



GOBIERNO
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DEL TAJO

COFIO RIVER RESTORATION AND DAM REMOVAL IN ROBLEDO DE CHAVELA (MADRID, SPAIN)

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COFIO RIVER RESTORATION AND DAM REMOVAL IN ROBLEDO DE CHAVELA (MADRID, SPAIN)

This project is developed within a group of works aimed to avoid rivers deterioration due to climate change effects.

The IPCC (IPCC - Intergovernmental Panel on Climate Change) suggests that climate change impacts on rivers will include changes in water quality, impacts on wetland plants and animals, and biodiversity loss, concluding "Changes in climate and land use will place additional pressures on already-stressed riparian ecosystems along many rivers in the world"



According to the *American Rivers* Organization: Climate change threatens to fundamentally alter where and when water is available across the world. And adding new dams is not the answer.

Most importantly, communities that have done the greatest damage to their natural infrastructure – wetlands, forests, streams and rivers – will have fewer defenses to protect them against a changing climate.

Decisions related to land use planning, flood protection, water infrastructure and many other facets of community life have a profound impact on a community's vulnerability in a warming world and will play a large role in determining the repercussions of the following changes.



Objectives:

- Recover river hydrological, morphological and ecological naturalness, before its further deterioration due to cc.
- Restore longitudinal and transversal connection within riparian ecosystems in order to recover its resilience capacity, essential to increase adaptability to drastic changes.
- Decrease flood risks in the riparian area and further along the river.
- Enhance rivers environmental corridors.



In order to reach these goals many projects have been developed. Most important are those aimed de recover longitudinal and transversal connection and decrease flood risks, such as DAM REMOVAL PROJECTS.

And, among them, one of the most significant is:

COFIO RIVER RESTORATION AND DAM REMOVAL IN ROBLEDO DE CHAVELA (MADRID, SPAIN).....

....as it can be considered a milestone in river restoration because, due to its **23 meters high**, is the highest dam ever demolished in Spain and probably in all Europe.



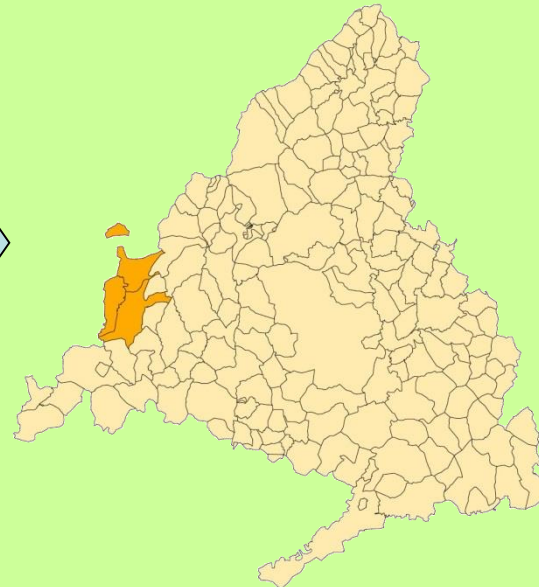
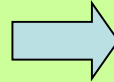
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The dam was located in Cofio river (belonging to Tajo river basin).

It was built for supplying purposes during the early sixties, but few years later it became unusable, due to water quality problems.



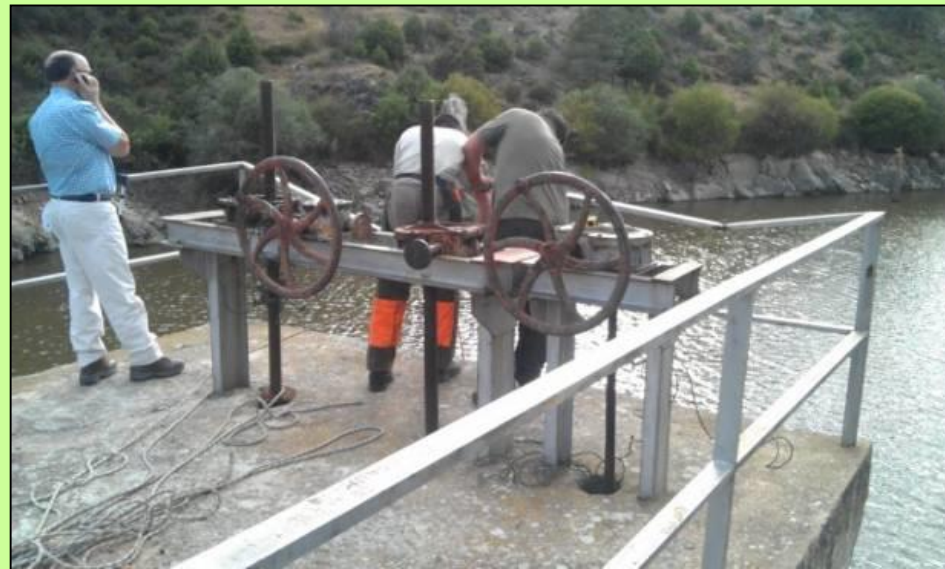
DAM LOCATION



DAM BEFORE RESTAURATION



OPENING FLOOD GATES



On June 8th, 2012, the Tajo River Basin Authority detected a water leak from the spillway impossible to repair and, consequently, launched urgent measures to avoid an extreme fish death in the reservoir and sediment transport downstream



INTERVENTIONS

1st STAGE: EMERGENCY ACTIONS ON JULY-AUGUST 2012



- ☐ Electric fishing and fish population transfer from the empty reservoir to downstream
- ☐ Dikes construction to avoid sediment transport downstream .
- ☐ Drainage in reservoir to help sediments dry out

2nd STAGE: RIVER BED AND BANKS RESTORATION (2012-2013)



- ☐ Sediments analysis to confirm heavy metal concentration, ecotoxicity and irritability were under legal limits.
- ☐ Sediments removal and translocation
- ☐ River bed restoration and banks reinforcement (natural stone breakwater)
- ☐ Riverine vegetation plantations

3rd STAGE: DAM DEMOLITION AND REMOVAL (2014)



Electric fishing and fish population transfer from the empty reservoir to downstream



Sounding line sampling to count fish
population density and sediments
thickness



Zip-line for fish transfer from the empty
reservoir to downstream



Electric fishing:

2.100 dead fishes

4.400 autochthonous fishes
(*Barbus barbus*,
Pseudochondrostoma polylepis)

Non autochthonous
fishes were sacrificed



DIKES CONSTRUCTION TO AVOID SEDIMENTS TRANSPORT DOWNSTREAM

1st dike: 1,5 m high.

Downstream dam wall for immediate sediments retention



2nd dike: 3,5 m high: 150 m downstream dam wall

Gravel and geotextile sheet core



DRAINAGE IN RESERVOIR TO HELP SEDIMENTS DRY OUT

Once the reservoir was emptied, a ditch helped sediments drainage and dry out



SEDIMENTOS REMOVAL AND TRANSLOCATION

Path in both sides to enter into the reservoir and remove sediments





Sedimentos translocation: 300 m upstreams in a wide meander.



During translocation



Sediments removed, stone protection and plantations

RIVER BED DELIMITATION AND BANKS PROTECTION:

Slopes were reprofiled and reinforced by a breakwater wall.

To prevent erosion, revegetation was accomplished by hydroseeding and native trees and bushes plantation



UNESPECTED EVENTS DURING WORKS

Fire in almost all Cofio valley (august 2012)



Floods in Cofio valley. March 2012



Backhoe loader
UNDER WATER



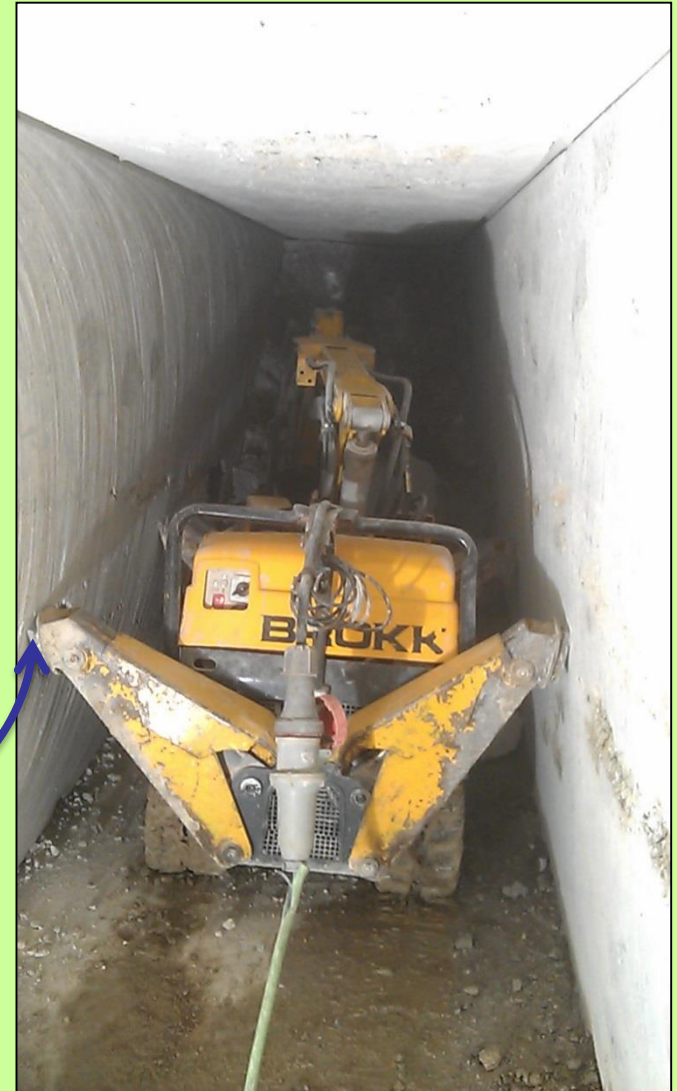
Backhoe loader
UNDER WATER



DRAIN CONSTRUCTION IN DAM WALL TO AVOID NEW FLOODS



Diamond wire saw



DURING DRAIN CONSTRUCTION IN DAM WALL



DRAIN IN DAM WALL ACCOMPLISHED





**WATER THROUGH
DRAIN AND SPILLWAY**



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SEPTEMBER 29th, 2014

DAM REMOVAL BY DETONATION

<https://vimeo.com/107684886>



RENATURALIZATION IN THE DAM SURROUNDINGS ONCE REMOVED THE RUBBLE



COFIO RIVER IN THE SECTION WHERE THE DAM WAS PLACED

FEW WEEKS LATER





COFIO RIVER IN THE SECTION WHERE THE DAM WAS PLACED

MAY 2015



THANKS!