RIPARIAN VEGETATION DATA – DENMARK

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RIPARIAN VEGETATION DENMARK – DATA SETS

- Data sets available for characterisation of status, pressures, impacts:

1) Two small research data sets from 1990's

2) National monitoring 2004-2009
   - Plant communities overall 517 riparian sites
   - Plant communities in 47 sites without agricultural production

   - No current monitoring in riparian areas

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5 JULY 2018 | TENNA RIIS
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ISSUES IN RIPARIAN AREAS IN DENMARK

Landuse – agricultural activities (62%)

Drainage requirements – channelsation, incised,

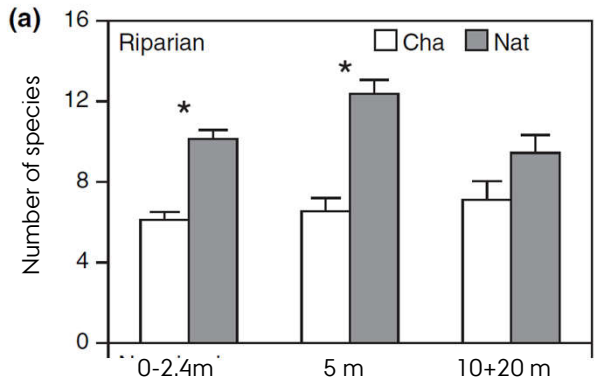
Eutrophication

- Plant diversity and species composition
- Overall diversity
- Ecosystem functioning – nutrient cycling, carbon cycling...

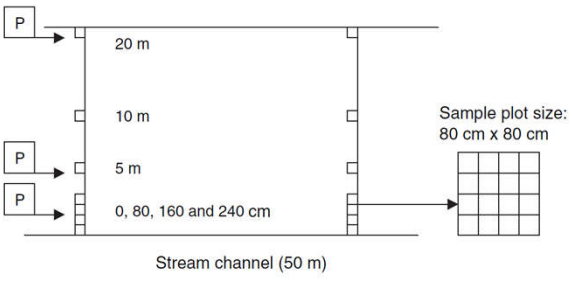
What do we know?
What do we want to know?

1) NUMBER OF RIPARIANS PLANT SPECIES DECLINE IN CHANNELISED STREAMS

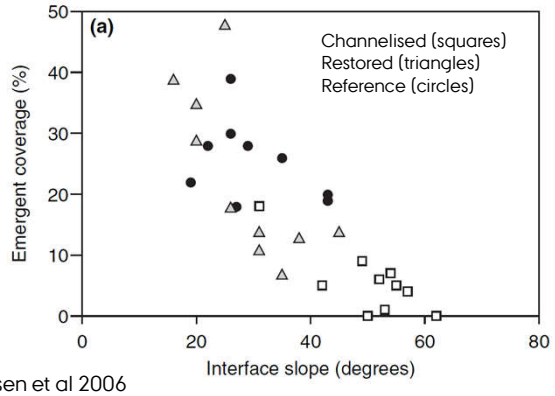
. 18 sites;



Baattrup-Pedersen and Riis, 2005

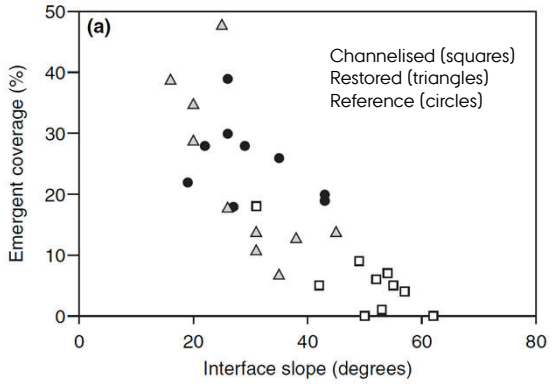


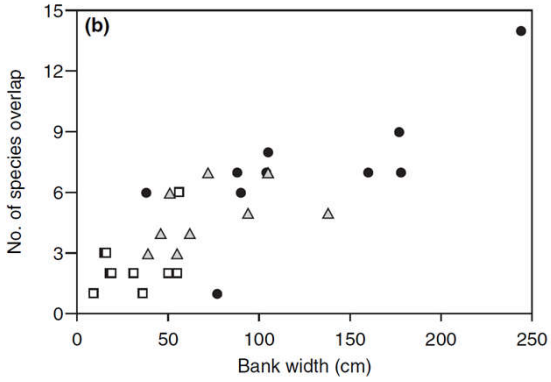
1) MORE EMERGENT GROWTH FORMS WHERE BANK SLOPE IS LESS STEEP



Pedersen et al 2006

1) HIGHER SPECIES OVERLAP WHERE BANK WIDTH WITHOUT CROPPING IS LARGER





Pedersen et al 2006

2) NATIONAL MONITORING 2004-2009 BUFFER STRIP PLANT COMMUNITIES

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Structural and functional characteristics of buffer strip vegetation in an agricultural landscape – high potential for nutrient removal but low potential for plant biodiversity

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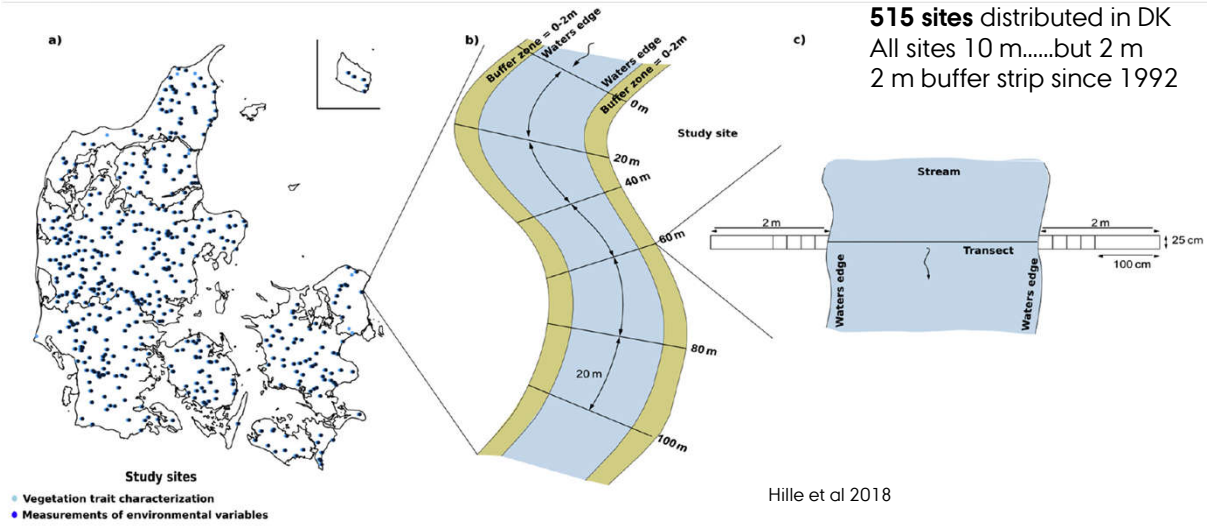
HIGHLIGHTS GRAPHICAL ABSTRACT

2) RIPARIAN MONITORING 2004-2009 – BUFFER STRIPS

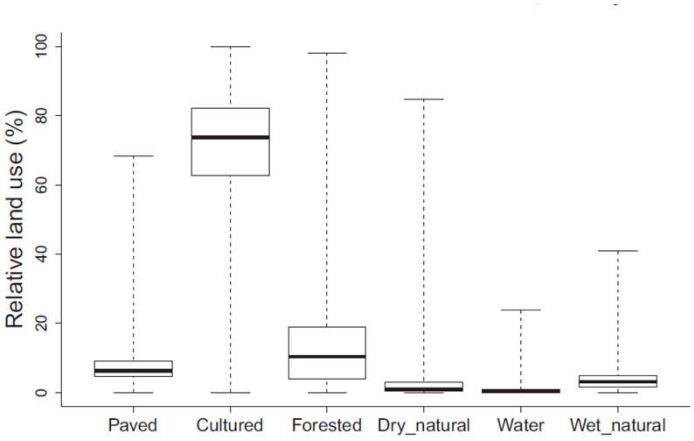


515 sites distributed in DK
All sites 10 m.....but 2 m
2 m buffer strip since 1992

Hille et al 2018

Fig. 1. a) Map of Denmark showing distribution of studied buffer strips. 515 study sites with vegetation trait characterization and 504 with measurements of environmental variables. b)

SITES WERE MAINLY IN CULTURED AREAS



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FLORISTIC QUALITY OF THE STUDIED BUFFER STRIPS WAS GENERALLY LOW

Only **3.3%** of the average number of species in the buffer strips were either endangered, rare, relatively rare or declining and thus, of conservation value

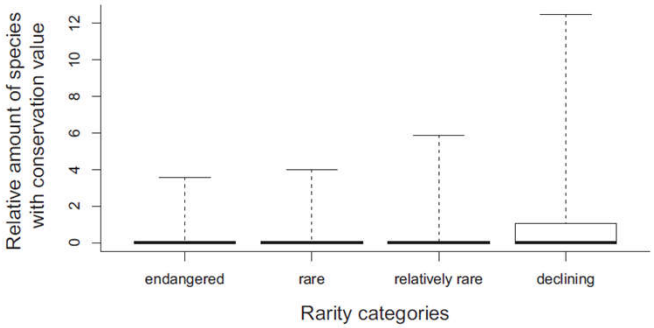
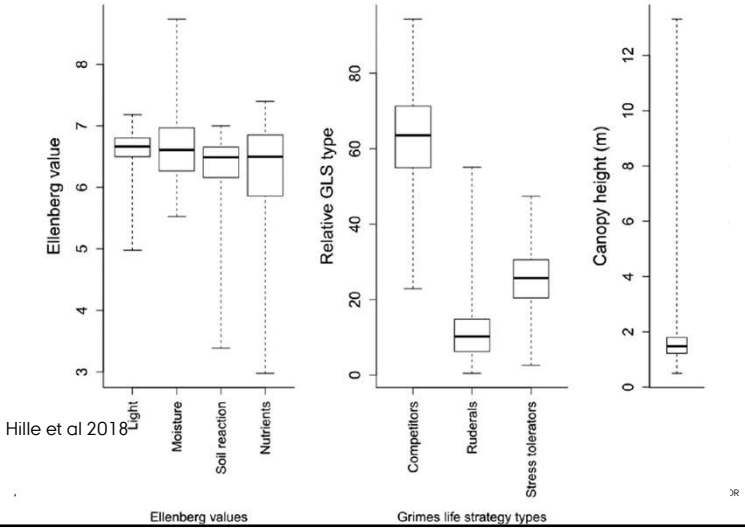


Fig. 2. Median number of species with conservation value found per study site in 515 Danish buffer strips. On average 0.02 endangered, 0.06 rare, 0.18 relatively rare and 0.86 declining species (in total 1.12 species with conservation value) were found per study site, which amounts to only 3.3% of the average number of species observed in buffer strips. Horizontal lines indicate the median, boxes the 25 and 75% percentiles and whiskers the min and max of the data.

Hille et al 2018

PLANT COMMUNITIES IN BUFFER STRIPS WERE CHARACTERIZED BY PRODUCTIVE AND COMPETITIVE SPECIES



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Epilobium hisutum
Filipendula ulmaria
Glyceria maxima
Phalaris arundinacea
Phragmites australis
Solanum dulcamara
Urtica dioica

1) THE ABUNDANCE OF PRODUCTIVE PLANT SPECIES WAS POSITIVELY RELATED TO HIGH INTENSITY LAND USE
2) ABUNDANCE OF STRESS-TOLERANT PLANT SPECIES WAS POSITIVELY RELATED TO LOW INTENSITY LAND USE.

RQL and fourth-corner analyses

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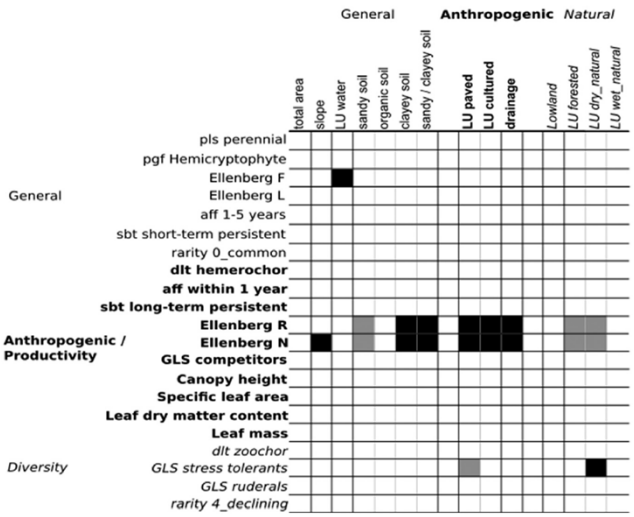
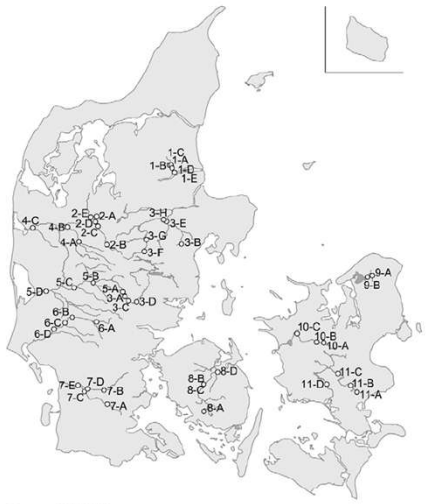


2) NOVANA: RIPARIAN MONITORING 2004-2009
AREAS NOT USED FOR AGRICULTURAL PRODUCTION



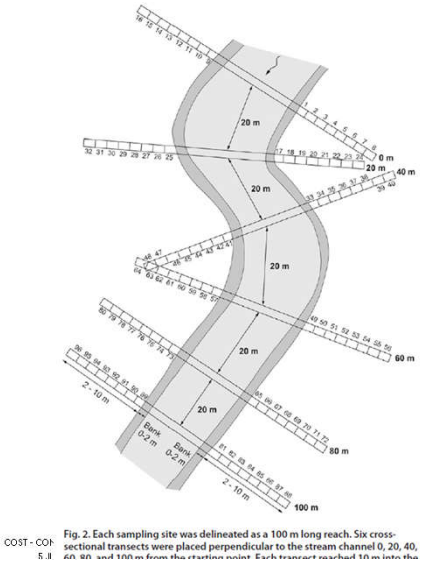


Fig. 2. Each sampling site was delineated as a 100 m long reach. Six cross-sectional transects were placed perpendicular to the stream channel 0, 20, 40, 60, 80, and 100 m from the starting point. Each transect reached 10 m into the

47 sites – subset
1st-5th order
10 m transects

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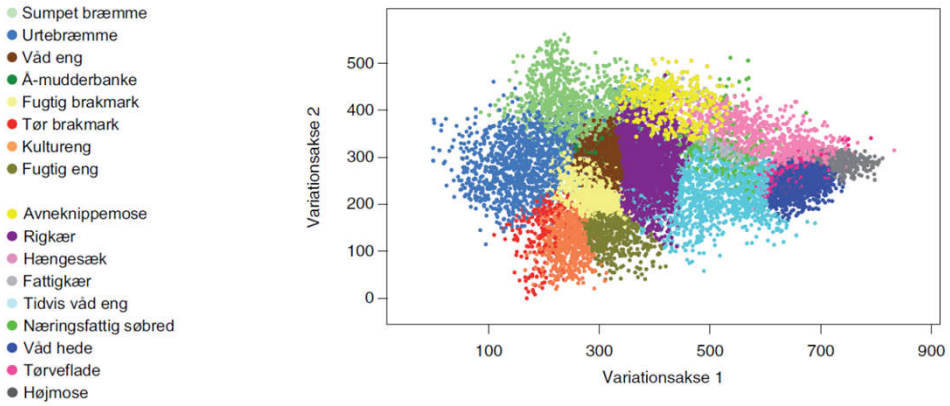
RIPARIAN PLANT COMMUNITIES IN DK:
17 COMMUNITY TYPES FROM SPECIES BASED CLASSIFICATION MODEL – MEADOWS AND FENS



Figur 13. De to vigtigste variationsakser for vegetationen i de 13.113 prøvefelter, der indgår i modellen. For hvert prøvefelt er det mest sandsynlige plantesamfund (model output) angivet.

Nygård et al 2006

DISTRIBUTION ALONG "NATURAL" STREAMS

- 9 of 17 plant communities present (a-i)
- Distinct patterns in relation to stream size and eutrophication
- Larger streams had more plant communities present
- Common/abundant community was eutrophic
- Rare communities had moisture preference

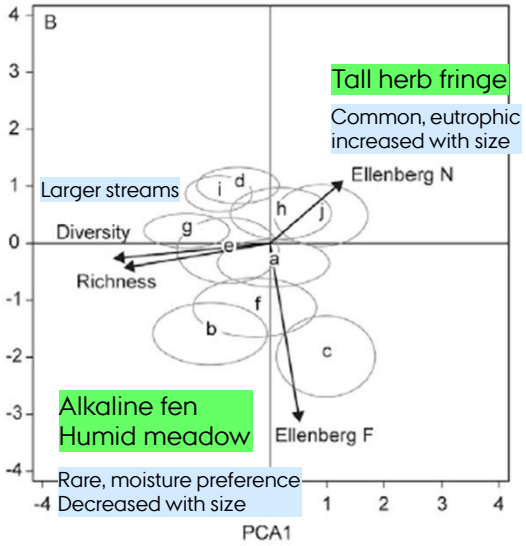


Fig. 3. (A) Detrended correspondence analysis biplot based on presence-absence data of plant species identified in 1798 randomly selected plots in a total of 47 riparian areas. The delineations (a–i)

MAIN CONCLUSIONS FROM CURRENT DATA SETS

- Stream profile (bank slope and width) affects riparian/bank vegetation diversity
- Floristic quality of buffer strips is generally low
- Larger streams have higher community diversity

- Plant communities in buffer strips/banks are characterized by productive and competitive species

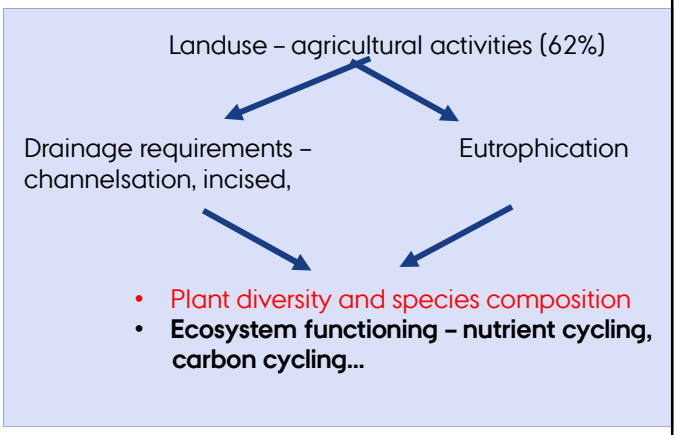
- Abundance of productive plant species was related to high intensity land use and abundance of stress-tolerant plant species was positively related to low intensity land use.

PERSPECTIVES

We know: Large effects on plant diversity and composition on banks

Next – what do we want to do:

- To classify effects from RV status:
  How to assess RV status including pressures?
- To assess impact: Plant communities' effect on function on banks and riparian areas
- Is diversity and function reversible via restoration ?



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