March 2009

Summary

Economic Impacts of Invasive Plants in British Columbia

Report Summary

Based on:

Frid, L., D. Knowler, C. Murray, J. Myers and L. Scott. 2009. Economic Impacts of Invasive Plants in BC. Prepared for the Invasive Plant Council of BC by ESSA Technologies Ltd., Vancouver, BC. 105 pp.

Prepared for:
Invasive Plant Council of BC

vancouver foundation

The Real Estate Foundation of British Columbia

British Columbia The Best Place on Earth | Ministry of Agriculture and Lands

Fraser Basin Council

NOTE: The full version of this report is available for download from the IPCBC website: www.invasiveplantcouncilbc.ca

Introduction

Invasive plants are known to have a range of environmental, social, and economic impacts wherever they establish and spread. Environmental effects include outcompeting native species, altering ecosystems, and reducing wildlife forage. Social impacts include spoiling hiking trails and lakeshores for recreation, and reducing visual quality when invasive plants flourish over large areas. Invasive plant managers have long known that invasive plants also have economic impacts. Some preliminary figures are available for Australia, parts of the United States, and other areas around the world, but the economic impacts of invasive plants in British Columbia have remained largely unstudied.

The Invasive Plant Council of BC led the development of an economic analysis of invasive plant impacts for British Columbia. A better understanding of this complex topic is anticipated to enable more effective ranking of invasive plant research and management activities with other large-scale priorities. This summary covers the report's key points.

Globally, invasive alien species are one of the five most important direct drivers of biodiversity loss and change in ecosystem services.

—Millennium Ecosystem Assessment, 2005

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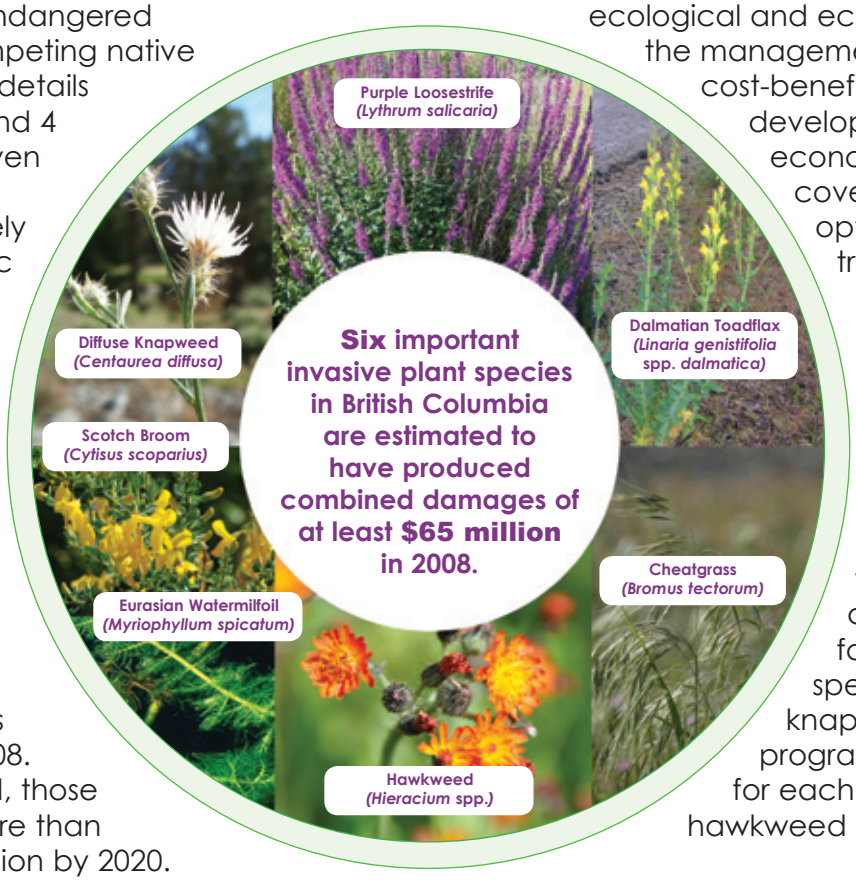
The Impacts of Invasive Plants with No Management Action

The economic impact analysis involved two phases. First, it was necessary to understand the impacts, or damages, of invasive plants without any management action or intervention. Phase I addressed seven important invasive plant species; each species produced general and specific impacts to biodiversity and to threatened and endangered species by outcompeting native plant species. The details listed on page 3 and 4 for each of the seven studied invasive species all ultimately produce economic impacts as well.

Despite incomplete or no information on some potential economic impacts, the report authors estimated that six of the invasive species produced combined impacts of $65 million in 2008. With further spread, those impacts would more than double to $139 million by 2020.



Purple loosestrife produced estimated impacts as high as $20 million, followed closely by diffuse knapweed at $18 million. However, by 2020, the potential for hawkweed to rapidly spread from its more recent establishment in British Columbia gives it the highest estimated annual economic impact of $60 million.

Cost-Benefit Analysis of Alternative Management Strategies

Phase 2 of the economic analysis involved further study of four species examined in Phase 1 through a cost-benefit analysis. This phase assessed the costs of different management strategies using an ecological model based on simple logistic growth for the invasive species. The model was developed to account for the ecological and economic effects of the management activities. The cost-benefit analysis involved developing a set of economic scenarios that covered a range of options for inventory, treatment budgets, program delay, and discount rates.

Biocontrol was found to be very economically beneficial. Benefit-cost ratios were estimated at $17 gained for every dollar spent on the diffuse knapweed biocontrol program, and over $185 for each dollar spent on hawkweed biocontrol.

If the spread of Scotch broom into neighbouring areas can be prevented, treatment of this invasive species was shown to be economically beneficial. Similarly, with adequate resources for inventory and education, the management of Eurasian watermilfoil also has economic benefits when establishment in new lakes is prevented.

Every dollar spent on diffuse knapweed biocontrol returns approximately $17 in benefits. Biocontrol of hawkweed is expected to produce a return over ten times greater of $185 for each dollar spent.

Recommendations

The report's recommendations are:

1. Efforts should be continued to develop a set of successful bio-agents for hawkweed.

2. Future biocontrol programs should include a plan for evaluation at multiple spatial scales: individual plants, release sites, and both regional and provincial.

3. Further analysis is needed to evaluate the trade-off between releasing less-effective agents sooner and delaying releases until more effective biocontrol agents are discovered.

4. Future participation by the province in the research and development of biocontrol agents undertaken by similar consortia is a worthwhile investment.

5. Ensure that sufficient resources are available for conducting field releases as early as possible in a biocontrol program, without compromising the prevention of non-target effects.

6. Economic evaluation of the cost of invasive plant species should be made prior to the release of biological control agents as a baseline on which success can be evaluated.

7. Standardized monitoring procedures should be developed to track changes in the densities of the target invasive plant, the biological control agents, and the plant community. These data should be made available through regular reports or on websites so that they can be publicly accessible.

8. Efficacy testing should be part of the development of biological control agents to improve the success rate of introduced agents in reducing plant density and to reduce the number of exotic species being introduced.

9. Land management actions, such as grazing management and seeding, are an important component of an invasive plant control program.

10. The management of invasive plants along utility and transportation corridors requires prioritization of corridors that have the potential to impact the surrounding area.

11. A key aspect of a control program against Eurasian watermilfoil is the allocation of resources towards inventory, and education aimed at preventing the infestation of currently un-invaded, but vulnerable, lake systems.

12. More primary research is required into the valuation of damages from invasive plants in BC. As an example, a small research program could be sponsored that would fund student research at the Masters and PhD levels.

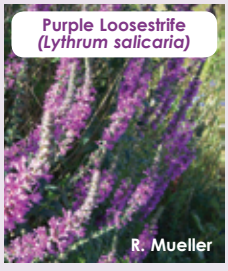
13. The impacts of climate change on the distribution of the important invasive plant species be considered for future analysis.

Species Impacts

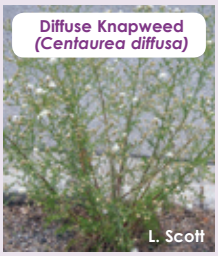
Economic impacts from invasive plants stem from their impacts on the environment. Some examples for each of the seven species in Phase 1 are listed below.

Purple loosestrife invades wetlands and riparian areas. Its impacts include:

- Reducing nesting habitat and forage for waterfowl and songbirds;
- Decreasing forage for ungulates and livestock which decreases hunting and viewing opportunities and revenue to ranchers;

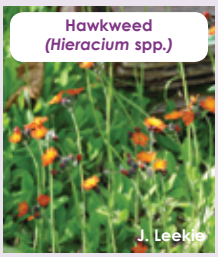


- Clogging habitat for fish spawning and reducing invertebrates that provide food for fish, which affects recreational and commercial fishing; and
- Changing the waterflow of drainage and irrigation ditches.



As an invader of rangelands and disturbed areas, **diffuse knapweed** can:

- Halve the production of nutritious grasses for wildlife and livestock (however, diffuse knapweed can possibly provide some forage value to bighorn sheep and deer);
- Increase surface run-off and decrease infiltration, which can increase the risk of soil erosion and sedimentation of nearby water bodies; and
- Destroy scenic and recreational values in rangelands used for hiking and walking.

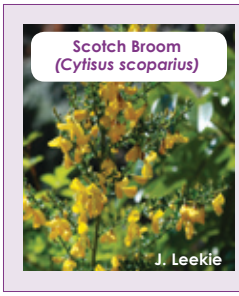


Hawkweed is a very aggressive invader that:

- Outcompetes cultivated grasses in hayfields and conifer seedlings in cutblocks;
- Grows in clonal populations that displace a wide range of native vegetation; and
- Produces a hayfever response in most people, leading to health impacts and associated personal and social costs.

Cheatgrass:

- Outcompetes native perennial grasses and crop species, thus reducing agricultural and rangeland productivity;
- Is highly adapted to fire by producing continuous fine fuels when it establishes and then covering sites completely after fire, leading to a higher fire risk; and
- Significantly reduces habitat for some wildlife species, such as sage grouse.

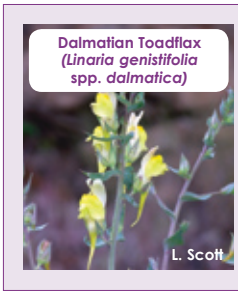


Scotch broom is well-established in coastal British Columbia, and it significantly threatens Garry Oak ecosystems on Vancouver Island and the Gulf Islands. It also:

- Outcompetes native species and reduces forage for wildlife and livestock;
- Restricts or entirely eliminates coniferous reforestation after logging; and
- Affects the soil's nitrogen composition and thus the entire ecosystem.

The only aquatic plant of the seven species is **Eurasian watermilfoil**, which grows in dense mats and can:

- Increase habitat for mosquitoes populations, leading to different risks for humans and animals;
- Reduce habitat quality for waterfowl and some fish species;
- Destroy recreational use of lakeshores for swimming and boating;
- Reduce oxygen levels in the water when the mats of vegetation decay; and
- Clog irrigation pipes and intakes for water supply and power generation.



Dalmatian toadflax:

- Reduces forage yields for wildlife and livestock;
- Contains toxic compounds that affect rangeland productivity and livestock production; and
- Reduces recreational opportunities, including wildlife viewing and hunting.

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