Session D7: The Most Evaluated Fishway in Spain: A New Lesson Every Year

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The most evaluated fishway in Spain: A new lesson every year

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GEA: Grupo de Ecohidráulica Aplicada –[Applied Ecohydraulics Group] Itagra.ct

2 CEIBA Estudios Ambientales S.L. Monasterio del Escorial, Nº 6. 28049 Madrid
1. Introduction

Ecohydrodynamics research group
University of Valladolid
Hydroaholics + ictioaholics

Public funding
Private funding

Ecological flow, environmental impacts, river restoration, fisheries management...

Research projects
Fish passes projects
1. Introduction

- Many new and old difficulties and facilities for migration ichthyofauna

Hydraulic and biological monitoring

Improvements

An example: Tormes River in Santibañez de Bejar (Salamanca)

Trout (*Salmo trutta*), Barbel (*Luciobarbus bocagei*) and nase (*Pseudochondrostoma duriense*)

Monitoring

Biological: movement pattern, approach, entry, passage

Hydraulic: flow, velocity, sediments

4 years
2. Study area
Weir in the reservoir tail

Hydropower Gauging weir

Natural waterfalls

Hydropower weir

Flat V Gauging station
3. Aims

a. Assess different obstacles

b. Detect difficulties and improve them

c. Enhance monitoring methodologies in field sites

4. Methods: biological monitoring

- Trapping
- Electrofishing
4. Methods: biological monitoring

- Nets
- Passive Internal Transponder (PIT Tags)
- External tags
- Video - monitoring
4. Methods: hydraulic monitoring

- Flow discharge: chemical gauging
- Flow velocity
- Depths
- Power dissipation
5. Results: trapping in the top of the fishway

Length:
Barbel: 24-55 cm
Nase: 14-19 cm
Trout: 29-48 cm

<table>
<thead>
<tr>
<th>Trapping</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barbel</td>
<td>390</td>
<td>2,191</td>
<td>2,819</td>
<td>&gt; 1,500</td>
</tr>
<tr>
<td>Nase</td>
<td>29</td>
<td>53</td>
<td>2,026</td>
<td>&gt; 6,000</td>
</tr>
<tr>
<td>Trout</td>
<td>24</td>
<td>29</td>
<td>99</td>
<td>&gt; 100</td>
</tr>
</tbody>
</table>
5. Results: PIT tags in the fishway
5. Results: video-monitoring

[Images of monitoring sites with annotations]

\[ \Delta h > 0.30 \text{ m} \]

[Pie chart showing percentages]
5. Results: video-monitoring
6. Improvements

- New fishway design
- New attraction weir in the fishway
- By-pass in the gauging weir
- By-pass in the reservoir tail
6. New assessment

- New fishway: Trapping, PIT tags and video-monitoring
- By-pass with PIT tags
- Movement patterns with external tags
- Influence of different tag systems
6. Next year... Will we be able to answer these questions?
6. Next year... Will we be able to answer these questions?

- Which kind of fishway works better?
- Are there some differences in the ascent?
- Relation between time-dependent covariates and spawning (survival analyses)
- Which is the best combination for field tagging?
- Can video-monitoring be a good and cheap assess tool?
- …
Acknowledgements: Gerardo Castro & Luis Gil (SSF SL); José María Rubio-Polo & Arturo Prieto-Blanco (CHD); and specially thanks to SSF hydropower plant.