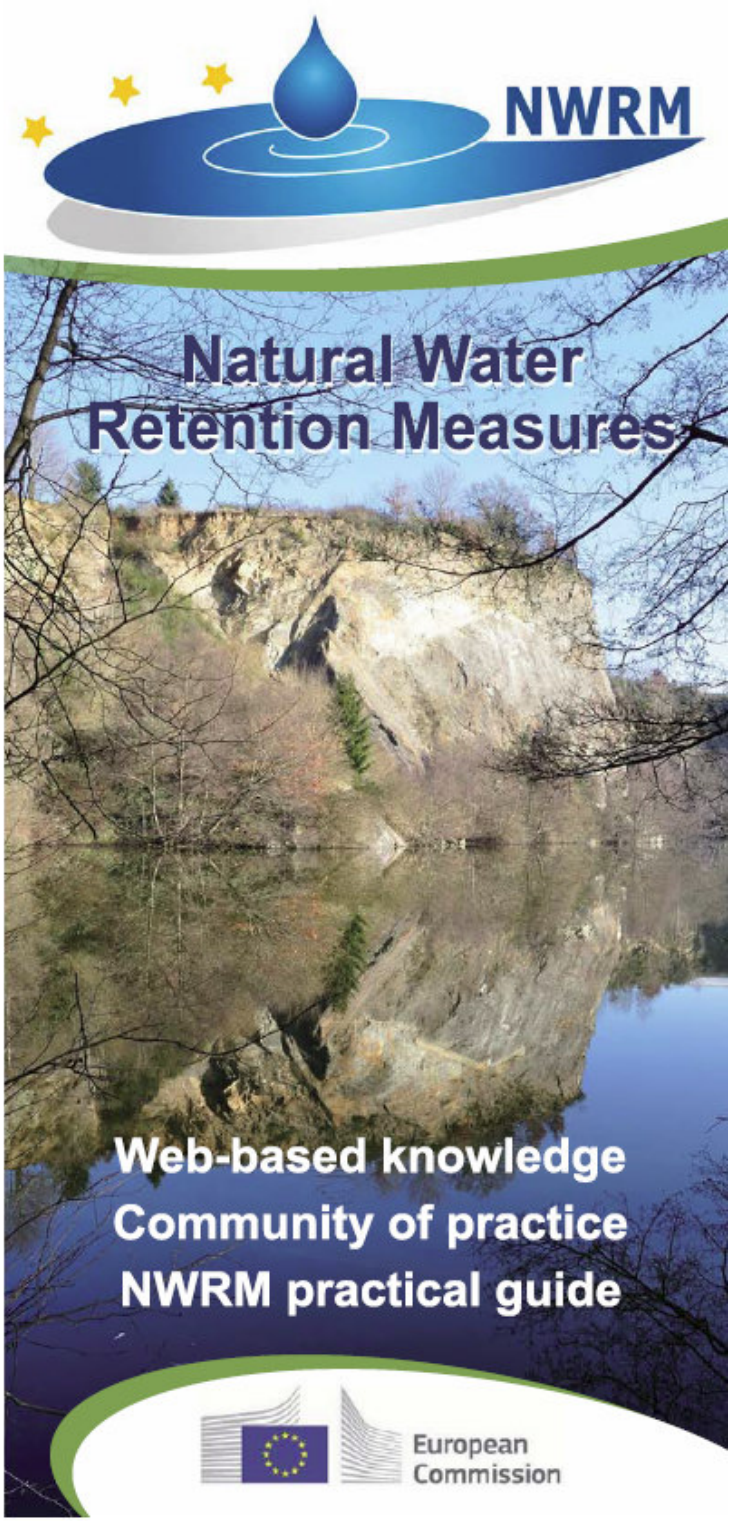

Pilot Project - Atmospheric Precipitation - Protection and efficient use of Fresh Water: Integration of Natural Water Retention Measures in River basin management

Service contract n°ENV.D.1/SER/2013/0010

"Maximizing the cost efficiency of flood risk management measures by matching urban benefits with rural costs for water retention"

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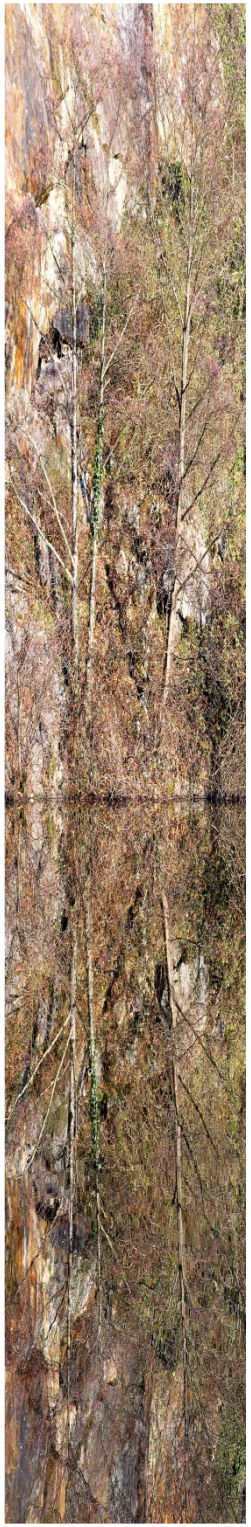
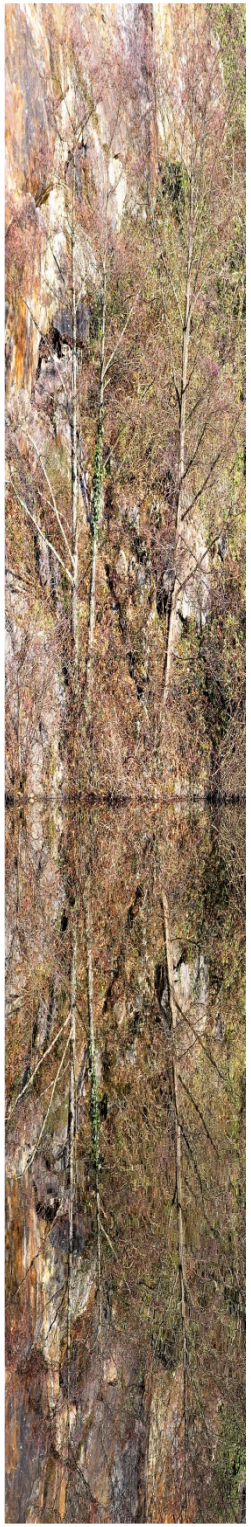


Some Basics: What are NWRMs?

- Water retention?
  - Longer residence time somewhere in the water cycle
    - on land?
    - in surface water?
    - in groundwater
- Natural?
  - NWRMs use natural processes
  - Functions commonly performed by nature
    - slowing down water flows
    - allowing soil infiltration
    - supporting aquifer recharging



NWRM include Green Infrastructure

- An alternative to grey infrastructure
  - Embankments, dykes and dams
- Restoration of riparian areas, wetlands and flood plains
- Urban and Rural Sustainable Drainage Systems (SuDS)
  - to retain water, support biodiversity and soil fertility and prevent floods and droughts
- "Towards Better Environmental Options for Flood Risk Management" (DG Environment, 2011)
  - Introduces a number of tested techniques for natural approaches which might be concretely applied on a local scale to reduce floods
  - Presents a number of projects which have restored flood plain ecosystems and at the same time contributed to flood prevention

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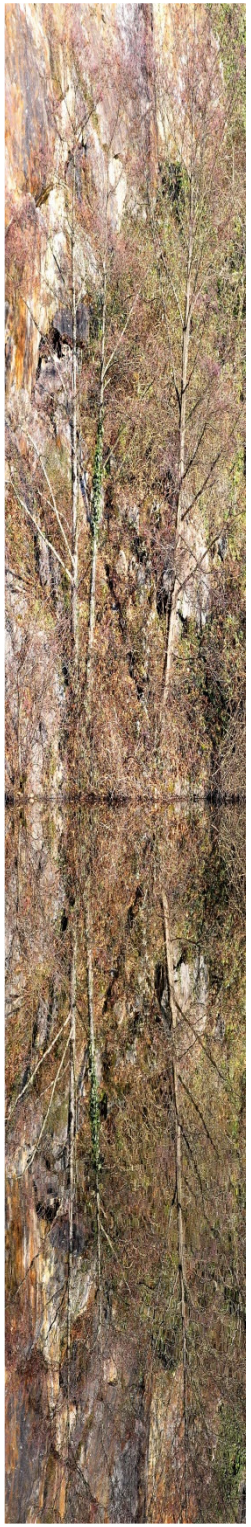

Some Basics: Why are NWRMs interesting?

- Most of the measures are not new
  - Wetlands
  - Riparian buffer zones
  - Continuous forest cover
  - Green roofs
  - Swales along roadways
- What is new is the focus on the benefits of retention
  - On-site benefits: nutrient reduction, drought reduction, increased bio-diversity, recreation…
  - Downstream benefits: flood risk reduction, nutrient reduction…
  - Upstream benefits: potential trade-offs

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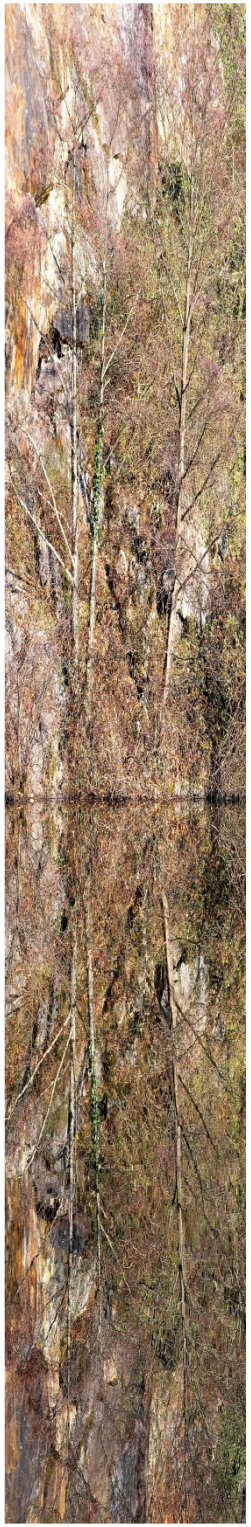
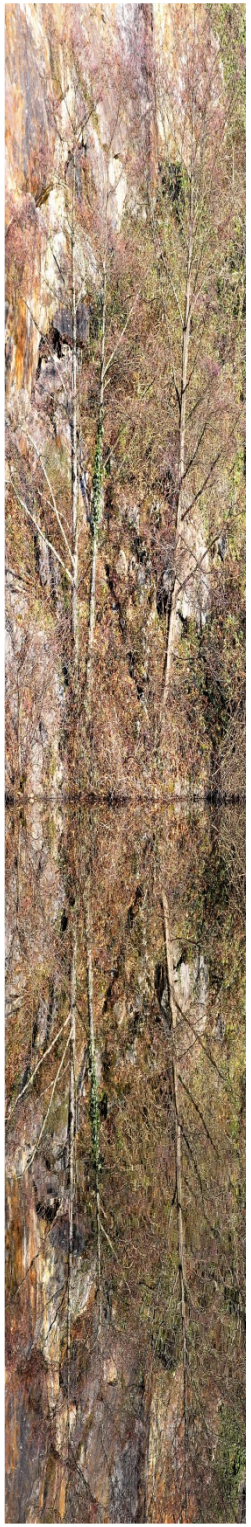


WFD addresses all the challenges faced by EU waters

- Recognition that water quality and quantity are intimately related within the concept of "good status"
- Land use and management have an effect on water quality and quantity
- Ecological and chemical status is threatened
- Risk of water scarcity
- More vulnerable to extreme events; floods and droughts
- Over-abstraction due to over-allocation
- **"These measures [NWRM] should be included in both RBMPs and [Flood Risk Management Plans] (FRMPs) and, as mentioned, should become a priority for financing under the [Common Agricultural Policy] (CAP), Cohesion and Structural Funds"**



NWRM storage potential

- Seasonal water storage
  - Reduction of water energy (bufferzones, hedgerows…)
  - Storage in surface water (wetlands, irrigation ponds…)
  - Storage in groundwater (buffer zones, wetlands…)
  - Storage in soil (reduced tillage, tile-drain regulation…)

- Event water storage (frequency, intensity)
  - Reduction of water energy
  - Storage in surface water
  - Storage in soil

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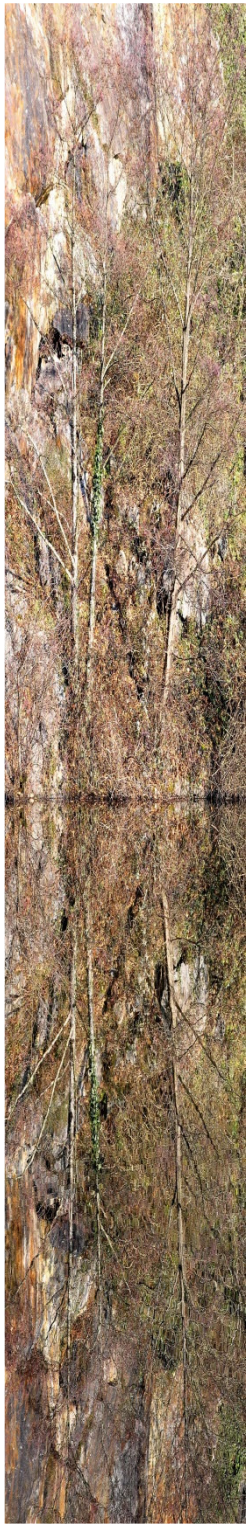
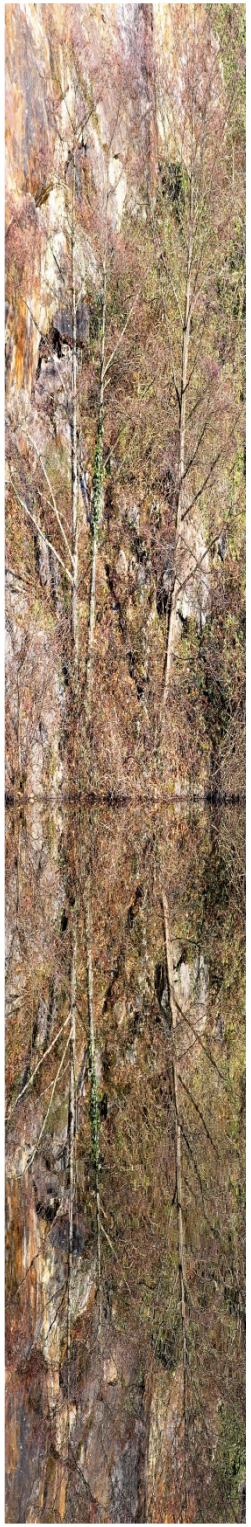


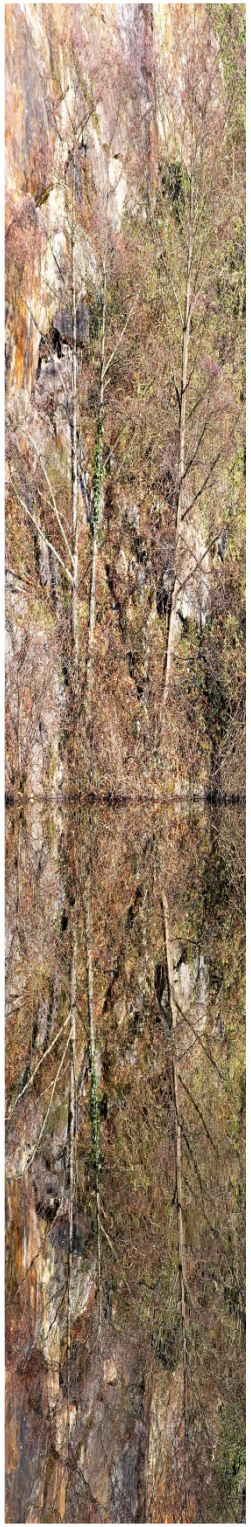
What do NWRM offer?

- Floods Directive and WFD
  - Opportunity for measures which reduce flooding and are compatible with the WFD
  - Opportunity for measures in RBMP (PoM) which are compatible with the Floods Directive
- Good news for FRMP:
  - NWRM will reduce the source of some flooding
  - Low cost measures (urban gains and rural gains)
  - Potentially postive cost-benefit ratios
  - Financing possible through CAP and European Structural and Investment Funds (ESIF)
- Bad news:
  - Little effect on extreme floods



Urban benefits and rural costs

- Costs of flood damage mitigation in urban areas are high
  - Defensive measures (grey infrastructure)
  - High opportunity costs for land
  - High maintenance costs
- Costs of NWRMs in rural areas are low
  - Measures that lower flood risks
  - Low opportunity costs for land
  - Low opportunity costs
- Benefits
  - Urban; high benefits from reducing flood damage and some ancillary benefits (biodiversity, recreation)
  - Rural; low but locally important benefits from reducing flood damage and significant ancillary benefits



Cost benefit ratios

- Most cost-efficient: measures that have high benefits and low costs
  - urban-rural
- May be cost-efficient: measures that have low costs and low benefits:
  - rural-rural
- May be cost-efficient: measures that have high costs and high benefits
  - urban-urban

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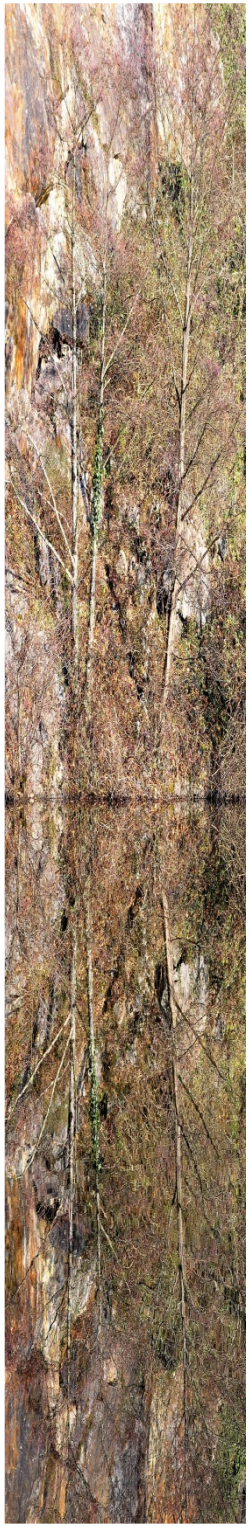

Key issues and questions

- What are the key issues and challenges faced when implementing flood risk management NWRM?
- Which additional measures could be included as NWRM measures? From a flood risk management point of view, which main features do all these measures share?
- What type of knowledge should be produced by the NWRM project for supporting the design and implementation of flood risk related NWRM in different MS?
- Which issues should receive specific attention in the practical guide that will be developed under the project?
- What is the best way to mobilise stakeholders in the networks and workshops organised in different regions?


Thank you for attention
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