

Migratory behaviour and spawning of adult river lamprey *Lampetra fluviatilis*

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I proposed to extend my recent research on the initial phase of up-river migration of river lamprey *Lampetra fluviatilis* to gather field data on spawning behaviour and the fate of spawned river lamprey, to analyse these results, produce a manuscript for publication and present my results at an international conference on freshwater biology (SEFS 2003, Edinburgh). The study was carried out in the River Derwent, a tributary of the River Ouse (north east England), using mark-recapture and radio-tracking. Under the EU Habitats and Species Directive, the lower Derwent is a candidate Special Area of Conservation (SAC), in which river lamprey, as well as sea lamprey *Petromyzon marinus* and brook lamprey *L. planeri* comprise relevant Annex II species components and are afforded conservation assistance in the context of that directive.

Rapid upstream migration of winter-running adult river lamprey was demonstrated by radio-tracking, but several obstructions appear to have limited their upstream penetration to the lower parts of the river, which have little spawning habitat. The maximum migration distance recorded for radio-tagged river lamprey was 43 km upstream from the release point, 19 days after release at Barmby barrage, close to the mouth of the Derwent. Most of their final positions were recorded just below weirs and maximum upstream migration distances of tagged lamprey varied with the date of tagging, with those lamprey tagged earlier and further downstream moving further than those tagged later and further upstream.

River lamprey radio-tagged at spawning areas did not move more than 200 m from core spawning areas, suggesting that they spawned and subsequently died there. Of over 60 sites in the Derwent catchment surveyed for spawning river lamprey in spring 2003, river lamprey were observed only at six. At one of these sites, the lowest in the river at which spawning was recorded (35 km upstream of the river mouth), a total of 17 990 adult river lamprey were counted over 15 consecutive days of the spawning period (13th–27th April 2003). The daily maximum count was 1,804. The available spawning habitat at this site was 450 m². Individual marking of 1,284 lamprey over the 15-day period and the proportion of these recaptured gave a conservative estimate of the spawning population at this site of 5,000, giving a cumulative density of 11 adult lamprey per square metre using the site of the spawning period. Nest construction was carried out primarily by females contrary to previously published accounts. Recapture data showed that over 97% of recaptured, tagged males were recorded at one or more different nests from those at which they were first tagged, whereas almost 50% of recaptured, tagged females were recorded at the same nest. Moreover, the operational sex ratio (OSR) was strongly biased towards females in nest-building and post-spawning colonies, whereas the OSR was biased strongly to males in spawning colonies, suggesting a strongly polygynous mating system within the population.

Within the Derwent, river lamprey spawning was restricted to just a few sites, mostly below weirs on the lower river, although as demonstrated very large spawning aggregations occurred at some sites. These may be susceptible to catastrophic events such as pollution, while collection of spawning lamprey for fishing bait could also be a threat. Lamprey are a popular bait for pike fishing in Britain but there appear to be very limited sanctions prohibiting their collection. For rivers with special conservation status such as the Derwent, careful attention needs to be paid to attaining and maintaining effective habitat protection, lamprey passage and prevention of exploitation at spawning grounds to help safeguard river lamprey populations. These issues probably also apply more widely elsewhere in Britain and Europe where lampreys occur.

The funds from the Hugh Cary Gilson Award were used to support my fieldwork costs and SEFS3 Conference (Edinburgh) attendance. A manuscript concerning the results of the lamprey spawning observations (M.-H. Jang & M.C. Lucas, Reproductive ecology of the river lamprey, *Lampetra fluviatilis*) has been prepared for publication.