

Macrozoobenthos

What can we learn from long-term
monitoring data?

QSR 1999 - Changes in species composition

- Jadebusen (1935 vs. 1975) :
 - 25 species disappeared, 48 species new
 - Increase of *Macoma*, *Mytilus*, *Eteone*, *Tubificoides*
 - Decrease of dominant *Pygospio*, *Corophium*, *Bathyporeia*
- Low. Sax. Hard-bottom (old data vs. 1993/95)
 - 39 species disappeared, 24 species new
- North German Wadden Sea (<1950 vs. 1980s)
 - 28 species decreased, *Polychaetes* increased

What does this tell us
about the ecological status
of the Wadden Sea?

What does this tell us about the ecological status of the Wadden Sea?

- In Northern German Wadden Sea:
 - Decrease of 28 species due to disappearance of natural oyster beds and *Sabellaria* –reefs
 - Increase of polychaetes adapted to disturbed habitats

»

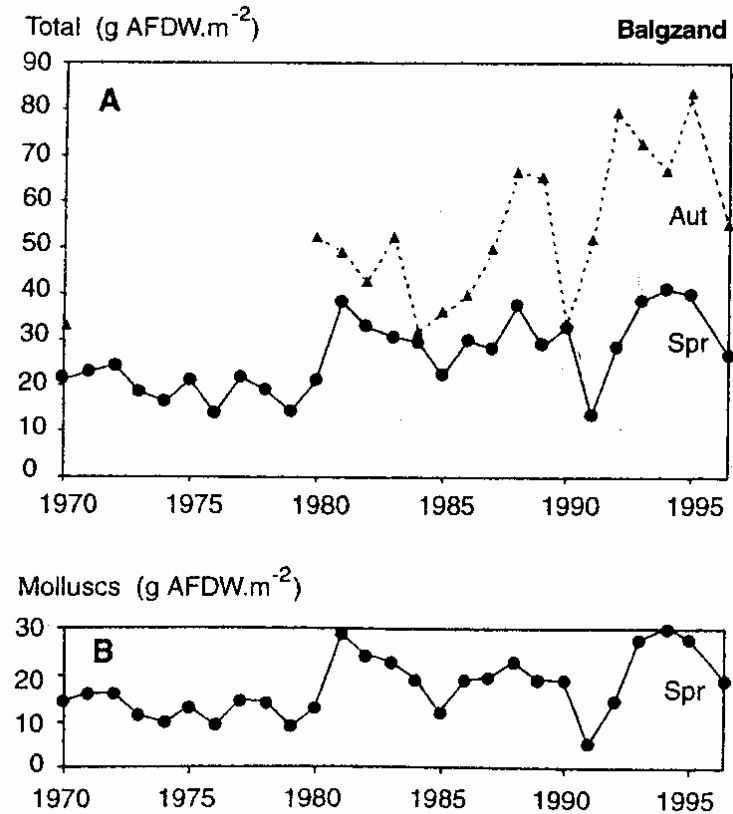
(Reise & c-workers)

What does this tell us about the ecological status of the Wadden Sea?

- In Northern German Wadden Sea:
 - Decrease of 28 species due to disappearance of natural oyster beds and *Sabellaria* –reefs
 - Increase of polychaetes adapted to disturbed habitats
- Conclusion:
 - less than “good ecological status”

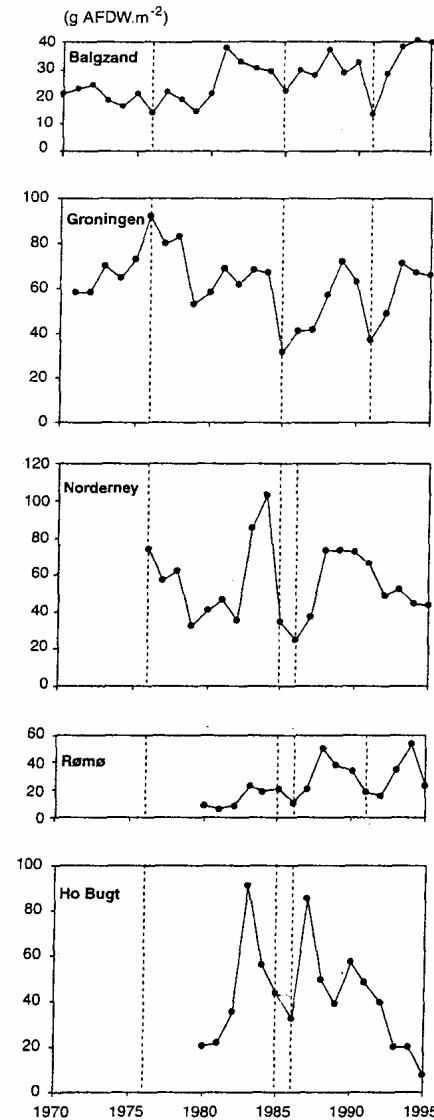
QSR 1999 - Biomass

1. Total biomass highly determined by bivalves



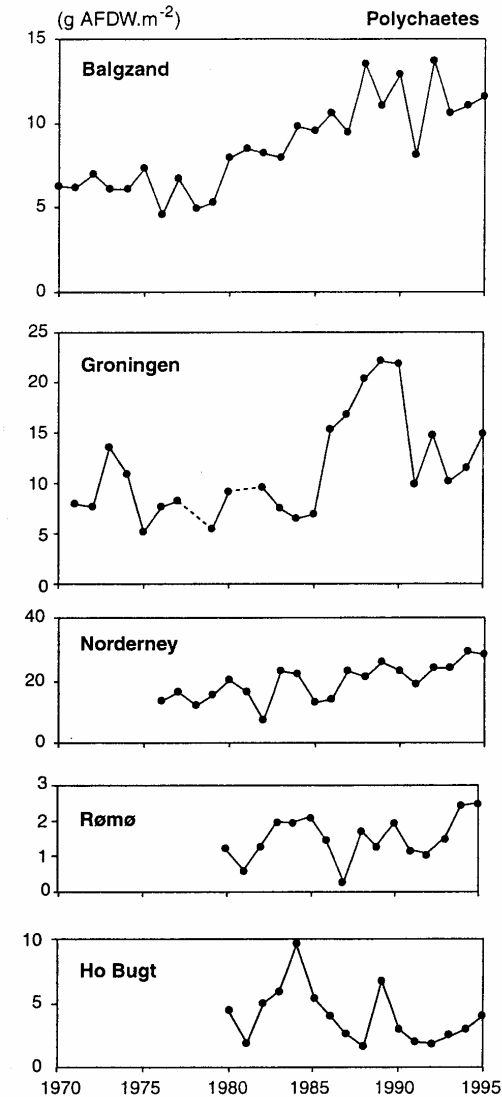
QSR 1999 - Biomass

1. Total biomass highly determined by bivalves
2. Bivalve biomass regulated by severe winters



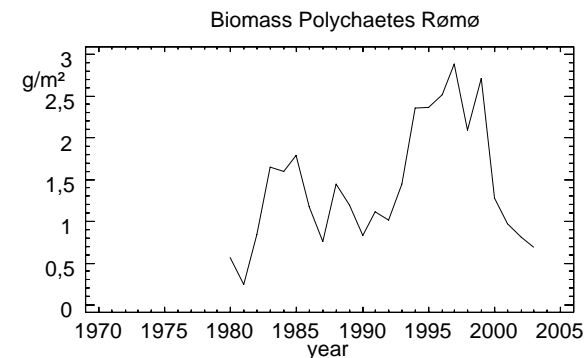
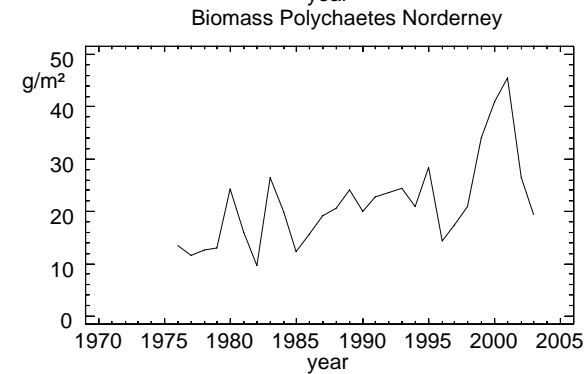
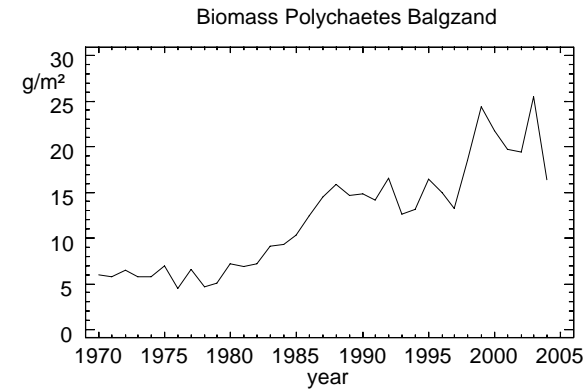
QSR 1999 - Biomass

1. Total biomass highly determined by bivalves
2. Bivalve biomass regulated by severe winters
3. Increasing biomass of polychaetes



QSR 2004 - Biomass

1. Total biomass highly determined by bivalves
2. Bivalve biomass regulated by severe winters
3. Increasing biomass of polychaetes



Is biomass a good indicator of ecosystem quality?

- For bivalves: No
 - Recruitment regulated by winter temperature and epibenthic predation
- For polychaetes: ???
 - No relationship with eutrophication status
 - No relationship with sediment disturbance (EVA-2)

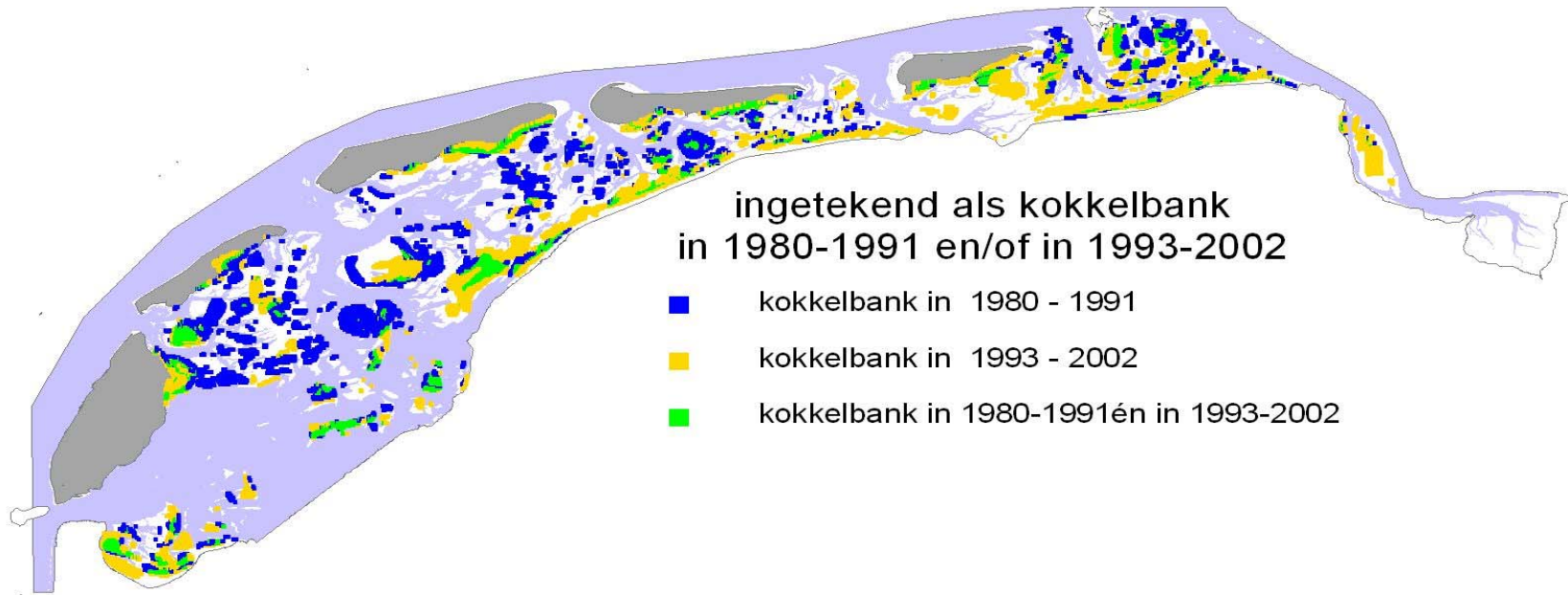
Is biomass a good indicator of ecosystem quality?

- For bivalves: No
 - Recruitment regulated by winter temperature and epibenthic predation
- For polychaetes: ???
 - No relationship with eutrophication status (QSR 1999)
 - No relationship with sediment disturbance (EVA-2)
- Conclusion:
 - change of alternate stable states?

Target

- An increased area of geomorphologically and biologically undisturbed tidal flats and subtidal areas

Changing cockle distribution



What happened with bivalve recruitment?

- Recruitment failures more frequent during last ca. 15 years
 - Especially at lower intertidal levels
 - Negative correlation with shrimp abundance
- No such pattern at higher intertidal levels

What happened with bivalve recruitment?

- Recruitment failures more frequent during last ca. 15 years
 - Especially at lower intertidal levels
 - Negative correlation with shrimp abundance
- No such pattern at higher intertidal levels
- **Conclusion:**
 - Centres of distribution of bivalves shifted to higher intertidal levels with more muddy sediments, mainly due to epibenthic predation pressure

What happened with the sediment?

- Sediment at lower intertidal levels got coarser (Balgzand – Beukema & Dekker, 2004)
- Loss of fine grained sediment due to “coastal squeeze (Flemming & co-workers)

What happened with the sediment?

- Sediment at lower intertidal levels got coarser (Balgzand – Beukema & Dekker, 2004)
- Loss of fine grained sediment due to “coastal squeeze“ (Flemming & co-workers)
- **Conclusion:**
 - Loss of preferred settling habitat for juvenile bivalves

Target evaluation

- Target:
 - An increased area of geomorphologically and biologically undisturbed tidal flats [....]
- Evaluation:
 - Development away from target
 - Decreased area of [.....] undisturbed flats

What reference to be chosen?

- Larger area with fine grained flats as present before “coastal squeeze”?

What reference to be chosen?

- Larger area with fine grained flats as present before “coastal squeeze”?
- Less coarse lower flats as present before sea level rise?

What reference to be chosen?

- Larger area with fine grained flats as present before “coastal squeeze”?
- Less coarse lower flats as present before sea level rise?
- Lower epibenthic predation pressure as present after more severe winters?

What reference to be chosen?

- Larger area with fine grained flats as present before “coastal squeeze”?
- Less coarse lower flats as present before sea level rise?
- Lower epibenthic predation pressure as present after more severe winters?
- **What will WFD decide?**