

# Drafting a climate change adaptation strategy for the Rhine: Lessons learnt!



Internationale  
Kommission zum  
Schutz des Rheins

Commission  
Internationale  
pour la Protection  
du Rhin

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Commissie ter  
Bescherming  
van de Rijn

International  
Commission  
for the  
Protection of  
the Rhine



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*Scientific assistant*



**Starting point** for climate change discussions within the ICPR: **Ministerial Meeting in 2007:**

- 2 reports/studies: literature synthesis report no. 174 and report no. 188 with hydrological scenarios : **“Study of Scenarios for the Discharge Regime of the Rhine”** ✓
- Assessing scenarios in terms of impact on quality/quantity status and uses, identifying adaptation measures (ICPR WGs Floods, Substances and Ecology) and developing an adaptation strategy until 2013-2014 **(ongoing process)** (✓)

# Impacts of climate changes on water management

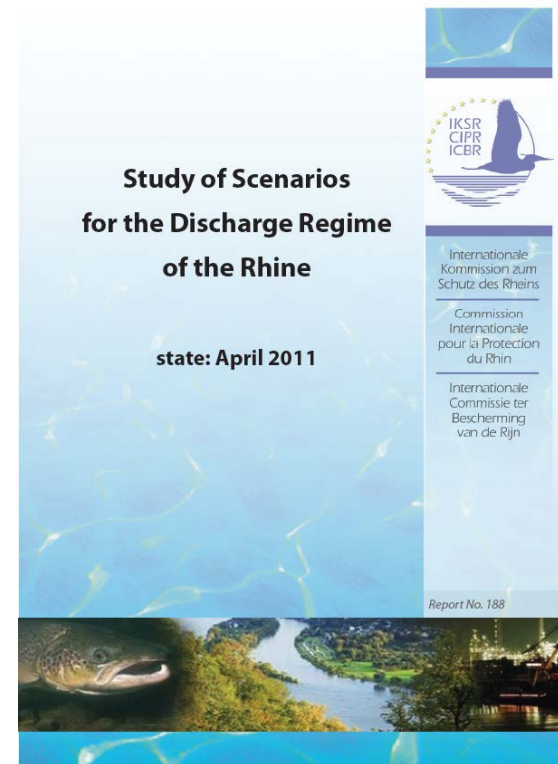


## Climate projections (until 2050 and 2100) show:

- Rise of winter/summer air temperatures
- Precipitation: wetter winters, drier summers

## Possible consequences:

- Winter: increase of runoff (floods)
- Summer: decrease of runoff (low water)



- **First consistent study for the whole Rhine catchment** (different parameters, 20th and 21<sup>st</sup> cent., focus on ranges of change)!

# Lessons learnt: basis for each action: a good transboundary cooperation!

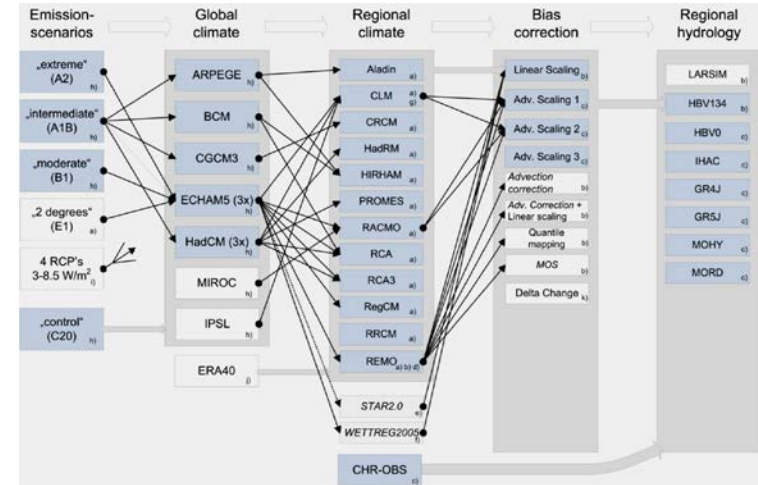


# Lessons learnt (assessment CC impacts)



Look at the past  
(observed change in the 20th)

Couple and cross  
information in order to  
reduce uncertainty!  
assessment with multi-  
model approach



Present  
“bandwidth of  
change” rather  
than precise  
values

Colour Code	Meaning
Orange	Decreasing trend
Grey	No unambiguous trend
Blue	Increasing trend
White	No statement possible

Parameter	Gauge	Corridors of scenarios	
		Change in % Near future	Change in % Remote future
MHO Hydrological year (Nov-Oct)	Basel	-5% bis +10%	-25% bis +15%
	Maxau	-5% bis +15%	-20% bis +15%
	Worms	-10% bis +20%	-15% bis +15%
	Kaub	-5% bis +25%	-10% bis +20%
	Köln	0% bis +20%	-5% bis +20%
	Lobith	0% bis +20%	-5% bis +20%
	Raunheim (Main)	0% bis +35%	0% bis +35%
Discharge „frequent“ flood	Trier (Mosel)	-10% bis +15%	-10% bis +20%
	Basel	-10% bis +10%	-20% bis +20%
	Maxau	-15% bis +20%	-15% bis +25%
	Worms	-15% bis +15%	-10% bis +35%
	Kaub	-15% bis +15%	-5% bis +40%
	Köln	-5% bis +15%	0% bis +40%
	Lobith	-5% bis +15%	0% bis +35%
Raunheim (Main)	0% bis +30%	5% bis +40%	
Trier (Mosel)	-5% bis +15%	0% bis +25%	

Interdisciplinarity (thematic working groups,  
different stakeholders)



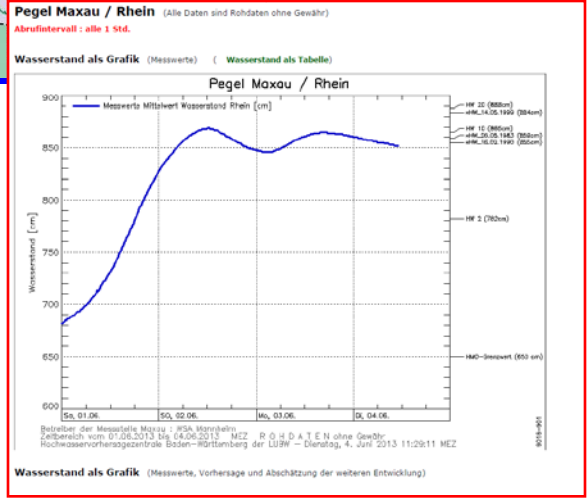
**What have we done so far and what are we doing in the Rhine basin that can be useful in the future to mitigate the impacts of climate change?**

- Flood risk management**
- Ecology**
- Water quality**

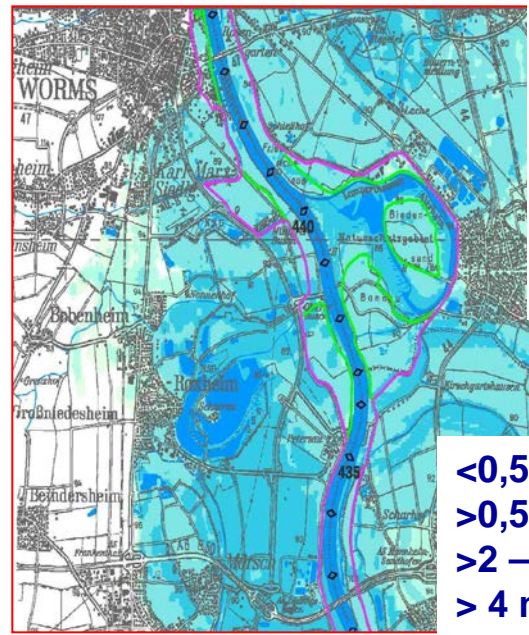
# No regret measures “Flood risk management”



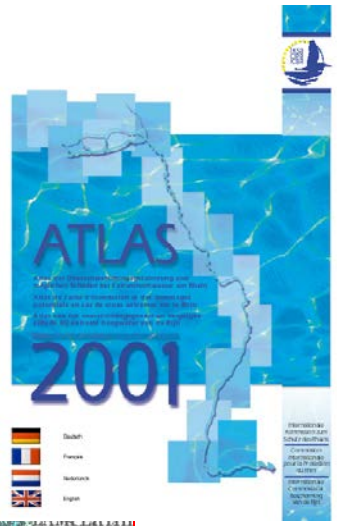
## Flood announcement and forecasting centres



## Flood hazard and risk maps



- < 0,5 m
- > 0,5 – 2 m
- > 2 – 4 m
- > 4 m



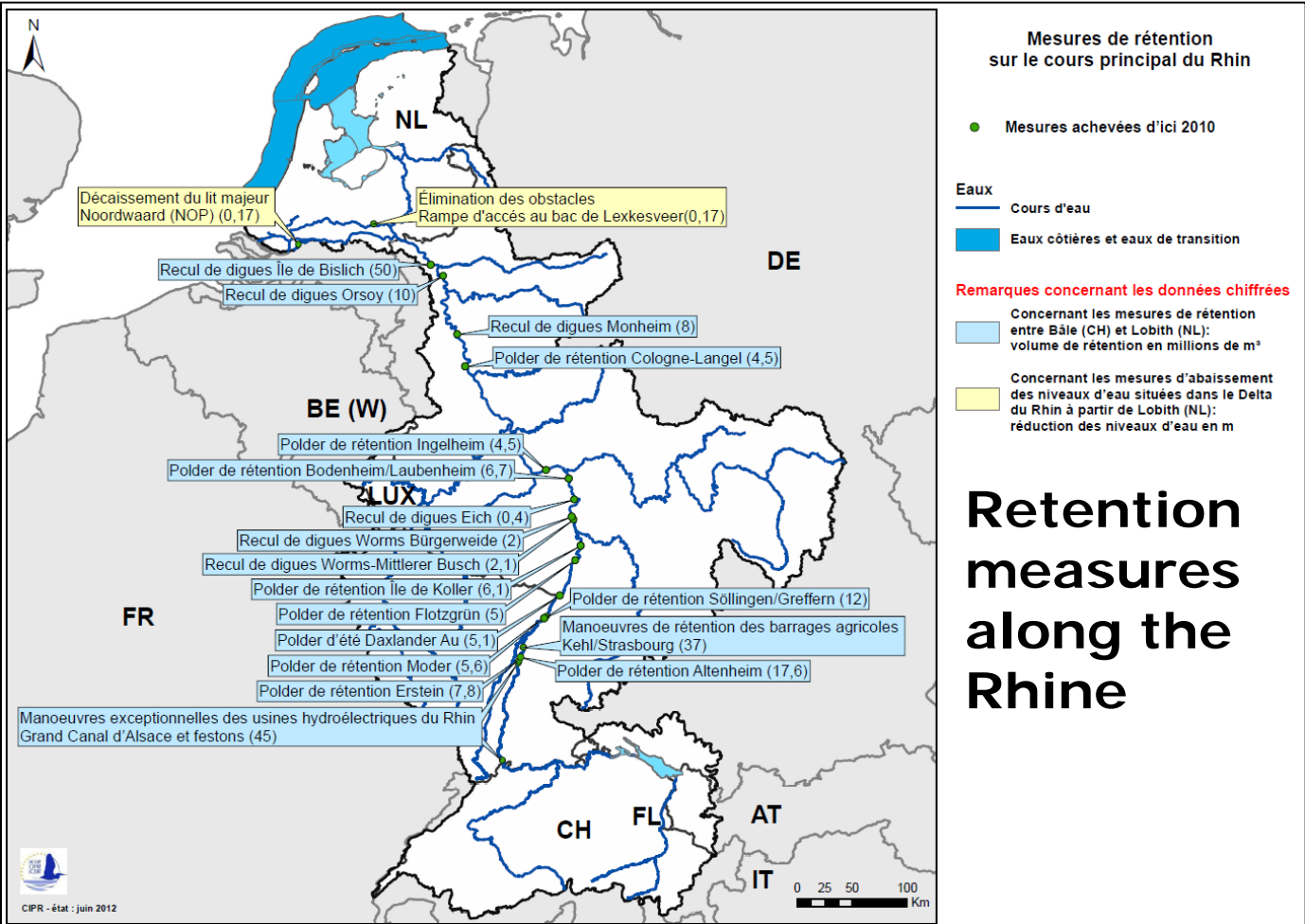
**Flood areas:**  
HQ10,  
100,  
extr.

# No regret measures "Flood risk management"



More room to the river (surface preservation and internationally coordinated retention measures)

→ good to reduce flood consequences + for the Rhine ecology





# No regret measures "Flood risk management": **Flood May-June 2013**



→ Seven retention measures came into effect

**Weir Kehl/Strasbourg**



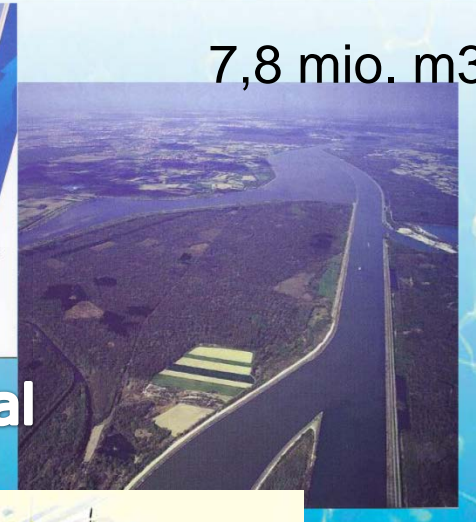
23 mio. m<sup>3</sup>

**Flood retention basin (Polder Erstein)**

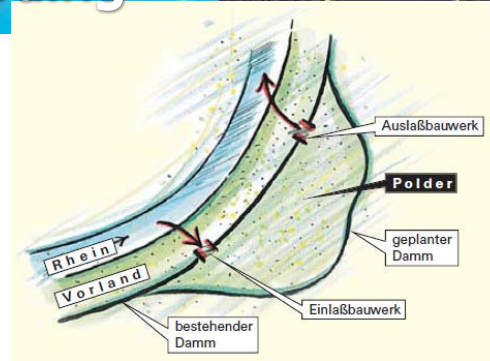
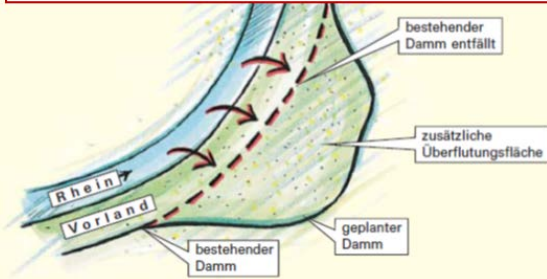


7,8 mio. m<sup>3</sup>

+ ecological flooding



**Dike relocation**



**City of Maxau (Upper Rhine) = - 15cm water level**

**Mainz (Middle Rhine) = some cm reduction**



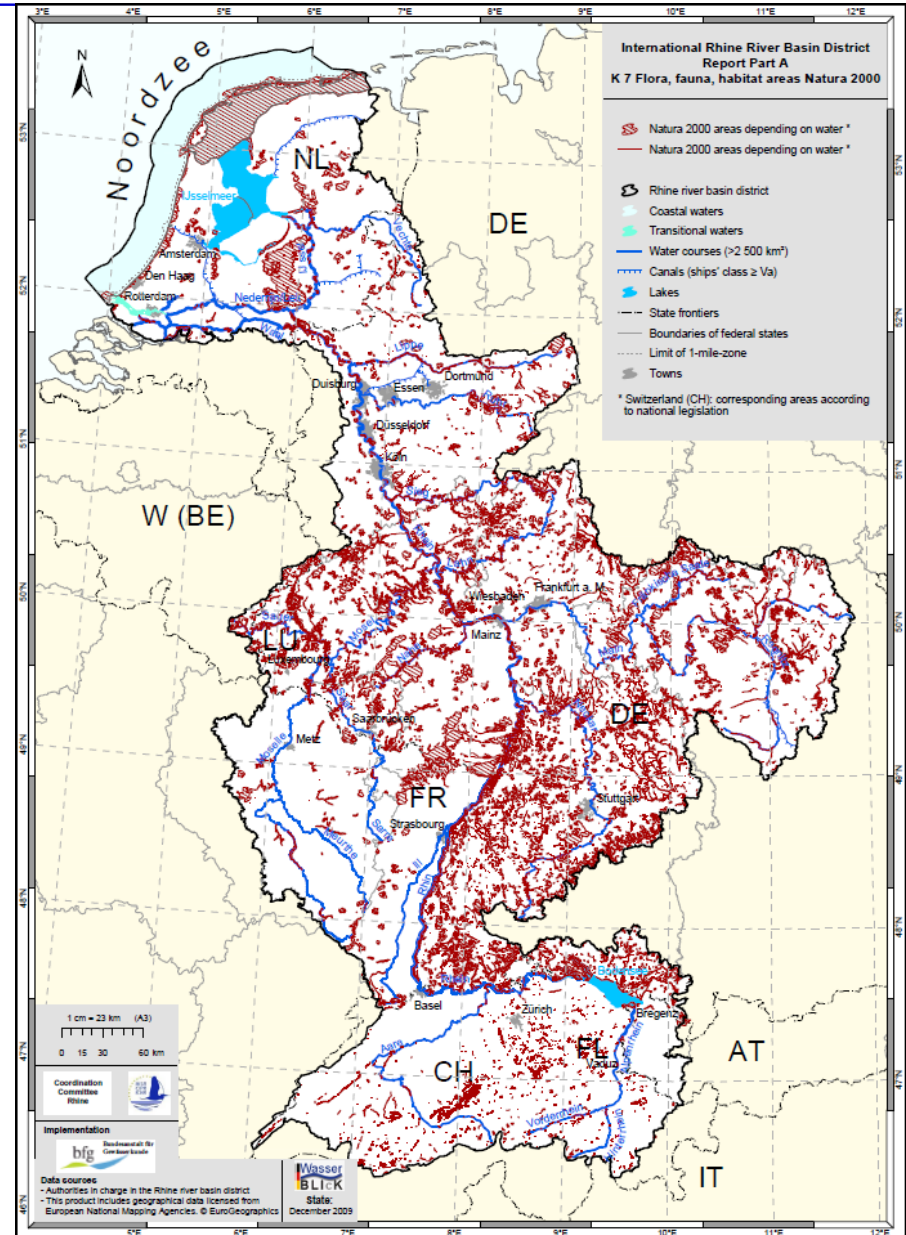
## Assessment of water temperature changes

- Link to ecology (fish, flora), water quality and energy production (specially in low water periods)
- Assessment of water temperature evolution in the 20<sup>th</sup> Century
- Drafting a report on potential water temperature changes in the 21<sup>th</sup> century based on model calculation and CC/Water temperature scenarios

# No regret measures “Biotope/habitat connectivity”



- Biotope Atlas
- Water related nature protection areas
- Current assessment of the connectivity
- Possible new measures



**Live with the river and  
adapt to flood!**



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