Environmental requirements in relation to hydropower in the context of the WFD

Hydropower and Fish

Research and innovation in the context of the European Policy Framework

Joint Workshop

IEA Hydropower TCP – European Commission DG RTD

29-30 May 2017, Brussels

Policy context

- Important role of hydropower in meeting renewable energy targets for 2020 and beyond
- Need and commitment of halting and reversing loss of biodiversity and protection of ecosystems
- Both policies are key to addressing climate change
- Challenge of sustainable contribution of hydropower and ensuring environmental quality objectives
- Relevant EU Environmental Legislation includes inter alia
  - ➔ EIA and SEA Directives
  - ➔ Birds and Habitats Directive
  - ➔ Water Framework & Floods Directives

➔ Challenge to strike the right balance!

EU Water Framework Directive (WFD)

Scope, objectives and tools

- **Scope**
  - Protection and management of all waters, including rivers, lakes, transitional-, coastal- and groundwater
  - **Covering all impacts on waters**

- **Objectives**
  - Protect and enhance water bodies
  - **Achievement of good status / potential**
  - **No deterioration**
  - Exemptions under certain conditions

- **Tools**
  - **River Basin Management Plans and Programmes of Measures**
  - Existing legislation: urban waste water treatment, nitrates from agriculture, habitats, etc.
  - Public participation

Water status classification

Good surface water status

Good **ecological** status	Is an expression of the quality of the structure and functioning of aquatic ecosystems including: **biological, hydromorphological and physico-chemical elements**	High Good Moderate Poor Bad
Good **chemical** status	Means meeting all **environmental quality standards** for chemicals set at EU level in Directive 2008/105/EC (priority substances)	Good Failing to achieve good

Good groundwater status

Good **quantitative** status	Means ensuring a **long-term balance** between abstraction and recharge, protecting as well associated surface waters and ecosystems.	Good Poor
Good **chemical** status	Means meeting all standards for chemicals, either set at EU level (pesticides and nitrates) or at national level (threshold values)	Good Poor

Progress and challenges

EU Water Framework Directive

- Integrated approach: all water categories, pressures, impacts
- Ecological dimension
- Transboundary cooperation
- Stakeholder involvement
- Economic instruments
- Common Implementation Strategy process
- Major driver for **research and innovation**
- **Comprehensive basin-wide picture** on water
- Investments in **restoration and protection**

- *But remaining challenges which need to be tackled*

Hydropower and the WFD

- Important source of renewable energy
- Amongst most common hydromorphological pressures leading to failure of WFD objectives
  - Change of hydrological regime - impoundments, abstractions, rapid change of flows
  - Modification of morphology and habitat degradation
  - Disruption of river continuity, habitat connectivity and sediment transport
- Impacts on river ecology determining water body status (e.g. composition and abundance of fish species)
- Significant share of water bodies designated as heavily modified due to power generation

➔ Need for mitigation of impacts from hydropower to achieve the WFD objectives

➔ Challenge of sustainability of new hydropower development

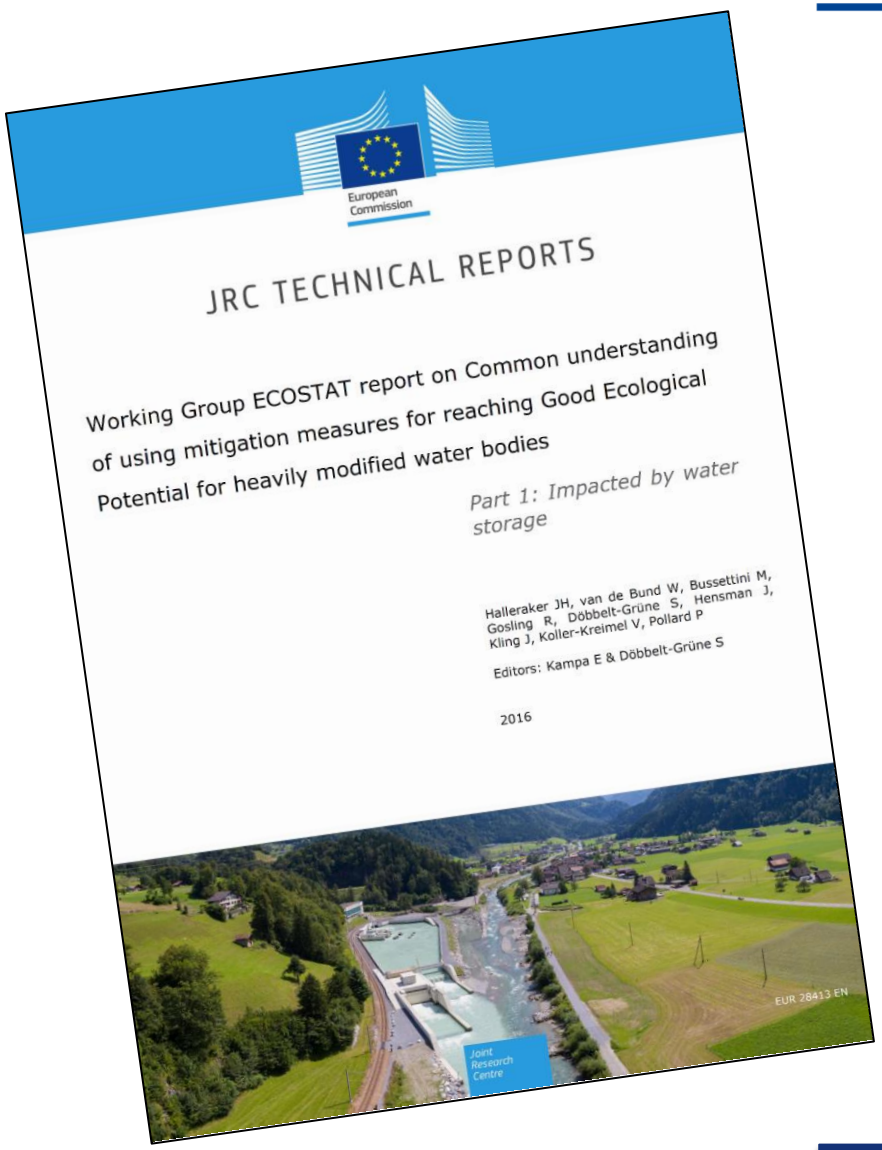
➔ Was and remains important issue at European level

Examples: Hydromorphological pressures

EU CIS guidance and activities

When	What (examples)
2003	Guidance document No. 4 on the identification and designation of HMWB and AWB
2006	Policy paper on WFD and hydro-morphological pressures with a focus on hydropower, navigation and flood defence activities, including recommendations for policy integration
2007	Workshop on WFD & Hydropower – formulation of first key principles for hydropower and WFD
2008	CIS Guidance No. 20 on Environmental Objectives and Exemptions discusses basic concepts for exemptions
2009	Workshop on HMWB delivered several recommendations relevant to hydropower and the WFD
2010	Water Directors Statement on "Hydropower Development under the Water Framework Directive" summarising key principles and recommendations
2011	2nd CIS workshop on Water Management, WFD & Hydropower made good practice recommendations on the application of WFD Article 4(7)
2015	CIS Guidance ecological flows in the implementation of the Water Framework Directive
2016	Establishment of CIS Ad-hoc Task Groups on Hydromorphology and Article 4(7) Guidance

See http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm and CIRCABC https://circabc.europa.eu

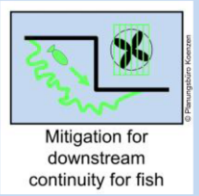
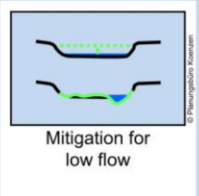


Common understanding of using **mitigation measures for reaching Good Ecological Potential** for heavily modified water bodies **Part 1: Impacted by water storage**

JRC Technical Report 2016

Technical report water storage

Examples for mitigation measures

Hydromorphological alteration*	Main ecological impact**	Mitigation for	Mitigation measures options	Mitigation measures in 2016 WFD reporting guidance	Pictogram
River continuity for upstream fish migration reduced/disoriented or interrupted	Fish: Populations of migratory fish absent or abundance reduced	Upstream continuity for fish	Ramp Fish pass By-pass channel Catch, transport & release (Fish stocking from hatchery)	Fish ladder* Bypass channels* Removal of structures	
River continuity for downstream fish migration reduced or interrupted	Fish: Populations of migratory fish absent or abundance reduced	Downstream continuity for fish	Fish-friendly turbines Fish screens By-pass channel Trap, transport & release Fish pass		
Artificially extreme low flows or extended low flows	Reduced abundance of plant & animal species. Alterations to composition of plant & animal species	Low flow	Provide additional flow River morphology changes	Setting of Ecological flows	

Challenge new hydropower development

New hydromorphological modification

or

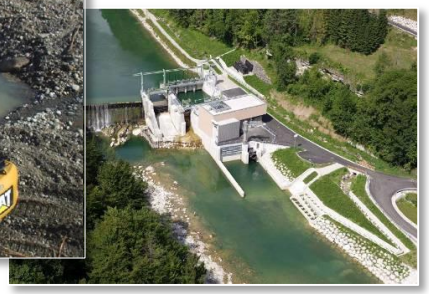
New sustainable human development activity

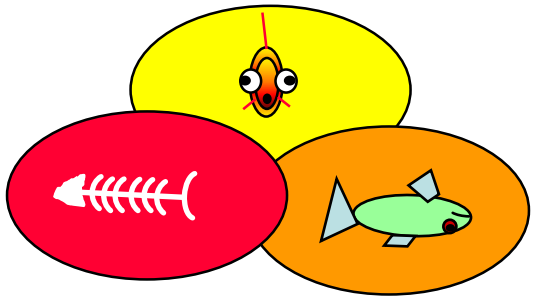
Can cause

Deterioration of status/potential

or

Non-achievement of WFD objectives





➔ **Requires exemption from WFD "no deterioration principle"**

➔ **Project cannot be authorised in case conditions not fulfilled**

New modifications preventing the achievement of **good water status** and/or **leading to deterioration** are only allowed under the following **conditions** (WFD Article 4.7):

- All practicable mitigation measures are taken
- There are no significantly better environmental options
- The benefits of the development outweigh the benefits of achieving the WFD objectives / the development is of overriding public interest
- The project and the reasons for it are reported in River Basin Management Plans

The WFD and Hydropower in a nutshell

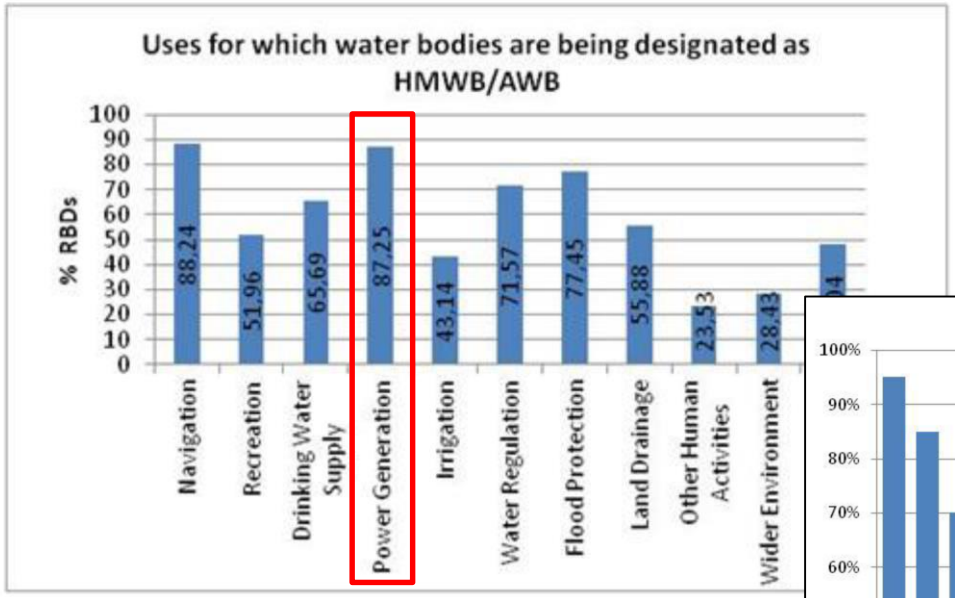
- Need for **coordinated approach - integration** of policies and planning (Renewable Energy Action Plans, River Basin Management Plans, …)
- **Existing hydropower**: Potential for win-win solutions
  - Need to mitigate impact of existing hydropower to achieve WFD objectives
  - Potential to increased energy output via modernisation; in connection with
  - Ecological restoration measures (fish migration aids, ecological flows, …)
- **New projects:** Integration of requirements in authorisation process
  - Ex-ante evaluation whether project may deteriorate water status / compromise achievement of WFD objectives
  - Specific conditions have to be fulfilled for granting new permits (Art. 4.7)
  - Benefits of early and strategic planning/integrated approach – sensitivity mapping
  - Ensuring good quality assessments, expertise & stakeholder engagement
- **Mitigation measures**: In project design & operation

➔ **Continuous need for innovative solutions – Cooperation between policy makers, stakeholders and research community essential!**

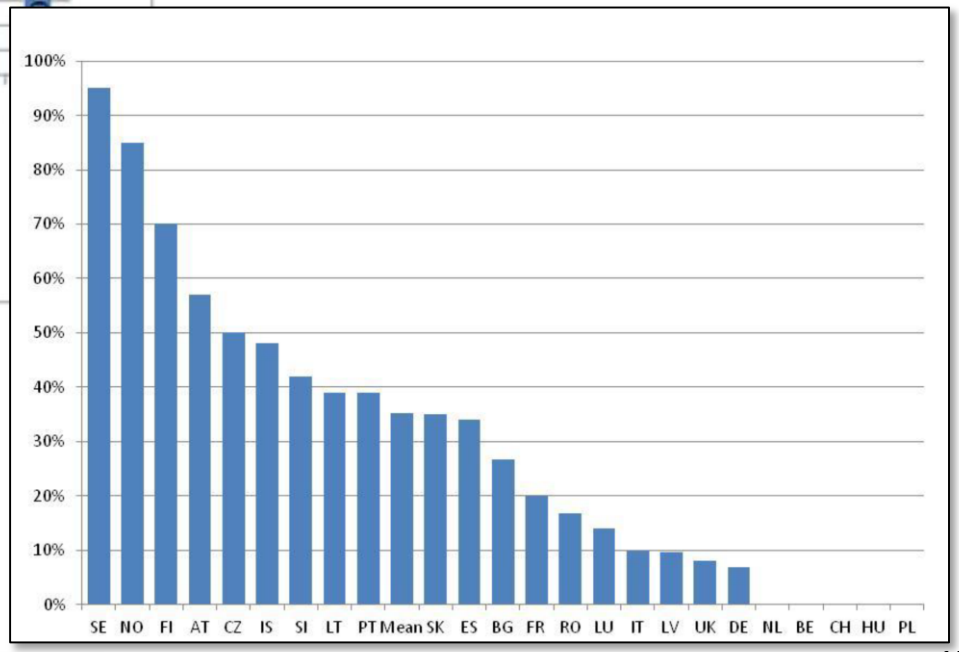
Thank you for your attention

More information
EU Water Policy: http://water.europa.eu/policy
CIS Guidance Documents: http://ec.europa.eu/environment/water/water-framework/facts_figures/guidance_docs_en.htm

"Heavily Modified Water Body" designation



Uses for which water bodies were designated as HMWB/AWB (share of RBDs)



Percentage of HMWBs designated due to hydropower in relation to total HMWBs (%)