Issue 13

Welcome to the Newsletter

Firstly, I would like to take this opportunity to wish you all well in these unprecedented times. I understand how challenging it is to operate under the current restrictions; however, I am confident we will get through this and that some level of normality will return soon.

A topic of focus for IFI is river restoration, which is a complex, challenging task-a balance between returning rivers to a pristine ecological state and maintaining their vital ecosystem services in a landscape that is changing over time. This issue highlights how IFI Research is developing the science behind

Science-Based Guidance on River Restoration — Hydromorphology & Climatic Change



From the cover of the latest IFISH on river restoration works

Over the last two centuries or so, Ireland's rivers have been subjected to navigation works, drainage schemes, and landscape uses that have changed their hydromorphologythe shape and physical characteristics of river channels. In recent years, trends in rainfall, air temperature and extreme weather events are changing ambient water temperatures and flow regimes in rivers, as well as the frequency and duration of droughts and floods. To encourage best practice based on international recommendations, IFI Research has issued guidance for state agencies and catchment stakeholders to incorporate into river restoration projects.

The latest issue of IFISH - Fish and Habitats, an electronic publication by IFI with a focus on fisheries ecology and environmental management, is "River Restoration Works -Science based Guidance centered on Hydromorphological



Four years difference: pre and post restoration works



lascach Intíre Éireann **Inland Fisheries Ireland**

river restoration and working with catchment stakeholders to restore and protect rivers and riparian zones.

As always, we thank all IFI staff who contribute to our research programmes and to this newsletter. Keep safe! Slán,

Dr. Cathal Gallagher, Head of Research & Development

River restoration	
CatchmentCARE & cattle	
Monitoring climate impact	ls

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n this issue Tracking ferox trout **IMREC** angler surveys Silver eel monitoring

Principles in an Era of Climate Change". The guidance describes an evidence-based assessment process for river restoration works and provides a framework for planning, designing, implementing and monitoring restoration projects, with examples of best practice that are compliant with Irish legislation and European directives. Also included are sections on barriers, managing alien invasive species and the habitat requirements and migration times of fish found in Ireland's rivers.

The guidance emphasises that restoration projects should consider lateral connectivity between rivers and their surrounding floodplain as well as longitudinal connectivity along rivers, allowing rivers to flow freely without barriers to fish migration. Restoration works should also prioritise tree replanting and protection of vegetation along riverbanks, which can help prevent erosion and buffer changes in temperature, thereby helping to mitigate the potential impacts of climatic change on rivers.

Key principles in the guidance are that restoration works should build the resilience of rivers to climatic changes and the capacity of rivers to provide ecosystem services. Maintaining natural hydromorphology, flow regimes and riparian vegetation along Ireland's 74,000km plus of rivers and streams will protect fish migration and vital habitat for fish stocks into an uncertain future. The river restoration guidance is available at https://tinyurl.com/river-restore.



Deciduous canopy cover providing dappled shade over a stream

Developments in Inland Fisheries Ireland Research

CatchmentCARE Restoration Projects Help Farmers Manage Cattle Access to Rivers

Cattle access points to rivers and streams for drinking can have negative impacts, such as trampling of riverbanks, destruction of riparian vegetation and reduced water quality by introduction of sediment and faecal matter. The CatchmentCARE team is working with farmers to provide drinking water to cattle while protecting rivers from their impacts by installing alternative drinking sources and fencing. Known as passive restoration, this approach allows natural river processes to take place, in turn creating a diverse range of habitats within the river corridor. Improving hydromorphology or 'naturalness' of a river in this way makes it more resilient to pressures.

The interregional CatchmentCARE programme involves several local authorities and state agencies working with local communities in cross-border catchments to improve freshwater water quality and build resilient ecosystems. On the Arney River in Fermanagh, the CatchmentCARE team



Livestock fencing along the Roo River

is working with the farming community to install a total of 11.3 km of fencing along 8.3km of river in two phases. Similarly on the Roo River in Cavan, which is a designated Area for Action under the Water Framework Directive, 6.6km of fencing will protect 4.1km of river. All three projects involve the installation of drinking points for livestock with associated pipework connecting to water sources, such as pasture pumps or solar-powered pumps from the river, rainwater harvesting systems, or mains supplies.

The restoration work will also involving planting native wildflowers and hundreds of tree saplings, including oak, alder, hazel, rowan, spindle, guelder rose and holly, to restore riparian habitat and to protect riverbanks from erosion. These projects are just one example of how CatchmentCARE is helping local communities to understand the pressures that rivers face and the actions that they can take to protect their local environment.



Water quality and restoration sites on the Arney River and Roo River

Climate Change Mitigation Research Programme — Visualising a Year on the Erriff

The Climate Change Mitigation Research Programme (CCMRP) aims to assess the impact of climatic change on Ireland's fish species and habitats, with the ultimate goal of building capacity for mitigation strategies. One approach used by the CCMRP to bridge knowledge gaps is to integrate data from different sources.

By situating a weather station at the Erriff National Salmonid Index Catchment (NSIC), the CCMRP team have been able to analyse the relationship between weather patterns, water levels from an Office of Public Works gauge on the river and data on fish movements from the NSIC fish counters to find interesting patterns. In 2020, for example, smolts took advantage of a wet spell around May 19th–22nd to run to sea during the otherwise dry period in the early summer. Peak sea trout run was in late June, whereas salmon runs did not respond until mid July despite good floods.

The work of the CCMRP team and IFI staff based at the NSIC shows how valuable an index catchment that

facilitates research by multiple projects can be for investigating how climatic changes will affect Ireland's fish stocks. A webstream from the Erriff NSIC weather sensor array is available at https://tinyurl.com/ccmrp-erriff-nsic.



Developments in Inland Fisheries Ireland Research

Radio-Tracking Study of Ferox Trout Spawning Helps Establish Conservation Measures

Ferox trout are a highly prized trophy fish among trout anglers. A fish-eating ecotype of brown trout usually found in large, deep lakes in Ireland, ferox trout tend to grow to large sizes and are long-lived compared with other brown trout, and there is evidence that they form genetically distinct populations in lakes where they are present. A recently published study by IFI Research has helped to improve conservation measures for this special type of trout.

Last October in the *Journal of Fish Biology*, Paddy Gargan of IFI Research and colleagues published a radio tracking study in which 134 ferox trout in Lough Corrib and Lough Mask were captured and fitted with tiny radio transmitters over 2005–2009. As well as monitoring surveys by foot along potential spawning steams by IFI staff, the survey involved



Radio-tagged ferox trout with antenna visible on its belly

 Ferox trout being released for tracking

the Irish Air Corps, which provided survey flights by helicopter over the lakes to detect tagged fish. The study showed that in both lakes, most ferox spawned in a single location: 92% of Corrib ferox spawned in the Cong River, and 76% of Mask ferox spawned in the Cong River and adjoining Cong Canal. This reliance on a small number of spawning locations by most of the population highlights the vulnerability of the ferox stocks in these lakes.

On the basis of the ferox study, new measures have been implemented to conserve this important angling resource in the Great Western Lakes. The trout season on the Cong River and Cong Canal has been restricted to protect ferox during their spawning migration. In addition, the Cong River and Cong Canal waterbodies have been recommended as requiring protection under the Water Framework Directive.

Wanted: Your 'Fishy Stories' — Sea Anglers Contribute Valuable Insights to IMREC Surveys

In early 2020, the Irish Marine Recreational Angling Survey (IMREC) team conducted an extensive national online survey to collect information about the behaviour and attitudes (B&A) of sea anglers in Ireland. As well as asking anglers about the current status of sea angling, the survey was designed primarily to characterize sea angling activity in Ireland. To collect data on why, when and where sea angling takes place and what species are important, the confidential and anonymous questionnaire was created in consultation with the project Steering Group representative of all sea angling interests in Ireland.

The survey gathered information on fish catch preferences of over 1,000 sea anglers in Ireland. Most frequent reasons given for sea angling were to relax, to unwind and to be outdoors. Anglers identified that mackerel, cod, pollack and bass were among their favourite species to target. The information will help the IMREC project team to make more informed decisions on how best to estimate angling catch and catch-and-release rates in Ireland. The "Behaviour & Attitudes Survey of Irish Sea Anglers" report can be accessed at https://tinyurl.com/imrec-ba-report. Continuing their efforts to explore the potential of citizen scientist anglers, the IMREC team is now launching a new online survey carefully designed to request sea anglers to contribute their observations of trends in fish species, which will help our understanding of how the state of coastal fisheries resources has changed over time. Sea anglers can share their knowledge with this survey by using the following link: https://www.surveymonkey.com/r/Fishing_Then_and_Now



Word cloud based on anglers' comments from the IMREC B&A report

Developments in Inland Fisheries Ireland Research

Silver in the Dark — Monitoring Ireland's Population of Migratory Silver Eels

The IFI Eel Monitoring Programme (EMP) annually assesses the escapement of the migratory phase of the European eel, *Anguilla anguilla*, known rather charismatically as the silver eel. As adult eels migrate to sea after spending years feeding and growing in rivers and lakes, they metamorphose, developing a characteristic silver colour along their sides. Their eyes and pectoral fins grow larger, and their digestive systems almost completely waste away—silver eels live off fat reserves alone to fuel their migration and sexual maturation. These changes help prepare the fish for the 6,000km swim towards their still mysterious spawning grounds, somewhere in the Sargasso Sea.



Coghill net fishing for silver eels in the Fane Fishery

Silver eels migrate to sea in winter, when rivers are high and especially when nights are dark around a new moon or due to weather conditions. Through the dark of winter, the EMP monitors this escapement from two index catchments in partnership with former commercial eel fishers. The Fane Fishery takes in high numbers of migrating eels running from the Clarebane River, the outflow of Lough Muckno. This lake remains one of the few strongholds for eels on Ireland's east coast. In contrast, the Barrow Fishery at Ballyteiglea Lock is an entirely riverine system, with the eel population dispersed throughout the catchment, rather than in a focal location.



The EMP records this catch to generate escapement numbers, total biomass, length frequencies, sex ratios and age profiles. Ireland must report on silver eel escapement to the EU every three years under the Eel Regulation for the recovery of eel stocks. The EMP also monitors the prevalence of the parasitic swimbladder worm *Anguillicola crassus*, an alien invasive species which is a major concern because it can damage eels' swimbladders, therefore possibly adversely affecting the swimming performance and ability to migrate of silver eels.

In recent years, the stock structure of eel fisheries have changed. As the eel population reduces in numbers, eels tend to grow larger and develop into females, resulting in a dramatic crash in the proportion of males. This pattern is indicative of the stark collapse of European eel stocks across its range, and these demographic changes are likely to be a response to reduced glass eel and elver recruitment beginning in the early 1980s. This important monitoring of Ireland's silver eel stocks was maintained this winter by the EMP, working within IFI Covid-19 protocols, to continue bringing our knowledge about this fascinating fish out of the darkness.





We Hope You Enjoyed the Newsletter

Feedback is always welcome, so please get in touch if you have any comments. Contact Rory Feeney at 01 8842636 or <Rory.Feeney@fisheriesireland.ie> Inland Fisheries Ireland, 3044 Lake Drive, Citywest Business Campus, Dublin D24 Y265 http://www.fisheriesireland.ie/Research-and-Development/fisheries-research.html IFI Research social media

@ ResearchIFI
 IFI Research
 YouTube channel