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:

S1395 - Petalwort (Petalophyllum ralfsii)

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.
### National Level

#### 1. General information

<table>
<thead>
<tr>
<th>1.1 Member State</th>
<th>UK (Scotland information only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2 Species code</td>
<td>1395</td>
</tr>
<tr>
<td>1.3 Species scientific name</td>
<td>Petalophyllum ralfsii</td>
</tr>
<tr>
<td>1.4 Alternative species scientific name</td>
<td></td>
</tr>
<tr>
<td>1.5 Common name (in national language)</td>
<td>Petalwort</td>
</tr>
</tbody>
</table>

#### 2. Maps

<table>
<thead>
<tr>
<th>2.1 Sensitive species</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2 Year or period</td>
<td>2015-2016</td>
</tr>
<tr>
<td>2.3 Distribution map</td>
<td>Yes</td>
</tr>
<tr>
<td>2.4 Distribution map Method used</td>
<td>Complete survey or a statistically robust estimate</td>
</tr>
<tr>
<td>2.5 Additional maps</td>
<td>No</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>b) Statistics/quantity taken</th>
<th>Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Season/year 1</td>
</tr>
<tr>
<td>Min. (raw, ie. not rounded)</td>
<td></td>
</tr>
<tr>
<td>Max. (raw, ie. not rounded)</td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>No</td>
</tr>
</tbody>
</table>

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

3.5. Additional information

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

British Bryological Society. 2018. Database to the end of 2017 (available via the NBN)

5. Range

5.1 Surface area (km²)
5.2 Short-term trend Period
5.3 Short-term trend Direction

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

5.4 Short-term trend Magnitude
a) Minimum
b) Maximum

5.5 Short-term trend Method used
c) Unknown

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
c) Confidence interval
b) Maximum
a) Minimum

5.10 Favourable reference range
a) Area (km²)
b) Operator
c) Unknown
d) Method

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

6. Population

6.1 Year or period
1974-2015

6.2 Population size (in reporting unit)
a) Unit
b) Minimum
c) Maximum
d) Best single value
number of map 1x1 km grid cells (grids1x1)

6.3 Type of estimate
Best estimate

6.4 Additional population size (using population unit other than reporting unit)
a) Unit
b) Minimum
c) Maximum
d) Best single value
number of localities (localities)

6.5 Type of estimate
Best estimate

6.6 Population size Method used
Based mainly on extrapolation from a limited amount of data

6.7 Short-term trend Period
2007-2017

6.8 Short-term trend Direction
Unknown (x)

6.9 Short-term trend Magnitude
a) Minimum
b) Maximum

6.10 Short-term trend Method used
Based mainly on extrapolation from a limited amount of data

6.11 Long-term trend Period
1998-2017

6.12 Long-term trend Direction
Unknown (x)

6.13 Long-term trend Magnitude
a) Minimum
b) Maximum
Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

6.14 Long-term trend Method used
Based mainly on extrapolation from a limited amount of data

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

6.17 Additional information

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)?
No
b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?
No

7.2 Sufficiency of area and quality of occupied habitat Method used
Based mainly on extrapolation from a limited amount of data

7.3 Short-term trend Period
2007-2018

7.4 Short-term trend Direction
Uncertain (u)

7.5 Short-term trend Method used
Insufficient or no data available

7.6 Long-term trend Period

7.7 Long-term trend Direction

7.8 Long-term trend Method used

7.9 Additional information

8. Main pressures and threats

8.1 Characterisation of pressures/threats

<table>
<thead>
<tr>
<th>Pressure</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive grazing or overgrazing by livestock (A09)</td>
<td>H</td>
</tr>
<tr>
<td>Extensive grazing or undergrazing by livestock (A10)</td>
<td>M</td>
</tr>
<tr>
<td>Reseeding of grasslands and other semi-natural habitats (A13)</td>
<td>M</td>
</tr>
<tr>
<td>Tillage practices (e.g. ploughing) in agriculture (A15)</td>
<td>M</td>
</tr>
<tr>
<td>Application of natural fertilisers on agricultural land (A19)</td>
<td>H</td>
</tr>
<tr>
<td>Agricultural activities generating diffuse pollution to surface or ground waters (A26)</td>
<td>M</td>
</tr>
<tr>
<td>Sports, tourism and leisure activities (F07)</td>
<td>M</td>
</tr>
<tr>
<td>Accumulation of organic material (L03)</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Threat</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intensive grazing or overgrazing by livestock (A09)</td>
<td>H</td>
</tr>
</tbody>
</table>
Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

10. Future prospects

10.1 Future prospects of parameters
a) Range Poor
b) Population Poor
c) Habitat of the species Poor

10.2 Additional information

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

11. Overall assessment of Conservation Status

11.1. Range
11.2. Population
11.3. Habitat for the species
11.4. Future prospects
11.5 Overall assessment of Conservation Status
11.6 Overall trend in Conservation Status
11.7 Change and reasons for change in conservation status and conservation status trend

13. Complementary information

13.1 Justification of % thresholds for trends
13.2 Trans-boundary assessment
13.3 Other relevant Information

11.5 Overall assessment of Conservation Status

No change

The change is mainly due to:

11.6 Overall trend in Conservation Status

No change

The change is mainly due to:

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

12.2 Type of estimate

Minimum

Based mainly on extrapolation from a limited amount of data

Uncertain (u)

Insufficient or no data available

12.3 Population size inside the network Method used

On the basis of 1-km records alone we would say that the short term trend is an increase, as reported in section 6. However, this would only be due to increased survey effort and does not reflect the threats and concerns about future prospects for the two 2015 discoveries in the North Uist Machair SAC. On balance we prefer to say there is uncertainty.

12.4 Short-term trend of population size within the network Direction

Uncertain (u)

Insufficient or no data available

12.5 Short-term trend of population size within the network Method used

On the basis of 1-km records alone we would say that the short term trend is an increase, as reported in section 6. However, this would only be due to increased survey effort and does not reflect the threats and concerns about future prospects for the two 2015 discoveries in the North Uist Machair SAC. On balance we prefer to say there is uncertainty.

12.6 Additional information
Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)
Figure 1: UK distribution map for S1395 - Petalwort (*Petalophyllum ralfsii*). 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.
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.
Species name: Petalophyllum ralfsii (1395)

Field label | Note
---|---
2.2 Year or Period | The liverwort was discovered in Scotland at Achnahaird in 1974 with the most recent record being 2016 with regular recording between these dates. However, because the additional monads were only discovered in 2015, the map would look the same irrespective of whether the date range 1974-2017 or 2015-2016 is used (2008 was the last record in the previous reporting period). 2015-2016 has been given here since all records within the current reporting period were made in this range and this data covers the entire known population in Scotland.

Species name: Petalophyllum ralfsii (1395) Region code: ATL

Field label | Note
---|---
5.3 Short term trend; Direction | The data indicate that the range has increased in Scotland, however, this is entirely due to extensive and targeted survey at potential new sites for the liverwort so the true trend is reported as unknown. There is a high risk that this newly defined range will decrease given the fragility of the newly discovered western locations. This is reflected in future prospects however and not recorded as a decline here.

5.11 Change and reason for change in surface area of range | SNH commissioned surveys during the winters of 15/16 and 16/17 focussed on known habitat characteristics outwith the then known range of this liverwort (Uists, Harris, Lewis, Colonsay, Coll and Tiree). The survey focussed on large areas of humid dune slack and resulted in the discovery of three new 1-km square records from two localities in the Uists; one on the island of Baleshare and the other on the island of Berneray. Very little suitable habitat was found elsewhere in the survey area despite an extensive search.

6.1 Year or Period | As 2.2

6.4 Additional population size | The number of individual thalli recorded at Achnahaird SAC in the 2008 SCM report was used in the previous reporting period. However, we now know that at any one time plants may be buried (but not dead) or have lost above-ground parts due to seasonal desiccation. For example, Site Condition Monitoring at Achnahaird SAC in autumn 2014 reported the absence of any thalli at a location where it was abundant previously. A follow-up visit in spring 2015, after sand had been blown off the population, estimated in excess of 1000 plants at the same location. It is likely that the population of below-ground perennating organs is more stable but we do not have a means of measuring their numbers other than by repeat visits to produce a cumulative population count. Estimates of individuals, as recorded above-ground, are no longer thought to be a meaningful way to describe the population site.

6.8 Short term trend; Direction | The data shows an increase in 1-km square records over the short-term period. However, this is entirely due to extensive and targeted survey at potential new sites for the liverwort so the true trend is reported as unknown. Given the very small number of plants in poor habitat within the newly discovered occupied 1-km squares, it is likely that similar degraded habitat has been lost elsewhere during the reporting period and that these new locations will be lost in the near future. This is reflected in future prospects however and not recorded as a decline here.

6.9 Short term trend; Magnitude | Magnitude calculated by dividing the number of occupied 1-km squares between 2013-2017 (4) by the number of 1-km squares occupied between 2007-2012 (1).

6.10 Short term trend; Method used | Given the inability to survey all of the species' range within each reporting period the survey cannot be said to be complete.
6.12 Long term trend; Direction
The data shows an increase in 1-km square records over the short-term period. However, this is entirely due to extensive and targeted survey at potential new sites for the liverwort so the true trend is reported as unknown. Given the very small number of plants in poor habitat within the newly discovered occupied 1-km squares, it is likely that similar degraded habitat has been lost elsewhere during the reporting period and that these new locations will be lost in the near future. This is reflected in future prospects however and not recorded as a decline here.

6.13 Long term trend; Magnitude
Magnitude calculated by dividing the number of occupied 1-km squares between 2007-2017 (4) by the number of 1-km squares occupied between 1995-2006 (1).

7.1 Sufficiency of area and quality of occupied habitat
We have responded 'no' to this question because of the lack of suitable habitat resulting in very small and apparently isolated populations in the Outer Hebrides. The lack of habitat here is likely due to traditional machair management resulting in poaching and dung impacts from cattle and control of rabbit populations to favour vascular plant features. Most areas at these sites were considered unsuitable but it is hard to imagine such isolated populations could have persisted for long periods with such small numbers, which suggest the area of suitable habitat was greater in the past and needs to be greater in the future for these western populations to persist. The quality of occupied habitat within Achnahaird SAC continues to be in good condition for the liverwort, as reported in 2013.

7.2 Sufficiency of area and quality of occupied habitat; Method used
Extensive survey of humid dune slack H2190 in western Scotland, which is the most likely broad habitat for the liverwort, found that most of this habitat did not have the correct micro-habitat characteristics. The proposed reasons are outlined in audit 8.1. In addition, and as reported in the 2013 report for H2190, there has been a trend towards dune system stability throughout north west Europe and losses to developments such as golf courses.

7.4 Short term trend; Direction
The H2190 habitat report will provide information on the status of the broad habitat but contains insufficient information on which to allocate a trend in the micro-habitat and processes required to support the liverwort. The trend has been assessed as 'Uncertain' because the factors restricting the extent of suitable habitat are still operating so decline is more likely than not.

8.1 Characterisation of pressures/ threats
Pressures and threats differ between Achnahaird SAC, where the species appears to be in good condition, and at the two new localities discovered in 2015 (see 5.11 and 9.5 audit notes). At Achnahaird SAC the main threats are likely to be under-grazing if sheep are not maintained on the site. Following survey of the Uists, Harris, Lewis, Colonsay, Coll and Tiree between 2015-2017, surveyor Nick Hodgetts noted that 'Most dune systems, especially on Coll and Tiree, are (now) unsuitable for P. ralfsii, being too heavily grazed and subject to heavy nutrient loading resulting in eutrophication of ground water and an increasingly organic component in the soil. This in turn leads to wet slacks being dominated by coarse vegetation with Calliergonella cuspidata dominant in the bryophyte layer. Most dune hummocks are dry, dominated by plants such as marram grass, with large common mosses such as Homalothecium lutescens, Rhytidiadelphus spp. and Syntrichia ruralis var. ruraliformis dominant in the bryophyte layer. Some sites are very intensively managed, with disturbance by vehicles, ploughing for cultivation, seaweed spreading for fertilisation, high stocking levels and much winter feed input.' And further 'Overall there was a strong impression that some sites may have deteriorated since the BBS visited them in 1992, with (for example) species such as Amblyodon dealbatus, Catosciopium nigritum and Meesia uliginosa now rare or absent, possibly due to increasingly intensive machair management. However, species other than P. ralfsii were not actively searched for, and some of them may be more visible later in the year, when producing sporophytes'.
| 9.5 List of main conservation measures | Within Achnahaird SAC Petalophyllum appears to be doing well with at least a stable population as the plot level. Monitoring is required here to assess the longer-term impacts of change in land use from campsite and grazing to grazing only. Negative impacts caused by recreational disturbance are likely to be negligible, but require continued monitoring. Detailed conservations measures are being developed for the Achnahaird Natura Plan. The two recently discovered populations, and assessment of potential habitat on other western Scotland islands, paint a less favourable picture (see 8.1 audit). The selected measures are required to improve habitat suitability for the liverwort. However, this may be difficult due to conflicting traditional management requirements for Machair and a long-history of grazing and fertilizer management. Recovery would likely take many decades but experimental approaches should be investigated e.g. removal of nutrient enriched surface soil. Cattle grazing should be replaced by sheep and rabbit grazing at known sites if there is to be any chance of avoiding continued decline. |
| 10.1 Future prospects of parameters | While it is difficult to measure the rate of decline in habitat suitability at the Uist sites, the habitat appears to be deteriorating and currently supports a very small population based on thallus counts. It is likely that these populations will be lost at some point in the near future, reducing the range in Scotland back to the single large population at Achnahaird. This will also result in loss of 1-km square occupancy, so the population and habitat for the species will likely decline. The prospects are poor because there is unlikely to be a significant change in management in the Uists. |
| 12.4 Short term trend of the population size within the network; Direction | On the basis of 1-km square population units, the population is stable at Achnahaird SAC. However, there is not enough information about the trend in 1-km squares within North Uist Machair SAC over the reporting period to confidently provided a trend here. For this reason the overall assessment is 'uncertain'. |