

Rare Plants

of the Oak Ridge Reservation

Some plants are naturally rare because their habitat is rare. Others, however, are rare due to human activities that include over collecting or over harvesting, introduction of foreign species, pollution or other environmental changes, and habitat fragmentation and alteration. The rarest plants of the Department of Energy's (DOE's) Oak Ridge National Environmental Research Park, part of the Oak Ridge Reservation (ORR), are protected by the state or federal government.

Protection of the ORR since the 1940s has resulted in the preservation of many rare plant species and communities that have disappeared from elsewhere in east Tennessee. More than 20 of the over 1100 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. Detailed investigations in unsurveyed areas locate rare plants not previously known to occur on the reservation or find new occurrences of known rare species. Large-tooth aspen (*Populus grandidentata*) was first located on the ORR during 2002. In 2000 new locations of four state-listed plants—golden seal (*Hydrastis canadensis*), tubercled rein orchid (*Platanthera flava* var. *herbiola*), Canada lily (*Lilium canadense*), and spreading false foxglove (*Aureolaria patula*)—were discovered on the ORR. Several state-listed plant species found on adjacent lands may also be present on the ORR.

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 in recent years.



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 from project development, reservoir water level fluctuations, recreational activity on river banks, and removal of the tree canopy.



*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 golden seal are prized for their reputed medicinal properties and are also threatened by commercial exploitation. (Lady's slipper photo ©R.K. McConathy; golden seal photo, Thomas G. Barnes@USDA-NRCS Plants Database)*

Locating Rare Plants

Many characteristics confound efforts to locate rare plants. Plants can emerge and flower any time from spring through fall. Identification can require a specific plant part—such as the flower, fruit, or seed. Some plants remain dormant for long periods. Thus, because of life cycle and vegetative characteristics, it is necessary to survey potential habitat for rare plants throughout the growing season.

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 more typical site on a dry, forested, rocky slope.

Threats to Rare Plants

The major threat to rare plant species is habitat alteration. Removing the tree canopy alters light and nutrient availability, severe fire destroys plants, 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.

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 rare plants.

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 plants occur have been designated as natural areas. Although these are not large expanses, they preserve some plant populations.



Field botanists must be familiar with the life-cycle and vegetative characteristics of the rare plants that might be in an area. (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.

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.

Complete information about environmental requirements is not, however, available for most species. Common sense 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 of the Oak Ridge National Environmental Research Park, contact Pat Parr, the Oak Ridge National Laboratory Area Manager, at 865-576-8123, parrpd@ornl.gov; or check the Research Park web site at http://www.esd.ornl.gov/facilities/nerp/rare_plant_list.pdf for the most recent list of reservation rare plants.