Indicators and trends

Monitoring climate change adaptation

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Indicator name				Version
NF11/NF12 **Number of forest sites served with a Statutory Plant Health Notice (SPHN) for *Phytophthora ramorum* (*Pr*)** **Area of forest felled under Special Plant Health Notices (SPHNs) for *Phytophthora ramorum* (*Pr*)**				**25/03/16**
Indicator type:	**Risk/opportunity**	**Impact**	**Action**	
			X	

SCCAP Theme	SCCAP Objective	CCRA risk/opportunity
Natural environment	N3: Sustain and enhance the benefits, goods and services that the natural environment provides	FO1: Risk of tree pests and diseases

At a glance

- *Phytophthora ramorum (Pr)* is already the cause of significant damage and mortality to Japanese larch, with European and hybrid larch also affected, especially in south-west Scotland.
- The fungus-like pathogen has spread rapidly in recent years
- Climate change projections of milder, wetter conditions are those under which *Pr* thrives
- This indicator monitors the number of sites served with Statutory Plant Health Notices (SPHNs) for *Pr* and the area of forest felled under such notices
- The worst affected area in Dumfries and Galloway is managed under separate legislation therefore SPHNs do not capture the full magnitude of impacts

Latest Figure

Year	Number of forest sites where a SPHN has been served for *Pr*[1]
2014/15	22

Source: Forestry Commission, 2014

Year	Area of forest felled under SPHNs served for *Pr* (thousand hectares)
2014/15	0.13

Source: Forestry Commission, 2014

Trend

Upward trend in both the number of SPHNs issued for *Pr* and area of forest felled under SPHNs issued for *Pr.*

[1] Note that the number of sites differs from the number of SPHNs issued (see Interpretation of Indicator Trends section).

Why is this indicator important?

Phytophthora ramorum (*Pr*) is a fungus-like pathogen which causes serious damage and mortality to trees and other plants. It thrives in mild and damp conditions such as those found in south-west Scotland (Forestry Commission Scotland, 2014a). Climate change projections suggest that in the future the Scottish climate will be milder and wetter. It is therefore anticipated that the risk of *Pr* infection in forests will increase unless significant adaptation actions are taken in the interim (Forestry Commission, 2015).

Japanese larch, an important timber species in Scotland, is particularly susceptible to *Pr* and can die within one to two seasons (Forestry Commission Scotland, 2014b). *Pr* infected larch represents a risk to biodiversity, as *Pr* can infect other tree species and heath land plants such as blaeberry. Also, important gardens and designed landscapes contain vulnerable plants. *Pr* therefore has economic, environmental and amenity impacts (Forestry Commission Scotland, 2014b).

Since it was first detected in western Scotland in 2010, *Pr* has spread, most significantly in south west Scotland, where it is causing significant damage and mortality to larch trees and other plants.

No cure has been found for *Pr* and there are no effective chemical treatments currently available to treat it. Policies and actions relating to the disease therefore focus on control to prevent or minimise any further spread of *Pr* and the damage it causes. Scientific advice is to remove and kill the living plant tissue on which the organism depends for reproduction. This means infected larch trees should be felled or killed as soon as possible after the disease has been found and before the next spring or autumn when sporulation begins on the needles (Forestry Commission, 2015).

Statutory Plant Health Notices (SPHNs) are issued by the Forestry Commission in *Pr* affected areas and require the felling of infected trees and those in a surrounding buffer zone. SPHNs are part of a suite of biosecurity measures being used to prevent the spread and minimise the impact of *Pr* in Scotland and which are explained in the Forestry Commission Scotland 'Action Plan for Ramorum on Larch in Scotland - 2013/14' (Forestry Commission Scotland, 2014b). The plan aims to 'manage and control the rate of spread of *Pr* on larch to significantly reduce economic impacts to the forestry, nursery and ornamental garden sectors and to protect the health of trees and heathland'. It includes actions on research, detection, precautionary measures, dealing with infected stands, and awareness raising measures. It is part of a Great Britain wide approach to tackling the disease and supports the delivery of DEFRA's Plant Biosecurity Strategy for Great Britain (DEFRA, 2014).

Related Indicators:
NF8 Proportion/area of larch within *Phytophthora ramorum* Risk Zone 1
NF10 Forest area infected by *Phytophthora ramorum*

What is happening now?

During the period 2014/15, 22 forest sites were issued with a SPHN for *Pr* and 0.13 thousand hectares of woodland were felled under these SPHNs (Forestry Commission, 2014).

The extent and rate of spread of *Pr* in Dumfries and Galloway creates an operational challenge for larch clearance and it is no longer considered feasible to use SPHNs for the felling of infected larch in this area. The Plant Health (Forestry) (*Phytophthora ramorum* Management Zone)(Scotland) Order

2014 therefore provides 'special arrangements' for movement of larch within a designated 'Management Zone' (see Figure 1), along with statutory controls on any potentially infectious timber and timber products leaving the area (Forestry Commission Scotland, 2014b). SPHNs continue to be issued for infected larch outwith the Management Zone. In 2014 SPHNs were strengthened to require felling of infected stands of larch and all larch within a 250m buffer zone Forestry Commission Scotland, 2015).

By the end of 2013, an estimated 5000-6000 hectares of larch were infected with *Pr* in Dumfries and Galloway (Forestry Commission Scotland, 2014a).

See Figure 1 for a map of *Pr* outbreaks in Scotland. The map shows sites for which SPHNs have been issued and sites where an infection of *Pr* is suspected.

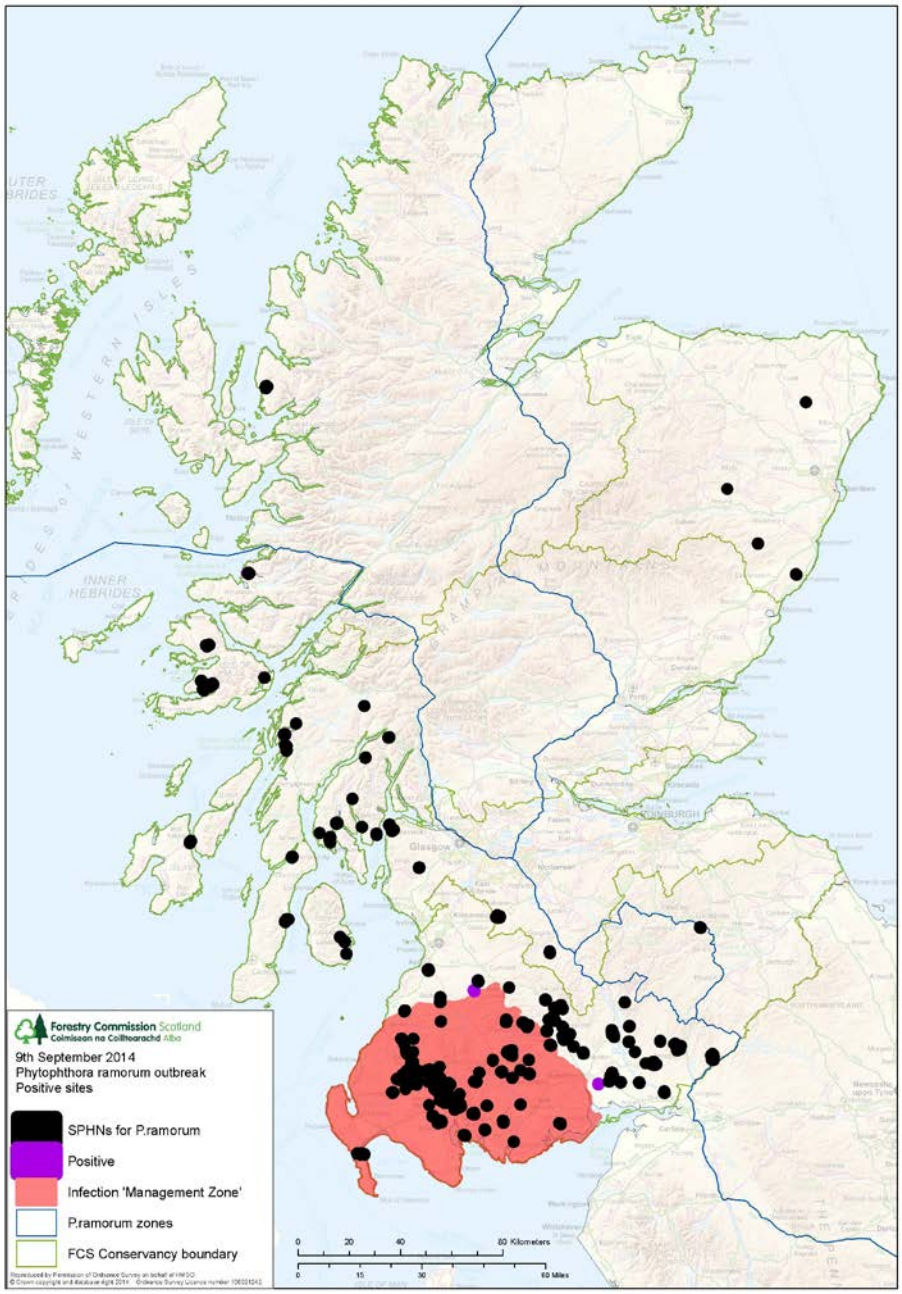

Figure 1: Map of known outbreaks of *Phytophthora ramorum* in Scotland (Source: Forestry Commission Scotland, 2014)

What has happened in the past?

The number of SPHNs issued, and area of forest felled under SPHNs, have both seen as increasing trend since 2010, shown in Tables 1 and 2, although the lower number of new sites served with SPHNs post 2012/13 may indicate a slowing of the spread of *Pr* outside the core infected area in Dumfries and Galloway.

Table 1. Number of forest sites where a SPHN has been served for *Phytophthora ramorum*

Year	Number of forest sites where a SPHN has been served for *Pr*
2010/11	1
2011/12	14
2012/13	123
2013/14	76
2014/15	22

Source: Forestry Commission, 2014; Robertson, 2015

Table 2. Area of forest felled under SPHNs served for *Phytophthora ramorum*

Year	Area of forest felled under SPHNs served for *Pr* (thousand hectares)
2010/11	0.0
2011/12	0.1
2012/13	0.4
2013/14	0.3
2014/15	0.13

Source: Forestry Commission, 2014; Robertson, 2015

What is projected to happen in the future?

As Forestry Commission Scotland have acknowledged that 'eradication of *Ramorum* on larch in Scotland is no longer achievable and the aim now is to contain and slow down new outbreaks' (Forestry Commission Scotland, 2014c); to this end biosecurity measures including SPHNs will continue to be utilised.

There are concerns about the potential *Pr* infection of other species, both in commercial forestry and wider biodiversity. Sitka spruce may be susceptible and a small number of cases have been reported (Forestry Commission, 2015). Shrub species such as rhododendron and viburnum, along with woodland and heathland plants such as blaeberry are all susceptible to *Pr* infection. *Rhododendron ponticum* is of particular concern because of its extent in woodlands, and because *Pr* sporulates (produces spores that can then spread infection to other shrubs and trees) on Rhododendron (Forestry Commission, 2015). There is also concern about infection of blaeberry, due to its ecological importance in heaths and woodland (Forestry Commission, 2015).

Patterns of change

The core area of *Pr* infection is in the south-west of Scotland. Other infected sites are in Argyll and Aberdeenshire (see Figure 1 for a map of *Pr* outbreaks in Scotland).

Interpretation of indicator trends

The increasing number of forest sites where SPHNs are being issued for *Pr* and the increasing area of forest felled under these SPHNs reflects the increasing spread of *Pr* in Scotland between 2010 and 2013 and the increasing scale of actions being taken to try to prevent the spread and minimise the impacts of the disease. The reduction in the number of sites issued with an SPHN for *Pr* and reduction in felling areas under these SPHNs since 2012/13 would suggest that the spread of Pr outwith the core area of infection Dumfries and Galloway has slowed, however the number of new SPHNs issued each year show that it is clearly still a significant problem. As noted below, these figures do not provide information on the extent of action to address the core *Pr* infection in Dumfries and Galloway.

It should be noted that the indicator used here, the number of forest sites where an SPHN has been served, differs from the number of SPHNs issued. This is for various reasons, for example a single SPHN can cover multiple sites, and conversely a single infection and the surrounding buffer zone may give rise to several SPHNs if multiple owners are involved. The number of forest sites is considered to be a better indicator of the spread of *Pr* infection.

Limitations

SPHNs are not being issued to control the felling of larch within the 'Management Zone' in Dumfries and Galloway – the core area of *Pr* infection in Scotland. As such figures relating to SPHNs noted above do not reflect the full scale of action to fell infected larch trees in Scotland. This may contribute towards the lower number of SPHNs issued and smaller area of forest felled under SPHNs in 2013/14 and 2014/15, compared to 2012/13.

References

DEFRA (2014) *Protecting Plant Health – a plant biosecurity strategy for Great Britain, April 2014.* www.forestry.gov.uk/pdf/TreehealthStrategyMinisters.pdf/$FILE/TreehealthStrategyMinisters.pdf (accessed April 2014)

Forestry Commission (2014) *Forestry Statistics 2014*. www.forestry.gov.uk/forestry/infd-7aqdgc (accessed March 2015).

Forestry Commission Scotland (2014a) *Phytophthora ramorum in Scotland*. http://scotland.forestry.gov.uk/supporting/forest-industries/tree-health/phytophthora-ramorum (accessed April 2014)

Forestry Commission Scotland (2014b) *Action Plan for Ramorum on Larch in Scotland.* www.forestry.gov.uk/pdf/FCSACTIONPLANFORRAMORUMONLARCHINSCOTLAND.pdf (accessed March 2015)

Forestry Commission Scotland (2014c) *Latest updates on Phytophthora ramorum*. http://scotland.forestry.gov.uk/supporting/forest-industries/tree-health/phytophthora-ramorum/latest (accessed March 2015)

Forestry Commission Scotland (2015) *Advice and information on Phytophthora ramorum* http://scotland.forestry.gov.uk/supporting/forest-industries/tree-health/phytophthora-

ramorum/advice-and-information (accessed March 2015)

Robertson, P. (Patrick.Robertson@forestry.gsi.gov.uk), 17 April 2015. *CXC forestry indicators on Phytophthora ramorum.* E-mail to R. Monfries (r.monfries@rbge.ac.uk)

Further information

Forestry Commission: www.forestry.gov.uk/pramorum

Forestry Commission Scotland: http://scotland.forestry.gov.uk/supporting/forest-industries/tree-health/phytophthora-ramorum/latest

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Appendix One: Indicator metadata and methodology

Table 1: Indicator metadata

	Metadata
Title of the indicator	NF11: Number of forest sites served with a Statutory Plant Health Notice (SPHN) for *Phytophthora ramorum* (*Pr*). NF12: Area of forest felled under Special Plant Health Notices (SPHNs) for *Phytophthora ramorum* (*Pr*)
Indicator contact: Organisation or individual/s responsible for the indicator	Ruth Monfries (Royal Botanic Garden Edinburgh, CXC)
Indicator data source	Forestry Commission Forest Statistics
Data link: URL for retrieving the indicator primary indicator data.	www.forestry.gov.uk/website/forstats2013.nsf/LUContents/D7DD6DF6687BC57880257A32004E1A4F

Table 2: Indicator data

	Indicator data
Temporal coverage: Start and end dates, identifying any significant data gaps.	2010 - 2014
Frequency of updates: Planned or potential updates	Annual
Spatial coverage: Maximum area for which data is available	Scotland
Uncertainties: Uncertainty issues arising from e.g. data collection, aggregation of data, data gaps	Under-representation of activity in Dumfries and Galloway (the core area of infection)
Spatial resolution: Scale/unit for which data is collected	Site level
Categorical resolution: Potential for disaggregation of data into categories	Not known. Presumably regional.
Data accessibility: Restrictions on usage, relevant terms & conditions	Publically accessible and freely available.

Table 3 Contributing data sources

Contributing data sources Data sets used to create the indicator data, the organisation responsible for them and any URLs which provide access to the data.
Forestry Commission data, presented in Forestry Statistics 2014 www.forestry.gov.uk/website/forstats2013.nsf/LUContents/D7DD6DF6687BC57880257A32004E1A4F

Table 4 Indicator methodology

Indicator methodology The methodology used to create the indicator data
N/A