



LIFE12 ENV/ES/1140

FINAL Report

Covering the project activities from 01/08/2013 to 30/07/2017

Reporting Date

30/01/2018

LIFE+ SEGURA RIVERLINK

Project Data

Project location	Murcia. Spain.
Project start date:	01/08/2013
Project end date:	30/07/2017
Total Project duration (in months)	48
Total budget	3,424,250 €
Total eligible budget	3,322,525 €
EU contribution:	1,655,555 €
(%) of total costs	48.35%
(%) of eligible costs	49.83%

Beneficiary Data

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Instructions:

The final report must be submitted to the Commission no later than 3 months after the project end date.

One paper and one electronic version of the report are sufficient for the Commission. These documents must be sent in identical versions also to the monitoring team. The report must also be sent to the national authority.

Please refer to the Common Provisions annexed to your grant agreement for the contractual requirements concerning a final report .

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List of key-words and abbreviations.

CHS	Confederación Hidrográfica del Segura - Coordinating beneficiary
ANSE	Asociación de Naturalistas del Sureste - Associated beneficiary 4
ARC	Archena fish pass
CAÑ	Cañaverosa dam
CARM	Comunidad Autónoma de la Región de Murcia - Associated beneficiary 1
CB	Coordinating beneficiary
CHA	Los Charcos weir
EC	European Commission
ESP	Esparragal weir
ERDF	European Regional Development Fund
EU	European Union
HOY	Hoya García weir
IAS	Invasive Alien Species
ITAGRA	Centro Tecnológico Agrario y Agroalimentario - Associated beneficiary 3
MAN	Manterola weir
MEN	Menjú weir
MOR	Moratalla weir (UNNAMED weir according to the proposal)
MUL	La Mulata dam
POS	Post-Trasvase weir
RBMP	River Basin Management Plan
SIBIC	Sociedad Ibérica de Ictiología (Iberian Society of Ichthyology)
SOT	Soto Damian weir
SRB	Segura River Basin
UMU	Universidad de Murcia - Associated beneficiary 2
WFD	Water Framework Directive

2. Executive summary.

The LIFE+ SEGURA RIVERLINK project (LIFE12 ENV/ES/1140) began on 1st August 2013 and was officially launched on 23rd and 24th September 2013 with the Kick-off Meeting in Murcia. This final report covers the period from the 1st August 2013 to the 30th of July 2017. The purpose of the report is to give the necessary final information for the Commission to evaluate the final state of the project according to the scheduled working plan, the final financial situation of the project.

The use of a new concept in land management and planning, the green infrastructure approach, is the solution to reverse landscape fragmentation by connecting natural areas. This improves ecosystems health and resilience, increases biodiversity and benefits human populations by improving ecosystem services.

This project takes place in the region of Murcia, in a stretch of the rivers Segura and Moratalla crossing several sites included in the Nature 2000 Network.



FIGURE 1. Project area with locations of the nine sites of action

In order to improve and strengthen fluvial connectivity, the **technical actions** in the SEGURA RIVERLINK project include the removal of an unused weir, the construction of eight fish passages and the implementation of an ecological restoration of the riverbanks. The design of the ecological restoration has been linked to the creation of a Land Stewardship Network, aiming to involve the population in the replacement of giant reed beds with native riparian forest and ensure the sustainability of the actions (Actions A and B).

To determine the effectiveness of these actions and evaluate the results, the project has carried out a monitoring program that includes biological, physical-chemical and hydromorphological indicators (Actions C). These actions have been analysed the performance of these measures with the hope of validating the green infrastructure approach to river basin management and its possible extension to the official River Basin Management Plan (RBMP) of the SRB.

The purpose of this project is to demonstrate that the concept of green infrastructure is a suitable solution to improve longitudinal connectivity and improve fish migration. RIVERLINK shows a holistic approach since it does not consider only the construction of fish ladders or the demolition of weirs and dams in an isolated way, but also includes fluvial

restoration actions and population involvement in order to increase biodiversity rates and people`s agreement in the action places and around the socioeconomic area of influence.

The most remarkable results of the project are:

- The demolition of a disused dam.
- The construction of eight fish passages.
- The elimination of IAS and the ecological restoration of eight stretches of the river.
- The monitoring of the fish community, plant community, bird population, and riparian fauna from the beginning of the project.
- The creation of a Segura River Stewardship Network that currently counts with 15 signed agreements (and much more in a unformal way)

Communication has been a key issue during the project. The Facebook page has more than 1,100 likes and there are more than 1000 followers in Twitter (more than the 1000% estimated in the proposal). Volunteering activities for fauna monitoring and fluvial restoration have been numerous and has counted with the participation of a lot of people (600) and a great acceptance by local environmental associations. At the same time, the environmental education program has been highly demanded by schools and educational centres (>4000 students). Webpage have received in these 4 years more than 41.000 visits (9.500 in the proposal)

Regarding management activities, project partners have participated in 35 coordination meetings so far and collaborate in a close way to carry out project activities and organize communication actions. The administrative personnel in each organization report on the financial state of the project whenever is required by the project coordinator.

The general progress of the project have been very good and most of the work has been done according to the scheduled timetable (refer to Table 1 for a brief summary of each action and to chapter 5.1 for the detailed description of the general progress by action). Only were some delays with technical problems with some fishways and administrative problems with the signature of agreement

The project has been successfully completed, fulfilling all the objectives. All the objectives, deliverables and milestones from the progress report of November 30, 2016 have been fulfilled as planned, especially the construction of the last one and the monitoring therefore. Below is a summary of them.

LIST OF ACTIONS WITH A SHORT DESCRIPTION OF THE GENERAL PROGRESS

	ACTION	GENERAL PROGRESS	COORD	PARTICIPANTS
A	A.1 Planning of actions to increase longitudinal connectivity: drafts of actions on target infrastructures.			

ACTION	GENERAL PROGRESS	COORD	PARTICIPANTS
Task 1. Building of Fish Passages	Completed The eighth fish pass was constructed close to a big village (Archena), was a natural river way	CHS	CHS/ITAGRA
Task 2. Weir demolition	Completed	CHS	CHS
A.2. Initial inventory and evaluation (state) of selected indicators in monitoring programmes initial inventory and evaluation (state) of selected indicators in monitoring programmes.			
Task 1. Initial evaluation of biological indicators: fish community and populations	Completed	UMU	UMU
Task 2. Initial evaluation of biological indicators: plant community	Completed	CARM	CARM
Task 3. Initial evaluation of biological indicators: bird community and bank-associated fauna	Completed	ANSE	ANSE
Task 4. Prior ecological state of the stretch of the project	Completed	CHS	CHS
A.3. Restoration-rehabilitation design at the bank level in the stretches of action.	Completed	CHS	CHS
A.4. Development of management and social participation mechanisms for use in later stages of the project	Completed	CHS	CHS/CARM/ ANSE
B.1 Increase of river connectivity: Demonstration of obstacles removal.	Completed	CHS	CHS
B.2 Increase of river connectivity: Demonstration of fish passages	Completed 8 fish passages are finished and working (SOT, MEN and HOY, ESP, CHA, POS and CAÑ). ARC was the last constructed in May of 2017	CHS	CHS
B.3 Increase of river connectivity: Demonstration of fluvial restoration associated to fish passages	Completed Restoration was fully executed, included ARC fish pass. Some work are extending the restoration with another intern funds in 2018	CHS	CHS/CARM

ACTION	GENERAL PROGRESS	COORD	PARTICIPANTS
B.4 Development of a land custody network in connectivity areas	Completed 15 custody agreements (8 in the proposal), 75 hectares included in the Land Custody Network (15 in the proposal), 8 concrete actions for environmental improvement and Implementation of the code of good management practices.	CARM/ ANSE	CHS/CARM/ ANSE
C.1. Monitoring activities			
Task 1. Evaluation and programme to monitor operation indicators at fish passage systems	Completed The constructed fish passages have been evaluated in order to find necessary constructive adjustments, especially in the accesses, and their operation.	ITAGRA	ITAGRA
Task 2. Monitoring programme for biological indicators: fish community and populations	Completed The fish-based monitoring programme have been an extraordinary tool to analyses the success of the fish pass construction	UMU	UMU
Task 3. Monitoring programme for revegetation projects at the restoration-rehabilitation plot level	Completed	CARM	CARM
Task 4. Monitoring programme, biological indicators: bird community and river banks	Completed The monitoring of birds, freshwater turtles, odonata and otter have been finished	ANSE	ANSE
Task 5. Monitoring programme for the biological state of the water	Completed 17 control points distributed along the 9 weirs.	CHS	CHS
Task 6. River Sediment Monitoring	Completed 17 sampling points distributed along the 9 weirs.	CHS	CHS
C.2 Socio-economic assessment	Completed. Public opinion have supported a lot the project	CHS	CHS
D. Communication and dissemination actions			
Task 1. Overall Dissemination Program of LIFE SEGURARIVERLINK project	Completed 1109 likes in Facebook (100 in proposal), 1077 followers in Twitter (75), 164 articles in media (16), 14 radio interviews (2), 5 tv interviews, 14 newsletter (14), etc.	ANSE	ALL

	ACTION	GENERAL PROGRESS	COORD	PARTICIPANTS
	Task 2. Environmental Education Program in schools and educational centres	Completed Participation of >4000 students.	ANSE	ALL
	Task 3. Program for the social involvement in the project (volunteering)	Completed 24 volunteering activities organized with 2382 volunteers	ANSE	ALL
E	E.1 Project Management and Monitoring	Completed 45 coordination meetings.	CHS	ALL
	E.2 After-life plan CHS	Completed. Very important action. Some after life plan actions are actually in execution	CHS	CHS
	E.3 Project Audit	Completed. Last project action	CHS	CHS
	E.4 Networking	Completed 43 events attended in the project. . Two big congresses organized in 2015 and 2016. Networking in Brussels, Holland, UK, etc.	CHS	ALL

TABLE 1. List of actions

LIST OF DELIVERABLES UNTIL 30-07-2017

N°	NAME	ACTION	DEADLINE	RESPONSIBLE	DONE	ADDED IN THIS LAST REPORT
D1	Database (initial)	A1	31/12/2013	DGMA	✓	
D2	A communication plan with the strategy for communication actions and Corporate identity materials	D1	01/01/2014	CHS	✓	
D3	Environmental restoration project document	A1	28/02/2014	CHS	✓	
D4	Technical plan to demolish the obsolete diversion dam	A1	31/03/2014	CHS	✓	
D5	A draft survey, structure of focus group and individual interview	C2	30/04/2014	CHS	✓	
D6	Report: Evaluation and assessment of the prior	A1	30/04/2014	CHS	✓	

N°	NAME	ACTION	DEADLINE	RESPONSIBLE	DONE	ADDED IN THIS LAST REPORT
	ecological state					
D7	Report: Evaluation and inventory of the bird community and bank-associated fauna	A1	30/04/2014	ANSE	✓	
D8	Report: Evaluation and inventory of the fish community and populations	A1	30/04/2014	UMU	✓	
D9	Report: Evaluation and inventory of the plant community	A1	30/04/2014	DGMA	✓	
D10	Technical plan for the constructive plan to allow fish passage at obstacles that are currently in use.	A1	30/04/2014	CHS	✓	
D11	“Exotic species elimination handbook”, 200 printed copies and at least 100 PDF copies sent	D 1	31/07/2014	DGMA	✓	✓
D12	Intermediate monitoring report	E 1	31/07/2015	CHS	✓	
D13	“Forest recuperation handbook”, 200 printed copies and at least 100 PDF copies sent (*)	D1	31/07/2015	DGMA	✓	✓
D14	A report on the results of surveys, focus groups and interviews	C 2	30/04/2016	CHS	✓	
D15	A guideline on improving the project positive impact on socio-economic issues of local populations	C 2	31/05/2016	CHS	✓	
D16	Report on fish passages built	B 2	31/01/2017	CHS	✓	✓
D17	Land custody management report	B 4	31/03/2017	CARM	✓	✓
D18	Report on fluvial restoration	B 3	31/03/2017	CHS	✓	✓
D19	After-life plan, setting the actions, means and	E 2	30/04/2017	CHS	✓	✓

N°	NAME	ACTION	DEADLINE	RESPONSIBLE	DONE	ADDED IN THIS LAST REPORT
	responsible needed to support the continuation of the project activities and results					
D20	13 Technical workshops minutes and conclusions	D 1	31/07/2017	ANSE	✓	✓
D21	14 Quarterly bulletins (every 3 months)	D 1	31/07/2017	ANSE	✓	✓
D22	2.Final monitoring report	C 1	31/07/2017	CHS	✓	✓
D23	4 annual evaluation reports on D1. Dissemination, social awareness and involvement in the project SEGURARIVERLINK	D 1	31/07/2017	ANSE	✓	✓
D24	A layman's report for the better understanding of project activities	D 1	31/07/2017	CHS	✓	✓
D25	A technical guide to support transfer activities on applying green infrastructure	D 1	31/07/2017	CHS	✓	✓
D26	Audit report	E 3	31/07/2017	CHS	✓	✓
D27	Scientific articles	D 1	31/07/2017	UMU/ITA	✓	✓

TABLE 2. List of deliverables

LIST OF MILESTONES

NAME	ACTION	DEADLINE	DONE
Start of the project	E.1	01/08/2013	✓
Filing a prior study on suitable technical solutions to allow fish passage at transversal obstacles	A.1	31/08/2013	✓
Start of interviews	A.1	01/10/2013	✓
Filing a document for the plan to demolish the obsolete diversion dam	A.1	31/10/2013	✓

NAME	ACTION	DEADLINE	DONE
Creation of the database	A.1	31/12/2013	✓
Project web site launched	D.1	01/01/2014	✓
Start of the Socio-Economic Impact evaluation	C.2	01/01/2014	✓
Demolition of an unused dam	B.1	31/01/2014	✓
Filing a document for the constructive plan to allow fish passage at obstacles that are currently in use	A.1	28/02/2014	✓
Start of the circulation and dissemination campaign by the Custody Network	B.4	31/03/2014	✓
Preliminary actions finished, starting of the implementation actions	E.1	30/04/2014	✓
Beginning of the monitoring activities	C.1	01/08/2014	✓
Public presentation of the “Exotic species elimination handbook”	D.1	01/08/2014	✓
Start of signing of Custody agreements	B.4	30/09/2014	✓
End of field collection of germplams	B.3	31/12/2014	✓
Start of passages building	B.2	27/02/2015	✓
Public presentation of the “Forest recuperation handbook”	D.1	31/07/2015	✓
End of nursery cultivation of seedling and cutting	B.3	30/09/2015	✓
End of project to eliminate exotic species	B.3	30/09/2015	✓
Celebration of EU network meeting on Fish Passage and River Connectivity*	D.1	01/08/2016	✓
Public presentation of the “Exotic species elimination handbook”	D 1	01/08/2014	✓
Public presentation of the “Forest recuperation handbook”	D 1	31/07/2015	✓
Presentation of the 4 evaluation reports on D1. Dissemination, social awareness and involvement in the project SEGURARIVERLINK (every 12 months)	D 1	01/08/2017	✓
Celebration of the 13 technical workshops (months 8, 11, 14, 18, 22, 26, 30, 33, 36, 39, 42, 45, 48).	D 1	01/08/2017	✓
Presentation of the layman’s report and the after-life communication plan	D 1	01/08/2017	✓

TABLE 3. List of milestones

3. Introduction

The territory holding the Segura River basin presents substantial climate contrasts going from plenty of droughts, torrential rains or frequent floods. This spatial and seasonal variability has for centuries moved man to control the river in order to make a use of it. For this reason the Segura River basin is one of the most regulated basins in Europe with numerous fluvial obstacles built throughout its length (mostly dams and weirs). All these factors imply a disruption in the natural motion paths of autochthonous fauna and flora. Dams and weirs are barriers to longitudinal movement across of animal and plant species which require a river continuity in order to develop, reproduce and feed themselves. These infrastructures are physical barriers to natural movement of fish along the river course, upstream as well as downstream

LIFE+ SEGURA RIVERLINK aims to improve connectivity between natural ecosystems by implementing the concept of green infrastructure, increasing the river permeability and longitudinal continuity (specially orientated towards Iberian cyprinids such as the *Luciobarbus sclateri*), help the recovery of the natural ecosystem, restore biodiversity resilience and increase the mobility of species along the river. It also hopes to reverse landscape fragmentation by reviving the green corridor role of the river and the connectivity between protected areas.

The river stretches included in the project are shorted by 9 weirs, one of which has already being demolished and the rest have been permeabilized with fish passes. These actions have been reinforced with the ecological restoration of the river banks. The project have developed also a Land Custody Network to integrate private owners in the river management and in agreeing good practices, increasing the links between the river and neighbouring lands.

The e results of the project are:

- Removal of a disused dam
- Construction of eight fish passages and 54 km of the Segura River opened up for free movement.
- Implementation of an ecological restoration to fight against the exotic invasive species *Arundo donax* and restore the native river species in the river stretch covered by the project.
- Inventory, assessment and diagnosis of the indicators selected for the monitoring and evaluation of the biological communities in each project area (fish community, plant community, bird population, riparian fauna and the classification of the ecological status).
- Creation of the Segura River Stewardship Network.
- Reaching a good ecological status of the Segura and Moratalla Rivers, as well as meeting the requirements established in the Water Framework Directive.
- Implementing the concept of a green infrastructure in the Segura basin, transferring the results obtained to the Segura River Basin Hydrological Plan.

The main expected longer term results include:

- The extrapolation of the techniques validated by the project to the rest of the basin through the Segura River Basin Hydrological Plan. This focus will help connect protected sites and keep the ecosystems in a good condition, thereby complying with the requirements established in the Water Framework Directive, and the results obtained will be transferred to the rest of the basin through the Segura Basin Hydrological Plan.
- Maintenance of the Segura River Stewardship Network to enable the long term preservation of the river restoration.
- Maintenance of the good ecological status of the river.

4. Administrative part

4.1. Description of the management system

PROJECT PHASES AND ACTIVITIES

The actions and activities of LIFE+ RIVERLINK were scheduled in three main phases:

- 1) Preparation of fishing passages and initial evaluation of indicators (A. Preliminary Actions – 9 months),
- 2) Construction of fishing passages, fluvial restoration and land custody network (B. Implementation Actions – 43 months)
- 3) Testing the impacts of fishing passages (C. Monitoring actions – 39 months).

Implementation and monitoring actions was the core of the project, being some of them overlapped. Parallel to these sequential actions, the communication activities (D. Communication Actions – 48 months) were conceived as a permanent action along all the project life, with three main axes: general communication of the project, volunteering and education.

Each beneficiary is responsible of, at least, the coordination of one task or action, depending on their field of expertise. In this way, CHS was responsible for preparatory actions, like the design and projects of fishing passages, in coordination with ITAGRA and for project management actions. The other partners were responsible for evaluating and monitoring the status of indicators, prior and post the construction of fishing scales, being UMU responsible for fishing populations, ANSE for birds' community and bank-associated fauna, CARM for plant community and CHS for the ecological state. CHS, ANSE and CARM were working also very closely in land stewardship in order to gather the support of the owners to maintain the activities undergone in the riverbank.

PROJECT ORGANISATION

The **project has been coordinated by CHS**, being responsible of the organization, planning and monitoring of the project.

The project has been structured at **two operational levels**: technical and administrative/financial. Each associated beneficiary had a contact person to deal with

technical and/or financial issues. CHS was coordinated with the financial and technical contacts of each organization for reporting and monitoring purposes.

The **Steering Committee and the Advisory Board** of the project was established at the beginning of the project (October 2013). Action coordinators were also named, and they are the focus points for technical issues.

Coordination meetings were held regularly in Murcia, at the headquarters of the coordinating beneficiary. At the beginning of the project, they were organized every month in order to ensure a correct start-up of the project, but once the project is running successfully, they are held every two months. The action coordinators and the technical and financial external support of the coordinating beneficiary are who normally participate in these meetings. All beneficiaries attended, with the exception of ITAGRA that was the only out of Murcia and cannot attend physically, so it is contacted previously to report its activity via email or telephone or via Skype during the meeting.

CHS called partners by email one week before the meeting and anticipated the agenda and main issues to discuss and review. After the meeting, minutes were sent to the ABs to get their feedback and summarize the tasks agreed during the meeting for each associate. From comments and conclusions of each meeting, check or “to do” lists were developed, in order to organise the work in the short and midterm. The agendas, minutes and attendance list of each meeting can be found attached to this report in the Administrative Annex.

Apart from meetings, **email communication** was produced regularly to keep partners updated about common activities, to coordinate actions and to share information coming from the EC.

Regarding the **financial reporting**, in order to perform a smooth project implementation at the financial level, CHS agreed with the other partners that an update of the project’s expenditure should be reported every three months. This should be supported by the necessary documentation that justifies the expenditures and their eligibility according to the project budget and the Common Provisions.

More details regarding project management can be found in Action E.1.

ORGANIGRAMME OF THE PROJECT

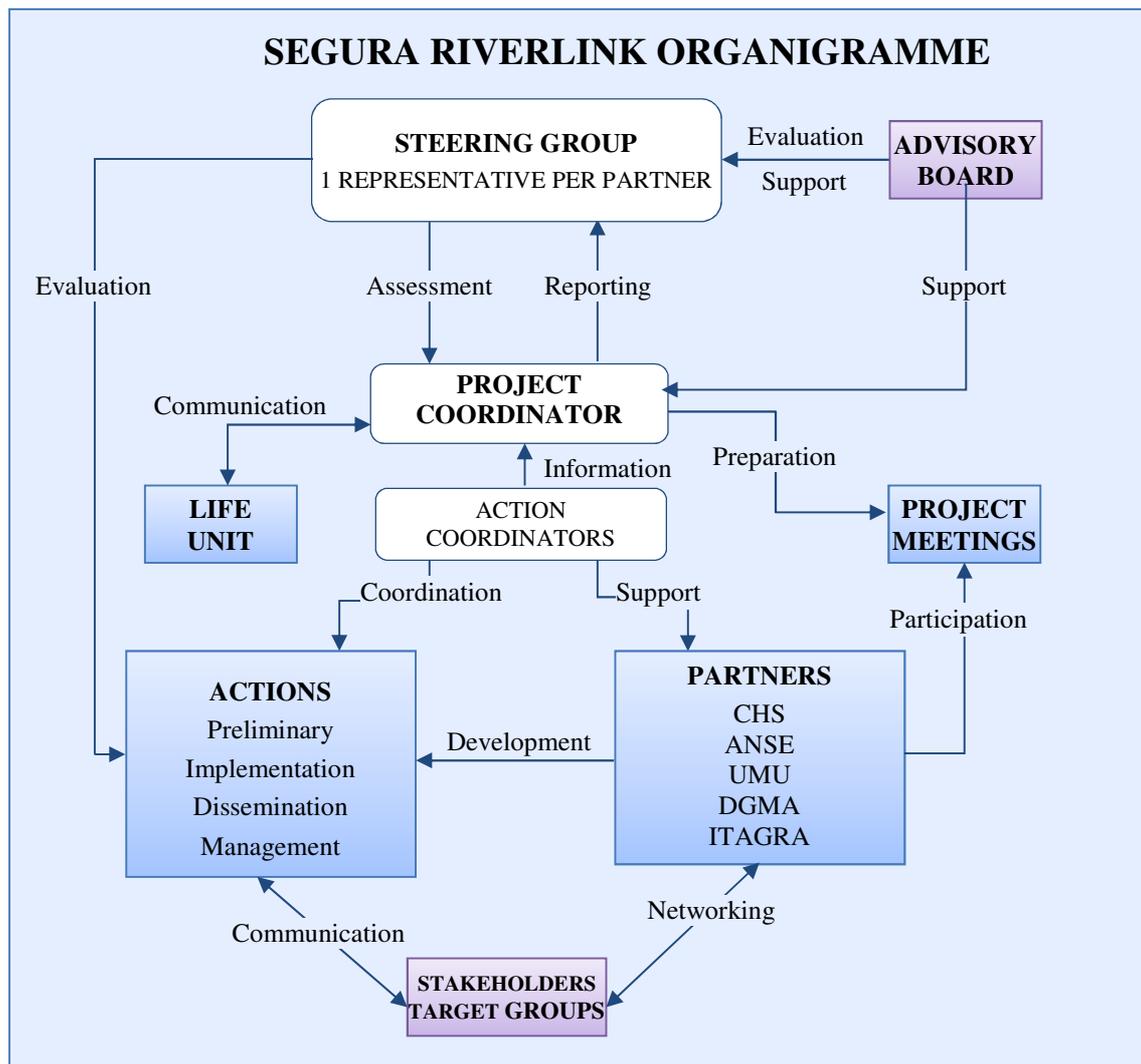


FIGURE 2. SEGURA RIVERLINK Organigram

PARTNERSHIP AGREEMENTS

Partnership agreements between CHS, ANSE and ITAGRA were signed on the 30 December 2013 and submitted with the Inception Report.

The partnership agreements of CARM and UMU were finally signed on 8 October and 28 September 2014, respectively. They were sent to the EC on 30 October 2014 and the GO decision was communicated on 17 November 2014.

4.2. Evaluation of the management system

Since the beginning of the project, CHS has taken the leader role for the coordination of the technical activities and the reporting obligations. The share of responsibilities and tasks and the management structure were well defined in the project proposal and in the partnership

agreements. This facilitated the beginning of the project and the logical implementation of actions.

Coordination meetings were proved as very successful because partners can face to face discuss the project progress, and jointly convey future activities. Also, they cooperated or sum up efforts if they were developing some activities at the same time, such as field trips, samplings, etc. These meetings were also important to announce partners the general communication activities of the project, involving all the partnership in the promotion and dissemination of them through the communication channels of each organization.

The project was very useful to establish working links between different environmental administrations and organizations. They work in the same territory but their activity is not coordinated because traditionally each one has worked separately (eg. CARM and CHS, ANSE and UMU..). Consequently, one of the main **benefits of the partnership** is the opportunity of know what the others are doing, learn from it and lead actions in the same direction.

Some **difficulties** have been found when trying to establish an efficient financial monitoring of the project. Some partners like ANSE and ITAGRA were not used to European financial certification processes, so a special effort was developed by the coordinating beneficiary in order to clarify any doubt and help them in the financial reporting. Since the project beginning, support was offered via email or training meetings to explain the support documentation to be gathered, how to fill the financial report, etc. On the other hand, public administrations (CHS and CARM) suffered from big and rigid structures where collecting financial documents to justify costs implies usually a long processes. In order to solve this, key contacts in each administration have been established, with staff in charge of the justification of other LIFE or European projects.

The communication with the monitoring team was very fluid and useful to solve doubts about eligibility of costs, financial justification, reporting and interpretation of the Common Provisions. They were always well-disposed to help with any issue and the communication via email was rapid and effective.

The monitoring team has been received five times in Murcia:

- Kick off meeting – 23 and 24 September 2013. The locations for fishing passages were visited and preliminary actions explained by each partner. The monitoring team explained financial and administrative rules for LIFE projects.
- Second monitoring visit: 17 March 2015. An update of the technical activities was done and partners could comment financial questions with the monitoring team.
- Third monitoring visit: 25 and 26 May 2016.
- Fourth monitoring visit: 7 and 8 March 2017. This time the EC officers were also received.
- Fifth monitoring visit: 18 and 19 September 2017. The project was already finished but the NEEMO responsible of the project came to Murcia to monitor the execution of the last fish passage and to orientate partners about the preparation of the Final Report.

These visits were very useful for all the RIVERLINK team. After them, EC letters have been received on 14 February 2014, 24 April 2015, 3 November 2016, 25 April 2017 and 9 October 2017.

The Inception Report was sent to the EC in May 2014. It covered the project activities from 01/08/2013 to 15/04/2014. A first letter of the EC was received in July 2014, communicating the NO GO decision due to the not signature of two partnership agreements (CARM and UMU). The GO decision was communicated after the signature in November 2014.

The Mid Term Report with payment request was sent in November 2015, receiving an EC letter of response in February 2016.

An Inception Report, informing about the progress of activities until November 2016, was sent in January 2017. The response of the EC was received in February 2017.

All the questions appearing in EC letters concerning to reports or monitoring visits have been answered in Annex II Responses to EC letters, attaching the required documentation.

The Action E.1 coordinated the overall project development, the joint activities of partners and all the administrative and financial tasks, together with the communication with LIFE+ unit and the external monitoring team, NEEMO.

4.3. Progress of Action E1

- **Participants:** All
- **What has been done:**

Task 1: Management of the consortium activities

The project was coordinated and managed by CHS, assisted by external experts and in collaboration with one representative of each beneficiary. The coordinator and the beneficiaries have made a big effort to ensure a correct implementation of the project. A fluent communication and the proximity among partners have enabled that the management of the project was developed fluently and without problems.

The main actions developed regarding project management were:

- Signature of the partnership agreements.
- Management Handbook: developed by CHS and delivered to partners in order to establish clear guidelines of the role that the coordinating beneficiary and associated beneficiaries. It contains also reporting obligations and budgetary issues, explanation of costs categories and related supporting documentation and a translation into Spanish of the “Guidance for financial management and reporting 2013” of the LIFE Programme.
- Establishment of the Steering during the kick-off meeting (September 2013).
- Election of the Advisory Board formed by experts proposed by each partner organization, in the period between the kick-off meeting and October 2013.
- Coordination of project actions through actions coordinators.
- Internal meetings of CHS team to review management tasks and update the project progress.

- Coordination meetings: held on a regular basis (every month or two months) with the presence of actions coordinators, coordinating beneficiary and external experts.

This is the calendar of the coordination, monitoring and management meetings held (45):

	DATE	PARTICIPANTS	OBJECTIVE
1	08/07/2013	CHS	Preparation of partnership agreements and revision of budget
2	12/07/2013	CHS	Preparation of partnership agreements, planning of management activities and project calendar, revision of budget.
3	18/07/2013	CHS	Internal project presentation at CHS facilities
4	24/07/2013	CHS – DGMA – UMU – ANSE	Information about the grant agreement, update on the objectives and scope of each partner, procedures for partnership agreements, revision of shared tasks and activities, project calendar, budget
5	03/09/2013	CHS	Preparation of Kick-off meeting
6	23- 24/09/2013	CHS – DGMA – UMU – ANSE – ITAGRA	Kick-off meeting. Presentation of activities to be developed in the first 9 months. State of partnership agreements. Administrative and financial recommendations.
7	04/10/2013	CHS	Financial and administrative issues
8	10/10/2013	CHS	Financial and administrative issues. Corporate image, website. Kick-off meeting in Madrid for beneficiaries.
9	17/10/2013	CHS – ANSE	Planning of general communication actions
10	05/11/2013	CHS – DGMA – UMU – ANSE	Coordination meeting
11	10/12/2013	CHS – DGMA – UMU – ANSE	Coordination meeting
12	12/02/2014	CHS – DGMA – UMU – ANSE	Coordination meeting
13	09/03/2014	CHS	Meeting of the coordinating beneficiary team
14	07/04/2014	CHS	Review of agenda of the coordination meeting and pending tasks for the Inception Report.
15	08/04/2014	CHS – DGMA – UMU – ANSE	Coordination meeting
16	19/05/2014	CHS	Meeting of the coordinating beneficiary team
17	21/05/2014	CHS-ANSE	Financial monitoring
18	02/06/2014	CHS – DGMA – UMU – ANSE	Coordination meeting
19	11/09/2014	CHS – DGMA – UMU – ANSE	Coordination meeting
20	28/10/2014	CHS	Meeting of the coordinating beneficiary team
21	29/10/2014	CHS – DGMA – UMU – ANSE	Coordination meeting
22	01/12/2014	CHS – DGMA – UMU – ANSE	Coordination meeting
23	21/01/2015	CHS	Meeting of the coordinating beneficiary team
24	04/02/2015	CHS – DGMA – UMU – ANSE	Coordination meeting
25	18/02/2015	CHS	Meeting of the coordinating beneficiary team
26	17/03/2015	CHS – DGMA – UMU – ANSE – NEEMO	Second visit of the Monitoring Team
27	26/03/2015	CHS	Revision of pending tasks after monitoring visit
28	28/04/2015	CHS – DGMA – UMU – ANSE	Coordination meeting
29	04/05/2015	CHS - ANSE	Financial monitoring
30	30/06/2015	CHS-ANSE	Financial monitoring
31	03/07/2015	CHS – DGMA – UMU – ANSE	Coordination meeting

32	03/07/2015	CHS	Preparation of financial documents
33	10/09/2015	CHS – DGMA – UMU – ANSE	Coordination meeting
34	2/12/2015	CHS – DGMA – UMU – ANSE	Coordination meeting
35	9/02/2016	CHS – DGMA – UMU – ANSE	Coordination meeting
36	10/05/2016	CHS – DGMA – UMU – ANSE	Coordination meeting – Preparation NEEMO visit
37	25/05/2016	CHS – DGMA – UMU – ANSE – NEEMO	4th monitoring visit NEEMO
38	21/09/2016	CHS – DGMA – UMU – ANSE	Coordination meeting
39	07/11/2016	CHS – DGMA – UMU – ANSE	Coordination meeting
40	20/01/2017	CHS	Financial monitoring
41	25/01/2017	CHS – DGMA – UMU – ANSE	Coordination meeting
42	22/02/2017	CHS – DGMA – UMU – ANSE	Coordination meeting
43	07/03/2017	CHS – DGMA – UMU – ANSE – NEEMO - EC	EC visit
44	15/06/2017	CHS – DGMA – UMU – ANSE	Final coordination meeting
45	19/09/2017	CHS – DGMA – UMU – ANSE – NEEMO	5th monitoring visit NEEMO

TABLE 3: Organization of coordination and management meetings

Task 2: Monitoring of the Project Progress

The monitoring of the project has been based on a fluent and regular communication between project partners, at the technical and financial levels.

Actions and management tools developed to monitor the project progress are:

- Working Breakdown Structure.
 - Critical Path Method.
 - Checklist of tasks emanating from coordination meetings, reviewed monthly to evaluate how actions are being carried out.
 - Evaluation of expenditures and supporting documentation sent by ANSE, ITAGRA, UMU and CARM, every three months to CHS to monitor the financial progress of the project.
- **Achieved objectives:**
 - Good project management with respect of timing, cost and quality during project life.
 - Development of activities and deliverables.
 - Completion of the official UE reports: Inception Report, Midterm Report, Progress Report and Final Report.

- Improvement of the project activities outputs and results compared to the originally planned (some actions have been implemented earlier than expected to improve results, some general objectives of the project have been overcome i.e. communication activities...).
 - Smooth project management and good collaboration among partners;
 - Good financial performance (total expenditure around 95% of the initial budget).
 - Permanent assessment and support for project partners until the end of the project and beyond.
 - Successful project coordination.
- **Remaining objectives:** None.
 - **Date of completion:** July 2017
 - **Variations in action:** none
 - **Action evaluation:** the management and coordination of the project has been successful thanks to a close monitoring of the project coordination and the collaboration and good cooperation of all partner.

	2013					2014	2015	2016	2017
	Ago	Sep	Oct	Nov	Dic	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable E1	X	X	X	X	X	X	X	X	X
Real dates E1		X	X	X	X	X	X	X	X

Table 4: Comparison between the foreseen sample calendar and real calendar

5. Technical part

5.1. Technical progress, per task

The overall objective of the project is to promote the environmental recovery of the Segura River Basin by demonstrating and validating different actions aimed at increasing the longitudinal continuity of the river under a green infrastructure approach.

Below you can find a short description of the project actions and the activities undertaken during the project implementation in the period between the 1st August 2013 and the 30th of July 2017.

5.1.1. Action A1: Planning of actions to increase longitudinal connectivity: drafts of actions on target infrastructures.

Task-1. Fish Passages projects

- **Participants:** CHS and ITAGRA (GEA Ecohidráulica, research group associated with ITAGRA.CT and the University of Valladolid)
- **What has been done:**

a) Weir characterization: The 23rd September 2013, first day of the kick-off meeting, the complete SEGURA RIVERLINK Team participated in the field visit organized by the CHS. The objective was to visit the most emblematic demonstration sites describing their characteristics and features (property, boundaries, etc.). To facilitate this work the CHS provided technical dossier with this information.

b) Topographic study: The topographic survey was carried out in October 2013 by ITAGRA. The topographic features of weirs, riversides and water levels were determined using a surveying station. To expedite this work and facilitate the localization of the weirs, a fluvial guard (CHS personnel) helped the technicians during all the visits.

The working plan was as follows:

	NAME OF THE OBSTACLE	ABREV	X_ETRS89	Y_ETRS89	RIVER
1	CAÑAVEROSA dam	CAÑ	612399	4237785	SEGURA
2	ELEVACION ZONA 1 POST-TRASVASE weir	POS	613801	4236645	SEGURA
3	EI ESPARRAGAL weir	ESP	617358	4234253	SEGURA
4	LA MULATA dam	MUL	623317	4233193	SEGURA
5	HOYA GARCÍA weir	HOY	627264	4233672	SEGURA
6	LOS CHARCOS weir	CHA	630736	4233131	SEGURA
7	EL MENJÚ weir	MEN	639340	4231145	SEGURA
8	SOTO DAMIÁN weir	SOT	640630	4229350	SEGURA
*	Toma de Rota weir		613005	4236099	SEGURA
*	Manterola weir	MAN	663947	4205535	SEGURA
*	Archena weie	ARC	649581	4219658	SEGURA

TABLE 5. Obstacles studied

During the second day, two additional weirs (not included in the proposal) were visited, Toma de Rotas and Manterola weirs. The first one was visited because it is placed in the project area but hasn't been selected as a demonstration site because a fish pass has already been projected although it hasn't been constructed yet. The second one, Manterola weir, is located in the city centre of Murcia, capital of region. This weir was visited and surveyed because of the possibility of making a fish pass in the future.

c) Prior study: A prior report with the most suitable technical solutions for each transversal obstacle was sent to CHS in November 2013 (Deliverable nº D10) by ITAGRA. In this report, a specialized literature revision was made in order to determine possible alternatives to solve migration problems. This report proposed a justified technical solution for each of the demonstration sites and the best location for it.

In May 2014 CHS sent IBERDROLA (owner of the two dams: MUL and CAÑ) a detailed analysis of the solutions proposed for the future fish pass projects.

d) Technical reports: For each fish pass, ITAGRA wrote down a technical report with constructive drawings and hydraulic calculations. This is the basic content included in the document for the constructive plan to allow fish passage at obstacles that are currently in use (Deliverable n° D6)

- CAÑ: A pool and a dam fish pass in the right riverside is projected .
- POS: A pool and weir fish pass is projected in the right riverside.
- ESP: In this weir, a pool and weir fish pass in the right riverside is projected.
- MUL: For this dam a fish funicular was initially designed.
- HOY: A natural like fish pass in the right riverside is projected.
- CHA: In this case, two technical reports have been done. The first one corresponds to the solution proposed in the prior report, a bottom ramp with boulder sills in the right riverside. However, due to property problems (the land owner did not agree, which put the viability of the project at risk), the location of the fish pass was changed. Therefore, a bottom ramp with boulder sills is projected in the left riverside as final solution
- MEN: A natural like bypass channel in the right riverside is projected.
- SOT: A vertical slot fish pass in the left riverside is projected.
- MAN: As an alternative to Mul, a vertical slot fish pass was studied but discarded
- ARC: As an alternative to MUL and MAN a natural like bypass channel in the left riverside is projected (2017)

e) Projects: All these solutions were discussed with the concessionaries, firstly in group (11th November 2013, photograph and attendance list can be found attached as Deliverable n° D10) and then individually, with several field visits in each demonstration site to discuss the technical report elaborated by ITAGRA.

The CHS was responsible for completing the fish passages projects using the technical reports elaborated by ITAGRA. All the projects were finished by July 2014 except for La Mulata, as IBERDROLA did not accept the technical solution. The technical solution projected in CAÑ was not accepted either and they finally wrote their own project. ARC project was finished in early 2017.

f) Request of the administrative authorization: The CARM (competent organism to provide this permit) and AB of the project authorized the works in September 2014 (2017 for ARC)

- **Main problems encountered:**

MUL: As previously explained, IBERDROLA (concessionaire of the dam) did not approve the technical solution presented as they were afraid the structure of the dam might be damaged. After a long negotiation, the fish passage in MUL had to be disesteemed for technical reasons.

Instead, the alternative proposed is to build a fish pass in the MAN, located in the city centre of Murcia, as it has an enormous potential to raise public awareness due to its location.

The first administrative consults with the Cultural and National Heritage Directorate begun in November 2014. The ideal technical solution is to build the fish pass in the left riverside. However, there is a protection which seems to make it difficult to locate there. The negotiation finishes with the rejection of the DG Cultural and we opted for a natural fishway close to a big village as Archena (ARC) , with high visit potential.

The fish pass project presented for CAÑ was not accepted by IBERDROLA. After a long negotiation, IBERDROLA developed their own alternative which was first discussed in Madrid (January 2015) and then in Murcia (July 2015) together with CHS and ITAGRA. Finally CAÑ was constructed and MUL was replaced by the ARC fishway.

- **Achieved objectives:**
 - Prior study of suitable technical solutions for 10 obstacles.
 - 8 definitive constructive projects out of the 8 expected (MUL was dismissed and CAÑ was finally designed by the concessionaire and approved by CHS-ITAGRA and ARC was designed by Itagra too).
- **Remaining objectives:** None
- **Variations in action:** Change of the fish passage in MUL for ARC and a delay in the end of the work of this fish passage.
- **Action evaluation:** successful in 8 of the 8 cases.

	2013	2014				2015	2016-2017
	Ago-Dic	Ene	Feb	Mar	Apr-Dic	Jan-Dec	Jan-Nov
Planned timetable A1 Task 1	X	X	X	X			
Real dates A1 Task 1		X	X	X	X	X	X

TABLE 6. Comparison between the foreseen calendar and the real calendar

Task- 2: Weir demolition project

- **Participants:** CHS, CARM and UMU
- **What has been done:**
 1. Even though the possible concessions attached to this weir were already studied during the proposal, this was review again. The weir was confirmed to be unused as no existing concessions were found.
 2. A water and sediment sampling selected upstream of the weir in order to identify possible pollutants (action C1 Monitoring activities, Task 6) was made by the CHS. No pollutants appeared in the results.

3. The mandatory authorization for the demolition was submitted on 12 November 2013 to the CARM. The CHS was required more information before authorising the works.
4. Initial study of the presence of fish communities in the area by the UMU, in order to analyse the need for a temporary transfer or translocation. No fish specimens were detected in the immediate vicinity of the weir during the days before the demolition.
5. The CARM elaborated a floristic inventory in the surroundings of the action area, with a special emphasis in endangered species, to determine those individuals that could be affected by the works, in order to avoid damage as far as possible.
6. The CHS elaborated a technical demolition project to study the possible impacts of the weir demolition (risk of pollutant release, lowering of the water level in the river upstream of the weir, erosion in the riverbeds, influence over near structures...) and describe the technical specifications of how the works should be done.

NAME OF THE OBSTACLE	X_ETRS89	Y_ETRS89	RIVER
MORATALLA weir (UNNAMED weir according to the proposal)	611706	4235454	MORATALLA

TABLE 7. Moratalla weir localization

Even though April-June 2014 was the scheduled date to implement the weir demolition, CHS decided to bring the date forward to January 2014 (previously consulting the EC via the external monitoring team) The Deliverable n°4 attached as annex 2 includes not only the project demolition but also de proper demolition itself.

No problems were identified and goals of this action have been achieved.

- **Achieved objectives:** Document for the plan to demolish the obsolete diversion dam.
 - **Remaining objectives:** none.
 - **Variations in action:** none.
 - **Action evaluation:** successful.

	2013					2014		
	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar
Planned timetable A1 Task 2	X	X	X	X	X	X	X	X
Real dates A1 Task 2		X	X	X	X			

TABLE 8. Comparison between the foreseen calendar and the real calendar

5.1.2. Action A2: Initial inventory and evaluation (state) of selected indicators in monitoring programmes initial inventory and evaluation (state) of selected indicators in monitoring programmes.

Task-1: Initial evaluation of biological indicators: fish community and populations

- **Participants:** UMU
- **What has been done:**
 1. The initial evaluation of the fish-based bioassessment was completed.
 2. The sampling localities at the regional level (the total river sector of the project) were successfully established. We had problems establishing one sampling locality at the local level (river stretches next to the La Mulata obstacle are impossible to access for sampling). However, this will not impact the monitoring programme of fish community and population indicators because data at regional scale will be used.
 3. Fish samplings was conducted between October and the first half of April. We had technical difficulties in conducting the surveys (mainly electrofishings) in several locations because the high flows hindered the sampling works (in two sampling sites the fish samplings were only qualitative). However, we obtained data from 1 or 2 visits over the action period in 6 sector-sites, 8 stretch-sites next to obstacles and 3 control-sites in the main channel of the Segura River (3 additional sampling sites in the Moratalla tributary).
 4. Due to the previous information obtained by the research group (Department of Zoology, University of Murcia), we have valid information for obtaining the value of indicators. In fact, no changes are necessary to the baseline implementation programme.
 5. The initial evaluation of community and population metrics have been successfully obtained for the total localities included into the monitoring programmes (except La Mulata). The technical report (Deliverable nº 9, annex 2) presents the main results of the metrics. Although we are going to add to the initial evaluation of fish-based bioassessment some data that we try to obtain during the spring, the action objectives have been fully achieved (100% of the objective accomplished).
- **Achieved objectives:** The initial evaluation of community and population metrics have been successfully obtained for the total localities included in the monitoring programmes except La Mulata dam, as sampling in this location was impossible and this locality was removed from the control points:
 - Presence/Absence and distribution of sentinel species, both indigenous and invasive.
 - Establishing optimal species and sizes for the development of the mark and recapture program.
 - Initial situation in terms of parameters that describe the population state (Age Structure, Size Classes, Gender Proportion, Recruiting, Rate of Individual Anomalies, etc.).

- Initial evaluation of the structure of the biological community (relative abundance, importance in terms of equitability, etc.)
- **Remaining objectives:** none.
- **Estimated date of completion:** -
- **Variations in action:** none.
- **Action evaluation:** successful

	2013					2014			
	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Apr
Planned timetable A2 Task 1	X	X	X	X	X	X	X	X	X
Real dates A2 Task 1		X	X	X	X	X	X	X	X

TABLE 9. Comparison between the foreseen calendar and the real calendar

Task 2: Initial evaluation of biological indicators: plant community

Action A2 Task 2 is completed.

- **Participants:** CARM
- **What has been done:**

In order to assess the initial state of conservation of the flora of the riverbanks, the CARM has conducted a number of inventories of plant species present in the surroundings of each of the nine demonstration sites where the fish passes will be implemented (see attached deliverable n° 5, annex 2). A total of 293 different taxa (approximately 13% of the flora of the Murcia Region) and 23 protected species under protection regulations of the Region of Murcia ([Decree n. ° 50/2003 of 30 May. Regional Catalogue of Protected Flora of the Region of Murcia](#)) have been inventoried. This work has been carried out with transect walks along both riverbanks of Segura and Moratalla Rivers in order to detect and localize where these species are located, to protect them when the fish passes and restorations works begin (they will determine accesses and working areas to minimize damage).

The inventories and location of areas with presence of protected, rare or threatened species is useful for the development of projects and the subsequent restoration works, as no planting will be done in those areas where native flora exists (in any case, its expansion or diversification with other species will be enhanced). Thus, only those areas where vegetation formations are not well developed will be restored. These areas, located upstream or downstream of the obstacles have been identified through the inventories.

On the other side, those autochthonous individuals in the surroundings of the demonstration sites considered in better conservation state and vitality have also been marked to collect germplasm (cuttings from branches and roots) during the winter break. The seeds of those species that could be reproduced in the tree nursery in this way were recollected in autumn 2013. As a result, 23 sites have been inventoried for the germoplasm recollection: La Encarnación, Cueva del Moro, Los Paradores, Las Capellanías, Moralejo (Agunzaderas), Puerto Hondo, Rincón de los Huertos, Fuente Mellinas, Benamor, Azud del Moratalla,

Maripinar, El Ginete, Los Charcos, La Mulata, Casa de la Maestra, El Esparragal, Azud de Rotas-Trasvase, La Esperanza, Campillo, Cañaverosa, Las Hoyicas, El Bayo and Las Juntas del Mundo.

No areas were marked in El Menju or Soto Damian weirs because of the presence of riparian species which belong to old restorations of gardening whose genetic origin is not guaranteed.

- **Achieved objectives:**
 - 9 floristic inventories, one per zone of action (the proposal includes a small error, it said 10 instead of 9).
 - Initial evaluation of the structure of the biological community (relative abundance, importance in terms of equitability, etc.)
- **Remaining objectives:** none.
- **Estimated date of completion:** -
- **Variations in action:** none
- **Action evaluation:** successful.

	2013					2014			
	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Apr
Planned timetable A2 Task 2	X	X	X	X	X	X	X	X	X
Real dates A2 Task 2				X	X	X	X	X	X

TABLE 10. Comparison between the foreseen calendar and the real calendar

Task 3: Initial evaluation of biological indicators: bird community and bank-associated fauna

- **Participants:** ANSE
- **What has been done:**

Field samples to monitor river fauna began in October 2013. Sample activity is summarized in the table below:

GROUP OF FAUNA	METHODOLOGY	N° OF SAMPLES	LOCATIONS SAMPLED	LOCATIONS WITH DATA
Otter	Rastreo	Variable depending on location	ALL	ALL except MUL
Otter	Camera trap	8	CAÑ, POS, ESP	CAÑ, POS, ESP
Odonate	Capture with net	4 per location	ESP, HOY, CHA	CHA, HOY, ESP, POS, CAÑ, MEN
Odonate	Larvae sampling	1 per location	ALL	ALL
Freshwater turtles	Pots sampling	13	CAÑ, POS, ESP, HOY, CHA, MEN, SOT	CAÑ, POS, ESP, HOY, CHA, MEN

Birds	Ringing	6 per location	POS, ESP, HOY, CHS, MEN	POS, ESP, HOY, CHS, MEN
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TABLE 11. Fauna Sampling A2 Task 3

Locations: Cañaverosa(CAÑ), Post-trasvase (POS), Esparragal (ESP), Mulata (MUL), Hoya García (HOY), Los Charcos (CHA), Menjú (MEN) and Soto Damian (SOT).

Sampling started in 26th September 2013. This complicated the odonate and freshwater turtle data gathering because these groups are invertebrates and ectodermic vertebrates, so their activity depends on the environmental or water temperature and are inactive or at a larval stage during the winter season. Freshwater turtle activity stopped in mid-Autumn as showed by sampled in 20th November 2013. The samples carried out in March 2014 in Hoya García and Los Charcos have resulted negative. The delay in the beginning of the activity in comparison to other locations in the Southeast of the Iberian Peninsula is due to the fact that the freshwater temperature is much lower than the temperature in other water bodies previously sampled.

The Deliverable n° 8 (see annex 2) attached to this report contains initial data obtained during autumn and winter 2013. The delay in the presentation of the full report does not affect to other project actions.

- **Achieved objectives:** Initial evaluation of the structure of the biological community (relative abundance, importance in terms of equitability, etc.).
- **Remaining objectives:** none
- **Estimated date of completion:** -
- **Variations in action:** none.
- **Action evaluation:** successful

	2013					2014					
	Aug	Sep	Oct	Nov	Dic	Jan	Feb	Mar	Apr	May	Jun
Planned timetable A2 Task 3		X	X	X	X	X	X	X			
Real dates A2 Task 3		X	X	X	X	X	X	X	X	X	X

TABLE 12. Comparison between the foreseen calendar and the real calendar

Task 4: Prior ecological state of the stretch of the project

- **Participants:** CHS
- **What has been done:**

Due to the high current flow through the Segura River during the months of October and much of November 2014, the sampling was conducted intensively in two days coinciding with a significant reduction in flow as a result of a broken channel upstream of the stretch of the project.

The first step for the classification of the prior ecological status was the selection of monitoring sites up and downstream of each weir, according to representativeness of the general conditions of the area and channel access criteria.

DAY	TASK	LOCATIONS
27/11/2013	Selection of sampling sites	ALL
28/11/2013	Sampling of biological, hydromorphological and physico-chemical quality elements	ALL Except MUL downstream
18/03/2014	Preliminary results of the quality elements analyzed	ALL Except MUL downstream
20/03/2014	Inventories of diatom and macroinvertebrate communities	ALL Except MUL downstream
26/03/2014	Prior ecological status of each weir	ALL Except MUL downstream

TABLE 13. Prior ecological status working plan

On November 28th the CHS proceeded to collect the samples corresponding to the quality elements and indicators that compute in the ecological status classification. The quality elements used were those defined by the WFD (see Deliverable 7.2.7). These quality elements are:

Biological quality elements:

Composition and abundance of Benthic Invertebrate fauna.
Composition and abundance of Aquatic Flora: Diatoms.

Hydromorphological quality elements:

Hydrological regime: river depth and width variation: channel cross sections.
River Continuity: River Connectivity Index.
Morphological Conditions of the channel upstream and downstream of each weir: Fluvial Habitat Index, the Index of Riparian Quality and riverbed substrate composition.

Chemical and Physicochemical quality elements:

General:

Thermal conditions: mean T^a,
Oxygenation conditions: dissolved oxygen and % oxygen saturation,
Salinity: Mean Electric Conductivity at 20°C,
Acidification status: pH, and
Solids in suspension.

Nutrient conditions:

Total ammonia (NH₄), nitrites (NO₂) nitrates (NO₃) Kjeldahl Nitrogen, Total Nitrogen (N), Phosphates (PO₄) and Total Phosphorus.

Specific pollutants:

Priority substances analyses are shown in action C1-Task-5.

A total of 17 samples of biological, hydromorphological and physicochemical quality elements were collected.

During the months of December, January and February the CHS proceeded to the analysis of water samples in the laboratory, and the determination and calculation of indicators, metrics and indexes needed for the prior ecological status classification.

The technical report was completed on 26/03/ 2014 with the following results:

WEIR	QUALITY ELEMENTS			ECOLOGICAL STATUS
	Biological	Physicochemical	Hydromorphological	
CAÑ Downstream	High	High	Good	Good
CAÑ Upstream	Good	Moderate	Good	Moderate
MOR Downstream	Poor	Moderate	Good	Poor
MOR Upstream	Moderate	Good	High	Moderate
POS Downstream	Good	Good	Good	Good
POS Upstream	High	Good	Good	Good
ESP Downstream	Good	Good	Good	Good
ESP Upstream	High	Good	Good	Good
MUL Downstream	NO DATA			
MUL Upstream	High	Good	Good	Good
HOY Downstream	High	Good	Good	Good
HOY Upstream	High	High	Good	Good
CHA Downstream	Good	Moderate	Good	Moderate
CHA Upstream	Good	Good	Good	Good
MEN Downstream	High	Moderate	Good	Moderate
MEN Upstream	Good	Moderate	Good	Moderate
SOT Downstream	High	Moderate	Good	Moderate
SOT Upstream	Poor	Moderate	Good	Poor

TABLE 14: Prior Ecological Status classification in each weir

WEIR	NATIVE SPECIES GROUPS	PROVISIONAL SCORE	OBSTACLE COMPLEMENTS	FISH PASS COMPLEMENTS	DOWNSTREAM MIGRATION	FINAL SCORE	
CAÑ	G3a, G3b	0	0	0	5	5	Poor
MOR	G3a, G3b	75	0	0	5	80	Good
ESP	G3a, G3b	0	0	0	5	5	Poor
POS	G3a, G3b	0	0	0	5	5	Poor

MUL	G3a, G3b	0	0	0	-5	0	Poor
HOY	G3a, G3b	0	0	0	5	5	Poor
CHA	G3a, G3b	75	5	0	5	85	Good
MEN	G3a, G3b	0	5	0	5	10	Poor
SOT	G3a, G3b	0	0	0	5	5	Poor

TABLE 15: River Connectivity index results in each weir

For the prior ecological status classification, macrophyte community was not considered because they must be sampled within their growing season (June-September), in order to ensuring the presence of all species in a state of maturity, preventing errors in species identification and reflecting the real diversity of the community. This means that during the autumn/winter campaigns (October 2014, October 2015, October 2016), no macrophytes will be sampled.

On the other side, fish community was not considered in the initial classification of ecological status because nowadays, there are not appropriate indexes for its evaluation in Spain and therefore no defined reference conditions to perform the classification.

No problems were identified and goals of this action have been achieved.

- **Achieved objectives:** Initial evaluation of the ecological status of the stretches of action, except for the river stretch located La Mulata downstream.
- **Remaining objectives:** none.
- **Variations in action:**
 - Sampling in La Mulata downstream was impossible and this locality was removed from the control points.
 - Macrophyte community was not considered because they must be sampled within their growing season (June-September), in order to ensuring the presence of all species in a state of maturity, preventing errors in species identification and reflecting the real diversity of the community.
 - Fish community was not considered in the initial classification of ecological status.
- **Action evaluation:** successful.

	2013					2014			
	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Apr
Planned timetable A2 Task 4	X	X	X	X	X	X	X	X	X
Real dates A2 Task 4		X	X	X	X	X	X	X	X

TABLE 16. Comparison between the foreseen calendar and the real calendar

5.1.3. Action A3: Restoration-rehabilitation design at the bank level in the stretches of action.

- **Participants:** CHS, CARM
- **What has been done:**

1. Design of the restoration projects:

– Identification of the project site location and its boundaries: The same as in Action A1, the CHS technicians have tried to involve local authorities, concessionaries and farmers when projecting this action. This objective has been reinforced after the restoration in MOR was destroyed. For that reason, CHS has organized several meetings with the mayors and environmental technicians of the three main councils involved in the project to explain the projects' objectives and the restoration goals, listen to their needs and preferences, as well as asking concessionaries and farmers involved. Public dissemination is necessary to attract stakeholder participation in the project planning and implementation, and to command respect for the restored areas by local residents.

– Identification of the ownership

– Identification of the need and restoration goals: Most of the restorations include the removal of the giant reed beds (*Arundo donax*) previous to the restitution of the autochthonous riparian forest.

– Identification of species used in the restoration and number of plants needed: This task is related to the germplasm collection and multiplication to obtain autochthonous plant and the nursery cultivation of seedlings and cuttings (*action B3*), coordinated by the CARM. Together with the CHS technicians, the species compositions have been determined and the species abundance estimated. The structure of all component communities has been described, considering criteria such as soil necessities, hydrology and other aspects of the physical environment.

SPECIE	NUMBER
<i>Atriplex halimus</i>	18
<i>Celtis australis</i>	182
<i>Coriaria myrtifolia</i>	243
<i>Fraxinus angustifolia</i>	228
<i>Genista umbellata/G.spartoides</i>	36
<i>Iris pseudacorus</i>	180
<i>Juniperus oxycedrus</i>	18
<i>Juniperus phoenicea</i>	18
<i>Lonicera biflora</i>	217

<i>Lycium europaeum</i>	18
<i>Nerium oleander</i>	1305
<i>Olea europaea var. Sylvestris</i>	18
<i>Pistacia lentiscus</i>	18
<i>Populus nigra</i>	405
<i>Populus.alba</i>	336
<i>Rhamnus alaternus</i>	18
<i>Rosa canina</i>	381
<i>Salix neotrichia</i>	195
<i>Salix purpurea lambertiana</i>	1044
<i>Salix fragilis</i>	808
<i>Sambucus nigra</i>	1258
<i>Scirpus holochoenus</i>	535
<i>Smilax áspera</i>	28
<i>Tamarix gallica</i>	69
<i>Tamarix canariensis</i>	162
<i>Typha dominguensis</i>	62
<i>Ulmus minor</i>	444
<i>Vinca difformis</i>	67

TABLE 17. Identification and number of species

- Characterization of the area: Description of the physical site conditions and identification of landscape restrictions has been done for every demonstration site.
- Identify strategies for long-term protection and management
- Budget design

The project covers 87.677 m² in 28 different actuation sites.

2. Request of the administrative authorization: done.
3. Restoration in the MOR: Even though it was not scheduled yet and because the MOR was demolished earlier than scheduled, a restoration in the surroundings was projected and is already implemented.
 - **Achieved objectives:** Fluvial restoration project.
 - **Remaining objectives:** none
 - **Estimated date of completion:** -
 - **Variations in action:** none.
 - **Action evaluation:** successful

	2013					2014						
	Aug	Sep	Oct	Nov	Dic	Jan	Feb	Mar	Apr	May	Jun	Jul
Planned timetable A3		X	X	X	X	X	X	X				
Real dates A3		X	X	X	X	X	X	X	X	X	X	X

TABLE 18: Comparison between the foreseen calendar and the real calendar

5.1.4. Action A4: Development of management and social participation mechanisms for use in later stages of the project

- **Participants:** CHS, CARM, ANSE
- **What has been done:**

This action aims to encourage landowners, farmers, hunters, fishers and general public to become more involved in the river management and protection and communicate the value of land stewardship as an effective and successful tool for nature and biodiversity conservation.

After several meetings between the partners, the main aims of the action have been fixed (to achieve the collaboration of land owners and farmers in the reforestation actions by giving them the chance to choose between several vegetal protected species and to collaborate in the execution of the plantation, for example). Equally, the cooperation of stakeholders in the River surveillance and in its landscape preservation, etc. will try to be achieved.

During the different communication activities (three project presentations, a Land Custody Seminar, a triptych...), The project has tried to explain stakeholders the advantages of a voluntary cooperation in the project throw the land custody network. A bi effort is being done in these activities as there is some reluctance amongst owner and farmers in some of the areas.

Besides, contacts with fruit export companies and rice producers have been done in order to link the project objectives with their commercial aim, trying to build synergies between both.

CARM has written a Good management practices document, a handbook for NGO's and stakeholder's use (see annex 3). The handbook is a collaborative work produced by a team of public employees and coordinated by an engineer and a solicitor with experience in communicating nature conservation and stewardship of the Regional Government. It is available online in the Life Project Web and in the Regional Government Web:

http://www.murcianatural.carm.es/c/document_library/get_file?uuid=947d025b-c705-4fd4-b301-922c06e3ee12&groupId=14

With the data base created by the CARM (Deliverable n° 1, annex 2), ANSE has made a full characterisation of local stakeholders around the demonstration sites. Data analysis has led to the identification of 10 target groups. Interviews to know their interests and motivations have been designed having in mind specific objectives for each one, what resulted in 10 different interviews models (see attached interviews models per target group).

Interviews to stakeholders groups should have started in October 2013, although this activity began in February 2014. These target groups would include a total of 157 entities and persons, according to the first characterisation of the area. They should be contacted with the aim of

maintaining an interview, both filling a questionnaire via email or in a face to face meeting. Moreover, owners in the surroundings are tried to be contacted, what would increase notably the number of target public. Although a total of 159 questionnaires were sent, only 28 have been sent back (17%). Consequently, a major effort will be done to get as many interviews as possible during the implementation of action B4.

- **Achieved objectives:**
 - Development of the conditions that facilitates the involvement of local stakeholders in the project.
 - 1 Database with 1,000 contacts who should be informed of the project's actions and results (Deliverable n° 1, annex 2).
 - Good management practices document
- **Remaining objectives:** none.
- **Estimated date of completion:** -
- **Variations in action:** none.
- **Action evaluation:** successful.

	2013					2014			
	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Apr
Planned timetable A4	X	X	X	X	X	X	X	X	X
Real dates A4		X	X	X	X	X	X	X	X

TABLE 19: Comparison between the foreseen calendar and the real calendar

**5.1.5. Action B1: Increase of river connectivity:
Demonstration of obstacles removal.**

- **Participants:** CHS, ANSE
- **What has been done:**

Even though April-June 2014 was the scheduled date to implement this action, CHS decided to bring the date forward to January 2014 (previously consulting the EC via the external monitoring team) to:

- Stop it from overlapping with the bird breeding season which goes from February/March up to June/July, depending on the area.
- stop it from overlapping with the fish spawning season and breeding of fresh water turtles which begins in March/April and can go on up to July.
- Facilitate the removal of the debris removed in the demolition, as the river flow is maximum during the months of November to March.

The 22th January 2014, the unused weir in the Moratalla River was demolished (see Deliverable n°4 attached as annex 2).

The works were done using a backhoe to prepare an access to the weir by widening the existent path up to 2.5 or 3m wide and clear the surroundings as the area was intensely covered with vegetation (mostly giant reed beeds, *Arundo donax*). The area was selectively cleared, protecting those individuals considered vulnerable such as *Tamarix* or *Salix*.

Once the area was cleared, the backhoe demolished the unused weir. The works continued the following three days, removing giant reed and preparing the surrounding area (1000m2 approximately) for the restoration.

ANSE organized two activities to restore the area. The first one under the Environmental Educational Program on 24th February, with a local educational centre, and the second one later that week under the Volunteering Program, 28th February and 1st March, during the I Fluvial Restoration Course. The first problem we had when implementing this action aroused a few days after the demolition. Even though the weir was unused (no current concessions), an illegal irrigator was found out to be using the weir to irrigate a small plantation. The CHS personnel had several meeting with him to try to solve his problem. On the 24th March of 2014, two days after the restoration was finished, CHS personnel discovered the restoration had been partially destroyed. There is no proved relation between both incidents but there is an obvious link between them. As a result, the incidence of the dissemination activities were increased in that area and, previous to the rest of restorations (action B.3), a big effort raising people’s environmental awareness was done in the area. These damages were restored on the 2nd December 2014 by restoring the dead plants.

Achieved objectives: Demolition of obstacles and removal of rubble and waste materials from the project area

- **Remaining objectives:** none.
- **Variations in action:** Even though April-June 2014 was the scheduled date to implement this action, the weir was removed in January 2014.
- **Action evaluation:** successful.

		2014					
		Jan	Feb	Mar	Apr	May	Jun
Planned timetable B1					X	X	X
Real dates B1	X						

TABLE 20: Comparison between the foreseen calendar and the real calendar

5.1.6. Action B2: Increase of river connectivity:
Demonstration of fish passages

- **Participants:** CHS
- **What has been done:**
The construction of the fish passages began in January 2015. 8 fish passages are finished and working already.

- CAÑ: A vertical slot fish pass in the right riverside (2016)
- POS: A pool and weir fish pass in the right riverside (2015)
- ESP: A pool and weir fish pass in the right riverside (2015)
- HOY: A natural like bypass in the right riverside (2015)
- CHA: A bottom ramp with boulder sills in the left riverside. (2015)
- MEN: A natural like bypass channel in the right riverside (2015)
- SOT: A vertical slot fish pass in the left riverside (2015)
- ARC: A natural like bypass channel in the left riverside (2017)

At least one information board was installed in each site to inform people about the works that were taking place.

- **Achieved objectives:** 8 finished fish passages out of the 8 fish passages expected:
- **Remaining objectives:** None

Variations in action: small delay in the construction of 4 out of the 8 fish passages (POS, ESP, CHA and CAÑ), that were constructed in autumn of 2015. One of the environmental problems targeted in the Segura River is the inverted natural regime (it carries maximum flow in summer due to the reservoir's discharges for irrigation and minimum flow in winter, opposite to what it should naturally be). As a consequence of this high flow during July-September, the fish passage construction had to be stopped during the summer months (please see Figure below) and began again in October.

The fish passage in MUL is finally dismissed and, as an alternative, a fish passage have been constructed in ARC (MAN was eliminated by technical problems with cultural protection) (see information in Action A2)

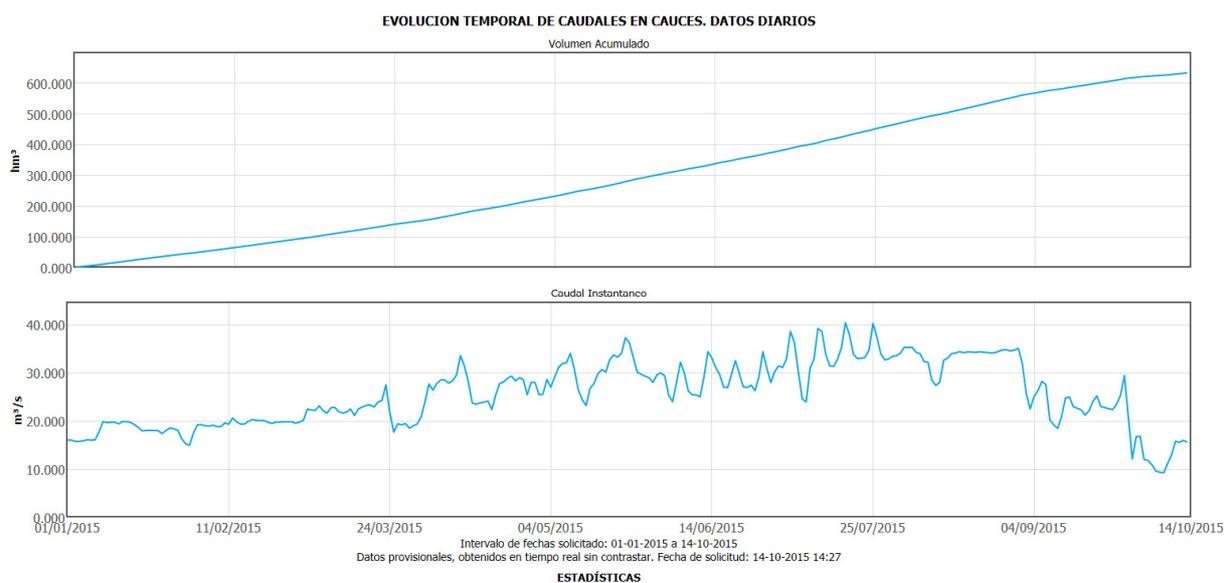


Figure 3. Temporary evolution of flows in Segura River between 01-01-2015 and 14-10-2015.

Daily data from the SAIH (Automatic Hydrological Information System)

All the information including projects, pictures, technical solutions are included in the deliverable D16

• **Action evaluation:**

	2014	2015				2016	2017 (ARC)
	Jul-Dic	Jan-Sep	Oct	Nov	Dec	Jan-Jun	May-June
Planned timetable A1 Task 1	X	X					
Real dates A1 Task 1	X	X	X	X	X	X	X

TABLE 21: Comparison between the foreseen calendar and the real calendar

5.1.7. Action B3: Increase of river connectivity:
Demonstration of fluvial restoration associated to fish passages

• **Participants:** CHS, CARM, ANSE

• **What has been done:** The planned actions for 2015-2017 included in the project “Ecological restoration of Segura and Moratalla rivers in the scope of the project LIFE+ SEGURA RIVERLINK” have been done successfully . This includes the restoration of the following sites:

- Left / right bank of Moratalla river in the action place MOR.
- Left bank of Segura river in the action place SOT.
- Right bank of Segura river in the action place MEN.
- Left / right bank of Segura river in the action place ESP.
- Left / right bank of Segura river in the action place HOY.
- Right bank of Segura river in the action place POST.
- Left bank of Segura river in the action place CHA.
- Right bank of Segura river in the action place CAÑ.
- Left bank of Segura river in the action place ARC (have been planted in autumn 2017 outside the project with CHS financial resources, instead of this area other areas of plantation inside the Custody network have been executed)

• **Achieved objectives:**

- More than 2,200 trees and 2600 bushes planted (and more 2.500 additional plantation due to the bad weather conditions)
- Clearness of more than 65,000 m2 of *Arundo donax* and maintenance of more than 52,000 m2.

- Installation of more than 575 meters of enclosure materials to protect plantations.
- More of 40% of plants have been survived (replantation in 2016 and 2017 have been executed)
- **Remaining objectives:** none
- **Date of completion:** September 2017
- **Variations in action:**
 - Tiles T7-R01 and T7-R02 have been eliminated because they were already planted by the public company Acuamed. In order to replace these areas, two tiles in CHA and ESP action places will be enlarged with the objective of developing more extensive actions for a better control of *Arundo donax*.
 - The failed holes of the project have been evaluated, been these lightly over those previously estimated in the planned restoration project. This is due to the extreme drought suffered in the area. Despite this, the plantation can be considered a success (see Deliverable D22)
 - The calendar of the action is extended until September 2017 in order to make more cleaning activities to control IAS and to provide watering to the plantations.
 - Although the ARC pass have been executed in 2017 spring and therefore impossible to make a plantation , in the 2017 autumn and outside the LIFE project, CHS have already executed with own financial resources a wide zone ecological restoration (more than 1.000 plants planted)
- **Action evaluation:** the tasks implemented already can be considered a success.

	2013					2014	2015	2016	2017
	Ago	Sep	Oct	Nov	Dic	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable B3	X	X	X	X	X	X	X	X	X
Real dates B3		X	X	X	X	X	X	X	X

TABLE 22: Comparison between the foreseen sample calendar and real calendar Action B3

5.1.8. Action B4: Development of a land custody network in connectivity areas

- **Participants:** CARM (coordinator), ANSE , CHS
- **What has been done:**

In accordance with the LIFE Agreement and in coordination with the associated beneficiaries and singularly with CHS and ANSE – that acts as land stewardship entity - diverse works have been done to create a land stewardship network in the frame of the project.

We began identifying the main agrarian activities developed in the areas of performance. A relation of potentially interested owners has been obtained.

Simultaneously, a manual was being prepared. Subsequently explanations were given to the farmers in the meetings celebrated in the affected municipalities. Field visits to contacted plots were then conducted. Environmental improvements that could be made in the area in land stewardship (collaboration in plantations, installation of drip irrigation for plantations, transfer of private waters for the irrigation, maintenance of the irrigation network, manual clearings of vegetation, limitation in the use of glyphosate, elimination of Invasive Alien Species (IAS) (mainly, *Arundo donax*) help in the plant growing, information about news or incidences, collaboration in follow-up, etc.)

These improvements were proposed and discussed with the owners. A proposal document of agreement was subsequently made in writing that serve as a framework for their implementation and was delivered to the farmers for its study and if there was compliance, preparing the signing of the agreement. To do this, we studied previously the location of the plot and its legal status.

Once signed the agreement we continued making visits to the plots subject to land stewardship and the plots subject to verbal stewardship agreement.

We remained a fluid contact with the owners for any questions related to compliance with the same or with the development of the actions of the project.

Finally, we attempted to build relationships between different owners through the conduct of meetings between them. The website of the project and their social networks has been used in the action dissemination. The findings have been presented at various conferences.

Similarly, a few awards and distinctions have been granted to the members of the land stewardship network.

Achieved results:

- 13 items of public or private property included in the Land Custody Network.
- 11 custody agreements.
- 8 technical memorandums for possible interventions by plots included in the Land Custody Network.
- 66 hectares of land included in the Land Custody Network, of which:
 - 60 Ha on public lands
 - 6 Ha. on private lands.
- Total: **66 Ha.** - 8 concrete actions for environmental improvement in the Land Custody Network.
- Implementation of the code of good management practices.
- Circulation and dissemination campaigns by the Custody Network among potentially affected/interested parties, along with the circulation of the SEGURA RIVERLINK project. 3 meetings with land owners and tens of visits to the properties.
- An increase in society's awareness of the environment and of the importance of the river as an environmental ecosystem. Land stewardship work has generated an important social impact:
<http://webtv.7tvregiondemurcia.es/divulgativos/diario-del-campo/2016/viernes-26-de-agosto/>
<https://www.youtube.com/watch?v=RBGAq07RTsM>
- In the medium run, the implementation of the code of good management practices is to lead to an improvement in the river's natural habitats. The evaluation of these results will be

done through itinerant sampling actions on biological and physical-chemical indicators, included in actions C1, C2, C3 and C4.

- A document for the definition of sensitive areas to be part of the Custody Network elaborated.
- A framework document of best practices for the management of fields belonging to the Custody Network elaborated.

- **Date of completion:** September 2017
- **Variations in action:** none
- **Action evaluation:** the tasks implemented already can be considered a success.

	2013					2014	2015	2016	2017
	Ago	Sep	Oct	Nov	Dic	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Mar
Planned timetable B4	X	X	X	X	X	X	X	X	X
Real dates B4		X	X	X	X	X	X	X	X

TABLE 23: Comparison between the foreseen calendar and real calendar B4

5.1.9. Action C1: Monitoring activities

Task 1. Evaluation and programme to monitor operation indicators at fish passage systems

- **Participants:** ITAGRA
- **What has been done:** The technical building of fish passes has been controlled. Both hydraulic and biological assessment have been done coordinated with UMU team, having an ecohydraulic evaluation of 8/8 built fishways (Archena, Jarral, Menjú, Los Charcos, Hoya García, Esparragal, Postrasvase, Cañaverosa). Thanks to this follow-up, improvements where it was necessary were done on time and nowadays all fishways have a satisfactory performance. It has also been possible to verify the proper performance of this fishway types for the target species (*Luciobarbus sclateri* and *Pseudochondrostoma polylepis*).

Monitoring program design

Hydraulic assessment: a specific and objective methodology has been designed and executed for all fishways (AEPS methodology). It assesses the suitability of the main design and hydraulic variables. It was been applied immediately after construction to make improvements (if necessary) on time.

Biological assessment: Fish ascent movements were tracked in detail through a microchip and antennas system (Passive Integrated Transponder –PIT– tags). Antennas were installed into two of the main fishway types: vertical slots and submerged notches with bottom orifices. Parameters like motivation, success and ascent time were

measured and compare between species, fishway types and with other data from the Mediterranean region.

Main results and Conclusions

Analyzing both hydraulic and biological assessment (summarized on tables 1 and 2), it can be determined a very suitable global performance of fishways built on the framework of Life Segura Riverlink.

Different types of fishways built are suitable for these Mediterranean species.

Making preliminary assessments allowed to make the necessary improvements on time and with lower cost.

Fishway Type	Attraction	Entry	Passage	Exit
Archena By-pass channel	Satisfactory	Satisfactory	Satisfactory	Satisfactory
El Jarral Vertical Slot	Satisfactory	Satisfactory	Satisfactory	Satisfactory
El Menjú By-pass channel	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Los Charcos Rock ramp	Suitable	Satisfactory	Satisfactory	Satisfactory
Hoya García By-pass channel	Satisfactory	Favourable	Satisfactory	Satisfactory
Esparragal Submerged notch	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Postrasvase Submerged notch	Satisfactory	Satisfactory	Satisfactory	Satisfactory
Cañaverosa Submerged notch	Suitable	Satisfactory	Suitable	Less suitable ¹

TABLE 24 Summary of the hydraulic assessment

	Vertical Slot (n=109)		Submerged notch with bottom orifice (n=56)	
	Luciobarbus sclateri	Pseudochondrostoma polylepis	Luciobarbus sclateri	Pseudochondrostoma polylepis
Attempt	(58/65) 89,2%	(39/44) 88,6%	(29/39) 74,4%	(8/17) 47,1%
Success	(55/58) 94,9%	(37/39) 94,8%	(23/29) 79,3%	(8/8) 100%
Ascent time¹	7,4 min/m	5,2 min/m	17,7 min/m	5,7 min/m

TABLE 25: Main results of the biological assessment

- **Achieved objectives:**
Hydraulic evaluation report and biological data about fish passage of 8 fish passages
- **Remaining objectives:** none.
- **Date of completion:** September 2017.

- **Variations in action:** none. Fish tracking methodology was changed for improving final results.
- **Action evaluation:** Successful

	2015	2016	2017	
	Jan-Dec	Jan-Dec	Jan-Mar	Mar-Jun
Planned timetable C1 Task 1	X	X	X	
Selection of sampling design and methodologies	-	-	-	
Hydraulic evaluation	X	X		
Hydraulic Technical report		X		
Preparation of equipment and consumables for biological evaluation	X	X		
Fish tagging and biological evaluation		X	X	X
Analysis and results about fish movements		X	X	X
Biological Technical report			X	X

TABLE 26: Comparison between the foreseen calendar and real calendar C.1.1. *In red* are marked those actions with delay due to fish passes building and *in blue* those associated to second reimbursement delays.

Task 2. Monitoring programme for biological indicators: fish community and populations

Participants - UMU was the only participant in this task.

What has been done:

Description - The aim of this action was to carry out a fish-based bioassessment programme (=monitoring programme) to evaluate the potential responses in fish community and sentinel's populations. This action allowed us to assess the suitability of the restoration and validate the methodologies developed (Actions B1, B2 and B3). It was also enable us to optimize management or detect deficiencies in the implemented infrastructures and was useful to validate progress in environmental status.

Monitoring program design and sampling effort

Four monitoring sub-programmes are being developed:

(1) Segura main channel fish-based bioassessment program (Sectors/Sites): Sampling localities at regional level (7 Sectors at the level of river sector of approximately 60 km long) and at weir level (11 Sites-Tr in fluvial stretches next to permeable obstacles) were monitored.

(2) Mark-recapture of sentinel fishes in the Segura main channel (specified sectors): Sector and specified mark-program were initiated in October 2014. The two main objectives of this program are (1) to obtain information about fish movement in the fluvial sector of the project and (2) to develop an informative campaign on sport fishing anglers. Due to the mark-recapture requirements, additional sampling localities at specified sectors were included.

Sector mark-program: VIE-Tag (Visible Implant Elastomer) in three sentinel species (*Luciobarbus sclateri*: lscla; *Pseudochondrostoma polylepis*: ppol; *Gobio lozanoi*: gloz), target individuals < 25 cm total size.

Specified mark-programme: Anchor-Tag (FD-94 Fly T-Bar Anchor) only in a sentinel species (*Luciobarbus sclateri*: lscla), target individuals > 25 cm total size.

Alpha-Tags were used only in an experimental way. An experimental study of radiotracking was developed with lscla specimens in a specified sector of the Segura.

(3) Moratalla tributary fish-based bioassessment programme: Three sampling localities in the Moratalla stream were monitored.

(4) Monitoring programme of the use of fish passes: During two migration periods (2016 and 2017) the effectiveness of each fishway through regular samplings into the fish passes was evaluated. Since January 2016, fishways and its down-stream stretches were sampled by electrofishing; biweekly and once a month respectively during the migration period and once a month during the rest of the year. Sentinel species and other fishes from the community have selected as target species.

Evaluation of progress – Sampling Effort

Sub-Programme (1): Segura main channel fish-based bioassessment programme (Sectors/Sites)	216 sampling days (from September 2014 to July 2017).
Sub-Programme (2): Mark-programme of sentinel fishes in the Segura main channel (specified sectors).	
Sub-Programme (3): Moratalla tributary fish-based bioassessment programme.	33 sampling days (from July 2014 to June 2017).
Sub-Programme (4): Monitoring programme of the use of fish passes.	125 sampling days (mainly from January 2016 to July 2017)

- A high additional sampling effort has been incorporated compared to the initial planning.
- Due to the high flows, we had technical difficulties in conducting the electrofishing samplings in disagreement to the initial design. We have had to repeat field trips to correctly perform the sampling. In fact, sampling effort (in terms of sampling days) was higher than the established effort in the initial design, however, the optimization in field works was high. Moreover, higher efforts in easy-worked sites were developed, mainly in the mark-programme of the sentinel species.
- Mark programmes were strongly conditioned by captures. Specified protocols were applied and an additional sampling effort has been incorporated compared to the initial planning.
- Base data to monitor the community and population fish metrics was being successfully obtained.
- Base data to evaluate the use and effectiveness of fish passes by the community and population was being successfully obtained.

Achieved objectives & Conclusions

- The monitoring programme is developing in a highly correct way (we can conclude that the main objectives are being accomplished). We have some sub-estimated data related to technical difficulties to make electrofishing in specified sites because they were no fordable stretches. However, the evaluation of community and population fish metrics was successfully obtained for the total sectors and the majority of sites included into the monitoring. Moreover, like an additional objective, the analyses of use and effectiveness of fishways by fishes showed significant results.

- No significant changes of fish assemblage and sentinel species populations (with metrics of composition, structure, abundance and length-frequency distribution) were detected between the initial and final phase of the project. However, potential changes in fish assemblage are not immediately visible and positive changes could be only become apparent after a longer monitoring period (more than 5 years).
- Mark-recapture monitoring program confirm the use of fish passes by sentinel species, either because of its characteristics like new habitat available for small and medium sizes, or because of its usefulness in the reproductive movement of the populations.
- The very high fidelity to sectors and stretches of the rivers observed in sentinel species could condition the use of fish passes by its populations and, as a consequence, fish movement will only become significant on the population status after a certain time period. A longer monitoring period is required.
- Although fish assemblage in Moratalla stream does not change detected during the monitoring was similar to that observed in previous phase, we can say that populations inhabited this stream are very interesting because they are mostly composed of natives with important stocks for the recruitment of the populations of the main channel.
- All of the types of fish passes implemented in the project were used by the fish assemblage. A total of 11561 specimens of 9 species were captured inside the fish passes and sentinel species were dominant which account for 97.7% of the total captures.
- In our first approach to data analysis, the higher captures inside fish passes were obtained in the El Jarral (Technical fish pass). However, more natural fish passes of Hoya-García and El Menjú (Bypass) showed also high values.
- The use of the different fish passes by sentinel species showed significant differences in the temporal pattern. The pattern observed in *Luciobarbus sclateri* and *Pseudochondrostoma polylepis* was more correlated to its reproductive movements during an annual cycle, all of types of fish passes have been shown to be effective for displacing schools of *Alburnus alburnus*, and *Gobio lozanoi* may be the sentinel species that shows a best adaptation to new microhabitats created inside the fish passes showing a constant in time use.
- A direct environmental benefit to a midterm, but collateral to the project, is that through the monitoring programmes more than 15000 specimens of eight different IAS (Invasive Alien Species) were removal from the fluvial sector objective of the project.

Action evaluation is successful - In sum, the monitoring program has made it possible to detect the use of fish passes carried out by the fish community and the populations of sentinel species and, consequently, their effectiveness in increasing connectivity between populations (a direct environmental benefit). In addition, temporary patterns of the use of each sentinel species which have been obtained should be useful in future management and a differential efficiency of different types of implemented fish passes has been observed, which should also be a tool for the future selection of new infrastructures (long-term and qualitative environmental benefits).

Evaluation of progress – Results

A first approach to data analysis have been developed, however, we intend to continue with the analysis and the obtaining of conclusions in the development of Post-LIFE actions (a doctoral thesis is currently being carried out, which partially evaluates the effectiveness of the fish steps carried out in the project).

Sub-Programme (4)

Monitoring programme of the use of fish passes

As a little example of the high successful of the fish pass. A total of 11561 specimens of 9 species were captured inside the fish passes implemented in the project. Sentinel species were dominant which account for 97.7% of the total captures (aalb 49.9%, gloz 35.6%, ppol 6,5% and lscla 5.7%).

Higher captures inside the fish passes were detected during the movement period, mainly spring and summer, although they are very influenced by punctual data (e.g. autumn 2016).

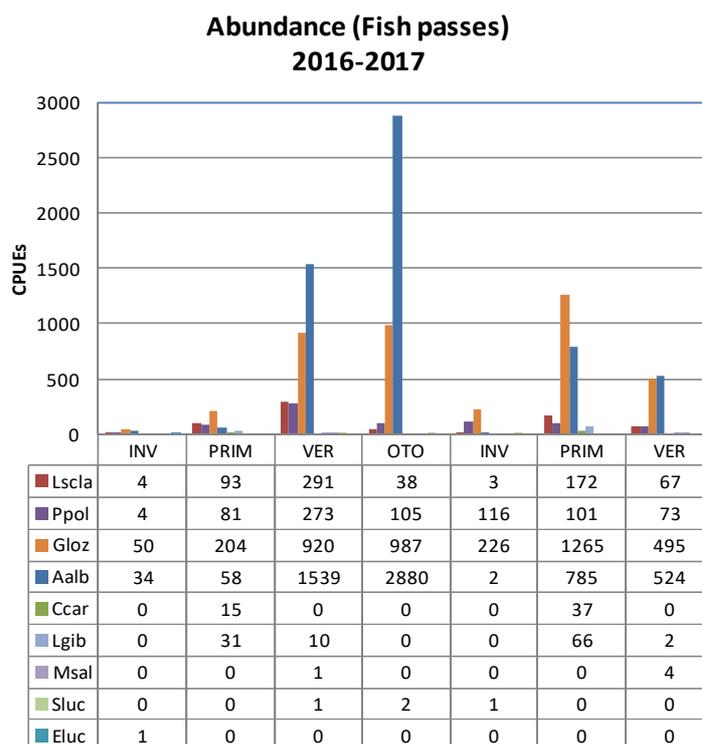


TABLE 27: Comparison between the foreseen calendar and real calendar C.1.1. *In red* are marked those actions with delay due to fish passes building and *in blue* those associated to second reimbursement delays.

It is important to emphasize that after the finalization of the project, UMU have been still working as you can see in the following table (see After Life plan deliverable D19), specially in the arc fish way.

Post-LIFE Actions: Monitoring programme of the use of fish passes.	
B1 Hoya-García	3 (07/08; 09/10; 01/12)
B2 El Menjú	3 (11/08; 05/10; 04/12)
B3 Archena	4 (03/08; 14/09; 06/10; 25/11)
T1 Cañaverosa	3 (14/09; 06/10; 02/12)
T2 Post-Trasvase	3 (15/08; 18/10; 30/11)
T3 El Esparragal	3 (15/08; 18/10; 30/11)
T4 El Jarral	4 (11/08; 05/10; 10/10; 05/12)
Total additional effort	19 sampling days (from January August to December 2017)

TABLE 28: Additional effort After Life Plan

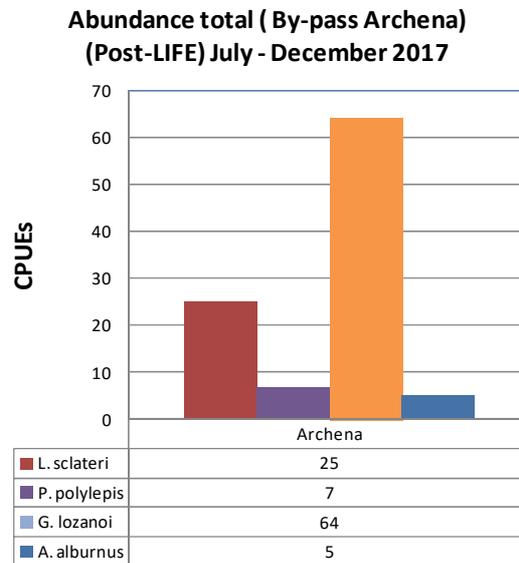


TABLE 29: Results in the last fish way constructed, ARC

Task 3. Monitoring programme for revegetation projects at the restoration-rehabilitation plot level

- **Participants:** CARM
- **What has been done:**

The objectives of the project LIFE SEGURA RIVERLINK are to promote and support the environmental recovery in the Segura river basin. The intention is to demonstrate and validate management measures for development of green infrastructures for the management of watersheds.

The actions within this Project are localized in the Northwest and in the UpperMeadow of Segura River, in the municipalities of Abarán, Calasparra, Cieza y Moratalla.

The main objective of the SEGURA RIVERLINK has been to improve connectivity between natural ecosystems through actions aimed at restoring the river and recovering its function as a green corridor.

According to the climatic factors like average temperature, maximum temperature, rainfall, average rainfall, potential evapotranspiration and average potential evotransporation, it can be concluded that the climate of the middle Segura basin corresponds to the temperate mediterranean climate according to the Papadakis classification. The climatic zones determine, among other variables, the type of vegetation most adapted to the characteristics of the territory, marking is as one of the most suitable for use in restoration work.

In addition to the factors presented above, for the planning of a restoration project it is important to know the nature and conditions of the types of soil, because they maintain a close relationship with the living beings that inhabit them, especially plants. In the Segura basin, a great variety of soils appear due to the existence of a great diversity of environments.

The objective of a restoration project is to return an area affected by a variety of conditions to its pre-disturbance state, creating ecosystems capable of self-sustaining similar to those of nearby undisturbed areas. To achieve this purpose it is necessary to consider, the environmental sector in which the project is taking place, and the plant species present to use them to achieve successful cultivation.

Based on the previous information about the typical riparian vegetation, the first step for a correct choice of the species to be used in the revegetation of a section is to see to which ecological sector it corresponds and what type of riparian formations are present. This selection is based on knowledge of the distribution of the species and their ecological requirements.

Once the different sections have been characterized where the planting is going to be carried out, the next step is the choice of the most suitable plant species for use in reforestation. In general terms, the location sections of the plots of the RIVERLINK Project are included in the same sector, so that the correct election will be marked by the presence of water from the water table or the fluvial dynamics of the area. The selected species have been mainly trees and shrubs, although some herbaceous species of a carpeting nature or other species with a good anchoring system have also been included.

Once the different factors to be taken into account in the development of a technical Project of riverbank restoration, we proceed to show the experiences developed in the different stages of work of the LIFE SEGURA RIVERLINK Project.

The objective in this Project is the implementation of a set of conservation actions. Among them, the vegetal restoration of the surroundings of certain obstacles of the Segura river is contemplated, where it is tried to eliminate the barriers for the fish. For this, the technical Project entitled “Ecological restoration of the Segura and Moratalla river in the scope of the Project LIFE+ SEGURARIVERLINK Project (LIFE12ENV/ES/1140)” has been drafted.

To value the effectiveness of these conservation actions, a monitoring program has been developed in which plots have been implemented for biological monitoring in the riverbank sites that were restored in the technical project.

The results obtained in the work experiences analysed in the framework of the LIFE SEGURA RIVERLINK Project, emphasize the positive evolution of the initial state of the vegetation in the restoration areas. Before the start of the plantation work the vegetation had a low specific richness mainly due to the presence of cane (*Arundo donax*), an alien and invasive species that had managed to displace the native species.

Likewise, it can be affirmed that the sampled habitats were strongly altered, due to the high presence of nitrophilous species that, together with the aforementioned, indicated a high anthropization of the section of the Segura river bank where the actions had been carried out.

Therefore, after the actions of forest restoration, the situation of low diversity and high existing anthropization has been reversed. It is expected that, in the medium term, the state of conservation of the natural habitats of the Segura river bank will be considerably improved.

Once the restoration work has been carried out and after the evaluation of the results obtained in the different monitoring reports, it can be affirmed that the increase in the specific richness of the plots studied is due to the planting that was carried out with a variety of river species than those presented at the beginning of the sampling.

Regarding the evaluation of the state of the repopulations, it is established that the survival detected in the last follow-up visit is around 40%. This survival value indicates quite encouraging results, taking into account that they have exceeded several summers, a critical period for plantations, especially considering that the last few years have been extremely dry due to the drought. The factors that to have influenced the mortality of the plantations mainly have been are eh access to groundwater and lack of signalling of the planted specimens.

Those sections in which the repopulation hasn't been successful should have a replenishment plan in place. In this regard, for the planning of replanting work it is necessary to take into account the availability of groundwater and the planting time.

In addition to the factors that affect the survival of the planted specimens, it is necessary to take into account the detection in the restoration areas of the Segura river bank of alien invasive species they may become established in the ecosystem becoming a threat to native biological diversity. For this reason, it is essential to make known its existence in order to carry out, in the shortest possible period of time, elimination actions and their subsequent monitoring and surveillance.

The species that are best developed are those that have the ability to regrow, and also those that require less water given their root development to reach humid areas of the subsoil. The implementation and development of the seedlings is generating the dispersion of their germplasm, above all, by means of sprouts, although it is expected that in the short term they will do it also by seed.

After reviewing the actions of plant restoration next to certain obstacles in the Segura river where the barriers to the fish have been removed, it can be concluded that actions aimed at renaturing the river and recovering its function as a green corridor and improving its biodiversity are giving the results expected initially to achieve an adequate level of success for all aspects discussed.

- **Estimated date of completion:** September 2017.
- **Variations in action:** In the Mediterranean climate, the most critical time for the survival of the plants used in reforestation is summer. For this reason it has been wanted to delay the follow-up actions in the field of reforestation, obtaining better results in this way

Task 4. Monitoring programme, biological indicators: bird community and river banks

- **Participants:** ANSE
- **What has been done:** All the foreseen winter and spring samplings between March 2014 and June 2017 have been developed. During this period, 110 field visits have been made (25 in 2014, 30 in 2015, 30 in 2016 and 25 in 2017), in which 3483 birds of 71 species were captured, with 2749 individuals ringed and 734 recaptured.

In the same way, monitoring of freshwater turtles has involved 81 sampling days covering all the locations (except MULATA and ARCHENA). 681 freshwater turtles have been trapped, corresponding to 452 new individuals marked, 220 recaptures and 4 not marked due to small size.

	Captures	Marked	Recaptures	No marked
2013	89	83	6	0
2014	163	127	33	3
2015	131	69	61	1
2016	158	92	63	0
2017	140	81	57	0
TOTAL	681	452	220	4

TABLE 30: Results turtles monitoring

Also, field visits have been done for odonata aiming to inventory the species and 24 were detected. In order to detect the presence of otter, tracks search has been done in every location (except MULATA), as well as 62 days of camera trapping in four locations.

- **Achieved objectives:** Monitoring data obtained about presence of birds, freshwater turtles, odonata and otter in the study area.

Collected data of riparian birds shows that richer communities are associated to better conserved riparian vegetation, while diversity is poorer in locations with mostly alien plant species (*Arundo donax*). There are no significant trends in diversity neither abundance of birds trapped during the study period. However, it is expected that in a medium-long term, birds communities will get richer thanks to vegetation restorations.

Freshwater turtles have been detected in all the sampled locations. Capture ratios were higher in places with slower water as well as upstream of the dams. Radio-telemetry shown reduced longitudinal movements and none individual was recaptured between localities.

24 odonata species were detected in the study area. The highlights were rare or threatened species like *Calopteryx xanthostoma*. This monitoring effort contributes to reduce the lack of information about this animal group in the study area.

Otter has been detected thanks to tracks search in all the locations. Artificial rivers are used by otters as marking places and probably also as feeding places.

- **Remaining objectives:** None
- **Estimated date of completion:** June 2017.

- **Variations in action:** No samplings have been made in MUL because the project has not worked in this area. Some birds' samplings have been made in winter for wintering population monitoring. Odonatan monitoring produced poor data so some changes in methodology had to be done. Transects for odonata samplings have result into more data than the initial methodology. The monitoring programme has needed a more intense effort than the initially expected. In spring 2016 no odonata and otter monitoring could be made in HOY due to meteorological reasons and because of the additional effort not expected in samplings for all locations.
- **Action evaluation:** Successful

	2013					2014						...	2017
	Ago	Sep	Oct	Nov	Dic	Ene	Feb	Mar	Apr	May	Jun	...	June
Planned timetable C1 Task 4											X	X	X
Real dates C1 Task 4					X	X	X	X	X	X	X	X	X

TABLE 31: Comparison between the foreseen calendar and the real calendar for Action C.1.4

Task 5. Monitoring programme for the biological state of the water

- **Participants:** CHS
- **What has been done:**

18 sample points located upstream and downstream of each of the nine obstacles (a new obstacle has been included called "Arचना weir" and another has been removed on Mulata weir as access is impossible) present in the study area.

Physico-chemical, biological and hydromorphological indicators were determined in all the points, as well as the Physico-chemical of the sediments. To evaluate the ecological state, the reference conditions and limits cut between ecological status classes listed in the Royal Decree (RD 817/2015) have been used. The ecological status has been determined following the criterion "one out, all out".

Physical-chemical quality indicators

15 physicochemical parameters were measured **with the results presented in the tables**, Out of the measured parameters, chlorides, COD, phosphorus, nitrites, total nitrogen, suspended solids and water temperature do not intervene in the calculation of the ecological state whereas ammonium, nitrate, orthophosphate, pH, conductivity, oxygen and the percentage dissolved oxygen saturation in the water do, according to the "one out, all out" criterion.

It can be seen that the physicochemical state has improved in 2017, in which all the sampling stations have been above good ecological status

Macrophytes.

The IVAM index has been used to calculate the ecological status of the waters bodies with the macrophytes indicator, although is not used in the calculation of the ecological status according to the RD 817/2015. Most of the sampling stations are in good or superior

ecological status every year, although in 2017 the worst results were obtained because the effects of the hard drought. (Table 36).

COD EST	2015		2016		2017	
	IVAM	Estado	IVAM	Estado	IVAM	Estado
ARC AAB	N.S.	N.S.	N.S.	N.S.	3,8	Moderado
ARC AAR	N.S.	N.S.	N.S.	N.S.	5,6	Bueno
CAÑ AAB	4,7	Bueno	8	Muy Bueno	4,56	Bueno
CAÑ AAR	5,2	Bueno	6,77	Muy Bueno	5,35	Bueno
CHA AAB	5,6	Bueno	5,33	Bueno	4,59	Bueno
CHA AAR	4,8	Bueno	5,33	Bueno	4,45	Moderado
ELE AAB	5,7	Muy Bueno	6	Muy Bueno	4,98	Bueno
ELE AAR	5,1	Bueno	6,28	Muy Bueno	5,58	Bueno
ESP AAB	5,3	Bueno	4,95	Bueno	5,69	Bueno
ESP AAR	4,8	Bueno	2	Deficiente	4,1	Moderado
HOY AAB	5,7	Bueno	4,57	Bueno	4,99	Bueno
HOY AAR	2,0	Deficiente	5,65	Bueno	5,09	Bueno
MEN AAB	4,7	Bueno	4,44	Bueno	0	Malo
MEN AAR	5,2	Bueno	5,74	Muy Bueno	3,52	Moderado
MOR AAB	5,2	Bueno	5,82	Muy Bueno	4,96	Bueno
MOR AAR	5,0	Bueno	4,26	Moderado	5,06	Bueno
MUL AAR	4,5	Bueno	N.S.	N.S.	N.S.	N.S.
SOT AAB	4,9	Bueno	5,67	Bueno	4,57	Bueno
SOT AAR	5,2	Bueno	5,14	Bueno	3,66	Moderado

TABLE 32: IVAM index for all sampling campaign. NS. Not sampled

Benthic diatoms.

The index used for evaluating the phytobenthos (diatoms) has been the IPS as indicated in the RD 817/2015. The results of year 2017 indicate that no sampling station has had an ecological status below good (Table 38). It can be highlighted that the stations located upstream and downstream from the Moratalla weir have changed their ecological status from moderate to good or very good in some years.

Identification	2015		2016		2017	
	IPS	Estado	IPS	Estado	IPS	Estado
ARC AAB	N.M.	N.M.	N.M.	N.M.	12,16	Bueno
ARC AAR	N.M.	N.M.	N.M.	N.M.	13,72	Bueno
CAÑ AAB	16,1	Muy Bueno	16	Muy Bueno	17,86	Muy Bueno
CAÑ AAR	17,3	Muy Bueno	17,6	Muy Bueno	17,56	Muy Bueno
CHA AAB	16	Muy Bueno	15	Muy Bueno	14,5	Bueno
CHA AAR	15,8	Muy Bueno	15,6	Muy Bueno	15,51	Muy Bueno
ELE AAB	16	Muy Bueno	15,1	Bueno	14,28	Bueno
ELE AAR	16,1	Muy Bueno	15,6	Bueno	16,84	Muy Bueno
ESP AAB	16	Muy Bueno	18,1	Muy Bueno	16,05	Muy Bueno
ESP AAR	16,5	Muy Bueno	15,4	Muy Bueno	15,98	Muy Bueno
HOY AAB	16,1	Muy Bueno	13,9	Bueno	13,61	Bueno
HOY AAR	18	Muy Bueno	14,8	Muy Bueno	14,67	Muy Bueno
MEN AAB	15,3	Muy Bueno	14	Bueno	15,02	Muy Bueno
MEN AAR	15,8	Muy Bueno	15,5	Muy Bueno	14,62	Bueno

Identification	2015		2016		2017	
	IPS	Estado	IPS	Estado	IPS	Estado
MOR AAB	12,5	Moderado	14,2	Bueno	17,81	Muy Bueno
MOR AAR	12	Moderado	11,6	Moderado	18,02	Muy Bueno
MUL AAR	15,8	Muy Bueno	N.M.	N.M.	N.M.	N.M.
SOT AAB	16	Muy Bueno	15,7	Muy Bueno	12,05	Bueno
SOT AAR	16	Muy Bueno	16	Muy Bueno	15,15	Muy Bueno

TABLE 33: IPS index for all sampling campaign.

Benthic macroinvertebrates.

Macroinvertebrates have been the indicator most sensitive to alterations, since it is the indicator that has shown the worst results. In 2017, the worst results were obtained for this biological indicator, possibly due to the lower flow at the time of sampling due to the great drought to which the hydrological basin is subject.

We highlight the presence of invasive alien species such as *Corbicula fluminea* that has appeared in the macroinvertebrate samples in all water points located downstream of the dam of La Mulata.

Cód. Estación	2015		2016		2017	
	IBMWP	Estado	IBMWP	Estado	IBMWP	Estado
ARC AAB	N.M.	N.M.	N.M.	N.M.	3	Malo
ARC AAR	N.M.	N.M.	N.M.	N.M.	7	Malo
CAÑ AAB	106	Bueno	98	Bueno	132	Muy Bueno
CAÑ ARR	103	Bueno	81	Bueno	70	Moderado
CHA AAB	83	Moderado	92,5	Bueno	60	Bueno
CHA AAR	70	Moderado	71	Bueno	14	Malo
ELE AAB	113	Bueno	118,5	Muy Bueno	91	Bueno
ELE AAR	95	Bueno	89,5	Bueno	108	Bueno
ESP AAB	108	Bueno	100	Bueno	105	Bueno
ESP AAR	107	Bueno	82	Bueno	105	Bueno
HOY AAB	110	Muy bueno	42,5	Moderado	72	Bueno
HOY AAR	44	Moderado	92,5	Bueno	56	Moderado
MEN AAB	88	Bueno	42,5	Moderado	65	Bueno
MEN AAR	87	Bueno	92,5	Bueno	60	Bueno
MOR AAB	82	Bueno	80	Bueno	57	Deficiente
MOR ARR	91	Bueno	77	Bueno	55	Deficiente
MUL AAR	59	Bueno	N.M.	N.M.	N.M.	N.M.
SOT AAB	75	Bueno	74	Bueno	58	Moderado
SOT ARR	63	Bueno	78	Bueno	46	Moderado

TABLE 34: IBMWP index for all sampling campaign.

HYDROMORPHOLOGICAL MONITORING

The prior hydromorphological monitoring was done as a part of the action A.2-Task-4 “Prior ecological status of the stretch of the project” the 28/11/2013. Both indices were evaluated “in situ” upstream and downstream of each weir.

The hydromorphology is one of the main elements that could change with the permeation of the obstacles. Due to its importance, various index were applied: QBR and IHF (established

by the IPH), RFV- index for the assessment of the riparian forest and – hidrogeomorphological index for the assessment of river systems.

As you can see in the examples in the next two tables (RFV and HQ) you can see the effect of the river restoration in only 3 years the results are that the biological status have been incremented in several stations.

Identificación	Tipo	2015	Estado QBR	2016	Estado QBR	2017	Estado QBR
ARC AAB	14	NM	NM	NM	NM	5	Malo
ARC AAR	14	NM	NM	NM	NM	10	Malo
CAÑ AAB	16	80	Bueno	100	Muy Bueno	100	Muy Bueno
CAÑ AAR	16	100	Muy Bueno	80	Bueno	90	Bueno
CHA AAB	14	20	Malo	35	Deficiente	35	Deficiente
CHA AAR	14	0	Malo	25	Malo	25	Malo
ELE AAB	16	50	Deficiente	55	Moderado	55	Moderado
ELE AAR	16	6	Malo	45	Deficiente	55	Moderado
ESP AAB	16	20	Malo	50	Deficiente	25	Malo
ESP AAR	16	50	Deficiente	25	Malo	30	Deficiente
HOY AAB	14	45	Deficiente	100	Muy Bueno	95	Muy Bueno
HOY AAR	14	90	Bueno	75	Bueno	75	Bueno
MEN AAB	14	35	Deficiente	45	Deficiente	45	Deficiente
MEN AAR	14	25	Malo	50	Moderado	50	Deficiente
MOR AAB	9	75	Bueno	65	Moderado	70	Moderado
MOR AAR	9	30	Deficiente	85	Bueno	85	Bueno
MUL AAR	16	40	Deficiente			NM	NM
SOT AAB	14	5	Malo	5	Malo	5	Malo
SOT AAR	14	5	Malo	10	Malo	15	Malo

TABLE 35: Hydromorphological Quality of each weir according Munné et al., 2003.

RFV

This index does not apply to the calculation of ecological status in RD 817/2015, so what has been applied by the authors (Magdaleno et al., 2010).

Identificación	2015	Estado RFV	2016	Estado RFV	2017	Estado RFV
ARC AAB	n.m.	n.m.	n.m.	n.m.	5	Malo
ARC AAR	n.m.	n.m.	n.m.	n.m.	5	Malo
CAÑ AAB	18	Bueno	Bueno	Bueno	18	Bueno
CAÑ AAR	19	Muy bueno	Muy bueno	Muy Bueno	19	Muy Bueno
CHA AAB	6	Malo	Malo	Moderado	12	Moderado
CHA AAR	7	Malo	Malo	Moderado	12	Moderado
ELE AAB	5	Malo	Malo	Malo	6	Malo
ELE AAR	11	Deficiente	Deficiente	Deficiente	11	Deficiente

Identificación	2015	Estado RFV	2016	Estado RFV	2017	Estado RFV
ESP AAB	6	Malo	Malo	Malo	6	Malo
ESP AAR	5	Malo	Malo	Deficiente	9	Deficiente
HOY AAB	12	Deficiente	Deficiente	Bueno	16	Bueno
HOY AAR	18	Bueno	Bueno	Bueno	18	Bueno
MEN AAB	5	Malo	Malo	Malo	7	Malo
MEN AAR	5	Malo	Malo	Deficiente	8	Deficiente
MOR AAB	12	Deficiente	Deficiente	Moderado	12	Moderado
MOR AAR	9	Malo	Malo	Moderado	12	Moderado
MUL AAR	4	Malo	Malo	n.m.	n.m.	n.m.
SOT AAB	5	Malo	Malo	Deficiente	8	Deficiente
SOT AAR	6	Malo	Malo	Malo	6	Malo

TABLE 36: Hydromorphological Quality of each weir according Magdaleno et al., 2010.

IHG

This index does not apply to the calculation of ecological status in RD 817/2015, so what has been applied by the authors (Ollero et al., 2008).

Identificación	IHG 2015	Estado IHG	IHG 2016	Estado IHG	IHG 2017	Estado IHG
ARC AAB	N.M.	N.M.	N.M.	N.M.	5	Malo
ARC AAR	N.M.	N.M.	N.M.	N.M.	10	Malo
CAÑ AAB	41	Deficiente	37	Deficiente	47	Moderado
CAÑ AAR	31	Deficiente	31	Deficiente	70	Bueno
CHA AAB	13	Malo	18	Malo	23	Deficiente
CHA AAR	18	Malo	42	Deficiente	32	Deficiente
ELE AAB	19	Malo	18	Malo	42	Moderado
ELE AAR	20	Malo	42	Deficiente	34	Deficiente
ESP AAB	21	Deficiente	15	Malo	19	Malo
ESP AAR	21	Deficiente	18	Malo	28	Deficiente
HOY AAB	22	Deficiente	37	Deficiente	47	Moderado
HOY AAR	42	Moderado	31	Deficiente	50	Moderado
MEN AAB	26	Deficiente	21	Malo	26	Deficiente
MEN AAR	18	Malo	20	Malo	21	Deficiente
MOR AAB	49	Moderado	21	Malo	55	Moderado
MOR AAR	37	Deficiente	20	Malo	23	Deficiente
MUL AAR	11	Malo	N.M.	N.M.	N.M.	N.M.
SOT AAB	16	Malo	15	Malo	20	Malo
SOT AAR	15	Malo	18	Malo	25	Deficiente

TABLE42: Hydromorphological Quality of each weir according Ollero et al., 2008.

The final result of the ecological status (combination between physicochemical, biological and hydromorphological) in 2017 is the following:

Identificación	Ecotipo	Estado Hidromorfológico	Estado F ^o -Q ^o	Estado Biológico	Estado Ecológico 2017
ARC AAB	14	Bueno	Bueno	Malo	Malo
ARC AAR	14	Bueno	Bueno	Malo	Malo

CAÑ AAB	16	Muy Bueno	Bueno	Muy Bueno	Bueno
CAÑ AAR	16	Muy Bueno	Bueno	Moderado	Moderado
CHA AAB	14	Bueno	Bueno	Bueno	Bueno
CHA AAR	14	Bueno	Bueno	Malo*	Malo*
ELE AAB	16	Bueno	Bueno	Bueno	Bueno
ELE AAR	16	Bueno	Bueno	Bueno	Bueno
ESP AAB	16	Bueno	Bueno	Bueno	Bueno
ESP AAR	16	Bueno	Bueno	Bueno	Bueno
HOY AAB	14	Muy Bueno	Bueno	Bueno	Bueno
HOY AAR	14	Muy Bueno	Bueno	Moderado	Moderado
MEN AAB	14	Bueno	Bueno	Bueno	Bueno
MEN AAR	14	Bueno	Bueno	Bueno	Bueno
MOR AAB	9	Bueno	Bueno	Deficiente	Deficiente
MOR AAR	9	Muy Bueno	Bueno	Deficiente	Deficiente
MUL AAR	14	N.M.	N.M.	N.M.	N.M.
SOT AAB	14	Bueno	Bueno	Moderado	Moderado
SOT AAR	14	Bueno	Bueno	Moderado	Moderado

TABLE 37: Ecological status 2017

- **Achieved objectives:** 8 physico-chemical, hydromorphological and biological water quality sampling
- **Date of completion:** July 2017
- **Remaining objectives:** None
 - **Variations in action:**

The action started 6 months later than expected due to administrative issues and also because of the delay in the fish passages construction. To compensate this situation, three samplings was programmed 2015 which will allow a closer and more detailed analysis of the fish passage works. This scenario is more justified since it is 2015 where potential changes in ecological and physicochemical water quality and changes in sediment transport and hydro-morphological conditions can suffer major transformations. The programmed calendar is: Apr-Jul-Nov 2015, Apr-Nov 2016, Mar-May 2017.

The sampling points located upstream and downstream of the Mulata dam were eliminated due to lack of access. In 2017. Two new sampling points were added (upstream and downstream of the Archena weir).

One of the problems encountered was the high flow rate and, even though no samplings had to be cancelled, the task was more difficult than expected and some flow measurements couldn't be taken. In 2017, samplings were carried out with low flow and this could influence the results obtained.

- **Action evaluation:** The delay in the beginning has been solved and the rest of the action have been progress successfully.

	2014	2015	2016	2017
	Jun-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable C1 Task 5	X	X	X	X
Real dates C1 Task 5		X	X	X

TABLE 38 Comparison between the foreseen sample calendar and real calendar C1 Task 5

Task 6. River Sediment Monitoring

- **Participants: CHS**
- **What has been done:**

A) Sediment sampling upstream Moratalla weir before its demolition

PRESENCE OF POLLUTANTS

CHS proceeded to collect water and sediment samples upstream of the Moratalla weir on 31/10/2013, in order to analyze the possible presence of pollutants as a previous step before its demolition. Given the predominantly agricultural nature of the land surrounding the weir, four substances were selected, identify as Priority Hazardous substances in the field of European Water Policy (39/2013/UE). The pollutants tested and the results are shown in the following Table:

SUBSTANCE	ANALYSIS RESULTS	UNITS	MAC-EQS	USES AGRICULTURAL PRACTICES IN
Hexachlorobenzene (HCB)	<2,5	µg/Kg	–	Pesticide
Hexachlorocyclohexane (HCH)	<10	µg/Kg	–	Insecticide
Hexachlorobutadiene (HCBd)	<10	µg/Kg	–	Fungicide
Trybutyltin compounds (TBT)	<0,4	µg/Kg	–	Biocidal

TABLE 45: Pollutants selected and results of sediment analysis

MAC-EQS: Maximum allowable concentration-Environmental quality standards

The analytical technique used was gas chromatography with electron capture detection. According to the results obtained, the presence of the four substances analyzed is undetectable which indicates that this substances are either absent or present at very low concentrations.

The parameters shown in the table below and its results are those consistent with water general parameters analyzed.

PARAMETER	RESULTS	UNIT OF MEASURE
-----------	---------	-----------------

Total Alkalinity	334	mg CaCO3/l
Chlorides	140	mg /l
Electrical Conductivity (20°C)	1753	µS/cm
BOD5	9	mg O2/L
COD	28	mg O2/L
Orthophosphate	1,2	mg PO4/l
Total Phosphorus	0,4	mg P/l
Amonia	2	mg NH4/l
Nitrate	4,3	mg NO3/l
Nitrite	0,004	mg NO2/l
Kjeldahl Nitrogen	2	mg N/l
Total Nitrogen	6	mg N/l
Sulfate	301	mg /l

TABLE 39: Pollutants selected and results of sediment analysis

Red data reflects the failing to comply with the quality standards defined for general parameters.

The results are consistent with the geology of the river basin and the possible entry of surplus irrigation to the channel.

B) Sediment sampling in the rest of the obstacles

18 sample points located upstream and downstream of each of the nine obstacles present in the study area.

PRESENCE OF POLLUTANTS

The following parameters have been evaluated: cadmium, mercury, nickel and lead. These substances have been proposed as their presence was found in the sediment matrix during the analysis done by the CHS under the Network Control of chemical status under the WFD.

Cadmium: In all the samplings made, the concentration of cadmium has been below the limit of quantification of the analytical technique (<2 mg / Kg).

Mercury: In all the samplings made, the concentration of mercury has been below the limit of quantification of the analytical technique (<0.3 mg / Kg).

Nickel: In the case of nickel if values have been obtained above the limit of quantification, at the sampling points, although at low concentrations (Table 47).

Campaña	2015	2016	2017
ARC AAB	N.M.	N.M.	21,25
ARC AAR	N.M.	N.M.	11,05
CAÑ AAB	4,6	11	8,43
CAÑ AAR	7,7	9,6	7,13
CHA AAB	8,5	7,5	6,24
CHA AAR	7	7,8	8,34

Campaña	2015	2016	2017
ELE AAB	7,3	9	6,99
ELE AAR	10,7	8,4	9,94
ESP AAB	7,7	7,6	11,1
ESP AAR	6,3	8,4	8,2
HOY AAB	5,8	4,9	6,78
HOY AAR	7,3	7,4	5,45
MEN AAB	6,1	6,2	6,57
MEN AAR	7,6	8,4	6,14
MOR AAB	5,8	9,7	9,87
MOR AAR	13,2	11	12,6
MUL AAR	9,3	N.M.	N.M.
SOT AAB	8,3	9,5	15,09
SOT AAR	8,5	9	5,5

TABLE 40: Concentration of nickel in the sediments

Lead: In the same way as in the case of nickel, values higher than the limit of quantification of lead have been given at the sampling points (table 48), although at low concentrations, which is difficult to attribute to anthropic activity.

Campaña	2015	2016	2017
ARC AAB	N.M.	N.M.	9,31
ARC AAR	N.M.	N.M.	7,72
CAÑ AAB	5,4	11,2	6,225
CAÑ AAR	7,3	9,9	6,985
CHA AAB	7,4	8,5	7,065
CHA AAR	6,7	7,8	7,875
ELE AAB	7,8	9,2	6,595
ELE AAR	9,9	9,9	8,77
ESP AAB	7,9	6,4	9,945
ESP AAR	7	7,2	8,295
HOY AAB	6,4	7,7	5,6
HOY AAR	8	8,3	8,055
MEN AAB	7,3	7,2	7,15
MEN AAR	8,8	5,4	5,78
MOR AAB	3,6	11,2	7,3
MOR AAR	8,3	8,1	11,05
MUL AAR	9	N.M.	
SOT AAB	6,9	9,2	9,45
SOT AAR	8,7	8,1	6

TABLE 41: Concentration of lead in the sediments

- **Date of completion:** July 2017
- **Variations in action:** none
- **Action evaluation:** The tasks implemented already can be considered a success.

	2013			2014	2015	2016	2017
	Oct	Nov	Dic	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable C1 Task 6				X	X	X	X
Real dates C1 Task 6	X			X	X	X	X

TABLE 42: Comparison between the foreseen sample calendar and real calendar

5.1.10. Action C2: Socio-economic assessment

- **Participants:** CHS, ANSE
- **What has been done:**

To determine and evaluate the potential socio-economic and cultural impacts of the project, the target groups have been identified and a draft survey has been designed (see Deliverable n^a 10):

	TARGET GROUP	DESCRIPTION
1	Public bodies and political parties	City councils in the project area, technicians, CHS and CARM personnel responsible for the river guard, Local political parties in the project area (Abarán, Cieza y Calasparra).
2	River users	NGOs, environmental associations, Fishermen associations, other sports clubs (hikers, kayakers, etc..),
3	Farmers and irrigation communities	Local unions and irrigation communities, concessionaries and farmers.
4	Teachers and educators	Local educational centres
5	Local companies	Tourism resorts, shops, restaurants etc.

TABLE 43: Target groups identified

The following deliverables have been produced:

- “A report on the results of survey, focus group and interviews” (April 2016).
- “A guideline on improving the project positive impact on socio-economic issues of local populations” (May 2016).

They contain the economic valuation of project actions from different points of view (CO2 fixation, contingent valuation, water saving...).

Both are attached as annexes to this report (D14)

- **Achieved objectives:**
- 33 individual interviews (being 20 the initial target).

- 95 web surveys
- 42 Twitter surveys.
- Focus groups.
- **Remaining objectives:** None
- **Date of completion:** July 2017
- **Variations in action:** none
- **Action evaluation:** the tasks implemented already can be considered a success.

	2014	2015	2016	2017
	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable C2	X	X	X	X
Real dates C2	X	X	X	X

TABLE 44. Comparison between the foreseen sample calendar and the real calendar Action C2

5.1.11. Action D: Communication and dissemination actions

Please refer to point 5.2 of the report.

5.1.12. Action E.1 Project Management and Monitoring

Please refer to point 4 of the report.

5.1.13. Action E.2 After-life plan CHS

- **Participants:** CHS
- **What has been done:** The After-Life Plan is attached as Deliverable (D19).
- **Achieved objectives:** Elaboration of an After-Life Communication Plan
- **Remaining objectives:** none
- **Date of completion:** September 2017
- **Variations in action:** none, slight delay in completion.
- **Action evaluation:** fulfilled.

	2017	2017
	May-Jul	Jul-Oct
Planned timetable E2	X	
Real dates E2	X	X

TABLE 45 Comparison between the foreseen sample calendar and the real calendar

5.1.14. Action E.3 Project Audit

- **Participants:** CHS
- **What has been done:** The auditor has audited the costs declared for all partners for the whole project period. Audit report is attached as project deliverable (Annex I – D26).
- **Achieved objectives:** Audited expenditures of the project.
- **Remaining objectives:** none
- **Date of completion:** December 2017
- **Variations in action:** none.
- **Action evaluation:** fulfilled.

	2017	2017
	Aug-Oct	Aug-Dec
Planned timetable E3	X	
Real dates E3	X	X

TABLE 46 Comparison between the foreseen sample calendar and the real calendar

5.1.15. Action E.4 Networking

- **Participants:** All
- **What has been done:**

Project partners have participated in the following networking activities:

DATE	EVENT	PARTICIPANTS
10/02/2016	Participation in Advisory Body of Land Stewardship (Biodiversity Foundation, Madrid)	22
25/04/2016	European Projects meeting "Rice and Conservation"	60
27/05/2016	Round table: rivers recovery and social movements	19
07/06/2016	"Raising awareness on fish migration and river connectivity" (meeting of EU projects for the World Fish Migration Day, Brussels)	20
14-15/05/2014	LIFE Platform Meeting: Climate change – ecosystem services for adaptation and mitigation (Norwich, UK)	52
22-24/10/2015	Fish Passage Conference, Groningen (The Netherlands) (Organization committee and oral communication)	34
7-8/06/2016	"NGO's and river restoration projects" Workshop (ZSL, London, UK)	10

01/08/2015	Visit Global Nature Foundation	6
22/06/2016	LIFE Networking Workshop on Fish and Aquatic Systems Restoration”	29
21/06/2016	SIBIC Congress	204
25-28/11/2015	V Nature Congress	115
TOTAL		571

TABLE 47 Networking activities

- **Achieved objectives:**

- Cooperation with the World Fish Migration Network on LinkedIn.
- Participation and/or organization of 11 networking events.
- Participation and involvement in the networking events of managers and people responsible of riparian greening in EU (more than 400 people);
- Participation of stakeholders from other related projects in the national and international level.
- Participation of representatives from naturalists associations from several countries of the European Union in the networking events;
- Participation of scientists and technicians specialist in the study of riparian species in the different areas involved;
- Accurate development of a sustainable network of stakeholders/initiatives related to the issue of the project during the rest of the project
- Development of efficient, widespread and sustained dissemination activities.

- **Date of completion:** July 2017.

- **Variations in action:** The creation of a networking group on fish passage and river connectivity at European level has been finally left aside. At the beginning of the project we found that similar initiatives were already ongoing (e.g.: the Dam Removal & Fish Passage Network in LinkedIn and the World Fish Migration Day initiative), so the project preferred to sum up to the existing movements in order to sum up efforts and connect other initiatives through these groups..

- **Action evaluation:** successful.

	2013					2014	2015	2016	2017
	Ago	Sep	Oct	Nov	Dic	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable A1 Task 2	X	X	X	X	X	X	X	X	X

Real dates A1 Task 2		X	X	X	X	X		X	X	X
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Table 48: Comparison between the foreseen sample calendar and real calendar E4

5.2 Dissemination actions

5.2.1 Objectives

The general objective of the Communication Plan was to inform about project activities and the targeted environmental problem with the aim of achieving a broad transfer of the green infrastructures concept in other areas.

Communication activities had the following specific objectives: a) disseminate the project among identified stakeholders, b) training different audiences about fluvial connectivity and functions of the riparian ecosystem, c) social involvement for the sustainability of the achieved results.

These objectives were accomplished by the development of three different programmes: overall dissemination, environmental education and volunteering.

5.2.2. Dissemination: overview per activity

Use of LIFE logo (and Natura2000 logo) on documents and durable goods

The communication materials produced incorporated the LIFE logo in their design, in order to accomplish the Life Program communication requirements. Also the equipment purchased for the project was marked with a sticker which includes the name of the project, LIFE logo and logo NATURA2000, website and the e-mail of the project. This was done because the contribution of the European Union in financing the materials and equipment made and used during the project was taken into account. Thus, with the aim of communicating this contribution, the logo of the LIFE Program was incorporated in all of them. The produced materials are listed below in the attached table.

PRODUCT	QUANTITY
Folders	100
Ballpens	1.000
Notebooks	200
Roll up	1
T-shirts	200
Labels (stickers)	
Piers for fishermen	50
Badges	100

Posters	2
Aquarium	1

Table 49 Communication materials developed

Task 1: Overall Dissemination Program

a) General considerations of the Overall Dissemination Program

Free entrance events were organized in public facilities with the aim of disseminating the project's objectives since its inception, such as the presentation of the project, the screening of the documentary “*El Segura, un río con mucha vida*” (attended by 200 people), congresses, seminars, networking activities, training courses, videos and newsletters. The profile of the audience attending the events was highly varied, including associations related to the project topic, farmers, public entities, etc. Most of the presentations took place in Cieza and Calasparra. The total number of attendees was 1.139. Likewise, at the Aquarium of the University of Murcia, several fish tanks were opened which house the autochthonous fauna of the Segura River in representation of the LIFE + SEGURA RIVERLINK project. The aquarium receives around 2.500 visits per month.

In addition, in this section are included the number of visit to the web page of the project, people subscribed to the email list in order to receive the updates and newsletter of the Project, followers of the social networks and scope of the press articles and other communication media.

The total number of people reached by the overall Dissemination Program amounts to more than two million (Table 58), far exceeding the number of 5.000 citizens initially planned.

b) Documents to plan the communication: Communication Plan and Corporate Identity Manual

The starting point for planning the general communication activity was the development of a Communication Plan and a Corporate Identity Manual. Both documents were reviewed by the project partners and were fully operational.

c) Website

The **website** of the project is allocated within the web of CHS, following the address <http://www.chsegura.es/chs/cuenca/segurariverlink/riverlink/>, but it is also readdressed from www.segarariverlink.eu. The website is in operation since 01/02/2014 and has the following sections:

- Presentation (general overview of the project).
- Project (actions and partners).
- A walk along the Segura River (educational section).
- News (main progresses).
- Get involved (upcoming activities).

- Contact (subscription to newsletter and information email).

Access to the website of the project was a total of 42.889 visits.

d) emailing list: 265 subscribers to the e-newsletter.

e) Social media

The following profiles were developed and are managed in social networks:

SOCIAL NETWORK	PROFILE	CREATION DATE
Facebook	Segurariverlink	10 November 2013
Twitter	@segurariverlink	07 November 2013

Table 50 Social Networks developed

Facebook page reached 1.111 followers, this amount has increased in 451 followers since its last analysis, and a total scope of 8.329 people according to Facebook statistics. On the other hand, the Twitter profile of the Project has 1.139 followers and it has shared 1.298 tweets.

f) Articles and other publications

Regarding **articles and other publications** to disseminate project objectives, results and progress done, the presence of LIFE+ SEGURA RIVERLINK in the media have been very important, reaching 162 appearances in paper and digital media and 12 scientific articles published (see **deliverables D21 about appearances in paper and digital media and D27 about scientific articles**)

g) Newsletter

14 newsletters have been sent, which were published periodically with updated information on the progress of the Project.

You can see the quantitative results of the O overall Dissemination Program in the table 63 in the point 5.3

Task 2. Environmental Education Program in schools and educational centers

a) Activities at the educational centers

After a year of efforts carrying out the dissemination of the project and after contacting all the educational centres, in May 2014 began continuously the activities at educational centres. In April 2014 a survey was designed for students to fill in all the centers that participate in environmental education activities. The survey had a part that was given before the explanation of the monitor to know the previous knowledge of the students and another part that was delivered at the end of each talk to verify that participants had acquired the knowledge. Likewise, if the time and the means allowed it, the talk was completed with audiovisual material, specifically the videos made by ANSE of the scientific bird ringing were presented and as the project progressed, the documentaries that were recorded of the project

were also visualized. The success of the project dissemination depended on the adequate dissemination of the information to the targeted public. The total number of students visited in schools was 3,027, as can be seen in Table 2.

b) Hiking routes and activities by local forest river and small plantations

The excursions and visits to plantations were not carried out in the schools until they had not received the talks. In this way, the excursions were a way of completing the explanations given at the talks, of the students appreciating the quality of the environment and of understanding why the actions were being carried out. At the first stage, the excursions were focused on visiting the areas within the scope of the project so that the students could observe the physical barriers that obstructed the natural movements of fish migration.

At the mid-final stage of the project and once the fish-scales were constructed, the students were taken to visit them to understand the reason for their location and how they worked. In this way, all issues explained in the centers were completed with these excursions. In addition, the routes were reinforced with visits to areas of the Natura 2000 Network and emblematic places such as the Sotos and Bosques de Rivera de Cañaverosa nature reserve or the Cieza riverside promenade. In Cieza, the activity was also completed with a visit to the Old Molino de Teodoro and other places of recognized historical value. In total, 1,351 schoolchildren participated in field trips. In these trips they were given brochures of the project and merchandising (stickers, pens, etc.). The following table shows how the expected results were considerably exceeded, since it was expected to reach 1.000 students and the final number reached almost 5,000.

Task 2: Environmental Education Program	Foreseen in the revised proposal	Achieved	Evaluation
Environmental Education Programm in schools	Promotion of changes in children and teenagers within the field of the project, at least 1.000 students of different training cycles/levels.	3.027	The final results is 4.779 participants. Respect to the expected 1,000 participants it exceeds expectations by almost 500%.
Hiking routes and activities by local forest river and small plantations		1.351	
Exposition of 9 panels for the exhibition in CEU San Pablo		401	

Table 51: Environmental Education Program in schools and educational centers

DATE	TITLE	LOCATION	ATTENDANTS
May 2014- June 2016	Environmental education activities in schools in the field of project territory	Moratalla, Cieza, Abarán Calasparra (Murcia)	3027
20/04/2015	Exposition of 9 panels for the exhibition in CEU San Pablo	Molina de Segura (Murcia)	401
March 2015- May 2017	Hiking routes and activities by local forest river	Cieza/Calasparra	1351
TOTAL			4779

Table 52 Final summary of environmental education data

Task 3. Program for the social involvement in the project (volunteering)

The volunteering program started on 01/02/2014, suffering some delay from the scheduled date (01/09/2013). This situation is due to the fact that ANSE, coordinators of this activity, preferred to wait until the initial contacts with all the local associations were made, and the first meeting was in November 2013.

Forty-three volunteering activities have been developed so far, where 835 people participated (included personnel of the project).

Task 3: Program for the social involvement in the project	Foreseen in the revised proposal	Achieved	Evaluation
Volunteering	100	835	The result has been eight times higher than initially expected.

Table 53 Final summary of social involvement of the project

- **Achieved objectives:**

- ✓ 162 appearances in paper and digital media.
- ✓ 16 radio interviews.
- ✓ 8 appearances in TV programmes.
- ✓ 43 events attended to present the project.
- ✓ 24 events organized.
- ✓ 2,382 attendants to LIFE+ SEGURA RIVERLINK events.
- ✓ 12 videos produced.
- ✓ 12 scientific articles.
- ✓ 14 newsletters.
- ✓ 11 noticeboards.
- ✓ 1 aquarium.
- ✓ 1 didactic unit.
- ✓ 1 travelling exhibition.
- ✓ 1 roll up.
- ✓ 2 leaflets.
- ✓ 2 posters.
- ✓ 37 educational activities organized.
- ✓ 4,283 attendants to educational activities.
- ✓ 46 volunteering activities organized.
- ✓ 835 attendants to volunteering activities.
- ✓ 41,935 access to the website from January 2014 to September 2017.
- ✓ 1,141 likes in Facebook.
- ✓ 1,099 followers in Twitter.

- **Remaining objectives:** none

- **Date of completion:** July 2017

- **Variations in action:**

- Some activities have been organized outside the territorial scope of the project.
- Two Congress will be celebrated under the scope of the SEGURA RIVELINK project V Congress of the Nature of the Region of Murcia and II of the Iberian

Southeastern V Congress of the Nature of the Region of Murcia and II of the Iberian Southeast (See Action E.4 Networking)

- A working camp was organized in July 2015.
- The Deliverables Elaboration of 2 technical publications were delayed.

- **Action evaluation:** successful.

	2013					2014	2015	2016	2017
	Ago	Sep	Oct	Nov	Dic	Jan-Dec	Jan-Dec	Jan-Dec	Jan-Jul
Planned timetable D	X	X	X	X	X	X	X	X	X
Real dates D		X	X	X	X	X	X	X	X

TABLE 54: Comparison between the foreseen sample calendar and the real calendar

5.3 Evaluation of project implementation

ACTION	RESPONSABLE	OBJECTIVE	% Achieved	% Implemented	Evaluation
A.1 Planning of actions to increase longitudinal connectivity: drafts of actions on target infrastructures.					
Task 1. Building of Fish Passages	CHS	10 fish passages projected	125	125	Successful (Two extra projects already projected, MAN, FIC)
Task 2. Weir demolition	CHS	1 weir demolition projected	100	100	Successful (Deliverable D4 and D10)
A.2. Initial inventory and evaluation (state) of selected indicators in monitoring programmes initial inventory and evaluation (state) of selected indicators in monitoring programmes.					
Task 1. Initial evaluation of biological indicators: fish community and populations	UMU	Initial evaluation of community and population metrics for the total localities included into the monitoring programmes	100	100	Successful (Deliverable D8)
Task 2. Initial evaluation of biological indicators: plant community	CARM	Initial evaluation of the structure of the biological community and 9 floristic inventories, one	100	100	Successful

Task 3. Initial evaluation of biological indicators: bird community and bank-associated fauna	ANSE	per zone of action Initial evaluation of the structure of the biological community	100	100	Successful (Deliverable D7)
Task 4. Prior ecological state of the stretch of the project	CHS	Initial evaluation of the ecological status of the stretches of action	100	100	Successful (Deliverable D6)
A.3. Restoration-rehabilitation design at the bank level in the stretches of action.	CHS	Fluvial restoration project	100	100	Successful (Deliverable D3)
A.4. Development of management and social participation mechanisms for use in later stages of the project	CHS	Development of the conditions that facilitates the involvement of local stakeholders in the project, 1 Database with 1,000 contacts who should be informed of the project's actions and results, Good management practices document	100	100	Successful
B.1 Increase of river connectivity: Demonstration of obstacles removal.	CHS	Demolition of obstacles and removal of rubble and waste materials from the project area	100	100	Successful (Deliverable D1)
B.2 Increase of river connectivity: Demonstration of fish passages	CHS	8 fish passages	100	100	Successful (Deliverable D16)
B.3 Increase of river connectivity: Demonstration of fluvial restoration associated to fish passages	CHS	Germplasm collection and multiplication to obtain autochthonous plant and nursery cultivation of seedlings and cuttings, River restoration activities next to the removed weir.	100	100	Successful (Deliverable D18)

<p>B.4 Development of a land custody network in connectivity areas</p>	<p>CARM/A NSE</p>	<p>8 items of public or private property included in the Land Custody Network, 8 custody agreements, 8 technical memorandums for possible interventions by plots included in the Land Custody Network, 15 hectares of land included in the Land Custody Network, 8 concrete actions for environmental Network elaborated.</p>	<p>162 (n°) 440(Ha)</p>	<p>162 (n°) 440 (ha)</p>	<p>13 items of public or private property included in the Land Custody Network. - 11 custody agreements. - 8 technical memorandums for possible interventions by plots included in the Land Custody Network. - 66 hectares of land included in the Land Custody Network, 8 concrete actions for environmental improvement in the Land Custody Network.</p>
<p>C.1. Monitoring activities</p>					
<p>Task 1. Evaluation and programme to monitor operation indicators at fish passage systems</p>	<p>ITAGRA</p>	<p>Monitoring programme to evaluate the fish passages</p>	<p>100</p>	<p>100</p>	<p>Successful 8 fish passage analysis (Deliverable D8)</p>
<p>Task 2. Monitoring programme for biological indicators: fish community and populations</p>	<p>UMU</p>	<p>Fish-based bioassessment programme to evaluate the potential responses in fish community and sentinel's populations</p>	<p>100</p>	<p>100</p>	<p>The monitoring programme have developed in a highly correct way (The evaluation of community and population fish metrics is successfully obtained for the total sectors and the majority of sites included into the monitoring) (Deliverable D22)</p>
<p>Task 3. Monitoring programme for revegetation projects at the restoration-rehabilitation plot level</p>	<p>CARM</p>	<p>Monitoring programme to evaluate the plant community in the restoration</p>	<p>100</p>	<p>100</p>	<p>(Deliverable D22)</p>
<p>Task 4. Monitoring programme, biological indicators: bird community and river banks</p>	<p>ANSE</p>	<p>Monitoring programme to evaluate the river associated fauna</p>	<p>100</p>	<p>100</p>	<p>(Deliverable D22)</p>
<p>Task 5. Monitoring programme for the biological state of the water</p>	<p>CHS</p>	<p>Monitoring programme to evaluate the ecological state of the river in the project area</p>	<p>100</p>	<p>100</p>	<p>1 campaign and 6 left. 17 sample points located upstream and downstream of each of the nine obstacles</p>

					(Deliverable D22)
Task 6. River Sediment Monitoring	CHS	Monitoring programme to evaluate the river sediments in the project area	100	100	1 campaign and 6 left. 17 sample points located upstream and downstream of each of the nine obstacles (Deliverable D22)
C.2 Socio-economic assessment	CHS	Determination of the socio-economic impacts of the project activities	100	100	See deliverables D14 and D15
D. Communication and dissemination actions					
Task 1. Overall Dissemination Program of LIFE SEGURARIVERLINK project	ANSE	Dissemination of the project activities, achieving a wide transfer of the validated methodology to other areas and increase the environmental awareness in society through: public acknowledgement, the education and training of stakeholders about the concept of sustainability in the riverside areas, the social involvement in the maintenance of the common benefits fulfilled with the project	100	100	The public impact of the project is very high (high number of visits through the social media, many stakeholders have expressed their interest in the project activities...) (Deliverable D20, D21, D23 and D27)
Task 2. Environmental Education Program in schools and educational centres	ANSE				
Task 3. Program for the social involvement in the project (volunteering)	ANSE				
E.1 Project Management and Monitoring	CHS	A correct project administration, coordination and management	100	100	Successful
E.2 After-life plan CHS	CHS	Some of the activities of the afterlife plan are already executing	100	100	Successful (Deliverable D19)
E.3 Project Audit	CHS	This action have finished the last, in December 2017	100	100	Successful (Deliverable D24)
E.4 Networking	CHS	Dissemination of the project s in the framework of fluvial connectivity, green	100	100	Successful (See point 5.2)

	infrastructures and of LIFE+ EU funding programme			
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Table 55: Evaluation of project implementation

Task 1: Overall Dissemination Program		Achieved	Foreseen in the revised proposal	Evaluation
Organization of event: Project presentations, Congress, Inauguration of equipment, Networking, Training course, documentary presentation, videos		1.139 + 15 videos + 42.500 visits to the Aquarium	5.000	The objective was to achieve the maximum diffusion of the project, especially to reach the people interested in the river, its use and management, and reach the 5,000 citizens. Objective surpassed in more than two million citizens reached.
Mass media (Articles, papers and other publications)		2.367.000		
Brochures	ANSE	400	5.000	
	CHS	1.500		
Manuals	“Exotic species elimination handbook”	700	200	http://www.murcianatural.carm.es/web/guest/visor-noticias5/-/asset_publisher/tP1z/content/4296596?artId=4296596
	“Forest recuperation handbook”	250	200	
Newsletter		14	14	
Website		42.889	9.500	
Emailing list		265	x	
Social media (Facebook plus Twitter)		2.250	750	
Notice boards with information about the aims, activities and results of the project.		23	8	4 notice boards were placed. The notice boards explained the planned constructions regarding to the fish scales (9 in the surroundings and 10 posters addressed to fishermen).
Notice boards with the visual elements of the corporate identity of the project		3	2	Two large notice boards about the Project were placed, one in Cieza and one in Calasparra.
Networking activities organized through workshops		1988	1.000	Twice as many attendees expected were received at workshops and online activities.
Travelling exhibition		9	9	The notice board of the Project travelling exhibition were taken to all educational centers, congresses, audiovisual exhibitions of the congress, etc.
Information and training courses, for active stakeholders, as technicians and volunteers		10 Training course, 3 Course, 6 Seminar	15	Objective achieved after 13 courses and 6 seminars carried out, 1.721 citizens reached.
Attendance to fairs and conferences. Scientific publications, congress and Scientific articles		5 Fair, 12 Congress. 12 scientific publications, 16 congress communicat	Publication of at least 2 articles in specialized press media about the progress and	

	ions and 6 scientific articles	evaluation of the actions fulfilled throughout the Project.	
Press releases	23	16	
Didactic unit design	✓	1	http://www.asociacionanse.org/guia-didactica-escolares-rio-segura/20170627

Table 56: Overall Dissemination Program

5.4 Analysis of long-term benefits

1. Environmental benecitos

Although right now it is very difficult to quantify all the environmental benefits of the same, several of them can be guessed and several are quite promising.

- There is no doubt that the steps for fish are working and that both the southern barbel and other sentinel species are using the steps as usual. Even so, it is too early to evaluate at the community level the changes that the steps may be producing, since the communities react on longer time scales than the projects. On the other hand, we should analyse the extreme drought that currently affects Segura and could even help reduce native species in the Segura River and improve the use of the passes, since native species are better adapted to extreme conditions. In the near future, a meeting will be held between CARM, UMU and CHS to continue sampling to evaluate the results of the scales at the community level and confirm the apparent successes.

- On the other hand where it is already possible to affirm without any doubt that the project has been a success is in the ecological restoration of the riverbanks. In spite of the harshness of the conditions, the hard work of maintaining the plantations has meant that there are already stretches of fairly young riverbank forests where the *Arundo donax* (invasive plant) begins to be controlled. The help of the people who have signed the custody agreement has been essential to the point that the best riparian forest trees are appearing in these areas. In order to quantify already the environmental improvement according to the criteria of the Water Framework Directive, several indices have been measured in the area in which it already shows an evident improvement (QBR, hydromorphology, deliverable D22)

2. Long-term benefits and sustainability

a. Long-term / qualitative environmental benefits

The improvement of the longitudinal river permeability. The results of the project are expected to be transferred to the rest of the 325km of the Segura River in the next 15 years. This will allow the migration of la aquatic community, fish and biological, improving in this way the connectivity of the river. This adaptation will be achieved by placing fish passages which will increase the possibilities of migration for these communities. The validation of this action will lead to the generalization of this kind of green infrastructure, rather unusual in

Mediterranean areas. To support this measure, there has been a legislative change in the Segura River Basin Management Plan, a direct consequence of the Segura Riverlink project, specifically article 32 "Improvement of the morphology and environmental quality of the channels") in section 4 that says:

” In the stretches of river designated as mass of water, the dams of less than 17 meters of height on the channel, as well as the weirs of flowing waters, must have a lift for the fish fauna. This lift should be designed to allow the passage of native fauna and make it difficult for invasive alien species to pass through.”

This legislative change, a direct consequence of this project, is of key importance in future actions in the Segura River Basin District and will ensure that private concessionaires must address the problem of fluvial connectivity, which is why it is expected that in the coming the hydrological planning is substantially advanced in solving the problem of fluvial continuity.

- The improvement of the ecosystems continuity by means of the fluvial restoration of the area aims to support the river permeability and naturalization.
- The increase of biodiversity, removing alien species and making possible the re-colonization by indigenous species.
- The improvement of the conservation of riparian habitats and the cooperation amongst stakeholders by developing a Land Custody Network and a good practice management plan, where private and public stakeholders, administrations and environmental organizations work together for the sustainability, protection and conservation of the river.
- The improvement of the linking between urban and rural areas, thanks to the development of some of these activities in urban areas and promoting the participation of inhabitants of those areas
- Maintenance of the "Segura River Stewardship Network". The creation and maintenance of a land guardian network will establish a number of legal agreements and voluntary agreements with the owners of the territories where river restorations are made. The maintenance of this network will enable the long-term preservation of these restorations and will consequently deepen the adaptation of river management to the principles of green infrastructure.

b. Long-term / qualitative economic benefits

River ecosystems in good conditions carry out environmental functions such as flood control, water storage, biodiversity, landscape or recreation which is not always considered in economic terms but which provide benefits to society.

Working with nature provides multiple benefits at comparatively low costs. Investment in green infrastructure makes economic sense, since it is always cheaper to restore and conserve ecosystems which are already in good conditions than to demolish large infrastructures. The

search of artificial solutions to replace the services that nature provides for free is not only technically difficult, but it also involves a high cost.

The project will also enhance and disseminate at a national and international level the natural values of the area, fostering new uses such as rural tourism and thereby creating new jobs.

Quantifying the economic impact of a project with these characteristics is quite difficult. In this case and with different methodologies different approaches have been made that are found in the D15 deliverable. In particular, the water savings that will be achieved with the project as well as the fixed CO₂ are very relevant.

The plantation in the Riverlink project is around 75 hectares, that is about 750,000 m². The evapotranspiration of that mature cane mass would be about 15,000 m³ per day, in comparison with the 2,475 m³ / day of the riparian forest, which is about 12,525 m³ / day. But obviously the cane is not evapotranspiring all year, assuming it is active in this area about 8 months a year. The total water saving estimated in the project is about 3,047,750 m³ or 3,047 hm³ / year

Taking an average conservative value of the monetary value of the water used in the basin, we can give an approximate value of 0.15 € / m³. Therefore, we would find that the water saving (when the forest is mature) due to the change from the exotic cane plantation to the native riparian forest, apart from other environmental assessments, is a value to the users of the basin (mostly farmers) of about 457,000 euros per year, which is a very high value and although the guarded area is only a part but it is where the best results have been produced.

With regard to the sequestration of CO₂ that the riparian forest performs more efficiently than *Arundo donax* (which in the end is usually burned and therefore the CO₂ re-emitted into the atmosphere, the following is indicated) If we focus on the 75 hectares approximately they have been replanted, (with 2200 trees and 2600 bushes planted) with the conservative estimates it can be estimated approximately, and taking as a conservative value the 100 tn / ha, about 7,500 tons of CO₂ fixed annually. Of about 6 euros per ton, the value would be about 45,000 euros per year in CO₂ fixed

c. Long-term / qualitative social benefits

The environmental improvements and education campaigns that will have been developed during the project will produce a substantial improvement in public awareness, increasing the number of visits to the areas, in the form of environmentally friendly tourism. Information on the benefits of a green infrastructure, on the local fish species or the existing habitats in the area as well as those actors directly involved in its management (private land owners, irrigation communities, hydroelectric power station managers, locals, government experts, environmental workers, etc.) will have helped raising environmental awareness as well as restoring heritage and fostering public use. The project will enhance and disseminate at a national and international level the natural values of the area, fostering new uses such as rural tourism and thereby creating new jobs.

Finally, the different actions planned to mitigate fragmentation by reconnecting protected areas and enhancing their ecological coherence, have produced benefit economic and recreational activities such as fishing and kayaking, which are very popular in the area and are strongly influenced by the existence of obstacles in rivers.

As a curiosity we can say that the steps of Hoya García fish or the artificial river type Menjú have been erected as tourist poles in the area, attracting many hikers since they are very pleasant to see, more now that they have naturalized, In fact there is some active tourism company that is promoted with the images of these artificial rivers.

- d. Continuation of the project actions by the beneficiary or by other stakeholders.
 - Integrating the green infrastructure model in the Hydrological Plan of the Segura Basin

One of the main objectives of the River Basin Management Plan (RBMP) of the Segura River which is currently being drafted is to improve the ecological status of its waters. Besides, this is one of the main objectives of the implementation of the concept of green infrastructure in this SEGURA RIVERLINK project as we discuss in the preview point and will have started the discussions to get included these tasks in the new RBMP 2021-2027.

Apart from this there are already several concrete actions in which the project is being continued, the main ones being the following:

- ANSE began to develop in January 2018 the project "River Custody for the reinforcement of inter-regional connectivity in the Segura River" that has the support of the biodiversity Foundation of the Ministry of Agriculture and Fisheries, Food and Environment and with the advice of the Water Commission of the CHS as a continuation of the LIFE + SEGURARIVERLINK . UMU has extended the samplings at cost, throughout the year 2017 at cost to follow the monitoring programs. As mentioned above, three-way meetings between UMU, CHS and CARM are already being established for the financing of future monitoring.
- Likewise on the part of both ANSE, CARM and CHS, advice is being given to the custodians and work is being carried out in the winter of 2017 on the maintenance of these areas through a contract with own funds of the CHS (50,000 euros + VAT), ensuring the continuity of the project
- The ecological restoration work has already been carried out on the Archena scale, which was the last one built and therefore the plantation had to be carried out outside the LIFE project
- We continue with technical advice to other LIFE projects such as the Ripilsilvanatura in which we are helping with the techniques used to eliminate the invasive species *Arundo donax*
- In the month of February 2018 at the Filmoteca de Murcia a video of the Segura river will be viewed on its biodiversity in the Segura Riverlink area where the custodians
- Maintenance of the "Segura Guardian Network" - Once the project is completed, the maintenance of the land guardian network will enable the long-term preservation of these restorations and will consequently deepen the adaptation of river management to the principles of green infrastructure. After the project, this action won't require a high budget since the two administrations together with ANSE are responsible for the maintenance and conservation of these areas. It is interesting to note that although 15 custody agreements have been signed, this does not reflect how many neighbouring

owners are going to be involved in the environmental protection of the Segura River. This is because the legal requirements to sign the agreements were quite strict and complicated when the properties were owned by several owners, inheritances, etc.

- This allows the implementation of the process in other areas and sectors and increases the awareness of all the stakeholders. The monitoring and evaluation and the studies on transferability and large scale introduction, together with all the technical guides, will allow any interested stakeholder in implementing this project. The CHS will assure that this system is widely disseminated using its network of contacts (other public administrations, universities...).
- It is planned that in Segura River in the location of Alcantarilla, techniques used in Segura Riverlink will be used in a project of ecological restauration. Project budget is around 1.000.000 euros and the initial date to start the works is May 2018.
- Environmental Volunteer Program and Environmental Monitoring. . The project plans to develop Environmental Volunteer programs from an environmental education point of view, as well as performing regular maintenance tasks in different areas that allow long- term preservation of the same. Tragsa with the financial support of MAPAMA will convocate in April of 2018 the first volunteer program call for NGO´s.
- Dissemination of technical information. Following months the technical staff of the project is going to participate in several environmental congresses and is planned to disseminate all the information about the Segurariverlink project. But there is a very important congress, that is Restaurarios , that is the Iberian (Portugal and Spain) Congress about river restoration that CHS will organize in collaboration with CIREF that will be the perfect place to exchange information about river restoration (and with another LIFE projects)

3. Replicability, demonstration, transferability, cooperation

The validation of the SEGURA RIVERLINK project will lead to the generalization of this kind of green infrastructure, rather unusual in Mediterranean areas. Even when designing the proposal, the project intends to reach and involve a wide range of different social groups, economic sectors and public administrations in order to achieve a successful widespread of the results and to transfer the experience and implement it in other areas and activities. We expect that the great potential for valorisation of the project results and its transferability will support the continuation of the dissemination and technology transfer activities. The successful achievement of the project objectives have demonstrated the feasibility of this technology and will foster the development of initiatives of transfer and implementation.

For that reason, one of the main objectives of the SEGURA RIVERLINK project is to integrate the results in the River Basin Management Plan (RBMP). Being this RBMP the main tool for water management, and being directly related with the WFD, it seems obvious to include the possible outcomes of this project (which will certainly help improve the ecological state of the masses of the basin) within the Hydrological Plan of the Segura Basin.

One of the main results of the project is that the South Barbel species, on which there was no data on obstacle franchability, has adapted very well to the tuna scales in the project. The data

from ITAGRA and the UMU (D22) show that the design of these scales that had worked with other cyprinids (such as the common barb or the colmilleja) in other areas of the Atlantic slope of the peninsula and that had not been practically studied on the Mediterranean slope and for this particular species (*barbus sclateri*) they have also been successfully tested on the Segura river. In fact, the values show even a higher percentage of passage and more speed in it than studies that have been carried out in Castilla-León on common barb.

This means that there are perfectly valid technical solutions for the lift in these Mediterranean rivers that have a more particular casuistry and that therefore can be extended to many other rivers in the Segura basin, as well as other rivers such as the Júcar River and the basins of eastern Andalusia.

Right now, three more scales have been designed (Manterola and la Fica in the city of Murcia and the Azud del Bayo in the Segura river, which due to the success of the 8 built and the lessons learned are expected to be executed in the coming months.

4. Best Practice lessons:

The implementation of fish passages along several locations of the Segura River is being demonstrated to increase biodiversity and to serve as green infrastructure that bring back to the river its connectivity functionality.

Perhaps one of the best lessons learned is the importance of monitoring in the evaluation of the project. Many projects have large investments but very little money is invested in monitoring it. In this project, both the duration of the project (48 months) and the large resources invested in the monitoring have served to evaluate very deeply the different techniques proposed, which has resulted in a greater use of resources.

One could highlight the good behaviour of natural rivers and the ease with which they can be integrated into the landscape, which is why they will be the priority option to be developed in the coming years. The only problem with these actions is the need for fluvial space to develop it and the limitation when they are high altitude dams.

Another lesson learned and that has been key is the importance of public participation in river restoration projects. As can be seen in the deliverable D23, both conventional and unconventional public participation has been very large, this project becoming a reference project both in the Mediterranean area and we could even say in the MAPAMA.

This great support from the population of the riverside municipalities and specially from the inhabitants who live on the banks of the rivers, has proved to be a key tool. This will allow that, in the areas where more agreements have been signed, maintenance could be carried out in the first years of the plants. In fact the results are already visible to the naked eye, having virtually eliminated all the cane in some areas.

Likewise another key lesson learned is the administrative cooperation (not only between state and regional government as partners of the project), but the fluid relationship with the local administration has allowed to improve the results of the project. Since improving the relationship with the neighbours of the area, the ease of permits, the improvement of technical solutions or the realization of activities, all these aspects have improved thanks to the good

relationship between the three existing administrations in the area that has been finger in this project.

5. Innovation and demonstration value

The few actions taken to permeabilize our rivers and allow the free flow of fish is due to the scientific gap that exists in Spain relative to problems of Iberian fish's migration and possible solutions. This situation is even worse in regions where the species represented are not considered quality trophies (Cyprinidae), something that occurs in the Segura River basin, where there is only one fish passage constructed and it is not currently operative.

Therefore, the actions that are planned to implement the SEGURARIVERLINK project will mean a fundamental reference in improving the longitudinal continuity of the river stream, specially orientated towards Iberian cyprinids. Surely, the experience and results to be obtained will be the basis for future construction of fish passage in the southeast of the Iberian Peninsula.

It should be noted that this project has become a reference in the Spanish water administration and for example has encouraged other confederations to work on LIFE projects and specially with cyprinids, the forgotten ones of Spanish fish, we are talking about the LIFE13 NAT project / ES / 000772 "ACTIONS FOR THE PROTECTION AND CONSERVATION OF IBERIAN CIPRINIDES OF COMMUNITY INTEREST -CIPRÍBER-" directed by the Douro Hydrographic Confederation.

On the other hand, it should also be noted that several tests have been carried out in the river restoration to eradicate the *Arundo donax*, one of the most dangerous exotic species worldwide, especially the advances in repeated cut techniques (they have been played with different frequencies, cutting heights etc.) and methods of asphyxia through the use of polyethylene sheets and have been a breakthrough that is already being used in the realization of new projects that will be executed in 2018 by the CHS. It is worth highlighting the project that will be carried out in the Segura river in the municipality of Alcantarilla, where a 5km stretch of river will be restored in a comprehensive manner, at a cost of more than one million Euros, where it will be applied. the techniques learned in the Riverlink project.

This same fact is being applied in the LIFE project Ripisilvanatura13 BIO / ES / 001407 with very good results.

6. Long term indicators of the project success: describe the quantifiable indicators to be used in future assessments of the project success.

- Presence/Absence and distribution of sentinel species, both indigenous and invasive.
- Conservation status of the habitats / species (relative abundance, importance in terms of equitability, inventories, ecological state of the stretches of action etc.)
- Population state (Age Structure, Size Classes, Gender, Proportion, Recruiting, Rate of Individual Anomalies, etc.).
- No. of removed obstacles
- No. of Construction Projects of fish passages implemented

- m2 Restoration-Rehabilitation areas implemented
- Custody agreements signed and hectares of land included in the Land Custody Network.
- Dissemination campaigns, courses and activities organized
- No attendants
- No. of publications
- No. of visits to the webpage, No. of followers on the social networks profiles and views on the audiovisual materials
- No. of visits to the validation sites
- No. of petitions of information about the project from different stakeholders
- No. of people involved in the workshops
- No. of handbooks distributed
- No. of press and other written media releases

6. Comments on the financial report

6.1. Summary of Costs Incurred

The next table summarize total costs incurred by the project until the 30th July 2017 (moth 49):

PROJECT COSTS INCURRED				
Cost category	Budget according to the grant agreement*	Costs incurred within the project duration	Variation of costs actually incurred (%)	Variation of costs actually incurred (€)
1.Personnel	1.660.844,00 €	1.595.480,30 €	96%	65.363,70 €
2.Travel	76.033,00 €	60.954,60 €	80%	15.087,48 €
3.External assistance	992.231,00 €	1.000.963,02 €	101%	- 8.732,02 €
4.Durables: total <u>non-depreciated</u> cost				
- <i>Infrastructure sub-tot.</i>	383.000,00 €	338.551,69 €	88%	44.448,31 €
- <i>Equipment sub-tot.</i>	70.550,00 €	6.689,79 €	9%	63.860,21 €
5.Consumables	20.180,00 €	32.805,29 €	163%	- 12.625,29 €
6.Other costs	20.190,00 €	26.941,70 €	133%	- 6.751,70 €
7.Overheads	201.222,00 €	196.115,54 €	97%	5.106,46 €
TOTAL	3.424.250,00 €	3.258.501,93 €	95%	165.748,08 €

Table 57: Revised budget after the approval of the amendment of 4 August 2017.

Total costs declared by LIFE+ SEGURA RIVERLINK sum up to 3,258,501.93 Euros, what means 95% of the proposed budget (3,424,250 Euros).

Costs actually incurred are within the allowed flexibility of 30,000€ and 10% allowed by the Article 15.2 of the Common Provisions.

In the **Equipment** category only 9% of the foreseen costs have been executed. None of the partners including costs in this budget line has declared 100% of these costs. This low percentage comes mainly because ITAGRA has only used 2% of the budget estimated, remaining around 57,000 Euros without been used because the equipment has not been purchased but finally rented.

Cost categories that have been slightly under the budget approved:

- **Personnel**: costs declared under this category remains 4% and around 65,000 € below the initial estimations. Despite this, all partners declared costs over what was initially foreseen, unless CARM that has not reach the initial budget in this category.

- **Travel**: 20% of the costs foreseen have not been used (15,087.48 Euros). This situation is mainly due to the fact that CARM has not declared expenditures under this budget line because of the difficulty to link costs of the organization's vehicles to the project. Also CHS has not need so much budget in this category as was initially expected. So, around 13,000 Euros of this 20% come from initial travel costs of CARM and CHS not consumed.

- **Infrastructure**: real costs of all the fish passages constructed during the project have been finally 12% below the planned budget (44,448.31 Euros). This comes from lower bids offered than the tenders launched.

Cost categories that have been over the initial estimated costs:

- **External assistance**: only 1% of costs initially foreseen have been overcome, what involves around 8,732 €.

- **Consumables**: partners have declared costs around 12,000 Euros over the initial budget foreseen in this budget line (63%). This budget category was under estimated in the proposal because during the project life, costs have been necessary for the realization of communication and monitoring activities.

- **Other costs**: costs declared in this budget category are 33% over what was initially foreseen (around 6,700 €). This category cost was underestimated in the planned budget and all partners, with the exception of CARM has overcome the budget proposed. UMU, CHS and ITAGRA have declared costs related to the organization of communication events (caterings, bus rental, fees of conferences, organization of workshops...). Others costs are custom duties or publication of public tenders. ANSE is the partner who has largely expended more than expected in this category, but all costs correspond to the massive number of communication activities developed (production of dissemination material, maintenance of volunteers, insurances, etc.)

** Details on the individual variations per partner and specific comments for each category can be consulted in the document "*financial report per partner*" attached in Annex VI Financial report.

6.2. Accounting system

Accounting systems

The accounting system used by the partners to different the invoices and expenses of the project LIFE+ SEGURA RIVERLINK are the following:

CHS: the project coordinator has one accounting reference to identify any cost related to the project (70002 – LIFE 12 Riverlink) in the accounting system “SOROLLA”. This code only includes expenses of the project.

UMU: the accounting reference into the programme JUSTO (application that integrates the accounting, budget and financial management of venues and expenditure of the University of Murcia) is 16558.

ANSE: The invoices of the project are identified with the number 4 in its analytical accounting system.

ITAGRA: the accounting code of the project is 004.RIVERL and identify of the expenses of the project.

CARM: the accounting reference for the project is 43805 “PROGRAMA LIFE+ RIVERLINK”. The code individualized the expenditures of the project into the accounting system SIGEPAL.

Procedure of approving costs

The procedures to approve the costs are different for each partner:

CHS: the expenditures have to be approved by the technical responsible: Mr. Eduardo Lafuente (Project Coordinator) and Mr Jose Carlos Gonzalez (Water Commissioner) and the financial and administrative department Mr Manuel Bravo (head of payment department). The invoices include the signatures of the technical responsible and the payment orders include the signature of the financial department.

UMU: the technician responsible of the project authorized the cost and signed the invoices. Then, the invoices are registered in the accounting system JUSTO and sent to the Economic Management Area for processing the payment.

ANSE: the expenditures of the project are approved by Jorge Sanchez (technical coordinator) and Pedro Garcia (administrative and technical coordinator).

ITAGRA: the costs of the project are presented by the project coordinator (Fco. Javier Ronda) to the Director of ITAGRA (previously Fernando González and now Asier Sáiz) that approved them.

CARM: the estimated expenditure to be charged annually to the investment project 43805 is calculated by the Service responsible of the project and approved in order to charge to the budget the project expenses according to the project timetable.

Time registration system

Partners used manual timesheets according to the template of the LIFE programme and the recommendations of the Communication of 08/12/2010 about the registration of time devoted to the projects. The timesheets are filled daily by each worker and reviewed and approved monthly by each project responsible. The persons that work for more than one LIFE project complete just one timesheet and are approved by the responsible persons of the different projects. Partners have followed the instructions received in CE letters to correctly fill the timesheets after the third monitoring visit (November 2016) and fourth monitoring visit (April 2017).

Invoices linked to the LIFE+ project

The reference of the project is sent to suppliers with the details for the invoice in order to include the project reference in any invoice including costs declared by the project. For the payments where the invoice numbers is not clear, a payment certificate from the bank was requested. In some cases that including the reference has not been possible, a stamp has been included, but always as the last option.

6.3. Partnership arrangements (if relevant)

The associated beneficiaries are responsible of their financial documents and their financial reporting, they complete their own financial statement and provide the information required by the beneficiary coordinator.

The only financial transactions between partners during the project have been those related to the transfer to each partner of the first and second payments.

For reporting purposes, the article 13 of the partnership agreements established that associated beneficiaries should send to the coordinating beneficiary *“cost statement summary” on 10/07/2015 at the latest for the mid-term financial statement and at 08/09/2017, at the latest, for the final report. For the progress reports, summaries must be sent to the beneficiary at the latest 21 days before the deadline for the submission”*.

6.4. Auditor's report/declaration

The details of the auditor are the following:

Name: Victor Guillamón Melendreras.
Address: Gran Via, 15. 7º/6º/5º, 30.004, Murcia.
Company: Sector, 3

The audit report is attached to this Final Report as Deliverable 26 (Annex I. Deliverables: D26. Audit report).

6.5 Summary of costs per action

TOTAL COSTS FINALLY INCURRED PER ACTION

Action no.	Short name of action	1. Personnel	2. Travel and subsistence	3.External assistance	4.a Infrastructure	4.b Equipment	6.Consumables	7.Other costs	TOTAL
A1	Preliminary Actions	141.057,83 €	4.227,59 €	179.706,50 €	- €	30,00 €	747,61 €	- €	325.769,53 €
B1	Increase of river connectivity: Demonstration of obstacles removal.	65.083,05 €	- €	- €	- €	- €	- €	- €	65.083,05 €
B2	Increase of river connectivity: Demonstration of fish passages	103.169,05 €	56,10 €	59.524,37 €	338.551,69 €	- €	- €	- €	501.301,21 €
B3	Increase of river connectivity: Demonstration of fluvial restoration associated to fish passages	172.533,46 €	1.279,37 €	362.961,78 €	- €	- €	- €	181,50 €	536.956,11 €
B4	Development of a land custody network in connectivity areas	68.265,76 €	989,81 €	63.392,93 €	- €	- €	1.468,68 €	64,73 €	134.181,91 €
C1	Monitoring activities	575.707,51 €	40.952,37 €	186.627,94 €	- €	4.370,12 €	25.630,02 €	647,13 €	833.935,09 €
C2	Socio-economic assessment	56.912,29 €	- €	- €	- €	- €	- €	- €	56.912,29 €
D1	Communication and dissemination actions	208.017,35 €	5.956,81 €	71.820,04 €	- €	2.289,67 €	4.958,98 €	25.337,05 €	318.379,90 €
E1	Project Management and Monitoring	204.734,00 €	1.593,55 €	73.783,46 €	- €	- €	- €	711,29 €	280.822,30 €
E3	Project Audit	- €	- €	3.146,00 €	- €	- €	- €	- €	3.146,00 €
E4	Networking	- €	5.899,00 €	- €	- €	- €	- €	- €	5.899,00 €
Overheads									196.115,54 €
	TOTAL	1.595.480,30 €	60.954,60 €	1.000.963,02 €	338.551,69 €	6.689,79 €	32.805,29 €	26.941,70 €	3.258.501,92 €

Table 58: Total cost finally incurred per action

VARIATIONS PER ACTION

Action no.	Short name of action	1. Personnel	2. Travel and subsistence	3.External assistance	4.a Infrastructure	4.b Equipment	6.Consumables	7.Other costs	TOTAL	
A1	Preliminary Actions	5.764,17 €	11.754,41 €	- 62.179,50 €	- €	- 30,00 €	252,39 €	1.000,00 €	- 43.438,53 €	115%
B1	Increase of river connectivity: Demonstration of obstacles removal.	41.871,95 €	- €	4.000,00 €	- €	- €	- €	- €	45.871,95 €	59%
B2	Increase of river connectivity: Demonstration of fish passages	- 1.949,05 €	1.943,90 €	102.499,63 €	44.448,31 €	- €	- €	- €	146.942,79 €	77%
B3	Increase of river connectivity: Demonstration of fluvial restoration associated to fish passages	41.197,54 €	2.020,63 €	- 17.961,78 €	- €	- €	- €	- 181,50 €	25.074,89 €	96%
B4	Development of a land custody network in connectivity areas	32.429,24 €	2.710,19 €	- 50.092,93 €	- €	- €	- 168,68 €	- 64,73 €	- 15.186,91 €	113%
C1	Monitoring activities	- 43.149,51 €	- €	- 34.227,94 €	- €	65.329,88 €	- 7.750,02 €	1.352,87 €	- 15.356,68 €	102%
C2	Socio-economic assessment	- 22.312,29 €	- €	- €	- €	- €	- €	- €	- 22.312,29 €	164%

		€							€	
D1	Communication and dissemination actions	- 22.231,35 €	- 5.123,81 €	8.159,96 €	- €	- 1.439,67 €	- 4.958,98 €	- 18.147,05 €	- 43.740,90 €	116%
E1	Project Management and Monitoring	33.743,00 €	1.554,45 €	36.216,54 €	- €	- €	- €	9.288,71 €	80.802,70 €	78%
E3	Project Audit	- €	- €	4.854,00 €	- €	- €	- €	- €	4.854,00 €	39%
E4	Networking	- €	- 3.899,00 €	- €	- €	- €	- €	- €	- 3.899,00 €	295%
Overheads									5.106,46 €	97%
	TOTAL	65.363,70 €	15.087,48 €	- 8.732,02 €	44.448,31 €	63.860,21 €	- 12.625,29 €	- 6.751,70 €		95%
		96%	80%	101%	88%		163%	133%		

Table 59: Variation per action

The main variations of the costs finally incurred according to the budget proposed per action are the following:

Action B1

Due to the fast development of the works related to the demolition of the obsolete dam, the costs initially estimated for personnel were not necessary because permanent staff dedicated less time to this action. Also, the final cost of this contract was lower than foreseen.

Action C2

This action has required a major dedication of permanent staff of CHS than expected in the realization of the proposal. This work has involved the realization of surveys to gather the public perception about the project and its later analysis and drafting of conclusions in the related Deliverables 14 and 15 (“Report on surveys, interviews and stakeholder groups” and “Guidelines for the improvement of the socioeconomic impact in local populations”).

Action E3

Costs corresponding to the project audit has been finally of 3,146 Euros, so the initial cost was overestimated. The auditor has audited project costs incurred by all beneficiaries along all the project life.

Action E4

The budget assigned to the networking action in the travel category has resulted insufficient to cover the travel and accommodation related to the events where the project has been transferred and shared with similar initiatives. LIFE+ SEGURA RIVERLINK has participated in 7 networking events (3 in Spain and 4 in other EU places), and has organized 2 networking meetings.

7. Annexes

Annex I Deliverables

Annex II Responses to EC letters

Annex III Project Indicators

Annex IV Financial Statements

Annex V Payment request

Annex VI Financial report:

- Financial reports of CHS, ANSE, DGMA, ITAGRA and UMU
- Financial report commenting individual budget per partner.
- Summary costs per action (Excel sheet)

Annex VII Administrative documentation

Partnership agreements – Submitted with Mid Term Report

Management Handbook – Submitted with Mid Term Report

Annex VIII Dissemination documents

Hard material delivered with the Mid Term Report:

- T-shirt
- Torches
- Pliers
- Badge
- Pen
- Notebook
- Sticker
- Folder