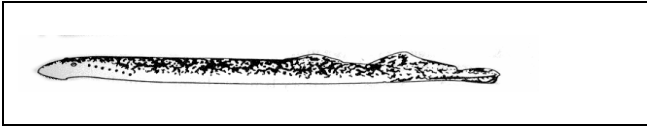


Nomination

Petromyzon marinus, Sea Lamprey



Geographical extent

OSPAR Region; I, II, III, IV

Biogeographic zone: 6,7,9,11,13,14,15,

Region & Biogeographic zones where the species is declining and/or under threat: as above but mainly in freshwater.

The sea lamprey *Petromyzon marinus* occurs in estuaries and easily accessible rivers over much of the Atlantic coastal area of western and northern Europe. It is found around Iceland, Norway, the Barents Sea and south to Northern Africa, and also occurs in the western Mediterranean and eastern North America (Hardisty, 1986).

P. marinus is a migratory species which breeds and passes an extended larval life in freshwater and migrates to the sea to feed. Adults feed on dead or netted fish, as well as being parasitic on healthy fish (Farmer, 1980). In the open sea they have been found attached to shad, cod, haddock and salmon (Kelly & King, 2001).

Application of the Texel-Faial criteria

P. marinus was nominated for inclusion on the OSPAR list with particular reference to decline, sensitivity, and rarity as well as threat.

Decline

There is no total estimate of the population size of sea lamprey in the OSPAR Maritime Area but it is known to have declined in many parts of Europe and particularly so in the last 30 years. It was found in the Scheldt estuary and along the Belgian coast, for example, but is only rarely caught in this area today (Poll, 1945). It was also present in the Dutch Rhine and Meuse but, because of declines, is now on the Red Data list of freshwater fishes in the Netherlands as an endangered species. There are also reports of a decline in Ireland in recent years (Kurz & Costello, 1999) but no substantive baseline information to quantify this (Kelly & King, 2001).

Rarity

The sea lamprey is much scarcer in western Europe than it was formerly, and is rare in much of its range today (Wheeler, 1978).

Sensitivity

The sea lamprey is probably most sensitive to human activity during its freshwater stage where poor water quality and degraded spawning habitat can have an impact on the species. The larvae may however be fairly resilient during the period when they burrow into the silt or rivers and streams, sometimes for several years.

Threat

The main threats to sea lamprey in the OSPAR Maritime Area take place on the inland waters used by the mature fish ready to spawn, larvae and young adults. The construction of dams and artificial embankments prevent the fish migrating freely, while extraction of water for irrigation can also make spawning grounds inaccessible and create difficulties fish returning downstream. The spawning grounds themselves have been degraded by extraction of gravel and stones from the river bed, siltation, and modifications in water flow caused by channelling and fluctuating water levels below dams. Poor water quality is another concern (e.g. Araújo *et al.*, 2000; Hardisty & Huggins, 1973; Hunn & Youngs, 1980; Meyer & Brunken, 1997; Witkowski, 1992).

The sea lamprey has been commercially fished throughout its European range although this is now much reduced. In the OSPAR Maritime Area these include former fisheries in Sweden, UK, France, Spain & Portugal (Maitland & Campbell, 1992) but this is now generally limited to fisheries in Spain and Portugal. The overriding reasons for its decline are considered to be poor water quality, and obstructions in rivers, and degradation of spawning grounds rather than overexploitation (Potts & Swaby, 1993).

Relevant additional considerations

Sufficiency of data

The decline in records in its freshwater habitat have provided the data on which this species has been given international protection through the EC Habitats and Species Directive and the Bern Convention.

Changes in relation to natural variability

Little is known about the natural variability in the population of sea lamprey and therefore whether the decline is greater than might be expected through natural change. The fact that activities on river systems are known to have affected the ability of adults to migrate up river does however suggest

that the decline is at least in part due to human activity rather than natural variability.

Studies of the larval stage have concluded that natural mortality may be high immediately after the larvae leave the nest but then relatively low and uniform during the rest of the larval stage (Hardisty, 1961).

Expert judgement

The decline in records have provided the data on which this species has been given international protection through the EC Habitats and Species Directive.

ICES Evaluation

The ICES review of this nomination by the Working Group on Fish Ecology (WGFE) reached the following conclusions (ICES, 2003).

The main threats to this species come from the continual loss of access, the degradation of spawning habitat, and poor water quality.

Quantitative data indicating a decline in either the range or in the size of the population were considered lacking. The statistics from the FAO indicate a decline, as do qualitative statements in the literature. However, it is evident that the FAO statistics underestimate, at least in France, the true level of captures and thus interpretation of the data must be made with caution.

There is certainly much circumstantial evidence that human activity can have a detrimental effect on sea lamprey populations and in some cases there is strong historical evidence, for example, in the Severn, that the species was more abundant in the past. In the absence of quantitative data, it is recommended that further efforts, in particular a search of the grey literature to confirm the current status of this species, be undertaken.

In those rivers where a self-maintaining population still exists, the lack of data will make it difficult to detect changes as a result of management action. In those rivers where the population has become extinct, the effect of any intervention will be more easily quantified.

Most of the environmental problems affecting sea lamprey are in freshwater and estuarine environments, and there is no evidence that anthropogenic activities in fully marine environments are threatening sea lamprey populations.

Threat and link to human activities

Cross-reference to checklist of human activities in OSPAR MPA Guidelines

Relevant human activity: Fishing, hunting, harvesting; extraction of sand, stone and gravel; constructions, land-based activities. *Category of effect of human activity:* Physical – substratum removal and change, water flow rate changes, Biological – removal of target species

The main threats to this species come from the degradation of spawning habitat, poor water quality. Two examples where threats such as these have been linked to human activities are the decline of *P. marinus* in the Dordogne (France) due to water pollution, erection of dams and dredging of the channel (Ducasse & Leprince, 1982) and the blocking of access by the fish to parts of the River Tagus. *P. marinus* is common in the Portuguese portion of the river Tagus it cannot move through to Spain because of dams lacking appropriate fish passes (Assis, 1990).

Management considerations

The main management measures that would assist the recovery of sea lamprey populations in the OSPAR Maritime Area are improvement of water quality, habitat conditions, and access to suitable spawning grounds in the estuaries and rivers of Europe. Artificial rearing in hatchery facilities may also have a role in conservation of this species but will only be successful in the long term if conditions that led to the decline in the first place have been tackled.

The sea lamprey is listed on Annexe II of the EC Habitats & Species Directive, and Annex III of the Bern Convention.

Further information

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