Chapter 10
Overview of this study
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The European Eel is a fish of significant commercial and ecological importance. It is one of only fifteen native fishes present in Ireland’s freshwater ecosystems and is perhaps the most recognisable of all our fauna. There is a long history and tradition of eel fishing on the Shannon, and this fish has a high heritage value both in this regard and though it’s ecological importance. The life cycle is remarkable, but it is largely this elaborate life cycle which has resulted in its decline in river systems throughout its range. The European Eel is a unique indicator of the environmental health and integrity of our oceans, estuaries and freshwaters, and its recent decline is seen as a serious environmental matter. The current study focused on eel stocks in the River Shannon, and was particularly concerned with the biology of juvenile eel stocks. A central theme in this study was management, and site specific methods to improve the recruitment of juvenile eel in this catchment through estuarine and riverine trapping, fingerling collection by electrical fishing and the improvement of natural recruitment through existing fishways, were sought.

Plate 49 Lower Shannon flood being partially released at Parteen Regulating Weir.

One of the key findings of this study was that, despite the global downturn in the abundance of this species, significant stocks of juvenile eels continue to enter the Shannon estuary. The
immigration patterns and development characteristics of glass eels were found to be similar to that found in other studies on the Shannon and other European Rivers. On the Shannon, glass eels arrive into the estuary from November/December onwards, with the highest abundance recorded during the months of February and March. Activity was found to peak during spring tides, and glass eels were found to be active during tides associated with both the new and full moon cycles. In addition to tidal influences, water temperature and discharge were found to play important roles in stimulating glass eel activity. The results indicate that the potential glass eel fishing season in the Shannon estuary extends from January to April, and support proposals made to obtain restocking material directly from this area. The movement of glass eels/elvers into freshwater was found to be dependent on water temperature and discharge. As in other studies, it was found that water temperatures over 10-12°C are required to trigger active upstream migration of elvers. The riverine migration period was found to extend from March to September, with peak activity during the period April-May. Larger juveniles eels migrated throughout the season, but the majority of elvers had a shorter migration period from mid-June to mid-August.

The mortality rate of glass eels in the Shannon estuary is unknown at this time however there are indications that it may be high. For example, significant and similar quantities of glass eels were present in the Shannon estuary during all study years, however only during 1997 - a year of low discharge and relatively high water temperatures – were significant catches of elvers made at the riverine trapping stations. The catches of both glass eels and elvers during the study period were significant and the catch during 1997 was the highest made at this location since 1982, and the fourth highest ever recorded at this location. Indeed the cumulative catch for 1997 (glass eels, elvers, and fingerlings combined) was fifth highest annual catch on the Shannon since records were started in 1959.

Other studies made as part of this thesis included an investigation of fish migration at the Ardnacrusha Borland fish-lift with particular emphasis on eels, an investigation of the interaction between brown trout and eels in the lower reaches of the River Shannon, and a study of juvenile eels in the lower reaches of tributaries of the Shannon estuary using electrical fishing. Although 26% of all upstream migrant fish recorded at the Ardnacrusha fish-lift were eels, it was concluded that the total numbers displaced upstream did not make a significant contribution to eel recruitment on the Shannon during the study period. The results also suggested that the efficiency of the fish-lift may be low at present. Other investigations concluded that trout are important predators of juvenile eels in the lower Shannon, and the displacements of trout upstream at Ardnacrusha Borland fish-lift may be a result of trout attempting to follow their prey upstream. The economic and ecological feasibility to collecting juvenile eels from the lower reaches of tributaries of the Shannon
estuary was also demonstrated. The growth rates of eels recorded during the current study were relatively slow and were similar to those previously reported for dense populations on the Lower Shannon.

Plate 50 Photo of eel being released after capture by electrofishing.

It is hoped that studies such as the current one will make a significant contribution to the conservation of the species at a local and national level, and also contribute to international efforts to safeguard its future. Although European Eel continues to be a common and indeed locally abundant species, the absence of a method of artificial propagation coupled with this species’ complex habitat requirements could make it particularly vulnerable to extinction in the future. The current study has made a significant contribution to our knowledge of the European eel in the Shannon catchment. Research and stock enhancement measures undertaken to date indicate that it is currently feasible to obtain the juvenile eel stocking requirements necessary for long term conservation and development of eel stocks in the River Shannon system from the Shannon region alone. The strategy to be adopted will necessitate the implementation, on an expanded scale, of a range of capture methods shown to be appropriate to the various locations and life history stages of juvenile eel being utilised.