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## **Integration of NWRM in river basin management**

### **Natural water retention measures and sustainable agriculture practices**

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2<sup>nd</sup> Danube Region Workshop, 23-24 June, 2014



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## **Structure of the presentation**

- 1. EU policy context**
- 2. NWRM examples**
- 3. Implementation**
- 4. Policy recommendations**

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## Policy context and options

### EU policy to support the NWRM realization

WFD

Blueprint

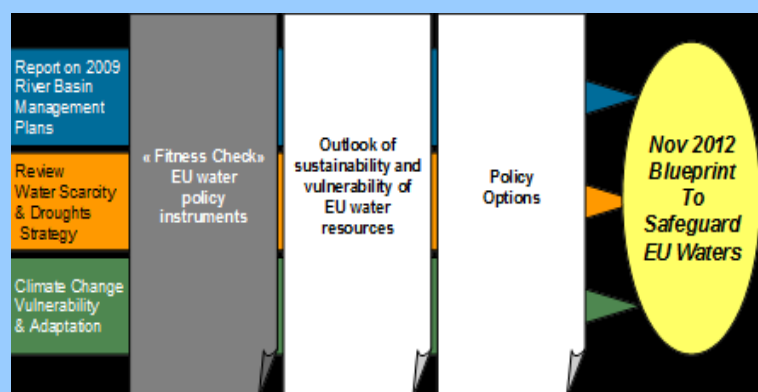
Nitrates Directive

CAP Health Check

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## WFD objective - agriculture

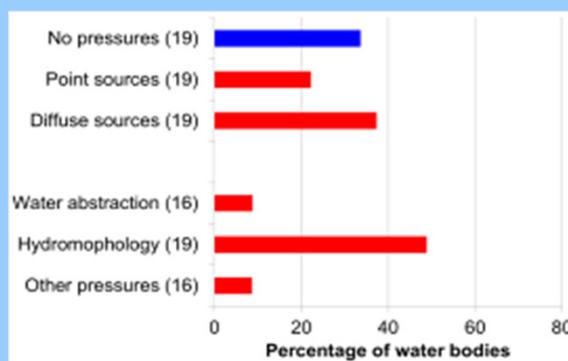
**Good ecological status or good ecological potential (GEP) in all of Europe's water bodies.**

**Diffuse pollution from agriculture (livestock and arable farming): major problem to achieving the WFD**

**Surface water run-off - pollutants such as sediment, nutrients, bacteria and pesticides**

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## Outcomes of the RBM Plans

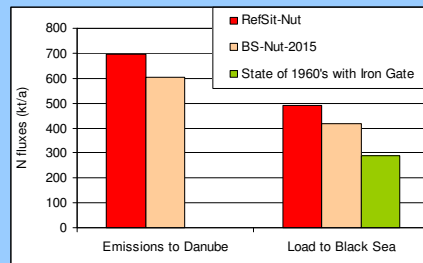


Measures to address these pressures:  
UWWTD, IED, ND.....

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## DRBMP: Anticipated effects of the JPM

### Nitrogen emissions and loads

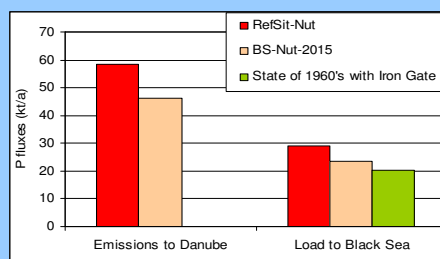


- Nitrogen emissions to surface waters in 2015 will be approx. 12% lower in comparison with present state.
- The load to the Black Sea will reach a level that is below the present state but still far above (40%) that of the 1960's.
- This means that the situation in the DRBD and the Black Sea will improve but not ensure the achievement of the management objectives and the WFD environmental objectives by 2015.

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## DRBMP Anticipated effects of the JPM

### Phosphorus emissions and loads



- P emissions will be in 2015 about 25 % lower.
- Load to the Black Sea will reach a level, which is still 15 % above the level in the 1960's.
- The load to the Black Sea will reach a level that is below the present state but still far above (40%) that of the 1960's.
- This means that the situation in the DRBD and the Black Sea will improve but not ensure the achievement of the management objectives and the WFD environmental objectives by 2015.

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## EU Blueprint

**Major challenges: flood, water scarcity and drought**

**Blueprint IA: NWRM implementation to improve water resource efficiency and sustainability**

### **Categories**

- water efficiency measures
- alternative water supply sources
- natural water retention measures.

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## Nitrates Directive & Buffer strips (SMR 4)

**NAP: concrete requirement for buffer strips**

**Under the regulations farmers must ensure that chemical fertilizer is not applied within 1.5 m of a surface watercourse**

**Ensure that organic fertilizer or soiled water is not applied within the minimum buffer zones for water extraction points as specified in the Regulations**

**Types of buffer strips considered:**

- no pesticides, no fertilizer, no manure, but still arable land
- grassland, no ploughing up
- trees grown.

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## Buffer strips targeting water quality

- **Buffer strips and cross compliance**

### **Cross compliance definition**

**(Recital 2 of Council Regulation (EC) No 1782/2003)**

- **“The full payment of direct aid should be linked to compliance with rules relating to agricultural land, agricultural production and activity. Those rules should serve to incorporate in the common market organizations basic standards for the environment, food safety, animal health and welfare and good agricultural and environmental condition. (...)”**
- **Potential link between environmental requirement and the full payment of direct aid.**
- **Link between Buffer strips obligation where it is defined by the EU legislation and the EU payment support.**
- **Buffer strip and SMR 4, 9**

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## Pesticide Directive & the Buffer strips (SMR 9)

- **Directive 91/414/EEC of 15 July 1991 Article 3(3) of directive 91/414/EEC states:**
- **“Member States shall prescribe that plant protection products (PPP) must be used properly. Proper use shall include compliance with the conditions established in accordance with Article 4 and specified on the labeling, and the application of the principles of good plant protection practice ..”**

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## CAP Health Check Review: Cross Compliance

The Health Check: changes to SMRs and GAEC)

Two new issues focus on water management, whilst a new compulsory GAEC standard requires Member States to introduce a standard for buffer strips next to watercourses - Protecting and management of water:

**Protect water against pollution and run-off and manage the use of water**

New GAEC Buffer Strip Requirement should improve water quality.

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## NWRM definitions

Not new concepts

Blue Print IA: “measures that aim to safeguard and enhance the water storage potential of landscape, soils and aquifers, by restoring ecosystems, natural features, and characteristics of water courses and by using natural processes”.

NWRMs are **living systems** adjusted to the local context

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## NWRM to reduce agricultural run-off: reduce water pollution, conserve the soil.

Afforestation forests	Developing forest stand on former agricultural areas to influence evapotranspiration, surface run-off and infiltration characteristics
Restoring and maintaining meadows and pastures	Water-retention-run-off regulation areas
Buffer strips	Vegetative cover - natural or planted area, . or along water courses
Grass waterways	Vegetative cover
Crop practices - crop rotation	Ensure the use of the soil as a natural water retention pool
Wetlands	Improvement in the hydrological regime, enhance habitat quality, reduce diffuse pollution (BOD, COD, N, P, pesticides, sediments)

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## NWRM Buffer strips benefits

**Multiple purposes – protect drinking water resources quality, block the movement of nutrients and pesticides into watercourses, reduce soil erosion**

**Preferably at least 5 m**

**Effective measure to achieve objectives of WFD, CAP, ...**



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## Buffer strips in the DRB

DE: Bavaria: on arable land buffer stripes with a width of 10 - 30 m

AT: width 10- 20 m

SI: width 5- 15 m

HR: Nitrated Directive – NAP

MD: 70 ha of buffer strip (75% efficient)

RO: width 1 m for land with slope < 12%; 3 m for land with slope > 12%.

SK: whole territory

UA: width 2.5, 50, 100 m. On slopes the width of buffer strips doubles (Water Code)

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## NWRM Land conversion benefits & costs

**Conversion of arable land into permanent pasture** aims to reduce nitrogen and phosphorus reaching water bodies at risk because of soil erosion and fertilization.

### **Conversion to extensive grassland:**

Greatest benefits if the grassland is used extensively and if the conversion is permanent. The measure allows reducing nitrogen and phosphorus losses due to lower inputs in the area.

In case of irrigation it reduces water abstraction needs and reduces soil erosion through the permanent grass cover.

Biodiversity in the area is improved.

Investment costs of this measure are the costs for compensation of farmers and economic costs include the loss of production.

**Ex. AT, CZ**

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## NWRM: Diversify crop rotation benefits & costs

Crop rotation means that succeeding crops which are of a different variety than the previous crop.

Increased crop rotation leads to a reduction in nutrient leakages, reduction of soil erosion, improved soil structure and fertility, and reduces the build-up of pests and the reliance on agricultural chemicals.

Economically, this measure might result in short to midterm income losses, though there are immediate savings from reduced need for chemical inputs, and longer term benefits from improved soil structure and fertility, and from reduced soil erosion

**Ex: MD, RO, UA**

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## Wetlands in the DRB (1)

AT: National parks "Lake Neusiedl-Seewinkel" (9.064 ha) and "Donau-Auen" (9.323 ha). Nature and landscape protection area

HU: The remediation of the existing wetlands are subsidized by the frame of the Environment and Energy Operational Programme (KEOP)

BG: In 2011 the national list with wetlands of international importance extended with "Karst Dragoman marsh complex" with a total area of 14,967 ha, which includes some of the last preserved karst marshes in Bulgaria.

Project Wetlands Restoration - physical restoration of the wetlands in the two protected areas.

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## Wetlands in the DRB (2)

SI: Wetlands conservation - BioMura project  
connecting main river with side branches,  
introduction of sustainable alluvial forest  
maintenance. The Mura river space is among the  
richest ecosystems in Slovenia.



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## Wetlands in the DRB (3)

**MD:** WB Project Agricultural Pollution Control (2004-2009) restored wetlands: 6.6 ha (Sarata-Rezesi site);  
the program of restoration included the introduction of nutrient filtration through hydrologic enhancement practices, improved water quality monitoring, and a tree planting sub-program.

**UA:** Black Sea region of Ukraine has 600,000 ha of wetlands.

Danube plavni - international importance

Programs of rehabilitated systems in Lower Danube (Ireland's Tatarin, Ermakov, lakes Katlabukh, Saf'yany) ongoing in cooperation with Wild World Fund.

About 12 000 ha (33 objects) will be restored at performance of the Tizsa RBMP.

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## Demo project: Making space for water in the Bodrog River Basin (HU-SK-UA)



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## Wetlands in the DRB (5)

**UNDP GEF MSP Integrating multiple benefits of wetlands and floodplains into improved transboundary management for the Tisza River Basin**

**Good example of floodplain restoration - create temporary “space” for water during flood events.**

**Benefits: improved habitats conditions (related to water regime and water quality, and agricultural use, nutrient retention and /or removal etc.).**

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## NWRM: Wetlands costs

**Investment costs** very site specific (water treatment, flood protection)

€150k to €400k/ha

**Opportunity costs** ~ loss in agricultural production

Scheldt project (Belgium) – loss of agricultural land estimated as €30k/ha

**Restoring costs**

**Maintenance costs: low but on long term**

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## NWRM: Wetlands benefits for water resources management

### Integral component of WFD

Cross cutting measures, relevant to different policy domains – WFD, Natura2000, CAP, European Marine Strategy, Floods Directive  
Increase water storage, contribute to groundwater replenishment and attenuate run-off.  
Contribute to improved water quality  
Represent a biodiversity value themselves.

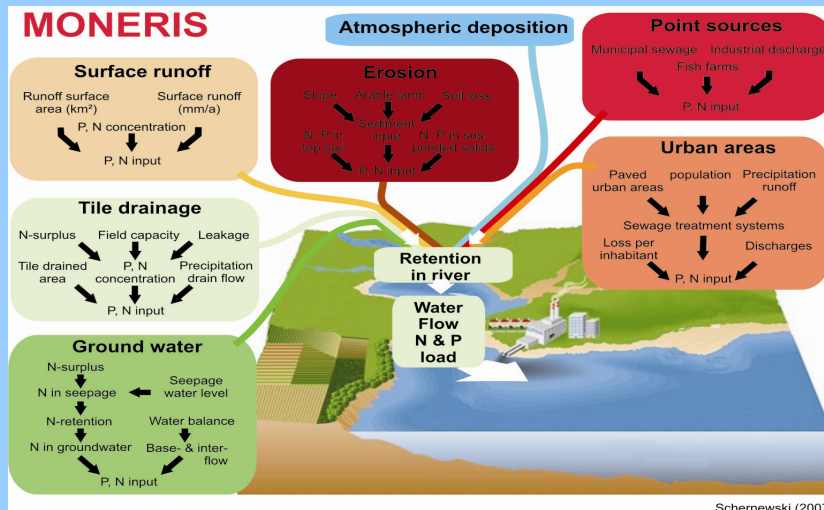


Provide important ecosystem services such as:  
Controlling water quality, water retention, flood prevention, soil protection and controlling sedimentation.  
Nutrient reduction  
Drought reduction  
Flood risk reduction  
Groundwater recharge  
Supporting wildlife habitat in riparian areas Natura 2000  
Tourism and recreation

**Evidence shows the wetlands are the most effective measures**

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## MONERIS - wetlands in TRB



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## Wetland scenarios assumptions

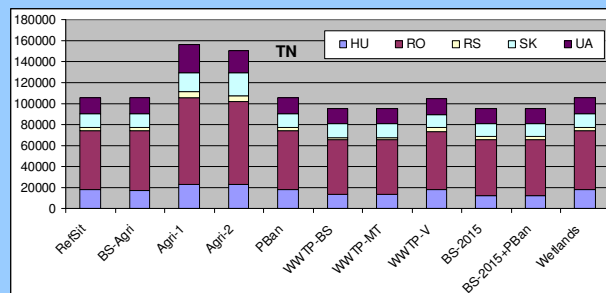
- only wetlands described as „disconnected wet lands“ have been considered.
- The land use shown in the inventory has been used to recalculate land use after restoration of wet lands.
- It was assumed that flood plains will be covered by water for 60 days per year. This water surface area was considered as new, additional water surface area. Arable land was assumed to become wet land. Only arable land of lowest slope class was changed. Urban areas, grass land, open land and forests remained unchanged. The land use class “marshes” was assumed to be comparable to wetlands in MONERIS.

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## Wetlands Inventory

Name of Wetland	Country	Size	urban area	Agriculture	Forest	Marsh	Water	Open land

## Wetlands scenario



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## Results

- Locally the reconstruction of wet lands has a very limited effect on the nutrient emissions to the surface waters.
- The positive effect of wetlands on the nutrient emissions is equalled out by higher emissions via direct atmospheric deposition on the larger surface waters. Additionally emission from wet lands as Dissolved Organic Nitrogen (DON) may finally cause higher TN emissions from wet lands than from arable land – especially at fairly low N surpluses from agriculture.
- On the other hand enlarged surface waters (by flood plains) cause higher retention, which finally leads to a positive total effect of reconstructing wet lands and causes a reduction of the loads.
- In catchments with higher N surplus the effect of areal reduction of arable land would be stronger. (HU 22 kg/(ha·a); RS 14 kg/(ha·a))
- Knowledge on the existence of tile drainages could influence the results positively (stronger reduction of emissions)
- To discuss:
  - How many days to which extent are flood plains covered with water?
  - The DON concentration originating from wet lands is crucial to model the effect of reconstructing wet lands. At the moment the value is 1 mg/l. Does this fit your data/experiences from these catchments?

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## Danube Floodplain Project proposal

Develop national/international floodplain inventories and realistic restoration targets based on a consistent prioritisation approach for wetland restoration

Development of an integrated tool (hydrological, hydraulic, terrain models) that integrate existing data and maps and assess the impact of the floodplain on reducing flood peaks

Assess the future impact of climate change on flood frequency, intensity and features

Development of the concept “**More space for rivers**”, along the Danube

Communication, dissemination and public awareness campaigns on the use and role of floodplains and their wetlands for flood management

Development of pilot feasibility studies for floodplain and wetlands restoration

Pilot restoration projects.

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## Lower Danube Green Corridor

- Bucharest - 5th June 2000 – Romania, Bulgaria, Moldova, Ukraine, signed the „Declaration on the co-operation for the creation of the Lower Danube Green Corridor”
- To create a network of functioning wetlands:
  - 773,166 ha existing protected areas
  - 160,626 ha of proposed new protected areas
  - 223,608 ha of proposed areas to be restored to natural floodplain

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## Danube Strategy

- **PA 5.02** To support wetland and floodplain restoration - best response to flood risk (including “green infrastructure”)
- **PA 4.01** To implement fully the Danube River Basin Management Plan
- **PA 6.01** To contribute to the 2050 EU vision and 2020 EU target for biodiversity
- **PA 4.12** awareness and exchange of good practice in integrated water management issues in the Danube Basin among decision-makers at all levels and among the population of the Region

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## Macro regional perspectives

Contribute to the implementation of the EUSDR, particularly PA 5 - To manage environmental risks.

Contributions to other PA such as PA 4 –To restore water quality (WFD implementation) and PA 6 – To protect biodiversity (by floodplain and habitats restoration).

Bring important added value to other pillars from the EUSDR by increasing the safety for further developments and increasing the attractiveness of natural assets for ecotourism development.

Offer long term solutions through restoring the floodplains and lowering water peaks of the lower Danube.

Help alleviate flooding downstream, improve water quality and restore valuable fish and wildlife habitat.

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## Expected results and outcomes

A Danube River Basin Strategy for floodplain restoration and an Action Plan

Increased technical capacity for flood management at the national level

Feasibility studies for floodplain restoration in 8 pilot areas

Natural functions of the floodplain and wetlands restored at key pilot sites

Enhanced recreational access and economic opportunities in the restored areas

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## Identification of barriers towards NWRM implementation

- Historical
- Financial
- Technical, planning
- Effectiveness
- Knowledge exchange
- Options to maximize benefits – water & nature, agriculture & forestry

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## Policy recommendations

**EU policy relevance, EU support**

**NWRM : incorporated in the 2nd RBM Plans and FRMP**

**The agricultural policies consider the impact of agriculture sector on water bodies**

**Identification of Direct impacts, Benefits, Costs, Barriers for implementation**

**Guide for implementation needed**

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**Thank you!!**

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