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Atlantic Aquatic Resource Conservation

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ATLANTIC AQUATIC RESOURCE CONSERVATION (AARC) PROJECT

River Shannon—AARC

What is AARC?

The Atlantic Aquatic Resource Conservation (AARC) Project is an inter-regional collaborative project looking at ways of improving the conservation status of important anadromous fish species throughout Europe. Anadromous fish species undergo important feeding/ spawning migrations from freshwater areas where they were spawned to distant feeding grounds in the marine environment. Threats to these life-histories from human activities have contributed to the decline of many important European anadromous fish species such as the Atlantic Salmon S*almo salar,* sea trout *Salmo trutta* and sea-lamprey *Petromyzon marinus*.

AARC's objective is to inform practical management solutions for improved resource conservation through greater scientific awareness of the problems, inter-region co-operation, increased awareness/ education and the application of practical solutions for fish passage, assisted natural recolonisation trials and river restoration techniques.

Project partners represent experts with extensive knowledge in fisheries management from educational institutions, research agencies and regulatory authorities throughout the UK, Ireland, Spain, France and Portugal.

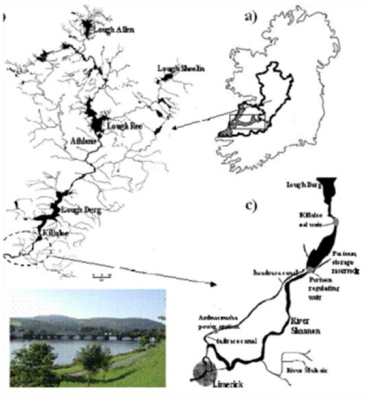
AARC and the River Shannon

Objective

Development and testing of practical protocols, consistent with evolutionary biology and population genetic theory, for the restoration of threatened Atlantic salmon in the Shannon River, Ireland associated with hydro-electric power generation.

Strategy

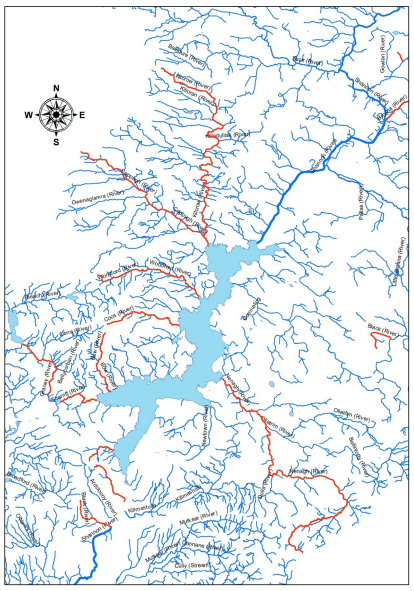
- **Identify and protect residual wild and feral populations**
- **Identify and relieve access issues**
- **A tributary specific moratorium on stocking to facilitate genetic assessment**
- **Select candidate genetic material for restoration populations**
- **Operate hatchery programme for gene banking and brood-stock management**
- **Assess locations for re-establishment of populations**
- **Release strategy complimentary to natural re-colonisation processes**
- **Releases to be restricted to the establishment of 2 or 3 cohorts**
- **Monitor fitness of satellite populations**



The River Shannon hydroelectric scheme was commissioned in 1929. It is situated at the lower end of the Shannon catchment, below Lough Derg. The scheme comprises a regulating weir at Parteen, a 11km headrace and generating station at Ardnacrusha

Identifying residual salmon populations—e-fishing surveys

Electro-fishing surveys were carried out on Lough Derg sub-catchment during summer 2010. The rivers surveyed were upstream of the hydroelectric station at Ardnacrusha. These stock assessment surveys were useful in identifying sub-catchments where salmon fry/parr were present, i.e., areas with residual salmon populations. A restocking embargo has been in place in the Lough Derg catchment for a number of years. The survey showed that a number of sub-catchments had salmon fry/parr present. This data will be processed and collated into a project specific GIS together with historical salmon data. This spacial visualisation tool will help highlight the decrease in salmon production areas throughout the Shannon. These changes are mostly due to anthropogenic effects, such as dredging, barriers to migration and water pollution.



River sub-catchments electro-fished under the AARC programme during summer 2010. Surveys were carried out by IFI and ESB in the Lough Derg sub-catchments.

Surveys in 2011 will focus on replicating last years surveys as well as carrying out additional assessments in the Lough Ree and Lough Allen sub-catchments. Prior ESB and Central Fisheries Board surveys have indicated that salmon have been absent for a prolonged period above the Tarmonbarry navigation weir. Although some adult salmon have been observed at navigation weirs and trapping facilities in the upper Shannon catchment, low recruitment and loss of spawning grounds have led to dramatic declines in salmon numbers in these upper sub-catchments. Assisted natural re-colonisation and redressing the issues which have led to these declines will gain important impetus under the AARC project.

E-fishing with back –packs to Catchment Wide Electrofishing Protocols. Surveys were carried out by IFI and ESB staff.

Habitat Assessment Surveys

Walk over surveys were carried out in sub-catchments of the River Shannon for habitat assessment works under the AARC project. The purpose was to assess habitat conditions within the river sub-catchments to ascertain if they provided suitable experimental sites for the 'common garden' experiments.

River Bunowen (Suck sub-catchment) at Ballymacward, County Galway.

These experiments, conducted within the upper reaches of the Shannon, will compare the relative 'performance' (survival, growth and life history variation) of a number of candidate populations from the lower Shannon, relative to the current hatchery strain.

The criteria examined in the assessment were:

- Suitability of substrate (spawning/ nursery gravels)
- Evidence of poor water quality (enrichment)
- Suitable size (for e/fishing & trapping surveys)

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

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Broodstock Collection—Rivers Feale and Mulkear

The common garden experiments, using genetic markers, will be undertaken over the next two years to assess the relative survival of a number of salmon populations originating in the Shannon basin, compared to the Parteen hatchery stock. As part of this experiment 60 broodstock were sampled from the candidate rivers, Rivers Feale (Kerry) and Mulkear (Limerick). Both these rivers are open to salmon angling based on stock assessment surveys which show salmon levels above safe conservation limits for both rivers. Sampling methods involved netting and electrofishing methods. Broodstock were floy tagged upon capture and transferred to the experimental holding facilities at Parteen Hatchery. Despite severe cold weather the work programme was successful, with the required numbers of hen and cock fish retrieved from both rivers. Low rainfalls in late November/ early December 2010 ensured river levels remained at a suitable level for sampling.

Broodstock collection on the River Feale, County Kerry

These fish and other experimental populations will be retained at Parteen Hatchery until stripping in late December 2010.

Bio-security protocols were developed for the AARC broodstock collection programme. All gear, equipment and vehicles were treated with Virkon™ Aquatic solution to help prevent the spread of invasive species and diseases. A big thanks to the Inland Fisheries Ireland crews, UCC and ESB Parteen Hatchery staff who worked tirelessly during the broodstock collection programme.

The salmon were individually coded with floy tags. This identification will be important for tracking during the genetic trials.

Broodstock collection in pictures!

A sample of fish from the broodstock collection programme: above a hen fish from the Feale; on the right, a cock fish from the Feale; below, a piscivorous brown trout from the upper Mulkear.

A floy tagged hen fish from the River Mulkear

Bio-security protocols were developed for the AARC broodstock collection to help prevent the spread of fish diseases and invasive aquatic species

Spraying equipment with Virkon Aquatic for bio-security purposes

It's kudos for the crew members from IFI and UCC (right) given the arctic conditions that prevailed (above)

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Transnational Programme

AARC—R Shannon

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The AARC project in Ireland will help increase our understanding of some of the factors causing salmon population declines in the River Shannon and how they might be addressed by using new developments from the study of restoration ecology. In the context of the Shannon Salmon Restoration Project objectives, published by the former Shannon Regional Fisheries Board, AARC will provide an important impetus by identifying the current status of salmon production in the Shannon, coordinating the activities of national authorities and scientific institutions and by applying genetic knowledge to provide a basis for the rehabilitation of salmon in the upper Shannon.

We're on the web!

www.aarcproject.org

AARC links with Mulkear LIFE

Lamprey tagging—Mulkear LIFE

MulkearLIFE (www.mulkearlife.com) a new €1.75 million European Commission funded LIFE Nature project which is working on the restoration of the Lower Shannon SAC (Mulkear River catchment) for Atlantic Salmon, Sea Lamprey and European Otter continues to make excellent progress. Inland Fisheries Ireland (formerly the Shannon Regional Fisheries Board) is the coordinating project partner together with the OPW and Limerick County Council with additional funding support comes from NPWS. 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 and is regarded as one of the top five salmon rivers in Ireland when its relative size is considered, producing a significant annual salmon run. It also holds substantial populations of Sea Lamprey and Otter are known to be widespread, however, recent evidence suggests numbers are in decline. The main project objective is to restore, through instream 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.

MulkearLIFE in the Shannon Catchment

AARC would like to thank Mulkear LIFE project staff for their help with the Broodstock collection on the River Mulkear