Jun 21st, 3:45 PM - 4:00 PM

Fish Passage Studies II: The Drifting Dead: Drift of Dead Fish in Three German Rivers

Lisa Heermann  
Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen

Torgeir Havn  
Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen

Eva Thorstad  
Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen

Finn Økland  
Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen

Maxim Teichert  
Ministerium für Klimaschutz, Umwelt, Landwirtschaft, Natur- und Verbraucherschutz des Landes Nordrhein-Westfalen

See next page for additional authors

Follow this and additional works at: https://scholarworks.umass.edu/fishpassage_conference

Heermann, Lisa; Havn, Torgeir; Thorstad, Eva; Økland, Finn; Teichert, Maxim; Sæther, Stein-Are; Borcherding, Jost; and Tambets, Meelis, "Fish Passage Studies II: The Drifting Dead: Drift of Dead Fish in Three German Rivers" (2016). International Conference on Engineering and Ecohydrology for Fish Passage. 22.  
https://scholarworks.umass.edu/fishpassage_conference/2016/June21/22

This Event is brought to you for free and open access by the Fish Passage Community at UMass Amherst at ScholarWorks@UMass Amherst. It has been accepted for inclusion in International Conference on Engineering and Ecohydrology for Fish Passage by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.
Presenter Information
Lisa Heermann, Torgeir Havn, Eva Thorstad, Finn Økland, Maxim Teichert, Stein-Are Sæther, Jost Borcherding, and Meelis Tambets

This event is available at ScholarWorks@UMass Amherst: https://scholarworks.umass.edu/fishpassage_conference/2016/June21/22
Drift of dead fish in three German rivers

Lisa Heermann, Torgeir Havn, Eva Thorstad, Finn Økland, Maxim Teichert, Stein-Are Sæther, Jost Borcherding and Meelis Tambets
Good tool to evaluate...

...migration routes
...migration speed
...activity
...
Good tool to evaluate...

...migration routes
...migration speed
...activity
...
... fate and mortality rates
Good tool to evaluate…

…migration routes
…migration speed
…activity
…
… fate and mortality rates
moving = alive
moving = alive
long-term stationary = dead
location = place of death
• Recordings may reflect behaviour of predator instead of tagged fish
• Recordings may reflect behaviour of predator instead of tagged fish
• Dead fish drift
Unkelmühle, Sieg

Gengenbach, Kinzig

Kuhlemühle, Diemel

Discharge: 53 m³s⁻¹

Discharge: 16 m³s⁻¹

Discharge: 3 m³s⁻¹
60 dead Atlantic salmon smolt
91-190 mm

55 dead European silver eel
575-940 mm

• Killed with an overdose of anaesthetic and blow on head or cutting spinal cord

• Surgical implantation of radio-tags into body cavity
Kuhlemühle, Diemel

Archimedes Screw
5 eel in Oct 2014

Tailrace of Francis turbine
5 eel in Oct 2014
Kuhlemühle, Diemel

Archimedes Screw
5 eel in Oct 2014
20 smolt in April 2015

Tailrace of Francis turbine
5 eel in Oct 2014
Unkelmühle, Sieg

Tailrace

5 eel in Oct 2014

Flood gate
Unkelmühle, Sieg

Tailrace
5 eel in Oct 2014
25 eel in Oct/Nov 2015

Flood gate
5 eel in Oct/Nov 2015
Unkelmühle, Sieg

Tailrace
- 5 eel in Oct 2014
- 25 eel in Oct/Nov 2015
- 20 smolt in April 2015

Flood gate
- 5 eel in Oct/Nov 2015
Gengenbach, Kinzig

Tailrace

10 eel in Oct/Nov 2015

20 smolt in April 2015
Manual tracking

- Portable receiver (Lotek SRX 600) and 3-E-Yagi antenna
- Every 2 – 7 days
- Distance smolt: up to 29 km
- Distance eel: up to 44 km
Stationary receivers along the river and several at power station

-> Detection of predation
The graph depicts the maximal distance drifted (in km) for different locations and species. The y-axis represents the maximal distance drifted, ranging from 0 to 35 km, while the x-axis lists the locations: Diemel, Sieg 2014, Sieg 2015, and Kinzig.

- **Diemel**: Maximal distance drifted is 1.1 km for Smolt and 5.1 km for Eel.
- **Sieg 2014**: Maximal distance drifted is 21.1 km for Eel with a value of XX for Smolt.
- **Sieg 2015**: Maximal distance drifted is 2.4 km for Smolt and 19.7 km for Eel.
- **Kinzig**: Maximal distance drifted is 0.2 km for Smolt and 30.1 km for Eel.

Legend:
- **Smolt** (Red Bar Graph)
- **Eel** (Black Bar Graph)
Smolt: 3 weeks after release
Eel: 2 months after release
Smolt: 3 weeks after release
Eel: 2 months after release

Median distance drifted (km)

Maximum water discharge in period after release (m$^3$ s$^{-1}$)
Smolt: 3 weeks after release
Eel: 2 months after release
Predation

Diemel

Sieg

Kinzig

35%

20%

35%
<table>
<thead>
<tr>
<th>Location</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predation</strong></td>
<td>35%</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Diemel</strong></td>
<td>20%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>Sieg</strong></td>
<td>35%</td>
<td>20% (2014)</td>
</tr>
<tr>
<td><strong>Kinzig</strong></td>
<td>35%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Predation

After 2.6 days

<table>
<thead>
<tr>
<th>River</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diemel</td>
<td>35%</td>
<td>13%</td>
</tr>
<tr>
<td>Sieg</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Kinzig</td>
<td>35%</td>
<td>10%</td>
</tr>
</tbody>
</table>
Summary

• Drift species-specific and site-specific
Summary

- Drift species-specific and site-specific
- Max drift distance up to 2.4 km for smolt and 30.1 km for eel
Summary

- Drift species-specific and site-specific
- Max drift distance up to 2.4 km for smolt and 30.1 km for eel
- No correlation to discharge
Summary

- Drift species-specific and site-specific
- Max drift distance up to 2.4 km for smolt and 30.1 km for eel
- No correlation to discharge
- Predation!
Summary

- Drift species-specific and site-specific
- Max drift distance up to 2.4 km for smolt and 30.1 km for eel
- No correlation to discharge
- Predation!

Dead fish as study-specific control group
A fish found after drift limit = alive or at least did not die directly at power station.
Thank you