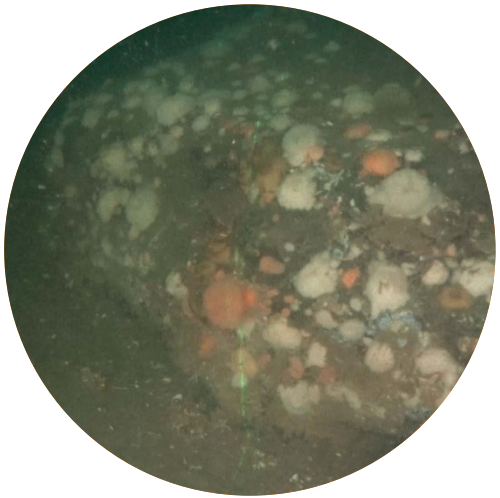
MONS project Borkumse Stenen

Gefinancierd door de Europese Unie

MONS ID49 Effectiviteit gesloten gebieden

Oscar Bos, Joël Cuperus, Timo Gaida, Bas Binnerts, Sander Wijnhoven



WAARDENBURG Ecology

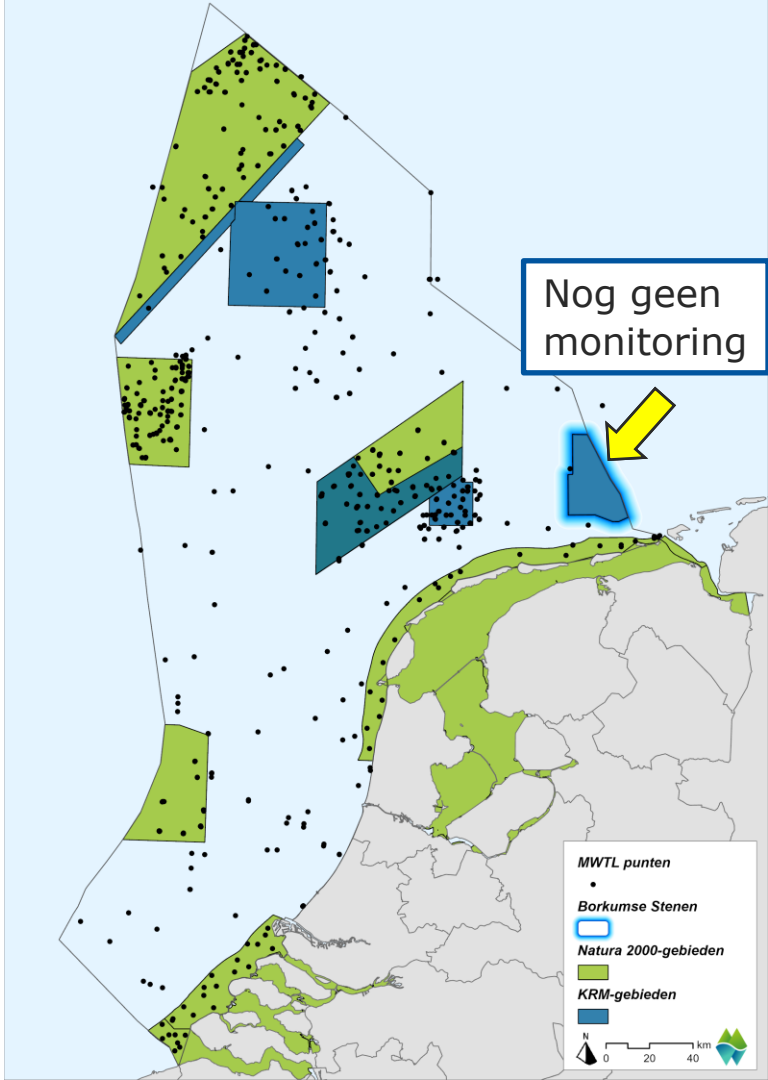
WAGENINGEN UNIVERSITY & RESEARCH

TNO innovation for life

Ecoauthor SWE2

Inleiding

- Doel MONS: evaluatie effectiviteit sluiting gebieden voor visserij
    - Met KRM monitoringprogramma (MWTL)
    - Aanvulling MONS:
        - Friese Front, Centrale Oestergronden: loopt mee vanaf 2024
        - Borkumse Stenen: te weinig bekend
- Opdracht: opstellen monitoringsplan

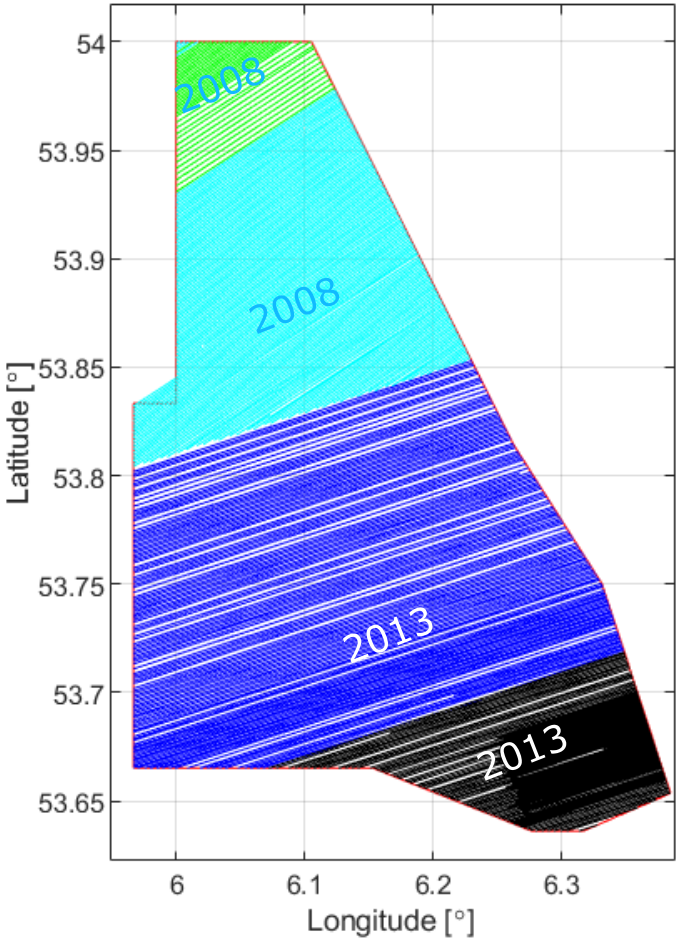


Opdracht

1) Inventarisatie van bestaande data
    - Akoestische data
    - Boxcore, video, habitatkaarten
    - Biodiversiteit
2) Veldwerk augustus 2024
3) Analyse data
4) Opstellen monitoringsplan

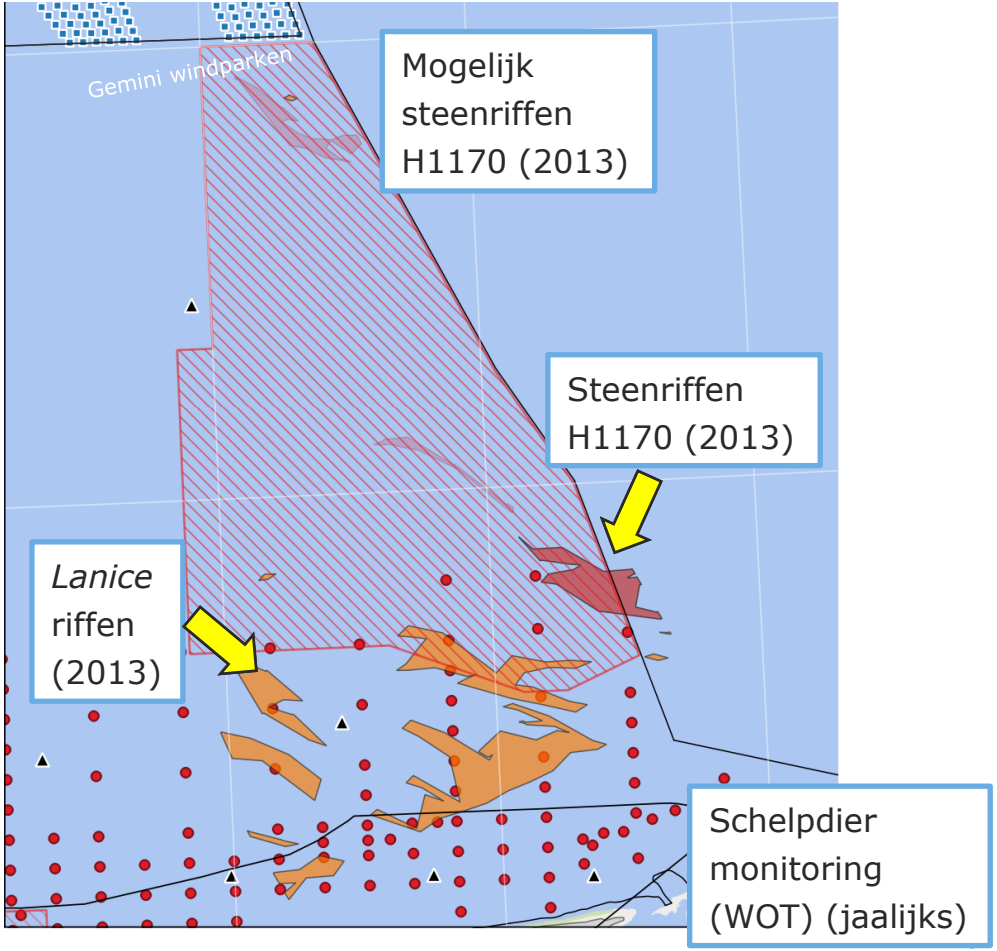
1. Historische data

- Akoestische data
  - Hydrografische Dienst
  - Volledige dekking gebied
  - Side Scan Sonar (SSS)



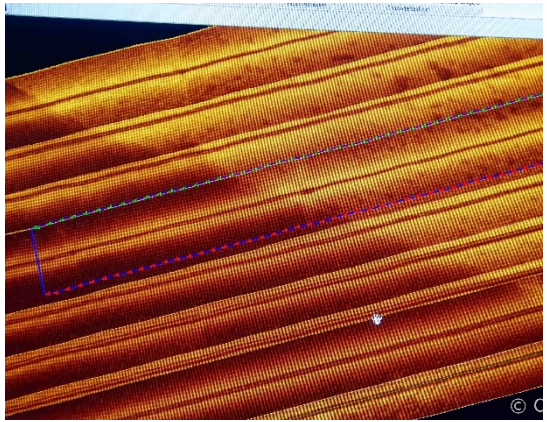
2. Benthos data

- 2009: Eerste SSS survey (elke 1.5 km)
- 2013: Benthos inventarisatie
    - Boxcore/duikers/video
- Jaarlijks: WOT monitoring
- Duitse MSFD data (video, van Veen)
- ReVIFES data (NIOZ) (boxcore)



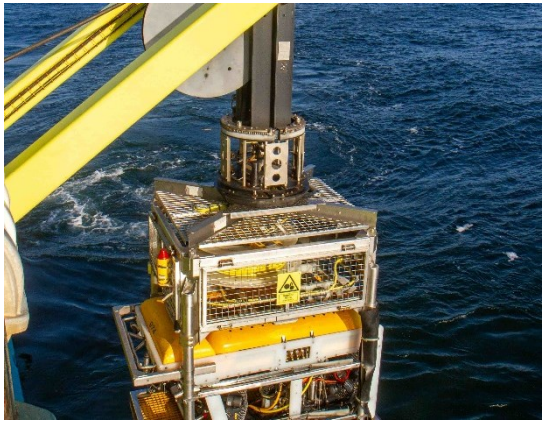
3. Veldwerk: extra habitat en biodiversiteits data

Augustus 2024

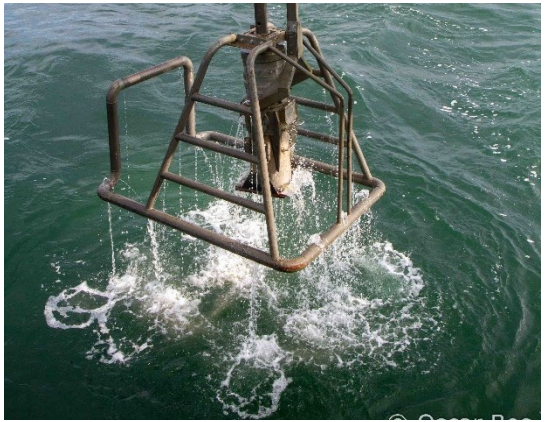


SSS & MBES (nacht)

Ca 3 km^2

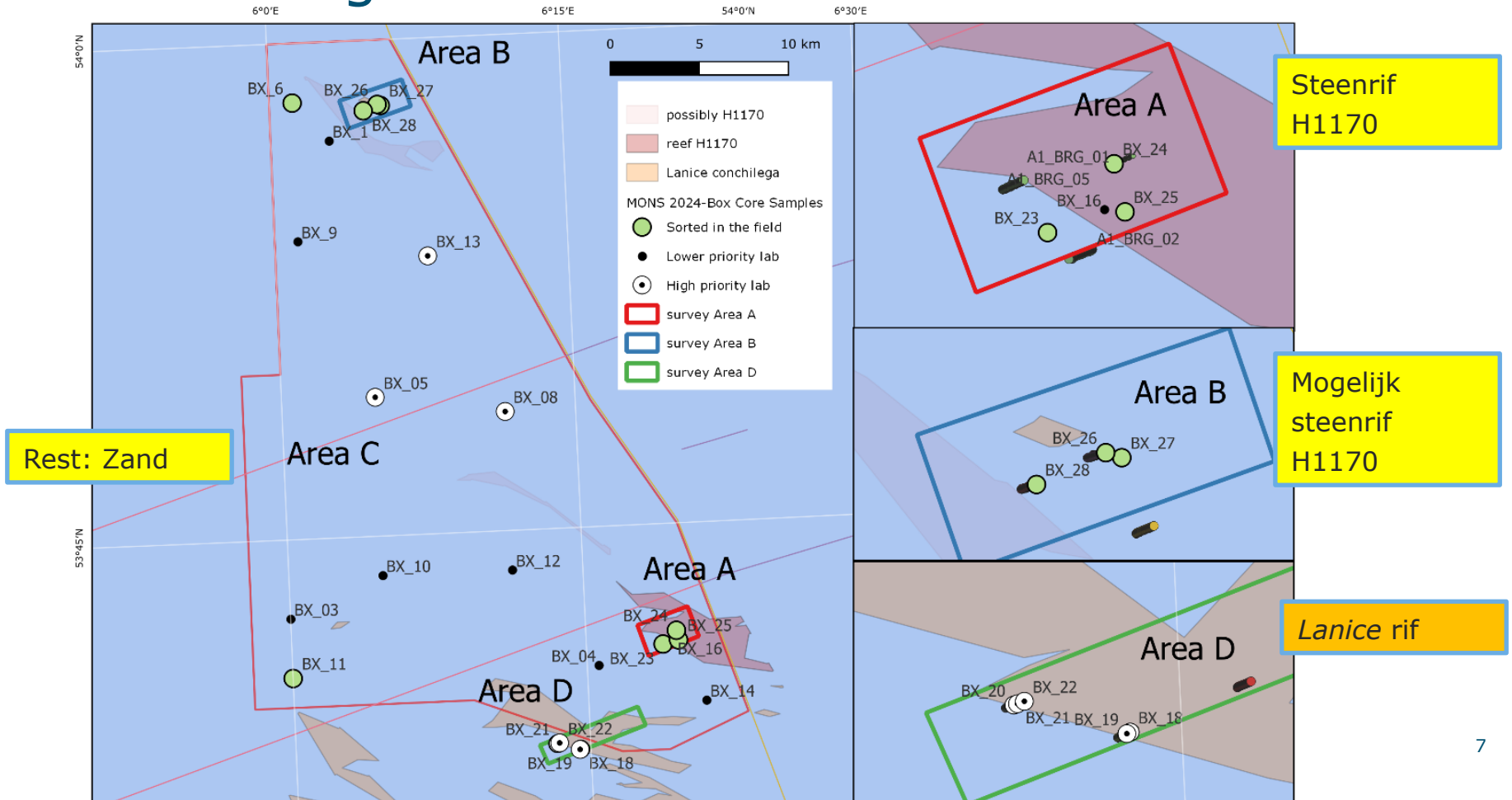


ROV tracks (ochtend)



Boxcore (middag/avond)

4. focus gebieden



Steenrif H1170

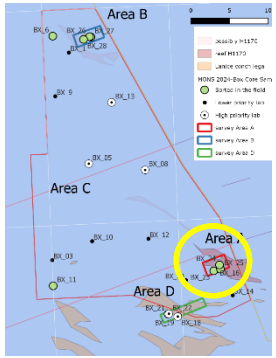
Mogelijk steenrif H1170

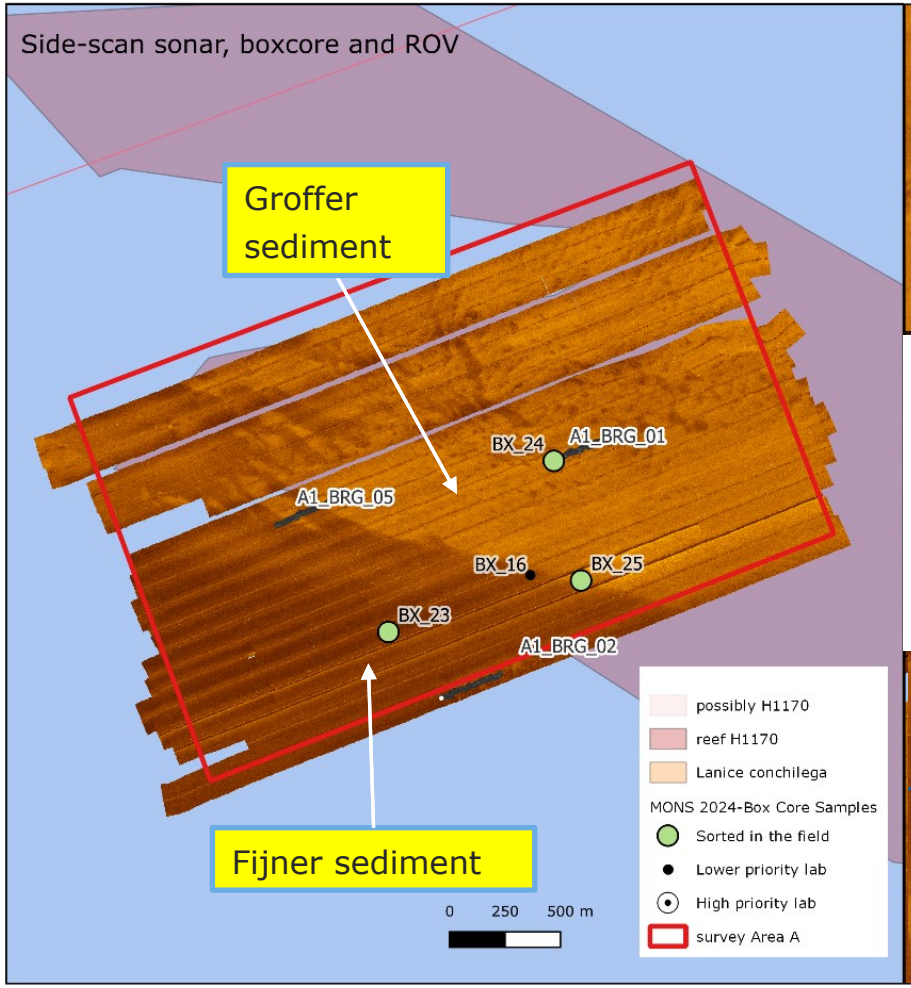
Rest: Zand

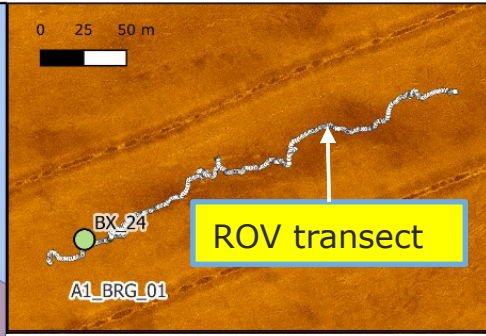
Lanice rif

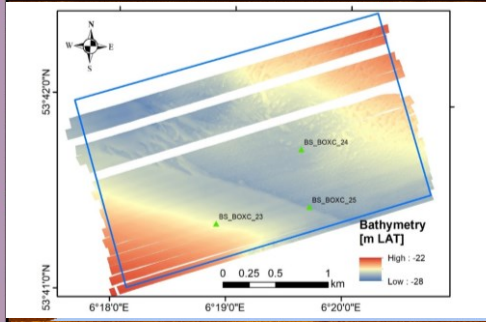
Gebied A

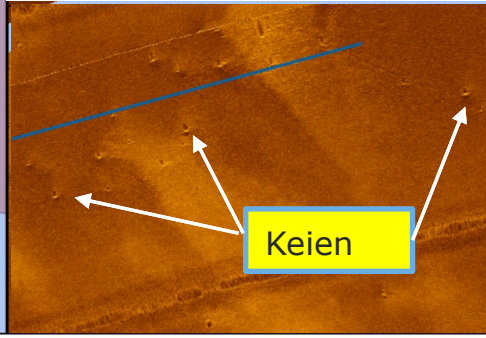
- Zand
- Losse keien











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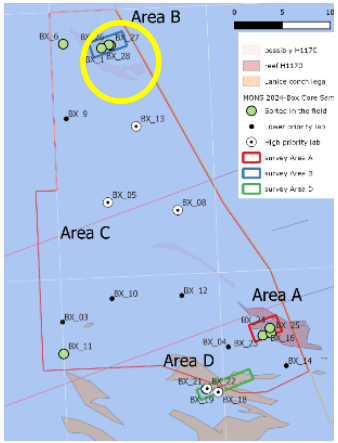
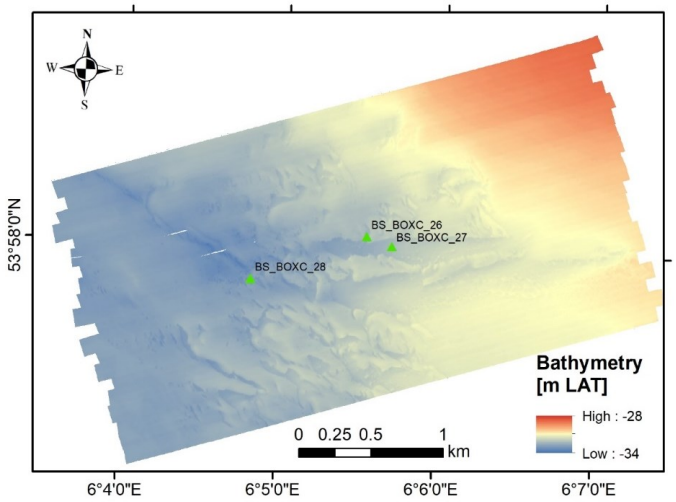
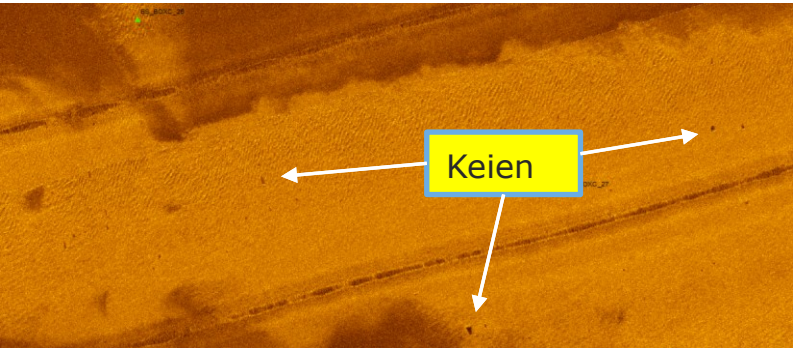
gebied A – H1170

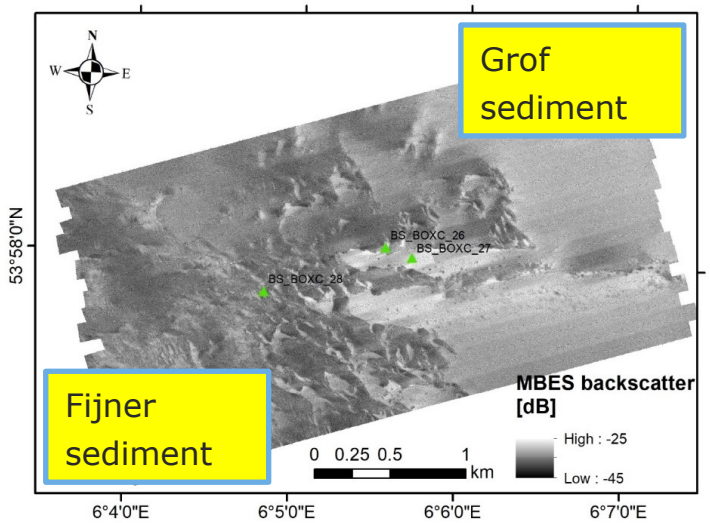
Steenriffen (H1170) (gebied B)

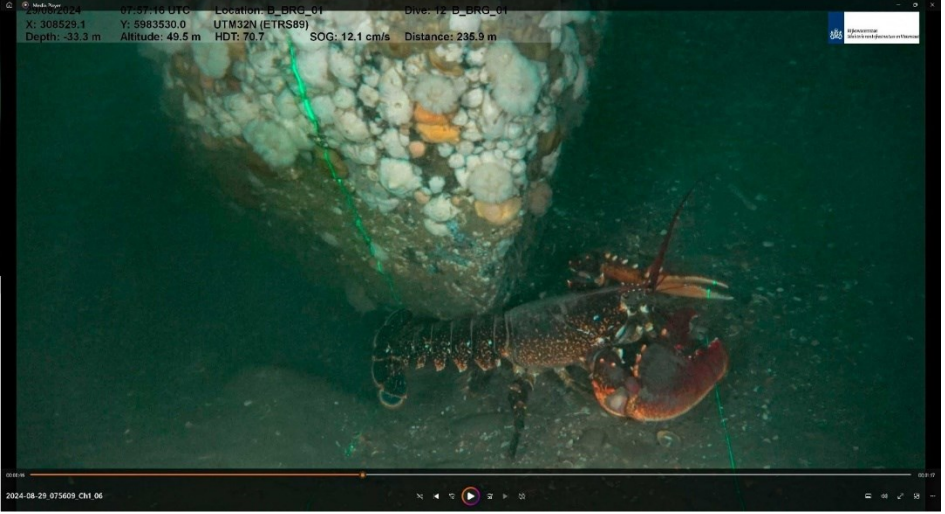
- Keien/stenen/ grind, zand
- Grof substraat










X: 308529.1
Y: 5983530.0
UTM32N (ETRS89)
Depth: -33.3 m
Altitude: 49.5 m
HDT: 70.7
SOG: 12.1 cm/s
Distance: 235.9 m
2024-08-29_075609_Ch1_06

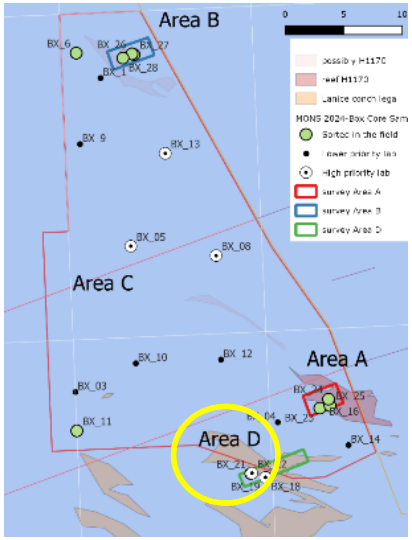

X: 308368.6
Y: 5983498.6
UTM32N (ETRS89)
Depth: -33.7 m
Altitude: 46.8 m
HDT: 131.9
SOG: 14.0 cm/s
Distance: 72.8 m
2024-08-29_072609_Ch1_03

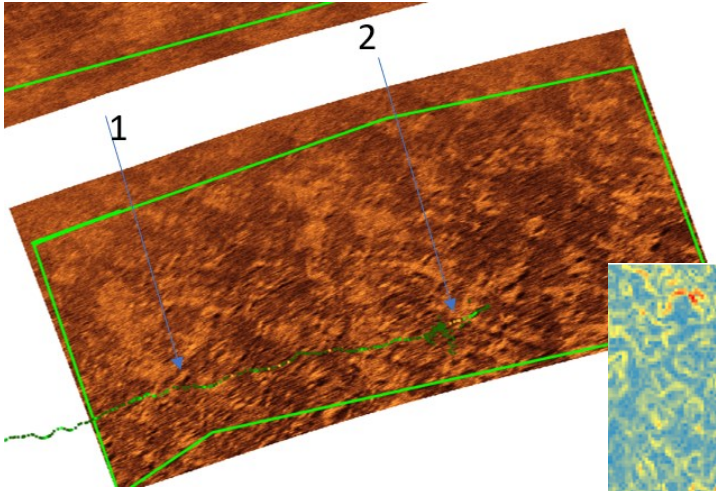

X: 309070.3
Y: 5983770.6
UTM32N (ETRS89)
Depth: -32.7 m
Altitude: 33.4 m
HDT: 190.2
SOG: 13.3 cm/s
Distance: -3.5 m
2024-08-29_083707_Ch1_00

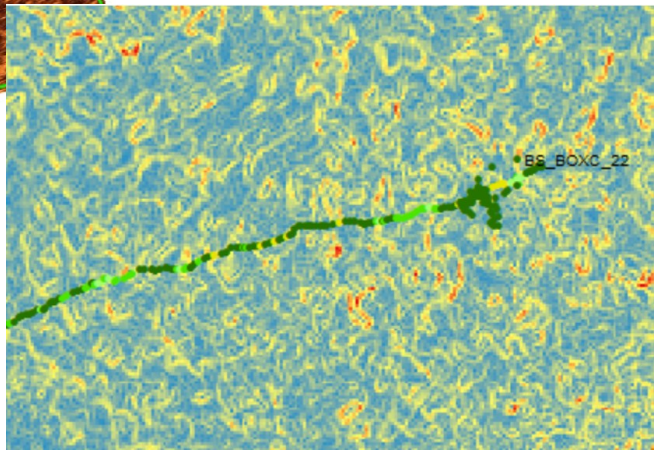

X: 308388.9
Y: 5983510.5
UTM32N (ETRS89)
Depth: -33.4 m
Altitude: 44.4 m
HDT: 59.4
SOG: 11.8 cm/s
Distance: 95.6 m
2024-08-29_072609_Ch1_03

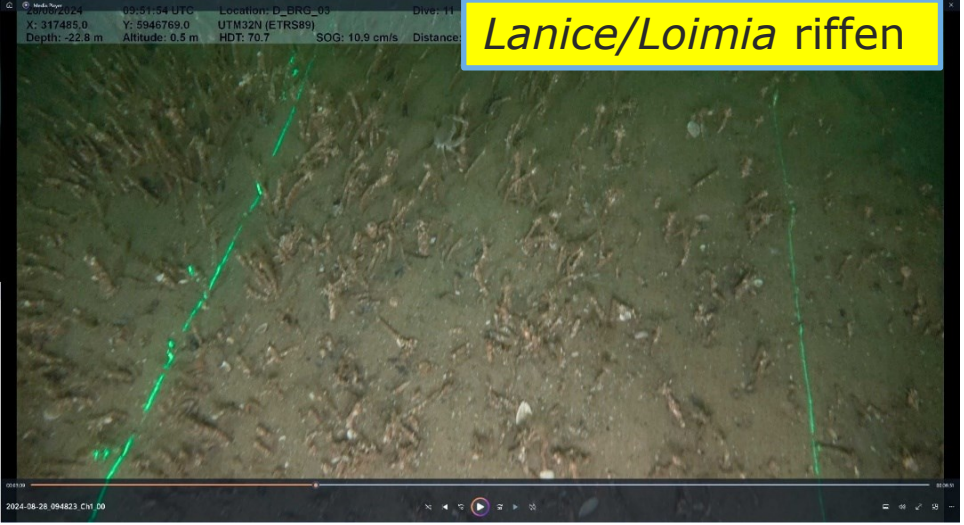
Lanice/Loimia riffen (gebied D)

- *Lanice/Loimia* riffen



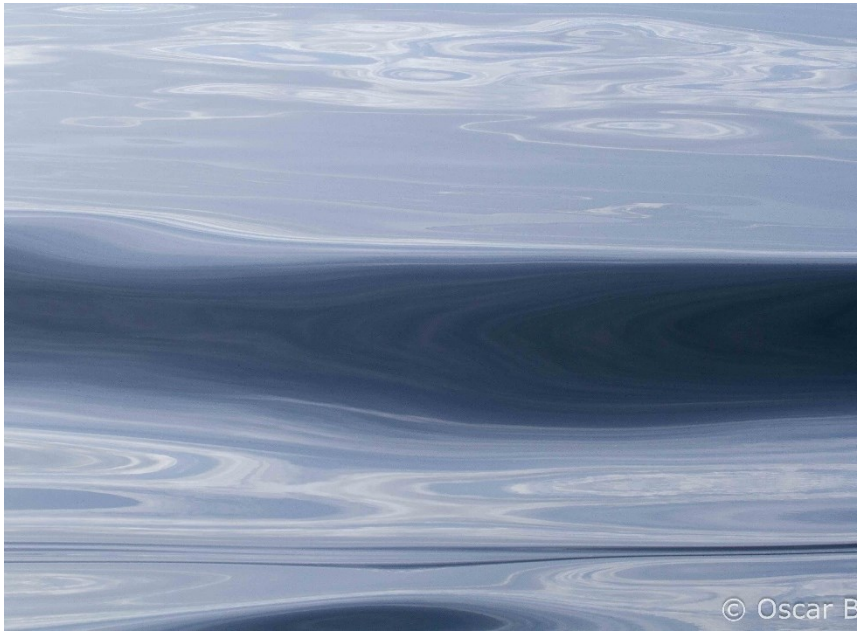






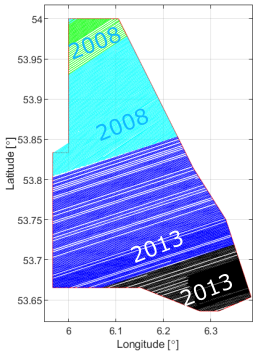
Lanice/Loimia riffen

5. Data verwerking en analyse



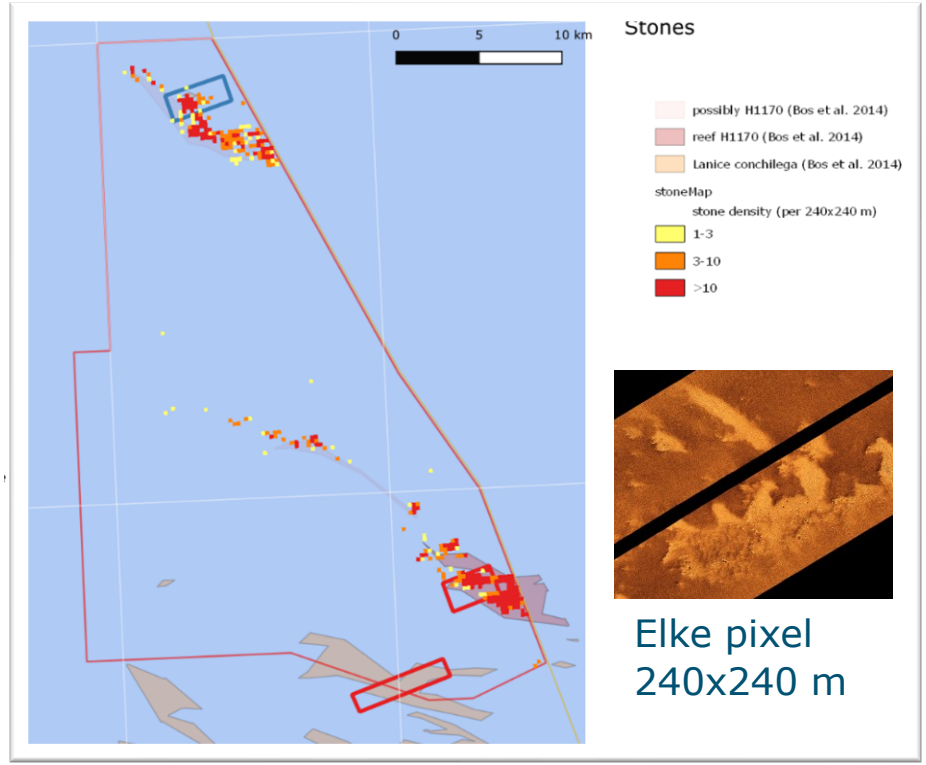
Steenriffen (H1170)

- Steen-dichtheidskaart
- Gebaseerd op SSS data



N stones per 240x204 m	N squares	Area (m2)	Area (ha)	Area (km2)
1-3	59	3,398,400	339.84	3.40
3-10	100	5,760,000	576.00	5,76
>10	161	9,273,600	927.36	9,27
TOTAL	320	18,432,000	1843.20	18.43

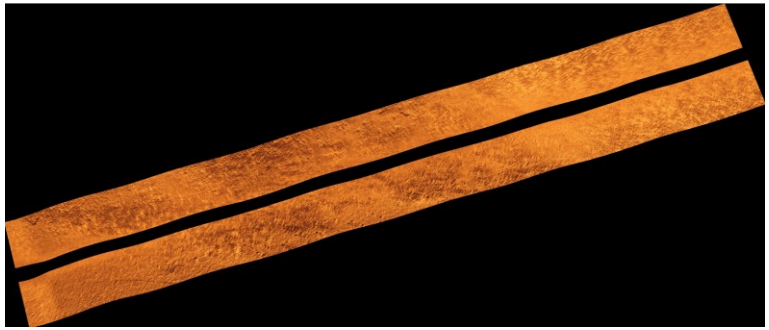
	Borkum Reef Grounds
Area total	684 km2
Areas with stones	18.43 km2



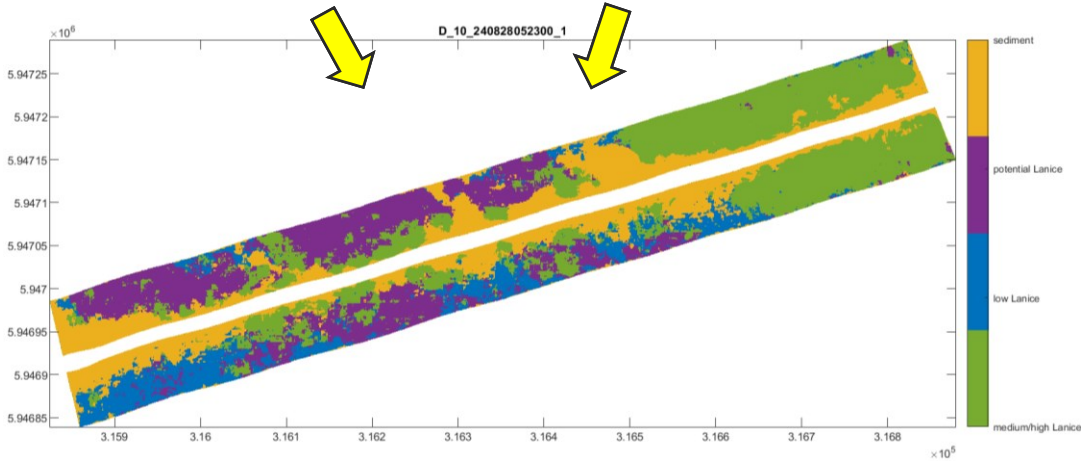
Elke pixel 240x240 m

Lanice/Loimia riffen Classificatie van SSS data (AI model)

SSS data

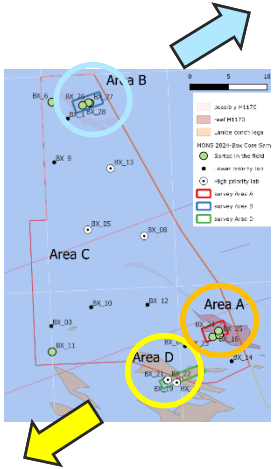


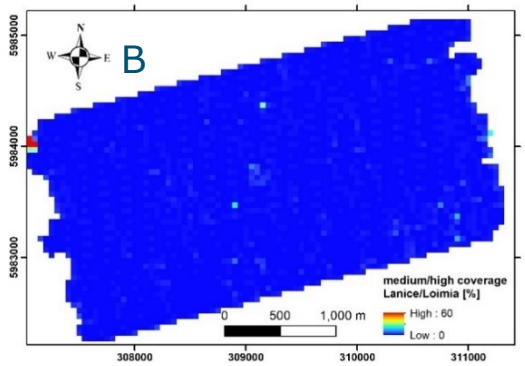
Annotatie aan boord m.b.v. de video

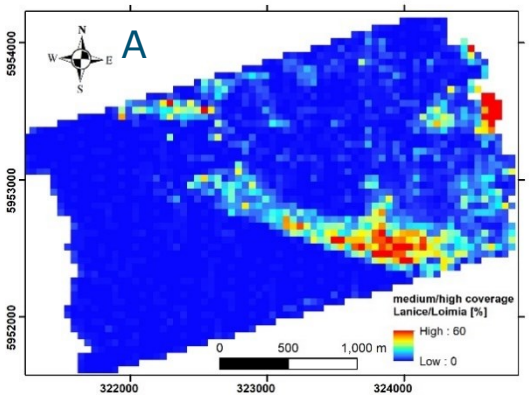


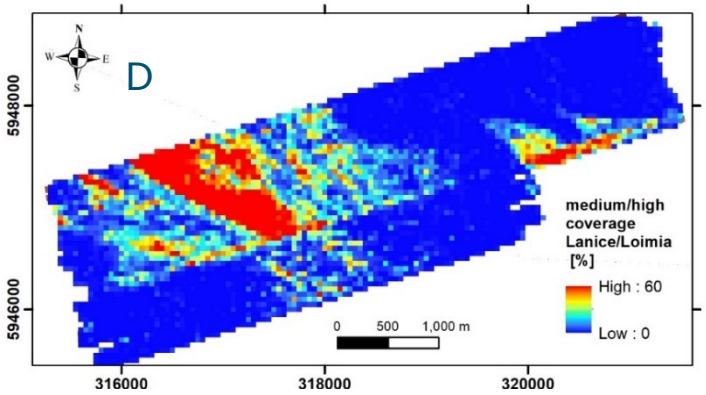
Lanice/Loimia riffen

- Detectie van riffen via AI analyse van akoestische data (SSS)







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Biodiversiteit
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Boxcores 138 taxa (88 soorten)
Video: 35 taxa (20 soorten)
© Oscar Bos


Stenen in gebied B
Box 27


© Oscar Bos


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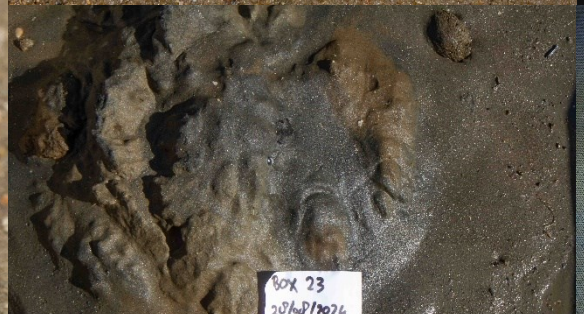
35% *Loimia*
65% *Lanice*
© Oscar Bos


BOX 23

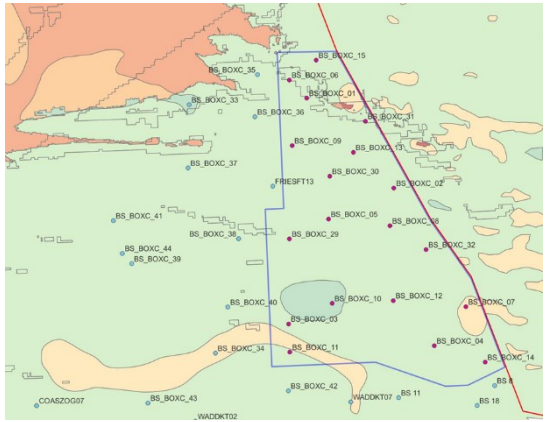

BOX 22

6. Voorgesteld monitoringsprogramma

- Doel: bepaling omvang, kwaliteit en ontwikkelingen van
  - EUNIS habitats
  - H1170 steenriffen
  - *Lanice/Loimia* riffen
- Analyse:
  - BISI indicator
  - Classificatie (AI model) van SSS data

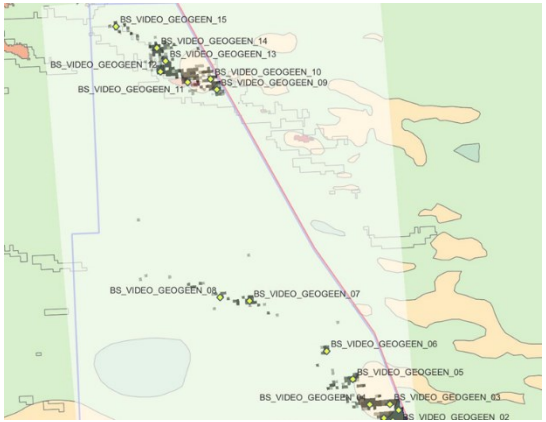
Monitoringsprogramma 2025

EUNIS habitats



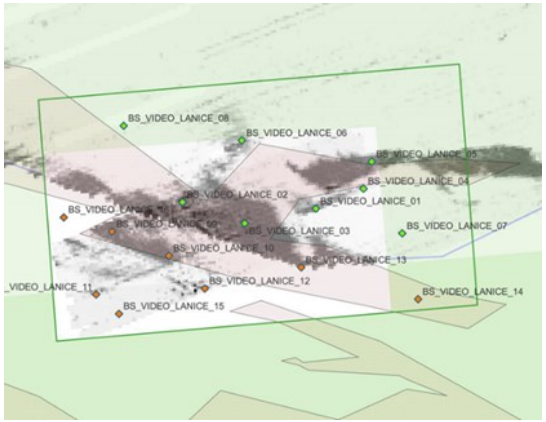
- Boxcore (19 binnen + 19 buiten)

Steenriffen H1170



- 16 video transecten
- Steen tot steen, 120 m

Lanice/Loimia riffen

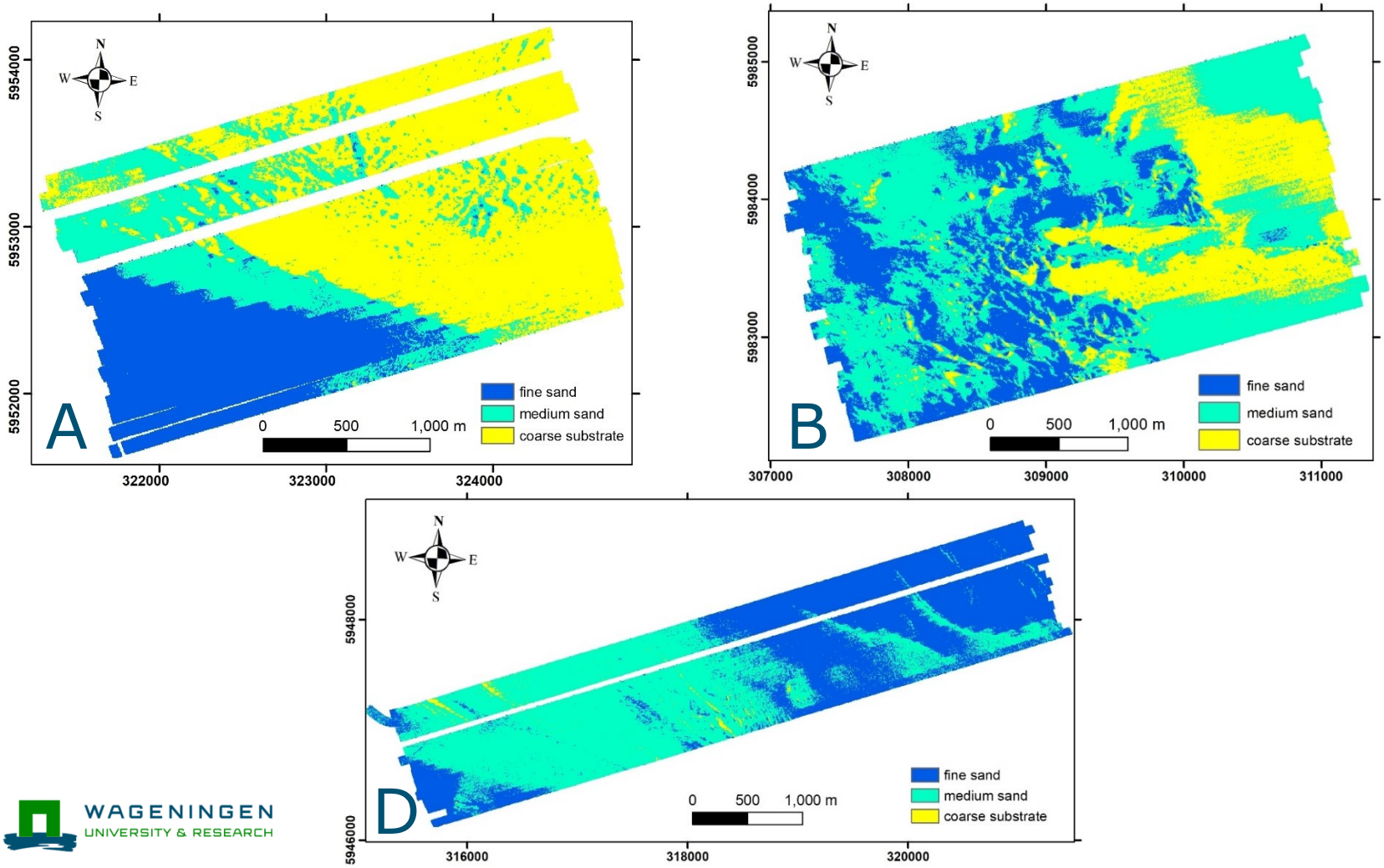


- 16 video transecten (rechte lijn)
- BACI
- SSS

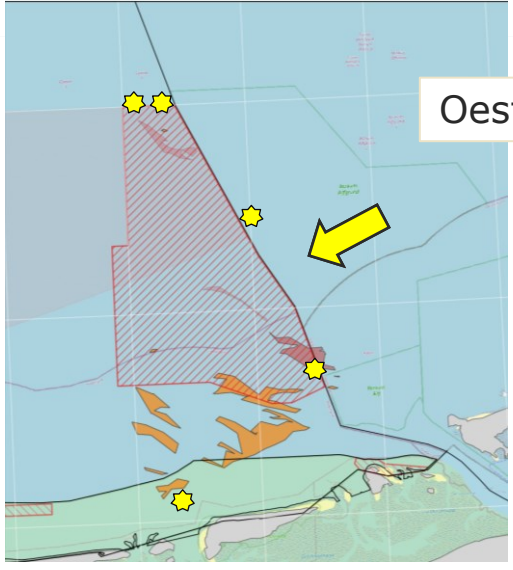
Conclusies

- Combinatie van akoestiek, video en boxcore werkt goed
- Historische en nieuwe akoestische data heel waardevol
    - Voor bv. natuurherstelprojecten (site selectie) in de hele Noordzee
    - Biogene riffen kunnen gedetecteerd worden door classificatie (AI modellen) van SSS data
- Borkums Stenen nu veel beter in kaart
    - Steenriffen nauwkeurig in beeld
    - *Lanice/Loimia* riffen vastgesteld
    - Aantal soorten nieuw (alleen bekend van Klaverbank)
    - *Loimia* volop aanwezig
- Monitoringsplan af (en de bemonstering is begonnen)

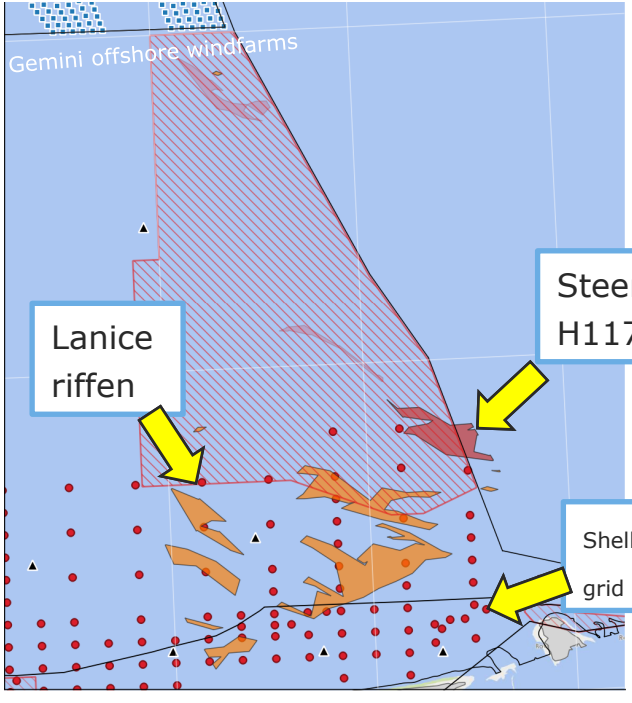
Dank


A
B
D
N
W
E
S
fine sand
medium sand
coarse substrate
0
500
1,000 m
5954000
5953000
5952000
322000
323000
324000
5985000
5984000
5983000
307000
308000
309000
310000
311000
5948000
5946000
316000
318000
320000

Context



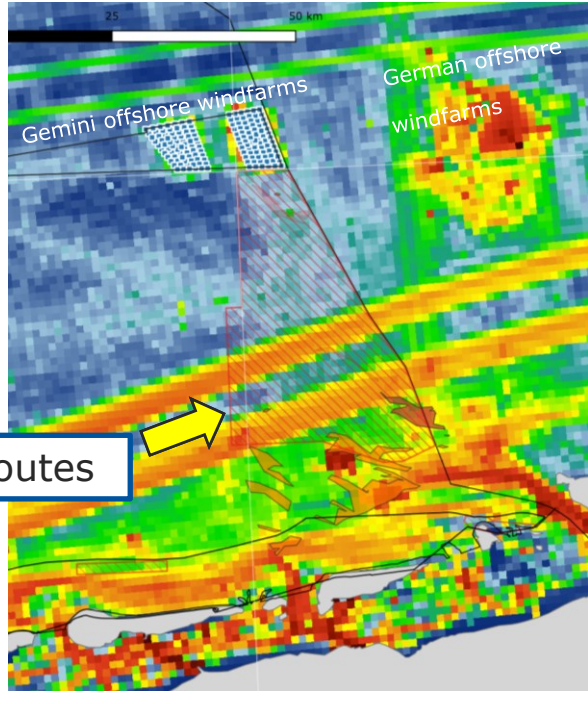
Oester herstel projecten



Lanice riffen

Steenriffen H1170

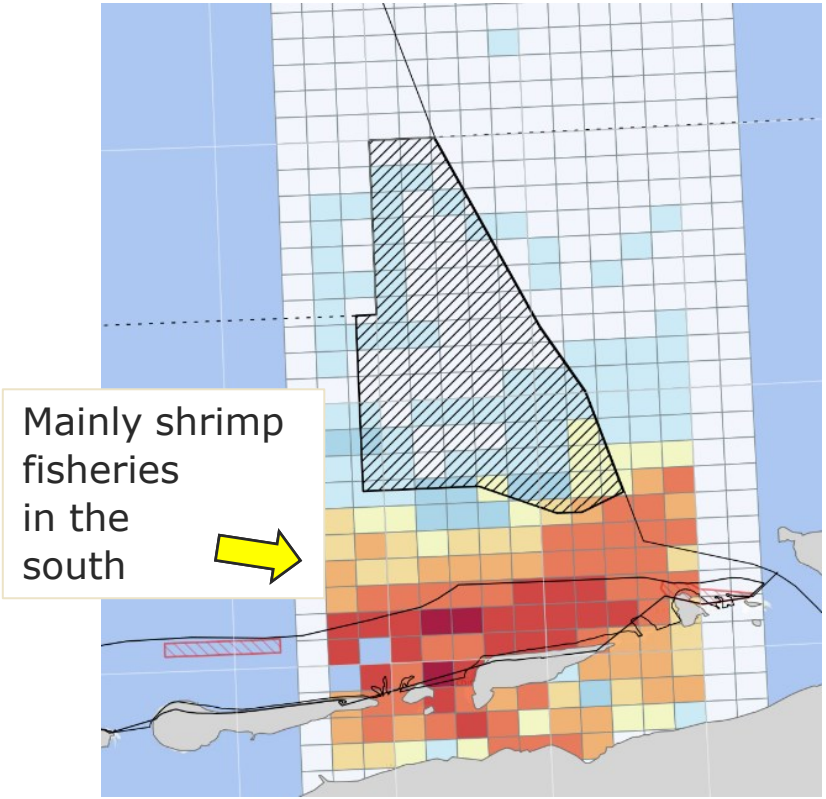
Shellfish monitoring grid (WOT)



Scheepvaart routes

Context: fishing

- 2014-2021
  - 59 fishing days/y
    - 48 days NL, 10 Germany
  - Mainly shrimp fisheries

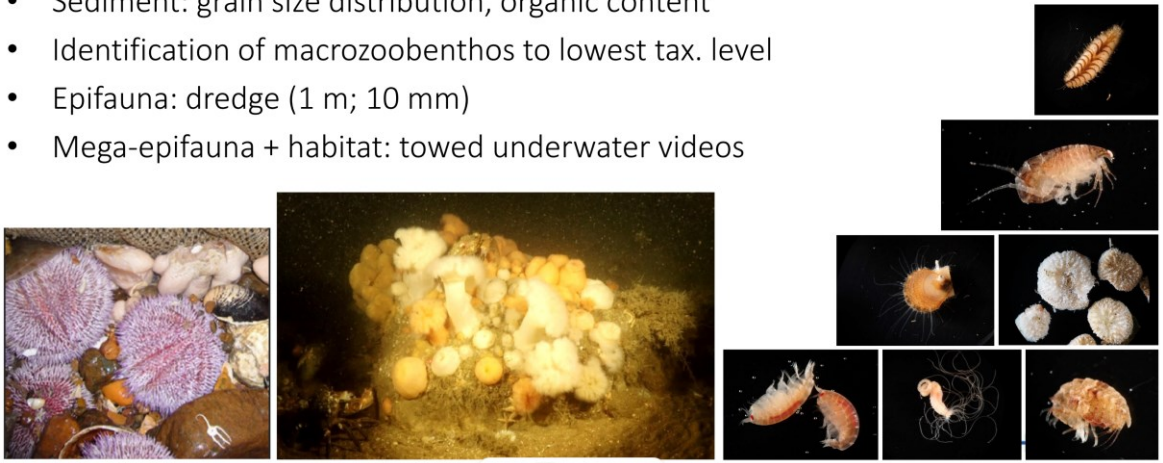


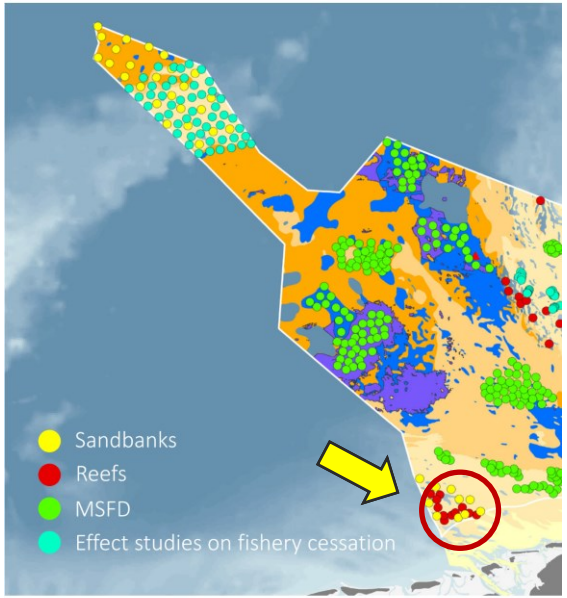
Art 11 background document (https://kennisdelen.rvo.nl/groups/view/244e11b4-4982-410f-ab62-eb94b7e23d51/community-of-practice-noordzee/files/cc1d62a2-bb6e-4275-b1ce-4c95e2b3b8df).

German MSFD sampling data

Sampling practices

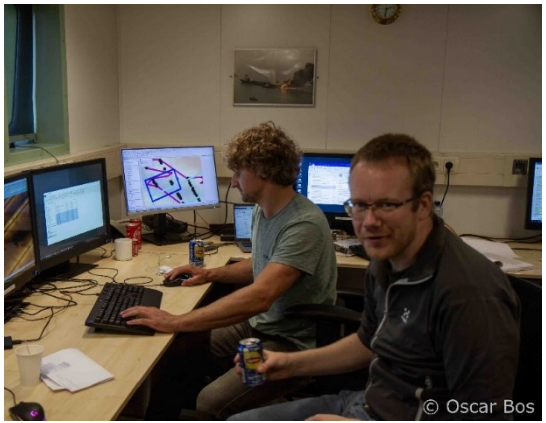
- Infauna: van Veen grab (0.1 m^2); seeving at 1000 µm
- Sediment: grain size distribution, organic content
- Identification of macrozoobenthos to lowest tax. level
- Epifauna: dredge (1 m; 10 mm)
- Mega-epifauna + habitat: towed underwater videos



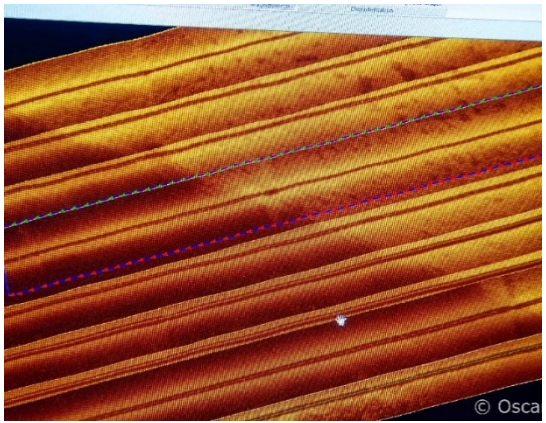


Night: side scan sonar & multibeam

Sss during the night (~ 3km2)

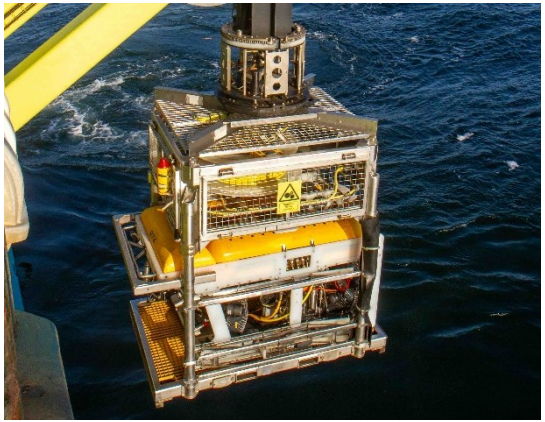


Data analysis before breakfast



Selection of ROV tracks after breakfast

ROV



3 transects of 200 m

Annotation of species and habitats during flying

Ready for lunch

boxcore

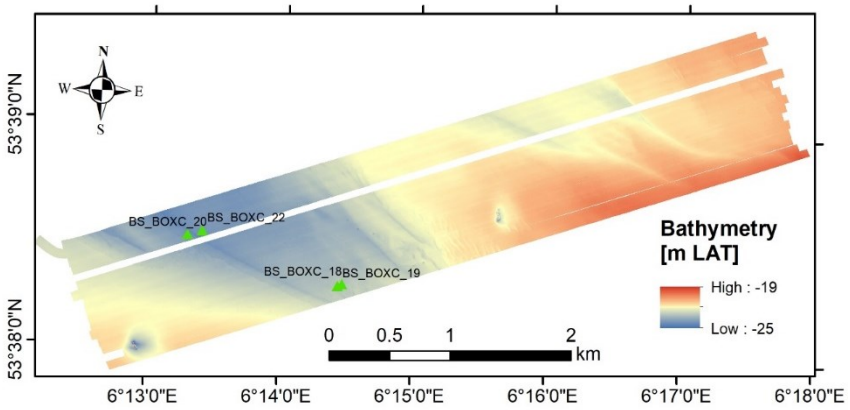
boxcoring all afternoon/evening

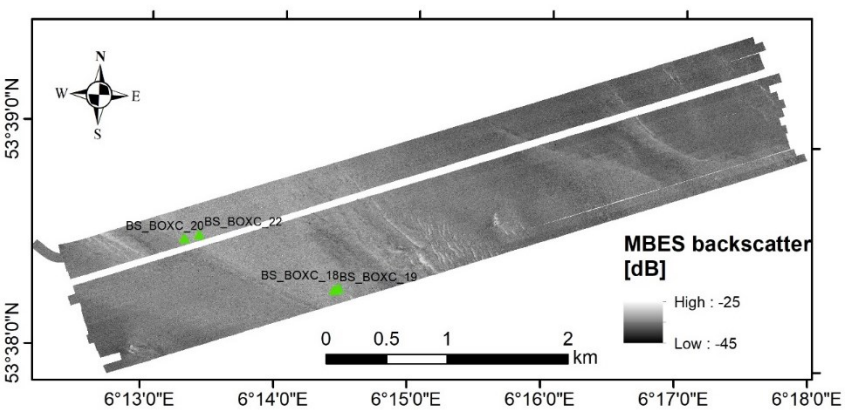
Fixed locations (EUNIS)

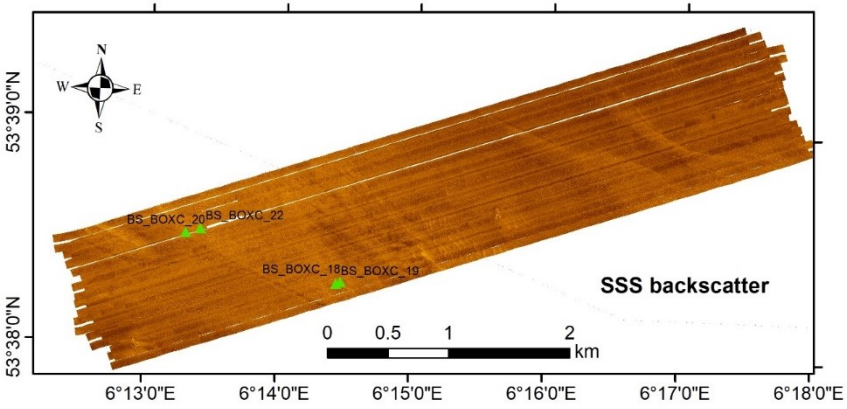
Extra samples (groudtruthing sss and video images)

Loimia present

D: Lanice/Loimia riffen







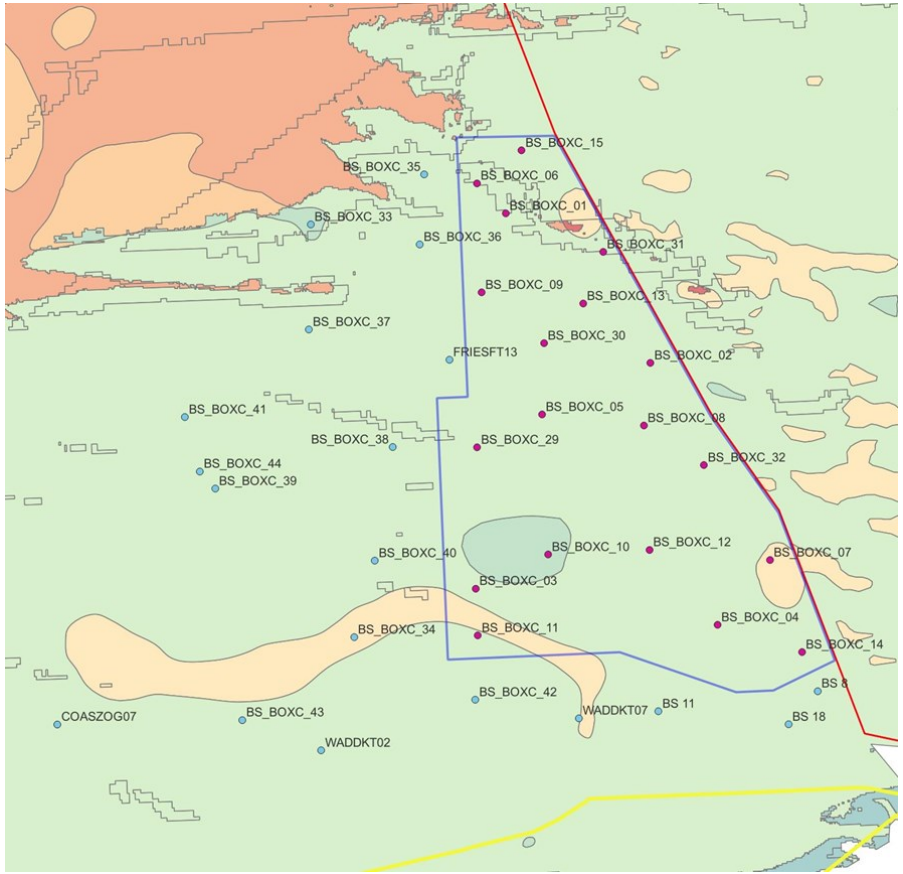
Biodiversiteit

- Boxcores:
  - 138 taxa
  - 88 soorten
    - Lanice: sum: 234 ind in 15 boxcores
    - Loimia: sum: 83 ind in 15 boxcores
- Video (rocks)
  - 35 taxa (20 species)

- Biodiv data serve for BISI indicator

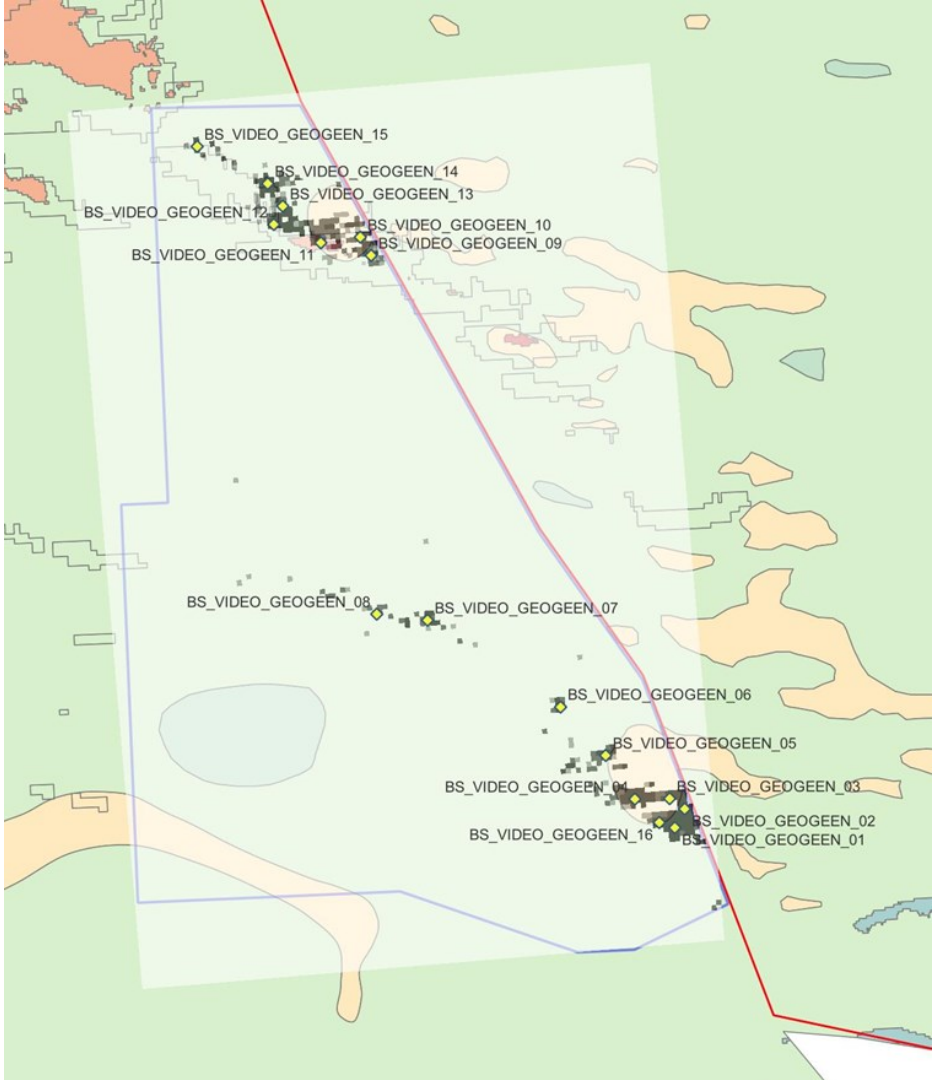
EUNIS broad habitat types

- Boxcores
  - 19 inside MPA
  - 19 outside MPA



H1170 rock reefs

- Video monitoring H1170
  - 16 video transects
  - 120 m each
  - Stone to stone



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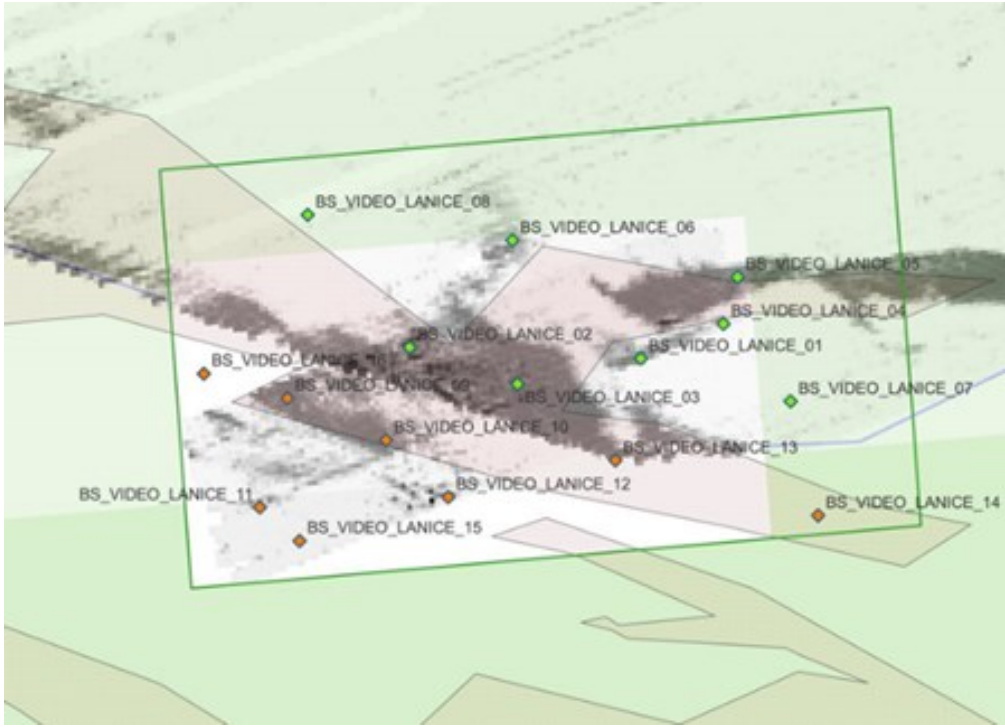
Lanice/Loimia reefs

- Video
  - 16 transects of 120 m
  - BACI
    - 8 inside reef
    - 8 outside reef
  - Straight line
- SSS – whole reef area



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