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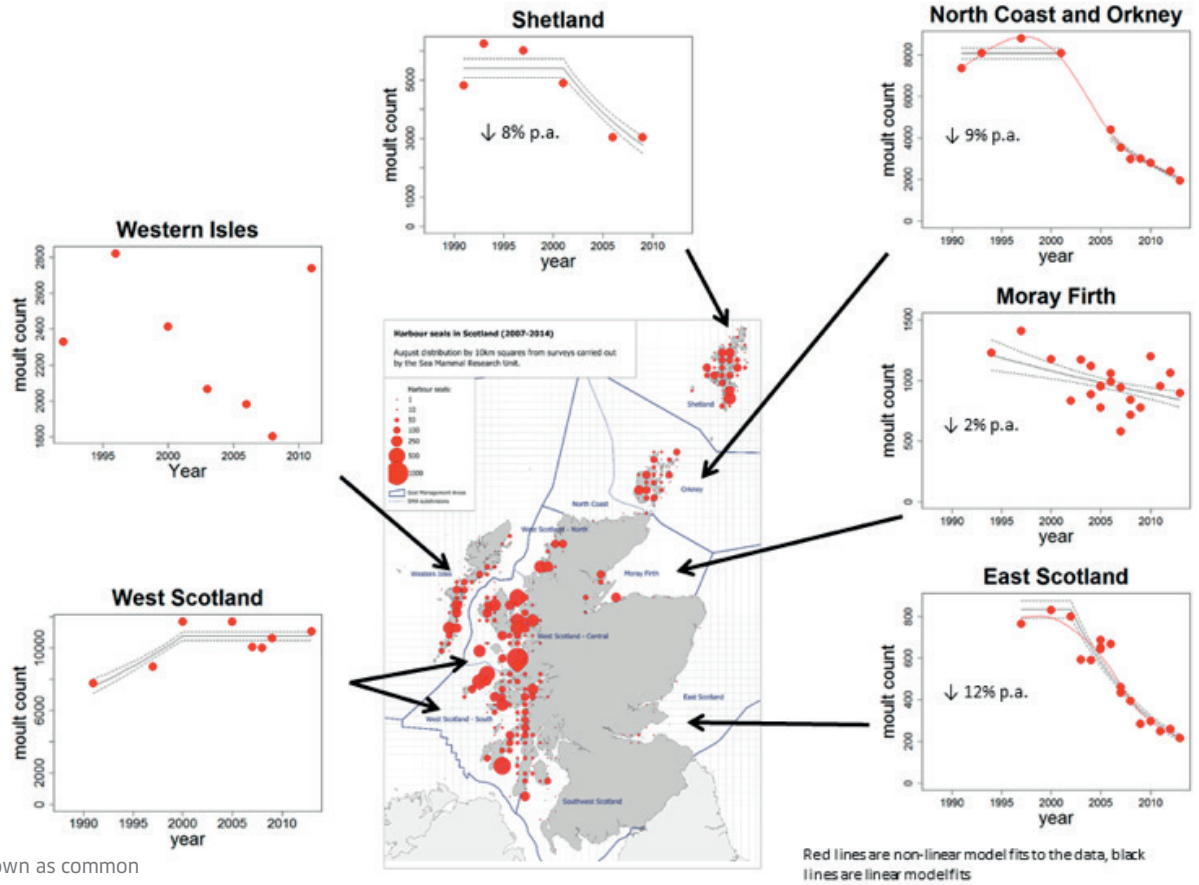
REGIONAL DIFFERENCES IN THE ABUNDANCE TRENDS AMONGST HARBOUR SEAL POPULATIONS

Introduction

Harbour seals[1] are one of the two species of seal found in UK waters and changes in their abundance (population size) and distribution are assessed through surveys by the Sea Mammal Research Unit (SMRU) at the University of St Andrews. Most surveys of harbour seals are carried out in August during the annual moult, which is the time of the annual cycle when the greatest and most consistent numbers of seals are found ashore. The surveys record the minimum number of harbour seals in each area and this figure is used as an indication or index of population size. Since around 2000, populations on the west coast and the Western Isles have been stable or increasing over time, but declines have been found in the numbers around the east and north coast of Scotland and in the Northern Isles.

HARBOUR OR COMMON SEAL (*PHOCA VITULINA*)

In more detail, the number of harbour seals in the Tay estuary has declined by around 95% since 2000, in Orkney by approximately 75% and in Shetland by approximately 30%. Numbers in the Moray Firth have fluctuated (see Figure below).



Red lines are non-linear model fits to the data, black lines are linear model fits

[1] Also known as common

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Causes of decline

SMRU has been funded by Scottish Government to investigate the causes of the declines. Survival and birth rates are being estimated and compared among populations with different trajectories. These rates dictate the population size, and the factors affecting them will determine the dynamics of the populations. The stable numbers in the southern area of West Scotland – South are as would be expected for a population with sufficient resources, low disease rates, few predators and little competition for food.

In contrast, the causes of the declines in numbers of harbour seals on the east and north coasts have not yet been identified. Although some factors have now been ruled out as **primary** causes of the declines, some, such as changes in body condition, may play secondary roles. It is also worth noting that the causes of the decline may not be the same in all regions.

- **Infectious disease (viral, bacterial, fungal, parasitic, protozoal)** - Data from live captures, rehabilitation centres and dead stranded seals indicate that infectious diseases are not causing higher levels of mortality. Phocine Distemper Virus is no longer circulating and there have been no reports of sick seals on haulout sites.
- **Nutritional stress** - Data from live captures, rehabilitation centres and strandings indicate that harbour seals in areas of decline are not in poor body condition and are not showing signs of nutritional stress.
- **Legal shooting** - The introduction of the Moray Firth seal management plan and Marine Scotland (2010) Act have markedly reduced levels of shooting. The seal licensing system is ensuring that declining populations are protected.
- **Fisheries bycatch** - Data from the bycatch observer programme and strandings indicate that harbour seals are not being caught in nets. There are no gillnet fisheries in the regions of decline.
- **Pollution** - Levels of persistent organic pollutants are very low in areas of decline well below any thresholds that have been identified as causing adverse health effects.
- **Loss of habitat** - Data from aerial surveys and telemetry studies indicate that foraging, moulting and breeding sites have not been lost.
- **Dispersal and emigration** - Data from telemetry studies indicate no **permanent** dispersal or emigration within or away from Scotland. Genetic structure studies also show that harbour seals on the west coast remain distinctly genetically different from those in the east, suggesting limited recent regional movement.
- **Entanglement in marine debris** - Data from stranded seals and from faecal samples from haul-out sites indicate that entanglement in marine debris or ingestion of plastics is probably not a major issue for UK seals.
- **Trauma (accidental killing)** - Suggestions that interactions of harbour seals with vessels cause spiral seal trauma have been superseded by the observation that these injuries can be caused by grey seals.

Current research

Factors that are still considered to be potentially critical drivers include:

- prey quality and availability
- increasing grey seal population size and the potential for competition between the two seal species, including any evidence of direct mortality caused by grey seals
- the occurrence and exposure of seals to toxins from harmful algae

Carcases of dead seals that wash ashore and are recovered will be examined *post mortem* by the veterinary pathologists from the Scottish Marine Animal Strandings Scheme.