

*Reprinted with permission from: Proceedings: Leafy Spurge Strategic Planning Workshop<sup>1</sup>, Dickinson, North Dakota. March 29-30, 1994. pp. 30-34.*

*Sponsored by: U.S. Department of the Interior and U.S. Department of Agriculture, Forest Service, Rocky Mountain Elk Foundation, and DowElanco.*

---

# Rare plant species of the North Dakota Badlands with some considerations for leafy spurge management

DARLA LENZ

*Botanist; North Dakota Natural Heritage Program, Bismarck, ND*

## **Abstract:**

Select rare plants of the North Dakota Badlands are discussed in regard to their relative rarity and habitat. The known impacts of leafy spurge on rare plant populations are addressed, along with considerations for leafy spurge control methods.

---

## **Introduction**

The first floristic surveys in western North Dakota were made incidental to explorations along the Missouri and Yellowstone Rivers prior to settlement of this region (Rohde-Fulton 1985). One of these early surveys in western North Dakota provided documentation for a species which may be North Dakota's rarest plant. This species, Hayden's yellowcress (*Rorippa calycina*), was collected from along the Yellowstone River in North Dakota in 1854 (Stuckey 1972) and has not been documented in North Dakota since that time.

Systematic floristic inventories and vegetation research in the badlands region have resulted in a compilation of the flora for this region (Heidel 1990). Research projects and floristic surveys have not focused strictly on rare plant species, although some species were identified during the course of the work. Barker (1978) first put together a list of the rare or unique plant species for North Dakota. A version of this list was adopted by the North Dakota Parks and Recreation Department's Natural Heritage Inventory (NDNHI) in order to develop priorities for inventorying rare plants. NDNHI botanical surveys

---

<sup>1</sup> Workshop Coordinator: Roger J. Andrascik, Resource Management Specialist, Theodore Roosevelt National Park, Medora, ND. Compiler: Nancy S. Ohlsen, Natural Resource Specialist, Theodore Roosevelt National Park, Medora, ND. Editor: Claude H. Schmidt, Agric. Exp. Stn., NSDU Extension Svc., NDSU, Fargo, ND.

aimed specifically at rare plant species began in earnest in 1981 (N.D. Parks and Recreation 1984).

## **Results and discussion**

### **Rare plant inventories in the North Dakota Badlands**

NDNHI has conducted both site-specific and species-specific rare plant inventories in the badlands region. In cooperation with the managing agencies, NDNHI has inventoried portions of Theodore Roosevelt National Park and portions of the Little Missouri National Grasslands, including areas of southern Medora Ranger District and Bullion Butte. A species-specific inventory was initiated in 1993 for Dakota buckwheat (*Eriogonum visheri*) in the Little Missouri National Grasslands.

Priorities for these rare plant inventories are developed based on the degree of rarity of each species. In general, there are three different types of rarity considered by botanists, conservation groups, and agencies (Ayensu 1981). These types of rarity are based on three characteristics; geographic range, habitat specificity, and population size (Rabinowitz 1981).

The rare plants of the North Dakota badlands also fall within these three rarity categories. These categories include: 1) endemics, or species with a restricted range. North Dakota's one endemic plant species is Dakota buckwheat; 2) "sparse" species, or those plants rare throughout an extended range. These species frequently have a narrow habitat specificity. Species of the badlands which are rare throughout their range include smooth goosefoot (*Chenopodium subglabrum*) and cushion fleabane (*Erigeron radicans*); and 3) peripheral and disjunct species. These species are at the edge of, or are separated from, the main body of their distribution. These species are generally more common elsewhere, but are uncommon within North Dakota. Examples of this type include limber pine (*Pinus flexilis*), and alyssum-leaved phlox (*Phlox alyssifolia*).

### **Rare plant habitats and known impacts of leafy spurge**

The habitats of rare plant species in the Badlands are as varied as the land itself. Insufficient information is available for many of these rare plant species to be able to draw definitive conclusions about their habitat preference (Lenz 1993). There are, however, some highly recognizable habitats which harbor rare plant species. These habitats include such areas as butte tops and slopes, riparian areas, and badlands formations. A detailed discussion of this region's rare plant species and their habitats is too extensive for the limited scope of this paper. Only selected habitats and associated rare plant species will be considered in this work.

The effect of leafy spurge on rare plant populations and habitats is not fully known. Some impacts have been documented during rare plant survey work (Heidel 1990, Lenz 1993). No quantitative information is available to document the true impact that leafy spurge has had on rare plant habitats within the North Dakota badlands. In the following text, selected rare plant habitats are discussed along with impacts of leafy spurge, if known.

## Rare plants of badlands formations

Dakota buckwheat has been the focus of the most comprehensive rare plant inventories and studies in this region. Information available for this species includes habitat information, associated species, and known threats. Dakota buckwheat habitat consists of barren clay outwash sites at the base of low relief badlands buttes and other erosional features (Vanderpool 1993). Leafy spurge has not been found associated with this habitat to date.

In North Dakota, Vanderpool (1993) surveyed 21 sites supporting Dakota buckwheat. None of these sites contained leafy spurge. Schmoller (1993) did not document leafy spurge in association with Dakota buckwheat populations examined at 33 sites in South Dakota. In addition, leafy spurge was not associated with Dakota buckwheat on any of the 40 sites examined by Ode (1987) in his study in South Dakota. He describes Dakota buckwheat as inhabiting a very harsh soil environment with dense clay-textured, sodium-affected, nutrient-poor substrates. It is possible that this habitat may be too harsh for leafy spurge to survive.

## Rare plants of riparian areas

Certain areas along the Little Missouri provide habitat for smooth goosefoot. Within the state, this species is found only on the open, early successional habitat adjacent to the Little Missouri River. This habitat is also prone to invasion by leafy spurge. During inventories in Theodore Roosevelt National Park, leafy spurge was identified as the greatest immediate threat to this species (Heidel 1990).

Certain rare plant species are found associated with woody draws and upland sites with shallow water tables in the badlands region. One example of this species is smoothbark cottonwood (*Populus × acuminata*). This cottonwood is found along intermittent drainages of western North Dakota. This species is an unusual hybrid between cottonwood (*P. deltoides*) and narrowleaf cottonwood (*P. angustifolia*). Leafy spurge has not yet been documented in locations supporting this species (Heidel 1990, Lenz 1993). However, this type of habitat can easily be overrun with leafy spurge once it becomes established in the vicinity.

## Rare plants of buttes, ridgetops, and hillslopes

Certain rare species occupy the sparsely vegetated buttes and ridges, or the mesic, shady, north- or east-facing slopes found within the badlands region. These sites provide a variety of microhabitats which may support rare plant species. The buttes of this region are variously capped by sandstones, scoria, chert, limestone, or other resistant materials (Bluemle 1991).

Individual rare species may be restricted to a particular substrate on a butte or ridge. For example, Dwarf mentzelia (*Mentzelia pumila*) is apparently limited to scoria buttes and outcrops (Dueholm 1993a). Other species of buttes and ridges exhibit no particular substrate affinities. Alyssum-leaved phlox is found on a wide variety of substrates, including clay and sandstones (Dueholm 1993b).

Certain rare species are associated with the shady mesic habitats generally found on the north- and east-facing butte slopes. This type of habitat supports species such as blue lips (*Collinsia parviflora*) and squaw currant (*Ribes inebrians*).

To date, leafy spurge has not been documented directly encroaching known rare plant populations found on butte tops and slopes (Dueholm 1993, Lenz 1993). However, leafy spurge is known to occur on buttes and slopes in the general vicinity of these populations. The inaccessibility of these sites creates difficulties for land managers attempting to control leafy spurge. Aerial spraying has been utilized for certain inaccessible regions of the badlands (pers. obs.). This method of control can negatively impact non-target rare plant populations.

### **Possible impacts of leafy spurge control methods on rare plant species**

Noxious plant control, specifically leafy spurge control, was identified by Heidel (1990) as the most pressing management need associated with rare plant management in Theodore Roosevelt National Park. Rare plant conservation presents a dilemma when developing leafy spurge control plans, due to the fact that control methods may also negatively impact rare plant populations.

Noxious weed control guidelines have been developed for one threatened plant species in North Dakota, the western prairie fringed orchid (*Platanthera praeclara*). These guidelines contain specific requirements for the use of control methods for leafy spurge. Herbicide spraying is prohibited within orchid population areas. Goat and sheep grazing is limited to periods outside of the orchid's lifecycle or is allowed if agronomy cages are placed around the orchid (Sheyenne Ranger District 1993). The development of similar guidelines may be appropriate for particular high priority rare species within the badlands region.

The possibility of goats or sheep actually grazing rare plants of the badlands region is unknown. It seems probable that individual plants and small populations could be grazed and thus negatively impacted by the use of these animals for leafy spurge control.

Herbicides can negatively impact nontarget plant species, and because of this fact, Heidel (1990) recommends that rare plant population boundaries should be noted during all treatments, and a rare plant population marking system be considered.

The use of a marking system for rare plant populations is predicated on the belief that all population locations are known, and this is simply not true. Information on the extent of rare plant populations throughout the badlands region is incomplete. Further inventory work is needed to document the rare plant species of highest priority. A more complete knowledge of rare plant population locations will allow natural resource managers to implement a leafy spurge control plan which will not negatively impact these populations.

## References

- Ayensu, E.S. 1981. Assessment of threatened plant species in the United States. *In*: Synge, H., ed. The Biological Aspects of Rare Plant Conservation. John Wiley & Sons Ltd. Smithsonian Institution.
- Barker, W.T. 1978. Unique or rare plants species of North Dakota. pp. 99-111. *In*: Inventory of exclusion and avoidance areas for the siting of energy conversion and transmission facilities. North Dakota Public Service Commission. Bismarck, North Dakota. 492 pp.
- Bluemle, J.P. 1991. The Face of North Dakota. Revised Edition. Educational Series 21. North Dakota Geological Survey.
- Dueholm, K.H. 1993a. Personal communication with Darla Lenz.
- Dueholm, K.H. 1993b. Bullion Butte Rare Plant Survey. Little Missouri National Grasslands. Report to the U.S. Forest Service, Sierra Club, and Meridian Oil Company by North Dakota Natural Heritage Inventory, North Dakota Parks and Recreation Department. Bismarck, North Dakota.
- Heidel, B. 1990. Inventory of Rare Plant Species in Theodore Roosevelt National Park. North Dakota Natural Heritage Inventory. North Dakota Parks and Recreation Department. Bismarck, North Dakota.
- Lenz, D.M. 1993. 1991-1992 Inventory of Rare Plant Species in the Little Missouri National Grasslands. Billings, Slope, and Golden Valley Counties, North Dakota. North Dakota Natural Heritage Program, North Dakota Parks and Tourism Department. Bismarck, North Dakota. A Report to the U.S. Forest Service.
- North Dakota Parks and Recreation Department. 1984. North Dakota Nature Preserve Plan; A Plan to Protect North Dakota's Natural Diversity. Bismarck, North Dakota.
- Ode, D. J. 1987. The Status of Dakota Wild Buckwheat. (*Eriogonum visheri* A. Nels.) In South Dakota. Report to the U.S. Fish and Wildlife Service. Wildlife Division, S.D. Game, Fish, and Parks Department. Pierre, South Dakota.
- Rabinowitz, D. 1981. Seven forms of rarity. *In*: Synge, H., ed. The Biological Aspects of Rare Plant Conservation. John Wiley & Sons Ltd. Smithsonian Institution.
- Schmoller, D. 1993. Status Survey for *Eriogonum visheri*. Wall Ranger District, Buffalo Gap National Grassland, Nebraska National Forest. Draft Report.
- Sheyenne Ranger District. 1993. Management Guidelines for the Western Prairie Fringed Orchid on the Sheyenne National Grassland. U.S. Forest Service. Lisbon, North Dakota.
- Stuckey, Ronald. 1972. Taxonomy and distribution of the genus *Rorippa* (Cruciferae) in North America. *Sida* 4 (4):279-430.
- Vanderpool, S.S. 1993. Distribution and Occurrence of *Eriogonum visheri* A. Nels. on the Medora and McKenzie Districts, Little Missouri National Grasslands, In North Dakota. Report to the North Dakota Natural Heritage Program, North Dakota Parks and Recreation Department. Institute for Ecological Studies, University of North Dakota. Research Report #44.