



## Recommendations for a Monitoring – Program

for the collection and documentation of technical and ecological efficiencies of technical-biological bank protection measures applied on inland waterways

<b>Condition of the Bank</b>	<ul style="list-style-type: none"> <li>→ Regular <b>bank inspections</b> directly after the installation and in regular intervals afterwards, during the critical initial phase at least every month and if extraordinary events (e.g. floods, heavy rainfall) take place, later every six months to a year (documentation of the results)</li> <li>→ <b>Photographic documentation</b> during the installation and afterwards in sufficient intervals (parallel to bank inspections)</li> </ul>
<b>Ground</b>	<ul style="list-style-type: none"> <li>→ Investigation of <b>geotechnical parameters</b> (geotechnical reports or additional explorations should be available)</li> <li>→ Description of the <b>groundwater situation</b> – documentation of the groundwater level in the hinterland</li> </ul>
<b>Topography of Water Body</b>	<ul style="list-style-type: none"> <li>→ Measurement of <b>cross-sections</b> in the bank area in a sufficiently close spacing before and after the measure (directly after the implementation, later annually), including the connections to site and bed topographies</li> </ul>
<b>Hydrology/ Hydraulics</b>	<ul style="list-style-type: none"> <li>→ Documentation of the <b>water level</b> and <b>discharge</b> hydrographs</li> <li>→ Measurement and documentation of <b>current velocities</b> (value, direction) in the direct vicinity of the bank, if necessary at different water levels, data from hydraulic-numerical models (BAW), if necessary</li> <li>→ Measurement and documentation of <b>fluctuations of the water level (flooding times)</b> in the area of the measure</li> </ul>
<b>Navigation</b>	<ul style="list-style-type: none"> <li>→ Documentation of the recent fleet (<b>types of vessels</b>)</li> <li>→ Documentation of the traffic density - <b>statistics of traffic</b> (e.g. via lock diary)</li> <li>→ Collection of typical <b>technical data</b> of the vessels (length, width, draught, type of propulsion, engine power) and its <b>conditions of travel</b> (speed of the vessel, distance to the bank)</li> <li>→ Measurement of the <b>hydraulic load on the banks</b> due to navigation (wave height, drawdown, flow velocity), if necessary at different water levels</li> </ul>
<b>Fauna</b>	<ul style="list-style-type: none"> <li>→ <b>Inventory/ documentation and evaluation</b> (fish, macrobenthos for measures under MW; birds, reptiles, ground beetles, spiders depending on the measure above MW): before the installation and (1), 2, 3, 5, 7 and 10 years after the installation (afterwards every 10 years, if necessary)</li> </ul>
<b>Vegetation</b>	<ul style="list-style-type: none"> <li>→ <b>Inventory/ documentation and evaluation:</b> before and directly after the installation as well as after 1, 2, 3, 5, 7 and 10 years, afterwards every 10 years, if necessary</li> <li>→ Documentation of the maintenance measures, which are carried out according to a set <b>maintenance plan</b> (examination every 10 years and adaptation, if necessary)</li> </ul>
<b>Maintenance</b>	<ul style="list-style-type: none"> <li>→ Documentation of the <b>maintenance and rehabilitation measures</b> (and its costs)</li> <li>→ <b>Photographic documentation</b> of damages and rehabilitation measures</li> </ul>