



# Nitrate leaching from new forests on arable land – short and long term monitoring

- Evaluation of afforestation as mitigation option

## **Per Gundersen**

Section for Forest, Nature and Biomass

Dept. of Geosciences and Natural Resource Management

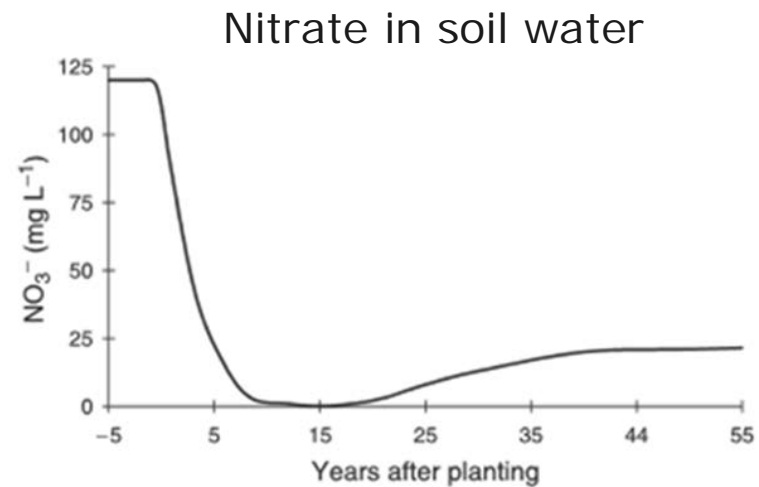
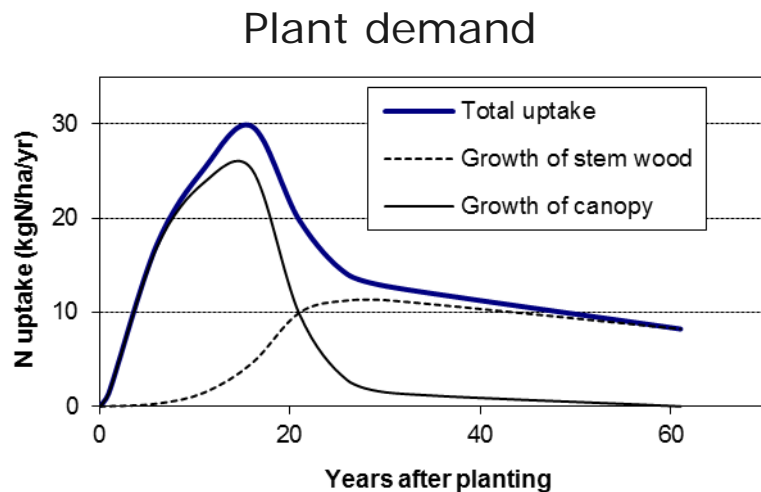
11 July 2017

Dias 1



## Hypothesis

- Forest in DK usually have low nitrate (90% < 10 mg/l). Can we expect that in new forest?
- Agricultural legacy, soil C/N = 8-10 →  $\Delta N_{\text{soil}} \sim 0$
- Plant N demand control N leaching
- Excess N after canopy closure due to N deposition



## Methods

- 8 sites
- Soil water nitrate
- Suction cups or soil extraction
- 0 to 50 years since afforestation
- Measured 17 to 31 years



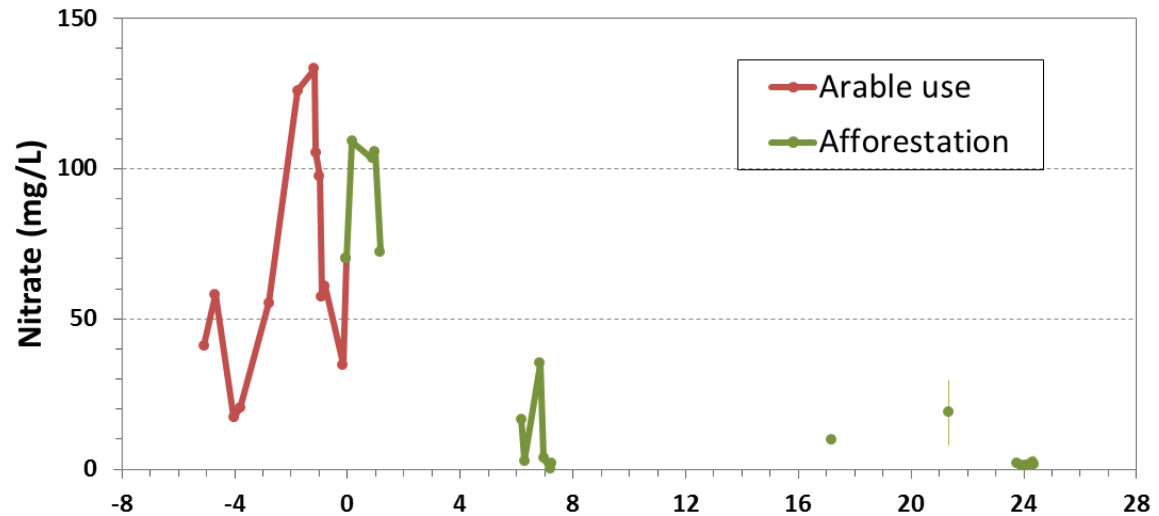
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Dias 3

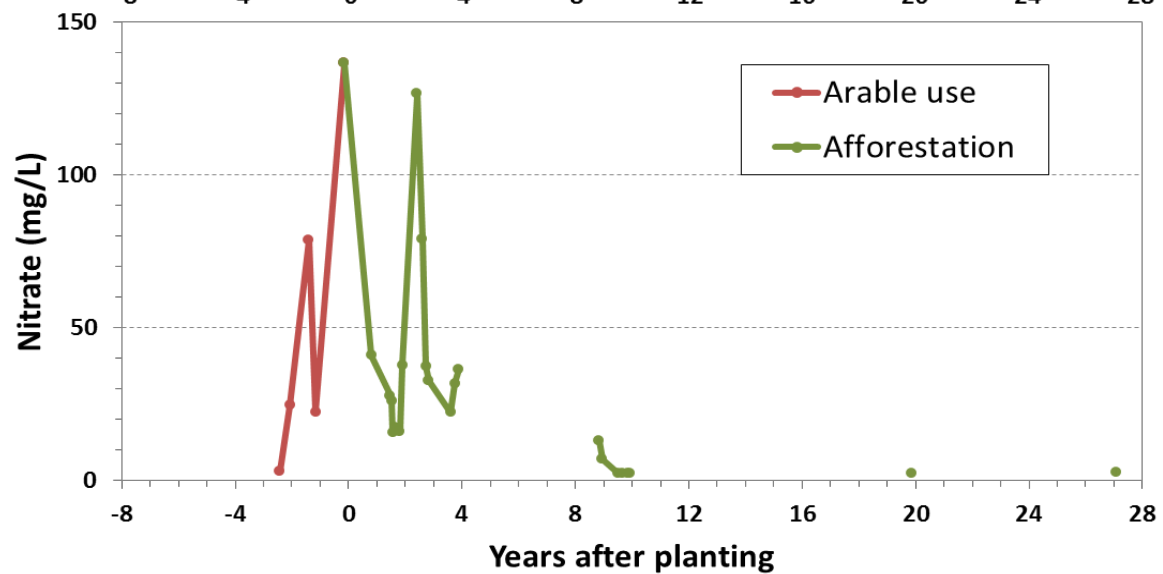


## Arable land converted to new forests

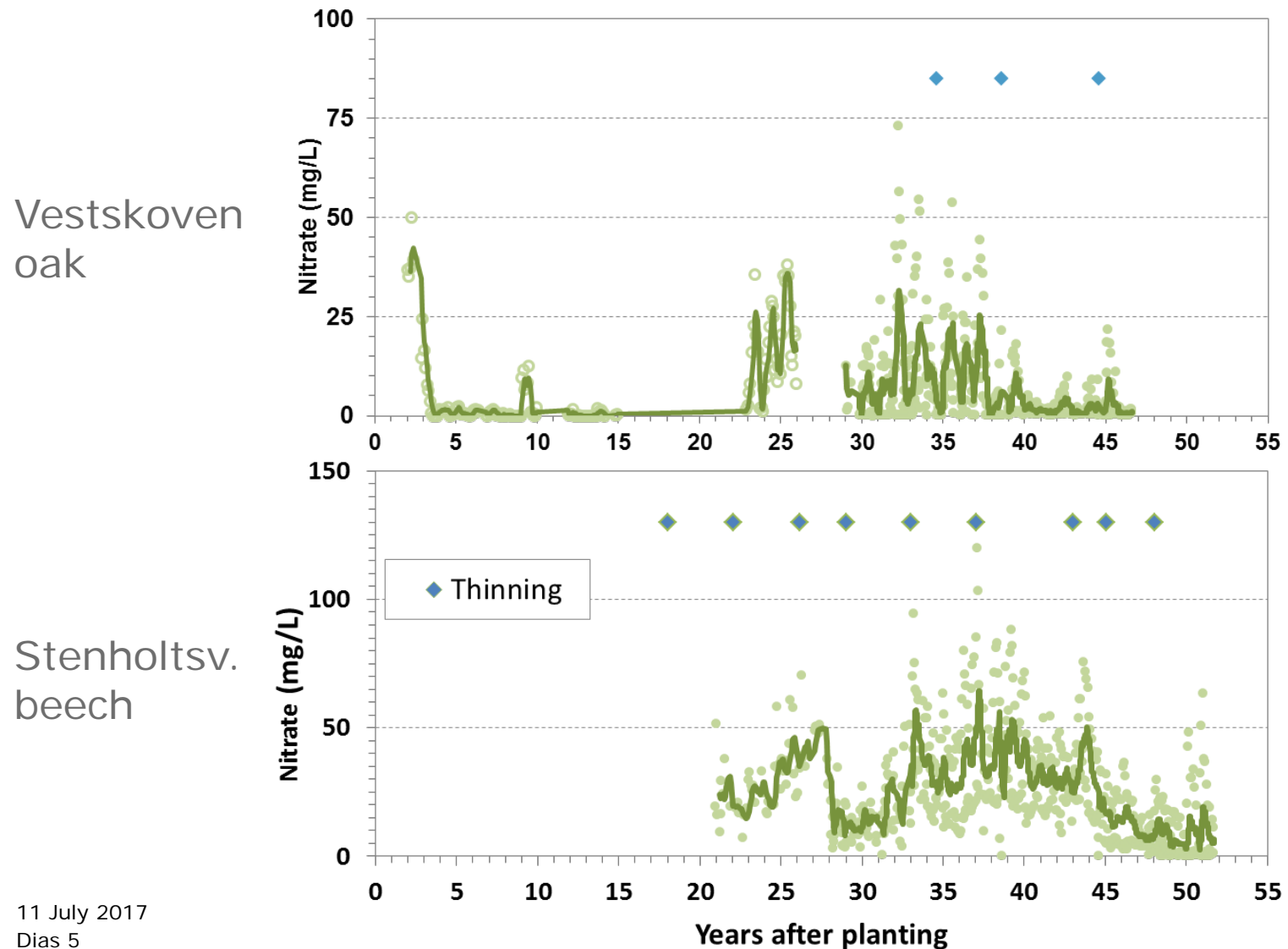
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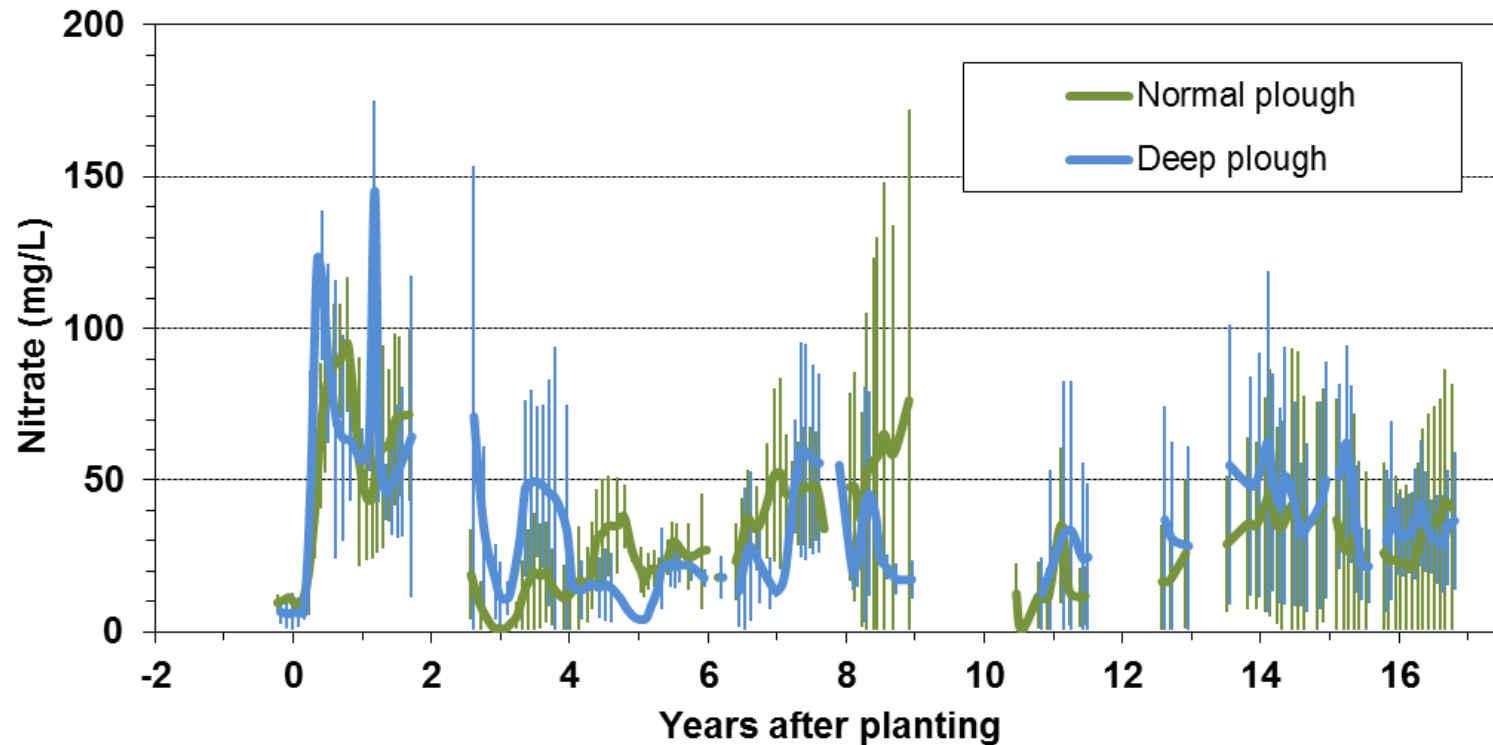
Baldersbæk



## New forests on nutrient rich clay soils

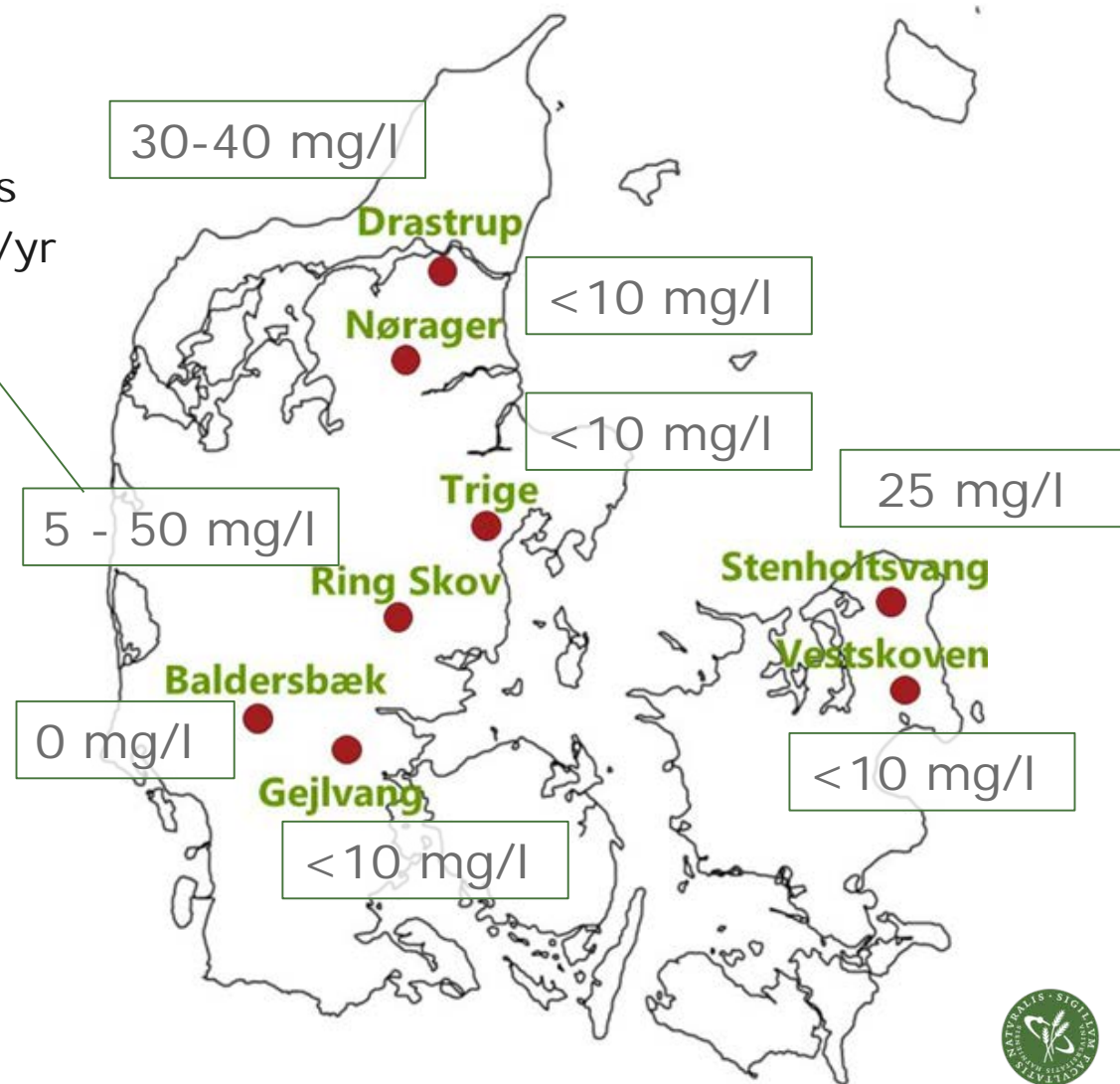
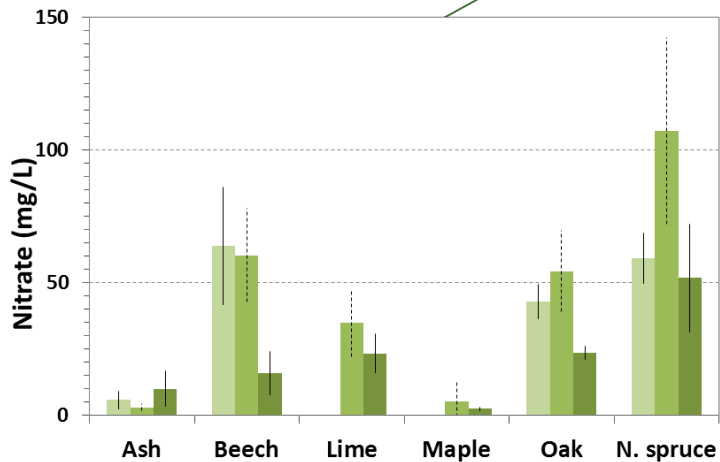


## Effect of soil preparation methods, Drastrup site



## Nitrate concentrations in the long-term

- 25 mg/l limit met in most cases
- Sandy soils < clay soils
- Leaching ~ 10 kgN/ha/yr
- Tree species matter





## Conclusions – nitrate from new forests

- The **agricultural legacy** makes new forests **prone to elevated N leaching**.
- **Except on sandy soils** where N accumulates in soil organic matter.
- **Nutrient rich soils** often had a **net loss of soil N over several decades** after afforestation.
- The **vegetation N-sink is controlling** the nitrate concentration dynamics, thus **regular thinnings** (whole tree harvest) to remove N and to stimulate regrowth **are important to reduce N leaching**.
- Some **tree species modify the N cycle**; however this aspect needs further study.





