A small guide through water management risks due to lack of water in north-eastern Bohemia

Petr Ferbar

Prague 18.10.2018 (Hotel Duo) – MGS 2018
Area of interest – Elbe River Board
Extreme hydrological events (Elbe River Board)

<table>
<thead>
<tr>
<th>Floods</th>
<th>Drought</th>
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<tbody>
<tr>
<td>1897</td>
<td>1921</td>
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<td>1926</td>
<td>1947</td>
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<td>1997</td>
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<td>2010</td>
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<tr>
<td>2013</td>
<td><strong>2015 - 2018</strong></td>
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</tbody>
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Water scarcity and drought in Europe
Available water sources in other countries

Zdroj: EEA – Istanbul, 2009
Increase of temperatures in Europe

European Space Program Copernicus

Reservoir VRCHLICE  Water temperature spring /autumn (°C)
relative to 1981 - 2010

Elbe River Board
Growing season: 
15th April – 15th September

Reference value: 
Mean of growing seasons in period 1981 – 2010

Tested years: 
1979 - 2018

Average water temperature of the growing season in comparison with reference values in chart year over year
Growth chart year over year comparisons for cumulative volume of the inflows to six reservoirs managed by the River Elbe Board during the growing season

Growing season: 15\textsuperscript{th} April – 15\textsuperscript{th} September

Tested years: 1979 - 2018

SIX RESERVOIRS 1979 - 2018 (Cumulative volumes of the inflow/mil. m\textsuperscript{3})
River basin water balance – current status

Legend of the map
Balance state of the river basin
- Green: Active state
- Yellow: Balanced state
- Pink: Passive state

Reservoirs

Map showing different states of river basins across a region, with cities marked as Usti nad Labem, Prague, Pardubice, and Hradec Kralove.
River basin water balance – view to 2085

Legend of the map
Balance state of the river basin
- Green: Active state
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Reservoirs
Water supply
(drinking water)

Groundwater abstractions

Cretaceous
deep well

Quarternary
shallow well

Shallow spring
Surface water abstractions
GW = 100 mil. m³ (85% drinking water)

Groundwater abstractions
GW = 600 mil. m³ (7% drinking water)

Elbe River Board
(for drinking water)
SW 30%
GW 70%

Czech Republic
(for drinking water)
SW 50%
GW 50%
Industry and Energy

Firm minimum (ecological) discharge

Temperature

Powerplant Mělník (Elbe)

Powerplant Trutnov – Poříčí (Úpa)

Powerplant Opatovice (Elbe)

Škoda Auto Kvasiny (Bělá)
Agricultural irrigation

Firm minimum (ecological) discharge

Technical infrastructure
Qualitative aspects during drought
Seč reservoir – longitudinal profile – development of oxygen (%)  
2013 – wet year (ordinary precipitation)  
2018 – dry year (little precipitation)
Qualitative aspects during drought

Quality monitoring on the surface water level (horizontal view) Vrchlice reservoir (2018)

The presence of green algae and cyanobacteria concentration of chlorophyll-a (µg/l)
Ecological aspects during drought (fish kill)

The upper part of the Elbe (Klášteská Lhota village)  
**Good status** – Salmonids

The middle part of the Elbe (Nymburk town)  
**Worse status** – recurrence of fish kill in autumn
Measures to increase the capacity of water resources (Elbe River Board)

Josefův Důl reservoir – increase the capacity by water transfer of the neighboring river basin.

Rozkoš reservoir – increase the storage space by sediment removal, reflections about water transfer.

Case study:
Water catchment area Cidlina and Mrlina… evaluation of water reserves, search for new water resources, restoration and repair of small water reservoirs.

Case study:
Water catchment area Doubrava and Vrchlice… evaluation of water reserves, search for new water resources.

Pěčín reservoir – new water supply reservoir for the Eastern Bohemia region.
Let's hope in better water availability...
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...Thank you for your attention