Jun 23rd, 11:20 AM - 11:35 AM

Session C4: Eel Protection Initiative (EPI) Rhineland-Palatinate/RWE Power AG on the Moselle River with Special Reference to "Catch & Carry" Methods

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Eel Protection Initiative (EPI) Rhineland-palatinate/RWE Power AG on the Moselle river with special reference to „catch & carry“ methods

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the location
regulated river: barrages for ships and hydropower stations

- Total generating capacity: 180 MW
- Annual output: 800 Mio. kWh
- MQ: 316 m³/s
- MNQ: 58 m³/s
- MHQ: 2,210 m³/s
- Length: 545 km
- Catchment area: 28,286 km²
fundamental notice

catch & carry
doesn’t solve
turbine caused
down-stream mortality
investigation of eel mortality with schokker „Mariechen“

Fankel 1993
what is the purpose of the eel protection initiative EPI?

- improve and extend the knowledge about eels and their special migrating behaviours by interdisciplinary cooperation between scientists, engineers and fishermen for a sustainable hydropower generation

- preserve the existing eel population of the Moselle river which supports the formation of vital spawning populations

- take animal protection aspects into account – minimize damage caused by turbines

- contribute to maintaining sustainable fishery along the Moselle river
3 fields of project activities

EPI: founded in 1995

joint commitment: search for avoiding/minimizing downstream turbine induced eel-mortality as well as maintaining company interests

funding: 215,000 € / year

joint project coordination: fishery, authority PP, RWE power AG

catch & carry (c&c), eel adjusted (bulb-)turbine operation (eaTo)

studies on biology, world wide knowledge transfer, behavior, fishery, protection

early detection and management, stop and divert, physical barriers, detection, remote sensing, forecast migration
10 professional fishermen (10 barrages) receive additional fishing gear for intensive silver-eel fishery and get paid for their catch at market price level each year between 4000 and 7000 kg of silver-eels (7000 - 10,000 eels, > 95 % ♂) are caught along the Moselle and transported downstream to the river Rhine.
catch & carry

- lock
- restricted area
- hydropowerstation
- fish trap
- current

= silver-eel
catch & carry
Investigations with schokker „Mariechen“ in 1993 → fato

50% charged turbine => eel-mortality > 50%

Turbines are run independently and as a group to maximize efficiency. The changeover points are much lower than the maximum flow capacity of the turbine.

→ eel/fish adjusted turbine operation (fato)

100% charged turbine => eel-mortality < 10 %
downstream migration of silver-eel under hydropower

100% = 28523
23% survival

6532 (23%)

overall survival rate
downstream migration of silver-eel under hydropower

23 % survival
example: barrage no. 10 (Trier) cumulative mortality to the Rhine

mortality rate at each particular hydropower station

<table>
<thead>
<tr>
<th>Hydropower Station</th>
<th>Mortality Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trier</td>
<td>23%</td>
</tr>
<tr>
<td>Detzem</td>
<td>41%</td>
</tr>
<tr>
<td>Wintrich</td>
<td>28%</td>
</tr>
<tr>
<td>Zeltingen</td>
<td>18%</td>
</tr>
<tr>
<td>Enkirch</td>
<td>25%</td>
</tr>
<tr>
<td>St. Adelgund</td>
<td>24%</td>
</tr>
<tr>
<td>Fankel</td>
<td>24%</td>
</tr>
<tr>
<td>Münden</td>
<td>25%</td>
</tr>
<tr>
<td>Lehmen</td>
<td>30%</td>
</tr>
<tr>
<td>Koblenz</td>
<td>31%</td>
</tr>
</tbody>
</table>

Cumulative mortality to the Rhine

- Trier: 2163
- Detzem: 1661
- Wintrich: 979
- Zeltingen: 709
- Enkirch: 548
- St. Adelgund: 435
- Fankel: 332
- Münden: 251
- Lehmen: 189
- Koblenz: 132
- Total: 251
downstream migration of silver-eel under hydropower and catch & carry

Weir
Weir with hydropower

Luxemburg
Saarland
Frankreich

GIS & Layout: UDATA - Umweltschutz und Datenanalyse
Stand 11.05.2015
downstream migration of silver-eel under hydropower, catch & carry and fish adjusted (bulb-)turbine operation

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catch&carry

overall survival rate

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silver-eel outlet Moselle under different conditions

- Before regulation: 28,523
- Hydropower: 6,532
- Hydropower + c&c: 12,856
- Hydropower + c&c + fato: 13,545

Relative percentages:
- Before regulation: 100%
- Hydropower: 23%
- Hydropower + c&c: 45%
- Hydropower + c&c + fato: 47+%
summary

catch & carry is a beneficial measure for eels and fishermen. In some cases (big, old hydropower stations), it is the only useful measure to bridge the gap until appropriate solutions are found.
thank you for your attention