Luiset Alexandre (2019): Using stable isotopes and hydrochemical monitoring to understand how beaver dam complexes impact nitrate pollution in two german low-orders streams.

Nitrogen on Earth's surface forms part of a major biogeochemical cycle, recently perturbed by human activity with the consequence of increasing eutrophication in freshwater ecosystems and increasing greenhouse gas emissions. As a response to the excessive inputs from human activities, research has focused on understanding natural sinks able to remove these, notably through denitrification (Sutton, 2011). Streams influenced by beavers are known to reduce the concentration in nitrate of the water flowing through the multiple dams, ponds and wetlands they created. This study tries to identify which processes are promoted by the beaver's activity and more particularly the denitrification, a definitive sink for nitrate. Stable isotopes values of $\delta^{15}N$ and $\delta^{18}O$ of the nitrate and hydrochemical analyses are used to determine the effect of beaver's activity on two low-order streams in Germany. Monitoring and field campaigns have been performed during the years 2017 and 2018 to sample the water upstream, inside and downstream the beaver's area. Results show that reductive conditions inside the system are decreasing both nitrate and sulfate in concentration from upstream to downstream. However, the results from isotopic analyses show a complete overhaul of the nitrate in the systems, with a new production from nitrification complicating the interpretation of the isotopic composition from denitrification. This study sheds light on the complexity of the nitrogen cycle at short scale because of the long residence time of the water inside beaver's systems and calls for further analysis and data collection.