

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

**Second Report by the United Kingdom under  
Article 17  
on the implementation of the Directive  
from January 2001 to December 2006**

**Conservation status assessment for :  
S2494: *Coregonus lavaretus* - Whitefish**

Please note that this is a section of the report. For the complete report visit <http://www.jncc.gov.uk/article17>

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## S2494 *Coregonus lavaretus* Whitefish

*Audit trail compiled and edited by JNCC and the Freshwater Inter-Agency Working Group*

This document is an audit of the data and judgements on conservation status in the UK's report on the implementation of the Habitats Directive (January 2001 to December 2006) for this species. Superscript numbers accompanying the headings below, cross-reference to headings in the corresponding Annex B reporting form. This supporting information should be read in conjunction with the UK approach for species (see 'Assessing Conservation Status: UK Approach').

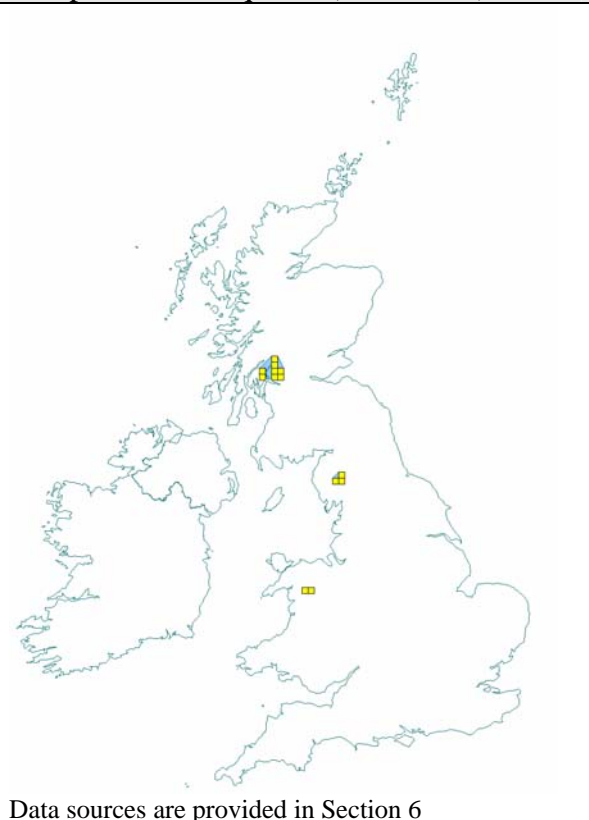
### 1. Range Information<sup>2,3</sup>

This species is found across three disjunct areas in Scotland, north England and north Wales.

#### 1.1 Surface area of range<sup>2,3,1</sup> 1,759 km<sup>2</sup>

The above estimate was calculated within Alpha Hull software, using extent of occurrence as a proxy measure for range (as shown in the map below). Alpha was set at 25 km to reflect the mobility of this species. The alpha hull (range area) was clipped to exclude marine habitat. Only the naturally extant populations were included in this calculation.

**Map 1.1.** Current extent of occurrence and occupied 10-km squares (1991-2001)



## **1.2 Date of range determination<sup>2.3.2</sup>**

### **1991 - 2001**

Records of native populations from the Database of Freshwater Fishes (Davies *et al.*, 2004), dated 1991 onwards were used to calculate the current extent of occurrence; the most recent record was 2001.

## **1.3 Quality of range data<sup>2.3.3</sup>**

### **Good**

The Environment Agency (in conjunction with the Centre for Hydrology & Ecology) have monitored sites in England (Ullswater, Haweswater, Red Tarn and Brotherswater). Scottish Natural Heritage monitor whitefish populations in Scotland (Loch Eck and Loch Lomond) and CCW co-ordinate whitefish monitoring at Llyn Tegid. Annual assessments are not available for all populations. However at this coarse scale, data quality can be considered good.

## **1.4 Range trend<sup>2.3.4</sup> and range trend magnitude<sup>2.3.5</sup>**

### **Stable**

The post 1994-trend is stable.

In Britain, the seven naturally extant populations are augmented by the establishment of two additional refuge sites in Scotland (Loch Sloy and Carron Valley Reservoir) in 1988-1990. Two refuge sites were also introduced in England (Small Water and Blea Tarn) in 1997. However, these are not yet considered established populations. Hence they have not been accounted for in the current estimate or post-1994 trend.

## **1.5 Range trend period<sup>2.3.6</sup>**

### **1994 – 2006**

## **1.6 Reasons for reported trend in range<sup>2.3.7</sup>**

### **3 = Direct human influence (restoration, deterioration, destruction)**

Translocations.

## **1.7 Favourable reference range<sup>2.7.1</sup>**

### **1,759 km<sup>2</sup> (Equal to current)**

The decision tree in Note 1 has been used as a guide in determining the favourable reference range estimate (see 'Assessing Conservation Status: UK Approach').

Current trend is stable. Original range was restricted to only seven UK waterbodies. The favourable reference range for this species is likely to be the continued survival of this species within its original known distribution. There is no evidence to suggest that this species occurred more widely within the UK than is currently understood. On this basis, the current estimate has been identified as a suitable baseline for the favourable reference value.

## **1.8 Range conclusion<sup>2.8</sup>**

### **Favourable**

Range has remained stable since the Habitats Directive came into force, and the current estimate is equivalent to the favourable reference range. For this reason, and in accordance with Annex C, range has been assessed as Favourable.

## 2. Population of the Species<sup>2.4</sup>

### 2.1 Population estimate<sup>2.4.1</sup>

#### 7 sites

This species is currently known at 7 natural sites, there are also an additional 4 translocation sites (see Table 2.1). There is no UK abundance estimate. However, individual counts have been recorded at Haweswater, Loch Eck, Loch Lomond & Llyn Tegid (see Table 2.2)

In Scotland, natural *C. lavaretus* distribution is restricted to Loch Eck and Loch Lomond. However, fish from Loch Lomond were transplanted to two other locations: Loch Sloy and the Carron Valley Reservoir in 1988-1990 (Maitland 1994; Maitland & Lyle 1990). Although it is known that *C. lavaretus* has become established in the Carron Valley Reservoir, the current health status of these transplanted populations is Unknown.

In Wales the distribution of *C. lavaretus* is restricted to just one lake, Llyn Tegid. Fish were translocated to a small lake, Llyn Caer Euni, but this small eutrophic lake proved unsuitable for *C. lavaretus* and the fish failed to establish a new population. Llywelyn the Great is also reputed to have translocated some *C. lavaretus* into an un-named pond – due to eutrophication problems in Llyn Tegid. It is probable that a refuge population composed of *C. lavaretus* from Llyn Tegid will be established in future years and attempts have already been made to establish a new refuge population in Llyn Arenig Fawr.

The English Lake District appears to be the stronghold for *C. lavaretus* within the British Isles and this species is found in Ullswater, Haweswater, Red Tarn and Brotherswater (Bagenal, 1970; Maitland & Lyle, 1990; Winfield *et al.*, 1994). A translocation of *C. lavaretus* from Haweswater to new sites has led to the establishment of new populations in both Small Water and Blea Tarn (Winfield *et al.*, 1997).

**Table 2.1** Number of *C. albula* populations within the UK.

	Number	Unit	Data Quality	Method Used
<b>UK Total</b>	7 (+ 4 translocation sites)	Number of sites	Good/Moderate	Data available from the EA, CEH, SNH and the Fish Conservation Centre. Quantitative hydroacoustics routinely used, although the use of gill nets is restricted in England.
<b>England</b>	4 (+2)	Number of sites	Good/Moderate	Populations monitored by EA, CEH and United Utilities. Monitored using quantitative hydroacoustics and gill nets. (note that the use of gill nets is restricted in England).
<b>Scotland</b>	2 (+2)	Number of sites	Good/Moderate	Populations monitored by SNH and CEH. Monitored using quantitative hydroacoustics and gill nets.
<b>Wales</b>	1	Number of sites	Good/Moderate	Populations monitored by CCW and CEH. Monitored using quantitative hydroacoustics and gill nets.
<b>Northern Ireland</b>	0	Number of sites	NA	Not extant

**Table 2.2** Absolute abundance of individuals in natural populations

<b>C. lavaretus</b>				
<i>England</i>				
<b>Haweswater</b>	1997 - 2006	138 – 472 (adults only)	Quantitative hydroacoustics	Winfield, I. J., Fletcher, J. M., & James, J. B. (2006). Monitoring of the schelly of Haweswater, April 2005 to March 2006. Final Report. <i>Report to United Utilities</i> . LA/C01512/12. 64 pp.
<i>Scotland</i>				
<b>Loch Eck</b>	2005	57,756	Gill nets with quantitative hydroacoustics	Winfield, I. J., Fletcher, J. M., & James, J. B. (2006). SCM of fish in Loch Eck. Final Report. <i>Report to Scottish Natural Heritage</i> . LA/C02852/1. 22 pp.
<b>Loch Lomond</b>	2004	44,270	Gill nets with quantitative hydroacoustics	Winfield, I. J., Fletcher, J. M., & James, J. B. (2006). SCM of fish in standing waters (Phase II). Final Report. <i>Report to Scottish Natural Heritage</i> . LA/C02256/4. 40 pp.
<i>Wales</i>				
<b>Llyn Tegid</b>	2003 - 2006	144,316 – 382,860	Gill nets with quantitative hydroacoustics (but gill nets restricted to 2003 only)	Winfield, I. J., Fletcher, J. M. & James, J. B. (2007). Llyn Tegid hydroacoustic surveys 2006. CCW Contract Science Report No. 763. Draft Final Report. <i>Report to Countryside Council for Wales</i> . LA/C03122/1. 42 pp.

## 2.2 Date of population estimate<sup>2.4.2</sup>

### 2006

## 2.3 Method of population estimate<sup>2.4.3</sup>

### 2 = Extrapolation from surveys of part of the population or from sampling

Quantitative data relating to the number of sites are of good quality, however for many sites, data relating to the actual number of individuals are less comprehensive. The preferred method of data collection for vendace involves the use of quantitative hydroacoustics and targeted short-duration gill netting. Abundance data given are minimum and maximum estimates (or single observations for Loch Eck and Loch Lomond) during July or August of whitefish equal to or greater than 40 mm in length, with the exception of Haweswater for which data are given for individuals greater than 250 mm in length due to the impracticality/undesirability of using gill nets. Data are derived from hydroacoustic estimates of all fish species equal to or greater than 40 mm in length, partitioned to the coregonid of interest on the basis of catch composition of offshore survey gill nets.

## 2.4 Quality of population data<sup>2.4.4</sup>

### Moderate

The quality of data for whitefish is good-moderate for a number of sites (Loch Lomond, Loch Eck, Haweswater and Llyn Tegid). However, for other sites (*i.e.* Ullswater, Red Tarn, Brotherswater and translocation sites) fully quantitative data is lacking. Overall, data quality is therefore reported as Moderate.

## 2.5 Population trend<sup>2.4.5</sup> and population trend magnitude<sup>2.4.6</sup>

### Decreasing

In Britain, seven naturally extant populations are augmented by the establishment of four additional refuge sites in Scotland (Loch Sloy and Carron Valley Reservoir) and England (Small Water and Blea Tarn). Although this represents an increase in the number of populations, these gains are offset by the fact that some populations (such as Loch Lomond) are now showing signs of decline.

**Table 2.3** National trends

Country	Trend	Data Source/ Comments
England	Declining	No Site Condition Monitoring data are available for whitefish populations in England and a detailed assessment is not available. Existing literature demonstrates that at least one population (Haweswater) is under considerable threat from piscivorous birds. [See Winfield 1995, 1997, Winfield <i>et al.</i> , 2004a, 2004b, 2006a]
Scotland	Declining	Recent Site Condition Monitoring Assessments (SNH/CEH) and recent monitoring work being carried out by SNH and Glasgow University have suggested that Loch Eck is in Favourable condition, but that the Loch Lomond population is decreasing to what may be critical levels. A number of factors may be contributing to this loss, but chief amongst these is the presence of an increasing number of ruffe ( <i>Gymnocephalus cernuus</i> ). [See Winfield <i>et al.</i> , 2006b, 2006c]
Wales	Not applicable	Site Condition Monitoring Assessments for whitefish in Llyn Tegid suggest that the population is in Unfavourable (recovering) condition. Ruffe are also present in Llyn Tegid and it is possible that this species will have a negative impact on whitefish within this site. [See Winfield, 2001; Winfield <i>et al.</i> , 2003a, 2003b, 2007]
Northern Ireland	Not applicable	Not applicable
UK	Declining	On the basis of the data available, only one of the original seven populations (Loch Eck) can be considered to be in a stable condition.

## 2.6 Population trend period<sup>2.4.7</sup>

1994 – 2006

## 2.7 Reasons for reported trend in population<sup>2.4.8</sup>

### 3 = Direct human influence (restoration, deterioration, destruction)

The introduction of non-native fish, particularly ruffe (Winfield *et al.*, submitted), has had a negative impact on the abundance of whitefish in some localities. In other areas, such as Haweswater, an analysis of reservoir management data over a 30 year period (1961-1991)

revealed that the decline of the whitefish population is associated with increased water abstraction, reduced water levels and predation by cormorants.

## **2.8 Justification of % thresholds for trends<sup>2.4.9</sup>**

**Not applicable**

## **2.9 Main pressures<sup>2.4.10</sup>**

Whitefish are present in a relatively small number of waterbodies and, from the data that is available, it is clear that some sites are under considerable pressure. Despite their restricted distribution within the UK, they are, or can be, subject to a wide range of pressures. Main pressures include:

**701 Water pollution** - deterioration in water quality

**910 Silting up** – silting up of spawning habitats

**954 Invasion by a species** - loss of spawning habitat by growth of invasive non-native species of plant

**966 Antagonism arising from introduction of species** - direct competition or predation by introduced species of fish

[See Winfield *et al.*, 1996, Winfield *et al.*, submitted a, submitted b].

## **2.10 Threats<sup>2.4.11</sup>**

**701 Water pollution** - deterioration in water quality

**910 Silting up** – silting up of spawning habitats

**954 Invasion by a species** - loss of spawning habitat by growth of invasive non-native species of plant

**966 Antagonism arising from introduction of species** - direct competition or predation by introduced species of fish

[See Winfield *et al.*, 1996, Winfield *et al.*, submitted a, submitted b].

## **2.11 Favourable reference population<sup>2.7.2</sup>**

**Unknown**

Since there is no complete UK abundance estimate, current population has been reported in number of populations. If the favourable reference population were to be reported using the same unit, it would most likely be equal to current. However, this would disguise the fact that populations in naturally extant sites are thought to have been in decline for many years. Without more robust population density data, quantification of the favourable reference value in terms of abundance would be meaningless. For this reason, Unknown is the most appropriate judgement.

## **2.12 Population conclusion<sup>2.8</sup>**

**Unfavourable – Inadequate and deteriorating**

The continuing decline of naturally extant populations indicates an assessment of Unfavourable, but, due to the establishment of four refuge sites, this has been classified as Inadequate, rather than Bad. The additional categorisation of deteriorating reflects the reported trend.

# **3. Habitat for the Species in the Biogeographic Region or Sea<sup>2.5</sup>**

## **3.1 Surface area of habitat<sup>2.5.2</sup>**

**97.59 km<sup>2</sup>**

92.23km<sup>2</sup> is the combined surface area of Loch Lomond, Loch Eck, Haweswater, Ullswater, Red Tarn, Brotherswater, Llyn Tegid). The combined area of translocated sites (Loch Sloy, Carron Valley Reservoir and Llyn Arenig Fawr) is 5.36km<sup>2</sup>. Total surface area is therefore reported as 97.59km<sup>2</sup>.

### **3.2 Date of estimation<sup>2.5.3</sup>**

**2007**

### **3.3 Quality of data on habitat area<sup>2.5.4</sup>**

**Moderate**

Despite extensive survey of potential whitefish habitat in designated sites in Scotland and Wales post-2003, relatively little is known about many of the sites in England or, indeed, within the translocated sites in Scotland.

### **3.4 Habitat trend<sup>2.5.5</sup>**

**Increasing**

In freshwater habitats, whitefish have suffered historically from agricultural intensification, and other point source pollution sources, which have caused a general deterioration in habitat quality. However, in more recent years, water quality within both extant and translocated sites has improved through the implementation of measures to reduce diffuse and point source pollution sources. Since the Habitat Directive came into force, overall, there has most likely been a slight increase in habitat quality.

### **3.5 Habitat trend period<sup>2.5.6</sup>**

**1994 – 2006**

### **3.6 Reasons for reported trend in habitat<sup>2.5.7</sup>**

**3 = Direct human influence (restoration, deterioration, destruction)**

Improved legislation and conservation management.

### **3.7 Suitable habitat for the species (in km<sup>2</sup>)<sup>2.7.3</sup>**

**Unknown**

### **3.8 Habitat conclusion<sup>2.8</sup>**

**Unknown**

Habitat quality, although improved, has not yet recovered fully. In terms of whether “area of habitat is sufficiently large (and stable or increasing) AND habitat quality is suitable for the long term survival of the species”, there is no true certainty at this stage; the continuing population declines suggest that it would be unwise to assume so. However, neither is it clearly detrimental to the long-term survival of the species. On this basis, a judgment of Unknown has been made.

## **4. Future Prospects<sup>2.6</sup>**

**Poor prospects**

Species likely to struggle unless conditions change

Subsequent to historic declines in habitat quality, conservation measures are helping to reverse former negative trends. Further, this species is being considered as a priority species under the UK Biodiversity Action Plan.

However, invasive non-native plant species, such as New Zealand pigmyweed, are now starting to become established in the shallow littoral areas of some waterbodies where other coregonid species (such as vendace) are known to spawn, and it is possible that this invasive non-native plant will find its way into sites containing whitefish populations. Once established it may be impossible for these species to be eliminated. Further, there is continuing concern regarding the declining population abundance in the natural sites. Unless this situation changes, the species is expected to struggle. Hence, prospects have been reported as Poor.

#### 4.1 Future prospects conclusion<sup>2,8</sup>

Unfavourable – Inadequate

### 5. Overall Conclusion<sup>2,8</sup>

Unfavourable – Inadequate

**Table 5.1.** Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
<b>Range</b>	Favourable	Range is increasing and not smaller than the favourable reference range	2
<b>Population</b>	Unfavourable – Inadequate and deteriorating	Any other combination A decline in some populations is ameliorated slightly by establishment of refuse sites	2
<b>Habitat</b>	Unknown	Insufficient reliable information	N/A
<b>Future Prospects</b>	Unfavourable – Inadequate	Any other combination Main pressures and threats to the species may be significant; there is a query over long-term viability of some populations, particularly Loch Lomond.	2
<b>Overall Assessment</b>	Unfavourable – Inadequate and deteriorating	One or more Unfavourable – Inadequate; no Unfavourable – Bad	2

\*1=High, 2=Moderate, 3=Low

High – Expert opinion is that the concluding judgement accurately reflects the current situation based on a professional understanding of the species. For range, population, and habitat, quality of data used to establish the current estimate has been identified as good; data used to inform trends is comprehensive and up to date.

Moderate – A greater understanding of the feature, or the factors affecting it, is required before a confident concluding judgement can be made by experts. For range, population, and habitat, the current estimate and/or trend are based on recent, but incomplete or limited survey data; or alternately, a comprehensive, but outdated (pre-1994) review.

Low – Judgements, and comprising estimates, are based predominately on expert opinion.

N/A – Assessment conclusion is unknown, on the basis of insufficient reliable information

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### **Map Data Source**

Biological Records Centre - Database for the Atlas of Freshwater Fishes, via the NBN  
C. Bean (pers comm.)