

Summary of National Parks & Wildlife Service surveys
for common (harbour) seals (*Phoca vitulina*) and grey
seals (*Halichoerus grypus*), 1978 to 2003



Irish Wildlife Manual No. 13



**Summary of National Parks & Wildlife Service surveys for common
(harbour) seals (*Phoca vitulina*) and grey seals (*Halichoerus grypus*),
1978 to 2003**

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Executive Summary

- This report provides an overview of seal surveys undertaken by National Parks & Wildlife Service (NPWS) staff and makes those data available to interested parties.
- In some areas there has been a consistent sampling of seals from 1978 to 2003 but the majority of sampling has been intermittent. Earliest surveys showed that the population, on a national basis, was relatively low. A total of 1504 observations have been made on seal populations since 1978.
- For grey seals, the greatest sampling effort has been made on two key geographical areas: the Blasket Islands and the Inishkeas Islands Group and mainly during autumn pupping. The peak estimate of grey seals at the Blaskets was 82 pups (1983) and 86 adults (1984). The Inishkeas supported a much larger pup production (242, 1984) and resident grey adults (294, 1986).
- Recent estimates by Kiely & Myers (1998) and Ó'Cadhla & Strong (2002) have shown that the population at these sites had increased substantially from the 1978 estimates. However, fluctuations in populations appear to be the pattern particularly at the Inishkeas Island Group. All-age population estimates for the Blasket Islands (1995) were between 542 and 698 and a corresponding figure derived for the Inishkeas Group estimating a total between 1050 and 1350 (2002).
- Sampling for common seals, undertaken mostly in July, has been spread over a wide geographical range. Greatest sampling effort by NPWS was in Bantry Bay. From 1978 to 2003, a total of 251 observations were made on this population. The population has been increasing since 1978 with a maximum count of 403 adult common seals (2003).
- The greatest proportion of the increase in the Bantry Bay population was attributable to the Glengarriff Harbour population. Kenmare River (386; 2003), inner Galway Bay (217; 2003), Sligo Bay (max = 275; 2001), Rooneys Island,

inner Donegal Bay (181; 2003) all supported large populations of common seals throughout the survey period. Most of these sites reported increases in recorded population during the same interval.

- Sites that were sampled on a monthly basis exhibit a seasonal fluctuation. In both Rooney's Island and Tawin Island (inner Galway Bay) greatest numbers were recorded during the winter months. These results run counter to the expectation and may be explained by aspect or some other seasonal factor.
- The last national estimate of common seal population was approximately 3000 in 1989 / 90 (Harrington, 1990). A recent NPWS sponsored aerial survey has estimated the 2003 population at 2905 common seals (Cronin *et al.* 2004). This recent survey whilst not directly comparable to previous surveys due to changes in methodology identifies a shift in the importance of common seal populations. In particular, it notes the increasing national significance of common seal populations on the south-west coast of Ireland.
- Recommendations are made for the continuation of regular seal surveys at certain locations and for the augmentation of survey effort at other sites.

Acknowledgements

This report was compiled from twenty-five years of data gathered by both current and former National Parks & Wildlife Service staff, volunteers and contractors. These data were largely collected by regional staff and the assistance of those who furnished old reports, datasheets and other sundry sources is most gratefully acknowledged. The following people, although perhaps not a complete list, have been mentioned in the documents received by the author as being actively involved in counts:

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1. Introduction

National Parks and Wildlife Service staff have been involved in seal census work from the 1970s to the present but until now the results have not been collated nationally and much of the work has not been published. This report seeks to unite the information held in a number of regional areas and provide comparison where possible of local populations of seals. Because of variation in methods and intensity of work, it is not possible to extrapolate to a national level for many annual samples.

Seal surveys were first undertaken in Irish Waters in the early 1960s (O'Gorman, 1963; Lockley, 1966). NPWS staff instigated surveys for seals in the late 1970s as a response to a proposal for a widespread seal cull. The demand for such a cull was largely fuelled by the perception of seals competing with fishermen for fish resources. Surveys at this time showed that the population, on a national basis, was relatively low. Concern was expressed over the sustainability of this low seal population (Patrick Warner, pers. comm.) and consequently led to a series of national seal surveys (Summer *et al.*, 1980; Warner, 1983). Survey effort was again reduced until the outbreak of phocine distemper virus (PDV) (*Morbillivirus*) in Western Europe in 1988 and 1989 (Kennedy *et al.*, 1988; Harris *et al.*, 1995). The large numbers of seals killed by this virus internationally led to fears for the populations of Irish common seals. A national survey was undertaken during 1989 to assess the affects of PDV on mainly local seal populations (Harrington, 1990). Another lull in survey effort followed through most of the 1990s due in part to health and safety concerns regarding boat-based operations. However, recent research and population estimates have been undertaken on both grey seals (BIM, 1997; 2001; Kiely & Myers, 1998; Kiely *et al.*, 2000; Ó'Cadhlá & Strong, 2002) and common seals (NPWS, unpublished data; Smiddy, 1998; Jane Gilleran, pers. comm.). The EU Habitats Directive (92/43/EEC), which was transposed into Irish law during 1997, and the accompanying need for distribution and status data for both common and grey seals, and their habitats, have largely mediated a recent resurgence in seal surveys by NPWS staff and outside agencies. A recent survey for grey seals has been completed at the Inishkea Island group (Ó'Cadhlá & Strong, 2002) and further surveys were undertaken on the Blasket Islands during 2003 (Michelle Cronin, pers. comm.). A national survey of common seals was completed in 2003 using infrared aerial photography (Cronin *et al.*, 2004). This survey was ground truthed using counts by NPWS staff and volunteers; some of the results from those counts are included in this document.

1.1 Conservation issues

In Ireland, prior to the enactment of the Wildlife Act in 1976 a bounty was paid for both grey and common seals as a measure to reduce competition with fisheries. However, this Act subsequently conferred protected status upon seals and killing of seals is nowadays sporadic and localised. However it can be very difficult to detect and to prosecute offences. Currently, the greatest threats faced by seals arise through disease, temporary food shortage, conflict with fishing, pollution, disturbance and entanglement with fishing gears.

In the late 1980s, phocine distemper virus (PDV), a form of *Morbillivirus*, swept through seals in north-western Europe. Over 17,000 common seals died in the North

Sea with populations in Denmark, the Netherlands and the United Kingdom worst affected (Harris *et al.*, 1995). These viruses may also spread to other marine mammals; a similar *Morbillivirus* outbreak subsequently caused a die off of striped dolphins in the Mediterranean Sea (Domingo *et al.*, 1990). In the northern Irish Sea, PDV first spread to common seal colonies in Northern Ireland, in particular Strangford Lough, in August 1988 (Kennedy *et al.*, 1988). An approximate total of 250 seals died as a result of PDV infection in Northern Ireland (Northridge *et al.*, 1990). However, the disease appeared to have a much lesser effect on seal populations in the Republic of Ireland. The impact of the disease on grey seals was much more difficult to quantify because of widespread migration and the seasonal use of haul-out sites. This disease is now perceived as a natural phenomenon and it was therefore unlikely that human intervention could have reduced the number of seals killed (Harris *et al.*, 1995). Another outbreak occurred during 2002 which reached Galway Bay but numbers of seals involved were low; only one carcass was identified as being phocine distemper virus positive (Jane Gilleran, pers. comm.). However, it is widely acknowledged that in already declining populations this virus would pose a particular threat to the sustainability of the population.

In Ireland, the Minister for the Environment, Heritage and Local Government may license killing of seals under the Wildlife Acts (1976 and 2000) on the grounds of interference with fishing or aquaculture, or in the interest of scientific research. However, the number of these licences issued on an annual basis is relatively low. The EU Habitats Directive requires Ireland to establish Special Areas of Conservation for both species of seal. Any activity likely to impact upon the seal population requires consent from the Minister. This legal protection affords seals considerable security from hunting and disturbance at haul-out sites. Continued development of coastal areas is also perceived as a threat to seal populations (Stone, 2003). Development adjacent to haul-out sites, through increased noise, human presence and foreshore development, may significantly reduce the suitability of sites for seals (Kiely & Myers, 1998). This is a particular problem when the amount of suitable habitat is already limited. Planning and licensing authorities must ensure that seals will not be adversely affected before allowing developments in a SAC designated for seals.

Seals are apex predators and consequently bioaccumulation of pollutants such as heavy metals and persistent organic chemicals (POC) occurs. Polychlorinated biphenyls (PCBs) are a particular threat. Female seals feeding on fish with high levels of PCBs may fail to breed and pollution could thus hinder the recovery of some populations that have been reduced by disease (De Swart *et al.*, 1994; Sørmo *et al.*, 2003ab). The levels of these pollutants in Irish Waters are generally low and the EPA (Environmental Protection Agency) are responsible for licensing and monitoring of these toxins in the environment.

Although the dangers posed to marine mammals by both live and ghost-fishing gears are relatively well documented (Morizur *et al.*, 1999) the threats posed within an Irish context are not well established. However, seals and fishermen have been perceived to be competing for the same resource. Seals are opportunistic hunters and numbers caught in fishing gear can at times be relatively high (Morizur *et al.*, 1999). However, it should be noted that in most cases seals are feeding on different resources to those sought by fishermen (BIM, 1997; 2001). There is nonetheless a perception that seals,

particularly grey seals, are a menace to fishing and aquaculture operations. Seal scarers are not widely used in Ireland (Thomas Tierney, pers. comm.). Therefore, close contact to fishing and aquaculture operations pose a potentially serious threat to populations of seals in areas of intensive activity.

1.2 Species descriptions

1.2.1 Grey seal (*Halichoerus grypus Fabricius*)

These seals are covered with grey and brown fur, sometimes with a pattern of blotches. There have no visible ears, a long muzzle and parallel nostrils. Grey seals are strongly sexually dimorphic (males 233kg; females 155kg) (Hayden & Harrington, 2001). The head/body length averages 207cm in males and females are usually about 180cm. Flippers account for about 25cm of the total length.

Grey seals in Ireland are widespread but greatest concentrations are found on exposed south-western, western and northern coasts. Populations of grey seals are also found on the east and south coasts (Kiely *et al.*, 2000). The largest populations of grey seal on the Irish Coast are found on the Blasket Islands, Inishkea Island group, the Saltees and the Raven (both off County Wexford). Between the tides they haul themselves out on to rocks, usually on uninhabited offshore islands, though some haul-outs are on secluded mainland beaches. Grey seals are gregarious at these haul-outs, sometimes forming large groups of several hundred animals, especially when they are moulting their fur in the spring.

Studies in both Wales and Scotland have shown that considerable offshore migration occurs in grey seals. Some of these seals are thought to constitute an element of the Irish population although the numbers involved are difficult to determine and under constant flux dependent on seasonal migrations and available food resources (Baines *et al.*, 1995; Hiby *et al.*, 1996; Kiely *et al.*, 2000; Callan Duck, pers. comm.).

About two-thirds of grey seals' time is spent at sea where they hunt and feed. Gadoids form the largest portion of grey seals diet particularly whiting, poor cod, bib, Norway pout (BIM, 2001). However, grey seals are opportunistic feeders and a wide range prey are consumed including other small fish such as wrasse, bass, sea bream, mackerel, herring, flat-fish species and cephalopods.

In the autumn grey seals congregate at traditional sites on land to breed. The timing of births varies but peak pup production is during October and November (Kiely & Myers, 1998). Grey seal pups weigh about 14kg at birth and have soft white fur. They remain on land where they suckle for 18-21 days. A female's milk contains up to 60% fat, so pups grow very quickly, gaining about 2kg in weight each day (Coulson & Hickling, 1960; 1964; Boyd & Cambell, 1971; Fedak & Anderson, 1982; Kovacs & Lavigne, 1986; Anderson & Fedak, 1987). This weight gain consists mainly of a layer of blubber below their skin, which is vital insulation when they go to sea. During the pupping season, male grey seals also come ashore to mate. The largest males, usually more than 10 years old, compete for a position within groups of breeding females. Occasionally males fight, and may sustain deep scars on their necks as a result.

Female grey seals may live for 35 years, but males seldom survive to more than 25 years old. (Hayden & Harrington, 2001)

1.2.2 Common (harbour) seal (*Phoca vitulina L.*)

These seals are usually covered in fine spot-patterned grey or brown fur. They have a rounded head with no visible ears and have 'V' shaped nostrils. The head/body length ranges from 140-185cm including flippers of about 20cm. Weight ranges from 8-16kg at birth but rising to 130kg in adults.

Common seals feed at sea but regularly haul out on to rocky shores or inter-tidal sandbanks to rest, or to give birth and to suckle their pups. Many of the most important haul-out areas are around the west coast of Ireland. These include Bantry Bay, Kenmare River, Galway Bay, Sligo Bay and the Donegal Coast but Carlingford Lough is currently very important and historically Strangford Lough has had a large population. Although young seals travel distances of several hundred kilometres, adults appear to remain faithful to favoured haul-out areas from year to year. The particular sites used may, however, vary with the seasons. Common seals travel up to 50km from haul-out sites to feed and may remain at sea for several days. Here they spend time diving, staying underwater for up to 10 minutes, and reaching depths of at least 50 metres.

The way in which common seals hunt is poorly understood, but they are known to eat a wide variety of fish, including whiting, *Pollachius* spp., haddock, *Trisopterus* spp. (Jane Gilleran, pers. comm.), herring, sandeels and flatfish. Shrimps and squid are also sometimes eaten. (Hayden & Harrington, 2001)

Females give birth to a single pup in June or July each year. Pups are very well developed at birth and can swim and dive when just a few hours old. This enables common seals to breed in estuaries where sandbanks are exposed for only part of the day. Mothers feed their young with extremely rich milk and pups grow rapidly, doubling their birth weight during the three or four weeks that they suckle. Males play no part in the rearing of pups but spend much of this period fighting amongst themselves in the water, attempting to increase their chances of breeding. Soon after breeding, common seals undergo the annual moult of their fur, during which they spend much of their time ashore.

A female common seal can reach 30 years of age, but males are unlikely to survive beyond 20 years (Hayden & Harrington, 2001).

2. Materials and methods

Information is presented for all counts undertaken by National Parks & Wildlife Service (NPWS) staff throughout the Irish Coast from 1978 to 2003. Most grey seal surveys were undertaken during autumn pupping on exposed shores particularly offshore islands. Grey seals spend most of the year dispersed at sea where they are in effect uncountable (Ward *et al.* 1987). Past research suggests that there is a high degree of breeding site fidelity among female grey seals (Boness & James, 1979; Pomeroy *et al.* 1994). A female may come ashore and return to sea several times before selecting a pupping site (Anderson *et al.* 1975; Pomeroy *et al.* 1994) or she may arrive at the chosen site a day or two before parturition (Fogden, 1971). Since mating occurs shortly after birth (Coulson & Hickling, 1964; Fogden, 1971; Bonner, 1972; 1982; Kovacs, 1987) there is a corresponding congregation of males. Therefore, counts of grey seals undertaken during the pupping season will provide both estimates of adult and young-of-the-year populations. An initial aerial survey in 1978 was used to identify haul-out sites. In many cases, access was only possible using rigid inflatable boats (*e.g.* Zodiacs). The combination of exposure and rocky shores meant that landing was often difficult, therefore in some cases counts were made from boat. Particular care was taken when cows were nursing pups so as not to cause disruption. In all seal surveys the time spent surveying was minimised. When possible mature grey seals were sexed where possible and the stage of development of pups was estimated. When pups were classified they were differentiated according to a scale devised by Radford *et al.* (1978). These stages were:

- Stage I Body thin, neck well defined, coat often stained yellow by prenatal excreta, umbilical cord conspicuous and not dried, vocalisations a weak bleat and animal docile (≤ 4 days old)
- Stage II Body outline smoother with neck still visible, cord atrophied or visible scar, vocalisations loud and snarl when handled ($4 \geq 11$ days old)
- Stage III Outline rounded to barrel-shaped. Neck indistinguishable and vigorous attack and escape reactions to handling ($11 \geq 17$ days old)
- Stage IV As stage III but with white pelage starting to moult. These pups are weaned or approaching weaning ($17 \geq 23$ days old)
- Stage V Fully moulted and weaned (≥ 23 days old)

However, in many cases it was not possible to either differentiate gender or classify pups. A life history table for species developed by Hewer (1964) and later modified by Harwood & Prime (1987) allows an all-age population estimate to be calculated from the total pup production. In this method, multipliers of 3.5 to 4.5, which account for variations in growth rate, juvenile and adult survival, and adult fecundity between populations, were applied to the total pup production estimate. Since many studies use these multipliers, all age estimates can be compared for different grey seal colonies documented in the literature (Kiely *et al.*, 2000). Although many sites reported grey seals, analysis was done on only two island groups ((Inishkeas, County Mayo (including the Duvillaun Islands) and the Blaskets, County Kerry)) (Map 1).

Common seals tend to be a more inshore species than grey seals. Therefore, they haul-out on a more regular basis. Daily counts of common seals have been estimated to

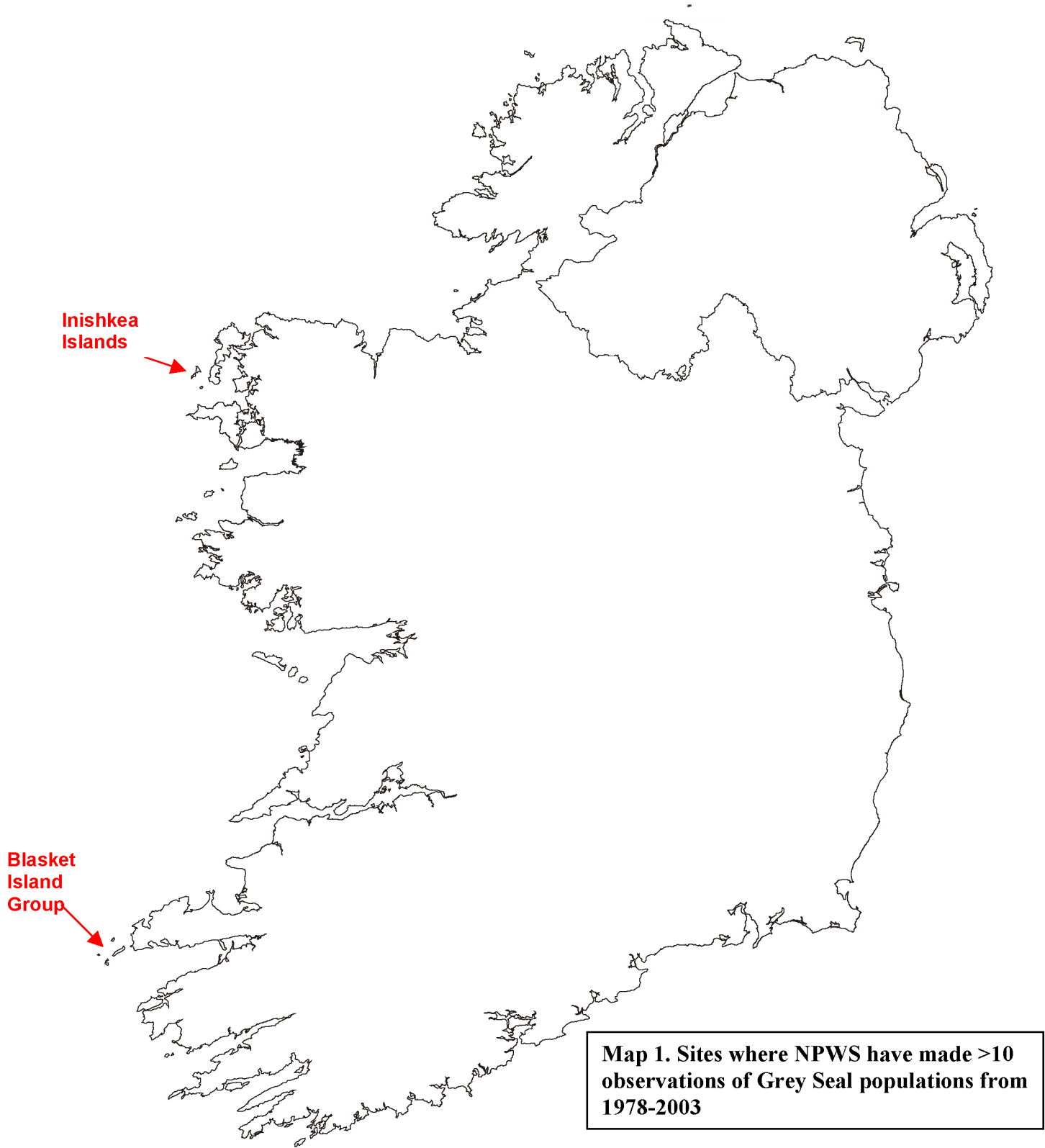
account for 50-75% of the total population (Thompson & Harwood, 1990). Common seals were generally sampled during the summer months particularly during the moulting season. At this time the greatest proportion of common seals are hauled out on shore. Unlike grey seals, common seals were often sampled from on-shore vantage points. Disturbance of seals was minimised by staying down wind on approach and by making counts from a distance judged not to cause distress. In some cases, a number of counts were made so as to derive an average number of seals on shore during a specific period.

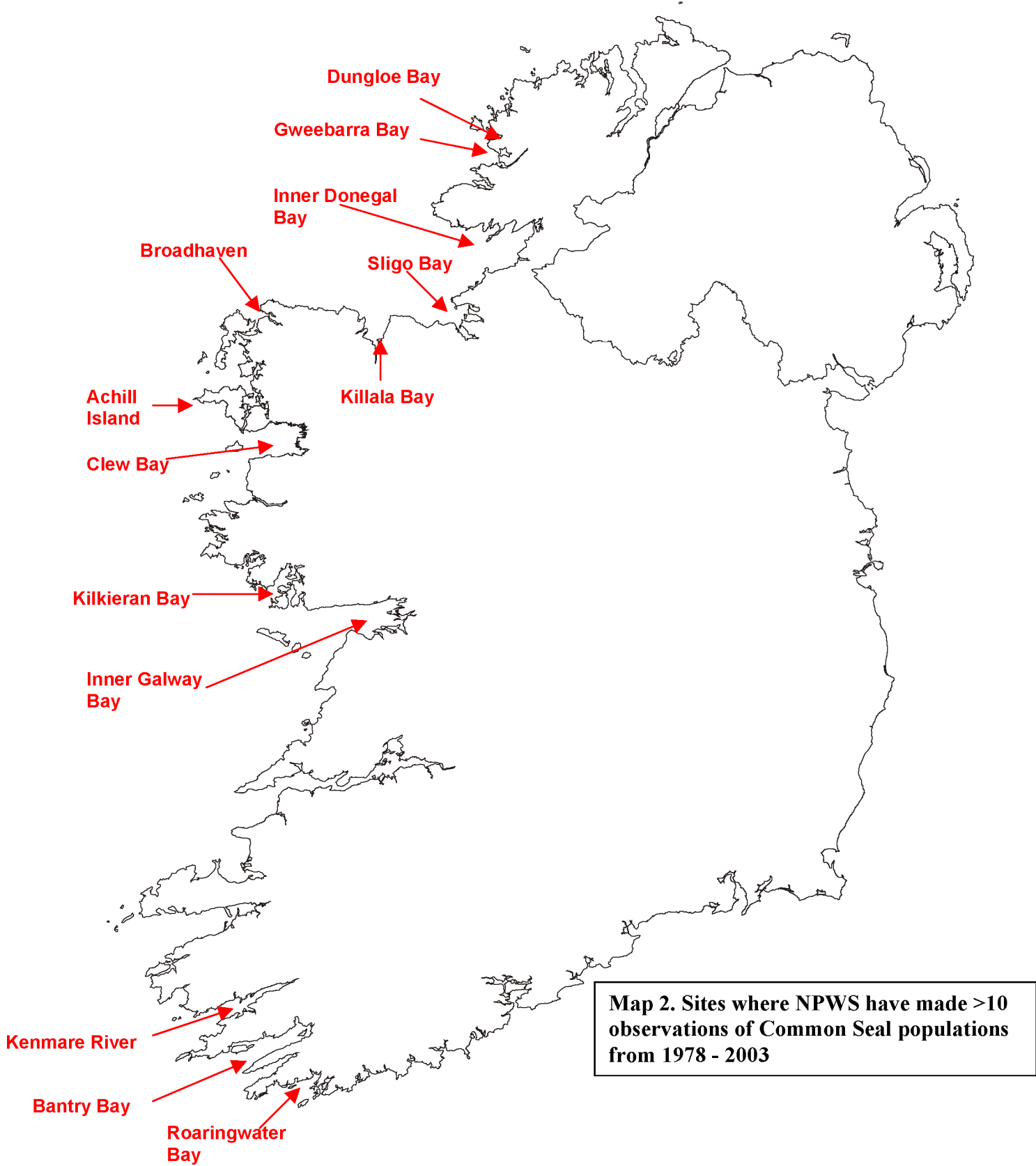
Sample sites for common seals where greater than ten observations were made are presented in Map 2. Sites that had consistent sampling from 1978 to 2003 include:

- Bantry Bay, County Cork
- Kenmare River, County Kerry
- Inner Galway Bay, Counties Galway and Clare
- Killala Bay, County Mayo
- Sligo Bay (including both Ballysadare and Drumcliff Bays), County Sligo
- Rooney's Island, Inner Donegal Bay, County Donegal

All information was collated from datasheets collected from NPWS staff. In its most basic form these data consisted of counts of seals on specific dates and general locations. However, in some cases data was also available on bay/catchment, specific location, grid reference, county, date, personnel, weather conditions, Beaufort scale, count duration, sampling effort, time of day, tidal state, sea state, species and maturity of seals counted.

A significant portion of this determinant information has been excluded from this report due to inconsistent availability. In cases where more than one count was made at a specific time and location a mean value was calculated. In bay/catchments where a number of counts were made at different locations on the same date then those data were pooled to form a total figure for the area. Where a number of counts were undertaken during the course of a year within a specific geographical area then a mean annual value was obtained. The nature and number of counts made meant that only minimum population estimates could be calculated for each geographical region. Annual population estimates made for broad geographic regions were graphed. These graphs broadly indicate the prevailing trends, however, due to the variance in sampling methods no further statistical analysis was undertaken. However, all collated raw data is presented in Appendix I to make it amenable to further analysis.





3. Results

National Parks & Wildlife Service (NPWS) staff have made a total of 1504 observations on seal populations since 1978. The number of counts made for seals varied considerably between years (Figure 1). Greatest effort for common seals has been made in the late 1970s and early 1990s but sampling effort for grey seals has been concentrated over the 1980s.

A recent revival in sampling effort has also occurred. Concentrations of populations meant that for some coastal areas a much greater sampling effort has been made in particular counties (Table 1 & 2). For grey seals, the greatest sampling effort has been made in Mayo and Kerry. However, the sampling effort has been proportionally spread over the greatest number of sites in Donegal. It is notable that for both species greatest effort has been made on the western seaboard.

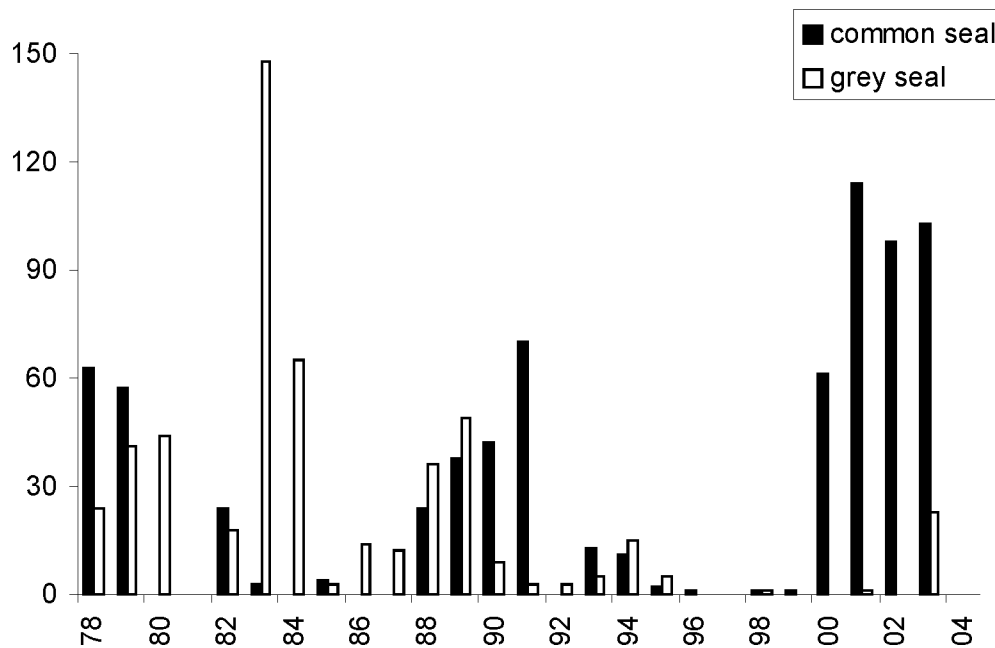


Figure 1. Number of counts made on an annual basis for both common and grey seals by NPWS staff in each year

Table 1. Number of observations and sites sampled for grey seals per county

County	Observations	Sites
Mayo	280	41
Kerry	143	13
Donegal	41	23
Galway	21	11

Clare	9	5
Cork	9	7
Sligo	7	3
Wexford	5	4
Dublin	3	2
Louth	1	1

Table 2. Numbers of observations and sites sampled for common seals per county

County	Observations	Sites
Cork	186	22
Kerry	154	22
Galway	144	32
Donegal	105	20
Mayo	98	17
Sligo	32	5
Clare	4	2
Wexford	4	2
Louth	2	1

The sampling effort was concentrated in July and October for common and grey seals respectively (Figure 2). From the overall sampling effort, a total of 725 observations of common seals were made. However, only 529 observations of grey seals were made in the same period.

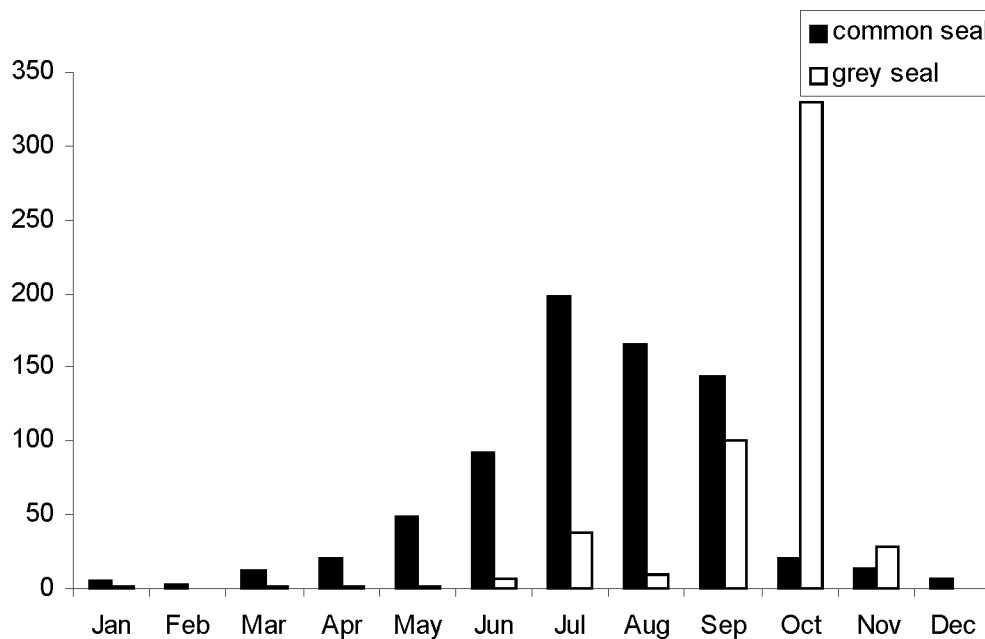


Figure 2. Monthly variations in the sampling effort of common and grey seal counts in Irish waters by NPWS staff

The sampling effort of common seals was more focussed towards counting adults but 187 pup counts were also made. The majority of grey seal counts also made observations of pup numbers ($n = 423$). Sampling effort was focussed upon particular seasonal movements of seals. The concentration of sampling effort on both a spatial and temporal basis means that for some locations there is a much better record of seal populations than for others. Therefore, it was felt that analysing populations where a greater or more consistent sampling effort has been made would lead to a greater appreciation of seal population trends. Sampling for grey seals was concentrated on two study sites: Inishkea Island (Inis Gé) group off the Mayo Coast and the Blasket Islands (na Blascadaí) off the Kerry Coast. Greatest sampling effort has been made for both sites during the 1980s; however, universities and NPWS staff have also conducted some recent survey work.

A substantial sampling effort had been made on the Inishkea Island Group. Whilst comprising 10 islands this island group recorded a large number of haul-out sites ($n = 30$). During NPWS surveys, the greatest number of adult grey seals were recorded in 1986 ($n = 294$). Grey seal pups reached their greatest abundance in 1984 with 242. Surveys conducted by NPWS, Kiely & Myers (1998) and O' Cádhlá & Strong (2002) have been included in the presented graph (Figure 3). It was clear from these counts that a great variation in the numbers of grey seals were reported using this site. A population estimate for the island group derived from annual pup production in counts made by NPWS, Kiely & Myers (1998) and O' Cádhlá & Strong (2002) place the most recent population of grey seals at this site at between 1050 and 1350 (Figure 4).

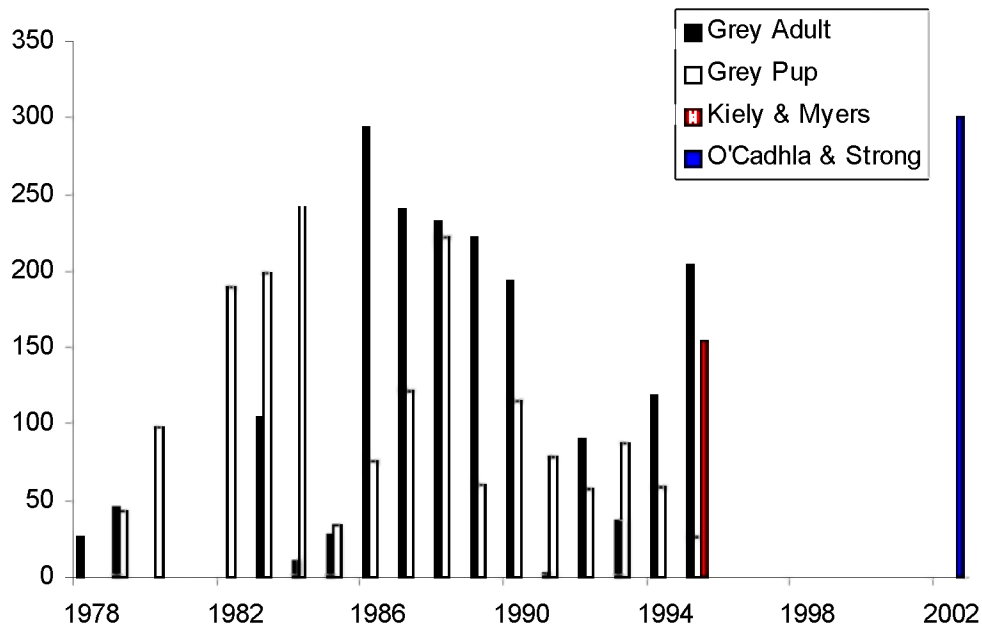


Figure 3. Total population counts at the Inishkea Islands Group from NPWS, and pup production counts by Kiely & Myers (1998) and O' Cádhlá & Strong (2002).

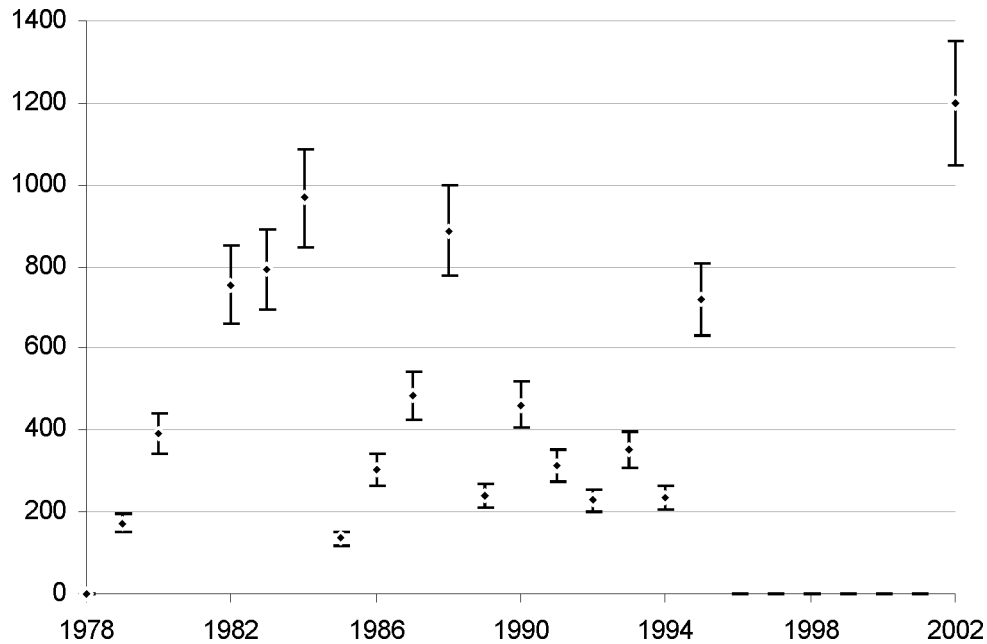


Figure 4. Population estimates derived from pup production at the Inishkea Islands Group by NPWS, Kiely & Myers (1998) and O'Cádhla & Strong (2002). The range of population estimates are presented by means of error bars.

The Blasket Islands group are comprised of 15 separate islands and islets with 13 recording grey seals during NPWS sampling. From NPWS counts, the Blasket Islands had a peak population of 86 adult grey seals recorded in 1984 and a peak pup count of 82 in 1983 (Figure 5). However, a more recent census conducted by Kiely & Myers (1998) showed that pup production had increased considerably during 1995. A population estimate derived from the above data is presented in Figure 6.

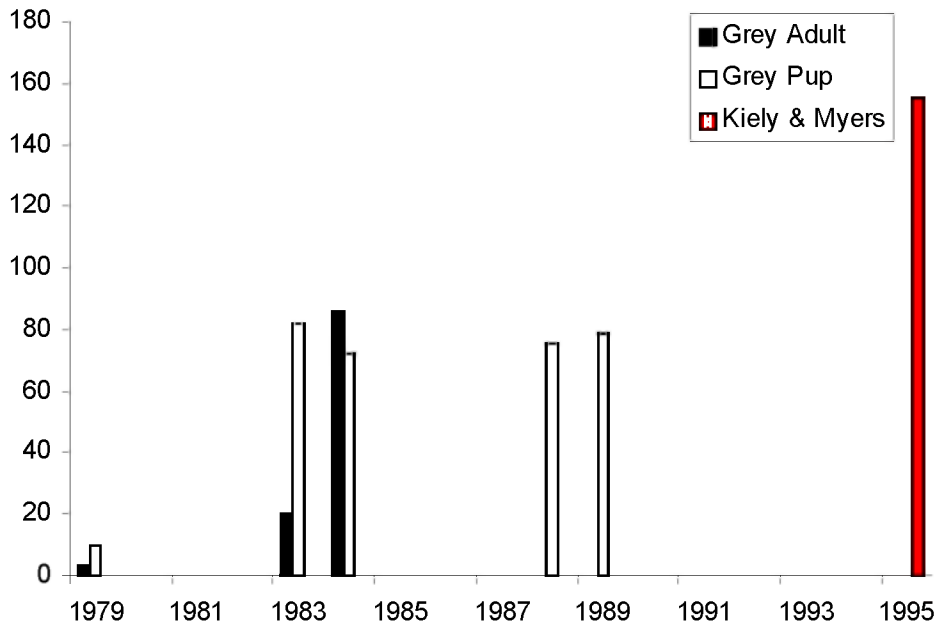


Figure 5. Total population counts for grey seal surveys on the Blasket Islands from 1979 to 1989 including data collected by Kiely & Myers (1998) for grey seal pup production during the reproductive season of 1995/1996

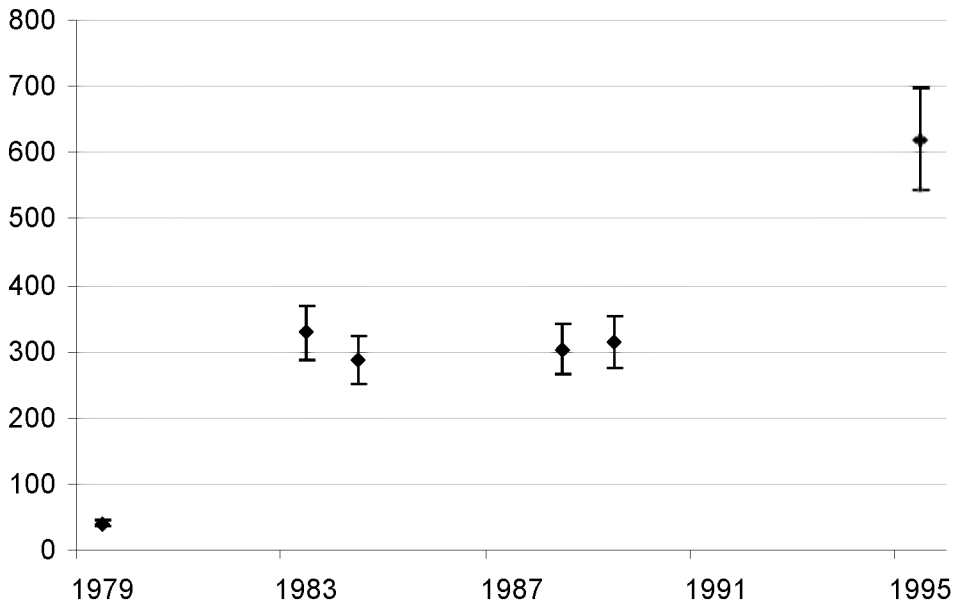


Figure 6. Population estimates derived from grey seal pup counts made on the Blasket Island Group including data from NPWS and Kiely & Myers (1998). The range of population estimates are presented by means of error bars

A number of other sites reported numbers of grey seals including: Roaringwater Bay (Co Cork), Mutton Island (Co Clare), Inishboffin, Inishgort, Slyne Head (Co Galway), Benwee Head, Killala Bay (Co Mayo), Ballysadare Bay (Co Sligo), Gweebarra Bay, Inishtrahull & Tor Rocks, Roonagh Point and Slieve Tooley (Co Donegal) (see Appendix I & II).

Common seals were generally found in relatively sheltered areas and were often counted from land. Due to the relative ease of counting from land there was a greater and more consistent sampling effort than for grey seals. However, it should be noted that the mottled colour of seals in general makes counting difficult against a rocky shore background. The greatest sampling effort was reported for Bantry Bay, County Cork where from 1978 to 2003 there were 251 observations of common seals. The population has increased since 1978 and with a maximum of 403 adult common seals recorded in 2003 (Figure 7). A number of geographically separate sites within the Bay consistently reported common seals (Figure 8). The greatest proportion of the increase in the Bantry Bay population was attributable to the Glengarriff Harbour (GH) population.

Although there has been a substantial sampling effort in Kenmare River, County Kerry, the bulk of effort has been recent (Figure 9). The population of seals by land and boat based operations peaked at 218 but an estimate of 386 was derived from the same area using aerial infra-red techniques (Cronin *et al.* 2004). There was a notable shift in haul-out sites during the course of this survey period. The most important sub-habitats in this area for common seals were Templenoe and Sneem areas (Figure 10).

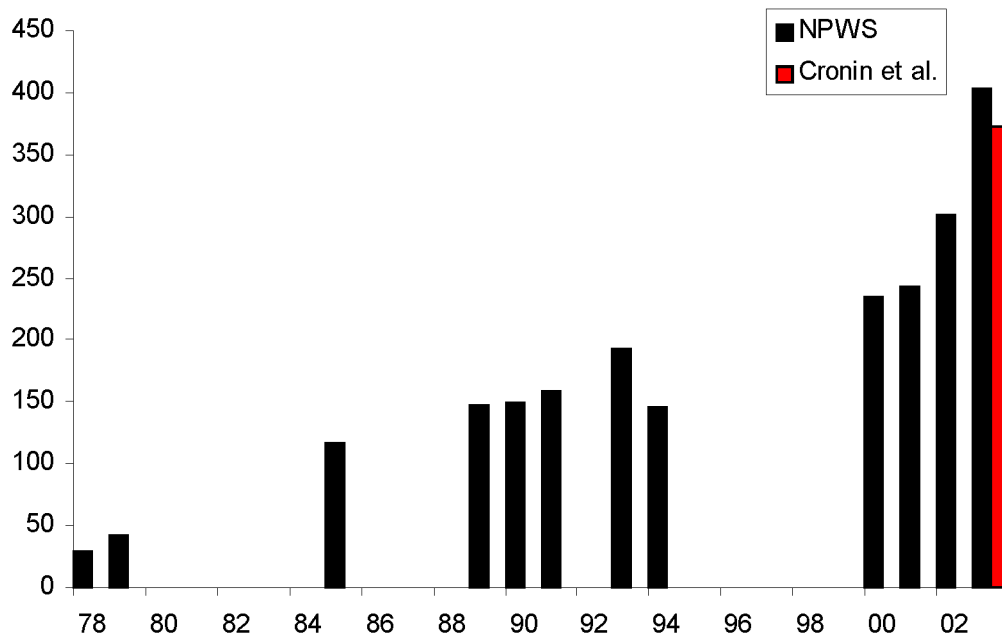


Figure 7. Annual peak counts of the common seal population derived from surveys within Bantry Bay, County Cork from 1978 (Obs. = 251) and including the 2003 national aerial survey (Cronin *et al.*, 2004)

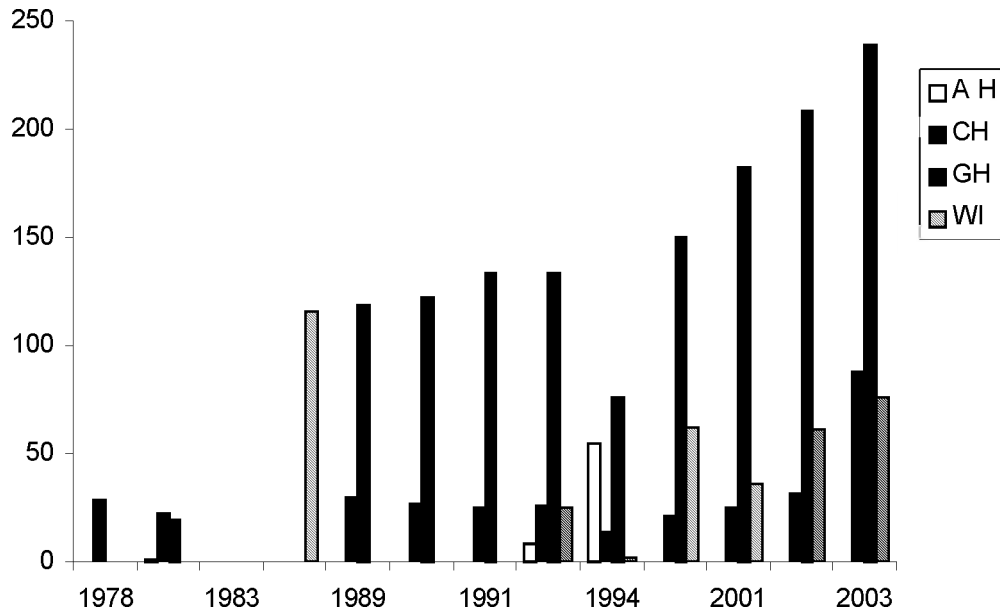


Figure 8. Common seal numbers counted at sites within Bantry Bay (AH, Adrigole Harbour; CH, Coolieragh Harbour & Garnish West; GH, Glengarriff Harbour; WI, Whiddy Island Complex).

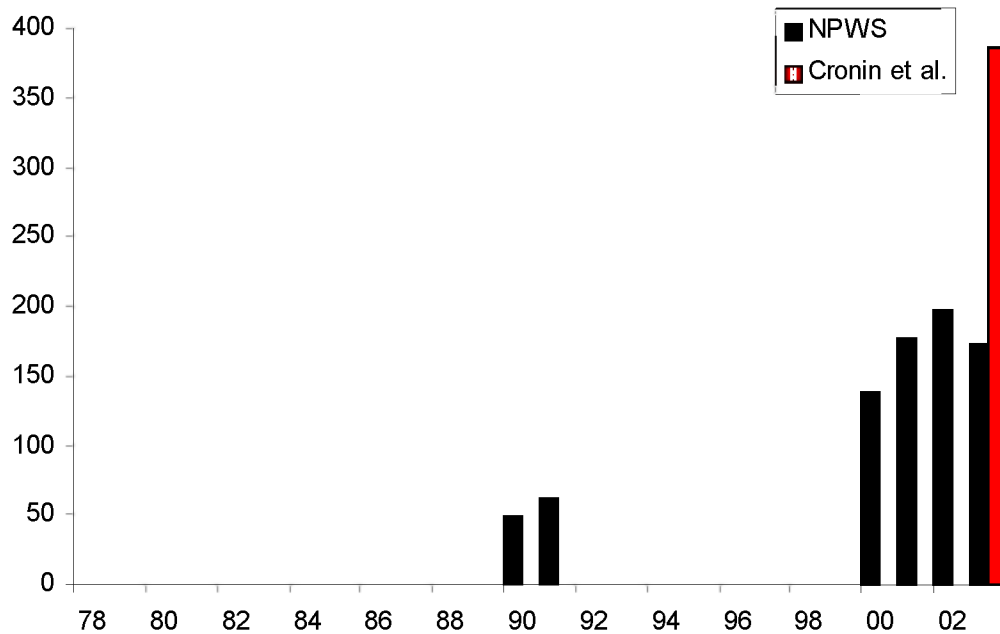


Figure 9. Annual population estimates derived from surveys of common seals undertaken with Kenmare River from 1990 (Obs. = 168) and including the recent aerial survey in 2003 (Cronin et al., 2004).

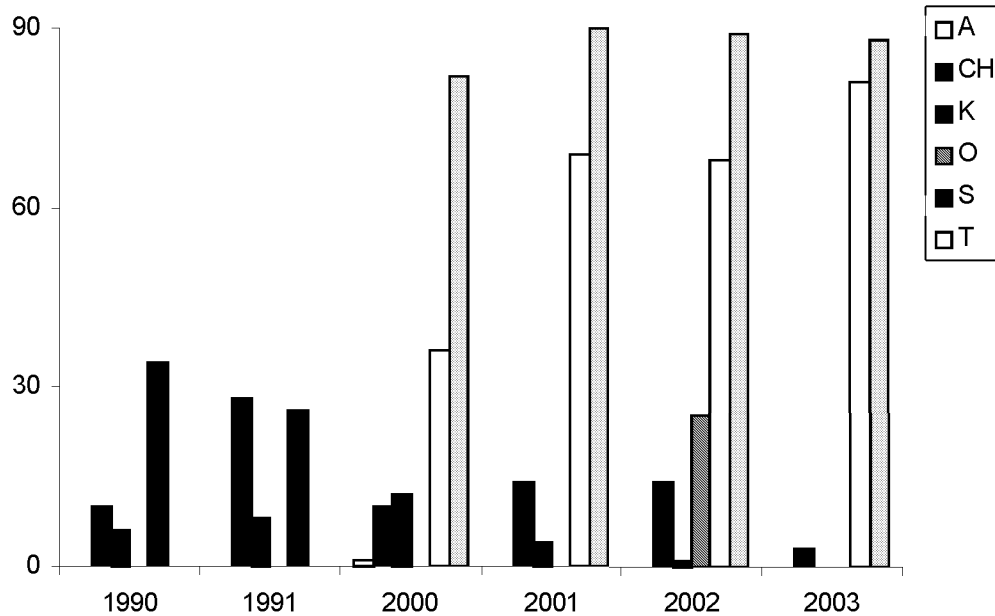


Figure 10. Annual common seal surveys undertaken at a number of sites within Kenmare River (A, Ardgroom; CH, Coongar Harbour; K, Killmackilloge; O, Ormonds; S, Sneem and T, Tempenoe)

Surveys in Galway Bay were spread over a wide geographical area and hence although there was a lot of sampling effort in the area whole Bay estimates were not available for many years (Figure 11). The last population estimate for Galway Bay, in 1990 and 1991, calculated between 300 and 400 common seals. The recent aerial survey estimates an inner Galway Bay population of 217 common seals. However, by analysis of three sites that were regularly surveyed since 1978 (Figure 12) it seems that there was a greater degree of population flux in inner Galway Bay than in other coastal areas.

Killala Bay, County Mayo was surveyed on a number of occasions since 1978. Recent surveys showed that there was a major increase in the population since the original surveys. However, a more consistent sampling effort must be undertaken to estimate populations before this current population estimate may be adopted as reflecting a resident population of common seals (Figure 13). Although there has been relatively few observations (Obs. = 32) made within Sligo Bay (Figure 14) they have been undertaken on a regular annual basis since 1978. This site has reported the most stable population and little flux has occurred since initial sampling.

County Donegal supports large populations of common seals but since surveys were carried out over a wide range of sites and at different times of year it is not possible to estimate annual populations of seals within the area. The site that has been most regularly surveyed in the Donegal area was Rooney's Island in Inner Donegal Bay. However, although the results presented are only for recent surveys it appears that the population in this area has been increasing (Figure 15). The peak population was 179 during August 2003.

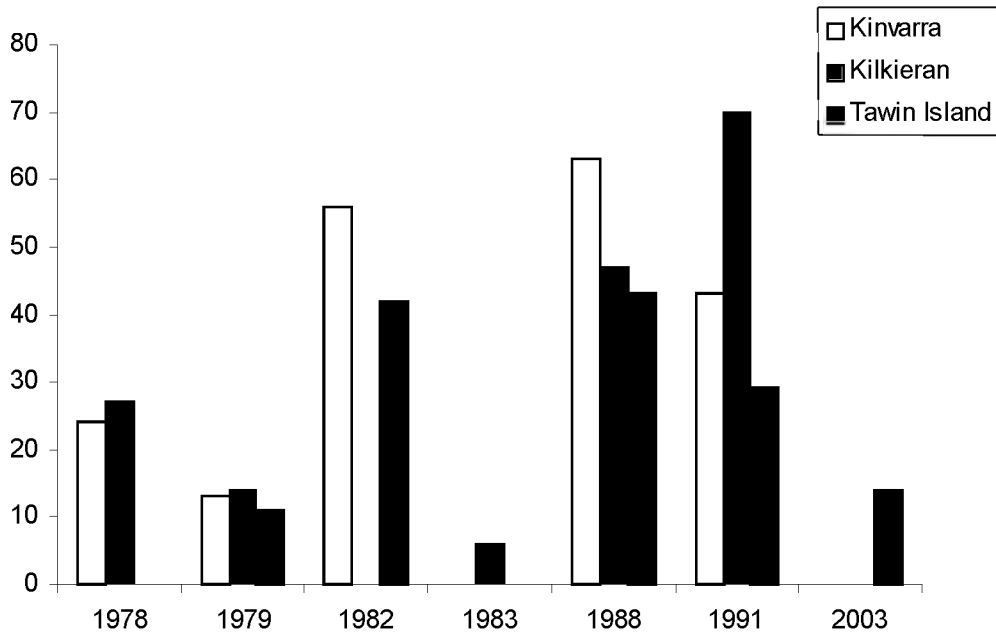


Figure 11. Common seal population estimates for inner Galway Bay from 1978 (Obs. = 192) including the aerial survey in 2003 (Cronin et al., 2004)

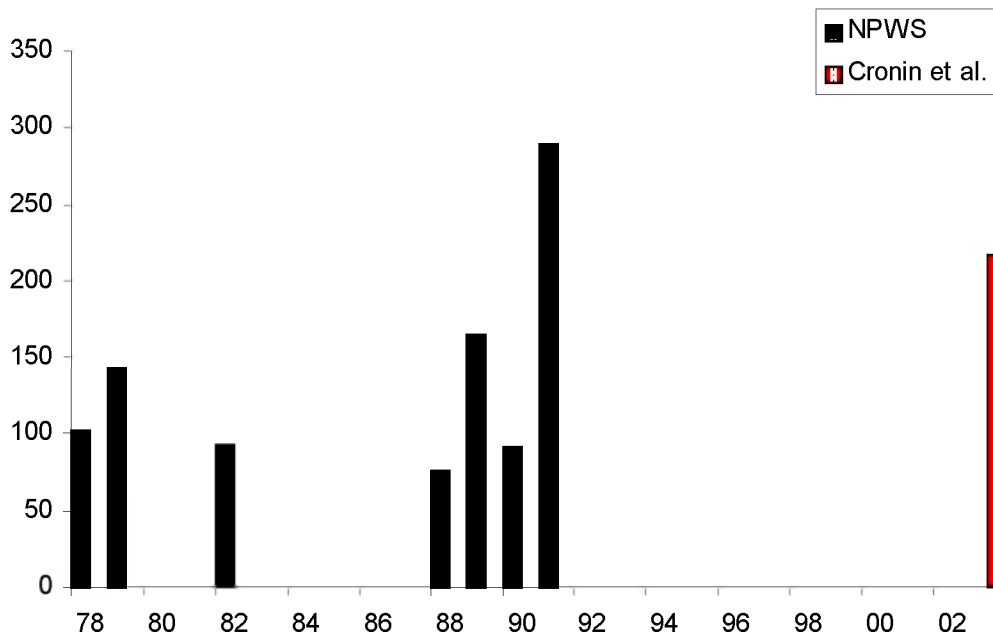


Figure 12. Common seal counts undertaken by NPWS staff at three sample sites in Galway Bay since 1978

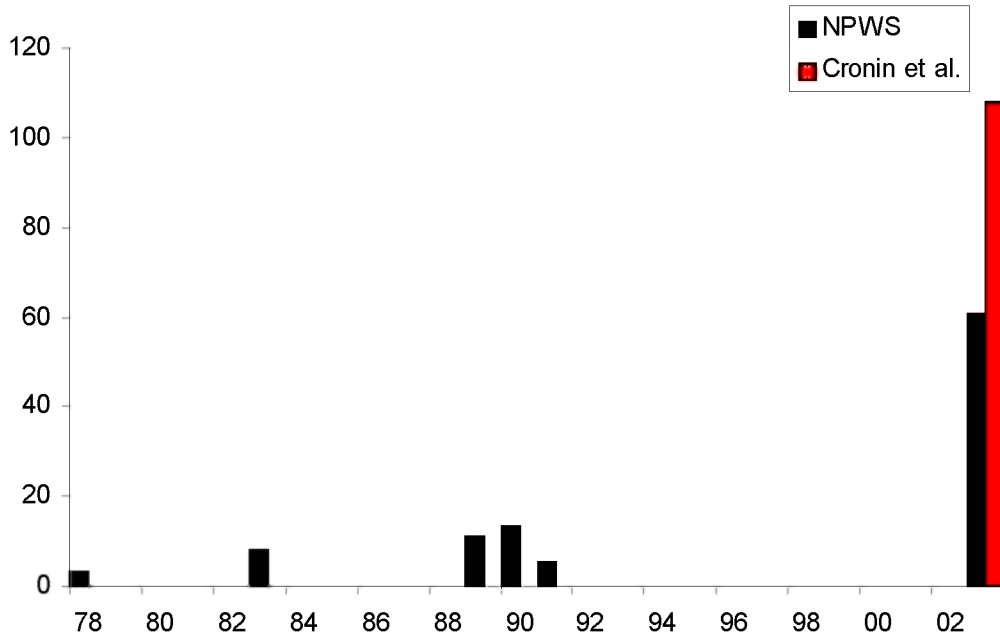


Figure 13. Annual population estimates of common seal derived from counts within Killala Bay, Co. Mayo from 1978 (Obs. = 54) including the aerial survey of 2003 (Cronin et al. 2004)

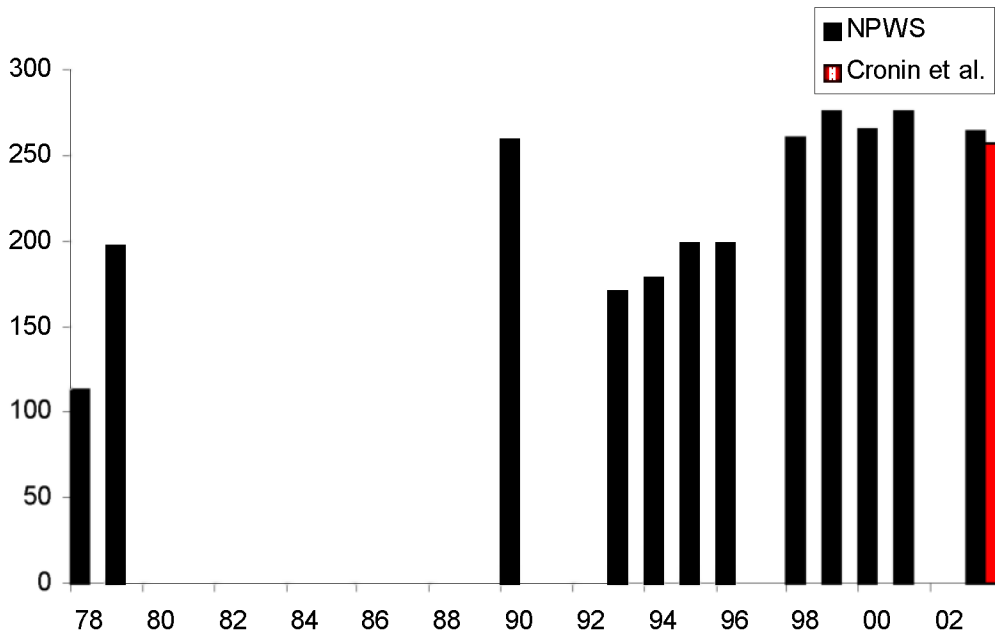


Figure 14. Annual population estimates for common seal derived from surveys undertaken within Sligo Bay, comprising both Ballysadare and Drumcliff Bays (Obs. = 32), from 1978 including the aerial survey of 2003 (Cronin et al., 2004)

By reference to the sampling effort undertaken, over a relatively short period of time, there is a degree of seasonal fluctuation in population estimates reported for Rooney's Island, Inner Donegal Bay. Very few haul-out sites have been sampled on a seasonal basis by NPWS staff. However, Tawin Island, within Galway Bay, has been surveyed in all months over the course of several years (Figure 16). The peak count of seals at this site was 128 in December 1988; however, the most recent ground counts showed the population peaking at 22 seals in June 2003. An aerial survey in August 2003 did not find any common seals at this site (Cronin *et al.*, 2004). Successive sampling (Obs. = 53) of this site clearly showed that greatest numbers of seals are hauled out at this site in the winter. This site in particular shows that there may be seasonal fidelity to some sites whilst others may have circ-annual importance.

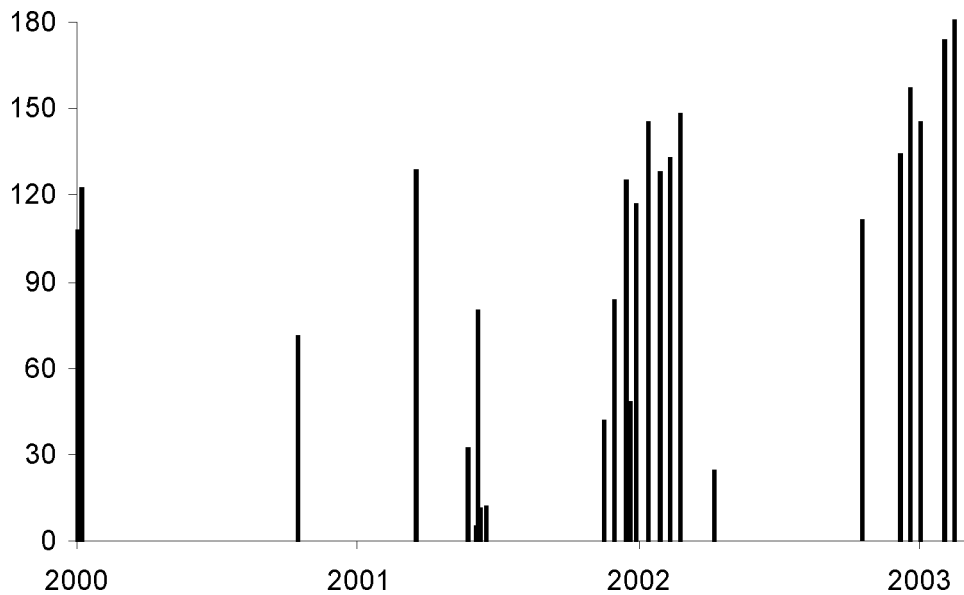


Figure 15. Common seal population surveys undertaken at Rooney's Island, Inner Donegal Bay

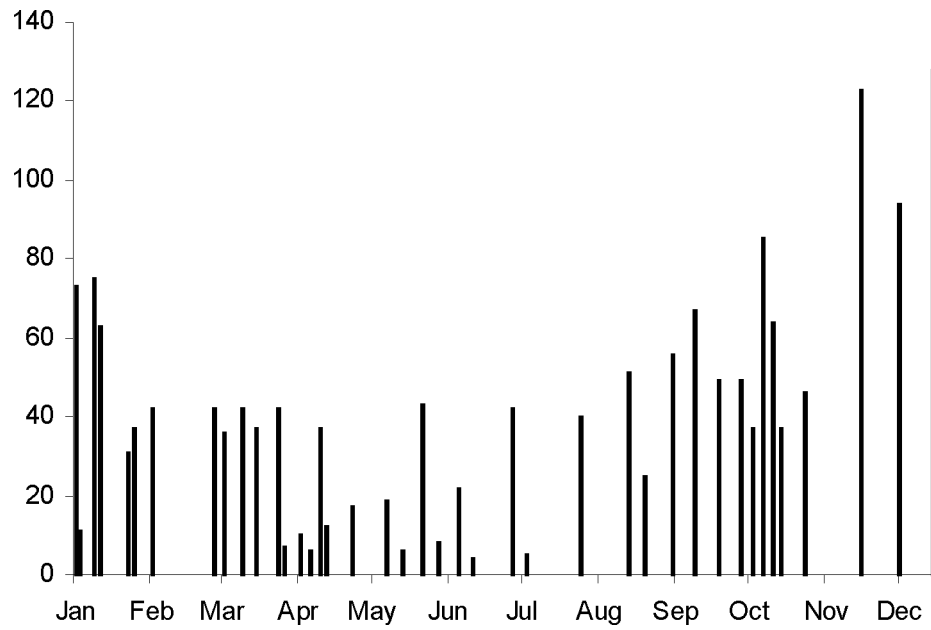


Figure 16. Pooled samples illustrating monthly variation in common seal counts within 53 observations made at Tawin Island, Galway Bay during 1979, 1982, 1983, 1988, 1991 and 2003.

5. Discussion

Seal surveys were undertaken by National Parks & Wildlife Service (then Forest & Wildlife Service) initially as a response to a demand for culls in the population due to concerns among fishermen about the impact of seals on the salmon drift net industry (Summers, 1983). The protected status of seals, through initially the 1976 Wildlife Act, meant that sanction for any seal cull then lay with the Minister for Fisheries, Forestry & Wildlife. Data were collected to inform a decision leading to this possible cull. Common seal populations in Ireland were counted in 1978 and 1979 (Summers *et al.*, 1980). Each census produced national population estimates of between 600 and 700 animals. Annual pup production was found to be around 120.

Grey seal populations in Ireland were counted from the air in 1979. A national population estimate of 266 animals was produced (Patrick Warner, pers. comm.). It was also noted that seals suffer high natural mortality from storms, disease and accident, particularly in the juvenile stages. At the time, numbers of seals were being shot and clubbed by fishermen, particularly grey seals on offshore islands. At the Inishkea Islands in 1979 at least 34 adults and 33 pups were killed. Another cull was documented as killing 121 pups and 16 adults during 1981 (Summers, 1983). This study thus considered that both species were at a dangerously low population level and that if external human pressures continued that either or both species would become extinct in Irish waters. Indeed, Summers (1983) stated that “the Irish grey seal breeding stock is small by any international standard and it would be ecologically unjustifiable to cull breeding sites”. It was also noted that even if the entire resident population of grey seals was culled that migrant seals from the Hebrides would disperse into Irish waters during the salmon fishing season and therefore the perceived problem of competition with grey seals would still exist. From this body of survey effort and scientific consideration it was obvious that a cull could not be justified. Following from this initial conservation threat a substantial effort was made by both current and former NPWS staff to continue to monitor the status of seal populations around the coast.

The EU Habitats Directive (92/43/EEC) aims to protect the natural heritage of the European Community through the designation, management and monitoring of important habitats and species. Both grey and common seals are listed as Annex II species, under this Directive, and consequently required the protection and monitoring of significant populations identified in Irish waters. The requirements of the EU Habitats Directive have shaped and directed the surveys of seals since it was signed into Irish law in 1997. Many of the sites around the Irish coasts supporting large numbers of grey and common seals have been designated as protected habitats or Special Areas of Conservation (SAC) (Appendix II). All designated common or grey seal habitats have been shown to consistently report large numbers of seals hauled out either throughout the year or in specific seasons. In most cases SACs that are designated for seals also have either marine habitats or species that concurrently warrant protection. Therefore, seals are often listed as one of a number of qualifying interests for the designation of a specific area of high conservation value. The protection afforded to seals requires that any development or activity that is likely to effect disturbance, unless previously licensed by another authority, requires the permission of the Minister of the Environment, Heritage and Local Government. The

Habitats Directive also requires the monitoring of populations of seals and their associated habitats in SACs subsequent to designation.

The largest grey seal colony in Ireland is found on the Inishkea Island group (Map 1). Therefore, this group of islands was surveyed on an almost annual basis from 1982 to 1995. The population of grey seals at this island group has shown dramatic fluctuations since the first surveys were undertaken (Figure 4). The population shows peaks in 1986 and 2002, and the 2002 all-age population estimate of between 1050-1350 is the largest since surveys began in the late 1970s. However, it appears from extensive survey work that fluxes in population are a feature of this site, therefore, regular monitoring is essential to track trends. Smaller numbers of seals were found on the Blasket Islands during the surveys in 1979, 1983, 1984, 1988 and 1989 than on the Inishkeas. The last published survey (during 1996) showed that the population had increased from that of the 1980s (Kiely & Myers, 1998). A more recent survey conducted during 2003 will provide current estimates of population status at the Blasket Islands (Cronin, *in preparation*). Whilst NPWS surveys have concentrated on the Inishkeas and Basketts, a number of other important populations are found on the Irish Coast (see Appendix I). However, it is notable that most sampling effort has been undertaken upon the west coast. A recent study on the Irish and Celtic Seas (Kiely *et al.* 2000) has shown that there are some relatively large populations that have remained to a large extent outside of NPWS sampling effort. The most important in order of grey seal abundance and all-age estimates calculated concurrently during surveys by Kiely *et al.* (2000) during 1997 and 1998 were:

The Saltees (78.9 ± 9.2 (SE)) (Co. Wexford)
 Raven Point (75.6 ± 7.2 (SE)) (Co. Wexford)
 Lambay Island (53.0 ± 4.0 (SE)) (Co. Dublin)
 Skerries Islands (28.2 ± 3.7 (SE)) (Co. Dublin)
 Blackrock (24.5 ± 3.9 (SE)) (Co. Wexford)
 Carnsore Point (12.2 ± 3.1 (SE)) (Co. Wexford)
 Rockabill (9.7 ± 3.9 (SE)) (Co. Dublin)
 Ireland's Eye (9.3 ± 2.7 (SE)) (Co. Dublin).

Surveys for common seals have been more regularly conducted by NPWS than for grey seals. Subsequent to the national surveys, localised surveys were undertaken mainly in the Galway Bay area from 1982 to 1989. The national censuses of 1989 and 1990 for common seals were designed primarily to determine any significant changes from populations observed in 1978 and 1979. Further to this it was hoped that a baseline seal census and estimate of production would be achieved by close monitoring of two populations (Rooney's Island, Donegal Bay and Glengarriff Harbour) during all spring-tides until October with the view to gaining detailed information on numbers of both adults and yearlings (Harrington, 1990).

It was also considered important to monitor the health of seals with specific regard to phocine distemper virus (PDV), which first became prevalent during 1988 (this disease killed approximately 17,000 seals in the North Sea). In the northern Irish Sea, PDV first spread to common seal colonies in Northern Ireland, in particular Strangford Lough, in August 1988 (Kennedy *et al.* 1988). An approximate total of 250 seals died as a result of PDV infection in Northern Ireland (Northridge *et al.*, 1990). PDV seems not to have impacted on the Irish Republic's population of seals;

only 6 were positively identified as having died from the disease. When other European populations experienced a 70% reduction in common seals, Ireland reported an approximately two-fold increase in the population of common seals from those observed in the late 1970s, the national population of common seals at this time was estimated at about 3000 (Harrington, 1990). However, the disease still poses a potential threat to both common and grey seals (Jane Gilleran, pers. comm.).

Due to health and safety requirements the number of boat based surveys that could be undertaken by NPWS staff were limited during a substantial period in the 1990s. However, in some sites where land-based observations could be made there was a continued effort. Following transposition of the European Habitats Directive into Irish law in 1997, an increase in effort has been made at most sites. Most of these surveys have focussed on specific bays and have not been co-ordinated on a national basis.

The most recent national survey for common seals was undertaken in 2003. This was the first survey in the Irish Republic to use infra-red imaging from a helicopter. However, the Environment and Heritage Service (EHS) of Northern Ireland undertook a similar study in 2002. A minimum population estimate for common seals in the Republic of Ireland was 2905. This is broadly comparable to the figure of approximately 3000 derived from the 1989 / 90 survey (Harrington, 1990). However, there has been a shift in some populations, and the population in the South West of Ireland, particularly those in Kenmare River and inner Bantry Bay are now considered the most important. An All-Ireland estimate of the total population of common seals, calculated from surveys undertaken in 2002 and 2003 using both the same methods and time of year was calculated as 4153. However, inferences as to current population trend can not be made since prior effort has been less comprehensive. Therefore, the combined 2002 / 03 surveys may be viewed as a base-line survey from which future surveys of a similar design may be compared. However, it is likely that the population of common seals has approximately remained stable since the 1989 / 90 survey.

The timing of surveys for both grey and common seals were closely linked to the reproductive cycle. In Ireland most births of grey seals occur from mid-September to November and pups spend approximately three weeks nursing on land prior to taking to water (Kiely & Myers, 1998). A life history table for grey seals developed by Hewer (1964) and later modified by Harwood & Prime (1987) allows an all-age population estimate to be calculated from the total pup production. In this method, multipliers of 3.5 to 4.5, which account for variations in growth rate, juvenile and adult survival, and adult fecundity between populations, were applied to the total pup production estimates from surveys. Therefore, in focussed grey seal surveys most sampling was consequently undertaken during the autumn months (Figure 2) to assess both adult populations and annual production concurrently. However, incidental observations of adult grey seals, outside of these times, will tend to greatly underestimate the population at a site. About two-thirds of grey seals time is spent at sea (BIM, 2001), therefore counts of grey seals should continue to be focussed on autumn months when greatest numbers congregate around reproductive activity.

For common seals the timing of counts was centred on or shortly after the pupping and moulting season *i.e.* during July and August. Common seal pups are well developed at birth (Hayden & Harrington, 2001) and consequently take to water relatively quickly. However, the proportion of common seals likely to be counted at

haul out sites has been estimated to be approximately 50-75% of the total population (Thompson & Harwood, 1990). Surveys at some sites have been undertaken on a wider temporal scale, particularly Rooney's Island, Donegal Bay and some sites in Galway Bay. These surveys show that summer surveys tend to underestimate the number of common seals utilising a haul-out site (Figures 15 & 16). It is clear from these study sites that there is a temporal flux in utilisation. Most studies have shown that maximum numbers of common seals will be counted at haul-out sites during July and August. However, the aspect of a site may make it more favourable during particular seasons and hence wider temporal scale monitoring is required to properly assess the resident population of common seals at a site. From these two study sites it may be suggested that at times the true population of seals will be underestimated by a once-off survey. Nonetheless, it is likely that sampling that has been consistently performed within the same broad temporal window would offer an indication of population trends.

6. Conclusions

- Recent surveys for both grey and common seals have shown that both populations are estimated to have increased since surveys began in the late 1970s.
- The nationally largest grey seal colony, on the Inishkea Islands, Co. Mayo, showed substantial fluctuations over 24 years.
- Surveys for grey seals should continue to be undertaken on a regular basis at both key populations on the Inishkeas Islands Group and Blasket Islands.
- Further survey work is required for populations at other locations particularly those on the east and south-east coast.
- Common seal populations increased in some locations in the 1990s but there is no evidence of a national population increase in the most recent 2003 aerial survey.
- The timing and methodology of surveys has important implications for the use and validity of estimates undertaken for both species.
- Sites that have not been recently been surveyed by NPWS should be re-surveyed to assess the current populations.
- Sites that have been surveyed consistently since the late 1970s should continue to be surveyed as a long-term monitoring tool for assessment of both the status of seal populations and general habitat quality.

Bibliography

- Anderson, S.A., Burton, R.W. and Summers, C.F. (1975). Behaviour of grey seals (*Halichoerus grypus*) during the breeding season at North Rona. *Journal of Zoology* **177**: 179-195.
- Anderson, S.A. and Fedak, M.A. (1987). Grey seal, *Halichoerus grypus*, energetics: females invest more in male offspring. *Journal of Zoology* **211**: 667-679.
- Baines, M.E., Earl, S.J., Pierpoint, C.J.L. and Poole, J. (1995). The West Wales Grey Seal census. *Report to Countryside Council of Wales* (CCW contract science report 131). Dyfed Wildlife Trust: Haverfordwest, UK.
- B.I.M. (1997). The physical interaction between grey seals and fishing gear. *Report to the European Commission, DG XIV. Reference PEM/93/06*. Bord Iascaigh Mhara: Dublin.
- B.I.M. (2001). Grey seal interactions with fisheries in Irish coastal waters. *Report to the European Commission, DG XIV. Study 95/40*. Bord Iascaigh Mhara: Dublin.
- Bonner, W.N. (1972). The grey seal and common seal in European waters. *Oceanographical and Marine Biological Review* **10**: 461-507.
- Bonner, W.N. (1982). The status of seals in the United Kingdom. in: *Mammals in the Seas*, Volume IV: small cetaceans, seals, sirenians and otters. *FAO Fisheries Series* **5(IV)**: 253-265.
- Boness, D.J. and James, H. (1979). Reproductive behaviour of the grey seal (*Halichoerus grypus*) on Sable Island, Nova Scotia. *Journal of Zoology* **188**: 477-500.
- Boyd, J.M. and Campbell, R.N. (1971). The grey seal (*Halichoerus grypus*) at North Rona, 1959-1968. *Journal of Zoology* **164**: 469-512.
- Coulson, J.C. and Hickling, G. (1960). The grey seals of the Farne Islands, 1958 to 1959. *Transactions of the Natural History Society of Northumberland* **13**: 151-178.
- Coulson, J.C. and Hickling, G. (1964). The breeding biology of the grey seal *Halichoerus grypus* (Fabricus), on the Farne Islands, Northumberland. *Journal of Animal Ecology* **33**: 485-512.
- Cronin, M., Duck, C., Ó Cadhla, O., Nairn, R., Strong, D. & O' Keeffe, C. (2004). Harbour seal population assessment in the Republic of Ireland: August 2003. *Irish Wildlife Manual* No. 11 National Parks & Wildlife Service, Department of Environment, Heritage and Local Government. Dublin, Ireland.
- De Swart, R.L., Ross, P.S., Vedder, L.J. and Timmerman, H.H. (1994). Impairment of immune function in harbour seals (*Phoca vitulina*) feeding on fish from polluted waters. *Ambio* **23**: 155-159.

- Domingo, M., Ferrer, L., Pumarola, M., Marco, A., Plana, J., Kennedy, S., McAliskey, M. and Rima, B.K. (1990). Morbillivirus in dolphins. *Nature* **348**: 21.
- Fedak, M.A. and Anderson, S.S. (1982). The energetics of lactation: accurate measurements from a large wild mammal, the grey seal (*Halichoerus grypus*). *Journal of Zoology* **198**: 473-479.
- Fogden, S.C.L. (1971). Mother-young behaviour at grey seal breeding beaches. *Journal of Zoology* **164**: 61-92.
- Harris, S., Morris, P., Wray, S. and Yalden, D. (1995). *A Review of British Mammals*. Joint Nature Conservation Committee, Peterborough, UK.
- Harrington, R. (1990). 1989 survey of breeding herds of common seal *Phoca vitulina* with reference to previous surveys. *Unpublished report, National Parks & Wildlife Service*, Dublin.
- Harwood, J. and Prime, J.H. (1978). Some factors affecting the size of British grey seal populations. *Journal of Applied Ecology* **15**: 401-411.
- Hayden, T. and Harrington, R. (2001). *Exploring Irish Mammals*. Town House Press.
- Hewer, H.R. (1964). The determination of age, sexual maturity, longevity and a life-table in grey seal (*Halichoerus grypus*). *Proceedings of the Zoological Society* **142** (4): 593-624.
- Hiby, L., Duck, C., Hall, A. and Harwood, J. (1996). Seal stocks in Great Britain. *NERC News*, January.
- Kennedy, S., Smyth, J.A., McCullough, S.J., Allan, G.M., McNeilly, F. and McQuaid, S. (1988). Confirmation of the cause of recent seal deaths. *Nature* **335**: 404.
- Kiely, O. and Myers, A.A. (1998). Grey seal (*Halichoerus grypus*) pup production at the Inishkea Island Group, Co. Mayo, and the Blasket Islands, Co Kerry. *Biology and Environment: Proceedings of the Royal Irish Academy* **98B** (2): 113-122.
- Kiely, O., Lidgard, D., McKibben, M., Connolly, N. and Baines, M. (2000). Grey seals: status and monitoring in the Irish and Celtic Seas. *Maritime Ireland/Wales INTERREG Report No. 3*. 76pp.
- Kovacs, K.M. (1987). Maternal behaviour and early behavioural ontogeny of grey seals (*Halichoerus grypus*) on the Isle of May, UK. *Journal of Zoology* **213**: 697-715.
- Kovacs, K.M. and Lavigne, D.M. (1986). Growth of the grey seal (*Halichoerus grypus*) neonates: differential maternal investment in the sexes. *Canadian Journal of Zoology* **64**: 1937-1943.
- Lockley, R.M. (1966). The distribution of grey and common seals on the coasts of Ireland. *Irish Naturalists' Journal* **15**: 136-143.

Morizur, Y, Berrow, S.D., Tregenza, N.G.C, Couperus, A.S. and Pouvreau, S. (1999). Incidental catches of marine mammals in pelagic trawl fisheries of the northeast Atlantic. *Fisheries Research* **41**: 297-307.

Northridge, S.P., Tasker, M.L., Webb, A. and William, J.M. (1995). Distribution and relative abundance of harbour porpoises (*Phocoena phocoena* L.), white beaked dolphins (*Lagenorhynchus albirostris* Gray) and minke whales (*Balaenoptera acutorostrata* Lacapede) around the British Isles. *ICES Journal of Marine Science* **52**: 55-66.

Ó'Cadhlá, O and Strong, D. (2002). Grey seal population status at islands in the Inishkea Group, as determined from breeding ground surveys in 2002. *Unpublished report to Dúchas, the Heritage Service.*

O'Gorman, F. (1963). Breeding stations of the grey seal in Ireland. *Bulletin of the Mammal Society of the British Isles* **20**: 15.

Pomeroy, P.P., Anderson, S.S., Twiss, S.D. and McConnell, B.J. (1994). Dispersion and site fidelity of breeding female grey seals (*Halichoerus grypus*) on North Rona, Scotland. *Journal of Zoology* **233**: 429-447.

Radford, P.J., Summers, C.F. and Young, K.M. (1978). A statistical procedure for estimating grey seal pup production from a single census. *Mammalian Review* **8(1-2)**: 35-42.

Smiddy, P. (1998). The status of the common seal in east Cork and Waterford. *Irish Naturalists' Journal* **26**: 108-109.

Sørmo, E.G., Skaare, J.U., Lydersen, C., Kovacs, K.M., Hammill, M.O. and Jensen, B.M. (2003a). Partitioning of persistent organic chemicals in grey seal (*Halichoerus grypus*) mother-pup pairs. *The Science of the Total Environment* **302**: 145-155.

Sørmo, E.G., Skaare, J.U., Jüssi, I., Jüssi, M. and Jensen, B.M. (2003b). Polychlorinated biphenyls and organochlorine pesticides in Baltic and Atlantic grey seal (*Halichoerus grypus*) pups. *Environmental Toxicology and Chemistry* **22(11)**: 2789-2799.

Stone, C.J. (2003). The effects of seismic activity on marine mammals in UK waters, 1998-2000. *JNCC Report 323*. Joint Nature Conservation Committee, Peterborough, UK.

Summers, C.F. (1980). The grey seal, *Halichoerus grypus*, in north-west Ireland. *Unpublished report to the Minister for Fisheries, Forestry & Wildlife.*

Summers, C. F. (1983). The grey seal, *Halichoerus grypus*, in Ireland. *Unpublished report to the Minister for Fisheries, Forestry and Wildlife.*

Summers, C.F., Warner, P.J., Nairn, R.G.W. Curry, M.G. and Flynn, J. (1980). An assessment of the status of the common seal *Phoca vitulina* in Ireland. *Biological Conservation* **17**: 115-123

Thompson, P.M. and Harwood, J. (1990). Methods for estimating the population size of common seals *Phoca vitulina*. *Journal of Applied Ecology* **27**: 924-938.

Ward, A.J., Thompson, D. and Hiby, A.R. (1987). Census techniques for grey seal populations. *Symposia Zoologica* **58**: 181-191.

Warner, P.J. (1983). An assessment of the breeding populations of common seals *Phoca vitulina* L. in the Republic of Ireland in 1979. *Irish Naturalists' Journal* **21**: 24-26.

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Appendix I

Data sets for all sample sites, dates and counts for common and grey seals for locations around the Irish Coast from 1978 to 2003. Italicised numbers represent second counts of the same population; dashes indicate a null count.

Table 3 Grey seal surveys on the Inishkea Island group undertaken by NPWS from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Grey Seal</i>	<i>Grey Pup</i>	<i>Pup development</i>	
Carrigmoylenacurhoga (<i>Carraig Mhaol na nCorróg</i>)	11 th Oct 79	13	25	-	
	2 nd Oct 84	1	-	-	
	15 th Oct 84	5	-	-	
	1 st Aug 86	40	1	-	
	26 th Jul 87	120	3	-	
	26 th Sep 87	120	3	-	
	15 th Sep 88	-	160	-	
	8 th Sep 89	73	22	-	
	29 th Sep 89	48	-	-	
	10 th Sep 90	-	43	-	
	25 th Sep 90	70	2	-	
	9 th Sep 91	-	27	-	
	Carrickawilt (<i>Carraig an Mhoilt</i>)	28 th Oct 79	15	2	I
		"	-	6	II
"		-	6	III	
"		-	-	IV	
"		-	3	V	
4 th Oct 80		-	11	I	
"		-	28	II	
"		-	13	III	
"		-	5	IV	
"		-	5	V	
23 rd Oct 80		-	4	I	
"		-	19	II	
"		-	13	III	
"		-	8	IV	
"		-	29	V	
4 th Oct 82		-	6	I	
"		-	12	II	
"		-	13	III	
"		-	24	IV	
"		-	5	V	
"		-	66	-	
15 th Oct 82		-	60	-	
30 th Sep 83		-	10	-	
3 rd Oct 83	-	4	I		
"	-	9	II		
"	-	9	III		
"	-	3	IV		
"	-	5	V		
10 th Oct 83	-	1	I		
"	-	9	II		

Table 3 Grey seal surveys on the Inishkea Island group undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Seal</i>	<i>Grey Pup</i>	<i>Pup development</i>
Carrickawilt (<i>Carraig an Mhoilt</i>)	10 th Oct 83	-	11	III
	“	-	6	IV
	“	-	6	V
	20 th Oct 83	-	3	I
	“	-	9	II
	“	-	19	III
	“	-	16	IV
	“	-	27	V
	3 rd Nov 83	-	-	I
	“	-	1	II
	“	-	7	III
	“	-	7	IV
	“	-	14	V
	2 nd Oct 84	-	1	I
	“	-	6	II
	“	-	7	III
	“	-	6	IV
	“	-	3	V
	“	-	23	-
	15 th Oct 84	-	26	-
	“	-	23	-
	1 st Aug 86	25	11	-
	24 th Sep 86	25	11	-
	26 th Jul 87	20	11	-
	26 th Sep 87	20	11	-
	15 th Sep 88	156	1	-
	“	-	1	-
	8 th Sep 89	43	12	-
	29 th Sep 89	67	18	II
	10 th Sep 90	30	1	-
	25 th Sep 90	36	14	-
	9 th Sep 91	-	40	-
	22 nd Sep 92	40	15	-
17 th Sep 93	-	25	-	
22 nd Sep 94	2	-	-	
4 th Oct 94	11	3	-	
5 th Oct 94	-	7	-	
1 st Nov 95	160	1	-	
Carrigea (<i>Carragaigh</i>)	1 st Aug 86	40	1	-
	24 th Sep 86	40	1	-
	26 th Jul 87	-	-	-
	15 th Sep 88	50	-	-
	8 th Sep 89	-	-	-
	29 th Sep 89	-	-	-
	17 th Sep 93	-	52	-
	22 nd Sep 94	33	-	-
	4 th Oct 94	4	2	-
	5 th Oct 94	-	3	-
Coolnaboley	11 th Oct 78	26	-	-

Table 3 Grey seal surveys on the Inishkea Island group undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Seal</i>	<i>Grey Pup</i>	<i>Pup development</i>
Dufforn Rocks	1 st Aug 86	-	-	-
	26 th Jul 87	-	-	-
	15 th Sep 88	-	-	-
	8 th Sep 89	-	-	-
	29 th Sep 89	-	-	-
Duvilaun Group (<i>na Dubhoiléan</i>)	20 th Oct 83	-	14	-
	3 rd Nov 83	-	1	II
	“	-	3	III
	“	-	3	IV
	“	-	12	V
Duvillaun Beg (<i>An Dubhoiléan Beag</i>)	3 rd Nov-83	-	-	I
	2 nd Oct 84	-	-	I
	“	-	1	II
	“	-	6	III
	“	-	7	IV
	“	-	3	V
	“	-	18	-
	15 th Oct 84	-	13	-
	15 th Oct 84	-	13	-
	19 th Oct 85	2	1	III
	1 st Aug 86	3	2	-
	24 th Sep 86	3	2	-
	26 th Jul 87	10	8	-
	26 th Sep 87	10	8	-
	15 th Sep 88	-	5	-
	15 th Sep 88	2	5	-
	8 th Sep 89	3	-	-
	29 th Sep 89	11	5	-
	10 th Sep 90	-	-	-
	25 th Sep 90	7	3	-
	9 th Sep 91	-	-	-
	22 nd Sep 92	16	10	-
	17 th Sep 93	3	2	-
22 nd Sep 94	11	-	-	
4 th Oct 94	7	6	-	
5 th Oct 94	-	37	-	
Duvillaun More (<i>An Dubhoiléan Mór</i>)	3 rd Nov 83	-	-	-
	2 nd Oct 84	-	1	I
	“	-	3	II
	“	-	8	III
	“	-	6	IV
	“	-	7	V
	“	-	28	-
	15 th Oct 84	-	48	-
	15 th Oct 84	-	46	-
	19 th Oct 85	13	4	-
	1 st Aug 86	74	37	-
	24 th Sep 86	74	37	-
	26 th Jul 87	36	41	-
	26 th Sep 87	36	41	IV
	15 th Sep 88	30	23	-
	“	30	23	-

Table 3 Grey seal surveys on the Inishkea Island group undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Seal</i>	<i>Grey Pup</i>	<i>Pup development</i>
Duvillaun Mor* (<i>An Dubhoileán Mór</i>)	8 th Sep 89	17	-	-
	29 th Sep 89	73	31	I
	10 th Sep 90	36	17	-
	25 th Sep 90	54	35	-
	9 th Sep 91	3	11	-
	22 nd Sep 92	34	32	-
	17 th Sep 93	29	8	-
	22 nd Sep 94	37	-	-
	4 th Oct 94	58	51	-
	5 th Oct 94	-	6	-
	1 st Nov 95	30	23	-
Inisderry	8 th Sep 88	21	-	-
Inisglora	11 th Oct 79	-	-	-
	30 th Sep 83	-	1	-
	3 rd Oct 83	2	1	II
	2 nd Oct 84	-	-	-
	1 st Aug 86	-	-	-
	26 th Jul 87	-	-	-
	15 th Sep 88	8	-	-
	8 th Sep 89	2	-	-
	29 th Sep 89	-	-	-
	1 st Nov 95	8	-	-
	Inishkea North (<i>Inis Gé Thuaidh</i>)	11 th Oct 79	10	1
28 th Oct 79		8	-	-
4 th Oct 80		-	8	I
“		-	12	II
“		-	3	III
“		-	-	IV
“		-	1	V
23 rd Oct 80		-	6	I
“		-	7	II
“		-	4	III
“		-	7	IV
“		-	15	V
4 th Oct 82		-	15	I
“		-	4	II
“		-	5	III
“		-	3	IV
“		-	-	V
15 th Oct 82		-	5	I
30 th Sep 83		7	-	-
3 rd Oct 83		-	-	I
“		-	4	II
“		-	2	III
“		-	-	IV
“		-	-	V
6 th Oct 83		-	5	I
“		-	17	II
“		-	16	III

Table 3 Grey seal surveys on the Inishkea Island group undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Seal</i>	<i>Grey Pup</i>	<i>Pup development</i>
Inishkea North (<i>Inis Gé Thuaidh</i>)	6 th Oct 83	-	3	IV
	“	-	7	V
	10 th Oct 83	-	2	I
	“	-	1	II
	“	-	4	III
	“	-	2	IV
	20 th Oct 83	-	2	I
	“	-	2	II
	“	-	2	III
	“	-	-	IV
	“	-	5	V
	3 rd Nov 83	47	-	I
	“	-	1	II
	“	-	1	III
	“	-	1	IV
	“	-	5	V
	2 nd Oct 84	-	-	I
	“	-	2	II
	“	-	1	III
	“	-	3	IV
	“	-	1	V
	“	-	7	-
	15 th Oct 84	-	14	-
	15 th Oct 84	-	14	-
	19 th Oct 85	12	29	-
	1 st Aug 86	15	-	-
	26 th Jul 87	10	1	-
	26 th Sep 87	10	1	I
	15 th Sep 88	-	2	-
	15 th Sep 88	2	2	-
	8 th Sep 89	3	-	-
	29 th Sep 89	32	5	I
	10 th Sep 90	-	25	-
25 th Sep 90	9	3	-	
9 th Sep 91	-	-	-	
17 th Sep 93	5	1	-	
22 nd Sep 94	-	-	-	
4 th Oct 94	8	6	-	
5 th Oct 94	-	7	-	
1 st Nov 95	2	2	-	
17 th Nov 03	-	-	-	
Inishkea South (<i>Inis Gé Theas</i>)	15 th Oct 84	-	1	V
	“	-	1	-
	1 st Aug 86	10	-	-
	24 th Sep 86	-	10	-
	26 th Jul 87	-	-	-
	15 th Sep 88	-	-	-
	“	-	-	-
	8 th Sep 89	-	-	-
	29 th Sep 89	-	-	-
	4 th Oct 94	4	2	-
“	-	-	-	

Table 3 Grey seal surveys on the Inishkea Island group undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Seal</i>	<i>Grey Pup</i>	<i>Pup development</i>
Inishkeeragh (Inis Caorach)	11 th Oct 79	-	-	-
	23 rd Oct 80	-	3	I
	“	-	3	II
	“	-	3	III
	“	-	6	IV
	“	-	5	V
	30 th Sep 83	-	6	-
	3 rd Oct 83	36	1	I
	“	-	14	II
	“	-	5	III
	“	-	-	IV
	“	-	2	V
	2 nd Oct 84	-	13	-
	15 th Oct 84	-	12	-
	1 st Aug 86	11	1	-
	26 th Jul 87	27	2	-
	15 th Sep 88	4	-	-
	8 th Sep 89	7	-	-
	29 th Sep 89	-	-	-
	4 th Oct 82	-	8	I
	“	-	-	II
	“	-	3	III
	“	-	4	IV
	“	-	1	V
	“	-	-	-
	15 th Oct 82	-	15	I
	10 th Oct 83	13	3	II
	“	-	2	III
	“	-	2	IV
	“	-	4	V
	20 th Oct 83	-	2	I
	“	-	3	II
	“	-	3	III
	“	-	4	IV
	“	-	8	V
	3 rd Nov 83	-	-	I
	“	-	1	II
	“	-	1	III
	“	-	1	IV
	“	-	3	V
	2 nd Oct 84	-	-	I
	“	-	2	II
	“	-	3	III
	“	-	4	IV
	“	-	2	V
	15 th Oct 84	5	12	
	24 Sep 86	11	1	
	26 Sep 87	27	2	
	15 Sep 88	-	-	
	1 st Nov 95	4	-	

Table 4 Grey seal surveys on the Blasket Islands undertaken by NPWS from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Grey Adult</i>	<i>Grey Pup</i>	<i>Pup development</i>
Beginish Island (<i>Beig Inis</i>)	8 th Oct 79	3	10	-
	11 th Oct 83	-	15	-
	14 th Oct-83	-	8	I
	“	-	6	II
	“	-	4	III
	“	-	11	IV
	“	-	22	V
	22 nd Oct 83	-	4	I
	“	-	5	II
	“	-	9	III
	“	-	4	IV
	“	-	18	V
	10 th Oct 84	55	3	I
	“	-	9	II
	“	-	14	III
	“	-	5	IV
	“	-	13	V
	16 th Sep 88	-	14	I
	“	-	7	II
	“	-	5	III
	“	-	2	IV
	“	-	-	V
	14 th Oct 88	-	3	I
	“	-	19	II
	“	-	24	III
	“	-	16	IV
	“	-	5	V
	6 th Sep 89	-	-	I
	“	-	6	II
	“	-	2	III
	“	-	-	IV
	“	-	-	V
	22 nd Sep 89	-	7	I
	“	-	24	II
	“	-	15	III
	“	-	6	IV
	“	-	1	V
	10 th Oct 89	-	3	I
	“	-	9	II
	“	-	17	III
	“	-	13	IV
	“	-	2	V
	Great Blasket (<i>An Blascaod Mór</i>)	11 th Oct 83	40	2
14 th Oct 83		-	3	I
“		-	5	II
“		-	5	III
“		-	6	IV
“	-	7	V	

Table 4 Grey seal surveys on the Blasket Islands undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Adult</i>	<i>Grey Pup</i>	<i>Pup development</i>	
Great Blasket (<i>An Blascoad Mór</i>)	22 nd Oct 83	-	1	I	
	"	-	2	II	
	"	-	4	III	
	"	-	1	IV	
	"	-	8	V	
	10 th Oct 84	25	-	-	
	"	-	3	I	
	"	-	3	II	
	"	-	9	III	
	"	-	7	IV	
	"	-	3	V	
	16 th Sep 88	-	-	I	
	"	-	1	II	
	"	-	2	III	
	"	-	-	IV	
	"	-	-	V	
	14 th Oct 88	-	-	I	
	"	-	5	II	
	"	-	5	III	
	"	-	5	IV	
	"	-	6	V	
	6 th Sep 89	-	-	I	
	"	-	-	II	
	"	-	-	III	
	"	-	-	IV	
	"	-	-	V	
	22 nd Sep 89	-	4	I	
	"	-	8	II	
	"	-	3	III	
	"	-	-	IV	
	"	-	4	V	
	10 th Oct 89	-	-	I	
	"	-	6	II	
	"	-	8	III	
	"	-	12	IV	
	"	-	2	V	
	Illaunbwee (<i>Oileán Bui</i>)	14 th Oct 83	20	1	-
		22 nd Oct 83	1	-	-
	Inishnabro	22 nd Oct 83	-	2	IV
		"	-	2	V
Inishvickillane (<i>Inis Mhic Aoibhleáin</i>)	22 nd Oct 83	-	-	I	
	"	-	2	II	
	"	-	-	III	
	"	-	2	IV	
	"	-	3	V	
	10 th Oct 84	3	-	-	
	"	3	3	-	

Table 4 Grey seal surveys on the Blasket Islands undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Adult</i>	<i>Grey Pup</i>	<i>Pup development</i>
Inishvickillane (<i>Inis Mhic Aoibhleáin</i>)	16 th Sep 88	-	2	I
	"	-	5	II
	"	-	6	III
	"	-	7	IV
	"	-	3	V
	14 th Oct 88	-	1	I
	"	-	4	II
	"	-	-	III
	"	-	4	IV
	"	-	-	V
	6 th Sep 89	-	8	I
	"	-	11	II
	"	-	-	III
	"	-	-	IV
	"	-	-	V
	22 nd Sep 89	-	-	I
	"	-	5	II
	"	-	2	III
	"	-	10	IV
	"	-	10	V
10 th Oct 89	-	2	I	
"	-	1	II	
"	-	6	III	
"	-	6	IV	
"	-	-	V	
Maharee Islands	8-Oct-79	5	-	-
	11-Oct-83	-	-	-
Oilean Buidhe	6 th Sep 89	-	-	I
	"	-	-	II
	"	-	-	III
	"	-	-	IV
	"	-	-	V
	22 nd Sep 89	-	-	I
	"	-	-	II
	"	-	2	III
	"	-	-	IV
	"	-	-	V
	10-Oct-89	-	-	I
	"	-	-	II
	"	-	-	III
	"	-	-	IV
"	-	-	V	

Table 4 Grey seal surveys on the Blasket Islands undertaken by NPWS from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Grey Adult</i>	<i>Grey Pup</i>	<i>Pup development</i>
Oilean na n-Óg	6 th Sep 89	-	-	I
	“	-	1	II
	“	-	3	III
	“	-	1	IV
	“	-	-	V
	22 nd Sep 89	-	-	I
	“	-	-	II
	“	-	-	III
	“	-	-	IV
	“	-	-	V
	10 th Oct 89	-	-	I
	“	-	2	II
	“	-	2	III
	“	-	-	IV
	“	-	2	V

Table 5 Sites surveyed for common and grey seals in County Clare from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Ballyvaughan	15-Jul-78	1	1	-	-
M220 092	11-Jul-79	36	7	1	-
	5-Oct-83	-	-	-	-
	26-Jul-90	150	20	-	-
	31-Jul-90	77	9	-	-
	23-Aug-90	49	4	-	-
	Dunmore Head	27 th Oct 1983	-	-	-
Hags Head	27 th Oct 1983	-	-	-	5
	29 th Oct 1983	-	-	-	-
Mutton Island	15 th Nov 1979	-	-	5	-
	5 th Oct 1983	-	-	20	-
	27 th Oct 1983	-	-	13	5

Table 6 Sites surveyed for common and grey seals in Bantry Bay, County Cork from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Adrigole Hbr. V81 49	16 th Aug 79	1	-	-	-
	22 nd Jun 93	-	-	-	-
	20 th Jul 93	-	-	-	-
	19 th Aug 93	8	-	-	-
	15 th Sep 93	-	-	-	-
	19 th Oct 93	31	-	-	-
	28 th Jan 94	21	-	-	-
	27 th May 94	34	-	-	-
	27 th Aug 01	20	-	-	-
	2 nd Sep 03	12	-	-	-
Bark Island V937 560	19 th Jun 00	-	-	-	-
	18 th Aug 00	-	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	7	-	-	-
	31 st Jul 01	4	-	-	-
	4 th Sep 01	7	-	-	-
	12 th Aug 02	-	-	-	-
	20 th Sep 02	-	-	-	-
NW of Big Point V932 537	19 th Jun 00	48	-	-	-
	18 th Aug 00	80	-	-	-
	11 th Sep 00	45	-	-	-
	22 nd May 01	44	-	-	-
	31 st Jul 01	83	16	-	-
	4 th Sep 01	55	-	-	-
	12 th Aug 02	91	10	-	-
	20 th Sep 02	64	-	-	-
	11 th Aug 03	44	5	-	-
1 st Sep 03	46	-	-	-	
Carrigeen V933 562	19 th Jun 00	-	-	-	-
	11 th Aug 02	44	5	-	-
	11 th Sep 00	3	-	-	-
	22 nd May 01	-	-	-	-
	31 st Jul 01	8	2	-	-
	4 th Sep 01	24	-	-	-
	12 th Aug 02	5	-	-	-
	20 th Sep 02	-	-	-	-
	11 th Aug 02	3	-	-	-
1 st Sep 03	12	-	-	-	
Carrigmore V912 514	19 th Jun 00	7	-	-	-
	18 th Aug 00	1	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	15	-	-	-
	31 st Jul 01	1	-	-	-
	4 th Sep 01	-	-	-	-
	12 th Aug 02	1	-	-	-
	20 th Sep 02	-	-	-	-
	11 th Aug 03	-	-	-	-
1 st Sep 03	-	-	-	-	

Table 6 Sites surveyed for common and grey seals in Bantry Bay, County Cork from 1978 to 2003 (continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Carrigskye V956 525	19 th Jun 00	-	-	-	-
	18 th Aug 00	22	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	4	-	-	-
	31 st Jul 01	20	3	-	-
	4 th Sep 01	3	-	-	-
	11 th Aug 02	14	-	-	-
	12 th Aug 02	27	5	-	-
	20 th Sep 02	-	-	-	-
	1 st Sep 03	23	-	-	-
Ellen's Rock bay V927 552	20 th Sep 02	19	-	-	-
	1 st Sep 03	-	-	-	-
	11 th Aug 03	-	-	-	-
Fir lands V933 556	19 th Jun 00	10	-	-	-
	18 th Aug 00	6	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	-	-	-	-
	31 st Jul 01	8	8	2	-
	4 th Sep 01	9	-	-	-
	12 th Aug 02	-	-	-	-
	20 th Sep 02	10	-	-	-
	11 th Aug 03	2	-	-	-
	1 st Sep 03	-	-	-	-
Four Heads Pt. V930 523	11 th Aug 03	3	-	-	-
	1 st Sep 03	1	-	-	-
Garinish West V903 503	14 th Jul 78	3	-	-	-
	18 th Jul 78	2	-	-	-
	18 th Jul 78	3	2	-	-
	18 th Jul 78	10	2	-	-
	18 th Jul 78	2	-	-	-
	18 th Jul 78	9	5	-	-
	8 th Jun 79	15	-	-	-
	9 th Jun 79	19	-	-	-
	12 th Jul 79	30	4	-	-
	12 th Jul 79	24	-	-	-
	20 th Jul 79	-	10	-	-
	19 th Oct 83	-	-	-	-
	4 th Jul 89	47	-	-	-
	19 th Jul 89	29	-	-	-
	8 th Aug 89	46	-	-	-
	1 st Sep 89	22	-	-	-
	2 nd Oct 89	2	-	-	-
	23 rd Apr 90	32	-	-	-
	8 th Jun 90	21	-	-	-
	21 st Aug 90	48	2	-	-
25 th May 91	52	-	-	-	
26 th Jun 91	10	-	-	-	
26 th Jul 91	15	-	-	-	
26 th Aug 91	42	-	-	-	
30 th Sep 91	4	-	-	-	

Table 6 Sites surveyed for common and grey seals in Bantry Bay, County Cork from 1978 to 2003 (continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Garinish West	9 th Oct 91	1	-	-	-
	22 nd Jun 93	41	-	-	-
	20 th Jul 93	17	-	-	-
	19 th Aug 93	43	-	-	-
	15 th Sep 93	4	-	-	-
	19 th 10 93	3	-	-	-
	28 th Jan 94	-	-	-	-
	27 th May 94	28	-	-	-
	19 th Jun 00	1	-	-	-
	18 th Aug 00	-	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	-	-	-	-
	31 st Jul 01	1	-	-	-
	4 th Sep 01	2	-	-	-
	12 th Aug 02	8	-	-	-
	20 th Sep 02	-	-	-	-
	11 th Aug 03	15	-	-	-
1 st Sep 03	37	-	-	-	
Garnish Island Area V903 503	19 th Jun 00	-	-	-	-
	18 th Aug 00	-	-	-	-
	11 th Sep 00	15	-	-	-
	22 nd May 01	6	-	-	-
	31 st Jul 01	11	2	-	-
	4 th Sep 01	1	-	-	-
	12 th Aug 02	4	3	-	-
	20 th Sep 02	15	-	-	-
	11 th Aug 03	24	4	-	-
1 st Sep 03	-	-	-	-	
Garvillan & Ship Island V938 552 & V939 551	19 th Jun 00	49	-	-	-
	18 th Aug 00	34	-	-	-
	11 th Sep 00	86	-	-	-
	22 nd May 01	87	-	-	-
	31 st Jul 01	18	4	-	-
	4 th Sep 01	116	-	-	-
	12 th Aug 02	58	6	-	-
	20 th Sep 02	104	-	-	-
	1 st Sep 03	121	-	-	-
11 th Aug 02	23	1	-	-	
Gerane East & Gerane Middle V934 485	19 th Jun 00	-	-	-	-
	18 th Aug 00	68	-	-	-
	11 th Sep 00	2	-	-	-
	22 nd May 01	11	-	-	-
	31 st Jul 01	33	-	-	-
	4 th Sep 01	52	-	-	-
	12 th Aug 02	87	-	-	-
	20 th Sep 02	-	-	-	-
	11 th Aug 03	70	-	-	-
1 st Sep 03	76	-	-	-	

Table 6 Sites surveyed for common and grey seals in Bantry Bay, County Cork from 1978 to 2003 (continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Gerane West V930 482	31 st Jul 85	97	-	-	-
	21 st Aug 85	135	-	-	-
	4 th Jul 89	-	-	-	-
	19 th Jul 89	-	-	-	-
	8 th Aug 89	-	-	-	-
	1 st Sep 89	-	-	-	-
	2 nd Oct 89	-	-	-	-
	23 rd Apr 90	-	-	-	-
	8 th Jun 90	-	-	-	-
	21 st Aug 90	-	-	-	-
	25 th May 91	2	-	-	-
	26 th Jun 91	-	-	-	-
	26 th Jul 91	-	-	-	-
	26 th Aug 91	-	-	-	-
	30 th Sep 91	-	-	-	-
	9 th Oct 91	-	-	-	-
	22 nd Jun 93	28	-	-	-
	20 th Jul 93	31	-	-	-
	19 th Aug 93	40	-	-	-
	15 th Sep 93	-	-	-	-
	19 th Oct 93	-	-	-	-
	28 th Jan 94	-	-	-	-
	27 th May 94	3	-	-	-
	19 th Jun 00	25	-	-	-
	18 th Aug 00	13	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	4	-	-	-
	31 st Jul 01	8	-	-	-
	4 th Sep 01	-	-	-	-
	11 th Aug 02	18	-	-	-
12 th Aug 02	7	-	-	-	
20 th Sep 02	-	-	-	-	
1 st Sep 03	-	-	-	-	
Glengarriff Harbour V93 54; V93 55; V93 56; V94 55; V92 54; V94 54	20 th Jul 79	5	1	-	-
	16 th Aug 79	34	12	-	-
	4 th Jul 89	99	-	-	-
	19 th Jul 89	96	-	-	-
	8 th Aug 89	115	-	-	-
	1 st Sep 89	151	-	-	-
	2 nd Oct 89	131	-	-	-
	23 rd Apr 90	114	-	-	-
	8 th Jun 90	109	-	-	-
	21 st Aug 90	144	6	-	-
	25 th May 91	56	-	-	-
	26 th Jun 91	102	-	-	-
	26 th Aug 91	172	-	-	-
	30 th Sep 91	141	-	-	-
	9 th Oct 91	159	-	-	-
22 nd Jun 93	39	-	-	-	

Table 6 Sites surveyed for common and grey seals in Bantry Bay, County Cork from 1978 to 2003 (continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Glengarriff Harbour	20 th Jul 93	147	-	-	-
	19 th Aug 93	124	-	-	-
	15 th Sep 93	222	-	-	-
	19 th Oct 93	144	-	-	-
	28 th Jan 94	-	-	-	-
	27 th May 94	151	-	-	-
Illaungeragh to Coulagh Rocks V907 511; V908 507; V906 508	19 th Jun 00	6	-	-	-
	18 th Aug 00	26	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	1	-	-	-
	31 st Jul 01	36	2	-	-
	4 th Sep 01	69	-	-	-
	12 th Aug 02	36	2	-	-
	20 th Sep 02	-	-	-	-
	11 th Aug 03	42	-	-	-
	1 st Sep 03	51	-	-	-
Otter Island area V935 552	19 th Jun 00	6	-	-	-
	18 th Aug 00	6	-	-	-
	11 th Sep 00	48	-	-	-
	22 nd May 01	-	-	-	-
	31 st Jul 01	-	-	-	-
	4 th Sep 01	7	-	-	-
	12 th Aug 02	3	1	-	-
	20 th Sep 02	15	-	-	-
	11 th Aug 03	3	1	-	-
	1 st Sep 03	3	-	-	-
Sunken Rock & Powers Rock V932 559 & V933 557	19 th Jun 00	-	-	-	-
	18 th Aug 00	6	-	-	-
	11 th Sep 00	48	-	-	-
	22 nd May 01	3	-	-	-
	31 st Jul 01	4	1	-	-
	4 th Sep 01	-	-	-	-
	12 th Aug 02	18	-	-	-
	20 th Sep 02	24	-	-	-
	11 th Aug 03	1	1	-	-
	1 st Sep 03	6	-	-	-
Yellow Rocks & Morneen Rocks V951 533 & V955 534	19 th Jun 00	8	-	-	-
	18 th Aug 00	3	-	-	-
	11 th Sep 00	-	-	-	-
	22 nd May 01	-	-	-	-
	31 st Jul 01	18	2	-	-
	4 th Sep 01	1	-	-	-
	12 th Aug 02	10	-	-	-
	20 th Sep 02	20	-	-	-
	11 th Aug 03	17	-	-	-
	1 st Sep 03	27	-	-	-

Table 7 Additional sites surveyed in County Cork from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Dunmanus Bay	18 th Jul 1978	2	-	-	-
	19 th Aug 1983	-	-	-	-
Roaringwater Bay	19 th Jul 1978	-	-	5	-
	5 th Oct 1978	-	-	9	4
	30 th Aug 1979	-	-	43	-
	21 st Oct 1979	-	-	5	-
	15 th Nov 1979	-	-	12	-
	19 th Oct 1983	-	-	3	-
	23 rd Oct 1983	-	-	-	1
	6 th Sep 1985	15	3	-	-
	11 th Sep 1985	10	-	-	-
	26 th May 1989	2	-	-	-
	29 th Sep 1989	5	-	-	-
	12 th Sep 2000	-	-	-	-
	23 rd May 2001	3	-	-	-
1 st Aug 2001	-	-	-	-	

Table 8 Sites surveyed for common and grey seals within Kenmare River, Counties Cork and Kerry from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Kenmare River (parts of)	17 th Jul 78	3	2	-	-
	“	3	3	-	-
	“	12	3	-	-
	21 st Jul 79	-	1	-	-
	19 th Oct 83	-	-	-	-
	18 th Jul 00	118	-	-	-
	12 th Sep 00	177	-	-	-
	23 rd May 01	116	-	-	-
	1 st Aug 01	184	-	-	-
	5 th Sep 01	218	-	-	-
	13 th Aug 02	197	-	-	-
	23 rd Sep 02	194	-	-	-
	18 th Aug 03	177	-	-	-
	Ardgroom Hbr.	18 th Jul 00	1	-	-
12 th Sep 00		-	-	-	-
23 rd May 01		1	-	-	-
1 st Aug 01		-	-	-	-
5 th Sep 01		-	-	-	-
13 th Aug 02		-	-	-	-
23 rd Sep 02		-	-	-	-
13 th Aug 03	-	-	-	-	

Table 8 Sites surveyed for common and grey seals within Kenmare River, Counties Cork and Kerry from 1978 to 2003 (continued....)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Adult</i>	<i>Grey Pup</i>
Brennel Island V840 673	2 nd Jun 90	14	-	-	-
	31 st Jul 90	-	-	-	-
	4 th Apr 91	36	-	-	-
	18 th Jul 00	20	-	-	-
	12 th Sep 00	56	-	-	-
	23 rd May 01	28	-	-	-
	1 st Aug 01	35	5	-	-
	5 th Sep 01	4	-	-	-
	13 th Aug 02	13	-	-	-
	23 rd Sep 02	39	-	-	-
	13 th Aug 03	24	-	-	-
Carrignaronomore V837 682	18 th Jul 00	-	-	-	-
	12 th Sep 00	11	-	-	-
	23 rd May 01	3	-	-	-
	1 st Aug 01	70	6	-	-
	5 th Sep 01	71	-	-	-
	13 th Aug 02	65	-	-	-
	23 rd Sep 02	3	-	-	-
13 th Aug 03	18	-	-	-	
Coongar Harbour	2 nd Jun 90	14	-	-	-
	31 st Jul 90	-	-	-	-
	22 nd Aug 90	16	-	-	-
	4 th Apr 91	28	-	-	-
	18 th Jul 00	7	-	-	-
	12 th Sep 00	12	-	-	-
	23 rd May 01	12	-	-	-
	1 st Aug 01	13	-	-	-
	5 th Sep 01	20	-	-	-
	13 th Aug 02	11	-	-	-
	23 rd Sep 02	17	-	-	-
13 th Aug 03	3	-	-	-	
Garinish V693 630	12 th Sep 00	-	-	-	-
	23 rd May 01	3	-	-	-
	1 st Aug 01	22	-	-	-
	5 th Sep 01	8	-	-	-
	13 th Aug 02	19	-	-	-
	23 rd Sep 02	10	-	-	-
13 th Aug 03	15	-	-	-	
Greenane Island V853 690	14 th Jul 78	20	-	-	-
	12 th Jul 79	7	-	-	-
	12 th Jul 79	4	-	-	-
	12 th Jul 79	20	-	-	-
	2 nd Jun 90	25	-	-	-
	31 st Jul 90	44	-	-	-
	22 nd Aug 90	44	8	-	-

Table 8 Sites surveyed for common and grey seals within Kenmare River, Counties Cork and Kerry from 1978 to 2003 (continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Adult</i>	<i>Grey Pup</i>
Greenane Island	4 th Apr 91	13	-	-	-
	18 th Jul 00	60	-	-	-
	12 th Sep 00	16	-	-	-
	23 rd May 01	15	-	-	-
	1 st Aug 01	9	1	-	-
	13 th Aug 01	35	-	-	-
	5 th Sep 01	35	5	-	-
	13 th Aug 02	35	-	-	-
	23 rd Sep 02	23	-	-	-
	13 th Aug 03	46	8	-	-
Ilaunmeanla V646 528	29 th Jul 91	-	-	-	-
	23 rd Aug 01	10	-	-	-
Illaunsillagh V620 610	19 th Jun 03	52	-	-	-
	16 th Jul 03	30	2	-	-
Killmackilloge	2 nd Jun 90	16	-	-	-
	31 st Jul 90	-	-	-	-
	22 nd Aug 90	1	-	-	-
	4 th Apr 91	8	-	-	-
	18 th Jul 00	-	-	-	-
	12 th Sep 00	23	-	-	-
	23 rd May 01	1	-	-	-
	1 st Aug 01	2	-	-	-
	5 th Sep 01	-	-	-	-
	13 th Aug 02	-	-	-	-
	23 rd Sep 02	-	-	-	-
	13 th Aug 03	-	-	-	-
	Ormond's Island/ Hog Island V79 65/ V79 64	18 th Jul 00	-	-	-
12 th Sep 00		-	-	-	-
23 rd May 01		-	-	-	-
1 st Aug 01		-	-	-	-
13 th Aug 01		-	-	-	-
5 th Sep 01		-	-	-	-
13 th Aug 02		-	-	-	-
23 rd Sep 02		50	-	-	-
13 th Aug 03		-	-	-	-
Parknasilla V70 63; V71 64; V71 63	2 nd Jun 90	32	-	-	-
	31 st Jul 90	22	-	-	-
	22 nd Aug 90	47	5	-	-
	4 th Apr 91	26	-	-	-
	18 th Jul 00	30	-	-	-
	12 th Sep 00	17	-	-	-
	23 rd May 01	46	-	-	-
	1 st Aug 01	22	-	-	-
	5 th Sep 01	16	-	-	-
	13 th Aug 02	7	-	-	-
	23 rd Sep 02	14	-	-	-
	13 th Aug 03	22	-	-	-

Table 8 Sites surveyed for common and grey seals within Kenmare River, Counties Cork and Kerry from 1978 to 2003 (continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Adult</i>	<i>Grey Pup</i>
Rossdohan North V71 63	18 th Jul 00	-	-	-	-
	12 th Sep 00	-	-	-	-
	1 st Aug 01	-	-	-	-
	5 th Sep 01	31	-	-	-
	13 th Aug 02	25	-	-	-
	23 rd Sep 02	38	-	-	-
	13 th Aug 03	30	-	-	-
Rossdohan South V71 63; V71 62	18 th Jul 00	-	-	-	-
	12 th Sep 00	24	-	-	-
	23 rd May 01	8	-	-	-
	1 st Aug 01	11	-	-	-
	5 th Sep 01	33	-	-	-
	13 th Aug 02	22	-	-	-
	23 rd Sep 02	-	-	-	-
	13 th Aug 03	14	-	-	-
Sherkey Island	17 th Jul 78	-	-	2	-

Table 9 Additional sites surveyed in County Kerry from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Ballinskelligs Bay	14 th Jul 1978	2	-	-	-
Castlemaine Harbour	14 th Jul 1978	3	-	-	-
	17 th Jul 1978	-	-	-	-

Table 10 Sites surveyed for common and grey seals within County Galway from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Ard Bay	5 th Jul 89	4	4	-	-
Aughinish Bay M316 119	15 th Jul 78 11 th Jul 79	12 8	2 5	- -	- -
Ballynakill Harbour	12 th Jul 89	11	2	-	-
Benmore Head	11 th Oct 79	-	-	-	13
Bertraghboy Bay L747377, L747386, L747405, L766429	13 th Jul 78 5 th Jul 79 9 th Jul 79	27 29 6	3 13 -	- - -	- - -
Brendan's Island M315 212	28 th Aug 91 28 th Sep 91	73 73	- -	- -	- -
Caherisland	11 th Oct 79	-	-	-	1
Carrickacummer Island	5 th Oct 83	-	-	3	10
Cashel Bay	5 th Jul 89	3	3	-	-
Chapel Island	5 th Oct 83 28 th Oct 83	- -	- -	5 -	7 4
Cleggan Bay	13 th Sep 88 12 th Jul 89	3 -	- -	- -	- -
Clifden Bay L624 403	13 th Jul 78 6 th Jul 89	- 1	- 1	2 -	- -
Corranroo Bay	11 th Jul 79	3	2	-	-
Deer Island	5 th Oct 83 29 th Jun 89 28 th Aug 91 28 th Sep 91	- 55 125 125	- - - 10	4 - - -	6 - - -
Glasilaun	11 th Oct 79	-	-	-	3
Glinsk L747 377	11 th Oct 79 30 th Sep 83	- -	- -	- -	5 2
Greatmans Bay	3 rd Jul 89	4	-	-	-
Illaunloo M222 116	15 th Jul 78	-	-	4	-

Table 10 Sites surveyed for common and grey seals within County Galway from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Inish Mor	5 th Oct 83	-	-	-	-
Inishboffin	12 th Jul 78	-	-	11	-
	12 th Nov 79	-	-	-	-
Inishdallagh	11 th Oct 79	-	-	9	-
Inishgort	11 th Oct 79	-	-	14	8
	24 th Oct 80	-	-	-	-
Kiggaul Bay L852 225	14 th Jul 78	6	1	-	-
Kilbrickan Bay	29 th Aug 91	11	2	-	-
	29 th Sep 91	11	2	-	-
Kilcolgan Point M299 195	15 th Jul 78	1	-	1	-
Kilkieran Bay L925 322 L875 210 L895 355 L898 357 L900 330 L905 380 L897 360 L902 382 L882 332 L906 382	10 th Jul 78	2	-	-	-
	"	1	-	-	-
	"	4	1	-	-
	"	9	3	-	-
	"	1	1	-	-
	"	10	4	-	-
	14 th Jul 79	4	-	1	-
	"	6	2	-	-
	"	2	-	-	-
	"	2	-	-	-
	5 th Oct 83	6	-	-	-
	4 th Jul 89	18	-	-	-
	11 th Jul 89	76	23	-	-
	29 th Aug 91	26	-	-	-
	29 th Aug 91	-	5	-	-
29 th Aug 91	9	-	-	-	
Kinvarra Bay M357 133 M361 131 M354 128	15 th Jul 78	24	8	-	-
	11 th Jul 79	23	6	-	-
	"	1	-	-	-
	"	15	6	-	-
	19 th Aug 82	69	-	-	-
	20 th Aug 82	60	-	-	-
	23 rd Aug 82	66	-	-	-
	25 th Aug 82	42	-	-	-
	27 th Aug 82	-	-	-	-
	31 st Aug 82	57	-	-	-
	7 th Sep 82	57	-	-	-
	9 th Sep 82	62	-	-	-
	13 th Sep 82	51	-	-	-

Table 10 Sites surveyed for common and grey seals within County Galway from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Kinvarra Bay	17 th Sep 82	46	-	-	-
	23 rd Sep 82	63	-	-	-
	27 th Sep 82	47	-	-	-
	6 th Oct 82	45	-	-	-
	13 th Oct 82	63	-	-	-
	29 th Jun 89	63	39	-	-
	15 th Apr 91	31	-	-	-
	19 th Apr 91	39	-	-	-
	20 th May 91	46	-	-	-
	27 th May 91	17	-	-	-
	10 th Jun 91	31	-	-	-
	24 th Jun 91	37	-	-	-
	28 th Aug 91	-	-	-	-
	10 th Jun 91	31	-	-	-
	24 th Jun 91	37	-	-	-
	28 th Aug 91	-	-	-	-
	28 th Sep 91	143	-	-	-
Mannin Bay	6 th Jul 89	14	1	-	-
	18 th Jun 03	14	1	-	-
	16 th Jul 03	33	3	-	-
Mweenish Bay	L788 300	14 th Jul 78	10	3	-
	L880 328	10 th Jul 79	14	-	-
	L788 300	5 th Jul 89	51	-	-
Oranmore Bay	M367 345	15 th Jul 78	12	7	-
	M372 145	11 th Jul 79	21	2	-
	M372 245	29 th Jun 89	27	10	-
		28 th Aug 91	12	-	-
		28 th Sep 91	12	-	-
Poolnaclough	M277 099	15 th Jul 78	1	-	-
		11 th Jul 79	2	-	-
Rabbit Island	M325 236	11 th Jul 79	1	-	-
Rine Point	M220 093	11 th Jul 79	5	2	-
Roundstone Pier		5 th Jul 89	13	2	-
Slyne Head		28 th Oct 83	-	-	6
		21 st Aug 84	-	-	2

Table 10 Sites surveyed for common and grey seals within County Galway from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
St Brendans Island	15 th Jul 78	8	1	-	-
	11 th Jul 79	17	4	-	-
	29 th Jun 89	15	-	-	-
Tawin Island M334 321	11 th Jul 79	11	-	-	-
	12 th Mar 82	42	-	-	-
	16 th Mar 82	36	-	-	-
	23 rd Mar 82	42	-	-	-
	29 th Mar 82	37	-	-	-
	7 th Apr 82	42	-	-	-
	20 th Apr 82	-	-	-	-
	24 th Apr 82	37	-	-	-
	3 rd Sep 82	25	-	-	-
	17 th Oct 82	37	-	-	-
	21 st Oct 82	85	-	-	-
	25 th Oct 82	42	-	-	-
	28 th Oct 82	37	-	-	-
	5 th Oct 83	-	-	-	-
	8 th Aug 88	-	-	-	-
	27 th Aug 88	34	-	-	-
	14 th Sep 88	52	-	-	-
	23 rd Sep 88	49	-	-	-
	3 rd Oct 88	49	-	-	-
	12 th Oct 88	32	-	-	-
	25 th Oct 88	52	-	-	-
	7 th Nov 88	33	-	-	-
	15 th Nov 88	71	-	-	-
	30 th Nov 88	97	-	-	-
	15 th Dec 88	94	-	-	-
	29 th Dec 88	95	-	-	-
	17 th Jan 89	11	-	-	-
	2 nd Jan 91	42	-	-	-
	15 th Jan 91	73	-	-	-
	22 nd Jan 91	75	-	-	-
	25 th Jan 91	63	-	-	-
	5 th Feb 91	31	-	-	-
8 th Feb 91	37	-	-	-	
15 th Feb 91	42	-	-	-	
9 th Apr 91	7	-	-	-	
15 th Apr 91	10	-	-	-	
19 th Apr 91	6	-	-	-	
26 th Apr 91	12	-	-	-	
6 th May 91	17	-	-	-	
20 th May 91	19	-	-	-	
27 th May 91	6	-	-	-	
4 th Jun 91	43	-	-	-	
10 th Jun 91	8	-	-	-	

Table 10 Sites surveyed for common and grey seals within County Galway from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Tawin Island M334 321	24 th Jun 91	4	-	-	-
	18 th Jun 03	22	-	-	-
	16 th Jul 03	5	-	-	-
Tarrae Pier	8 th Aug 88	40	-	-	-
	27 th Aug 88	17	-	-	-
	14 th Sep 88	4	-	-	-
	23 rd Sep 88	18	-	-	-
	3 rd Oct 88	-	-	-	-
	12 th Oct 88	17	-	-	-
	25 th Oct 88	12	-	-	-
	7 th Nov 88	13	-	-	-
	30 th Nov 88	26	-	-	-
	29 th Dec 88	33	-	-	-

Table 11 Sites surveyed for common and grey seals in County Mayo from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Achill Sound F7307	10 th Jul 1978	53	18	-	-
	18 th Jul 1979	68	6	1	-
	30 th Oct 1980	-	-	2	3
Benedereen	30 th Sep 1983	-	-	-	2
Benwee Head	26 th Oct 1980	-	-	17	15
	30 th Sep 1983	-	-	-	-
Blacksod Bay F703281	10 th Jul 1978	5	-	3	-
	5 th Oct 1988	1	1	-	-
	22 nd Jun 1989	16	2	-	-
Broad Haven F735318	10 th Jul 1978	6	-	1	-
	4 th Sep 1988	9	-	-	-
	11 th Apr 2003	4	-	-	-
	30 th Jul 2003	28	5	-	-
	14 th Aug 2003	31	-	-	-
	28 th Aug 2003	24	-	-	-
	4 th Sep 2003	29	-	-	-
	5 th Sep 2003	23	-	-	-
Clare Island	18 th Oct 1980				5
Clew Bay L895 936 L897 934 L915 937 L920 845 L930 935 L935 855 L935 948 L941 850	11 th Jul 1978	59	11	1	-
	17 th Jul 1979	33	6	1	-
	23 rd Jun 1989	83	12	-	-
	18 th Jul 1989	16	5	-	-
	2 nd Sep 1991	101	-	-	-
	20 th Jul 1994	61	-	-	-
	11 th Apr 1995	22	-	-	-
	22 nd Jun 2000	20	10	-	-

Table 11 Sites surveyed for common and grey seals in County Mayo from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Clew Bay	22 nd Sep 2001	-	-	-	-
L943 846	13 th Oct 2001	-	-	-	-
L943 846	14 th Sep 2002	-	-	-	-
L945 855	12 th Oct 2002	-	-	-	-
	16 th Nov 2002	-	-	-	-
	14 th Dec 2002	-	-	-	-
	20 th Mar 2003	40	-	-	-
	29 th Mar 2003	-	-	-	-
	31 st Mar 2003	39	-	1	-
Killala Bay	10 th Jul 78	3	-	-	-
	30 th Sep 83	3	-	-	-
	22 nd Jun 89	11	4	-	-
	15 th Jun 90	7	-	-	-
	22 nd Jun 90	5	-	-	-
	25 th Jun 90	22	-	-	-
	27 th Jun 90	11	-	-	-
	2 nd Jul 90	23	-	-	-
	4 th Jul 90	22	-	-	-
	9 th Jul 90	11	-	-	-
	18 th Jul 90	9	-	-	-
	23 rd Jul 90	19	-	-	-
	26 th Jul 90	7	-	-	-
	9 th Aug 90	15	-	-	-
	16 th Aug 90	17	-	-	-
	23 rd Aug 90	9	-	-	-
	10 th Sep 90	17	-	-	-
	24 th Sep 90	21	-	-	-
	8 th Oct 90	1	-	-	-
Bartragh, Killala Bay	16 th Jul 03	32	-	-	-
	"	34	-	-	-
	"	37	1	3	-
	19 th Jun 03	41	-	-	-
	"	52	-	-	-
	"	54	-	-	-
	"	55	2	13	-
	"	55	-	-	-
	"	58	-	-	-
	13 th Aug 03	88	-	-	-
	"	97	-	-	-
	"	98	-	-	-
	"	100	-	-	-
Bone Rock	30 th Sep 83	5	-	-	-
Kid Island	26 th Oct 80	-	-	3	2
Moyne Point, Killala Bay	21 st May 91	1	-	-	-
	31 st May 91	1	-	-	-
	6 th Jun 91	-	-	-	-
	12 th Jun 91	11	-	-	-
	24 th Jun 91	4	4	-	-
	3 rd Jul 91	-	-	-	-

Table 11 Sites surveyed for common and grey seals in County Mayo from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Moyne Point, Killala Bay	8 th Jul 91	-	-	-	-
	15 th Jul 91	-	-	-	-
	19 th Jul 91	3	-	-	-
	12 th Aug 91	1	-	-	-
	16 th Aug 91	5	-	-	-
	20 th Aug 91	-	-	-	-
	27 th Aug 91	-	-	-	-
	2 nd Sep 91	8	-	-	-
	9 th Sep 91	-	-	-	-
	18 th Sep 91	28	-	-	-
	25 th Sep 91	27	-	-	-
	Killary Harbour	26 th Jun 1989	4		
Mularanny	15 th Nov 88	15			
Sruhll Lough	14 th Aug 2003	33			

Table 12 Sites surveyed for common and grey seals in County Sligo from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Ballysadare Bay					
G585 348	9 th Jul 78	1	-	-	-
G597 332	"	1	1	-	-
G605 332		67	24	-	-
G599 323		10	-	-	-
G605 223	18 th Jul 79	60	15	-	-
	"	50	-	1	-
	"	30	18	-	-
	10 th Jul 80	-	-	11	-
	1 st Jun 90	195	17	-	-
	1 st Jun 93	171	-	-	-
	1 st Jun 94	179	-	-	-
	1 st Jun 95	198	-	-	-
	1 st Jun 96	199	-	-	-
	1 st Jun 98	260	-	-	-
	1 st Jun 99	275	-	-	-
	1 st Jun 00	265	-	-	-
	1 st Jun 01	275	-	-	-
	12-Mar-03	255	-	-	-
	8-Apr-03	159	-	7	-
G6133; G6032;	18-Jun-03	309	15	2	-
G6131	"	308	20	3	-
	19-Jun-03	298	15	17	-
	18-Jul-03	380	54	-	-
	19-Jul-03	395	57	27	-

Table 12 Sites surveyed for common and grey seals in County Sligo from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Drumcliff Bay					
G618 436	9-Jul-78	8	5	-	-
G622 437	“	17	6	-	-
G636 427	“	9	6	-	-
G610 430	19-Jul-79	4	-	-	-
G645 430	“	8	3	-	-
G65 42	“	45	7	-	-
	1-Jun-90	64	1	-	-
	11-Nov-03	40	-	-	-

Table 13 Sites surveyed for common and grey seals in County Donegal from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Inner Donegal Bay					
G874 752	7 th July 78	14	2	-	-
G887 751	“	22	2	-	-
G910 747	“	10	1	-	-
	“	46	5	-	-
G885 751	12 th Jul 79	44	-	-	-
	1 st Jun 90	57	2	-	-
	16 th Jun 03	132	-	-	-
	17 th Jul 03	164	38	-	-
Carantulla Head					
G722 742	7 th Jul 78	-	-	1	-
Doorin Point					
G910 748	25 th Jun 03	2	-	-	-
G910 748	30 th Jul 03	-	-	-	-
Dungloe Bay					
B75 11	8 th Jul 78	1	-	-	-
B75 12	6 th Jun 79	72	-	-	-
B75 13	1 st Jun 90	87	4	-	-
B75 14	12 th Aug 99	171	-	-	-
B75 15	10 th Jan 01	55	-	-	-
	15 th Jan 01	14	-	-	-
	9 th May 01	112	-	-	-
	8 th Jun 01	98	-	-	-
	25 th Jun 01	206	-	-	-
	9 th Jul 01	86	-	-	-
	31 st Jul 01	128	-	-	-
	20 th Aug 01	203	-	-	-
	27 th Apr 02	106	-	-	-
	28 th May 02	150	-	-	-
	20 th Jun 02	177	-	-	-
	11 th Jul 02	97	47	-	-
	27 th Aug 02	244	-	-	-
	27 th Sep 02	128	20	-	-
	17 th Oct 02	87	-	-	-

Table 13 Sites surveyed for common and grey seals in County Donegal from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Dungloe Bay	5 th Nov 02	47	-	-	-
	5 th Feb 03	202	-	-	-
	27 th Mar 03	178	-	-	-
	22 nd Apr 03	200	-	-	-
	26 th Jun 03	156	44	-	-
	13 th Aug 03	215	-	-	-
	27 th Sep 03	216	-	-	-
	5 th Oct 03	84	-	-	-
	3 rd Dec 03	15	-	-	-
Dunrea Head C256171	6 th Jul 78	2	-	-	-
Fanad Head	28 th Oct 03	-	-	-	45
Gull Island G646 914	31 st Oct 79	-	-	1	5
Gweebarra Bay	8-Jul-78	-	-	-	-
	26-Oct-78	-	-	10	1
	19-Jul-79	-	-	-	-
	20-Jul-79	-	-	-	-
	1-Jun-90	74	1	-	-
	19-Jun-03	51	3	-	-
	18-Jul-03	59	7	2	-
Gweedore Bay	8 th Jul 78	-	-	-	-
Hassans G885 750 G910 748	19 th Jul 79	12	6	-	-
	30 th Jul 03	1	-	-	-
Horn Head C002411	30 th Oct 79	-	-	1	-
Inish Beg	30 th Oct 79	-	-	-	-
	12 th Nov 79	-	-	-	-
Inish Dooley	30 th Oct 79	-	-	-	-
Inishal B735 110	20 th Jul 79	54	18	-	-
Inishtrahull & Tor Rocks C475670	30 th Oct 79	-	-	6	-
	1st May 97	-	-	19	-
	20 th May 97	-	-	138	-
	10 th Jul 97	-	-	69	-
	13 th Jul 97	-	-	64	-
Inisnagor Bay	9 th Jul 78	-	-	-	-
Inver Bay G806 769	7 th Jul 78	1	-	1	-
Killybegs	7 th Jul 78	1	-	3	-

Table 13 Sites surveyed for common and grey seals in County Donegal from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Lough Foyle	5 th Jul 78	-	-	-	-
Lough Swilly	2 nd Aug 79	4	-	-	-
	12 th Nov 79	-	-	-	1
	28 th Oct 03	-	-	-	37
Loughros Beg & Mor G689 903; G692 935	8 th Jul 78	-	-	-	-
Merries Point	7 th Jul 78	-	-	1	-
Mullansole G910 748	25 th Jun 01	126	38	-	-
	11 th Aug 03	185	36	-	-
Mulroy Bay C155375	6 th Jul 78	1	1	-	-
	22 nd Jul 79	17	5	-	-
	2 nd Aug 79	23	4	-	-
	30 th Oct 79	-	-	2	-
	1 st Jun 90	14	-	-	-
	28 th Oct 03	-	-	-	10
Rathmullen C283265	6 th Jul 78	1	-	-	-
Roonagh Point L 742 804	27-Mar-00	52	-	-	-
	31-Jul-01	103	-	-	-
	8-Aug-01	108	23	-	-
	9-Aug-01	117	29	-	-
	19-Aug-02	25	-	-	-
	16-Oct-02	-	-	-	-
	6-Dec-02	11	-	-	-
	20-Mar-03	41	-	-	-
	31-Mar-03	42	-	1	-
	29-May-03	33	-	9	2
	20-Jun-03	22	1	6	-
	16-Jul-03	18	-	8	-
	6-Aug-03	49	-	-	-
Rooney's Island G910 748, G905 744	12 th Oct 79	-	-	-	-
	29 th Jun 00	108	24	-	-
	30 th Jun 00	100	22	-	-
	4 th Jul 00	122	25	-	-
	10 th Apr 01	71	-	-	-
	11 th Sep 01	124	34	-	-
	"	131	26	-	-
	"	131	12	-	-
	19 th Nov 01	28	11	-	-
	"	36	-	-	-
	29 th Nov 01	5	-	-	-
	30 th Nov 01	80	-	-	-
	4 th Dec 01	11	-	-	-
11 th Dec 01	19	-	-	-	

Table 13 Sites surveyed for common and grey seals in County Donegal from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Rooney's Island	11 th Dec 01	4	-	-	-
	13 th May 02	48	-	-	-
	"	35	4	-	-
	27 th May 02	92	-	-	-
	"	74	24	-	-
	"	86	27	-	-
	"	111	30	-	-
	13 th Jun 02	124	27	-	-
	"	133	-	-	-
	"	131	-	-	-
	"	117	7	-	-
	24 th Jun 02	121	11	-	-
	"	112	37	-	-
	"	117	39	-	-
	"	145	3	-	-
	10 th Jul 02	145	5	-	-
	"	109	-	-	-
	25 th Jul 02	101	-	-	-
	"	79	-	-	-
	"	72	-	-	-
	"	129	1	-	-
	26 th Jul 02	127	1	-	-
	8 th Aug 02	131	4	-	-
	"	135	7	-	-
	21 st Aug 02	148	-	-	-
	"	150	1	-	-
	"	147	-	-	-
	"	148	-	-	-
	4 th Oct 02	22	20	-	-
	"	25	44	-	-
	"	25	44	-	-
	16 th Apr 03	111	-	-	-
	4 th Jun 03	135	6	-	-
	"	133	6	-	-
	16 th Jun 03	58	45	-	-
	"	60	45	-	-
	"	60	46	-	-
	"	46	86	-	-
	17 th Jun 03	157	7	-	-
	30 th Jun 03	145	39	-	-
31 st Jul 03	174	33	-	-	
12 th Aug 03	181	34	-	-	
13 th Aug 03	179	37	-	-	
27 th Aug 03	174	23	-	-	
Salthill G885 750	19 th Jul 79	22	8	12	-
Slieve Tooley G645 915	26 th Oct 78	-	-	18	-
G629 920	31 st Oct 79	-	-	-	1
G629 921	14 th Oct 80	-	-	-	5
G629 923	"	-	-	-	1
	"	-	-	-	3

Table 13 Sites surveyed for common and grey seals in County Donegal from 1978 to 2003
(continued...)

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Slieve Tooley					
G629 924	14 th Oct 80	-	-	-	2
G614 923	"	-	-	-	2
G599 918	"	-	-	-	3
G588 917	"	-	-	-	2
G570 912	"	-	-	-	3
G570 911	"	-	-	-	8
G60 92	12 Apr 97			291	
Tory Island	30 th Oct 79	-	-	1	-
B874 460	12 th Nov 79	-	-	-	-
Trawenagh Bay					
B775 041	8 th Jul 78	-	-	-	-
	19 th Jul 79	7	4	-	-

Table 14 Sites surveyed on East and South East coast of Ireland from 1978 to 2003

<i>Location</i>	<i>Date</i>	<i>Common Seal</i>	<i>Common Pup</i>	<i>Grey Seal</i>	<i>Grey Pup</i>
Carlingford Lough	20 th Jun 03	23	-	1	2
Co. Louth	16 th Jul 03	31	3	-	-
Lambay Island,	27 th Oct 78	-	-	22	5
Co. Dublin	16 th Oct 79	-	-	-	4
	25 th Oct 83	-	-	17	7
Bannow Bay	14 th Jul 78	8	-	-	-
Co. Wexford					
Courttown Beach	10 th Jan 80	-	-	2	-
Co. Wexford					
Saltee Islands	16 th Oct 79	-	-	16	8
Co. Wexford	10 th Jan 80	-	-	2	-
	24 th Oct 83	-	-	47	11

Appendix II

Candidate Special Areas of Conservation (cSAC) for seals (May 2004)

Common Seal (*Phoca vitulina*)

Site Code	Name
000622	Ballysadare Bay (Sligo)
001482	Clew Bay Complex (Mayo)
000627	Cummeen Strand/ Drumcliff Bay (Bay)
000133	Donegal Bay (Murvagh) (Donegal)
000268	Galway Bay Complex (Galway / Clare)
000090	Glengarriff Harbour and Woodland (Cork)
000197	West of Ardara/ Maas Road (Donegal)

Grey Seal (*Halichoerus grypus*)

Site Code	Name
002172	Blasket Islands (County Kerry)
000495	Duvillaun Islands (County Mayo)
000147	Horn Head and Rinclevan (County Donegal)
000278	Inishboffin and Inishshark (County Galway)
000507	Inishkea Islands (County Mayo)
000204	Lambay Island (County Dublin)
000101	Roaringwater Bay and Islands (County Cork)
000707	Saltee Islands (County Wexford)
000190	Slieve Tooley/Tormore Island/Loughros Beg Bay (Co Donegal)
000328	Slyne Head Islands (County Galway)

