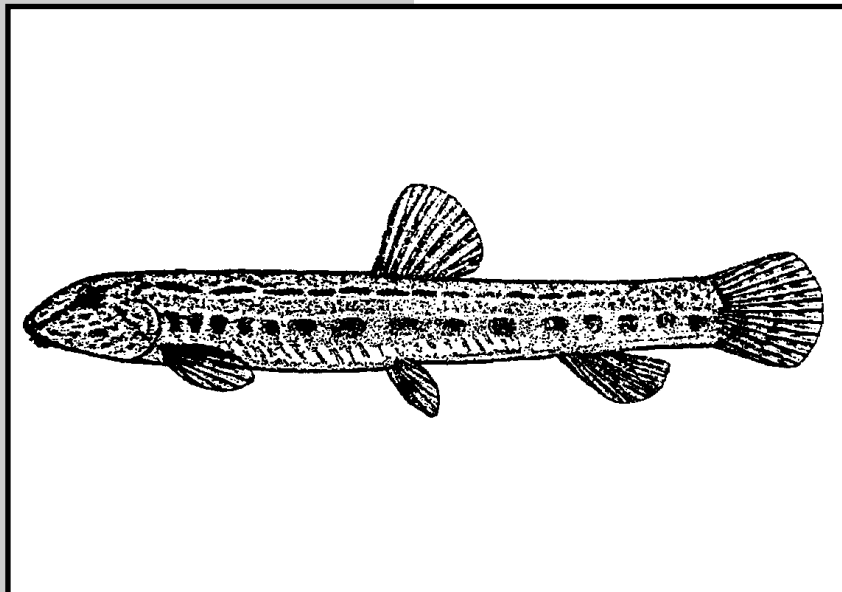


Spined loach

Cobitus taenia



The spined loach is a small bottom-dwelling fish less than 12cm long. It has a strongly patterned, laterally compressed body and its mouth is surrounded by six barely visible barbels. It gets its name from a two pronged spine present in a pocket beneath each eye.

The spined loach has a specialised feeding mechanism by which it pumps fine material through its buccal cavity and extracts food particles with mucus. It therefore requires the ample presence of finer substrates. While it can tolerate mud and silt, it appears to have a preference for sandy substrates that has not been properly recognised in this country until recently. This may

National lead organisation(s)
Environment Agency

be linked to the presence of appropriately sized (0.2-0.75mm) prey species and plant/detrital material in sands. In addition, sands are likely to provide a better spawning substrate than finer sediments. However, the existence of different races of spined loach, some of which are more adapted to the silty organic sediments more typical of lakes and drains, should not be ruled out.

County lead organisation(s)

Abundant submerged vegetation appears to be a very important habitat feature, which acts as a refuge from predators (including fish and even invertebrates) and may provide extra feeding opportunities. Taken in conjunction with substrate preferences, optimal habitat for the species seems to be a mosaic of macrophyte beds and bare sand, providing opportunity for feeding, refuge and spawning. Water depth does not appear to be a major constraint, since the species occurs in lakes as well as rivers and streams. However, the species may fare better in shallower waterbodies where plants can root and the occurrence of predatory fish species is limited, or at least in waterbodies with good depth variation that includes shallow areas.

Optimal habitat is thought likely to be more abundant in rivers and streams than in static waterbodies. Heavily modified streams have been found to be less likely to support spined loach populations than more natural river channels, probably due to loss of habitat diversity (including flow refugia) and enhancement of peak current velocities (leading to wash-out of fish). Lowland drains have superficial similarities to canalised rivers in terms of channel structure, but they do not suffer from the same high current velocities during flood events. This is likely to be a key factor in the presence of spined loach populations in lowland drains.

The spined loach has a short life cycle and consequently depends on good recruitment into the adult population each year. Any large-scale transient physical or chemical disturbance, to the spawning process and juvenile development, will therefore have a disproportionate effect on spined loach populations compared to longer-lived fish species. Continuity of optimal spawning and juvenile habitat is essential.

Current status

National status

It is found across the whole of Europe and central Asia. In England, spined loach have been recorded only in the lower parts of the Trent and Great Ouse catchments, and in some small rivers and drains in Lincolnshire and East Anglia. It is absent from southern and northern England, Wales, Scotland and Ireland. The current UK distribution of the species is a result of colonisation from Europe along historical river connections before the land bridge was severed at the end of the last ice age. This distribution has been maintained by a lack of angler interest in the species and consequent lack of artificial spread by man. The long period of isolation from the continent means that British spined loach may well have developed into endemic races, sub-species or even species.

Little is known of the population densities of spined loach in any of the waters in which it occurs, since the species is not routinely monitored by the Environment Agency or any other organisation and it is an inconspicuous species that is easily overlooked. Most records are based on the capture of a few specimens, often during routine fish surveys, where the electrofishing and netting methods are ineffective in the capture of spined loach.

Local status

The fish recorder for Bedfordshire has been carefully amassing records of the spined loach and now has records for the species throughout the length of the Ouse in Bedfordshire and from a number of its tributaries. The species has been recorded from 17 tetrads, a similar number of records to that for the ten spined stickleback, barbel and silver bream. There are occasional observations of spined loach being found in numbers possibly congregating in appropriate spawning areas.

Current factors affecting the Spined loach

- c **Habitat Degradation** — The close association of the spined loach with areas of fine sediment and aquatic plants mean that their distribution can change seasonally with deposition and erosion of silt by fluctuating flows and the seasonal growth and decay of vegetation. River dredging and weed cutting operations are carried out in rivers and streams by the Environment Agency and the Internal Drainage Board in relation to flood defence and navigation requirements. These operations can have locally detrimental effects on spined loach populations, although the presence of spined loach in a number of waters that been subject to such management for many years suggests that it can survive such disruptions.

Elevated loads of phosphorus will ultimately lead to algal domination and elimination of submerged macrophytes through shading.

The loading of bed sediments with degradable material will lead to reduced oxygen availability in the substrate itself and in the water column near the sediment/water interface. This is likely to lead to reduced egg and juvenile survival and should be avoided. Improved treatment of sewage effluents and other organic discharges to reduce BOD concentrations may be required. Livestock farms can also be a key source, both from the farmyard and from landspreading of slurry and dirty water. Organic enrichment is also caused by enhanced plant growth and subsequent decay as a result of elevated phosphorus loads to the system.

Siltation of bed sediments is a complex problem that is dictated by particulate inputs to the system and the flushing capacity of the waterbody. Primary treatment will remove the majority of solids from point sources,

while adopting soil conservation measures and establishing buffer zones of permanent vegetation alongside water margins and across key run-off pathway will reduce diffuse loads. In riparian areas that are particularly prone to overland flow, establishment of permanent pasture should be encouraged, with stocking densities that maintain good sward integrity. In rivers and streams, reasonable bed velocities should be maintained to keep as much as possible of the particulate load in suspension. In terms of river engineering, narrowing overwide channels will increase bed velocities and thereby help the self-cleaning process.

- c **Water Quality** — Waters with loading of fine sediments, which stone loach prefer, show a tendency to poorer water quality e.g. a decline in oxygen levels and an increase in ammonia. Adaptations to such environments imply that spined loach can tolerate reasonably high ammonia concentrations. Although in water with 8% oxygen saturation, spined loach became disturbed and, at 6% saturation, small specimens commence air-breathing.
- c **Water Quantity** — Spined loach has been associated with the slower flowing water of the Great Ouse. In high winter flows the fish become concentrated in deeper slacker areas. High flows with no slack water refuge may cause dispersal from optimum habitat.
- c **Competition** — The stocking of various species of fish of high angling interest is likely to lead to adverse consequences for the spined loach. Bottom-feeding fish, such as carp and tench, will disturb sediments and create turbid waters that will impact upon submerged macrophyte communities. A range of omnivorous and carnivorous species will prey upon the eggs, juveniles and adults of spined loach.

Current action

Legal Status

Spined loach is generally regarded as threatened, if not rare in Europe. In accordance with its status, spined loach is listed under Appendix 3 of the Bern Convention and has been included under Annex II of the EC Directive on the conservation of natural habitats and flora and fauna.

Management, research and guidance

The Environment Agency have adopted engineering and maintenance activities which seek to maintain or create a mosaic of submerged vegetation and bare sandy substrate, with a good range of water depths and active growth of marginal vegetation. Since these habitats must be available continually to spined loach populations, it is crucial that any such activity at sites where the species occurs (or is to be encouraged) is undertaken in a patchy manner on a rotational basis, always leaving frequent suitable habitat for egg development, juveniles and adults.

Further destruction of habitat diversity through canalisation is avoided, while channels badly affected by historical works are considered for restoration using sympathetic engineering techniques. Dredging is largely restricted to mid-channel with a long return period for rotational dredging frequency. Weed cutting is undertaken to retain approximately one third of the submerged macrophyte beds at any one time, in a patchy distribution that encourages natural flow diversity.

Where required The Environment Agency and Anglian Water are taking steps to reduce phosphorus loads from sewage treatment works along the Ouse and its tributaries.

Pressures on agriculture and adoption of more sophisticated fertiliser management may lead to reduction in the run-off of phosphates from agricultural land.

Surveying and monitoring

There is great scope within the Environment Agency for improved recording of the species in streams, rivers and drains. There is a strong move within Fisheries Departments to improve the recording of small species of no angling interest. Spined loach is sometimes caught in routine fishery surveying, and are sometimes picked up by routine macro-invertebrate surveys.

Action plan objectives and targets

- A. Ensure the continued survival of the spined loach in one of its stronghold catchments; the River Great Ouse.
- B. Establish the status and distribution of spined loach in Bedfordshire and identify favoured habitats so that protection is afforded from disturbance caused by river management procedures by 2005
- C. Establish mechanisms for both casual and targeted monitoring of spined loach populations.

Proposed action

Abbreviations

BCC	Bedfordshire County Council
BNHS	Bedfordshire Natural History Society
CLA	Country Landowners Association
EA	Environment Agency
EN	English Nature
FWAG	Farming and Wildlife Advisory Group
IDB	Bedford Group of Drainage Boards
MAFF	Ministry of Agriculture, Fisheries and Food
NFU	National Farmers Union
WT	Wildlife Trust for Beds, Cambs, Northants & Peterborough

Action

Implemented by

Policy and legislation

a). Lobby for designation of appropriate parts of the catchment in Bedfordshire as SSSIs or SACs associated with spined loach	BCC, EA
b). Seek to ensure water quality objectives on all controlled waters are achieved and that ecological requirements of the spined loach are taken into account.	Anglian Water, EA
c). Local Environment Agency Plans (LEAPs) to include targets and actions to safeguard the spined loach where appropriate. Site safeguard and management	EA
a). Identify population distributions of spined loach in Bedfordshire and use this information to highlight key habitats that need protection and identify habitat characteristics for re-creation projects elsewhere.	BCC, BNHS, EA, WT
b). Consider the needs of spined loach when undertaking any river maintenance operations or flood defence capital works which could affect flows or habitat regime. Promote the use of soft-engineering and resist canalisation and culverting wherever practical.	EA, IDB
c). Support provision of chemical free riparian buffer strips adjacent to intensive agriculture, especially in identified priority areas for spined loach.	EA, FWAG
d). In waterbodies with spined loach populations ensure stocking is restricted to repopulating after pollution incidents or water quality improvements.	Angling Clubs

Spined loach

Action	Implemented by
Species management and protection	
a). No action proposed	
Advisory	
a). Disseminate management guidelines to landowners, fishing clubs and operating authorities on how to incorporate the needs of spined loach into management works.	EA, EN
b). Disseminate species awareness leaflet (Environment Agency) to all interested parties.	EA
c). Improve liaison with fishermen, regarding the spined loach to obtain any useful information regarding their presence.	BNHS, EA
d). Nutrient budgeting and soil conservation measures on farmland should be encouraged and the establishment of buffer strips considered to reduce phosphate loss into rivers. Application of best agricultural practice and effective enforcement of the Slurry, Silage and Agricultural Fuel Oil Regulations will alleviate problems of organic sediments and reduced oxygen availability.	CLA, FWAG, MAFF, NFU
Future research and monitoring	
a). Investigate spined loach distribution, status and identify any spawning areas in Bedfordshire Great Ouse and its tributaries.	BNHS, EA, WT
b). Encourage anglers to record any spined loach seen.	Angling Clubs
c). Ensure that spined loach records from various organisations (Environment Agency, Natural History Society, Angling Clubs etc) are collated and made available to the Biodiversity Recording and Monitoring Centre. Angling Clubs,	BNHS, EA
d). Targeted surveys of distribution and status, using point abundance sampling or simple hand trawls in likely habitats as a regular part of Environment Agency Fisheries Department work.	EA
Communication and publicity	
a). No action proposed	

Complementary plans

Bedfordshire and Luton Biodiversity Action Plans for Waterways and Wetlands, Water Vole, European Otter and White Clawed Crayfish.

Upper Ouse Local Environment Agency Plan (LEAP). The Environment Agency, Anglian Region, Central Area, Bromholme Lane, Brampton, Huntingdon, Cambs. PE18 8NE.

Bedford Ouse Local Environment Agency Plan (LEAP). The Environment Agency, Anglian Region, Central Area, Bromholme Lane, Brampton, Huntingdon, Cambs. PE18 8NE.

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References

Bedfordshire Natural History Society annual journal-reports of the fish recorder.

English Nature (1999) **Minor fish species**, workshop proceedings document, final report.

Mainstone C P (1998) Environment Agency Species Management Guidelines: spined loach *Cobitis taenia*.

Mann R H K (1996) **Species Action Plan: spined loach *Cobitis taenia***, report to English Nature in association with the Environment Agency.

Perrow M R and Jowitt A J D (1997) **The habitat and management requirements of spined loach *Cobitis taenia*** English Nature Research Report No 244 English Nature Peterborough

Perrow M R and Jowitt A J D (1998) **Survey of selected sites and habitats for spined loach *Cobitis taenia*** English Nature research report no.303

