

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

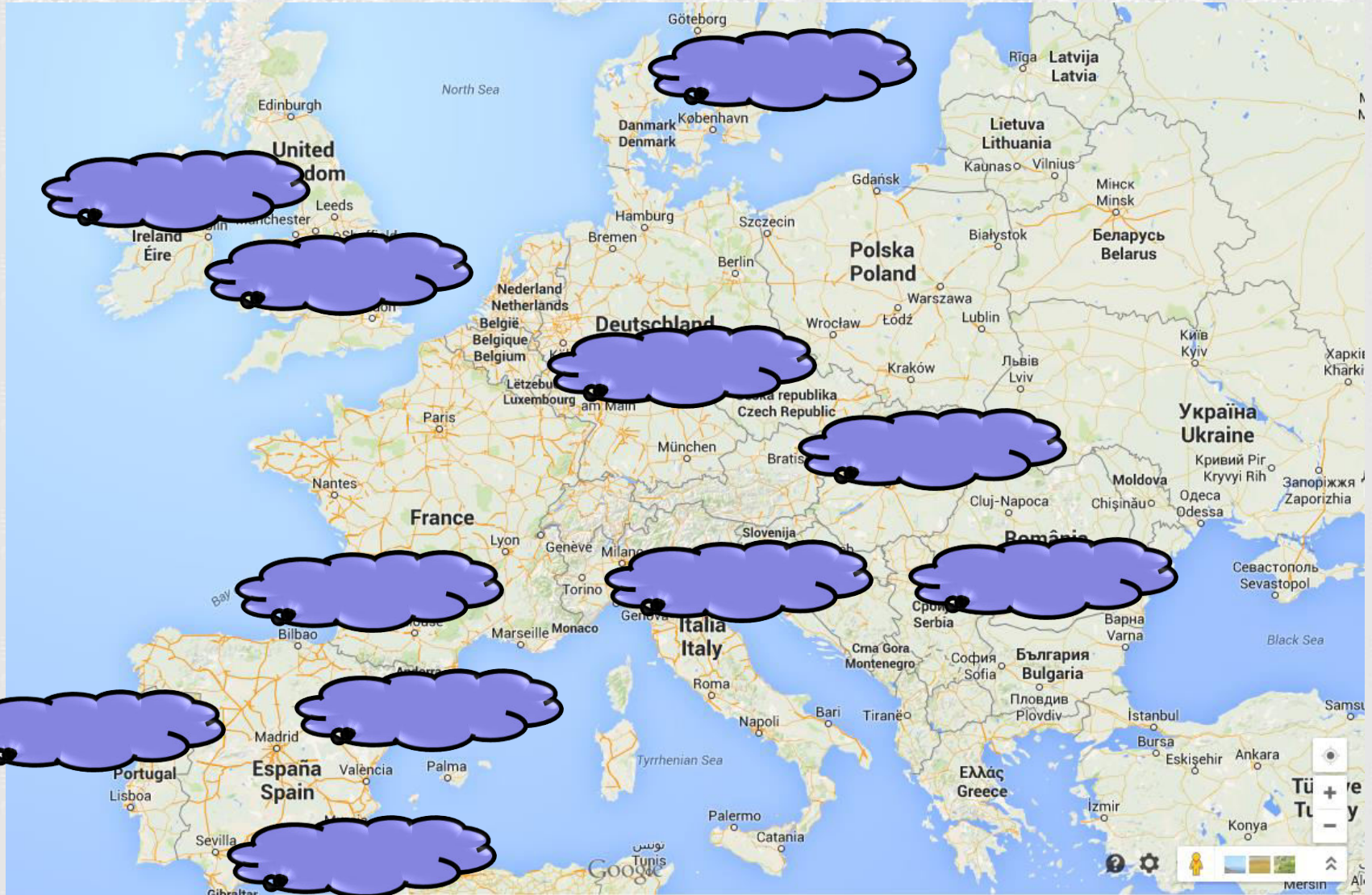
Carlos M. Escartín

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Flood damage in Europe in last years



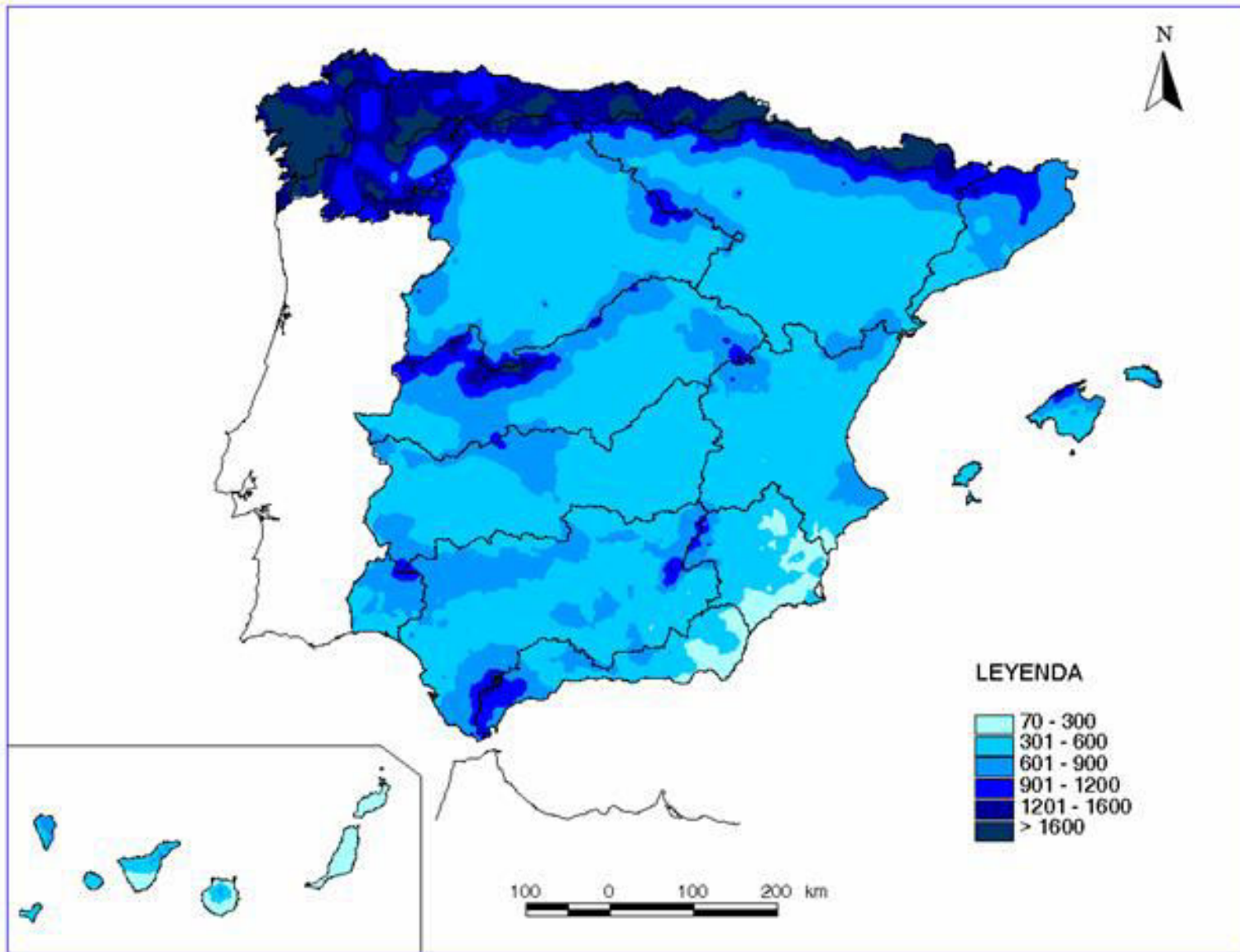


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Flood damage in Spain

Average annual precipitation (mm)



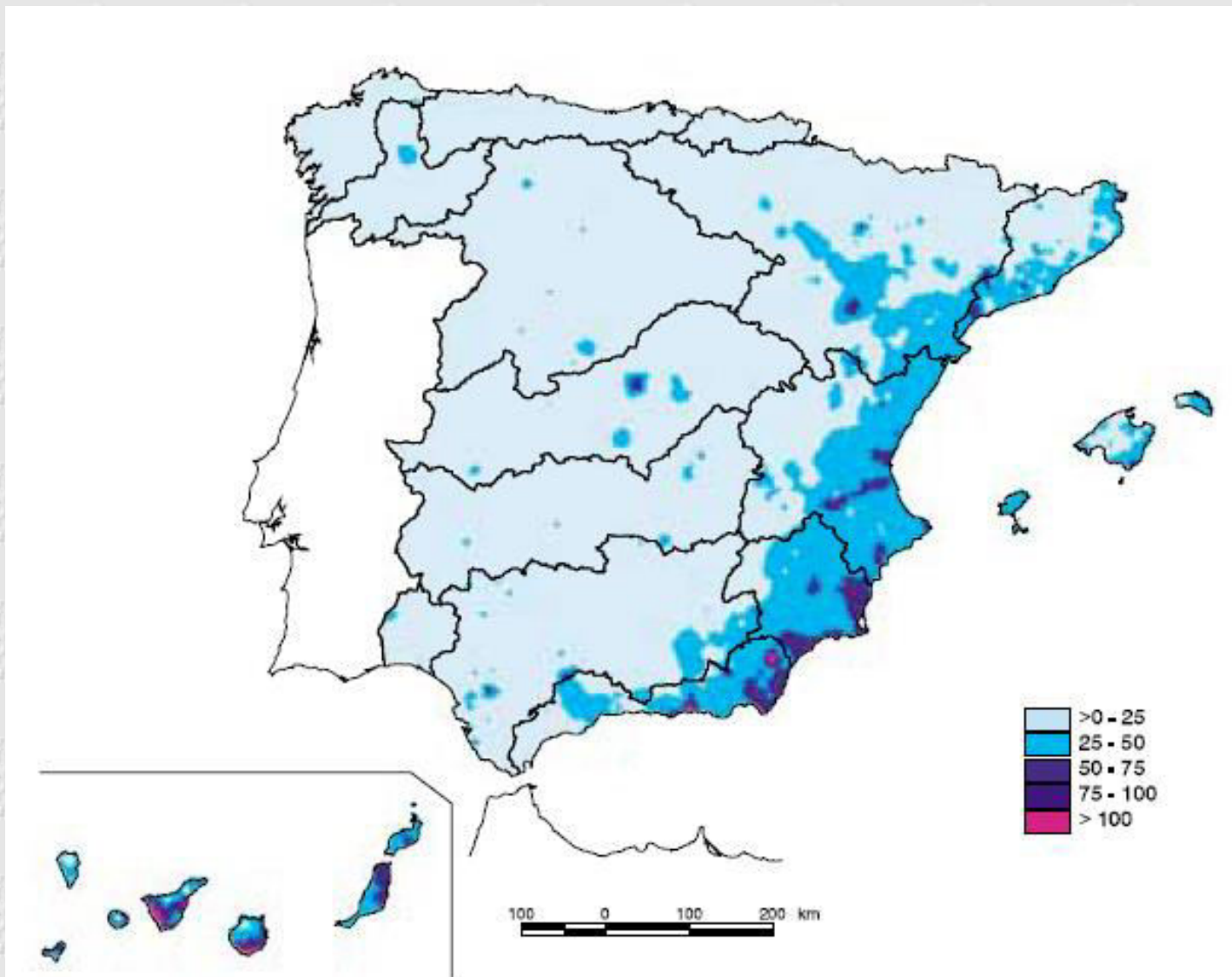


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Flood damage in Spain

Percentage ratio between the maximum daily precipitation and mean annual precipitation





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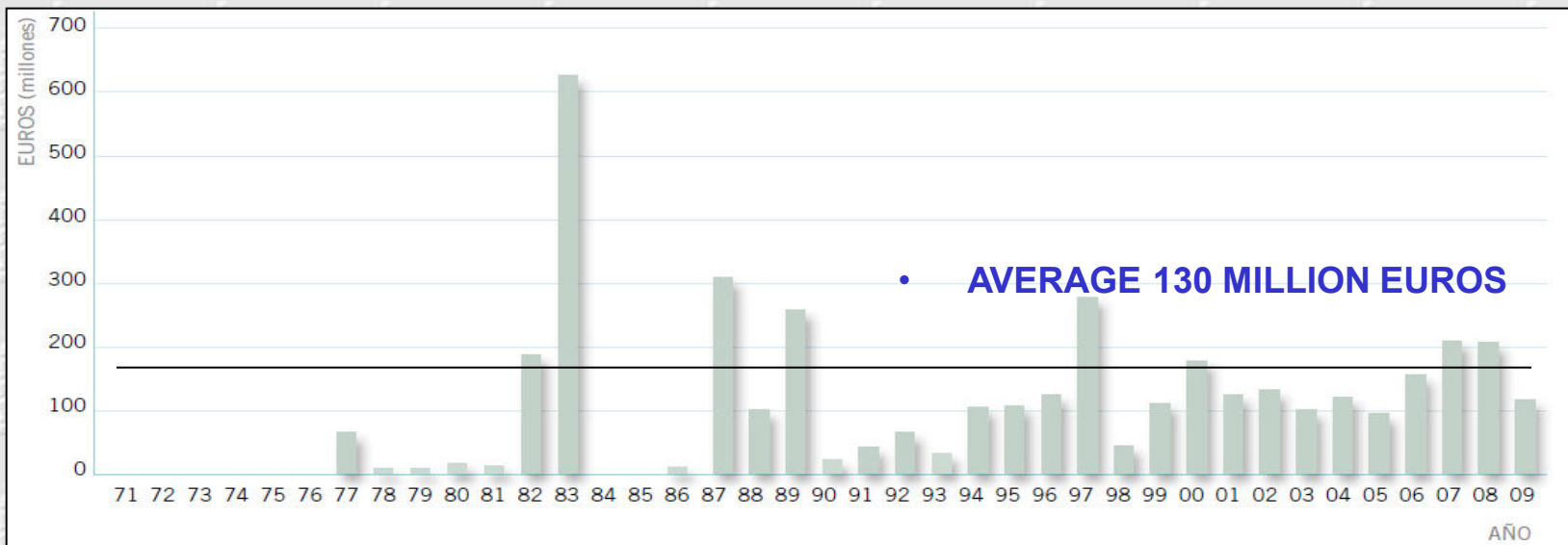


European Commission

Floods are the main natural disaster source in Spain.

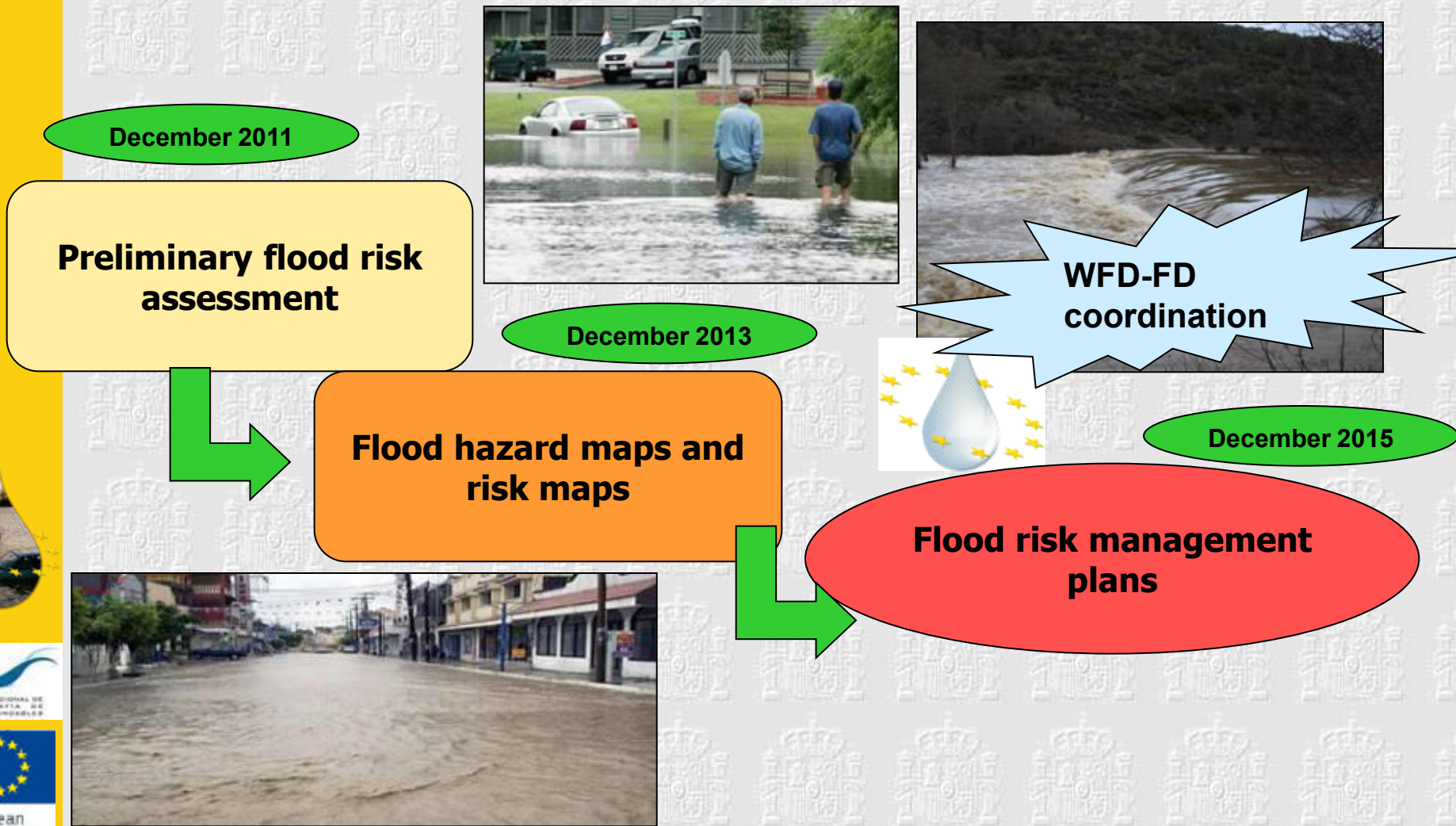
Their influence has been evaluated and the analysis has revealed that losses due to floods account for more than 60% of the total in the Spanish territory, with a total losses over **800 million euros per year**.

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:



The Directive on assessment and management of flood risks

Floods are natural phenomena which cannot be prevented, ...so we must learn to live with them



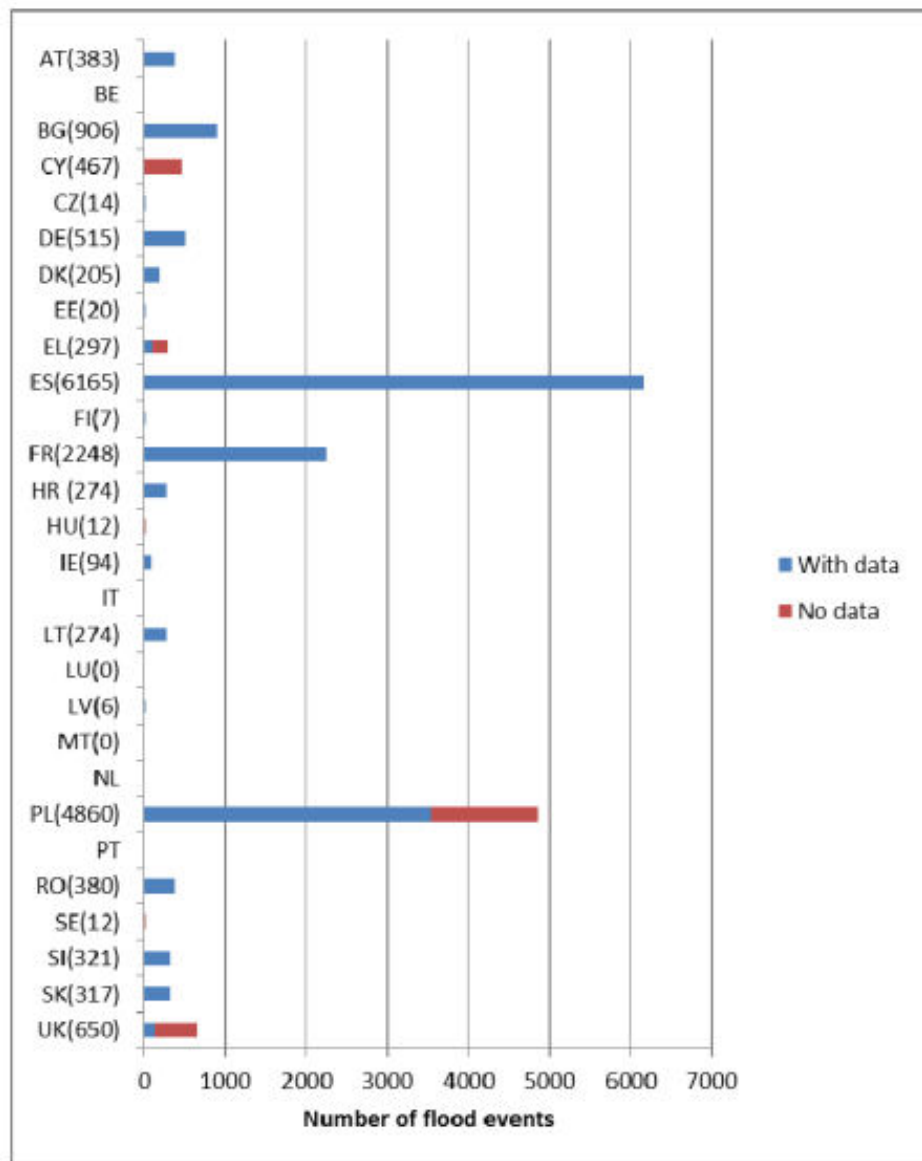


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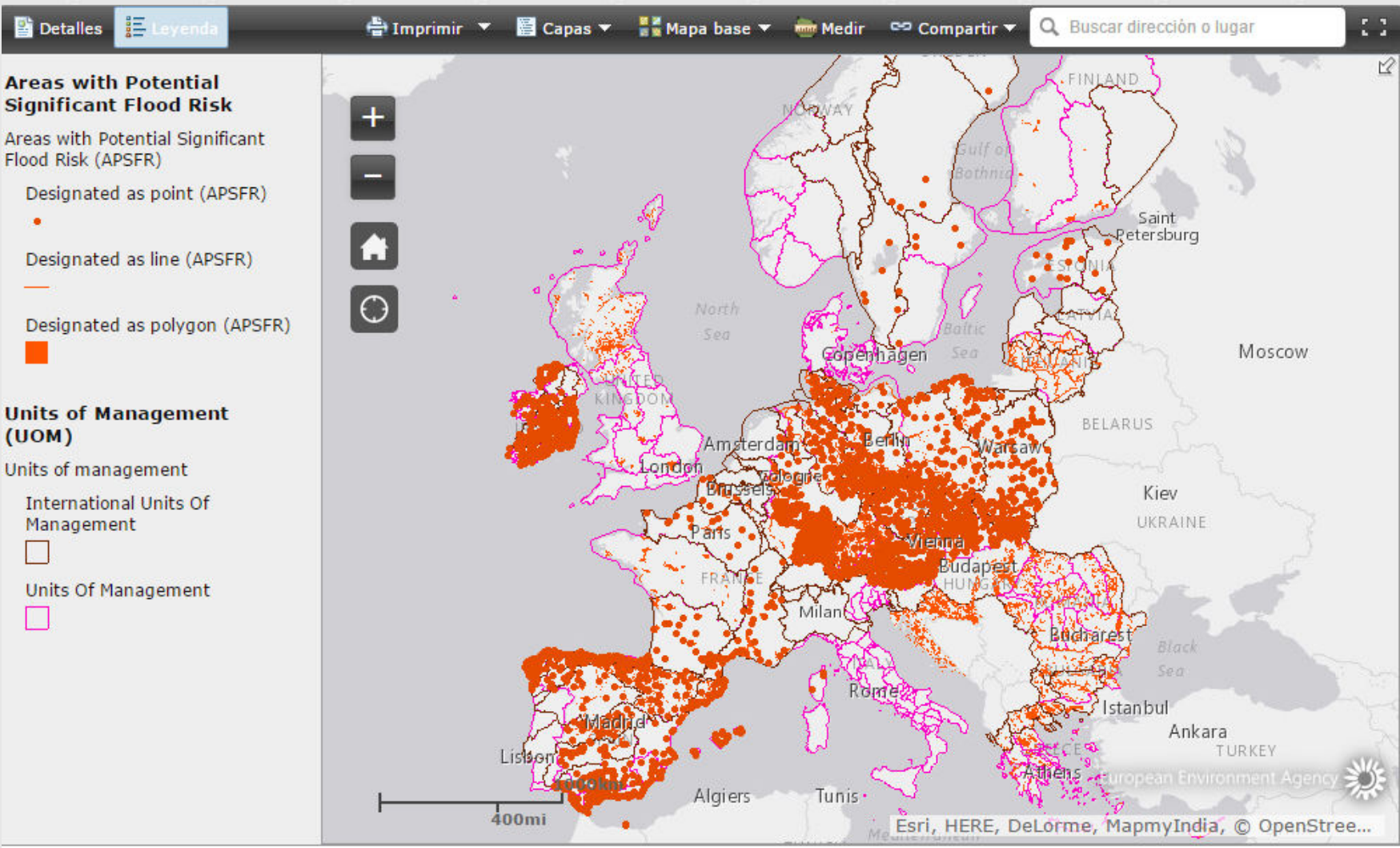
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PRELIMINARY FLOOD RISK ASSESSMENT IN EUROPE

Number of reported historic flood events by Member State



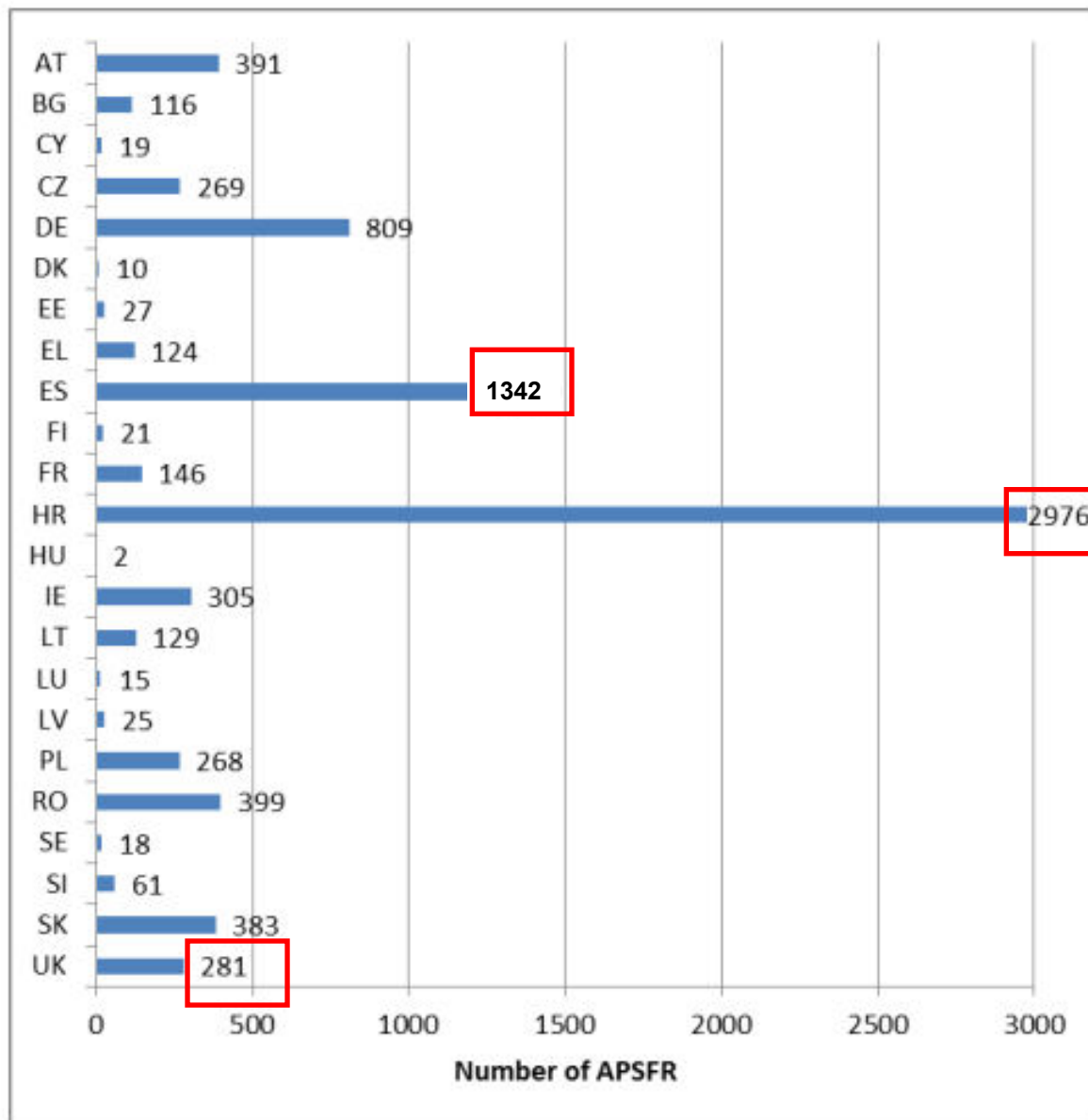
The Floods Directive PFRA / APSFR



• <http://www.eea.europa.eu/themes/water/interactive/floods-directive-pfra-apsfr>



Figure 6.1 Number of identified Areas of Potential Significant Flood Risk





Flood hazard and risk maps

Flood hazard 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:

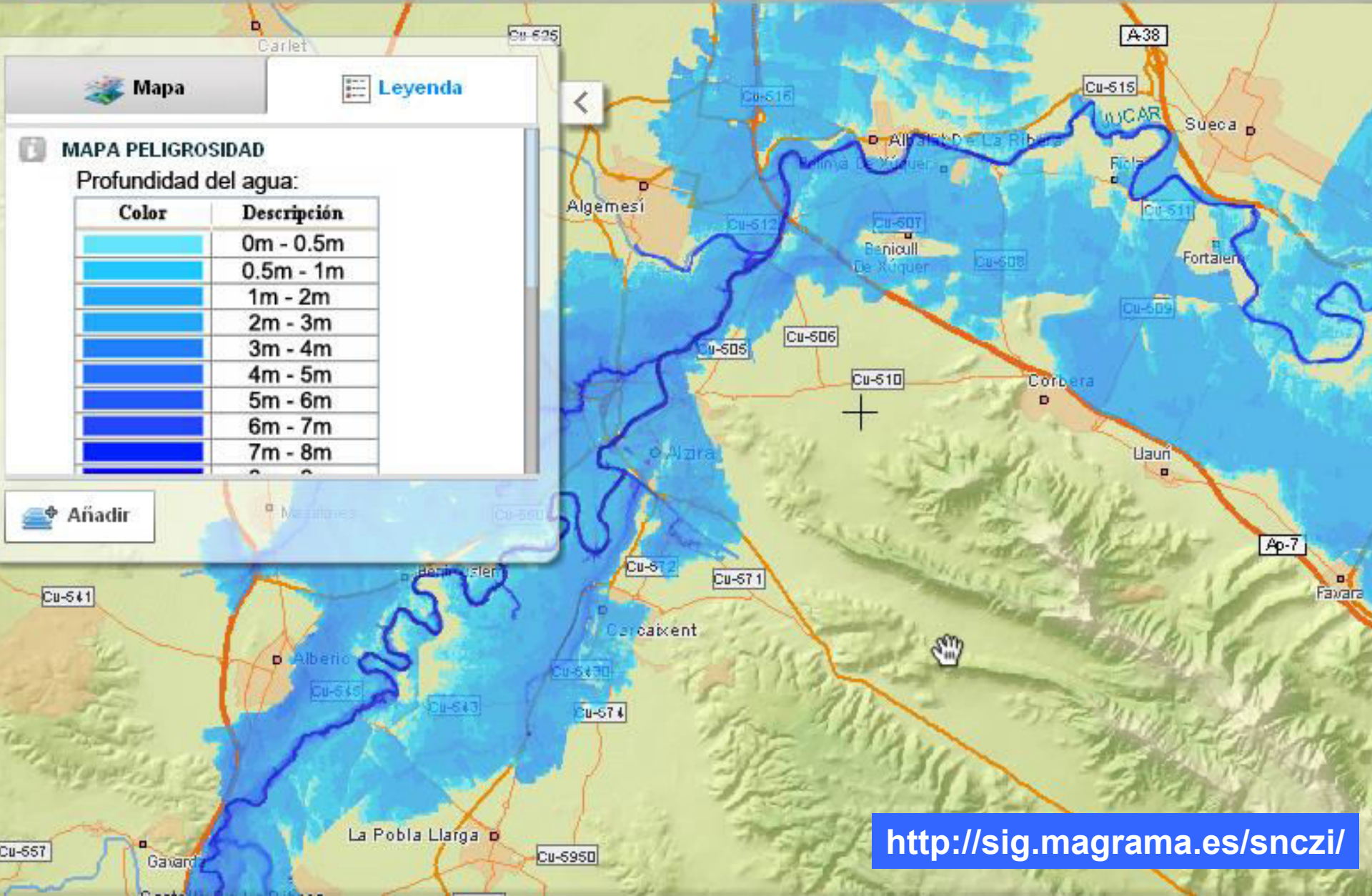
- The extent of the flood;
- Water depths or water levels, as appropriate.
- When appropriate, the flow velocity or the relevant water flow.



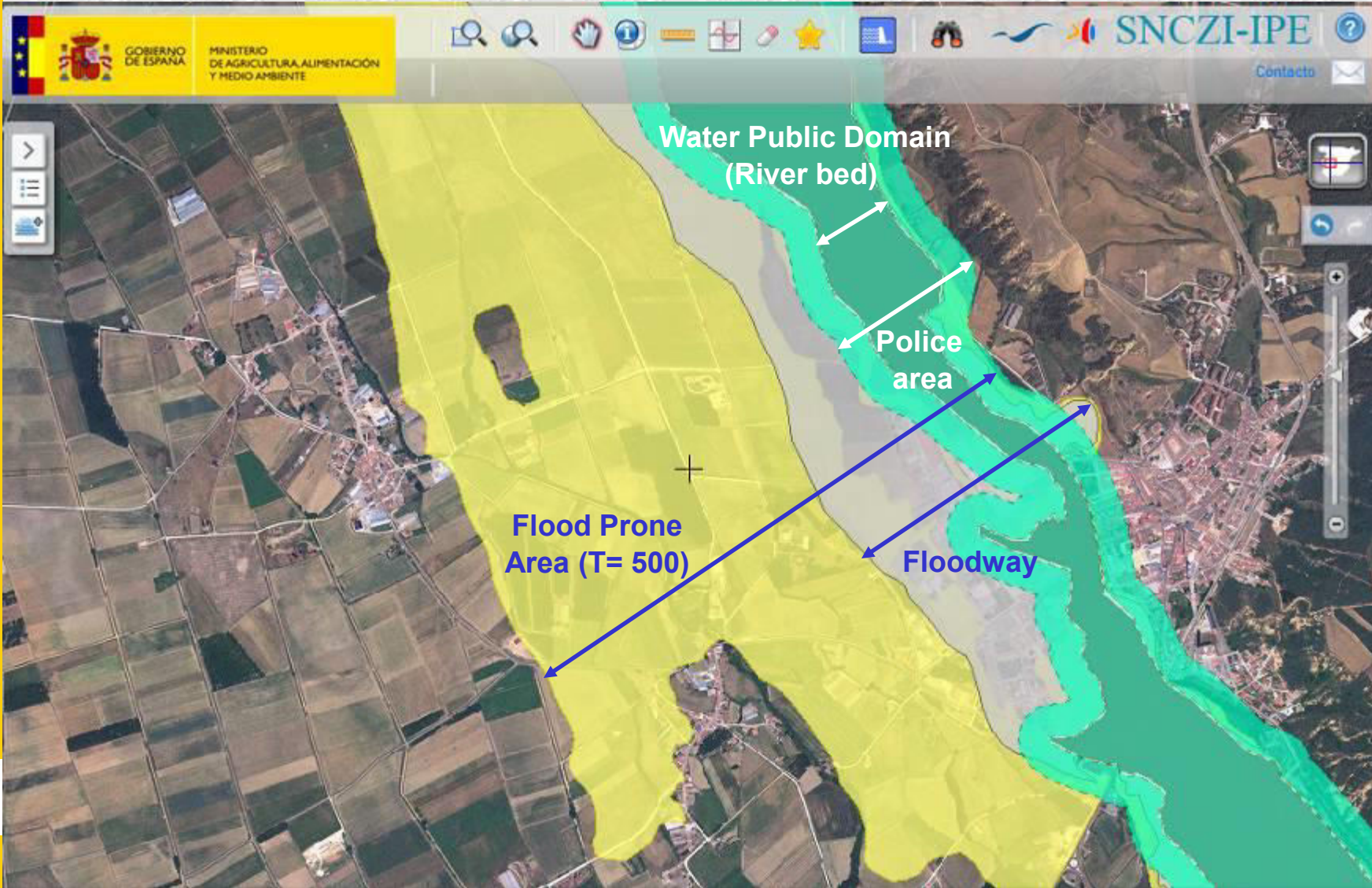
They must be done by 22 December 2013



Flood hazard maps



Legally regulated riverine area under the Spanish Water Law





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...

Nº de habitantes estimados en la zona inundable

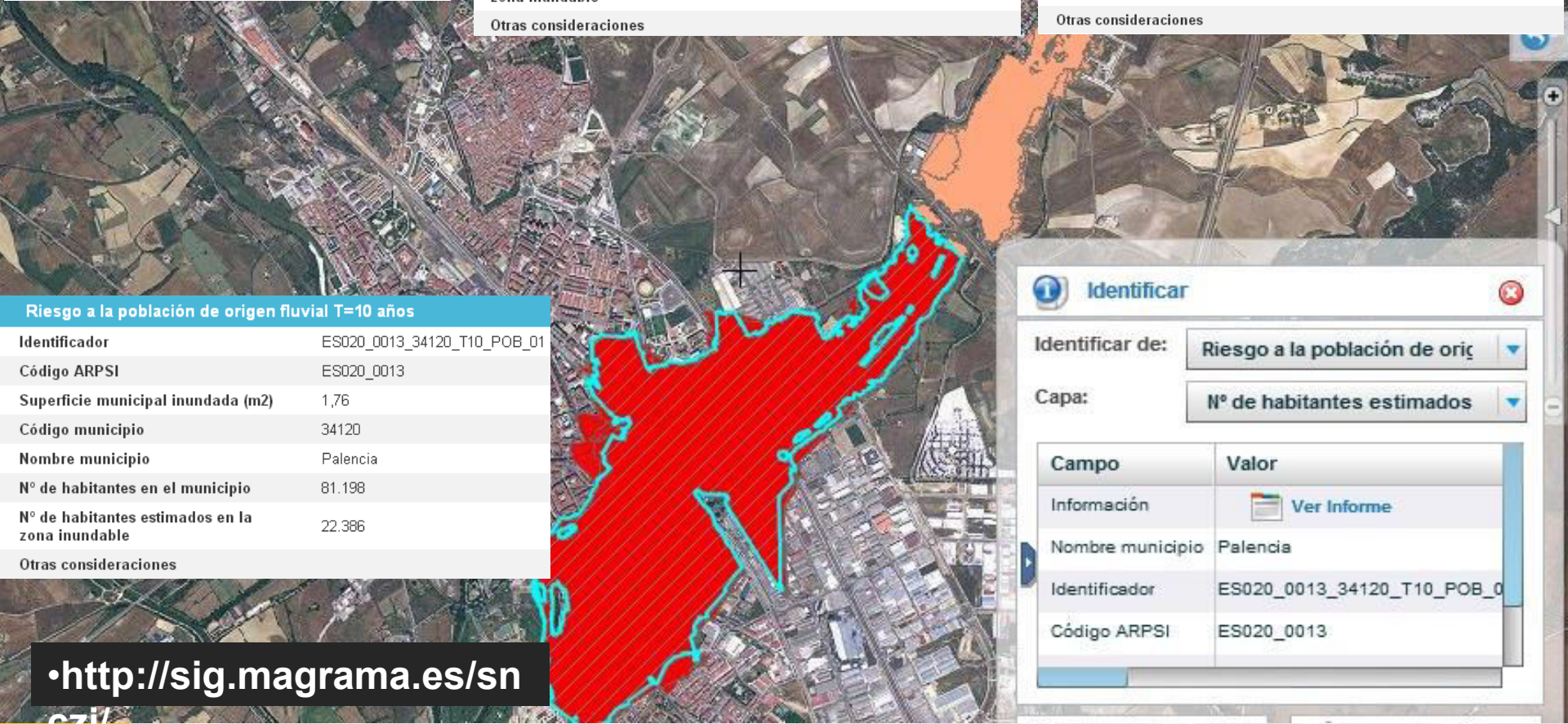
- 0
- 1 - 100
- 101 - 1000
- 1001 - 5000
- > 5000

Riesgo a la población de origen fluvial T=100 años

Identificador	ES020_0013_34120_T100_POB_01
Código ARPSI	ES020_0013
Superficie municipal inundada (m2)	1,88
Código municipio	34120
Nombre municipio	Palencia
Nº de habitantes en el municipio	81.198
Nº de habitantes estimados en la zona inundable	23.908
Otras consideraciones	

Riesgo a la población de origen fluvial T=500 años

Identificador	ES020_0013_34120_T500_POB_01
Código ARPSI	ES020_0013
Superficie municipal inundada (m2)	1,97
Código municipio	34120
Nombre municipio	Palencia
Nº de habitantes en el municipio	81.198
Nº de habitantes estimados en la zona inundable	25.080
Otras consideraciones	



Riesgo a la población de origen fluvial T=10 años

Identificador	ES020_0013_34120_T10_POB_01
Código ARPSI	ES020_0013
Superficie municipal inundada (m2)	1,76
Código municipio	34120
Nombre municipio	Palencia
Nº de habitantes en el municipio	81.198
Nº de habitantes estimados en la zona inundable	22.386
Otras consideraciones	

Identificar

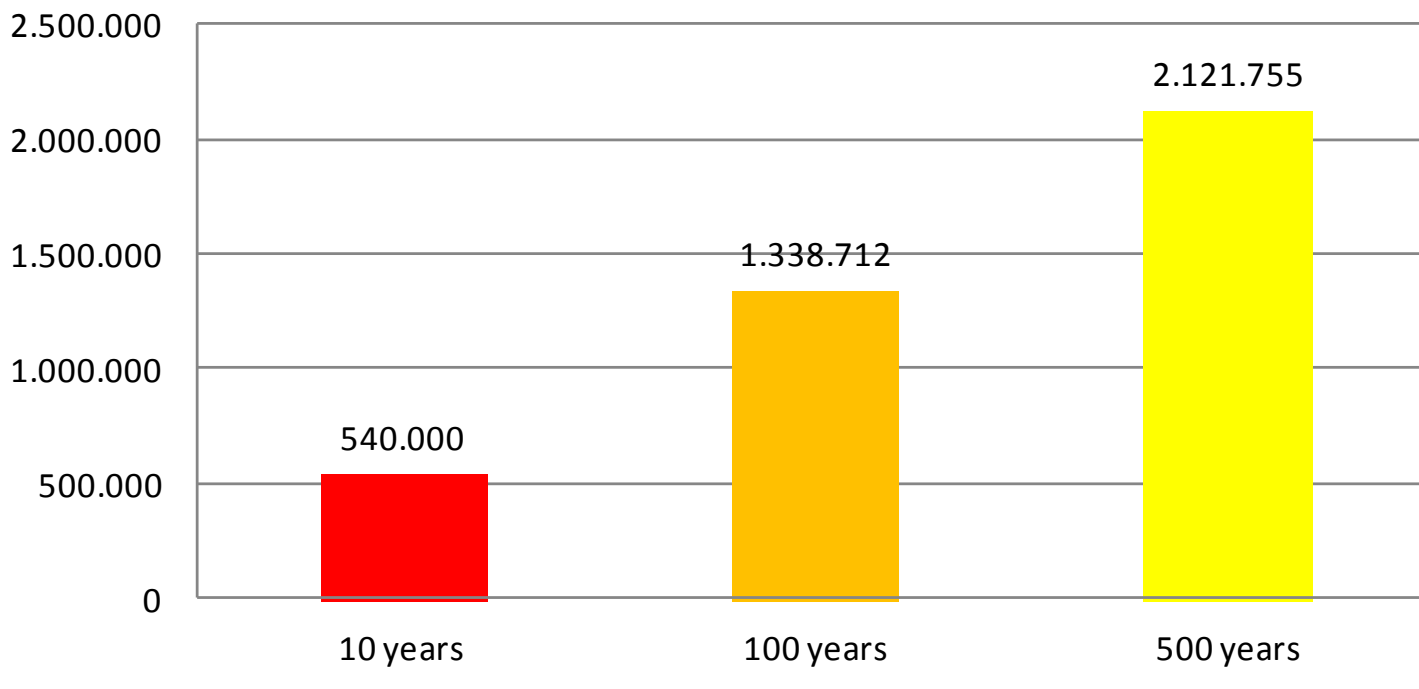
Identificar de: **Riesgo a la población de origen fluvial**

Capa: **Nº de habitantes estimados**

Campo	Valor
Información	Ver Informe
Nombre municipio	Palencia
Identificador	ES020_0013_34120_T10_POB_01
Código ARPSI	ES020_0013

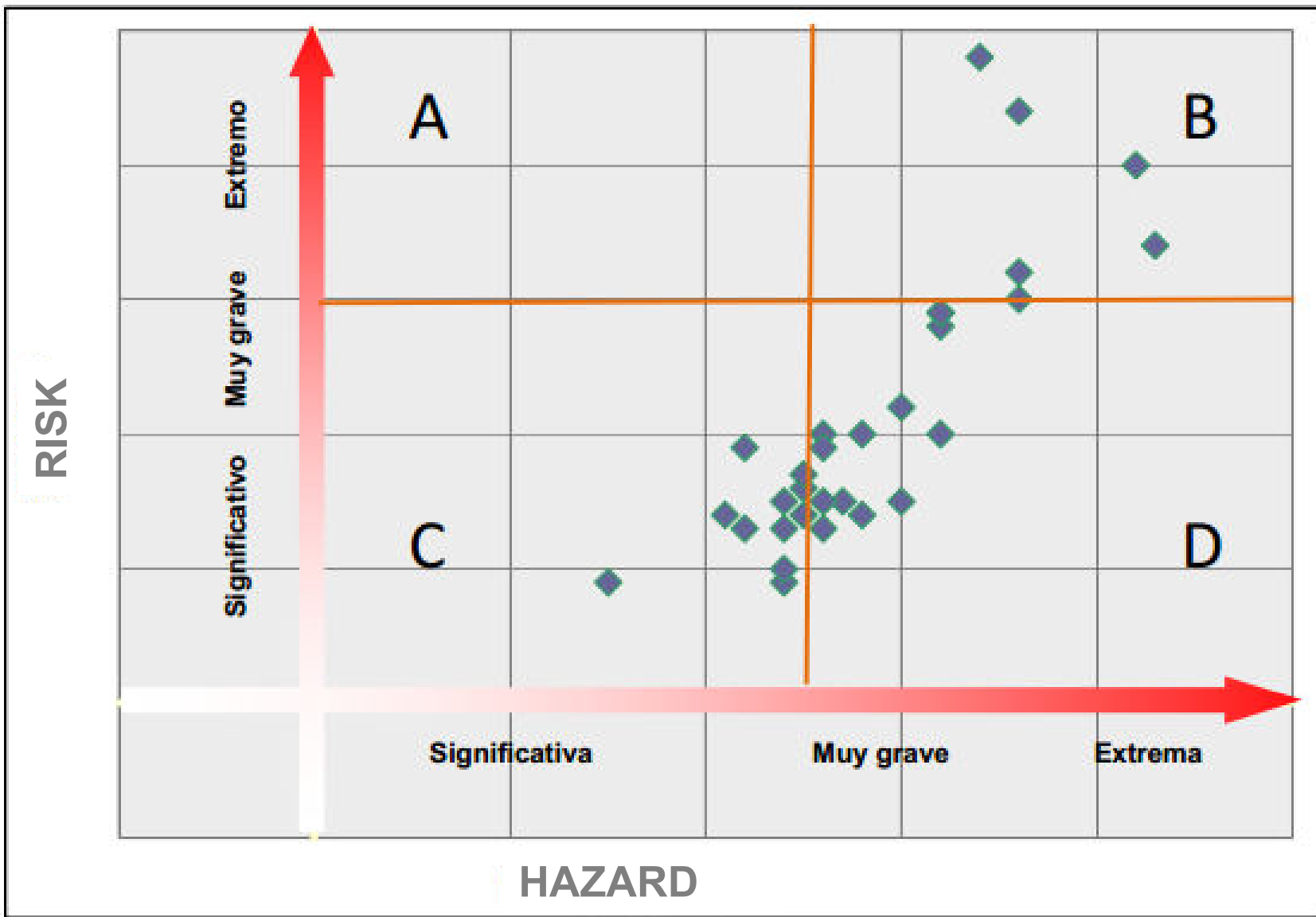
Flood risk maps

Indicative number of inhabitants potentially affected. Fluvial flooding





Flood hazard and risk maps results





Flood risk management plans

DIRECTIVE 2007/60/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 October 2007 on the assessment and management of flood risks

CHAPTER IV

FLOOD RISK MANAGEMENT PLANS

Article 7

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.



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.





Flood risk management plans

Type of measures identified by the European Commission

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



Example of Green Infrastructure

Earth embankment before the works

Earth embankment in its new location



River Órbigo Restoration Project (León, Spain)





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Example of Green Infrastructure



River Órbigo Restoration Project (León, Spain)





Conclusions

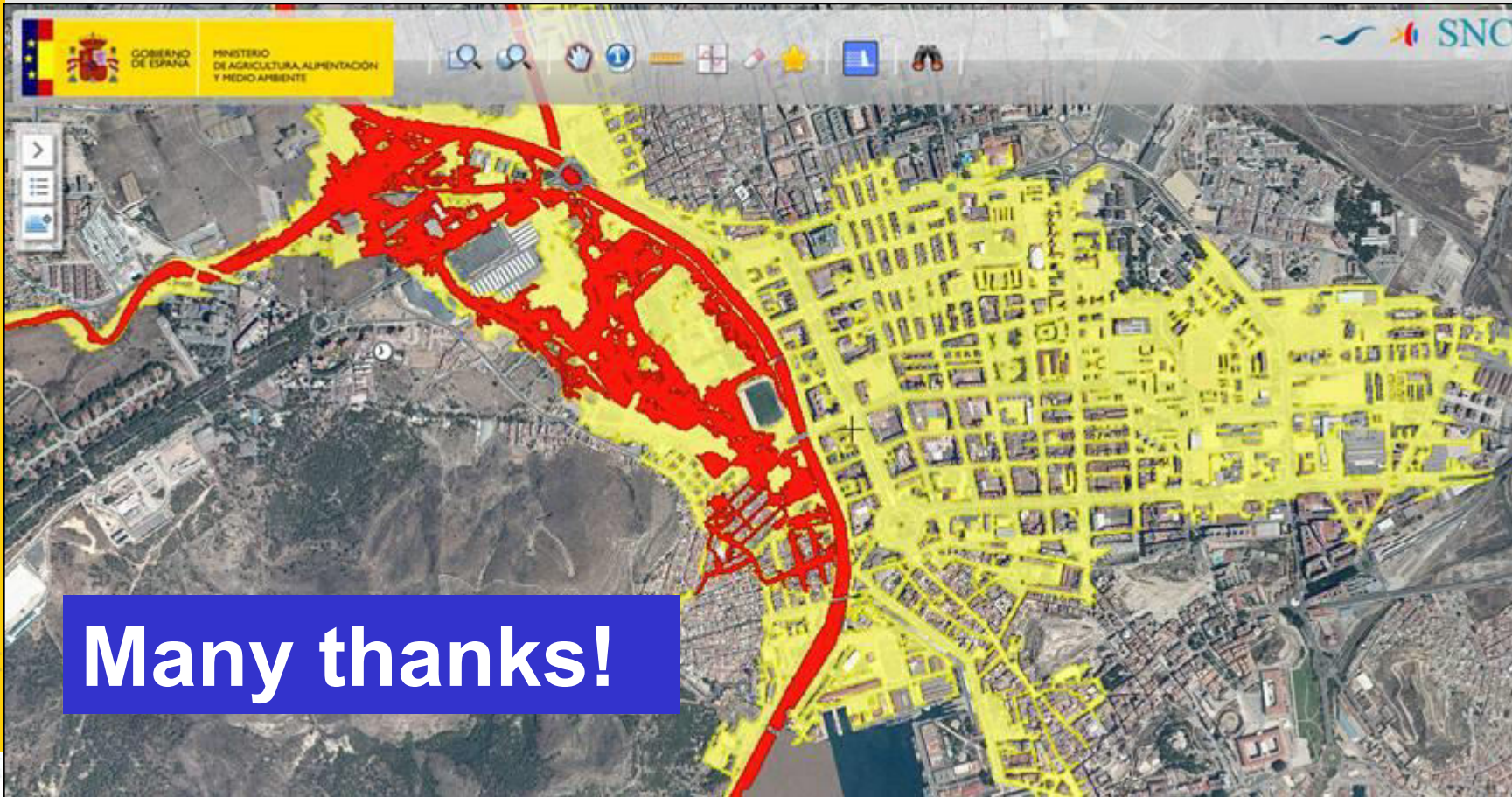
Spain has been working on flood-prone area management for a long time and the Floods Directive is being a boost to improve the works done

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





Many thanks!

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

