



<LIFE09 NAT/IE/000220>

**Final Technical Report**  
Covering the project activities from September 1<sup>st</sup> 2010 to June 23<sup>rd</sup> 2015

Reporting Date  
19/08/2016

LIFE PROJECT NAME  
**Blackwater SAMOK (DuhallowLIFE)**

**Data Project**

<b>Project location</b>	Upper Blackwater River, Duhallow, Co. Cork
<b>Project start date:</b>	01/09/2010
<b>Project end date:</b>	23/06/2015
<b>Total budget</b>	€ 1,995,826
<b>EC contribution:</b>	€ 935,650
<b>(%) of eligible costs</b>	46.88%

**Data Beneficiary**

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**This report is accompanied by the following:**

Project action technical reports (hard copies, Table 1), Project brochures/calendars/other dissemination material (hard copies, Table 2), Press releases (hard copies, Table 3), and USB device (containing an electronic copy of this document and all other annexed items and documents – *See Appendix*)

**Table 1 Technical Reports/Responses and Financial Statements**

Annex Code	Annex Title
T.1.1	Layman’s Report
F.1.1	Final Financial Statement
F.1.2	IFI Financial Statement
F.1.3	Pobal Financial Statement
F.1.4	Financial Audit Report
F.2.1	SAMOK responses to Commission Letters
F.2.2	Personnel Costs - Fran Igoe
F.2.3	Personnel Costs - Tim Ring
F.2.4	Personnel Costs - Dermot Murphy
F.2.5	Personnel Costs - Con S Murphy
F.2.6	Personnel Costs - Karen Delanty

**Table 2 Project action technical reports**

Project Action	Annex Code	Title
A1	A.1.1	SAC Management Plan
A2	A.2.1	Management guide for cattle management for riverine SACs
A3	A.3.1	Habitat management plan
C1	C.1.1	Final Technical Report - Reduction of Bank Erosion
C2	C. 2.1	Final Technical Report - Reduction and elimination of trampling and soiling of river by cattle by fencing
C3	C. 3.1	Final technical Report - Removal of Cattle Drinks and Access Points
C4	C. 4.1	Final technical Report - Provision of Silt Traps
C5	C. 5.1	Final technical Report - Rebalancing of riparian vegetation to address areas affected by excessive shading
C6	C. 6.1	Final Technical Report - Rebalancing of riparian vegetation to address areas where riparian cover is adequate
C7	C. 7.1	Final Technical Report - Provision of habitat and resting areas for otter
C8	C.8.1	Final Technical Report (O’Clery and Lusby - Assessment) - The Kingfisher Nest Box Project in Duhallow
C9	C.9.1	Final Technical Report - Provision of nesting boxes for Dippers
C10	C.10.1	Final Technical Report - Removal and monitoring of Himalayan Balsam
D5	D.5.1	Wildlife recording by national school children - Mary Immaculate Student Placement Report
E3	E.3.1	Final Monitoring Report - Fish Stock Survey
E3	E.3.2	Final Monitoring Report - FPM and Glochidia
E3	E.3.3	Fish Stock Survey (Rampart Stream)
E4	E.4.1	Biodiversity Audit Report
E7	E.7.1	Evaluation of DuhallowLIFE+ Project - Blackwater SAMOK
E8	E.8.1	AfterLIFE Plan

**Table 3 Project brochures/calendars/other dissemination material**

Project Action	Annex Code	Title
A2	A.2.3	Calendar 2015 (Hard copy)
A2	A.2.4	Calendar 2014 (Hard copy)
A2	A.2.5	Calendar 2013 (Hard copy)
D6	D.6.39	DVD - LIFE on the River Allow
D7	D.7.1	Newsletter - Summer 2015*
D7	D.7.2	Newsletter - Spring 2015*
D7	D.7.3	Newsletter - Winter 2014*
D7	D.7.30	Sustainable Farming Brochure
D7	D.7.31	Invasive Species Brochure
D7	D.7.32	Annex Species Brochure
D8	D.8.1	Conference brochure
D8	D.8.2	DuhallowLIFE RAPTORLIFE programme
D8	D.8.3	Conference Invite

**Table 4 Press releases/newspaper articles for final reporting period**

Project Action	Annex Code	Title
D6	D.6.1	CEF Awards - County supplement Examiner 08.12.15
D6	D.6.2	Duhallow Group Honoured (The Examiner 30.11.15)
D6	D.6.3	Sisters are doing it for themselves (Corkman 04.06.15)
D6	D.6.4	Wild LIFE as we know it in Duhallow (Corkman 04.06.15)
D6	D.6.5	Funding to Protect Wildlife (Irish Examiner 1st June 2015 page 14 Outdoors)
D6	D.6.6	A Walk on the Wild Side (The Corkman 28.05.15)
D6	D.6.7	It's all hooves to the pump to clean up rivers (Examiner 09.04.15)
D6	D.6.8	Greenane Park to be wildlife haven (Corkman 02.04.15)
D6	D.6.9	EU Rules Block on Cork Homes (Corkman (front page) 11.12.14)
D6	D.6.10	EU Pearl Mussel Rule shelves towns' plan (Corkman 11.12.14)
D6	D.6.11	Duhallow expert defends the pearl mussel (Corkman 11.12.14)
D6	D.6.12	Quirky Pearl Mussel Competition at Ploughing Championships (Corkman 09-10-14)

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## **1. LIST OF KEY-WORDS AND ABBREVIATIONS.**

<b>AA</b>	<b>Appropriate Assessment</b>
<b>CEO</b>	<b>Chief Executive Officer</b>
<b>CLG</b>	<b>Company Limited by Guarantee</b>
<b>CNN</b>	<b>Cork Nature Network</b>
<b>DAFM</b>	<b>Department for Agriculture, Food and the Marine</b>
<b>FPM</b>	<b>Freshwater Pearl Mussel</b>
<b>ICMSA</b>	<b>Irish Creamery Milk Suppliers' Association</b>
<b>IFA</b>	<b>Irish Farmers' Association</b>
<b>IFI</b>	<b>Inland Fisheries Ireland</b>
<b>IRD</b>	<b>Integrated Resource Development</b>
<b>LWD</b>	<b>Large Woody Debris</b>
<b>NBDC</b>	<b>National Biodiversity Data Centre</b>
<b>NIS</b>	<b>Natura Impact Statement</b>
<b>NPWS</b>	<b>National Parks and Wildlife Services</b>
<b>OPW</b>	<b>Office of Public Works</b>
<b>RACMG</b>	<b>River Allow Catchment Management Group</b>
<b>RSS</b>	<b>Rural Social Scheme</b>
<b>RTÉ</b>	<b>Raidió Teilifís Éireann (Radio and Television of Ireland)</b>
<b>SRFB</b>	<b>Southern Regional Fisheries Board</b>
<b>TG4</b>	<b>Teilifís na Gaeilge</b>

## 2. EXECUTIVE SUMMARY

### Project Objectives

The project aimed to restore the populations of Freshwater Pearl Mussel, Atlantic Salmon and Otter (Annex II species EU Habitats Directive), Kingfisher (Annex I species EU Birds Directive) and a sub-species of Irish Dipper endemic to Ireland, in the Upper Blackwater catchment SAC. The project commenced in September 2010 and focussed its on-the-ground conservation works on the River Allow SAC a sub-catchment of the Munster Blackwater SAC (Code: 002170) and its information dissemination on the general public, with the main focus in the Duhallow Region of North Cork and East Kerry. The project concluded on the 23<sup>rd</sup> of June 2015.

### Key Deliverables and Output

- 0.5km of riverbank restoration to prevent bank erosion
- 38km of riparian zone fenced off to exclude livestock from overgrazing and poaching riverbanks
- Provision of ‘flood friendly’ fencing to farmland prone to seasonal flooding (project innovation)
- Provision of over 60 pasture (nose) pumps, six solar powered pumps and troughs to farmers whose cattle access to the river for drinking was fenced off.
- Signed agreements for managed cattle crossings at three points on the Allow and Dalua Rivers
- Provision of silt traps to six farms, preventing tonnes of fine material from entering the main Allow channel (project innovation)
- Coppicing and pruning of a 6.46km length of riverbank along the Allow, Dalua and Brogeen Rivers where excess shading and tunnelling was found to occur
- Planting of native trees along the riparian areas was carried out along 6.66km within a 7.45km length of river channel.
- Provision of ten artificial otter (*Lutra lutra*) holts and 28 log piles
- Provision of 12 kingfisher (*Alcedo atthis*) nest boxes
- Provision of 20 dipper (*Cinclus cinclus hibernicus*) nest boxes at ten sites
- Eradication and management of the non-native invasive species, Himalayan balsam (*Impatiens glandulifera*)
- Production of guidelines for the management of riparian zones for riverine SACs, habitat restoration plan for tributaries of the Blackwater and a guide to sustainable riparian and water quality management in farms in close proximity to riverine SACs.
- Awareness raised among the community, school children, and other key stakeholders on the importance of the SAC and the issues affecting it through workshops, class room visits and media exposure.

### Description of Project

The Project, based in Newmarket Co. Cork, was developed in order to restore the populations of Freshwater Pearl Mussel (*Margaritifera margaritifera*), Atlantic Salmon and Otter (Annex II species EU Habitats Directive), Kingfisher (Annex I species EU Birds Directive) and a sub-species of Irish Dipper endemic to Ireland, through their long term conservation in the Upper Blackwater catchment

## **Project Framework**

The project was administered by IRD Duhallow CLG, Coordinating Beneficiary, with Associate Beneficiaries Inland Fisheries Ireland as project partners along with Pobal. Pobal administer payroll for IRD Duhallow's Rural Social Scheme (RSS). RSS consisted of the majority of personnel for the on-the-ground works. Pobal were added as Associated Beneficiaries, which was a project modification. Other project modifications included the reassignment of funding for bridges at cattle crossing points to other concrete conservation actions, the prolongation of the project by six months and the change in the name of our project partners from Southern Regional Fisheries Board to Inland Fisheries Ireland.

## **Results**

### *Preparatory Actions (Actions A1 – A3)*

A Special Area of Conservation Management Plan was produced for the upper reaches of the Munster Blackwater (Cork/Waterford) SAC. A guide to sustainable riparian and water quality management on farms in close proximity to riverine SACs was produced for riparian landowners in the River Allow catchment. A habitat development plan for tributaries of the upper Blackwater was also written to target required conservation works to these channels.

### *Concrete Conservation Actions (Actions C1 – C10)*

Over 38km of riverbank, in the River Allow catchment, was improved through bank restoration, fencing of riparian habitat, elimination of cattle access to the rivers, planting of native trees, management of sections of river where excess shading occurred and management of Himalayan balsam. Siltation of the rivers was also reduced through these actions, together with the provision of silt traps along farm drains. Artificial resting areas and nest boxes were also installed at targeted sites for otters, kingfishers and dipper.

### *Public Awareness and Information Dissemination Actions (Actions D1 – D8)*

Over 10,000 households received a quarterly newsletter with updates of the project. Thirty-six primary schools and five post-primary schools were visited by the project. These schools were then involved in the species recording programme set-up by the project. The project regularly contributed to local print and radio media and have been featured twice on national television (RTÉ and TG4). Signs and brochures were produced to further disseminate information on the project. DuhallowLIFE also hosted a project launch conference and end-of-project conference.

### *Monitoring and Project Operation Actions (Actions E1 – E8)*

Fish stock freshwater pearl mussel and riparian biodiversity monitoring was conducted throughout the duration of the project. Licencing issues led to delays in FPM monitoring and modifications to the fish stock monitoring programme. Spot checks, walkover surveys and incidental observations were used to monitor otter, kingfisher and dipper abundance. Annual financial auditing and a final external project evaluation were conducted and an AfterLIFE conservation plan has been published.

### 3. INTRODUCTION

One of the major reasons for the decline of the Freshwater Pearl Mussels, in Irish rivers, has been the increase in sediment movement through rivers and its settlement onto the river bed (Anon, 2004). When this occurs, formerly clean gravels become clogged with fine sediment. Fine sediment can adversely affect juvenile pearl mussels and salmonid fishes, buried in the sediment, which depend on a plentiful supply of oxygen to their habitat (Walsh, Neill, & Lucey, 2012). Bank erosion can be a source of silt in rivers (Scottish Environment Protection Agency, 2012). Sources of fine sediments arising from modern land practices and drainage schemes may have increased fine sediment content in river beds. Soil erosion via livestock poaching at feeding points and bank edges not protected by fencing, tillage of arable soils and ploughing for afforestation may produce long-term degradation of the channels (Neill & Hey, 1992).

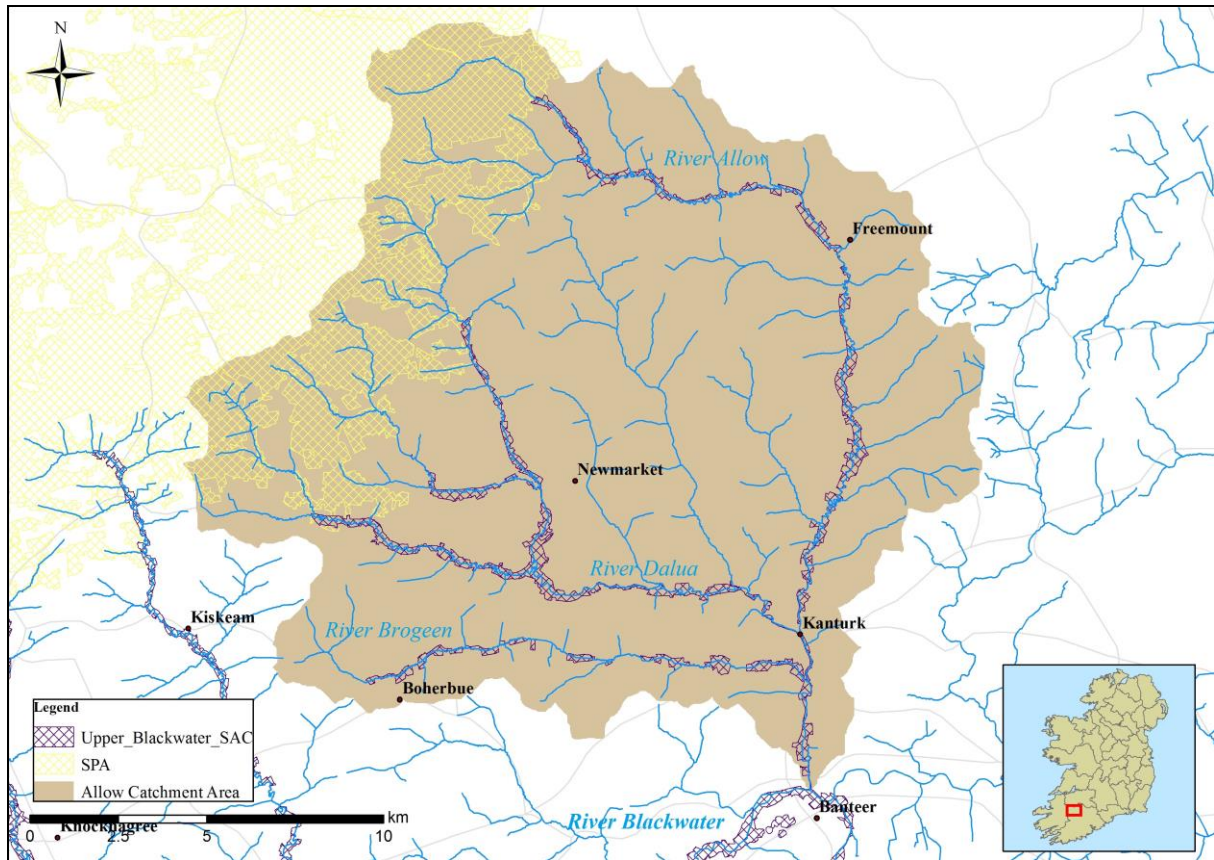
Another cause of riverbank erosion is the invasive species, Himalayan balsam. In Ireland it is most invasive in damp habitats particularly along river corridors, where it out-competes native vegetation in summer and dies back in winter, exposing river banks to erosion. It spreads rapidly downstream in river catchments due to its prolific seed production (Invasive Species Ireland, 2015).

The principal aim of this EU LIFE+ Nature and Biodiversity Project (Blackwater SAMOK, hence referred to as DuhallowLIFE) was to reduce and halt excessive siltation of FPM and Atlantic salmon habitat in the channels of the Allow catchment. This was achieved through the following objectives:

- Environmentally friendly bank revetment (to stabilise river banks), fencing (restrict cattle access to the river, trampling and overgrazing of the riparian zone) and provision of silt traps and constructed wetlands (reduce risk of siltation from forestry plantations).
- Reduction in erosion and organic pollution from cattle through the provision of alternative drinking sources to replace cattle drinking access points. Provide alternative river crossings for landowners with land on both sides of the river.
- Increase in dappled light effect where excessive shading by vegetation is a problem for Atlantic salmon production.
- Reduction in the impacts of increased temperatures due to climate change by the provision of balanced riparian zone with optimal shading in exposed areas, to ensure that summer water temperatures do not reach lethal limits for Atlantic salmon and Pearl mussel.
- Improvement of otter habitat through provision of otter holts and resting areas.
- Improvement of kingfisher habitat through provision of suitable bank nesting sites with nest boxes. Improvement of dipper nesting opportunities through provision of nest boxes for under bridges.
- Management and eradication of invasive species (*Impatiens glandulifera*) in the catchment by monitoring and removing the species from the River Allow catchment.

Increasing public awareness of the issues faced in the Allow catchment and further afield was a key objective of the project. Public information workshops, educational lectures and fieldtrips have increased awareness. Involvement with the schools in Duhallow (36 primary and 5 post-primary) has also ensured close interaction with students throughout the region. Two students, whose school was visited by the project, went onto to enter the BT Young Scientist Awards with their own project on Freshwater Pearl Mussels. They won bronze in their category.

IRD Duhallow has an excellent rapport with the local community as the board members of IRD Duhallow consist of representatives drawn from the community. The LIFE+ project has benefitted from this direct public participation model developed by IRD Duhallow since 1989. By working with the local population to bring about a sense of a greater appreciation of the natural heritage of the SAC, this effort should effectively help increase local pride and a sense of place and bringing the natural heritage to the fore.



**Figure 1 Map of DuhallowLIFE (Blackwater SAMOK) Project Area**

## 4. LIFE PROJECT FRAMEWORK

### 4.1. Project Structure and Management

DuhallowLIFE was funded with the contribution of the LIFE+ financial instrument of the European Community, with co-financing from Inland Fisheries Ireland (associated beneficiary). IRD Duhallow is the coordinating beneficiary. Pobal, who administer the payroll for RSS participants, is the other associated beneficiary. IRD Duhallow is the implementing body for RSS. RSS participants were the chief on-the-ground conservation works personnel. The project was supported by a large number of key stakeholders including landowners, agricultural bodies (IFA, ICMSA, Teagasc), local authorities, Cork Nature Network (CNN), Coillte, BirdWatch Ireland and the general public.

The project team was comprised of a Project Manager, Project Coordinator/Senior Scientist, Project Officer/Junior Scientist, Project Administrator (financial, part-time) and Project Clerical Officer (part-time). The project coordinator reported to the Duhallow Environment Working Group. The group met monthly and had particular interest for all technical aspects of the project while assisting on the ground with various events and also promoting the project, which in turn the Working Group reports to the main Board of IRD Duhallow. The project steering committee met quarterly and had both technical and financial interest with the project.

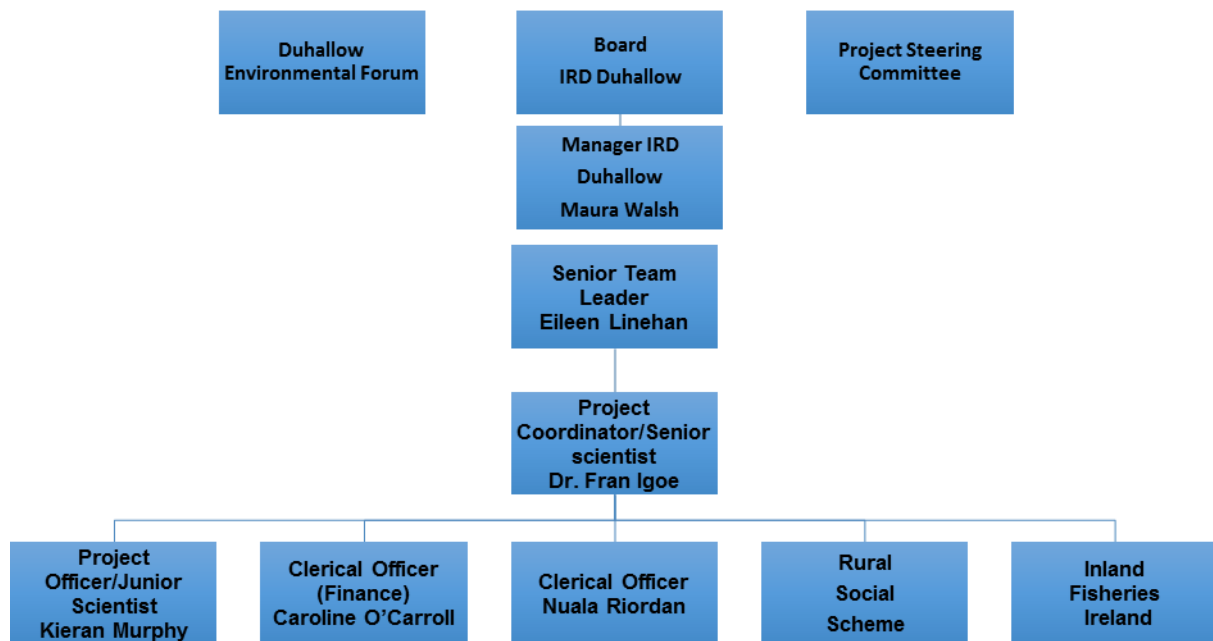


Figure 2 Organogram of project team and the project management structure

## 4.2. Project Actions

DuhallowLIFE's project actions were as follows:

**Action A1:** Management plan for the Upper Blackwater River (Blackwater SAC).

**Action A2:** Guide to sustainable riparian and water quality management on farms in close proximity to riverine SACs "Towards sustainable and environmentally sound water solutions for farms located in close proximity to water courses."

**Action A3:** Detailed Habitat Development Plan for tributaries of the Upper Blackwater.

**Action C1:** Reduction of bank erosion.

**Action C2:** Reduction and elimination of trampling and soiling of river by cattle by fencing vulnerable river bank sections.

**Action C3:** Removal of cattle drinking access points and crossing points causing siltation and organic pollution, by provision of alternative drinking strategies including novel pumping systems (e.g. solar panel powered pumps for drinking troughs).

**Action C4:** Replacement and upgrading of existing silt traps and provision of new silt traps and constructed wetlands to remove silt emanating from afforested upland sections. Trials of purposely designed wetlands will be carried out to determine their effectiveness in treating silt derived from commercial forestry in upland areas.

**Action C5:** Rebalancing of riparian vegetation to address areas affected by excessive shading.

**Action C6:** Rebalancing of riparian vegetation to address areas where riparian cover is inadequate.

**Action C7:** Action for otters – Provision of habitat and resting areas for otter through introduction of brush bundles and otter holts.

**Action C8:** Action for Kingfisher – Provision of nesting boxes for Kingfisher.

**Action C9:** Action for Dipper – Provision of nesting boxes for Dipper.

**Action C10:** Removal and monitoring of Himalayan Balsam

**Action D1:** Creating awareness amongst the community: Public Awareness and Participation Workshops.

**Action D2:** Creating awareness amongst school children.

**Action D3:** Educational lectures.

**Action D4:** Development and management of website, with an educational dimension, including volunteer census activity.

**Action D5:** Schools Species Recording Project.

**Action D6:** Media activity relating to education and community monitoring actions.

**Action D7:** Development of information brochures/newsletter and signage about the project.

**Action D8:** End of Project Conference.

**Action E1:** Project Advisory Group.

**Action E2:** Employment of Project Team.

**Action E3:** Fish stock survey.

**Action E4:** Biodiversity audit, Otter survey, kingfisher survey, dipper surveys.

**Action E5:** Liaison with other EU LIFE Nature/Biodiversity projects.

**Action E6:** External auditing.

**Action E7:** Evaluation

**Action E8:** AfterLIFE plan

### **4.3. Project Modifications**

Throughout the duration of the project four modifications were accepted by the Commission:

#### *Name change of associated beneficiary:*

In July 2010, the Southern Regional Fisheries Board (SRFB) became part of Inland Fisheries Ireland (IFI) which is an amalgamation of seven regional and the Central Fisheries Board into a single agency. At the Project Steering Group meeting of November 24th 2011, the Head of Business Development of IFI, Suzanne Campion signed the relevant project modification forms for the change of associated beneficiary name from SRFB to IFI.

#### *Amendments to Project Actions:*

Action C1 - Approval was given for the transfer of some or all of the works proposed under the action from the River Allow to the River Dalua (within the Natura 2000 site). This was to overcome license conditions that had proved to be unworkable in 2013 due to delays in ancillary licenses (FPM survey licenses). Changes in the implementation of planning legislation meant that this action was subsequently directed through the planning process. Work was successfully completed on excessive bank erosion identified under Action A3 in September and October 2014.

Action C5 - Similarly, restrictions by NPWS had precluded some of the proposed works on the River Allow. It was suggested where works were originally proposed, but within FPM areas, that this work be carried out within the SAC at "tunnelled" locations identified under Action A3.

Action C3 - The original proposal to build three bridges was not a viable option. A practical alternative was developed, where the landowners implemented a more sustainable cattle management regime at river crossing points. This alternative approach was accepted under the project modification in May 2014. Signed agreements were obtained from the identified three landowners who cross the river with livestock (Annex C.3.2).

#### *Prolongation of Project:*

The original proposal time line for this project was September 2010 until August 2014. However, significant delays in communication, processing and issuing of the required licensing from the National Competent Authority were encountered from the beginning of the project and right through the duration of the project until August 2013, when some resolution was achieved. The modification of the project finish date to the 23<sup>rd</sup> of June 2015 was granted by the Commission on the 4<sup>th</sup> of August 2014.

#### *Addition of Associated Beneficiary:*

The original project proposal had two project partners: IRD Duhallow as coordinating beneficiary and Inland Fisheries Ireland as associated beneficiary. However, the joint mission by the EC Desk Officers on 12<sup>th</sup> June 2014 revealed that the project structure as it stood did not strictly comply with the Common Provisions. A substantial element of the project matching funding was in the form of personnel costs associated with the Rural Social Scheme. This scheme is an exchequer funded scheme to pay farmers with small holdings a wage to contribute to rural development. IRD Duhallow manages the scheme in Duhallow, ranging from training the personnel to organising work on the ground and managing the staff. Although IRD Duhallow manage their time recording through timesheets, the wages are actually paid from a separate bank account held by a separate entity, Pobal. Pobal administer a range of government programmes including the Rural Social Scheme (RSS). To ensure the

eligibility of personnel costs of staff supported by the Rural Social Scheme, it was necessary to include Pobal as an associated beneficiary. The modification brought the project into line with the requirements under the Common Provisions and Pobal, as an associated beneficiary complied with Articles 5 and 6 of the Common Provisions.

## 5. PROGRESS AND RESULTS

The Project officially began on the 1<sup>st</sup> of September 2010 and came to an end on the 23<sup>rd</sup> of June 2015. The Gantt chart in the *Appendix* gives an overview of the progress of the project.

**Table 5. Progress of Project Actions throughout the duration of the project (\*Forestry drain water attenuation and small plot farmland wetland)**

Description	Target	2011	2012	2013	2014	2015
A1 - SAC management plan	1	0	0	0	0	1
A2 - Farm management guide	1	0	0	0	0	1
A3 - Habitat management plan	1	0	0	0	0	1
C1 - Stabilise river bank	0.44km	0	0	0	0.33km	0.52km
C2 - Fence river bank	37.96km	0	1	18.6km	29.29km	38.54km
C3 - Cattle crossing	3	0	0	2	3	3
C3 - Closed Cattle drinks	82	0	3	36	74	83
C4 - Construct wetlands	2	0	0	0	0	2*
C4 - Install silt traps	5	0	0	4	6	6
C5 - Coppice/prune river bank trees	6.46km	0.2km	0.644km	2.2km	3.11km	6.46km
C6 - Plant riparian zone	6.84km	0.5km	2.673km	5.2km	5.83km	6.84km
C7 - Construct otter holts	10	0	10	10	10	10
C7 - Construct brush bundles	28	0	2	2	12	28
C8 - Place kingfisher nest boxes	12	0	0	12	12	12
C9 - Place dipper nest boxes	10		20	20	20	20
C10 - Remove Himalayan Balsam	4.56km	8.0km	28.43km	28.43km	35.7km	35.7km
D1 - Hold public awareness workshops	10	3	5	19	37	49
D2 - Visit primary schools	40	0	12	36	36	36
D2 - Visit secondary schools	5	0	0	5	5	5
D2 - Involve schools in software application	36	0	12	36	36	36
D3 - Hold educational lectures	32	3	4	17	28	37
D4 - Upload articles to website	24	12	24	58	84	90
D5 - Species Recording (Schools)	36	0	12	36	36	36
D6 - Issue press releases	34	6	12	19	31	36
D6 - Publish magazine articles	4	1	6	7	9	10
D6 - Do national radio interviews	4	2	2	3	3	4
D6 - Do local radio interviews	8	1	3	4	6	8
D6 - Do TV programmes	2	0	DVD	DVD	1+DVD	1+DVD
D7 - Erect appropriate signage	5	0	0	0	5	5
D7 - Issue newsletters	16	3	6	10	13	15
D7 - Produce brochures	4	1	1	1	4	4
D8 - Host End of Project Conference	1	0	0	0	0	1
E1 - Project Advisory Group	1	1	1	1	1	1
E2 - Employment of Project Team	1	1	1	1	1	1
E3 - Carry out fish stock surveys	4	1	5	5	9	10

<b>E3 - FPM Survey</b>	-	0	0	10	28.5km	28.5km
<b>E4 - Carry out otter, kingfisher and dipper surveys</b>	3	3	5	7	10	10
<b>E5 - Liaise with other LIFE projects</b>	n/a				19	21
<b>E6 - External Auditing</b>	4	1	2	3	4	4
<b>E7 - External Evaluation</b>	4	0	0	0	0	1
<b>E8 - AfterLIFE Plan</b>	1	0	0	0	0	1

## 5.1. Preparatory Actions

### 5.1.1. Action A1

*Action started:* March 2010

*Action completed:* June 2015

*Deliverable:* Produce SAC plan and NIS (Annexes A.1.1 and A.1.2)

*Summary of action:* Conservation plan was produced for the upper reaches of the Natura 2000 site. Integrated Catchment Management Plan produced for River Allow catchment. Natura Impact Assessment report also produced for Appropriate Assessment.

Conservation objectives have been published for the River Blackwater SAC (Site Code: 002170) but no Conservation plan is available ([www.npws.ie](http://www.npws.ie)). The DuhallowLIFE project undertook to develop a management plan for the SAC, concentrating on the upper portion of the Natura 2000 site (catchment area = 866.5km<sup>2</sup>). The development of this plan was progressed through a multifaceted approach, which included; direct engagement of relevant stakeholders through targeted correspondence, regular advertisements on the LIFE page of the IRD Duhallow newsletter, the DuhallowLIFE website and social media including Facebook. The following documents were also consulted; Natura 2000 site Conservation Objectives, the draft Freshwater Pearl Mussel sub-basin plans and Ireland's Article 17 report (2013) for Freshwater Pearl Mussel, European otter, Atlantic salmon and Kingfisher. In addition, a draft version of the document was made available to participants at five River Allow Catchment Management Initiative meetings where local stakeholder input was invited. In attendance at these meetings included senior staff from almost all of the relevant state agencies, NGO's, community groups, landowners, anglers and the public.

In addition, a more detailed plan was developed for the River Allow Sub-Catchment, where most of the on the ground concrete conservation actions occurred (Annex A.1.3). This initiative has been described as "Exemplar" by the Environment Protection Agency for community engagement in Ireland and has been studied as a model for other catchments in the country. The initiative was developed in association with INTERREG IV TRAP project (<http://trapproject.eu>) - The Territories of Rivers Action Plans (TRAP) and the plan outlines key areas requiring redress. Some of these have already been addressed within the life time of this LIFE project and (e.g. Annex A.1.4) the remainder will be targeted during the afterLIFE phase and under the implementation phase of the 2nd cycle of the EU Water Framework Directive.

Under this action a Natura Impact Statement was drafted and submitted to the licensing authority (NPWS). A Strategic Environmental Assessment was found to be unnecessary (consultation with NPWS) as the project was assessed directly through Appropriate Assessment.

### 5.1.2. Action A2

*Action started:* March 2010

*Action completed:* June 2015

*Deliverable:* Management guide for cattle management for riverine SACs (Annex A.2.1).

*Summary of action:* A Management guide for cattle management for riverine SACs. In support of this action three Annual information calendars were produced targeting farmers. A management guide was produced for landowners farming along riparian SAC's.

**Educational Calendars:** In support of this action three colourful information calendars were produced (2013, 2014 and 2015; Annex A.2.2, A.2.3, A.2.4). This public engagement strategy, utilising calendars as the medium, evolved from a stakeholder analysis which identified the need to make information relevant to farmers and key stakeholders within the catchment and present this information in an easily digestible and accessible format. The calendar format developed incorporated project actions and key relevant environmental stewardship messages within a colourful and attractive format. A trial run conducted in 2013 was so successful that follow up printing was required to meet demand. Information contained included advice for farmers on good environmental practice, coupled with information on the SAC. The advice contained was based on the project team's knowledge of farming in the area with specific advice on stock management, drainage maintenance and land nutrient spreading.

**Best practice guide:** A guide for the "best practice" management of cattle along riverine SACs was prepared. Many of the recommendations within the guide are based on the lessons learnt from the conservation actions carried out during the operational period of the LIFE project. Additional information, especially in the context of nutrient management issues encountered by the project was also included. The guide was assembled with the assistance of two Agricultural Scientists to ensure that it was relevant to Agricultural interests, especially the end user (i.e. the local farmer). Critically, the guide includes project innovations developed by the LIFE team in partnership with the local farming community.

Bringing added value to this action the project built on the guideline development process to a bespoke Agri-environment scheme for the River Allow catchment. Taking into consideration the need to protect the Natura 2000 site, environmental challenges and agricultural practices in the catchment, the project liaised with the landowners through workshops, farm walks and 'one on one' visits to evolve a scheme that could be locally led. The scheme and the proposed measures are developed to be as practical as possible from the farmers' perspective but deliver tangible results to the environment. Updates on the development of the evolving scheme were also presented at the regular River Allow Catchment Management meetings. The scheme is a hybrid "results-action based scheme" and has been put forward to the Department of Agriculture for consideration under the Locally Led Agri-environment Scheme option under the Rural Development Plan 2014-2020. The scheme, during its evolution, has been presented at seminars and conferences including Integrated Catchment Management Seminar in Cork (Annex P.14.27) and Teagasc Farming and Biodiversity Conference (Annex P.13.10). The scheme was produced with the support of the Environmental Protection Agency and the INTERREG IV Trap project.

### 5.1.3. Action A3

*Action started:* March 2010

*Action completed:* June 2015

*Deliverable:* Habitat development plan for tributaries of the upper Blackwater SAC (Annex A.3.1).

*Summary of action:* A plan was produced to progress the improvement of the habitat of the tributaries of the upper Blackwater SAC. The plan specifically aims to improve Atlantic salmon stocks and contains a range of recommendations from invasive species removal to livestock management.

A habitat development plan has been drawn up with specific emphasis on the restoration of habitat for Atlantic salmon. Using a combination of field surveys and satellite imagery, detailed habitat recommendations were drafted in close consultation with the local angling clubs. IFI, NPWS, Cork Nature Network (CNN; formerly Cork Branch of the Irish Wildlife Trust) were also closely consulted and a student placement from University College Cork worked on GIS aspects of the project for three months. Additional support was also provided through the EPA. Key issues identified included: invasive plant species, fish passage issues, excessive riparian vegetation, cattle access and unmitigated drainage networks. These data have also been digitised into GIS. The invasive species portion of the work has been made available to CNN and Cork County Council.

Information from this plan has informed subsequent LIFE project actions (e.g. survey work on the Natura 2000 portion of the River Brogeen, highlighting the need for tree pruning work along the lower reaches. This was subsequently carried out in 2013/2014 (Action C5)). A previously unrecorded extensive stand of Himalayan balsam (8km) was discovered on the Brogeen which was brought under control under Action C10. Additional work, funded through the EU LEADER programme was carried out by IRD Duhallow, targeted a tributary (Rampart stream) of the River Dalua restoring habitat over a 400m reach. The LIFE team provided technical advice and oversight ensuring that restoration standards were high. This work was selected as an example of best practice and presented in Vienna, Austria by LEADER funded staff from IRD Duhallow (Annex D.7.23 – European River Restoration Conference: Restoring Rivers in Europe: Celebrating Successes and Addressing Challenges). This work entailed the introduction of spawning gravel, weirs to create pool habitat and aeration/turbulence, increase channel capacity and length and improve the streamside riparian habitat area on a degraded stream accessed by Atlantic salmon for spawning. Subsequent to the works brown trout minimum densities were shown to increase (0.03/m<sup>2</sup> to 0.09/m<sup>2</sup>) while Atlantic salmon numbers remained stable (Annex E.3.3). Brook Lamprey were also observed spawning for the first time.

A significant amount of the detailed habitat mapping work was carried out under this action, along the upper Blackwater, providing the necessary information which informed a subsequent successful EU LIFE Nature bid (LIFE 13 NAT IE 000769 RaptorLIFE), further building on the work carried out by the current LIFE project and providing a real return, rather than "more reports on the shelf gathering dust". This report and associated GIS data are being treated as live information and available to local angling clubs and other interested parties to avail of for planning restoration projects. The information is also of particular value to the 2nd Cycle planning phase for the WFD for the upper reaches of the Blackwater SAC and is being made available to the Department of the Environment, Community and Local Government and the EPA for characterisation and investigative assessment purposes.

## 5.2. Concrete Conservation Actions

### 5.2.1. Action C1

*Action started:* February 2011

*Action completed:* January 2015

*Key deliverable:* Stabilise river bank along a 0.44km section utilising bank revetment. (Final Technical Report: Annex C.1.1)

*Summary of action:* The target of addressing 0.44km of river bank was achieved through a combination of an innovative river bank revetment technique developed by the project, willow spiling and restoration of former river bank revetment work. A novel low impact soft engineering technique was developed using a combination of locally sourced natural material, rock and publically donated used Christmas trees. This is a “best practice technique for addressing river bank erosion for the SAC” and the site now serves as a demonstration site for regular visits.

River erosion in the River Allow catchment and associated sedimentation of the river bed habitat was found to be high during initial studies carried out by the project. Anon (2010) also identified river bank erosion as a significant pressure in the catchment. Under the original LIFE proposal, it was proposed to utilise a Christmas tree log technique as described in O’Grady (2006) to carry out bank revetment. However, at the onset of the project, it was discovered that previous river bank revetment work, using the same technique and carried out by the Southern Regional Fisheries Board in the late 1990's met with mixed outcomes. Although it worked well in some locations it was less successful at other sites and led to some apprehension within the landowner community.

#### Project innovation

A novel "best practice technique" was developed in partnership with the Kanturk Angling Club who also secured funding through LEADER and Inland Fisheries Ireland. The combination of three funding streams is an excellent example of funding maximisation leading to a multiplier effect and increased outcomes with two EU funding instruments working together with a national exchequer fund. The LIFE team provided technical advice to the LEADER funded project whilst permissions were pending under Appropriate Assessment for Action C1. A project innovation was developed for this 1km site (Natura 2000: River Dalua outside of Kanturk). In excess of 360m severely eroding river bank was addressed. The technique was refined and augmented further through the involvement of Rural Social Scheme participants to flood proof the fence line at the site, by planting native trees and through the placement of Christmas trees along the most erosion sensitive locations. This best practice technique involves re-profiling of the river bank and protecting the base of the eroding bank using rock, the removal and replacement of the natural turf on the bank (an essential procedure due to the late seasonal stage at which the work was carried out), planting of willow stakes and securing of used Christmas trees, donated by the public, to fencing posts driven into the ground. In addition to this, willow fascines (bundles of willow slips laid horizontally) were also buried within the redesigned bank. The bank was then fenced (the fence line moved back by 3m from the river bank) using the project innovation (flood friendly fencing technique). The Daily Telegraph, A UK daily newspaper described it as the ‘greenest solution’ to recycling Christmas trees (Lean, 2012. ‘*Christmas Trees given new lease of life to save riverbank.*’ The Telegraph – Annex D.6.28). Over 1000 Christmas trees were donated by the public in 2012 for this work after advertisements in the LIFE section of the IRD Duhallow newsletter, radio interviews and announcements at the local mass services.

#### Rehabilitation of IFI revetment work (180m)

Reinforcement and restoration of historical river bank revetment work was carried out along a middle channel section of the River Allow. In 1999 under the Tourism Angling Measure (EU

Structural Funds) log Christmas tree revetment work (O'Grady 2006) was carried out along the river downstream of Freemount village. Some of this work had been undermined by drainage and unmanaged cattle access but had potential to be restored through the careful placement of stone, placement of fresh used Christmas trees, extensive planting of willow and fencing.

#### Willow spiling (195m)

Willow spiling (weave) was trialled on the River Allow and was shown to be successful along two locations (immediately downstream of Freemount and Metal Bridge area). These now serve as demonstration sites. Trials along other stretches proved less successful (upstream of Freemount) as the rate of river bank erosion was too severe for the technique to meet with any success.

#### Bank revetment (145m)

In 2014 river bank restoration work was carried out along a 145m section of the River Dalua portion of the SAC following the best practice technique as described above. In addition to planting willow, fascines were also placed. The project followed best practice with regard to potential silt disturbance and monitoring showed that levels downstream of the sites were consistent with background levels recorded for the river. This site now forms part of a demonstration site for best practice river bank revetment on the River Blackwater and was utilised for the field trip during the end of project conference on May 26<sup>th</sup>. The site is also used as a demonstration site for the EPA Catchments Science study course for Public Authorities (4 visits to date – average attendance = 30-35 participants).

### 5.2.2. Action C2

*Action started:* September 2012

*Action completed:* June 2015

*Key deliverable:* Fence river banks (37.9km) to manage livestock (Final Technical Report: Annex C.2.1)

*Summary of action:* Fencing of river bank was carried out along 38.5km of SAC riparian zone. Two project innovations were developed. 1. Set back from river distance of fence (single strand electric fence) is critical to success of measure and must be at least 2m from the top of river bank for riparian vegetation to grow unhindered from grazing pressure. 2. A novel "flood friendly technique" was developed which was suitable for fencing along river banks regularly inundated during flood events and impacted by heavy debris loads.

The target of 37.96km of river bank fencing was exceeded (38.5km) through the good cooperation of the local farming community. The riparian areas of 48 farms were fenced, with the extent of fence ranging from 90m to 1500m depending on the extent of river frontage per farm holding.

Additional achievements were made through an early project discovery. This was that the setback distance from the river traditionally used for the fence line in the area (and recommended under Agri-environment schemes) was not sufficient to protect riparian margins from grazing farm animals. Due to the flood prone nature of the low lying land adjacent to the river, single strand electric fencing is often used in the catchment area. This has the advantage that water during moderate flood event will travel under the fencing wire relatively unimpeded. However, the project noted that farm animals will reach under the single electric fence wire and crop the vegetation to a distance up to 1m from the fence line, sometimes to the river edge, thus undermining the effectiveness of the fence as an environmental measure. Therefore, the project negotiated with landowners a fence line distance in excess of 2m. This was the equivalent of in excess of 40,000m<sup>2</sup> extra riparian

margin protected from grazing pressure along the river margin. A fence line setback distance of at least 2m is a project recommendation for any project using single strand fencing and a recommendation advanced to the Department of Agriculture and Food for consideration in future Agri-environment schemes.

Where land was particularly prone to flooding, farmers were not able to establish permanent fence lines along the riparian zone. Through discussions with the local farmers the project team developed an innovative "flood friendly fencing" technique. The technique has worked extremely well and the initial trial test fence is still in place since its initial placement and trial in September 2012. The local farmer on whose farm the fence is located has even given a radio interview, explaining how well the technique has worked for him (Action D6) and the site is now a demonstration site (Action D3). This technique is being forwarded to the EPA and DAFM for consideration for future Agri-environment schemes.

Basic Farm Payment eligibility is a cause of concern for many landowners in the catchment, where more effective buffer strips along river margins are being promoted. This concern has been highlighted through meetings with DAFM and is an issue which is under active discussion between IRD Duhallow and DAFM.

Monitoring of plant species richness found that species richness was much higher within the riparian margins (Annex C.2.4).

### 5.2.3. Action C3

*Action started:* May 2011

*Action completed:* June 2015

*Key deliverable:* Provision of three managed cattle crossings (project modification) and alternative livestock drinking facilities. (Final Technical Report: Annex C.3.1)

*Summary of action:* Managed cattle crossing with the agreement of the landowners was established on three farms which spanned both sides of the SAC (river) replacing unmanaged open access for cattle. Alternative drinking sources in the form of pasture pumps, solar powered pumps and troughs were provided to farmers where cattle drinks were closed off by fencing.

Demonstration sites for pasture pumps were established on two beef farms and on one dairy farm, solar powered pumps and troughs together with rainwater harvesting were established also.

#### **Managed livestock river crossing**

Prior to the commencement of the project, three farms were identified where cattle had free access to both sides of the river without a managed crossing point. Two farms were beef farms and the other a dairy farm. Dairy cows are generally milked twice daily and therefore may need to cross the river on a frequent basis to access grazing paddocks. Beef cattle crossing requirements although less can also have a significant impact where the farm straddles both sides of the river. In the original application it was proposed to build three bridges to facilitate cattle movement across the river. This option was not viable due to planning restrictions and estimated cost (€200k per bridge: Malachy Walsh Consultants). An alternative solution was developed by the project team and agreed through a project modification, as an alternative method which broadly meets the same objective (i.e. avoid cattle disruption of the river, in particular organic pollution loading).

An agreed "Cattle crossing Management Plan", which aims to reduce livestock impact on the river, was devised for each of the three farms. The project obtained written agreements from all three farmers (Annex C.3.2) that they will manage the crossings using the agreed technique. Monitoring by the project team indicates that they continue to so.

### **Alternative drinking sources**

Under Action C2 over 38km of fencing was erected throughout the catchment. An essential component of this work was to close off existing cattle access and drinking points to eliminate soiling, poaching and trampling. A total of 83 drinking and access points were closed. On closure of these drinking points, alternative water sources or drinking points were required. Three techniques have been used; 1. solar powered pumping from the river to troughs, 2. pasture pumping direct from the river or preferably from side channels and drains avoiding direct abstraction from the SAC and 3. water harvesting (demonstration farm). Alternative cattle watering points were provided for beef cattle through the provision of 63 pasture pumps. A Single pasture pump can service between 15 and 20 cattle. Therefore, where larger herds exist or where the farm was split into a number of paddock areas, more than one pasture pump was provided (max per farm = 6). For the larger and more water demanding dairy herds, 6 solar operated pumps and troughs were also provided on a needs basis. Farmers were also encouraged to access the local authority mains supply where this was available to further reduce pressure on the SAC. Rainwater harvesting was also developed in the demonstration farm supplying water to six troughs and supplemented by water from the milking parlour cooler plate. This farm now serves as a demonstration site for the project and receives regular visits from a range of interest groups including high level government and industry personnel. The two beef farms are also used as demonstration farms by the supplier of the alternative livestock drinking equipment (<http://www.odonovaneng.ie/2015/05/27/aquamat-pasture-pump/>).

#### *5.2.4. Action C4*

*Action started:* June 2011

*Action completed:* June 2015

*Key deliverable:* Development of two wetland techniques and a novel silt trapping technique to address siltation (placed in farms). (Final Technical Report: Annex C.4.1)

*Summary of action:* Development of two wetlands, one customised for water retention in upland forested areas and the other to intercept nutrients from soiled water on sloped farm roadways. An innovative silt trapping system was developed specifically for farm drains but also suitable for certain types of forestry settings. Six drains were treated.

Planning for the development and placement of constructed wetlands commenced at the onset of the project. Three sites were initially identified in the upper reaches of the catchment. Site survey (e.g. levels) investigations and modelling were carried out. Due to concerns from the site owner and the competent authority regarding proposed works (work was proposed to take place within the SPA) the development of these sites were not progressed further.

Two novel techniques

**Forestry attenuation wetland:** A novel low environmental risk technique was developed by the project. This technique can be rolled out as part of a treatment train to slow water down within forest drainage networks, and should not require planning permission. The technique was developed and tested at one site (Langford Rowls) at the source of the River Allow (and within the SPA). The technique involved the construction of a small wetland to slow water within the existing drainage network. The project innovation involved the manual manufacture of "grassed up compost bags" and their subsequent modular placement in a semi-circular configuration to create an impoundment. Details on the construction methods are given in Annex C.4.1.

**Farm roadway runoff entrapment wetland:** A second wetland prototype was developed to capture runoff from farm roadways. This was developed at one of the LIFE project's demonstration farms. The wetland is constructed to take away excessive soiled water runoff

which accumulates on the farm roadway during wet weather. The technique has been incorporated into the bespoke Agri-environment scheme developed by IRD Duhallow for the River Allow catchment. Farm roads (particularly in dairy farms) were identified as a significant source of nutrient enrichment during walk over surveys (PJ Phelan, agricultural consultant pers. comm. - Annex A.2.2).

**Silt traps:** The project conducted a study of existing silt traps in a plantation forestry and windfarm site in the upper reaches of the catchment and found that in excess of 50% of the traps examined were not operating properly (Annex C.4.3). This information was communicated to the forestry owner with the recommendation that more frequent maintenance of the traps should take place.

Sedimentation resulting from farm drainage networks was however identified as a significant risk factor to the SAC, especially within the vicinity of FPM beds (Anon 2010). Therefore, the project prioritised this area for attention. A drainage network audit walkover survey conducted in 2011 identified 86 drains, draining directly into the SAC. Thirty of them actively eroding and discharging silt directly into the SAC. Some of these drains discharged directly into river sections where large numbers of FPM had been identified.

The project team researched the availability of suitable techniques for the entrapment of silt within deep drains (some in excess of 2m deep) of heavy soils in areas with high rainfall by seeking advice from practitioners working in the relevant sector (e.g., agriculture/forestry) and searching the internet. Off the shelf designs were not available and the project team were advised by one "expert" that "silt traps were a waste of time". Without readily available expert advice, the project team set about developing its own project "innovation" after consultation with personnel involved in similar mitigations for the wind farming industry in Ireland. The design developed by the LIFE project was then tested and shown to be highly effective, removing not just silt moving along the bottom (entrained) of these actively eroding farm drains but also suspended solids (Annex C.4.2). It is recommended that these traps are placed in a series forming a treatment train (based on the Sustainable Urban Drainage System concept) within each drain. The extent of the treatment train (normally a series of three, two or one traps) placed, depends on the size of the drains, the extent of mobile substrate and hydrologic regime. Some drains have a continuous flow of water all year round (these drains are essentially small streams, known locally as "Glashas", which were historically straightened) or just periodically. These drains require a higher level of maintenance. In drains which are dry outside of heavy rain weather, one or two traps is sufficient. Drains in six farms are currently being treated by a total of 12 traps. This technique is being advanced to DAFM as a potential measure for future Agri-environment schemes.

#### 5.2.5. Action C5

*Action started:* May 2011

*Action completed:* June 2015

*Key deliverable:* 3.11km of tree pruning along a 6.46km length of river bank. (Final Technical Report: Annex C.5.1)

*Summary of action:* Pruning of excessively dense riparian vegetation causing a tunnelling effect and reduced incident sunlight reaching the stream bottom, thereby negatively affecting instream production.

Excessive river bank vegetation growth can reduce incident sunlight and cause undesirable levels of shading to rivers and has been shown to be negatively associated with juvenile salmonid densities in Irish rivers (O'Grady 1993). 6.4km of river bank along the River Allow was identified as having areas that would benefit from tree pruning to increase the incident sunlight. Pruning at selected target areas along the River Allow's main channel commenced

in 2011. Initial pruning concentrated on younger trees which facilitated the provision of live material (willow *Salix sp.*) for planting up of exposed and eroding river banks. Pruning took place along the Rivers Dalua and Brogeen in 2012 and 2013. In 2014 specialised chainsaw training was provided to Rural Social Scheme participants working on the project, so that work could concentrate on larger trees and in more dangerous situations. The work concentrated on the lower reaches of the Rivers Allow and Dalua. Some work was also carried out along the Brogeen River,

This work was carried out in close consultation with IFI and NPWS who were kept informed at all stages. An added value to this work was the creation new angling locations which facilitated the direction of angling activity away from sensitive FPM areas to less sensitive areas. This was done by careful planning and agreement with the local Kanturk Angling Club and the LEADER funded Duhallow Centre of Excellence.

#### 5.2.6. Action C6

*Action started:* May 2011

*Action completed:* June 2015

*Key deliverable:* Planting of native trees along the riparian areas was carried out along 6.66km within a 7.45km length of river channel. (Final Technical Report: Annex C.6.1)

*Summary of action:* The addition of native broadleaves will rebalance the riparian zone and facilitate biodiversity along the riparian corridor, providing shelter to the range of aquatic organisms which utilise the river and also contribute to stabilisation of the river bank and provide a buffering effect against possible overland organic pollutants.

Planting of native riparian vegetation concentrated on riparian areas vulnerable to river bank erosion and where tree cover was limited. Initial planting in 2011 concentrated on willow planting (*Salix sp.*) utilising a range of willow planting techniques including planting of poles, stakes and slips. Planting first commenced on reinstated revetment work formerly carried out by Inland Fisheries Ireland downstream of Freemount village.

Subsequent planting of native trees focused on other stretches along the River Allow. In 2012 planting of willow commenced along the River Dalua. In 2013 and 2014 planting including other native trees (Ash, Alder, and Oak). In 2013 the project discovered that trees labelled as "native willow" had been sold by a local nursery, when in fact they were of Canadian origin. In order to follow best practice, it was decided to source trees locally only by turning to the local community and industry. A fantastic response was forthcoming from the public with a considerable donation from Coillte. These trees were sourced locally by teams of RSS participants in areas where natural woodland expansion was occurring along native woodland edges. Saplings were dug and stored onsite by these teams and translocated subsequently. These saplings would have been destroyed by the forestry owner if left in situ as part of the management regime for the woodland. This method of collection ensured that all trees were of local provenance. Planting of trees of local provenance ensured that all trees are in synchrony with the local climatic conditions and biodiversity characteristics. These trees were donated by the public and Coillte. The project also ran an "Acorn School" campaign in 2013, where local school children were encouraged to collect acorns to germinate for subsequent planting. The following species were collected or "marked for collection" by the project. An estimated total of 7000 willow, 500 alder, 300 ash and 150 oak were planted.

#### 5.2.7. Action C7

*Action started:* January 2012

*Action completed:* June 2015

*Key deliverable:* 10 artificial otter holts. 28 otter brush bundles (log piles). (Final Technical Report: Annex: C.7.1)

*Summary of action:* Otter holts and brush bundles strategically placed in locations where otter activity was determined to be low or absent. High levels of mammal activity were associated with the otter holts in the first year. It is recommended that vegetation around holts is managed to ensure that entrances are visible and accessible.

Biodiversity survey audits carried out in 2011 targeting otters found that they were widespread in the River Allow catchment (Annex C.7.4). However, low occurrences and absences were noted in some areas. These areas were targeted for the placement of artificial otter holts.

A total 10 artificial otter holts were constructed at the IRD Duhallow headquarters following a design by the Suffolk Otter Trust and Rivers Project (Annex C.7.5). Holts were approximately 1.2m in width, and had an internal chamber with two entrances. Construction of the holts was done using marine plywood to increase longevity of the boxes and 12 inch (30cm) pipes were placed leading to the two entrances of the artificial holts. The holts were assembled and buried on site at predetermined locations based on the surveys referred to above. Suitability of the receiving site was determined against a range of habitat and disturbance criteria before placement was considered. A total of 10 holts were placed. During the first year of placement (2012), some form of mammal activity was noted for six (60%) out of the nine holts monitored. Some evidence of “activity” by an unidentified animal was noted again in 2013. Activity was lower in subsequent years and it is hypothesised that the sites became overgrown and the entrance points less obvious to otters. Strimming and the placement of otter spraints are recommended to increase the likelihood of otter activity.

In addition to the otter holts, 28 brush bundles were also placed throughout the catchment, mostly confined to suitable riparian areas. These were constructed using a range of locally sourced (usually material generated from tree pruning - Action C5). A range of woody material was used from native willow, although at some locations hazel, alder and ash.

The LIFE project also carried out a sustained public information and awareness campaign to highlight threats to otter. The high occurrence of otter road fatalities (>5 otters within the Allow catchment over a 2-year period: 2013-2014) in particular was highlighted. Information road signage was also produced to alert motorists that they were in an area of high otter activity and remind them to drive responsibly. Public interest in otters was high with good attendances at workshops and responses on social media to video footage of otter captured by trap cameras (<https://www.facebook.com/IRDDuhallowLifeProject/?fref=ts#>).

#### 5.2.8. Action C8

*Action started:* April 2011

*Action completed:* June 2015

*Key deliverable:* 12 artificial kingfisher nest boxes placed in river banks along the River Allow. (Technical Evaluation Report: Annex C.8.1)

*Summary of action:* River banks along the Blackwater were surveyed for kingfisher nest activity. Sites where no activity was noted but determined to be potentially suitable for supporting kingfisher were selected for kingfisher box placement. No uptake was noted for any nest box and three boxes were damaged or lost due to excessive river bank erosion. A review was carried out which makes recommendations for future placement of kingfisher boxes to be undertaken within the afterlife programme.

The target for the placement of kingfisher nest boxes was reached. Three boxes at two sites was severely damaged due to the undermining and erosion of the respective river banks due to flood damage. Two boxes were lost (erosion therefore exceeded a rate of 1m in less than one year of river bank) and another box damaged at a second site. This illustrates the extent that river bank erosion is as a limiting factor affecting the selection of nesting sites by kingfisher in the Allow River. Birdwatch Ireland provided an evaluation of this action and the advice given is informing the afterLIFE management of the project with regard to kingfisher (Annex C.8.1).

#### 5.2.9. Action C9

*Action started:* April 2011

*Action completed:* June 2015

*Key deliverable:* 10 bridges to be fitted with dipper nest boxes. (Final Technical Report: Annex C.9.1)

*Summary of action:* Dipper boxes were strategically placed in locations where dipper activity was determined to be low or absent. Two customised designs were developed which are suitable for low standing bridges and have been used elsewhere in Ireland. Uptake of nest boxes was high with up to 70% of installed bridge sites occupied in 2014. Nest boxes were installed to an additional 10 bridge sites in 2015.

A survey of along the entire length of the River Allow, was completed in 2011 to determine the distribution of nesting habitat for dipper. Particular attention was paid to road bridge crossings on the Rivers Allow, Dalua and Brogeen. Dippers will often nest in crevices or on ledges beneath or along the sides of bridges crossing rivers. Where nests were not found at bridge crossing points, an assessment was made to determine if a suitable nesting platform could be installed in the form of an artificial nest box or ledge suitable for dipper.

The distribution of natural dipper nests was mapped on GIS and potential locations for the installation of artificial nest platforms were identified and also mapped.

Available dipper nest box designs were researched. Two designs were selected for modification to meet local conditions in Duhallow (a wooden ledge and a circular corrugated pipe). Most bridges along the River Allow Catchment are relatively low so the wooden ledge design was customised to make it less vulnerable to vandalism. The other design was a corrugated pipe cut to specific lengths as described in (Annex C.9.4). Two nest boxes were (one of each design) installed under 10 bridges along the Rivers Allow, Dalua and Brogeen.

On the first year of installation (2012), there was a 40% uptake of bridge site. Birds showed a preference for the wooden shelf design over the circular pipe. The latter offered little protection against the wind and no uptake was noted. Due to the curvature of the underside of the majority of the bridges in the catchment, it was only possible to install the nest pipes parallel to the river flow, increasing exposure of the cavity to the prevailing wind blowing under the bridge.

In the second year (2013), the design of the pipe was modified on advice by the Duhallow Birdwatch Group by placing a wooden baffle in the centre of the pipe to offer protection against the prevailing winds. In 2013 birds showed a complete preference for the modified pipe design and no new nests were recorded on the wooden shelf.

In year three (2014) the nest platforms were cleared of all nests prior to the nesting season. This time nesting was noted under 7 bridges, i.e., 70% of sites occupied (pair of boxes per site). In 2015 nests were installed along another 10 bridges, bringing the number of bridges up to 20.

The nest box designs were featured on the Birdwatch Ireland eWings Magazine and have been subsequently placed in a number of other areas (e.g., MulkearLIFE, National Roads Authority projects (<http://mulkearlifec.com/next-mcv-outing-saturday-22-february-2014/>)).

#### 5.2.10. Action C10

*Action started:* June 2011

*Action completed:* June 2015

*Key deliverable:* The control and removal of Himalayan balsam from 5km of river channel bank. (Final Technical Report: Annex C.10.1)

*Summary of action:* The invasive species H balsam was subject to a sustained control programme targeting the River Allow and its tributaries, the Brogeen and Dalua Rivers. Removal work was carried out following a strategy which addressed the seed source and followed the life stages of the plant along the channel reaches. Removal was carried out manually without the use of chemicals and the project developed a best practice in the removal of H balsam in Ireland. H balsam was removed from approximately of 35km which was 7 times more than originally planned. This is probably the largest manual H balsam removal project undertaken in Europe to date.

Himalayan Balsam was identified as an issue along the River Allow during preliminary survey work in 2009. The River Allow catchment (Rivers Allow, Dalua, Brogeen, Glenlara and Owenkeale) forms part of the Blackwater River (Cork/Waterford) Special Area of Conservation (Natura 2000 site code: 002170).

On commencement of the LIFE project in 2011, detailed field survey found that 5km of river channel was infested with Himalayan Balsam. The source of the plant in the catchment was found to be an infestation at the James O’Keeffe Institute in Newmarket, apparently having been grown in Newmarket Demesne as an ornamental plant in the 1950s. Trial plots were established at this site to help characterise the growth rate, plant density and timing of flowering of the species in this part of Ireland. Prior to beginning the removal effort, a network of twenty-two permanent 1m<sup>2</sup> quadrats was set up between Kanturk and the Allow/Blackwater confluence, and the vegetation in the quadrats was assessed. This included the number of individual plants of Himalayan Balsam and the proportion of bare ground within each quadrat, and well as the proportion of cover of other plant species.

Removal of the plant was carried out by hand-pulling and placing the plant material into 50kg fertiliser bags. This material was then stored in a plastic-lined pit until it had rotted down and was no longer viable. Plants which had gone to seed were treated by enclosing the head of the plant in a plastic bag before cutting the stem below the bag.

Vegetation monitoring at the quadrat locations and walkover surveys were carried out annually from 2012 to 2015 inclusive. The most striking outcomes of the removal programme were the low regrowth of Himalayan Balsam, and the rapid recovery of native vegetation. Over the four years of monitoring only two plants of Himalayan Balsam were found in one quadrat in 2015. All quadrats showed significant vegetation recovery in the first year after removal, with those in high light conditions having complete cover of native grass and herb species. Shaded sites were slower to recover. The average proportion over all quadrats of grasses to broadleaved herbaceous species was higher in the first year, levelling off to approximately equal proportions in subsequent years. Colonisation by another invasive species, Japanese Knotweed, was noted at one of the monitoring quadrats.

Results from the Newmarket trial site suggest that Himalayan Balsam in open ground conditions is more productive both in terms of the height of plants and the number of flower heads per plant, when compared with plants growing in shaded conditions; and that the species is more productive in shaded dry conditions than shaded damp sites.

The findings from the vegetation monitoring aspect of the project demonstrate clearly the effect that monospecific stands of Himalayan Balsam have on native riparian vegetation, and also the robustness of that vegetation in recovering once the invasive plant is removed. Although an intensive removal effort over a full growing season is initially required to clear stands of the plant, the outcomes of this project show that this is a highly effective approach over the short to medium term (up to four years' post-removal) at a minimum. Factors to consider in targeting future control efforts in this and other similar catchments are the high productivity and earlier flowering of the invasive plant in open conditions, and the apparent slower recovery of shaded habitats. Identifying the seed source (i.e. furthest upstream colony) of the invasive plant is important for catchment-wide control over the longer term.

### **5.3. Public Awareness and Dissemination of Results**

#### *5.3.1. Action D1*

*Action started:* May 2011

*Action completed:* June 2015

*Key deliverable:* 10 public and community training sessions.

*Summary of action:* 49 workshops were organised to inform various stakeholders of the project and its objectives. Stakeholders ranged from riparian fishery owners and anglers, forestry interests, the general public to the board of IRD Duhallow.

The targets of this action were exceeded. Workshops were delivered to inform and engage stakeholders relevant to the project. Interactive sessions were organised with key interest groups ranging from forestry interests to farming practitioners. The rollout of workshops has been a key vehicle in the transfer of knowledge generated by the project to stakeholders most likely to bring these learnings forward (e.g., best practices, innovations, etc.: - Actions C1, C2, C3, C4, C4, C9, C10). Workshops were organised with landowners and separately with representatives of DAF to highlight and further develop the project innovations relevant to good farm practice and environmental protection (Actions C1 best practice in river bank restoration, C2: flood friendly fencing, C3: managed animal crossing and alternative livestock water drinking sources and C4: silt trapping in farm drains) that could be incorporated into a potential future Agri-environment Scheme.

The project developed an integrated catchment process in partnership with INTERREG IV TRAP project targeting the River Allow (Annex A.1.3).

Six catchment management meetings conducted between December 2014 and 2015, with a cumulative attendance of 177 persons, have been core to the local partnership. Attendees have included local community, social partners (farmers, businesses), public sector, Local Authority and the Allow groundwork team. These sectors can be sub-divided further into thirteen stakeholder groups including practitioners, advisory/policy, planning/regulation and environmental NGOs (Igoe *et al.*, 2015). Some stakeholders may have an interest in more than one sector. The average distance travelled per person was 103 km (round trip), with the total distance travelled for all six meetings 17,400 km (Figure 24). The total number of people at all six meetings was 177, with total person hours 531 (based on 3-hour meeting length). Ballinger *et al* (2016) states that "The local partnership approach in the River Allow Catchment Management Group (RACMG) is a functional and iterative process, which is constantly evolving. The approach centres on catchment works principally funded through the EU LIFE Financial Instrument and stakeholder management group meetings. RACMG meetings have provided a forum for pooling of stakeholder interests, skills, resources and actions, enabling increased social, economic and political awareness, and thus ensuring the generation of maximum added value. The added value lies in its potentially long-term outcomes, resilience, and lower costs of implementation of catchment works."

In recognition of the advances made by the DuhallowLIFE project and the River Allow Catchment Management Initiative, the EPA now use the project including the demonstration farms, as the field based element of their ICM training course aimed at Industry and Public Authorities. Attendees are practitioners in the field of water management or industries that regulate or impact on water management in the context of the WFD. The objective of the course is to promote and embed ICM within the day to day operations and planning of water policy makers, practitioners and industry. In excess of 30 people attended these courses.

### 5.3.2. Action D2

*Action started:* April 2012

*Action completed:* June 2015

*Key deliverable:* Delivery of classroom workshops, talks and field based trips

*Summary of action:* All primary (n=36) and post primary schools (n=5) were visited by the project team and separately by Inland fisheries Ireland staff. Development of software for species recording mapping with school children (see also Action D5).

The project visited all schools between 2012 and 2014. This action has been completed in 2014 together with 4 additional schools adjacent to the core project area. Interest from the schools has been extremely high however and on request from school principals follow up visits were undertaken to 19 schools 2015. A satisfaction questionnaire was circulated to the school principals to ascertain how well the programme was received.

An illustration of the effectiveness of the programme can be gauged by the fact that students from one National School four years after their school (Lismire) was visited went on and entered the National BT Young Scientist competition citing the visit by the project team as the inspiration behind their interest in the Freshwater Pearl Mussel and the subsequent project entry. This project was featured on the front cover of the EPA Catchments Newsletter 2016 (Annex D.2.3). The following is an extract of an article written by these students for the same publication *"my project partner Riona Sheahan and I entered and displayed a project at the 52nd annual BT Young Scientist and Technology Exhibition, 2016, held in the RDS in Dublin. Our project, entitled the "Plight of the Pearls", investigated the factors that affect the distribution of the freshwater pearl mussel along the River Allow, a tributary of the River Blackwater in North County Cork. Of the factors that we investigated where mussels were present, we found that substrate size and siltation were the two factors that affected their distribution; depth of the water, distance of the mussels from the river bank, macro-habitat type, pH and temperature values and light intensity were all found not to have a significant impact. Total absence in certain locations were associated with pollution discharges. Our project won the 3rd prize in the Biological and Ecological Sciences, Intermediate (Group), category, a major achievement for us and something we hope will contribute in a meaningful way to the saving of the pearl mussel. We first came across the freshwater pearl mussel in primary school. Dr Fran Igoe came to our school to talk about our river and this was our first exposure to the species. Opting to work with Fran and the LIFE+ team for our project was an easy decision as not only was the mussel something of relevance to us as local people, a fact highlighted to us by the LIFE+ Project's visit. We are extremely grateful to Fran Igoe, John Ballinger and Nuala Riordan for their assistance and advice during our project and our science teacher Mr Derry O'Donovan."*

### 5.3.3. Action D3

*Action started:* May 2011

*Action completed:* June 2015

*Key deliverable:* 32 educational lectures

*Summary of action:* 32 educational lectures were given on topical issues relevant to the project, its delivery and the Natura 2000 site network.

Educational lectures were held throughout the project duration. These lectures were delivered to target specific audiences including the general public, landowners and angling interests, policy makers and national conferences. The format of the lectures varied depending on the target audience. On specific focus topics, invited speakers, expert in their area spoke on topics relevant to the LIFE project and the Natura 2000 site. In addition, local speakers and the project team also gave talks and arranged practical workshops to encourage greater engagement in the environment. These focus topics ranged from presentations on Otters, lamprey, birds of prey, small mammals, invasive species to environmental management techniques.

### 5.3.4. Action D4

*Action started:* March 2011

*Action completed:* June 2015

*Key deliverable:* Establishment and management of website including delivery of 24 web articles highlighting the project (<http://duhallowlife.com/>)

*Summary of action:* A website was established at the onset of the project to provide an online presence show casing the project and its actions. Project updates were provided with regular features on the project actions. A Facebook social media page was also established and regularly kept up to date.

The project website was established at the beginning of the project in 2011. The site gives an overview of the project, project actions, the project team, details of the Natura 2000 site, the EU LIFE financial instrument and news and social media updates. 90 web articles were posted on the site. Embedded in the site is the species recording maps hosting the survey results by school children which is described in more detail under Action D5. In addition, regular updates were made on the Facebook page which continued to reach a wide audience. One post attracted over 7000 hits. The site has now been rolled over into the new RaptorLIFE project to provide an ongoing presence during the afterlife phase of the project.

### 5.3.5. Action D5

*Action started:* April 2012

*Action completed:* June 2015

*Key deliverable:* Involve all primary (n=36) and post primary schools (n=5) in the survey and recording of wildlife in their neighbourhood and post on online map using a bespoke software application developed by this action (Final Report: Annex: D.5.1).

*Summary of action:* Development of a “species recording project” for school kids “nature detectives”. This involved the development of a nature recording booklet, a dedicated online mapping system to upload the recorded data and training for school children plus the input of the data online.

All schools within Duhallow were visited by the project team by the end of 2013 and the nature detective species recording programme delivered to the school children by the project

team with the assistance of a GIS specialist and work experience students. A bespoke online mapping system was developed by IT company Compass Informatics through close liaison with the project (<http://maps.duhallowlife.com/>). A wildlife recording booklet programme was also developed so that the children could record the species in their neighbourhood to be transferred to the online mapping database (Annex D.5.3). Students were encouraged to record the wildlife in their back gardens, farms and local community with the assistance of their parents or responsible adults. This had the dual function of not only ensuring the children's safety but also involved adults in the programme increasing its reach. Once the data was collected the recording sheets were returned to the project team for processing by secondary school level transition-year students. In addition, work placement students and volunteers from the University of Limerick worked with the LIFE project to enter and interrogate all of the outstanding data. This was summarised in a report (Annex D.5.1). These data will be analysed further to determine if wildlife patterns can be extracted from the data that might bring extra value from a conservation perspective.

Feedback from the primary school principals was very positive: “*Enjoyable, valuable survey for the children towards wildlife*”, “*Thanks to IRD Duhallow for promoting care for wildlife & environment, we are grateful.*”

It is planned during the afterLIFE phase of the project to have an open day with the schools in collaboration with the National Biodiversity Data Centre and present the work carried out by the children to the children. The final validated set of data was entered by work experience students and volunteers.

#### 5.3.6. Action D6

*Action started:* July 2011

*Action completed:* June 2015

*Key deliverable:* Delivery of a range of media outputs highlighting the project

*Summary of action:* This action involved the presentation of the project and its actions through various media formats including; national and local press, national and local radio, TV, DVD, magazines and e-magazines.

To ensure that the project reached a large cohort of people, both locally and nationally, the project was showcased through a range of media. At the national level interviews were given for TV, Radio, Newspapers and magazines. At the local province and county level interviews were given to the local radio station, local newspapers, parish newsletters. Press releases were also issued to both the national and local press. Table 1 gives an overview of the articles published and the reach of the media.

The project was featured on a special edition of ‘Ear to the Ground’ which has a wide readership and also within IRD Duhallow's annual progress report. A high profile article was printed in the Irish Times. Articles and features were published in the Local Newspaper (The Corkman) on a range of project actions. The project and associated environmental work carried out by IRD Duhallow was featured on a 2hr long Local Radio programme together with other broadcasts on local radio.

Press articles

Articles were produced this year in a number of newspapers both locally and nationally (Annex D.6.1 to Annex D.6.50);

#### **National Newspaper**

A dedicated article on the project was published in the Irish Times in their Saturday Environment feature page. The article, written by well-known environmental journalist and

author Paddy Woodward, highlighted how the project was working with stakeholders on the ground. The article pointed out how the LIFE project working with these stakeholders including farmers have worked to improve the environment by restoring river banks and carried out conservation works in partnership with the local community. The article was well received and recycled a number of times through the online environmental NGO community. *Indeed, the project co-ordinator was very pleased to accidentally discover (when invited in for a cup of tea) that a framed copy of this article now hangs in the kitchen of the landowner (Tony Ahern) on whose farm the featured work took place.*

### **Local Newspaper**

The project was featured in quite a few articles of the largest local Newspaper, The Corkman. Articles ranged from work to increase sunlight to benefit juvenile Atlantic salmon, invasive species work including a drive for more volunteers to assist the project, and results of a competition inviting the public to "Guess the age of Freshwater Pearl Mussel". A spinoff project inspired restoration work on an important Atlantic spawning tributary in the River Allow catchment and this work was directed by the LIFE project. This work received an award in Vienna. This and the restoration work were featured in a newspaper article also.

### **Magazine**

The LIFE project was featured twice in the national TV magazine (Ear to the Ground Annual Magazine) in Summer 2014 (two-page article) (Annex D.6.17) and Winter 2011 (Annex D.6.46). The project was also highlighted on an annual basis: one and two page spreads for the project was also given to the project in the IRD Duhallow Progress report, featuring aspects of the project.

### **Local Radio**

The Project Co-ordinator and Scientist gave interviews on the Frank Lewis: Saturday Supplement Show, highlighting the work being carried out by the project in relation to the environment. The Project Co-ordinator was in the studio on air for 2hrs. This programme has a wide listenership even outside of Co Kerry. LIFE project participants including the Rural Social Scheme staff, a local farmer, anglers, a university work experience student, volunteers and IRD Duhallow staff were also interviewed on this interactive programme.

A subsequent programme was aired covering the upper reaches of the River Blackwater taking in the local history, environment and culture of the area. The Project Co-ordinator and IRD Duhallow CEO (Maura Walsh) gave interviews highlighting on the project and the long term environmental aims of IRD Duhallow to help with the conservation of the Natura 2000 sites in the area.

The Project Scientist was also interviewed by Patricia Messenger of C103fm (Count Cork local radio station) over a Corkman article about the project's provision of pasture (nose) pumps.

### **Television**

Filming of the project was undertaken by TG4, the National Irish language television station and featured on *An Nuacht*. The programme featured on the use of used Christmas trees and the river bank restoration work delivered under Action C1 (*An Nuacht* recording - <https://www.youtube.com/watch?v=UM-ywQkSGQ0>). RTE's programme, 'Echo Eye', broadcasted a feature length television programme on Integrated Catchment Management and the River Blackwater featuring the DuhallowLIFE project (Actions C1, C2, C3 and C10). The project was also featured in the RTE (National TV) Ear to the ground magazine.

The educational DVD was produced to further disseminate the works of the project to a wider audience. It was greatly received at conferences and workshops. Each school that was visited

was also given a copy. The project also uploaded the DVD onto Youtube.com (<https://www.youtube.com/watch?v=aFvZab1yN6U>). This was to reach an international audience to exhibit the benefits of the LIFE Programme and IRD Duhallow combining to enhance and protect environment at a community.

### **E-zines**

Two articles were published in the Wings e-zine (Magazine of Birdwatch Ireland). The articles featured Action C8 and Action C9 respectively (Annex D.6.22 & Annex D.6.37). These articles were well received on foot of the article outlining the nest boxes developed for Dippers by the project, the project received queries on the best design of bird boxes for National Road Authority and Local Authority bridge sites. The project was also featured in three separate articles in the 2016 spring edition of the EPA Catchments Quarterly Magazine. The project team submitted an article giving an overview of the project. Additional articles were published highlighting the scientific work carried out by local school Transition Year Students, which won an award at the 2016 national young BT Scientists awards. These students worked with the project team in the delivery of their submission "Plight of the Pearls" which was used by the EPA as the feature front cover for their Spring edition. An article was also published which highlighted the competition win by two visiting students on work experience from Wexford, who submitted photographs highlighting the protection of water courses work of the project (Action A2 and Action A3) which they experienced. The title of their submissions were "Granting dreams to blocking streams, using Christmas trees as silt traps" and "Water conservation, no erosion on banks, prevents river pollution, nature says thanks". All of the above e-zines are also available in a hard copy publication.

#### *5.3.7. Action D7*

*Action started:* April 2011

*Action completed:* June 2015

*Key deliverable:* Erection of five information signs, publication and printing of four information brochures and the circulation of 16 newsletters (quarterly).

*Summary of action:* Five information signs were erected at selected sites in the River Allow Catchment. One information brochure was launched at the Project launch conference with the others (Annex species information, Invasive species, and Sustainable farming) printed throughout the duration of the project. Ten thousand households in Duhallow received 15 quarterly newsletters on the progress of the project.

### **Newsletter** (*Annex D.7.1 to Annex D.7.15*)

Regular updates were provided in the IRD Newsletter and these were also produced in colour PDF format for download from the project website. Since December 2011 edition, the LIFE project has featured in the IRD Duhallow Newsletter on a seasonal basis. The feature has its own page on the newsletter with the appropriate logos and this is circulated to 10,000 homes around Duhallow. The newsletter covers the main activities of the project that is of public interest. In 2012 the project was advised to produce a dedicated page on the Newsletter on a quarterly basis. This has been done. In addition, the project team produced a full colour version of the newsletter, including photographs and publish on the website and make it available at presentations and meetings.

### **Signage** (*Annex D.7.23 to Annex D.7. 27*)

All information signage is in place. These signs were developed through wide consultation with stakeholder groups (Tidy towns, community council, anglers and landowners and school children and following "Plain English Guidelines" to ensure that the information is accessible to everyone regardless of reading ability). The Duhallow Environment Working Group and

the Duhallow Birdwatch Group provided technical support regarding the featured wildlife species and checked the accuracy of information. Signs were designed to highlight specific species for respective areas, highlight the SAC (and explain what is a Natura 2000 site and what this European network of sites mean), project and the actions (highlighting actions relevant to the area where the sign was placed). Within the main public recreational park area, a larger information sign was developed, including the life cycle of the Freshwater Pearl Mussel and local wildlife information compiled by the LIFE team from their surveys of the park, to draw people towards the information sign. All signs are web enabled for smart phones. By swiping the "Quick Response Code" on the information sign, the webpage on the users' smartphone web browser is directed to the LIFE project website.

### **Brochures** (Annex D.7.29 to Annex D.7.34)

Three brochures were produced on 1. Annex species of the EU Directives, 2. Removal of H balsam based on technique developed by the project and 3. Techniques to reduce the impact of agriculture.

In late 2013 the project produced a colourful calendar (see Action A2), which was very popular and was used by the project to disseminate information about the project both locally and at national/international symposia.

Feedback on the signage has been very positive from the community, especially concerning the large information sign placed in Greenane Park in Kanturk. At the National Ploughing Championships 2014, the co-ordinator of Coastwatch Ireland (an NGO working to improve Ireland's coastline) Karin Dubsky said that our information sheet on Himalayan balsam was the most practical brochure on invasive species eradication that she had come across. She was also very complimentary of the other information sheets.

#### *5.3.8. Action D8*

*Action started:* May 2015

*Action completed:* May 2015

*Key deliverable:* Host end of Project Conference

*Summary of action:* The end of project conference was used as a media to disseminate the project results. It also gave closure to the project for the project team, stakeholders involved, and also the EU LIFE team (Annex D.8.1 to Annex D.8.3).

The Project hosted its 'End of Project Conference' on the 21<sup>st</sup> and 22<sup>nd</sup> of May 2015. The conference included guest speakers from national and international EU LIFE projects along with testimonies from local stakeholders on the successes and interactions of the project. 120 guests and speakers attended the event over the two days.

## **5.4. Overall Project Operation and Monitoring**

### *5.4.1. Action E1*

*Action started:* March 2011

*Action completed:* June 2015

*Key deliverable:* Convening of Project Advisory Group

*Summary of action:* A Project Advisory (Steering Group) Group was convened at the start of the project to oversee the direction of the project, appoint and liaise with the project team, advise on aspects of the project.

The project coordinator continued to give the steering group updates and also gave updates to the Duhallow Environment Forum on a monthly basis. This group contained a range of

expertise from various backgrounds and provided the necessary assistance to the project. The project team also liaised with the IRD Duhallow Birdwatching Group for technical advice. The project also gave updates to the Blackwater Salmon Development Group (Blackwater River Trust). This group is important for the development of the Blackwater River and was an important vehicle for supporting and promoting the project outside of the Duhallow area.

#### 5.4.2. Action E2

*Action started:* September 2010

*Action completed:* June 2015

*Key deliverable:* Employment of Project team

*Summary of action:* The full Project team was employed by March 2011. Changes in personnel have occurred throughout the project.

Initial recruitment took place throughout October and November 2010, with the Project Manager, Eileen Linehan, and Project Coordinator, Pat Fitzpatrick starting on the 28<sup>th</sup> November 2010 and Project starting on the 1<sup>st</sup> December 2010. The Project Scientist, Dr Fran Igoe, began work on the 2<sup>nd</sup> March 2011.

In March 2012, the project co-ordinator, Patrick Fitzpatrick left his post. He was replaced by project scientist, Dr Fran Igoe. In July 2012, Kieran Murphy was taken on in the role of project development officer.

Project Financial Administration was conducted by Teresa Collins from inception in 2010 to December 2013. She was replaced by Caroline O'Carroll. Nuala Riordan was brought on as clerical officer in December 2014.

#### 5.4.3. Action E3

*Action started:* September 2011

*Action completed:* September 2014

*Key deliverable:* Electrofishing monitoring surveys were conducted on the Allow, Dalua and Brogeen Rivers (Final Technical Report: Annex E.3.1). Freshwater pearl mussel snorkel surveys were also carried out on the River Allow (Final Technical Report: Annex E.3.2).

*Summary of action:* Electrofishing surveys were conducted in 2011, 2012 and 2014, with project partners Inland Fisheries Ireland. Freshwater pearl mussel snorkel surveys were conducted, under licence, in 2013 and 2014.

#### **Electrofishing- Atlantic salmon/salmonids**

A baseline survey was completed in 2011 electrofishing by Inland Fisheries Ireland on the week of September 26<sup>th</sup> - 30<sup>th</sup> 2011, under the direction of Dr. Karen Delanty. Routine fish statistics were collected. This survey provided baseline data not only to Atlantic salmon and other species such as brown trout, but also highlighted a significant population of juvenile lamprey.

The electrofishing survey was repeated in 2012, focusing on key sites identified on foot of the baseline survey and modified works plan on foot of feedback from NPWS.

In 2014, the electrofishing monitoring programme was redesigned to take into account the lack of progress in bank revetment work on the River Allow. Sites monitored included bank revetment work on the River Dalua and also tree pruning work on the Brogeen River.

Following the Project's technical support and advice on IRD Duhallow's LEADER funded restoration of the Rampart Stream, monitoring surveys were conducted by Inland Fisheries Ireland in 2013, 2014 and 2015 (Annex E.3.3) to showcase how instream works can improve habitat and fish stock numbers.

### **Freshwater Pearl Mussel**

Snorkel surveys began in August 2013, after licencing delays. The monitoring continued in 2014. A total of 28.5km (approx.) of river bed was surveyed with over 17,600 freshwater pearl mussels observed.

#### *5.4.4. Action E4*

*Action started:* April 2011

*Action completed:* June 2015

*Key deliverable:* Surveys were carried out on otters, kingfishers and dippers to determine their response to actions being undertaken in this project

*Summary of action:* Monitoring surveys for Otters, Kingfishers and Dippers were conducted throughout the duration of the project. Each survey was conducted to suit each species. Incidental observations were also included (Final Technical Report: Annex E.4.1).

Surveys of otter distribution and also of the occupation success of kingfisher and dipper boxes was conducted annually. The project team collected survey data on these species to provide a more accurate description of the distribution and the status of the target species and biodiversity within the SAC area. Birdwatch Ireland carried out an evaluation of the Kingfisher nest box work (Annex C.8.1).

#### *5.4.5. Action E5*

*Action started:* October 2010

*Action completed:* June 2015

*Key deliverable:* Liaise with other EU LIFE Projects

*Summary of action:* The project has liaised with a number of EU LIFE projects as well as many other nature and biodiversity projects

Liaison with other LIFE projects was a continual occurrence throughout the duration of the project. Regular liaison was maintained with our sister project (MulkearLIFE project: LIFE07 NAT/IRL/000342). A presentation was made by IRD DuhallowLIFE at the end of LIFE project for MulkearLIFE in September 2014. MulkearLIFE in turn presentation of our own end of project conference in May 2015.

**ISAC LIFE Project** (October 30<sup>th</sup> & 31<sup>st</sup> 2013): The LIFE team attended the end conference of another LIFE project in Wales. The ISAC (Irfon Special Area of Conservation) LIFE Project, run by the Wye and Usk Foundation, has dealt with many of the same issues our own project works on, including fencing, erosion and a declining Freshwater Pearl Mussel population.

**3Water LIFE** (December 10<sup>th</sup> 2013) IRD Duhallow LIFE had the privilege of presenting at the end of project conference organised by the LIFE+ 3Water project. We were specifically invited to outline our experiences giving an example of another project operating in a different EU Member state also dealing directly with landowners. The 3Water LIFE project is based in Midden Limburg, Belgium and is a partnership between the European Landowners Organisation, municipal authorities, statutory conservation and forestry agencies, private landowners and NGOs. It is the first major LIFE project integrating private landowners directly into conservation, taking a lead role in driving the project. This innovative project which aims to protect aquatic habitats to benefit the Tree frog and the Bittern, works on three basic principles or the three E's: Education, Economics and Ecology. Using these guiding principles the project has demonstrated what can be done through real partnerships between private landowners and conservationists.

**Pearl Mussels in Peril (PIP) LIFE Project** (September 9<sup>th</sup> 2014): The project also hosted a workshop and field trip for the UK Pearls in Peril LIFE project. This was a very productive meeting where common issues discussed. The project innovations developed by the DuhallowLIFE project were of particular interest to our visitors, as some of these may have practical applications for Freshwater Pearl Mussel conservation in the UK. Similar difficulties regarding permissions to carry out practical on the ground work are also being encountered by some of the partners in the UK.

**LIFE Information Day (UK/Ireland)** (March 26<sup>th</sup> 2014): The DuhallowLIFE project presented at the UK/ROI Information Day held in London, to show case the project and the model developed by IRD Duhallow. This stimulated a considerable amount of interest afterwards, with a number of UK LIFE project potential applicants networking, to learn more about the project structure, invasive species management and stakeholder interaction, including the schools programme. A trip was also planned to visit the LIFE AQUAVIVA Project from Slovenia (which finished in August and is currently in the final write up stage), to discuss how planning for the afterLIFE. It is also intended to visit some of the Wetman LIFE sites (LIFE09 NAT/SI/000374) and examine how this project is working towards protecting important wetland sites.

**Practical Implementation of Freshwater Pearl Mussel Measures - End of Project Conference** (June 19<sup>th</sup> 2014). This project was an INTERREG IVc project focussing on the development of practical implementation of Freshwater Pearl Mussel Measures. Previously IRD Duhallow LIFE presented at an interim conference run by this INTERREG project. The project scientist attended the project with the hope of adopting measures for River Allow and/or improving on measures developed by IRD DuhallowLIFE. However, it became evident that the project innovations (silt traps, flood friendly fencing, river bank restoration, multi layered public/stakeholder engagement) developed by IRD DuhallowLIFE are indeed novel and the project has now engaged with the EPA and the TRAP INTERREG IVc project to develop these further with a view to incorporating them into an Agri-environment scheme.

**LIFE AQUAVIVA** (1<sup>st</sup> of May 2013) the **Slovenian** project team visited Duhallow and the River Allow. LUTRA are very experienced in working with the LIFE programme and are currently focusing on otters. Therefore, we were in an excellent position to show them our work to date which benefits otters, this included checking out some of our artificial otter holts, riparian works and our public awareness work

#### 5.4.6. Action E6

*Action started:* December 2011

*Action completed:* June 2015

*Key deliverable:* External audit of accounts

*Summary of action:* All IRD Duhallow programmes are audited at the end of each year, the LIFE Project was included in this audit system.

A separate evaluation was conducted at the end of the project.

#### 5.4.7. Action E7

*Action started:* June 2015

*Action completed:* August 2015

*Key deliverable:* The project was evaluated by an external assessor (Project Evaluation: Annex E.7.1)

*Summary of action:* An external assessor was contracted to evaluate the project. Members of staff and key stakeholders (e.g. landowners, Environmental Working Group, Duhallow Birdwatch Group) were interviewed on the progress and execution of project targets and management.

#### 5.4.8. Action E8

*Action started:* June 2011

*Action completed:* June 2015

*Key deliverable:* Production of AfterLIFE Plan

*Summary of action:* AfterLIFE Plan was produced (AfterLIFE Plan: Annex E.8.1)

An After-LIFE Conservation Plan was produced by the project. It provides a road map for the management of the site, post project completion, outlining the ongoing maintenance required and timeline involved. The key stakeholders have been identified and a framework structure put in place to facilitate the development of an integrated catchment management approach to the management of the River Allow. The has become the template nationally and identified as a successful model under the Water Framework Directive in Ireland.

## 6. EVALUATION AND CONCLUSIONS

### 6.1. Project Implementation Process

The management system deployed by the project was based on the successful implementation of other EU and national funded projects (e.g. LEADER, Community Enterprise, etc.) which IRD Duhallow had managed since the company began operations in 1989. IFI, as project partners, were invaluable through their cooperation in monitoring and public awareness raising, especially in school fieldtrips. RSS participants were regularly updated on the progress of their work and on the progress of the project as a whole. Regular update meetings were held with the Environmental Working Group, who offered advice and guidance throughout the project.

### 6.2. Project Management

The management system deployed by the project was based on the successful implementation of other EU and national funded projects (e.g. LEADER, Community Enterprise, etc.) which IRD Duhallow had managed over the past 20 years. Day-to-day management was undertaken by Ms Eileen Linehan and Dr Fran Igoe, in their roles as Team Leader and Project Coordinator respectively. Dr Igoe was assisted by a full-time Project Officer, Mr Kieran Murphy. The project was also supported directly by other IRD Duhallow staff, based out of the James O' Keeffe Institute. The staff members, which included the CEO and other administrative and support staff located within the James O' Keeffe Institute in Newmarket, supported the implementation of project actions. These staff members provided support for financial administration and recording of all financial payments to ensure that the coordinating and associated beneficiaries adhered to the requirement of the LIFE+ regulations. The Team Leader dealt with all other finance and administrative issues and all invoices, tenders and financial reporting. This work was carried out with the support of the Financial Administrative Officer assigned to DuhallowLIFE on a part-time basis.

#### 6.2.1. Problems encountered

The project aimed to restore the populations of Freshwater Pearl Mussel, Atlantic Salmon and Otter, Kingfisher and a sub-species of Irish Dipper endemic to Ireland, in the Upper Blackwater catchment SAC. However, the poor relationship between the project and the

competent authority, NPWS, did not allow for the full implementation of a more comprehensive programme of work which would have more fully realised the stated aim, most especially with regards to the freshwater peal mussel. NPWS, as the competent authority, was reluctant to engage on a partnership level in a similar manner to all other stakeholders. It decided instead to take the regulatory route which resulted in very significant delays to the project in the granting of licensing for its freshwater peal mussel work and similar delays related appropriate assessment required for riverbank restoration.

The granting of a project modification to extend the lifetime of the project to June 2015, helped the project to address various project setbacks, including the aforementioned licensing difficulties, and prolonged flooding in 2012. These, and other setbacks, impacted negatively on project delivery and especially survey work.

### *6.2.2. Partnerships and their Added Value*

DuhallowLIFE created very successful partnership between IRD Duhallow and IFI. The expertise of IFI staff along with the RSS staff provided by IRD Duhallow ensured fish stock surveys were conducted safely and efficiently. Also, the school field trips led by IFI perfectly complemented the school visits conducted by the project team. As IFI were project partners some essential licences (survey) and permissions (instream works during spawning season) were obtained far quicker than from other regulatory authorities.

Although Pobal were not officially added as an associated beneficiary until late in the project, they were essential to the project as they provided the payroll for RSS participants. The RSS crews were the backbone of the implementation and successes of the project's concrete conservation works.

Local stakeholders, especially Kanturk and District Trout Anglers and volunteers, have played an integral part in the project. Himalayan balsam eradication, while mostly attended to by RSS workers, can also be accredited to the local anglers and the many volunteers that have offered their services throughout the duration of the project

IRD Duhallow will continue to host the RACMG meetings. These meetings have already reaped some beneficial outcomes (e.g. DWTP discharge into the Allow remediated swiftly upon discovery). Also, through the RACMG, IRD Duhallow was able to put forth the idea of establishing a position or official, at a regional basis, whereby community engagement in water conservation and protection was at the forefront. As it happens, the European Union (Water Policy) Regulations 2014 gave effect to a new Local Authorities Water & Communities Office (LAWCO) to facilitate a coordinated regional approach.

Through the RACMG meetings conservation efforts for the Allow Catchment will continue to be discussed with the appropriate stakeholders lending their expertise and possible funding strategies to further improving the Allow catchment's habitat. IRD Duhallow will also continue to provide on-the-ground staff (RSS) to perform maintenance work to many of the actions the LIFE Project conducted.

### **6.3. Success and Failures**

What can be considered the greatest success was the high stakeholder engagement at every aspect of the project. The wider community outreach work undertaken by project, coupled with extensive stakeholder and school engagements are an extremely positive step in the long-term protection of the Allow catchment. The positive engagement with landowners in particular is of significance in terms of gaining the trust and confidence of the local farming

community which is fundamental to the success of any initiative involving decisions over people's private lands and livelihoods.

In terms of sheer scope, the eradication and management of Himalayan balsam was another huge success. The accomplishment of the work to control Himalayan balsam and effectively remove it from a catchment has important implications for local authorities, land owners and community. It emphasises the value of a coordinated approach to deal with this invasive species. The lessons learnt by the project can even be incorporated into training programmes, management planning and control/treatment guidance to all relevant bodies, groups and individuals.

The River Allow Catchment Management Group worked to build a durable and lasting partnership between local government, state agencies and local communities. The parties, with the exception of the NPWS at a national level, worked extremely closely together. Through these active catchment management partnerships structures have been set in place that will remain a lasting legacy in the AfterLIFE phase of project.

The project's biggest failing was in establishing and securing a lasting partnership with the NPWS. While flood events prevented the timely execution of some of the concrete conservation, licencing and planning issues prevented any meaningful bank restoration (i.e. riverbank re-profiling) occurring on the River Allow, which is the only FPM river in the Allow catchment. Also, delays in snorkelling licences meant that the FPM survey of the Allow could not be completed within the timeline of the project.

#### **6.4. Comparison Against the Project Objectives**

The main objective of the project was to reduce and halt excessive siltation of FPM and Atlantic salmon habitat in the channels of the River Allow catchment. While the project possessed the expertise and experience to realise the objective set out, bureaucracy and licencing issues changed the scope of the project output.

The vast majority of the project actions met, and even exceeded, their targets. All three plans/guides outlined in the Preparatory Actions invited the input and critique from targeted stakeholders. These were returned to the project in a timely manner so as to implement advised changes and improvements to each document.

The majority of the concrete action targets were met. The instalments of otter holts and log piles, and kingfisher and dipper nest boxes were conducted early in the project. Fencing, the provision of cattle drinks, planting and coppicing were all weather dependent and the extension approved by the Commission was invaluable in achieving these targets. Himalayan balsam eradication and management initially involved only 5km of river channel. Further survey work found the Himalayan balsam infestation covered over 30km of riverbank. This was a case where exceeding the original objective was a requirement rather than an added bonus. The project had great success with the installation of silt traps in agricultural drains. However, the implementation of wetlands and retention ponds in upland forestry sites was met with setbacks as the forestry landowners, Coillte, changed regional senior personnel midway through discussions. While the original regional manager was agreeable to many of the project's proposals, new management were less enthusiastic. Ultimately, a single forestry drain was treated by the project as an experimental procedure that may lead to a best practice method (Annex C.4.1). With regards to the reduction of riverbank erosion, the targeted extent of the works was exceeded but the methodology applied differed from what was originally intended (Annex C.1.1).

**Table 6 Deliverables, milestones and reports scheduled in initial Blackwater SAMOK project proposal**

Name of the Deliverable	Action Code	Date Due	Actual Date Completed
Public Awareness Campaign Initiation	D1	31/10/2010	11/04/2011
Website	D4	31/03/2011	28/02/2011
Inception Report	All	30/04/2011	30/04/2011
Progress Report No. 1	All	31/08/2011	31/12/2011
Reduction of bank erosion	C1	30/11/2011	31/03/2015*
Alternative Cattle Drink Sources	C3	31/08/2012	22/06/2015*
Progress Reports No. 2	All	31/08/2012	31/12/2011
20 Primary visits and 2 Secondary school visits	D2	31/10/2012	30/04/2013
4 Community Workshops	D1	31/10/2012	19/10/2011
Mid- Term Report	All	31/01/2013	30/11/2012
Balancing of riparian vegetation	C5-C6	31/03/2013	22/06/2015*
Progress Report 3	All	31/08/2013	31/08/2013
Wetlands and silt traps	C4	30/11/2013	22/06/2015*
Otter holts and brush bundles	C7	31/01/2014	04/03/2015
Educational Awareness Campaign Completion	D2	31/01/2014	14/06/2013
Kingfisher nest boxes	C8	31/03/2014	25/02/2013
Dipper nest boxes	C9	30/04/2014	28/02/2012
Management plan for Upper Blackwater SAC	A1	31/08/2014	23/06/2015*
Guide to cattle management in SAC	A2	31/08/2014	23/06/2015*
Upper Blackwater Tributaries Habitat Development Plan	A3	31/08/2014	23/06/2015*
Project Evaluation	E7	31/08/2014	12/06/2015*
After Life Plan	E8	31/10/2014	23/06/2015*
Himalayan Balsam removal	C10	31/03/2014	31/03/2015*
End of project conference	D8	31/08/2014	20/05/2015*
Progress Report No. 4	All	Not Scheduled*	31/10/2014
Final Report	All	23/09/2015	31/05/2016

\*Project Extension

### 6.5. Environmental Benefits, Policy and Legislation Implications

All of the work carried out by the project has had a direct positive impact on the conservation objectives of the Allow Catchment. The wider benefits are the skills, procedures and networks collected from this project which will stimulate additional work within the wider Blackwater Catchment and other catchments in Ireland.

The project aimed to influence wider policy through the partnership with INTERREG IV TRAP. Project innovation, flood friendly fencing, was complimented by Agricultural Interest Groups, and it is hoped that this will facilitate the wider use of fencing in flood prone areas to manage livestock more effectively around watercourses. The project worked to develop a more tailored Agri-environment scheme for the River Allow catchment and officials from key

government agencies were seen to be taking a keen interest in developments. Direct positive impact on discharge from a Drinking Water Treatment Plan was achieved through robust involvement of the project team in identifying and progressing the issue with the relevant statutory agency.

A significant restoration project was completed on the River Dalua co-ordinated by the local angling club with the assistance of funding from Inland Fisheries Ireland and IRD Duhallow's LEADER Programme. A similar smaller scale project was realised on a tributary of the Dalua (Rampart stream) which is a habitat for Atlantic salmon. A successful LIFE project bid (RaptorLIFE) to address many of the issues raised in Action A3 in the upper Blackwater catchment has also been successful.

IRD Duhallow believes that the future of conservation and agriculture in Duhallow (including the Natura 2000 sites) is heavily dependent on how Ireland implements future Agri-environment schemes. It is important that schemes actually deliver on what they claim to set out to do and to do this they must be focused, well researched and practical to implement. The DuhallowLIFE project provided the ideal testing ground for some potential measures in the region and IRD Duhallow has made a submission to the Department of Agriculture outlining what some of these measures could include.

## **6.6. Innovation and Demonstration Value**

Awareness raising and educational work carried out by the project have highlighted the importance of habitat protection and enhancement in the Upper River Blackwater Catchment. The project has been particularly strong in this area as a wide variety of media is being used. Awareness of the Natura 2000 site is now strong within the target group. Significant awareness was achieved throughout the local community at a range of levels from schools to information workshops and educational lectures. The project received national attention through symposia and conferences. Along with innovative 'flood friendly' fencing and silt trapping treatment trains, three demonstration farms (one dairy and two beef) were also established for visiting projects. These will remain in place throughout the AfterLIFE process.

## **6.7. Long-term Indicators of Project Success: (Sustainability and Continuity of the Project)**

With the launch of the RACMG many of the AfterLIFE objectives will be met. Indeed, the success of IRD Duhallow and the RACMG's implementation and adoption of the AfterLIFE conservation plans will dictate the sustainability of conservation works beyond the five-year term of the plan. The details of this are described in the AfterLIFE Plan (Annex E.8.1).

## **6.8. Socio-economic Effects**

The approach of the project and of IRD Duhallow, as a community development company, was to work in partnership with all relevant stakeholders. This included the two associated beneficiaries (IFI and Pobal), other key partners and supporters, including the EPA, local landowners and farmers, anglers and community groups. The partnerships established throughout the project aimed to develop and deliver a practical approach to habitat restoration and riparian management for the Allow catchment for the targeted species and their related habitats. Before the awarding of LIFE+ funding an existing environment sub-committee was in place and worked effectively within the overall organisational structure. The newly established catchment management group (RACMG) worked to build a durable and lasting partnership between local government, state agencies and local communities. Through an

active catchment management partnership, structures have been put in place that will remain a lasting legacy with the AfterLIFE phase of project.

## 7. COMMENTS ON FINANCIAL REPORT (SEE F-ANNEXES)

### 7.1 Summary of Costs Incurred

PROJECT COSTS INCURRED			
Cost category	Budget according to the grant agreement	Costs incurred within the project duration	% by budget line
1. Personnel	€1,359,379	1,536,827	113.05%
2. Travel	€43,244	40,622	93.94%
3. External assistance	€238,795	222,918	93.35%
4. Durables: total <u>non-depreciated</u> cost		-	-
- <i>Infrastructure sub-tot.</i>		0	-
- <i>Equipment sub-tot.</i>	€103,208	93,208	90.31%
- <i>Prototypes sub-tot.</i>		0	-
5. Consumables	€106,632	98,131	92.03%
6. Other costs	€14,000	15,227	108.76%
7. Overheads	€130,568	140,484	107.59%
<b>TOTAL</b>	<b>€1,995,826</b>	<b>2,147,417</b>	<b>107.59%</b>

### 7.2 Accounting System

IRD Duhallow operates a receipts and payments accounting system. All payments are recorded by Cheque number, Action Code and Date on an excel based cheques journal. Bank reconciliation was completed on a monthly basis. Each month, our Finance Committee were given a finance report detailing the expenditure that month and overall budget status.

The majority of invoices were paid directly from the LIFE bank account with some specific items paid for by IRD Duhallow central account to facilitate bulk purchasing, and payment made using the company credit card. IRD Duhallow central account invoiced the project on a monthly basis together with the payroll invoice, as payroll was completed centrally on a sage payroll system. All internal invoices are accompanied by all backup.

The Enterprise Team Leader, Eileen Linehan or the Manager Maura Walsh, approved all costs allocated to the project and wrote “please issues a cheque for...” on each invoice. All invoices have the LIFE identifier code of LIFE09 NAT/IE/000220 clearly visible on them. All suppliers were made aware of the need to have this code and accounts were opened in shops specifically for the project with the code. The action that each invoice was costed to was written on all invoices. Each invoice was examined to determine which code it should be costed to and in some circumstances, an individual invoice could be costed to a number of actions. The method for payment in the most part was by cheque, and payment method is written on all invoices.

Staff costs were apportioned on a well-established time/project based on signed and authorised timesheets. All staff involved (project staff and RSS participants) electronically filled out monthly timesheets generated on Microsoft Excel. All Project staff timesheets were

approved and signed by Eileen Linehan. RSS participant timesheets were approved and signed by an RSS supervisor, namely Tim Ring and Sheila O’Keeffe. All time sheets were entered on the Excel EU reporting template. During the overlap period between SAMOK and the RaptorLIFE project (LIFE13NAT/IE/000769 RaptorLIFE), separate rows were inserted in the time sheets to distinguish between the projects.

### **7.3 Partnership Arrangements**

The Associated Beneficiaries in the project were Inland Fisheries Ireland and Pobal. IFI supplied copies of all approved invoices to the coordinating beneficiary which were for personnel and travel and subsistence. P60’s and salary details were also provided by IFI. IFI costs attributable to the project were less than originally anticipated.

Pobal were Associated Beneficiary by virtue of the fact that they hold the payroll function for IRD Duhallow’s RSS personnel. Pobal did not receive any payments from the project.

All information relating to Associated Beneficiaries was entered by IRD Duhallow and approved by the beneficiary concerned.

### **7.4 Auditors Report**

The Project’s Financial Audit was completed by **Westboro Partners, Westboro House, Montenotte, Cork T23 HVF6**. The Audit Report is included in the Annex (Annex F.1.4).

## 7.5 Summary of Costs by Action

The bulk of the expenditure was in line with the original application. Initially we had planned

Action no.	Short name of action	1. Personnel	2. Travel and subsistence	3. External assistance	4.a Infra-structure	4.b Equipment	4.c Prototype	5. Purchase or lease of land	6. Consumables	7. Other costs	TOTAL
A1	SAC Management Plan	17,174.63	463.20	2,821.70	-		-	-			20,459.53
A2	Management guide for cattle management for riverine SACs	2,479.38	50.03	10,455.55	-		-	-	227.85		13,212.81
A3	Habitat management plan	13,036.35	764.65		-		-	-			13,801.00
C1	Reduction of Bank Erosion	103,307.53	2,449.48	19,628.96	-	5,097.47	-	-	10,716.13		141,199.57
C2	Reduction and elimination of trampling and soiling of river by cattle by fencing	104,300.21	654.85	13,472.59	-	438.12	-	-	42,339.04		161,204.81
C3	Removal of Cattle Drinks and Access Points	100,115.79	1,097.37	375.00	-	77,654.71	-	-	10,045.51		189,288.38
C4	Provision of Silt Traps	104,259.85	1,167.26	123.80	-	763.90	-	-	1,514.04		107,828.85
C5	Rebalancing of riparian vegetation to address areas affected by excessive shading	96,864.64	724.72	26,570.50	-	1,032.49	-	-	7,167.20		132,359.55
C6	Rebalancing of riparian vegetation to address areas where riparian cover is adequate	93,771.12	515.78	4,366.50	-	897.90	-	-	582.32		100,133.62
C7	Provision of habitat and resting areas for otter	91,988.83	710.35	90.80			-	-	278.58		93,068.56
C8	Provision of nesting boxes for Kingfisher	89,318.91	2,462.47		-		-	-	1,343.97		93,125.35
C9	Provision of nesting boxes for Dippers	91,239.68	963.36		-		-	-	768.53		92,971.57
C10	Removal and monitoring of Himalayan Balsam	398,485.37	388.34	4,426.50	-		-	-	657.60		403,957.81
D1	Public Awareness Workshops	24,897.80	3,581.14	100.00	-		-	-	4,939.88	147.20	33,666.02
D2	Creating Awareness amongst Children	8,924.94	385.68	5,927.80	-		-	-	391.01		15,629.43
D3	Educational Lecture	7,877.88	1,298.54	5,060.00	-		-	-	1,478.75		15,715.17
D4	Website	11,597.28	123.97	7,197.25	-	840.00	-	-			19,758.50
D5	Species Recording	21,102.89	1,860.29	41,607.38	-	142.08	-	-	5,649.93		70,362.57
D6	Media Activity	18,189.51	1,097.76	4,279.33	-		-	-	427.59		23,994.19
D7	Brochures/Newsletters/Signage	13,182.10	631.84	9,792.78	-		-	-		15,069.86	38,676.58
D8	Project Conference	2,630.00		24,361.70	-		-	-	2,815.47		29,807.17
E1	Project Advisory Group	11,796.91	303.37	240.00	-		-	-	1,937.91		14,278.19
E2	Employment of Project Team.	21,031.01	551.25	20,500.00	-		-	-	560.78		42,643.04
E3	Fish stock survey	43,371.55	4,208.16	444.34	-	6,045.02	-	-	4,108.69		58,177.76
E4	Biodiversity audit	26,814.47	2,722.45		-		-	-		10.00	29,546.92
E5	Liaison with other EU LIFE Nature/Biodiversity projects.	3,261.34	11,395.26	147.20	-	296.73	-	-	3.60		15,104.13
E6	External auditing.	327.16	31.76	6,353.56	-		-	-			6,712.48
E7	Evaluation	3,083.84	19.14	8,000.00	-		-	-	176.78		11,279.76
E8	AfterLIFE plan	12,395.56		6,574.55	-		-	-			18,970.11
Over-heads											140,484.30
	<b>TOTAL</b>	<b>1,536,826.52</b>	<b>40,622.47</b>	<b>222,917.79</b>	<b>-</b>	<b>93,208.42</b>	<b>-</b>	<b>-</b>	<b>98,131.16</b>	<b>15,227.06</b>	<b>2,147,417.72</b>

on purchasing bridges for cattle crossing, however this proved far too expensive for the project and we subsequently got approval to shift the funds toward personnel. Our personnel costs were much higher than anticipated and this is largely due to the large Himalayan Balsam eradication which was completed by RSS Participants.

## **8. ANNEXES**

Annexes are divided according to their Project Action code (e.g. Annex C.7.1 is the final technical report for Action C7 - Provision of habitat and resting areas for otters; Annex D.7.30 is the Sustainable Farming Brochure which was a project deliverable under Action D7 - Development of information brochures/newsletter and signage about the project).

Also annexed are presentations made by the project (e.g. Annex P.11.X signifies the year in which the presentation was made was 2011, P.12.X = 2012, etc.) and project action maps (e.g. Annex MapC.1.1 is the map showing the extent of works carried out for Action C1).

Electronic copies of all annexed items and documents are provided in the accompanying USB device.

See Appendix 10.2 for full list of annexed items and documents.

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**10. APPENDIX**  
**10.1 Gantt Chart**

**Table 7 Gantt chart following the progress of the project**

Overall project schedule		2010				2011				2012				2013				2014				2015				
		1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	
<b>Action A.1</b>	Proposed																									
	Actual																									
<b>Action A.2</b>	Proposed																									
	Actual																									
<b>Action A.3</b>	Proposed																									
	Actual																									
<b>Action C.1</b>	Proposed																									
	Actual																									
<b>Action C.2</b>	Proposed																									
	Actual																									
<b>Action C.3</b>	Proposed																									
	Actual																									



	Actual																												
<b>Action D.2</b>	Proposed																												
	Actual																												
<b>Overall project schedule</b>		2010				2011				2012				2013				2014				2015							
		1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
<b>Action D.3</b>	Proposed																												
	Actual																												
<b>Action D.4</b>	Proposed																												
	Actual																												
<b>Action D.5</b>	Proposed																												
	Actual																												
<b>Action D.6</b>	Proposed																												
	Actual																												
<b>Action D.7</b>	Proposed																												
	Actual																												
<b>Action D.8</b>	Proposed																												
	Actual																												

<b>Action E.1</b>	Proposed			[Redacted]																					
	Actual			[Redacted]																					
<b>Action E.2</b>	Proposed																								
	Actual																								
<b>Overall project schedule</b>		2010				2011				2012				2013				2014				2015			
		1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T	1T	2T	3T	4T
<b>Action E.3</b>	Proposed																								
	Actual																								
<b>Action E.4</b>	Proposed																								
	Actual																								
<b>Action E.5</b>	Proposed																								
	Actual																								
<b>Action E.6</b>	Proposed																								
	Actual																								
<b>Action E.7</b>	Proposed																								
	Actual																								
<b>Action E.8</b>	Proposed																								
	Actual																								

## 10.2 Annexes

### 10.2.1 Technical and Financial Annexes

**Table 8 List of Technical and Financial Annexes (\*denotes printed copies attached)**

Annex Code	Annex Title
T.1.1	Layman's Report*
F.1.1	Final Financial Statement*
F.1.2	IFI Financial Statement*
F.1.3	Pobal Financial Statement*
F.1.4	Financial Audit Report*
F.1.2	Financial Audit Report*
F.2.1	SAMOK responses to Commission Letters*
F.2.2	Personnel Costs - Fran Igoe*
F.2.3	Personnel Costs - Tim Ring*
F.2.4	Personnel Costs - Dermot Murphy*
F.2.5	Personnel Costs - Con S Murphy*
F.2.6	Personnel Costs - Karen Delanty*

10.2.2 Preparatory Actions

**Table 9 List of Annexes for Preparatory (A) Actions (\*denotes printed copies attached)**

Action number	Short name of action	Annex code	Description
A 1	Management plan for SAC	A.1.1	SAC Management Plan*
		A.1.2	Natura Impact Statement - Duhallow LIFE
		A.1.3	Strategic Environmental Assessment - FPM
		A.1.4	River Allow Catchment Action Plan
		A.1.5	Freemount waste water treatment plant discharge report Allow River
		A.1.5	Catchment Management Initiative (Slovenia Poster)
A 2	Riparian and water quality farm management	A.2.1	Management guide for cattle management for riverine SACs*
		A.2.2	Agri-Environment Scheme for River Allow PJ Phelan
		A.2.3	Calendar 2015 (Hard copy)
		A.2.4	Calendar 2014 (Hard copy)
		A.2.5	Calendar 2013 (Hard copy)
A 3	Habitat Development Plan for tributaries of the Upper Blackwater	A.3.1	Habitat management plan*
		A.3.2	Brogeen Survey
		A.3.3	Proposal to address the threat of non-native plant species to two Natura 2000 sites in the Cork/Kerry region, from infested road marginal areas. Action A3
		A.3.4	Survey of riparian corridor through plantation forestry along the Upper Blackwater -
		A.3.5	Upper Blackwater Survey 2013

10.2.3 Concrete Conservation Actions

**Table 10 List of Annexes for Concrete Conservation (C) Actions (C1 - C7) (\*denotes printed copies attached)**

Action number	Short name of action	Annex code	Description
C 1	Reduction of Bank Erosion	C.1.1	Final technical report - Reduction of Bank Erosion*
		C.1.2	Interim Report - Reduction of Bank Erosion
		C.1.3	Suspended solids in the River Allow and tributaries
		C.1.4	Pilot Bank Revetment Programme 2012
		C.1.5	Erosion Report 2011
C 2	River Bank Fencing	C.2.1	Final Technical Report - Fencing Report - Reduction and elimination of trampling*
		C.2.2	Interim Report - Reduction and elimination of trampling and soiling of river by cattle by fencing vulnerable river
		C.2.3	Interim Report on Fencing along the River Allow - Action C2 of IRD Duhallow LIFE
		C.2.4	Vegetation and Fencing Comparison Study - 2012
C 3	Alternative Cattle Drinks and crossings	C.3.1	Final Technical Report - Removal of Cattle Drinks and Access Points*
		C.3.2	Landowner Agreement - Scanned
		C.3.3	Interim Report - Removal of cattle drinks and crossing points
		C.3.4	Cattle crossing trial (Kanturk first trial)
C 4	Silt Traps and Wetlands	C.4.1	Final Technical Report - Provision of Silt Traps*
		C.4.2	Interim Report on Silt Trap installation in Allow River Catchment
		C.4.3	Silt Trap Study of Coillte Forestry Drains
		C.4.4	Retention pond proposal with comments from key stakeholder Coillte 2011
C 5	Pruning of riparian vegetation	C.5.1	Final Technical Report - Rebalancing of riparian vegetation affected by excessive shading*
		C.5.2	Interim Report - Rebalancing of riparian vegetation to address areas where riparian cover is inadequate
C 6	Planting of riparian vegetation	C.6.1	Final Technical Report - Rebalancing of riparian vegetation where riparian cover is inadequate*
		C.6.2	Progress report on planting trees where riparian vegetation is inadequate
		C.6.3	Rebalancing of riparian vegetation to address areas where riparian cover is inadequate.
		C.6.4	Planting & Coppicing Report - Action C6
		C.6.5	Willow Planting Locations
C 7	Otter holts and brush bundles	C.7.1	Final Technical Report - Provision of habitat and resting areas for otter*
		C.7.2	Inspection of Artificial Otter Log Piles in the Allow Catchment
		C.7.3	Inspection of Artificial Otter Holts in the Allow Catchment 2012
		C.7.4	Otter distribution survey River Allow 2011
		C.7.5	Building an Otter holt

**Table 11 List of Annexes for Concrete Conservation (C) Actions (C8 – C10) (\*denotes printed copies attached)**

<b>Action number</b>	<b>Short name of action</b>	<b>Annex code</b>	<b>Description</b>
<b>C 8</b>	<b>Kingfisher nest boxes</b>	C.8.1	Final Technical Report (O'Clery and Lusby - Assessment) - The Kingfisher Nest Box Project in Duhallow*
		C.8.2	Provision of nesting boxes for Kingfishers
		C.8.3	Provision of Nesting Sites for the European Kingfisher and Dipper
<b>C 9</b>	<b>Dipper Nest boxes</b>	C.9.1	Final Technical Report - Provision of nesting boxes for Dippers*
		C.9.2	Interim Report 2014 - Provision of nesting boxes for Dippers
		C.9.3	Provision of nesting boxes for Dippers - 2013
		C.9.4	Installation of Artificial Nesting Units for the Dipper 2012
<b>C10</b>	<b>Removal of Himalayan balsam</b>	C.10.1	Final Technical Report - Removal and monitoring of Himalayan Balsam*
		C.10.2	Vegetation monitoring of H Balsam removal programme 2015 (monitoring year 4)
		C.10.3	Vegetation monitoring of H Balsam removal programme 2014 (monitoring year 3)
		C.10.4	Interim Report - Removal and Monitoring of Himalayan Balsam
		C.10.5	Vegetation monitoring of H Balsam removal programme 2013 (monitoring year 2)
		C.10.6	Vegetation monitoring of H Balsam removal programme 2012 (monitoring year 1)
		C.10.7	Removal of Himalayan balsam end of year 1

10.2.4 Stakeholder engagement, education and awareness, and dissemination actions

**Table 12 List of Annexes for Public Awareness and Information Dissemination (D) Actions (D1 – D5) (\*denotes printed copies attached)**

Action number	Short name of action	Annex code	Description
<b>D 1</b>	<b>Awareness amongst local community</b>	D.1.1	Mink talk - Paddy Sleeman 18.03.15 (Poster)
		D.1.2	Invasive Species in Kerry Seminar 28.02.15 (Poster)
		D.1.3	Making wildlife homes workshop 11.02.15 (Poster)
		D.1.4	Invasive workshop 01.10.14 (Poster)
		D.1.5	The Birds of Duhallow - JLusby 19.06.14 (Poster)
		D.1.6	John Lusby - Merlin Talk 18.12.13 (Poster)
		D.1.7	Badger talk - Paddy Sleeman 04.12.13 (Poster)
		D.1.8	Library Poster 11 & 12.12.12 (Poster)
		D.1.9	Freshwater Pearl Mussel talk 29.06.2011 (Poster)
		D.1.10	Invite to SAMOK launch 08.07.11 (Poster)
<b>D 2</b>	<b>School liaison</b>	D.2.1	LIFE schools introduction to project
		D.2.2	Nature Detective
		D.2.3	EPA Catchment Newsletter feat. Young Scientists
		D.2.4	IFI Activity Card - Freshwater Pearl Mussel
		D.2.5	IFI Activity Card - Birds of streams and rivers
		D.2.6	IFI Activity Card - Public Consultation Meeting
<b>D 3</b>	<b>Educational lectures</b>	D.3.1	Beauty and the Beast Lampreys 05.06.14 (Poster)
		D.3.2	Wildlife talk 04.12.2013 (Poster)
		D.3.3	Farming, fishing & forestry 23.04.13 (Poster)
		D.3.4	Wildlife & the community 18.04.13 (Poster)
		D.3.5	Otter Talk 09.04.13 (Poster)
		D.3.6	Himalayan Balsam Talk 7.09.11 (Poster)
<b>D 4</b>	<b>Website</b>	D.4.1	<a href="http://duhallowlife.com/">http://duhallowlife.com/</a>
<b>D 5</b>	<b>Species Recording Project</b>	D.5.1	Wildlife recording by national school children - Mary Immaculate Student Report*
		D.5.2	School Survey Report - Mary Immaculate Student Placement Report
		D.5.3	Species Recording booklet
		D.5.4	Species Recording Permission sheet

**Table 13 List of Annexes for Public Awareness and Information Dissemination (D) Actions (D6) (\*denotes printed copies attached)**

Action number	Short name of action	Annex code	Description
<b>D 6</b>	<b>Media and community education</b>	D.6.1	CEF Awards - County supplement Examiner 08.12.15*
		D.6.2	Duhallow Group Honoured (The Examiner 30.11.15)*
		D.6.3	IRD Duhallow Progress Report 14-15*
		D.6.4	Sisters are doing it for themselves (Corkman 04.06.15)*
		D.6.5	Wild LIFE as we know it in Duhallow (Corkman 04.06.15)*
		D.6.6	Funding to Protect Wildlife (Irish Examiner 1st June 2015 page 14 Outdoors)*
		D.6.7	A Walk on the Wild Side (The Corkman 28.05.15)*
		D.6.8	It's all hooves to the pump to clean up rivers (Examiner 09.04.15)*
		D.6.9	Greenane Park to be wildlife haven (Corkman 02.04.15)*
		D.6.10	EU Rules Block on Cork Homes (Corkman (front page) 11.12.14)*
		D.6.11	EU Pearl Mussel Rule shelves towns' plan (Corkman 11.12.14)*
		D.6.12	Duhallow expert defends the pearl mussel (Corkman 11.12.14)*
		D.6.13	Quirky Pearl Mussel Competition at Ploughing Championships (Corkman 09-10-14)*
		D.6.14	Conservation experts descend on Duhallow
		D.6.15	IRD Duhallow Progress Report 13-14
		D.6.16	Public asked to help remove invasive non-native plant (Corkman July 24 2014)
		D.6.17	Duhallow leads the way in River Bank Protection (Ear to the Ground (Summer 14))
		D.6.18	Corkman - Planning Ahern's 01.05.14
		D.6.19	Juvenile Atlantic Salmon come out of the shadows (Corkman -01-05-14)
		D.6.20	Environment Project showcased in Vienna (Corkman 01-05-14)
		D.6.21	Restoring Banks (Irish Times - Paddy Woodworth 08-02-14)
		D.6.22	Dipper nest box Article (Birdwatch Ireland - eWings)
		D.6.23	Signs are that Duhallow Otters need our Support (Corkman 16-05-13)
		D.6.24	Behind every great Salmon river there's a Pearl (TAFI a)
		D.6.25	Behind every great Salmon river there's a Pearl (TAFI b)
		D.6.26	IRD Duhallow Annual Report 2012 2013
		D.6.27	IRD Duhallow Annual Report 2012 2013 p2
		D.6.28	Thousands saved in this very unusual rescue (Corkman frogspawn 11.04.13)
		D.6.29	Christmas trees given new lease of life to save riverbank (Daily Telegraph Jan 12)
		D.6.30	New Lease of LIFE for old Christmas tress (Corkman 3 Jan 2013)

**Table 14 List of Annexes for Public Awareness and Information Dissemination (D) Actions (D6) continued**

Action number	Short name of action	Annex code	Description
<b>D6</b>	<b>Media and community education</b>	D.6.31	Christmas trees wanted to protect rare species (Examiner article Jan 2 2013)
		D.6.32	Taking a walk on the wild side (Corkman 16th August 2012)
		D.6.33	Day of the Region Booklet '12
		D.6.34	School children survey water life at Shrone Lough (June 12 2012 a lucey)
		D.6.35	IRD Duhallow Annual Report 20112012
		D.6.36	IRD Duhallow Annual Report 20112012 p2
		D.6.37	Kingfisher and Dipper (Birdwatch Ireland eWings June 2012)
		D.6.38	Kids to the rescue as floods wash up endangered pearl mussels (The Corkman-21 June 2012)
		D.6.39	DVD - LIFE on the River Allow
		D.6.40	School children take to the river to help with wildlife project (Press release 30 March 2012 River trip)
		D.6.41	Blackwater home for elusive otters (Examiner 16.1.12)
		D.6.42	EU backed project aims to eradicate invasive Indian Plant (Irish Times 7.7.11)
		D.6.43	€1 million project to eradicate plant from River Allow (Irish Examiner 7.7.11)
		D.6.44	€1 million eco project to save fish (Evening Echo 7.7.11)
		D.6.45	Plan to save pearl mussel in River Allow (Corkman 7.7.2011)
		D.6.46	Duhallow gets EU backing to fight off alien invading (Corkman 14.7.2011)
		D.6.47	Ear to The Ground Dec 2011
		D.6.48	IRD Duhallow Progress Report
		D.6.49	Promoting Duhallow's Local Rivers (Sherkin Comment 2011)
		D.6.50	Otter-Irish Independent 22.12.11
D.6.51	Study aims to boost Otter population (Irish Times 23.12.11)		

**Table 15 List of Annexes for Public Awareness and Information Dissemination (D) Actions (D7) (\*denotes printed copies attached)**

Action number	Short name of action	Annex code	Description
<b>D 7</b>	<b>Information brochures/newsletter</b>	D.7.1	Newsletter - Summer 2015*
		D.7.2	Newsletter - Spring 2015*
		D.7.3	Newsletter - Winter 2014*
		D.7.4	Newsletter - Autumn 2014
		D.7.5	Newsletter - Summer 2014
		D.7.6	Newsletter - Spring 2014
		D.7.7	Newsletter - Winter 2013
		D.7.8	Newsletter - Autumn 2013
		D.7.9	Newsletter - Summer 2013
		D.7.10	Newsletter - Spring 2013
		D.7.11	Newsletter - Winter 12
		D.7.12	Newsletter - Summer 2012
		D.7.13	Newsletter - Spring 12
		D.7.14	Newsletter - Winter 11
		D.7.15	Newsletter - Summer 11
		D.7.16	Two Minute Balsam Pull
		D.7.17	Step by step for Silt Traps
		D.7.18	H. Balsam Information Leaflet
		D.7.19	ICM Flier
		D.7.20	Guidance document - Reducing the impact of land drainage
		D.7.21	Poster - Donegal FPM Conference
		D.7.22	FINS H balsam poster
		D.7.23	Vienna Poster
		D.7.24	Invasives trinity college (poster)
		D.7.25	Information Sign Confluence with Blackwater
		D.7.26	Information Sign John's Bridge
		D.7.27	Information Sign Grennane Park
		D.7.28	Information Sign Freemount
		D.7.29	Information Sign Tony Ahern's
		D.7.30	Sustainable Farming Brochure*

**Table 16 List of Annexes for Public Awareness and Information Dissemination (D) Actions (D7 continued & D8)**

<b>D7</b>	<b>Information brochures/newsletter</b>	D.7.31	Invasive Species Brochure*
		D.7.32	Annex Species Brochure*
		D.7.33	LIFE Project Launch Invitation
		D.7.34	Project Brochure
<b>D 8</b>	<b>End of project conference</b>	D.8.1	Conference brochure*
		D.8.2	Duhallow LIFE RAPTORLIFE programme*
		D.8.3	Conference Invite*

10.2.5 Monitoring and Project Operation Actions

**Table 17 List of Annexes for Project operation and monitoring (E) Actions (E3 to E5, E7 & E8) (\*denotes printed copies attached)**

Action number	Short name of action	Annex code	Description
E 3	Fish Stock Survey	E.3.1	Final Monitoring Report - Fish Stock Survey*
		E.3.2	Final Monitoring Report - FPM and Glochidia*
		E.3.3	Fish Stock Survey (Rampart Stream)*
		E.3.4	Fish Stock Survey 2014
		E.3.5	Snorkel Survey for Freshwater Pearl Mussel 2014
		E.3.6	Interim Report on Snorkel Survey for Freshwater Pearl Mussel 2013
		E.3.7	Glochidia Survey 2012
		E.3.8	Survey for River and Brook Lamprey in the Allow River 2012
		E.3.9	Electrofishing survey salmonid report 2012
		E.3.10	Survey of Freshwater Pearl Mussel Johns Bridge July 2011
		E.3.11	E-fishing survey of Allow 2011
E 4	Biodiversity audit	E.4.1	Biodiversity Audit Report*
		E.4.2	Otter Survey of the Allow River catchment area 2012
E 5	Liaison with other Life projects	E.5.1	Donegal FPM INTERREG Conference
		E.5.2	Rúairí Ó Conchúir (MulkearLIFE) talking to Duhallow school children
		E.5.3	Visit from AquaViva Project (Slovenia)
		E.5.4	FINS Conference
		E.5.5	DuhallowLIFE visit to ISAC Project
		E.5.6	Pearls in Peril Visit to Duhallow
		E.5.7	MulkearLIFE end of project conference
E 7	Evaluation	E.7.1	Evaluation of DuhallowLIFE+ Project - Blackwater SAMOK*
E 8	After life plan	E.8.1	AfterLIFE Plan*

10.2.6 Presentations

**Table 18 List and codes for Annexed Presentations for the years 2010 and 2011**

<b>Presentations</b>	<b>Annex Code</b>	<b>Presentation Title/Description</b>
<b>2010</b>	P.10.1	Intro Presentation 25.11.10
<b>2011</b>	P.11.1	Kick Off 11.01.11 IRD Duhallow LIFE presentation
	P.11.2	Monitor mtg 21.01.11 Photo Walk Through
	P.11.3	NPWS presentation April 6 2011
	P.11.4	Project actions, status of pearl mussel and banks (April 12 2011)
	P.11.5	Project actions, status of pearl mussel and banks (April 12 2011) pt 2
	P.11.6	Blackwater Salmon Development Group Meeting 15-4-11
	P.11.7	NPWS presentation April 20 2011 E Moorkens
	P.11.8	Coomhola Salmon trust M Boyden June 8 2011
	P.11.9	NPWS presentation June 28 2011 Blackwater salmon development group
	P.11.10	IFI presentation July 1 2011
	P.11.11	Coillte presentation July 6th 2011
	P.11.12	Landowners Presentation 6.7.11 Actions C-C10, D1, D3
	P.11.13	Launch Presentation 8.7.11
	P.11.14	LIFE Launch presentation July 8th 2011
	P.11.15	School Presentation 4.8.11 - Action D2 and D5
	P.11.16	UL Project Presentation 15.09.11
	P.11.17	Monitor Meeting 06.09.11
	P.11.18	Project review meeting Sept 6 2011 AA Neil Wilkie
	P.11.19	H balsam presentation Sept 7th 2011 Action D1 and C10
	P.11.20	Env Forum 8.9.11
	P.11.21	NPWS Presentation 13.09.11
	P.11.22	Project NPWS meeting Sept 13 2011 AA
	P.11.23	EO meeting Oct 12 2011
	P.11.24	Project Presentation 03.11.11
	P.11.25	3 Water Conference 9.11.11 Action D1
	P.11.26	IRD Board meeting presentation Nov 14 2011
	P.11.27	Project Presentation – Overview IRD Board meeting presentation Nov 14 2011
	P.11.28	Blackwater Development Group Nov 23 2011

**Table 19 List and codes for Annexed Presentations for 2012**

<b>Presentations</b>	<b>Annex Code</b>	<b>Presentation Title/Description</b>
<b>2012</b>	P.12.1	Sand martin Artificial Colony Birdwatch 17 Jan 2012
	P.12.2	Blackwater Development Group Jan 25 2012
	P.12.3	Env Forum 16.2.12
	P.12.4	Teagasc meeting 17 Feb 2012
	P.12.5	KTA AGM 20.2.12
	P.12.6	Environmental Working Group April 26 presentation 2012 Project update
	P.12.7	Env Forum 03.5.12
	P.12.8	Env Forum 21.6.12
	P.12.9	Blackwater Development Group June 26 2012
	P.12.10	Coillte Environmental Working Group July 10 presentation 2012
	P.12.11	H balsam presentation 23 July 2012 staff training
	P.12.12	UCD UCC visit to project 31 August 2012 - hydrology and suspended solid meeting MKQ etc.
	P.12.13	Blackwater River Trust Sept 4th 2012
	P.12.14	Interim project review N Wilkie Sept 4th 2012
	P.12.15	Landowner presentation Sept 21 2012
	P.12.16	LIFE presentation Environmental Working Group 8th Nov 2012
	P.12.17	Common purpose presentation by LIFE team Nov 2012
	P.12.18	Blackwater Development Group Nov 27 2012
	P.12.19	Presentation to Polish visitors to IRD 06 Dec 2012 short version
	P.12.20	Presentation to Polish visitors to IRD 06 Dec 2012
	P.12.21	Steering group meeting 17 Dec 2012

**Table 20 List and codes for Annexed Presentations for 2013 and 2014 (partial)**

<b>Presentations</b>	<b>Annex Code</b>	<b>Presentation Title/Description</b>
<b>2013</b>	P.13.1	ERBD Protected Areas Workshop March 01 2013b
	P.13.2	TRAP Presentation (20-03-2013)
	P.13.3	LIFE Environmental Awareness Month 23 April 2013a
	P.13.4	LIFE NS schools introduction to project
	P.13.5	TY Presentation
	P.13.6	Otter Conference Kinsale MISE IRD Duhallow LIFE Month 25 April 2013
	P.13.7	Board Presentation June 2013
	P.13.8	Steering Group Meeting 5th July 2013
	P.13.9	Michael Ewing 08 August 2013
	P.13.10	REPS meeting 02Oct 2013 Teagasc
	P.13.11	IRD DuhallowLIFE project –Winning Hearts and Minds 06Dec2013
<b>2014</b>	P.14.1	Special presentation to Paddy Woodworth Irish Times Jan 29th 2014
	P.14.2	Environmental Working Group 27Feb2014
	P.14.3	IRD Duhallow LIFE London 0314
	P.14.4	River Allow Catchment Management Action Plan (30-04-14)
	P.14.5	Allow catchment management workshop kick-off April 30th 2014
	P.14.6	Landowner Meeting (May-14-2014)
	P.14.7	Lamprey talk Beauty and the Beast LIFE and Lamprey June 5th 2014
	P.14.8	EPA 11 June 2014
	P.14.9	WFD Workshop Biodiversity & Protected Areas Training Workshop 2014
	P.14.10	Visit by European Commission Desk Officers and External Monitor 12 June 2014
	P.14.11	Board Presentation 2014 LIFE MTwohig
	P.14.12	Wexford Naturalist Club visit June 20th 2014
	P.14.13	PATRICIA TORPEY DAFM June 26th 2014
	P.14.14	Blackwater Development Group June 25 2014
	P.14.15	Crews meeting - July 26th 2014
	P.14.16	EPA ICM Unit visit 2014
	P.14.17	Allow CM meeting 28 Aug 2014
	P.14.18	Team Training day Sept 8th 2014
	P.14.19	Visit by UK LIFE project Pearls in Peril

**Table 21 List and codes for Annexed Presentations for 2014 (continued) and 2015**

<b>Presentations</b>	<b>Annex Code</b>	<b>Presentation Title/Description</b>
<b>2014</b>	P.14.20	DuhallowLIFE project MulkearLIFE end of project conference
	P.14.21	Blackwater Development Group Sept17 '14
	P.14.22	LIFE+ project meeting 22 Sept 2014
	P.14.23	Invasive Species Conference 1stOct14
	P.14.24	Landowner meeting Oct 16th 2014 IRD Duhallow LIFE+ project
	P.14.25	Agri Environment Scheme for River Allow presentation (16-10-14)
	P.14.26	Allow CM meeting 23 Oct 2014 Update on Duhallow LIFE project
	P.14.27	River Allow Catchment Management Workshop November 06 2014final
	P.14.28	Environmental Working Group 2014 Update 05 November 2014
	P.14.29	Blackwater River Trust meeting 04 Dec 2014
	P.14.30	Allow CM meeting 10 Dec 2014
<b>2015</b>	P.15.1	From Barntown to Ballydesmond 09 01 2015
	P.15.2	Limerick CoCo and Volunteers 16 01 2015
	P.15.3	STRIVE EPA kick-off meeting 28 01 2015
	P.15.4	Allow CM meeting Jan 28 2015
	P.15.5	Otter Presentation for ICM meeting (28-01-15)
	P.15.6	BW Rivers Trust 04 02 2015
	P.15.7	Blackwater River Trust meeting 04 Feb 2015
	P.15.8	Kanturk Anglers AGM - 09.02.15
	P.15.9	GIVING WILDLIFE A HELPING HAND Feb 11 2014
	P.15.10	Visit by European Commission External Monitor 17 Feb 2015
	P.15.11	Invasive Species Seminar 28.02.15
	P.15.12	Annual meeting of Irish Freshwater Biologists Mar 6th 2015
	P.15.13	Clonakilty Agri College visit 09.04.15
	P.15.14	Blackwater River Trust meeting 16 April 2015
	P.15.15	DuhallowLIFE slides for Frank Curran Leitrim CoCo
	P.15.16	Education and Public Awareness 21.05.15

10.2.7 Project Action Maps

**Table 22 List and codes for Annexed Project Action Maps**

Action number	Short name of action	Annex Code	Description
N/A	<b>Blackwater SAMOK</b>	MapC0.1	DuhallowLIFE Project Area
<b>C1</b>	<b>Reduction of Bank Erosion</b>	MapC1.1	Reduction of bank erosion
<b>C2</b>	<b>River Bank Fencing</b>	MapC2.1	Reduction and elimination of trampling and soiling of river by cattle by fencing vulnerable river bank sections
		MapC2.2	Plant diversity study
<b>C3</b>	<b>Alternative Cattle Drinks and crossings</b>	MapC3.1	Cattle Access (Fenced off)
		MapC3.2	Cattle crossing
		MapC3.3	Solar panel powered pumps for drinking troughs)
<b>C4</b>	<b>Silt Traps and Wetlands</b>	MapC4.1	Silt trap drain catchments
		MapC4.2	Silt traps
<b>C5</b>	<b>Pruning of riparian vegetation</b>	MapC5.1	Rebalancing of riparian vegetation to address areas affected by excessive shading
<b>C6</b>	<b>Planting of riparian vegetation</b>	MapC6.1	Rebalancing of riparian vegetation to address areas where riparian cover is inadequate
<b>C7</b>	<b>Otter holts and brush bundles</b>	MapC7.1	Provision of habitat and resting areas for otter through introduction of brush bundles and otter holts
<b>C8</b>	<b>Kingfisher nest boxes</b>	MapC8.1	Provision of nesting boxes for Kingfisher
<b>C9</b>	<b>Dipper Nest boxes</b>	MapC9.1	Provision of nesting boxes for Dippers
<b>C10</b>	<b>Removal of Himalayan balsam</b>	MapC10.1	H. Balsam Densities along river 2015
		MapC10.2	H. Balsam Densities along river 2011
		MapC10.3	Removal and monitoring of Himalayan Balsam
<b>E3</b>	<b>Fish Stock Survey</b>	MapE3.1	Fish stock survey 2014
		MapE3.2	Fish stock survey 2012
		MapE3.3	Fish stock survey 2011
		MapE3.4	FPM survey
<b>E4</b>	<b>Biodiversity audit</b>	MapE4.1	Biodiversity Audit - Otter Survey
		MapE4.2	Biodiversity Audit - Kingfisher Sightings
		MapE4.3	Biodiversity Audit – Potential Kingfisher Territories
		MapE4.4	Biodiversity Audit - Dipper Sightings
<b>Multiple Actions</b>	<b>Project Photographs</b>	PP.X	Photographs cover all C-actions plus Actions D1, D2, D3, D6, D8, E3 and E4

