THE FUTURE OF NON-NATIVES: PREVENTING WOODY PLANT INVASION

Benjamin Berthiaume
Environmental Studies CSB|SJU
Dr. Derek Larson

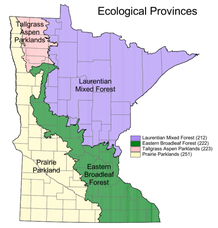
Abstract

Non-native plants will continue to invade Minnesotan ecosystems. This ongoing invasion leads to the displacement of native flora with foreign trees, shrubs, and vines, which creates huge ecological and economic problems. It is evident that this invasion needs to be stopped, but how? Through the creation of best policy practices and the analysis of policies in Minnesota and its neighboring states in terms of both their application of the best practices and their actual successes in prevention, it is possible to identify the best possible means of preventing future invasion. Reassigning invasive plant policymaking to the local and county level while maintaining support from the state level is the best strategy to preventing the invasion of non-native woody plants in the future, as it allows for more specified policies and greater success in the enforcement of the policies.

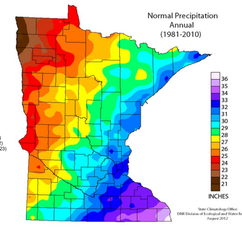
Methods

In order to best create future control methods for invasive woody plants, a literature review of effective policy goals was first performed. This revealed that identifying species and place are perhaps the two most important factors in creating a successful policy. Then, the invasive plant policies of the Great Lakes states were evaluated and analyzed. The evaluation revealed that Minnesota's policies were more developed than the other states' laws, and the analysis proved this correct as introduction rates for some of the most widespread species are less significant in Minnesota compared to the rates in the other states. This revealed that the success of Minnesota in enforcing these laws at a local level led to the highest compliance rate of any Great Lakes state. The thesis was formed using all of these best practices, and then a case study of Minnesota was performed to reveal that certain areas of the state will identify different future risk species, which proves that making invasive plant policies at the local and county levels most effectively applies the best practices.

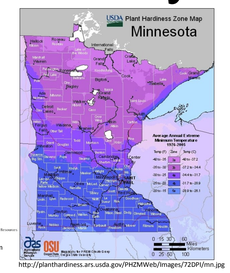
Minnesota Case Study



http://files.dnr.state.mn.us/natural_resources/ecs/province.pdf



http://www.climate.umn.edu/img/normals/81-10_precip/81-10_precip_norm_annual.htm



http://planthardiness.ars.usda.gov/PHZMWeb/Images/72DPI/mn.jpg

The image on the left shows the different ecological provinces of Minnesota; the image in the center shows normal annual precipitation; the image on the right shows the hardiness zones of Minnesota (indicating which plants are most likely to thrive at a location based on average annual minimum temperature). The images above indicate how important it is to create policies on the local and county level, as ecological and climatic characteristics vary greatly across the state. Identifying specific species (which is one of the best practices in creating invasive plant laws) can further prove that policies should be created at the local and county level.

European cotoneaster

http://www.ag.ndsu.edu/tree-selector/system/photos/105/original/european_cotoneaster_3.jpg?1298529010

European cotoneaster is best suited for areas in southwestern Minnesota. It is well adapted to moist, well-drained soils; is hardy from zone 3 to zone 5, and is well suited to the windy conditions of the area. It is better adapted to the prairie ecology than trees and large shrubs.

Goat Willow

http://www.aphotoflora.com/images/salicaceae/salix_caprea_goat_willow_19-09-08.jpg

Goat willow is best suited for areas in southeastern and central Minnesota. It thrives in wetland areas but does not require standing water, it is able to thrive in high elevations, and is hardy up to zone 5. It is therefore well-suited to the wetland and forested areas of SE and central MN.

Best Practices

Prevention is the ultimate goal of controlling invasive woody plant spread. Therefore, in order to achieve prevention, control methods should aim to implement the following strategies:

- Using research and knowledge to identify specific species on which to focus control methods. This involves building knowledge on patterns of invasion, rate, and spread; correct identification; impact potential; growth, reproduction, and survival characteristics in relation to the environment; and information about their control.
- Identifying a specific place on which to focus control methods. The absence of predators, pests, and diseases; inferior reproduction potential in native plants; inferior competitiveness of native plants in consuming resources; the amount of chemical change (eutrophication); the presence of empty-niches; and the amount of disturbance in a specific place all contribute to a non-native plant's invasive potential.
- Enforcing invasive plant policies at the local and county levels. Of all the Great Lakes states, Minnesota is the only state that successfully enforces invasive plant policies at the local or county level, which leads to an 85% compliance rate among landowners.

Reassigning invasive plant policymaking to the local and county level enables all of these best practices to be most successfully implemented.

Barriers

Barriers to reassigning invasive plant policymaking to the local and county level include the following: lack of financial and human resources may limit the ability to control and manage invasive species, a lack of public awareness makes it difficult to prevent introduction, and a lack of synchronization between local invasive plant policies may enable introduction rates to grow in some places.

Key References:

Widrlechner, Mark P., Emily J. Kapler, Philip M. Dixon, and Janette R. Thompson. "The Importance of Geographic and Biological Variables in Predicting the Naturalization of Non-Native Woody Plants in the Upper Midwest." *Journal of Environmental Horticulture* 31, no. 2 (June 2013): 124-131.

Cronk, Quentin C.B. and Janice L. Fuller. Plant Invaders: The Threat to Natural Ecosystems. 1995. Reprint, London: Earthscan, 2001.