Session A5: Dam Removal: Enhancing or Degrading Ecological Integrity?

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Dam removal: enhancing or degrading ecological integrity?

Birgitta Malm Renöfält, Anna Lejon, Christer Nilsson, Micael Jonsson
**NÄTRAÅN**
The Kuba dam

- Approx. 2.5 m
- Damming effect 1000m
- No flow regulation

Succession study (3 years), vegetation

**NISSAN**
The Unnefors dam

- 2.3 m
- Damming effect 4500m
- No flow regulation

Before and after, vegetation & invertebrates

**Purpose of removal**
- Avoid maintenance
- Improve fish migration
- Regain spawning areas
- Removed late autumn 2007

**Purpose of removal**
- Freshwater pearl mussel
- Improve fish migration
- Regain spawning areas
- Removed early spring 2007
Project design

Riparian vegetation
Invertebrates

Reference

New rapid (Nätraån)

Impoundment

Downstream
Riparian vegetation
Invertebrates
Sampling design vegetation

- 30 plots on each reach type
  - Vascular plant species
    - Presence
    - % cover
  - Total Veg. Cover (%-classes)
  - Substrate composition
  - Bare soil (%cover)
  - Soil moisture (%)
  - Over story cover (none, low, medium, high)
  - Elevation

- Polystyrene cubes
  (disturbance)

- Astroturf mats
  (sediment traps)

- Temperature logger
Sampling design invertebrates

1 x 0.35 m²
mesh size 0.5 mm

Reference reach 550 m, six replicates
Downstream reach 1400 m, 12 replicates

Sampled 2007 (before)
2008 (after)
2011 (after)
<table>
<thead>
<tr>
<th>Location</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservoir</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Former rapid</td>
<td>a</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>Downstream</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
<tr>
<td>Reference</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>
Species composition former reservoir

Reservoir
- 2007
- 2008
- 2009

Reference
- 2007
- 2008
- 2009
Species composition former rapid

- Former rapid:
  - 2007
  - 2008
  - 2009

- Reference:
  - 2007
  - 2008
  - 2009
Species composition downstream
High proportion of trees and shrubs due to a high number of saplings.
Oligochaeta  
Ephemeroptera  
Plecoptera  
Trichoptera  
Simuliidae  
Diptera  
Coleoptera  

Taxon richness and density

Renofalt et al. Fig. 2, top.

Renofalt et al. Fig. 3, top.
## Sediment deposition

<table>
<thead>
<tr>
<th>Location</th>
<th>Mean before removal (g m(^2)-1)</th>
<th>Mean after removal (g m(^2)-1)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>1395.5</td>
<td>1286.25</td>
<td>0.663</td>
</tr>
<tr>
<td>Downstream</td>
<td>1918.75</td>
<td>8280.5</td>
<td><strong>0.021</strong></td>
</tr>
<tr>
<td>Upstream</td>
<td>397.75</td>
<td>283.75</td>
<td>0.809</td>
</tr>
</tbody>
</table>

Taxon composition downstream
• Depends on what type of organism you look at

• Depends on whether you look at downstream effects or effects in the former reservoir
Thank you!

Questions?