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International Cooperation under the Floods Directive (2007/60/EC) - Factsheets for International River Basins

Accompanying the document

REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL

on the implementation of the Water Framework Directive (2000/60/EC) and the Floods Directive (2007/60/EC)
Second River Basin Management Plans
First Flood Risk Management Plans

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Acronyms

APSFR	Area of Potential Significant Flood Risk
CBA	Cost-benefit analysis
EU	European Union
FD	Floods Directive (Directive 2007/60/EC)
FHRM	Flood Hazard and Risk Map
FRMP	Flood Risk Management Plan
iFRMP	international Flood Risk Management Plan
iRBD	international River Basin District
iRBMP	international River Basin Management Plan
iUoM	international Unit of Management
PFRA	Preliminary Flood Risk Assessment
RB	River Basin
RBD	River Basin District
RBMP	River Basin Management Plan
WFD	Water Framework Directive
WISE	Water Information System for Europe

Introduction

There is long standing bilateral or multilateral cooperation established between the Member States in the area of water management that predates the introduction of the Water Framework Directive (WFD) and the Floods Directive (FD). Next to the assessment of the first Flood Risk Management Plans (FRMPs) under the FD, a desk-based review of this cross-border cooperation was carried out on the basis of (1) the transboundary river basins (RBs) level international FRMPs (iFRMP) and (2) the national FRMPs, to ascertain how the FD has influenced this cooperation, and with a view to making recommendations towards further reinforcing it. The findings of this review are therefore constrained by the choice of the aspects reviewed and by the amount of information contained in the reviewed documents.

The aim of the European Union (EU) Directive on the assessment and management of flood risks (Directive 2007/60/EC; the FD[1]), which entered into force on 26 November 2007 is, to reduce the adverse consequences of floods on human health, the environment, cultural heritage and economic activities (Art. 1). In terms of cross-border co-operation, Member States shall coordinate their flood risk management practices[2] in shared RBs, including with third counties, and shall in solidarity not undertake measures that would increase the flood risk in neighbouring countries. Member States should take into consideration long term developments, including climate change, as well as sustainable land use practices in the flood risk management cycle. Article 8 of the FD requires that Member States shall ensure coordination with the aim of producing one single iFRMP, or a set of FRMPs coordinated at the level of the international River Basin District (iRBD)/international Unit of Management (iUoM) level.

The European Commission is required to report to the European Parliament and Council in 2018 on progress made by Member States with implementing the Directive. The present document is part of this reporting and comprises a series of fact sheets for the international RB which are describing the application of the Directive at iRBD or iUoM level.

It is based on the information reported by Member States to the Water Information System for Europe (WISE), previous national and EU overview reports on Preliminary Flood Risk Assessments (PFRA) and Flood Hazard & Risk Maps (FHRM) published by the European Commission[3] and the national and international Flood Risk management Plans (FRMP and iFRMPs).

27 RBs were chosen for the assessment (see Table 2 for an overview). RBs shared with Greece (five iRBDs) and Ireland (three iRBDs) could not be assessed due to the delayed

[1] See http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007L0060
[2] See Article 5(2), Article 7(1), Article 7(4), Article 8 and Annex A.II(3) of the Directive.
[3] Available under http://ec.europa.eu/environment/water/flood_risk/overview.htm)

reporting. In addition, RBs shared between Lithuania-Latvia-(Russia)-(Belarus) (three iRBDs), one basin shared between Italy and France[4] and four iRBDs shared between Sweden-Norway were not reviewed.

Types of international coordination

According to the type of coordination mechanism that has been established by the Member States in the different iRBDS/iUOM, four main categories have been identified in the context of this assessment[5]:

a) **Category 1 RBs** which are iRBDS/iUOMs with (a) formal international agreement(s), an international coordinating body and an iFRMP produced by this international body;

b) **Category 2 RBs** which are iRBDS/iUOMs with (a) formal international agreement(s), an international coordinating body, but no iFRMP;

(c) **Category 3 RBs** which are iRBDS/iUOMs with (a) formal international agreement(s), but no international coordinating body and no iFRMP;

d) **Category 4 RBs** which are iRBDS/iUOMs with no formal international agreement, no international coordinating body and no iFRMP.

An overview of the identified categories is given in Table 1.

Table 1: Different types of international co-ordination in relation to the FD

Category	Formal international agreement	International coordinating body	IFRMP produced
1	Yes	Yes	Yes
2	Yes	Yes	No
3	Yes	No	No
4	No	No	No

The assessment suggests that despite the absence of river basin commissions, there is notable cooperation between Germany and Denmark, Sweden and Finland, Latvia and Estonia and Spain and Portugal. In the map below the basins assessed are shown.

[4] Italy has applied Art 13(1)(b) for all UOMs and no PFRA reporting was carried out. Italy subsequently clarified that a Memorandum of Understanding was signed in 2013 ("Protocollo d'intesa transfrontaliera per il bacino idrografico del fiume Roja e dei suoi affluenti") with the aim of carrying out international coordination activities under Directives 2000/60/EC (the WFD) and 2007/60/EC (the FD). In addition, several Interreg projects were launched in the last years one of which "Concert-Eaux" is still ongoing. In addition, the FRMP LIGURIA UOM, which is included in the Northern Apennines RBMP approved by Decree of the President of the Council of Ministers on 27th of October 2016, contains information on the above described activities.

[5] Other categories might exist, but have not been identified in the context of this review.

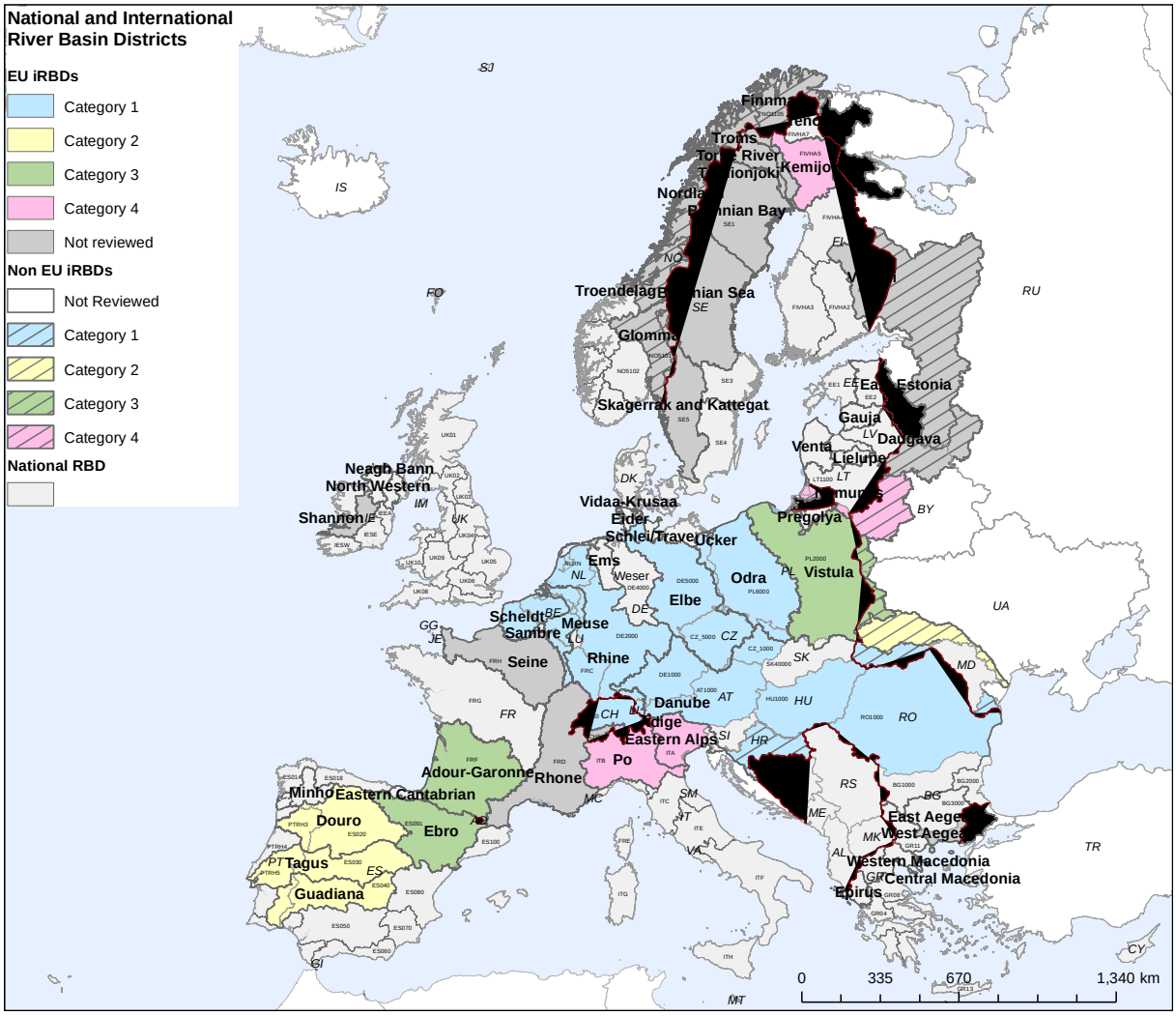

Figure 1: ***Map of iRBD for which a review was done***

Table 2: ***List of selected iRBDs/iUoM for which an assessment was done***

Category	International RBs	Riparian EU Member States/*Non-EU countries*
Category 1	Danube[6]	Austria, Bulgaria, the Czech Republic, Germany, Croatia, Hungary, Italy, Poland, Romania, Slovenia, Slovakia *Non-EU countries: Switzerland, Albania, Bosnia and Herzegovina, Serbia, Ukraine, Moldova, Montenegro, FYROM*[7]
	Elbe	Austria, the Czech Republic, Germany, Poland
	Rhine	Austria, Belgium, Germany, France, Italy, Luxembourg, The Netherlands *Non-EU countries: Switzerland, Liechtenstein*
	Meuse	Belgium, Germany, France, Luxembourg, The Netherlands
	Odra	the Czech Republic, Germany, Poland
	Scheldt	Belgium, France, The Netherlands
	Duero/Douro	Spain, Portugal
	Guadiana	Spain, Portugal

[6] Please note that within the Danube an additional sub-catchment FRMP for the Sava is under development.
[7] Former Yugoslav Republic of Macedonia.

Category	International RBs	Riparian EU Member States/*Non-EU countries*
	Miño/Minho	Spain, Portugal
	Tagus (Tajo/Tejo)	Spain, Portugal
	Isonzo/Soca	Italy, Slovenia
	Dniester/Dnistr/Nistru	Poland *Non-EU countries: Moldova, Ukraine*
	Ems	Germany, The Netherlands
	Tornio/Torne	Finland, Sweden
	Teno/Tana	Finland *Non-EU* countries: *Norway*[8]*, Russia*
Category 3	Garonne/ (Cantabrico Oriental)	France, Spain
	Garonne/ (Ebro)	France, Spain
	Vistula	Poland, Slovakia, Lithuania *Non-EU countries: Ukraine, Belarus*
	Pregolya	Poland, Lithuania *Non-EU countries: Russia*
	Torne Bothanian Bay	Finland, Sweden *Non-EU countries: Norway*
	Vidaa/Wiedau[9]	Denmark, Germany
	Krusaa/Krusau[10]	Denmark, Germany
Category 4	Po	Italy, France *Non-EU countries:* Switzerland
	Gauja/Koiva	Estonia, Latvia
	East Estonia	Estonia *Non-EU countries: Russia*
	Kemijoki\[11]	Finland *Non-EU countries: Norway, Russia*
	Teno/Tana	Finland *Non-EU countries:* Norway, Russia
	Nemunas/Nieman/Neman/Nyoman	Lithuania, Poland *Non-EU countries: Russia, Belarus*
	Schlei Trave	Germany, Denmark
	Eider	Germany, Denmark
	Eastern Alps (Adige)	Italy *Non-EU countries:* Switzerland

The categories might differ from the categories applied under the WFD's equivalent assessment because of different agreements made for the management of flood risk.

The table below lists those RBs where no assessment was carried out due to absence of information through FD implementation channels for the national parts of the RBs.

[8] Norway is not implementing the FD.

[9] The transboundary rivers shared by Denmark and Germany are the Vidaa/Wiedau and the Krusaa/Krusau rivers. Vidaa-Krusaa is part of the Eider and Schlei/Trave RBD in Germany, and make up the whole of the iRBD in Denmark (Internationalt Vanddistrikt DK4).

[10] See footnote above.

[11] Finland subsequently clarified that only a very small part of the RB is in Russia (2,9 %) and an even smaller part in Norway. These parts are very sparsely populated small upstream catchments with only a very little human or hydrological impact on the Kemijoki RB. In addition, no flood risk issues have been identified in these parts from the work of the Finnish-Russian transboundary commission.

Table 3: List of iRBDs/iUoM for which an assessment was not carried out

International RB	Riparian EU Member States/Non-EU countries
Shannon/North Eastern	The United Kingdom, Ireland
Neagh Bann	The United Kingdom, Ireland
North Western	The United Kingdom, Ireland
Drin	Greece *Non-EU countries: Albania, FYROM*
Aoos/Vjosa	Greece *Non-EU countries: Albania*
Nordland	Sweden *Non-EU countries: Norway*
Troendelag	Sweden *Non-EU countries: Norway*
Bothanin Bay	Sweden *Non-EU countries: Norway*
Skagerrak and Kattegat	Sweden *Non-EU countries: Norway*
Lielupe	Lithuania, Latvia
Venta	Lithuania, Latvia
Daugava	Lithuania, Latvia *Non-EU countries: Russia, Belarus*
Mesta-Nestos	Bulgaria, Greece
Struma-Strymonas	Bulgaria, Greece
Central Macedonia	Greece *Non-EU countries: FYROM, Serbia*

1 International units of management – Category 1 Basins

1.1 Danube River Basin

1.1.1 Contextual information

The Danube RB is shared by the riparian countries of Germany, Austria, the Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Bulgaria and Romania, with shares in non-EU countries principally in Serbia, Bosnia and Herzegovina, Montenegro, Moldova and the Ukraine. The Danube is considered a Category 1 RB, as an international commission has been set up – The International Commission for the Protection of the Danube River (ICPDR)[12] – to enable cooperation between the riparian countries – and an iFRMP exists.

Within the Danube catchment an international commission at the sub- catchment level exists: The International Sava River Basin Commission (ISRBC) has been established for purpose of the implementation of the Framework Agreement on the Sava River Basin. One of the goals of the Framework Agreement is to undertake measures to prevent or limit hazards, such as floods. The Sava Commission is currently in the process of drafting an iFRMP.

1.1.2 Institutional setup and governance of the transboundary RB

The ICPDR has produced an iFRMP[13] together with Germany, Austria, the Czech Republic, Slovakia, Hungary, Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, Bulgaria, Romania, Moldova and Ukraine. Within the Commission, the Expert Group 'Flood Protection' (FP EG) is tasked with supporting the implementation of the FD.

Although there is no requirement in the FD for riparian Member States to co-fund projects, considering the transboundary context, it is not clear if financial resources for joint cooperation (other than the functioning of the ICPDR) have been made available by the participating states. However, the iFRMP indicates which financial instruments are planned to be used (or already being used) for joint cooperation. For example, the EUSDR[14] supports the measures foreseen in the iFRMP and provides a platform for developing projects on flood risk management, especially flood mitigation. The iFRMP states that Article 7(4), the solidarity principle, has been applied in the basin: The ICPDR agreed that the measures with positive downstream effects shall have the key priority at the basin-wide level (i.e., measures like natural water retention, warning systems, reduction of risk from contaminated sites in floodplain areas, exchange of information). The plan states that to avoid the negative downstream effects, the national legislation shall contain provisions stipulating that FRMPs

[12] https://www.icpdr.org/

[13] More information regarding the iFRMP and the maps produced under the FD can be found here: https://www.icpdr.org/main/activities-projects/flood-risk-management

[14] http://www.danube-region.eu/

shall not include measures which, by their extent and impact, significantly increase flood risks in other countries.

The iFRMP was developed in consultation with the WFD and since the ICPDR is responsible for both, the overall coordination of the implementation of the FD and the WFD in the Danube RB a good prerequisite for synergies exists. Some examples of win-win measures are stated in the iFRMP.

1.1.3 Consultation and publication of the iFRMP

Under public participation, the ICPDR pursues a range of activities. These include 1) public information such as the development of technical public documents and general publications (e.g. the quarterly magazine 'Danube Watch'); 2) environmental education, awareness raising and outreach (e.g. the annual river festival 'Danube Day' or the teacher's kit 'Danube Box') and 3) public consultation activities directly linked to the development of the River Basin Management Plan (RBMP) and FRMP.

To accompany the development of the iFRMP, public consultation was done in two main stages, in which comments from the public were collected: 1) on a timetable and work programme including public consultation measures and 2) on the draft FRMP.

Public consultation for both of these steps spun a period of at least six months, in which the opportunity to provide comments was actively promoted. The timetable and work programme were published for comments from 22 December 2012 to 22 June 2013; the draft iFRMP entered the public consultation phase on 22 December 2014 and concluded 22 July 2015.

The opportunity to participate in each of these steps was promoted through the ICPDR network of contracting parties and observers, through news items on the ICPDR website icpdr.org, the magazine Danube Watch, targeted advertisements in specialist media such as Aquapress and through a video clip that called stakeholders to get active in the consultation process. The video was used in national channels via the ICPDR network and can be found at icpdr.org/main/get-active.

For the consultation on the draft iFRMP, a comprehensive approach was chosen that aimed at stakeholder groups with differing degrees of involvement in water management issues. These can be divided into four groups and corresponding activities, which are described in more detail below. Raw data and reports on each of these activities was published online at http://icpdr.org/main/activities-projects/consultation-2015.

The opportunity to comment on the draft plan in writing was primarily advertised to organised stakeholders with the technical capacity and expertise, such as ICPDR observers. Until 22 July 2015, fourteen written comments by a range of organisations or individuals representing

an organisation were provided jointly for the iFRMP and the international RBMP's (iRBMP) update for 2015. Each of these comments, some of which are extensive documents relating to several different elements in the draft Plans, were published online and processed for the final report.

In addition, a stakeholder consultation workshop 'Voice of the Danube' was held in Zagreb on 2 and 3 July 2015.

In order to expand the target groups of public consultation beyond expert stakeholders, a simple and easily accessible online questionnaire was developed and published via ICPDR.org to target the interested, but not informed public. In parallel, a questionnaire related to the iRBMP's update for 2015 was also published. In total, 95 people filled in the questionnaire for the iFRMP, and a further 90 people filled in the one for the iRBMP.

To include the general public that would not be targeted by the other consultation measures, a social media campaign was implemented in parallel to the preparation for the stakeholder consultation workshop.

To ensure the highest possible transparency, all comments requesting changes or additions in the draft iFRMP were collected and processed by the relevant ICPDR expert or task group. A final report was published alongside with the final iFRMP in December 2015. This final public consultation report gives an overview on the measures pursued and the original sources for the comments received. Furthermore, a table breaks down the individual requests for changes to the draft management plan together with information on the chapter it relates to, which organisation or individual raised it and how it was dealt with – if it resulted in changes, information is given on which; if it was rejected, a reason is given why. The report was sent to all organisations and individuals that participated in the public consultation activities and can be found on icpdr.org.

1.1.4 Preliminary Flood Risk Assessment in the iFRMP

In the iFRMP it is stated that the risk assessment has been coordinated at the international level. An updated version of the Area of Potential Significant Flood Risk (APSFR) map published in the PFRA report in 2011 was developed. The design and background data of the map follows the approach of the ICPDR for WFD reporting on level "A", which is the highest (least detailed) level, that of the overall international RB district.

Transboundary APSFRs were defined by the FP EG as any area (in the transboundary reach of the Danube river or one of its tributaries) that has been assigned as a transboundary APSFR by at least one country. The assignment was discussed then further at the bilateral level. If the transboundary character of an APSFR is regarded as not yet agreed by one country, this is shown on the map. For a river crossing a border, the area of common interest is assigned as

transboundary APSFR. The extent of this area of common interest has to be agreed by the neighbouring countries. The ICPDR agreed that two scenarios (medium and low probability) are relevant for the level of the international RB district. In the iFRMP, there is no information on which sources of flooding have been considered[15].

On the basis of the APSFRs, different risk maps for the entire Danube RB have been developed by the ICPDR and are explained in detail in the following section.

1.1.5 Flood Hazard and Flood Risk Maps in the iFRMP

The Danube riparian countries did not use the same probabilities of flooding for developing their national FHRMs. For low probability flooding, return periods between 100 and 1 000 years were used. For medium probability flooding all countries with the exception of Ukraine and Moldova, used a return period of 100 years. For high probabilities, no scenario was agreed at ICPDR level, but risk maps are given. The probabilities used for low and medium probability by each country are listed in the following table:

Table 10: Return periods used for FHRMs in the Danube

Country Code	Medium probability	Low probability
Germany	HQ100	HQ1 000/1,5xHQ100
Austria	HQ100	HQ300
the Czech Republic	HQ100	HQ500
Slovakia	HQ100	HQ1 000/extremely dangerous flood
Hungary	HQ100	HQ1 000
Croatia	HQ100	HQ1 000 with no flood protection facility, protected systems considering dike failure
Slovenia	HQ100	HQ500
Serbia	HQ100	HQ1 000
Bosnia and Herzegovina	HQ100	HQ500
Bulgaria	HQ100	HQ1 000
Romania	HQ100	HQ1 000
Ukraine	HQ10-20	HQ100-200
Moldova	HQ10-20	HQ100

The following risk maps for the entire Danube RB are available:

a) The map on "risk and population" shows the population potentially affected by floods with low, medium and high probability in the parts of the countries belonging to the Danube RB. In the inundation areas addressed, there are at least 936 000 people affected by floods with high probability, at least 3 721 000 people

[15] The ICPDR subsequently clarified that all sources of floods have been considered - depending on national approaches - and are visualized in the same map.

affected by floods with medium probability and at least 6 734 000 people affected by floods with low probability.

b) The maps on "risk and economic activity" display the share of inundated area by class of economic activity (according to Corine Land Cover) for low, medium and high probability floods. The agricultural areas have the major share among the different types of economic activities followed by the category 'others', which combines a number of various activities. Approximately 29 000 km^2 of agricultural areas are potentially affected by low probability floods in the Danube RB. A significant share of the urban areas is potentially affected by low probability floods in Austria, Bosnia and Herzegovina, Slovakia and the Czech Republic, while the largest urban area potentially affected by low probability floods is in Hungary (783 km^2).

c) The map on "risk and installations with the potential to cause pollution" shows the number of IPPC and Seveso installations affected by floods with low, medium and high probability in the parts of the countries belonging to the Danube RB. Floods with high probability affect 146 installations, floods with medium probability affect 337 installations and floods with low probability affect 617 installations.

d) There are two maps on "risk and WFD protected areas". One map is showing Natura 2000 protected areas superimposed by the flood hazard areas (for the low probability floods scenario). Only the overlapping flood hazard areas are displayed. The second map displays the total number of affected areas designated for the abstraction of water intended for human consumption under WFD's Article 7, and of the affected bodies of water designated as recreational waters, including areas designated as bathing waters under Directive 2006/7/EC by floods with low, medium and high probability. Floods with high probability affect 241 drinking water and recreational water areas, floods with medium probability affect 413 drinking water and recreational water areas and floods with low probability affect 796 drinking water and recreational water areas in the Danube RB.

No map is provided for cultural heritage at risk of flooding.[16]

No data were provided by Ukraine, Moldova and Montenegro on FHRMs.

1.1.6 Setting of objectives for the management of transboundary flood risk

The ICPDR agreed upon the following objectives of the flood risk management for the Danube RB:

[16] Cultural heritage will be added in the second cycle.

- Avoidance of new risks
- Reduction of existing risks
- Strengthening resilience
- Raising awareness
- Solidarity principle

These objectives focus on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity and aim to address all aspects of flood risk management focusing on prevention, protection, preparedness, including flood forecasts and early warning systems. The objectives are not further quantified and they are in line with the ones established nationally by the Member States being members of the ICPDR. However, they are described on a very general level and therefore leave room for accommodating specificities on Member States level[17].

1.1.7 Planning and implementation of measures with transboundary effect

There are common principles for defining measures. Annex 2 of the iFRMP lists transboundary projects supporting the iFRMP. Joint measures/projects are:

- Danube Sediment Project: One of the main goals of the proposed project is to establish for the first time a Danube River Basin sediment budget, identify reaches with surplus and deficit, river bed aggradation and degradation, sediment-related problems in flood risk management, drinking water production, hydropower generation, navigation, water quality and ecology, as well as gain knowledge and better understanding of sediment transport and morpho-dynamic processes in the Danube River (M61).
- Danube Floodplain Project: The overall objective of the proposed project is to reduce the flood risk through floodplain restoration along the Danube and other DRB rivers (M31).
- DANICE project: The DANube River Basin ICE focusses on conveyance investigation and icy flood management (M61).

[17] The ICPDR subsequently clarified that this general approach was needed to reflect the heterogeneity in the basin (e.g., EU Member States and Non-EU countries, GDP per capita differences, etc.)

- The LAREDAR project focuses on hazard and risk mapping, risk management planning of the LAkes and REservoirs in the Danube (M41).

- The Coca-Cola Company and WWF are working in a seven-year partnership to restore vital wetlands and floodplains along the River Danube and its tributaries. The project aims to restore 53 km² of wetland habitat in the Danube region by 2020. The ICPDR is observer in the Steering Group of the partnership (M31).

- Improvement of flood forecasting (M41).

- Information exchange on the operation of hydraulic structures. Flood forecasting and flood management need real time information and data on the operation of flow control structures. Pre-emptying the reservoirs of holding back water to fill up the reservoirs influence the precision of the flood forecasting and can endanger the flood management of the downstream stretches (M43).

- Coordination in operative flood management is increasingly important with more floods affecting multiple countries and exceeding peak historical levels in the last years (M24).

- Development of elements of FRMP for trans-boundary sub-units of common interest (M24).

- Exchange of flood protection techniques, technologies and experiences (M24).

- Develop an education/training network (M43).

- Enhance coordination of operative flood protection methods and equipment (M24).

- Analysis of catchment reaction on different precipitation scenarios in the upper Danube including identification of retention sites (M61).

- ProDaM – Protect Danube and Morava: The project objective is to optimize the joint flood management in the border area of the Danube and Morava between Austria and the Slovak Republic (M24).

- DAMWARM project (Drava And Mura WAter and Risk Management) Project focuses on better and more efficient Drava and Mura River Basin and flood (and other) risk management (M24).

- FRISCO1: Common Slovenian and Croatian transboundary flood risk management project. The project addresses the flood risk at all of the Slovenian-Croatian borderline rivers (Kolpa/Kupa, Bregana, Sotla/Sutla, Drava, Mura and Dragonja rivers) (M24).

Several projects or project proposals/ideas presented as transboundary projects were developed by the ICPDR and/or EUSDR PA5 and they shall:

- reflect the objectives and priorities set in iFRMP,
- have a transboundary character,
- help to implement the measures listed in Annex 2 of the iFRMP.

There is no ranking or prioritization of these projects, as they are all considered as supportive to the implementation of the iFRMP.

The iFRMP presents only the strategic level measures for the RB. Selecting the measures for this plan, the priority was given to measures with downstream effect (according to Article 7(4)) of the FD) such as natural water retention, warning systems, reduction of risk from contaminated sites in floodplain areas or exchange of information. The top priority was given to nature based solutions (natural water retention and giving more space to rivers) but the importance of the structural measures was also recognized.

A river basin wide cost-benefit analysis was not used in the prioritisation and planning of measures with a transboundary effect. A summary of existing national approaches to the cost-benefit analysis (CBA) is provided. As a result, it is clear that some Danube countries are using some sort of CBA (Germany, Austria, Slovakia, Hungary, Slovenia, Bosnia and Herzegovina, Romania, Bulgaria), others not.

The measures listed above relate to the main common and coordinated measures[18]:

Table 11: Joint coordinated measures

M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...)
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M43	Preparedness, Public Awareness and Preparedness, Measure to establish or enhance the public awareness or preparedness for flood events
M61	Other

[18] Numbering according to 'A User Guide to the Floods Reporting Schemas' (Technical support in relation to the implementation of the FD), see: http://cdr.eionet.europa.eu/help/Floods/Floods_603_2016/resources/User%20Guide%20to%20the%20Floods%20schema%20v6.0.pdf

The measures under the FD were coordinated with those under the WFD by the ICPDR which is responsible for supporting the implementation of both Directives. To produce PFRAs, several ICPDR Contracting Parties used data that they had collated as part of the WFD process to assist with their contribution to the overall PFRA for the Danube.

There is no information regarding timing of the implementation of measures within the iFRMP. Reporting on the Danube FRMP implementation progress will be done via national representatives to the ICPDR FP EG during the second cycle.

1.1.8 Consideration of climate change in the iFRMP for the Danube

Taking climate change into account is, according to FD's Art 14(4), a requirement for the reviews of the second cycle of the FD. The iFRMP of the Danube contains a specific chapter on climate change. It focuses on what regional scenarios have been developed and the effects on measures. The iFRMP lists measures by several countries, where the effects of climate change were taken into account (e.g. for Romania: Adapting construction, infrastructure and existing defence structures in terms of climate change).

It is not clear whether the potential effects of climate change on the risk of flooding have been taken into account when setting objectives. It is stated that adapting flood risk management to climate change issues has to be included in the next cycle of FRMPs. Similarly, climate check of flood risk measures will be performed in the future reviews of the iFRMP. Whereas the chapter on establishing objectives does not mention climate change, the dedicated chapter on climate change focuses on what regional scenarios have been developed and the effects on measures. However, a link to the Danube Climate Adaptation Study developed in 2012 is established.

1.1.9 Good practice examples in the iFRMP of the Danube RB

The most outstanding good practice examples of the activities of the ICPDR regarding the coordination of the FD implementation at the international level is the ICPDR's large range of public participation activities discussed earlier. One exemplary feature is that the comments on the draft iFRMP were all published online.

Further, various risk maps for the entire Danube River Basin were developed for the iFMRP, i.e. maps on risk and population, economic activity, installations with the potential to cause pollution and WFD protected areas. This uniform representation of flood risk for the Danube

is an excellent instrument for raising public awareness, but also for focusing the attention of risk management planners in all riparian countries on their common goal.

1.1.10 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

- The return periods to assess low probability flood risk are not the same in the Danube Basin. Such a streamlining should be envisaged where possible as it could facilitate common risk assessments.
- Information on the coordination mechanism for the risk assessment should be provided as this might be an inspiring example for other basins.
- The sources for flooding that have been considered in the definition of the transboundary APSFR should be specified in the iFRMP.
- Information from Ukraine, Moldova and Montenegro should be included in the FHRM as soon as made available.
- Information on the underlying assumptions/factors for producing the FHRMs should be provided.
- Co-financing of measures should be considered to strengthen cross-border cooperation but also to ensure that the measures taken are following an overarching concept to reduce the risks.
- Any new information on CBA should be added if available to support the prioritisation and planning of measures with a transboundary effect.
- Climate change should be considered in the setting of objectives and in the prioritisation of measures.
- The iFRMP does not make fully clear whether joint implementation of measures will take place and how this is organised. It is recommended to make this clearer in the second Plan.

1.2 Rhine River Basin

1.2.1 Contextual information

The Rhine RB is shared primarily by Germany, France, the Netherlands and Switzerland, with smaller shares found in Austria, Italy, Luxembourg, Belgium and Liechtenstein. The Rhine is considered a Category 1 RB, as an international RB commission has been set up – The International Commission for the Protection of the Rhine (ICPR)[19] – to enable cooperation between the different EU Member States and non-EU countries and an iFRMP exists.

Article 13 of the FD was applied in parts of the basin for PFRA, namely in Germany (Rhineland-Palatinate (Article 13(1)(a) all parts of the Rhine), Saarland (Article 13(1)(a) all parts of the Rhine), Bavaria (Article 13(1)(a) for the part Alpine Rhine – Lake Constance and Article 13(1)(a) as well as Article 13(3) for the part Main) and Hessen (Article 13(1)(b) for A-level waters), in the Netherlands (13(1)(b)), in Belgium (Wallonia) (13(1)(a) and 13(2)), in Luxemburg (13(1)(a)) and in Liechtenstein (13(2)). In other Member States (France and Austria) and German states (Lower Saxony, North-Rhine-Westphalia, Baden-Württemberg and Thuringia) Article 4 was applied in the entire territory.

1.2.2 Institutional setup and governance of the transboundary RB

The International Commission for the Protection of the Rhine (ICPR) produced an iFRMP together with the EU Member States Italy, Austria, France, Germany, Luxemburg, Belgium, the Netherlands, and non-EU countries Liechtenstein and Switzerland. Within the ICPR, the common working group 'Floods' is tasked with supporting the implementation of the FD.

The iFRMP[20] for the Rhine RB consists of an international part and a national part (see the iFRMP, Annex 4 with links to the national parts).

Although not a requirement of the FD, it is not clear if financial resources for joint cooperation (other than the functioning of the ICPR) have been made available by the participating states. The iFRMP does not provide any information whether there is financing for joint activities and projects[21]. The iFRMP states that based on the principle of solidarity (Article 7(4)), the states should avoid taking measures which due to their extent and their impacts considerably increase the flood risk in other countries along the river upstream or downstream as long as these measures are not coordinated between the Member States

[19] http://www.iksr.org

[20] More information regarding the iFRMP and the maps produced can be found at the link below, as well as an "atlas", i.e. an FHRM, for the main stream of the Rhine from source to mouth (1.233 km):
http://www.iksr.org/en/floods-directive/

[21] The ICPR subsequently informed that two projects (calculations of the effects of water level reduction measures and the joint development of a GIS tool enabling the calculation of the effects of measures on risk reduction) were jointly financed (ca. 300.000 €).

concerned and a common solution has been found. Practical examples for this coordination are given in Chapter 4.4 of the iFRMP where Figure 7 shows the calculated transboundary impact on the reduction of flood peaks due to concrete measures lowering the water level.[22]

The development of the iFRMP was done in consultation with the iRBMP. The iFRMP states that as far as measures in the Rhine RB are concerned, possible synergies with the environmental targets of the WFD will be enhanced and the environmental effects of measures liable to cause a deterioration of the ecological state of water bodies will be reduced to a minimum. Chapters 4.1 and 4.4 as well as Annexes 8 and 9 of the iFRMP show possible synergies between measures of the FD and measures of the WFD.[23]

1.2.3 Consultation and publication of the iFRMP

The draft of the first iFRMP for the Rhine RB (part A[24]) was published on the ICPR website[25] on 22 December 2014 and was thus available for public participation and consultation. This online consultation was done in parallel to that of the draft of the second iRBMP according to the WFD. This was also the case in most Member States of the Rhine catchment.

Detailed information about the public consultation process is mentioned in Chapter 6 of the iFRMP. ICPR Observers such as NGOs were involved from the start through their participation in the working groups. Further, during the six months of the iFRMP online consultation period, the ICPR received statements and requests for adaptation of the draft from some NGOs (observers to the ICPR) and other stakeholders. These requests have been discussed in detail within the working group Floods, as the ICPR body in charge, and were largely integrated into the iFRMP.[26]

1.2.4 Preliminary Flood Risk Assessment in the iFRMP

The PFRA was coordinated on the international level.[27] The iFRMP provides a map of APSFRs for the whole Rhine RB but does not draw overall conclusions. In the iFRMP reference is made to a special report on the identification of APSFRs within the whole basin[28] which includes more details and conclusions. There is no information on which sources of flooding were considered[29].

[22] Situation in 2010 and in 2020; see list of measures in Annexes 11-1 and 11-2 of the iFRMP.
[23] Situation in 2010 and in 2020; see list of measures in annexes 11-1 and 11-2 of the iFRMP.
[24] Part A = catchment areas > 2,500 km²
[25] www.iksr.org
[26] Information about this specific process and the report summarizing the discussions and agreements in the ICPR can be found in German, French and Dutch here: https://www.iksr.org/en/floods-directive/public-participation/
[27] Chapter 2.1 of the iFRMP.
[28] http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Reports/FD-1st_report_01.pdf
[29] There is brief information on discharge regimes in the Rhine basin (chapter. 1.2 of the iFRMP).

1.2.5 Flood Hazard and Flood Risk maps in the iFRMP

The iFRMP presents an overview map[30] with river stretches or areas for which the Member States have drafted FHRMs. Further, there is a reference to a specific report[31] on the drafting of FHRMs including the internationally agreed discharge values for the three flood scenarios (low, medium and high probability) for the main stream of the Rhine used for the national maps[32]. However, these values are not specified in the Plan but in the separate report.

The original ICPR Rhine Atlas of 2001 was updated based on the national FHRMs. Taking into account the internationally agreed discharge values for the three flood scenarios[33], the Interactive Rhine Atlas 2015[34] presents updated maps of flood hazard and flood risk.

No statistics on people potentially affected by the different flood scenarios, risk to economic activity, risk to environment or risk to cultural heritage were published in the iFRMP. However, some general information can be found in chapter 1.2 of the iFRMP and the Rhine Atlas of 2015 maps the potential adverse consequences and the risk related to human health, environment, cultural heritage and economic activities. Further, detailed information can be found in the national reports[35].

1.2.6 Setting of objectives for the management of transboundary flood risk

A number of common principles[36] and joint objectives[37] have been established for the management of flood risk at the international level. Links with the Action Plan on Floods (1998) of the ICPR are made. The iFRMP details the different objectives as follows:

- avoid new, unacceptable risks;
- reduce existing risks to an acceptable level;
- reduce adverse consequences during a flood event;
- reduce adverse consequences after a flood event.

[30] Chapter 2.2 of the iFRMP.
[31] "Report on the drafting of FHRM in the IRBD 'Rhine'" http://www.iksr.org/fileadmin/user_upload/Dokumente_en/Communique_/FD_-_2nd_report.pdf ; References in the iFRMP: Chapter 2.2 and Annex 7
[32] See Annex 3 of the "Report on the drafting of FHRM in the IRBD 'Rhine'".
[33] low, medium and high probability, see Annex 3 of the "Report on the drafting of FHRM in the IRBD Rhine".
[34] https://www.iksr.org/en/documentsarchive/rhine-atlas/
[35] Annex 4 of the iFRMP.
[36] Chapter 3.1 of the iFRMP.
[37] Chapter 3.2 of the iFRMP.

In Annex 4 of the iFRMP there is an assessment that shows how the different objectives are reflected at the Member States level. The review shows that the general targets of flood risk management on the national and international level are the same in the whole basin.

Potential effects of climate change on the risk of flooding and on flood risk management are briefly described in the iFRMP[38]. However, they were not directly taken into account when setting objectives[39].

1.2.7 Planning and implementation of measures with transboundary effect

The Member States in the Rhine RB have agreed upon the following approach for the planning and implementation of measures:

- Regional or local measures which are known not to have any transboundary effects will be planned and implemented regionally/locally;

- For regional measures with transboundary effects there will first be an exchange of information at a bilateral level or within RB commissions for sub-basins, as for example the Moselle-Sarre. Eventually, these measures must be coordinated on a bilateral or trilateral level in order to find joint solutions;

- The measures with regional effects mentioned under the second bullet point might also cause supra-regional effects. Therefore, such measures must at the same time be included in the mutual exchange of information within the ICPR. Due to this approach, measures with transboundary effects are coordinated throughout the RB district[40]. The effect of planned measures must be determined in common[41]. Aspects of cost-effectiveness may be taken into account;

- Enhancement of national or regional agreements targeted at keeping floodplains free of all uses; exchange on these activities within the ICPR.

In the iFRMP it is stated that the afore-described approach is applicable to measures such as creating retention areas, dike relocation, room for the river and measures regulating discharges, the construction or strengthening of dikes, etc. It remains unclear whether or how other types of measures are affected by this approach.

[38] Chapter 1.3.
[39] The ICPR subsequently noted that this is not required by the FD for the first cycle.
[40] Examples of such measures are provided in the iFRMP, e.g. in Chapter 4.4 and Annexes 11-1 and 11-2 of the iFRMP.
[41] See Figure 7 in the iFRMP.

Joint principles for prioritising measures on an international level are mentioned in Chapter 3.1. The iFRMP plan lists common objectives[42] and a set of concrete joint measures that seem to be a high priority for all Member States and aim at: (i) international coordination of measures, (ii) improving the exchange of information and access to information; (iii) improving flood forecasting and warning systems and at (iv) implementing measures aimed at lowering the water levels. The iFRMP states also that for the coordination of measures with supra-regional effects aspects of cost-effectiveness may be taken into account but no further information is provided[43]. As mentioned previously, the iFRMP states that Article 7(4) has been applied in the basin and that the relationship between up and downstream countries plays an important role in flood risk management within the basin.

The main common and coordinated measures[44] are:

Table 12: Joint coordinated measures

M21	Prevention, Avoidance, Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
M23	Prevention, Reduction, Measure to adapt receptors to reduce the adverse consequences in the event of a flood actions on buildings, public networks, etc...
M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, e.g. flood vulnerability assessment, maintenance programmes or policies etc...)
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water
M32	Protection, Water flow regulation, Measures involving physical interventions to regulate flows, such as the construction, modification or removal of water retaining structures (e.g., dams or other on-line storage areas or development of existing flow regulation rules), and which have a significant impact on the hydrological regime
M33	Protection, Channel, Coastal and Floodplain Works, Measures involving physical interventions in freshwater channels, mountain streams, estuaries, coastal waters and flood-prone areas of land, such as the construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes, etc.
M34	Protection, Surface Water Management, Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacities or though sustainable drainage systems (SuDS)
M35	Protection, Other Protection, Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M43	Preparedness, Public Awareness and Preparedness, Measure to establish or enhance the public awareness or preparedness for flood events
M61	Other

[42] Chapter 3.2 iFRMP.

[43] The ICPR developed a quantitative instrument aimed at the determination of flood risks and the effects of risk reducing measures (see Introduction, Chapter 5 and Annex 2 of the iFRMP). The ICPR subsequently noted that the FD does not require the inclusion of cost-effectiveness/-benefits in the FRMP.

[44] Numbering according to 'A User Guide to the Floods Reporting Schemas' (Technical support in relation to the implementation of the FD).

It is stated in the iFRMP that with regards to the planned measures possible synergies with the environmental targets of the WFD will be enhanced and the environmental effects of measures liable to cause a deterioration of the ecological state of water bodies will be reduced to a minimum.

For some of the measures, in particular those measures aimed at lowering the flood water levels, a timeframe is given in the iFRMP with an implementation deadline until 2020 and post 2020 (2030).

According to the requirements of the FD, the progress of the measures implemented will be reviewed every six years. This is the task of the expert group within the ICPR. The effect of all measures implemented at a national level will have to be identified on a national as well as on an international level for the whole RB. It is possible to evaluate and calculate the effect of all measures on the (reduction of) flood risk, including those reducing the water level with the help of existing methods and a GIS instrument, both developed by the ICPR [45] [46]. For existing measures, this calculation has already been made within the ICPR Action Plan on Floods. In the future, these calculations will be carried out regularly.

1.2.8 Consideration of climate change in the iFRMP for the Rhine

Climate change has to be taken into account in more depth from the second cycle of the FD (Art.14(4)) and onwards. The iFRMP addresses the issue of climate change and has a specific sub-section on how climate change was taken into account in the flood risk assessment.[47] Aspects covered are:

- Impacts of climate change for the Rhine catchment;[48]
- Climate change effects on measures of flood risk management.

The chapter on climate change first lists basin wide impacts from climate change based on a common assessment and the effects on measures of flood risk management. Also, following the instructions of the 15th Conference of Rhine Ministers, the ICPR has drafted a strategy to adapt to climate change[49]. However, it remains unclear if these scenarios are used at the national level.

While climate change is not mentioned in establishing objectives in the iFRMP, the plan is linking selected measures to climate change[50] and several of the common measures relate to

[45] https://www.iksr.org/en/topics/floods/flood-risk-tool/
[46] Specified in the introduction, Chapter 5 and Annex 2 of the iFRMP.
[47] Chapter 1.3 of the iFRMP.
[48] See also Annex 6.
[49] https://www.iksr.org/en/topics/climate-change-in-the-rhine-catchment/
[50] See Chapter 1.3 of the iFRMP.

climate change issues[51]. Many of the common measures described that are going to be implemented in the Member States may be considered as no-regret and win-win measures. They also have a positive effect on changes of the water balance brought about by climate change.

1.2.9 Good practice examples in the iFRMP of the Rhine RB

A number of good practice examples are available for the Rhine River Basin:

- The iFRMP states that internationally agreed discharge values for the three flood scenarios (low, medium and high probability) have been used (values are not directly specified in the plan but are mentioned in a specific report).
- Measures with transboundary effects are coordinated throughout the RB.
- National or regional agreements targeted at giving more room to the river and keeping floodplains free of all uses are enhanced by the ICPR.
- A coherent international Rhine Atlas 2015 from source to mouth (FHRMs of the iRBD 'Rhine') **provides** a uniform representation of flood risk for the Rhine and thus is an excellent instrument for raising public awareness, but also for focusing the attention of risk management planners in all riparian countries on their common goal.
- Based on existing methods and a GIS instrument the effect of all measures on the flood risk, including those reducing the water level, can be calculated.
- Climate change effects on flood risk management measures are taken into account.
- The iFRMP refers to regional transboundary plans and activities (part B[52], as opposed to part A which is the iFRMP) in different parts of the Rhine basin. Various bi- or multilateral procedures and activities have been implemented on this level, such as shared flood forecasting models and shared data flows.

1.2.10 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

[51] See Chapter 4 of the iFRMP.
[52] Annex 4 of the iFRMP
https://www.iksr.org/en/floods-directive/flood-risk-management-plan/ and
https://www.iksr.org/en/floods-directive/flood-risk-management-plan/national-reports/

- Co-financing of measures should be considered to strengthen cross-border cooperation but also to ensure that the measures taken are following an overarching concept to reduce the risks.

- More specific information should be provided on how the principle of solidarity (Article 7(4)) was implemented in practice.

- Public awareness raising activities of the iFRMP at the international level could be increased, for instance by integrating the international dimension into the national public awareness raising campaigns.

- Overall conclusions of the flood risk assessment should be presented for the entire iRBD.

- The iFRMP should specify the sources of flooding that have been considered in the definition of the transboundary APSFR.

- Statistics on people potentially affected by the different flood scenarios, risk to economic activity, risk to environment or risk to cultural heritage should be provided.

- Joint principles for prioritising measures on the international level should be set out, e.g. a methodology for CBA.

- Climate change should be considered in the setting of objectives and prioritisation of measures.

1.3 Meuse River Basin

1.3.1 Contextual information

The Meuse RB is shared between France, Germany, Belgium, the Netherlands and Luxembourg. The Meuse is considered a Category 1 RB, as an international river basin commission has been set up – The International Meuse Commission (IMC)[53] – to enable cooperation between the five Member States and an international iFRMP exists.

[53] http://www.meuse-maas.be/

1.3.2 Institutional setup and governance of the transboundary RB

The IMC has produced an iFRMP[54] together with the Member States France, Germany, Belgium, the Netherlands and Luxemburg. Within the commission, the common working group 'Hydrology and Floods' is tasked with supporting the international implementation of the FD.

Although not a requirement of the FD, it is not clear if financial resources for joint cooperation (other than for the functioning of the IMC) have been made available by the participating countries, e.g. the iFRMP does not provide any information whether there is financing for joint activities and projects. The iFRMP states that Article 7(4) of the FD has been applied in the basin and that countries should avoid taking measures which due to their extent and their effect considerably increase the flood risk in other countries upstream or downstream in the same river catchment or sub-catchment as long as these measures are not coordinated between the Member States concerned and a common solution has been found. The iFRMP provides information[55] on which measures need to be coordinated and/or information exchange is needed on the international level.

The development of the iFRMP was done in consultation with the development of the iRBMP, which was coordinated by the IMC. So far, the subject of flooding has been included in the iRBMP prepared for the WFD. In addition, an extra document with the assessment of synergies between measures under both Directives was developed.

1.3.3 Consultation and publication of the Meuse iFRMP

The public consultation for the iFRMP was the responsibility of the five countries. The IMC did not take any actions related to public consultation. The plan was only published online and it remains unclear whether any awareness raising activities on the iFRMP took place at the country level for the iFRMP in paricular.

1.3.4 Preliminary Flood Risk Assessment in the iFRMP of the Meuse

The PFRA was coordinated on the international level. The iFRMP states that each of the bordering countries has developed its risk assessment, but for water bodies at the borders bilateral coordination has taken place. However, the iFRMP does not provide details regarding the content of the coordinated risk assessment.

The iFRMP does not draw conclusions for the overall RB, still, maps of the entire catchment are presented. A map with APSFRs in the RB is given together with a table that shows the

[54] More information regarding the iFRMP and the maps produced can be found here: http://www.meuse-maas.be/Directives/Directive-Inondations.aspx.

[55] Chapter 5 of the iFRMP and in the appendix 3.

transboundary waters and gives some basic information on how the coordination between the countries was organised. The source is provided: Only fluvial flooding has been considered.

1.3.5 Flood Hazard and Flood Risk Maps in the iFRMP of the Meuse

The probabilities of flooding assumed for developing the flood hazard maps in the five riparian countries were different for low probability and high probability flooding. For low probability flooding return periods from a 100 up to a 1 000 year were assumed and for high probability flooding from 10 up to 30 years. For medium probability flooding the same return period of a 100 years was applied in all five Member States.

No statistics for the different scenarios on people potentially affected, on risks to economic activity, risks to the environment and risks to cultural heritage were published in the iFRMP. This information is available in the national FRMPs.

1.3.6 Setting of objectives for the management of transboundary flood risk

For the management of flood risk at the international level, joint objectives have been established by the five Member States. The objectives are defined at strategic level and operational levels. The strategic level objectives which are listed in the iFRMP are:

- Joint and efficient responsibility based on the solidarity principle: The aim is to determine the most appropriate level so as not to take higher-level measures which can be implemented more efficiently at the local level;
- Solidarity in the case of flooding;
- Proportionality of measures: Creation of a prioritization program, if possible on the basis of a CBA.

The three operational objectives are:

- Effective international coordination of measures with transboundary effects;
- Improvement of the flood forecasting and warning;
- Improve flood risk knowledge.

The measures are based on the operational objectives.

The international objectives were derived based on the national objectives defined by the five Member States.

The potential effects of climate change on the risk of flooding have been taken into account by the Member States when setting objectives[56].

1.3.7 Planning and implementation of measures with transboundary effect

A joint principle in planning and implementing measures was defined by one of the objectives on the international level - the 'Proportionality of measures', i.e. the creation of a prioritization program for measures. It is stated that a ranking of measures on the international level was performed considering the mobilized human, technical and financial resources of all stakeholders and the expected benefits.

The iFRMP does not mention whether a CBA[57] was used in the prioritisation and planning of measures with a transboundary effect (although this is stated as a common objective). However, it mentions that CBA is done at the Member States level following different approaches and is mostly used in the case of construction measures.

As mentioned previously, the iFRMP states that Article 7(4) has been applied in the basin and that the relationship between up and downstream countries plays an important role in flood risk management within the basin. The iFRMP does not provide information how this is handled in practice.

The main common and coordinated measures[58] are:

Table 13: Joint coordinated measures

M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M61	Other

The iFRMP states that measures under the FD were coordinated with those under the WFD by the ICM. In the Annex of the iFRMP an overview over potential synergies between measures under the FD and objectives of the WFD is provided. Measures are judged based on whether they support WFD objectives, whether they are not relevant for the WFD objectives or whether they are in conflict with WFD objectives.

[56] Chapter 9 of the iFRMP describes how this has been done.

[57] The IMC subsequently noted that the FD does not make it obligatory for Member States to discuss cost-effectiveness/-benefits in the FRMP.

[58] Numbering according to 'A User Guide to the Floods Reporting Schemas' (Technical support in relation to the implementation of the FD), see:
http://cdr.eionet.europa.eu/help/Floods/Floods_603_2016/resources/User%20Guide%20to%20the%20Floods%20schema%20v6.0.pdf

There is no information regarding an agreed timing of the implementation of measures in the iFRMP; the implementation of measures is a responsibility of the national/regional authorities.

The progress in the implementation of measures is monitored in a joint way based on a set of indicators which relate to each objective in the iFRMP:

The indicators for objective 1 are:

- New national polices in FRM;
- Local measures, which have an impact on other countries within the basin;
- Results of coordination between riparian states and the IMC on measures which can have a negative impact on other countries.

The indicators for objective 2 are:

- Results of the agreement on the exchange on hydrological data;
- Results from technical exchange;
- Other improvements on the forecasting of floods.

The indicators for objective 3 are:

- Exchanged data by countries/regions;
- Common products and methods developed by the riparian states.

The working group on 'Flood Management' in the ICM is responsible for monitoring and control.

1.3.8 Consideration of climate change in the iFRMP for the Meuse

The summary of the IMC states that Member States have started to work on joint flow patterns based on national climate scenarios. Chapter 9 of the iFRMP provides information how the issue of climate change was considered in the setting of objectives or in the selection of measures[59].

[59] The IMC subsequently noted that climate change issues will be further integrated in the second cycle.

1.3.9 Good practice examples in the iFRMP of the Meuse RB

A good practice example of how to implement the FD at the international level from the Meuse RB is that the Member States have started to work on joint flow patterns. Further, the fact that there are indicators related to objectives can be considered as good practice.

1.3.10 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

- Co-financing of measures should be considered to strengthen cross-border cooperation but also to ensure that the measures taken are following an overarching concept to reduce the risks.
- More specific information should be provided on how the principle of solidarity was implemented in practice.
- Public awareness raising activities of the iFRMP at an international level could be increased, for instance by integrating the international dimension into the national public awareness raising campaigns.
- More information should be provided on how the PFRA was coordinated at the international level.
- Overall conclusions of the flood risk assessment should be presented for the entire RB.
- The return periods to assess high and low probability flood risk are not the same in the Meuse Basin. A converge should be envisaged wherever possible as it supports common risk assessments.
- Statistics on people potentially affected by the different flood scenarios, risk to economic activity, risk to environment, risk to cultural heritage should be provided.
- Climate change considerations should be introduced in the setting of objectives and prioritisation of measures.
- It should be considered to introduce a CBA for the planning and prioritising of measures with a transboundary effect.

1.4 Elbe River Basin

1.4.1 Contextual information

The Elbe RB is shared primarily by the Czech Republic and Germany, with smaller shares found in Austria and Poland. The Elbe is considered a Category 1 RB as an international river basin commission has been set up – The International Commission for the Protection of the Elbe River (ICPER)[60] – to enable cooperation between the four Member States and an iFRMP exists.

1.4.2 Institutional setup and governance of the transboundary RB

The Elbe RB is coordinated through the International Commission for the Protection of the Elbe River, which has produced an international iFRMP together with the Czech Republic, Germany, Austria and Poland[61]. Within the ICPER, the common working group 'Flood Protection' is tasked with supporting the implementation of the FD.

Although not a requirement of the FD, it is not clear if financial resources for joint cooperation (other than for the functioning of the International Commission for the Protection of the Elbe River) have been made available by the participating states and the iFRMP does not provide any information whether there is financing for joint activities and projects. The iFRMP mentions that measures are implemented on a national level. However, the information submitted by Germany to WISE, states that the iFRMP for the Elbe includes measures for Germany and the Czech Republic where cross-border solutions needed to be found. The iFRMP states that Article 7(4) has been applied in the basin and that the relationship between upstream and downstream countries plays an important role in flood risk management within the RB.

The development of the iFRMP was done in consultation with the WFD. The measures in the iFRMPs were aligned with those under the WFD. The implementation of both Directives was coordinated, according to the ICPER, in particular regarding the improvement of efficiency, information exchange and synergies in achieving the environmental objectives of the WFD.

1.4.3 Consultation and publication of the Elbe iFRMP

The iFRMP provides an overview of the public consultation that took place. International workshops on risk assessment and risk and hazard maps and an international workshop on the management plans took place. An international Elbe Forum was held to inform the public on the current state of play of both the WFD and the FD. A summary of the results of the PFRA for the international basin was published in German and Czech and made available to the

[60] http://www.ikse-mkol.org/en/
[61] Austria and Poland share only small parts of Elbe River basin (less than 1 %)

public. All documents, including the draft FRMPs and the risk maps have been published on the website of the Elbe Commission. There was also an international Elbe Forum on the iFRMP and the iRBMP.

1.4.4 Preliminary Flood Risk Assessment in the iFRMP of the Elbe

In the frame of the working group 'Flood Protection' of the ICPER, each Member State informed other delegates about their methods implementing the FD; all topics, aspects and steps of implementation with respect to the FD had been consulted amongst the delegates. However, as Austria and Poland did not identify APSFRs in their share of the Elbe RB, most of the information in the iFRMP refers to the German and Czech approaches. During the comparison of the methodologies for the risk assessment developed by Germany and the Czech Republic, the Elbe river commission found that comparable risk areas were identified by the two Member States.

The iFRMP details the PFRA and its conclusions for each Member State separately, but does not draw conclusions for the overall RB. Information reported by Austria and Germany to WISE state that the risk assessment was coordinated through the working group under the Elbe Commission; however, the information does not clarify for which specific topics. The iFRMP states that there was a workshop held between the Czech Republic and Germany to discuss and compare methodologies for the PFRA. Although each Member State had developed different methodologies, the results were the same. While the methodologies themselves were not coordinated during their development, the results of the methodologies – i.e. the identification of APSFRs was compared to ensure that the different methodologies nevertheless resulted in the same identified risk areas.

The same sources of flooding were considered in the common APSFRs between the Czech Republic and Germany. The iFRMP states that in the Czech Republic fluvial floods caused by regional precipitation were taken into account whereas flooding from heavy rain leading to flash floods is only locally important and has not resulted in the designation of APSFR and that groundwater causing floods were not taken into account. In Germany, coastal and fluvial floods were taken into account. For both Austria and Poland general information regarding the methodology for identifying risk areas is presented in the iFRMP; these sections do not mention which sources of flooding were considered in Austria and Poland[62].

[62] The ICPER subsequently clarified that:
(a) Austria considered pluvial and fluvial historic flood events, however, Austria identified only APSFRs based on fluvial floods due to the defined thresholds for significance.
(b) In Poland all types of floods (apart from floods from sewage systems and tsunamis) were analysed taking into account available historical data and the classification of floods used thus far in Poland. Ultimately, fluvial (river) and coastal floods were identified as significant types of floods, differentiating them in terms of the mechanism and characteristics.

1.4.5 Flood Hazard and Flood Risk Maps in the iFRMP of the Elbe

The probabilities of flooding used for developing the flood hazard maps are mostly the same between the Czech Republic and Germany. For low probability flooding, the Czech Republic used a return period of 500 years and Germany a return period of 200 years for the main river and between 200-1 000 years for all other waters. For medium probability flooding, both the Czech Republic and Germany used a return period of 100 years. For high probability flooding, the Czech Republic used a return period of five and 20 years in all APSFR.[63] On the other hand, Germany used a return period of 20 years for the main river and between 10-25 years for all other waters.

Common risk maps were developed for the Elbe and were published on the Elbe Commission's website. An interactive map with flood risk areas for the whole basin is available, from which access to the national maps is provided[64].

The following statistics on people potentially affected, risk to economic activity, risk to environment and risk to cultural heritage were published in the iFRMP[65]:

Table 14: Areas to be flooded in Km^2 (Status 11.08.2015)

Probability	Fluvial flooding			Seawater flooding		
	CZ	DE	Total	CZ	DE	Total
high	695	2 424	3 119	0	41	41
medium	895	4 325	5 220	0	43	43
low	1 141	8 307	9 448	0	661	661

Table 15: Number of affected inhabitants (Status: 11.08.2015)

Probability	Fluvial flooding			Seawater flooding		
	CZ	DE	Total	CZ	DE	Total
high	26 232	101 520	127 752	0	2 860	2 860
medium	103 104	373 129	476 233	0	3 910	3 910
low	323 942	958 583	1 282 525	0	609 000	609 000

Table 16: Impacted IED-, or PRTR- und IPPC- facilities (Status: 11.08.2015)

Probability	Fluvial flooding			Seawater flooding		
	CZ	DE	Total	CZ	DE	Total
high	2	71	73	0	57	57
medium	25	170	195	0	62	62
low	66	861	927	0	159	159

[63] This rule is defined by regulation no. 236/2002.

[64] See http://geoportal.bafg.de/mapapps/resources/apps/IKSE_DE/index.html?lang=de

[65] Please note that the figures given in the table below may be counted several times when either several fluvial flood risk areas in places of watercourse confluences or seawater flood risk areas and fluvial flood risk areas overlap.

Table 17: Number of areas in which economic activities or the environment is impacted (Status: 11.08.2015)

Potential negative impacts	Medium Probability					
	Fluvial flooding			Seawater flooding		
	CZ (111)	DE (281)	Total (392)	CZ (0)	DE (1)	Total (1)
Economic activities	103	235	338	0	1	1
Environment (general)	70	235	305	0	1	1

For cultural heritage sites affected, specific sites are listed but are not linked to probability scenarios. Five sites are mentioned in Germany and two are mentioned in the Czech Republic.

1.4.6 Setting of objectives for the management of transboundary flood risk

The iFRMP details the different objectives as defined by the Czech Republic and Germany. They were not commonly developed. However, the objectives set by the Czech Republic and Germany are very similar.

In the Czech Republic, the most important objective is to reduce the risk to inhabitants due to floods, as well as reduce risk on economic activities, cultural and historical areas, taking into account the precautionary principle. Three general objectives were set: 1) Prevent the emergence of new risks and to reduce the size of areas with an unacceptable risk; 2) Reduce flood risk and 3) Improve the precaution of inhabitants, the resilience of buildings, infrastructure, economic and other activities against the negative effects of floods.

In Germany, four general objectives were set at national level: 1) Avoid new risks in flood risk areas; 2) Reduce existing risks in flood risk areas; 3) Reduce the adverse effects during a flood and 4) Reduce the adverse effects after a flood.

The general objectives established in the iFRMP are applicable regardless of potential effects from climate change on the risk of flooding The chapter on establishing objectives does not mention climate change. The international plan refers to a study from 2011 where it is stated that at present, the link between medium and long-term climate change and the frequency, duration and intensity of future floods and droughts is not yet sufficiently clear that it could be used as a reliable basis for planning water quantity and flood risk management. The specific chapter on climate change focuses on what regional scenarios have been developed and on overarching climate change strategies but does not make a link to the established common objectives in the iFRMP.

1.4.7 Planning and implementation of measures with transboundary effect

There are common principles for defining groups of measures. The individual measures in each group are nationally defined. Each group of measures describes the principles behind their selection. It is unclear whether there are common principles also for prioritising specific measures, still the iFRMPs mentions that the following measures will be prioritised: measures in areas with significant flood risk; prevention measures, especially those financed by municipalities or property owners; and measures to protect inhabitants and assets, e.g. preparation of information systems. However, the iFRMP also states that measures financed through public investments, especially from national or regional programmes, will be prioritised by the authorities providing the financing.

A cost-benefit analysis was not employed for the prioritisation and planning of measures with a transboundary effect.[66] The iFRMP states that an assessment methodology regarding the effects of the measures has not been developed at international level.

The main common and coordinated groups of measures[67] are:

Table 18: Joint coordinated measures

M21	Prevention, Avoidance, Measure to prevent the location of new or additional receptors in flood prone areas, such as land use planning policies or regulation
M22	Prevention, Removal or relocation, Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard
M23	Prevention, Reduction, Measure to adapt receptors to reduce the adverse consequences in the event of a flood, actions on buildings, public networks, etc...
M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...)
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water
M32	Protection, Water flow regulation, Measures involving physical interventions to regulate flows, such as the construction, modification or removal of water retaining structures (e.g., dams or other on-line storage areas or development of existing flow regulation rules), and which have a significant impact on the hydrological regime

[66] The ICPER subsequently noted that a cost-benefit-analysis (CBA) is not mandatory according to the FD. For instance, in Germany a CBA was not considered appropriate at the level of the FRMP, as the FRMPs are at a strategic and aggregated level. The measures too are defined at a strategic level. Instead, a CBA is mandatory in the detailed planning process for any technical measure on federal state or regional level.

[67] Numbering according to 'A User Guide to the Floods Reporting Shemas' (Technical support in relation to the implementation of the FD) see : http://cdr.eionet.europa.eu/help/Floods/Floods_603_2016/resources/User%20Guide%20to%20the%20Floods%20schema%20v6.0.pdf

M33	Protection, Channel, Coastal and Floodplain Works, Measures involving physical interventions in freshwater channels, mountain streams, estuaries, coastal waters and flood-prone areas of land, such as the construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes, etc.
M34	Protection, Surface Water Management, Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacities or though sustainable drainage systems (SuDS)
M35	Protection, Other Protection, Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M51	Recovery and Review (Planning for the recovery and review phase is in principle part of preparedness), Individual and societal recovery, Clean-up and restoration activities (buildings, infrastructure, etc), Health and mental health supporting actions, incl. managing stress Disaster financial assistance (grants, taxCons), incl. disaster legal assistance, disaster unemployment assistance, Temporary or permanent relocation, Other
M52	Recovery and Review, Environmental recovery, Clean-up and restoration activities (with several sub-topics as mould protection, well-water safety and securing hazardous materials containers)
M53	Recovery and Review, Other, Other recovery and review Lessons learnt from flood events Insurance policies

The iFRMP states that measures under the FD were coordinated with those under the WFD to maximise synergies and reduce conflicts insofar as possible. Measures were grouped into three categories: Measures that support the objectives of the WFD, measures that cause conflicts, and measures that are not relevant to the WFD. The planned measures in the Elbe basin were assessed against these categories, with the majority of the measures supporting the WFD. The chapter ends by stating that more information can be found in the national FRMPs.

There is no information regarding timing of the implementation of measures within the iFRMP.

The iFRMP states that monitoring of the implementation of measures will take place at national level, so there is no common monitoring approach in the RB.

1.4.8 Consideration of climate change in the iFRMP for the Elbe

The chapter on PFRA has a specific sub-section on how climate change was taken into account in the assessment. It first lists climate research projects that have been carried out in the last years within the Elbe region. Some of these projects are regional or national but the GLOWA project mentioned looked at the Elbe region as a whole. The chapter also states that under the Elbe commission a document was produced summarizing the previous research, including presenting conclusions. It is not clear, however, if this resulted in the same climate scenario being used amongst the riparian countries.

There is no information in the iFRMP regarding if and how climate change was considered in the setting of objectives or in the selection of national measures.

1.4.9 Good practice examples in the iFRMP of the Elbe RB

- In the consultation and publication of the Elbe River Basin's iFRMPs a good practice example is that a summary of the results of the PFRA for the international basin was published in German and Czech and made available to the public.
- The interactive map with flood risk areas for the whole basin, with access to the national maps.

1.4.10 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

- The return periods to assess flood risk are not the same in the Elbe Basin, especially for low probability events. Convergence should be envisaged wherever possible as it supports common risk assessments.
- More specific information should be provided on how the principle of solidarity was implemented in practice.
- Co-financing of measures should be considered to strengthen cross-border cooperation, but also to ensure that the measures taken are following an overarching concept to reduce the risks.
- Further information on potential basin wide impacts (e.g. number of buildings affected, area of agricultural land affected, number of areas under Article 6 WFD, etc.) should be provided.
- Overall conclusions of the flood risk assessment should be presented for the entire RB.
- The sources of flooding that have been considered in the definition of the transboundary APSFR should be specified.
- The iFRMP should be more specific about the common principles for prioritising measures.
- It should be considered to introduce a CBA for the planning and prioritising of measures with a transboundary effect.
- Climate change should be considered in the setting of objectives and in the prioritisation of measures in the Elbe RB.

1.5 Odra River Basin

1.5.1 Contextual information

The Odra River Basin (RB) is shared by the Czech Republic, Germany and Poland. The Odra is considered a Category 1 RB, as an international river basin commission has been set up – The International Commission for the Protection of the Odra River against Pollution (ICPO)[68] – to enable cooperation between the three Member States and an iFRMP exists. The objectives of the ICPO in the field of flood protection in the Odra RB are:

- preventing and permanently reducing the risk of flood damage;
- coordinating the implementation of the WFD and of the FD.

1.5.2 Institutional setup and governance of the transboundary RB

The ICPO, has produced an international FRMP (iFRMP) together with the Czech Republic, Germany and Poland. Within the ICPO, the common working group 'Flood' is tasked with the implementation of the FD.

The activities of the ICPO (including meetings for joint cooperation) are financed primarily from the contributions of the three parties of the Agreement, as well as from donations, subsidies, interest and funds from other sources.

The iFRMP states that Article 7(4) of the FD has been applied in the basin and that the relationship between up and downstream countries plays an important role in flood risk management within the basin. The information is general and there is no mention of common financing of measures[69][70].

The development of the iFRMP was done in consultation with the iRBMP. Measures of the FD were coordinated with those under the WFD to maximise synergies[71], to ensure information exchange and to ensure that also WFD objectives are met.

[68] http://www.mkoo.pl

[69] Poland subsequently noted that information about activities (including financial matters) is contained in separate agreements, documents, plans or programs. For example, the most important document for financing activities between Poland and Germany is the agreement between the Government of the Republic of Poland and the Government of the Federal Republic of Germany on the joint improvement of the situation on waterways on the Polish-German border (flood protection among others).

[70] It was subsequently clarified that coordination for the implementation of Article 7(4) is included in the scope of the G2 Working Group's activities within the ICPO. One of the tasks of the working group is to exchange information on the implementation of strategically significant, cross-border activities in the field of flood risk management, in particular measures included in the iFRMP for the Oder.

[71] An assessment of potential synergies to reach the objectives of both Directives was carried out. It is further stated that detailed information on measures can be found in the national Plans.

1.5.3 Consultation and publication of the Odra iFRMP

The iFRMP provides an overview of the public consultation that took place. An international Forum and Joint info days on the iFRMP were held to inform the public on the current state of play of both the WFD and the FD. A summary of the results of the PFRA for the RB was made available to the public. All documents, including the draft FRMPs and the FHRMs were published on the website of the Odra River Commission. There was also an international conference on the implementation of the WFD and the FD, where the latest results on flood risk management were presented.

1.5.4 Preliminary Flood Risk Assessment in the iFRMP of the Odra

The risk assessment has been coordinated to some extent on the international level. The iFRMP states that the Member States have exchanged the necessary information to carry out the risk assessment and to produce the relevant maps. However, the detailed risk assessment was different in the countries and is described separately for each Member State even if a common set of criteria (not further specified) have been used. Furthermore, the potential adverse consequences of future floods considered in the different Member States are different. The general topics are the same though: Human health, Environment, Cultural heritage, Economic activity, but the sub-categories differ.

The conclusions of the PFRA, FHRMs and of the "Action Programme of Flood Protection of Oder River" are presented for the entire international basin and can be summarized as follows:

- Maintaining or increasing the retention capacity in individual river areas, in order to effectively limit the risk of flooding.
- Reduce the vulnerability of flood-prone areas.
- Improve the legal framework for management and building in dyke protected areas with residual flood risks.
- The methods for hydrologic meteorological prognosis, prediction and pre-warning are to be further developed.
- Strengthen the dialogue with the potentially flood affected population to increase awareness about the flood risks as well as their self-sufficiency.
- Develop legal and economic instruments for flood management (e.g. reduction of the damage potential through financial incentives for resettlement).
- Regular modernization of the icebreaker fleet and the related infrastructure in the area of the Lower and Middle Odra.

- For flood risk management, an adapted maintenance of the coastal and inland waters as well as the related water service facilities are indispensable.

1.5.5 Flood Hazard and Flood Risk Maps in the iFRMP of the Odra

The probabilities of flooding used for developing the flood hazard maps differ in the three Member States for low and high probability flooding. For low probability flooding Germany used a return period of 200 years and Poland and the Czech Republic a return period of 500 years. For high probability flooding Germany used return periods between 10 and 25 years, Poland a return period of 10 years and the Czech Republic a return period of five or 20 years. Only for medium probability flooding, which is set at equal or larger than a 100 year return period in the Directive, the same return period was used in all three Member States namely 100 years.

A common risk map for the whole basin was developed and is available in the iFRMP, but no hazard map has been developed. Instead there is an interactive map on the ICPO website which offers access to all national risk and hazard maps[72]. No statistics for the different flooding scenarios on people potentially affected, on risks to economic activity, risks to the environment and risks to cultural heritage were included in the iFRMP.

1.5.6 Setting of objectives for the management of transboundary flood risk

The iFRMP includes a table with joint objectives for the management of flood risk at the international level which are then further detailed into sub targets. There is no clear description how the joint objectives have been agreed on[73]. The general objectives are:

- Avoid new risks;
- Reduction of existing risks;
- Reduction of adverse consequences during a flood event;
- Reduction of adverse consequences after a flood even.

The objectives are the same for all Member States of the ICPO.

It is not clear whether the potential effects of climate change on the risk of flooding have been considered when setting objectives. The chapter on establishing objectives does not mention climate change. The specific chapter on climate change focuses on what regional scenarios have been developed and overarching climate change strategies but there is no link to the establishment of common objectives at the RB level.

[72] See http://www.mkoo.pl/index.php?mid=28&aid=675&lang=DE

[73] Poland subsequently clarified that during the meetings of the "Flood" working group's (G2) discussions, among others, goals were jointly set.

1.5.7 Planning and implementation of measures with transboundary effect

There are some joint principles for defining and prioritising measures which relate to two transboundary projects and the agreed 'flood protection program 2004'. In the latter a list of priority actions/measures has been agreed upon, which is the basis for the joint work. Actions and priorities are indicated in the national FRMPs, taking into account international agreements, such as the Polish-German agreement.

The bilateral agreement between Poland and Germany on improving water transport on the Odra river also sets priorities as regard to a common flow regulation concept. There is no information in the iFRMP on whether a cost-benefit analysis was used in the prioritisation and planning of measures with a transboundary effect.

No main common and coordinated measures were defined in the iFRMP. Chapter 4.2 describes the general measure categories which are of importance on supra-regional or RB level. Further, a table with the number of measures implemented in each of the countries is shown. Important measures with international impact are also briefly mentioned. The implementation of measures with international impact is coordinated within existing bilateral agreements and follow-up procedures.

There is no information regarding timing of the implementation of measures within the iFRMP[74].

The iFRMP states that monitoring of the implementation of measures will be based on the European Commission's reporting requirements, but no further details are given[75].

1.5.8 Consideration of climate change in the iFRMP for the Odra

The chapter on the PFRA has a specific sub-section on how climate change was taken into account in the assessment for each Member State. It focuses on what regional scenarios have been developed in each Member State and shows that no common approach was used so far.

There is no information regarding whether climate change was considered in the setting of objectives or in the selection of measures.

1.5.9 Good practice examples in the iFRMP of the Odra RB

In the consultation and publication of the iFRMP for the Odra RB, a good practice example is that a summary of the results of the PFRA for the RB was made available to the public.

[74] The ICPO subsequently informed that parties to the Agreement on the International Commission for the Protection of the Oder against Pollution set specific deadlines for the implementation of projects in their national Plans.

[75] Poland subsequently informed that the implementation of activities is documented by the International Commission for the Protection of the Odra against Pollution at specific intervals.

1.5.10 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

- Co-financing of measures [76]should be considered to strengthen cross-border cooperation but also to ensure that the measures taken are following an overarching concept to reduce the risks.
- More specific information should be provided on how the principle of solidarity was implemented in practice.
- Information on the underlying assumptions/factors and common criteria for producing the FHRMs in the different Member States should be provided.
- Clear information should be included on any joint flood risk areas and common coordinated measures defined for joint risk areas if necessary. In case common measures are defined in the next iFRMP, information should be provided on joint implementation and monitoring and on how these are organised.
- The return periods to assess high and low probability flood risk are not the same[77] in the Odra RB. Convergence should be envisaged wherever possible as it supports common risk assessments.
- Statistics on people potentially affected by the different flood scenarios, risk to economic activity, risk to environment and risk to cultural heritage should be provided.
- The iFRMP should be more specific on how the joint objectives for the management of flood risk have been agreed on and on whether the same objectives also apply to the Czech Republic[78].
- Climate change should be considered in the setting of objectives and prioritisation of measures.
- The iFRMP should be more specific on joint principles for defining and prioritising measures and on whether a CBA has been applied.

1.6 Scheldt (Escaut) River Basin

1.6.1 Contextual information

The Scheldt River Basin (RB) is shared by Belgium, the Netherlands and France. It is considered a Category 1 RB, as an international river basin commission has been set up – The

[76] The ICPO noted that co-financing is not required by the FD.
[77] The ICPO noted that using the same probabilities is not required by the FD for high and low probability floods.
[78] The Czech Republic subsequently informed that the same objectives as in Poland and Germany apply.

International Scheldt Commission[79] (ISC) – to enable cooperation between the three Member States and an iFRMP exists.

1.6.2 Institutional setup and governance of the transboundary RB

The Scheldt RB is coordinated through the International Scheldt Commission, which has produced an iFRMP together with Belgium (Flanders, Wallonia and Brussels), the Netherlands and France. Within the river commission, the common working group PA7b works specifically on floods, hydrology and low flows.

The iFRMP does not provide information on resource allocation for joint cooperation (other than for the functioning of the ISC), but it does outline the extensive work and meetings carried out over the years between the Member States.[80]

The iFRMP states that the requirements of the WFD have been considered by all riparian countries. The iFRMP has identified whether selected measures have beneficial, negative or no impact on the implementation of the WFD. The iFRMP however states that measures were expressed at a very abstract level and recommends carrying out a more specific assessment based on the specific measures planned at local level in the transboundary catchments.

The iFRMP outlines the specific steps where mutual information or coordination between the Scheldt countries and regions is required when implementing the FD (i.e. exchange of relevant information during flood risk assessment; coordination of the identification of areas with a high risk of flooding; exchange of information prior to the production of flood risk maps; coordination during drafting of FRMPs). Furthermore, the iFRMP presents a list of relevant types of measures for the Scheldt and their potential transboundary effects[81] and goes on to say that for measures which impact another country or region, the ISC assumes a coordinating role. There is no information on further coordination during the selection or implementation of measures.

1.6.3 Consultation and publication of the Scheldt iFRMP

The iFRMP does not specify any joint/transboundary communication strategy or activities. It notes that the public was not informed on an international level. Instead, it refers to Articles 9 and 10, which stipulate that it is the responsibility of the national and regional authorities to inform the public on the relevant national or regional plan, as well as on the content of the

[79] www.isc-cie.org/
[80] France subsequently referred to the application of coordination section (4) art.7 in terms of the ISC's tasks (cf. Ghent treaty, international Scheldt treaty, 3/12/2002).
[81] Table 5, p 35-38 of the FRMP.

overarching, international part. Details of the national consultations are presented in the iFRMP[82].

1.6.4 Preliminary Flood Risk Assessment in the iFRMP of the Scheldt

In the reporting of the three Member States there is no explicit statement on whether the PFRA has been coordinated on an international level. However, the iFRMP specifies that an exchange of relevant information for the elaboration of the PFRA is obligatory. Furthermore, the information reported indicates that the PFRAs are based on national approaches. However, it is stated that Member States have exchanged information through the ISC during the preparation of the PFRA: Project group PA7B "Floods" managed the iterative process of information exchange and coordination on the PFRA. The iFRMP includes a description of the commonalities and differences between member states PFRA approaches, in particular regarding whether they produced PFRAs according to Article 4 (the approach followed by France) or whether they made use of Article 13 and applied transitional measures for the first cycle of the FD (as was done by Brussels, Flanders and Wallonia in Belgium, and the Netherlands). A synthesis of the outcome as a map is provided in the annexes.

The sources of flooding that were considered in the PFRA depend on the location of the regions. The Netherlands, France and the Flemish region of Belgium have considered sea water flooding and river flooding. France has also discussed surface run-off and groundwater flooding in an informative section, but no run-off risk was calculated for these. In the Belgium region of Brussels river flooding, groundwater flooding, surface run-off, and pluvial flood risks have been analysed, while in the region of Wallonia river flooding and surface run-off were taken into account.

1.6.5 Flood Hazard and Flood Risk Maps in the iFRMP of the Scheldt

The Member States did not use the same probabilities of flooding for developing the flood hazard maps. The iFRMP provides a table showing the different probabilities considered in each Member State. Return periods between 100 and 10 000 years were used for low probability flooding, return periods between 25 and 300 years for medium probability flooding and return periods between 10 and 30 years for high probability flooding.

A common map, showing APSFRs, was developed for the overall Scheldt RB, but no statistics on people potentially affected, risk to economic activity, risk to environment and risk to cultural heritage were made available in the iFRMP. However, these are provided in the national FRMPs.

[82] Annex 2 of the iFRMP.

A table is provided in the annexes showing that the risk assessment is coherent between all Member States regarding human health, environment, cultural heritage and economic activity. Some differences between Member States exist however: Flanders for example does not report any wastewater treatment plants but is also the only one presenting information on bus routes. Wallonia shows where phone booths and cabinets for electrical equipment are located, and Brussels shows open-air car parks.

1.6.6 Setting of objectives for the management of transboundary flood risk

The objectives set in the iFRMP were based on a comparison between the objectives set in the national FRMPs and are shared objectives. They focus on: 1) strengthening transboundary cooperation for the planning and monitoring of measures with a transboundary impact; 2) improving information sharing on floods and flood warning and 3) improving knowledge exchange to support decisions. The iFRMP notes also that all Member States and regions mainly aim to reduce the number of fatalities and economic damage, but also have objectives for the protection of habitats.

The iFRMP highlights that climate change should be taken into account in the future. So far, the Netherlands and Flanders have taken climate change into account nationally when setting flood risk management objectives.

1.6.7 Planning and implementation of measures with transboundary effect

The iFRMP does not state that common principles for defining measures were adopted. A categorisation of measures (protection, prevention, preparedness and recovery) is presented, but it is not clear whether this classification was used in the planning of individual regions/Member States. The iFRMP also highlights which criteria are relevant for multi-lateral discussions. France, Brussels/Belgium and Wallonia/Belgium were still in the process of preparing their programme of measures (PoM) when the iFRMP was prepared, which is why the relevant chapter of the iFRMP ought to be updated once the national PoMs are finished and available. Nationally, the Netherlands and Flanders/Belgium mainly use cost-benefit analysis and a maximum reduction of loss of lives to prioritise measures[83].

There is no explanation in the iFRMP on how any measures with a transboundary effect were prioritised or whether a cost-benefit analysis was used[84]. There is no information regarding timing of the implementation of measures within the iFRMP or a joint monitoring.

The main common and coordinated measures[85] are:

[83] Wallonia/BE informed subsequently that it used a multi criteria approach to prioritise its programme of measures.

[84] France subsequently noted that work in this area would be considered for the second cycle of the FD.

Table 19: Joint coordinated measures

M22	Prevention, Removal or relocation, Measure to remove receptors from flood prone areas, or to relocate receptors to areas of lower probability of flooding and/or of lower hazard
M23	Prevention, Reduction, Measure to adapt receptors to reduce the adverse consequences in the event of a flood actions on buildings, public networks, etc...
M24	Prevention, Other prevention, Other measure to enhance flood risk prevention (may include, flood risk modelling and assessment, flood vulnerability assessment, maintenance programmes or policies etc...)
M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water
M32	Protection, Water flow regulation, Measures involving physical interventions to regulate flows, such as the construction, modification or removal of water retaining structures (e.g., dams or other on-line storage areas or development of existing flow regulation rules), and which have a significant impact on the hydrological regime
M33	Protection, Channel, Coastal and Floodplain Works, Measures involving physical interventions in freshwater channels, mountain streams, estuaries, coastal waters and flood-prone areas of land, such as the construction, modification or removal of structures or the alteration of channels, sediment dynamics management, dykes, etc.
M34	Protection, Surface Water Management, Measures involving physical interventions to reduce surface water flooding, typically, but not exclusively, in an urban environment, such as enhancing artificial drainage capacities or though sustainable drainage systems (SuDS)
M35	Protection, Other Protection, Other measure to enhance protection against flooding, which may include flood defence asset maintenance programmes or policies
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M61	Other: Preparedness: implementation or improvement of crisis management scheme and reduction of catastrophic hazards (e.g. accidental pollution)

1.6.8 Consideration of climate change in the Scheldt iFRMP

Climate change was not considered in the drafting of the iFRMP for setting of joint objectives or in the planning of joint measures[86]. However, the iFRMP mentions that climate change is an important issue to consider and highlights that climate change should be taken into account in the future.

Information in WISE reported by Belgium provides a synthesis on knowledge of past impacts of climate change and future prognostics. It also highlights that a working group in the international river commission is evaluating the quantitative impacts of climate change on water resources and has proposed a series of actions to improve knowledge and coordination (in particular how to develop homogenous approaches between riparian Member States). The information provided by France highlights that a 60cm increase in sea level was considered in

[85] Numbering according to 'A User Guide to the Floods Reporting Shemas' (Technical support in relation to the implementation of the FD) see: http://cdr.eionet.europa.eu/help/Floods/Floods_603_2016/resources/User%20Guide%20to%20the%20Floods%20schema%20v6.0.pdf

[86] France subsequently noted that the FD does not make it obligatory for Member States to discuss climate change in the first FRMP.

the flood risk assessment following French guidance. It notes the need for further hydrological studies. The information provided by the Netherlands describes that the flood protection scheme in the Netherlands has a lifespan of up to 100 years and include in their design considerations of the expected impacts of climate change. It is stressed that climate change is increasingly taken into account in Dutch flood management policy through modification of measures taken, strategic planning and improved modelling. The information provided for Flanders indicates that the impact of climate change on the flood risk was calculated for both an average climate projection and a high climate projection. The CBA took into account the average climate projection for all actions. The selection of measures was thus optimized for the average climate projection.

1.6.9 Good practice examples in the iFRMP of the Scheld RB

For the implementation of the FD on the international level, the activities of the ISC provide a good practice examples for the Scheldt RB: The iFRMP includes a description of the commonalities and differences between the Member States' PFRAs.

1.6.10 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

- Information on whether the principle of solidarity was implemented in the RB should be provided.
- The iFRMP should be more specific on how the measures under the WFD and FD are coordinated.
- Public awareness raising activities of the iFRMP at the international level should be considered, by integrating for instance the international dimension into the national public awareness raising campaigns.
- More detailed information should be included on how the PFRA was coordinated at the international level.
- The return periods to assess flood risk are not the same in the Scheldt RB[87]. Convergence should be envisaged wherever possible as it supports common risk assessments.
- Statistics on people potentially affected by the different flood scenarios, risk to economic activity, risk to environment and risk to cultural heritage should be provided.

[87] The delegations of the ISC (France, Wallonia, Flanders, Brussels, Federal Belgium, the Netherlands) subsequently noted that this is not a requirement of the FD and that the probabilities are exchanged between the delegations.

- Climate change should be considerd in the setting of objectives and prioritisation of measures[88].
- Common principles for defining and prioritising measures should be considered for adoption.
- It should be considered to introduce a CBA for the planning and prioritising of measures with a transboundary effect.
- The information regarding the joint measures planned in the iFRMPshould be completed: The iFRMP does not make fully clear whether joint implementation of measures will take place.

[88] The delegations of the ISC noted that according to the FD climate change should be taken into account in the second FRMPs.

2 International units of management – Category 2 Basins

Category 2 Basins included: Duero (Spain, Portugal), Guadiana (Spain, Portugal), Miño/Minho (Spain, Portugal), Tagus (Spain, Portugal) and Isonzo/Soca (Italy, Slovenia), Ems (Germany, the Netherlands), Dniester/Dnistr/Nistru (Poland, Moldova, *Ukraine*), Tornio/Torne River (Sweden, Finland), Teno/Tana (Finland, *Norway*, *Russia*)

2.1 Introduction

For the Category 2 River Basins (RB), i.e. the international RBs with formal international agreement and international coordinating body or bodies, but no iFRMP, the outcome of the assessment on international cooperation is summarized in one section for all basins due to a) the limited amount of information that was available and b) similarities in the outcome of the assessment.

2.1.1 Contextual information

Four of the Category 2 RBs that were reviewed, the **Duero**, the **Guadiana**, the **Miño/Minho** and the **Tagus** RBs, are shared between Member States Spain and Portugal. They are all regulated by the 'Albufeira Convention'[89] for the protection and sustainable use of the waters of the Spanish-Portuguese watersheds, which was signed in 1998.

The **Isonzo/Soca** RB is shared between Member States Italy and Slovenia and is regulated by the "Commissione Italo-Slovena per'idroeconomia" in Italian and "Stalna slovensko-italijanska komisija za vodno gospodarstvo" in Slovenian (hereinafter called Permanent Bilateral Commission for Water Management) established in 1975. The Commission is in charge of studying all hydrological problems of common interest and proposing appropriate solutions in this field in order to ensure the improvement of water and electricity supply.

The agreement for international cooperation for the **Ems** RB is not based on a specific agreement but is anchored in a Ministerial correspondence between the two countries. The Ministers responsible for protection of the waters in the Ems RB in Germany and the Netherlands agreed to develop a common international coordination document for the Ems RB.

The **Torne** RB is shared between Member States Finland and Sweden. Whereas there is no iFRMP, the Finnish-Swedish Transboundary River Commission has the objective, in accordance with the Finland-Sweden Intergovernmental Agreement of 2010, to inter alia prevent floods and environmental accidents.

[89] http://www.cadc-albufeira.eu/

The **Teno/Naatamo/Paatsjoki** RB is shared between Finland, Norway[90] and Russia. Some flood related activities are carried out.

By definition, no iFRMPs have been developed for any of the category 2 RBs.

2.1.2 Institutional setup and governance of the transboundary RBs

The 'Infrastructure and Flood Security Working Group' is the expert group of the Albufeira Convention which is responsible for flood management of the **Spanish/Portuguese catchments**. The competencies of the working group are defined as follows: (i) identify relevant information in flood and emergency situations and ensure mechanisms for information exchange; (ii) promote the development of joint studies on floods and management of water infrastructures with transboundary effects; (iii) ensure the elaboration and installation of flood and emergency management instruments in the Spanish-Portuguese RBs; (iv) study the framework of competences in the area of safety of hydraulic infrastructures that may affect bilateral relations, in particular the role of concession companies or owners of dams or other hydraulic infrastructures and (v) develop a work program on issues related to dam safety, emergency plans and evaluation of risks of rupture and serious accidents with transboundary effects.

For the **Isonzo/Soca** RB there is no permanent working group on flood risk management in the 'Permanent Bilateral Commission for Water Management', but the Commission meets regularly to discuss the level of implementation of the FD and the WFD and all cooperation activities between the two countries in this sector. Between 2012 and 2015, the Commission met several times (at the official and technical/expert level) to coordinate the preparation of all the Flood Directive implementation activities (Italy, Slovenia)[91].

The international cooperation for the **Ems** RB between Germany and the Netherlands takes place within the 'International Steering Group Ems' (ISE). The group is responsible for overall harmonisation and general progress of work and the fundamental decisions on collaboration are taken by representatives of the responsible Ministries. In addition, experts from the Netherlands, from North Rhine-Westphalia and Lower Saxony work within the 'International Coordination Group Ems' (ICE). This group implements the underlying decisions of the Steering Group and arrives at specific agreements on joint implementation of

[90] Norway is not implementing the FD, it does implement the WFD.

[91] Italy subsequently informed that in order to establish a permanent working group, sharing methods, techniques and objectives as planned, the Eastern Alps RBD submitted in March 2018 the strategic project proposal VISFRIM (Vipacco and Other Transboundary River Basins Flood Risk Management) in the context of the INTERREG ITA-SLO 2014-2020 Program. The main objective of the project is to achieve an efficient management of the hydraulic risk in transboundary basins (the international Isonzo and Vipacco RBs and the interregional Lemene RB), through the development of methodologies and technological tools for the implementation of the existing FRMPs and their update by 2021. Recently the project proposal was selected among the proposals to be financed and its inception is planned by January 2019.

the required operational tasks. Working groups are in place according to thematic demand and tackle various themes of the FD and technically support the International Coordination Group Ems.

In the **Tornio/Torne** RB the cooperation is coordinated by the Swedish Civil Contingencies Agency, the Finnish Ministry of Agriculture and Forest and the Finnish-Swedish Transboundary River Commission. The border commission organizes meetings between the parties to discuss responsibilities and actions and has inter alia the tasks of: a) promoting coordination of the work of the authorities and municipalities and other parties that have interests in flood prevention and avoiding environmental accidents at border crossings and b) the responsibility to share information and hold meetings to discuss programs and plans set out in Article 10[92]. The border commission acts as a chair between the County Administrative Board and the Centre for Economic Development, Transport and the Environment (ELY Center) in the preparation of FRMPs (Finland, Sweden).

For the **Teno/Naatamo/Paatsjoki** RB coordination takes place under the Finnish-Norwegian Transboundary Water Commission which has been active since 1980 and the Finnish-Russian Transboundary Commission which is active since 1964.

It is not clear if financial resources for joint cooperation have been made available in any of the Category 2 RBs. Only for the **Duero** basin one measure (M24: Elaboración de estudios de mejora del conocimiento sobre la gestión del riesgo de inundación – Preparation of studies to improve flood risk management knowledge) refers to the costs of international cooperation, but no costs are specified. There is also no information on the financing for joint activities and projects.[93]

It is also not clear whether the solidarity principle has been applied in the five RBs. Spain and Portugal refer to the importance of the principle in the FRMPs, but for all except one of the RBs no further information is provided on how this principle has been applied[94]. Only for the **Tagus** RB it is explicitly mentioned that none of the measures taken in Spain increases flood risk in the downstream Portuguese areas. In the FRMP for the Eastern Alps (Italy), Article 7(4) is not explicitly mentioned. In the **Tornio/Torne** RB, the Tornio FRMP (Finland) acknowledges that FRMPs needs to be harmonised and measures cannot have a negative cross-border impact unless agreed jointly within the international RB.

[92] In accordance with the Finland-Sweden Intergovernmental Agreement of 2010.

[93] Slovenia subsequently informed of the Slovenian-Italian VISFRIM strategic flood risk reduction project in the Isonzo/Soca RB which includes many common flood risk reduction activities. https://www.ita-slo.eu/sites/default/files/Graduatorie_strategici_lestivce_strateski_Ita-Slo_05_2018.pdf

[94] Portugal subsequently clarified that Portugal and Spain have an agreement to increase the information exchange during flood events. In the Tagus basin this exchange is already done by connecting databases. This automation will be extended to the other international basins. With this agreement it is made possible to manage dam storage capacity existing in the two countries in order to minimize the effects of floods.

For the **Spanish/Portuguese catchments** the Portuguese FRMP describes the interaction with the RBMP on a very generic level. Interaction addresses a) the overlaps between WFD water bodies and FD risk areas, and b) the effects of FD measures on the WFD objectives, considering three elements: 1) contribution to WFD objectives, as per the flow reduction (e.g. by recovery of riparian vegetation) and subsequently reduced pollution risks; 2) exemptions due to WFD's Art. 4(6); 3) exemptions due to WFD's Art. 4(7). In the **Tagus** FRMP, out of 33 overlapping areas, in three of them, interference with the WFD's objectives might be the case, but these are not further described, and a generic reference to the RBMP is provided for further details.[95]

For the **Isonzo/Soca** RB, information on the coordination is also provided. During a meeting of technical experts held in Gorizia in December 2015, the existing synergies between the measures of the national FRMPs (Italy, Slovenia) and those of the RBMP were discussed and promoted. The inventory of measures in the FRMP of the Eastern Alps (Italy) and of Slovenia indicates for each measure whether there can be a synergy, potential conflict or no interaction with the RBMP measures and whether the measures are also adopted in the RBMP (win-win situation).

The **Dniester/Dnistr/Nistru** RBn is shared between Member States Poland and Moldavia and Ukraine. The Polsh WISE report states that no APSFRs were identified in the Dniester/Dnistr/Nistru RB and therefore no FRMP was prepared. According to the Polish Dniester RBMP, the Ukrainian-Polish Commission has five working groups: 1) planning of transboundary waters; 2) protection of border waters against pollution; 3) flood control regulations and drainage; 4) combating extraordinary pollution; and 5) hydrometeorology and hydrogeology.

2.1.3 Coordinated consultation of FRMPs in transboundary RBs

Since there are no iFRMPs for Category 2 RBs, there is also no joint/transboundary communication strategy in place for an FRMP in any of the basins. It should be noted though for the **Iberian peninsula**, that the Spanish draft FRMPs were also produced in Portuguese language and are available on the website of the competent Portuguese authority. In the Finish FRMP for the **Tornio/Torne** RB, the summary of the Plan also exists in Swedish, Mäenkieli and in Northern Sami language (for the indigenous Sami people). The FRMP for the Eastern Alps (Italy) states that further coordination of public participation activities, exchange of data and methodologies in the implementation of the FD is important, however it remains unclear how this has been made operational.

[95] It was further clarified by Portugal and Spain that at its 20th plenary meeting, the Commission for the Implementation and Development of the Albufeira Convention agreed to prepare a joint report on the implementation of the programme of measures for shared bodies of water, including the measures set out in the framework of the FD, as well as the evaluation of their status, according to the mid-term evaluation set out in Article 15(3) of the WFD.

For the Garonne-Cantabrico, the Garonne-Ebro, the Vistula, the Pregolya and the Tornio/Torne RBs there was a public consultation individually for the national FRMPs.

There has been no joint public consultation or awareness rising of joint activities in most of the RBs. For the Minho (Unit of Management ES10) a joint workshop was held in 2015 for the consultation and formal procedure of exchanges of FRMPs (between Spain and Portugal) and the clarification of the agendas. Also the FRMPs for the Tornio/Torne River includes a table showing several meetings and workshops where the flood risk management work has been presented and many of these events have been joint events. For example, there was a public consultation of the national FRMPs where both, Finland and Sweden were involved. During the process, collaboration took place regarding goals, responsibilities, tasks and roles.

2.1.4 Preliminary Flood Risk Assessment in transboundary RBs

For all catchments in Category 2 the conclusions of the PFRA were presented only individually for the national shares.

The transboundary risk areas for the **Ems** RB are Haren-Rütenbrock-Kanal and the Ems Estuary. The document on international coordination states that the methodologies used in the two Member States are different, but coordination and data exchange during the risk assessment took place and the results are comparable. In the case of the Ems river, Germany considered fluvial and coastal flooding, while the Netherlands considered fluvial, pluvial, coastal flooding and artificial water bearing infrastructure. The international coordination document for the Ems river provides the conclusion of the PFRA in the form of a map.

For the **Isonzo/Soca** RB during a meeting of the Permanent Bilateral Commission for Water Management in 2014, FHRMs already prepared and available for the respective parts of the Isonzo/Soca RB were presented[96]. The text of the FRMP (Italy) explains that the measures to manage flood risk were subject to coordination rather than the risk assessment itself.

The coordination of the risk assessment in the **Tornio/Torne** RB is summarised in Appendix 6 of the FRMP of Haparanda (Sweden). There is no information on how the coordination was performed, but the results of the coordination are provided[97].

Flood risk in **Teno/Tana** RB has been jointly assessed between Finland and Norway and it is very low or even non-existent and no APSFR has been designated. The Finnish-Norwegian Transboundary Water Commission has also acknowledged the low flood risk in the area and the

[96] Slovenia subsequently informed that in a meeting of the Permanent Bilateral Commission for Water Management in 2012 information exchange on the PFRA and the harmonisation of APSFR's in the RB took place. http://www.statika.evode.gov.si/fileadmin/vg_komisije/SLO-IT-zasedanje_december%202012.pdf

[97] Finland subsequently informed that in addition, a joint report on the PFRA was prepared in 2011 and the coordination is briefly described in the national FRMPs.

cooperation is presently focusing on other aspects such as implementation of the WFD and fisheries.

It is not clear whether the risk assessment in the four **Spanish/Portuguese** RBs has been coordinated on an international level as no specific information is provided in the national FRMPs (Spain, Portugal).

For the **Guadiana** RB three joint risk areas have been identified by Spain: Two fluvial APSFRs (ES040_EXT_019 (Guadiana X) and ES040_AND_001 (Guadiana XI)) and one coastal APSFR (ES040_AND_008). Portugal has not identified flood risk areas for the Guadiana RB[98]. There is no information on whether the sources of flooding considered in the common flood risk areas are the same.

2.1.5 Flood Hazard and Flood Risk Maps in transboundary RBs

The probabilities of flooding used for developing the flood hazard maps are different in the national shares of each RB (see the table below, return periods in years).

Table 20: Overview of return periods in "category 2" basins (in years)

River Basin	Member States	low probability	medium probability	high probability
Spanish/Portuguese RBs	Portugal	1 000	100	20
	Spain	500	100	10
Isonzo/Soca	Slovenia	500	100	10
	Italy	300-500	100	30
Ems	Germany	200-1 000	100	10-20
	The Netherlands	500-1 000	100-300	10-30
Tornio/Torne	Finland	250-1 000	100	2, 5, 10 and 20
	Sweden	10 000	100	50
Teno/Tana	Finland	250-1000	100	20

A common risk map only exists for the **Ems** RB, which is based on the individual national approaches. However, the international coordination document states that the results shown in the map are comparable. In the **Tornio/Torne** RB, initial flood hazards maps were produced in a joint project in 2009-2012, but the final ones adopted at the national level are differentiated because of variations in the chosen flood scenarios/probabilities.

As mentioned above, in the **Isonzo/Soca** RB mutual presentations of the FHRMs took place in 2014 under the Permanent Bilateral Commission for Water Management[99].

[98] It was subsequently clarified by Spain and Portugal that in the 20th plenary meeting of the Commission for the Implementation and Development of the Albufeira Convention, (Oporto, November 2017), the WG on Planning was entrusted with coordinating the preparation of the FRMPs for the 2022-2027 period, in particular the development of common methodologies to identify critical areas of flood risk, especially in shared bodies of water, taking into account the impact of climate change.

[99] Slovenia subsequently provided this internet link:

2.1.6 Setting of objectives for the management of flood risk in transboundary RBs

For the **Isonzo/Soca** RB at the meeting of the Permanent Bilateral Commission for Water Management held in Miren (Slovenia) in October 2014, the state of implementation of the FD was discussed and the participants noted that both parties had common objectives and decided to coordinate their implementation. However, no more explicit information is provided on these objectives. It is therefore assumed that the objectives referred to are those defined at the national level: To reduce the potential negative consequences that floods may have on human health, the environment, cultural heritage and economic activity. The impacts of climate change will be accounted for in the next FRMP (Italy).

For the **Ems** RB (Germany, the Netherlands), the different objectives are as follows: (a) avoid new, unacceptable risks; (b) reduction of existing risks to an acceptable level; (c) reduction of adverse consequences during a flood event and (d) reduction of adverse consequences after a flood event. The national objectives are the same, but they are described in much more detail. Climate change has not yet been taken into account when setting the joint objectives for the basin, but will be in accordance with Article 14(4) in the next cycle.

For the **Torne/Tornio** RB, objectives for flood risk management were compared for the Finnish and Swedish parts and are mostly the same. These include for instance informing the general public about flood risk and how one can prepare for a flood with a return period of 50-100 years. In the Tornio FRMP (Finland) also Haparanda's (Sweden) objectives are presented and similarities and differences are shown in a table. No joint objectives for the management of flood risk at the international level have been established in the four **Spanish/Portuguese** RBs.

There is no information available for the **Dniester/Dnistr/Nistru** RB and the **Teno/Naatamo/Paatsjok**i RB.

2.1.7 Planning and implementation of measures in transboundary RBs

Common and coordinated measures[100] were only listed for the **Ems** RB:

Table 21: Joint coordinated measures

M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M61	Other

http://www.statika.evode.gov.si/fileadmin/vg_komisije/SLO-IT-zasedanje_oktober%202014.pdf

[100] Numbering according to 'A User Guide to the Floods Reporting Shemas' (Technical support in relation to the implementation of the FD) see:
http://cdr.eionet.europa.eu/help/Floods/Floods_603_2016/resources/User%20Guide%20to%20the%20Floods%20schema%20v6.0.pdf

Chapter 5.2 of the coordination document of the Ems lists the following set of common measures: a) dike watching (dyke controls); b) information exchange and c) exchange on crises management and joint trainings.

In the Ems RB, no agreed timeframe for implementing the measures is provided. However, according to the coordination document between Germany and the Netherlands it seems that the joint measures have already been implemented. No information is provided on whether the implementation of these measures has been or will be monitored in a joint way.

For the **Isonzo/Soca** RB the key joint principle for defining and prioritising measures is to coordinate the methodology for the evaluation of their costs and benefits, but no further information is provided in the documents assessed.

For the **Isonzo/Soca** RB the main common and coordinated measures are:

Table 22: Joint coordinated measures

M31	Protection Natural flood management / runoff and catchment management, Measures to reduce the flow into natural or artificial drainage systems, such as overland flow interceptors and / or storage, enhancement of infiltration, etc and including in-channel, floodplain works and the reforestation of banks, that restore natural systems to help slow flow and store water
M41	Preparedness, Flood Forecasting and Warning, Measure to establish or enhance a flood forecasting or warning system
M42	Preparedness, Emergency Event Response Planning / Contingency planning, Measure to establish or enhance flood event institutional emergency response planning
M43	Preparedness, Public Awareness and Preparedness, Measure to establish or enhance the public awareness or preparedness for flood events

During the meeting of technical experts held in Gorizia in December 2015 for the Isonzo/Soca RB, the existing synergies between the measures of the FD and those of the WFD were discussed and promoted. The inventory of measures available in Annex V to the FRMP of the Eastern Alps (Italy) indicates for each measure whether there can be a synergy with the WFD's measures and whether the measure is also adopted in the RBMP (win-win situation). The inventory of measures in the Slovenian FRMP indicates for each measure whether there can be a synergy, potential conflict or no interaction with the RBMP measures. Furthermore, the FRMP states that the transboundary measures will be implemented in two phases (the first phase is 2016-18 and the second phase 2019-21). The group of technical experts appointed by the Italian-Slovenian Commission met four times in 2016 to discuss the progress in the implementation of the common measures. Each meeting was devoted to the monitoring of a specific measure among the shared ones.

For the **Tornio/Torne** RB, measures are discussed jointly, and the corresponding measures are shown in the Finish FRMP, for example, using tables and describing possible

transboundary impact. Some measures are reported by Sweden, however, it is not clear which measures were coordinated on an international level.[101]

Based on the assessment of the national FRMPs there are no common and coordinated measures and no information was found in the national FRMPs on whether there are joint principles for defining or prioritising measures[102] for the four **Spanish/Portuguese** RBs.[103]

There is no information available for the **Dniester** RB[104] and the **Teno/Naatamo/Paatsjoki** RB.

2.1.8 Consideration of climate change in transboundary RBs

For the **Spanish/Portuguese** catchments there is no information if climate change has been considered as an international coordination issue. Spain refers to previous studies existing on water availability reduction (however not much linked to flood risk), and explains that further studies will be undertaken, while Portugal refers to the fact that such studies will be undertaken by 2018 only. There is no information regarding whether climate change was considered in the setting of objectives or in the selection of measures.

For the **Isonzo/Soca** RB, the FRMP for Eastern Alps (Italy) states that, in line with Article 14 of the FD, the impact of climate change on the occurrence of floods and their effect will be evaluated when reviewing the Plan. The review will take into consideration the Italian National Climate Change Strategy which has been adopted on 16 June 2015.

In the **Ems** RB (Germany, the Netherlands), climate change is not addressed in the coordination document, but in the national FRMPs information is provided.

In the **Tornio/Torne** RB, it is not clear if climate change was considered as an issue for bilateral coordination.[105]

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[101] Finland and Sweden subsequently informed that all the measures stated in both FRMPs were discussed in several joint Finnish-Swedish meetings between the Transboundary River Commission, regional and municipal authorities.

[102] Spain subsequently informed that Article 18 of the Albufeira Convention sets out actions to be taken if there are floods. In section 4 of the Convention, both countries commit to sharing in real time, during an emergency flooding situation, the information they have about precipitation, flows, levels, reservoir situations and operating conditions. The aim of this is to support the adoption of the most appropriate management strategies and the coordination of such strategies. Also, both countries must coordinate their individual and joint actions so as to prevent, eliminate, mitigate and control the effects of flooding.

[103] Portugal subsequently informed that although not mentioned in the Plans, a common project was proposed in 2016 to INTERREG (POCTEP), called Prevention of Flood and Drought Risks in the Minho-Lima International Basin, approved in 2017 with an amount of EUR 2.3 M. The main objective is to develop activities to mitigate the effects of floods and drought, increasing knowledge on extreme events throughout the international basin in the context of climate change, to better prevent, prepare, manage and promote environmental and human protection.

[104] Poland subsequently clarified that FRMPs were prepared for areas at risk of flooding, identified in the PFRA and detailed in the FHRMs. Due to the fact that no APSFRs were identified in the Dniester River Basin, no FHRMs were prepared and also there was no need to prepare FRMPs.

There is no information available for the **Dniester** RB[106] and the **Teno/Naatamo/Paatsjoki** RB.

2.1.9 Recommendations for next flood risk management planning cycles

In preparing for the second cycle of the FD, the following recommendations can be made to further improve cooperation:

- Drafting an iFRMP for the international UoM/RBD should be considered. This will serve as a tool to guide cooperation on all aspects: protection, prevention and preparedness. Defining objectives for the management of flood risk at the transboundary level could be a first step in this direction.
- Co-financing of measures with a transboundary effect should be considered to strengthen cross-border cooperation but also to ensure that the measures taken are following an overarching concept to reduce the risks.
- More specific information should be provided in the national FRMPs on how the principle of solidarity was implemented in practice.
- Public awareness raising activities of the national FRMPs at an international level should be increased, thereby promoting appreciation of RB wide and transboundary water management.
- The probabilities to assess flood risk for high and low probability floods are not the same. A converge of probabilities used could be envisaged as it supports common risk assessments. Overall conclusions of the flood risk assessment for the entire RB should be presented in the national FRMPs.
- Risk maps and statistics on people potentially affected by the different flood scenarios, risk to economic activity, risk to environment or risk to cultural heritage covering the entire RB should be provided. This should aid regional risk management cooperation.
- Climate change should be considered in the setting of objectives and in the prioritisation of measures.

[105] Finland and Sweden subsequently informed that climate change was included as a topic in joint projects at the PFRA and FHRM phases. These activities will be strengthen in the second cycle.
[106] See footnote above with clarification from Poland.

Spanish/Portuguese RBs:

- Information on coordination with the WFD at the international level should be provided.
- Information on the coordination of the risk assessment at a transboundary level should be provided.
- Information should be provided if transboundary flood risk areas for the Duero, the Miño/Minho and the Tagus RBs exists and if yes, how they have been designated.
- Joint principles for defining and prioritising measures at an international level should be specified.
- Common measures should be defined and coordinated at an international level.

Isonzo/Soca RB:

- Information on the existence of joint flood risk areas starting from the PFRA phase should be provided.

3 International units of management – Category 3 Basins

Category 3 Basins include: Garonne-Eastern Cantabrian (Spain, France), Garonne-Ebro (Spain, France), Vistula (Lithuania, Poland, Slovakia, *Belarus, Ukraine*), Pregolya (Lithuania, Poland, *Russia*), Vidaa/Wiedau (Denmark, Germany) Krusaa/Krusau (Denmark, Germany)

3.1.1 Introduction

Category 3 RB are basins which are international RB or international UoMs with formal international agreements, but no iFRMP and no international coordinating body.

The outcome of the assessments on international cooperation for all Category 3 RBs is summarized in one section due to a) the limited amount of information that was available and b) similarities in the findings of the assessment.

3.1.2 Contextual information

For the **Garonne** RB in France and the **Eastern Cantabrian** and **Ebro** RBs in Spain, a number of agreements are in place that relate to international cooperation, but very few information on the activities undergone under these agreements is provided. For the three RBs reference is made to the Agreement of Toulouse that was established between Spain and France in February 2006 in order to better coordinate measures taken in the watersheds located in both countries (especially measures of the WFD). For the linked Garonne and Ebro RBs it is stated that under this convention it was agreed to make independent plans and to hold technical meetings for coordination, but no further details on these meetings are provided. For the linked Garonne and Eastern Cantabrian basins, the Joint Commission of the Lanós Lake and the Upper Garonne Joint Commission are also in place, but no activities are reported.

The **Vistula** RB is a Category 3 RB that is shared between EU Member States Lithuania, Poland and Slovakia and non-EU countries Belarus and Ukraine. International cooperation is based on a large number of international conventions and intergovernmental agreements, including: the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (17 February 2000), the agreement between Poland and Slovakia on Water Management in Border Countries (14 May 1997), the agreement between Poland and the Ukraine on cooperation in the field of water management in border waters (10 October 1996), the agreement between Poland and Belarus on cooperation in the field of environmental protection (20 May 1992) and the agreement between Poland and Lithuania on cooperation in the field of border water use and protection (07 June 2005). International cooperation in the area of particular water regions is carried out under statutory tasks and concentrates on cooperation in border waters (Slovakia, Ukraine, Lithuania, Belarus) and

other cooperation in the field of water management. This cooperation is also based on the arrangements for mutual cooperation in the implementation of EU water policy. For the Vistula RB, information exchange with Slovakia takes place within the framework of the Polish-Slovak Border Water Commission and the Polish-Ukrainian Border Water Commission. At present negotiations are underway on a draft agreement between Poland and Belarus on cooperation in the field of water management for border waters.

The **Pregolya** RB is shared between Member States Lithuania and Poland, and Russia. International cooperation is coordinated by the National Water Management Board in Poland and based on two formal international agreements: one with Lithuania (7 June 2005) and one with Russia (first signed 17 July 1964 under the USSR and automatically renewed every five years).

The transboundary rivers shared by Denmark and Germany are the Vidaa/Wiedau and the Krusaa/Krusau rivers. Vidaa-Krusaa is part of the **Eider** and the **Schlei/Trave** RB in Germany, and makes up the whole of the international RB in Denmark (Internationalt Vanddistrikt DK4). The Eider and Schlei/Trave RB in Germany and the Internationalt Vanddistrikt DK4 have originally been reported as international RBs according to Article 3 of the WFD, but since 19 % of the Vidaa/Wiedau and 25 % of the Krusaa/Krusau RBs are located in Germany, these minority shares of the basins are combined with larger RBs and both treated in a combined manner by Germany. but since only very small shares of the basins are located in Denmark, they are both treated as national RBs by Germany. This is based on an agreement with Denmark and has been reported as such for both the WFD and the FD. The implementation of the FD has been coordinated between Germany and Denmark[107].

3.1.3 Institutional setup and governance of the transboundary RBs

For none of the Category 3 RBs an international coordinating body exists. Hence, coordination is performed by the different bodies (e.g. working groups) based on international agreements, but very few information on who is performing which task is available. For the two **French-Spanish** catchments no working groups are in place. The Spanish FRMP (ES091) for the **Garonne-Ebro** refers to technical meetings, but no further details are given. For the **Garonne-Eastern Cantabrian** the FRMP (ES017) includes a specific annex on international cooperation, which does not refer to any working group, but details all issues regarding this topic. In the **Vidaa/Wiedau** and the **Krusaa/Krusau** RBs work is coordinated

[107] Germany subsequently informed that a joint declaration from 2005 exists. The agreement originally was limited to coordinating the implementation of the WFD, but it was updated in 2010 via an exchange of ministerial letters to include also coordination under the FD.

between relevant authorities[108]. For the **Vistula** several working groups have been established. For the **Pregolya** RB no information on any working groups was available.

It is not clear if financial resources for joint cooperation have been made available in any of the "Category 3" basins. There is also no information on the financing for joint activities and projects. Only for the **Vistula** RB it is explicitly stated that there are no investment activities that could have cross-border effects. Countries in the Vistula RB (also outside the EU) are being kept informed about any activities/projects carried out or planned in the RB during the bilateral commission meetings.

All FRMPs, refer to the principle of solidarity, i.e. Member States should avoid taking measures which due to their extent and their effect considerably increase the flood risk in other countries upstream or downstream in the same river catchment or sub-catchment as long as these measures are not coordinated between the Member State concerned and a common solution has been found. However, it remains unclear how this is handled in practice.

No information was provided on how the FRMPs were coordinated with the RBMPs for Category 3 RBs on the international level, except for the **Garonne-Eastern Cantabrian** RB where it is mentioned in the Spanish FRMP that the French authorities have been invited by Spain to a workshop on floods in the frame of the second RBMP drafting. However, coordination between FRMPs and RBMPs has taken place in many cases at the national level.

3.1.4 Coordinated consultation of FRMPs in transboundary RBs

For the **Garonne-Eastern Cantabrian,** the **Garonne-Ebro,** the **Vistula,** the **Pregolya** and **Vidaa/Wiedau** and the **Krusaa/Krusau** no joint/transboundary communication strategy has been developed. In the **Vistula** and **Pregolya** RBs consultation was mainly done via the established working groups.

3.1.5 Preliminary Flood Risk Assessment in transboundary RBs

For the **Vidaa/Wiedau** and the **Krusaa/Krusau** it is stated that the PFRA was coordinated among Denmark and Germany[109], but no details are provided.

Transboundary risk areas have been identified in the **Garonne-Eastern Cantabrian** RB but the information provided in the national FRMPs (Spain, France) is not matching. According to the Spanish FRMP (ES017) there are two joint flood risk areas (Irún-Hondarribia and regatas Ugarana y Lapitxuri), while the French FRMP (FRF) identifies one transboundary risk

[108] Denmark subsequently informed that this is accomplished by means of annual meetings between senior representatives from Germany and Denmark where information on the implementation of the FD in the Danish-German border is exchanged.

[109] Denmark subsequently informed that this is accomplished by means of annual meetings between senior representatives from Germany and Denmark.

area, the Basque Coastline. The sources of flooding that are considered in these transboundary flood risk areas are not entirely overlapping for the two Member States. In the Garonne-Eastern Cantabrian RB the Spanish FRMP (ES017) mentions that fluvial and marine flooding were considered, while in the French FRMP (FRF) it is stated that overflows of watercourses, marine submersions, urban or agricultural runoff, rising groundwater, rising mountain torrents and ruptures or failures of hydraulic structures are taken into account.

3.1.6 Flood Hazard and Flood Risk Maps in transboundary RBs

The probabilities of flooding used for developing the flood hazard maps of the four Category 3 RBs are different in the national shares of each RB (see table below).

Table 23*: *Overview of return periods in "category 3" RBs (in years)

RB	Member States	low probability	medium probability	high probability
Garonne-Ebro	Spain	500	100	10
	France	1 000s	100-300	10-30
Garonne-Eastern Cantabrian	Spain	500	100	10
	France	1 000	100-300	10-30
Vistula	Poland	0.2%	1%	10%
	Slovakia	1 000	100	5, 10 and 50 years
	Lithuania	0.1%	1%	10%
Pregolya	Poland	0.2%	1%	10%
	Lithuania	no info	no info	no info
Schlei/Trave	Germany and Denmark	200	100	10
Eider	Germany and Denmark	200	100	10

3.1.7 Setting of objectives for the management of flood risk in transboundary RBs

For none of the Category 3 RBs, joint objectives for the management of flood risk at the international level have been established.

For the **Garonne-Ebro** and the **Garonne Eastern Cantabrian** RBs the French submission to WISE states that 'an identification of cross-border issues is to be carried out, which will be followed by the establishment of useful contacts and cooperation' .

For the **Vidaa/Wiedau** and the **Krusaa/Krusau** objectives have been set. They are: a) avoid new, unacceptable, risks; b) reduction of existing risks to an acceptable level; c) reduction of adverse consequences during a flood event and (d) reduction of adverse consequences after a flood event.

3.1.8 Planning and implementation of measures with transboundary effect

For none of the six Category 3 Basins joint principles for defining or prioritising measures have been defined and no information on the use of a cost-benefit analysis is provided.

For the **Vistula** and **Pregolya** RBs there are some measures reported by Poland, but none are international, the majority are national, some regional (within Poland). For the **Vidaa/Wiedau** and the **Krusaa/Krusau** RBs it is stated that measures are coordinated, but further details are not provided.

No information is provided for any of the Category 3 Basins regarding a coordination of measures with the WFD's requirements on international level[110].

3.1.9 Consideration of climate change in transboundary RBs

There is no information regarding whether climate change was considered in the setting of objectives or in the selection of measures at international level. Climate change has been considered in parts of five of the international Category 3 RBs within the national contexts.

3.1.10 Recommendations for next flood risk management planning cycles

For all Category 3 RBs the following recommendations can be made to further improve cooperation:

- Closer links should be developed in order to move progressively towards a Category 1 RB, if justified by the circumstances. This would mean to develop a formal agreement/s with an international coordinating body and eventually an international FRMP.

[110] Poland subsequently clarified that for the Vistula and Pregolya river basin, no investment measures are planned in the first cycle of implementation of the FD that could have a cross-border impact. Therefore, there was no need for coordination of measures with the WFD's requirements at the international level.

4 International units of management – Category 4 Basins

Category 4 Basins include: Po (Italy, France, *Switzerland*), Eastern Alps/Adige (Italy, *Switzerland*), Gauja/Koiva (Estonia, Latvia), East Estonia (Estonia, *Russia*), Nemunas/Nieman/Neman/Nyoman (Lithuania, Poland, *Russia, Belarus*), Kemijoki[111] (Finland, *Norway, Russia*),

4.1.1 Introduction

Category 4 RB are international RBs or international UoMs with no formal international agreement, no international coordinating body and no iFRMP. The outcome of the assessments on international cooperation for basins is summarized in one section due to (a) the very limited amount of information that was available and (b) similarities in the findings of the assessment.

4.1.2 Contextual information

The **Po** RB is shared between the Italy and France and the Non-EU Switzerland. Coordination activities have only been carried out for the Strategic Environmental Assessment (SEA) of the Italian FRMP: Institutional representatives of France and Switzerland were consulted with regards to the cross-border portions of the Po RB. No further coordination activities have been put in place for the preparation of the Italian FRMP.

The **Eastern Alps/Adige** RB is shared between the Italy and Non-EU Switzerland. The Eastern Alps FRMP (Italy) explains that, for the international RB district Adige, due to the limited territorial extent (only 1.09% of its surface is in Switzerland) and the absence of particular issues related to the management of flood risks, no agreement has been signed between the two countries, nor the development of a shared plan was necessary.

The **Gauja/Koiva** RB is shared between Estonia and Latvia. No information was found in the national FRMPs or on the European Environment Agency's WISE regarding any kind of international cooperation in relation principally to flood risk management. A background document on "Transboundary Cooperation between Estonia and Latvia in the frame of River Basin Management Planning in Gauja/Koiva River Basin District" mentions flooding as a source of pollution in two water bodies. The document further states that cooperation in the RB will continue with the aim of developing a transboundary policy document for the Gauja/Koiva RB for the third RBMP implementation. It is unclear if this will also address flooding issues.

[111] Finland subsequently informed that only a very small part of the RB is in Russia (2,9%) and an even smaller part in Norway. These parts are very sparsely populated small upstream catchments with only a very little human or hydrological impact on the Kemijoki RB. In addition, no flood risk issues have been identified in these parts from the work of the Finnish-Russian transboundary commission.

The **East Estonia** RB is shared between Estonia and Russia. No information was found in the East Estonian FRMP or on WISE regarding any kind of international cooperation.

The **Nemunas/Nieman/Neman/Nyoman** RB is shared between Lithuania and Poland, and Russia and Belarus. The Polish information to WISE states that for this basin no APSFR was identified and no FRMP was prepared.

4.1.3 Institutional setup and governance of the transboundary RB

No information for any of the basins.[112]

4.1.4 Coordinated consultation of FRMPs in transboundary RBs

No information for any of the basins.

4.1.5 Preliminary Flood Risk Assessment in transboundary RBs

No information for any of the basins.[113]

4.1.6 Flood Hazard and Flood Risk Maps in transboundary RBs

No information for any of the basins.

4.1.7 Setting of objectives for the management of transboundary flood risk

No information for any of the basins.

4.1.8 Planning and implementation measures with transboundary effect

No information for any of the basins.

4.1.9 Consideration of climate change in transboundary RBs

No information for any of the basins.

4.2 Recommendations for next flood risk management planning cycles

The following recommendations can be made to further improve cooperation:

- Formal bilateral or multilateral cooperation mechanisms should be established on the subject, or flood risk management included in the context of a changing climate in already established mechanisms.

[112] Estonia and Latvia subsequently informed that there was an agreement signed on 24/10/2003 between the Ministry of Environment of the Republic of Latvia and the Ministry of the Environment of the Republic of Estonia on co-operation in protection and sustainable use of trans-boundary watercourses. The agreements provided for the establishment of groups of experts from the competent authorities which convene regularly to exchange information and to coordinate issues important for the development of the RBMP and the FRMP.

[113] Latvia and Estonia subsequently informed that there are no trans-boundary flood risk areas (APSFR) within the Gauja/Koiva RB. Estonia also informed subsequently that there are no trans-boundary flood risk areas within the East Estonia RB. Therefore, there are no transboundary flood hazard and risk maps, nor flood risk management plans.

Annex

Overview of international coordinating mechanisms

Category	iRBD	International Coordinating Body/ International Coordinating Mechanism	Means of coordination
Category 1	Danube	International Commission for the Protection of the Danube River (ICPDR)	Expert Group 'Flood Protection' (FP EG)
	Rhine	International Commission for the Protection of the Rhine (ICPR)	Working Group 'Flood'
	Meuse	International Meuse Commission (IMC)	Working Group 'Flood management'
	Elbe	International Commission for the Protection of the Elbe (ICPER)	Working Group 'Flood management'
	Odra	International Commission for the Protection of the Odra (ICPO)	Working Group 'Flood management'
	Scheldt (Escaut)	Internatioal Scheldt Commission (ISC)	Working Group 'PA7b'
Category 2	Duero/Douro	Albufeira Convention	Infrastructure and Flood Security Working Group
	Guadiana	Albufeira Convention	Infrastructure and Flood Security Working Group
	Miño/Minho	Albufeira Convention	Infrastructure and Flood Security Working Group
	Tagus (Tajo/Tejo)	Albufeira Convention	Working Groups on Hydrological Information, Planning and Information Exchange
	Isonzo/Soča/Soca	Italian-Slovenian Commission for the hydroeconomy	No permanent working group
	Dniester/Dnistr/Nistru	Agreement between the Government of Ukraine and the Government of Poland on Cooperation in the Field of Water	Ukrainian-Polish Working Group on flood control regulations and

Category	iRBD	International Coordinating Body/ International Coordinating Mechanism	Means of coordination
		Management in Frontier Waters (signed in 1996). This agreement established the Ukrainian-Polish Commission. Agreement between the Government of the Republic of Moldova and the Government of Ukraine on the joint management and protection of the cross-border waters in 1994.	drainage
	Ems	Managed through close cooperation between the German Federal States of Lower Saxony and North Rhine-Westphalia and the Netherlands as well as with the German Federal Government No international coordinating body but supporting document on international coordination developed in addition to the three national FRMPs (DE, NL)	Two working groups: a) an international coordination group and b) an international governance group which also deals with flood management
	Tornio/Torne	Coordinated by the Swedish Civil Contingencies Agency, the Ministry of Agriculture and Forestry in Finland and the Finnish-Swedish Border Commission Finland-Sweden Intergovernmental Agreement of 2010 with the objective to inter alia prevent flood and environmental accidents for the Torne River.	Non-permanent working groups are in place. The Swedish Finnish River Commission can arrange meetings and working facilities for the working groups.
	Teno/Tana, Nataamo/Neiden, Pasvloa/Paatsjoki/Pasvik	Coordinated by the Finnish-Norwegian Transboundary Water Commission and the Finnish-Russian Transboundary Commission.	

Category	iRBD	International Coordinating Body/ International Coordinating Mechanism	Means of coordination
Category 3	Garonne/ Cantabrico Oriental	Agreement of Toulouse (established between Spain and France in February 2006) FRMP (ES017) includes a specific annex on international cooperation, which details all issues regarding this topic	No working group
	Garonne/Ebro	Agreement of Toulouse (established between Spain and France in February 2006) -under this convention it was agreed to make independent plans, and to hold technical meetings for coordination, but no further details on these meetings are provided Joint Commission of the Lanós Lake and the Upper Garonne Joint Commission are also in place, but no activities are reported. Spanish FRMP (ES091) refers to technical meetings, but no further details are given	No working group
	Vistula	Convention on the Protection and Use of Transboundary Watercourses and International Lakes (17 February 2000) Agreement between Poland and Slovakia on Water Management in Border Countries (14 May 1997) Agreement between Poland and the Ukraine on cooperation in the field of water management in border waters (10 October 1996) Agreement between Poland and Belarus on cooperation in the field of environmental protection (20 May 1992) Agreement between Poland and	Group R - for flood prevention measures, regulation of border watercourses, water supply, land improvement, planning and hydrogeology; HyP Group - for hydrology and flood protection, dealing among others among other exchanges and control of hydrometeorological information,

Category	iRBD	International Coordinating Body/ International Coordinating Mechanism	Means of coordination
		Lithuania on cooperation in the field of border water use and protection (7 June 2005) International cooperation in the area of particular water regions is carried out under the statutory tasks and concentrates on cooperation in border waters (Slovakia, Ukraine, Lithuania, Belarus) and other cooperation in the field of water management. This cooperation is also based on the arrangements for mutual cooperation in the implementation of the EU water policy. For the Vistula River Basin, information exchange with Slovakia takes place within the framework of the Polish-Slovak Border Water Commission and the Polish-Ukrainian Border Water Commission. At present negotiations are underway on the draft agreement between Poland and Belarus on cooperation in the field of water management in border waters.	performing flow measurements on boundary profiles; Ukrainian-Polish Working Group on flood control regulations and drainage
	Pregolya	International cooperation is coordinated by the National Water Management Board in Poland and based on two formal international agreements: one with Lithuania (7 June 2005) and one with Russia (first signed 17 July 1964 under the USSR and automatically renewed every five years). National FRMPs (LT, PL) exist, but no iFRMP was prepared.	No working group
	Vidaa/Wiedau	Signed bilateral joint declaration	

Category	iRBD	International Coordinating Body/ International Coordinating Mechanism	Means of coordination
		on cooperation between Denmark and Schleswig Holstein	
	Krusaa/Krusau	Signed bilateral joint declaration on cooperation between Denmark and Schleswig Holstein	