

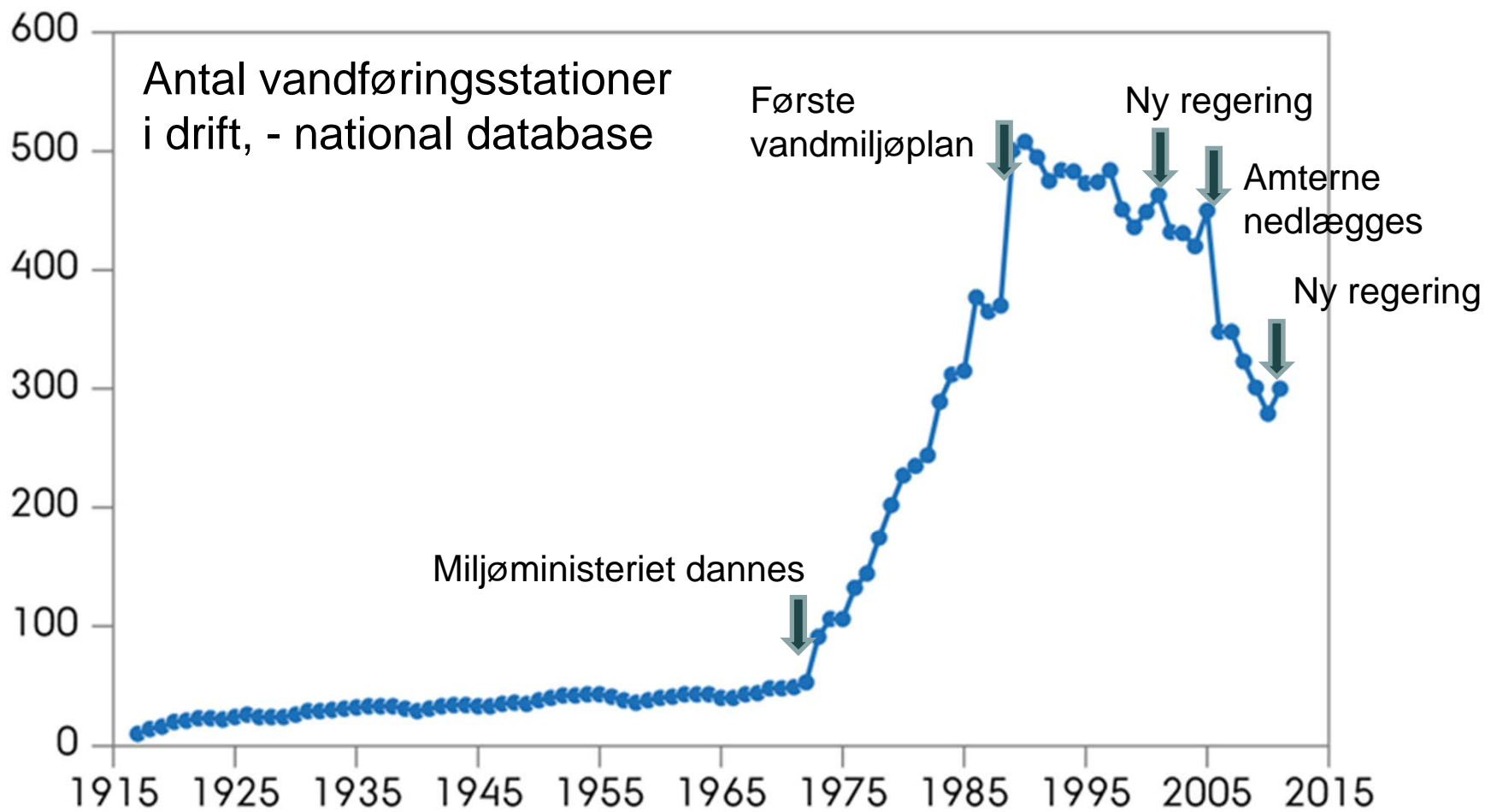


# Hydrometrisk overvågning status og behov





- › **Naturstyrelsen (7 lokale enheder) har ansvar for:**
  - › **Stationsdrift (ca. 280)**
  - › **Vandføringsmålinger (ca. 2600 pr år)**
  - › **Databehandling og beregninger**
  - › **Kvalitetssikring**
  
- › **Aarhus Universitet, Dansk Center for Miljø og Energi (DCE) har ansvar for:**
  - › **Fælles fagsystem til databehandling (HYMER)**
  - › **National database (ODA)**
  - › **Rapportering**
  - › **rådgivning og support**
  - › **Kvalitetssikring**
  
- › **Kommunerne ???**

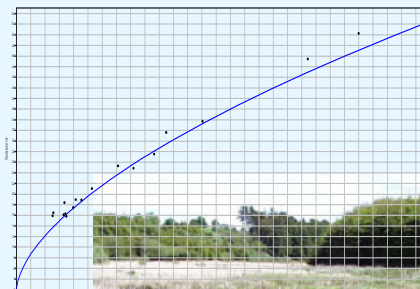






## DATABEHOV

Vandmiljøovervågning



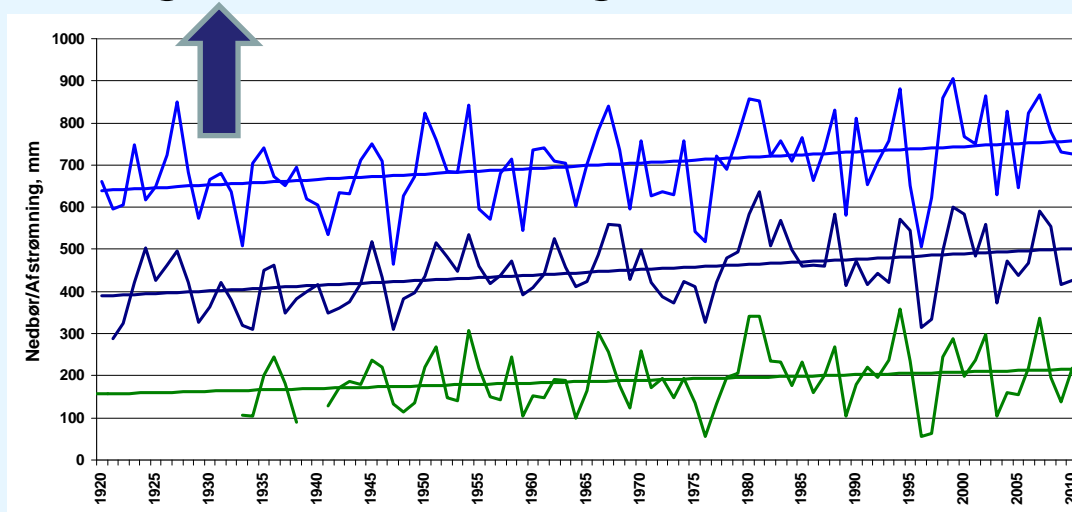
Vandløbsadministration  
Regulativer  
Vedligeholdelse



Vandløbs- og vådområderestaurering



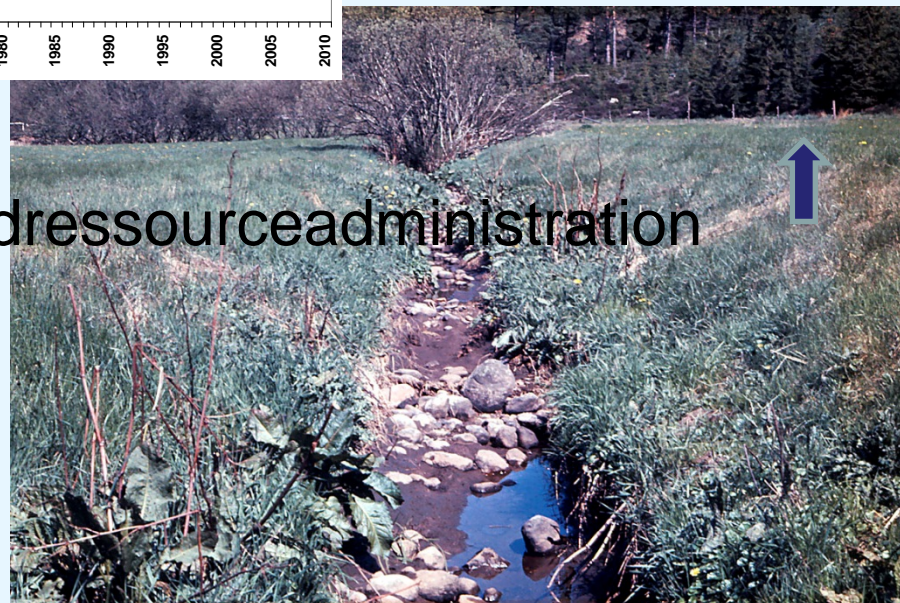
# Forskning, klimaudvikling, vandbalance etc.



Undervisning



Vandressourceadministration







## Øversvømmelsesrisiko/kortlægning



Vandplaner / indsatsplaner



## Afvandingsprojekter



## Vandkraftpotentiale





## IGANGVÆRENDE PROJEKTER OG OPGAVER

### › **Tekniske anvisninger**

1. Hydrometriske stationer, drift og vedligeholdelse
2. Vandføringsmåling med vingeinstrument
3. Vandføringsmåling med akustisk Doppler instrument (ADCP)
4. Hydrometriske stationer, databehandling og beregninger

### › **Datapublicering på nettet**

- › Ny hjemmeside bl.a. med alle tidsserier af daglig vandføring i drift november 2012





# Forbedret afstrømningsopgørelse – umålte oplande



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## Monitoring runoff and nutrient transport in the coastal zone of a Danish lowland river

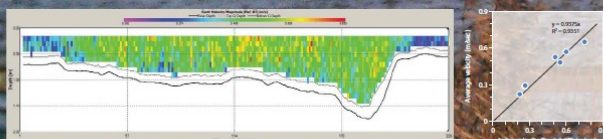
### Background

Denmark has a very long coastline compared to its total area, and therefore large parts of the lower river reaches are influenced by tidal and coastal backwater effects. This situation makes it impossible to gauge the water discharge and nutrient loadings to many fjords and marine inland waters when utilizing traditional methods. Consequently, only 50 percent of the country is covered with gauging stations even though more than 400 gauging stations are established. We are today using models to estimate the total water runoff and nutrient loadings to coastal waters from ungauged areas (See Windolf et al. 2011). One major problem relates, however, to the calibration of the modeling system as we are lacking data from the lower part of Danish river systems.



### Objectives

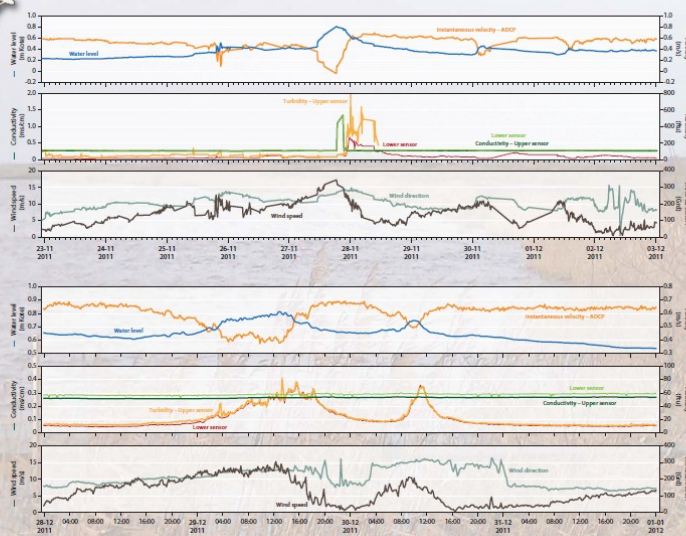
1. To measure water runoff from a 393 km<sup>2</sup> ungauged area in the lower part of River Skjern, Denmark.
2. To investigate if stratified flow conditions exists in the lower part of Danish rivers influenced by backwater effects.
3. To establish a data set to be used to validate an existing water runoff and nutrient loading modeling system (DK-QNP).



### Methods

In order to investigate the possibilities of improving the Danish gauging network and to test the models used for runoff estimation in else ungauged areas, a new monitoring station was established in the summer of 2011 in the River Skjern very close to the outlet in Ringkjøbing Fjord at the west coast of Jutland. The hydraulic conditions at this new gauging station are affected by tidal and backwater effects and the nutrient transport may be influenced by stratified flow conditions. The catchment area to the new gauging is 2550 km<sup>2</sup>, and the width of the channel is 70-80 meters.

The velocity distribution is measured in the profile by both horizontal and vertical multi cell Doppler sensors. Conductivity (salinity), turbidity and water temperature are measured by sensors in 2 levels, near bottom and in the upper part of the depth profile. Time integrated water samples are collected also in 2 levels with a 2 hour interval and analyzed for total nitrogen, nitrate, total phosphorous and phosphate. The wind speed and direction is registered at the station.



### Perspectives

The preliminary results show a strong correlation between the water velocities and the wind especially during the winter storms coming mainly from the west and northwest. Also the nutrient concentrations and the suspended sediment are changing heavily during and following the storm events.

Data from the new monitoring station and the model outputs will be compared and evaluated, and the hydrodynamics will be examined.

### Acknowledgments

We would like to thank the following people for their assistance in the field and laboratory with the measurements: Uffe Mensberg, Carsten Brian Nielsen, Henrik Stenholt, Karina Jensen, Marlene V. Skjærbaek and Erling Pedersen. This work was partly funded by a grant from the Danish EPA Environmental Effective Technology Programme.



**References**  
 Morsdal, L., Thomsen, H., Trolldenier, J., Larsen, S.E., Børgesen, J., Ovesen, N.B. and Kronvang, B. A distributed modeling system for simulation of monthly runoff and nitrogen sources, loads and sinks for ungauged catchments in Denmark. *Journal of Environmental Monitoring* 13: 2645-2658.





# Interkalibrering af ny målemetode - ADCP

