



Ecosystem based management of corals, fish and fisheries in the deep waters of Europe and beyond

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SB1 changed text here slightly from '... project is focused on improving the ecosystem...' as 'focused' is used later in the sentence Sadhbh, 07/10/2010

Outline



Tools and methods to support marine spatial planning

•Some thoughts about the definition of deep-sea fisheries

CoralFISH Consortium







CoralFISH study areas



Key Research Areas



Background studies

- 1. Regional cold water coral settings
- 2. Regional deep-water fish and fisheries review

Development of monitoring indicators

- 3. Deep-water fish occurrence and fisheries impacts in cold-water coral habitat
- 4. Genetic fingerprinting of cumulative long-term effects of fishing impacts on corals
- 5. Ecosystem function, modelling and metrics

Development of tools for ecosystem based management

- 6. Habitat suitability modelling
- 7. Identification of sensitive and essential/preferred fish habitat
- 8. Economic models and policy advice
- 9. Education, dissemination and outreach



Developing tools and methods to support MSP

Deep-water fish and fisheries



How can we map fishing pressures to protect vulnerable habitats while minimising conflicts with the fishing industry?

How do we reconcile demands from different stakeholders on how to use the deep sea ?

Burgos and Ragnarsson, 2012 Bottom trawl fishing effort 2007-2010 Electronic logbook (ELB) data, 150 m resolution



Sharing high resolution fisheries data – a win-win





Accurate evaluation of the overlap between fishing and vulnerable benthic habitats

Identification of areas with low impacts by bottom fishing gears

• Reduction of conflicts with fishers by optimizing the design of marine protected areas.



Quantifying VME spatial extent

Coral Point Distribution







Linking coral occurrence to recognisable geoforms identified from bathymetry JF Bourrillet - IFREMER

GEOHAB

Bourrillet et al., 2012 Classification result:

head of Odet canyon

Ifremer

5 km vertical exeg. x 2 Elements on the flamica. Elements around the Canyon path

Escarpments IFL - sloping] 20 to 8 esc] IFL - sloping] 10 à 20"] IFL - sloping [5 à 10°] terraces IFL (slope < 5") not used crests, residual > 8m throughs, residual <- 8m Thalweg (channels, ...) Crest from Spurs gully fall secondary crest escarpments flanks - sloping] 20 to 0 and flanks - sloping] 10 to 20°] flanks - sloping [5 to 10°] terraces (slope: <5") river banks bed , moderate slope] 10 -20"] bed, weak slopes [0 - 10"] canyon thalweg.

Bourrillet et al., 2012 Spatial distribution of CW biota



from CoralFISH catalog v5







B) HabitatSuitabilityModelling

Chris Yesson, ZSL, Institute of Zoology, London



Habitat Suitability Modelling

- Take distribution data
- Add environmental data
- Model
- Predict 'suitable' areas



Rengstorf et al., 2013

Modelled distribution of Lophelia reef habitat



Fisheries impact risk assessment

- Cooperation with Deepfishman
- Apply seabed risk categorisation (A. Kenny) to Irish deep-water fishable area
- Make use of *Lophelia* predicted habitat map and vessel monitoring data

Seabed risk categorisation

	Seabed Category	Seabed Assessment	Risk category	Fishing Footprint	Potential Management Measure/Response
presence	1	Areas of known VME (based upon monitoring data)	High	Both	Closed to bottom fishing gears
Potential VME - presence	2a	Areas of potential VME (known with low to moderate levels of certainty based upon HSMs)	Moderate	Inside	Observer enforced non destructive encounter protocols (e.g. camera systems)
	2b	Areas of potential VME (known with low to moderate levels of certainty based upon HSMs)	High	Outside	Non invasive low impact survey techniques to be employed before fishing permitted (EIA protocols)
Known VME absence (false +ve)	За	Areas of no or low density/biomass VME (based upon monitoring data), which models predict could support VME	Moderate	Inside	A proportion of these areas (up to 20% of total predicted extent of VME) should be closed to fishing for potential recovery of seabed functions
	3b	Areas of no or low density/biomass VME (based upon monitoring data), which models predict could support VME	N/A	Outside	This category essentially provides an evaluation of model reliability (it should be close to zero)
Known VME - absence	4a	Areas of no or low density/biomass VME (based upon monitoring data) which models predict are unlikely to support VME.	Low	Inside	Unrestricted bottom trawling
	4b	Areas of no or low density/biomass VME (based upon monitoring data) which models predict are unlikely to support VME.	Low	Outside	Unrestricted bottom trawling
Potential VME absence	5a	Areas of potential no VME (known with low to moderate levels of certainty based upon HSMs)	Low	Inside	Unrestricted bottom trawling
	Sb	Areas of potential no VME (known with low to moderate levels of certainty based upon HSMs)	Moderate	Outside	Observer enforced non destructive encounter protocols (e.g. camera systems, gear modifications)

Map 1:

True distribution vs. potential distribution (model includes ALL Lophelia observations, Living and dead, reef and solitary)

The grid shows the model study area (based on predictions of the global model (Davies & Guinotte, 2011) Rockall Trough and very deep areas were excluded) Area: 202,000km2 Grid cells (10km2): 2020



Map 2:

Presence of high percentage (70%) fishing activity in 10 x 10km grid cells (CEFAS)

The active fishing area is much smaller than the total fishable area

Issue for defining the fishing footprint but nb. A single exploratory trawl can do major damage to a VME



Map 3:

Risk assessment based on the categories 1, 2 and 5

Black/Red is high risk Orange/yellow is medium risk

Green is low risk



Deep-sea definition for fisheries management

- To implement proper ecosystem based management, ALL species present below 200m (or shelf break) should be regarded as 'deepsea'
- As a first step, 'zoning' should be undertaken to spatially allocate activities including fishing but also the protection of VMEs, establishment of SACs under Natura 2000, zones for oil and gas exploration, etc. Define current trawling footprint
- As a second step, sector specific management can be applied so that in the case of fisheries fish stocks are managed depending on their life-history characteristics, resilience and productivity... and thus the continuum from predominantly shallow water life history characteristics to predominantly deep-sea life histories is addressed. Deepfishman recommendations



www.eu-fp7-coralfish.net

