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:

S6353 - Whitefish (*Coregonus lavaretus*)

ENGLAND

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 (England information only)**
1.2 Species code	**6353**
1.3 Species scientific name	**Coregonus lavaretus Complex**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Whitefish

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	Based mainly on extrapolation from a limited amount of data
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

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

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

Schelly are not directly exploited as a quarry species for recreational angling in England. It is possible that they could be captured as bycatch when fishing for other freshwater fish species, however, they have specific protection under Schedule 5 of the wildlife and Countryside Act 1981 and general protections from fishery activity under the Salmon and Freshwater Fisheries Act 1975. Number of adults would be used, however, no recording unit available due to no national requirement for catch returns to be submitted and specific targeting of schelly being illegal.

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

Burgess, A, Goldsmith, B and Goodrich, S. 2014. Interpretation of Water Framework Directive Macrophyte Data for CSM Condition Assessment. Project Reference No: 25552. Report to Natural England.
Common Standards Monitoring Guidance for Freshwater Fauna 2015
Common Standards Monitoring Guidance for Freshwater Lakes 2015
Davies, C., Shelley, J., Harding, P., McLean, I., Gardiner, Ross & Peirson, G. 2004. Freshwater Fishes in Britain. The species and their distribution. Harley Books.
Etheridge, E.C. 2009: Aspects of the conservation biology of Coregonus lavaretus in Britain. PhD thesis University of Glasgow.
Hewitt, S. M. & Winfield, I. J. 2013. Location of whitefish (Coregonus lavaretus) spawning grounds using Eurasian otter (Lutra lutra) spraints and prey remains. Advances in Limnology, 64, pg.333-343.
Joint Nature Conservation Committee. 2013. Third Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2007 to 2013
Mainstone, C., Hall, R. & Diak, I. 2016. A narrative for conserving freshwater and wetland habitats in England. Natural England Research Reports, Number 064
Mainstone, C.P. 2016. Developing a coherent narrative for conserving freshwater

and wetland habitats: experiences in the UK. WIRES Water, published Online: Nov 07 2016. DOI: 10.1002/wat2.1189.
Maitland, P.S. & Campbell, R.N. 1992 Freshwater Fishes of the British Isles. HarperCollins
Rosch, R. & Schmid, W. 1996. Ruffe (Gymnocephalus cernuus), newly introduced into Lake Constance: preliminary data on population biology and possible effects on whitefish (Coregonous lavaretus). Ann. Zool. Fennici 33 467-471
Winfield, I. J., Fletcher, J. M. & James, J. B. 2015. Fish assessments in support of lakes tour. Final report. Centre for Ecology and Hydrology (Unpublished)
Winfield, I.J., Bean, C.W. , Gorst, J. , Gowans, A.R.D. , Robinson, M. & Thomas, R. 2011. Assessment and conservation of whitefish (Coregonus lavaretus (L.)) in the U.K. Advanc. Limnol. 64. P305-321.
Winfield, I. J., Fletcher, J. M. & James, J. B. 2010. Rare Fish Monitoring Final Report. Report to Natural England and Environment Agency (Unpublished).
Winfield, I.J., Fletcher, J.M. & James, J.B. 2011. Monitoring of the schelly of Haweswater April 2010 to March 2011. Final Report to United Utilities (Unpublished)
Winfield, I.J., Fletcher, J.M. & James, J.B. 2009. Monitoring of the schelly of Haweswater April 2009 to March 2010. Final Report to United Utilities (Unpublished)
Winfield, I. J., Fletcher, J. M. & James, J.B. 2008. Monitoring of the schelly of Haweswater, April 2008 to March 2009. Final Report. To United Utilities (Unpublished)
Winfield, I.J., Fletcher, J. M. & James, J.B. 2007. Monitoring of the schelly of Haweswater, April 2007 to March 2008. Final Report. To United Utilities (Unpublished)
Winfield, I. J., Fletcher, J.M. & James, J. B. 2006. Monitoring of the schelly of Haweswater, April 2006 to March 2007. Final Report. To United Utilities (Unpublished)
Winfield, I. J., Fletcher, J.M. & James, J.B. 2005. Monitoring of the schelly of Haweswater, April 2005 to March 2006. Final Report. To United Utilities (Unpublished)

5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
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		
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	
5.11 Change and reason for change in surface area of range	No change	

	The change is mainly due to:
5.12 Additional information	The species still occupies all four sites where it is thought to have been naturally resident.Whitefish populations have been successfully translocated to Blea Water and Small Water, however, although these sites are located within a similar geographic area (the lake district) these translocation sites are not known to have been naturally colonised by schelly and will not be used for article 17 reporting.

6. Population

6.1 Year or period	2015	
6.2 Population size (in reporting unit)	a) Unit	number of individuals (i)
	b) Minimum	
	c) Maximum	
	d) Best single value	23
6.3 Type of estimate	Minimum	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	
	b) Minimum	
	c) Maximum	
	d) Best single value	
6.5 Type of 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	Stable (0)	
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	1994-2018	
6.12 Long-term trend Direction	Stable (0)	
6.13 Long-term trend Magnitude	a) Minimum	
	b) Maximum	
	c) Confidence interval	
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	No change	
	The change is mainly due to:	

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

6.17 Additional information	In 2012 analysis of data on fish entrained in the Haweswater water abstraction system since 1994 indicated some level of recovery in the schelly population in this waterbody, however, hydroacoustic surveys in 2015 demonstrated that overall fish populations in Haweswater remained low.Due to a lack of previous data for Brotherswater it was not possible to present the 2015 survey results for schelly in a robust temporal context. However, the 2015 results demonstrated that the population was recruiting and contained a variety of age classes, leading to a CSM assessment of favourable for schelly and potentially indicating an increasingly strong population.

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	Stable (0)	
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	Haweswater is subject to anthropogenic water level fluctuations due to abstraction during use as a drinking water supply reservoir. This is thought to be the primary reason for a long-term decline in the lakes schelly population. Repeated recruitment failures caused by rapid falls in water level during the spawning and egg incubation period is the likely mechanism of impact. During the early 1990s predation pressure by a newly-established breeding colony of cormorants at Haweswater may be responsible for the schelly population's failure to recover despite a more sensitive water level management regime being implemented. Ullswater schelly populations may be impacted in localised areas around the inlet of Glenridding Beck by lead ore washings from Greenside mine. This may have been compounded by the extremely high flows associated with storm Desmond in 2015 depositing an additional load of fine sediment containing mine tailings. The 2014 lake SSSI CSM report stated that phosphorus concentrations lay within the mesotrophic range (<15 microgl-1) and had remained relatively stable since 2007, with high dissolved oxygen concentrations throughout the water column, indicating good water quality at the site. However, the high levels of tourism and amenity use in the area was highlighted as a risk to the site. In addition, the existence of roach have been reported which are not native to Ullswater and may compete with schelly. Concerns have been expressed regarding low dissolved oxygen concentrations at depth within Brotherswater. In 2015 the schelly population was considered to be in favourable condition, however, climate change effects have the potential to	

exacerbate DO fluctuations and stress on schelly in future years.
This assessment is solely based on schelly populations only being present in Haweswater, Ullswater, Botherswater and Red Tarn since the last glacial retreat from the lake district. At the present time, there is no evidence for schelly having been present within England at any other location. However, in the geographical area described by the Lake District, it is likley that waterbodies with a similar water chemistry, thermal regime, morphology and speicies assemblage may have been/are available for colonisation by schelly, should suitable conditions allowing their colonisation of these water bodies have become or will become available. If this principle is taken to its conclusion, suitable transloction sites (e.g. free from non-native species and with low future risks) in a similar geographic area (Lake District) are likely to exist. These sites may be capapble of mitigating for uncontrollable climate change effects, severe water level changes and predation pressure. It is thought that translocations of schelly from Haweswater to nearby Blea Water and Small Water have been successful, thereby creating two current refuge populations.

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Abstraction from groundwater, surface water or mixed water (K01)	H
Problematic native species (I04)	H
Extraction activities generating diffuse pollution to ground or surface waters (C11)	M
Other climate related changes in abiotic conditions (N09)	M

Threat	Ranking
Abstraction from groundwater, surface water or mixed water (K01)	H
Problematic native species (I04)	H
Extraction activities generating diffuse pollution to ground or surface waters (C11)	M
Other climate related changes in abiotic conditions (N09)	H
Other invasive alien species (other then species of Union concern) (I02)	H

8.2 Sources of information

8.3 Additional information

K01 - Artificially severe drawdown during spawning periods at Haweswater.
K01 - Although a more sympathetic abstraction regime has been implemented at Haweswater, increasing demand for potable water may lead to the need for a return to more rapid drawdown at sensitive times of the schelly lifecycle.
I04 - Predation pressure due to expanding cormorant population at Haweswater. Competitive pressure from non-native roach becoming established in Ullswater.
I04 - Cormorant populations at Haweswater were actively managed, however, management has reduced in recent years and therefore the population and associated predation pressure may be expected to increase. Roach are a recent addition to the Ullswater fish community having been first reported in

2013. The roach population and its competitive pressure on schelly may be expected to increase as there are no effective control measures for removing roach from the lake at the present time. Ruffe are found in Bassenthwaite Lake and Derwent water and therefore represent a risk of spread to schelly sites, increasing the risk of egg predation.
C11 - Fine sediment contaminated with lead ore may become deposited on gravels used for spawning in Ullswater.
C11/N09 - Fine sediment contaminated with lead ore may become deposited on gravels used for spawning. This may become exacerbated by climate change effects increasing the frequency of extremely high flow events.
N09 - Warming of the climate may increase the persistence and severity of oxygen depletion within the hypolimnion at Brotherswater, leading to a reduction in deep water refuge areas. Climate change effects may have increased the probability of recent extremely high flow events occurring and the increased deposition of contaminated fines in Ullswater.
C11/N09 - Fine sediment contaminated with lead ore may become deposited on gravels used for spawning. This may become exacerbated by climate change effects increasing the frequency of extremely high flow events.
I02 - Crassula helmsii is found in nearby Bassenthwaite Lake and Derwent Water and may spread to schelly sites such as Haweswater, smothering sub-littoral spawning substrates. There is currently no effective control agent/method for Crassula.

9. Conservation measures

9.1 Status of measures	a) Are measures needed?	No
	b) Indicate the status of measures	
9.2 Main purpose of the measures taken		
9.3 Location of the measures taken		
9.4 Response to the measures		
9.5 List of main conservation measures		
9.6 Additional information		

10. Future prospects

10.1 Future prospects of parameters	a) Range b) Population c) Habitat of the species	
10.2 Additional information	The Haweswater schelly population has persisted at a low level from its rapid decline in the early 1980's to the present day, therefore, if abstraction / drawdown regimes are managed sympathetically and cormorant predation rates are controlled schelly populations may remain stable over the next 12 year period. Should a suitable management regime be found it is possible that the Haweswater population may increase. In addition, although not included in article 17 reporting, the translocated populations in Blea Water and Small water	

appear to be stable and offer a refuge, should Haweswater populations decline further.
The 2015 survey carried out at Brotherswater indicated a healthy population. This is encouraging and, in the forseeable future/next 12 years, there is no reason to suspect that this should change. However, in the longer term, climate change may lead to an increase in the severity of deoxygenation in the deeper water areas, leading to a reduction in the available habitat for schelly and possible impacts on the population.
The long term prospects for the Ullswater schelly population is uncertain due to the potential for impacts from non-native species such as roach and the possible introduction of Crassula, which has the potential to smother spawning gravels, from other areas of the lake district. The input of contaminated fine sediment may increase if climate change leads to more frequent extreme high flow events.
The status of the Red Tarn population is unknown and should be surveyed as a matter of priority.

11. Conclusions

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	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	

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

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

13.3 Other relevant Information

Distribution Map

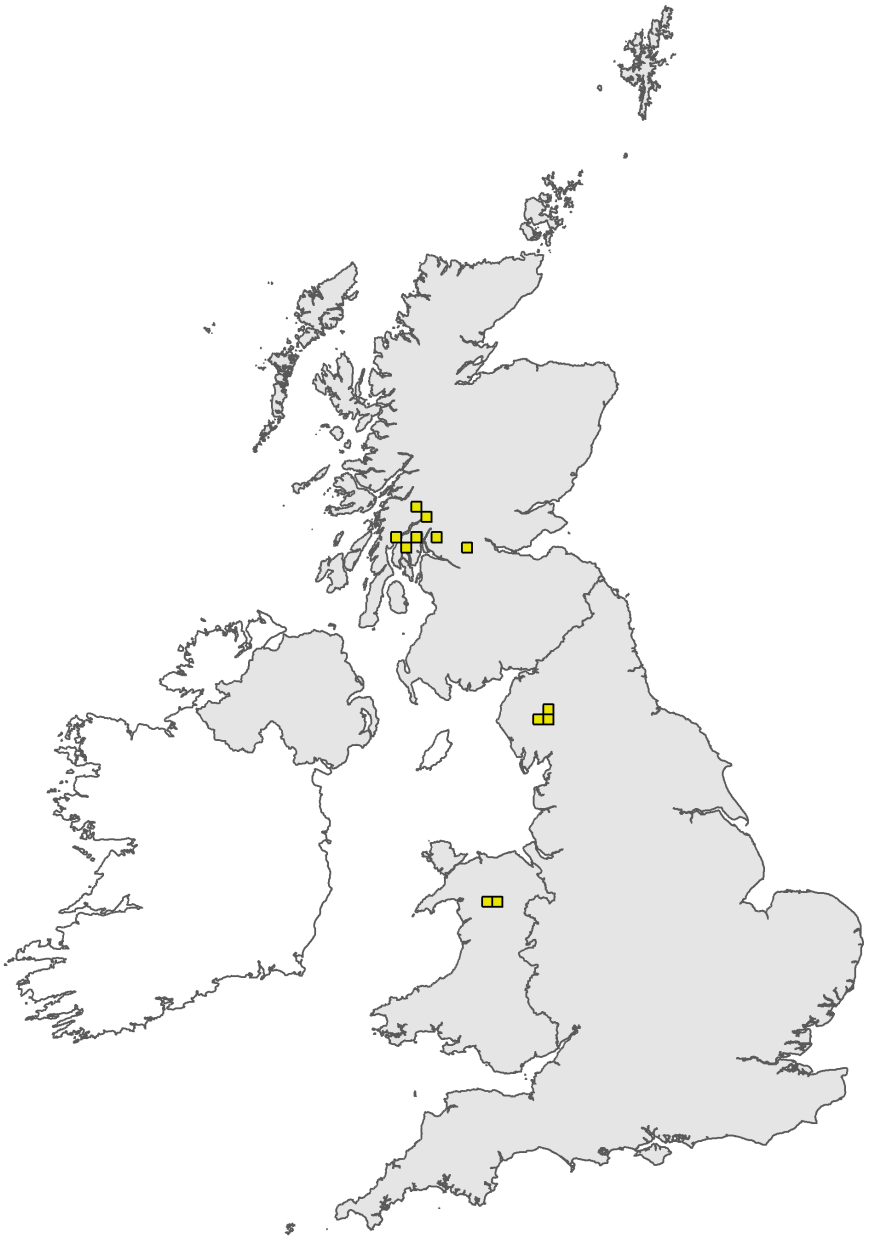

Figure 1: UK distribution map for S6353 - Whitefish (*Coregonus lavaretus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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

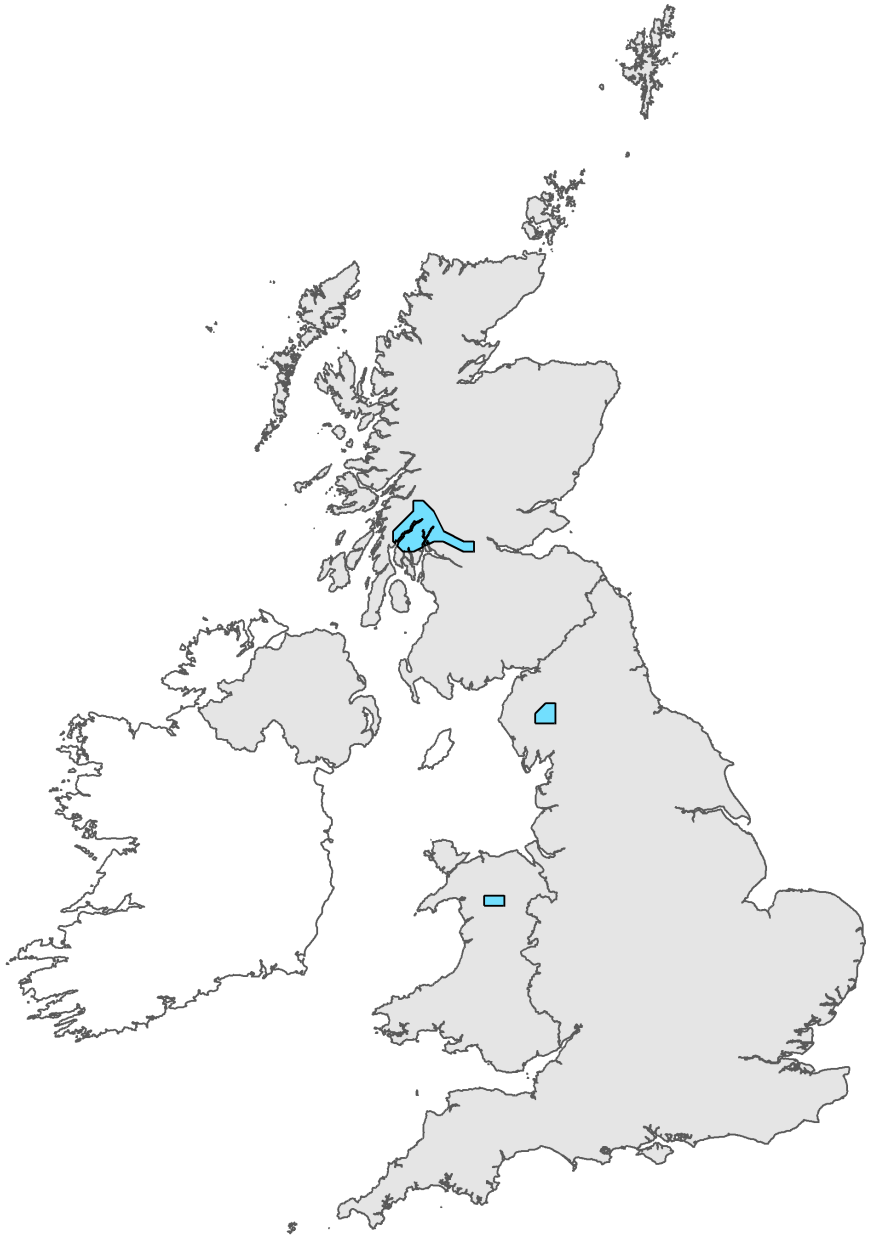

Figure 2: UK range map for S6353 - Whitefish (*Coregonus lavaretus*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

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.