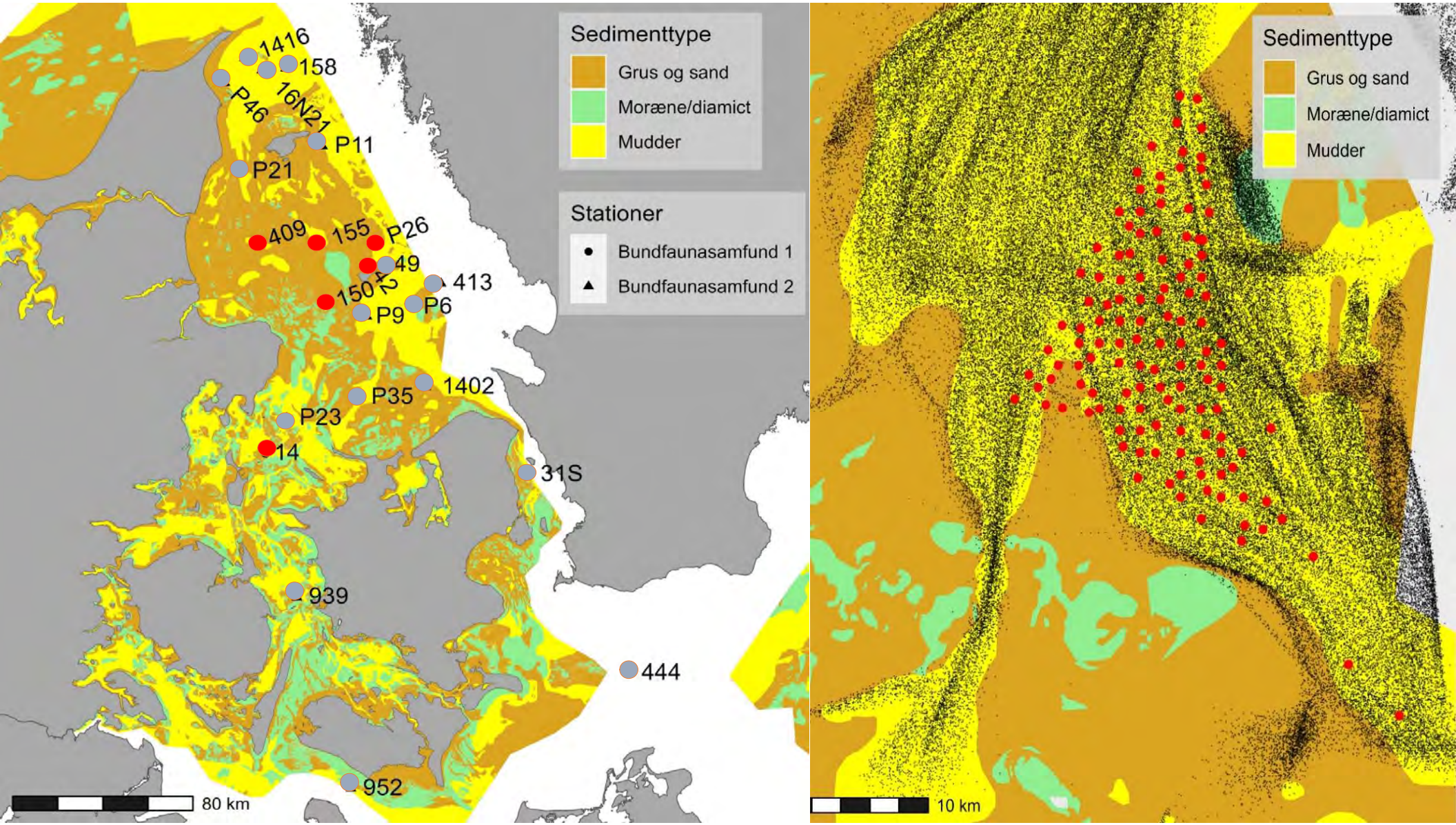
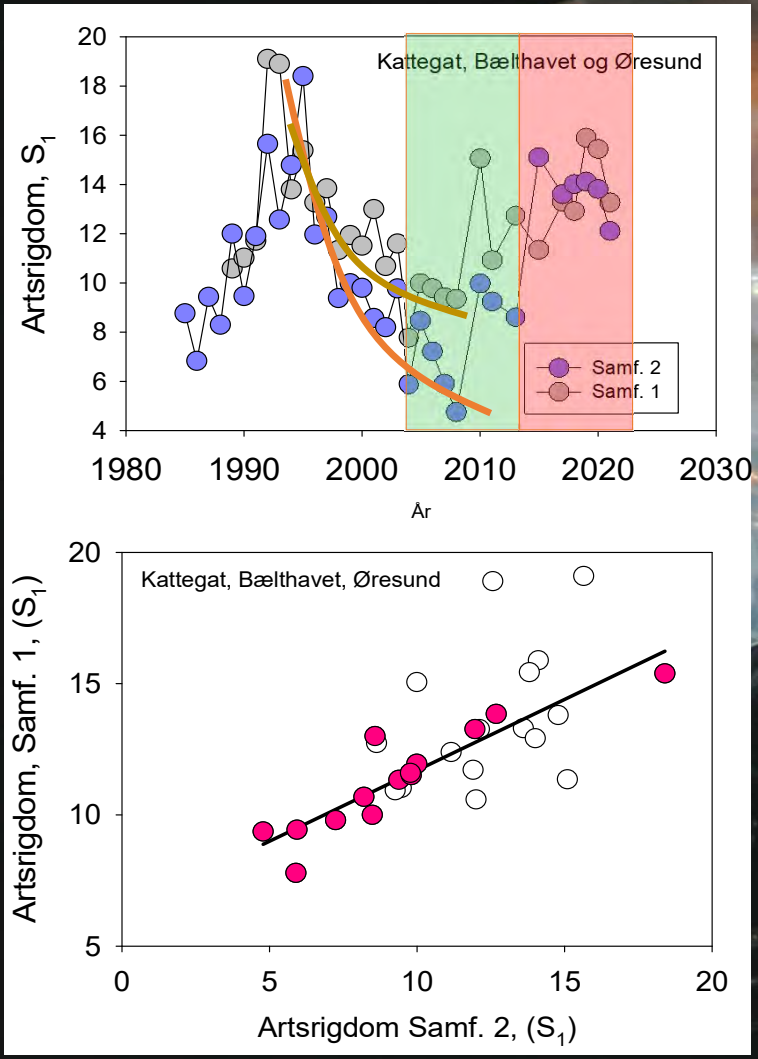
Nephrops trawling: From loss of biodiversity to loss of ecosystems services

Jørgen L. S. Hansen & Nikolaj Reducha Andersen

"When bottom trawling affects trawl free areas"


Sedimenttype
Grus og sand
Moræne/diamict
Mudder
Stationer
Bundfaunasamfund 1
Bundfaunasamfund 2
1416
158
P46
16N21
P11
P21
409
155
P26
49
413
150
P9
P6
1402
P35
P23
14
31S
939
444
952
80 km
Sedimenttype
Grus og sand
Moræne/diamict
Mudder
10 km

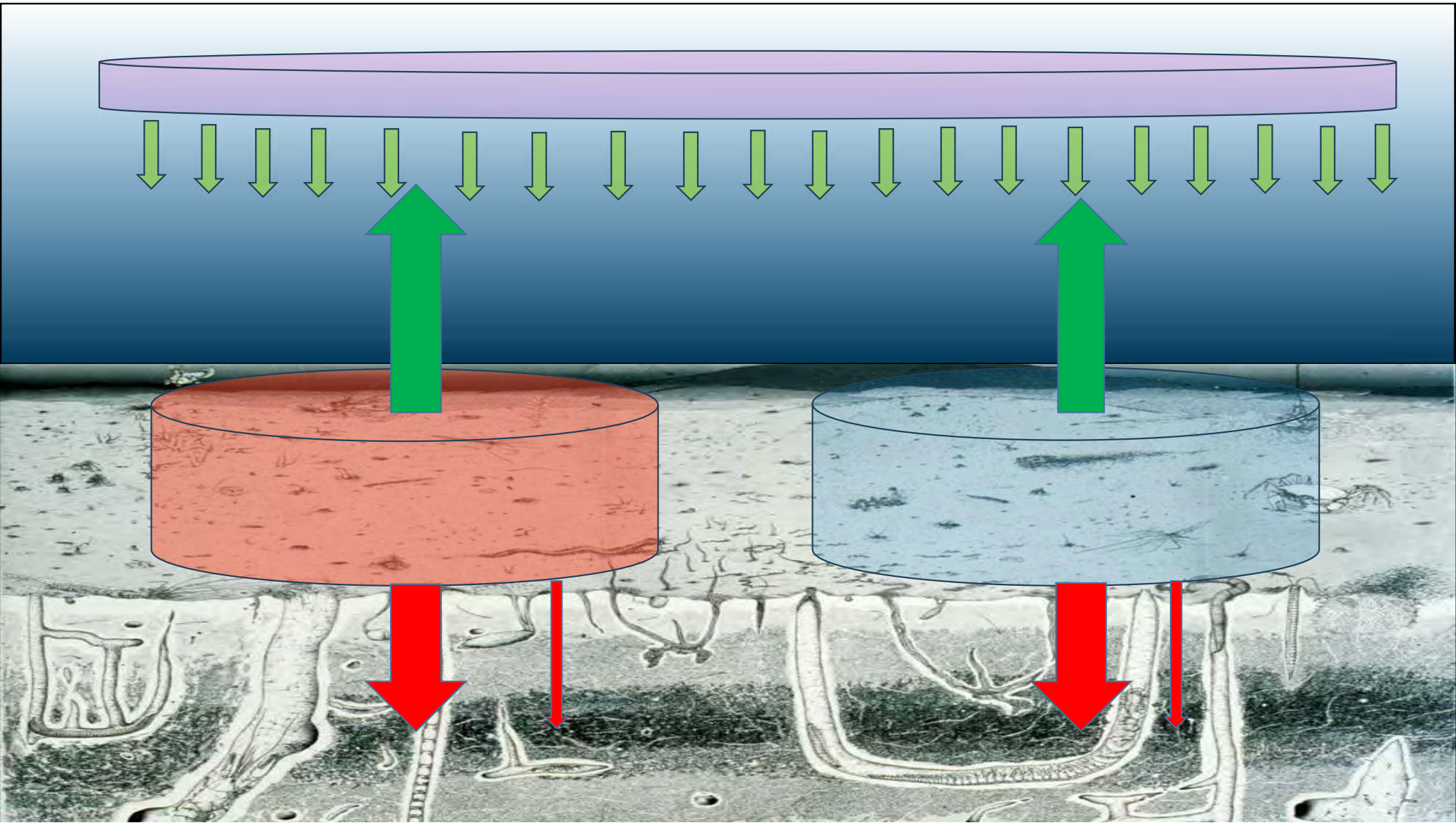


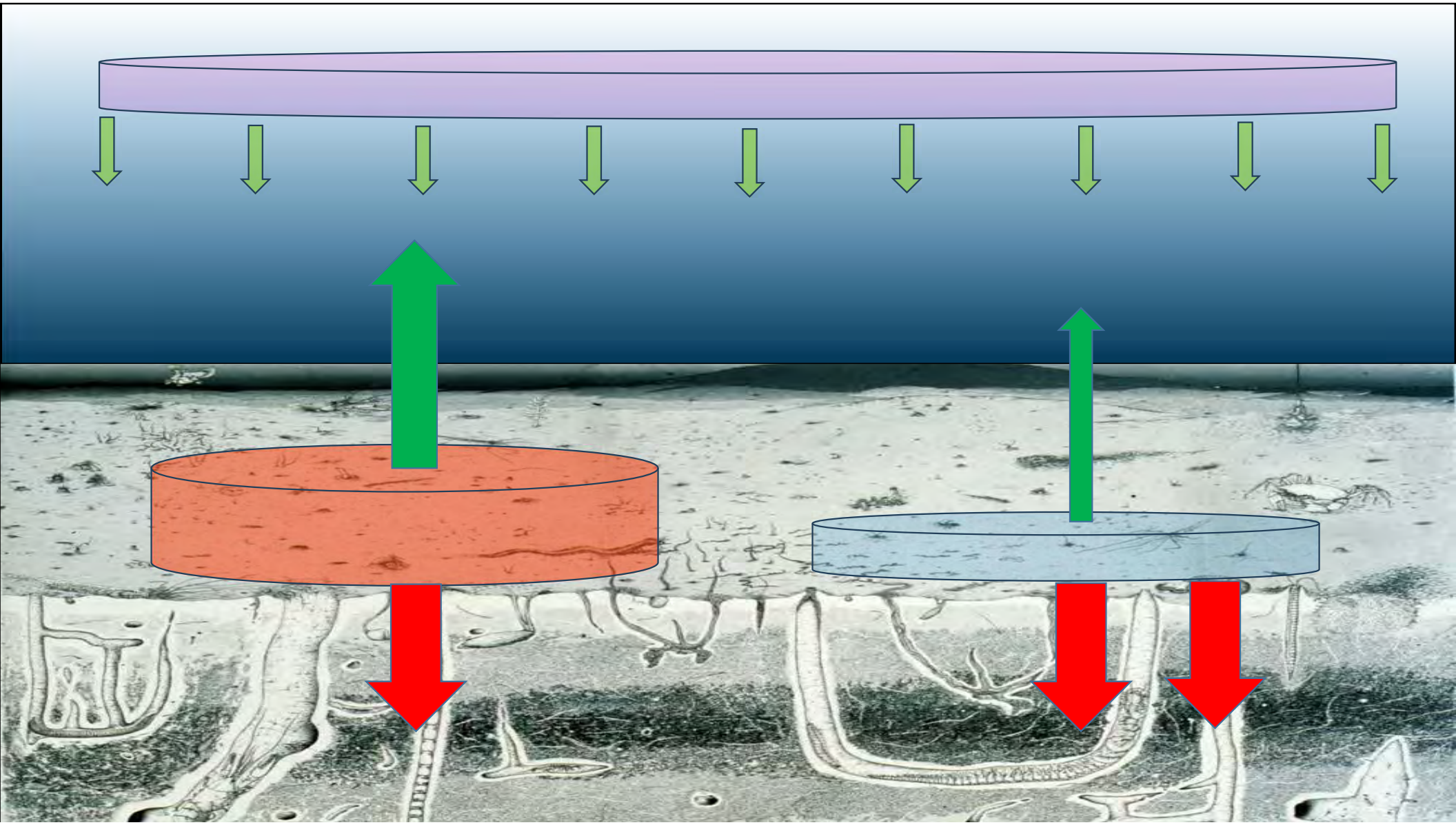
Synchronous decline in >300 species 1995-2008

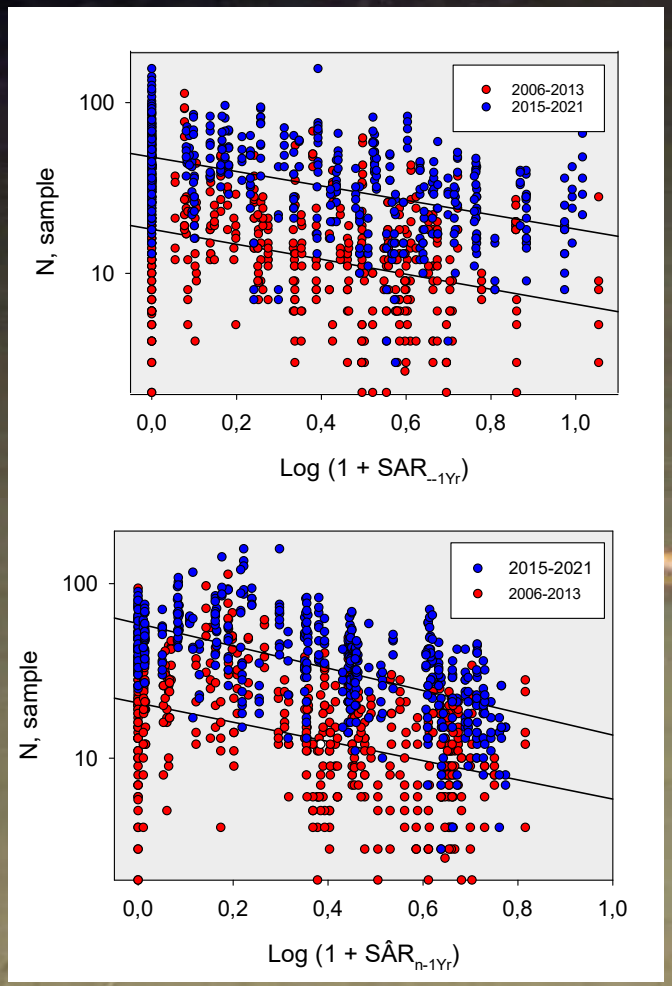
Trawled areas declined two times as fast as non-trawled areas

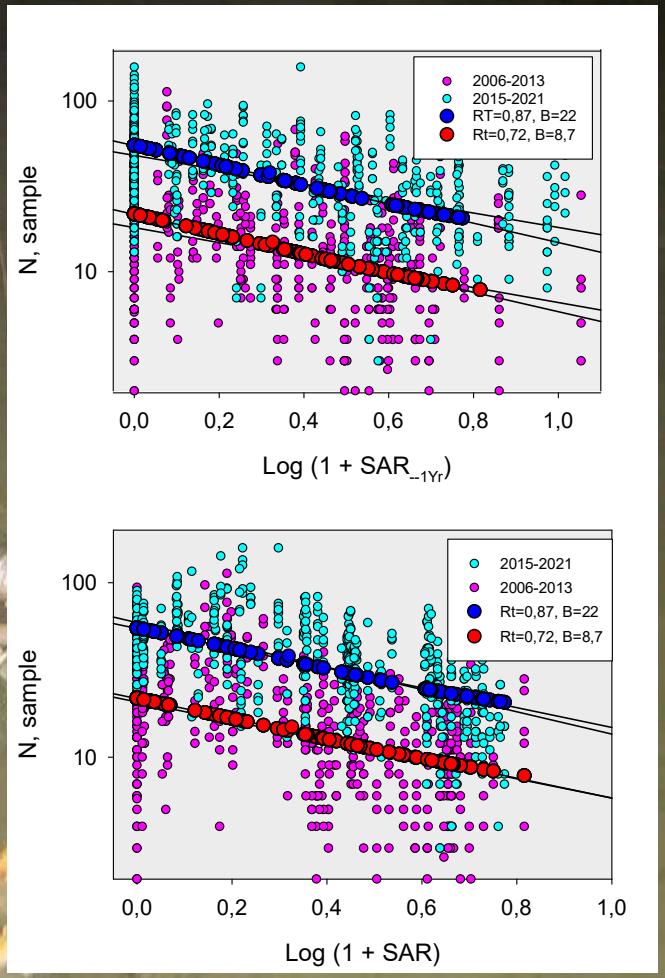
Biodiversity on each station depended more on regional development in the whole Kattegat area than on local environmental factors (sediment, salinity, depth etc.).

Peter Göransson ©






2006-2013
2015-2021
N, sample
100
10
0,0
0,2
0,4
0,6
0,8
1,0
Log (1 + SAR--1Yr)


2006-2013
2015-2021
RT=0,87, B=22
Rt=0,72, B=8,7
N, sample
100
10
0,0
0,2
0,4
0,6
0,8
1,0
Log (1 + SAR--1Yr)

2015-2021
2006-2013
N, sample
100
10
0,0
0,2
0,4
0,6
0,8
1,0
Log (1 + SÂRn-1Yr)

2015-2021
2006-2013
Rt=0,87, B=22
Rt=0,72, B=8,7
N, sample
100
10
0,0
0,2
0,4
0,6
0,8
1,0
Log (1 + SAR)

6%, 16%, 19%, 41%

SA/kg Nephrops = 12000 m2

Trawlet area: 9000 km2

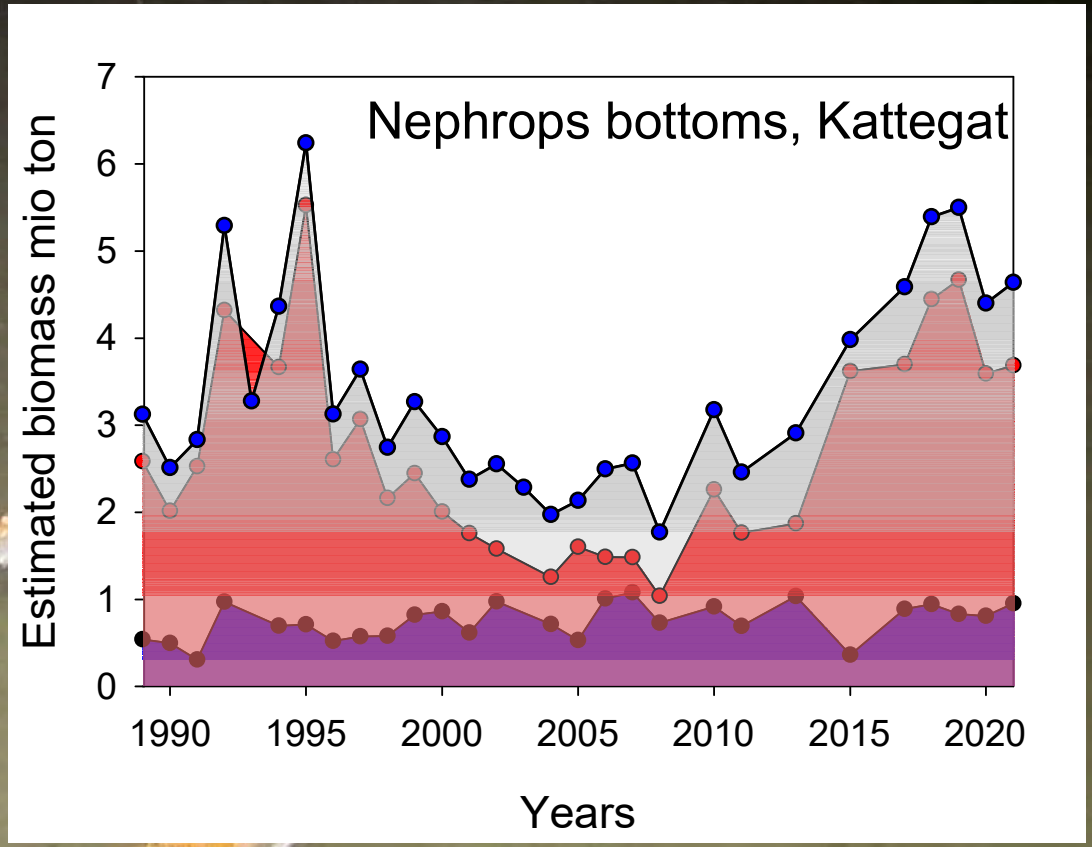
Benthos 300 g /m2

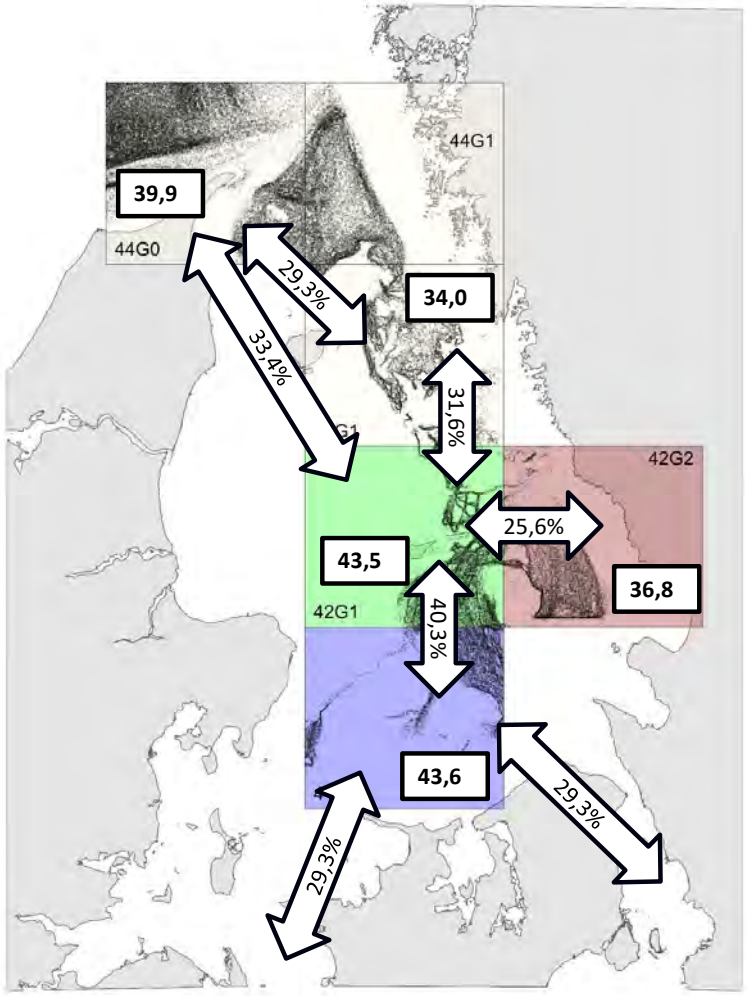
Loss of benthos biomass/kg Nephrops landet ~ 500 kg

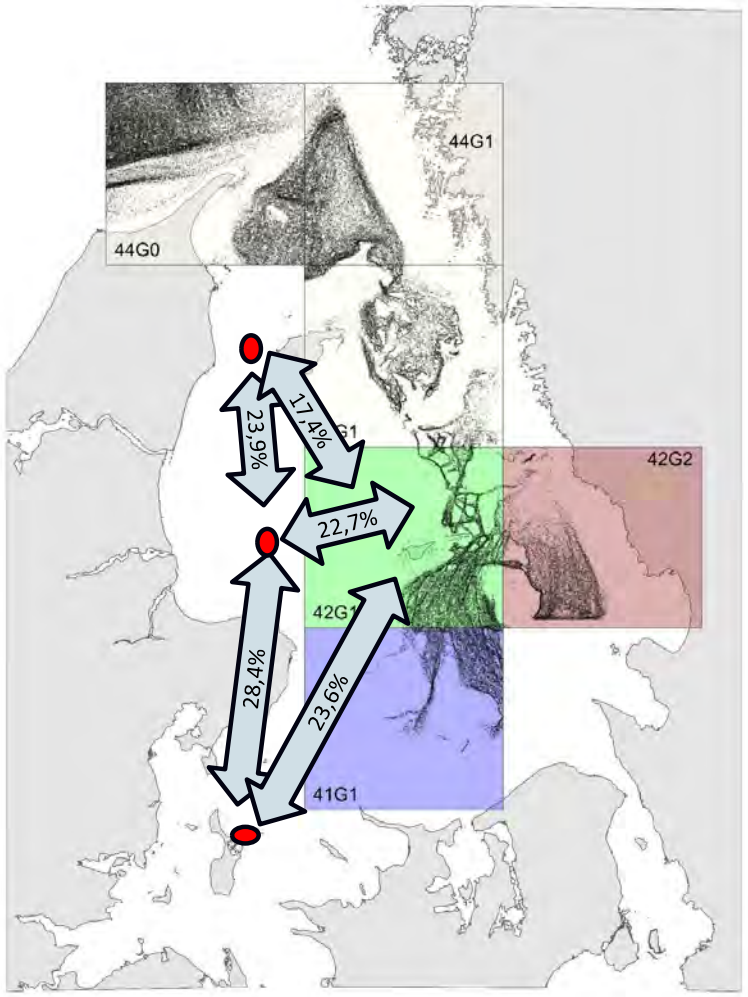
Total loss of biomass Kattegat up to one mio. tons

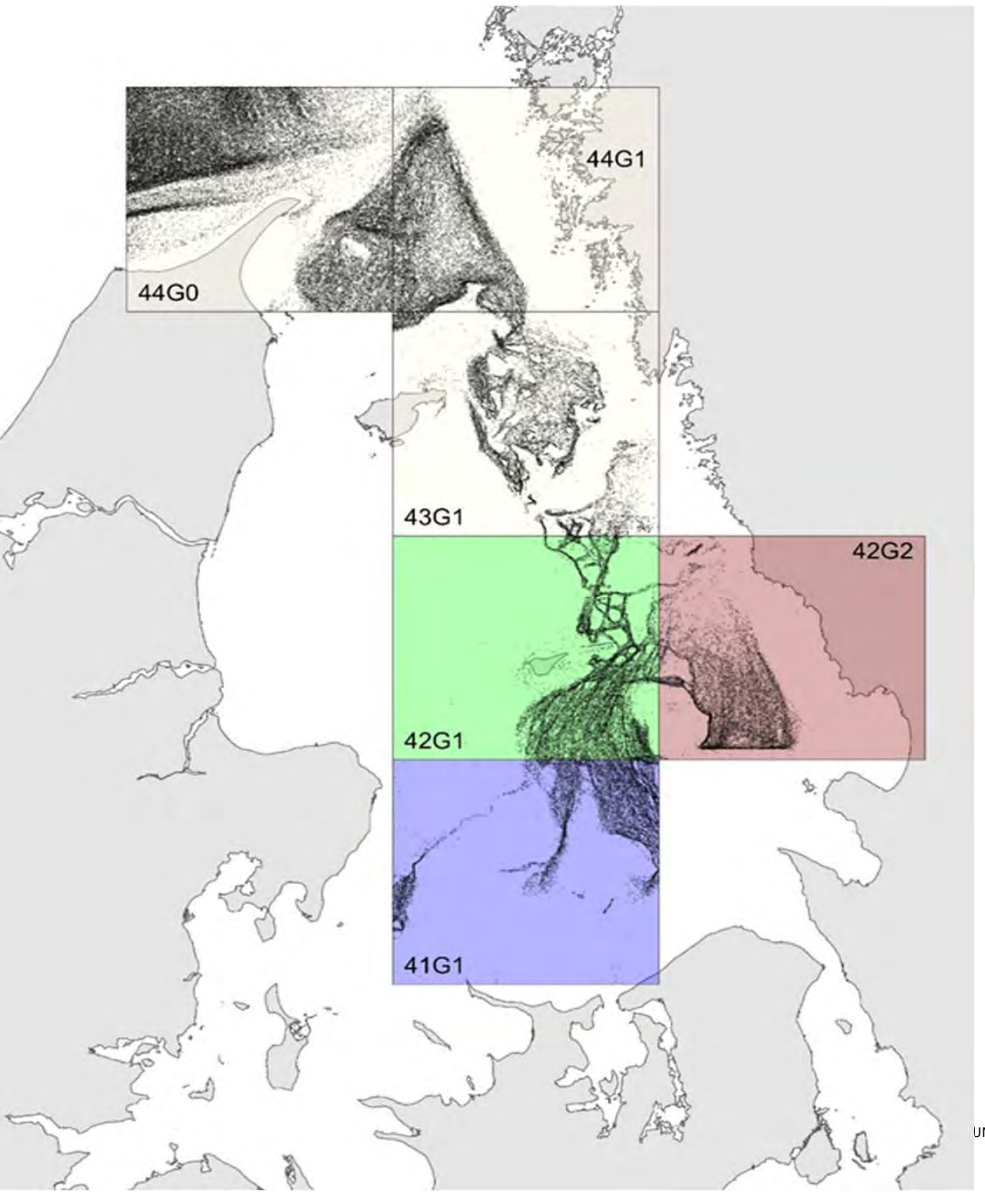
Landing per area per yr of edible parts (tails) : 2 kg/ha/yr

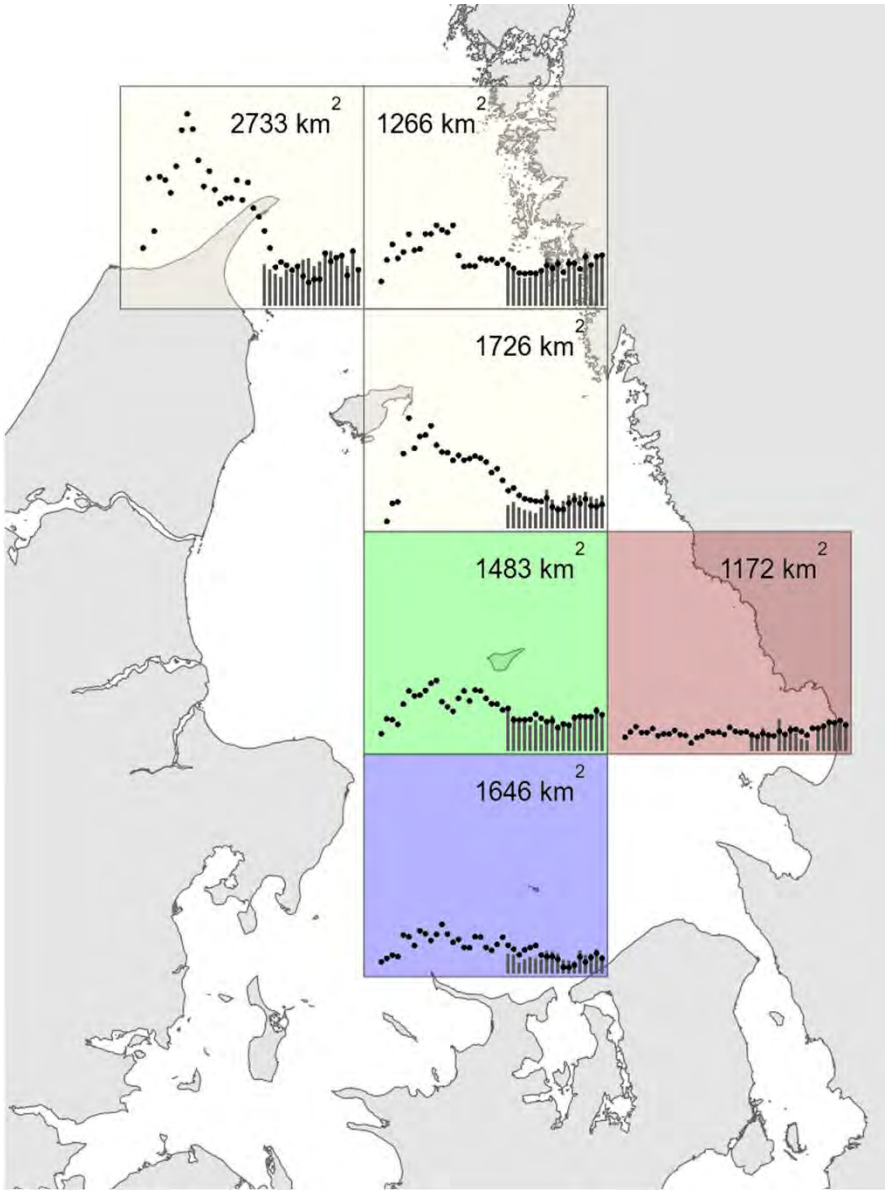
CO2eq/kg : 20-90kg




44G1
39,9
44G0
29,3%
34,0
33,4%
31,6%
42G2
25,6%
43,5
36,8
42G1
40,3%
43,6
29,3%
29,3%


44G1
44G0
17,4%
23,9%
42G2
22,7%
42G1
28,4%
23,6%
41G1





UNE 2017

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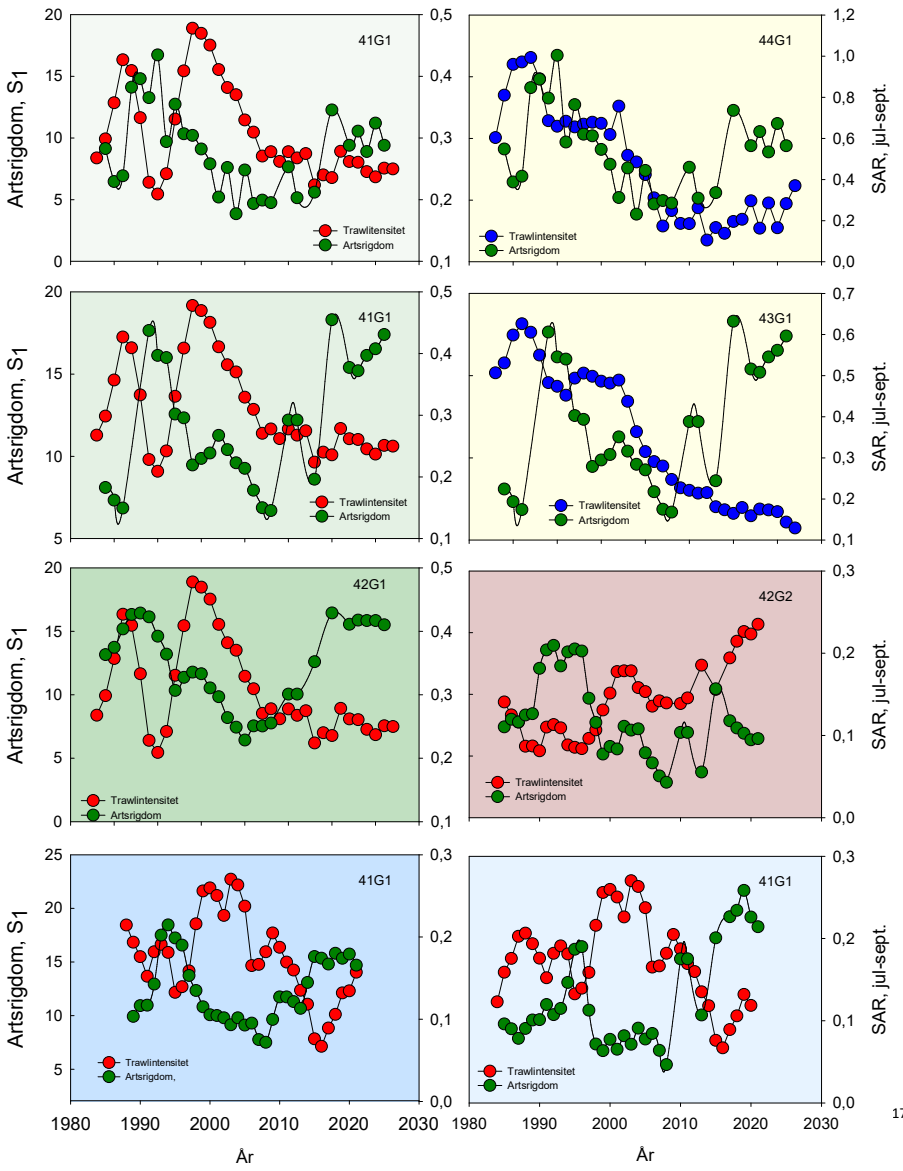
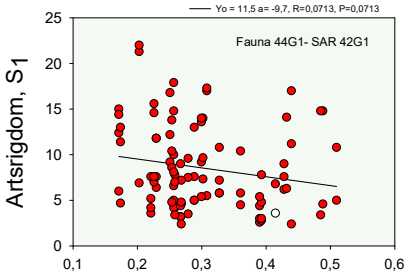
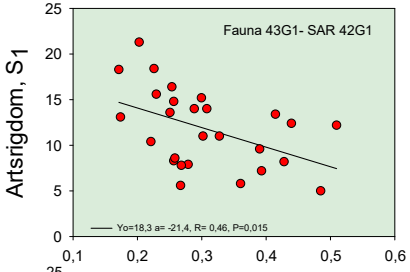
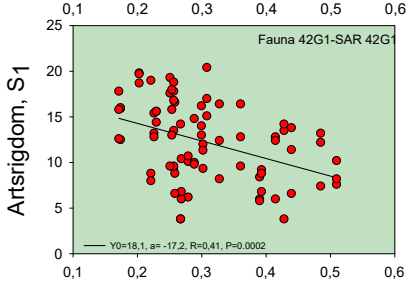
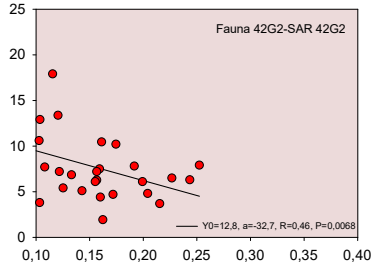
SENIOR RESEARCHER

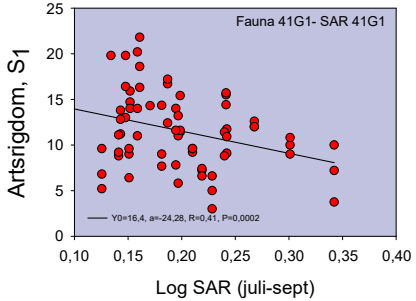

41G1
44G1
41G1
43G1
42G1
42G2
41G1
41G1
Trawlintensitet
Artsrigdom
Artsrigdom,
Artsrigdom, S1
SAR, jul-sept.
År
1980
1990
2000
2010
2020
2030

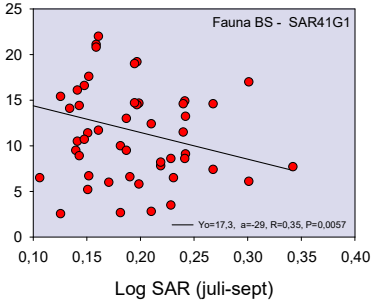

Yo = 11,5 a= -9,7, R=0,0713, P=0,0713
Fauna 44G1- SAR 42G1
Artsrigdom, S1

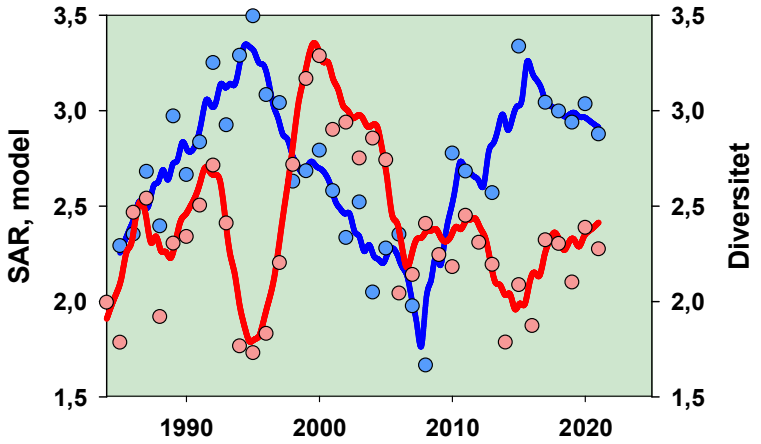

Fauna 43G1- SAR 42G1
Yo=18,3 a= -21,4, R= 0,46, P=0,015
Artsrigdom, S1

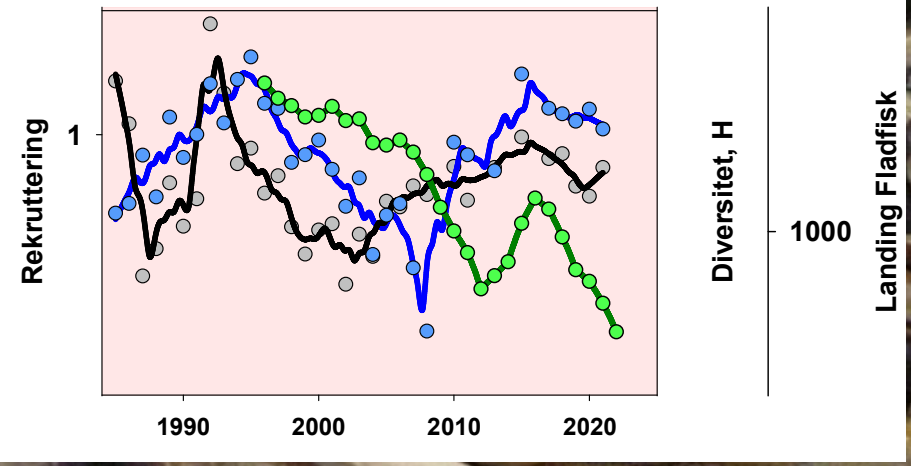

Fauna 42G1-SAR 42G1
Y0=18,1, a= -17,2, R=0,41, P=0.0002
Artsrigdom, S1


Fauna 42G2-SAR 42G2
Y0=12,8, a=-32,7, R=0,46, P=0,0068

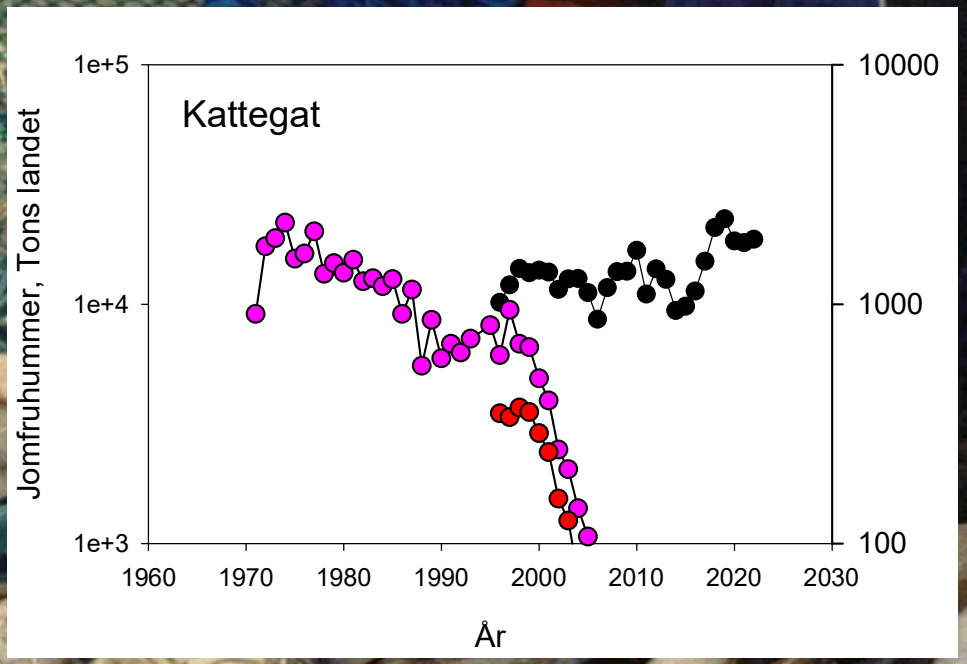

Fauna 41G1- SAR 41G1
Y0=16,4, a=-24,28, R=0,41, P=0,0002
Artsrigdom, S1
Log SAR (juli-sept)

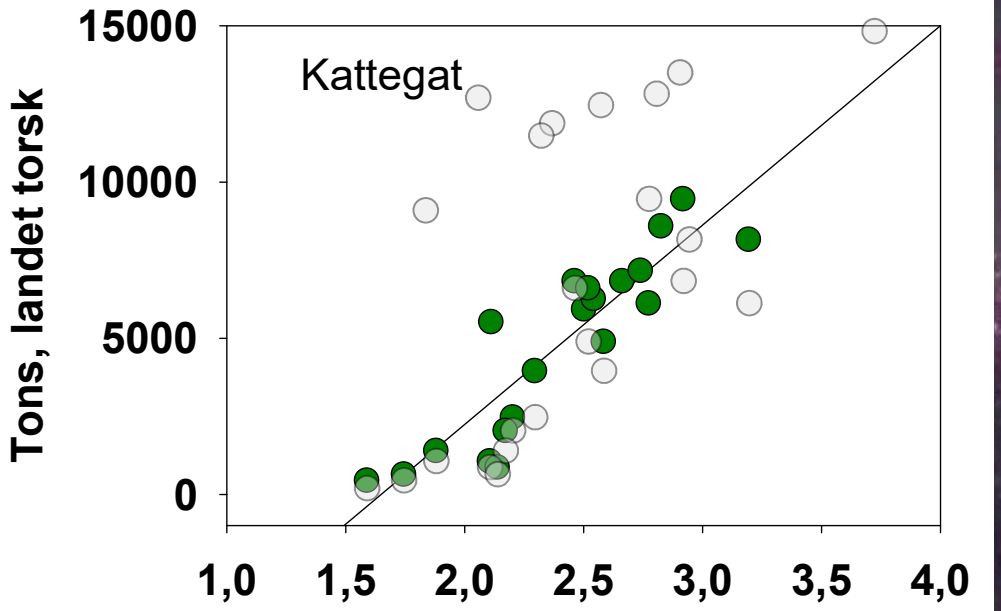

Fauna BS - SAR41G1
Yo=17,3, a=-29, R=0,35, P=0,0057
Log SAR (juli-sept)

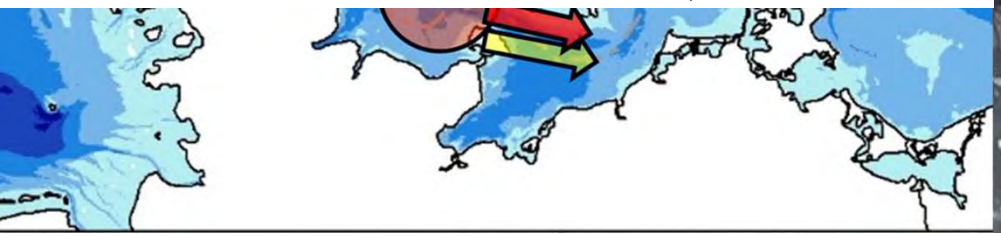


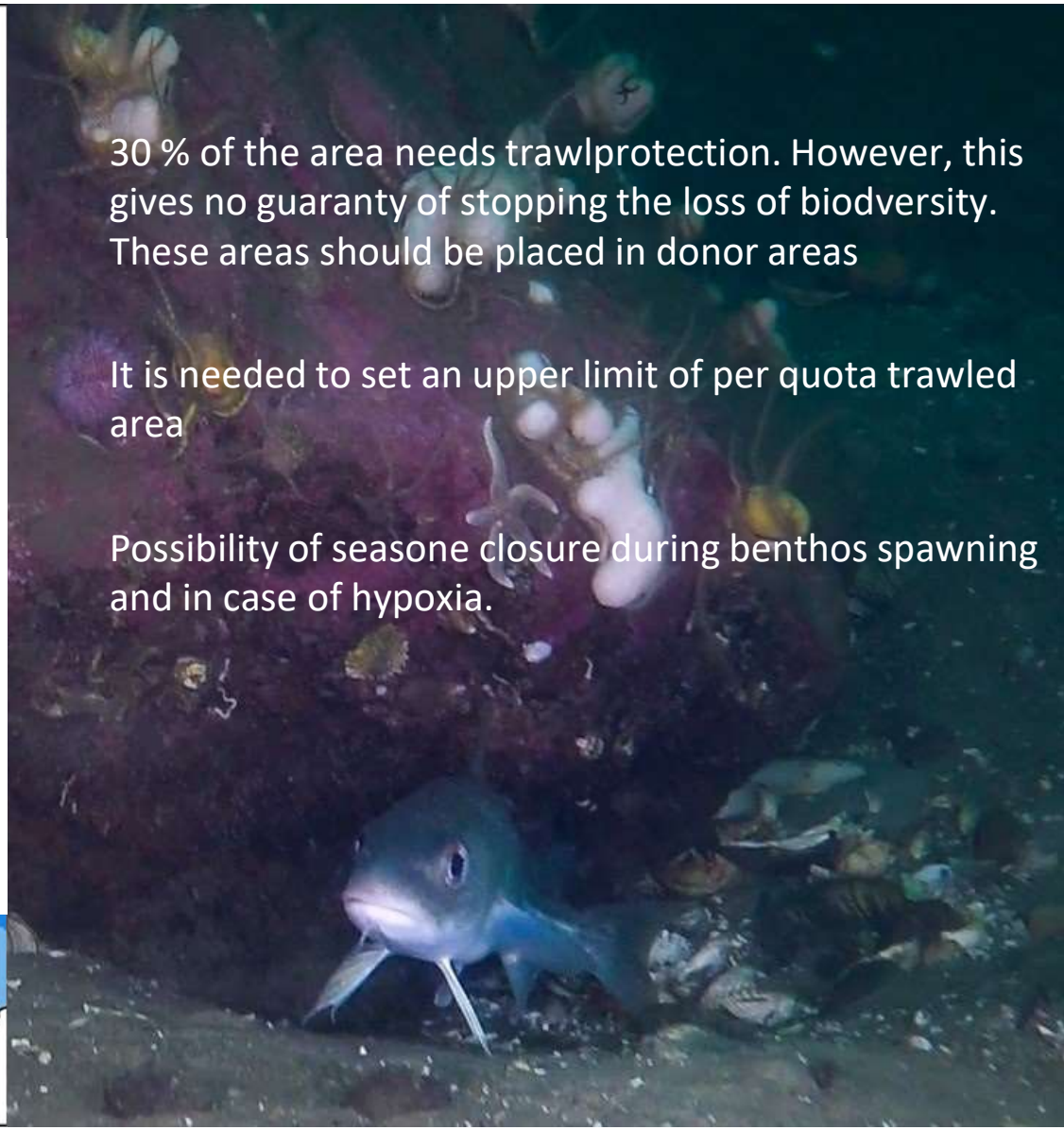


Landing Fladfisk









30 % of the area needs trawlprotection. However, this gives no guaranty of stopping the loss of biodversity. These areas should be placed in donor areas

It is needed to set an upper limit of per quota trawled area

Possibility of seasone closure during benthos spawning and in case of hypoxia.

Thanks for your attention