

Chapter 1. Invasive Plant Impacts

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The impacts of invasive species are felt from the local to the global scale. Scientists, land managers, and the general public are becoming more aware of invasive plant impacts. Weed invasion is considered the second most serious threat to natural habitats, after habitat fragmentation and loss (Randall 1996). The economies of many states are based upon use or extraction of natural resources for food and economic growth. Utilization of resources has been impacted by the encroachment of invasive plants.

Selected studies have documented the impact of individual species. For example, it is estimated that tansy ragwort invasion has caused losses of \$6 million per year to the state of Oregon (Radtke and Davis 2000). Hirsch and Leitch (1996) estimated a \$42 million annual loss due to three *Centaurea* species in Montana, North Dakota, South Dakota.

As alarming as some of these numbers sound, comprehensive data about economic impacts are scarce, and it is even more daunting to assess economic and ecological costs for invasive plant species in a meaningful way. Cost benefit analysis reflecting the true costs associated with invasive plant invasion have been completed for few species at varying scales using different methodologies. The extent of economic damage caused by invasive species is only beginning to be appreciated by economists and policy makers, and the methods by which to do so are still being explored or have not been tested at the landscape scale.

- Hybridization between native cordgrass, *Spartina alterniflora*, and an exotic cordgrass, *Spartina foliosa*, have created a fast-growing plant with rhizomatous roots which accentuates tidal sediment buildup and has decreased habitat for shorebirds and waterfowl in the San Francisco Bay (Vila et al. 2000)

- *Melaleuca* invades wetland areas in Florida and creates monospecific stands. Increased shade and soil temperature change the local microclimate, the water table is lower, and fire frequency and intensity are altered (Randall 1996).
- A significant reduction in the five most common native species was recorded in native mixed grass prairie invaded with leafy spurge, *Euphorbia esula* (Belcher and Wilson 1989).
- Invasive pathogens from Europe essentially eliminated the once dominant American chestnut and American elm trees (Mooney and Hobbs 2000)

Plant invasions have been shown to alter ecosystem processes such as nutrient cycling, fire frequency, hydrologic cycles, sediment deposition, and erosion. Invasive plants displace native species or hybridize with them, altering the gene pool. Yet, ecological impact is perhaps even more difficult to assess than the economic effect. Putting a price on ecosystem services, or those benefits supplied to human societies by natural ecosystems, is complex. Such benefits include timber, game animals, and pharmaceutical products, items that we have traditionally assigned an economic value, and can “price.” Ecosystem services, such as purification of air and water, climate regulation, regeneration of soil fertility, decomposition of wastes, and maintenance of biological diversity are more complex, and it becomes more difficult to assign value. The natural processes that occur within an ecosystem; e.g., the nitrogen cycle and the carbon cycle, are largely not accounted for when trying to assess the cost of ecological impact. How to assess the values as well as how to assign value to ecological assets is an issue that economists, ecologists, and policymakers are facing.

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