Saskatchewan Conservation Data Centre

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SKCDC Guidelines for Collecting Spatial Data during Vascular Plant Surveys

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Table of Contents

Introduction

The Saskatchewan Conservation Data Centre (SKCDC) requires spatial information for entering plant observations into its database. Spatial data is currently received from a myriad of projects and sources and is reported in many different ways, not all of which are equally useful or representative. In the past, observations were mapped from written descriptions or coordinates estimated from paper maps. With the use of newer technologies (e.g., GPS), it is possible to collect much more accurate and detailed information. With this in mind, it will be a benefit to both the submitter and SKCDC if the data can be collected in a manner that serves the plant survey goals as well as provides useful information for the SKCDC database. These guidelines are intended to reduce data processing time, both for the agency submitting the data, as well as for SKCDC staff. While they will not be suited to every project, the SKCDC hopes that they can be applied in most cases.

Henderson (2009) provides excellent background and recommendations for data collection, including tips on using track files to record patch boundaries (useful as noted below). The SKCDC guidelines are based on this document.

The SKCDC welcomes comments and suggestions to improve these guidelines (contact the SKCDC).

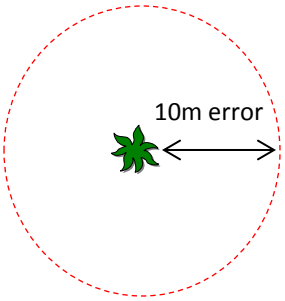
SKCDC Mapping

Plant observations can be mapped as points, lines or polygons, and once mapped in the SKCDC database they become Source Features. Waypoints are processed into point type Source Features, occupied portions of transects are processed in line type Source Features, and patches are processed into polygon type Source Features. A Source Feature should accurately represent the location of the plants on the ground, without falsely including unoccupied area. If there is any uncertainty associated with the observed location (e.g., GPS error values), then an uncertainty buffer is applied to it when it becomes a Source Feature (Figure 1). The SKCDC can make use of written descriptions of the location of a plant (typically received from historical data), but prefers to receive either coordinates or shapefiles recorded using a GPS or data logger. Described locations typically have a higher uncertainty associated with them, and therefore have a larger locational uncertainty buffer when mapped. Using a GPS to record a location usually results in a much lower spatial uncertainty, as long as the GPS unit's locational error is <5m at the time of recording the spatial data. For further information on how the SKCDC maps observations, please see the SKCDC mapping methodology webpage.

Figure 1. Illustration of how a waypoint with GPS error of +/-10m is mapped as a Source Feature.

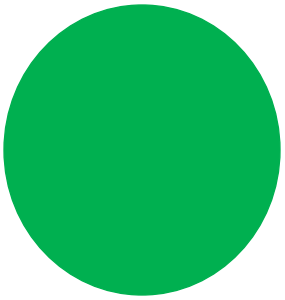
Field Observation

- A single plant is recorded with a waypoint; GPS error is +/- 10m



Mapped Source Feature

- Takes into account the 10m error because the plants on the ground are anywhere within this polygon



Survey Protocols

Plant survey protocols should follow those set forth by the Ministry of Environment. Those protocols can be found via the Ministry of Environment Wildlife Research and Projects webpage.

Spatial Data Collection Guidelines

Once a rare plant (or group of plants) has been located, and before data can be collected for that observation, the observer must first determine how to spatially lump or split groups of plants (that is, plants of the same taxon). In order to accomplish this, the following considerations may be made:

- What are the goals of the survey?
- What are the life history (e.g., annual, perennial) and growth (e.g., rhizomatous) characteristics of the taxon?
- How are the plants distributed (e.g., clumped, scattered, etc.)?
- How far apart are the plants?
- Does suitable or unsuitable habitat occur between the plants? Are there significant barriers or changes in habitat in between the plants?
- Is it useful to represent each plant individually if they occur close together?
- Is it accurate to represent a patch of plants lumped together if they occur far apart?
- Is there a clear boundary that delineates a patch of plants?
- If the patch size of a group of plants on the ground is very large, is it more useful to split it up during data collection to make population estimates more useful?

How far apart can plants be on the ground and still be grouped together into one patch for data collection? Much more consideration on a case by case basis is needed to determine whether and how plants should be lumped or separated spatially. A shorter separation distance between patches is always more desirable for the most accurate representation, since it provides the most detail about where plants occur on the ground, but is not always feasible from a time management perspective. On the other hand, plants that are too far apart should never be lumped together in a single patch, as this is too misrepresentative (i.e. when mapped, it will appear that unoccupied area is occupied, Figures 2 and 3). The cutoff distance will depend on the considerations listed above. While it is difficult to dictate a cutoff distance, the SKCDC recommends that plants >30m apart never be spatially grouped together into a patch, but note *that it will be appropriate in many situations to use a much shorter distance to separate and record plant patches* (e.g., if unsuitable habitat occurs between them, Figures 2-4).

For very large patches of plants, it may be worthwhile to arbitrarily separate them for mapping to make counts or estimates more meaningful. In addition, some idea of the density distribution (e.g., densely clumped, widely scattered, evenly distributed) of the plants should be noted.

Figure 2. Patches of plants that are >30m apart should be mapped as separate patches.

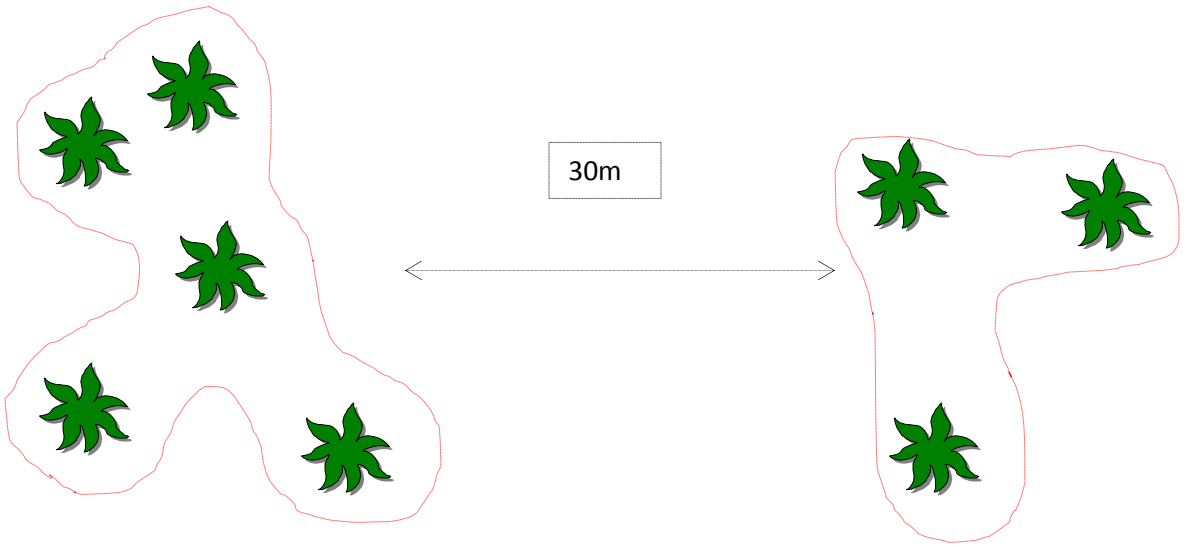


Figure 3. There are many instances where a separation distance of <30m should be used, such as when unsuitable habitat (e.g., dense shrub cover) occurs between patches of plants that occupy a different type of habitat (e.g., open grassland).

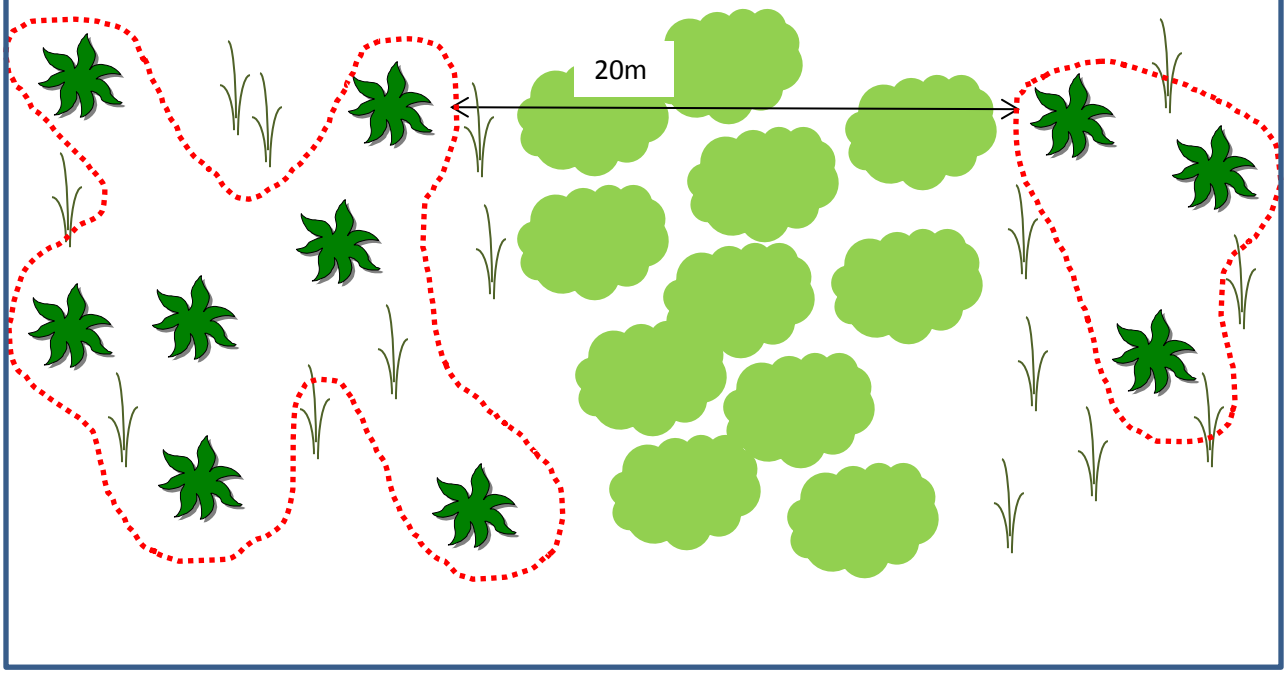
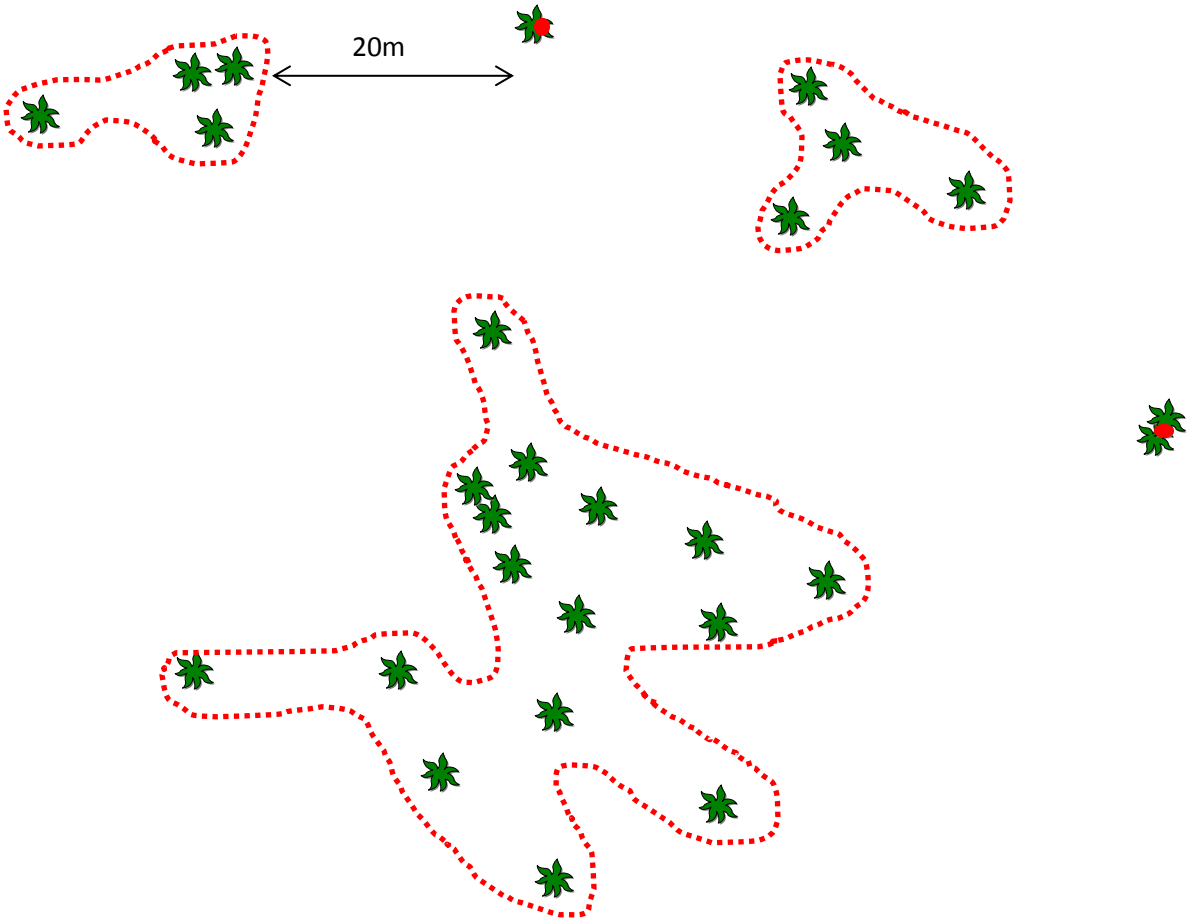


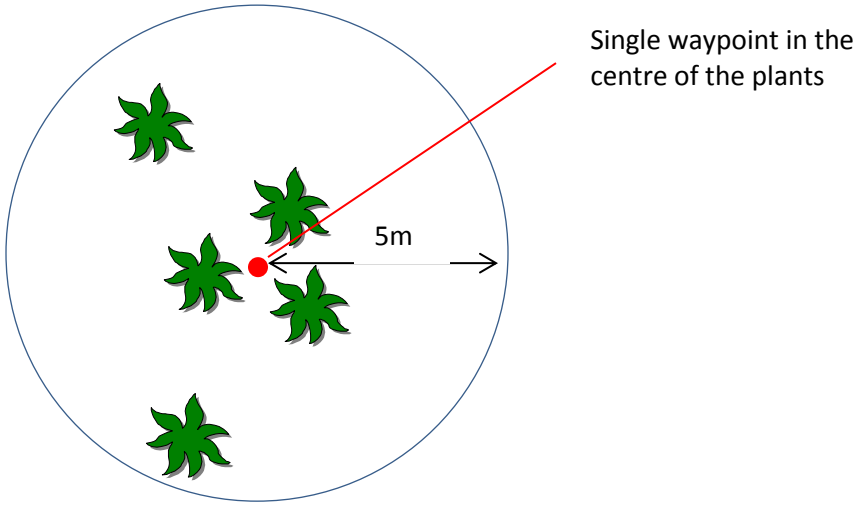
Figure 4. Example of how plants occurring over a larger area may be lumped for spatial recording using both waypoints (red dots) and tracks (red lines). A separation distance of 20m is used.



Individual Plants or Small Patches

An individual plant, or plants that occur together in a relatively small area (i.e. a patch size of <5m radius) can be recorded with a single waypoint in the centre of the patch (Figure 5).

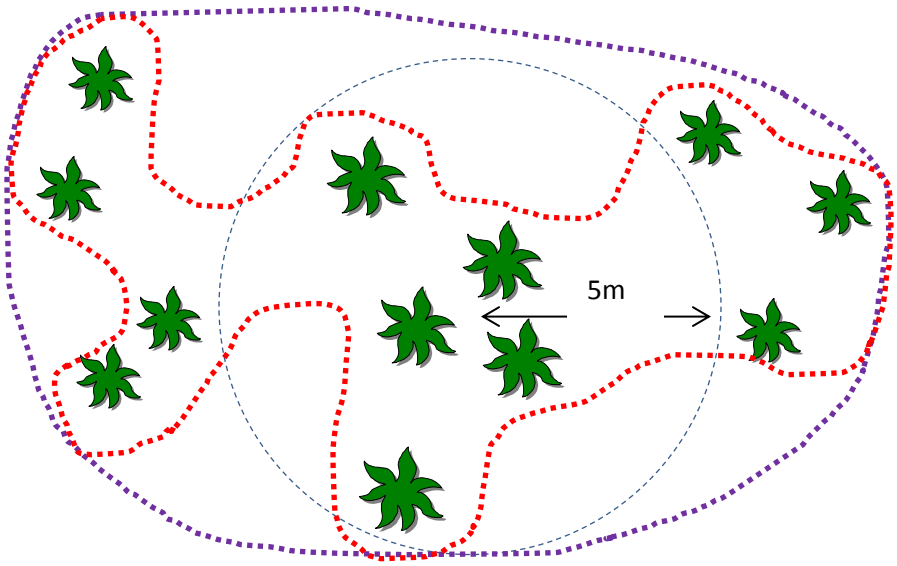
Figure 5. Plants that are in a patch of <5m radius can be recorded with a single waypoint



Large Patches

Groups of plants occupying an area more than >5m radius should be mapped as a patch instead of with a waypoint (Figure 6). The SKCDC does not recommend using multiple waypoints to record the boundary of a patch, as this increases processing time for the observation and may decrease accuracy. The easiest and most useful way to map a patch boundary using a GPS (or other data logger) is to use the track function (see Henderson 2009, pg. 13-15). The level of detail recorded with the track file will depend on the considerations listed at the beginning of this section. The SKCDC recommends more detail (see red track in Figure 6) for the most accurate representation. A central waypoint should be included for the observation in the Species Detection Loadform, and the track files or polygons can be sent in a shapefile (or other acceptable spatial file type such as .gpx or .kml) that accompanies the loadform. Multiple tracks and waypoints can be submitted in a single shapefile, as long as each one is clearly linked to an observation in the loadform. The unique name of the track or waypoint should be recorded in the "Waypoint/Track Name" field of the Species Detection Loadform. If an observation is associated with a single waypoint, then coordinates for that waypoint should always be filled out in the appropriate fields in the spreadsheet, whether waypoints are submitted in the shapefile or not. The naming convention for the tracks and waypoints will be left up to the submitter, but it should remain relatively consistent within each project.

Figure 6. Plants occupying a patch >5m in radius should be recorded as a patch using a track file. Two track files, with varying degrees of detail, are shown (one in red, one in purple). The red track file is preferred by the SKCDC.



Linear Features

Groups of plants that occupy a linear feature (e.g., along a shoreline, right-of-way, road, or data collected only on a transect) that is <5m wide can be recorded using a track file by walking from the start to end point (i.e., creating a line). If observers do not wish to use a track file and instead mark a start and end point along a right-of-way, they may do so, but should process their own data into a line (rather than two points) before submitting it to the SKCDC. If the width is >5m, then plants should be mapped as a patch rather than a line. If plants are being recorded only within the right-of-way boundary, even if they continue off of it, then the observer should make a note of this in the observation record.

Multiple Species

When multiple rare species are encountered together and are distributed over large areas (e.g., occur along several hundred meters of a right-of-way), the SKCDC understands that, due to time constraints, it may become difficult to map patches of each species following these guidelines. While it is most beneficial to follow the guidelines in all cases, some allowance may be given for the time constraint of doing so when rare species are locally common. In such cases, large patches of an individual taxon may be lumped together for mapping.

Plants belonging to different taxa should never be lumped together into the same record within the Species Detection Loadform even if they occur in the same location. Each taxon should be reported on a separate line in the spreadsheet. If spatial data is being submitted in a shapefile, it is acceptable for multiple records in the spreadsheet to reference a single waypoint or track file if they occur at the same location.

Observation Data Collection Guidelines

Data collection should follow the fields outlined in the Species Detection Loadform found on the Ministry of Environment's Wildlife Research and Projects webpage. Both survey data and observation data need to be recorded. The minimum required fields are noted. Each occurrence/observation/patch should be reported on a new line (for example, data would be collected separately for 5 patches as shown in Figure 4, resulting in 5 lines filled out in the loadform).

Data Submission

The Species Detection Loadform spreadsheet should always be submitted. If an accompanying shapefile exists, it should be submitted as well.

Data that is related to a Ministry of Environment permit is no longer submitted directly to the SKCDC, but is submitted with final reports to ENV.researchpermit@gov.sk.ca. From there it will be forwarded to the SKCDC. Data that is not related to a permit may be submitted directly to the SKCDC. For more information, please see the SKCDC data submission webpage.

Resources

Henderson, D. 2009. Occupancy Survey Guidelines for Prairie Plant Species at Risk. Canadian Wildlife Service, Prairie and Northern Region. Environment Canada. 37pp.

Ministry of Environment Wildlife Research and Projects. http://www.saskatchewan.ca/business/environmental-protection-and-sustainability/wildlife-and-conservation/wildlife-research-permitting