



Forestry Commission Scotland
Coimisean na Coilltearachd Alba

An approach to prioritising control of rhododendron in Scotland



Scottish Natural Heritage
Dualchas Nàdair na h-Alba

All of nature for all of Scotland
Nàdair air fad airson Alba air fad

Contents

Executive Summary	3
Introduction	3
An approach to rhododendron control	5
Background	5
Objectives of this approach	7
Objective 1: Focus efforts on priority control areas	7
Objective 2: Target entire local populations	8
Objective 3: Ensure effective use of available funds	8
Delivering control in priority areas	10
Financial support	12
Future steps	12
References	12
Appendix 1 – Why is rhododendron a problem for Scotland?	14
It damages the environment	14
It damages livelihoods	15
It harbours plant diseases	15
It spreads quickly	15
Appendix 2 – Identifying priority control areas	17
Appendix 3 - Assessing applications for financial support for rhododendron control	18





Executive Summary

This approach to prioritising control of rhododendron in Scotland will help landowners demonstrate compliance with Scottish legislation on non-native species and reduce the impact of rhododendron in EU Natura Designated sites. Responsibility for the removal of invasive non-native species, such as rhododendron¹, rests with landowners.

The presence of rhododendron is a major cause of designated native woodlands being classified as in unfavourable condition. Therefore the underlying principle of this approach is to target control in designated habitats, using synchronised action at a landscape scale co-ordinated across multiple land holdings. To maximise value for money Scottish Government funds should be targeted towards priority habitats, where control focuses on entire populations of rhododendron, and where best practice control measures are used.

Introduction

This document is aimed at supporting decision makers in Scottish policy-making, funding and landowning organisations, who must decide on where and how funding is committed in order to achieve the successful control of rhododendron in priority habitats and, in the longer term, across Scotland. The success of this approach will be reviewed in 2020.

There are many non-native species in Scotland, although only a small number of these cause damage to the environment, the economy, our health and the way we live. These are called invasive non-native species.

Responsibility for the removal of invasive non-native species, such as rhododendron, rests with landowners.

The presence of rhododendron is a major cause of biodiversity loss in Scotland, particularly on sites designated under the EU 'Habitats Directive'² classified as in unfavourable condition, and in priority native woodland habitats³. It was identified by the Native Woodlands Survey of Scotland as a contributing factor to woodlands being in poor condition.

Rhododendron is the host for two major plant pathogens, **Phytophthora ramorum** and **P kernoviae**, that are both known to infect and kill trees. It also plays an important role in the spread of these pathogens.

Phytophthora ramorum is causing extensive damage and mortality to larch trees and other plants in (mainly) the wetter west of Scotland. Removal of the host plant is considered to be an important element in the control of spread of these pathogens in Scotland and this will be a consideration when prioritising control of rhododendron-infected sites.

The underlying principle of the approach is to prioritise control of rhododendron in designated habitats where the greatest benefit can be gained from synchronised control at a landscape scale and where action can be co-ordinated across multiple land holdings. Scottish Government funds should be targeted towards priority habitats, should control entire populations of rhododendron, and will be expected to follow best practice management techniques. Control of populations on non-priority areas will be considered for funding through the SRDP⁴ competitive grant application process.

Practical planning guidance has been developed to support project officers and land managers when initiating and undertaking an Invasive Non-Native Species control project. It is available at <http://www.nonnativespecies.org/index.cfm?pageid=383>

¹ In this document the problematic invasive wild type of *Rhododendron ponticum* and all its invasive hybrids are referred to simply as rhododendron.

² http://ec.europa.eu/environment/nature/legislation/habitatsdirective/index_en.htm

³ <http://jncc.defra.gov.uk/page-1437>

⁴ <https://www.ruralpayments.org/publicsite/futures/topics/all-schemes/forestry-grant-scheme/>



An approach to rhododendron control

Rhododendron is an invasive non-native species that was deliberately introduced to Scotland by humans and is outwith its native range.

Responsibility for the removal of invasive non-native species, such as rhododendron, rests with landowners. This approach will help landowners demonstrate compliance with relevant legislation.

It is an offence under the [Wildlife and Countryside Act 1981](#)⁵, as amended by the [Wildlife and Natural Environment \(Scotland\) Act 2011](#)⁶, to plant or cause to grow in the wild any plant outwith its native range or to allow a non-native species that is not exempt or licensed to spread into the wild.

Guidance on non-native species, approved by the Scottish Parliament and published by Scottish Government, came into effect on 2 July 2012 ([The Non-Native Species Code of Practice \(2012\)](#)⁷). The Code sets out guidance on how you can act responsibly to ensure that non-native species under your ownership, care, and management do not cause harm to our environment.

To further comply with the Act, landowners are also expected to take reasonable steps to prevent rhododendron from spreading into the wild.

The approach presented here also allows land managers to comply with the UK Forestry Standard Guidelines on Forests and Biodiversity; 2017 to control or remove rhododendron where this is feasible, particularly where collaborative actions are planned to control populations of invasive rhododendron.



Background

Introduced as a garden shrub in the 1800s, rhododendron is regarded as the most invasive and damaging non-native plant in the wild in Scotland (Williamson, 2002). The reasons why rhododendron is a major problem in Scotland are summarised at [Appendix 1](#).

Rhododendron ponticum thrives in the mild and wet conditions typical of the west of Scotland, and can tolerate a range of light levels from full sun to heavy shade. It thrives both in open spaces and closed canopy woodland and is known to live to over 100 years. If left untreated it can eliminate all vegetation growing beneath its canopy, and eventually out-compete nearly all native tree and shrub regeneration.

If invasive rhododendron is left untreated, the potential scale and cost of its control will increase as populations continue to mature, expand and spread into new habitats (Edwards and Taylor, 2008).

It has a high seed output – a mature bush can produce almost 1 million seeds annually – and the seed is very light and readily dispersed for short distances by wind. It can also be carried further afield on animal fur, clothing, vehicles and machinery.

The spread of invasive rhododendron is a widespread issue and the impact of this invasive non-native plant on the habitats of Scotland is increasing in scale and extent. Information on the extent of rhododendron in Scotland is available from several sources. The National Forest Inventory has published preliminary estimates of the presence and extent of rhododendron in British Woodlands within the [Forestry Official Statistics](#)⁹.

⁵ <http://www.gov.scot/Topics/Environment/Wildlife-Habitats/InvasiveSpecies/legislation>

⁶ <http://www.legislation.gov.uk/asp/2011/6/contents>

⁷ <http://www.gov.scot/Publications/2012/08/7367>

⁸ <https://www.forestry.gov.uk/ukfs/biodiversity>

⁹ <https://www.forestry.gov.uk/ukfs/biodiversity>



Information is also available for all native woodland habitats as part of the [Native Woodland Survey of Scotland](#) ¹⁰.

High level summary information of the condition of designated features on protected nature sites is available on the Scotland's Environment web site (<http://www.environment.scotland.gov.uk/get-interactive/data/protected-nature-sites/>). The data can be filtered and presented to show the pressures affecting features and their current condition status.

Evidence strongly suggests that previous control projects have failed to provide the level of control required, because control areas were within re-seeding distance of untreated mature rhododendron populations, and that follow-up control was not sufficiently long-term in approach to ensure re-invasion of the control site did not occur.

Objectives of this approach

This approach has three objectives. They are consistent with the GB Invasive Non-native Species Framework Strategy, the 2020 Challenge for Scotland's Biodiversity, and the Scottish Government's Code on Non-native Species (2012).

Objective 1: Focus efforts on priority control areas

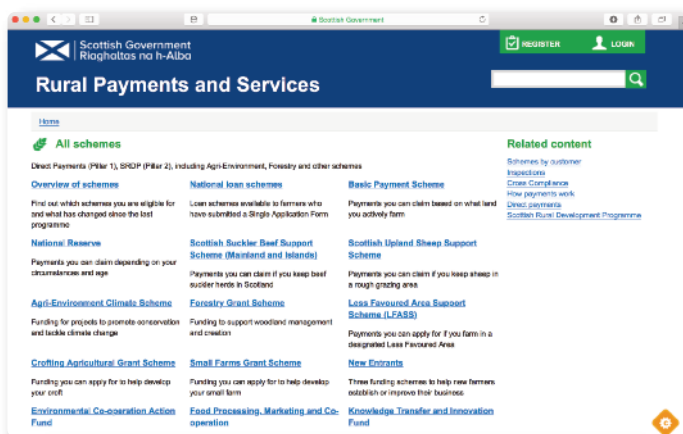
A mapping exercise conducted by Forestry Commission Scotland and Scottish Natural Heritage identified priority control areas as being those of the highest biodiversity value already affected by rhododendron, and/or vulnerable to invasion. Prioritising the removal of rhododendron from these areas will help native habitats and associated features recover to favourable condition, which is a key requirement of the EU Habitats Directive.

A map of priority control areas is given in Figure 1 - the map indicates where co-ordinated control work will give the greatest benefit. [Appendix 2](#) describes the method used to identify these areas.

These will be the highest priority sites for grant aid support for rhododendron control under the Scottish Rural Development Programme (SRDP) 2014-2020, both for woodland and open habitats.

Applications for areas outwith the priority sites will need to make a strong case for being funded (e.g. by including a letter of support from Forestry Commission Scotland or Scottish Natural Heritage). These exceptional cases would include other designated sites that are in unfavourable condition because of rhododendron; or where rhododendron control is needed to maintain favourable condition; or priority habitats outwith the west coast of Scotland Important Plant Area (see [Appendix 1](#)).

Note that rhododendron stands infected with *Phytophthora* are treated as a plant health issue and land managers may be directed to take specific actions under the relevant plant health legislation (<http://scotland.forestry.gov.uk/supporting/forest-industries/tree-health>).



¹⁰ <http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/native-woodland-survey-of-scotland-nwss>



Under certain circumstances bushes in close proximity to Phytophthora-infected larch trees will be considered a priority for control but only if their removal is vital in preventing the spread of phytophthora onto healthy unaffected trees. Cases will be assessed on an individual basis.

Objective 2: Target entire local populations

The most efficient technique to achieve long-term control, reduce the potential for spread into non-infected areas and avoid continued funding control operations is to remove the seed source of an entire local population (Harris et al. 2002).

An entire local population is defined as one or more core areas of mature flowering bushes, usually densely populated, plus a surrounding 150m bush-free buffer zone, i.e. the area outwith which seedlings are unlikely to establish (Harris et al. 2002). In some environments populations are linear in nature, and can

extend for several kilometres e.g. along lochside edges, where locating a surrounding 150 m bush free zone will be problematic. In these cases a pragmatic risk-based approach will be taken, to identify a suitable boundary that can act as the population extent, limiting where possible the risk of reinvasion from mature seeding bushes.

The supplementary guidance for delivering invasive non-native plant control projects explains further the methodology for landscape scale control of entire local populations.

Objective 3: Ensure effective use of available funds

Given the scale of the invasive rhododendron problem, it is likely that there will only be resources available to treat a small proportion of priority sites each year. Therefore to ensure value for money is achieved, this approach prioritises projects that demonstrate sustained control on priority areas (Figure 1) where it will have a lasting benefit.

Additionally, to make a real difference to infected habitats, monitoring and follow-up control efforts must be maintained until local eradication is achieved. Investment of money and effort in rhododendron control should be protected by a sustainable programme of follow-up monitoring and retreatment(s), to ensure that cleared areas are not re-invaded. For more information see the relevant section in [The guidance for delivering invasive non-native plant control projects](#).



Figure 1: Spatial prioritisation map for rhododendron control.



Delivering control in priority areas

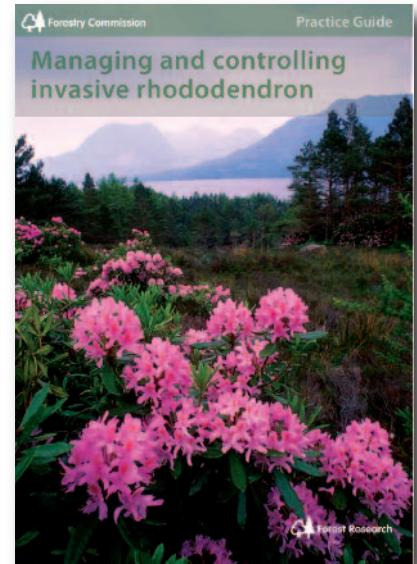
As the lead public bodies for rhododendron control, Forestry Commission Scotland and Scottish Natural Heritage will work together on behalf of Scottish Government to support the control of Rhododendron in priority areas. However, this cannot be achieved without the support and commitment of other organisations, landowners and individuals.

Projects will only be funded if they use the most appropriate control methods for that particular infestation and location. Best practice methods for controlling rhododendron are explained in more detail in the Forestry Commission practice guide '[Managing and controlling invasive rhododendron](#)'.

To support delivery Forestry Commission Scotland and Scottish Natural Heritage will:

- Raise awareness across Scotland's land management and policy-making sectors, non-governmental organisations and the wider public, of the problem of rhododendron and the approach to prioritising and controlling it;
- Work with a range of partners, decision-makers and stakeholders to embed this approach, encouraging them to inform and motivate others, provide opportunities for training and skill-sharing among practitioners, and develop the contractor base in Scotland;
- Focus efforts on promoting effective control work in priority areas, encouraging landowners and project coordinators to be champions within their communities;
- Ensure this approach is embedded on the National Forest Estate and other land managed by Scottish Government on behalf of the people of Scotland;
- Provide clear and consistent advice on complying with relevant legislation;
- Implement a proportionate and risk-based approach to using [Species Control Agreements and Species Control Orders](#)¹¹ to support a coordinated approach to rhododendron control;
- Support continued work to increase our knowledge about the risks posed by rhododendron and research into control methods, so that control efforts are as effective as possible.

The likely roles and responsibilities of others – funders, project co-ordinators, landowners, volunteers, and other public bodies – are outlined in the implementation guide that accompanies this approach.



¹¹ <http://www.gov.scot/Publications/2012/08/7367/9>





Financial support

Rhododendron control is currently funded through the Scottish Rural Development Programme (SRDP) 2014-2020. Relevant packages are the Woodland Improvement Grant of the [Forestry Grant Scheme](#) and the Rhododendron Control option of the [Agri-Environment Climate Scheme](#).

SRDP funding will be targeted to supporting control projects in the priority control areas shown in Figure 1. Projects outwith these target areas may still be deemed eligible for SRDP funding where there is a strong justification endorsed by Scottish Natural Heritage or Forestry Commission Scotland.

There is potential for rhododendron control to be funded by other public and private sources, and ideally this will be determined according to the same criteria as were used to identify the priority control areas of this approach. [Appendix 3](#) outlines a method for assessing funding applications that supports this approach.

Future steps

It is anticipated that future steps will be:

- In the short term (0-5 years), to disseminate best practice information on currently successful rhododendron control projects; and to use the principles behind this approach for controlling other invasive non-native species.
- In the medium term (5-10 years), to secure commitment and resources for the longer term and review the technical knowledge underpinning this approach.

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Appendix 1

Why is rhododendron a problem for Scotland?

It damages the environment

Rhododendron reduces the biodiversity of woodlands, open ground habitats and watercourses. Once established, it casts dense shade and produces poor quality leaf litter, impacting on water quality and reducing invertebrate abundance. In turn this affects fish, amphibian and bird populations. The dense shade will eventually eliminate all ground flora and prevent it from returning.

It can invade peatlands, particularly raised bogs already damaged by drainage, and prevents the vital accumulation of organic matter which forms peat.

Rhododendron is present on many protected nature sites (such as Sites of Special Scientific Interest and Special Areas of Conservation), and some fail to meet their site condition standards as a consequence.

The process of rhododendron displacing native species and modifying habitats is particularly acute in rare and sensitive habitats such as the Atlantic woodlands of oak, ash, hazel and birch on the west coast of Scotland.

The impact of rhododendron on 'Scotland's Rainforest'

The Atlantic woodlands of Scotland's west coast are known as Scotland's Rainforest. These iconic and internationally important woodlands depend on the clean air and mild, moist, oceanic climate of Scotland's western seaboard – making them a cool temperate version of tropical rainforests. They support a unique flora of lichens, mosses and liverworts which are amongst the richest on the planet, and some of which are extremely rare.

Plantlife and their partners have identified the west coast of Scotland as an Important Plant Area (IPA), containing 80 Sites of Special Scientific Interest, 13 Special Areas of Conservation and 5 National Nature Reserves. However, the spread of rhododendron into its woodlands, wet heaths and rocky slopes is a serious threat to this internationally important area. Even after rhododendron clearance by the most sensitive methods, re-colonisation by the rarer species is extremely slow.





It damages livelihoods

Dense stands of rhododendron lower the amenity and recreation value of woodlands, restrict access to the countryside, block path networks and make riverbanks inaccessible for angling.

Rhododendron foliage contains andromedotoxin which is poisonous to mammals if ingested. Therefore established plants cannot be controlled by grazing, and it has no value as fodder. Equally, invasion by rhododendron makes land unsuitable for grazing, significantly reducing the value of grazing land where it is found.

In commercial forestry plantations, rhododendron suppresses the growth of trees and impedes harvesting and restocking operations, leading to increased management costs.

It harbours plant diseases

Rhododendron hosts two known strains of Phytophthora. These pathogens affect a number of shrub and tree species used in commercial forestry, nurseries and horticulture businesses as well those found in private gardens and designated sites. It has a particularly severe impact on larch plantations but there is no known treatment for it.

It spreads quickly

The pernicious growth rate of rhododendron in Scotland means that the cost of controlling it will continue to rise. It is estimated that over £10 million was spent on rhododendron control in Scotland from 2003 to 2013, and yet it continues to spread.





Appendix 2

Identifying priority control areas

To identify priority areas for rhododendron control, a GIS model was created which included the following elements:

Geographical extent

The GIS model covers all native woodlands assessed by the Native Woodland Survey of Scotland (NWSS) and oceanic ravines identified as being important for bryophytes (mosses and liverworts) (Averis, 2012).

Prioritisation scores

Within the GIS model, native woodland polygons and oceanic ravine sites were assigned scores, according to the following weighted criteria:

Conservation designations	
Special Areas for Conservation	10
Sites of Special Scientific Interest	10
Ancient woodland sites	5
Water Framework Directive water bodies	5
Archaeological sites on RCHAMS database	5

Areas containing vulnerable species	
Important Plant Areas (Plantlife)	10
Oceanic bryophyte ravines	10
Red data list lichens and bryophytes	5
Lichens indicative of ecological continuity	5

Risk of rhododendron invasion and spread	
Areas with highly oceanic climate	20
Sites adjacent to, or containing, rhododendron	10
'A' roads and railways	5



The threshold score for inclusion within the initial priority area for control of rhododendron was set at 85 out of 100.



Appendix 3

Assessing applications for financial support for rhododendron control

Control programmes should be focused primarily on the priority control areas (Figure 1) to help bring about full control in these most vulnerable sites. Control programmes elsewhere in Scotland should use the same assessment attributes so that the approach is delivered consistently:

- Does the project encompass a definable local population that is manageable to control? This data can be found from site visits and datasets such as the Native Woodland Survey of Scotland <http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/native-woodland-survey-of-scotland-nwss>
- Are local physical conditions conducive to rhododendron spread, near to a seed source (including private gardens), and upwind / upstream of a dispersal pathway?
- Will the project include a Special Area of Conservation, Site of Special Scientific Interest, Ancient Semi-Natural or Native Woodland, or Important Plant Area? These areas are registered on the SNH Sitelink map (<https://gateway.snh.gov.uk/sitelink/>).
- Will the project encompass a watercourse that is failing good status because of rhododendron? This can be assessed by using data available at <http://www.environment.scotland.gov.uk/get-interactive/data/water-body-classification/>.
- Will it use the most appropriate control methods and be able to secure on-going control and commitment in the area?
- Will it help protect important archaeology and heritage gardens?



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