THE GREY SEALS OF BARDSEY

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A Grey Seal pup. Mark Simmonds/HSI

The bird life of Bardsey has been well documented, but the island's significant population of Grey Seals has only comparatively recently started to be explored. It provides an interesting insight into the UK's overall population.

Bardsey: a remarkable island

There is a windswept and remote speck of land just off the north coast of Wales that hosts a significant but rather forgotten population of one of the UK's largest mammals, the Grey Seal *Halichoerus grypus*. The speck is known as Bardsey (but should never be called 'Bardsey Island'), and its Welsh name, Ynys Enlli, means very appropriately 'the island in the currents', reflecting the swift and complex local currents which race around it and which can reach up to nine knots on spring flood tides in the Sound (Stansfield 2010). Its third name, the 'Island of Twenty Thousand Saints', reflects its long and enduring status as a holy place of pilgrimage (probably including the peril of the crossing, especially in medieval times). Bardsey sits just 3km off the southern tip of the Llŷn (Lleyn) Peninsula and is some 179ha (444 acres) in extent, almost 3km long and 1km across at its widest. The Narrows, a thin isthmus, divides the island into an uninhabited southern portion, complete with an automated lighthouse, and the inhabited northern part. The latter rises steeply to the east as 'The Mountain', which reaches 167m and then abruptly falls away, with steep slopes and cliffs facing those of the rugged mainland coast. The Narrows hosts the only small stretch of sandy

beach on its northern aspect, and the remainder of the island's ten kilometres or so of coastline consists of rocky shores, including some deep ravines and caves. The seals favour primarily the main bay, Henllwyn, but also haul out and breed in a variety of widely differing rocky nurseries around the shore, including some deep ravines.

Three human families currently live on the island: one mainly fishes and one mainly farms (and helps to monitor the seal population), while the third runs the Bardsey Bird and Field Observatory (BBFO), which was established in the 1950s (Stansfield 2010). There may be as few as eight residents on the island outside the holiday season. In the 1870s, there were more than 70 trying to eke out a living there, a number which may again be reached in the peak season when the island's various holiday accommodations are in full use. In addition, several dozen day-trippers can visit, when sea conditions allow. For much of the year, however, Bardsey is a quiet place and year-round it is devoid of motor vehicles, cats, rabbits and rats. The island hosts a rich diversity of resident and visiting fauna, and notable wildlife includes Red-billed Choughs *Pyrrhocorax pyrrhocorax* and Manx Shearwaters *Puffinus puffinus*, as well as the Grey Seals.

Biologists have both been inspired by the island (Birkhead 2014) and also, facilitated by the BBFO, undertaken considerable monitoring and other research here. The identification of many rare and scarce species and habitats now means that the island has yet more 'names': it is a National Nature Reserve (NNR), a Site of Special Scientific Interest (SSSI), a Special Protection Area (SPA) and an Area of Outstanding Natural Beauty (AONB). In addition, it is part of the Pen Llŷn Heritage Coast and the island also sits fairly centrally within the Pen Llŷn a'r Sarnau Special Area of Conservation (SAC). This marine designation extends north along the mainland coast and south around the unusual reef system of The Sarns, which are one of the key features for which it has been established, along with the local submerged sandbanks, estuaries and coastal lagoons (JNCC 2015).

Introducing the marine mammals of Bardsey

Bardsey is best known for avifaunal studies but, since the 1990s, it has also regularly hosted marine-

Red-billed Chough on Bardsey. Mike Lane/FLPA

mammal researchers. Those focused on cetaceans have exploited the island's high vantage points to monitor porpoises and dolphins and have used the island as a launch-pad for boat-based photo-ID work (Simmonds *et al.* 2013). The BBFO and the local farming family, too, have played a significant part in monitoring the local marine mammals, and a series of articles has resulted in 'Bardsey's Wildlife' (the annual report of the BBFO) and recently in the scientific literature. Despite their strong presence in the centre of Cardigan Bay, and regular encounters just south of the island in Tremadoc Bay (MPS pers. obs.), Bottlenose Dolphins *Tursiops truncatus* are rare in the waters closer to the island. Instead, the large grey and typically heavily scarred dolphin frequently seen here is the little-studied Risso's Dolphin *Grampus griseus* (Simmonds *et al.* 2013). Research on this species started from the island in 1997, building on the land-based observations of Megan Morgan Jenks, Mick Green and the Friends of Cardigan Bay, which showed that resightings could be made of recognisable individuals. This led to regular and ongoing expeditions by Whale and Dolphin Conservation (WDC) to study the local cetaceans, which include the Harbour Porpoise *Phocoena phocoena*. A number of other cetacean species have also been sighted from the island, but they do not exhibit any degree of residency. These include Common Dolphins *Delphinus delphis*, Common Minke Whales *Balaenoptera acutorostrata*, and Orcas *Orcinus orca* (Stansfield 2010; Simmonds *et al.* 2013).

The southern part of Bardsey viewed from The Mountain, with Henllwyn, the main bay where most seals breed, to the left. Rebecca Robotham/HSI

Risso's Dolphins have proved an elusive subject for study, being typically boat-shy and capable of deep evasive dives. In 2013, however, Marijke de Boer and colleagues published analyses based on ten years of photo-ID studies showing there to be a local population of around 100–200 individuals using Bardsey waters, including (as many sightings of calves show) for breeding purposes (de Boer *et al.* 2013). De Boer *et al.* (2014) also reported on the differing ways in which Harbour Porpoises and Risso's Dolphins exploited local habitats, with their distinct distributions linked to topographic and dynamic cyclic variables including depth, slope and aspect, as well as current speed.

Investigation of the Grey Seal's habitat use on the island has also begun. Generally, the seals haul out year-round to rest, but greater concentrations occur in the late winter, when they are moulting, and in autumn, when they breed. A weekly low-tide seal census was initiated in 2009 (McMath & Porter 2010) and haul-out numbers have ranged from 24 to 311 (J. Porter, pers. comm.). The late Mandy McMath of the Countryside Council for Wales (now Natural Resources Wales) and her co-workers also initiated a photo-ID study. The typically pale pelage and dark spotting of female Grey Seals can be used to identify individuals, and high-quality digital photographs – mainly of the head and neck of mothers with pups (usually in dry conditions, as the appearance of the pelage can change when wet) – were used to build a photo-catalogue of individuals. These images confirmed breeding-site fidelity. The Bardsey bull seals are less distinctively marked, but there is some evidence that they, too, show fidelity, as reported elsewhere (Hall 2002), although this may be to particular females rather than to localities. It has also been hypothesised that the Welsh-coast Grey Seals could be a distinctive population segment (McMath & Porter 2010; Oliver *et al.* 2010). Seal studies on Bardsey paused after 2010, when Mandy McMath became too unwell to continue, and in 2013, 2014 and 2015 the authors, supported by the Humane Society International (HSI), visited the island during the peak breeding season in order to extend the database. We were able to re-identify several females, and some of these had returned rather precisely to the same small discrete breeding sites and within just a few metres of where they had been previously recorded.

Grey Seal behaviour

Some of the basic aspects of seal behaviour have long been established. Grey Seals generally return to their natal sites to breed. Females give birth on land and, for some 15–18 days, suckle their single white-coated pups, which rapidly put on weight, while 'attendant' bulls wait nearby for the mothers to come into oestrus (Bonner 1981).

Mothers may lose some 9% of their body mass during this time, when neither they nor the bulls feed (Renouf 1991). The mother seal sniffs and noses her pup's face within minutes of its birth, and shortly thereafter the pup begins to vocalise. The male pups are reported to spend more time in nosing their mothers and also to be 'more aggressive' feeders than female pups (consistent with the greater weight gain of the male pups) (Renouf 1991). While nursing, the mother seals typically repel all other seals, keeping them away from the vulnerable pup. Then, around the time of weaning, the mothers come into oestrus, mating occurs and the females go off to sea, leaving the pup behind. The abandoned pup moults and takes on its adult pelage, which is typically darker in males and complete with recognisable spotting in many female pups. The pups may wait on the shore for several weeks before they, too, take to the sea, by which time they may have lost a full quarter of their body mass (Bonner 1981). At this stage the weaned pups are especially vulnerable to predators, such as gulls, and also to storm surges, both of which can be problems on Bardsey.

Recent studies in Scotland which considered site fidelity and breeding behaviour revealed significant behavioural subtleties, including considerable variation in pup-rearing approaches between individuals based on their 'Consistent Individual Differences' or 'personalities' (Twiss *et al.* 2012). This variation is apparent also in the Bardsey rookery. In particular, some mothers regularly encourage their unweaned pups to swim, whereas others keep them away from the water. It was previously thought that the dependent pups swam only if washed into the sea (Hewer 1974), and this, while likely to be affected by the nature of the nursery site as well as the mother's parenting approach, has been previously reported also from south-west England (Westcott 1997). White-coated pups may also 'piggy-back' on their swimming mothers.

The significance of nursing-site selection was apparent on Bardsey in the autumn of 2014, when many white-coats were lost to high seas combined with a very high tide, those being reared in more protected sites faring better. There are several nursery sites in deep ravines. The advantage afforded by such sites may be that there is very little chance of human disturbance (ropes would be needed to descend to most) but, on the other hand, their sheer walls offer no safe retreat from very high seas. In contrast, some of the pups being nursed or moulting in the area of the main bay were able to retreat on to the grassy pasture of The Narrows away from the waves. Pre-weaning mortality in this species is usually between 5% and 20%, but can be as high as 30% (Thompson & Härkönen 2008).

A mother seal warns an amorous bull off and away from her pup. Mark Simmonds/HSI

The classic 'Roman nose' of an adult Grey Seal bull. Mark Simmonds/HSI

Behaviour away from the haul-outs is less well known and, given the observed fidelity of at least some bulls and females, there remains speculation about whether they associate at other times of year and out at sea. Similarly, where and how do the weaned pups learn the skills which they need to survive and integrate into seal societies? What is known, however, is that Grey Seals are shallow, short-duration divers. Typically in the United Kingdom, dives average 4–10 minutes (with a maximum of 30 minutes) in duration and tracking of individual seals has shown that they can feed up to several hundred kilometres offshore during short foraging trips lasting 1–5 days (Hall 2002). Foraging areas are generally linked to haul-out locations, and Grey Seals often make repeated trips to the same region offshore from a particular haul-out, but they will occasionally move to a new one and begin foraging in a new region. The movements of tagged seals (Russell & McConnell 2014), however, would seem to support the notion that the Welsh–Irish Sea population is discrete, with little sign of movement between Welsh/Irish and Scottish haul-outs.

Putting the Bardsey seals into context

Britain and Ireland host breeding populations of two species of 'true seal' (family Phocidae): the Grey Seal and the smaller Harbour or Common Seal *Phoca vitulina*. More northerly-based species, including the Harp Seal *Pagophilus groenlandica*, the Hooded Seal *Cystophora cristata* and the Atlantic Walrus *Odobenus rosmarus rosmarus*, are only occasionally recorded.

The Grey Seal is a large, sexually dimorphic animal. In the UK, the mature bulls are on average 2m long and weigh 233kg (maximum 310kg) (Bonner 1981). They have relatively massive shoulders, the skin in the neck-shoulder region is typically heavily folded and scarred (rather like a mane in appearance), and they have a big 'roman nose'. Adult females average 1.8m and 155kg. At birth, pups are 90–105cm long, male pups averaging 15.8kg and female pups averaging 14.8kg in weight. Weaning weights average 40kg for males and 35.8–39.6kg for females.

Three discrete populations and two subspecies, *Halichoerus grypus grypus* in the western and eastern North Atlantic and *H. g. macrorynchus* in the Baltic Sea, are recognised (Thompson & Härkönen 2008). The IUCN categorises the whole species as of 'Least Concern' on the basis of its large population which is generally increasing in most areas of study. In contrast, however, this is also regarded as one of the rarest seal species (JNCC 2015). The total UK population is estimated to be between 117,000 and 171,000 individuals and constitutes some 40% of the world population and 95% of the EU one, giving the UK important responsibility for its conservation. Most of the UK Grey Seal population is in Scotland, but the animals frequenting Bardsey may form the

second largest population in Wales after that in Pembrokeshire. The first record of a Grey Seal pup on Bardsey comes from 1954, although the species may have been there before this but have been removed by hunting. Hewer (1974) noted that numbers of Grey Seals were increasing on the island in the 1970s, and this may still be the case. Interestingly, the last major study of seals in the Irish Sea – which appears to be a key document for the Pembrokeshire SAC – does not make reference to the Bardsey seals (Kiely *et al.* 2000).

Threats to British seals, and the law

Bonner (1981) commented that 'man is, and has been since prehistoric times, the principal predator' of the Grey Seal, a species historically hunted for meat, blubber, skin and oil. Indeed, when Europeans reached the New World, Grey Seals quickly became a primary exploited resource and were harvested to such a degree that they were thought to have been exterminated in eastern Canada until relatively recently (Lavigne & Kovacs 1988). Grey Seal populations were hunted across most of the species' range until the mid-twentieth century. Diminished populations led to this pinniped becoming the first mammal to be addressed by modern legislation in the UK, via the Grey Seals Protection Act of 1914. Today, it is afforded limited protection from intentional killing by legislation that varies across the national boundaries of the United Kingdom. In England and Wales, the Conservation of Seals Act (1970) prohibits killing during a closed season from 1st September to 31st December, although seals causing damage at fish nets can be killed under licence by approved methods. In Scotland, from 2011 onwards, it became an offence under the Marine (Scotland) Act (2010) to kill, injure or take a seal at any time of year, except to alleviate suffering or where a licence has been issued by Marine Scotland. In Northern Ireland, the Wildlife (Northern Ireland) Order 1985 applies. This, too, allows authorised seal-shooting for the purpose of protecting fisheries.

Grey Seals and Harbour Seals are listed in Appendix III of the Berne Convention, and in Annexes II and V of the EU Habitats and Species Directive. They are, consequently, species whose conservation requires the designation of Special Areas of Conservation (SACs). In Wales, the Pembrokeshire Marine SAC has been established in part for its Grey Seals. They are noted as a qualifying species for the Pen Llŷn a'r Sarnau SAC, but not as a reason for its designation (JNCC 2015).

A suckling youngster. Mark Simmonds/HSI

Grey Seal pup resting. Rebecca Robotham/HSI

Several Grey Seal culls have been undertaken in the UK, the most recent in Scotland in 1977. This resulted in a public outcry and the cull was abandoned in 1978 (Mammal Society 2015). The main current rationale for killing seals is fisheries protection. Although their diet varies with location, they are largely demersal or benthic feeders (Hall 2002). In some areas, sandeels *Ammodytes* can represent more than 70% of their prey. 'Problem' seals are still regularly shot around nets and fish farms in Scotland, and in 2014 as many as 164 Grey Seals and 41 Common Seals were reported as shot under licence to Marine Scotland (L. Nunny, pers. comm.). This is not, however, a problem in Wales, including on Bardsey, which may help to explain the seals' seemingly high tolerance of human visitors there, although the seals can still be startled and will 'stampede' down the shore to the safety of the water, which may be the biggest threat to their welfare here. A hasty retreat across a rocky shore can cause injuries.

The most common cause of death among juvenile Grey Seals in Britain is entanglement in fishing gear (Baker *et al.* 1998), and they are most likely to be caught in static gear such as gill nets (Read *et al.* 2006), which are in use around the coasts of Wales, including around the Llŷn Peninsula (CCW 2010). Close to Bardsey, fishing seems limited mainly to crab- and lobster-potting and angling, which present no threat to the seals. McMath & Porter (2010), however, commented that Welsh waters will soon be experiencing major new pressures, having been identified for offshore renewable-energy development, and noted the importance of further seal research in order to understand better the risks facing the seals. Simmonds *et al.* (2013) also highlighted the potential threat from various offshore industries, including marine-energy plants that may include the placement of underwater turbines in high-energy areas. The significance of such developments for marine mammals is largely unknown. Chemical pollution and oil spills are also recognised threats (Hall 2002).

In addition, one especially cruel threat apparent in Bardsey, and elsewhere around the UK, is that of chronic entanglement in pieces of fishing net or loops of marine debris. McMath & Porter (2010) noted seals with nooses of lost netting cutting into their necks, and we recorded similarly afflicted individuals in 2013 and 2015 on the island. Often it seems that younger seals get a loop caught around their neck and, as they grow, this becomes embedded. The welfare implications are severe (Allen *et al.* 2012).

Looking to the future

Visitors to this remarkable little island have an excellent opportunity to view these large wild mammals, including their breeding behaviour, at close quarters. Seal-watching, however, should always be conducted with care so as to avoid causing stress, stampedes or situations in which frightened mothers might become separated from pups. A portable 'seal-hide', which could be approached outside the seals' line of vision, could be positioned on the pasture overlooking the more accessible breeding locations. This would provide a

focus for those who wished to view and learn about the seals while minimising disturbance. The hide could be taken away outside the breeding season. This modest action may also make visitors more aware that they are witnessing something special that needs to be treated with respect and conserved.

Grey Seals, judging from their promotion as a tourist attraction by the Welsh Government (2015), have a value to the Welsh economy. Despite this, there seems to be little concerted action to conserve them. The Pen Llŷn a'r Sarnau management plan, for example, appears not to promote or require any actions for them, although a leaflet is currently in production for visitors (J. Porter, pers. comm.). More positively, the Pembrokeshire SAC does have management measures developed for this species.

Nationwide, the status of Grey Seals seems positive for now, but this could change, especially as human activities at sea are changing. Developments could include adverse modifications in the scale and nature of fisheries and other industries within the species' range. The seals' intelligence (and personalities) will, it is hoped, make them adaptable to future challenges, but there are still likely to be limits, and long-term monitoring, including that conducted on Bardsey, may therefore prove important in detecting population-level responses. The island's many excellent seal-viewing points and its varied shoreline make it a natural laboratory for ongoing long-term non-invasive studies, as Mandy McMath realised.

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