TARGETED ENVIRONMENTAL MITIGATION OF AGRICULTURAL DRAINAGE LOSSES

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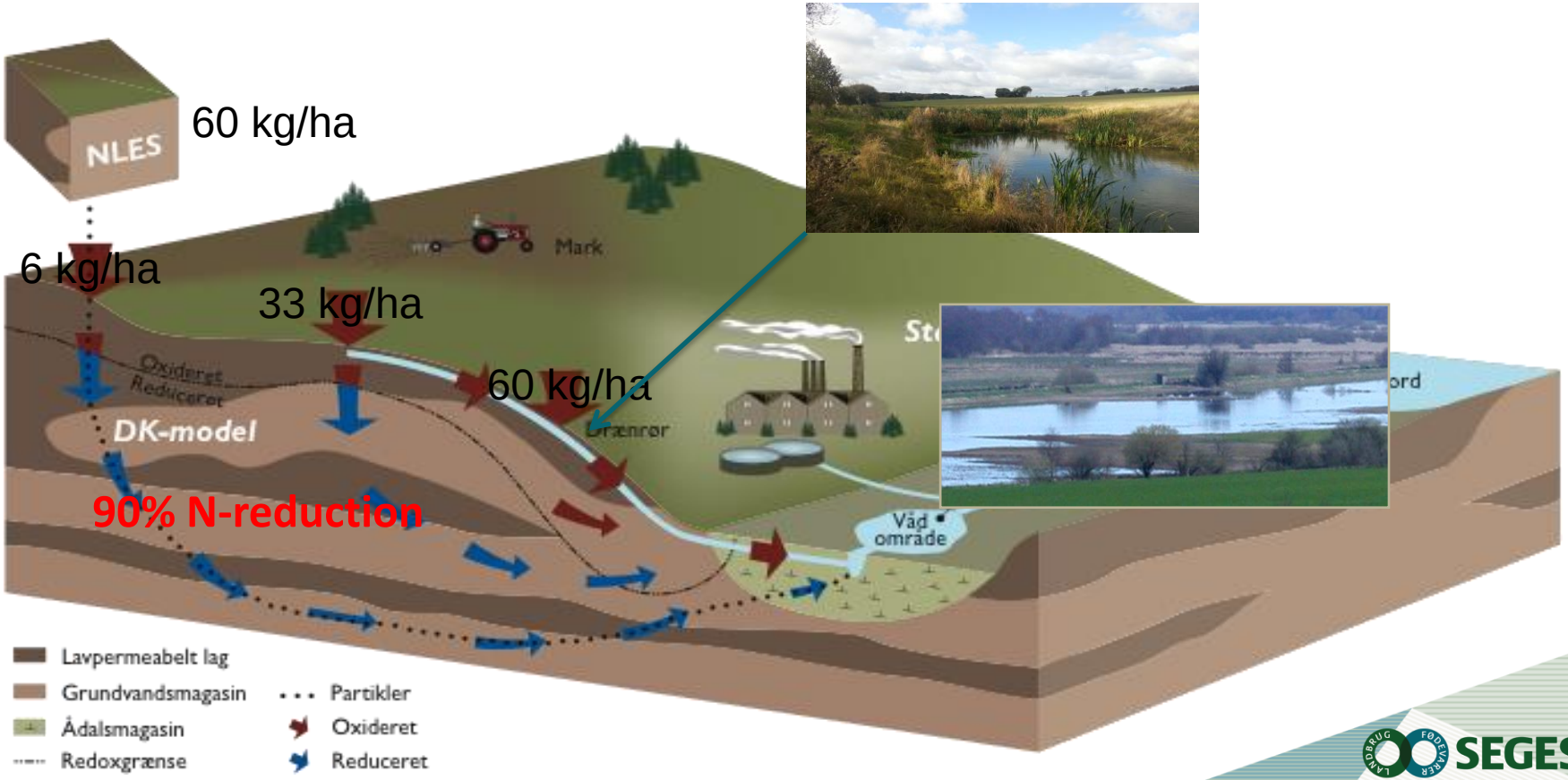
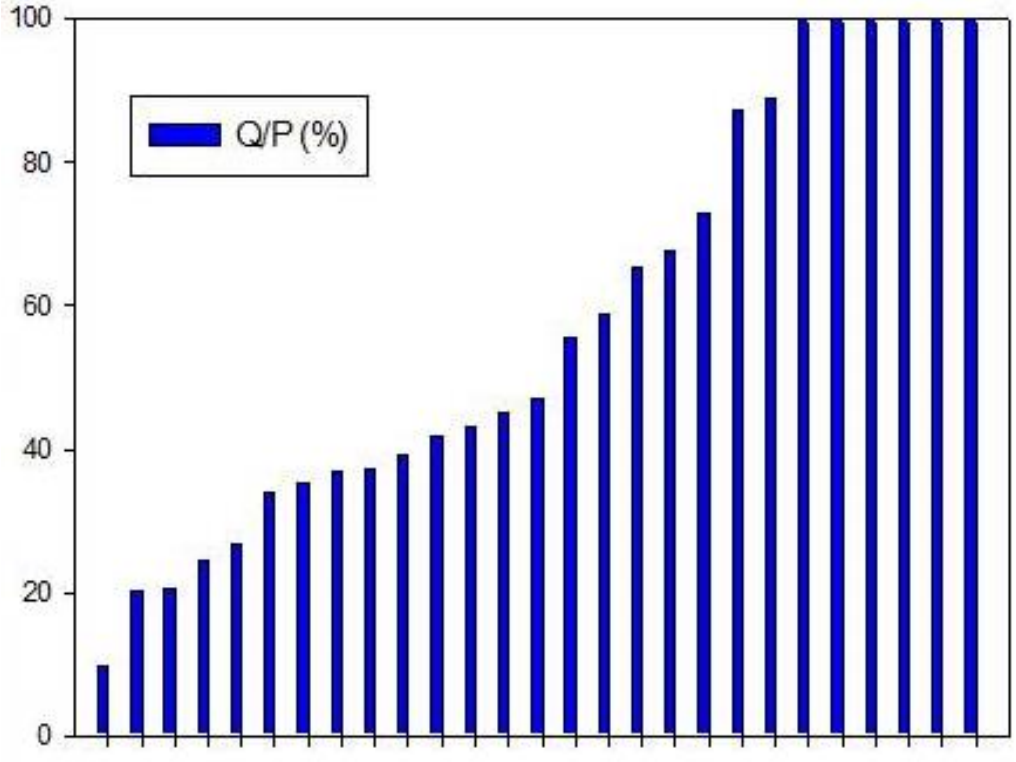
Rostock, December 6, 2017

TARGETED ENVIRONMENTAL MITIGATION



DRAINAGE DISCHARGE PERCENTAGE

Drainage dominated



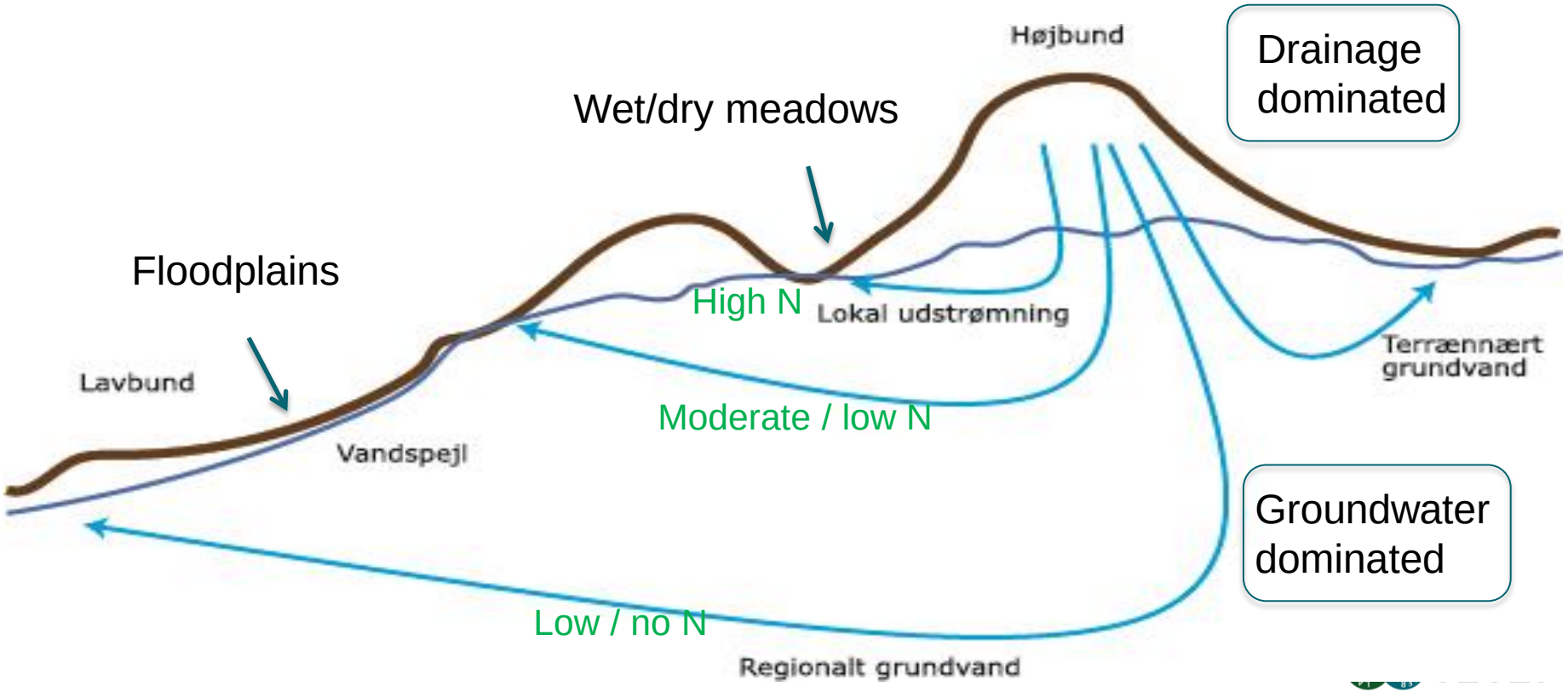
Groundwater dominated

Tile-drained fields
Clay-content >11%

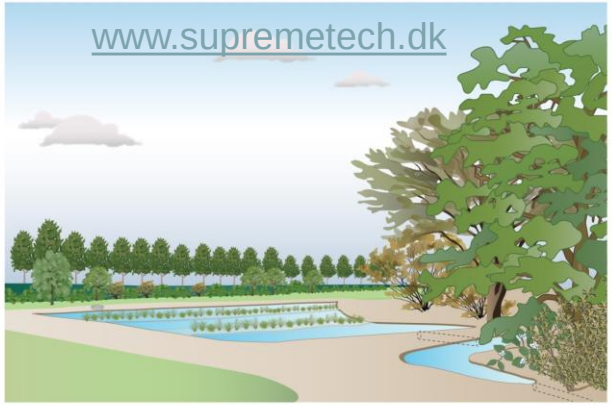
www.idrain.dk

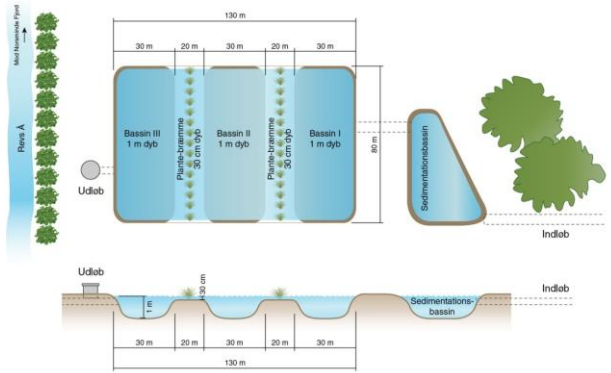
Iversen et al

CATCHMENT ANALYSIS – WETLAND SUITABILITY



SURFACE-FLOW CONSTRUCTED WETLANDS

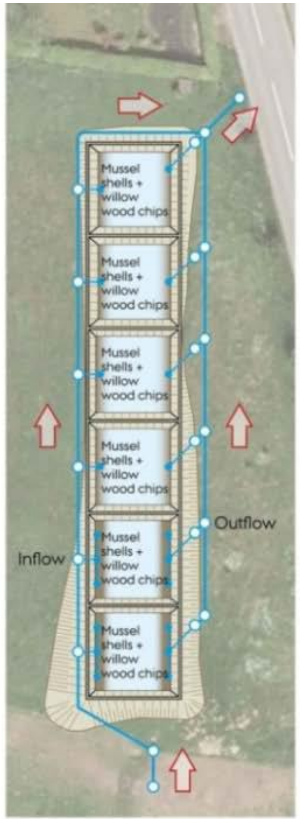


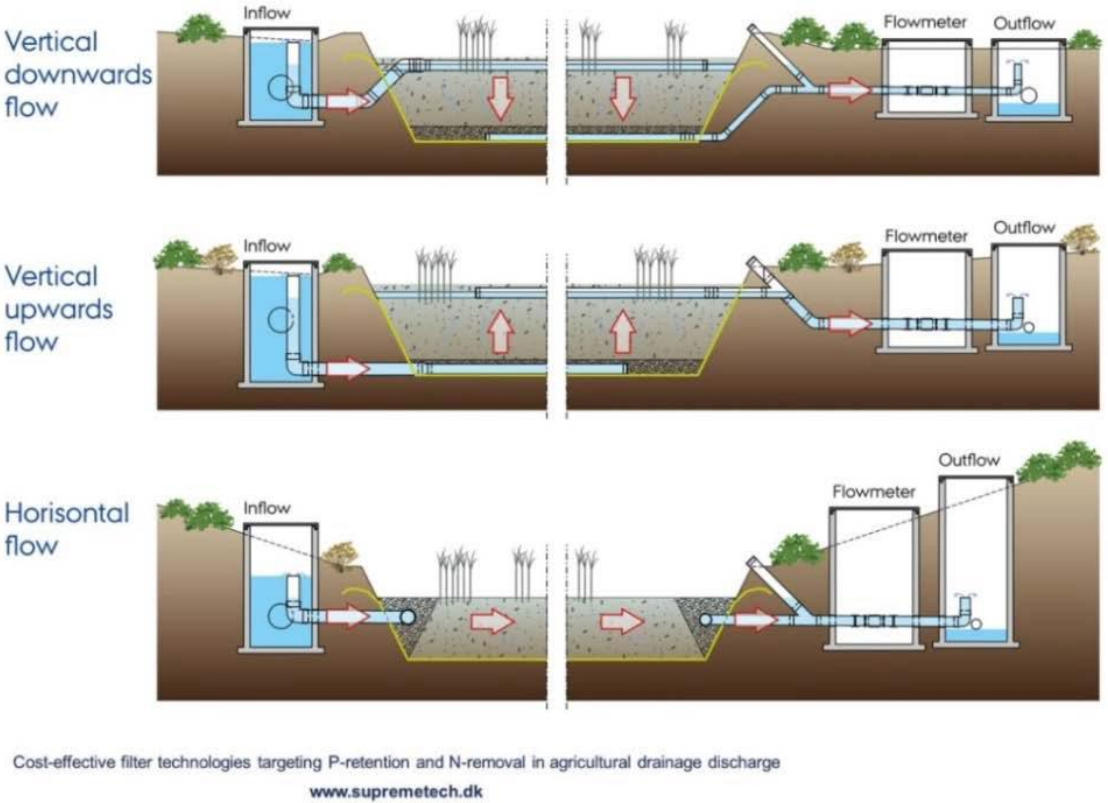


Size: 1% of drained catchment
Yearly N-reduction: 20-30%
Yearly P-reduction: 30-80%
Sediment retention

Kjærgaard, C., Hoffmann, C.C., Gertz, F., Iversen, B.V. 2017.
Minivådområder – et nyt kollektivt virkemiddel. Vand & Jord, nr 3, s. 84-88.

SUBSURFACE-FLOW CONSTRUCTED WETLANDS





www.supremetech.dk

Hoffmann, C.C., Kjærgaard, C. 2017. Kvælstoffjernelse i matricevådområder. Vand & Jord, nr 3, s. 93-96.

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SUBSURFACE-FLOW CONSTRUCTED WETLANDS

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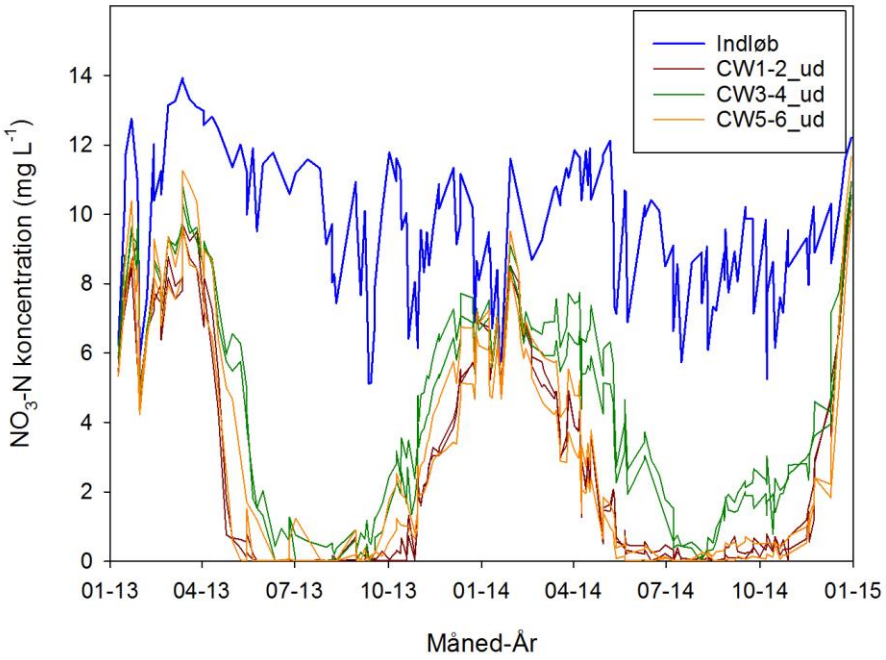
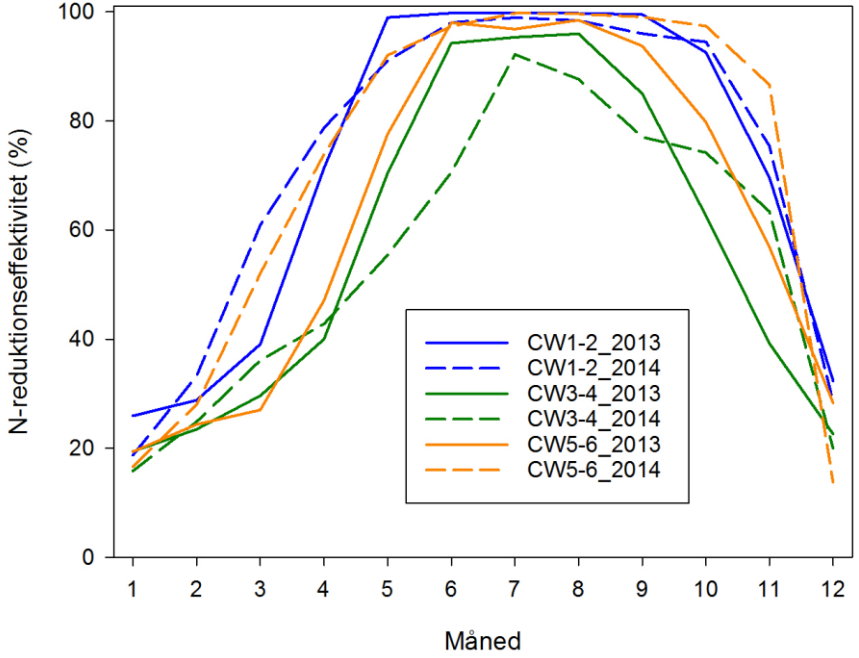


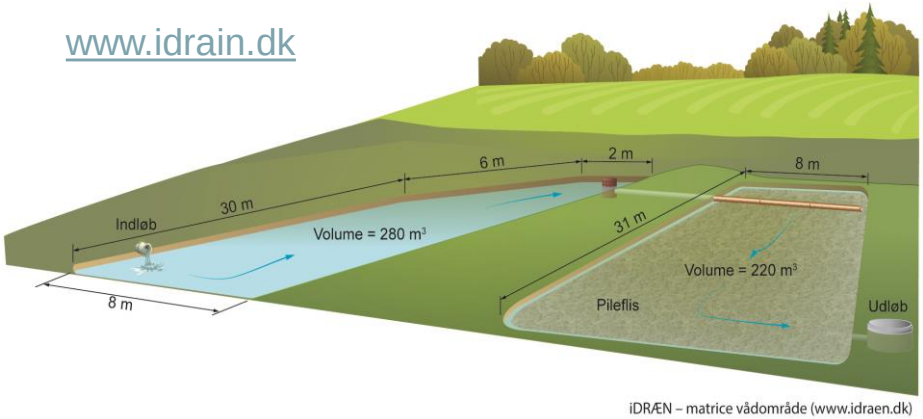
Modelling N-reduction: N-red ~f (temp, HRT)



Hoffmann, C.C., Kjærgaard, C. 2017. Kvælstoffjernelse i matricevådområder. Vand & Jord, nr 3, s. 93-96.

OPTIMIZING N-REMOVAL IN SUBSURFACE-FLOW CW'S

www.idrain.dk



iDRÆN – matrice vådområde (www.idraen.dk)

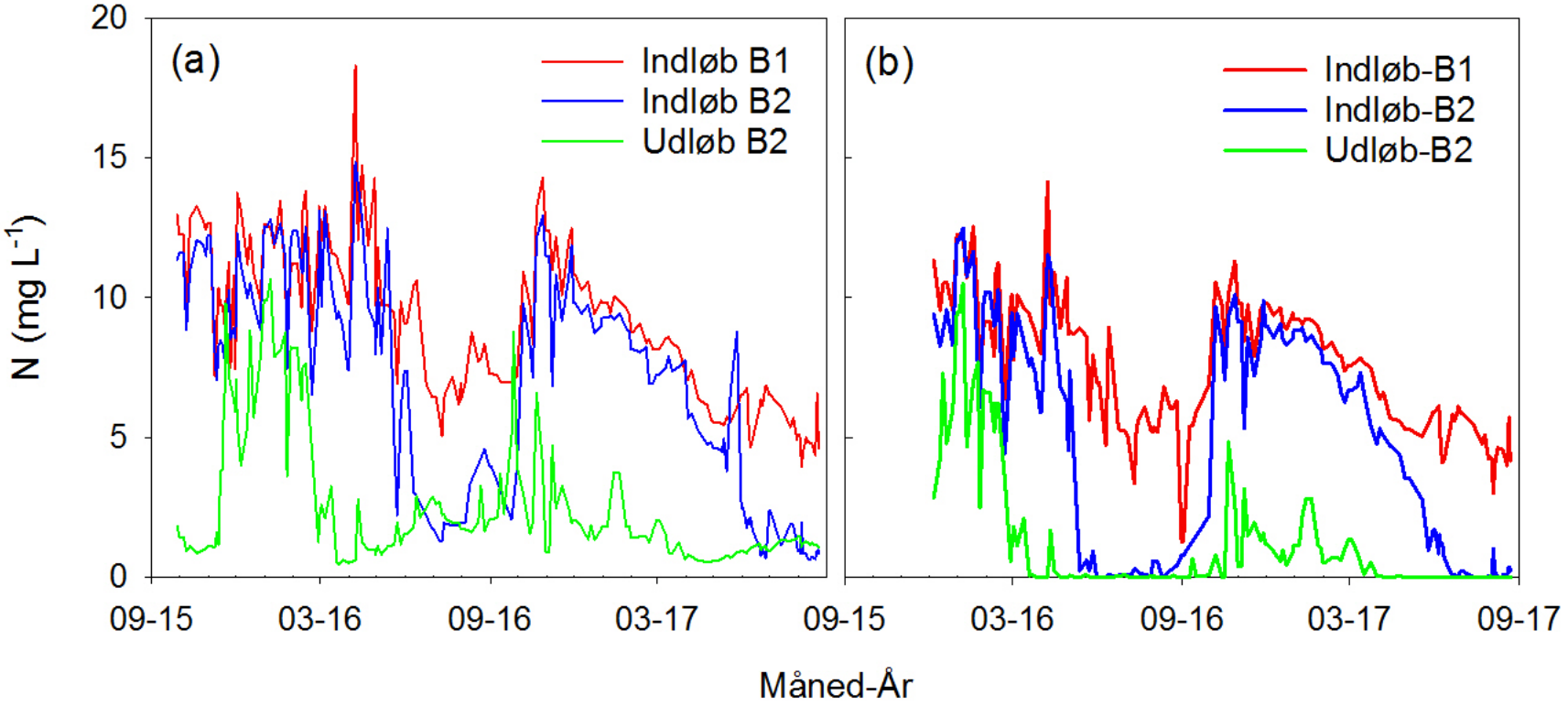

Photo: Carl Christian Hoffmann


Photo: Charlotte Kjærgaard

Storage pond
Woodchips filter-bed
Size: 0,2-0,25% of drained catchment

Hoffmann, C.C., Kjærgaard, C. 2017. Optimeret kvælstoffjernelse i matricevådområde. Vand & Jord, nr 3, s. 101-105.

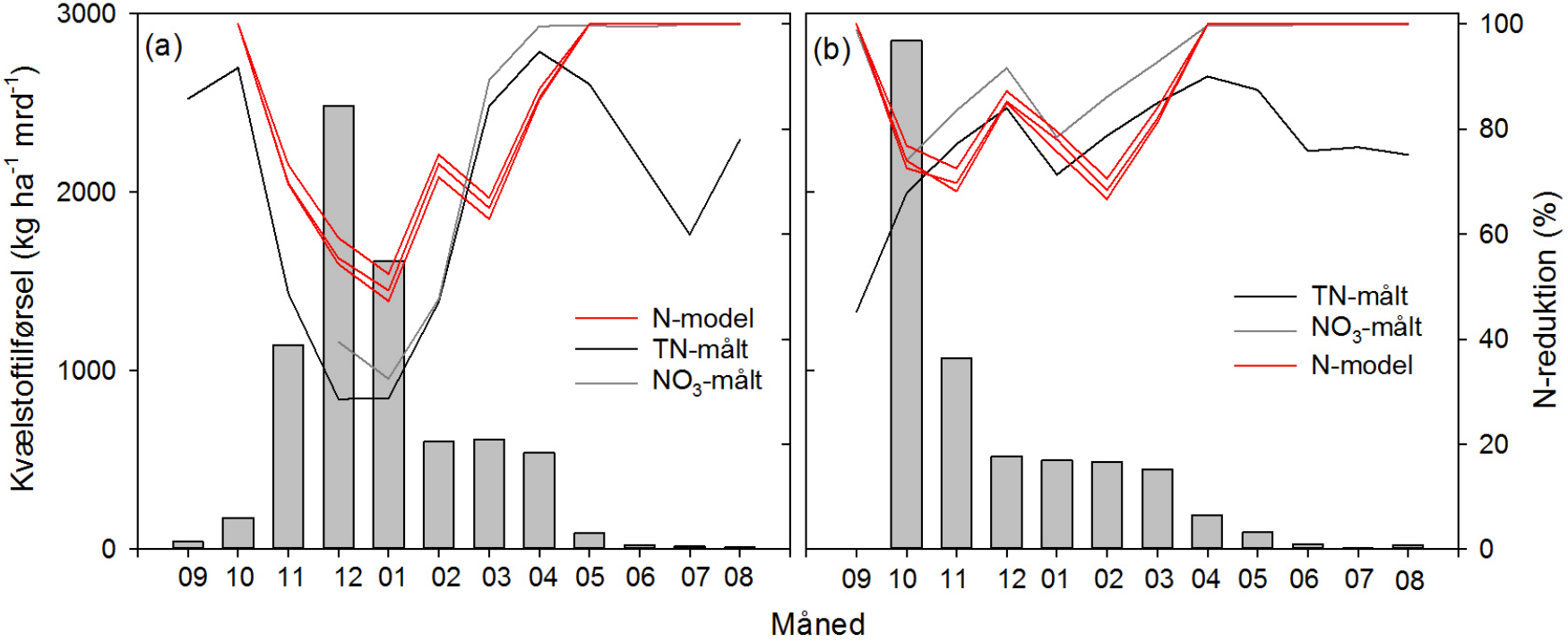
SUBSURFACE-FLOW CONSTRUCTED WETLANDS



Hoffmann, C.C., Kjærgaard, C. 2017. Optimeret kvælstoffjernelse i matricevådområde. Vand & Jord, nr 3, s. 101-105.

www.idrain.dk

SUBSURFACE-FLOW CONSTRUCTED WETLANDS



Hoffmann, C.C., Kjærgaard, C. 2017. Optimeret kvælstoffjernelse i matricevådområde. Vand & Jord, nr 3, s. 101-105.

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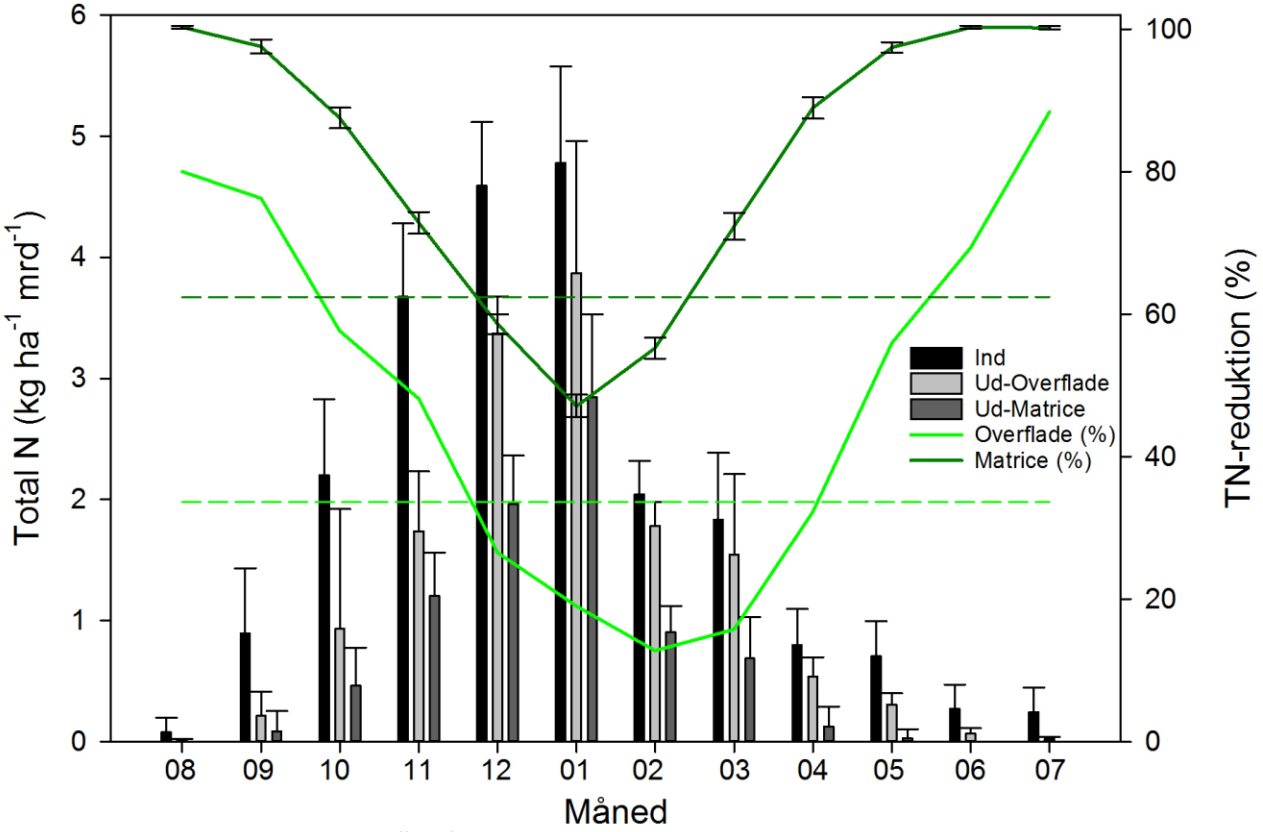
SURFACE VS SUBSURFACE-FLOW CW'S



Kjærgaard, C., Hoffmann, C.C., Iversen, B.V. 2017. Filtre i landskabet øger retentionen. Vand & Jord, nr 3, s. 106-110.

www.idrain.dk

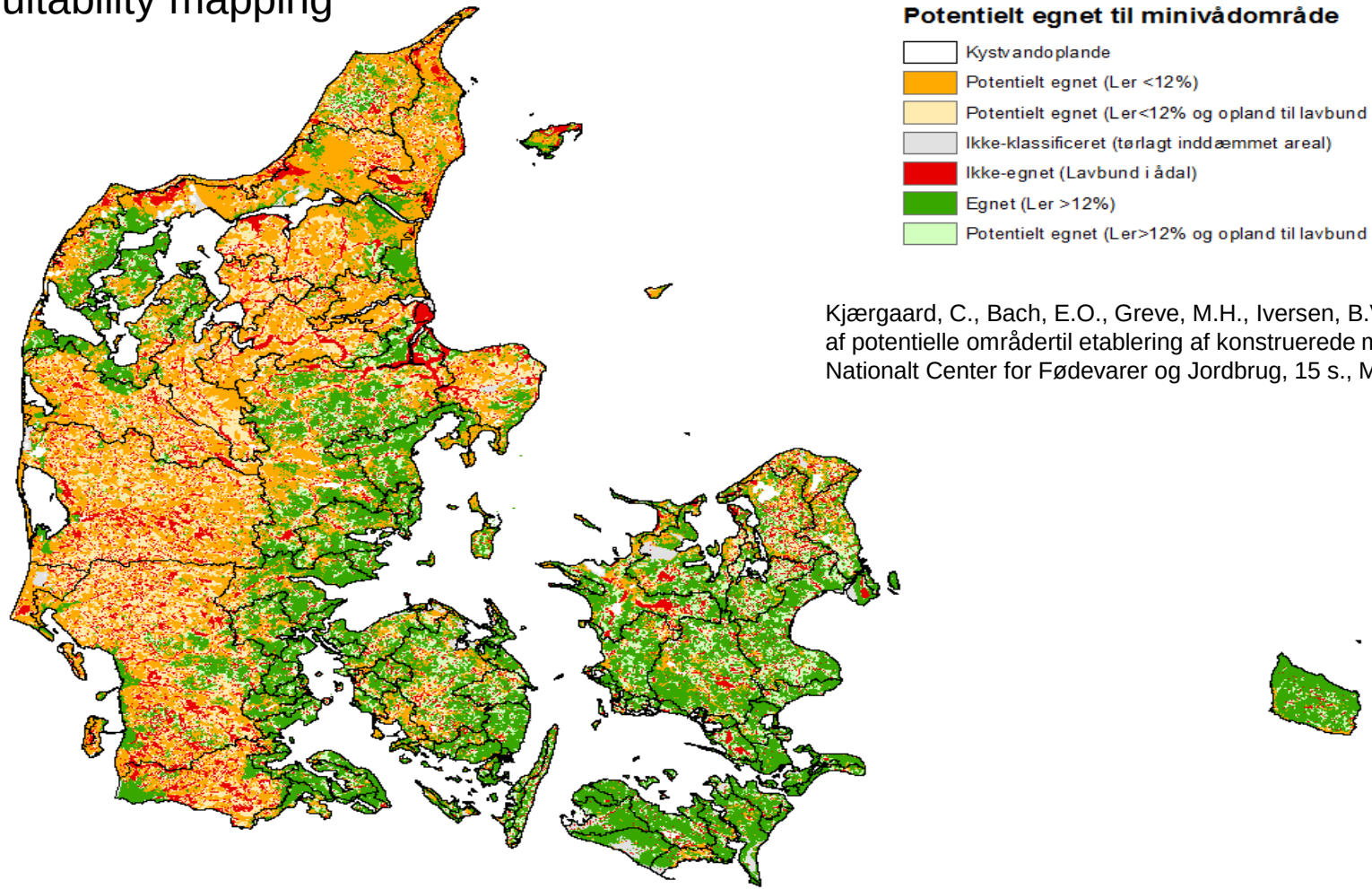
STRATEGY FOR IMPLEMENTING TARGETED MEASURES

Where should we implement targeted drainage measures to ensure a cost-efficient mitigation strategy?

Criteria

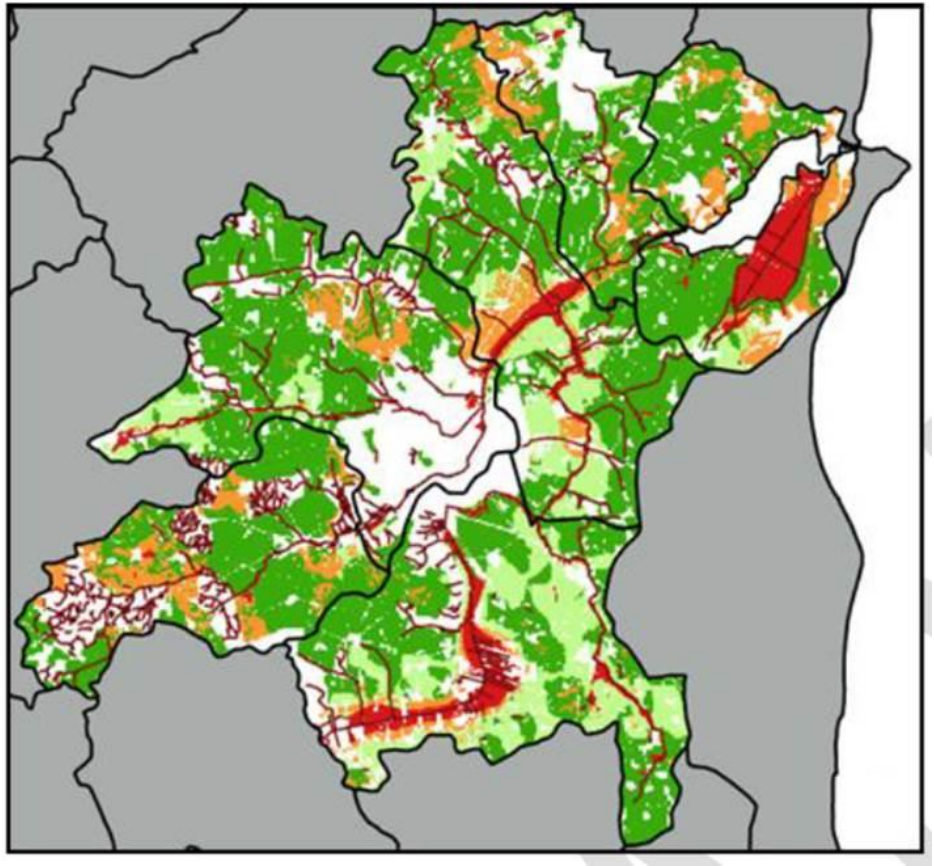
1. Reduction requirement in target recipients
2. Drainage discharge/transport dominated areas
3. Root zone N-losses quantitative significant
4. Quantitative environmental impact on coastal water (N)

Suitability mapping



Kjærgaard, C., Bach, E.O., Greve, M.H., Iversen, B.V. 2017. Kortlægning af potentielle områdertil etablering af konstruerede minivådområder. DCA – Nationalt Center for Fødevarer og Jordbrug, 15 s., Maj 2017.

Catchment analysis



Areas suitable for riparian wetlands or constructed wetlands

Sub-catchments	Suitable constructed wetlands (%)	Upland riparian lowland (%)	Riparian lowland (%)
43600028	61	4,4	16
43600041	50	33	11
43600042	75	11	2,5
43600043	61	22	6,2
43600051	73	1,1	0,9
43602599	72	5,4	1,1
Total	**4.815 (63)**	**1.224 (16)**	**541 (7)**

Constructed wetlands

Riparian wetlands

Kjærgaard, C., Hoffmann, C.C., Iversen, B.V. 2017. Filtre i landskabet øger retentionen. Vand & Jord, nr 3, s. 106-110.

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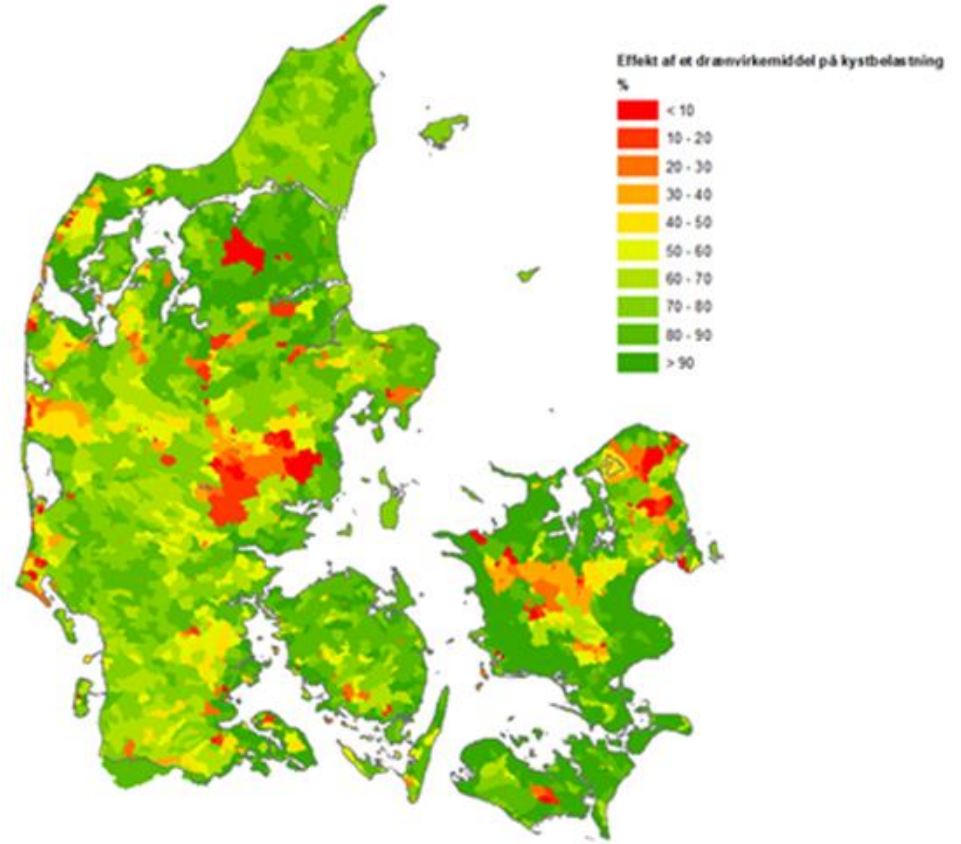
STRATEGY FOR IMPLEMENTING TARGETED MEASURES

Criteria

1. Suitability of agricultural areas (drainage discharge dominated areas)
2. **Root zone N-losses quantitative significant**
3. **Quantitative environmental impact on coastal water (N)**



Kjærgaard, C., Børgesen, C.D. 2017. Udarbejdelse af minivådområdeeffekt (kg N pr ha minivådområde) på ID15-oplandsniveau. DCA – Nationalt Center for Fødevarer og Jordbrug, 16 s, nr. 2017-760-000042, 7. april, 2017.

NATIONAL PRIORITY MAP CONSTRUCTED WETLANDS