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Session D2: Coimbra Fishway: Restoring Connectivity in River Mondego

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Presenter Information
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COIMBRA FISHWAY
Restoring connectivity in River Mondego

Ana Telhado, João Ferreira, Felisbina Quadrado, José Proença, Carlos Batista, Bernardo Ruivo Quintella, Pedro Raposo de Almeida

Groningen, June 2015
Where is river Mondego?

What was the problem?

What was done?

What we expect to do?
Where is River Mondego?
Where is River Mondego?
What was the problem?

DAMS:

• modify river continuity, creating obstacles to fish migration

• contribute to impoverish, or even, to extinct fish species with conservation and/or economic value
What was the problem?

River Mondego had severe floods and, for that reason, it was regulated.

Four large dams were built in river Mondego basin with the purpose of:

- flood control
- hydroelectric power generation
- public and industry supply
- irrigation
What was the problem?

Coimbra Açude-Ponte dam was built in 1981 with a fish passage but the dam became the first large obstacle for diadromous fish.

Açude-Ponte dam

<table>
<thead>
<tr>
<th>Dam Characteristics</th>
<th>Açude-Ponte dam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Gate structure</td>
</tr>
<tr>
<td>Crest length</td>
<td>202.4m</td>
</tr>
<tr>
<td>Height</td>
<td>22m</td>
</tr>
<tr>
<td>Maximum discharge</td>
<td>2000 m³/s</td>
</tr>
<tr>
<td>distance from Atlantic Sea</td>
<td>45 km</td>
</tr>
</tbody>
</table>
What was the problem?
What was the problem?

Fishway inefficiency resulted from structural and hydraulic problems:

- difficulty in finding entrance, inadequate attraction flow;
- high step at the entrance of the passage;
- pool size not adapted for existing species;
- high gap between pools;
- high water speed inside the passage.
In 2011, after several years of biological and hydraulic monitoring and studies, a new vertical-slot pool type fishway was built, near the old one, in order to restore river connectivity.
What was done?
### What was done?

**Fishway characteristics**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total length</strong></td>
<td>125m</td>
</tr>
<tr>
<td><strong>Number of pools</strong></td>
<td>23</td>
</tr>
<tr>
<td><strong>Length and width of each pool</strong></td>
<td>4,5x3m</td>
</tr>
<tr>
<td><strong>Flow inside the fishway</strong></td>
<td>Between 1 - 1,5 m³/s</td>
</tr>
<tr>
<td><strong>Water height in the pools</strong></td>
<td>Between 1 - 2 m</td>
</tr>
<tr>
<td><strong>Dissipated power</strong></td>
<td>&lt;150 Watt/m³</td>
</tr>
</tbody>
</table>
What was done?
The Coimbra fishway was monitored from 2012 to 2014 using:
• visual counts (video);
• biotelemetry techniques;
• CPUE abundance with electrofishing.

• Monitoring results show that several autochthonous species use the Coimbra fishway, including the diadromous sea-lamprey, Allis and Twaite shad and European-eel.
What was done?
What was done?

During 2013 and 2014 more than 3 000 000 million fishes used the Coimbra Fishway
What was done?

2013

2014
What was done?

<table>
<thead>
<tr>
<th></th>
<th>Downstream - upstream movements</th>
<th>Upstream - downstream movements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea Lamprey</td>
<td>30 310</td>
<td>-</td>
</tr>
<tr>
<td>Allis and twaite shad</td>
<td>10 930</td>
<td>-</td>
</tr>
<tr>
<td>Iberian barbel</td>
<td>39 544</td>
<td>5 583</td>
</tr>
<tr>
<td>Iberain nase</td>
<td>101 317</td>
<td>3 356</td>
</tr>
<tr>
<td>Thinlip grey mullet</td>
<td>2 033 255</td>
<td>1 029 682</td>
</tr>
<tr>
<td>European eel</td>
<td>1 370</td>
<td>221</td>
</tr>
<tr>
<td>Trout</td>
<td>406</td>
<td>18</td>
</tr>
<tr>
<td>Exotic Species</td>
<td>392</td>
<td>105</td>
</tr>
<tr>
<td>Non identified specimens</td>
<td>11 901</td>
<td>14 969</td>
</tr>
<tr>
<td>Total</td>
<td>2 229 425</td>
<td>1 053 934</td>
</tr>
</tbody>
</table>

- PIT telemetry has shown an efficiency of 30% for *Petromyzon marinus* and 14% for *Luciobarbus bocagei*

- Pre and post fishway construction electrofishing monitoring shows improvements in sea-lamprey larvae abundance both upstream and downstream from the Açude-Ponte dam
What we expect to do?

- Public divulgation of monitoring results and promotion of public visits to the Coimbra Fishway;
- Assuring funds for long term monitoring;
- Monitoring fish migration in association with experiences in the exploitation regimes of upstream hydropower dams;
- Maximize the results of the Coimbra Fishway with other projects/tasks (increase river continuity upstream from the Açude-Ponte dam, eel passage experiences, integrated management of fisheries in river Mondego).
Conclusions

- The construction of the new Coimbra Fishway is worth the investment (both in terms of conservation and socio-economics);
- Monitoring results show that the Coimbra fishway is efficient;
- Improvements on the good results of the Coimbra fishway are possible if other measures are implemented in the Mondego River Basin.

Thank you

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