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Prioritize Your Exotic Plant Battles: Get Focused

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Introduction

Pimentel et al. (2005) estimate that there are at least 25,000 exotic plants in North America. Most land ownerships have far too many nonnatives to attempt eradication. In fact, as it is in agriculture, on-going suppression is the likely course of management for many exotics. Focusing management activity is essential to be effective, efficient, and actually control those species that pose the greatest threat to park resources. This paper outlines a ranking and prioritization process to aid management focus.

To arrive at a combined list of exotic species to control and areas to protect, an analysis should include the following examinations:

- Identify the nonnatives within your ownership. Focus on those that are recognized as problematic by regional or state authorities.
- Rank invasives by their potential for environmental harm and potential for control.
- Identify resources that need special protection due to their significance or sensitivity. Identify local restrictions that affect the means and timing of treatment.
- Meld the species-specific and geographic inputs, along with operational considerations, into an overall treatment priority system.

Focus on regionally recognized problems

Professional organizations and interest groups such as botanical societies, native plant societies, and exotic species councils are excellent sources of information and thought on the subset of nonnatives deemed to be invasive to the area. Most regions and states have such groups whose published materials can lend ready help in evaluating whether to focus on particular nonnatives. (See the paper by Åkerson and Forder, this volume, for more information.)

Since eliminating all nonnatives is virtually impossible, the most aggressive invasives must be identified for priority treatment. Typically, nonnative species that are highly-to-moderately invasive cannot be tolerated at even low levels due to their ability to quickly expand and dominate native systems.

It is possible that newly emerging invasives will not be included in published lists. In that case, use professional input from other regions and states that have already encountered the plant. Figure 1 illustrates a species that was not, until recently, recognized in published materials of the Commonwealth of Virginia.

Many weeds that are invasive of meadows are not considered invasive in shady forest settings. Maintaining a consolidated list for priority-setting runs the risk of having certain meadow weeds eliminated from consideration. Therefore, if meadows and forests are being managed, it is better to keep separate lists. Recommendations:

Figure 1. Mile-a-minute vine is highly invasive by seed and vegetative spread. Certain newly arrived, highly invasive exotics such as mile-a-minute should be treated regardless of being on published lists.



- Refer to invasive plant lists from an appropriate state or regional exotic pest plant council or native plant society.
- Consider plants that are a high-to-moderate threat within your geographic region of consideration.
- Create separate listings for forest (shaded) and meadow (full-sun) settings.

Create a species-based ranking

The process above winnows down the candidates from all nonnatives to a subset of the most invasive to a given area. The next step is to create a relative ranking amongst the invasives. This should not be seen as merely picking to most “virulent” or fast-spreading. It is also wise to focus on those invasives that are newly introduced or have the least breadth of impact. Starting with those will cost the least time and resources to gain control and eradication.

There are several ranking methods that look at both an invasive’s biological threat and its potential for early control success. We have used an early version of Hiebert and Stubbendieck’s ranking model (1993) with good success. Other ranking methods include: the NatureServe Invasive Species Assessment Protocol (Morse et al. 2004), which is best used in a regional assessment scope, and several evaluations created by states (including models from Virginia, California, Nevada, and Arizona).

The Hiebert and Stubbendieck model is described in their *Handbook for Ranking Exotic Plants for Management and Control*. It evaluates a given species by its significance of impact (evaluating innate ability to become a pest and current level of impact) and its feasibility of control (evaluating current abundance within the park, ease of typical control, and side effects of control). Figure 2 helps illustrate the relative ranking that develops from such a system. Where three species are approximately coequal in their feasibility of control (kudzu, Johnson grass, and gorse), it is readily apparent that it would be wise to tackle kudzu before the others since it has a significantly greater current and potential impact.

Without other considerations, an initial ranking from the example above would be as in Table 1. Note that two species are considered equal in overall ranking. Where local knowledge can inform the process, the species ranking might be grouped differently. Recommendations:

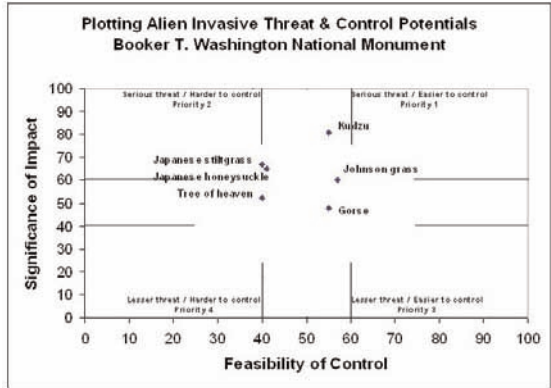


Figure 2. The graphical output of species-specific ranking by the Hiebert and Stubbendieck (1993) method. Note the relative values indicated at the four quadrants of the graph.

Treatment priority	Invasive species
1	Kudzu
2	Johnson grass
3	Gorse
4	Japanese stiltgrass
	Japanese honeysuckle
	Tree of heaven

Table 1. The apparent ranking where other considerations do not override the Hiebert and Stubbendieck method.

- Use a species-based ranking system to arrive at a relative ranking that considers environmental risk and best potential for early control success
- Use local knowledge to adjust the initial rankings and groupings.

Consider areas and native species needing protection

If setting treatment priorities were only about ranking nonnative species, one might be left with chasing a particular plant wherever it is found in the park. Although this is a good strategy for extremely invasive exotics such as mile-a-minute vine and others, it is not practical in more complex environmental settings or with moderately invasive plants. Field crews would spend more time locating sites than actually controlling invasives. What is needed is geographical consideration.

Identify the natural and cultural resource areas that have especial need for protection. Preferentially protect areas containing native listed species. Consider monitoring and controlling infestations in sites recently disturbed by natural and human-caused events. Protect water resources. Protect cultural resources such as nationally listed landscapes, historic sites, and archaeological sites. Consider controlling invasives in highly trafficked areas and those with strong prevailing winds. Such areas act as vectoring pathways for population expansion. Vectoring areas may include trailheads, trails, roads, and land adjacent to home sites, as well as mountain gaps and passes, ridge tops, and wide roadways.

On the other hand, it is also necessary to identify areas that by law or policy have certain management restrictions. Wilderness areas, for instance, have restrictions on the kind of equipment that may be used. Without specific approval, power saws and other motorized equipment may not be used. Battlegrounds usually have restrictions on digging and uprooting, since artifacts might be exposed and their *in situ* significance destroyed. In such a case, soil disturbance during treatment would not be allowed. Other local restrictions may also apply. In all these cases, planning is needed to either gain special dispensation or invest added time in the control work. Recommendations:

- Consider special native species, habitat, and geography for early treatments: presence of rare, threatened, endangered or state listed species, or its habitat; recent site disturbances where exotic plants are likely to invade; riparian zones, wetlands, and streams; cultural resources at risk; and vectoring areas where invasives can be inadvertently transported by people, wildlife, and winds.
- Incorporate local restrictions that impact the means and timing of treatments: wilderness restrictions, archaeological resource protection restrictions, and historic landscape and plantings restrictions.

Create an operationally sound approach

By this point, a subset of the most invasive plants has been gathered from the dozens of exotics present. The individuals in the subset have been ranked for their relative invasiveness and potential for control. Native species and geographical areas requiring priority treatment have been identified, and restrictive concerns have been noted. The final step in the prioritization process is to meld these considerations into an operationally feasible whole. It is the most tactical of the steps. Operational efficiency must be considered. In the end, program success comes from the rapid accumulation of restoration success, one site after another.

Consider the following criteria during the melding process. They are listed in their order of importance.

- Protect listed native species before considerations of general invasive plant control.
- Control the highly ranked invasives before those of lesser threat and control potential.
- Treat new and small infestations before larger, older ones.
- Consider delaying treatment in areas where policy restrictions are in force.
- When possible, once in an area to treat a given invasive species, treat all invasives in the area.

The considerations above focus on biological and cultural need as well as programmatic efficiency. It cannot be overemphasized that funding agencies must be shown results for the trust and funding they provide. Early on in the life of a program, one must show evidence of a series of rapid successes. It is organizational death to tackle huge sites that cannot speedily be brought under control. Recommendations:

- Create a plan that can accomplish a series of rapid successes.



Figure 3. Often ignored, Japanese stiltgrass takes over after control of other exotic plants.

- Don't treat one highly invasive species but leave moderately invasive species behind to take over (Figure 3).
- Aim for full restoration of native species and ecosystem function.

Get organized in your war against invasive exotics. Create a ranked priority system that helps you remember where you are headed in the midst of battle. Aim for early successes that you can document to prove the value of your program and gain added support. Never underestimate the psychological benefits of successes for building momentum and support.

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