



Programma Operativo Nazionale *Governance* e Azioni di Sistema FSE 2007-2013

ASSE E: *Capacità istituzionale* - Obiettivo specifico 5.5: *Rafforzare ed integrare il sistema di governance ambientale*

Azione 7A: *Azioni orizzontali per l'integrazione ambientale*

III Convegno Nazionale sulla Riqualificazione Fluviale

Sessione Internazionale

Riqualificare i corsi d'acqua nella regione mediterranea

ispirazione dalle buone pratiche - impegno per le sfide correnti

REGGIO CALABRIA

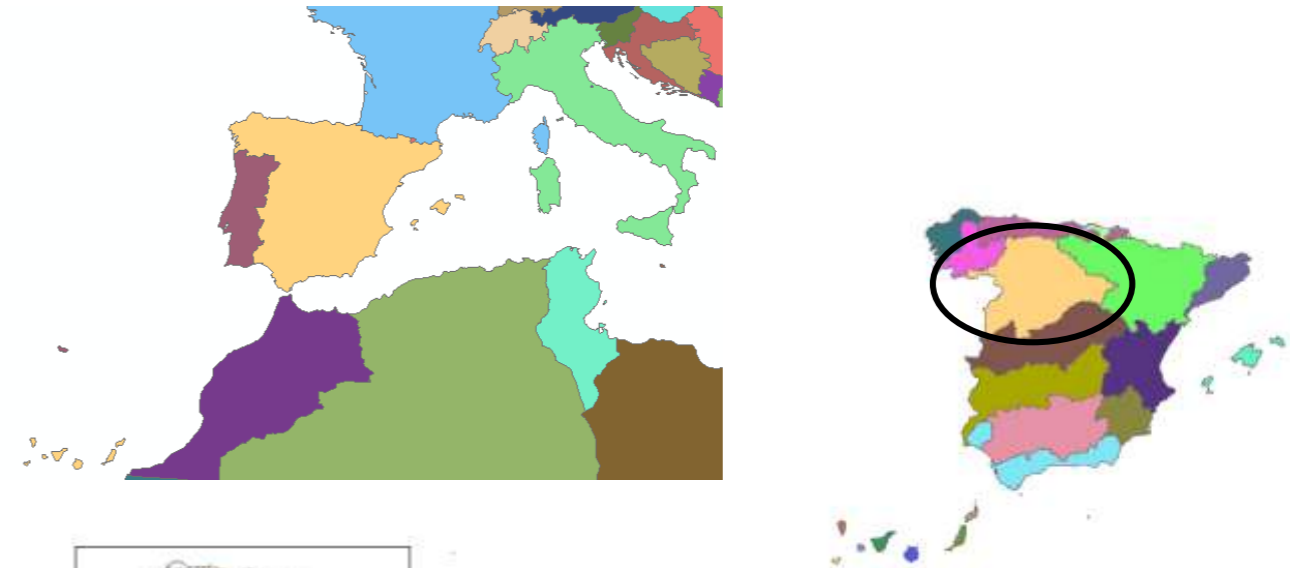
29 ottobre 2015

**RESTORING SPACE FOR RIVERS AND FLUVIAL
CONNECTIVITY IN THE DUERO BASIN (SPAIN)**

Rosa Huertas



Some data of the Duero Basin



International Duero Basin

Total area: 98.000 km²

Average yearly discharge: 21.800 Hm³

Spain area: 79.000 km² (81%)

Spain discharge: 13.600 Hm³ (62%)

Portugal area: 19.000 km² (19%)

Portugal discharge: 8.200 Hm³ (38%)

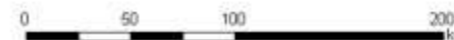
Boundary: 400 km

Spanish part of the Duero Basin



Portuguese part

- Masas de agua españolas
- Masas de agua portuguesas
- Frontera con Portugal
- Capitales de provincia
- Aguas costeras
- Embalses
- Provincias
- Parte española de la Demarcación
- Parte portuguesa de la Demarcación



Several river restoration measures have been carried out in the last 10 years in the Spanish part of the Duero Basin by the Duero Basin Authority.

There are different categories, but the main are recovery of the longitudinal continuity, and measures to improve lateral connectivity,

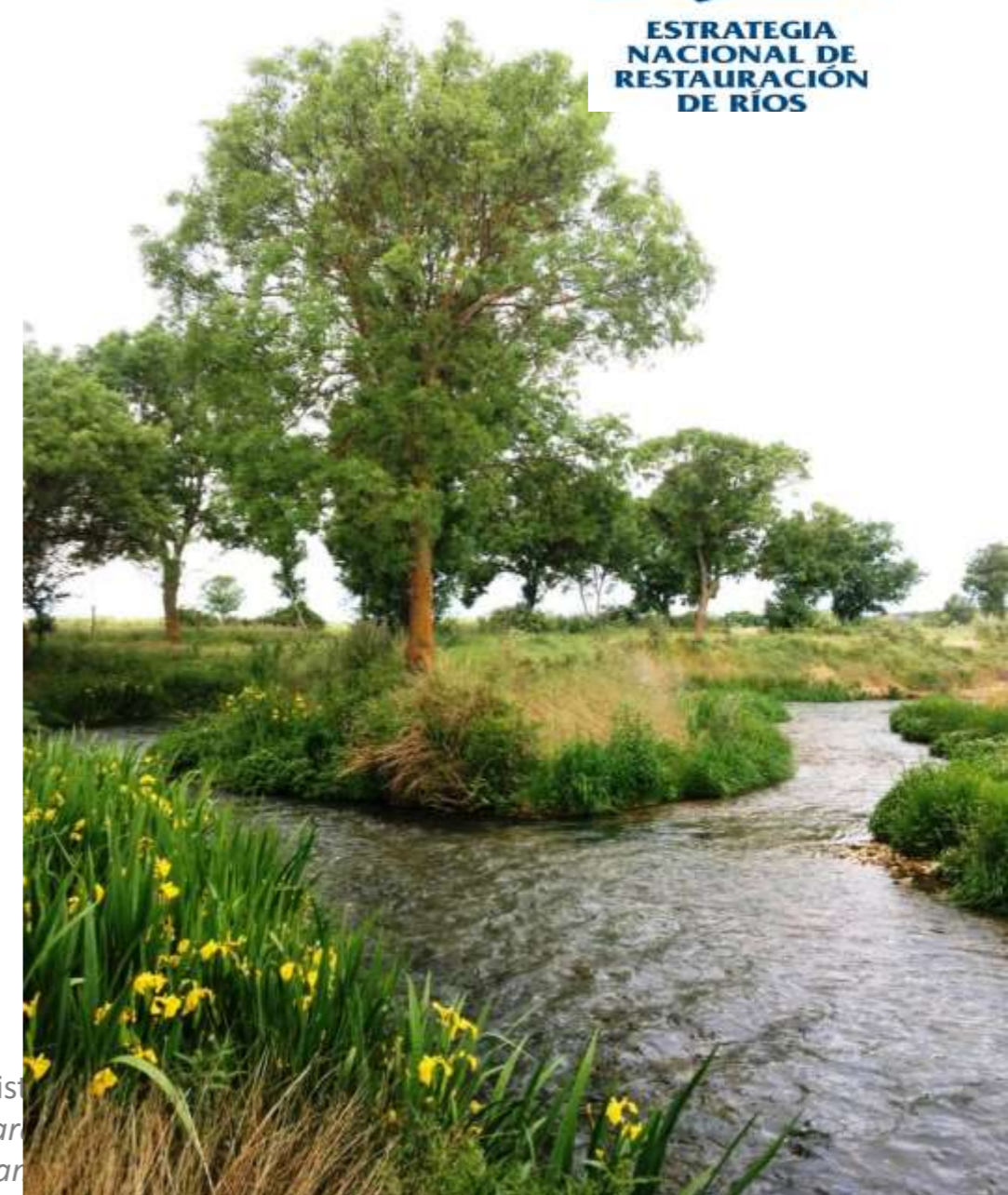
These measures are part of the National Strategy of River Restoration and are integrated in the Program of Measures of the Duero Basin Management Plan.

These actions are in accordance to some Objectives set by several European Directives:

- Improvement of the hydromorphological and quality conditions in water bodies (Water Framework Directive)
- Control increase of flood risk (Floods Directive)
- Making bigger the water infiltration in alluvial areas (Groundwater Directive)
- Amelioration of the capacity of natural treatment processes in the receiving environment (Several Directives about Water Quality)
- Fluvial ecosystem recovery (Nature Network 2000: Habitats and Birds Directives)



ESTRATEGIA
NACIONAL DE
RESTAURACIÓN
DE RÍOS

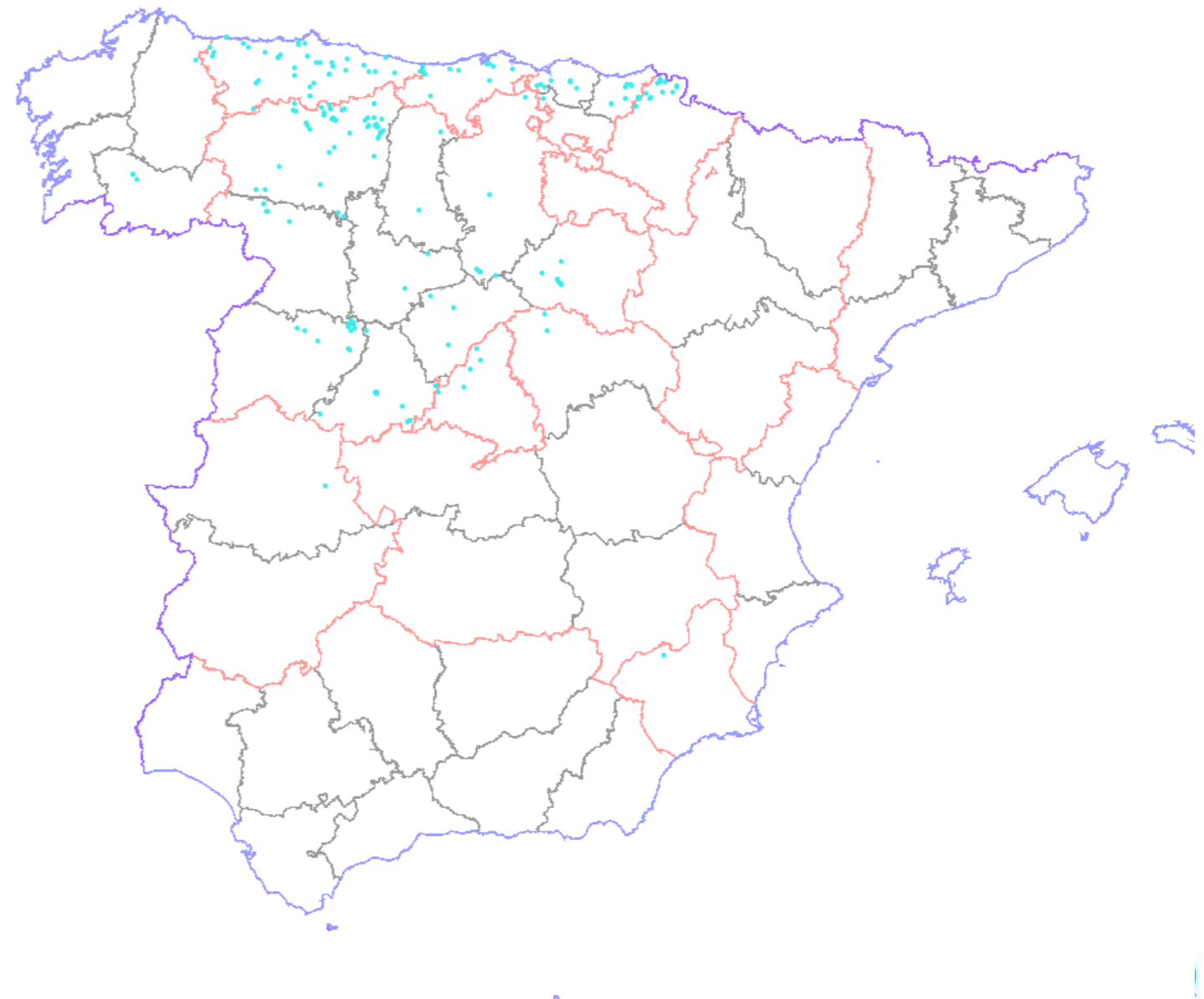


Longitudinal continuity

**Diagnosis: over 3500 of transversal barriers
(weirs and dams) in the Duero Basin
Around 60% no longer in use**

Different kinds of action:

- total removal**
- partial removal**
- fish passage**

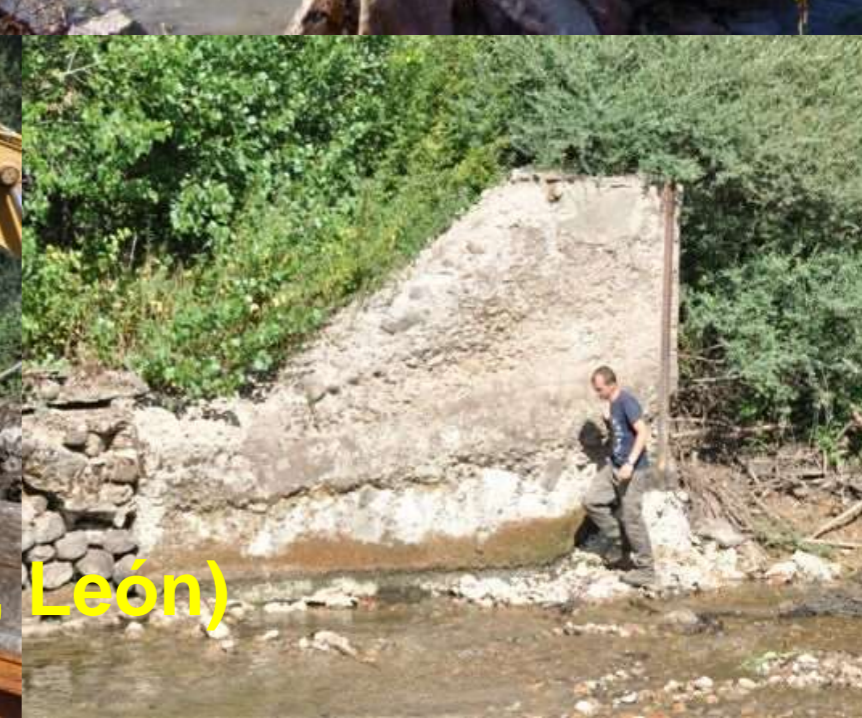


Longitudinal continuity

**Barriers totally removed up to now:
110 with more than 700 km of river length
reconnected
(flows, sediments, nutrients and biota)**



Demolition of La Concepción weir (Tormes river, Salamanca-Spain)



Demolition of the Villamorisca weir (Cea River, León)



Unione europea
Fondo sociale europeo



MINISTERO DEL LAVORO
E DELLE POLITICHE SOCIALI
Direzione Generale per le Politiche
Attive e Passive del Lavoro



Governo italiano
Parlamento del Consiglio dei Ministri
Dipartimento della Funzione Pubblica



fse per il tuo futuro
Programmi operativi nazionali
per la formazione e l'occupazione

Demolition of La Gotera dam (Bernesga river, León-Spain)



Trabajos de pesca eléctrica



Inicio de la demolición del muro



Detalle de la demolición del muro



Retirada de escombros



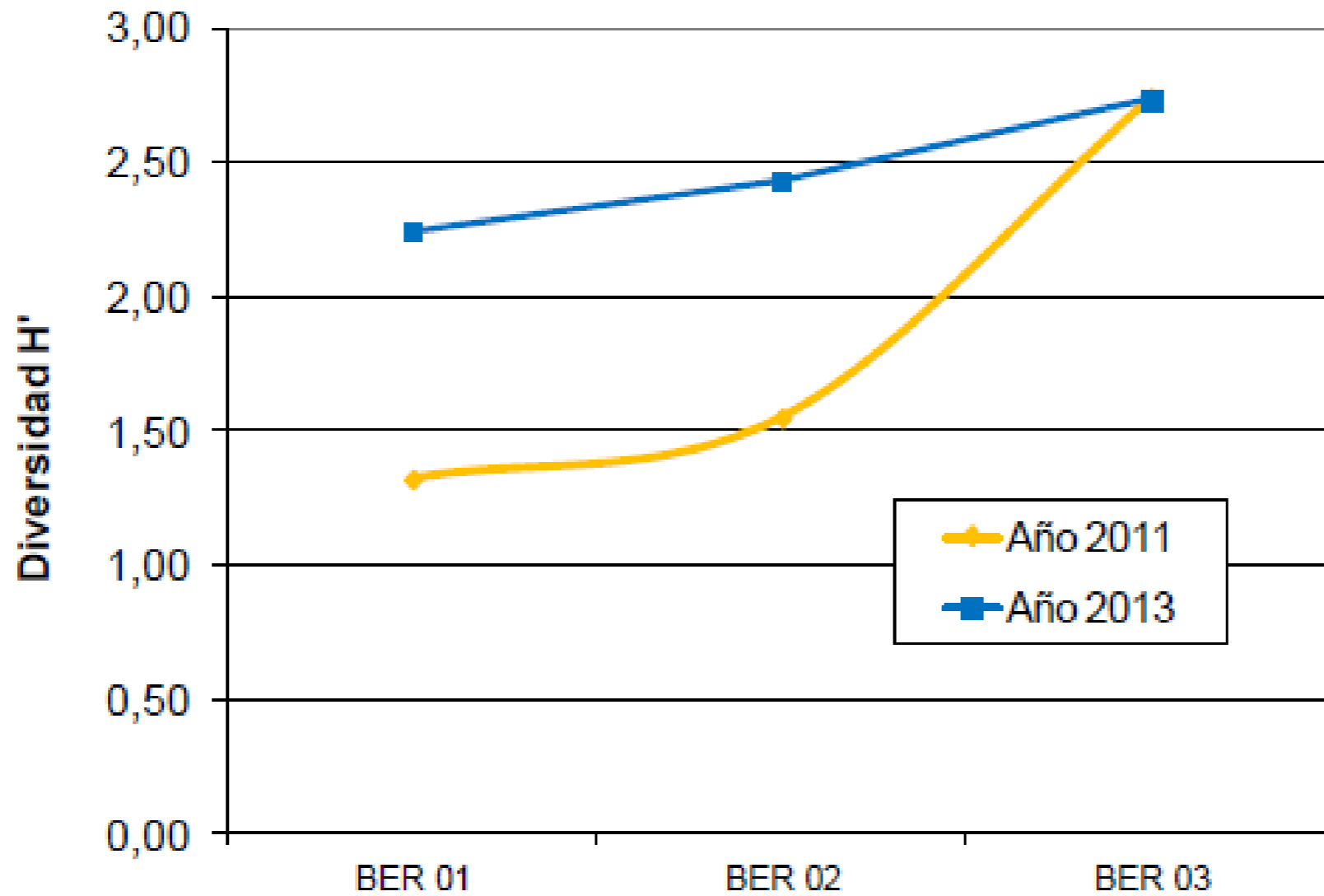
Inicio de la incisión en los acarreos



Finalización de los trabajos



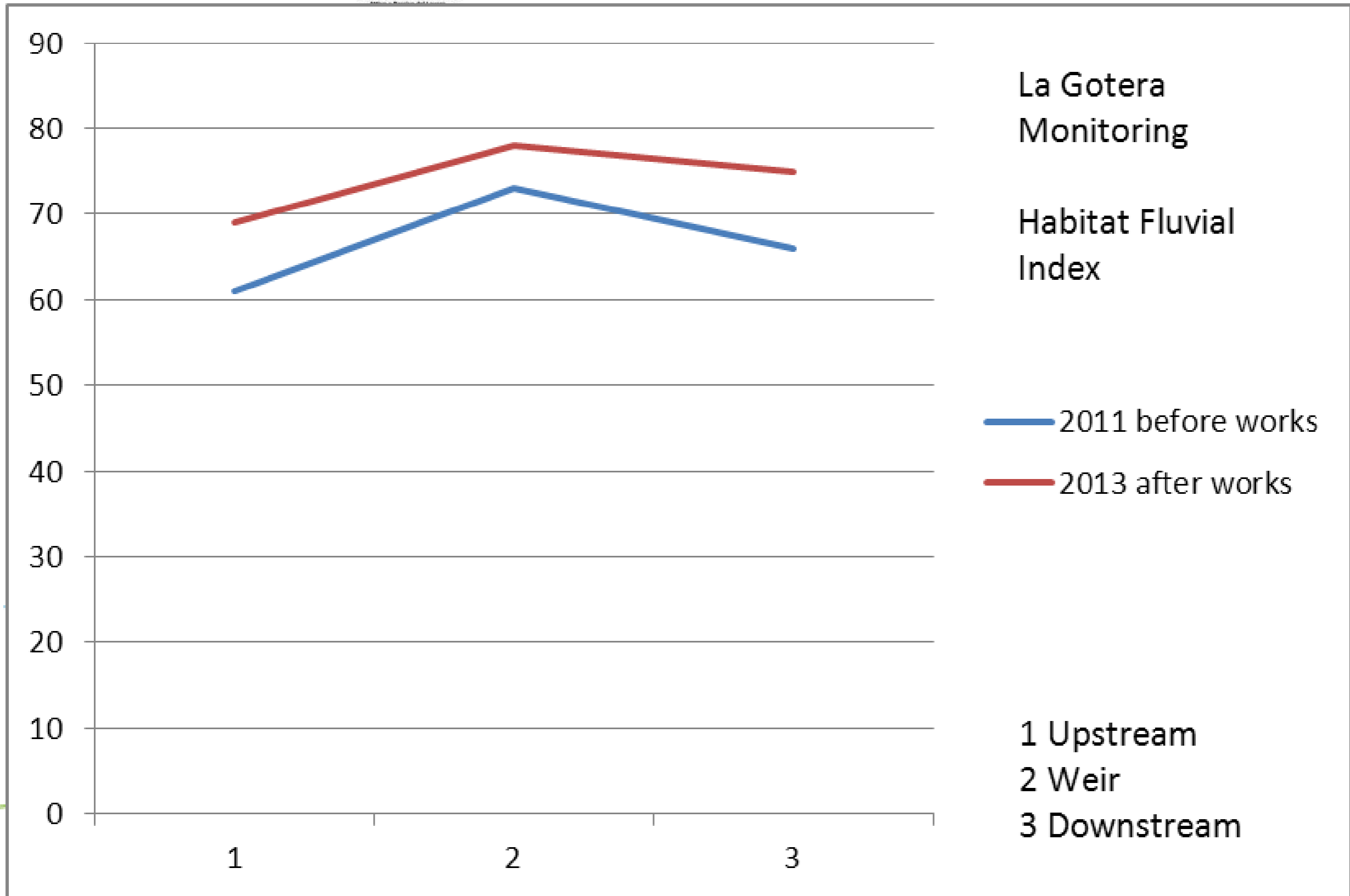
La Gotera Monitoring macroinvertebrates



Upstream Dam Downstream

Programma Operativo Nazionale Governance e Azioni di Sistema FSE 2007-2013
ASSE E: Capacità istituzionale - Obiettivo specifico 5.5: Rafforzare ed integrare il sistema di governance ambientale
Azione 7A: Azioni orizzontali per l'integrazione ambientale





Programma Operativo Nazionale Governance e Azioni di Sistema FSE 2007-2013

ASSE E: Capacità istituzionale - Obiettivo specifico 5.5: Rafforzare ed integrare il sistema di governance ambientale

Azione 7A: Azioni orizzontali per l'integrazione ambientale

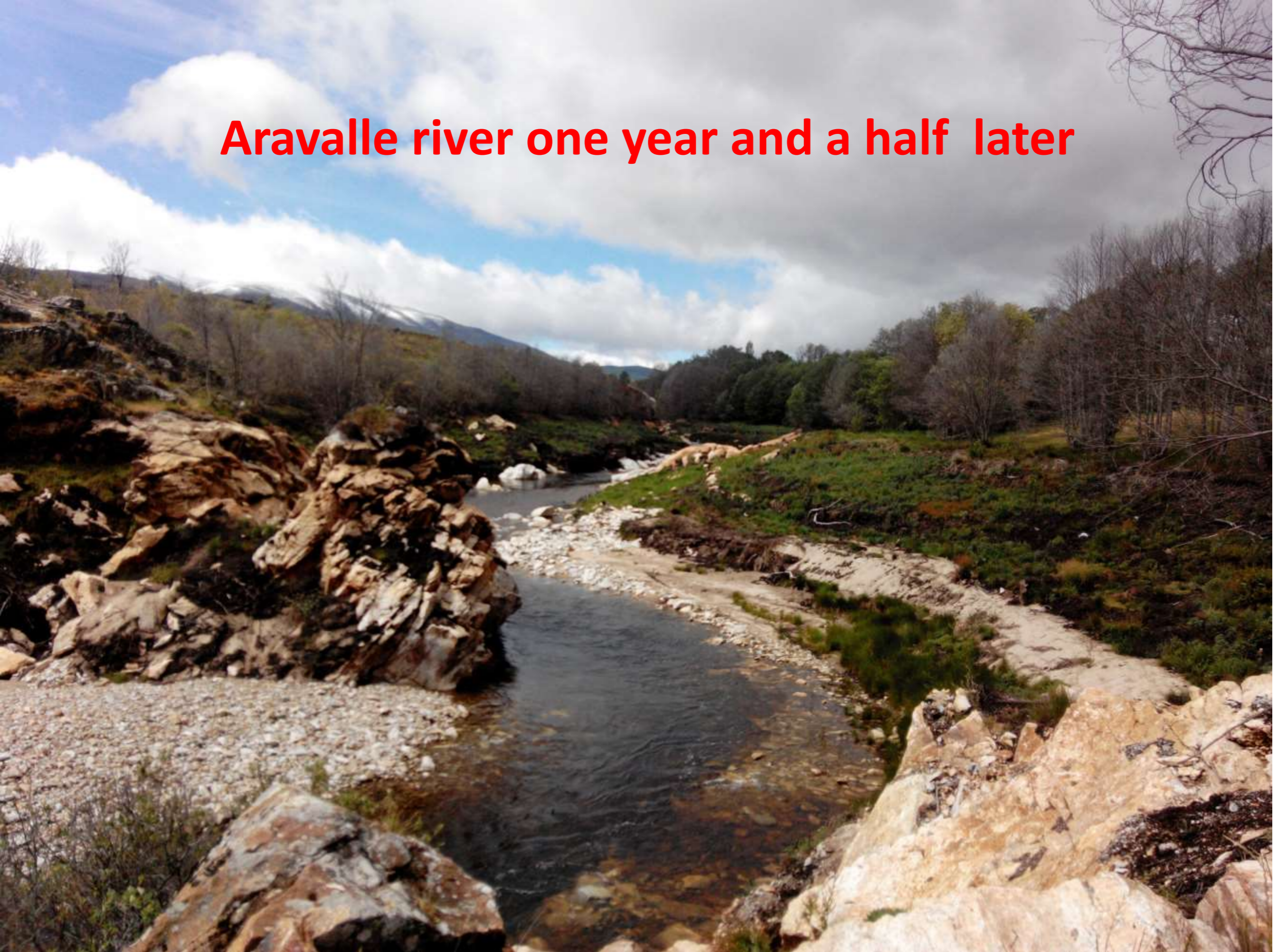
Demolition of the Umbrías Dam (Aravalle river, Ávila-Spain)



(Aravalle river, Ávila-Spain) two months later



Aravalle river one year and a half later





Unione europea
Fondo sociale europeo



MINISTERO DEL LAVORO
E DELLE POLITICHE SOCIALI
Direzione Generale per le Politiche
Attive e Passive del Lavoro

Longitudinal continuity

**Barriers partially removed and
fish passages up to now: 103,
with more than 500 km of river
length partially reconnected**



MINISTERO DELL'AMBIENTE
E DELLA TUTELA DEL TERRITORIO E DEL MARE

Programma Operativo Nazionale Governance e Azioni di Sistema
ASSE E: *Capacità istituzionale* - Obiettivo specifico 5.5: *Rafforzare e*
Azione 7A: *Azioni orizzontali per l'integrazione*



Problems resulting from the weir

It means an obstacle to fish fauna movements

It favours:

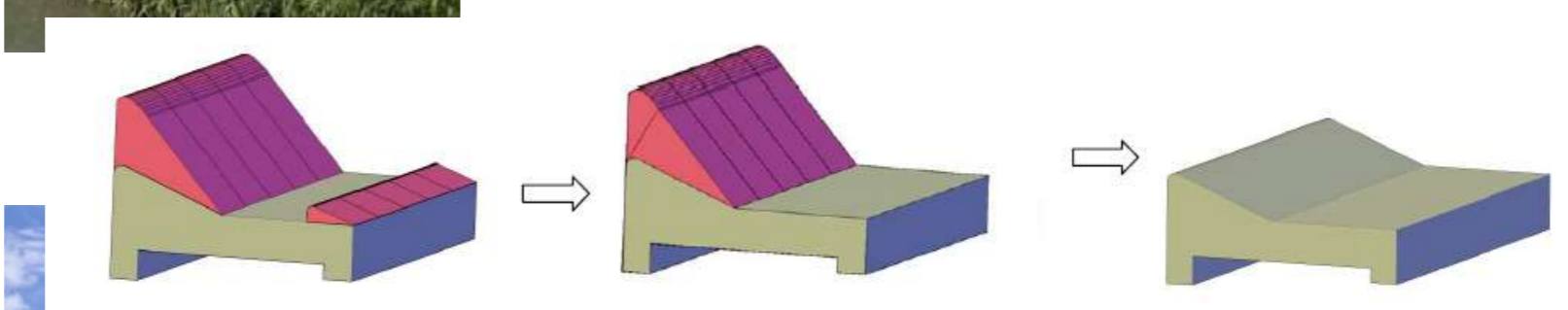
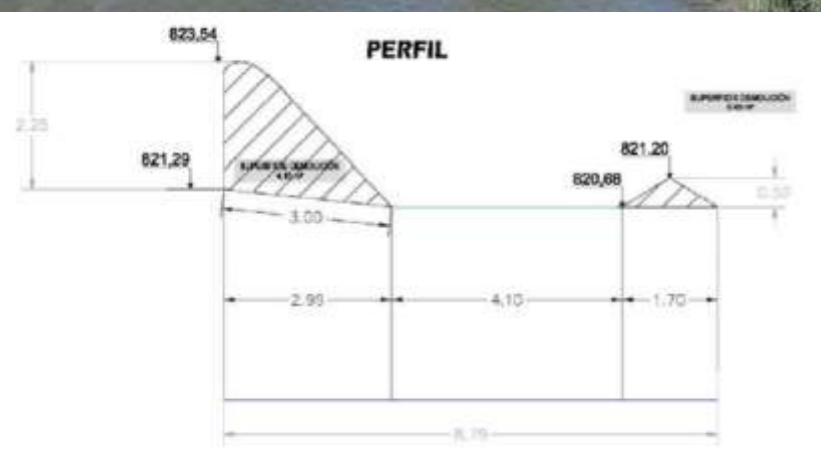
- sediments built up
- breeding ground for vegetation
- waste, wood retention, etc.



Problems resulting from the weir

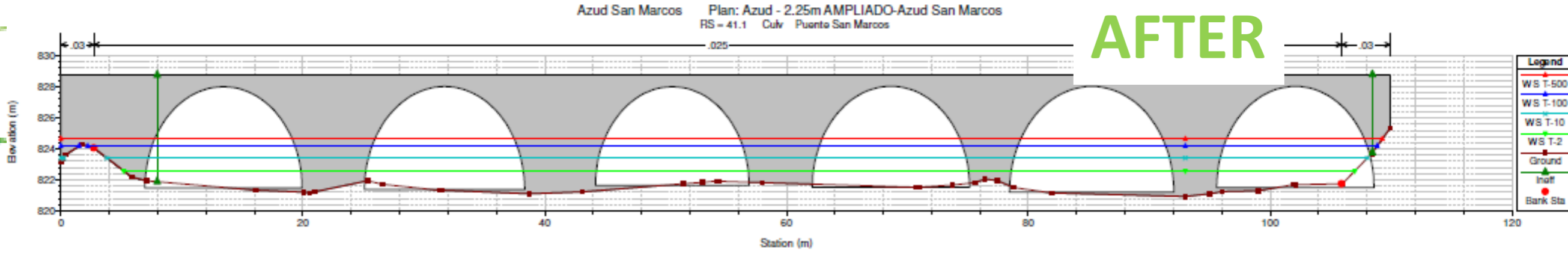
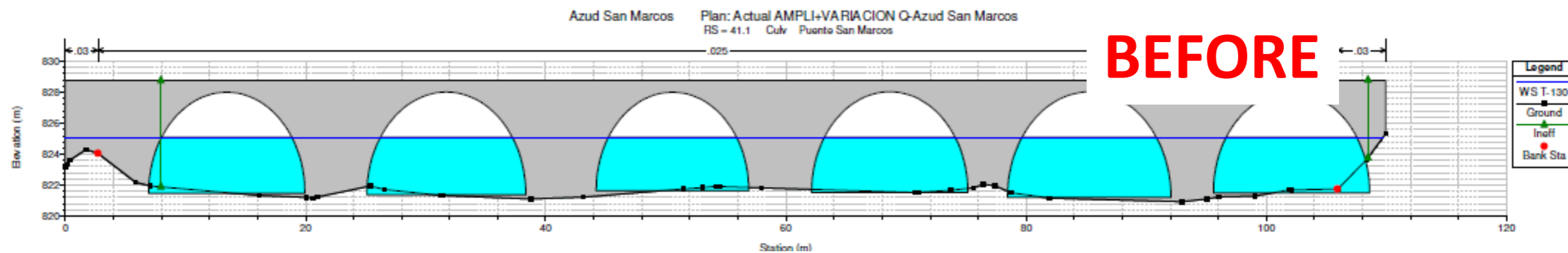
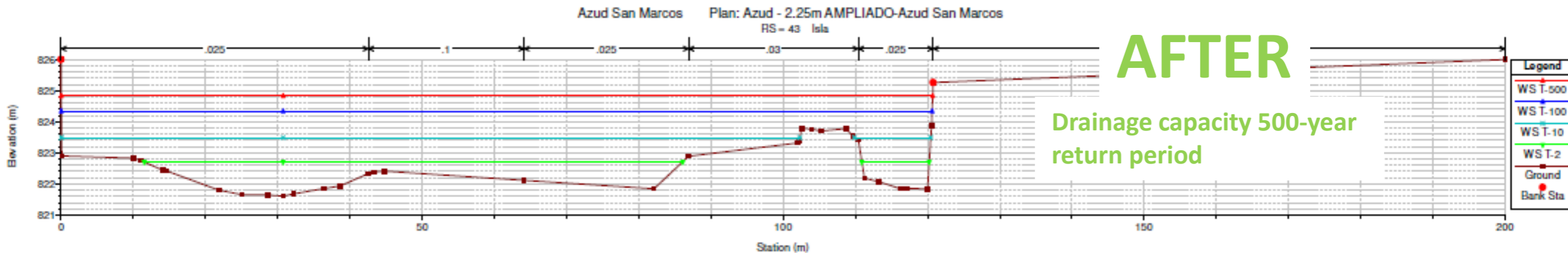
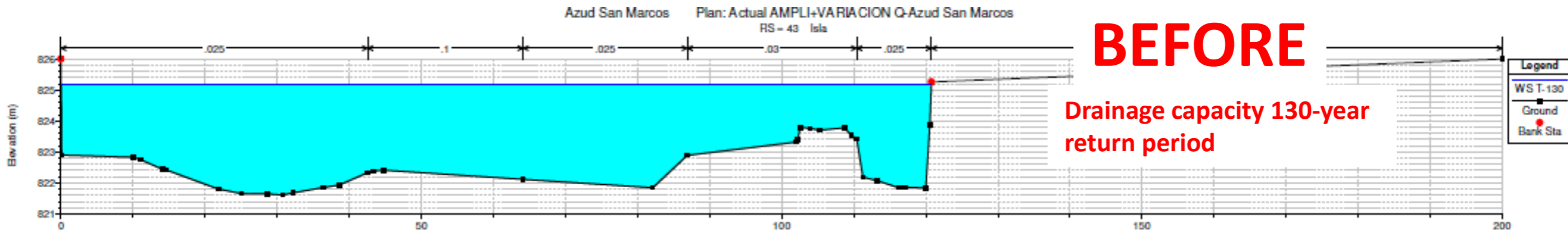
It represents an obstacle to flow
discharge in case of a flood event,
increasing the flood risk in the city





Partial removal of San Marcos weir in the Bernesga river in the city of León (Duero River Basin)

Hydraulic simulation, by means of HEC-RAS software, to model flow behaviour before and after weir removal





Unione
Europea

Unione
Europea



14 Marzo 2014. Puente de San Marcos. León

Longitudinal continuity

More and better fish passages to enhance river biota connectivity thus improving water quality and overcoming habitats fragmentation.



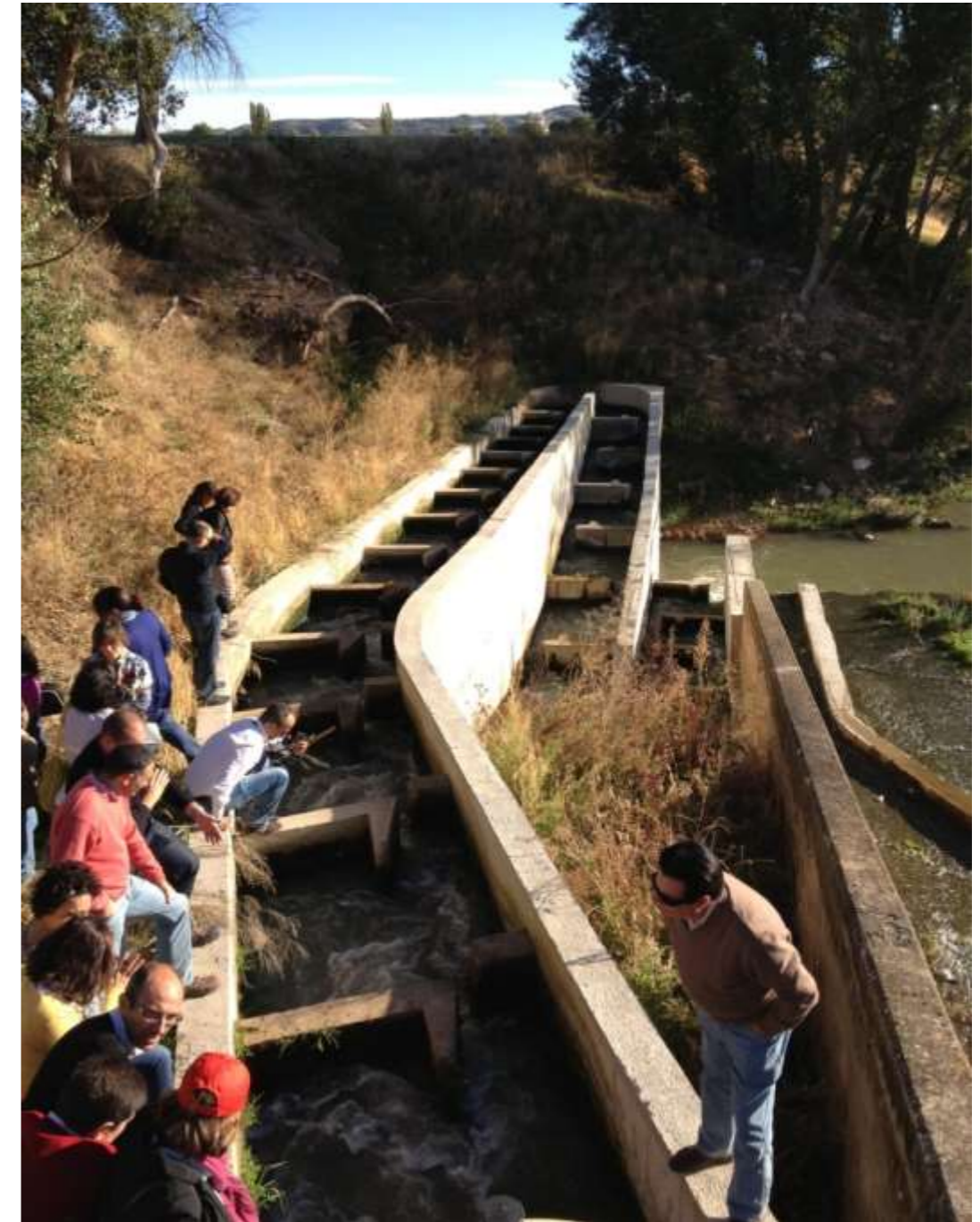
-27 built on public weirs or dams or those no longer in use but impossible to remove

-Works in 75 hydropower weirs and dams built and payed by their owners as a result of an auditing plan carried out by the Duero Basin Authority in all the existing hydropower plants in the basin (fish passege is mandatory)



This has promoted the study of solutions from universities and companies, promoting new opportunities for monitoring and research, adopting some very innovative solutions (channel swim assessment, biological assessments ...) as well as the establishment of new partnerships between government, scientists and companies.





-Rigorous surveillance and control management can be more efficient for environmental protection and river restoration than expensive works programs and more according to the principle of “polluter pays”

-There is room for cooperation between different stakeholders that can result in interesting outcomes R+D



Lateral connectivity

There is not a catalogue of levees, dikes and rock armour in the basin, but there are hundred kilometers.

Measures:

Up to now, 38 projects

-Levee removal or set back:

66 km have been removed and 8 set back.

- Dechannelization, recovery of old beds and secondary arms (around 14 km)

PROGRAMA DE MANTENIMIENTO Y CONSERVACION DE CAUCES DE LA CUENCA DEL DUERO
Subprograma 4: Recuperación y mejora de la conexión lateral de los ríos
RENATURALIZACIÓN Y RESTAURACIÓN DEL RÍO SALADO EN VILLARRÍN DE CAMPOS, ZAMORA

En el año 1972 con el fin de producir la desecación total de la superficie lagunar de la zona de Villarrín, el Arroyo Salado fue convertido en un verdadero canal, dotado de sus márgenes laterales, conformados por el material extraído en la excavación, asegurando un trazado prácticamente rectilíneo. La situación está dentro de la Reserva Regional de Caza "Lagunas de Villarrín", que a la vez está declarado como ZEPA por su riqueza ornitológica y LIC por su riqueza botánica. Con los trabajos realizados, se pretende recuperar el cauce antiguo del Arroyo, eliminando los márgenes laterales, y con ese material tapar el canal, con el fin de devolver al río su forma de inundación original y dar de agua a las zonas de prados contiguos (Prados Salinos Mediterráneos -Aunada Mestri y Prados Húmedos Mediterráneos de marbas altas del Maizón-Hidrocenotipo) y la principal asociación presente en la zona que es Estepas Salinas Mediterráneas-Limnetales.

Zona de los trabajos sobre la fotografía aérea de 1964 y octubre de 2006

Zona de los dos tramos empalmados, se observa el canal rectilíneo en oscuro y a su izquierda el antiguo cauce meandriforme recuperado.

Antes de los trabajos Después de los trabajos Antes de los trabajos Después de los trabajos

COMPACTUACI
NTOS DESPUES

Panorama de la zona ya recuperada, produciéndose visiblemente el aumento de la fauna de inundación y la conectividad lateral.

Las limícolas, como en este caso la cigüeñuela no lo tenían fácil con el canal; ahora con la disminución de la profundidad pueden alimentarse en el lecho del cauce recuperado.

El cambio va produciendo ya sus frutos



The Órbigo River Restoration Project

an example of restoring space for rivers



Some data about River Órbigo:

- Basin surface: 4,990 km²
- Length: 108 km, part in Natura Network
- Original geomorphology: braided (wandering) and meandering



Comparison between orthophotos of a 5 km segment in the Stretch I of the Órbigo River taken in 1956 and 2006. They show perfectly the encroachment on the original channels (braided), the channelization and the drastic morphological changes occurred in 50 years.

Programma Operativo Nazionale Governance e Azioni di Sistema FSE 2007-2013

ASSE E: *Capacità istituzionale* - Obiettivo specifico 5.5: *Rafforzare ed integrare il sistema di governance ambientale*

Azione 7A: *Azioni orizzontali per l'integrazione ambientale*

Previous situation: Enbankment and channelization

Problems:

- Hydraulic malfunctioning
- Flood problems
- Urban planning and housing under risk conditions
- Impacts on aquatic ecosystems
- Expensive maintenance



➔ Different policies facing problems caused by the same situation

Approach: integrated approach, and river catchment scale in the design of the project, but 3 stretches to manage the works



Specific objectives:

- Recovering morphology and hydraulic capacity of the former stream bed of the river and its connectivity with the floodplain and improving longitudinal continuity
- Achievements in doing so:
 - Increasing concentration times -> flood abatement -> flood risk attenuation (Floods Directive 2007/60/EC)
 - Improving ecological conditions of the riparian corridor and the diversity of habitats (Water Framework Directive 2000/60/EC and 92/43/ECC Habitats Directive).
 - Demonstrative value: example of synergic implementation of different European Directives, and fits perfectly in the concept of Natural Water Retention Measures (Green Infrastructure)
 - Costs reduction

Main actions

Works to improve lateral connectivity and dynamics by recovering natural floodplains along 25 km:

- Elimination of rock armour: 4.720 m
- Elimination of earth embankments: 8.710 m
- Movement of earth embankments away from the channel: 5.220 m
- Recovery of secondary arms: 10.063 m



-Works to improve longitudinal continuity:



Modification of a transversal obstacle to allow the passage of fauna and sediment flow



-Forest actions:

Revegetation with riparian vegetation



- Recovery of 480 ha of flood prone areas with a high capacity to attenuate floods naturally
- Greater infiltration rate and rate of recharge of the alluvial natural floodplains, soil fertilization
- Higher habitat diversity thanks to the increasing both longitudinal and lateral continuity and the recovering adjacent fluvial areas
- Integration of the river in the urban setting so improvement of the landscape and strengthening of tourism and leisure opportunities
- Drastical reduction in maintenance costs



River Orbigo Restoration Project: monitoring

- Winter 2013 160 m³/s flood and 2014 250 m³/s flood – comparable to those in 1995 and 2000 causing serious damages – flood abatement, no damages now.

Recovering room from the river proved to prevent damages caused by floods (Floods Directive)

- Monitoring of topographic changes and morphological changes: hydromorphological indicators

Change in the ecological status of the water body (WFD and HDirective)

**THESE ARE REAL FACTS THAT HELP
TO COMMUNICATE AND CONVINC**



Il Programma
di Sviluppo Regionale



MINISTERO DEL LAVORO
E DELLE POLITICHE SOCIALI



Governo italiano

Partecipazione del Consiglio dei Ministri
Dipartimento della Funzione Pubblica



per il tuo futuro
Programmi operativi nazionali
per la formazione e l'occupazione

Orbigo river monitoring by drone



Public Participation Process: communication is a key to success



Why was it needed?

- Recovering floodplain natural functioning implied losing some using possibilities: housing, farming, limitation to poplar plantation
- Project based on the principles of flood attenuation clashes with a mentality stemming from several decades of channelization and reduction of natural floodplain works
- To overcome the local approach: importance of the river as a corridor where every action involves upstream-downstream effects

How was it carried out?

- More than 3 years and 50 meetings throughout all the project: project drafting, implementation and monitoring, with local authorities, stakeholders and population as a whole

Programma Operativo Nazionale Governativo

ASSE E: Capacità istituzionale - Obiettivo specifico 5.5: Rafforzamento delle istituzioni

Azione 7A: Azioni orizzontali per la partecipazione

MEDIO AMBIENTE
El 'chip' mental para entender las obras de mejora ecológica del río
Los trabajos para descanalizar el Órbigo recuperan el paisaje natural inundable

A. Belmonte Ordoño
Las obras de mejora de canalización del río Órbigo que se están realizando en el municipio de Sanabria, en la provincia de Zamora, implican un cambio de mentalidad que se está haciendo poco a poco. El director de la obra, José Ignacio Rodríguez, explica que "el proyecto va enfocado a que la gente que vive en la zona del Órbigo recupere el paisaje natural inundable que tenía antes de ser canalizado".

Los trabajos de mejora de canalización del río Órbigo que se están realizando en el municipio de Sanabria, en la provincia de Zamora, implican un cambio de mentalidad que se está haciendo poco a poco. El director de la obra, José Ignacio Rodríguez, explica que "el proyecto va enfocado a que la gente que vive en la zona del Órbigo recupere el paisaje natural inundable que tenía antes de ser canalizado".



Medio Ambiente eligió el Órbigo como actuación preferente porque soporta una gran presión humana

M.A. Belmonte Ordoño
La región ecológica del río Órbigo es una de las más importantes de la Estrategia Nacional de Restauración de Ecosistemas Acuáticos de Medio Ambiente por ser uno de los que mayor presión soporta por la actividad humana. El río Órbigo es un río de caudal moderado y su actividad económica y turística es alta. La actividad económica y turística es alta. La actividad económica y turística es alta.

Los datos
El río Órbigo es un río de caudal moderado y su actividad económica y turística es alta. La actividad económica y turística es alta. La actividad económica y turística es alta.



Change of mentality to understand the ecological improvement of the river
The dechannelization works recover the natural floodplain

News about the difficulties to get through to riparian communities the new concept of "room for the river", after years watching channelization works, and how eventually the new approach is understood.



Volunteering and environmental education program

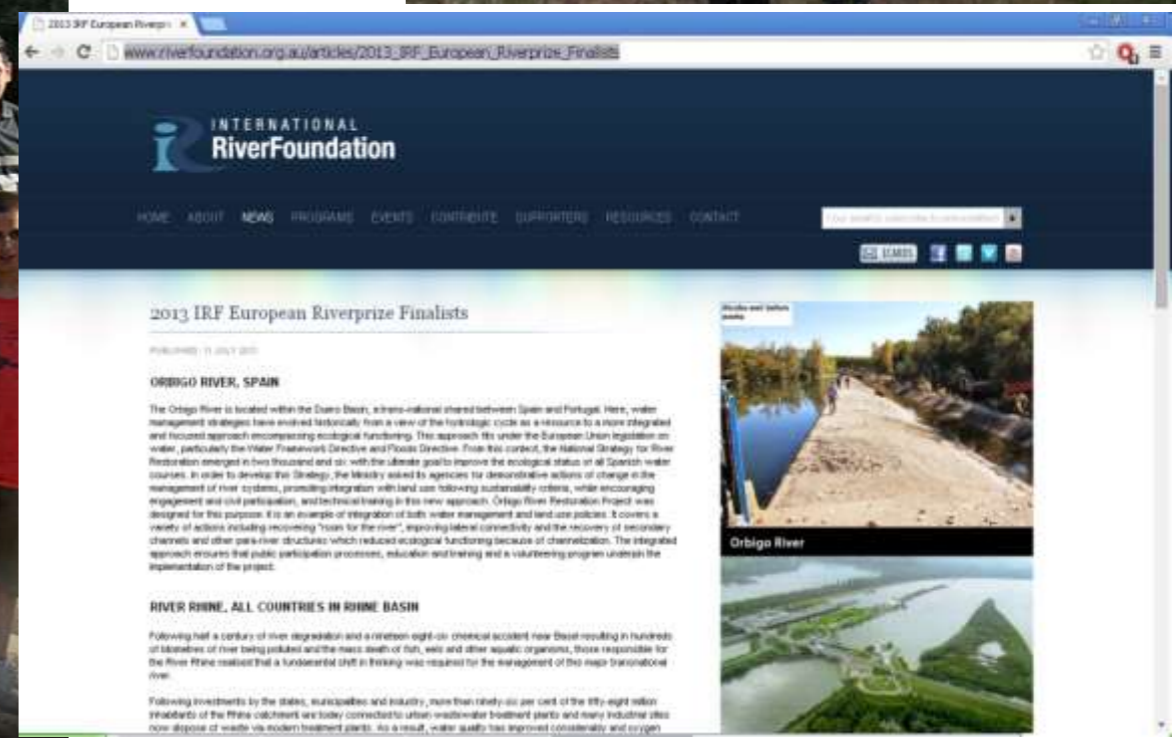
- Goal: encourage active participation and raise awareness about river ecosystems
- Targeted to all kinds of people, particularly those not taking part in the public participation process (children, youth, families...)





Dissemination and training: demonstration value of the project to mobilize and convince

- Become a reference piece of work, visited by students, technicians and professionals, authorities...
- Selected by several Universities to be studied in degrees and masters and by the Ministry for its training program
- Selected for the field visit of the First Iberian Congress on River Restoration
- Video shooting
- Finalist 2013 European Riverprize awarded by the IRF
- Orbigo basin is one of the pilot basins in the River Restoration Community of Practice promoted by the European Centre for River Restoration and Wetlands International



ECRR's CoP Public Participation meeting
Orbigo River, León (Spain) September 2014

River Res EIP Action Group (River Restoration Benefits)

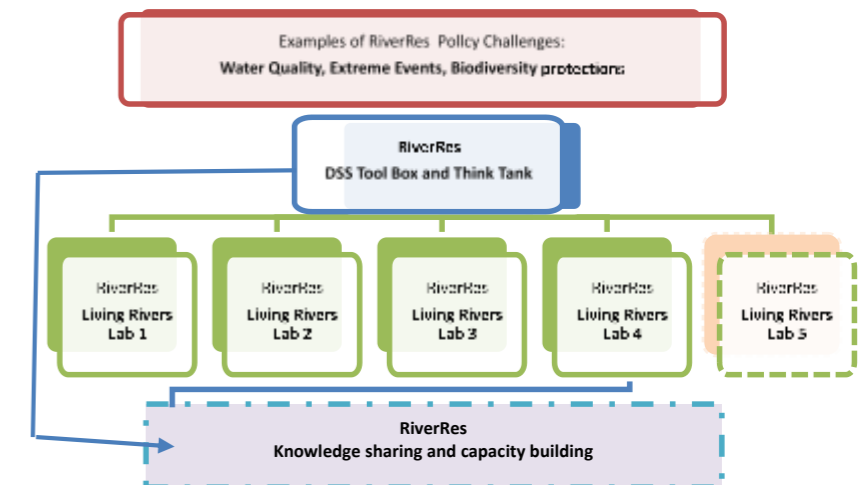
EIP Water Action Group
Pooling resources – Innovating water



PROMOTED BY THE DUERO BASIN AUTHORITY

MAIN OBJECTIVES

- 1. To develop **DSS tools** to identify and assess the cost and benefits of river restoration projects
- 2. To act as a **think tank regarding public participation and communication in river restoration and develop a toolbox**
- 3. **To test and demonstrate these DSS Tools**, by applying them in specific river restoration projects in demonstration sites in what we call **RiverRes Living Labs**.
- 4. The last action is targeted to **knowledge sharing and capacity building**, particularly with the DSS tools developed.



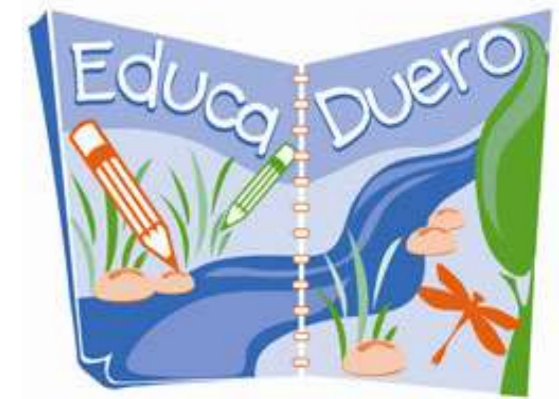
LESSONS LEARNT

- START EASY, BUT HAVE AN INTEGRATED APPROACH OF DIFFERENT POLICIES
- START SMALL, BUT HAVE CATCHMENT SCALE OF THE PROJECT
- MONITORING MATTERS
- THE RIVER IS THE BEST CARPENTER OF ITS OWN BUILDING
- RIVER RESTORATION CAN ALSO BE GOT WITH ADMINISTRATIVE AND LEGAL INSTRUMENTS
- **RIVER RESTORATION IS MORE A CULTURAL PROBLEM THAN A TECHNICAL ONE**
- CLEAR IDENTIFICATION OF THE BENEFITS OF THE PROJECTS, PARTICULARLY THE SOCIO-ECONOMIC BENEFITS THEY INVOLVE FOR PEOPLE
- RELEVANCE OF SOCIAL TOOLS TO COMMUNICATE THESE BENEFITS AND GET PEOPLE ON YOUR SIDE AND THEN INVOLVED AND ENGAGED
- LET PEOPLE KNOW YOUR SUCCESS: NECESSITY OF DISSEMINATION TO CONVINCe, MOBILIZE AND GET SUPPORT FOR NEW PROJECTS: this kind of solutions works!! and can be replicated in other rivers suffering the same problems
- WORK IN NETWORK, SHARE YOUR KNOWLEDGE, LEARN FROM OTHERS
- RIVER RESTORATION IS NOT ONLY A RESPONSABILITY FOR PUBLIC ADMINISTRATION, BUT A SHARED TASK

KEY ELEMENTS FOR SUCCESSFUL PUBLIC PARTICIPATION IN RIVER RESTORATION

- WILLINGNESS OF AUTHORITIES
- RIGHT IDENTIFICATION OF THE TARGET AUDIENCE BUT PUBLIC INVOLVEMENT SHOULD NOT BE RESTRICTED TO A SMALL CIRCLE OF INFLUENTIAL STAKEHOLDER GROUPS
- THE SOONER INVOLVEMENT, THE BETTER RESULTS
- PARTICIPATION IS A PROCESS TO BE CARRIED OUT DURING ALL THE STAGES OF A PROJECT (DESIGN, EXECUTION, MONITORING)
- GOOD PLANNING OF THE PROCESS AND GOOD MODERATION BY A TEAM OF SOCIAL EXPERTS SHOULD BE VERY USEFUL
- TIME FOR DISCUSSIONS AND RESPECTFUL WAYS OF INTERACTION
- UNDERSTABLE INFORMATION AND TRANSPARENCY
- FLEXIBILITY AND LOCAL APPROACH TO EACH CONTEXT

Testo



THANK YOU FOR YOUR ATTENTION

EIP Water Action Group
Pooling resources – Innovating water

