Central Fisheries Board
Research Project Summaries
December 2009

Contents

Chairman's Statement

The role of the applied research in fisheries is critical in ensuring that correct decisions and management advice is offered as stakeholders seek to manage, conserve and protect Ireland's Inland Fisheries resource. This document reports on some of the key research projects undertaken by the staff of the Research and Development Division of the Central Fisheries Board in 2009. It does not attempt to capture the full spectrum of work undertaken and advice provided by the scientists in the Division.

Like all enterprises over the past year the Central Fisheries Board has been impacted by the resource constraints implemented due to the deterioration in the Irish economy. Given these constraints, I am delighted that the business management processes were in place enabling timely decisions and prioritisation to take place, thus ensuring that the limited resources available were focused on the most critical projects.

Once again the 2009 field season was hampered by adverse weather, but despite these constraints the largest ever national fisheries monitoring program was delivered to time and budget. Teams of researchers working on the Water Framework Directive project, the Habitats Directive project and the National Eel Monitoring Programme worked throughout the country on coordinated field work plans ensuring the avoidance of duplication and the sharing of data and results. This coupled with other national research conducted in the Conservation Limit Attainment project, Environmental River Enhancement project and the Waterways Management project ensured a busy season. The Division also provides research and development services to, and works closely with other sister agencies, national and international organisations, academic institutions and our parent Department, the Department of Communications Energy and Natural Resources. The Board is delighted with the efforts of the committed, experienced and highly qualified scientists working across all research disciplines and particulaly when operating in such difficult times. However, without the support and commitment of the management and staff in the Regional Fisheries Boards it would not be possible to undertake many of the key projects reported in this document.

On my own behalf and on behalf of my fellow Board members I would like to thank and congratulate all who have contributed to the significant corpus of research work which was undertaken in 2009. I would also like to wish the Research and Development Division every success in the new Inland Fisheries Ireland organisation which will come into being early in 2010.

David Mackey

Chairman Central Fisheries Board

February, 2009

Foreword by the Director of Research and Development Division

As we move forward towards a new decade we are delighted to report on the continued efforts of the Research and Development Division in delivery against the key goals identified in the CFB's Strategic Plan (2008-2011). Our key strategic goal is "to develop and deliver high quality cost effective applied scientific research and development services to meet the Boards customers' needs" which we seek to deliver through:

- conducting scientific research on fisheries to deliver economic and heritage benefits by ensuring sustainability and conservation of fish in their ecosystems
- conducting research 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

In 2009 Ireland experienced a year of rapidly changing economic conditions which necessitated the implementation of budgetary and resource constraints in the Public Service. These constraints lead to an interim review of our 2009 Business Plan, resulting in project prioritisation and resource reallocation. The projects were prioritised to meet 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 flavour of the applied research role of the CFB rather than to document all projects and areas of advice delivered during 2010. For each project a separate more detailed report is being provided as a deliverable for the main stakeholders.

Although our interim business review required the rationalisation of a number of research projects, it should be noted that the largest national fish monitoring survey in the history of the state has been undertaken. This work is mainly driven by the requirements of the Habitats & Water Framework Directives and the National Eel monitoring programme. To optimise the value of this work, the CFB has now developed a process to capture in a National Archive both physical samples and data records from these surveys. This will ensure that time stamped annual records from our catchments will be available for future analysis as required in years to come.

The CFB scientists worked closely with the Regional Fisheries Boards to provide the research necessary (30 projects conducted in 2009), to support their role in development and conservation of the valuable Inland Fisheries. This work and indeed all of the projects undertaken by the CFB could only be completed with the support and expertise received from our colleagues in the Regional Fisheries Boards.

In addition to the work outlined in this report the Research and Development Division also plays an important role in provision of advice to Government in order to support decisions and policy development in relation to Inland Fisheries. This is an increasing role as more focus is placed nationally and through the European Union on the protection and conservation of our environment.

We look forward with anticipation to 2010 and to delivering applied research to support the protection and conservation of our natural aquatic environment. In planning this work we are very cognisant of the economic environment and the continued resource restrictions. It is with this in mind that we are increasingly focused on ensuring that all projects deliver against their key milestones and budgets. We also look forward to the new Inland Fisheries Ireland organisation, achieved through the merger of the Regional and Central Fisheries Boards, and the expertise and knowledge that will be available within the new structure.

Dr Cathal Gallagher

Director of Research & Development Division

January 2010

Water Framework Directive (WFD) Surveillance Monitoring – Lakes, Rivers and Transitional waters

REMIT OF THE PROJECT

The Water Framework Directive (2000/60/EC) and Irish National Legislation (S.I. No. 722 of 2003) came into force in 2000 and 2003 respectively. A principal aim of this legislation is to preserve existing ecosystems where water quality is currently at high or good status and to restore to good status those waters which are currently impaired. The Directive specifies that monitoring of a variety of elements (including fish) in rivers, lakes and transitional waters shall commence in 2007. The Central Fisheries Board (CFB) has been assigned the responsibility by the Environmental Protection Agency (EPA), in accordance with the above legislation, of delivering the fish monitoring requirements of the WFD.

WHY IS THE PROJECT BEING UNDERTAKEN?

Each Member State in the EU is required to implement corrective measures to preserve waters in high and good ecological status and to restore waters which are at risk of not achieving good ecological status by 2015. A key step in this process is that each Member State must assess the current ecological status (high, good, moderate, poor or bad) of surface waters through national monitoring programmes. Ongoing monitoring of these water bodies can then track the effectiveness of any corrective measures that have been put in place to restore those that do not meet the requirement of good ecological status.

Monitoring of a range of physical, chemical and biological elements (phytoplankton, macrophytes, phytobenthos, benthic invertebrates and fish) started in 2007 in line with the required WFD timescale. Surveillance monitoring locations for all biological elements, including fish, have been set out in the WFD Water Monitoring Programme published by the EPA in 2006.

PLANNED COMPLETION DATE

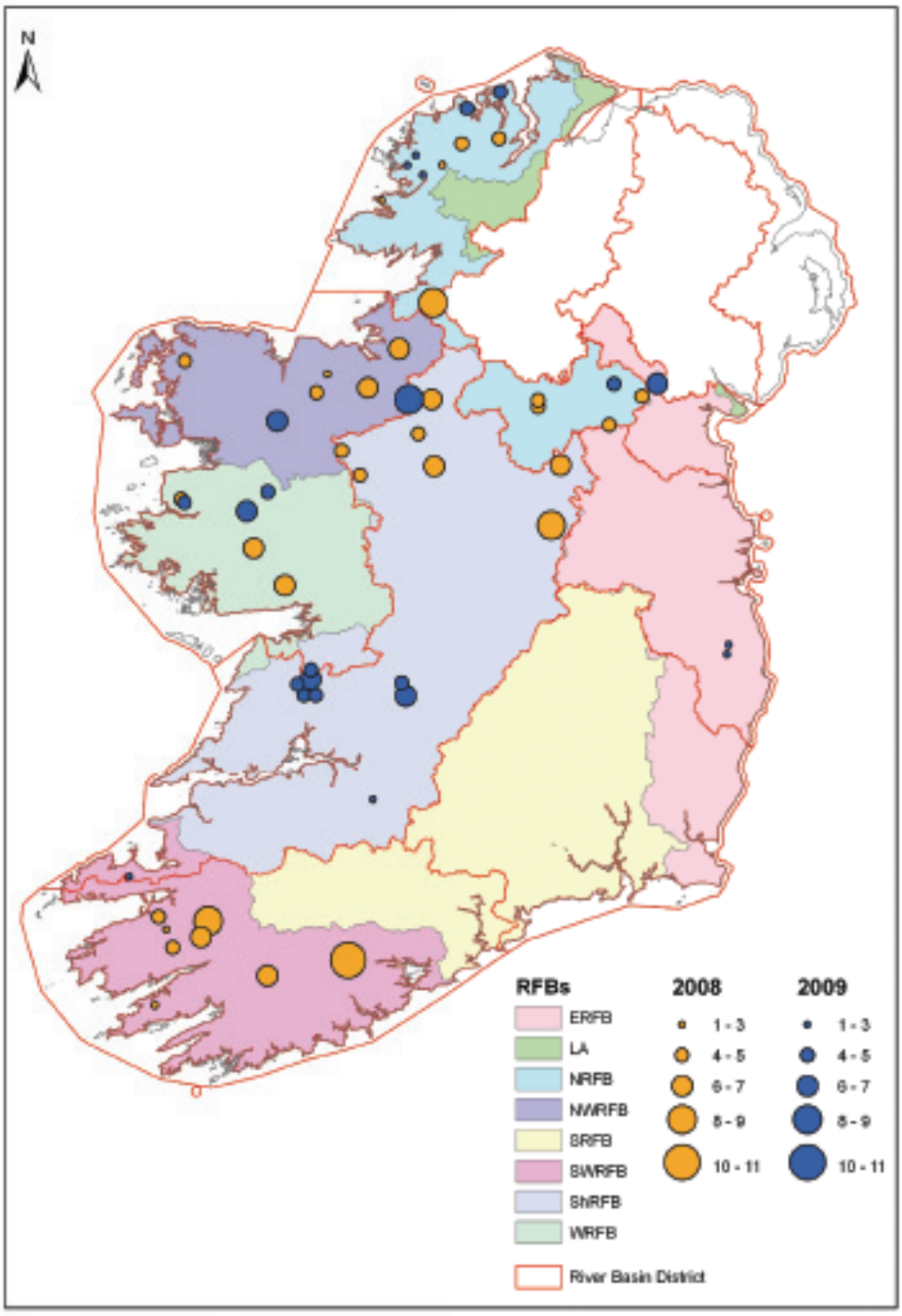
The WFD is an ongoing legislative requirement under which all matters relating to the quality, quantity and ecology of freshwater, transitional waters and inshore marine waters will be protected and managed. The first three year phase (2007 – 2009) of the monitoring programme was completed in 2009. The second three year phase will commence in 2010 and continue until the end of 2012.

PROGRESS TO DATE

Monitoring of fish stocks on lakes and transitional waters commenced in 2007 using a suite of standardised methods based on European (CEN) Standards. Fifteen lakes and three transitional waters were completed.

An extensive WFD fish surveillance monitoring programme was conducted during 2008. A total of 32 lakes with over 8,000 fish recorded, 83 rivers (38 wadeable sites, 45 boat sites) with over 20,000 fish recorded and 42 transitional waterbodies with over 66,000 fish recorded were surveyed. All fish were counted, measured and weighed. Scale samples were taken from a large range of fish and a sub-sample of fish were retained for laboratory analysis. Individual reports for each water body from 2007 and 2008 have been published on the dedicated WFD fish website (www.wfdfish.ie). A comprehensive summary report of the 2008 surveillance monitoring programme has also been compiled and is available on this website.

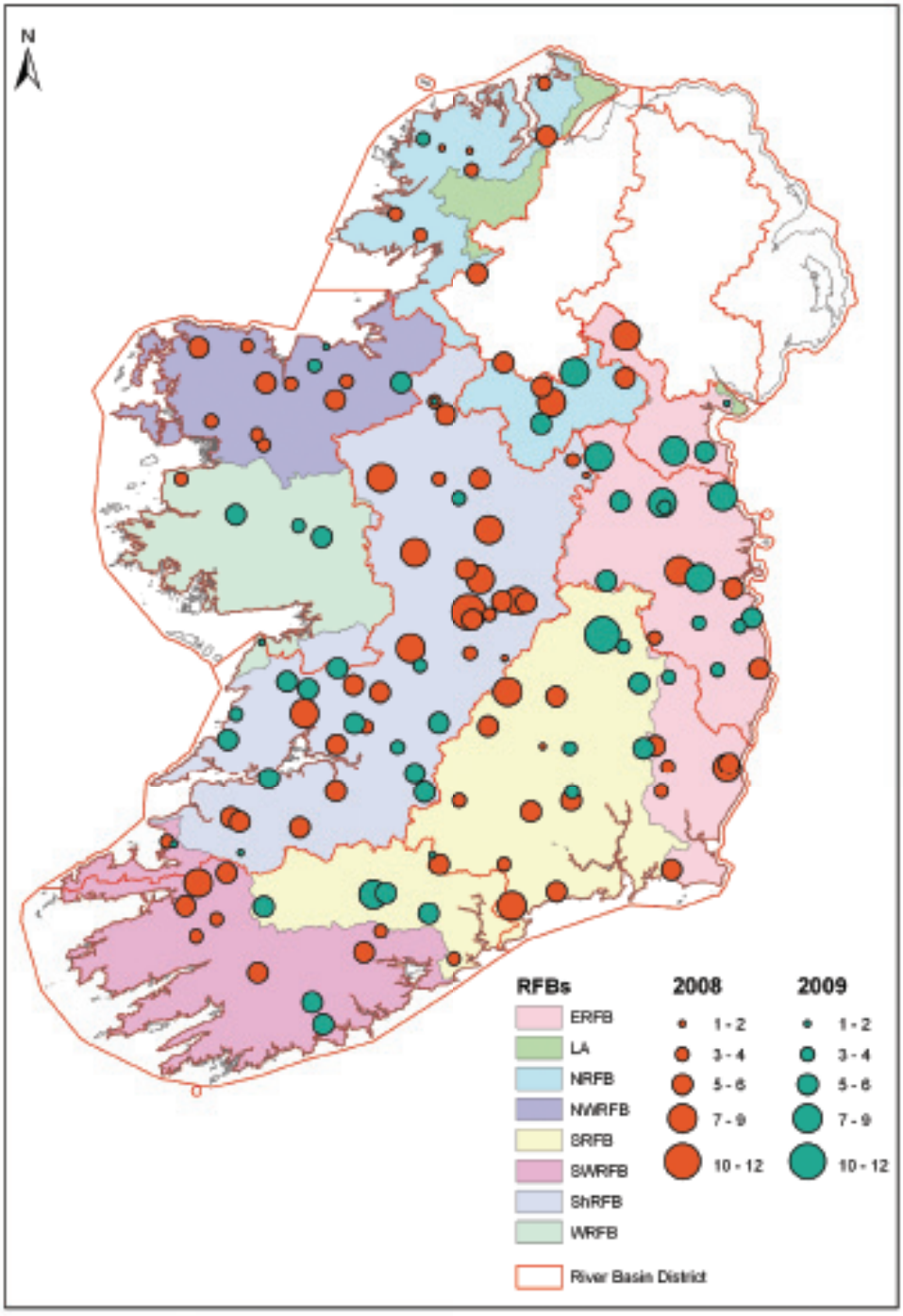
In 2009, a further extensive surveillance monitoring programme was conducted, with 23 lakes, 54 rivers and 23 transitional waters being surveyed. All fish have been measured and weighed and scales and other bony structures are currently being prepared for aging in early 2010. Preliminary reports for all water bodies have been published on the wfdfish.ie website and will be replaced with more detailed reports once all fish data has been processed. A comprehensive summary report of the 2009 surveillance monitoring programme will also be available in due course.



Species richness for all lake sites surveyed in 2008 and 2009

WHO WILL BENEFIT FROM THE PROJECT?

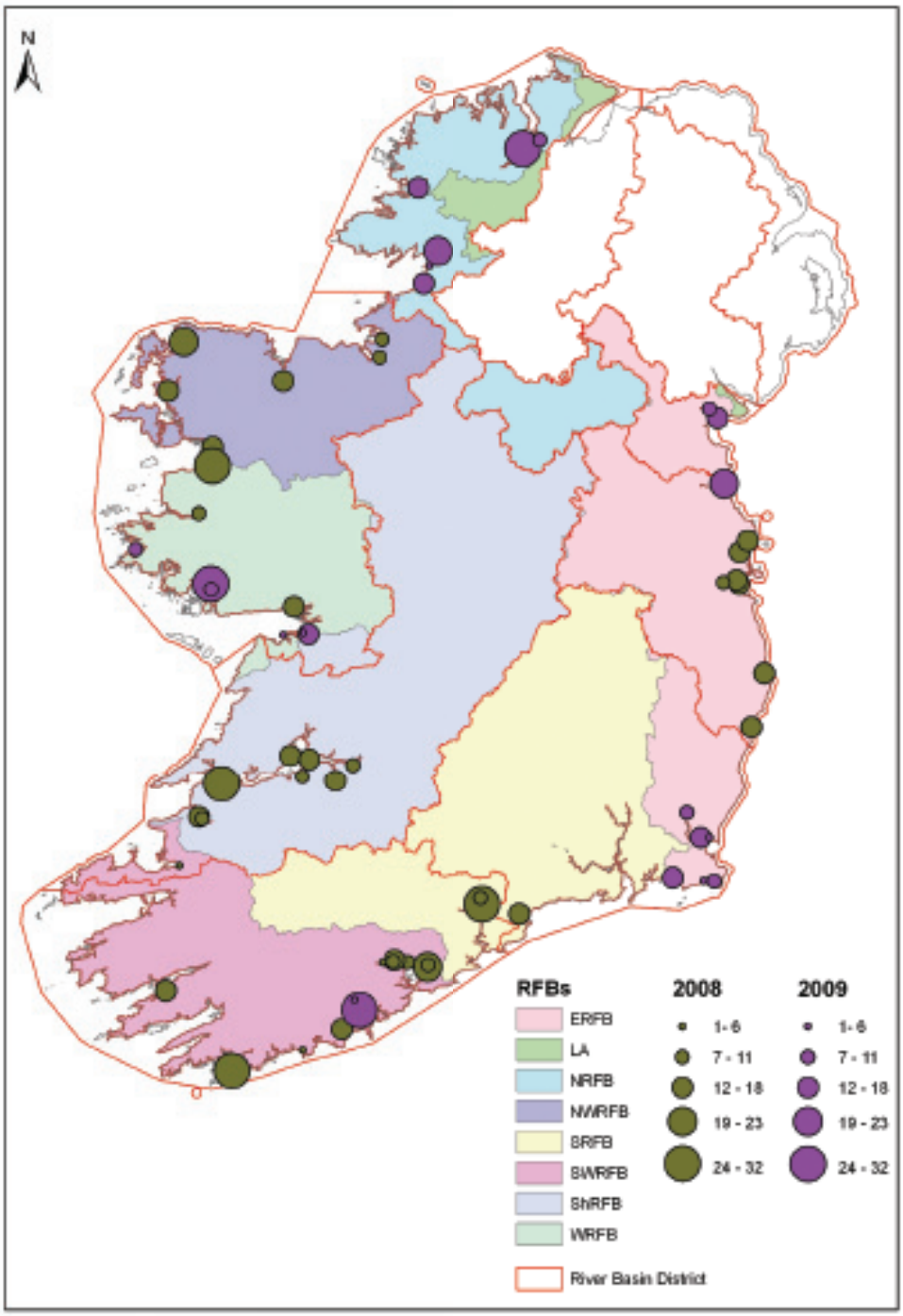
The WFD fish monitoring programme provides an extremely valuable, comprehensive new fish dataset for rivers, lakes and transitional waters using standardised methods that will allow evaluation of long term trends in species composition, abundance and age structure. This information will be of particular interest to the EPA, Regional Fisheries Boards (RFBs), fishery owners, angling organisations and the informed public. The main purpose of the information will be to fulfil the fish monitoring requirements of the WFD for Ireland, enabling River Basin Management Plans (RBMPs) to be developed and implemented effectively.



Species richness for all river sites surveyed in 2008 and 2009

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 (July – October). These reports are replaced regularly with more detailed reports on each water body once all the relevant fish data has been processed. An essential aspect of the WFD surveillance monitoring programme is the rapid dissemination of feedback to all relevant parties, including the RFBs, fishery owners, angling organisations and the public. The data collected is also provided to the EPA on a yearly basis as input to the River Basin Management Plans. A comprehensive report on the 2009 surveillance monitoring programme for lakes, rivers and transitional waters will be available in April 2010.



Species richness for all transitional water sites surveyed in 2008 and 2009

FINDINGS OF INTEREST

Eels were ubiquitous within the lakes surveyed in 2009, existing in all 23 lakes. Native fish species (excluding eels) were absent from seven lakes surveyed, and these could be described as purely coarse fish lakes (Loughs Alewnaghta, Bunny, Dromore, Gur, Inchicronan, Muckno and White). Char populations were recorded in Loughs Doo, Kindrum, Mask and Sessiagh. Adult salmon were observed in Doo Lough and sea trout were captured in Doo and Dungloe Loughs.

A total of 15 fish species were recorded in river sites during 2009. Out of the 54 river sites surveyed, brown trout were recorded in 50 (92.6%) sites. The highest abundance of brown trout captured in any site surveyed was 0.43

Boat electro fishing

fish/m^2 in the Glendine River Co. Clare. Salmon were recorded in 41 sites (75.9%) with the highest abundance of 0.58 fish/m^2 occurring in the Bilboa River in Co. Limerick. Sea trout were also captured in three sites (5.6%). Juvenile lamprey were recorded at 26% of the sites and eels occurred at 81.1%. Roach, pike and perch were observed in 16.7%, 16.7% and 20% of sites respectively. Nine-spined stickleback were recorded in 2009 (none recorded in 2008) in the rivers Tully and Burren in the River Barrow catchment. The invasive species, dace, was recorded in four rivers – Munster Blackwater at Kilavullen Bridge, Barrow, Awbeg and Tully, all within the Southern Regional Fisheries Board.

More than 27,500 fish were captured during the transitional water surveys, comprising of 57 different species. The most unusual finding during the transitional water surveys was a dead 10ft python which was captured in a seine net in the Slaney estuary near Enniscorthy, during September 2009. The source of the snake is still unknown, however it is probable that it escaped from a vivarium or was released into the river by a pet owner who couldn't look after it any longer.

NEXT STEPS

Fish material from the 2009 surveys is currently being processed and fish aging will take place in early 2010. A comprehensive summary report on 2009 surveillance monitoring will be available in October 2010. Planning of the monitoring programme for the first year of the second three year surveillance monitoring phase (2010 – 2012) will commence in early 2010, with fieldwork due to be conducted between June and October 2010. Due to adverse weather conditions and flooding, some river sites scheduled for survey in 2009 will be carried forward to 2010.

PROJECT DIRECTOR	Dr. Fiona Kelly (Senior Research Officer)
PROJECT MANAGER	Dr Andrew Harrison (recently appointed in Nov 2009). Previously Dr Fiona Kelly (Senior Research Officer).
TOTAL BUDGET €	The WFD surveillance monitoring programme operates on a three year rolling basis, with an overall projected budget of €4.95 million for the period 2007 – 2009. Funding received for 2009 was over €1.3 million.
FUNDING SOURCE	Funding for 2009 was provided by the Department of Communications, Energy and Natural Resources.
RESOURCES UTILISED	Nine full time staff were employed on the project throughout 2009. In November 2009 a new project manager was appointed and in December 2009 one technician and two temporary fisheries assistants were appointed, bringing the current staffing levels to eleven. Survey work is undertaken with staff of the Regional Fisheries Boards (21 temporary staff in 7 RFB's)
DELIVERABLES	Dedicated WFD website (www.wfdfish.ie). Weekly preliminary reports throughout the field season circulated to CFB and RFB staff as well as being placed on the website. Detailed reports on each water body surveyed circulated to CFB and RFB staff as well as being placed on the website. Final summary report for 2009 surveillance monitoring programme. GIS database. Data on fish status for rivers, lakes and transitional waters delivered to the EPA for inclusion in the River Basin Management Plans. Data (fish and abiotic information) delivered to European and Nordic intercalibration databases for rivers and lakes. Fish data from transitional waters delivered to NIEA and EA (England and Wales) for development of WFD transitional waters classification tool. River fish and abiotic data delivered to SNIFFER for development of the WFD river fish classification tool for Republic of Ireland, Northern Ireland and Scotland.

PROJECT STAFF

Dr. Fiona Kelly

Dr. Andrew Harrison

Dr. Ronan Matson

Ms. Lynda Connor

Mr. Glen Wightman
(up to Sept 09)

Mrs. Ciara Wogerbaur
(from Dec 09)

Mr. Rory Feeney

Ms. Grainne Hannah

Ms. Roisin O'Callaghan

Emma Morrisey

(& two fisheries assistants from Dec 09 to Feb 10 – Dr. Brian Hayden & Mr. Trevor Stafford)

National Habitats Directive and Conservation Fish Programme

REMIT OF THE PROJECT

To develop and carry out a national monitoring programme on the fish species listed in the EU Habitats Directive and the Irish Vertebrates Red Data Book. The Habitats Directive species include Atlantic salmon, Allis-, Twaite and Killarney shad, Sea-, River- and Brook lamprey and pollan. In addition, the programme targets char and smelt, listed in the Red Data Book.

WHY IS THE PROJECT BEING UNDERTAKEN?

There is an obligation, under Irish implementing legislation, on the Minister of DCENR to undertake monitoring in respect of fish species listed in the Habitats Directive. Ireland must provide a status assessment, to cover the entire national territory, to the EU on a 6-year cycle in respect of the listed fish species. The database on char and smelt is patchy, with clear indications of loss of char populations in major lakes over the last 20 years. Smelt appears to have an extremely fragmented distribution in Irish waters.

PLANNED COMPLETION DATE

There will be an ongoing annual requirement for this national programme. The next status report to the EU is due in 2013.

PROGRESS TO DATE

The programme breaks down into a series of species-associated work packages. Within each species, a further series of sub packages links to the various environmental windows available to sample different life stages of the species.

The programme is actively engaged in developing a series of sampling protocols to provide comparable and quantitative information to permit intra- and inter-waterbody comparison of fish status within and between years.

In 2009, sampling was undertaken for pollan in L. Derg, in a synergy with the Water Framework Directive fish monitoring team. Sampling was also undertaken for juvenile and adult anadromous shad in the SACs of the south east with staff of the Eastern and Southern Regional Fisheries Boards. Catchment-wide sampling for juvenile lamprey was undertaken in six systems, working with Regional Fisheries Bard staff. In two of these, the Inny (Shannon RFB) and Garavogue-Bonet (Northwestern RFB) the field survey was undertaken directly by local staff, liaising with CFB project personnel.

Catchment-wide sampling for juvenile salmon was undertaken in a range of catchments by the CFB's salmon team, working with RFB colleagues. The monitoring was undertaken in the context of CL attainment and dovetails with status assessment of salmon for Habitats Directive.

Surveys on two lakes in Donegal with the Northern RFB generated data on char populations while estuarine sampling with the Southern RFB generated information on smelt populations in specific waters.

The project has identified a suite of monitoring and other elements, up to 2013, that should provide a framework for a comprehensive status update to the EU.

WHO WILL BENEFIT FROM THE PROJECT?

The project fulfils an integral legal obligation on the Minister of DCENR. The nation as a whole will benefit in terms of the contribution the project will make to fish biodiversity and our knowledge of the status, biology and ecology of the listed fish species. The project provides an opportunity to highlight the status of the fish species listed.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

A report on investigations undertaken in 2009 will be available in the first quarter of 2010.

FINDINGS OF INTEREST

The WFD fisheries survey on L. Derg did not yield any pollan.

Despite high levels of angler success for shad on the R. Barrow at St. Mullins, no juvenile shad were captured during autumn sampling.

Substantial numbers of juvenile lamprey were taken in lowland sites in the Avoca catchment.

The Bandon catchment yielded widespread and substantial populations of juvenile lamprey.

Juvenile lamprey were not widely distributed in the Garavogue-Bonet, Swilly and Leannan catchments.

NEXT STEPS

Exchequer funding is required to continue this programme in 2010. Programmes of work have been developed for 2010 and beyond, with a view to facilitating conservation management decision-making from the distribution data sets generated to date.

Juvenile Lamprey training 2009 P. Condon (NWRFB), S. Hartigan, S. Francis and K. Rogers (WRFB), J. King (CFB)

T Robinson and P Ruane (ShRFB Juvenile Lamprey survey Inny catchment

Sorting juvenile Lamprey from bed material

Juvenile Lamprey survey site on Bonet (P.Condon NWRFB)

Juvenile Shad trawling SRFB staff

Juvenile Lamprey 16mm

PROJECT TEAM	CFB: Dr. James King, Dr. Sean Rooney, Ms. Nicola O' Gorman 2009 catchment-wide lamprey surveys: Inny: Mr. Tony Robinson, Mr. Peter Ruane (ShRFB) Garavogue – Bonet: Mr Paul Condon (NWRFB).
TOTAL BUDGET €	Exchequer funding (Operational & Capital) €280k in 2009.
FUNDING SOURCE	Exchequer funded.
RESOURCES UTILISED	Three full time staff are employed on the project. They work closely with Regional Fisheries Board staff, who provide logistical, infrastructural and personnel support.
DELIVERABLES	Improved management information. Report in Q1 2010. Advances in development of monitoring tools and strategies.

PROJECT STAFF

Dr. James King

Dr. Sean Rooney

Ms. Nicola O'Gorman

Status of the Invasive Bloody red shrimp *(Hemimysis anomala)* in the Shannon Catchment

REMIT OF THE PROJECT

To determine the distribution and status of Hemimysis in Lough Ree and elsewhere in the Shannon catchment. It is also proposed to provide information on the potential impacts of this invasive species on the aquatic ecosystem.

WHY IS THE PROJECT BEING UNDERTAKEN?

Hemimysis is a known invasive species in Europe and has the capacity to cause ecosystem shifts. Its presence in the Shannon system has raised serious concerns about the potential impact that this mysid shrimp could have on natural plankton populations and on fish communities in this important fishery.

PLANNED COMPLETION DATE

December 2010.

PROGRESS TO DATE

Distribution studies have been conducted throughout the River Shannon system and its major lakes. Some preliminary surveys have been conducted in the Shannon-Erne Waterway. An information leaflet for distribution to the public and specific user groups has been prepared. Experiments to learn more about the feeding habits of Hemimysis have been undertaken in QUB.

WHO WILL BENEFIT FROM THE PROJECT?

Information that may be used to control the spread of Hemimysis in Irish waters will benefit all water users and particularly anglers.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

An interim report will be available in January 2010. A final report will be ready for Q1 of 2011.

FINDINGS OF INTEREST

Hemimysis has been recorded in Loughs Derg, Ree, Boderg and Key. This smaller member of the Mysid family killed and consumed many times more prey (native aquatic insects) that the larger native mysid in a shorter time interval.

NEXT STEPS

Further *in vivo* experiments will be conducted to assess the potential of this invader to adversely impact on fish communities in the Shannon catchment. Distribution studies will continue through 2010.

PROJECT MANAGER	Dr Joe Caffrey.
TOTAL BUDGET €	€10,000
FUNDING SOURCE	CFB, ShRFB and Quercus.
RESOURCES UTILISED	The bulk of the research is being conducted in QUB, where 1 PhD and 2 MSC students are engaged working on the project.
DELIVERABLES	At least one scientific publication and 3 theses will issue from the work. Information leaflets will be produced and distributed widely.

PROJECT STAFF

Dr. Joe Caffrey

Control of Aquatic Invasive Species and Restoration of Natural Communities in Ireland (CAISIE)

REMIT OF THE PROJECT

The main purpose of the project is to contribute to the halting of biodiversity loss in Ireland by preventing further impacts on native biodiversity from high impact aquatic 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 is being done through a Life+ Project known as CAISIE, the acronym for 'the control of aquatic invasive species in Ireland'.

WHY IS THE PROJECT BEING UNDERTAKEN?

Invasive species in Irish watercourses are a growing threat and need to be addressed urgently. In 2005, an invasive species called *Lagarosiphon major* established itself in Lough Corrib. *Lagarosiphon major* is a plant with origins in southern Africa. How this plant arrived in Lough Corrib is unknown. However, it has managed to aggressively establish itself and cover a large portion of the lake and, because it is an invasive species, it is having a severe adverse effect on the existing ecosystem with Lough Corrib. The Life+ project will combat the growth and spread of *Lagarosiphon major* as well as other invasive species in the Grand and Barrow Canals.

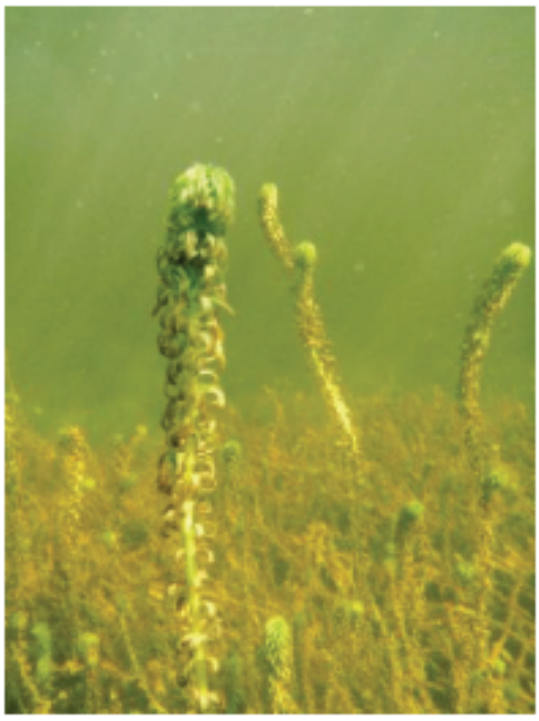
The Life+ Project is a European-funded project and will provide a focus for research and management work which will inform future programmes that target invasive species in Ireland and worldwide.

PLANNED COMPLETION DATE

The planned completion date is April 2013.

SCUBA diver sampling remediation of native aquatic plant species on newly deployed light excluding geotextile

***Lagarosiphon major* established east lake stand (Greenfields, Lough Corrib)**



PROGRESS TO DATE

The Life+ Project was due to commence in January 2009. However with, the Irish Government recruitment embargo, a full project team was only put in place in October 2009. With the assistance of the Western Regional Fisheries Board, afield station was set set up in Moycullen. Work has progressed with data collection, recording, field work and experiments.

In November 2009, the Life+ monitoring expert conducted an audit on the project on behalf of the European Commission. The result from the audit was that the project management aspect has progressed in line with the EU requirements.

WHO WILL BENEFIT FROM THE PROJECT?

The successful completion of the project will have immediate and direct benefits for all stakeholders within the Lough Corrib catchment and along the Grand Canal and Barrow Navigation corridors. The project has a clear demonstration character and will contribute to halting biodiversity loss in other Irish catchments and in other member states.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

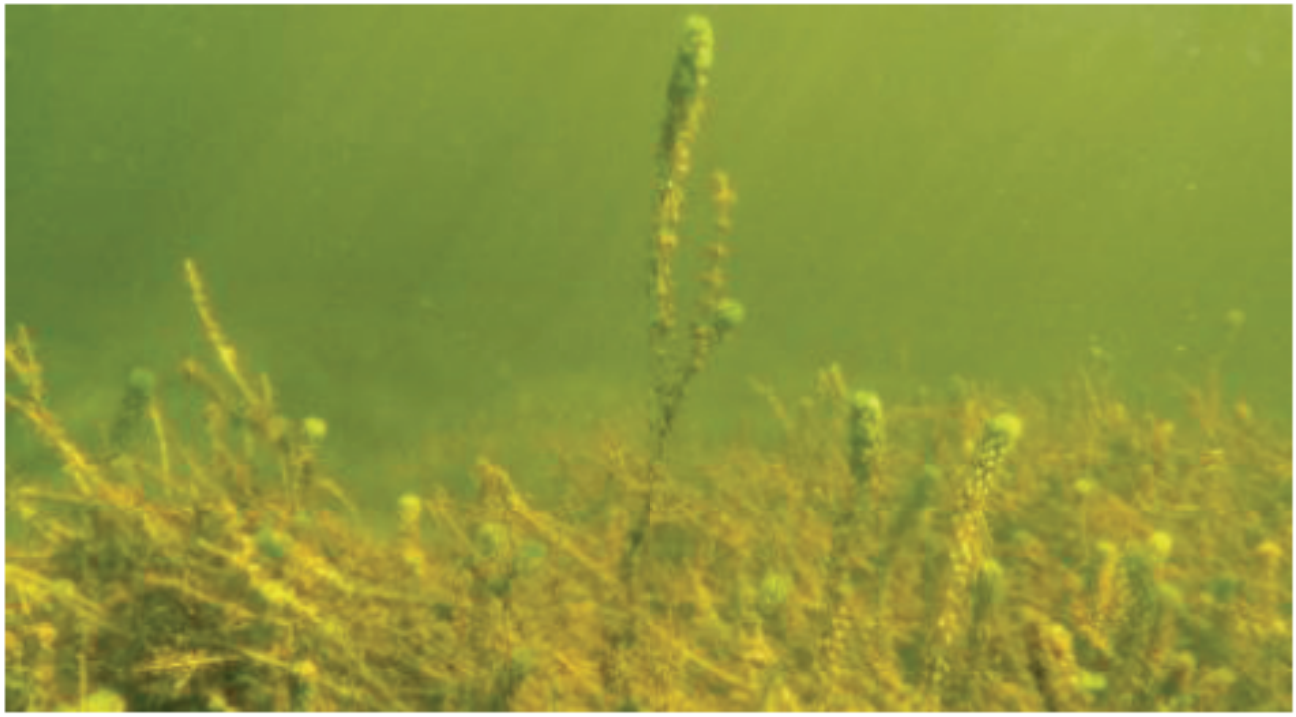
The first interim report is due for submission in June 2010. Following this, an interim report will be issued at the end of each year or as requested by the European Commission.

A final report will be submitted to Europe in April 2013.

FINDINGS OF INTEREST

This is a large project that focuses on invasive species in two major watercourses – Lough Corrib and the Grand Canal & Barrow Navigation corridors. Preliminary work on *Lagarosiphon major* control in Lough Corrib has revealed one method that has the capacity to kill the invasive weed while also enabling the recovery of the indigenous flora.

Semi-collapsed *Lagarosiphon major* stand, Lough Corrib, illustrating seasonal variation in plant morphology.



NEXT STEPS

A detailed road map showing key deliverables over the duration of the project has been developed. The Project Advisory Group has been established and will provide the project with guidance over the next three years. Early 2010 will see the Ministerial launch of the Life+ Project and the establishment of a Marketing and Media campaign to increase awareness on invasive species.

A stakeholder workshop is scheduled for April 2010.

PROJECT MANAGER	Shireen Sayed.
TOTAL BUDGET €	€1.5m approx. over 4 years.
FUNDING SOURCE	The Life+ Project is a European Life+ funded project with the National Parks and Wildlife Services having the role of co-financier.
RESOURCES UTILISED	A Project Manager and three scientists have been recruited to complete this project. The WRFB are integral to the project and have assigned a number of dedicated staff field members to this project. OPW have committed time, staff and equipment to assist in the execution of the weed cutting programme.
DELIVERABLES	The first Project Advisory Group meeting was held in November 2009, with the next meeting scheduled for the end of February 2010. A dedicated website (www.caisie.ie) was setup at the end of 2009. As part of the awareness campaign a number of information leaflets, guides, media articles and other publicity and education material will be produced during the life of the project. A stakeholder forum will be held in March 2010 and a European workshop in October 2012.

PROJECT STAFF

Dr. Joe Caffrey

Ms. Shireen Sayed

Ms. Stephanie Evers

Ms. Helena Morgan

Mr. Michael Millane

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) and to report on the impacts of these works in terms of hydromorphology and biodiversity impacts; to deliver a new environmental training programme for OPW's Arterial Drainage Division; to audit implementation of new environmental guidance in OPW's channel maintenance programme.

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.

Some of the channels where enhancement works were carried out:

Little River

Maine River

Morningstar River

River Dee

PLANNED COMPLETION DATE

5-year programme – 2008 - 2012.

PROGRESS TO DATE

Approximately 100km of channels identified for works in 2009. This covered 2 additional Capital Enhancement programmes and 12 additional Enhanced Maintenance programmes. Work undertaken in 2009 also included a

number of work programmes not completed in 2008. In 2009 a total of 8 Capital Enhancement and 9 Enhanced Maintenance programmes were successfully completed. The remainder of the work will be completed in 2010. This year the monitoring aspect of the project was extended to include bird survey work which will compliment the existing biodiversity monitoring programme for fish, flora, macro-invertebrates and hydromorphology. Year 2 of monitoring experimental and control sites completed. Auditing of 25% of all OPW machine drivers involved in the implementation of the new environmental guidance achieved. The 2009 interim report has been completed.

WHO WILL BENEFIT FROM THE PROJECT?

River corridor biota and stakeholders.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

Interim reports to OPW annually.

FINDINGS OF INTEREST

Development of comparative baselines on invertebrates, fish, birds and riparian plants in open and shaded channel zones.

NEXT STEPS

The project has a natural element of rolling activity. Development of OPW training programme to commence in 2010.

PROJECT MANAGER	Dr. M. O' Grady; Dr. J. King.
TOTAL BUDGET €	€330,000 in Year II
FUNDING SOURCE	OPW Drainage Division.
RESOURCES UTILISED	Core CFB (MOG, JK); CFB team recruited for project – K. Delanty, B. Coghlan, R. O'Briain and M. O'Regan; RFB staff; OPW engineering, technical and ground staff.
DELIVERABLES	Reports; Impact studies; Protocols; Scientific publications.

PROJECT STAFF

Dr. Martin O'Grady

Dr. James King

Dr. Karen Delanty

Ms. Michelle O'Regan

Mr. Rossa O'Brien

Mr. Brian Coughlan

Compiling a series of aerial photographs of Irish fisheries

REMIT OF THE PROJECT

To provide an aerial photographic database of all inland, estuarine and sea shore locations of fishery interest for inclusion as a layer in the Boards G.I.S. database.

WHY IS THIS PROJECT BEING UNDERTAKEN?

To provide an aerial photographic database of all inland, estuarine and sea shore locations of fishery interest for inclusion as a layer in the Boards G.I.S. database.

PLANNED COMPLETION DATE

Will depend on the availability of Air Corps helicopter flights – possibly circa 2012 to 2013.

WHO WILL BENEFIT FROM THE PROJECT?

All personnel working in the Inland Fisheries sector. These data can be used for a wide range of purposes – planning survey programmes, estimating the degree, location and extent of problem areas, sourcing access points, assessing the impact of landslides, pinpointing pollution sources and many other areas.

Some examples of the usefulness of these data are as follows:

A comprehensive survey of ten salmon rivers was completed in Donegal with a view to drawing up management proposals for this resource. Aerial photographic surveys of these rivers were carried out initially. This allowed one to identify the degree and extent of overgrazing, bank erosion problems and possible pollution sources. These data were also used to designate specific zones in river catchments to ensure that subsequent sampling locations were representative of particular zones.

Aerial photographic surveys of estuarine areas have proved very valuable in mapping the extent of salt marsh areas – locations which are of key importance as spawning and nursery areas for a number of fish species.

In the last few years an exotic plant (*Lagarosiphon major*) has started to colonise parts of Lough Corrib. Over the past three years an aerial photographic series has been compiled to obtain baseline data on the location and extent of natural floral colonies on our major lakes before further change occurs.

In 2008 there were three serious landslides which impacted on our river catchments – one in Kerry, a second in Leitrim and a third event in Donegal. The degree of disturbance, in each case has been mapped from the air. A repeat of this exercise, over time, will allow one to quantify the long-term effects of such events.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

Data on individual series are available as soon as the photographs are taken and subsequently indexed. It is hoped that a more permanent digital indexed series will be archived on a "stand alone" server when this becomes available. Due to the recent limitation on staff resources (loss of a technician post) the indexation of these data into a G.I.S. layer has been suspended.

The full extent of the photographic record to date is illustrated in Figure 1- a photographic record is available for all of the blue colour coded channels.

NEXT STEPS

To continue enlarging the database, source the funding required for the server and commence the indexation and cross referencing with other layers in the G.I.S. system.

PROJECT MANAGER	Dr. Martin O'Grady.
TOTAL BUDGET	No major expenditure until a server is purchased.
FUNDING SOURCE	CFB core funds.
RESOURCES UTILISED	MOG'S time in taking and subsequently filing the photos. A technician's time in inputting these data into a G.I.S. "layer" (no longer available).
DELIVERABLES	A national aerial photographic layer in the CFB GIS system.

The highlighted channels (in blue) illustrate the extent of the photographic record to date (Dec. 2009).

PROJECT STAFF

Dr. Martin O'Grady

Ciara Wogerbaur

National Assessment of Attainment of River Specific Salmon Conservation Limits

REMIT OF THE PROJECT

To determine the level of Conservation Limit (CL) attainment in individual salmon rivers.

WHY IS THE PROJECT BEING UNDERTAKEN?

Conservation Limits (CLs) have been set for all 148 Irish salmon rivers and recreational and commercial inshore fisheries are now regulated based on these CLs being met on a river by river basis. The Standing Scientific Committee (SSC) of the National Salmon Commission (NSC) annually reviews all data for salmon rivers to provide scientific advice on the compliance levels (i.e. CL attainment levels) for the NSC. The NSC and the National Fisheries Management Executive (NFME) use these data to set salmon catch figures for the following year. With the support of the RFBs, this project is reporting and developing additional indices of CL attainment (redd counts, juvenile salmon fry abundance and refinement of partial counter fish counts) to assist the assessment process.

PLANNED COMPLETION DATE

This is the third year of an ongoing project reporting annually in March.

PROGRESS TO DATE

The attainment of CL can be gauged by direct measures (e.g. counter data or the use of rod catch based estimates to calculate total salmon numbers returning to rivers) or by indirect measures such as redd counts or juvenile indices. The various activities undertaken under the CL attainment programme in 2009 are reported.

INDIRECT MEASURES

SALMON REDD COUNTS

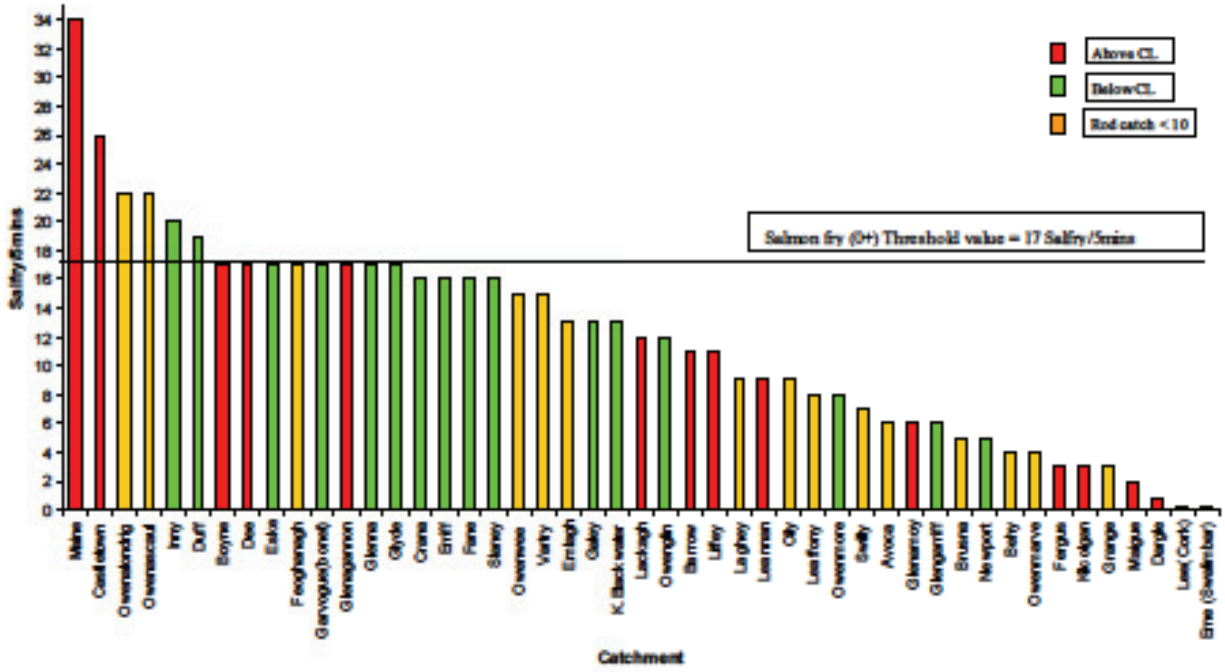
A national database of salmon redd counts, based on RFB staff data, has been compiled to provide an indirect relative measure of annual abundance. Where robust data exists, redd counts are being used to provide an index of salmon abundance that can be used to inform the process on attainment of salmon conservation limits.

JUVENILE SALMON INDEX (CATCHMENT-WIDE ELECTROFISHING)

The abundance of salmon fry close to salmon redds in riffle areas has been used previously (Kennedy and Crozier, 1994) as an index of salmon abundance. This technique is now being developed for Irish salmon rivers to provide a 'catchment-wide' index of juvenile salmon abundance. 2009 was the third year of this extensive national programme to develop this index for Irish salmon rivers. 970 sites in 47 catchments were electrofished in 2009. In total, 15 catchments exceeding CL, 14 which under CL, and 18 closed catchments were electro-fished (Table 1 & Fig 1).

THE USE OF PIT TAG TECHNOLOGY TO ESTIMATE TOTAL SALMON RUNS AT PARTIAL COUNTER LOCATIONS

Several existing fish counters are partial counters (i.e. cover a portion of the river and only part count the salmon run), where the recorded count has to be raised by a factor to provide an estimate of the total upstream run. A project was designed to improve the accuracy of the 'raising factor' and in 2008, adult salmon were captured, using various methods, PIT tagged and returned alive into each river. Salmon were tagged and released in the Boyne, Slaney and Corrib. Numbers tagged on the Boyne and Slaney were small. Large numbers of rod caught fish were tagged on the Corrib and the numbers passing through the partial counter, during the summer period, provided



Summary results for catchment-wide electrofishing in 2009

a good estimate for a raising factor. This work was extended to the partial counter site at Clondulane Weir on the Munster Blackwater in autumn 2009.

WHO WILL BENEFIT FROM THE PROJECT?

Anglers, commercial fishermen, general public, SSC of the NSC and all relevant Government and State agencies (CFB, NFME, RFBs, MI, DCENR, DOELG/NPWS). The data on juvenile salmon electrofishing will also be important in providing an assessment of the status of salmon stocks in all of Ireland's 148 salmon rivers and will be reported on for the obligations under the EU Habitats Directive monitoring requirements for salmon in 2013.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

Fieldwork and analysis complete. Report due in Q2 2010.

FINDINGS OF INTEREST

In 2009, electrofishing data for the first three years of the programme were analysed by the Standing Scientific Committee. Following the precautionary approach adopted for the provision of catch advice, an index threshold value of 17 fry (average catchment wide 5 minute electrofishing) was proposed by the SSC as the cut off point for identifying rivers which could be considered for catch and release. This assessment indicated that rivers known to be above conservation limit recorded average densities of 17 salmon fry.

Catchment-wide electrofishing on the Argideen River is the title

RFB	District	River name	CL status 2009	Mean salmon fry abundance	No. of sites
ERFB	Dundalk	Castletown	Below CL	26	8
ERFB	Dundalk	Dee	Below CL	17	18
ERFB	Dundalk	Glyde	Below CL	17	14
ERFB	Dundalk	Fane	Above CL	16	5
ERFB	Drogheda	Boyne	Below CL	17	148
ERFB	Dublin	Vartry	< 10 rod catch	15	4
ERFB	Dublin	Liffey	Below CL	11	34
ERFB	Dublin	Dargle	Below CL	0.88	5
ERFB	Wexford	Slaney	Above CL	16	31
ERFB	Wexford	Avoca	< 10 rod catch	6	29
SRFB	Waterford	Barrow	Below CL	11	69
SWRFB	Cork	Glengarriff	Above CL	6	8
SWRFB	Cork	Lee(Cork)	< 10 rod catch	0.26	21
SWRFB	Kerry	Maine	Below CL	34	16
SWRFB	Kerry	Owenalondrig	< 10 rod catch	22	7
SWRFB	Kerry	Owenascaul	< 10 rod catch	22	10
SWRFB	Kerry	Feoghanagh	< 10 rod catch	17	10
SWRFB	Kerry	Emlagh	< 10 rod catch	13	5
SWRFB	Kerry	K.Blackwater	Above CL	13	13
SWRFB	Kerry	Behy	< 10 rod catch	4	9
SHRFB	Limerick	Galey	Above CL	13	31
SHRFB	Limerick	Fergus	Below CL	3	35
SHRFB	Limerick	Maigue	Below CL	2	62
WRFB	Ballinakill	Erriff	Above CL	16	16
WRFB	Ballinakill	Owenglin	Above CL	12	16
WRFB	Galway	Kilcolgan	Above CL	3	35
WRFB	Kerry	Inny	Above CL	20	11
NWRFB	Ballina	Leaffony	< 10 rod catch	8	12
NWRFB	Ballina	Brusna	< 10 rod catch	5	34
NWRFB	Bangor	Owenmore	Above CL	8	5
NWRFB	Bangor	Glenamoy	Below CL	6	5
NWRFB	Bangor	Newport	Above CL	5	7
NWRFB	Sligo	Garvogue(bonet)	Above CL	17	54
NWRFB	Sligo	Grange	< 10 rod catch	3	6
NRFB	Ballyshannon	Duff	Above CL	19	9
NRFB	Ballyshannon	Eske	Above CL	17	14
NRFB	Ballyshannon	Owenwee	< 10 rod catch	15	8
NRFB	Ballyshannon	Laghey	< 10 rod catch	9	9
NRFB	Ballyshannon	Oily	< 10 rod catch	9	11
NRFB	Ballyshannon	Erne (Swalimbar)	< 10 rod catch	0.16	23
NRFB	Letterkenny	Glenagannon	< 10 rod catch	17	10
NRFB	Letterkenny	Glenna	< 10 rod catch	17	6
NRFB	Letterkenny	Crana	Above CL	16	23
NRFB	Letterkenny	Lackagh	Below CL	12	12
NRFB	Letterkenny	Leannan	Below CL	9	29
NRFB	Letterkenny	Swilly	< 10 rod catch	7	17
NRFB	Letterkenny	Owenmarve	< 10 rod catch	4	6
		Total sites			970

Fig. 1. The mean abundance of salmon fry in 47 catchments from catchment-wide electrofishing. (Rivers with < 4 sampling sites were excluded)

NEXT STEPS

This was Year 3 of a long-term programme. 2010 will see refinements to the existing programme and a greater roll-out of relevant measurement and calibration activities. Development of an index of CL attainment based on fry abundance is a priority which will require at least five years of data.

PROJECT MANAGER	Dr Paddy Gargan & Dr Willie Roche.
TOTAL BUDGET €	€189,000
FUNDING SOURCE	Salmon Conservation Fund.
RESOURCES UTILISED	Serena Keane & Trevor Stafford CFB) and the staff of the seven Regional Fisheries Boards.
DELIVERABLES	Catchment-wide electrofishing data available to SSC in November 2009. Comprehensive report in Spring 2010 detailing all activities.

PROJECT STAFF

Dr. Willie Roche

Dr. Paddy Gargan

Ms. Serena Keane

Mr. Trevor Stafford

Compilation of Habitat-Based Catchment Information and Historical Eel Data in Support of Eel Management Plans (EEL-PLAN)

REMIT OF THE PROJECT

This project supports the compilation and analysis of historical eel data along with the river, lake and transitional water habitat based GIS information. The outputs of this project formed the basis for the development of River Basin Eel Management Plans and particularly for monitoring into the future.

WHY IS THE PROJECT BEING UNDERTAKEN?

The latest scientific advice from the International Council for the Exploration of the Sea (ICES) concerning European eel is that the stock is outside safe biological limits and that current fisheries are not sustainable. ICES have recommended that a recovery plan be developed for the whole stock of European eel as a matter of urgency and that exploitation and other human activities affecting the stock be reduced to as close to zero as possible. The new EU Regulation for the recovery of the stock of European Eel requires that current spawner escapement (as silver eel) is measured against the best estimate of escapement that would have existed if no anthropogenic influences had impacted on the stock. It has been assumed that pre-1980s data represents the best potential estimate of pristine production levels. Where comprehensive eel data are lacking, the target level of escapement can be calculated using historical datasets, habitat based assessments of potential eel production and/or with reference to rivers of similar ecology and hydrography. This project is designed to collate and deliver available data.

PLANNED COMPLETION DATE

October 2009.

PROGRESS TO DATE

Eel Management Plans were submitted to the EU in December 2008. Data collated early in the delivery of this project was utilised to formulate some of these plans. Available historical data were collated on an ongoing basis and the complex SQL database was debugged and signed off. Gap analysis was delivered. Excellent added value from the Water Framework monitoring programme, being delivered by CFB on lakes, rivers and transitional waters monitoring programme provided new data on eel distribution, densities, age and parasite status. Project report completed.

Yellow eel

WHO WILL BENEFIT FROM THE PROJECT?

All stakeholders. CFB, RFBs, RBDs, MI, DCENR, ICES, EU Commission

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

Final report was forwarded to Funding Agency, Marine Institute in December 2009

FINDINGS OF INTEREST

Historical eel data are scant due to poor record keeping and limited reporting obligations. Eel specific sampling surveys required to generate quality data. Angling for eels is limited due to lack of angler interest compounded by reduction in eel numbers.

NEXT STEPS

All available historical raw data were uploaded over the course of the project. Substantial additional raw data from the Fisheries Research Centre (now Marine Institute) were uncovered after the data entry phase of this project was completed. Additionally only a small proportion of the expected raw data for the Shannon catchment from ESB/ NUIG was available to the project. All of these data require to be uploaded. Supplementary funding is required to develop a database interface to facilitate standardised and simple uploading of any outstanding and all new monitoring data. To date these data have been uploaded indirectly through spreadsheets which can be inefficient. CFB has responsibility for delivering the National Eel Monitoring Programme and will require this interface.

PROJECT MANAGER	Dr. William Roche.
TOTAL BUDGET €	€69,000
FUNDING SOURCE	National Development Plan 2007—2013. Science, Technology & Innovation Programme - Marine Research Sub-Programme.
RESOURCES UTILISED	CFB core staff, CFB recruited staff, inputs from all RFBs.
DELIVERABLES	Provision of a GIS database of sub-catchment lakes, river reaches and transitional waters - providing quantitative data on the presence of natural and artificial barriers. Gap analysis of data using the GIS database. Inventory of historical eel datasets/publications. Digitised eel stock database. Evaluation of acquired eel data against available fisheries models. The provision of a complete GIS database package of catchment information for eel, to be utilised by the Marine Institute and the Fisheries Boards. Database being prepared by project partner.

PROJECT STAFF

Dr. Willie Roche

Dr. Ciara O'Leary

Fisheries Development Programme for Waterways Ireland

REMIT OF THE PROJECT

The Central Fisheries Board are contracted by Waterways Ireland to provide fisheries and environmental management services in respect of the Royal Canal, Grand Canal, the Barrow Navigation and the Shannon-Erne Waterway.

WHY IS THE PROJECT BEING UNDERTAKEN?

The proposed work 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. It further recognises the fisheries management and environmental needs of these watercourses.

The programme also pays due cognisance to the obligations imposed by the Water Framework Directive. A canal is identified in the WFD as an Artificial Water Body (AWB), which is defined in Article 1 of the Directive as 'a body of water created by human activity'. In recognition of their navigational and recreational roles, AWBs must be assessed in terms of their 'ecological potential' as opposed to their 'ecological status', which applies to natural water bodies such as rivers and lakes.

PLANNED COMPLETION DATE

An ongoing contract of service has operated between the two agencies since 1990.

PROGRESS TO DATE

An analysis of long-term trends in fish stock status and community structure was carried out in 2009.

In excess of 120,00 fish were stocked into the Royal and Grand Canals in 2009. Approximately 2300 rudd were stocked into the 16th level of the Royal Canal at Kilcock in advance of the Waterways Ireland Sponsored Junior Canals Championship held in August 2009.

A large number of fish rescue or salvage operations were necessitated by routine dredging and maintenance operations on both canals and the Shannon-Erne Waterway. Analysis of macroinvertebrate and aquatic plant recolonisation at dredged sites on the Barrow Line of the Grand Canal was conducted.

Water samples, for the purposes of Water Framework Directive Compliance Monitoring, were collected at 40 sites on four occasions in 2009. Aquatic invertebrate samples were also collected at these sites during spring and autumn and aquatic plant communities were assessed during the autumn sampling period. Data collected during the period 2006-2009 was analysed and used to determine current ecological potential.

WHO WILL BENEFIT FROM THE PROJECT?

Work conducted under the programme directly aids the rational management and development of the fisheries resource on the inland waterways. Data collected for WFD monitoring purposes has been incorporated into national datasets and aided the development of an international monitoring and assessment tool.

Canal angling competition 2009

Salvage operation in the Grand Canal Dublin

Canal sediment sampling for WFD

WHEN WILL THE INTERIM/FINAL REPORTS BE AVAILABLE?

A summary report of activities conducted between July 2006 and June 2009 is drafted. A report covering the period July to December 2009 will be completed in March 2010.

FINDINGS OF INTEREST

Assessment of long term trends in fish stocks have revealed some changes in fish communities on both the Royal and Grand Canals. In particular, the continued expansion in the range and numbers of roach, has led to a homogenisation of fish communities on both the Royal and Grand Canals.

The majority of canals were determined to be of Good Ecological Potential (GEP), with three AWB's achieving GEP by extraction.

Analysis of macroinvertebrate and aquatic plant recolonisation over an 18 month, post dredging period, has indicated that ecological rehabilitation following dredging can be relatively rapid. Results will be used to inform future management strategies.

NEXT STEPS

Data and samples collected for WFD monitoring will be processed and analysed. Results will determine ecological status. Management information and management strategies will be formulated based on available scientific information.

PROJECT MANAGER	Dr. Joe Caffrey
TOTAL BUDGET €	€300,000
FUNDING SOURCE	Waterways Ireland
RESOURCES UTILISED	Three full time staff are employed on the project. They work closely with Regional Fisheries Board and Waterways Ireland Staff.
DELIVERABLES	Improved management information. Agreed management programmes and protocols

PROJECT STAFF

Dr. Joe Caffrey

Mr. Paul McLoone

Dr. Tara Gallagher

Mr. John Coyne

National Eel Monitoring Programme

REMIT OF THE PROJECT

To monitor the status of eel stocks in rivers, lakes and estuaries under the national eel stock recovery plan

WHY IS THE PROJECT BEING UNDERTAKEN?

ICES has advised that European eel stocks are outside safe biological limits and the current fisheries are not sustainable. Fishing mortality is high and recruitment to the stock is at a historically low level. ICES has recommended that a recovery plan be developed for the whole stock of European eel as a matter of urgency and exploitation and other activities affecting the stock be reduced to as close to zero as possible. Following this advice, an EU Council Regulation (EC no 1100/2007) establishing measures for the recovery of the stock of European eel was introduced in 2007. Under this regulation, each EU member state was required to prepare an Eel Management Plan. Ireland submitted its National Eel Management Plan in December 2008 and the plan was approved by the EU Commission in 2009.

The objective of each Eel Management Plan is to reduce anthropogenic (man-made) mortalities so as to permit with high probability the escapement to the sea of at least 40 % of the silver eel biomass relative to the best estimate of escapement that would have existed if no anthropogenic influences had impacted the stock.

Every three years, each Member State must submit details of eel monitoring programmes, and monitoring of implementation and effectiveness of Management Actions and also monitoring of the impact of management actions on the eel stock.

The national plan describes a comprehensive programme of monitoring and evaluation of management actions and their implementation, and also a programme of eel stock assessment to establish a stock baseline, estimate silver eel escapement and monitor the impact of the management actions on the local stocks.

Pit-tagging yellow eels in Waterford estuary

Passing pit-tagged silver eels through a detector at the Galway eel fishery

PLANNED COMPLETION DATE

Monitoring of eel stocks nationally will continue until the reporting period in 2011.

PROGRESS TO DATE

Management actions described in Ireland's recovery plan will contribute to achieving a recovery in eel recruitment in 90 years. It is imperative that equivalent EU-wide action is taken at this level so as not to diminish the impact of Ireland's contribution. Progress to date on eel monitoring has seen five large lakes surveyed for yellow eels, three catchments (Erne, Corrib & Shannon) surveyed for silver eel escapement and one large transitional water body (Waterford estuary) sampled.

Picture of a yellow lake eel (top) and a migrating silver eel (bottom)

WHO WILL BENEFIT FROM THE PROJECT?

There is a national requirement to monitor the effectiveness of the management action introduced, i.e. closure of the

commercial eel fishery. Every three years, each Member State must submit details of; eel monitoring, effectiveness and outcome of Eel Management Plans, contemporary silver eel escapement, non-fishery mortality, and policy regarding enhancement/stocking.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

The report of the 2009 monitoring will be available in spring 2010. A final report will be submitted to the EU covering the three years 2009-2011.

FINDINGS OF INTEREST

Lake surveys in 2009 have established a baseline to monitor eel stock recovery as a result of management actions. Important information on the abundance and distribution of the swim bladder parasite *(Anguicolla crassus)* has been gathered nationally. Limited information was previously available on eels in estuaries. Survey work in the Waterford estuary established stock densities and revealed that 60% of eels captured were females.

NEXT STEPS

2009 was the first of a three year national eel monitoring programme. Monitoring will continue in 2010 and 2011 prior to a report being submitted to the EU as required by COUNCIL REGULATION (EC) No 1100/2007 establishing measures for the recovery of the stock of European eel

PROJECT MANAGER	Dr. Paddy Gargan & Dr. Ciara O'Leary.
TOTAL BUDGET €	€288,000 for 2009
FUNDING SOURCE	Department of Communications, Energy & Natural Resources.
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 2009 monitoring.

PROJECT STAFF

Dr. Paddy Gargan

Dr. Ciara O'Leary

Robert Cruikshanks

EELIAD Project: (Tagging of European Eel with Satellite Tags to Determine their Spawning Location)

REMIT OF THE PROJECT

This project, which began in 2008, is designed to investigate the spawning location of European eels using satellite tagging technology.

WHY IS THE PROJECT BEING UNDERTAKEN?

The spawning location of eels at sea has never been found and this project aims to track eels in the Atlantic Ocean using satellite technology to gain information on migration and spawning locations. European eel stocks have seen a very severe collapse in the past decade and the reason for the collapse in not clearly understood. If the migration route and spawning location of eels at sea can be found, scientists can begin to shed light on the reasons for the stock collapse of European eels.

PLANNED COMPLETION DATE

The project will run over the 2008-2011 period.

PROGRESS TO DATE

Large eels were fitted with miniature satellite tags on their seaward migration in late 2008. The 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 up until November 2009. The objective was to track the migration route across the Atlantic towards the Sargasso 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. Twenty five eels were tagged on the River Corrib in October and November 2008 and released into Galway Bay.

WHO WILL BENEFIT FROM THE PROJECT?

European eel stocks have seen a very severe collapse in the past decade and the reason for the collapse in not clearly understood. If the migration route and spawning location of eels at sea can be found, scientists can begin to shed light on the reasons for the stock collapse of European eels. A wide range of national and international agencies will benefit from the research.

WHEN WILL INTERIM/FINAL REPORTS BE AVAILABLE?

An interim report will be available at the end of 2009 and a final report will be available in 2011.

FINDINGS OF INTEREST

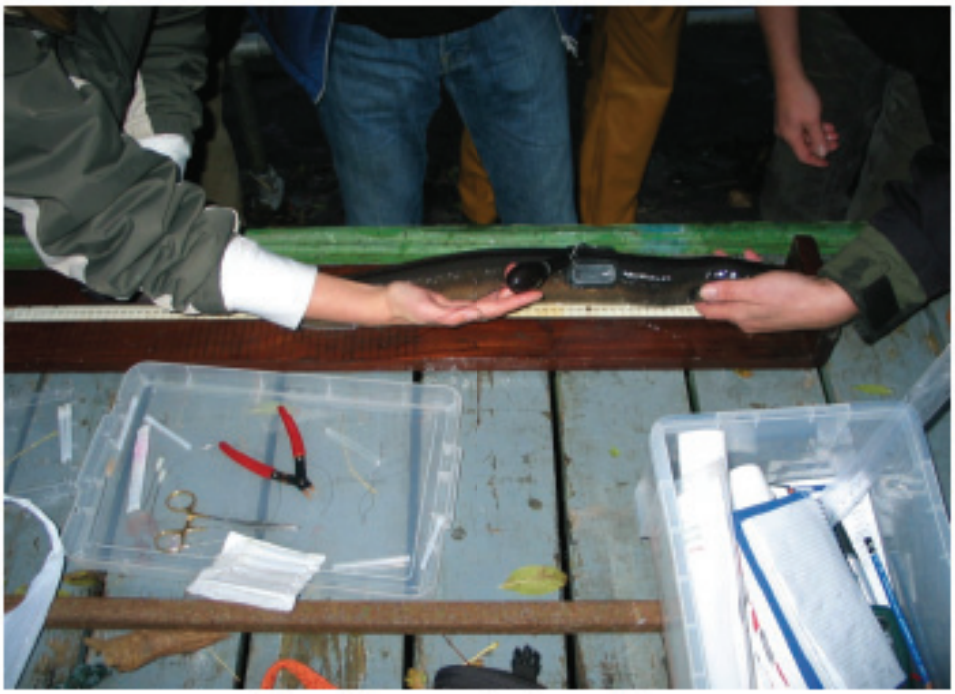
A paper has been published in the Journal Science on the results of the pilot tagging work undertaken in 2006 & 2007, which was a precursor to this project. Transmissions were received from 14 of 22 tagged silver eels released on the west coast of Ireland in October and November 2006. Eels migrated southwest, suggesting a route against the prevailing shelf edge and Atlantic drift currents and toward the Canary and Azores current systems. When eels moved into the mesopelagic zone they all undertook distinct diel vertical migrations (DVMs), predominantly between depths of 200 and 1000 m. During night, eels occupied shallow warm water. At dawn, eels made a steep dive into the cool disphotic zone. At night, they ascended steeply back into the upper layer. DVM allows pelagic organisms to avoid exposure to predators during the day and maximize feeding time at night. Predator avoidance may explain the deeper depths during the day, but eels do not feed during the spawning migration. We hypothesize that the observed DVM reflects thermoregulation. The daily ascent into shallower warm water may serve to maintain sufficiently high metabolism and swimming activity, whereas descent to deeper waters may permit the eels to keep their average temperature below 11°C, delaying gonadal development until reaching the Sargasso Sea. This potential delay of the maturation may prove especially important when eels encounter higher surface temperatures during later stages of the migration. Further technical improvements of PSAT tags and the

continuation if the project over the 2008-2011 period render it realistic to record the entire spawning migration to the Sargasso Sea.

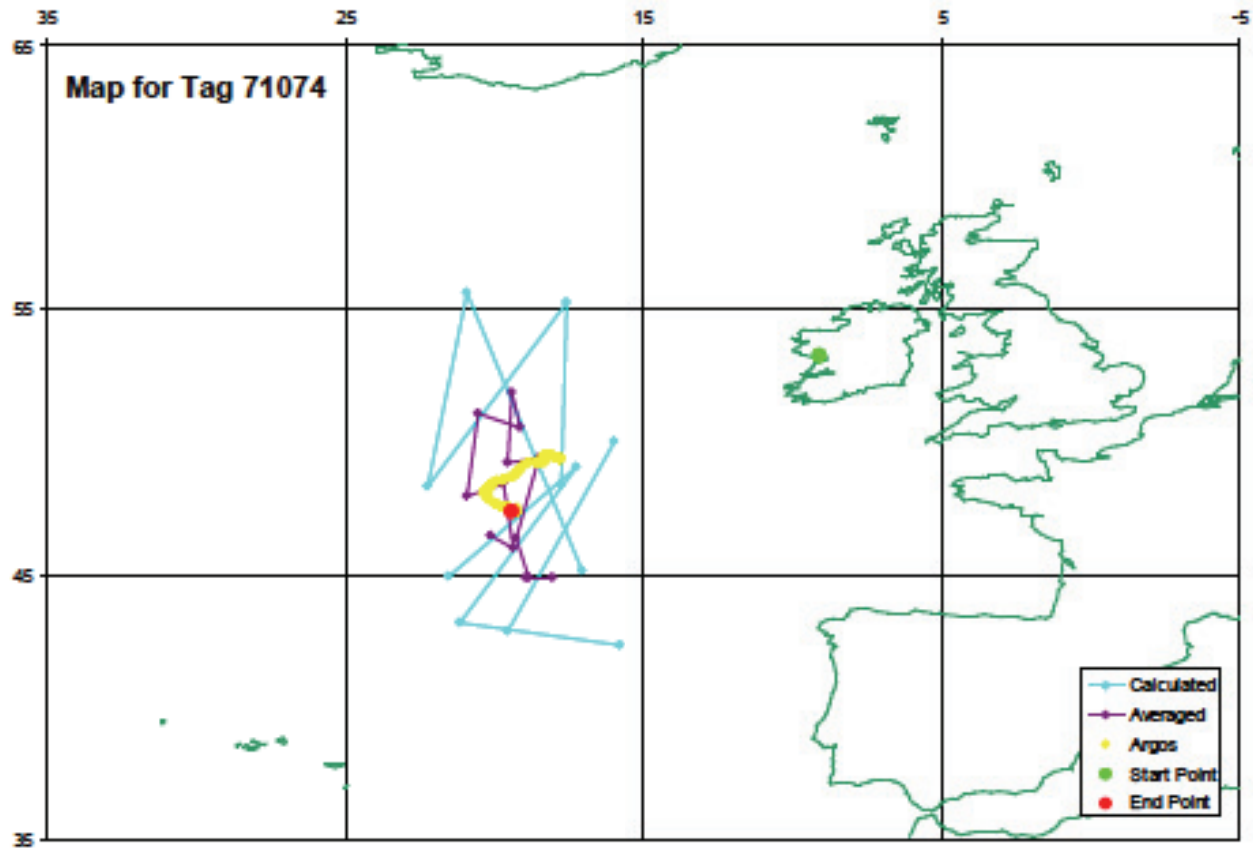
NEXT STEPS

Eels will be fitted with satellite tags and internal data storage tags in 2010 and their migration monitored in the Atlantic.

Pop-off satellite tag fitted to a silver eel



Silver eel being fitted with a satellite tag



Location of a satellite tag pop-off tag (·) and subsequent drift pattern south-west of Ireland, February 2007

PROJECT MANAGER	Dr. Paddy Gargan.
TOTAL BUDGET €	€115,000 over the period 2008-2011
FUNDING SOURCE	European Union 7th Framework Project.
RESOURCES UTILISED	One full time staff member is employed on the project. Survey work in undertaken in conjunction with the staff of the Regional Fisheries Boards.
DELIVERABLES	Increased understanding of the biology and marine migration of European eels and the causes for their decline.

PROJECT STAFF

Dr. Paddy Gargan

Gus

List of Other Projects not included in Project Summary for 2009

PROJECT NAME	PROJECT MANAGER & STAFF
Distribution and status of aquatic invasive plant species in the River Lee catchment.	Dr. Joe Caffrey & Mr. John Coyne
Status of carp stocked into enclosed watercourses from Roscrea Fish Farm in the 90s.	Dr. Joe Caffrey & Mr. John Coyne
Study to evaluate the efficacy of chub removal operations from the River Inny.	Dr. Joe Caffrey & Mr. John Coyne
Assessment of the impact of the new invasive species to Ireland, Creeping water primrose (Ludwigia grandiflora), on the flora in a pond in SW Kerry.	Dr. Joe Caffrey
National Ferox trout project	Dr. Paddy Gargan
National Sea trout / sea lice monitoring project	Dr. Paddy Gargan
Lake fish atlas	Dr. Willie Roche & Dr. Karen Delanty
Restoration of the River Lee Salmon populations.	Dr. Willie Roche
Celtic Sea Trout project	Dr. Willie Roche & Dr Paddy Gargan
NASCO Focus Area Reports	Dr. Paddy Gargan, Dr. Willie Roche, Ms Serena Keane
Char lake survey in Donegal	Dr. James King, Mr John Coyne, Ms Nicola O'Gorman, G. McCaffrey, P. Kelly, C. McMullen, staff at Letterkenny and Donegal districts (NRFB)
Training programme in Lamprey ecology and sampling	Dr. James King, Ms Nicola O'Gorman