



Marine Monitoring Handbook

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Grey seal *Halichoerus grypus*



Figure 4.1 Grey seal *Halichoerus grypus* (Paddy Pomeroy, SMRU)

Introduction to the species' interest

The grey seal *Halichoerus grypus* is the larger of the two resident species in the UK, reaching a length of up to 2.45m and weighing up to 310kg (both measurements for adult males)¹ (Figure 4.1). Typically they breed on exposed rocky coasts and in caves but occur in most coastal habitats at other stages of their life cycle. They are predominantly fish feeders taking a variety of species including sandeels, gadoids, salmonids, and flatfish, with cephalopod and crustacean invertebrates occasionally consumed. Their dietary composition varies seasonally and is linked to the availability of prey species. Grey seals form polygynous breeding groups but the size of the groups and the sex ratio varies with the nature of the habitat. Sites with open access may have a ratio of one male to two females but where access is restricted, for example in caves, the ratio may rise to one male for every ten females. The timing of breeding varies but in general, it occurs in September–October in S.W. Britain, October–November in west and north Scotland, and November–December at the Isle of May (Firth of Forth) and the Farne Islands. A single pup is produced and weaned after 16–21 days. Females come into oestrus towards the end of lactation when mating occurs. Females leave the breeding site soon after mating, and so there is no parental care for the pups post-weaning. In the UK, humans are the only major predator of adult grey seals, although potentially, predation by large cetaceans (e.g. killer whales) or sharks may occur in offshore areas. Starvation and infection are established sources of pup mortality.

The Sea Mammal Research Unit (SMRU) of the Natural Environmental Research Council (NERC) has extensively studied grey seal biology and population dynamics in the UK. In particular, they have completed surveys of population size,² diet, movements and foraging behaviour (using Satellite Relay Data Loggers attached to seals)³ and genetic diversity.

Approximately 40% of the world population of grey seals breed at UK sites, which represents 95% of the EC population. There are breeding colonies all round the coast, from the Scilly Isles clockwise to the North Norfolk Coast. These colonies vary greatly in size with the main breeding colonies located in the Inner and Outer Hebrides, Orkney, Shetland, the mainland coast of north and north-east Scotland, the Isle of May, the Farne Islands and west Wales.

The largest breeding colonies, based on pup production, are candidate SACs. Sites were selected using the most up-to-date population information available at the time, although populations at individual sites may fluctuate. Sites were also chosen to reflect the geographical distribution of breeding sites – for example in west Wales, which is the most southerly breeding population.

1 These statistics and the following text are taken from: Bonner, W N and Thompson, P M (1990) Seals, etc.: Order Pinnipedia – Grey seal. In: Harris, S and Corbet, G B (eds) *The Handbook of British Mammals*, Chapter 11, pp. 472–480. Blackwells, Oxford.

2 See http://smub.st-and.ac.uk/ch1_1.html

3 See http://smub.st-and.ac.uk/ch3_2.html

Monitoring requirements and suggested techniques for grey seal

To help implement the UK's Common Standards for Monitoring programme, it is necessary to recommend a small number of techniques that are likely to provide comparable measures for each attribute (Table 4-1). The UK Marine SACs project evaluated the inter-comparability of some of these techniques (for example acoustic versus visual counts of dolphins), but considerable further work is required to establish suitable techniques for many attributes. The advice presented below will be updated when new information becomes available.

Table 4-1 Suggested techniques for measuring the attributes that may be used to define favourable condition of grey seal populations. Guidance will be developed for the techniques listed.

<i>Generic attribute</i>	<i>Feature attribute</i>	<i>Technique</i>
Quantity (abundance)	Population size	Aerial photo-monitoring; Direct counts from boat or shore; Mark-recapture; Photographic mark/recapture
Population dynamics	Recruitment	Pup counts;
	Mortality	Track adult survivorship; Adult and pup carcass recovery
	Emigration	Tracking pups
	Immigration	Tracking pups
Population structure	Age structure	Estimate natural population structure; ID of known individuals
	Sex ratio	
	Fragmentation/isolation	
	Genetic diversity	DNA analysis
Habitat requirements	Area for breeding	Aerial photography; Habitat mapping; Airborne remote sensing; Shore survey
	Area for feeding	Fish census techniques; AGDS; Side scan sonar; Acoustic fish monitoring
	Undisturbed area for breeding	Monitor disturbance events ⁵
	Environmental processes	Measure water quality factors ⁶ ; Debris/litter survey ⁷ ; Survey injury to animals

Specific issues affecting the monitoring of grey seal

Estimating population size

The current surveillance programme undertaken by the SMRU is likely to make a substantial contribution to condition monitoring of SACs. Currently, each discrete breeding site in the Inner and Outer Hebrides, Orkney and the Isle of May is photographed between three and six times at regular intervals every year throughout the breeding season. Aerial surveys are carried out from a light twin-engine aircraft, using a large format aerial camera mounted in a vibration-damped, motion-compensating cradle. At sites in Pembrokeshire, the Farne Islands, Orkney and Lincolnshire, population size is estimated by ground counts from boat and shore. These techniques (aerial or ground) should be

4 See *Grey seals: Status and monitoring in the Irish and Celtic Seas*
<http://www.ucc.ie/ucc/research/crc/pages/research/project1.htm>

5 Disturbance in breeding areas may reduce pup production.

6 To determine levels of nutrients, pollutants and pathogens.

7 For example, discarded monofilament nets and ropes may entangle seals causing lacerations.

used for all other sites not surveyed by these existing programmes. Counting grey seals at breeding or haul-out sites will only provide an *estimate* of the population size and structure because it cannot take account of the proportion of the population at sea.

Seals can travel up to 100km per day, and individual animals have been tracked for 3,000km. Consequently there may be large migrations between breeding and haul-out sites. There is a regular interchange of individuals between sites on the east coasts of Scotland and England, although there remains some genetic differentiation between each population. Some of these movements may be seasonal and linked to seasonal changes in the spatial distribution/availability of prey species. There is limited information on the fidelity of individuals to a particular breeding site but some have been recorded returning to the same location on an annual basis for at least 15 years. These movements must be considered when interpreting the results of condition monitoring studies on population size in an SAC.

Population dynamics

Pup counts are taken at the breeding sites and may provide an estimate of birth rate. Mortality amongst newborn pups can be as much as 15%, with a further mortality rate of between 40 and 60% occurring within 12–18 months.

The main causes of mortality are difficult to quantify as many seals (adults and pups) die at sea, but disease caused by parasites, pollution and entanglement in discarded/lost fishing nets are some of the main causes.

A detailed understanding of the population dynamics needed in order to define favourable condition of the grey seal is not available.

Habitat requirements

Grey seals depend on the sea for their food but also have a need for safe areas of land to haul out to rest, give birth and moult. They require undisturbed areas, usually uninhabited off-shore islands, that afford easy access to the intertidal and adjacent coastal areas above Mean High Water of spring tides. There is increasing evidence that certain habitat features, such as access to shallow freshwater pools, are important.

Studies demonstrated that grey seals can forage widely, although most feeding activity was within 50km of a haul-out site. Typical foraging trips last from two to five days. Nevertheless, satellite telemetry studies show distinct aggregations of animals at offshore locations in the North Sea, often where the seabed comprises coarse sand and gravel. Monitoring attributes in relation to foraging area and prey availability will be difficult for grey seals because of their mobility and ability to switch between prey species.

Health and safety

Grey seal colonies are often located in remote areas that present considerable health and safety risks. Staff must follow all standard procedures, particularly in relation to working alone (to be avoided), working in remote areas and working from small boats. Some specific risks are:

- working in caves;
- working on offshore rocks, where difficulties are associated with landing, wave surges, being stranded by a rising tide;
- attack by adult seals, particularly during the breeding season and/or in confined spaces (caves or gullies);
- infection of wound if bitten;
- bacterial infection from seal faeces at breeding/haul-out sites.

The Wildlife and Countryside Act 1981⁸ and the Animals (Scientific Procedures) Act 1986⁹ control and regulate the study of wild animals that involve the capture and release, handling or remote sampling of individuals. Under this legislation, a licence is required from the UK Government for all activities that require the capture or handling of grey seals.

8 See: <http://www.wildlife-countryside.detr.gov.uk>

9 See: <http://www.homeoffice.gov.uk>