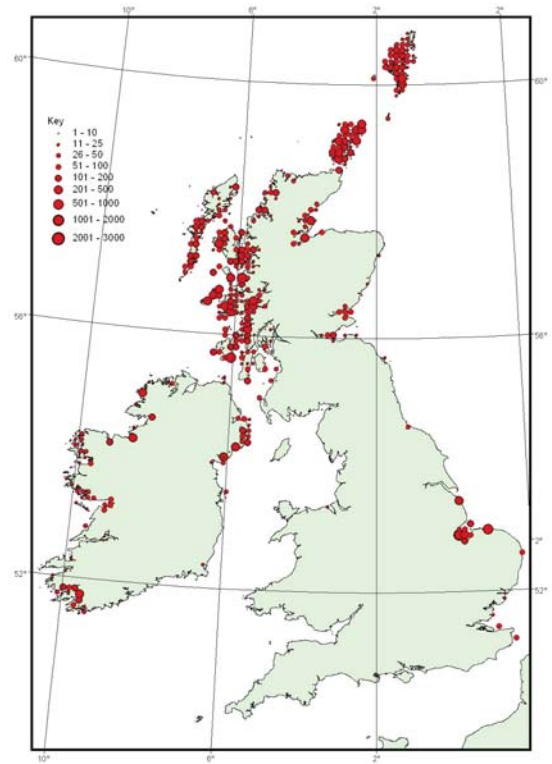




Marine mammals as indicators of change

In recent years there has been increasing awareness of the need to manage the impact of human activities on the environment. We need to make sure we maintain the unique features which support plant and animal life within ecosystems. Good ecosystem health is essential in order to maintain productivity, stability, biodiversity, and economic, intrinsic, cultural, recreational and aesthetic values.

Ecosystem health can be assessed using physical, chemical or biological elements as indicators. These indicators should provide an easy-to-understand way to describe the state of an ecosystem and how it changes over time. This means that indicators need to be measurable, simple to interpret, relevant, comparable, and cost-effective to measure. Ideally, they should also be features of the environment that people will value. Marine mammals are all of these things.



The number and distribution of harbour seals in August 2001-2006 around the UK and Ireland

How can we identify a healthy environment?

The Oslo and Paris Commission (OSPAR) has led the way in developing Ecological Quality Objectives (EcoQOs) which can indicate a healthy marine environment. They include a desired or target level of an ecological quality set relative to a reference level. In the North Sea, EcoQO indices have been set for marine



Nicola Quirck

Bottlenose dolphins

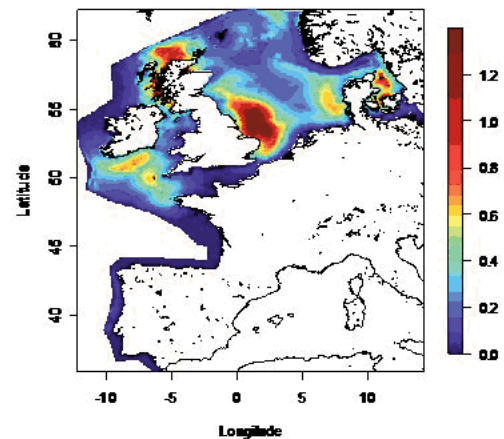


mammal population size and distribution, levels of by-catch in fisheries and pollutant burdens.

The EcoQOs assume that a large decline in the numbers of seals, whales and dolphins indicates relatively poor ecosystem health. The numbers of marine mammals, and where they are, responds to changes lower down the food chain. Consequently, changes in marine mammal distribution, abundance and behaviour may indicate changes in other parts of the ecosystem.

Marine mammals accidentally caught by the fishing industry are known as 'by-catch'. By-catch is not ideal in any fishery, but animals that have been caught can be used to investigate the health of marine mammal populations.

Because marine mammals are at the top of food chains their blubber tends to contain high concentrations of toxic substances, such as organochlorines (OCs). These levels may indicate the health of individual marine mammals, and the condition of the wider ecosystem. Research has been carried out to determine the amount of exposure animals have to these pollutants and how their bodies respond. Monitoring these pollutants in marine mammals is a cost-effective procedure and may indicate changes in marine pollution that are important to human health.



Harbour porpoise estimated density (animals per km²) in 2005

Where SMRU fits in

Our researchers are developing ways to use predators at the top of the food chain as indices in marine ecosystems. We also monitor the size of seal populations in the UK. SMRU co-ordinated the Small Cetacean Abundance in the North Sea (SCANS) surveys which have resulted in greatly increased knowledge of the total number of dolphins and porpoises around Europe. By working with The Centre for Environment, Fisheries and Aquaculture Science (CEFAS) and The Scottish Government we have also been investigating how fisheries and by-catch have been changing.

Further information

www.biology.st-andrews.ac.uk/scans2/index.html

www.ospar.org

SMRU Leaflet "The Special Committee on Seals"