



Federal Ministry for the  
Environment, Nature Conservation  
and Nuclear Safety

# Conference on Adaptation of Water Management to Effects of Climate Change in the Danuber river Basin

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Impulse Presentation for Final Discussion

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**“Existing European water policy on freshwater, coastal and marine management is already fit to factor in climate change. ...**

**...In particular, the Water Framework Directive (WFD) is a power-ful tool to introduce climate change impacts into water resources management and river basin planning, at the latest in the second planning cycle in 2015 and preferably before.**

**This process should integrate the needs, including the ecological needs, and impacts from all water-related sectors.**

***Key message 2 of the European Symposium  
“Time To Adapt-Climate Change and the European  
Water Dimension, Berlin - 12 to 14 February 2007***





“The Water Framework Directive provides a consistent framework for integrated water resources management. It does not however address climate change directly. The challenge will be to incorporate measures to cope with climate change as part of its implementation, starting with the first planning cycle for 2009.”

*Greenpaper by the European Commission*

*“Adapting to climate change in Europe– options for EU action”,  
June 2007*



„Recommends that water scarcity issues be dealt with, as much as possible, through the implementation of an appropriate set of measures within the River Basin Management Plans, including identifying the necessary adaptation strategies for climate change and coordinated water resources management in international river basins...“

*Council of (Environment) Ministers,  
Conclusions on Water Scarcity and Droughts,  
30 October 2007*



- How does climate change affect the implementation of the WFD ?
  - Through direct impacts on the relevant characteristics of water bodies and the relevant quality elements?
  - Through indirect impacts due to changes in pressures as a result of climate change effects in water dependent sectors?



- How can adaptation to these direct and indirect impacts be incorporated in the planning process in the WFD framework? How can we get to climate proof programmes of measures?
- How can WFD implementation can contribute to mitigation?



- **CIS Activity on Climate Change and EU Water Policy**
- **First Activity: CIS workshop on River Basin Management Plans & Climate Change (20 & 21 November 2007, Bonn)**



# Direct Impacts

- Change in Water Temperature
  - impacts on temperature sensitive species
  - impacts on self purification capacities
  
- Change in Discharge and River Flow (annual & seasonal)
  - impacts on groundwater recharge
  - water availability for water related eco-system
  - effects on sediment transport
  - effect on capacities to cope with pollution loads



# Direct Impacts

- Change in Frequency and Intensity of extreme Events (floods and droughts)
  - more frequent re-mobilisation of pollutants during floods
  - erosion
  - stress on aquatic and water related eco-systems during droughts
- Impacts on Aquatic Ecosystems / Impacts on the biological Quality Elements
  - Loss of species and protected areas (e.g. wetlands)
  - Changes in eco-regions (northward movement)
  - Alien – invasive species
- Salt Water Intrusion and Coastal Erosion due to Sea Level Rise



# Indirect Impacts

with potential effects on WFD objectives and implementation.

- **Hydropower**
  - less discharge → more reservoir capacities → increased hydro-morphological pressure
  - problems to ensure ecological minimum flows
- **Thermal Power Plants**
  - Higher ambient temperature → increased demand for cooling water for power plants → additional rise in water temperature
- **Navigation**
  - less flow → more regulation → increased hydro-morphological pressure (but potential for synergies between navigational and ecological needs with regard to ensuring minimum flows in summer)

These impacts will vary per region and per season.



# Indirect Impacts

with potential effects on WFD objectives and implementation.

- Water supply
  - Higher ambient temperature → increased demand → higher extraction rates → increased stress on groundwater quantity having lower recharge rates at the same time
- Agriculture/ land use changes
  - less precipitation → increased demand for irrigation → higher extraction rates → increased stress on water resources as well as potential pollution problems, salt intrusion in coastal areas
- Infrastructure

These impacts will vary per region and per season.



These direct and indirect will affect more or less all the Significant Water Management Issues for the Danube River Basin

- Surface water: Organic pollution
- Surface water: Nutrient pollution
- Surface water: Hazardous pollution
- Surface water: Hydromorphological alterations
- Groundwater: Alterations to quality
- Groundwater: Alterations to quantity



# Action for First RBM Cycle

- It is recommended that a chapter on climate change is included in the first RBMPs (national and international plans), aiming at:
  - Facilitating the public consultation
  - Improving general awareness of all actors for climate change trends and impacts
  - Paving the way for more climate change related actions in 2nd/3rd cycle
  - Allowing for incorporating international, national and regional information on predictions in a descriptive way (with reference to the used models and methodology)



# Action for First RBM Cycle

- Contents of such a chapter could be:
  - Summary of existing knowledge on climate change trends and scenarios
  - Identifying the main impacts, also on other water relevant sectors.
  - Outlook on future steps for incorporating climate change impacts into the planning process with a view to ensuring the adaptiveness of the PoM



# Action for First RBM Cycle

- Attempt to carry out a rough **climate check** of the Programme of Measures on the **basis of common sense** and **available knowledge** - as in many cases, at least the direction of the main possible climate change impacts is known. (check list approach).
- **Win-win situations** (=already planned measures in water-dependent sectors that already enhance adaptive capacities or could easily be adapted to be able to deal with climate change impacts) should be identified.
- **Irreversible actions** should be avoided.



# Actions for 2nd and 3rd RBM Cycle

- **Future monitoring** should be more focused to detect climate change impacts, when possible (e.g. surface water quantity, additional quality elements, biodiversity and influence of extreme event). **Specific indicators** could be developed. This could be further elaborated by relevant CIS groups.
- As part of the 6 year planning cycle, **consider type changes** for particular water bodies - on the basis of supporting data.
- As part of the ongoing work at the EU level on ecological status, possible **consequences** concerning **reference conditions** may be explored.



# Actions for 2nd and 3rd RBM Cycle

- Rules for using **exemptions** apply in the same way as without climate change (i.e. are measures disproportionately expensive/technical feasible).

Infrastructural adaptation measures by other sectors might invoke Article 4(7) more often.



# Actions for 2nd and 3rd RBM Cycle

- Programmes of Measures need to be made **climate proof** on the basis of constantly evolving knowledge and new, more differentiated data. Guidance at the European level could be developed.
  - *Climate proofing = ensuring the sustainability of investments over their entire life time and the effectiveness of measures, taking explicitly into account the impacts of changing climate. Therefore, the PoM should be robust enough to cope with changing climatic conditions.*
- In many cases, **no-regret measures** that are less dependent on high confidence levels of predictions of climatic changes could already be identified (e.g. “room for the river”, water efficiency and savings). Furthermore, measures with less uncertainty should be prioritised;



# Actions for 2nd and 3rd RBM Cycle

- For particular measures, the contribution to mitigation (e.g. wetland management for enhancing capacity a sink) as well as the climate impact (e.g. carbon emissions of improved waste water treatment) need to be assessed.
- The RBMPs plan should **look into broader water management issues** related to climate change (flood management, sediment management, land use, spatial planning, water demand/supply management).
  - already foreseen in the ICPDR SWMI-paper



# Data and Knowledge Gaps, Research Needs

- **Model chains need to be improved**, from the global models to the regional scale;
- **Climate change impacts need to be translated** (via water quality and water quantity aspects) into impacts on the ecological functioning;
- **More research** is needed, both on physical processes and on the way how to deal with remaining uncertainties.
- **Agreement** at the appropriate level (European and/or river basin) is needed **on scenarios and the ensemble of models**;
- **Research results** should be made available more widely and the **data infrastructure** needs to be improved.



Thank you for your Attention!



publicly accessible link:

[http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework\\_directive/implementation\\_conventio/workshop\\_november&vm=detailed&sb=Title](http://circa.europa.eu/Public/irc/env/wfd/library?l=/framework_directive/implementation_conventio/workshop_november&vm=detailed&sb=Title)