Towards Better Environmental Options for Flood risk management
Why this initiative?

- Floods are the most common and most costly natural disasters in Europe. Severe floods with devastating effects happen every year in Europe, and such flood events are likely to become more frequent with climate change.
- Less severe but more frequent flood events may also cause damage and disruption to society and can also result in the loss of lives.
- Strategic long term and integrated flood risk management must place real effort on prevention as far as possible to increase resilience of society.
- Measures which work with nature are becoming more important, as they contribute to the strengthening of the resilience of nature and society to extreme weather events.
- Natural flood management measures may also have benefits for biodiversity and society, and for increasing resilience to other climate change related threats like water scarcity and drought.
- This initiative aims at highlighting some of those measures and their benefits!
Better environmental options in flood risk management - what is this note about?

- Flood risk management can go hand in hand with nature protection and restoration, and deliver benefits for both people and nature.
- This is an initiative of the European Commission, which aims at bringing win-win solutions into the focus of flood risk management.

- Key documents explaining legal and policy framework, the benefits of natural flood risk management, and the way to implement it on the ground are provided.
- Examples of the role of natural flood management via green infrastructure and their multiple benefits – both in rural and urban areas are explained.
- An annex with further background information with key documents, tool-kits and best practice examples completes the information material.
Why do better environmental options need to be explored?

- Some traditional flood risk management measures have a negative impact on the quality and quantity of waters, or on biodiversity-rich areas.
  - Examples can be the building or new dams or dikes which change the river flow, by reducing water for related ecosystems in the area or which accentuate problems in dry seasons by altering the natural flow of the river. Structures containing flood water may even increase flooding downstream.
- In all these cases, environmental legislation asks for the evaluation of better, feasible environmental options to such infrastructure.
- The Habitats Directive, the Water Framework Directive, the Environmental Impact Assessment and Strategic Environmental Assessment Directives set out such requirements, and the procedures to follow to find the right set-up when maintaining human safety whilst protecting the environment.
  - The EU Floods Directive requires that flood related measures in those Directives are part of the Flood Risk Management plans to be prepared by 2015.
Who should be concerned by this issue?

- **Authorities at national, regional, local and at catchment level** who are responsible for the implementation of the Floods Directive, who are all involved in designing the optimal measures needed to reduce flood risk in their area!

- **Authorities responsible for implementation of nature and water legislation** are also concerned!

- **National, regional and local authorities dealing with preparedness for and response to floods**, with a key interest in trying to prevent such events as far as possible!

- **Other private or public parties** interested in effective measures for flood risk minimization and the improvement of natural capital.

- **Decision makers responsible for deciding which measures shall be implemented and when** – aiming at reducing the damages caused by flood events.
Significant cost of measures – but also significant costs to society of damage from floods

- Costs of prevention, protection and preparedness can be substantial …

- … but so are the costs to society of the damage caused by floods!

- It make economic sense to select measures which have multiple benefits for society – for the environment as well as for flood protection!

- Measures that are robust and flexible in view of the uncertainties surrounding the effects of climate change should also be favoured ("no-regret").
Why do we need natural flood management?

- As our understanding of the interplay between rivers and the landscape has grown, effective solutions which work with nature, rather than against it, are becoming more important than ever.

- Physical measures which seal the soil, or are designed to contain the water in the riverbed, may even increase the flood risk downstream, rather than reducing it!

- Measures which improve the storage capacities of flood water temporarily during flood events, can be effective in protecting against flooding, as well as also provide other benefits deriving from ecosystem services, such as for leisure activities and nature protection.
What is natural flood management?

Natural flood management starts with an assessment of the hydrological processes across the whole catchment of a river or along a stretch of coast to identify where measures can best be taken – with focus on increasing water retention capacities. Often, the same piece of land delivers multiple benefits.

Examples of such measures:
- restoring natural flows by realignment of coastal areas, or re-connection of rivers with their floodplain
- restoration of wetlands which can store flood water and help “slow the flow” of flood waters
- reservoirs in agricultural areas which can store flood water during flood events, and otherwise be high nature value areas
- urban Green Infrastructure such as green spaces, sustainable urban drainage and green roofs, can also play important roles in densely populated areas.
What is Green Infrastructure?

- Green Infrastructure improves the resilience of ecosystems. This can help mankind and society to become less vulnerable to natural disasters. It additionally delivers benefits to biodiversity (by increasing the connectivity of ecosystems). Green Infrastructure also contributes to mitigation and adaptation to climate change.

- Green infrastructure contributes to minimising natural disaster risks, by using ecosystem-based approaches for coastal protection through marshes/flood plain restoration rather than constructing dikes only.

- Green Infrastructure helps ensuring the sustainable, continued provision of ecosystem goods and services (such as water retention and flood risk prevention, CO2 in-take) while increasing the resilience of ecosystems (which enables to react to climate change).

- It also promotes integrated land management and planning approaches, as well as the involvement of stakeholders in the process.

- Examples are: priority restoration and enhancement of inland and coastal marshes, floodplain forests and bogs in rural areas, as well as green roofs and walls and permeable soil covers in urban areas.
Example of Green Infrastructure
Ecological restoration of a floodplain forest

- In feasible areas, restored floodplain forests, re-connecting the river with the adjoining floodplain, can better store water than artificial constructions.

- The forest mitigates climate change effects by effectively storing CO2, and helps to adapt to often disastrous climate change impacts by storing flood water which is arriving in ever higher frequencies and quantities.

- At the same time, such a restored floodplain forest ecosystem will be able to deliver its services such as filtering the water, ensuring the drinking water table, and preventing erosion and offering recreation facilities.

- Floodplain forests are amongst the most biodiversity-rich habitats in Europe – they ensure the connectivity for species of European importance such as otter, rare fish and bird species breeding in the wet elder and ash woodland.
Which are the multiple benefits of such measures?

- The benefits of flood prevention measures are avoided costs of damage to society, human health, economic activities, infrastructure, cultural heritage and the environment.

- Natural flood management measures also have additional benefits, such as:
  - maintaining and restoring biodiversity, by strengthening the functionality of ecosystems.
  - provision of nature protection areas which can also be valuable for recreation and increasing life quality.
  - improving water quality and to restoring water resources.
  - contribute to the development of a green economy.
  - economic benefits, through provision of jobs and business opportunities in addition to environmental advantages.

- Although such benefits may not always be quantified or monetised, their advantages are important (and compare favourably against traditional measures).
EU funds can support these measures!

- Different EU funds can be used to finance a wealth of measures!
- Cohesion and Regional Development Funds, the Rural Development Funds, and LIFE+ are key examples.
- Whenever EU funds are used, EU legislation needs anyway to be complied with, including requirements of identifying the better environmental options for instance flood management …
INTRODUCTION AND PURPOSE OF THE NOTE

1. WHAT IS THE EU LEGAL FRAMEWORK FOR FLOOD RISK MANAGEMENT?

1.1 When and how shall flood risk management plans be prepared?
1.2 Why are better environmental options needed?
1.3 How is nature protection and biodiversity policy linked to flood risk management?
1.4 Which are the key nature legislation and policies to be considered?
1.5 Which are the synergies with other key EU policy areas? (soil, agriculture, forestry, impact assessments)
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Structure of Note II

2. WHY IS INTEGRATED FLOOD RISK MANAGEMENT OF FLOODS IMPORTANT?

3. WHAT IS GREEN INFRASTRUCTURE, AND WHY COULD IT BE USEFUL FOR FLOOD RISK MANAGEMENT?

4. WHY IS INTEGRATED SPATIAL MANAGEMENT AND STAKEHOLDER INVOLVEMENT IMPORTANT?

5. CLIMATE CHANGE ADAPTATION AND FLOOD RISK MANAGEMENT

2.1. Coordinating at the catchment level - a new approach

2.2. What is natural flood management?

3.1. What is “Green Infrastructure”?

3.2. Green Infrastructure - strengthening ecosystems and their services
Structure of Note III

6. COSTS - AND BENEFITS - OF GREEN INFRASTRUCTURE FOR FLOOD RISK MANAGEMENT

7. EU FUNDING FOR FLOOD RISK MANAGEMENT AND IMPROVEMENT OF FLOODPLAIN ECOSYSTEM SERVICES

7.1. Cohesion and solidarity (DG REGIO and DG EMPL)
7.2. Rural Development (DG AGRI)
7.3. LIFE

ANNEXES – more detailed examples of measures, projects, case studies and key reference literature
Content of Annexes

Part I on *Natural flood management methods* introduces a number of tested techniques for natural approaches, which might be concretely applied on local scale on the ground to reduce floods.

Part II gives an explanation on the ecological importance of rivers – focussing on the services river ecosystems deliver.

Part III lists good practice examples on the implementation of the WFD in relation to hydro-morphology, in particular on recommendations for measures to implement new approaches to flood risk management.

Part IV presents a number of *LIFE projects which have restored floodplain ecosystems*, and at the same time contributed to flood prevention, as examples for Green Infrastructure elements. Those projects have been co-financed by the EU LIFE funding instrument.

Part IV finally lists *key references and documents for further reading*.
More information on the European Commission’s DG Environment homepage:

Water and Floods policy:  
http://water.europa.eu/policy

Green Infrastructure:  
http://ec.europa.eu/environment/nature/ecosystems/green_infrastructure.htm

Biodiversity information:  
http://biodiversity.europa.eu/

or write directly to:  
maria.braettemark@ec.europa.eu  
(Flood risk management)  
marco.fritz@ec.europa.eu  
(Green Infrastructure)