



Alberta Native Plant Council

P.O. Box 52099, Garneau Postal Outlet, Edmonton, Alberta T6G 2T5

Information Bulletin: March 2000

ANPC Guidelines For Rare Plant Surveys in Alberta

The Alberta Native Plant Council (ANPC) has updated its Guidelines For Rare Plant Surveys in Alberta. These guidelines have considered information on rare plant species genetics, population dynamics, plant ecology, phenology, current survey methods from other areas, and the knowledge and experience of a number of practicing field botanists in Alberta.

The input and review of the following botanists in updating the guidelines is gratefully acknowledged: Dr. Peter Achuff, Lorna Allen, Tiffanie Billey, Cheryl Bradley, Dana Bush, Joyce Gould, Dr. Graham Griffiths, Ruth Johnson, Clare Tannas, Kathy Tannas, Anne Holcroft Weerstra, Kathleen Wilkinson and Joan Williams.

The need for guidelines was brought to the attention of the ANPC by some of its membership active in botanical consulting. At present standardized guidelines for rare plant surveys have not been adopted by any of the governments in Western Canada. However, proponents of proposed developments are sometimes requested to conduct rare plant surveys as part of the environmental assessment process. Surveys are being requested with inappropriate techniques, time frames and scopes.

In the interest of identifying, conserving and protecting rare native flora, the Alberta Native Plant Council is proposing a process for effective scientific assessment of a site for rare plants.

The objective of the guidelines is to standardize approaches to the assessment of lands for the presence of rare plant species so that:

- reliable information on rare plant species presence and status on a site is produced;
- the potential of locating a rare plant species on a site is maximized.

The Alberta Native Plant Council is a non-profit society that strives to promote knowledge of Alberta's native plants, to conserve native plant species and their habitats, and to preserve this diverse resource for the enjoyment of present and future generations. The council's specific objectives are:

- To educate individuals, industry, and government about native plants.
- To co-ordinate information and activities concerning Alberta's native plants.
- To encourage native plant research.
- To preserve habitats and plant communities.
- To encourage appropriate use of Alberta's native plants.

For more information on the ANPC Guidelines For Rare Plant Surveys or the Alberta Native Plant Council please contact us by writing to the above address or contacting;

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Guidelines For Rare Plant Surveys

Jane Lancaster

Introduction

At present standardized guidelines for rare plant surveys have not been adopted by any of the governments in Western Canada, although proponents of proposed developments are sometimes requested to conduct rare plant surveys as part of the environmental assessment process. Surveys are sometimes requested with inappropriate techniques, time frames and scopes.

In the interest of identifying and conserving rare native flora, the Alberta Native Plant Council (ANPC) is proposing an effective, scientific process for assessment of an area for rare plants. It is hoped that these guidelines will increase understanding of the scope of the process among proponents and those required to conduct rare plant surveys. These guidelines are not prescriptive. It is up to the professional judgment of the botanist to design appropriate surveys for a study area.

A good set of rare plant survey guidelines were produced for the California Native Plant Society during the 1980's by James Nelson of the California Energy Commission. The ANPC guidelines reflect and build on this work, which can be found at the California Native Plant Society website (www.cnps.org/rareplants/relations/cdfg_guidelines.htm).

Objective of the ANPC Rare Plant Survey Guidelines

The objective of the guidelines is to standardize approaches to the assessment of lands for the presence of rare plant species so that:

- reliable information on rare species presence and status (i.e. population size, management concerns) in a study area is produced;
- the potential of locating a rare species in a study area is maximized.

Guidelines for surveying for rare plant communities are not included in these guidelines. There are procedural differences for surveying for plant communities. The Alberta Natural Heritage Information Centre (ANHIC) has developed a Preliminary Plant Community Tracking List for Alberta. Botanists should review this and note potential rare communities when doing rare plant surveys as areas requiring additional research. Documenting rare plant communities fully should be incorporated into vegetation surveys.



Objective of A Rare Plant Survey

Rare plant surveys are undertaken to determine the presence and location of all rare plant species on a survey site. A rare plant survey can confirm the presence of rare species in a study area, but it can seldom rule out the existence of rare species in a study area.

Rare Plants

A rare plant species is considered to be any native vascular or non-vascular (mosses, hornworts, liverworts) plant that, because of its biological characteristics or for some other reason, exists in low numbers or in very restricted areas in Alberta. Although not technically classified as plants, the definition of rarity also applies to lichens and fungi.

Information on rare plants, native biodiversity and elements of special concern is collected, evaluated and made available by Conservation Data Centres (CDCs). The Alberta Natural Heritage Information Centre (ANHIC) is Alberta's Conservation Data Centre. Rare plant species for Alberta include those listed on the current ANHIC tracking and watch lists (www.gov.ab.ca/env/parks/anhic/anhic.html). Most provinces and states in North America now have Conservation Data Centres for storing and managing data on biodiversity elements of special concern within their borders (Contact Address Section). Lists of rare species change as new information becomes available or as the status of populations changes.

Rare Plant Populations

The Alberta Natural Heritage Information Centre uses the concept of an element occurrence (EO) to track rare plants. Generally a principal element occurrence corresponds to a population or metapopulation (The Nature Conservancy 1998). Principal element occurrences are separated from one another by barriers to movement or dispersal, or by specific distances defined for each element across either unsuitable habitat or suitable but apparently unoccupied habitat. The separation distance is generally defined as one kilometre or greater between occurrences. The Nature Conservancy further defines a metapopulation as a spatially structured group of subpopulations where at least one subpopulation has a non-trivial probability of natural extirpation. Persistence of the metapopulation depends on the exchange of propagules (seeds, spores, pollen, etc.) between patches or subpopulations. There is a necessary functional dynamic of extirpation from given patches and recolonization between patches by dispersal.

Qualifications of Surveyors

Surveyors for rare plants must have:

- experience as a botanical field investigator.
- the taxonomic experience to identify, in the field, most plant species they come across in the survey area, and the remainder later through taxonomic determination.
- a knowledge of plant ecology.
- a knowledge of the local flora and of potential rare species in the habitats surveyed.



Pre-Field Work

COMPOSE A LIST OF POTENTIAL RARE SPECIES.

- Check with the Conservation Data Centre (ANHIC) for existing rare plant occurrences:
 - in the study area,
 - in similar habitats in the area,
 - in the Natural Region or Subregion (or equivalent for other jurisdictions).
- Take the complete provincial tracking list(s) with you in the field.
- Liaise with any appropriate knowledgeable agencies, scientists and other people (Conservation Data Centres can recommend local botanists).

COMPILE INFORMATION ON POTENTIAL RARE PLANT SPECIES.

- Obtain species occurrence information from ANHIC (review completed ANHIC Element Occurrence Records).
- Find a description, illustration and photograph (if possible).
- Examine herbarium specimens to become familiar with the plants.
- Check floras for key characters useful in differentiating rare species from similar common species.
- Gather biological information on rare species - annual, perennial, saprophyte.
- Gather ecological information on rare species - substrate and habitat preferences, - associated dominant species.
- Collect phenological information on potential species to assess appropriate field survey dates. - (If you have no information use flowering dates of common species in the area.)

MAP THE PROJECT AREA

- Obtain maps and aerial photographs of an appropriate scale.
- Map habitats and plant communities in the study area using aerial photographs (\leq 1:30,000 scale, preferably colour).
- Gather information on special habitats and areas of ecological significance in the study area.
- Map special habitats and known rare plant locations in the study area using aerial photographs.
- Map areas that will potentially be disturbed during construction and operation.
- If available, review other mapped information: topography, surface geology, soils and hydrology, to help locate potential habitats and plant communities.



Rare Plant Field Survey Methods

FLORISTIC VERSUS QUANTITATIVE SURVEY METHODS

Traditional quantitative methods that focus on vegetation community classification are inappropriate and inefficient for rare plant surveys. Quantitative vegetation analysis techniques tend to represent dominant vegetation species on a site and focus effort on small portions of a study area. Rare plants tend to have small discrete populations or to be thinly scattered on a landscape. They are more likely to be found by concentrating search effort in covering a larger area.

Ecological land classification studies can give context and clues but they are not well linked to rare plant occurrences. Microhabitats, ephemeral habitats, unusual landscape features and transition zones between habitats are important sites for rare plants. These fine scale biotic patterns occur within and between larger, mappable vegetation units. Rare plant sites are often closely linked to substrate, seasonal water patterns, small-scale landscape features and particular plant associations.

Rare plant surveys should be floristic in nature. A floristic survey in this context is not to develop a full list of the plant species in the study area but rather to ensure that all species encountered are sufficiently evaluated to confirm or to rule out the possibility that they are a rare species. Rare plant searches cover a study area more thoroughly than quantitative methods. Search effort is focused inspecting as many on the fine scale biotic patterns, unusual plant associations and landscape features as possible while still checking some portions of each dominant habitat or plant association. All sites and features with high probability of supporting rare species should be checked.

LEVELS OF SURVEY

Rare plant surveys are conducted for a number of objectives. Three basic levels are

- Reconnaissance searches – for presence/absence
- Population surveys - for population size and aerial extent
- Demographic surveys – for population dynamics

The objective of these ANPC field survey methods is to determine the presence of rare plant species and to give preliminary indications of population size and aerial extent.

Field Work

- The size of the project area may preclude detailed inspections of the entire area. In these cases searches should concentrate on as many likely sites as is feasible while still sampling each habitat represented in the study area. Skew search effort to sample more sites with higher probability of supporting rare plants.
- Systematic search patterns are recommended to minimize overlap and maximize coverage. Search patterns will depend on the topography and vegetation cover.
- Where conditions permit, walking a series of roughly parallel “transects” in a search unit will maximize coverage of the area.
- Spacing of the search transects will depend on the density of the vegetation cover, visibility through it, and the size of the plants in it.



EXAMPLES OF SEARCH PATTERNS AND INTENSITY

- Meander searches focus on a particular habitat and the range of variation within
 - Involve walking ‘randomly’ through a site or plant association and noting each new species until no more new species are observed.
 - Useful in difficult terrain or irregularly shaped search areas.
 - May be biased toward areas that are easier walking and may oversample some areas (i.e. hit some areas >once).
- Patterned searches, walking a series of roughly parallel “transects” in a search unit.
 - Maximizes coverage of an area and minimizes overlap.
 - Reduces the tendency to avoid difficult search terrain.
 - Access may be difficult at times and unique habitats may be missed.
- Search intensity varies with:
 - vegetation density,
 - visibility through the layers,
 - plant size and taxon.

A combination of the two methods is often useful. Meander searches help locate biotic patterns and their boundaries, which can then be searched using transects to maximize the coverage of the polygon of interest. Search patterns and intensity are discussed in Nelson 1984 and Nelson 1986.

ESTIMATING POPULATION SIZE

Some population surveys may require only noting presence or absence in the study area. Others require a rough estimate of population size, in which case classes such as 0-10, 11-100, 101-1000, 1001-5000 etc. are appropriate. ANHIC’s report form asks for information on extent and number of individuals. If the population is small in extent and the number of counting units (ramets/genets) are few, a complete population count or census may be feasible. For larger, more extensive populations, an approach is to map the extent/boundary of the population and determine average density or frequency of occurrence in sample quadrats, regularly or randomly spaced. The objectives of the survey will determine what method for measuring a population’s size and condition is appropriate. A useful publication on measurement techniques is ‘Measuring and Monitoring Plant Populations’ by Elzinga et al. 1998.

Minimum Requirements For a Rare Plant Survey

Minimum requirements for a defensible rare plant survey are as follows:

- The rare plant survey should provide reasonable geographic coverage of the study area including:
 - samples of each representative plant community,
 - all uncommon plant associations,
 - all features or biotic patterns with high probability of supporting rare plants.
- Survey the area when potential rare species are most visible (when diagnostic features are most identifiable).
- Survey the area at least twice during the growing season for vascular species.
- Revisit all sites where rare plants have been previously recorded.

Due to the timing of planned disturbances to the landscape, the above conditions cannot always be met. It is important to document survey effort in terms of the dates of survey, number of site



visits, methods and survey effort. One site visit or a survey at a marginal time of year is better than not conducting a rare plant survey before a disturbance. However, it is important to indicate confidence levels in the results and whether the survey meets the minimum requirements to be defensible in a hearing.

Requirements For a Thorough Rare Plant Survey

- The study area should be surveyed a sufficient number of times during a growing season to observe:
 - cool season and warm season perennials,
 - summer and winter annuals,
 - ephemeral habitats and events (i.e. snow melts, ephemeral wetlands, spring seeps).
- A number of visits may be required in areas with a longer growing season.
- The study area should ideally be assessed over a number of growing seasons and moisture conditions for a number of reasons, such as:
 - During climatic fluctuations, e.g. dry years, annuals may not germinate.
 - Perennials may not produce flowers, making them difficult to identify.
 - In a number of plant families with subterranean perennial organs, above ground growth can be absent for 1-2 years.
 - Grazing and insects and disease can affect the vigour and visibility of rare plants on a site.
- A higher proportion of study area should be searched.
 - A smaller study area will be searched in its entirety.
 - Geographic coverage of larger study areas will be as extensive as possible with as many polygons inspected as is feasible.

Documenting Rare Plant Sightings

Detailed documenting of rare plant occurrences is needed to improve our understanding of rare plant species biology, habitat requirements, phenology and abundance.

- Conduct an accurate count or estimate of individuals (ramets/genets). Note what you are considering an individual (clumps, flowering stalks).
- Do a detailed habitat/plant community description and a map for each population of a rare species.
- Determine the extent of the area a population occupies both within and, if possible, beyond the study area.
- Determine any communities or microhabitats that appear important to the rare species.
- Rare plant sightings should be supported with voucher specimens. Vouchers should be collected but only under the following conditions:
 - If the immediate population can withstand the loss (<4% loss of individuals). Refer to ANPC's Native Plant Collection and Use Guidelines for further information (Bush, 1993).
 - If a collecting permit has been granted (where applicable).
- For small populations, collect the minimum of plant material from the part of the plant that will allow confirmation.



- Where collecting is not an option, documenting the species with photographs may be effective. Take a picture of the plant habit, and a close-up of a diagnostic feature. A photograph of the surrounding habitat is also valuable.
- State the reference(s) used to key the plant.
- Consult a taxonomic expert for confirmation of identifications for difficult species.
- Fill in a “Rare Native Plant Report Form” (Appendix 1) or equivalent in other jurisdictions. Fill in all the fields.
- When documenting rare species, record precisely the location, habitat, plant community, aspect, slope, elevation, relative abundance, substrate, soil type and texture (where known), drainage and date.
- Record any additional information on phenology, vigour, size classes or age classes; and factors affecting the plant(s) such as moisture conditions, competition, insect pests, current land use, grazing pressure, fire, threats, etc.
- Map all occurrences of a rare species on a topographic map, an air photo and a plant community map if available.
- All rare plant locations should be described as precisely as possible by legal land description, latitude and longitude or UTM coordinates. A GPS reading may be useful.
- Record directions so that the plant(s) may be easily relocated. Photographs are useful for documenting locations.

Reporting Rare Plant Sightings

ALBERTA NATURAL HERITAGE INFORMATION CENTRE REPORTING

- A Rare Native Plant Report Form (available from ANHIC) should be filled out and sent to ANHIC.
- All voucher specimens need to be properly mounted and labelled. For information on proper mounting and labelling of herbarium specimens see Brayshaw 1996.
- All plant material vouchers collected should be contributed to a publicly accessible herbarium, typically a university or museum herbarium (ANHIC does have a small herbarium but there is no curator).
- Vouchers, whether specimen or photograph, should be submitted to experts for confirmation of identification (contact ANHIC for information). Only those records that are substantiated by a confirmed identification will be incorporated into the database.

RARE PLANT SURVEY PROJECT REPORTING

- Rare plant survey reports must allow the receiving agency to assess the quality and rigour of the survey.
- The extent of the pre-survey search of the ANHIC database and any element occurrence records (EOR) found should be stated. Indicate the date of the ANHIC search in your report. Target species and community types should be identified and species phenology discussed. From this information the rationale for the survey design should be given.
- The field survey must be traceable to the field botanist.



- A sign-off sheet with signatures of the original botanists should be present on the final document to ensure that findings are reported.
- The report must contain an expression of survey effort in terms of percentage of the area covered, hours in the field and dates of survey and names of surveyors.
- Discuss limitations of the survey (times of year, number of site visits, effort). Confidence in the results should be addressed and whether the survey is sufficient to be defensible at a hearing.
- Document the number and location of all voucher specimens.
- State whether a Rare Native Plant Report Form is being filed with ANHIC and when it is expected. If not, state the reasons.
- Unless contracted to maintain the privacy of the information, all rare plant findings should be reported to ANHIC. Once a decision has been reached on a project where rare plant information has been withheld, permission should be sought to release the information to ANHIC.
- If you use a conservation data centre you have a responsibility to contribute to it.

A sample Table of Contents for a rare plant survey report is included as an appendix to the guidelines.

Contact Addresses

Alberta Native Plant Council, P.O. Box 52099, Garneau Postal Outlet, Edmonton,
Alberta T6G 2T5. Website: <http://www.anpc.ab.ca/>

Alberta Natural Heritage Information Centre, 2nd Floor, Oxbridge Place, 9820 106th
Street, Edmonton, Alberta, T5K 2J6, (780) 427-5209.
Website: <http://www.gov.ab.ca/env/parks/anhic/anhic.html>

British Columbia Conservation Data Centre.
Website: <http://www/elp.gov.bc.ca/rib/wis/cdc/>

California Native Plant Society. Website: <http://www.cpns.org/>

Montana Natural Heritage Program, The Montana Natural Resource Information System.
Website: <http://nris.state.mt.us/mtnhp/plants/index.html>

Saskatchewan Conservation Data Centre. Website: <http://www.biodiversity.sk.ca/Default.htm>

The Nature Conservancy. Website: <http://www.tnc.org/>



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Appendices

Appendix 1: Rare Native Plant Report Form

Appendix 2: Sample Rare Plant Report Table of Contents



SAMPLE RARE PLANT REPORT TABLE OF CONTENTS

- Dana Bush, Axys Environmental Consulting Ltd.

INTRODUCTION

METHODS

Survey methods

- Survey dates
- Survey intensity (# of data points or % area covered, and number of field days)
- Reasons for choosing data points (every 300 m, intense search of wellpad, 10% of polygons etc.)
- Identification (e.g. verified at U. of C., verified by *name of botanist*)
- Collection guidelines (e.g. 1:20 rule)

Preliminary Literature and ANHIC Search

- Names of species that may be found in the study area
- Describe ANHIC search parameters
- Habitats
- Phenology
- Identify element occurrences in the study area or close to the proposed development.

RESULTS

Species Descriptions

- Description
- Location (including GPS readings)
- Population size and extent
- Ecosite phase and community type
- Habitat
- Biology
- Reasons for rarity
- Causes for concern (weeds, changes in hydrology, loss to development etc.)

Map or air photos

ANHIC Rare Native Plant Report Form (to be filed with ANHIC)

Limitations of Survey

Discuss your confidence in the results, including the number of surveys, survey dates, intensity etc.

FOR DEVELOPMENT PROJECTS, YOU MAY ALSO NEED TO DESCRIBE THE:

Nature of the project effects

- Direct loss of individuals or populations
- Alterations in vegetation that may affect populations (weeds, reclamation species, dust deposition, air emissions, tree removal)
- Alterations in landscapes that may affect populations (changes in hydrology, snowpack etc.)

Mitigation

- Describe proposed mitigation for each species.
- Outline monitoring required to determine success of mitigation over time.

Impacts after Mitigation

- Evaluate the significance of the loss to the local population and the national and/or international populations.

SIGNATURE SHEET

This page should include the names of all field botanists and authors and their credentials. The senior author should sign it, acknowledging that all relevant information is included, and that they accept responsibility for the accuracy of the report. Field botanists and contributing authors may also sign it to indicate that they have seen the final report and approve of the data and recommendations.

