ECONOMIC IMPACTS

Invasive plants result in economic losses and costs to control the invasive plants themselves in order to mitigate further economic losses. An economic analysis of seven invasive species present in B.C. was conducted in 2008 (Frid et al. 2009). The species were: purple loosestrife (*Lythrum salicaria*), diffuse knapweed (*Centaurea diffusa*), hawkweed (*Hieracium* sp.), cheatgrass (*Bromus tectorum*), Scotch broom (*Cystiusscoparious*), Eurasian watermilfoil (*Miriophyllum spicatum*) and Dalmatian toadflax (*Linaria dalmatica*). The analysis stated the values to be underestimates due to a lack of economic data for potential impacts yet concluded:

"Without intervention, the economic damage caused by each one of the selected invasive species was estimated to range from 1 to 20 million dollars in 2008, increasing to between 5 and 60 million dollars by 2020 (based on 2006 Canadian dollars). The total expected damages, in the absence of any management, were estimated to be a minimum of $65 million in 2008, rising to $139 million by 2020."

The analysis further investigated costs for treatment methods of a number of species. As for diffuse knapweed, the analysis concluded:

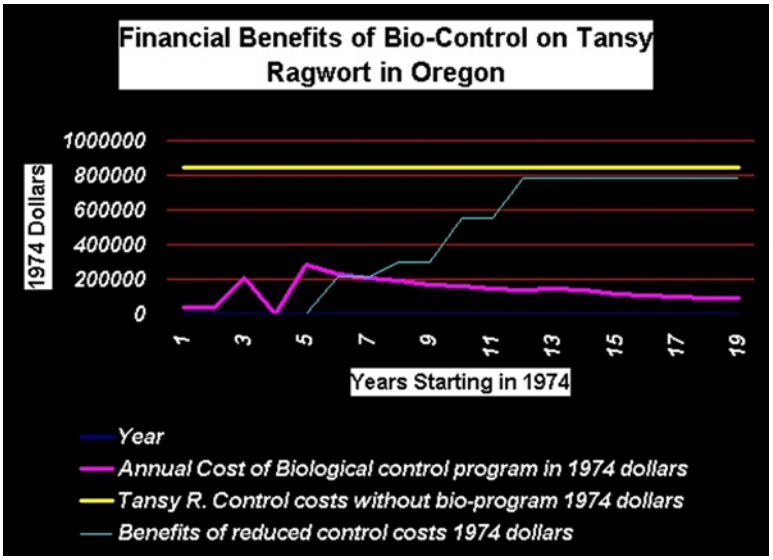
Biological control: "The Net Present Value (NPV) for the program in BC was estimated to be $17.4 million under baseline assumptions, and the Benefit-Cost Ratio (BCR) was 17.0 dollars gained for every dollar spent on the program."
Chemical control: "Based on a treatment budget of $180,000 CDN per year, economic analysis indicates a negative NPV. The BCR fluctuates between 0.78 and 1.05. A negative NPV for the treatment program indicates that the chemical treatment of diffuse knapweed is not economically viable."

Further, in the U.S.A, economic impacts are estimated at:

- In Montana it is estimated the direct and in-direct cost from 3 knapweeds species to be $42 million annually which could support 518 jobs in the state (Sheley and Petroff 1999); and
- In North Dakota, from leafy spurge alone, an estimated $2.9 million annually is lost from wildlife associated recreational expenditures (Sheley and Petroff 1999).

Biocontrol is a long-term solution for management of invasive plants. Over time, other treatment methods become increasingly unnecessary, and may eventually not be needed at all. It is desirable to decrease the amount of herbicide applied to the environment (or potentially applied in the future) and to decrease economic losses and costs for control.

An economic study of tansy ragwort (*Senecio jacobaea*) in Oregon used three biological control agents to help mitigate the economic losses estimated in the millions of dollars due to (among others) decreased forage and cattle death from tansy ragwort poisonings and to decrease the costs necessary to control the invasive plant. The resulting report by Hans Radtke, An Economic Evaluation of Biological Control of Tansy Ragwort, discusses the success of this biological control program. Data from "Table 6 Cost and Net Annual Benefits of Biological Control of Tansy Ragwort in 1974 Dollars" (Radtke 1993) has been plotted to depict the overall economic benefits realized from the biological control of tansy ragwort by the seed fly (*Hylemya seneciella*), the flea beetle (*Longitarsus jacobaeae*) and the cinnabar moth (*Tyria jacobaeae*).



REFERENCES

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. 107 pp.

Radtke, H. 1993. An Economic Evaluation of Biological Control of Tansy Ragwort. Oregon Dept. of Agric. State Weed Board, Oregon, U.S.A.

Sheley, R. L. and J. K. Petroff. 1999. Biology and Management of Noxious Rangeland Weeds. Oregon State Univ. Press, Oregon, U.S.A.