

# Value of Weed Management for Nature-Based Outdoor Recreation

by Damian C. Adams and Donna J. Lee

## Background

Invasive exotic weeds are a serious problem for Florida's natural areas. To date, an estimated 124 different invasive exotic weed species (74% upland species) have established in state parks and other natural areas (FLEPPC, 2007). Despite public spending of \$92 million between 1997 and 2007, invasive exotic weeds infest 1.5 million acres of Florida's public conservation land, impacting upland ecosystems and threatening biodiversity (FDEP, 2007). In the absence of adequate prevention, monitoring, and management, new exotic weeds will become established and existing exotic weeds will spread.

Among the economic sectors at risk is Florida's nature-based tourism and recreation industry valued at nearly \$8 billion per year (FDEP, 2007). Invasive weeds can diminish the quality of recreation in natural areas and reduce the frequency of repeat visits (Adams and Lee, 2007). However, because invasive weeds are difficult and costly to manage, state weed control programs are often underfunded (Lee et al., 2009). According to the U.S. General Accounting Office (2002), estimates of the economic damages caused by invasive exotic weeds can help justify increased funding.

## Nature-based outdoor recreation survey

With support from a Florida Department of Environmental Protection Bureau of Invasive Plant Management research grant, we conducted a study to quantify the economic impact of invasive weeds on nature-based outdoor recreation. We surveyed Florida residents to find out how weeds diminish their outdoor recreation experience and how much more residents would pay to visit a park that is free of weeds and vegetated with native plants versus a park infested with weeds. The survey method we employed has widely been used to study the value of natural resources and environmental amenities.

We sent a web link to Florida residents to identify recreationists who had visited an upland or wooded park during the past 12 months. To determine preferences and quantify economic values we developed a series of questions asking respondents to choose between pairs of *conceptual* parks with different characteristics as illustrated in Figure 1. We asked respondents to assume that the parks were equal in every way except for changes in key attributes that vary in quality or quantity. In our case, parks differed by invasive plants, entrance fees, quality and type of facilities, and native animal and plant species. The quantity or quality levels of each attribute (e.g., "Excellent" versus "Minimal" facilities) were selected according to established survey design methods. Attribute levels were: (1) facilities – minimal, adequate, or excellent; (2) diversity of animal species – low, moderate, or high; (3) diversity of plant species – low, moderate, or high; (4) presence of invasive plants – none, few and dispersed, or numerous and dense; and (5) fee for park use – free, \$10, \$20.

In the end, 1,436 Florida residents completed our web survey. We conducted a statistical analysis of the responses and found that Florida residents are willing to pay more for a nature park with natural or restored native vegetation that is free of invasive weeds. On average, Florida residents will pay \$10.82 more to visit a park that is free of invasive weeds compared to a park that is densely populated with weeds. If the park is also rich in native flora, residents would pay an additional \$7.46. Combining these, Florida residents would pay \$18.28 more to visit a pristine nature park that is both rich in native flora and free of invasive weeds. While Florida residents are typically not required to pay steep fees to visit nature parks, outdoor enthusiasts will often drive long distances to visit pristine areas and thus pay in both time and gas. Outdoor enthusiasts who are knowledgeable about the damages caused by invasive weeds through personal experience or other means likewise have a strong preference for pristine nature parks

PARK CHARACTERISTICS	PARK A	PARK B
Condition of park facilities such as parking, picnic areas, and restrooms	Excellent	Adequate
Diversity of natural and indigenous plants	High	Low
Presence of invasive exotic weeds	None	Numerous and dense
Fees for park entrance, parking, and camping	\$20	Free
Which park do you prefer? <input type="checkbox"/> PARK A <input type="checkbox"/> PARK B		

Fig. 1

and would pay \$19.94 more per visit compared to a non-pristine park. Outdoor enthusiasts who have contributed time or money to remove weeds and restore vegetation have a greater disdain for invasive weeds than the average resident and would pay \$23.22 more to visit a pristine nature park versus a park lacking in native vegetation and overrun with weeds.

Our survey respondents also let us know that Florida residents appreciate facilities and are willing to pay to visit parks with constructed amenities. On average, Florida residents will pay \$7.44 more to visit a park with good quality facilities such as picnic areas, parking, and well maintained restrooms compared to a park that offers poor facilities. When these results are taken together, outdoor enthusiasts who are knowledgeable about the damages caused by invasive weeds would pay \$27.38 more to visit a pristine park with quality facilities than they would pay to visit a park that is not pristine and deficient in facilities. Further, outdoor enthusiasts who have contributed time or money to weed removal and restoration would pay \$30.66 more to visit a pristine park that lacks invasive plants, has rich native flora, and offers quality facilities than they would pay to visit a park that is overrun with invasive plants, has few native plants, and is lacking in facilities.

Based on annual attendance at 115 Florida State parks and the need for funding to control invasive weeds, we estimated that local residents would pay an additional \$52.9 million annually for weed removal and native plant restoration in state parks and non-local visitors would pay an additional \$98.2 million for a total value of \$151 million for annual weed removal and native plant restoration in state parks.

## Summary

Florida's unique ecosystems are the foundation of a nature-based tourism and recreation industry that generates \$8 billion per year for the local economy. Invasive weeds threaten ecosystem biodiversity and are therefore of serious ecological and economic concern. The state's 11 million acres of public conservation land have been under maintenance control since 1997. If a lapse of

funding should occur, invasive weeds on 1.5 million acres could threaten 9.5 million acres of public conservation land. Based on Florida's 115 upland state parks with 16.5 million total visits per year, our study estimates that residents would pay \$151 million for maintenance weed removal and native plant restoration in state parks.

Florida residents place a high value on outdoor recreational activities in natural areas and have an awareness and appreciation for native vegetation. Additional funding for research and control of invasive weeds in natural areas may well be justified.

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