

## **Management Methods: Physical Methods**

### **Physical Methods in Action**

#### **Slide 1: Introduction**

Many National Wildlife Refuges employ physical methods for invasive plant management because they often can be used on ecologically or socially sensitive sites. Additionally, volunteers can readily participate because no special training or licenses are required. Selection of a physical method requires consideration of the plant species and site, and applying that method at an optimal time and intensity. The following examples illustrate how physical methods have been used with varying levels of success on and near refuges.

#### **Slide 2: Girdling Black Locust at Fox River NWR, WI**

Treating black locust (*Robinia pseudoacacia*) at Fox River NWR (Wisconsin) involves girdling followed by herbicide application. Black locust can reproduce vegetatively by root sprouting or stump sprouting, making it difficult to control with physical methods alone. Refuge staff has had success with girdling trees and chemically treating the girdle, which reduces the possibility of root and stump sprouting.

#### **Slide 3: Cutting Buckthorn at Minnesota Valley NWR, MN**

Over a two-day event, Eagle Scouts assisted staff at Minnesota Valley NWR (Minnesota) with an oak savannah habitat restoration project. Using hand tools and elbow grease, Scouts cleared invasive buckthorn (*Rhamnus cathartica*) from one acre of oak savannah habitat by cutting buckthorn stems at the soil surface. Refuge staff piled and burned the cut buckthorn. Buckthorn stems were later treated with herbicides and prescribed fire was applied to keep buckthorn controlled.

#### **Slide 4: Digging and Pulling Houndstongue at Rocky Mountain Arsenal NWR, CO**

In parts of Rocky Mountain Arsenal NWR (Colorado), dense trees and debris make it impossible to use motorized spray equipment to treat houndstongue (*Cynoglossum officinale*). To solve this problem and prevent houndstongue from producing seeds, a youth group, college interns, and refuge volunteers and staff used shovels to cut the root crowns or pull the plant out leaving it on the ground to dry and die.

#### **Slide 5: Lake Drawdown to Eradicate *Hydrilla* at Noxubee NWR, MS**

In an effort to eradicate *Hydrilla* (*Hydrilla verticillata*) in Loakfoma Lake, staff at Noxubee NWR (Mississippi) drained the water from the 450-acre impoundment. Disking treatments then brought *Hydrilla*'s reproductive tubers to dry out on the soil surface. Future eradication plans include removing selected areas of soil and testing the

effectiveness of elemental copper combined with an herbicide in reducing the standing crop of tubers.

### **Slide 6: Cutting Kudzu Vines at Caddo Lake NWR, TX**

At Caddo Lake NWR (Texas), refuge staff experimented with cutting kudzu vines (*Peuraria lobata*) and applying herbicides to the cut stems. Access for treating plants was difficult due to dense understory, which made treatments very labor and time intensive. Unfortunately, treated plants regrew readily from extensive root reserves within a short time. Future efforts may include prescribed fires to clear dense understory and experimenting with different herbicide products.

### **Slide 7: Rototilling Smooth Cordgrass at Willapa Bay NWR, WA**

One method of eradicating smooth cordgrass (*Spartina alterniflora*) at Willapa Bay NWR (Washington) involves using an amphibious machine towing a rototiller. The action of the rototiller smothers smooth cordgrass clones with mud, which prevents the plants from regrowing. Although this method takes much more time to implement than herbicide application, it quickly provides shorebirds with open mudflats for foraging.

### **Slide 8: Flooding Perennial Pepperweed at Lower Klamath NWR, CA**

At Lower Klamath NWR (California), the potential for using flooding as a management tool for perennial pepperweed (*Lepidium latifolium*) was discovered largely by accident. Due to high water levels in 2005, wetland management units were inundated for two to three weeks longer than would occur in a typical year. Delaying drawdown appeared to control established perennial pepperweed plants, however, there were some undesirable effects on the plant community and nesting marsh birds. Flooding is a reasonable option to refuge staff because it can be applied to large areas at relatively little expense compared to other control methods, and can be integrated into routine water management.

### **Slide 9: Mowing Common Reed at Rachel Carson NWR, ME**

Since 2002, Rachel Carson NWR (Maine) has been reducing small patches of common reed (*Phragmites australis*) with mowing treatments. Along the edge of the refuge's Webhannet Marsh, common reed plants grow near rare wetland species, such as the slender blue flag iris (*Iris prismatica*). Mowing with a specialized mower twice each year, in late summer and early fall, has reduced common reed density and other plants have begun to sprout in formerly infested areas. Periodic mowing allows sedges, forbs, and fruiting shrubs to regenerate, benefiting landbirds during the breeding season and fall migration.

**Slide 10: Pulling and Harvesting Water Chestnut at Silvio O Conte, NFWR**

With a massive volunteer effort, Silvio O. Conte NFWR (CT, MA, NH, VT) is controlling water chestnut (*Trapa natans*) and preventing its spread throughout the Connecticut River watershed. Specialized mechanical harvesting machines are used prior to seed production for the few larger infestations. By canoe, volunteers search water bodies and hand pull newly discovered and other small infestations, which must be pulled annually for at least 12 years.

**Slide 11: Physical Barriers for Managing Giant *Salvinia* on the Colorado River**

Physical barriers were used on the Colorado River in Arizona as part of an integrated approach for managing a floating aquatic plant, giant *Salvinia* (*Salvinia molesta*). The US Bureau of Reclamation installed mechanical harvesters above Cibola NWR to clear trapped floating vegetation from the barriers. However, plant debris accumulation caused the barriers to break before the debris could be harvested, sending plant fragments downstream to the refuge. Efforts using physical barriers were abandoned in 2006.

**Slide 12: Conclusion**

National Wildlife Refuges have success using physical methods in managing invasive plants but also have learned why some physical methods fail or are not suitable. The effectiveness of physical control varies with the method used as well as the biology of the target species and site conditions.