

Rare Plants of the Oak Ridge Reservation

Some plants are naturally rare because their habitat is rare. Others, however, are rare as a result of human activities. Restrictions on development of the Department of Energy's Oak Ridge Reservation (ORR) since the 1940s have resulted in the preservation of many rare plant species and communities that have disappeared elsewhere in east Tennessee. More than 20 of the greater than 1,100 vascular plant species found on the ORR are listed as endangered, threatened, or of special concern by the state of Tennessee.

Rare Plant List

The list of rare species on the ORR changes over time. Annual investigations in unsurveyed areas locate rare plants not previously known to occur on the reservation or find new occurrences of known rare species. In 2000 four state-listed plants—goldenseal (*Hydrastis canadensis*), tuber-cled rein orchid (*Platanthera flava* var. *herbiola*), Canada lily (*Lilium canadense*), and spreading false foxglove (*Aureolaria patula*)—were discovered in new locations on the ORR. In 2008 the first known occurrence of the state-listed naked-stem sunflower (*Helianthus occidentalis*) was found. Several state-listed plant species found on adjacent lands may also be present on the ORR.



Spreading false foxglove grows in the shade on the edge of the Clinch River and several tributaries on the ORR. Threats to this wildflower as well as other rare plants on the ORR include habitat destruction due to project development, reservoir water-level fluctuations, recreational activity on river banks, and removal of the tree canopy.

Threats to Rare Plants

The major threats to rare plant species are habitat alteration and loss. Removing the tree canopy alters light and nutrient availability, reduction in moisture impacts wetland species, mowing or applying herbicides to maintain rights-of-way can kill plants, and changes in adjacent land use can impact a population. Other threats include illegal harvesting of some species; competition from nonnative, invasive species; and environmental changes caused by pollution.



*Some rare plants that are difficult to cultivate are illegally dug up and sold. Pink lady's-slipper (*Cypripedium acaule*) (left), state listed as endangered due to potential commercial exploitation, is much prized in the wildflower trade. Ginseng (*Panax quinquefolius*) (center) and goldenseal (right) are prized for their reputed medicinal properties and are also threatened by commercial exploitation. (Lady's slipper photo ©R.K. McConathy; goldenseal photo, ©Thomas G. Barnes, University of Kentucky)*

Locating Rare Plants

Considerable effort is required to determine rare plant presence or document population status, and many characteristics confound efforts to locate them. Plants can emerge and flower from spring through fall. Identification can require examination of a specific plant part—such as the flower, fruit, or seed. Some plants can remain dormant for years. Because of life cycle and vegetative characteristics, it is necessary to survey potential habitat for rare plants throughout the growing season, searching for specific species at the times they are most likely to be in a reproductive state and, thus, able to be accurately identified.

Plants sometimes grow in habitats atypical for the species. Gravid sedge (*Carex gravida*) is a prairie species typically found on dry, open sites. On the ORR it has been found in a forested wetland as well as in a somewhat more typical site in a dry, rocky, semi-open woodland.

Species sometimes disappear for a time. Michigan lily (*Lilium michiganense*) and hairy sharp-scaled sedge (*Carex oxylepis* var. *pubescense*) were identified in the past on the ORR, but they have not been seen since 1961 and 1951, respectively. Because the habitat they require still occurs on the ORR, it is possible that they will be found again.



Field botanists must be familiar with the life cycle and vegetative characteristics of the rare plants that might grow in a specific habitat. (Photo ©R.K. McConathy)



Canada lily grows on the ORR in moist woods, forest edges, and power-line openings that run through moist forests. It is threatened by habitat destruction, indiscriminate use of herbicides, and removal for transplanting.

Managing Rare Plants

Managing rare plant populations is not a straightforward, standardized process. It involves knowing the rare plants that grow on the ORR; their environmental requirements; methods to protect their habitat; and in some cases, techniques to manipulate that habitat to benefit the species.

Protection of rare species in their natural habitat is the best method of ensuring their long-term survival. Many sites on the ORR where rare plant species or populations occur have been designated as research park natural areas. Although these are not large expanses, they preserve some plant populations.

Understanding a species' environmental requirements is basic in making management decisions. Populations of tall larkspur (*Delphinium exaltatum*) benefit from periodic mowing in early winter after seed drop but prior to spring growth. Mowing at that time of the year helps maintain the open habitat the species requires, while not disturbing the plants during their period of active growth. The population of this species on the ORR is one of the largest in the world.

Complete information about environmental requirements is not, however, available for most species. Logical decisions based on the available information and resources are necessary to protect them. Thus, preservation of the rare plants of the ORR requires active management and cooperation with other agencies.

For more detailed information on rare plants on the Oak Ridge National Environmental Research Park, contact Pat Parr, the Oak Ridge National Laboratory natural resources manager, at 865-576-8123, parrpd@ornl.gov, or check the park's website at http://www.esd.ornl.gov/facilities/nerp/orr_rareplantlist.pdf for the most recent list of ORR rare plants.