

**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:

S2492 - Vendace (*Coregonus albula*)

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	2492
1.3 Species scientific name	<i>Coregonus albula</i>
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Vendace

2. Maps

2.1 Sensitive species	No
2.2 Year or period	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

Adams CE, Lyle AA, Dodd JA, Bean CW, Winfield IJ, Gowans ARD, Stephen A & Maitland PS. 2014. Translocation as a conservation tool: case studies from rare freshwater fishes in Scotland. *The Glasgow Naturalist* 26: 17-24.

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Coyle S & Adams CE 2011. Development of a methodology for the assessment of the quality of vendace spawning substrate and its application to sites in Scotland and northern England. Scottish Natural Heritage Commissioned Report 308.

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Harrod C. 2011. Characterising the trophic ecology and habitat use of vendace using stable isotope analysis. Scottish Natural Heritage Commissioned Report 282.

Lyle AA & Adams CE 2016. Assessing the presence of vendace in Dubh (Black) Loch, 2016. Report to Scottish Natural Heritage.

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Maitland, PS 2004 Keys to the Freshwater Fish of Britain and Ireland with notes on their distribution and ecology . Freshwater Biological Association , Scientific Publication No. 62, 245pp.

Maitland PS 2007. Scotland's Freshwater Fish; Ecology Conservation and Folklore. Trafford: Victoria, BC.

Maitland PS & Lyle, AA 1990. Practical conservation of British fishes: current action on six declining species. Journal of Fish Biology (Suppl. A) 1, 25-54.

Maitland PS, Lyle AA & Winfield IJ 2003. Survey of vendace in Daer Reservoir and Loch Skene. Report by Fish Conservation Centre to English Nature. English Nature Contract No. EIT 34-01-006.

Maitland PS, Lyle AA, Winfield IJ & Fletcher JF. 2011. Vendace in Loch Earn. Scottish Natural Heritage Commissioned Report 284.

Maitland PS & Lyle AA. 2013. Ex situ and in situ approaches, including assisted reproduction, for the conservation of native species of charr (Salmonidae) and whitefish (Coregonidae) in Scotland. International Zoo Yearbook 47: 129-139.

Winfield IJ, Fletcher JM & Lyle AA. 2011. Assessment of the vendace refuge population of Loch Skeen. Scottish Natural Heritage Commissioned Report 281.

Winfield IJ, Adams CE, Bean CW, Durie NC, Fletcher JM, Gowans AR, Harrod C, James JB, Lyle AA, Maitland PS, Thompson C & Verspoor E. 2012. Conservation of the vendace (*Coregonus albula*), the U.K.'s rarest freshwater fish. Advances in Limnology 63: 547-559.

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Winfield IJ, Adams CE & Fletcher JM 1996. Recent introductions of the ruffe (*Gymnocephalus cernuus*) to three United Kingdom lakes containing *Coregonus* species. Annales Zoologici Fennici 33, 459-466.

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6.7 Short-term trend Period	1998-2017
6.8 Short-term trend Direction	Increasing (+)
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate
6.11 Long-term trend Period	1997-2017
6.12 Long-term trend Direction	Increasing (+)
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	Genuine change The change is mainly due to: Genuine change
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)? 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	Complete survey or a statistically robust estimate	
7.3 Short-term trend Period	2005-2017	
7.4 Short-term trend Direction	Stable (0)	
7.5 Short-term trend Method used	Complete survey or a statistically robust estimate	
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information	There are no long-term changes to the distribution of habitats occupied by native populations of vendace - the last native population (Mill Loch, nr. Lochmaben in Dumfriesshire) became extinct in the late 1960's. Since 1998 vendace have been established in three locations (Loch Skeen, Loch Earn and Daer Reservoir).	

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8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Agricultural activities generating point source pollution to surface or ground waters (A25)	M
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M
Forestry activities generating pollution to surface or ground waters (B23)	M
Land, water and air transport activities generating pollution to surface or ground waters (E05)	M
Management of fishing stocks and game (G08)	H
Introduction and spread of species (including alien species and GMOs) in freshwater aquaculture (G24)	H
Physical alteration of water bodies (K05)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	H
Increases or changes in precipitation due to climate change (N03)	H

Threat	Ranking
Agricultural activities generating point source pollution to surface or ground waters (A25)	M
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	M
Forestry activities generating pollution to surface or ground waters (B23)	M
Land, water and air transport activities generating pollution to surface or ground waters (E05)	M
Management of fishing stocks and game (G08)	H
Introduction and spread of species (including alien species and GMOs) in freshwater aquaculture (G24)	H
Physical alteration of water bodies (K05)	M
Temperature changes (e.g. rise of temperature & extremes) due to climate change (N01)	H
Increases or changes in precipitation due to climate change (N03)	H

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

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9.2 Main purpose of the measures taken	Expand the current range of the species (related to 'Range')
9.3 Location of the measures taken	Only outside 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	

Reduce/eliminate point pollution to surface or ground waters from agricultural activities (CA10)
Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)
Reduce impact of hydropower operation and infrastructure (CC04)
Reducing the impact of (re-) stocking for fishing and hunting, of artificial feeding and predator control (CG03)
Control/eradication of illegal killing, fishing and harvesting (CG04)
Early detection and rapid eradication of invasive alien species of Union concern (CI01)
Management, control or eradication of established invasive alien species of Union concern (CI02)
Management, control or eradication of other invasive alien species (CI03)
Adopt climate change mitigation measures (CN01)
Reinforce populations of species from the directives (CS01)
Improvement of habitat of species from the directives (CS03)

9.6 Additional information	Native populations of this species have been lost and those which are now present in Loch Skeen , Loch Earn and Daer Reservoir have been introduced there as part of a deliberate series of conservation actions. Initially these were carried out under the SNH Species Action Initiative, and latterly by the five-year Species Action Framework (see Bean et al. (2016) for an overview). Ruffe and other species native to the UK (such as roach) present a risk to vendace in other parts of its UK range (Bassenthwaite Lake and Derwentwater) and it is important to prevent their introduction to newly established Scottish sites. Further spread of ruffe and other non-native species (both non-native to the UK or to individual catchments/waterbodies) to new sites is now regulated by the Salmon and Freshwater Fish (Scotland) Act 2003. Water quality and the overall aquatic environment are protected through WFD-led domestic legislation. Vendace are protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended)
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10. Future prospects

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

11. Conclusions

11.1. Range
11.2. Population
11.3. Habitat for the species
11.4. Future prospects

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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

a) Overall assessment of conservation status

No change

The change is mainly due to:

b) Overall trend in conservation status

No change

The change is mainly due to:

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
- b) Minimum
- c) Maximum
- d) Best single value

12.2 Type of estimate

12.3 Population size inside the network Method used

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

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

12.6 Additional information

13. Complementary information

13.1 Justification of % thresholds for trends

13.2 Trans-boundary assessment

No relevant

13.3 Other relevant Information

Distribution Map



Figure 1: UK distribution map for S2492 - Vendace (*Coregonus albula*). 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 S2492 - Vendace (*Coregonus albula*). 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 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: *Coregonus albula* (2492)

Field label	Note
2.4 Distribution map; Method used	In the British Isles the freshwater fish species vendace has been known to occur in only four lakes. Two of these are in Scotland, the Castle and Mill Lochs in Dumfriesshire and two are in England, Bassenthwaite Lake and Derwent Water in Cumbria. These original Scottish sites (in the Castle and Mill lochs (Dumfriesshire)) are now extinct and were lost in the 20th century. The Castle Loch population became extinct in 1911 and the Castle Loch population was lost in the 1960's. Several attempts have been made to re-establish vendace in Scotland, although the original sites remain unsuitable for the survival of this species. Adams et al. (2014) and Lyle & Maitland (2013) provide reviews. New vendace populations have become established in Loch Skeen (Maitland et al., 2003) and Loch Earn (Lyle & Adams, 2017) as well as Daer Reservoir (Adams & Lyle, 2017). The Loch Sleen and Loch Earn populations were established using fish obtained from Bassenthwaite Lake. The Daer Reservoir population was established using fish from Derwentwater (Cumbria).
3.5 Additional information	No commercial or sporting (recreational) fishery exists for this species in Scotland. Occasional reports of angler caught fish are received, although these fish, protected under Schedule 5 of the Wildlife & Countryside Act 1981, are returned.

Species name: *Coregonus albula* (2492) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	All sites (all of which are from translocated sites) were surveyed, using the methodology of Bean (2003), over the period 2016-2018. The success of an additional translocation to Loch Valley was assessed in 2017 and no evidence of successful recruitment was discovered. However, as for Loch Earn and Daer Reservoir, fish are difficult to detect at low density and it is possible that some fish may remain. In the previous cycle report, the existence of vendace in Daer Reservoir population was not confirmed, despite intensive survey. Successful evidence of recruitment was discovered there in 2017 (see Adams & Lyle, 2018).
6.2 Population size	Based on actual survey (Adams et al., 2017; Lyle & Adams, 2017; Adams & Lyle, 2017). Hydroacoustic (fish density) data was only available from Loch Skeen although the presence of vendace was confirmed in Loch Earn and Daer Reservoir.
7.9 Additional information	There are no long-term changes to the distribution of habitats occupied by native populations of vendace - the last native population (Mill Loch, nr. Lochmaben in Dumfriesshire) became extinct in the late 1960's. Since 1998 vendace have been established in three locations (Loch Skeen, Loch Earn and Daer Reservoir).
8.1 Characterisation of pressures/ threats	This previously extinct species is now known to be established in three waterbodies in Scotland. Invasive fish and plant species are known to be a risk within lakes where this species is still known to be naturally extant and these pose a significant risk to any newly established Scottish populations. Fish introductions are controlled under legislation (Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003). Water quality, particularly issues which lead to sedimentation in spawning substrates, constitute a further risk to all sites, although it is not considered to be a current issue in any of the Scottish sites. Climate change is an issue which affects all native freshwater fish species in Scotland - particularly because freshwater fish may have little or no access to alternative habitats. A review of vendace in Scotland and conservation action is provided by Bean et al. (2016).

8.3 Additional information	The key pressures for vendace are climate change, competition and predation by introduced species and habitat quality (influenced by climate, water quality, sedimentation), macrophyte encroachment into littoral spawning areas and water abstraction (e.g. drawdown at inappropriate times (such as spawning and incubation) in populations established in reservoirs).
9.6 Additional information	Native populations of this species have been lost and those which are now present in Loch Skeen , Loch Earn and Daer Reservoir have been introduced there as part of a deliberate series of conservation actions. Initially these were carried out under the SNH Species Action Initiative, and latterly by the five-year Species Action Framework (see Bean et al. (2016) for an overview). Ruffe and other species native to the UK (such as roach) present a risk to vendace in other parts of its UK range (Bassenthwaite Lake and Derwentwater) and it is important to prevent their introduction to newly established Scottish sites. Further spread of ruffe and other non-native species (both non-native to the UK or to individual catchments/waterbodies) to new sites is now regulated by the Salmon and Freshwater Fish (Scotland) Act 2003. Water quality and the overall aquatic environment are protected through WFD-led domestic legislation. Vendace are protected under Schedule 5 of the Wildlife & Countryside Act 1981 (as amended).
10.2 Additional information	The future prospects for vendace are likely to be good, based on the fact that the species was formerly extinct and has now been successfully introduced to three new sites.