

9. Water and soil pollution

Ecological problems of waters

Include seas and rivers.

Seas:

- *transport* (contamination/pollution of harbours)
- *oil tanker accidents* (3/1989 – Alaska *Prestige*, 2/1996 South Wales *Sea Empress*)

Why does oil keep on the sea level? Oil = lighter than water => prevents aeration of water, prevents skin breathing + toxicity => birds, fish, mammals, coastal areas are **hit**

Rivers:

What is the main pollutant of rivers?

- *industries*
 - harmful substances = waste → rivers, e.g. nitrates from paper industry, agriculture production)
 - temperature = inadequate cooling => global climate change, e.g. change of fauna and flora diversity

How many degrees of pollution do we know? 5 degrees of pollution:

1. spring mountain areas, 5. particular sections/distances of Váh, Hornád, Danube, Rhine

What cleans sewage/waste waters? sewage tank/plant

Several types of water cleaning:

- Mechanical cleaning = water thinning, pouring/straining
- Chemical cleaning = shrinking of soluble matter (coagulation vs. neutralization)
 - Aqueous solution of $\text{Ca}(\text{OH})_2$ if $\text{pH} < 7$
 - Salt acid if $\text{pH} > 7$
- Biological cleaning = use of processes in nature, i.e. pollutants are source of energy/material for bacteria (pollutants/waste material → bacteria cells → cleaning)

The worst is pollution of drinking water sources (especially on limestones)

Glaciers = one of great reserves of clean drinking water (but in inaccessible/unavailable conditions, e.g. mountain and continental glaciers)

But available water sources in dense populated regions are very limited (river water, groundwater) = **these areas are most endangered** ⇔ **population density, agriculture and industrial production**

- e.g. *Žitný ostrov* in Slovakia ⇔ Slovnaft BA, *Žitný ostrov* = largest drinking water reserve in Central EU

Ecological problems of soils

Increasing of soil erosion (droughts, landslides, lack of trees/forests, ...) ⇔

- *ploughing* downslopes (correctly = contour ploughing)
- *wrong type of farming* (Sahel) => change in natural vegetation coverage (deforestation, monocultures)
- *wind erosion* in dry areas

Devaluation of soils (contamination by incorrect fertilizing, salification by irrigation) ⇔

- incorrect application of *fertilizers* => **nitrates**
- contamination of soil by *heavy metals*, e.g. lead (Pb) nearby roads, mercury (Hg), arsenic (As), cadmium (Cd)
- everything goes/engages to *food chain* => accumulation of arsenic (As replacing some building parts of a cell)

Declining of arable land ⇔ new built-up areas (settlements, communications, dams)

Keywords:

oil tanker, aeration, toxicity, harmful substances (pollutants), nitrates, global climate change, degrees of pollution, sewage tank/plant, mechanical/chemical/biological cleaning, soil erosion, ploughing downslopes, monocultures, soil/wind erosion, fertilizers, contamination, heavy metals, food chain, built-up areas