COSEWIC
Assessment and Status Report

on the

Yukon Podistera
Podistera yukonensis

in Canada

SPECIAL CONCERN
2014

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada

COSEPAC
Comité sur la situation
des espèces en péril
au Canada

COSEWIC status reports are working documents used in assigning the status of wildlife species suspected of being at risk. This report may be cited as follows:

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Yukon Podistera — Photo: Syd Cannings.

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COSEWIC
Assessment Summary

Assessment Summary – November 2014

Common name
Yukon Podistera

Scientific name
Podistera yukonensis

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 is occurring at or near several locations.

Occurrence
Yukon

Status history
Designated Special Concern in November 2014.

COSEWIC
Executive Summary

Yukon Podistera
Podistera yukonensis

Wildlife Species Description and Significance

Yukon Podistera is a tufted perennial 10-40 cm tall that often forms clumps from a stout elongate taproot. Blue-green pinnate basal leaves subtend the leafless flowering stems bearing compound umbels of small flowers that are bright yellow when newly opened, but fade to white.

Yukon Podistera is one of just a few species restricted globally to unglaciated areas of Alaska and west-central Yukon (eastern Beringia); approximately 90% of its global range lies within Canada. Yukon Podistera occupies a narrow ecological niche in Yukon.

Distribution

Yukon Podistera is restricted globally to the west-central Yukon and a small area of adjacent eastern Alaska. The 22 known Canadian subpopulations are found in two disjunct regions, the northern one centred in the southern Ogilvie Mountains and the southern in the Dawson and Ruby ranges.

Habitat

Yukon Podistera is restricted to dry, well-drained, rock-dominated habitat with sparse vegetation and limited soil development. It is shade-intolerant, and prefers substrates where surface materials periodically move downslope, or where there is slow movement through frost action, generally with some degree of slope. Yukon Podistera grows on rocky tors, talus slopes and on river bluffs with exposed bedrock. Most sites occur on south-facing slopes, but in a few sheltered microsites, some individuals were found on east- and west-facing slopes, with low snow accumulation. It grows from 702 to 1,757 m in elevation, with 15 of 22 Yukon subpopulations found between 1450 and 1700 m.

Biology

Little is known about the biology of Yukon Podistera, but it is likely a long-lived species. It is an early-flowering plant that appears to exhibit staggered fruit development. In most subpopulations the majority of plants did not flower, the two lower elevation subpopulations being the exception. Subpopulations visited later in the season all exhibited some degree of failure to set fruit (50-70% of plants in one subpopulation). Reproduction is by seed that likely disperses by wind over short distances. Whether the plant is able to withstand or adapt to disturbance is unknown.

Population Sizes and Trends

The total number of Yukon Podistera plants found in Canadian subpopulations is estimated to be at least 17,143 to greater than 24,093. Seven subpopulations had counts of 1,000 or more, ten subpopulations had 200-1000 individuals, and the remaining five subpopulations had fewer than 200 plants. Nearly 20,000 of the total are considered to be mature. No information is available on trends.

Threats and Limiting Factors

A loss of habitat as a result of climate change is expected to be the greatest threat to Yukon Podistera. Mining activity, which can directly affect subpopulations and habitat, has also been identified as a low threat. Seven of the 22 known Canadian subpopulations of Yukon Podistera occur on active quartz mining claims (18% of the Canadian population), and one of these also falls partially within an active placer mining claim. Seven others (40% of the Canadian population) are located in heavily staked areas and are within 2 km of an active claim; however, direct long-term effects to these populations are not considered imminent. Only one subpopulation occurs in a protected area.

Protection, Status, and Ranks

Yukon Podistera currently has no legal protection or status in Canada or the US. It is not listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

NatureServe (2014) considers Yukon Podistera to be vulnerable globally (G3) in Canada (N3) and in Yukon (S3). In the United States, it is considered critically imperilled to imperilled nationally (N1N2) and in Alaska (S1S2). The Canadian and Yukon General Status rank is 2, “May Be At Risk.” While quartz mining is regulated under the *Quartz Mining Act* (2003), exploration is often conducted under the threshold for a land use permit and environmental assessment. Exploration at this level may pose a serious threat to some small subpopulations.

TECHNICAL SUMMARY

Podistera yukonensis

Yukon Podistera — Podistère du Yukon

Range of occurrence in Canada: Yukon Territory

Demographic Information

Generation time: unknown, but the plants are perennial and likely do not flower for a few years after establishment. Estimation to first flowering is 3 years. There is evidence that these are likely long-lived and slow growing plants.	Unknown but estimated to be 10-20 years
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?	Unknown, probably stable
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	n/a
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	39,805 km²
Index of area of occupancy (IAO) (Always report 2x2 grid value). Value given is the minimum known; likely greater than this, although smaller than 250 km^2	96 km²
Is the population severely fragmented? >50% of the population is in patches that are large enough to be considered viable	No
Number of locations	22
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	No
Is there an [observed, inferred, or projected] continuing decline in number of (sub)populations?	No
Is there an [observed, inferred, or projected] continuing decline in number of locations*?	No

Is there an inferred continuing decline in area and/or quality of habitat? due to expanding exploration activities and increased shrubification due to a changing climate	Yes, slight
Are there extreme fluctuations in number of (sub)populations?	No
Are there extreme fluctuations in number of locations?	No
Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each subpopulation)

Subpopulation	**N Mature Individuals**
Apex Mountain, East of	950
Apex Mountain, Southeast of	3,800
Chandindu	1,425
Chert Mountain	570
Little Gold	260
Miller's Ridge (West of Carmacks)	105
Mount Nansen1	925
Mount Nansen2 (Victoria Mountain)	190
Mount Nansen3	690
Alder Creek, upper	95
Mount Harper, 15 km south of	475
Mount Ina, 11 km north of	665
Mount Nansen, West Ridge	27
Schist Creek, 8 km northwest of	29
Porphyry Peak, 15 km north of	1,665
Porphyry Peak	120
Sekulmun Lake, west of	190
Syenite Range (Little Klondike)	190
Headwaters of Shell and Cliff creeks	1425
Eagle Creek	475
Incised Peak	2375
Fifteen-Mile Creek	2850
Total (see Table 1)	**19,236**

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	not done

Threats (actual or imminent, to subpopulations or habitats)

The effects of climate change through habitat shift are considered to be a long-term threat. Present and future placer and quartz (hard rock) mining and associated human disturbance are a threat to 14 of the 22 known subpopulations.

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? In the United States, it is considered critically imperilled to imperilled nationally (N1N2) and in Alaska (S1S2).	Present
Is immigration known or possible?	Yes
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Yes
Is rescue from outside populations likely? Possible but unlikely due to limited dispersal ability.	No

Data-Sensitive Species

Is this a data-sensitive species?	No

Status History

COSEWIC: Designated Special Concern in November 2014.

Status and Reasons for Designation:

Status: Special Concern	**Alpha-numeric code:** Not Applicable
Reasons 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 is occurring at or near several locations.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): Not presently met, but may be met in the future as a result of climate change and resulting habitat loss.
Criterion B (Small Distribution Range and Decline or Fluctuation): Not met. Though the IAO is below the threshold for Endangered, and there is a slight decline in habitat, the EO exceeds thresholds, the population is not considered to be severely fragmented, there are 22 locations, and the population is not believed to undergo extreme fluctuations.

Criterion C (Small and Declining Number of Mature Individuals): Not met. The population exceeds thresholds.
Criterion D (Very Small or Restricted Population): Not met. The population and IAO exceed thresholds.
Criterion E (Quantitative Analysis): Not done.

COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS
(2014)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.

Environment Canada / Environnement Canada
Canadian Wildlife Service / Service canadien de la faune
Canada

The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

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Yukon Podistera

Podistera yukonensis

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2014

TABLE OF CONTENTS

List of Figures

List of Tables

List of Appendices

WILDLIFE SPECIES DESCRIPTION AND SIGNIFICANCE

Name and Classification

Scientific name: *Podistera yukonensis* Mathias & Constance

Synonyms: none

English common name: Yukon Podistera, Yukon Woodroot, Yukon Goldcrown

French common name: Podistère du Yukon

Northern Tutchone common name: gé thą (rabbit root)

Family: Apiaceae, Carrot Family

Major plant group: Angiosperm – Eudicot flowering plant

Yukon Podistera, *Podistera yukonensis,* is one of four species in the genus *Podistera*; all are restricted to western North America. The other species found in Canada is Macoun's Podistera, *Podistera macounii*. The ranges of these two species are not known to overlap (Hultén 1968; Cody 1996). Yukon Podistera is readily distinguished by its entire, blue-green leaflets, whereas Macoun's Podistera has dark, leathery, lobed leaflets. While no genetic studies focusing on the genus *Podistera* have been published to date, a phylogenetic study of the subfamily Apioideae was completed in 2004 (Sun *et al.* 2004). According to this study, the genus, *Podistera*, is not monophyletic and Yukon Podistera and Macoun's Podistera do not share their most recent common ancestor. Further genetic work is currently under way by the Consortium for the Barcode of Life for the Yukon Conservation Data Centre (Bennett pers. comm. 2014). Yukon Podistera was first described by Mathias and Constance (1950), and no revisions have occurred since, nor have any synonyms, subspecies or varieties been described.

The species was first collected in 1948 in the Syenite Range approximately 120 km southeast of Dawson City, Yukon (Mathias and Constance 1950; Bostock 1979; herbarium specimens with the National Herbarium of Canada CAN127186 and CAN151857).

Morphological Description

Yukon Podistera is a tufted perennial plant, which often forms dense clumps from a branched underground stem (caudex) arising from a stout elongate taproot (Figures 1-2). The erect or ascending basal leaves are blue-green, 3-12 cm long, and pinnate with 3-6 pairs of opposite leaflets, the lowermost leaflets usually ternate (compound with three equal divisions), the others simple. The stems are 10-40 cm tall, leafless, and tinged with red in fruit. The inflorescence is a compound umbel with several to many rays 5-10 mm long. The five petals are small (about 1 mm long) and bright yellow when newly opened, quickly fading to white. The fruits are ovate-oblong, about 3-7 mm long by 1.5-3 mm broad,

flattened, initially reddish but weathering to a straw color before splitting into two mericarps longitudinally and dispersing (Schroeder pers. obs. 2012). The chromosome number has not yet been determined. (Batten *et al.* 1979)

Figure 1. Yukon Podistera in full flower. Miller's Ridge, May 16, 2012. Photo: Syd Cannings.

Figure 2. Yukon Podistera stem with shoots. 11 km north of Mount Ina, June 27, 2013. Photo: Syd Cannings.

Population Spatial Structure and Variability

Twenty-two subpopulations of Yukon Podistera are known from Yukon. These subpopulations are isolated from each other by considerable distances with the exception of the Mount Nansen subpopulations, which occur within 6.5 km of each other, and the Apex Mountain subpopulations are separated by 4 km (Figure 3). The genetic differentiation between subpopulations has not been investigated.

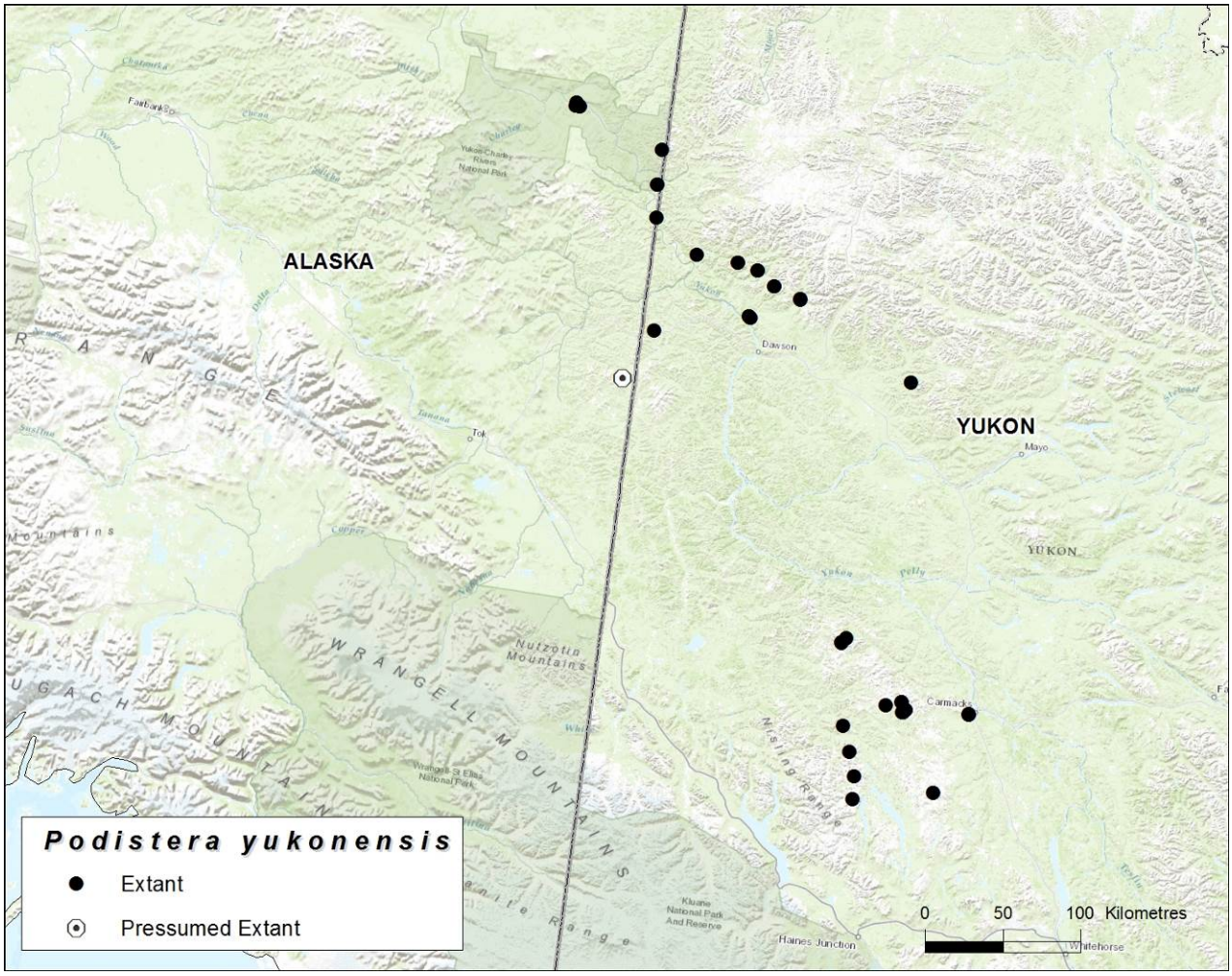

Figure 3. Global localities of Yukon Podistera. Map: Jenny Wu (note 15-mile Creek subpopulation is not shown).

Designatable Units

Only one designatable unit is recognized as the entire Canadian population occurs within the same COSEWIC ecological zone (Northern Mountain). There are no data on discreteness; genetic structure or evolutionary significance among populations and no subspecies are recognized.

Special Significance

Yukon Podistera is one of just a few species restricted globally to eastern Beringia, which includes unglaciated areas of Alaska and west-central Yukon. The Klondike Plateau Ecoregion comprises most of eastern Beringia in Canada and corresponds roughly to the area of Yukon that has been unglaciated the longest. 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.

No traditional uses of Yukon Podistera have been reported by Little Salmon Carmacks (Moar pers. comm. 2013), Tr'ondëk Hwëch'in (Olson pers. comm. 2013), Selkirk (Magrum pers. comm. 2013), or Na-Cho Nyak Dun (Hogan pers. comm. 2013) First Nations, although it is known as gé thą (rabbit root) in Northern Tutchone.

DISTRIBUTION

Global Range

Yukon Podistera is found in unglaciated areas of the Yukon River drainage in eastern Alaska and west-central Yukon, along with one subpopulation that occurs in the upper reaches of the Pacific drainage in Yukon. In Alaska, it is known from three confirmed extant sites: Hillard Peak, Kathul Mountain, and the headwaters of Pleasant Creek in the Northern Ogilvie Mountains, and has been reported from an additional site, Divide Mountain, which is believe to be extant; however, the exact locality has not been determined (Figure 3; University of Alaska 2009; Lipkin pers. comm. 2013; Nawrocki pers. comm. 2013).

Canadian Range

There are 22 known subpopulations of Yukon Podistera within west-central Yukon (Figure 3). The Canadian range is centred on the Klondike Plateau Ecoregion, which contains eleven subpopulations. To the northeast of the Klondike Plateau Ecoregion, five subpopulations are found within the Mackenzie Mountains Ecoregion; to the east, one subpopulation is found in the Yukon Plateau North Ecoregion; to the southeast, two subpopulations are found in the Yukon Plateau Central Ecoregion; and to the south, three subpopulations are found in the Ruby Ranges Ecoregion (Smith *et al.* 2004). The Canadian range appears to be split into two disjunct areas; one centred on the southern Ogilvie Mountains and adjacent plateaus to the west, and another further south, centred on the Dawson and Ruby ranges. Based on a global extent of occurrence calculated using minimum convex polygon geometry, approximately 90% of the global range is found within Canada.

Extent of Occurrence and Area of Occupancy

The extent of occurrence (EO) of Yukon Podistera is 39,805 km², calculated as the area contained within the shortest continuous boundary around known subpopulations. The index of area of occupancy (IAO) is 96 km² based on 2 km x 2 km grids. The full extent of several of the subpopulations may not be known due to time limitations and difficult terrain.

Search Effort

Early botanical exploration in Yukon was often undertaken by geologists and botanists who centred their searches around rivers and streams—the highways of the time, and the focus of gold exploration (Hultén 1940). As the gravel beds and placer operations slowly became less lucrative following the Klondike gold rush of 1897, greater effort was put into exploration in upland areas with habitat more suitable for Yukon Podistera. It is interesting that even with all the mining exploration, it wasn't until 1948 that a botanist attached to a Geological Survey of Canada crew made the first collection of Yukon Podistera known to science. This is despite a smaller gold rush that sparked exploration in the Carmacks area in the early 1930s (Bostock 1957).

Almost all Yukon Podistera collections made prior to 2012 were made as part of untargeted botanical exploration, or as a result of geological exploration. In 2012, the Canadian Wildlife Service and/or trained biologists led searches specifically targeting Yukon Podistera. Over 41 days, over 174 sites (localities greater than 1 km apart) were visited and explored (Figure 4). Access to sites was either by helicopter or on road and by foot. Additional inaccessible cliff sites along river courses were observed solely from a helicopter. Fifty-one person-days were spent searching for Yukon Podistera in 2012. In 2013, 25 person-days were spent surveying 56 sites. In 2014, 28 person-days were spent surveying 43 sites.

Targeted sites were selected for similarity to habitat descriptions from known subpopulations, proximity to known subpopulations, and occurrence within the known range and unglaciated sections of the Yukon River drainage (Figure 4). Efforts were also made to revisit known subpopulations to establish subpopulation size and more precise locality information. To make efficient use of the time and budget available, similar habitat in the surrounding area was searched at the same time, biasing search efforts towards these areas. All sites visited were recorded by tracks and/or waypoints generated by GPS units.

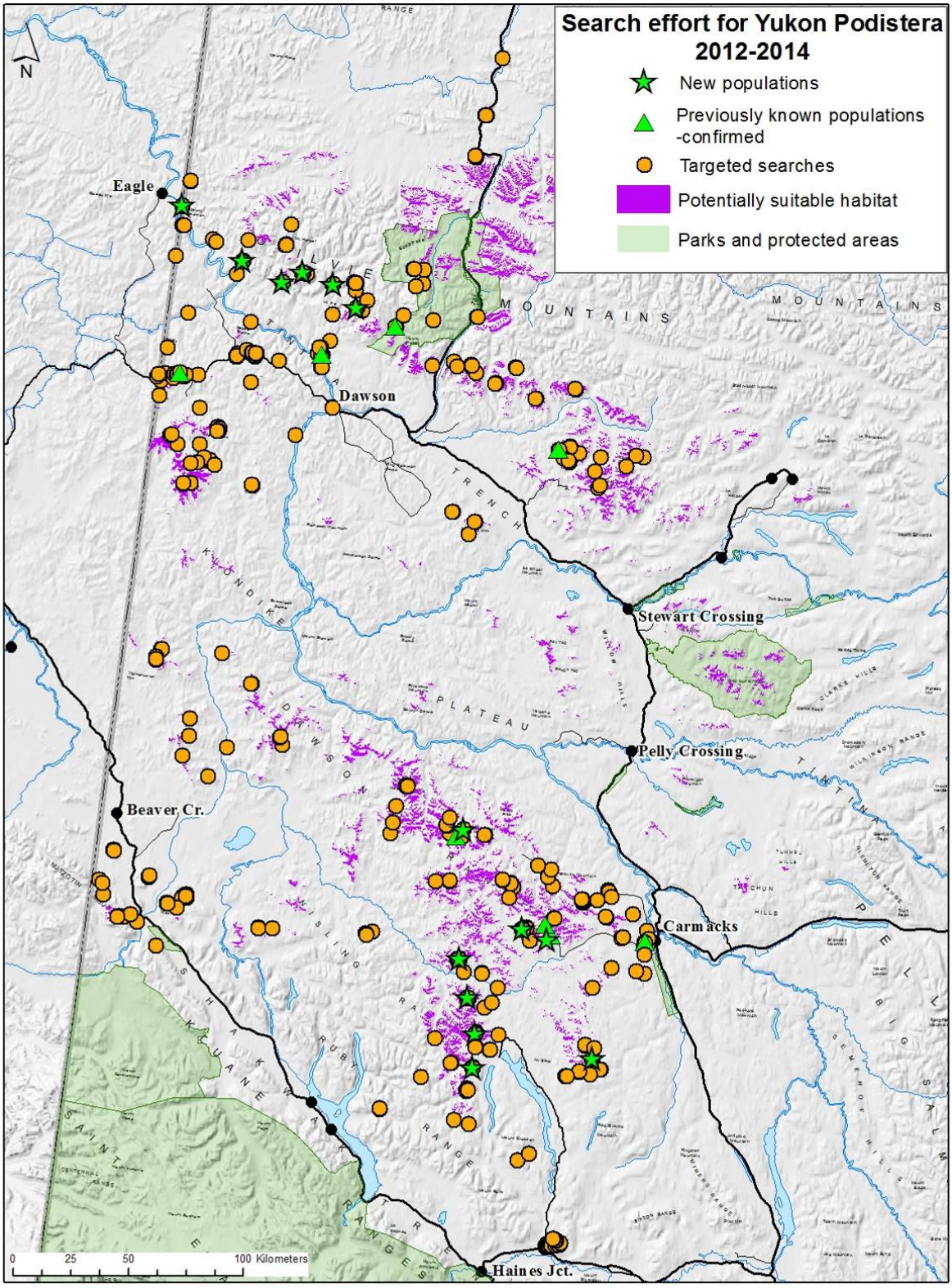

Figure 4. Search effort for Yukon Podistera 2012 - 2014.

The locality and status of several of the known subpopulations have been revised based on fieldwork in 2012. When the type specimen was originally collected in the Syenite Range by J.D. Campbell in 1948, he recorded the site as being located at 63-64°N, 136-138°W, on the south side of the Little South Klondike River, and then, at some point, the "south" was crossed out on the herbarium label and replaced by "north" (National Herbarium of Canada CAN127186, CAN151857). Targeted helicopter-supported searches in summer 2012 and 2014 found a small subpopulation (110-500 plants) in the vicinity of these coordinates. However, given the locational uncertainty of this subpopulation, whether this is a new discovery or a rediscovery is unknown.

Another subpopulation was discovered southeast of Apex Mountain in 1982. Coordinates were to the nearest minute and of unknown origin (Agriculture and Agri-Food Canada 2012a; National Collection of Vascular Plants DAO582181). Although these coordinates fall to the east of the subpopulation found in 2012, it is believed that they are likely the same subpopulation as there was no suitable habitat at the 1982 coordinates, and a hand-drawn map by the original collector (Frisch 1983) corresponds to the new discovery.

The Yukon Podistera subpopulation found near the Top of the World Highway in 2012 is believed to be the Little Gold subpopulation originally observed by J.A. Calder and J.M. Gillett in 1960 (Agriculture and Agri-Food Canada 2012b; National Collection of Vascular Plants DAO455475). The description of the site's road locality and the landforms present agree with the subpopulation found in 2012. Alaskan Natural Heritage Program botanists spent a couple of days looking for the Calder collection from the US side of the border but "couldn't find any habitat that was at all suitable in the location Calder describes" (Lipkin pers. comm. 2013). This early collection was reported to be "near the Alaska-Yukon border."

A collection was made by Lloyd Spetzman of the U.S. Geological Survey in June 1963 (CAN 298888). The site was reported to be "Divide Mountain, Basalt Mine", but no coordinates were given. The collection was sent to eminent botanist Erling Porsild at the Canadian Museum of Nature who identified the collection as Yukon Podistera, and wrote on the sheet "New to Alaska." No subsequent publication or recognition of this collection is known, and the site currently remains as credible but unconfirmed (Lipkin pers. comm. 2013; Nawrocki pers. comm. 2013).

A habitat suitability model was used to identify areas for targeted searches in 2014 (Figure 4). The parameters included unglaciated, unforested sites between 1200-1800 m with a slope of 5-40º and an aspect of 70-280º (see **Habitat Requirements**). Though lacking information for the southern extent of Yukon Podistera's distribution, the model shows that much of the suitable habitat has been searched, and much of the intervening habitat is considered unsuitable (and is mainly heavily forested).

HABITAT

Habitat Requirements

Yukon Podistera is restricted to dry, well-drained, rock-dominated habitat with sparse vegetation and limited soil development. It is found on rocky tors, on talus slopes (Figure 5), and on river bluffs with exposed bedrock. It is found primarily on south-facing slopes, but in a small number of very sheltered microsites, a few individuals were found on east and west-facing slopes (aspect range: 70-280°). Slopes range from 5-40° and tend to have low snow accumulation, allowing for early exposure (see **Life Cycle and Reproduction**). In Yukon, it grows at low elevations (below 800 m) at Chandindu and Miller's Ridge, even though no other Yukon subpopulations fall below 1,200 m, and the highest Yukon subpopulation (Sekulmun Lake) grows at 1,757 m. In Alaska, it ranges from 360-1,280 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. They tolerate these conditions, but forest plants do not appear to be as numerous, robust or fertile as the Yukon Podistera plants on the exposed, south-facing slope above. 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 theory. 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).

Yukon Podistera has an affinity for bedrock but also prefers substrates where surface materials periodically move downslope. It was found growing on ledges and crevices of rock faces, or among boulders and cobbles at the base of tors in nine of the 17 subpopulations visited in 2012-13. When individual plants growing on tor ledges were excavated at Little Gold and Mount Nansen 1, the taproot was found to grow through very fine cracks deep into what appeared to be solid blocks of rock – in either case it was impossible to locate the end of the root. Yukon Podistera was also frequently found growing on talus slopes with slow movement through frost action comprised of lichen-covered cobbles and boulders (nine subpopulations). They grew most commonly along the edges of strips of vegetation oriented down the slope, and made up of a sparse mat of low grasses, forbs and lichen over a very thin layer of soil. In these situations the additional stability offered by the sparse vegetation was a common associate, provided the vegetation was not too thick.

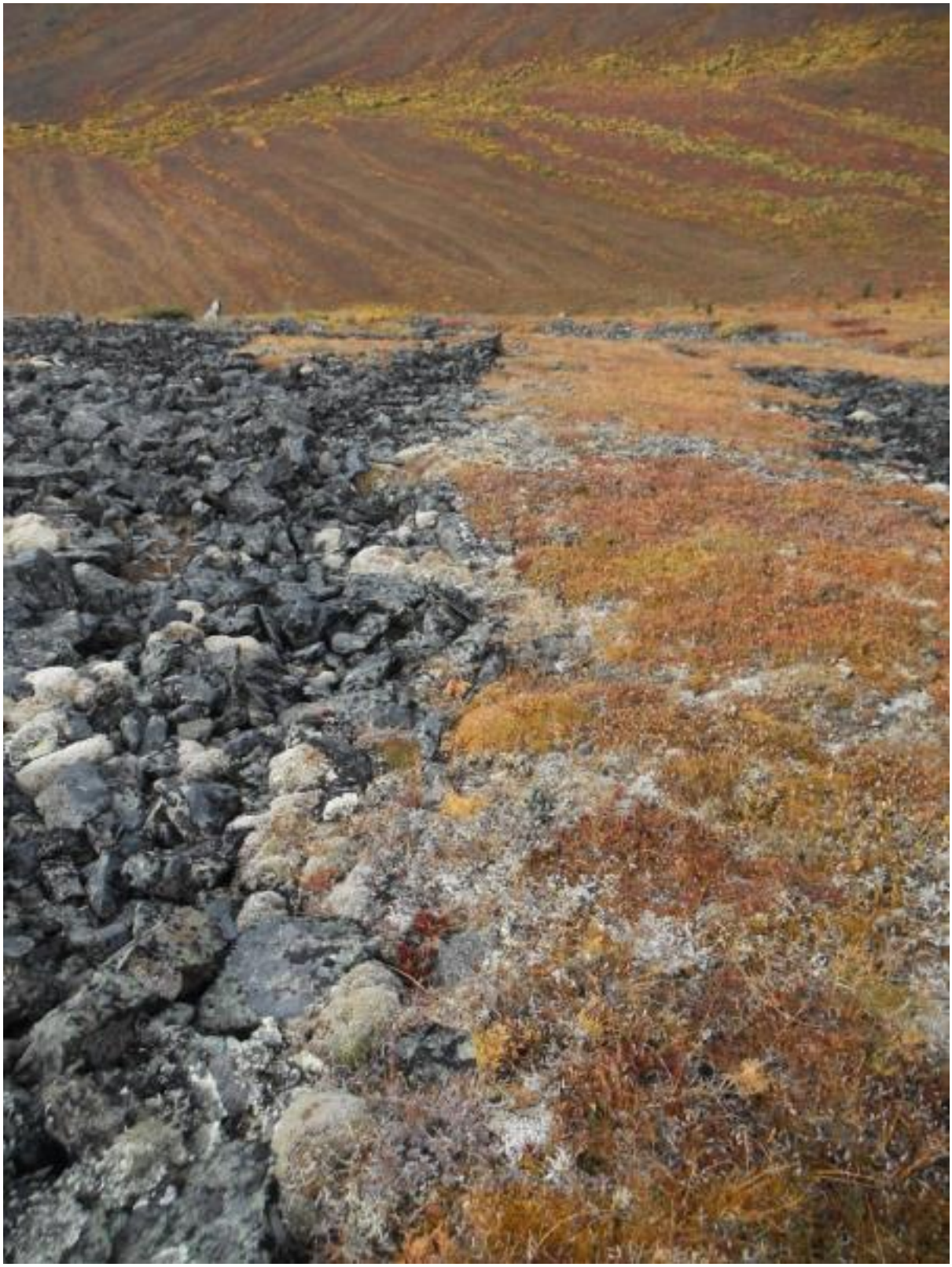

Figure 5. Yukon Podistera site southeast of Apex Mountain. September 6, 2012. Photo: Syd Cannings.

Conversely five subpopulations also exhibited growth on what appeared to be unstable substrate. Between outcrops of bedrock, which host Yukon Podistera, some of the Chandindu subpopulation grew in slide areas comprised of unstable, fine scree. These slides were inaccessible so there is no way to gauge how far below the surface bedrock lay, but given the exposed bedrock surrounding the slide areas, it is possible that bedrock lies close below the surface giving Yukon Podistera a stable substrate to root in just below the scree. The Miller's Ridge subpopulation is the only other subpopulation that grew in an area where the surface was made up of unstable, fine materials (in this case, coarse sand). These small, sandy blowouts were located between exposed bedrock tors where it appears likely that they were underlain by bedrock relatively close to the surface, although no attempt was made to verify this. In similar habitat at Kathul Mountain, it was found that Yukon Podistera appeared to follow the pattern of bedrock at or just below the surface, making it less abundant or absent where bedrock was deeply buried (Parker 1995).

Small portions of five subpopulations growing at the edge of the southern Ogilvie Mountains were found growing on unstable substrate as well, but of loose shale and talus. These areas were surrounded rocky tors, and vegetation-stabilized talus, where Yukon Podistera grew more abundantly.

Given Yukon Podistera's affinity for rocky substrate, it is surprising that there is no obvious link between the bedrock geology of the Yukon population sites. For instance, the Miller's Ridge and the East of Apex Mountain subpopulations are both found on basaltic volcanics, which are very different geochemically from most other localities that are found on granodiorite, schist and felsic volcanics (Murphy pers. comm. 2012; Yukon Energy, Mines and Resources 2014). None of the subpopulations occur on calcareous sedimentary rock, which comprises much of the unglaciated areas of Yukon. There is, however, one small subpopulation of 32 plants in Alaska at the headwaters of Pleasant Creek 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).

Yukon Podistera appears to be a poor competitor that will only grow in areas of sparse vegetation, where it is frequently found with Mountain Avens (*Dryas* species), Alpine Sweet Grass (*Anthoxanthum monticola* ssp*. alpinum*) and Prickly Saxifrage (*Saxifraga tricuspidata)*. However, it is able to live at a wide range of elevations, on a variety of substrates. It may be that it is an alpine species that tolerates lower elevations in exposed rocky habitat (Parker 1995). 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 (<5% in most cases). This may indicate that there are other important habitat requirements of this plant that are not yet known.

Habitat Trends

Most Yukon Podistera subpopulations occur in remote areas, making assessment of habitat trends difficult. For the same reasons, though, its condition is likely to have remained relatively stable within the last ten years. The one thing that was noticeable at, or near, many of the new sites visited in summers of 2012 and 2013 was the presence of mining claim posts erected within the last ten years, trenching and other exploration paraphernalia such as camp remains.

BIOLOGY

Very little is known of the biology of Yukon Podistera. Beyond the initial monograph describing the species, the only literature focusing on the plant are three rare plant survey reports done in Alaska (Batten *et al.* 1979; Parker 1995, 1997). There is a similar paucity of literature on all members of the genus. The information below is an amalgamation of observations made by participants in the 2012 and 2013 targeted surveys and those of the authors of the Alaskan reports.

Life Cycle and Reproduction

Yukon Podistera is a perennial of unknown longevity, but given the branched caudex covered in the persistent remains of multiple years of growth, and the elongate taproot, it is likely a long-lived species and the generation time is estimated to be between 10 to 20 years. Several dry umbels from previous seasons were observed still attached to flowering plants confirming that it also reproduces multiple times. It is unknown how long the seeds remain viable in the seed bank after the year they are produced. Nor is it known what their germination requirements are.

It is an early-flowering plant that is quick to start producing seed after flowering, and continues producing seed throughout the season. Yukon Podistera was in full bloom on the open slope at the Miller's Ridge site (elevation 800 m) on May 16, 2012, while at the Mount Nansen 1 site (elevation 1470 m), plants were in full bloom, or just opening on June 16, 2012. At roughly the same time (June 21), mid-sized capsules had already developed on plants on the exposed areas of the Miller's Ridge site. Late in the season (August 25, 2012), fruits at various stages of development were still seen on plants at the Mount Nansen 1 site. It appears that fruiting continues throughout the season and it may be the length of the season that determines how many reach maturity after fertilization. Fruit development also appears to be staggered as fruit at different stages of development on the same umbel were observed across all subpopulations.

The age at which plants reach sexual maturity and generation time are both unknown, as is the fertility of individuals. Yukon Podistera is likely a long-lived plant with 10 to 20 years being an estimated generation time. Although flowers, fruit and a range of size classes were observed in all subpopulations, their relative abundance varied. The Miller's Ridge subpopulation had predominately mid-sized (10-20 cm diameter) to large (20-30 cm diameter) plants, many with 6 or more umbels, in the open areas. Within the edge of the forest, plants tended to be mid-sized (10-20 cm diameter) to mid-sized with fewer umbels. At upper Alder Creek some small plants (4-5 cm diameter) produced 1 or 2 umbels. Over 50% of the Chandindu plants that were visible from the helicopter were large to very large with more than 10 umbels per plant. Although this may partially be because smaller plants were not as visible from the air, in no other subpopulation was there the same proportion of plants as large or producing as many flowers.

The growth form of Yukon Podistera (long taproot, branched caudex covered in the remains of multiple past years of growth) suggests that some of the rosettes may be quite old. It is not known how frequently Yukon Podistera flower during their lifespan. It appears that most rosettes, even if they are not flowering, may be mature. For the purposes of this report, a mature individual is defined as an individual with more than two leaves arising from the caudex.

It was not possible to visit all subpopulations later in the season, but at the Mount Nansen 1 site on August 25, 2012 approximately 50-70% of plants exhibited some degree of failure to produce fruit after producing flowers (cover photo), although only approximately 5% had umbels that were completely fruitless.

Reproduction is by seed, although at Mount Ina a single plant was seen that exhibited multiple shoots growing from an elongated aboveground stem (Figure 2). It is unknown whether the stem was rooting at the nodes. This plant was found in an atypical substrate of sloping unstable shale, which only covered a small portion of the Mount Ina site at the base of rock outcrops where Yukon Podistera was growing much more abundantly (Syd Cannings pers. comm. 2014). Plant collections made at the subpopulations visited in 2012 show a distinctly tapering taproot with no evidence of shoot growth other than at the main caudex. There has been speculation that some plants at Hillard Peak in Alaska that appear as individuals aboveground may be attached belowground and be spread by downslope movement (Parker 1995), but there have been no collections made to support this hypothesis. While there is no direct evidence of vegetative reproduction, the Mount Ina plant suggests that on unstable substrate single plants of Yukon Podistera are able to cover more ground through elongated stems, possibly in response to downslope movement.

Yukon Podistera produces nectar indicating it is insect-pollinated, as is most of the family Apiaceae, although the species responsible have not yet been identified. Due to their proximity, the Mount Nansen subpopulations may be cross-pollinated, as may the Apex Mountain subpopulations, although it is unlikely that pollen transfer occurs between any of the other subpopulations due to the separation distance.

Physiology and Adaptability

Yukon Podistera appears to be adapted to a comparatively narrow ecological niche characterized by well-drained, rock-dominated, nutrient-poor, sparsely vegetated substrate, and relatively stable south-facing aspects. While this may indicate a lack of adaptability, they do appear to survive in what may be less than optimal circumstances within forest edges, on calcareous substrate, and in unstable substrate although the subpopulations in these circumstances are generally not as healthy or productive.

Efforts to propagate Yukon Podistera to date have been unsuccessful, so it is unknown whether it is possible. It is also unknown to what degree it can withstand or adapt to disturbance.

Dispersal and Migration

Yukon Podistera likely disperses seed by wind, as do many members of the family Apiaceae. When ripe, the fruit splits longitudinally into two plano-convex seeds which dangle in the breeze until a strong enough wind shakes them free and disperses the seed. Wind-dispersed seeds of the family Apiaceae generally do not travel far. The maximum distance was less than 15 m in a study of ten species of Apiaceae (Jongejans and Telenius 2001); the distance was partially dependent on plant height and wind speed. The species they studied were all over 50 cm tall, while the flowering stems of Yukon Podistera generally grow to 40 cm at the most, and often less. Although they do live in extremely exposed and windy localities, their short stature would inhibit seed dispersal over long distances. It may partially explain why Yukon Podistera sometimes grows only in small portions of available habitat even when there is much more apparently suitable habitat available nearby (within 15-30 m). Other means of dispersal are unknown although a common dispersal mechanism for many alpine plants is producing seeds that can be blown across wind-packed snowfields for quite some distance.

Interspecific Interactions

No available information.

POPULATION SIZES AND TRENDS

Sampling Effort and Methods

Efforts were made to revisit all eight previously known subpopulations of Yukon Podistera in 2012-13 in order to confirm they were extant, and to collect precise information on subpopulation size and extent. Of the seven that were revisited, the Little Gold and Mount Nansen 1 and 2 subpopulations have all been counted and their extent is known. The Chandindu subpopulation is situated on a steep bluff making it largely inaccessible, so its subpopulation size was estimated by experienced observers from a helicopter that hovered by the site. The remainder of the subpopulations were estimated by observers, but the full extent of the subpopulation may not be known due to time limitations and difficult terrain.

Of the 10 subpopulations newly discovered in 2012-13, Mount Nansen 3 was thoroughly mapped and counted. The sizes of the remaining subpopulations were estimated by trained observers as precisely as possible. Also, the full extent of these subpopulations may not be known as it was often difficult to delimit their lower extent due to difficult terrain and time constraints. Details of population counts are available in Table 1.

Where counts were made, all individuals were counted by walking the site. In some instances seemingly separate individuals may be connected by the branched caudex. In order to limit this occurrence, several specimens were excavated during the first count to gauge the degree of branching and how it was made visible aboveground. Individual plants are generally easily distinguished by the tendency of different branches of the same plant to clump very closely together. Count methods were verified when collecting specimens.

Table 1. Population counts.

Subpopulation Locality	Date of Discovery & Observer	Date of Confirmation	Name of Person Counting	Area of Subpopulation based on Yukon CDC polygons (ha)	Total Count	Mature Individuals (plants with >1 stem arising from caudex)	Comments	Threats
Apex Mountain, East of	NEW IN 2012	2012-07-10	Syd Cannings	4.81	>1,000	950	full extent not known	Adjacent to mining claim
Apex Mountain, Southeast of	1982-06-09: Robert Frisch	2012-09-06	Syd Cannings	54.46	>4,000	3,800	locality adjustment (see Canadian Range); full extent not known	Adjacent to mining claim
Chandindu	1993-05-22: Carl Roland	2012-06-22	Lori Schroeder, Syd Cannings	960.25	>1,500	1,425	area and subpopulation estimates based on view from helicopter	none
Chert Mountain	1993-08-24: Catherine Kennedy	2013-06-26	Syd Cannings	2.92	>600	570	uncertain whether full extent is known: difficult terrain	none

Subpopulation Locality	Date of Discovery & Observer	Date of Confirmation	Name of Person Counting	Area of Subpopulation based on Yukon CDC polygons (ha)	Total Count	Mature Individuals (plants with >1 stem arising from caudex)	Comments	Threats
Little Gold	1960-07-01: J.A. Calder & J.M. Gillett	2012-06-24	Lori Schroeder	1.81	250-300	260	locality adjustment (see Search Effort); full extent is known	mining
Little South Klondike	1948-08-04: J.D. Campbell	n/a	n/a	unknown	unknown	unknown	See Syenite Range (see Search Effort)	n/a
Miller's Ridge (west of Carmacks)	2007-05: Jim Pojar	2012-06-21	Syd Cannings	2.09	110	105	subpopulation estimate not exact; uncertain whether full extent is known	trampling (mining claim expired), Adjacent to active mining claim.
Mount Nansen 1	2008-07-14: Petra Foerster	2012-06-16	Lori Schroeder	0.67	975	925	full extent is known	mining
Mount Nansen 2 (Victoria Mountain)	2008-07-14: Petra Foerster	2012-06-17	Lori Schroeder	0.26	200	190	full extent is known	mining
Mount Nansen 3	NEW IN 2012	2012-08-26	Lori Schroeder	1.47	725	690	full extent is known	mining
Alder Creek, upper	NEW IN 2013	2013-05-30	Syd Cannings	0.47	100	95	uncertain whether full extent is known: difficult terrain	none
Mount Harper, 15 km south of	NEW IN 2013	2013-06-27	Syd Cannings, Bruce Bennett	2.91	350-650	475	uncertain whether full extent is known: lower limit uncertain	none
Mount Ina, 11 km north of	NEW IN 2013	2013-06-27	Syd Cannings, Bruce Bennett	2.09	600-800	665	uncertain whether full extent is known: lower limit uncertain	none
Mount Nansen, West Ridge	NEW IN 2013	2013-09-10	Saleem Dar, Shannon Stotyn	0.04	28	27	uncertain whether full extent is known: lower limit unclear	mining
Schist Creek, 8 km northwest of mouth	NEW IN 2013	2013-09-10	Saleem Dar, Shannon Stotyn	0.16	30	29	full extent known	Adjacent to mining claim
Porphyry Peak, 15 km North of	NEW IN 2013	2013-09-10	Saleem Dar, Shannon Stotyn	3.99	1750	1,665	uncertain whether full extent is known: lower limit unclear	mining
Porphyry Peak	NEW IN 2013	2013-09-10	Saleem Dar, Shannon Stotyn	0.06	125	120	uncertain whether full extent is known: not all suitable habitat surveyed	none
Sekulmun Lake, west of north end	NEW IN 2013	2013-09-10	Saleem Dar, Shannon Stotyn	2.86	>200	190	full extent not known	none
Syenite Range (Little Klondike?)	REDISCOVERED 2014	2014-05-28	Syd Cannings		100-500 (<1000)	190		none (mining claim expired) adjacent to active mining claims.
Headwaters of Shell Ck and Cliff Ck	NEW IN 2014	2014-05028	Saleem Dar, Shannon Stotyn		1000-2000 (perhaps >2000)	1425	Large population – full extent unknown	mining
Eagle Ck, 2.3 km S	NEW IN 2014	2014-06-13	Saleem Dar, Shannon Stotyn		500+	475	Common within area observed – full extent unknown	Adjacent to mining claim

Subpopulation Locality	Date of Discovery & Observer	Date of Confirmation	Name of Person Counting	Area of Subpopulation based on Yukon CDC polygons (ha)	Total Count	Mature Individuals (plants with >1 stem arising from caudex)	Comments	Threats
Incised Peak, E of	NEW IN 2014	2014-05-27	Saleem Dar, Shannon Stotyn		2,000-3,000	2375		Adjacent to mining claim
Fifteen-Mile Creek	NEW IN 2014	2014-07-16	Saleem Dar, Shannon Stotyn		1,000-5,000	2850	Large population – full extent unknown	none

Abundance

The total number of individual Yukon Podistera plants found in the 22 Canadian subpopulations revisited in 2012-14 is estimated to be 17,143 to greater than 24,093 (Table 2). Of those, an estimated 19,236 are considered to be mature. For the purposes of this report, a mature individual is defined as an individual with more than two leaves arising from the caudex.

As outlined above, precise counts were made of four of the 22 extant subpopulations. Mount Nansen 1 had 975 individuals, Mount Nansen 2 had 200, Mount Nansen 3 had 725 and Little Gold had 250-300.

The numbers of individuals at the largest subpopulations were not precisely counted. It was estimated that seven subpopulations had counts of 1,000 or more, ten subpopulations had 200-1000 individuals, and the remaining five subpopulations had fewer than 200 plants.

Fluctuations and Trends

No trend information is available for this species. Most sites have only been visited once since their initial discovery and complete subpopulation counts have not been made for several sites (see **Abundance**). Yukon Podistera are long-lived plants and subpopulations are not expected to undergo extreme fluctuations.

Rescue Effect

Given the very short distance that Yukon Podistera seeds are believed to travel during dispersal (<50 m), and the fact that the shortest distance between a known Alaskan subpopulation and a Yukon subpopulation is approximately 23 km, it is unlikely that dispersal from Alaska will mitigate any decline in the Yukon population.

THREATS AND LIMITING FACTORS

Threat "impact" was assessed for Yukon Podistera (Appendix 1) following Master *et al.* (2009). Overall threat was calculated to be medium to low. Loss of alpine habitat from climate change is ongoing. Habitat shift is expected to be significant in the longer term. Mining may affect 18% of the known Canadian population which are on active mining claims (Table 1); however, severity was considered to be slight (1-10%) as currently most of the claims are in the exploration stage. An additional 40% of the Canadian population occur in patches within 2 km of active mining claims. Impacts of recreation are considered to be negligible.

Mining and Exploration (3.2)

Gold mining in Yukon has been undertaken using both placer and quartz mining techniques since prior to the Klondike Gold Rush, which began in 1896. Both of these methods may affect Yukon Podistera and its habitat, although quartz mining is more likely to have a direct effect as it is focused on upland areas where Yukon Podistera is found. From the Mount Nansen 3 subpopulation, you can see a placer operation in the valley, and trenching scars from quartz exploration lining the hillsides. Most of the trenching scars at this site have revegetated to some degree.

Development of a quartz mining claim may involve varying levels of activity ranging from surficial rock sampling to trenching and drilling to bulk sampling. Often it is the by-products of exploration, such as housing and access, which will have the greater impact. While gravel-bearing riparian areas suitable for placer mining aren't typically suitable habitat for Yukon Podistera, in some areas, particularly in subalpine areas, placer claims may extend up hillsides to suitable habitat, as is the case with the Mount Nansen 1 subpopulation. It is located close to the upslope edge of the placer claim and is unlikely to be directly affected by the excavation activities; however, it is susceptible to attendant activities such as development of access routes.

Not all claims are developed and the level of development fluctuates with gold prices. Over 114,000 quartz claims were staked in Yukon in 2011 when gold prices were at an all-time high (Stephens pers. comm. 2013). This is a five-fold increase in staking over the previous high. This staking rush was centred within the known range of Yukon Podistera.

Seven of the 22 known Canadian subpopulations of Yukon Podistera occur on active quartz mining claims (Mount Nansen 1, 2 and 3, Mount Nansen West Ridge, North of Porphyry Peak, the headwaters of Shell Creek, and Little Gold), and Mount Nansen 1 also falls partially within an active placer mining claim (Figure 6). Active claims are defined here as those that are registered as current with the Mining Recorder's Office as of November 12, 2013 (Figure 7). The three small Mount Nansen subpopulations are the most at risk from mining due to the existing road access to these subpopulations, and the fact that they are located on claims within a solid grid of claims extending in all directions for three kilometres or more.

The Miller's Ridge subpopulation is located nearly 1 km northeast of the access road to the Mount Nansen subpopulations. Trenching has occurred within the subpopulation; however, the claims are not currently active, but are adjacent to existing claims. It is not known if any plants were lost during exploration at this site.

The Little South Klondike River subpopulation is located within the heavily staked Syenite Range; however, the claim that was once on this subpopulation has lapsed. Similarly the claims that once covered the Miller's Ridge subpopulation have expired. The two subpopulations near Apex Mountain are loosely surrounded by quartz claims, the nearest active claim being approximately 1 km distant (Figure 7). However, claim posts of unknown age were seen and photographed within the subpopulation (Cannings pers. comm. 2012-2013).

The nearest mining claim to the Schist Creek subpopulation is approximately 2.3 km distant and Incised Peak is surrounded by active mining claims, the closest being 1 km. The nearest mining claim to the Eagle Creek subpopulation is approximately 1.9 km on the other side of the valley.

The Chandindu subpopulation is located on a cliffside on Tr'ondëk Hwëch'in First Nation category A settlement lands, which include subsurface rights (Tr'ondëk Hwëch'in Final Agreement 1998).

The Chert Mountain subpopulation is located within, and 1.5 km from the edge of, Tombstone Territorial Park within which mining is not permitted aside from the two grandfathered claims ≥14 km distant. There are no active mining claims near the other six subpopulations (Upper Alder Creek, Mount Harper, Mount Ina, Fifteen-mile Creek, Porphyry Peak, and Sekulmun Lake).

The recent staking rush is located within the current known range of Yukon Podistera. There are many areas of suitable habitat within this range not yet surveyed for Yukon Podistera. These areas (the western end of the Dawson Range, high points in the Klondike Plateau, the southern edge of the Ogilvie Mountains and the Syenite Range) are all heavily staked (Figure 7).

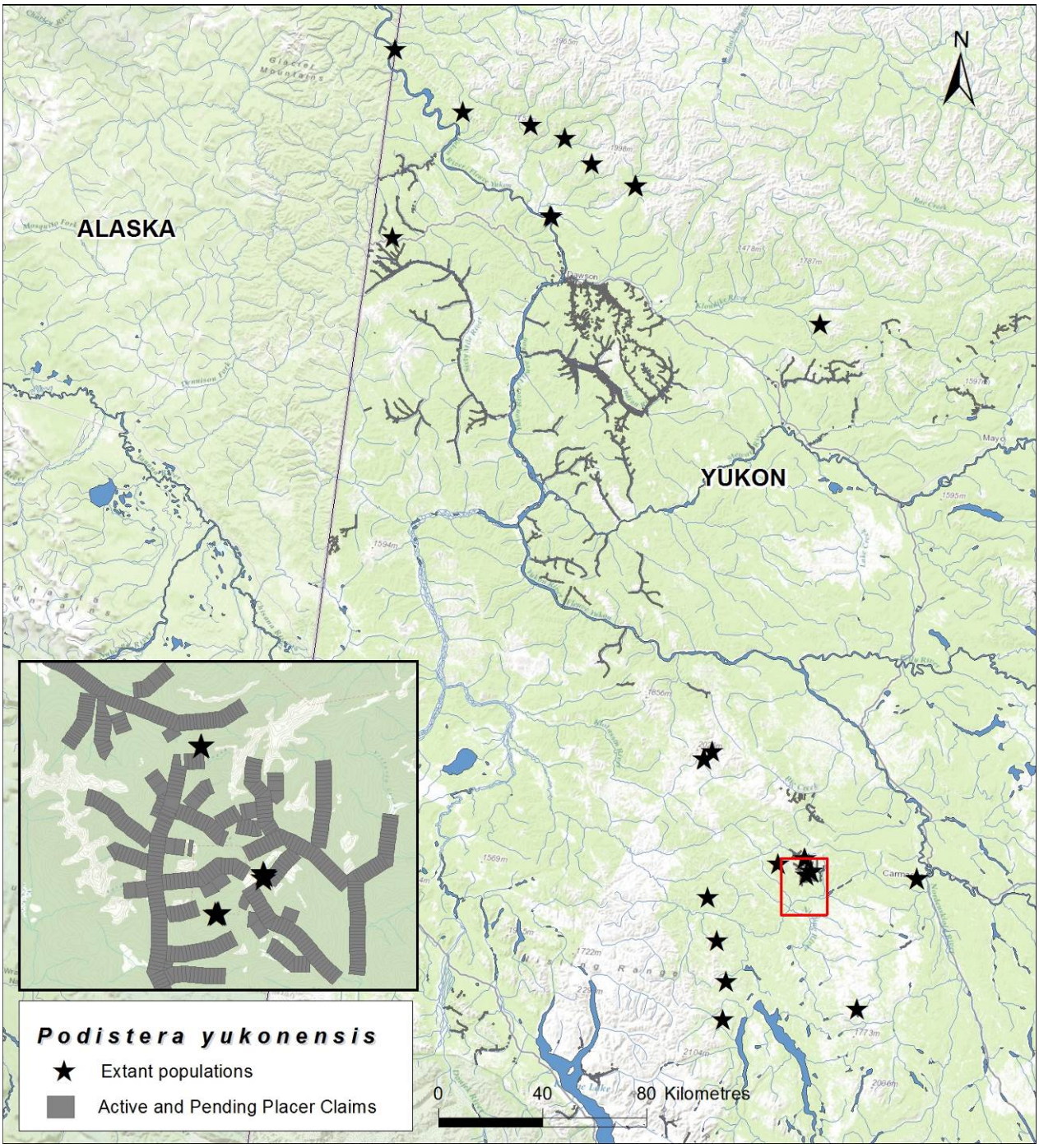

Figure 6. Active and pending placer claims as of November 12, 2013. Map: Jenny Wu (note 15-mile Creek subpopulation is not shown).

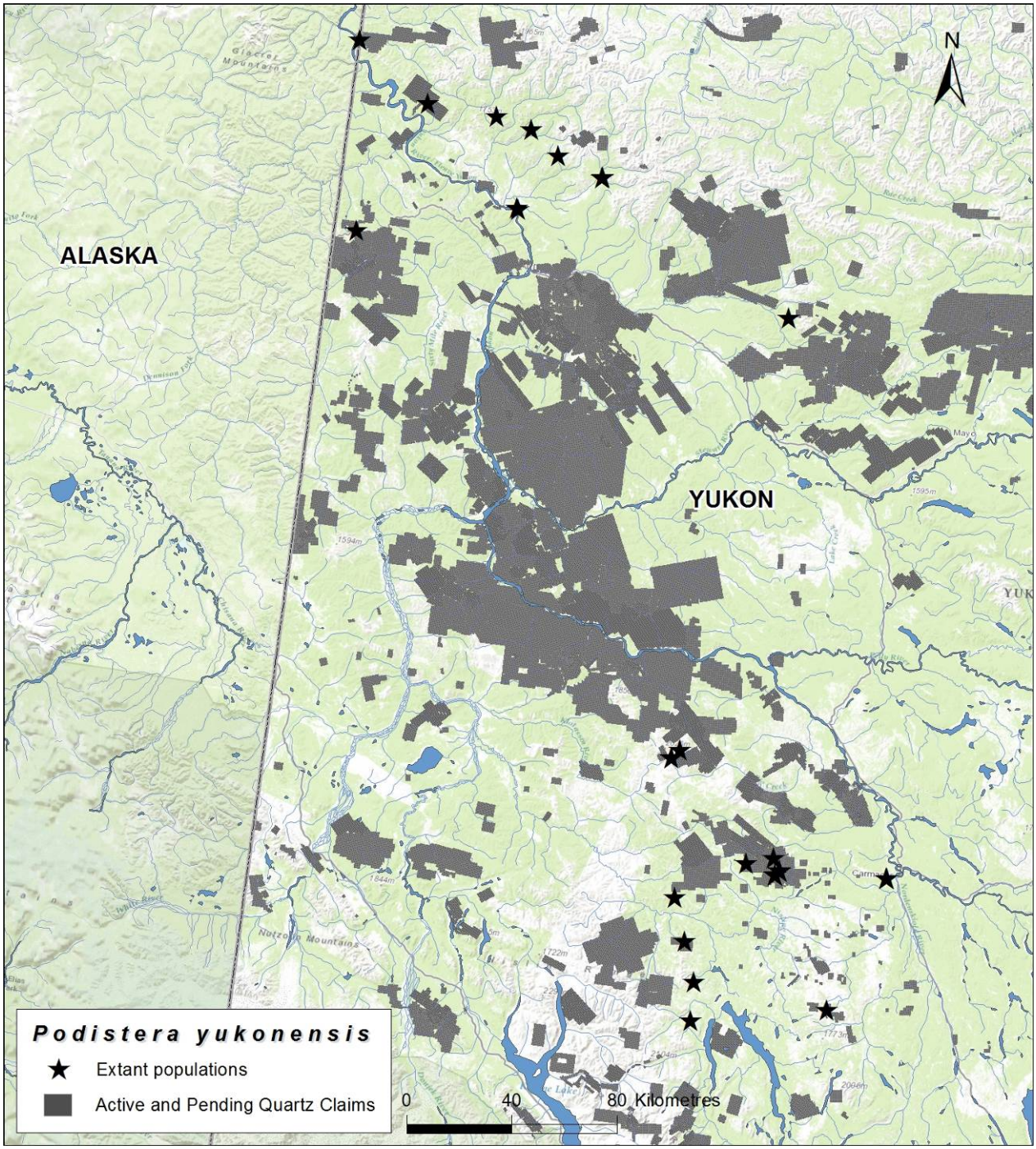

Figure 7. Active and pending quartz claims as of November 12, 2013. Map: Jenny Wu (note 15-mile Creek subpopulation is not shown).

Climate Change – Habitat Shift (11.1)

Climate change projections that have been developed for Whitehorse (south), Pelly Crossing (south-central), and Dawson City (northwest-central) Yukon, all indicate an annual increase in temperature of 2.5–3.7°C by 2050 (Hennessey *et al.* 2011; Hennessey and Streicker 2011; Northern Climate ExChange 2011). Precipitation is generally expected to rise as well, although there is more regional variation with Dawson anticipating a rise of 10-40%, Pelly Crossing 37-44%, and Whitehorse 14-22%, while the region northeast of Dawson is expected to have decreasing precipitation.

With a warming climate, the shrub line in Yukon mountain ranges, such as those where Yukon Podistera grows, will likely advance upslope (Danby and Hik 2007). An increase in shrub cover has also been observed in arctic tundra in Alaska over the last 50 years (Tape *et al.* 2006). Yukon Podistera is a species associated with exposed rocky substrate, or one covered by a very shallow layer of loose material or plant matter, most often in alpine or subalpine environments. The loss of alpine and arctic tundra and the increase in shrub cover will likely decrease the amount of habitat suitable for Yukon Podistera, threatening its persistence. The increase of shrubification will likely also increase snow capture, which would further reduce habitat suitability for a plant that appears to favour early exposure. This is likely also what is happening at the lower elevation Miller's Ridge site. 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 in the adjacent, exposed sites.

Recreational Activities (6.1)

The Chert Mountain subpopulation is located within Tombstone Territorial Park. Since 1987, interpretive centre visitation in the Park has increased from just over 2,000 to over 12,000 in 2012 (Tombstone Territorial Park Management Committee 2013). While only a small percentage of these visitors travel into the backcountry where Yukon Podistera is known, both private and commercial wilderness recreation within the Park is increasing and may impact the known subpopulation as well as unknown subpopulations. The Chert Mountain subpopulation is more than five kilometres from the commonly travelled routes. Miller's Ridge is along a popular hiking route with no established trail. Scrambling (climbing in areas with loose soil) may be affecting the population there.

Number of Locations

All 22 known subpopulations are found in distinct locations. Twenty-one of these are distinct based on the threat from mining, and the Chert Mountain subpopulation is distinct based on the low threat posed by recreation. The only two subpopulations that are less than 4 km apart are the Mount Nansen 1 and 3 subpopulations. They are located approximately 2.3 kilometres apart on claims owned by the same claim holder. However, the Mount Nansen Road runs between the two, meaning that they can be accessed separately, and while there is a contiguous route over claims belonging to the same claim holder between the two, the most direct route is through another claim holder's claim. While it is possible that development of these claims could occur simultaneously, affecting both subpopulations, the pre-existing road, which allows separate access and prevents continuous trenching between the two, makes it unlikely.

PROTECTION, STATUS AND RANKS

Legal Protection and Status

Yukon Podistera currently has no legal protection or status in Canada or the USA. It is not listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES 2013).

Non-Legal Status and Ranks

NatureServe (2013) considers Yukon Podistera to be vulnerable globally (G3), nationally in Canada (N3) and in Yukon (S3). In the United States, it is considered critically imperilled to imperilled nationally (N1N2) and subnationally in Alaska (S1S2).

The Canadian and Yukon General Status rank is 2, "May Be At Risk" (Wild Species 2010).

Habitat Protection and Ownership

All except one subpopulation are on public land and receive no direct habitat protection. Chert Mountain is found within Tombstone Territorial Park, which is managed under the Yukon *Parks and Land Certainty Act*, R.S.Y. 2002, c165, Schedule A of the Tr'ondëck Hwëch'in First Nation Final Agreement (1998), and the Tombstone Territorial Park Management Plan (Environment Yukon 2009). These agreements and legislation do not afford any specific protection for Yukon Podistera; however, they do prevent and/or control many types of development and motorized access within the park including prohibiting new mining activity. They also provide the opportunity to manage for protection of the species; however, as there are no other plant species assessed by COSEWIC in Yukon territorial parks, the level of protection has yet to be determined.

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BIOGRAPHICAL SUMMARY OF REPORT WRITER

Lori Schroeder has worked as an environmental educator and contractor since she moved to Yukon in 1989. Shortly after the move, she began collecting plants and studying them for personal interest, and she later continued as an employee and contractor with Environment Yukon, Environment Canada, and Kwanlin Dün First Nations. She is currently studying the impact of the Aishihik Wood Bison Herd on grassland vegetation for her Master's thesis in Conservation Biology at the University of Alberta, Edmonton.

COLLECTIONS EXAMINED

Pressed specimens collected in 2012 from the Mount Nansen subpopulations and the Little Gold subpopulation were examined, along with live specimens while conducting surveys. Images and database of specimens held at the University of Alaska Museum of the North (ALA) in Fairbanks, Alaska were viewed using the Arctos online website (University of Alaska 2009). Digital images of the specimens from the National Herbarium of Canada (2012a,b,c) were viewed after they were received from the Canadian Museum of Nature.

Appendix 1. Threats Classification Table for Yukon Podistera

THREATS ASSESSMENT WORKSHEET

Species or Ecosystem Scientific Name	Podistera yukonensis
Element ID	477788
Date (Ctrl + ";" for today's date):	04/09/2014
Assessor(s):	B.A. Bennett; S.G. Cannings; S.F. Dar; T. Jung
References:	COSEWIC 2-month Status Report

Overall Threat Impact Calculation Help:

Threat Impact		Level 1 Threat Impact Counts: high range	low range
A	Very High	0	0
B	High	0	0
C	Medium	0	0
D	Low	1	1
Calculated Overall Threat Impact:		Low	Low
Assigned Overall Threat Impact:		D = Low	
Impact Adjustment Reasons:			
Overall Threat Comments		Mining is considered the greatest threat to Yukon Podistera; however, only 20% of the Canadian populations is currently under any threat of mining based on active mining claims (July 2014).	

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
1	Residential & commercial development						
1.1	Housing & urban areas						
1.2	Commercial & industrial areas						
1.3	Tourism & recreation areas						
2	Agriculture & aquaculture						
2.1	Annual & perennial non-timber crops						
2.2	Wood & pulp plantations						
2.3	Livestock farming & ranching						
2.4	Marine & freshwater aquaculture						
3	Energy production & mining	D	Low	Restricted (11-30%)	Slight (1-10%)	High (Continuing)	
3.1	Oil & gas drilling						
3.2	Mining & quarrying	D	Low	Restricted (11-30%)	Slight (1-10%)	High (Continuing)	Mineral exploration affects 20% of the populations. Most work is at the exploration stage.
3.3	Renewable energy						
4	Transportation & service corridors						

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
4.1	Roads & railroads						
4.2	Utility & service lines						
4.3	Shipping lanes						
4.4	Flight paths						
5	Biological resource use						
5.1	Hunting & collecting terrestrial animals						
5.2	Gathering terrestrial plants						
5.3	Logging & wood harvesting						
5.4	Fishing & harvesting aquatic resources						
6	Human intrusions & disturbance		Negligible	Negligible (<1%)	Slight (1-10%)	High (Continuing)	
6.1	Recreational activities		Negligible	Negligible (<1%)	Slight (1-10%)	High (Continuing)	Hiking may impact some populations including Miller's Ridge and limited if any at Chert Mountain.
6.2	War, civil unrest & military exercises						
6.3	Work & other activities						
7	Natural system modifications						
7.1	Fire & fire suppression						
7.2	Dams & water management/use						
7.3	Other ecosystem modifications						
8	Invasive & other problematic species & genes						
8.1	Invasive non-native/alien species						
8.2	Problematic native species						
8.3	Introduced genetic material						
9	Pollution						
9.1	Household sewage & urban waste water						
9.2	Industrial & military effluents						
9.3	Agricultural & forestry effluents						
9.4	Garbage & solid waste						
9.5	Air-borne pollutants						
9.6	Excess energy						
10	Geological events						
10.1	Volcanoes						
10.2	Earthquakes/tsunamis						
10.3	Avalanches/landslides						

Threat		Impact (calculated)		Scope (next 10 Yrs)	Severity (10 Yrs or 3 Gen.)	Timing	Comments
11	Climate change & severe weather	CD	Medium - Low	Pervasive (71-100%)	Moderate - Slight (1-30%)	High (Continuing)	
11.1	Habitat shifting & alteration	CD	Medium - Low	Pervasive (71-100%)	Moderate - Slight (1-30%)	High (Continuing)	Loss of alpine habitat from climate change is ongoing, but is considered to have negligible impact within the next 10 years. Habitat shift is expected to be significant in the longer term. Over the next 3 generations (30-60 years) the effects of shrubification and snow accumulation may cause additional mortality.
11.2	Droughts						
11.3	Temperature extremes						
11.4	Storms & flooding						

Classification of Threats adopted from IUCN-CMP, Salafsky *et al.* (2008).