

Closed areas for fisheries management: How much is enough?



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Sustainable Fisheries in the South-Western Indian Ocean: the importance of the Education, Management and Governance

Closed Areas for Fisheries

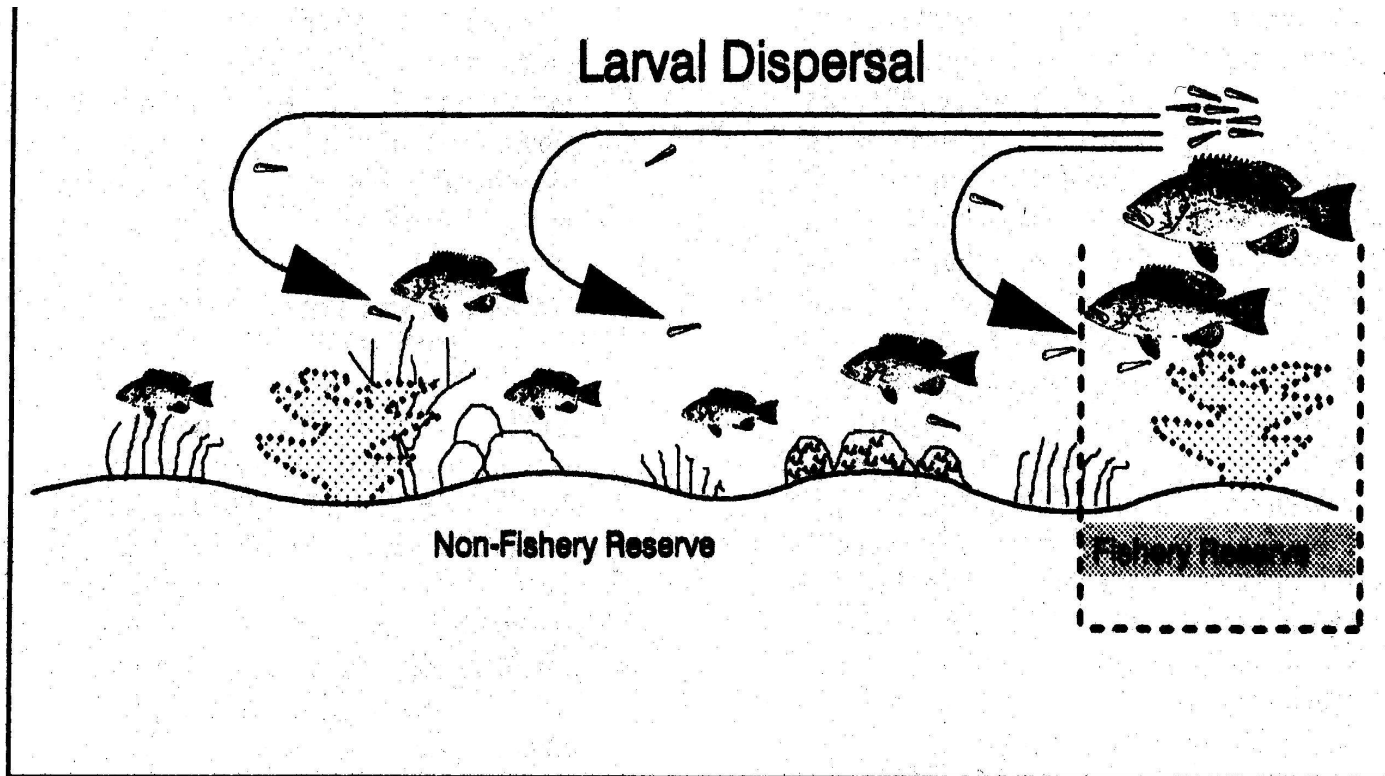


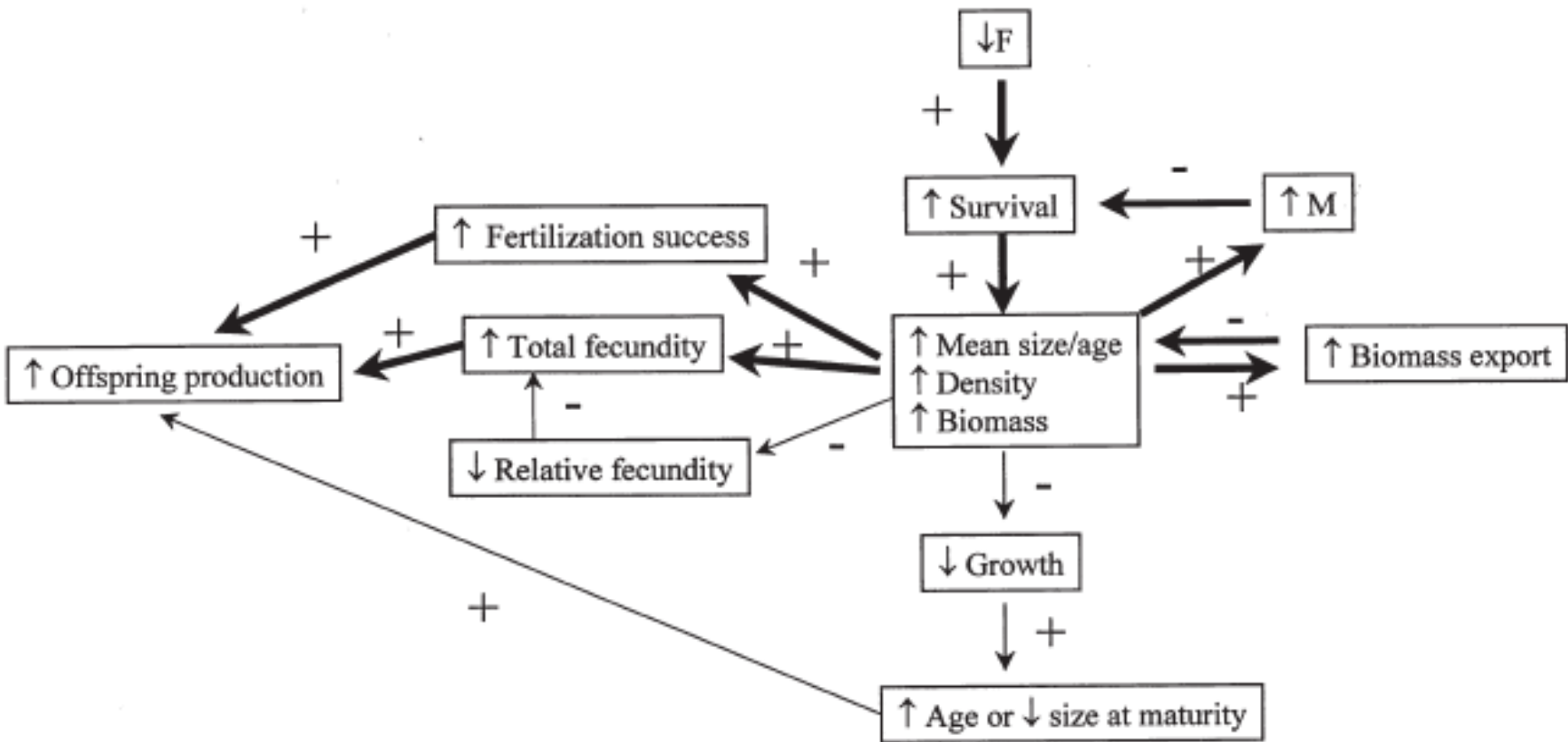
Figure 11. Many larvae generated by adults in marine fishery reserves should disperse and recruit to harvested areas.



PDT, 1990



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Sanchez Lizaso et al 2000



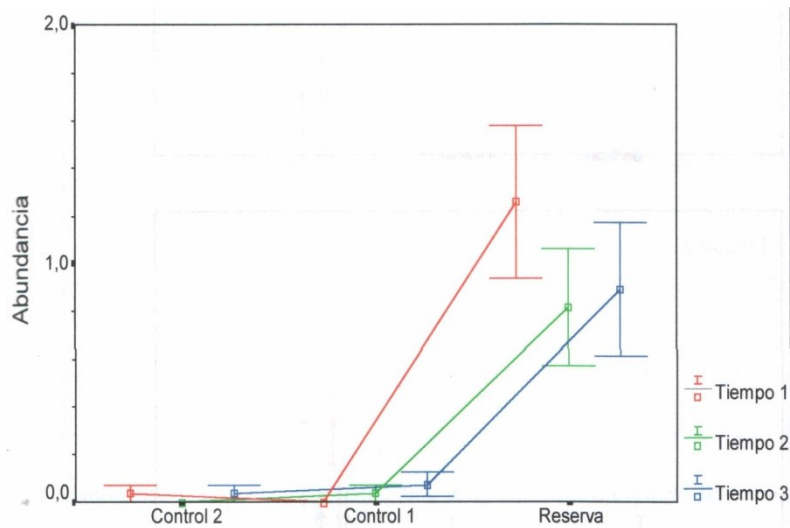
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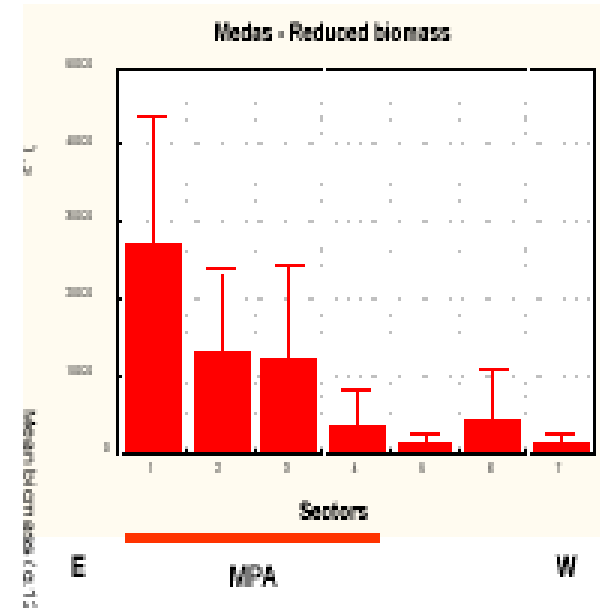
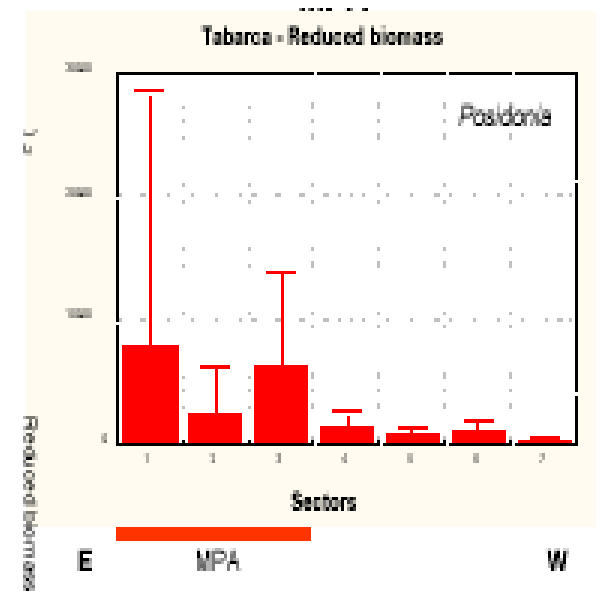
- Higher abundance and biomass of target species

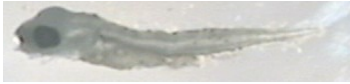


Epinephelus marginatus

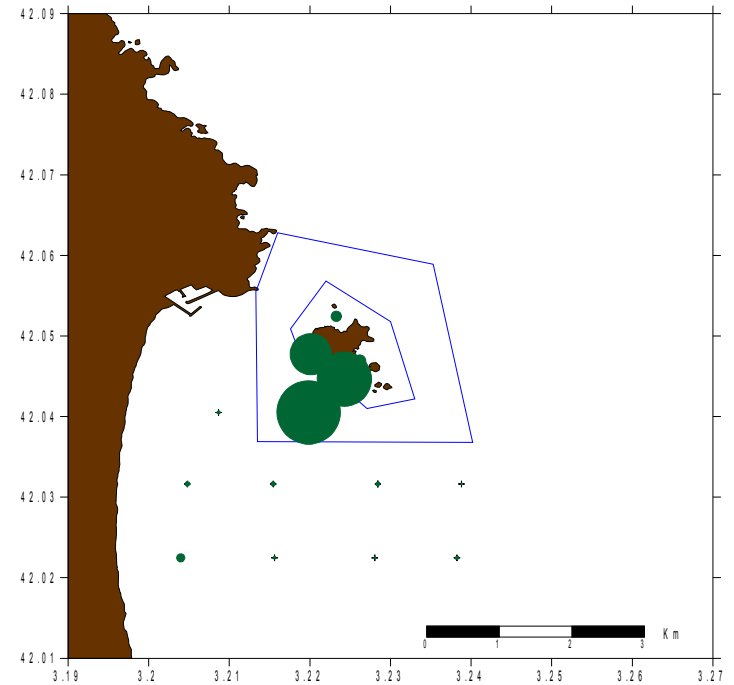


Tabarca marine reserve (Bayle 1999)





- Increase spawning stock biomass
- Increase the production of eggs and larvae
- No information on recruitment



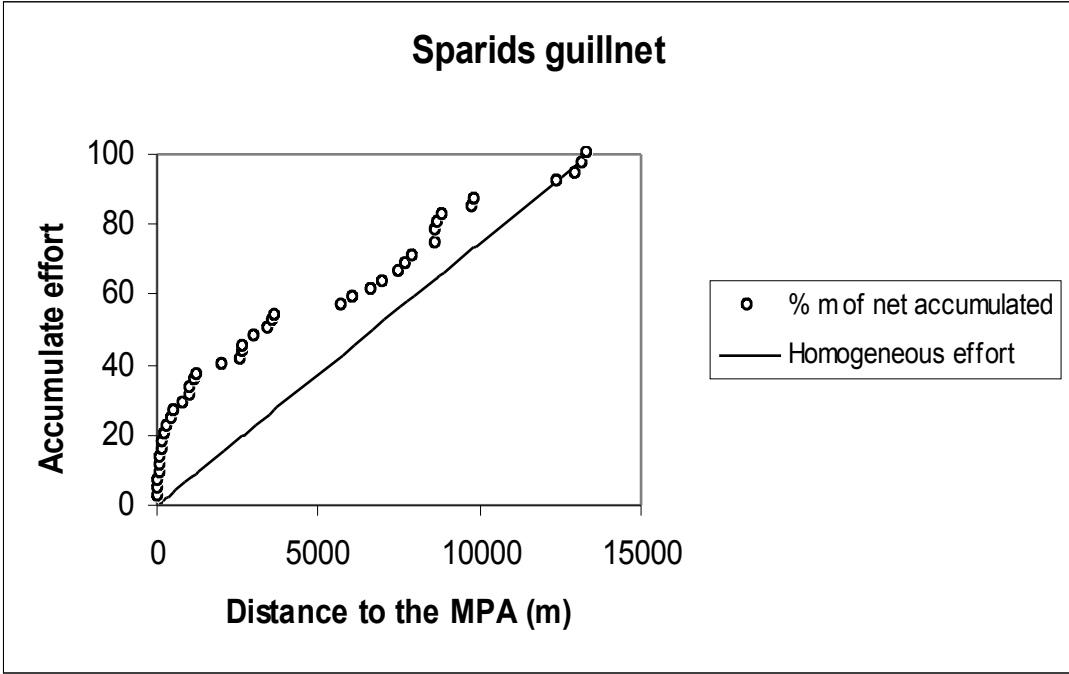
López-Sanz et al 2011



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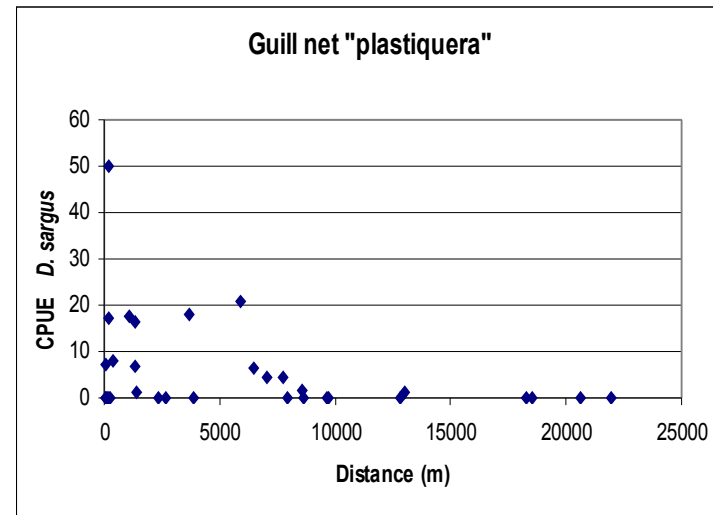
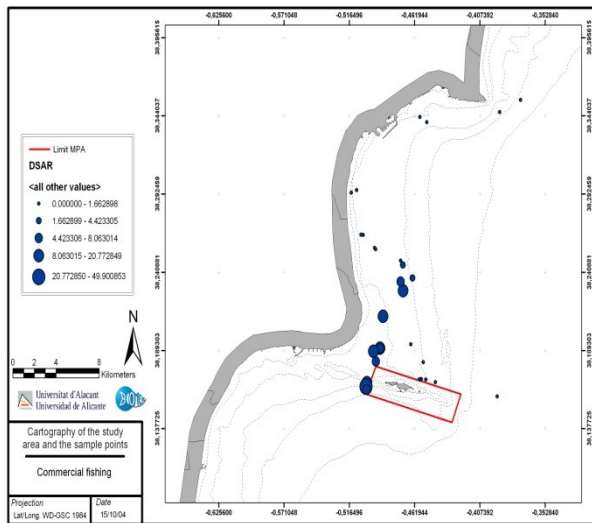
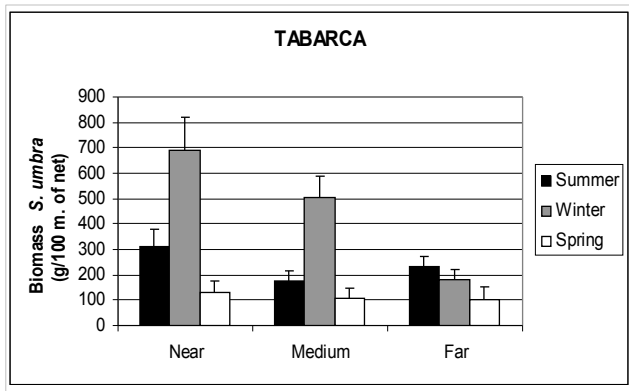
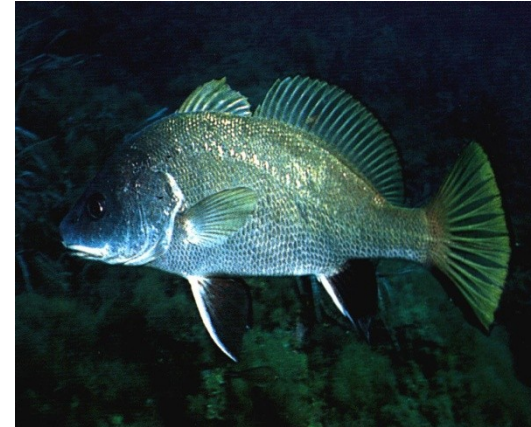
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Fishing effort concentration in the boundaries



— Arrastres
— Artes menores

Increase of the catches of target species

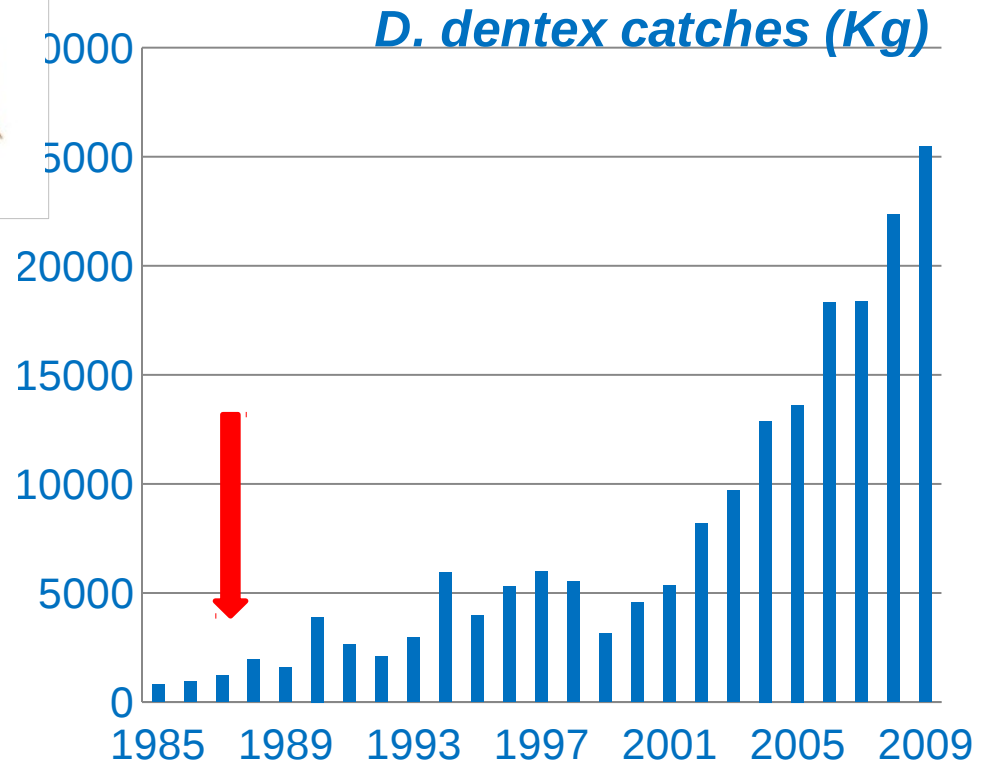
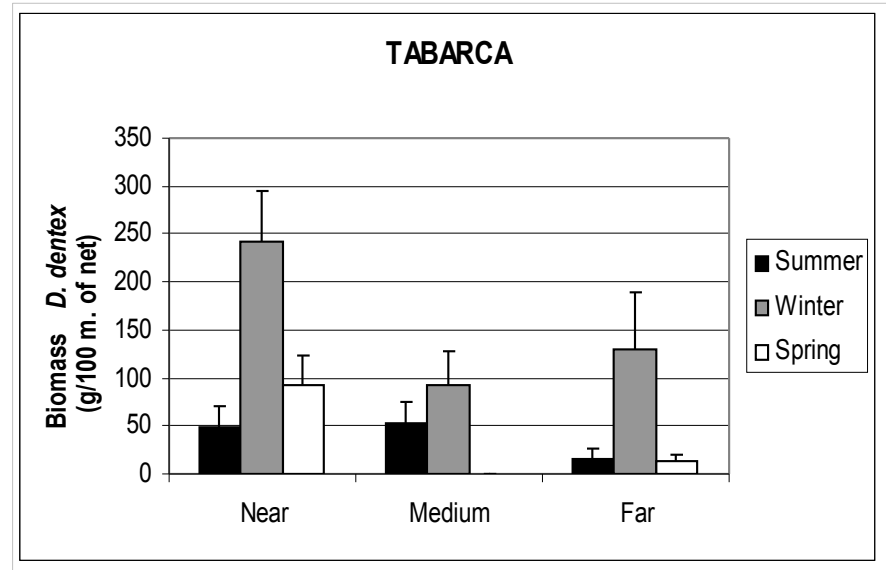


Goñi et al 2008 MEPS 366: 159–174
Forcada et al 2009 MEPS 379: 197–211

D. dentex

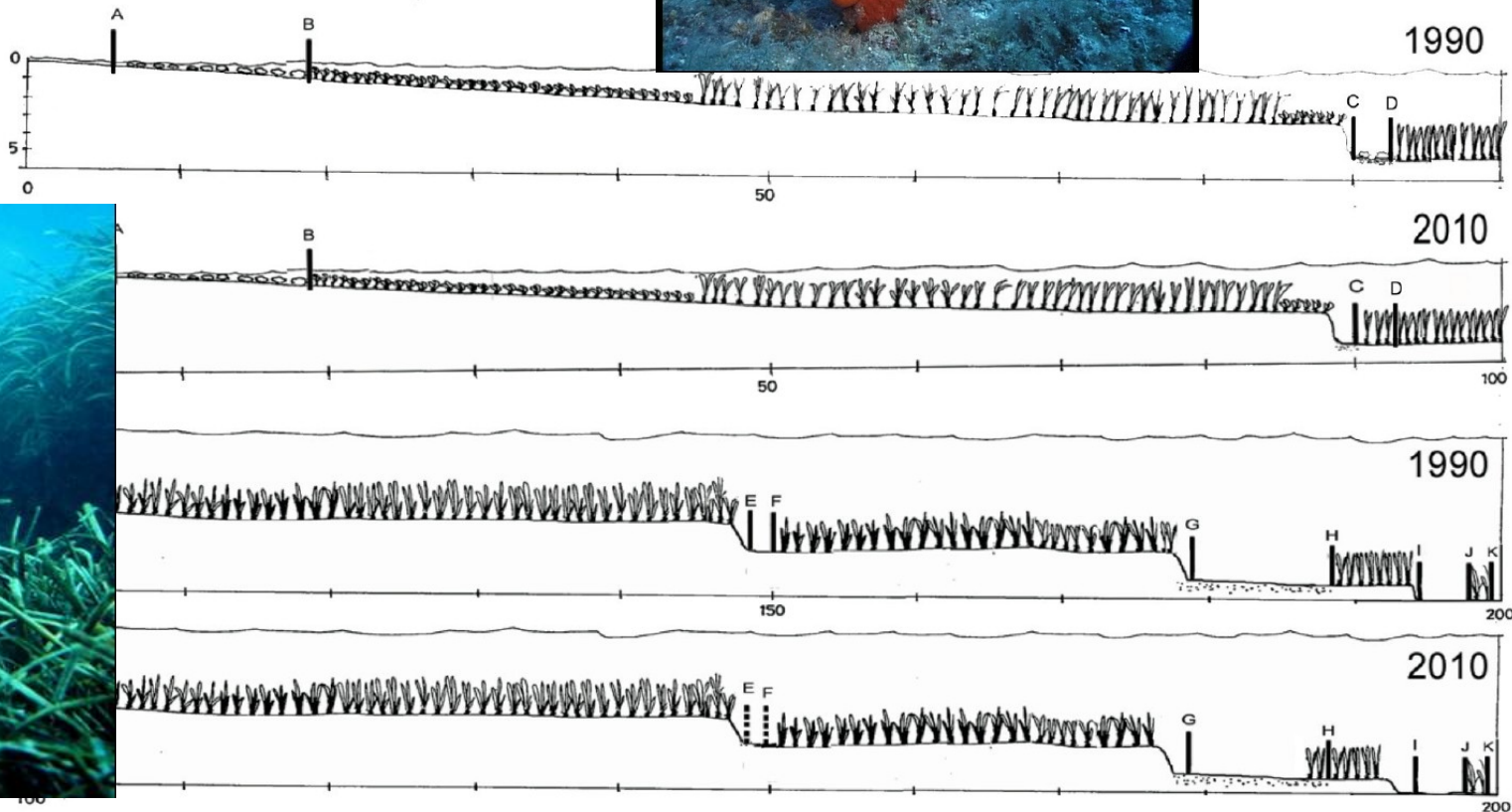


Forcada et al, 2009
Orozco & Sánchez Lizaso, 2011



Closed Areas allow the conservation of key ecosystems and protected species

González Correa et al 2015



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How much is enough?

- MPAs are effective for fishery enhancement and conservation objectives but the relevant question for managers is the proportion of the area of distribution of each population that need to be protected.
- It is necessary to achieve an equilibrium between biomass accumulation inside and biomass export to open areas.



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- Surface to be protected is dependent on the biology of species. Usually species with more mobility need larger closed areas (Ramos et al 2002).
- Small protected areas have been effective for the protection of low mobility species.



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Convention on Biological Diversity

- By 2020, at least 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape
- Currently, some 13 per cent of terrestrial areas and 5 per cent of coastal areas are protected, while very little of the open oceans are protected



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However 10 % may not be enough and, for fisheries management, best results have been observed with 20-25% closed areas (Russ & Alcalá, 1999; Alcalá & Russ, 2000).

Limit reference point for many fisheries is between 20-30% SSB

On the other hand, in Kenya (Mombasa Marine National Park), the protection of 65% of the fishing area doubled CPUE but reduced total catch and the number of fishers (McClanahan & Kaunda-Arara 1996)



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Surface in protected areas may be on partial protection status with some fishing allowed inside. (i.e. a surface protected of 20 % not necessary means a reduction in F of 20%)

Or may be not effectively implemented (paper parks).

We should consider only surface completely closed to fishing and effectively implemented.



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In many countries MPAs are biased to protect some particular habitat (i.e. coastal reefs)



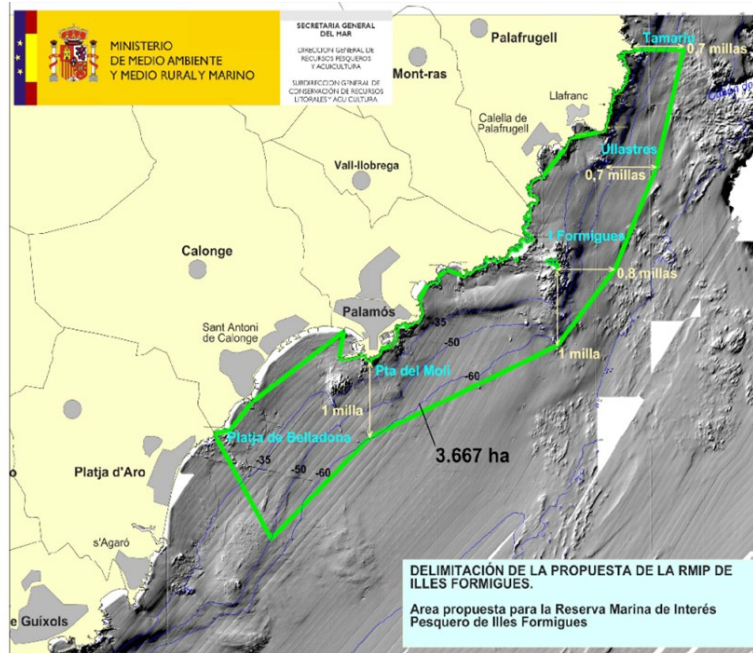
The target of 20-30% surface protected has to be achieved for all marine habitats from coastal habitats to open seas to benefit all marine species.



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If target is to expand the network of areas closed to fisheries and effectively enforced the constraint in many countries are financial sustainability of protection.



Formigues MR, Spain



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Financial sustainability of protected areas may be reached by different ways.

In Spain it is assumed that all the cost has to be assumed by the government

In other countries the co-management or the funding by NGOs may be relevant

However usually are winners with protection that may contribute to funding (Badalamendi et al 2000)

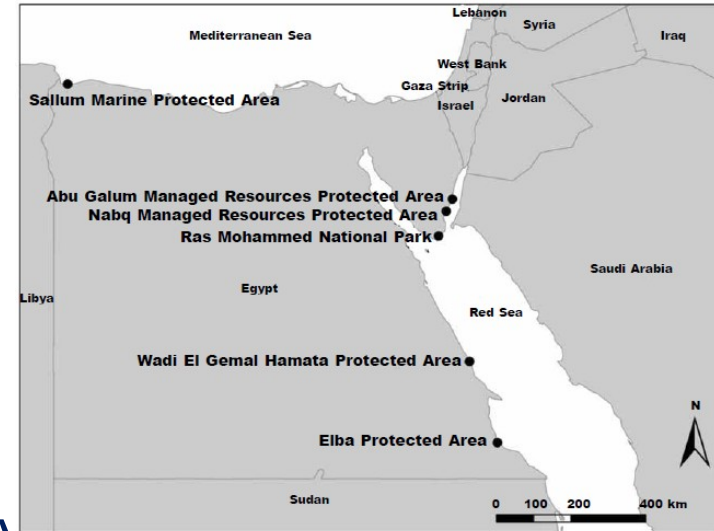


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Red Sea MPAs (Samy et al 2011)

- Ras Mohammed National Park
Management cost: m€ 87,500/year.
Income generated by visitors
approximately € 1,952,000/year
- Wadi El Gemal–Hamata Protected Area
Management cost: € 131,750,
Income generated by visitors € 2,959,595
20 times more in both cases



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It has been observed that a significant percentage of visitors to some Spanish MPAs will accept to financially contribute to their management (Durgun, 2013).

But how to pay enforcement in high sea with no visitors?

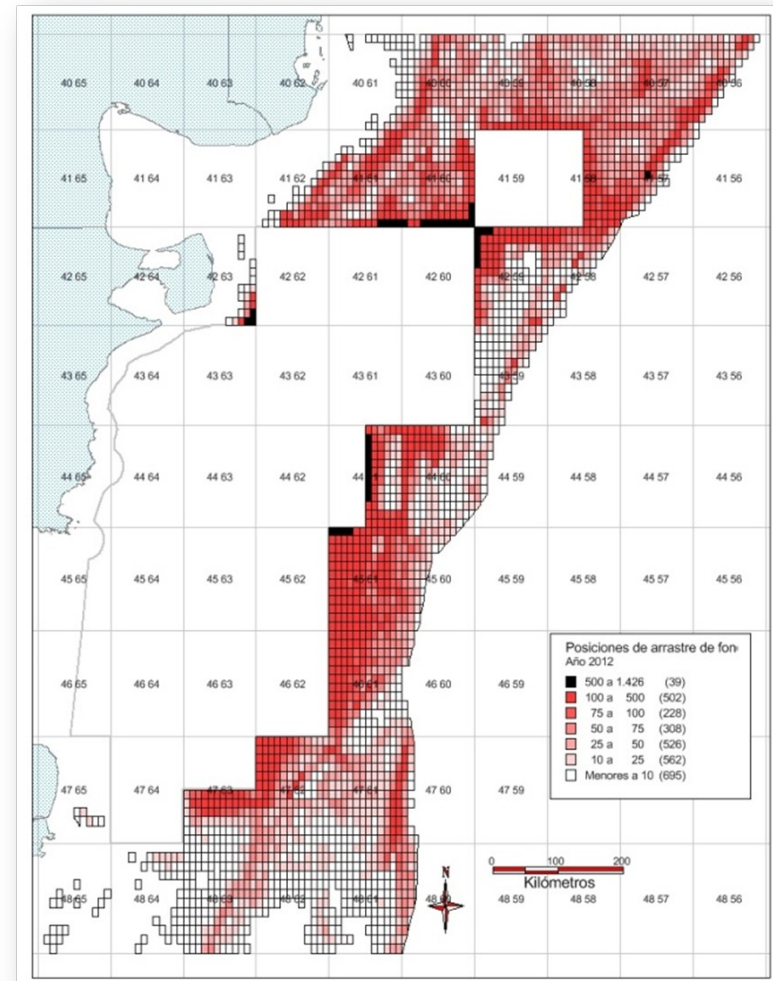


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(Mazzini, 2013)

Usually to fish in open sea larger boats are needed.

Enforcement of closed areas in the high sea may be very easy and cheap with Vessel Monitoring System (VMS) and/or Automatic Identification System (AIS)



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Conclusion

- MPAs are effective for protecting marine biodiversity and rebuilding stock biomass
- At least 20-30 of **ALL** marine habitats have to be closed to fisheries
- Sustainable financing is needed to ensure enforcement



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Thank you!

Merci beaucoup!

Misaotra!

Muchas gracias!

Muito obrigado!



Tabarca Marine Reserve, Alicante Spain



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