Guidelines for Rare Plant Surveys

Wisconsin Natural Heritage Inventory Program
Wisconsin Department of Natural Resources

Introduction

Rare plant survey guidelines were produced for the California Native Plant Society by James Nelson (1987) (revised by CNPS, 2001), the Alberta Native Plant Council (Lancaster, 1998) and the Native Plant Society of Saskatchewan (Bizecki Robson, 1998). Those guidelines have contributed to this document.

Traditional quantitative methods that are designed for plant community classification are not efficient for rare plant surveys. Such techniques tend to represent dominant species and focus effort on small portions of a study area. Rare plant species are often sparsely distributed across the landscape, appearing infrequently and often in specialized habitats linked to substrate, small-scale landscape features, and other factors. Rare plants are more likely to be found by surveys that cover a larger area.

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. However, the more often an area is surveyed without finding a rare plant population, the lower the likelihood that a dormant population is present.

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. Rare plant searches cover a study area more thoroughly than quantitative methods. Efforts are focused on surveying as many of the specialized habitats as possible while still checking some portions of each dominant habitat or plant association. All habitats and features with high probability of supporting rare species should be checked.

Floristic survey work also requires an assessment of plant community and habitat types present in a site, thus drawing upon the plant ecology knowledge of the surveyor. This assessment of habitat and community types requires a degree of knowledge on the part of the surveyor that allows for targeting of specialized habitats, or habitat types where rare species occurrences are most likely.

Transects or grids may still be used to ensure site coverage and allowing mapping of rare species. However, the aim is not to "sample" vegetation, but to survey the entire site.

Survey Levels

Rare plant surveys are conducted for a number of objectives including reconnaissance for rare species, surveys for population size and extent, and demographic surveys for population dynamics.

At the very least, rare plant surveys should provide reasonable geographic coverage of the site including samples of each represented plant community, all uncommon plant associations, and all
features having a high probability of supporting rare plants. Surveys for rare vascular plants should be done at least twice a year when rare species are most visible.

**Survey Types and Techniques**

Survey intensity varies with topography, vegetation density and visibility, and plant species and size.

It is important to emphasize the role of phenology in rare plant surveys. While many rare species can be found throughout the growing season by a knowledgeable botanist, seasonal coverage that targets peak identification periods will increase the confidence in the survey and the likelihood of detecting species. Ideally, a site will be surveyed during the following periods: early spring, later spring, early summer, late summer, and early autumn. This type of coverage will capture the key detection periods of most species, including spring ephemerals that completely disappear after flowering. At a minimum, sites should be surveyed twice to capture peak spring/early summer and late summer/early autumn identification periods.

For targeted rare plant surveys, where a single or suite of species is being sought, surveys will concentrate only on suitable habitat within the area of interest. Key habitat types are identified and then thoroughly searched during field work. As always, survey work should be undertaken during the optimal period in order to maximize the likelihood of detection and identification. The time required for this type of survey is less than for a complete floristic inventory, but the chance exists that the target species will remain undetected.

Two main techniques for rare plant surveys are generally used: random meander and systematic transects. The random meander covers areas that appear likely to have rare taxa, based on habitat and the judgment of the investigator. Searches should concentrate on as many likely sites as is feasible while still sampling each habitat represented in the study area. Meanders involve walking “randomly” through a site or plant community and noting each new species. They are useful in difficult terrain or irregularly-shaped sites, and are particularly useful for locating small habitat features. However, depending on the surveyor, meanders may be biased toward areas that are easier to survey and may oversample some areas. The use of a GPS can help a botanist to adequately survey a site, especially those sites that are large or difficult.

A systematic search follows transects as a guide to provide the greatest coverage possible of the area. Where conditions permit, walking a series of roughly parallel “transects” in a search unit will maximize coverage of the area. Patterned searches maximize coverage of an area and minimize overlap. They also reduce the tendency to avoid difficult search terrain. However, unique, smaller habitats may be missed. Spacing of the search transects will depend on the density of vegetation and the size and visibility of the plants in it.

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 area of interest.

We generally recommend the use of the meander technique to maximize coverage of suitable habitats. Documentation of the methods used and the results obtained is necessary for reviewers to be able to judge if survey efforts are adequate.
Minimum Qualifications for a Rare Plant Surveyor

In general, a rare plant surveyor should have:

- experience as a botanical field investigator;
- plant taxonomic experience and a knowledge of plant ecology (the surveyor should preferably be recommended by another professional botanist);
- familiarity with the local flora and potential rare plants in the habitats to be surveyed;
- Field investigators should be prepared to identify rare species not on their prepared lists for the area and not previously found nearby, ranges extensions may be found during surveys.
- familiarity with local, state, and federal laws, policies, and regulations regarding rare plant protection and environmental assessment; and
- a demonstrated ability to prepare detailed technical reports.

Preparation for Field Surveys

Obtain and review all available mapping for the study area or region, including site maps, topographic maps, species distribution maps, and current aerial photographs.

Generate a list of the rare species possibly present in the study area by using the Wisconsin Natural Heritage Inventory county data web site (http://dnr.wi.gov/topic/NHI/data.asp), local and regional floras, distribution maps (e.g., http://www.botany.wisc.edu/wisflora/), published reports, and existing site species lists. The Bureau of Natural Heritage Conservation occasionally updates the list of Endangered, Threatened and Special Concern plants. The most up-to-date version of this list as well as photos and information on diagnostic traits of individual species can be found here: (http://dnr.wi.gov/topic/endangeredresources/plants.asp).

Compile information on potential rare species. Check floras for key characters useful in differentiating rare species from similar common species. Gather biological and ecological information on potential rare species. Examine herbarium specimens to become familiar with the plants. Note: collecting information on potential rare plants is not a substitute for conducting survey at the appropriate times of the year. Database information is incomplete, and rare plants are not always predictable in where they occur.

Review the flowering periods and growing requirements for rare species that maybe encountered in order to determine survey periods. Determine when potential rare plants at the site will be easiest to identify and use those times to conduct surveys. Two or more survey periods will likely be required in a single season to adequately survey for all rare plants.

Determine the habitats and plant communities that are present and their priority for surveys in the study area. Compare the list of rare species with available habitat types in the study area. Known occurrences of rare plants should be mapped onto topographic maps or air photos and taken into the field.

Vouchering, Documentation, and Reporting

Specimen collection should be conducted in a manner that is consistent with conservation ethics and accepted plant collection and documentation techniques. All collections shall be made in
accordance with applicable state and federal permit requirements. Voucher specimens should only be collected if the population size and vigor are sufficient to allow removal of an individual. Partial collections of a portion of the plant displaying diagnostic characters can be sufficient for verification without destroying the individual plant. All vouchers should be deposited with a recognized public herbarium, preferably the Wisconsin State Herbarium at the University of Wisconsin-Madison, to make them available for study.

When collection is not an option, photographs may be an acceptable alternative in most cases. Photographs should be sufficient quality to document both diagnostic characteristics and entire plants. Photographs should have an indication of scale. A 15 cm ruler is preferred, but if one is not available use an object that is commonly available such as a U.S. penny or nickel. Larger scale pictures are useful to detail habit, habitat quality, and location.

A complete description of the plant characteristics should accompany any records not documented by a voucher.

Check identifications using herbarium collections and with experts to obtain verifications.

When an Endangered, Threatened, or Special Concern plant is located, a Wisconsin Natural Heritage Inventory (WNHI) rare plant reporting form or equivalent written form, accompanied by a copy of the appropriate portion of a 7.5-minute topographic map with the occurrence mapped, shall be completed and included within the survey report as well submitted separately to the WNHI program botanist. Population boundaries should be mapped as accurately as possible. The number of individuals in each population should be counted or estimated, as appropriate. GPS waypoints (if taken), in an electronic form, should accompany the report in a comma-delimited textfile and/or MapSource format with LAT and LONG in decimal degrees and WGS84 datum.

References:


