33rd Nordic Geological Winter Meeting - January 11th 2018

TRANSPORT AND TRANSFORMATION OF NITRATE IN A DANISH RIPARIAN LOWLAND

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TReNDS

Transport and Reduction of Nitrate in Danish Landscapes at various Scales

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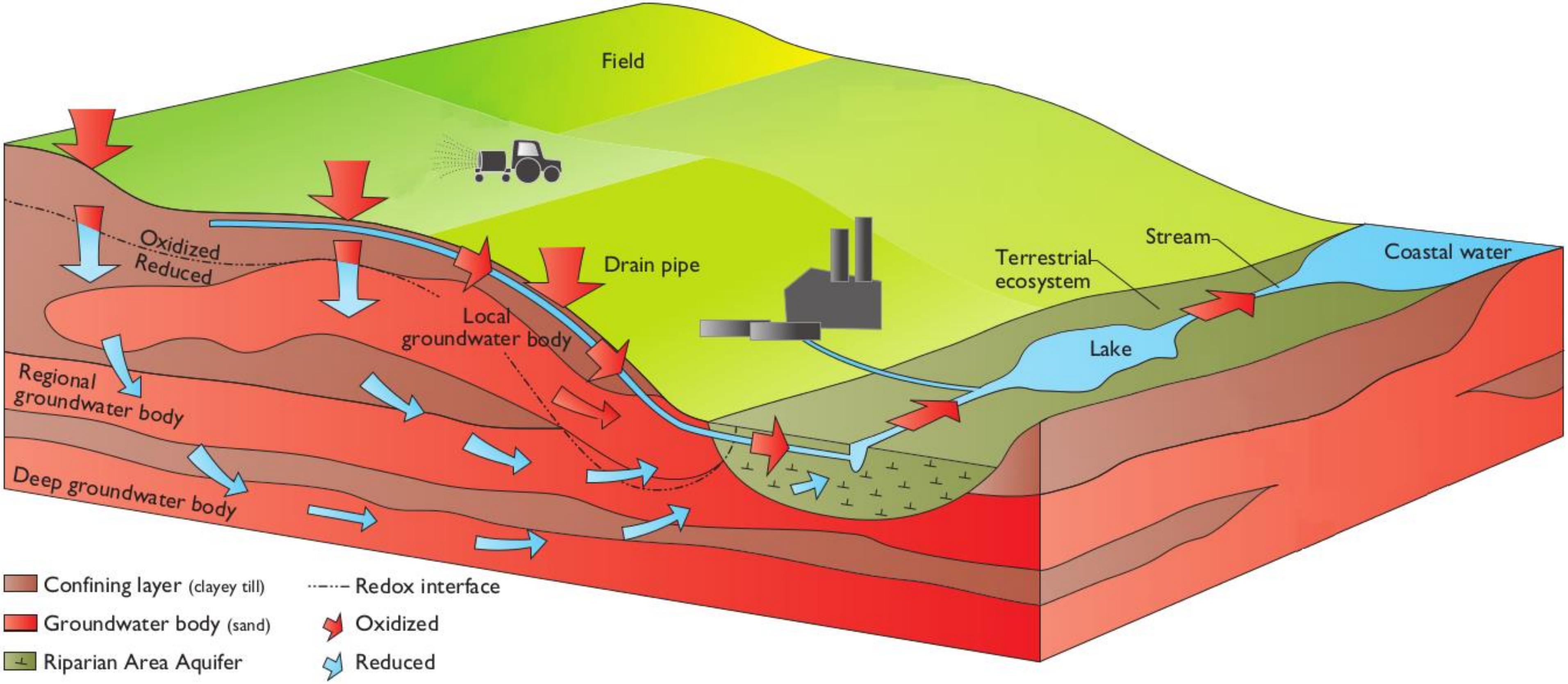
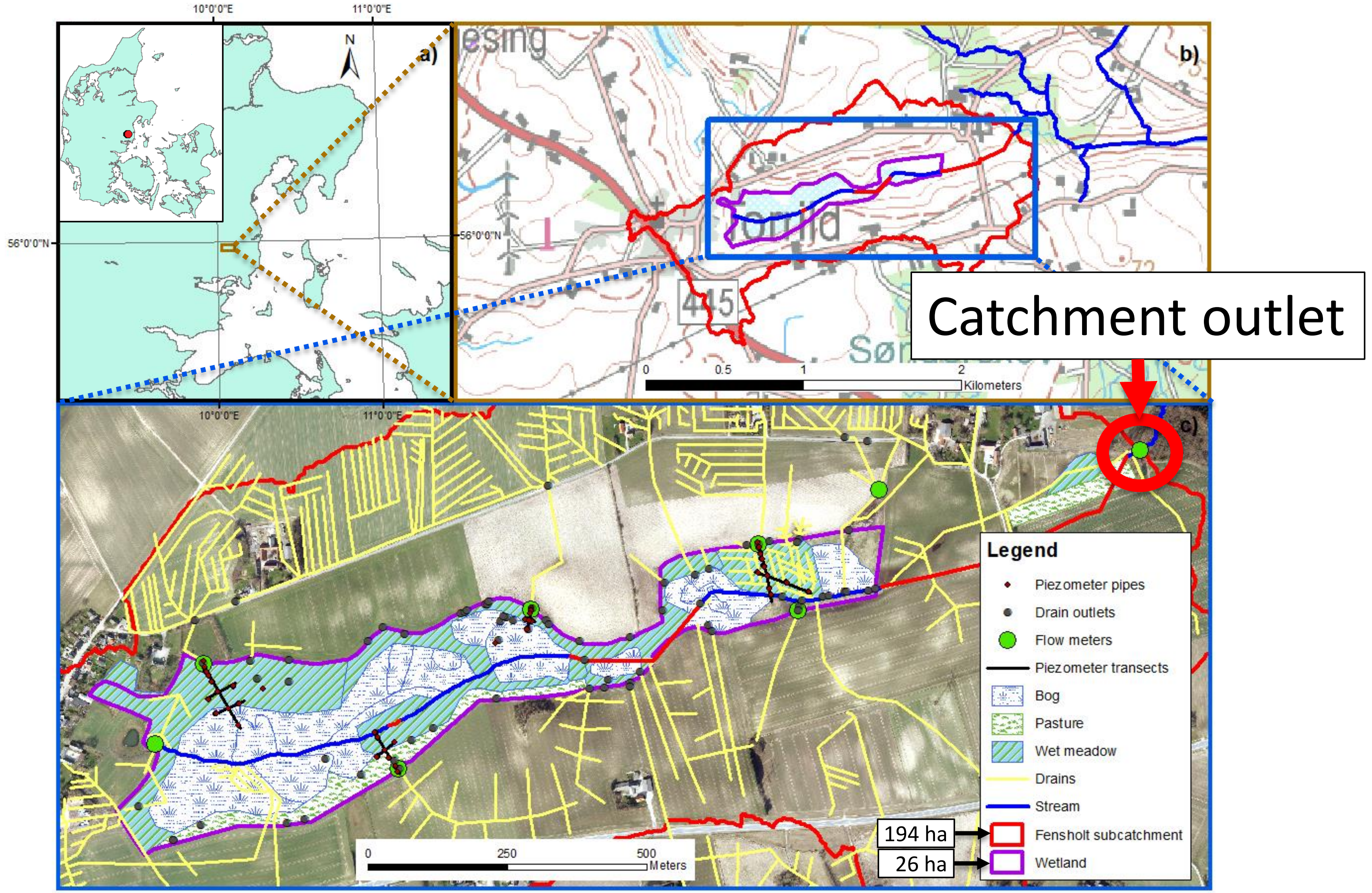
Introduction

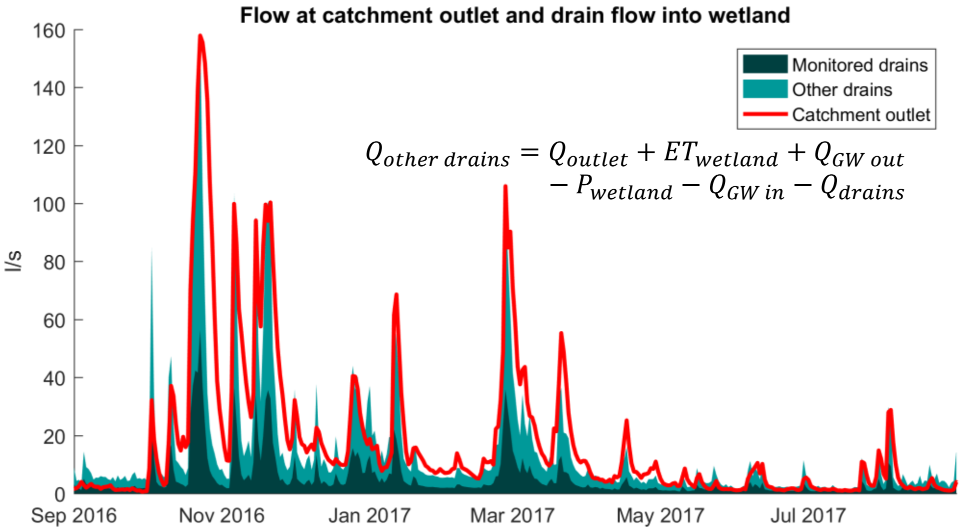
- Uniform nitrogen regulation ⇨ spatially differentiated regulation
- Identification of robust and vulnerable areas
- Influence of riparian lowlands?



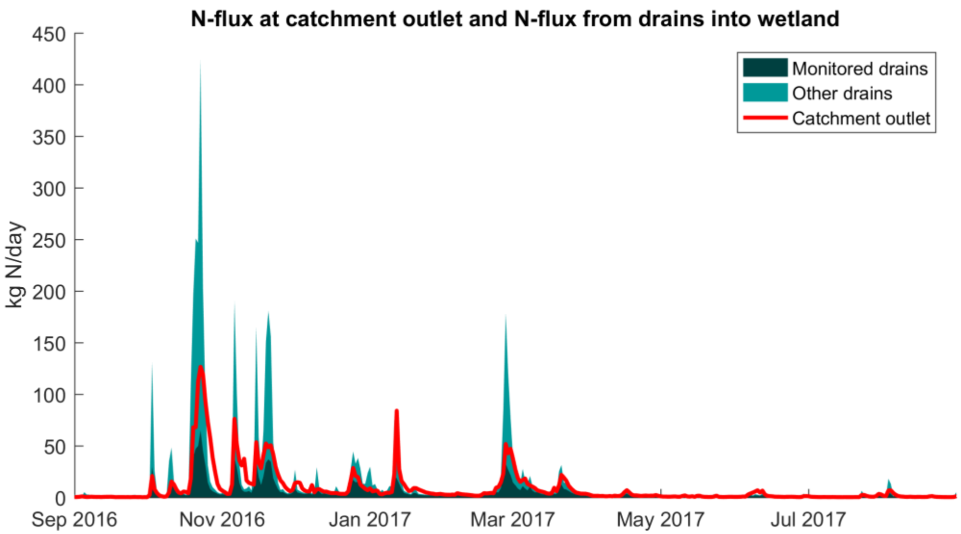
The Fensholt study site – a riparian lowland



Results – catchment total

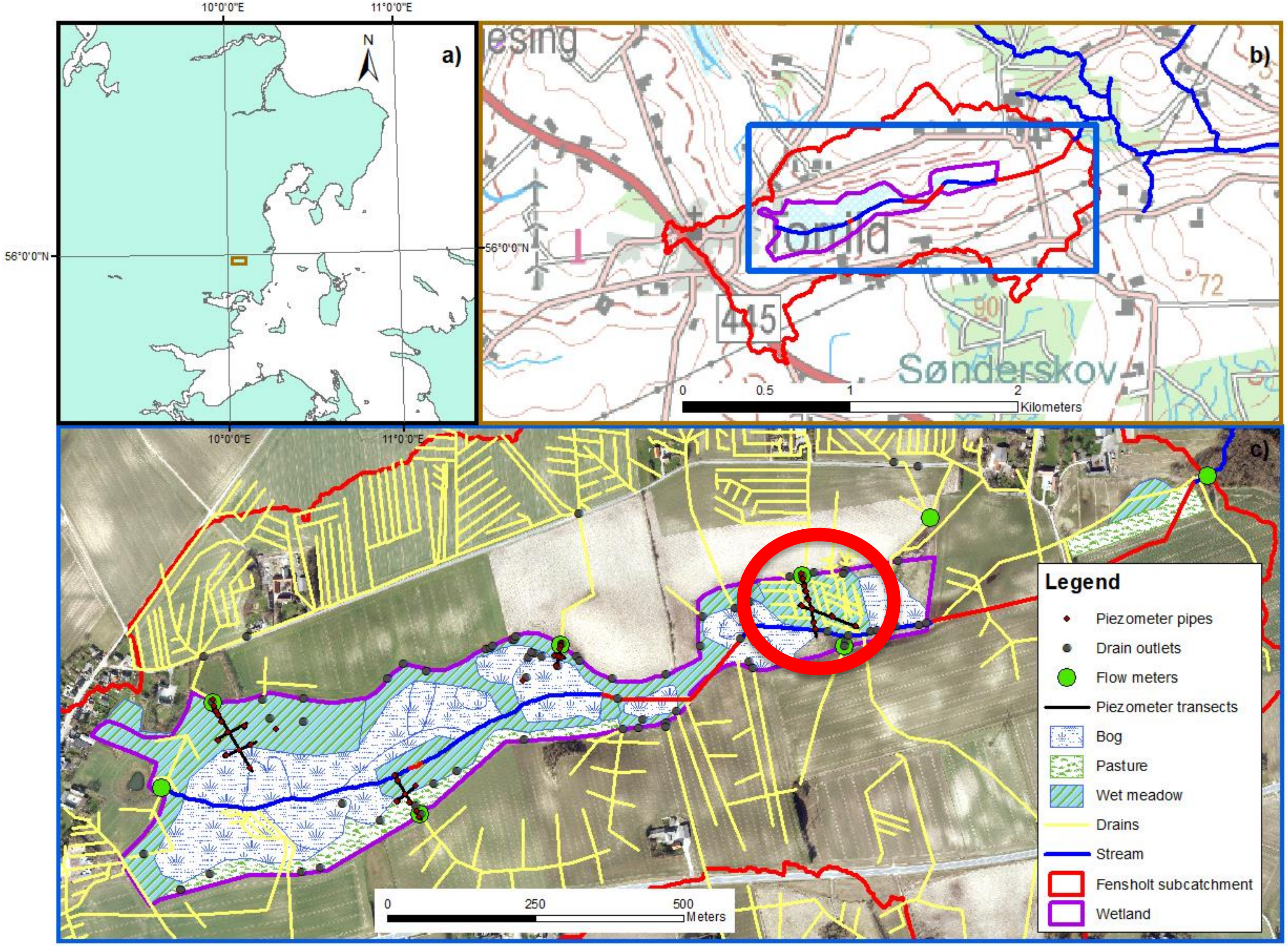


		Flow [1000 m³/yr]	N-flux [kg/yr]
Input to wetland	Unmonitored drains / other sources	295	3485
	Precipitation on wetland (atm. dep.)	225	356
	Monitored drains	161	1739
	Groundwater inflow in hillslope	30	194
	Sum in	**711**	**5774**
Output from wetland	Catchment outlet	558	3093
	Evapotranspiration from wetland	144	0
	Seepage to deeper groundwater	9	0
	Sum out	**711**	**3093**

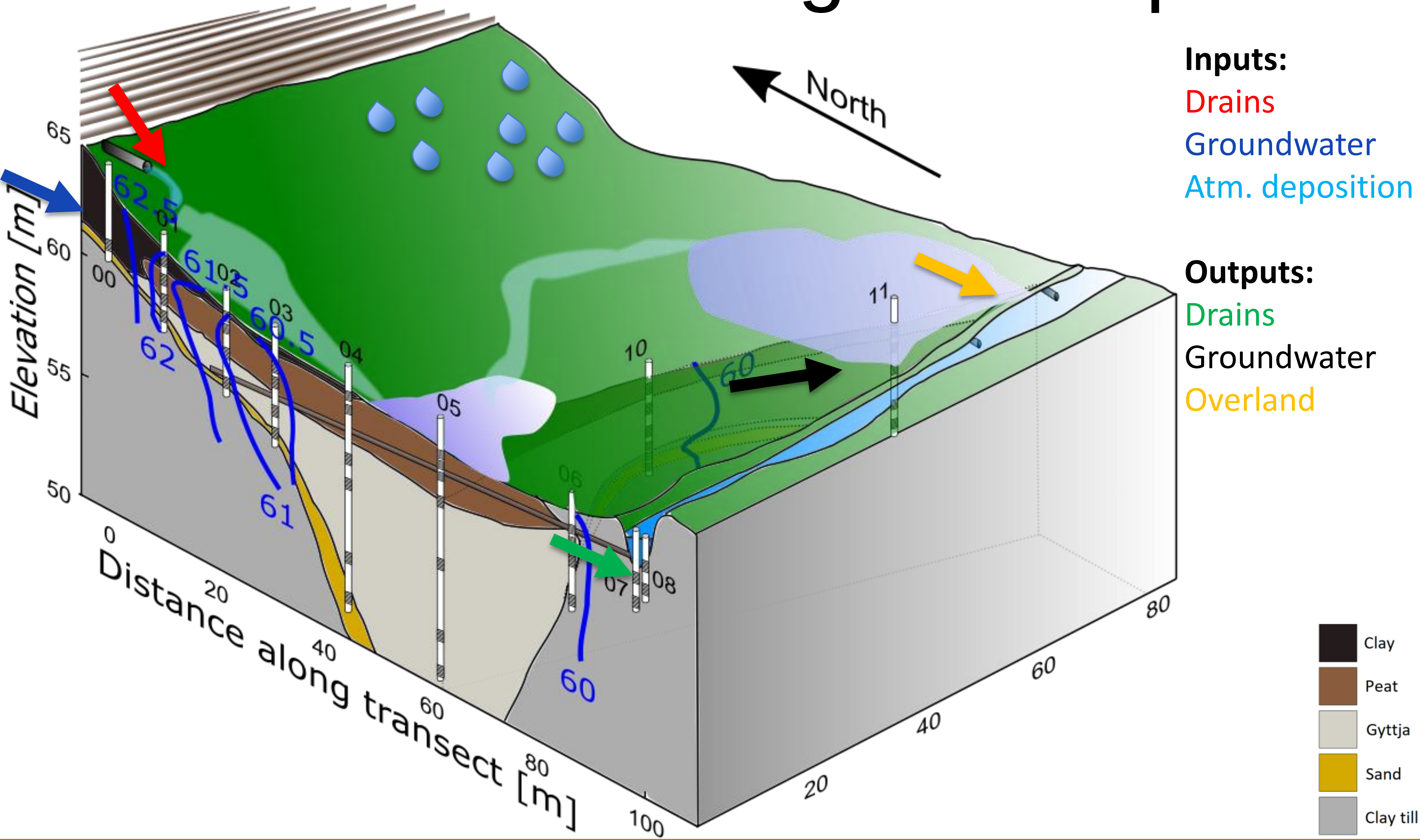


Nitrogen removal = 2682 kg/yr
= **46 %**
= 103 kg N/ha wetland/yr

Fensholt transect 31



Transect 31 – Nitrogen flow paths

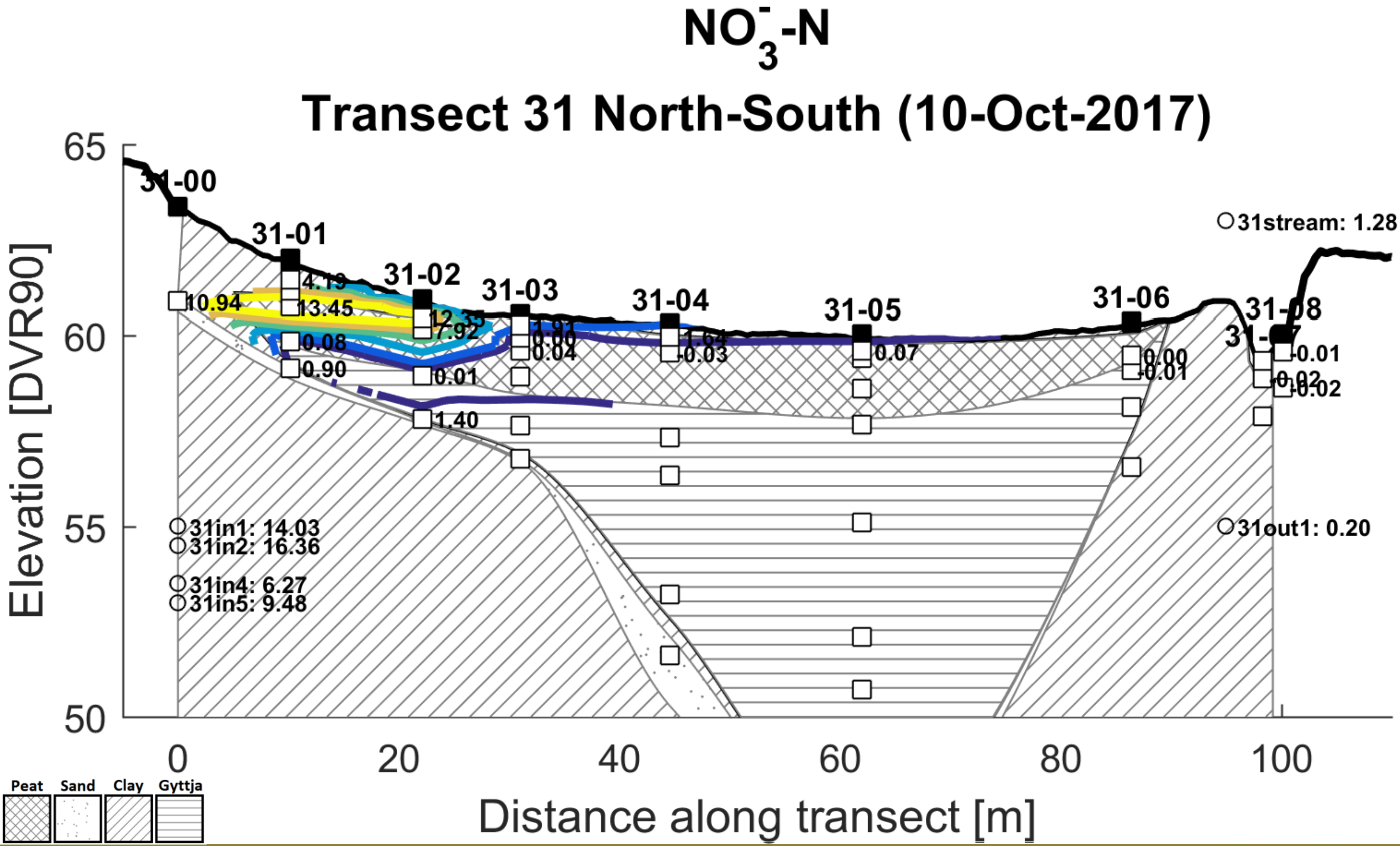


Inputs:
Drains
Groundwater
Atm. deposition

Outputs:
Drains
Groundwater
Overland

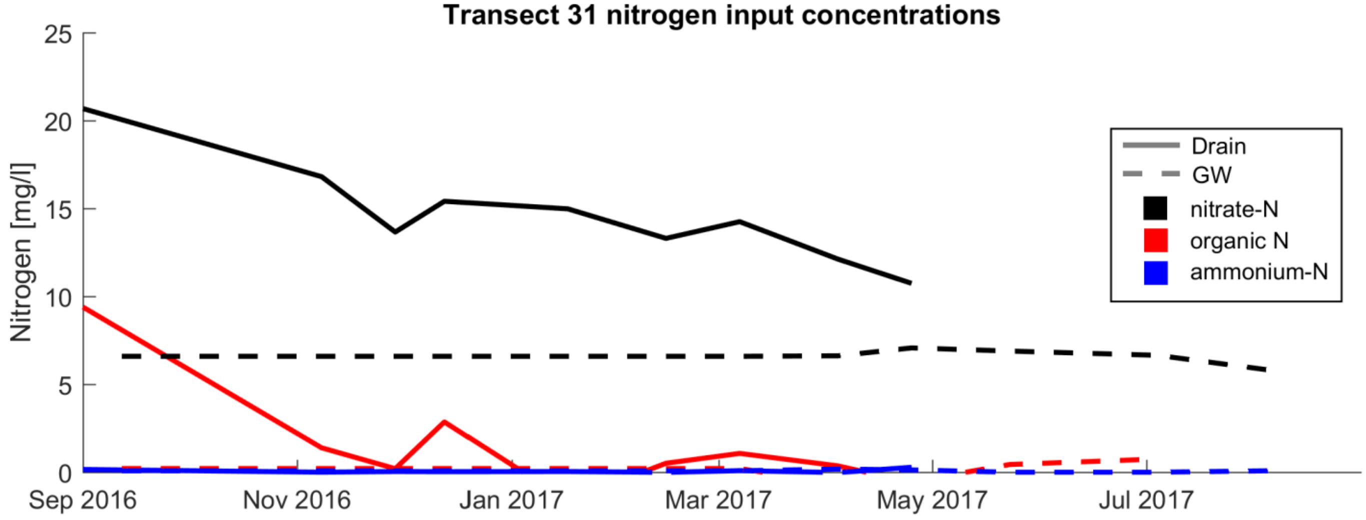
Transect 31 – Movement of nitrate

Sep. 13th 2016 | Oct. 26th 2016 | Nov. 8th 2016 | Nov. 29th 2016 | Dec. 13th 2016 | Jan. 17th 2017 | Feb. 14th 2017 | Mar. 7th 2017 | Apr. 4th 2017 | Apr. 25th 2017 | May 23rd 2017 | Jul. 4th 2017 | Aug. 8th 2017 | Sep. 26th 2017 | Oct. 10th 2017

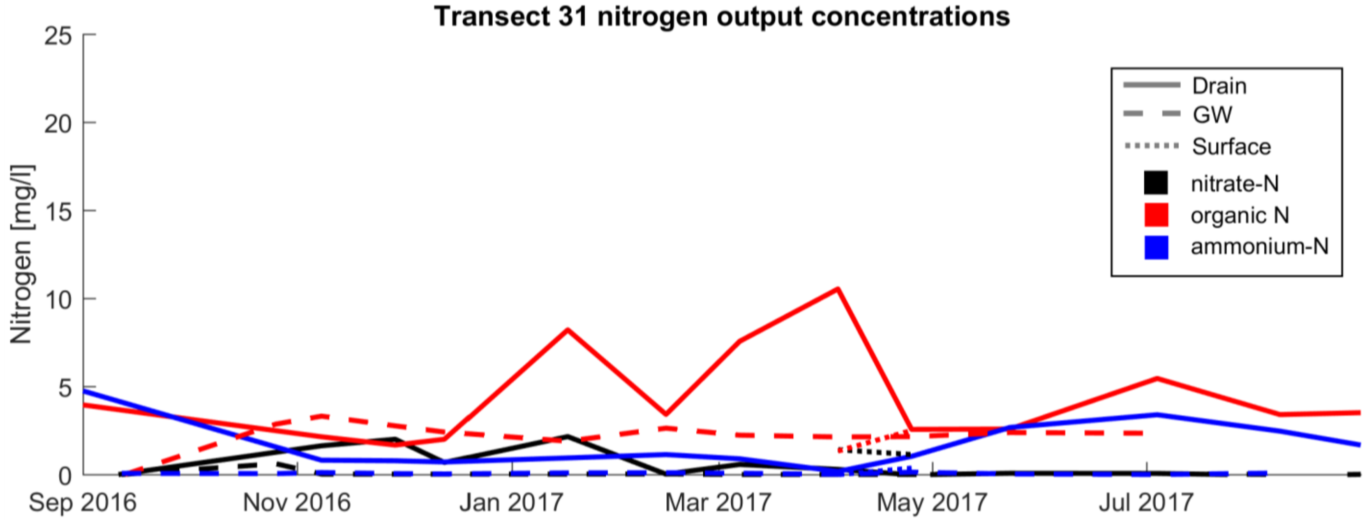


Transect 31 – Nitrogen transformation

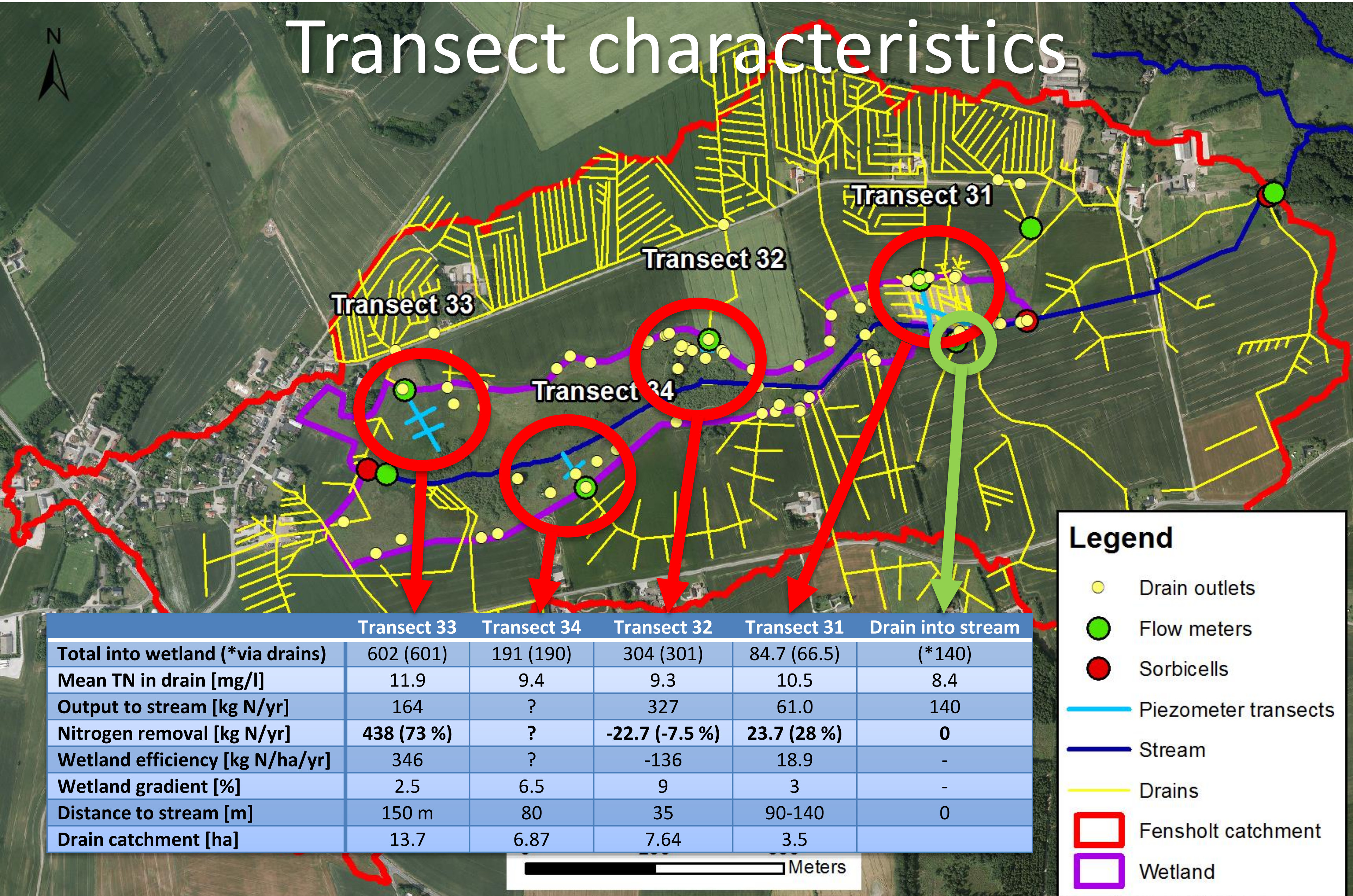
In:



Out:



Transect characteristics



	Transect 33	Transect 34	Transect 32	Transect 31	Drain into stream
Total into wetland (*via drains)	602 (601)	191 (190)	304 (301)	84.7 (66.5)	(*140)
Mean TN in drain [mg/l]	11.9	9.4	9.3	10.5	8.4
Output to stream [kg N/yr]	164	?	327	61.0	140
Nitrogen removal [kg N/yr]	**438 (73 %)**	**?**	**-22.7 (-7.5 %)**	**23.7 (28 %)**	**0**
Wetland efficiency [kg N/ha/yr]	346	?	-136	18.9	-
Wetland gradient [%]	2.5	6.5	9	3	-
Distance to stream [m]	150 m	80	35	90-140	0
Drain catchment [ha]	13.7	6.87	7.64	3.5	

Conclusions

- Riparian lowlands may be either sources or sinks for nitrogen
- Infiltration is essential for nitrate transformation
  ➔ Controlling factors:
  - Distance from drain outlet to stream
  - Topographical gradient
  - Infiltration area
  - Hydraulic conductivity of peat
  - Hydraulic loading

Thank you

see more at trends.nitrat.dk

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