Overview of Flood Risk Management in Europe: implementation of the Floods Directive in Spain

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Flood damage in Europe in last years
Flood damage in Spain

Average annual precipitation (mm)
Flood damage in Spain

Percentage ratio between the maximum daily precipitation and mean annual precipitation
Floods are the main natural disaster source in Spain. Their influence has been evaluated and the analysis has revealed that losses due to floods account for more than 60% of the total in the Spanish territory, with a total losses over 800 million euros per year.

The compensation paid by the Insurance Compensation Consortium for flood damages to insured goods in the last few years are shown in the box below:

- AVERAGE 130 MILLION EUROS
The Directive on assessment and management of flood risks

Flooding are natural phenomena which cannot be prevented, ...so we must learn to live with them.
Number of reported historic flood events by Member State

- AT (383)
- BE
- BG (906)
- CY (467)
- CZ (14)
- DE (515)
- DK (205)
- EE (20)
- EL (297)
- ES (6165)
- FI (7)
- FR (2248)
- HR (274)
- HU (12)
- IE (94)
- IT
- LT (274)
- LU (10)
- LV (6)
- MT (0)
- NL
- PL (4860)
- PT
- RO (380)
- SE (12)
- SI (321)
- SK (317)
- UK (650)

Legend:
- Blue bar: With data
- Red bar: No data

Number of flood events

0 1000 2000 3000 4000 5000 6000 7000
The Floods Directive PFRA / APSFR

Areas with Potential Significant Flood Risk

Areas with Potential Significant Flood Risk (APSFR)
- Designated as point (APSFR)
- Designated as line (APSFR)
- Designated as polygon (APSFR)

Units of Management (UOM)

Units of management
- International Units Of Management
- Units Of Management

Figure 6.1  Number of identified Areas of Potential Significant Flood Risk

- AT: 391
- BG: 116
- CY: 19
- CZ: 269
- DE: 809
- DK: 10
- EE: 27
- EL: 124
- ES: 1342
- FI: 21
- FR: 146
- HR: 2976
- HU: 2
- IE: 305
- LT: 129
- LU: 15
- LV: 25
- PL: 268
- RO: 399
- SE: 18
- SI: 61
- SK: 383
- UK: 281

Number of APSFR
Flood hazard and risk maps

Preparation of flood hazard maps for APSFR covering the geographical areas which could be flooded according to the following scenarios:

- High probability: 10 years
- Medium probability: 100 years
- Low probability: 500 years

For each scenario the following elements shall be shown:

- The extent of the flood;
- Water depths or water levels, as appropriate.
- When appropriate, the flow velocity or the relevant water flow.

They must be done by 22 December 2013
Flood hazard maps

http://sig.magrama.es/snczi/
Legally regulated riverine area under the Spanish Water Law

http://sig.magrama.es/snczi/
Flood risk maps

Contents:

- Indicative number of inhabitants potentially affected
- Type of economic activity of the area potentially affected
- Points of interest
- Protected areas

Installations which might cause accidental pollution, cultural heritage, infrastructures, civil protection facilities, etc.

Water bodies WFD, areas for the abstraction for human consumption, recreational waters, Natura 2000 sites
Flood risk maps

- Inhabitants affected

**Riesgo a la población de origen fluvial T=10 años**

<table>
<thead>
<tr>
<th>Identificador</th>
<th>ESC020_0013_34120_T10_POB_01</th>
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<tbody>
<tr>
<td>Código ARPSI</td>
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<tr>
<td>Superficie municipal inundada (m²)</td>
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<td>Nombre municipio</td>
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<td>Nº de habitantes estimados en la zona inundable</td>
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</tr>
<tr>
<td>Nº de habitantes estimados en la zona inundaible</td>
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<td>Otras consideraciones</td>
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**Riesgo a la población de origen fluvial T=500 años**

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<td>Nº de habitantes estimados en la zona inundable</td>
<td>81,198</td>
</tr>
<tr>
<td>Nº de habitantes estimados en la zona inundaible</td>
<td>25,080</td>
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<td>Otras consideraciones</td>
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</table>

http://sig.magrama.es/sn
Indicative number of inhabitants potentially affected.

Fluvial flooding

- 10 years: 540,000
- 100 years: 1,338,712
- 500 years: 2,121,755
Flood hazard and risk maps results
2. Member States shall establish appropriate objectives for the management of flood risks for the areas identified under Article 5(1) and the areas covered by Article 13(1)(b), focusing on the reduction of potential adverse consequences of flooding for human health, the environment, cultural heritage and economic activity, and, if considered appropriate, on non-structural initiatives and/or on the reduction of the likelihood of flooding.
Flood risk management plans:

**General objectives:**

1. Increasing awareness of flood risks and improving self-protection strategies among population, economic and social actors to deal with this risk.

2. Enhancing coordination and collaboration of all stakeholders involved, taking into account flood risk management is a shared responsibility among all of the administrations and the society.

3. Improving the understanding of flood phenomena, through specific studies, to better manage flood risk.

4. Improve flood forecasting and early warning systems for a better response in case of flood events.
Flood risk management plans

**General objectives:**

5. Help to enhance land-use and urban planning policies and the management of exposure of people and assets in flood prone areas.

6. Reduction of flood risk, through reduction of hazard, by means the enhancement of infiltration, giving rivers more space and also the construction, modification or removal of structures that, which have a significant impact on the hydrological regime.

7. Improving resilience and reducing vulnerability of goods and the different land uses located in the floodplain.

8. Enhancing or maintaining, where appropriate, the good status of water bodies by means the improvement of their hydromorphological conditions according to the Water Framework Directive objectives.
### Type of measures identified by the European Commission

<table>
<thead>
<tr>
<th>Type of Measures</th>
<th>Prevention</th>
<th>Protection</th>
<th>Preparedness</th>
<th>Recovery and review</th>
</tr>
</thead>
</table>
| Prevention       | - Land use planning policies  
|                  | - Removal and relocation of land-uses which are incompatible with flooding  
|                  | - Adapting land-uses to the risk of flooding  
|                  | - Other measures  |
| Protection       | - Measures to reduce the flow, enhancement of infiltration, including in-channel and floodplain works that restore natural systems, etc.  
|                  | - Construction, modification and/or removal of water retaining structures, to be considered on case by case basis  
|                  | - Construction, modification and/or removal of defensive structures in the riverbed and/or floodplain, to be considered on case by case basis  
|                  | - Measures to reduce surface water flooding, such as sustainable urban drainage systems  
|                  | - Other measures  |
| Preparedness     | - Flood forecasting and warning  
|                  | - Emergency event response planning  
|                  | - Public awareness and preparedness  
|                  | - Other measures  |
| Recovery and review | - Restoration activities (human and material damage), health and mental health supporting actions, disaster financial assistance, etc.  
|                  | - Environmental recovery, clean-up activities, etc.  
|                  | - Lessons learnt  |
MEDIDAS A NIVEL DE ARPSI:
COMPATIBILIDAD CON DIRECTIVA MARCO DEL AGUA


Resource Document
River Órbigo Restoration Project (León, Spain)

Example of Green Infrastructure

Earth embankment before the works

Earth embankment in its new location
Example of Green Infrastructure

River Órbigo Restoration Project (León, Spain)
Conclusions

Collaboration among all Administrations is already bearing significant fruit

The production and public availability of flood hazard and risk maps is going to be a milestone for Administrations’ actions, specially as regards those related to land-use and urban planning

The flood risk management plans should include appropriate measures, addressed to all the stages of the cycle of risk management, in order to achieve their objectives

Spain has been working on flood-prone area management for a long time and the Floods Directive is being a boost to improve the works done
Overview of Flood Risk Management in Europe: implementation of the Floods Directive in Spain

Many thanks!