

#### Impacts of fisheries, mining and tourism over Rhodolith/maerl beds

#### **Rafael Riosmena-Rodríguez**

Programa de Investigación en Botánica Marina, Departamento de Biología Marina, UABCS

#### Main human impacts:



**PJ Moore** 

Eutrophication,

Dredging,

Mussel farms,

Fishing impacts, fisheries practices

Mining,

Port building

Touristic activities



Complex 3-D structure, no two maerl beds the same (Biomaerl, 1999)



Granulometric fractions

 Medium and
 Medium and

 Coarse maerl
 Coarse sands
 Fines 20% to 50 %

#### Increases in agricultural and sewage discharges

Eutrophication, the increase in the levels of macronutrients (particularly nitrogen and phosphorus), is due in European coastal waters principally to the use of artificial fertilizers and also to the discharge of untreated sewage or sewage with only primary treatment. It can result in the excessive growth of ephemeral species of macroalgae (commonly referred to as green tides where the effects are visible on the shore). Eutrophication also causes increased turbidity of the coastal water due to more prolific growth of phytoplankton. Both these effects could result in damage to maerl biotopes. Heavy overgrowth of epiphytic algae would reduce light levels available to the maerl, presumably reducing growth rates, as would increased turbidity from planktonic blooms. In addition, the macroalgal overgrowths and phytoplankton might compete with the maerl for selected nutrients.

Hily *et al.* (1992) reported for Brittany that increased terrigenous material in river effluents, as a result of unspecified changes in agricultural activities, is responsible for the increase in turbidity in the rade de Brest. Where high turbidity and eutrophication occurred, these prevented the establishment of many algal species, causing the ubiquitous ones to dominate (*Ulva* sp.,*Ceramium rubrum*).

Grall & Glémarec (1997) investigated the effects of eutrophication in the rade de Brest, by comparing impacted and control sites. Overall, there was an increase in algal cover, shown as greatly increased biomass at the impacted site. Species richness of animals in most of the trophic groups (e.g. carnivores, detritivores and scavengers) was slightly reduced, although diversity of surface deposit feeders was enhanced. The numbers of individuals per sample was slightly increased for the most abundant trophic group, detritivores.

## **Dredge activities**

## **Fisheries** impacts

Scallop dredging has profound, long-term impacts on maerl habitats **1.J. M. Hall-Spencer**<sup>1</sup>,<sup>2</sup> and **P. G. Moore**<sup>2</sup>





1413



Figure 4. Phytomatolithon calcareum maerl thalli collected at Site 3 by Batters in 1891, before scallop fishing began in the Clyde Sea area (upper set), compared with specimens collected from the same site in 1995 (lower set). Scale bar represents 1 cm.



Figure 5. Sediment collected in traps 2 h before and 2 h after scallop dredging at different distances from the track (Site 2). An experimental study of the ecological impacts of hydraulic bivalve dredging on maerl 1.<u>C Hautona</u>,\*, J.M Hall-Spencerb and <u>P.G Moorea</u>

Phylum	AFDW (g)	%
Cnidaria	0.94	0.2
Nemertea	0.13	0.0
Annelida	4.94	1.2
Crustacea	7.59	1.9
Mollusca	375.36	94.1
Bryozoa	0.01	0.0
<b>Echinoderm</b> ata	5.68	1.4
Chordata	0.01	0.0
Rhodophycota	0.74	0.2
Chromophycota	3.32	0.8
Chlorophycota	0.05	0.0
Total	398.77	100



### Shrimp fisheries

#### **Fish farm impacts on maerl bed crustaceans** Jason Hall-Spencer

EU policy: move fish farms to areas with strong current flow

Scottish Environment Protection Agency (SEPA) & Scottish Natural Heritage (SNH) asked me: how will fish farms affect maerl beds?





3 farm sites: low live maerl cover





Mean ( $\pm$ SE) % maerl found live in replicate 0.25 m<sup>2</sup> quadrats at

reference sites and 0-100 m from three salmon cages



*K*-Dominance curves showing changes in community structure with distance from farms; data from 1 mm sieved  $0.01 \text{ m}^2$  cores.





# Fisheries practices: anchors, fishing gear and disposal of waste

## Mining: precautonary principle

The **precautionary principle** or precautionary approach to <u>risk management</u> states that if an action or policy has a suspected risk of causing harm to the <u>public</u> or to the<u>environment</u>, in the absence of <u>scientific consensus</u> that the action or policy is not harmful, the <u>burden of proof</u> that it is *not* harmful falls on those taking an action.

The principle is used by policy makers to justify discretionary decisions in situations where there is the possibility of harm from making a certain decision (e.g. taking a particular course of action) when extensive scientific knowledge on the matter is lacking. The principle implies that there is a <u>social responsibility</u> to protect the public from exposure to harm, when scientific investigation has found a plausible risk. These protections can be relaxed only if further scientific findings emerge that provide sound evidence that no harm will result.

## Actual mining actitivies who impact rhodolith/maerl beds

Maerl has been extracted from artisanal or dredge in northern Europe for agricultural uses or for water filtration. However, the commercial use has reached more than 600,000 tons in grancia only. Maerl is a French industry both for the value and the volume of extraction. Another country that participates is the UK meet up with more than 300,000 tons.



http://www.ukmarinesac.org.uk/communities/maerl/m1\_1.htm



#### http://www.calciodecoralvital.com/







Bone Graft Materials *Dental Clinics of North America*, Volume 51, Issue 3, Pages 729-746 H. Precheur



Osteoporosis Gone In Days - Natural cure for Osteoporosis. Life changes in weeks if not days. -<u>www.CureOsteoporosisToday.com</u>

Inventors: <u>Dean Neuls</u> <u>Marcos Neves</u> Agents: <u>NIXON & VANDERHYE, PC</u> Assignees: <u>HL DISTRIBUTION COMPANY</u> Origin: <u>ARLINGTON, VA US</u> IPC8 Class: AA61K3332FI USPC Class: 424639



Read more: <a href="http://www.faqs.org/patents/app/20090053324#ixzz0lrvoc7lW">http://www.faqs.org/patents/app/20090053324#ixzz0lrvoc7lW</a>

7. The method of claim 10 wherein the marine algae is a rhodolith.

8. The method of claim 10 wherein the marine algae is a non-geniculate coralline algae.



https://www.google.com.mx/search?q=population+density&espv=2&biw=1242&bih=567&site=webhp&source=Inms&tb m=isch&sa=X&ved=0CAYQ\_AUoAWoVChMI7qDD4L6sxwlViqYeCh2E\_QKH#tbm=isch&q=tourism+growth&imgrc=SlgVkat y478WBM%3A

#### **Leisure activities**

Leisure activities, particularly marine ones, are part of an important growth industry at present. Several activities connected with yachting, e.g. anchoring either by temporary anchors or by permanent moorings, can damage maerl. In the Fal, the action of the mooring chain as vessels swing in the tide has been observed to crush maerl and other organisms. It is likely, however, that yachtsmen would be open to suggestions of less damaging types of moorings.





SOURCE: WORLD TRAVEL & TOURISM COUNCIL 2002







### **Cornwall Against Dean Super Quarry**







http://www.cads2015.com/marine-conservationzone/

