

Welcome to the second BIOWATER newsletter. BIOWATER is now half-way and has so far produced nine peer-reviewed papers, 17 posters and 14 presentations at different international conferences. In June 2019 we organized a special session at the Land Use and Water Quality Conference in Aarhus, Denmark, and presently ten papers are being reviewed in a special issue on environmental effects of the green shift, in the Springer Journal AMBIO. We have also had stakeholder workshops/interviews in all four Nordic countries, and organized three PhD-courses on catchment modelling, and catchment hydrology, biogeochemistry and processes. Below please find the main news items since our last newsletter (from May 2019):

From our website [www.biowater.info](http://www.biowater.info)



[New paper on economy, biodiversity and ecosystem services in peat production.](#)

The result from peat production in Finland show that with a relatively small decrease in economic returns, a substantial decrease in biodiversity loss and a reduction in water emissions compared to the benchmark level could be attained. This shows that it is possible to significantly improve land-use management by applying multi-objective optimization in land-use planning.



[New paper on controlled drainage.](#)

The study showed that harvest yield was unaffected by controlled drainage. The considerable reduction of N and P loss via drainage water was mainly driven by the reduction in drain flow and not denitrification.



[Blue effects of green shift discussed in the green forests of Finland.](#)

The annual BIOWATER Camp 2019 were held in Rokuanhovi, Finland. We discussed our Centre's achievements so far, and developed our plans and priorities for the next years.



[BIOWATER PhD-course successfully implemented](#)

18 students followed BIOWATER PhD course at the University of Oulu, Finland. During two intensive days, the participants had 12 lectures on the topic of *Catchment hydrology, biogeochemistry and processes*.

BIOWATER upcoming events

**BIOWATER Internal Scenario workshop**, Uppsala, Sweden. 27-28 February.

**BIOWATER Course in SWAT scenario modelling**, Madrid, Spain. 24-28 March 2020.

**BIOWATER Annual Camp 2020**: 25-28 May, Hurdalsjøen hotel, Norway

## Relevant conferences

**16th International Symposium on Aquatic Plants**, Aarhus, Denmark. 15-19 June 2020.

**Nordic Hydrological Conference 2020**, Tallinn, Estonia. 10-13 Aug. 2020.

**3rd ESP Europe Conference**, Tartu, Estonia, 21-24 Sept. 2020.

## Publications -since april 2019

### Biowater scientific papers

Kortelainen, P, Larmola, T, Rantakari, M, Juutinen, S, Alm, J, Martikainen, P.J. Lakes as nitrous oxide sources in the boreal landscape. *Glob Change Biol.* 2020; 00: 1– 14. <https://doi.org/10.1111/gcb.14928>

Juutinen, A, M. Saarimaa, P. Ojanen, S. Sarkkola, A. Haara, J. Karhu, M. Nieminen, K. Minkkinen, T. Penttilä, M. Laatikainen, A. Tolvanen, 2019. Trade-offs between economic returns, biodiversity, and ecosystem services in the selection of energy peat production sites, *Ecosystem Services*, Volume 40, 2019, 101027, ISSN 2212-0416, <https://doi.org/10.1016/j.ecoser.2019.101027> (Juutinen\_et\_al2019)

Carstensen M.V., Børgesen, C.D., Ovesen, N.B., Poulsen, J.R., Hvid, S.K., Kronvang, B. 2019. Controlled Drainage as a Targeted Mitigation Measure for Nitrogen and Phosphorus. *J. Environ. Qual.* 48:677–685 (2019) [doi:10.2134/jeq2018.11.0393](https://doi.org/10.2134/jeq2018.11.0393). Carstensen et al 2019 *J Environ Qual*

Haghighi, A.T., Ashraf, F.B., Riml, J., Koskela, J., Kløve, B., Marttila, H. 2019. A power market-based operation support model for sub-daily hydropower regulation practices. *Applied Energy*, Volume 255, December 2019, 113905. <https://doi.org/10.1016/j.apenergy.2019.113905>

### Biowater posters

Weng, H., Bechmann, M. 2019. Effects of land use on nutrient losses from small agricultural catchments in Norway. *International Interdisciplinary conference on Land Use and Water Quality (LUWQ)*, Aarhus University, 3-6 June 2019.

Kronvang, B., Larsen, S.E., Tornbjerg, H., Kyllmar, K., Kløve, B., Bechmann, M., Rankinen K., Lepistö, A., de Wit, H. 2019. A conceptual mini-catchment typology for analyzing eutrophication risks in surface waters in the Nordic countries. *International Interdisciplinary conference on Land Use and Water Quality (LUWQ)*, Aarhus University, 3-6 June 2019.

Carstensen, M. V., Hashemi, F., Hoffmann, C. C., Zak D. , A., J. , Kløve, B., Marttila, H., Kyllmar, K., Vermaat, J., Immerzeel, B. & Kronvang, B. 2019. Evaluation of measures for mitigation of diffuse pollution from agricultural drainage system. *International Interdisciplinary conference on Land Use and Water Quality (LUWQ)*, Aarhus University, 3-6 June 2019.

Blankenberg, A.-G.B., Skarbøvik, E. 2019. Bufferzones along streams: Good for environment but bad for food production? *International Interdisciplinary conference on Land Use and Water Quality (LUWQ)*, Aarhus University, 3-6 June 2019.

Futter, M.N., Rakovic, J., Sandström, S., Kyllmar, K. 2019. Phosphorus mass balances in Swedish agricultural catchments. *International Interdisciplinary conference on Land Use and Water Quality (LUWQ)*, Aarhus University, 3-6 June 2019.

Hashemi, F., Kronvang, B. 2019. Analysis of land use change for nitrate reduction to obtain multiple benefits for water quality and nature in a Danish catchment. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Carstensen, M. V., Zak, D., Weitzmann van't Veen, S. G., Audet, J., Kjeldgaard, A., & Kronvang, B. (2019). Nitrous oxide emission from integrated buffer zones mitigating N loss from tile drained agricultural fields. Poster presented at the 8th international symposium on Wetland Pollutant Dynamics and Control (WETPOL), Aarhus University, 17-20 June 2019.

Immerzeel, B., Vermaat, J.E., Juutinen, A., Pouta, E., Artell, J. 2019. The recreational value of Nordic river catchments: A discrete choice experiment. LEEPIn2019, 24-25 June 2019, Land, Environment, Economics and Policy Institute, University of Exeter, Exeter, United Kingdom.

### Biowater Conference Presentations

Collentine, D., Kyllmar, K., Rakovic, J., Solheim, A.L., Blicher-Mathiesen, G., Tolvanen A. 2019. BIOWATER systems attribute survey: Impacts of the bioeconomy on land use and land management in the Nordic countries in the year 2050. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Rakovic, J., Collentine, D., Futter, M.N.: The Nordic Bioeconomy. Pathways and water quality futures in agricultural landscapes. 2019. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Kyllmar, K., Andersen, H.E., Blicher-Mathiesen, G., Bechmann, M., Rankinen, K. 2019. Source apportionment of N and P in small agricultural monitoring catchments as a basis for improved classification of river basins. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

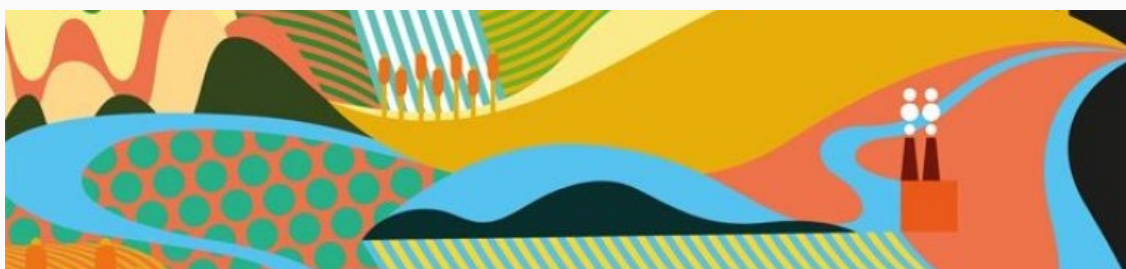
Vermaat, J.E., Immerzeel, B., Pouta, E., Juutinen, A. 2019. Applying ecosystem services as a framework to analyze the possible effects of a green bioeconomy shift on Nordic catchments. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Skarbøvik, E., Kronvang, B., Kyllmar, K., Rankinen, K. 2019. Setting reference conditions for nutrients in Nordic surface waters: Methodologies, levels, uncertainty and management implications. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Stutter, M., Pohle, I., Rakovic, J. 2019. Typing catchments for risk and resilience factors in P pollution and waterbody impacts: Supporting landscape planning. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Kaste, Ø., de Wit, H.A., Weng, H., Skarbøvik, E. 2019. Counteracting effects of climate and land-use change on riverine element run-off? A combined analysis of Norwegian natural and agricultural headwater catchments and large rivers' monitoring data. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.

Stenrød, M., Bøe, F.N., Eklo, O.M. 2019. Glyphosate and the sustainability of cropping practices in northern climate. International Interdisciplinary conference on Land Use and Water Quality (LUWQ), Aarhus University, 3-6 June 2019.



BIOWATER (2017-2022) is a Nordic Centre of Excellence, with a main goal to examine the impacts of the bioeconomy on land use and freshwater quality and quantity. We are PhD-students, post.docs., and senior researchers from eight institutes in four countries (Denmark, Finland, Norway and Sweden), with collaborating European institutes. Much of our work is done by our dedicated students; presently nine PhD-students and two

post docs are associated with the center.

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