***Species at Risk Act***
Management Plan Series

# Management Plan for Yukon Podistera (*Podistera yukonensis*) in Canada

## Yukon Podistera

2023

Government of Canada
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For copies of the management plan, or for additional information on species at risk, including the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) Status Reports, residence descriptions, action plans, and other related recovery documents, please visit the Species at Risk (SAR) Public Registry[1].

**Cover illustration:** Yukon Podistera, Miller's Ridge, Carmacks, Yukon.
Photo Syd Cannings

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[1] www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html

# Preface

The federal, provincial, and territorial government signatories under the Accord for the Protection of Species at Risk (1996)[2] agreed to establish complementary legislation and programs that provide for effective protection of species at risk throughout Canada. Under the *Species at Risk Act* (S.C. 2002, c.29) (SARA), the federal competent ministers are responsible for the preparation of management plans for listed species of special concern and are required to report on progress within five years after the publication of the final document on the SAR Public Registry.

The Minister of Environment and Climate Change is the competent minister under SARA for the Yukon Podistera and has prepared this management plan, as per section 65 of SARA. To the extent possible, it has been prepared in cooperation with the government of the Yukon as per section 66(1) of SARA.

Success in the conservation of this species depends on the commitment and cooperation of many different constituencies that will be involved in implementing the directions set out in this plan and will not be achieved by Environment and Climate Change Canada, or any other jurisdiction alone. All Canadians are invited to join in supporting and implementing this plan for the benefit of the Yukon Podistera and Canadian society as a whole.

Implementation of this management plan is subject to appropriations, priorities, and budgetary constraints of the participating jurisdictions and organizations.

[2] www.canada.ca/en/environment-climate-change/services/species-risk-act-accord-funding.html#2

# Acknowledgments

The initial draft of this management plan was written by Rhonda Rosie (private consultant). Subsequent drafts were developed by Syd Cannings and Nancy Hughes (Environment and Climate Change Canada, Canadian Wildlife Service – Northern Region [ECCC]). Bruce Bennett, Thomas Jung, Piia Kukka, and Caitlin Willier (Government of Yukon), and Don Reid (Wildlife Conservation Society) reviewed a draft of this plan. The Yukon Conservation Data Centre provided data on species occurrences.

# Executive Summary

Yukon Podistera (*Podistera yukonensis*) is a long-lived, tufted perennial herb with blue-green pinnate basal leaves. The leafless flowering stems bear compound umbels of small, bright yellow flowers that fade to white. This species grows from a stout elongate taproot, often forming clumps. It grows in alpine habitats in well-drained, rock-dominated areas; on talus or scree slopes, tors, and river bluffs with exposed bedrock.

Yukon Podistera is restricted globally to unglaciated areas of Alaska and west-central Yukon. Approximately 90% of its global range lies within Canada.

Yukon Podistera was listed as a species of Special Concern under Schedule 1 of the *Species at Risk Act* (SARA) in February 2019.

Perhaps the greatest long-term threat to Yukon Podistera is the loss of alpine habitat as a result of climate warming. Mining and mineral exploration have the potential of degrading habitat at specific sites.

The management objective is to ensure the long-term persistence of all extant subpopulations in Canada, including any newly located or rediscovered subpopulations.

The broad strategies to be taken to address the threats to the species are presented in the Conservation Measures section.

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# 1. COSEWIC* Species Assessment Information

**Date of Assessment:** November 2014

**Common Name (population):** Yukon Podistera

**Scientific Name:** *Podistera yukonensis*

**COSEWIC Status:** Special Concern

**Reason for Designation:** This long-lived plant, almost entirely restricted to Canada, is at risk due to projected loss of its alpine habitat as a result of rapidly changing climate. In addition, mining and mineral exploration are occurring at, or near, several locations.

**Canadian Occurrence:** Yukon

**COSEWIC Status History:** Designated Special Concern in November 2014.

* COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

# 2. Species Status Information

In Canada, Yukon Podistera (*Podistera yukonensis*) is listed as Special Concern on Schedule 1 of the federal *Species at Risk Act* (SARA).

NatureServe (2020) considers Yukon Podistera to be vulnerable to apparently secure globally (G3G4) and nationally in Canada (N3N4), and vulnerable to apparently secure in Yukon (S3S4). In the United States, it is considered critically imperilled to imperilled nationally (N1N2) and subnationally in Alaska (S1S2). Approximately 90% of the global range is found within Canada (COSEWIC 2014).

# 3. Species Information

## 3.1. Species Description

Yukon Podistera is a tufted perennial plant, which often forms dense clumps from a branched underground stem arising from a stout elongate taproot. The basal leaves are blue-green, 3-12 cm long, and pinnate[3] with 3-6 pairs of leaflets on opposite sides of the stem (Figure 1). The stems are 10-40 cm tall, leafless, and tinged with red when the plant is mature. The flowers form a compound umbel[4] with several to many rays 5-10 mm long. The five petals are small (about 1 mm long) and bright yellow when

[3] Pinnate leaves have small leaflets arranged along a central stem

[4] An umbel is a group of flowers radiating out from a single point; a compound umbel is an umbel with a group of umbels at the end of each stem.

newly opened (cover photo), quickly fading to white. The fruits are about 3-7 mm long by 1.5-3 mm broad, flattened, initially reddish but weathering to a straw color (COSEWIC 2014).

Figure 1. Yukon Podistera with maturing flowers going to seed; Miller's Ridge, Carmacks, Yukon. Photo: Syd Cannings

## 3.2. Species Population and Distribution

Yukon Podistera is one of just a few species restricted globally to eastern Beringia, which includes the unglaciated areas of Alaska and west-central Yukon. With the exception of one known subpopulation, Yukon Podistera is further limited to the upper Yukon River drainage, barely extending into Alaska at the western edge of its range. Approximately 90% of the species' global range lies within Canada based on a global extent of occurrence (COSEWIC 2014).

Twenty-seven subpopulations[5] of Yukon Podistera are known from Canada (Yukon Conservation Data Centre 2022). These subpopulations are isolated from each other by considerable distances, especially between a northern group of subpopulations centred in the Ogilvie Mountains and a southern group in the Dawson and Nisling Ranges (Figure 2).

The total number of individual plants of Yukon Podistera known in Canada is estimated to be between 17,000 and 30,000, of which approximately two-thirds are mature plants

[5] For consistency, the term 'subpopulation' is used here as it is in the COSEWIC report, where 'population' refers to the entire Canadian population and 'subpopulation' refers to groups of individuals isolated from other groups. In this case, 'subpopulation' is equivalent to the 'occurrence' of the Yukon Conservation Data Centre and NatureServe (2020): groups isolated from one another by more than 3 km.

(COSEWIC 2014, Yukon Conservation Data Centre 2022). This is a minimum estimate, since all subpopulations have not been fully censused, and there are potentially undiscovered occurrences. Trends are unknown, but a decline as a result of climate warming is inferred (COSEWIC 2014).

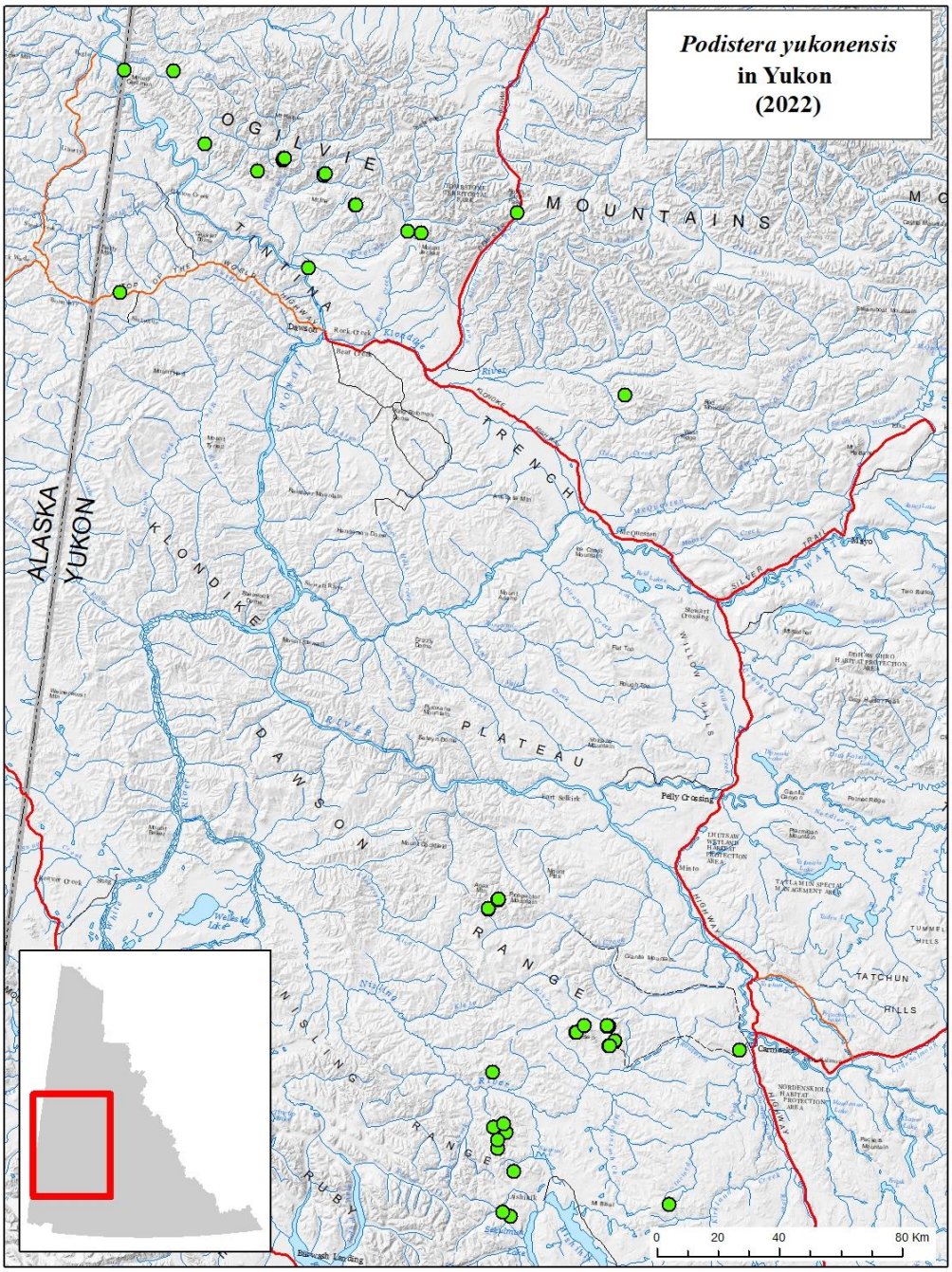


Figure 2. Known distribution (green dots) of the Yukon Podistera in Canada. The dots represent separate patches of the species; patches separated by less than 3 km of suitable habitat are included in the same subpopulation (Yukon Conservation Data Centre 2022).

## 3.3. Needs of the Yukon Podistera

Yukon Podistera is restricted to open, dry, well-drained, rock-dominated habitat, occurring in channels of developed soil and vegetation adjacent to or within rock. It is most often found on talus or scree slopes with slow movement through frost action, most commonly along the edges of vegetation strips oriented down the slope, made up of a mat of low grasses, forbs and lichen over a channel of soil. It also grows in crevices on rock tors, and on river bluffs with exposed bedrock. It grows primarily on south-facing slopes, but in a small number of sheltered microsites a few individuals have been found on east- and west-facing slopes. Slopes range from 5-40° and tend to have low snow accumulation, allowing for early spring exposure. In Yukon, it primarily grows at elevations between 1232 and 1777 m, with three subpopulations between 500 and 800 m (Yukon Conservation Data Centre 2022). In Alaska, it ranges from 360 to 1280 m (Parker 1995; University of Alaska Museum Herbarium ALA15084).

Yukon Podistera appears to be shade-intolerant, although part of the Miller's Ridge subpopulation (approximately 20 plants) does extend into the edge of an open aspen forest that is growing out of the debris flow (or mining trench) at the base of the slope that houses the majority of the subpopulation. The plants tolerate these conditions, but they do not appear to be as numerous, robust or fertile as the plants on the exposed, south-facing slope above (Bruce Bennett, pers. comm. 2020). It is possible that the forest is expanding over areas where Yukon Podistera established itself in the past under better conditions. The relatively young age of the aspen supports this hypothesis. Similarly, small numbers of Yukon Podistera have been found growing within the edge of an aspen forest below the main subpopulation on Kathul Mountain in Alaska (Batten et al. 1979).

Despite large areas of apparently suitable and available habitat at some of the sites searched, Yukon Podistera was only found in very small proportions of that habitat (COSEWIC 2014). This sparse distribution may be the result of poor dispersal capabilities of Yukon Podistera, or it may simply reflect our limited understanding of 'suitable' habitat.

There is no obvious link between the bedrock geology and the Yukon subpopulation sites, although none of the subpopulations occur on calcareous sedimentary rock (rock mostly or partially composed of calcium carbonate), which comprises much of the unglaciated areas of Yukon. There is, however, one small subpopulation of 32 plants in Alaska in the Ogilvie Mountains that is known to occur on calcareous shale scree (Parker 1997). In this instance, it may be that Yukon Podistera tolerates the calcareous conditions in order to take advantage of the open vegetation in the area (Parker pers. comm. 2013).

# 4. Threats

## 4.1. Threat Assessment

The Yukon Podistera threat assessment (Table 1) is based on the IUCN-CMP (World Conservation Union–Conservation Measures Partnership) unified threats classification system (Master et al. 2009). Threats are defined as the proximate activities or processes that have caused, are causing, or may cause in the future the destruction, degradation, and/or impairment of the entity being assessed (population, species, community, or ecosystem) in the area of interest (global, national, or subnational). Limiting factors are not considered during this assessment process. For purposes of threat assessment, only present and future threats are considered. Historical threats, indirect or cumulative effects of the threats, or any other relevant information that would help understand the nature of the threats are presented in the Description of Threats section.

**Table 1**. Threat calculator assessment, from COSEWIC (2014). Based on a meeting on 4 September 2014, attended by B. Bennett, S. Cannings, S. Dar, and T. Jung; reviewed in February 2021.

| Threat # | Threat description | Impact[a] | Scope[b] | Severity[c] | Timing[d] |
|---|---|---|---|---|---|
| 3 | Energy production & mining | Low | Restricted | Slight | High |
| 3.2 | Mining & quarrying | Low | Restricted | Slight | High |
| 6 | Human intrusions & disturbance | Negligible | Negligible | Slight | High |
| 6.1 | Recreational activities | Negligible | Negligible | Slight | High |
| 11 | Climate change & severe weather | Medium-Low | Pervasive | Moderate-Slight | High |
| 11.1 | Habitat shifting & alteration | Medium-Low | Pervasive | Moderate-slight | High |

[a] **Impact** – The degree to which a species is observed, inferred, or suspected to be directly or indirectly threatened in the area of interest. The impact of each threat is based on Severity and Scope rating and considers only present and future threats. Threat impact reflects a reduction of a species population or decline/degradation of the area of an ecosystem. The median rate of population reduction or area decline for each combination of scope and severity corresponds to the following classes of threat impact: Very High (75% declines), High (40%), Medium (15%), and Low (3%). Unknown: used when impact cannot be determined (e.g., if values for either scope or severity are unknown); Not Calculated: impact not calculated as threat is outside the assessment timeframe (e.g., timing is insignificant/negligible or low as threat is only considered to be in the past); Negligible: when scope or severity is negligible; Not a Threat: when severity is scored as neutral or potential benefit.

[b] **Scope** – Proportion of the species that can reasonably be expected to be affected by the threat within 10 years. Usually measured as a proportion of the species' population in the area of interest. (Pervasive = 71–100%; Large = 31–70%; Restricted = 11–30%; Small = 1–10%; Negligible < 1%).

[c] **Severity** – Within the scope, the level of damage to the species from the threat that can reasonably be expected to be affected by the threat within a 10-year or three-generation timeframe. Usually measured as the degree of reduction of the species' population. (Extreme = 71–100%; Serious = 31–70%; Moderate = 11–30%; Slight = 1–10%; Negligible < 1%; Neutral or Potential Benefit ≥ 0%).

[d] **Timing** – High = continuing; Moderate = only in the future (could happen in the short term [< 10 years or 3 generations]) or now suspended (could come back in the short term); Low = only in the future (could happen in the long term) or now suspended (could come back in the long term); Insignificant/Negligible = only in the past and unlikely to return, or no direct effect but limiting.

## 4.2. Description of Threats

The greatest threat believed to be facing Yukon Podistera is the loss of alpine habitat through climate change. Habitat shift (shrubification upslope) is expected to be significant in the longer term.

**IUCN-CMP Threat 3. Energy production & mining** (Low impact)

*3.2. Mining & quarrying*

Approximately 5-9% of the Canadian population occurs in four subpopulations that are on active quartz mining claims (Yukon Conservation Data Centre 2022, Yukon Energy, Mines and Resources 2022); most of the claims are in the exploration stage. An additional 28-56% of the Canadian population occurs in six subpopulations within 2 km of active mining claims (Yukon Conservation Data Centre 2022).

**IUCN-CMP Threat 6. Human intrusions & disturbance** (Negligible impact)

*6.1 Recreation*

Impacts of recreation are considered negligible, given the remote nature of most of the subpopulations. Miller's Ridge is along a popular hiking route with no established trail. Scrambling (climbing/hiking in areas with loose soil) possibly could affect the population. The only other site within easy walking distance of a road is the one at Little Gold on the Top of the World Highway, but this one is on a small tor that is unlikely to be eroded by walkers (B. Bennett, pers. comm. 2020).

**IUCN-CMP Threat 11. Climate change & severe weather** (Medium-low impact)

*11.1 Habitat shifting & alteration*

Loss of alpine habitat as a result of climate change is ongoing.

Climate change is predicted to bring warmer, wetter conditions to the southern Yukon. Ryan *et al*. (2022) summarize the latest projections for the south-central Yukon. Mean annual precipitation in the region is projected to increase by 20-22% by the 2050s; winter, spring and summer precipitation is projected to increase 11-26%, and fall precipitation is projected to increase 35-36%. Precipitation by snow is expected to increase 11-12%. Temperatures are projected to increase 2.5-3.1°C in the summer and fall, and 2.1-2.6°C in the winter and spring. The number of frost-free days is expected to rise by 24-26 days, a 22-24% increase.

With a warming climate, the shrub line in Yukon mountain ranges is advancing upslope (Danby and Hik 2007, Myers-Smith 2011, Myers-Smith et al. 2011). The loss of alpine tundra and the increase in shrub cover will likely decrease the amount of habitat suitable for Yukon Podistera, threatening its persistence. Shrubification will likely increase snow capture, which would further reduce habitat suitability for a plant that appears to favour early spring exposure. At the Miller's Ridge site near Carmacks, Trembling Aspen infill appears to be degrading Yukon Podistera habitat around the edges of the subpopulation, leading to plants that are less numerous, robust and fertile than those in the adjacent, exposed sites (COSEWIC 2014).

# 5. Management Objective

- To ensure long-term persistence of all extant subpopulations in Canada, including any newly located or rediscovered subpopulations.

Continuing presence of apparently stable subpopulations at known sites over the long term (at least 50-100 years) both implies and requires continued habitat integrity. In the case of Yukon Podistera, this means the persistence of open (unshaded), undisturbed, rocky habitat.

# 6. Broad Strategies and Conservation Measures

## 6.1. Actions Already Completed or Currently Underway

- Extensive surveys for Yukon Podistera were undertaken by Canadian Wildlife Service staff in 2012-14; 174 sites were visited in 104 person days of effort. These surveys were designed primarily to locate undiscovered subpopulations; preliminary counts of individuals were made and habitat described in brief.

- Detailed baseline surveys for future monitoring have been undertaken by Environment Yukon at three sites in the southern portion of the range in 2020, and at three sites in the Ogilvie Mountains in 2022. These surveys established permanent transects along an altitudinal gradient that were designed to track the increase in shrub number and size, and to monitor the health of Yukon Podistera with climate warming. Temperature and relative humidity was recorded by data loggers from 2020-2022 at the three southern sites; drone photography was used to document shrub size and extent all six sites.

- A phylogenetic study of the subfamily Apioideae (Sun et al. 2004; Sun and Downie 2010) indicates that the subfamily has radiated rapidly and that the genus *Podistera* is not monophyletic. Some Yukon subpopulations have had the

ITS2[6] barcode region of their DNA analysed; there is evidence of some genetic diversity but further sampling is needed to determine relationships among subpopulations (Barcode of Life Data System (BOLD) 2022).

## 6.2. Broad Strategies

In order to achieve the management objective, conservation measures are organized under five broad strategies (from Conservation Measures Partnerhip's (2016) Conservation Actions Classification v. 2.0).

1. Land management
2. Awareness raising
3. Conservation designation and planning
4. Legal and policy frameworks
5. Research and monitoring

[6] The genetic sequence of the internal transcribed spacer 2 region (ITS2) of nuclear ribosomal DNA is commonly used to distinguish closely related species of animal and plants.

## 6.3. Conservation Measures

**Table 2.** Conservation Measures and Implementation Schedule

**Broad Strategies** are taken from **the Conservation Measures Partnerhip's (2016) Conserva**tio**n Actions Classification v. 2.0.**

| Conservation Measure | Priority[c] | Threats or Concerns Addressed | Timeline |
|---|---|---|---|
| **Broad Strategy** | | | |
| **Land management** | | | |
| Assess current threats at extant and presumed extant populations, and develop and implement a mitigation plan where appropriate. | Medium | Mining and mineral exploration; Threat 3 | 2023-2026, then ongoing |
| Develop mitigation advice | Medium | Mining and mineral exploration; Threat 3 | 2023-2026, then ongoing |
| **Awareness Raising** | | | |
| Develop communication strategy for stakeholders and public to build awareness and encourage stewardship; produce and distribute educational materials | High | Mining and mineral exporation; Threat 3 | 2023-2026, then ongoing |
| Promote public awareness of the vulnerability of alpine ecosystems to climate change | Medium | Climate Change; Threat 11 | 2023-2026, then ongoing |
| **Conservation Designation and Planning** | | | |
| Ensure that Yukon Podistera is considered within the Dawson Regional Land Use Plan, and subsequent land use planning initiatives; evaluate existing tool(s) for protecting occurrences. | High | Mining and mineral exploration: Threat 3 | 2022-2023 |
| **Legal and Policy Frameworks** | | | |
| Canada meets its climate targets as outlined in the Paris Agreement. | High | Climate Change: Threat 11 | 2023-2031, then ongoing |
| Yukon meets its climate targets. | High | Climate Change: Threat 11 | 2023-2031, then ongoing |
| **Research and Monitoring** | | | |
| Survey known subpopulations for status, abundance and threats | High | Knowledge gaps | 2023-2031 |
| Search for unknown subpopulations | Low | Knowledge gaps | 2023-2031 |
| Continue long-term monitoring surveys (e.g. transects, drone photography) to determine the rate and extent of shrubification of the lower alpine zone | High | Climate change: Threat 11 | 2023-2026; then ongoing |
| Using habitat models and climate change projections, identify areas that may be climate refuges for Yukon Podistera | Medium | Climate change: Threat 11 | 2022-2026 |

| | | | |
|---|---|---|---|
| Research into longevity, seed viability and germination requirements, sexual maturity, generation time, and individual fertility | Low | Knowledge gaps | 2023-2026 |
| Genetic studies to determine relationships among isolated subpopulations | Low | Knowledge gaps | 2023-2031 |

[e] *"Priority" reflects the degree to which the measure contributes directly to the conservation of the species or is an essential precursor to a measure that contributes to the conservation of the species. High priority measures are considered those most likely to have an immediate and/or direct influence on attaining the management objective for the species. Medium priority measures may have a less immediate or less direct influence on reaching the management objective, but are still important for the management of the population. Low priority conservation measures will likely have an indirect or gradual influence on reaching the management objective, but are considered important contributions to the knowledge base and/or public involvement and acceptance of the species.*

## 6.4. Narrative to Support Conservation Measures and Implementation Schedule

**Broad Strategy: Land Management**

In order to ensure the long-term viability of the species in Canada and the continued integrity of its habitat, there is a need to develop mitigation advice for mining exploration in alpine sites. Impacts need to be documented and best management practices developed. Mitigation may require measures such as avoiding disturbance of habitat within groups of plants. The susceptibility of this species to the loss of habitat as a result of climate warming (COSEWIC 2014) presents a special challenge, since this is not easily mitigated at local scales. In the longer term, active management of some sites may need to be considered in order to ensure persistence.

**Broad Strategy: Conservation Designation and Planning**

The Dawson Regional Land Use Plan may identify sites for the conservation of this species, as could future land use plans in the southern parts of its range. Existing tools for protecting occurrences should be assessed.

**Broad Strategy: Awareness Raising**

Much of the public and many stakeholders are likely unaware of the existence of Yukon Podistera. Increased communications regarding the species, its habitat needs, and the threats facing it would go a long way to ensuring the success of conservation efforts. The threat that climate warming poses to alpine ecosystems needs to be stressed to the public and governments alike.

**Broad Strategy: Legal and policy frameworks**
Because climate warming is considered the foremost long-term threat to Yukon Podistera, both Canada and the Yukon need to play their role in global actions to minimize the magnitude of climate change. Under the Paris Agreement, Canada committed to reducing its greenhouse gas emissions by 30% below 2005 levels by 2030. In 2019, the 2005 level was estimated at 730 Mt $CO_2$ eq (Environment and Climate Change Canada 2020). Similarly, the Government of the Yukon has pledged to reduce the Territory's greenhouse gas emissions by 30% by 2030 (Government of Yukon 2020).

**Broad Strategy: Research and monitoring**
Detailed mapping and accurate census estimates need to be made at all occurrences; monitoring of progress cannot occur without baseline measurements of distribution and abundance. Long-term monitoring transects and drone photography should be continued at a number of Yukon Podistera subpopulations to measure the rate and extent of shrubification of the alpine habitat, and to measure the response of Yukon Podistera at those sites.

In the future, more active management of this species may be required to ensure its persistence, especially at sites prone to shrubification. To aid in these efforts, more studies are required on its basic biology, including longevity, age at maturity, pollinators, and fertility. Genetic data from some Yukon sites have been collected that reveals some diversity among them (BOLD 2022), but more work is needed to document the detailed relationships among isolated subpopulations. This would be useful to determine whether or not some might represent designatable units[7], in future status re-assessments.

# 7. Measuring Progress

The performance indicators presented below provide a way to measure progress towards achieving the management objectives and monitoring the implementation of the management plan.

- A stable or increasing population of Yukon Podistera over the next ten years. Population trends will be inferred by repeated surveys of Yukon Podistera at known sites.
- Persistence or increase of present distribution of Yukon Podistera in Canada, as measured using repeated reconnaissance surveys.

[7] A desgnatable unit (DU) is a discrete and evolutionarily significant subunit of a species, often assessed as a separate 'wildlife species' under *SARA*.

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# Appendix A: Effects on the Environment and Other Species

A strategic environmental assessment (SEA) is conducted on all SARA recovery planning documents, in accordance with the *Cabinet Directive on the Environmental Assessment of Policy, Plan and Program Proposals*[8]. The purpose of a SEA is to incorporate environmental considerations into the development of public policies, plans, and program proposals to support environmentally sound decision-making and to evaluate whether the outcomes of a recovery planning document could affect any component of the environment or any of the Federal Sustainable Development Strategy's[9] (FSDS) goals and targets.

Conservation planning is intended to benefit species at risk and biodiversity in general. However, it is recognized that implementation of management plans may also inadvertently lead to environmental effects beyond the intended benefits. The planning process based on national guidelines directly incorporates consideration of all environmental effects, with a particular focus on possible impacts upon non-target species or habitats. The results of the SEA are incorporated directly into the management plan itself, but are also summarized below in this statement.

This management plan will benefit the environment by promoting the conservation of the unglaciated alpine habitat of Yukon Podistera. This habitat is also home to the Collared Pika (listed under *SARA* as Special Concern), and several plants restricted globally to this region but not yet assessed or listed. The potential for the plan to inadvertently lead to adverse effects on other species was considered and the SEA concluded that this plan will clearly benefit the environment and will not entail any significant adverse effects. The reader should refer to the following sections of the document in particular: description of the species' needs, ecological role, and limiting factors; and the conservation actions.

[8] www.canada.ca/en/environmental-assessment-agency/programs/strategic-environmental-assessment/cabinet-directive-environmental-assessment-policy-plan-program-proposals.html
[9] www.fsds-sfdd.ca/index.html#/en/goals/