



Economic Impacts of Invasive Species in the Pacific Northwest Economic Region



A report prepared by the
PNWER Invasive Species Working Group
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“Working together across our common borders is vital to prevent the introduction of unwanted invasive species across the Pacific Northwest. As the majority of invasive species are intentionally introduced, people and agencies must undertake actions to prevent transporting invasives to new areas. With ‘an ounce of prevention’, governments and industries will avoid the exponential costs of control and the environmental impact to ecosystems. Whether prevention or control, collaboration on priorities and coordinated actions is needed on all sides of our legal jurisdictions as ‘invasives know no boundaries’. Together we can make a difference.”

- Bill Bennett, MLA, Kootenay East, Province of BC



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Invasive species are forever altering the natural areas that make our region so unique. Invasive species outcompete native plants and animals, devastating industries, families, and native cultures that rely on the region's natural resources. They also degrade waterways, harming water quality and limiting recreational opportunities.

The estimated damage from invasive species worldwide totals **more than \$1.4 trillion**, or five percent of the global economy.¹ The annual U.S. cost from invasives is estimated to be **\$120 billion**, with more than 100 million acres affected (i.e., about the size of California).² The economic impact caused by the six invasive plants in Canada was predicted to be a minimum of \$65 million in 2008, rising to \$139 million by 2020.³ About 25 percent of Canada's endangered species, 31 percent of its threatened species and 16 percent of its vulnerable species are in some way at risk because of alien species. In the province of British Columbia and in other areas across Canada, invasive species have affected some of the most diverse native ecosystems, including wetlands and riparian forests, which are becoming increasingly imperiled.⁴ The state of Florida spends **\$56 million a year** to manage one invasive species—hydrilla. The Washington Department of Agriculture and state Salmon Recovery Funding Board have contributed about **\$6 million since 2004** to control invasive knotweed infestations.

Here are some ways in which invasive species pose an economic burden:

- Reduced grazing potential—once productive grazing lands turn into wastelands as invasive species invade.

Leafy Spurge in Southern Manitoba \$40.2 million

Leafy spurge (*Euphorbia esula*) is an invasive weed species that has infested several million acres across the Great Plains of North America, including critically important native prairie pastures. A 2010 assessment noted that there is at least 1.2 million acres of leafy spurge in Manitoba—the most affected areas are pastures, natural areas, hay or forage land, roadsides, rail lines, and utility corridors.⁵ In 10 years, this weed has tripled in the number of acres infested.

“Leafy spurge seriously threatens what remains of our native prairie pastures.”

- *Rural Development Institute*

Leafy spurge costs Manitoba **\$40.2 million annually**, largely a result of reduced carrying capacity of grazing, the impacts on public lands for recreation and reduced habitat value, and the impact of infestation on right-of-ways. This estimate is double the estimate of 1999, and includes costs based on lost grazing capacity of livestock pastures, chemical applications for leafy spurge on roadsides, and other costs.

- Alteration of fire regimes—more frequent and hotter wildfires reduce land values of timber and private property.
- Reverse salmon recovery efforts—species, such as Japanese knotweed or Brazilian elodea, invade areas of restored salmon habitat.
- Fewer recreational opportunities—as habitat quality declines, native fish and wildlife species decline, creating fewer opportunities for recreation and reduced revenue. Also, invading weeds choke lakes and rivers, limiting boating and other water sports.

- Loss in agricultural productivity—about a fourth of U.S. agricultural gross national product is lost each year to foreign plant pests and the costs of controlling them.⁶
- Reduced ability to export goods—maintaining pest-free commodities is essential for maintaining export markets.
- Reduced property values—studies show reduced property values with invasive species infestations.
- Disease in domesticated livestock populations—invasive species, such as feral pigs, can harbor and spread disease, such as swine brucellosis, pseudorabies, and foot-and-mouth disease. All of these diseases pose economic threats to the livestock industry.

Table 1. Examples of the economic effects of invasive species.

Industry/Area Affected	Invasive Species	Cost
Agriculture (U.S. cotton industry)	Boll weevil	\$50 billion dollars (total cost since 1890s)
Western U.S. rangelands	Leafy spurge	\$110 million in 1990
Canadian agriculture	Weeds	\$2.2 billion annually
U.S. agriculture	Weeds	\$30.6 billion in control costs and production losses
Western U.S. forests	Asian gypsy moth	\$20 million eradication campaign
U.S. waterways	hydrilla and water hyacinth	\$100 million annually
Aquaculture industry in Washington	Non-native <i>Spartina</i>	\$26 million since 1996
U.S. infrastructure	Zebra mussels	\$1.12 billion in control costs and damages
Eastern U.S. forests	Gypsy moths	\$764 million in 1981
Canadian rangeland and wetlands	Purple loosestrife	\$20 million in 2008
Canadian rangeland and agriculture	Cheatgrass	\$10 million in 2008

Non-native cordgrass (*Spartina*) in the Pacific Northwest > \$26 million

Along the Pacific Coast, there are four species of invasive cordgrass (*Spartina* spp.) that have invaded ecologically critical habitat within the intertidal and low marsh communities of estuaries and their outlets.⁷ *Spartina* forms dense monocultures that disrupt the ecology, structure, and function of mudflats and intertidal habitat, which provide the basis for a complex food web that includes invertebrates, fish, shorebirds and waterfowl. Monocultures also alter the hydrology of the estuaries by creating deep drainage and surge channels, increasing elevation that can affect navigation and cause coastal flooding.

In Washington, Oregon, and California, where *Spartina* has been identified as a problem for some time, millions of dollars are spent annually on *Spartina* management programs. Washington has spent **\$26 million since 1996** to eradicate *Spartina* from critically important habitats, such as Willapa Bay National Wildlife Refuge. Oregon is implementing a *Spartina* eradication plan, and in 2010, British Columbia predicted it would cost **\$200,000 annually for five years** to eradicate this invasive plant species.



Zebra and Quagga Mussels in the Pacific Northwest > \$100 million



Zebra and quagga mussels (*Dreissena* spp.) are freshwater, bivalve mollusks that have a dark and white (zebra-like) pattern on their shells. Native to Eurasia, they were introduced to the Great Lakes region of North America in the 1980s. Zebra and quagga mussels attach to hard substrates, and are found in clusters. They can foul pipes of hydroelectric facilities, water works, and other industrial facilities, including fish passage facilities, fish screens, fish hatcheries and aquaculture operations. These highly invasive mussels can disperse and grow quickly and reach high densities, impairing facility functions and damaging ecosystems wherever they are established.⁸

Congressional researchers estimated that an infestation of zebra mussel in the Great Lakes cost the power industry alone **\$3.1 billion in the 1993-1999 period**, with a total economic impact on industries, businesses, and communities of **more than \$5 billion**.

A recent assessment of the potential economic costs of mussel infestation of the Columbia River Basin, if it were to become infested, estimated **a one-time cost of \$21 million plus annual costs of \$26 million**.⁹ In Idaho, the conservative estimate of statewide direct and indirect costs from establishment of Dreissenid mussels, which does not include mussel impacts on irrigation systems (because there was no data) is **\$94,474,000**.¹⁰ Bureau of Reclamation-wide appropriated costs attributable to zebra and quagga mussels **since 2008 are \$12.6 million**.

Knapweed in Montana \$42 million/year



Montana has spent more than **\$42 million annually** on the direct and indirect costs of diffuse, spotted, and Russian knapweed. Knapweed invades rangeland, forest land, railway embankments, parks and wildlife areas, road ditches, built-up areas, and river banks. As a result, reduced plant diversity in these “wild lands” lowers their value as wildlife habitat and decreases their water and soil conservation benefits.¹¹

Knapweeds release a chemical substance that inhibits surrounding vegetation, by producing a large amount of seed, and by being adapted to a variety of environments and soils. Knapweed seeds tend to be carried in parts of farm machinery, logging equipment, or recreational vehicles. To control knapweeds, herbicide treatments can be used on small patches, and cultural or biological methods for widespread infestations. However, herbicide treatments can be expensive and toxic to other plants. Biological controls that can be used is the introduction of two fly species that reduce the amount of seeds produced, and three moth species that feed on knapweed seed and root tissue. Cultural controls may include cultivation, burning and mowing.

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“Like “biological wildfires,” invasive species quickly spread and have the potential to affect nearly all terrestrial and aquatic ecosystems in the Northwest. The threats caused by these species have become one of the greatest environmental challenges of the 21st century in economic, environmental, and human health expenditures.”

- Idaho Representative Eric Anderson, , Co-Chair of the
PNWER Invasive Species Working Group

The Pacific Northwest Economic Region Invasive Species Working Group

The PNWER Invasive Species Working Group consists of representatives from each of the PNWER provinces and states that seek to address the regional economic and environmental impact of invasive species and promote regional collaboration and sharing of best practices.