

Migration and spawning of river lamprey *Lampetra fluviatilis* in relation to spawning habitat availability in a regulated river, River Derwent

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Introduction

The river lamprey *Lampetra fluviatilis* is a parasitic, principally anadromous, lamprey species which typically migrates upriver in winter and spawns in spring. Formerly widespread through western Europe, it is now regarded as endangered. The reasons for this are not wholly clear, but disruption of migration and access to freshwater spawning and rearing habitats appears to have played at least a part (Hardisty 1986). The aim of this study was to examine the influence of multiple, small river-channel obstructions on the upstream migration of adult river lamprey in relation to the availability and use of fragmented spawning habitat in a regulated river.

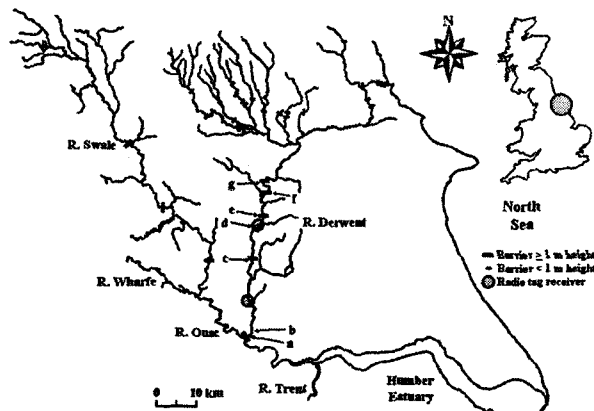


Fig.1. Location of the Derwent study area. (a) Barmby Barrage, (b) Loftsome Bridge [4 km upstream (u/s) from Derwentmouth], (c) Elvington Sluices (25 km u/s DM), (d) Stamford Bridge Weir (35.4 km u/s DM), (e) Buttercrambe Weir (40.2 km u/s DM), (f) Howsham Weir (45.7 km u/s DM), (g) Kirkham Weir (50.3 km u/s DM).

Materials and methods

Trapping (1.0 m long, 2-funnel eel pots, mesh to first funnel 12 mm mesh after first funnel 10 mm) was carried out at five sites (a, b, c, d and g in Fig. 1) in the lower Derwent between 19 November 2002 and 16 April 2003 in order to provide lamprey for radio-tagging. In total, thirty-four river lamprey (mean±SD total length, 37.7±3.2 cm; weight, 108±18.7 g) were radio-tagged and released at the site of capture.

Results and summary

The degree of influence of river regulation on diadromous fish populations is principally a function of availability of appropriate habitat and access to that habitat. The impact of river channel obstructions on upriver migration and access to spawning habitat was examined for the river lamprey *Lampetra fluviatilis*, a threatened European anadromous species, by radio-tracking and field survey in the River Derwent, a small, regulated river in North East England, with a tidal barrage and five other low-head (1.6-2.6 m) barriers in the lower 80 km of river.

Radio-tracking demonstrated rapid, nocturnal upriver migration of up to 44.7 km in 19 days, but that the distance moved upriver was strongly related to the date of tagging and to flow. Although fishways exist at several barriers, 50% of radio tagged lamprey tracked for over 20 days did not pass any barriers, while 42% passed one barrier, 4% passed two barriers and 4% passed three barriers. Potential lamprey spawning habitat occupied less than 0.8% river length of the lower 80 km of the Derwent, but became more abundant upstream of that area. Adult river lamprey were observed at six of sixty six potential spawning localities surveyed in 2003. They were concentrated below obstructions, with the size of spawning aggregations declining with distance upstream. Although spawning habitat was abundant further upstream most lamprey used remnant habitat patches in the lower reaches, which are highly susceptible to human intervention and have the potential to act as a population bottleneck.

References

- Hardisty M.W. 1986. *Lampetra fluviatilis* (Linnaeus, 1758) *The Freshwater Fishes of Europe. Vol. 1, Part I. Petromyzontiformes.* pp. 249-278. Aula-Verlag, Wiesbaden.