European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the species:

S1528 - Marsh saxifrage (*Saxifraga hirculus*)

SCOTLAND

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Scotland information only)**
1.2 Species code	**1528**
1.3 Species scientific name	**Saxifraga hirculus**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Marsh saxifrage

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2010-2017
2.3 Distribution map	Yes
2.4 Distribution map Method used	Complete survey or a statistically robust estimate
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	No	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	No
	c) regulation of the periods and/or methods of taking specimens	No
	d) application of hunting and fishing rules which take account of the conservation of such populations	No
	e) establishment of a system of licences for taking specimens or of quotas	No
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	No
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

BSBI Distribution Database
Commissioned research - unpublished report. Genetic work by A. Finger, Royal Botanic Garden Edinburgh 2017 (field work in 2016).
Communications of the species promoted by Plantlife Scotland. Source Plantlife Scotland.

5. Range

5.1 Surface area (km²)

5.2 Short-term trend Period

5.3 Short-term trend Direction

Increasing (+)

5.4 Short-term trend Magnitude

a) Minimum

b) Maximum

5.5 Short-term trend Method used

Complete survey or a statistically robust estimate

5.6 Long-term trend Period

5.7 Long-term trend Direction

5.8 Long-term trend Magnitude

a) Minimum

b) Maximum

5.9 Long-term trend Method used

5.10 Favourable reference range

a) Area (km²)
b) Operator
c) Unknown
d) Method

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5.11 Change and reason for change in surface area of range	Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data
5.12 Additional information	Since 2013 two new, geographically distinct, sites have been discovered. Both sites are relatively large in extent. This is as a result of non-specific target surveys in remote upland areas and related to surveys for the next Atlas. Surveyors have been targeting areas which have not been visited previously. It is possible that further sites for Saxifraga hirculus could be discovered in the future.

6. Population

6.1 Year or period	2005-2016	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	13
6.3 Type of estimate	Minimum	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of localities (localities)
	b) Minimum	6
	c) Maximum	
	d) Best single value	
6.5 Type of estimate	Best estimate	
6.6 Population size Method used	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2005-2016	
6.8 Short-term trend Direction	Unknown (x)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Insufficient or no data available	
6.11 Long-term trend Period		
6.12 Long-term trend Direction		
6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.14 Long-term trend Method used		
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method	
6.16 Change and reason for change in population size	Improved knowledge/more accurate data	

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The change is mainly due to: Improved knowledge/more accurate data

6.17 Additional information	The six general localities are: Pentland Hills, Grampian (includes a planted site in a separate 10km square - included as the genetic source is from Grampian), Caithness east, Caithness west (new for the 2013 report), Monoliath (new for the 2019 report) and Fealar (new for the 2019 report).Localities support sub-populations within discrete flushes. Including the introduced site there are 13 occupied 1km squares. Excluding the introduced site there are 12 occupied 1km squares. The known population is considered to be 'stable', the number of new localities likely reflecting new survey effort. The true population (and therefore trend) is unknown due to insuffient data (localities may be undiscovered). The preliminary results of a genetic survey by RBGE suggest that the total number of genetic individuals is very small at some sites. Counting the ramets may not therefore provide a good indication about genetic fitness at each site. It is hoped that the results of the genetic study will be published in due course.

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	Yes
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Yes
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on expert opinion with very limited data	
7.3 Short-term trend Period	2005-2016	
7.4 Short-term trend Direction	Increasing (+)	
7.5 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information	Habitat condition is available through SAC condition reporting and site visits to SSSIs by SNH staff. RBGE noted any particular threats such as over-grazing for all sites visited in 2017. There was one site which exhibted signs of intense grazing on the supporting flushes. Even if stock numbers are low these areas are preferentially grazed. Grazing exclosures were erected on that site leaving one occupied flush as a control. It might therefore be expected that habitat condition in the short term is increasing at that site.	

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Intensive grazing or overgrazing by livestock (A09)	H
Extensive grazing or undergrazing by livestock (A10)	H

Threat	Ranking
Intensive grazing or overgrazing by livestock (A09)	M

Extensive grazing or undergrazing by livestock (A10)	M

8.2 Sources of information	scm - 2007 - Craigengar, survey by RBGE in 2016 scm - 2015 Hill of Towanreef, survey by RBGE in 2016
8.3 Additional information	Overgrazing at at Craigengar SAC has been addressed using grazing exclosures. Overgrazing is not reported from either Hill of Towanreef SAC or Caithness and Sutherland Peatlands SAC. At both new sites found during this reporting period and each of which is outwith a SAC neither over grazing nor undergrazing was recorded. Undergrazing has been reported as a threat at Hill of Towanreef SAC, but not at Craigengar SAC or Caithness and Sutherland Peatlands SAC (2 localities well separated). At Craigengar SAC care will be required to ensure that undergrazing does not pose a threat within grazing exclosures. At both new sites, each of which is outwith a SAC neither over grazing nor undergrazing was recorded.

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	Yes
	b) Indicate the status of measures	Measures identified and taken
9.2 Main purpose of the measures taken	Increase the population size and/or improve population dynamics (improve reproduction success, reduce mortality, improve age/sex structure) (related to 'Population')	
9.3 Location of the measures taken	Only inside Natura 2000	
9.4 Response to the measures	Short-term results (within the current reporting period, 2013-2018)	

9.5 List of main conservation measures

Maintain existing extensive agricultural practices and agricultural landscape features (CA03)
Stop mowing, grazing and other equivalent agricultural activities (CA06)
Reinstate appropriate agricultural practices to address abandonment, including mowing, grazing, burning or equivalent measures (CA04)

9.6 Additional information	There is no current indication that invasive non-native species are a direct threat at the existing six locations. Invasive non-native species do present an indirect threat e.g. Mimulus species could occupy the same habitat as Saxifraga hirculus. Awareness of invasive non-native species is greater now than it was in 2013. It is likely that invasive non-native species would be identified and reported more quickly than in 2013. BSBI for example has been encouraging volunteers to record non-native species, and which are considered to be under-recorded.

10. Future prospects

10.1 Future prospects of parameters	a) Range	Good
	b) Population	Good
	c) Habitat of the species	Good
10.2 Additional information		

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11. Conclusions

11.1. Range	Favourable (FV)
11.2. Population	Favourable (FV)
11.3. Habitat for the species	Favourable (FV)
11.4. Future prospects	Favourable (FV)
11.5 Overall assessment of Conservation Status	Favourable (FV)
11.6 Overall trend in Conservation Status	Improving (+)
11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data b) Overall trend in conservation status Improved knowledge/more accurate data The change is mainly due to: Improved knowledge/more accurate data
11.8 Additional information	

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	10
12.2 Type of estimate	Best estimate	
12.3 Population size inside the network Method used	Complete survey or a statistically robust estimate	
12.4 Short-term trend of population size within the network Direction	Stable (0)	
12.5 Short-term trend of population size within the network Method used	Complete survey or a statistically robust estimate	
12.6 Additional information	There are an additional three 1km squares occupied outwith the Natura 2000 network in Scotland. One of the three additional squares represents an introduced population.	

13. Complementary information

13.1 Justification of % thresholds for trends	
13.2 Trans-boundary assessment	

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13.3 Other relevant Information	Ongoing surveillance has located two new locations increasing the conservation status and implying a trend upwards. Both new locations are outwith the Natura 2000 network. The implied trend upward is unlikely to be real since the populations had likely been present previously but undetected. There are six general localities for marsh saxifrage in Scotland. At the Grampian general locality one of the sub-populations has been introduced using plants from Grampian populations. This introduced site was not surveyed during the reporting period 2013-2018. In Scotland there are 13 occupied 1km squares of which 1 contains the introduced population. The 2016 survey by RBGE found that there are a minimum of 87 genotypes in Scotland of which a minimum of 35 genotypes are out with the Natura 2000 network. The two Caithness general localities account for 46 genotypes. The number of genotypes at the Pentland and Grampian sites is very small and could have conservation implications. Within the Natura network concern had been expressed about high grazing levels at one site. This site has had grazing exclosures erected around all sub-populations except one which has no fencing to act as a control.

Distribution Map

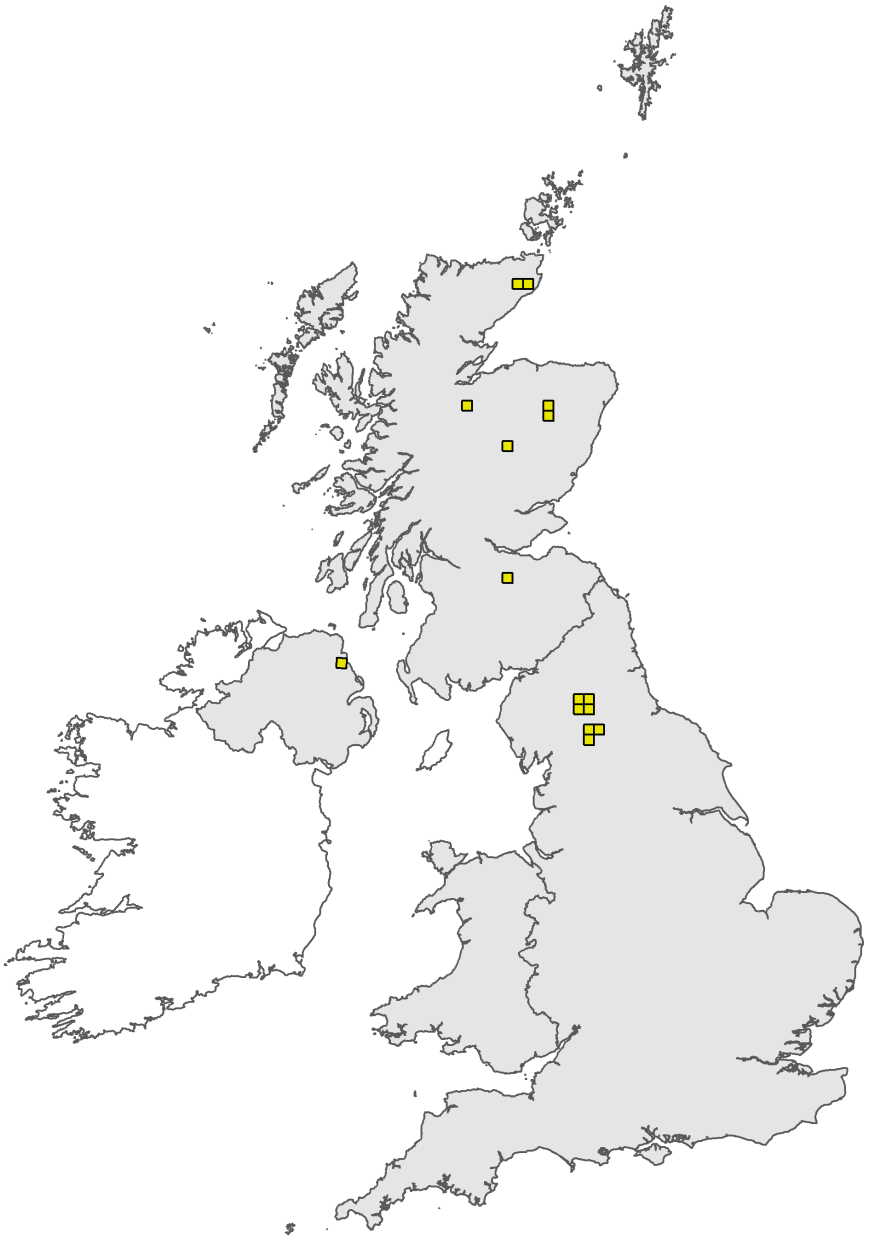

Figure 1: UK distribution map for S1528 - Marsh saxifrage (*Saxifraga hirculus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

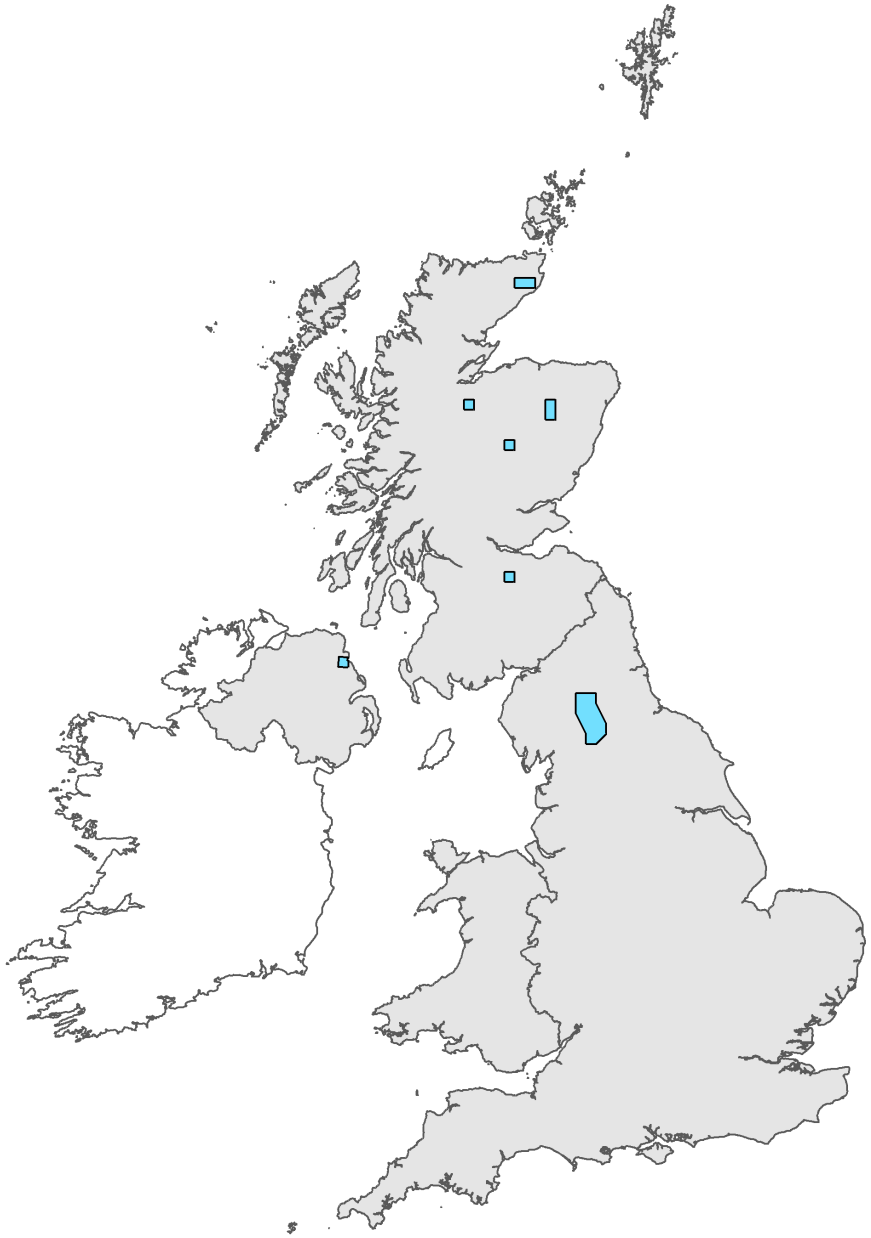

Figure 2: UK range map for S1528 - Marsh saxifrage (*Saxifraga hirculus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 20km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Saxifraga hirculus (1528)

Field label	Note
2.3 Distribution map	The introduced site at Towie (NJ41) is treated as within native range. The species was translocated with conservation purpose using plants from the extant Grampian sites.

Species name: Saxifraga hirculus (1528) Region code: ATL

Field label	Note
5.12 Additional information	Since 2013 two new, geographically distinct, sites have been discovered. Both sites are relatively large in extent. This is as a result of non-specific target surveys in remote upland areas and related to surveys for the next Atlas. Surveyors have been targeting areas which have not been visited previously. It is possible that further sites for Saxifraga hirculus could be discovered in the future.
6.2 Population size	There are six native localities most of which contain several sub-populations. The localities are: Pentland, Grampian, Caithness east, Caithness west, Monoliaths and Fealar. In addition to supporting native populations, one of the six localities, Grampian, contains a single introduced site, Towie. The introduced site increases both the number of occupied 10km and 1km squares by one. The introduced site is included within the Grampian locality as the founding genetic source is from Grampian. The most recent available information for the introducedTowie site predates the start of Article 17 reporting making the Towie site data deficient. The Caithness populations are treated as two localities as they are several km apart. One Caithness locality is to the east of a main Trunk road and the other is to the west of the Trunk road. At the last Article 17 reporting round there were a total of four native localities all of which contain several sub-populations. Since the last Article 17 report was produced two new native localities have been found, each of which is geographically separated from any of the other known localities. The two new localities are Monoliath and Fealar. The total number of occupied 1km squares considered to be native is 12. The total number of occupied 1km squares for this reporting period is 13 to include the introduced population at Towie.
6.8 Short term trend; Direction	The population estimates use differing methodologies making conclusions regarding population trend uncertain. The trend for the four localities addressed by the previous round of Article 17 reporting appears most likely to be stable as there is not evidence of an increase or decrease and the number of sub-populations is static. There is evidence to suggest a heavy grazing impact at the Pentland locality and grazing exclosures have been recently erected to address that issue. For the purpose of this round of Article 17 reporting the trend is assessed as unknown. An assessment of unknown has been assigned as there has not been long term surveillance at the two new sites and whilst it is most likely that the best studied sites are stable there is little empirical evidence to support that conclusion. The discovery of two new sites also introduces the possibility that there are or have been additional sites which we are unaware about. This introduces a further unknown regarding the population or range trend at a Scottish level.

6.16 Change and reason for change in population size	The six general localities are: Pentland Hills, Grampian, Caithness east, Caithness west (new for the 2013 report), Monoliath (new for the 2019 report) and Fealar (new for the 2019 report). Localities support sub-populations within discrete flushes. The known population is considered to be stable, the number of new localities likely reflecting new survey effort. The true population (and therefore trend) is unknown due to insuffient data (localities may be undiscovered). The preliminary results of a genetic survey by RBGE suggest that the total number of genetic individuals is very small at some sites. Counting the ramets may not therefore provide a good indication about genetic fitness at each site. It is hoped that the results of the genetic study will be published in due course.
7.5 Short term trend; Method used	Habitat condition is available through SAC condition reporting and site visits to SSSIs by SNH staff. RBGE noted any particular threats such as over-grazing for all sites visited in 2017. There was one site which exhibted signs of intense grazing on the supporting flushes. Even if stock numbers are low these areas are preferentially grazed. Grazing exclosures were erected on that site leaving one occupied flush as a control. It might therefore be expected that habitat condition in the short term is increasing at that site.
8.3 Additional information	Undergrazing is a threat at Hill of Towanreef SAC, but not at Craigengar SAC or Caithness and Sutherland Peatlands SAC (2 localities well separated). At both new sites, each of which is outwith a SAC neither over grazing nor undergrazing was recorded. Previous threats posed by forest expansion and drainage are no longer considered to be a threat due to improved awareness of conservation and/ or changing agricultural/ sporting practices.
9.6 Additional information	There is no current indication that INNS are a direct threat at the existing six locations. INNS do present an indirect threat e.g. Mimulus species could occupy the same habitat as Saxifraga hirculus. Awareness of INNS is greater now than it was in 2013. It is likely that INNS would be identified and reported more quickly than in 2013. BSBI for example has been encouraging volunteers to record non-native species, and which are considered to be under-recorded.
10.1 Future prospects of parameters	Although the future of the habitat is likely to be stable over most locations, at the site in the Pentland Hills with grazing exclosures it is hoped that there will be habitat improvement.
10.1 Future prospects of parameters	The population is likely to remain largely stable, but hopefully with some improvement at the Pentland site with grazing exclosures. The future trend has however been assigned unknown because it is possible that new sites could be found, thereby increasing the population. There is therefore a degree of uncertainty (in a positive direction).
11.5 Overall assessment of Conservation Status	In Scotland the status is favourable and improving. At the Pentland Hills site concern about overgrazing has been addressed using fencing. It is hoped that this will reduce grazing pressure. The improvement is however largely as a result of new knowledge. For the 2013 report a new location had been rediscovered (west Caithness). For the current report two new sites have been found well away from the closest known site. It is possible that further sites might be found.
12.1 Population size inside the pSCIs, SCIs and SACs network	In addition to the 10 occupied 1km squares in the Natura 2000 network in Scotland, there are a further three occupied 1km squares out with the Natura 2000 network. Of these three squares, one square (Towie) is an introduced population.

12.1 Population size inside the pSCIs, SCIs and SACs network	Although the reporting unit is 1km square, RBGE conducted an assessment of area occupied by ramets at each site in Scotland in 2016. RBGE also estimated the number of genotypes. The extent survey by eye was conducted by botanical experts. The area is the extent of the populations and not the extent of the apparently suitable habitat. The minimum total area of ramets within SAC sites within Scotland was estimated as 631 m2. The minimum figure for extent is presented as not all known flushes at Craigengar SAC were visited IN 2016. The predicted extent of those populations in flushes not visited is low. The number of genotypes recorded within SAC sites in Scotland is 52. It is possible that some genotypes were missed so the figure is presented as a minimum. The extent of ramets out with SAC sites in Scotland is a minimum of 330 m2. The number of genotypes in Scotland out with SAC sites is 35 (minimum).