



Photo: D.P. Eidsvoll

Theme 5: Assessment of risks to drinking water provision from forest fertilization and harvesting

Regular forest fertilization is planned in the Glitre catchment over the next 100 years to increase forest productivity. The catchment (45 km²) is an important drinking water source, and the question is whether fertilization is likely to impact drinking water provision. A small area of the catchment (0.675 km²) was fertilized in June 2017, and surface water quality monitoring data from before and after fertilization allowed us to look for short-term nitrogen leaching effects. Potential longer-term fertilization and harvesting effects were explored through a consideration of the nitrogen budget for the catchment and how this might change in the future, making use of process-based modelling results from a similar Norwegian catchment. The main findings and recommendations include:

- Some evidence was found for leaching of nitrate immediately post-fertilization in June 2017, but this was small and short-lived. Short-term leaching is not expected to be a problem in the future as long as fertilization plans are adhered to.
- Forest harvesting results in an increase in nitrogen delivery to Glitrevann. This can be seen at present: Guritjernsbekken, where clear-felling occurred in recent years, has higher total N and nitrate concentrations than the other monitored tributaries.
- Future forest harvesting plans include 1 km² around 2050 and 5 km² around 2070. Modelling studies suggest this could result in up to a 20-23% increase in N export to the lake compared to background (i.e. no harvesting) levels over 2017-2090.
- To protect the lake from harvesting-associated nitrogen fluxes, harvesting intensity should be less than 1 km²/year (2.2% of the catchment area).
- To screen for harvesting-associated increases in N inputs to the lake, we recommend routine monitoring of tributaries downstream of areas affected by harvesting.
- Taking appropriate soil protection measures and using appropriate buffer strips during harvesting are among the most important ways of preventing excessive N and carbon inputs to surface waters and could potentially be improved by extending the use of buffer strips to non-permanent streams. Careful timing of harvesting-related activities is also important, in relation to ground conditions, forecasted rainfall or snow melt.

Reference: Jackson-Blake L, Clayer F. 2020. Assessment of risks to drinking water provision in Glitrevann from forest fertilization and harvesting. NIVA report 7458, 33 pp.

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SURFER – Surface waters: The overlooked factor in the forestry climate mitigation debate.