

Mining- and Environmental Rehabilitation

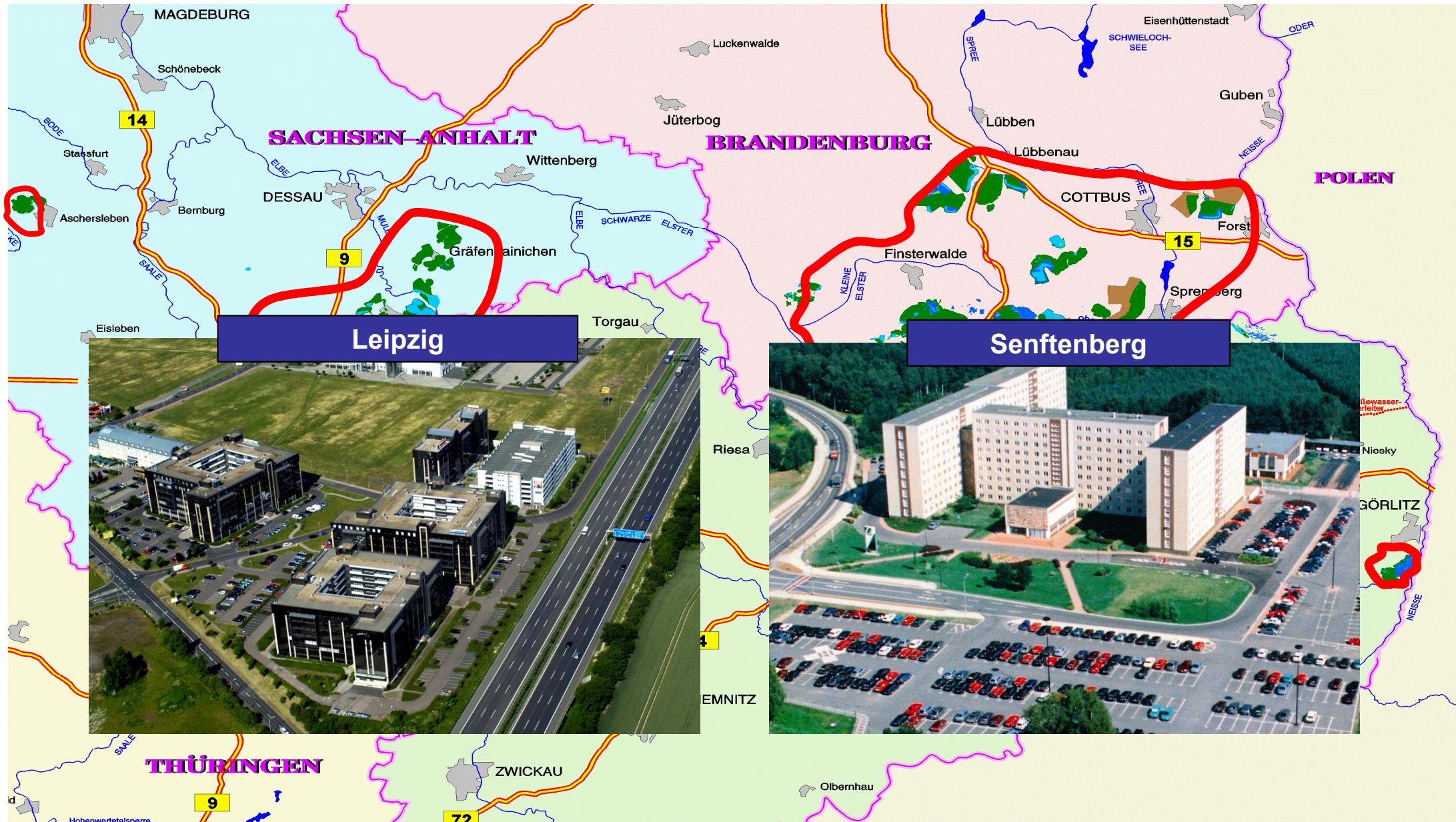
- A sustainable investment into future



- Rehabilitation and reuse

Jörg Schlenstedt, Senior Expert, Department Principles Geotechnics / Water Management

Lignite rehabilitation areas of LMBV





- **State owned company (Ministry of Finance)**
- **Responsibility: Decommissioning and rehabilitation of sites used by the lignite mining industry of the GDR**
- **Includes:**
 - **the re-cultivation of dumps feasible for re-use in the public interest**
 - **the restoration of a self regulating water balance according to water quantity and quality**

**Closing down
Lignite Mining
until 1999**

*Orderly and fast closing down of business units
which can not be privatized*



**Rehabilitation-/
Backfilling &
Maintenance of
underground mines**

*Acting as a mining company in the fields of
rehabilitation of lignite industry and securing
underground mines of potash-spade-ore mining*

Utilization

*Use and sell of assets, property and real estates
of the company*

Open pits, unsafe slopes, acid mine water



Open pits in direct vicinity to villages



Organization of the lignite mining rehabilitation

Steering & Budgeting Council:

StuBA

National Gov.: Ministries of Finance, Environment, Economy

4 Federal States: Ministries

Office of National Gov. & Federal Government

Hosts: LMBV, Labor Agency

- Acceptance of overall planning
- Budgeting and approval of projects
- Controlling
- Audits of Resource allocation

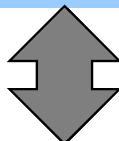
Regional rehabilitation council

(National/States/Communities)

- Acceptance of Planning
- Consideration of public interests

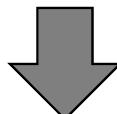


Federal Audit Office



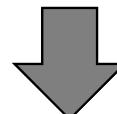
Project Management Organization: LMBV

- Rehabilitation Planning
- Obtaining of permission
- Tendering / Contracting
- Project Control / Controlling
- Preparation of reuse / Utilization of properties
- Proof of fund allocation

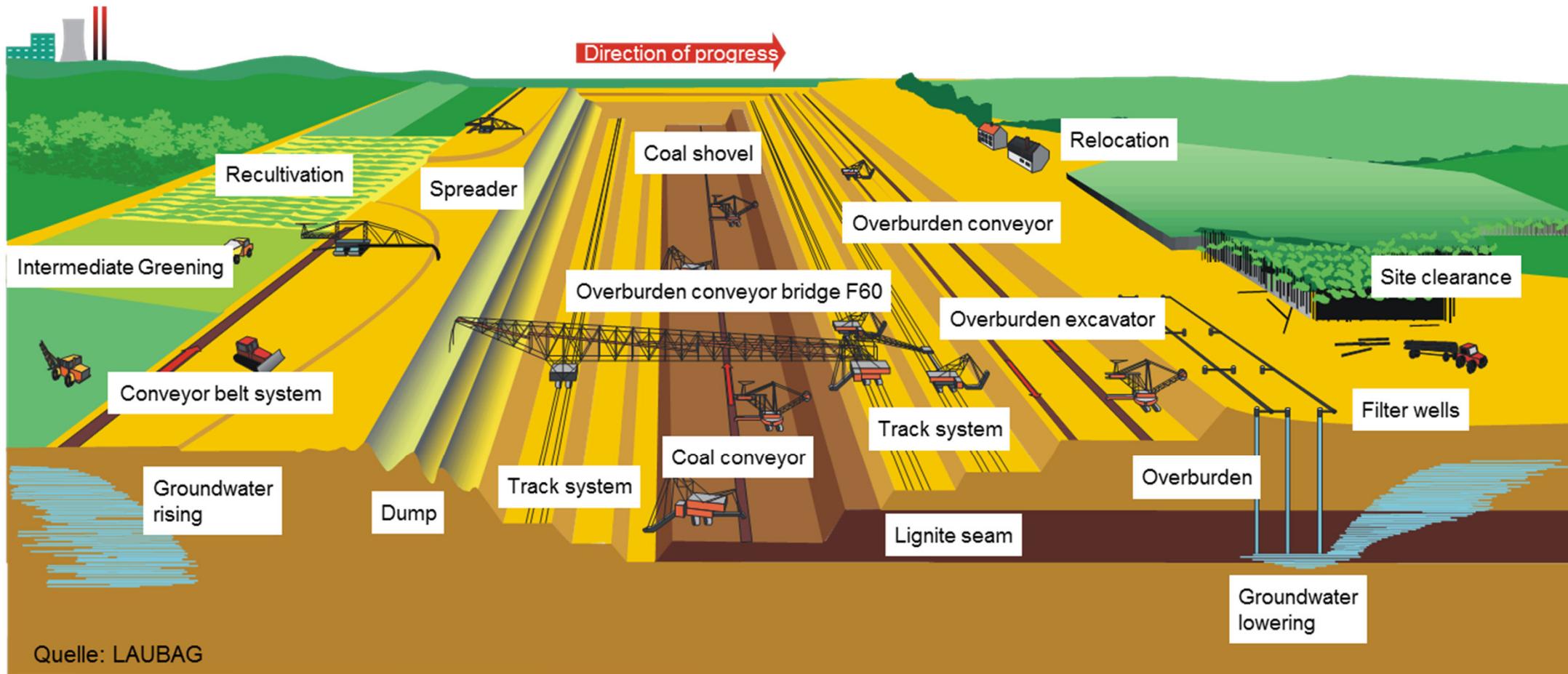


Execution: Private Companies

- Execution of rehabilitation work after competitive tendering
- Billing and handover of contract content



Principle of overburden and lignite excavation and movement



- Short distance (Direct dumping combination)
- Mixed substrates => physical and chemical quality problems possible
- Lose material density in Lusatian region (sandy substrates)

Open pit



Typical mining in soft rock material – here sand





Belt Conveyor Bridge System F 60



Geotechnical tasks



Geotechnical reinforcement railway bed Lohsa



depth compaction eastern slope Silver-lake:

950 m length

50 m width

Temporarily with 4 machines

New technology: gentle blasting compaction



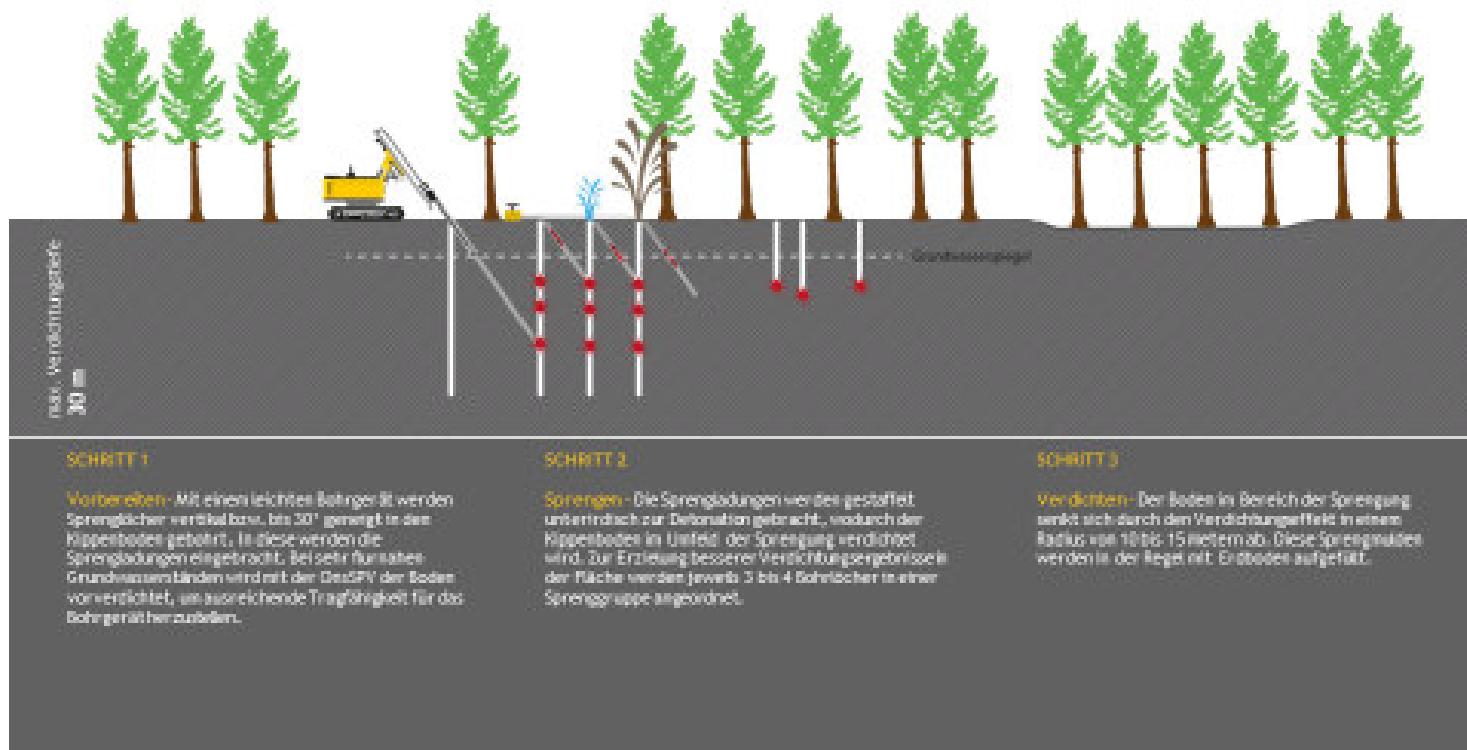
- Total geotechnical restricted areas : approx. 33,500 ha
- Areas with geotechnical securing requirements: approx. 20,600 ha
- Gentle blasting compaction 10,000 ha (only 7 -22 kg explosive material per borehole)
- Vibrating pressure compaction 840 ha
- Earthworks 20,000 ha

Braunkohlesanierung, Aufbau neuer Landschaften

Gentle blasting compaction



SCHONENDE SPRENGVERDICHTUNG

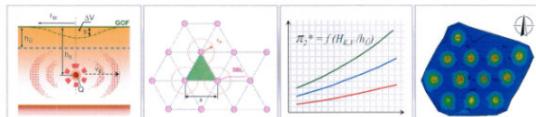


Braunkohlesanierung, Aufbau neuer Landschaften

Solving the new geotechnical problems



Handlungsempfehlung für eine „Schonende Sicherung der Kippe mittels Sprengverdichtung“ auf Grundlage wissenschaftlich unterzetteter Dimensionierungsregeln und bei praktischen Anwendungen der Sprengverdichtung gewonnener Ergebnisse und Erfahrungen



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Freiberg - Februar 2014

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Handlungsgrundlage zur komplexen Bewertung der Innenkippenflächen der LMBV in der Lausitz



Senftenberg, Januar 2015

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BIUG

Zschiedrich

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CDM Smith

ppa. Scholz
Bereichsleiter Technik



Anwenderempfehlung

für Belastungsversuche als Bestandteil von
Standsicherheitsnachweisen von Innenkippenflächen



Freiberg, Senftenberg, 09.12.2016

37 Seiten - Anlagen 6 Tabellen 8 Abbildungen



Change of groundwater level

- Soil wetness, Flooding



Change of soil properties

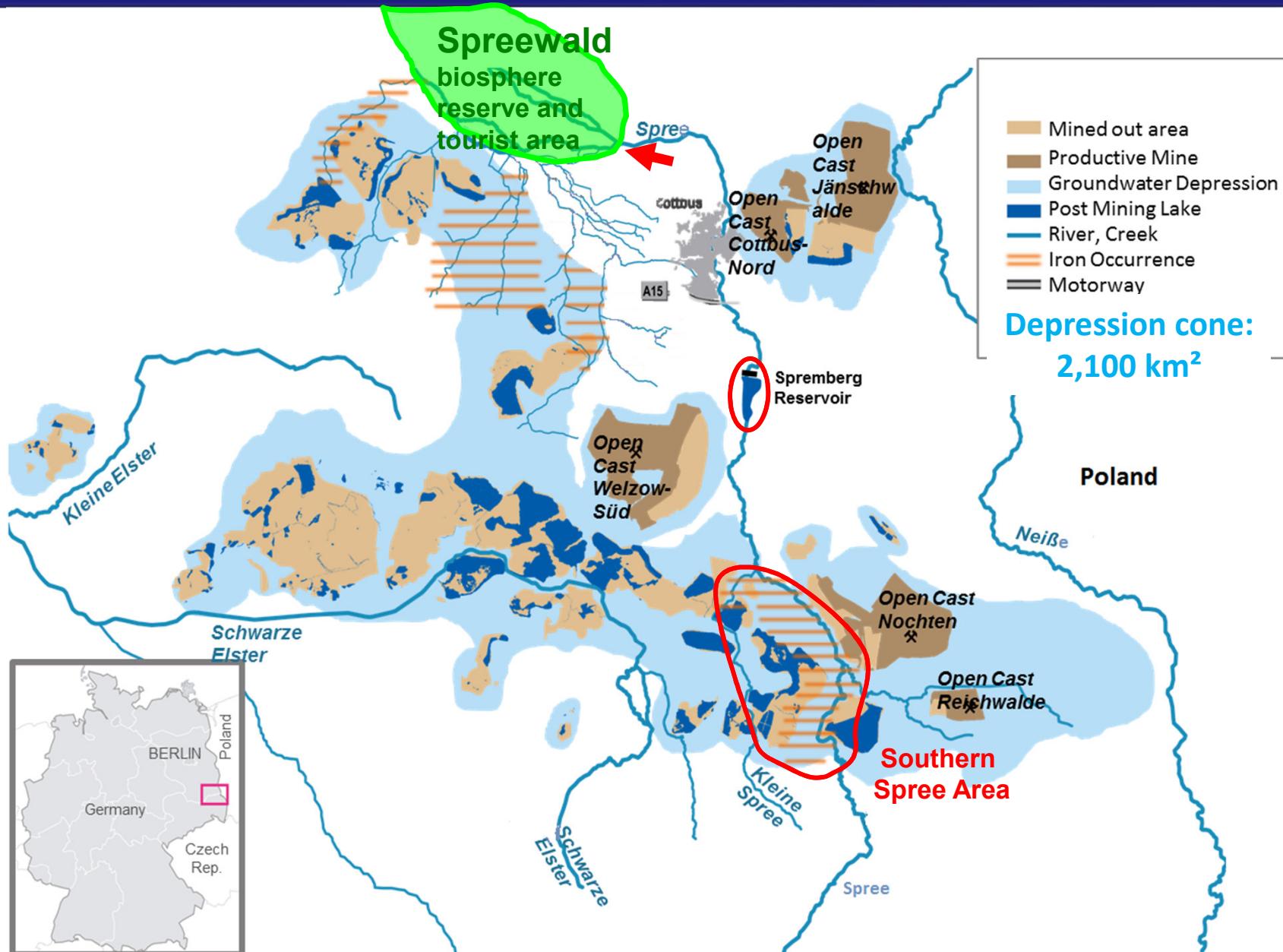
- broken terrains, Settlements



Change of groundwater properties

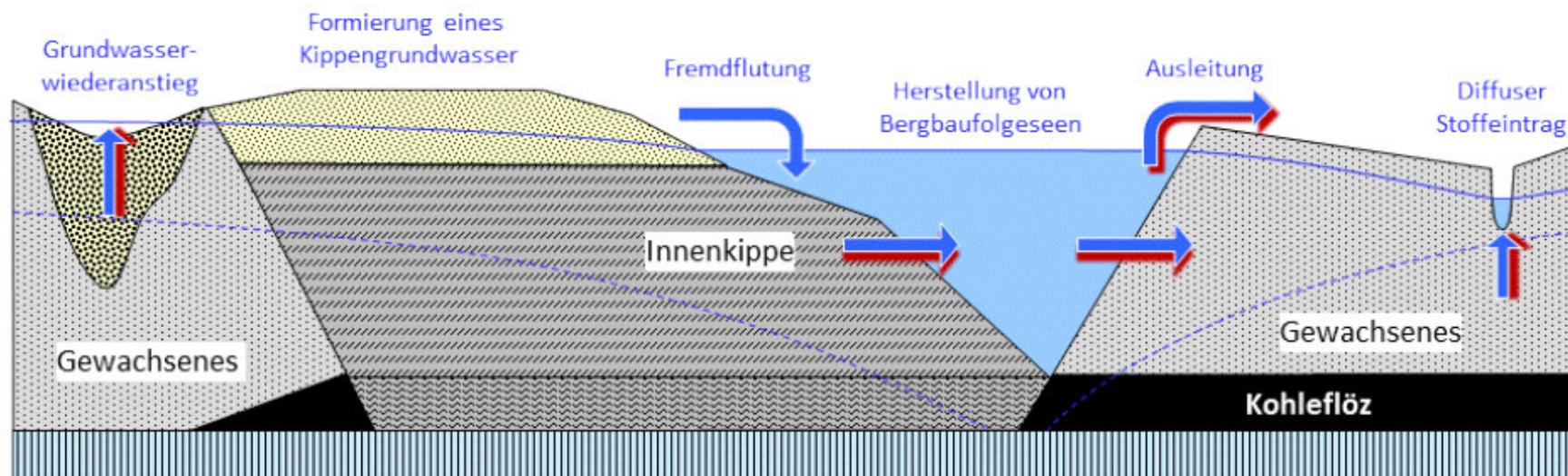
- Exfiltration from dumps and surrounding bedrock layers into rivers and lakes

Water problems after groundwater rise



Braunkohlesanierung, Aufbau neuer Landschaften

Problems related to quality



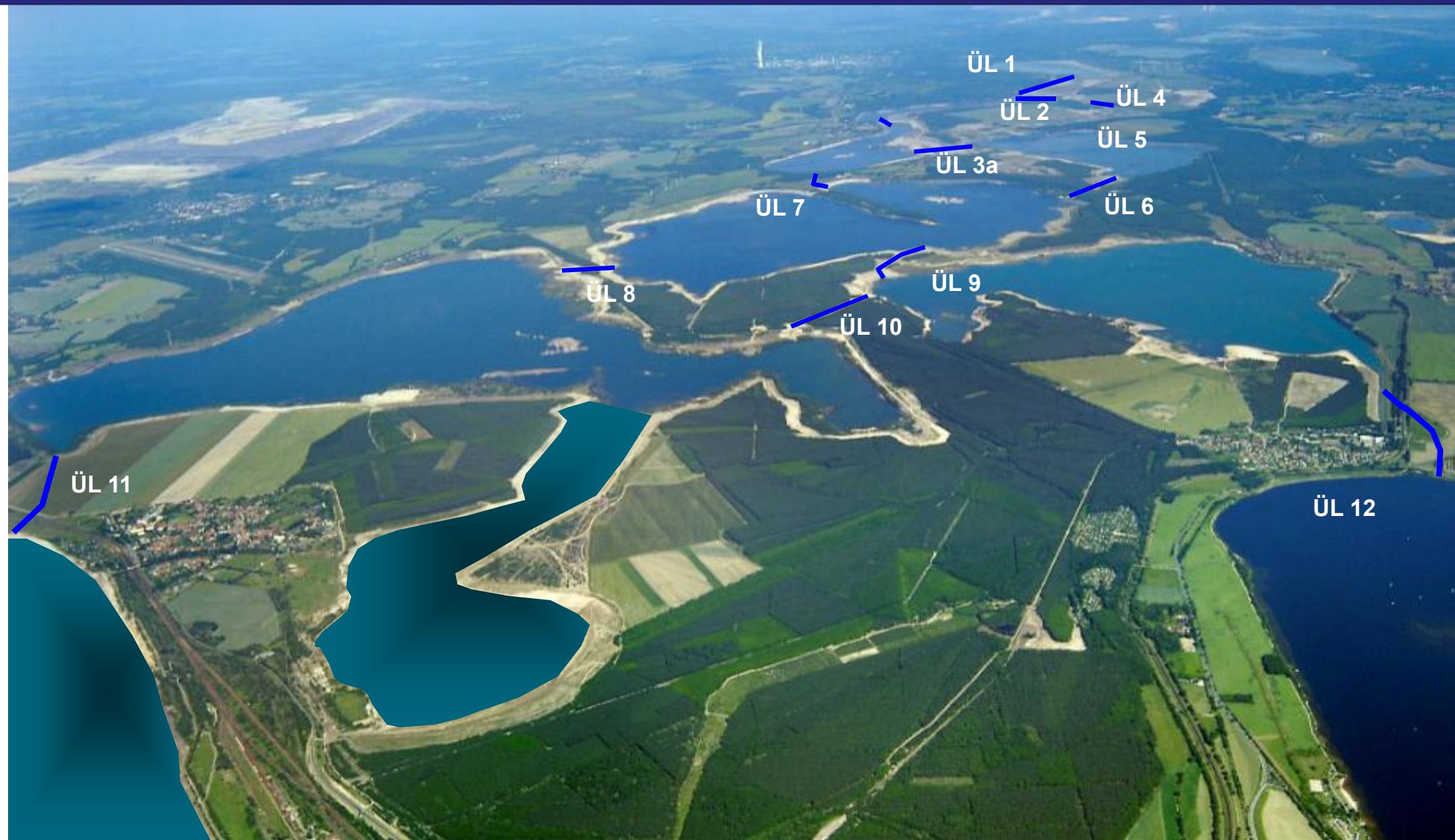
water
influenced by
mining

- high sulphate concentration
- low pH-value
- high iron concentration

Maiden voyage of water-rehabilitation boat KLARA – September 2016



Lusatian lake chain



Rehabilitation of Water household



Construction of channels for flooding with water from rivers

Construction of pipelines

Connecting channel 12 (Koschener Kanal)



Extension of the channels
above hydrological needs
to use them for touristic
purposes with boats and
excursion boats



Area of groundwater lowering Conflict between groundwater level after mine closure and

Infrastructure

Abandoned
mining

Building
structure

Legacies

Rivers

app. 5.800 affects, thereof app.
■ 2.400 still activities necessary,
■ 1.400 secured,
■ 1.000 in planning

Groundwater rising City Senftenberg

Central area Senftenberg:

585 Buildings

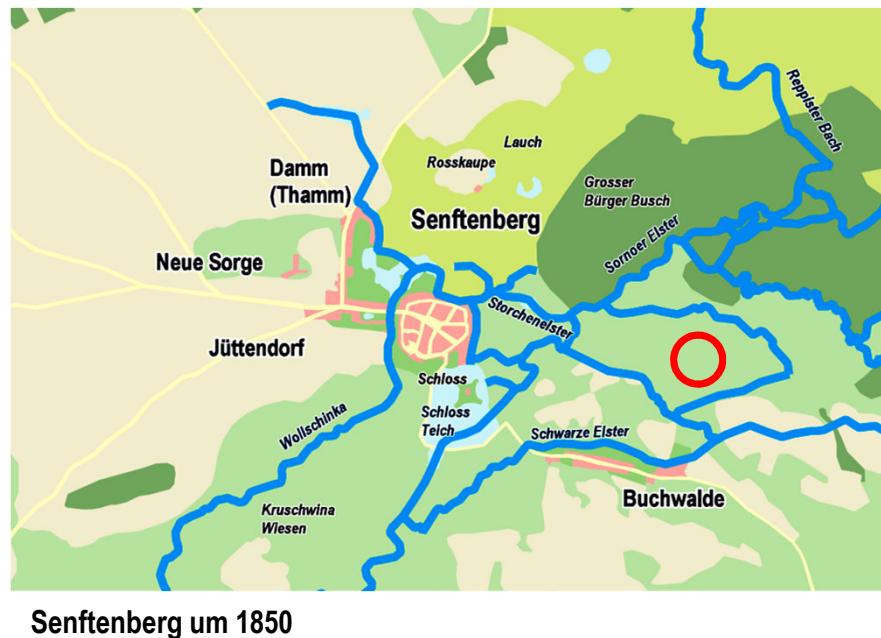
Laugfeld and eastern areas:

150 Buildings + 30 Commercial buildings Laugfeld

Vogelsiedlung Senftenberg:

120 Buildings

Due to over 100 years of lignite mining the groundwater level around the city of Senftenberg was lowered. Formerly existing rivers, channels and trenches get lost and often new buildings were erected on them.



Locations of Horizontal-filter-wells in Senftenberg

Horizontal-filter-well

Pipeline

Hydraulic sphere of influence

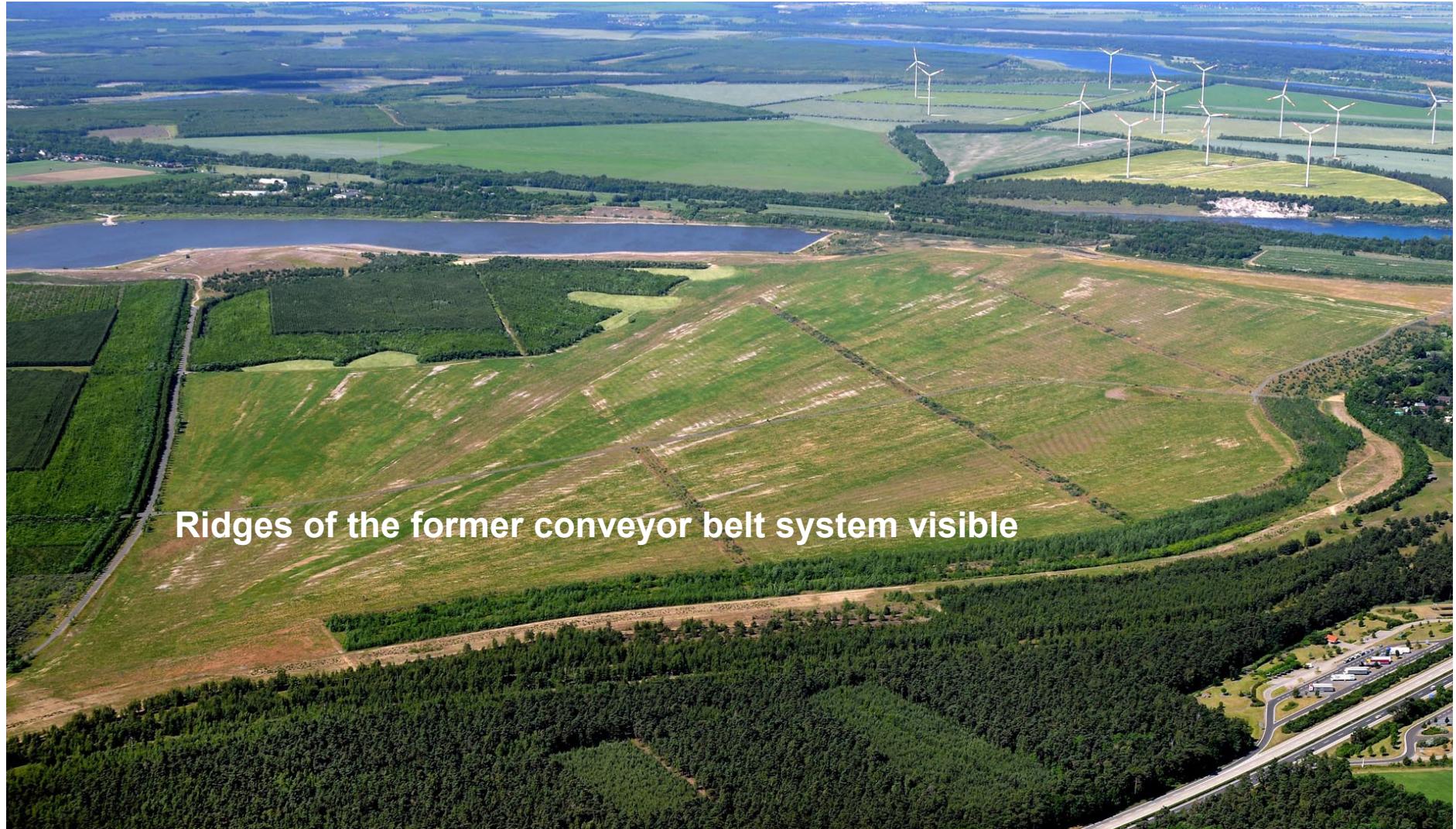


Goal: Lowering of groundwater level from 99,5 to 98,0 mNHN

Brandenburg: Sites of Horizontal-filter-wells in Senftenberg

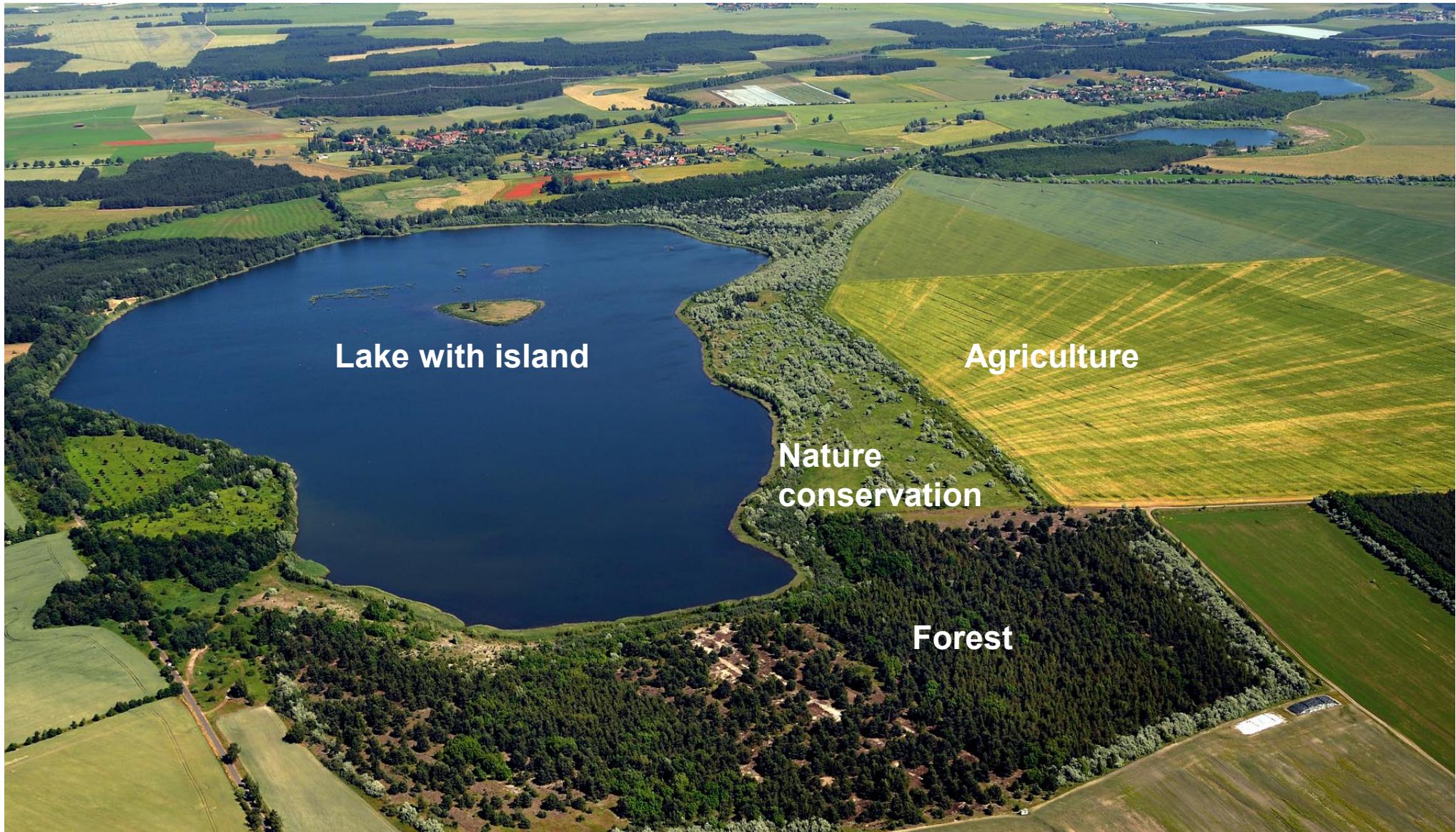


Re-cultivation



Ridges of the former conveyor belt system visible

Re-cultivation



Re-cultivation: Remove of sealing sheet from river Spree





- **large areas**
- **un-fragmented**
- **undisturbed**
- **natural processes**

Glückauf!

