Area-based Measures for Mobile Species

Peter G.H. Evans & Giuseppe Notarbartolo di Sciara
SHIPPING ACTIVITY & COLLISION RISK IN NORTHERN EUROPE

a) Shipping Density

b) Whale Density

c) Collision Risk

Source: Evans & Baines (2011)
RISK MAPS: COMMON DOLPHINS IN THE IRISH SEA

a) Vulnerability to bycatch in pelagic trawls

b) Distribution of fishing effort from VMS data

- The map on the left takes predicted densities from surveys and incorporates a biosensitivity weighting that includes life history parameters & conservation status as well as known susceptibility to bycatch from these particular fishing gears.
Area-based measures require identification of locations important to cetaceans, where human activities would have a particularly negative impact upon populations.

The question is: Can that best be achieved by establishing an MPA or to track human activities likely to have negative impacts and apply mitigation measures accordingly?

Almost all management measures have a spatial component; resources are always limited so need to focus on high risk areas.
MPAs as “Spatial Management”

The US National Marine Sanctuary System
Key principles of Natura 2000

- Conservation of species & habitats across entire natural range in EU - irrespective of political boundaries
- Site selection is exclusively scientific
- Sites have strong legal protection
- Not a system of nature reserves – management in collaboration with stakeholders
- Promotes sustainable development: new activities or development affecting N2000 are not automatically excluded

Source: European Commission
DESIGNATED SACs CONTAINING HARBOUR PORPOISE
Natura 2000 sites hosting Bottlenose Dolphin *Tursiops truncatus*

274 sites in ten Member States (but 74 sites classified as ‘D’)

Source: European Commission
BOTTLENOSE DOLPHIN & HARBOUR PORPOISE DISTRIBUTIONS IN NW EUROPEAN SEAS: 1980-2000

a) Bottlenose Dolphin

b) Harbour Porpoise

Source: Reid, Evans & Northridge (2003)
Atlas of Cetacean Distribution in north-west European waters
BOTTLENOSE DOLPHIN DENSITIES IN THE IRISH SEA

1990-1994

HARBOUR PORPOISE SUMMER DENSITIES IN UK WATERS FROM 1994 TO 2009

• need to demonstrate persistence in high usage over time

Source: Heinanen & Skov (2015)
SANDEEL CATCH RATES FROM 1990 TO 2009

Source: ICES & CEFAS
Why populations may shift areas of concentration:

- climate change (oceanographic changes affecting cetacean prey)
- human-induced habitat change
- over-fishing of prey stocks
- increased mortality from bycatch
- increased disturbance – noise, risk of ship strike, and disruption of feeding/nursing
No. tagged = 62 harbour porpoises; Period of tagging: 1992-2007

Source: Sveegaard & Teilmann, 2007; Teilmann et al., 2008; Sveegaard et al., 2011
Understanding Cetacean Distributions

Identify environmental drivers of spatial and temporal variations in cetacean distributions, and predict their persistence.

Source: James Waggitt & Peter Evans
IUCN WCC, Barcelona, Oct. 2008
The EBSAs are special marine areas that serve important purposes, to support the healthy functioning of oceans and the many services that they provide.

In 2008 CBD adopted 7 scientific criteria for identifying EBSAs in need of protection in open-ocean waters and deep-sea habitats.

1. Uniqueness or rarity;
2. Special importance for life history of species;
3. Importance for threatened, endangered or declining species and/or habitats;
4. Vulnerability, fragility, sensitivity, slow recovery;
5. Biological productivity;
6. Biological diversity;
7. Naturalness.
As part of this effort, the Parties to the CBD identified 15 Mediterranean Ecologically or Biologically Significant Areas (EBSAs) in 2014, on the basis of the 7 criteria and a wealth of ecological considerations, where the presence of marine mammal habitat featured significantly.
EBSAs – Ecologically or Biologically Significant Areas

Pat Halpin, MGEL, Duke U
Zoning of MPAs as Spatial Management Tool

Brad Barr, NOAA
ZONING APPROACH TO AREA PROTECTION

The bottlenose dolphin in Wales

Source: Pesante et al., 2008; Baines & Evans, 2012; Feingold & Evans, 2014
FISHERIES MANAGEMENT: PREVENTION OR REDUCTION OF IMPACTS

1. Close fisheries or areas
2. Design “whale safe” fishing gear
3. Develop rescue networks (for large whales)

Marine Mammal Protected Areas can:

• Institute seasonal closures
• Apply measures to reduce bycatch, e.g. pingers
• Provide a site and support for experimental fisheries
• Act as a catalyst or hub for rescue networks
Switch gear

Figure 7: The two-chamber pot sitting just above the bottom. When the pot is fishing, the entrance will be in the direction of the current. This enables the cod to follow the scent from the bait bag into the pot. Usually eight pots are set in a line with a distance of 60 meters between them.

David Mattila, NOAA
Develop “whale safe” gear

Potential points of entanglement

Scott Landry: PCCS

Potential points of entanglement

David Mattila, NOAA
Develop “whale safe” gear

Scott Landry: PCCS

Sinking ground lines first instituted in “critical habitat” (Cape Cod Bay)

May have reduced risk by up to 70%

David Mattila, NOAA
<table>
<thead>
<tr>
<th>In theory</th>
<th>In practice</th>
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<tbody>
<tr>
<td>• MPAs should be selected on the basis of long-term high population usage, linked to stable features</td>
<td>• Until relatively recently, MPAs have been selected without adequate survey effort over an appropriately wide area and long time frame</td>
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<td>• MPAs should be of an appropriate size; preferably large enough to be stable to perturbations</td>
<td>• MPAs are usually too small, either because they were not selected for that species or because of fear of conflict with other stakeholders</td>
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<td>• Adaptive management is necessary to be responsive to changes; this requires monitoring in &amp; out of MPAs</td>
<td>• Legislation to establish MPAs and subsequent management generally takes too long to respond at the appropriate spatial and time scales</td>
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<td>• Once established, human activities that pose risk need some form of management with appropriate mitigation</td>
<td>• Often, adequate resources are not provided to fully understand risk from different human activities and then to take remedial action</td>
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