



Institute for European
Environmental Policy

Europe's Waters: Climate Impacts, Adaptation and EU Response

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Overview of Presentation



- Examine key impacts of climate change on Europe's waters
- Adaptation measures
- How can EU law and policy address these issues?

Issues to Consider



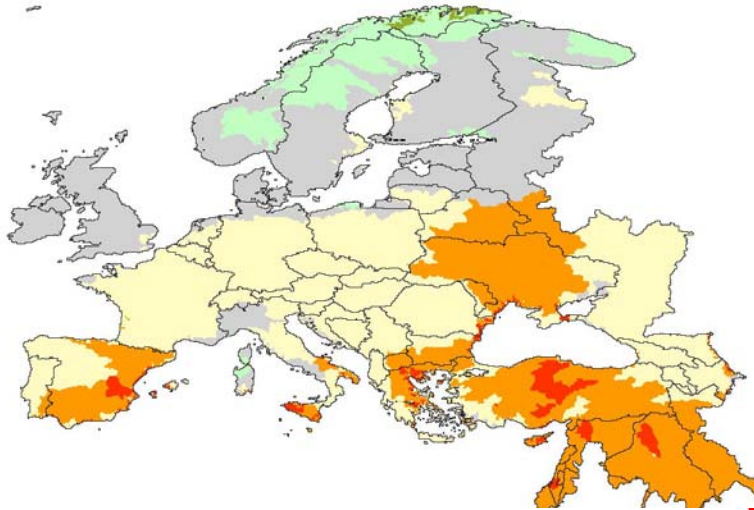
- Precipitation – rain and snow
- Temperature – water temperature, snow melt
- Direct impacts on water and indirect on water users
- Drought (water for biodiversity, domestic, industry, power, agriculture) and flooding
- Current problems and future changes
- What responses are appropriate (adaptation)

Water availability – annual (University of Kassel): SCENES



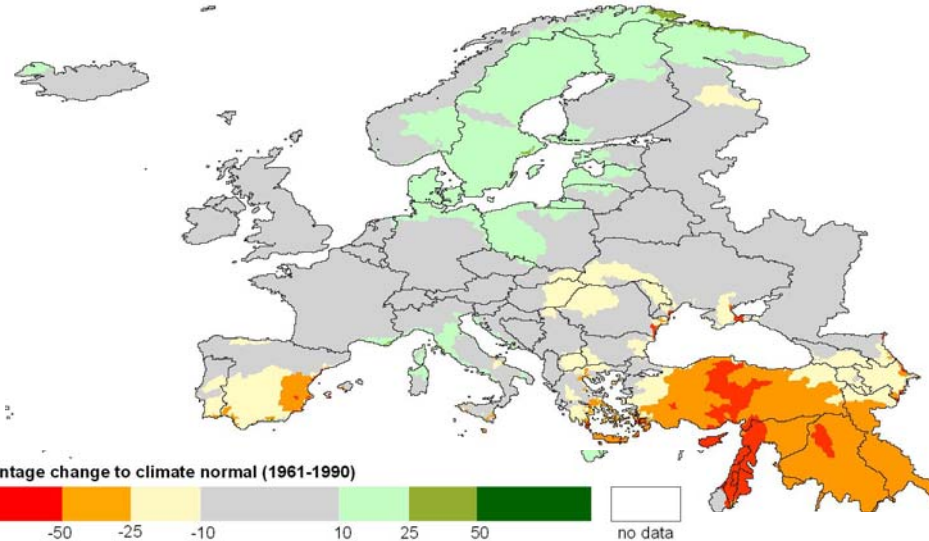
Change in average annual water availability

- natural flow: not considering dam management and water use -
(IPCM4, A2 scenario, 2050s)



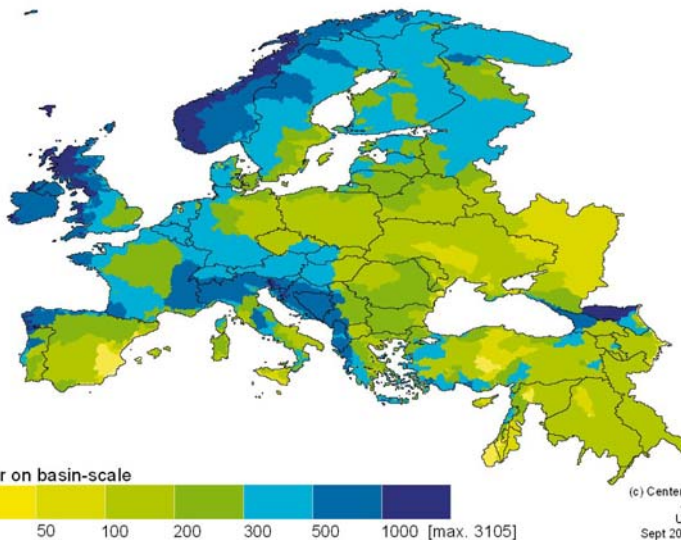
Change in average annual water availability

- natural flow: not considering dam management and water use -
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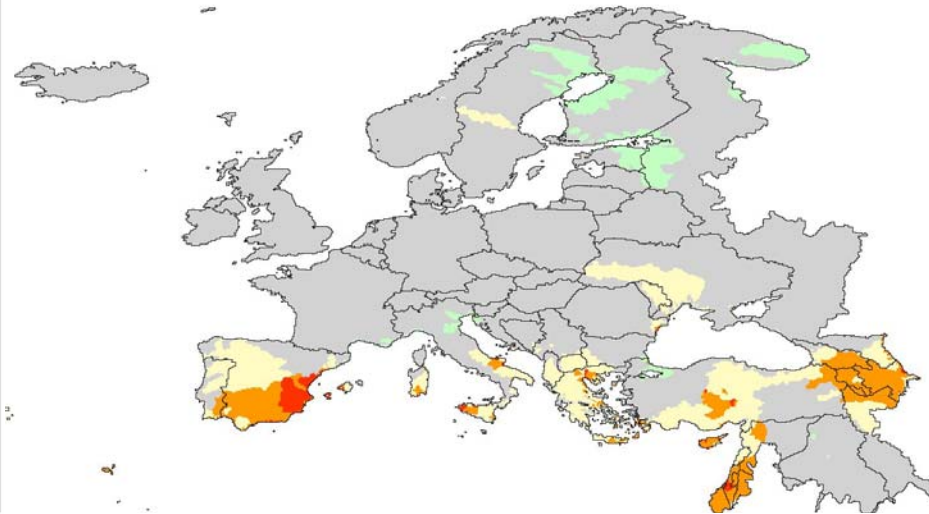
Average annual water availability

- natural flow: not considering dam management and water use -
(climate normal, 1961-90)



Change in average annual water availability

- natural flow: not considering dam management and water use -
(MPEH5, B1 scenario, 2050s)

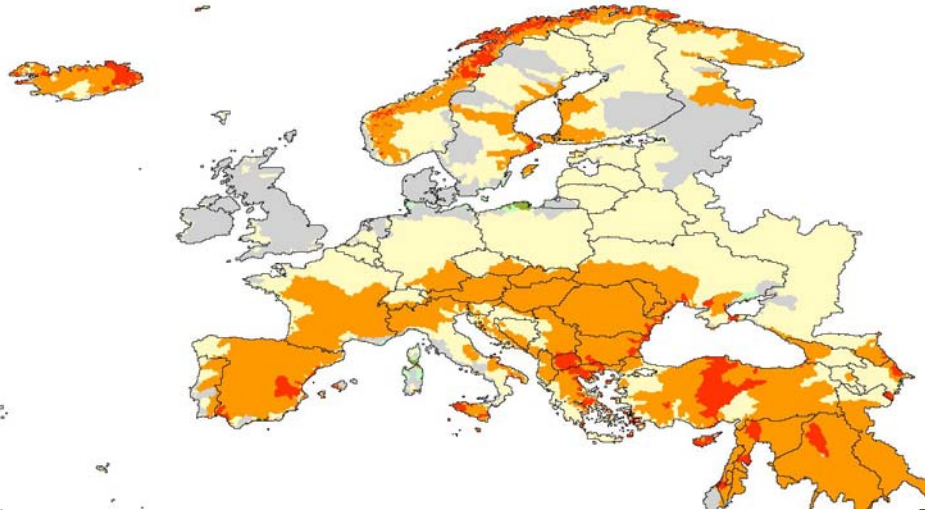


Water availability – summer (University of Kassel): SCENES



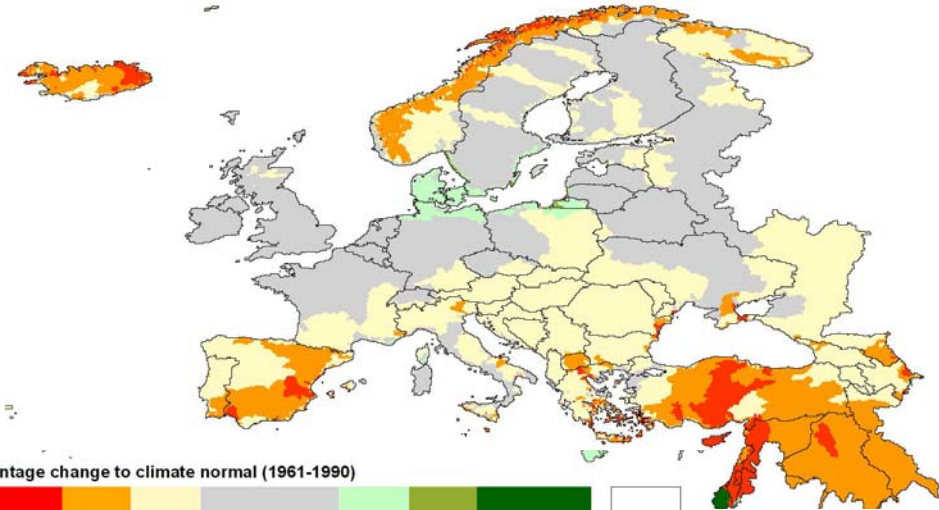
Change in average seasonal water availability in summer

- natural flow: not considering dam management and water use -
(IPCM4, A2 scenario, 2050s)



Change in average seasonal water availability in summer

- natural flow: not considering dam management and water use -
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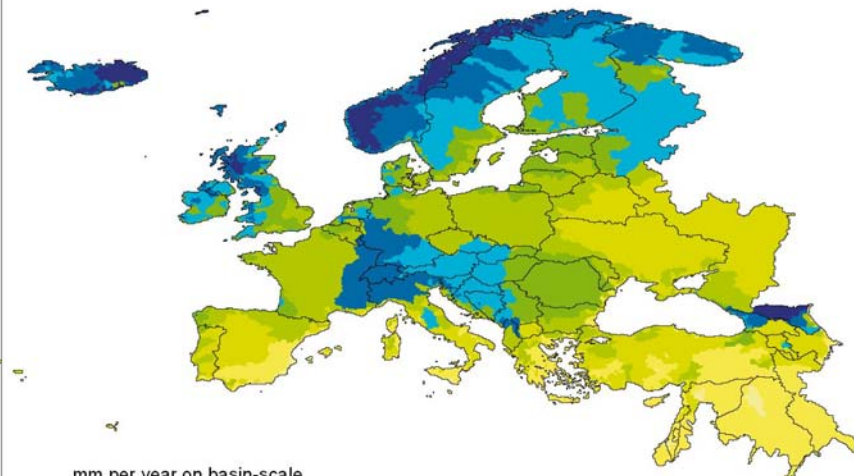


percentage change to climate normal (1961-1990)



Average seasonal water availability in summer

- natural flow: not considering dam management and water use -
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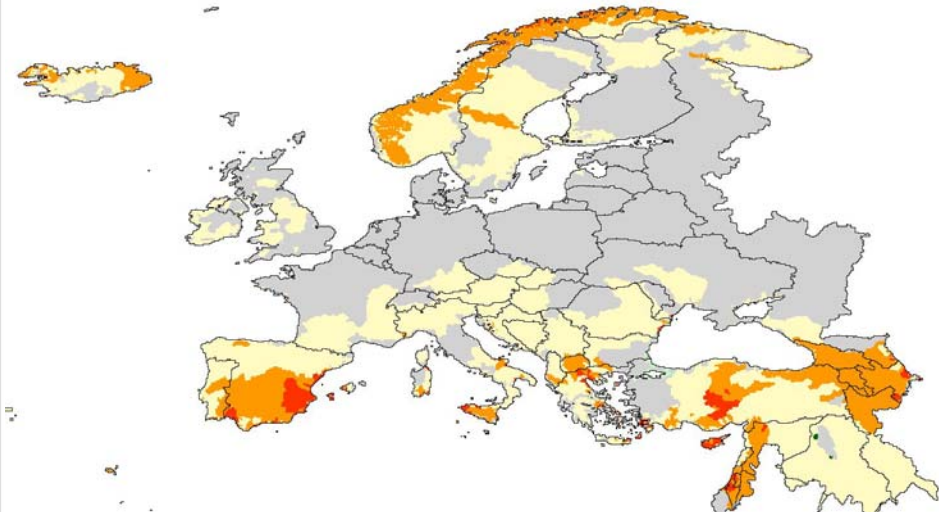
mm per year on basin-scale



(c) Center for Environmental
Systems Research,
University of Kassel
Sept 2009 - WaterGAP 3.1

Change in average seasonal water availability in summer

- natural flow: not considering dam management and water use -
(MPEH5, B1 scenario, 2050s)

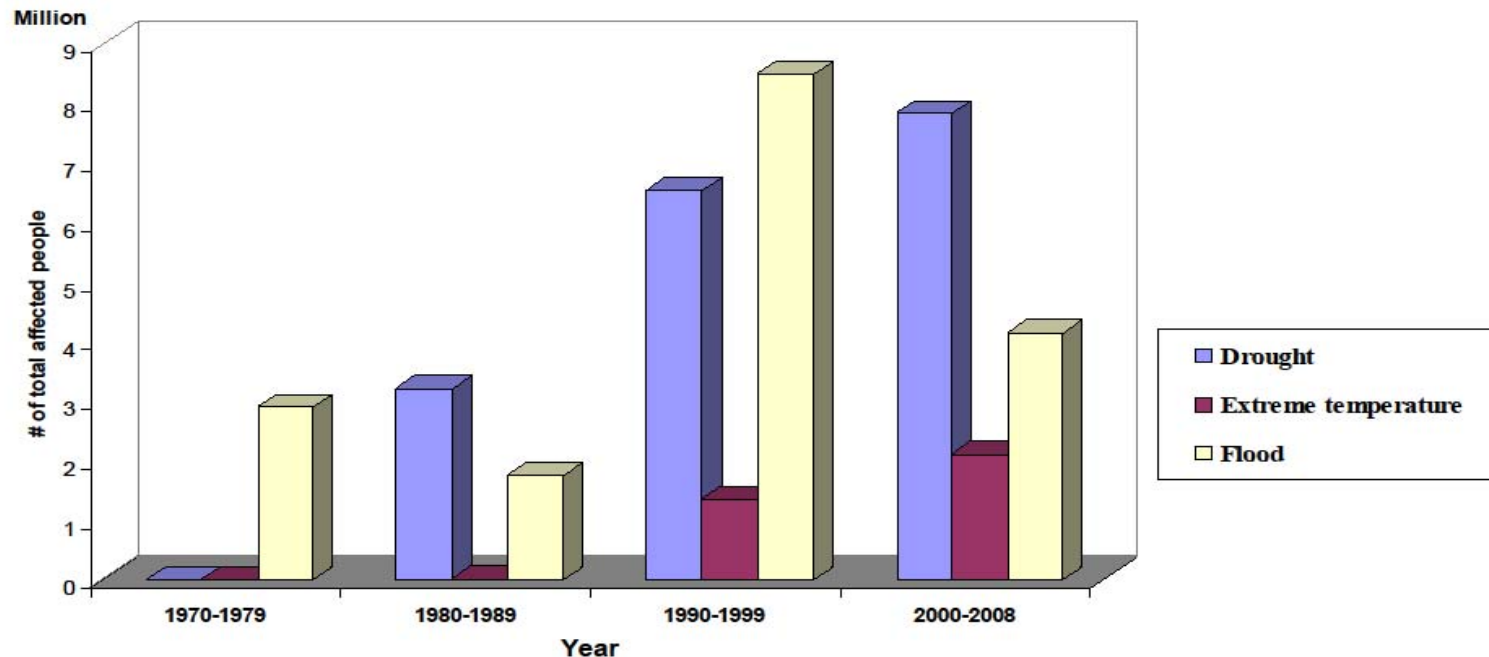


Climate impacts on water



Parameters	Examples of direct impacts of climate change
Hydrological	Changing river flows and sea levels lead to coastal erosion Hydrological connectivity of slopes, channels, and coastal zones Long-term bed-load and channel change Geomorphological processes creating dynamic/diverse habitats
Physico-chemical	Changes in water temperature and dissolved oxygen Decreased dilution capacity of receiving waters Increased erosion and diffuse pollution More frequent flushing of combined sewer outflows Photoactivation of toxicants Exceedence of water quality standards
Biological-ecological	Changing metabolic rates of organisms Changing ecosystem productivity and biodiversity Climate space of plant and animal distributions Fish migration patterns and dispersal corridors Increased eutrophication and prevalence of algal blooms Changes in aquatic fauna and flora at reference sites Changes in species assemblages in designated areas

We already have increasing problems



**Current 'vulnerability' to climate impacts in Europe:
Number of people affected by serious drought, extreme
temperature and flooding**

(Source: EM-DAT database by the Centre for Research on the Epidemiology of Disasters, Université Catholique de Louvain)

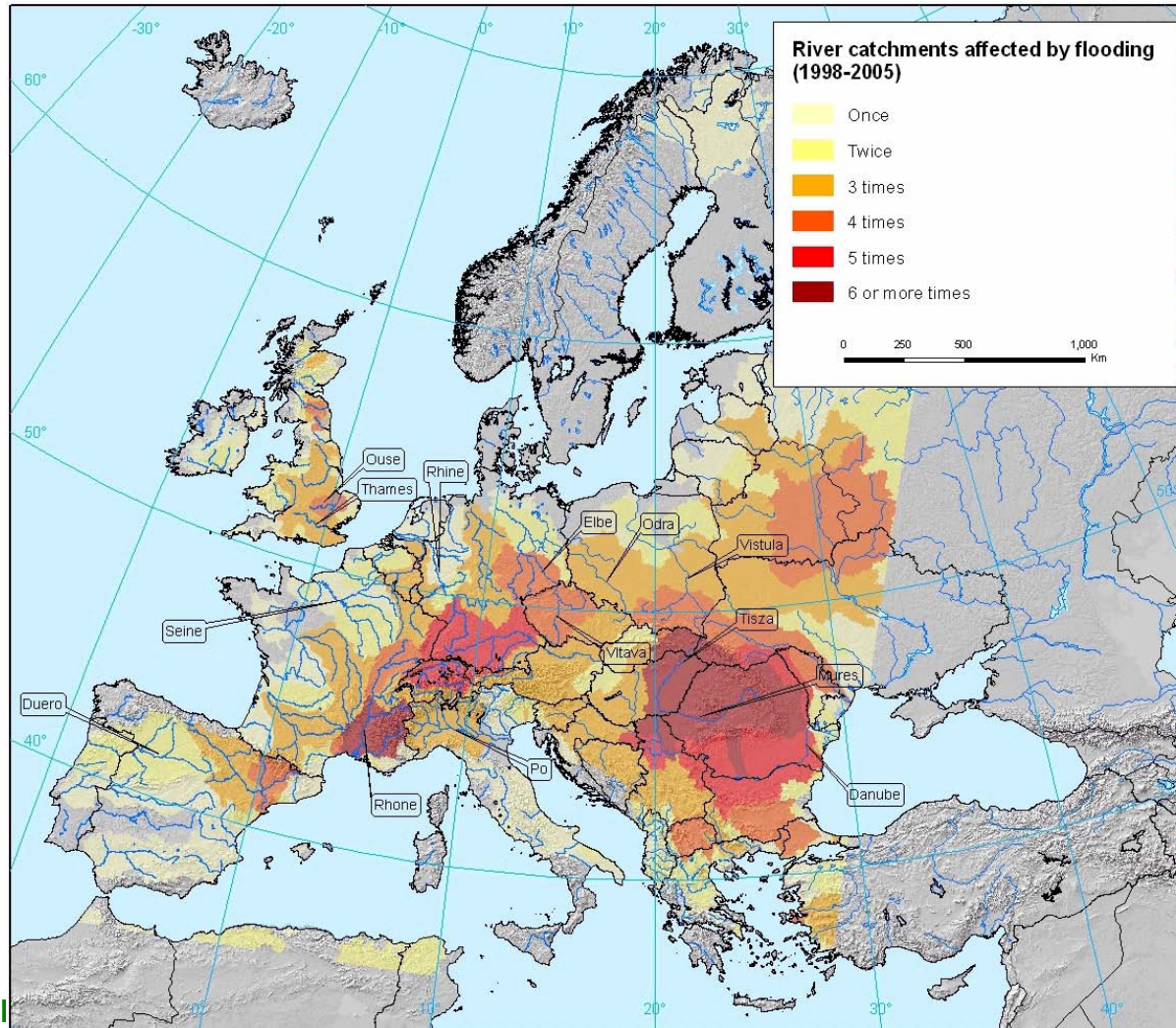
Flooding!



Flooding 1998-2005 (EEA)



About 100 (river) floods: more than 700 fatalities, a million people affected and 25 billion EUR in insured economic losses



Water Scarcity



- Scarcity – not just southern Europe – survey included Belgium, Denmark Germany, Hungary and the UK
- Severe droughts have affected more than 800,000 km² of the EU territory (37%) and 100 million inhabitants (20%) in four separate years since 1989.
- Across Europe agriculture is main cause of water abstraction, but in parts of Northern Europe abstraction can be dominated by domestic and manufacturing sectors
- Economic, social, political impacts and conflicts

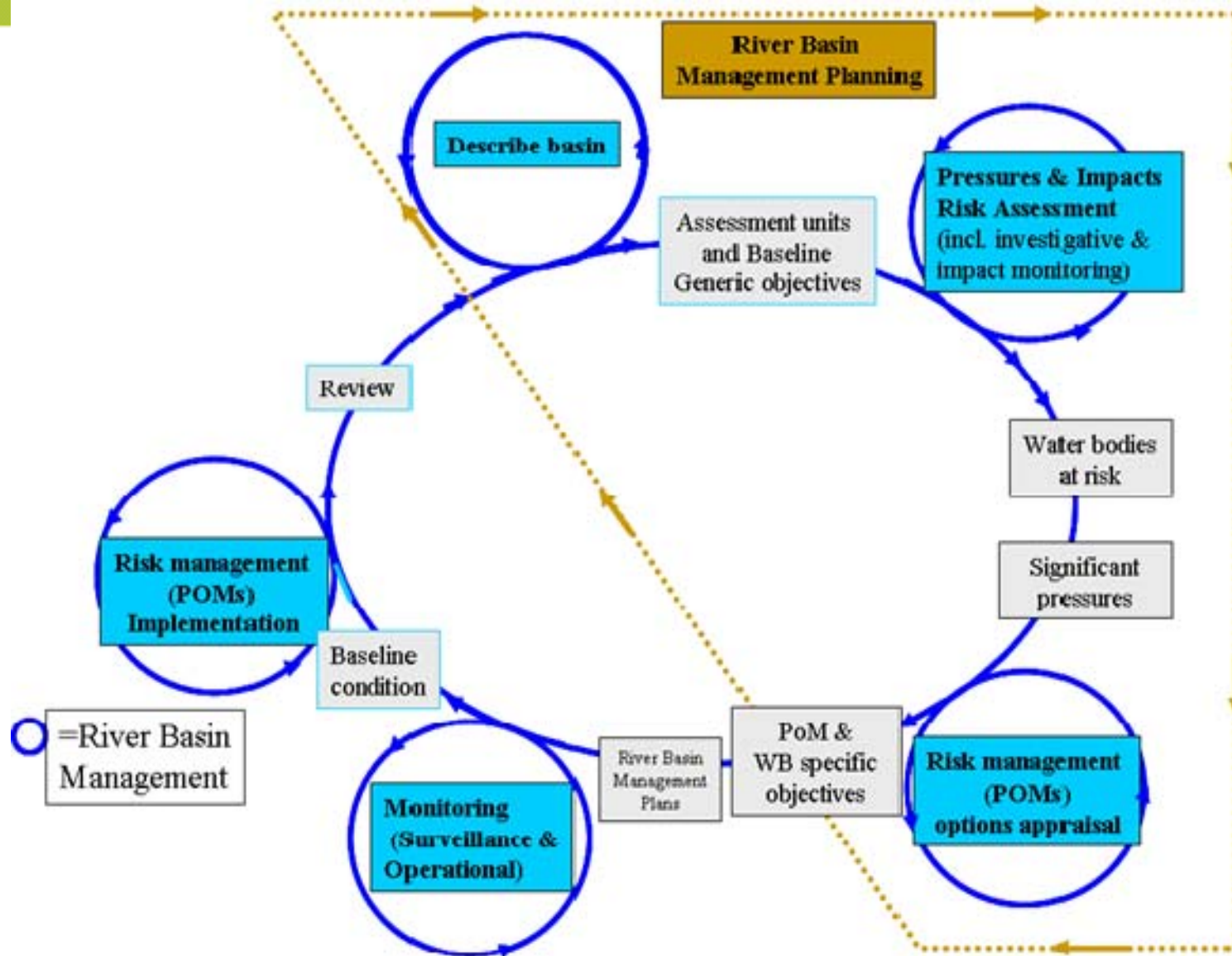
Spray irrigation!





- 2000 Water Framework Directive – comprehensive planning, ecological objectives, integrating human activities (quality and quantity)
- 2007 Floods Directive – risk assessment and planning – not prescribe level of protection
- 2007 Communication on water scarcity and droughts – information, assessment, not new measures

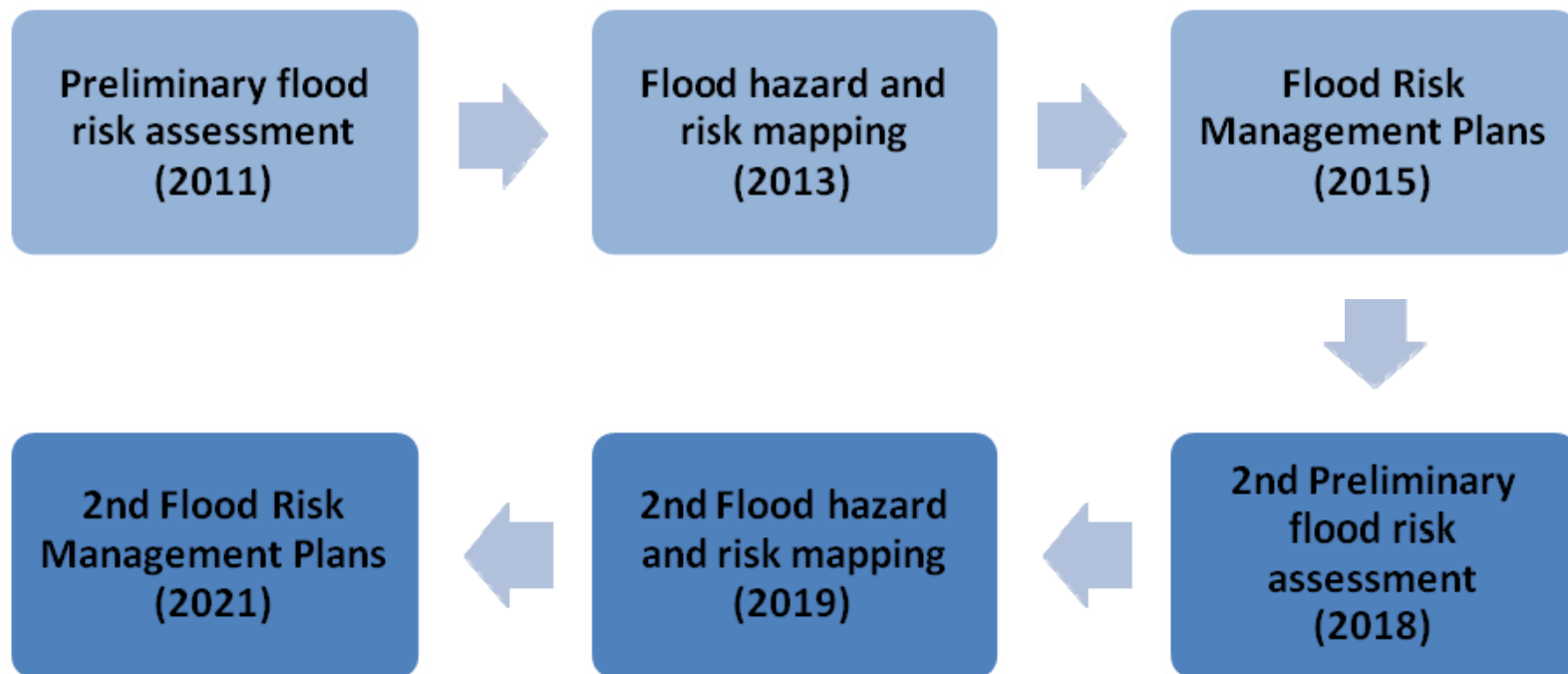
WFD Management Cycle





- First assessments done, River Basin Management Plans should be published December 2009
- End of implementation Dec 2015
- Then six year cycles
- Potential for delaying difficult measures!

Floods Directive





- Develop guidelines and tools to integrate climate into WFD and ensure integration into Floods Directive
- Assess efficiency measures for water use across sectors
- Explore potential for policies to boost ecosystem water storage
- Clearing House Mechanism as database on impacts, adaptation, etc. (2011)
- Integrate with biodiversity objectives



- Currently being agreed
- Practical guidance
- Use catchment models – impacts on waters and on pressures on waters
- Focus on river basin planning post 2015
- Quality, quantity, drought, extreme events
- Does not change planning logic of WFD – need to think about monitoring, information, measures
- Link RBMP to national climate adaptation strategies
- ‘No regrets’ policies – tackling drought, flooding, etc., helps now and in the future

Integrate, integrate and integrate!



- WFD is an integrating measure
- Protecting biodiversity may assist water storage, flood management, etc.
- Challenge to integrate WFD objectives with CAP, MS land-use planning, etc.
- Objectives, measures, information must be adapted to climate impacts
- Climate impacts on water must be addressed in other EU policies, e.g. CAP

Upland peat water storage





- Commission to review River Basin Plans from 2010 – including water pricing
- Assessment of progress of Water Scarcity Communication
- Links with Adaptation White Paper and national adaptation strategies
- CAP Review (up to 2013)
- Regional Fund objectives



- White Paper on Adaptation to Climate Change (COM(2009) 147) [Water: SEC(2009) 386]
- Communication on Water Scarcity and Droughts (COM(2007) 414)
- Water Framework Directive (2000/60/EC)
- Flood Risk Management Directive (2007/60/EC)
- Farmer, et al. 2008. Water Scarcity and Droughts: EP ENVI Briefing number 631-713
- UNECE Convention on Transboundary Waters: Guidance on Water and Climate Adaptation (6 Nov 09): http://www.unece.org/env/water/mop5/mop5_docs.htm



Thank you

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