

MANAGING INVASIVE PLANTS

on the OAK RIDGE RESERVATION

Invasive plant problems

Many of the nearly 170 species of unwelcome, nonnative plants that grow on the Department of Energy's (DOE's) Oak Ridge Reservation (ORR) have no natural controls in this area; become invasive; and cause ecological, economic, and human health impacts. Executive Order 13112, signed by President Bill Clinton in 1999, requires federal agencies such as DOE to manage invasive species.

While some invasive plants can grow on natural sites on the ORR, the most problematic are those that thrive in disturbed areas. Some are restricted to specific habitats, while others can grow in a broad range of environments and are major concerns across the entire ORR.

Remedies: managing invasive species

"Managing" invasive species does not necessarily result in their complete eradication, as soil in and near the treated area often retains seeds that can germinate or roots that can sprout for many years. Sometimes natural restoration takes place after invasive plants have been treated. In many cases, however, more extensive efforts (e.g., surface preparation, revegetation with native species) are required. Thus, management should incorporate rehabilitation or restoration of native species and a monitoring program to detect recolonization in treated areas and initiate retreatment.



The best time to remove invasive species is when they are first discovered, before they have a chance to spread. Giant reed (Arundo donax) (above) and spotted knapweed (Centaurea stoebe), for example, were recently found at single locations on the ORR and treated to stop them from spreading. Monitoring of the areas in which the species were found will determine whether the treatment was successful. If necessary, the areas will be retreated. (Photo by Mike Ryan)



A 42-acre patch of kudzu has penetrated a deep ravine on Gallaher Bend. A perimeter has been established around it to slow its spread until more aggressive treatment can be undertaken. (Photo by H. D. Quarles)

Integrated pest management (IPM), the treatment strategy used on the ORR, is an effective and environmentally sensitive approach to invasive species management that relies on a combination of common-sense practices. IPM coordinates information about invasive species and the local environment with available pest control methods, thereby facilitating management by the most economical means and with the least possible hazard to people, property, and the environment.

Three primary approaches to invasive plants are implemented on the ORR:

- targeting an individual species wherever it occurs,
- managing multiple species in areas of high ecological value, and
- treating the corridors or routes of dispersal and invasion.

Because of the size of the ORR and the variety of problems invasive plants present, the judicious application of all three techniques offers the best route for success.

ORR invasive plant management plan

The ORR invasive plant management plan prioritizes eradication and restoration activities with the goal of returning the ORR to a more natural

condition. A main emphasis of the plan is to minimize the opportunity for invasive plants to become established by using native species in landscaping and quickly revegetating disturbed areas with desirable species.

Maximum benefits result from prioritizing control in important natural areas, security areas, and remediation sites and in places where treatments are most likely to make a meaningful difference. Prime targets for treatment include autumn olive (*Elaeagnus umbellata*), privet (*Ligustrum* spp.), kudzu (*Pueraria montana*), tree-of-heaven (*Ailanthus altissima*), mimosa (*Albizia julibrissin*), and princess tree (*Paulownia tomentosa*).

Priorities for treating invasives are identified using an adaptive management scheme that is based on past experiences—knowing what has been done where and which areas need quick follow up. First, a standard approach is used each year, including evaluating treated areas for necessary supplemental control. Secondly, management of invasive plants is coordinated with other Reservation management. For example, because the goals of invasive plant management complement those of power line management, invasive species are treated when tall plants are removed from rights-of-way to keep them from interfering with transmission lines. Finally, areas are monitored and maintained as necessary until native communities have become established. After native species are restored, these functional plant communities help prevent the growth of invasive species in what would otherwise be disturbed areas.

Valuable experience has been gained in reestablishing native species on the ORR in areas where invasive species have been controlled. For example, slopes from which kudzu has been removed have sometimes been planted with native grasses to prevent erosion problems. Some native grasslands are being established to replace high-maintenance lawn areas (e.g., around Oak Ridge National Laboratory [ORNL]) and restore areas affected by other stressors (e.g., the Southern pine bark beetle). In addition, ORNL staff have worked with Tennessee Wildlife Resources Agency staff to convert areas of nonnative fescue to native grasses using a mix of mainly native seeds. This improves wildlife habitat and complements the long-term invasive plant management goals.



Treatments used to manage invasive plants include herbicide sprayed while on foot and direct application of herbicide to the base of a tree (inset photo). (Photos by H. D. Quarles)



Fire is a powerful tool for managing invasive species and improving native plant communities. Prescribed burns in grasslands discourage unwanted weeds and favor prairie plants by stimulating blooming and seed production. After a prescribed burn in an ORR field cleared invasive brush species, native vegetation grew from roots and seeds remaining in the soil (inset photo). (Photos by H. D. Quarles)

Persistence is the key to keeping invasive plants under control. Implementation of the ORR invasive plant management plan will provide long-term benefits by protecting the natural resources of the Reservation. For more detailed information on nonnative, invasive plants and their management on the ORR, contact Pat Parr, the ORNL natural resources manager, at 865-576-8123 or parrpd@ornl.gov or Harry Quarles at 865-241-2412 or quarleshdiii@ornl.gov or check the Oak Ridge National Environmental Research Park website at http://www.esd.ornl.gov/facilities/nerp/invasive_species.html.