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Marine Protected Areas
A review of their use for delivering marine biodiversity benefits

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Introduction

The UK is committed to identifying and designating relevant areas of the UK's seas as areas of protection belonging to "a network of well-managed sites by 2010". As part of this, the Government is also considering the role Marine Protected Areas (MPAs) can play in ensuring functioning and resilient ecosystems and the protection of biodiversity.

What was done

This report examines the evidence for benefits from MPAs set up for the conservation of marine biodiversity and across the full spectrum of management regimes from Highly Protected Marine Reserves (HPMRs), where all extraction is prohibited, to multiple-use management areas

Evidence for the beneficial effects of MPAs is described in relation to:

- conservation of biodiversity;
- habitat protection;
- commercial species (as a result of biodiversity conservation measures rather than fish stock management);
- protection or enhancement of ecosystem services; and
- insurance against environmental or management uncertainty.

The value of MPAs for scientific research, education and raising awareness about the marine environment are also touched on briefly.

Results and conclusions

The most systematic analysis of MPA effects to date, where there is good comparable data for HPMRs suggests overwhelming positive effects on biodiversity. These were apparent as higher densities, biomass, size and diversity of certain species or groups of species within reserves compared to outside reserves, or after reserve establishment compared to before. There is also some evidence of positive species and community effects such as greater complexity of food webs and increased primary and secondary productivity in MPAs as a consequence of protection. Some commercially exploited species have been shown to benefit from MPAs set up for biodiversity conservation.

Reported habitat protection benefits of MPAs fall into two categories: preventing or reducing the impact of human activities; and providing conditions free from recurring impact thus allowing time and space for recovery and restoration.

The most direct evidence that MPAs can protect and enhance ecosystem services comes from situations where habitats and species protected by MPAs are known to provide such services. By way of illustration, the report presents evidence on the role of seagrass beds, kelp forests, mussel beds, maerl beds and sediment communities in supporting ecosystem services such as productivity, sedimentation, stablisation, oxygenation, shoreline protection, sediment production and nutrient recycling.

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The potential for MPAs to act as insurance against environmental or management uncertainty is promoted as a biodiversity conservation benefit. This role has also been agreed as an objective of individual MPAs but has still to be tested.

There are many examples of MPAs being used for scientific investigation and education. HPMRs have been used as reference sites for monitoring the impacts of human activities, for example, while the UK Marine SACs LIFE Project has shown the educational potential and use of MPAs.

Not all studies into the effects of individual MPAs reveal positive effects on marine biodiversity. Negative effects may result from attracting activities into an MPA or increasing pressure outside the MPA by displacing activities. Within MPAs negative effects are most likely to be due to poor management or limited understanding of the carrying capacity of the site. Impacts outside MPAs demonstrate problems with the wider management regime rather than failure of the MPA. They highlight the importance of MPAs being set into a wider integrated marine management context rather than isolated islands of biodiversity conservation.

MPAs have many roles and are one of a number of management tools which can be used for the conservation of marine biodiversity. This report provides evidence of many positive effects of MPAs on marine biodiversity. The conclusion is that there is overwhelming evidence of the benefits of MPAs for marine biodiversity and that these benefits are clearest and most significant in the case of Highly Protected Marine Reserves.

English Nature's viewpoint

This report provides an excellent summary of the advantages and disadvantages of Marine Protected Areas drawn from real examples. English Nature notes that the evidence supports the case that MPAs provide overall benefits to marine biodiversity. English Nature will use the evidence compiled in this report to support the case for the development of a UK-wide system of Marine Protected Areas, including Highly Protected Marine Reserves, for marine biodiversity, particularly in the context of the Government's Marine Bill.

Selected references

COMMONWEALTH OF AUSTRALIA. 2003. The benefits of Marine Protected Areas. Available from: http://www.gbrmpa.gov.au/corp_site/key_issues/conservation/rep_areas/rep_area_overview.html [Accessed February 2006]

HALPERN, B.S. 2003. The impact of marine reserves: do reserves work and does reserve size matter? *Ecological Applications*, 13(1) Supplement, 2003. pp S117-137.

LUBCHENCO, J., PALUMBI, S.R., GAINES, S.D. & ANDELMAN, S. 2003. Plugging a hole in the Ocean: the Emerging Science of Marine Reserves. *Ecological Applicatons* 13(1) Supplement, 2003.

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