Research Project Summaries

2010

Iascach Intíre Éireann
Inland Fisheries Ireland

Contents

Chairman's Statement

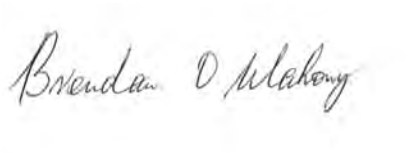
This report summarises the major research projects undertaken by Inland Fisheries Ireland (IFI) during 2010, a year in which the research function of the Central Fisheries Board was incorporated into the new fisheries organisation that is Inland Fisheries Ireland. The report is a précis of the key research projects but does not attempt to document the full spectrum of work undertaken and advice provided by IFI scientists.

2010 was a very challenging, but yet rewarding year for the IFI Research Division. Many projects were impacted by reduced resources and staff levels and in addition the research teams were further hampered by poor weather conditions during the surveying season. Despite these restraints I am delighted to report that the Water Framework Directive, Eel Monitoring, Conservation Limits Attainment, Environmental River Enhancement and Waterways Ireland projects teams delivered the key goals outlined in the 2010 business plan.

The Board of IFI recognises the expertise, experience and dedication of the IFI scientists and research staff and their contribution to the conservation and protection of the valuable inland fisheries resource. It should also be noted that this work could not be achieved without the cooperation and commitment of the management and staff from each of the IFI River Basin Districts.

The Board appreciates the role that research plays in supporting management decision making and in providing advice to our parent department, other state agencies and key stakeholders. For without data on the status of catchments and their species, IFI will not succeed in making good management decisions to support our core goals of conservation, protection and development of the inland fisheries resource and sea angling.

Finally, on my own behalf and on behalf of my fellow Board members I would like to commend the research team on the volume and quality of the work delivered in 2010.



Brendan O'Mahony

Chairman, Inland Fisheries Ireland.

Foreword

The Research and Development (R&D) Division of Inland Fisheries Ireland (IFI) is tasked with the delivery of applied research to support the conservation and development of Ireland's inland fisheries resource. In 2010, the focus of the Division has been on the provision of expert scientific advice and in servicing the requirements of National, European and International legislation. Scientific advice is essential in supporting fishery management decisions and in the development of strategies and legislation to enable the protection and conservation of inland and coastal fish species and their habitats. The research team's stated goal is the delivery of high quality, budgetary and time bound applied research in partnership with other State and international agencies including Universities.

2010 was a year of major organizational change in the inland fisheries sector, with the integration of the Central and Regional Fisheries Boards into the new national organisation, Inland Fisheries Ireland, (IFI) on 1st July 2010. IFI's R&D function is tasked with delivery on a key national strategic goal "to develop and deliver high quality, cost effective, applied scientific research and development services to meet the IFI's customers' needs". This goal is to be delivered through:

- conducting scientific research on fisheries to deliver economic and heritage benefits by ensuring sustainability and conservation of fish in their ecosystems
- conducting research in conjunction with sister agencies to provide advice for the management and understanding of ecosystem function in aquatic fisheries habitats
- ensuring adherence to operational procedures which harmonize with our environment and cultural heritage
- supporting and preserving the quality and diversity of aquatic ecosystems and ensuring compliance with relevant European Union and national legislation
- providing an advisory service to relevant bodies.

As we moved into 2010 Ireland continued to experience the effects of a contracting economy and the resulting implementation of budgetary and human resource constraints in the Public Service. These constraints were reflected in our 2010 Business Plan, resulting in project prioritisation to meet European Union (EU), National and International reporting requirements. This report summarises some of the larger projects' objectives and achievements; the intent being to give the reader a sense of the applied research role rather than to document all projects and areas of advice delivered during 2010. For each project a separate, detailed report is provided to the main stakeholders.

During 2010, IFI was involved in over 20 projects across a broad range of fisheries research and monitoring activities including water chemistry, aquatic vegetation, aquatic invasive species, coarse fish, pike, endangered (conservation) species, native fresh water fish and marine recreational fish species. Many of these projects deliver advice to fishery managers to support decisions, for instance, on the conservation of salmon, or addressing the threat of invasive species

or fulfilling the requirements of the Habitats and Water Framework Directive. Several of these projects are delivered through strategic partnerships with others including; national agencies such as the Marine Institute, the National Parks and Wildlife Service (NPWS), Waterways Ireland(WI), the Office of Public Works (OPW); academic partners in Queens University Belfast, University College Dublin, University College Cork and Trinity College Dublin; the following International agencies: Environmental Agency (UK), European Union, North Atlantic Salmon Conservation Organisation (NASCO) and the European Inland Fisheries and Aquaculture Advisory Commission (EIFAAC).

The new inland fisheries organisation offers the opportunity to ensure a consistent prioritised national approach is taken to all research projects. This is of particular importance in the current difficult economic climate and where IFI are faced with many challenges to our natural aquatic environment. In the coming year, the IFI research function will again operate in a climate of diminishing staff numbers and resources. In order to deliver the best possible service for our stakeholders we will use our project and business management processes to deliver optimum results from these reduced resources.

Cathal Gallagher, Head of Research and Development, Inland Fisheries Ireland.

Marine Sports Fish

Overview

Inland Fisheries Ireland has operated the National Marine Sport Fish Tagging Programme for over 40 years. This is recognised as one of the largest and most important tagging programmes in Europe and is mainly concentrated on elasmobranch (sharks and rays) captured in Irish waters. Over this period and up to the present day approximately 40,000 fish, mainly blue shark, have been tagged. Apart from being valuable commercial species, shark and rays are significant angling species and data are required to assess and manage the conservation and protection of these species and their habitats, both internationally (for distant migrants) and locally (for local migrants).

The entire national tagging dataset was captured on paper records or, in more recent years, stored in mixed digital formats and it was essential that these data were entered into a database. IFI, with the support of the Marine Institute (MI) and University College Dublin, has been developing a comprehensive national database for this programme to facilitate full analysis of this data set.

Project Deliverables

- To prepare all IFI marine sport fish tagging data for incorporation into a newly created national marine sport fish tagging database and to carry out analyses of all species distribution and movement based on these datasets.
- To ensure all data is digitized and a database is installed in IFI.
- To prepare reports on all species outlining distribution, migration patterns and biological data for incorporation into management reports for a wide variety of uses (EU conservation & management objectives, objectives from international conservation conventions and national management of stocks for the marine angling sector).

Planned Completion Date and availability of final report

This project will be completed in March 2011 with a final report and database also delivered at that date.

Status

All data on this project has been digitized in 2010 with the final report pending in March 2011.

Luke Byrne with tagged Tope before its release back to the sea

Project Manager:	Dr. William Roche
Total Budget:	€23.5k
Funding Source:	Marine Institute & CFB core funding
Resource utilizes:	External contract UCD
Deliverables:	Database and supporting documentation.

Dr. William Roche

Pike Research

Overview

Because pike is a key angling species in Ireland, it is necessary for IFI fishery managers to understand the basic biology and ecology of the fish under different conditions. Little research has been conducted on pike in Ireland in the recent past; this three year project, which is being conducted in cooperation with University College Dublin, will help address this deficiency and fill in some of the large gaps in our knowledge of this species.

Pit tagging of pike from L. Sheelin prior to its transfer into L. Slevins

Releasing pit tagged pike into L. Slevins

Project Deliverables

The key objectives will centre on the following areas:

- Phyloecology – use micro-satellite (DNA) samples to study pike from different parts of Ireland, Britain and other European countries to look at the possible origins of Irish pike stock/s.
- Review pike data held by IFI in order to update information on the biology of Irish pike in relation to diet, differential growth patterns and longevity of male and female fish.
- A "stable isotope" study of pike (using flesh samples) across a range of different ecological habitats will provide information on the variation in the fish's diet, across age classes, with particular reference to the transition from an invertebrate to a piscivorous diet.
- The survival of pike transferred to new waters from their natal habitat will be evaluated.

Planned Completion Date and availability of final report

This project will be completed in January 2013, with a final report and data delivered to IFI by March 2013. Annual progress reports are also part of this deliverable.

Status

In 2010 a detailed work programme is in place for the three year project. Both laboratory and field studies have been in progress for some time and excellent progress has been made in relation to both the ecological and genetic aspects of the project.

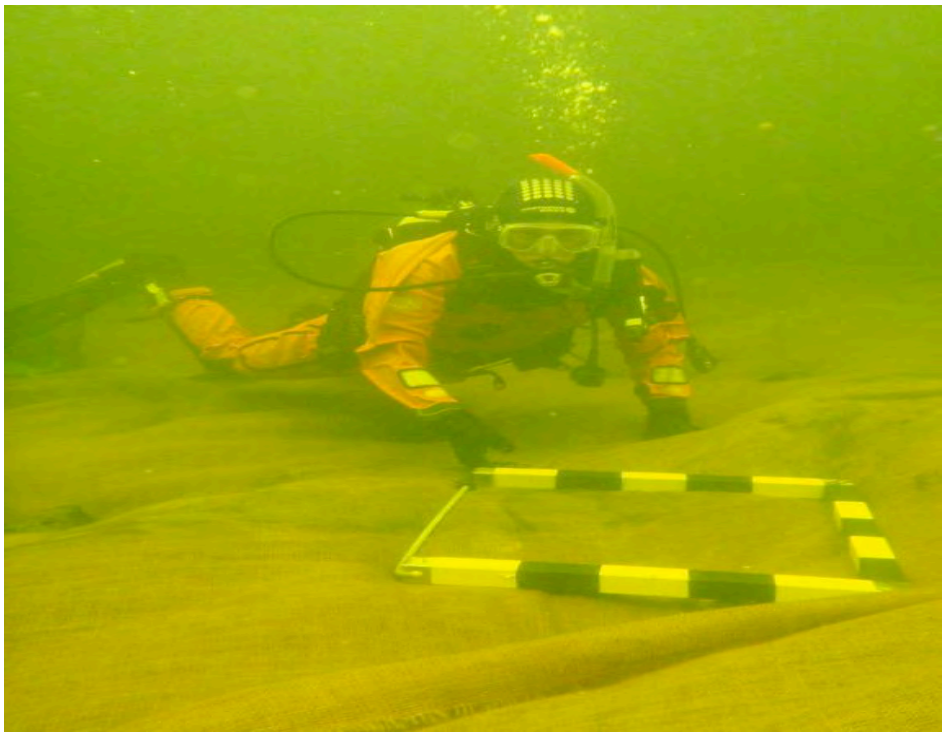
Project Manager: Dr. Martin O'Grady & Dr. Joe Caffrey
Total Budget: €84,000
Funding Source: Irish Federation of Pike Angling Clubs & CFB core funding
Resource utilizes: External contract UCD, Ph. D. Studentship & IFI staff
Deliverables: Reports, data and advice on the status and behavior of Irish Pike.

Dr. Martin O'Grady. Dr. Joe Caffrey.

Control of Aquatic Invasive Species in Ireland (CAISIE)

Overview

The aim of the Control of Aquatic Invasive Species in Ireland (CAISIE) is to contribute to the halting of biodiversity loss in Ireland by preventing further impacts on native biodiversity from high impact aquatic and riparian invasive species. This will be achieved through the development and demonstration of effective control methods, a programme of stakeholder engagement and awareness raising, and policy development and dissemination. This project is jointly funded by the National Parks and Wildlife Service and the European Union (through the EU LIFE+ programme).

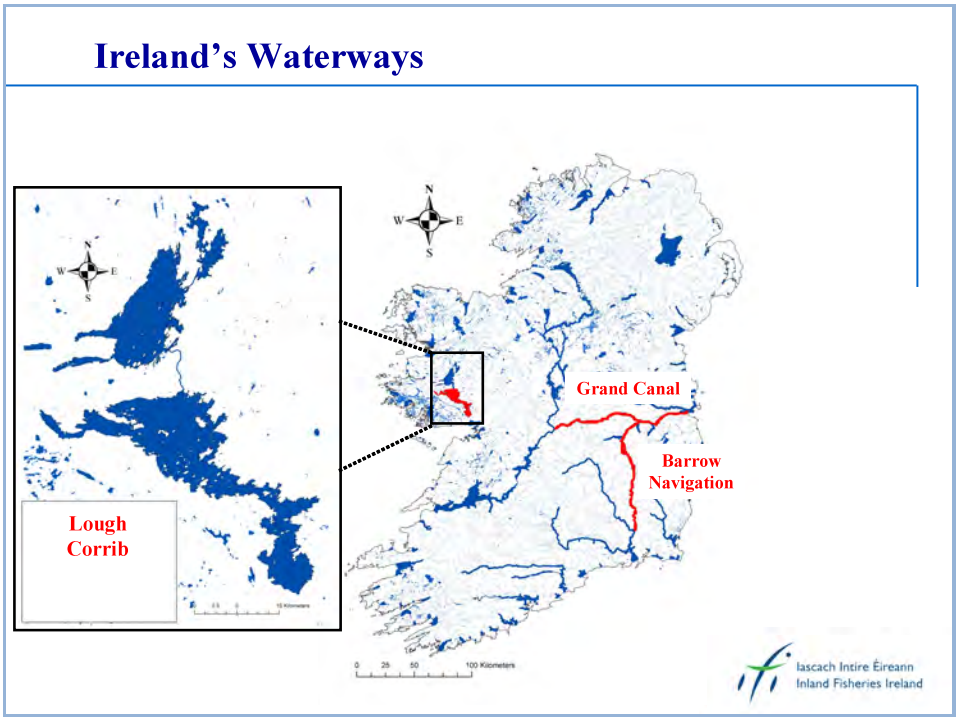


This photo shows the work being carried out under water with the jute in place

Project Deliverables

- To protect the native biodiversity in Lough Corrib by cutting and managing *Lagarosiphon major*.
- To prevent further spread of high impact aquatic invasive species by implementing control measures in a key dispersal corridor (The Grand Canal and Barrow Navigation system).
- To collect data on effective control methods and develop guidelines for effective aquatic and riparian invasive species management.
- To engage key stakeholders in education and awareness programmes aimed at preventing new invasions, further spread and re-invasion by existing high impact invasive species.

- To exchange and disseminate information on control methods and progress through links with other European invasive species control teams and policy makers leading to more effective control of aquatic invasives in Ireland and across Europe.
- To contribute to the protection of biodiversity in Ireland and the European target to halt biodiversity loss by 2015 by building capacity on invasive species control.



Planned Completion Date and availability of final report

This project will be completed in December 2012, with the final report delivered to the EU in April 2013.

Status

The CAISIE project has now completed the first year of a three year programme. Control works on *Lagarosiphon major* in Lough Corrib are underway with a combined programme of weed cutting, light exclusion using jute matting and chemical control methods. Preliminary research to determine the distribution of the newest Irish invader, the Asian clam (*Corbicula fluminea*) in the Barrow Navigation system commenced in 2010. In November 2010, in conjunction with Waterways Ireland, the Heritage Council and NPWS, CAISIE commenced jute matting trials and Benthic Barrier trials for control of invasive plants on the Grand Canal and Asian clam (*Corbicula fluminea*) on the Barrow Navigation respectively.

Dace from the 27th Level of the Grand Canal, Athy

Project Manager:	Ms. Shireen Sayed
Technical Manager:	Dr. Joe Caffrey
Total Budget:	€1.75 Million
Funding Source:	NPWS, IFI and EU LIFE+ funding
Resource utilizes:	IFI staff and various technical experts
Deliverables:	Reports, scientific papers, data, advice and management of invasive species.

Dr. Joe Caffrey. Ms. Shireen Sayed. Ms. Stephanie Evers.

Ms. Helen Moran. Dr.Michael Millane.

Mulkear Life+ Project

Overview

The Mulkear LIFE+ project (www.mulkearlife.com) is a €1.75 million European Union funded LIFE+ Nature project working on the restoration of the Lower Shannon Special Area of Conservation (SAC Mulkear River catchment) for Atlantic Salmon, Sea Lamprey and European Otter. Inland Fisheries Ireland is the coordinating project partner together with the Office of Public Works (OPW) and Limerick County Council. Additional funding support comes from the National Parks and Wildlife Service (NPWS) and Tipperary County Councils. The Mulkear, together with its principal tributaries (Dead, Bilboa and Newport rivers), drains a catchment area of approximately 650 km² spanning counties Limerick and Tipperary. The Mulkear River is regarded as one of Ireland's top salmon rivers and also sustains populations of Sea Lamprey and Otter. The main project objective is to restore, through in-stream rehabilitation works, degraded habitats along stretches of the Mulkear River and its principal tributaries. This work, while beneficial to many species, is targeted at Sea lamprey, Atlantic salmon and the European otter.

Sea Lamprey ascending Annacotty Weir using the newly installed lamprey pass

Preparing the Sea Lamprey Fish Pass for Annacotty Weir

Project Deliverables

- Enhancement of the populations of Atlantic salmon, Sea lamprey and otters along the Mulkear River.
- Greater awareness and understanding of issues affecting the SAC and how to manage same.
- Development of practical, costed and transferable management prescriptions for habitat rehabilitation for Atlantic salmon, Sea lamprey and European otters for other Natura 2000 sites.

Mulkear Base Map

Planned Completion Date and availability of final report

This project will be completed in September 2013 with the final report delivered to the EU in January 2014. The project plan and IFI requirements ensure the delivery of detailed reports during the lifecycle of the project.

Status

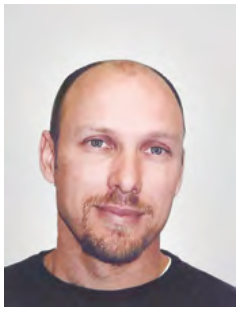
The project reports considerable progress in enhancing the populations of Atlantic salmon and Sea lamprey through in-stream rehabilitation work. For example the OPW carried out instream works, bank protection and stabilisation on approximately 1.5km on the Newport River. Considerable progress has also been achieved in addressing obstacles to the annual adult sea lamprey river upstream migration for spawning and recruitment. An extensive monitoring programme via radio tagging of Sea Lamprey began in mid-May 2010 to determine habitat use and how obstacles are approached.

Much of the early spring and summer was spent addressing and reversing the damage caused by invasive exotics (Giant Hogweed, Japanese Knotweed, Himalayan Knotweed, and Himalayan Balsam). Excellent progress has been achieved by Limerick County Council and the OPW in controlling invasives; primarily Giant Hogweed and Japanese Knotweed with significant areas

covered on the Dead, Mulkear, Annagh, Killeengarrif and Newport Rivers. In most cases this included an initial site treatment and multiple retreatments. The total area covered in 2010 was approximately 30km.

During 2010, the project team facilitated a range of events at a local and wider community level including illustrated talks, workshops, primary and post primary school visits, presentations and school field trips.

Project Manager:	Mr. Ruairí Ó Conchúir
Total Budget:	€1,740,818
Funding Source:	IFI, NPWS and EU Life **+** and associated stakeholders.
Resource Utilises	Staff and resources from IFI, Limerick County Council, North & South Tipperary Councils & the Office of Public Works.

Mr. Ruairí Ó Conchúir. Mr. Glen Wightman.

Celtic Sea Trout Project (CSTP)

Overview

The sea trout is the migratory form of the brown trout and is a popular target fish in rod and net fisheries of rivers and coastal waters around the Irish Sea, many of which are in decline. Current understanding suggests that the incidence of sea trout and the composition and status of their stocks is sensitive to the environments in which they live. Their complex life history, coupled with their widespread occurrence, makes sea trout a unique and potentially sensitive indicator of environmental change, integrating responses across diverse habitats. The EU funded INTERREG IVa (Innovation and Environmental Regions of Europe) Celtic Sea Trout Project (Ireland-Wales axis) , intends to investigate the freshwater and marine ecology of sea trout and translate it into fishery management and conservation benefits for countries bordering the Irish Sea.

Possible juvenile sea trout from the Lower Slaney – indistinguishable from resident brown trout at this life stage

Project Deliverables

The CSTP aims are:

- To understand and describe sea trout stocks in the Irish Sea and thereby to enhance sea trout fisheries and strengthen their contributions to quality of life, to rural economies and to national biodiversity.
- To explore the use of sea trout life history variation as a tool to detect and understand the effects of climate change.

Planned Completion Date and availability of final report

IFI is the lead organisation in delivering the sea trout sampling programme in freshwater, estuaries and coastal waters and will contribute comprehensively to the overall project. This project will be completed in January 2013 with the final report delivered to the EU in May 2013.

The project plan and IFI requirements ensure the delivery of reports throughout the lifecycle of the project.

Rod caught sea trout before being returned alive (pic courtesy Terry Jackson)

Status

In 2010, IFI coordinated the collection of samples of juvenile trout in sea trout spawning areas from 100 rivers within the study area, and through an angler-led sampling programme, collected up to 150 sets of adult sea trout scales from 'priority' rivers. Inshore marine sampling of sea trout was also carried out. As with all projects stakeholder engagement is vital, and in 2010 CSTP staff liaised with clubs, anglers and interested parties to demonstrate the project and the benefits of EU funding. See the project website, developed and supported by IFI at www.celticseatrout.com

Celtic Sea Trout Project Map – sea trout systems and proposed marine sampling zones

Project Manager: Dr. William Roche
Total Budget: €466k EU Funding and IFI resources
Funding Source: EU and IFI core funding
Resource utilizes: IFI staff
Deliverables: Reports, data, advice.


Dr. William Roche.


Dr. Paddy Gargan.


Mr. John Coyne.

Atlantic Aquatic Resource Conservation (AARC) Project

Overview

The Atlantic Aquatic Resource Conservation (AARC) Project comes under the 2007-2013 Atlantic Area Programme. It is an association between 13 international partners in a three year project (2010-2012). The broad aim of AARC is to 'cooperate intensively to deliver a strategy for Integrated Water Resource Management (IWRM). A central focus will be culturally and economically important migratory fish species which link water marine, coastal and freshwater resources'. From the Irish perspective, we will be dealing with Restorative initiatives for Atlantic salmon in the Shannon System.

The project will look at the development and testing of practical protocols, consistent with new insights emerging from the disciplines of evolutionary biology and population genetics, for the restoration of Atlantic salmon in the Shannon River, Ireland.

The AARC project will make a valuable contribution to the Shannon Salmon Restoration Plan (SSRP) which was launched recently by IFI and looks at redressing the decline in Atlantic salmon populations throughout the Shannon river system.

Project deliverables

The AARC project will endeavor to:

- increase our understanding of some of the factors causing salmon population declines in the upper Shannon.
- contribute to the design and implementation of future salmon stock enhancement programmes.
- compare the genetic composition of the existing salmon populations to historical populations within the Shannon catchment.
- inform management in relation to Shannon salmon conservation.

Planned Completion Date and availability of final report

The final project report is due in the last quarter of 2012. Field experimentation will be completed by summer 2012. Lab DNA analysis will be completed by last quarter 2012.

Project Manager:	Mr. Oisin Naughton & Dr. Paddy Gargan
Total Budget:	Total Budget €3.87m. Irish budget is €754,242
Funding Source:	65% European Regional Development Fund (ERDF). Matching funds by IFI, University College Cork (UCC), the Electricity Supply Board (ESB) ESB and the Marine Institute
Resource utilizes:	IFI staff and various technical experts
Deliverables:	Reports, data sets, GIS maps and advice.

Status

Electro-fishing surveys were carried out on Lough Derg sub-catchment during summer 2010 by IFI and ESB. The rivers surveyed were upstream of the hydroelectric station at Ardnacrusha. These stock assessment surveys were useful in identifying sub-catchments where salmon fry/parr were present, i.e., areas with residual salmon populations. A restocking moratorium has been in place in the Lough Derg catchment for a number of years. The survey showed that a number of sub-catchments had salmon fry/parr present.

Several milestones in the project have already been reached:

- Preliminary electrofishing surveys in the Lough Derg catchment have highlighted areas with residual salmon populations.
- Habitat assessment surveys have shown the extent of habitat loss as a result of anthropogenic activities (drainage, barriers to migration, water quality).
- A once off broodstock collection programme was completed, providing eggs for the trials to show the relative survivals of salmon genotypes sourced from the Feale, Mulkear and , Shannon rivers and Parteen hatchery.
- The collation and integration of relevant data into project specific GIS has been initiated.

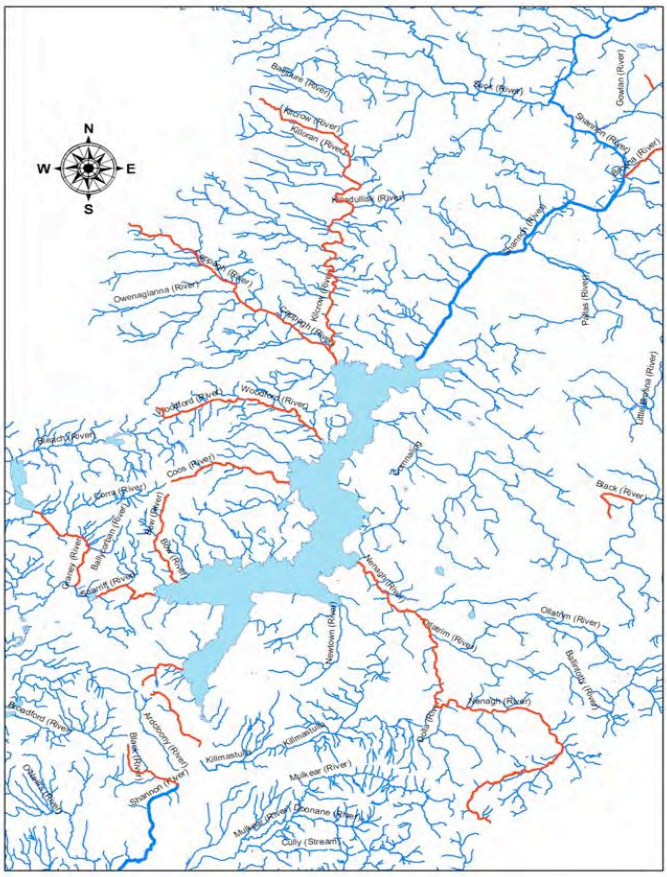
Walk over surveys were carried out in sub-catchments of the River Shannon to identify suitable rivers in which to conduct the relative survival experiments. This will compare the relative survivals of progenies from the Feale, Mulkear and main Shannon rivers with the Parteen hatchery strain.

The criteria examined in the assessment were:

- Suitability of substrate (spawning/nursery gravels)
- Water quality (evidence of over-enrichment)
- Size (the river needs to be of manageable size for practical implementation of e/fishing & trapping surveys).

In addition to using the information to select a suitable site for the relative survival trials the information will feed into the building of a specific database and GIS for spatial analysis/data interrogation. Characteristics such as spawning potential, habitat works, previous drainage works, etc., were recorded and will help build up a detailed picture of viable production areas as well as other important fisheries criteria.


Dr. Paddy Gargan. Mr. Oisin Naughton.



Rivers in the Lough Derg catchment area surveyed in 2010 under the AARC project

EELIAD Eel Research

Overview

IFI is a partner in the ***EELIAD*** project (European Eels in the Atlantic Assessment of their Decline which is a research initiative to investigate the ecology and biology of European eels. The information gained will be integrated into models to determine the most important factors that influence silver eel production and migration success. The fulfillment of this objective will provide a means to evaluate the likely success of the EU Eel Recovery Plan, to enable management actions to be most effectively directed to enhance and conserve eel stocks across Europe, and to determine the dynamics of eel population structure and reproductive success.

Field studies on migration routes, behaviour and spawning, will be supported by the use of cutting edge biotechnological analyses to determine population structure, and innovative modeling approaches that will incorporate these data into fishery management models. EELIED will link with other groups and projects, such as INDICANG (INDICateurs d'abondance et de colonisation sur l'ANGuille europeene (Anguilla Anguilla)) a network of monitoring programmes that report on the status and the development of eel populations over the Atlantic Area) and the joint EIFAAC/ICES Working Group on Eel.

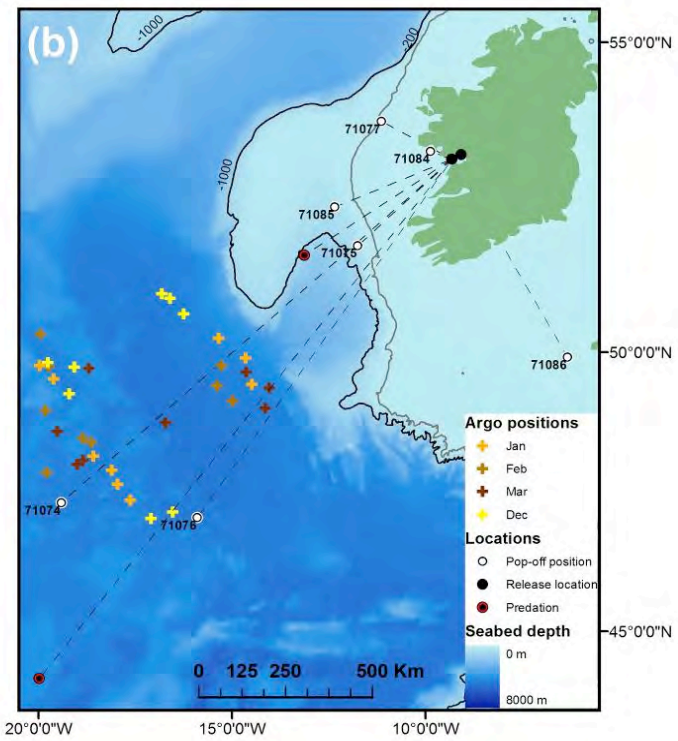
Project Deliverables

- to provide scientific data that will be of direct use to the conservation of eel stocks as it will help to clarify the reasons for the recent decline in the stock.
- to provide managers with information to change and improve the way that eel fisheries and habitats are managed across Europe,
- to ensure that enough silver eels migrate to their spawning grounds to reproduce and sustain the species.

An eel fitted with a pop-off Satellite tag to record depth and temperature. The EELIAD project has tracked eel west of the Azores on their marine migration

Planned Completion Date and availability of final report

This project will be completed in November 2011 with the final report delivered to the EU in December 2011.



Final pop-off position of a selection of eel satellite tags released from Ireland

Status

IFI have been involved, with the co-operation of ESB Fisheries, in tagging large eels. In autumn 2010, 64 large eels (1.9-2.3kg) were fitted with satellite and data storage tags and released to sea off the west coast of Ireland to determine migration routes, behavior and spawning.

Project Manager: Dr. Paddy Gargan.

Total Budget €: €115,000 over the period 2008-2011

Funding Source: European Union 7th Framework Project & IFI resources

Resources Utilised: One full time staff member is employed on the project. Survey work in undertaken in conjunction with the staff of the Regional isheries Boards.

Deliverables: Increased understanding of the biology and marine migration of European eels and the causes for their decline.

Dr. Paddy Gargan and Dr. Gustavo Becerra Jurado.

National Eel Management Plan

Overview

In response to advice from the International Council for the Exploration of the Sea (ICES) that the European eel (*Anguilla anguilla* L.) is endangered and that the fishery is unsustainable, the EC regulation establishing measures for the recovery of the European eel (Council Regulation 11000/2007) was created. This regulation for the recovery of the eel stock required Ireland to establish an eel management plan to reduce eel mortality and ensure an increase in the number of silver eel escaping Ireland to spawn. Ireland's management plan involved closure of the fishery, mitigation of hydropower, ensuring upstream eel migration at barriers and improvement in water quality. In June 2009 the EU accepted our national plan as an adequate address to the issues raised in the regulation. The management plan is up for review in 2012.

The eel management plan contains a number of monitoring objectives to ensure compliance with the management actions. IFI was tasked with carrying out these objectives.

Project Deliverables

- Estimate Silver Eel Escapement (in collaboration with ESB, NUIG, Marine Institute).
- Estimate silver eel escapement indirectly using yellow eels.
- Monitor the impact of fishery closure on yellow eel stock structure.
- Inter-Calibration with Water Framework Sampling.
- Compare current and historic yellow eel stocks.
- Establish baseline data to track changes in eel stock over time.
- Evaluate impedance of upstream colonisation: migration and water quality effects.
- Determine parasite prevalence and eel quality.

Planned Completion Date and availability of final report

2010 Survey work was completed in late in November 2010, the final report on the 2010 national eel monitoring programme report is expected by March 2011.

Status

2010 was the second year of the eel monitoring programme. A national elver monitoring programme was initiated with 9 locations chosen. The aim of the programme is to monitor the level of elver recruitment arriving in Ireland and create a long-term time series to track changes in recruitment levels. In the yellow eel study, five lakes (Upper Lough Corrib; Upper Lough Derg; Upper Lough Erne; Lough Feeagh and Lough Ree); the Slaney Estuary and South Sloblands were sampled. Various morphological measurements were recorded and a continuation of the mark recapture (MR) study was carried out with all eels tagged with passive integrated transponders (PIT). Morphological measurements (length; weight; eye diameter; pectoral fin length etc.) were taken to determine life stage and estimate maturation. A number of eels were sacrificed for further analysis in the laboratory (parasite prevalence, age, growth).

Project Manager : Dr. Paddy Gargan & Dr. Ciara O'Leary.

Total Budget € : €288,000

Funding Source: IFI Core Funding

Resources Utilised: Three full time staff are employed on the project. Survey work is undertaken in conjunction with the staff of the Regional Fisheries Boards.

Deliverables: Compliance with the eel monitoring requirements under Ireland's Eel Management Plan. A Report on 2010 monitoring and inputs to the Standing Scientific Committee on Eel.

Silver eel fishing on Lough Mask 2010 using coghill nets. (photo: Mask coghill nets 4)

Elvers ascending the salmon fish pass in Ballysadare in July 2011

Dr. Paddy Gargan. Dr Ciara O'Leary. Dr. Robert Cruikshanks

Water Framework Directive

Overview

In 2007, IFI (previously the Central and Regional Fisheries Boards), began a fish monitoring programme to assess the health of Ireland's rivers, lakes and estuaries/lagoons. This work is necessary to fulfill the requirements of the EU Water Framework Directive (WFD) which was transposed into Irish Law through the European Communities (Water Policy) Regulations 2003 (S.I. No. 722 of 2003).

The comprehensive three year rolling fish monitoring programme developed by IFI encompasses over 300 water bodies, including 174 river sites, 78 transitional water bodies (estuaries and lagoons),and 78 lakes. Information collected in each survey is used to assign an 'ecological status' to each water body, ranging from high status to bad status, with the aim of achieving at least good ecological status in all water bodies by 2015. The data collected will also help angling clubs and fishery owners to better manage their fisheries and promote sustainable fisheries development.

Project Deliverables

- Preliminary reports for all water bodies surveyed in 2010 have been published on the dedicated WFD fish WFD fish website (www.wfdfish.ie) and will be replaced with more detailed reports once all fish data has been processed. A comprehensive summary report of the 2010 surveillance monitoring programme will also be available in due course.
- Detailed survey reports from 2007 and 2008, preliminary reports from 2009 and summary reports of the 2008 and 2009 fish monitoring programmes are also available online on www.wfdfish.ie.
- All lakes, rivers and transitional waters surveyed for WFD up to 2009 have been assigned an ecological status class (high, good, moderate, poor, bad) and results have been submitted to the EPA and NIEA.
- A new GIS database of all fish captured during the WFD surveys has been developed, and an interactive GIS map viewer displaying fish survey data is also available on the WFD fish and IFI websites.
- A stakeholder forum was held in December 2010 highlighting the progress and key findings of the first three year rolling WFD fish monitoring programme (2007 – 2009).
- Fish and abiotic data delivered to European and Nordic intercalibration databases for rivers, lakes and transitional waters.
- River fish and abiotic data delivered to SNIFFER for development of the WFD river fish classification tool for Ireland (FCS2 Ireland).
- A fish in lakes classification tool (FIL2) was developed in partnership with the Agri-Food and Biosciences Institute for Northern Ireland.
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Planned Completion Date and availability of final report

The WFD is an ongoing legislative requirement under which all matters relating to the quality, quantity and ecology of freshwater, transitional waters and inshore marine waters will be protected

and managed. The first three year phase of the monitoring programme was completed in 2009. The second three year phase commenced in 2010 and will continue until the end of 2012.
WFD survey work was completed in October 2010, with interim reports delivered on each catchment survey throughout the year. Laboratory analysis of samples is underway and the resulting data will be available in time for delivery of the 2010 WFD Summary Report in July 2011.

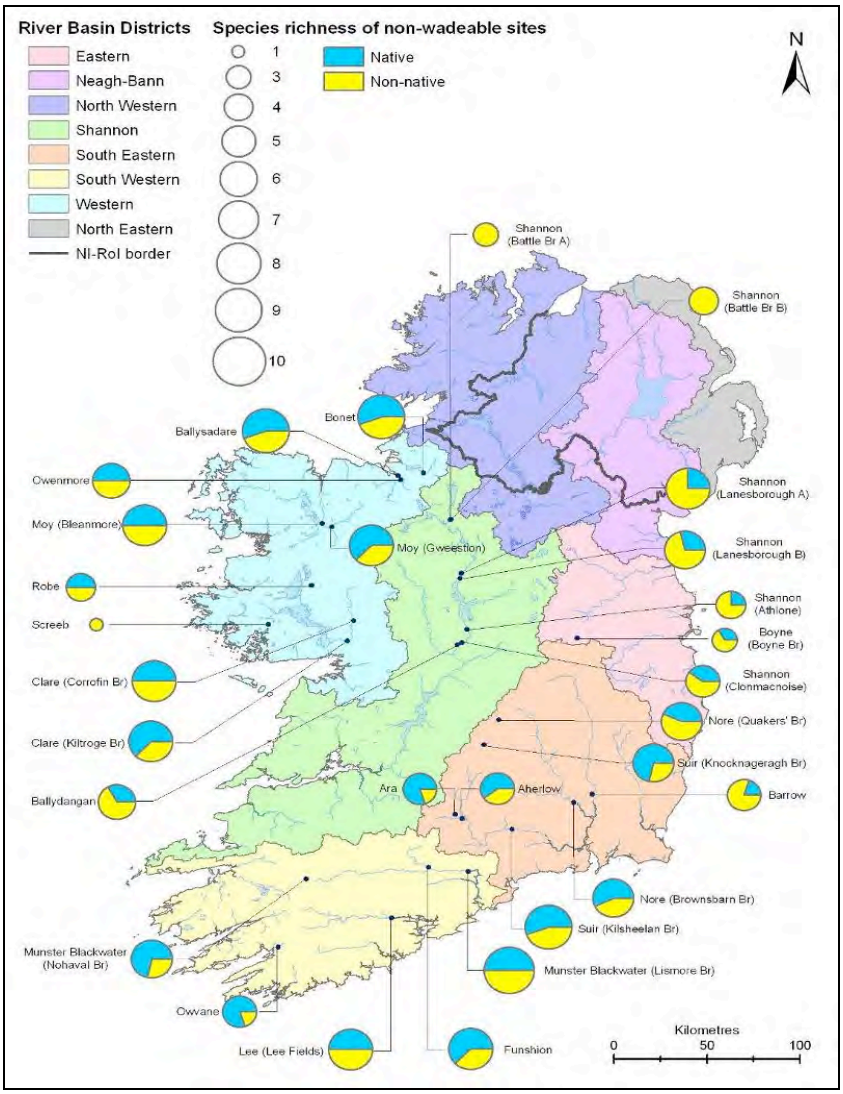
Status

Fieldwork conducted during 2010 is part of the second three year programme from 2010 - 2012. A reduction in staffing levels during 2010 resulted in fewer sites being surveyed than were originally planned. Nevertheless, a concerted effort by the WFD team within IFI, along with the assistance of many regional IFI staff, has seen the successful completion of surveys in a total of 25 lakes, 41 river sites and 25 transitional waters nationwide (i.e. 87% of planned surveys were completed).

The surveys were conducted using a suite of European standard methods; electric fishing is the main survey method used in rivers and various netting techniques are used in lakes and estuaries. All fish (approximately 50,000 fish) captured during the surveys have been identified, counted and a representative sample has been measured, weighed and had scales and other bony structures removed for aging purposes. Some fish were retained for further analysis in the IFI laboratory.

Preliminary reports for all water bodies surveyed during 2010 have been published to the WFD fish website (www.wfdfish.ie) and will be replaced by more detailed reports when they become available. A comprehensive summary report for the 2010 surveillance monitoring programme will also be available in due course.

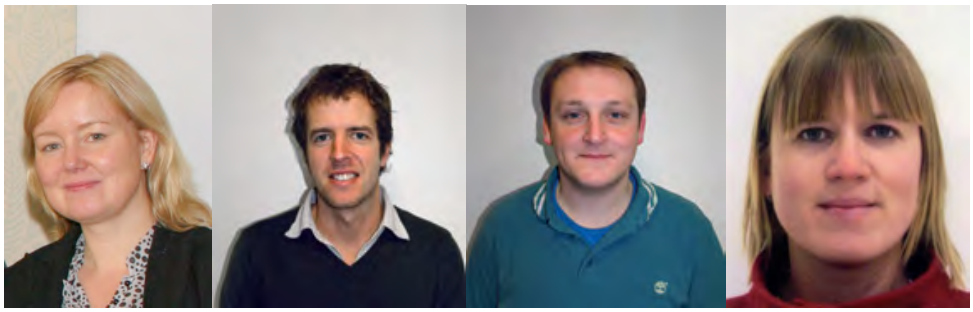
Project Director:	Dr. Fiona Kelly (Senior Research Officer)
Project Manager:	Dr. Andrew Harrison
Total Budget €:	The WFD surveillance monitoring programme operates on a three year rolling basis. Funding received for 2010 was €1.19 million
Funding Source:	Core IFI Funding
Resources Utilised:	Nine full time staff and four temporary staff were employed on the project throughout 2010. IFI WFD research staff were support by IFI RBD staff.
Deliverables:	Dedicated WFD website (www.wfdfish.ie) Weekly preliminary reports throughout the field season Detailed reports on each water body surveyed circulated to IFI staff as well as being placed on the website Final summary report for 2010 surveillance monitoring programme. Ecological status for fish in lakes, rivers and transitional waters delivery to EPA and NIEA Fish and abiotic data delivery for intercalibration.



Species richness for all non-wadeable river sites (n=29) surveyed during 2010 for WFD monitoring

Setting a surface floating monofilament multi-mesh CEN standard survey gill net on Upper Lough Erne, Co. Fermanagh, July 2010

Beam trawling on Rogerstown Estuary, October 2010



Dr. Fiona Kelly. Dr. Andrew Harrison. Dr. Ronan Matson. Ms. Lynda Connor.

Mrs. Ciara Wogerbauer. Mr. Rory Feeney. Ms. Emma Morrissey.

Ms. Grainne Hanna. Ms. Roisin O'Callaghan.

Habitats Directive

Overview

IFI undertakes the monitoring of fish species listed under the EU Habitats Directive (SI 94 of 1997). Under Annex II of the Habitats Directive the fish species requiring monitoring to fulfil the Irish obligations are:

- Atlantic salmon
- River, Brook and Sea lamprey
- Twaite and Killarney shad
- Pollan.

Species listed in the Red Data Book (Whilde, 1993) which are not listed under the Habitats Directive are smelt and char. Both these species are included in the National Programme for Habitats Directive and Red Data Book Fish Species. This programme examines all of the named fish species throughout their life-cycle, with the exception of Atlantic salmon which is managed under the IFI's National Programme for salmon.

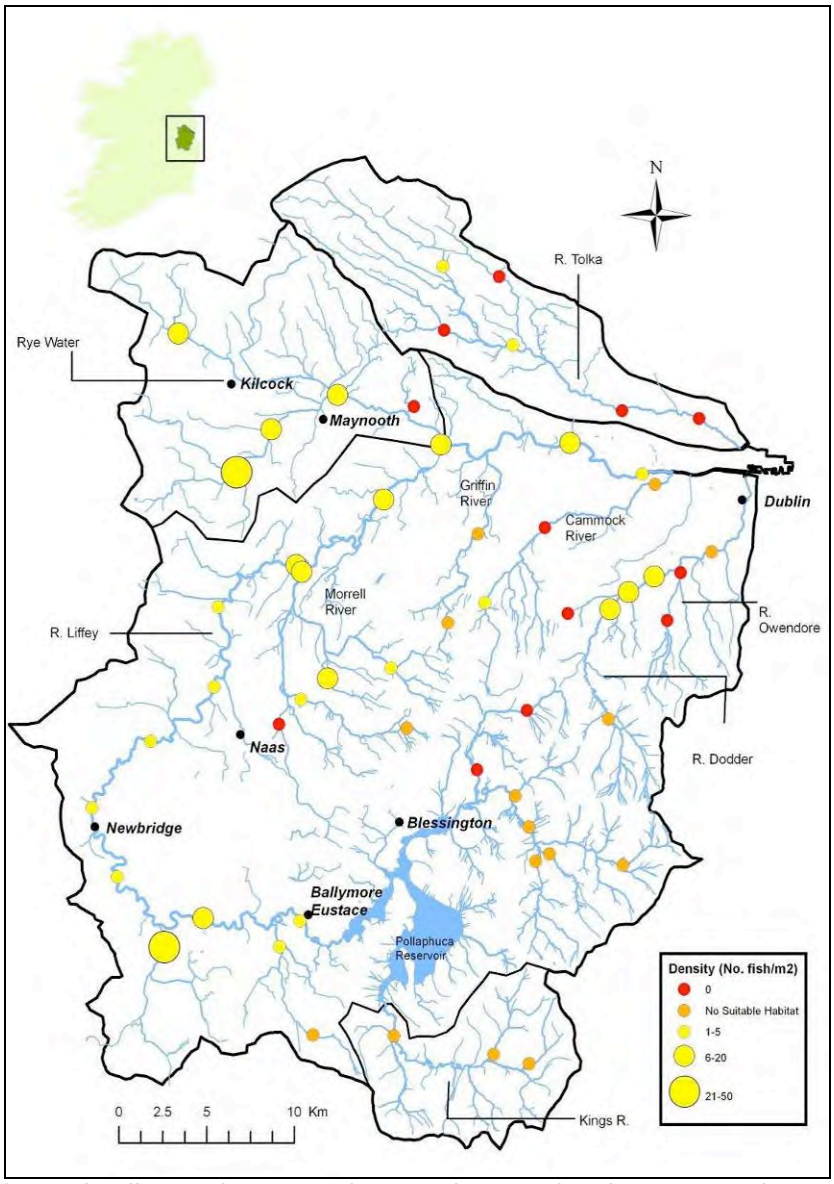
Bongo net for sampling larval and juvenile shad with IFI team, St. Mullins, June 2010

Project Deliverables

In the medium and longer term, the investigations should lead to:

- Development of rigorous and repeatable sampling protocols that provide information on status of target life stage of the species in question
- Data sets that contribute to informed management decisions

- Identification of necessary measures to safeguard or conserve specific taxa. These may include legislative instruments, such as bye laws to manage exploitation, and conservation measures, such as removal or modification of artificial barriers to fish passage (up- and downstream).



Map of the Liffey and Tolka catchments indicating the sampling locations and outcomes from the juvenile lamprey survey, autumn 2010

Planned Completion Date and availability of final report

The programme is a long-term one with a series of annual tasks designed to input to a developing database. Summary review reports are produced annually and specialist management papers and scientific journal articles will be generated.

Project Manager :	Dr. James King
Total Budget € :	€354,000
Funding Source:	IFI Core Funding
Resources Utilised:	Two full time staff are employed on the project. Survey work is undertaken in conjunction with IFI staff within individual River Basin Districts.
Deliverables :	Compliance with the monitoring requirements under the EU Habitats Directive for Annex II fish species Increased knowledge base Species management strategies Annual reports.

Status

In the 2010 sampling season, spawning surveys were undertaken for brook and sea lamprey, Twaite shad, Pollan, char and smelt. The team worked with the IFI Water Framework Directive team in a survey of Lough Ree, one of the known locations for pollan in the Republic. The survey used conventional netting as well as hydroacoustics to locate and record a sample of pollan. Initial indications pointed to a relatively small population of pollan in the lake.

Juvenile surveys were undertaken for smelt, Twaite shad and lamprey. Sampling trials for post-larval and early juvenile shad gave promising results in the River Barrow estuary and will be developed further in 2011. Catchment wide juvenile lamprey surveys were undertaken on the Liffey and Laune catchments, working with local IFI staff, and on the Finn and Deele, working with staff of the Loughs Agency.

In conjunction with the Mulkear LIFE project, the team radio tagged sea lamprey in order to monitor their upriver progression, in the context of barriers to passage. Some very interesting results were recorded, including a movement of many fish back downstream with some returning to the main stem of the River Shannon.

The survey programme is working towards the next reporting date of 2013 to the EU on the status of the relevant Habitats Directive fish species within the national territory.

Dr. James King. Dr. Sean Rooney. Ms. Nicola O'Gorman.

Salmon Conservation Limits Attainment Project

Overview

The general decline in salmon stocks internationally over the past two decades and changes in the way that salmon are managed in Ireland since 2007, has led to many salmon rivers being closed to commercial fishing and angling. Salmon stocks in each individual river are now assessed scientifically and if best available information indicates that there is less than the number of salmon required to spawn in each river (the salmon conservation limit, CL), the fishery is closed and no salmon harvest is permitted.

After scientific assessment in 2009, 55 rivers were identified as having a surplus over the conservation limit, while 90 rivers either had no identifiable surplus or, insufficient information, and were closed for harvesting salmon by commercial fishing or angling.

Apart from direct counts of adult salmon in-river from counters and rod catch data from fisheries open to angling (harvest or catch-and-release fisheries), an indirect method such as juvenile salmon fry assessment (termed catchment-wide electrofishing), has provided a quantifiable threshold value to determine fishery performance. Where the threshold value is exceeded, the fishery can be opened for catch –and –release angling the following year. This type of assessment has been carried out in approximately 80 rivers since this programme began in 2007.

With the improved management regime additional rigour is required in relation to scientific data for salmon management. In this regard datasets are being refined to ensure that the models used by the Standing Scientific Committee (SSC an independent group of scientists who offer scientific advice to managers on salmon) are being updated with the best available information. Detailed salmon genetics studies to improve knowledge of Irish salmon stocks for better management formed a substantive element of the programme.

Under the CL Attainment Programme the efficiency of partial counters on the Boyne and Munster Blackwater was investigated using Passive Integrated Transponder (PIT) tag technology. The dynamics of adult populations also required investigation to advise on the proportion of 1SW (sea winter) and MSW (multi sea winter) in different stocks or populations and on run-timing. These data will contribute to refining CL for individual rivers (given that this is reported in actual fish numbers and not eggs). The impact of predators of salmon in the ecosystem needs to be addressed in models and studies on predators were initiated in 2010.

Project Deliverables

- Catchment wide electro-fishing, with the support of IFI staff nationally, on 40 rivers. Summary data for the SSC process in November 2010. Final report in 2011.
- Salmon genetic programme to provide scientific information to better understand Irish salmon stocks. Specifics in this programme were:

- To determine the genetic make-up of juvenile salmon in tributaries upstream of the Lee hydro-station and determine their genetic profile relative to other tributaries of the Lee and the hatchery strain.
- Assessment of various aspects of salmon population genetics in Irish rivers to improve the genetic baseline. Collection of genetic material on small rivers, important for assessing species biodiversity investigation, relevant to the Habitats Directive.
- To maintain and refine the existing national salmon genetic database by provision and analysis of additional samples to enable the investigation of baseline temporal stability, i.e. providing for a comparison of 2010 samples with previously collected samples.
- Preliminary investigation of the relationship between one sea winter (1SW) and multi sea winter (MSW) salmon, proportions of sea age fish contributing to spawning. Use of electro-fishing and scales from adult returns etc.
- Investigation of local adaptation of salmon stocks to individual catchments.
- Research into the establishment of a salmon genetic baseline for forensic analysis.

- PIT tag programme to provide an estimate of full salmon upstream counts at partial counter sites on the Boyne and Munster Blackwater.
- Collection of salmon biological data (scales, lengths, weights and run-timing) for stock descriptions from different fisheries.
- Pilot projects examining cormorant predation to determine the level of predation, the nature and abundance of the fish species being consumed over the season.

Carrying out Juvenile Salmon catchment-wide electro-fishing

Project Manager:	Dr. Paddy Gargan & Dr. William Roche
Total Budget €:	€179,000
Funding Source:	Salmon Conservation Fund
Resources Utilised:	External contracts and IFI resources
Deliverables:	2010 Juvenile salmon index, salmon genetic analysis reports, reports on predation.

Status

A total of 40 rivers were surveyed in 2010, this included several index systems. These survey data were analysed and used to support salmon management advice for the 2011 season. As part of the Lee Restoration Project, survey samples were provided for genetic analysis, this resulted in the publication of a salmon genetics report for the River Lee. Using these data the GSI (Genetic Salmon Index) baseline was updated including the South-East complex (Nore/Barrow/Suir/Slaney) dataset The genetic structure of salmon populations for biodiversity status assessment samples was collected from ten rivers. Juvenile salmon samples were collected from 15 rivers in 2010 to test for temporal stability.

In collaboration with UCC and the Marine Institute, an experimental population of salmon was established using broodstock collected from the Burrishoole and Erriff river systems. A number of experimental families were produced representing four groups, pure Burrishoole, pure Erriff, and the reciprocal Burrishoole x Erriff and Erriff x Burrishoole crosses. Representatives of each of the experimental families and of the four groups were laid down in both the Aashleagh Falls hatchery on the Erriff and at the Furnace hatchery on the Burishoole River.

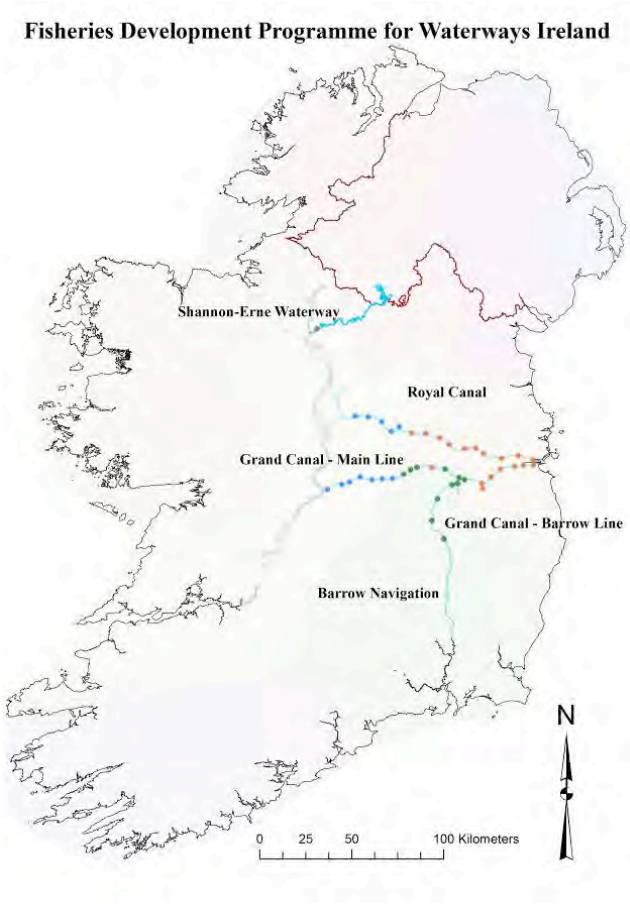
IFI cooperated with experts in the installation of PIT tagging data capture devices and supporting antennae on the Rivers Boyne and Munster Blackwater. One hundred and ninety-nine salmon captured by traditional draft net fishermen in the Boyne estuary between June and September were PIT tagged. Thirty two salmon captured by anglers on the Munster Blackwater were also tagged. Up to December (2010) only low percentages have passed through either monitoring facility. To complement the Boyne study seven salmon were also radio-tagged to assess their rate of upstream migration.

Dr. Paddy Gargan. Dr. William Roche.

Waterways Ireland Project

Overview

IFI are contracted by Waterways Ireland to provide fisheries management, aquatic plant management and water quality monitoring and pollution abatement services to Waterways Ireland, the respect of the Royal and Grand Canals, the Barrow Navigation and the Shannon-Erne Waterway. Cognisant of those obligations imposed by the Water Framework Directive, the programme reflects the statutory obligations of Waterways Ireland and its objective of providing a quality waterways habitat commensurate with its use by a wide diversity of user groups.



Project Deliverables

- To optimize the angling potential of these multi-purpose recreational waterways
- To fulfill of Waterways Ireland's Water Framework Directive monitoring requirements.

Status

Fish stock assessments conducted along the navigable watercourses indicate that fish stocks are in a generally healthy state. Stock enhancement operations were carried out on the 45th level on the Royal Canal at Clondra, in advance of the re-opening of the navigation into the 16th level of the Royal Canal in advance of the Junior Canals Championship.

Fish rescue operations were necessitated by routine dredging and maintenance operations on the Royal and Grand Canals. Analysis of macro invertebrate and aquatic plant re-colonisation in those areas that were wet dredged during winter 2009-2010 was conducted throughout the growing season in 2010, and will help inform future management strategies.

An extensive aquatic plant and invasive species survey was carried out on the Grand Canal and Barrow Navigation in 2010 in cooperation with IFI's invasive species team. A similar weed management survey was conducted on the Royal Canal. Furthermore, efforts were made to quantify the relative efficacy of the various weed management (cutting) options available to Waterways Ireland. The results of these programmes have been used to provide management advice throughout the weed growing season and will also help inform future management programmes along all of the navigations within the programme.

The invasive Asian clam (*Corbicula fluminea*) was identified for the first time in Ireland in the tidal river Barrow near St. Mullins in 2010. It was also subsequently recorded from the Shannon, at Carrick on Shannon. This species, which can cause considerable economic and environmental harm, has not been recorded upstream of St. Mullins or from sites surveyed along the Shannon-Erne Waterway to date. Trials have been initiated on the tidal Barrow to attempt to control populations of this species.

Water samples, for the purposes of Water Framework Directive Compliance Monitoring, were collected at 44 sites on the Royal and Grand Canals and the Shannon-Erne Waterway on four occasions in 2010. Aquatic plant communities were assessed at these sites during the autumn sampling period. Previously collected data has been incorporated into a Canal Classification Tool for canals in Ireland and the UK. This tool corroborates expert judgment advice previously submitted, that the majority of Irish canals are meeting Good Ecological Potential targets.

Project Manager:	Mr. Paul McLoone & Dr. Joe Caffrey
Total Budget €:	€264,272
Funding Source:	Waterways Ireland
Resources Utilised:	IFI resources
Deliverables:	Annual report for IFI and Waterways Ireland, supported by data and analysis.

Electrofishing on the Grand Canal, Tullamore

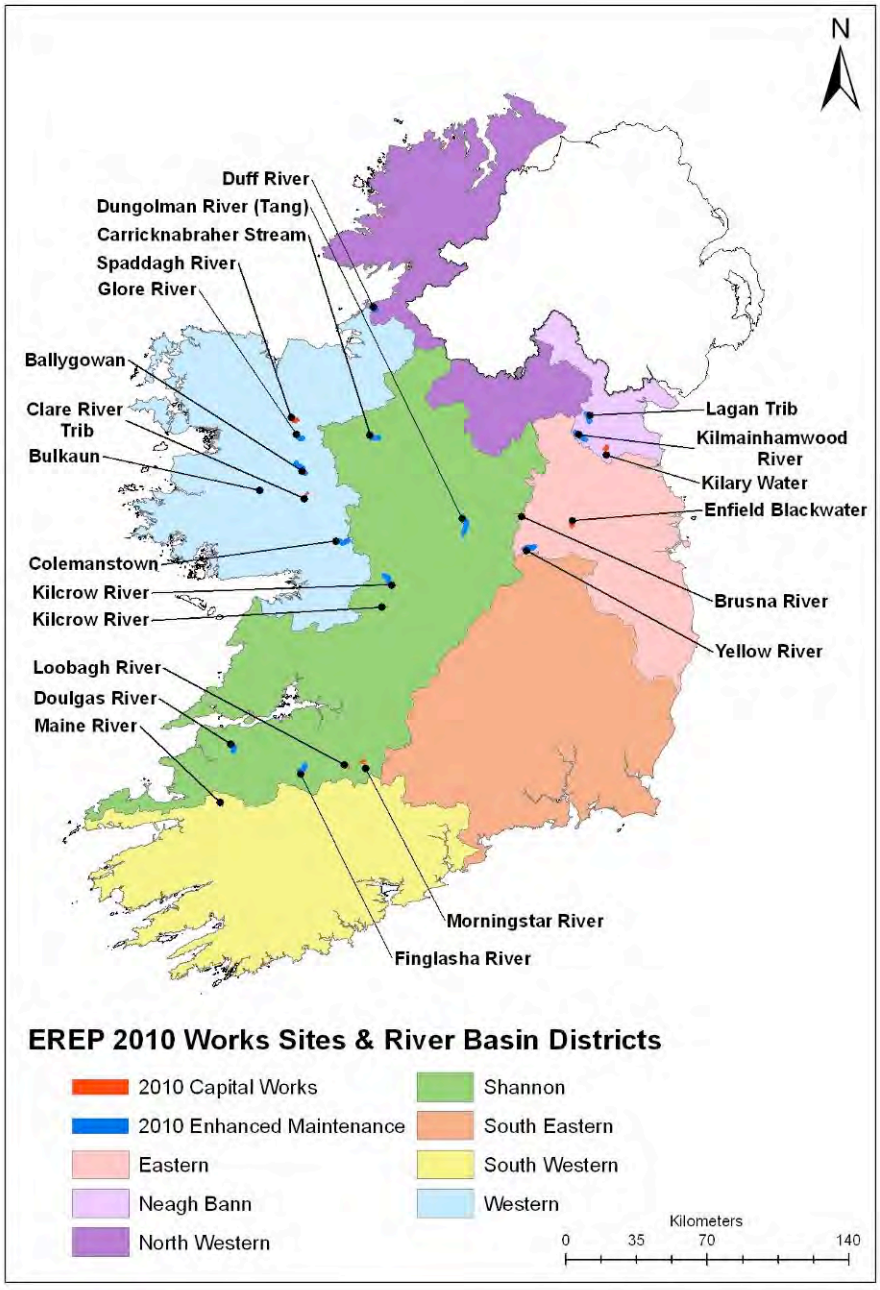
Dr. Joe Caffrey. Mr. Paul McLoone.

Dr. Tara Gallagher. Mr. Will Corcoran.

Environmental River Enhancement Programme (EREP)

Overview

The Environmental River Enhancement Programme (EREP) project aims to undertake a programme of capital enhancement works and of enhanced maintenance on Office of Public Works (OPW) channels over a 5 year period. The project will also report on the impacts of these works in terms of biodiversity and hydromorphology impacts. The EREP team will work with OPW staff, throughout the project, to identify, develop and implement environmentally friendly drainage maintenance.



EREP 2010 Worksites and River Basin Districts

Project Deliverables

- Enhancement design plans and walk-over reports for all channels identified for EREP.
- Provide an EREP training programme to OPW staff
- Carry out River Hydromorphology (RHAT) Assessment Technique (RHAT) surveys
- Undertake Biodiversity Monitoring
- Produce an EREP information leaflet.

Project Directors:	Dr. Martin O'Grady and Dr. J. King
Project Manager:	Dr. Karen Delanty
Total Budget €:	€355,000
Funding Source:	Office of Public Works
Resources Utilised:	IFI resources
Deliverables:	Development and maintenance plans, training, surveys, data, analysis and reports.

Status

In 2010 ten Capital Works programmes and twelve Enhanced Maintenance programmes were implemented. Scientific monitoring for fish, plants, birds, macro-invertebrates and hydromorphology was undertaken across a number of catchments. An EREP training programme was delivered to all OPW field staff. An information leaflet was produced and distributed through the web and OPW.

A range of stone material (gravel, cobble and boulders) being introduced to drained rivers to restore channel morphology

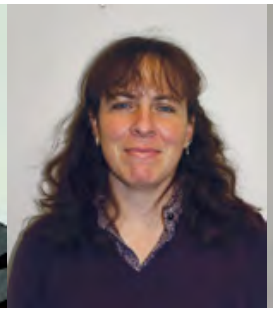
Paired stone deflector and pool constructed during the 2010 EREP Capital works project on the R. Maine

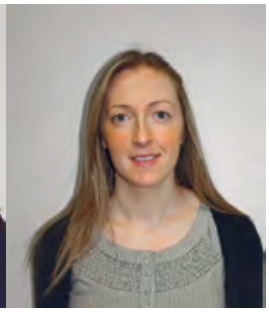
Summary

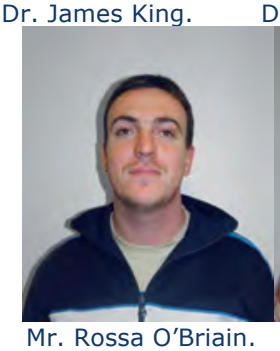
The projects outlined above give a flavour of the work carried out by researchers in IFI; this is not a fully comprehensive list and is not intended to capture the knowledge and expertise captured in the advice offered to government, management and stakeholders. Inland Fisheries Ireland is thankful to all the partners who contributed to our research efforts, particular thanks should be given to the angling community, project partners, scientists and project funders without whom our work would be very limited.

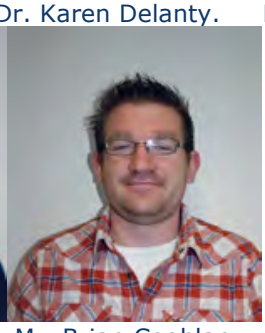

Dr. Martin O'Grady.


Dr. James King.


Dr. Karen Delanty.


Ms. Michelle O'Regan.


Mr. Rossa O'Briain.


Mr. Brian Coghlan.

List of other projects not included in this report

Project	Project Directors
Fish stock surveys on Lough Sheelin:	Dr. Martin O'Grady.
Conservation hatchery development:	Dr. James King.
Support for Irish Specimen Fish Committee:	Dr. William Roche.
Update IFI R&D Web site:	All R&D Staff.
Development of Invasive Species viewer:	Dr. Joe Caffrey.
Red Data Book for Fish:	Dr. J. King (lead) and all SRO's.
Electrofishing Review:	Dr. W. Roche.
NRFB Salmon Rivers report:	Dr. W. Roche
Freshwater Fish Atlas:	Dr. K. Delanty & Dr. W.Roche.
Student Projects with UCD (all with reports):	All SRO's.
Lough Sheelin Catchment Nutrient Sampling Programme:	Dr. Fiona Kelly, Paul Gordon& IFI SHRBD staff.
River Fish Classification Tool for Ireland (SNIFFER WFD 68c):	Dr. Fiona Kelly and WFD/IFI research staff.
Development of a Lake Fish Classification Tool:	Dr. Fiona Kelly, Dr. Andrew Harrison & Lynda Connor.
Ongoing compilation of an aerial photographic database for all major rivers, lakes and estuaries in Ireland.	Dr. M.O'Grady.

Glossary of Terms

Coghill nets Eel nets usually placed at weirs or below bridges on rivers used to capture silver eels migrating to sea

DCENR the Department of Communications, Energy & Natural Resources

DoF the Department of Finance

DEHLG the Department Of Environment, Heritage & Local Government

Electro Fishing The utilisation of the reaction of fish to electrical fields in water for facilitating fish capture.

EU European Union

Fish Counters Electronic device used to determine the number of fish migrating past a particular location. See Vaki, Logie, Partial Counters below.

GIS Geographical Information Systems

HD Habitats Directive

Logie Resistivity fish counter placed across a weir to count fish moving upstream or downstream.

Partial Counter Fish counter which only covers part of the river width or counts only part of the fish run.

Put and Take Fisheries Fisheries where hatchery trout are stocked at a catchable size to create recreational angling.

Pit Tag A Passive Integrated Transponder (PIT) tag is an encoded wire tag attached to a fish which and can be read remotely using a pit tag reader based on radio frequency technology.

Phyloecology The use of DNA analysis to study relationships between stocks of the same species living in different geographical areas.

RBD River Basin District

Several fishery where title to the fishing rights are owned.

Standing Scientific Committee purpose is to offer independent scientific advice to IFI on Eels and Salmon.

STP Sewage treatment plant.

Trap and transport systems capture of eels and transport and release below hydro-electric facilities to avoid turbine mortality of eels.

Wet dredged dredging of a water body channel without dewatering.

WFD Water Framework Directive.