

Historical Perspectives

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(Born 9 February 1957)



Ian L. Boyd is a marine mammalogist specializing in the behavioural dynamics of marine predators, management of marine ecosystems, and ecological economics. He has conducted a broad range of experimental research on marine mammals, much of which has been focussed upon the behavioural ecology of pinnipeds but has recently moved to the management of risks to marine mammals. He has published more than 140 scientific papers in the refereed literature and written or edited nine books.

Dr. Boyd was educated at George Heriot's School in Edinburgh, Scotland, before going on to study Zoology at the University of Aberdeen (B.S., 1979) and the University of Cambridge (Ph.D., 1982). He was the first Ph.D. student in Britain educated specifically in marine mammal biology. In 1996, he was awarded a DSc by the University of Aberdeen.

Dr. Boyd worked as a physiological ecologist at the Institute of Terrestrial Ecology at Monks Wood in Huntingdon from 1982 to 1987. For the

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In addition to his position in academia, Dr. Boyd edits annual advice to the British Government on the management of seal populations. He has created an offshoot company, SMRU Ltd., to expand the near-market activities of SMRU, and he is a leader in a project to provide offshore industry and naval operations with an environmental risk management tool for marine mammals.

Dr. Boyd has received a number of awards for his research leadership, including the Scientific Medal from the Zoological Society of London and the Bruce Medal for polar research. He is also a fellow of the Royal Society of Edinburgh, the Scottish national academy of science. Until recently, Dr. Boyd was Editor-in-Chief of the *Journal of Zoology*, and he sits on the Editorial Board of *Antarctic Science*.

Dr. Boyd has had a lifelong interest in his native Scotland. He has written several books about the natural history of the Hebrides, and he has been the trustee of several Scottish-based charities. He is currently advising the Scottish Government on new approaches to fisheries management.

Compiled by Emily M. Walter, Assistant to the Editor, *Aquatic Mammals*

The History of Marine Mammal Research in the United Kingdom: An Exploration of the Interaction of Human Socioeconomics and Marine Mammal Ecology

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The United Kingdom of Britain and Northern Ireland, or “Britain,” has occupied an important position in the history of marine mammal research. I would like to be able to say that this is because marine mammals have always been seen as an important feature of British culture and heritage, but the evidence suggests that this was not the case. Historically, morality has been secondary to the imperatives of socioeconomics and, at the most extreme, economic survival in the face of war. Self-appointed elites and bear-knuckled exploitation have played an important part in driving the interest in marine mammals within Britain. In common with a lot of other research in natural resource management that emerged in Britain during the 20th century, marine mammal research emerged from an imperialist tradition. This brought about a bureaucracy that controlled the direction of research, thus entraining the talented individuals involved, towards centralised national goals.

Perhaps the most enduring achievement of marine mammal research in Britain derives from a fair claim it has to being partly responsible for stimulating the emergence of ecology as a scientific discipline in the 1920s (Sheail, 1987). The legacy of long-term involvement in marine mammal research also has left Britain with a rich community of marine mammal researchers and an infrastructure for marine mammal research that, although small compared with some areas of science, is perhaps the largest of any country relative to its size and wealth. The struggle to maintain this level of activity in the future reflects one of the fundamental contradictions that runs through almost all marine mammal research. This is because, fascinating though marine mammals are, they have lost their strategic economic importance. If researchers were given a free choice, marine mammals are just about the last group of animals one would choose as subjects in which to study general principles in biology. Of course, as aquatic mammals, they have some unique biological features that do invite investigation; however, this does not negate the view that marine mammals are far from ideal subjects for research.

Research interest in marine mammal studies in Britain is sustained largely for cultural reasons, many of which are graphically illustrated at the

Annual Meeting of the International Whaling Commission Scientific Committee, which attracts a level of international public interest far beyond that of any other animal ethics issue, except perhaps that of the unborn child. It is arguable that marine mammals today are once again taking on a new type of strategic importance globally—not because of any intrinsic economic value but because of their totemic status and their potential to influence wealth creation activity. The problem for marine mammal research, at least in a British context, is that these cultural drivers are rarely taken seriously and carry little weight within the type of highly competitive system for research funding that exists today. Only as major new industrial activities attempt to establish themselves in the offshore environment are those who have traditionally dismissed marine mammal research as a scientific backwater beginning to realise that marine mammals are an issue that can make or break the economic viability of these projects. Such projects include offshore renewable energy developments that are part of centralised national objectives.

The cultural processes that increasingly tend to justify future marine mammal research, and that surround the use of marine mammals as indicators or “bellwethers” of marine environmental health, highlight another fundamental contradiction for researchers. If research is to be useful, it must be impartial, independent, and innovative, but delivering this vision means walking a fine dividing-line between siding with cultural progressiveness, often represented by the views expressed by the environmental pressure groups, and having to be aligned with the processes of the British Establishment.¹ Unfortunately, many researchers within the marine mammal research community

¹By “Establishment” I mean more than a democratically elected government, although it often includes the governing political class. It is almost a truism that the more democracy becomes established, the more that underlying self-appointed elites emerge who will by themselves wield most of the power via control of the social and cultural rewards structured within society. Britain has one of the oldest democracies in the world; thus, it also has one of the most sophisticated Establishments, and the Establishment is usually unsympathetic to cultural change that could threaten its control.

fail to find an appropriate balance in this respect, and some of the bureaucratic structures, such as government-operated laboratories, fail to encourage impartiality and independence.

The uneasy hegemony between marine mammal research and these contrasting elements is perhaps most magnified in Britain because of the continuing power of the British Establishment. All nations have their Establishments, but in Britain, it is remarkable the extent to which lifting the turf covering the research landscape reveals “rat-runs” that tend to converge upon some distant points of power that are rather few in number. In the remainder of this article, I have no intention of lifting that turf, but I hope that I may provide some insights as to why marine mammal research in Britain has ended up where it is today. I also hope to demonstrate that the roots of marine mammal research in Britain actually go back a very long way. Although it is probably possible for all forms of research to claim that their roots are in The Enlightenment of the late 18th century, I think the association for marine mammal research is stronger than for many other areas of study. This has been brought about because of a complex association between marine mammals, exploration, and the structure of British society, especially through the 19th century. It even includes evidence of the background effects of socioeconomic engineering and the economic challenges brought about by war, all of which have had far-reaching consequences for marine mammals and, in the end, those who carry out research on them. As Frank Fraser Darling (1969), one of the early British marine mammal researchers who became Vice-President of the Conservation Foundation, would have observed, there is a close interaction between human ecology and marine mammal ecology, although I suspect the space and time scales suggested by me for these interactions are much larger than anything he would ever have envisaged.

Early Beginnings: The Imperial Legacy

As befitted a country that retained strong ambitions for global influence well into the last few decades of the 20th century, it was research that partly projected this power for Britain. Marine mammal research was a rich part of this mix. Britain, as an economic power, was built upon the products of empire in which the raw materials that drove the economy were derived from the colonies, and Britain itself supplied the technology, technical expertise, and the administrative structures that drove this global economic machine. This “machine,” which made Britain the dominant global economic power of the 19th century, demanded raw materials, which included basic fats and oils (not all for food, fuel,

soaps, and lubricants, but also as the basis for high explosives to allow Britain to project her power in less benign ways). Many of these materials had to be sourced from natural products, and a ready source through the first half of the 20th century was from marine mammals, especially baleen whales. Consequently, Britain built the largest single whaling industry of any country and encouraged the establishment of major commercial companies, some of which, Christian Salvesen (Vamplew, 1975), for example, specialised in the acquisition, transport, and delivery of the required raw materials. Others, such as Lever Brothers, specialised in the refinement and transformation of these raw materials (not necessarily only sourced from British whaling companies) into usable products. Although Norway had a significant influence on this process by being the source of much of the manpower and technology, the economic driver was Britain.

Consequently, Britain was the nation with the largest investment in industrialised whaling until well into the late 1950s, and most of this was centred around whale factories and the island of South Georgia, which was strategically positioned to provide port and replenishment facilities for whaling expeditions venturing to the ice edge of the Weddell and Bellingshausen Seas. The region around South Georgia was also a significant whaling ground in its own right and was the shore base for up to five simultaneously operating whaling stations (Headland, 1984). Unlike most other governments that promoted whaling interests, the British Government had territorial possessions within the whaling regions, which were occupied and managed. The Colonial Office, now known as the Foreign and Commonwealth Office (FCO), of the British Government, had responsibility for the management of these overseas possessions and vigorously promoted British companies in the



Leith Harbour Whaling Station at South Georgia in the late 1990s, some 35 years after the end of whaling operations at this, the largest whaling station ever built. Whaling in the Southern Ocean was the principal driving force behind the development of marine research capacity. (Photo: I. L. Boyd)



The researcher and his subjects: The author photographing Antarctic fur seal pups at South Georgia in 1999 while lying along the length of a blue whale skull part-buried in shingle; the backdrop is the remains of Stromness Whaling Station. (Photo: Tony Martin)

region. Unlike the companies themselves, whose objectives were to extract as much from whaling as possible, the Colonial Office had its eye on the longer-term economics of the region. This means that some of the “histories” of whaling in the region (Hart, 2006) have a tendency to portray the Colonial Office as the progenitor of the concept of sustainable development. Perhaps there is an element of truth in this, but I personally doubt that this concept was built upon any significant foundation of biological intuition or a strong conservation ethic. Rather, it was the only option for any responsible and precautionary administration to take to counter the pressure from whaling companies to maximise their own profits. However, as we know, whatever the moral or administrative objectives might have been, the policy was a miserable failure.

Following the end of the First World War, whaling was perhaps one of the first experiments to categorically reject the hypothesis set up by the great Thomas Henry Huxley (1884) in his inaugural address to the Fisheries Exhibition in London in 1883, when he suggested that

probably all the great sea fisheries are inexhaustible; that is to say, that nothing we do seriously affects the number of the fish. And any attempt to regulate these fisheries seems consequently, from the nature of the case, to be useless.

Huxley (1884) has been unfairly barracked ever since for this statement, but, to be fair, he was taking a scientist’s approach and was asking the question from an academic perspective: “whether fisheries are exhaustible; and if so, whether anything can be done to prevent their exhaustion?” He also recognised the limits to environmental productivity and the dilemmas presented between exploitation and conservation in natural resource management:

The supply of food is, in the long run, the chief of these interests. Every nation has its anxiety on this score, but the question presses most heavily on those who, like ourselves, are constantly and rapidly adding to the population of a limited area, and who require more food than that area can possibly supply. Unlike these circumstances, it is satisfactory to reflect that the sea which shuts us in, at the same time opens up its supplies of food of almost unlimited extent.

Within 20 years of the beginning of whaling at South Georgia, there were strong signs of declining catches. Some of the whale species—mainly humpbacks (*Megaptera novaeangliae*) and right whales (*Balaena* sp.) that had originally attracted whalers to South Georgia had either become extinct or economically unviable. There then began a tension between the licensing authorities at South Georgia, controlled by the Colonial Office, and the whaling companies because the authorities sought to conserve whale populations by placing regulation upon the industry. Undoubtedly, this effect of whaling had happened before, especially in the northern whaling grounds, but, perhaps led by thinkers like Huxley, this was beginning to be seen as a problem that science could tackle. An important consequence of declining whale numbers at South Georgia was the beginning of scientific studies of the whales and their environment with the objective of gaining a better understanding of what sustained whales and how many whales could be exploited safely.

To us, today, this all sounds very normal and logical, but in the early 1920s, these ideas were revolutionary. Even more revolutionary was the programmatic nature of the research that emerged, known as the Discovery Investigations, originally established in 1918 and that reported to Parliament in 1920. The name given to this programme was largely derived from the ship used as a base for the studies. This was the *RRS Discovery*, built in Dundee in 1900, that had been Captain R. F. Scott’s vessel for his 1901 to 1904 expedition to the Antarctic. The connection this gave between the Heroic Age of Discovery and the Age of Industrialised Discovery of the Oceans represented by the powerful fleets of research ships now available to researchers should not be lost. Not only was this a prelude of things to come in terms of large-scale investigations of ecological systems and processes, it was a revolution of organisation and funding. It was not deemed satisfactory to hope that the private ventures involved in whaling would undertake appropriate research to allow them to manage their activities in a manner that would lead to sustained exploitation of the resource. Instead, independent scientific input was



The *RRS Discovery* docked in her present location in Dundee. Most famous as the ship used by Robert Falcon Scott for his 1901-1904 expedition to the Antarctic, she was subsequently refurbished as a research ship to support the Discovery Investigations that were one of the earliest demonstrations of programmatic research and were focused upon the ecology of whales in the Southern Ocean. (Photo: I. L. Boyd)

required, and this was funded through taxation (in this case, through a levy on the industry operating from South Georgia). The concept of government-sponsored, independent research carried out in the public good was emerging. Of course, whaling was not the only source of this revolution. Similar activities were underway in fisheries with the establishment of the International Council for the Exploration of the Seas in 1902. Whaling and its associated whale research were early examples of these new ideas, however. In addition, there were much greater dangers of overexploitation of the marine system than of land- or freshwater-based systems because of the lack of clarity of ownership of natural capital in the marine situation. Perhaps these reflect some of the earliest stirrings of the concept of sustainability in an industrialised context.

Early Beginnings of Marine Mammal Research

So, when did marine mammal research begin in Britain? The intellectual underpinning of the Discovery Investigations came from Charles Elton, an Oxford professor, who is generally seen as the father of Ecology. He was, of course, a man of his times as was Huxley and his other predecessors,

²Incidentally, James Clark Ross took a young scientist called Joseph Hooker to Antarctica on the *HMS Erebus* in 1839. The New Zealand, or Hooker's, sea lion, is named after him, and his great, great granddaughter, Sascha Hooker, is currently a marine mammal biologist working at the Sea Mammal Research Unit at the University of St. Andrews.

including Darwin. In the same way as it would be simplistic to lay the foundations of the theory of Evolution by Natural Selection at the feet of Charles Darwin, it would be unrealistic to lay the foundations for Ecology, or marine mammal research, at the feet of a single individual or even the Discovery Committee, which organised and oversaw the Discovery Investigations. Marine mammal research began long before Elton and the Discovery Committee. Huxley (1884) recognised the role of marine mammals in ocean ecology when he said, "The great shoals [of fish] are attended by hosts of . . . cetaceans." There are a couple of fascinating stories to be told around these early roots of marine mammal research, which I can only touch upon here.

One example reflects how some of Britain's great universities underpinned the British Empire with the intellectual capital and ideas that made it function. The Discovery Investigations, together with their marine mammal focus, are one of the best early examples of intellectual engagement with the issue of natural resource management; however, there are also many others in engineering, forestry, and agriculture, all of which were exported to the colonies. Much of this intellectual infrastructure emerged originally with The Enlightenment in the late 18th century, but it happened in parallel with other important events that wove marine mammals through the fabric of the economic and political life of the country and created the need to observe and record them.

This is illustrated most profoundly in the connection between the marine mammal research of today and the way in which Britain explored the Arctic and the Antarctic in the post-Napoleonic era. This happened under the watchful eye of a nearly unbroken British Establishment line from the actions of the British Admiralty in the middle 18th century until the beginning of the Discovery Investigations in 1918. British Establishment puppeteers like John Barrow and his protégé, Sir Clements Markham, who were arguably direct products of the intellectual revolution of The Enlightenment, sent the likes of John Franklin, James Clark Ross, and Robert Falcon Scott to the poles.²

This happened mainly in the wake of, and possibly because of, largely undocumented 18th and 19th century British and American sealing and whaling expeditions to these regions. There was a natural synergism between the development of the Heroic Age of Exploration that began with Cook in the 1750s and ended with the First World War. The British Establishment was keen to impose its "stamp" on the sealing and whaling trade—especially given the competition that existed between British, French, and American interests in sealing

and whaling through the late 18th century. It was also keen to retain centralised control of the process by discouraging privateers. Ernest Shackleton and William Speirs Bruce both experienced the cold shoulder of the British Establishment when they established their own polar expeditions. Earlier non-establishment characters who explored the Polar Regions were classified as sealers and included James Weddell (1787-1834), whose name is carried to the present day by the Weddell seal (*Leptonychotes weddellii*). These people were part explorer and part entrepreneur, though it was in their interest to study the marine mammals they were there to exploit. I think they would have identified closely with many of the basic questions we still ask in marine mammal biology such as “What is the distribution and abundance of these species?” Even if they did not have the scientific framework within which observations could be made and recorded, my suspicion is that marine mammal science really originated with some of these intrepid individuals. It was also in the interests of the sealing and whaling captains to observe and interpret the biology of the species that they were exploiting. Consequently, the Discovery Investigations represented an absorption and approval by the British Establishment of something that had probably been going on unofficially for a century or more. Arguably, it was James Cook who, in 1779, “set the hare running” that resulted in the economically highly successful, but ecologically devastating, exploitation of the whales in the Southern Ocean during the first half of the 20th century and, from a scientific perspective, the first major ecological studies of marine mammals.

The ending of the Napoleonic Wars also set a number of other “hares running” and led inexorably to the establishment of modern marine mammal research in Britain. This happened, firstly, as I have described, by releasing a new era of 19th century exploration that sustained the momentum of a tradition of “studying” and documenting marine mammals on polar expeditions (both privateer and British Establishment). A glut of experienced, but unemployed, naval officers deprived of war became the basic raw material for this process and were the group from which the Discovery Investigations eventually emerged.

However, secondly, the ending of the Napoleonic Wars also had consequences for marine mammals at home in Britain that were eventually also to converge with the hare that had been sent running in the Southern Ocean and that was not to return to home soil for another 100 years or so. The Napoleonic Wars had led to a process which encouraged the population of the outermost islands of northern Britain, especially the Hebrides, to develop a labour force that would harvest kelp to produce potash as

a basic raw material for gunpowder. This industry collapsed at the end of the Napoleonic Wars and the consequences were not completely to unwind in ecological terms for at least 150 years. It is possible that the signals from these perturbations may still be present in the population dynamic of marine mammals in Britain and, to a lesser extent, in the Southern Ocean population. The logic for this conclusion is derived from the probable ecological cascades that resulted from fluctuations in human predation pressure on marine mammals and the long-term effects of these cascades.

The collapse of the kelp industry led to a mismatch between the human population and its capacity to maintain itself. Overpopulation of the outlying regions of Britain continued throughout the 19th century in spite of many initiatives to bring work. Some of these initiatives, although well-meaning, simply extended the pain of economic weakness into the early 20th century. But this human population familiar with the sea and marine mammal exploitation supplied the sealing and whaling industries with appropriately skilled individuals from Britain’s outlying island communities to man the expeditions to the Arctic and Antarctic to exploit seals and whales. Many also emigrated to Canada and the United States to ply their trade there. For example, there is a close relationship between the origins of harp sealing in Canada and emigration from Britain.

Although we have little idea about what seal populations existed in Britain before relatively recent times, it seems very likely that high human population levels led to high levels of exploitation of marine mammals as a resource within Britain and profound levels of predation on seals in their core habitat. An irony that should not be lost completely is that the human population that supported one industry—kelp harvesting—that was originally built up to provide the raw materials for war in the early 19th century eventually supplied much of the labour force for an industry that supplied raw materials, this time in the form of glycerol products for high explosive production, in the early to middle 20th century. As I shall explain in the next section, this human population process is likely to have had a major influence upon the legislation brought forward in Britain for the management of seal populations and that first emerged in 1914. Within this legislation is the fundamental *raison d’être* for current investments in marine mammal research in Britain nearly 100 years on.

The Modern Era

The Discovery Investigations were the beginning of the modern era in marine mammal biology in Britain. It is likely that they developed in

parallel with other similar activities elsewhere, especially in connection with the exploitation of fur seals (*Callorhinus ursinus*) in the North Pacific. The long-term studies represented by the Discovery Investigations provided a foundation for understanding the oceanography of the whaling regions in the Southern Ocean, the life cycle of krill (*Euphausia superba*) as the major food source for whales, and, of course, the life-histories of the whales themselves. Although the Discovery Investigations continued until 1951, after this time, their functionality was absorbed into the Falkland Islands Dependencies Survey (FIDS), which was controlled by the Colonial Office. The FIDS had developed from Operation Tabarin, a military operation to occupy British territories in the Antarctic during the Second World War. The FIDS continued detailed studies of the Southern Ocean whales, fur seals (*Arctocephalus gazella*), and southern elephant seals (*Mirounga leonina*); and some of the early classical works on seal and whale reproductive anatomy, behaviour, and ecology emerged from work done by Nigel Bonner and Dick Laws through the 1950s while they worked for FIDS. The FIDS was renamed the British Antarctic Survey (BAS) in 1962, and BAS has remained an important sponsor of marine mammal research, much of it focussed upon Antarctic fur seals from its base at Bird Island, which continues to the present day.

Drivers for Marine Mammal Research in the Modern Era

Industrialised whale exploitation in the Southern Ocean and the development of research around this had consequences for what was happening on the home stage. These consequences presented in two ways: First, through the enactment of legislation to “protect” seals and, second, through the recycling of expertise and experience gained in the Southern Ocean within the domestic scene.

In parallel with the industrialised scale of marine mammal exploitation going on in the Southern Ocean, there was a growing consciousness about the need to manage marine resources within Britain. Consequently, some of the earliest wildlife protection legislation to be enacted in Britain came in 1914 with the Grey Seals Protection Act. Grey seals (*Halichoerus grypus*) had been a traditional local source of oil, skin, and meat and, based upon analyses from archaeological sites, this had probably been the case for many millennia. However, owing to their colonial breeding habits, grey seals are vulnerable to predation using unsophisticated methods (mainly netting and clubbing), which led to the perception that grey seals were scarce. The 1914 Act

was motivated mainly to protect grey seals as a resource (the idea of conservation with broader objectives had not yet emerged) and, as such, it protected them during their breeding season with a “close” season (meaning when no hunting was permitted) from 1 October to 15 December. This Act was modified in 1932 to allow specific exceptions to this protection as a way of allowing fishermen to protect their fisheries from grey seals. However, it was never clear the extent to which there was any distinction between grey seals and harbour seals (*Phoca vitulina*), the other common indigenous species around the coast of Britain, in the legislation or management. The suspicion is that no distinction was made. Even today, some people who should know better cannot tell the difference between these species.

By the 1950s, seal populations were beginning to show some level of increase. Ironically, this was not really noticed as a result of research but because of increasing complaints from salmon fishermen about the effects that seals were having on their catches. In northern Britain, coastal salmon fishing was carried out using a variety of methods, including coastal drift-netting and the use of fish traps set along the shore. Both of these methods of fishing are now uneconomical and are almost extinct; however, in the 1950s, salmon-netting was an important part of the economies of coastal communities and could wield important influence. After all, before the emergence of salmon farming, which has now established salmon as the largest single agricultural export from Scotland, salmon-netting was the major source of fresh salmon for tables of expensive restaurants in London. Perhaps more importantly, the British legislature was still dominated by the land-owning classes. These gentlemen—*Les Grandes Poissons*—needed to brand themselves using luxury foods like salmon. More importantly, they needed to provide paternalistic support for the tenant fishermen who were an integral part of the stratified nature of British society. It is for these types of reasons that, even today, fishing (especially salmon fishing) retains political influence far beyond its economic importance.

Feedback from the salmon fishermen about seal numbers suggested that either the 1914/1932 legislation was successful in regulating hunting or—more likely—that there had been a socioeconomic and demographic shift in the human population that had reduced the predation of seals by man. Following about a century of human overpopulation, the outlying communities in Britain were in rapid decline because of the mortality caused by the two World Wars; and this, combined with the increasing influence of centralised labour markets, shifted the rural population into the cities.

These combined factors probably contributed to the reduction of human predation of seals. Reduced dependency through the 20th century on subsistence economies almost certainly added to this decrease. Today, the consensus would be that much of the recent increase in grey seals around the UK coast, which reached levels of around 6% per annum from the early 1960s until the mid-1990s, has been driven by a combination of release from human predation pressure and, more controversially, ecosystem changes probably brought about by high levels of fishing pressure.

The Nature Conservancy was established in 1949 to advise the British government on wildlife matters, which represented a small step in the slow uptake of the principles of conservation by the British Establishment following the Second World War. The Nature Conservancy took an early interest in marine mammals and declared North Rona, lying about 40 miles north of the Outer Hebrides, a National Nature Reserve in June 1956 because of its importance as one of the main



The island of North Rona was declared a National Nature Reserve for grey seals in 1956 and was photographed here in 1958. Despite its remoteness, this has been the site of almost unbroken research on grey seals to the present day. (Photo: J. Morton Boyd)

breeding colonies for grey seals. Partly as a result of this, it established a research programme on the grey seal and, from the late 1950s until the early 1970s, it sent expeditions to this isolated island almost every year to monitor the breeding season and to carry out research on the life cycle of this little-known species. These studies represent some of the earliest scientific publications on grey seal ecology and behaviour, some of which are still referred to today (Boyd & Campbell, 1971).

In 1963, the Nature Conservancy established a Consultative Committee on Grey Seals and Fisheries because of the perceived conflict there was between the conservation objectives for both grey seals and for fisheries. At that time, the grey seal population in Britain was estimated to be 29,500, which is about one-quarter of its current size. Even though the committee was unable to quantify fish consumption, it concluded that there was a case for controlling grey seal numbers.

It is interesting to pause and consider how different this attitude is from that of the present day. Decisions about marine resource management in the 1960s were not generally built upon sound science with a healthy level of precaution built in. In spite of now knowing a lot more about how much fish is eaten by grey seals, the present view about the apparent competition between grey seals and fisheries is that the interaction is too complex for us to facilitate a rational decision about managing grey seal populations in favour of fisheries. This is because we have little faith that the objective—increasing the amount of fish available to fishermen—could be met and, in any case, the costs of management would probably outweigh the socio-economic benefits, quite apart from offending a significant portion of the British public. None of this applied in the 1960s when those in authority

Table 1. Legislative instruments affecting marine mammals in UK coastal waters; there is a level of uncertainty about the extent to which each of these extends to offshore waters. Most apply to 12 nmi from the coast, but recent moves to extend the “Habitats Directive” to 200 nmi will have wide-ranging implications for UK responsibilities to manage and conserve marine mammals in the NE Atlantic.

Legislative instrument
Council Directive 92/43/EC on the Conservation of Natural Habitats and Wild Fauna and Flora, Annex IV (the ‘Habitats Directive’) – The bottlenose dolphin, harbour porpoise, and the grey and harbour seals are listed as Annex II species.
Conservation of Seals Act of 1970
The Conservation of Seals (England) (No. 2) Order 1990
Conservation of Seals (Scotland) Order 2004
Conservation of Seals (Scotland) Order 2007
Schedule 2, Regulation 38 of The Conservation (Natural Habitats & c.) Regulations 1994 for harbour porpoise, bottlenose dolphin, and Minke whale
Convention on the Conservation of Migratory Species (The Bonn Convention)
Wildlife and Countryside Act of 1981
Nature Conservation (Scotland) Act of 2004
Harbour porpoises are further protected under OSPAR’s list of threatened and declining species.

made decisions with little or no information. The Nature Conservancy reports of reasons for coming to this conclusion are obscure and were based mainly on hearsay.

This report set into motion a series of management measures with the objective of reducing the grey seal population by 25% from its benchmark size in 1961. The subsequent 15 years saw a gradual increase of grey seal culls, which was accompanied by increasing public hostility to this type of management action, largely because colour television graphically illustrated the visual horrors of the Canadian harp seal hunt. The hunts were now presented to the public in their own front rooms. The British public were sensitised to the brutality of seal culling and remain so to this day. A media campaign ensued that successfully turned Britain from being one of the worst offenders when it came to animal rights in the harvesting of marine mammals to one of the most fervent proponents of the animal rights message.

All this was an important stimulus for driving forward marine mammal research, and the next section will show how this developed in parallel to the evolution of the *real politique*. First, however, I must finish the story of the evolution of legislation to protect marine mammals that eventually led to the creation of the Sea Mammal Research Unit (SMRU), which today is Britain's main resource for scientific advice and research about marine mammals.

Current protection and management of marine mammals in Britain is given under a range of different Acts of Parliament. Since the early 1990s, Scotland has tended to proceed along a slightly different path from the rest of Britain. The basis of the UK legislation is the Wildlife and Countryside Act of 1981, which gives the same level of protection to cetaceans as other wildlife species. Over the past decade or more, this Act has been supplemented and strengthened in response to European Directives, which have had an important influence upon UK wildlife management legislation (see Table 1). However, an oddity in this set of legislation remains the Conservation of Seals Act of 1970. This quirky little piece of legislation, which remains the centrepiece of the UK's conservation and management strategy for seals, was introduced by a Mr. John Temple in 1969 as a Private Member's Bill to update the 1932 Act. Its purpose was to bring harbour seals within the bounds of the legislation and to regulate hunting. Since the 1950s, an unregulated hunt for harbour seal pups had developed mainly in Orkney and The Wash. Even today, few people in Britain understand this legislation. It has some very strong features that could make it a template for future legislation, but it also has some very significant weaknesses. In

fact, while it is a misnomer in the modern context because the word "conservation" in its title actually refers to seals as an exploitable resource that needs to be conserved, it states that the responsibility for delivering scientific advice about the management of seals in the UK shall be vested in the Natural Environment Research Council (NERC).

The NERC is an independent, publicly funded body (similar to the National Science Foundation in the United States) whose primary mission is to promote scientific excellence in the environmental sciences. It so happened that the NERC was being created at about the same time as the Conservation of Seals Act was being processed by Parliament, and the responsibility for delivering scientific advice was slipped into the Act with little thought for the consequences and because the *modus operari* for the NERC had yet to be established. Almost certainly completely by accident, the UK legislature had struck on what I believe to be a robust scenario for the provision of independent, objective scientific advice to government by vesting this responsibility in an independent but publicly funded research organization that has no responsibility for implementing the legislation. This led to the creation of the Sea Mammal Research Unit (SMRU) in 1976, which has been the backbone of marine mammal research in Britain ever since. Consequently, rather than having a government laboratory delivering advice about the management of seals (and by default also about cetaceans), in Britain, this advice is provided by an independent group of scientists whose funding does not depend upon them aligning their advice with any political influence or legislative requirement and which has, since 1996, been part of the University of St. Andrews.

The 1970 Act is the basis upon which we build current marine mammal research in Britain, but, as I mentioned earlier, its pedigree really started with the ending of the Napoleonic Wars and the consequences this probably had for seal populations around the British coast. It also represented the return to Britain of the "hare" that had been "set free" in the Southern Ocean about the same time and that had become almost exhausted by the blood and guts of industrialised whaling. Research, even if it had not been the basic driver for what occurred in the Southern Ocean, had been complicit in the process that led to the decimation of those baleen whale populations. The comparative failure of the Discovery Investigations and their successors to halt the decimation of whale stocks is another story that needs to be told: I suspect it harps back to the need for science to be completely independent of political or commercial control, and the Discovery Investigations were probably independent of neither. Nevertheless, the

expertise developed there was returned for use in a national context, with experienced researchers from the Southern Ocean becoming involved in the research of marine mammals at home. Nigel Bonner, the first director of SMRU, and his successor, Dick Laws, were both from this mould, as am I, the present director, to some extent because I developed much of my research career working on Southern Ocean marine mammals while I worked for the British Antarctic Survey.

Research and Researchers: The Return of the Hare

The 1950s were the early days marine mammal research in Britain. Much was being done to understand the food and environment of whale populations in the Southern Ocean, but the Discovery Investigations were derailed by disciplines, such as oceanography and plankton biology, which left the original purpose of attempting to understand the dynamics of whale populations “high and dry.” Perhaps this is why successive chairmen of the Edinburgh-based whaling company, Christian Salvesen, argued against the costs to the industry of the Discovery Investigations because they were perceived as irrelevant. How familiar this is today when listening to some commercial and government critics of the structure and function of modern research. The experience of the Discovery Investigations suggests that the scientific community should ignore them at their peril.

Some direct marine mammal research was done, most notably by people like L. Harrison Matthews and Colin Bertram (2001). Still, this rarely amounted to more than carrying out studies of gross anatomy or broad descriptions of natural history. I have already alluded to the likelihood that the failure of the Discovery Investigations was driven by a lack of independence. But ecologists themselves cannot be absolved from blame, and I suspect the Discovery Investigations will stand as an early example of how to establish a revolutionary new approach to ecological research that fell far short of its goals because of poor implementation.

However, following the transition to the Falkland Islands Dependencies Survey (FIDS), a new breed of biologist was recruited (e.g., Martin Holdgate, Nigel Bonner, and Dick Laws) who extended their skills to studies of behaviour, physiology, and population structure and dynamics. Martin Holdgate eventually became a senior civil servant in the British Government and director of the International Union for the Conservation of Nature (IUCN). Both Bonner and Laws returned to the UK to lead marine mammal

research as directors of the SMRU or, in the case of Bonner, the Seals Research Division, which was the precursor to SMRU. Bonner himself wrote an interesting and enduring book about the interactions between people and marine mammals (Bonner, 1982). Laws eventually became a highly successful director of the BAS.

Other important characters in this mix were Sydney Brown, who changed from being a whaling inspector in the Southern Ocean’s whale harvest to being an important whale biologist at SMRU. Ray Beverton and Sydney Holt produced their classic paper on stock-recruitment models in fisheries in 1957. Significantly, it was Beverton who was the boss at the NERC when the responsibility for marine mammal research was absorbed into the NERC in 1970. Sydney Holt, of course, went on to become one of the most significant characters to drive forward the scientific agenda of the International Whaling Commission (IWC) until very recently.

Research and Researchers: New Faces

It would be easy to overlook the effect that particular individuals had upon the evolution and development of marine mammal research in Britain. The earliest interest was shown in the 1930s by Frank Fraser Darling when he developed methods of studying the behavioural ecology of several large mammals using close, personalised observations of behaviour, which he linked to the environment. In modern terms, Darling’s observations and methods were naïve, but they were revolutionary for the times. Perhaps his most accomplished work of the era was his book, *A Herd of Red Deer* (1937), which remains a seminal early work on the life-history of a species. This was followed by his book, *A Naturalist on Rona* (Darling, 1939), in which he attempted to take the same approach with grey seals. The added challenges of working on marine mammals meant that his approach was less successful than with red deer; still, Darling’s study is possibly the earliest example of a structured autecological study of a marine mammal. Darling had a special interest in human ecology in marginal habitats and an underlying belief in the need for people to respect their environment and to live with it in a balanced manner. He tried to “practice what he preached” and part of this was to examine how other large mammals achieved this balance. Later in life, Darling became an international advocate for conservation, though he remained highly influential in the issues of seal management in Britain.

Before the 1970s, there were few academics interested in marine mammals. In the 1950s, Humphrey Hewer took up the challenge. He was an academic at Imperial College in London and

had collaborated with Charles Elton's Bureau of Animal Population at Oxford, the same Elton who was so influential in the establishment of the Discovery Investigations, when Hewer was the Rodent Officer at the Ministry of Agriculture and Fisheries during the Second World War. His work on grey seals was done mainly as an aside to his interests in general zoology, but it culminated in the book, *British Seals*, published in 1974 in the New Naturalist Series. Hewer, together with a colleague named Ken Backhouse, collected together what information they could about the biology of the species from existing records, many of which were obtained from the carcasses of seals shot by fishermen. Hewer also made visits to several grey seal colonies in the Hebrides and, as a result, managed to construct a fairly accurate picture of the life-history of the species.

If Hewer's work was grounded in academia, the other work that developed in the 1950s was grounded in the practicalities of management. The Nature Conservancy, the government agency responsible for wildlife conservation, had declared North Rona a National Nature Reserve in 1956. In 1958, they employed J. Morton Boyd as their Regional Officer for Northwest Scotland, which included North Rona. Boyd (my father), together with his colleague Niall Campbell, decided to embark upon an annual census of seals at North Rona as part of the process of gathering information about the population. At that time, there were few other grey seal colonies, and North Rona was the largest in the world (soon to be overtaken by others in Britain and by Sable Island in Canada). This led to annual expeditions to this isolated island that were continued into the early 1970s and eventually have become led by staff at the SMRU. Since the 1980s, these expeditions have taken on a different function from that originally envisioned, but the legacy of North Rona is well-established in the annals of British marine mammal biology.

Boyd also attempted to address the question of where seals went in the 11 months of each year between the breeding seasons. In the days before radio- and satellite-tags, this was a very challenging problem, but Boyd knew that the conservation of the species relied upon knowledge of their main critical habitat beyond that of the breeding colonies. He began branding grey seal pups at North Rona and built a network of observers from the lighthouse keepers to feed back information about the sightings of branded seals. Predictably, the study was not especially productive or insightful, but it was a start to what is now a major research effort applied to marine mammals in general.

Any description of the early days of marine mammal research in Britain would be deficient without covering the very substantial contribution

made by Grace Hickling, who was an amateur naturalist working on the Farne Islands off the Northumberland coast throughout the 1950s and 1960s. She was helped and encouraged by John Coulson, an ecologist from Durham University, and together they produced one of the most important early papers on density dependence in a marine mammal by showing a relationship between the mortality rate of pups on different islands and the density of mothers (Coulson & Hickling, 1964).

From the early 1970s, much of the research on marine mammals was carried out by the NERC's Seals Research Division, which absorbed the other researchers working on whales within the NERC in 1976 to become the SMRU. I have already mentioned that Nigel Bonner and Dick Laws, who had "cut their teeth" as marine mammal researchers within the South Georgia seal and whale fisheries, were early directors of these organisations. They proceeded to recruit additional scientists, including Bill Vaughan, who also had been a sealing inspector at South Georgia. Vaughan took on the daunting role of surveying the UK seal populations, which contributed to a data set documenting the rise of grey seal populations in Britain from the early 1960s. Among the new faces were new graduates like Sheila Anderson, Charles Summers, and John Harwood. They then have given way over the past 30 years to a succession of biologists who have "taken up the baton" and maintained the strong tradition of marine mammal research in Britain.



Grace Hickling (1908-1956), an amateur naturalist who worked on grey seals at the Farne Islands, Northumberland from the 1950s to the 1970s; together with John Coulson from Durham University, she published the first demonstration of density-dependence in a marine mammal. In this photograph, she is on the Farne Islands during a cull of grey seals in 1975. (Photo: J. Morton Boyd)

The Present Day

Times have changed. I hold the honour of having been the first Ph.D. student in Britain educated specifically in marine mammal biology. Paul Thompson was my successor, and he now leads a substantial research group at the University of Aberdeen. Now, at SMRU alone, there are up to 20 Ph.D. students in training at any time plus about 15 others involved in training at the Master's level. This does not include the numerous other individuals who also are being trained under the guidance of experienced academics at other universities in the UK.

Returning to the underlying theme of this historical essay, it is important to appreciate the significant place that marine mammal research has had in the development of marine science in Britain. Studying marine mammals is technically challenging and needs a coordinated community of researchers. Of course, it is slightly unnatural to make the division between researchers based upon national contributions in the present climate. Marine mammal research is now truly international. Of about 70 staff and students at SMRU, we have over ten nationalities represented. It is often as likely to hear French, German, or Spanish being spoken in the corridors as it is to hear English. This is as it should be, and long may it last.

Literature Cited

- Beverton, R. J. H., & Holt, S. J. (1957). *On the dynamics of exploited fish populations* (Fishery Investigations Series II, 19, Ministry of Agriculture, Fisheries, and Food).
- Bonner, W. N. (1982). *Seals and man: A study of interactions*. Seattle: University of Washington Press. 170 pp.
- Boyd, J. M., & Campbell, R. N. (1971). The grey seal (*Halichoerus grypus*) at North Rona, 1959 to 1968. *Journal of Zoology – London*, 164, 469-512.
- Colin Bertram. (2001, November 22). *Telegraph*. Retrieved 22 December 2008 from www.telegraph.co.uk/news/obituaries/1318195/Colin-Bertram.html.
- Coulson, J. C., & Hickling, G. (1964). The breeding biology of the grey seal, *Halichoerus grypus* (Fab.), on the Farne Islands, Northumberland. *Journal of Animal Ecology*, 33, 485-512.
- Darling, F. F. (1937). *A herd of red deer: A study in animal behavior*. Oxford, UK: Oxford University Press.
- Darling, F. F. (1939). *A naturalist on Rona*. Oxford, UK: Clarendon Press. 137 pp.
- Darling, F. F. (1969). *Wilderness and plenty*. London: British Broadcasting Corporation. 88 pp.
- Hart, I. B. (2006). *Whaling in the Falkland Islands Dependencies 1904-1931: A history of shore and bay-based whaling in the Antarctic*. Trowbridge, UK: The Cromwell Press. 363 pp.

- Headland, R. (1984). *The island of South Georgia*. Cambridge, UK: Cambridge University Press. 293 pp.
- Hewer, H. R. (1974). *British seals*. London: Collins.
- Huxley, T. H. (1884). Inaugural address. *Fisheries Exhibition Literature 4*, 1-22.
- Sheail, J. (1987). *Seventy-five years in ecology: The British Ecological Society*. Oxford, UK: Blackwell Scientific Publications. 301 pp.
- Vamplew, W. (1975). *Salvesen of Leith*. Edinburgh and London: Scottish Academic Press. xii + 311 pp.