



NIBIO

Norwegian Institute of Bioeconomy Research

# Buffer zones

## with different vegetation cover – monitoring of the surface runoff

A-G. B.Blankenberg, D. Krzeminska, A. Isidorova, E. Skarbøvik

ID number: # 170



LuWQ2025, Land Use and Water Quality

### INTRODUCTION

Grass covered buffer zones are a common measure for improving water quality in Norway's agricultural catchments. Increased focus on buffer zones is important in a future climate perspective, both for food production, biodiversity and water quality.

### OBJECTIVE

This study focus on the effect of buffer zones (BZ) on surface runoff of nutrients and sediments. Only 3.5% of Norway's total land area is agricultural land, and maintaining fodder production in the BZs is therefore deemed important.

Here we show the results of 3 years monitoring of surface runoff from BZs with two different types of plant cover (grass and flower mixture). The adjoining fields have cereal production and are autumn tilled.

### SITE

The test-field is located in South-East Norway. The soils are clay-rich and the erosion risk is high. Our test-field has eight plots, where no. 1 and 4 are references (cereals, no BZ), no. 2, 5, 7 have grass and no. 3, 6, 8 have flowers. Downstream of each plot, water is collected in a gutter (Fig. 1, left). From the gutter the water runs into tipping buckets, one per plot. Each time the tipping bucket tilts, a sub-sample of water is entering a water jug. Water proportional water samples are collected from each jug (Fig. 1, right).



Figure 1. Experimental set-up. Aerial photo of the test field, with the eight plots and two sampling-huts. The vegetation in the eight plots are illustrated (gras: green, flowers: pink, and reference (cereal): yellow.). Pictures of the test-field and sampling-system.

### RESULTS



Figure 2. Water samples from the eight plots (02. July 2024).

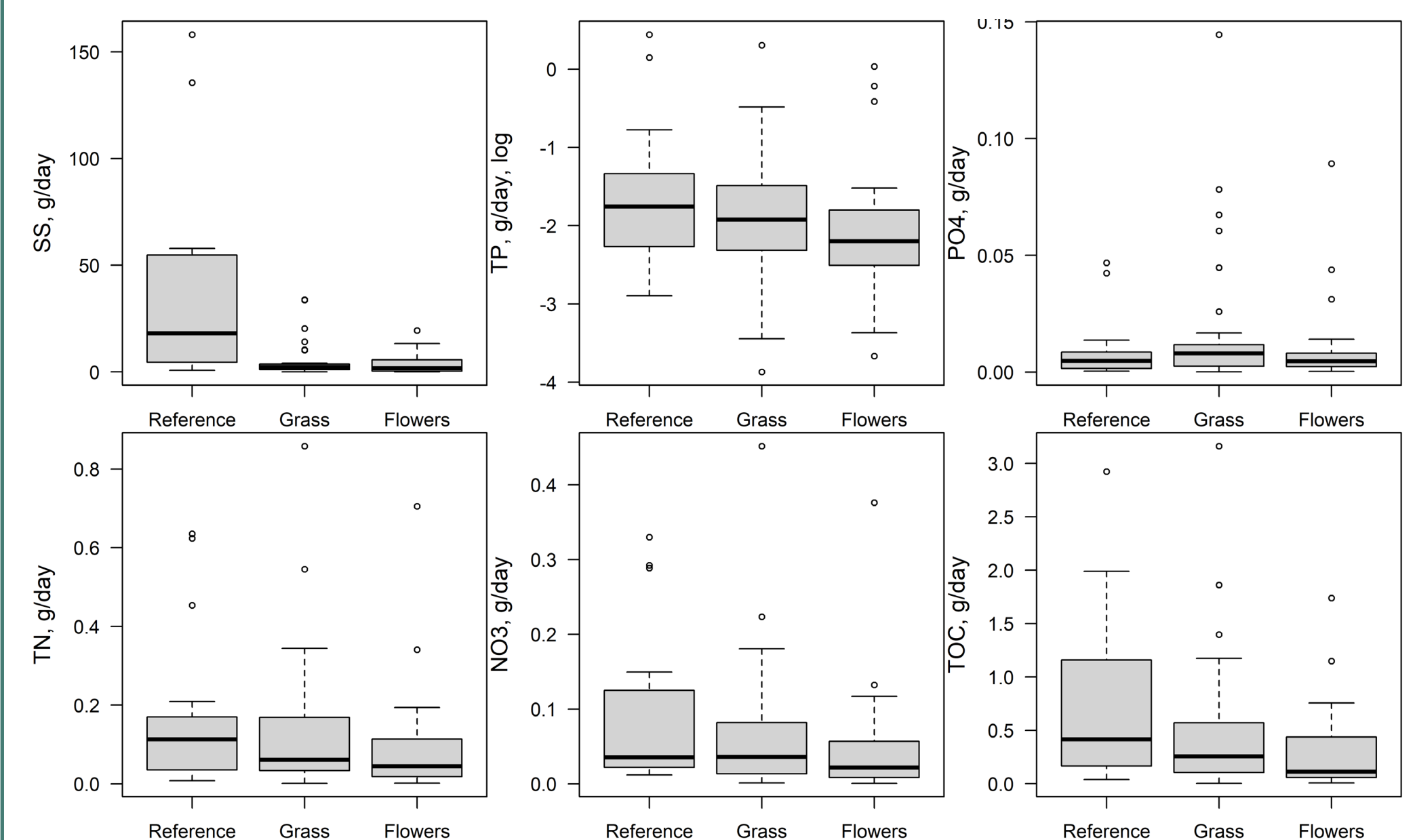


Figure 3. Load of SS and nutrients vs. vegetation type in the BZ.

The results show that:

- Visually, there is a difference in water quality in the bottles containing surface runoff from the eight fields with and without buffer zones (Fig. 2).
- Average SS load was significantly higher with no BZ than with grass and flowers (Fig. 3).
- There was no similar significance for TP, TN, TOC, or NO<sub>3</sub>

### CONCLUSIONS AND FOLLOW-UPS

After three years of operation, we found that the BZs with grass and flowers significantly reduced the losses of suspended sediments from the cereal fields, as compared to no BZ. However, no such trend was found for any of the nutrient fractions.

We saw no significant retention difference between grass and flower cover. This may be due to poor growth of vegetation in the BZs the first couple of years.

In the next years, seasonal variations will be studied, as well as infiltration and retention in the soil matrix.

### SOURCE

Blankenberg et al. 2025. NIBIO-report, in prep.