Effects of Recreational Trails on the Spread of Non-Native Invasive Plant Species
Whitney Hill and Jennifer Fraterrigo
Department of Natural Resources and Environmental Sciences, University of Illinois, Urbana, IL 61801

INTRODUCTION

Biological invasions pose a serious threat to biodiversity conservation. Invasion of native plant communities can lead to substantial declines in native species richness and abundance. Invaders can also alter fundamental ecosystem properties to promote their own persistence. Understanding the factors that contribute to the spread of invasive plant species is therefore an important research need in ecology.

The spread of an invasive species is usually preceded by several other stages. The introduction or arrival of plant propagules into a new area is followed by establishment, during which a pioneering population becomes established and begins to reproduce. Human activity, even those considered low-impact, can influence the outcome of these stages. For example, recreational trails may contribute to species introductions by carrying propagules on shoes or clothing, and trails may increase the availability of suitable habitat for invasive species, particularly within dense forests. Additionally, edges created by hiking trails may attract other species that disperse the propagules of invasive plants. For these reasons, hiking trails may contribute substantially to the spread of non-native invasive plants.

STUDY SITES

Research was conducted on state and federally managed lands within the Shawnee National Forest. Forest cover was predominantly oak-hickory, with remnants of historically planted pines. Non-native invasive plant species were identified as a problem throughout the research area, although specific species compositions appear to be sporadic. A total of 16 trails that received various levels of use were studied, all of which were designated as "hiker only" by trail managers.

OBJECTIVES AND SIGNIFICANCE

This research aims to evaluate the effects of hiker foot traffic on recreational trails on the spread of non-native invasive plant species. The ability of non-native invasive plants to attach themselves to hiker clothing and "hike-in" their way into new territory increases the likelihood that recreational hiking trails play a role in spreading the spread of non-native invasive species. Non-native invasive species are gaining increasing attention due to their ability to rapidly dominate an area, modifying the ecosystem completely. In addition to dispersing native vegetation, non-native invasive plants are thought to have the ability to alter disturbance regimes, nutrient cycling, and geomorphological, biogeochemical, and hydrological processes. Recreational trails exist so that visitors can enjoy natural habitats, however, if non-native species are spreading throughout forests as a result of trail use, implementation of better management techniques may be necessary.

METHODS

At each study site, the abundance of four non-native invasive species along the edge of the trail and in the forest interior. The focal species included Microgynorchis uniflora, Leptosporis cordata, Centaurea jacea, and Rosa multiflora. These species were selected due to the fact that they were known to have invaded the southern portion of Illinois and have been identified as threat species to forest health by the US Forest Service. Trailside data were collected directly along the trail, and forest interior data were collected 50 meters within the forest and parallel to the trail. Species abundance was recorded every 5 m along transects as percent cover using a 1 x 1 meter quadrat. Data were collected beginning 25 meters from the trailside and transects were spaced 50 m apart to avoid overlap. Where permitted, data for 5 ales of each type of transect were collected on each trail.

RESULTS & DISCUSSION

The percent cover of non-native invasive species observed on transects along trailsides was significantly higher than those observed along transects 50 meters within the forest (p<0.0001). On average, non-native invasive species coverage 5.6 times the amount of ground alongside trails as they did in the forest interior. Both overall averages (Figure 1) and individual trails (Figure 2) demonstrated higher rates of invasive presence alongside trails as compared to areas in the forest interior.

This study suggests that hiking trails enhance the presence and abundance of non-native invasive species. If presence of non-native invasive species was limited to the areas directly alongside trails, harm to overall forest health would not be a significant concern. However, the presence of non-native invasive species in adjacent forest interior suggests that recreational trails may serve as points of entry for non-native invasions, from which they extend deeper into a forest interior. Further investigation of the extent of non-native invasive plants spread from a trailside as well as how distance from the trailhead affects percent cover will be conducted in the Fall 2016 Semester.

REFERENCES CITED


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