DAM REMOVALS IN BASQUE COUNTRY
Basque Water Agency (URA)
The Basque Country is in the north of the Iberian Peninsula. It’s a mountainous territory, crossed by the watershed between the Cantabrian and the Mediterranean seas.

**FEATURES:**

- Surface: 7,234 Km².
- Maximum height: 1,500 m.
- 209 Km of coast (Cantabrian sea).
- Population: 2,193,205 inhabitants, 85% in its north half.
- Height population density: 301 inhabitant/Km².
Coast of the Basque Country

In the north (Cantabrian Shed) the dominant landscapes are the meadows and the coniferous forest plantations.
Its valley bottoms are occupied by urban uses and intense industrial activity.
The Mediterranean Shed, with lower slopes, the wide valleys are occupied by agricultural uses. The hillsides and mountains usually have natural forests.
We are a PUBLIC ORGANISATION in charge of managing the water policy in the Basque Country.

Attached to the Environment, Territorial Planning and Housing Department of the Basque Government.

Main functions:

• Protection of the aquatic environment and its ecosystems

• Promoting a sustainable use of water, ensuring adequate management of demand and proper return to the environment

• Flood risk management to increase public safety

• Promoting and driving technological innovation in the field of water.
DAM REMOVALS IN BASQUE COUNTRY

• WHY?

Protection of aquatic environments and its related ecosystems

TO IMPROVE RIVER CONNECTIVITY

TO DECREASE WATER TEMPERATURE AND EUTROPHICATION OF RIVERS

TO IMPROVE PHYSICAL-CHEMICAL AND BIOLOGICAL CONDITIONS OF WATER

TO RESTORE NORMAL SEDIMENT TRANSPORTATION AND FLUVIAL MORPHOLOGY

POTENTIAL IMPROVEMENT OF THE HABITAT FOR FISH FAUNA AND AQUATIC MUSTELID

Reduce flood risk
DAM REMOVALS IN BASQUE COUNTRY
CURRENT PERMEABILITY IN BASQUE RIVERS

About 1,800 dams, water used for:
• Watermills
• Forges
• Industry

Impermeable dams
Permeable dams
DAM REMOVALS IN BASQUE COUNTRY

• **LEGAL FRAMEWORK**
  - Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora
    - Law 42/2007 on Natural Heritage and Biodiversity
    - Designation of SACs and their Management Plans
      Permeability of rivers as a measure of conservation
    It promotes infrastructure-removal at rivers, as well as the longitudinal and lateral continuity of rivers
  - Hydrological and flood risk management plans
    Programmed measures includes dam removals

• **CONSTRAINTS**
  - Patrimonial value
  - Current water use

Alternative options
DAM REMOVALS IN BASQUE COUNTRY

- FOLLOW-UP CONCLUSIONS
  - Sediment transportation
  - New morphology of the river
  - Rise of fish fauna population
  - Specimens found upstream the removed dam
DAM REMOVALS IN BASQUE COUNTRY

• EXAMPLES

LIZARKOLA DAM, IN LEITZARAN RIVER
DAM REMOVALS IN BASQUE COUNTRY

PRESATXU DAM, IN ALTUBE RIVER

Before

After
DAM REMOVALS IN BASQUE COUNTRY

LA SALVADORA DAM IN VILLABONA, ORIA RIVER
DAM REMOVALS IN BASQUE COUNTRY

IBERDROLA’S DAM, IN LAPUEBLA DE LA BARCA, EBRO RIVER
DAM REMOVALS IN BASQUE COUNTRY

• EXAMPLES

DAM, IN BAIAS RIVER

Before

After
INTURIA DAM

Built in 1913, to divert the water flow to a hydroelectric generation station.

- Concrete gravity dam
- Plant curve of 60 m length
- Original storage capacity: 300,000 m³
- Storage capacity in 2013: 70,000 m³
- Height: 12.90 m
LOCATION
### Main objective: Inturia dam removal

**Actions and aim for the conservation of the SAC ES2120013 Leitzaran Ibaia/Río Leitzaran**

<table>
<thead>
<tr>
<th>Objetivo operativo 3</th>
<th>Eliminar los obstáculos en el corredor acuático</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Es de aplicación en particular la Directriz 5.D.2 en relación con las concesiones fuera de uso en el ámbito de la ZEC (Piscifactoría Truchas Erreka, Olloki y Presa Inturia) o fuera de él pero que pueden tener efectos significativos sobre la misma (Galgo Paper).</td>
</tr>
<tr>
<td></td>
<td>AP1.- Se redactarán y ejecutarán proyectos para la permeabilización/demolición de los obstáculos asociados a las concesiones fuera de uso existentes en la ZEC (Piscifactoría Truchas Erreka, Olloki y Presa Inturia) o en sus proximidades (Galgo Paper). Destaca como objeto prioritario la presa de Inturia, con proyecto de demolición redactado. Su ejecución sería de gran interés. Los proyectos contemplarán actuaciones de mejora morfológica de las riberas del remanso o embalsamiento en todas las obras de derribo total o parcial de azudes/obstáculos.</td>
</tr>
<tr>
<td></td>
<td>Actuaciones</td>
</tr>
<tr>
<td></td>
<td>Asimismo son de aplicación la Directriz 5.D.5. (Mantenimiento en buen estado de sistemas de control de volúmenes de agua utilizados y de las instalaciones asociadas a la concesión: escalas, rejillas...), y las actuaciones 1.AC.7. (Incorporación de pasos específicos para anguila), y 1.AC.8. en relación con la evaluación de la eficacia de los sistemas de permeabilización de obstáculos en el ámbito de la ZEC, en particular para los obstácu-</td>
</tr>
</tbody>
</table>
• Deteriorated structure in disuse.
• High cost of maintenance.
• Fauna barrier and hydromorphological disturbances.
DEMOLITION BY PHASES

Four phases of demolition were planned:

- Allow for the river to adapt to the changes.
- Reduction of temporal negative effects.

<table>
<thead>
<tr>
<th></th>
<th>1st phase</th>
<th>2nd phase</th>
<th>3rd phase</th>
<th>4th phase</th>
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</thead>
<tbody>
<tr>
<td>Date of the action</td>
<td>August 2013</td>
<td>August 2014</td>
<td>August 2015</td>
<td>January 2016</td>
</tr>
<tr>
<td>Execution time</td>
<td>28 days</td>
<td>31 days</td>
<td>12 days</td>
<td>11 days</td>
</tr>
<tr>
<td>Budget</td>
<td>79,933 €</td>
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<td>59,350 €</td>
<td>58,230 €</td>
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<tr>
<td>Demolition volume</td>
<td>313 m³</td>
<td>739,4 m³</td>
<td>920,7 m³</td>
<td>815 m³</td>
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<tr>
<td>Height taken down</td>
<td>3.3 m</td>
<td>3.3 m</td>
<td>3.6 m</td>
<td>2.7 m</td>
</tr>
</tbody>
</table>
1<sup>st</sup> PHASE: AUGUST 2013

PREVIOUS WORK

Protection of Bertxin dam
Emptying the reservoir by diverting the maximum possible flow through the canal of the hydroelectric installation.
1st PHASE: AUGUST 2013

Cofferdam

Demoliting first at left bank
Then demolishing towards the right bank

A concrete slab was built

- Lowered height = 3.30 meter
- Demolition volume = 313 m³
2nd PHASE: AUGUST 2014

Cofferdam and left half demolition

Right half demolition
Concrete slab was built

Lowered height = 3.30 meter
Demolition volume = 739.40 m³

2nd PHASE: AUGUST 2014
3rd PHASE: AUGUST 2015

Flow-bypassing by one lateral side

Right half demolition
3rd PHASE: AUGUST 2015

Lowered Height = 3.60 meter
Demolition volume = 920.70 m³

Left half demolition
4th PHASE: JANUARY 2016

Demolition

Material removal
4th PHASE: JANUARY 2016

Lookout at the right riverbank

Lowered Height= 2.70 meter
Demolition volume= 815 m³
INTURIA DAM REMOVAL

Situación inicial
12,9 m

2013
9,2 m

2014
5,9 m

2015
2,7 m

2016
Sin obstáculo
## INTURIA DAM REMOVAL

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GEOMORPHOLOGICAL: Upstream of the former backwater area, there have been significant incisions since the beginning of the demolition, but in the last two years have slowed down.

SEDIMENT TRANSPORT: 240,000 m$^3$ of sediments have been released from Inturia dam. 66,600 m$^3$ of suspended sediments have been washed downstream, 28% of which passed through the gauging station.

HABITATS (meso-habitat, section of 4.5 km fluvial): The study section corresponds to a fluvial salmonid course where it's been confirmed that the productive areas have increased in number and length after the demolition.

HAVING REMOVED THE DAM IN PHASES IS THE MAIN REASON FOR THE SATISFACTORY RESULTS ACHIEVED
DAM REMOVALS IN BASQUE COUNTRY
Basque Water Agency (URA)

FOR FURTHER DETAIL:
a-urquijoluengo@uragentziaz.eus
nechandi@uragentziaz.eus

www.uragentzia.eus

Pärnu, 22nd May 2019