

Cost-benefit Analysis of Control Programmes of Giant Hogweeds in Finland

Antti Miettinen¹, Kauko Koikkalainen¹, Eija Pouta¹, Terhi Rytteri², and Jari Teeriaho²

¹ *Natural Resources Institute Finland (Luke)* ² *Finnish Environment Institute (SYKE)*

Background information

Giant hogweeds (*Heracleum mantegazzianum*, *H. persicum* and *H. sosnowskyi*) are invasive alien species which have negative impacts on ecology, economy and human health. Hence, control programmes are often necessary and economically viable.

Research objectives

The aim of this study was to determine the costs incurred of eradicating or limiting giant hogweeds and the benefits provided by these control measures. The objective was to compare two control programmes in order to select the most efficient one.

Methods

We utilised cost-benefit analyses and examined the performance of two control programmes:

- 1) eradication of giant hogweeds from Finland within the next 20 years and
- 2) maintenance of the current giant-hogweed area.

They were compared to a baseline scenario which describes the current state of this species and its assumed dispersion when no control measures are performed.

Data

According to known occurrences and an estimation based on them, the total number of giant-hogweed sites in Finland is 13,000. The total area occupied by giant hogweeds was estimated to be 1,000 hectares. It was assumed that, without control measures, the number of giant-hogweed sites increases (in the baseline scenario) by 4% and the area under giant hogweeds increases (in the baseline scenario) by 3% annually.

The costs in the control programmes include costs of labour, pesticides, tools, protective equipment, materials, and travel. It was assumed possible to control most of the locations chemically (with glyphosate). Only occurrences in conservation areas and close to waterways must be treated mechanically. The baseline scenario includes no control measures and, thus, no control costs.

The benefits of giant-hogweed control are avoided costs. For the monetary evaluation of the benefits, we identified three benefits: the avoidance of *photodermatitis*, the preservation of the quality of areas used for recreation and the preservation of the conservation values of protected areas.



Photo: Natalia Räikkönen

Results

When the length of the period over which costs and benefits were calculated was 50 years and the annual discount rate was 1%, the results of the cost-benefit analysis indicated that the discounted benefits of programme 1 in which giant hogweeds will be eradicated in 20 years were a bit greater (€3,823,948) than the discounted costs (€3,763,672), that is, the programme is just about beneficial to implement and the money spent on the eradication will be received back 1.02 times.

	Discounted benefits	Discounted costs	Net present value	Benefit-cost ratio
Baseline scenario	-4,353,069	0	-4,353,069	
Control programme 1	3,823,948	3,763,672	60,276	1.02
Control programme 2	2,336,691	3,630,130	-1,293,439	0.64

However, the benefits of control alternative 2 in which the current giant-hogweed area will be preserved were not greater than the costs, and this programme will not be beneficial within the period of 50 years even at the discount rate of 0%.

Conclusions

The eradication of giant hogweeds from Finland within the next 20 years is beneficial if the decision-makers consider the welfare of future generations and if the society has the presence of mind to wait dozens of years for the benefits of the control to be realised.