IMPACT OF NAVIGATION ON THE AQUATIC COMMUNITIES

Cristina Sandu – IAD, Romania, sanducri@yahoo.com
Harald Kutzenberger – IAD GS, Austria, kutzenberger@iad.gs
Jürg Bloesch – IAD, Switzerland, bloesch@eawag.ch

International Association for Danube Research
www.iad.gs
Waterways

Water bodies - “environmental friendly transportation“ ➔

but they are also

• Habitat for the aquatic communities
• Freshwater resource for human needs
• Site for recreational activities
• Inland fishery resource
• Areas mitigating the impact of climate change
Sustainable use of waterways
= balance navigation & environmental needs

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<tr>
<th>NAVIGATION</th>
<th>ENVIRONMENT</th>
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<tbody>
<tr>
<td>Depth Sediment dredging</td>
<td>Habitat/substrate for invertebrates and fish (life cycles)</td>
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<td>Width Bank enforcement, canalization</td>
<td>Populations (nesting, spawning, feeding, rearing youngsters, migration), riparian zones &amp; floodplains as dynamic ecosystems</td>
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<tr>
<td>Discharge Water abstraction, canalization Dams, ship locks</td>
<td>Habitats and longitudinal connectivity, fish long-distance migration; isolation of populations (genetic diversity)</td>
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### Impact of navigation on fish community

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<tr>
<td>Kills or injuries of adult fish by direct entrainment through propeller zone</td>
<td>Prevent fish from nest-guarding (increased egg predation) or feeding</td>
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<td>Mortality of eggs, early life stages and adults due to return currents, shear stress, wash waves, dewatering</td>
<td>Dislodgement of fish eggs or juveniles to inappropriate habitats</td>
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<td>Stranding of fish larvae and juveniles on the banks</td>
<td>Increased sediment resuspension and turbidity</td>
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<td>Loss of shelter habitats (esp. macrophytes) and disconnection of floodplain habitats</td>
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<td>Restricted food availability</td>
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*Source: Wolter & Arlinghaus, 2003*
Danube River Basin: Endangered sturgeons and SAP

- Sturgeon Action Plan (SAP) 2006 under the Bern Convention (72 actions)
- 6 native species in the DRB: 1 extinct, 4 (critically) endangered, 1 vulnerable
- Main threats: over-exploitation, pollution, anthropogenic habitat alterations and disruption of migration
- Main stressors/pressures: navigation, hydropower, dredging and gravel exploitation, embankments for flood protection
- Measures: any technical development needs a sound EIA
Aim: to close the natural Sturgeon life-cycle
→ needs joint and simultaneous actions in the Upper, Middle and Lower Danube

1. restore and maintain stocks: → Sturgeons ready to migrate
2. ensure upstream migration: → of waiting Sturgeons
3. provide spawning habitats: → for arriving Sturgeons
4. ensure downstream migration: → of young Sturgeons and spent adults

Huso Huso

Action Plan for the Conservation of Sturgeons (Acipenseridae) in the Danube River Basin
Sturgeon “life-schedule” in Lower Danube River

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<td>Ac.guldenstaedti (Danube sturgeon)</td>
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“Environmental window”, low vulnerability: mid of November – mid February
Dredging must not be performed during March – November as disturbance is crucial
(Tamuno et al. 2009)

PLATINA workshop, Ruse, 15 - 16.09.2009
Learn from previous mistakes

River channelization + increased navigation lead to:
- increased hydromorphological alterations
- increased pollution
- increased number of invasive species
- decreased diversity and productivity of fish communities

Currently, many restoration projects are carried out on European rivers as a consequence of massive loss of biodiversity and ecosystem services
Good solutions by joint efforts

- Melioration of navigation projects on Lower Danube - measures by TEN-T conflicting with WFD, SAP, Bern Convention, NATURA 2000, etc.

- Cooperation needed between governmental bodies, scientists and environmental organizations for a sustainable management approach of waterways

- Proper SEA, EIA and monitoring are needed

- Joint lobby at EU level for equal weight of the environment and the infrastructure development projects