

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 :  
**S1099: *Lampetra fluviatilis* - River lamprey**

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

Please cite as: Joint Nature Conservation Committee. 2007. *Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006*. Peterborough: JNCC. Available from: [www.jncc.gov.uk/article17](http://www.jncc.gov.uk/article17)

## **S1099 *Lampetra fluviatilis* River lamprey**

*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').

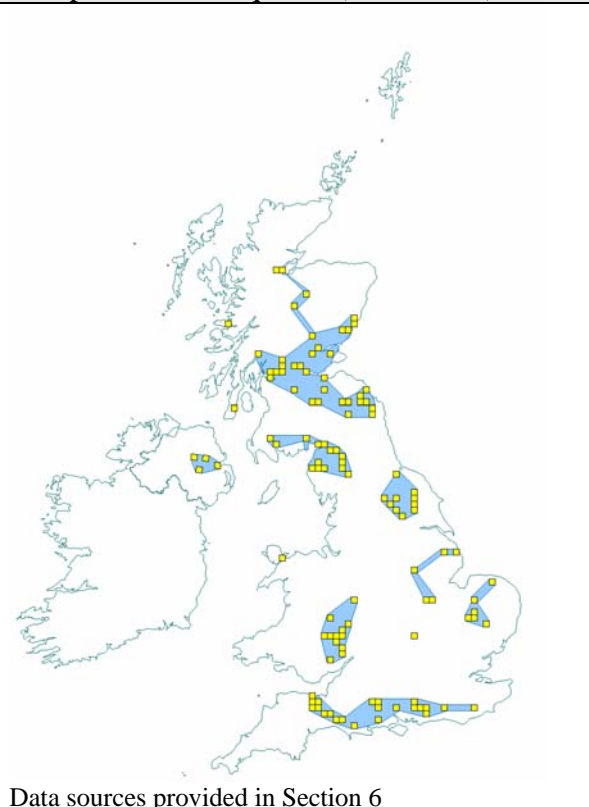
### **1. Range Information<sup>2.3</sup>**

*Lampetra fluviatilis* is widespread in the UK. It has been recorded from many rivers from the Great Glen southwards (Maitland, 2004) and a limited number immediately north of the Great Glen (ERA, 2005). The species has also been recorded from inland waters in Northern Ireland and confirmed as present in many rivers in Southern Ireland (Kelly & King, 2001).

#### **1.1 Surface area of range<sup>2.3.1</sup> 37,685 km<sup>2</sup>**

The above estimate was calculated using Alpha Hull software, with extent of occurrence used as a proxy measure for range. The value of alpha was set at 25km, and clipped to include inland habitat only.

**Map 1.1.** Current extent of occurrence and occupied 10-km squares (1990-2002)



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

### **1990 – 2003**

Records from 1990 to 2003 were used to calculate the current extent of occurrence; 2002 was the most recent available record. These provide the best representation of current range, as it is understood by species experts.

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

### **Moderate**

The Database for the Atlas of Freshwater Fishes (from which all GB data has been extracted), provides a relatively good data source for most fish across Britain. However, it does not represent a complete inventory. Similarly, data published in Jackson & McLeod (2000) (used for NI mapping only) were compiled from a variety of sources.

This is likely to be compounded by the problems in distinguishing between *L. fluviatilis* (river lamprey) and *L. planeri* during their juvenile stage (see section 2.4). To improve the quality of the range data for *L. planeri* there will need to be further surveys specifically targeted at this species, or that take account of some of their particular habitat requirements. Based on this, data quality has been reported as moderate, rather than good.

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

### **Stable**

Records from the NBN Gateway (including the Database and Atlas of Freshwater Fish) were examined over three discrete time periods: pre-1972 (1972 was the publication date of Peter Maitland's FBA key to freshwater fish which included distribution maps); 1972 to 1991; and post-1992 (when the Habitats Directive was introduced). However, the data was found to be insufficient for determining trends due to the relative lack of historic lamprey surveys (until recently, very few surveys aimed at lampreys).

Maitland (2004) suggested that whilst the species has been lost from a number of former catchments (due to pollution and barriers to migration), the current extent of the species' range appears similar to its historical range. Unfortunately the definition of 'historical' range in this context is unknown. However, it can be assumed from this, that the range has been relatively stable since the Habitats Directive came into force in 1994.

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

### **1994 – 2002**

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

### **Not applicable**

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

### **37,685 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').

Maitland (2004) suggested that whilst the species has been lost from a number of former catchments, the current extent of the species' range appears similar to its historical range.

Hence, there is not evidence to suggest the range need be larger than current to support the species at favourable status.

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

### **Favourable**

From the information available, range would appear to have remained stable since at least 1994, and the favourable reference range is equivalent to the current estimate. Hence, 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>**

#### **Unknown**

There are no comprehensive population size estimates available for this species in the UK.

Scottish Natural Heritage commissioned a national survey of lamprey in 2004. It confirmed *L. fluviatilis* as being present at 28 survey sites in 20 different rivers (*Lampetra* were found at many more sites but *L. fluviatilis* were not confirmed at those sites). At those 28 survey sites, 15 had a minimum density of *Lampetra* ammocoetes (note: this may include brook as well as *L. fluviatilis*) greater than the optimal habitat target of 10 fish/m<sup>2</sup> (JNCC, 2005), with the average density being 21 fish/m<sup>2</sup> which is considerably greater than the catchment average target of 5 fish/m<sup>2</sup> used by JNCC (2005) to report on the condition of designated sites. Therefore, where the species has been recorded recently in Scotland outwith designated sites, it appears to be present in reasonable numbers.

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

**Not applicable**

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

**Not applicable**

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

#### **Poor**

There are two main issues with much of the existing data for *L. fluviatilis*. Many surveys that record *L. fluviatilis* are not specifically aimed at lampreys and therefore, given their specific habitat requirements, are likely to under-record the species. In addition, most surveys concentrate on the juvenile stage, when *L. fluviatilis* cannot be distinguished from brook lamprey. Therefore many records cannot be ascribed to a specific species (even when the survey is specifically aimed at lamprey), and so there will be further under-recording of *L. fluviatilis*.

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

#### **Unknown**

Beyond the acknowledgement that there has been an overall decline in the number of *L. fluviatilis* (e.g. commercial fisheries for the species used to exist on some large British rivers but now there is only one known *L. fluviatilis* fishery) there is little information to comment on any trend in the population of *L. fluviatilis*.

Only on the River Ouse, in north-east England, has there been an attempt to examine any trend by comparing modern and historic commercial fishery catches (Masters *et al.*, 2006). This study found that while modern annual catches (between 1995 and 2004) tended to be lower than historic annual catches (between 1908 and 1914) they were generally still of the same order of magnitude. Therefore no firm conclusions were drawn about any long term trend in the population of *L. fluviatilis* in the River Ouse.

There has also been an attempt to estimate the numbers of migrating *L. fluviatilis* returning to the Endrick Water in Scotland (Loch Lomond Fishery Trust, 2005). However poor conditions meant that no conclusions could be made about trends in *L. fluviatilis* population.

## **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>**

**Not applicable**

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

**Not applicable**

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

**221 Bait digging**

**300 Sand and gravel extraction**

**420 Discharges**

**701 Water pollution**

**811 Management of aquatic and bank vegetation for drainage purposes**

**820 Removal of sediments (mud...)**

**830 Canalisation**

**850 Modification of hydrographic functioning, general**

**852 Modifying structures of inland water courses**

**853 Management of water levels**

**951 Drying out / accumulation of organic material**

**952 Eutrophication**

**953 Acidification**

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

**221 Bait digging**

**300 Sand and gravel extraction**

**420 Discharges**

**701 Water pollution**

**811 Management of aquatic and bank vegetation for drainage purposes**

**820 Removal of sediments (mud...)**

**830 Canalisation**

**850 Modification of hydrographic functioning, general**

**852 Modifying structures of inland water courses**

**853 Management of water levels**

**951 Drying out / accumulation of organic material**

**952 Eutrophication**

**953 Acidification**

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

### **Unknown**

Even in the River Ouse, where there is long term fishery data on *L. fluviatilis* (Masters *et al.*, 2006), substantially more research would be needed to investigate the links between the spawning stock of *L. fluviatilis* and survival of subsequent life-cycle stages and their incorporation into a population model, before targets could be established. Therefore, there is insufficient information to make a judgement on the favourable reference population of *L. fluviatilis*.

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

### **Unknown**

There is insufficient information available to make a judgement on population.

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

Clean well-oxygenated river gravels for spawning with suitable nearby hiding places. Good water quality, and slower flowing nursery areas of sandy silt for juveniles. The adult stage migrates to, and feeds in, estuaries. Therefore suitable estuarine conditions are needed at the mouth of 'home' rivers, free from pollution and with suitable prey fish species. They also require a clear migration route from estuary to the spawning grounds, with suitable river flows and no barriers.

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

#### **Unknown**

The accessible wetted area for England and Wales is 117.4 km<sup>2</sup> (CEFAS & Environment Agency, 2006). No figures are available for Scotland or Northern Ireland. However, based on the surface area of these countries, it is likely that this figure would increase by a factor of approximately 2.5, thus increasing the total figure to approximately 293km<sup>2</sup>.

However, even then, not all of these wetted areas would be suitable for *L. fluviatilis*. This species is likely to only utilise the middle to lower reaches of large river systems and tend not to penetrate into the upper reaches. A true estimate of habitat surface area currently used is therefore unknown.

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

**Not applicable**

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

#### **Poor**

The estimate for accessible wetland areas calculated by CEFAS & Environment Agency (2006) is not thought to provide a suitable surrogate for habitat surface area (it only includes rivers classed as salmon rivers, and excludes Scotland and Northern Ireland). In the absence of an alternate, reliable estimate, data quality can only be classified as poor.

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

#### **Decreasing**

Historically, organic pollution and industrial pollution have degraded fresh water habitat across the UK. Impoundments have also limited the area of fresh water habitat available for

*L. fluviatilis*; weirs that can be ascended by migratory salmonids often still represent an impassable barrier to *L. fluviatilis*.

Although pollution levels have been reduced in recent decades as a result of a decline in heavy industry and investment in the treatment of sewage effluent, actions to control diffuse sources of pollution are in their early stages. However, based on expert opinion, conditions are now considered to be improving. Therefore the trend in habitat is assessed as increasing.

### **3.5 Habitat trend period<sup>2.5.6</sup> 2000 – 2006**

There is insufficient data to report post-1994 trends with confidence. Habitat trends have therefore been reported over a more recent date-class, based predominantly on expert opinion.

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

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

Historic declines resulted from organic pollution, industrial pollution and restriction of access by weirs etc. Improvements in more recent years are attributed to active 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>**

#### **Unfavourable - Inadequate but improving**

Historically, *L. fluviatilis*'s freshwater habitat is thought to have declined in both area and quality, due to the construction of barriers and pollution. Although conditions are now considered to be improving, in expert opinion, *L. fluviatilis*'s habitat has not yet been restored to Favourable status across the UK; 69% of SACs designated for *L. fluviatilis* were assessed as Unfavourable during Common Standards Monitoring (although it is important to note that this does not necessarily mean that the habitat in those SACs is not of sufficient quality to support *L. fluviatilis*). It seems reasonable to conclude that, if the SACs represent the best sites for *L. fluviatilis*, the species will be in a poorer state in the wider countryside. For this reason, and in accordance with Annex C, habitat has been assessed as Unfavourable – Inadequate but improving.

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

### **Poor prospects**

Species is likely to struggle unless conditions change.

*L. fluviatilis* is listed under Annex II of the Habitats Directive, and is being considered as a priority species under the UK Biodiversity Action Plan. Restoring the freshwater habitat of *L.* is the priority within designated sites (this is the principal reason for many having been assessed as Unfavourable condition during Common standards Monitoring assessments). There seem to be reasonable prospects for the restoration of this habitat, although it is in the very early stages. Judging success will be difficult, due to the difficulties in identifying *L. fluviatilis* and some of the unknowns about their exact habitat requirements (*e.g.* ability to negotiate obstacles). Outside of SACs, restoring access to catchments, and areas of

catchments, that this species has formally occupied is an important means by which Favourable condition will be achieved.

In England, Wales and Scotland a review of all consents or licences for discharge and abstractions affecting SACs is underway which should lead to significant improvements in water quality and water resources stresses on this species. Aside from the above reviews or activities affecting SACs the Water Framework Directive is adding impetus to the drive for controlling the ecological impacts of pollution and abstraction.

Impoundments have limited the distribution of *L. fluviatilis* within many river systems. Restoring access is hampered by the lower public profile of lampreys compared with salmon and sea trout but also a poor understanding of their actual water quantity requirements (Maitland, 2003). The Water Framework Directive should add impetus to efforts to restore waters affected by barriers to migration, but many such waters seem likely to fall within the definition of 'Heavily Modified Waterbody' and these have only modest environmental objectives.

One unusual population of *L. fluviatilis*, in the Endrick Water, does not migrate to sea but feeds in Loch Lomond. Recent, ongoing research suggests that the preferred prey species of this *L. fluviatilis* population, the powan, has suffered a decline in population in recent years. Further monitoring of *L. fluviatilis* population in the Endrick Water is needed to determine the implications of a decline in the preferred prey species on this unique (in the UK) freshwater feeding *L. fluviatilis* population. All other *L. fluviatilis* populations feed in estuaries on a variety of fish species. Little is known about the precise marine species *L. fluviatilis* feeds on or the availability of such prey species, and in this assessment pressures and threats in the freshwater environment have been assumed to be the principal pressure on *L. fluviatilis*.

Therefore in summary, there seem to be reasonable prospects for restoration of the species' supporting habitat in SACs (water quality and water resources). But the extent to which the species' habitat is restored outwith the designated site network through the implementation of the Water Framework Directive is unclear at present. Action to restore the morphology of rivers to achieve the objectives of the Water Framework Directive may help deliver this, but a lack of understanding of the water quantity needs of *L. fluviatilis* is a potential hindrance. Based on this information, it is difficult to justify a judgement of good (defined by the Commission as "species is expected to survive and prosper"). Hence, a more precautionary approach is taken, and prospects are reported as poor. However, with conservation measures firmly in place, and with habitat conditions showing signs of improvement, prospects are also expected to improve over the next 12 years.

#### **4.1 Future prospects conclusion<sup>2.8</sup>**

**Unfavourable – Inadequate but improving**

### **5. Overall Conclusion<sup>2.8</sup>**

**Unfavourable – Inadequate but improving**

**Table 5.1.** Summary of conclusions

Parameter	Judgement	Grounds for Judgement (in accordance with Annex C)	Reliability*
<b>Range</b>	Favourable	Current range is stable and not smaller than the 'favourable reference range'	2
<b>Population</b>	Unknown	Insufficient reliable information available	N/A
<b>Habitat</b>	Unfavourable - Inadequate but improving	Any other combination Although habitat conditions are now considered to be improving following historic declines, in expert opinion, the river lamprey's habitat has been not yet been restored to Favourable status across the UK	3
<b>Future Prospects</b>	Unfavourable - Inadequate but improving	Any other combination Main pressures and threats may be significant; and there is a query over whether the species will remain viable on the long-term. However, on the basis that management strategies are in place, and habitat is improving, prospects are also expected to improve.	2
<b>Overall Assessment</b>	Unfavourable - Inadequate but improving	One or more 'Unfavourable - Inadequate' but 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

## 6. References

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## Map Data Sources

GB records:

Biological Records Centre - Database for the Atlas of Freshwater Fishes (1637-2003) (via NBN Gateway)

Northern Ireland records:

Jackson, D.L. & McLeod, C.R. (eds.) (2000) Report 312 - Handbook on the UK status of EC Habitats Directive interest features: provisional data on the UK distribution and extent of Annex I habitats and the UK distribution and population size of Annex II species. Revised 2002. Peterborough: Joint Nature Conservation Committee. Available online at: <http://www.jncc.gov.uk/page-2447>