

Inland Fisheries Ireland Research and Development

Executive Report 2011



Iascach Intíre Éireann
Inland Fisheries Ireland



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Research and Development Report 2011



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Chairman's Statement



On behalf of the Board of Inland Fisheries Ireland, I would like to compliment the Research and Development Division on this report which documents the research being conducted during 2011. This research is essential in supporting Ireland reporting requirements under European Union Directives and regulations, but also in offering advice and guidance to managers and stakeholders in the Inland Fisheries sector. This report contains a précis of the key research projects but does not attempt to capture the full spectrum of research undertaken and advice provided by IFI scientists.

Inland Fisheries Ireland is very focused on delivery and value for money, this is reflected in the planning cycle relating to research projects. Each year projects are prioritised, planned and budgeted based on strategic deliverables and annual business plans. What is also critical is the monitoring of deliveries against milestones. With this in mind the Board is briefed each quarter on progress against the Board approved R&D business plans. Given these reviews I can confirm that despite the current restrictions on staff and resources all major 2011 project milestones were delivered.

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 co-operation and commitment of the management and staff from each of the IFI River Basin Districts.

Finally, on my own behalf and on behalf of my fellow Board members I would like to thank and commend the research team on the quality of the work, projects and advice delivered in 2011.

Brendan O'Mahony

Chairman,

Inland Fisheries Ireland

Foreword



The research organisation of Inland Fisheries Ireland (IFI) is clearly focused on the delivery of applied research, the output of which is data and advice to support managers and stakeholders in the sustainable development and conservation of the inland fisheries resources. This task does not only pertain to the fresh water resource but also to the coastal recreational fisheries and the species and habitats they contain. The research division continues to be focused on servicing the requirements of National, European and International legislation and regulation. It is expected that these legislative responsibilities will increase as we move forward into 2012 with the roll out of the national legislation SI 477 relating to Ireland's implementation of the Habitats

Directive where it referred to fish species.

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 harmonise 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.

Despite IFI's experiencing continued resource and staffing pressures the R&D division has delivered all major requirements set out in 2011 research programme. 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 2011. Many of the projects outlines are conducted in partnership with other agencies and academic institutions. There has been a strong focus on ensuring that a national co-ordinated approach is brought to research programmes and that through sharing of information duplication of work can be avoided.

Finally, I would like to thank all the R&D staff for their expert contributions and dedication over the past year. In doing so I would also like to acknowledge the support, knowledge and expertise provided by all IFI staff without whom all research projects would have struggled.



Cathal Gallagher

**Head of Research and Development,
Inland Fisheries Ireland**

Marine Sports Fish Activity

REMIT OF PROJECT

To develop and populate a database to capture the archival national marine sport fish tagging dataset to provide information for the management, protection and conservation of key elasmobranch species and their habitats

WHY IS THE PROJECT BEING UNDERTAKEN?

The database is populated by tagging data for the six primary elasmobranch species of conservation interest. Their IUCN (Interaction Union for the Conservation of Nature) conservation status ranges from 'near threatened' (Blue shark, *Prionace glauca*, and Thornback ray, *Raja clavata*) to 'vulnerable' (Tope, *Galeorhinus galeus*), 'endangered' (Undulate ray, *Raja undulata*) and 'critically endangered' (Angel shark, *Squatina squatina*, and Common skate, *Dipturus batis*).

Inland Fisheries Ireland has operated the National Marine Sport Fish Tagging Programme for about 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 up to the present day approximately 40,000 fish, 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).

PLANNED COMPLETION DATE

All data on his project has been digitized. This project completed in 2011.



Plate 1. Terry Jackson with tagged Tope before its release back to the sea

WHO WILL BENEFIT FROM THE PROJECT?

IFI, Marine Institute, conservation species management agencies, conservationists, marine fishery biologists, fisheries managers, ICAAT (The International Commission for the Conservation of Atlantic Tunas) and anglers

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

A summary report and database have been delivered.

PROGRESS TO-DATE

The national tagging dataset up to 2008 was entered into a database in 2010 on a contract basis by researchers at University College Dublin. In 2011 recent data were collated for incorporation into the database by Inland Fisheries Ireland staff. This delivered a functional IFI marine sport fish tagging database which will facilitate ongoing analyses of elasmobranch species distribution and movement in Ireland.

A summary report on the primary elasmobranch 'conservation' species outlining their distribution and migration patterns was prepared. Data from this report and other biological data will be incorporated 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).

This programme is delivered by a network of dedicated angling charter skippers and anglers who tag fish on a voluntary basis in the interests of elasmobranch conservation and furthering research.

FINDINGS OF INTEREST

Blue shark and tope are distant migrants. Almost 50% of fish tagged under the programme were blue shark and recaptures are recorded throughout the North Atlantic including the east coast of the USA and some locations off the northern coast of South America. Angel shark, undulate ray and common skate are local migrants displaying limited migratory behaviour. The numbers of Angel shark being tagged has declined over the past decade reflecting its poor conservation status.

NEXT STEPS

An analysis of tagging data for three species is scheduled for completion in 2012.

PROJECT TEAM	Dr. William Roche, Dr. Michael Brennan & Shane O'Reilly
TOTAL BUDGET €	€2 k
FUNDING SOURCE	IFI internal funding
RESOURCES UTILISED	IFI staff, various charter boat skippers and anglers

PROJECT STAFF



Dr. William
Roche

Pike Research

REMIT OF PROJECT

As a key angling species in Ireland, it is necessary for IFI fishery managers to understand the basic biology and ecology of pike in Irish waters. The key objectives include the following:

Population Ecology –pike from around Ireland are being investigated using microsatellite DNA to see if there is structure to populations in Ireland. Comparisons will also be made with samples from Britain and Europe in order to investigate potential countries of origin.

Review pike data in the Inland Fisheries Ireland 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” (using flesh samples) and dietary study of pike across a range of different ecological habitats will provide information on the variation in the fish’s diet, how it varies between different habitats, and what effect that has on growth and condition.

A morphological study which will enable to see if the differences in diet and habitat type are reflected in size and shape of the fish

WHY IS THE PROJECT BEING UNDERTAKEN?

Little research has been conducted on pike in Ireland to date; this three year project, which is being conducted in University College Dublin, will help address this deficiency and fill in some of the large gaps in our knowledge of this species.

PLANNED COMPLETION DATE

This project will be completed in March 2013.

WHO WILL BENEFIT FROM THE PROJECT?

Freshwater anglers in general and specifically the Irish Federation of Pike Angling Clubs will reap the rewards from this ecological study. The findings will also be useful to Failte Ireland and other agencies that promote freshwater angling.



Plate 2. Pit tagging pike from L. Sheelin prior to its transfer into L. Slevins

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

A final report and data delivered to IFI by June 2013. Annual progress reports are also part of this deliverable.



Plate 3. Releasing pit tagged pike into L. Slevins

PROGRESS TO-DATE

By 2010 a detailed work programme was put in place for the running of this three-year project. Currently, the genetic element of the project is nearing completion and indicates some interesting results that should be available shortly. Field work for 2011 was successfully completed. Laboratory and dietary work is currently ongoing.

FINDINGS OF INTEREST

Preliminary analysis of pike microsatellites (genetic analysis) indicates that population structure is not as simple as was first thought and that there is a minimum of two pike strains evident. Further examination in 2012 should clarify the picture.

NEXT STEPS

Examine further pike outgroups (e.g. from UK & France) to attempt to identify the potential source of original pike populations. Carry out stable isotope analysis and complete dietary analysis. Conclude field sampling in 2012.

PROJECT TEAM	UCD, Dr. Joe Caffrey, Dr. Martin O'Grady
TOTAL BUDGET €	€96K
FUNDING SOURCE	IFI and IFPAC
RESOURCES UTILISED	Study to be conducted with the assistance from IFI staff and the co-operation of IFPAC

PROJECT STAFF



Dr. Joe Caffrey



Dr. Martin
O'Grady

Control of Aquatic Invasive Species in Ireland (CAISIE)

REMIT OF PROJECT

The CAISIE Project (Control of Aquatic Invasive Species and Restoration of Natural Communities in Ireland) is tasked with contributing to the halting of biodiversity loss in Ireland by preventing further impacts on native biodiversity from high impact aquatic and riparian invasive species. The project commenced in September 2009 and is focused on two main geographical areas: (1) Lough Corrib and (2) the Grand Canal and Barrow Navigation. The CAISIE project is funded by the EU Life+ programme with co-financing from the National Parks and Wildlife Service.

WHY IS THE PROJECT BEING UNDERTAKEN?

Aquatic invasive species (AIS) are internationally recognised as a principal threat to the biodiversity of native inland water ecosystems. The impact of AIS on biodiversity can be mediated by competitively excluding or out-competing the less robust native species, by preying on native species or by altering the natural aquatic or riparian habitat in which they reside. These species pose a growing threat to Ireland's unique biodiversity and to economic interests such as fisheries, tourism and agriculture. The CAISIE project aims to control high impact invasive species (notably the curly-leaved waterweed *Lagarosiphon* major in Lough Corrib and a range of AIS in the Grand Canal and Barrow Navigation) and prevent their further impacts through the development and demonstration of effective control methods, a programme of stakeholder engagement and awareness raising, and policy development and dissemination.

PLANNED COMPLETION DATE

December 2012 with a final report due in April 2013.

WHO WILL BENEFIT FROM THE PROJECT?

The CAISIE project will result in a wide range of benefits. Controlling aquatic invasive plants such as curly-leaved waterweed, New Zealand pigmyweed and Japanese Knotweed will provide increased access to waterways for recreational angling and boating. In addition, the control of all the invasive species targeted by the CAISIE project will limit their further spread within or to other waterways enhancing the overall protection of our native aquatic species and general biodiversity in Ireland. The development of novel and innovative control methods will provide new tools to tackle future invasions and other research will help to better understand the AIS impacts in our environment. Habitat rehabilitation measures will help to restore impacted native aquatic habitats and ecosystems in the project areas. Preventing the introduction, establishment or spread of AIS can ultimately prove economically beneficial through reducing or eliminating the need for future control and habitat restoration works.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

Final report will be available from May 2013.

PROGRESS TO-DATE

In Lough Corrib, under the CAISIE project, over 75% of the lake area originally infested by the curly-leaved waterweed has been treated to date. Here, innovative control methods such as using light-excluding jute matting have been trialled successfully and further developed. Indeed, this method has been trialled on other AIS and received both national and international attention. Many previously infested bays have now been re-opened for angling. In the Grand Canal and Barrow Navigation, a range of AIS have been controlled including Japanese knotweed, Nuttall's pondweed and New Zealand pigmyweed. Indeed, in the latter case, control operations have practically eradicated this weed from the Grand Canal. Further to this, control trials have been undertaken on the Asian clam and Himalayan balsam. In general, much informative research has been conducted which has allowed us to better understand the impacts of AIS in Ireland. Considerable effort has been put into producing AIS biosecurity guidelines for stakeholders including anglers, boaters and scuba divers. Many stakeholder events have been attended to promote general awareness on the threat posed by AIS and to encourage stakeholders

to put in place biosecurity practices that may prevent the further introduction and spread of AIS in Ireland's waterways.



Plate 4. Curly-leaved waterweed at Bob's Island in Lough Corrib before and after mechanical cutting and harvesting weed control.

FINDINGS OF INTEREST

In Lough Corrib, over 78% (c. 80 ha) of the lake area originally infested by the curly-leaved waterweed has been treated to date. In summer 2011, the weed was completely eradicated from six bays in the lake.

In Lough Corrib, 100% (c. 150 m²) of the lake area originally infested by the New Zealand pigmyweed has been treated.

Nuttall's pondweed has been extensively controlled in the Grand Canal (c. 41 km of channel length).

Extensive works have eradicated the main infestation of New Zealand pigmyweed in the Grand Canal (2.2 km of channel length).

All sites with Japanese knotweed (n=18) in the Grand Canal and Barrow Navigation have been treated.

All sites with giant hogweed (n=2) in the Grand Canal and Barrow Navigation have been eradicated.

Asian clam control trials (most successfully using various dredging treatments) have been conducted in the Barrow Navigation which will better inform future approaches to control.

Chinese mitten crab and bloody-red shrimp have not been detected in Grand Canal and Barrow Navigation.

Dace is not present in the Grand Canal.

The CAISIE project team are encouraged by the increasingly positive response from stakeholder groups and the public as regards our AIS biosecurity and education and awareness initiatives.

NEXT STEPS

AIS control work and related research will continue to be conducted on the invasive curly-leaved waterweed in Lough Corrib and on target high impact AIS in the Grand Canal and Barrow Navigation. The project will endeavour to continue to promote invasive species biosecurity practices among stakeholder groups and encourage them to adopt such measures. An 'After Life' plan will be developed that will build upon the experience and key continue aspects of the CAISIE project after it ends in 2012.

PROJECT TEAM	Dr. Joe Caffrey (Project Leader); Bryan Deegan (Project Manager); Dr. Michael Millane (Research Officer); Helen Moran (Research Assistant)
TOTAL BUDGET €	1.5 million
FUNDING SOURCE	EC Life+ and NPWS
RESOURCES UTILISED	Focus of project on Lough Corrib and Grand Canal Navigation (to below St Mullin's). Primarily a services project.

PROJECT STAFF



Dr. Joe Caffrey



Dr. Michael
Millane



Helen Moran

MulkearLIFE – EU LIFE+ Project

REMIT OF PROJECT

MulkearLIFE (www.mulkearlifeproject.com) is a €1.74 million European Commission funded LIFE+ Nature project working on the restoration of the Lower Shannon Special Area of Conservation (Mulkear River catchment) for Atlantic Salmon, Sea Lamprey and European Otter. Inland Fisheries Ireland is the coordinating beneficiary together with the Office of Public Works 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 nationally important populations of Sea Lamprey and European 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.

WHY IS THE PROJECT BEING UNDERTAKEN?

This project is being undertaken to enhance the populations of Atlantic salmon, Sea lamprey and otters throughout the Mulkear catchment. Concurrently, it will create greater awareness and understanding of issues affecting the Special Areas of Conservation and how to manage such areas for targeted species and habitats. The project is also being undertaken to develop practical, costed and transferable management prescriptions for habitat rehabilitation for Atlantic salmon, Sea lamprey and European otters for other Natura 2000 sites in Ireland and across Europe.



Plate 5. Himalayan Balsam Removal

PLANNED COMPLETION DATE

MulkearLIFE's programme of work is scheduled to be completed on the 1st January 2014

WHO WILL BENEFIT FROM THE PROJECT?

The work of the project is of direct as the project actions directly improve the conservation status of the Lower Shannon SAC. It is also of direct benefit to project participants (IFI staff, NPWS staff, farmers

and landowners with river frontage, anglers, students and teachers, conservation rangers, conservation volunteers, researchers) and all members of the catchment management group.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

The grant agreement between the EU and IFI as Coordinating Beneficiary sets out a reporting timeframe of MulkearLIFE, namely 3 annual progress reports, 1 midterm report (June 2012) and 1 final report. The final report is scheduled to be delivered to the EC LIFE Unit by 1st April 2014.

PROGRESS TO DATE

MulkearLIFE has achieved considerable progress in 2011 in enhancing the populations of Atlantic salmon and Sea lamprey through in-stream rehabilitation work. During the year, the Office of Public Works (OPW) carried out instream works, strategically placing 100's of random boulders, on approximately 4.7kms on the Newport River & Annagh River. Limerick County Council constructed 10 rubble mats on the main stem of the Mulkear River, utilizing over 1,500 tons of rock. All instream measures are designed to enhance salmon populations and increase the instream and riparian biodiversity. The Project Team, IFI, NPWS staff and a large number of Mulkear Conservation Volunteers members completed the second annual rapid assessment survey for otter. The results of the survey help guide MulkearLIFE's work with otter this included the installation of eight artificial otter holts throughout the catchment.

Considerable progress has also been achieved in addressing obstacles to upstream migration by sea lamprey river spawning and recruitment purposes. Sea lamprey specific fish passes were installed at Annacotty and Ballyclogh weir in May 2011. An extensive monitoring programme via radio tagging of sea lamprey began at the same time. This documented the passage of lamprey at both sites. Additional observational monitoring documented large numbers of sea lamprey successfully ascending these obstacles utilising the fish passes.

Excellent progress has been achieved by Limerick County Council and the Office of Public Works in controlling invasives, primarily Giant Hogweed and Japanese Knotweed with significant areas covered on the Dead, Mulkear, Annagh, Killeenagarraff and Newport Rivers. Much of the early Spring and Summer of 2011 was spent addressing and reversing the damage caused by these Non-native Invasive Species (Giant Hogweed, Japanese Knotweed, Himalayan Knotweed, Himalayan Balsam). In most cases, this included an initial site treatment and multiple retreatments. The total area covered in 2011 was approximately 75km. A boat purchased by Limerick County Council and equipped with spraying gear for 2011 season made the treatment of invasives more efficient.

During 2011, 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. To date (December 2011) the Project's Environmental Education Programme, which targets primary and post primary schools within the Mulkear catchment, has reached over 1,000 school-children and their teachers. This is something MulkearLIFE is extremely proud of and means that in excess of 1,000 people, mostly young local students, have now an enhanced understanding of the work of MulkearLIFE and the importance of riparian habitat and the connectivity of rivers and wildlife corridors. This is therefore an extremely important investment of time and resources by MulkearLIFE, with the support of colleagues in Inland Fisheries Ireland, in the future conservation status of Ireland's rivers and biodiversity.

FINDINGS OF INTEREST

The sea lamprey fish pass, specifically designed by the project to assist passage over two major barriers (Annacotty and Ballyclogh weirs) has proved to be a considerable success in 2011. The instream rubble mats installed specifically to increase salmonid population were utilised 10 days post construction by sea lamprey for spawning purposes. This is the first time sea lamprey have been documented spawning on rubble mats and goes to show that the creation of complex habitat will benefit a number of species.

NEXT STEPS

MulkearLIFE will continue to deliver on all approved project actions in 2012 and 2013. This will include extensive instream works, catchment wide electro fishing survey work, otter survey work and continued treatment of the Non Native Invasive Species (NNIS) Giant Hogweed, various knotweeds and various balsams including Himalayan Balsam. In addition, the project will continue to fulfil all its management,

monitoring, public awareness and information dissemination actions and activities. While MulkearLIFE is on course to achieve its main objective and improve the conservation status of the Lower Shannon SAC within the existing timeframes, the timeframes are extremely problematic. A concerted work effort is currently underway to ensure the positive momentum developed by MulkearLIFE over the past number of years.



Plate 6. Otter holt installations

PROJECT MANAGER	Mr. Ruairí Ó Conchúir
TOTAL BUDGET €	€1,740,818
FUNDING SOURCE	IFI - €214,000 (as coordinating beneficiary); Office of Public Works - €305,000 and Limerick County Council - €171,200 (as associated beneficiaries); NPWS - €160,000; North & South Tipperary County Councils €8,00 and €12,000 a
RESOURCES UTILISED	Mostly staff resources from IFI; financial and staff resources from the OPW and Limerick County Council and only financial resources from NPWS.

Celtic Sea Trout Project (CSTP)

REMIT OF PROJECT

The INTERREG IVa funded (Ireland-Wales axis) Celtic Sea Trout Project is investigating the freshwater and marine ecology of sea trout and translating it into fishery management and conservation benefits for countries bordering the Irish Sea. The genetics, microchemistry and parasitology of sea trout form core elements of this project.

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.

To convert new information and understanding into improved practical management of fisheries

To develop long-term collaboration amongst fisheries workers and users of the fisheries across the Irish Sea



Plate 7. Sean Smith with his 6.04 kg sea trout, a record for Lough Currane

WHY IS THE PROJECT BEING UNDERTAKEN?

The sea trout is the migratory form of brown trout and a popular target in rod and net fisheries in rivers and coastal waters around the Irish Sea, some 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 features coupled with their widespread occurrence, makes sea trout a unique and potentially sensitive indicator of environmental change (e.g. climate change), integrating responses across diverse habitats. However, there are major questions regarding understanding of sea trout biology, namely:

Where do they go at sea and how are their stocks structured and interlinked?

What is their marine ecology (feeding, growth, survival and life history variation)?

What environmental and other pressures are they exposed to?

How do their life histories (and thus fishery quality) respond to environmental variation?

Answers to these questions are required to understand the reasons for change and identify potential solutions. The CSTP intends to provide this missing knowledge and conservation benefits for countries bordering the Irish Sea.

PLANNED COMPLETION DATE

April 2012

WHO WILL BENEFIT FROM THE PROJECT?

IFI, fishery managers, relevant State agencies (NPWS) and anglers. On a broader front the project outputs will benefit all agencies, fisheries managers and anglers involved in sea trout fisheries discharging into the Irish Sea.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

May 2012



Plate 8. Sampling at Sea



Plate 9. Celtic Sea Trout Project Map – sea trout systems and proposed marine sampling zones

PROGRESS TO-DATE

Various workpackages within the CSTP are designed to answer the questions posed in the project proposal and central to these workpackages is sampling of sea trout populations at the juvenile stage in freshwater, in inshore and offshore marine waters and adult sea trout returning to freshwater to spawn. A major part of the sampling programme is the ongoing collection of sea trout scales for analysis of life histories and growth rates from 25 priority sea trout rivers. This was mainly carried out by anglers and required extensive communication with angler groups across Wales, Ireland, Northern Ireland, Scotland, England and the Isle of Man and distribution of many special sampling kits. As with many fisheries projects stakeholder engagement is vital, and in 2011 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

Inshore marine sampling of sea trout was also carried out at many different stations around the Irish Sea. Offshore, a new trawl sampling method has been used successfully in surveys from Dublin to the Solway coast, via the Isle of Man.

In 2011, IFI, working closely with Bangor University, coordinated the collection of adult sea trout scales from priority rivers through an angler-led sampling programme.

Various data (fisheries, GIS etc) were collated for other tasks within the project.

FINDINGS OF INTEREST

Inshore marine sampling - sea trout have been taken at most sites sampled around the Irish Sea. Various methods (including commercial nets/traps, CSTP survey nets, contracted samplers and anglers) yield samples. A highlight of 2011 was sampling offshore waters in Ireland, Scotland, the Isle of Man, England and Wales using a novel surface trawling technique and a total of 69 sea trout were captured.

Genetic analysis has established a baseline of genetic variation in freshwater trout populations (sampled in putative sea trout spawning areas) and has shown remarkably strong structuring, with patterns that appear to reflect the ancient glacial history of the Irish Sea. This information, together with innovative sea trout microchemistry studies, will be used to assign marine caught sea trout to their regions or rivers of origin, in order to learn how they distribute themselves at sea.

Life history analysis, based on scale readings, has begun to identify various population types as characterized by specific age structures, spawning histories and growth rates of individual fish. Length frequency and scale reading data has shown that the angling fishery in many Irish rivers is dominated by finnock. Stock structure is more complex in some of the larger Welsh rivers. Elements of other tasks relating to sea trout marine feeding, marine distribution modeling and fisheries analysis will be completed during 2012.

NEXT STEPS

2012 will see completion of the sampling programme concentrating on marine sampling off the Welsh coast. Available samples will be processed in 2012 to provided scales, tissues and data for the other tasks within the project. These include genetic, microchemistry and marine ecology and life history tasks. Historical catch and fisheries GIS data will be sourced for specific workpackages addressing the fisheries inventory and economic value task, and freshwater production respectively. Merging of datasets across the project will continue until all are incorporated for the final reporting stage.

PROJECT TEAM	Dr. William Roche, John Coyne, Daniel Cierpial & Dr. Paddy Gargan
TOTAL BUDGET €	€466 k (over 3.5 years)
FUNDING SOURCE	INTERREG Iva Ireland –Wales & IFI internal funding
RESOURCES UTILISED	IFI staff, anglers, contract samplers & IFI laboratories

PROJECT STAFF



Dr. William
Roche



John Coyne



Dr. Paddy
Gargan

Bass Research & Monitoring Programme

REMIT OF PROJECT

Sustainable management of bass is a priority for Inland Fisheries Ireland. In 2011 planning for an enhanced bass research and monitoring programme was undertaken to comprehensively deliver on IFI's remit and augment current bass related activities. IFI's research and monitoring programme will be underpinned by a comprehensive national review of bass management policy which was initiated by IFI in 2011. The enhanced programme will also build on fundamental bass research and monitoring undertaken by the Inland Fisheries Trust, and the Central Fisheries Board in contributing significantly to assessments undertaken by the Marine Institute between 2000 and 2008.

In 2011 IFI was requested by the Marine Institute to undertake a pilot study to estimate recreational bass angling fishery landings in the Republic of Ireland to fulfil a national reporting requirement under the EU Data Collection Framework (No. 665/2008). The DCF is 'a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy (CFP)'. The Marine Institute is the national reporting body for the DCF in Ireland. This study dovetailed with the IFI commissioned survey of the Economics of Irish Angling initiated in 2011 and being conducted by DTI.

Allied to these strategic management activities collection of fundamental bass data to inform stock status continued as part of IFI's Marine Sportfish Programme.

WHY IS THE PROJECT BEING UNDERTAKEN?

Bass is an extremely important marine sport angling species in Ireland. The steep decline in bass stocks in Ireland in the mid-1970s, which was attributed by anglers and the Central Fisheries Board, to overexploitation in a then unregulated fishery, and temperature regulated fluctuating recruitment patterns, resulted in a severe decline of the renowned Irish bass angling resource. Ultimately the decline led to the cessation of the commercial fishery in 1990 to conserve stocks through the Bass (Conservation of Stocks) Order, 1990. Since then bass have been regarded solely as an angling species and are restrictively managed. Bass is the only marine species in Ireland to be managed for angling. Inland Fisheries Ireland (IFI) is the statutory body which is tasked with advising the Minister for Communications, Energy and Natural Resources, on policy and national strategies relating to inland fisheries including sea angling.

PLANNED COMPLETION DATE

The draft bass policy document, which will have substantial implications for bass research and monitoring activity for the next 3-5 years, will be completed in early 2012. The DCF report on the recreational bass angling catch in Ireland will report in May 2012.

WHO WILL BENEFIT FROM THE PROJECT?

IFI, MI, the angling tourism sector, the guided angling services sector, ICES, conservation agencies/sector, the EU and associated agencies.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

The draft policy document will be available for review in early 2012 and the final policy document is likely to be issued in late 2012 following an iterative review process involving all stakeholders and relevant consultees.

The DCF report will be forwarded to MI in May 2012 for incorporation into its report to the EU.

PROGRESS TO-DATE

Meetings of policy group have been held and a draft document is being prepared.



Plate 10. Specimen bass

Surveys of bass anglers (mainly on a walk-up basis) are being conducted by staff from IFI regional offices to determine (a) angling effort and (b) numbers of bass caught and retained per annum for DCF reporting.

The national bass scale collection programme re-established with new and historical samples being archived. Data for bass from monitoring surveys of transitional waters and Irish Specimen Fish Committee sources being collated on an ongoing basis. Otolith and scale microchemistry analysis techniques using laser ablation and ICPMS being researched.

FINDINGS OF INTEREST

Clear policy is required to develop strategy to continue sustainable use of the national bass resource. A long-term bass research and monitoring programme is required to rationally manage stocks of this valuable angling species.

The bass angling industry is beginning to develop as indicated by the increasing numbers of angling guides and services.

Preliminary findings indicate that recreational angling landings (i.e. catch retained) are minimal and catch-and-release is widely practiced by anglers.

NEXT STEPS

The important next steps will include adoption of the national policy, and its implementation over the next three years (2013-2015), incorporating guiding principles for a long-term research and stock monitoring programme. IFI will develop a formal research and monitoring plan aimed at providing the data and tools to support management of this important angling species.

PROJECT TEAM	Dr. William Roche & Shane O'Reilly
TOTAL BUDGET €	€23 k
FUNDING SOURCE	EU Data Collection Framework & IFI internal funding
RESOURCES UTILISED	IFI staff nationally & laboratory facilities

PROJECT STAFF



Dr. William
Roche

Atlantic Aquatic Resource Conservation (AARC) Project

REMIT OF THE PROJECT

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. This will include 1. determining the genetic composition of contemporary and historical populations of salmon in the Shannon and 2. comparing the relative performance in the wild of the progeny Feale, Mulkear and Shannon wild and hatchery salmon populations. The Irish partners in the project are:

Inland Fisheries Ireland

ESB Fisheries Conservation

University College Cork

Marine Institute

The total project budget is €3.87m. The budget for the Irish partners over 3 years is €754,242.

WHY IS THE PROJECT BEING UNDERTAKEN?

The project is being undertaken as part of a concerted effort to address the impacts from anthropogenic activities on Atlantic salmon populations in the River Shannon. It 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 various work programmes will endeavour to collate relevant habitat information as well as assess the current status and distribution of residual salmon populations through the Lough Derg catchments and the mid-Shannon.

PLANNED COMPLETION DATE

The final project report is due in the last quarter of 2012. Field experimentation will be completed by October 2012. Lab DNA analysis will be completed by end 2012. The final AARC conference will be held in Ireland in November 2012.

PROGRESS TO DATE

Much progress has been made in achieving the objectives set out in the project application in 2010. Of particular success was the sourcing of broodstock salmon and the hatchery rearing of experimental eggs for the relative survival studies for a number of Shannon salmon populations. Experimental eggs were transferred from ESB's Parteen Hatchery to experimental sites on the River Suck. Quantitative electro-fishings were carried out to establish densities of salmon fry at the respective sites. The genetic origins of all sampled fish were recorded through fin clips. Important morphometric information was recorded throughout the project, from broodstock fish through electrofishing surveys, right through to smolt capture. These results have already shown significant growth rates and the migration of a number of smolts as S1 (one year) old fish.

Significant progress has also been made on the compilation of a specific Shannon AARC GIS. This database will include all AARC project survey data including: potential spawning habitats; electrofishing survey results (ESB, IFI and UCC surveys); water quality layers; preliminary barriers data; restocking sites. This mapping tool will help maximise the presentation of relevant survey data, particularly in relation to spatial visualisation and will help inform management decisions relating to Shannon salmon conservation.

Plates 11 and 12: Electro-fishing surveys on the River Suck as part of the analysis of survival to year two of experimental AARC fish. PIT tags were inserted into experimental fish under an aesthetic with a handheld injector (right photo).

Plates 13 and 14: A Passive Integrated Transponder (PIT) tag array was installed in the River Bunowen to monitor PIT tagged pre-smolts and smolts migrating through the River Bunowen. The array was installed by Biomark, an American firm specialising in fish tracking and monitoring. The array consists of two lines of three 10ft antennae across the river bed. Tagged fish are recorded by a reader mounted on a hut on the river bank and data can be retrieved remotely via a dial-up modem.

Plates 15 and 16 : Assessments of spawning habitats were carried out on the entire River Suck catchment as part of the AARC project. These surveys covered all areas by foot and by kayak and used geo-location techniques for mapping the potential spawning areas throughout the catchment. Above, spawning areas on the Springfield River, Williamstown, County Galway.

WHO WILL BENEFIT FROM THE PROJECT?

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. The project will help identify important factors in the conservation of Atlantic salmon in the Shannon. It will provide a set of useful maps and a spatial visualisation tool, for improved planning and development throughout the Shannon catchment.

WHEN WILL THE INTERIM/FINAL REPORTS BE AVAILABLE?

The project reports quarterly to the commission in terms of financial and activity reporting. Activity reports are published at regular intervals on <http://aarcproject.org/>. A series of project newsletters were published and distributed to relevant stakeholders. They are available on the project website and at www.fisheriesireland.ie. Reports were compiled on electrofishing surveys carried out on 0+ and 1+ fish and on Catchment Wide Electrofishing surveys throughout the Shannon. The final project report will be available in late 2012.

FINDINGS OF INTEREST

As the project nears conclusion in December 2012, all project requirements have been met and exceeded in a number of cases. Highlights from the Shannon AARC project include:

Broodstock fish from five different areas were successfully acquired, in consultation with angling clubs and fisheries owners

Morphometric data, fecundity data and egg survival information was acquired throughout the hatchery on-growing, providing important (and rare) information on wild salmon populations. Complete health checks were carried out on all broodstock and results were negative for all commercially important fish diseases, showing a good disease status for the relevant rivers.

0+ and 1+ electrofishings were carried out at the experimental sites on the River Suck. This provided density information at the various locations as well as relative survivals of the different salmon populations.

A complete potential spawning habitat survey was carried out on the River Suck catchment to highlight potential areas for salmon production.

A Passive Integrated Transponder (PIT) tag array was installed on the River Bunowen, Clonbrock Demesne, County Galway. This array is currently recording PIT tagged smolts and pre-smolts as they migrate through the Bunowen River.

Migrating smolts were also recorded using Rotary Screw Traps at Clonbrock Demesne. Trapped smolts were processed for morphometrics and the insertion of PIT tags and this information will be layered with flow data and water temperature.

Other important analysis from the various sampling programmes will provide information on growth rates of the different fish, growth rates for the limestone Bunowen catchment, migration times and other important biological information.



Plates 11 and 12: Electro-fishing surveys on the River Suck as part of the analysis of survival to year two of experimental AARC fish. PIT tags were inserted into experimental fish under an aesthetic with a handheld injector (right photo).



Plates 13 and 14: A Passive Integrated Transponder (PIT) tag array was installed in the River Bunowen to monitor PIT tagged pre-smolts and smolts migrating through the River Bunowen. The array was installed by Biomark, an American firm specialising in fish tracking and monitoring. The array consists of two lines of three 10ft antennae across the river bed. Tagged fish are recorded by a reader mounted on a hut on the river bank and data can be retrieved remotely via a dial-up modem



Plates 15 and 16 : Assessments of spawning habitats were carried out on the entire River Suck catchment as part of the AARC project. These surveys covered all areas by foot and by kayak and used geo-location techniques for mapping the potential spawning areas throughout the catchment. Above, spawning areas on the Springfield River, Williamstown, County Galway.

A project specific GIS is currently being constructed. This will layer important fisheries information and information acquired under AARC with other environmental datasets such as water quality data, drainage channels, corine datasets, wetted area and barriers datasets.

NEXT STEPS

The final steps in the project will involve collating the various scientific datasets from the various work programmes to scientifically assess the relative survivals of the various salmon populations and the hatchery strain of fish from the common garden experiments.

Important biological information such as fecundities, egg sizes, relative growth rates, relative survival, smolt run times, etc., will be assessed in the context of this rare opportunity to work on wild populations of salmon.

Autumn smolt runs will continue to be assessed at Clonbrock on the River Bunowen using the Rotary Screw Traps and the PIT tag array. This information will complete the datasets for the ultimate objective – the relative survival (common garden) experiments.

Data from the AARC project is still being compiled using GIS technology for the electrofishing surveys and spawning habitat surveys with various tools being developed for extrapolating the datasets. This is not due for completion until November 2012.

The final AARC conference will take place in Limerick, Ireland at the end November 2012. This conference will disseminate information from all participating countries in the AARC project.

PROJECT TEAM	IFI - Oisín Naughton & Paddy Gargan; UCC- Philip McGinnity, Jamie Coughlan, Brian Clarke & Tom Cross; ESB-Denis Doherty; Marine Institute-Niall O'Maoileidigh; Compass Informatics – Paul Mills
TOTAL BUDGET €	Total Budget €3.87m. Irish budget is €754,242
FUNDING SOURCE	65% ERDF funding. Matching funds by IFI, UCC, ESB and Marine Institute
RESOURCES UTILISED	Three full time equivalent staff
DELIVERABLES	Increase our understanding of some of the factors causing salmon population declines in the upper Shannon; contribute to the design and implementation of stock enhancement programmes; compare the genetic composition of the existing salmon populations to historical populations; establish themed GIS; informed management in relation to River Shannon salmon conservation

EELIAD Eel Research

REMIT OF PROJECT

Inland Fisheries Ireland is a partner in the EELIAD project 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.

WHY IS THE PROJECT BEING UNDERTAKEN?

This study is being undertaken to provide information on marine migration of eels to better understand eel ecology and migration 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. EELIAD will link with other groups and projects, such as INDICANG (a network of monitoring programmes that report on the status and the development of eel populations over the Atlantic Area) and the joint EIFAC/ICES Working Group on Eel. The project is being undertaken 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.

PLANNED COMPLETION DATE

Winter 2012



Plate 17. A 2.3 kg silver eel fitted with a pop-off Satellite tag to record depth and temperature and location.

WHO WILL BENEFIT FROM THE PROJECT?

The project will 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.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

The final report is due Winter 2012

PROGRESS-TO-DATE

IFI have been involved, with the co-operation of ESB Fisheries, in tagging large eels. In autumn 2011, 16 large eels (1.9-2.1kg) were fitted with satellite tags and released to sea off the west coast to determine migration routes, behavior and spawning.

FINDINGS OF INTEREST

The satellite tags record depth, temperature and light on the eel migration route across the Atlantic. Different tags were programmed to pop-off at differing time periods. The objective is to track the migration route across the Atlantic towards the Saragossa Sea. The tags float to the surface and connect with the Argus satellite which downloads the data on depth and other parameters and give a GPS position of the tag. Silver eels have been recorded migrating south west past the Azores for distances of over 2,000km. Valuable information of depth, diurnal migration, swimming speed and predation has been obtained.

NEXT STEPS

The information gained from marine tracking studies will be analysed to provide information on marine migration of eels.

PROJECT TEAM	Dr. Paddy Gargan and Dr. Gustavo Becerra Jurado
TOTAL BUDGET	€115,544
FUNDING SOURCE	EU
RESOURCES UTILISED	IFI Staff and support from ESB Fisheries, Marine Institute and Eel Fishermen

PROJECT STAFF



Dr. Paddy
Gargan



Dr. Gustavo
Becerra Jurado

National Eel Management Plan

REMIT OF PROJECT

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. Inland Fisheries Ireland was tasked with carrying out these objectives.



Plate 18 . Silver eel fishing on Lough Mask 2010 using coghill nets.

WHY IS THE PROJECT BEING UNDERTAKEN?

The project is being undertaken to fulfil Ireland's obligations under the monitoring objectives set out in its eel management plan. The objectives are;

To estimate Silver Eel Escapement (in collaboration with ESB, NUIG, Marine Institute)

To estimate silver eel escapement indirectly using yellow eels

To monitor the impact of fishery closure on yellow eel stock structure

Inter-Calibration with Water Framework Sampling

To compare current and historic yellow eel stocks

To establish baseline data to track changes in eel stock over time

To evaluate impedance of upstream colonisation: migration and water quality effects.

To determine parasite prevalence and eel quality

PLANNED COMPLETION DATE

2011 Survey work was completed in late in December 2011, the final report on the 2009-2011 national eel monitoring programme report will be delivered in March 2012.

WHO WILL BENEFIT FROM THE PROJECT?

The information obtained will be important in evaluation the present status of the eel stock nationally and the impact of the measures undertaken under Ireland's eel management plan for the recovery of the eel stock.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

A report on the 2009-2011 monitoring programme will be available in March 2012



Plate 19. Elvers ascending the salmon fish pass in Ballysadare in July 2011.

PROGRESS-TO-DATE

2011 was the third year of the eel monitoring programme. A national elver monitoring programme was initiated with 8 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, six lakes (Burrishoole, Lough Derg; Lough Oughter, Lough Ramor, Lough Inchiquin, Ballynahinch lake) and Waterford estuary were sampled. Monitoring of the silver eel run on the Fane system, downstream of Lough Muckno was undertaken in autumn 2011. 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).

FINDINGS OF INTEREST

Glass eel and elver catches are at an all-time low and at only approx. 5% of historic catches. Yellow eel surveys show a lack of small eels and a shift to larger female eels, indicative of a collapse in elver recruitment. Monitoring of the impact of the closure of the fishery is too soon to show a change in eel population structure. It was not possible to estimate silver eel production and escapement from transitional waters. The presence of the swim bladder parasite *A. crassus* was recorded in a broad range of water bodies nationally.

NEXT STEPS

Following completion of the monitoring report in March 2012, a further three year monitoring programme will be undertaken over the 2012-2015 period.

PROJECT TEAM	Dr. Paddy Gargan, Dr. Ciara O'Leary, Dr. Gustavo Becerra and Dr. Robert Cruikshanks
TOTAL BUDGET	€ 188,766
FUNDING SOURCE	DCENR
RESOURCES UTILISED	IFI Staff and Eel Fishermen

PROJECT STAFF



Dr. Paddy
Gargan



Dr. Ciara
O'Leary



Dr. Gustavo
Becerra Jurado



Dr. Robert
Cruikshanks

Water Framework Directive (WFD) Surveillance Monitoring of Fish Stocks in Lakes, Rivers and Transitional waters

REMIT OF PROJECT

The Water Framework Directive specifies that monitoring of a variety of biological elements (including fish) is undertaken in order to assign an overall ecological status to a water body. Inland Fisheries Ireland has been assigned the responsibility by the Environmental Protection Agency (EPA) to deliver the fish monitoring requirements of the WFD. The fish monitoring programme has been conducted annually since 2007 at specified locations. This programme is providing information on the ecological status of fish species present in each waterbody as well as information on their abundance, growth and population demographics.

WHY IS THE PROJECT BEING UNDERTAKEN?

Each EU Member State is required to implement restorative measures to preserve those water bodies that are currently in High or Good ecological status and to restore those water bodies that are currently impaired, in order that they achieve at least Good ecological status by 2015. In order to achieve this, each Member State must assess the current ecological status (High, Good, Moderate, Poor or Bad) of surface waters through monitoring of a variety of biological and physico-chemical elements. Ongoing monitoring of these water bodies can then track the effectiveness of corrective measures put in place to restore those that do not meet the requirement of Good ecological status. Monitoring locations for all physico-chemical and biological elements (phytoplankton, macrophytes, phytobenthos, benthic invertebrates and fish) have been set out by the EPA in 2006 and monitoring began in 2007 in line with the required WFD timescale.

PLANNED COMPLETION DATE

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.



Plate 20. Retrieving a seine net on Castlemaine-Cromane transitional waterbody, October 2011

The first three year phase (2007 – 2009) of the monitoring programme was completed in 2009. The second three year phase commenced in 2010 and will continue until the end of 2012.

WHO WILL BENEFIT FROM THE PROJECT?

The data collected to date for the WFD fish monitoring programme not only fulfils legislative requirements but provides an invaluable source of information on fish species distribution and abundance for decision makers, angling clubs, fishery managers and owners and other interested parties.



Plate 21. Setting a seine net on Castlemaine-Cromane transitional waterbody, October 2011

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

Interim (preliminary) reports on each water body are published to the dedicated WFD fish website (www.wfdfish.ie) throughout the monitoring season (June – October). These reports are replaced regularly with more detailed reports on each water body once all the relevant fish data has been processed. Final reports for all water bodies surveyed during 2011 have been published to the WFD fish website (www.wfdfish.ie). A comprehensive summary report for the 2011 surveillance monitoring programme will also be available in due course. A report on the ecological status of each waterbody in relation to the fish stocks is also provided to the EPA on a yearly basis as input to the River Basin Management Plans.

PROGRESS TO-DATE

The first three year surveillance monitoring cycle (2007 – 2009) has been completed, with a total of 276 water bodies being surveyed, encompassing 70 lakes, 134 river sites and 72 transitional water bodies. More than 70 fish species and 150,000 individual fish were recorded.

During 2010, 25 lake waterbodies, 43 river waterbodies and 25 transitional waterbodies were surveyed and over 50,000 fish were captured, measured and examined. In 2011, a further 30 lake waterbodies, 58 river waterbodies and 2 transitional waterbodies were surveyed and over 38,000 fish were captured, measured and examined. All fish have been identified, counted and a representative sub-sample have been measured, weighed and aged. Scale samples were taken from a large range of fish species and a sub-sample of fish were retained for laboratory analysis of sex, stomach contents and parasitism.

FINDINGS OF INTEREST

A total of 17 fish species (sea trout are included as a separate 'variety' of trout) and three types of hybrid were recorded among the 30 lake waterbodies surveyed during 2011. Eel was the most common fish species recorded, being found in all lakes surveyed (100%). This was followed by brown trout, perch, pike and roach which were present in 72%, 66%, 48% and 48% of lakes respectively. Sea trout were captured in six lakes in the north-west, west and south-west: Lough Beagh, Glencullin Lough, Carrowmore Lake, Lough Brin and Lough Leane. Arctic char were recorded in six lakes in the northwest, south-west, and west: Lough Acoose, Lough Caragh, Lough Leane, Lough Beagh, Lough Melvin and Lough Talt. Perch, followed by pike and roach were the most widely distributed non-native species recorded during the 2011 surveillance monitoring programme, with perch being present in 19 lakes and pike along with roach being present in 14 out of the 29 lakes surveyed.

A total of 14 fish species and one type of hybrid were recorded in the 58 river waterbodies surveyed during 2011. Species richness ranged from ten in the Rye Water (Kildare Br.) site to zero species in the River Dodder tributary (Piperstown). Brown trout was the most common species recorded, being present in 89% of sites surveyed, followed by three-spined stickleback (66%), eels (60%), stone loach (55%), salmon (49%) and lamprey (46%). Juvenile salmon were recorded in the River Tolka indicating a return of the species to this Dublin city river.

A total of 26 fish species were recorded among the 2 transitional water bodies surveyed during 2011. Sprat was the most abundant fish species captured followed by flounder and common goby. A number of important angling species were recorded during the surveys in 2011: flounder, plaice and sea bass were



Plate 22 . Electric fishing on the Ratoath River, July 2011

recorded in both waterbodies, while thick-lipped grey mullet, sea trout, salmon and brown trout were recorded in Castlemaine Harbour.

NEXT STEPS

Detailed reports on each water body surveyed in 2011 will be available in Q2 and a comprehensive summary report on the 2011 surveillance monitoring programme will be available in Q3. Fieldwork for the 2012 surveillance monitoring programme will be conducted between June and October 2012 with fish processing and data analysis progressing over the winter months.

PROJECT TEAM	Dr. Fiona Kelly, Project Director Dr. Andrew Harrison, Lynda Connor, Dr. Ronan Matson, Rory Feeney, Emma Morrissey, Ciara Wogerbauer, Kieran Rocks, Patricia Wilson, (July 10 to Oct 10) Sinead O'Reilly, (July 10 to Oct 10) Karen Kelly, (July 10 to Oct 10) Michael Behan, (July 10 to Oct 10)
TOTAL BUDGET €	Funding received for 2011 was €0.5 million
FUNDING SOURCE	Funding for 2011 was provided by the Department of Communications, Energy and Natural Resources
RESOURCES UTILISED	Eight full time staff and four temporary staff were employed on the project throughout 2011. Survey work was conducted in conjunction with further full time and temporary staff employed in regional IFI offices.
DELIVERABLES	Increase our understanding of some of the factors causing salmon population declines in the upper Shannon; contribute to the design and implementation of stock enhancement programmes; compare the genetic composition of the existing salmon populations to historical populations; establish themed GIS; informed management in relation to River Shannon salmon conservation

PROJECT STAFF



Dr. Fiona Kelly



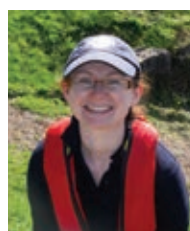
Dr. Andrew
Harrison



Dr. Ronan
Matson



Lynda Connor



Ciara
Wogerbauer



Rory Feeney



Emma
Morrissey

Habitats Directive

REMIT OF PROJECT

The remit of the project is to examine the status of the 'conservation fish species' i.e shads, lamprey species, pollan, char and smelt, in Irish waters. The shads, lamprey species and pollan are listed in Annex II of the EU Habitats Directive, along with Atlantic salmon.

WHY IS THE PROJECT BEING UNDERTAKEN?

There is a legal obligation on Ireland to report on the status of species listed in the EU Habitats Directive on a six-year cycle. The Minister of CENR, as the inland fisheries minister, is charged with this responsibility for the Habitats Directive fish species and IFI carries out this function for the Minister.



Plate 23. Terry Jackson and Mark Corps with shad caught by rod and line in Carrick-on-Suir.

PLANNED COMPLETION DATE

There is an ongoing onus on the state to report in six-yearly cycles to the EU. Next reporting date is 2013, after which a new six-year cycle of monitoring and status assessment begins.

WHO WILL BENEFIT FROM THE PROJECT?

The knowledge base generated on status and distribution of the relevant species will be important in identifying any necessary conservation or infrastructural measures required for the species survival.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

Interim reports are produced annually on work carried out in that year. These are available on the IFI website.

PROGRESS TO-DATE

The programme is an on-going one, the requirement to undertake monitoring and surveillance of the Habitats Directive fish species being enshrined in the recently-enacted Statutory Instrument 477 of

2011. Given the tenuous or uncertain status of several of the species, the development of statistically-meaningful and repeatable survey techniques is an important requisite. The team works with the WFD team in regard to pollan status in the large Shannon lakes, using hydroacoustic and netting techniques.



Plate 24. Potential pollan spawning habitat in L. Ree

FINDINGS OF INTEREST

Considerable success was achieved through angling surveys for adult shad in the Munster Blackwater and Suir estuaries in 2011, working with angling staff of IFI's Business Development team. Ongoing telemetry studies on adult sea lamprey were continued with the Mulkear LIFE project.

NEXT STEPS

Six-year status review to be generated, working with National Parks and Wildlife Service, for submission to the EU in 2013.

PROJECT TEAM	Dr. James King; Nicola O'Gorman; Dr. Sean Rooney
TOTAL BUDGET €	€200 k
FUNDING SOURCE	Exchequer funded National Programme
RESOURCES UTILISED	IFI R&D resources; Access to local IFI staff and logistics in variety of River Basin Districts; synergy with IFI's Water Framework Directive survey team

PROJECT STAFF



Dr. James King



Dr. Sean
Rooney



Nicola
O'Gorman

Salmon CL Attainment project

REMIT OF PROJECT

The general decline in salmon stocks internationally over the past two decades and since 2007 changes in the way that salmon are managed in Ireland 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 are less than the number of salmon required to spawn in each river (the salmon conservation limit) then the salmon stock is protected and no harvesting is permitted. After scientific assessment in 2011, 52 rivers were identified as having a surplus over the conservation limit, while 89 rivers either has 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 and facilitate it being open for catch and release angling in the subsequent year. This type of assessment has been carried out at over four thousand sites in 117 rivers since this programme began in 2007.

Detailed salmon genetics studies to improve knowledge of Irish salmon stocks for better management formed an element of the programme. Under the CL Attainment Programme the efficiency of partial counters on the Boyne and Munster Blackwater was investigated using PIT tag technology. The dynamics of adult populations also required investigation to advise on the proportion of 1SW and MSW in different stocks or populations and on run-timing. These data will contribute to refining Conservation Limits for individual rivers. A study on the impact of cormorant predation in four salmon catchments was completed in 2011.

WHY IS THE PROJECT BEING UNDERTAKEN?

The project is being undertaken to provide data on the status of salmon stocks in rivers where no direct means of stock assessment is available. Salmon genetic programme provide scientific information to better understand Irish salmon stocks. Specifics in this programme were 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. Sampling was undertaken 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 2011 samples with previously collected samples. Investigation of local adaptation of salmon stocks to individual catchments was undertaken. A PIT tag programme was undertaken 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) was undertaken for stock descriptions from different fisheries. Pilot projects were undertaken examining cormorant predation and the nature and abundance of the fish species being consumed over the season.

PLANNED COMPLETION DATE

December 2011

WHO WILL BENEFIT FROM THE PROJECT?

The project is designed to provide scientific information of salmon stocks nationally to determine if stocks are meeting conservation limits. The project also provides information of how discrete certain river stocks are and how best these stocks should be managed, Fishery managers, scientists, local river proprietors and anglers will all benefit from a better understanding of the biology and stock status of salmon nationally.

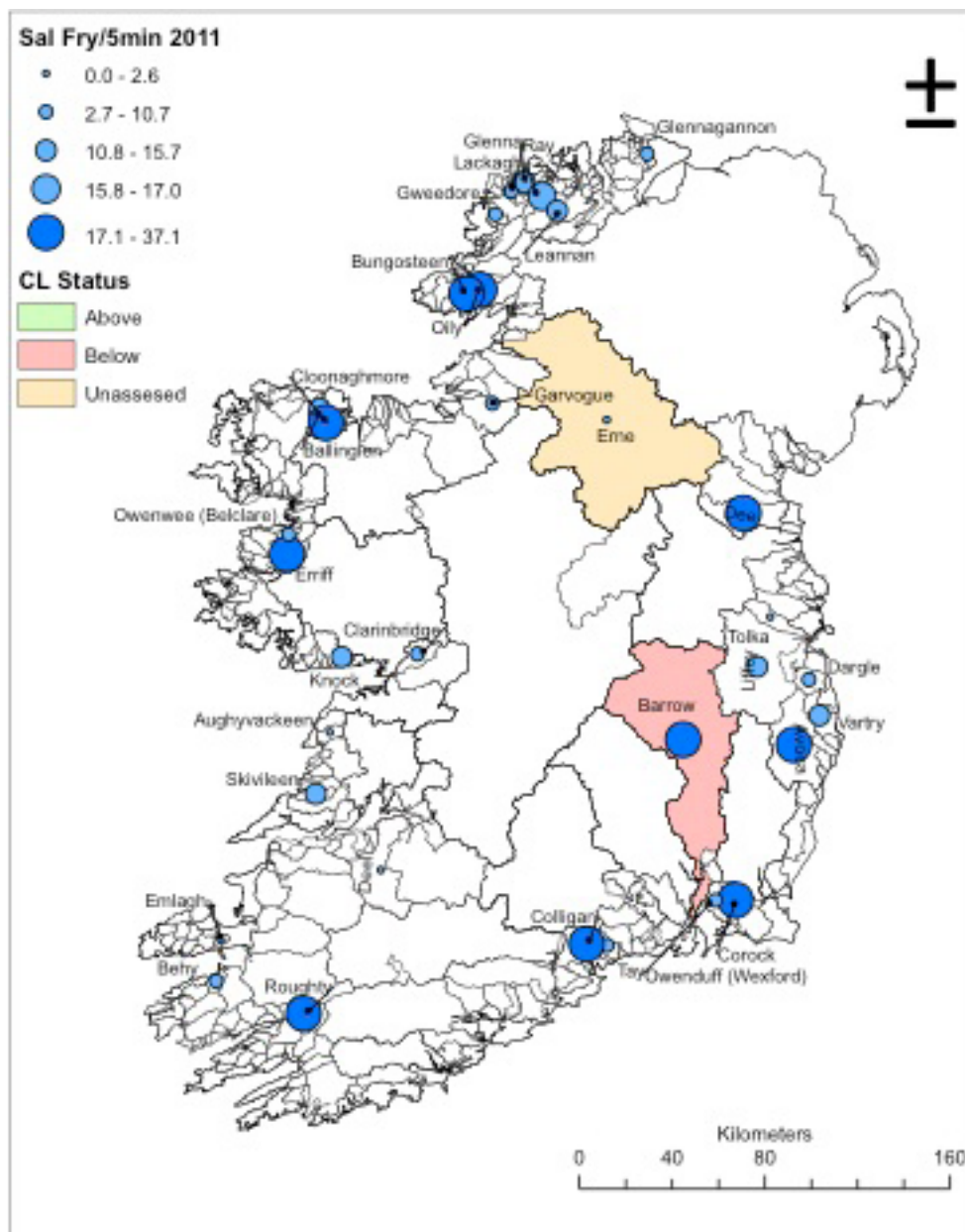
WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

March 2012

PROGRESS-TO-DATE

A total of 739 sites were electro-fished in 34 rivers in 2011, this included several index systems. The survey data was analysed and used to support salmon management advice for the 2012 season.

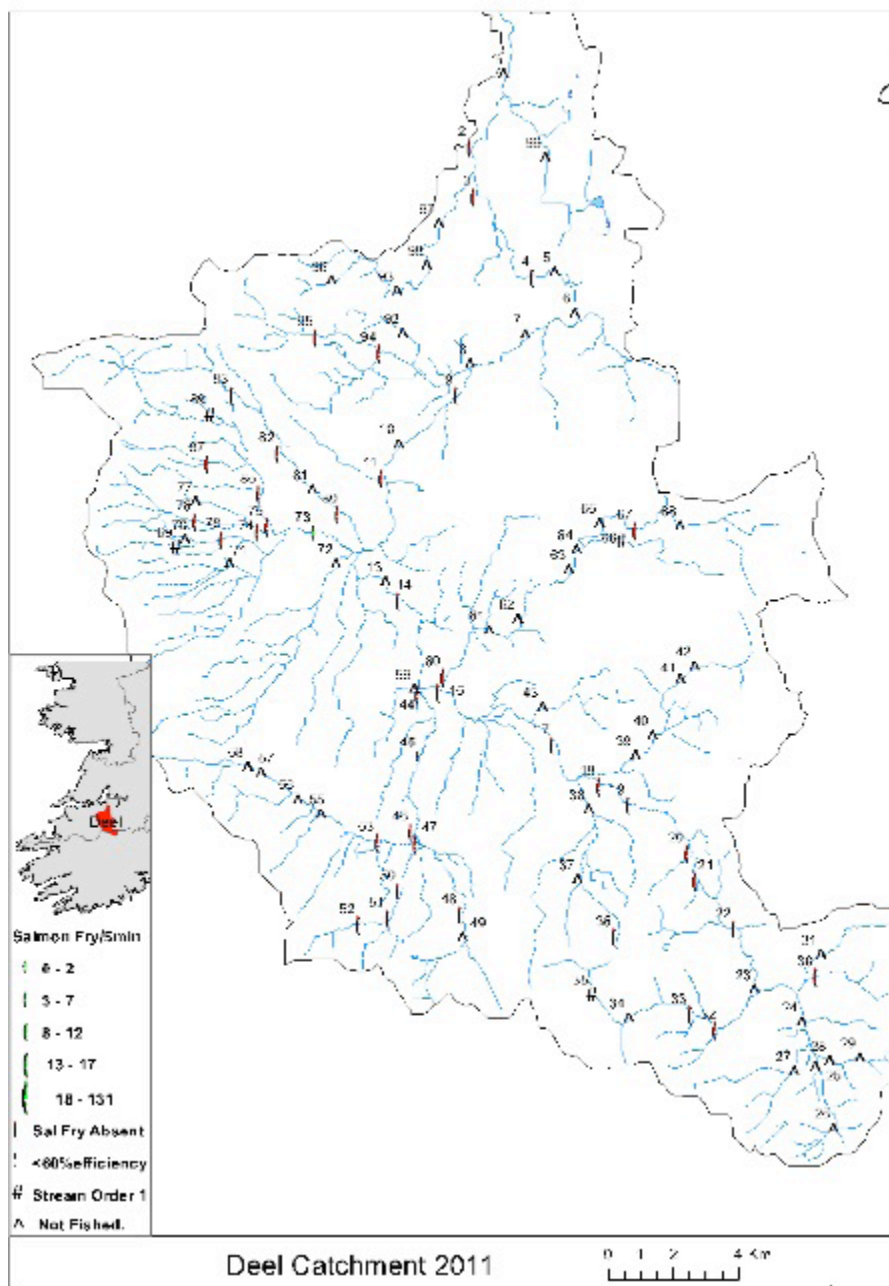
For genetic structure of salmon populations for biodiversity status assessment, samples were collected from ten rivers. Juvenile salmon samples were collected from 15 rivers in 2011 to test for temporal stability.



FINDINGS OF INTEREST

For the 34 salmon catchments surveyed in 2011, the salmon fry abundance ranged from an average of one salmon fry or below on the Erne, Deel and Aughyvackeen to a catchment average of 37 salmon fry on the Corock. The Oily, Colligan, Bungosteen, Cloonaghmore, Dee, Erriff, Roughty, Barrow and Avoca all recorded a catchment wide average of >17 fry. Salmon fry densities of over 15 Salfry/min were also recorded on the Lackagh, Liffey, Ballinglen and Varty catchments.

Seven rivers, predicted not to have a salmon surplus in 2010, had an average salmon fry index ≥ 17 over the 2007-2010 period. These rivers, (Glyde, Boyne, Slaney, Bride, Glenshelane, Owenascaul, & Kerry

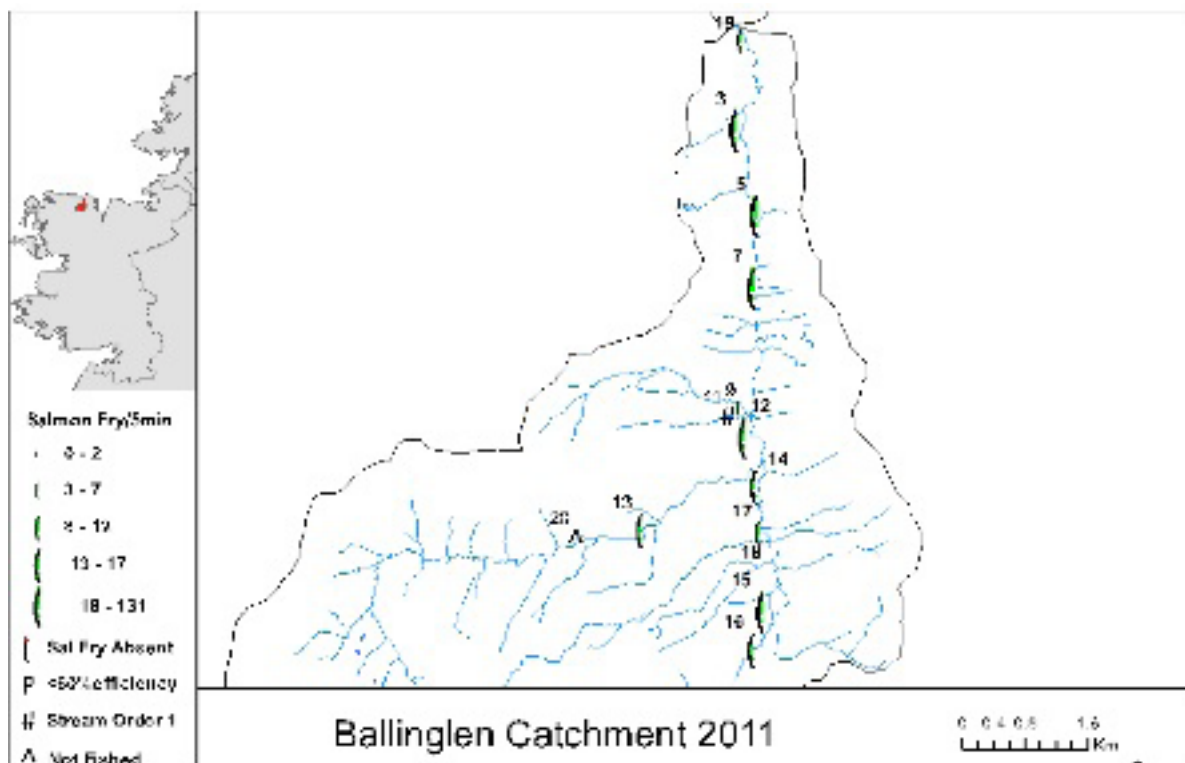


Blackwater) were recommended for opening on a catch & release basis in 2011 which would also provide rod catch data for estimation of stock size.

Generally there was good agreement between the Standing Scientific Committee scientific assessment of attainment of salmon conservation limit from rod catch or counter data and the results of the catchment-wide electro-fishing surveys. However, some rivers, primarily small rivers with a rod catch < 10 rivers, were, based on electro-fishing results, very unlikely to be meeting their derived CL. (Dargle, Vartry, Emlagh, Isle Burn, Straid, Donagh, & Culoort).

Results to date indicate that the catchment wide electro-fishing technique has good potential for salmon stock assessment. It is anticipated that at least 5 years data will be required before meaningful relationships between juvenile abundance and conservation limits can be developed. The technique is likely to provide the best estimate of salmon stock status in small rivers where rod catch was low (<10 salmon annual rod catch) and cannot be used to estimate salmon stock size currently.

In collaboration with the Marine Institute, an experimental population of salmon was established using broodstock collected from the Burrishoole and Erriff river systems to determine if salmon are locally adapted to their own river system. The progeny of both stocks will be monitored in the Erriff catchment to determine if one stock has better survival to the smolt stage. This information will be important in advising salmon enhancement strategies nationally.



Year / River	Site Number	X	Y	Date	Riffle Grade	Sal Fry Captured	Status (Include)	Sal Fry / 5min
2011/Ballinglen	003	110119	338066	04/10/2011	2	19	Included	24.00
2011/Ballinglen	005	110378	336972	03/10/2011	2	21	Included	23.00
2011/Ballinglen	007	110336	336045	04/10/2011	2	23	Included	25.00
2011/Ballinglen	009	110118	334469	05/10/2011	3	3	Included	3.00
2011/Ballinglen	011	109960	334367	05/10/2011	2	5	Stream Order 1	
2011/Ballinglen	012	110219	334145	03/10/2011	2	14	Included	17.73
2011/Ballinglen	013	108876	332955	04/10/2011	2	10	Included	13.00
2011/Ballinglen	014	110334	333510	04/10/2011	1	12	Included	14.77
2011/Ballinglen	015	110447	331923	03/10/2011	2	18	Included	20.70
2011/Ballinglen	016	110310	331426	03/10/2011	2	12	Included	15.69
2011/Ballinglen	017	110369	332893	04/10/2011	1	9	Included	11.70
2011/Ballinglen	018	110410	332762	04/10/2011	2	1	Included	1.00
2011/Ballinglen	019	110143	339199	05/10/2011	3	9	Included	11.45
2011/Ballinglen	020	108021	332808	05/10/2011		0	Not Fished	

Plate 27. Results of CWF on the Ballinglen catchment in 2011.

Work was undertaken to assess the raising factor required at two partial fish counter sites in 2011. IFI cooperated with experts in the installation of data capture devices and antennae on the Rivers Boyne and Munster Blackwater. Two hundred salmon were captured by traditional draft net fishermen on the Blackwater and thirty salmon were captured by anglers on the Munster Blackwater, all of which were tagged. The information on the numbers of fish passing through PIT tag detectors at counter sites on both rivers will assist in determining the raising factor to be applied to the fish counter data on these rivers.

NEXT STEPS

Work will continue on the assessment of attainment of salmon conservation limit project in 2012

PROJECT TEAM	Dr. Paddy Gargan and Dr. William Roche
TOTAL BUDGET	€ 120,224
FUNDING SOURCE	Conservation Stamp
RESOURCES UTILISED	IFI Staff and support from Marine Institute

PROJECT STAFF



Dr. William
Roche



Dr. Paddy
Gargan

PLANNED COMPLETION DATE

The current contract ran from January to December 2011.

WHO WILL BENEFIT FROM THE PROJECT?

The overall aim of the work is to optimize the angling potential of these multi-purpose recreational waterways whilst ensuring that Waterways Ireland's Water Framework Directive obligations with respect to aquatic ecosystem health are achieved. Furthermore, relevant biological data and management information is provided to a variety of statutory bodies and stakeholder interests.

WHEN WILL INTERIM / FINAL REPORTS BE AVAILABLE?

Regular progress reports are submitted to Waterways Ireland throughout the year and a summary document prepared annually. A scientific report will be produced during 2012.



Plate 29. Electrofishing on the Barrowline on the Grand Canal, Oct 2011

PROGRESS TO-DATE

Fish stock assessments were conducted along several sections of the Shannon-Erne Waterway, the Barrow Navigation and the Royal and Grand Canals in 2011. While some localised changes in fish stock structure were noted, in general, stocks of coarse fish and pike remain healthy across those areas surveyed.

A total of approximately 700kg of adult coarse fish were stocked into six sections of the Royal and Grand Canals in 2011. Sourced from disease free waters, these fish enhanced the amenity value of the fisheries that were stocked. A notable stocking occurred on the 45th level of the Royal Canal, Clondra, where in excess of 320kg of large fish were stocked in spring 2011 following the re-opening of the waterway in 2010.

A total of 15 separate fish rescue operations, which required approximately 110 man days to complete, were conducted during 2011. Approximately 2.75 tonnes of fish were relocated within adjacent canal habitats during these operations in 2011. The largest event saw over 35000 (~1.5 tonnes) adult fish removed from 2.2km of the Grand Canal, near Ticknevin, in December 2011. This facilitated the treatment and removal of New Zealand Pigmyweed (*Crassula helmsii*) a highly invasive non-native aquatic plant species.

FINDINGS OF INTEREST

A major fish kill occurred on the 27th level of the Barrow Line of the Grand Canal in December 2010, as a result of an unidentified effluent entering the canal through a culverted stream. Following a large scale investigation into this event, sources of pollution to this culvert have been identified and eliminated, resulting in improved water quality in the canal. Project staff monitored invertebrate communities in this canal section throughout 2011 with results indicating that invertebrate communities are returning to a healthy state. Further monitoring will be conducted in 2012.

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 2011. Aquatic plant communities were assessed at these discrete sites during the autumn sampling period. Overall, the aquatic health of the waterway network is high and continues to meet designated targets.

Extensive aquatic plant management surveys were conducted along the Barrow Navigation, the Shannon-Erne Waterway and on the Royal Canal between Mullingar and Clondra in 2011. In addition to informing both real-time and future weed management programmes, these surveys also allowed broad scale examinations of the distribution and status of an array of invasive species (plant and animal) to be conducted. These species may not only impact upon the ecology of infected waters, but can also seriously undermine navigation and other amenity use. Of particular concern is the Asian clam (*Corbicula fluminea*) which was recorded downstream of the Barrow Navigation in St. Mullins and near the confluence of the Shannon-Erne Waterway, in Leitrim in 2010. Benthic trawls conducted on the above mentioned waterwa

NEXT STEPS

The programme will continue throughout 2012. The status of invasive species will continue to be monitored closely. IFI staff will work collaboratively with colleagues in Waterways Ireland and a variety of external organisations to maximise the value of such work.

PROJECT TEAM	Dr. Joe Caffrey, Paul McLoone, Dr. Tara Gallagher & Will Corcoran
TOTAL BUDGET €	€235000
FUNDING SOURCE	Waterways Ireland
RESOURCES UTILISED	IFI resources

PROJECT STAFF



Dr. Joe Caffrey



Paul McLoone



Dr. Tara
Gallagher



Will Corcoran

Environmental River Enhancement Programme (EREP)

REMIT OF THE PROJECT

To undertake a programme of capital enhancement works and of enhanced maintenance on OPW channels over a 5-year period (2008-2012) with an annual target of 100 km of channel specified for inspection and works; to report on the impacts of these works in terms of hydromorphology and biodiversity; to deliver a new environmental training programme for OPW's Arterial Drainage Division; to audit implementation of new environmental guidance in the Office of Public Work's (OPW's) channel maintenance programme; to undertake additional scientific studies as these arise.

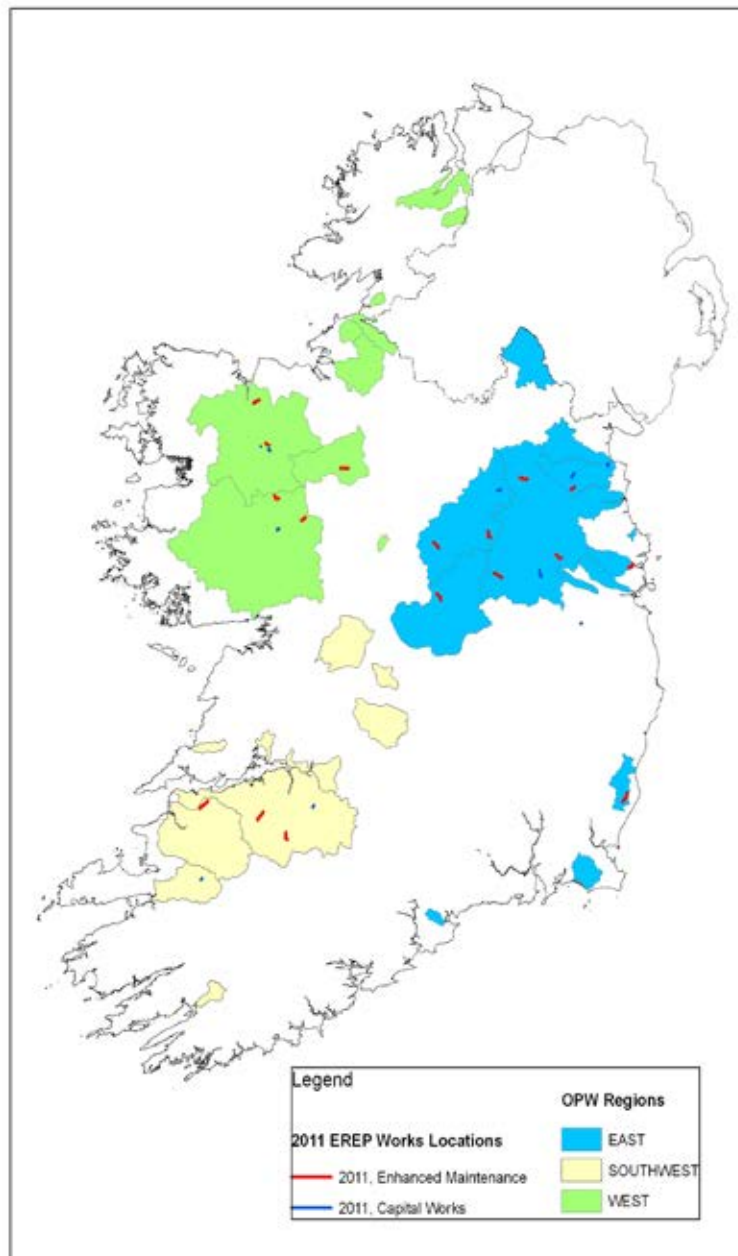


Plate 30. Location of all rivers Included in EREP

WHY IS THE PROJECT BEING UNDERTAKEN?

Contributes to advancement of national (National Biodiversity Programme) and international (EU Habitats Directive and EU Water Framework Directive) legislative requirements in the context of arterially drained rivers and provides and appraisal of the ecology of river corridor habitats and impact of channel maintenance programmes on them.

PLANNED COMPLETION DATE

5-year programme – 2008-2012.



Plate 31. Example of a paired deflector being constructed

WHO WILL BENEFIT FROM THE PROJECT?

OPW, the commissioning agency is the initial beneficiary. In the larger picture, river corridor biota and stakeholders should benefit. It is also considered that strategies developed in the programme, and shown to be effective in contributing to biodiversity and hydromorphology, may usefully be undertaken by Local Authorities and Drainage Boards undertaking similar channel maintenance activities.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE

Interim report to OPW annually.

PROGRESS TO DATE

Project inception, recruitment and training of new IFI staff completed; programme of works and interim reports for Years 1 to 4 have been completed. Extensive training programmes for O.P.W. staff at driver, foreman and engineer level were delivered in Years 3 and 4. Annual targets of 100 km of enhanced channel per annum are being met. A final report on this 5-year programme will be drafted later this year.

NEXT STEPS

Currently O.P.W. are considering an extension to this project.

PROJECT TEAM	Dr. Martin O'Grady, Dr. James King, Dr. Karen Delanty, Brian Coughlan, Rossa O'Brien & Michelle O'Regan
TOTAL BUDGET €	€305,000
FUNDING SOURCE	OPW fully funded project
RESOURCES UTILISED	5 IFI staff full time, 2 IFI staff part-time. Staff contributions from OPW Drainage Maintenance

PROJECT STAFF



Dr. Martin
O'Grady



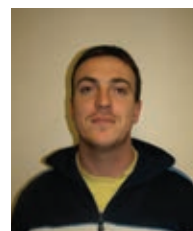
Dr. James King



Dr. Karen
Delanty



Michelle
O'Regan



Rossa O'Briain



Brian Coughlan

Other Projects

List of other projects not included (some of the additional commenced in 2011 but may not have delivered until 2012)	
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 & training course	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
Provision of expert evidence (legal cases)	All SRO's
Mitigating the Impact of Flood Relief Schemes on Fisheries	Dr. M. O'Grady
Monitoring the Status of Fish Stocks in Irish Trout Lakes	Dr. M. O'Grady