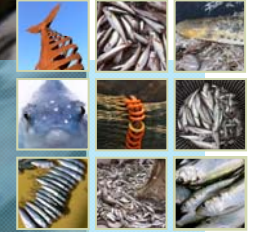


1st Trilateral Analysis of Fish in the Wadden Sea

Future Needs for Harmonized Assessment

Zwanette Jager (ZiltWater Advies)
in cooperation with
TMAP ad hoc fish expert group





TMAP ad hoc fish expert group

Installed in 2006, follow-up previous symposium
Enhance trilateral coordination fish monitoring
Support the TMAP revision: include FISH!

Participants

Loes Bolle

Andreas Dänhardt

Britta Diederichs

Zwanette Jager (chair)

Thomas Neudecker

Jörg Scholle

Ralf Vorberg

Gerold Lürßen

Harald Marencic (secr.)



Nationalpark
Wattenmeer
SCHLESWIG-HOLSTEIN



vTI
Johann Heinrich
von Thünen-Institut



WAGENINGEN UR
For quality of life

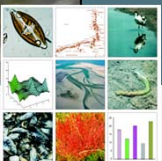
MARINE SCIENCE SERVICE

Bio Consult
Schuchardt & Scholle GbR

Introduction

Tasks of the TMAP ad hoc fish expert group:

- Joint analysis of monitoring results
- Develop a fish assessment tool
- Assess the status of Wadden Sea fish
- QSR Wadden Sea 2009, Thematic report 14: Fish
- Formulate targets for the Wadden Sea Plan



Survey data

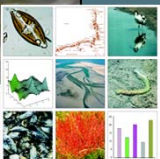
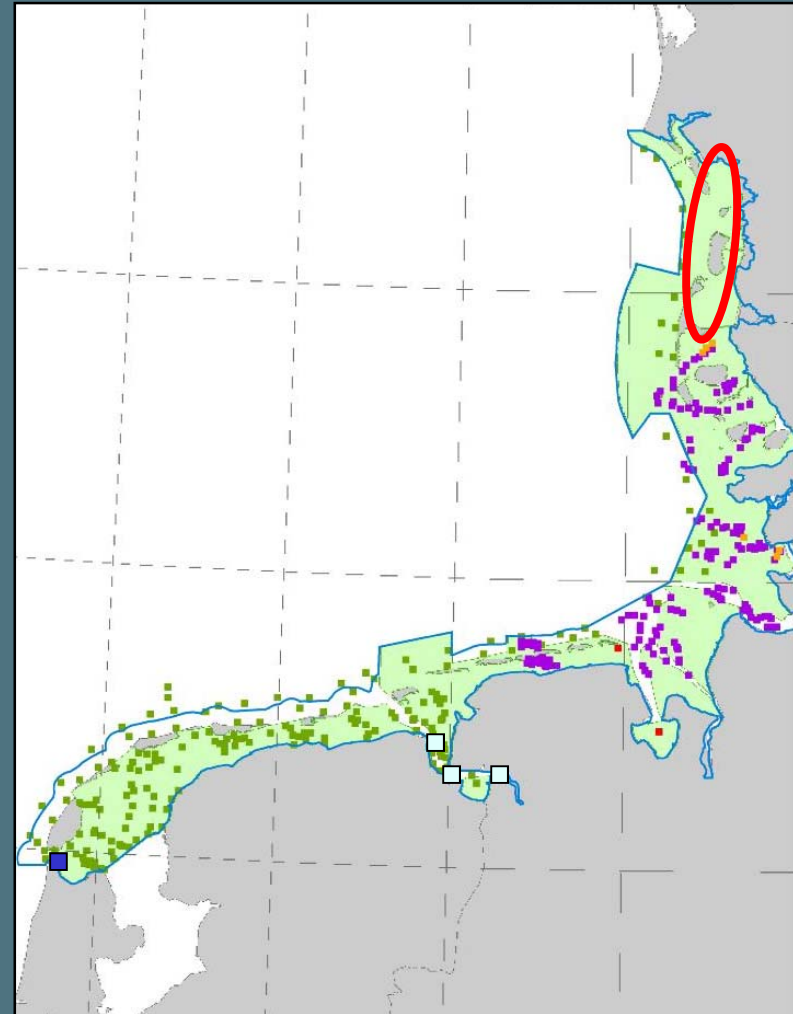
Surveys (joint analysis)

- DFS (Wageningen IMARES) ■
- DYFS (von Thünen Institut) ■
- SHS (SH Wattenmeer) ■

Other surveys

- Fyke monitoring (NIOZ) ■
- WFD monitoring estuaries ■
- Bird-fish interaction research ■

gap in Danish Wadden Sea



Towards a fish assessment tool

WFD methodology as a starting point

Fish is biological quality element for transitional waters;
Wadden Sea = coastal water; no fish assessment required

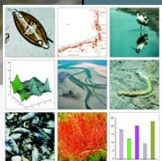
Index and assessment tool:

- species composition
- abundance (& age structure)

Select indicators of anthropogenic impact

Reference: "undisturbed condition" (1870-1920)

EQR: score of actual indicator value vs. reference value



Reference conditions & Selection criteria

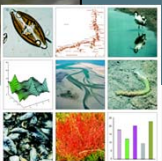
Reference list of Wadden Sea fish species

- 150 species, of which 13 fresh water spp.
- 50% (extremely) rare (e.g. Basking shark)
- 50 common, 26 fairly common species

Impossible to analyse all common species

Selection criteria

- on management relevance: WFD, HD, red list
- on ecological relevance: functional guilds
- sensitivity to driving forces:
e.g. climate change, habitat degradation
- monitoring aspects

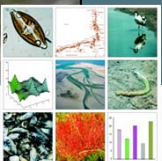


Priority species

Alosa fallax - Twaite shad
Osmerus eperlanus - Smelt
Lampetra fluviatilis - River lamprey
Platichthys flesus - Flounder
Zoarces viviparus - Eelpout
Ammodytes sp. - Sand eel
Pleuronectes platessa - Plaice
Solea solea - Sole
Limanda limanda - Dab
Gadus morhua - Cod
Merlangius merlangus - Whiting
Clupea harengus - Herring
Sprattus sprattus - Sprat
Engraulis encrasicolus - Anchovy

High relevance,
poor monitoring:

Alosa alosa - Allis shad
Coregonus oxyrinchus - Houting
Petromyzon marinus - Sea lamprey
Gymnocephalus cernua - Ruffe



Joint Analysis on priority species

Bolle et al. (2009) - Trends in Wadden Sea fish fauna.
IMARES C108/08

Spatial coverage

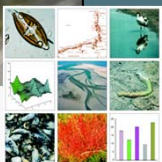
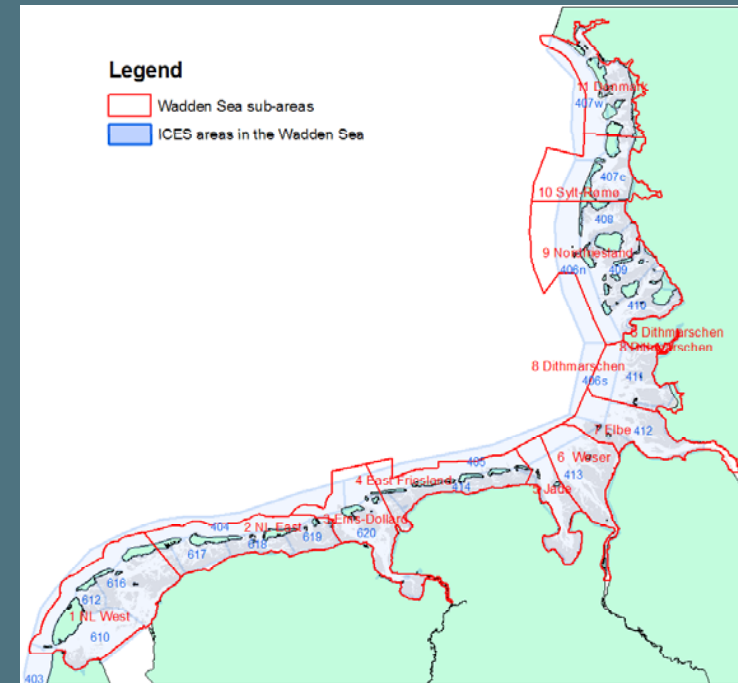
- Dutch & German Wadden Sea
- QSR sub-areas

Temporal coverage

- once per year
- autumn (DFS, DYFS) > 1970
- summer (SHS) > 1991 / 2001

Metrics

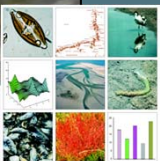
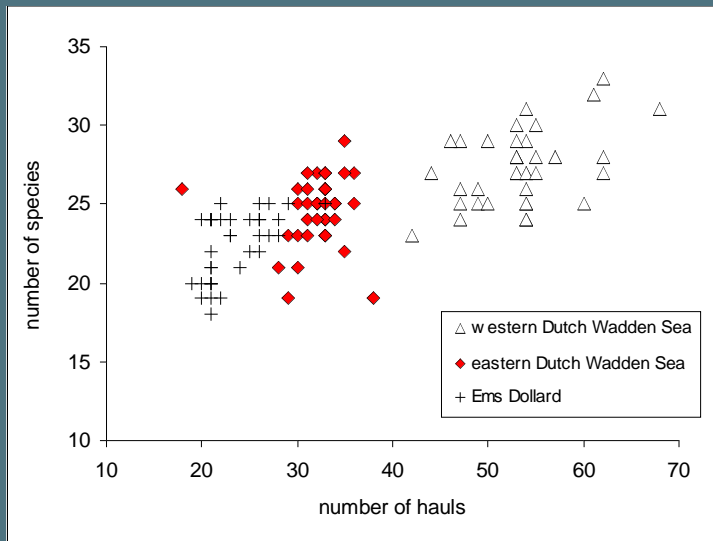
- no. of species / species richness
- species (trends in) abundance : TrendSpotter
- mean length



Results - species richness

Species richness

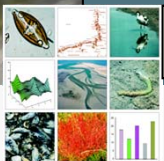
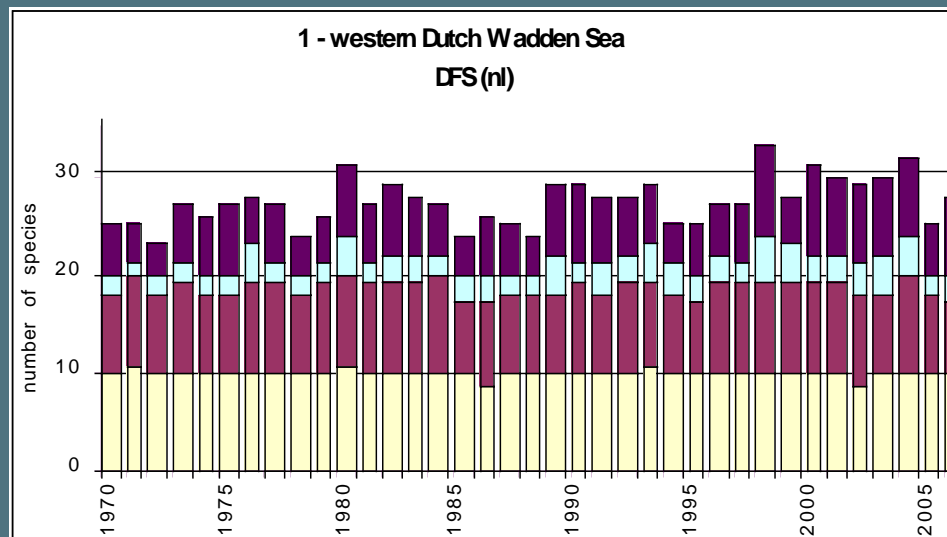
- dependent on number of hauls
- therefore also differences per region
- drawback for an indicator for trilateral Wadden Sea



Results – species composition by guild

Species composition by guild

- no clear trend
- fairly stable Estuarine resident / Marine juvenile guilds
- fluctuations in Marine Seasonal / Marine Adventitious guilds



ER

MJ

CA

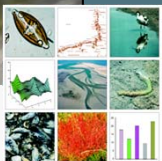
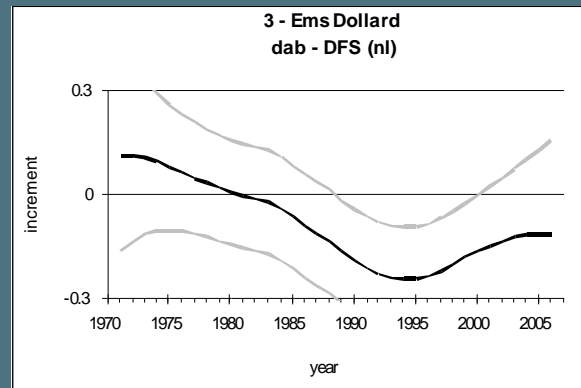
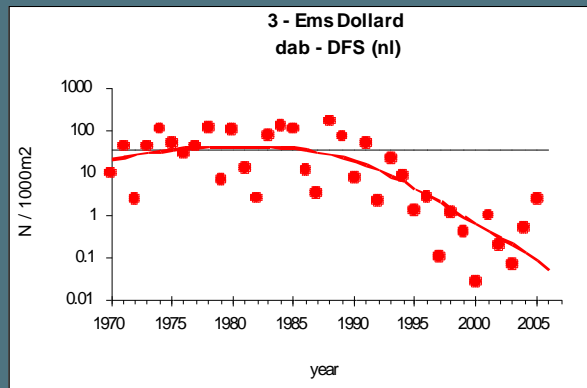
MS+MA

Source: DFS+DYFS; Bolle et al. 2009

Results - trends in abundance: dab *L. limanda*

TrendSpotter

- trend in mean abundance
- statistical significance



Results - trends in abundance: dab *L. limanda*

Summary of trends

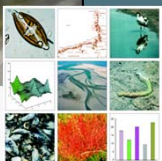
Before 1990:

- increase in East Frisia (4),
- slight decrease in E.Dutch WS (2), Dithmarschen (8), North Frisia (9)
- no trend in W.Dutch WS (1), Ems-Dollard (3), Elbe (7)

After 1990:

- strong decrease in all QSR areas

	1970	1975	1980	1985	1990	1995	2000	2005	overall description
area 1									decrease
area 2									decrease
area 3									decrease
area 4									increase<decrease
area 7									decrease
area 8									decrease
area 9									decrease



Source: Bolle et al. 2009

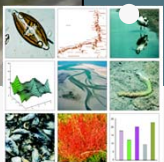
Assessment

Progress was made

- joint analysis gave more detailed and robust descriptions of long-term trends in fish species in the Wadden Sea
- spatial resolution was refined to the level of QSR sub-area
- more objective way of determining trends in abundance by applying TrendSpotter methodology

1st Steps to developing a Trilateral WS-Fish tool

- choice of metrics to evaluate
- how to assess the status: from scientific point of view not possible to qualify fish fauna as 'good', 'moderate' or 'poor'
- lack of understanding of causal factors



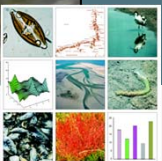
Gaps & Recommendations

Knowledge gaps

- processes, anthropogenic vs. natural impact (climate change)
- relation Wadden Sea fish with North Sea and estuaries
- relation fish species with specific habitats

Recommendations on research

- Enable funding of concomitant research on fish ecology
- Enhance accessibility of data & results of applied research (such as Environmental Impact Assessment studies on fish)



Recommendations

On monitoring

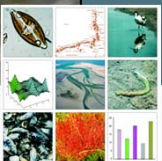
Pelagic fish monitoring: expand spatial coverage

Danish Wadden Sea: include in demersal fish surveys

Seasonal occurrence: increase frequency to at least 2/yr

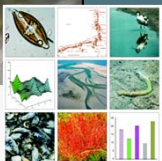
On management

- include selected metrics in TMAP parameters; multi-method
- further develop & implement trilateral fish targets
- continue working on development of assessment 'tool' which is suitable & acceptable given the lack of knowledge of causal factors



Wadden Sea Plan 2010: Fish Targets

- Viable stocks of populations and a natural reproduction of typical Wadden Sea fish species
- Occurrence and abundance of fish spp. according to the natural dynamics in (a)biotic conditions
- Favourable living conditions for endangered fish species
- Maintain the diversity of natural habitats to provide substratum for spawning and nursery functions for juvenile fish
- Maintain and restore the possibilities for the passage of migrating fish between the Wadden Sea and inland waters



Parameters of the TMAP (2010) 3.4. Fish

Parameter:

- distribution and abundance of fish species in the Wadden Sea

Monitoring:

- existing surveys for demersal fish (IMARES, vTI-SF) and pelagic fish (LKN)

Assessment:

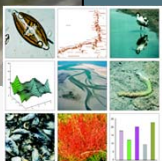
Wadden Sea fish assessment tool in preparation (similar to WFD tool in transitional waters).

Parameter:

- distribution and abundance of species in transitional waters

Monitoring:

- stow net fishery (pelagic fish), 3-4 stations in Ems, Weser, Elbe, Eider
- guidelines developed for WFD monitoring (obligatory)



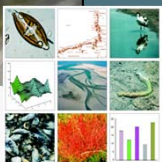
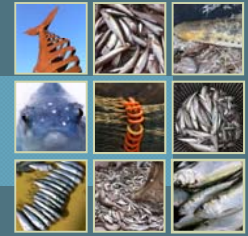
TMAP Ad hoc Fish Expert group

On the basis of the Wadden Sea Plan, an overall strategy will be developed on how to harmonize the assessments at national, trilateral and EU level.

Thematic experts' workshops will continue to discuss, and if necessary harmonize, assessment criteria and develop quantitative values for Wadden Sea Area.

Further technical adaptations of TMAP parameters (such as locations, frequencies, methods) have also to be considered, as have their alignment with the HD, WFD and, where appropriate, MSFD assessment schemes which are under development.

The main parameters in need concern macrozoobenthos, macrophytes, eutrophication, **fish** and chemical substances.



Thank you...

