MINT PROJECT

Research protocol
German-Polish exchange

Gefördert durch / Projekt dofinansowała

dpjw
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Deutsch-Polnisches Jugendwerk
Polsko-Niemiecka Współpraca Młodzieży

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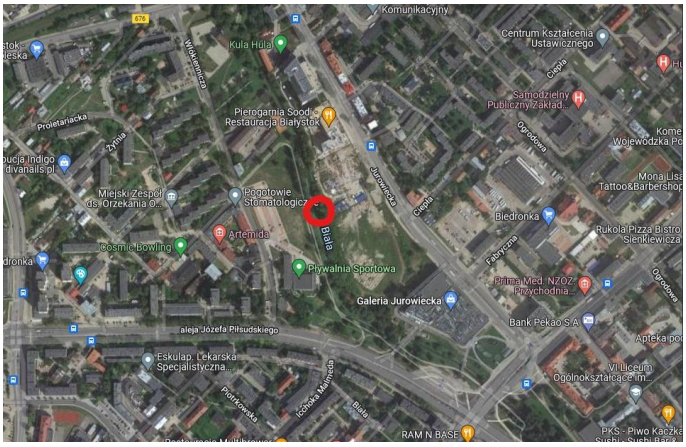
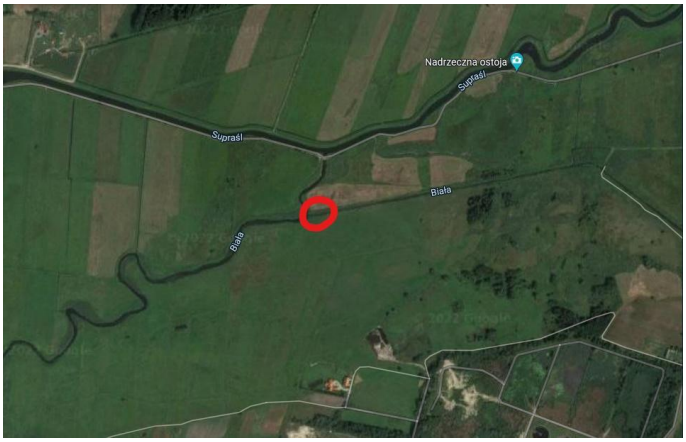
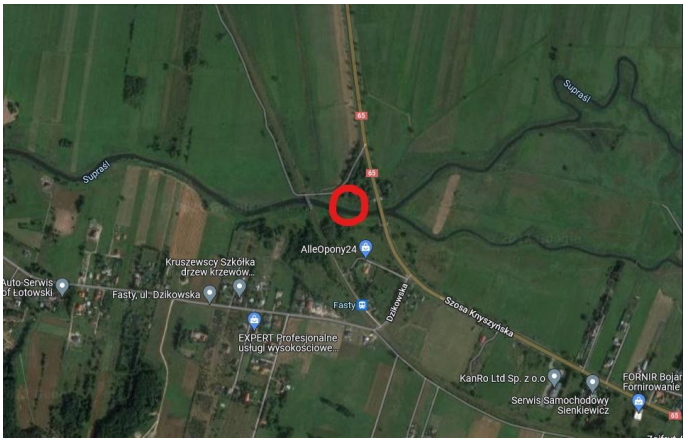
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City: Bialystok, Poland

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Sampling locations

Lp.	Location	Map
1.	“White River” City centre	
2.	“White River” After water treatment	
3.	“White River” Crossing with “Supraśl River”	

Analysis of anions in water



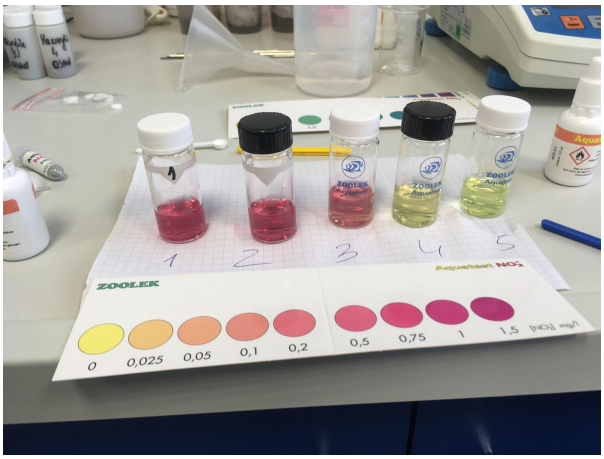


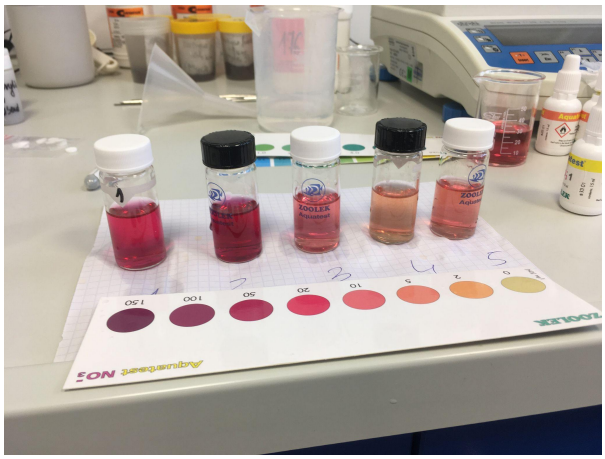


During the test of water we prepared samples with appropriately measured probes with water.



We added reagents to decolourise the water depending on the anions it contained.





On the basis of the interpreted values we wrote down the results taking into account the measurement error.

Expectations:

"The water is most polluted in the city and behind the sewage treatment plant, but the water taken from the rivers outside the city is clean".

Already during the first stage of the experiment to check the purity of water, taking water to test tubes, we could see turbidity and floating particles in the water from the middle of the city which was located under the gallery where people usually throw garbage wherever they can. However water taken faraway from the city was more clear. This is due to the fact that in fast waters such as rivers outside cities there is no environment that would have a negative impact on water quality and fast waters are mostly of better quality and drinkability. After testing, our expectations were confirmed and the waters near the sewage treatment plant and the city centre were much more turbid (by more than half) and harder (Carbon).

Conclusions:

The water near the sewage treatment plant had the most negative results of all those tested. The reason for this is probably inaccurate disposal of waste and toxins extracted from sewage water, which then get into our rivers.

Water from the city centre is in the middle of the three tests due to the influence of urban life on nature, but it is less destructive than waste from sewage treatment plants.

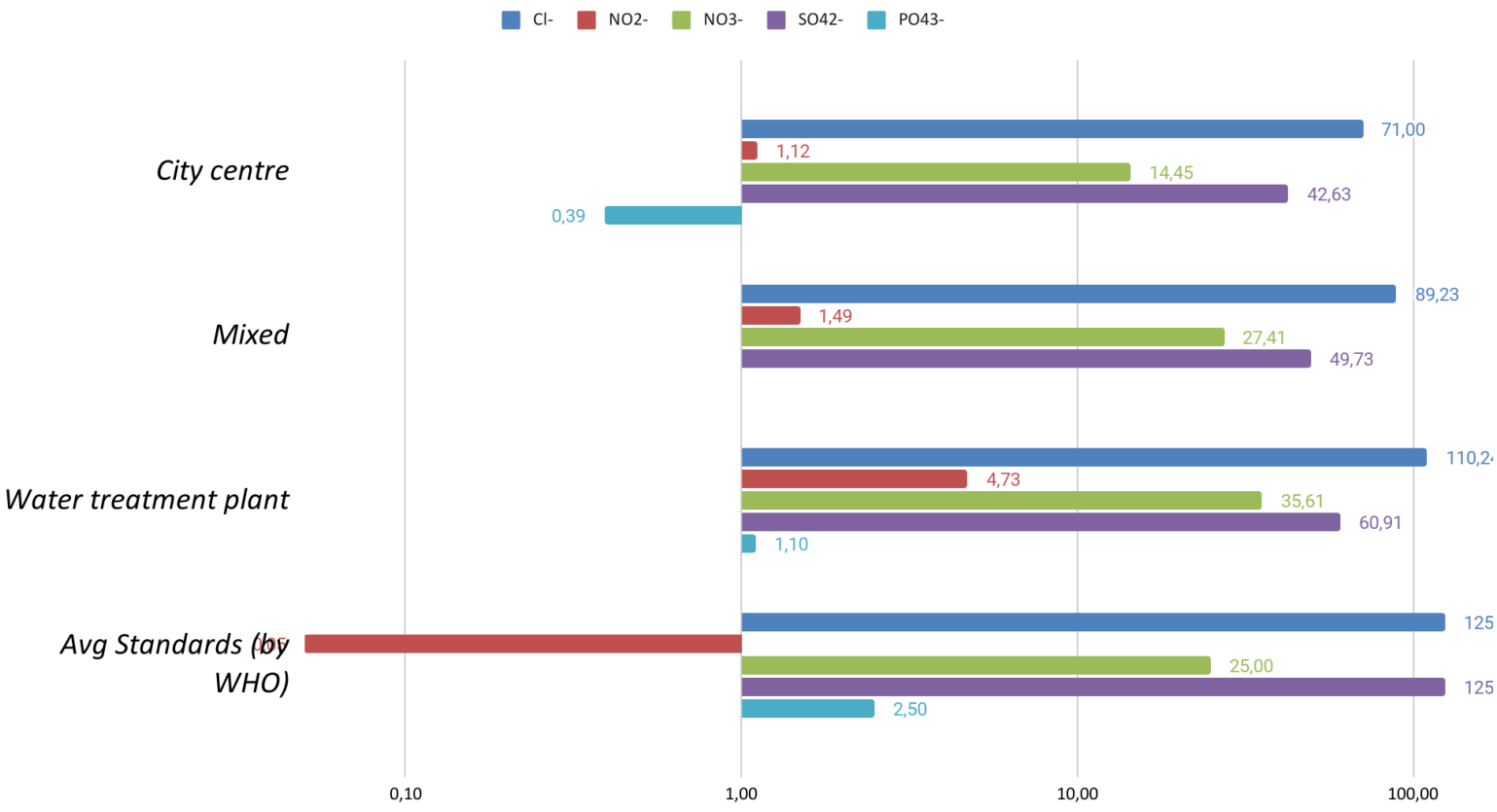
The water taken from the river outside the city met our expectations in the level of purity. The reason for this water quality is the absence of buildings and human interference in the flora and fauna of the river.

Evaluation:

According to our assumptions, the water is the cleanest before flowing through the city. Things get a little worse in the city centre, from observation alone you can see an increased amount of waste such as polymers and glass that accumulates in the narrow passageways.

The water flowing out of the city also receives water from the nearby sewage treatment plant, which significantly worsens the condition of the water. In addition, the treatment plant increases the flow of the river more than the river itself.

Stats


Cl-
NO2-
NO3-
SO42-
PO43-
City centre
71,00
1,12
14,45
42,63
0,39
Mixed
89,23
1,49
27,41
49,73
Water treatment plant
110,2
4,73
35,61
60,91
1,10
Avg Standards (by WHO)
125
25,00
125
2,50
0,10
1,00
10,00
100,00

Parameters

Cl^- - The chloride content is usually caused by sewage inflow into the water. Chlorides in surface water are always present in dissolved form. When there is a lot of chloride in the water - the water starts to have corrosive properties.

$SO4^{2-}$ - Together with chlorides, sulphates are the most common contaminants in surface water. They enter due to leaching of sedimentary rocks, soil dissolution, and oxidation of sulphides and sulphur as protein breakdown products from wastewater. When sulphates are abundant - drinking water can cause digestive diseases.

$NO2^-$,$NO3^-$ - The appearance of nitrates in water is alarming because it is very difficult to fight against them. Water containing these compounds is very dangerous, mainly for newborns and small children and should not be consumed. Their origin may be natural - they are formed in groundwater as a result of mineralization of organic matter and nitrification processes and from some easily soluble minerals, or as a result of human activity - infiltration of compounds into water along with sewage from an improperly secured septic tank or intensive nitrogen fertilisation of nearby fields. Even at low concentrations, ammonia and nitrite have toxic effects.

$PO4^{3-}$ - Phosphates are a naturally occurring form of phosphorus that is present in the environment and all around us. However, inorganic phosphates are different from natural phosphorus.Phosphates in natural waters can come from the decomposition of organic plant or animal compounds, from fields fertilised with phosphate fertilisers, and from industrial wastewater pollution. The organic, as well as mineral - dissolved and undissolved.

pH - can be acidic, neutral or basic - on a scale of 0 to 14 (about 7 - neutral reaction). It is a quantitative concentration of hydrogen ions. The test can be carried out using colorimetric or electrometric methods. The pH of water can easily be checked with litmus paper. A low pH indicates corrosiveness, while a high pH indicates a tendency to foam. Water safe for humans should have a pH between 6.5 and 9.5.

Turbidity - physical parameter that measures the reduction in relative transparency of water by suspended particles that persist in it. It is created as a result of disturbances in the penetration of light through the water layer as a result of its scattering and absorption by suspended particles contained in it.

Overall and carbonate hardness - presence or absence of cations dissolved in the water, mainly calcium and magnesium salts. Total hardness is the sum of carbonate and non-carbonate or calcium and magnesium hardness.