March 15, 2012

Radnor Township Board of Health
Radnor Township Environmental Advisory Council
301 Iven Avenue
Wayne, PA 19087-5297

Dear Board of Health and Environmental Advisory Council,

This letter is written to describe the holistic approach that is needed for effective control of non-native invasive species. Effective control of invasive species requires an approach that is much more comprehensive than simply spraying an area with herbicide each year. We hope you find the information presented in this letter helpful in informing how Radnor Township can move forward to address this difficult but important issue on all of its public lands. The information presented here is based on my recent review of management protocols, as well as my 30 years of experience as a Registered Landscape Architect; for the past sixteen years I have been engaged in designing and managing ecological restoration projects, many of which have included invasive species management.

Effective control of non-native invasive species is multifaceted and should include prevention; survey, detection & monitoring; control; restoration; and education and training [(1)]. All are important to adequately reduce populations of non-native invasive species that can over-run native plants and their habitats. "Before embarking on a weed management program, it is important to develop a straightforward rationale for the actions you plant to take [(2)]." This rationale should guide development and implementation of your strategy.

PREVENTION

Prevention includes avoiding the planting of species that escape into the wild areas and degrade landscapes. Many such species are well-known, such as Burning Bush *(Euonymus elatus)*. But there are also many plant species being sold today that are just starting to escape from cultivation and so are not well known yet as potential problems -- such as Japanese Maple (*Acer palmatum)* [(3)]. The safest approach is to avoid planting non-native species, and of course to also avoid planting known invasive species. Lists and information on non-native invasive species is available online [(4)]. It is important to undertake this approach on municipal lands, but also to educate residents so they too help in this important prevention effort on their own properties.

DELAWARE RIVERKEEPER NETWORK
925 Canal Street, Suite 3701
Bristol, PA 19007
Office: (215) 369-1188
fax: (215)369-1181
drn@delawareriverkeeper.org
www.delawareriverkeeper.org

SURVEY, DETECTION & MONITORING

To accomplish effective control, one first needs to know how big the problem is. Whether for a small park, or the whole municipality, one needs to know what species are involved and their distribution. Mapping is needed to identify the current conditions, and is best done prior to applying management control. After control strategies have been implemented, follow-up mapping is needed to see if the infestations have been effectively controlled and to help develop next steps. Yearly monitoring is needed to review the success of the management and identify any re-infestations, in order to inform and adjust follow-up management.

CONTROL

"An invasive plant control program is best viewed as a part of an overall restoration program…rather than simply eliminating the plant. When selecting control methods, keep in mind that the ultimate purpose of the work is to preserve native species, communities, and/or functioning ecosystems [(2)]."

Control of non-native invasive species may include a variety of methods -- physical, biological and sometimes perhaps even chemical. But chemical controls must be carefully considered as part of an overall strategy so that their use can be kept to a minimum, because research continues to demonstrate that chemical controls can have both direct and cascading harms on ecological communities.

To avoid introducing chemicals into our environment, it best to first consider utilizing physical control or biological control. A poor approach is to simply spray a site with weed killer, killing both the non-native and native species, opening up the ground to additional infestation by invasive species, and failing to re-establish a native habitat.

A proper approach is to identify the target species of concern, identify desirable native species around the target species, and then determine the best control methodology. One needs to avoid spraying native species, including native grasses and perennials as well as trees and shrubs, which are often intermixed with the invasive species.

Often manual control -- pulling the plants including the roots -- is the preferred method, in order to avoid damage from herbicides to adjacent native species. Pulling of invasive species and roots is effective for many invasive species, and depends on the timing and root systems of those plants. Even invasive species that are tough to manually control due to sprouting root pieces, such as Japanese Knotweed *(Polygonum cuspidatum)*, can be effectively managed in smaller areas with manual removal of plants and roots, with annual follow-up. Removal of Multiflora Rose *(Rosa Multiflora)* and their root systems is often very effectively done in spring with shovels and tools such as a Weed Wrench [TM], avoiding herbicides altogether. Use of black plastic to kill invasive plants is feasible in some areas for species including Common Reed *(Phragmites australis)*; black plastic plus heavy tarps or mats should be used when eradicating Common Reed because it can pierce through typical black plastic [(6)].

Biological control includes introducing animals, fungi or other microbes [(5)] that are approved for use by USDA-APHIS. For instance, Purple Loosestrife *(Lythrum salicaria)* may be controlled with introduced insects, to achieve a significant reduction in the population of the Purple Loosestrife [(7)].

If chemical control is used and is the only option, such as in control of larger infestations of Common Reed or Japanese Knotweed, it should to be done for the minimum amount of years necessary for controlling that species, not as a yearly program of application. The means of applying the chemical can also be adjusted to minimize the volume of use, the chance for hitting unintended areas, and for ensuring the most effective coverage to the right parts of the plant needed to ensure its demise. The chemical control needs to be followed by planting of native species that can help suppress re-infestation and restart natural succession to help produce a beneficial native habitat.

For some species, chemical control is not considered the most effective option. For example, Canada Thistle *(Cirsium arvense)* is best managed by repeated cutting and/or burning, correctly timed to deplete the root systems – the application of chemicals is not a preferred means to manage such a species of this kind[8]. This is an example of why knowing and researching the invasive species being managed is so very important – to ensure the right strategy is chosen.

Using chemicals such as those in the glyphosate-based Roundup family for simple weed control along paths or in paths is a poor shortcut to other more environmentally friendly methods such as hand-weeding. The money saved by avoiding the purchase of chemicals can be put towards other purposes.

RESTORATION

Integral to the control of non-native invasive species is the restoration of landscapes to enhance native habitat. Thick stands of invasive species can prevent the natural establishment of native species, so once controlled, natural succession can be encouraged through the planting of native seeding and plantings.

Replanting should be similar to nearby native habitats, utilizing species based on local native plant communities. Specialists in restoration can provide advice on the most effective restoration plans.

For many people, planting is the fun part of the overall management effort, and the local community should be encouraged to be involved in planting efforts and for the ongoing monitoring and annual hand weeding control efforts that will help ensure long-term success of the project. Larger areas of plantings can be done with municipal staff and/or contractors. There is grant funding available, especially for native plants utilized in restoration projects.

The Delaware Riverkeeper Network has worked with the Township to seek funding for restoration of the West Wayne Preserve. While our joint efforts on this front have not yet yielded success, we are committed to continuing to work with the Township to accomplish our mutual restoration goals for the site which borders the Radnor Trail.

EDUCATION AND TRAINING

Educating the public on the problems associated with non-native invasive species can help garner support for properly funded holistic control and restoration efforts. Education through brochures and online articles also can encourage people to avoid buying and planting invasive species – both those that are well known and those that are starting to look like they will create problems in the future. Talks open to the public on

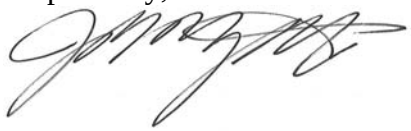
the subject of non-native species and the values of native plantings can also be an effective part of any education campaign.

Training is important for volunteers that may help with invasive plant management. This training can also serve as an important part of a broader communication effort – each trained volunteer becomes a spokesperson with their friends and neighbors on the value of native species, the problems of non-natives, and the importance of the work the Township is undertaking.

Training and state certification is required for herbicide applicators: expertise in the proper use of herbicides is necessary to avoid over-use and improper chemical formulations. Sensitivity to issues such as the effect on surrounding native species is important for proper use of herbicides – this takes training of identification of native species in young and mature forms, including shrubs, trees, grasses, sedges and rushes. It also is important to understand how to avoid non-target habitats such as neighboring wetlands, woodlands or waterways.

I hope the information in this letter will be beneficial and useful as Radnor makes decisions on the most effective approach to management of non-native invasive species. If you would like more information, more detail, or guidance to other resources for implementing restoration and/or effective trainings please let us know.

Respectfully,



John Nystedt, RLA, LEED BD+C
Restoration Specialist
Delaware Riverkeeper Network

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