

Chapter 18

Plant Management in Natural Areas

Balancing Chemical, Mechanical, and Cultural Control Methods

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A variety of methods are used in managing invasive plants in natural areas. This generally includes chemical, mechanical, and cultural control methods. In determining which of these methods to use in a particular situation, a number of questions should be answered. This includes the long term plan for the site, the need for selectivity, the level of infestation, the life cycle of the target species (which will affect the timing of the control effort), the type of labor that will be conducting the treatments, and overall costs. Once the preferred method of control is identified, the next step is to determine the types of personal protection equipment (PPE) that will be needed to ensure the safety of applicators. PPE includes various types of ear and eye protection, water proof aprons, chaps, gloves, shin guards, and boots.

I. Introduction

The best defense against non-native plant invasion is constant surveillance of right-of-ways, stream banks, and internal roads and trails, followed by effective control measures at the first appearance of new arrivals. *Early detection and treatment* will minimize efforts and costs that come with treating well established plants or full-blown infestations (Figure 1).



Figure 1. Herbicide application. Image by Steven Manning, Nashville, Tennessee.

More effort is required for successful eradication of established infestations. In such cases, the goal of eradication can still be accomplished with proper treatments, although costs may be prohibitive without cost share or incentive programs funds, and cooperative participation by neighboring landowners.

In severe cases, large-scale conversion of existing infestations is the only solution. This involves eradication procedures that incorporate integrated management strategies and reestablishment of native plants. Fortunately, in southern forests, native plants already in the soil seed bank will usually become re-established once the invaders are eliminated.

II. Selection of Methods and Tools for the Project

Non-native plant invasions generally require site specific control methods utilizing an integrated pest management approach. Choosing the appropriate tools for control is contingent upon several factors. In determining what control methods and tools should be used to accomplish the goals of a weed management project, a number of questions should be answered. For example:

What is the long term plan for the target site?

Control methods can change dramatically based on the future use of a site. For example, if a site is to be completely cleared and kept clean of any tall vegetation, a less selective and less expensive approach can be taken. However, if a site contains rare species and will be protected indefinitely, a more selective and often more expensive and time consuming control method must be considered.

What is the need for selectivity?

As an example, a prairie with an infestation level of 99% invasive grasses can be treated with a systemic herbicide followed by re-establishment of native species from the soil seed bank. However, if the prairie contains a wide variety of

native species as well as targeted non-native species, a more selective herbicide or methodology should be used.

What is the level of infestation?

The level of infestation can dramatically affect the cost of control and methodology chosen. A multi-stemmed species growing at a high infestation level will take more time to control than a light infestation. The size of the target plant will also dictate the control method. A high infestation level of Chinese privet (*Ligustrum sinense* Lour.) in a desirable understory requires cutting tools that are selective. If the Chinese privet is 1-2 years old, a foliar application while desirables are dormant would take less time and less chemical, therefore lowering the cost.

How does timing affect the control method?

Understanding the life cycle of the invasive plant allows the applicator to select the optimal time for control. Some species require one foliar application per year while others can be treated at several times throughout the year. Applying herbicides at the appropriate stage in a plant's life cycle (seasonal timing) can also increase plant selectivity and reduce the rate of herbicide use or the need for multiple treatments in a season.

What type of labor will be working on the site?

In-house, contract, or volunteer labor all have different strengths and distinct disadvantages in weed management projects. Volunteers most often utilize manual or mechanical control methods, while in-house and contract labor often use mechanical and herbicide application tools. In-house and contract workers are typically better suited to work on larger infestations that require special equipment, precise herbicide applications, and other approaches.

How important is cost?

The cost of a project is directly related to treatment method, intensity of infestation, plants and areas that need safeguarding, and availability of resources. Cost share and incentive programs can decrease costs for the landowner but the number and years of retreatment might be restrictive. Once a plan is formulated, careful cost estimates should be made that are based on project objectives. Once a plan is implemented, it should be understood by project partners that any disruption in scheduled treatments can cause major setbacks in meeting project goals. If ineffective treatments such as cutting woody invasive plants without applying herbicide to the stumps are used, large costs over runs should be expected. Using the most efficient control methods is a sound investment in safeguarding a natural heritage for future generations.

III. Safety Considerations

Weed management professionals should always utilize the personal protective equipment (PPE) that is recommended for a prescribed treatment method. A task as seemingly simple as surveying a site requires PPE. Safety helmets and ear covers help to protect an applicator from airborne chemicals, as well as loud noise and falling debris that are associated with mechanical control (Figure 2).



Figure 2. Safety helmet and ear covers. Image by Steven Manning, Nashville, Tennessee.

Table 1 provides a list of PPE that is needed for various invasive plant management tasks.

Often the best control methods involve some type of herbicide application. As such, it is very important to understand the laws associated with PPE for each herbicide used. All chemical labels outline the required PPE for the specific application. For all herbicide applications it is important to have an eye wash kit ready to use on site. Practitioners should also understand which specific respirator if required, is necessary based on the contents of the herbicide label (Figure 3).

IV. Summary

Once a weed infestation has been detected and delimited, appropriate control methods must be employed to contain it, prevent further reproduction, and ultimately, to eradicate it. In most cases, several retreatments will be necessary to achieve that long term goal. A successful invasive plant control program usually involves an integrated approach. Chemical, mechanical, and cultural control techniques should all be considered in developing a project plan. The next two chapters of this publication (Chapters 19 and 20) provide an overview of the various methods that are typically employed to control invasive plants in natural areas.

Table 1. Personal protective equipment that is needed for different invasive plant management tasks

Task	Rubber Boots	Rubber Adron	Appropriate Chaps	Neoprene Gloves	Hearing Protection	Shin Guards	Safety Boots	Eye Protection	Leather Gloves	Hard Hat
Survey		X					X	X		
Mechanical Control								X	X	
Stem Injection		X		X			X	X	X	
Cut & Treat		X	X	X	X	X	X	X	X	
Mixing Herbicides	X							X		X
Applying Herbicides	X							X		X
Girdling		X					X	X		



Figure 3. Personal protective equipment for herbicide application. Image by Steven Manning, Nashville, Tennessee.