

NEBRASKA'S

Threatened and Endangered Species



*Western Prairie
Fringed Orchid*

NEBRASKA GAME AND PARKS COMMISSION

Western Prairie Fringed Orchid —A threatened species

Status

The range of the western prairie fringed orchid (*Platanthera praeclara*) extends from the Mississippi River westward to the Sandhills of Nebraska. It grows as far north as Manitoba, Canada, and as far south as Oklahoma. As its name implies, it has an eastern counterpart, the eastern prairie fringed orchid (*Platanthera leucophaea*), which occurs primarily east of the Mississippi River.

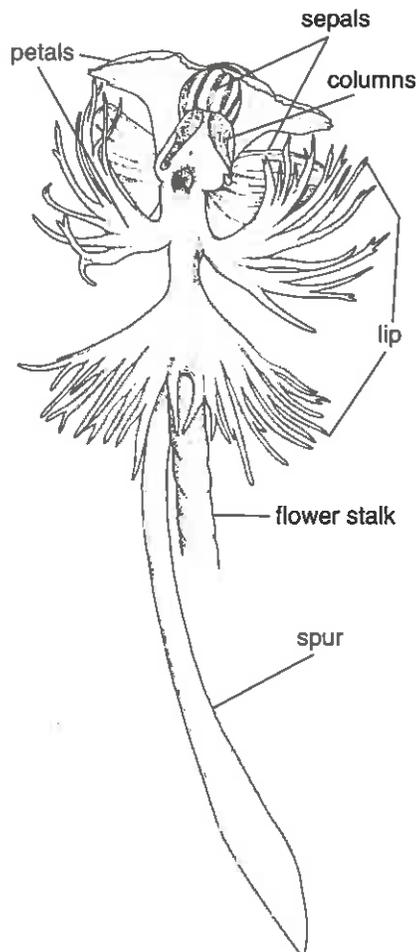
In Nebraska, the orchid grows in the eastern two-thirds of the state from the Missouri River in the east to Cherry and Keith counties in the west. It is found from Cherry to Dakota counties in the north, southward to Webster through Richardson counties.

Prior to pioneer settlement, the western prairie fringed orchid was widespread and locally common throughout its range. An 1873 record comments that the orchid was "found all over eastern Nebraska." By the late 1800s, settlement was already having a devastating impact on the species. An 1889 account from Kansas states that "once school children brought armfuls of the curious [orchid], ... now they are seldom seen." The species' decline in Nebraska was documented as early as 1898 in an account which notes that the orchid was "common in the wet valleys of the sandhills ... also in [the prairie region], where, however, it is a disappearing species." The account continues, "It was formerly abundant in the Blue River District, but is now met with but rarely and occurs only scattered and at distant stations."

Across its range, it has

declined more than 60 percent in population numbers and vastly more in plant numbers. In Nebraska, the orchid has declined to less than a dozen populations with fewer than 600 plants. In 1989, as a result of these critical declines, the western prairie fringed orchid was listed as a threatened species under both the federal and Nebraska endangered species acts.

Currently, orchids are known from small populations in Lancaster County near Lincoln, eastern Seward county, Hall county near Grand Island, and from several widely scattered populations in east-central Cherry County.



Description

Although rare, flowering orchids are readily identified in the field. Flowering plants are usually comparable in height to the surrounding prairie grasses, with smooth, yellow-green foliage which blends well into the surrounding vegetation. Mature plants may grow up to 42 inches tall, but 20 to 30 inches is more common. Individual plants have a single, stout stem up to .5 inches in diameter with two to five erect leaves alternately spaced on the stem. The keeled, lanceolate-shaped leaves are somewhat thickened and have parallel veination. They are three to five inches long and .5 to 1.5 inches wide, with bases which sheath the stem. Non-flowering plants may consist of only a single basal leaf and can be very difficult to find.

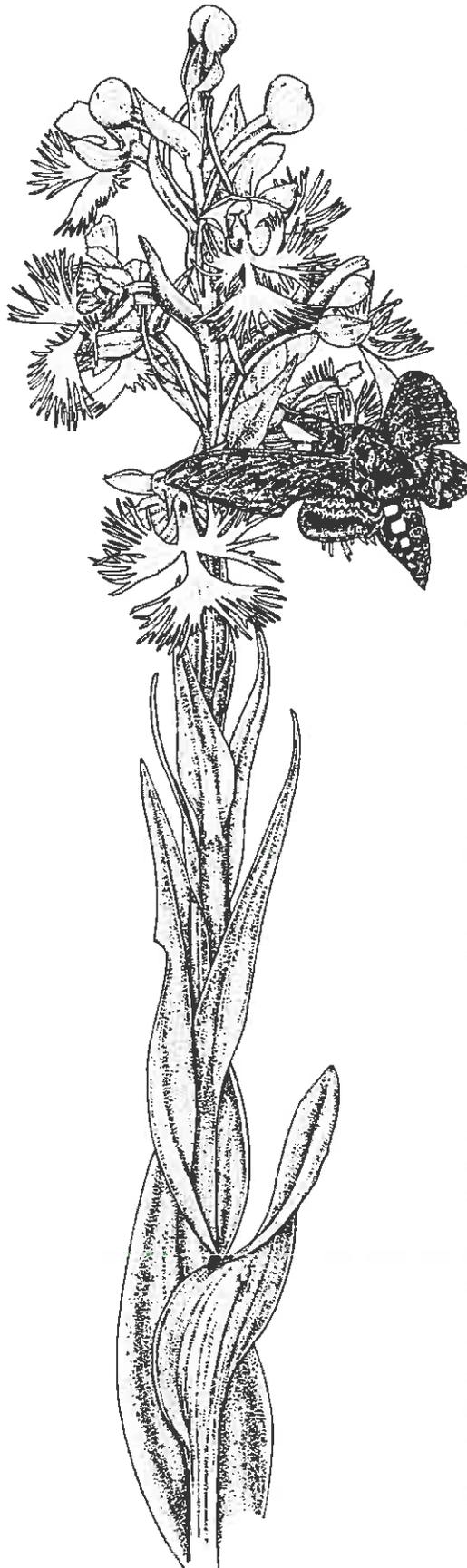
The inflorescence is an elongated flowerhead, or raceme, with each individual flower borne on its own stalk from the main stem. Individual flowers are subtended by a bract which resembles a small leaf. These bracts are up to .25 inch wide and 1.5 inches long. The single raceme may be up to 10 inches in length with one to 25 flowers which begin blooming at the bottom and progress upward. Under optimum conditions, flowers may bloom for up to 10 days, and an inflorescence may be in bloom for several weeks.

While its flowers do not clearly resemble the more familiar tropical orchid species, the western prairie fringed orchid follows a pattern of flower adaption typical of all orchids. The relatively large flowers may be up to

1.25 inches wide and 1.75 inches long and are comprised of three creamy-white petals backed by three pale green sepals. The two upper, fan-shaped petals are truncated, and in combination with one of the sepals form a hood-like structure. The lower petal is modified into a broad, spreading lip which is deeply three-lobed. Each of the lobes is, in turn, deeply incised, producing a fringed appearance. The lower lip also bears a slender, curving spur that extends up to two inches from the back of the flower and holds an ample quantity of nectar. The flower produces a delicate, sweet fragrance which rivals that of any wildflower.

Life History

These specialized structures are adapted to one strategic function — insect pollination. Pollination is highly specific for only a few species of nocturnal hawkmoths of the Family *Sphingidae*. Near dusk, the orchid noticeably increases its fragrance to attract the wide-ranging moths. The white-fringed lip directs approaching moths to the spur and the plentiful supply of nectar. As the moth hovers with its long tongue extended into the spur, two specialized pollen-bearing structures, called columns, brush pollen onto the eyes of the moth. After the moth leaves, the columns rotate, exposing the stigma for pollen deposition by the next moth that visits the flower. This process ensures pollination between plants. Only those species of hawkmoths with properly spaced eyes and compatible length tongues can act as pollinators.



Orchids begin growth in early May and, with favorable conditions, flower from mid-June to late July. The peak flowering period is from the last week in June through the second week in July. If a flower is pollinated, it develops into a slender, angled capsule filled with thousands of microscopic seeds. In early fall the capsule splits, and the seeds are scattered like dust in the wind.

The western prairie fringed orchid is not an obligatory annual bloomer. Rather, flowering is dependant on suitable climatic conditions such as plentiful moisture and moderate temperatures for both the previous and current growing years.

The exact temperature, moisture, dormancy and light requirements for seed germination and seedling development are not known for the western prairie fringed orchid. This precludes greenhouse propagation for research or commercial use. One known aspect of the orchid's growth is its symbiotic association with micorrhizae, soil-inhabiting fungi. Orchid seeds basically contain only an embryo, and their small size is, in part, due to a lack of endosperm, a seed's stored food reserves. Thus, the seed must establish a delicately balanced relationship with specific micorrhizae. Using micorrhizae-derived nutrients, the seed is able to grow leaves and produce its own food through photosynthesis. However, the association with micorrhizae continues throughout the orchid's life. During periods of stress or unfavorable climatic conditions, this relationship allows the orchid to survive in a totally subter-

ranean stage. Thus, orchids can go unobserved for many years until favorable conditions return and allow them to again produce above-ground growth and, with optimum conditions, to flower.

Habitat

The western prairie fringed orchid is a species of the North American tallgrass prairie community. In eastern Nebraska, the orchid occurs in mesic upland prairies in glacial drift and calcium-rich loess soils. In central and northeast Nebraska, it occurs in wet-mesic prairies and sedge meadows in alluvial soils of river floodplains. In the Sandhills of central and western Nebraska, the orchid occurs in the sandy soils of subirrigated meadows and prairie swales. While specific site types vary, all sites are typified by the tallgrass prairie habitat and a high soil moisture profile.

Populations of the western prairie fringed orchid are found primarily in high to moderate quality, unplowed prairies. Plants will colonize disturbed areas of tallgrass prairie, such as graded road ditches and soil borrow sites, but will persist only if the site reverts to prairie.

Limiting Factors

The major limiting factor for the western prairie fringed orchid is its dependency on the limited habitat of mesic to wet-mesic tallgrass prairie. It requires sites where near-surface groundwater maintains a relatively high and constant level of soil moisture. Even in mesic upland prairies, orchid sites have a higher soil moisture profile than the surrounding areas. Historically,



these sub-surface sources of groundwater were relatively constant and reliable. That is no longer true.

Wetland drainage, stream channelization, ditching and irrigation from shallow aquifers pose threats to the orchid by depleting groundwater and reducing soil moisture. Reduced or interrupted stream flows also pose a threat through the drying of adjacent wet meadows.

The main cause of decline in orchid populations is the loss of habitat which has occurred over the past 100 years and is ongoing. The first major loss resulted from the settlement of the Great Plains when settlers plowed vast

acres of tallgrass prairie for conversion to cropland. A second major decline occurred when tractors replaced draft animals and "surplus" pasture and hayland was converted to cropland. The conversion to cropland is still a major threat today. Habitat is also lost to commercial development, urban expansion and road construction.

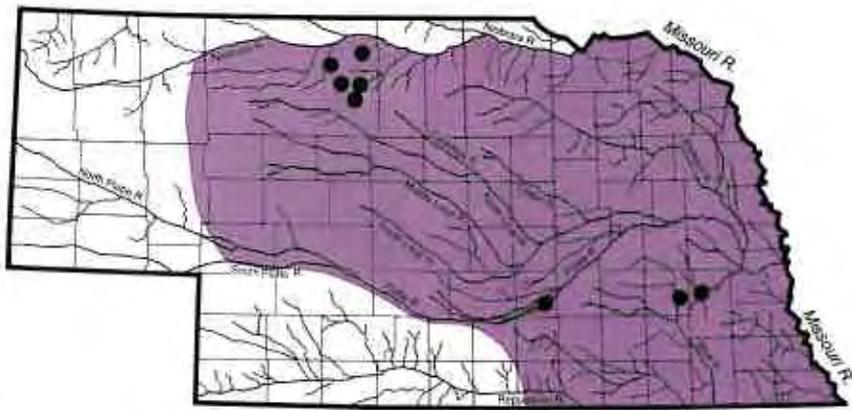
Several grassland management practices pose significant threats to the orchid. Most remaining orchid habitat is used primarily for grazing and haying. As a prairie species, the orchid evolved with grazing by native herbivores, and existing populations on grazed lands indicate

that it can tolerate low to moderate levels of grazing by domestic animals. Continuous overgrazing, however, is very detrimental, resulting in direct plant mortality, habitat degradation due changes in species composition and the introduction of exotic species and reduced viability due to lack of seed production. The orchid does tolerate some haying, but annual cutting during the growing season prevents seed production and results in increased plant mortality due to stress. The net effects are an inability to reproduce and a decline in populations.

Noxious weeds such as musk and Canada thistles and leafy spurge pose multiple threats to the orchid. Invading noxious weeds threaten populations through direct competition for nutrients and by habitat modification. In addition, the orchid may be threatened by the indiscriminate use of herbicides to control noxious weeds.

Similarly, the uncontrolled and non-selective use of pesticides near orchid populations poses a serious threat. The indiscriminate use of herbicides to control weedy and exotic species can result in the inadvertent killing of orchids. Large-scale application of insecticides can threaten an orchid population's reproductive capability by killing the hawkmoths which are vital for pollination. In some areas, hawkmoth numbers are so depleted that only a very small percentage of flowers are pollinated and produce seed.

Many native orchids are highly sought after by researchers, orchid growers and wildflower



enthusiasts. Because most species, including the western prairie fringed orchid, cannot be domesticly propagated, the only source for plants is plundering

wild populations. The loss of even one plant from small a population can seriously threaten its existence.

Management

As a threatened species, the orchid is provided protection under both the federal and the Nebraska endangered species acts. As part of its responsibility, the Nebraska Game and Parks Commission will develop a recovery plan for the orchid.

The recovery strategy for the orchid will focus on locating all extant populations, protecting them and implementing appropriate management for all populations. Protection and management will be tailored to each population and implemented through cooperative agreements, conservation easements and limited land acquisition when necessary.

Management will require staking or fencing plants to prevent them from being hayed or grazed



Western prairie fringed orchid

and periodic seasonal rest to enable them to complete their growth cycle. Grazing management will prevent overgrazing and promote rotation and variable stocking rates. Practices such as prescribed burning will be used to reintroduce natural processes. Many of these management practices not only benefit the orchid, but also improve forage production and the entire prairie community.

To ensure adequate soil moisture, actions will be taken to prevent activities that would deplete groundwater near orchid populations. Protection will also require working with landowners to prevent damage to orchid populations from the improper use of pesticides and to provide technical support for the control of noxious and weedy plant species and problem insects.

The protection and recovery of the orchid will require the involvement and cooperation of many groups and individuals from federal and state government to private landowners.



Wet meadow habitat of the western prairie fringed orchid in Cherry County.

Suggested Reading

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North Dakota Parks and Recreation Department. 1986. *Report on the Status of *Platanthera praeclara* Sheviak and Bowles in Oklahoma, Kansas, Nebraska, South Dakota, and North Dakota*. North Dakota Parks and Recreation Department, Number 60181-1437-84.

Sheviak, Charles J. and Martin L. Bowles. 1986. *The Prairie Fringed Orchids: A Pollinator Isolated Pair*. *Rhodora* 88: 267-390.

U. S. Fish and Wildlife Service, 1993. *Recovery Plan for Western Prairie Fringed Orchid (*Platanthera praeclara*, Sheviak and Bowles)*. U.S. Fish and Wildlife Service, Ft. Snelling, Twin Cities, MN.

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Note: New data on the occurrence and distribution of this species are being collected constantly, and some of the information in this publication may be outdated. It should be used for a general understanding of the status of this species in Nebraska and not as the sole source of locational information for any report, project, regional/local planning or environmental impact assessment. For current information on this or other threatened and endangered species, or for additional copies of this publication, contact the Wildlife Division, Nebraska Game and Parks Commission, P.O. Box 30370, Lincoln, NE 68503.



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