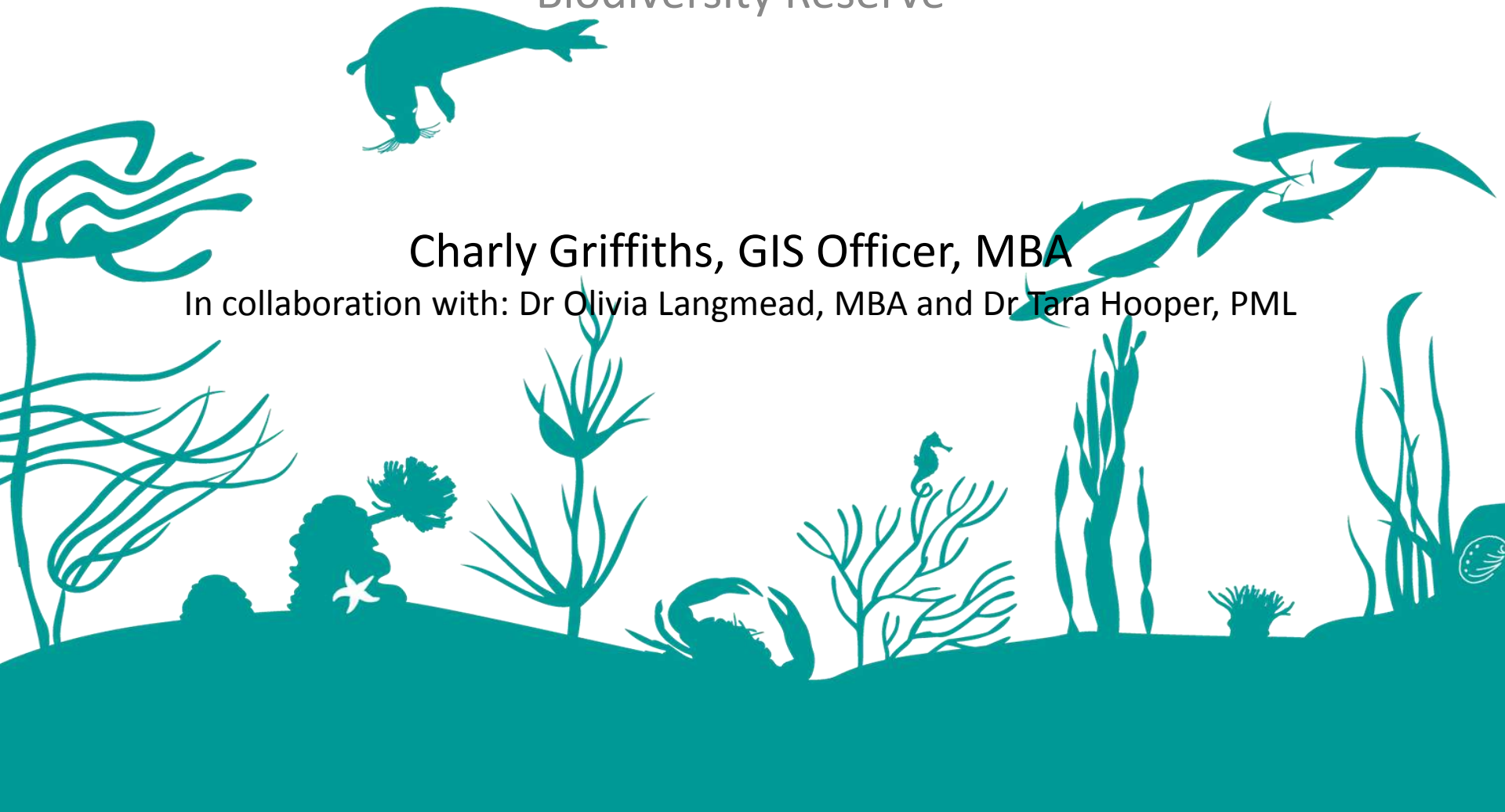
VALMER
PANACHE
Protected Area Network Across
the Channel Ecosystem
THE ENGLISH CHANNEL
one ecosystem two projects
FINAL CONFERENCE -MARCH 17th-18th 2015 - TORQUAY

Applying GIS to stakeholder processes and Ecosystem Service Assessment

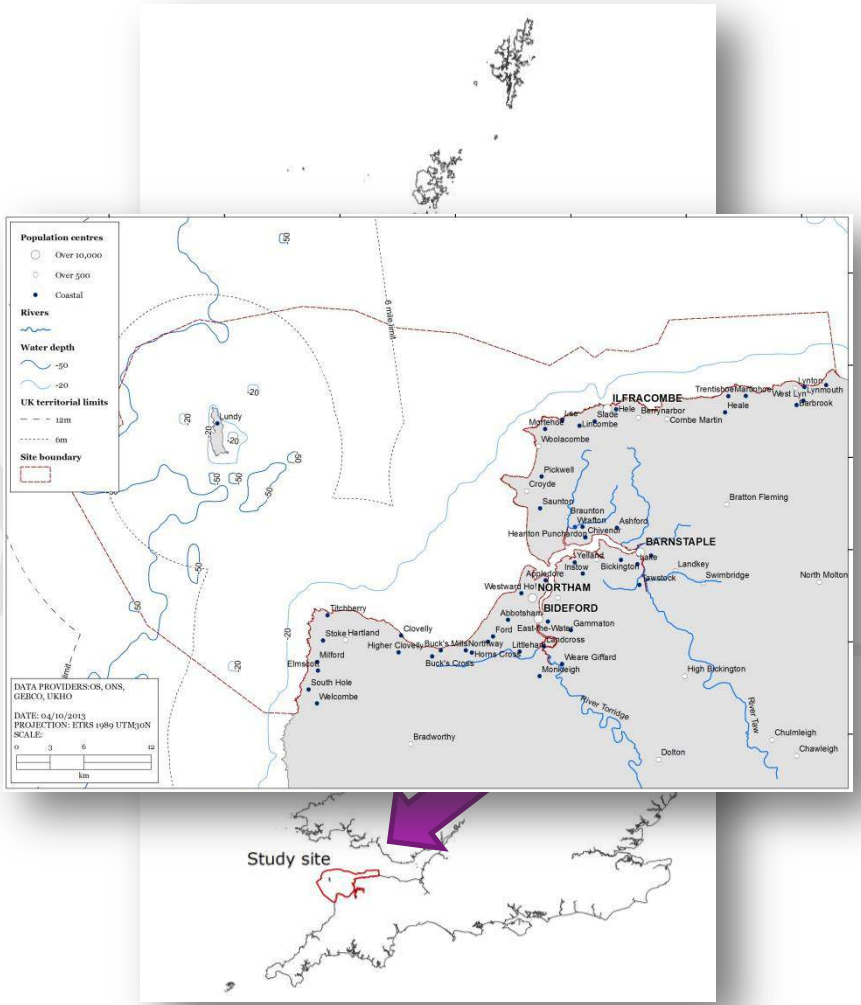
Methods from the UNESCO North Devon Biodiversity Reserve



Charly Griffiths, GIS Officer, MBA

In collaboration with: Dr Olivia Langmead, MBA and Dr Tara Hooper, PML

What we're talking about



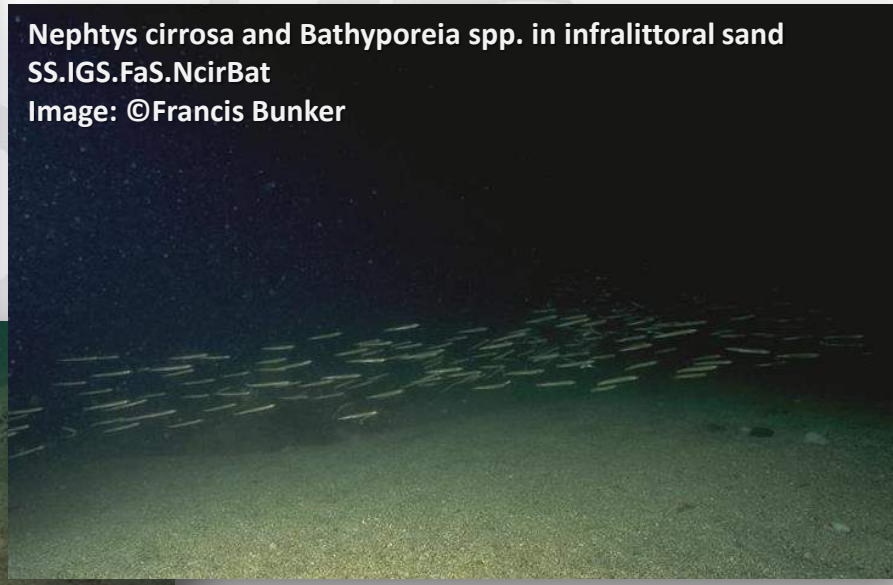
How do ecosystem services change in North Devon under different conditions?

- Ecosystem service assessment
- Scenario development
- Modelling ecosystem service change

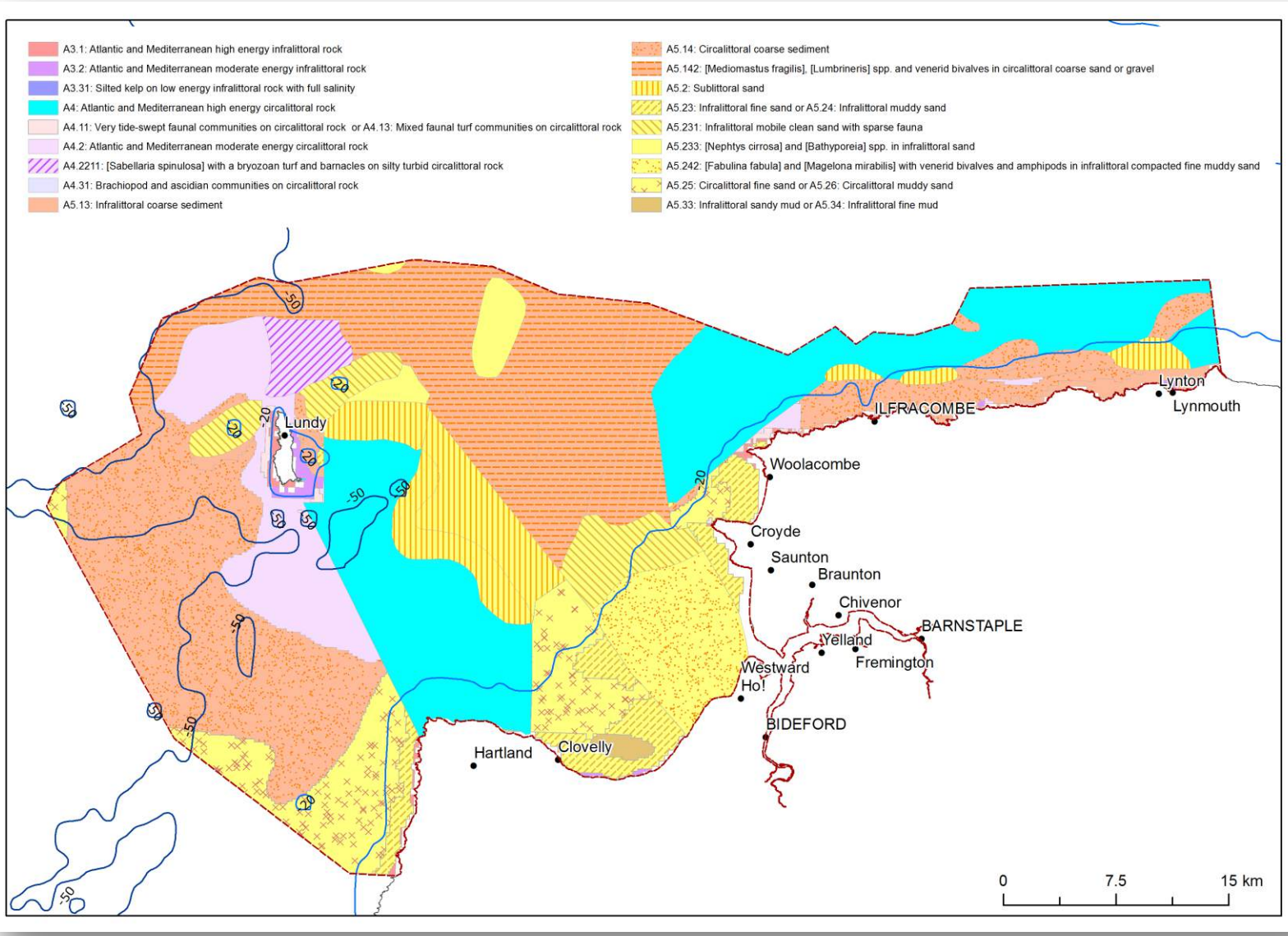
Why use GIS?

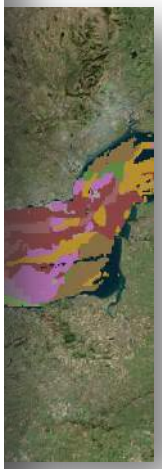
- Spatial area
- Spatial interactions
- Spatial model to assess scenario changes

ECOSYSTEM SERVICE ASSESSMENT
Subtidal sediment habitats

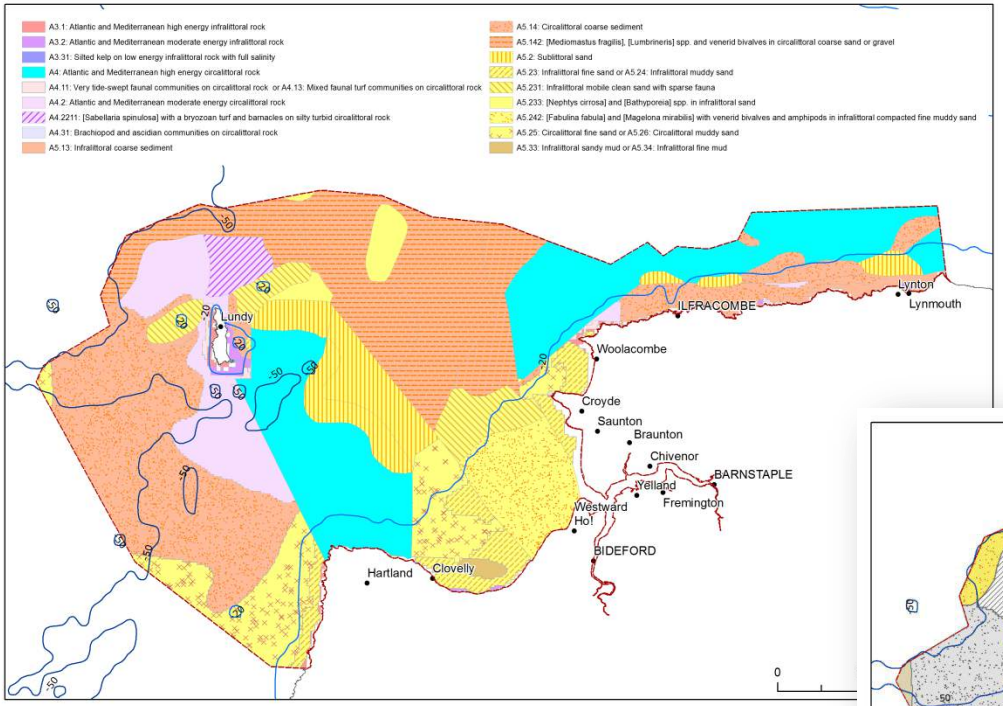


ECOSYSTEM SERVICE ASSESSMENT
Creation of benthic habitat map

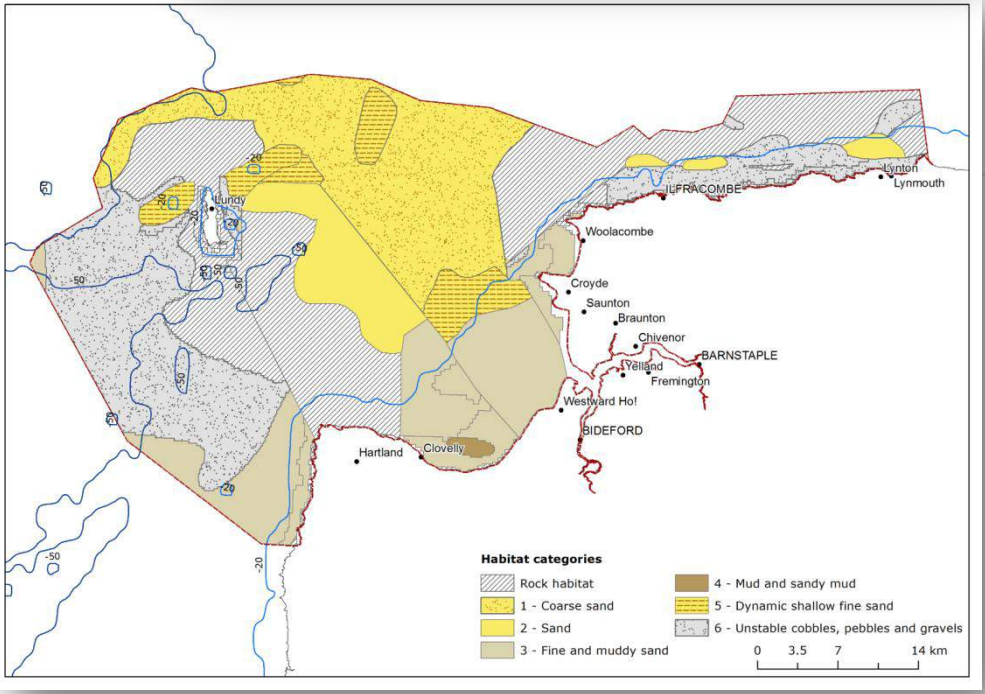




ECOSYSTEM SERVICE ASSESSMENT
Assign broad habitat types



27	SS.SBR.SMus.MytSS	SS	SBR	SMus	MytSS		04
28	IMX.EstMx.CreAph	IMX	EstMx	CreAph		Shingle, coarse sand, mixed sediments	97
28	IMX.FaMx.An	IMX	FaMx	An		Shingle, coarse sand, mixed sediments	97
28	IMX.FaMx.VsenMtru	IMX	FaMx	VsenMtru		Shingle, coarse sand, mixed sediments	97
28	IMX.KSwMx.LsacX	IMX	KSwMx	LsacX		Kelp	97
28	LMX	LMX				Shingle, coarse sand, mixed sediments	97
28	LMX.novo.HedMacMx	LMX	novo	HedMacMx		Shingle, coarse sand, mixed sediments	(97)
28	LMX.novo.HedOlMx	LMX	novo	HedOlMx		Shingle, coarse sand, mixed sediments	(97)
28	LMX.novo.HedScrMx	LMX	novo	HedScrMx		Shingle, coarse sand, mixed sediments	(97)
28	LMX.Psyllid	LMX	Psyllid			Shingle, coarse sand, mixed sediments	(97)
28	LMX.Psyllid.VS	LMX	Psyllid	VS		Shingle, coarse sand, mixed sediments	(97)
28	SS.SMx	SS	SMx				04



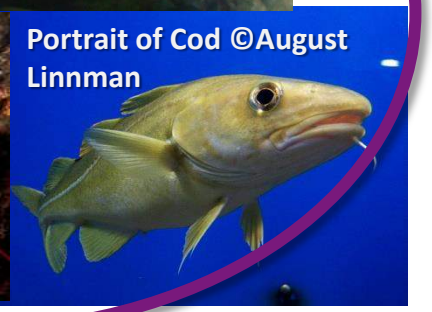
Hall, K., Paramor, O.A.L., Robinson L.A., Winrow-Giffin, A., Frid C.L.J., Eno, N.C., Dernie, K.M., Sharp, R.A.M., Wyn, G.C.& Ramsay, K. (2008). Mapping the sensitivity of benthic habitats to fishing in Welsh waters-development of a protocol. CCW [Policy Research] Report No: [8/12], 85pp.

ECOSYSTEM SERVICE ASSESSMENT
Level of ecosystem service provision

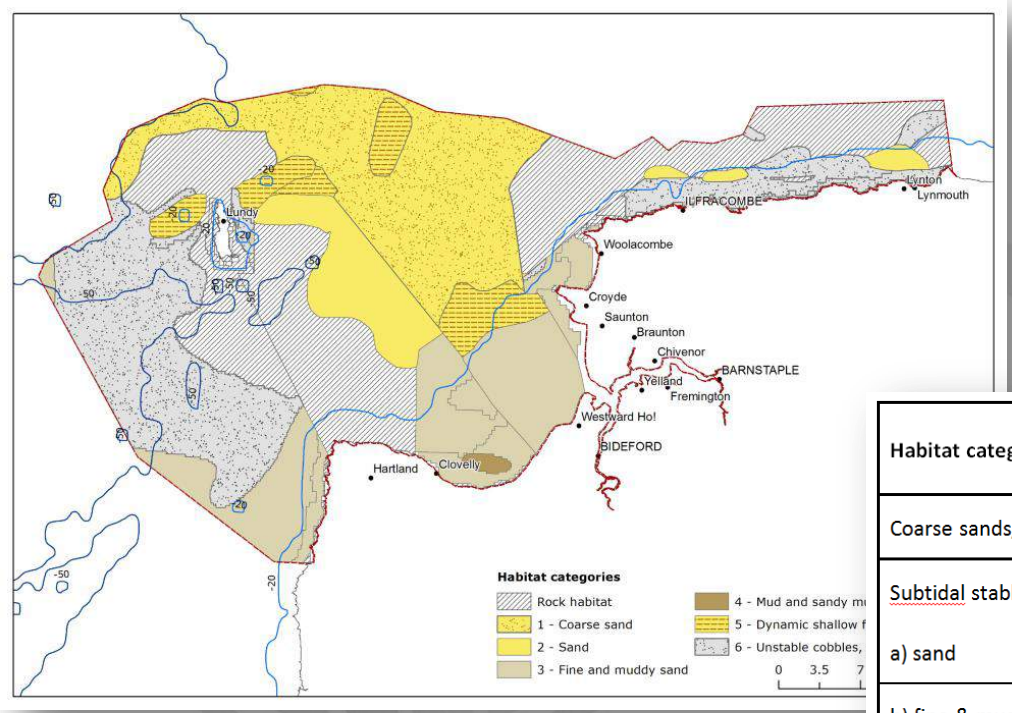
CARBON SEQUESTRATION

WASTE REMEDIATION

FISH NURSERY



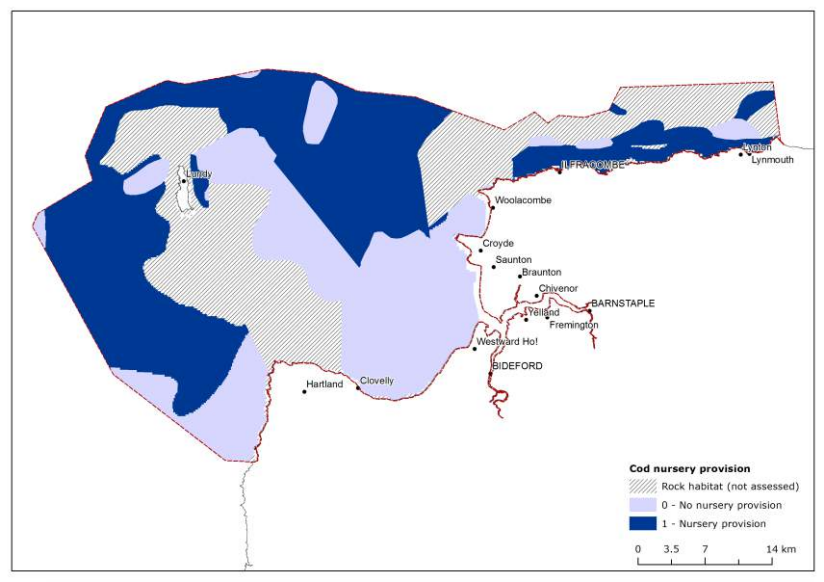
ECOSYSTEM SERVICE ASSESSMENT
Link service provision to broad habitat

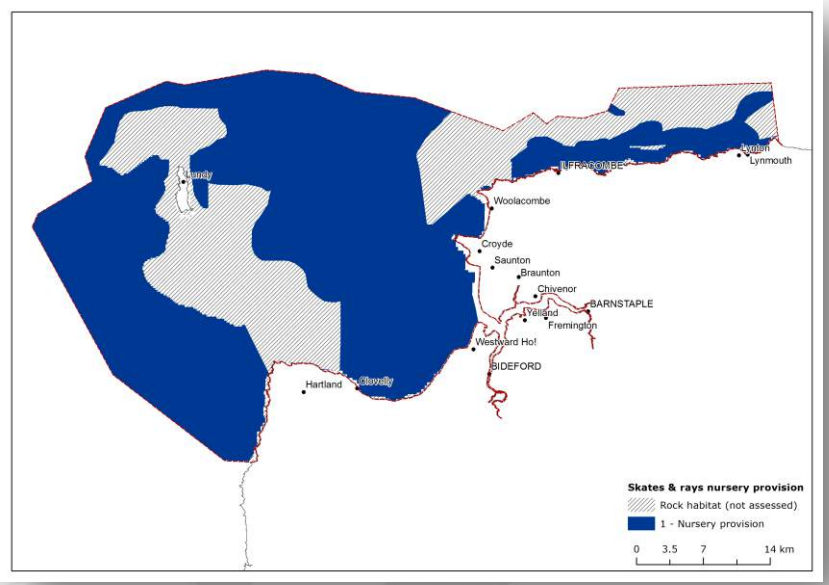


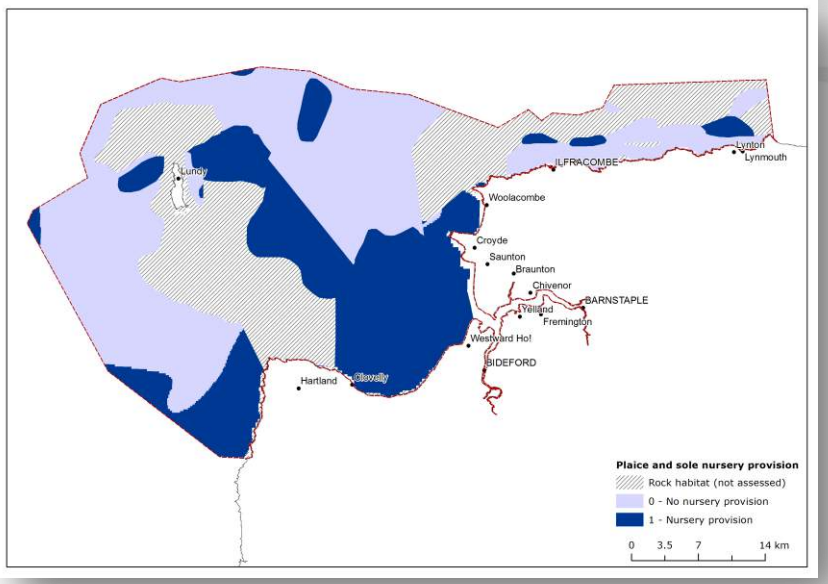
Habitat category	Nursery habitat: Bass, Sole, Plaice	Nursery habitat: Lobster	Nursery habitat: Cod	Nursery habitat: Skates & Rays	Waste processing	Carbon storage
Coarse sands/gravels						
Subtidal stable muddy sands, sandy muds and muds:						
a) sand						
b) fine & muddy sand						
c) mud & sandy mud						
Dynamic, shallow water fine sands						
Unstable cobbles, pebbles, gravels						
Confidence	High	Low	Low	Medium	Low	Low

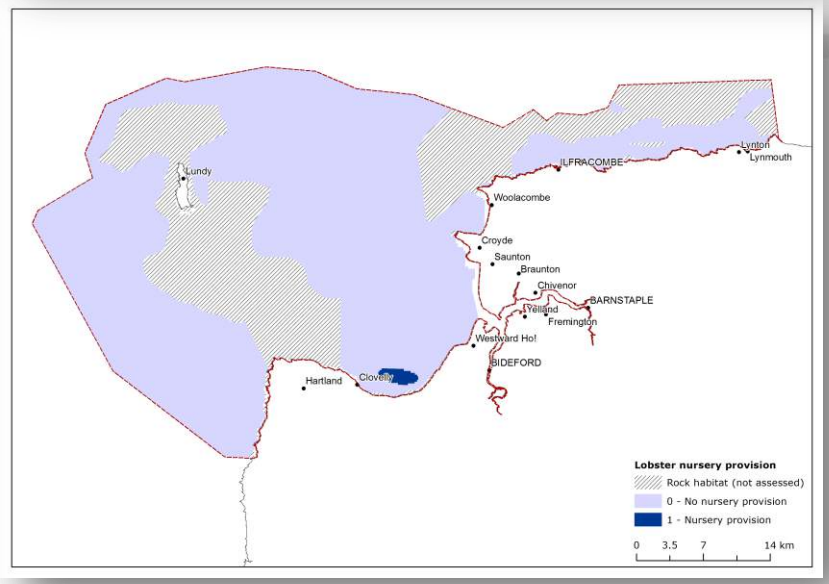
Potential to supply ecosystem service: Significant Moderate Low Negligible

ECOSYSTEM SERVICE ASSESSMENT
Maps of level of ecosystem delivery









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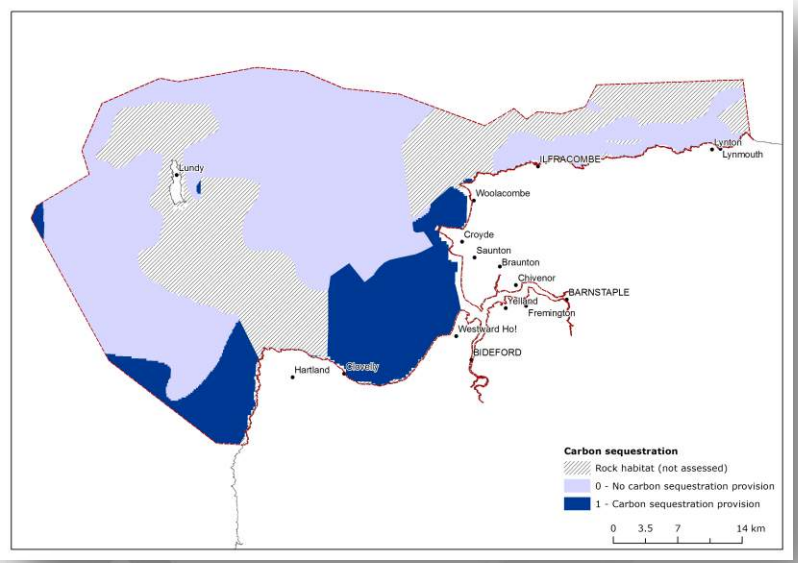
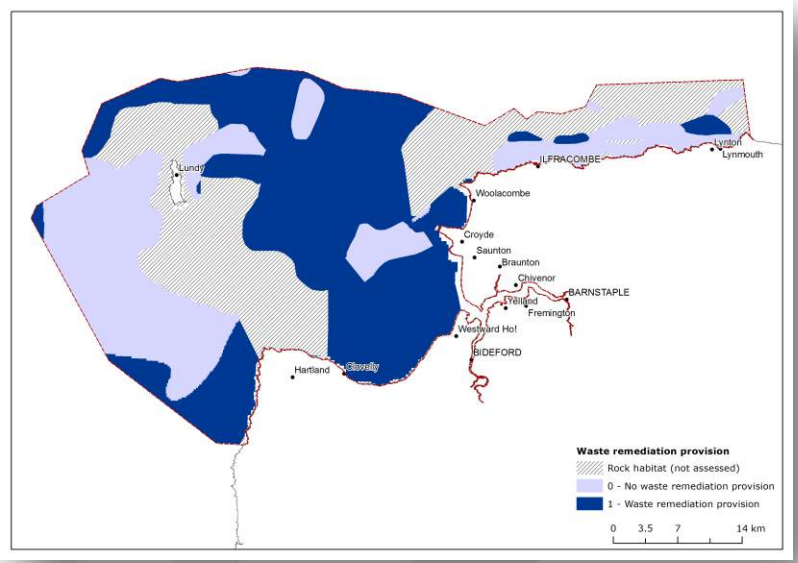
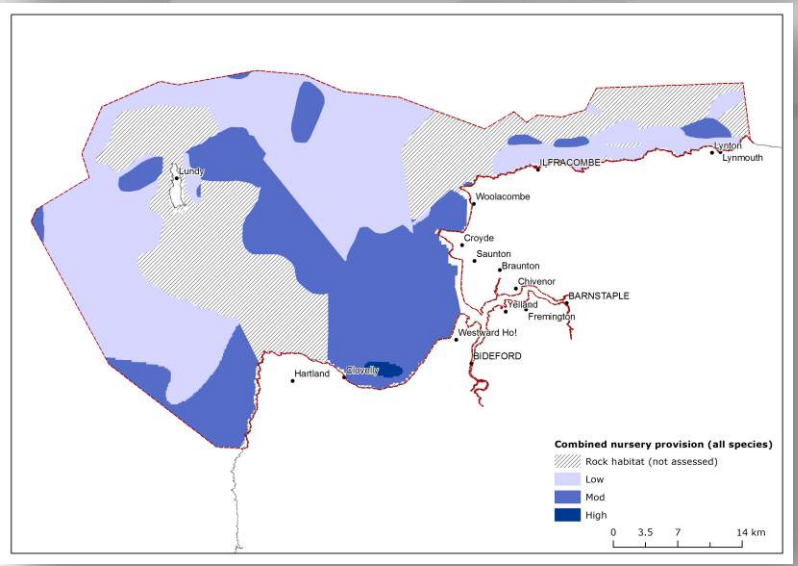
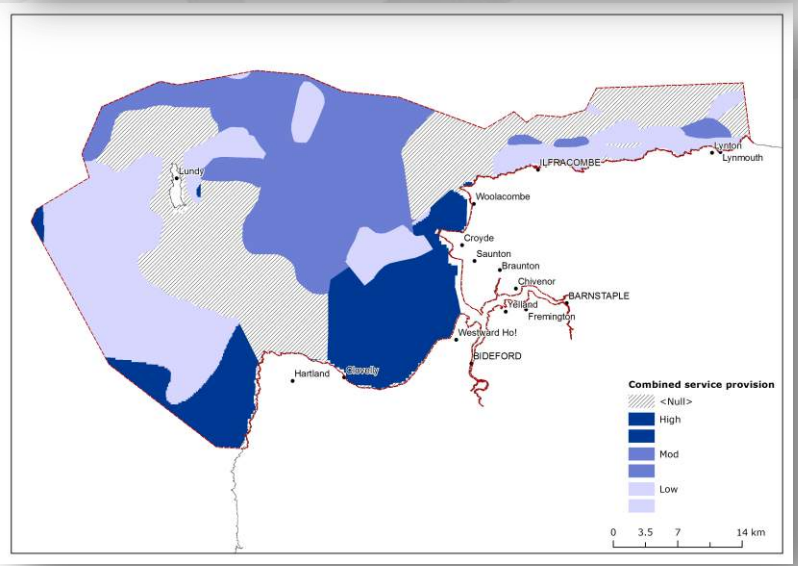








QUICK SUMMARY

- We decided which ecosystem we wanted to assess
- Looked at which habitats are present in our study area
- Decided which services we would assess
- Understood how our habitat information would have to be presented in order to link it to level of service provision
- Presented the level of ecosystem service provision within the UNESCO North Devon biosphere reserve

Any questions so far??

SCENARIO DEVELOPMENT

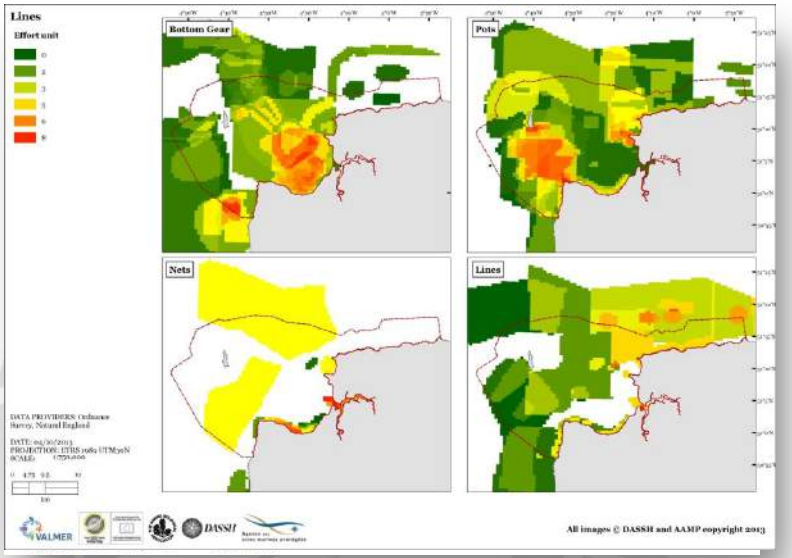
Working with our stakeholders

- *Mapping DIPSR analysis – maps of Drivers, Responses and State*
- *Present to stakeholders*
- *Incorporate additional information*
- *Suggestion and prioritisation of locally important scenarios*
- *Decision on final 3 scenarios*

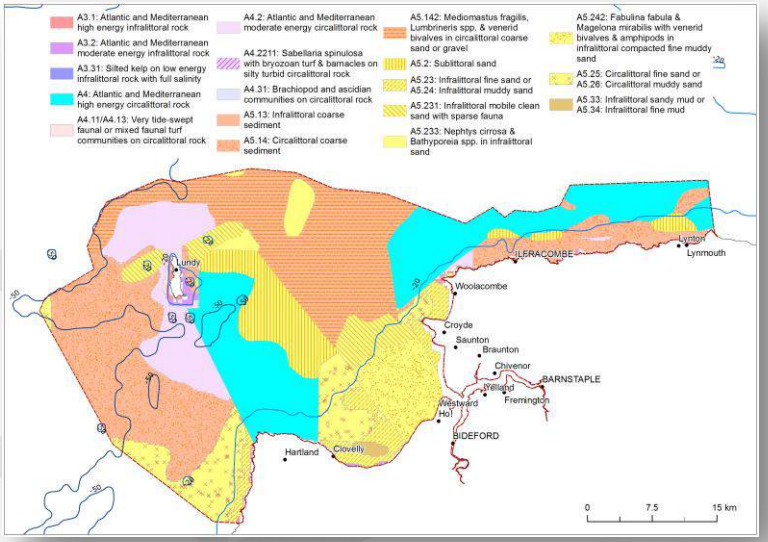
SCENARIO DEVELOPMENT

Scoping and stakeholder involvement

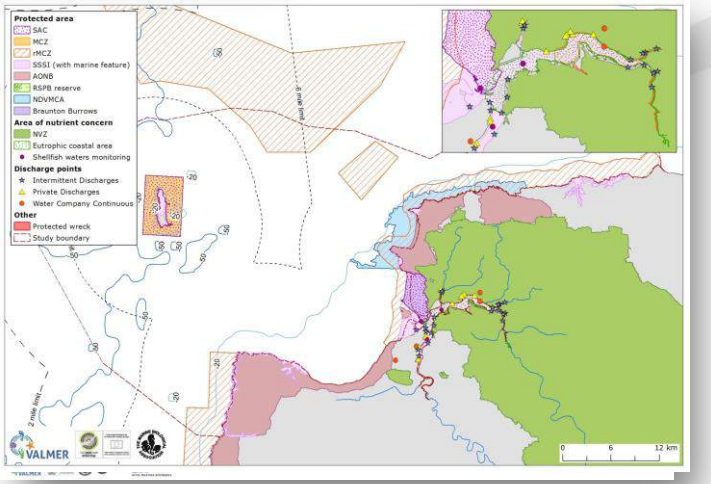
DRIVERS



STATE (Habitats)



RESPONSES



SCENARIO DEVELOPMENT

First Workshop to identify and prioritise scenarios

Initial scenarios (Stakeholder Workshop 2)	Elaborated by project team	Prioritised at Stakeholder Workshop 3	Final scenarios	Comments
Tidal development	Tidal development			Scored low importance by stakeholders
rMCZ designation	rMCZ designation	rMCZ designation	rMCZ designation	Tranche 2 rMCZs does not include Morte platform, thus two subscenarios including and not including Morte Platform were devised
Coastal change				Drivers and pressures on seabed habitats unclear
Increased nutrients	Increased nutrients	Decreased nutrients		Very restricted area (only within estuary) affected by pressure, ecological impacts uncertain
Aggregate extraction	Aggregate extraction	Aggregate extraction	Aggregate extraction	Extraction site underwent changes due to seabed depth constraints
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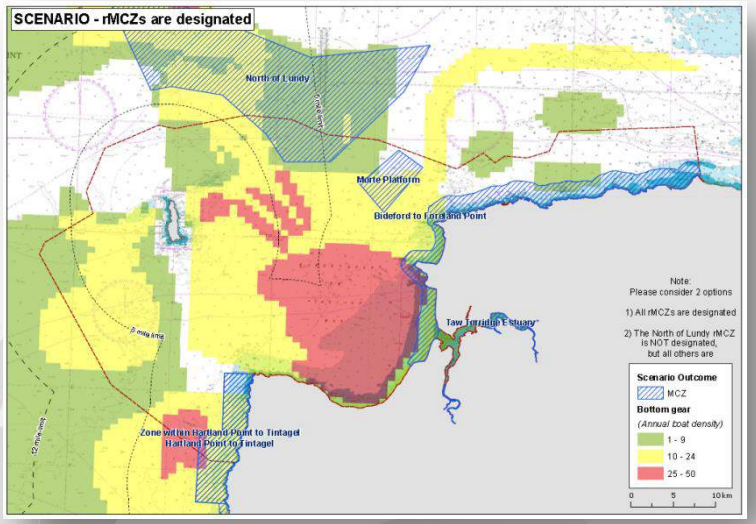
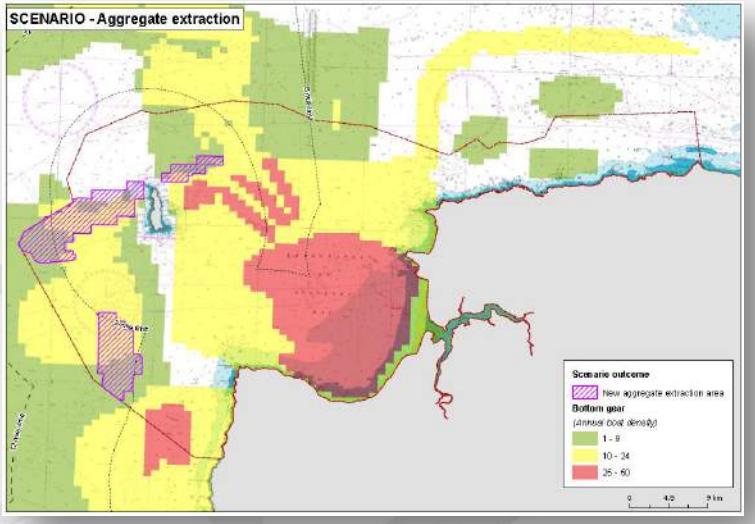
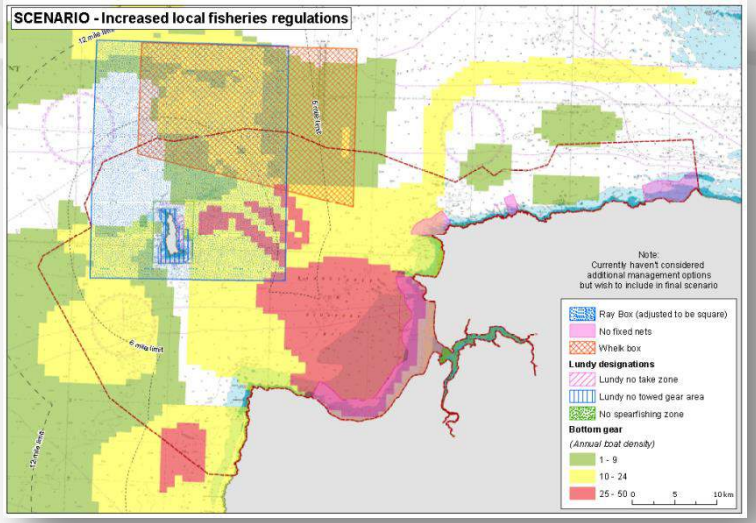
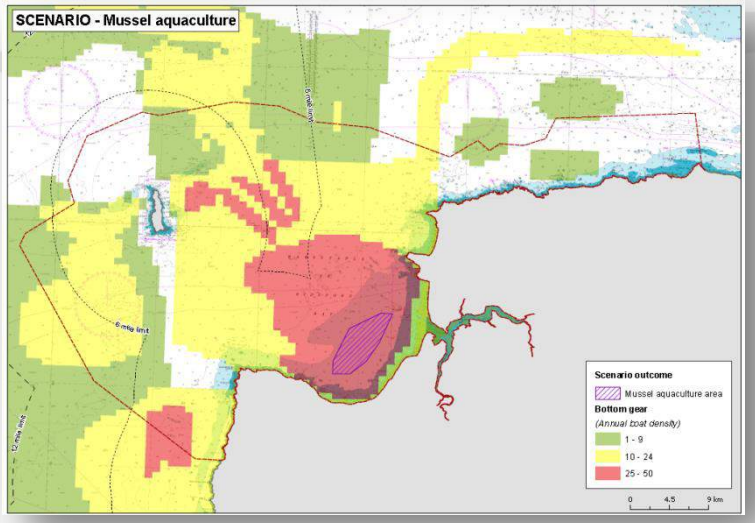
SCENARIO DEVELOPMENT

What the scenarios look like









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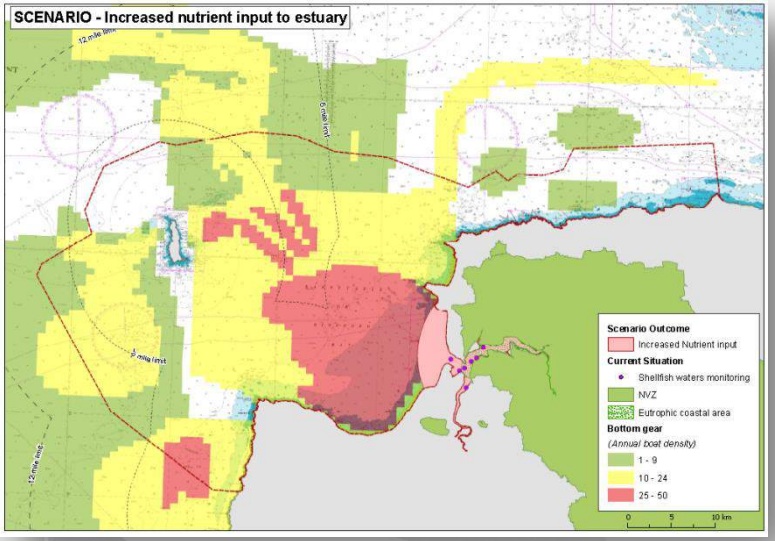

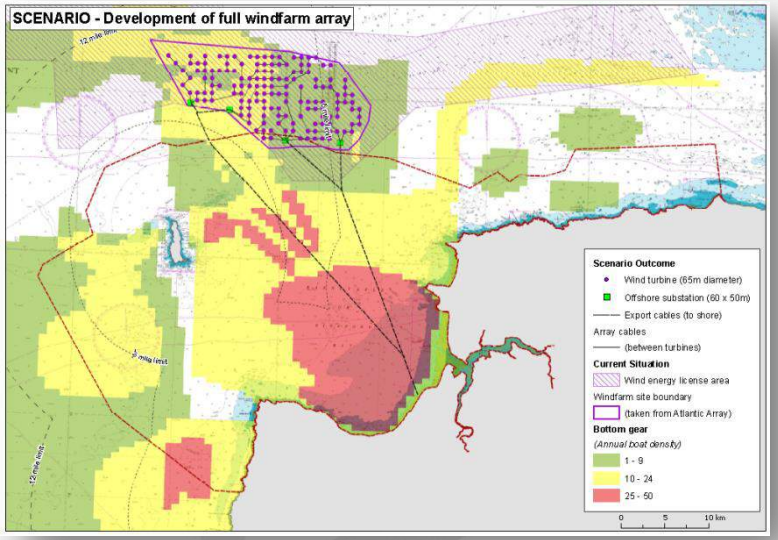

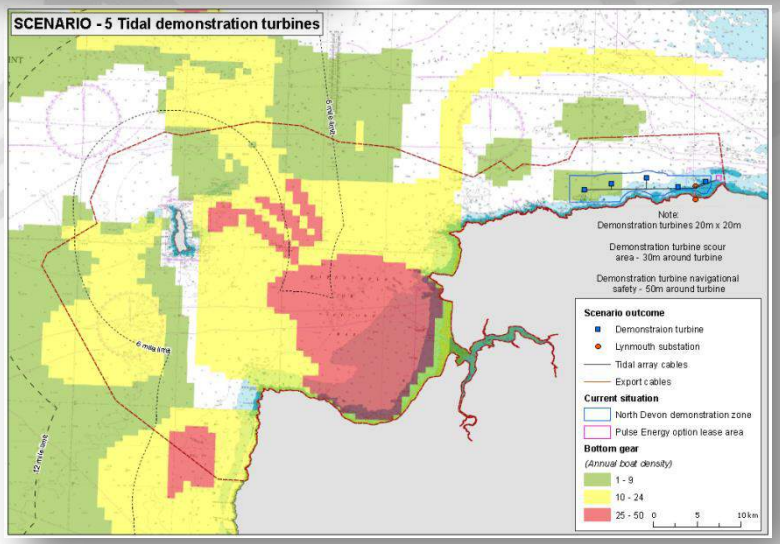

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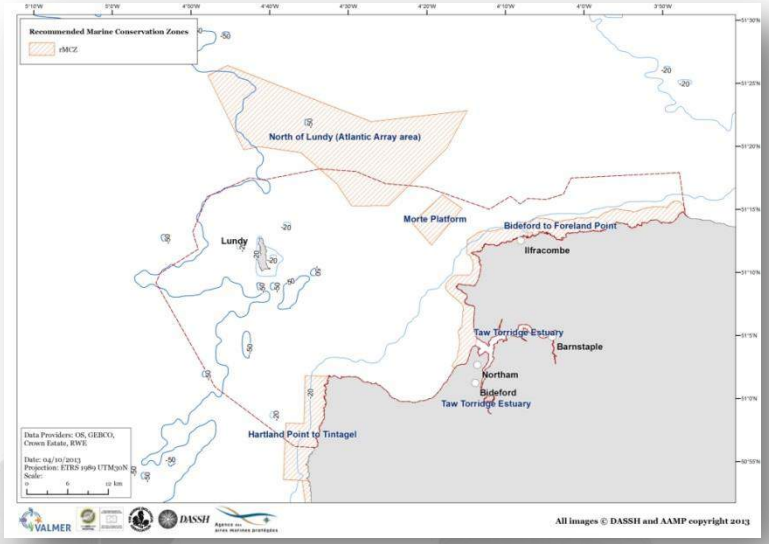
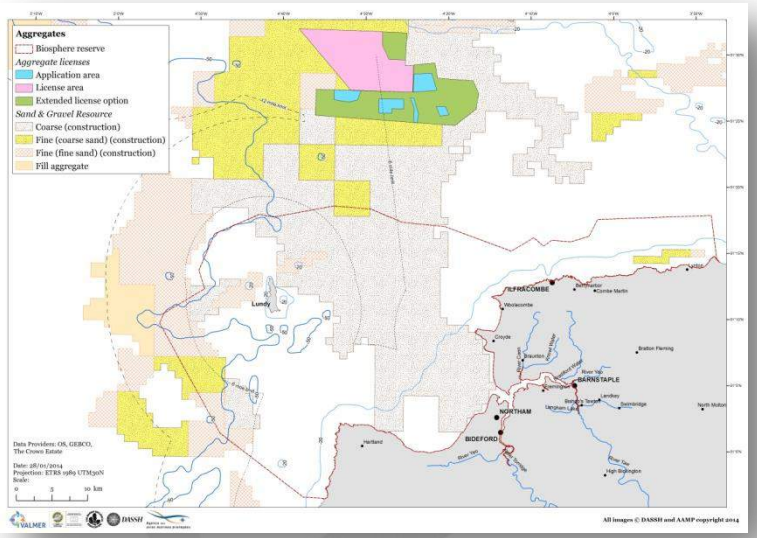
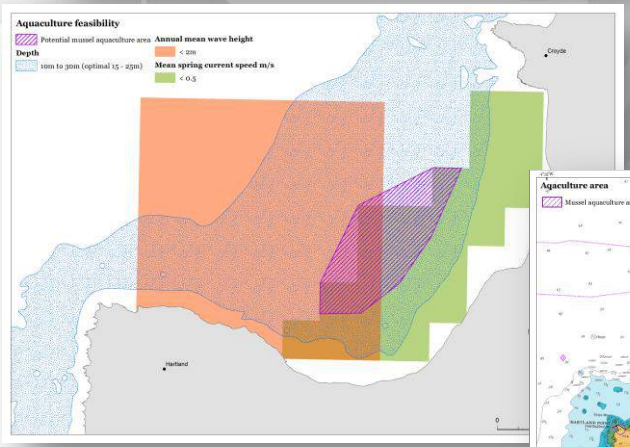
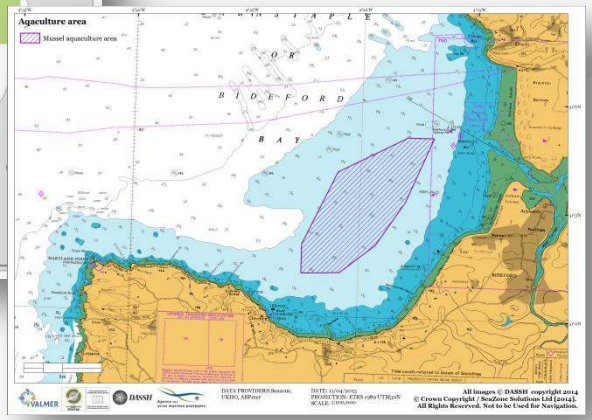
SCENARIO DEVELOPMENT

Our final three scenarios









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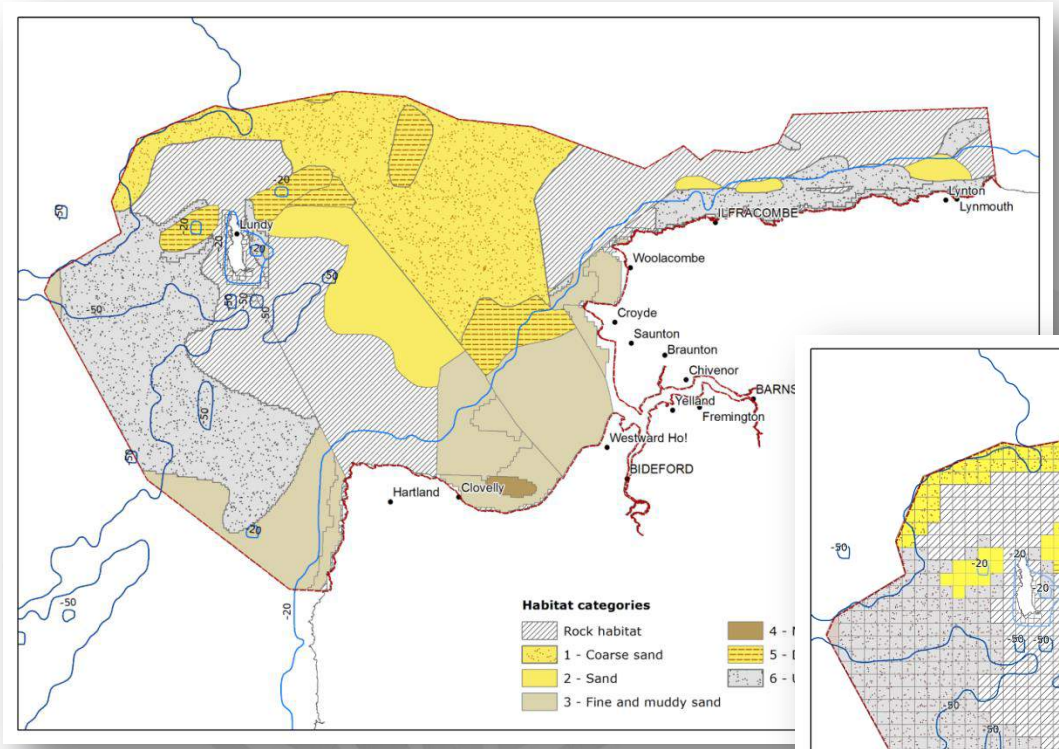
QUICK RECAP

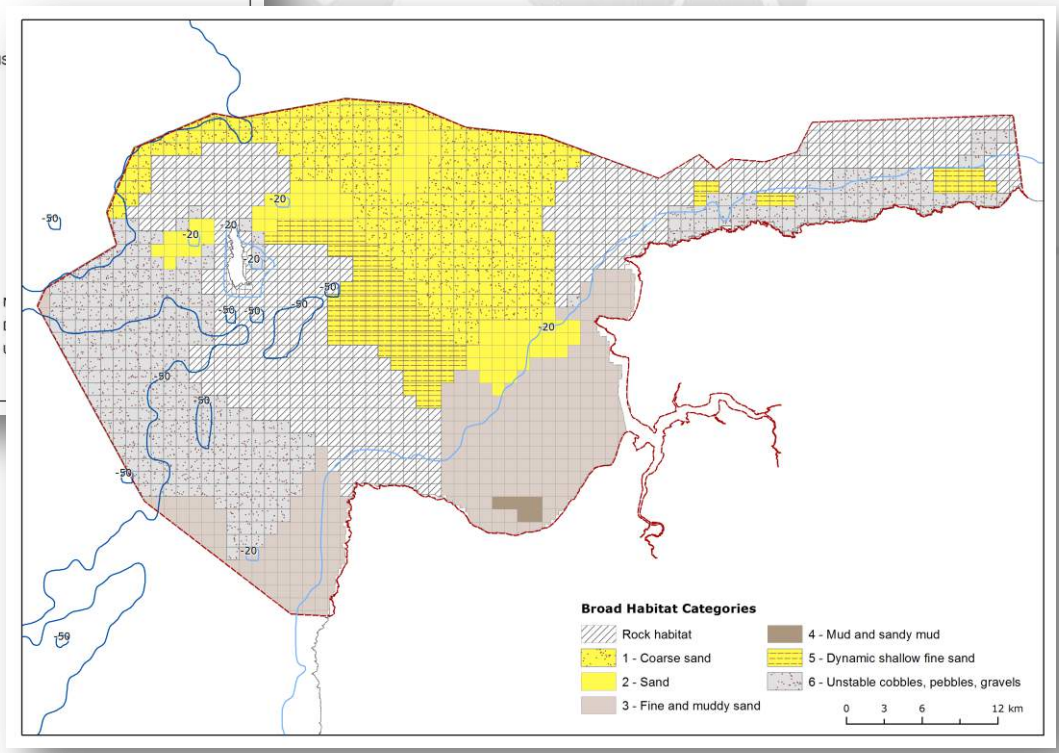
- We have established:
  - What scenarios we are going use to assess how levels of service provision may change
    - Which can then inform how the biosphere reserve might be managed (in theory).
  - What habitat we're looking at
  - What key services provided by this habitat we are going to assess
  - What levels of service provision they could potentially provide

Still awake?
Any questions??
Image: ©Mila Zinkova

MODELLING CHANGE

Partitioning the study area





MODELLING CHANGE

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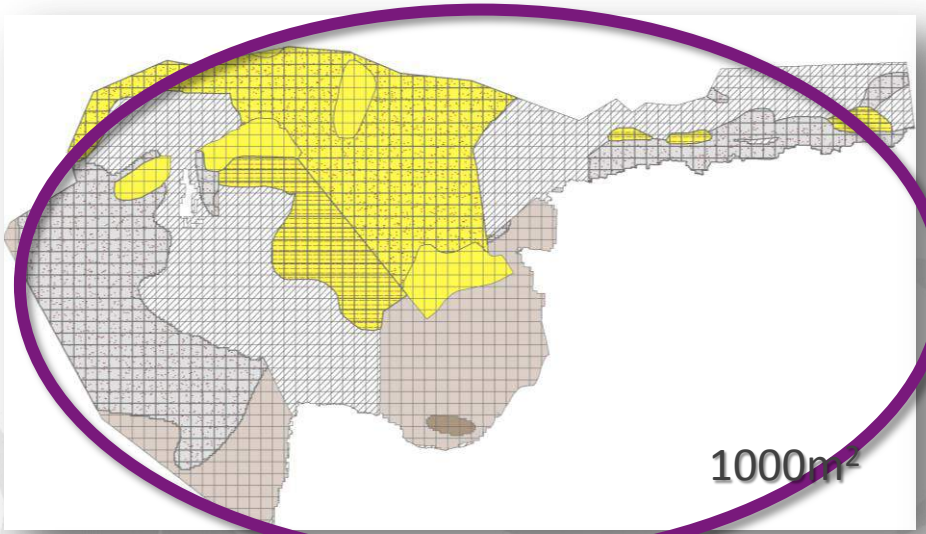
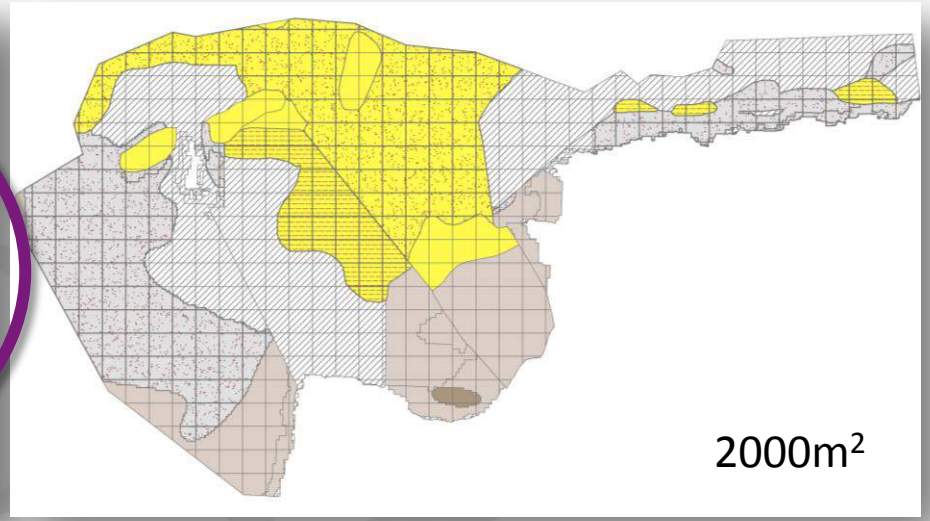
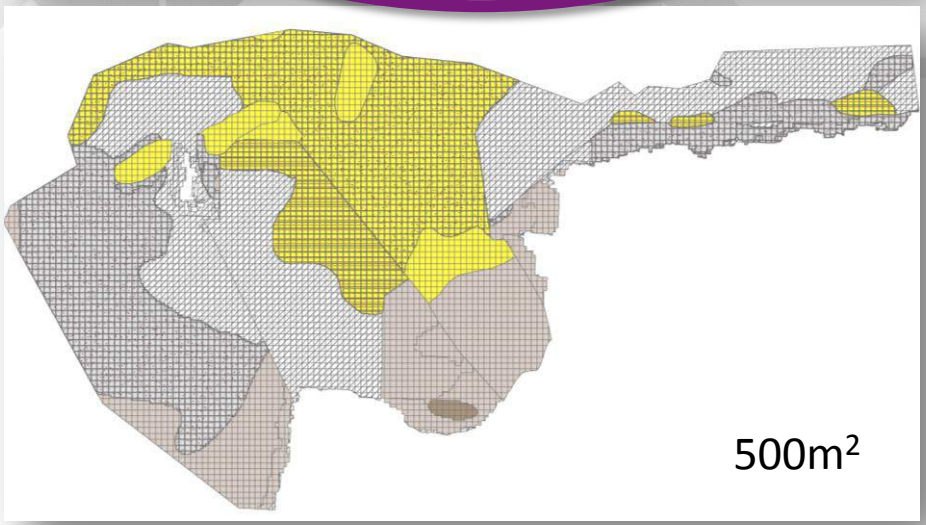
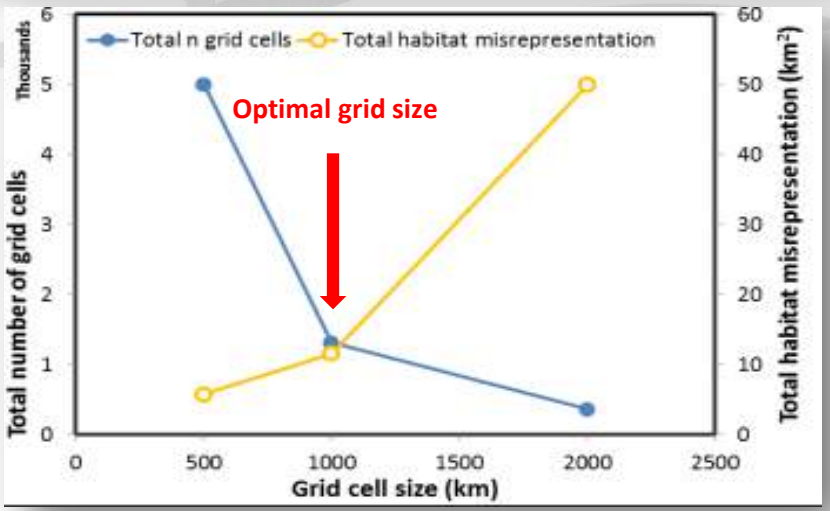


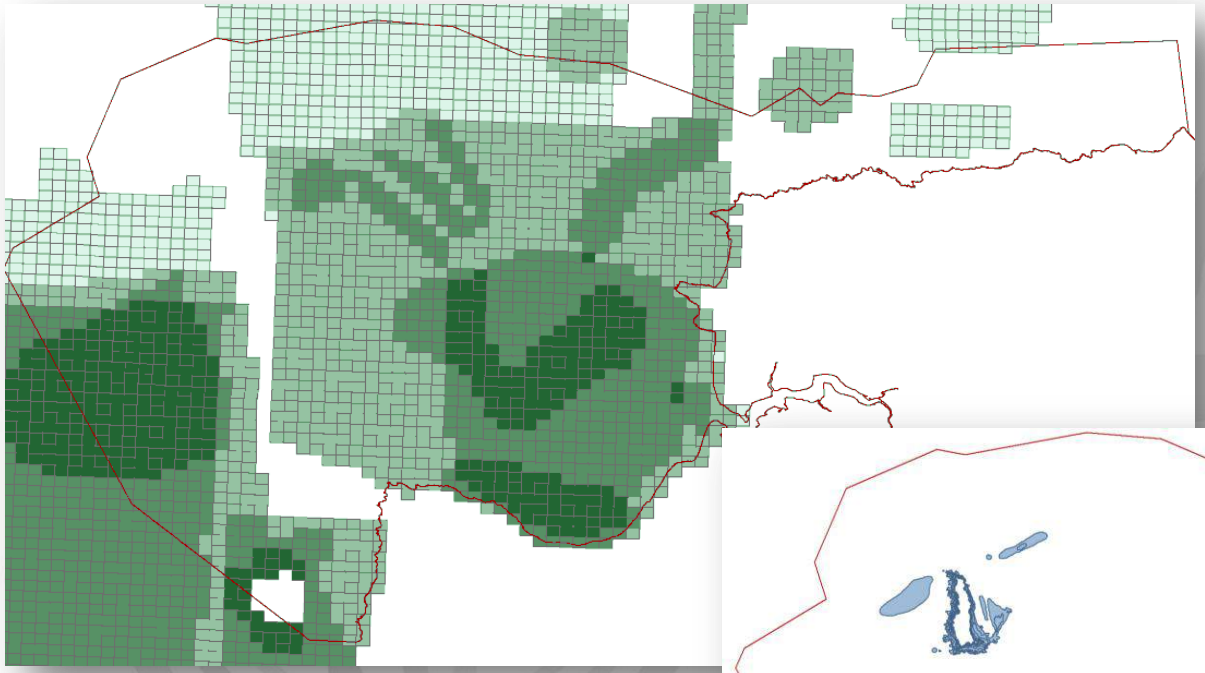


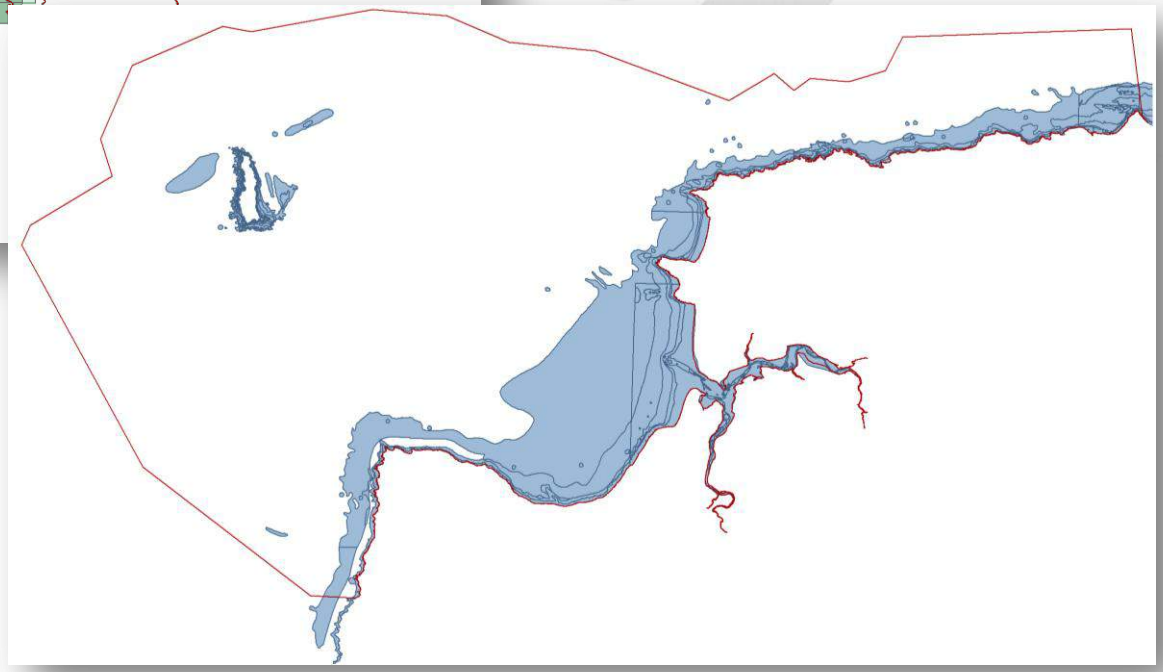




MODELLING CHANGE

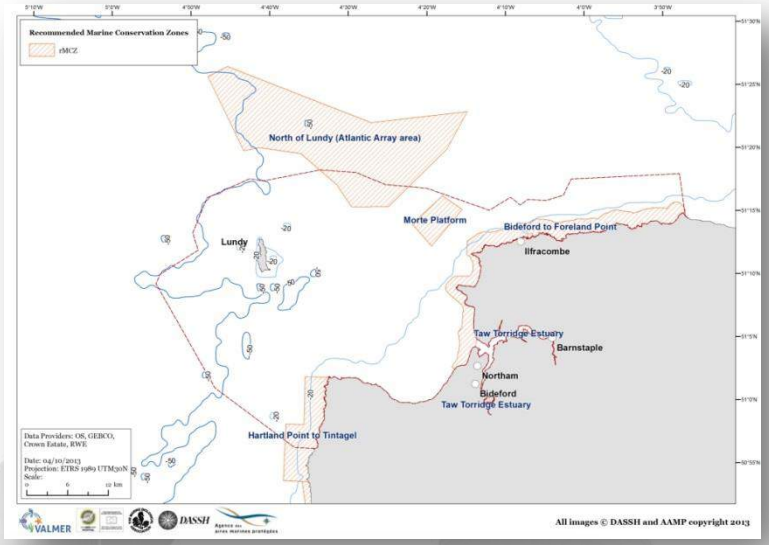
Variables and pressures

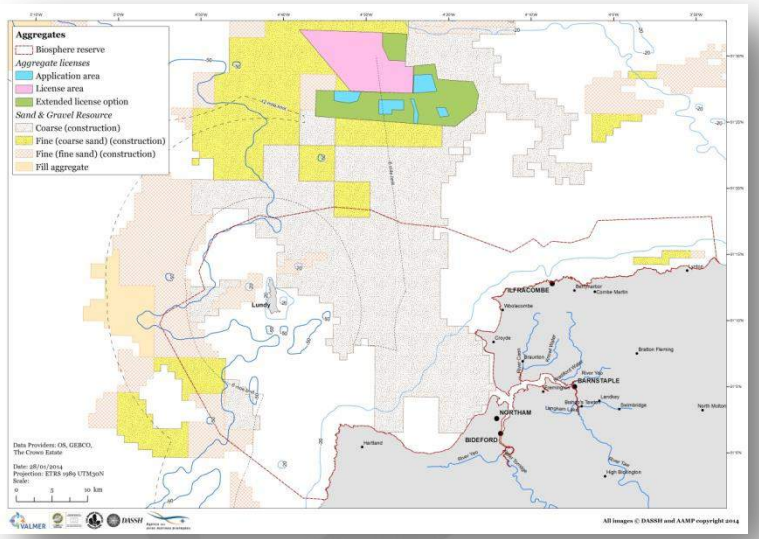


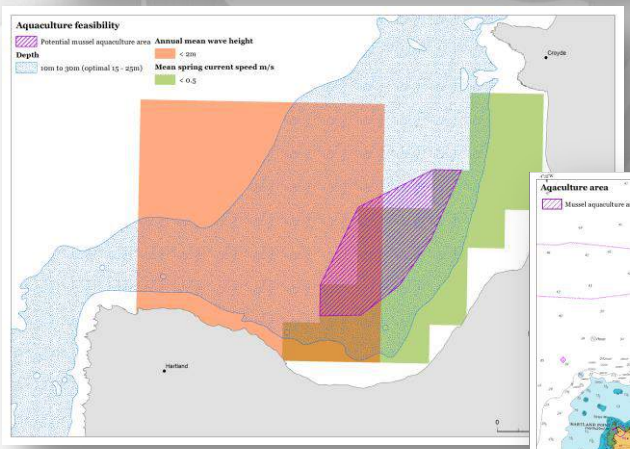


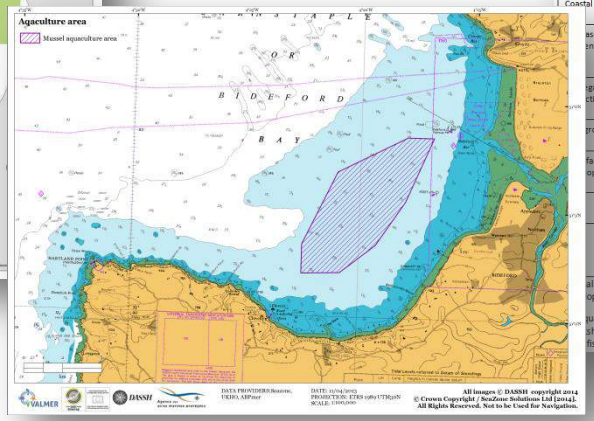
SCENARIO DEVELOPMENT

Our final three scenarios







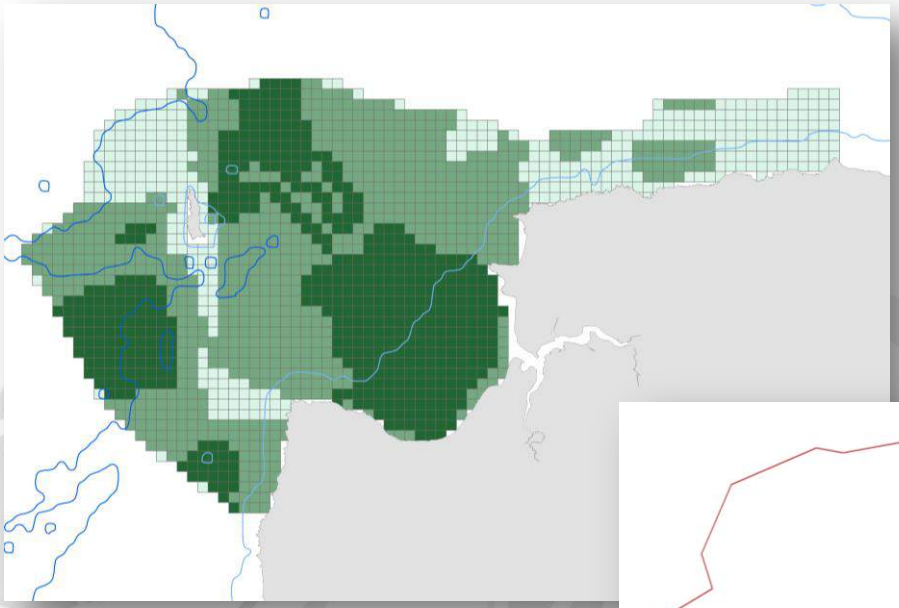


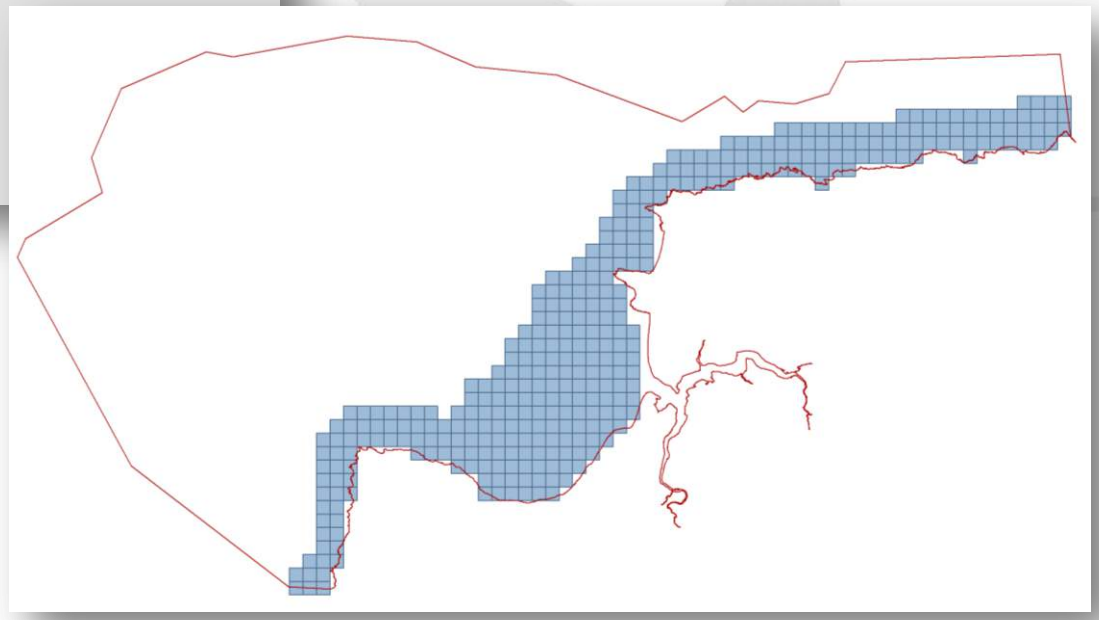
Initial scenarios (Stakeholder Workshop 2)	Elaborated by project team	Prioritised at Stakeholder Workshop 3	Final scenarios	Comments
Tidal development	Tidal development			Scored low importance by stakeholders
rMCZ designation	rMCZ designation	rMCZ designation	rMCZ designation	Tranche 2 rMCZs does not include Morte platform, thus two subscenarios including and not including Morte platform were devised
Coastal change				Drivers and pressures on seabed habitats unclear
ased nts	Increased nutrients	Decreased nutrients		Very restricted area (only within estuary) affected by pressure, ecological impacts uncertain
gate ction	Aggregate extraction	Aggregate extraction	Aggregate extraction	Extraction site underwent changes due to seabed depth constraints
rowth	Blue growth			Scored low importance by stakeholders
farm opment	Windfarm development	Renewables array		Very small area affected by pressure, below limits of model accuracy
	Local fisheries management.*			Dismissed by stakeholders - led by fisheries sector
		Aquaculture development**	Aquaculture development	Introduced at Workshop 3 by stakeholders as a replacement to Local fisheries management

al fisheries management was suggested at Stakeholder Workshop 2, but time prevented its opment during that event, so the scenario was subsequently developed by the project team.

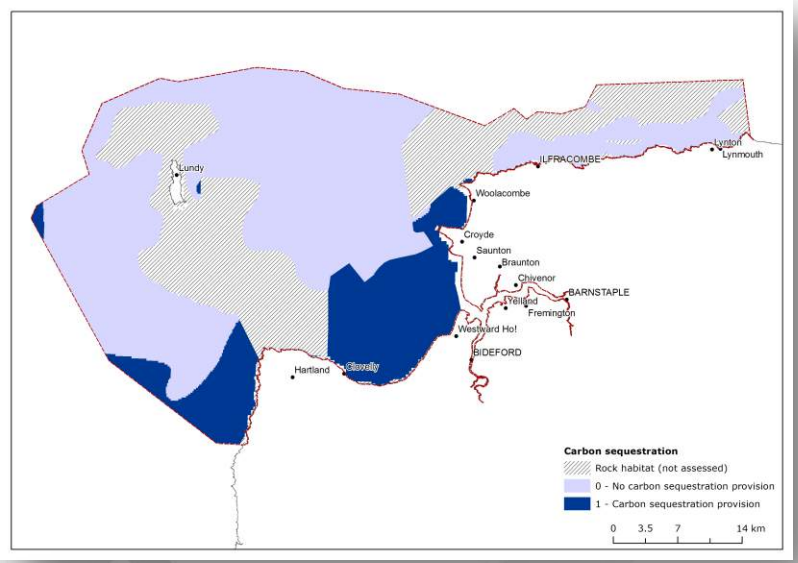
uaculture development was added, at the request of Stakeholders during Stakeholder shop 3, as an alternative fisheries development option following the rejection of the proposed fisheries management scenario.

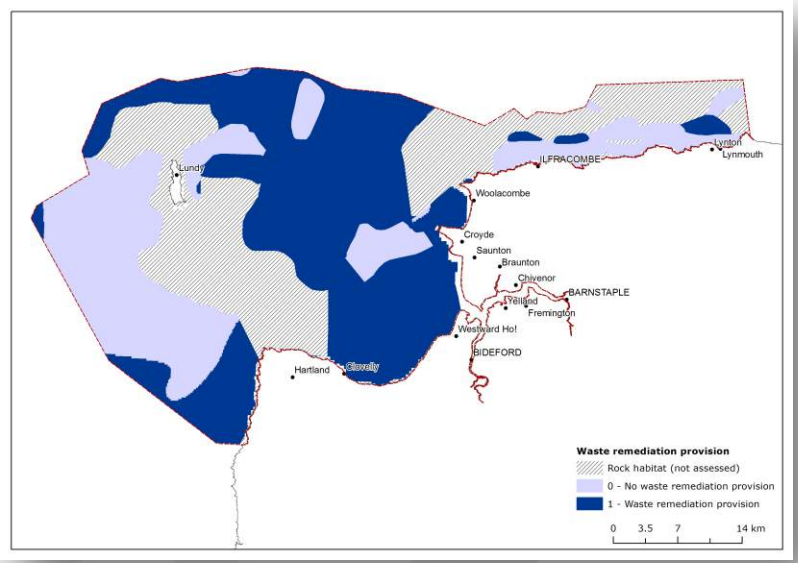
MODELLING SCENARIO CHANGE

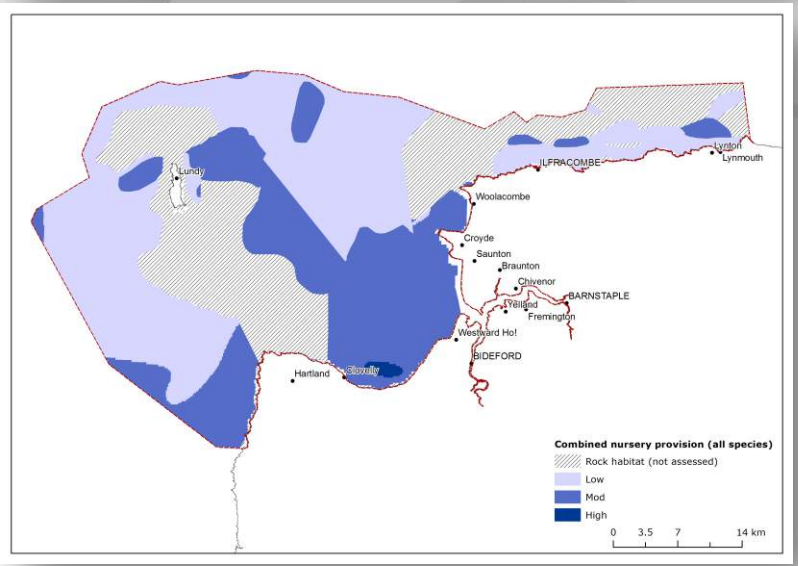


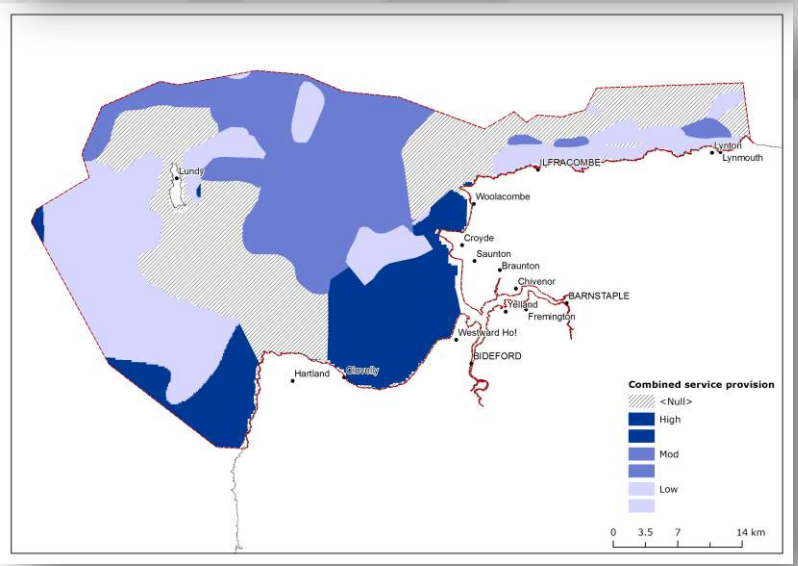


ECOSYSTEM SERVICE ASSESSMENT
Maps of level of ecosystem delivery



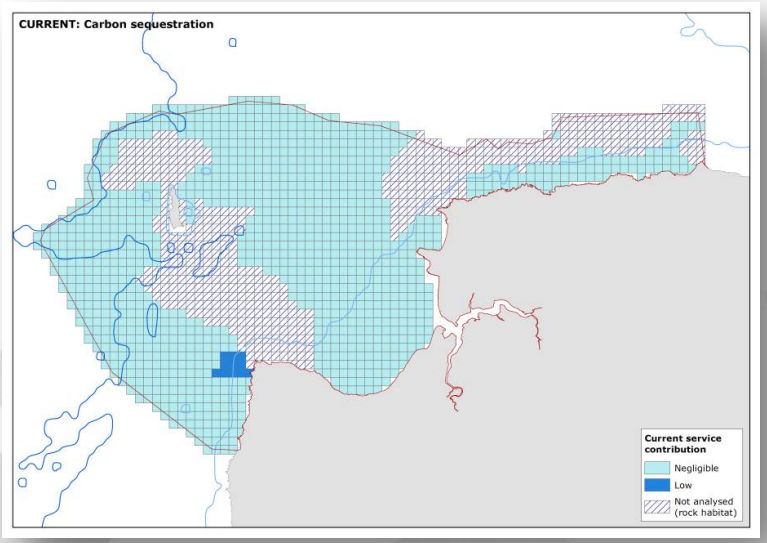


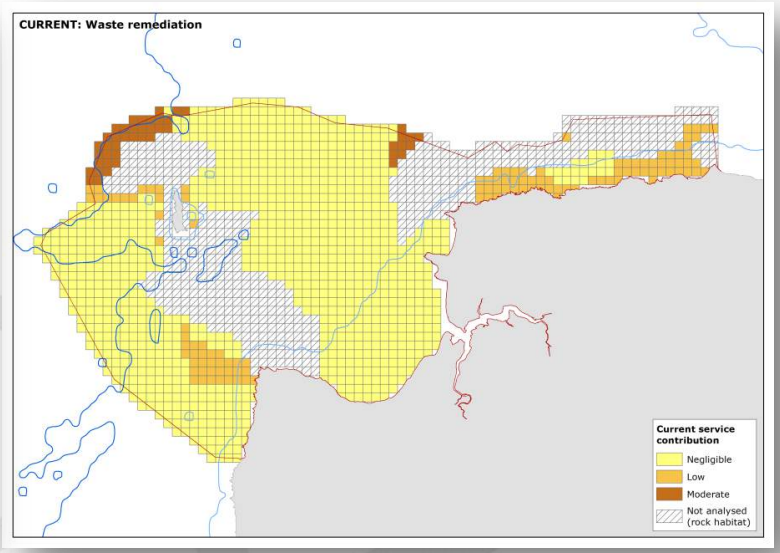


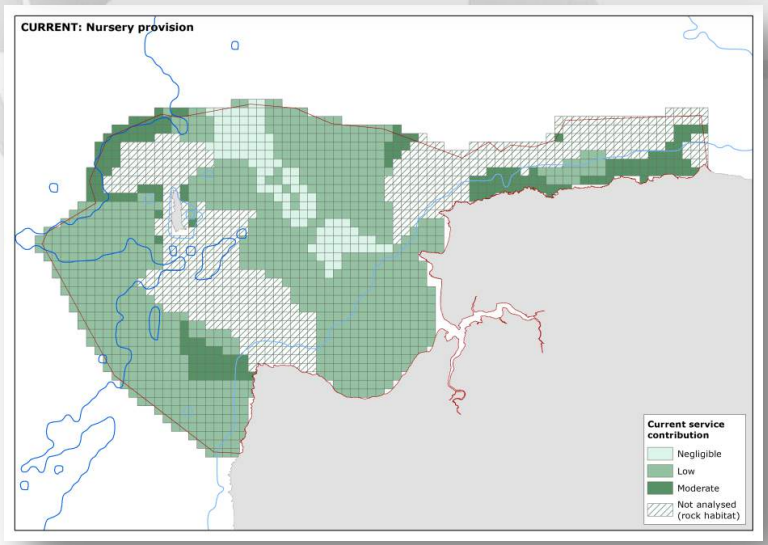


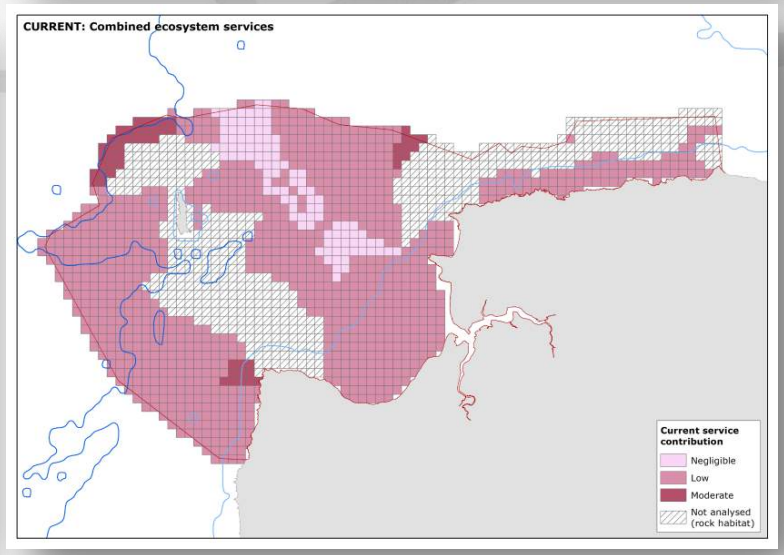
MODELLING CHANGE

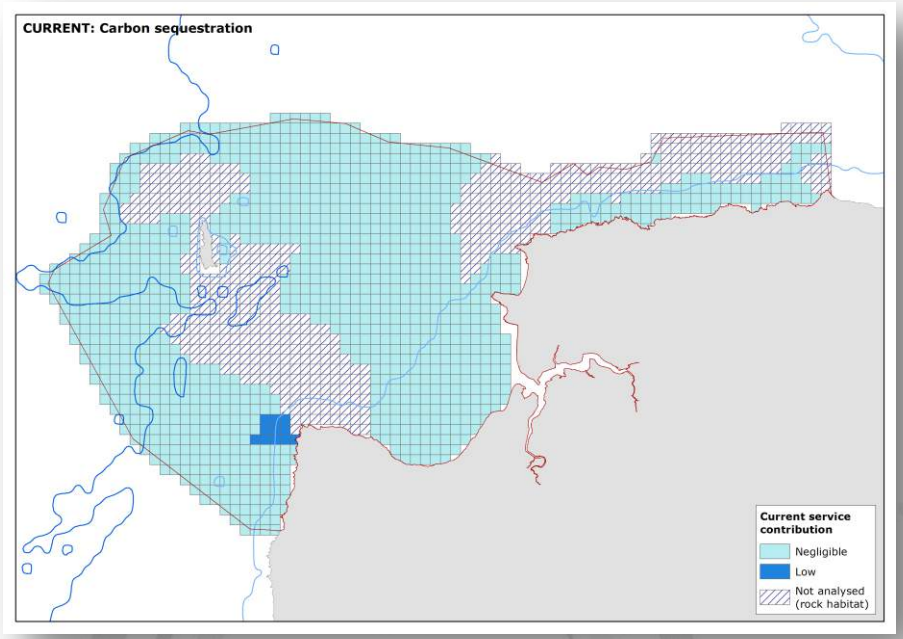
Actual service delivery

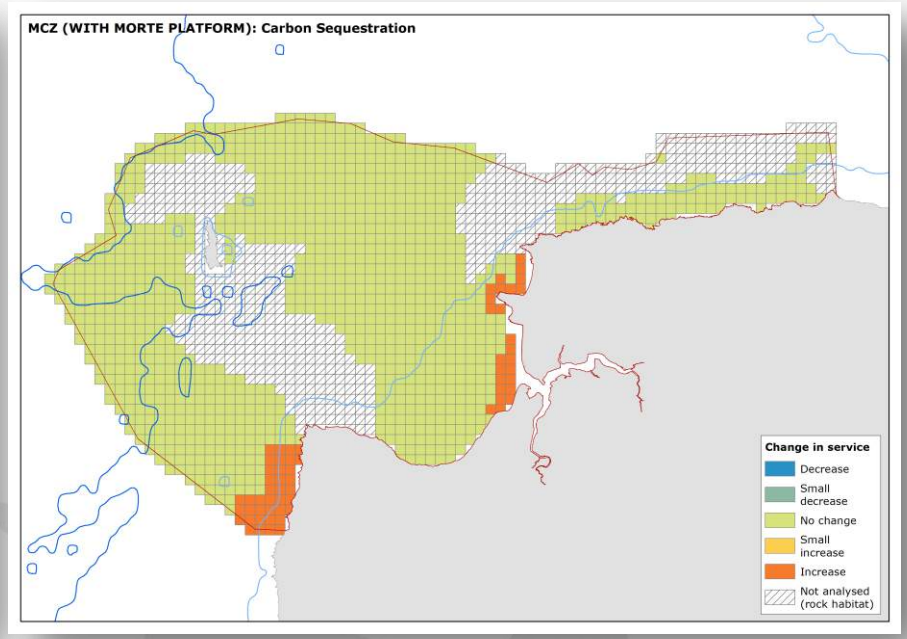


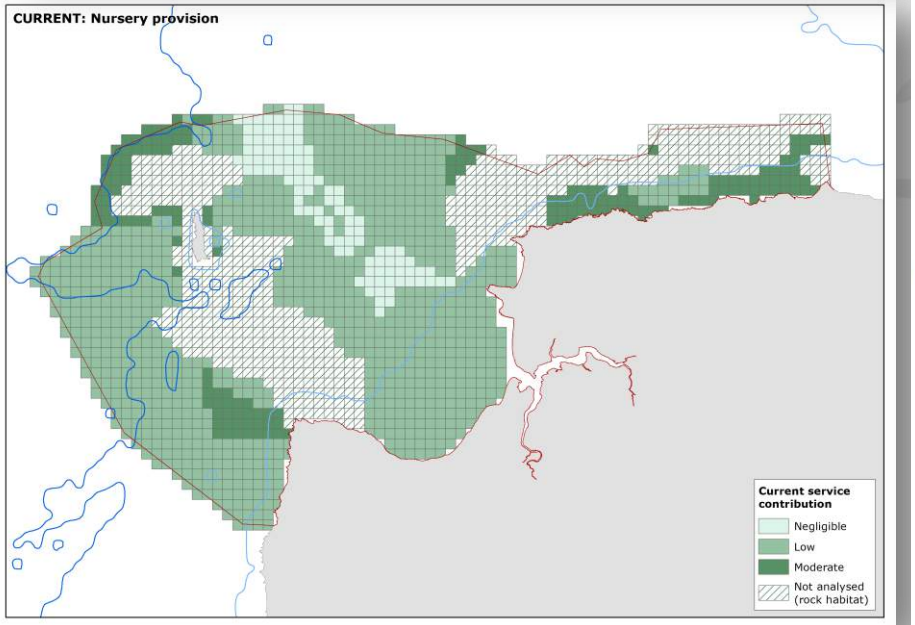


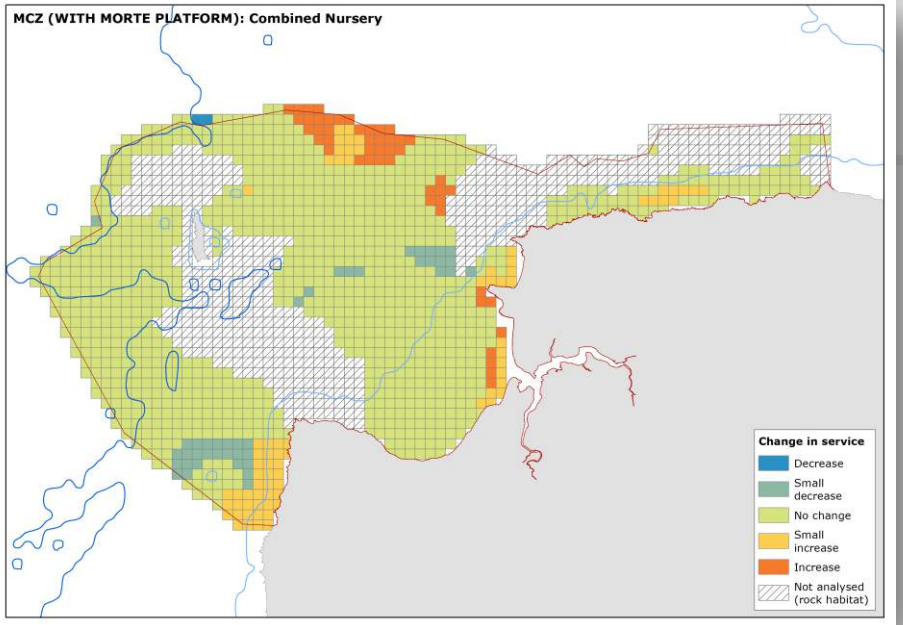


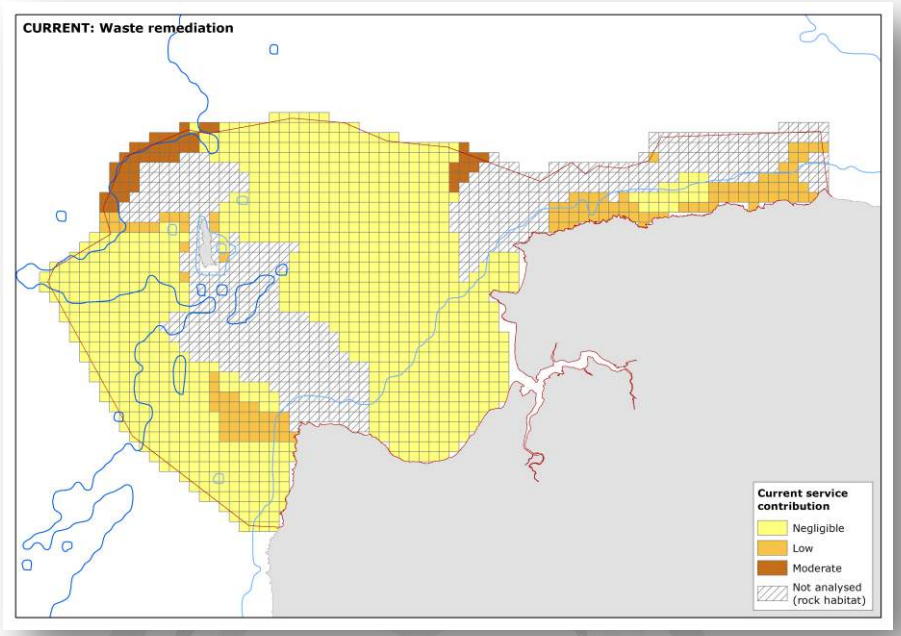


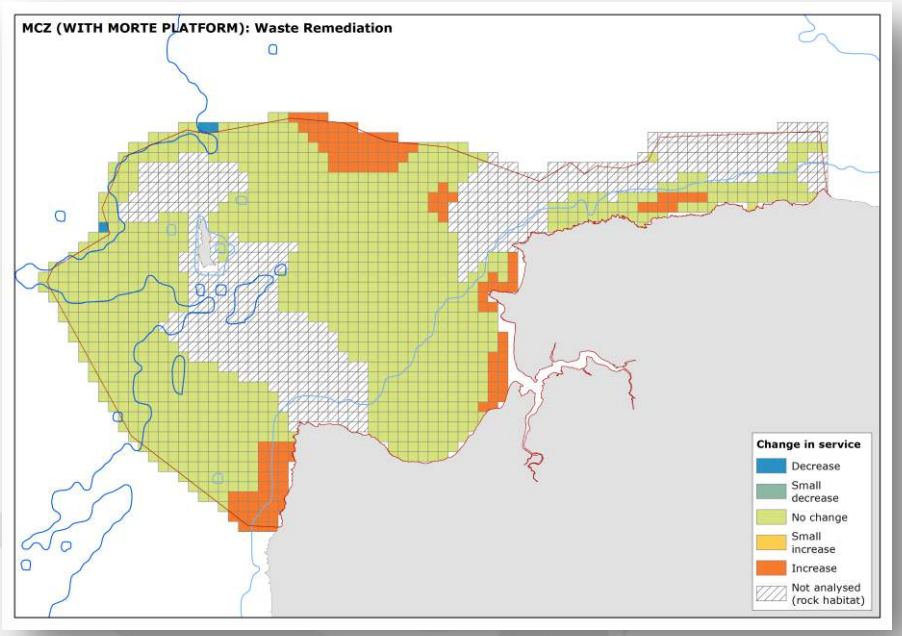

CURRENT: Carbon sequestration
Current service contribution
Negligible
Low
Not analysed (rock habitat)

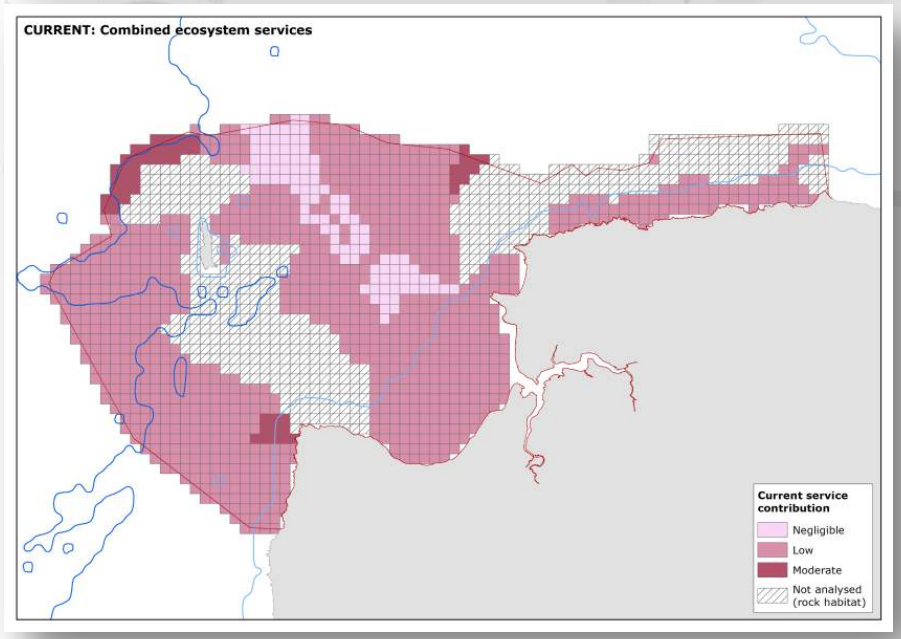

MCZ (WITH MORTE PLATFORM): Carbon Sequestration
Change in service
Decrease
Small decrease
No change
Small increase
Increase
Not analysed (rock habitat)

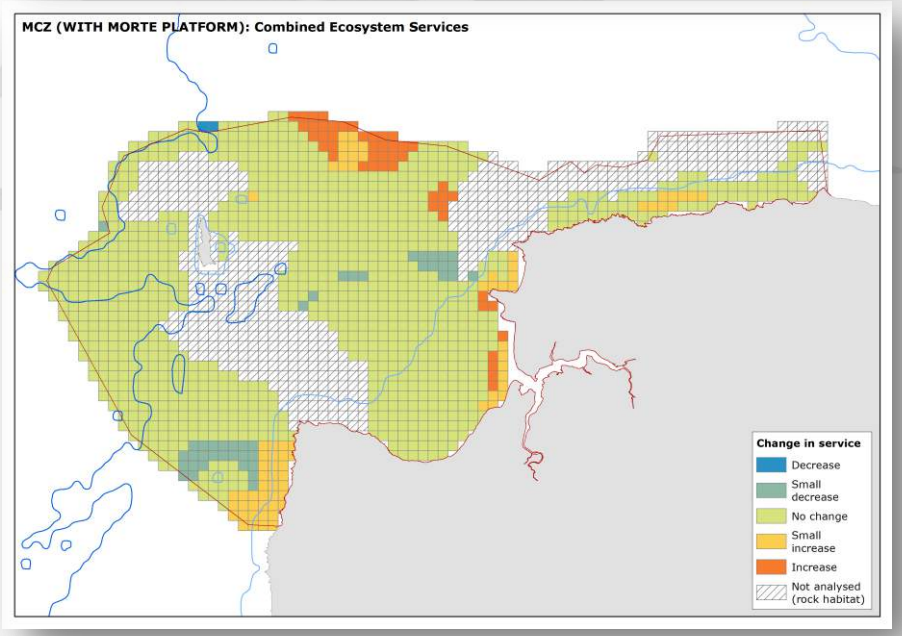

CURRENT: Nursery provision
Current service contribution
Negligible
Low
Moderate
Not analysed (rock habitat)


MCZ (WITH MORTE PLATFORM): Combined Nursery
Change in service
Decrease
Small decrease
No change
Small increase
Increase
Not analysed (rock habitat)


CURRENT: Waste remediation
Current service contribution
Negligible
Low
Moderate
Not analysed (rock habitat)


MCZ (WITH MORTE PLATFORM): Waste Remediation
Change in service
Decrease
Small decrease
No change
Small increase
Increase
Not analysed (rock habitat)


CURRENT: Combined ecosystem services
Current service contribution
Negligible
Low
Moderate
Not analysed (rock habitat)


MCZ (WITH MORTE PLATFORM): Combined Ecosystem Services
Change in service
Decrease
Small decrease
No change
Small increase
Increase
Not analysed (rock habitat)

Quick Summary

- Partitioning the study area
  - Gridding habitat, variables, scenarios
- Creating “current” service provision
  - Using fishermap data
- Assessing change of ecosystem services

- NEXT for the management measures…..

Thank you for your undivided attention

Any further questions?

Image: © João Paulo Corrêa de Carvalho

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.