IMWA Congress

in Christchurch, New Zealand



Rehabilitation of the Lusatian Water Balance, in Consideration of Climate Change and the End of Lignite Mining

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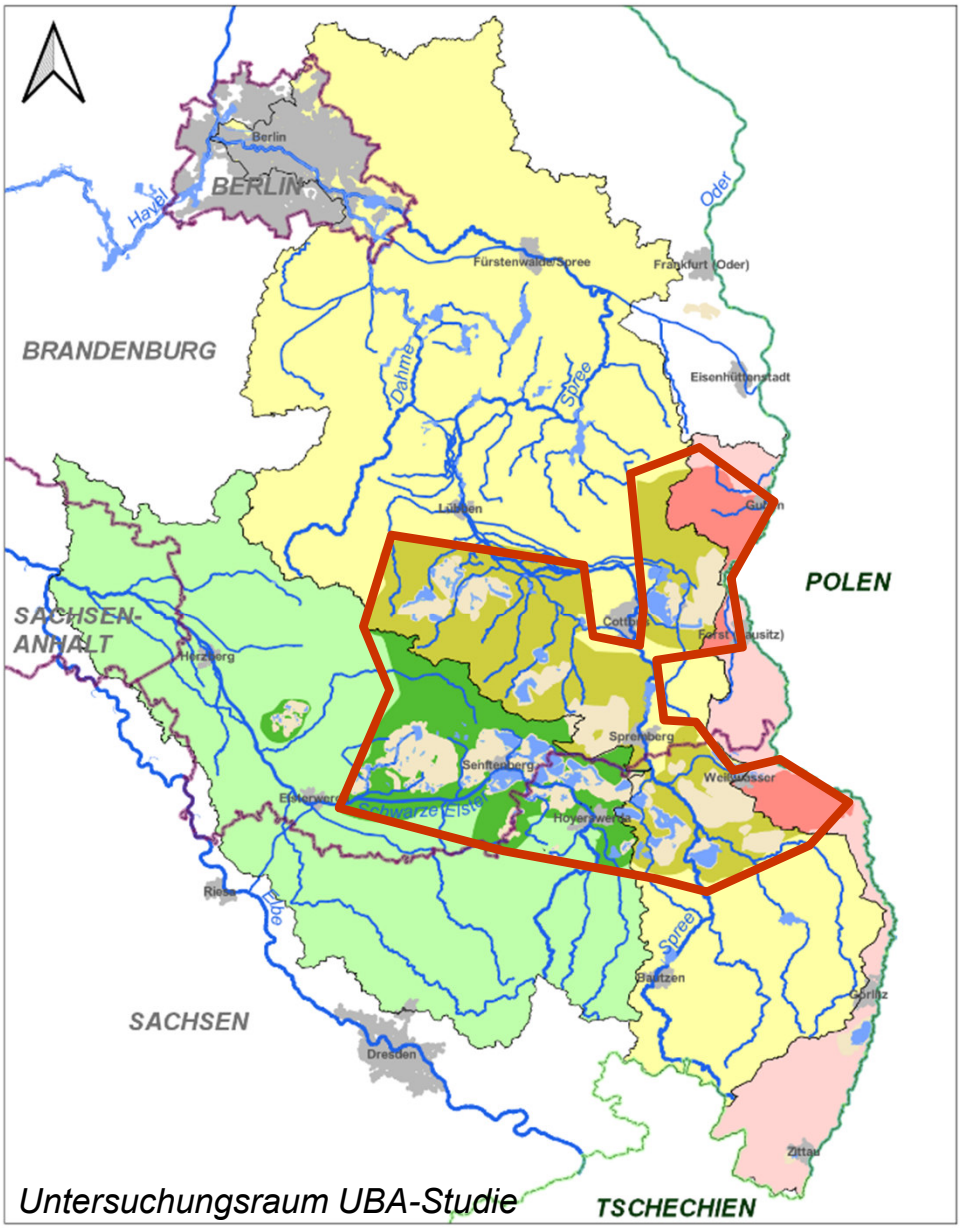
Introduction

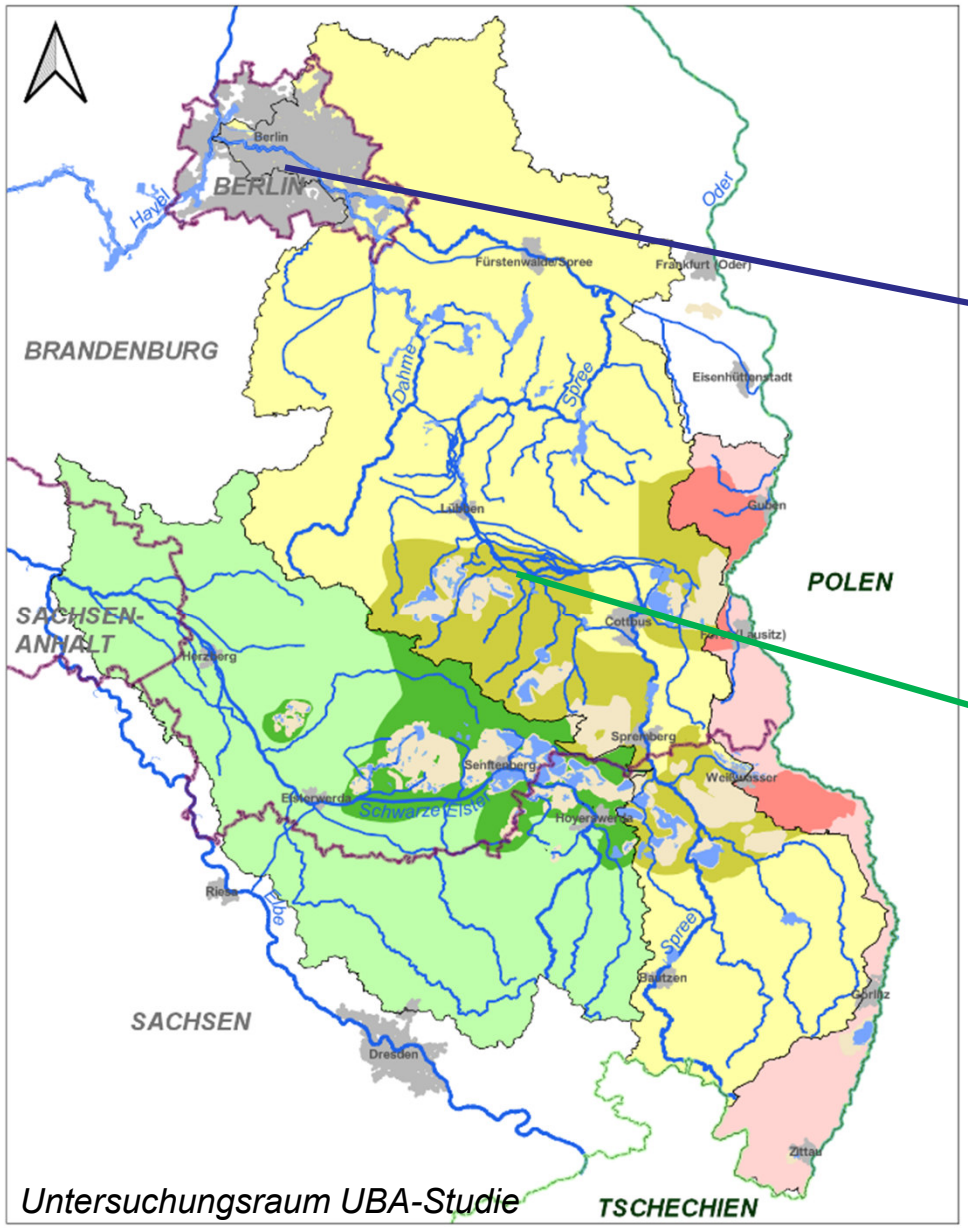


Untersuchungsraum UBA-Studie

Lusatian lignite mining area

- catchment areas
  - Spree
  - Schwarze Elster
  - Lausitzer Neiße

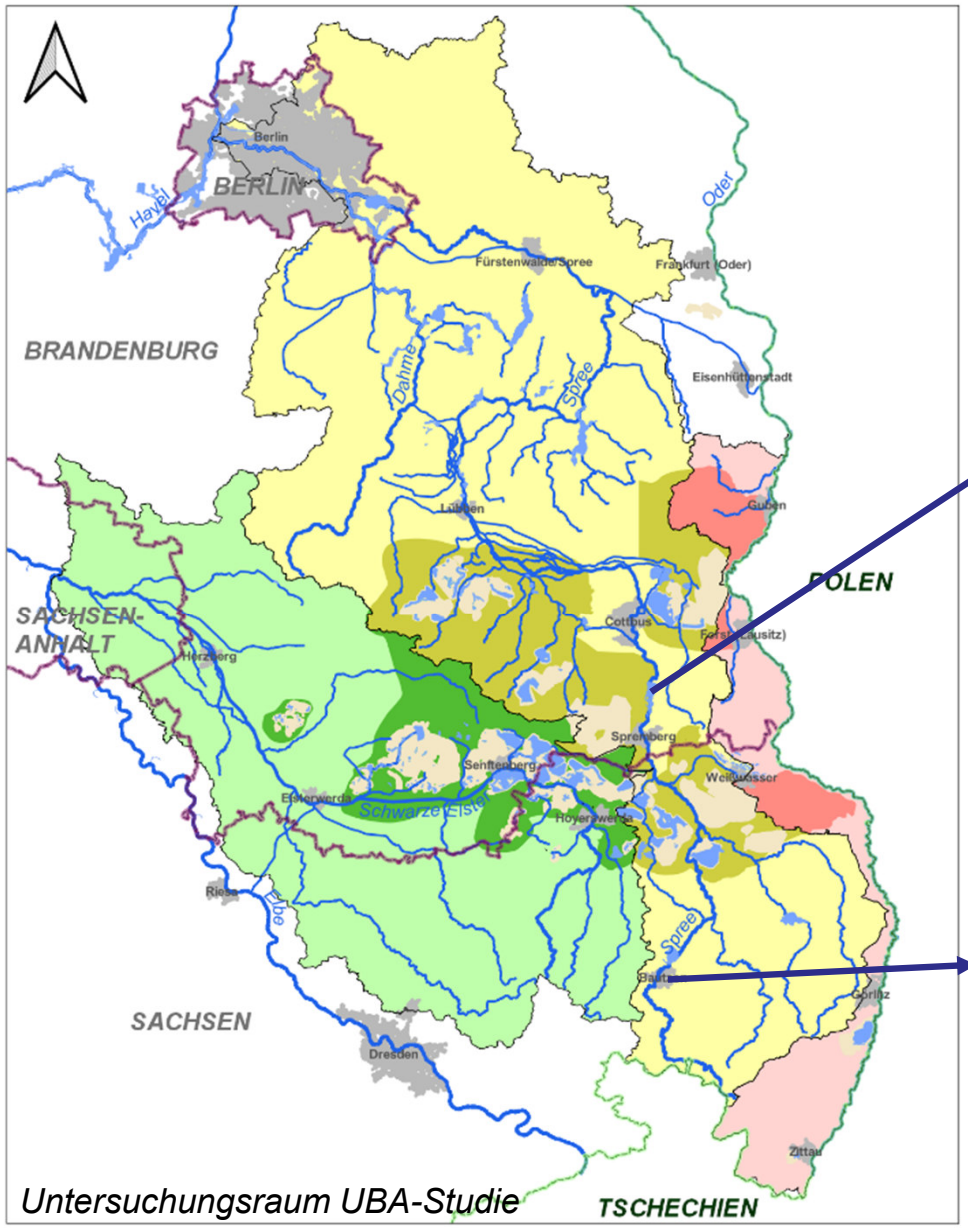
Introduction



Lusatian lignite mining area

- water supply
  - of the metropolitan region of Berlin and
  - Spreewald UNESCO-biosphere reserve

Introduction



Untersuchungsraum UBA-Studie

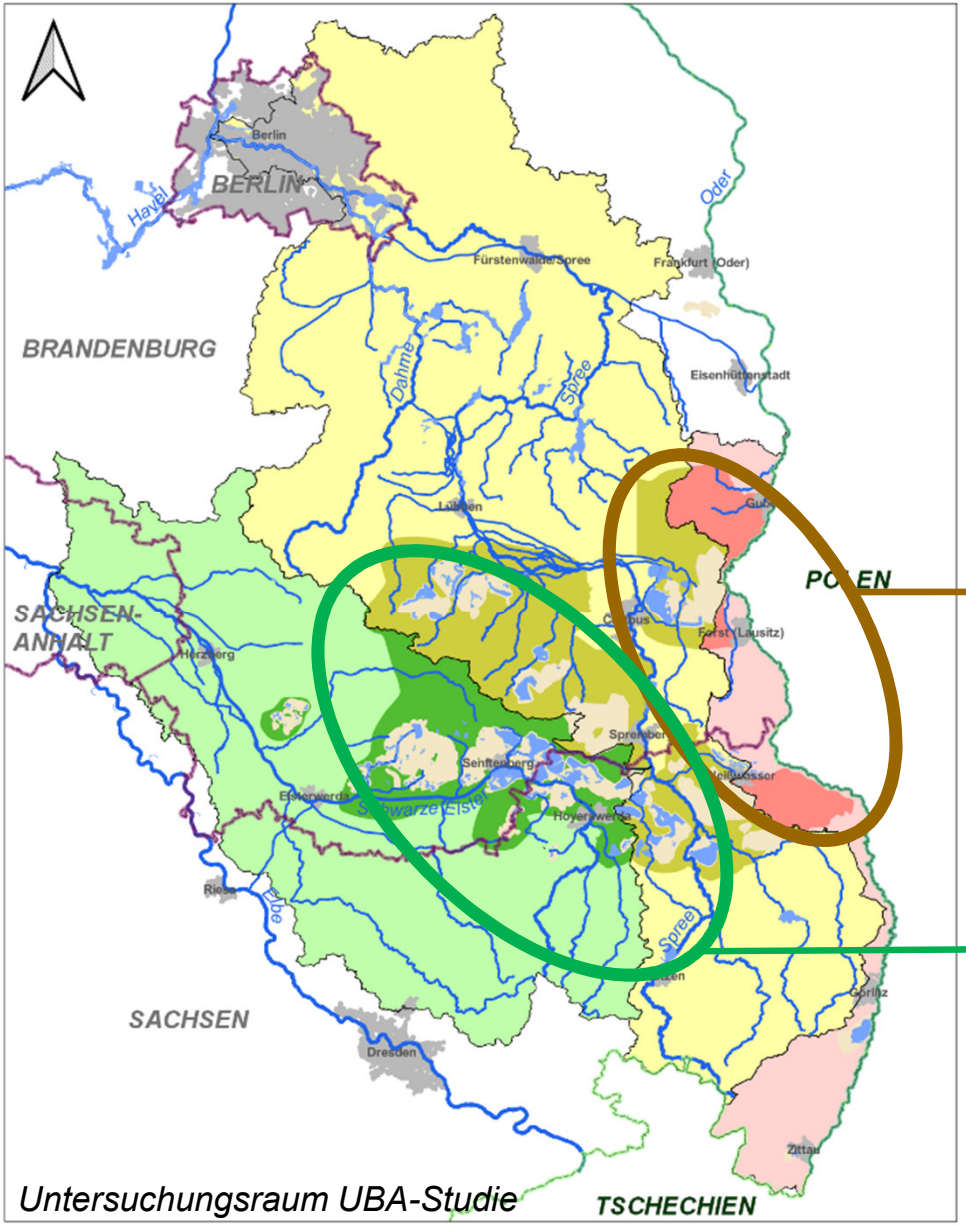
dam Spremberg

dam Spremberg (Photo: LMBV)

dam Bautzen

dam Bautzen (Photo: LTV)

Introduction



Untersuchungsraum UBA-Studie

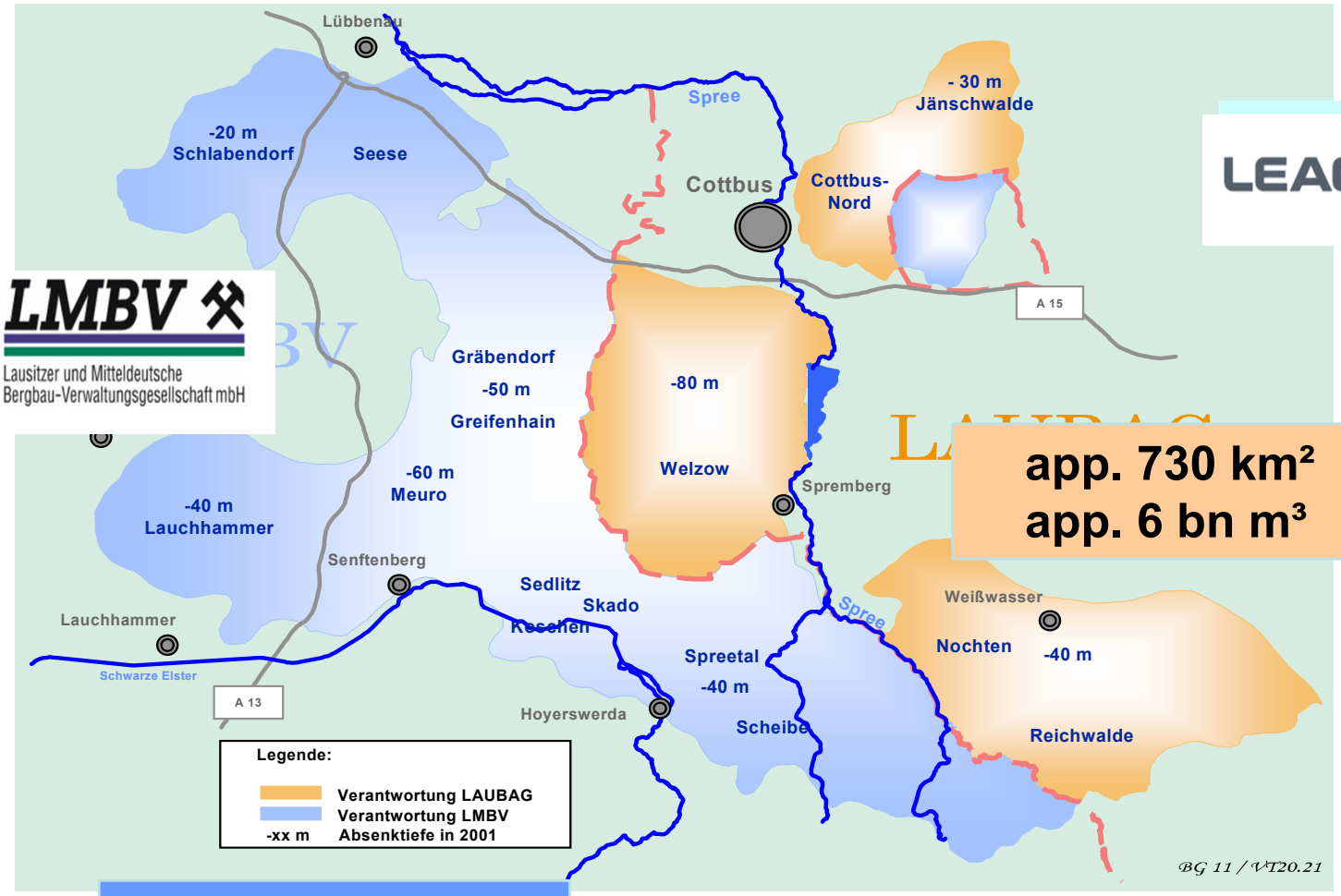
Lusatian lignite mining area

- mining companies
  - active mining (LEAG)
  - rehabilitation mining (LMBV)

LEAG

LMBV
Lausitzer und Mitteldeutsche Bergbau-Verwaltungsgesellschaft mbH

1992: groundwater depression cone in lusatia



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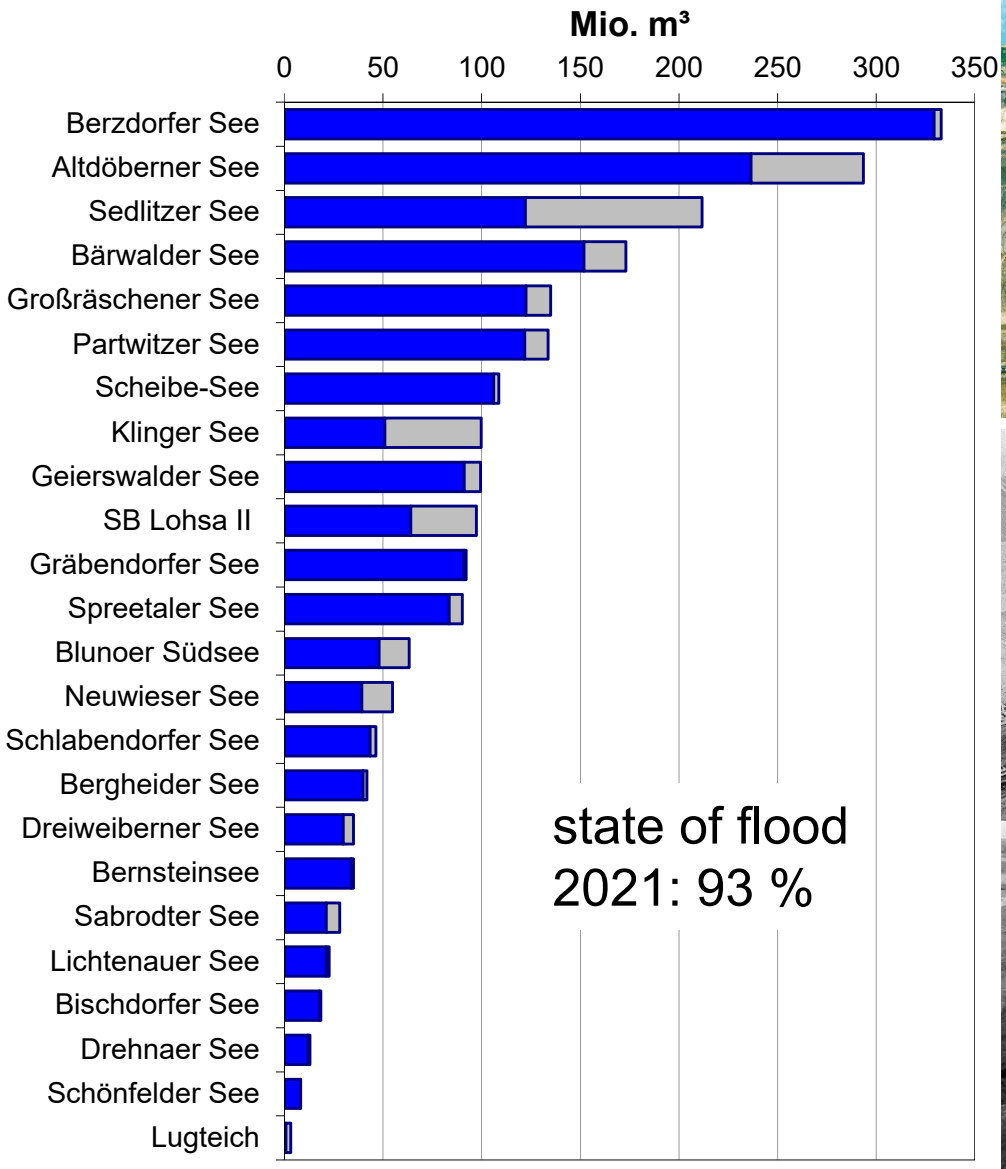
LEAG

app. 730 km²
app. 6 bn m³

app. 1.310 km²
app. 7 bn m³

year	gw	lake	total
total [bn m³]			
1992	9,0	4,0	13,0
2020	4,9	2,3	7,2
volume deficit [bn m³] LMBV			
1992	4,5	2,5	7,0
2020	0,6	0,3	0,9
volume deficit [bn m³] LEAG			
1992	4,5	1,5	6,0
2020	4,3	2,0	6,3

flooding of open cast mines




Berzdorf 2000 – 2020 (Photo: LMBV)


Bärwalde 1992 – 2016 (Photo: LMBV)

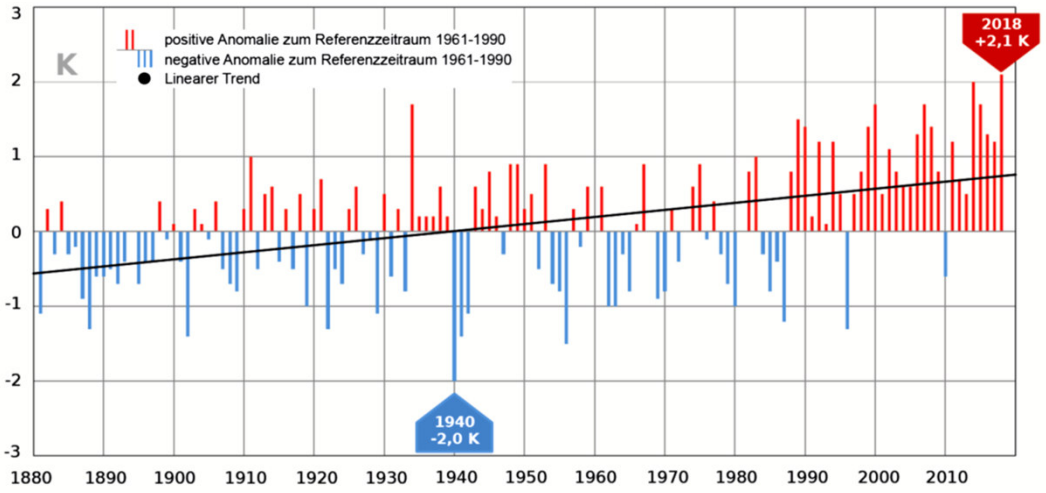

Meuro 1999 – 2019 (Photo: LMBV)

important changes affecting the restoration of water balance

end of lignite mining

mining technology park, power plant Lippendorf

climate change



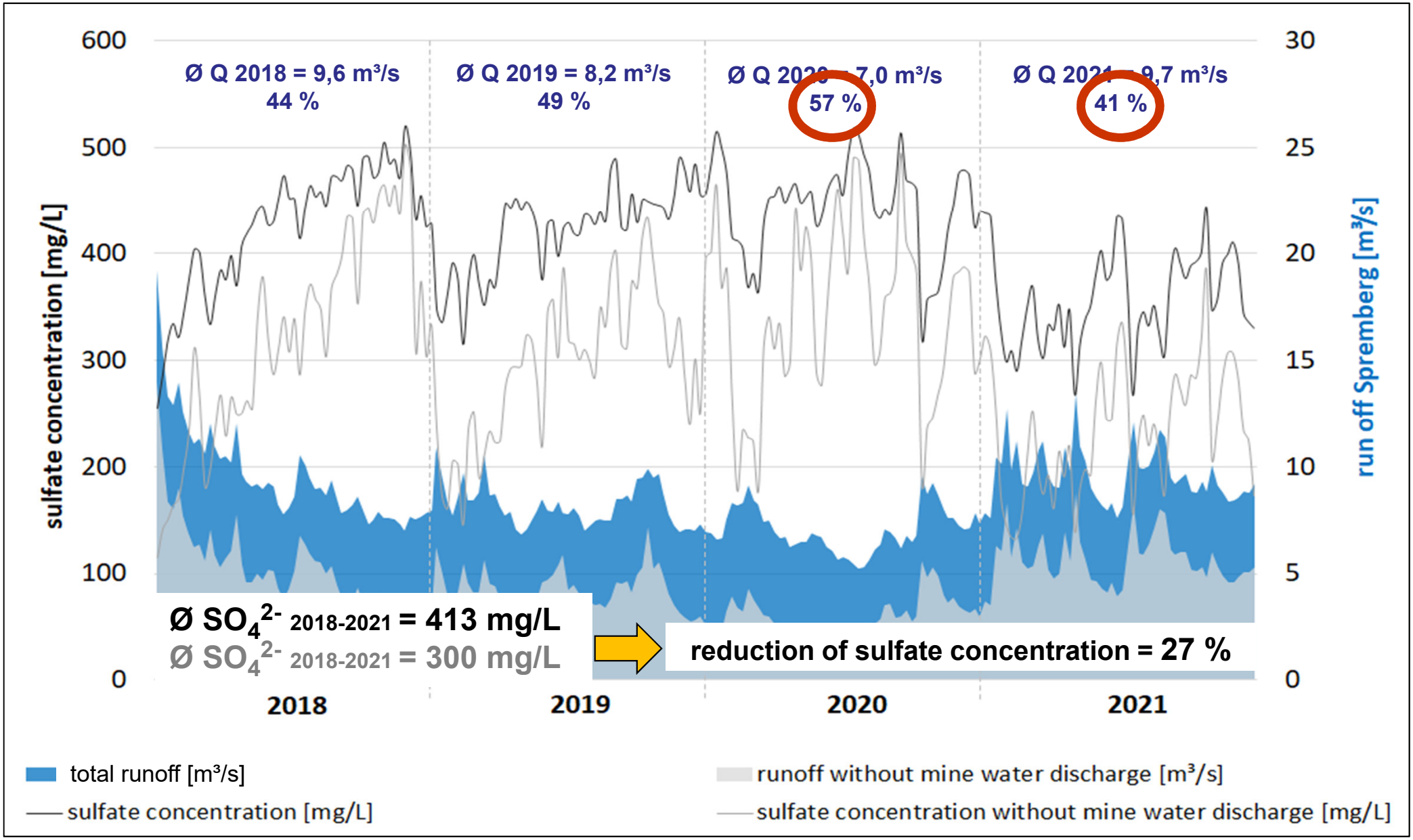
DWD, LfU (2019) Klimareport BB

open cast mine Berzdorf in 1996 (Photo: LMBV)

Lausitzer Neiße in august 2010 (Photo: LMBV)

Schwarze Elster near Buchwalde in summer 2019 (Photo: Totsche)

spree‘s runoff and mine water discharge at Spremberg



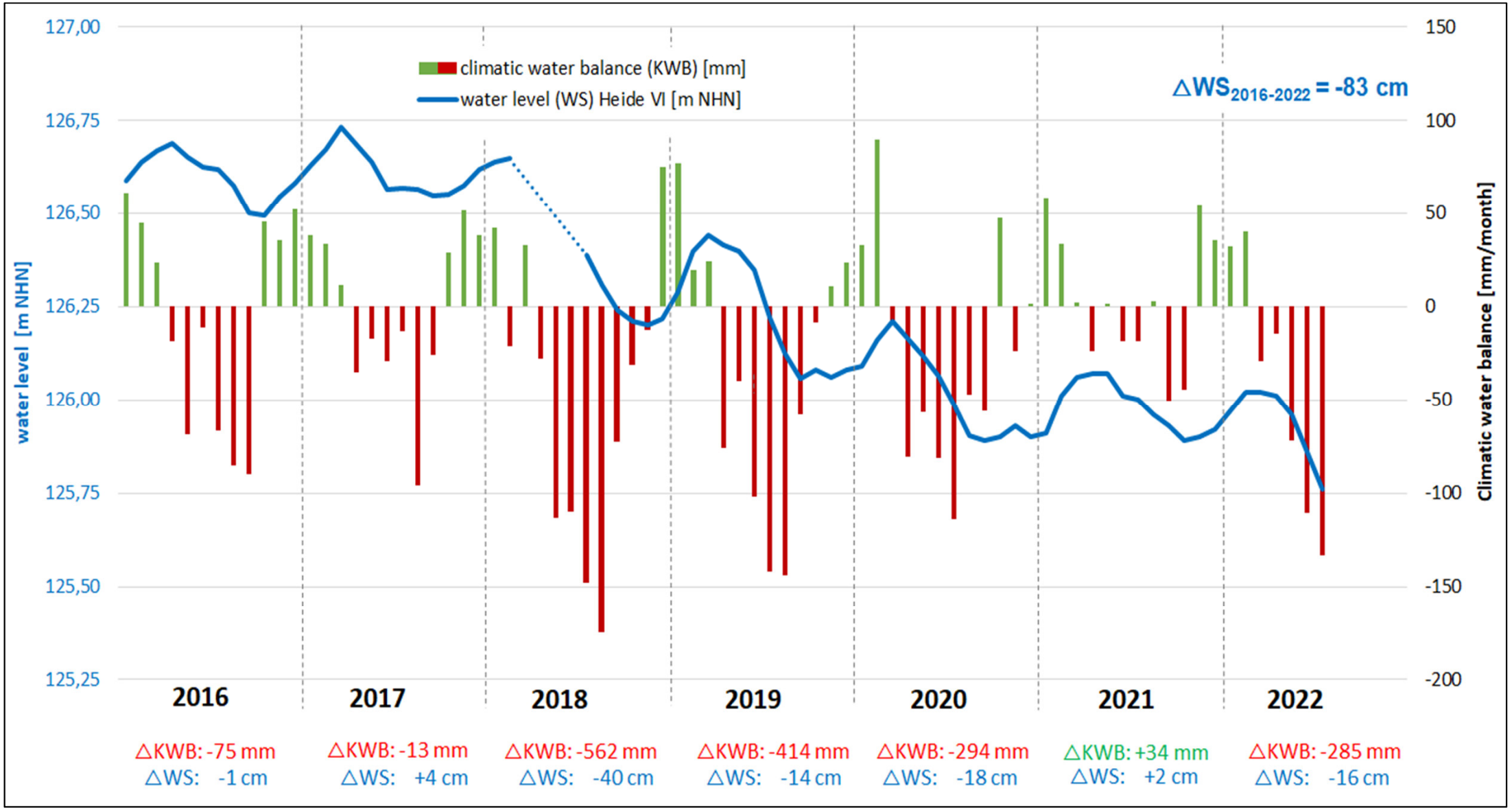
Schwarze Elster

- spring 2019

- summer 2019

development of water level

Water level development and climatic water balance of the Heide VI post-mining lake



mining pit lakes water storage

WSS Lohsa II (Spree)

- storage volume up to **72 Mio. m³**
  currently 22 Mio. m³ test of accumulation

SB Bärwalde (Spree)

- storage volume up to **25 Mio. m³**
  currently 12,6 Mio. m³ test of accumulation

Restlochkette (lake chain) (Schwarze Elster)

- storage volume up to **39 Mio. m³**
  currently limited test of accumulation

Selection of climate realizations

in agreement with the expert group climate/climate change

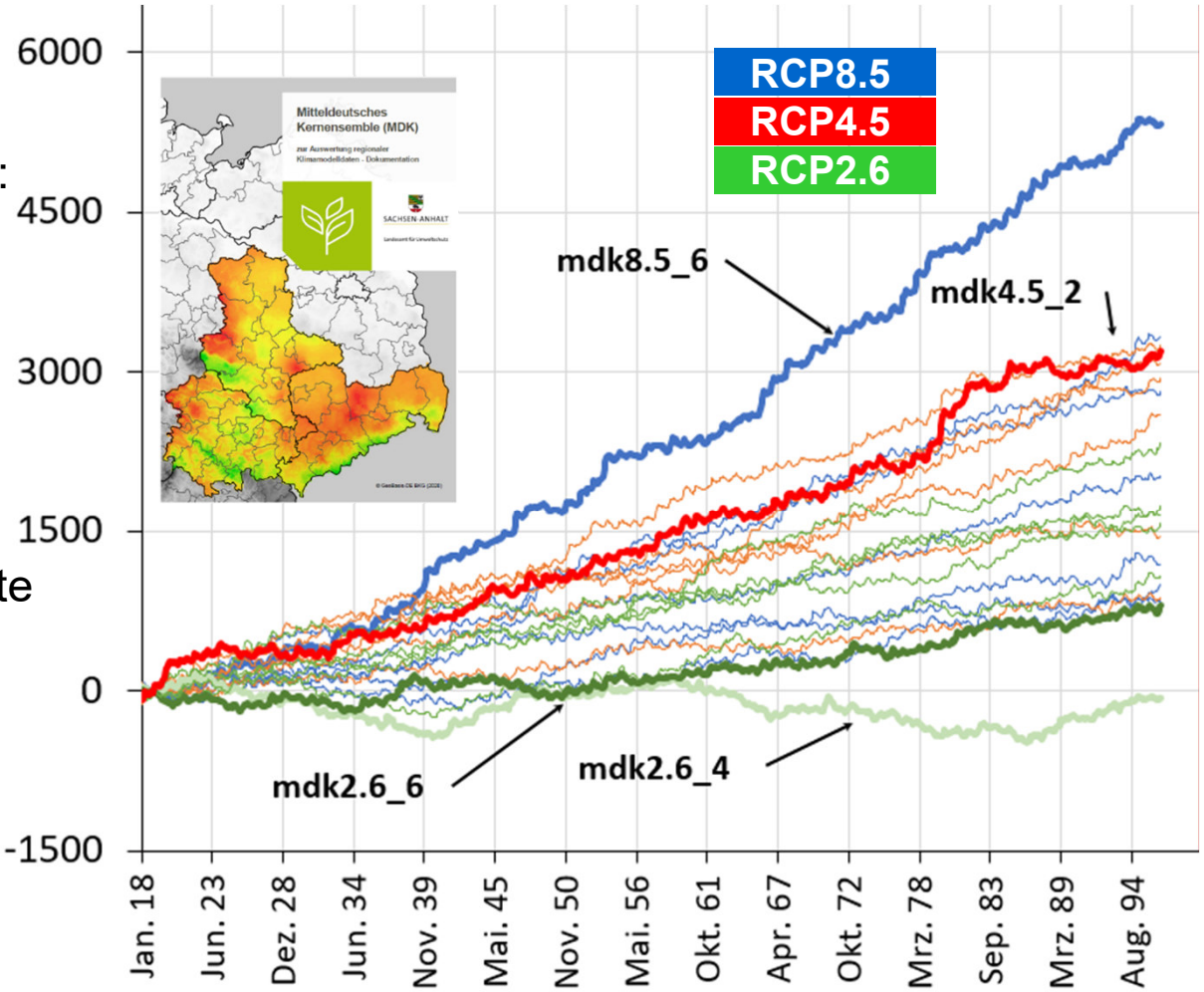
use of 2 climate realizations of the central German core ensemble as a planning basis:

- **dry conditions:**
  RCP **2.6**_6 (MPI_WETTREG)
- **wet conditions:**
  RCP **4.5**_2 (EC-EARTH_CCLM)

if necessary we can use 2 worst-case climate realizations:

- **extreme dry conditions:**
  RCP **2.6**_4 (MIROC_CCLM)
- **extreme wet conditions:**
  RCP **8.5**_6 (HadGEM_RACMO)

accumulated change of groundwater recharge [mm] in the Lusatian area



consequences for LMBV post-mining rehabilitation work

movement in mining areas

ground failure Schlabendorf (Photo: LMBV)

Schlabendorf sand volcano 07/2019 (Photo: LMBV)

ground failure SB Lohsa II 07/2012 (Photo: LMBV)

consequences for LMBV post-mining rehabilitation work

affects of the stability of slopes

Senftenberger See 2018 (Photo: J. Berger)


Greifenhain 2006 (Photo: LMBV)

intensify bank erosion and formation of cliffs


SB Lohsa II, 2015 (Photo: LMBV)


Sedlitzer See, 2011 (Photo: LMBV)

new strategies for overcoming the water management challenges

river basin management

LMBV flooding control center

- open-cast lignite mines

  → reservoirs for flood retention

- develop additional water resources
- increase existing storage capacities
- water balance modelling
- creation of a water management concept
- reduce demands
- compensation of water deficit – stretched over al long period of time

Flooding lake Sedlitz in 2021 (Photo LMBV)

Conclusion

- Water management in the lignite mining area was and is a challenge in terms of water volume and water quality
- The politically decided phase-out of coal-based power generation will decreases the water volume in the river Spree for a long period of time
- The long-term effects of climate change cannot yet be reliably assessed. However, recent dry years have given a first impression of possible future conditions.
- River basin management must therefore be as robust and flexible as possible to be able
  - development of further water resources and additional storage areas
  - further expansion of the water network
  - use of other water catchment areas
- A working group with members from the German states of Saxony, Brandenburg and Berlin as well as the publicly financed LMBV and private mining company are all working together to find solutions to the upcoming water shortage.

Thank you and Glückauf!