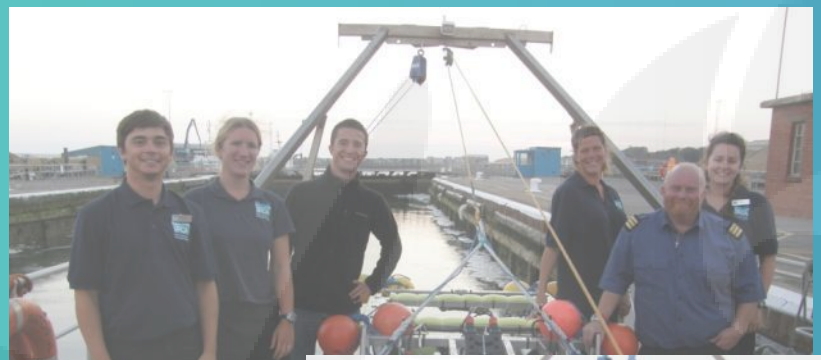

PANACHE

Protected Area Network Across the Channel Ecosystem

A Comparative study of towed video for MPA monitoring in different marine habitats

twitter @Dr Emma Sheehan

Dr Sandrine Vas,Erin Pettifer, Dr Nicola Foster, Dr Luke Holmes, Sarah Nancollas, Sophie Cousens, Ian Jones, Noemie Baux, Nicolas Desroy and Prof Martin Attrill

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Sussex IFCA Inshore Fisheries and Conservation Authority

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Content

- Background to WP2 part b
- Details of the experimental trial and results
- Lessons learnt for us and the wider scientific community

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Background

- I focus on studying the positive and negative effects of human impacts (fisheries, marine renewables, MPAs) on the seabed to help protect the marine environment and provide data for sustainable use of our seas

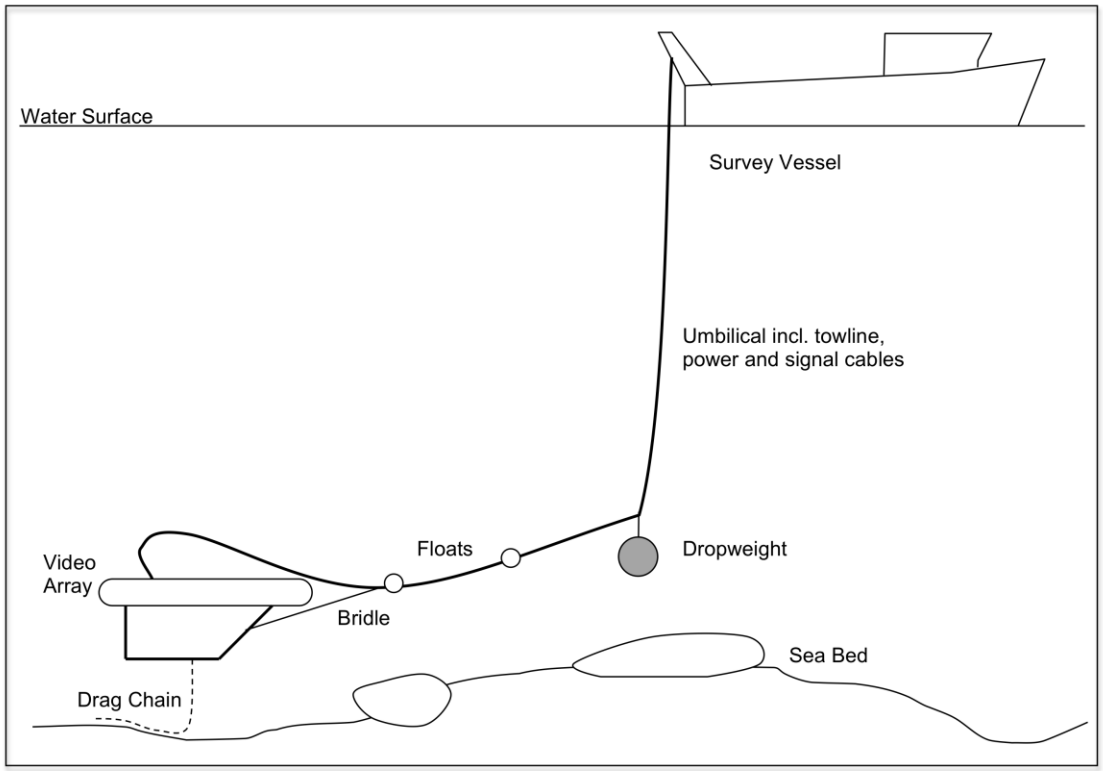
- Developed cost-effective methods of sampling the seabed using video cameras

Methods

Towed Flying Array– HD (1)

- Sheehan et al 2010 PLoS ONE

Deploy off a range of fishing boats



- Sheehan et al 2010 PLoS ONE

Benefits of using fishing boats as research vessels

- We benefit from knowledge of the site and experience of towing gear at sea
- Fishers better understand how fishing gear impacts the seabed
- Survey provides an informal friendly arena for discussing ideas about mutually beneficial management practices

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We learn about fishing

We can talk about:
Importance of temperate biogenic reefs

Nursery/Protection

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Feeding habitat

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Spat settlement

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Stabilise sediments

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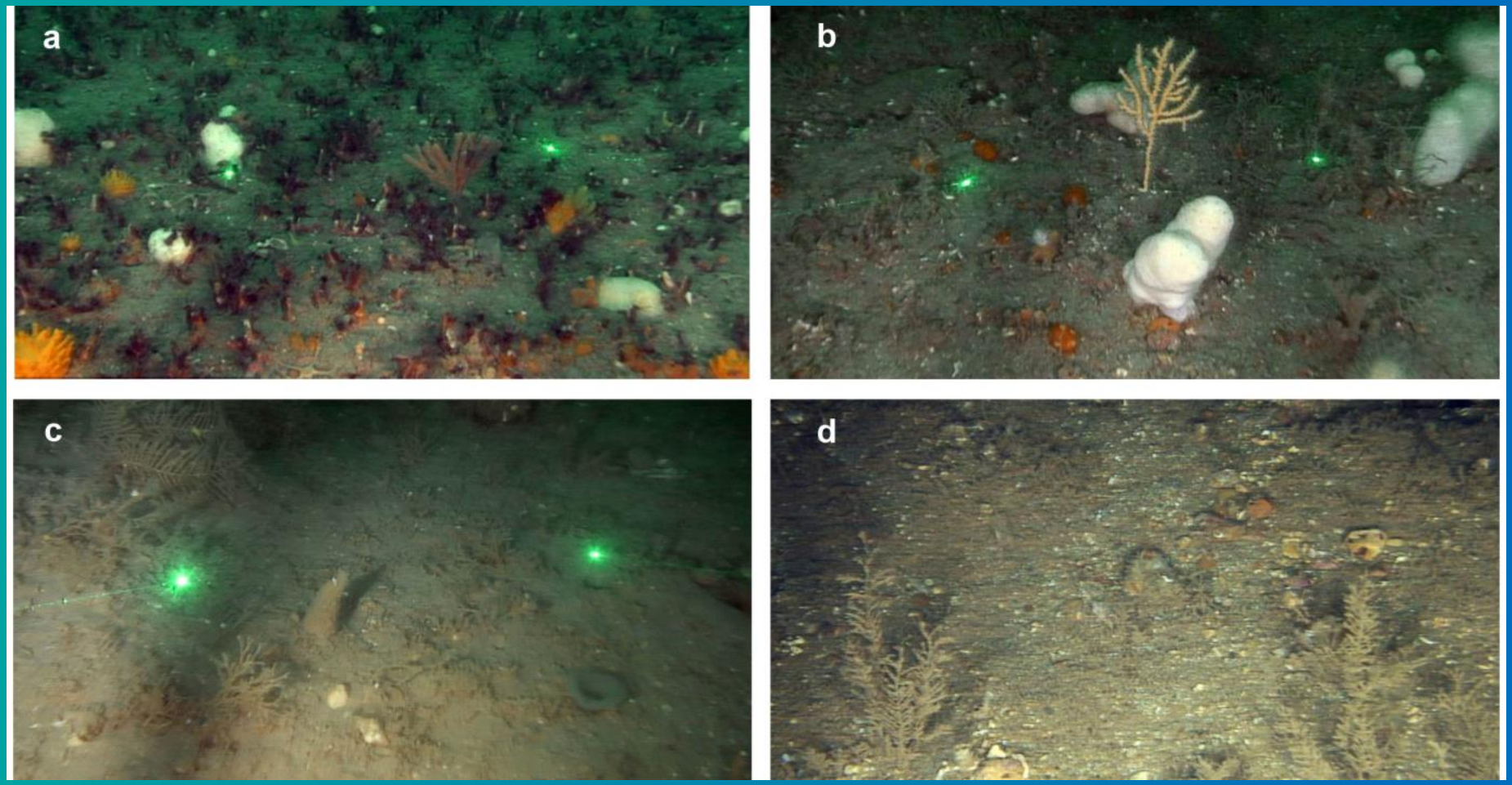

Sheehan et al 2013 Mar. Poll. Bull

Need for Collaborative project

- Increasing numbers of MPAs, new legislation, MSP
- Lots of people undertaking similar surveys

- Presents great opportunity for studying ecological connectivity and MPA effectiveness over large spatial and temporal scales

- But we didn't know if different methods of benthic video sampling are compatible

Rationale

- Aim to develop, test and compare towed underwater video systems (TUVS) for the purpose of habitat and biodiversity monitoring
- Assess compatibility of three TUVS
- Learn from each other and improve existing methods
- Produce best practice recommendations

PANACHE- Develop a new towed video system

SPECIFICATIONS

- Opportunistic use during any type of sea survey (in particular recurrent stock assessment surveys)
- Must resist all kind of weather and sea current conditions
- Should not require dedicated operator (simple to use)
- Yield HD video (and photos) of the bottom biodiversity and sediment type
- Down to -600m (for video monitoring over all the continental shelf)

Develop a new towed video system

PAGURE

(bottom contacting video sledge)

2 video cameras + led lights

1 vertical still camera + flashs

Pointer lasers (scaling)

Topo-laser (rugosity – impact)

Compare towed video systems

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PAGURE

- 290kg
- 1.5 x 1.1 x 0.7 m
- 14 000 €
- HD 1080p
- 600m
- **Benthic contacting sled**

Flying array

- 50kg
- 1 x 1 x 0.5 m
- 35 000 €
- HD 720p
- 100m
- **Benthic tending sled**

IFCA TUVS

- 9kg
- 0.6 x 0.5 x 0.4 m
- 12 000 €
- 480p
- 50m
- **Benthic contacting sled**

Methodology

• 1 MPA over 3 different habitats – sand, mixed and rock

•Technical parameters : camera, lights, laser spec, cost, ease of deployment in various conditions

• Biological response variables (analysed by MI) : Number of taxa, Abundance, Species assemblage on 10 randomly selected frame grabs

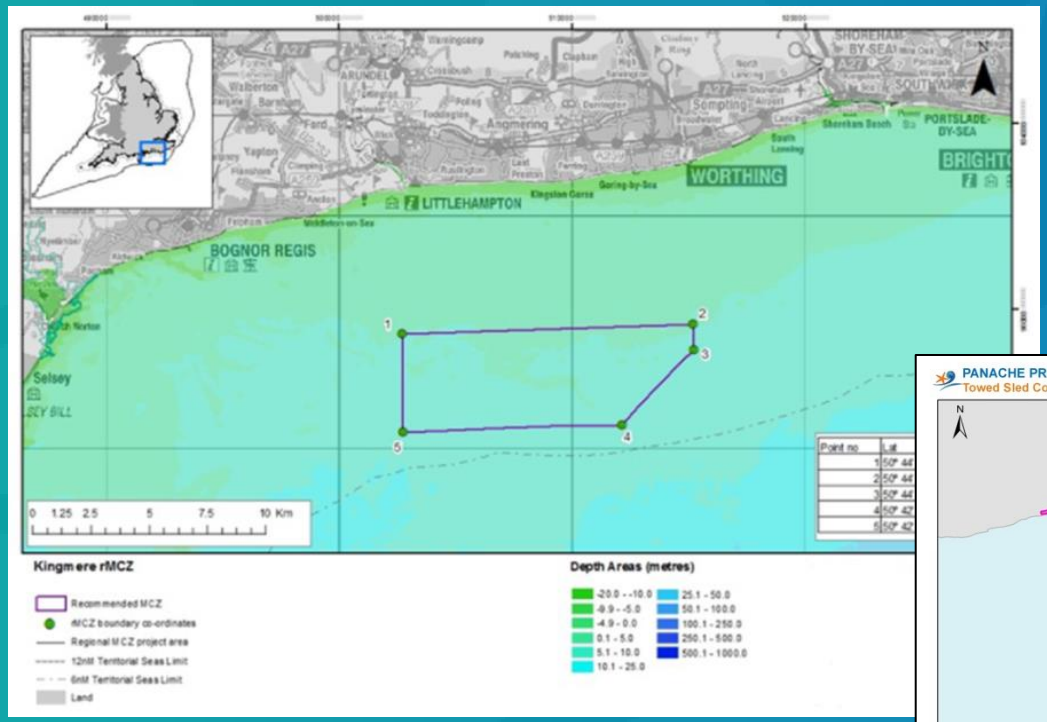
• Impact assessment on different habitats types (analysed by MI) (using backwards facing GoPro)

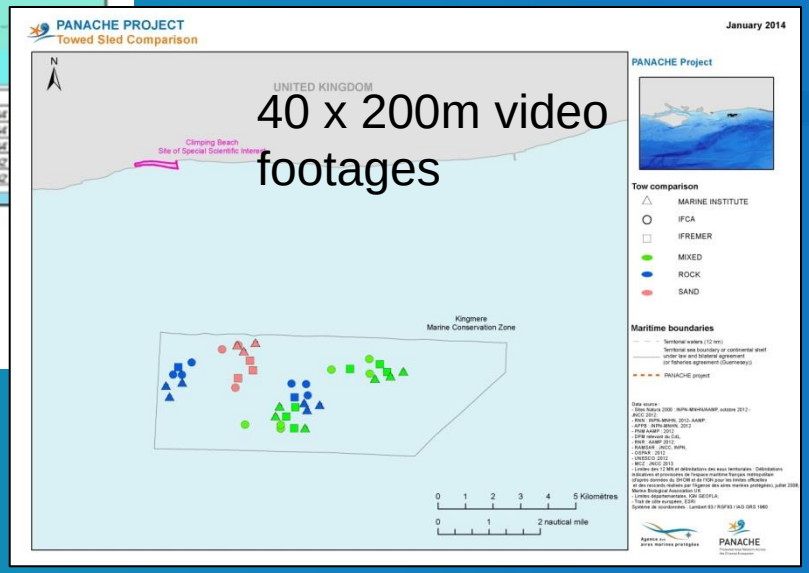
- Analysis all done by MI for data analysis consistency

1=no impact
2=fine sediments resuspended
3=cobbles turned over
4=boulders disturbed
5=Lost visibility

Area of study

Kingmere Marine Conservation Zone, off Sussex, UK





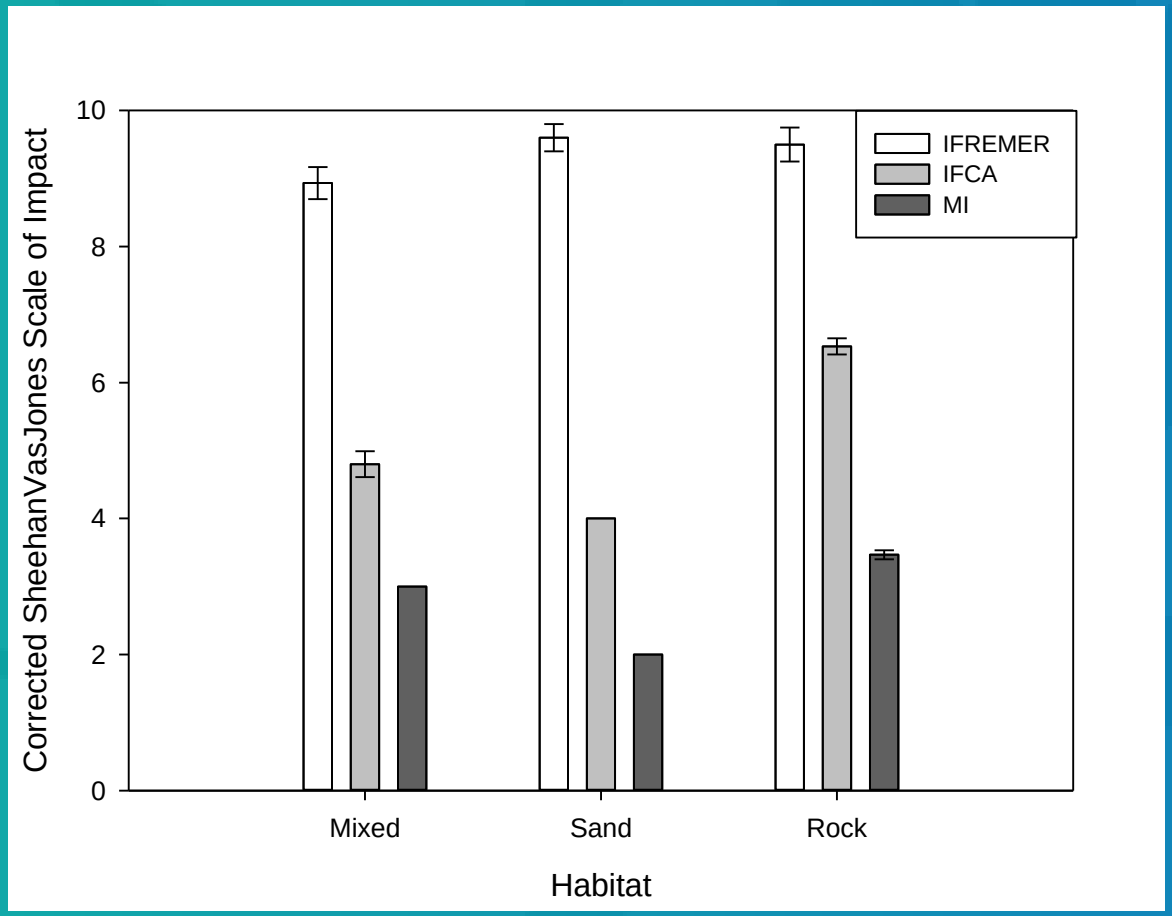
Screen shots

- Vision field size was measured, all observable species were enumerated, % cover were determined, species richness, densities and species assemblages were computed for each individual tow.

Deployment of TUVS

- Deployment ease was often related to the weight of the TUVS
- However, heavier TUVS are more stable on all kind of bottom, current, weather conditions
- Benthic contacting sled not operational on high rock boulders or only as drop down
- Benthic tending sled was more complex to set up and require specialised staff

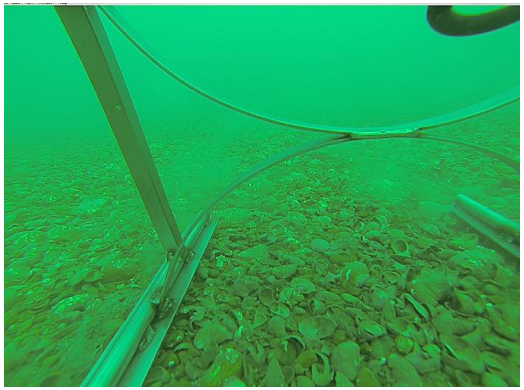
Benthic impact



Heavy benthic contacting sled have greater impact than benthic tending sled

IFREMER on mixed ground.

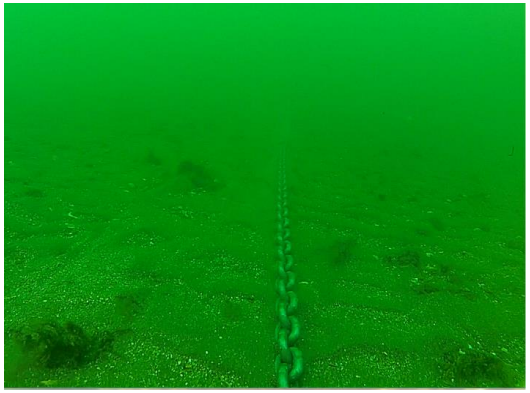
IFREMER on sand.



IFCA on mixed ground.

IFCA on sand.

MI on mixed ground.



MI on sand.

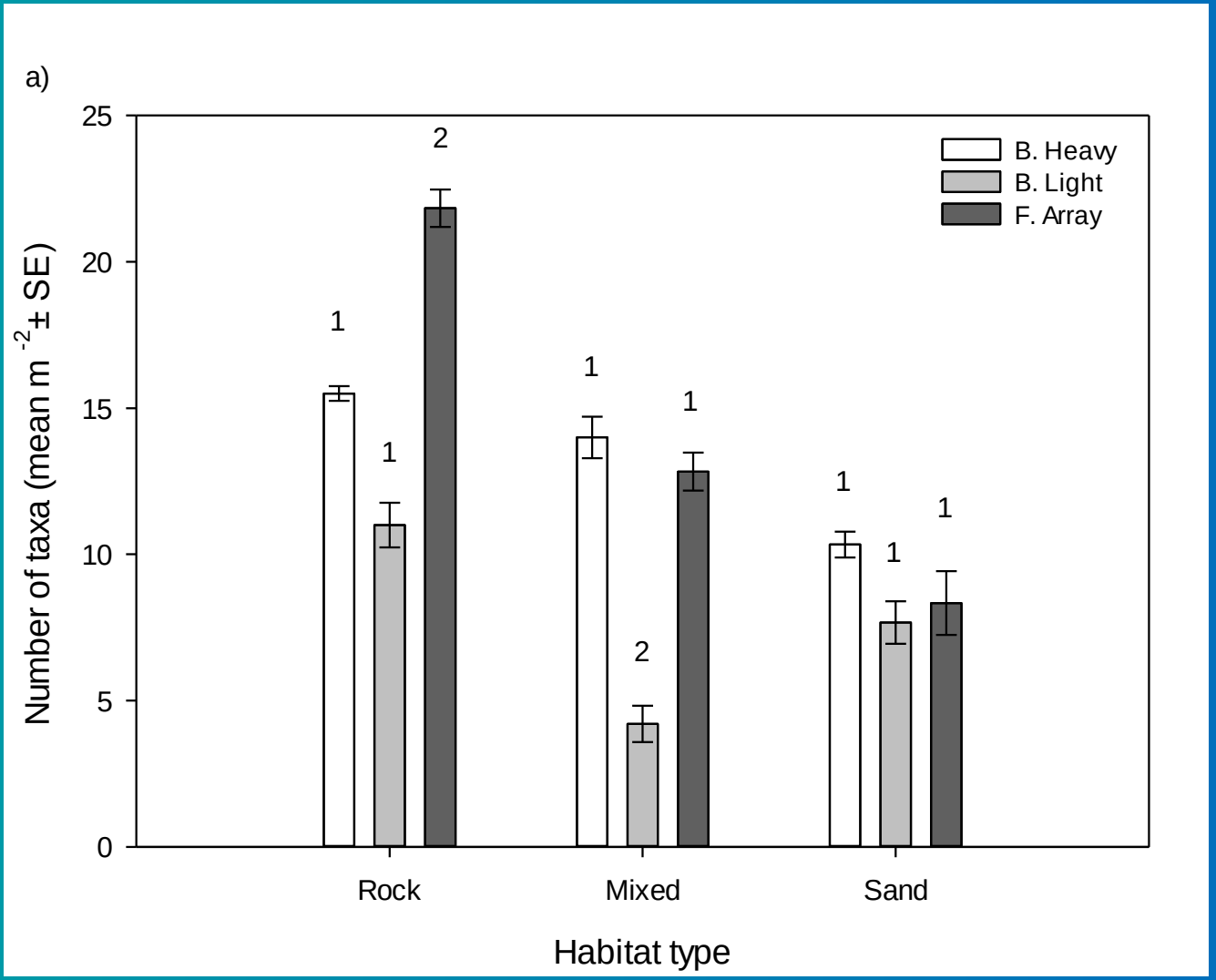
Benthic impact

- Benthic impact may be large for heavy benthic contacting TVS (but only over the surface of the skids). Such system may be dedicated to areas where trawling generally occurs (most of the shelf area).

- Monitoring rocky reefs (boulders over 1m) requires benthic tending systems (or drop down)

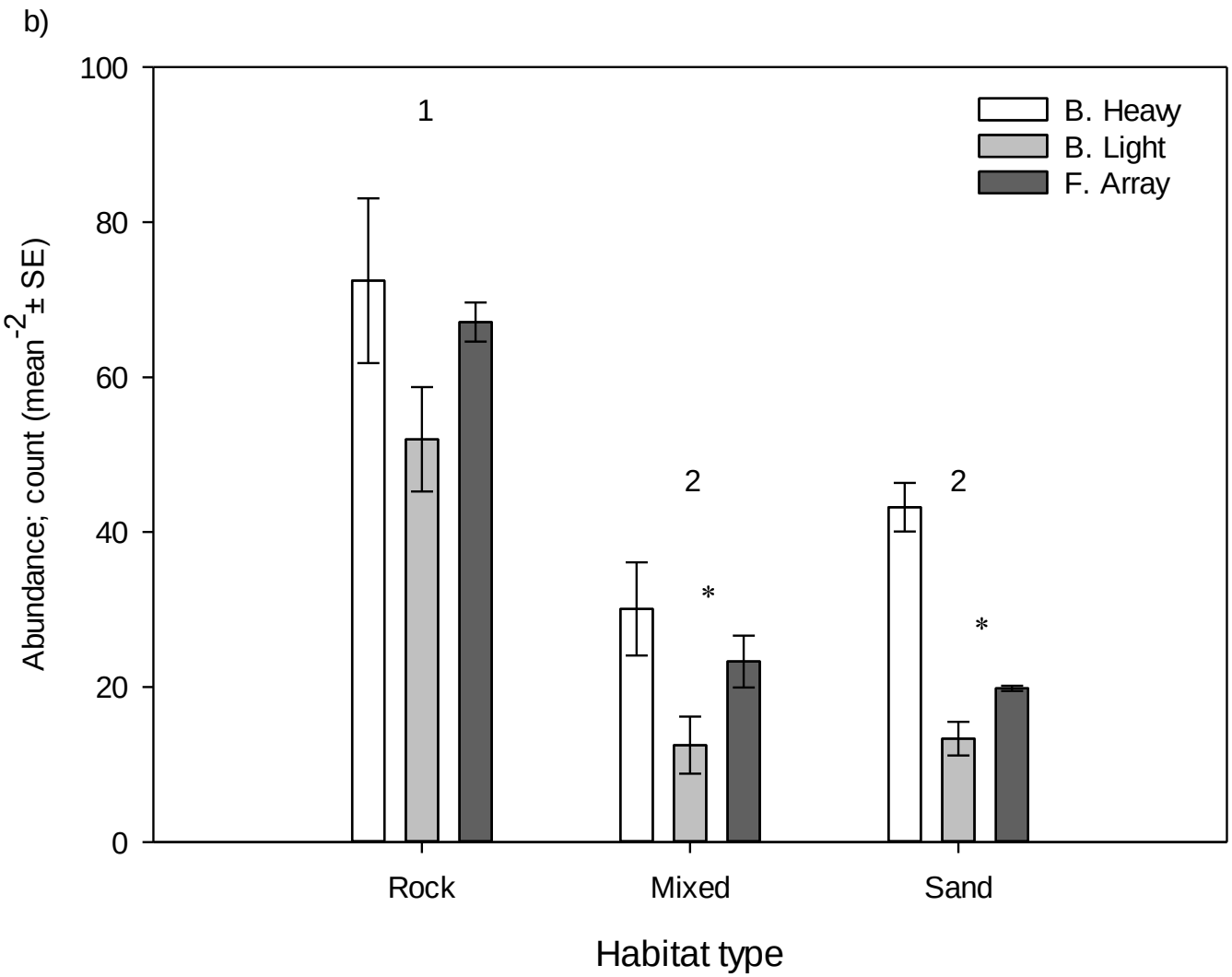
Species observations

Number of taxa



Species observations

Abundance



Species observations

- Species richness, densities and cover may be related to vision field size and camera resolution (recommend good lighting, wide angle, TUVS stability and HD)

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Conclusions and Recommendations

- Video footage are very valuable data to monitor habitat, biodiversity and human impact
- TUVS are relatively cheap and simple to operate. Survey, deployment and analysis protocol may be easily adapted
- Operation over rocky or sensitive habitats require use of benthic tending, more complex, system
- For long term monitoring or use of different TUVS specification, recommend using fixed vision field and resolution to enable unbiaised comparison
- As survey are expensive, opportunistic use of existing recurrent surveys is recommended
- Archiving of videos allow for sharing and re-analyses of data when required (change in scope or methodology)

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Thank you to the Sussex IFCA boat crew

PANACHE *Towards a common, coherent and efficient response to cross-border challenges*
Vers une réponse commune, cohérente et efficace aux défis transfrontaliers

france (manche channel) england interreg
European Regional Development Fund
The European Union, investing in your future
Fonds européen de développement régional
L'Union européenne investit dans votre avenir

Agence des aires marines protégées
The Wildlife Trusts Cornwall
Dorset Wildlife Trust
Dunkerque Port Grand Port Maritime de Dunkerque www.dunkerque-port.fr facebook.com/dunkerqueport
Hampshire & Isle of Wight Wildlife Trust Protecting wildlife. Inspiring people. The Wildlife Trusts
Ifremer
Sussex IFCA Inshore Fisheries and Conservation Authority
Kent Wildlife Trust
Marine Institute University of Plymouth
Nausicaá La Mer est sur Terre Centre National de la Mer Boulogne/Mer-France
rspb giving nature a home
WWF

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Thank you for your attention
Merci pour votre attention

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Kent Wildlife Trust

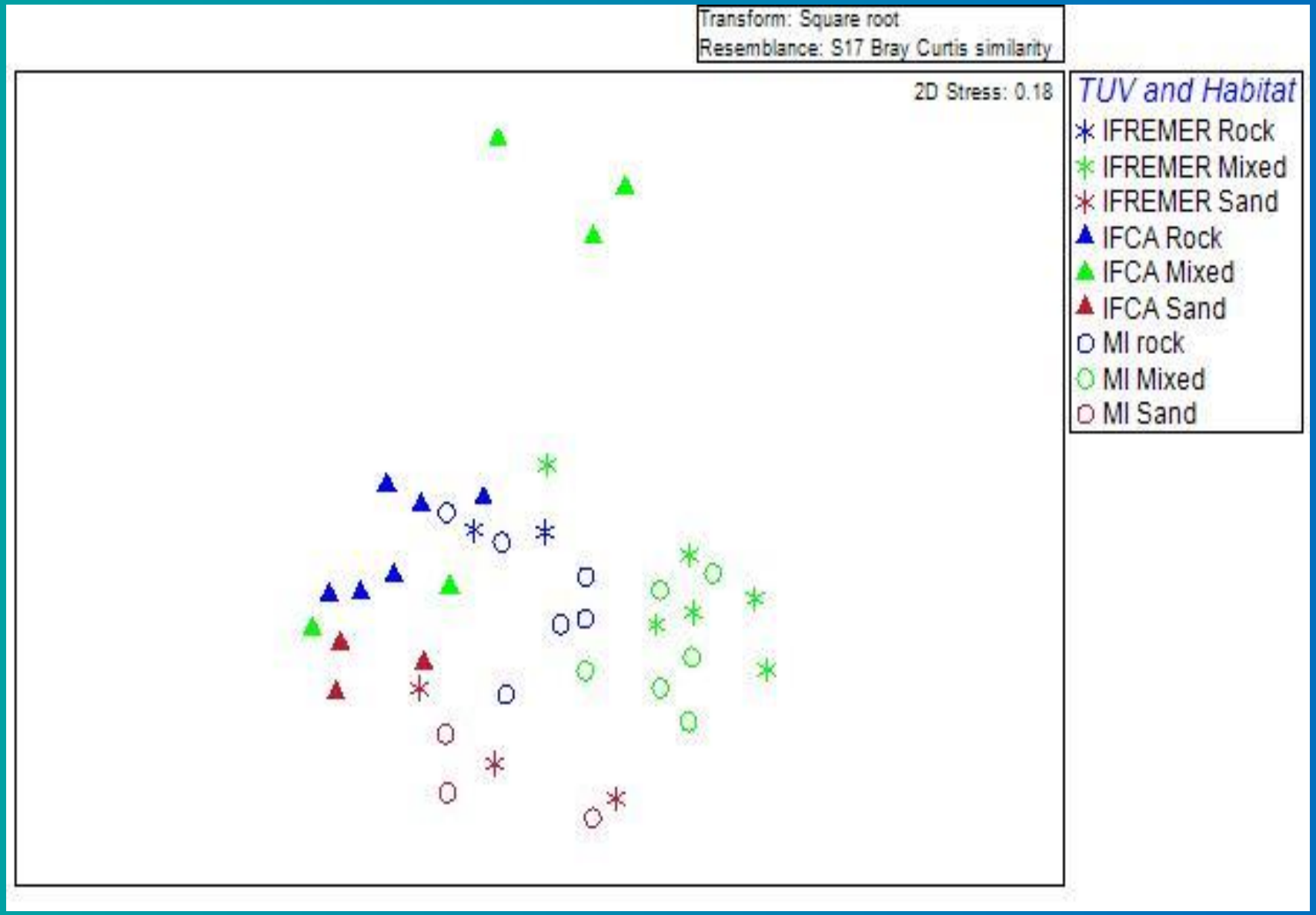
Marine Institute University of Plymouth

Nausicaá La Mer est sur Terre

rspb giving nature a home

WWF

Assemblage


Transform: Square root
Resemblance: S17 Bray Curtis similarity
2D Stress: 0.18
TUV and Habitat
IFREMER Rock
IFREMER Mixed
IFREMER Sand
IFCA Rock
IFCA Mixed
IFCA Sand
MI rock
MI Mixed
MI Sand

The VALMER and PANACHE projects were selected under the European cross-border cooperation programme INTERREG IV A France (Channel) - England, co-funded by the ERDF.