

## Ecological functioning of ditches

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(PhD 1 nutrient retention)



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(PhD 2 maintenance)



The total length of ditches in the Netherlands is estimated at roughly 300.000 km, creating a unique landscape.

### Ditches; of great ecological importance!

Although man-made, ditches are of great ecological importance in the Netherlands. Not only do ditches contribute considerably to the biodiversity in agricultural areas, also their self-purification capacity is expected to be of great importance for the surface water quality.

However, ditches have hardly been studied and the effects of ditch vegetation on **nutrient retention**, as well as the effects of **maintenance activities** (mowing and dredging) on the **composition of ditch vegetation** remain largely unclear.

### Research outline and objectives

**PLONS** stands for **P**roject **L**angjarig **O**nderzoek **N**ederlandse **S**loten.

The project focuses on the mechanisms and processes controlling the ecological functioning of ditches. It is hypothesized that ditches show shifts in vegetation composition (Figure 1). Two aspects are considered to be important in ditches considering these shifts; nutrients and maintenance. These two aspects influence the type of vegetation found in a ditch and the rate at which denitrification occurs (Figure 2).

#### Objectives

1. Analyze the effects of ditch maintenance and vegetation type on nutrient retention in ditches, with a main focus on denitrification (Annelies Veraart).
2. Determining the mechanisms controlling shifts in vegetation type (Figure 1), resulting from nutrient state and maintenance activities in ditches. (Jeroen van Zuidam)

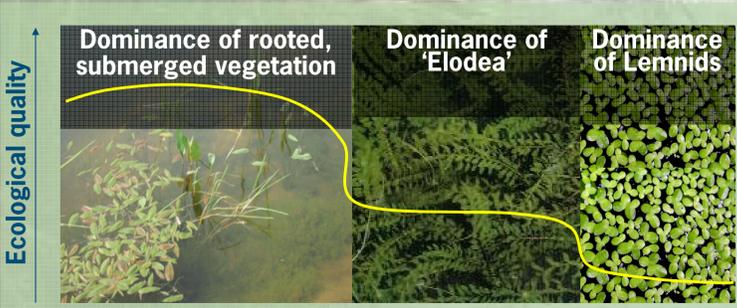


Figure 1. Shifts in vegetation type as hypothesized in this research, resulting from changes in water quality

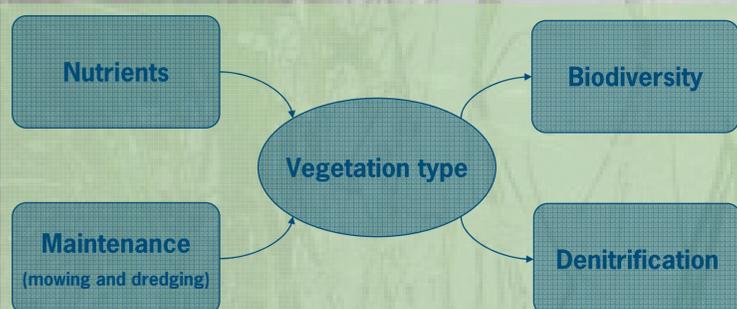


Figure 2. Overview of the research topics: nutrients and maintenance lead to a certain vegetation type which influences biodiversity and the rate of denitrification

#### 1. Nutrient retention in ditches

- Temperature, initial nutrient levels, oxygen levels and available substrate for biofilms are the main factors regulating denitrification
- N removal by denitrification is highest in ditches where floating plants are dominant
- There are significant seasonal fluctuations in denitrification in ditches
- Maintenance events decrease the nutrient removing capacity of ditches

#### 2. Maintenance and vegetation type

- Nutrient state and maintenance determine species distribution along the water column
- Plant traits determine the effect of nutrients and maintenance on seasonal development of vegetation
- Changes in timing, frequency and method of mowing affect seasonal development of vegetation
- With increasing nutrient state, a higher mowing and dredging frequency is needed to maintain species diversity.