



Bayerisches Staatsministerium für
Umwelt und Gesundheit



Bavarian Climate Programme 2020

Christian Wanger
Bavarian State Ministry of the
Environment and Public Health
Brescia, October, 10, 2013

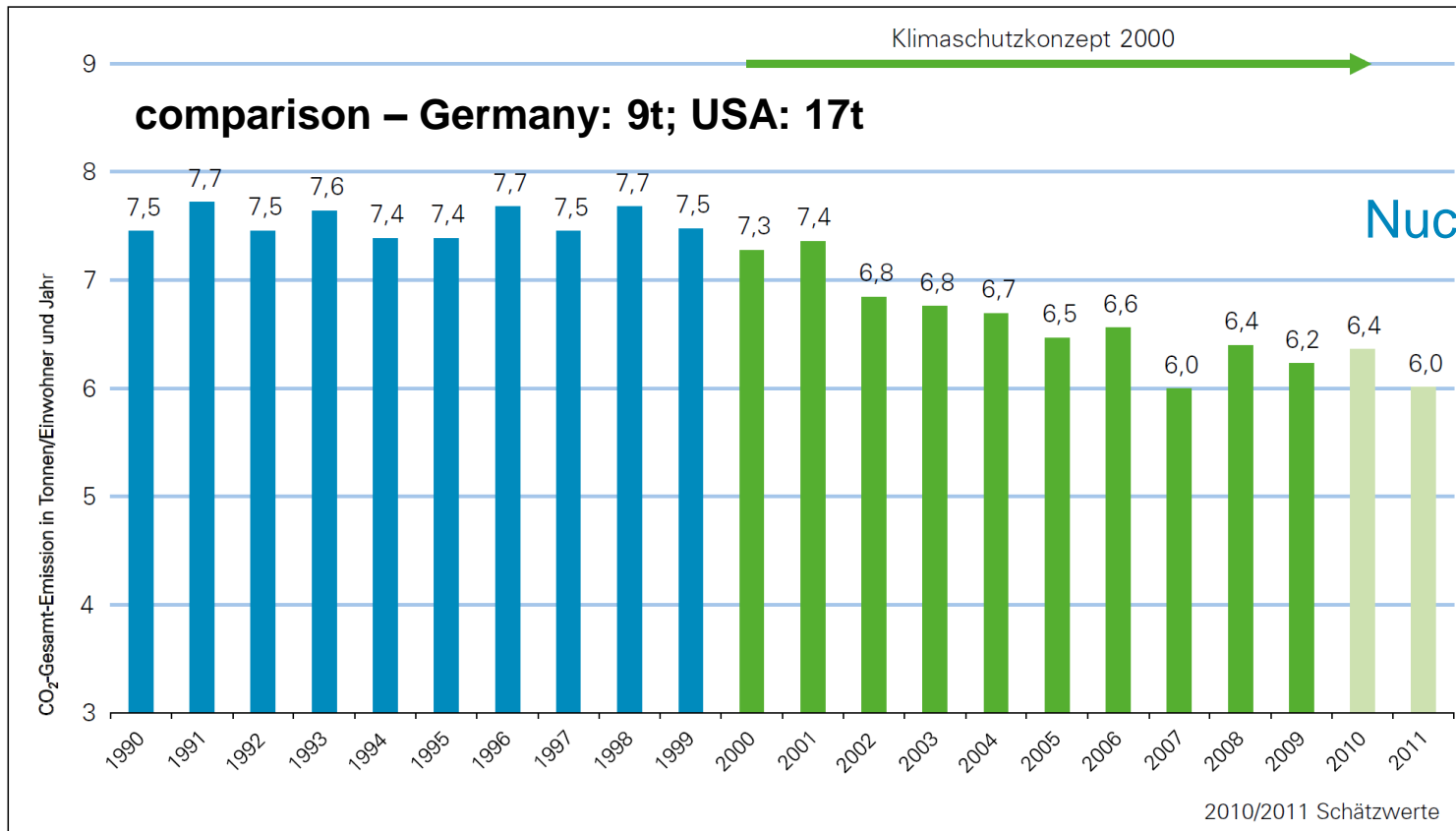
Bavarian Climate Programme 2020

- Three fields of action:
 - 1) **Reduction** of Greenhouse-Gas emissions
 - 2) **Adaptation** to the effects of climate change
 - 3) Research and Development for supporting reduction and adaptation
- Funds between 2008 – 2014 of about 1 Billion € in these fields of action
- Deutsches Institut für Wirtschaftsforschung (DIW 2007):
Without adaptation until 2050 about 96 Billion € economical damage in Bavaria

Goals in **Reduction** of Greenhouse-Gas emissions until 2020

- To reduce annual energy-related **CO2 emissions below 6 tons** per capita
- To increase **energy productivity by 30 %**
- To **double renewable energies** in final energy consumption to 20 % (electricity, heating, industrial energie,...)
- To increase **renewable energies in electricity to 50 %**
- **increasing hydro-electric power** taking account of the concerns of water management and nature conservation
- To **increase geothermal energy** up to 2 % (electricity and heat supply)
- To **increase biomass** in the production of primary energy to 10 %,
- To **decrease heating energy** of houses of about 20 % and industrial heat demand of 15 %

annual energy-related CO₂ emissions per capita in Bavaria



Nuclear phaseout ?

Energiebedingte CO₂-Emissionen in Bayern (pro Einwohner und Jahr)

Quelle: Bayerisches Landesamt für Statistik und Datenverarbeitung sowie Bayerisches Staatsministerium für Wirtschaft, Infrastruktur, Verkehr und Technologie (2010 und 2011 Schätzung)

Reduction of Greenhouse-Gas emissions in all fields:

- Energetic refurbishment of buildings (~35% of all CO₂ emissions are related to buildings)
- Transport (individual and public transport): e.g. increase public transport, use biofuels, hybrid and electric cars...
- Industry: increase energy efficiency...
- **Forestry and agriculture**, moor restoration, use of natural building materials, increase of biomass, ...
- **Renewable energy** and climate friendly energy production



Influence on water !

Bavarian targets to 2021:

hydro power:

new construction, upgrading & retrofitting
in cooperation with water management &
nature conservation!

17% of electricity use from hydro power!
(13,3 % in 2009)

bioenergy:

wood, pellets, fuel, biogas, power-heat cogeneration, new
energy plants

9% of total energy consumption (7% today) & nearly **10%** of
electricity (6% today)





**climate adaptation
climate change =
stress for bavarian forests**

slight change in temperature and
precipitation
means for the spruce suffering from:
-droughts
-storms/wind
-vermin (bark beetle)



→ destruction of 5600 ha bavarian forests
through severe drought (2003), bark beetle
(2006), wind (2007)

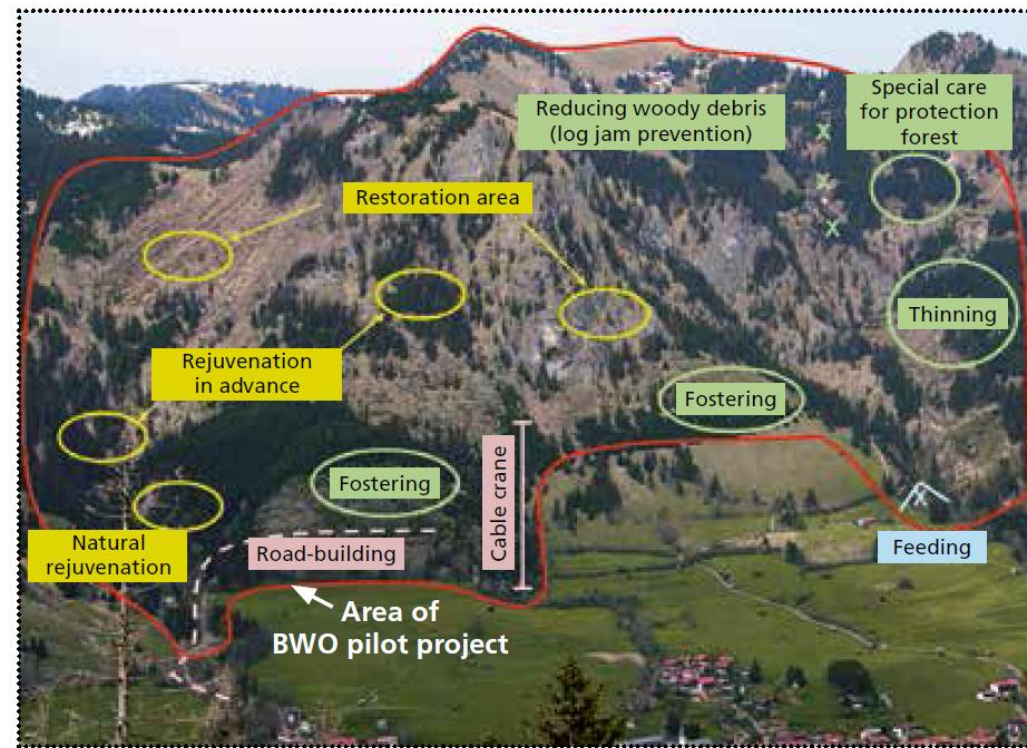


Figure 17 – Example of measure combination within a Mountain Forest Initiative Area. (Bavarian State Institute of Forestry)

adaptation:

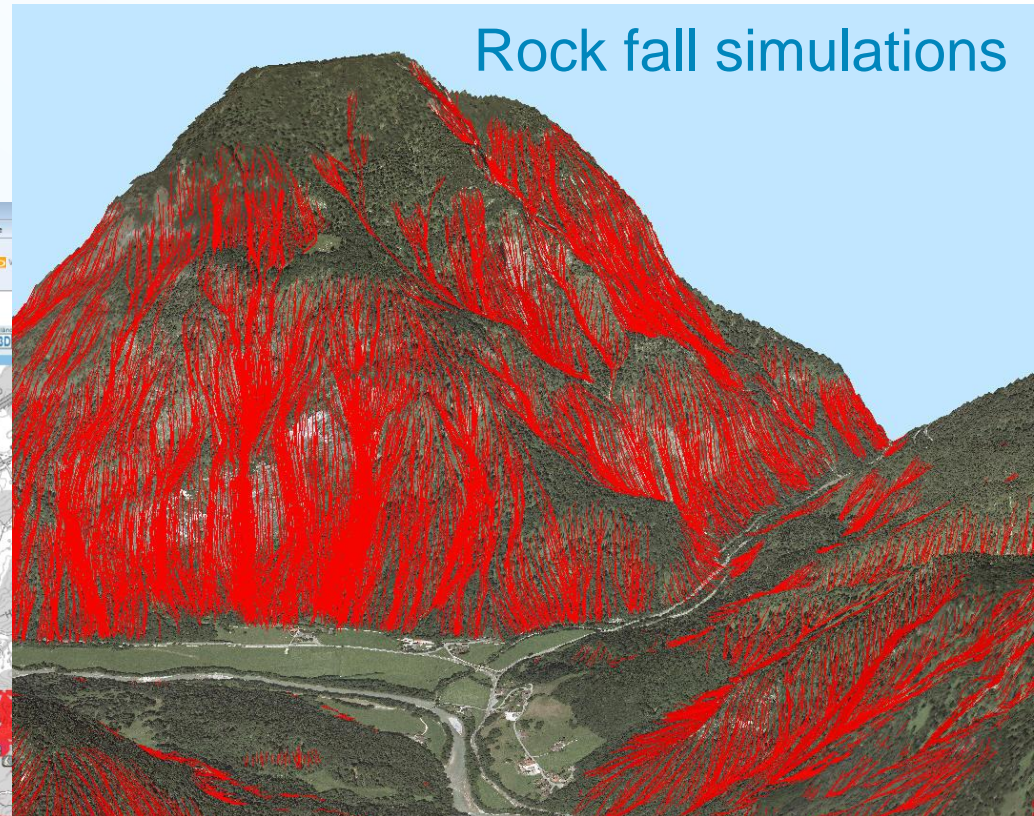
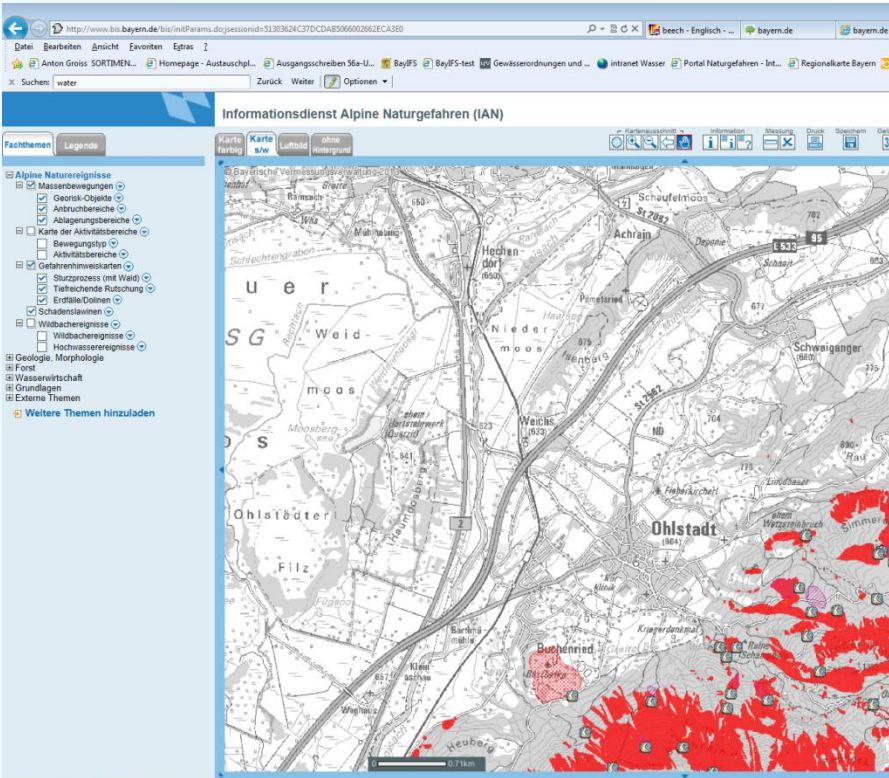
- program about forest conversion
- special program on mountain forests

conversion of immediately endangered spruce-colonies (260.000 ha Fichten) into climate- tolerant mixed forests (100.000 ha)



Measures - Georisks

- Extend Georisk database for whole Bavaria, thus boosting prevention and enhancing security
- Producing hazard maps
- Extend online information services

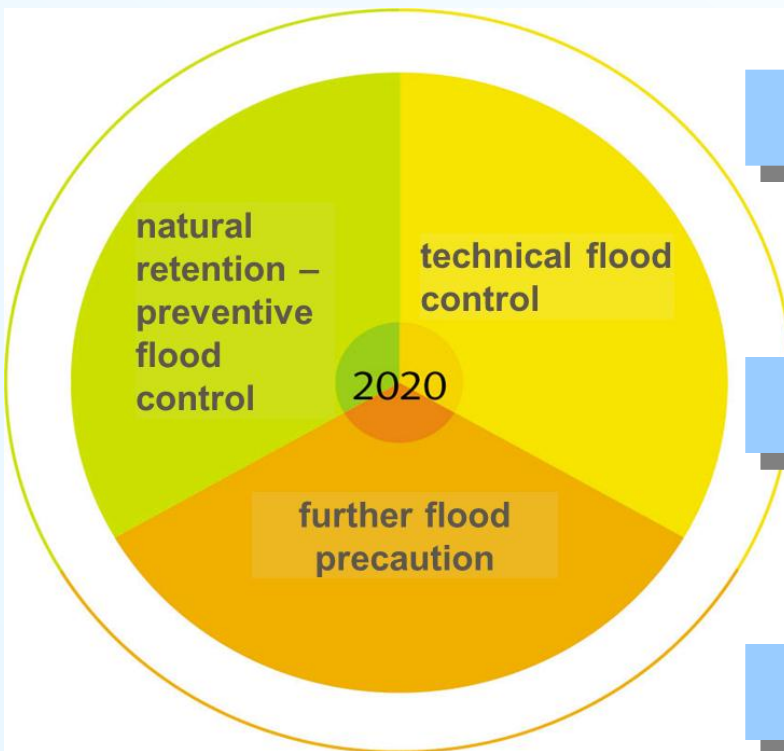


Water management: Precautions and Adaptation to Climate Change

Foundations and Monitoring (KLIWA)		
<ul style="list-style-type: none"> Investigation of the ramifications of climate change Deduction of basic consequences 		<ul style="list-style-type: none"> Identification of research priorities Monitoring of water supply levels
Precautions (CO ₂ reduction)	Adaptation	
<ul style="list-style-type: none"> Geothermal energy Energy efficiency in effluent disposal Energy from runoff Optimized use of hydro energy CO₂ reduction through alluvial forests 	<p>Flooding</p> <ul style="list-style-type: none"> Climate change factors Reduction of restrictions Securing of previous flood plains as emergency polders Flooding support expansion (reservoirs, retention) Flooding prediction optimization Danger flood zone maps Integral mountain torrent protective concepts 	<p>Low water and drought</p> <ul style="list-style-type: none"> Strengthening of the water supply (combines systems, production alternatives, securing ground water reserves) Thermal load plans and low water management plans Low water filling Sewage cleaning requirements Water-protecting agriculture
<p>Water risks</p> <ul style="list-style-type: none"> Terrestrial heat use Agricultural irrigation Energy crops, fertilizers and pesticides Decentralized biogas plants Consistency 	<p>Comprehensive measures</p> <ul style="list-style-type: none"> Securing reserve areas in corresponding reservoir study Water reserves in agricultural areas (groundwater restructuring, flood protection) Rainwater cultivation (desealing, seepage) Infrastructure adaptations (e.g. canals) Public relations and raising awareness 	

Measures – Water management

flood-action programme 2020 – enhanced after Flood 2013



Water renaturalization

Water meadow action program:
“Active Reserve on the Plain”

Flood reservoirs

Controlled polders
Protection for cities and
communities; levee sanitation

Determination / allocation of flood
areas

Designation of priority regions;
flood information service program

Natural Retention

Example: widening of the river Wertach

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Exceeding the design floods

Overtopping of a dike with concrete sealing wall:

Reduction of damage in case of extrem events



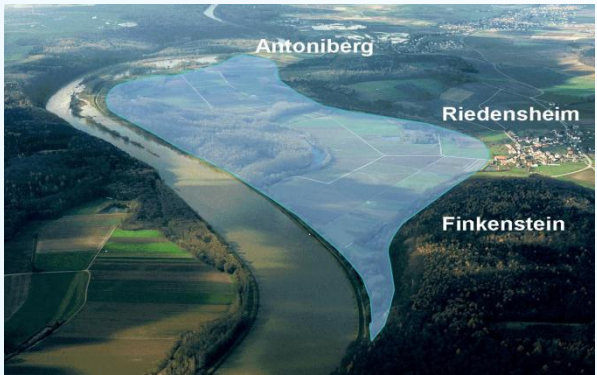
Dike refitting programme and new standards for dikes: interior sealing walls



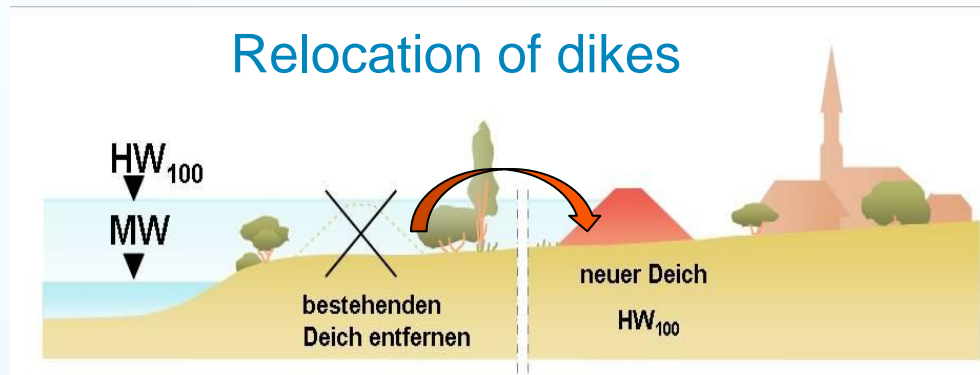
Design flood for hydraulic structures considering +15 % climate change



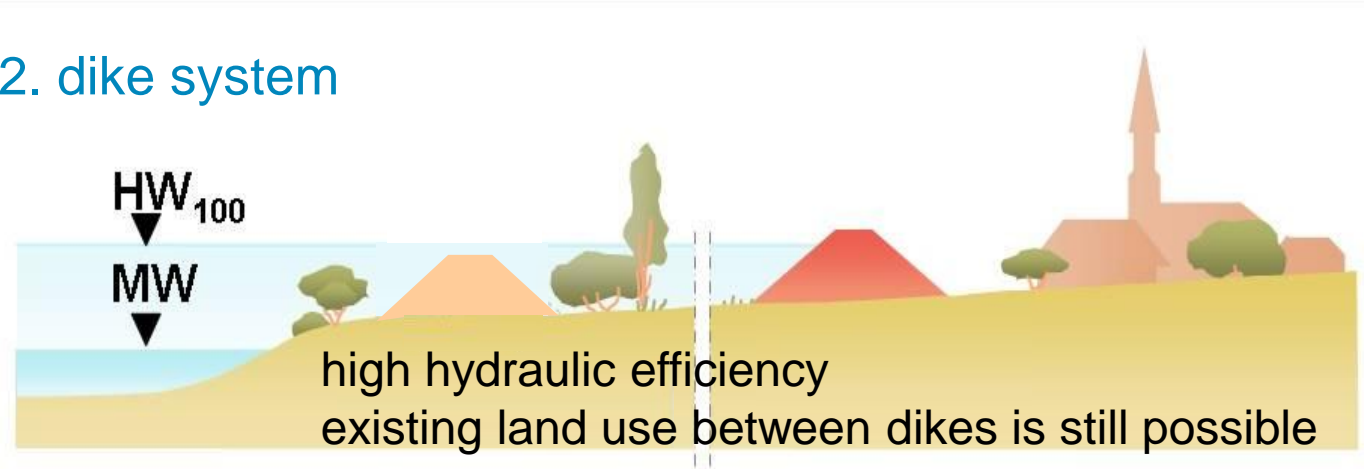
Further retention strategies



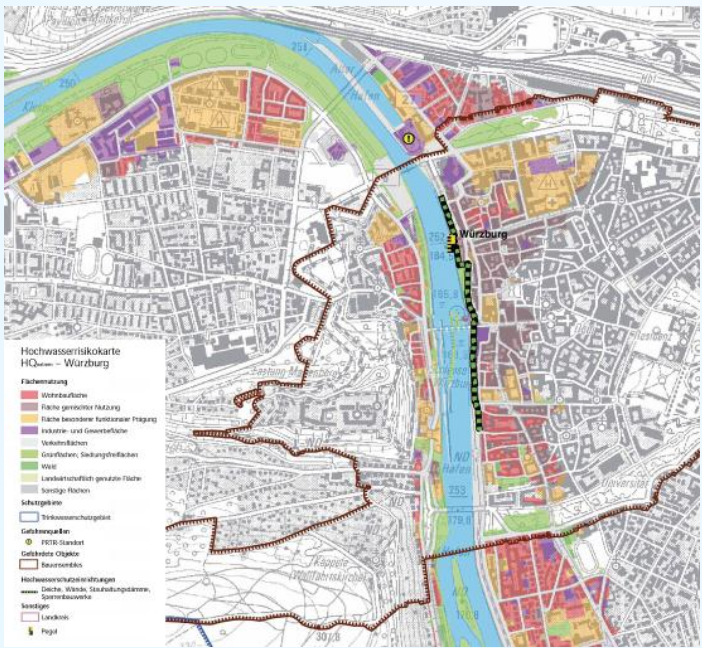
controlled flood polders



2. dike system



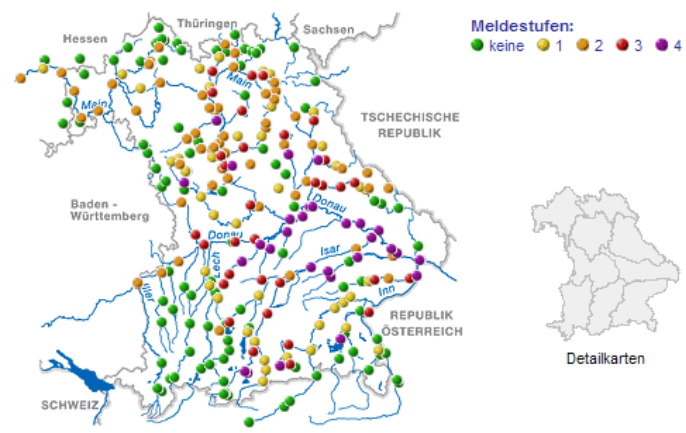
- Improve Flood prediction system
- Coordinated controls of reservoirs and hydropower plants
- Implementation of the Floods Directive



Hochwasserlagebericht Nr. 18 vom 03.06.2013, 13:10 Uhr

Weiterhin extreme Hochwassersituation im Donau- und Innggebiet. Auch im Mainingebiet hält die Hochwasserlage weiter an. [mehr >>](#)

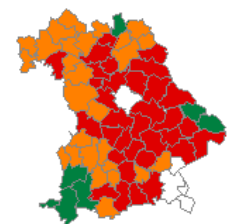
Aktuelle Meldestufen



Aktuelles

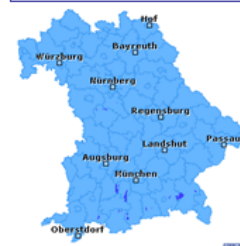
Zur Zeit keine Mitteilungen.

Hochwasserwarnungen



[mehr >>](#)

Wetterwarnungen vor Stark- und Dauerregen



Detailkarten



Flood 2013: oil leads to a total damage of houses

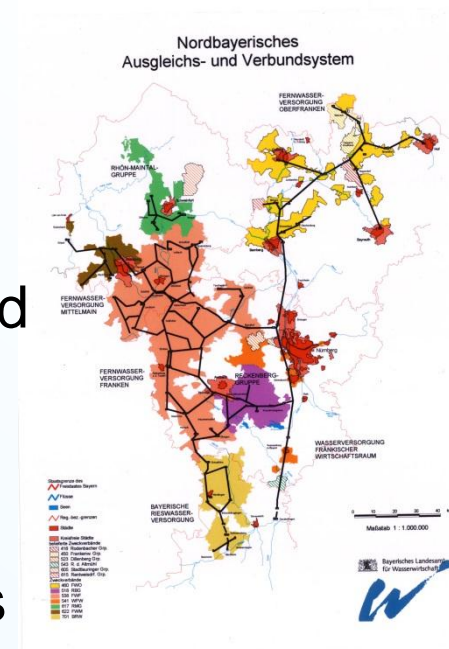
Low water information and monitoring system

- Discharge
- Temperature
- Groundwater
- Lakes
- Reservoirs

=> Thermal load plans and low water management plans

some measures: Low water and drought

- Optimization of monitoring infrastructure (gauges...)
- Investigate new possible areas for reservoirs for drinking water supply and low water management
- Inspection of supply guarantee for drinking water and process water
 - E.g. Linking of separate supply systems of municipalities
 - E.g. additional drinking fountain for drought periods
- Improve natural groundwater recharge in rural areas and rainwater seepage in urban areas
- Improve biological reliability and resilience by including biodiversity in measures of flood protection, river restoration and consequent implementation of WFD





Conflicts CO₂-Reduction and Adaptation: e.g. renewable energy by biogas

- More cultivation of land for energy crops
 - flood protection ?
 - erosion ?
 - colmation ?
 - nutrients contamination?
- More biogas plants
 - danger of failure ?



Thank you for your attention

