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

Conservation status assessment for the species:

S1395 - Petalwort (*Petalophyllum ralfsii*)

UNITED KINGDOM

IMPORTANT NOTE - PLEASE READ

- The information in this document represents 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.
- It is based on supporting information provided by the geographically-relevant Statutory Nature Conservation Bodies, which is documented separately.
- The 2019 Article 17 UK Approach document provides details on how this supporting information contributed to the UK Report and the fields that were completed for each parameter.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Maps showing the distribution and range of the species are included (where available).
- Explanatory notes (where provided) are included at the end. These provide additional audit trail information to that included within the UK assessments. Further underpinning explanatory notes are available in the related country-level reports.
- 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; and/or (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species).
- The UK-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.

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NATIONAL LEVEL

1. General information

1.1 Member State	**UK**
1.2 Species code	**1395**
1.3 Species scientific name	**Petalophyllum ralfsii**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Petalwort

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2013-2018
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

England
British Bryological Society, 2018. Database to the end of 2017.
Blockeel, T.L., Bosanquet, S.D.S., Hill, M.O. & Preston, C.D. 2014. Atlas of British & Irish Bryophytes. Pisces Publications, Newbury.
Stribley, M.J. 2018. Monitoring Survey for Petalwort Petalophyllum ralfsii at selected sites in Devon and Cornwall 2017/ 2018. Report for Freshwater Habitats Trust.
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Callaghan, D. 2013. Section 41 bryophytes of the Sefton Coast, Merseyside. Unpublished report to Natural England.
Holyoak, D. 2006. Petalophyllum ralfsii species dossier, Plantlife International.
Cox, J.H.S. 2017. Survey for Petalophyllum ralfsii at Dawlish Warren on 28.2.17. Unpublished report of field visit by Natural England.
Scotland
Hodgetts, N.H. 2017. Surveillance of Petalophyllum ralfsii in the Hebrides - 2016/17: summary. Unpublished report to SNH.
Hodgetts, N.H. 2016. Surveillance of Petalophyllum ralfsii in the Uists - 2015/16. Unpublished report to SNH.
Rothero, G.P. 2003. Site dossier for bryological interest: Achnahaird Bay SSSI. Unpublished report to SNH.
Hodgetts, N.G. 2015. Third cycle Site Condition Monitoring report for bryological interest: Achnahaird SSSI/SAC. Scottish Natural Heritage Commissioned Report 881
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2nd cycle. Achnahaird SSSI. Inverness, Scottish Natural Heritage (unpublished report).
Genney, D.R. and McSorley, C.A. In prep. Exploring the range limits of the scarce liverwort Petalophyllum ralfsii in Scotland.
British Bryological Society. 2018. Database to the end of 2017 (available via the NBN)
Hodgetts, N.H. and Genney, D. R. 2013 - 2016. Surveillance of priority bryophytes in Scotland: Petalophyllum ralfsii. Unpublished report to SNH.
Wales
BLOCKEEL, T.L., BOSANQUET, S.D.S., HILL, M.O. & PRESTON, C.D., 2014, Atlas of British and Irish bryophytes. Pisces Publications, Newbury
BOSANQUET, S.D.S. 2012a. Supporting information for Countryside Council for Wales submission on Petalophyllum ralfsii
BOSANQUET, S.D.S. 2012b. Dune bryophytes at Brownslade Burrows, Castlemartin Range SSSI. Unpublished CCW report
BOSANQUET, S.D.S. 2015a. Dune mosses and liverworts on Laugharne - Pendine Burrows SSSI revised 2015. Unpublished NRW report
BOSANQUET, S.D.S. 2015b. Section 42 bryophytes (Bryum calophyllum, B. warneum and Meesia uliginosa) at Tywyn Aberffraw. Unpublished NRW report
CALLAGHAN, D.A. 2014. Bryophyte survey of Newborough Warren - Ynys Llanddwyn. Anglesey. Unpublished report to NRW
CALLAGHAN, D.A. 2017a. Bryophyte survey and assessment of Morfa Dyffryn NNR. Unpublished report to NRW
CALLAGHAN, D.A. 2017b. Bryophyte survey and assessment of Morfa Harlech NNR. Unpublished report to NRW
DUNNE, H., JESSOP, A., STEVENSON, P. & TOWNSEND, N. 2017. Petalophyllum ralfsii (Petalwort) Monitoring at Ynyslas NNR, Ceredigion, 2017. Aberystwyth University MSc Thesis
HOLYOAK, D.T. 2002. Petalwort Petalophyllum ralfsii: Report to Plantlife on work carried out in England and Wales during 2001 and 2002. Countryside Council for Wales/English Nature Contract Report
NEWTON, M.E. 2012. GRONANT DUNES AND TALACRE WARREN S.S.S.I.: PETALOPHYLLUM RALFSII RE-MONITORING. Unpublished report to Countryside Council for Wales
WESTWOOD, S., WOODMAN, J.P., WILKINSON, K. & LUDLOW, D. 2014. Petalophyllum ralfsii survey Merthyr Mawr 27th November 2014. Unpublished NRW report
WILKINSON, K. 2018a. Summary of Petalophyllum monitoring 2013 to 2018. NRW internal report
British Bryological Society database, accessed 6th February 2018
N.Ireland
Atherton, I., Bosanquet, S., and Lawley, M. 2010. Mosses and Liverworts of Britain and Ireland- a field guide. British Bryological Society, Plymouth.
CHURCH, J.M., HODGETTS, N.G., PRESTON, C.D. & STEWART, N.F. 2001. British Red Data Books mosses and liverworts. Joint Nature Conservation Committee.
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Holyoak, D.T. 2003. The distribution of bryophytes in Ireland. An annotated review of the occurrence of liverworts and mosses in the Irish vice-counties based mainly on the records of the British Bryological Society. Dinas Powys, Vale of Glamorgan: Broadleaf Books.
Holyoak, D.T. 2006. Progress towards a species inventory for conservation of

bryophytes in Ireland. Biology and Environment, Proceedings of the Royal Irish Academy 106B (3): 225-236.
Lockhart, B., Hodgetts, N. & Holyoak, D. (2012). Rare and threatened bryophytes of Ireland. National Museums Northern Ireland Publication No 028.
NIEA. Unpublished surveys and reports. Various years

5. Range

5.1 Surface area (km²)	2605.88	
5.2 Short-term trend Period	2007-2018	
5.3 Short-term trend Direction	Stable (0)	
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	Approximately equal to (≈)
	c) Unknown	
	d) Method	The FRP is the same as in 2013 and is approximately equal to the current population. An FRP operator has been used because it has not been possible to calculate the exact FRP. The FRP is considered to be large enough to maintain a viable population and is no less than when the Habitats Directive came into force in the UK. For further details see the 2019 Article 17 UK Approach document.
5.11 Change and reason for change in surface area of range	No change	
	The change is mainly due to:	
5.12 Additional information		

6. Population

6.1 Year or period	1974-2018	
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	43
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	
	c) Maximum	

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	d) Best single value	25
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	2007-2018	
6.8 Short-term trend Direction	Decreasing (-)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Based mainly on extrapolation from a limited amount of data	
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	 More than (>) The FRP is the same as in 2013 and is no more than 25% above the current population. An FRP operator has been used because it has not been possible to calculate the exact FRP value. For further information see the 2019 Article 17 UK Approach document.
6.16 Change and reason for change in population size	Genuine change Improved knowledge/more accurate data The change is mainly due to:	 Genuine change
6.17 Additional information	In 2013 the species population was reported as 26 localities declining to 25 localities in 2019. This small decrease at the UK-scale masks intra-country variation. In Wales the number of localities has reduced from 17 localities in 1995 to 11 localities in 2019, whilst improved survey has lead to an increase in localities reported in Scotland.	

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (for long-term survival)?	No
	b) Is there a sufficiently large area of unoccupied habitat of suitable quality (for long-term survival)?	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	Decreasing (-)	

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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	Petalwort is closely associated with sand dunes in the UK and requires compacted substrates with low vegetation. Much of the occupied habitat is becoming more closed, with increasing vascular plant growth and reducing abundance of Petalwort.

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Extensive grazing or undergrazing by livestock (A10)	M
Agricultural activities generating air pollution (A27)	M
Other invasive alien species (other then species of Union concern) (I02)	M
Mixed source air pollution, air-borne pollutants (J03)	M
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H
Sea-level and wave exposure changes due to climate change (N04)	M

Threat	Ranking
Extensive grazing or undergrazing by livestock (A10)	M
Agricultural activities generating air pollution (A27)	H
Other invasive alien species (other then species of Union concern) (I02)	M
Mixed source air pollution, air-borne pollutants (J03)	M
Natural succession resulting in species composition change (other than by direct changes of agricultural or forestry practices) (L02)	H
Sea-level and wave exposure changes due to climate change (N04)	M

8.2 Sources of information	
8.3 Additional information	

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')

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9.3 Location of the measures taken	Both inside and outside Natura 2000
9.4 Response to the measures	Medium-term results (within the next two reporting periods, 2019-2030)
9.5 List of main conservation measures	

Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)
Reduce/eliminate air pollution from agricultural activities (CA12)
Reduce/eliminate soil pollution from agricultural activities (CA14)
Prevent conversion of (semi-) natural habitats into forests and of (semi-)natural forests into intensive forest plantation (CB01)
Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (CF02)
Management, control or eradication of other invasive alien species (CI03)
Reduce impact of mixed source pollution (CJ01)
Management of habitats (others than agriculture and forest) to slow, stop or reverse natural processes (CL01)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters	a) Range	Poor
	b) Population	Bad
	c) Habitat of the species	Bad
10.2 Additional information	Petalwort is a very small and low-growing species that is vulnerable to a range of threats, in particular being out-competed by coarser vegetation. It is declining in parts of the UK and the habitat appears to be deteriorating. There is danger of it being lost from several sites. Future trend of Range is Very Negative - decreasing >1% (more than one percent) per year on average; Future trend of Population is Negative - decreasing <=1% (one percent or less) per year on average; and Future trend of Habitat for the species is Very negative - important deterioration. For further information on how future trends inform the Future Prospects conclusion see the 2019 Article 17 UK Approach document.	

11. Conclusions

11.1. Range	Favourable (FV)
11.2. Population	Unfavourable - Inadequate (U1)
11.3. Habitat for the species	Unfavourable - Bad (U2)
11.4. Future prospects	Unfavourable - Bad (U2)
11.5 Overall assessment of Conservation Status	Unfavourable - Bad (U2)
11.6 Overall trend in Conservation Status	Deteriorating (-)

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11.7 Change and reasons for change in conservation status and conservation status trend	a) Overall assessment of conservation status Genuine change Improved knowledge/more accurate data The change is mainly due to: Genuine change b) Overall trend in conservation status Genuine change Improved knowledge/more accurate data The change is mainly due to: Genuine change
11.8 Additional information	Conclusion on Range reached because: (i) the short-term trend direction in Range surface area is stable; and (ii) the current Range surface area is approximately equal to the Favourable Reference Range Conclusion on Population reached because: (i) the short-term trend direction in Population size is decreasing by 1% per year or less; and (ii) the current Population size is not more than 25% below the Favourable Reference Population. Conclusion on Habitat for the species reached because: (i) the area of occupied and unoccupied habitat is not sufficiently large and (ii) the habitat quality is not adequate for the long-term survival of the species; and (iii) the short-term trend in area of habitat is decreasing. Conclusion on Future prospects reached because: (i) the Future prospects for Range are unknown; (ii) the Future prospects for Population are poor; and (iii) the Future prospects for Habitat for the species are bad. Overall assessment of Conservation Status is Unfavourable-bad because one or more of the conclusions is Unfavourable-bad. Overall trend in Conservation Status is based on the combination of the short-term trends for Range - stable, Population - decreasing, and Habitat for the species - decreasing.

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: 38
12.2 Type of estimate	Minimum
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	Decreasing (-)
12.5 Short-term trend of population size within the network Method used	Based mainly on extrapolation from a limited amount of data
12.6 Additional information	

13. Complementary information

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13.1 Justification of % thresholds for trends

13.2 Trans-boundary assessment

13.3 Other relevant Information

Distribution Map

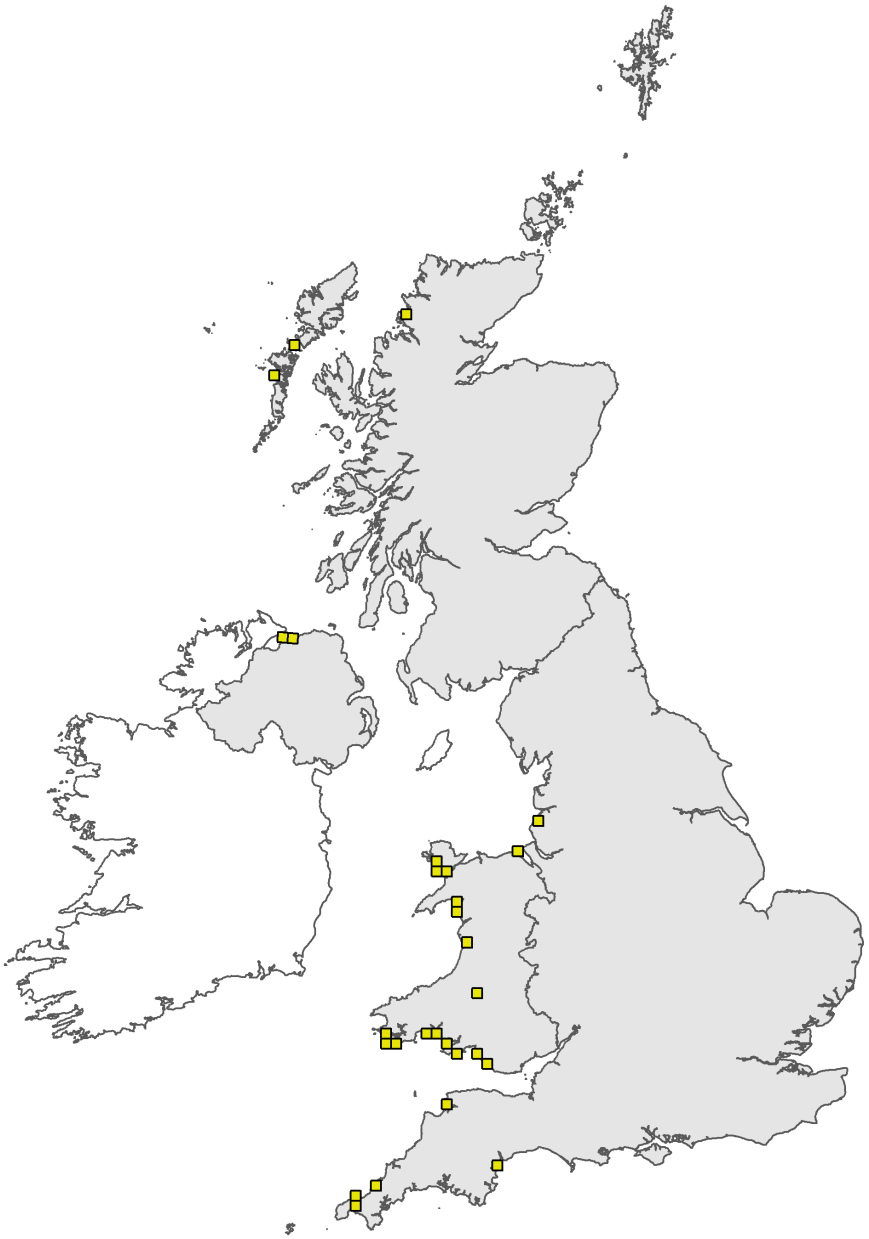

Figure 1: UK distribution map for S1395 - Petalwort (*Petalophyllum ralfsii*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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.

Range Map

Figure 2: UK range 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 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.