Jun 23rd, 2:30 PM - 2:45 PM

Session A5: A Dam Removal in Robledo de Chavela (Madrid, Spain) and River Restoration

Lidia Arenillas Girola
Confederación Hidrográfica del Tajo (Spain)

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

Lidia Arenillas Girola
Confederación Hidrográfica del Tajo (Spain)

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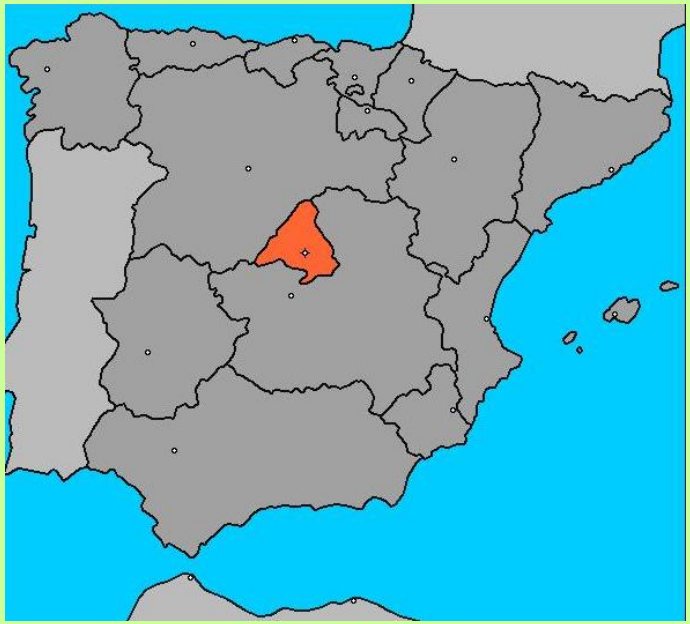
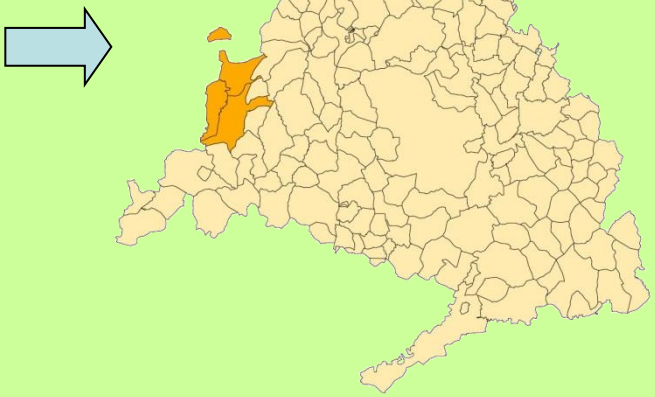
The Robledo de Chavela dam removal can be considered a milestone in river restoration as, due to its 23 meters high, is the highest dam ever demolished in Spain and probably in all Europe.

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.





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DAM LOCATION

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DAM BEFORE RESTAURATION

OPENING FLOOD GATES

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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

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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)

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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

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Electric fishing:

2.100 dead fishes

4.400 autochthonous fishes (Barbus barbus, Pseudochondrostoma polylepis)

Non autochthonous fishes were sacrified

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DIKES CONSTRUCTION TO AVOID SEDIMENTS TRANSPORT DOWNSTREAM

1st dike: 1,5 m high.

Downstream dam wall for inmediate sediments retention

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

Gravel and geotextile sheet core

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DRAINAGE IN RESERVOIR TO HELP SEDIMENTS DRY OUT

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

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SEDIMENTOS REMOVAL AND TRANSLOCATION

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

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Sedimentos translocation: 300 m upstreams in a wide meander.

During translocation

Sediments removed, stone protection and plantations

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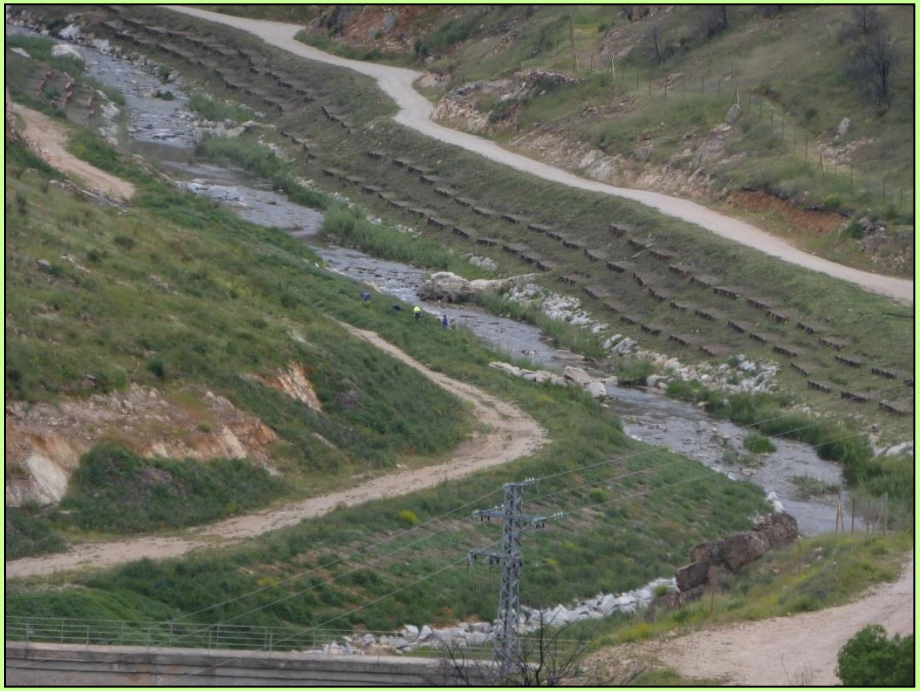
RIVER BED DELIMITATION AND BANKS PROTECTION:

Slopes were reprofiled and reinforced by a breakwater wall.

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



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UNESPECTED EVENTS DURING WORKS

Fire in almost all Cofio valley (august 2012)

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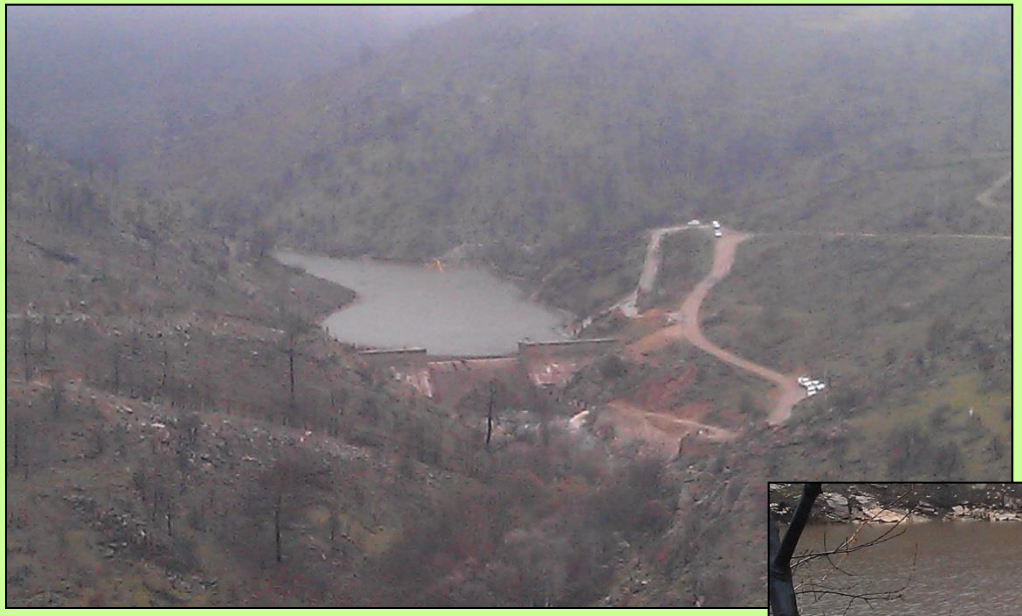
Floods in Cofio valley. March 2012



Backhoe loader
UNDER WATER

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Backhoe loader
UNDER WATER

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DRAIN CONSTRUCTION IN DAM WALL TO AVOID NEW FLOODS

Diamond wire saw

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DURING DRAIN CONSTRUCTION IN DAM WALL

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DRAIN IN DAM WALL ACCOMPLISHED

WATER THROUGH DRAIN AND SPILLWAY

SEPTEMBER 29th, 2014

DAM REMOVAL BY DETONATION

https://vimeo.com/107684886

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RENATURALIZATION IN THE DAM SURROUNDINGS ONCE REMOVED THE RUBBLE

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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!