WOLVERINE MINE
WILDLIFE PROTECTION PLAN
VERSION 2018-02

Prepared for:

Yukon Government Department of Energy, Mines and Resources

Prepared by:

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Vancouver, British Columbia

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Table of Contents

Executive Summary ..... **iv**

1 Introduction **1**

2 Regulatory Requirements, Plan Updates and Concordance **3**

2.1 Development of the Wildlife Protection Plan 3

2.2 Roles and Responsibilities 3

2.3 YZC Environmental Policies 4

2.4 Plan Concordance with Guidance Documents, EA Screening Report and QML-0006 4

3 Incorporation of Traditional Knowledge and Results of Consultation **10**

3.1 Wildlife Technical Committee 11

4 Wildlife Resources **14**

4.1 Valued Ecological and Cultural Components Related to Wildlife 14

4.2 Overview of Seasonal Use and Habitat for Selected Wildlife 15

5 General Wildlife Protection Procedures **19**

5.1 Wildlife-Human Conflicts 19

5.2 Land Use 20

5.3 Transportation: Roads and Aircraft 21

5.4 Wildlife Habitat Protection 22

5.5 Tailings Facility Operation and Management 23

5.6 Wildlife Records Program 23

6 Specific Wildlife Monitoring Procedures **24**

6.1 Tailings Facility Monitoring 24

6.2 Winter Wildlife Monitoring 27

6.3 Monitoring of Metal Levels in Vegetation 39

6.4 Monitoring of Metal Levels in Small Mammals 41

6.5 Regional Wildlife Monitoring Programs 44

6.6 Rare Species Documentation 44

7 Annual Wildlife Records Program and Reporting **45**

8 Adaptive Management **46**

9 Closure Conditions **47**

10 References **48**

List of Figures

Figure 1-1: Location of the Wolverine Mine within the Yukon and Kaska Nation Traditional Territory 1
Figure 6-1: Study Areas for Tailings Facility Monitoring Program 26
Figure 6-2: American Marten Summary of Location and Count Along Established Winter Wildlife Transects 28
Figure 6-3: American Squirrel Summary of Location and Count Along Established Winter Wildlife Transects 29
Figure 6-4: Short-tailed Weasel Summary of Location and Count Along Established Winter Wildlife Transects 30
Figure 6-5: Vole species Summary of Location and Count Along Established Winter Wildlife Transects 31
Figure 6-6: Snowshoe Hare Summary of Location and Count Along Established Winter Wildlife Transects 32
Figure 6-7: Lynx Summary of Location and Count Along Established Winter Wildlife Transects 33
Figure 6-8: Wolf Summary of Location and Count Along Established Winter Wildlife Transects 34
Figure 6-9: Red Fox Summary of Location and Count Along Established Winter Wildlife Transects 35
Figure 6-10: Moose Summary of Location and Count Along Established Winter Wildlife Transects 36
Figure 6-11: Woodland Caribou Summary of Location and Count Along Established Winter Wildlife Transects 37
Figure 6-12: Rock Ptarmigan Summary of Location and Count Along Established Winter Wildlife Transects 38
Figure 6-13: 2010, 2011 and 2014 Vegetation Sampling Locations 40
Figure 6-14: Small Mammal Sampling Locations 43

List of Tables

Table 2-1: WPP Concordance with Plan Requirement Guidance for Quartz Mining Projects (EMR, 2013) 5
Table 2-2: Screening Report Commitments 6
Table 2-3: WPP Table of Concordance with QML-0006 Section 12.3 Requirements 8
Table 3-1: Issues and Concerns for Wildlife Identified through Consultation with the Kaska Nation 10
Table 3-2: Suggestions made by the WTC during the June 26, 2012 site visit 12
Table 4-1: Selected Wildlife VECCs Based on 2005/2006 EA Consultation and QML-0006 Requirements 15
Table 4-2: Wildlife Occurrence and Habitat Availability for Key Seasonal Periods in the Wolverine Project Area (YZC, 2005a) 16
Table 6-1: Location Description and Vegetation Characteristics of the Tailings Facility Monitoring Station and the 3 Reference Stations 25
Table 6-2: Winter Transects Summary and Monitoring Dates 27
Table 6-3: Total Metal Analysis Parameters with Reportable Detection Limits (RDL's) 39
Table 6-4: Small Mammal Sampling Transect Locations 41
Table 6-5: Total Metal Analysis Parameters 42

Table 7-1: Wildlife Monitoring Program Monitoring Frequencies for Mine Operations, Temporary Closure and Permanent Closure Phases 45

List of Appendices

Appendix A: Wolverine Mine Corporate Policies

Appendix B: Guidelines for Minimizing Disturbance to Wildlife and their Habitats during Monitoring Activities

Appendix C: Wildlife Records Program

Appendix D: Procedures for Reporting Wildlife Incidents and Observations

Appendix E: Tailings Facility Monitoring Protocol

Appendix F: Winter Wildlife Monitoring Protocol

Appendix G: Metal Levels in Vegetation Protocol

Appendix H: Metal Levels in Small Mammals Protocol

Appendix I: Rare Plant Species Monitoring Procedures

Date	February 2018		
Revision Tracking			
Date	**Version**	**Changes to the Plan**	**Reason for Update**
April 9, 2009	2009-01	-	Submitted in advance of mine construction
February 23, 2018	2018-02	Updated to be consistent with *Plan Requirements Guidance for Quartz Mining Projects*	• Required by the December 19, 2017 letter from Robert Holmes *Re: Extension of Temporary Closure Period, Updated Reclamation and Closure Plan and Security Determination – Wolverine Mine, Yukon Territory* • Submitted in advance of mine re-start

Executive Summary

The Wolverine Mine, owned and operated by Yukon Zinc Corporation (YZC), is a zinc-silver-copper-lead-gold underground mine, with 1,700 tonnes per day (tpd) capacity concentrator to produce copper, lead, and zinc concentrates. The Wolverine Mine is in the southeastern Yukon within the Kaska Nation Traditional Territory. Site access is via air, or over a 24 km all season access road, which connects with the Robert Campbell Highway at km 190. Yukon Zinc completed major site construction throughout 2009 and 2010. Commercial production of 1,020 tpd was achieved on March 1, 2012. Production first achieved 1,700 tpd in January 2013, however, the production rate was decreased by mid-2013, and the average production rate in 2014 was 1,180 tpd. The majority of the concentrate from Wolverine was trucked to the port at Stewart, British Columbia.

On January 27, 2015, Yukon Zinc announced that it was temporarily shutting down operations, due to unfavourable market conditions and has been in a temporary closure state since. However, the restart of the Wolverine Mine is currently being contemplated. As such, updates to the Mine Operating and Environmental Management Plans under Quartz Mining Licence QML-0006 are required. This Wildlife Protection Plan V2018-01 (WPP) is an update to the plan previously submitted on April 9, 2009 and approved on May 13, 2009. The intent of this WPP is to provide wildlife and wildlife habitat protection and monitoring measures to be implemented at the Wolverine Mine under operating, temporary closure and permanent closure conditions. This WPP has been updated in accordance with the *Plan Requirement Guidance for Quartz Mining Projects* (EMR, 2013) and in accordance with *Reclamation and Closure Plan Version 2016-07-V3 approval*, received December 19, 2017.

Acronyms

ANOVA	Analysis of Variance
CITES	Convention on International Trade in Endangered Species
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DAB	Development Assessment Branch
EA	Environmental Assessment
EAR	Environmental Assessment Report
ECO	Executive Council Office
EEM	Environmental Effects Monitoring
EMP	Environmental Management Plan
EMR	Yukon Government Department of Energy, Mines and Resources
FCH	Finlayson Caribou Herd
ICP-AES	Inductively Coupled Plasma Atomic Emission Spectroscopy
ICP-MS	Inductively Coupled Plasma Mass Spectroscopy
KNG	Keyeh Nejeh Golder
LFN	Liard First Nation
MCSA	Money Creek Study Area
MERG	Mining Environment Research Group
MPERG	Mining and Petroleum Environmental Research Group
MSSA	Mine Site Study Area
PCSA	Putt Creek Study Area
POC	Point Of Commencement
POT	Point Of Termination
QML	Quartz Mining Licence QML-0006
RDL	Reportable Detection Limit
RIC	Resource Inventory Committee
RRDC	Ross River Dena Council
SEPA	Socio-Economic Participation Agreement
TK	Traditional Knowledge
TLU	Traditional Land Use
TSF	Tailings Storage Facility
VECC(s)	Valued Ecological and Cultural Component(s)
WPA	Wolverine Project Area
WPP	Wildlife Protection Plan
WTC	Wildlife Technical Committee
YCDC	Yukon Conservation Data Centre
YE	Yukon Environment
YESAA	Yukon Socio-economic Assessment Act
YG	Yukon Government
YZC	Yukon Zinc Corporation

Units

°C	degrees Celsius
%	percent
α	confidence value
a.s.l.	metres above sea level
cm	centimeters
ha	hectare
km	kilometres
km/h	kilometres per hour
m	metres
mm	millimetres
Mt	Megatonnes
t	metric tonnes
tpd	metric tonnes per day
mg	milligram
kg	kilogram

Note: All units in this report are assumed to be metric unless specifically stated otherwise.

1 Introduction

The Wolverine Mine, owned and operated by Yukon Zinc Corporation (YZC), is a zinc-silver-copper-lead-gold underground mine, with on-site milling capabilities of 1,700 tpd to produce copper, lead, and zinc concentrates. The Wolverine Mine is in southeastern Yukon near the headwaters of the Wolverine Lake watershed within the Kaska Nation Traditional Territory (Figure 1-1). The original estimated life-of-mine was nine years, based on a 5.2 Mt mineable reserve. The site is accessed by aircraft or by vehicle on a 24 km long access road, which connects with the Robert Campbell Highway at km 190.



Figure 1-1: Location of the Wolverine Mine within the Yukon and Kaska Nation Traditional Territory

Components of the Wolverine Mine include:

- Underground mine;
- Tailings Storage Facility (TSF);
- Seepage collection pond;
- Waste rock storage piles;
- Industrial complex, mill, and camp;
- Landfill;
- Airstrip; and
- Site access road.

YZC completed major site construction throughout 2009 and 2010. Mill commissioning commenced in 2011 and commercial production of 1,020 tpd or 60% of rate mill capacity over a 30-day period was achieved on March 1, 2012. Production first achieved 1,700 tpd in January 2013. In January 2015 YZC announced that it was temporarily shutting down operations at the Wolverine Mine due to unfavourable market conditions, putting the site in "Temporary Closure". There is currently 5+ years of minable reserves identified at the Wolverine Mine. Mine restart is proposed to commence in 2018, pending financing. Mine operations will be followed by a four year decommissioning and closure phase, and a ten year post-closure monitoring phase.

The Mine is situated near the headwaters of the Wolverine Lake (or Nougha Mene) watershed, and is within the traditional territory of the Kaska Nation. The Kaska Nation in the Yukon is comprised of the Ross River Dena Council (RRDC) and the Liard First Nation (LFN). Nougha Mene, an important area to the Kaska, is a place for rejuvenation of the spirit, for renewing connections with the land, for practicing cultural traditions, and is also utilized for its wildlife, fish, and plant resources.

The average elevation of the Mine area is 1,350 m above sea level (a.s.l.) with a typically cold climate. Mean daily temperatures in summer average about 15°C, and -25°C in winter. Rain is common from May through September with mean annual rainfall amounts of 570 mm. Snow is typical between October and April, and annual accumulations are generally less than 200 cm. Wind gusts usually average less than 15 km/h throughout most of the year, and generally do not exceed 40 km/h.

Habitats in the vicinity of the Wolverine Mine support a number of wildlife species including woodland caribou, moose, black bear, grizzly bear, wolf, fox, coyote, wolverine, marten, mink, lynx, river otter, beaver, small mammals, raptors, ptarmigan, waterfowl, shorebirds, and a variety of forest songbirds. The Finlayson Lake/River area and the east slope of the Pelly Mountains are part of the Tintina Trench migration corridor, and are used extensively by waterfowl and shorebirds including trumpeter swan and sand hill crane on their north-south migration. The lakes and small pond-wetland complexes in the region provide breeding and migratory habitat for waterfowl, shorebirds, and other species. The mine site is situated in the southeast portion of the Finlayson Caribou Herd (FCH) range. Grizzly bears and to a lesser degree Thinhorn sheep are occasionally seen in the mine area.

Popular land use activities within the Wolverine Lake area including hunting, trapping, and recreation but are typically limited in the immediate vicinity of the mine site, which is located several kilometres upslope and east of the lake. Teslin Outfitters is the guide outfitter in the region with most outfitting activities occurring west of the Mine, and RRDC holds nearby group trapping concessions. Frances Lake, located northeast of the main Mine area, has the main local recreational site closest to the Mine area. Frances Lake Campground and Wilderness Lodge is located on Francis lake.

2 Regulatory Requirements, Plan Updates and Concordance

This WPP (version 2018-02) is a requirement under Section 12.3 (Wildlife Protection Plan) of the Quartz Mining License QML-0006 (QML) as well as a requirement of the approval of Reclamation and Closure Plan 2016-07-V.3 (EMR, 2017). This WPP covers the operational requirements for wildlife protection and monitoring, as well as the requirements during temporary and permanent closure of the mine. As such, this plan is also submitted to meet the requirements should the mine re-start following the current temporary closure period as well as the requirements under the current temporary closure status.

2.1 Development of the Wildlife Protection Plan

WPP 2009-01 was developed by YZC in partnership with RRDC, LFN and Yukon Environment (YE) through the Wolverine Mine Wildlife Technical Committee (WTC). This updated WPP 2018-02 builds on the protection and monitoring procedures outlines in version 2009-01 to incorporate information collected over the mine operating period, updated guidance documents and current QML-0006 approvals and conditions. This WPP provides procedures for minimizing and managing impacts to wildlife from routine mine activities, provides details on the implementation of wildlife monitoring programs, and details processes for improving mitigation and management measures through adaptive management. The focus of the WPP is on the protection of wildlife resources, and does not include aquatic resources (e.g., fish, benthic invertebrates), which are addressed through other mechanisms such the Metal Mining Effluent Regulations Environmental Effects Monitoring Program and the Wolverine Mine Environmental Monitoring and Surveillance Plan.

2.2 Roles and Responsibilities

During mine operations, the Mine General Manager is responsible for ensuring that the site is managed in a way that ensures compliance with all regulatory requirements and internal sustainability objectives.

The Environmental Manager for Yukon Zinc has overall responsibility to ensure the WPP is followed throughout mine life. The Environmental Manager ensures that environmental monitoring is being done as per project authorizations and approved plans. The Environmental Manager may delegate responsibilities to alternate companies and/or individuals to oversee particular activities at their discretion.

During temporary closure and permanent closure, the Site Superintendent is responsible for managing all aspects of the closed mine site, including ensuring compliance with all EPPs. The corporate executive branch is responsible for ensuring regulatory compliance and that reporting is conducted in accordance with all mine permits and licences during the temporary closure and/or permanent closure phases.

A YZC Environmental Scientist or designate will be responsible for ensuring that monitoring program activities follow the procedures outlined in the protocol documents, datasheets are complete and accurate, samples are packaged, labelled and stored correctly, and data management and entry procedures are accurate and complete. Additional data management and reporting requirements are provided in the protocol documents provided in Appendices E to H.

2.3 YZC Environmental Policies

Protection of the environment is a corporate priority for YZC. YZC is committed to managing its business in a way that will contribute and achieve a high level of environmental performance and meet the goal of continuous improvement. YZC will strive to preserve and protect the environment for the future while providing a safe and responsible operating environment through the development and implementation of its environmental policies and plans. Policies that have been developed for the Mine and are relevant to the WPP include:

- Environmental Protection Policy;
- Health and Safety Policy;
- Heritage Resources Protection Policy; and
- Wolverine Mine Firearm Policy.

These policies are provided in Appendix A.

2.4 Plan Concordance with Guidance Documents, EA Screening Report and QML-0006

This plan is a core component of the Environmental Management System, which is detailed in the various Environmental Management Plans (EMPs) required under QML-0006. Each EMP details a fundamental component of the environmental management and planning process for the mine and provides a practical way to minimize environmental and socio-economic impacts from work areas, activities, and operations. The EMPs provide YZC with a reference for monitoring regulatory compliance, and are or will be adaptive in approach, to allow for improvements to management policies and procedures over time.

Relevant EMPs that should be read in conjunction with the WPP include:

- Waste Management Plan;
- Hazardous Materials Management Plan;
- Spill and Contingency Plan;
- Sediment and Erosion Control Plan;
- Heritage Resources Protection Plan; and
- Environmental Monitoring and Surveillance Plan.

The WPP has been prepared to meet the requirements in the Plan Requirement Guidance for Quartz Mining Projects (EMR, 2013), and the concordance of the WPP with that guidance document is summarized in Table 2-1.

Table 2-1: WPP Concordance with Plan Requirement Guidance for Quartz Mining Projects (EMR, 2013)

Guidance Requirements	Concordance with WPP V2018-02
Provide a brief overview of the project description, describe how wildlife use the area, indicate if there are any areas of concern within the project footprint, and describe the key areas where the project has potential to affect wildlife in the area. If First Nations were consulted during the development of this plan a summary of their key issues and concerns should be outlined along with how these issues are addressed in the Wildlife Protection Plan.	Section **Error! Reference source not found. Error! Reference source not found.**
Provide a table of concordance that outlines all applicable proponent commitments made during the environmental assessment the decision document terms and conditions and license conditions, and show how these terms have been addressed in this plan.	Section 2.1 Development of the Wildlife Protection Plan Section 4.1 Valued Ecological and Cultural Components Related to Wildlife
For all revisions to this plan provide a table which indicates all areas where changes have been made.	Executive Summary
Provide a summary of the wildlife that is supported by the habitats in the vicinity of the project, identify any wildlife corridors or migration routes that are used, and describe any wildlife features (e.g., breeding grounds, mineral licks, dens, nests, etc.) that are within the project area.	Section 4.2 Overview of Seasonal Use and Habitat for Selected Wildlife
Provide a description of any Valued Ecological and Cultural Components ("VECC") that were identified during the environmental assessment and the rationale for why each species was identified as a VECC.	Section 4.1 Valued Ecological and Cultural Components Related to Wildlife
Include a summary of the seasonal periods, occurrence, and available habitat for all wildlife VECCs in the vicinity of the project. An overview of the habitat availability and classification for each VECC must also be provided in this section.	Section 4.2 Overview of Seasonal Use and Habitat for Selected Wildlife
Provide an overview of the management and mitigation strategies and actions that will be implemented to minimize the impacts to wildlife and their habitat. A summary of the training available to employees and visitors on wildlife protection procedures is also required in this section.	Section 5 General Wildlife Protection Procedures
Describe how the site will be designed and constructed to reduce wildlife interaction. Include the procedures that will be carried out to minimize conflicts between wildlife and employees or visitors. Provide details of what animal attractants are on site, how the attractants are stored, and the procedures that are in place to reduce wildlife-human conflicts due to attractants. Include an outline of the procedures that will be put in place to minimize impacts to traditional land users and guide outfitters.	Section 5 General Wildlife Protection Procedures
Describe how impacts to wildlife from the mine operations will be minimized. Activities that should be described include, but are not limited to, operating	Section 5 General Wildlife Protection Procedures

Guidance Requirements	Concordance with WPP V2018-02
procedures for transportation routes, on-road and off-road vehicles, heavy equipment, and aircraft and controls or deterrents used restrict wildlife access to tailings storage facilities or other high risk mine facilities. Identify the procedures that are in place to manage potential impacts to wildlife from direct and indirect habitat loss.	
Describe the recording program that is in place to document all wildlife observations and incidents and how this data will be used to identify existing or potential issues and areas of concern between wildlife and project components. Include a description of how rare species will be documented and reported. This program should include waterfowl and shorebird occurrence and distribution on all tailings ponds or other large storage ponds.	Section 7 Annual Wildlife Records Program and Reporting
Include a description of the program and methodology to monitor the occurrence, distribution and movement of wildlife on and near the mine site. If monitoring programs differ between seasons indicate the seasonal-specific monitoring programs that are in place. Include a description of how the data will be used to assess the effects to wildlife occurring from mine activities.	Section 6 Specific Wildlife Monitoring Procedures
Describe the program and methodology to monitor the baseline metal concentration in wildlife forage plants and small mammals and how the data will be used to assess the effects that the mining operation is having on these levels.	Section 6 Specific Wildlife Monitoring Procedures
Describe the adaptive management actions that will be employed should negative effects on wildlife be observed.	Section 8 Adaptive Management

Several government agencies, both federal and territorial, are involved in assessing, approving, reviewing, authorizing and monitoring the Wolverine Mine. These activities are managed in the form of regulatory, plan, monitoring and reporting based instruments that are directly or indirectly linked to environmental monitoring practices. For this plan, these instruments include the:

- Yukon Environmental and Socio-Economic Assessment Board Screening Report; and
- Quartz Mining Licence QML-0006.

Commitments addressed herein as detailed in the 2006 Screening Report (DAB, 2006) are outlined in Table 2-2 and those detailed in the QML are summarized in Table 2-3.

Table 2-2: Screening Report Commitments

Screening Report Commitment: September 20, 2006	Section Where Requirement Addressed
• Access to the haul road and mine must be restricted during all phases of the project.	Section 5.3 Transportation: Roads and Aircraft
• The proponent must enter into discussions on a formal environmental agreement with the Yukon government, as	Section 3 Incorporation of Traditional Knowledge and Results of Consultation

Screening Report Commitment: September 20, 2006	Section Where Requirement Addressed
represented by the Yukon department of Environment, with a view to finalizing the agreement within six months of the issuance of the Quartz Mining Licence. The environmental agreement must address, but not be limited to the following:	
○ Formalization of Wildlife Protection Plan and Waste Management Plan as identified in the EAR, including commitment to not allow employees' vehicles on site, along with a 'no firearms' and no hunting policy.	Section 3 Incorporation of Traditional Knowledge and Results of Consultation
○ Formalize requirements to restrict access to the site during all phases of the project.	Section 5.3 Transportation: Roads and Aircraft
○ Commitments to avoid low level flights over lakes and critical wildlife habitat within the spatial scope of the project to the extent possible.	Section 5.3 Transportation: Roads and Aircraft
○ The agreement must formalize wildlife monitoring within the mine and haul road locations, including the monitoring of waterfowl and shorebirds within the TMF, particularly during migration periods.	Section 5.3 Transportation: Roads and Aircraft and Section 6.2 - Winter Wildlife Monitoring
○ The agreement must specify measures to restrict access during construction, operations, periods of temporary closure, decommissioning and post-closure, including provision for partial or full road reclamation as a means of access restriction, based on access requirements for decommissioning, monitoring and maintenance purposes.	Section 5.3 Transportation: Roads and Aircraft
○ The agreement must address the issue of appropriate speed limits on the haul road as a means of mitigating direct wildlife casualties.	Section 5.3 Transportation: Roads and Aircraft
• Fencing around any mine structure, including the tailings impoundment, must be installed at the discretion of a Mining Inspector if determined to be necessary for wildlife protection at any point during the life of the project.	Section 5.1 Wildlife-Human Conflicts and Section 5.5 Tailings Facility Operation and Management
• Prior to the commencement of haul road construction, the proponent and Yukon government, in consultation with the Kaska, must identify a suitable location for a gate to ensure its effectiveness in restricting access.	Section 5.3 Transportation: Roads and Aircraft
• Snow-plow "push outs" to allow for the escape of wildlife on the haul road must be situated as approved by a Conservation Officer and/or the regional biologist of the Yukon department of Environment.	Section 5.3 Transportation: Roads and Aircraft
• Prior to the annual big-game hunting season, the proponent must contact the outfitting concession holder with a view to	Section 5.3 Transportation: Roads and Aircraft

Screening Report Commitment: September 20, 2006	Section Where Requirement Addressed
identifying areas where outfitting activities will be occurring; the proponent must make best efforts to amend flight schedules and routes to avoid flights within these areas during periods when outfitting activities are taking place.	Section 5.2 Land Use
• Aircraft flights must be routed to avoid active caribou rutting and sheep lambing areas to the extent possible.	Section 5.3 Transportation: Roads and Aircraft
• The objective of mitigating likely significant adverse environmental effects on traditional pursuits by aboriginal persons includes mitigation requirements for wildlife protection and reclamation obligations. The implementation of mitigation measures such as access restriction and other wildlife protection measures, progressive and final reclamation with ongoing follow-up program implementation into the post-closure period, backed by financial security, are intended to restore that the project area to the extent that it will be available for traditional pursuits by aboriginal persons should the Kaska wish to engage in such activities.	Section 5.2 Land Use
• The proponent is required to accurately monitor and report on all interactions in the Yukon between the project and caribou, moose, bear and sheep, from the mine site, along the haul route to the British Columbia border. Particular attention to wildlife (including waterfowl) interactions with the tailings management facility is required during the operating and any temporary closure periods.	Section 6.6 Wildlife Records Program
• Adaptive responses include but are not limited to the lowering of speed limits and additional fencing requirements in the mine area.	Section 8 Adaptive Management

Table 2-3: WPP Table of Concordance with QML-0006 Section 12.3 Requirements

QML-0006 Section 12.3 Regulatory Requirements	Section Where Addressed
a) Measures to restrict public access to the site during development, and production, temporary closure, and during decommissioning and post-closure.	Section 5.3 Transportation: Roads and Aircraft
b) A program for wildlife monitoring at and within the immediate vicinity of the site, including monitoring of waterfowl and shorebirds within the tailings management facility during key migration periods.	Section 6 Specific Wildlife Monitoring Procedures Appendix E to H: Monitoring Protocols
c) Identification and posting of appropriate speed limits for the access road and any other road at the site to reduce wildlife casualties and the method of ensuring that such limits are not exceeded by employees or contractors of the Licensee.	Section 5.3 Transportation: Roads and Aircraft
d) Mechanisms to be used to prohibit private on-road and off-road vehicles on the access road and site.	Section 5.3 Transportation: Roads and Aircraft

QML-0006 Section 12.3 Regulatory Requirements	Section Where Addressed
e) Mechanisms to ensure that employees and contractors of the Licensee do not bring firearms or hunt in association with their employment at site, unless otherwise permitted by the Chief, Energy, Mines and Resources.	Section 5.1 Human-Wildlife Conflicts Appendix A Wolverine Mine Firearm Policy
f) A protocol for aircraft use over and in the vicinity of: i. Wolverine Lake, Little Wolverine Lake, and Little Jimmy Lake; ii. Known critical wildlife habitat in the area of the Undertaking including caribou rutting and sheep lambing areas; iii. Areas to be used by local outfitting concession holder.	Section 5.2 Land Use Section 5.3 Transportation: Roads and Aircraft
g) A protocol for contacting the local outfitting concession holder to identify areas where the concession holder may be conducting outfitting activities that will be occurring during the next upcoming outfitting season.	Section 5.2 Land Use
h) Mechanisms for avoiding disturbance of trap lines and traditional trails by the Undertaking.	Section 5.2 Land Use
i) Strategies and schedule for constructing snow plough "push-outs" to allow for the escape of wildlife on the haul road.	Section 5.3 Transportation: Roads and Aircraft

Other additional regulatory instruments noted as relevant to the monitoring and protection of wildlife in the mine area include:

- Federal Legislation:
    - *Canada Wildlife Act*
    - *Migratory Birds Convention Act*
    - *Species at Risk Act*
    - *Yukon Act*
    - *YESAA*
- Yukon Legislation:
    - *Environment Act*
    - *Wildlife Act*
    - Yukon Conservation Data Centre
- Local First Nations management plans and TK/TLU data
- Local management plans for caribou or other wildlife and/or other studies (i.e. Finlayson Caribou Herd Late-Winter Population Survey)

3 Incorporation of Traditional Knowledge and Results of Consultation

In July 2005, YZC entered into a Socio-Economic Participation Agreement (SEPA) with the RRDC on behalf of the Kaska Nation. The SEPA outlines the provisions for the participation of the Kaska Nation in exploration, development, and operational activities associated with the Wolverine Mine, and exploration in the Finlayson District. YZC subsequently entered into a Traditional Knowledge (TK) Protocol with RRDC in September 2006 to ensure that TK was meaningfully considered, so that sites and areas of significance were not compromised by Mine activities. Table 3-1 provides a summary of the key wildlife issues and concerns that were raised during the EA and permitting phases by the Kaska Nation.

Table 3-1: Issues and Concerns for Wildlife Identified through Consultation with the Kaska Nation

Category	Wildlife Issues and Concerns Identified by the Kaska

General	• Signs and prohibitions for no littering and feeding wildlife
	• Response strategy for bears (e.g., reporting, deterrents)
	• Delivery of bear awareness workshop
	• Management of wastes (e.g., disposal, bear proof containers, electric fencing)
	  ○ Prohibitions on firearms, hunting or fishing by employees
	  ○ Restricted road use (i.e., locked gates)
	• Prohibition of non-employees at site and on road
	• Reporting of all licensed hunting and fishing activities
	• Reporting of incidents to an Environmental Monitor

Attractants	• Restrictions on use of salt • Re-vegetation using unpalatable species
Roads	• Road use guidelines (e.g., minimize traffic volume, avoid sensitive periods, warnings, speed restrictions, gate and security procedures) • Road management guidelines (e.g., snow push-outs) • Gating and prohibition of traffic on road, ATV restrictions
Wildlife Disturbance	• Collect baseline data on seasonal distribution of selected species; • Track surveys and observations of wildlife • Revise key habitat maps based on TK and available science if necessary • Continue monitoring caribou through seasonal helicopter surveys (and ground-based surveys)
Contaminants	• Temporary fencing • Surveillance of facility (e.g., cameras, employees) • Use of deterrents (e.g., netting, explosive devices, audio devices) • Prevent re-vegetation around tailings pond • Baseline data collection and assay for ptarmigan, voles and certain vegetation
Aircraft	• Avoid over flights of key habitats during key periods • Identify key habitats and key periods of use by sheep, caribou and waterfowl • Develop guidelines to minimize disturbance to wildlife • Predetermine outfitter activities and avoid these areas

During the preparation of the Environmental Assessment (EA), YZC engaged an RRDC TK Committee to complete a TK report for the Mine area. The confidential report, entitled Wolverine Mine Project TK

Interviews September 2005-December 20051 (TK Report) is not presented within this WPP due to confidentiality requirements agreed to between RRDC and YZC, however, general outcomes from the TK Report include:

- Two figures within the TK Report document areas of cultural significance and known wildlife migration corridors and habitat.
- There are no mineral licks within the footprint on or near project infrastructure such as the mill site and camp, tailings facility or mine access road. There are three mineral licks located within the general area (northeast and northwest of the mine area).
- Wildlife migration routes do not conflict with mine infrastructure or the tailings facility, but moose migration routes have been identified near the mine access road.
- The closest known sheep area is described to be southwest of the mine and paralleling an unspecified waterway east of the mine.
- Caribou calving grounds are located outside the Mine footprint (greater than 30 km away).
- The only mapped Mine-TK interaction is at the north end of the mine access road where the road crosses a traditional trail. The road was designed to bisect the trail to minimize the amount of disturbance, and only crosses the trail once. During road construction in 2007, Environmental Technician Billie Maje was onsite during construction activities to observe and mitigate any potential cultural or environmental conflicts. No additional cultural conflicts were observed.

The TK Report information has been incorporated in this document in the form of monitoring of the Wolverine Mine area, and notably within the area where the TK Report shows migratory routes. Based on results speed limits will be reduced, and snow plough push-outs will be located where wildlife crossing have been identified.

3.1 Wildlife Technical Committee

A Wildlife Technical Committee (WTC) was formed in late 2008 to inform the content of the WPP V2009-01 and to allow participation in monitoring activities by stakeholders once the mine was in operation. The WTC included participants from RRDC, Liard First Nation (LFN), Yukon Government (YG) and YZC. WTC teleconference meetings were held in early 2009 for the development of WPP V2009-01. After the WPP was approved by Energy, Mines and Resources in May 2009, a field tour was organized and held at the Wolverine Mine on July 9, 2009. The tour was attended by representatives from RRDC, Yukon Environment, and YZC. The tour provided an opportunity for WTC members to meet face-to-face, become familiar with the mine, and provide a forum for discussing wildlife concerns associated with mine advancement.

The WTC was also provided with the WPP annual reports, which were submitted in Q1 of the year following the year in which the data was collected. In 2010, the Wildlife Technical Committee was

[1] *Wolverine Mine Project TK Interviews September 2005-December 2005*[1], prepared by Norman Sterriah (Ross River Dena Council TK Coordinator)

contacted in March to review the draft 2009 Annual Report. Comments were not received from the Ross River Dena Council wildlife technical committee members. Yukon Environment reviewed the report and had no specific concerns with the report layout or content, and made some general comments on the results with respect to the spatial distribution of animal and metal concentration variation between the small mammal species. Keyeh Nejeh Golder (KNG) was contracted by YZC on behalf of the Laird First Nation Development Corporation, and they provided comments subsequent to the submission of the report to Energy, Mines and Resources.

On June 26, 2012, members of the Wildlife Technical Committee (WTC) visited the Wolverine Mine to tour the site and discuss the efforts made to-date toward fulfilment of the Wildlife Protection Plan, and the results from the programs executed in 2011. The WTC members and participants that were present included: Ted Charlie (RRDC), Charlie Dick (RRDC), Frankie Magun (LFN), Sam Donnessey (LFN), Matt Clarke (Liard Regional Biologist), Ryan Drummond (Liard Regional Wildlife Technician), and Sandra Bob (YZC Community Liason Coordinator). The site visit included a review of the 2011 program results and a tour of the mine site. Table 3-2 provides a summary of the suggestions made during the site visit.

Table 3-2: Suggestions made by the WTC during the June 26, 2012 site visit

Program	Proposed Suggestion
Wildlife Records Program	It was noted that this information was quite useful as a source of wildlife presence, and was consistent with some of the known seasonal wildlife movements in the area (e.g., Caribou). A suggested use was identifying specific sections along the Access Road where wildlife movements are more common. Signs to indicate these sections to drivers (particularly large ore trucks) could be installed to help prevent potential 'road strikes'. Even though there had not been any road strikes to date, extra precaution should be taken.
	Because of the usefulness of the information, more emphasis could be placed on gathering more incidental data. It was therefore suggested that wildlife recording logs could be placed in the YZC ore trucks (14 in total), and handed into the environmental department at the end of each month. The focus would therefore be placed on wildlife presence along the road, which could better identify the sections of the road most commonly used by wildlife (see above).
Winter Wildlife Records Program	It was suggested that the existing (and future) data could be better presented as "# of observations per KM" since it could be easily compared from year to year, and with other similar wildlife tracking efforts in the area, since this is common practice.
Tailings Monitoring Program	The group was informed that migratory duck species were observed occupying the tailings facility during early spring when it was the only open body of water in the area. Several deterrents were used by YZC to some success, particularly the fake predatory owls that were positioned on the 4 barge anchor poles surrounding the facility. It was then suggested that a fake Peregrine Falcon, combined with Falcon calls from an 'auditory machine', may be an ideal deterrent, since they are a common predator of waterfowl species in the area.
	A net to cover the pond was also tabled, but was deemed impractical due to the size of the pond, and the fact that the pipes and the pump barge within the pond will be moved on a regular basis to cater for tailings deposition, important to managing the integrity of the dam and facility on a whole.
Metal Levels in Vegetation, or Forage Species	It was noticed that all of the sampling locations within the 'Money Creek Reference Area' (MCRA) were clustered in the relatively same area, and that a more representative data set should include sampling locations in other parts of the MCRA. It was suggested that some

Program	Proposed Suggestion
	of these locations include the top and other side of the mountain since they would be more isolated from any potential impacts from mine activities.
	The group was informed that of the 3 forage species, Lichen proved to more statistically reliable (for making comparisons between areas and with time), since the entire plant was being sampled (unlike Willow) and could be found in abundance in all areas (not just around creeks like Horsetail). This finding was supported by previous studies on impacts from mines that also used Lichen as a bio-indicator. It was therefore suggested that Lichen be the sole forage species for monitoring metals moving forward.
	Sampling Lily Pads was suggested as an additional forage species to be analyzed for metals, since they were fed on by wildlife species in the area (e.g., Moose). However, since heavy effort was already being placed on monitoring impacts to the water quality through the Monitoring and Surveillance Program, as well as Metal Mines Effluent Regulations, it was deemed to be redundant.
Metal Levels in Small Mammals	Item 1. In 4) above applies with this sampling as well, since it was conducted in the same area.
	The group was informed that of all the small mammals species captured, the Redback vole was the most reliable species for monitoring metal levels due to its relatively high abundance/population in all 3 survey areas, ecological importance, and ease of identification. In order to reduce the overall impact from the research effort, it was suggested that the Redback vole be used as the sole bio-indicator species for the program moving forward. However, to avoid jeopardizing the biodiversity data collected from the previous monitoring efforts, it was suggested that 'live traps' be used as well, the only concern being that the change in trapping effort could affect the outcome (i.e., trap success may differ).

In 2013, there was no formal meeting held with the Wildlife Technical Committee. However, the suggestions for improvement to the Plan made during the 2012 site visit were implemented in 2013 (e.g., establishment of road signs at critical areas informing drivers of the potential presence of wildlife, issuing of wildlife log books to concentrate haul truck drivers, increased effort to deter migratory bird species from the tailings pond area). Also, many of the suggestions made were related to the Metals Levels in Small Mammals and Vegetation Programs, which were implemented in 2014.

No Wildlife Technical Committee meetings were held in 2011, or 2014-2017.

The 2018 version of the WPP will be provided to RRDC, LFN and YG for comments.

4 Wildlife Resources

Habitats near the Mine support a number of wildlife species including: woodland caribou, moose, black bear, grizzly bear, wolf, fox, coyote, wolverine, marten, mink, lynx, river otter, beaver, small mammals, raptors, ptarmigan, waterfowl, shorebirds, and a variety of forest songbirds. The Finlayson Lake/River area and the east slope of the Pelly Mountains are part of the Tintina Trench migration corridor and are used extensively by waterfowl and shorebirds including trumpeter swan and sand hill crane on their north-south migration (Sinclair et al., 2003). The lakes and small pond-wetland complexes in the region provide breeding and migratory habitat for waterfowl, shorebirds, and other species. The mine site is situated in the southeast portion of the Finlayson Caribou Herd (FCH) range.

4.1 Valued Ecological and Cultural Components Related to Wildlife

At the beginning of the EA process in 2005, the selection of Valued Ecological and Cultural Component(s) (VECC) was conducted through consultation with various technical experts and stakeholders, including RRDC, the Kaska Forest Stewardship Council, Yukon Government Development Assessment Branch, Yukon Government Energy, Mines and Resources (EMR), Yukon Government Environment (YE), Canadian Wildlife Service, Yukon Land Use Planning Council, and the University of Alberta (YZC, 2005a). From this process, nine wildlife species/species-associations were identified as VECCs for the Mine. The selected VECCs were expected to represent larger assemblages of wildlife species known to occur in the area, and were selected based on the applicability of the following criteria:

- Conservation status (i.e., Committee on the Status of Endangered Wildlife in Canada (COSEWIC), Convention on International Trade in Endangered Species (CITES), *Yukon Wildlife Act*);
- Ability of species to function as an indicator for a broader number of species;
- Potential to sustain project impacts;
- Species of cultural, social, economic and regional importance;
- Environmental Assessment Report Guidelines (Yukon ECO, 2005);
- Input from the review of the Biophysical Assessment Workplan submitted to regulators and RRDC in May/June 2005 (YZC, 2005b);
- Findings from previous field investigations; and
- Input from the Project Technical Committee (meeting June 15, 2005).

The VECCs chosen during this process and additional rationale for selection are identified in Table 4-1. These VECCs are the main species considered for management, mitigation and monitoring strategies and actions that will be implemented to minimize the impacts to wildlife and their habitat under this plan. Waterfowl and shorebirds are also included as selected VECCs as they were identified as species of concern under QML-0006 Section 12.3b. This table has been updated from WPP 2009-01 to reflect the most up to date COSEWIC assessment and status reports.

Table 4-1: Selected Wildlife VECCs Based on 2005/2006 EA Consultation and QML-0006 Requirements

Selected VECC	Additional Rationale for VECC Selection
Woodland Caribou	• Listed as 'special concern' under COSEWIC (2014) • Species of regional importance
Moose	• Identified in regional context as significant moose population in Yukon.
Grizzly bear	• Listed as 'special concern' under COSEWIC (2012).
Lynx and Snowshoe hare	• Lynx is a prey specialist linked to snowshoe hare cycle. • Lynx is listed under CITES Appendix II.
American marten	• Socio-economic value as a furbearing species.
Song bird community	• Species listed under COSEWIC (2006, 2007, 2011 & 2013) and the Migratory Birds Convention Act.
Trumpeter swan	• Breeding habitat in local study area. • Listed in Yukon Wildlife Act as 'specially protected' species. • Listed species under the Migratory Birds Convention Act.
Beaver	• Socio-economic value as a furbearing species. • Representative of other mammal species that use wetland habitats.
Thinhorn sheep	• Potential habitat occurrence in the local study area.
Waterfowl and Shorebirds	• Identified as a management concern under QML-0006.

4.2 Overview of Seasonal Use and Habitat for Selected Wildlife

Table 4-2 provides a summary of the key seasonal periods, occurrence, and available habitat for selected wildlife VECCs near the Wolverine Mine. The reference to the Wolverine Project Area (WPA) in the table is the local study area assessed during the EA phase of the Project (YZC, 2005a), and includes the mine site and access road plus an approximately 14,000 ha buffer area.

Defining available habitat for each assessed species noted above involved habitat suitability modelling as per Resource Inventory Committee (RIC) Standards (1999a), and subsequent field verification for moose, grizzly bear, lynx and snowshoe hare, marten, trumpeter swan, and beaver. Habitat classifications assigned for each assessed species noted above is based on the percentage of the provincial/territorial best habitat, which is the benchmark habitat for a species against which all other habitats for that particular species is evaluated. The habitats for moose, marten, lynx and snowshoe hare are based on a four-class rating system, and include habitat classification values of nil (0%), low (1-25%), moderate (26-75%), and high (76-100%). Habitat for grizzly bear is based on a five-class habitat classification rating system comprised of nil (0%), very low (1-5%), low (6-25%), moderate (26-50%), high (51-75%), and very high (76-100%). The habitat classification of confirmed, unconfirmed and potential habitat, for trumpeter swan and beaver is based on aerial survey conducted in 2005. Fall and winter habitat availability for caribou is based on satellite interpretation of terrestrial lichen abundance and key wildlife habitat areas identified for the herd by Yukon Environment (YZC, 2005a).

Table 4-2: Wildlife Occurrence and Habitat Availability for Key Seasonal Periods in the Wolverine Project Area (YZC, 2005a)

Wildlife Species	Key Seasonal Periods	Wildlife Occurrence in the WPA	Habitat Availability in the WPA
Woodland Caribou	Calving (May/June)	Limited occurrence in the WPA during the calving season. Mapping based on YE surveys and telemetry studies from 1982-2004, indicate only two documented occurrences in the vicinity of the WPA.	Not assessed in 2005
	Post-Calving (June/July)	Limited occurrence documented in the WPA. This is based on less than 5% of all caribou observations (n=4,307), from 1982-2004 YE surveys and telemetry data being found in the WPA.	Not assessed in 2005
	Fall Rut (October)	Limited occurrence documented in the WPA. This is based on less than 5% of all caribou observations (n=34,471), from 1982-2004 YE surveys and telemetry data, being found in the WPA.	Assessment indicates 4,455 ha of available fall habitat in the WPA. Of this about 1,594 ha is confirmed habitat with the remainder being unconfirmed habitat.
	Winter (November-April)	Limited occurrence documented in the WPA. This is based on less than 5% of all caribou observations (n=14,149), from 1982-2004 YE surveys and telemetry data, being found in the WPA.	Assessment indicates about 1,047 ha of available winter habitat in the WPA. Of this 979 ha is confirmed habitat, and the remaining being unconfirmed habitat.
Moose	Spring/Summer (May-August)	No specific data is available for the WPA on moose density. Surveys conducted in the Finlayson-Francis Lake area in 1996 by YE indicated a density of 0.31 moose/km^2.	Not assessed in 2005
Moose	Rut/Post-Rut (September-November)	No specific data is available for the WPA on moose density. Surveys conducted in the Finlayson-Francis Lake area in 1996 by YE indicated a density of 0.31 moose/km^2.	Not assessed in 2005
	Winter (December-April)	No specific data is available for the WPA on moose density. Surveys conducted in the Finlayson-Francis Lake area in 1996 by YE indicated a density of 0.31 moose/km^2.	Assessment indicates 9,488 ha of available winter habitat in the WPA. About 31% (2,941 ha) is low, 48% (4,554 ha) moderate, and 21% (1,993 ha) high value moose winter habitat.
Thinhorn Sheep	Lambing (May –June)	Since 2005, no visual confirmation of sheep presence or sign has been seen in the WPA. During aerial surveys,	Based on habitat modelling, no suitable thinhorn sheep habitat is present in the WPA. Suitable

Wildlife Species	Key Seasonal Periods	Wildlife Occurrence in the WPA	Habitat Availability in the WPA
		sheep were documented in portions of the Campbell Range (east of Wolverine Lake) and in close proximity to North Lakes (south of Wolverine Lake).	habitat was identified south of the Wolverine Project in the vicinity of North Lakes.
	Winter		
Grizzly Bear	Spring	No specific quantitative data on grizzly bear population numbers or density is available for the WPA.	Assessment indicates 10,664 ha of available spring forage habitat. About 18% (1,920 ha) is very high, 22% (2,346 ha) high, 7% (747 ha) moderate, 10% (1,066 ha) low, and 43% (4,585 ha) very low value spring grizzly bear habitat.
Grizzly Bear	Summer/Fall	No specific quantitative data on grizzly bear population numbers or density is available for the WPA.	Assessment indicates 10,667 ha of available summer/fall forage habitat. In the WPA. About 13% (1,386 ha) is very high/high, 41% (4,374 ha) moderate, 30% (3,200 ha) low, and 16% (1,707 ha) very low value summer/fall forage habitat.
Lynx and Snowshoe Hare	All seasons	No specific quantitative data on lynx and snowshoe hare population numbers or density is available for the WPA.	Assessment indicates 10,758 ha of available lynx and snowshoe hare habitat in the WPA. About 44% (4,734 ha) high, 52% (5,594 ha) moderate, 4% (430 ha) low value habitat.
American Marten	All seasons	No specific quantitative data on marten population numbers or density is available for the WPA. Trapping records indicate marten are likely common in the WPA and have been observed frequently at the Wolverine Lake exploration camp.	Assessment indicates 5,873 ha of available marten habitat in the WPA. About 20% (1,175 ha) is moderate, and 80% (4,698 ha) low value marten habitat.
Songbirds	Spring Migration (April-May)	43 passerine species were assessed during the EA phase (YZC, 2005a). No quantitative data on songbird densities is available for the WPA.	Songbirds use a diversity of habitats in the WPA. Habitat requirements and use varies by species and season.
	Breeding Season (May-July)		
	Fall Migration (August-October)		
	Spring Breeding		

Wildlife Species	Key Seasonal Periods	Wildlife Occurrence in the WPA	Habitat Availability in the WPA
Trumpeter Swan	(May-June) Summer Nesting (July-September)	One confirmed breeding pair of trumpeter swans with cygnets was documented in 2005. Additional swans may occur where suitable habitat is available.	Assessment indicates that available habitat for trumpeter swans in the WPA is about 585 ha. Of this 99% of the habitat is confirmed breeding habitat.
Beaver	All seasons	Beaver colonies are common in the WPA. Aerial survey in 2005 indicated over 50 wetlands in the WPA had past or present sign of beavers. Between 1980 and 2001 the total beaver fur harvest from the WPA was approximately 1,300 pelts.	Assessment indicates available habitat for beaver in the WPA is about 1,714 ha. Of this 69% is confirmed habitat, and the remaining is potential habitat.

5 General Wildlife Protection Procedures

The Wolverine Mine has implemented management and mitigation strategies or actions YZC to minimize impacts to wildlife and their habitats, as well as land users (e.g., traditional/cultural use, outfitters, trappers), from routine activities and unplanned events associated with operation of the mine. These procedures were compiled from a variety of sources including recommendations from government agencies, consultation with First Nations and stakeholders, and by reviewing and incorporating current practices for mitigating wildlife impacts associated with mine development and operation.

Mine effects on wildlife will be minimized by:

- Managing human-wildlife encounters and conflicts;
- Minimizing injury or mortality to wildlife from vehicular accidents;
- Protecting wildlife from contamination (e.g., ingestion of tailings water);
- Managing potential increases in hunting pressure due to improved access;
- Minimizing impacts to land users (i.e., guide outfitter, trap line holders, traditional land users); and
- Monitor impacts to wildlife populations from the construction and operation of the mine.

All YZC personnel, contractors, and visitors, will be provided training on this WPP and the wildlife protection procedures contained herein as a component of the work site orientation. YZC management will ensure that personnel and contractors are familiar with, and follow the procedures identified in this section of the WPP. Short stay visitors (e.g., less than 1 day) will be escorted by YZC personnel throughout the course of their duties at the mine site.

5.1 Wildlife-Human Conflicts

To minimize potential impacts to wildlife it is essential that work activities are always carried out in a safe and responsible manner. The following general procedures will be carried out to minimize effects from the development and operation of the mine:

- All mine personnel and contractors will be provided wildlife safety training, which will include bear awareness and safety training, as part of their work site orientation package.
- Mine personnel and contractors will not attempt to handle nuisance or problem wildlife on their own. Site Management will be notified immediately if any wildlife is encountered while working at site.
- The harassment of wildlife is prohibited under the *Yukon Wildlife Act*. Attempts to chase, catch, divert, follow, or otherwise harass wildlife by on-road or off-road vehicles, boats, aircraft, or on foot will not be permitted at any time.
- Feeding wildlife is prohibited, including during travel to and from the mine site.
- Personal pets will not be permitted.

- Personal wildlife deterrents (e.g., air horns, bear spray, bear bangers) will be issued and carried by field crews (e.g., environment staff, geologists). Training on personal wildlife deterrents will be completed prior to issuance and use.
- No hunting or fishing will be permitted by mine personnel or contractors at the mine site or on YZC's mining claims and leases.
- Personal firearms will not be permitted at the mine site. This includes the transport, storage and use of firearms. The Firearm Policy is provided in Appendix A.
- Only Authorized Personnel, specified by Site Management, will be permitted to use non-lethal deterrent measures (e.g., rubber bullets, air horns, bear bangers) or lethal measures to protect person(s) and/or property from wildlife. Lethal measures will only be used when all other practical means of averting the threat has been exhausted.
- Littering will not be permitted. Bear-proof storage containers are located at multiple locations around the mine site and are to be used to dispose all refuse and garbage.
- All work areas will be kept free of garbage and spills. All uncontained garbage or spills will be cleaned up immediately. Improper disposal of garbage, especially food or kitchen wastes, will be reported to Site Management as soon as possible.
- All wastes will be disposed according to the Waste Management Plan.
- The landfill and incinerator will be enclosed with an electrified fence and operated in compliance with Commercial Dump Permit #81-014.
- Hiking near the mine site will be permitted during non-working hours. Areas that will be excluded from this activity include sensitive and critical habitat areas identified by YZC in consultation with the WTC. Hiking is only on locations as approved by Mine Management following trails marked by the Environmental Department.
- Research and monitoring guidelines, detailed in Appendix B, will be followed to minimize disturbances to wildlife and habitats from these activities.
- Wildlife incidents (e.g., traffic accidents), observations of wildlife acting in a non-normal way, and nuisance or problem animals will be reported to Site Management immediately. Any observations of wildlife behaving in a normal way will be reported to Site Management within 24 hours. Reporting procedures are detailed in Appendix D and the Wildlife Log is provided in Appendix C.

5.2 Land Use

In order to minimize impacts to traditional land users and outfitters the following procedures will be implemented.

- Trapping will not be permitted on YZC mining claims but is not limited in the general area. RRDC, who holds the group trap line, is compensated bi-annually through the Land Use Interruption Supplement outlined in the SEPA. RRDC will be contacted to trap nuisance animals when

necessary. If unavailable, the Yukon Government Conservation Officer, will be contacted **(Ross River: 867.969.2202; Faro: 867.994.2862; Watson Lake: 867.536.3210)**.

- Use of areas for traditional land use practices (e.g., hunting, fishing, berry picking) in the general vicinity of Wolverine Lake is not restricted if these areas are accessed by a means other than the mine access road or airstrip.
- Each spring, the Environmental Coordinator or designate will consult with Teslin Outfitters on their planned outfitting activities for the upcoming hunting season. Identified active outfitting areas will be integrated into Mine planning and will be provided to the aircraft and helicopter contractors to avoid, as needed. To the extent possible aircraft will avoid operating in active outfitting areas during specified periods.

5.3 Transportation: Roads and Aircraft

It is important that all activities along transportation routes for on-road and off-road vehicles, heavy equipment, aircraft and helicopters are used in a safe and responsible manner to ensure that impacts to wildlife are minimized. These measures will be followed whenever possible, when guidelines do not conflict with Canadian Aviation Regulations. Weather conditions or other safety considerations may require deviation from flight paths or preferred elevation (e.g., aircraft may be required to adjust flight altitude to avoid conflicts with other planes).

- Access will be restricted by a locked gate at the entrance to the mine access road at km 190 of the Robert Campbell Highway, to prevent public use.
- Maximum speed limit on the access road will be 60 km/h unless otherwise posted. Travel speeds will be adjusted according to road conditions, weather, and wildlife presence when and where required.
- Minimum traffic levels will be maintained along the mine access road to the extent possible.
- Wildlife will have the right-of-way at the mine site and along the access and site roads when it judged safe to allow passage.
- The authorized use of on-road and off-road vehicles will be restricted to established roads and designated trails at the mine site except to access monitoring sites and remote communications equipment.
- To improve visibility from dust, the mine access road and site roads will be sprayed with water during dry periods as needed.
- In winter, the mine access road and site roads will be plowed, and products having low environmental impact (e.g., sand, gravel, non-palatable salts such as lithium chloride) will be used as needed to ensure safe road conditions.
- Push-outs will be plowed along the access road in winter as required depending on the presence of wildlife trails or crossings, snow height, and road limitations. Pushouts will be placed in areas of infrequent use by wildlife.

- Any observations of wildlife will be reported to Site Management as soon as possible.
- Wildlife incidents (e.g., traffic accidents) will be reported to Site Management immediately.
- The guidelines for flying in sheep and caribou habitat areas have been developed by Mining & Petroleum Environmental Research Group (MPERG, 2008) and Mining Environment Research Group (MERG, 2002) and are well known to aircraft contractors. These guidelines will be followed by any mine personnel or contractors to minimize potential wildlife harassment from aircraft and helicopter over flights.
- A minimum flight altitude of 300 m (or 1,000 ft) above ground level will be maintained to the extent possible; between May 1 and June 31 the minimum cruising altitude will be increased to 600 m above ground level when caribou have been identified in the area (for the protection of calving caribou).
- All reasonable efforts will be made to avoid sensitive habitats during key seasonal periods.
- When sensitive habitats cannot be avoided, a minimum over flight altitude of 600 m (or 2,000 ft) will be maintained to the extent possible.
- Whenever possible, aircraft will avoid sheep ranges by 3.5 km or a ridge will be placed between the aircraft and sheep range, and aircraft will fly at altitudes below sheep if they are encountered.
- To the extent possible aircraft will avoid over flights in proximity to Wolverine Lake, Little Wolverine Lake, Little Jimmy Lake, and Frances Lake.
- Purposefully flying towards, hovering and circling wildlife will not be permitted.
- Exceptions will also be permitted for low-level flights and/or flights during wildlife surveys, as directed by Mine biologists in accordance with wildlife research permits.

5.4 Wildlife Habitat Protection

All reasonable efforts will be made to minimize impacts and reclaim disturbed habitats through all phases of the Mine. Procedures to manage potential impacts to wildlife from direct and indirect habitat loss include:

- Vegetated buffers adjacent to mine facilities and roads will be maintained to the extent possible. Exceptions will include areas that will be managed for wildlife and human safety.
- Any habitat feature (e.g., nest, den, mineral lick, etc.) that is encountered during activities by mine personnel or contractors will be reported to Site Management immediately for follow-up actions as required.
- Reclamation and seeding along roads and trails will be at the direction of Site Management according to the recommendations provided in the approved Reclamation and Closure Plan. Native seed mixes will be used whenever possible to minimize wildlife attraction to re-vegetated areas.

- The destruction or interference with wildlife's dam, den, lair or nest will not be permitted at any time and is an offence under the *Yukon Wildlife Act*. The Conservation Officer in Ross River **(867.969.2202)** will be contacted by Site Management if exceptions to the management provisions or the *Act* are required.

5.5 Tailings Facility Operation and Management

To minimize impacts associated with the tailings facility, the following procedures will be followed:

- Seepage from the tailings pond will be minimized through the installation of an impermeable basin liner.
- Wildlife monitoring will be carried out near the tailings facility, on a regular basis (Section 6.1).
- Routine monitoring and surveillance activities (e.g., water and sediment quality, aquatic life, etc.) will be undertaken throughout the life of the Mine as per licence requirements and as outlined in the Environmental Monitoring and Surveillance Plan.
- Wildlife deterrent measures (e.g., automated horns, aural calls, bangers, etc.) will be used as required if wildlife are detected near the TSF.

5.6 Wildlife Records Program

The purpose of the Wildlife Records Program is to provide incidental data to support more regimented wildlife monitoring programs, and to identify existing or potential issues and areas of concern between wildlife and Mine components. This program will involve the reporting, by mine personnel and contractors, of wildlife observations and incidents encountered during mine development and operation. Wildlife observations include visual observations of wildlife behaving in a normal way, and wildlife sign (e.g., tracks, scat, nests, dens, etc.) will be reported to Site Management in a timely manner. Wildlife incidents include close or aggressive encounters, unusual or erratic behaviour, traffic accidents or near misses, and dead or injured wildlife will be reported to Site Management. Reporting of wildlife observations and incidents will occur on an ongoing basis. All wildlife incidents will be reported to Site Management at the time they occur or as soon as reasonably possible; and wildlife observations within 24 hours of sighting. The protocol for reporting wildlife incidents and observations is provided in Appendix D and the Wildlife Log is provided in Appendix C.

6 Specific Wildlife Monitoring Procedures

The Wolverine Mine wildlife monitoring programs have been developed to monitor wildlife activity, to assess changes to wildlife and habitat resources, and to evaluate whether mitigation measures outlined in Section 4 are effective in managing Mine effects on wildlife. These programs are based on information assessed during the EA completed in 2005, and input from the Wildlife Technical Committee. YZC will apply the principles of adaptive management based on the outcomes of the monitoring programs.

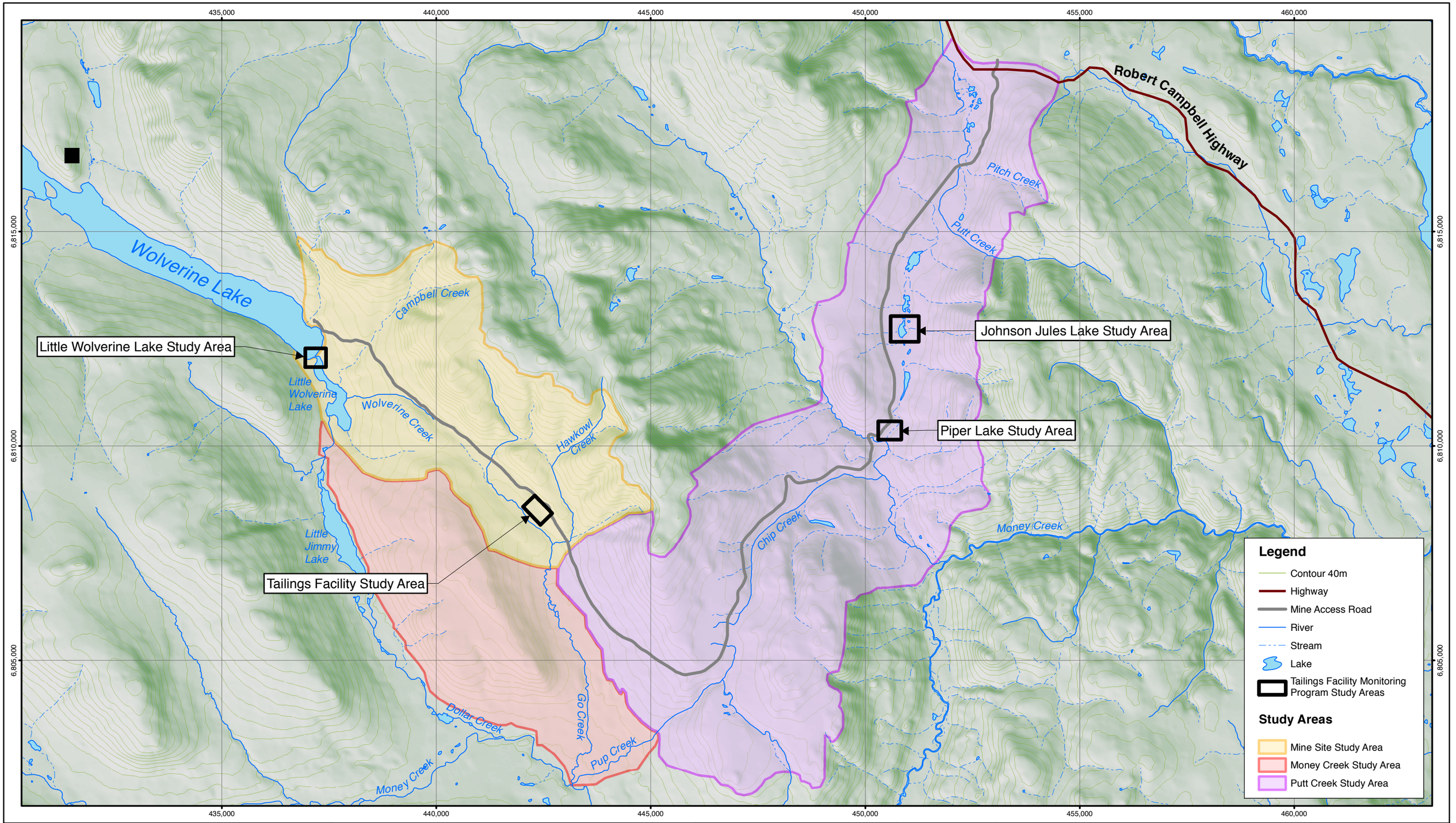
There are five monitoring programs planned within the Mine area, as well as regional monitoring programs that are conducted by Yukon Environment with the participation of other stakeholders. Guidelines for minimizing disturbance and harassment to wildlife and their habitats from monitoring activities at the Mine is provided in Appendix B. Monitoring program summaries are provided below, and the protocols for each program is detailed in Appendix E to H.

6.1 Tailings Facility Monitoring

The tailings facility monitoring program monitors waterfowl and shorebird occurrence and distribution during the fall and spring migration periods, and assesses the effectiveness of mitigation measures in managing impacts from the operation of the tailings facility. Ground based observation stations will be used to survey the tailings facility and control sites shown on Figure 6-1. Descriptions of the monitoring locations and vegetation characteristics are provided in Table 6-1. Surveys are to be conducted in spring (~April/May) and fall (~August/September) during migration (Sinclair et al., 2003), and are to be conducted weekly for the duration of each migration period. Field surveys will involve counting all birds using each survey area by species, sex and age class, where possible, and documenting wetland habitat characteristics as per RIC (1997 and 1999b). The monitoring protocol for this program is provided in Appendix E.

Table 6-1: Location Description and Vegetation Characteristics of the Tailings Facility Monitoring Station and the 3 Reference Stations

Station	Stn. No.	Location Coordinates		Station Vegetation Characteristics									Comments
		Easting	Northing	Total Vegetation % Cover	Tree Layer % Cover	Tree Layer Species	Shrub Layer % Cover	Shrub Layer Species	Forb Layer % Cover	Forb Layer Species	Ground % Cover	Water % Cover	
Tailings Facility	TRP-1	442737	6808318	**5**	35	Spruce dominated	35	Willow dominated	30	Horsetail dominated	**15**	**80**	TRP-1 = Tailings Reference Point, where a photo will be taken every season moving forward
	BSS-1	442565	6808482	**5**	35	Spruce dominated	35	Willow dominated	30	Horsetail dominated	**15**	**80**	BSS-1 = Bird Survey Station #1
Piper Lake	BRS-1	450595	6810685	**30**	20	Spruce dominated	40	Willow dominated	40	Lichen dominated on slopes, Horsetail dominated near waters edge	**0**	**70**	BRS-1 = Bird Reference Station #1
Little Wolverine Lake	BRS-2	437422	6812159	**20**	30	Spruce dominated with some stands of Poplar	40	Buckbrush and Willow dominated	30	Even distribution of Hudson Bay, Blueberry, Lichen, and horsetail	**5**	**75**	BRS-1 = Bird Reference Station #2
Johnson Jules Lake	BRS-3	450939	6814248	**10**	30	Spruce dominated with some stands of Poplar	50	Buckbrush and Willow dominated	20	mainly grass moss	**5**	**85**	BRS-1 = Bird Reference Station #3



0 625 1,250 2,500 3,750 5,000 Meters

Projection: UTM Zone 9, NAD 83

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YukonZinc CORP

DESIGNED BY		
DWG. CHECK		
DRAWN BY	VV	Mar 23, 2010
SCALE	1:80,000	
PROJECT NO.	474-3	

Wolverine Project Wildlife Protection Plan

Study Areas for Tailings Facility Monitoring Program

Figure:

REV.

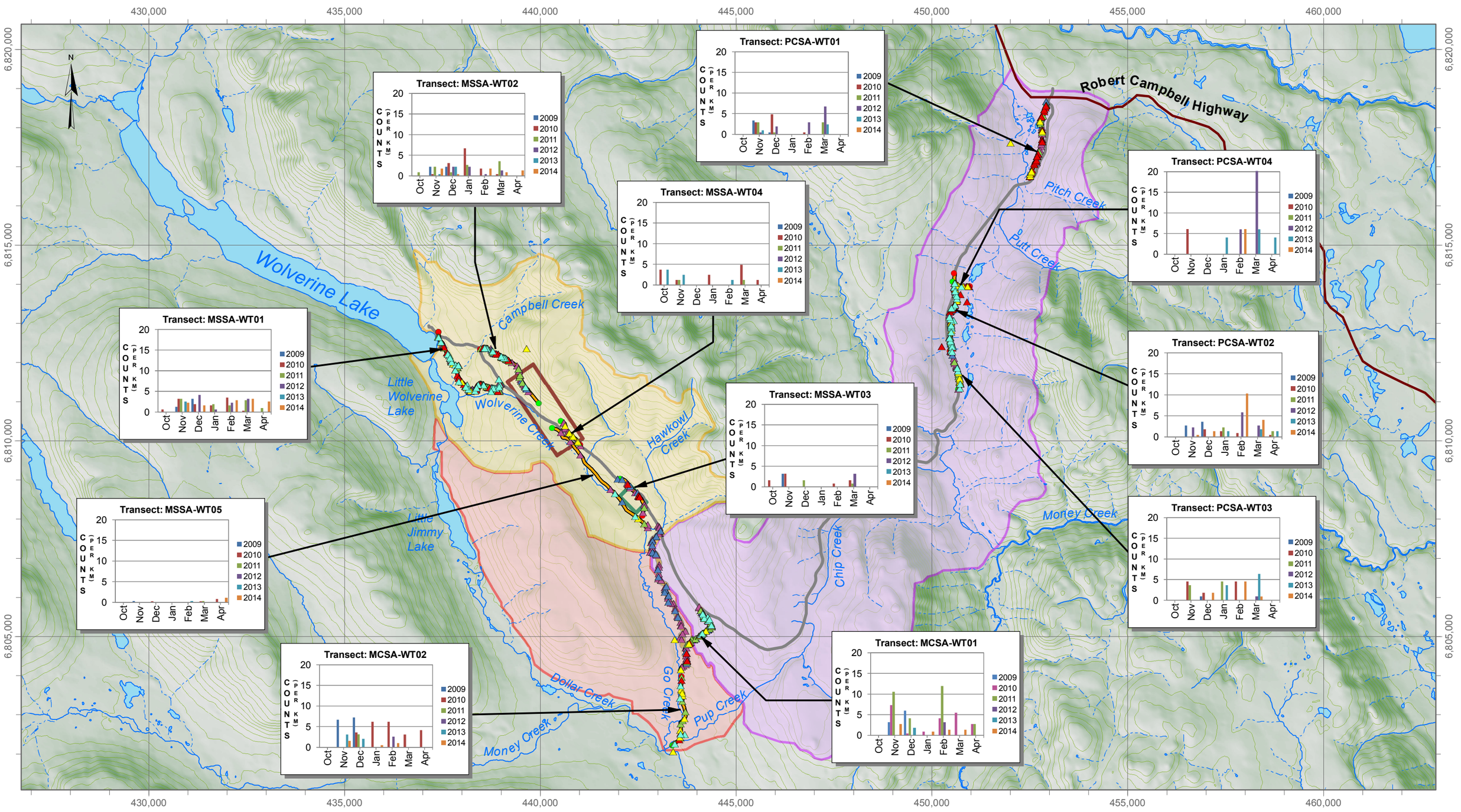
6.2 Winter Wildlife Monitoring

The winter wildlife monitoring program monitors the occurrence, distribution and movement of wildlife in the winter months, and assesses if effects to wildlife are occurring from mine activities. Transects have been established near Mine components (e.g., mine site, access road), and in undisturbed and/or control areas at the locations described in Table 6-2. The survey period will be from about mid-October to late April, depending on winter weather and snow conditions. Surveys will be completed at minimum once per month with the goal of completing a minimum of nine sampling sessions each winter season. Field surveys will involve documenting wildlife or wildlife sign (e.g., tracks, scat, and pellets) that cross the survey transect as per standard survey methods (e.g., Hofer, 2007; RIC 1998, 1999c and 2006). Snow depths will also be taken at regular intervals (D'Eon, 2004; RIC, 2006), and general habitat information will be recorded. The monitoring protocol for this program is provided in Appendix F. Results of winter wildlife monitoring to date and locations of the winter transects are provided in Figure 6-2 through Figure 6-12.

Table 6-2: Winter Transects Summary

Study Area	Transect ID	POC Coordinates		POT Coordinates		Transect Length (m)
		Easting	Northing	Easting	Northing	
MCRA	MCSA-WT01	444059	6805764	442561	6807991	1400
MCRA	MCSA-WT02	443582	6804151	442561	6807991	3500
MCRA	MCSA-WT03	442561	6807991	443443	680212	3000
MSSA	MSSA-WT01	439000	6811459	437381	6812665	2000
MSSA	MSSA-WT02	438474	6812355	439661	6811320	1100
MSSA	MSSA-WT03	441972	6809022	442606	6808088	800
MSSA	MSSA-WT04	440513	6810504	441041	6809862	800
MSSA	MSSA-WT05	440222	6810352	442661	6807797	3100
PCSA	PCSA-WT01	452486	6816714	452914	6818695	2020
PCSA	PCSA-WT02	450450	6812277	450600	6814375	2100
PCSA	PCSA-WT03	450673	6811319	450450	6812277	1000
PCSA	PCSA-WT04	450554	6814048	450967	6813940	430

MSSA = Mine Site Study Area; PCSA = Putt Creek Study Area; MCSA = Money Creek Study Area; POC = Point Of Commencement; POT = Point Of Termination



LEGEND

Marten Tracks
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas
- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

DATE SAVED:	Mar 24, 2015
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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

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PROJECT:

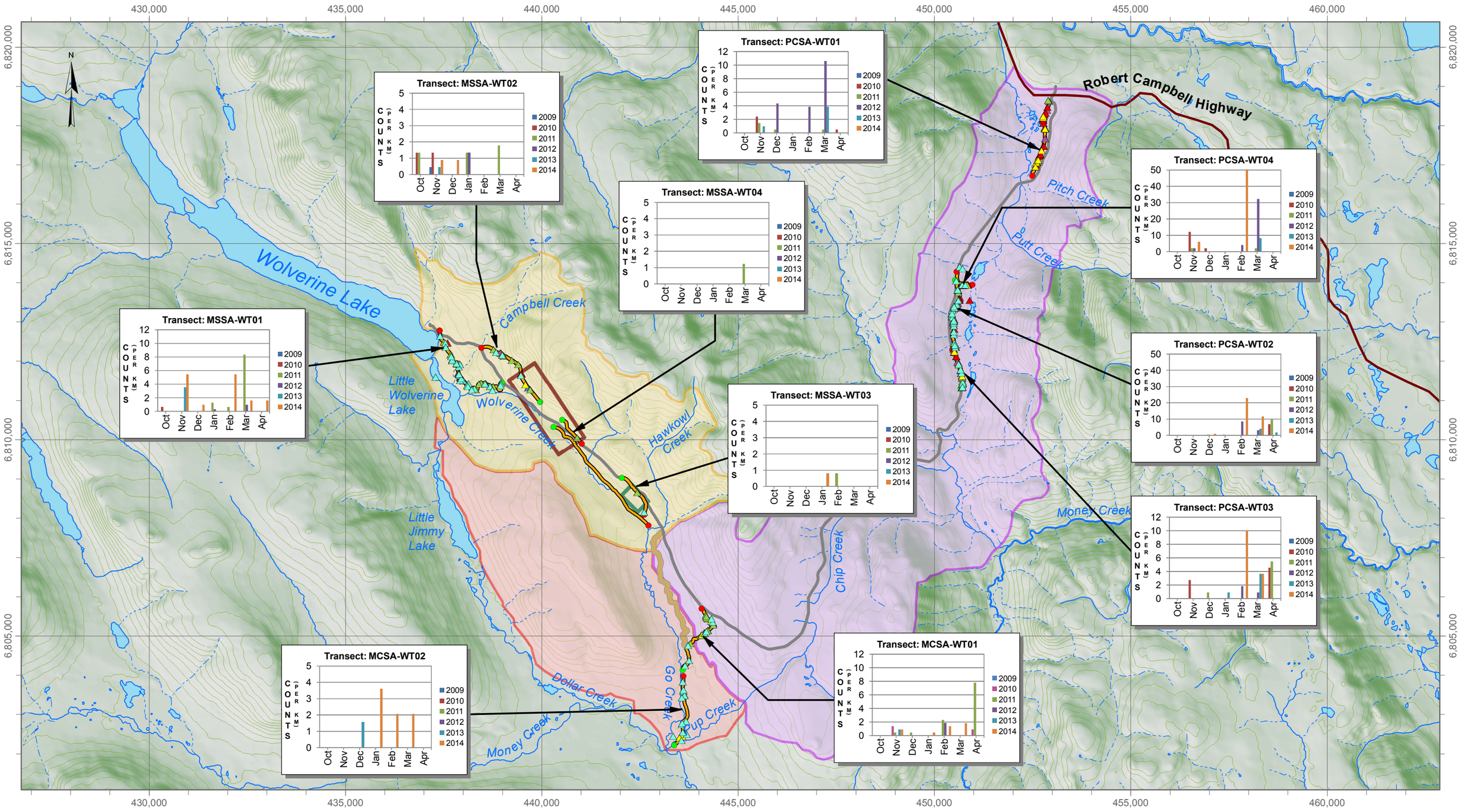
Wolverine Project Wildlife Protection Plan

TITLE: Winter Wildlife Transects: 2009-2014 Marten Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Marten MAAM\Marten(MAAM)_2014.mxd



LEGEND

American Red Squirrel Tracks

- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas

- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

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Datum: *North American 1983*
Units: *Meter*

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0 1 2 Km

CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

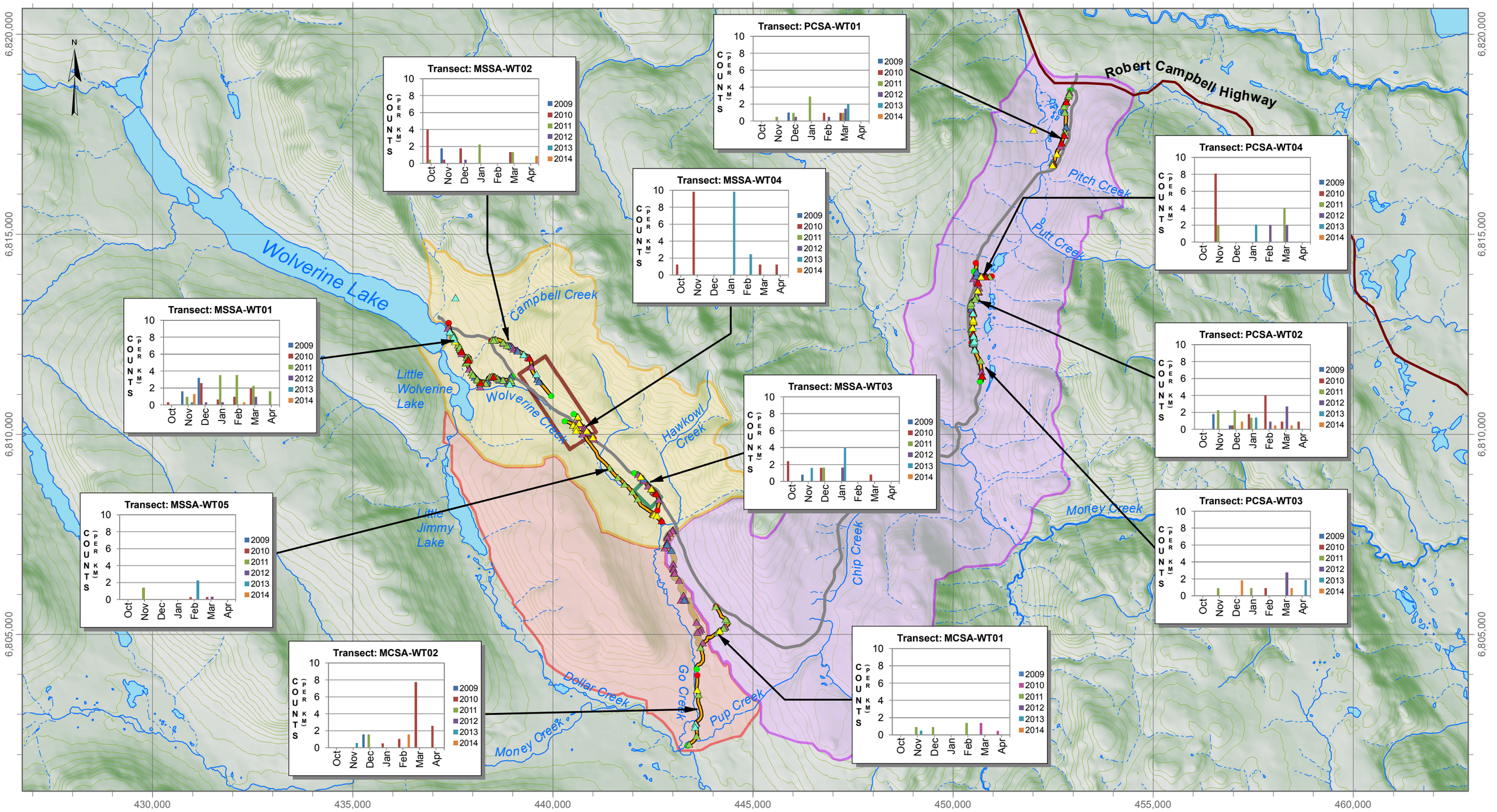
Wolverine Project Wildlife Protection Plan

TITLE: Winter Wildlife Transects: 2009-2014 American Red Squirrel Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\American red squirrel TAHU\AmericanRedSquirrel(TAHU)_2014.mxd



LEGEND

Short-Tailed Weasel Tracks

- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas

- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

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Coordinate System: *NAD 1983 UTM Zone 9N*
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Units: *Meter*

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CLIENT: Yukon Zinc Corp

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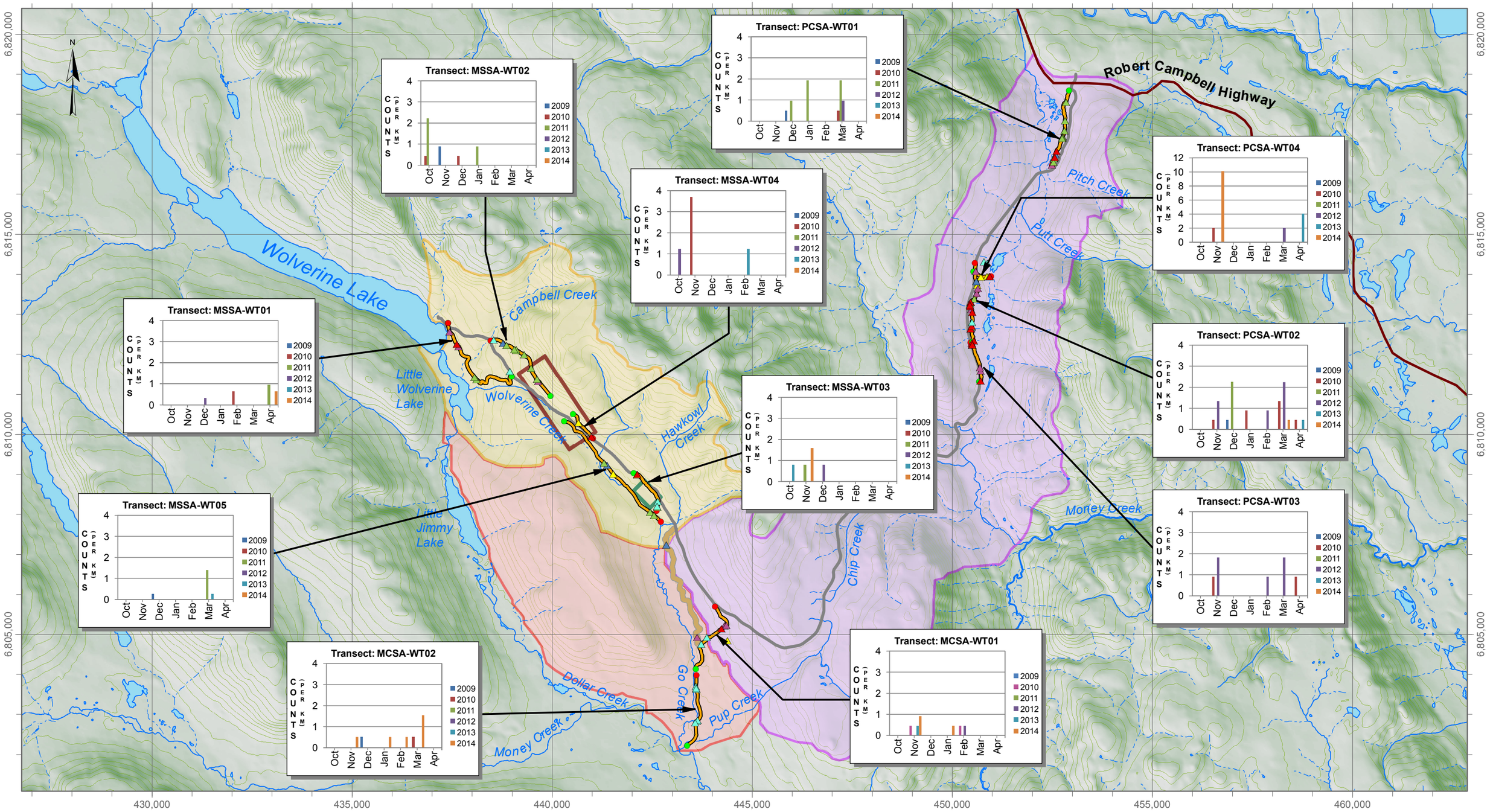
PROJECT: **Wolverine Project Wildlife Protection Plan**

TITLE: Winter Wildlife Transects: 2009-2014 Short-Tailed Weasel Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Short-tailed Weasel MUER\ShortTailedWeasel(MUER)_2014.mxd



LEGEND

Vole Tracks
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas
- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

DATE SAVED:	Mar 24, 2015
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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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0 1 2 Km

CLIENT: Yukon Zinc Corp

Lorax Environmental

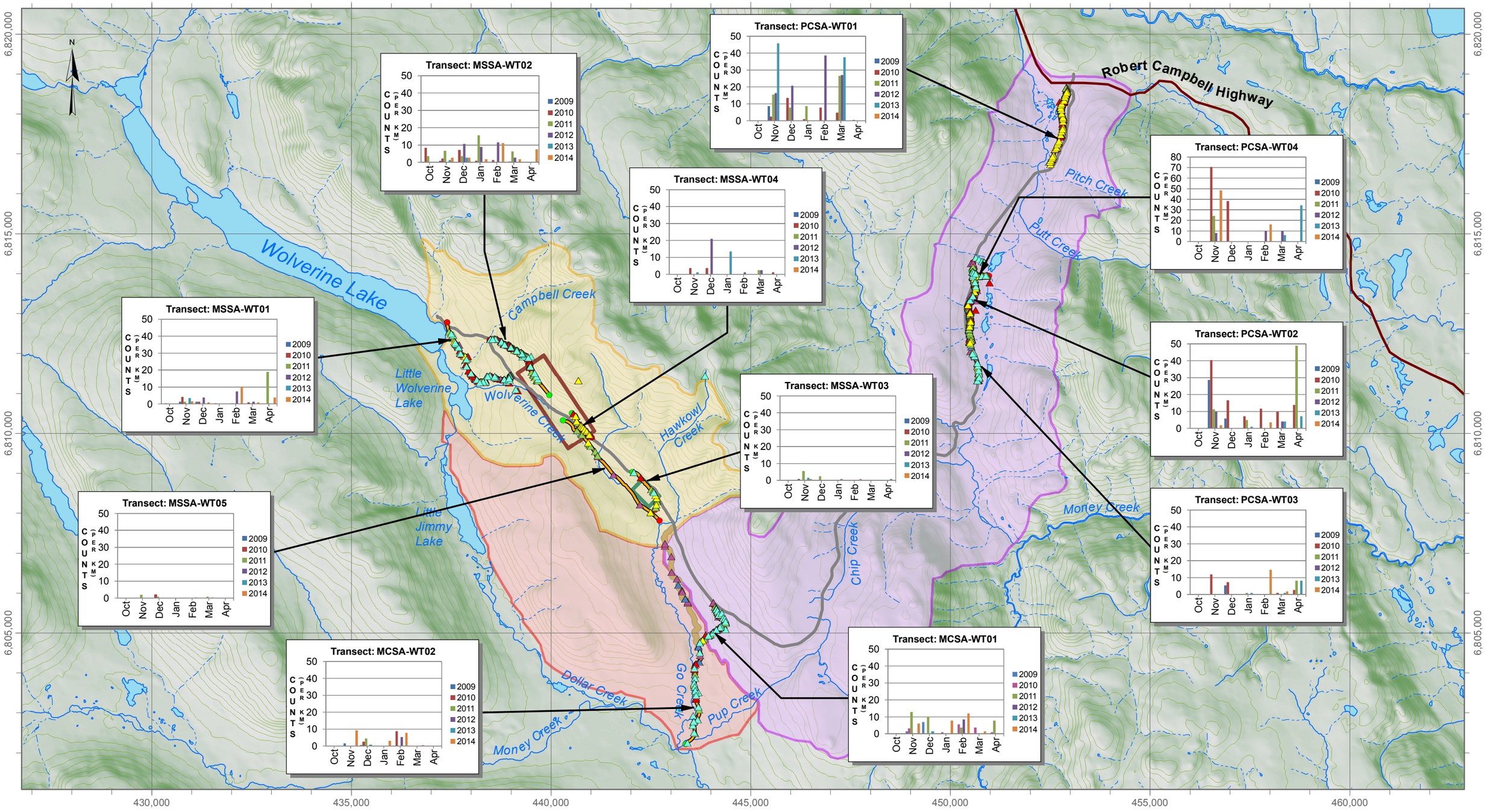
PROJECT: **Wolverine Project Wildlife Protection Plan**

TITLE: Winter Wildlife Transects: 2009-2014 Vole Species Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Vole species MICR\VOLE(MICR)_2014.mxd



LEGEND

Snowshoe Hare Tracks

- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas

- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

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VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

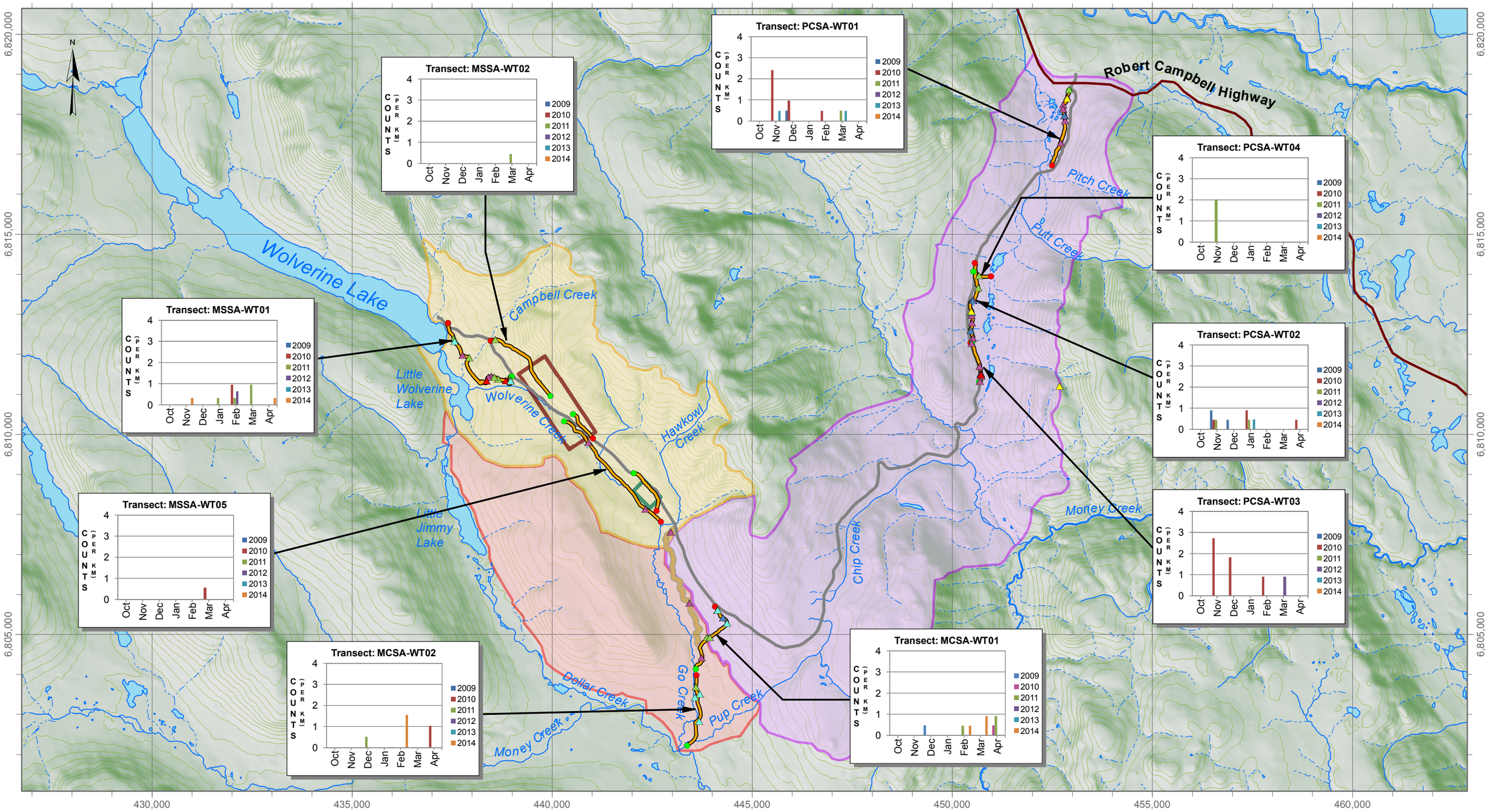
Wolverine Project Wildlife Protection Plan

TITLE: Winter Wildlife Transects: 2009-2014 Snowshoe Hare Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Snowshoe hare LEAM\Snowshoe Hare (LEAM)_2014.mxd



LEGEND

Lynx Tracks
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas
- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

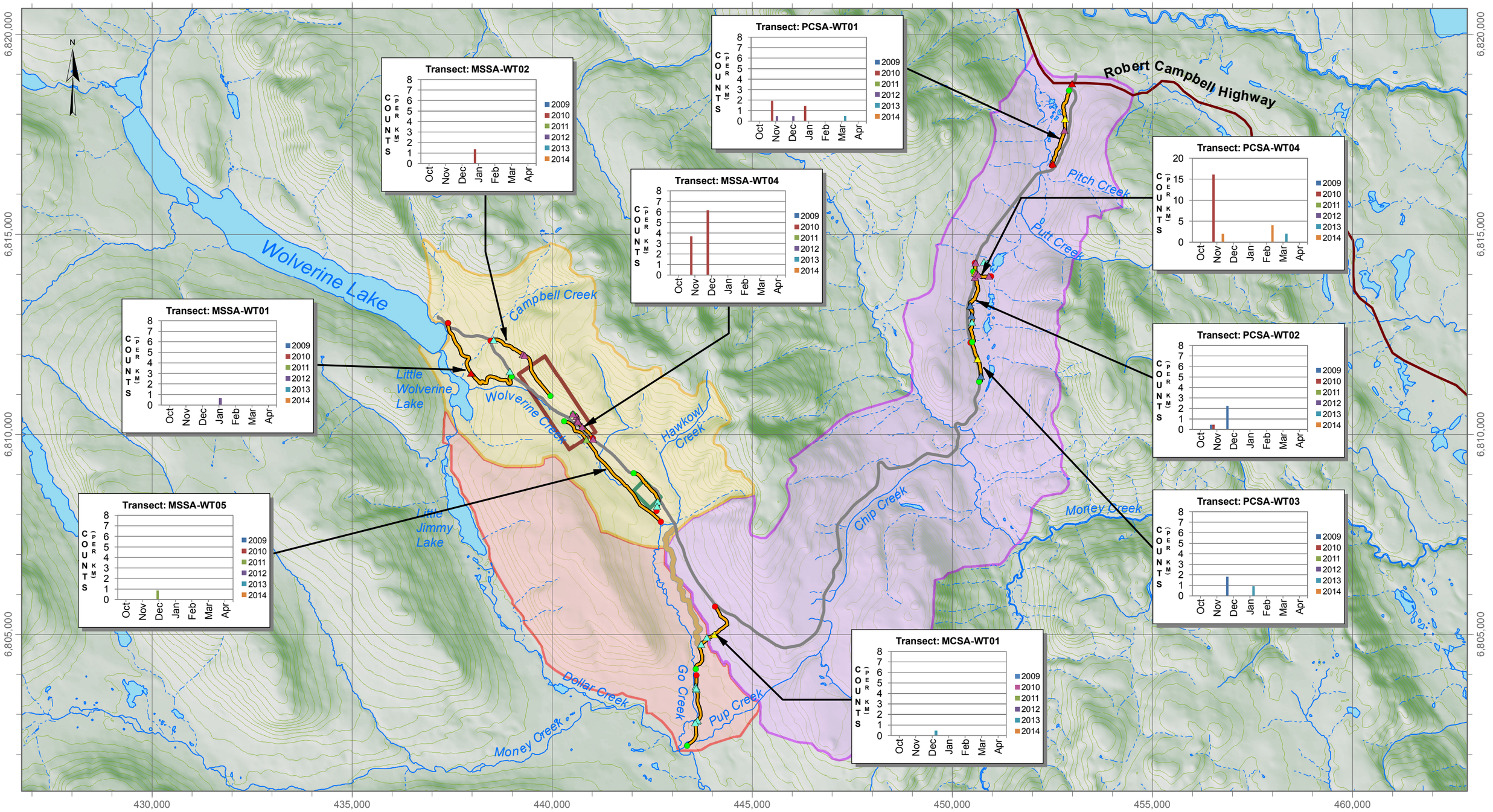
Wolverine Project Wildlife Protection Plan

TITLE: Winter Wildlife Transects: 2009-2014 Lynx Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Lynx LYCA\Lynx(LYCA)_2014.mxd



LEGEND

Wolf Tracks
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas
- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

DATE SAVED:	Mar 24, 2015
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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

Lorax Environmental

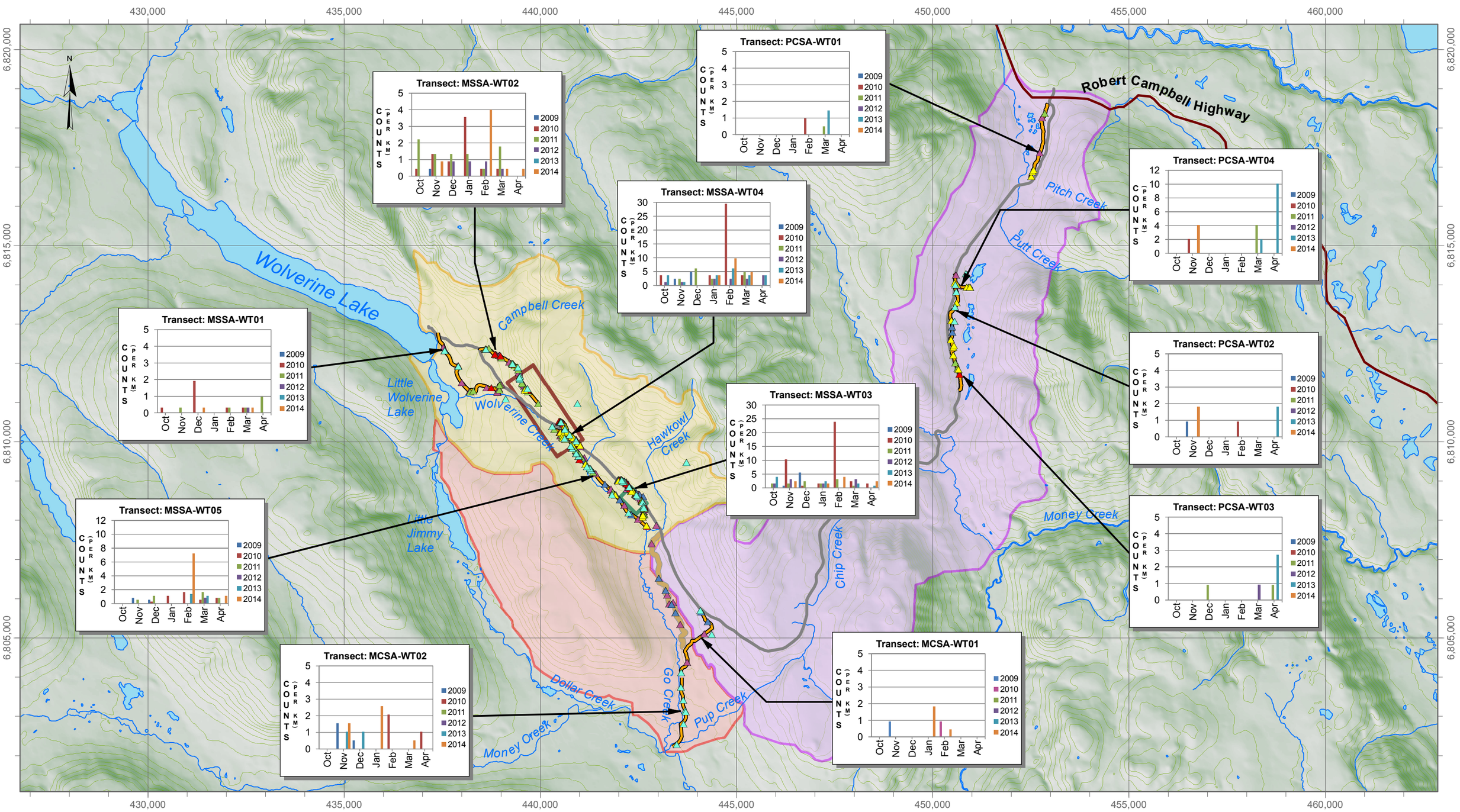
PROJECT: **Wolverine Project Wildlife Protection Plan**

TITLE: Winter Wildlife Transects: 2009-2014 Wolf Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Wolf CALU\Wolf(CALU)_2014.mxd



LEGEND

Fox Tracks
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas
- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

DATE SAVED:	Mar 24, 2015
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VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

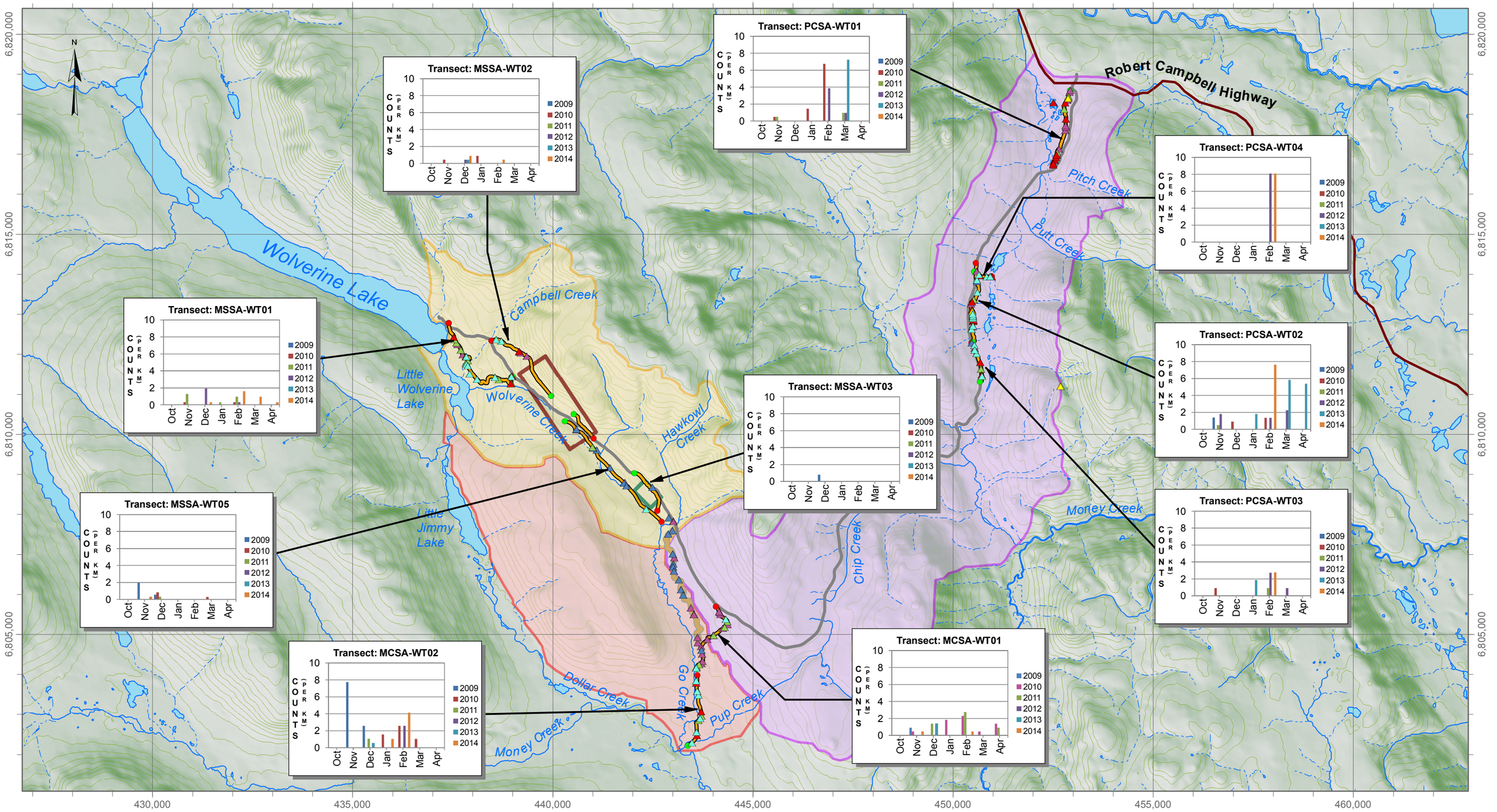
Wolverine Project Wildlife Protection Plan

TITLE: Winter Wildlife Transects: 2009-2014 Fox Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Fox VUVU\Fox(VUVU)_2014.mxd



LEGEND

Moose Tracks

- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas

- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

DATE SAVED:	Mar 24, 2015
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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

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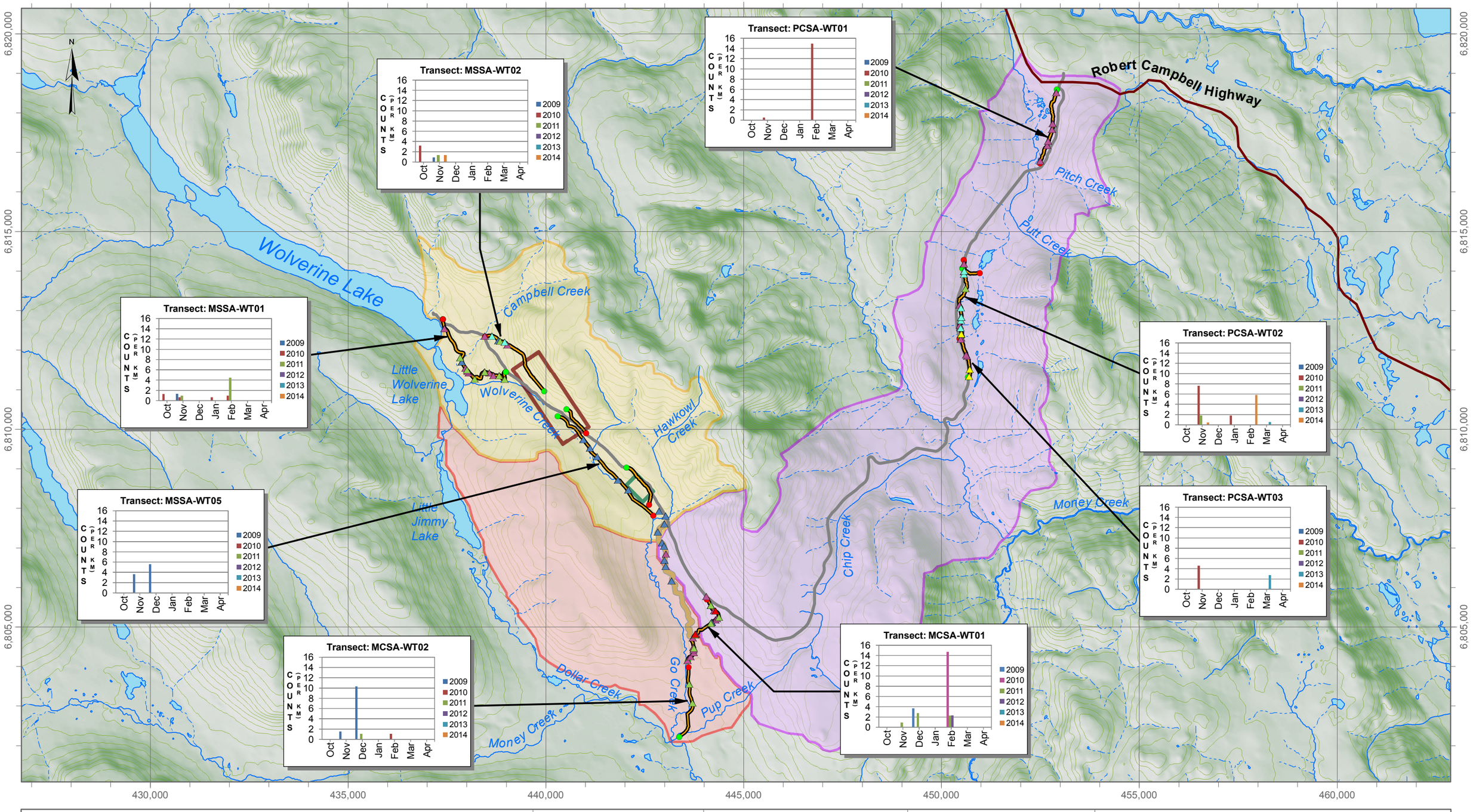
PROJECT: **Wolverine Project Wildlife Protection Plan**

TITLE: Winter Wildlife Transects: 2009-2014 Moose Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Moose ALAL\Moose(ALAL)_2014.mxd



LEGEND

Caribou Tracks
- 2014
- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas
- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

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CLIENT: Yukon Zinc Corp

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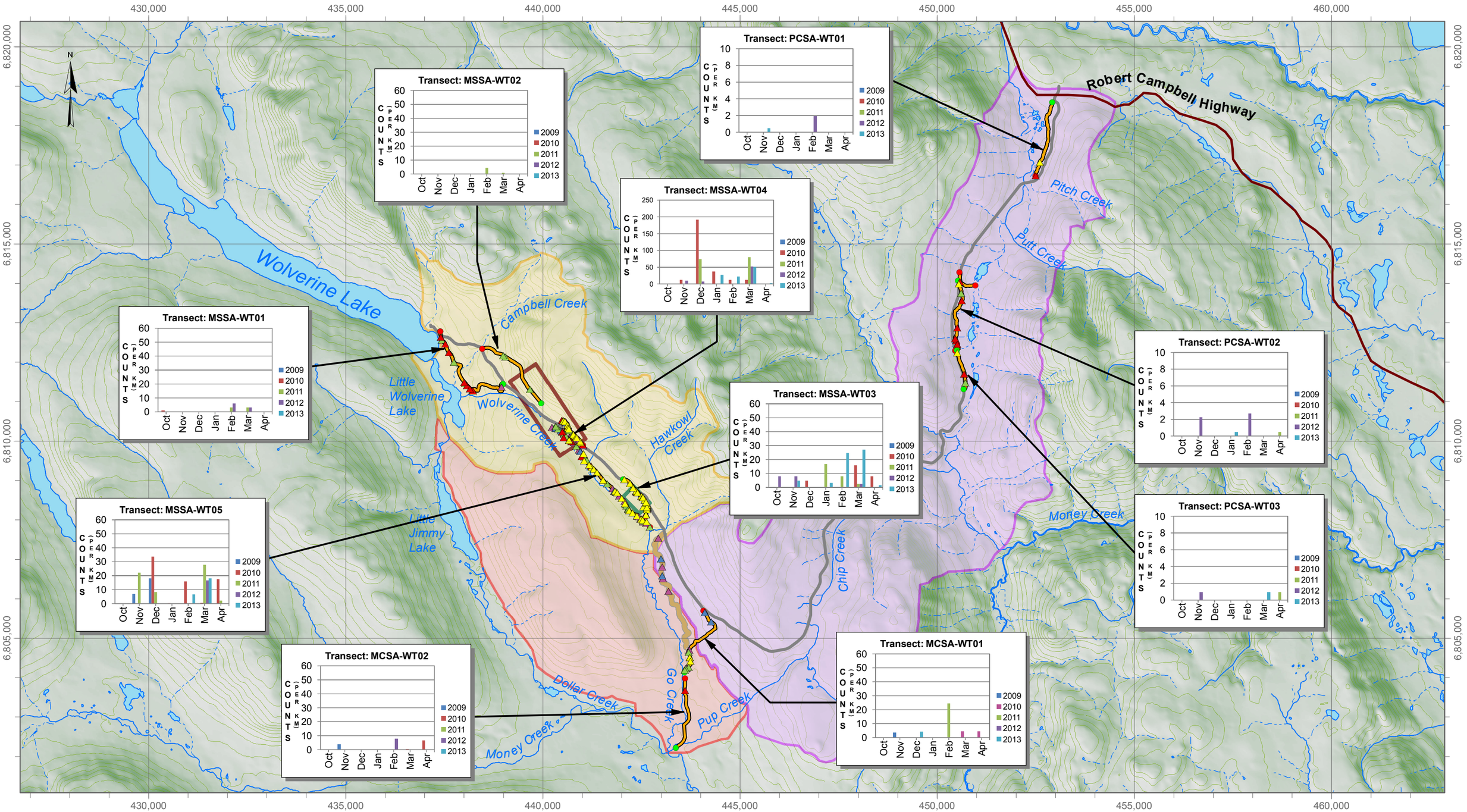
PROJECT: **Wolverine Project Wildlife Protection Plan**

TITLE: Winter Wildlife Transects: 2009-2014 Caribou Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\Caribou RATA\Caribou(RATA)_2014.mxd



LEGEND

Rock Ptarmigan Tracks

- 2013
- 2012
- 2011
- 2010
- 2009

- Point of Commencement
- Point of Termination
- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas

- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

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Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:90,000

0 1 2 Km

CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

Wolverine Project Wildlife Protection Plan

TITLE: Winter Wildlife Transects: 2009-2013 Rock Ptarmigan Track Data

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2013 Animal Maps\Rock ptarmigan LAMU\RockPtarmigan(LAMU)_2013.mxd

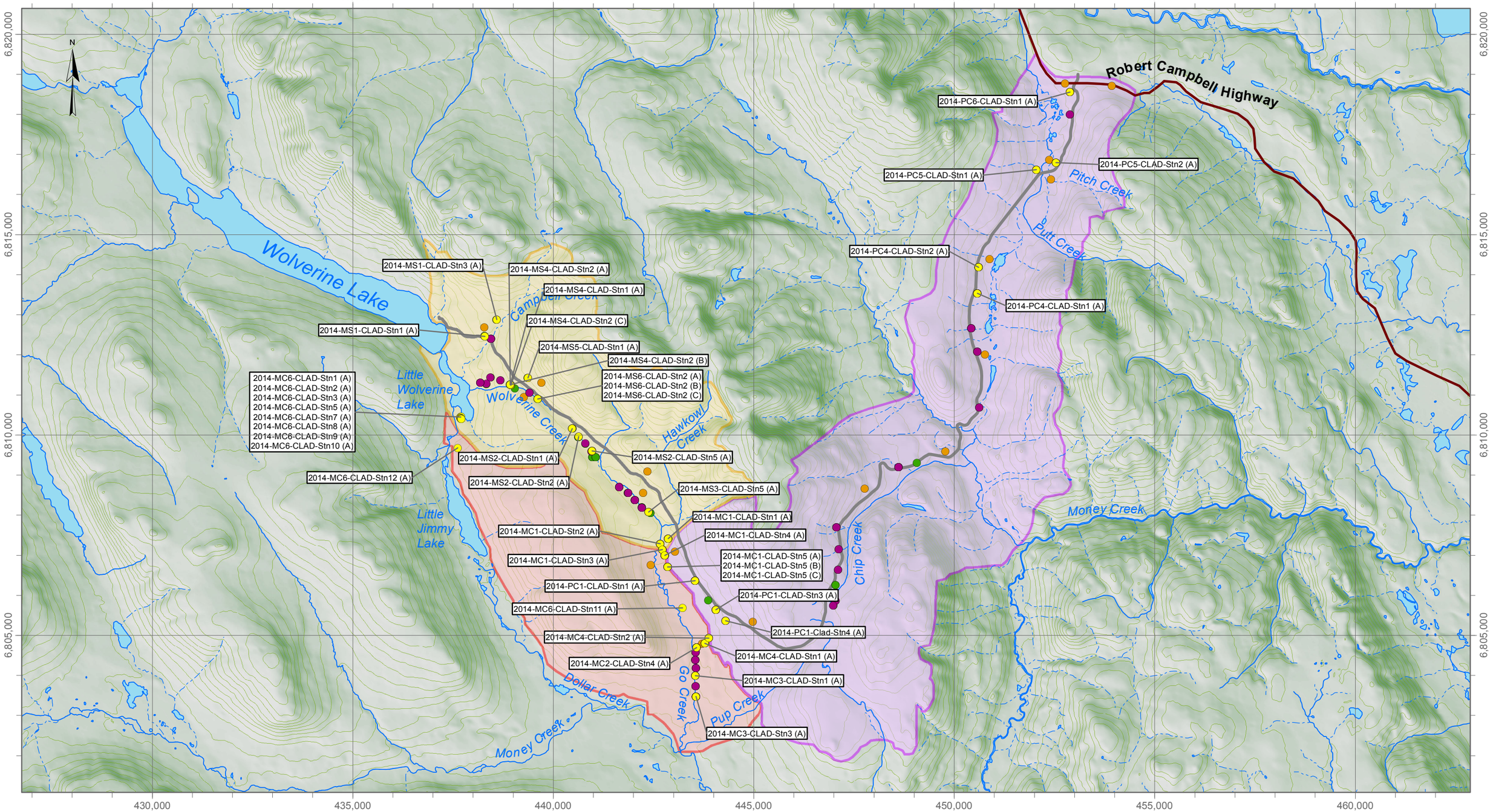
6.3 Monitoring of Metal Levels in Vegetation

The metal levels in vegetation purpose assesses metal concentrations in selected wildlife forage plants (lichen, horsetail, and willow species) and to evaluates whether plant metal concentrations increase due to mine operation. A series of transects has been established at the locations shown in Figure 6-13, and sampling is conducted along those transects as detailed in Appendix G. Vegetation samples are sent to an accredited laboratory for analysis of metals concentrations using ICP-MS for the parameters outlined in Table 6-3.

Statistical comparisons using Analysis of Variance (ANOVA) are the used to determine if significant differences exist between the mean total metals from each vegetation species of the active operating study areas (PCSA and MSSA) and the reference study area (MCRA). Statistical comparisons should also be used to determine if a significant difference exists between the data collected during baseline conditions (i.e., 2009 and 2010) and those collected subsequently during mine operations. A difference being deemed significant simply means that it is reliable, or that it did not happen by chance. When making comparisons, a 95% confidence value ($\alpha = 0.05$) will used. Hence, if a statistic is found to be significantly greater than another, one can be 95% confident that the difference is reliable/true, and did not happen by chance.

Table 6-3: Total Metal Analysis Parameters with Reportable Detection Limits (RDL's)

Element	Symbol	RDL (mg/kg)	Element	Symbol	RDL (mg/kg)	Element	Symbol	RDL (mg/kg)
Aluminum	Al	1	**Copper**	Cu	0.5	**Silver**	Ag	0.05
Antimony	Sb	0.1	**Iron**	Fe	10	**Sodium**	Na	10
Arsenic	As	0.01	**Lead**	Pb	0.01	**Strontium**	Sr	0.1
Barium	Ba	0.1	**Magnesium**	Mg	10	**Thallium**	Tl	0.05
Beryllium	Be	0.1	**Manganese**	Mn	0.1	**Tin**	Sn	0.1
Bismuth	Bi	0.1	**Mercury**	Hg	0.01	**Titanium**	Ti	1
Boron	B	5	**Molybdenum**	Mo	0.1	**Uranium**	U	0.05
Cadmium	Cd	0.01	**Nickel**	Ni	0.1	**Vanadium**	V	2
Calcium	Ca	10	**Phosphorus**	P	10	**Zinc**	Zn	0.1
Chromium	Cr	0.5	**Potassium**	K	10			
Cobalt	Co	0.1	**Selenium**	Se	0.01			



LEGEND

- 2014 Vegetation Sampling Locations
- 2011 Vegetation Sampling Locations
- 2010 Vegetation Sampling Locations
- Original Vegetation Sampling Locations
- Point of Commencement
- Point of Termination
- Highway
- Contour 40m
- Mine Access Road
- River
- Stream
- Discontinued Transect
- 2011 Transect
- Lake
- Mine Area
- Tailings Facility

Study Areas

- Mine Site Study Area
- Money Creek Study Area
- Putt Creek Study Area

DATE SAVED:	Mar 25, 2015
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VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:90,000

0 1 2 Km

CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

Wolverine Project Wildlife Protection Plan

TITLE: 2011 Vegetation Sampling Locations

PROJECT #: 474-7

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\MXD\2014 vegetation sampling locations map.mxd

6.4 Monitoring of Metal Levels in Small Mammals

Metal level in small mammal monitoring is conducted to assess baseline metal concentrations in wildlife, and determine whether levels of metals in wildlife increase due to effects from mine operation. Small mammals including voles, mice, lemmings, shrews, and possibly chipmunks, and squirrels, are the focal species for this program. Trapping transect locations are detailed in Table 6-4 and shown on Figure 6-14. Transects PCSA-02, PCSA-04, and PCSA-05 were removed from the program in 2014, as they had trapping successes <5% or lower in 2009. Transect MSSA-03 was also removed from the program as the specimen quota (based on wildlife permit) has been met. As per requests by the WTC in 2012, an additional 600 m transect was established as a reference (i.e., control) site in an area completely isolated from potential impacts from the mine (MCRA – 06).

Table 6-4: Small Mammal Sampling Transect Locations

Study Area	Transect ID	Point of Commencement		Point of Termination		Transect Length (m)
		Easting	Northing	Easting	Northing	
MCRA	MCRA-04	443220	6805681	443394	6805169	600
	MCRA-05	443120	6805307	442996	6805543	300
	MCRA-06	437541	6809757	437614	6809678	600
MSSA	MSSA-01	442583	6808559	442658	6808682	150
	MSSA-02	441552	6808807	441645	6808694	150
	~~MSSA-03~~	~~438238~~	~~6812491~~	~~438290~~	~~6812641~~	~~150~~
	MSSA-04	438967	6811245	439045	6811168	150
	MSSA-05	440576	6810049	440476	6810162	150
	MSSA-06	439318	6811289	439372	6811427	150
PCSA	PCSA-01	443561	6806334	443654	6806219	150
	~~PCSA-02~~	~~446850~~	~~6806192~~	~~446752~~	~~6806226~~	~~150~~
	PCSA-03	448680	6809207	448616	6809323	150
	~~PCSA-04~~	~~450523~~	~~6813470~~	~~450610~~	~~6813593~~	~~150~~
	~~PCSA-05~~	~~452075~~	~~6816515~~	~~452048~~	~~6816664~~	~~150~~
	PCSA-06	452848	6818635	452799	6818491	150

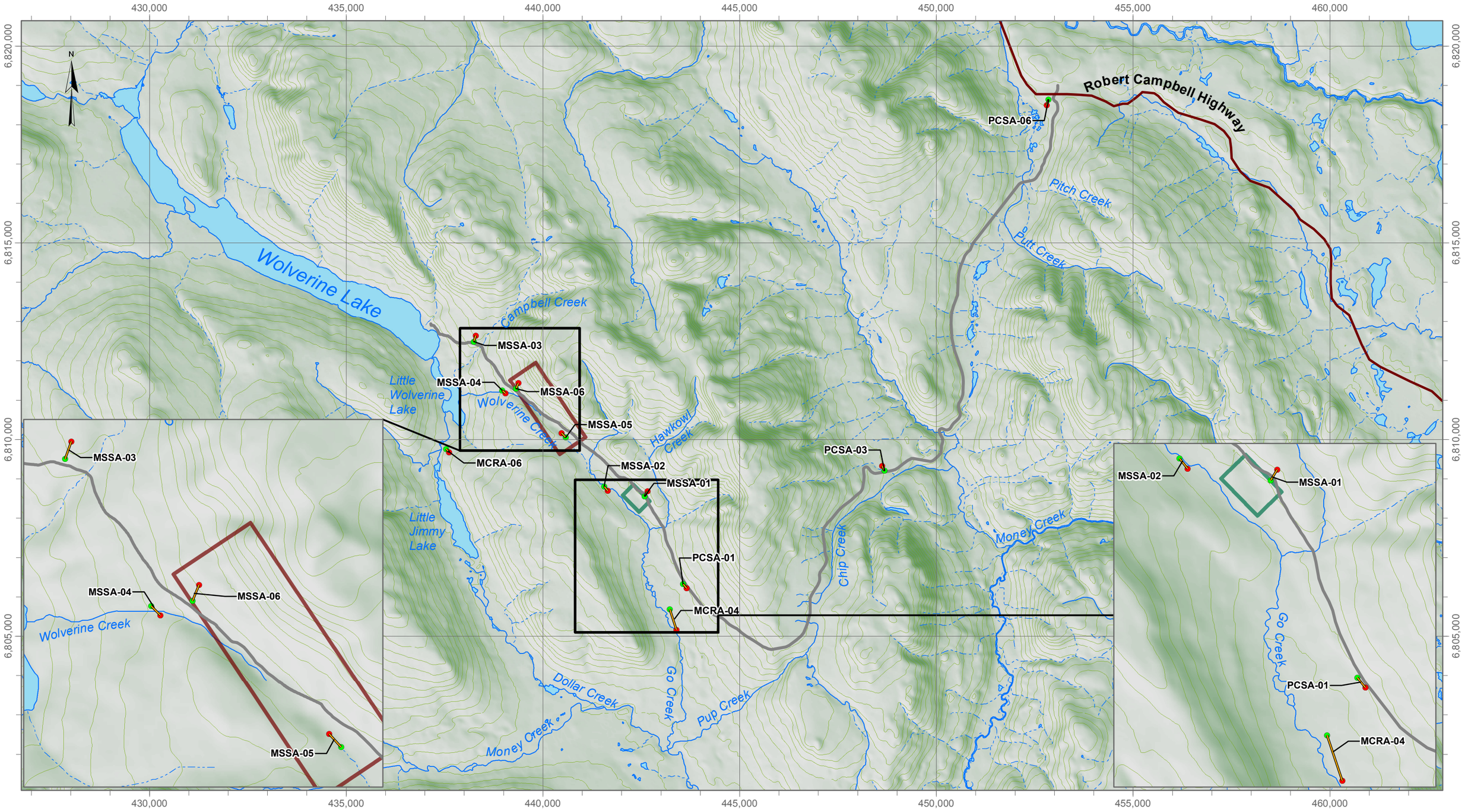
The monitoring protocol for the metal levels in small mammals program is provided in Appendix H. For small mammals except shrews, trapping stations will be placed at 15 m intervals along each transect with two Museum Special snap traps installed at each station. Pitfall traps, to capture shrews, will be installed approximately every 60 m along each transect. Sampling will occur in August with each trapping session being four trap-nights in duration. Traps will be checked each morning, and all animals captured will be collected for sampling.

Collected specimens will be processed by an accredited laboratory. The samples re digested in a nitric acid/hydrogen peroxide/hydrochloric bath which eradicates the organic matrix and dissolves the metals in the sample. The remaining solution is analyzed by Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES) and Inductively Coupled Plasma Mass Spectroscopy (ICP-MS). Small mammal samples were analyzed for 30 elements at the specified laboratory RDLs outlined in Table 6-5.

As per comments made by the Wildlife Technical Committee following a review of the 2011 program results, only whole body metals analysis is to be conducted (i.e., no dissection and analysis of kidney, liver and muscle tissue), and only Red Back Vole species (*Clethrionomys rutilus*) will be run through whole body analysis.

Table 6-5: Total Metal Analysis Parameters

Element	Symbol	RDL (mg/kg)	Element	Symbol	RDL (mg/kg)	Element	Symbol	RDL (mg/kg)
Aluminum	Al	0.2	**Copper**	Cu	0.01	**Silver**	Ag	0.004
Antimony	Sb	0.001	**Iron**	Fe	2	**Sodium**	Na	2
Arsenic	As	0.01	**Lead**	Pb	0.002	**Strontium**	Sr	0.02
Barium	Ba	0.02	**Magnesium**	Mg	2	**Thallium**	Tl	0.0004
Beryillium	Be	0.02	**Manganese**	Mn	0.02	**Tin**	Sn	0.02
Bismuth	Bi	0.02	**Mercury**	Hg	0.01	**Titanium**	Ti	0.2
Boron	B	0.4	**Molybdenum**	Mo	0.002	**Uranium**	U	0.0004
Cadmium	Cd	0.002	**Nickel**	Ni	0.01	**Vanadium**	V	0.04
Calcium	Ca	2	**Phosphorus**	P	2	**Zinc**	Zn	0.04
Chromium	Cr	0.04	**Potassium**	K	2			
Cobalt	Co	0.004	**Selenium**	Se	0.01			



LEGEND

Mammal Trapping Transects

- Point of Commencement
- Point of Termination
- Transect

- Contour 40m
- Highway
- Mine Access Road
- River
- Stream
- Lake
- Mine Area
- Tailings Facility

DATE SAVED:	Mar 24, 2015
DRAWN BY:	GM
REVIEWED:	DF
VERSION:	1

Coordinate System: *NAD 1983 UTM Zone 9N*
Projection: *Transverse Mercator*
Datum: *North American 1983*
Units: *Meter*

1:90,000

0 1 2 Km

CLIENT: Yukon Zinc Corp

Lorax Environmental

PROJECT:

Wolverine Project Wildlife Protection Plan

TITLE:

2014 Small Mammal Trapping Program Transects

PROJECT #: A317-1

FIGURE:

P:\474 (Yukon Zinc Wolverine)\Lorax Drafting\Wildlife maps\2014 Animal Maps\MXD\2014 Small Mammal Trapping Transects.mxd

6.5 Regional Wildlife Monitoring Programs

Regional programs are those studies or surveys with broad geographic scopes that consider the requirements of wildlife with larger range requirements (e.g., caribou, bears). For the Wolverine Mine, these programs are typically led by the Yukon Government and are collaborative encouraging participation by First Nations and other stakeholders in the region. YZC contributed $10,000/year to Finlayson Caribou Herd (FCH) surveys in 2006, 2009, 2010, 2011 and 2012.

YZC will consider supporting other regional monitoring programs. Submission of a proposal will be required that outlines study objectives, and a cost estimate that includes the requested funding contribution and/or in-kind support. In order for a project proposal to be considered by YZC, it must be relevant to its regulatory obligations and operations (e.g., within the Finlayson Region).

6.6 Rare Species Documentation

The Yukon Conservation Data Centre (YCDC) created a "Yukon Rare Plant Information Sheets" (YCDC, 2016) outlining what proponents must do when encountering a rare or suspected rare species while working or travelling on the land. The Vascular Plant Field Form identifies key information to record such as:

- location (mark a GPS waypoint if possible),
- date and time,
- observer name,
- population size (count or estimate the number of individuals if possible) and,
- area of extent (e.g. did you find them all over the mountainside on only at one site)

If rare or suspected rare species are encountered, YZC will follow the rare species documentation protocol by completing the Field Observation Form (Appendix I). A detailed index of rare plants is also provided in Appendix I. Observations will then be reported to the YCDC at yukoncdc@gov.yk.ca.

7 Annual Wildlife Records Program and Reporting

YZC will report annually on Mine mitigation and monitoring activities related to wildlife and wildlife habitats, as part of general annual reporting. The reporting will include, but not be limited, to the following information:

- Summary of Mine activities;
- Summary of wildlife mitigation efforts;
- Summary of annual monitoring results;
- Description of First Nations, regulators and/or stakeholder involvement; and
- Description of proposed changes to mitigation and monitoring plans, as required.

A summary of survey frequency and schedule for field work schedules for each monitoring program component is provided in Table 7-1 for mine operations, temporary closure and permanent closure phases. Many of these are not required during temporary or permanent closure as outlined in Section 9.

Table 7-1: Wildlife Monitoring Program Monitoring Frequencies for Mine Operations, Temporary Closure and Permanent Closure Phases

Program	Frequency		
	Mine Operations	Temporary Closure	Permanent Closure
Wildlife Records Program	Year round	Year round	During regularly scheduled site visits
Tailings Facility Monitoring	Weekly during spring migration (~April/May) and fall (~August/September) migration	Bi-annually spring migration (~April/May) and fall (~August/September) migration	Annually
Winter Wildlife Monitoring	Monthly from mid-October to late April. A minimum of 9 sampling sessions per winter season.	Annually	Annually
Metal levels in Vegetation	Every 3 years, late-July to early August during peak growing season	Once prior to closure	Once following closure
Metal levels in Small Mammals	Every 3 years, Trapping will be carried out in August after completion of the breeding season. Each trap session will be 4-trap nights in duration.	Only if statistical increased in metal concentrations in plants are found during the metal levels in vegetation monitoring program	

8 Adaptive Management

The purpose of the Wildlife Protection Plan is to minimize the effects of mine activities on wildlife and wildlife habitat. To best achieve this, the Wildlife Protection Plan will be considered a “living” document and will be revised as new information relevant to the protection of wildlife in the Mine area becomes available.

The wildlife monitoring programs outlined in the WPP are designed to monitor the results of Mine mitigation and identify any unanticipated Mine-related effects so that mitigation actions can be implemented to reduce further adverse effects. As described in Section 8, monitoring results will be reported on annually, to assess trends in monitoring results. Adaptive management measures will be employed to manage for any unanticipated effects from the Mine.

Situations requiring adaptive management may include:

- Variance from predicted numerical values or exceedance of identified thresholds; or
- Unexpected events (e.g., identification of new Sharp-tailed Grouse leks within the Mine footprint).

The WPP will be updated and revised on a recurring basis to ensure that mitigation measures adapt to results of the Mine effects monitoring. The WPP updates will include consideration of monitoring results, management reviews, incident investigations, shared traditional or local knowledge, new or improved scientific methods, regulatory changes, or other Mine-related changes.

Mitigation and monitoring strategies for wildlife will be updated to maintain consistency with action plans, management plans, and best management practices that may become available during the life of the Mine.

9 Closure Conditions

Activities associated with the closure or temporary closure of the Mine still have the potential to affect wildlife and wildlife movement. Wildlife monitoring will continue during the closure and temporary closure phases, at a reduced frequency (Table 7-1), to determine whether Mine-related effects are occurring and if mitigation and management measures are adequate to minimize any observed effects. Anticipated activities include monitoring within the Mine Site, monitoring of Mine activities including traffic and waste management activities, and recording wildlife observations and Mine-related wildlife mortality.

General Wildlife Protection Procedures outlined in Section 6 will be followed, regardless of the Mine's stage. These procedures ensure the continued protection of wildlife throughout mine life.

Specific monitoring programs outlined in Section 6 are only to be carried out during Mine Operations. During temporary closure, wildlife monitoring will consist of:

- **Winter Wildlife Monitoring**: Once during the winter;
- **Monitoring of Metal Levels in Vegetation:** Once prior to the initiation of permanent closure; and
- **Monitoring of Metal Levels in Small Mammals**: Only if significant changes in metal levels in vegetation is detection.

During ultimate closure, wildlife monitoring will consist of:

- **Monitoring of Metal Levels in Vegetation:** Once following the initiation of permanent closure; and
- **Monitoring of Metal Levels in Small Mammals**: Only if significant changes in metal levels in vegetation is detection.

10 References

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Appendix A: Wolverine Mine Corporate Policies

Wolverine Mine Procedure

Subject: Firearms Policy & Procedure	Procedure: Environment #3
Effective Date: December 7, 2013	Revision # 1 Revision Date: October 16, 2013

Wolverine Mine Firearm Policy

- All firearms are prohibited at the Yukon Zinc Corporation, Wolverine Mine site unless otherwise authorized by YZC Management.

- Firearms are to only be used for the protection of personnel and property in the event of dangerous wildlife.

- All hunting of wildlife or recreational shooting is strictly prohibited.

- All authorized firearms at the Wolverine Project site are under direct control of the YZC Management or an employee(s) designated by YZC Management.

- As described in the *Yukon Occupational Health and Safety Regulations:*

  "any worker who is required to use, handle or otherwise have control of a firearm shall:

  a) *have successfully completed the Canadian Firearms Safety Course, as given by an instructor who is designated by a chief firearms officer, and*

  b) *demonstrated proficiency with that firearm to the employer."*

- Every designated employee who handles firearms in the course of their duties, must hold a valid Federal Firearms Possession License with non-restricted acquisition privileges.

- All firearms must be handled and stored in accordance with the federal *Firearms Act.* This includes, but is not limited to, locking mechanisms on all firearms when not in use and proper storage of ammunition.

Subject: Firearms Policy & Procedure	Procedure: Environment #3
Effective Date: December 7, 2013	Revision # 1 Revision Date: October 16, 2013

Wolverine Mine Firearm Procedure

Objective:

The objective of this procedure is to assist operators in recognizing hazards related to firearm use, when and how to use the firearm in a safe manner, and proper handling and storage of the firearm and ammunition. Encounters with wildlife at the Wolverine Mine Site are a common occurrence and for the most part non-confrontational. However, there can arise situations in which a firearm can be used to either frighten away a nuisance animal or used defensively to protect employees from harm. In all instances, every effort will be made to scare the animal away rather than harming the animal. The use of a firearm for defensive purposes will **always** be a last resort.

Scope:

This procedure applies to all authorized users of firearms at the Wolverine mine site and remote sampling areas frequented by Environmental Personnel.

Training Required:

- Operators **must** possess a valid Federal Firearms Possession License with non-restricted acquisition privileges.
- Operators **must** demonstrate sufficient knowledge, safe handling, and care and storage of the site firearm as determined by a representative of the Safety & Training Dept. or a competent individual designated by the Safety & Training Dept. The appropriate sign-off sheet must be completed and kept on file (See Appendix C).
- It is recommended that operators participate in a refresher training session on the handling and use of a gun at least once a year, particularly if the operators have not handled/used a gun for over a year. This session will be coordinated by the Safety & Training Dept. or a competent individual designated by the Safety & Training Dept.

Basic Safety Guidelines:

- All operators must thoroughly read and understand the firearm manufacturer's operating instructions (See Appendix B).
- Always keep the muzzle pointed in a safe direction, whether loaded or unloaded. (Away from yourself and others). Never point a firearm at something you don't intend to shoot.
- Always assume that a firearm is loaded until you prove it not to be.

Subject: Firearms Policy & Procedure	Procedure: Environment #3
Effective Date: December 7, 2013	Revision # 1 Revision Date: October 16, 2013

- Firearms should be kept unloaded until you are ready to fire. Never store a loaded firearm.
- Don't rely on the firearms safety mechanism. Do not walk or travel with a shell in the chamber.
- Be sure of your target **and** what is beyond it.
- Use the correct ammunition for the firearm and choose the correct "load" for the intended purpose (i.e., are you scaring birds off a waterway or using the gun to defend against bears in the field?).
- The firearm is **only** to be used for protective purposes against wild, nuisance animals.
- **The most dangerous animal is a wounded one** – when practical, seek a person who is authorized to use a gun on the mine site to dispatch a nuisance animal. If an animal must be put down, all efforts must be made to eliminate suffering to the animal and mitigate the potential hazard to others.
- Storage of the firearm and ammunition will be designated to two separate locked cabinets with the keys secured in a third locked cabinet accessible to authorized persons only.
- If firearm fails to fire when the trigger is pulled, handle with care. Always keep your muzzle pointed in a safe direction. Keep your face away from the breech, engage the safety mechanism, carefully open the action and eject the unfired shell.
- When practical, wear safety glasses and hearing protection when shooting.
- Make sure the barrel is clear of obstructions before shooting.
- Do not alter the firearm in any way.
- Follow proper maintenance and cleaning procedures as outlined in the operating manual. Store the firearm with either a trigger lock on or the chamber plug in the breech.

Appendices:

Appendix A: Firearms Safety - Remington Model 870 Pump Action Shotgun
Appendix B: Firearms Safety – Mossberg Model 500 Pump Action Shotgun
Appendix C: Firearms Sign Off and Training Checklist

Wolverine Mine Procedure

Subject: Firearms Policy & Procedure	Procedure: Environment #3
Effective Date: December 7, 2013	Revision # 1 Revision Date: October 16, 2013

Name	Signature	Date
Originator : Jason Hole Revision Author: Grant Hutchinson & Robin McCall		
Environmental Superintendent Robin McCall		
H&S Superintendent		
General Mine Manager Floyd Varley		

Environmental Protection Policy

Environmental protection is a corporate priority for Yukon Zinc Corporation (YZC) and it is the company's commitment to strive to preserve and protect the environment for the future, while providing a safe and responsible operation. YZC will develop its natural resources for the benefit of its employees, shareholders, local communities and First Nations. Managing programs and activities is a key priority to ensure a high standard and to strive for continuous improvement in performance.

Yukon Zinc Corporation will develop and operate the Wolverine Project to minimize the geographic extent, duration, and magnitude of effects of project development and operations on valued ecosystem and cultural components. The Project has been designed for eventual permanent, passive closure, will be managed to minimize risk of potentially harmful incidents, and will manage its business under the following environmental policies.

POLICIES:

1. Integrate environmental policies, programs, and practices into all activities of the organization.

2. Monitor the performance of environmental programs and management systems to ensure compliance with company and legislative requirements.

3. Establish an ongoing program of review and improvement of environmental performance.

4. Identify, assess, and manage environmental risks.

5. Develop, maintain, and test emergency preparedness plans to ensure protection of the environment, workers, and the public.

6. Work with government and the public to develop effective, efficient, and equitable measures to protect the environment based on sound science.

7. Require contractors to comply with company environmental policies and work co-operatively to improve environmental performance.

8. Encourage dialogue on environmental issues with employees and public and be responsive to concerns.

9. Ensure that all employees understand and are able to fulfill their environmental responsibilities.

10. Reclaim sites in accordance with site-specific criteria in a planned and timely manner.

January 1, 2009

Health and Safety Policy

Health and safety is an integral part of our everyday work and it is Yukon Zinc Corporation's (YZC) commitment to provide a safe and healthy working environment. YZC will maintain and develop safe work conditions and practices to comply with all applicable laws governing its activities. YZC considers the safety and health of its workers to be of the utmost importance and each member of the management team and every individual has the responsibility to ensure that we all work towards maintaining a high standard in health and safety while promoting continuous improvement in performance.

PRINCIPLES:

- All hazards can be safeguarded
- Working safely must become the natural way to work
- Effective leadership is essential to success
- Achieving and maintaining excellence in safety is a never-ending process
- Injuries are not okay
- Employees must be involved in developing safe practices
- Management provides leadership and direction in safety
- Health and safety is a part of all business decisions
- Working safely is a condition of employment

Yukon Zinc is committed to protecting and promoting the health of all employees by providing a safe, healthy physical environment and supportive workplace culture and will manage its business under the following safety policies.

POLICIES:

1. Conduct business in a manner that will eliminate, minimize or control hazards to ensure the health, safety and security of its employees, contractors, the community and the environment
2. Provide and maintain a safe and healthy workplace for all individuals including employees, contractors and visitors
3. Train and motivate all individuals to work in a safe and responsible manner
4. Meet legislative and regulatory requirements
5. Ensure safety equipment, personal protective equipment and protective clothing are appropriate to the activities of each employee, contractors, and visitors
6. Strive for continual improvement in our health and safety performance by setting and reviewing achievable targets
7. Hold each individual accountable for health and safety

January 1, 2009

Heritage Resource Protection Policy

Yukon Zinc Corporation recognizes the value that heritage resources have for the Kaska and Yukoners. Yukon Zinc is committed to protecting Yukon heritage and will comply with the *Yukon Historic Resource Act,* the *Yukon Archaeological Sites Regulation,* and agreements with the Kaska. Yukon Zinc is committed to building awareness and respect for heritage resources. To accomplish these objectives Yukon Zinc will:

- Develop a heritage resource protection plan
- Incorporate Kaska views and traditional knowledge in planning, development and operations
- Incorporate heritage resource protection into all activities
- Deliver heritage and cultural awareness training to our employees and contractors
- Maintain the confidentiality of Kaska traditional knowledge and heritage sites

January 1, 2009

Appendix B: Guidelines for Minimizing Disturbance to Wildlife and their Habitats during Monitoring Activities

WOLVERINE PROJECT

GUIDELINES FOR MINIMIZING DISTURBANCE TO WILDLIFE AND THEIR HABITATS FROM MONITORING ACTIVITIES

OBJECTIVES

These guidelines have been developed by YZC in partnership with the Wolverine Project Wildlife Technical Committee to:

- Minimize stress and/or disturbance to wildlife from monitoring activities.
- Reduce impacts to habitats or sensitive ecosystems.
- Ensure safety of all personnel undertaking field studies.

The guidelines provided below were adapted from the Canadian Council on Animal Care (2003)[1] and RIC (1997)[2].

GUIDELINES

- Field studies will be carried out according to standard sampling methods that minimize impacts to wildlife from research activities.

- Field personnel will be sensitive to wildlife responses to human presence, especially animals with dependent young, to the extent possible.

- Field visits and activities will be timed so that impacts to wildlife during their most sensitive periods (e.g., breeding) are minimized or avoided whenever possible.

- To minimize investigator disturbance during field studies, consistency in survey timing and intensity will be maintained to the extent possible.

- Field personnel will be familiar and trained in current field survey/sampling methodologies that minimize disturbance to wildlife, as appropriate, to meet the objectives of the studies.

- To minimize disturbance from revisiting field sites due to lost or missed data, field personnel will ensure that all data collected is accurate and complete, and samples are taken correctly.

- The use of on-road and off-road vehicles will be restricted to designated roads and trails at the Wolverine Project to the extent possible.

- The footprint of monitoring sites will only be as large as necessary to meet the objectives of the study.

- The collection of biological samples (e.g., vegetation, animals) will be limited to the amount required to meet the objectives of the monitoring program.

[1] Canadian Council on Animal Care. 2003. CCAC Guidelines on: the Care and Use of Wildlife. Ottawa, ON. website: http://www.ccac.ca/

[2] Resource Inventory Committee (RIC). 1997. Live Animal Capture and Handling Guidelines for Wildlife Mammals, Birds, Amphibians and Reptiles. Standards for Components of British Columbia's Biodiversity No. 3. BC Ministry of Environment, Lands and Parks, Victoria, BC.

- Field equipment and supplies brought into the field to conduct the studies will be brought out at the completion of the program.

- All food and domestic wastes (e.g., sandwich wrappers, apple cores, banana peels) will be removed from the field and disposed of in bear proof storage containers at designated locations around the mine site.

- Field personnel will be familiar with the local weather conditions , and YZC safety and emergency procedures for working in these environments.

- Field personnel will be trained in the use of off-road vehicles and other field equipment necessary to complete the monitoring programs.

- All field personnel will receive wildlife safety training as a component of their work site orientation and training at the time of hire.

- Field personnel will receive training and be required to carry personal wildlife deterrents in the field to assist in management of human-wildlife encounters or conflicts should they occur.

- All field crews will be required to carry handheld radios for the purpose of maintaining contact with Site Management. As required, regular check-in times will be established with their Supervisor before heading into the field.

Appendix C: Wildlife Records Program



Wildlife Monitoring Log

Date	Time	Location	Species

Appendix D: Procedures for Reporting Wildlife Incidents and Observations

WOLVERINE PROJECT

WILDLIFE INCIDENT REPORT

Each time a wildlife incident is reported to Site Management by YZC personnel or contractors, an incident report will be completed immediately thereafter.

GENERAL INFORMATION

Date/Time: _____ Employee/Contractor Name: _____

Name of Supervisor or Manager: _____ Shift: _____

Reported Incident to: _____ Date/Time: _____

DETAILS OF INCIDENT

1. Wildlife Species: _____ Number of Animals: _____
2. Incident Type (circle one): vehicle collision near miss encounter nuisance/problem interaction
   Other, specify: _____
   If vehicle involved specify type: truck, ATV, heavy equipment, aircraft, or helicopter
3. Location (e.g., GPS location, road km , facility):

_____

4. Incident Outcome (circle one): injury mortality defensive behaviour no injury management action
   Other, specify: _____
5. Description of Incident and Outcome: _____

_____

_____

_____

_____

_____

_____

_____

6. Activity of wildlife before incident: _____

_____

_____

_____

7. Type of Habitat (e.g., road, camp, wetlands, etc):_____

_____

_____

8. Could the incident have been prevented? Circle one. Yes No Uncertain

If yes, describe how. _____

_____

_____

_____

Please submit completed forms to the Environmental Scientist or your Supervisor/Manager.

For Office Use Only:

Environmental Department Review:

Completed by: _____ Title: _____

Date/Time Reviewed: _____

Subsequent Actions Taken (e.g., follow-up with Conservation Officer, on-site action, collection of samples, and other relevant information): _____

_____

_____

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Management Review:

Completed by: _____ Title: _____

Signature: _____ Date: _____

Copies of this report sent to:

☐ YZC Corporate Office ☐ Conservation Officer ☐ Yukon EMR ☐ Yukon Environment

☐ Ross River Dena Council ☐ Liard First Nation

WOLVERINE PROJECT

WILDLIFE OBSERVATION FORM

Each time wildlife or wildlife sign (e.g. tracks, scat, dens, nests, mineral licks, etc.) are seen by YZC personnel or contractors, the observation will be reported in writing on the Wolverine Project Wildlife Observation Form or verbally with the information recorded on the form.

Observer: _____ Date:_____ Time (24-hour):_____

Weather: Temp. (°C):_____ Precip:_____ Wind:_____ Other:_____

Wildlife Species: _____ Number of Animals: _____

No. Adults: Female: _____ Male: _____ Unclassified: _____ No. Juveniles: _____

Wildlife Activity (e.g., feeding, running, walking, flying, swimming, etc.):_____

_____

_____

Location (i.e., in UTMs, road km, facility, etc.): _____

Habitat (e.g., road, wetland, facility, etc.):_____

_____

Other comments (e.g., behaviour, reaction to disturbance, etc.):_____

_____

_____

Appendix E: Tailings Facility Monitoring Protocol

WOLVERINE PROJECT
ROUTINE MONITORING:
TAILINGS FACILITY PROTOCOL

PURPOSE

The purpose of this program is to monitor waterfowl and shorebird occurrence and distribution during the spring and fall migration periods, and assess the effectiveness of mitigation measures in managing the impacts from the operation of the tailings facility.

FOCAL SPECIES

This program will focus on migratory waterfowl and shorebirds during the spring and fall migration periods. Species that have been documented in the Wolverine Project Area (WPA) previously include bufflehead, common loon, common merganser, horned grebe, mallard, Canada goose, northern pintail, red-breasted merganser, red-throated loon, ring-necked duck, sandhill crane, trumpeter swan, semi-palmated plover, solitary sandpiper, spotted sandpiper, arctic tern, herring gull, mew gull, sora and sanderling (YZC, 2005)[1].

STUDY AREA

The study areas for the baseline and effects monitoring are the Mine Site Study Area (MSSA) and the Putt Creek Study Area (PCSA). These study areas roughly correspond to the wildlife local study area that was assessed during the Environmental Assessment (EA) phase of the Wolverine Project (YZC, 2005)[2]. The MSSA is about 3,240 ha, and includes the mine site infrastructure (i.e., mine portal, tailings facility, camp complex, industrial complex, airstrip and landfill). The PCSA is about 7,920 ha, and includes the the access road from the mine site to its junction with the Robert Campbell Highway. The control/reference area included in the program is the Money Creek Reference Area (MCRA). The MCRA is about 2,560 ha and is situated in the Money Creek watershed, and is similar in ecosystem composition to the MSSA and PCSA. The study areas for the monitoring program are shown on Figure 1.

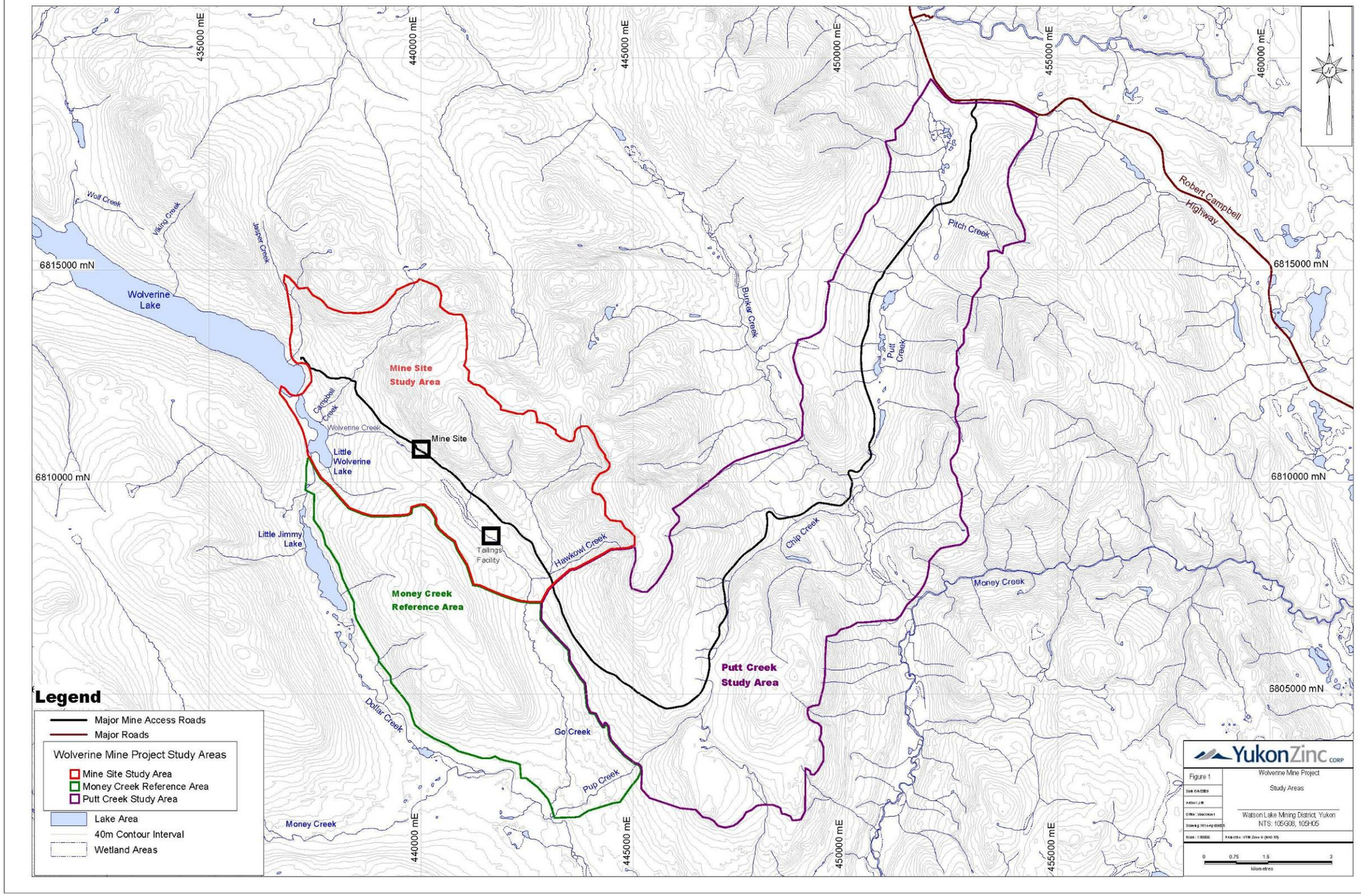
STUDY DESIGN

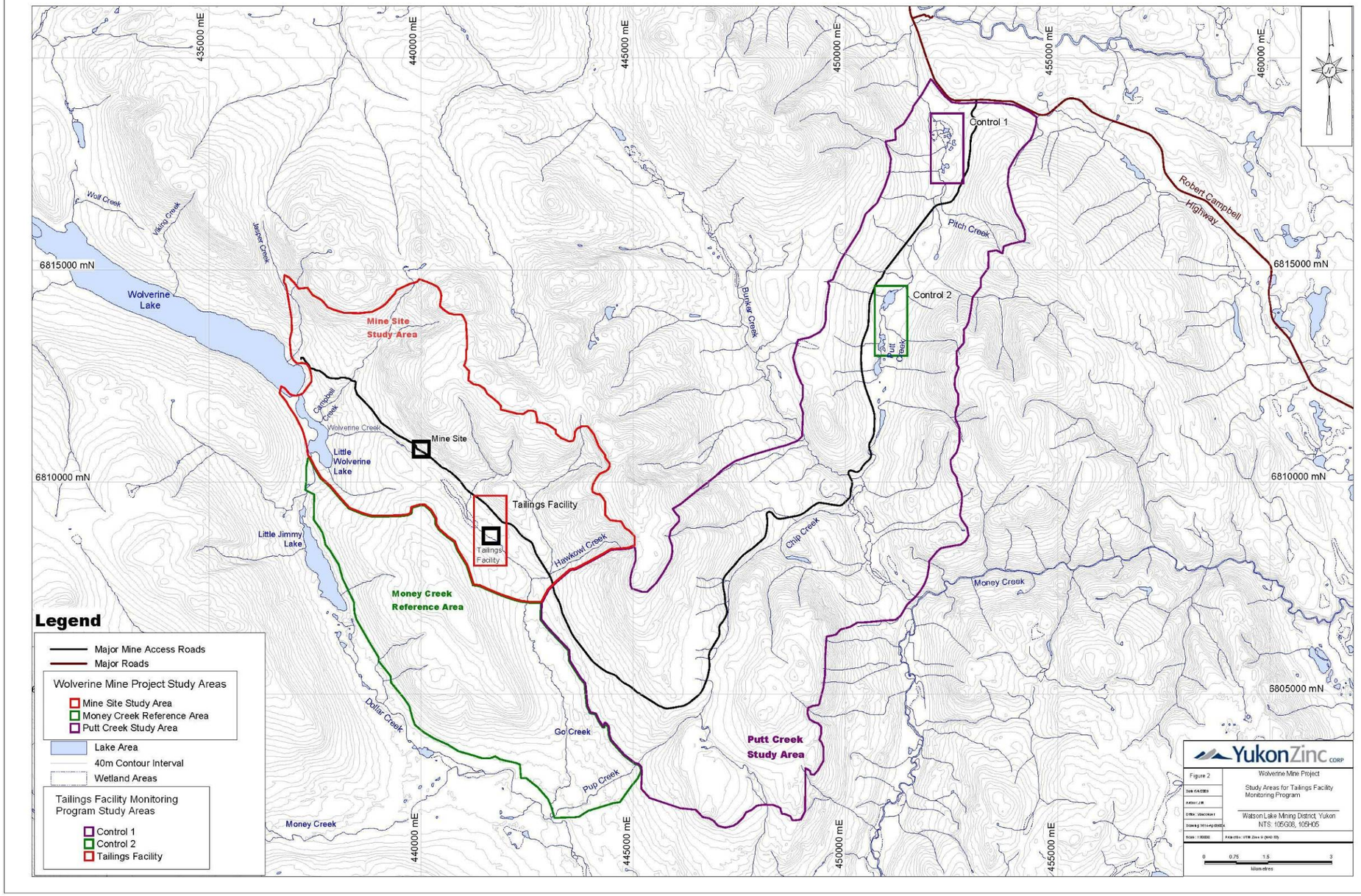
The tailings facility will be the primary survey area, along with two control areas shown on Figure 2. Both of the control areas are located in the PCSA and are expected to be relatively similar to the post-operations tailings pond. Surveys will coincide with the spring (~April/May) and fall (~August/September) migratory periods (Sinclair et al., 2003)[3], and will be carried out at minimum once per week for the duration of each migratory period. Monitoring is planned to start fall 2009, and will continue on an annual basis through the operations phase. Post-operations monitoring frequency will coincide with other planned monitoring activities at the mine site.

[1] Yukon Zinc Corporation (YZC). 2005. Wolverine Project Environmental Assessment Report, October 2005. Prepared by AXYS Environmental Ltd.

[2] Yukon Zinc Corporation (YZC). 2005. Wolverine Project Environmental Assessment Report, October 2005. Prepared by AXYS Environmental Consulting Ltd.

[3] Sinclair, P.H., Nixon, W.A., Eckert, C.D., and N.L. Hughes. 2003. Birds of the Yukon Territory. UBC Press, University of British Columbia, Vancouver, BC.595 p.


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Wolf Creek
Viking Creek
Jasper Creek
Wolverine Lake
Campbell Creek
Wolverine Creek
Little Wolverine Lake
Little Jimmy Lake
Mine Site
Tailings Facility
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Burke Creek
Putt Creek
Pitch Creek
Robert Campbell Highway
Hawkowl Creek
Chip Creek
Money Creek
Dollar Creek
Go Creek
Pup Creek
Legend
Major Mine Access Roads
Major Roads
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 1
Wolverine Mine Project
Study Areas
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0
0.75
1.5
3
Kilometres


435000 mE
440000 mE
445000 mE
450000 mE
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6815000 mN
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Wolf Creek
Viking Creek
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Little Jimmy Lake
Tailings Facility
Tailings Facility
Hawkowl Creek
Money Creek Reference Area
Dollar Creek
Go Creek
Pup Creek
Money Creek
Burke Creek
Control 1
Pitch Creek
Robert Campbell Highway
Control 2
Putt Creek
Chip Creek
Money Creek
Putt Creek Study Area
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Legend
Major Mine Access Roads
Major Roads
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
Tailings Facility Monitoring Program Study Areas
Control 1
Control 2
Tailings Facility
YukonZinc CORP
Figure 2
Wolverine Mine Project
Study Areas for Tailings Facility Monitoring Program
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0 0.75 1.5 3
Kilometres

The number of birds using each survey area (tailings facility, and control areas) during each survey period will be recorded by species from observation stations established in each survey area, and classified according to age and sex class, if possible. Wetland characteristics will be also be documented as per RIC (1997[4], 1999[5]) during each survey period (i.e., spring and fall migration survey period). Other species observed in the vicinity of the survey areas will be documented incidental to monitoring program activities.

PERSONNEL AND TRAINING

A field crew comprised of two people (i.e., Environmental Scientist and Environmental Technician or designates) will be required to complete the work under this monitoring program. The responsibilities of each person are outlined below.

- A YZC Environmental Scientist or designate will be responsible for ensuring that the monitoring program is conducted according to current standards and practices. In addition to participating in the field program as required, the Scientist will carry out quality control measures to ensure data is complete and accurate, oversee data management and entry, and ensure proper processing of samples, completion of chain-of-custody forms and shipment of samples to the laboratory, and liaising with the laboratory and the WTC as required.

- The Environmental Technician or designate will participate in the field program, data management and entry, preparation and shipment of samples to the laboratory and other tasks as required on the direction of the Environmental Scientist. On-the-job training will be provided to carry out the responsibilities under this monitoring program.

A Wildlife Biologist will provide technical support for the monitoring program as needed. In addition to providing training related to the field program, the biologist may participate in the field program, program review (e.g., field methods, data collection and management, etc.), and data analysis and reporting as required.

Training will be provided in the field to ensure that data is collected in a consistent and accurate manner, and to ensure calibration among all personnel involved in the field program.

FIELD EQUIPMENT AND SUPPLIES

Equipment and supplies that will be needed to complete the field program includes:

- Binoculars and/or spotting scope
- Field identification guidebooks
- Datasheets and clipboard
- Waterproof markers and pencils
- Field maps
- Hip or chest waders and boots
- Handheld GPS

[4] Resource Inventory Committee (RIC). 1997. Standardized Inventory Methods for Components of British Columbia's Biodiversity: Shorebirds *Plovers, Oystercatchers, Stilts, Avocets, Sandpipers, Phalaropes and Allies* (v.1.1). BC Ministry of Environment, Lands, and Parks, Victoria, BC.

[5] Resource Inventory Committee (RIC). 1999. Inventory Methods for Waterfowl and Allied Species: *Loons, Grebes, Swans, Geese, Ducks, American Coot and Sandhill Crane* (v. 2.0). Standards for Component's of British Columbia's Biodiversity No. 18. BC Ministry of Environment, Lands, and Parks, Victoria, BC.

- Flagging tape
- Safety and first aid gear
- Stakes or t-bar fence posts
- Permanent station makers (e.g., metal tags)
- Digital camera

PROGRAM PLANNING AND LOGISTICS

Prior to the start of the field program, research permits will need to be acquired, field equipment and supplies obtained, and wetland delineation and areas determined. Following the completion of the field program, an Export Permit for shipment of samples to a laboratory in British Columbia must be obtained.

The research permitting process will be led by the Environmental Scientist. Prior to initiating the monitoring studies, a *Scientists and Explorers Permit* under the *Yukon Scientists and Explorers Act (1958)* from the Yukon Tourism and Culture, Heritage Resources Branch, and a *Wildlife Research Permit* under the *Yukon Wildlife Act* from the Yukon Environment will be obtained.

The process for applying for the research permits requires the completion of the *Scientists and Explorers License Application* available at http://www.tc.gov.yk.ca/scientists_explorers.html. The application process may take up to three months due to the consultative component of the permit application process.

After the *Scientists and Explorers Permit* is received, the application process for the *Wildlife Research Permit* can proceed. Information, including a description of the planned research or monitoring studies, and copies of the *Scientists and Explorers* permit is provided to the Yukon Environment, Enforcement and Compliance Branch, for review. The *Wildlife Research Permit* is then issued after completion of the review. This process typically takes about a week to complete.

FIELD METHODS

1. Control Site and Observation Station Verification

Field verification of control areas (Figure 2) will be carried out in summer 2009 to ensure that they are suitable for meeting the objectives of this program. This will involve:

- Visiting control areas to evaluate whether they are suitable for this program.

- Selecting observation station locations within each survey area, and establishing adequate stations so that the entire area can be viewed.

- Marking and installing signage (or permanent markers) at each station location, and recording the location (in UTMs) using a handheld GPS. Data collected for each observation station will be recorded on the *Tailings Facility Monitoring Station Datasheet*.

- Recording wetland/habitat characteristics and evidence of wildlife sign at each observation station at the beginning of each survey period (i.e., spring and fall migration periods).

- Flagging the route between observation stations to ease locating during subsequent visits.

Prior to the survey periods each year, the survey areas will be visited to ensure that the stations are well marked.

2. Field Survey Methods

To minimize potential disturbance to wildlife and wildlife habitat from monitoring activities, the guidelines provided in Appendix B of the *Wolverine Project Wildlife Protection Plan v. 2009-01* will be followed. Field survey will be carried out according to the methods outlined below.

- Surveys will not be carried out if weather conditions that reduce visibility (e.g., rain, high winds, fog, etc.) are present.

- Each survey area (i.e., tailings facility, or control areas) will be surveyed at minimum once per week during the survey period (i.e., spring or fall migration).

- Surveys will be initiated about a half an hour after sunrise and be completed within four hours after sunrise. More than morning survey session may be needed to survey the three survey areas.

- The order in which the survey areas are visited will be rotated between surveys. The first monitoring period will start in fall 2009 for the control sites only. The tailings facility study area will be monitored after it has been constructed, and the operations phase has been initiated.

- During a given survey period (i.e., spring or fall migration monitoring period), efforts will be made to ensure that they survey areas are surveyed the same observer.

- The observer will be careful not to disturb birds when approaching observation stations, and will wait at each observation station for at least one minute before stating the survey.

- From the observation station, birds will be sighted using binoculars and/or spotting scope as required. Sighting distance should be about 100 m from the observation station.

- All waterfowl and shorebirds seen from the observation station will be counted by species, and age and sex class, if possible. Each cluster of birds will be counted at least three times to ensure accuracy. The highest value will be recorded if there is a discrepancy between counts. Data will be recorded on the *Tailings Facility Monitoring Survey Datasheet*.

- Evidence of other wildlife use (e.g., beaver, bear, moose) will also be recorded.

- The Environmental Scientist or designate will ensure that all datasheets are complete and accurate before proceeding to the next station.

DATA MANAGEMENT

The Environmental Scientist will be responsible for ensuring that datasheets are complete and accurate, samples are packaged, labeled and stored correctly, and data management and entry procedures are accurate and complete.

All original hardcopy data and supplementary information (e.g., photographs) will be scanned and stored in an electronic format on the project network. All original hardcopy data (e.g., datasheets,

maps, etc) will be filed according to standard procedures to ensure that the integrity of the data is maintained and thoroughly documented in the project files.

All monitoring data and supplementary information will be entered into an electronic database such as MS Excel or MS Access according to standard procedures. All data entered into the database will be rechecked by the person entering the data to ensure that it is correct. Discrepancies between field data and database will be identified and corrected. The Environmental Coordinator or designate will carry out quality control measures at the end of each data entry cycle.

Review of the monitoring program data will be carried out by a YZC Environmental Scientist or Wildlife Biologist to assess whether there are any immediate wildlife issues or concerns that need to be addressed, or if there are any trends associated with project components or operations that require follow-up actions.

DATA ANALYSIS AND REPORTING

Routine analysis and reporting of monitoring program results is a fundamental component of the adaptive management process. At the conclusion of the monitoring program and receipt of metal analyses, in years that the program is undertaken, a summary report will be prepared by YZC. The report will include the monitoring procedures, data results and analyses, and appendices with the original field and laboratory data. The purpose of the summary report will be to provide a detailed record of monitoring program results, a tool for monitoring impacts to wildlife and their habitats, and to facilitate detailed review by the WTC. The report will subsequently be included in the Wolverine Project Annual Report as required by *QML-0006.*

DATASHEETS

The datasheet that will be used for this program is provided below. The datasheet will be reviewed and modified as required based on the results of the initial monitoring program.

1. Tailings Facility Monitoring Station Datasheet
2. Tailings Facility Monitoring Survey Datasheet

YukonZinc CORP

WOLVERINE PROJECT

TAILINGS FACILITY MONITORING STATION DATASHEET

Field Crew:_____ Date:_____ Time (24 hour):_____ Survey Area:_____ Wetland Size (ha):_____

Stn. No.	Location		Station Vegetation Characteristics[1]								Comments (e.g., evidence of wildlife use, wetland characteristics, etc)
			Tree Layer		Shrub Layer		Forb Layer		Ground Layer		
	Easting	Northing	% Cover	Species	% Cover	Species	% Cover	Species	% Cover	Species	

[1] Station Vegetation Characteristics: Provide for each layer - % cover by layer (i.e., tree, shrub, forb, ground), and the dominant species in each vegetation layer

WOLVERINE PROJECT

TAILINGS FACILITY MONITORING SURVEY DATASHEET

Field Crew:_____ Date:_____ Time (24 hour):_____ Survey Area:_____

Weather: Temp. (°C):_____ Precip:_____ Wind:_____ Comments:_____

Stn. No.	Start Time (24 hour)	End Time (24 hour)	Species	No. Birds				Comments (e.g., behaviour of birds, evidence of other wildlife, etc.)
				Adult Female	Adult Male	Uncl. Adult	Juvenile	

Appendix F: Winter Wildlife Monitoring Protocol

WOLVERINE PROJECT
ROUTINE MONITORING:
WINTER WILDLIFE MONITORING PROTOCOL

PURPOSE

The purpose of this program is to monitor the occurrence, distribution and movement of wildlife in the winter months, and assess if effects are occurring from mine activities.

FOCAL SPECIES

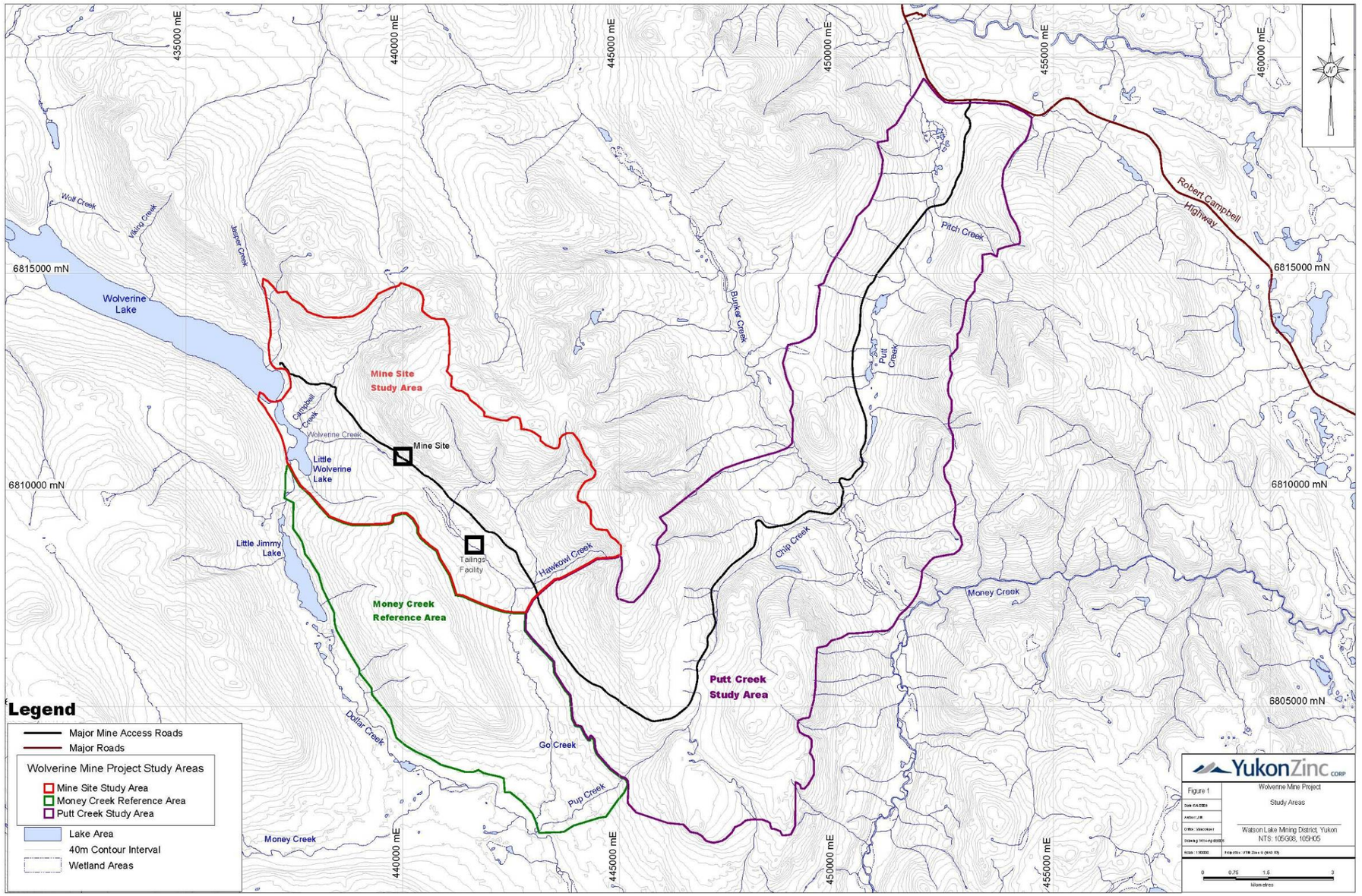
The winter wildlife monitoring program focuses primarily on terrestrial wildlife active during the winter months. Species that may occur in the vicinity of the Wolverine Project include lynx (*Lynx canadensis*), wolf (*Canis lupus*), coyote (*Canis latrans*), fox (*Vulpes vulpes*), wolverine (*Gulo gulo*), fisher (*Martes pennanti*), marten (*Martes americana*), moose (*Alces alces*), and caribou (*Rangifer tarandus*). This method is not suitable for surveying hibernating species.

STUDY AREA

The study areas for the baseline and effects monitoring are the Mine Site Study Area (MSSA) and the Putt Creek Study Area (PCSA). These study areas roughly correspond to the wildlife local study area that was assessed during the Environmental Assessment (EA) phase of the Wolverine Project (YZC, 2005)[1]. The MSSA is about 3,240 ha, and includes the mine site infrastructure (i.e., mine portal, tailings facility, camp complex, industrial complex, airstrip and landfill). The PCSA is about 7,920 ha, and includes the the access road from the mine site to its junction with the Robert Campbell Highway. The control/reference area included in the program is the Money Creek Reference Area (MCRA). The MCRA is about 2,560 ha and is situated in the Money Creek watershed, and is similar in ecosystem composition to the MSSA and PCSA. The study areas for the monitoring program are shown on Figure 1.

During the EA phase of the Project, the wildlife study area was stratified into four bioclimate zones: alpine (ALP), subalpine (SUB), boreal highland (BOH) and boreal lowland (BOL; YZC, 2005). The ALP zone is found above 1,650 m above sea level (a.s.l.), primarily to the north of the mine infrastructure and airstrip. It is characterized by gently rolling high elevation topography, and is dominated by lichens, sedges, fescue, and alpine forbs. The SUB zone is found between 1,320 to 1,650 m a.s.l., and is comprised of scrub birch and forb meadow complexes in low relief areas, with dwarf shrubs such as heathers and avens at upper elevations. This zone covers a large area north of Go Creek and encompasses most of the western portion of the assessed area. BOH is the most common bioclimate zone in the study area, and is found at elevations from 980 to 1,320 m a.s.l. This zone is dominated by black and white spruce in forested areas with willow/birch mosaics along gentle side slopes, and a number of wetlands in valley bottoms. BOL is found only in the PCSA near the access road and Robert Campbell Highway junction at elevations below 980 m a.s.l. It is characterized by a relatively high cover of lodgepole pine and white spruce forest with varied amounts of aspen and pine on crests and south-facing slopes. Black spruce dominates valley bottoms adjacent to wetlands. Bioclimate zone distribution relative to the study areas are shown on Figure 2.

[1] Yukon Zinc Corporation (YZC). 2005. Wolverine Project Environmental Assessment Report, October 2005. Prepared by AXYS Environmental Consulting Ltd.


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Bunker Creek
Putt Creek
Pitch Creek
Robert Campbell Highway
Chip Creek
Money Creek
Putt Creek Study Area
Legend
Major Mine Access Roads
Major Roads
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 1
Wolverine Mine Project
Study Areas
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0
0.75
1.5
3
kilometres

STUDY DESIGN

Winter track count surveys will be carried out each winter season during the construction and operations phases, and will coincide with other routine monitoring activities post-closure.As per RIC (1998[2], 1999[3]) approximately 20 km of transect will be established in the study areas. It is expected that about half of the transects will be associated with project components (e.g., mine site and access road), and the remaining transects in undisturbed and/or control areas. Where possible, transects will be established within only one bioclimate zone. Transect locations are shown on Figure 3 and will be field verified during summer 2009.

Transects will be systematically surveyed using standard winter track count methods as described by RIC (1998, 1999, 2006[4]) and Hofer (2007)[5]. Field surveys will involve documenting wildlife or wildlife sign (e.g., tracks, scat, and pellets) that cross or intercept each transect. Data collection will include documenting species, type of sign, distance along transect sign encountered, and general habitat information. Snow depth data will also be collected at regular intervals along each transect according to D'Eon (2004)[6] and RIC (2006). The field methods for this program are outlined below. Surveys will occur from about mid October through to late April, and will be dependent on winter weather and snow conditions. The surveys will be completed at minimum once per month, with about seven survey sessions being conducted each winter season. Additional surveys will be carried out if winter weather and snow conditions permit.

PERSONNEL AND TRAINING

A field crew comprised of two people (i.e., Environmental Scientist and Environmental Technician or designates) will be required to complete the work under this monitoring program. The responsibilities of each person are outlined below.

- A YZC Environmental Scientist or designate will be responsible for ensuring that the monitoring program is conducted according to current standards and practices. In addition to participating in the field program as required, the Scientist will carry out quality control measures to ensure data is complete and accurate, oversee data management and entry, and ensure proper processing of samples, completion of chain-of-custody forms and shipment of samples to the laboratory, and liaising with the laboratory and the WTC as required.

- The Environmental Technician or designate will participate in the field program, data management and entry, preparation and shipment of samples to the laboratory and other tasks as required on the direction of the Environmental Scientist. On-the-job training will be provided to carry out the responsibilities under this monitoring program.

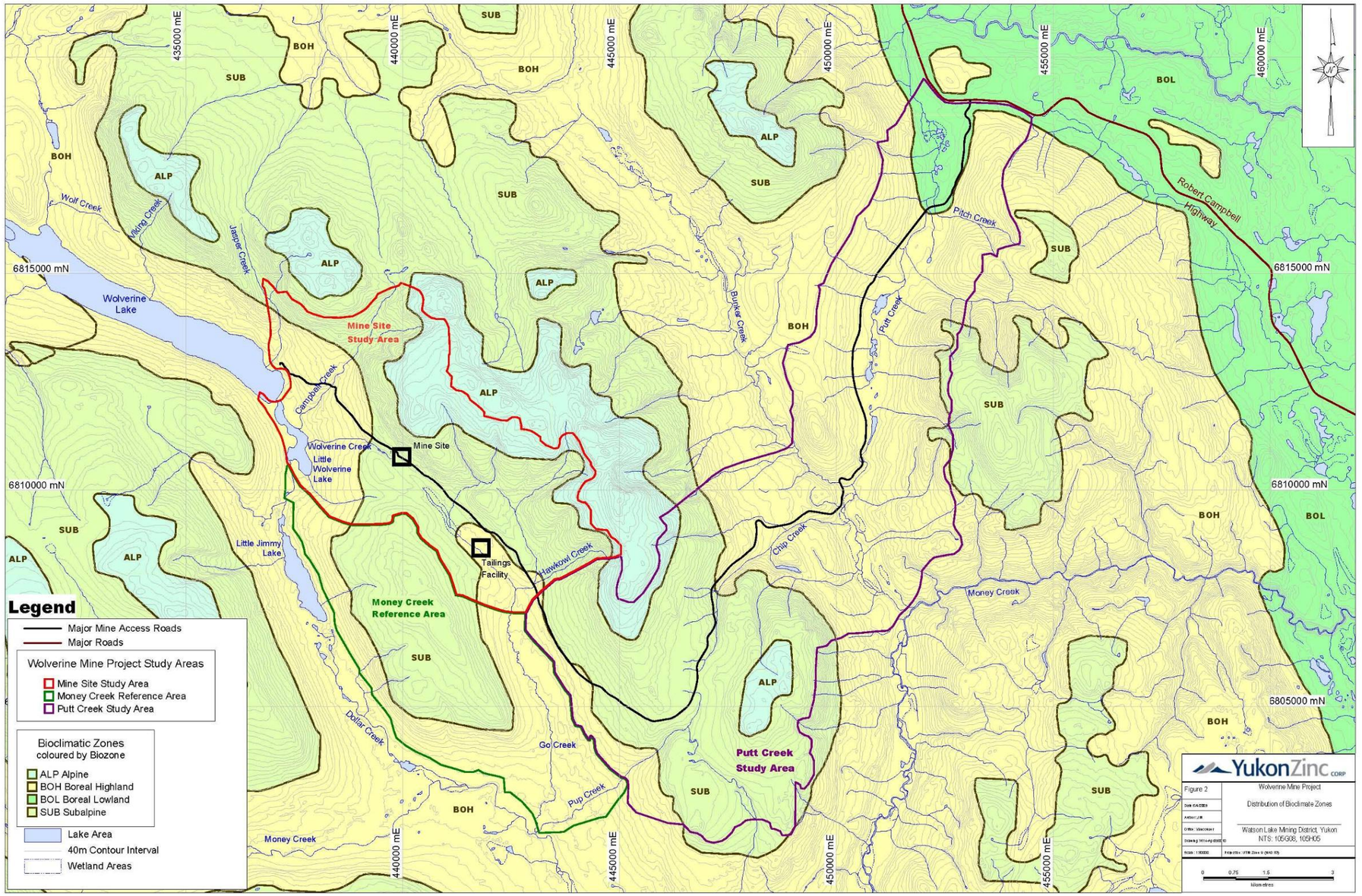
[2] Resource Inventory Committee (RIC). 1998. Inventory Methods for Marten and Weasels. Standards for Components of British Columbia's Biodiversity No. 24. BC Ministry of Environment, Lands and Parks, Victoria, BC.

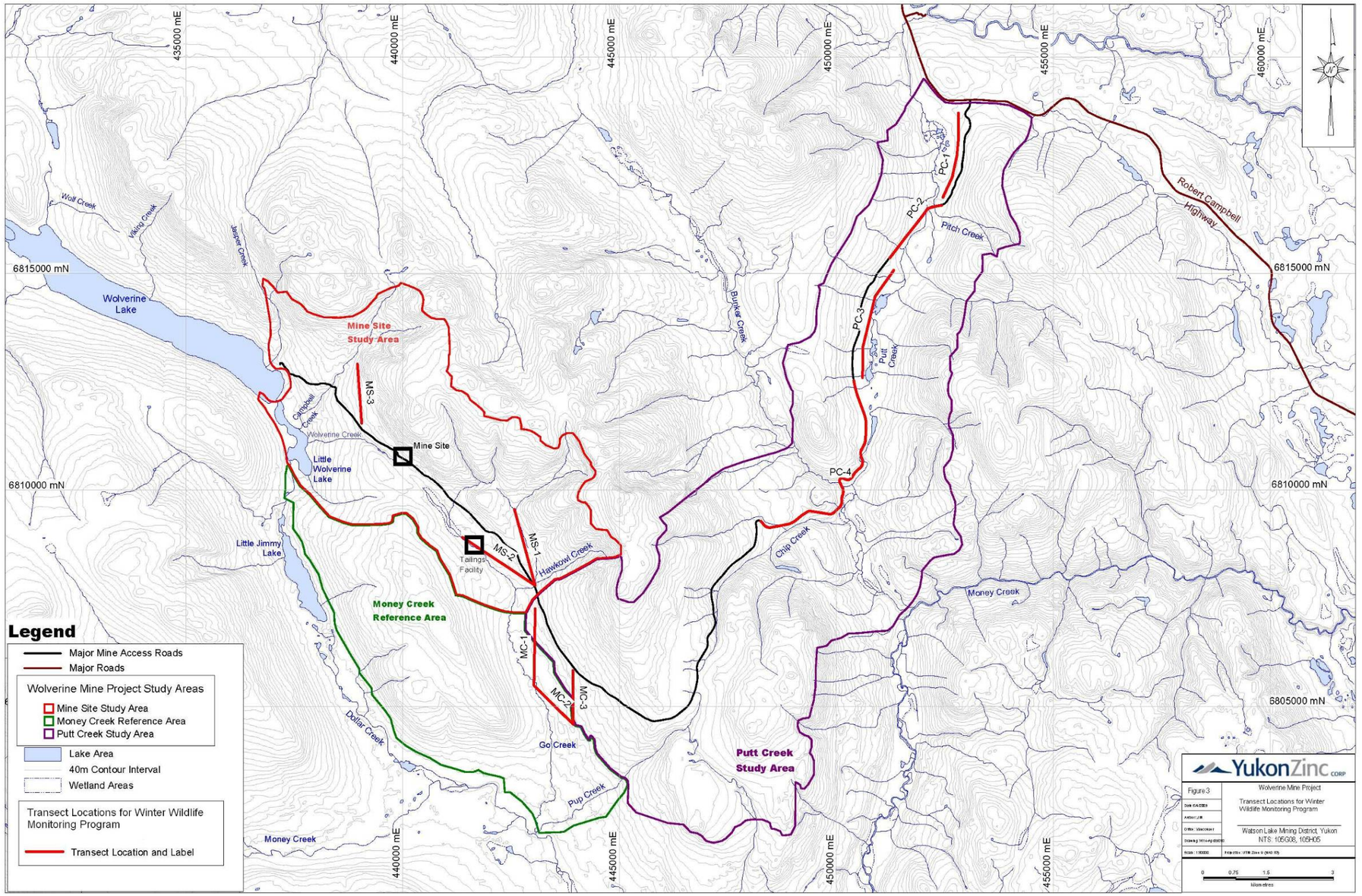
[3] Resource Inventory Committee (RIC). 1999c. Inventory Methods for Medium-sized Territorial Carnivores: Coyote, Red Fox, Lynx, Bobcat, Wolverine, Fisher, and Badger. Standards for Components of British Columbia's Biodiversity No. 25. Prepared by the Ministry of Environment, Lands and Parks, Victoria, BC.

[4] Resource Inventory Committee (RIC). 2006. Ground-based Inventory Methods for Ungulate Snow-track Surveys. Standards for Components of British Columbia's Biodiversity No. 33a. BC Ministry of Environment, Victoria, BC.

[5] Hofer, E. 2007. Yukon Ecological Monitoring Protocols (2007 ed.). Kluane Monitoring Handbook. Available at: http://www.zoology.ubc.ca/~krebs/kluane.html. Accessed on January 5, 2009.

[6] D'Eon, R.G. 2004. Snow Depths as a Function of Canopy Cover and Other Site Attributes in a Forested Ungulate Winter Range in Southeast British Columbia. BC Journal of Ecosystems and Management, 3(2): 1-9.


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Major Roads
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Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Bioclimatic Zones coloured by Biozone
ALP Alpine
BOH Boreal Highland
BOL Boreal Lowland
SUB Subalpine
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 2
Wolverine Mine Project
Distribution of Bioclimate Zones
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0 0.75 1.5 3
kilometres


435000 mE
440000 mE
445000 mE
450000 mE
455000 mE
460000 mE
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Bunker Creek
PC-1
PC-2
PC-3
PC-4
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Putt Creek
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Major Mine Access Roads
Major Roads
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
Transect Locations for Winter Wildlife Monitoring Program
Transect Location and Label
YukonZinc CORP
Figure 3
Wolverine Mine Project
Transect Locations for Winter Wildlife Monitoring Program
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0
0.75
1.5
3
kilometres

A Wildlife Biologist will provide technical support for the monitoring program as needed. In addition to providing training related to the field program, the biologist may participate in the field program, program review (e.g., field methods, data collection and management, etc.), and data analysis and reporting as required.

Training will be provided in the field to ensure that data is collected in a consistent and accurate manner, and to ensure calibration among all personnel involved in the field program.

FIELD EQUIPMENT AND SUPPLIES

Equipment and supplies that will be needed to complete the field program includes:

- Snowmobiles or vehicle
- Handheld GPS
- Flagging tape
- Field maps
- Clipboard and datasheets (printed on waterproof paper)
- Snowshoes or skis
- T-bar fence posts or stakes
- Graduated snow probe (for measuring snow depth)
- Wildlife field guidebooks
- Digital camera
- Erasable writing tablet
- Ruler (e.g., clear plastic)
- Waterproof markers and pencils
- Backpack
- Safety (e.g., handheld radio, bear spray, bear bangers) and first aid gear

PROGRAM PLANNING AND LOGISTICS

Prior to the start of the field program, research permits will need to be acquired, field equipment and supplies obtained, and transects need to be field verified. Following the completion of the field program, an Export Permit for shipment of samples to a laboratory in British Columbia must be obtained.

The research permitting process will be led by the Environmental Scientist. Prior to initiating the monitoring studies, a *Scientists and Explorers Permit* under the *Yukon Scientists and Explorers Act (1958)* from the Yukon Tourism and Culture, Heritage Resources Branch, and a *Wildlife Research Permit* under the *Yukon Wildlife Act* from the Yukon Environment will be obtained.

The process for applying for the research permits requires the completion of the *Scientists and Explorers License Application* available at http://www.tc.gov.yk.ca/scientists_explorers.html. The application process may take up to three months due to the consultative component of the permit application process.

After the *Scientists and Explorers Permit* is received, the application process for the *Wildlife Research Permit* can proceed. Information, including a description of the planned research or monitoring studies, and copies of the *Scientists and Explorers* permit is provided to the Yukon Environment, Enforcement and Compliance Branch, for review. The *Wildlife Research Permit* is then issued after completion of the review. This process typically takes about a week to complete.

FIELD METHODS

1. Transect Field Verification

- The point of commencement (POC) for each transect will be located in the field, and marked using a tree or stake, flagged, and labeled. The stake and/or flagging will be placed as high as possible so that the POC isn't buried under snow in winter.

- The POC will be labeled with transect ID, bearing, and distance along transect (e.g., Transect MS-1 180° 0+000 m)

- The location will be referenced using a handheld GPS and photographed. Data for each transect will be recorded on the *Winter Wildlife Monitoring Transect Datasheet.*

- The transect bearing will be followed, preferably in a straight line, and flagged. The distance will be measured using handheld GPS (or compass and hip-chain if preferred).

- The point of termination (POT) will be marked, labeled and photographed. Data on transect length and location will be recorded on the datasheet.

Prior to each winter monitoring period, the field team will confirm that transects are clearly marked and labeled in the summer. Missing markers, in particular POC and POT markers, will be replaced as required.

2. Field Survey Methods

To minimize potential disturbance to wildlife and habitat from monitoring activities, the guidelines provided in Appendix B of the *Wolverine Project Wildlife Protection Plan v. 2009-01* or subsequent updates will be followed. Field surveys will be conducted according to the following procedures:

- Survey will be initiated at least 12 hours after a snowfall.

- General information will be recorded at the beginning of the survey, including transect ID, date, start time, weather conditions the day before and day of the count, and time since last snowfall. All data will be recorded on the *Winter Wildlife Monitoring Survey Datasheet.*

- Transects will be surveyed using snowmobiles, vehicles, snowshoes and/or skis as necessary. Snowmobile or vehicle travel speed will be no more than 5 km/h to avoid missing or running over tracks.

- The field crew will track bearing and distance along transect using a snowmobile/vehicle odometer, hip-chain or handheld GPS.

- Any wildlife species or sign that crosses or intercepts the transect will be counted. Data recorded for each observation will include wildlife species, sign type (e.g., track, trail, scat/pellets, den, etc), distance species/sign found along transect, and general habitat data.

- After a track or trail has been counted, it will be crossed out to avoid recounting during subsequent surveys.

- Snow depth measurements (in centimeters (cm) and recorded to the nearest 0.5 cm) will be taken every 500 m using a snow probe (i.e., a graduated pole for measuring snow depth),

and also at the POC and POT of each transect. Three measurements will be taken and averaged.

- When possible, photographs including sign, habitat, or wildlife will be taken.

- Before leaving the site, datasheet(s) will be checked to ensure that all fields have been entered completely (i.e., no missing data) and accurately.

DATA MANAGEMENT

The Environmental Scientist will be responsible for ensuring that datasheets are complete and accurate, samples are packaged, labeled and stored correctly, and data management and entry procedures are accurate and complete.

All original hardcopy data and supplementary information (e.g., photographs) will be scanned and stored in an electronic format on the project network. All original hardcopy data (e.g., datasheets, maps, etc) will be filed according to standard procedures to ensure that the integrity of the data is maintained and thoroughly documented in the project files.

All monitoring data and supplementary information will be entered into an electronic database such as MS Excel or MS Access according to standard procedures. All data entered into the database will be rechecked by the person entering the data to ensure that it is correct. Discrepancies between field data and database will be identified and corrected. The Environmental Coordinator or designate will carry out quality control measures at the end of each data entry cycle.

Review of the monitoring program data will be carried out by a YZC Environmental Scientist or Wildlife Biologist to assess whether there are any immediate wildlife issues or concerns that need to be addressed, or if there are any trends associated with project components or operations that require follow-up actions.

DATA ANALYSIS AND REPORTING

Routine analysis and reporting of monitoring program results is a fundamental component of the adaptive management process. At the conclusion of the monitoring program and receipt of metal analyses, in years that the program is undertaken, a summary report will be prepared by YZC. The report will include the monitoring procedures, data results and analyses, , and appendices with the original field and laboratory data. The purpose of the summary report will be to provide a detailed record of monitoring program results, a tool for monitoring impacts to wildlife and their habitats, and to facilitate detailed review by the WTC. The report will subsequently be included in the Wolverine Project Annual Report as required by *QML-0006.*

DATASHEETS

The datasheet that will be used for this program is provided below. The datasheet will be reviewed and modified as required based on the results of the initial monitoring program.

1. Winter Wildlife Monitoring Transect Datasheet
2. Winter Wildlife Monitoring Survey Datasheet

WOLVERINE PROJECT

WINTER WILDLIFE MONITORING TRANSECT DATASHEET

Date: _____ **Field Crew:** _____ **Weather:**_____

Transect ID	Survey Area[1]	Transect Bearing (º)	Point of Commencement		Transect Length (m)	Point of Termination		General Comments (e.g., photos, habitat, sign)
			UTM Easting	UTM Northing		UTM Easting	UTM Northing	

[1] Survey areas: Mine Site Study Area (MSSA), Putt Creek Study Area (PCSA), or Money Creek Reference Area (MCRA)

WOLVERINE PROJECT

WINTER WILDLIFE MONTORING SURVEY DATASHEET

Transect ID: _____ **Field Crew:** _____

Date:_____ **Start Time (24 hr):** _____ **End Time (24 hr):** _____

Weather Day Before Count: Temp (ºC) _____ **Wind** _____ **Precip.** _____

Weather Day of the Count: Temp (ºC) _____ **Wind** _____ **Precip.** _____

Time since Last Snowfall (hrs): _____ **Comments:**_____

Track Survey Data

Distance (m)	Species Code	Sign Type	Number of Sign	Habitat	Comments

Snow Depth Data

Distance (m)	Snow Depth$_1$ (cm)	Snow Depth (cm)	Snow Depth (cm)	Avg. Snow Depth (cm)	Comments

Instructions for completing the datasheet are provided below.

The information provided below is specific to the Track Survey Data portion of the datasheet.

1. Distance: record the distance sign was encountered along the transect.

2. Species code: for mammals are based, in general, on the first two letters in the genus and species. Species codes for animals that some species that may be encountered during the program are provided in Table 1. It is possible other species that are not in this list may also be encountered during survey, and should be added to the list.

Table 1. Wildlife Species Names and Codes

Common Name	Scientific Name	Species Code
Lynx	*Lynx canadensis*	LYCA
Coyote	*Canis latrans*	CALA
Wolf	*Canis lupus*	CALU
Fox	*Vulpes vulpes*	VUVU
Wolverine	*Gulo gulo*	GUGU
Fisher	*Martes pennanti*	MAPE
Marten	*Martes americana*	MAAM
Moose	*Alces alces*	ALAL
Caribou	*Rangifer tarandus*	RATA

3. Sign Type: The most likely sign types that will be encountered include visual observations of animals (V), scat (SC), pellets (P), tracks (TR), trail (TL), digging (DG), hair (H), bed (B), den (D), mineral lick (ML). If other sign is seen and is not included then be sure to record the new code and its definition on the datasheet.

4. Number of Sign: refers to the number of a type of sign seen. For example, a linear set of tracks are typically considered a trail, or the number of animal seen, sets of tracks, piles of scat, beds, etc.

5. Habitat: record the general habitat characteristics in the vicinity of where wildlife or wildlife sign were encountered. For example, were there any unique habitat features (e.g., coarse woody debris, wildlife trees, dense forest stand) or provide a general description of the structural characteristics.

The information provided below applies to the Snow Depth Data portion of the datasheet.

1. Distance: refers to the distance along the transect that snow depth data was measured and recorded.

2. Snow Depth (cm): refers to the snow depth measurements taken at each location. Three measurements of snow depth will be taken at a distance of about 1 m from each other. Measurements will be recorded to the nearest 0.5 cm.

3. Average Snow Depth (cm): The three snow depth measurements will be averaged to obtain this value. This measurement can be calculated at the mine site office after returning from the field.

4. Comments: provide any general comments on snow conditions that may affect the survey.

Appendix G: Metal Levels in Vegetation Protocol

WOLVERINE PROJECT

ROUTINE MONITORING: METAL LEVELS IN VEGETATION PROTOCOL

PURPOSE

The purpose of this program is to assess baseline metal concentrations in wildlife forage plants, and determine whether metal levels in the selected vegetation species increase from mine operation.

FOCAL SPECIES

Three plant life forms were selected for sampling based on their value as wildlife forage plants, variability in mechanisms for metals uptake, rate of metals accumulation, and differences in exposure pathways. These include lichen (*Cladina stellaris*), willow (*Salix planifolia*), and horsetail (*Equisetum arvense*). Lichens have been widely used in other studies as indicators of environmental quality, primarily associated with contamination from atmospheric sources and precipitation (Gartner Lee, 2006[1]; Hutchinson et al., 1996[2]), and are important forage resources for woodland caribou using habitats in the region. Willow is an important forage resource for moose throughout most of the year, and is also browsed by caribou (Franzmann and Schwartz, 2007)[3]. Horsetail is a preferred forage species of moose and bears using riparian and wetland habitats (Schwartz et al., 2003)[4].

STUDY AREAS

The study areas for the baseline and effects monitoring are the Mine Site Study Area (MSSA) and the Putt Creek Study Area (PCSA). These study areas roughly correspond to the wildlife local study area that was assessed during the Environmental Assessment (EA) phase of the Wolverine Project (YZC, 2005)[5]. The MSSA is about 3,240 ha, and includes the mine site infrastructure (i.e., mine portal, tailings facility, camp complex, industrial complex, airstrip and landfill). The PCSA is about 7,920 ha, and includes the the access road from the mine site to its junction with the Robert Campbell Highway. The control/reference area included in the program is the Money Creek Reference Area (MCRA). The MCRA is about 2,560 ha and is situated in the Money Creek watershed, and is similar in ecosystem composition to the MSSA and PCSA. The study areas for the monitoring program are shown on Figure 1.

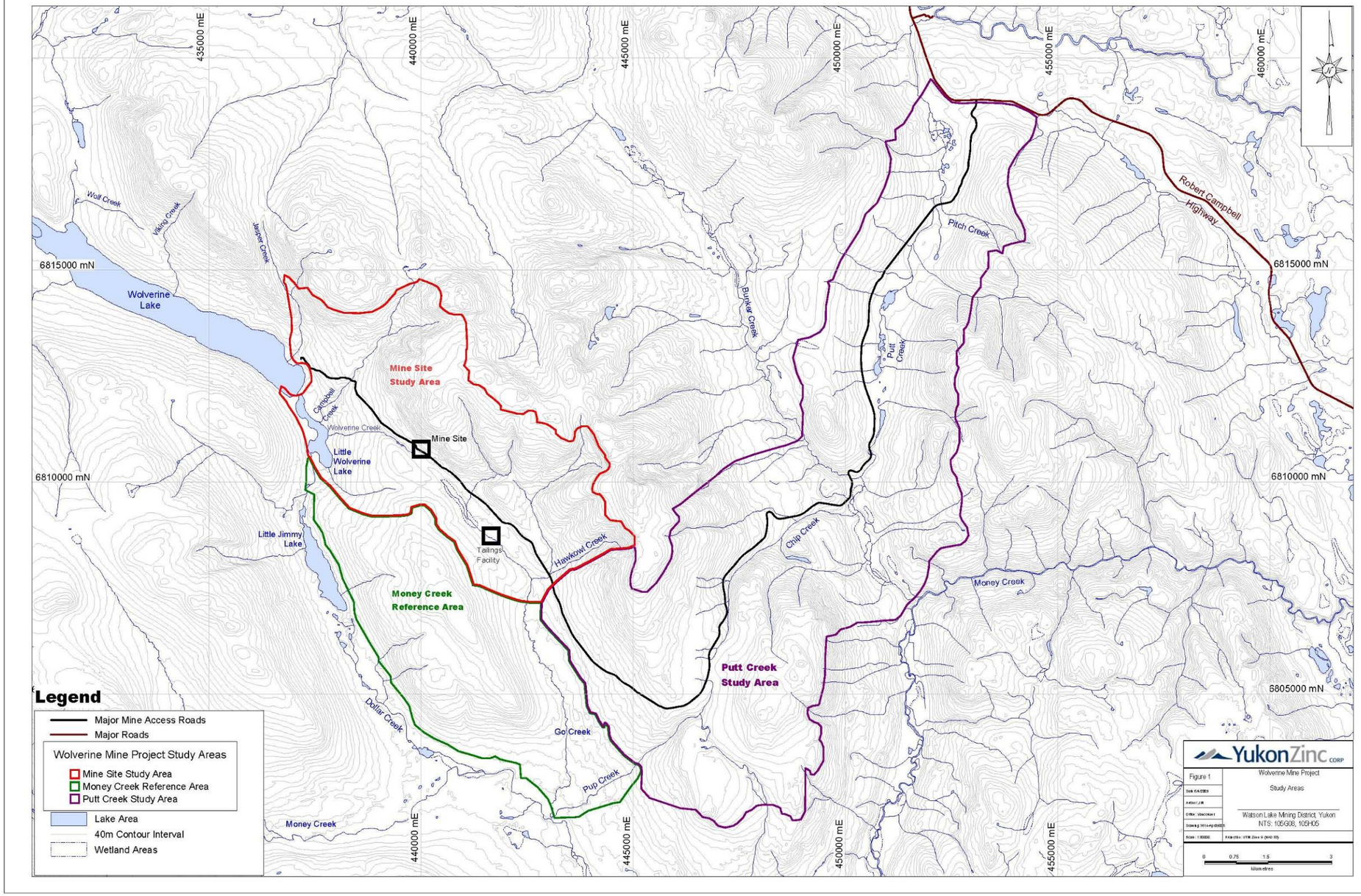
[1] Gartner Lee Ltd. 2006. Anvil Range Mine Complex – Terrestrial Effects Study: Investigation into Metal Concentrations in Vegetation, Wildlife and Soils. Prepared for Deloitte & Touche on behalf of the Faro Mine Closure Planning Office.

[2] Hutchinson, J., Maynard, D., and Geiser, L. 1996. Air Quality and Lichens – A Literature Review Emphasizing the Pacific Northwest, USA. USDA Forest Service, Pacific Northwest Region Air Resource Management Program.

[3] Franzmann, A.W., and CC. Schwartz. 2007. Ecology and management of the North American moose 2nd ed. University Press of Colorado, Boulder, CO.

[4]Schwartz, C.C., Miller, S.D., and M.A. Haroldson. 2003. Grizzly Bear. *In* G.A. Feldhamer, B.C. Thompson, and J.A. Chapman, eds. Wildlife Mammals of North America: Biology, Management, and Conservation.2nd Ed. Johns Hopkins University Press, Baltimore, Maryland. p. 556-586.

[5] Yukon Zinc Corporation (YZC). 2005. Wolverine Project Environmental Assessment Report, October 2005. Prepared by AXYS Environmental Consulting Ltd.


435000 mE
440000 mE
445000 mE
450000 mE
455000 mE
460000 mE
6815000 mN
6810000 mN
5805000 mN
Wolf Creek
Viking Creek
Jasper Creek
Wolverine Lake
Campbell Creek
Wolverine Creek
Little Wolverine Lake
Little Jimmy Lake
Mine Site
Tailings Facility
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Hawkowl Creek
Burke Creek
Putt Creek
Pitch Creek
Chip Creek
Money Creek
Dollar Creek
Go Creek
Pup Creek
Robert Campbell Highway
N
Legend
Major Mine Access Roads
Major Roads
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 1
Wolverine Mine Project
Study Areas
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0
0.75
1.5
3
Kilometres

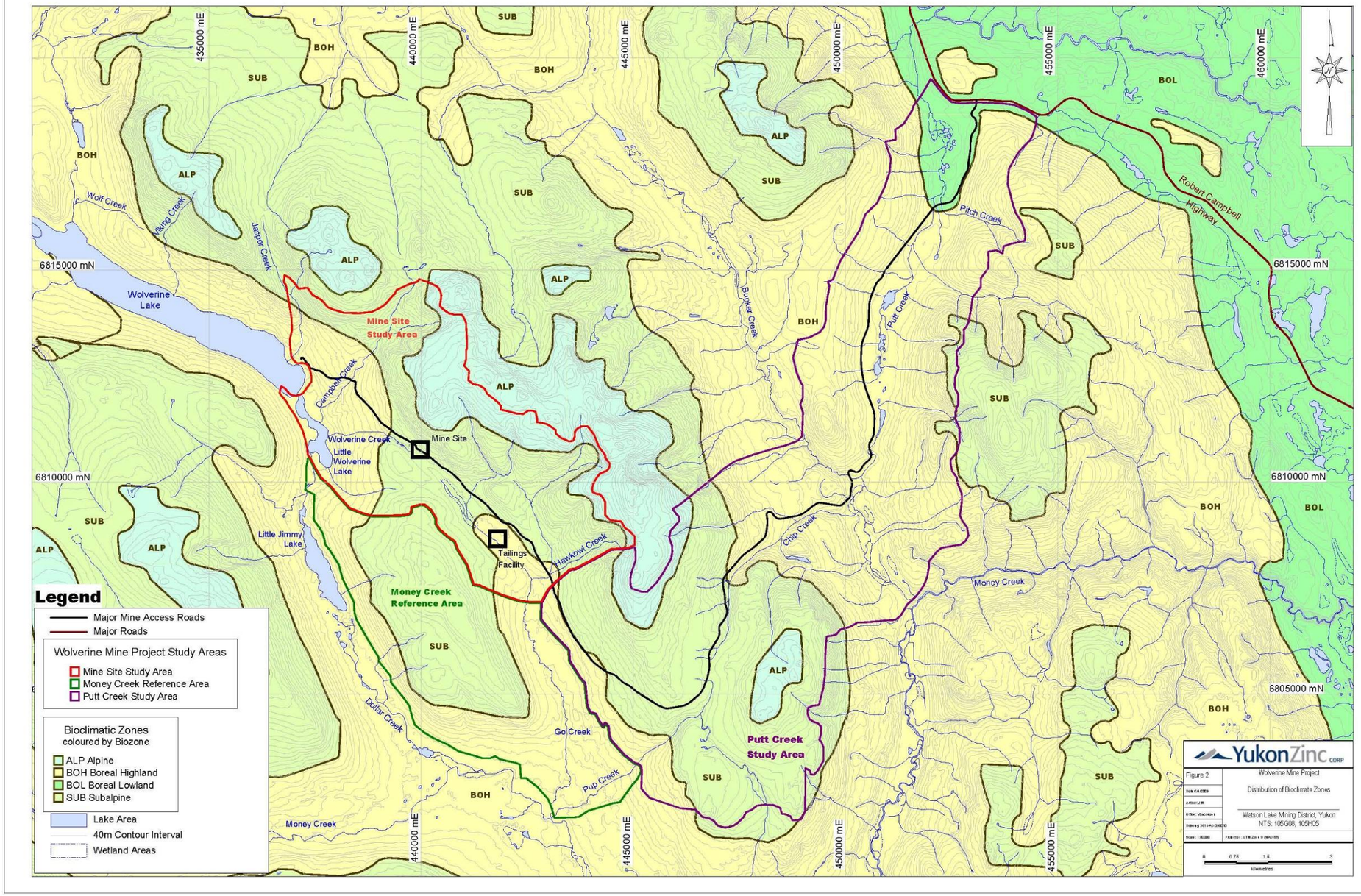
During the EA phase of the Project, the wildlife study area was stratified into four bioclimate zones: alpine (ALP), subalpine (SUB), boreal highland (BOH) and boreal lowland (BOL; YZC, 2005). The ALP zone is found above 1,650 m above sea level (a.s.l.), primarily to the north of the mine infrastructure and airstrip. It is characterized by gently rolling high elevation topography, and is dominated by lichens, sedges, fescue, and alpine forbs. The SUB zone is found between 1,320 to 1,650 m a.s.l., and is comprised of scrub birch and forb meadow complexes in low relief areas, with dwarf shrubs such as heathers and avens at upper elevations. This zone covers a large area north of Go Creek and encompasses most of the western portion of the assessed area. BOH is the most common bioclimate zone in the study area, and is found at elevations from 980 to 1,320 m a.s.l. This zone is dominated by black and white spruce in forested areas with willow/birch mosaics along gentle side slopes, and a number of wetlands in valley bottoms. BOL is found only in the PCSA near the access road and Robert Campbell Highway junction at elevations below 980 m a.s.l. It is characterized by a relatively high cover of lodgepole pine and white spruce forest with varied amounts of aspen and pine on crests and south-facing slopes. Black spruce dominates valley bottoms adjacent to wetlands. Bioclimate zone distribution relative to the study areas are shown on Figure 2.

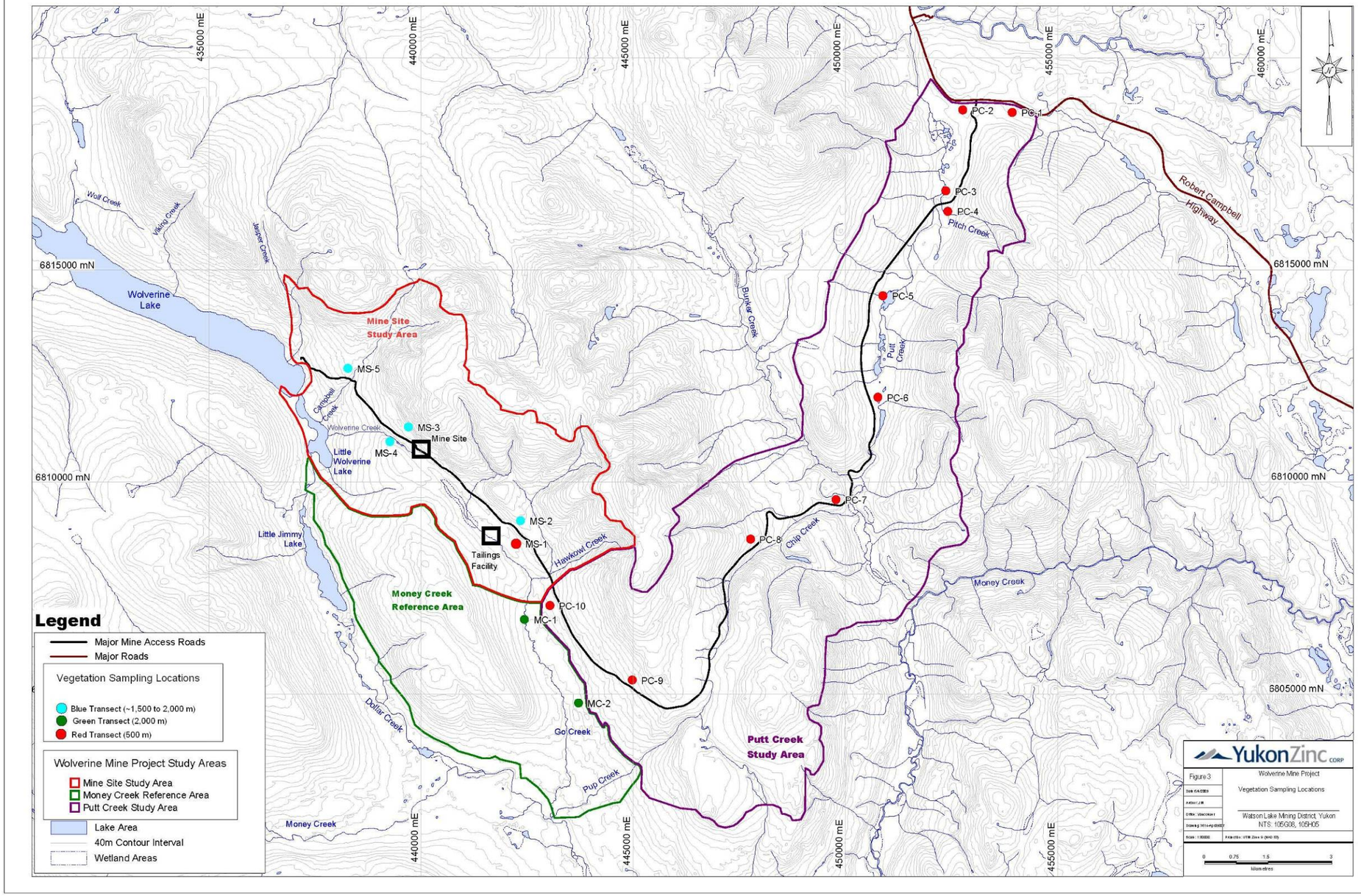
STUDY DESIGN

Baseline sampling for metal levels in wildlife forage plants will occur in 2009, and subsequent operational monitoring will commence in 2011 and then every three years (e.g., 2014, 2017) thereafter until closure, or until monitoring data indicates no contamination and the Wildlife Technical Committee (WTC) is in agreement. The sampling of vegetation will occur in late July and early August during the peak growing season.

Five transects, approximately 1,500 to 2,000 m in length, will be established in the MSSA. The length of each transect will be modified as required and will be dependent on terrain and accessibility to areas for sampling. Each transect will originate in the vicinity of the mine site and radiate out into surrounding areas. Vegetation samples will be collected every 250 m between 0 m and 1,000 m, and every 500 m thereafter along each transect, corresponding to about seven stations along each transect. In the PCSA, 10 sampling sites will be located along the length of the access road. A 500 m transect will be established at each location with vegetation samples being collected at 0 and 500 m. The start of each transect will be a minimum of 50 m off the road corridor. Two 2,000 m transects will be established in the MCRA. Sampling along each transect will occur every 500 m, totaling ten sampling stations. Sampling transects and site locations are shown on Figure 3, and will be field verified in summer 2009.

All reasonable efforts will be made to ensure that each transect is located within only one bioclimate zone. Vegetation samples will be collected at regular intervals along each transect. For each species present at a sampling location, three replicate (triplicate) samples will be collected. The goal will be to collect about 35 lichen, 50 willow, and 50 horsetail triplicates across all study areas combined. Samples will be collected using powder-free nitrile gloves, and placed in a labeled sterile plastic bag. Data that will be recorded for each sample collected is outlined in the Field Methods below. Digital photographs will be taken of each sampling station for program records. All vegetation samples will be frozen until shipment to an accredited laboratory of metals analysis using ICP-MS.


435000 mE
440000 mE
445000 mE
450000 mE
455000 mE
460000 mE
6815000 mN
6810000 mN
5805000 mN
BOH
SUB
ALP
BOL
Wolf Creek
Viking Creek
Jasper Creek
Wolverine Lake
Mine Site Study Area
Campbell Creek
Wolverine Creek
Little Wolverine Lake
Mine Site
Little Jimmy Lake
Tailings Facility
Hawkowl Creek
Money Creek Reference Area
Dollar Creek
Go Creek
Pup Creek
Money Creek
Burke Creek
Putt Creek
Pitch Creek
Putt Creek Study Area
Chip Creek
Robert Campbell Highway
N
Legend
Major Mine Access Roads
Major Roads
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Bioclimatic Zones coloured by Biozone
ALP Alpine
BOH Boreal Highland
BOL Boreal Lowland
SUB Subalpine
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 2
Wolverine Mine Project
Distribution of Bioclimate Zones
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0 0.75 1.5 3
Kilometres


435000 mE
440000 mE
445000 mE
450000 mE
455000 mE
460000 mE
6815000 mN
6810000 mN
5805000 mN
Wolf Creek
Viking Creek
Jasper Creek
Wolverine Lake
Mine Site Study Area
MS-5
Campbell Creek
Wolverine Creek
MS-3
Mine Site
MS-4
Little Wolverine Lake
Little Jimmy Lake
Tailings Facility
MS-2
MS-1
Hawkowl Creek
Money Creek Reference Area
MC-1
PC-10
PC-9
MC-2
Dollar Creek
Go Creek
Pup Creek
Money Creek
Putt Creek Study Area
Burke Creek
PC-5
Putt Creek
PC-6
PC-7
PC-8
Chip Creek
Money Creek
PC-2
PC-1
PC-3
PC-4
Pitch Creek
Robert Campbell Highway
N
Legend
Major Mine Access Roads
Major Roads
Vegetation Sampling Locations
Blue Transect (~1,500 to 2,000 m)
Green Transect (2,000 m)
Red Transect (500 m)
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 3
Wolverine Mine Project
Vegetation Sampling Locations
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0
0.75
1.5
3
Kilometres

PERSONNEL AND TRAINING

A field crew comprised of two people (i.e., Environmental Scientist and Environmental Technician or designates) will be required to complete the work under this monitoring program. The responsibilities of each person are outlined below.

- A YZC Environmental Scientist or designate will be responsible for ensuring that the monitoring program is conducted according to current standards and practices. In addition to participating in the field program as required, the Scientist will carry out quality control measures to ensure data is complete and accurate, oversee data management and entry, and ensure proper processing of samples, completion of chain-of-custody forms and shipment of samples to the laboratory, and liaising with the laboratory and the WTC as required.

- The Environmental Technician or designate will participate in the field program, data management and entry, preparation and shipment of samples to the laboratory and other tasks as required on the direction of the Environmental Scientist. On-the-job training will be provided to carry out the responsibilities under this monitoring program.

A Wildlife Biologist will provide technical support for the monitoring program as needed. In addition to providing training related to the field program, the biologist mayparticipate in the field program, program review (e.g., field methods, data collection and management, etc.), and data analysis and reporting as required.

Training will be provided in the field to ensure that data is collected in a consistent and accurate manner, and to ensure calibration among all personnel involved in the field program.

FIELD EQUIPMENT AND SUPPLIES

Equipment and supplies that will be needed to execute the field program includes:

- Medium and large-sized Ziploc bags
- Handheld GPS
- Compass
- Maps
- Waterproof markers and pencils
- Clipboard and datasheets (printed on waterproof paper)
- Vegetation field guides
- Nitrile powder-free gloves
- Garden clippers
- Trowel (preferable stainless steel)
- 99% isopropanol (for cleaning sampling utensils)
- Digital camera
- Hand lens
- Safety (e.g., handheld radio, bear spray, bear bangers) and first aid gear
- Backpack (medium to large sized)
- Coolers and ice packs (from the laboratory)
- Scale (for measurement of sample weights)
- Erasable label board for pictures

PROGRAM PLANNING AND LOGISTICS

Prior to the start of the field program, research permits will need to be acquired, field equipment and supplies obtained. Following the completion of the field program, an Export Permit for shipment of samples to a laboratory in British Columbia must be obtained.

The research permitting process will be led by the Environmental Scientist. Prior to initiating the monitoring studies, a *Scientists and Explorers Permit* under the *Yukon Scientists and Explorers Act (1958)* from the Yukon Tourism and Culture, Heritage Resources Branch, and a *Wildlife Research Permit* under the *Yukon Wildlife Act* from the Yukon Environment will be obtained.

The process for applying for the research permits requires the completion of the *Scientists and Explorers License Application* available at http://www.tc.gov.yk.ca/scientists_explorers.html. The application process may take up to three months due to the consultative component of the permit application process.

After the *Scientists and Explorers Permit* is received, the application process for the *Wildlife Research Permit* can proceed. Information, including a description of the planned research or monitoring studies, and copies of the *Scientists and Explorers* permit is provided to the Yukon Environment, Enforcement and Compliance Branch, for review. The *Wildlife Research Permit* is then issued after completion of the review. This process typically takes about a week to complete.

FIELD METHODS

1. Field Sampling Procedures

To minimize potential disturbance to wildlife and habitat from monitoring activities, the guidelines provided in Appendix B of the *Wolverine Project Wildlife Protection Plan v. 2009-01* or subsequent updates will be followed. The program will be carried out according to the methods outlined below.

- All field data will be recorded on the *Vegetation Metals Datasheet*.

- The point of commencement (POC) for each transect will be located and marked in the field at least 50 m from project infrastructure (e.g, mill site, tailings facility, access road, etc.).

- The POC location will be recorded using a handheld GPS (in UTMs). The POC, or 0 m, will be the first sampling location along each transect.

- Vegetation species found at each station will be collected. Three replicates (A, B, or C) will be collected for each species present at the station (e.g., if the willow is present, three samples of the willow will be taken). Field guidebooks will used as required to verify species identification.

- Prior to collecting each sample, sampling bags will be labelled with the date and time collected and sample number. The sample number is comprised of the year-transect number-species-station number-sample identifier and replicate letter (e.g., 2009-MS1-LICHEN-STN1-01A).

- A minimum of 10 g wet weight will be collected for each sample. Willow samples will be collected from the same plant and will be current year growth (leaves and shoots). Only the above root portion of horsetails will be collected, multiple plants may be required to collect

sufficient plant material for each replicate. The whole plant of lichens will be collected and each replicate will be gathered from a small defined area.

- Nitrile powder-free gloves will be worn when collecting samples. If sampling utensils are used to collect samples, they will be rinsed with the isopropanol before collecting the next sample.

- Data recorded for each sample will include study areas, transect number, station number and location (in UTMs), date and time specimen collected, species collected, sample number (year-transect number-species-station number-sample identifier and replicate letter), plant part collected (i.e., stem, leaves, root, etc.), sample type (i.e., sample is from one plant only, or is a composite of more than one plant), % cover (i.e., how much of the area is covered by each sampled species), and any comments on wildlife/wildlife sign or habitat use.

- A digital photograph will be taken at each sampling location for program records.

- Samples will be placed temporarily in a cool, dark place for transport from the field, and then transferred to a designated freezer at the mine site.

PROCESSING AND STORAGE OF SAMPLES

- Upon return from the field, samples will be checked to ensure that labels and datasheets are in agreement. All samples will remain in the freezer until just prior to shipment to the laboratory.

- Prior to shipment of samples to the laboratory, a chain-of-custody form will be completed. A copy will be kept on file for project records.

- Transport coolers will be packed with frozen ice packs and samples will be placed in the coolers. All efforts will be made to ensure samples remain frozen or cool until received at the laboratory.

- Each cooler will be clearly labeled with the laboratory contact information, YZC contact information, and other appropriate labels (e.g., sample stickers). Copies of the chain-of-custody forms will be attached to the inside top of the cooler in an envelope.

- The laboratory will be notified that the samples have been shipped from site.

LABORATORY ANALYSIS

Vegetation samples will be analyzed by an accrediated laboratory for metals using ICP-MS. Duplicates of selected vegetation samples and reference standards will also be completed for the purpose of QA/QC of laboratory analytical technique.

DATA MANAGEMENT

The Environmental Scientist will be responsible for ensuring that datasheets are complete and accurate, samples are packaged, labeled and stored correctly, and data management and entry procedures are accurate and complete.

All original hardcopy data and supplementary information (e.g., photographs) will be scanned and stored in an electronic format on the project network. All original hardcopy data (e.g., datasheets, maps, etc) will be filed according to standard procedures to ensure that the integrity of the data is maintained and thoroughly documented in the project files.

All monitoring data and supplementary information will be entered into an electronic database such as MS Excel or MS Access according to standard procedures. All data entered into the database will be rechecked by the person entering the data to ensure that it is correct. Discrepancies between field data and database will be identified and corrected. The Environmental Coordinator or designate will carry out quality control measures at the end of each data entry cycle.

Review of the monitoring program data will be carried out by a YZC Environmental Scientist or Wildlife Biologist to assess whether there are any immediate wildlife issues or concerns that need to be addressed, or if there are any trends associated with project components or operations that require follow-up actions.

DATA ANALYSIS AND REPORTING

Routine analysis and reporting of monitoring program results is a fundamental component of the adaptive management process. At the conclusion of the monitoring program and receipt of metal analyses, in years that the program is undertaken, a summary report will be prepared by YZC. The report will include the monitoring procedures, data results and analyses, , and appendices with the original field and laboratory data. The purpose of the summary report will be to provide a detailed record of monitoring program results, a tool for monitoring impacts to wildlife and their habitats, and to facilitate detailed review by the WTC. The report will subsequently be included in the Wolverine Project Annual Report as required by *QML-0006*.

DATASHEETS

The datasheet that will be used for this program is provided below. The datasheet will be reviewed and modified as required based on the results of the initial monitoring program.

1. Vegetation Metals Datasheet

WOLVERINE PROJECT

VEGETATION METALS DATASHEET

Date: _____ Field Crew: _____ Weather: Temp (ºC) _____ Wind _____ Precip. _____

Study Area:_____ Transect No.: _____ Comments: _____

Stn. No.	Station Location		Time Collected	Species	Sample No.	Plant Part Collected[1]	Sample Type[2]	% Cover[3]	Comments (Habitat &/or Wildlife Use)
	UTM Easting	UTM Northing							

[1] Plant Part Collected: identify if the whole plant (W), leaves (L), shoot (S), or above root (AR) portion of the plant is collected.
[2] Sample Type: identify if the sample was collected from one individual plant (IND), or if it is a composite of more than one plant (COM). Composite samples will most likely be collected for lichens or horsetails to obtain a suitable amount of plant material for laboratory analysis.
[3] % Cover: provide an estimate of how much of the sampling station area is covered by each sampled species

Appendix H: Metal Levels in Small Mammals Protocol

WOLVERINE PROJECT

ROUTINE MONITORING: METAL LEVELS IN SMALL MAMMALS

PURPOSE

The purpose of this program is to assess baseline metal concentrations in wildlife, and determine whether levels of metals in wildlife increase from mine operation.

FOCAL SPECIES

Small mammals are the focal species group for assessing metal levels in wildlife. Species that may potentially occur in habitats in the vicinity of the Wolverine Project include arctic ground squirrel (*Spermophilus parryii*), red squirrel (*Tamiasciurus hudsonicus*), muskrat (*Ondata zibethicus*), least chipmunk (*Eutamias minimum*), meadow jumping mouse (*Zapus husonius*), deer mouse (*Peromyscus maniculatus*), red-backed vole (*Clethrionomys rutilus*), heather vole (*Phenacomys intermedius*), meadow vole (*Microtus pennsylvanicus*), long-tailed vole (*M. longicaudus*), Siberian lemming (*Lemmus sibiricus helvolus*), and shrews (*Sorex* sp.).

STUDY AREAS

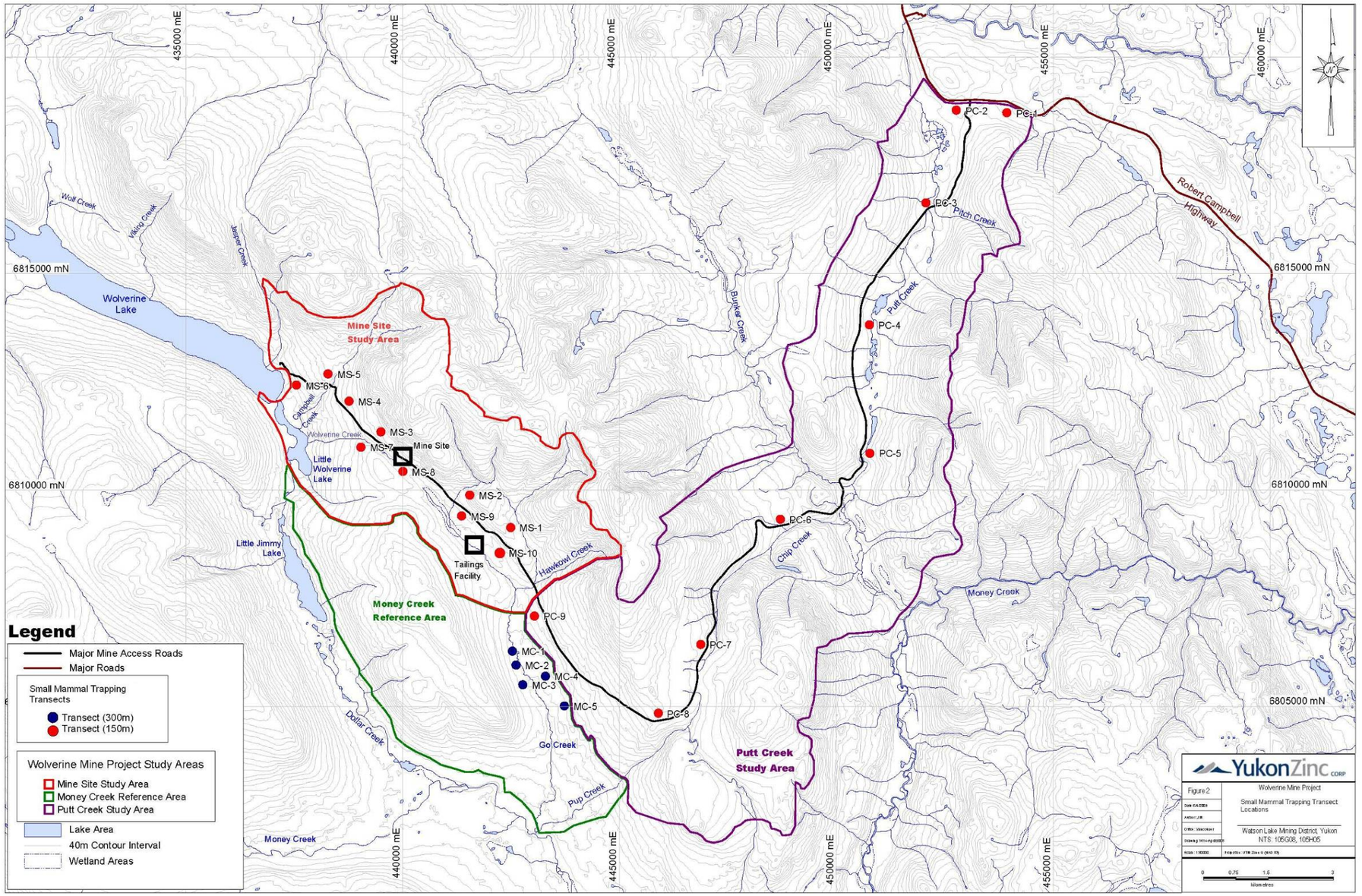
The study areas for the baseline and effects monitoring are the Mine Site Study Area (MSSA) and the Putt Creek Study Area (PCSA). These study areas roughly correspond to the wildlife local study area that was assessed during the Environmental Assessment (EA) phase of the Wolverine Project (YZC, 2005)[1]. The MSSA is about 3,240 ha, and includes the mine site infrastructure (i.e., mine portal, tailings facility, camp complex, industrial complex, airstrip and landfill). The PCSA is about 7,920 ha, and includes the the access road from the mine site to its junction with the Robert Campbell Highway. The control/reference area included in the program is the Money Creek Reference Area (MCRA). The MCRA is about 2,560 ha and is situated in the Money Creek watershed, and is similar in ecosystem composition to the MSSA and PCSA. The study areas for the monitoring program are shown on Figure 1.

STUDY DESIGN

Baseline sampling for metal levels in wildlife will occur in 2009, and subsequent operational monitoring will start in 2011 and then every three years (e.g., 2014, 2017) thereafter until closure, or monitoring data indicates no contamination and the WTC is in agreement. Sampling for small mammals will occur in August.

Trapping transects will be established in each of the study areas. About ten 150-m transects will be established in the MSSA and also the PCSA. A trapping grid comprised of five 300 m transects will be established in the MCSA. Transect locations will be modified as required to address terrain or accessibility concerns during the field implementation phase. The location of transects are shown on Figure 2.

[1] Yukon Zinc Corporation (YZC). 2005. Wolverine Project Environmental Assessment Report, October 2005. Prepared by AXYS Environmental Consulting Ltd.


435000 mE
440000 mE
445000 mE
450000 mE
455000 mE
460000 mE
6815000 mN
6810000 mN
6805000 mN
Wolf Creek
Viking Creek
Jasper Creek
Wolverine Lake
Mine Site Study Area
MS-5
MS-6
MS-4
MS-3
MS-7
Mine Site
MS-8
MS-2
MS-9
MS-1
MS-10
Tailings Facility
Campbell Creek
Wolverine Creek
Little Wolverine Lake
Little Jimmy Lake
Hawkowl Creek
Money Creek Reference Area
Money Creek
Dollar Creek
Go Creek
Pup Creek
Putt Creek Study Area
Bunker Creek
Pitch Creek
Putt Creek
Chip Creek
Robert Campbell Highway
PC-1
PC-2
PC-3
PC-4
PC-5
PC-6
PC-7
PC-8
PC-9
MC-1
MC-2
MC-3
MC-4
MC-5
Legend
Major Mine Access Roads
Major Roads
Small Mammal Trapping Transects
Transect (300m)
Transect (150m)
Wolverine Mine Project Study Areas
Mine Site Study Area
Money Creek Reference Area
Putt Creek Study Area
Lake Area
40m Contour Interval
Wetland Areas
YukonZinc CORP
Figure 2
Wolverine Mine Project
Small Mammal Trapping Transect Locations
Watson Lake Mining District, Yukon
NTS: 105G08, 105H05
0
0.75
1.5
3
kilometres

Trap stations will be established at 15 m intervals along each transect. Snap traps will be used to capture mice, voles, lemmings, and possibly chipmunks and squirrels, and pitfall traps will be used for shrews. The study areas will be sampled in August with each trapping session being four trap nights in duration with no pre-baiting period. The number of trap nights will be modified if small mammal density or capture rate is determined to be low. Specimens will be frozen until shipment to an accredited laboratory. Tissue samples (kidney, liver, muscles) will be extracted from the specimens by the laboratory, and analyzed for metals using ICP-MS.

PERSONNEL AND TRAINING

A field crew comprised of two people (i.e., Environmental Scientist and Environmental Technician or designates) will be required to complete the work under this monitoring program. The responsibilities of each person are outlined below.

- A YZC Environmental Scientist or designate will be responsible for ensuring that the monitoring program is conducted according to current standards and practices. In addition to participating in the field program as required, the Scientist will carry out quality control measures to ensure data is complete and accurate, , oversee data management and entry, and ensure proper processing of samples, completion of chain-of-custody forms and shipment of samples to the laboratory, and liaising with the laboratory and the WTC as required.

- The Environmental Technician or designate will participate in the field program, data management and entry, preparation and shipment of samples to the laboratory and other tasks as required on the direction of the Environmental Scientist. On-the-job training will be provided to carry out the responsibilities under this monitoring program.

A Wildlife Biologist will provide technical support for the monitoring program as needed. In addition to providing training related to the field program, the biologist mayparticipate in the field program, program review (e.g., field methods, data collection and management, etc.), and data analysis and reporting as required.

Training will be provided in the field to ensure that data is collected in a consistent and accurate manner, and to ensure calibration among all personnel involved in the field program.

PROGRAM EQUIPMENT

Equipment and supplies that will be required to carry out this program includes:

- Museum Special Snap Traps
- Peanut butter and rolled oats (bait mixture)
- Mixing pail and stick (for bait mixture)
- Large and medium-sized Ziploc bags
- Approx. 100 1-L ice-cream pails or large cans (e.g., coffee cans)
- Nitrile powder-free gloves
- 1-L (or more) water bottle, with water (for pitfall traps)
- Portable cooler (for the field)
- Coolers and ice-packs (from the laboratory)
- Shovel and hedge clippers (for cutting through roots)
- Hand sanitizer (alcohol based)
- Hip-chain and string
- Compass
- Handheld GPS

- Flagging tape
- Waterproof markers and pencils
- Pesola scales (10 g, 100 g, and 500 g)
- Ruler (clear, plastic, or similar measuring scale with millimeters)
- Mammal identification key and field guides
- Hand lens
- Digital camera
- Clipboard and datasheets (printed on waterproof paper)
- Safety (e.g., handheld radio, bear bangers, bear spray) and first aid gear
- Personal protective equipment (as per WorkSafe BC regulations)
- Backpack (medium to large-sized for field gear, including traps)

PROGRAM PLANNING AND LOGISTICS

Prior to the start of the field program, research permits will need to be acquired, field equipment and supplies obtained, and bait prepared. Following the completion of the field program, an Export Permit for shipment of samples to a laboratory in British Columbia must be obtained.

The research permitting process will be led by the Environmental Scientist. Prior to initiating the monitoring studies, a *Scientists and Explorers Permit* under the *Yukon Scientists and Explorers Act (1958)* from the Yukon Tourism and Culture, Heritage Resources Branch, and a *Wildlife Research Permit* under the *Yukon Wildlife Act* from the Yukon Environment will be obtained.

The process for applying for the research permits requires the completion of the *Scientists and Explorers License Application* available at http://www.tc.gov.yk.ca/scientists_explorers.html. The application process may take up to three months due to the consultative component of the permit application process.

After the *Scientists and Explorers Permit* is received, the application process for the *Wildlife Research Permit* can proceed. Information, including a description of the planned research or monitoring studies, and copies of the *Scientists and Explorers* permit is provided to the Yukon Environment, Enforcement and Compliance Branch, for review. The *Wildlife Research Permit* is then issued after completion of the review. This process typically takes about a week to complete.

An Export Permit is required under the *Yukon Wildlife Act* to export animals or animal parts out of the Yukon. The Environmental Scientist will contact the Yukon Environment, Conservation Officer in Ross River to acquire an Export Permit to transport the samples to the laboratory for analysis as soon as possible after the completion of the field program. The Conservation Officer will require information on species, tissue type/animal part, and how many of each before a permit can be issued. The samples cannot be shipped to laboratory without this permit included in the shipment package.

FIELD METHODS

To minimize potential disturbance to wildlife and habitat from monitoring activities, the guidelines provided in Appendix B of the *Wolverine Project Wildlife Protection Plan v. 2009-01*.will be followed. The field methods for this program have been adapted from RIC (1998)[2] to meet the objectives of this program, and are outlined below.

[2] Resource Inventory Committee (RIC). 1998. Inventory Methods for Small Mammals: Voles, Mice, Shrews and Rates. Component's for British Columbia's Biodiversity No. 31. BC Ministry of Environment, Lands and Parks, Victoria, BC.

1. Verification and Set-up of Transects

Transects for sampling will be established in each of the study areas according to the methods outlined below.

- The location of transect will be located and established before starting the trapping session. All transect data will be recorded on the *Transect Datasheet*.

- The point of commencement (POC) will be marked (e.g., with a stake), flagged, and labeled with program, transect number, distance along transect, and transect bearing (e.g., SMT, Transect MS-1, 0+000 m, 180°).

- The location will be recorded using a handheld GPS in UTMs. Detailed notes on access and transect will be documented for future reference.

- Each transect will follow a predetermined bearing. Efforts will be made to ensure that transects are within only one ecosystem type. Distance along each transect will be measured using a hip-chain..

- At 15 m intervals, sampling locations will be flagged and labeled with program transect number, station number, and distance along transect (e.g., SMT, Transect MS-1, Station 1, 0 + 015 m).

2. Small Mammal Trapping

Once transects are established, the following field methods will be followed.

- Two snap traps will be placed within 2 m of each station centre, and in areas where small mammals are likely to be active (e.g., under or along woody debris or rocks, under bushes, along worn trails). A piece of flagging tape will be hung above the trap location for easy reference during field sampling.

- At station 3 (0+30 m), station 6 (0+90 m) and station 9 (0+150 m), three pitfall traps will be installed at each station. Pitfalls should be located within 3 m of each other. The holes will be dug using a shovel and other tools as necessary, and the bucket placed in the hole. The lip of the bucket will be flush with the ground. Organic debris (e.g., branches, rocks, etc.) will be placed near each trap as necessary to attract small mammals to the pitfall trap locations.

- Snap traps will be baited with the pre-mixed peanut butter and oat bait mixture, and set open, and water will be added to the pitfall traps at set up. The date and time the traps were set will be recorded.

- Traps will be checked every day during the trapping session starting in the early morning. Transects and traps should be visited in the same order they were set.

- If an animal is captured, data will be recorded on the *Small Mammal Capture Datasheet*. This will include date and time the trap set and checked, transect number, station number, trap number (1 or 2, arbitrarily assigned in the field), morphological measurements (weight, sex class, age class). Each specimen will be assigned a specimen ID comprised of program year-species code-transect number-specimen number (e.g., 2008-PEMA-MS1-01)._Species codes are provided on the datasheet. Digital photographs will be taken of each specimen collected, and include a scale (e.g., ruler) for reference.

- For species that are unidentifiable, or unable to be classified by age class, additional measurements including total length, tail length, hind foot length, ear length, and information on pelage (i.e., colour, pattern), and other distinguishable characteristics will be recorded. Digital photographs will be taken of each specimen collected, and include a scale (e.g., ruler) for reference.

- All animals captured will be collected. Specimens will be placed in a sterile plastic bag and labeled with a specimen ID comprised of program year-species code-transect number-specimen number (e.g., 2009-PEMA-MS1-01) and date and time collected. Samples will be placed in a portable cooler for transport from the field.

- After specimens have been measured, processed, and placed in the cooler, the traps will be reset.

- Each trap session will run for a period of four-trap nights. If density of animals or capture rate is determined to be low, the number of trap nights will be modified up to 6-trap nights.

- All consumable materials (e.g., gloves, flagging) no longer usable will be taken out of the field and disposed of appropriately at the landfill.

3. Deactivation of Trap Stations and Transects

- At the completion of each four-night trap session, the snap traps and pit fall traps will be removed from the field. Holes from the pits will be filled in with the soil that was removed prior to installation.

- Flagging and other materials used in the field will be removed, except for the POC marker, and disposed of at the landfill as appropriate.

- Traps will be cleaned, disinfected (e.g., with bleach and water), and stored after the completion of each monitoring period (e.g., 2009).

PROCESSING AND STORAGE OF SAMPLES

- All samples collected will be transferred from the portable cooler to a designated freezer at the mine site. .

- After all samples have been collected, the Environmental Scientist will coordinate with the expediter to ensure that samples will be shipped out on the earliest flight possible so that samples remain frozen until received by the laboratory.

- Each cooler will be labeled with laboratory address, YZC contact person, and sample stickers. Copies of the Export Permit and chain-of-custody forms will be placed in an envelope and attached securely to the top of the cooler lid.

- The laboratory will be notified that the samples have been shipped from site. Samples will be shipped out early to mid-week to ensure that laboratory staff is available to receive the shipment when it arrives.

LABORATORY ANALYSIS

Samples will be analyzed by an accredited laboratory for metals using ICP-MS. Tissue samples (kidney, liver, muscle) from the specimens will be extracted by the laboratory, and analyzed for metals using ICP-MS. Duplicates of selected tissue samples and reference standards will also be completed for the purpose of QA/QC of laboratory analytical technique.

DATA MANAGEMENT

The Environmental Scientist will be responsible for ensuring that datasheets are complete and accurate, samples are packaged, labeled and stored correctly, and data management and entry procedures are accurate and complete.

All original hardcopy data and supplementary information (e.g., photographs) will be scanned and stored in an electronic format on the project network. All original hardcopy data (e.g., datasheets, maps, etc) will be filed according to standard procedures to ensure that the integrity of the data is maintained and thoroughly documented in the project files.

All monitoring data and supplementary information will be entered into an electronic database such as MS Excel or MS Access according to standard procedures. All data entered into the database will be rechecked by the person entering the data to ensure that it is correct. Discrepancies between field data and database will be identified and corrected. The Environmental Coordinator or designate will carry out quality control measures at the end of each data entry cycle.

Review of the monitoring program data will be carried out by a YZC Environmental Scientist or Wildlife Biologist to assess whether there are any immediate wildlife issues or concerns that need to be addressed, or if there are any trends associated with project components or operations that require follow-up actions.

DATA ANALYSIS AND REPORTING

Routine analysis and reporting of monitoring program results is a fundamental component of the adaptive management process. At the conclusion of the monitoring program and receipt of metal analyses, in years that the program is undertaken, a summary report will be prepared by YZC. The report will include the monitoring procedures, data results and analyses, , and appendices with the original field and laboratory data. The purpose of the summary report will be to provide a detailed record of monitoring program results, a tool for monitoring impacts to wildlife and their habitats, and to facilitate detailed review by the WTC. The report will subsequently be included in the Wolverine Project Annual Report as required by *QML-0006.*

DATASHEETS

The datasheets for this monitoring program are provided below. The datasheets will be reviewed and modified as required based on the results of the monitoring program and input from the WTC.

1. Small Mammal Transect Datasheet
2. Small Mammal Capture Datasheet

WOLVERINE PROJECT

SMALL MAMMAL TRANSECT DATASHEET

Study Area: _____ **Date:**_____ **Field Crew:**_____

Transect ID	POC Location		POT Location		Bearing (°)	Transect Length (m)	Distance between Stations (m)	General Habitat Description
	UTM Easting	UTM Northing	UTM Easting	UTM Northing				

YukonZinc CORP

WOLVERINE PROJECT

SMALL MAMMAL CAPTURE DATASHEET

Study Area: _____ **Transect ID:** _____ **Field Crew:** _____

Traps: Set Date:_____ **Set Time (24 hr):** _____ **Check Date:** _____ **Check Time (24 hr):**_____

Obs. No.	Stn. No.	Trap Type[1]	Trap No.[2]	Specimen ID[3]	Species Code[4]	Weight (g)[5]	Sex Class[6]	Age Class[7]	BL (mm)[8]	TL (mm)[9]	HF (mm)[10]	EL (mm)[11]	Pelage[12]	Comments[13]

PAGE ___ of ____

Instructions for Small Mammal Capture Datasheet

1. Obs. No.: Assign a unique observation ID to each specimen starting at one (1). Will be used for the specimen ID (see point 4).
2. Trap Type: refers to snap trap (S) or pitfall trap (P)
3. Trap No.: refers to trap number; arbitrarily assigned by trap type. A trap number of 1 or 2 is assigned for S; and 1, 2 or 3 for P.
4. Specimen ID: program year – species code – transect number – observation number (e.g., 2009-PEMA-MS1-01). Specimen number is arbitrarily assigned in the order captured along each transect. Species codes are provided below in Table 1.
5. Species codes for mammals are based, in general, on the first two letters in the genus and species. Species codes for small mammals that may be captured are provided in Table 1 below.

Table 1. Small Mammal Species Names and Codes

Common Name	Scientific Name	Species Code
Arctic ground squirrel	*Spermophilus parryii*	SPPA
Red squirrel	*Tamiasciurus hudsonicus*	TAHU
Muskrat	*Ondata zibethicus*	ODZI
Least Chipmunk	*Eutamias minimum*	EUMI
Meadow jumping mouse	*Zapus husonius*	ZAHU
Deer mouse	*Peromyscus maniculatus*	PEMA
Red-backed vole	*Clethrionomys rutilus*	CLRU
Heather vole	*Phenacomys intermedius*	PHIN
Meadow vole	*Microtus pennsylvanicus*	MIPE
Long-tailed vole	*Microtus longicaudus*	MILO
Siberian lemming	*Lemmus sibiricus helvolus*	LSHE
Shrew	*Sorex* sp.	SOSP

6. Weight: measured in grams using the spring Pesola scales. Use appropriate size for species being weighed.
7. Sex Class: male (M), female (F), unknown (U)
8. Age Class: adult (A), sub-adult (SA), and juvenile (J)
9. Body Length (BL): total length of the animal minus the tail vertebrae length (i.e., body length minus the tail)[1]
10. Tail Length (TL): length of the tail measured from the base of tail to last vertebra[1]
11. Hind Foot Length (HL): length of hind foot measured from edge of heel to end of the longest claw[1]
12. Ear Length (EL): length of ear measured from the ear notch[1]
13. Pelage: description of the hair or fur of the animal[1]
14. Comments: this may include reference to any distinguishing characteristics of the specimen, habitat characteristics, or observations of wildlife or wildlife sign in vicinity of station.

[1] Descriptions adapted from: Nagorsen, D.W. 2002. An Identification Manual to the Small Mammals of British Columbia. Ministry of Sustainable Resource Management, Ministry of Water, Land and Parks, and Royal BC Museum, Victoria, BC.

Appendix I: Rare Plant Species Monitoring Procedures

Yukon
Environment

YUKON CONSERVATION DATA CENTRE
FIELD OBSERVATION FORM – PLANT

Yukon Conservation Data Centre

Scientific Name: _____

Common Name: _____

ID'd by: _____ ID verified by: _____

Specimen submitted here for verification ☐ Yes ☐ No

OBSERVER INFORMATION

Name(s): _____

_____

Email: _____

Phone/Fax: _____

Address: _____

_____

COLLECTOR INFORMATION

Specimen collected? ☐ Yes ☐ No

Duplicate collected? ☐ Yes ☐ No

Collection #: _____

Name of Herbarium where deposited:

_____

Photo taken? ☐ Yes ☐ No

LOCATION INFORMATION

Site Name: _____ NTS mapsheet # _____

General location description: _____

_____

_____

Location captured as a POINT

Latitude: _____

Longitude: _____

UTM Easting: _____ Northing: _____

UTM Zone: _____

Map Datum used: NAD27 / NAD83 / WGS84 / Other

(datum is found below contour interval scale on NTS mapsheets and/ or in the GPS's settings. WGS84 is recommended for GPS)

Elevation (include units): _____

Coordinate source:

☐ **GPS** accuracy: _____

☐ **NTS map** scale: _____

☐ **Google Earth**

☐ **Other** (describe): _____

_____

Elevation source:

☐ altimeter ☐ NTS map

☐ GPS ☐ Google Earth

Location captured as an AREA (Polygon) (submit digital file or hardcopy map, sketch, etc.)

Method of capture:

☐ **GPS trackfile accuracy:** _____ trackfile ID: _____

☐ **Paper map with sketch** (attach hard copy)

☐ **Other** (e.g. kml file, shapefile) (please describe)

_____

_____

Was the full extent of the population mapped? ☐ Yes ☐ No

Observation Information Please fill in the following descriptions to the best of your abilities. We recognize you may not be able to provide detailed information on all of the types of information listed.

Date of Observation (yyyy/mm/dd): _____

Search effort (approx. time at site): _____ (minutes, hours or days)

Description of What Was Observed: (include information on numbers observed, numbers estimated (and basis for estimate), population density, abundance, area of occupancy (and how measured), phenology at time of visit, etc.)

_____

_____

_____

_____

_____

Abundance

- ☐ **Abundant** – in all habitat where expected, often dominant
- ☐ **Common** – in all habitats where expected
- ☐ **Uncommon** – in many sites, but not all
- ☐ **Occasional** – scattered in low numbers, or in few sites
- ☐ **Rare** – only place seen, or in few sites in very few numbers

Population size estimate

- ☐ <50 (provide exact count: _____)
- ☐ 50-100 (attempt count: _____)
- ☐ 100-500
- ☐ 500-1000
- ☐ 1000-10,000
- ☐ >10,000

Site/Habitat Description: (include information on habitat (alpine, aquatic, cliff, forest, grassland, etc.), plant communities, dominant species, associated species, other rare species, substrate, soils, slope, aspect, moisture, canopy, etc.)

_____

_____

_____

Light:	**Position:**	**Moisture:**
open	crest	inundated
partial	upper slope	saturated (wet-mesic)
filtered	mid slope	moist (mesic)
shade	lower slope	dry-mesic
	bottom	dry (xeric)

_____

_____

_____

Potential Threats/Conservation Concerns: (include any observations on threats to the population or habitat, current land use, and likelihood of persistence)

_____

_____

_____

Please submit this form and any associated files (paper or digital) to:

Environment Yukon (V5A)
Yukon Conservation Data Centre
Box 2703, Whitehorse, YT Y1A 2C6

Email: yukoncdc@gov.yk.ca

Tel: (867) 667-3684
Fax: (867) 393-6405
Toll free: 1-800-661-0408 ext. 3684

List files included with your submission: (e.g. paper maps, digital photos, shapefiles, waypoints, trackfiles, etc.)

_____

_____

_____

_____

If submitting a specimen for verification, please check one of the following:

- ☐ Return specimen to sender after verification
- ☐ Deposit specimen at an appropriate repository

Thank you for your assistance in helping us track rare species in the Yukon!

Print Clear

Clubbed Bent Grass

WATCH LIST

Agrostis clavata

Grass Family (Poaceae)

Habitat: Disturbed ground on sandbars and gravelbars, and in wet meadows and coniferous forests

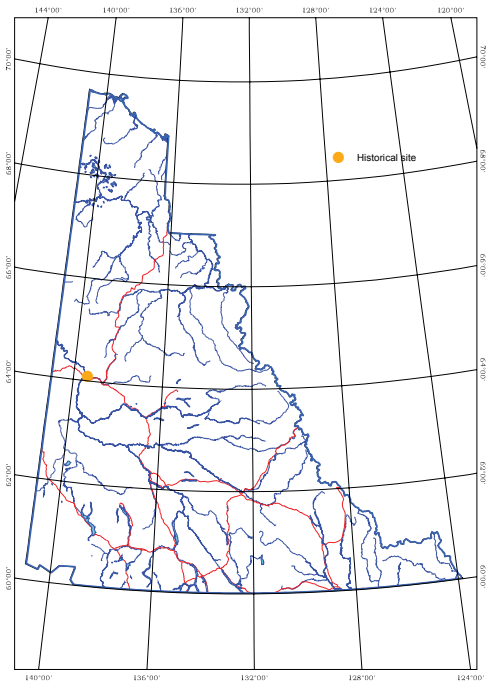
DISTRIBUTION
Yukon: Central Yukon; known only from the vicinity of Dawson City, Moosehide Mountain
North America: Alaska and Yukon
World: Amphi-Beringian

Conservation Rank:
Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Historical (NH)
Yukon rank: Historical (SH) last reported 1949

Distinguishing features: *Agrostis clavata* is most similar to *Agrostis scabra* by having flat wider leaves 1-5(7) mm vs narrow involute 1-2 mm; it has more nodes 3-6 vs 1-3.



Illustration Utah State Univeristy



For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Northern Water-plantain

Alisma triviale

Water-Plantain Family (Alismataceae)
Synonyms: *A. plantago-aquatica* var. *americanum*

Habitat: Shallow muddy ponds, stream margins, marshes, and ditches

DISTRIBUTION

Yukon: Extreme southeastern Yukon; known only from the La Biche River
North America: From Yukon to southern United States
World: North America

CONSERVATION RANK

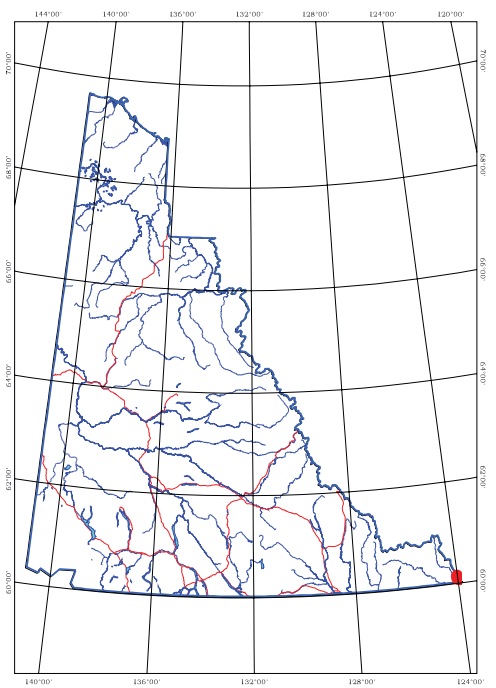
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Perennial aquatic herb with fibrous roots, grows to 1 metre tall. Flowers white, leaves egg-shaped with long stalks.



Alisma triviale

Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett



B. Bennett



T. Jung

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Pearly Everlasting

Anaphalis margaritacea

Composite Family (Asteraceae)
Synonyms: *Gnaphalium margaritaceum*

Habitat: Moist areas by hotsprings

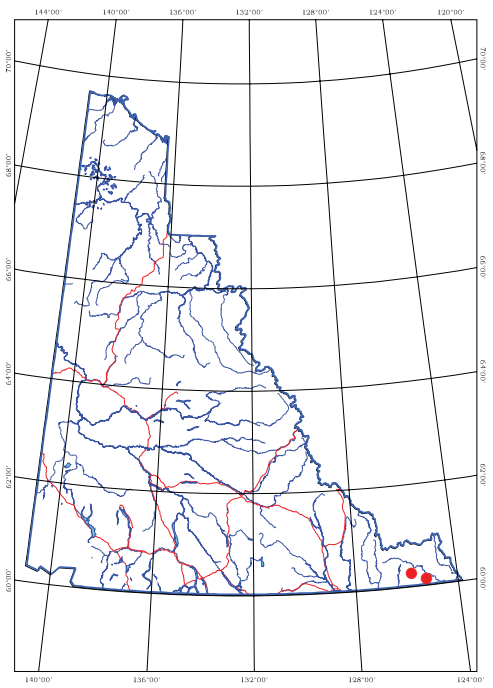
DISTRIBUTION
Yukon: Southeastern Yukon; known from Larsen Creek and Crow River hot springs
North America: From Yukon to southern United States
World: Circumtemperate

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Flowers lack petals (ray flowers), plants soft velvety, leaves entire (not notched or divided).



© NRC Research Press







R. Rosie



R. Rosie

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Northern Wild Comfrey

Andersonglossum boreale

Borage Family (**Boraginaceae**)
Synonyms: *Cynoglossum boreale*

Habitat: Mesic forest openings

DISTRIBUTION

Yukon: Southeastern Yukon; known only from a single site near the Coal River; reported but unconfirmed from sites south of Whitehorse and Teslin.
North America: From Yukon to Newfoundland and northeastern United States, widely extirpated eastwards
World: Boreal North America

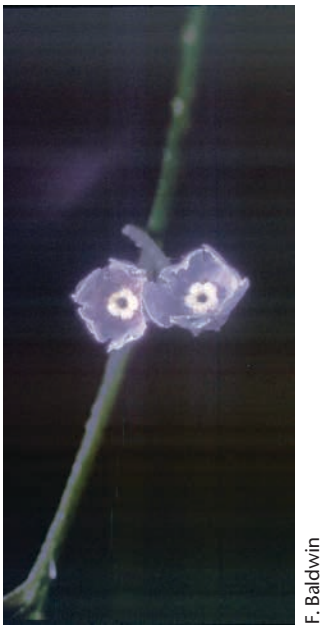
CONSERVATION RANK

Global rank: Apparently Secure to Secure (G5T4T5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1) Last reported in 1983

Distinguishing features: Coarse perennial herb; flowers blue to red purple; nutlets with numerous barbed prickles. Similar to Stickseed that is annual with a short taproot (see photo).



F. Baldwin

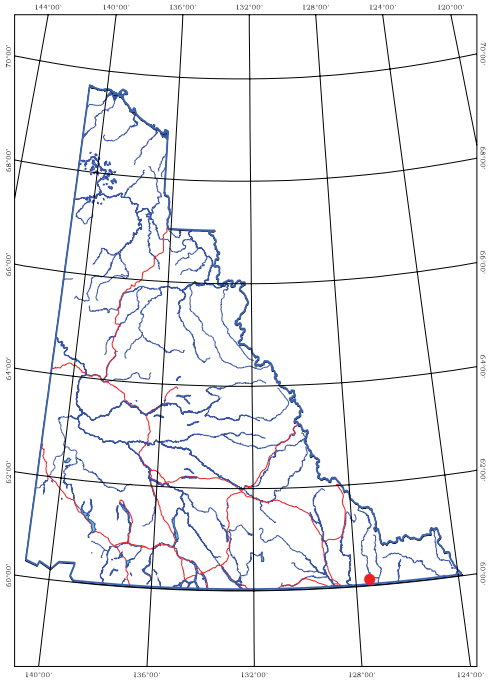


F. Baldwin



Cynoglossum boreale

Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett

Western Stickseed (*Lappula occidentalis*) *see distinguishing features

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Aleutian Cress

Aphragmus eschscholtzianus

Mustard Family (Brassicaceae)
Synonyms: *Braya eschscholtziana.*; *Eutrema eschscholtzianum*

Habitat: Alpine tundra, heath and solifluction areas by rivulets

DISTRIBUTION

Yukon: Southwestern Yukon south of 62°N
North America: Yukon, British Columbia and found further north in Alaska to 67°N
World: Amphiberingian

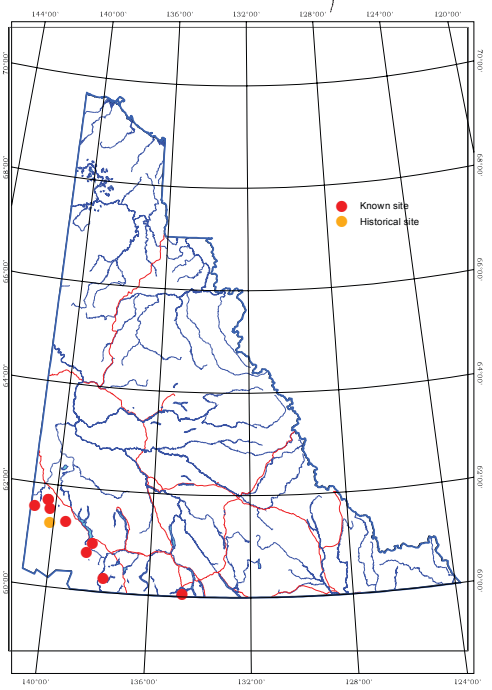
CONSERVATION RANK

Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: This species can be distinquished from all other species of mustard by being a plant with the combined characters: silique-bearing, stem leaves crowded below the inflorescence, and a short stature (usually <2cm). Most often confused with *Cardamine bellidifolia* which lacks the stem leaves.



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F. Baldwin

Aleutian Cress (*Aphragmus eschscholtzianus*)



B. Bennett – YG

Alpine Bittercress (*Cardamine bellidifolia*) *see distinguishing features



B. Bennett – YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Sand-dune Rockcress

Arabidopsis lyrata ssp. *petraea*

Mustard Family (Brassicaceae)

Synonyms: *Cardamine petraea; Arabis media*

Habitat: Arctic Ocean sand dunes, deltas and river banks

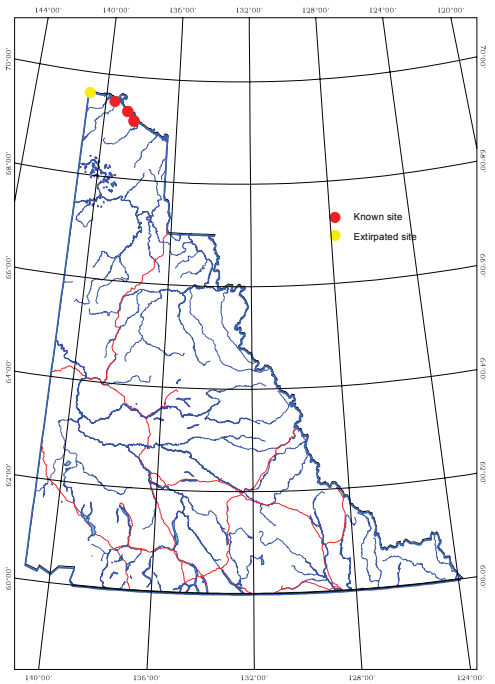
DISTRIBUTION
Yukon: North Coast
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Not Ranked (GNR)
Canadian rank: Critically Imperilled to Imperilled (N1N2)
Yukon rank: Critically Imperilled to Imperilled (S1S2)
Species at Risk Act status: Candidate

Distinguishing features: This is the only *Arabis* or *Arabidopsis* on the North Coast.



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B. Bennett



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Saltwater Cress

Arabidopsis salsuginea

Mustard Family (Brassicaceae)
Synonyms: Thellungiella salsuginea, *Eutrema salsugineum*

Habitat: Alkaline flats and at the edges of saline pools

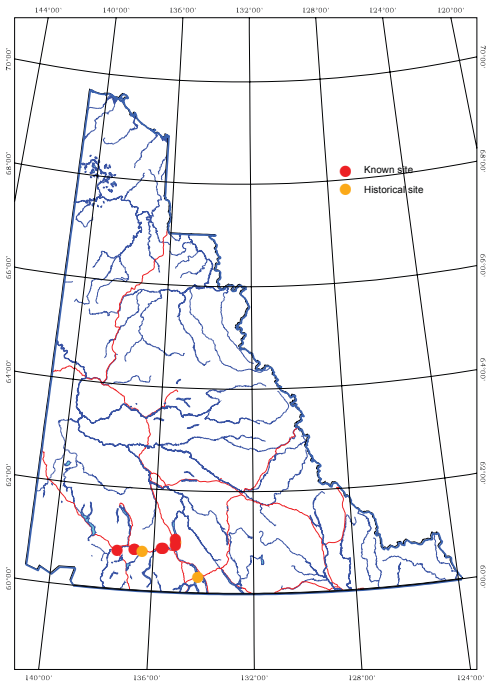
DISTRIBUTION
Yukon: South-central Yukon south of 61°N
North America: Yukon to Saskatchewan
World: North America

CONSERVATION RANK
Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Can be separated from other mustards by the following combination of features: annual, fruit long (1-1.5 cm) and thin, flowers white, stem leaves clasping, plants hairless.



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F. Baldwin



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Arctic Thrift or Sea-Pink

Armeria maritima ssp. *sibirica*

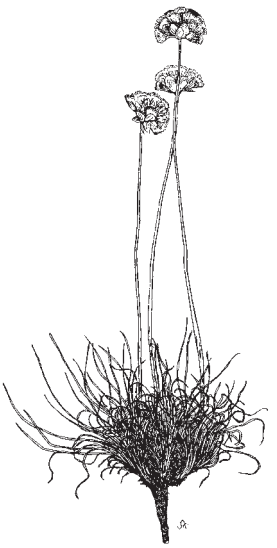
Leadwort Family (Plumbaginaceae)
Synonyms: *A. maritima* ssp. *arctica*

Habitat: Coastal sand dunes and wet areas on tundra

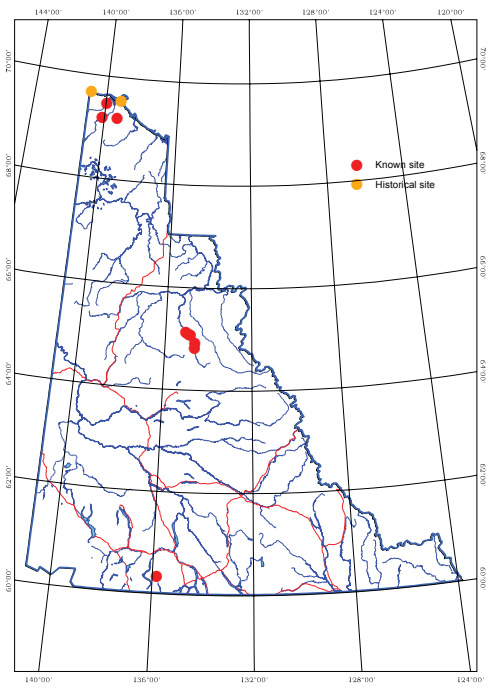
DISTRIBUTION
Yukon: Northern Yukon, on the northwest coast and the Wind River with a disjunct site at Rose Lake in S YT.
North America: From Yukon to Newfoundland, northwestern United States
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5T5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Vulnerable (S3)

Distinquishing features: Arctic Thrift resembles Wild Onion (see photo), but has no onion-like fragrance.



© NRC Research Press





B. Bennett

Arctic Thrift *(Armeria maritima)*



B. Bennett

Wild Onion ***(Allium schoenoprasum)*** ****see distinguishing features***



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Parry's Arnica or Nodding Leopardbane

Arnica parryi

Composite Family (Asteraceae)
Synonyms: *A. parryi* ssp. *parryi; A. parryi* ssp. *genuina*

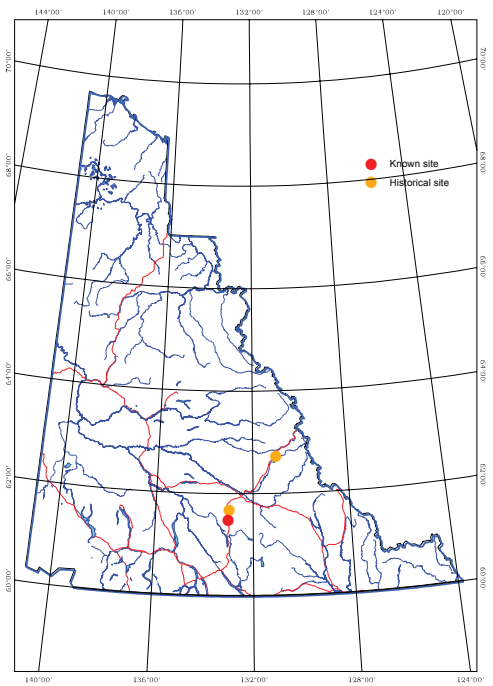
Habitat: Alpine meadows, steep ravines, and ledges

DISTRIBUTION
Yukon: South-central Yukon; known only from Mount Sheldon and Lapie and Rose river pass
North America: From Yukon to California and Colorado
World: Cordilleran

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)
Distinguishing features: This is the only *Arnica* lacking petals (ligulate flowers).



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B. Bennett



F. Baldwin



For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Purple Wormwood

Artemisia globularia

Composite Family (Asteraceae)

Habitat: Dry rocky rubble on steep alpine slopes, often along ridges.

DISTRIBUTION

Yukon: Extreme northern Yukon and a single disjunct collection from the Nutzotin Mountains otherwise known only from Ivvavik National Park
North America: Yukon and Alaska
World: Amphiberingian

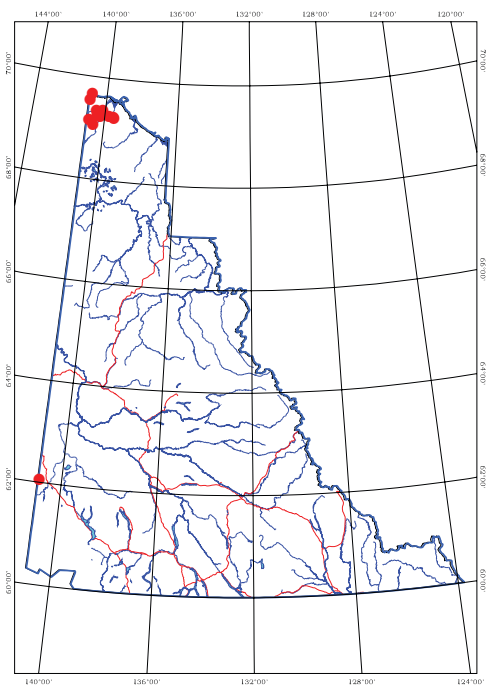
CONSERVATION RANK

Global rank: Apparently Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: This is the only *Artemisia* with flowers that are purplish and hairless.



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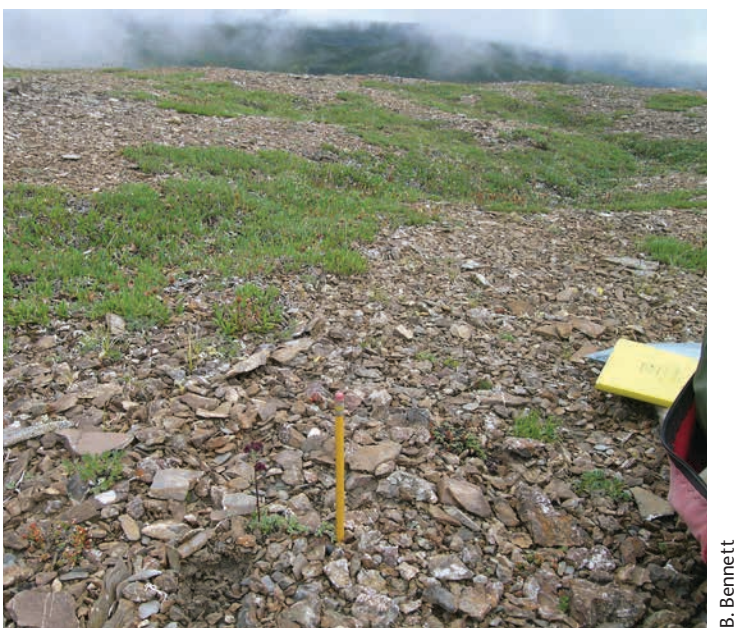




S. Wolfe



S. Wolfe



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Siberian Wormwood

Artemisia laciniata

Composite Family (Asteraceae)
Synonyms: *A. laciniatiformis; A. macrobotrys, A. tanacetifolia*

Habitat: Grassy flats, riverbanks, and open wooded slopes with *Calamagrostis purpurascens, Artemisia frigida,* and *Populus tremuloides*

DISTRIBUTION

Yukon: Central Yukon; known only from the Yukon River from Braeburn to Ballarat Creek where locally common
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK

Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: Blades of leaves 2-3 times pinnately divided; leaves glandular dotted; leaf segments spreading; those of the lower leaves blunt or rounded. Vegetative plants may be confused with *Tanacetum bipinnatum* but tip of leaves of *Tanacetum* are pointed, and it is only found along rivers. Sometimes confused with *Artemisia novegica* which has larger flowers and longer peduncles (flower stalk) up to 5 cm vs <1 cm.



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B. Bennett

Lake Huron Tansy (*Tanacetum huronensis*)

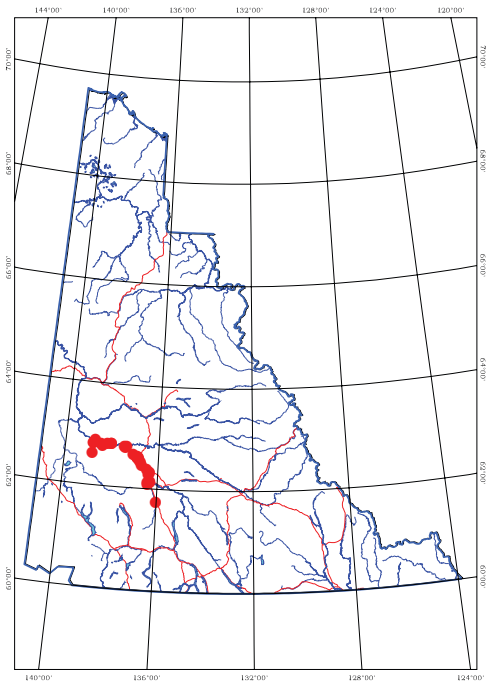


B. Bennett

Siberian Wormwood, note the rounded tips of the leaves.



B. Bennett



For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Michaux Wormwood

WATCH LIST

Artemisia michauxiana

Composite Family (Asteraceae)

Habitat: Open, rocky slopes

DISTRIBUTION
Yukon: Southern Yukon
North America: From Yukon Southern Lakes to western United States
World: Cordilleran

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Leaves mainly along the stem, which are compound and composed of several lobes (bipinnatifid) and ultimate segments toothed.



J. Pojar



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F. Baldwin





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Rock Wormwood

Artemisia woodii

Composite Family (**Asteraceae**)
Synonyms: *A. rupestris ssp. woodii*

Habitat: Dry calcareous loess, open montane to alpine slopes

DISTRIBUTION
Yukon: Southwestern Yukon north to about 62°N
World: Endemic to Yukon

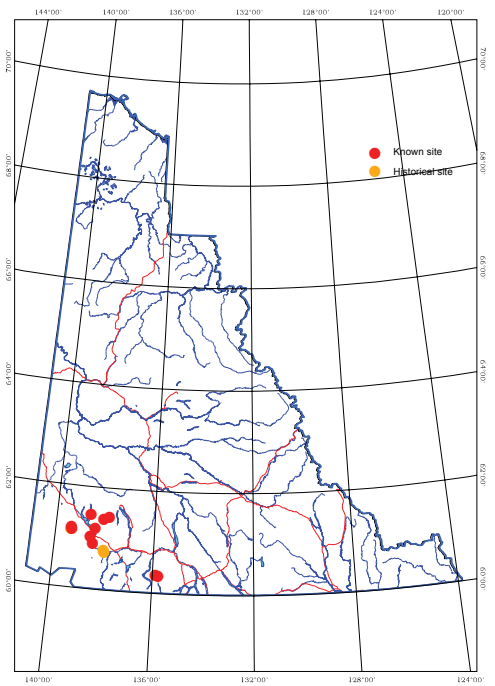
CONSERVATION RANK
Global rank: Imperilled to Vulnerable (G2G3)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Not At Risk (1997)

Distinguishing features: Stems form a woody base of low growing mats, basal leaves mostly linear, plant sticky and glandular, particularly the flowers.



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Illustration L. Mennell - YG





B. Bennett



J.M. Line - YG



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Green Spleenwort

Asplenium viride

Spleenwort Family (Aspleniaceae)
Synonyms: *A. trichomanes-ramosum*

Habitat: Talus slopes and limestone crevices

DISTRIBUTION

Yukon: Northwestern Yukon; known only from the Ogilvie Mountains
North America: From Yukon to Newfoundland, northern United States
World: Circumtemperate

CONSERVATION RANK

Global rank: Apparently Secure (G4)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1) last reported in 1984

Distinguishing features: Sori covered by elongate indusia attached along one edge, flap-like, veins not reaching the margin (see below).

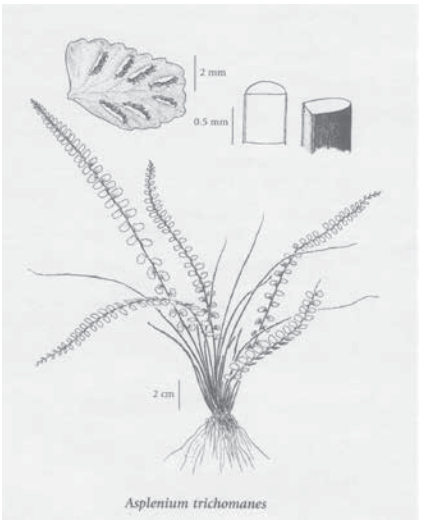
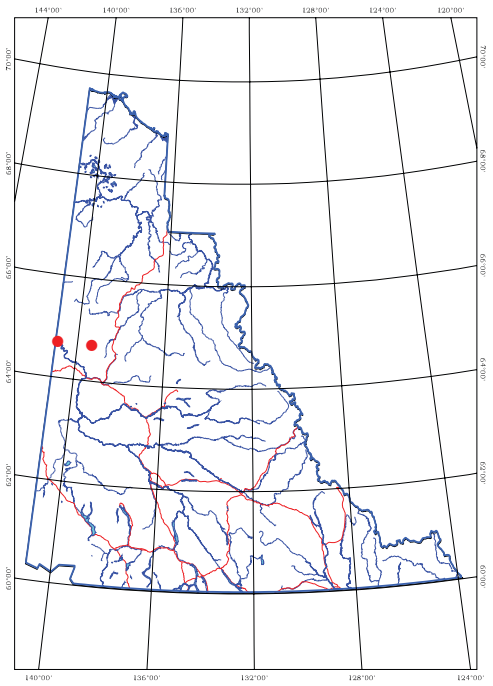


Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett

Green Spleenwort (*Asplenium trichomanes-ramosum*)

Common ferns for comparison



J. Line

Rusty Cliff Fern (*Woodsia ilvensis*)



B. Bennett

Fragile Fern (*Cystopteris fragilis*)

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

American Alpine Lady Fern

Athyrium alpestre ssp. *americanum*

Wood Fern Family (Dryopteridaceae)
Synonyms: *A. americanum*; *A. distentifolium* ssp. *americanum*; *A. alpestre* ssp. *americanum*; *A. distentifolium* auct. non; *A. distentifolium* var. *americanum*

Habitat: Moist, open rocky subalpine slopes and alpine meadows

DISTRIBUTION

Yukon: East-central Yukon; known only from near the Northwest Territories border at about 63°N
North America: From Yukon to Newfoundland, southwestern United States
World: North America

CONSERVATION RANK

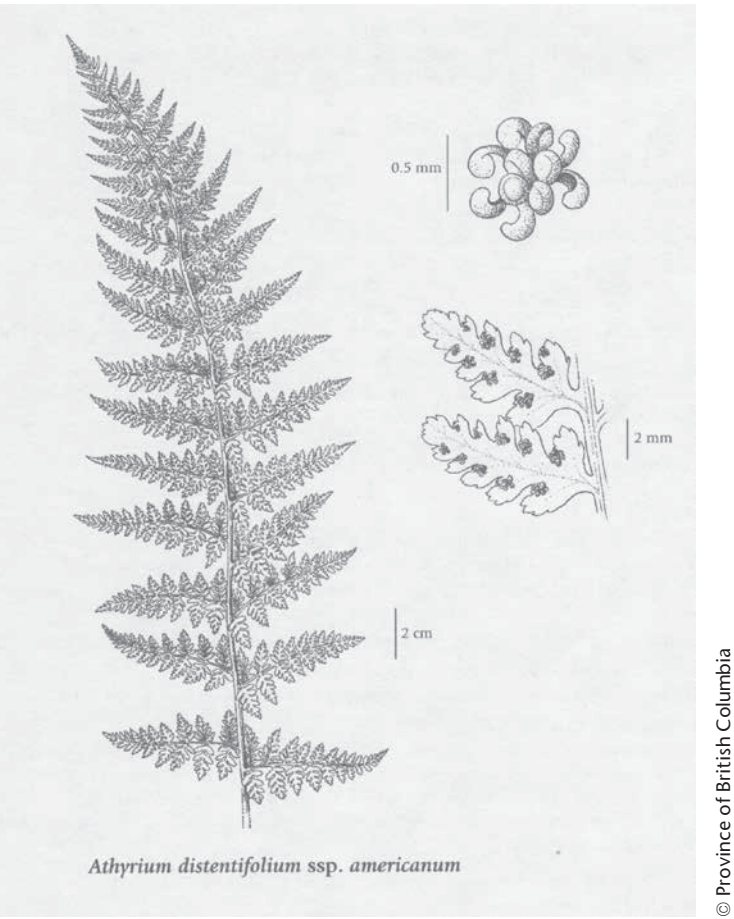
Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Vulnerable to Apparently Secure (N3N4)
Yukon rank: Historical (SH) (last reported in 1960)

Distinguishing features: Sori round, submarginal; indusia much reduced or usually absent. This species is smaller than the Lady Fern (<80 cm) and has a crinkled appearance as though scorched by a flame. Lady Fern has horseshoe-shaped indusia.



J. Riley

American Alpine Lady Fern (*Athyrium alpestre*)



© Province of British Columbia



For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Saline Saltbush

Atriplex dioica

Goosefoot Family (**Chenopodiaceae**)

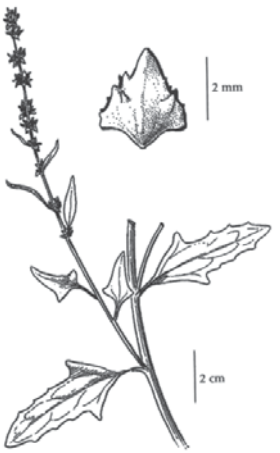
Synonyms: *Atriplex subspicata*; *A. patula* var. *subspicata*

Habitat: Alkaline flats and meadows

DISTRIBUTION
Yukon: South-central Yukon
North America: From British Columbia to Newfoundland, southern United States. Yukon population disjunct by 700 km.
World: North America

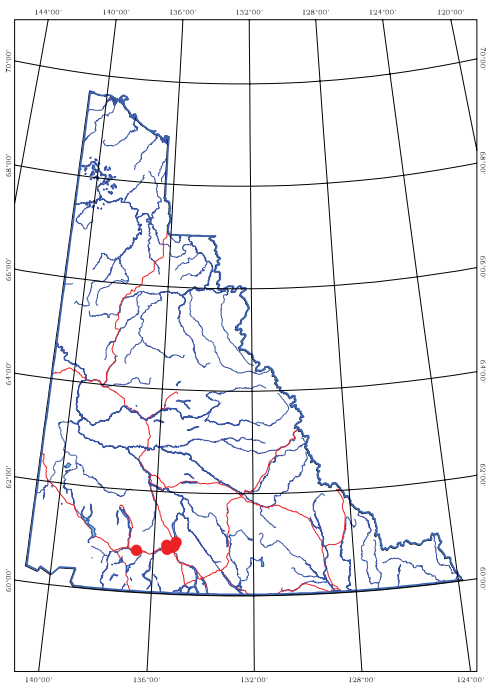
CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Leaves fleshy, fruits triangular, 2 stigmas, male and female flowers separate but on the same plant.



Atriplex subspicata

Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett



P. Long



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Hooker's Oatgrass

Avenula hookeri

Grass Family (Poaceae)
Synonyms: *Avenochloa hookeri*, *Helictotrichon hookeri*

Habitat: Low elevation mesic to dry, open prairie slopes, hillsides, and meadows

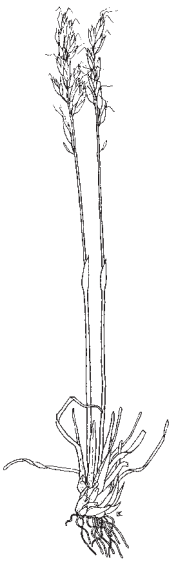
DISTRIBUTION

Yukon: Southcentral and southwest
North America: Endemic from Yukon south east of the Rocky Mountains to New Mexico and eastwards to Manitoba and Wisconsin

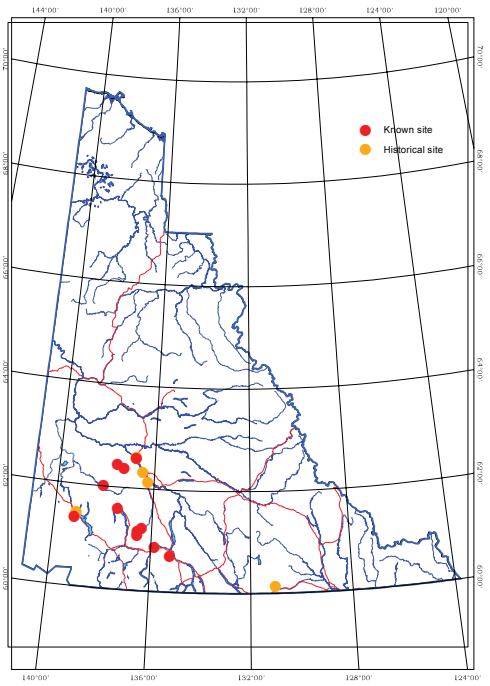
CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Tufted perennial grass less than 40 cm tall with an erect narrow head. Spikelets 3-6 flowered with a long bent awn arising from the back of the glume.



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For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Red Bulrush, Swaying Rush

Blysmopsis rufa

Sedge Family (Cyperaceae)
Synonyms: Blysmus rufus; *Scirpus rufus*

Habitat: Saline flats and meadows

DISTRIBUTION
Yukon: South-central Yukon; known only from the Fox Lake area
North America: Northern North America
World: Circumboreal

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Blymopsis rufa* is separated from *Carex* sp. by having perfect (both male and female flower parts) flowers with several spikelets in a flattened 2-ranked terminal spike. Perianth bristles are lacking.



YG photo

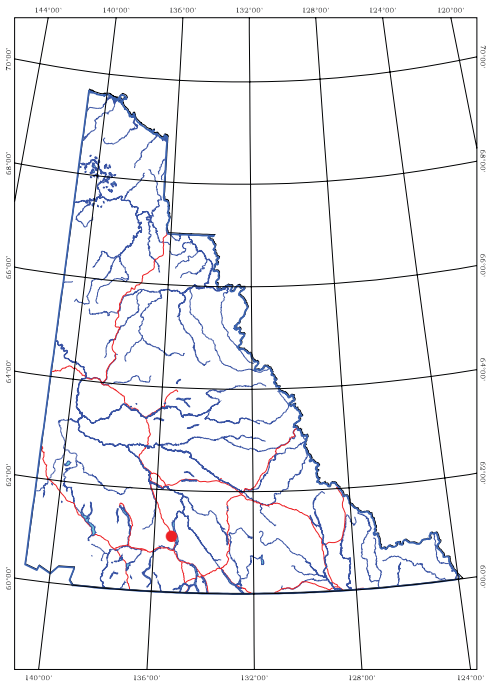




Illustration L. Mennell - YG

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Soldier Rockcress

Boechera drepanoloba

Mustard Family (Brassicaceae)

Synonyms: *Arabis drepanoloba*; *Arabis lemmonii* var. *drepanoloba*
Habitat: Rocky slopes and talus in alpine and subalpine environments.

DISTRIBUTION
Yukon: Southwestern Yukon, known only from near Carcross and Kluane National Park
North America: Cordilleran Alaska S through BC, AB to CO and AZ
World: Western North America

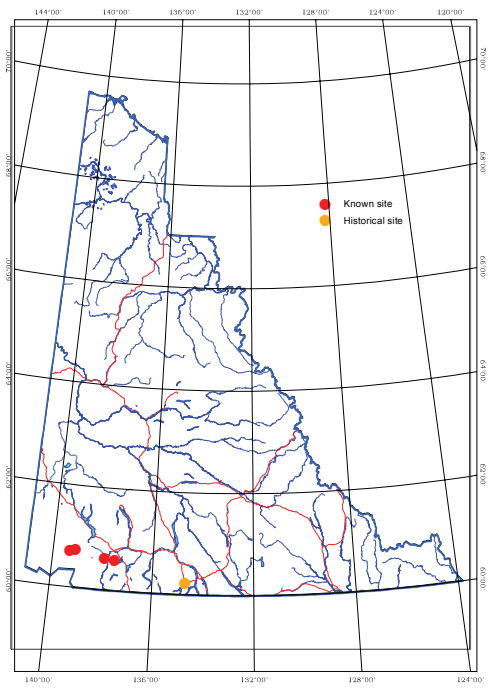
CONSERVATION RANK
Gobal rank: Apparently Secure (G4?)
Canadian rank: Not Ranked (NNR)
Yukon rank: Imperilled (S2)

Distinquishing features: Stems hairless or with very few hairs. *Boechera drepanoloba* differs from *B. lemmonii* by having pick-shaped (submalpighiaceous) hairs along the
margins of basal leaves, wider (2.5–3.5 vs. 1.6–2.3 mm) fruits, strongly auriculate (vs. minutely auriculate) cauline leaves, and a greater number of ovules per ovary (44–104 vs. 26–44).

Boechera drepanoloba is easily distinguished from *B. stricta* by its fruits spreading from one side of the stem and more highly branched (3- to 6-rayed vs. strictly 2-rayed) hairs on the basal leaves.



Agri-food and Agriculture Canada (DAO)



For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alaska Moonwort

Botrychium alaskense

Adder's Tongue Family (Ophioglossaceae)

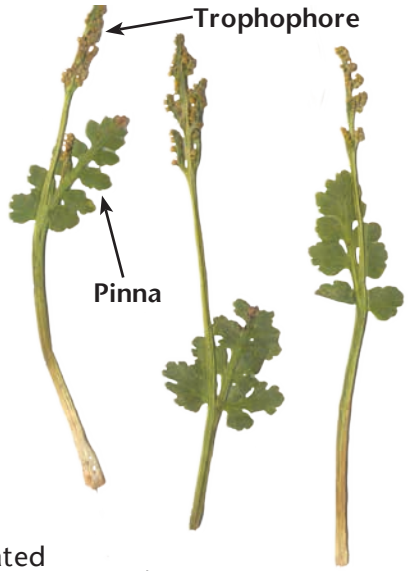
Habitat: Gravel

DISTRIBUTION
Yukon: Central and southwestern Yukon
North America: BC, Yukon and Alaska
World: Western North America

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: This species can be separated from similar pinnate-pinnatifid species as follows (from Farrar, 2006*)

1a. Upper pinna bases rounded (angle > 90°) pinna tips rounded; sporophore stalk equal to trophophore length; sporophore pinnately branched.....*B. pinnatum*
1b. Upper pinna bases pointed (angle < 90°); pinna apices angular; sporophore stalk shorter than trophophore length; sporophore divided into three main branches .....
.....go to 2
2a. Trophophore outline triangular (equilateral) with basal
pinnae nearly as large as the central rachis and pinnae;
pinna pairs 3-4; pinnae narrowly ovate to oblong.....*B. lanceolatum*
2b. Trophophore outline narrowly triangular to broadly
ovate; basal pinnae not disproportionately enlarged; pinna pairs 5-6; pinnae ovate to elliptic.....*B. alaskens*



Northwestern Moonwort (*Botrychium pinnatum*).

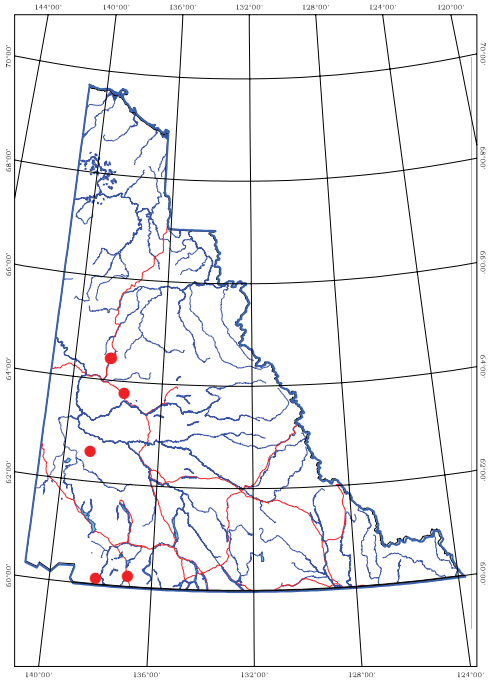


G. Brunner

Alaska Moonwort (*Botrychium alaskense*)



Triangle Moonwort (*Botrychium lanceolatum*)





G. Brunner

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Narrow-leaved Moonwort

Botrychium lineare

Adder's Tongue Family (Ophioglossaceae)

Habitat: Dry gravel benches

DISTRIBUTION
Yukon: Southwestern Yukon; known only from Kluane Lake and near Minto
North America: Scattered throughout unglaciated areas in Alaska, Yukon, Quebec and the southern United States
World: North America

CONSERVATION RANK
Global rank: Imperilled to Vulnerable (G2G3)
Canadian rank: Imperilled (N2)
Yukon rank: Critically Imperilled (S1)
Species at Risk Act status: Candidate

Distinguishing features: *Botrychium lineare* has the narrowest pinna (leaf-like structure) span of all moonworts, only broadening where they divide. At maturity, its sporophore (fruiting) stalk is twice the length of the trophophore (leaf-like segment).



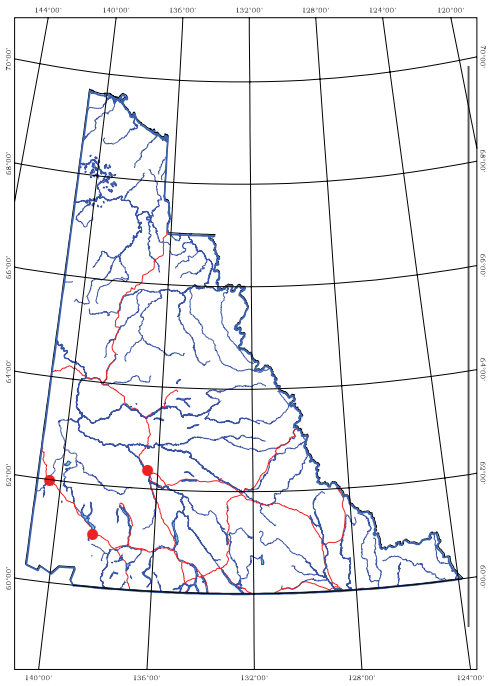
B. Bennett



B. Bennett



B. Bennett



For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Leathery Grapefern

Botrychium multifidum

Adder's Tongue Family (Ophioglossaceae)
Synonyms: *Osmunda multifida*

Habitat: Gravel roadbeds

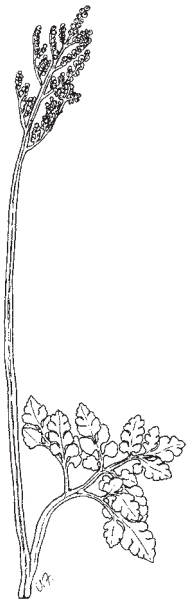
DISTRIBUTION
Yukon: West-central Yukon; known only from southeast of Dawson and the Top of the **World** Highway
North America: From Yukon to Newfoundland, southwestern and northeastern United States
World: Circumboreal

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Sterile blade deltoid, tripinnate, attached near the base of the stem.



YG photo



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G. Brunner





G. Brunner

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Yukon Conservation Data Centre

Rattlesnake Fern

Botrypus virginianus

Adder's Tongue Family (Ophioglossaceae)
Synonyms: *Osmunda virginiana, Botrychium virginianum*

Habitat: Rich meadows associated with hot springs.

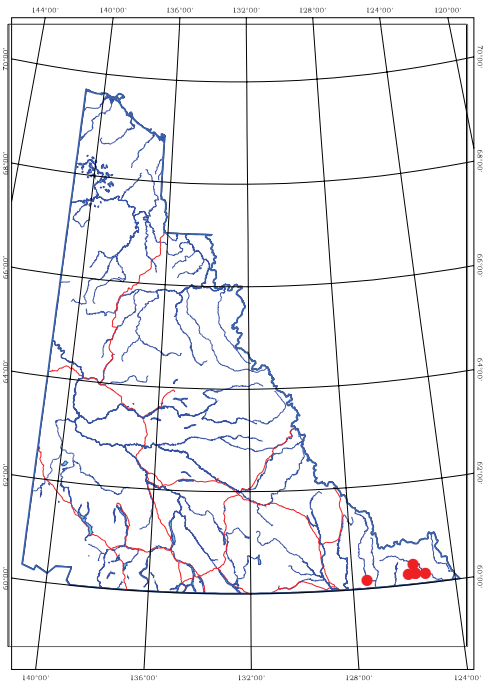
DISTRIBUTION
Yukon: Southeast Yukon; known only from Coal River, Beaver River, Larsen Creek, and Crow River springs.
North America: Throughout except Nunavut and California
World: Central and South America, Eurasia

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Leaf blades D-shaped 5-25 cm. Photosynthetic leaf blade thin, herbaceous, unstalked.



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yellow Sedge

Carex flava

Sedge Family (Cyperaceae)

Habitat: Moist lakeshores, wet meadow or bogs near edges of lakes and streams. Gravelly/sandy beaches

DISTRIBUTION
Yukon: Southeast Yukon; known only from Coal River and MacPherson Lake
North America: Canada, northern United States
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: One terminal sessile staminate spike, and cluster of subglobose pistillate spikes, with a leaflike bract just below the inflorescence. It is separated from *C. viridula* by having deflexed perigynia (5-6mm), beak approximately as long as body of perigynia. Carex viridula has shorter perigynia (2-3 mm) without a pronounced beak.



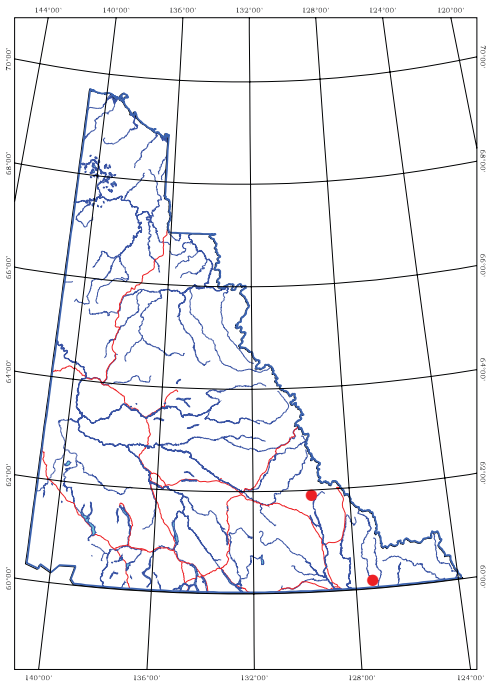
B. Bennett



Illustration by J.R. Janish Courtesy of University of Washington Press



A. Ceska





YG photo

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Hudson Bay Sedge

Carex heleonastes

Sedge Family (Cyperaceae)
Synonyms: *Carex neurochlaena*

Habitat: Peat bogs, sometimes along streams

DISTRIBUTION

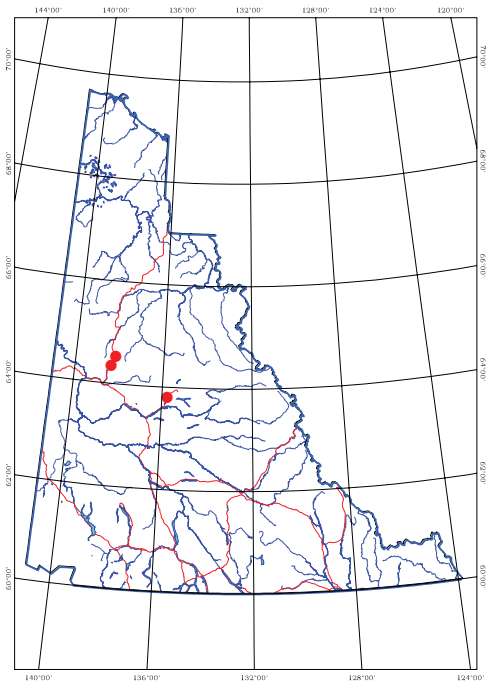
Yukon: Central Yukon; known only from the southern Dempster Highway, vicinity of Mayo, and Rink Rapid on the Yukon River
North America: Alaska and boreal Canada east to Quebec
World: Circumboreal

CONSERVATION RANK

Global rank: Probably Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: All spikes bisexual with female flowers on top. Resembling *C. glareosa* but stems stiff and scabrous. Spikes 3-4(6).





For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Arctic Marsh Sedge

Carex holostoma

Sedge Family (Cyperaceae)

Habitat: Turfy tundra at edges of ponds, a prounced acidophyte



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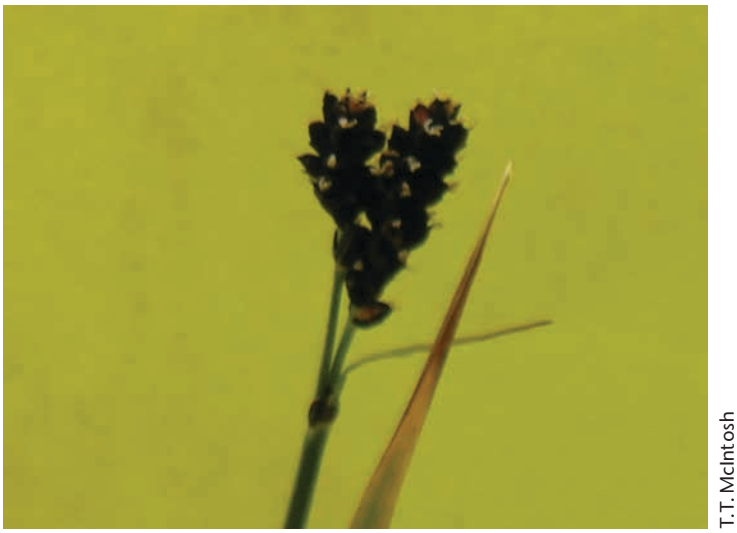
DISTRIBUTION

Yukon: Known only from the Dempster Highway and North Slope.
North America: Low arctic Alaska to Greenland.
World: Amphi-Beringian

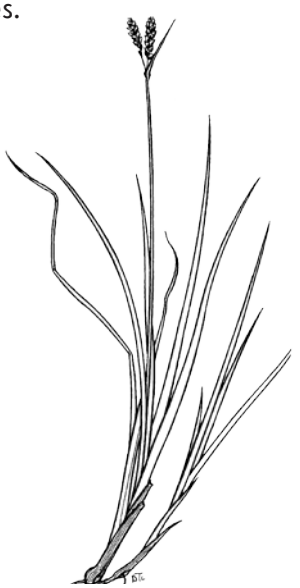
CONSERVATION RANK

Global rank: Probably Secure (G4)
Canadian rank: Probably Secure (N4)
Yukon rank: Imperilled (S2)

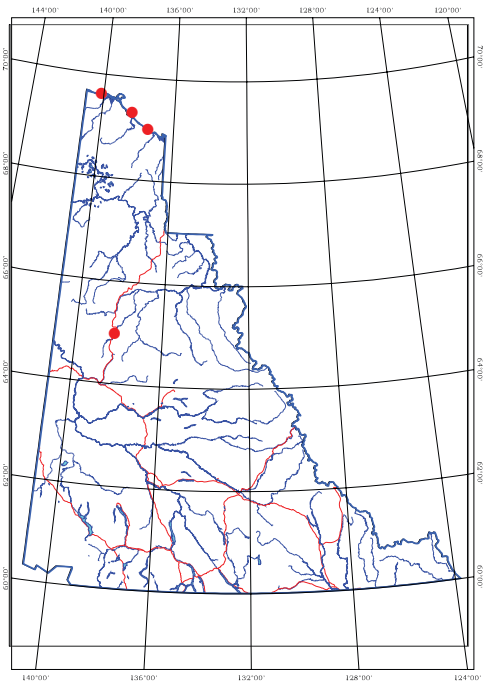
Distinguishing features: Inflorescence compact; all spikes of equal length. Staminate spikelet hidden amongst female spikelets. Loosely tufted or long rhizomes.

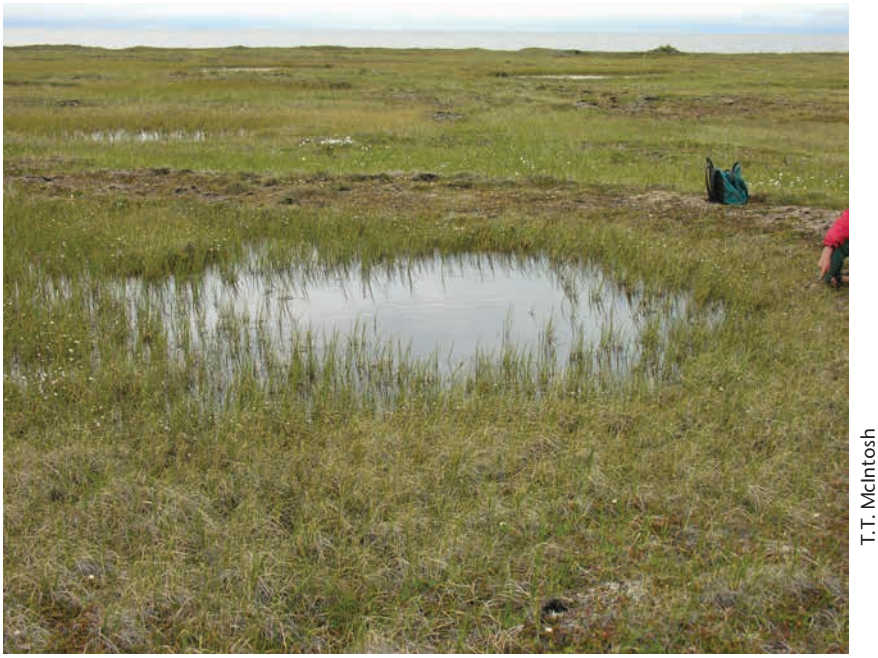


T.T. McIntosh



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T.T. McIntosh

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Yukon Conservation Data Centre

Inland Sedge

Carex interior

Sedge Family (Cyperaceae)
Habitat: Calcareous seeps and springs. Woodland wetlands.

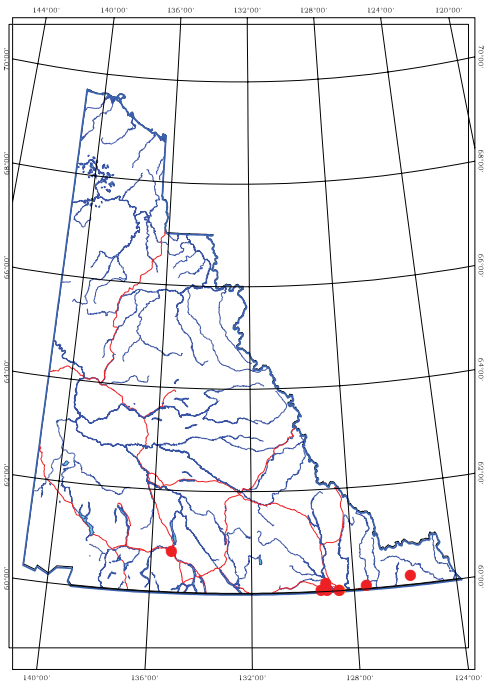
DISTRIBUTION:
Yukon: east of Whitehorse.
North America: Boreal Alaska to Newfoundland south to N Mexico.
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
National rank: Secure (N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Densely tufted from fibrous roots. Flowering stem longer than the narrow 1-2.4 mm wide leaves. Spikelets 2-5, female flowers above the male on the terminal spike; lateral spikes female usually with some males at the base. Perigynia 2-3.2 mm long 4-12 veined unwinged, without whitish dots.



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Yukon Conservation Data Centre

Weak Sedge

Carex laxa

Sedge Family (Cyperaceae)

Habitat: Wet tundra bogs, graminoid meadows and woodland marshes; edges of ponds

DISTRIBUTION
Yukon: Central Yukon; known only from wetlands near Mount Haldane and Beaver Creek
North America: Alaska, Yukon and Northwest Territories.
World: Amphi-Beringian

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Imperilled (N2).
Yukon rank: Critically Imperilled to Vulnerable (S1S3)

Distinguishing features: *Carex laxa* is separated from *C. limosa* by its sheathing inflorescence bracts, rhizomatous (not stoloniferous) habit, and lack of dense root hairs. It may be separated from *C. capillaris* by having a creeping rhizome vs forming (cespitose) clumps.

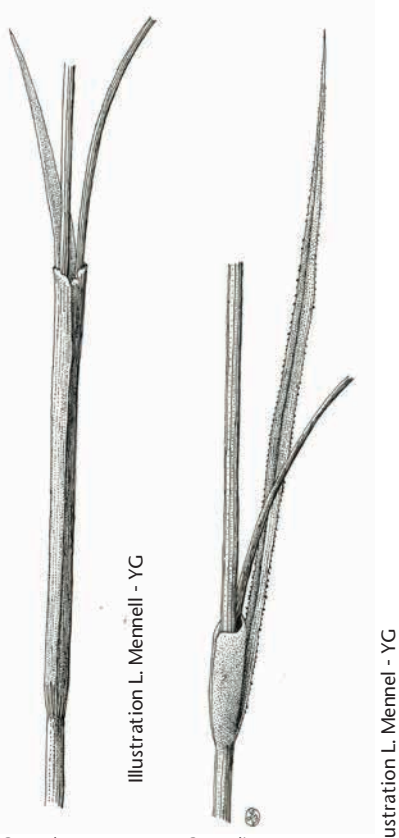


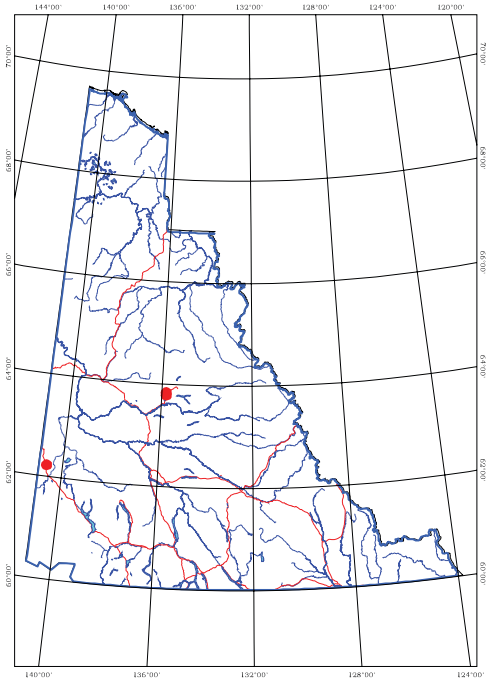
Illustration L. Mennell - YG

Carex laxa *Carex limosa*

Illustration L. Mennel - YG



YG photo





L. Schroeder

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Few-seeded Sedge

Carex oligosperma

Sedge Family (Cyperaceae)

Habitat: Bogs, sphagnum-dominated areas, open swamps, marshes, lakeshores, and riverbanks

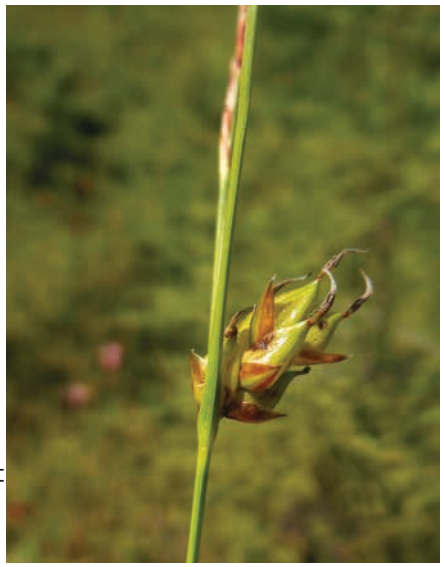
DISTRIBUTION
Yukon: Central Yukon; known only from near Ethel Lake
North America: Canada, eastern United States
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Historical (SH) (last reported in 1970)

Distinguishing features: *Carex oligosperma* is separated from *C. rostrata* by its shorter, more egg-shaped female spikes and its dark green filiform (narrow) leaves with margins ≤ 2.5 mm wide.



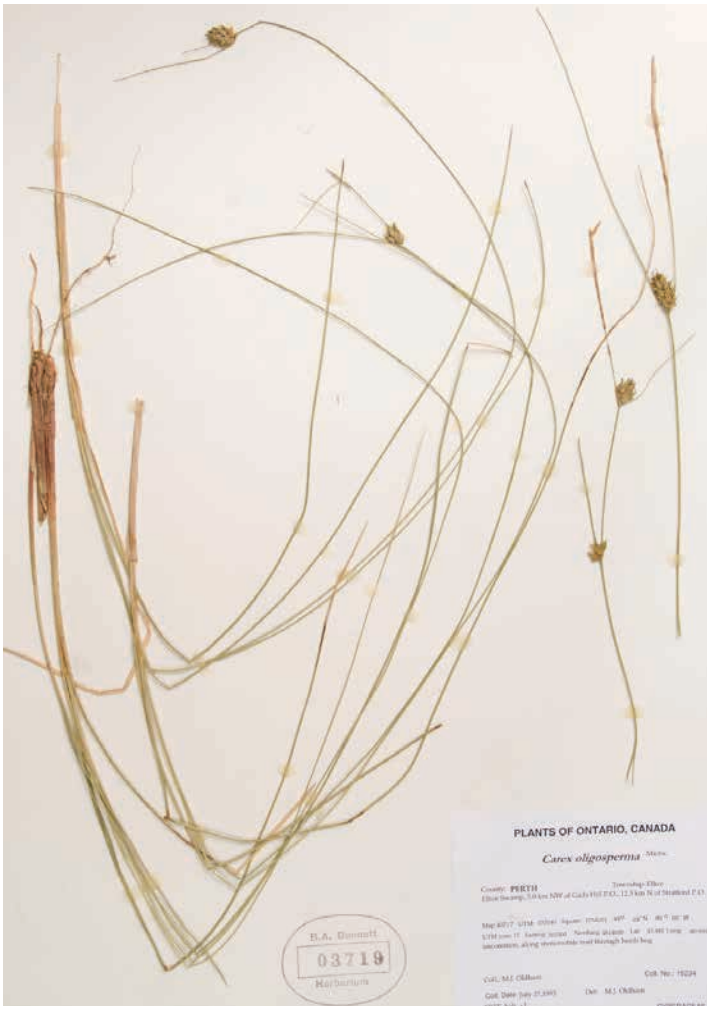
immature fruit



Russ Schipper

mature fruit

Russ Schipper







Carex oligosperma

Illustration L. Mennell - YG

Carex sychnocephala

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Prairie Sedge

Carex prairea

Sedge Family (Cyperaceae)

Habitat: Calcareous marshes. Not found in areas with saline groundwater or oligotrophic (acidic) muskeg.

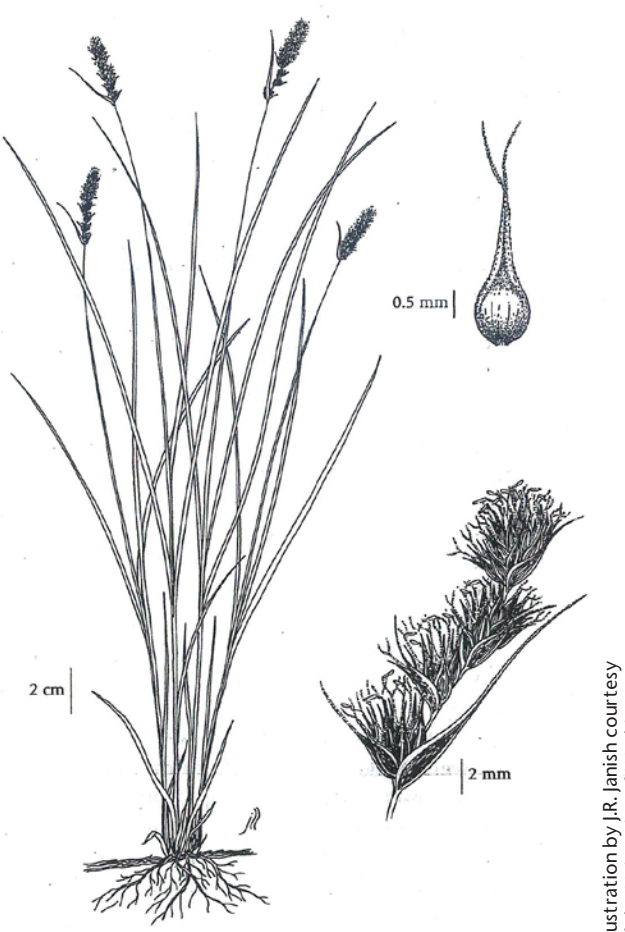
DISTRIBUTION

Yukon: Southeast Yukon; known only from 10 km southeast of Watson Lake near the Liard River.
North America: Canada, northern United States.
World: North America

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Historical (SH) (Last reported in 1943)

Distinguishing features: *Carex prairea* is separated from *C. diandra* as *Carex prairea* spikes are interrupted (not continuous), and by having a leaf sheath strongly copper coloured instead of whitish.



Carex prairea

Illustration by J.R. Janish courtesy of the University of Washington Press





J. Fenneman

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Baikal Sedge

Carex sabulosa

Sedge Family (**Cyperaceae**)
Synonyms: *C. sabulosa* ssp. *leiophylla*; *C. leiophylla*

Habitat: Sand dunes, river deltas, and creek banks

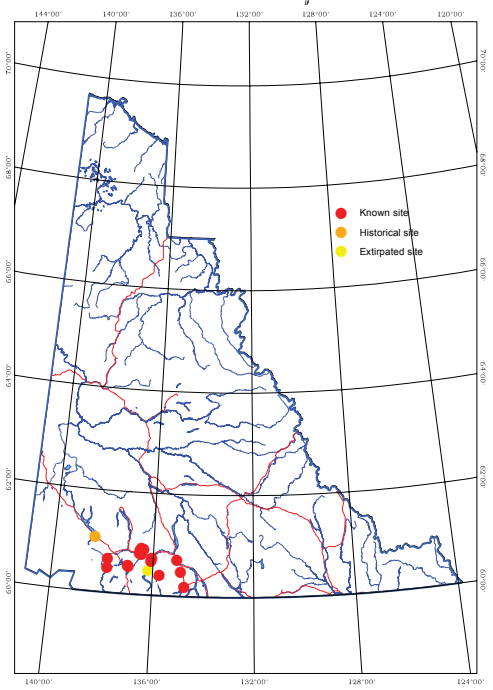
DISTRIBUTION
Yukon: South-central and southwestern Yukon
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)
***Species at Risk Act* status: Threatened**

Distinguishing features: This is a **distinctive** species of dunes and sandy soils. Sheath is purplish, leaves are curly, and head is nodding and dragging on the ground at maturity, and the terminal spike is usually gynaecandrous (female flowers above the male). Occasionally it is confused with *C. maritima* which has straight leaves and an androgynous terminal spike.



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J. Meikle



J. Meikle

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Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

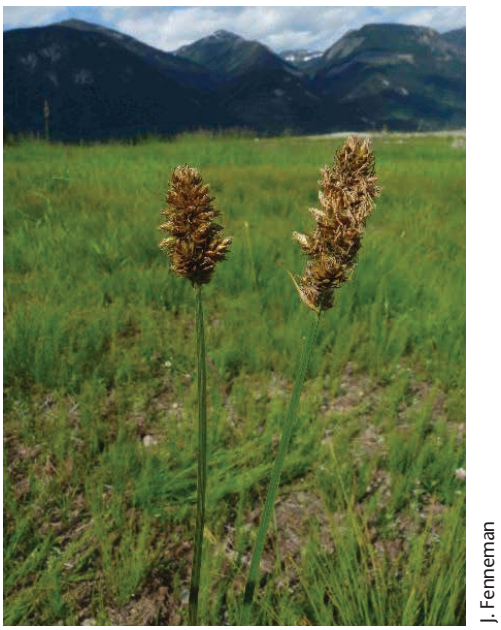
Yukon Conservation Data Centre

Sartwell's Sedge

Carex sartwellii

Sedge Family (Cyperaceae)

Habitat: Seasonally wet, alkaline, grassy openings on dwarf birch/willow flats



J. Fenneman

DISTRIBUTION

Yukon: South-central Yukon; known only from just north and west of Whitehorse
North America: North America, except southern States.
World: North America

CONSERVATION RANK

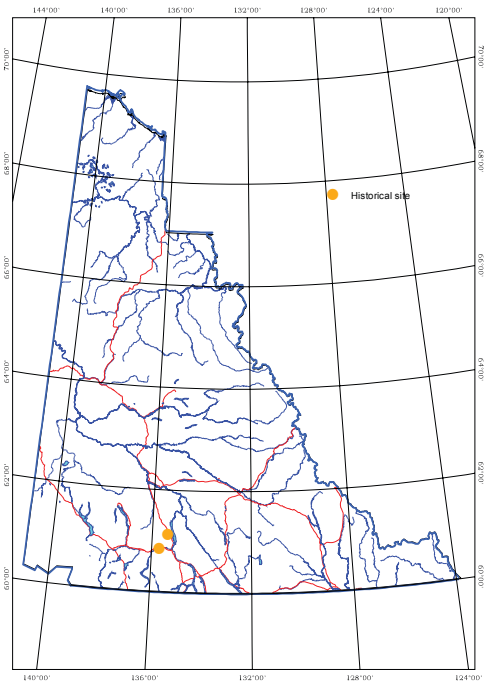
Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Historical (SH) (last reported 1968)

Distinguishing features: *Carex sartwellii* is separated from *C. praegracilis* by having its upper sheaths green-lined below, with veins that extend just below the sheath, long ligule (2.2-8 mm) and perigynia veined on both surfaces vs a smooth, unveined sheath, short ligule (0.6-2.6 mm) and perigynia veined only on upper surface.



Illustration by J.R. Janish courtesy of the University of Washington Press







YG photo

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Many-headed Sedge

Carex sychnocephala

Sedge Family (Cyperaceae)

Habitat: Wet areas, at least seasonally, open, sandy, silty or peaty shores, banks, on limestone.

DISTRIBUTION

Yukon: Southern Yukon from Kluane to Watson Lake and north to Mayo.
North America: Boreal areas from Alaska to Quebec and south to Colorado and Wisconsin.

CONSERVATION RANK

Global rank: Apparently Secure (G4)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled (S2)

Distinguishing features: The bracts at the base of the spikes are long and leaflike, much longer than the inflorescence, giving the sedge a distinctive appearance. It often lacks conspicuous rhizomes and has a small diffuse root system. It may appear to be annual.



Illustration L. Mennell - YG

Carex oligosperma

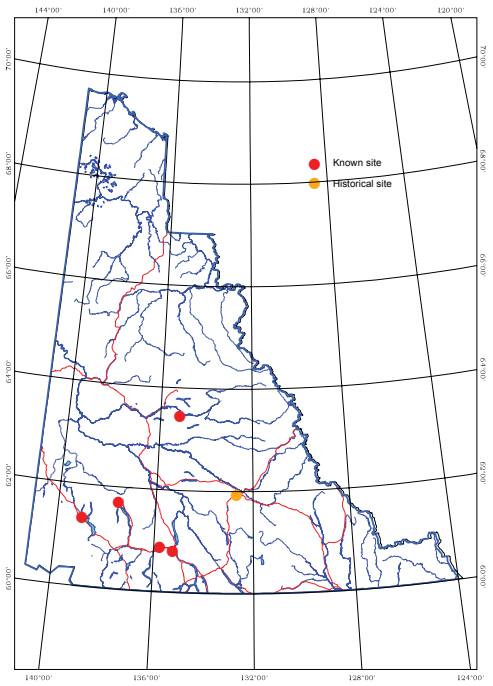




Illustration L. Mennell - YG

Carex sychnocephala

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Dryland Sedge

Carex xerantica

Sedge Family (Cyperaceae)

Habitat: Dry grassy slopes

DISTRIBUTION
Yukon: South-central Yukon; known only from Agay Mene Territorial Park
North America: Western Canada and Alaska, Great Plains to Ontario
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1)

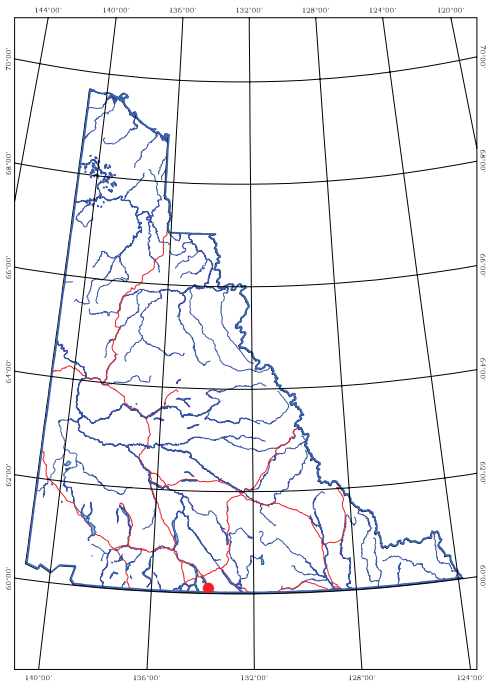
Distinguishing features: *Carex xerantica* is separated from *C. petasata* by having whitish/yellowish pistillate scales with indistinct veins, a smaller perigyna (3.8-4.8 mm vs 6-8 mm), and a distinctive pale silvery aspect to inflorescence. Perigynia have 6-10 veins on upper surface, and are unveined or indistinctly veinged on the lower surface.



A. Ceska



Illustration by J.R. Janish courtesy of the University of Washington Press





J. Staniforth - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

White Mountain Heather

Cassiope mertensiana

Heather Family (*Ericaceae*)
Synonyms: Andromeda metensiana

Habitat: Alpine tundra



YG photo

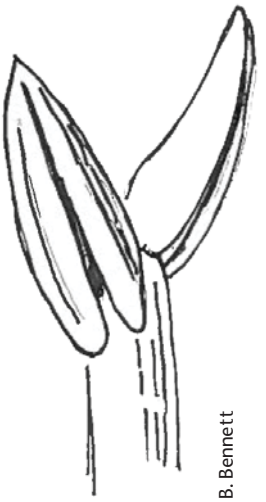
DISTRIBUTION

Yukon: Known from a single site west of the Hyland River
North America: Cordilleran south to California and Colorado
World: North America

CONSERVATION RANK

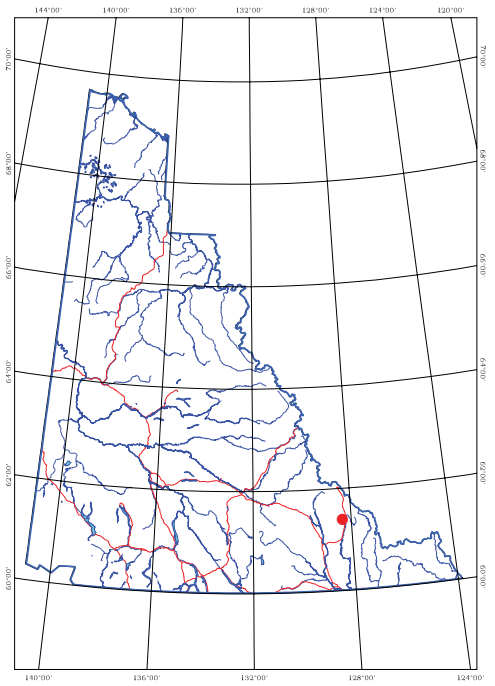
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

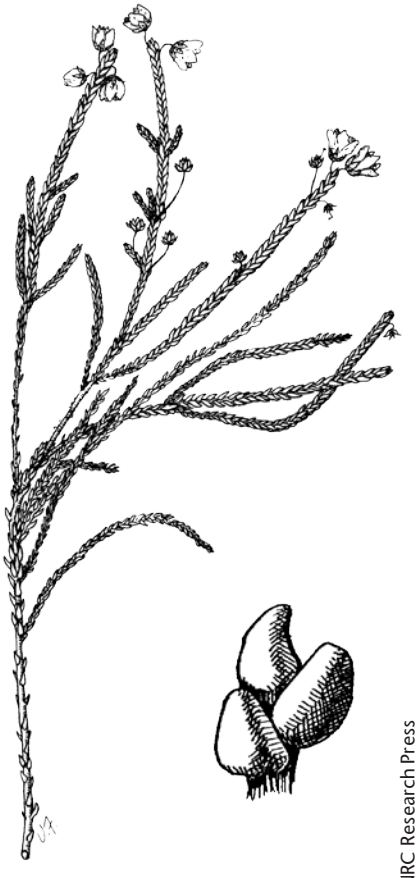
Distinguishing features: Leaves not grooved on the back.



B. Bennett

Four-anged Mountain Heather (notice the groove in leaf)





NRC Research Press

White Mountain Heather (no groove)

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Tawny Paintbrush

Castilleja miniata var. *fulva*

Figwort Family (Scrophulariaceae)
Synonyms: *Castilleja fulva*

Habitat: Roadsides, grassy meadows

DISTRIBUTION
Yukon: South-central and southeast
North America: Endemic to northeastern BC and southern Yukon
World: North America

CONSERVATION RANK
Global rank: Probably Secure (G4)
Canadian rank: Probably Secure (N4)
Yukon rank: Critically Imperilled to Vulnerable (S1S3)

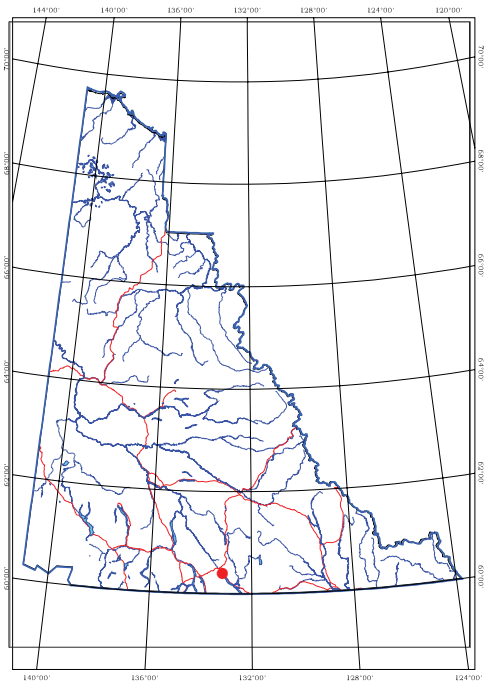
Distinguishing features: Calyx lobes 2.3 mm vs 4-12 mm/ The color is variable, but mostly pale apricot orange, sometimes tawny yellow, or yellowish red; *Castilleja miniata* is red, *Castilleja unalaschcensis* is yellow. Tawny Paintbrush also has a violet stigma, at least in some plants.



Virginia Skilton - YG



Virginia Skilton - YG





B. Bennett - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Narrowleaf Goosefoot

Chenopodium leptophyllum

Goosefoot Family (**Chenopodiaceae**)

Habitat: Grassy alkaline flats

DISTRIBUTION
Yukon: South-central Yukon
North America: Throughout North America, except northern and eastern Canada
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Chenopodium leptophyllum* differs from the common garden weed, Lamb's Quarter (*Chenopodium album*), by having densely covered with a mealy powdery substance, narrow, single-veined, linear leaves.

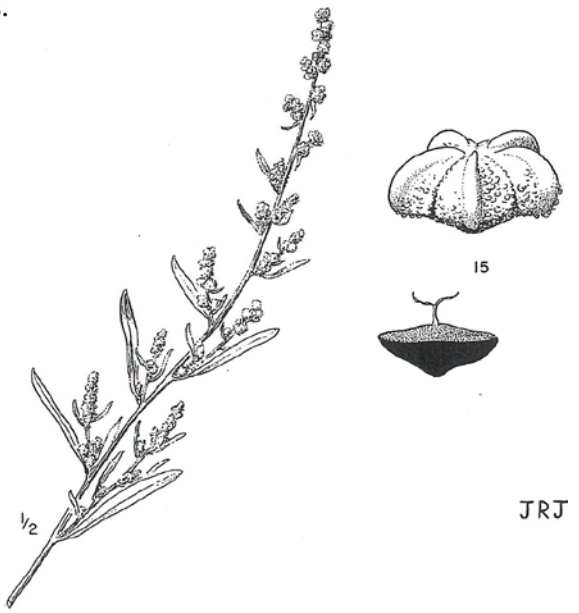


Illustration by J.R. Janish courtesy of the University of Washington Press





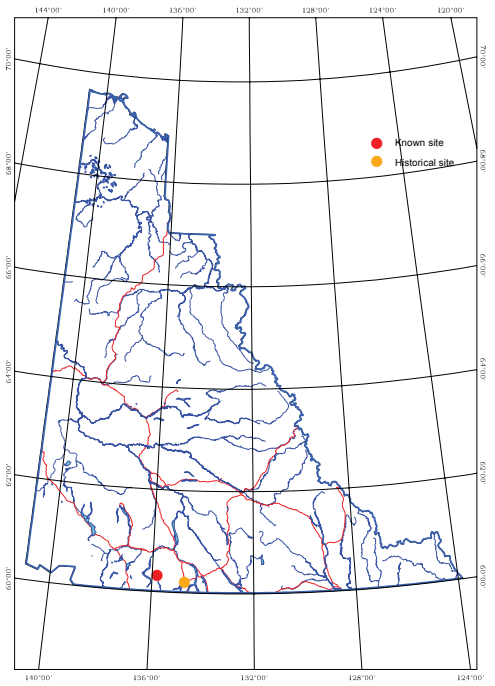
J. Fenneman (both photos)

Narrowleaf Goosefoot *see distinguishing features



B. Bennett

Lamb's Quarter (*Chenopodium album*) *see distinquishing features





A. Ceska

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Common Pipsissewa

Chimaphila umbellata

Wintergreen Family (Pyrolaceae)

Habitat: Coniferous forests in mountains

DISTRIBUTION
Yukon: Southeast Yukon; known only from the Beaver River
North America: North America, except southern United States
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Chimaphila umbellata* is separated from *Pyrola* sp. by its leaves being arranged around the stem in whorls.

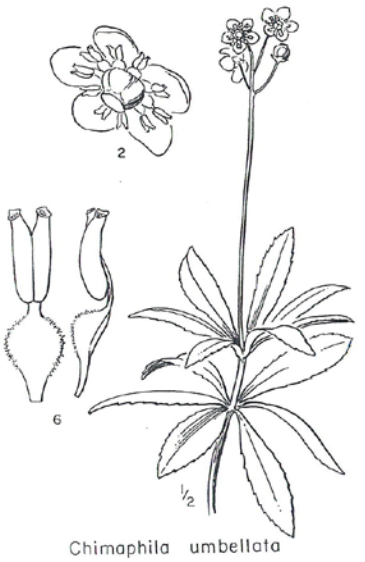
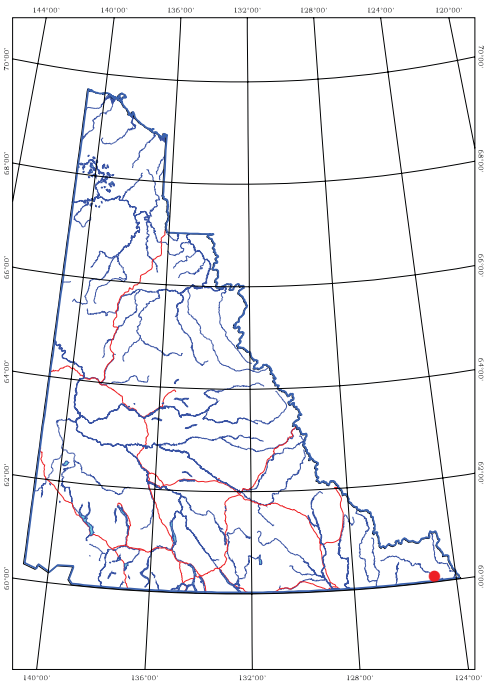


Illustration by J.R. Janish courtesy of the University of Washington Press



J. Riley





B. Bennett - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Leafy Thistle

Cirsium foliosum

Composite Family (Asteraceae)
Synonyms: *Cardus foliosus*

Habitat: Moist soil, grasslands, meadows, edges and openings in boreal forest, riverbanks

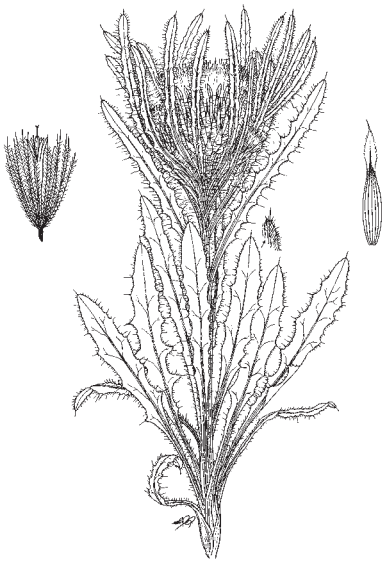
DISTRIBUTION
Yukon: Southern Yukon south of 63°N
North America: Cordilleran, Yukon to Wyoming
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled (S2)

Distinguishing features: This biennial species has the largest flowers in Yukon. It can be separated from *C. arvense* by having a large taproot.



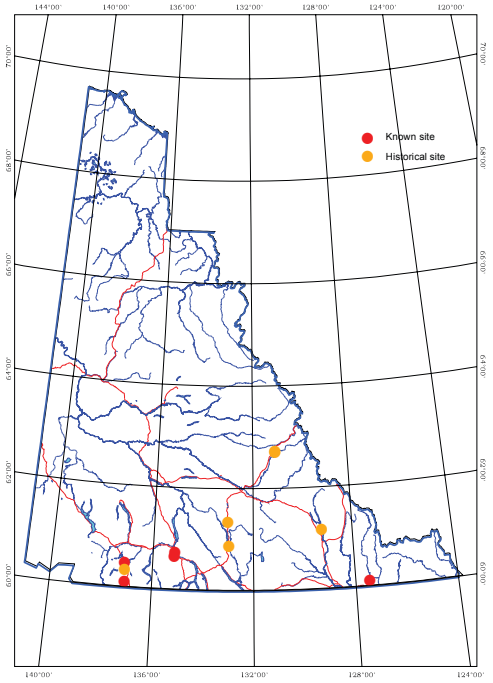
R. Rosie



© Province of British Columbia



P. Long





P. Long

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alpine Spring Beauty

Claytonia megarhiza

Purslane Family (Portulacaceae)

Habitat: Alpine tundra, base of scree slope near streams

DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park
North America: Western North America
World: North America

CONSERVATION RANK
Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Vulnerable (N3)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: It is separated from similar *Claytonia* species by having a stem so short that all leaves appear basal, with a dense rosette of short spatulate fleshy leaves, which are longer than the inflorescence.



I. Gartiner

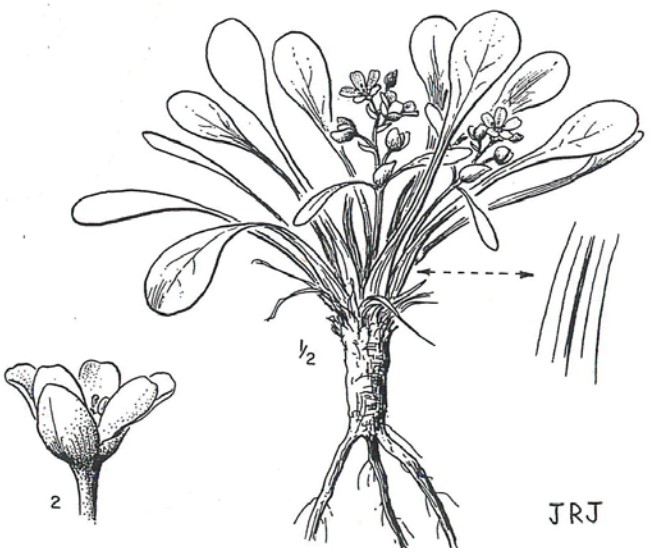


Illustration by J.R. Janish courtesy of the University of Washington Press





J. Carey, YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Ogilvie Mountain Spring Beauty

Claytonia ogilviensis

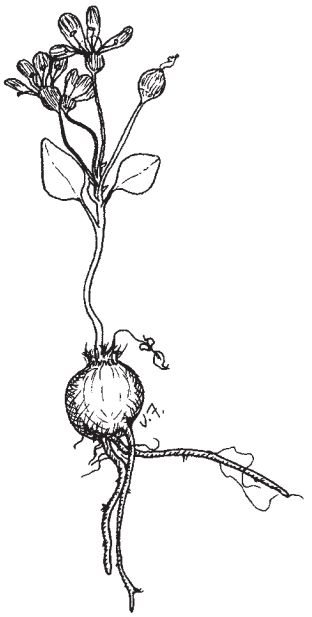
Purslane Family (**Portulacaceae**)

Habitat: Alpine slopes and talus

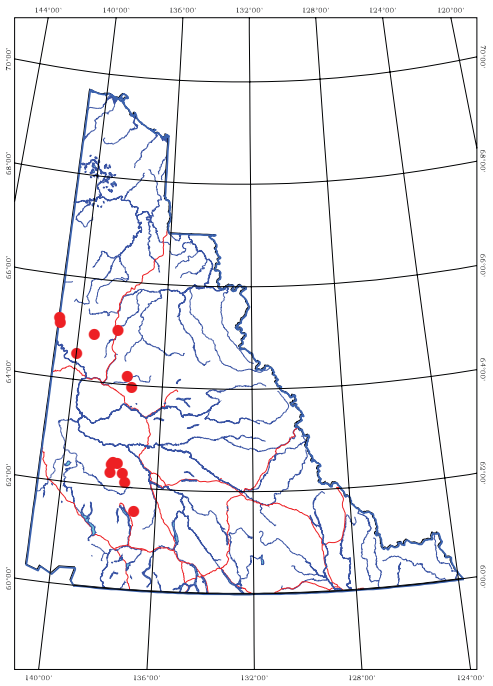
DISTRIBUTION
Yukon: Endemic to northwestern Yukon. Known only from the Ogilvie and Dawson mountain ranges.
World: Endemic to Yukon

CONSERVATION RANK
Global rank: Vulnerable (G3)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: Tubers turnip-shaped to globose; bracts all leaflike, petals bright purple. Leaves taper to a petiole (stalk attaching the blade to the stem).



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B. Bennett



B. Bennett

Tuber



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Scamman's Spring Beauty WATCH LIST

Claytonia scammaniana

Purslane Family (Portulacaceae)
Synonyms: *Claytonia porsildii*; *Montia scammaniana*

Habitat: Alpine tundra, talus and scree slopes on serpentine rivers

DISTRIBUTION
Yukon: Western Yukon north of 61°N
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

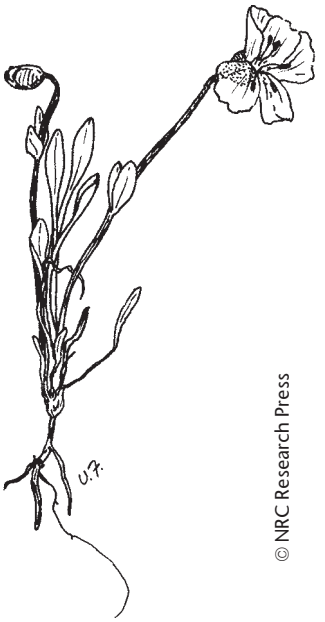
Distinguishing features: Flowers pink, fading to white, plants with long rhizomes but no tuber, leaves narrowly oblong-spathulate to linear with conspicuously sheathing membranous bases.



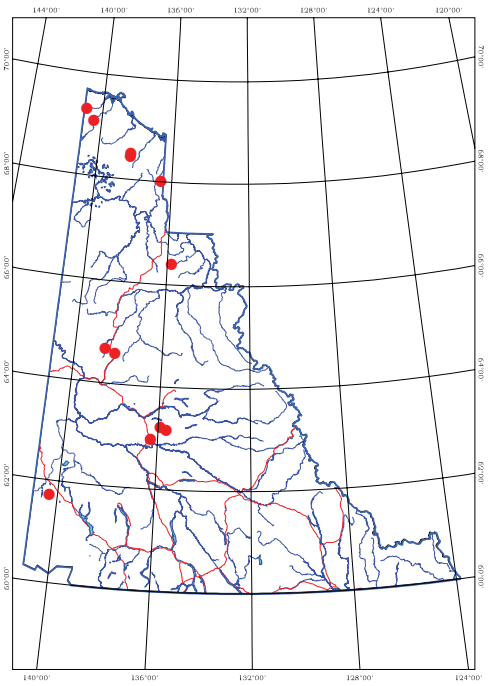
B. Bennett - YG



B. Bennett



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B. Bennett - YG

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.
Yukon Conservation Data Centre

Blue-eyed Mary

WATCH LIST

Collinsia parviflora

Figwort Family (Scrophulariaceae)

Habitat: Rock outcrops on southerly slopes

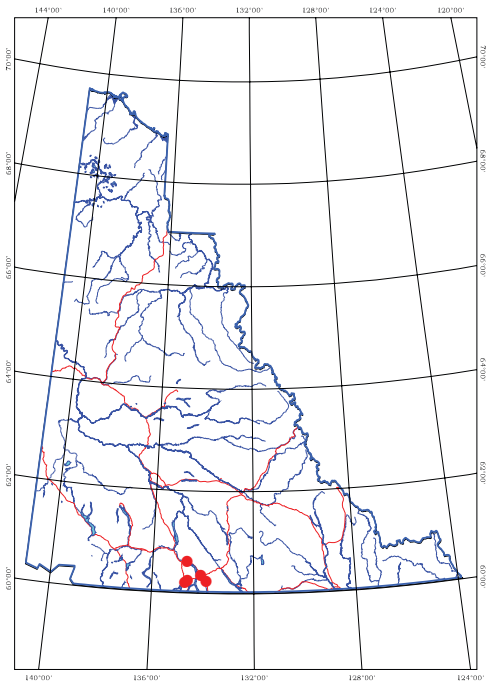
DISTRIBUTION
Yukon: South-central Yukon south of 61°N; known only from the Southern Lakes
North America: From Yukon to Ontario, southwestern and northeastern United States
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Vulnerable (S3)

Distinguishing features: Annual plant blooming from late May to mid-June. Stamens 4. Flowers on long stalks (pedicles).



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Pale Comandra

Comandra umbellata ssp. *pallida*

Sandalwood Family (Santalaceae)
Synonyms: *C. pallida*

Habitat: Prairie grassland and dry open coniferous woodland

DISTRIBUTION

Yukon: Southwestern and west-central Yukon; known only from Kluane and Aishihik lakes and Five Finger Rapids (Yukon River)
North America: Disjunct to Yukon, British Columbia to Manitoba, southwestern United States
World: North America

CONSERVATION RANK

Global rank: Secure (G5T5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

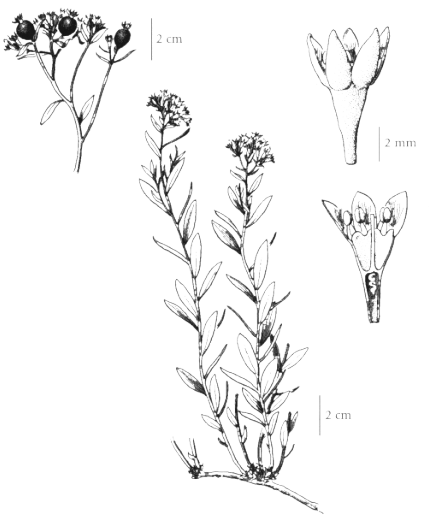
Distinguishing features: A very distinctive species with only one close relative (*Geocaulon lividum)* from which it can be separated by having terminal cymes or panicles; fruit dry and nutlike.



B. Bennett

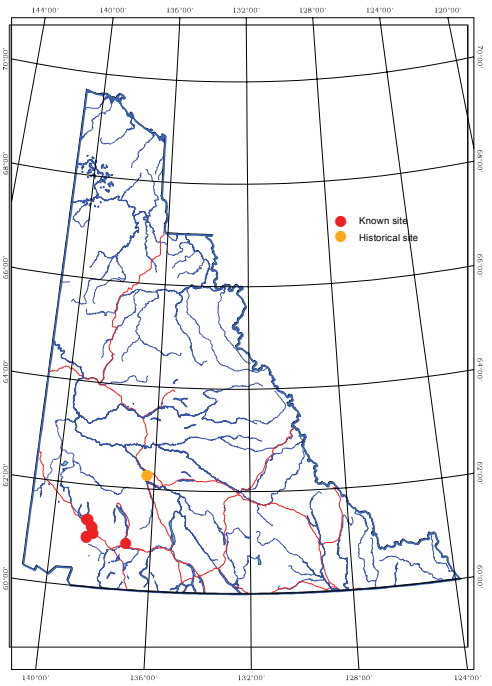


A. Ceska



Comandra umbellata var. *pallida*

Illustration by J.R. Janish courtesy of the University of Washington Press





S. Cannings

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Slender Gentian

Comastoma tenellum

Gentian Family (Gentianaceae)
Synonyms: *Gentianella tenella*

Habitat: On tundra in dry alpine gravels and to be look for in sand or mud flats on the arctic coast.

DISTRIBUTION

Yukon: Southwest Yukon; known only from Kluane National Park, Asi Keyi Territorial Park and surrounding areas
North America: Arctic coasts of North America, and western United States
World: Circumpolar

CONSERVATION RANK

Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: *Comatostoma tenella* is separated from *Gentianella amarella* by being branched from the base (not from the stem) and having long pedicels. Differs from Gentianella propinqua by having a frilled throat (see drawing).



Four-parted Gentian *Gentianella propinqua* does not have a frilled throat.

B. Bennett

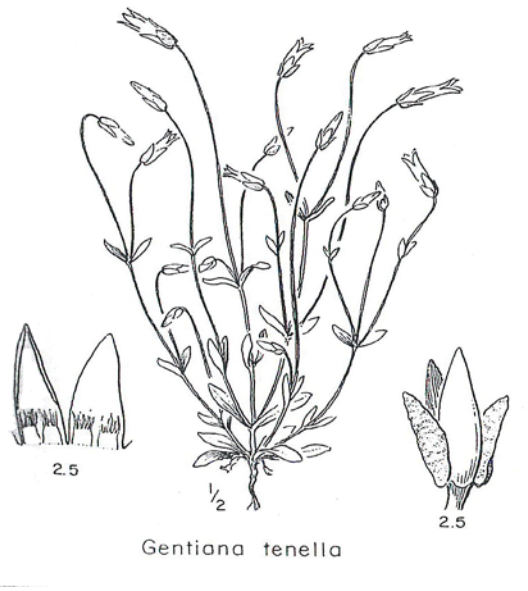
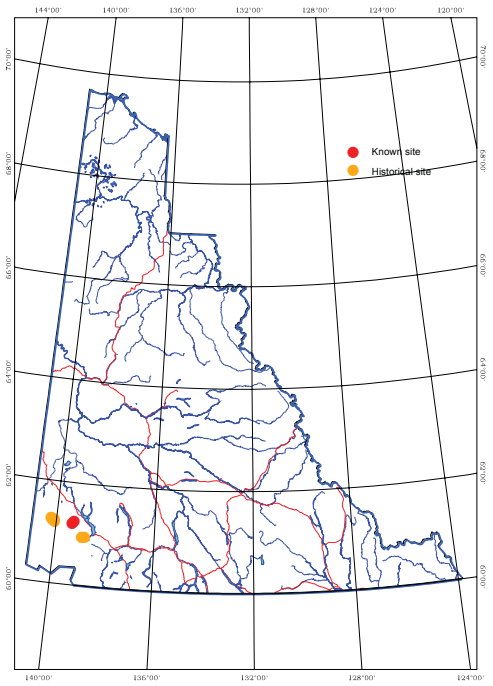


Illustration by J.R. Janish courtesy of the University of Washington Press





For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alaskan Bugseed

Corispermum ochotense

Goosefoot Family (**Chenopodiaceae**)
Synonyms: *C. hyssopifolium sensu Cody (1996)*

Habitat: Sand, fine alluvial sands on river islands and dunes

DISTRIBUTION
Yukon: West-central and southwestern Yukon; known from the Alsek and Yukon rivers and Kluane Lake
North America: Yukon, Alaska, Northwest Territories, Saskatchewan
World: Amphiberingian

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Imperilled (N2)
Yukon rank: Imperilled (S2)
***Species at Risk Act* status:** Candidate

Distinquishing features: This is an annual plant that usually can only be detected from late July onwards. Leaves linear and not toothed or fleshy. The wide wing rules it out *C. villosum* or *C. hookeri*. The clumped inflorescence and large seed (2.8-4 mm long) rules out *C. hyssopifolium.* Alaskan Bugseed seeds are reddish without splotches characteristic of *C. pallasii*.



B. Bennett

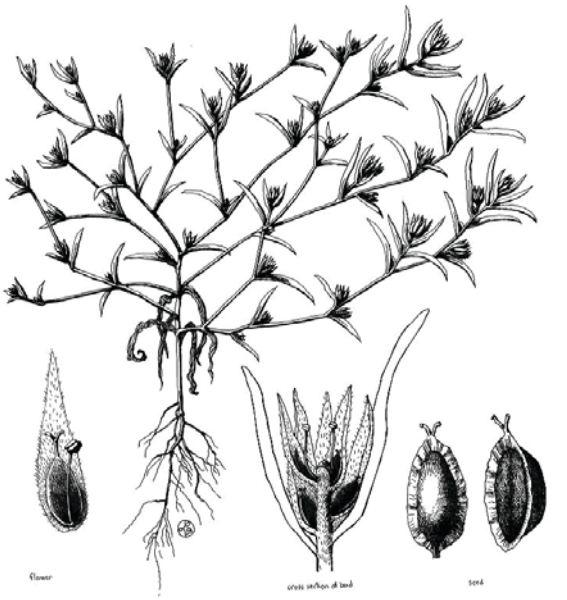
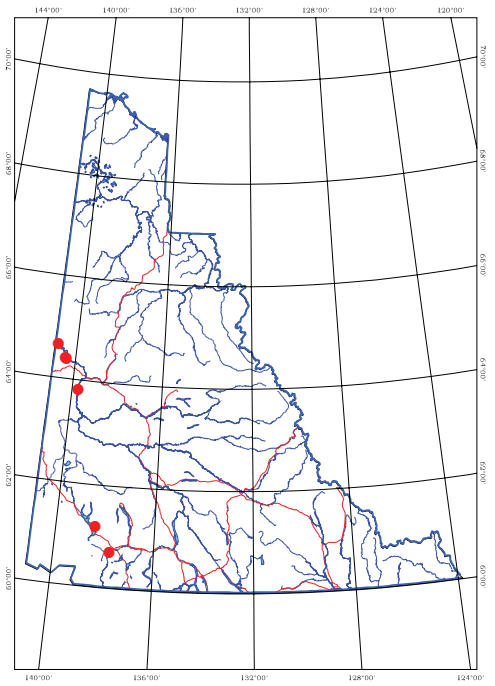


Illustration L. Mennell - YG





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Pallas' Bugseed

Corispermum pallasii

Goosefoot Family (Chenopodiaceae)

Habitat: Sand, fine alluvial sands on river islands and dunes

DISTRIBUTION
Yukon: West-central Yukon; known from a single site on the Yukon River
North America: Yukon, BC to Quebec, Michagan North Dakota, Ohio
World: Amphiberingian-Russia, Mongolia and China, and introduced in Europe

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable to Apparently Secure (N3N4)
Yukon rank: Critically Imperilled (S1)

Distinquishing features: This is an annual plant that usually can only be detected from late July onwards. Pallas' Bugseed seeds have characteric splotches.



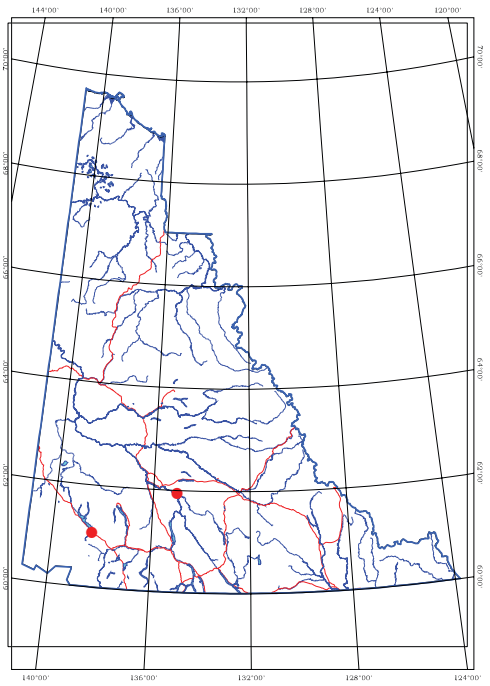
B. Bennett

Corispermum pallasii



B. Bennett

Pallas' Bugseed habitat





J. Meikle

Habitat along the Yukon River in the Big Salmon area 2009

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Water Pygmyweed

Crassula aquatica

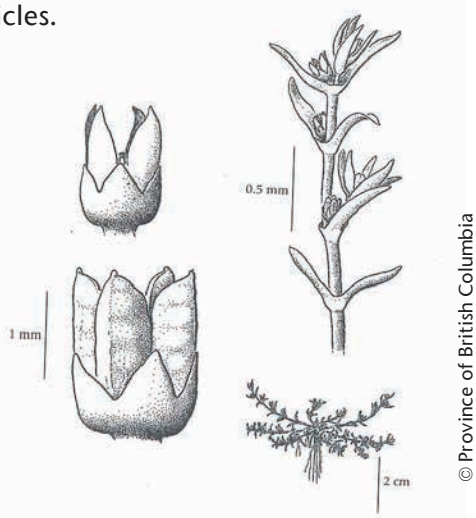
Stonecrop Family (Crassulaceae)
Synonyms: Tillaea aquatica

Habitat: Mudflats and shallow pools

DISTRIBUTION
Yukon: South-central Yukon; known only from Marsh and Nares lakes
North America: North America, except Great Plains and southeastern United States
World: Scattered circumtemperate

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: A small aquatic annual that is separated taxonomically from terrestrial *Sedum/Rhodiola* by having 4-parted flowers with 4 stamens. It is sometimes confused with *Montia fontana (see photo),* which have flowers that extend further on recurved pedicels.



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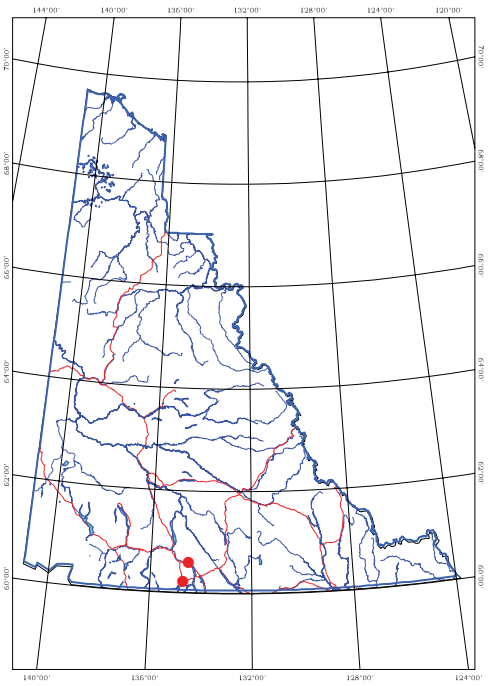
Mireille Delisle-Oldham

Pygmyweed (*Crassula aquatica*)



B. Bennett

Water Blinks (*Montia fontana*) *see distinguishing features





YG photo

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Spotted Lady's-slipper

WATCH LIST

Cypripedium guttatum var. *guttatum*

Orchid Family (Orchidaceae)

Habitat: Open calcareous woodlands

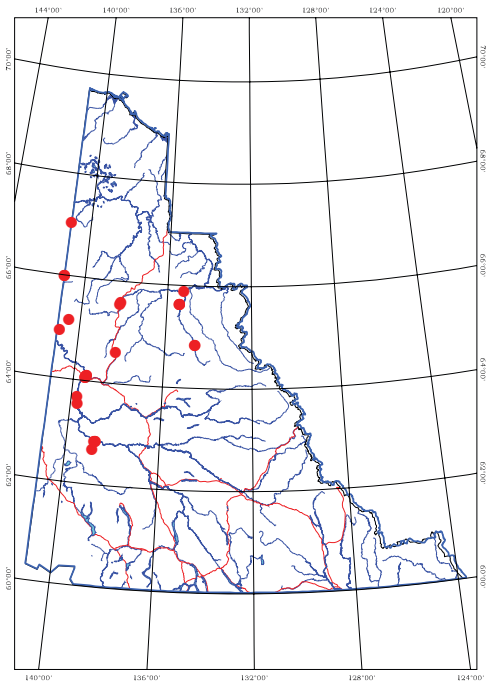
DISTRIBUTION
Yukon: North of 62°N and west of 134°W
North America: Yukon, Northwest Territories and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Plants with two leaves, flowers solitary scapose, purple blotched.



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D. Gunnlaugson



S. Cannings



D. Gunnlaugson

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yellow Lady's-slipper

Cypripedium parviflorum

Orchid Family (Orchidaceae)
Synonyms: *C. calceolus* ssp. *parviflorum*; *C. calceolus* var. *parviflorum*; *C. parviflorum* var. *maskasin*

Habitat: Moist calcareous woodlands

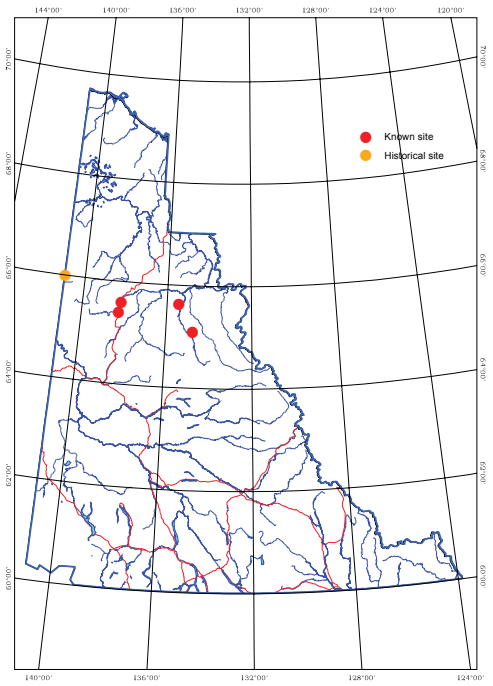
DISTRIBUTION
Yukon: Known from 5 sites (2 historical) AK/YT border, Dempster Highway, and Wind River
North America: From Yukon to Newfoundland, southern United States
World: Circumboreal

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Stem leaves 3-5, sepals longer than flowers, flowers yellow, capsules glandular with long hairs.



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B. Bennett



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Poverty Oatgrass

Danthonia spicata

Grass Family (**Poaceae**)

Habitat: Dry, rocky soil in the vicinity of hot springs

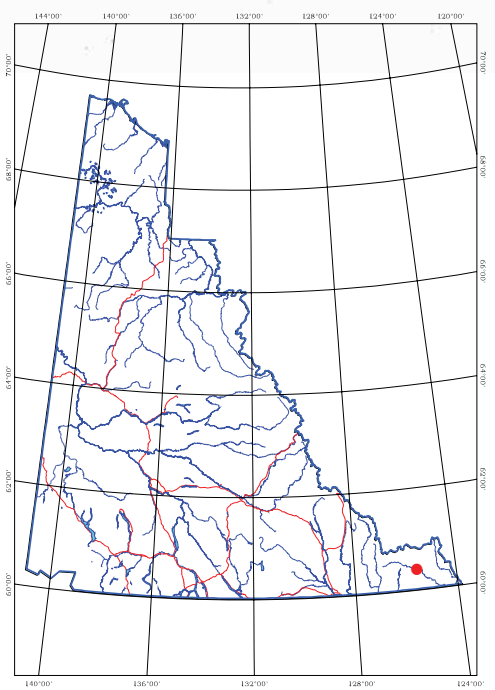
DISTRIBUTION
Yukon: Southeast Yukon; know only from Beaver River Hotspring
North America: North America, except southwestern United States
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Glumes longer than spikelet, tufted perennial with a bent awn attached between the lobes of the bifid tip. Can be distinguished from *D. intermedia* by its shorter lemmas (4-5 mm vs 7-10 mm).



Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett



C. Eckert - YG



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Arctic Larkspur

Delphinium brachycentrum

Crowfoot Family (Ranunculaceae)

Habitat: Alpine meadows and valleys

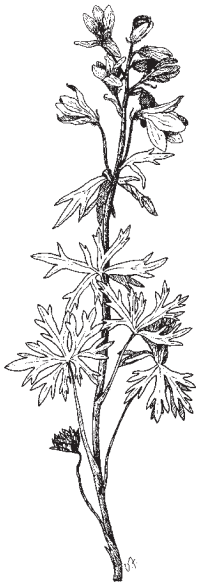
DISTRIBUTION
Yukon: Northern and southwestern Yukon; known only from the British-Richardson Mountains and the Kluane area
North America: Yukon, British Columbia and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Apparently Secure to Secure (G4G5)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Resembles the Tall Larkspur, *D. glaucum* however differs by having <13 flowers, <50 cm tall and bears leaves mostly on the lower fifth of the stem.



B. Bennett



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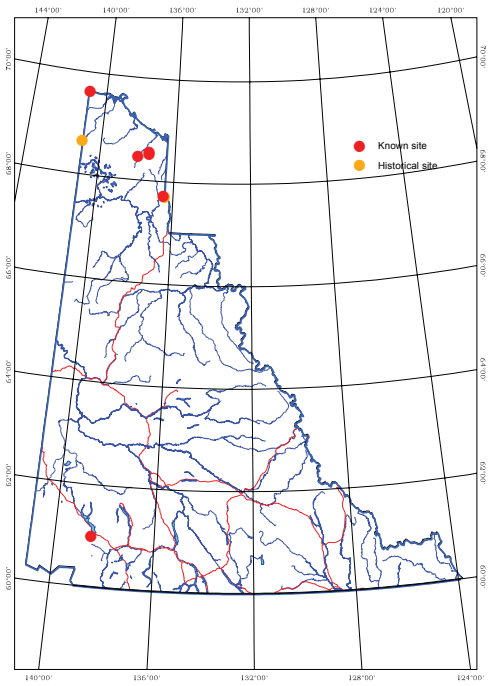
B. Bennett

Tall Larkspur (*Delphinium glaucum*)



B. Bennett

Tall Larkspur (*Delphinium glaucum*)





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alaska Dwarf Primrose

Douglasia alaskana

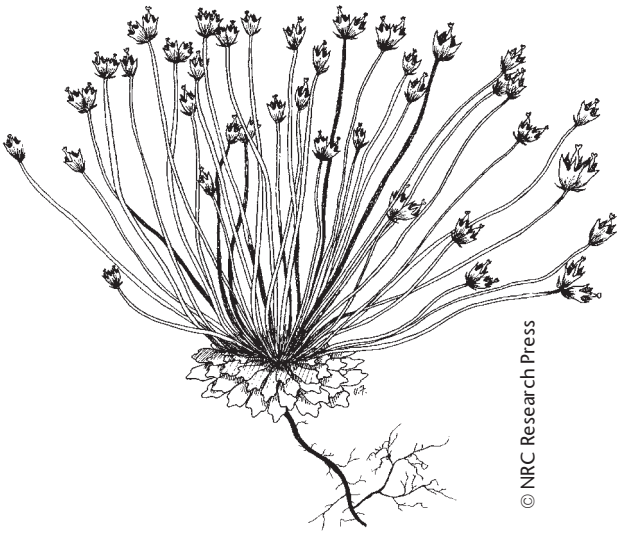
Primrose Family (**Primulaceae**)
Synonyms: *Androsace alaskana*

Habitat: Rocky alpine slopes and crevices

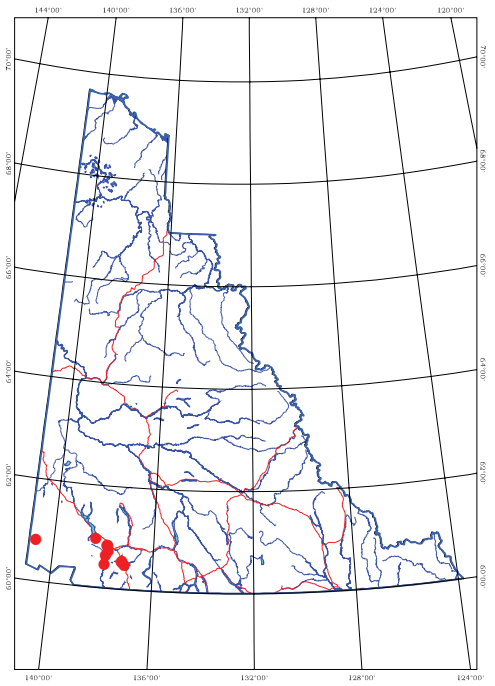
DISTRIBUTION
Yukon: Southwestern Yukon; known only from Kluane National Park
World: Endemic to southern Alaska and Yukon

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Imperilled to Vulnerable(N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: Annual. Resembles Fairy Candelabra, *Androsace septentrionalis*, however the flowering stalks end with 1-3 flowers instead of an umbell of numerous flowers.



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F. Baldwin

Alaska Dwarf Primrose



B. Bennett

Fairy Candelabra (*Androsace septentrionalis*)
*see distinguishing features



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Klaza Draba

Draba bruce-bennettii

Mustard Family (Brassicaceae)

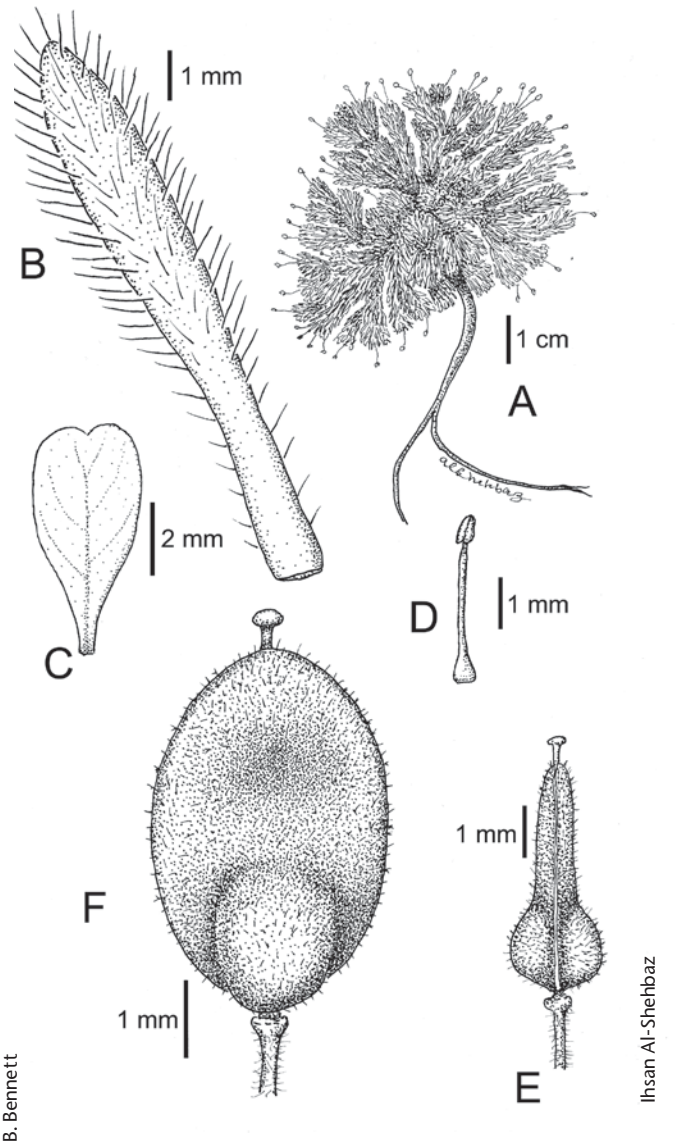
Habitat: Alpine tundra on andesite volcanic bedrock.

DISTRIBUTION
World: Endemic to Langham and Tritop mountains of the Dawson Range.

CONSERVSTION RANK
Global rank: Not Ranked (GNR))
Canadian rank: Not Ranked (NNR)
Yukon rank: Imperilled (S2)

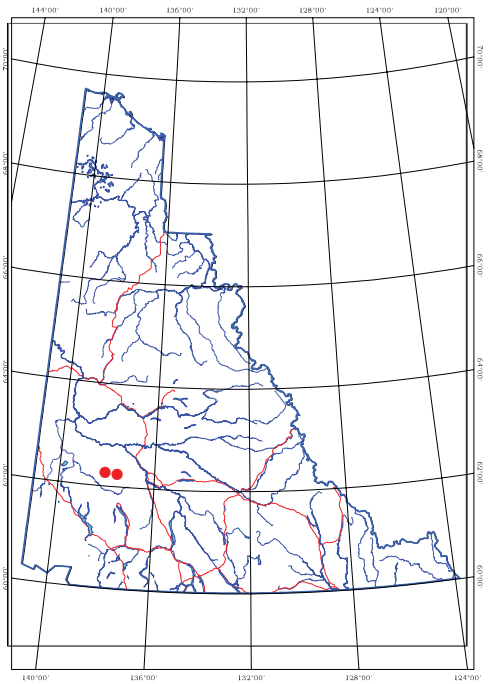
Distinguishing features: Fruit is swollen at the base. Most closely resembles *D. macounii*, it differs by having straight stalks on the fruit, linear to linear-oblanceolate (vs. oblanceolate to obovate) basal leaves. 1-4 (vs 3-13 flowered). Fruit with simple to 2-rayed hairs.





B. Bennett

Ihsan Al-Shehbaz





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Caswell's Draba

Draba caswellii

Mustard Family (**Brassicaceae**)

Habitat: Alpine tundra

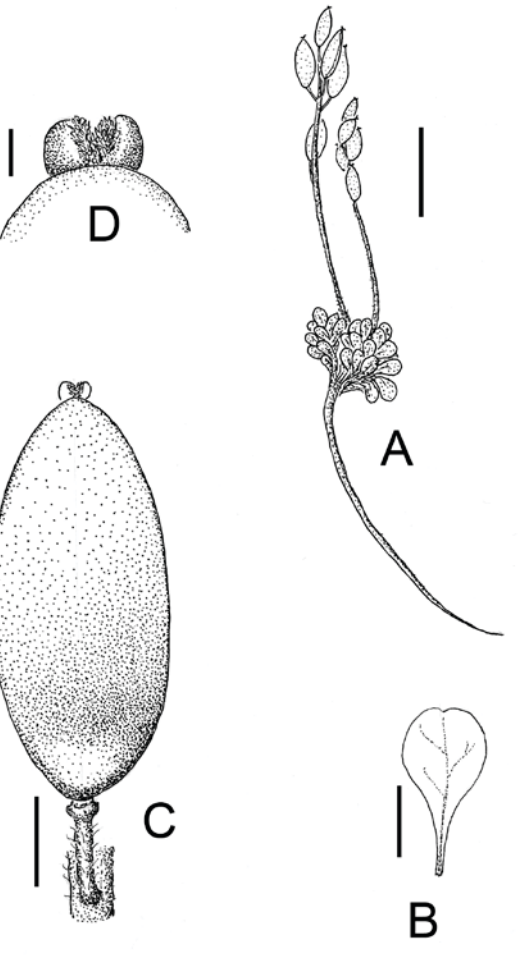
DISTRIBUTION
World: Endemic to Kluane National Park

CONSERVSTION RANK
Global rank: Critically Imperilled (G1)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)

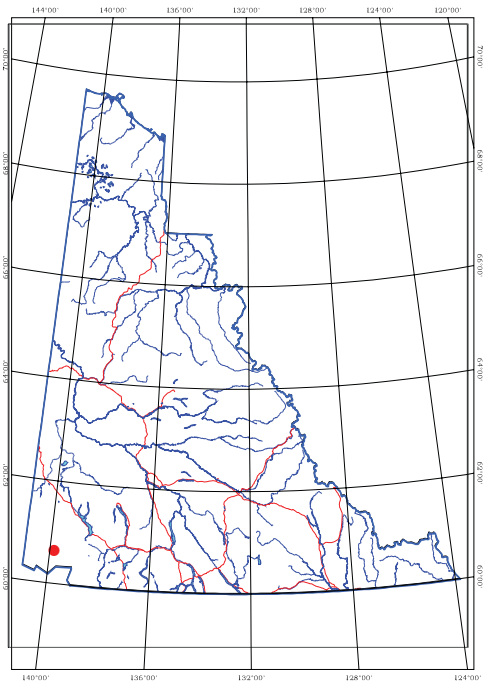
Distinguishing features: Most closely resembles *D. porsildii*, it differs by having soft, crisped trichomes throughout, pubescent pedicels and distal parts of stems, obovate petals ca. 1.8 0.8 mm, elliptic fruits 3.5–4.5 1.5–1.8 mm, obsolete styles, flattened and strongly 2-lobed decurrent stigmas, and ca. 24 seeds and aborted ovules per fruit. By contrast, D. porsildii has stiff, non-crisped trichomes, glabrous pedicels and distal parts of stem, ovate to oblong fruits 4–7.5 1.7–3 mm, style 0.1–0.3(–0.5) mm, entire to slightly 2-lobed nondecurrent stigmas, and 12–16 seeds and aborted ovules per fruit. 1.5–1.8 mm, obsolete styles, flattened and strongly 2-lobed decurrent stigmas, and ca. 24 seeds and aborted ovules per fruit. By contrast, D. porsildii has stiff, non-crisped trichomes, glabrous pedicels and distal parts of stem, ovate to oblong fruits 4–7.5 1.7–3 mm, style 0.1–0.3(–0.5) mm, entire to slightly 2-lobed nondecurrent stigmas, and 12–16 seeds and aborted ovules per fruit.



BABY Herbarium photo



Ishan Al-Shehbaz



For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Dense-leaved Draba

Draba densifolia

Mustard Family (**Brassicaceae**)

Habitat: Alpine tundra and scree slopes, generally on dry sites

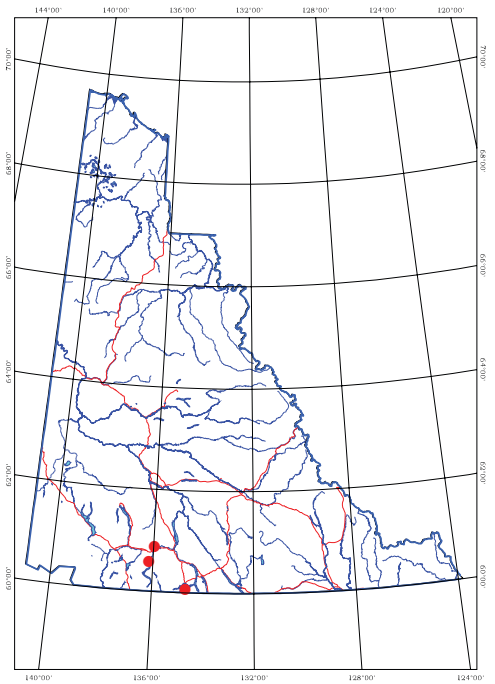
DISTRIBUTION
Yukon: South-central Yukon, known only from Kusawa Lake and Montana Mountain
North America: Western North America
World: Cordilleran

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Critically Imperilled to Vulnerable (S1S3)

Distinguishing features: Having no hairs on the upper leaf surfaces, only sparsely hairy on the lower surfaces, leaves ciliate, midvein prominent, plants cushion-forming.



S. Nielsen





S. Nielsen

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Kluane Draba

Draba kluanei

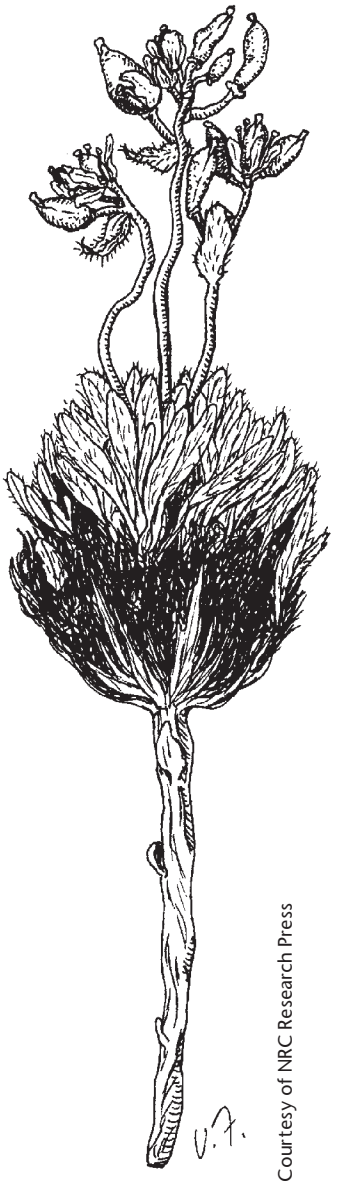
Mustard Family (Brassicaceae)

Habitat: Rocky alpine slopes, often with SW aspect

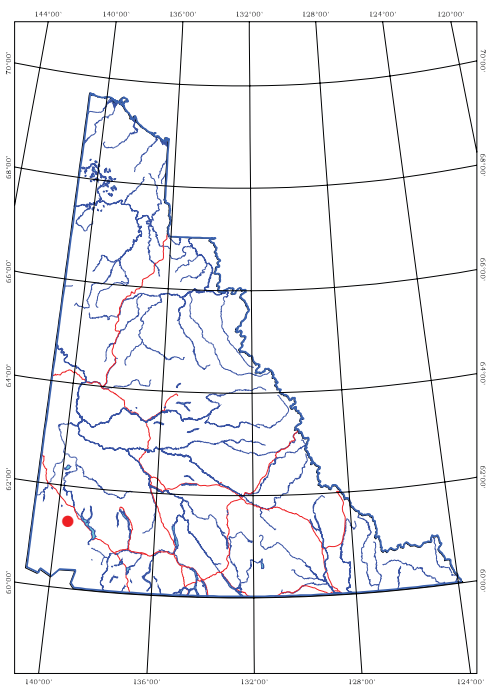
DISTRIBUTION
World: Endemic to Kluane National Park

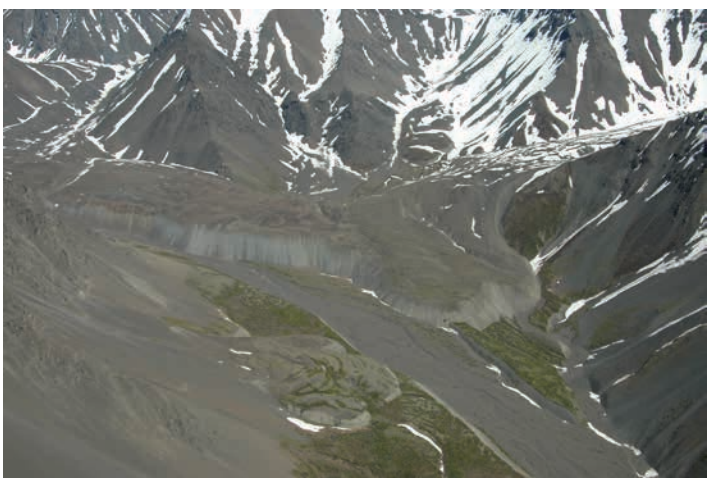
CONSERVATION RANK
Global rank: Critically Imperilled (G1)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Draba kluane*i is separated from closely related drabas by having white flowers with a short styles, pubescent stems with 1-2 leaves, and narrowly obovate, glabrous or sparsely pubescent fruits.



Courtesy of NRC Research Press





S. Cannings

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Mulligan's Draba

Draba mulliganii

Mustard Family (Brassicaceae)

Habitat: 370–1550 m on limestone gravel around outcrops, limestone crevices, dry serpentine knolls in heath vegetation with patches of exposed slide rock, and shale rubble slopes.

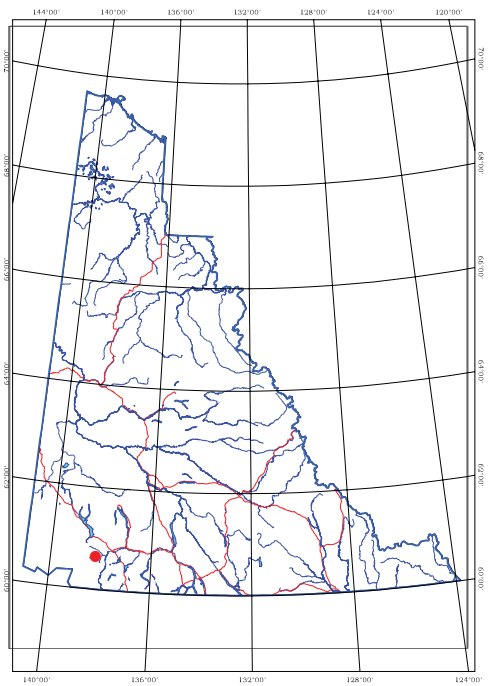
DISTRIBUTION
Yukon: Kluane National Park
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Not Ranked (GNR)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Candidate

Distinguishing features: Distinguished from *D. porsildii* by having broadly obovate petals 3.2–4.0 2–3 mm (vs. spatulate petals 1.5–2.2 0.7–1.2 mm), divaricate to ascending lowermost fruiting pedicels (4–)5–9 mm long (vs. ascending pedicels 0.5–2(–4) mm long), non-appressed fruits with styles 0.4–1.0 mm long (vs. appressed fruits with styles 0.05–0.10 mm long), and abaxial leaf surface with 8–12-rayed stellate trichomes often without spurred rays (vs. 3–5-rayed trichomes often with some rays 1-spurred).



Agri-food Agriculture Canada



For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Murray's Draba

Draba murrayi

Mustard Family (**Brassicaceae**)

Habitat: Dry cliffs and steep rocky slopes

DISTRIBUTION
Yukon: Northwestern Yukon; known only from western Ogilvie Mountains; exact locality unknown.
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Imperilled (G2)
Canadian rank: Historical (NH)
Yukon rank: Historical (SH) (last reported 1936)
***Species at Risk Act* status:** Candidate

Distinguishing features: This species can be distinguished from all other species of Draba by having styles longer than 1.5mm.



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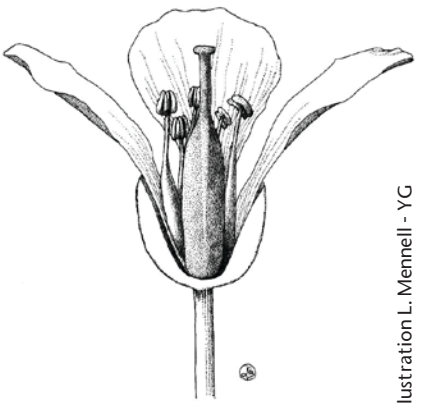
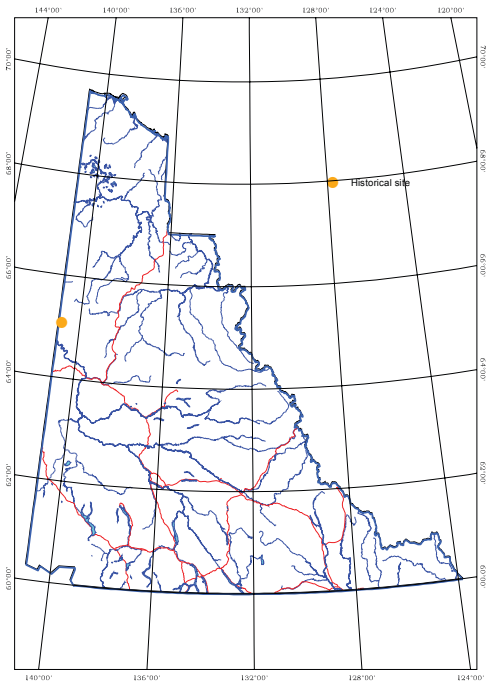


Illustration L. Mennell - YG



F. Baldwin





C. Parker

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Hairy Draba

WATCH LIST

Draba pilosa

Mustard Family (*Brassicaceae*)
Synonyms: *Draba alpina var. pilosa*

Habitat: Dry gravelly slopes, sandy places, generally wet tundra.

DISTRIBUTION
Yukon: Known only from Ivvavik and Vuntut National Parks, and Herschel Island
North America: Alaska - Nunavut
World: Amphiberingian (Russian Far East)

CONSERVATION RANK
Global rank: Not Ranked (GNR)
Canadian rank: Not Ranked (NNR)
Yukon rank: Imperilled to Vulnerable (S2S3)

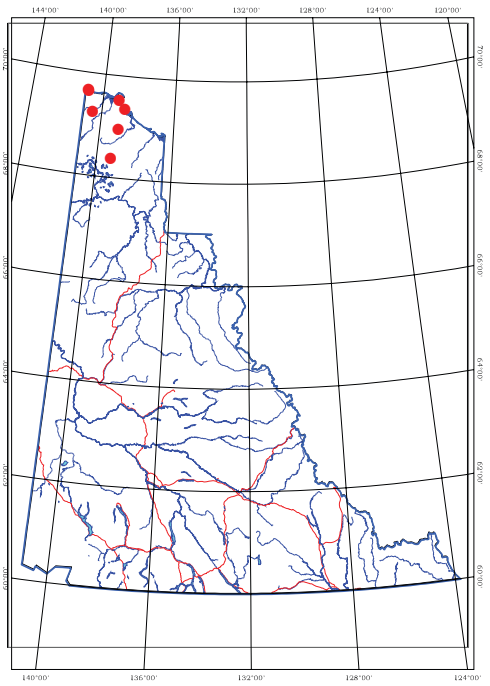
Distinguishing features: Flowering stems without hairs or leaves, flowers yellow with petals 3.5-6 mm long, leaves with prominent persistent mid-veins.



S. Wolfe



B. Bennett





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Porsild's Draba

Draba porsildii

Mustard Family (Brassicaceae)

Habitat: Generally rocky or gravelly, subalpine and alpine zones on ridges, talus, scree, and gravel slopes, cliffs, ledges, and summits.

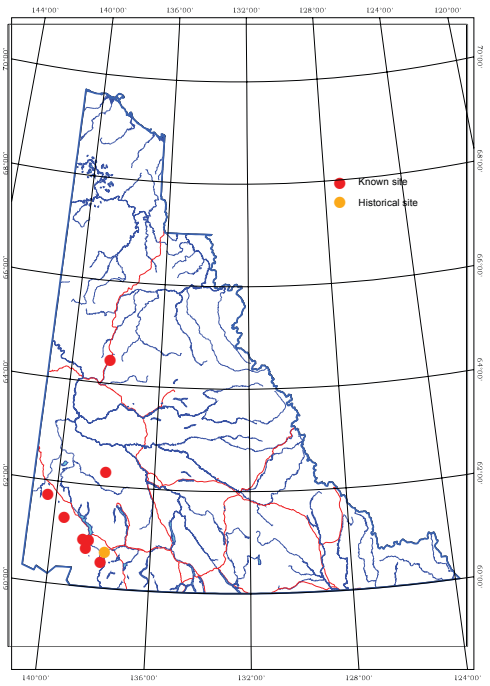
DISTRIBUTION
Yukon: Southwest Yukon, north to the Dempster and west to the South Canol Road.
North America: Cordilleran south to Wyoming
World: North America

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Vulnerable to Apparently Secure (N3N4)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: White flowers, stem hairless, leafless (or 1 leaf), fruits hairless <8 mm long. *Draba lonchocarpa*, a more common species, has fruits usually greater than 8 mm.



Canada Dept. of Agriculture





Forrest Baldwin

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.
Yukon Conservation Data Centre

Coast Mountain Draba

Draba ruaxes

Mustard Family (Brassicaceae)
Synonyms: *Draba ventosa* var. *ruaxes*

Habitat: Alpine communities, including scree slopes, gravelly summits and xeric soils, and nunataks

DISTRIBUTION

Yukon: Southwest Yukon; known only from Kluane National Park and vicinity.
North America: Cordilleran Washington to Alaska
World: Endemic to North America

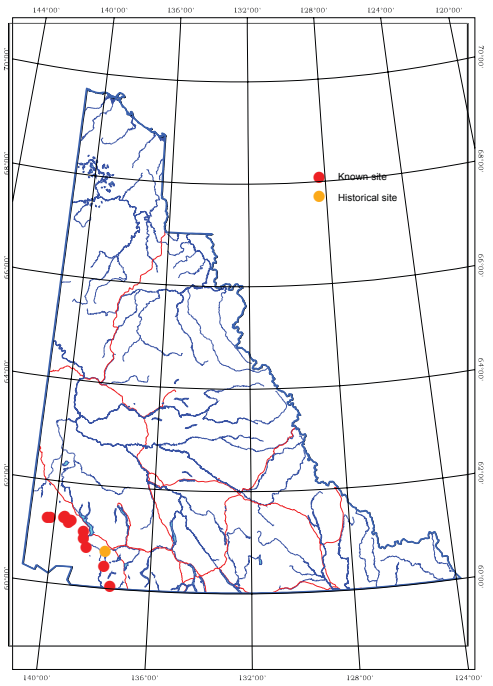
CONSERVATION RANK

Global rank: Apparently Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
Species at Risk Act status: Candidate

Distinguishing features: *Draba ruaxes* has well-formed anthers and pollen, and abundant, unbranched hairs on leaves, stems, sepals, and fruits. *Draba ventosa* has abortive anthers and/or pollen, and no unbranched hairs.







For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Scotter's Draba

WATCH LIST

Draba scotteri

Mustard Family (Brassicaceae)
Synonyms: Draba eschscholtzii

Habitat: Alpine communities, including scree slopes, gravelly summits and xeric soils, and nunataks

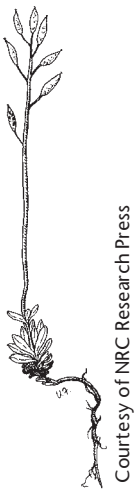
DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park and Rose-Lapie Pass
World: Endemic to Yukon

CONSERVATION RANK
Global rank: Imperilled to Vulnerable (G2G3)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Candidate



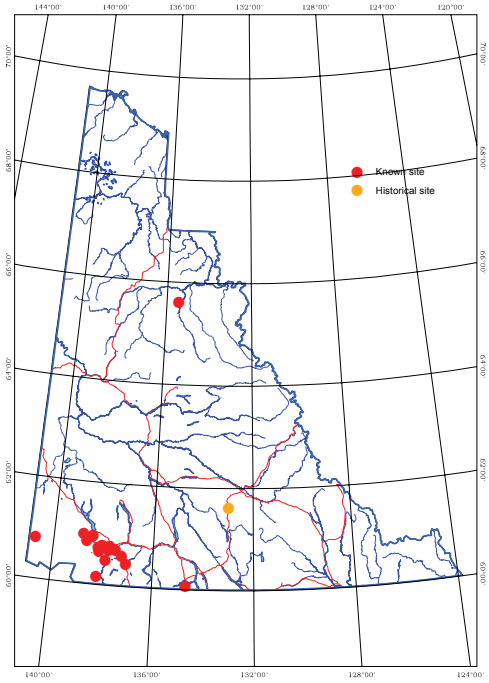
B. Bennett

Distinguishing features: *Draba scotteri* is separated from *D. porsildii* by having yellow flowers, hairs on lower leaf surfaces mostly stellate (short stalked 6-8 rays) and siliques with simple to forked hairs.



Courtesy of NRC Research Press







YG photo

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Star-flowered Draba

Draba stenopetala

Mustard Family (Brassicaceae)

Habitat: Alpine scree and turfy slopes

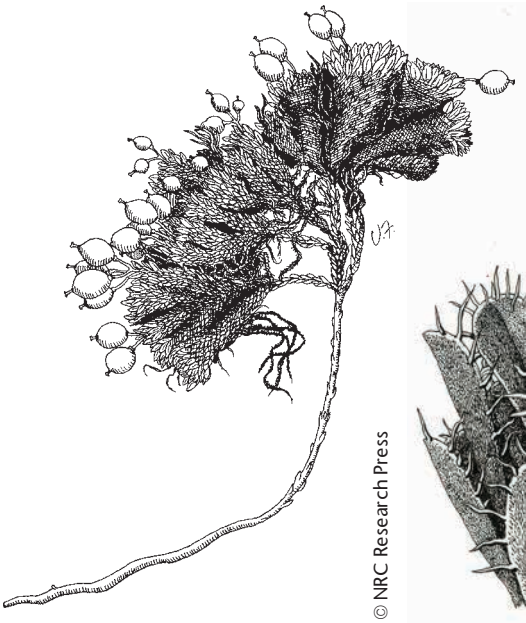
DISTRIBUTION
Yukon: West of 134°
North America: Yukon, British Columbia, Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Imperilled (N2)
Yukon rank: Imperilled (S2)
***Species at Risk Act* status:** Candidate

Distinguishing features: When in flower the Star-flowered Draba can be distinguished from all other alpine plants by its ribbon-shaped petals.



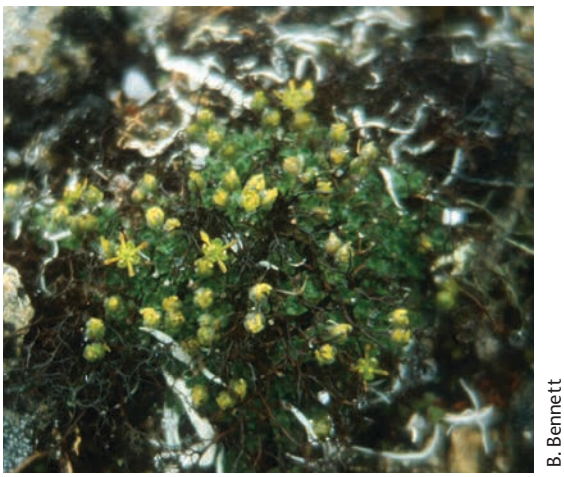
F. Baldwin



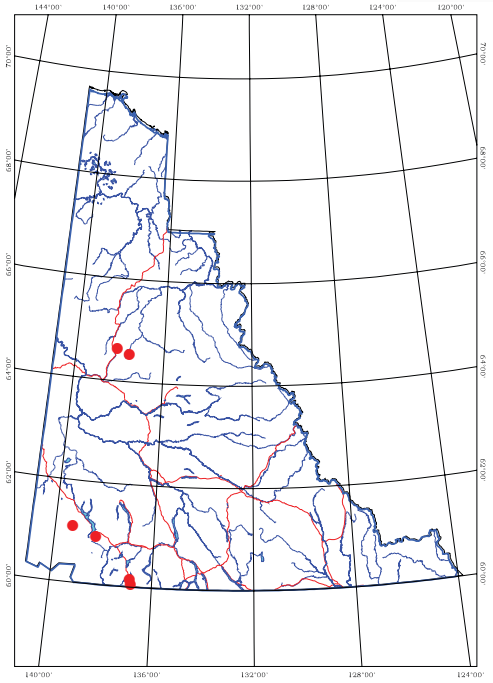
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Illustration L. Mennell - YG



B. Bennett





S. Cannings

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Wind River Draba

Draba ventosa

Mustard Family (**Brassicaceae**)

Habitat: Alpine and subalpine, talus, scree slopes, slides, cliffs; often on limestone



DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park
North America: Western Canada, Alaska, Rocky Mountains.
World: North America

CONSERVATION RANK
Global rank: Vulnerable (G3)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Draba ventosa* is separated from *D. ruaxes* by long-stalked stellate hairs on both leaf surfaces and by fruits with simple and star-shaped hairs. Styles 1.0-1.25 mm.

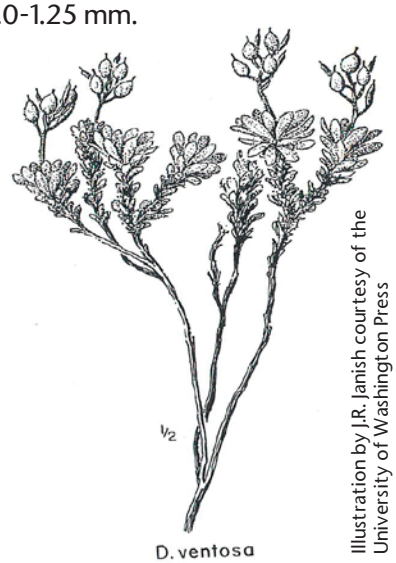
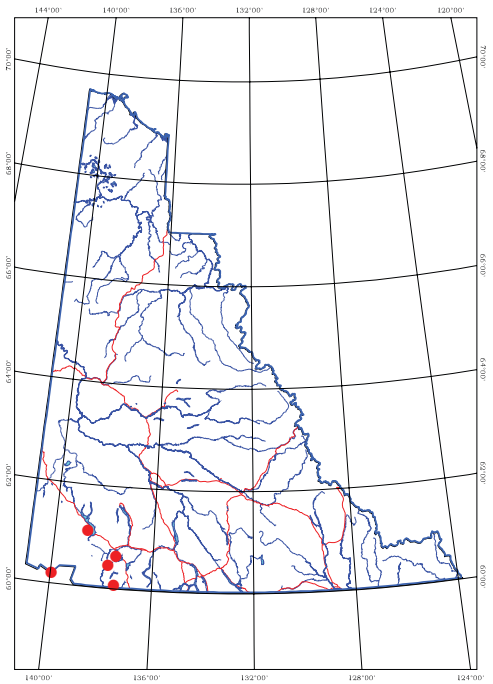


Illustration by J.R. Janish courtesy of the University of Washington Press





For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yukon Draba

Draba yukonensis

Mustard Family (Brassicaceae)

Habitat: Open stony ridges and grassy areas

Distribution
Yukon: Southwestern Yukon; known only from north of Haines Junction and the north end of Aishihik Lake
World: Endemic to Yukon

CONSERVATION RANK
Global rank: Imperilled to Vulnerable (G2G3)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** (assessed) Endangered

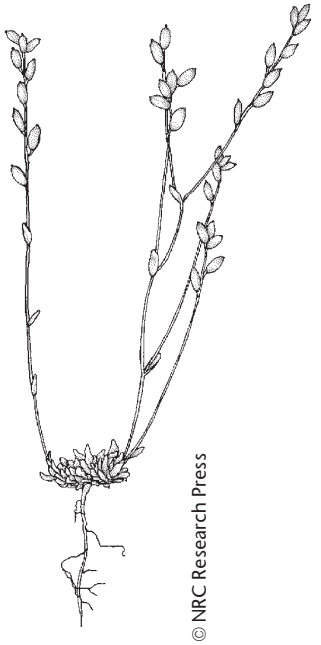
Distinguishing features: This species can be distinguish by having stellate hairs on pods and leaf surfaces with simple and forked hairs only.



G. Mussnug



YG photo



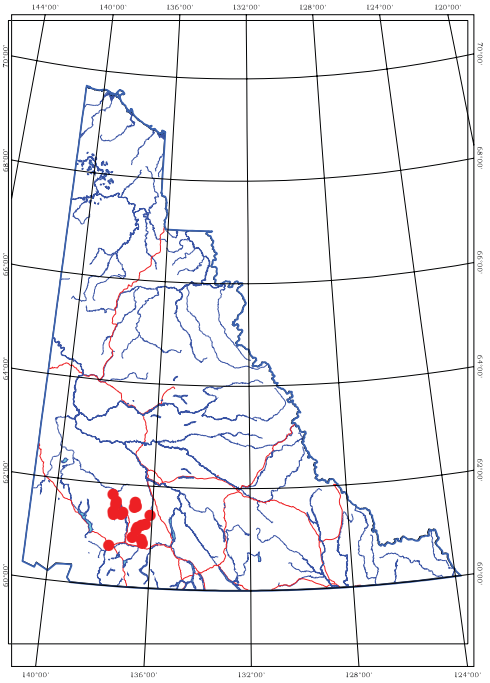
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G. Mussnug



J.Line - YG





J. Line - YG

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Muir's Fleabane

Erigeron muirii

Composite Family (**Asteraceae**)
Synonyms: Erigeron grandiflorus ssp. *muirii*

Habitat: Exposed rocky slopes and ridges, tundra, gravel barrens and sandstone outcrops

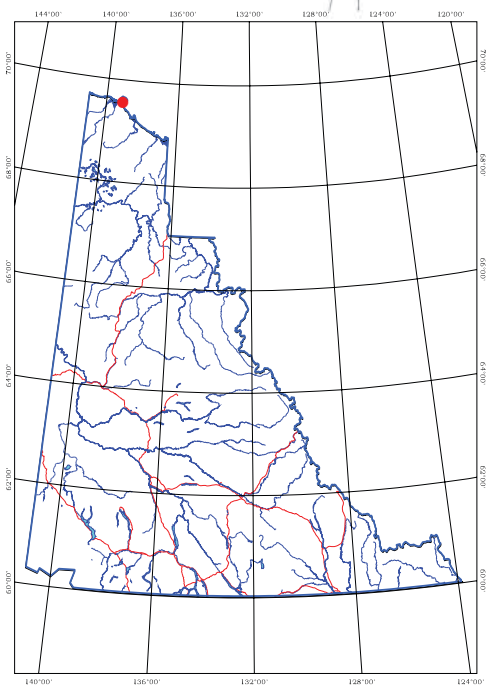
DISTRIBUTION
Yukon: Northern Yukon; known only from Herschel Island
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Imperilled to Vulnerable (G2G3)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Candidate

Distinguishing features: Similar to Porsild's Fleabane but with densely hairy (lanate) leaves. Muir's Fleabane has no glandular hairs but bears very thin, curly and intermingled hairs that are totally different than the stiffer and straighter hairs of Porsild's Fleabane which also has glandular hairs. Muir's Fleabane has stem leaves that are not clasping. Porsild's Fleabane has stems leaves that are subclasping.



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B. Bennett



F. Baldwin



B. Bennett

Porsild's Fleabane (*Erigeron porsildii*) *see distinguishing features.

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Buff Fleabane

Erigeron ochroleucus

Composite Family (Asteraceae)

Habitat: Grassy south-facing slopes

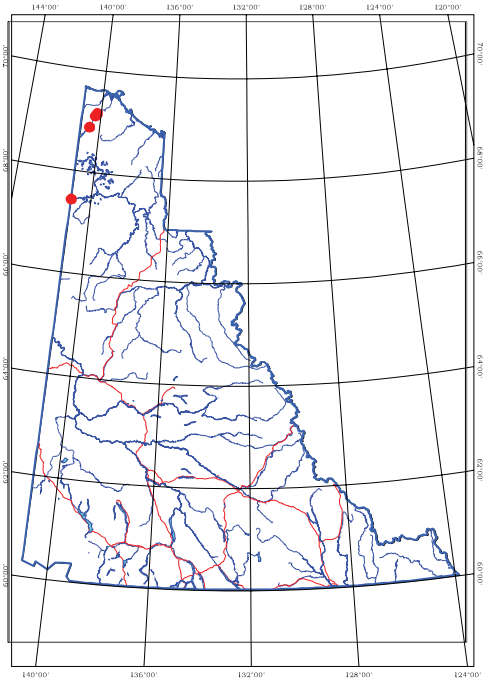
DISTRIBUTION
Yukon: Northern Yukon; known only from Rampart House and Ivvavik National Park
North America: Great Plains, British Columbia, disjunct to Yukon and Alaska
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Imperilled (N2)
Yukon rank: Imperilled (S2)
***Species at Risk Act* status:** Candidate

Distinguishing features: Resembles Cut-leaf Fleabane, *E. compositus*, by having linear leaves that are much narrower than those of the Tufted Fleabane, *E. caespitosus*. Tufted Fleabane also has a flowering base (caudice) that is branched, and is usually unbranched in Buff Fleabane.



Illustration L. Mennell - YG





J. Pojar



B. Bennett

Cut-leaved Fleabane (*Erigeron compositus*) *see distinguishing features.



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yellow Wild Buckwheat

Eriogonum flavum var. *aquilinum*

Buckwheat Family (**Polygonaceae**)

Habitat: Sandy and gravelly slopes

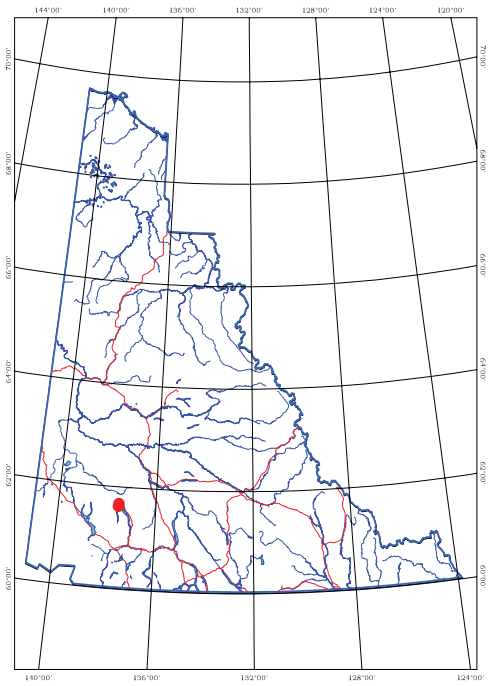
DISTRIBUTION
Yukon: Southwestern Yukon; known only from Aishihik and Sekulmun lakes
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Imperilled (G5T2)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Under Review

Distinguishing features: This species is distinctive with a stout, woody, orange coloured branched caudex. The flowers are bright yellow. Basal leaves covered with a white tomentum that is especially thick and felt-like on the undersurfaces.



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A. Ceska



A. Ceska



A. Ceska

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Showy Forget-me-not

Eritrichium splendens

Borage Family (Boraginaceae)

Habitat: Rocky alpine slopes and barrens

DISTRIBUTION
Yukon: North of 65° and the St. Elias Mountains
World: Endemic to Yukon, Alaska and Northwest Territories

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Eritrichium splendens* can be distinguished from *E. aretioides* by its leaves with appressed hairs and larger corollas (10mm). *E. aretioides* has spreading hairs and smaller flowers (to 6mm). Note: this species has recently been split into 2 species *E. boreale*, and *E. grandiflorum*.



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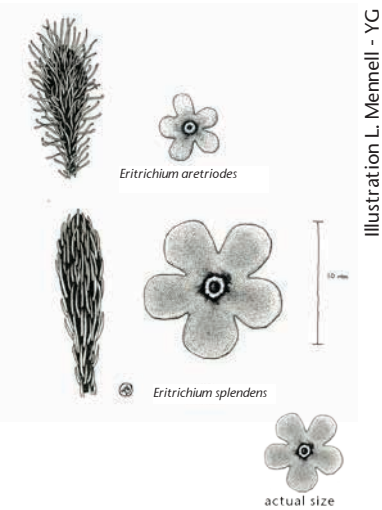
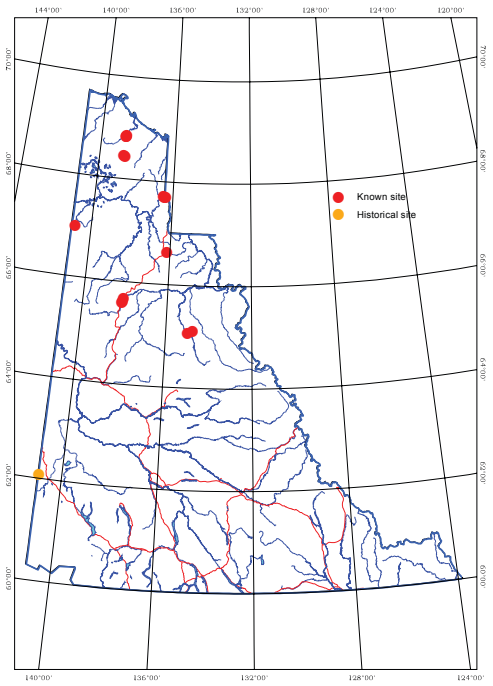


Illustration L. Mennell - YG





J. Line - YG



J. Line - YG



B. Bennett - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Dawson Wallflower

Erysimum angustatum

Mustard Family (**Brassicaceae**)
Synonym: *E. capitatum* var. *purshii*

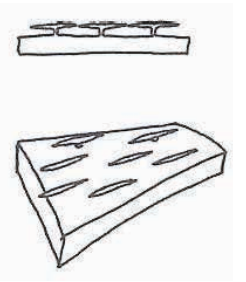
Habitat: Steep, dry, south-facing rubble slopes; rocky outcrops on steep, open-wooded slopes; dry grasslands



B. Bennett

DISTRIBUTION

Yukon: Central and southwest Yukon
World: Endemic to Yukon and Alaska



Malpighiaceous hairs

Illustration J.G. Harris

CONSERVATION RANK

Global rank: Vulnerable (G3)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Not At Risk (1993)

Distinguishing features: *Erysimum angustatum* is separated from other *Erysimum* species by its small stature (≤ 30 cm), bright yellow colour, large petals (≥ 12mm), and by being densely covered in malpighiaceous hairs (hairs attached to a surface by their centres). Leaves are clustered at the base.



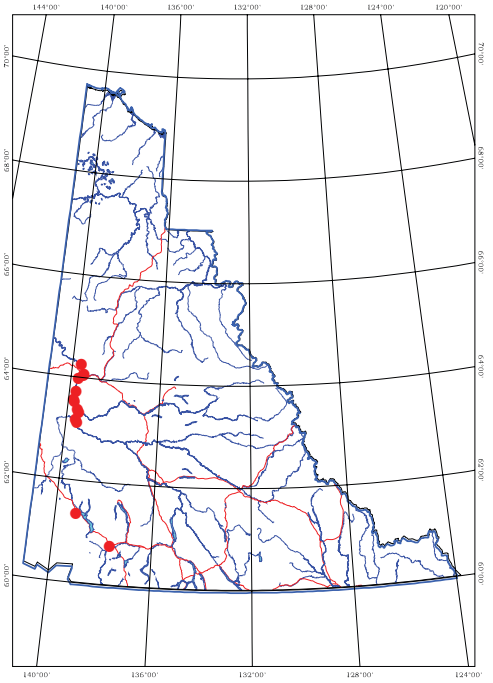
Illustration courtesy of NRC Research Press



Small-flower Prairie Wallflower (*E. coarctatum*) note leaves are not clustered



Dawson Wallflower





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Three-flowered Avens

Geum triflorum

Rose Family (**Rosaceae**)

Habitat: Dry prairie and grassland; grassy flats in openings in dry forest; dry gravel and sandy soils

DISTRIBUTION
Yukon: Southeast and south-central Yukon; known only from the Takhini Valley, Beaver River and near Minto
North America: Western and central North America
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: *Geum triflorum* is separated from other *Geum* species by flower colour (straw to pale purple) and habitat (grasslands).





B. Bennett

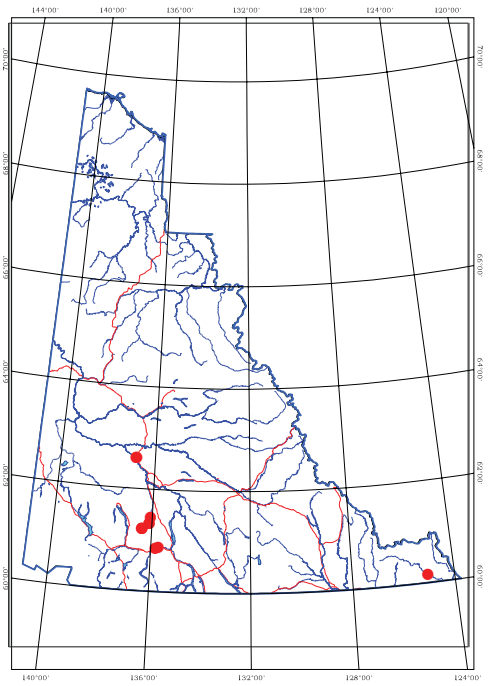


Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Four-Leaved Mare's-Tail

Hippuris tetraphylla

Plantain Family (Plantaginaceae)

Habitat: Saline or brackish lagoons and pools of maritime coastlines.

DISTRIBUTION
Yukon: Along the north coast
North America: Along coasts south to BC and east to Newfoundland and Eurasia.

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled (S2)

Distinguishing features: Leaves are in whorls of 3-5, usually 4, blunt-tipped, typically fleshy or leathery. Often growing with other *Hippuris* species. The whorls of leaves do not overlap with the ones above or below, except at the top.



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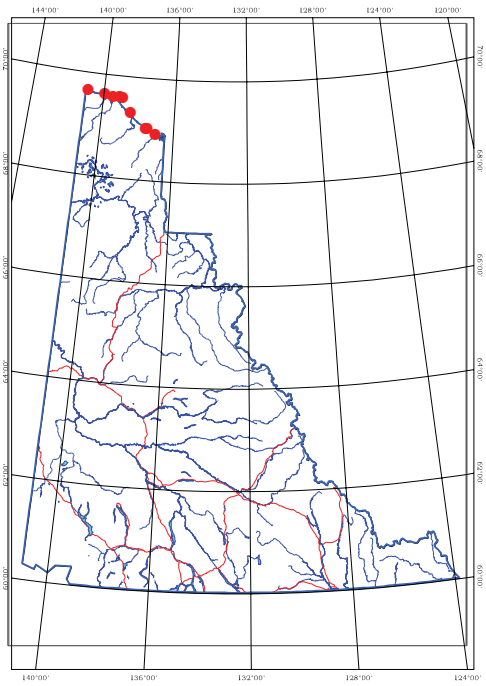
B. Bennett

Four-leaved Mare's-tail



B. Bennett

Lance-leaved Mare's Tail (Hippuris lanceolata)
*see distinguishing features





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Beach-head Iris

Iris setosa

Iris Family (**Iridaceae**)
Synonyms: *I. setosa* ssp. *interior*

Habitat: Meadows and lakeshores

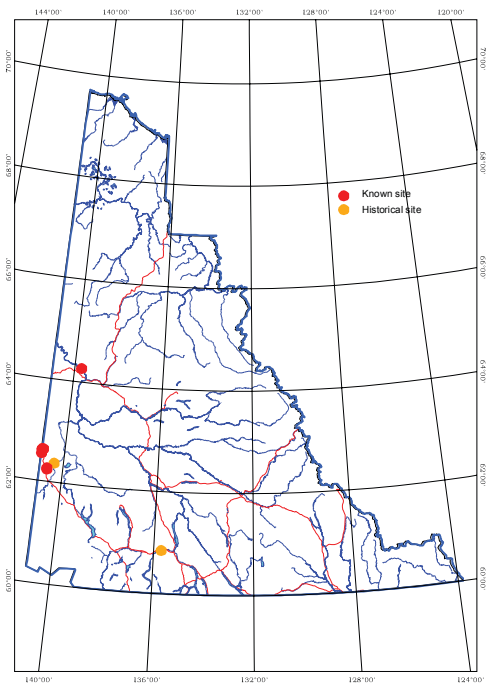
DISTRIBUTION
Yukon: Western Yukon
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: This is the only large Iris native to Yukon. It is similar to ssp. *setosa*, but differs in having shorter, more scarious and violet coloured bracts and narrower, less arched leaves.



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B. Bennett



B. Bennett



L. Schroeder

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Spiny-spored Quillwort

Isoetes echinospora

Quillwort Family (Isoetaceae)
Synonyms: *I. muricata* var. *braunii*

Habitat: Aquatic or emergent, maturing in late summer in non-calcareous silty or peaty-sand, often amongst cobble and fine gravel; typically with little or no associated vegetation.

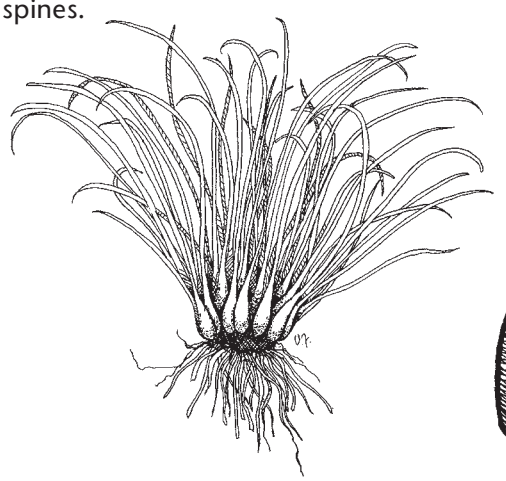
DISTRIBUTION

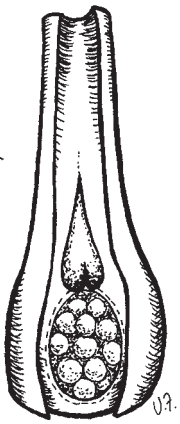
Yukon: Southern Yukon south of 62°N
North America: Throughout Canada and Alaska, and western and northeastern United States
World: North America

CONSERVATION RANK

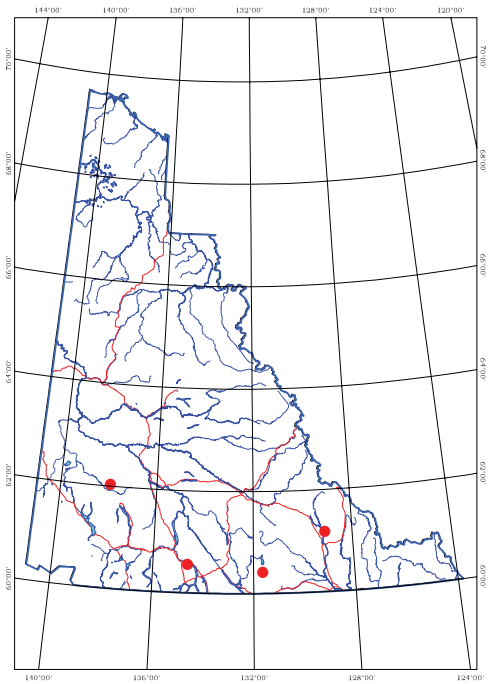
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Vulnerable (S3)

Distinguishing features: Can be separated from Maritime Quillwort, *I. maritima*, by having megaspores <30 micrometres, bearing thin sharp spines and having an obscure girdle. Maritime Quillwort has short, blunt, stout spines.





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J. Pojar



J. Line - YG



D.F. Brunton

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Yukon Conservation Data Centre

Maritime Quillwort

Isoetes maritima

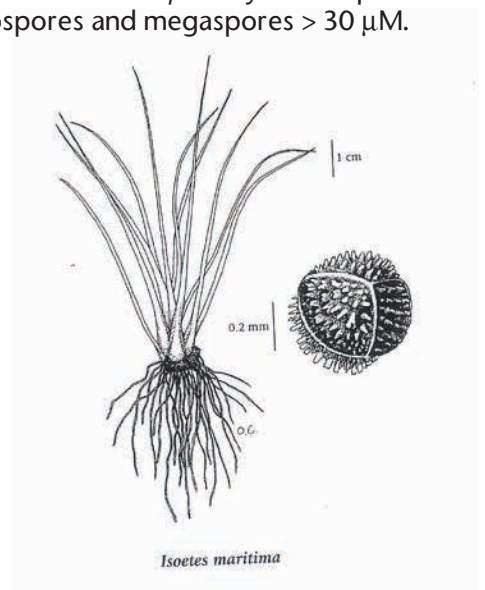
Quillwort Family (Isoetaceae)

Habitat: Emergent or aquatic, maturing in late summer in non-calcareous silty or peaty-sand, often amongst cobble and fine gravel; typically with little or no associated vegetation.

DISTRIBUTION
Yukon: North Yukon; known only from Dezadeash Lake, Turner Lake, and Ivvavik National Park
North America: BC, Alberta, Alaska, Washington
World: Northwestern North America

CONSERVATION RANK
Global rank: Apparenty Secure (G4)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: *Isoetes maritima* is separated from *Isoetes echinospora* by coarse pronounced spines on microspores and megaspores > 30 µM.



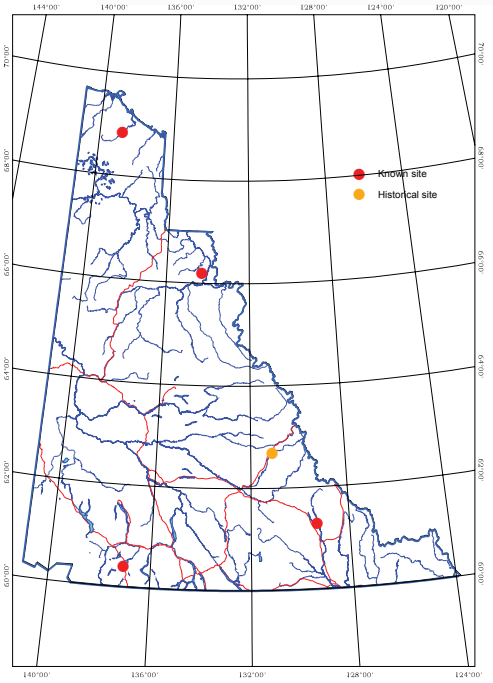
© Province of British Columbia



B. Bennett



B. Bennett





YG photo

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Oriental Junegrass

Koeleria asiatica

Grass Family (Poaceae)
Synonyms: Koeleria asiatica ssp. *atroviolacea*

Habitat: Dry to moist tundra, shale screes, Arctic Ground Squirrel burrows

DISTRIBUTION
Yukon: Southwest and northeast Yukon
North America: Alaska, Yukon and Northwest Territories
World: Amphi-Beringian

CONSERVATION RANK
Global rank: Apparenty Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

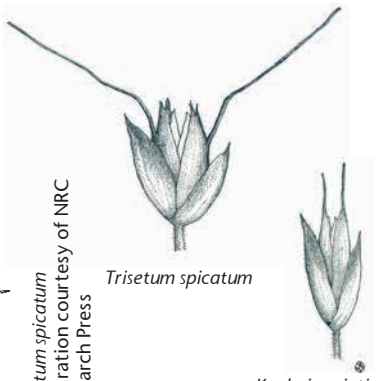
Distinguishing features: *Koeleria asiatica* is separated from *Trisetum spicatum* by having finely pubescent stems and straight awns (see below). Both have a crowded spike-like panicle, the spikelets with 2-4 florets. It can be separated from *K. macrantha* by having lemma that are hairy, purple, and are finely hairy throughout.



M. Oldham



Trisetum spicatum
Illustration courtesy of NRC Research Press



Trisetum spicatum

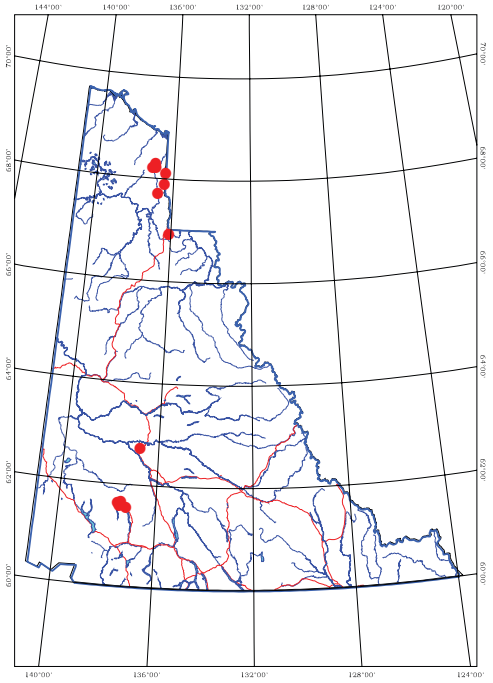
Koeleria asiatica



Koeleria asiatica
Illustration L. Mennell - YG



B. Bennett - YG





B. Bennett - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Winterfat

Krascheninnikovia lanata

Goosefoot Family (Chenopodiaceae)
Synonyms: *Ceratoides lanata; Eurotia lanata*

Habitat: Dry mountain slopes; grasslands

DISTRIBUTION
Yukon: Southwestern Yukon; Kluane National Park adjacent to Kluane Lake, lower Aishihik area and the Takhini River
North America: Yukon, Great Plains, western and southern United States. Not known from BC or Alaska.
World: North America

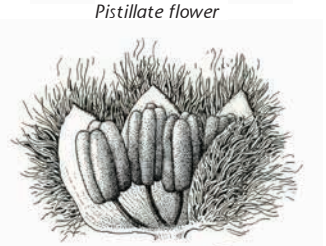
CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Resembles Pasture Sage, *Artemisia frigida*, but does not have branching leaves.



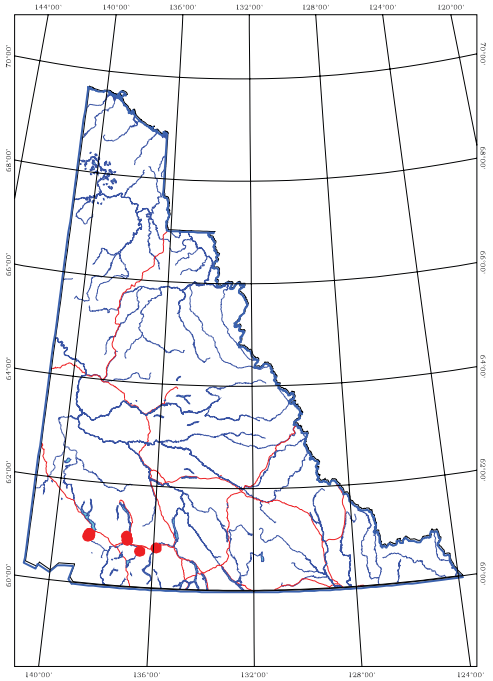


Pistillate flower



Staminate flower

Illustration L. Mennell - YG





B. Bennett

Winterfat, *Krascheninnikovia lanata*



B. Bennett

Pasture Sage, *Artemisia frigida*, notice branched leaves



B. Bennett

Winterfat habitat

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Tall Blue Lettuce

Lactuca biennis

Aster Family (Asteraceae)

Habitat: Hot springs

DISTRIBUTION
Yukon: Southeast Yukon; known only from Larsen and Beaver River hot springs.
North America: All the provinces south to New Mexico and Tennessee.
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: 20-30 bluish or whitish flowers, milky sap, pappus brown. Sap milky, leafy stems, annual or biennial.



Forrest Baldwin

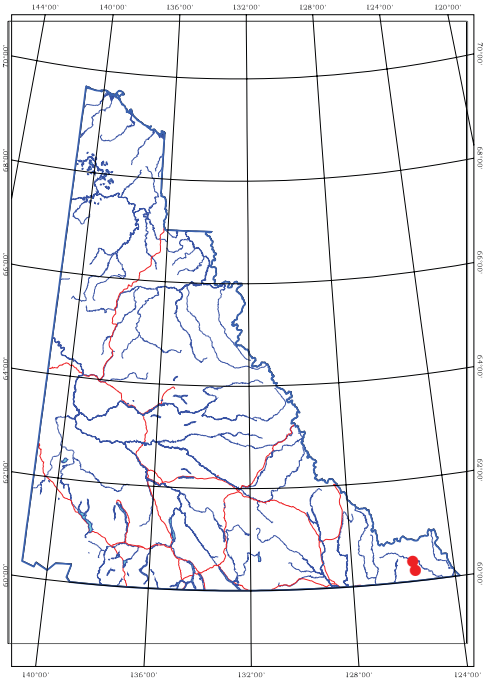




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Forrest Baldwin





C. Eckert - YG

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Beach Pea

Lathyrus japonicus

Pea Family (Fabaceae)
Synonyms: *Lathyrus maritimus* ssp. *pubescens*

Habitat: Sheltered beaches along the Arctic coast.

DISTRIBUTION
Yukon: Known only from Shingle Point and the Blow River Delta
North America: Coastal areas and the Great Lakes.
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S2)

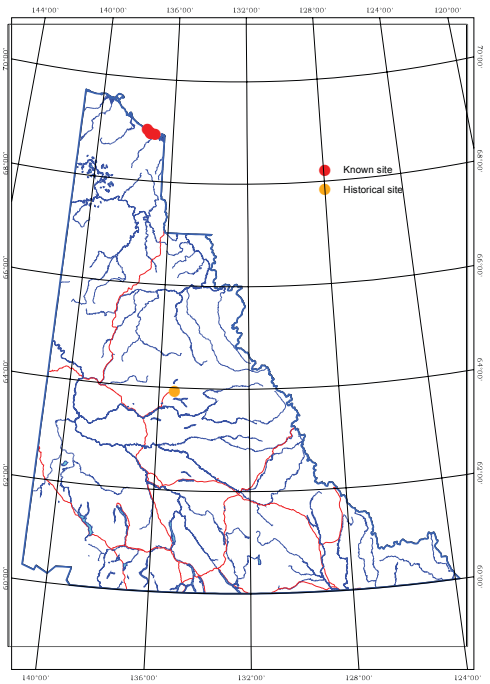
Distinguishing features: Stipules as large as or larger than leaflets, tendrils present.



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B. Bennett (YG)





T.T./ McINtosh

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Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alpine Lewisia

Lewisia pygmaea

Purslane Family (Portulacaceae)

Habitat: Alpine tundra

DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park, disjunct 1400 km from SE BC.
North America: Western North America
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Vulnerable to Apparently Secure (N3N4)
Yukon rank: Historical (SH) last reported in 1965

Distinguishing features: *Lewisia pygmaea* is separated from *Claytonia* species by having solitary flowers, linear basal leaves, petals/stamen ≥ 5, and capsule opening by a circumscissile lid.



I. Gartner

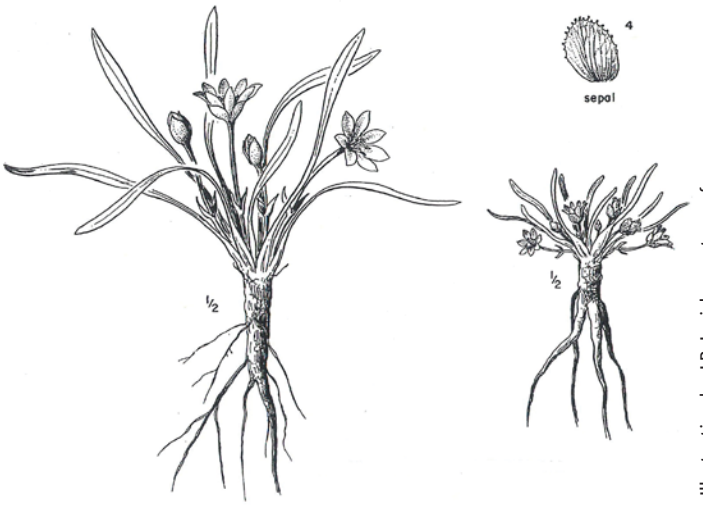
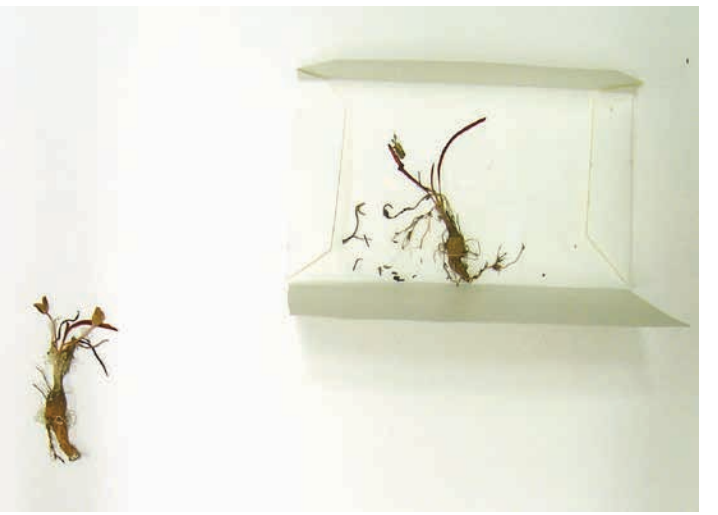


Illustration by J.R. Janish courtesy of the University of Washington Press



I. Gartner





For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Water Mudwort

Limosella aquatica

Figwort Family (Scrophulariaceae)

Habitat: Semi-aquatic, mud or wet sand next to wetlands or slow moving water



B. Bennett

DISTRIBUTION

Yukon: Potentially throughout.
North America: Western North America and across Canada
World: North America
World: Circumtemperate

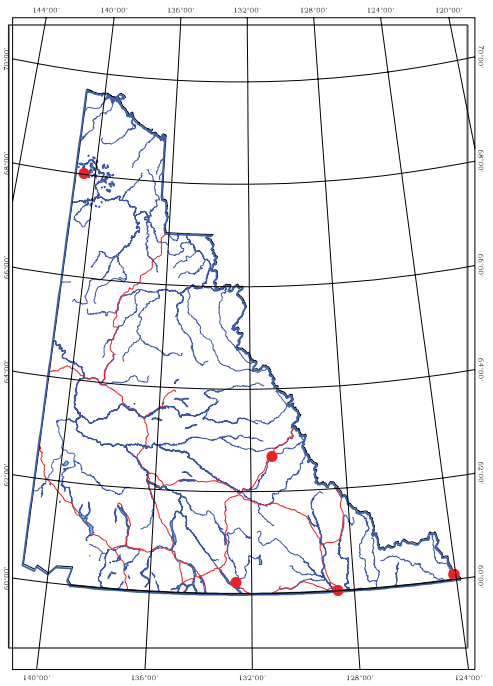
CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Hairless dwarf (2 cm tall) annual with creeping stolons forming rosettes. May be confused with *Subularia aquatica* which has 4 petals instead of 5.



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For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Sea Milkwort

WATCH LIST

Lysimachia maritima

Primrose Family (Primulaceae)
Synonyms: *Glaux maritima*

Habitat: Alkaline flats and sloughs

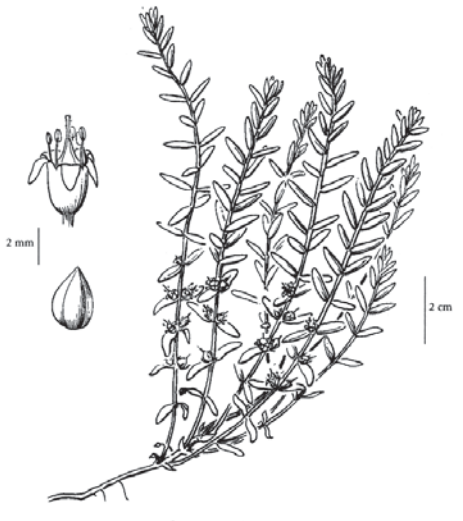
DISTRIBUTION

Yukon: Southern Yukon south of 61°N; known from between Whitehorse and Haines Junction and north to Lake Laberge
North America: Yukon and British Columbia to Atlantic coast, and western and northeastern United States
World: Circumboreal

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Low growing (<10 cm) perennial, succulent flowers solitary in axils of the leaves.



Glaux maritima

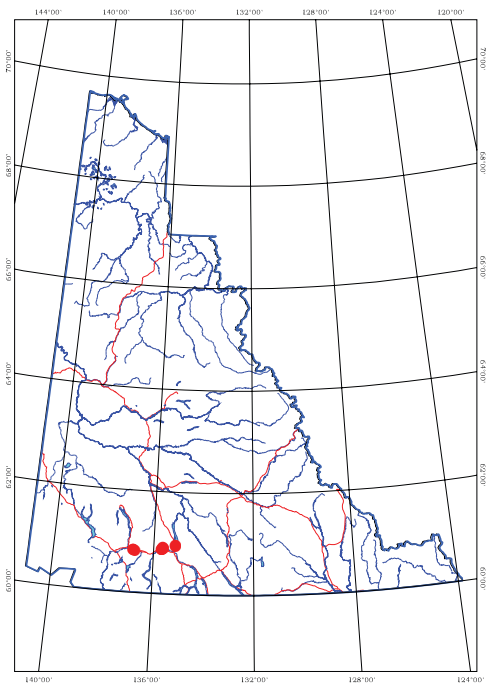
Illustration by J.R. Janish courtesy of the University of Washington Press



B. Bennett



P. Long





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Bog Adder's-mouth

Malaxis paludosa

Orchid Family (Orchidaceae)

Habitat: Fens, open sphagnum bogs

DISTRIBUTION
Yukon: Northeastern Yukon
North America: Yukon to Ontario, Alaska and Minnesota
World: Circumboreal

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Imperilled (S2)

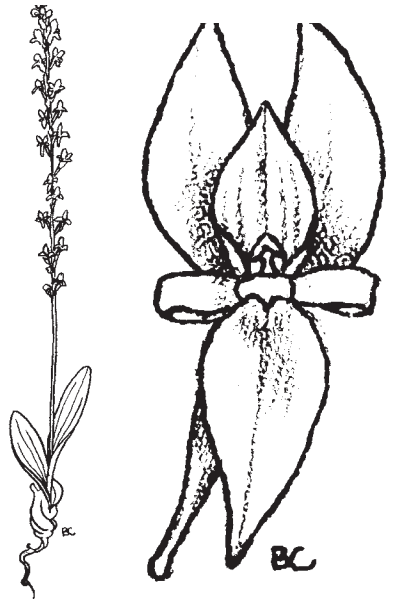
Distinguishing features: Inflorescences terminal, spike, flowers 2-55, small, petals 1-1.5 mm; leaves 2-3, <3cm long, indistinctly veined; growing from bulb-like corm with fiberous roots.



F. Baldwin



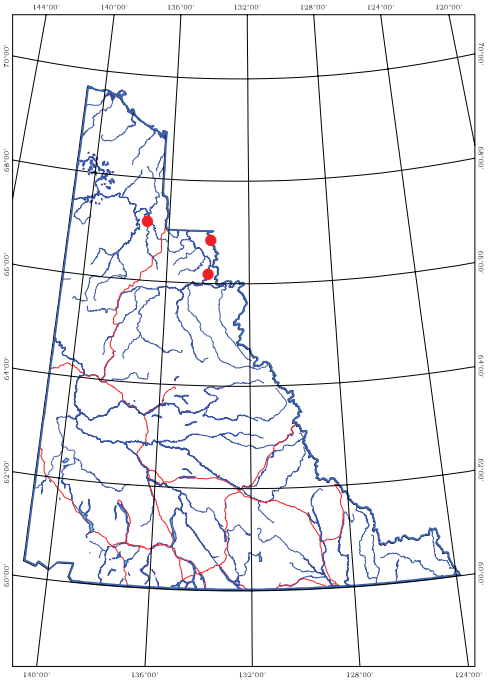
F. Baldwin



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D. Vujnovic





R. Rosie

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Ostrich Fern

Matteuccia struthiopteris

Wood Fern Family (Dryopteridaceae)
Synonyms: *Matteuccia struthiopteris var. pensylvanica*

Habitat: Moist riparian mixed forests and hotsprings

DISTRIBUTION

Yukon: Southeastern Yukon; known only from LaBiche and Beaver rivers
North America: Yukon to Newfoundland throughout the boreal zone, Alaska, northeastern United States
World: Circumboreal

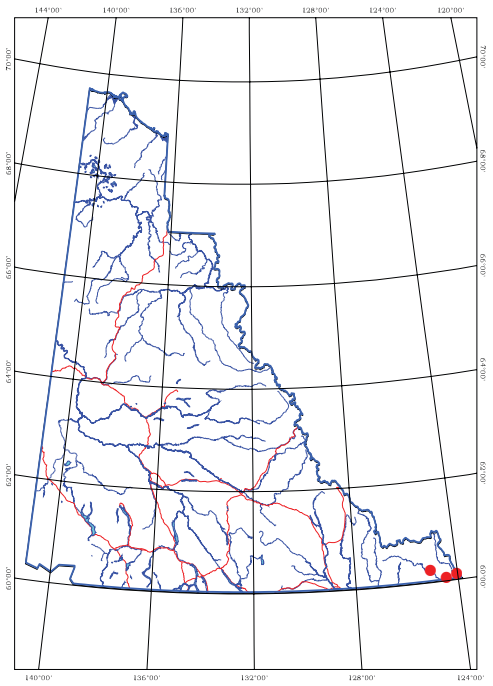
CONSERVATION RANK

Global rank: Possibly Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled to Imperilled (S1S2)

Distinguishing features: The spores are not produced on the back of the leaves, but on a separate frond, only the tiny rockbrake ferns, *Cryptogramma* spp. share this feature.



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J. Meikle



B. Bennett



L. Schroeder

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Spiked Saxifrage

Micranthes spicata

Saxifrage Family (Saxifragaceae)
Synonyms: *Micranthes galacifolia*; *Saxifraga galacifolia; S. spicata*

Habitat: Shady cool creek sides usually under birch and alder. Often associated with late season overflow ice. Moist alpine areas.

DISTRIBUTION
Yukon: West-central and southwest Yukon; known only from tributaries of the White and Yukon rivers
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Imperilled (N2)
Yukon rank: Imperilled (S2)
***Species at Risk Act* status:** Special Concern

Distinguishing features: Leaves round or kidney shaped as broad as long with a long leaf-stalk. Flowers yellow in a narrow spikelike panicle. 50-70 cm tall; up to 15 cm broad.



F. Baldwin



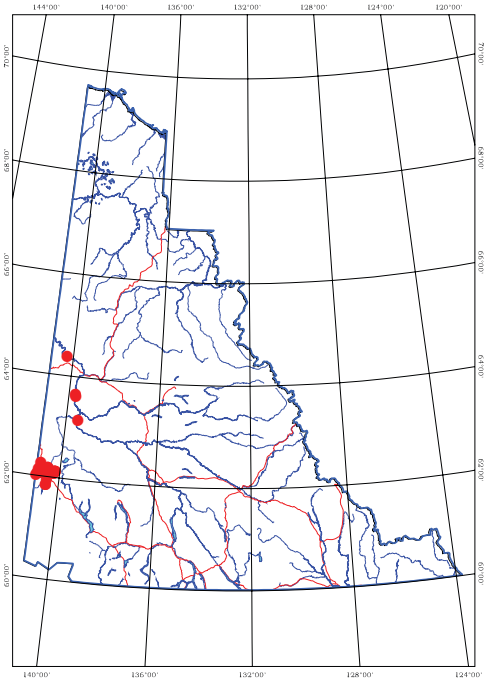
S. Dar



Shannon Stotyn



S. Cannings





S. Cannings

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Water Blinks

Montia fontana

Purslane Family (Portulacaceae)
Synonyms: *Montia lamprosperma*

Habitat: Pools, springs, meadows, other wet or moist places.

DISTRIBUTION
Yukon: North coast; Marsh Lake and Lewes Marsh.
North America: Scattered throughout the arctic regions, along the Pacific Coast to South America, along the Atlantic Coast to northeastern USA. Widespread inland in the Pacific Northwest. Scattered inland in Alaska.

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (G4G5)
Yukon rank: Critically Imperilled to Vulnerable (S1S3)

Distinguishing features: A small aquatic annual that is separated taxonomically from terrestrial *Claytonia/ Montia* by being annual. It is sometimes confused with *Crassula aquatica* (see photo), which has flowers that are erect.



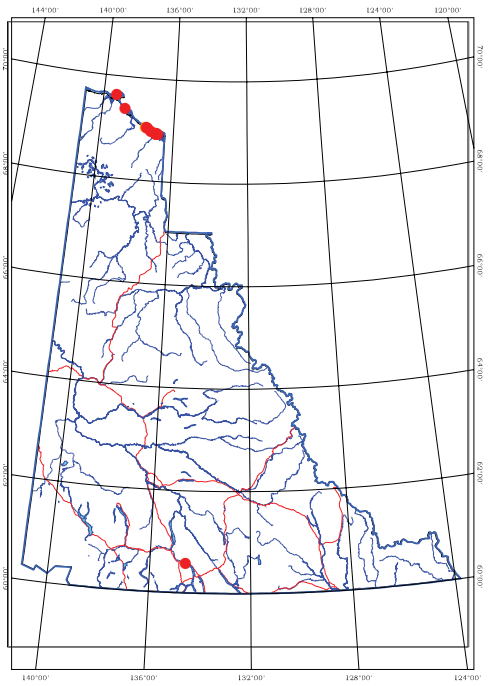
B.Bennett

Water Blinks *see distiguishing features



Mireille Delisle-Oldham

Pygmyweed (*Crassula aquatica*)





B.Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Spike Muhly

Muhlenbergia glomerata

Grass Family (Poaceae)

Habitat: Wet, rocky or peaty places along sheltered lakeshores

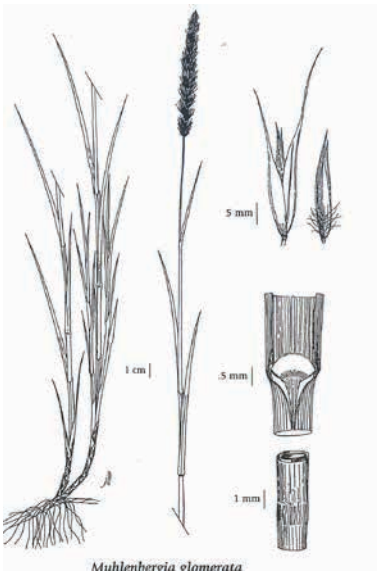
DISTRIBUTION
Yukon: Southeast Yukon
North America: North America, except southern United States
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Muhlenbergia glomerata* is separated from *M. mexicana* by having culm internodes with bristle-like hairs directed downward throughout, and from *M. richardsonis* by having flat leaves.

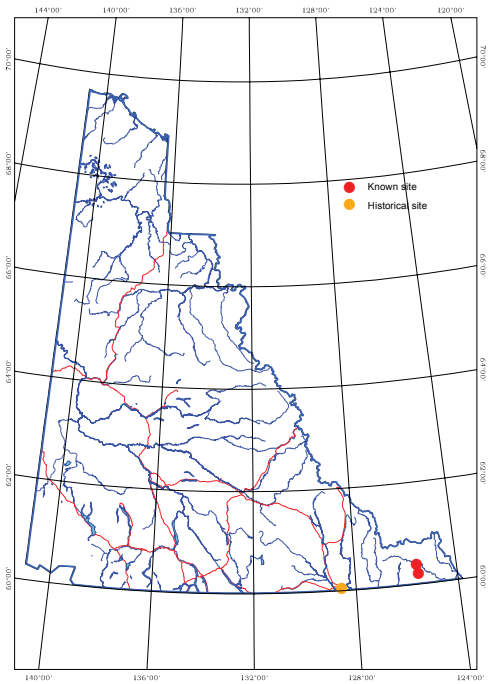


A. Ceska



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B. Bennett - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Mexican Muhly

Muhlenbergia mexicana

Grass Family (Poaceae)

Habitat: Gravel bars in vicinity of hot springs



DISTRIBUTION

Yukon: Southeast Yukon; known only from Larsen Hotsprings
North America: North America, except Prairies and northern Canada, mainly in midwest and NE US.
World: North America

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Possibly Extirpated (SH) (Last reported in 1977)

Distinguishing features: *Muhlenbergia mexicana* is separated from *M. glomerata* by having stem internodes hispidulous (with bristle-like hairs) only below the nodes or hairless and from *M. richardsonis* by having flat leaves.



Illustration by J.R. Janish courtesy of the University of Washington Press





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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Slender Naiad

Najas flexilis

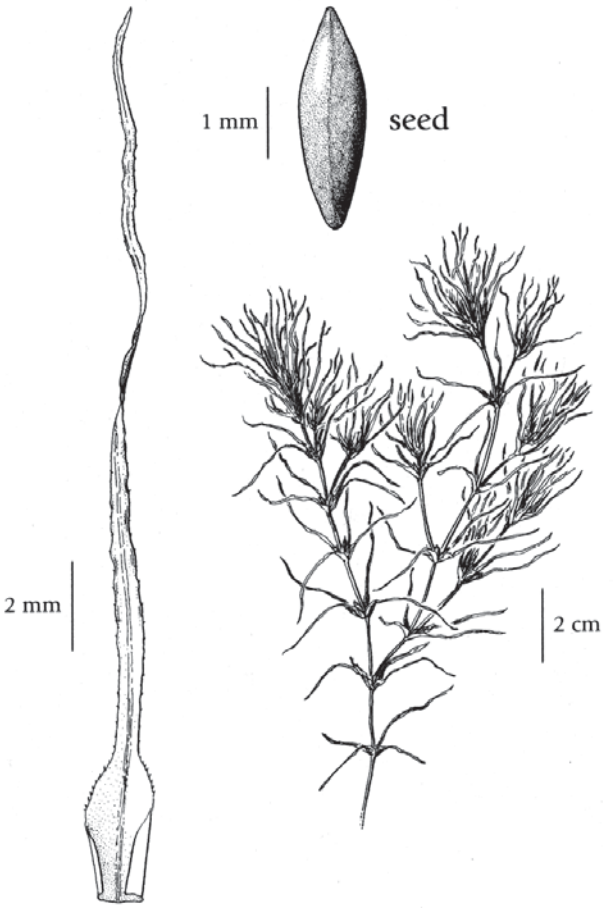
Water-lily Family (Nymphaeaceae)
Synonyms: *Caulinia flexilis*; *N. canadensis*

Habitat: Shallows of ponds and lakes; aquatic

DISTRIBUTION
Yukon: Southern Yukon; known only from Wye Lake in Watson Lake
North America: Widely scattered throughout North America
World: Circumboreal

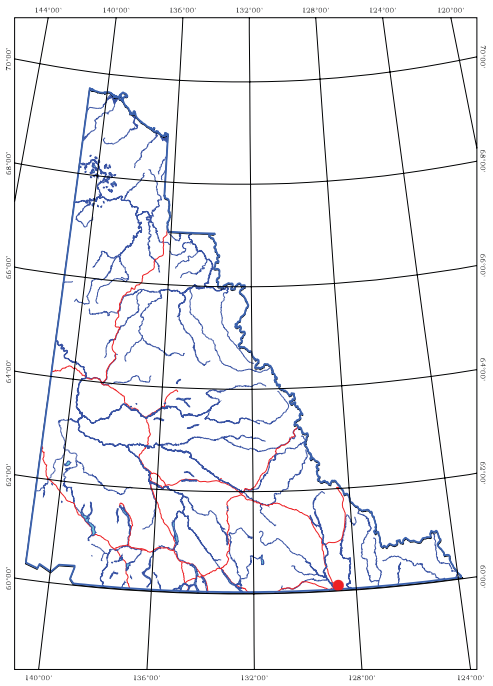
CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Can be separated from *Potamogeton* by having flowers in the axils of the leaves and *Zannichellia* by having leaf margins finely serrate.



Najas flexilis

Illustration by J.R. Janish courtesy of the University of Washington Press





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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Goldenweed

Nestotus macleanii

Composite Family (Asteraceae)
Synonyms: *Haplopappus macleanii*; *Stenotus borealis*; *Stenotus macleanii*

Habitat: Calcareous, dry stony and shaley slopes

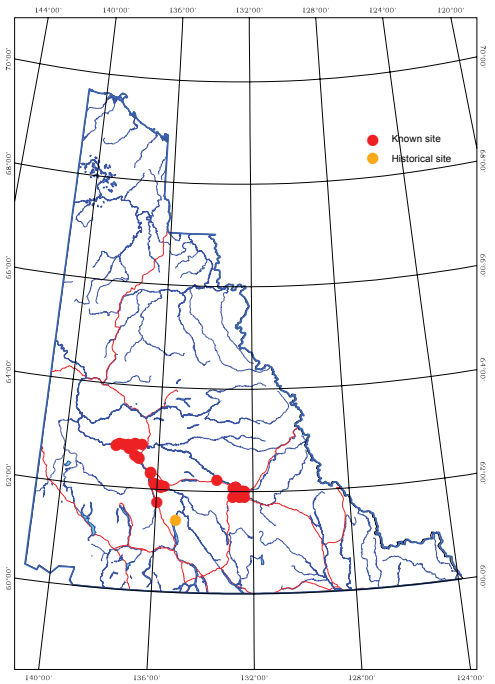
DISTRIBUTION
Yukon: Endemic to south-central Yukon

CONSERVATION RANK
Global rank: Vulnerable (G3)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)
Species at Risk Act status: Not At Risk (1997)

Distinguishing features: Densely caespitose to matted perennial from a multiheaded woody stem; leaves linear, acute, rigid, keeled, 0.5-1.0 cm long, hairy along the edges, forming whorls, mostly all basal. Flowers golden yellow, pappus tawny.



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S. Cannings

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Pygmy Water-lily

Nymphaea tetragona

Water-lily Family (**Nymphaeaceae**)

Habitat: Ponds, lakes and quiet streams

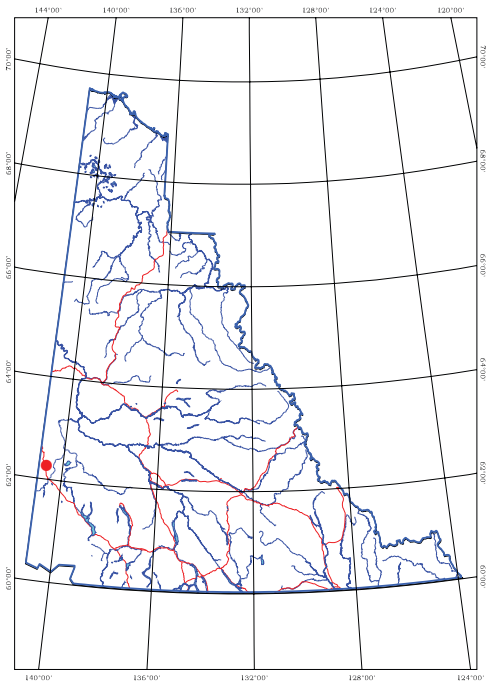
DISTRIBUTION
Yukon: Western Yukon; known only from Snag Junction
North America: Western Canada including Yukon and Northwest Territories, Alaska and northwestern United States
World: North America, Eurasia

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled to Imperilled (S1S2)

Distinguishing features: Flowers white and broadly expanding, with 4 green or purplish sepals, distinguish *Nymphaea* from Yellow Pondweed, *Nuphar* spp., that have nearly round flowers with 5 or more yellow sepals the resemble petals. Leaves of *Nymphaea* are much smaller.



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L. Schroeder



L. Schroeder



R. Rosie

Compare the size of *Nymphaea* (center) with *Nuphur* (upper left).

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yellow Owl's-clover

Orthocarpus luteus

Figwort Family (Scrophulariaceae)

Habitat: Alkaline flats and open grassy slopes

DISTRIBUTION
Yukon: Central Yukon, Faro and north of Whitehorse
North America: Yukon to Great Plains, western US
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Plant annual, flowering in July. 10-40 cm tall.





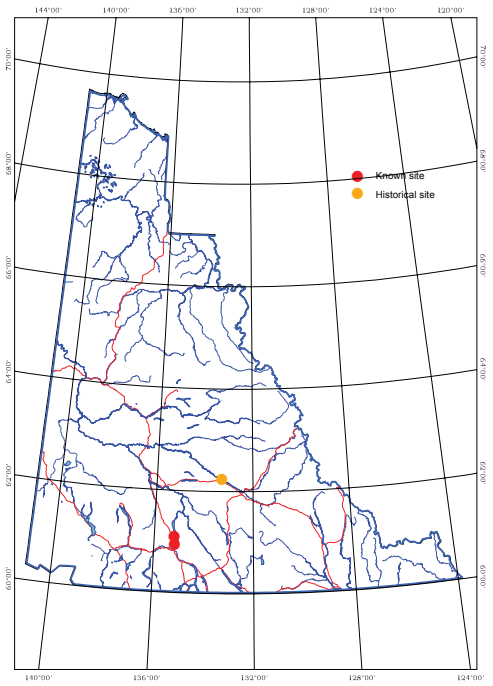
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For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Murray's Arctic Locoweed

Oxytropis arctica var. *murrayii*

Pea Family (Fabaceae)

Habitat: Alpine slopes and gravel bars

DISTRIBUTION
World: Endemic to Kluane National Park

CONSERVATION RANK
Global rank: Critically Imperilled to Imperilled (G4?T1T2)
Canadian rank: Critically Imperilled to Imperilled (N1N2)
Yukon rank: Critically Imperilled to Imperilled (S1S2)

Distinguishing features: The only locoweed with the combination of flowers blue 25 mm, 2-5 per stalk, bearing verticillate (whorled) leaves.



B. Bennett

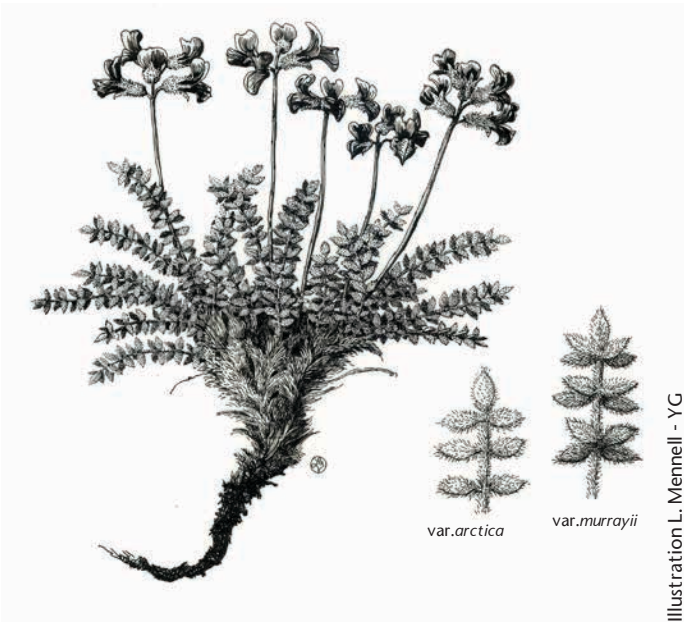
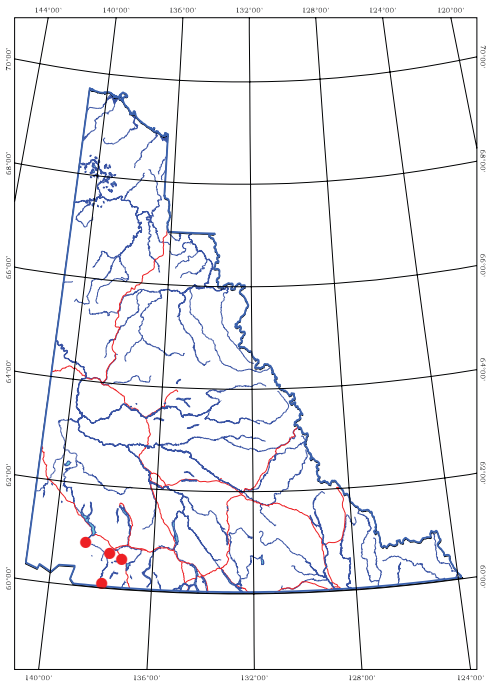


Illustration L. Mennell - YG



B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Merten's Locoweed

Oxytropis mertensiana

Pea Family (Fabaceae)

Habitat: Moist alpine slopes and gravel bars

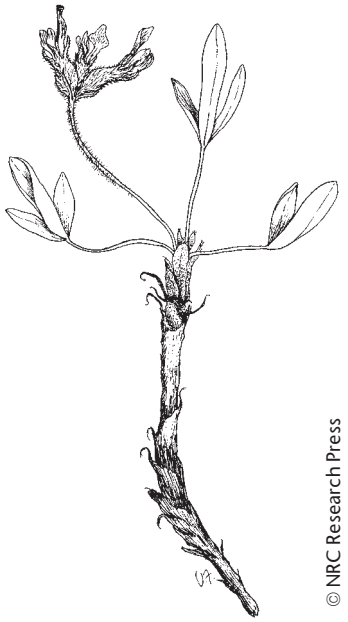
DISTRIBUTION
Yukon: Northeastern Yukon; known only from the southern Richardson and Ogilvie mountains
North America: Yukon and Alaska to Eurasia
World: Amphiberingian

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Imperilled (N2)
Yukon rank: Imperilled (S2)
***Species at Risk Act* status:** Candidate

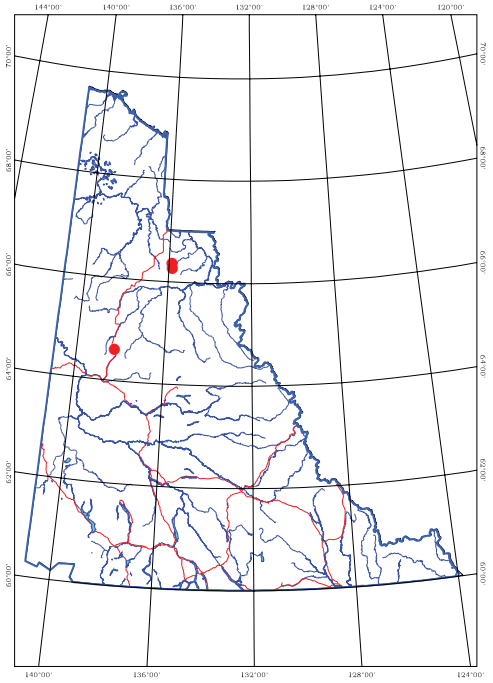
Distinguishing features: Leaves 1-3 (5) foliate, ciliate, hairless above; petals reddish violet.



B. Bennett



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Cornwallis Island Poppy WATCH LIST

Papaver cornwallisense
Poppy Family (Papaveraceae)
Synonyms: *Papaver radicatum* ssp. *polare*
Habitat: Dry calcareous alpine tundra and rocky outcrops



s. Copper

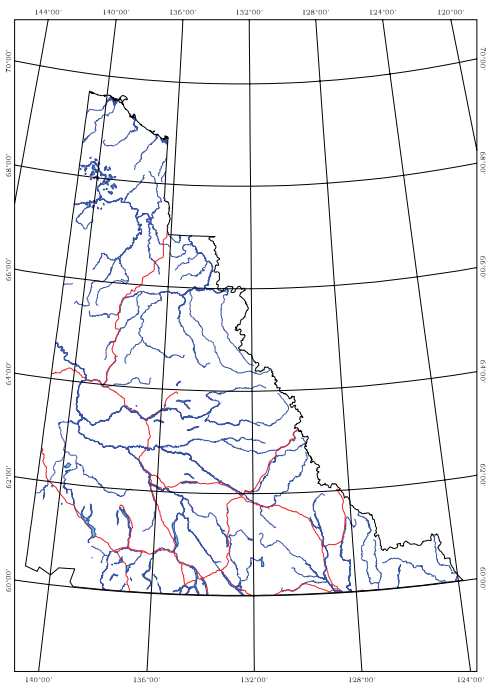
DISTRIBUTION

Yukon: Mackenzie Mountains and possibly the Richardson and St. Elias mountains
North America: Yukon and the Canadian Arctic Archipelago
World: Circumpolar with gaps

CONSERVATION RANK

Global rank: Not Ranked (GNR)
Canadian rank: Not Ranked (NNR)
Yukon rank: Unrankable (SU)

Distinguishing features: Petals white, anthers 20-30, leaves 5-lobed, lobes not overlapping, fruit as broad as long with shiny black hairs. *Papaver cornwallisense* can be separabled from *P.dahlianum* by leaf and leaf lobe shape (ovate in *P. dahlianum* versus narrow, strap-shaped in *P. cornwallisense*), leaf color (dark to bluish green versus greyish green), and in capsule shape (subglobular versus more or less elongated pear-shaped).



For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Walpole's Poppy

Papaver walpolei

Poppy Family (Papaveraceae)

Habitat: Dry calcareous alpine tundra and rocky outcrops

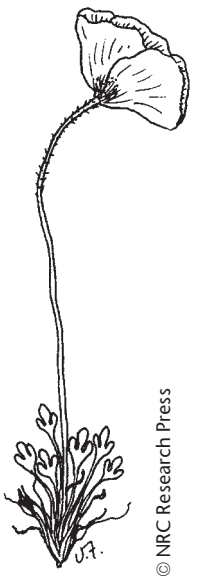
DISTRIBUTION
Yukon: West-central Yukon; known only from the Ogilvie and Wernecke mountains
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: Plant low growing, densely clump-forming. Leaves: hairless, leathery with revolute (edges curling underneath) margins, entire, mostly bearing three lobes at the tip.



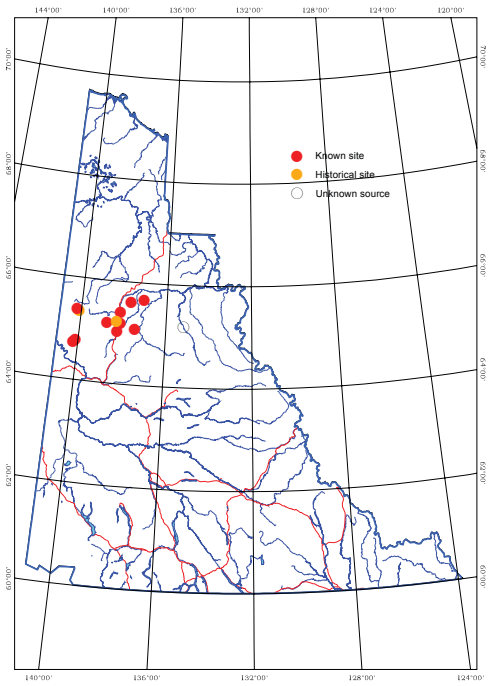
L. Schroeder



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L. Schroeder





B. Bennett



B. Bennett - YG

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Yukon Conservation Data Centre

Pennsylvania Pellitory

Parietaria pensylvanica

Nettle Family (Urticaceae)
Synonyms: *Parietaria pensylvanica* var. *pensylvanica*

Habitat: Moist, shaded areas by hot springs

DISTRIBUTION

Yukon: Southeast Yukon; known only from Beaver River and Larsen hotsprings
North America: North America, except northern Canada
World: North America

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

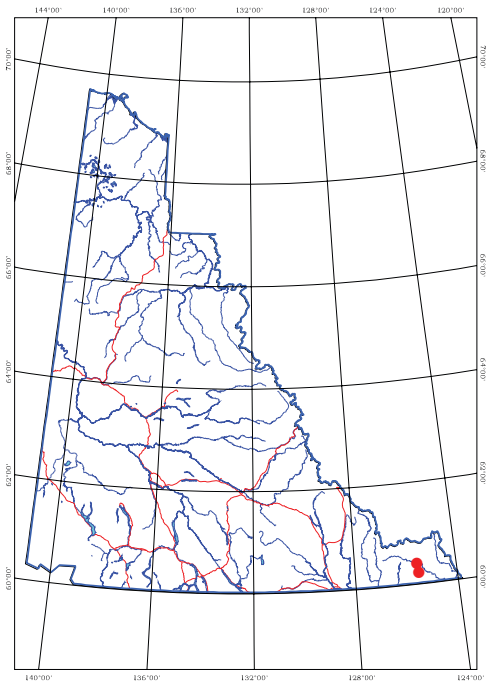
Distinguishing features: *Parietaria pensylvanica* is separated from Stinging Nettle (*Urtica dioica*) by having alternate (not opposite leaves) and no stinging hairs.



Illustration by J.R. Janish courtesy of the University of Washington Press



B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Elephant's-head Lousewort

WATCH LIST

Pedicularis groenlandica

Broomrape Family (Orobanchaceae)

Habitat: Wet calcareous meadows

DISTRIBUTION

Yukon: Southern Yukon mainly in the Watson Lake to Rancheria area, also Snafu Lake
North America: Yukon to Quebec and Labrador including northern Canada, Alaska and western United States
World: Northern North America

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Flowers shaped like the head of a miniature elephant.



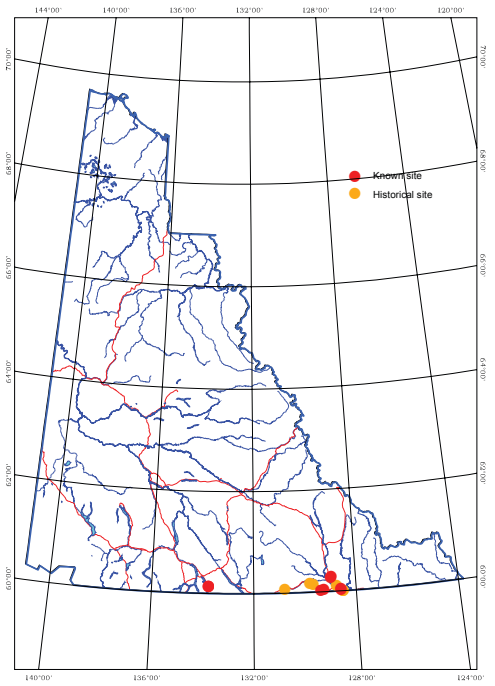
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Yukon Conservation Data Centre

Coffee Creek Scorpionweed

WATCH LIST

Phacelia mollis

Waterleaf Family (Hydrophyllaceae)

Habitat: Dry sandy or rocky slopes and turfy tundra

DISTRIBUTION
Yukon: West of 137°
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Probably Secure (G4)
Canadian rank: Apparently Secure (N4)
Yukon rank: Apparently Secure (S4)

Distinguishing features: Plant perennial, velutinus pubescent; stamens longer than corolla; filaments hairless.



J. Meikle

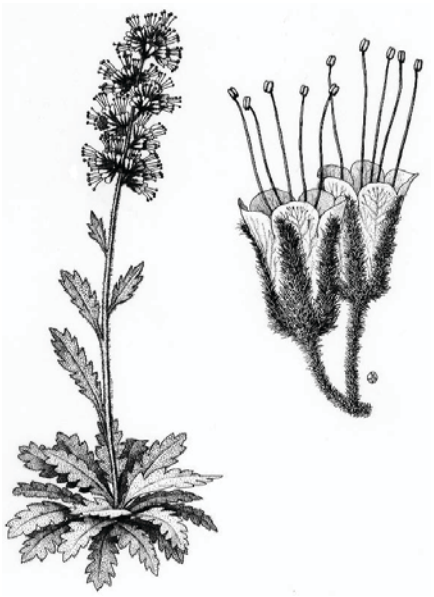
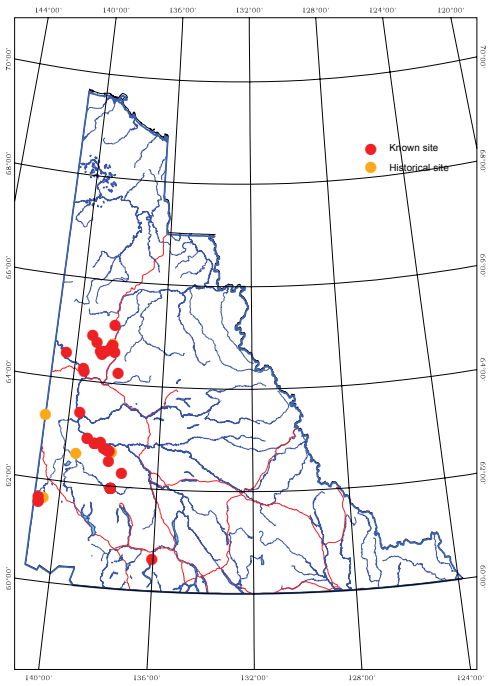


illustration L. Mennell - YG



J. Meikle





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Northern Beech Fern

Phegopteris connectilis

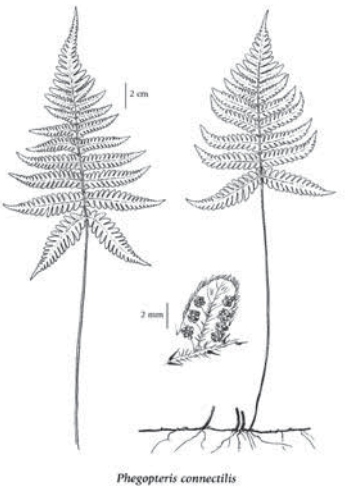
Marsh Fern Family (**Thelypteridaceae**)
Synonyms: *P. polypodioides*; *Dryopteris phegopteris*; *Polypodium connectile*; *Polypodium phegopteris*; *Thelypteris phegopteris*

Habitat: Moist alpine cliff ledges and rocky slopes

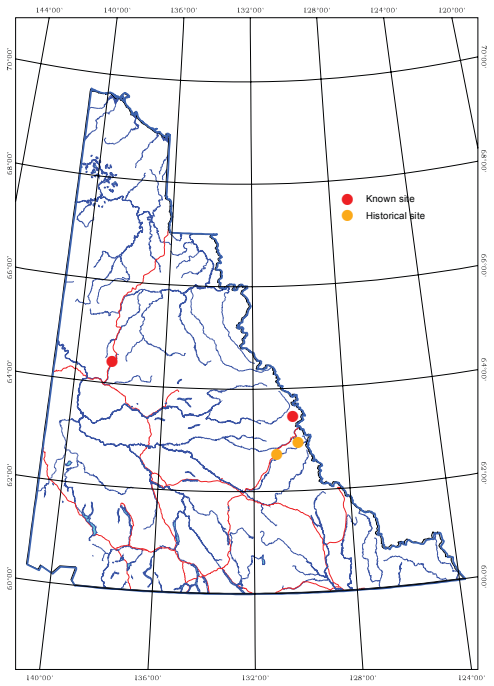
DISTRIBUTION
Yukon: Central Yukon and expected in southeast and southwest.
North America: Widespread throughout North America excluding southern United States
World: Circumboreal

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled to Imperilled (S1S2)

Distinguishing features: Indusia absent; fronds borne singly along a cordlike rhizome, fronds pinnate-pinnatifid; blades triangular, longer than broad.



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J. Pojar



Greg Brunner



B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Seaside Plantain

Plantago maritima

Plantain Family (Plantaginaceae)
Synonyms: *P. maritima* var. *juncoides*; *P. juncoides* Lam.; *P. j.* var. *glauca*

Habitat: Alkaline flats

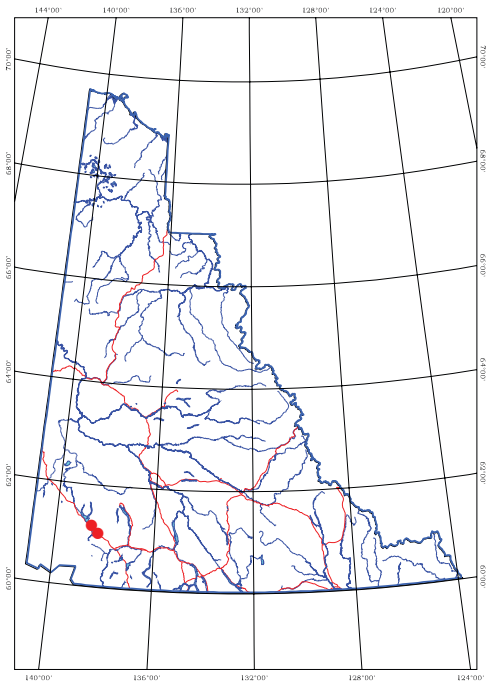
DISTRIBUTION
Yukon: Southwestern Yukon; known only from the Slims River delta
North America: Yukon to Newfoundland in Canada, Alaska, west and east coast of United States
World: Circumboreal

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Resembles the Hoary Plantain, (see photo) however has leaves that are linear to narrowly oblong; seeds flat on the inner surface and hairs that curve upwards.



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J. Riley

Sea Plantain (*Plantago maritima*)



B. Bennett

Hoary Plantain (*Plantago canescens*) *see distinguishing features



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Abbreviated Bluegrass

WATCH LIST

Poa abbreviata ssp. abbreviata

Grass Family (Poaceae)

Habitat: Shattered limestone, shrub/herb/moss-lichen tundra

DISTRIBUTION
Yukon: North Yukon
North America: Yukon, Northwest Territories, Alaska
World: Circumpolar

CONSERVATION RANK
Global rank: Not Yet Ranked (G5TNR)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: This is an arctic, caespitose, dwarf perennial, with plants tufted, contracted panicle, and short branches. *Poa abbreviata* var. *abbreviata* anthers are shorter (0.2-0.8 mm) than var. *pattersonii*, and lemma with hairs between the ribs and veins.



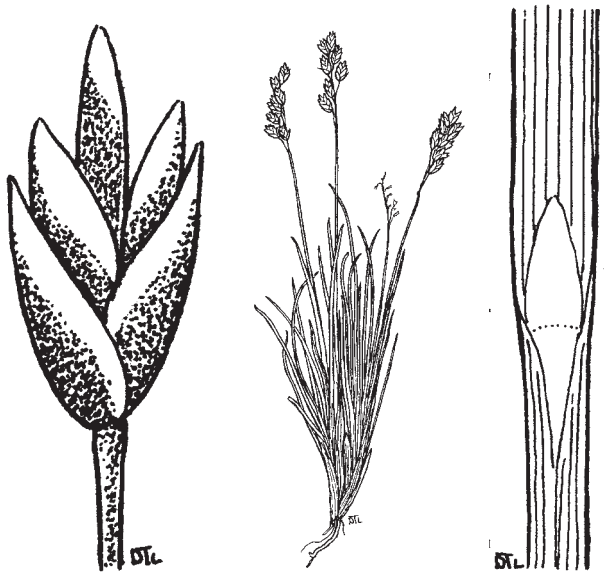
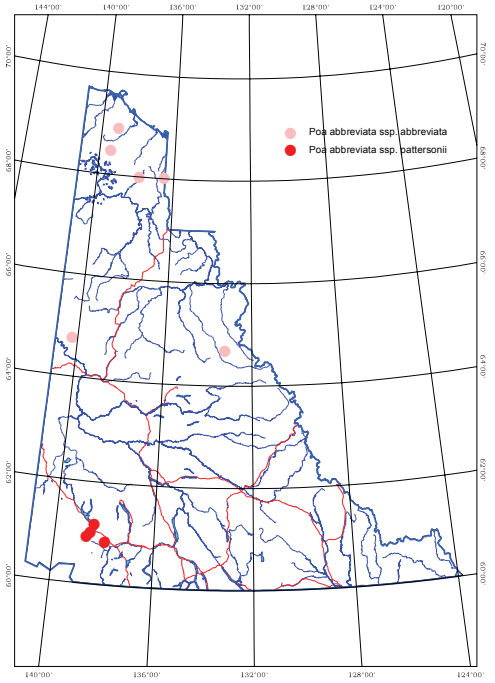




Illustration courtesy of NRC Research Press



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Yukon Conservation Data Centre

Patterson's Bluegrass

WATCH LIST

Poa abbreviata ssp. *pattersonii*

Grass Family (Poaceae)
Synonyms: Poa jordalii

Habitat: Alpine turf.

DISTRIBUTION
Yukon: Southwest Yukon
North America: Western North America
World: Amphi-Beringian; Cordilleran

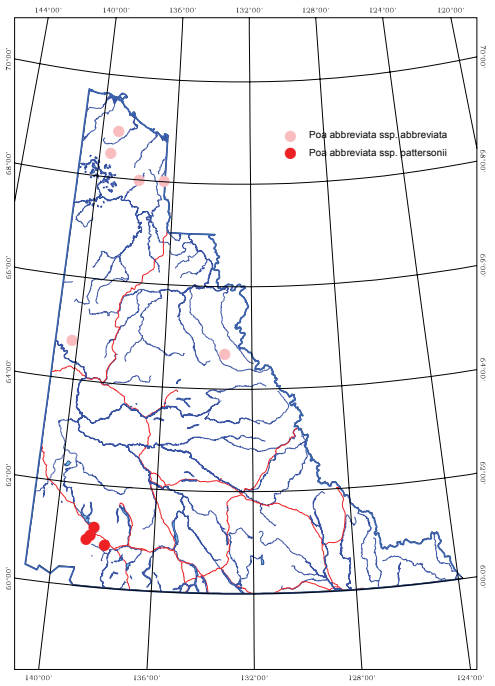
CONSERVATION RANK
Global rank: Secure (G5T5)
Canadian rank: Vulnerable (N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: *Poa abbreviata* var. *pattersonii* anthers are longer (0.6 -1.2 mm (1.8)) than var. *abbreviata* and lemma with or without hairs between the ribs and the veins. It is often confused with *P. glauca* and is separated by its predominately intravaginal branching, vegetative shoots and shorter anthers. Poa glauca has anthers >1.2 mm, usually and open panicle.





Illustration by J.R. Janish courtesy of the University of Washington Press





For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Polar Bluegrass

Poa pseudoabbreviata

Grass Family (Poaceae)
Synonyms: *P. brachyanthera*

Habitat: Open, well-drained, alpine slopes

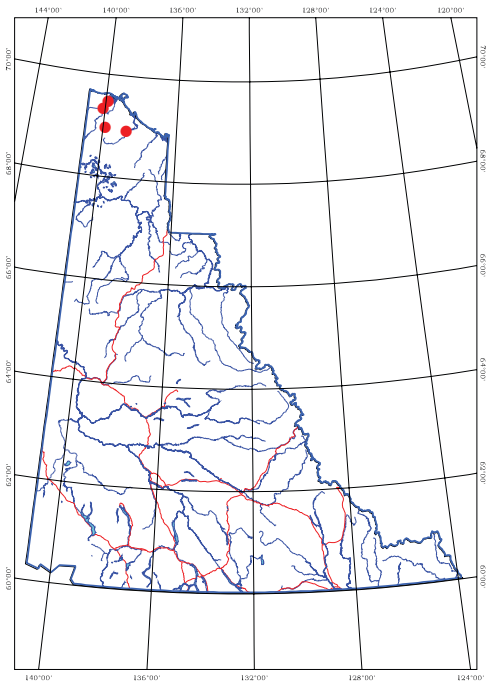
DISTRIBUTION
Yukon: Known only known from Ivvavik National Park
North America: Yukon, Northwest Territories, British Columbia and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Can be separated from all other species in the genus by the combination of the following characters: tufted habitat, anthers <1mm, , lemmas not distinctly webbed, panicle open and expanding.

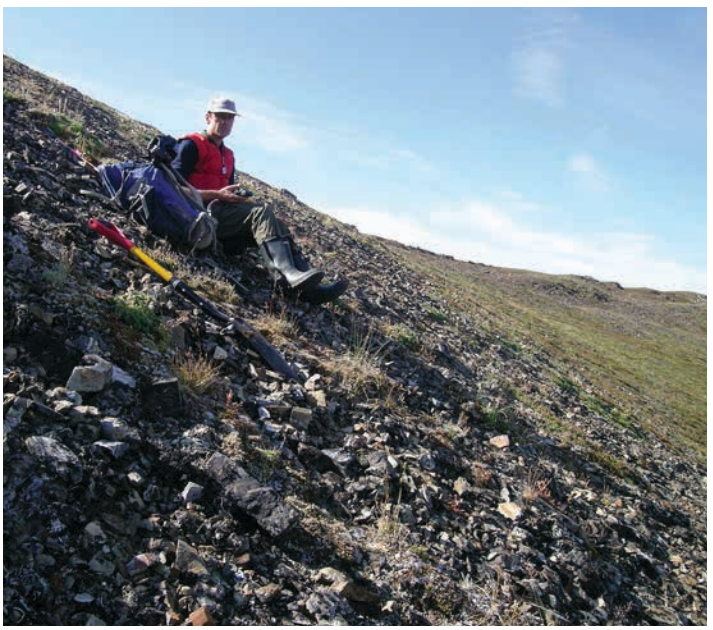


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Yukon Conservation Data Centre

Alpine Bent Grass, Mountain Bentgrass

Podagrostis humilis

Grass Family (Poaceae)
Synonyms: Agrostis humilis; *A. thurberiana; Podagrostis thurberiana*

Habitat: Open graminoid or herbaceous meadows in alpine/subalpine zones

DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park
North America: Western North America, Alaska-Nevada; Cordilleran
World: Western North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: A caespitose grass of the alpine/subalpine with relatively closed purplish panicle. It is separated from *Agrostis* sp. on the basis of relatively long palea and the elongation of the rachis beyond the base of the floret. It differs from *Calamagrostis* by its poorly developed callus hairs and awns.



YG photo

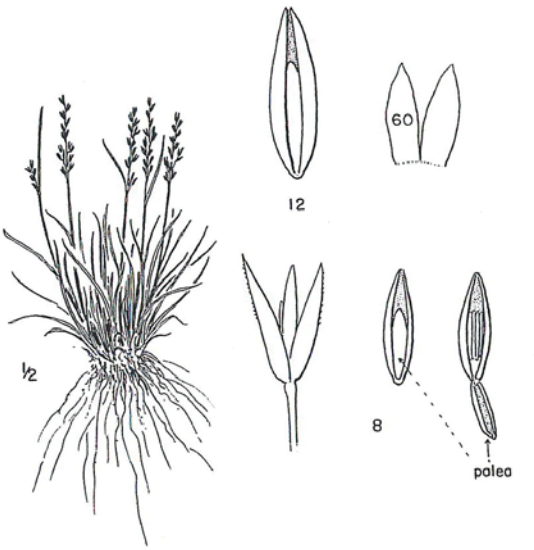
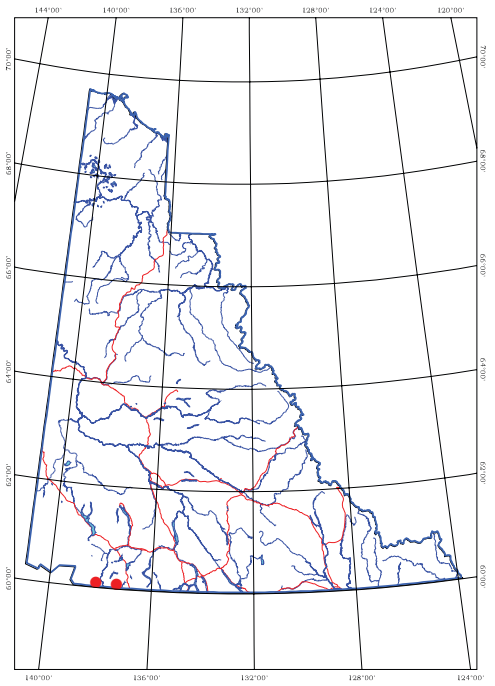


Illustration by J.R. Janish Courtesy of University of Washington Press





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Yukon Conservation Data Centre

Macoun's Podistera

WATCH LIST

Podistera macounii

Parsley Family (**Apiaceae**)
Synonyms: *Ligusticum mutellinoides* ssp. *alpinum; Pachypleurum alpinum; Ligusticum macounii*

Habitat: Dry alpine heath and stony slopes

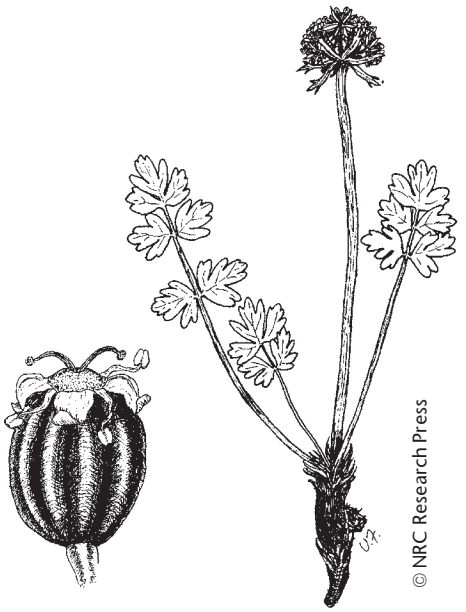
DISTRIBUTION
Yukon: West-central and northern Yukon
North America: Yukon, Northwest Territories, Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: Differing from *Podistera yukonensis* by having leathery leaves. Leaflets lobed or incised.



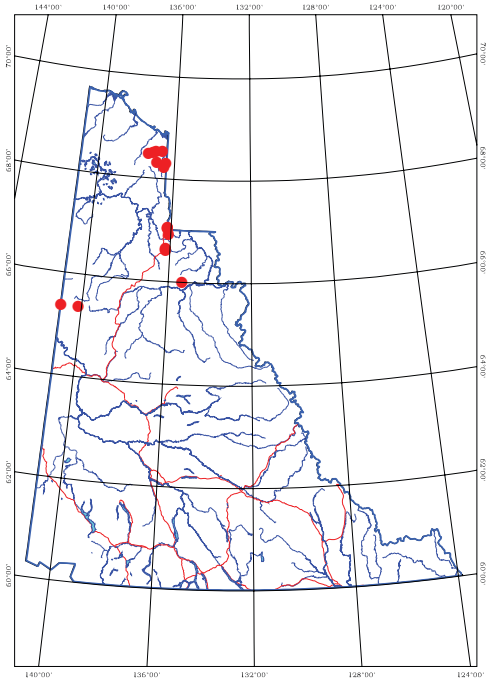
F. Baldwin

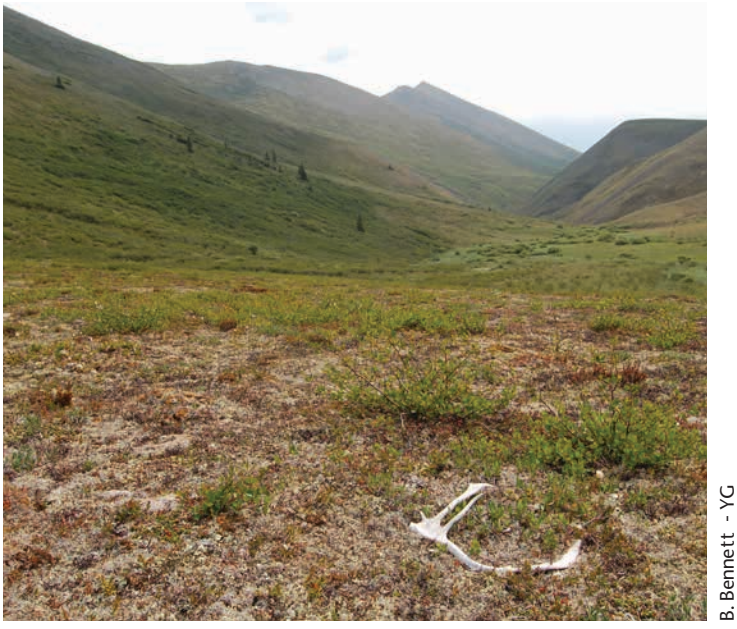


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Yukon Conservation Data Centre

Yukon Podistera

Podistera yukonensis

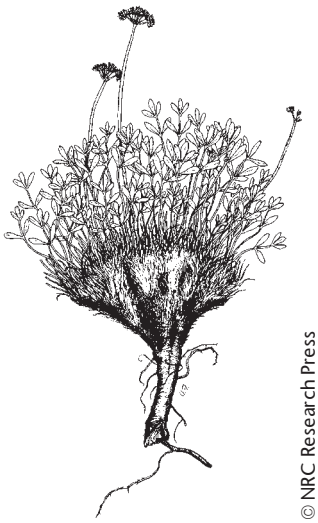
Parsley Family (Apiaceae)

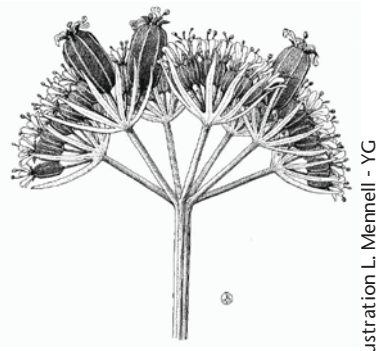
Habitat: Talus slopes and cliff crevices in sites that become snow-free early in the season. Typically volcanic or sedimentary. Not associated with limestone.

DISTRIBUTION
Yukon: West-central Yukon
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Vulnerable to Apparently Secure (N3N4)
Yukon rank: Vulnerable to Apparently Secure (S3S4)
***Species at Risk Act* status:** Special Concern

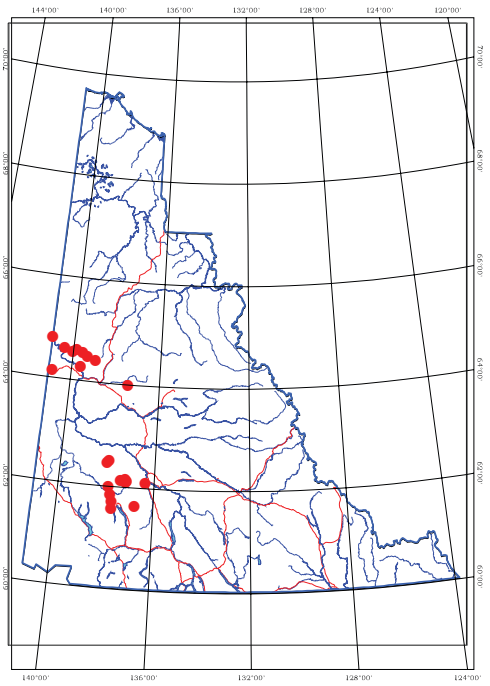
Distinguishing features: Differing from *Podistera macounii* by having a many-headed caudex. Leaflets entire or with basal ones pinnate or deeply cleft. Leaves blue-green.





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Illustration L. Mennell - YG





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S. Cannings



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alaska Jacob's-ladder

WATCH LIST

Polemonium villosissimum

Phlox Family (Polemoniaceae)

Habitat: A specialist of mobile high alpine screes and exposed ridges, mainly on calcareous or circumneutral substrates

DISTRIBUTION

Yukon: St. Elias and Ogilvie mountain ranges
World: Endemic to Yukon, BC, and Alaska

CONSERVATION RANK

Global rank: Probably Secure (G4)
National rank: Vulnerable to Probably Secure (N3N4)
Yukon rank: Vulnerable to Probably Secure (S3S4)

Distinquishing features: Can be separated from *P. boreale* by having more flowers (5-15 vs 1-5) that forms a cluster (capitate) vs open flowers. The plant lacks glandular hairs (present in *P. boreale*); anthers are yellow (*P. boreale* white).



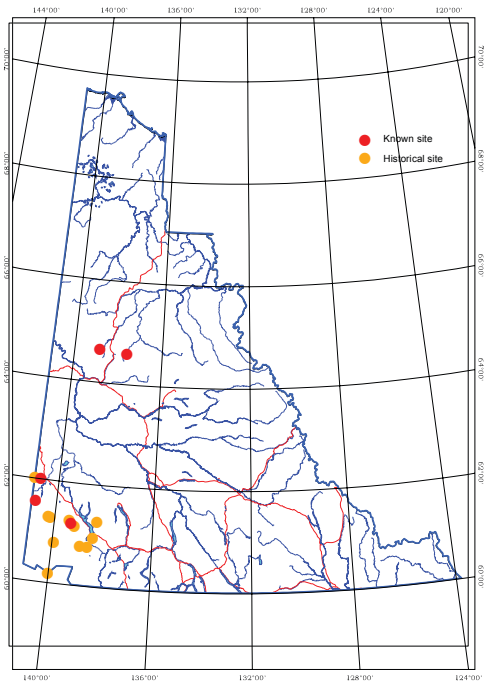
B. Bennett

Alaska Jacob's Ladder (*P. villosissimum*)



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Northern Jacob's-ladder (*P. boreale*)





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Polemonium villosissimum habitat

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Douglas' Knotweed

Polygonum douglasii

Buckwheat Family (**Polygonaceae**)

Habitat: South-facing slopes near hotsprings

DISTRIBUTION
Yukon: Southeast Yukon; known only from Crow River Hot Spring
North America: North America, except northern Canada and southeastern United States
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Polygonum douglasii* is separated from similar *Polygonum* species by having a 4-angled stem without obvious ribs, narrow linear leaves with parallel veins, and closed flowers.



J. Fenneman

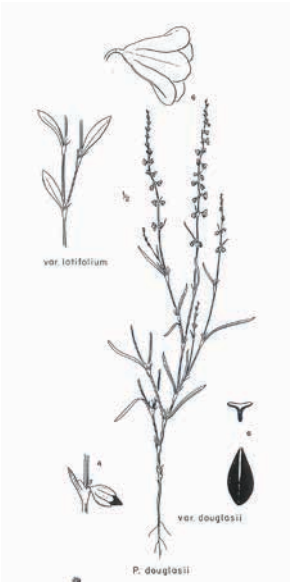
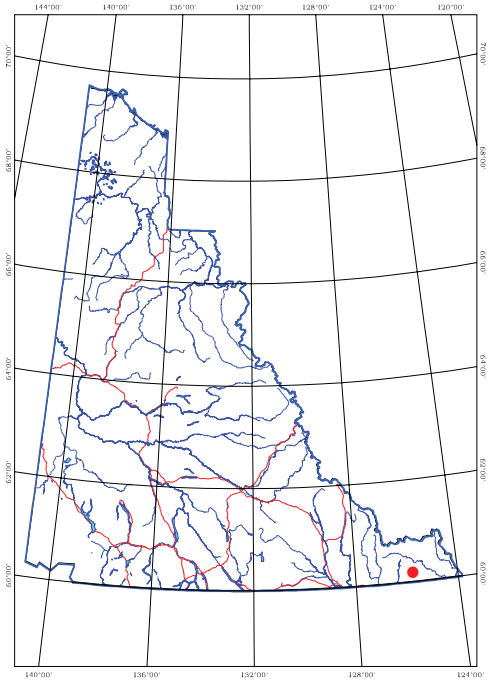


Illustration by J.R. Janish courtesy of the University of Washington Press







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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Northern Hollyfern

WATCH LIST

Polystichum lonchitis

Wood Fern Family (Dryopteridaceae)
Synonyms: *Aspidium lonchitis.*; *Dryopteris lonchitis*

Habitat: Calcareous cliffs, moist rocky slopes and talus slopes

DISTRIBUTION

Yukon: Southern Kluane National Park, the Itsi Range and Tombstone Park
North America: Western Canada disjunct to eastern Canada, western United States and Great Lakes
World: Circumtemperate

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Pinnate shaped like swords.



B. Larson

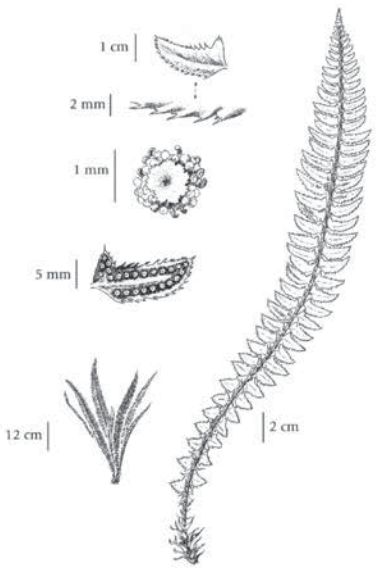
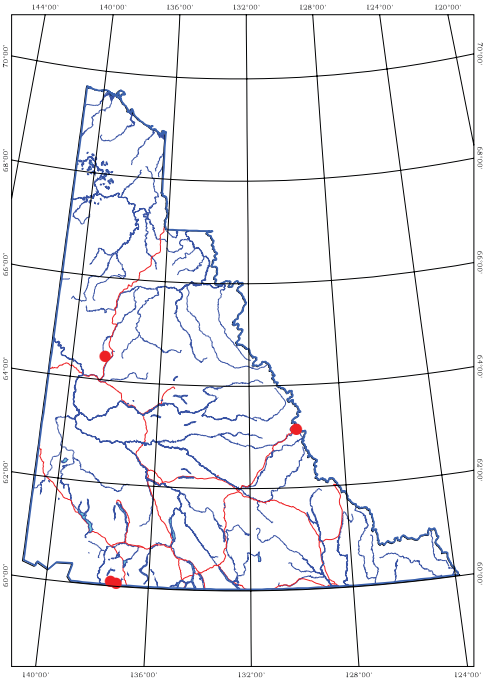


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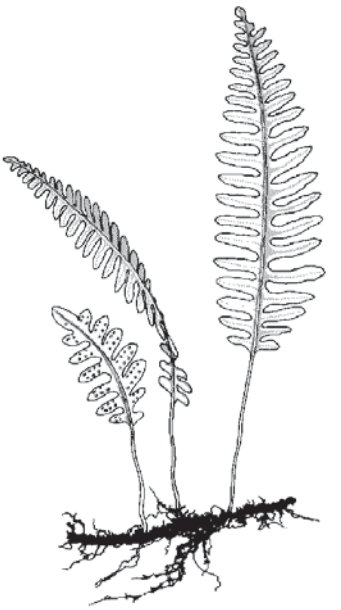
Yukon Conservation Data Centre

Siberian Polypody

Polypodium sibiricum

Polypody Family (**Polypodiaceae**)

Habitat: Shaded moist cracks and ledges on rock outcrops; on a variety of substrates including granite and dolomite.

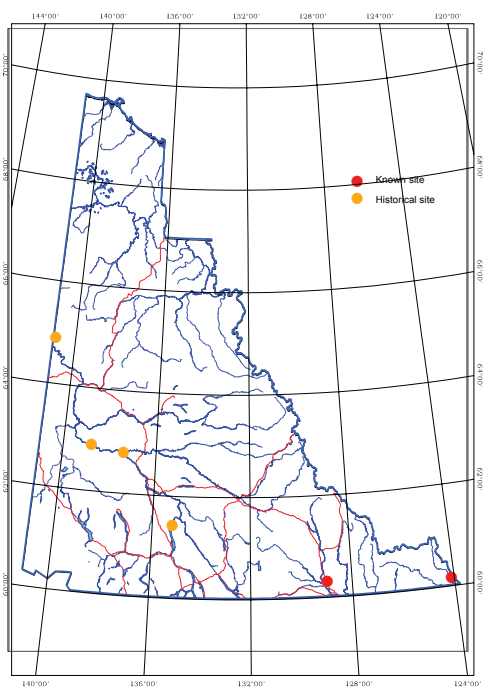


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DISTRIBUTION
Yukon: Historically reported from the Yukon River; also Tom Creek and the La Biche River.
North America: Boreal Canada and Alaska
World: Amphi-beringian across northern North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Imperilled (S2)

Distinguishing features: Leaves evergreen from a creeping rhizome, lacking indusia.





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Blunt-leaved Pondweed

Potamogeton obtusifolius

Pondweed Family (Potamogetonaceae)

Habitat: Small shallow lakes and ponds

DISTRIBUTION
Yukon: South and central Yukon; known only from Sheldon Lake and the Dezadeash River
North America: Alaska, Canada, northern States.
World: Amphi-Atlantic

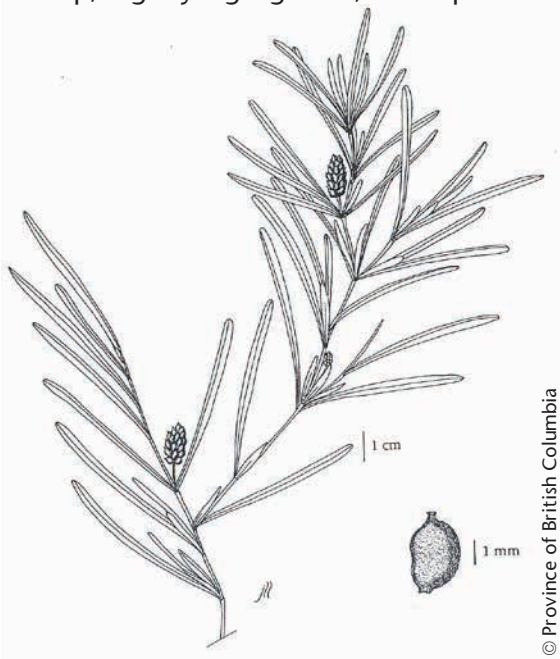
CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Critically Imperilled to Vulnerable (S1S3)

Distinguishing features: *Potamogeton obtusifolius* is separated from similar *P. friesii* by distinctive rounded leaf tip, slightly zigzag stem, and stipules not connate.

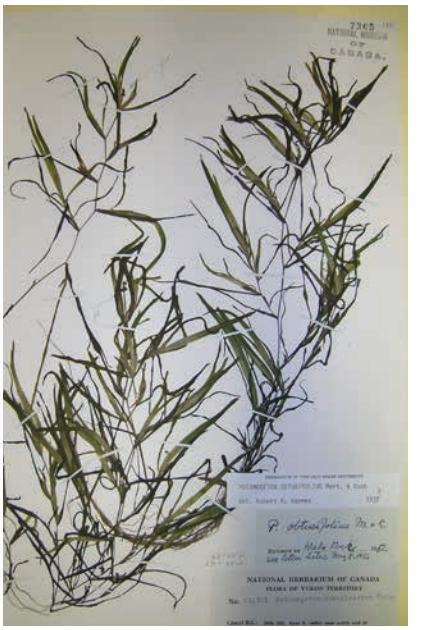




J. Fenneman

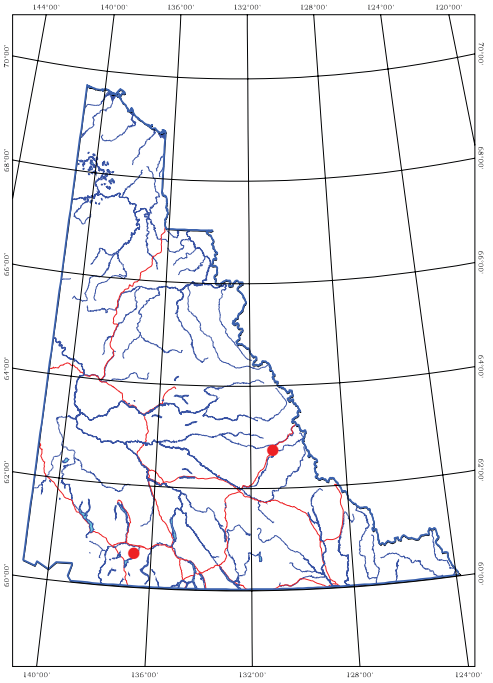


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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Straight-leaved Pondweed

Potamogeton strictifolius

Pondweed Family (Potamogetonaceae)

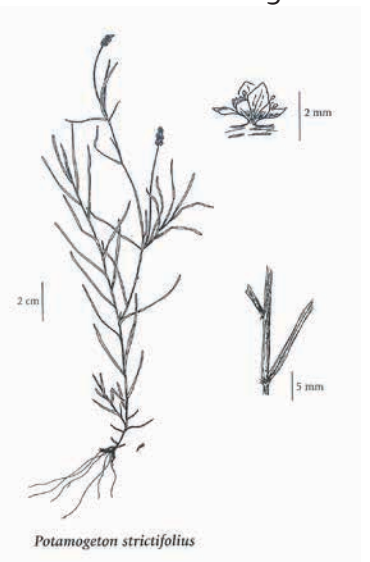
Habitat: Wetland lacking flowing water, characterized by Pond Lily and Water Arum

DISTRIBUTION
Yukon: Central Yukon; known only from northeast of McQuesten Lake
North America: Canada, Great Plains and eastern United States.
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1)

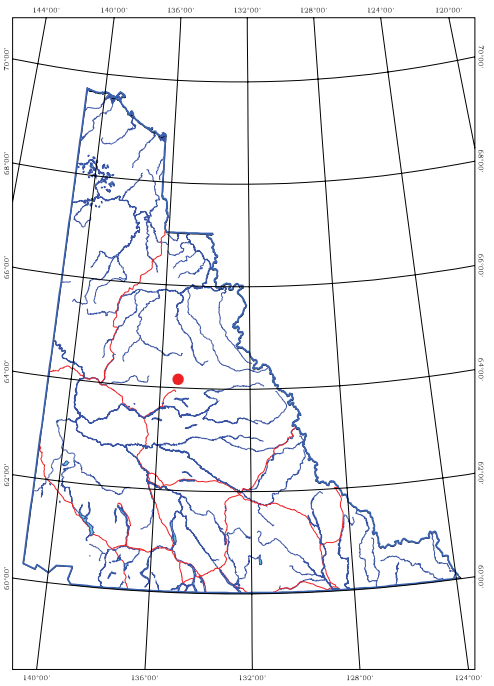
Distinguishing features: Is distinguished from *P. friesii* by leaf characters — leaf tip bristle tipped, 3-13 veins, turions flattened with inner and outer leaves in same plane, and leaf bases not corrugated.







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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yenisei River Pondweed

Potamogeton subsibiricus

Pondweed Family (**Potamogetonaceae**)
Synonyms: *P. porsildiorum*

Habitat: Shallow water

DISTRIBUTION
Yukon: East-central and northwestern Yukon. Known only from the Canol Road, Mile 65 Dempster Highway and Stokes Point
North America: Yukon, Northwest Territories, Alaska, and Quebec. Historical in Ontario.
World: Amphiberingian

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure (G3G4)
Canadian rank: Vulnerable (N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Leaves all linear, 1.5-2 mm wide, 9-17 veined. Tips with a small projection (mucronate).



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P. subsibiricus

P. friesii (not always mucronate tipped)

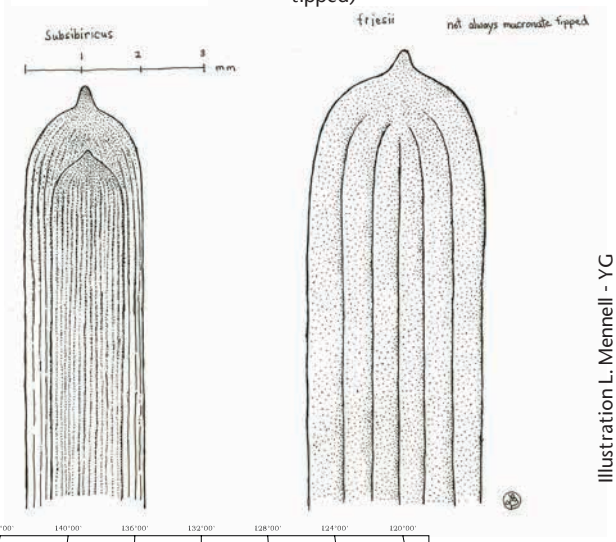
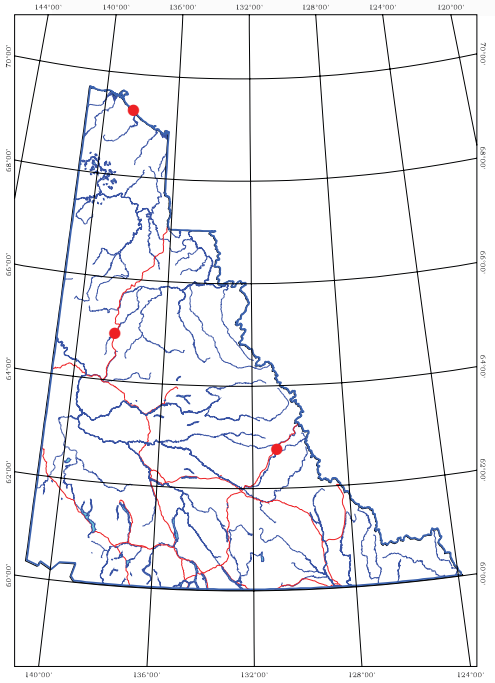


Illustration L. Mennell - YG



B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Sheep Cinquefoil

Potentilla ovina

Rose Family (**Rosaceae**)

Habitat: Alpine tundra

DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park
North America: Western North America
World: North America

CONSERVATION RANK
Global rank: Possibly Secure (G5?)
Canadian rank: Vulnerable (N3)
Yukon rank: Possibly Critically Imperilled (S1?)

Distinguishing features: *Potentilla ovina* is separated from similar *Potentilla* species by its short stature (5-15 cm) and pinnate (mostly basal) leaves with 9-12 crowded ascending segments deeply divided into 3-5 linear segments.

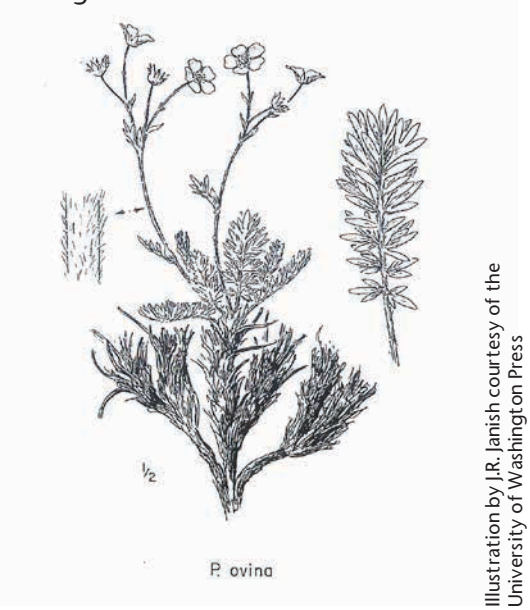
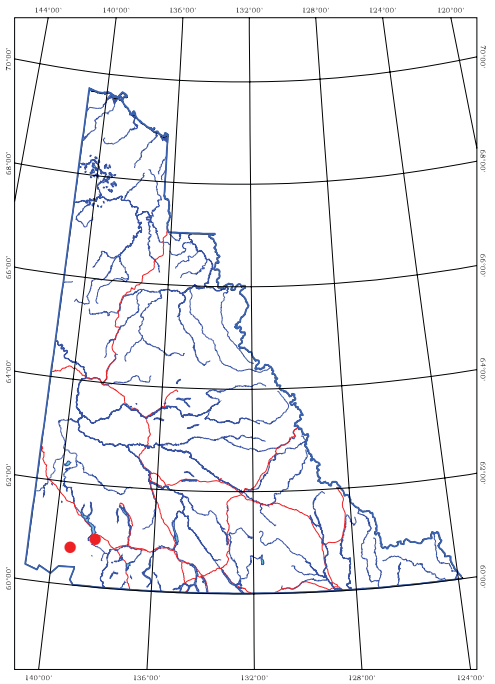


Illustration by J.R. Janish courtesy of the University of Washington Press





For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Arctic Primrose

WATCH LIST

Primula pumila

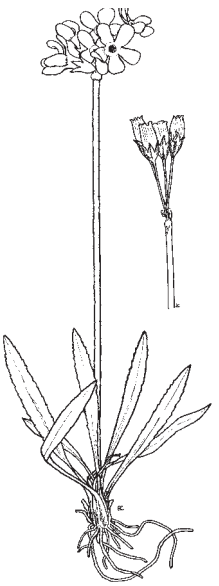
Primrose Family (Primulaceae)
Synonyms: *Primula eximia*

Habitat: Wet meadows and stream banks

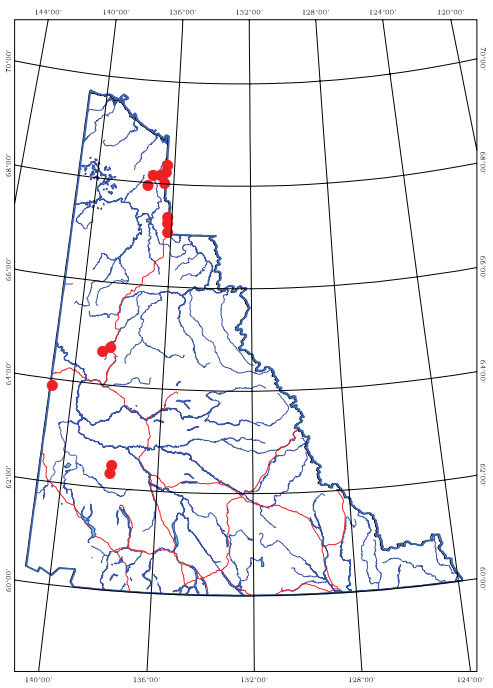
DISTRIBUTION
Yukon: Central and northern Yukon
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Can be separated from all other Yukon Primula species by its large flowers (about 2 cm across) and petals that are not notched.



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J. Pojar

Arctic Primrose *(Primula pumila)*



B. Bennett

Northern Primrose (*Primula borealis*) *see distinguishing features



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Yukon Conservation Data Centre

Vahl's Alkali Grass

Puccinellia vahliana

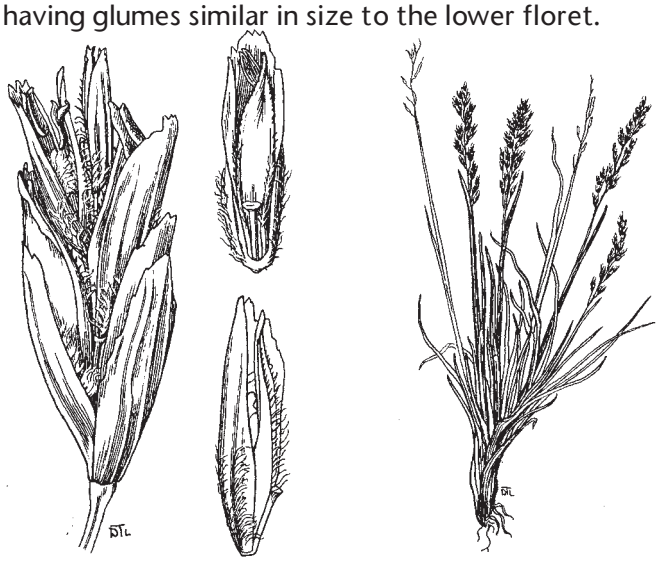
Grass Family (**Poaceae**)
Synonyms: Colpodium vahlianum

Habitat: Wet, calcareous seepage areas on mountain slopes, and open soils on coastal tundra.

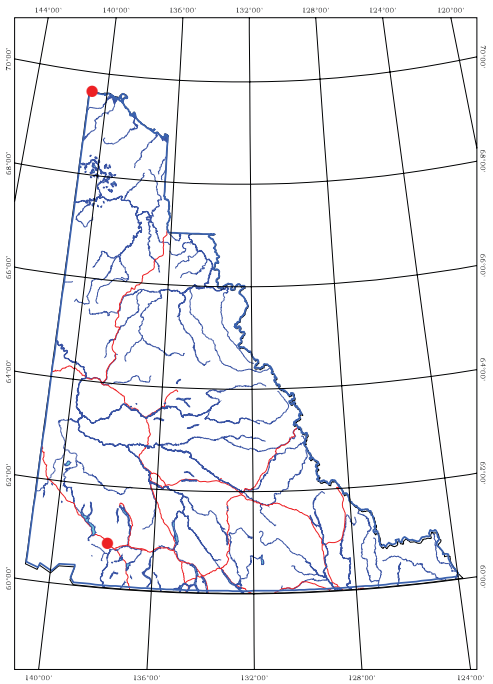
DISTRIBUTION
Yukon: Southwest and northwest Yukon; known only from Mount Decoeli and Clarence Lagoon
North America: Arctic Coast; disjunct to St. Elias Mountains
World: Amphi-Atlantic

CONSERVATION RANK
Global rank: Apparenty Secure (G4)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Puccinellia vahliana* has crinkly roots and foliage that is yellowish green with metallic lustre. It is separated from other *Puccinellia* species in having glumes similar in size to the lower floret.



Courtesy of NRC Research Press





B. Bennett -YG



B. Bennett -YG



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Five-leaved Dwarf Bramble

Rubus pedatus

Rose Family (*Rosaceae*)

Habitat: Subalpine Fir dominated open forests

DISTRIBUTION
Yukon: Southeastern Yukon; known only from Crescent Lake
North America: Cordilleran south to Oregon and Idaho
World: North America

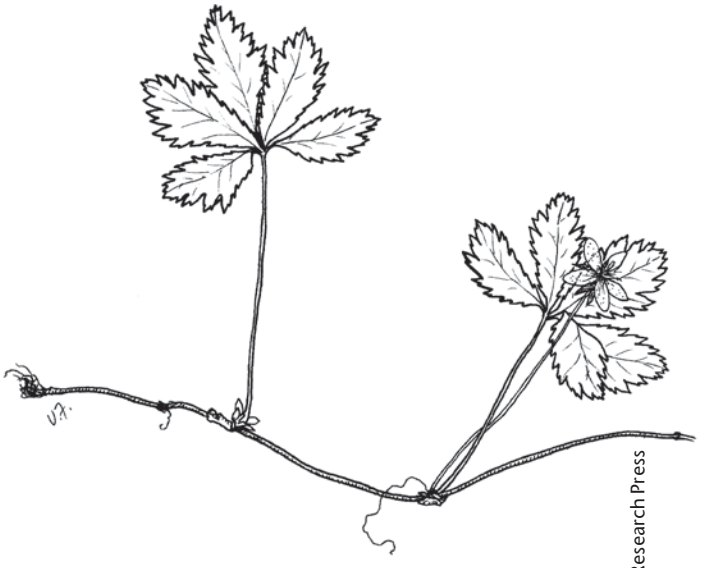
CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: creeping unarmed perennial with 5 leaflets per leaf. Flowers white.



B. Bennett

Five-leaved Dwarf Bramble (*Rubus pedatus*)

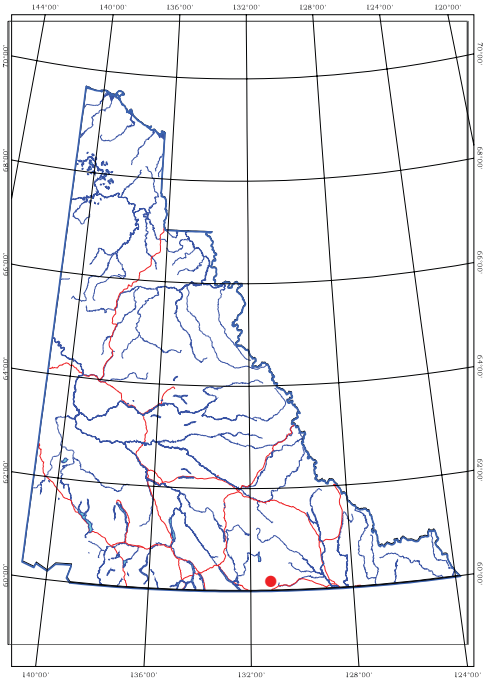


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Similar species Stemless Raspberry (*Rubus arcticus*)





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Habitat

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Yukon Conservation Data Centre

Bering Sea Dock

Rumex beringensis

Buckwheat Family (Polygonaceae)
Synonym: *Acetosella beringensis*

Habitat: Wet ash and sand along lakeshores and slow streams

DISTRIBUTION
Yukon: Southwestern Yukon; known only from Asi Keyi
North America: Yukon and Alaska
World: Amphiberingian

CONSERVATION RANK
Global rank: Vulnerable (G3)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Candidate

Distinguishing features: Male and female flowers on different plants; flowers mainly unisexual; leaves linear; with thick, densely tufted underground stolons; inflorescence erect and interrupted, at least at base.

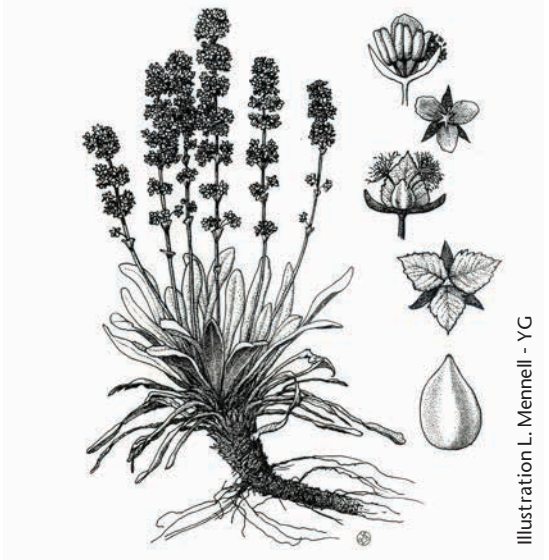
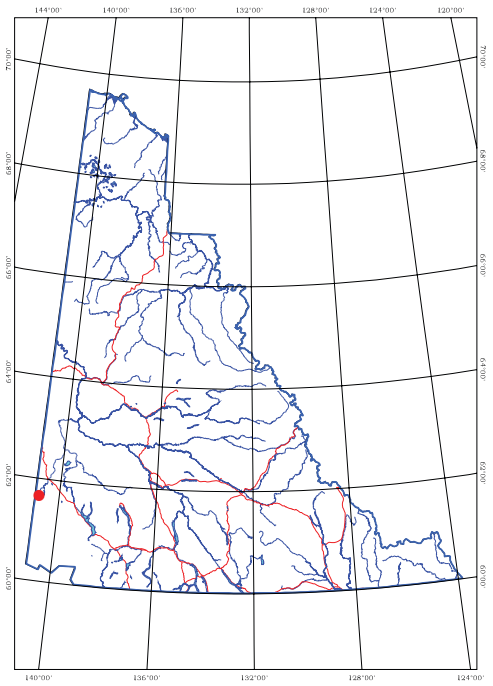


Illustration L. Mennell - YG





J. Meikle - YG



J. Meikle - YG



J. Meikle - YG

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Lapland Sorrel

Rumex lapponicus
Buckwheat Family (*Polygonaceae*)
Synonyms: *Rumex acetosa* ssp. *alpestris*; *Acetosa alpestris* ssp. lapponica; *Rumex alpestris* ssp. *lapponicus*

Habitat: Meadows, rock outcrops, fine soils along rivers and streams in tundra and montane and subalpine zones.

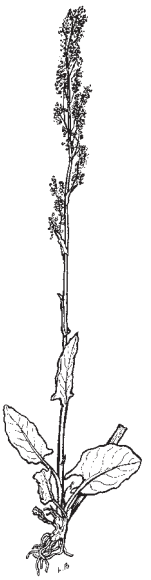
DISTRIBUTION

World: Circumboreal including northern Eurasia and Greenland.
Yukon: Known only from Quill Creek, northern Richardson Mountains, and Crescent Lake (Cassiar Mountains)
North America: Western North America from Yukon and Alaska, south to Montana and Wyoming

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled to Vulnerable (S1S3)

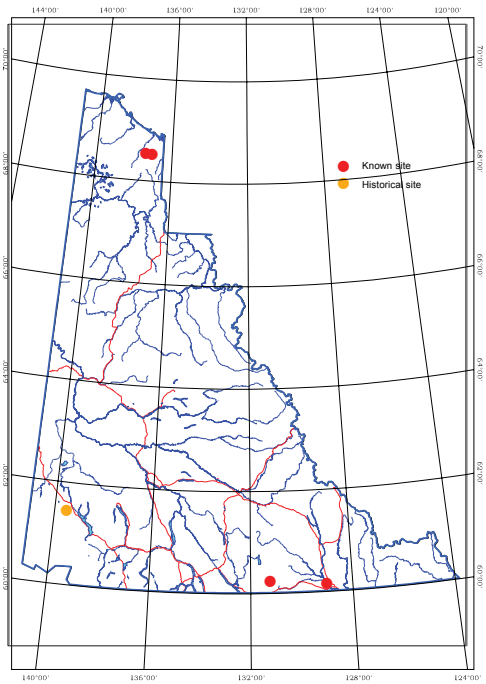
Distinguishing features: Male and female flowers are on separate plants. Lowest leaves arrowhead shaped, triangular with two lower lobes.



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Amelie Rousseau





Cathy Koot

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Spiral Ditchgrass, Widgeon-grass

Ruppia cirrhosa



Ditch-Grass Family (Ruppiaceae)
Synonyms: Ruppia spiralis; *Ruppia maritima* var. *occidentalis; Ruppia maritima* var. *spiralis; Ruppia occidentalis; Ruppia cirrhosa* ssp. *occidentalis*

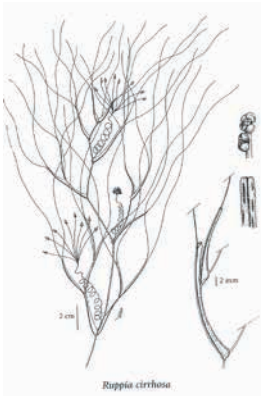
Habitat: Shallow, alkaline waters; marshes, ponds, sloughs

DISTRIBUTION
Yukon: Central Yukon; known only from Needlerock Creek and a site south of Braeburn
North America: Western and central Canada, sporadically in United States
World: Circumpolar

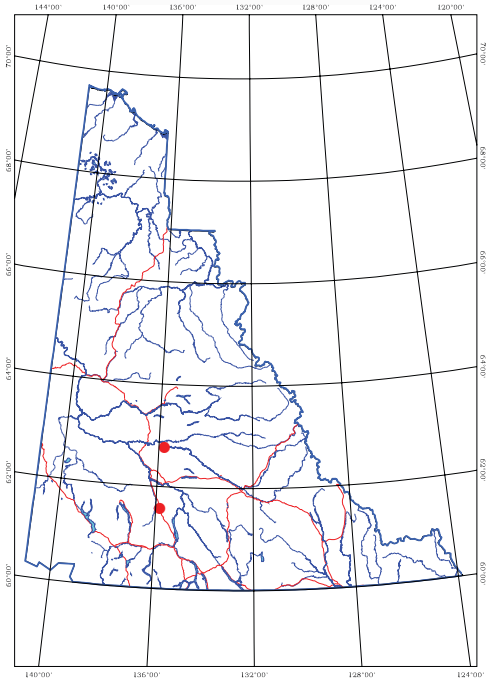
CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: *Ruppia cirrhosa* is a submerged, freely branched aquatic bearing alternate linear leaves. It is separated from *Ruppia spiralis* by having a peduncle with more than 5 coils, longer than 30 mm in fruit.





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Yukon Conservation Data Centre

Arctic Glasswort

Salicornia borealis

Goosefoot Family (Chenopodiaceae)
Synonyms: *S. rubra* ssp. *borealis*

Habitat: Alkaline flats

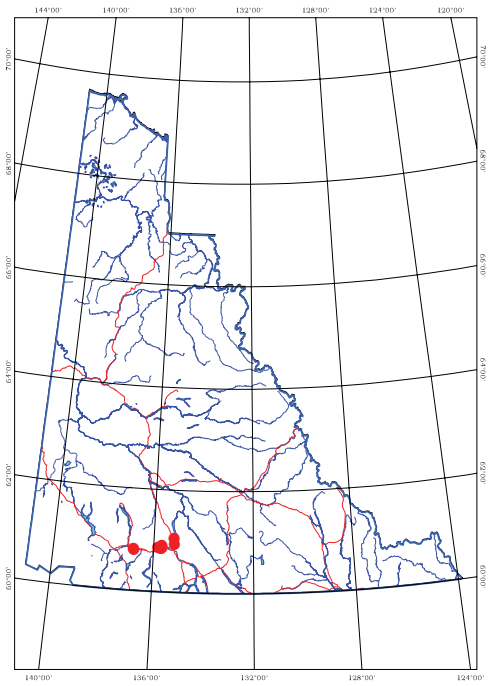
DISTRIBUTION
Yukon: South-central Yukon; known only from north and west of Whitehorse
North America: Yukon, Ontario and Manitoba
World: Circumboreal

CONSERVATION RANK
Global rank: Imperilled (G2)
Canadian rank: Imperilled (N2)
Yukon rank: Imperilled (S2)
***Species at Risk Act* status:** Candidate

Distinguishing features: No visible flowers. Plants annual, succulent and turn bright red at maturity.



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Yukon Conservation Data Centre

MacCalla's Willow

Salix maccalliana

Willow Family (Salicaceae)

Habitat: Peat bogs, fens, road and river margins



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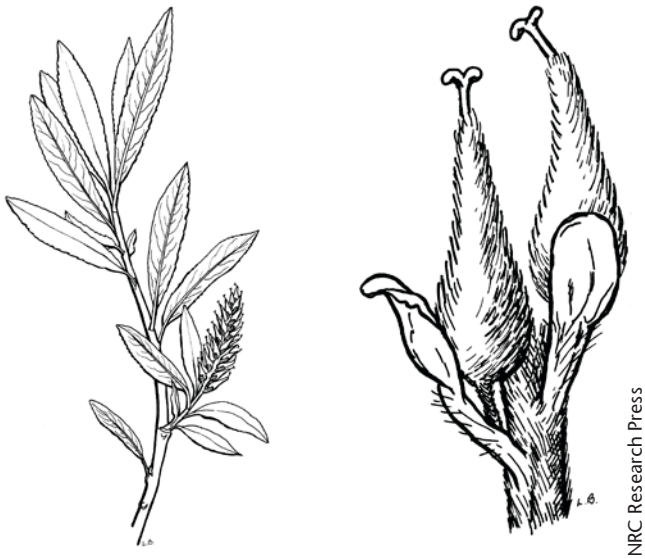
DISTRIBUTION

Yukon: Southeast Yukon
North America: Boreal regions of Canada east to Quebec and south to Washington and Minnesota.
World: Endemic to North America

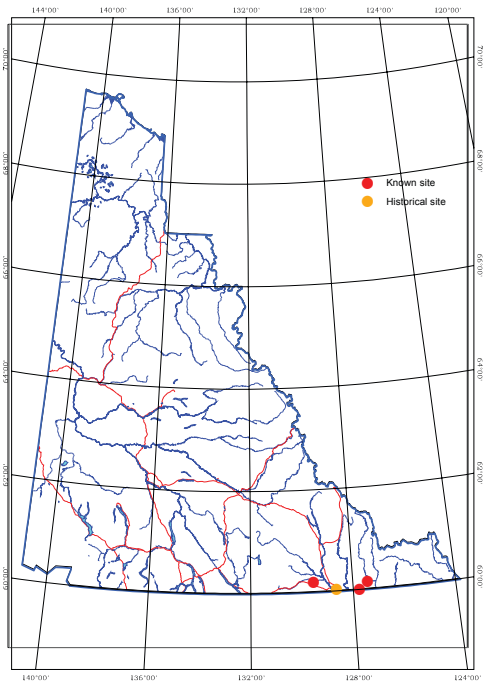
CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled to Imperilled (S1S2)

Distinguishing features: Shrub 1-5 m, catkins expanding at the same time or after the leaves. Stem, reddish, hairless. Lower surface of leaves not glaucous, margins toothed. Female catkins pubescent.



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Raup's Willow

Salix raupii

Willow Family (Salicaceae)

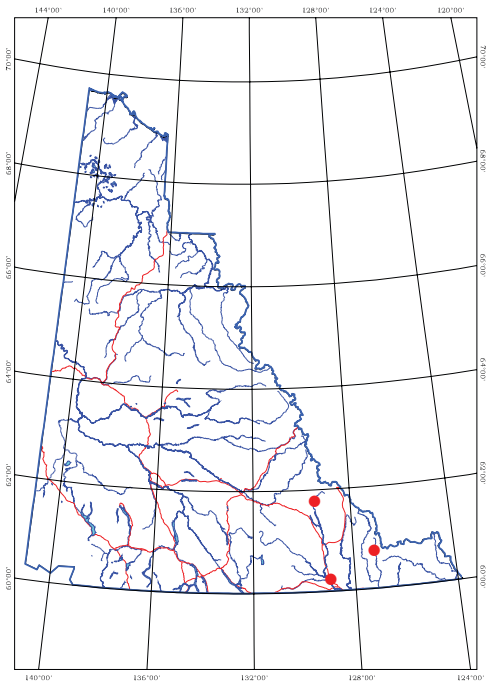
Habitat: Thickets in moist open White Spruce and Trembling Aspen woods, gravel floodplains, treed bogs, sphagnum woodlands

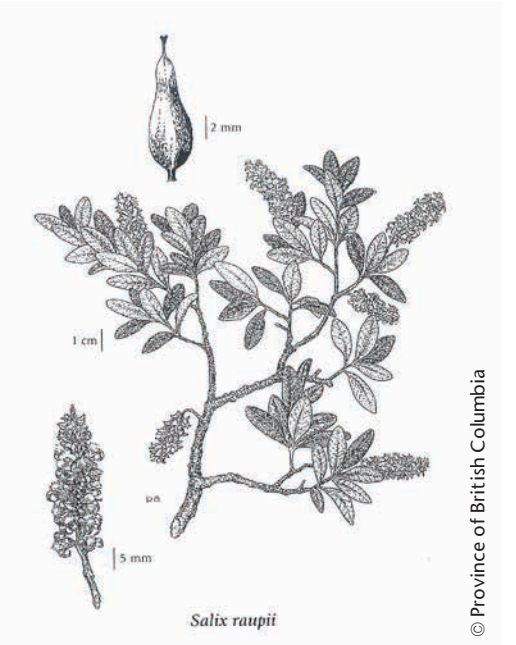


DISTRIBUTION
Yukon: Southeast Yukon
North America: Yukon, Northwest Territories, Alberta, BC
World: Endemic to western Canada

CONSERVATION RANK
Global rank: Imperilled (G2)
Canadian rank: Imperilled (N2)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Salix raupii* resembles a hairless *S. glauca* and *S. athabascensis*. It is separated from *S. barclayi* by having leaves entire or glandular crenate; yellowish leaf-stalks; lemon yellow or bicolour glabrous bracts, branchlets glabrous; nectary half as long as stipe; and styles 0.6 - 0.8 mm long.





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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Wedge-leaved Willow

Salix sphenophylla

Willow Family (Salicaceae)

Habitat: Polygonal tundra



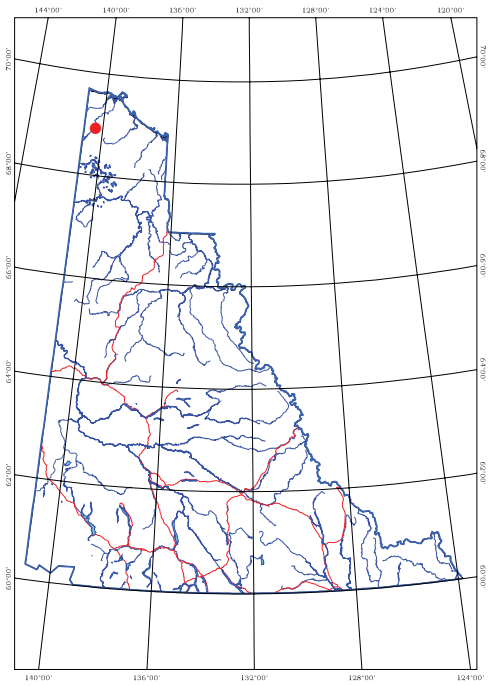
DISTRIBUTION
Yukon: North Yukon; known only from Ivvavik National Park
North America: Alaska, Yukon, Northwest Territories.
World: Amphi-Beringian

CONSERVATION RANK
Global rank: Apparenty Secure (G4)
Canadian rank: Critically Imperilled to Imperilled (N1N2)
Yukon rank: Critically Imperilled to Imperilled (S1S2)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Salix sphenophylla* is separated from *Salix arctica* by having pistils glabrous or sparsely pubescent on the beak, leaves dull above (not dark and glossy), branchlets trailing and rooting.



Illustration courtesy of NRC Research Press



For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

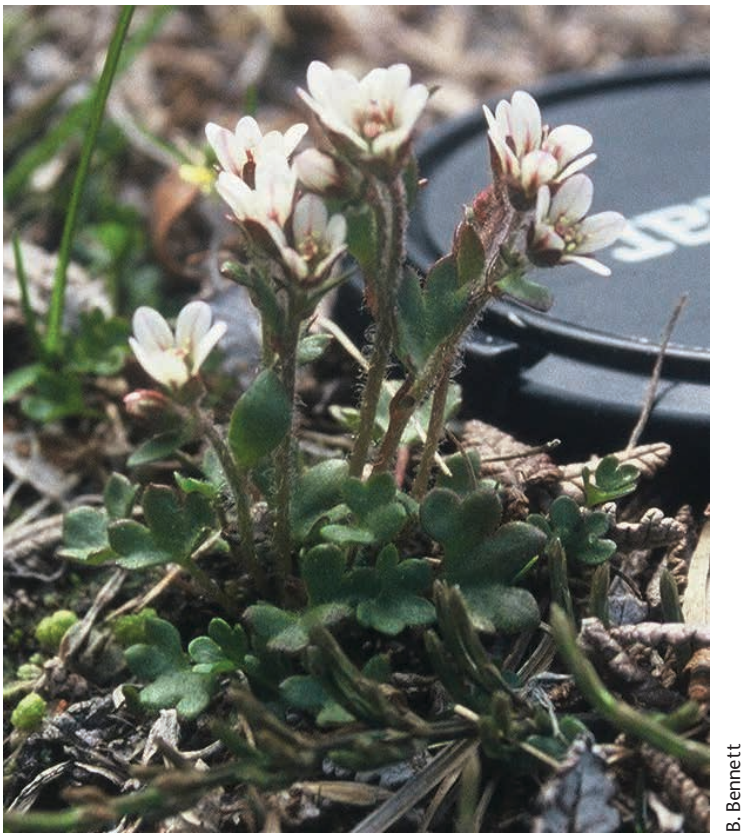
Yukon Conservation Data Centre

Arctic Seashore Saxifrage

Saxifraga rivularis ssp. *arctolitorialis*

Saxifrage Family (Saxifragaceae)

Habitat: Arctic seashores, soil banks, on silt or clay; 0-10 m.



B. Bennett

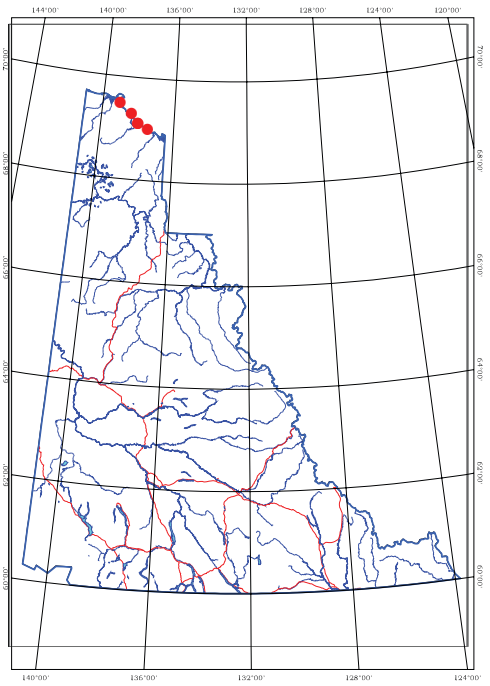
DISTRIBUTION

Yukon: Arctic coast
North America: Alaska to Nunavut on Arctic seashores
World: Eastern Russia to Greenland (ssp. *rivularis* is Amphi-atlantic)

CONSERVATION RANK

Global rank: Imperilled to Vulnerable (G5T2T3)
Canadian rank: Not Ranked (NNR)
Yukon rank: Critically Imperilled to Imperilled (S1S2)

Distinguishing features: *Saxifraga rivularis* ssp. *arctolitoralis* is mat-forming with rhizomes often present petals 2 to 3 times longer than sepals; 2 to 6 mm long compared to
Saxifraga hyperborea which is tufted, not mat-forming, rhizomes and stolons absent, petals 1.5 times longer than sepals; 2 to 3.4 mm long.





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Common River Grass

WATCH LIST

Scolochloa festucacea

Grass Family (**Poaceae**)

Habitat: In shallow water or wet marshes

DISTRIBUTION
Yukon: Central Yukon; known only from útsäw Lake system
North America: Northwestern North America, Great Plains
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: This is a tall prairie grass of wet places. This monospecific genus is separated from other *Poaceae* by its spikelets that have 2 to many flowers, glumes that are shorter than the first floret, its mainly bisexual flowers, lemmas that are awnless or with an apical awn and densely villous callusses that have 7 nerves.



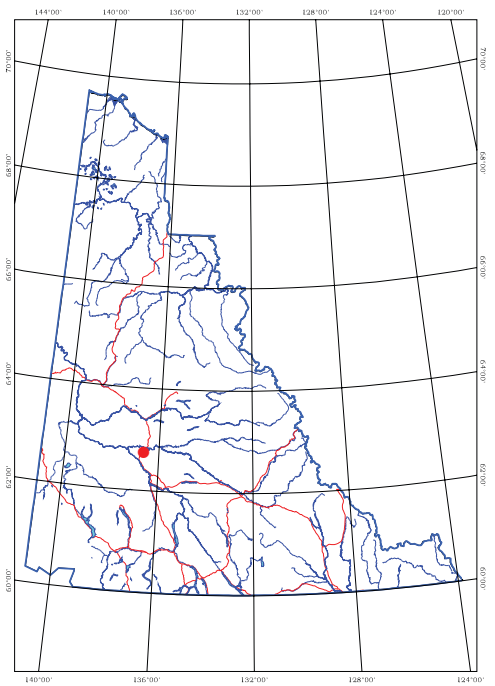
J. Fenneman



Illustration by J.R. Janish courtesy of the University of Washington Press









V. Loewen - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Mount Sheldon Ragwort

Senecio sheldonensis

Composite Family (Asteraceae)

Habitat: Turfy places in subalpine meadows. Wet to moist meadows and forest openings in montane to alpine zones

DISTRIBUTION
Yukon: South and central Yukon
North America: Yukon, Northwest Territories, British Columbia
World: Endemic to mountains in NW Canada.

CONSERVATION RANK
Global rank: Vulnerable (G3)
Canadian rank: Vulnerable (N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: It is separated from *S. triangularis* by its smaller stature (30-60cm tall), broadly lanceolate leaves (not triangular-hastate) and margins that are shallowly sinuate or wavy denticulate (not denticulate). Lacks basal leaves.



B. Bennett

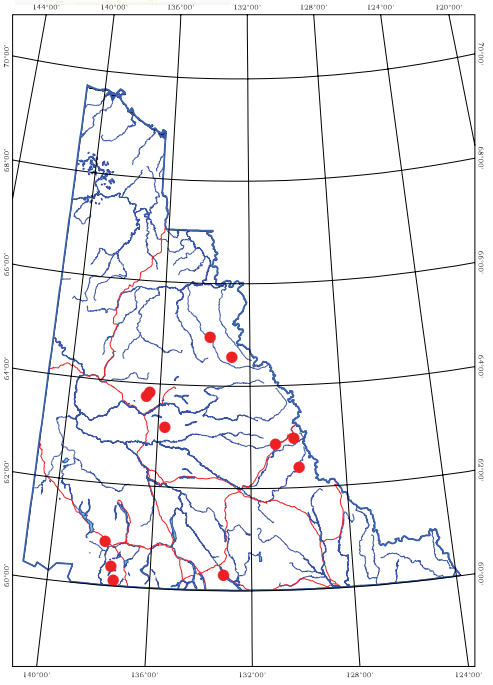


Illustration L. Mennell - YG





B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Williams' Catchfly

Silene williamsii

Pink Family (Caryophyllaceae)
Synonyms: *S. menziesii* ssp. *williamsii*; *S. menziesii* var. *williamsii*

Habitat: South-facing rocky slopes, disturbed ground, river gravel and bluffs

DISTRIBUTION
Yukon: West-central Yukon
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Probably Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)

Distinguishing features: Similar to *S. menziesii* but has leaves broadest below the middle, longer calyx (12 mm vs 5-7 mm) and reddish brown seeds. Plants sticky, often lying flat on scree slopes.



F. Baldwin

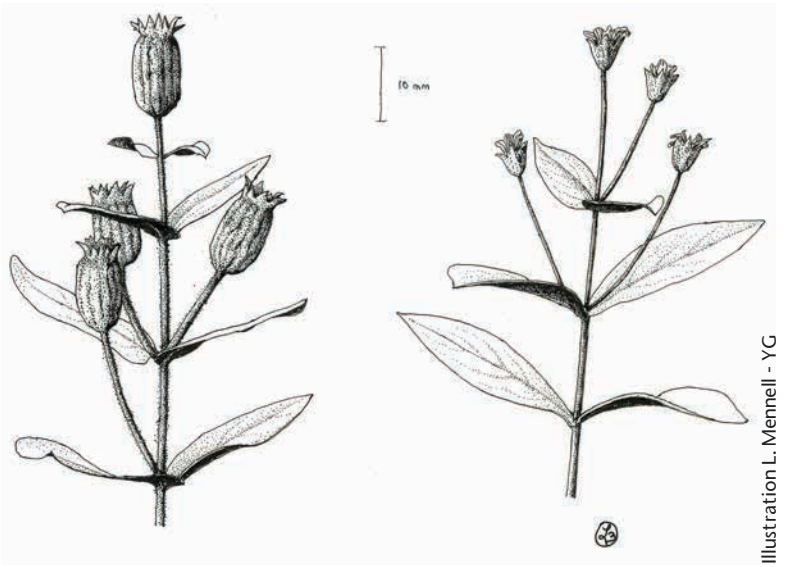
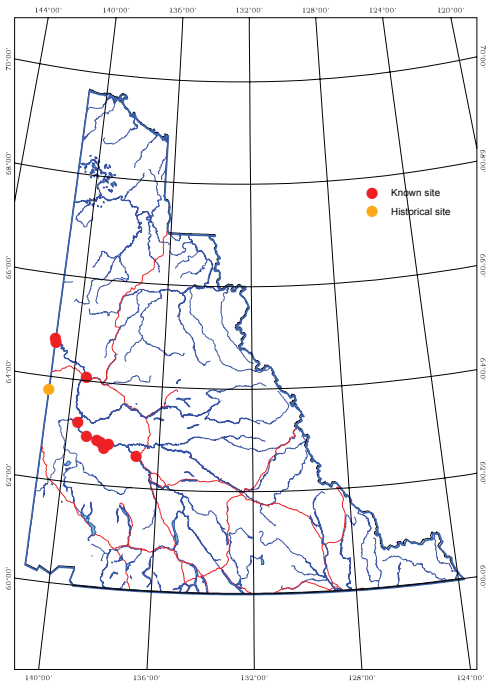
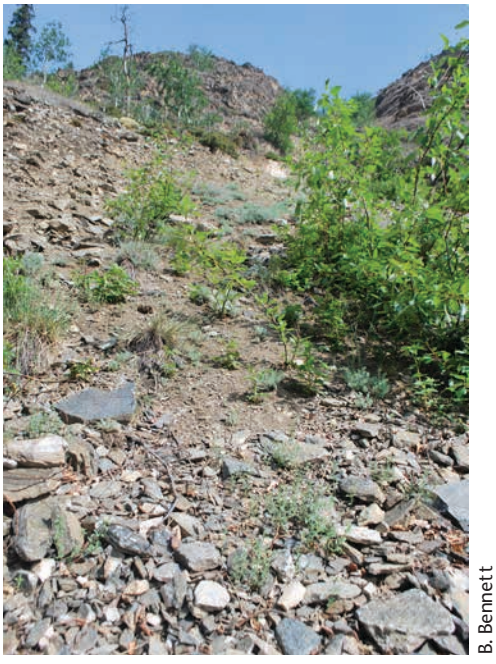


Illustration L. Mennell - YG



Alaska Natural Heritage Program





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Porsild's Smelowskia

Smelowskia porsildii

Mustard Family (Brassicaceae)
Synonyms: Smelowskia calycina var. *integrifolia*; *Smelowskia calycina* var. *porsildii*; *Smelowskia calycina* ssp. *integrifolia*; *Smelowskia jurtzevii*; *Smelowskia spathulatifolia*

Habitat: Alpine ridges or scree slopes

DISTRIBUTION
Yukon: Unglaciated areas of western Yukon
North America: Alaska, Yukon
World: Amphi-Beringian

CONSERVATION RANK
Global rank: Vulnerable to Apparently Secure with Taxonomic Uncertainty (G5T3T4Q)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: *Smelowskia porsildii* is separated from *S. borealis* by having flowers that are creamy white vs purple to lavender and having a single base vs multiple branches. *Smelowskia porsildii* can be separated from *S. media* by leaf shape; *S. porsildii* being apically 3 or 5-lobed.



B. Bennett

Porsild's Smelowskia



B. Bennett

Alpine Smelowskia (*Smelowskia media*) *see distinguishing features

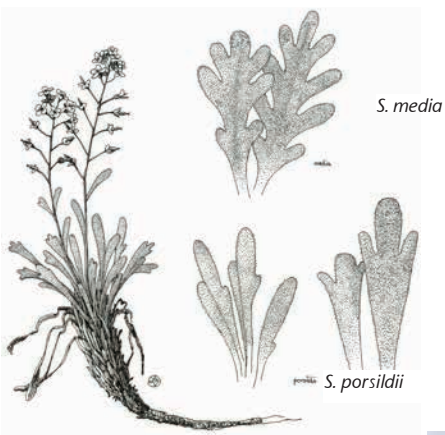
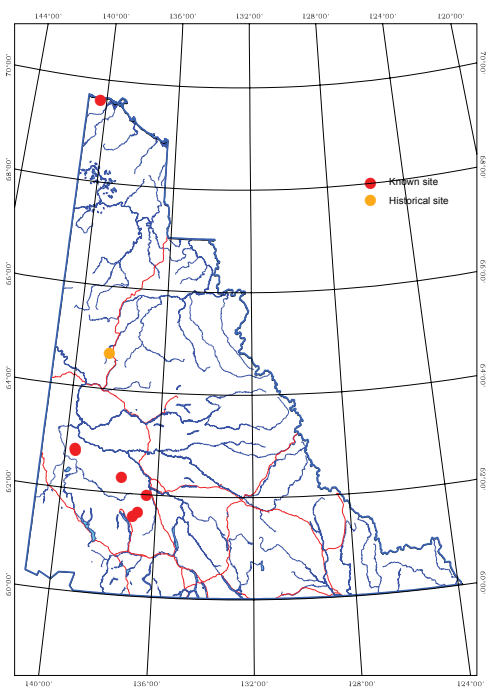


Illustration L. Mennell - YG





B. Bennett

Porsild's Smelowskia habitat



B. Bennett

Boreal Smelowskia (*Smelowskia borealis*)

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Boreal Smelowskia (*Smelowskia borealis*)

Alaska Starwort

Stellaria alaskana

Pink Family (**Caryophyllaceae**)

Habitat: Alpine tundra and scree slopes. Rock outcrops, talus slopes and moraines



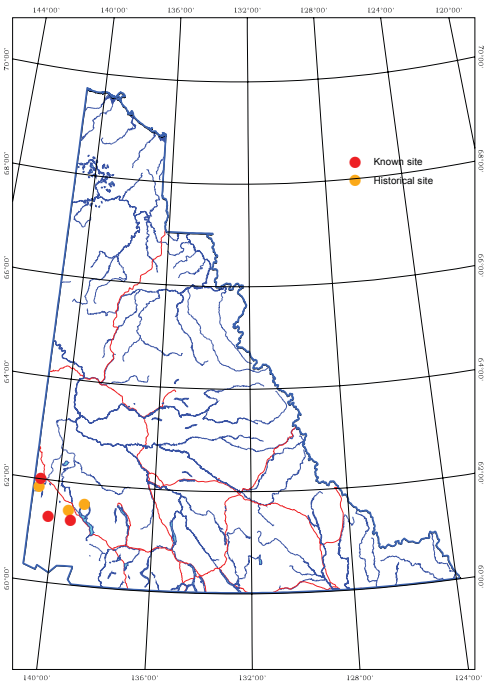
DISTRIBUTION
Yukon: Southwest Yukon; known only from Kluane National Park and vicinity
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Stellaria alaskana* is separated from other *Stellaria* sp. by having exceptionally long narrow prominently veined sepals 6.5 - 9.0mm, flowers larger than *S. longipes* (usually single), petals shorter than sepals, and deeply lobed. Leaves broad resembling *Wilhelmsia physodes*.









For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Matted Starwort

Stellaria dicranoides

Pink Family (Caryophyllaceae)
Synonyms: *Arenaria dicranoides*; *A. chamissonis*; *Cherleria dicranoides*

Habitat: Calcareous scree slopes at high altitudes

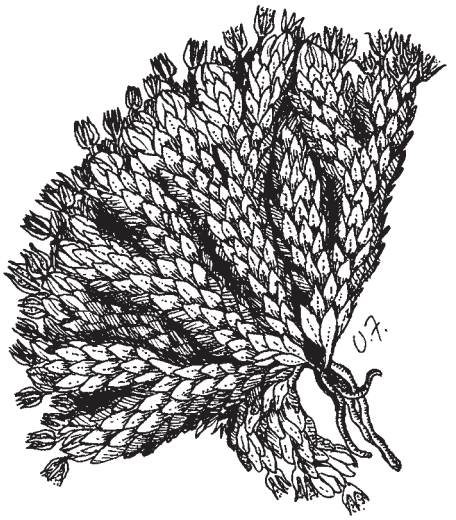
DISTRIBUTION
Yukon: Northwestern Yukon; known only from the Ogilvie Mountains
North America: Yukon and Alaska
World: Amphiberingian, endemic to Alaska, Yukon and Russia

CONSERVATION RANK
Global rank: Apparently Secure (G4)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: Plants densely cushion-forming; with a central taproot more closely resembling a *Saxifraga* than a *Stellaria*.



B. Bennett



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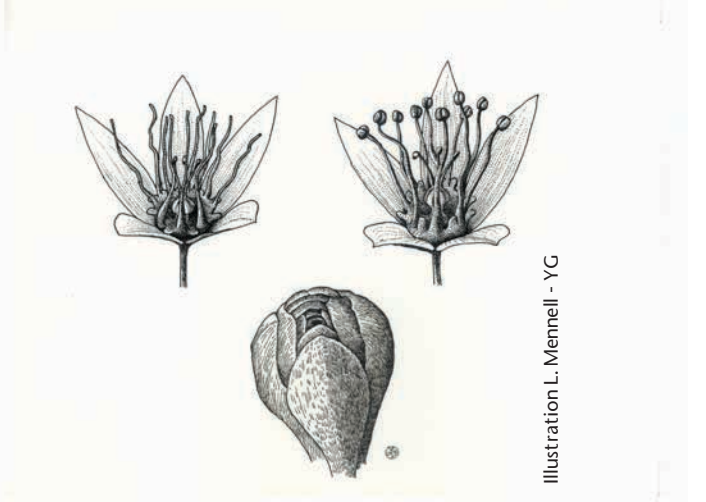
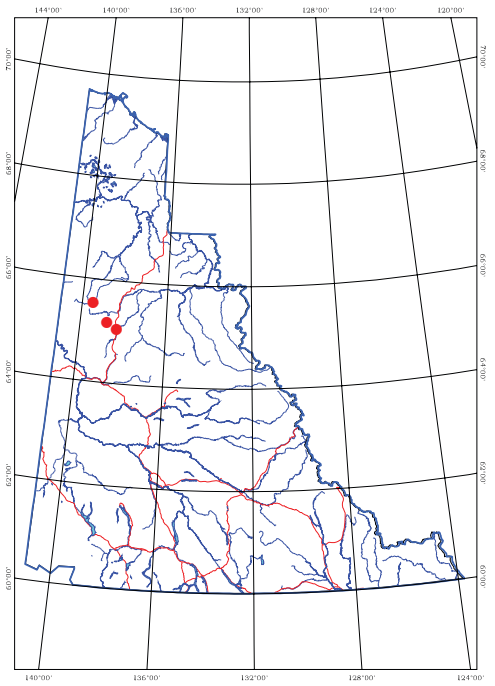
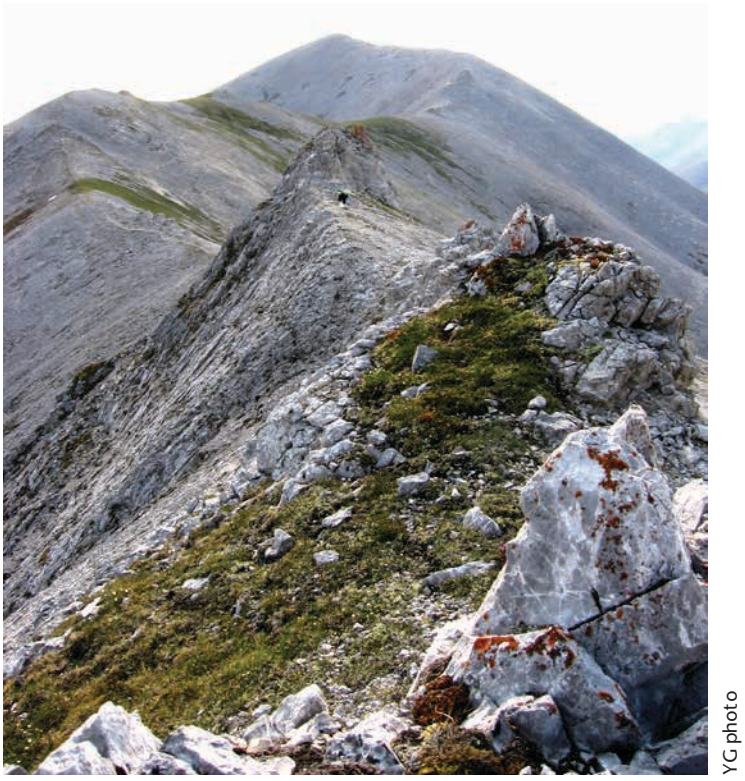


Illustration L. Mennell - YG





YG photo

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Pursh's Seepweed

WATCH LIST

Suaeda calceoliformis

Goosefoot Family (**Chenopodiaceae**)
Synonyms: *S. americana; S. depressa*

Habitat: Alkaline flats

DISTRIBUTION

Yukon: Southwest and south-central Yukon south of 62°N
North America: Widespread throughout North America, excluding southeastern United States, Quebec and Labrador
World: North America

CONSERVATION RANK

Global rank: Apparently Secure to Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Vulnerable (S3)

Distinguishing features: Plant annual, leaves succulent, entire (not notched or divided), flowers perfect (with male and female parts in the same flower), not hairy or mealy.

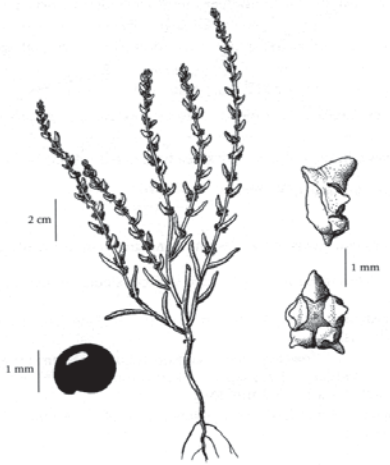
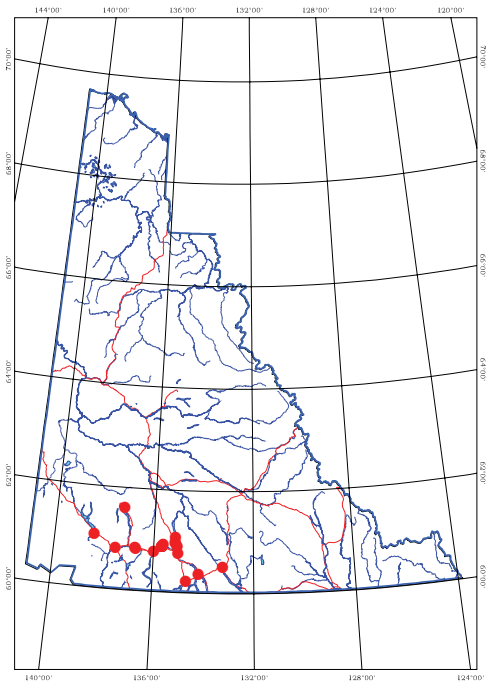


Illustration by J.R. Janish courtesy of the University of Washington Press

Suaeda calceoliformis





B. Bennett



B. Bennett



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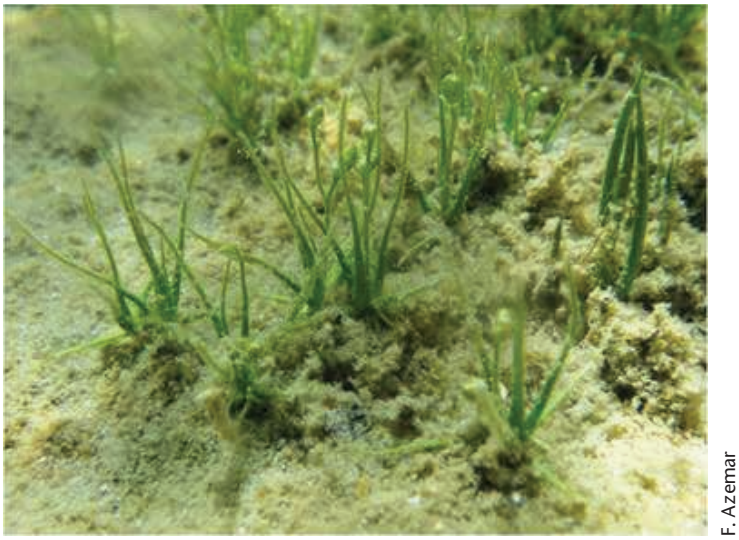
Yukon Conservation Data Centre

Water Awlwort

Subularia aquatica ssp. *americana*

Mustard Family (Brassicaceae)

Habitat: Muddy pool margins, rocky gravelly bottoms, shallow stream pools, shallow sandy water flats, gravelly lake beaches, stream and lake shorelines to 1.5 m deep.



F. Azemar

DISTRIBUTION

Yukon: Scattered throughout southern Yukon to 63°N. Disjunct in the Eagle River drainage.
North America: Throughout Canada except Nunavut and Alberta and northern USA. Scattered inland in southern Alaska.
World: A separate subspecies is restricted to northern Europe and Russia.

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Vulnerable (S3)

Distinguishing features: A small aquatic annual with four white petals. Hairless.



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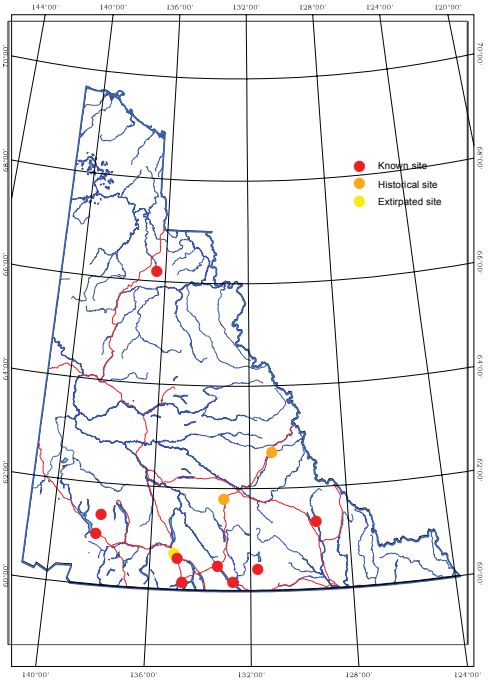


M. Burrus



F. Azemar

Water Awlwort (right) *Isoetes* sp. (left)





M. Burrus

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Alpine bog swertia

Swertia perennis

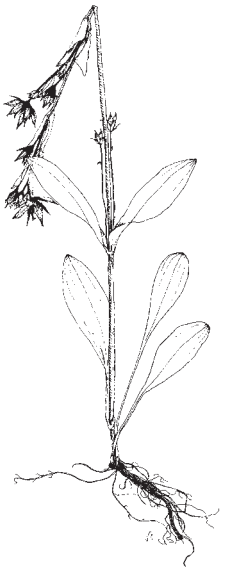
Gentian Family (Gentianaceae)

Habitat: Wet subalpine meadows, streamsides, and bogs.

DISTRIBUTION
Yukon: Known only from the Haines Road
North America: Cordilleran from Alaska to northern California
World: Northern Eurasia

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Vulnerable to Apparently Secure (N3N4)
Yukon rank: Critically Imperilled (S1)

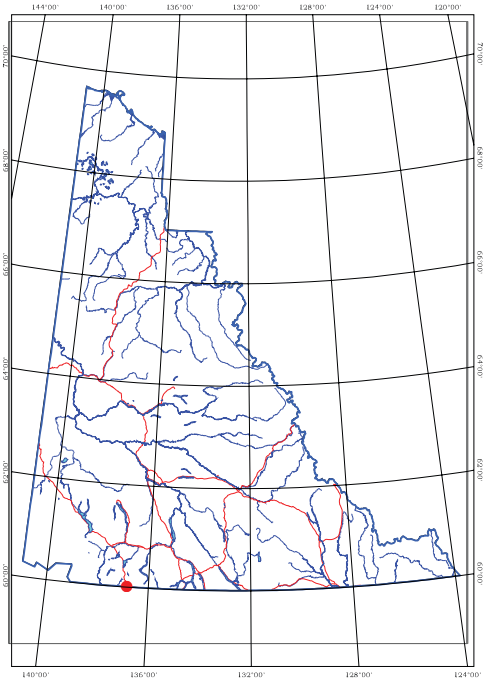
Distinguishing features: Perennial from a fleshy rhizome, hairless, 5-petalled violet-blue to white, 20-60 cm tall.



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Rayless Alkali Aster

Symphyotrichum ciliatum

Composite Family (Asteraceae)
Synonyms: Aster brachyactis, *Aster angustus; Aster laurentianus; Brachyactis ciliata; Tripolium angustum*

Habitat: Alkaline meadows near ponds

DISTRIBUTION
Yukon: South-central Yukon
North America: From Yukon to southern United States
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: This is Yukon's only annual species of Aster growing from a weak taproot.



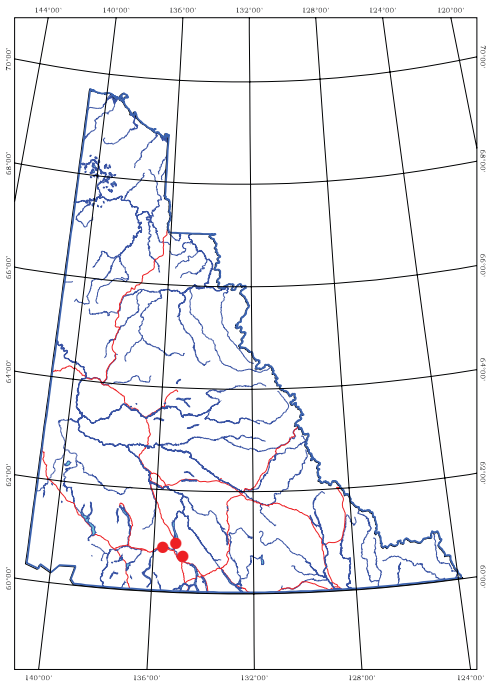
P. Long



© NRC Research Press



P. Long





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Leafy Aster

Symphyotrichum foliaceum

Synonyms: *Aster foliaceum*
Habitat: Openings in montane woods in wet subalpine meadows, streamsides, and bogs.

DISTRIBUTION

Yukon: Known only from the Haines Road
North America: From Yukon to southern United States
World: North America

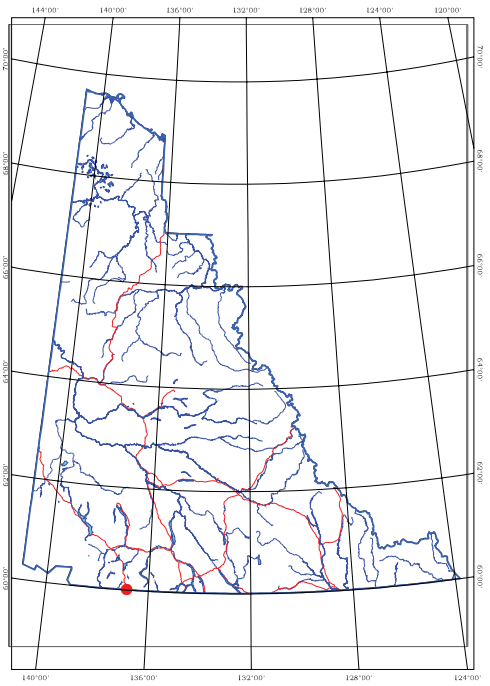
CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Violet or purple flowers about 2 cm in diameter, standing erect 10-60 cm, fibrous-rooted rhizome, being several to many enlarged, leaf-like, phyllaries that often exceed the length of the involucre.



B. Bennett





B. Bennett

For more information, contact the
Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Yukon Aster

Symphyotrichum yukonense

Composite Family (Asteraceae)
Synonyms: Aster yukonensis

Habitat: Mud flats, lakeshores, and gravelly slopes

DISTRIBUTION

Yukon: Southwestern Yukon; known only from the Kluane region
World: Endemic to Yukon, Alaska, and Northwest Territories

CONSERVATION RANK

Global rank: Vulnerable (G3)
Canadian rank: Imperilled to Vulnerable (N2N3)
Yukon rank: Imperilled to Vulnerable (S2S3)
***Species at Risk Act* status:** Not At Risk (1996)

Distinguishing features: Differing from other species of Aster by having linear clasping stems and phyllaries that are densely glandular and pubescent.





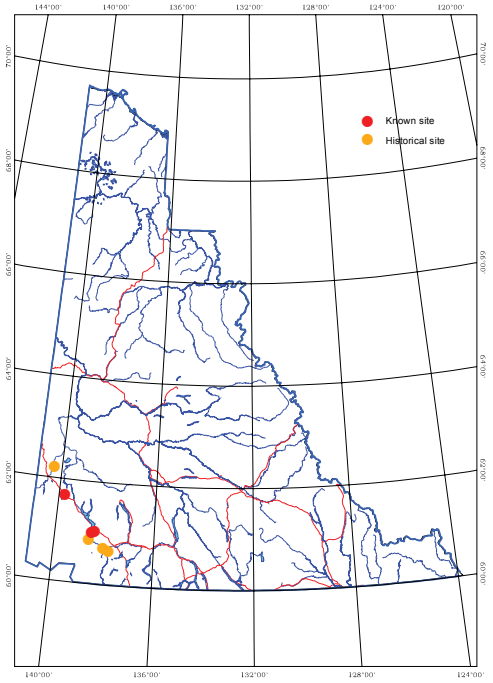
Yukon Aster



Siberian Aster

© NRC Research Press

Illustration L. Mennell - YG





B. Bennett



B. Bennett



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Pink Dandelion

Taraxacum carneocoloratum

Composite Family (Asteraceae)

Habitat: Alpine ridges

DISTRIBUTION
Yukon: Unglaciated areas of western Yukon; known only from North Fork Pass in Ogilvie Mountains and Ivvavik National Park
World: Endemic to Yukon and Alaska

CONSERVATION RANK
Global rank: Vulnerable to Probably Secure (G3G4)
Canadian rank: Critically Imperilled to Vulnerable (N1N3)
Yukon rank: Critically Imperilled to Vulnerable (S1S3)
***Species at Risk Act* status:** Candidate

Distinguishing features: Involucral bracts without horns or tubercles on the tips, plants small usually <9 cm tall, petals pink or flesh coloured, pappus yellowish.



S. Wolfe



B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

High-Arctic Dandelion, Northern Dandelion

Taraxacum hyparcticum

Composite Family (**Asteraceae**)

Habitat: Gravelly, sandy silt; north-facing slopes, marine/lacustrine deposits

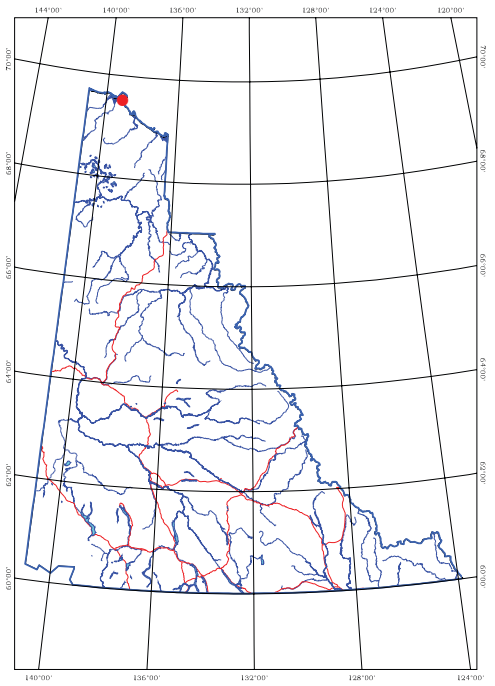
DISTRIBUTION
Yukon: North coast Yukon; known only from Ptarmigan Bay
North America: Arctic areas, Alaska, Yukon, Northwest Territories, Nunavut
World: Arctic North America, Greenland, Eurasia

CONSERVATION RANK
Global rank: Not Yet Ranked (GNR)
Canadian rank: Not Ranked (NNR)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: This high arctic native dandelion is separated from other *Taraxacum* species by having large and broadly open, cream-coloured to white or pink flowers with outer, abiaxal, pinkish stripes. It is a low-growing plant (5-12 cm tall). Hornless or with very small horns.



C.L. Parker





B. Bennett - YG

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Western Poison Ivy

Toxicodendron rydbergii

Sumac Family (Anacardiaceae)
Synonyms: *Rhus radicans*; *Rhus radicans* var. *rydbergii*

Habitat: Dry southerly slopes around hot springs

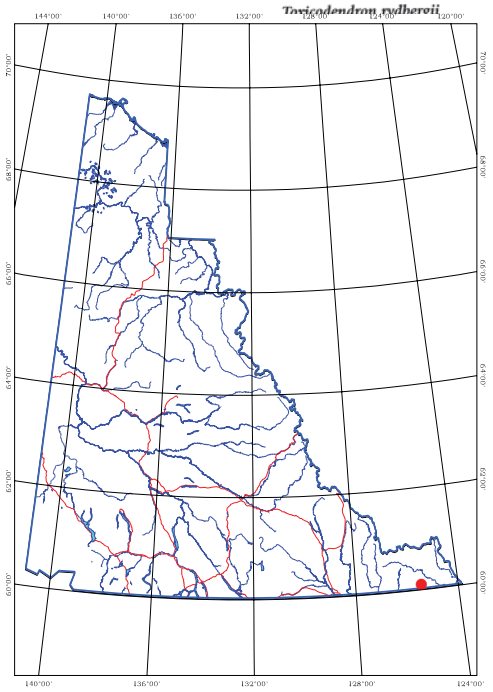
DISTRIBUTION
Yukon: Southeastern Yukon; known only from Larsen Hotsprings
North America: Widespread throughout North America, excluding southwestern and southeastern United States and northern Canada
World: North America

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Critically Imperilled (S1)

Distinguishing features: Resembles Wild Sarsaparilla, *Aralia nudicaulis*, but can be separated by having leaves in 3's that are glossy with no teeth, vs leaves 3-5 with leaves saw-toothed.



Illustration by J.R. Janish courtesy of the University of Washington Press





R. Rosie



R. Rosie



R. Rosie

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Siberian False Oats

Trisetum sibiricum

Grass Family (Poaceae)
Synonyms: *T. flavescens* var. *sibiricum*; *T. litorale*; *T. sibiricum* ssp. *litorale*

Habitat: Moist grassy slopes

DISTRIBUTION
Yukon: Northern Yukon; known historically from the arctic coast between King and Kay points; two subspecies are known from the territory: ssp. *sibiricum* from the Babbage River on the arctic coast and ssp. *litorale* from Coffee Creek and the Porcupine River
North America: Yukon and Alaska
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Critically Imperilled (N1)
Yukon rank: Critically Imperilled (S1)
***Species at Risk Act* status:** Candidate

Distinguishing features: *Trisetum sibiricum* can be separated from *T. spicatum* by being rhizomatous as opposed to cespitose and by having smooth culms and leaves, and its broad, less dense panicles.



B. Bennett



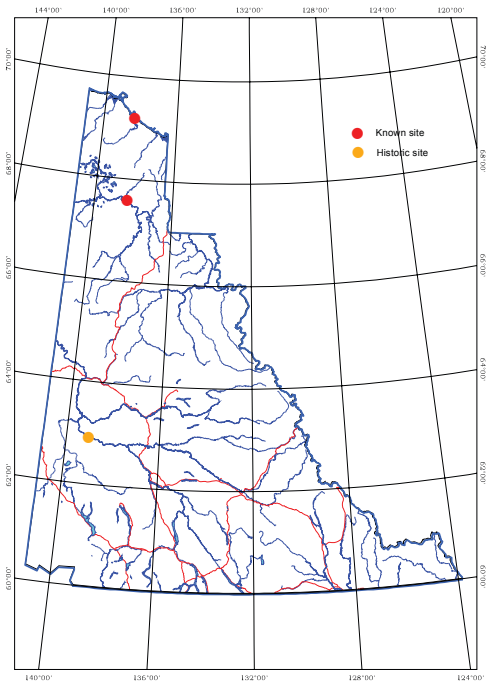
Illustration L. Mennell - YG

Trisetum sibiricum



© NRC Research Press

Trisetum spicatum





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Broad-leaved Cattail

WATCH LIST

Typha latifolia

Cattail Family (Typhaceae)

Habitat: Shallow ponds, ditches, lakeshores, in wet soil.

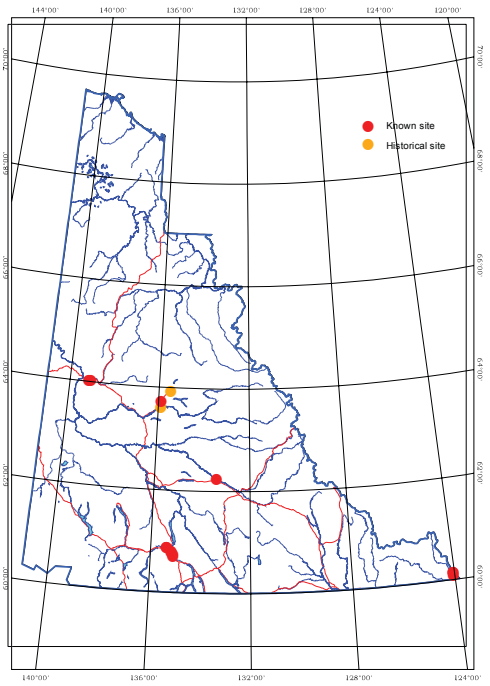
DISTRIBUTION
Yukon: South of Dawson City
North America: Every territory, province and state except Labrador
World: Mexico, Central & South America, Eurasia, Africa

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Vulnerable (N5)
Yukon rank: Vulnerable (S3S4)

Distinguishing features: Large wetland plant with broad-leaves and a distinctive inflorescence.



B. Bennett





B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Twin-flowered Violet

Viola biflora ssp *biflora*

Violet Family (**Violaceae**)

Habitat: Alpine meadows

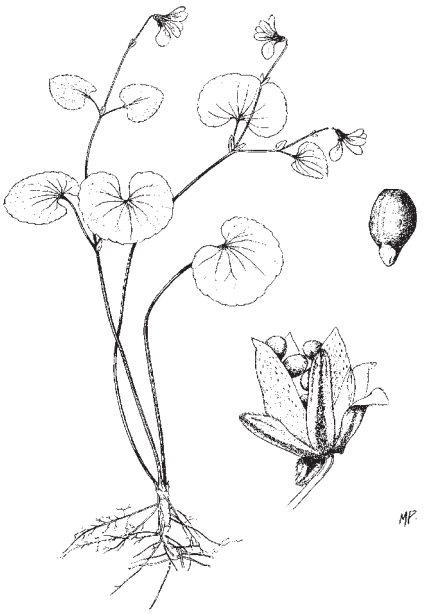
DISTRIBUTION
Yukon: West-central Yukon
North America: Yukon, Alaska, and Colorado
World: Amphiberingian

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Vulnerable (N3)
Yukon rank: Vulnerable (S3)

Distinguishing features: The only violet with the combination of yellow flowers and leafy stems. *Viola canadensis* of the southeast Yukon has white flowers that are yellow at the base.



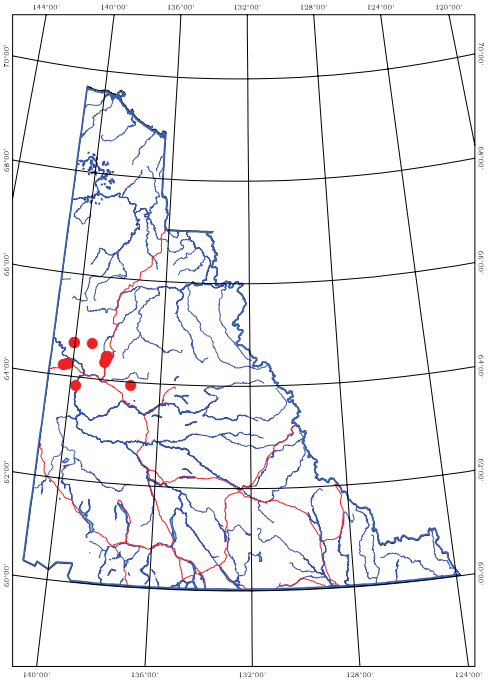
F. Baldwin



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B. Bennett





B. Bennett

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Northern Bog Violet

Viola nephrophylla

Violet Family *(Violaceae)*

Habitat: Wet ground, in open forest, wet depressions, marl pond shores, rocky shores; usually in areas with calcareous bedrock.

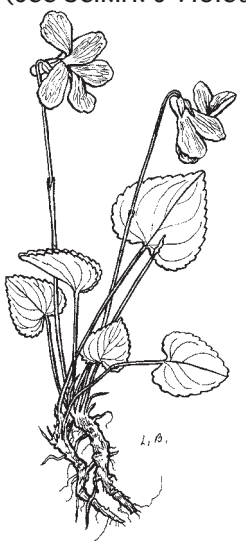


B. Bennett

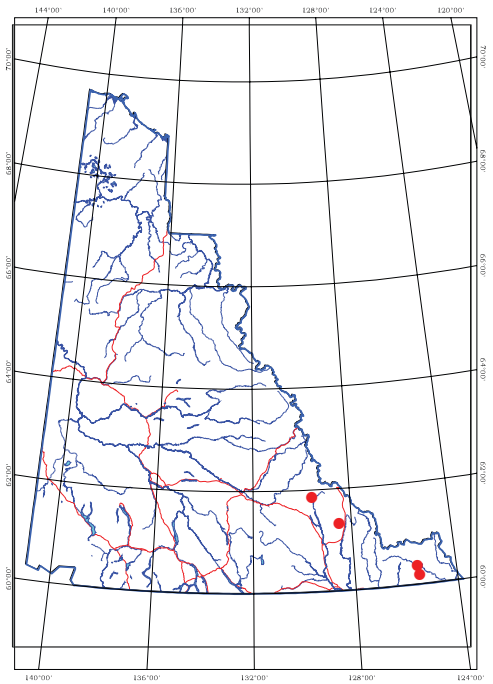
DISTRIBUTION
Yukon: Forests and springs of southeastern Yukon
North America: Boreal and forests, throughout Canada except Nunavut and Labrador. Not known in Alaska or southeastern United Status

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Flowers purple violet, side petals bearded; stems not bearing leaves; rhizome thick without stolons (long shoots); stipules separate from the leaf stalks (see Selkirk's Violet)



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For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Selkirk's Violet

Viola selkirkii

Violet Family (**Violaceae**)

Habitat: Cool, rich, shady woods and thickets, rocky calcareous slopes and moist ravines; usually in areas with basic soils or over limestone bedrock.

DISTRIBUTION
Yukon: Southeast Yukon
North America: Boreal forest from Alaska to Newfoundland south to northern USA. **World:** Circumboreal with large gaps.

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Secure (N5)
Yukon rank: Imperilled (S2)

Distinguishing features: Flowers pale violet, petals not bearded; stems not bearing leaves; leaves hairy above, hairless below; stipules joined to the leaf stalks (see Northern Bog Violet). Lacks stolons. Basal lobes often touching or overlapping even when the leaves are flattened.



Forrest Baldwin

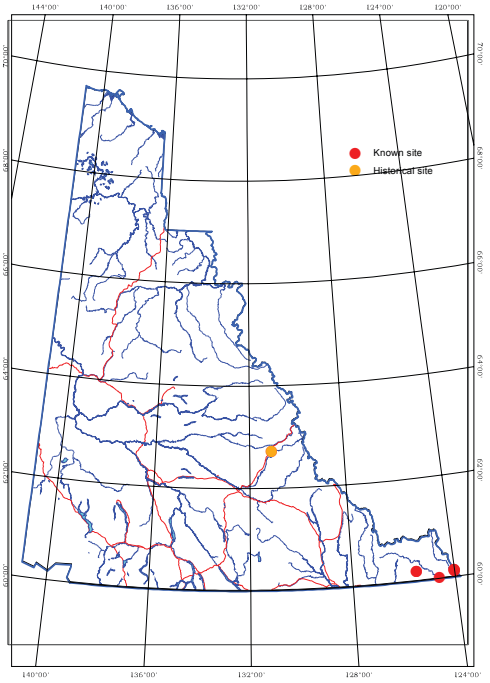
Note the petals do not have hairs (not bearded).



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Curtis Bjork





B. Bennett

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Yukon Conservation Data Centre

Mountain Cliff Fern

WATCH LIST

Woodsia scopulina

Wood Fern Family (Dryopteridaceae)
Synonyms: *W. oregana* var. *lyallii*

Habitat: Rocky cliffs and scree slopes

DISTRIBUTION

Yukon: South-central Yukon; known only from Marsh Lake, Kusuwa Lake, Tagish Lake, and Takhini Valley.
North America: Western North America, Ontario, and Quebec; scattered in eastern North America
World: Cordilleran

CONSERVATION RANK

Global rank: Secure (G5)
Canadian rank: Apparently Secure (N4)
Yukon rank: Vulnerable (S3)

Distinguishing features: Separated from other species of *Woodsia* in Yukon by its large size (up to 40 cm) and having stems not jointed at the base.

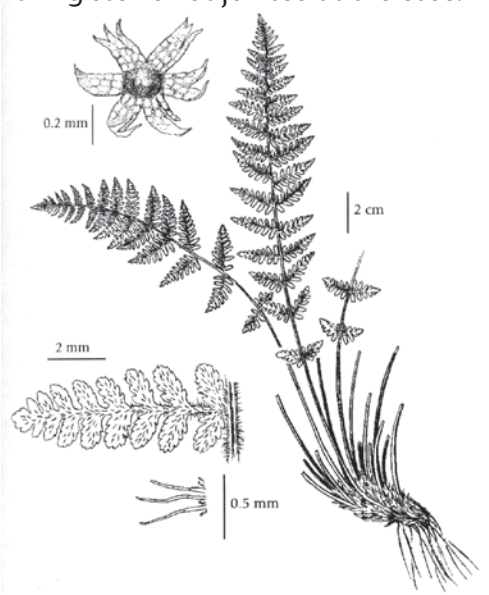
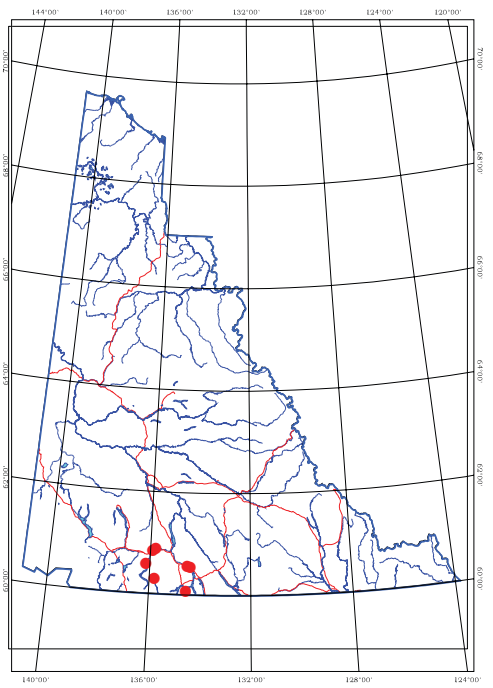


Illustration by J.R. Janish courtesy of the University of Washington Press





B. Bennett



B. Bennett

Note the stems are not jointed and break at uneven lengths.



B. Bennett

For more information, contact the Yukon Conservation Data Centre at 867-667-3684 or yukoncdc@gov.yk.ca.

Yukon Conservation Data Centre

Horned Pondweed

Zannichellia palustris

Horned Pondweed Family (**Zannichelliaceae**)

Habitat: Shallow water along pond edges

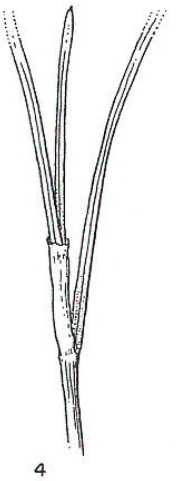
DISTRIBUTION
Yukon: South-central Yukon; known only from salt flats in the Takhini and Dezadeash valleys
North America: throughout North America
World: Circumpolar

CONSERVATION RANK
Global rank: Secure (G5)
Canadian rank: Apparently Secure to Secure (N4N5)
Yukon rank: Imperilled (S2)

Distinguishing features: *Zannichellia palustris* is separated from other, fully submersed, freely branching aquatic plants by having slender stems bearing whorls of thread-like leaves. The flowers are in flat-topped inflorescence (see figure) or solitary in axils and the axils of the leaves and are either male or female.



R. Rosie



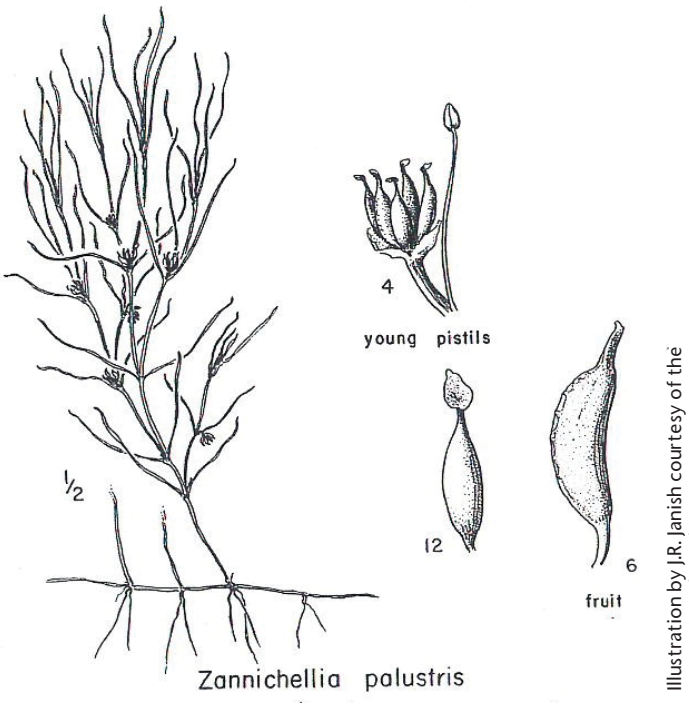
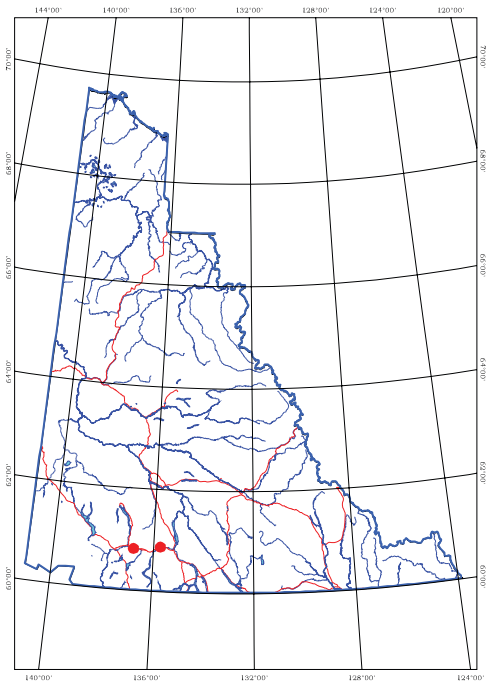


Illustration by J.R. Janish courtesy of the University of Washington Press





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Yukon Conservation Data Centre