



Expert workshop: Environmental effect of floods and flood protection measures

– Background document for the preparation of participants –

EEA, Kongens Nytorv 6, Copenhagen

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Introduction

Flooding is a natural phenomenon in the water cycle and is part of the discharge dynamics of streams and rivers. Flood events influence the biodiversity in the natural floodplains and historically define the land use of these areas. Land use changes, in combination with a loss of floodplain areas, change the impacts of an extreme event on human health, economic activity, cultural heritage and the environment. Flood defenses change (read: lower) the likelihood of unexpected inundations but they still can occur. Intense developments behind defenses and the absence of small events raising awareness make that the impacts of extreme events beyond the protection level of the defenses still have significant impacts and risks. Over the last decades the awareness of natural water retention measures and nature based flood measures have increased. Natural floodplain ecosystems can cope with flooding. Changing (ground)water levels and temporary flooding are even a prerequisite for sustaining the floodplain's typical flora and fauna and related ecosystem services.

It is clear that not only the European Floods Directive is influencing the environmental impacts of flooding and the management of floodplains. Key environmental policies are the Water Framework Directive and the Birds and Habitat Directives. Also wider policy instruments, like the Common Agricultural Policy or Green Infrastructure Communication have an impact on floods and floodplains. Besides the environmental policies themselves, it is also worthwhile to look at their implementation. As expressed in the Water Blueprint there is a need for better implementation and better coordination (and in some areas integration) of the different policies to achieve the individual goals expressed in all of them.

Aim and structure of the workshop

The aim of this workshop is to create a better and more structured insight in the environmental effects of flooding (both negative and positive impacts) and the environmental impacts of flood protection measures.

The outcome of the workshop will be workshop minutes and conclusions that will be used in the drafting of an EEA Report on "Floods and Vulnerability" to be published by the end of 2015 and with a focus on the environmental effects of flooding and influencing policies.

(Shorter to the date of the workshop we will also share with you a first draft of this report as additional background information.)

For the details about the structure of the workshop, a draft agenda is attached to the invitation. It is intended to be an exchange platform with limited presentations to maximize the time for discussions. We expect an active involvement of those accepting the invitation and we will ask many of you to prepare statements to guide the discussion once we know the list of participants.

In case of content related questions, please contact both:

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(for organisational and practical questions: please see invitation)

Sessions

A lot of information on floods is available from past evidence, modelling and scenarios. Where the Floods Directive equally talks about impacts on human health, environment, cultural heritage and economic activities, it is clear that more information (or at least more structured information) is available on economic impacts and fatalities and affected people. During this workshop's first session, we will focus on environmental impacts of flooding and of flood protection measures from the evidence of past events, and how information is monitored and structured.

In a second session, we will focus on the environmental aspects of floodplain status and trends. This is closely related to how (if so) and when environmental aspects are taken on board in the planning process at a strategic level; i.e. when overlooking the whole River Basin District.

In the last session, we go deeper into the planning process practice from restoration schemes to individual measures and restoration projects that are taking into account the multi-functionality of floodplains.

Below we introduce the different topics in more detail. The questions at the end are to be seen as a starting point only and during the workshop the broader issue can be (and will be) discussed beyond these questions.

Environmental impacts of floods: past evidence monitoring and structuring the information

In addition to economic and social damage, floods can have severe environmental consequences, for example, when installations holding large quantities of toxic chemicals are inundated or disconnected artificial wetland areas destroyed. This is recognized in the EU Floods Directive where Member States have to carry out a Preliminary Flood Risk Assessment (PFRA), where environmental consequences of past or potential future (read: modeled) floods can be categorized as:

- Waterbody Status: Adverse permanent or long-term consequences ecological or chemical status of surface waterbodies or chemical status of ground water bodies affected, as of concern under the WFD. Such consequences may arise from pollution from various sources (point and diffuse) or due to hydromorphological impacts of flooding.
- Protected Areas: Adverse permanent or long-term consequences to protected areas or water bodies such as those designated under the Birds and Habitats Directives, bathing waters or drinking water abstraction points.
- Pollution Sources: Sources of potential pollution in the event of a flood, such as IPPC and Seveso installations, or point or diffuse sources.
- Other: Other potential permanent or long-term adverse environmental impacts, such as those on soil, biodiversity, flora and fauna, etc.

The reporting to the European Commission about the PFRA shows differences in between Member States, but in general less information on environmental impacts is available compared to the economic impacts. When EEA questioned the member countries beginning of 2015 to add information

on a voluntary base, it became clear that information about the environmental impact is often not available (in a structured way).

By end of 2018, the Member States shall make a revised PFRA available. While difficult for historic events, it is expected that for the recent events (or 'the future past floods') more information about environmental impacts can be reported based on readily available and easily derivable information.

Given the reporting for the (PFRA) and the Flood Risk Management Plans (FRMP) some information on environmental effects of flooding is available at least in some countries but not systematically recorded in others. Although not excluded by the floods directive, positive environmental effects of flooding are not reported in the PFRA so far. While not explained, this can be because of the lack of longtime monitoring and scientific work beyond case studies. However, floods serve an important role in balance of wetland ecosystems are the key driver in natural rivers and floodplains. Regular flooding in wetlands/floodplains allows retaining nutrients that can promote biodiversity. Floods can also potentially help to control invasive weeds. Flooding also provides spawning area for fish and a way for species to move to different areas. Even extreme flooding is important for biodiversity: floods can play the role of a "reset" button for nature.

Questions:

Are the categories for environmental impacts as foreseen for the floods directive reporting covering the whole issue?

How can this be improved (adding categories, better structuring, more clear definitions ...)?

What kind of data and information is needed to have a more complete reporting on environmental impacts of flooding in the next PFRA?

What kind of monitoring and structuring of information is needed during and (immediately) after flooding? Are these data currently monitored? And shared? Cross-boundary?

What kind of information can "science" provide? And how to bring this information together with the policy questions?

Are the most important flood-related environmental impacts caused by flooding or by flood protection measures? Even when considering pollution?

Trends on floodplain status

In Europe already up to 90 % of former riparian floodplains are lost or functionally extinct during the last centuries. In particular, the main reason for the loss of biodiversity in floodplains and related ecosystem services is the continued decline in floodplain area due to:

- competing land uses, like agriculture or urbanization,
- less variability in discharge and constant water levels, like for hydropower and navigation, and
- "barriers" in between river and floodplain, like for flood defenses and river training.

Floodplains are not only water retention areas; they are also known as biodiversity hotspots and offer a remarkably diverse array of natural functions and services for humans. When remaining (active) floodplains are compared with those that have been cut off from the inundation regime, active flood-

plains that are influenced by floods and droughts have a much greater ability to act as flood retention and protection areas, as reservoirs for groundwater, as filters (or sinks) for sediments and dissolved pollutants, as carbon sinks, as natural habitats for highly specialised flora and fauna as well as for recreational purposes. Active floodplains delay the discharge of flood waves and, thus, contribute to mitigate flood peaks, especially when the floodplains are covered with near-natural forests. Today trade-offs exist between the conservation of biodiversity in floodplain ecosystems and the human use of goods and services from floodplains. Floodplain ecosystems can only offer this multitude of services if their ecological integrity is sustained.

Despite the fact that much information on floodplain status and vulnerability monitored and reported as part of the obligations for directives as the water framework directive or the birds and habitats directives, summarizing status assessments at international river basin district and/or at European scale are still scarce. Nevertheless, where they exist, these assessments are important information pieces to defend the cases for floodplain conservation and restoration.

Questions:

Does coordinated monitoring and reporting for different EU obligations (like floods directive, water framework directive or birds and habitats directives) - all having an interest in mapping and planning for the same geographical area: the floodplain - achieve requirements for assessing floodplain status? And for coordinating the conservation (or even restoration) efforts?

How much of the existing floodplains are under threat, i.e. have the chance of being cut off from the river by planned or future flood defense works?

How are the environmental impacts of flooding and of the proposed measures taken into account in the strategic vision and planning at the level of the (international) river basin district?

What are the trends and impacts of Floodplain vulnerability, multi-functionality and related ecosystem services for management and policy?

Management of floodplains and implementation of flood, water and nature protection legislation: practical realities in Europe– green versus grey infrastructure and “greening the grey”

Reconfiguring a river and its adjacent floodplain can generate numerous benefits for both nature and society, ranging from richer biodiversity, more appealing landscapes and additional recreational opportunities to improved flood prevention and protection. Equally, however, floodplain management deals with a wide variety of institutional, economic and social aspects related to industrial and agricultural production, water protection, nature conservation, flood defense, navigation, recreation, urban and rural development and the protection of historical landscapes. A successful floodplain management plan or restoration scheme needs to involve not only stakeholders and institutions from the most diverse sectors, but also at different scales of action and jurisdiction.

After an (extreme) flood, there's often found political backing for the promotion of nature based solutions like room for rivers. Afterwards, only few projects find their way in realization. Natural Water Retention Measures, measures called non-structural or green measures, are promoted and integrated in Flood Risk Management Plans for river basin districts or catchments. Too often flood risk managers at local scale are favouring more technical options to prevent flood risk and the potential

synergies with other fields are not fully taking into account. Technical solution like restoring the former dike line, raising the dike height or building technical polders (all examples of grey measures) are happening instead of focusing on nature based solutions.

Questions:

How can the different managers acting in or at the border of the floodplain (floodplain management, flood defence ...) better integrate their efforts and come up with holistic approaches for floodplains? How to ensure that synergistic effects like nature conservation, climate change (mitigation) or nutrient retention are minimized? Even when it's hard to quantify them?

Directives from the EU environmental acquis, like the water framework directive, birds and habitats directives but also the floods directive are seen to be better implemented when this is done coordinated?

What would integration of the different management plans of these directives bring as additional benefit?

And what level of coordination is needed beyond the environmental acquis? How to include spatial planning, Common Agricultural Policy or Regional Development Policies?

What more is needed to realise green infrastructure?

Is "greening the grey" the future to balance the different interests or rather a lack of ambition opt for green measures?