

# Sustainable Acquisition Success Story

## Operations Spotlight on Oak Ridge National Laboratory

### ORNL Uses Goats as Herbicide Alternative

The Oak Ridge National Laboratory (ORNL) has found an alternative to herbicides for a particularly difficult invasive species. ORNL has started using goats to manage invasive plants at the approximately 32,000-acre Oak Ridge Reservation (ORR) in Roane County, Tennessee. The ORR is approximately 70% forested with undeveloped areas in native grasslands, fallow fields, wetlands, cedar barrens, streams, and other unique natural habitats. Invasive plant management has been important to maintaining natural areas, research areas and facility grounds on the ORR since the program began in 2002. One challenge has been controlling large, established kudzu patches, particularly in areas not easily accessible due to terrain, lack of roads, and the presence of sensitive habitats.



*Photo Credit: ORNL- Kudzu Patch*

Kudzu is an exotic, highly invasive plant which can cover vast acreages. It causes habitat destruction, utility rights of way maintenance problems, and it encroaches on facility grounds. Kudzu can grow at a rate of about one foot per day per vine in proper conditions. In the past, kudzu has been managed with varied success at ORR through use of herbicides applied to foliage. However, it typically takes multiple years of retreatment to fully eradicate kudzu within an area; this is often prohibitively expensive. Additionally, repeatedly applying herbicide to areas can run the risk of negatively impacting native plants and seeds beneath the kudzu, and may adversely affect beneficial soil microbes, fungi, soil-dwelling animals, and animals which use these as food sources. Herbicide run-off may impact aquatic plants and animals as well.



*Photo Credit: ORNL- Goats Grazing*

In May 2020, the ORNL Natural Resources Management Team began testing the use of goats as a kudzu biocontrol method on a 48-acre, well-established kudzu patch in a natural area on the ORR. The area was very steep with portions inaccessible by motorized equipment and dangerous for herbicide sprayer personnel.

A herd of about 40 goats cleared kudzu by eating vines and foliage to ground level, but not eating the large woody vines. Though this method does not kill established kudzu, it results in exposure of root crowns and larger vines which can then be targeted with low-volume basal herbicide treatment or manual removal. Regrowth appears to be greatly reduced by using the goats along with a targeted herbicide treatment/removal method.



*Photo Credit: ORNL- Cleared Kudzu Patch*

From May through September 2020, the goats remained on site. They were contained in 3- to 5-acre sections by electric fencing and allowed to remain until kudzu in that section was removed. The contractor monitored kudzu removal and moved goats to new sections as needed. Although goats take longer to clear the same area compared to herbicide application, the goats are easily able to treat inaccessible areas and clear kudzu vines to the root crown, limiting regrowth. Altogether, this should result in higher efficacy and overall cost savings.

This combined method of kudzu control is an environmentally sustainable method, as well as economically effective. The cost of using goats was about the same as the cost to treat with herbicides- approximately \$500-\$700 per acre. Long term savings are yet to be determined.

For the duration of this two-year pilot project, the contractor is responsible for providing goats, electric fencing, goat housing, fresh water for the goats, herding, and guard dogs. After the goats graze on the kudzu foliage, there will be a prescribed burn of the 48-acre plot to remove dead kudzu vines and leaves. Once that is done, resprouting of kudzu should be apparent, and concentration will shift to removal of the kudzu root crowns. Kudzu root crown survival and plant regrowth will be checked by the end of Summer 2021, at which time a determination will be made to the efficacy of this invasive plant control method.

## Keys to Success



### Challenge

The amount and frequency of herbicide application needed to control kudzu (an invasive plant species) at ORR posed a risk to the surrounding environment. Additionally, many areas of the reserve were difficult to access for herbicide sprayer personnel.

### Solution

A pilot is being conducted using goats to control the growth of kudzu through grazing.

### Results/Benefits

The cost of the goats (\$500-\$700/acre) was about the same as the cost of herbicides. Goat grazing significantly reduced kudzu foliage, clearing kudzu vines to the root crown. This should result in more efficient kudzu control and higher cost savings over time.

### Creative Problem Solving

ORNL found a more natural way to clear invasive plant species on the reserve using goats, which significantly reduces the amount of herbicide pollution in the surrounding environment and risk to workers from herbicide exposure and attempting to access inaccessible locations.

### Key Stakeholders

ORNL Natural Resources Management Team. If the project is successful, other DOE contractors who manage portions of the ORR will benefit from using goats to control kudzu as well.

*Site Contact Information: Kitty McCracken, [mccrackenmk@ornl.gov](mailto:mccrackenmk@ornl.gov)*