Posteropdracht voor het vak Water 1 (HWM-10303) van Wageningen Universiteit

Rodenbeker Quellental, a way to upgrade the Alster?

Nele Bettels

Onderzoeksvraag

What is the influence of the feeder rivers in the Rodenbeker Quellental on the water quality of the Alster?

Gebiedsbeschrijving

The Rodenbeker Quellental (*Quellental,* German for: 'spring valley') is in the north east of Hamburg, located at the Oberalster. It is a nature reserve of 84 ha[1]. The terrain, with many hills and valleys, was formed in the last ice age. The Alster, Rodenbek and Bredenbek are rivers/creeks running through the national park. Special about this area are the many **springs** that can be found on the hillsides. They offer a special biotope with demanding water species like caddisfly and ephemera and rare bird species such as kingfisher and grey wagtail. The creeks are ending here in the Alster which could influence the water quality, expected is in a positive way.

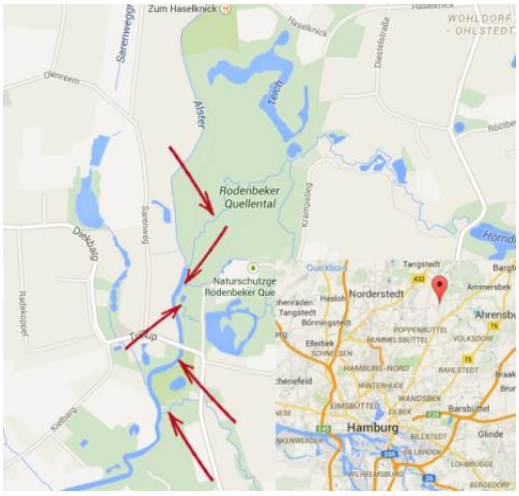

Figure 1: Map of the area, red arrows are places where I took the tests[F1].

Resultaten

In Germany, the saprobiensystem is a classification system used to rate the water quality of water bodies. It was invited by R. Kolkwitz and M. Marsson. There are 7 water quality classes with four main quality classes (I: **Oligosaprobic** zone; II: **β-mesosaprobic** zone; III: **α-mesosaprobic** zone; IV: **polysaprobic** zone) and three classes which are in between (I-II; II-III; III-IV). To classify a water body biological and chemical attributes are used.

For the biological attributes the saprobienindex is calculated. To get this index a formula is used (see below).

It works with indicator species which are listed in a table. In this table you also find the value of s_i and g_i for all these species. The only thing left to do for you is to count how many individuals of one species you can find in the chosen field. So if you for example get S=1.3 you would have the water quality class I. Which saprobienindex is which water quality class is also written down in a table.

$$S = \frac{\sum_{i=1}^{n} s_i \cdot h_i \cdot g_i}{\sum_{i=1}^{n} h_i \cdot g_i}$$

S: Saprobienindex of the sample
s_i: saprobien value
h_i: frequency
g_i: indication weight
n: quantity[2]

Figure 2: Bredenbek in early summer 2014.

The chemical water quality class analysis shows in comparison to the biological only the temporary situation, it is more precise though. There is also a table used for getting the results. The feeder rivers that are coming out of the Rodenbeker Quellental have due to the chemical tests the water quality class II. The Alster has before and after the Rodenbeker Quellental the water quality class II-III. The biological water quality class analysis mainly confirms the results of the chemical analysis.

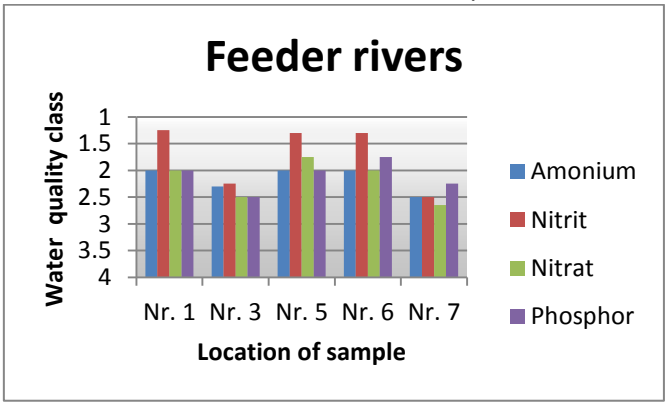

Figure 3: Water quality classes of different locations. Nr. 1,5,6 are feeder rivers. Nr. 3 is the Alster after and Nr.7 the before the Rodenbeker Quellental [3]

Conclusie

The tributaries from the Rodenbeker Quellental have from the chemical aspect no impact on the quality of water of the Alster. Therefor the tributaries are probably too small and the differences between the water quality classes are too little. From a biologically aspect the area offers due to the rare conditions very valuable biotopes that host many protected species. To answer the research question: The water quality of the Alster changes barely though the tributaries but the springs are a big enrichment for the biodiversity.

Referenties

Behörden für Stadtentwicklung und Umwelt (no year). NSG Rodenbeker Quellental. http://www.hamburg.de/rodenbeker-quellental/, last viewed: 17.01 2015

[1]Hamburg-Magazin.de (2011). Naturschutzgebiet Rodenbeker Quellental erweitert. http://www.hamburg-magazin.de/service/umwelt/artikel /detail/naturschutzgebiet-rodenbeker-quellental-erweitert.html, last viewed: 17.01 2015

[2]Jürgen Gaul (2003). Bestimmung der Gewässergüte. http://www.bfv-nagoldtal.de/gewaesserkunde.htm#Saprobienindex, last viewed: 17.01 2015

[3]Bettels, N. and Brandenburg, T. (2014) Rodenbeker Quellental

[F1]Google Maps, 15 jan. 2015, www.google.com/maps