NWRM in Spain: successes and challenges for future implementation

Josu Elso
Iberian Centre for River Restoration

CIREF
centro ibérico de restauración fluvial

Why NWRM were implemented in Spain?

Two main reasons:

- The need to implement European Directives: WFD, Habitats Directive and Flood Directive
- Spanish National Strategy for River Restoration

Why NWRM were implemented in Spain?

1. Directives (WFD, Habitats and Flood Directives)

- Good Ecological Status of the surface waters
- Prevent further deterioration of rivers
- Restore those that do not fulfil WFD requirements
- Preserve habitats and species
- Prevent flood damage

Coordinate implementation

Why NWRM were implemented in Spain?

2. Spanish National Strategy for River Restoration (2006)

- To restore ecological quality of river systems and their environmental values

- Promoted by the Environmental Ministry of the Spanish Government from 2006 and is ongoing

As a result, change in river management: Ecosystem Approach

And the first examples of floodplain restoration were carried out

Although there are still very few examples

- Two examples from the region of Navarra (Arga and Ebro Rivers)
- One more from the Duero River Basin (Órbigo River)

Restoration of the floodplain in Soto de los Tetones, Ebro River. Tudela municipality

- Promoter: Regional Government of Navarra
- 100% funded by the Regional Government of Navarra

Gobierno de Navarra

NATURA 2000

- NATURA 2000 site in the region of Navarra, northeast of Iberian Peninsula

- 110 has of old rice fields

- The area was restored in order to improve the environmental conditions of the area and to prevent damages caused by floods in the city of Tudela, located downstream

- Public participation process in which the Regional Government, the municipality, neighbors and farmers participated

Restoration of the floodplain in Soto de los Tetones

- Public land of the municipality of Tudela
- Carried out between October 2005 and January 2006
- Action: Removal of the dykes to recover the natural floodplain
- Objective: to improve the conditions for self-recovery of the natural vegetation, increasing the carrying capacity of the area for target species (Natura 2000) and water retention to prevent downstream floods
- Final Cost Euro 145.184

Big flood February 2003

Q=3,320 m^3/s (T=10-15 years)

Soto Tetones: Ebro River

2003

Soto Tetones: Ebro River

2006

Soto Tetones: Ebro River

2006

Soto Tetones: Ebro River

Q=2,260 m^3/s (T=3 years)

2006

Soto Tetones: Ebro River

2008

Soto Tetones: Ebro River

2014

Soto Tetones: Ebro River

2014

Soto Tetones: Ebro River

Dyke removal in Arga River. Vallacuera, Peralta Municipality

- Promoter: Regional Government of Navarra
- 75% funded by EU LIFE funds

Gobierno de Navarra

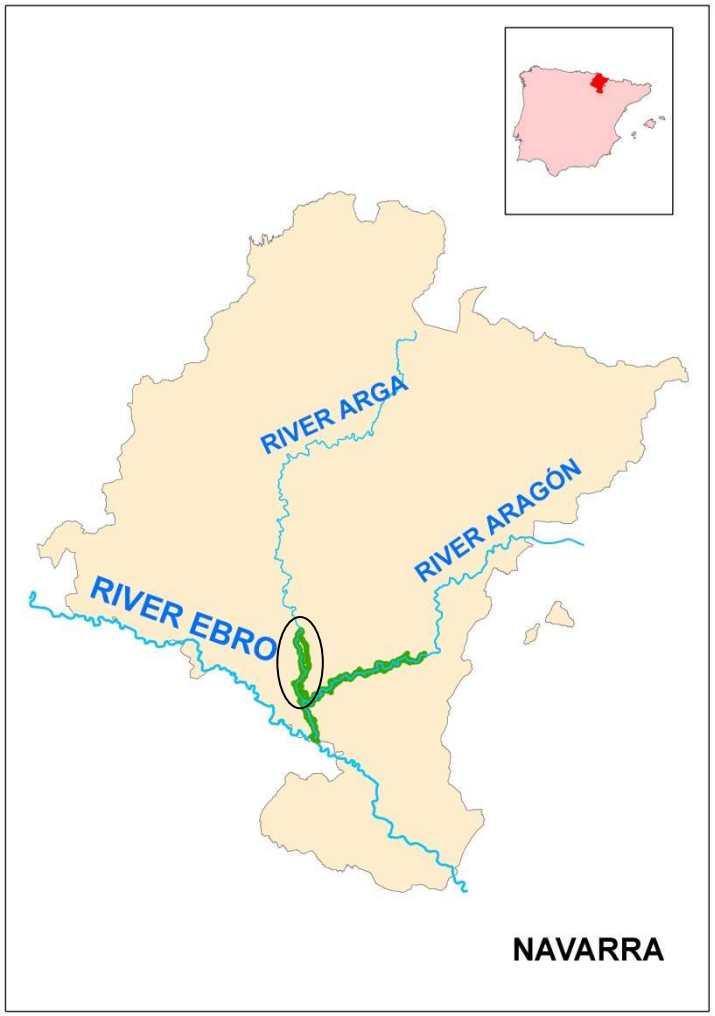
Life

NATURA 2000

LIFE GERVE

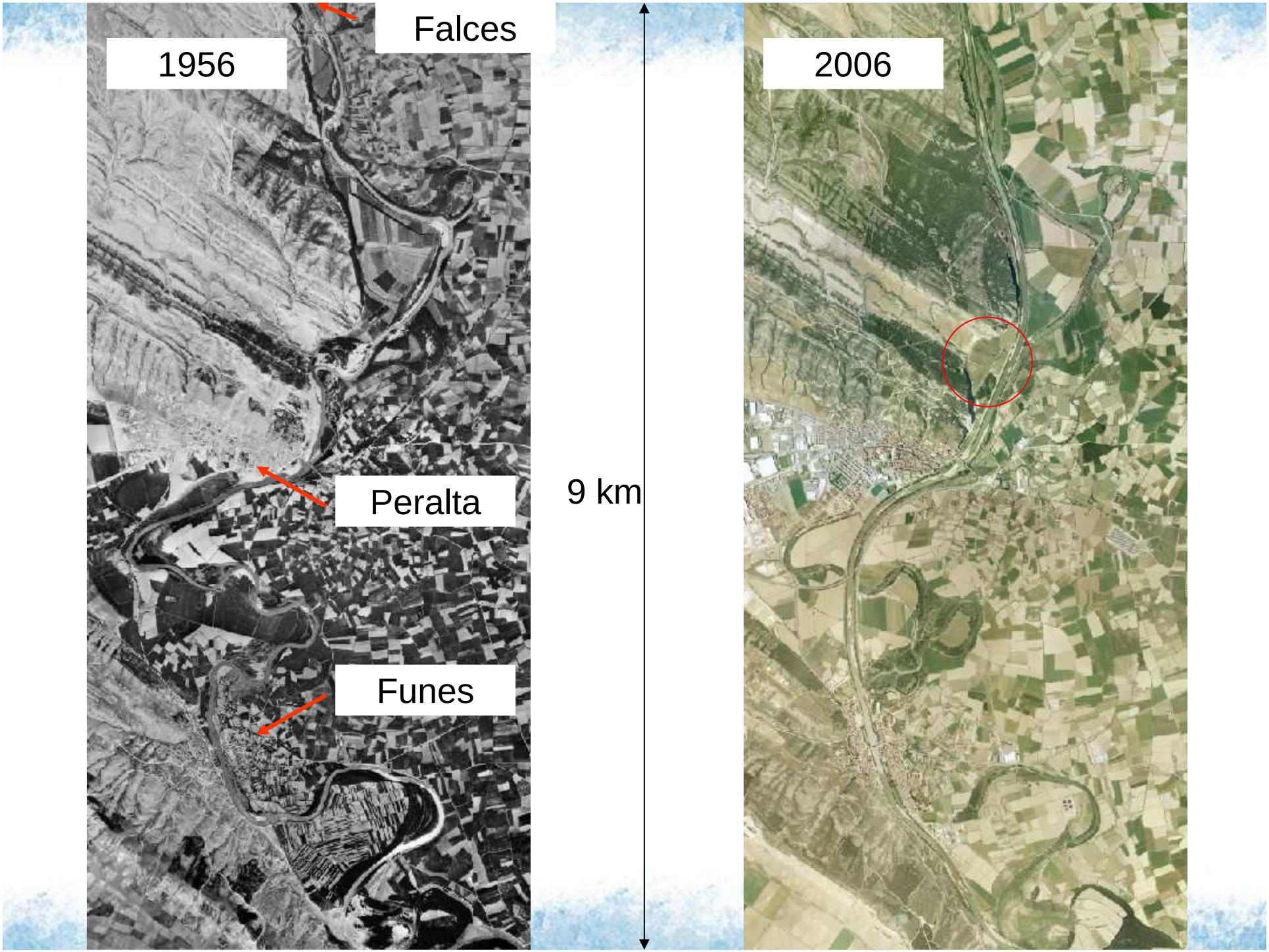
- *Lower Reaches of the Aragon and Arga Rivers* SCI was the first Management Plan elaborated for a fluvial site in Navarra

- The SCI includes most of the habitat of a Priority Species in Habitats Directive: European Mink



- Lower reach of Arga River was canalized in the 80's with the aim of prevent towns from flooding

- It was an ecological disaster and floods still occur and are more dangerous than before


1956
Falces
Peralta
Funes
9 km
2006

Dyke removal in Vallacuera

- Public land of the municipality of Peralta
- Carried out between September 2006 and May 2007
- Action: Removal of the canalization's dyke to recover the natural floodplain
- Objective: to improve the conditions for self-recovery of the natural vegetation, increasing the carrying capacity of the area for target species and water retention to prevent downstream floods
- Final Cost Euro 138.840

Dyke removal in Vallacuera, Peralta Municipality

1956

2006


KOMATSU


2014

What made this successful?

- In both cases, there was a strong stakeholder engagement
  - Local authorities
  - Communities
  - Different sectoral regional administrations
- Regional Government and EU subsidised interventions
- Municipal land ownership
- Land potential for production not always very high (floods or soil quality)

What made this successful?

- In both cases, it was taken advantage of opportunities
  - 2003 flood (Ebro)
  - Mink distribution allowed LIFE funds (Arga)
- These opportunities were used to explain people the importance of recovering Natural Water Retention Areas
- Natura 2000 was very helpful
- However, little flood related information was used (hydrological modelling, etc)
- These cases were used as inspiration for other cases in Spain that improved what it was done in Navarra

Órbigo River in Duero River Basin

- Promoter: Duero River Basin Authority (Spanish Ministry of Environment)
- Funded with funds of the National River Restoration Strategy

ESTRATEGIA NACIONAL DE RESTAURACIÓN DE RÍOS

GOBIERNO DE ESPAÑA
MINISTERIO DE AGRICULTURA, ALIMENTACIÓN Y MEDIO AMBIENTE
CONFEDERACIÓN HIDROGRÁFICA DEL DUERO

Órbigo River in Duero River Basin

River restoration measures were integrated in Green Infrastructures Concept with several effects:

•Improvement of the hydromorphological and quality conditions in water bodies (Framework Directive)

•Control increase of flood risk (Flood 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)

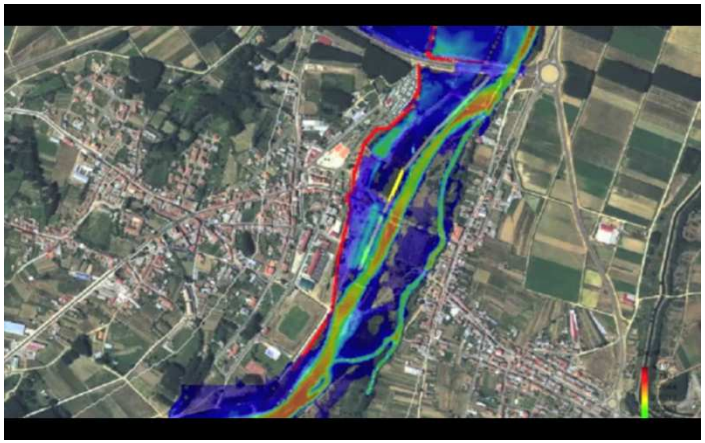
Órbigo River in Duero River Basin

- Elimination of rip-raps: 4.720 m
- Elimination of levees and rip-raps: 8.710 m
- Movement of earth embankments away from the channel (levees set-back): 3.130 m
- Recovery of secondary channels: 10.063 m
- Recovery of flood prone areas: 300 ha
- Plus some forestry works aimed

at natural bank stabilization

Órbigo River in Duero River Basin

Participation process



Hydraulic models

Restoration Project (Finalist in the 2013 European River Prize)

vimeo

http://vimeo.com/67721317

River Restoration and Flood Risk Management: The River Orbigo Example

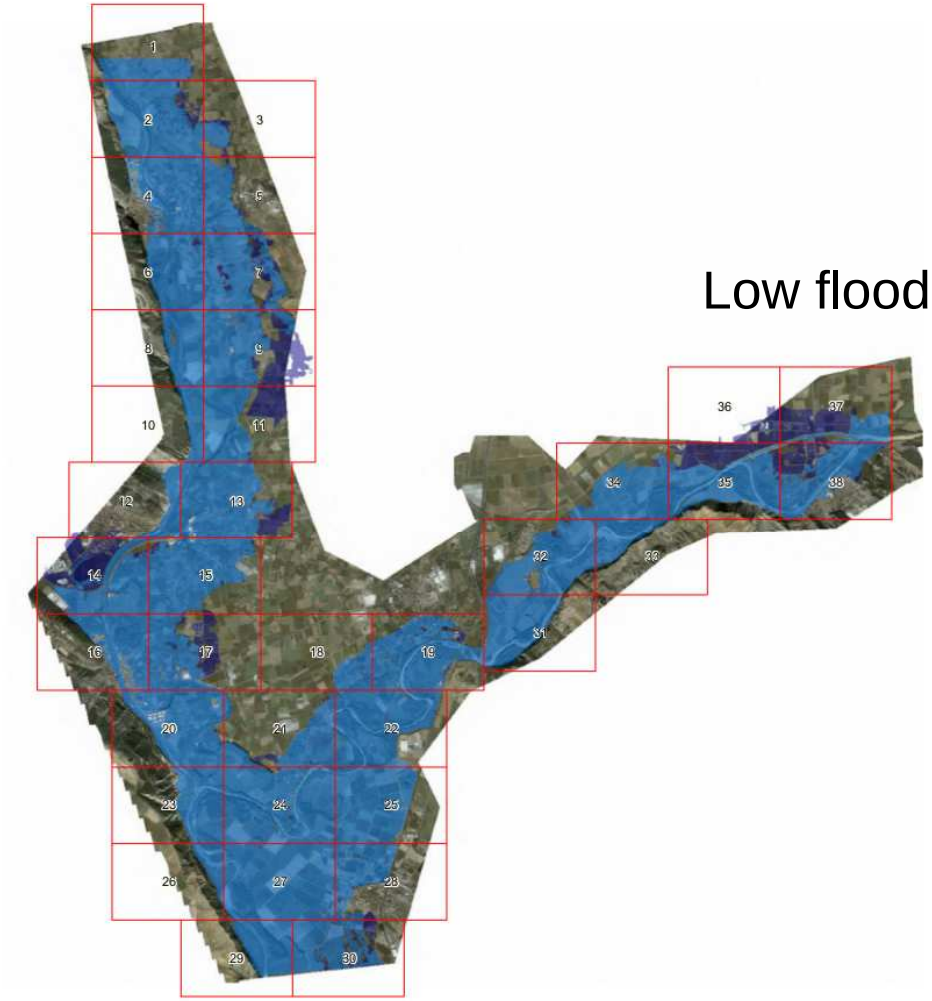
de **Carlos Rodriguez (BICHO Prods)** PRO hace 1 año AÚN SIN CALIFICACIÓN

The Órbigo River Project has been implemented by the Spanish Ministry of Agriculture, Food and Environment through the Duero River Basin Authority, in compliance with the Floods Directive and the Water Framework Directive and their respective goals of reducing the negative effects of floods and improving the ecological status of water bodies.
The idea behind the project was that by restoring river connectivity with the floodplains, the hydraulic capacity of the river in the event of flooding would be vastly increased, since it would be able to absorb more water in a controlled manner. In turn, through restoration of this connectivity, various natural processes would be re-established that would lead to ecological improvements.
In summary, the project consisted of removing all of the existing defensive structures along 23 kilometres of riverbed, or setting them back beyond the floodplain, depending on whether land use in the floodplain was compatible or not with flooding. In the case of setting the structures back, the location of the new defensive structures was selected on the basis of hydrologic and hydraulic studies in such a way so as to exploit the maximum hydraulic capacity of the floodplain to abate floods, respecting and thereby increasing the protection of areas occupied by populations.

Future challenges?

- More scientific background (studies) that would support the need to restore Natural Water Retention Areas is needed
- Working on private lands, through purchasing of lands or right of use, is also needed

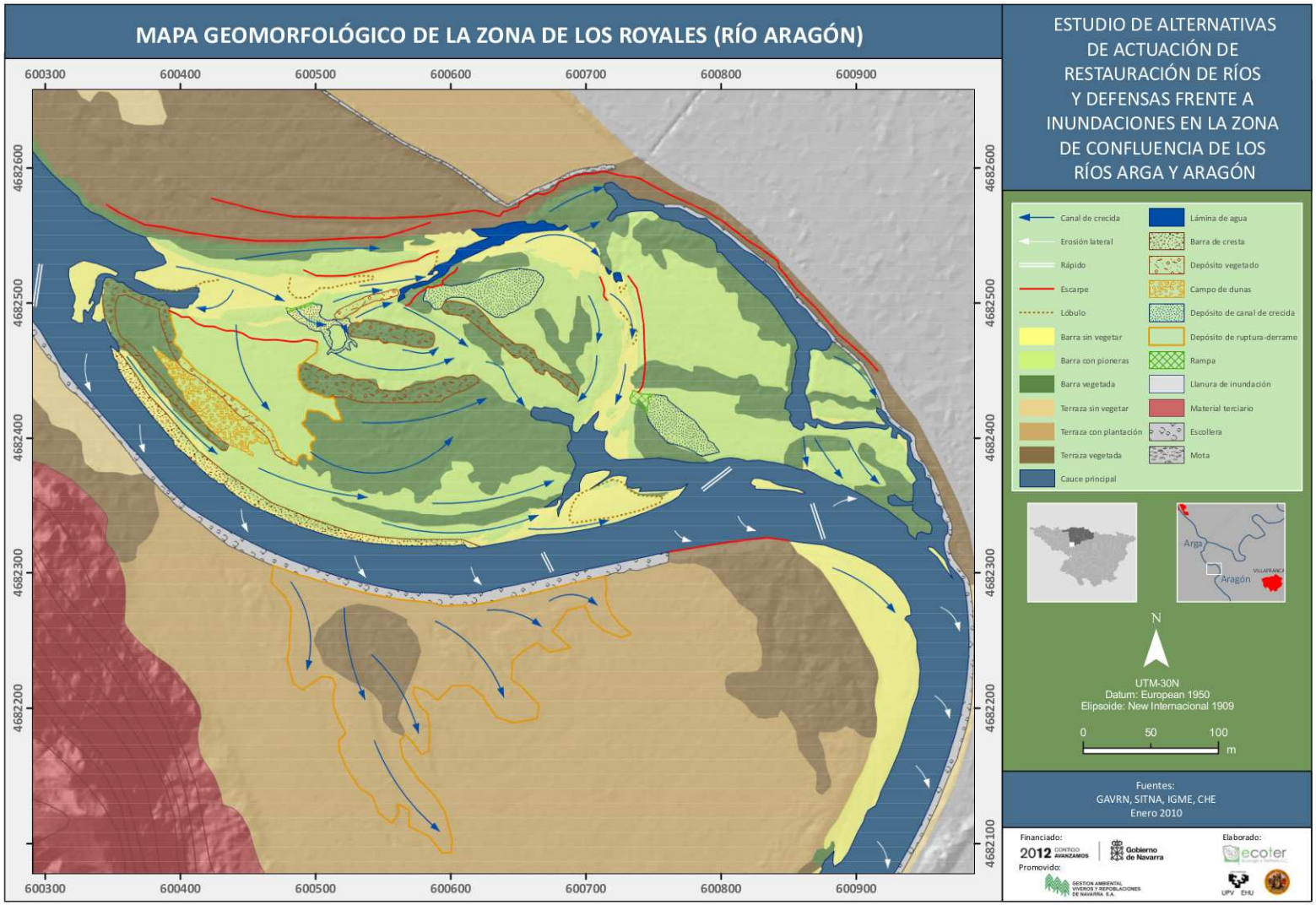
- The Órbigo case inspired the Region of Navarra to study at a larger scale the prevention of floods through the restoration of Natural Water Retention Areas
- Hidrologic and hydraulic studies were carried out in the Lower Arga and Aragon Rivers

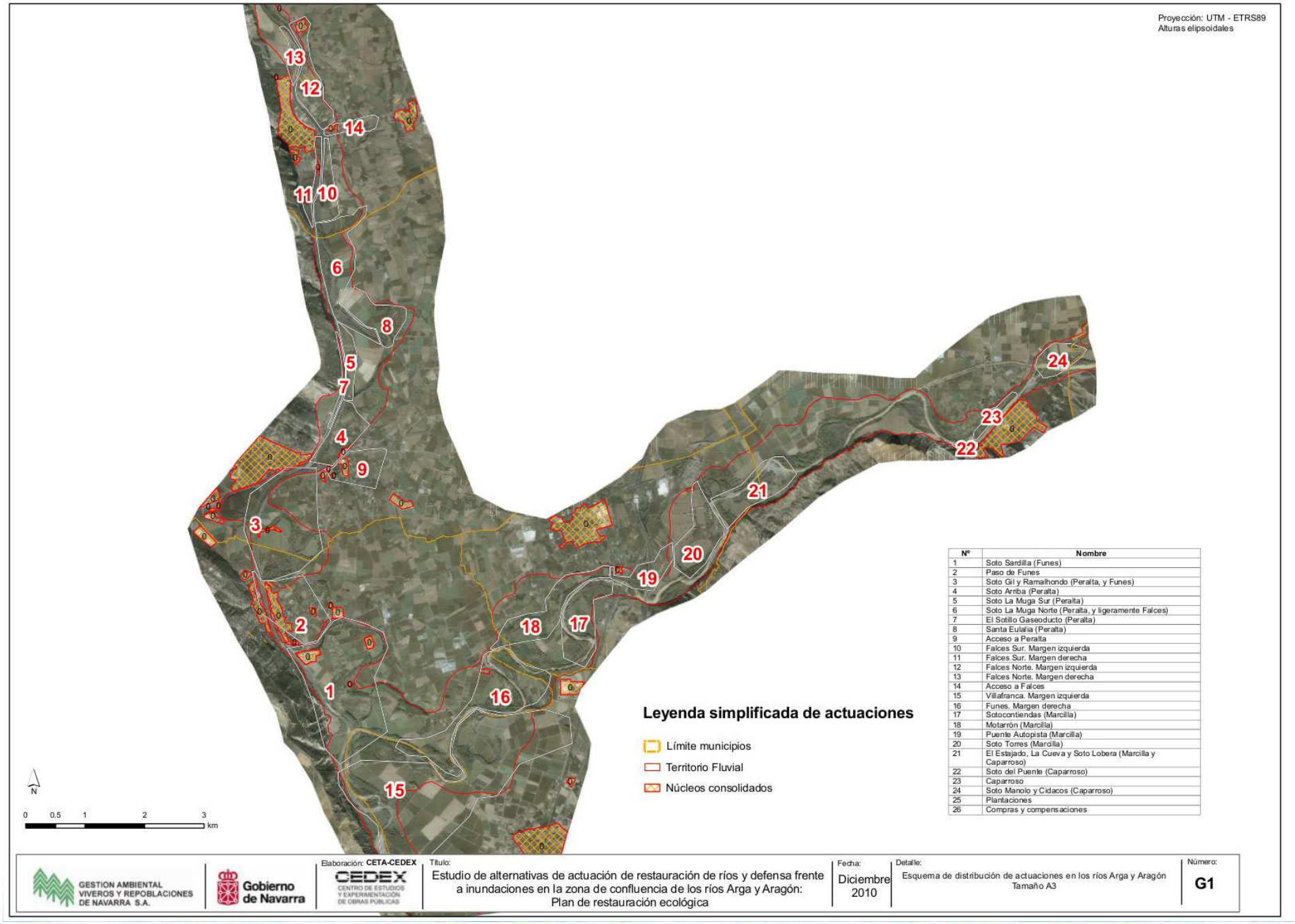


Low flood risk

GESTION AMBIENTAL VIVEROS Y REPOBLACIONES DE NAVARRA S.A. / Gobierno de Navarra	CONSULTOR: INCLAM Ingeniería del Agua	TITULO DEL PROYECTO: Estudio hidrológico-hidráulico y elaboración de mapas de peligrosidad de inundaciones en las zonas de confluencia de los ríos Arga y Aragón en Navarra	FECHA: DICIEMBRE, 2009	ESCALA: 1:5.000	DESIGNACION: MAPAS DE PELIGROSIDAD DE INUNDACIONES BAJA PROBABILIDAD	Nº 3 / Plano Guía

- They were completed with morphodinamic studies





Nº	Nombre
1	Soto Sardilla (Funes)
2	Paso de Funes
3	Soto Gil y Ramalhondo (Peralta, y Funes)
4	Soto Arriba (Peralta)
5	Soto La Muga Sur (Peralta)
6	Soto La Muga Norte (Peralta, y ligeramente Falces)
7	El Sotillo Gaseoducto (Peralta)
8	Santa Eulalia (Peralta)
9	Acceso a Peralta
10	Falces Sur. Margen izquierda
11	Falces Sur. Margen derecha
12	Falces Norte. Margen izquierda
13	Falces Norte. Margen derecha
14	Acceso a Falces
15	Villafranca. Margen izquierda
16	Funes. Margen derecha
17	Sotocontiendas (Marcilla)
18	Motarrón (Marcilla)
19	Puente Autopista (Marcilla)
20	Soto Torres (Marcilla)
21	El Estajado, La Cueva y Soto Lobera (Marcilla y Caparroso)
22	Soto del Puente (Caparroso)
23	Caparroso
24	Soto Manolo y Cidacos (Caparroso)
25	Plantaciones
26	Compras y compensaciones

GESTION AMBIENTAL VIVEROS Y REPOBLACIONES DE NAVARRA S.A.

Gobierno de Navarra

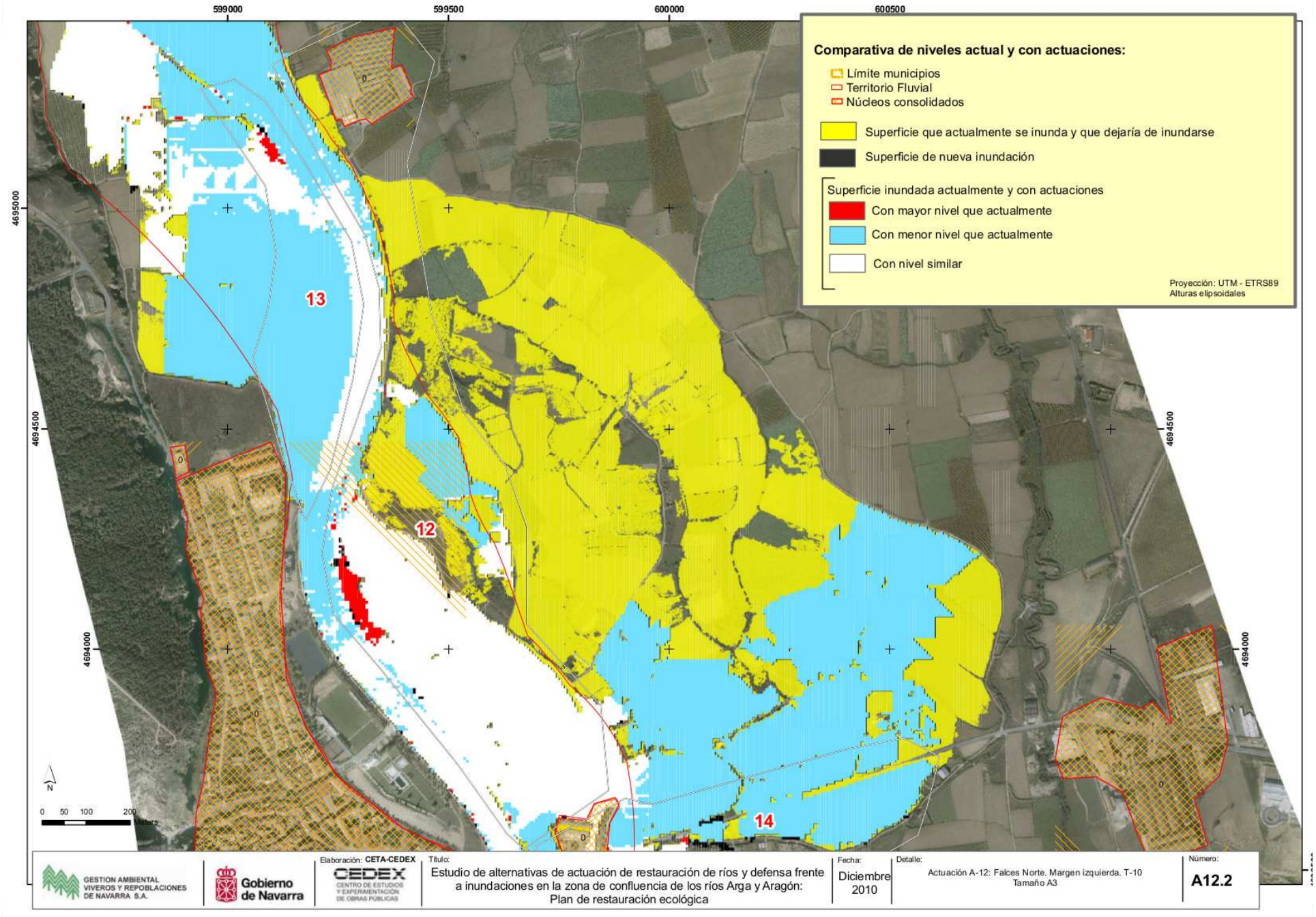
Elaboración: **CETA-CEDEX**
CEDEX CENTRO DE ESTUDIOS Y EXPERIMENTACIÓN DE OBRAS PÚBLICAS

Título:
Estudio de alternativas de actuación de restauración de ríos y defensa frente a inundaciones en la zona de confluencia de los ríos Arga y Aragón: Plan de restauración ecológica

Fecha:
Diciembre 2010

Detalle:
Esquema de distribución de actuaciones en los ríos Arga y Aragón
Tamaño A3

Número:
G1


599000
599500
600000
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4695000
4694500
4694000
Comparativa de niveles actual y con actuaciones:
Límite municipios
Territorio Fluvial
Núcleos consolidados
Superficie que actualmente se inunda y que dejaría de inundarse
Superficie de nueva inundación
Superficie inundada actualmente y con actuaciones
Con mayor nivel que actualmente
Con menor nivel que actualmente
Con nivel similar
Proyección: UTM - ETRS89
Alturas elipsoidales
13
12
14
N
0 50 100 200
Meters
GESTION AMBIENTAL VIVEROS Y REPOBLACIONES DE NAVARRA S.A.
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CEDEX
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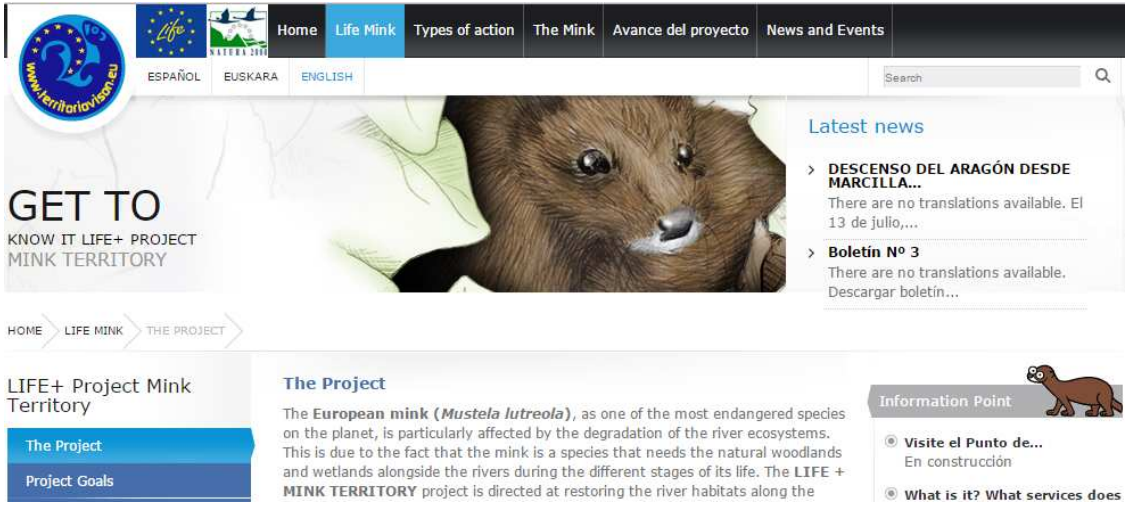
Fecha:
Diciembre 2010
Detalle:
Actuación A-12: Falces Norte. Margen izquierda. T-10
Tamaño A3
Número:
A12.2

What is the future?

- These actions are being carried out by the Government of Navarra and the Ministry of Environment through a LIFE project

Mink Territory

http://www.territoriovison.eu/



- Most of the budget is addressed to the removal of dykes, and purchasing of private land and right of uses in the floodplain

Some recommendations

- Start easy: make sure you will succeed
- Talk to people: explain and participate
- Look for funding opportunities (LIFE, EIB, umbrella species,….)
- Spread the word at all levels: in scientific meetings but especially at local level
- Then go bigger!!!

•Modelling is a great tool

Thank You

Josu Elso
Josu.elso@cirefluvial.com

The information about the actions carried out in Navarra was kindly provided by the Government of Navarra and the information about the Órbigo River by Ignacio Rodríguez, from the Duero River Basin Authority, which is gratefully acknowledged. More information can be found at:

www.navarra.es

www.chduero.es

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