



Photo: Christian Jung, LHW Saxony-Anhalt  
Flood plain near Breitenhagen, 10 June 2013

## INTERNATIONAL FLOOD RISK MANAGEMENT PLAN FOR THE ELBE RIVER BASIN DISTRICT

Floods are natural events that may have devastating consequences in densely-populated cultural areas. This is also reflected by the extreme flood events that affected the Elbe river basin in 2002, 2006, 2010, 2011 and 2013 (Table 1). Human activities resulting in increasing settlement areas in flood plains as well as a loss of natural retention areas can substantially increase the probability of flood events and their adverse consequences. That is why countries make every effort in order to reduce these risks. Appropriate measures need to be coordinated in the entire river basin to be effective. Therefore the “Directive on the Assessment and Management of Flood Risks” (Directive 2007/60/EC) was adopted on EU level on 23 October 2007 and is now being implemented by the EU member countries.

Table 1: Floods in 2002, 2006, 2010, 2011 and 2013 in the Elbe river basin

| Flood event [year] | Areas affected |  | Fatalities | Flood damage* [in million] |
|--------------------|----------------|--|------------|----------------------------|
|                    | State          | Partial catchment areas  |            |                            |
| 2002               | CZ             | Vltava, Berounka, Elbe downstream of Vltava mouth                      | 17         | CZK 72,600                 |
|                    | D              | Elbe from Czech border to Geesthacht weir and adjacent catchment areas | 21         | € 8,900                    |
| 2006               | CZ             | complete Elbe river basin, mainly Sázava and Lužnice                   | 9          | CZK 3,630                  |
|                    | D              | Große Röder, lower part of Middle Elbe, Jeetzel                        | 0          | € 110                      |
| 2010               | CZ             | Ploučnice and Kamenice   | 0          | CZK 2,080                  |
|                    | D              | Tributaries of Upper Elbe, Schwarze Elster, Mulde, Saale, Spree        | 4          | € 895                      |
| 2011               | CZ             | Berounka, Ohře, Ploučnice and Kamenice                                 | 0          | CZK 40                     |
|                    | D              | Schwarze Elster, Große Röder, Saale, lower part of Middle Elbe         | 0          | no information             |
| 2013               | CZ             | Upper Elbe, Vltava incl. Berounka, Elbe downstream of Vltava mouth     | 16         | CZK 15,100                 |
|                    | D              | Middle Elbe river basin as well as Saale and Mulde river basin         | 0          | € 5,200                    |

\* Prices of the respective years (without conversion), fatalities and material damage for the complete Elbe river basin.

The countries located in the Elbe river basin agreed to prepare an “International Flood Risk Management Plan for the Elbe River Basin District” (hereinafter referred to as “International Plan”). This plan consists of the jointly prepared part A with summary information for the international level and the national parts B prepared by the individual states (Fig. 1).

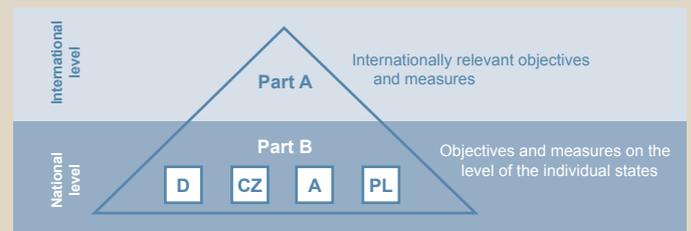


Fig. 1: Structure of the „International Flood Risk Management Plan for the Elbe River Basin District“

The International Commission for the Protection of the Elbe River (ICPER), who has been actively supporting the transnational cooperation in the field of flood protection since the 1990ies and has issued numerous publications on this subject, was assigned the coordination of this plan (Table 2).

Table 2: ICPER publications on the subject of flood protection and year of publication

|  |      |
|--|------|
| Hydrological Assessment of the Flood in June 2013 in the Elbe River Basin                        | 2014 |
| Final Report on the Implementation of the "Elbe Flood Protection Action Plan" 2003 - 2011        | 2012 |
| Hydrological Assessment of the Flood Events in August and September 2010 in the Elbe River Basin | 2012 |
| Second Report on the Implementation of the "Elbe Flood Protection Action Plan" 2006 - 2008       | 2009 |
| Hydrological Assessment of the Spring Flood 2006 in the Elbe River Basin                         | 2007 |
| First Report on the Implementation of the "Elbe Flood Protection Action Plan" 2003 - 2005        | 2006 |
| Documentation of the August 2002 Flood in the Elbe River Basin                                   | 2004 |
| Elbe Flood Protection Action Plan  | 2003 |
| Survey of the Existing Flood Protection Measures in the Elbe River Basin                         | 2001 |
| Flood Protection Strategy for the Elbe River Basin   | 1998 |

For the implementation of the Directive on the Assessment and Management of Flood Risks the same designation of the international Elbe river basin district and the same responsible authorities were used as for the Water Framework Directive (Directive 2000/60/EC). The International Plan was prepared in three stages:

- Preliminary flood risk assessment (until 22 December 2011)
- Flood hazard and flood risk maps (until 22 December 2013)
- Flood risk management plan (until 22 December 2015)

### Preliminary Flood Risk Assessment

In view of the results of the preliminary flood risk assessment in the international Elbe river basin district, flood hazard and flood risk maps as well as subsequent flood risk management plans were prepared for a total of 9,905 km of rivers (393 areas with significant flood risk), among them 7,858 km (282 areas) in Germany and 2,047 km (111 areas) in the Czech Republic. No areas with a significant flood risk were determined in the Polish and in the Austrian parts of the international Elbe river basin district, which amount to about 0.8% of the total area of the Elbe river basin district (Fig. 2).

### Flood Hazard and Flood Risk Maps

The flood hazard and flood risk maps show the extent of the hazard and the risk due to floods from surface waters and floods from the sea with low, medium and high probability (Table 3). The central access to these maps for the international Elbe river basin district has been made possible by way of an interactive map application (Fig. 3).

Table 3: Flood scenarios

| State | Flood scenarios – return period [years]   |                    |   |
|-------|---|--------------------|---|
|       | Low probability or scenarios for extreme events   | Medium probability | High probability  |
| CZ    | 500 years   | 100 years          | 20 years  |
| D     | 200 years for the main Elbe stretch and 200 to 1,000 years for the other water bodies, possibly in combination with failing infrastructural facilities for flood defence (without information on the return period) | 100 years          | 20 years for the main Elbe stretch and 10 - 25 years for the other water bodies |

The flood hazard and flood risk maps provide information on flood plains (Table 4) and the number of affected inhabitants (Table 5) in areas with a significant flood risk.

Table 4: Flood plains\* in km² in the international Elbe river basin district (data as per: 11 August 2015)

| Probability | Floods from surface waters |       |       | Floods from the sea |     |       |
|-------------|----------------------------|-------|-------|---------------------|-----|-------|
|             | CZ                         | D     | Total | CZ                  | D   | 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 5: Number of affected inhabitants\* in the international Elbe river basin district (data as per: 11 August 2015)

| Probability | Floods from surface waters |         |           | Floods from the sea |         |         |
|-------------|----------------------------|---------|-----------|---------------------|---------|---------|
|             | CZ                         | D       | Total     | CZ                  | D       | 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 |

\* Flood plains (Table 4) and the inhabitants affected (Table 5) may be counted several times if the risk areas in the estuary and the scenarios of the land and seaside floods overlap (tidal Elbe).

### International Plan

The Flood Risk Management Directive (Article 7) stipulates that the flood risk management plans need to establish adequate objectives for the risk management for mitigating adverse flood impact on protective goods (human health, environment, cultural heritage as well as economic activity and substantial material assets). This refers both to technical measures and non-constructive measures of flood prevention.

### General Objectives of Flood Risk Management

In both countries, these objectives are based on the following principles:

- Avoiding new risks in flood risk areas
- Reducing existing risks and the areas with flood risks

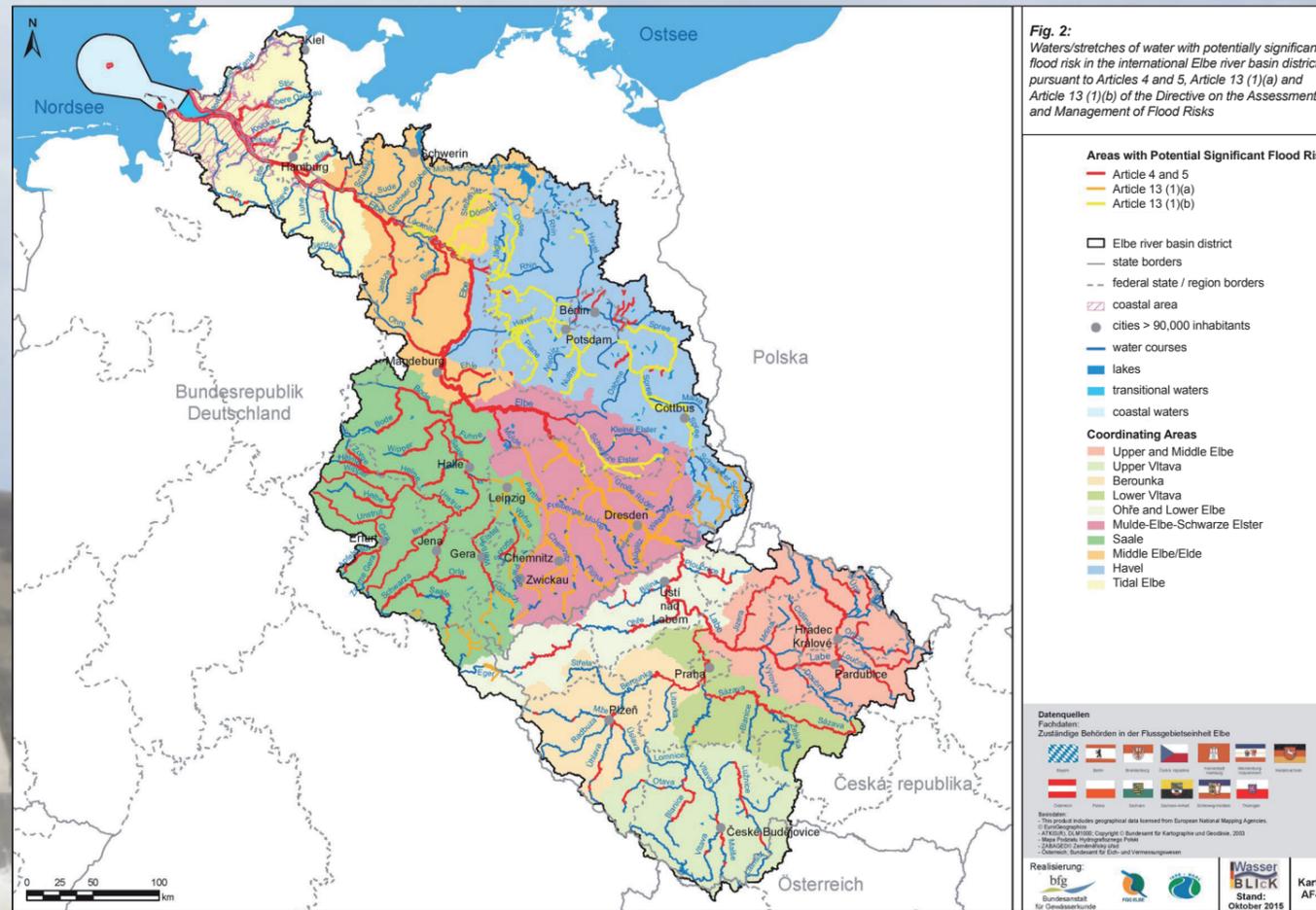


Fig. 2: Waters/stretches of water with potentially significant flood risk in the international Elbe river basin district pursuant to Articles 4 and 5, Article 13 (1)(a) and Article 13 (1)(b) of the Directive on the Assessment and Management of Flood Risks

**Areas with Potential Significant Flood Risk**

- Article 4 and 5
- Article 13 (1)(a)
- Article 13 (1)(b)

**Coordinating Areas**

- Upper and Middle Elbe
- Upper Vltava
- Berounka
- Lower Vltava
- Ohře and Lower Elbe
- Mulde-Elbe-Schwarze Elster
- Saale
- Middle Elbe/Elde
- Havel
- Tidal Elbe

**Datenquellen**

Fachstellen: Zuständige Behörden in der Flussgebiets Einheit Elbe

Beiträger:

- Das Produkt enthält geographische Daten basierend auf dem Europäischen Nationalen Kartierungsagentur.
- © EuroGeographics
- © AKRIS/IL, Copyright © Bundesamt für Kartographie und Geodäsie, 2003
- Mapa Polska Hydrograficzny Państwowy Urząd Geodezyjny
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- Reducing flood risks and adverse flood impact
- Increasing precautions and resilience of society against the adverse effects after floods

### Measures

Part A of the International Plan contains the measures in Germany and in the Czech Republic for which common solutions are needed in some parts. Where required, Polish and Austrian aspects will also be taken into consideration, when the target is to describe the uniform or coordinated approach in the international Elbe river basin district. This plan constitutes the consistent continuation of the „Elbe Flood Protection Action Plan“ 2003 – 2011 by incorporating its objectives and activities and integrating them in the overall strategy of the flood risk management.

Part A mainly comprises measures that can have an effect for the complete river basin district. On the one hand, these are measures on a regional level with supra-regional effect in the river basin district. On the other hand, there are measures, among them many non-structural measures, that due to their character need to be implemented for the complete river basin district in order to achieve the desired effect. This mainly includes flood forecasting, warning and information systems. Germany and the Czech Republic have developed an efficient communication and information system which has already proved its worth in cases of concrete cross-border emergency response, mainly during the floods in 2002, 2006, 2010, 2011 and 2013.

The measures selected generally comprise all aspects of flood risk management, i.e. „Prevention“, „Protection“, „Preparedness“, „Recovery and Review“. Table 6 shows that „Prevention“ and „Preparedness“ measures have been established for all areas with a significant flood risk.

Table 6: Number of areas where measures are implemented (ranked according to the flood risk management aspects) (data as per: 11 August 2015)

| Aspects of flood risk management | Number of areas |           |               |
|----------------------------------|-----------------|-----------|---------------|
|                                  | CZ (Σ 111)      | D (Σ 282) | Total (Σ 393) |
| Prevention                       | 111             | 282       | 393           |
| Protection                       | 32              | 274       | 306           |
| Preparedness                     | 111             | 282       | 393           |
| Recovery and Review              | 0               | 197       | 197           |
| Other                            | 0               | 116       | 116           |

The national flood risk management plan of the Czech Republic does not comprise any measures within the framework of „Recovery and Review“ and „Other“. Individual measures for the aspect „Recovery and Review“ are taken and implemented individually after each major flood. The employees of the authorities in charge of flood defence and disaster management get regular training.

### Examples for Supra-regional Measures

- Setting up floodplain areas
- Activities for refining the flood forecasting service system
- Increasing retention capacity in some existing dams (particularly measures at Orlik Dam)
- Optimizing and adapting the polders at Havel river and water level management of Havel and Spree

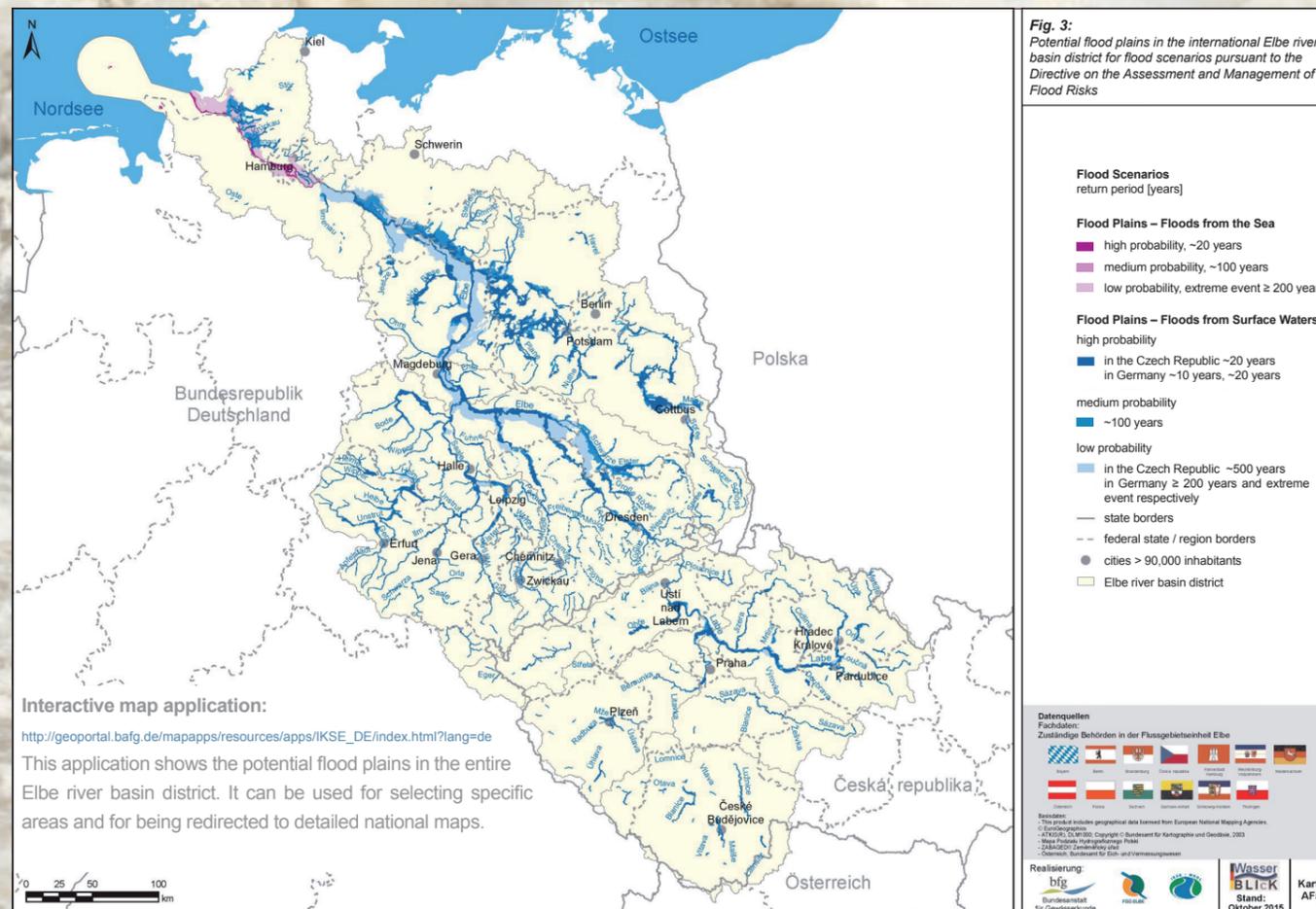


Fig. 3: Potential flood plains in the international Elbe river basin district for flood scenarios pursuant to the Directive on the Assessment and Management of Flood Risks

**Flood Scenarios** return period [years]

**Flood Plains – Floods from the Sea**

- high probability, ~20 years
- medium probability, ~100 years
- low probability, extreme event ≥ 200 years

**Flood Plains – Floods from Surface Waters**

- high probability
  - in the Czech Republic ~20 years
  - in Germany ~10 years, ~20 years
- medium probability
  - ~100 years
- low probability
  - in the Czech Republic ~500 years
  - in Germany ≥ 200 years and extreme event respectively

— state borders  
- - federal state / region borders  
● cities > 90,000 inhabitants  
□ Elbe river basin district

**Datenquellen**

Fachstellen: Zuständige Behörden in der Flussgebiets Einheit Elbe

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### Interactive map application:

[http://geoportal.bafg.de/mapapps/resources/apps/IKSE\\_DE/index.html?lang=de](http://geoportal.bafg.de/mapapps/resources/apps/IKSE_DE/index.html?lang=de)

This application shows the potential flood plains in the entire Elbe river basin district. It can be used for selecting specific areas and for being redirected to detailed national maps.

### Coordination with the Water Framework Directive

The measures listed in the national flood risk management plans were allocated to one of the following groups:

- M1: Measures supporting the objectives of the Water Framework Directive.
- M2: Measures that may result in a conflict of interests. These measures may be subjected to a case-by-case-assessment within the framework of the subsequent planning process.
- M3: Measures that are usually not relevant for the objectives of the Water Framework Directive.

The assessment of the measures proposed shows that the 4,044 aggregated measures reported for the international Elbe river basin district comprised 1,435 (36%) M1 measures, 942 (23%) M2 measures and 1,070 (26%) M3 measures. For 597 (15%) aggregated measures no clear allocation is possible. This goes to show that a large number of aggregated flood protection measures support the objectives of the Water Framework Directive. Please see the national plans for more detailed information.

### Providing Information to the Public

The exchange of important information between the competent authorities in international river basins needs to be guaranteed. Therefore ICPER conducted international workshops on the following subjects in Magdeburg:

- Preliminary flood risk assessment (31 May and 1 June 2011),
- Flood hazard and flood risk maps (4 December 2012),
- The flood in June 2013 and the international flood risk management plan in the Elbe river basin (21 November 2013)

as well as

- the International Elbe Forum in Ústí nad Labem on 23 April 2013, where the interested public was informed about the current status of the implementation of the Water Framework Directive and the Flood Risk Management Directive.



Photos: Lenka Běhounek, ICPER

An important part of the information is the publication of the preliminary assessment results of the flood risk (in the "Final Report on the Implementation of the Elbe Flood Protection Action Plan 2003 - 2011") as well as the flood hazard and flood risk maps (interactive map applications - see inside).

The draft of part A of the International Plan was published on 19 December 2014 on the ICPER website and discussed with the public at the International Elbe Forum in Ústí nad Labem on 22 April 2015.

### Analysis of the Comments

The consultation of part A of the International Plan was conducted from 22 December 2014 to 22 June 2015. Within this period it was possible to submit written comments to the ICPER Secretariat.

The public comments were assessed and taken into consideration where appropriate. The detailed replies and statements regarding the individual comments were published on the ICPER Website on 10 March 2016.

### Publication of the Plan

Since 17 December 2015 part A of the International Plan has been available in German and Czech on the ICPER website [www.ikse-mkol.org](http://www.ikse-mkol.org).

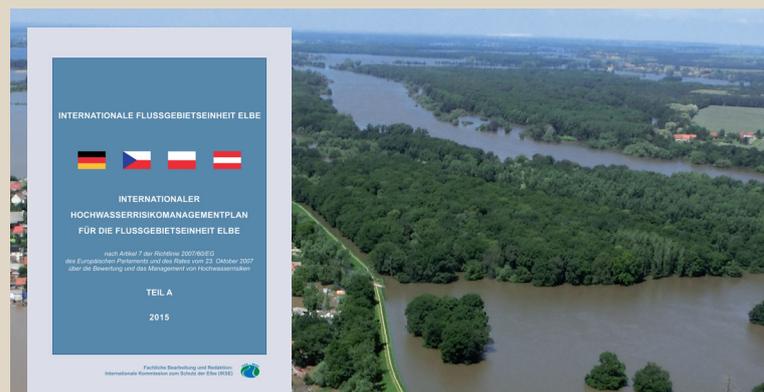
The parts B, i.e. the national plans of the countries in the Elbe river basin, have been published on the following websites:

- for the Czech Republic: [www.povis.cz](http://www.povis.cz)
- for Germany: [www.fgg-elbe.de](http://www.fgg-elbe.de)
- for Austria: [wisa.bmlfuw.gv.at](http://wisa.bmlfuw.gv.at)
- for Poland: [www.powodz.gov.pl](http://www.powodz.gov.pl)

### Reviews

The individual stages of the flood risk management planning are reviewed periodically and updated as needed, at the following dates and then every six years:

- Preliminary flood risk assessment (until 22 December 2018)
- Flood hazard and flood risk maps (until 22 December 2019)
- Flood risk management plan (until 22 December 2021)



### Conclusion

This International Plan does not only constitute the complete implementation of the European Directive on the Assessment and Management of Flood Risks, it also demonstrates the shared understanding and approach for tackling flood risks in the international Elbe river basin district. It has a particular added value because it helps to review the efficiency of the measures elaborated together in the past, particularly for managing the floods in recent years. In this regard the plan is a living document that has already turned out to be highly relevant. At the same time it lays the foundation stone for a sustainable, systematic cross-border continuation of the flood risk management for the coming decades.

#### ICPER Information Sheet 2016 on the European Flood Risk Management Directive

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