



Conference Abstract

eDNA metabarcoding fish in relation to the Water Framework Directive indices

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Abstract

The Water Framework Directive (WFD) recognizes fish as a biological quality element to determine the ecological health and quality of waterbodies. Therefore fish monitoring is carried out using conventional methods like electrofishing and seine fishing following standardized protocols. This data is then used in metrics that calculate ecological quality ratios (EQR) for waterbodies. eDNA-metabarcoding could prove an alternative to this conventional WFD-monitoring by offering high sensitivity, possibly lower costs and less invasive sampling.

A large project was set up in the Netherlands together with STOWA and the waterboards to explore the possibilities to use eDNA-metabarcoding as an alternative way to carry out the WFD-monitoring for fish. In 2015 in a total of 55 WFD transects (250 meter) were sampled using eDNA-metabarcoding in parallel to the conventional WFD-monitoring. On average 60% more species were detected with eDNA-metabarcoding. In 2016 a total of 9 whole waterbodies (small rivers/ lakes / canals) were sampled in parallel. A sample strategy that mixed water collected from 3 long transects was compared to a strategy that sampled the 3 transects individually.

The results showed that the strategy with mixed water samples resulted in nearly the same results at far lower costs. Furthermore a first comparison was made between the relative abundance in eDNA sequences and the relative abundance in biomass and numbers caught. Building on this project between 2018 and 2020 a total of 73 waterbodies were

sampled with eDNA-metabarcoding in parallel to conventional WFD-monitoring. Those included streams, rivers, canals, lakes and brackish waterbodies.

The final goal is to assess if eDNA-metabarcoding fish can provide similar EQR-scores compared to the conventional WFD-monitoring. This can be done by either renovating the current metrics used or to build new ones based on eDNA data.

This presentation will discuss the advantages and disadvantages of both options and gives some insight in the steps still needed for implementation of eDNA-metabarcoding methods in standardized WFD-monitoring.

Keywords

Edna-metabarcoding; fish; Water Framework Directive; Indices; Metrics; Monitoring; Bioassessment; Environmental DNA;

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