiles. | 2000 |
| **February - April 2000** - Drafting of ranks -all selected species. | |
| **May 2000** - First review of all ranks by co-management boards. | **June 2000** - Review of the first draft by all co-editors. |
| **September 2000** - Review of Fish ranks by *DFO*. | |
| **October 2000** - Review of Marine Mammal ranks by *DFO*.<br>Review of bird ranks by *CWS-YK*.<br>Second review of all ranks by co-management boards. | **October 2000** - Review of final draft by all co-editors. |
| | **December 2000** - Printing and pre-distribution of report to co-editors. |
| 2001 | |
| | **February 2001** - Official release of report; Web-posting of both report and infobase. |

## Methodology - The Canada-wide guidelines in the NWT context

The General Status Working Group developed guidelines to standardize the evaluation process across jurisdictions.

These guidelines provided details on

- species scope,
- scoring criteria, and
- status rank categories and their definitions.

***Species scope***

The Working Group agreed that, for the year 2000 report, each jurisdictions would provide information on mammals, freshwater fishes, birds, butterflies, amphibians, reptiles, ferns and orchids. NWT provided ranks for all selected groups except butterflies. The NWT ranking group provided a species list of butterflies in the NWT for inclusion in the Canada-wide report in year 2000, but did not provide ranks due to lack of time and the limited number of experts on insects in the NWT (see Preparing for 2005).

Early in 1999, RWED hired a summer student to create lists of species found in the NWT for each species group. Because many species exist in both Territories, RWED shared resources with the Government of Nunavut to create these lists for both jurisdictions, based on published literature and local knowledge.

Printed references also provided additional baseline information that would be used to assess status rank of species, as well as to provide additional background information on, for example, the number and name of subspecies, the biology of the species, its habitat, its taxonomy, and its status according to COSEWIC and IUCN. See Appendix 4 for a complete list of fields and additional information.

If possible, species taxonomy and nomenclature followed the standard shared by the Association for Biological Information. When available, each species were also tagged with its unique *Element Code* developed and used by the Association for Biological Information and the Conservation Data Centres in Canada.

These species lists were originally developed using EXCEL ™ then transferred to ACCESS ™ . These lists were the precursors of the information database "NWT SPECIES MONITORING" made available to the public at the publication of the report "NWT Species 2000". This *infobase* was and still is the official compendium of all the information used to evaluate the general status of species in the NWT.

To date, the infobase includes current information on the initial eight species groups covered by the year 2000 report: mammals, freshwater fishes, birds, amphibians, terrestrial reptiles, butterflies, ferns and orchids. The infobase has grown to include information on additional groups: all vascular plants, lichens, mosses, marine fishes, molluscs, tiger beetles, dragonflies and damselflies. These last species were added mainly to gather information on the groups selected at a meeting of the General Status Working Group in Vancouver April 2001 for the next General Status report in year 2005.

### *Biological indicators and scoring matrix*

Guidelines were developed to convert data and information into status ranks. These guidelines use a set of seven indicators, each of which is scored according to general criteria. The guidelines adopted by the Working Group as a standard were originally detailed in the document *Proposal for Ranking Species Under the National Framework For Endangered Species Conservation* (Harper et al. 1996). The guidelines described in Harper et al. (1996) are based on definitions used in the IUCN Red List categories, CITES Criteria for Amendment of Appendices I and II, and the National Heritage Programs and CDCs of the Nature Conservancy. These indicators and criteria formed the basis for a detailed procedure used to evaluate the general status of species in the NWT.

In accordance with the adopted guidelines, seven indicators were used to rank the status of a species using a score matrix. These indicators described biological attributes related to size, i.e., population, number of occurrences, and distribution, related to trends in population and distribution, and related to threats to population and habitat.

*Size*

1) **Population Size** = the current estimate of the total number of mature individuals

2) **Number of Occurrences** = the estimated number of occurrences where the species currently persists. An occurrence, according to the IUCN definition, is a location or place where a species is found, in which a single event may affect all individuals of the taxon.

3) **Distribution** = the current range. In this report, distribution was calculated as the percentage of total NWT land or marine area covered by the range of the species.

*Trend*

4) **Trend in Population** = an estimate of the change in number of mature individuals over time.

5) **Trend in Distribution** = an estimate of the change in area of range over time

*Threat*

6) **Threats to Population** = observed, inferred, or projected factors affecting individuals or populations that may result in population declines.

7) **Threats to Habitat** = observed, inferred, or projected habitat alterations that may result in population declines.

Indicators were scored on an interval scale represented by four letters, from A to D.

***Size indicators and scoring criteria***

| | **SCORES** | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |
| **Population size** | Very small (<1000) | Small (1000-3000) | Medium (3000-10,000) | Large (> 10,000) |
| **Number of Occurrences** | Very small (0-5) | Small (6-20) | Medium (21-100) | Large (> 100) |
| **Distribution** | Very restricted (<3% of jurisdiction) | Restricted (4-10% of jurisdiction) | Regional (11-50% of jurisdiction) | Widespread (>50% of jurisdiction) |

*Population size*

Population size was defined by "the current estimate of the total number of mature individuals capable of reproduction." (Harper et al. 1996). A range of letter scores indicated uncertainty and natural fluctuations (e.g. irruptive species of mammals).

*Number of occurrences*

We estimated the number of occurrences by the number of sites where the species currently persists (Appendix 6; Harper et al. 1996). An occurrence, according to Harper et al. (1996), is a "location representing a habitat which sustains or otherwise contributes to the survival of a population".

Many discussions occurred on how big locations could be and how populations could be defined. Harper et al. (1996) explained the basis for including this attribute as an indicator: very few site occurrences would make a species "very susceptible to any number of ecological disturbances, both predictable and unpredictable…" . We adopted the definition of an occurrence that would integrate the disturbance concept and would not preclude any size determination. Occurrences were defined as locations or places where a species is found, in which a single event may affect all individuals of the taxon (IUCN/SSC Criteria Review Working Group. 1999). Based on this definition, even large sites covered by calving grounds of mammals, colonies of birds, and spawning grounds of fishes could be defined as a single occurrence because a single event may affect all reproductive individuals of that population.

For some groups of species, an occurrence was simply the site when individuals of that species were known to occur. In many cases, especially for plants and insects, the number of known occurrences obviously represented only a minimum estimate. Caution was used to assign rarity on species for which very little number of occurrences were found despite many investigations as opposed to species that were less studied. For further details see Appendix 7, point 4.

*Distribution*

Distribution was defined as the percent of the jurisdiction (here NWT) represented by the range of the species. The range was the area enclosed in the smallest possible polygon drawn around all individual occurrences recorded, or the area shaded in on the map given in a reference source. In practice, the percent distribution was estimated by counting grid marks falling in the range divided by the total number of grid marks available in the NWT. Very large areas of unsuitable habitat were excluded by deleting them from a species possible range, i.e., the entire area in which the organism might occur. For example, for all marine mammals except the Ringed Seal, the ocean area within the summer boundary of the permanent pack ice was excluded from the total number of pixels available in the NWT. More details on distribution are given in Appendix 7, point 1.

This indicator was augmented by information about the ecozones in which each species is found within the NWT and about habitat use (Appendix 4). When a species is known to exist in only a few sites, information on the area, region, or community was sometimes recorded.

Many species are at the limit of their natural range in the NWT. We noted them in the report by indicating which species had a distribution covering less than 10 % of the Territory.

***Trend indicators and scoring criteria***

| | **SCORES** | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |
| **Population trend** | Rapid decline (>50% in 10 years) | Decline (>20% in 10 years) | Stable (incl. natural fluctuations) | Increasing (any rate) |
| **Distribution trend** | Rapid decline | Decline | Stable | Increasing |

*Population trend*

Population trend was defined as the change in the number of mature individuals over time. This indicator had both qualitative (rapid decline, decline, stable, increase) and quantitative criteria (% change over a specified period). For example, a rapid decline was defined as a decrease in population of at least 50% in the last 10 years (or 3 generations whichever is longer).

Natural fluctuations were not considered part of a decline or increase. An observed decline was not considered part of a natural fluctuation unless there was evidence of this (Appendix 6; Harper et al. 1996).

Lack of long-term data for many species and populations within the NWT made this indicator difficult to use consistently. For example, for migratory birds nesting in the NWT, long-term data on numbers are available at some sites along the migratory routes from National bird surveys, but these trends could not be substantiated by any information or data from the breeding grounds in the North. Consequently, the National bird survey population trend may have had an undue weight in the evaluation of the status of some migratory bird species. See further details in Appendix 7, point 7.

Distinctions between declines and fluctuations were also difficult. Nevertheless, population trends were the basis for ranking many species as sensitive. Documenting population trends in the North was deemed essential to help future independent review of the data and information used to rank these species.

*Distribution trend*

Distribution trend was defined as a change in the geographic distribution of the species over time. Harper et al. (1996) describe quantitative criteria for this indicator: rapid decline is a decrease of 50%, whereas a decline is a decrease of 20% in the last 20 years or 6

generations, whichever is longer. These quantitative criteria were almost never consulted because very little data could be found to corroborate changes for which qualitative evidence existed. Most information about distribution trend was inferred from trends in population sizes or by comparing information about the historical distribution of a species in the NWT to more recent information (see field list for the infobase: Appendix 4).

***Threat indicators and scoring criteria***

| | **SCORES** | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |
| **Threats to population** | Extreme | Moderate | Limited | None |
| **Threats to habitat** | Extreme | Moderate | Limited | None |

*Threats to the population*

Threats to the population were any observed, inferred, or projected factors that can have a direct impact on population sizes. For example, we did not consider hunting, harvesting, or fishing a threat unless these activities were or could be conducted in such a way that they have an impact on population size.

Local or regional threats were described with the name of the region. Natural mortality factors were not considered threats unless there was evidence that these factors have been enhanced through human activities. In some cases, threats to population and habitat could not be distinguished.

The relative impact of threats was assessed mainly using qualitative criteria. Extreme threats affected, or had the potential to affect severely most of the populations in the NWT, and were impossible or difficult to mitigate. Moderate threats affected, or had the potential to affect severely some populations or moderately most populations in the NWT and could

be mitigated. Limited threats affected, or had the potential to affect very few populations in a limited fashion. For some species, the only information available on threats was a list of all potential threats with little evidence of their actual impacts. In these cases, threats were usually scored as "limited". When no potential threats were known, threats were scored has "None known". Uncertainty in whether or not potential threats existed was recorded by leaving the threat indicator blank.

*Threats to the habitat*

Habitat threats were any observed, inferred, or projected factors that can have a direct impact on habitat (loss, degradation, or fragmentation), which may result in population declines (Appendix 6; Harper et al. 1996). Most potential habitat threats were inferred by comparing the type of human activities present in a region with a species habitat requirement. The relative impact of threats to the habitat was assessed mainly using the qualitative criteria as described for threats to the population. Again, for many species, the only information available on threats was a list of all potential threats with little evidence of their actual impacts. For example, forestry and oil-gas development was described as potential threats, but whether these activities were conducted in such a way that they have an impact on population size was mostly unknown. Uncertainty in whether or not potential habitat threats existed was recorded by leaving the threat indicator blank.

## From Scores to Ranks

### *Standard general status ranks*

The General Status Working Group developed ranks that would describe the range of biological status of species. None of the ranks have a legal basis. These ranks defined a coarse–scale assessment of the general status of species. They are different from status designations assigned after detailed assessments done by some provincial committees on species at risk or by COSEWIC. This difference is reflected in the ranks' names and in their definition:

**At risk** - species for which a formal assessment has been completed and determined to be at risk of extirpation or extinction. This category was reserved for those species that had received such detailed, formal review and that had been listed as endangered or threatened either provincially or nationally.

Species with a COSEWIC status were *not* automatically included in the *At Risk* category. The General status process was considered a process independent from COSEWIC status assessment; a COSEWIC status did not dictate a general status rank. COSEWIC can be based on assessments made up to ten years ago. The independent rank evaluation insured that more recent data and information could be used to ranked any species at a lower than "may be at risk". If that case occurred, as for the Bowhead Whale in the Beaufort Sea, the species was left at that lower rank even if it had a COSEWIC status of endangered or threatened.

**May be at risk** - species that may be at risk of extirpation or extinction, and are therefore candidates for a detailed risk assessment. This category described species that have the highest priority for a detailed consideration.

**Sensitive** - species that are not believed to be at risk of extirpation or extinction, but that may require special attention or protection to prevent them from becoming at risk. This category described species that have medium priority for further consideration.

**Secure** - species that are not believed to be at risk or sensitive.

Some sensitive and secure species were from a group of species (e.g., ungulates, carnivores, waterfowl, fishes) that are more studied and better known than other groups. These species would continue to be looked after by wildlife management agencies and northern residents in the future, as they are generally species that are directly used by residents or species of social or economic importance.

**Undetermined** - species for which insufficient data, information, or knowledge is available to reliably evaluate their status.

**Not assessed** - species that have been reported in the NWT but have not been examined for the year 2000 report. Information may exist about these species, but was not consulted. Due to time constraints on the 2000 report, some taxa, especially the butterflies, have not been assessed.

**Exotic -** species that have been introduced into the NWT as a result of human activity.

**Extirpated** - species no longer thought to be present in the NWT, but that exist elsewhere in the wild.

**Extinct** - species that are believed to no longer exist in the wild.

**Accidental/vagrant -** species occurring infrequently and unpredictably, outside their usual range.

Some species appeared to be extending their range into the NWT. If these species were not capable of breeding in the NWT, or were not seen on a regular basis, they were given a rank of Vagrant. However, if these species were found to be breeding or found to be regularly sighted, they were given a rank other than Vagrant.

***Status rank evaluation guidelines***

Because experts ranked the status of most species independently, we established additional guidelines to help translate indicator scores into ranks (Table 2). These guidelines were more detailed than those given in Harper et al. (1996). As opposed the discussion-driven guidelines mostly used by other jurisdictions, the NWT guidelines were essentially rule-driven. Experts were requested to score each indicator according to the scoring matrix (see Biological indicators and scoring matrix), leaving the score field blank (see Appendix 4) if they judged that they did not have enough information to score an indicator. These scores were then converted by the expert into a general status rank by

following a rule-driven process demonstrated in the scoring matrix below. As indicated, a species was drafted a rank of the highest general status reached using any indicator.

Each expert followed this guideline, but exceptions were allowed. For example, if committees, experts and knowledgeable people were of the opinion that some indicators did not fully reflect a useful aspect of a species' biological status, the indicator was given less weight in drafting a status rank. In each case, justifications and comments were provided with the draft rank.

This type of rule-driven guidelines helped standardize the rank evaluation process in the absence of committee discussions and greatly helped the review process by encouraging experts to clearly state how they used both scores and additional available information to rank each species status.

## *Guidelines for Scoring Attributes and Assigning General Status Ranks*

| | | SCORE | | | |
|---|---|---|---|---|---|
| | Indicator | A | B | C | D |
| Size | 1A. Population Size | Very small (< 1000) | Small (1000 - 3000) | Medium (3000 - 10 000) | Large (> 10 000) |
| | 1B. Number of Occurrences | Very small (0 - 5) | Small (6 - 20) | Medium (21 - 100) | Large (> 100) |
| | 1C. Distribution | Very Restricted (< 3% of jurisdiction) | Restricted (4-10% of jurisdiction) | Regional (10 - 50% of jurisdiction) | Widespread (> 50% of jurisdiction) |
| Trend | 2A. Trend in Population | Rapid Decline (> 50% in 10 years) | Decline (> 20% in 10 years) | Stable (incl. natural fluctuations) | Increasing (any rate) |
| | 2B. Trend in Distribution | Rapid Decline | Decline | Stable | Increasing |
| Threat | 3A. Threat to Population | Extreme | Moderate | Limited | None |
| | 3B. Threat to Distribution | Extreme | Moderate | Limited | None |

**ASSIGN THE HIGHEST GENERAL STATUS REACHED USING ANY INDICATOR**

| | |
|---|---|
| May Be At Risk | |
| Sensitive | |
| Secure | |

Additional guidelines were also developed to help evaluate the ranks of some species by non-experts (see Appendix 7, point 8). Guidelines also emerged from discussions and suggestions as the project unfolded. For example in birds, most species ranked as "undetermined" had information to score only less than three or four indicators, whereas at least six scores were used to rank a species as "secure", "sensitive" or "may be at risk". Guidelines were developed to help assess whether or not enough information was available to rank the species to any other status than "undetermined", "not assessed",

"vagrant", or "exotic". If potential threats could not be detailed and scored, the species was usually ranked as *Undetermined* to reflect our lack of knowledge and indicated that we need further work.

## Referencing and citing guidelines

### *Reference codes*

To meet the different objectives of the General Status process, we found early that keeping track of "where the information came from" was at least as important as collating the information itself. A systematic referencing system was deemed essential to information validation, to future ranking exercises, and to insure that users of the Infobase would cite the information properly.

Each line of information in the Infobase was referenced to the original source. A semi-colon separates each input in the same field; a semi-colon also separates the corresponding source in the reference field.

Experts were requested to reference any inputs they added themselves; each input was validated and retained in the Infobase only after a source was referenced to it. This source could be a published document, an unpublished note or report, or the expert's "personal communication".

Each source was given an alpha-numeric code. These were not unique, that is, the same source may have more than one code. This occurred because experts were often working on different copies of the Infobase and could independently cite the same source and unknowingly give it different codes. However, the same code could not refer to two different sources. To insure this, codes were assigned following these guidelines: experts coded their own sources with their initials, followed by a letter describing the type of sources (e.g., B for books, P for pamphlets, A for articles, and H for "heads" or personal communication, W for web sites, etc.), then followed by a number. Exceptions occurred but were not numerous. References codes given by experts were retained as much as

possible to save validation time, reduce errors, and avoid producing orphaned input (input without reference source).

### *Citing the Infobase*

The Infobase is a public document, available though the Internet. However, it is a special document that can be cited only following a very strict protocol. This results from the very nature of the document. The Infobase cannot be considered a simple citable database containing original data or information. It is rather a compendium of cited information. In fact, the name "*Infobase*" was found for the compendium to "brand" it as something different than a database.

The Infobase functions in a fashion similar to other better-known compendiums like *Current Contents* (Institute for Scientific Information 2001). Abstracts listed in *Current Contents* can be read, but *Current Contents* cannot be used as the reference source for these abstracts. *Current Contents* will simply help users find citable information. Similarly, the Infobase should not be cited and is best used to retrieve the original information that can then be cited using its original source. However unlike *Current Contents*, the Infobase contains some information that is not available elsewhere, for example, a direct citation from a knowledgeable person. For these cases, the Infobase may be cited, but by using these specific guidelines.

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>
> > *(Referred from a CD version)*
> > *Knowledgeable person's name, Affiliation. 2000. in Government of the Northwest Territories. NWT Species Monitoring - Infobase. CD Format - Version 2000. Resources, Wildlife and Economic Development, GNWT, Yellowknife, NT.*
> >
> > *(Referred for the Web site)*
> > *Knowledgeable person's name, Affiliation. 2000. in Government of the Northwest Territories. NWT Species Monitoring - Infobase. Available online:*

*http://www.nwtwildlife.rwed.gov.nt.ca/monitor (Date accessed).*
*Resources, Wildlife and Economic Development, GNWT, Yellowknife, NT.*

## Preparing for 2005

Monitoring is continuous and the general status ranking process is expected to produce a re-evaluation of all the species ranked in the year 2000 report, in addition to a new group of species.

The Working Group drafted a work plan for the next report due in year 2005. Because the number of species remaining to be assessed is very large – tens of thousands of species are known to be present in Canada -- the Working Group suggested that the task necessary to evaluate species for the next report be staggered among the preceding four years. If these ranks were to be made public only in 2005, published ranks for some species would be up to four years old. The Working Group thus suggested that new set of ranks be published every year using the Internet. The year 2005 report would thus simply become a summary of the work done since the year 2000 report.

**NWT Provisional Status Ranks**

In the NWT, where expertise on some groups of species, for example insects and plants, is not strong, the process may require additional time for review of each rank. Each year, the status ranks for the proposed group of species would be drafted by experts or non-experts, and sent for review to co-management boards and external experts. The ranks under review would remain "provisional" until a review process is finalised. This would allow changes to be made on the provisory status ranks until the "final" ranks are assigned in year 2005. Each provisional Status Rank, dated by year, could be made public along with the species ranks from other jurisdictions. But again, the year 2005 report would be a summary of the work done since the year 2000 report, with a new set of Final ranks.

These additional species should have a provisional status rank by these due-dates:

**December 2001**

- Butterflies - 89 known species in the NWT (for jurisdictions, like the NWT, who had not ranked these species in year 2000). Two experts with extensive field experience are drafting, under contract, the status ranks for butterflies in the NWT and in Nunavut. Again, the Government of Nunavut agreed to share resources for this task.
- Vascular plant subset 1 :

  Pteridophytes (fern allies only) - 26 known species in the NWT,

  Gymnosperms (conifers family) - 6 known species in the NWT, and

  Genus of the Class Monocotyledoneae except grasses (Poaceae), sedges (Cyperaceae), and orchids (Orchidaceae) - 75 known species in the NWT.

The draft ranking of the plants will be done by non-experts, with the help of updated detailed methods similar to those described in Appendix 7.

**December 2002**

- Crayfishes - no known species in the NWT
- Vascular plant subset 2 - 20% of the 1220+ known species in the NWT:

  Grasses family (Poaceae) - 122 known species in the NWT

  and sedges family (Cyperaceae) - 128 known species in the NWT.

**December 2003**

- Margaritiferidae & Unionidae mussels - two known species in the NWT
- Vascular plant subset 3 - 20% of the 1220+ known species in the NWT. This group will consist of about 500 species; the first half of the Genus of the Class Dicotyledoneae, including:

| Family | Known species in the NWT |
|---|---|
| Apiaceae – Carrots | 12 |
| Araliaceae – Ginseng | 1 |
| Balsaminaceae – Touch-me-not | 1 |
| Betulaceae – Birches | 7 |
| Brassicaceae – Mustards | 87 |
| Callitrichaceae – Water-starworts | 3 |
| Caryophyllaceae – Pinks | 55 |
| Ceratophyllaceae – Hornwort | 1 |
| Chenopodiaceae – Goosefoot | 17 |
| Cornaceae – Dogwoods | 3 |

| | |
|---|---|
| Crassulaceae – Stonecrops | 4 |
| Droseraceae – Sundews | 3 |
| Elaeagnaceae – Oleastas | 3 |
| Elatinaceae – Waterwort | 1 |
| Empetraceae – Crowberry | 1 |
| Fabaceae – Peas | 41 |
| Fumariaceae – Fumitories | 3 |
| Geraniaceae – Geranium | 2 |
| Grossulariaceae - Currents | 5 |
| Haloragaceae – Water-milfoils | 5 |
| Hippuridaceae – Mare's tail | 1 |
| Linaceae – Flaxes | 2 |
| Myricaceae – Bayberriy | 1 |
| Nymphaeaceae – Water-lilies | 3 |
| Onagraceae – Evening-primroses | 12 |
| Papaveraceae – Poppies | 6 |
| Polygonaceae – Buckwheats | 18 |
| Portulacaceae – Purslanes | 4 |
| Ranunculaceae – Buttercups | 43 |
| Rosaceae- Roses | 53 |
| Salicaceae – Willows | 49 |
| Santalaceae – Sandalwoods | 2 |
| Saxifragaceae – Saxifrages | 39 |
| Urticaceae – Nettle | 1 |
| Violaceae - Violets | 9 |

**December 2004**

- Dragonflies and damselflies - 37 known species in the NWT
- Tiger beetles - nine known species in the NWT
- Vascular plant subset 4 - 20% of the 1220+ known species in the NWT. This group will consist of the re-assessment of ferns and orchids (41 known species) and of about 320 species in the remaining Genus of the Class Dicotyledoneae, including:

| **Family** | **Known species in the NWT** |
|---|---|
| Adoxaceae – Musroot | 1 |
| Amaranthaceae - Amaranth | 1 |
| Apocynaceae – Dogbanes | 2 |
| Asteraceae – Asters | 157 |
| Boraginaceae – Borages | 10 |
| Campanulaceae – Bellflowers | 4 |

| | |
|---|---|
| Caprifoliaceae – Honeysuckles | 6 |
| Cistaceae – Rock-rose | 1 |
| Diapensiaceae – Pincushion-plants | 2 |
| Ericaceae – Heath | 22 |
| Gentianaceae – Gentians | 11 |
| Hydrophyllaceae – Waterleaf | 1 |
| Lamiaceae- Mints | 10 |
| Lentibulariaceae – Bladderworts | 6 |
| Menyanthaceae – Buck-bean | 1 |
| Orobanchaceae – Broom-rape | 1 |
| Plantaginaceae – Plantains | 4 |
| Plumbaginaceae – Leadworts | 1 |
| Polemoniaceae – Phlox | 7 |
| Primulaceae – Primeroses | 16 |
| Pyrolaceae – Wintergreens | 8 |
| Rubiaceae – Madders | 7 |
| Sarraceniaceae – Pitcherplant | 1 |
| Scrophulariaceae – Figworts | 33 |
| Valerianaceae - Valerians | 3 |

**December 2005**

- Re-evaluations of the eight groups of species ranked in year 2000, except ferns and orchids re-done in 2004.

The nomenclature and taxonomy of many species of vascular plants has changed since the publication of the flora Porsild and Cody (1980). Consequently the exact number of species under evaluation may slightly differ from the numbers listed above. To facilitate cross-referencing between the old and the new taxonomy, the Internet-based infobase will include the name used in Porsild and Cody (1980), the corresponding new name as used in Kartesz (1999), as well as the Association for Biological Information (2001) "ELCODE".

The Working Group has initiated a critical review the general status process and is drafting a general guideline manual to be used across jurisdictions. Issues that are most likely to be discussed include:

- How to account for and evaluate uncertainty when drafting ranks?
- How can expertise be found for the lesser-known species groups?

- Should the process tackle sub-species as well as species?
- Should the process move from a geographical division of ranks based on political boundaries (i.e., jurisdictions) to a more ecological one? For example, should the process report on species rank integrated at the ecozone level independently of Provincial or Territorial boundaries?

A review of the process and guidelines as implemented in the Northwest Territories may reveal that some changes would be beneficial. Any of these changes should still insure that the NWT process remains consistent with the process used in other jurisdictions.

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## Appendix 1 - Copy of Brechtel et al. 1999 - reproduced with permission.

# MONITORING THE GENERAL STATUS OF WILD SPECIES:

# DRAFT INTERPRETATION OF SECTION 3 OF THE FRAMEWORK FOR THE CONSERVATION OF SPECIES AT RISK IN CANADA

# AND

# RECOMMENDATIONS FOR ESTABLISHING A NATIONAL PROCESS

**APPROVED BY THE WILDLIFE MINISTERS COUNCIL OF CANADA**

**APRIL 1998**

Prepared by a working group from:

Alberta - Steve Brechtel

British Columbia - David Fraser

Canadian Wildlife Service - Simon Nadeau and Charles Dauphine

Department of Fisheries and Oceans - Howard Powles

Nova Scotia - Sherman Boates

Ontario - Doug Hagan

January, 1999

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# A NATIONAL PROGRAM TO MONITOR [1] THE GENERAL STATUS OF WILD SPECIES IN CANADA

## INTRODUCTION

In signing the Accord for the Protection of Species at Risk in Canada, provincial, territorial and federal Ministers responsible for wildlife committed themselves to prevent species in Canada from becoming extinct as a consequence of human activity. The Framework for the Conservation of Species at Risk in Canada has been developed to identify the various tasks necessary to fulfil the commitments made in the Accord, and to implement a co-ordinated national approach for their achievement. One element of this Framework (Approach section 3) is a commitment to monitor the general status of wild species. It states:

### 3. MONITORING THE GENERAL STATUS OF WILD SPECIES

To evaluate periodically the general status of all species, jurisdictions will assess the status of species or species groups to identify those that may be in trouble, require special attention or protection, require additional information or trigger formal risk assessment.

Each jurisdiction will:

X Create and implement an ongoing process, using definitions and categories compatible with those set out by the CESCC, to assess and evaluate the general status of all wild species, species groups within its jurisdiction for the purpose of prioritizing species/species groups[2] where more information is needed and to identify species which require more detailed assessment;

X Produce a report on the known status of wild species/species groups within their jurisdiction at least once every five years.

The CESCC will:
Use reports from each jurisdiction to produce a summary report on the known status of Canadian assemblages at least once every five years.

This section will assist in fulfilling several of the commitments of the Accord, but is essential to clauses (iii) j: monitor, assess and report regularly on the status of all wild species; and (iii) k: emphasise preventative measures to keep species from becoming at risk.
Several components of this element of the National Framework need to be clarified, discussed and agreed on now so that we have a common understanding of what will be required from all of our organizations and the process that will be implemented to fulfil this task.

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[1] MONITOR in this context requires the determination of the general status of species, and then the tracking of changes in this status over time.

[2] The primary focus of this strategy is to determine the general status of species. For certain poorly described taxa, for which species lists are not available, (eg soil invertebrates) it will be appropriate to develop processes to define the status of species groups.

The following document clarifies the intent of this section of the national Framework and recommends an integrated process for evaluating and reporting on the general status of species at both the jurisdictional and national levels in Canada. It must be recognized at the outset, however, that this process (and the reports it produces) are dependent on the currently available data, knowledge, and information on the biological status of species. For many species our current understanding is inadequate to determine even a general status, and for some taxa comprehensive species lists do not yet exist. This is, however, an ongoing process which will improve in both precision and completeness over time. Early reports in this series will serve to define the general status of many species for which we have sufficient information. Of equal value, however, they will also help to focus management and data collection priorities by identifying what we do not yet know, but need to find out.

## BACKGROUND AND INTERPRETATION

Canada (and each jurisdiction within it) contains hundreds of vertebrate and thousands of plant and invertebrate species. While most of these are healthy and widespread, some are or may be at risk[3], while others require some level of conservation or management to prevent them from becoming at risk. The task of determining the general status of all wild species, and separating them into appropriate conservation categories, is the first logical step in any co-ordinated national approach to the conservation of species. It will be particularly valuable in the identification of species that may be at risk, but is also intended to help integrate and prioritize the conservation and management of the broad spectrum of species for which we are each responsible.

Section 3 of the national Framework identifies the general approach that will be taken to fulfil this task. A review and interpretation of the key phrases within Section 3 will help to set the parameters of this activity:

The purpose of this task is established in the first paragraph: To evaluate periodically the general status of all species...

...to identify those species that may be in trouble... - meaning those that are or may be at risk of extinction or extirpation nationally;

...require special attention or protection... - to prevent them from becoming at risk;

...require additional information... - to allow at least a general assessment of their status using this system;
...or trigger formal risk assessment. - Section 3 is an assessment of general status; a much more detailed assessment is necessary prior to establishing that a species is nationally threatened or endangered.

Each jurisdiction will - indicates that the federal government and each of the provincial and territorial governments will

Create and implement an ongoing process... - The determination of the general status of all wild species will never be complete. As our information improves, the accuracy and precision of status assessments will increase, but populations and habitat conditions will continue to change and influence the status of species in both positive and negative ways. This is an ongoing process not a single task.

...using definitions and categories compatible with those set out by CESCC... - This is one of the essential parameters of this process, and will enable CESCC to compile and produce national assessments which are based on information compiled by each jurisdiction in its geographic area of responsibility. Compatible, however, does not necessarily mean identical. Each jurisdiction retains the ability to use definitions and categories that are appropriate for its

[3] Risk means risk of extinction or extirpation

management needs, but has committed to ensure that these will be compatible with (at least as detailed as) those set out by CESCC. Each jurisdiction should also be responsible to clearly identify how its system of definitions and categories can be directly equated to those set out by CESCC.

...assess and evaluate the general status of all wild species, species groups within its jurisdiction...

- Clearly, the focus of this task is to determine the general **biological** status of species. The assessment and evaluation will include standard biological attributes such as the status and trends in populations, range and distribution, and habitat parameters. It will not include social or political considerations such as cost or achievability of recovery, public profile of the species, or other socio-economic values.

- The ultimate goal of the task is to assess the general status of **all wild species** in Canada. The scope of this task, however, is immense, and it will not be achieved for many years. For some poorly known taxa (particularly invertebrates) comprehensive species lists are not available, and new species remain to be described or identified as occurring in Canada. For many other taxa, our current understanding of the biological characteristics of individual species is inadequate to determine even their general status. In the short term, it will be possible to determine the general status of many species for which we have adequate information, knowledge, or data (e.g. vertebrates and vascular plants). Overall, however, this process will serve to clarify what we do and do not know about the status of species in Canada, and will thereby help to focus our future efforts.

- The focus of this process is the determination of general status for full biological species. While it may be applied to subspecies or populations which are of national or jurisdictional importance, this is a lower priority and should only be done after the respective species has been assessed and ranked.

- It is important to note here that this is a system based on species, not communities or ecosystems. Community or ecosystem health may be used as an element that influences species status, but this system is not intended to evaluate or assess the status of communities or ecosystems.

...for the purpose of prioritizing species/species groups... - Clearly, Section 3 is designed to provide a mechanism to group species into categories of similar status so that we can prioritize our activity on taxa ...where more information is needed and to identify species which require more detailed assessment . More detailed assessment, in this context, includes both species that may be at risk, and those that may require special attention or protection to prevent them from becoming at risk.

While this is to be an ongoing process, each jurisdiction has committed to ...produce a report on the known status of wild species groups within their jurisdiction at least once every five years. This will allow CESCC to ...use reports from each jurisdiction to produce a summary report on the known status of Canadian Species/species assemblages at least once every five years.

- It is important to note here that these reports will use currently available information to identify the known status of all wild species. It is clear that for many taxa, information, knowledge and data will be inadequate to establish a known status, particularly within the five year reporting period. Identifying that even the general status of these species can not be determined with current knowledge, and that we ...require additional information... , is a positive contribution of this process and will assist in prioritizing our collective efforts. A status undetermined or data deficient category will be needed, and for many taxa, the majority of species may initially be placed in this category.

## RECOMMENDATIONS FOR ESTABLISHING A NATIONAL PROCESS

In the national Framework, each jurisdiction has committed to create and implement an ongoing process to assess, evaluate, and report on the general status of all wild species, which is compatible with the definitions and categories set out by

CESCC. Clearly, the first essential step in establishing this national process is for CESCC to define the biological attributes to be considered, the categories of status that will be the result of these evaluations, and the process for compiling the reports from jurisdictions that will be used to produce the national status report. Each jurisdiction will then have a template upon which to build or refine their individual processes.

It must be recognized that all jurisdictions evaluate the status of the species for which they are responsible, and prioritize management and data collection programs to meet a variety of both biological and socio-political needs. The national general status determination process should, whenever possible, build on these jurisdictional processes, and serve to integrate and strengthen current efforts. Similarly, while jurisdictions will continue to establish their own data collection priorities, the National process will help to focus and co-ordinate data collection efforts.

**A - BIOLOGICAL ATTRIBUTES TO BE ASSESSED**

All evaluations of the biological status of species assess a similar group of biological attributes. We **recommend** that the CESCC establish the following as standard attributes, each of which will be evaluated by each jurisdiction, and will be compiled to determine national status:

1 Population Size
: The current estimate of the total number of mature individuals.

2 Population Trend
: An estimate of the change in number of mature individuals over time.

3 Geographic Distribution
: The current range.

4 Distribution Trend
: An estimate of the change in area of range over time

5 Number of Occurrences
: Estimated number of sites where the species currently persists.

6 Occurrence Trend
: Estimate of the change in the number of occurrences over time.

7 Factors Affecting Populations
: Observed, inferred, or projected factors affecting individuals or populations that may result in population declines or increases.

8 Factors Affecting Habitats
: Observed, inferred, or projected habitat alterations that may result in population declines or increases.

9 Status Elsewhere
: Biological status of the species outside of the jurisdiction doing the evaluation (may also include consideration of the proportion of the global or national population for which the jurisdiction is responsible).

Not all of these attributes will be equally applicable to all species. More detailed operational definitions, and standard criteria and guidelines to rank species within each attribute will have to be drafted, and approved by CESCC. When possible, these definitions and criteria should reflect both international systems (e.g. IUCN, The Nature Conservancy) and established Canadian processes (see Harper et al, 1996[4], and various provincial systems).

[4] Harper, B., G. Court, S. Brechtel, A. Harcombe, B. Hall, R. Halladay, and B. Andrews 1996. Proposal for ranking species under the National Framework for endangered species conservation. Unpublished report presented to the National Endangered Species Workshop, June 10, 1996. B.C. Ministry of the Environment and Alberta Department of Environmental Protection.

**B - STATUS CATEGORIES**

The primary result of the general status determination process will be a series of lists of species with similar biological ranks. We **recommend** that the CESCC establish the following five standard status categories:

1 - Species for which a detailed assessment has been completed and they have been determined to be at risk (extinct, extirpated, endangered, or threatened);

2 - Species that may be at risk of extinction or extirpation, and are therefore candidates for detailed risk assessment;

3 - Species which are not at risk but which are sensitive and may require special attention or protection to prevent them from becoming at risk;

4 - Species which are not at risk or sensitive;

5 - Species for which insufficient information, knowledge, or data is available to reliably evaluate their general status.

In addition to suggesting priorities for action by jurisdictions, the inclusion of species into status categories provides important information to all Canadians on the status of species which their actions may influence. In this context, the naming of these categories is important. We recommend that the above categories be referred to as:

1 - At Risk
2 - May Be At Risk
3 - Sensitive
4 - Secure
5 - Status Undetermined

In choosing names for the status rank categories resulting from this system, it is essential that they not be confused with the results of the much more detailed risk assessments that result in the formal designation of threatened or endangered species by COSEWIC, or the legal designations made by Canadian jurisdictions.

## C - EVALUATION AND REPORTING PROCESS

The assessment and evaluation process is intended to provide a coarse filter by which to rank species into categories of similar status. Given the large number of species to be ranked, it must be simple and flexible, and must accommodate great variation in the amount and quality of the data available.

There are a variety of species ranking processes being actively used by various jurisdictions in Canada and elsewhere, but they all use fundamentally the same process. We **recommend** that the national process established under Section 3 of the Framework build on existing systems, and utilize the following 6 steps at both the jurisdictional and national levels:

1 - Status categories are created and defined, and guidelines are established to help in the assignment of species to the appropriate category;

2 - Standard biological attributes to be assessed are defined, and criteria and guidelines to assist in the ranking of species within each attribute are identified;

3 - The best currently available data, information, and knowledge is compiled (in the national process, this information would be drawn primarily from the jurisdiction status evaluations);

4 - A group of knowledgeable individuals meets and ranks each of the nine biological attributes for each species, and then, giving consideration for any unique characteristics of the species, identifies a general status rank for each species within a particular taxa (professionals, scientists, naturalists, individuals familiar with the ranking process, and others should be included in this process);

5 - Written documentation of the key information used, how it was interpreted, and the reasoning behind the identified status rank is recorded in a standard format;

6 - The status rank, and written documentation on which it is based, is made public, is reviewed and revised on an ongoing basis and as new information becomes available, and a summary report on the known status of species is published at least once every five years.

This process utilizes both the best available scientific data and information, and the knowledge and opinions of informed individuals, including relevant traditional and community knowledge.

It is important to note that jurisdictions can apply this process in a variety of ways; including a large or limited public input process, or directing greater or lesser effort to the compilation current data, knowledge, and information. To a large extent, this will depend on the resources each jurisdiction has available and chooses to allocate to this task, and the utility each jurisdiction sees in the process for fulfilling its management responsibilities.

While it is important that each jurisdiction be free to utilize this system to meet its differing needs, it is essential that sufficient compatibility in definitions, biological attributes, measurement criteria, and status categories be maintained to allow CESCC to use the results of jurisdictional evaluations to compile and produce a national assessment of the general status of all species across their Canadian range.

To ensure this compatibility, we **recommend** that CESCC approve the status categories, biological attributes to be considered, and general process that have been identified above as the standard minimum measures that each jurisdiction will use, and that they establish a working group to:

- develop definitions and guidelines to be used in the placement of species within a particular status category, and the ranking of species within each biological attribute;

- co-ordinate and facilitate implementation of this process at the jurisdictional and national level over the next five years; and

- review and refine the process.

Membership in this working group should reflect the membership of CESCC and they should be able to draw upon other specialists and experts as needed to fulfil their task. The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) will be one of the prime users of the information compiled in this process, and will be involved in a similar process to establish priorities for detailed status assessments. It would be reasonable for this working group to function parallel to COSEWIC under the CESCC structure.

It should be recognized, however, that the identification of species that are or may be at risk and the triggering of formal risk assessment by COSEWIC is only one of the outcomes of this process. It will also identify and prioritize a broad diversity of species that are not at risk but may require special management or attention to prevent them from ever becoming at risk, and it will entail the first comprehensive national effort to identify species for which we currently have inadequate data to determine even a general status. In this context, Section 3 of the Framework for the Conservation of Species at Risk in Canada, will integrate with the national and jurisdictional initiatives for the conservation of Canadian biodiversity.

# Appendix 2 - Covering letter for draft outline - NWT Species 2000.

Distribution list

Dear Madam, Sir:

**Review of report outline - Ranking the Status of Wild Species in the NWT**

It is my pleasure to forward for your review an outline of our future report on the general status of wild species in the Northwest Territories (NWT). The report will be an integral part of NWT's contribution to the implementation of the Accord for the Protection of Species At Risk in Canada. All provinces and territories in Canada are preparing a similar report. The NWT report should be ready for publication in late summer 2000.

The report will summarize the results of a general ranking of more than 400 NWT species. This ranking distinguishes species that may be at risk of extirpation from species that are obviously secure. The process by which this ranking was done is detailed in the attached draft outline. The primary goal of this initial ranking is to prioritize species for further detailed assessment of their status. Detailed assessment could lead to a legal status designation by a Committee formed under future NWT Species-at-Risk legislation or by the Committee on the Status of Endangered Species in Canada (COSEWIC).

The report, which includes summary lists of ranked species, will also be useful for impact assessments of development projects and cumulative impact monitoring, and will be valuable as an education tool.

The attached outline is a summary of the work done so far. It represents months of effort and contributions from all Regional Offices and headquarters of the Department of Resources, Wildlife and Economic Development, from the Canadian Wildlife Service, Environment Canada, from the Department of Fisheries and Oceans, from Wood Buffalo National Park, and from many knowledgeable persons in the Northwest Territories. Participating agencies and governments, if they so request, will have the further opportunity to be a final editor of the work. Please indicate if you would like to jointly edit and publish the final version of the report. Logos of all parties involved with the final publication will appear on the report.

We ask, at this point, that you review the report outline, with special attention to the drafted status ranks. To help you during this preliminary review process, please find attached a copy of the information used to draft the status rank of a selected number of species. All the information collected on the 400 species is available upon request. Please feel free to request any additional information, and to review all aspects of the draft outline.

We would greatly appreciate your input before May 29, 2000. For your information, the projected timeline for publication is described below:

May 1 Start Wildlife Co-managament review of ranks and report outline.
May 29 Finalize co-managemet review and prepare first draft of text.
June 15 Review of first draft of report. Begin design layout.
June 30 Finalize review of first draft and prepare final draft.
July 15 Review of final report by all parties who requested to be co-editors.
August 15 Final report ready for Publication

Thank you for your participation. I look forward to working with you towards the publication of the first report on the status of wild species in the Northwest Territories.

Sincerely,

Robert McLeod
Deputy Minister

April 19, 2000

# Appendix 3 - List of contributors for species ranks and report "NWT Species 2000".

Ad Hoc Ranking Committees

*Arctic Stock Assessment DFO Committee - Freshwater Fishes*
C. Day
R. Tallman
S. Cosens
Arctic Stock Assessment Section
DFO Science Directorate,
Freshwater Institute
Winnipeg, MB

*NWT Mammals Committee*
R. Graf[1]
R. Case[1]
R. Mulders[1]
S. Carrière[1]
A.Veitch[2]
R. Popko[2]
J. Nagy[3]
J. Lange[1]
B. Elkin[1]
A.Gunn[1]
Resources, Wildlife and Economic Development
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[3]Inuvik, NT

**Personal Contributions**

R. Bell
Fisheries Joint Management Committee
Inuvik, NT

B. Benn
Gwich'in Renewable Resource Board
Inuvik, NT

A. Bourque
North Slave Region
RWED
Government of Northwest Territories
Yellowknife, NT

M. Bradley
Wood Buffalo National Park
Fort Smith, NT

R.G. Bromley
Whole Arctic Consulting
Yellowknife, NT

S. Carrière
Wildlife and Fisheries Division
RWED
Government of Northwest Territories
Yellowknife, NT

R. Case
Wildlife and Fisheries Division RWED
Government of Northwest Territories
Yellowknife, NT

P. Clarkson
Gwich'in Renewable Resource Board
Inuvik, NT

S. Cosens
Fisheries and Oceans Canada
Winnipeg, MB

C. Day
Fisheries and Oceans Canada
Winnipeg, MB

B. Elkin
Wildlife and Fisheries Division RWED
Government of Northwest Territories
Yellowknife, NT

K. Ditz
Fisheries and Oceans Canada
Yellowknife, NT

M. A. Fournier
Canadian Wildlife Service
Environment Canada
Yellowknife, NT
and
Amphibians and Reptiles Conservation Network
Northwest Territories Co-ordinator
Ecology North

E. Haber
National Botanical Services
Ottawa, ON

G. Gilchrist
Canadian Wildlife Service
Environment Canada
Yellowknife, NT

R. Graf
Wildlife and Fisheries Division
RWED
Government of Northwest Territories
Yellowknife, NT

A. Gunn
Wildlife and Fisheries Division RWED
Government of Northwest Territories
Yellowknife, NT

G. Hammerson
The Nature Conservancy
Higganum, CT, USA

L. Harwood
Western Arctic Area - Central and Arctic Region
Fisheries and Oceans Canada

Inuvik, NT

J. Hines
Canadian Wildlife Service
Environment Canada
Yellowknife, NT

V. Johnson
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E. Krutko
South Slave Region
RWED
Government of Northwest Territories
Fort Providence, NT

J. Lange
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Winnipeg, MB

J. Morin
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J. Nagy
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J. Obst
Arctic Ecology & Development Consulting Yellowknife, NT

B. Olsen
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Tulita, NT

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R. Popko
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Government of Northwest Territories
Norman Wells, NT

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M. Robertson
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R. Sanderson
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Fort Providence, NT

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Inuvik, NT

A.Veitch
Sahtu Region
RWED
Government of Northwest Territories
Norman Wells, NT

L. Wakelyn
Canadian Wildlife Service
Environment Canada
Yellowknife, NT

# Appendix 4 - List of fields in the infobase "NWT Species Monitoring".

Fields for Nunavut were present in the original Excell ™ database, but not in the subsequent online Access ™ version. The Government of Nunavut was responsible for updating the information independently during the scoring and ranking phase of the general status evaluation.

Fields "REF" are codes leading to printed material or names of knowledgeable persons given as reference for the information detailed in field(s) immediately preceding. Preliminary referenced information was provided to experts to help them draft ranks for species. Experts were requested to add any information in any field, and were requested to provide their opinion on scores and ranks in fields specifically reserved for that purpose (marked by ***** in the table below).

| Field name | Note | Expert input |
|---|---|---|
| ***Species ID*** | Primary key | |
| ***Species latin*** | Scientific name | |
| **Species common** | English name | |
| **Class** | See Appendix 4, point 5 | |
| **Subclass** | | |
| **Order** | | |
| **Superfamily** | | |
| **Family** | | |
| **Subfamily** | | |
| **REF** | | |
| **ELCODE** | Element code (shared by CDCs and the ABI) | |
| **Number of known subspecies (in Canada)** | | |
| **REF** | | |
| **Number of known subspecies (in NWT)** | Name may be noted | |
| **REF** | | |
| **Number of known subspecies (in Nunavut)** | | |
| **REF** | | |
| **Ecozones[2]** | See Appendix 7, point 2 | |
| **REF** | | |
| **Historical distribution in NWT[1]** | See Appendix 7, point 1 | |
| **REF** | | |
| **Distribution in NWT[1]** | See Appendix 7, point 1 | |
| **REF** | | |
| **1C & Comments** | Score and comments for Distribution indicator | * |
| **Historical Distribution in Nunavut[1]** | See Appendix 7, point 1 | |
| **REF** | | |
| **Distribution in Nunavut[1]** | See Appendix 7, point 1 | |
| **REF** | | |
| **Trend in Distribution** | | |
| **REF** | | |

| | | |
|---|---|---|
| **2B & Comments** | Score for Distribution trend indicator | * |
| **Population size (in NWT and Nunavut)** | | |
| **REF** | | |
| **1A & Comments** | Score for Population indicator | * |
| **Trend in population in NWT** | See Appendix 7, point 7 | |
| **REF** | | |
| **2A & Comments** | Score for Population trend indicator | * |
| **Trend in population in Nunavut** | See Appendix 7, point 7 | |
| **REF** | | |
| **# of occurrences in the NWT[4]** | See Appendix 7, point 4 | |
| **REF** | | |
| **1B & Comments** | Score for Occurrences indicator | * |
| **# of occurrences in Nunavut[4]** | See Appendix 7, point 4 | |
| **REF** | | |
| **Density** | Any referenced information on density | |
| **REF** | | |
| **Threats to population** | Descriptions | |
| **REF** | | |
| **3A & Comments** | Score for Threats to population indicator | * |
| **Threats to habitat** | Descriptions | |
| **REF** | | |
| **3B & Comments** | Score for Threats to habitat indicator | * |
| **Habitat[3]** | See Appendix 7, point 3 | |
| **REF** | | |
| **Age at Maturity (of female)** | | |
| **REF** | | |
| **Longevity** | | |
| **REF** | | |
| **Frequency of reproduction (per year)** | | |
| **REF** | | |
| **Host-food species (if relevant)** | | |
| **REF** | | |
| **Economic considerations** | Any information on economic consideration such as direct use by humans | |
| **REF** | | |
| **COSEWIC status** | COSEWIC status with year of assessment | |
| **REF** | | |
| **Canadian Conservation Significance (plants)** | See Appendix 7, point 6 | |
| **REF** | | |

**IUCN status or CDC rank**

| | | |
|---|---|---|
| **REF** | | |
| **STATUS** | Status rank | * |
| **Comments** | General comments | |
| **Decision process** | Notes on type of process, e.g., committee or independent experts | |
| **Sent to National** | Dates of contribution to the Canada-wide ranking | |

## Appendix 5 - Copy of the instructions forwarded to experts with the database (version June 2000).

# Instructions to Experts for scoring species

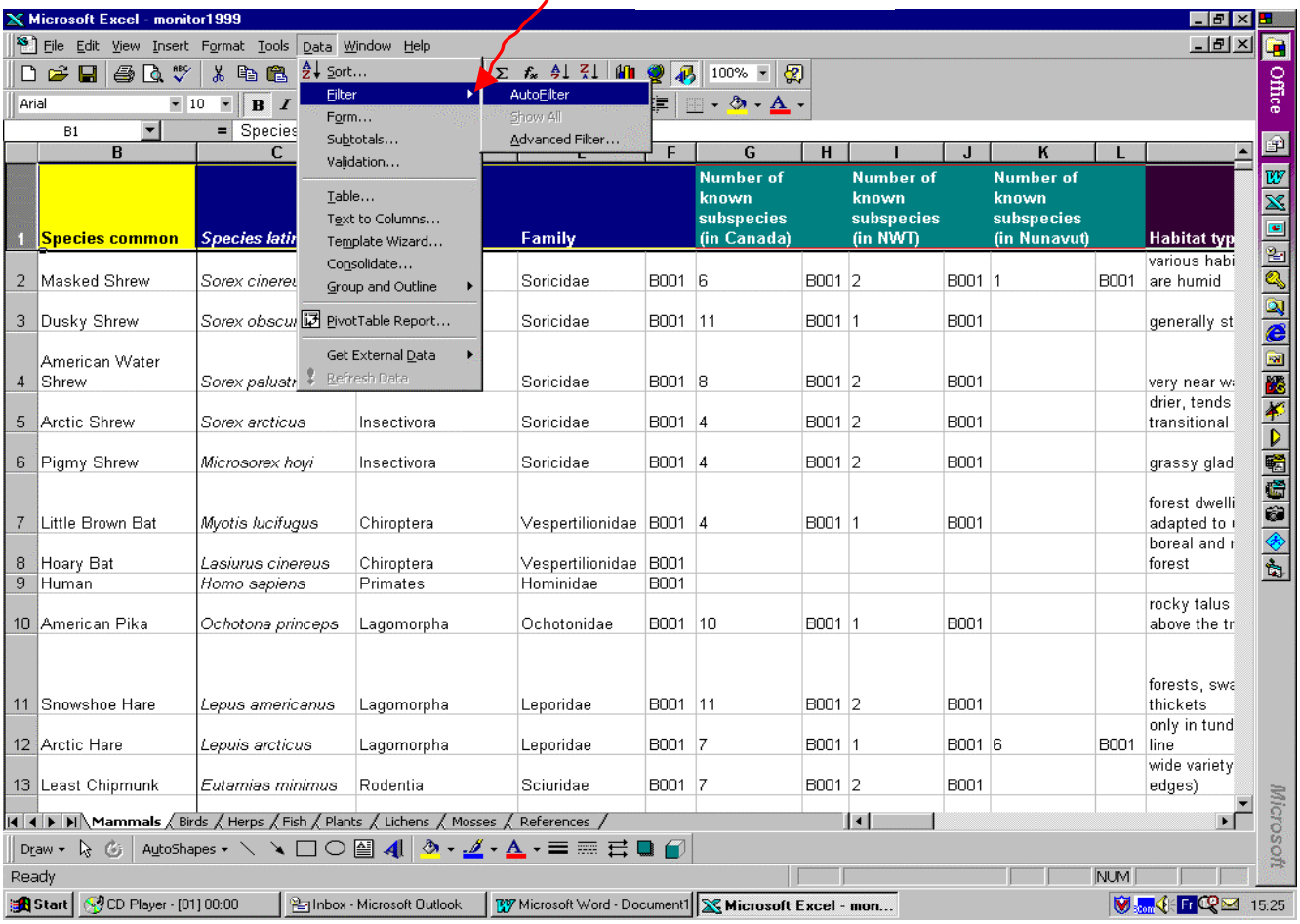
**What is the Species Monitoring Infobase?**

The Infobase is available in two formats, as an Excel-based list and as an Access database. The details below specifically refer to the Excell format. The infobase is divided into species group, e.g., Mammals, Birds, Herps, Fishes, Plants (Vascular), Lichens, Mosses, where each is listed in an individual sheet (Excell) or linked to an individual button (Access).

Referenced information or attributes on taxonomy, life history, abundance, and distribution augment the Species list. These were added to help you score each species. The information provided is from printed material only. A blank cell indicates that no information is available or could be found when the database was distributed. If you have new information, or feel or know that one of these attributes is erroneous, please make a note in a text file. All cited literature is noted besides the information using a code (e.g., B001) and cross-referenced in the "References and Notes" sheet.

The information that each expert insert in the Infobase as a Personal Communication (i.e., information not from printed material) will be preserved in the Infobase as a Pers. Comm. and become part of the next public version. Treat all comments as Pers. Comm.

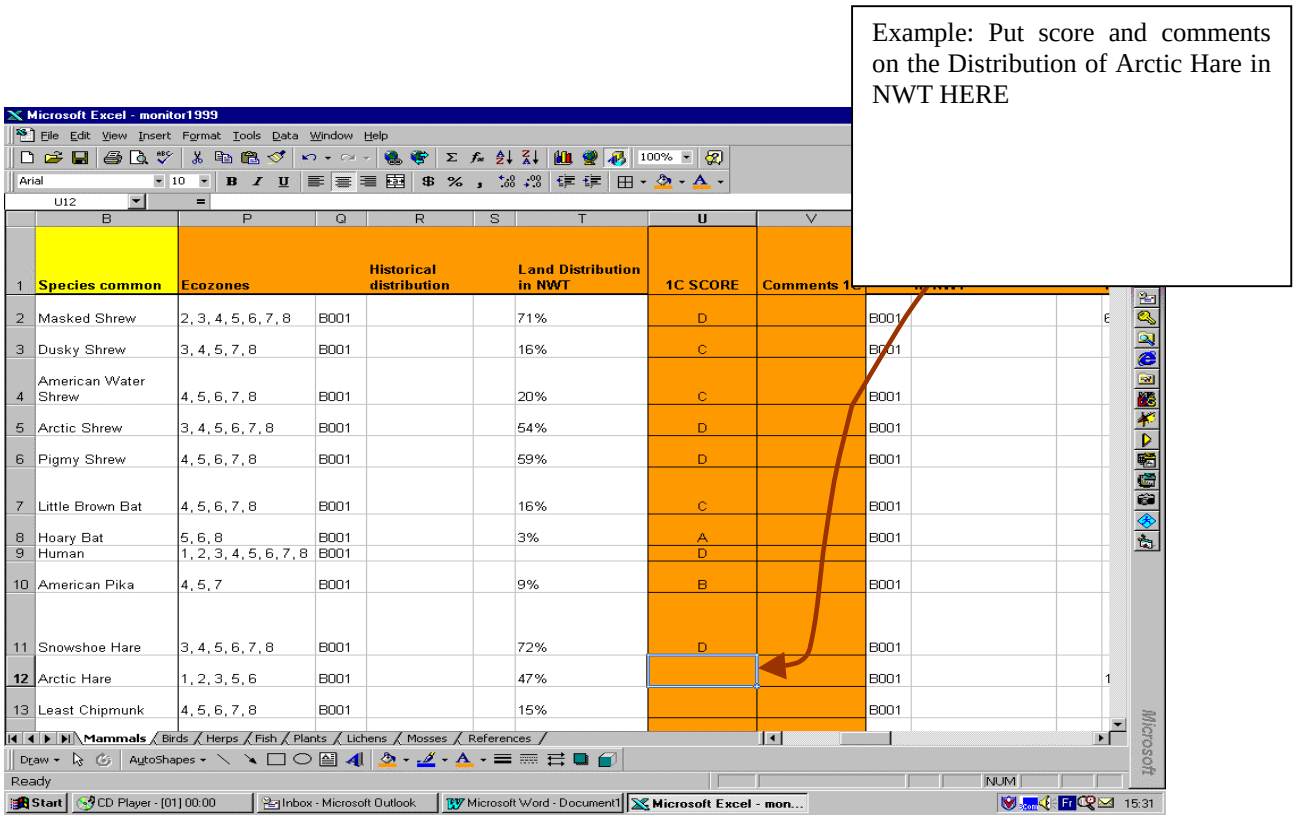
**How do I navigate in the Excell format database.**
Before modifying the database, please make a copy as backup.



The easiest way to quickly find a species is to use the AutoFilter. Simply select the first row of the sheet (i.e., the colored row) and click on Data-Filter-Autofilter (Figure 1). Arrows will appear beside each column name (e.g., Species common) for you to use in select a species to work on.

**How to score a species?**

Use your general or expert knowledge of the species to score up to seven indicators in the database. The indicators are related to 3 aspects of a species status: Size (Indicators 1), Trends (Indicators 2), and Threats (Indicators 3). All scores are colour-coded to help you navigate among the 3 different kinds of attributes. Use the score matrix (Annex 1) to guide you in applying a score from A to D for each indicator. Use your best judgment, refer to the definitions provided (Annex 1), and feel free to add any comments (reasons, qualifiers, uncertainty, etc.) in the cell next to each score.




**What kind of comments to write.**

Comments should be descriptive but simple. For example, threat to populations may be described in the comments cells as « disease; northern limit with low reproductive rates ».

Useful comments include :
For Size indicators, indicate comments on :
- Extrapolation from density
- Extrapolation from a small-scale study
- Educated guess based on (described) e.g., hunting or harvest returns

For Trend indicators:
- Measured past or present trend
- Potential trend due to x (describe) reasons
- Educated guess based on (described)

For Threats indicators:
- List of the major threats, e.g., DDT, human disturbance, disease, habitat loss, over-harvesting, etc.

**What to do if there is too little information to score something?**

There are two kinds of uncertainty, each of which should be noted differently.

1- If you feel you cannot say anything about a species – leave all the score and comment cells blank. This will tell us you have chosen not to assess this species.
2- If you know there is little information available but you can score at least one attribute for a species, put "?" in the score cells for which you have too little information to score. Make a note of your uncertainty in the comments cells.

**If you have any questions, please contact:**

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Wildlife and Fisheries
Department of Resources, Wildlife and Economic Development
Government of the Northwest Territories
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Canada X1A 3S8
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**Thank you very much for your help!!**

**GENERAL STATUS CATEGORIES**
**Defined/adopted by the General Status Working Group**

**January 2000**

**1-AT RISK** - species for which a formal assessment has been completed and determined to be at risk of extirpation or extinction

**2-MAY BE AT RISK** - species that may be at risk of extirpation or extinction, and are therefore candidates for a detailed risk assessment

**3-SENSITIVE** - species which are not believed to be at risk of extirpation or extinction, but may require special attention or protection to prevent them from becoming at risk

**4-SECURE** - species which are not believed to be at risk or sensitive

**5-UNDETERMINED** - species for which insufficient data, information, or knowledge is available to reliably evaluate their status

**6-NOT ASSESSED** - species known or believed to be present but which have not yet been assessed

## Annex 1: Score matrix

| | SCORE | | | |
|---|---|---|---|---|
| **Indicator** | **A** | **B** | **C** | **D** |
| **1a. Population Size** | Very small (< 1000) | Small (1000-3000) | Medium (3000-10000) | Large (> 10 000) |
| **1b. Number of Occurences** | Very small (0-5) | Small (6-20) | Medium (21-100) | Large (> 100) |
| **1c. Distribution** | Very Restricted (< 3% of jurisdiction) | Restricted (4-10% of jurisdiction) | Regional (11-50% of jurisdiction) | Widespread (> 50% of jurisdiction) |
| **2a. Trend in population** | Rapid Decline (> 50% in 10 years) | Decline (> 20% in 10 years) | Stable (incl. Nat. fluctuations) | Increasing (any rate) |
| **2b. Trend in Distribution** | Rapid Decline | Decline | Stable | Increasing |
| **3a. Threat to population** | Extreme | Moderate | Limited | None |
| **3b. Threat to Habitat** | Extreme | Moderate | Limited | None |

## Definitions:

**Population size:** Number of mature individuals estimated or inferred to be capable of reproduction. Where a population is characterized by natural fluctuation use the lower estimates.

**Occurrences:** Locations or places where a species is found, in which a single event may affect all individuals of the taxon.

**Distribution:** The smallest convex polygon of all the known occurrences

**Decline:** A recent, current or projected future decline, for which causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Does not include natural fluctuations in numbers.

Score matrix and guidelines for general status assignment

Score groupings for assigning

| | |
|---|---|
| MAY BE AT RISK | |
| SENSITIVE | |
| SECURE | |

**RULE: ASSIGN THE HIGHEST GENERAL STATUS REACHED USING ANY INDICATOR**

| | SCORE | | | |
|---|---|---|---|---|
| **Indicator** | **A** | **B** | **C** | **D** |
| **1a. Population Size** | Very small (< 1000) | Small (1000-3000) | Medium (3000-10000) | Large (> 10 000) |
| **1b. Number of Occurences** | Very small (0-5) | Small (6-20) | Medium (21-100) | Large (> 100) |
| **1c. Distribution** | Very Restricted (< 3% of jurisdiction) | Restricted (4-10% of jurisdiction) | Regional (11-50% of jurisdiction) | Widespread (> 50% of jurisdiction) |
| **2a. Trend in population** | Rapid Decline (> 50% in 10 years) | Decline (> 20% in 10 years) | Stable (incl. Nat. fluctuations) | Increasing |
| **2b. Trend in Distribution** | Rapid Decline | Decline | Stable | Increasing |
| **3a. Threat to population** | Extreme | Moderate | Limited | None |
| **3b. Threat to Habitat** | Extreme | Moderate | Limited | None |

## Appendix 6 - Copy of Harper et al. (1996)

# Proposal for Ranking Species Under the National Framework For Endangered Species Conservation

By

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Steve Brechtel[1], Andrew Harcombe[1],
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June 10, 1996

## Proposal for Ranking Species[1] under the National Framework for Endangered Species Conservation

### GOAL

The maintenance of biodiversity in Canada by ensuring that no species becomes extinct as a consequence of human activities.

### PURPOSE

Regular evaluation of the well being of all species in Canada, to identify those that may be at risk of extinction, sensitive, or not at risk, with due consideration of their status elsewhere. Evaluation assists in setting conservation priorities nationally, federally, provincially and territorially.

### APPROACH

This is a proposed process for ranking the general status of wildlife species referred to in Item 3 in the draft National Framework for Endangered Species Conservation (National Framework).

Under the National Framework, ranking is used to identify the need and priority for detailed assessment and designation of species at risk nationally. Rankings are first prepared by management agencies (Federal, Provincial or Territorial bodies). Information used in these jurisdictional ranks are then compiled by the Canadian Endangered Species Conservation Committee (CESCC) to determine National Ranks (see Fig. 1).

CESCC and Federal, Provincial and Territorial bodies will all use current knowledge and compatible ranking processes for determining the provincial, territorial or national priority for more detailed assessment and status designation. The ranking process places species or groups of species in one of four categories within a provincial/territorial or national range as follows:

* THE RED LIST... includes any species known to be, or believed to be, at risk[2].

* THE YELLOW LIST... includes any species known to be, or believed to be, particularly sensitive to human activities or natural events.

* THE GREEN LIST... includes any species known to be, or believed to be, not at risk.

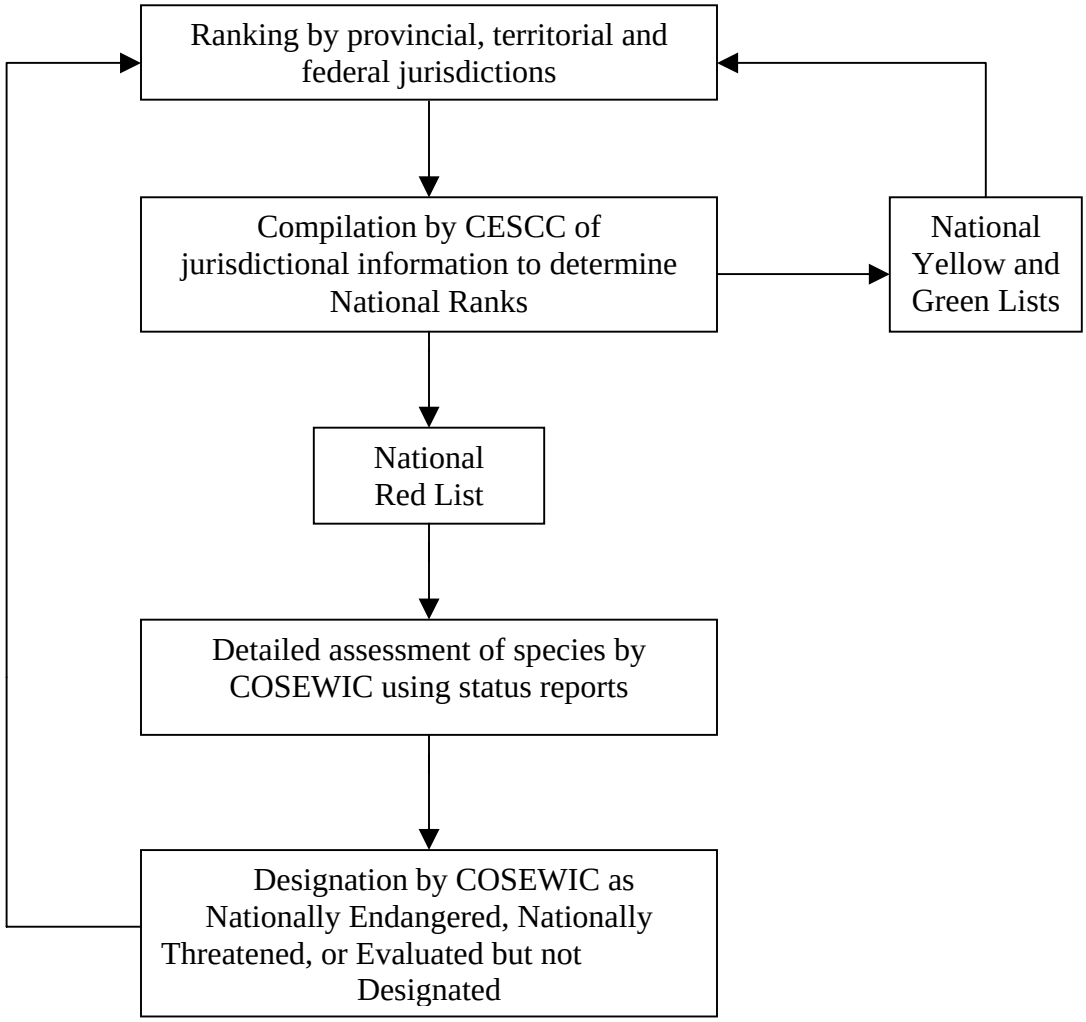
* STATUS UNDETERMINED... applies to any species where not enough information exists to adequately use the ranking system (exceptional cases only).

---

1- Species is defined as a regularly occurring indigenous species, subspecies, variety or geographically defined population of wild fauna or flora.

2- Risk refers to imminent risk of extinction or extirpation.

Figure 1. Relationship between the proposed national ranking system and detailed assessment and designation of species at risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).




## PROPOSED SPECIES RANKING SYSTEM

The Proposed system is designed to be a simple and flexible way of assimilating knowledge and data on the general status, of all wild species. Among other benefits, this will provide a preliminary assessment of species that may be at risk of extinction (RED LIST), species that are particularly sensitive to human activities or natural events (YELLOW LIST), and species that are considered to be not at risk (GREEN LIST) It is also designed to accommodate variation in the quality and quantity of data available for ranking. It is not designed to be used for detailed status assessment, such as that used in formal status designation by groups such as COSEWIC, although most of the criteria used will be similar. Neither is it designed to take into account the

economic, political, and logistical factors that affect the likelihood that recovery actions will be successful, since these factors are best addressed during the preparation of recovery plans.

The proposed system is similar to the system used by Natural Heritage Programs and Conservation Data Centres in various jurisdictions in North and South America. The same system is used to rank vertebrates, invertebrates, and plants. The standardized methodology and terminology mean it will be easy to exchange and share data across administrative boundaries, and compile provincial, territorial, and federal ranking information to determine national ranks for species. Ranking information can be made available to anyone who is interested, so specialists and other interested parties can debate the facts rather than mere subjective assessments.

The system uses seven criteria for evaluation, 1) population size, 2) population trend, 3) distribution trend, 4) geographic distribution, 5) number of occurrences, 6) threats to the population, and 7) threats to the habitat. Each criterion is rated on a scale from worst to best, "A" being the worst, and "D" being the best. Species with a large number of "A" criteria are the most at risk of extinction or extirpation, species with a large number of "D" criteria are demonstrably secure and essentially ineradicable under present conditions.

Table 1. Proposed criteria and rating scale for ranking the general status of all wild species.

| Criteria | Rating Scale | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |
| **Population Size** | <1000 | 1001-3000 | 3001-10,000 | >10,000 |
| **Population Trend** | rapidly declining | Declining | stable | increasing |
| **Distribution Trend** | rapidly declining | Declining | stable | increasing |
| **Geographic Distribution** | <3% of area | 4-10% of area | I 1 -50% of area | >50'% of area |
| **Number of Occurrences** | <5 | 6-20 | 21-100 | >I |
| **Threats to the Population** | extreme | Moderate | limited | none |
| **Threats to the Habitat** | extreme | Moderate | limited | none |

**Definitions of Criteria**

Definitions of the criteria used in the proposed ranking procedure are based on definitions used in the IUCN Red List Categories, CITES Criteria for Amendment of Appendices I and II (Res. Conf. 9.24), and' the Natural Heritage Programs and Conservation Data Centres of the Nature Conservancy.

**1. Population size**

Population size is defined as the current estimate of the total number of mature individuals capable of reproduction. Where populations are characterized by natural fluctuations the minimum number should be used. Likewise if the population is characterized by biased breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals that will take this into account (e.g. estimates of the effective population size - Ne). For many species a figure of less than 1000 individuals has been found to be an appropriate guideline of what constitutes a small population. The figures in the table are presented as general guidelines since it is impossible to give numerical values that are applicable to all taxa. It is likely that different definitions of what constitutes a small population will need to be developed for different taxonomic groups.

**2. Population trend**

Population trend is defined as an estimate of the change in the number of mature individuals over time. Rapidly declining is defined as a decrease of 50% in the last 10 years or 3 generations, whichever is longer. Declining is defined as a decrease of 20% in the last 10 years or 3 generations, whichever is longer. Natural fluctuations will not normally count as part of a decline, but an observed decline should not be considered part of a natural fluctuation unless there is evidence for this.

**3. Distribution trend**

Distribution trend is defined as a decrease in the geographic distribution of the species over time. Rapidly declining is defined as a decrease of 50% in the last 20 years or 6 generations, whichever is longer. Declining is defined as a decrease of 20% in the last 20 years or 6 generations, whichever is longer.

**4. Geographic distribution**

Geographic distribution is defined as the current area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of occurrence, excluding cases of vagrancy. The area within the imaginary boundary should, however, exclude significant areas where the species does not occur. For migratory species, the geographic distribution is the smallest area essential at any stage for the survival of the species.

**5. Number of occurrences**

Number of occurrences is defined as the estimated sites where the species currently persists. A site occurrence is described ecologically as a location representing a habitat which sustains or

otherwise contributes to the survival of a population. A site occurrence will be defined differently for different species depending on their natural history. When a species' distribution is extremely limited and there are very few site occurrences, it is very susceptible to any number of ecological disturbances, both predictable and unpredictable (the small population paradigm). This criteria is therefore the single most important factor influencing overall rank when the number of occurrences is few.

**6. Threats to the population**

Threats to the population are defined as observed, inferred, or projected direct exploitation, harassment, or ecological interactions with predators, competitors, pathogens or parasites which may result in population declines. Extreme threats are significant, affect more than half the population, and are unmitigated. Moderate threats are also serious, but effect less than half the population or are mitigated by some level of human protection. Limited threats are less significant to population viability, or are being mitigated through protective measures.

**7. Threats to the habitat**

Threats to the habitat are defined as observed, inferred, or projected habitat alterations (loss, conversion, degradation, or fragmentation) which may result in population declines. Extreme threats are significant, affect more than half the population, and are unmitigated**.** Moderate threats are also serious, but effect less than half the population or are mitigated by some level of human protection. Limited threats are less significant to population viability, or are being mitigated through protective measures.

**EXAMPLES OF RANKING FORMS**

Table 2 depicts an example of what a ranking form would look like using this system, if it were applied to the Anatum Peregrine Falcon in British Columbia. Rankings would be assigned at the jurisdictional level by a group of scientists that include species specialists as well as experts familiar with the ranking system. A letter code is entered in an appropriate box beside each of the seven criteria using the rating scale in Table 1. In some cases the group doing the ranking may find it most appropriate to assign a range of letter codes (e.g. B to C) given the level of information available. The comments field beside each letter code is very important, as this is where actual numbers, level of confidence, search intensity, actual types and level of threats, actual types and level of protection, and references in the literature are cited.

The final ranking is arrived at by considering all 7 criteria at once to determine the most appropriate category for the species (Red List, Yellow List, Green List, or Status Undetermined). For example, if the group believes the species fits the definition for Red-listing, meaning it requires more detailed formal assessment for possible designation as Endangered or Threatened, the species should be ranked on the Red List.

All 7 criteria are important, but depending on the species being assessed and circumstances involved, some criteria will. be a given higher weighting in the final ranking. There is a field on the form to explain the reasons why a species has been ranked in a particular category. In the example given in Table 2, low population size, small number of occurrences, and moderate threats to both populations and the habitat, led the group to rank BC's Anatum Peregrine Falcon on the Red List.

Determining National Ranks for wildlife species will involve a similar process as that outlined above for jurisdictional ranking. The ranking will also be done by a group of scientists that include species specialists as well as experts familiar with the ranking system. The difference is that the group will not be required to generate original information since they can compile the information given on each jurisdictional ranking form. Then after reviewing the "reasons" section of each jurisdictional ranking form, they will independently re-apply the criteria outlined in Table I at a national scale to determine the National Ranking of the species:

Table 2. Example of ranking at the provincial level for the Anatum Peregrine Falcon.

| **Species: Anatum Peregrine Falcon** | | **Jurisdiction: British Columbia** |
|---|---|---|
| **Criteria** | **Letter Code** | **Data, Comments and References** |
| Population size | A | Largely unknown, but likely very small (<50) |
| Population trend | C | Population declines in the past well documented but recent overall trend less clear. North American populations are increasing (Cade et al. 1988) |
| Distribution trend | C | Local extirpations documented in the past (e.g. Okanagan Valley - Cannings et al. 1987). Recent Overall trend unclear, may be increasing slowly. |
| Geographic distribution | C to D | Breeds in the Fraser Valley, and in the interior of the province from the Okanagan Valley north through the central interior and possibly in the Peace Lowlands (Campbell et al. 1990). Likely more widespread. |
| Number of occurrences | B to C | Less than 20 known breeding sites, although thought to be more widespread, but very local. |
| Threats to the population | B | Disturbance at nest sites may cause desertion. Environmental contaminants (DDT, DDE) may still Occur in certain areas at levels that will affect Reproduction. |
| Threats to the habitat | B | Urbanization and other development continues to Remove hunting habitat |

Ranking: **RED**
Reasons: **Very small population still in an early recovery stage. Very few breeding sites known. Low potential for population increase. Moderate threats to habitat and populations still occurring. Widely listed as endangered or threatened, including Canada (Cook and Muir 1984).**
Authors: **John Cooper, Myke Chutter, Syd Cannings, Bill Harper, Leah Ramsay**

Dates: **93-11-27 and 96-05-15**

# Appendix 7 - Detailed methods given in the infobase to describe and score indicators, describe additional species attributes, and assess ranks.

**1. Distribution Determination:** distribution was determined by counting the number of grid marks covered by the area in question in relation to total area.

**1.1** Area of organism's range = the area enclosed by the individual occurrences recorded, or the area shaded in on the map given in the reference source.

**1.2** Total possible range = the entire area in which the organism might occur.

**1.2.1** Terrestrial Mammals: the land mass of the mainland and islands (except those in James Bay), not including the area covered by Great Slave Lake and Great Bear Lake (NWT = 158 grid marks, NU = 244 grid marks).

**1.2.2** Marine Mammals:

**a)** for all marine mammals except the Ringed Seal: the ocean area open south of the permanent pack ice summer boundary (NWT = 54 grid marks, NU = 287 grid marks).

**b)** for the Ringed Seal: the entire ocean enclosed in Northern boarders (NWT = 167 grid marks, NU = 370 grid marks).

**1.2.3** Polar Bears: have a terrestrial and marine distribution.
Terrestrial = same as 1.2.1.
Marine = same as 1.2.2b).

**1.2.4** Birds: the land mass of the mainland and islands (except those in James Bay), including the area covered by Great Slave Lake and Great Bear Lake (NWT = 164 grid marks, NU = 244 grid marks). NOTE: as most birds in the North area migratory and present only during the summer months, the distribution given is for the locations present during the summer (the winter location is indicated in a different field).

**1.2.5** Herps: the land mass of the mainland and islands (INCLUDING James Bay), not including the area covered by Great Slave Lake and Great Bear Lake (NWT = 158 grid marks, NU = 245 grid marks).

**1.2.6** Fish: same as 1.2.4.

**1.2.7** Lepidoptera: same as 1.2.1.

**1.2.8** Molluscs:

**a)** freshwater = same as 1.2.4.

**b)** marine = same as 1.2.2a). (Note: only live specimen and literature records were included; empty shell records were not used in the distribution calculation).

**1.2.9** Plants: same as 1.2.1.

**1.2.10** Lichens: same as 1.2.1.

**1.2.11** Mosses: same as 1.2.1.

.

**2. Ecozone Determination**

**2.1** The terrestrial ecozones used and the location of these ecozones are defined by the Terrestrial Ecozones of Canada map from Natural Resources Canada:

Ecozone 1 = Arctic Cordillera
Ecozone 2 = Northern Arctic
Ecozone 3 = Southern Arctic
Ecozone 4 = Taiga Cordillera
Ecozone 5 = Taiga Plains
Ecozone 6 = Taiga Shield
Ecozone 7 = Boreal Cordillera
Ecozone 8 = Boreal Plains

Terrestrial ecozones for this database were determined by two methods:

**2.1.1** If a shaded distribution map was available, the ecozones recorded were those that fell underneath the shaded area.

**2.1.2** If occurrences (dots) were available, the ecozones recorded were those in which an dot occurred, NOT the ecozones which occurred within the area encompassed by the dots (range).

**2.2** For the Herps exclusively, ecozone 9 (Hudson's Plain) was included.

**2.3** For the Marine species, 3 marine ecozones were considered based on delineation of National Ecological Areas by the Committee on the Status of Endangered Species in Canada (COSEWIC). Only 2 marine zones are found in the North:

**2.3.1** Ecozone 10 = Arctic Ocean

In NWT and NU. From the Beaufort Sea to Baffin Island and Hudson and James Bays. Western boundary is the International border with Alaskan waters, and eastern boundaries are the tip of Elsemere Island, south to Cumberland Pen (Baffin), further south to across Hudson Strait.

**2.3.2** Ecozone 11 = Atlantic Ocean

In NU only. Western boundary is the tip of Elsemere Island, south to Cumberland Pen (Baffin), further south to across Hudson Strait and eastern boundary is the International border with Greenland, Denmark and the International oceanic waters.

**3. Habitat Determination:** Habitat = terrain type in which the species can most frequently be found throughout the year.

**3.1** Several taxonomic groups can be found in distinct habitats at different times of the year:

**3.1.1** Birds: many birds are migratory and reside in different locations and habitats during the summer and winter. Only the summer habitat is described (although the general winter location is mentioned in a separate field).

**3.1.2** Herps: when available, the summer, winter and breeding habitats are all mentioned.

**3.1.3** Fish: the adult and spawning habitats are mentioned. When available and differing from the adult or the spawning habitat, the immature / juvenile stage habitats are included.

**3.1.4** Lepidoptera and Odonata: adult and larvae habitats are included. Larvae habitat = the foodplant on which the larvae most commonly feed.

**4. Occurrences** = locations or places where a species is found, in which a single event may affect all individuals of the taxon .

**4.1** Most occurrence data consist of the specimen records which make up the distribution maps (these do not necessarily represent distinct occurrences, nor is it likely that they represent all of the occurrences present in the north, as many areas are un-surveyed)

**4.1.1** Molluscs: only live specimen and literature records are included; empty shells are not included as they could have originated from any location (similarly they are not used in the distribution calculation).

**5. Nomenclature** = the unique scientific (and common) names of each organisms.

**5.1** Common English names are included when present in the literature (many plants and marine molluscs lack common names).

**5.2** Scientific names:

**5.2.1** All taxonomic groups are classified at the Order, Family, *Genus* and *species* level, with the exception of **plants** and **marine molluscs,** which are classified at the Class, Family, *Genus* and *species* level.

**a)** As scientific names change, the nomenclature follows specific literature as cited in the infobase.

**b)** Common or recent scientific synonyms are included in parenthesis, for a few species. Other synonyms can be found in the references literature.

**5.2.2** Some taxas include additional nomenclature:

**a)** Herps: further classified into Class.

**b)** Butterflies: further classified into Subfamily.

**c)** Molluscs: freshwater species may be further classified into Class, Subclass, Superfamily, and/or Subfamily

**6. Canadian Conservation significance for plants**

Conservation of plants is directly related to conservation of specific habitat and areas where they occur. Rare disjunct and endemic plants must be given special attention as they may represent a large proportion of a genetic heritage of a species in a very restricted area.

**6.1** Plants are described according to Tables 3 and 4 in Reference B036

**6.2**. Definitions

**6.2.1** Endemic, rare = Plant species occurring only in Canada and rare.

**6.2.2** Rare throughout Canada = Plant species rare in NWT/Nunavut and also rare where it occurs elsewhere in Canada.

**6.2.3** Disjunct = Plant species present only as disjunct population(s) in NWT/Nunavut from other populations in Canada or adjacent jurisdictions.

**7. Population national trend determination and status assessment for land and shore birds.**

In Canada, population trends for some land birds are determined through a series of programmes done mostly on a national scale. Some of these programmes and projects have a limited northern component but most do not. A list is given below. Trends from these efforts were used for ranking birds. Additional information of National trends for Land birds can be found in references LWR01 and MAF12.

**7.1** List of monitoring contributors

BBS = North American Breeding Birds Survey (National)

CBC = Christmas Bird Count (National - trends from US and Canada of birds that may or may not breed in Canada)

CMMN = Canadian Migration Monitoring Network (National)

**7.2** Definition of National trends

**7.2.1** Decline based on National trend 5 = statistically significant decline > 3% per year, considered equivalent to a Rapid Decline (>50% in 10 yrs) for this ranking exercise

**7.2.2** Decline based on National trend 4 = statistically significant decline 1-3% per year, considered equivalent to a Decline (>20% in 10 yrs) for this ranking exercise

**7.2.3** Stable based on National trend 3 = none significant decline or increase, considered equivalent to Stable for this ranking exercise

**7.2.4** Increase based on National trend 1-2 = significant OR non-significant increase of 1-3% per year, considered equivalent to Increase for this ranking exercise

**7.3**. Assessment of status using National trends

7.3.1 If a Species is present in NWT with a distribution of regional level or more ( > 11 % coverage) and if a National trend exist, the National trend is taken into consideration when assessing status. For these species, we assumed that the population size and number of occurrences can also be scored as inferred from the large distribution, with knowledge of the breeding density and/or breeding habits of the species. The National trend information is always noted but is considered only after considering trends (local trends) in the North, if they are available. This step-wise consideration is necessary as the National trends are based on surveys predominantly in the southern parts of Canada, and may not completely reflect trends in the North (see references LWR01 and MAF12 for more details.

**7.3.2** If a Species is present in NWT with a distribution of Restricted level or less ( < 10 % coverage) and if a National trend exist, the National trend is noted only (see point 7.3.1), status is undetermined but exceptions exist.

**8. Status assessment for vascular plants.**

Determination of the status on plants in NWT was key-driven and based on printed material only; additional information from experts was not sought. References used were B003 and B036. Species nomenclature was reviewed using B115.

**8.1** Definition of status of plants in NWT based on references B003 and B036. A key to help assess status according to these definitions is provided at 8.2

**8.1.1 May Be At Risk =** Rare plant according to B036 **AND (**Endemic in Table 3; B036 **OR** Rare in Canada in Table 4; B036 **OR** Disjunct according to B036**)**. Please refer to **6.** Canadian Conservation significance for plants for more details.

**8.1.2 Sensitive =** Rare according to B036 or Local-rare according to B003 **AND NOT** as described in 8.1.1 **AND** the risk associated with threats can be inferred from site locations, habitat, and human activities in or near site locations.

**8.1.3 Secure = (**Widespread according to B036, appendix III **OR** not mentioned in B036**) NOT** as described in 8.1.1 and 8.1.2 **AND** the risk associated with threats can be inferred from site locations, habitat and human activities in or near site locations.

**8.1.4 Undetermined =** NOT as described in 8.1.1 **AND** the risk associated with threats **CANNOT** be inferred from site locations and human activities in or near site locations.

**8.1.5. Not Assessed =** Plant described in B036 or B003, but which have not been assessed or evaluated according to the key described in 8.2

**8.2** Key for determining status using information from B003 and B036.

Ia Rare plant listed in B036 as noted in 'Density' field and/or in 'Number of occurrences' field …. II

Ib Not Rare plant (B036) ……III

IIa Endemic (Table 3, B036) or Rare in Canada (Table 4, B036) or Disjunct (B036) as noted in 'Canadian Conservation significance' field…….. **May Be At Risk**

IIb Not Endemic or Rare in Canada ……...III

IIIa Risk of threats can be inferred from site locations, habitat and human activities……..IV

IIIb Risk of threats cannot inferred, i.e., threats may be described but impact and risk are difficult to assess……..……..**Undetermined**

IVa Rare (B036), rare-local plant (B003) as noted in 'density' field…….**Sensitive**

IVb Widespread, common, frequent (B003;B036) but not local rare (B003) ……..……..……..……..**Secure**

**Database references cited in detailed methods**

**B003** Porsild AE, and Cody WJ. 1980.Vascular Plants of Continental Northwest Territories, Canada, National Museums of Canada, Canada.

**B036** McJannet CL, Argus GW and Cody WJ. 1995. Rare Vascular Plants in the Northwest Territories. Syllogeus 73:1-104.Canadian Museum of Nature.

**B115** Cody W J . 1996. Flora of the Yukon Territory. National Research Council of Canada - Monograph Publishing Program**,** Ottawa.

**LWR01** Downes CM, E H Dunn and C M Francis. 2000. Canadian Landbird Monitoring Strategy: monitoring needs and priorities into the new millennium. A 9-15. Partners in Flight - Canada, Ottawa, ON.

**MAF12** Dunn E. 1997. Setting priorities for conservation, research and monitoring of Canada's land birds. Technical Report Series Number 293. Canadian Wildlife Service, Ottawa