National Parks & Wildlife Service

HARBOUR SEAL POPULATION MONITORING 2009-2012: Report No. 1

REPORT ON A PILOT MONITORING STUDY CARRIED OUT IN SOUTHERN & WESTERN IRELAND, 2009

June 2010

INTRODUCTION

Two species of seal (*Phocidae*) commonly breed in Ireland: the Harbour seal (*Phoca vitulina vitulina*) and the Grey seal (*Halichoerus grypus*). Ireland's current minimum population estimate for Harbour seal numbers 2,905 seals, based on a robust baseline assessment carried out in August 2003 (Cronin *et al*., 2004; Cronin *et al*., 2007). A national breeding population assessment for Grey seal followed in 2005-06 (Ó Cadhla *et al*., 2007) with an ancillary nationwide survey also carried out during the 2007 moult season (Ó Cadhla & Strong, 2007). Thereafter, a scientific evaluation of ongoing monitoring methods for populations of each species (Cronin & Ó Cadhla, 2008) was commissioned by the Research Section of the National Parks & Wildlife Service (NPWS). The report outlined monitoring options for Ireland's seal populations based on data and experience obtained during the national seal population assessments and other scientific considerations. This information, together with the results of seal monitoring work carried out by regional staff since 2003 and the potential operational capacity for annual seal monitoring were also considered by NPWS in the development of monitoring strategies for Harbour seal and Grey seal by mid-2009.

With regard to monitoring Ireland's Harbour seal population, what resulted was a twin-track approach targeting the annual moult season (August-September approximately) when the highest numbers of Harbour seals gather ashore. It consists of the following two components:

1. A full national co-ordinated survey occurring within the 6-year Habitats Directive Article 17 reporting cycle, in order to produce an updated minimum estimate of the population size.
2. Annual monitoring on the ground by NPWS regional staff at key regional haul-out sites in order to deliver recurrent data on approximately 40-50% of the national population.

Both components are designed to complement each other, permitting the two-way 'truthing' of aerial and ground-count data in years when both survey elements coincide and placing the data gathered by either monitoring component into an appropriate context. Furthermore, annual monitoring data from selected sites may be pooled to investigate ongoing regional or local population status & trends.

Finalisation of coherent NPWS seal monitoring strategies in 2009 was followed by initial pilot studies to reassess regional populations of (a) Harbour seal (*Phoca vitulina*) in August-September 2009 and (b) Grey seal (*Halichoerus grypus*) in September-November 2009. These studies aimed to test monitoring survey feasibility and data collection methods for each species in the field and to resolve any logistical or methodological problems encountered.

This report summarises and draws conclusions from the Harbour seal pilot study in which "Annual monitoring" counts were carried out by regional staff at a selection of moult haul-out sites in southern and western Ireland. Support was given by members of the Marine Research Section.

Under the annual Harbour seal monitoring programme developed and tested in 2009, it was intended that:

i. Each selected regional site would be surveyed on three separate sample dates during the moult season (Aug-Sept);
ii. Where possible, a series of hourly counts of seals at each site would occur within two hours of Low Water (i.e. LW ± 2hr), to include a count at the time of Low Water;
iii. Counts of Harbour seals at all haul-out sites would occur in the afternoon where possible.

This pilot monitoring work aimed to be co-ordinated in its approach, via a standard survey protocol, accounting for environmental (e.g., weather, tides) and behavioural variability which greatly affect Harbour seal site-use and haul-out group size.

METHODS

Contact in 2009 between research and regional staff in the southwest, west and northwest regions allowed for the examination of Harbour seal survey methods and data collected since 2003 and identified key regional sites which might be possible to cover in a co-ordinated manner during the forthcoming moult season. A trial set of survey guidelines (Appendix I) and a standardised datasheet (Appendix II) were developed for field testing. The study area was limited in order to conduct surveys on a trial basis while also delivering data on key colonies containing different seal habitats and haul-out group sizes. While counts of Harbour seals were the main survey target, additional data on the prevailing environmental conditions, group composition, seals in the water, Grey seals and any disturbance events encountered were also sought from recorders (*see* Appendix II).

Where possible, the 2009 pilot study set out to survey each selected monitoring site three times between the 10th August and 10th September while allowing for suitable weather conditions and tidal requirements (*see* Appendix I). In most cases surveys were carried out from an established shore-based vantage point giving a clear unrestricted view of all animals in the haul-out group using suitable optical equipment (i.e. telescope and binoculars). However, in the case of larger bays in Counties Cork and Kerry (e.g., Bantry Bay, Kenmare River) which contain numerous small haul-out sites not easily accessed or viewed from land, provision was made to conduct surveys by boat. This has been the preferred method of population monitoring at these important locations for a number of years (Heardman *et al.*, 2006). Considering the complex expansive area to be covered in such cases, individual haul-out sites are normally surveyed once within the optimal LW ± 2hr period, as close to the time of Low Water as possible.

RESULTS

The pilot study in 2009 demonstrated the feasibility of carrying out co-ordinated monitoring counts at regional haul-out sites and data collection methods were tested satisfactorily in the field by the various participants involved (Appendix III). Several regional locations were surveyed simultaneously on the same day given good weather conditions and almost all Harbour seal counts were carried out within the Tide and Time of Day guidelines (Appendix I). Poor weather conditions notably hampered survey effort at a few locations (see location information below) but overall the weather conditions described by surveyors were quite favourable for conducting counts of Harbour seals (i.e. no precipitation, wind strength ≤ Beaufort Force 3-4). Returned datasheets were mostly received in digital (i.e. Word) form and no difficulties in field recording were apparent in the review of survey data or in communications with participating staff.

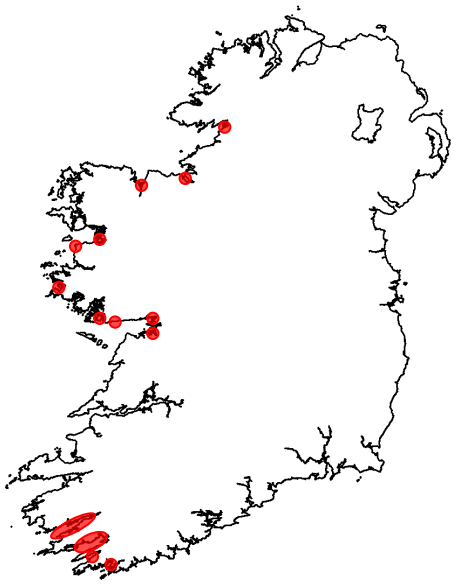

Figure 1. Map of coastal locations (in red) surveyed for Harbour seals during the pilot study in Aug-Sept 2009.

Fourteen coastal locations in southern and western Ireland were surveyed (Fig. 1), many of which contain multiple sites at which moulting Harbour seals have been shown to haul out ashore (Cronin *et al.*, 2004). In

addition to boat-based surveys of inner Bantry Bay and Kenmare River, land-based sub-sampling was also conducted opportunistically at Adrigole Harbour, Co. Cork (n=3 surveys) and Illaunsillagh, Co. Kerry (n=1 survey) respectively. A good range of Harbour seal habitats was covered in the study, from rocky shorelines situated within larger open bays (e.g., Kenmare River) or more exposed coastal locations (e.g., Roonagh, Co. Mayo; Loughaunbeg, Co. Galway) to enclosed, sheltered sites consisting of inshore islets (e.g., Cashla Bay, Co. Galway; Westport Bay, Co. Mayo;) or intertidal estuarine sandbanks (e.g., inner Donegal Bay).

A total of 40 surveys were carried out within the general period targeted, of which 26 were carried out between 10th-31st August. Eight surveys of four locations (Roaringwater Bay, Dunmanus Bay, inner Bantry Bay and Kenmare River) were carried out by boat and these were timed to concentrate recording effort at individual sites around the period of Low Water in order to deliver the maximum numbers of Harbour seals ashore. An additional boat-based survey of inner Bantry Bay was carried out on 8th October. The remaining 32 surveys were carried out from suitable vantage points on land.

Maximum numbers of Harbour seals recorded during the 10th Aug-10th Sept survey period are shown in Table 1. In the southwest, sites in Roaringwater Bay, inner Bantry Bay and Kenmare River reiterated their importance on both regional and national scales (Cronin *et al*., 2004; Heardman *et al.,* 2006). In the western region comparably higher maximum figures were recorded in Kinvara Bay, Oranmore Bay, Cashla Bay, Westport Bay and the Moy estuary. In the northwest, Harbour seal count data obtained from Ballysadare Bay and inner Donegal Bay continued to demonstrate these sites' importance on both regional and national scales. Overall, the combined data collected across all sites in 2009 delivered information on a significant proportion of Ireland's Harbour seal population based on its observed distribution and minimum estimate from August 2003 (Cronin *et al*., 2004).

Table 1. Locations surveyed for Harbour seals during the pilot study in Aug-Sept 2009 and summary count data associated with each location. [n/a = not applicable, i.e. where full recounting of seals at individual haul-out sites within the 2-hour period either side of Low Water (LW) was not possible]

County	**Location name**	**2009** No. of surveys carried out	**Re-sampling** within tidal cycle (i.e. LW ± 2hr)	**2009** Max. count of Harbour seals	**Tidal state** during maximum count
Cork	Roaringwater Bay	3	n/a	74	LW±0.5hr
	Dunmanus Bay	1	n/a	34	LW-1hr
	Adrigole Harbour[1]	3	n/a	35	LW+1hr
	Bantry Bay (inner)	2	n/a	332	-2.8 to +0.3
Kerry	Kenmare River	2	n/a	310	LW±2hr
	Illaunsillagh[2]	1	✓	21	LW-2hr
Galway	Kinvara Bay	3	✓, ✓, ✓	109	LW
	Oranmore Bay	3	✓, ✓, ✓	105	LW-1hr
	Loughaunbeg, Inverin	2	✓, ✓	26	LW-2hr
	Cashla Bay	2	✓, ✓	108	LW-1hr
	Mannin Bay	3	n/a, ✓, n/a	63	LW-2hr
Mayo	Roonagh	3	✓, ✓, ✓	28	LW-1hr
	Westport Bay	3	✓, ✓, ✓	121	LW+2hr
	Moy estuary	3	✓, ✓, ✓	96	LW
Sligo	Ballysadare Bay	3	n/a, ✓, ✓	337	LW+2hr
Donegal	Donegal Bay (inner)	3	✓, ✓, ✓	209	LW+1hr

[1] This site lies within Bantry Bay. [2] This site lies within the Kenmare River.

An initial examination of the prevailing tidal state during which the recorded maximum number of Harbour seals occurred at each location showed no strong pattern of association between the two variables (Table 1) and highest numbers of seals at a site could be found at any stage of the target LW ± 2hr period. Dates in 2009 on which the maximum numbers of Harbour seals were recorded at each location were also highly variable (Fig. 2) and did not suggest a clear geographic (i.e. regional) or temporal pattern of association given gaps in survey effort due to poor weather, etc. The sample sizes in these cases are small however (n=13 and n=14, respectively) and further replication of survey effort will be required to perform statistical analyses on the monitoring data recorded.

Overall, numbers of Harbour seals at locations that were monitored consistently through the two-hour period either side of Low Water did tend to increase from two hours before Low Water (i.e. LW-2hr). However, the outcome of repeated counting thereafter until two hours after Low Water (i.e. LW+2hr) was very variable between (i) individual sites and (ii) individual survey dates. Twenty-six surveys were conducted in this way across 11 locations (Table 1). Examples of summary data collected are given below for Kinvara Bay, the Moy estuary and Donegal Bay (Fig. 3). A number of locations showed declines in the numbers of Harbour seals gathering ashore as a result of local disturbances via human activity that were observed by members of the survey team (e.g., Fig. 3 - Kinvara 1, Moy 1, Donegal 3). Participants in the survey also noted apparent weather-related anomalies in distribution and seal count data.

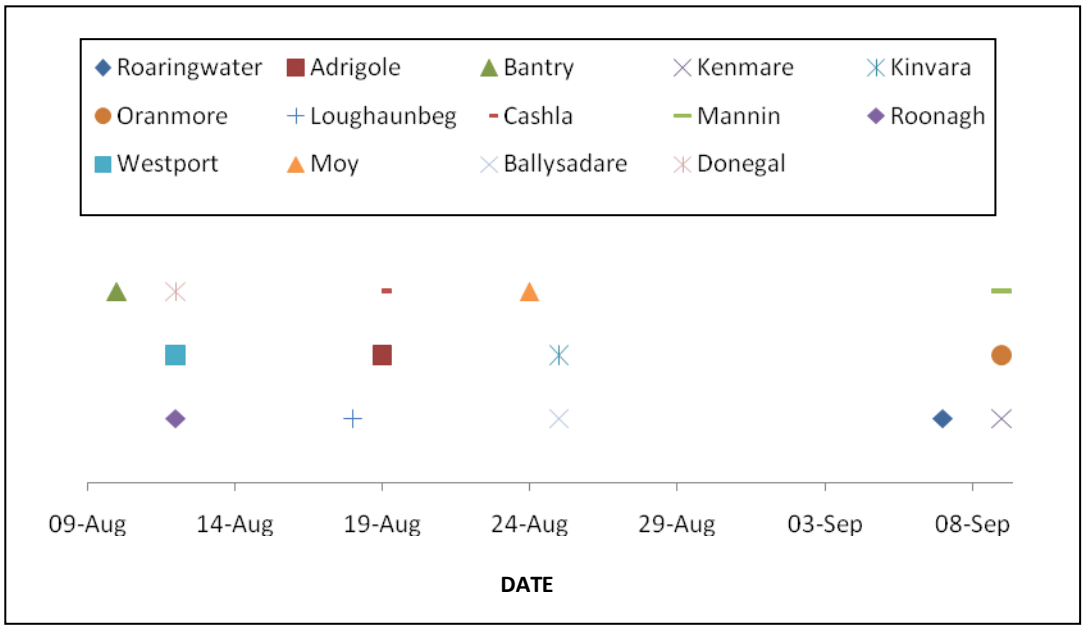

Figure 2. Distribution of dates in Aug-Sept 2009 during which the maximum counts of Harbour seal were recorded at selected pilot study locations. Only sites where two or more counts were performed are included.

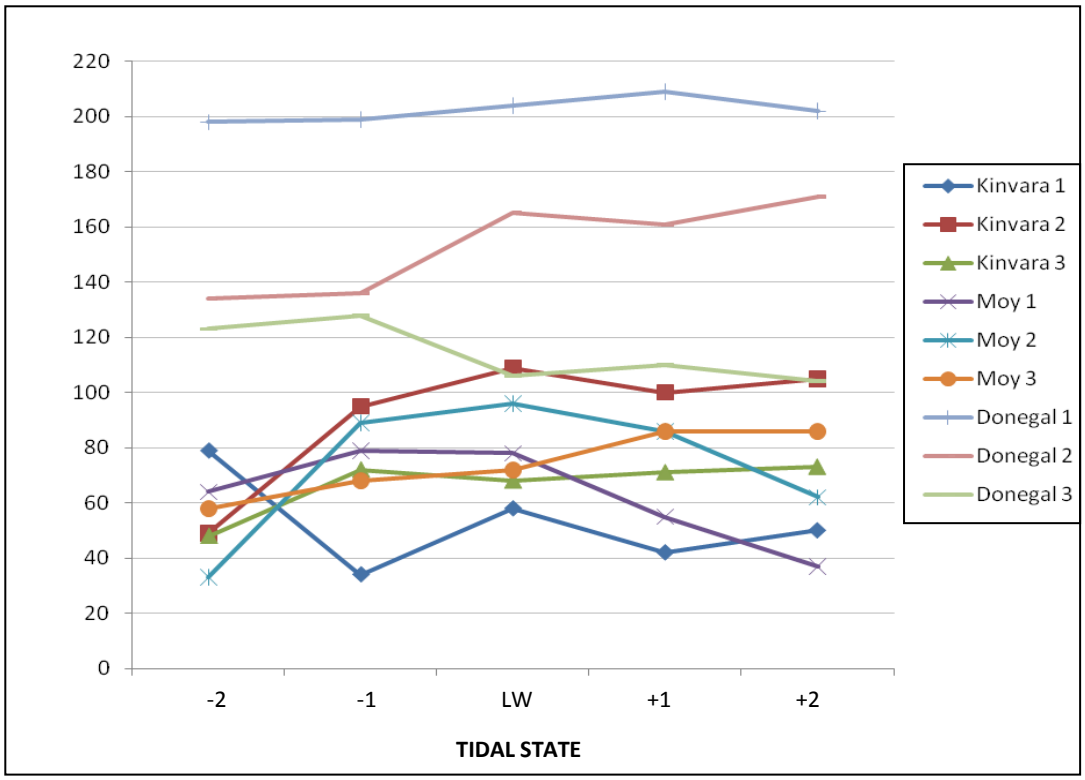

Figure 3. The distribution of Harbour seal count data at three pilot study locations in Aug-Sept 2009, shown according to the prevailing tidal state. The total count for each tidal state is shown where coverage was within 2 hours of Low Water (LW).

Roaringwater Bay
Boat-based survey (n=3).
Maximum count of Harbour seals = 74
Date of maximum count = 7th Sept
Principal sites for Harbour seals continue to be found in the inner reaches of the bay, i.e. Ballydehob and Ringarogy Island/Ilen estuaries. A similar count (70 seals) was recorded on 17th Sept 2008.

Dunmanus Bay
Boat-based survey (n=1).
Maximum count of Harbour seals = 34
Date of maximum count = 25th Aug
The principal sites for Harbour seals were found in the inner reaches of the bay at Carraigphillip and Mucklagh Rocks. In recent years 27 and 29 Harbour seals were recorded on 15th Sept 2007 and 18th Sept 2008 respectively.

Adrigole Harbour, Bantry Bay
Land-based survey (n=3).
Maximum count of Harbour seals = 35
Date of maximum count = 19th Aug
Disturbance, resulting in some seals entering the water, was recorded on two survey dates due to fishing boat and recreational craft (i.e. kayak, dinghy) activity. In recent years 23, 27 and 17 Harbour seals were recorded on 28th Aug 2007, 10th Sept 2007 and 19th Sept 2008 respectively.

Bantry Bay (inner)
Boat-based survey (n=3*). [* *3rd survey took place on 8th Oct*]
Maximum count of Harbour seals = 332
Date of maximum count = 10th Aug
Principal sites for Harbour seals continue to be found in the inner reaches of the bay, i.e. Whiddy Island area and Glengarriff Harbour. In recent years 303, 268 and 329 Harbour seals were recorded on 7th Sept 2006, 10th Sept 2007 and 15th Sept 2008 respectively.

Kenmare River
Boat-based survey (n=2).
Maximum count of Harbour seals = 310
Date of maximum count = 9th Sept
First survey (21st Aug) was less effective due to poor weather conditions. Inclusion of the outermost parts of the bay is difficult in the prescribed time period due to its size and the distribution spread of haul-out groups. In recent years 239 and 285 Harbour seals were recorded on 12th Sept 2007 and 16th Aug 2008 respectively.

Illaunsillagh, outer Kenmare River
Land-based survey (n=1).
Maximum count of Harbour seals = 21
Date of maximum count = 11th Sept
A total of 20 Harbour seals were recorded at this site on 12th Sept 2007.

Kinvara Bay
Land-based survey (n=3).
Maximum count of Harbour seals = 109
Date of maximum count = 25th Aug
Disturbance, resulting in significant numbers of seals entering the water, was recorded on one survey date due to a close approach by two kayakers. The site required surveying from both the east and west sides of the bay in order to obtain a more accurate estimate of all Harbour seals occurring in the bay.

Oranmore Bay
Land-based survey (n=3).
Maximum count of Harbour seals = 105
Date of maximum count = 9th Sept
The site required surveying from both the north and southeast sides of the bay in order to obtain a more accurate estimate of all Harbour seals occurring in the bay.

Loughaunbeg, Inverin
Land-based survey (n=2).
Maximum count of Harbour seals = 26
Date of maximum count = 18th Aug
Weather conditions on the above date were not ideal for conducting Harbour seal counts (i.e. persistent rain, onshore southerly wind: Beaufort force 5-6 in strength).

Cashla Bay
Land-based survey (n=2).
Maximum count of Harbour seals = 108
Date of maximum count = 19th Aug
This total exceeds previous known data for the site and the observed total group size remains to be explained. Hauled out seals were concentrated in the inner (northern) part of the bay.

Mannin Bay
Land-based survey (n=3).
Maximum count of Harbour seals = 63
Date of maximum count = 9th Sept
Weather conditions on one date were not ideal for conducting Harbour seal counts (i.e. southwesterly wind: Beaufort force 5 in strength). Principal sites for Harbour seals continue to be found in the Salt Lough and inner parts of the bay. This requires access for counting from more than one side of the bay in order to obtain a more accurate estimate of all Harbour seals occurring there.

Roonagh
Land-based survey (n=3).
Maximum count of Harbour seals = 28
Date of maximum count = 12th Aug
Weather conditions on one date were not ideal for conducting Harbour seal counts (i.e. onshore southwesterly wind: Beaufort force 4-6 in strength). Disturbance, resulting in some seals entering the water, was recorded on one survey date. This was due to a person walking by.

Westport Bay
Land-based survey (n=3).
Maximum count of Harbour seals = 121
Date of maximum count = 12th Aug
This total exceeds previous known data for the site and the observed total group size remains to be explained. Hauled out seals were concentrated in the northern part of the bay among islets lying between Pigeon Point and Inishraher island. Weather conditions on one date were not ideal for conducting Harbour seal counts (i.e. rain showers, onshore westerly wind: Beaufort force 5 in strength).

Moy estuary
Land-based survey (n=3).
Maximum count of Harbour seals = 96
Date of maximum count = 24th Aug
Weather conditions on one date were not ideal for conducting Harbour seal counts (i.e. southwesterly wind: Beaufort force 4-6 in strength). Disturbance, resulting in some seals entering the water, was recorded on two survey dates. This was due to the close approach of a passing fishing boat and a tourist boat, respectively.

Ballysadare Bay
Land-based survey (n=3).
Maximum count of Harbour seals = 337
Date of maximum count = 25th Aug
Weather conditions on two dates were not ideal for conducting Harbour seal counts (i.e. poor visibility due to mist and west/southwest wind: Beaufort force 4-6 in strength, respectively). A suitably elevated vantage point on the east side of the bay is commonly used to survey the bay using a high magnification telescope. Disturbance, resulting in significant numbers of seals entering the water, was recorded on one survey date. This was due to the close approach of people walking. In recent years peak counts of 365 and 361 Harbour seals were recorded in the bay in July 2007 and June 2008, respectively.

Donegal Bay (inner)
Land-based survey (n=3).
Maximum count of Harbour seals = 209
Date of maximum count = 12th Aug
Principal sites for Harbour seals in inner Donegal Bay continue to be found within the estuary adjacent to Murvagh and Laghy. Disturbance, resulting in some seals entering the water, was recorded on one survey date. This was due to aquaculture personnel working along the shore approximately 100m from the haul-out site.

DISCUSSION

The aim of this initiative was to trial an effective regional monitoring programme that could deliver site monitoring data for a modest proportion of the Irish Harbour Seal population while being logistically and safely achievable using established best practice. Such monitoring would also be expected to deliver sufficiently robust data to complement full national assessments of population status in accordance with the 6-year reporting cycle for the European Commission.

Results from the pilot study carried out in southern and western Ireland demonstrated the feasibility of annual site monitoring for Harbour seals. Weather conditions during the survey were generally favourable for conducting Harbour seal surveys and the provision of three sampling days during the moult season for most monitoring locations allowed for some flexibility to complete surveys within prevailing conditions in August and early September. The return of results in digital format was most useful, there were few problems with data collection and it is recommended that future Harbour seal monitoring data are compiled in a standardised digital format (i.e. Excel data form or spreadsheet).

The 2003 national survey showed that Harbour Seals were widely scattered among 231 distinct haul-out sites (Cronin *et al*., 2004). The vast majority of these sites contained fewer than 50 seals and many sites can only be surveyed effectively by aerial or boat-based means since they are not easily viewed from land. However the sites surveyed in 2009, many of which are designated for Harbour seal, were selected carefully due to their accessibility and local population estimates, and indications from the data are that they returned a significant proportion of the national population. While different to the land-based survey approach, the surveying of inner Bantry Bay and Kenmare River by boat are necessary due to the significant number of sites inaccessible from land. Continued boat-based coverage should be maintained for these locations given their regional and national importance and a well established survey protocol by NPWS staff in the region.

The forty surveys conducted between 10th August and 10th September were a considerable achievement given the pilot nature of this study and generally poor or unstable weather conditions during the summer of 2009. Maximum group sizes of Harbour seals in 2009 were favourable in most cases. However, care must be taken that the 2009 pilot study data are not over-interpreted since the principal methods for survey in 2009 and those employed during the last full population assessment (2003) differed in either year. Most haul-out counts in August 2003 consisted of a single fly-over survey by helicopter equipped with a thermal imaging device and camera equipment and some differences were observed between data gathered from the air and from the ground via 'ground-truthing' depending on the visibility/accessibility of the site (Cronin *et al*., 2004; Cronin *et al*., 2007). In many cases in 2009 three replicate surveys, with counts spanning a c. 4-

hour period, were available from which to select the maximum number of Harbour seals (i) on a given day and (ii) within the prescribed August-September period. The 2009 survey, when carried out in this manner showed the efficacy of this monitoring methodology in allowing for natural variability in the number of seals at a location between dates, time of day, state of tide, weather conditions and other variables (e.g., the influence of human activity at a site).

Further replication of survey effort will assist in the understanding of such explanatory variables and improve estimates of local and regional population size into the future. The incidence of disturbance may be an important factor in this regard at some locations where Harbour seals commonly haul-out ashore in proximity to human activity and the monitoring surveys conducted in 2009 were an effective means of logging the incidence and observed causes of such events.

An updated national population assessment will deliver an appropriate estimate that can be compared with the results of the 2003 baseline survey and can re-establish the context of current monitoring data.

REFERENCES

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 Manuals No. 11. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin. 34 pp.

Cronin, M., Duck, C., Ó Cadhla, O., Nairn, R., Strong, D. & O'Keeffe, C. (2007). An assessment of population size and distribution of harbour seals in the Republic of Ireland during the moult season in August 2003. *J. Zool.* 273(2): 131-139.

Cronin, M. & Ó Cadhla, O. (2008). *NPWS phocid monitoring methods and interval assessment. Recommendations for monitoring of the harbour seal (Phoca vitulina vitulina) & grey seal (Halichoerus grypus) populations in the Republic of Ireland.* Report commissioned by the National Parks & Wildlife Service. Coastal & Marine Resources Centre, University College, Cork. 47pp.

Heardman, C., O'Donnell, D. & McMahon, D. (2006). The status of the harbour seal *Phoca vitulina* L. in inner Bantry Bay, Co Cork and inner Kenmare River, Co. Kerry: 1964-2004. *Ir. Nat. J.* 28(5): 181-191.

Ó Cadhla, O., Strong, D., O'Keeffe, C., Coleman, M., Cronin, M., Duck, C., Murray, T., Dower, P., Nairn, R., Murphy, P., Smiddy, P., Saich, C., Lyons, D. & Hiby, A.R. (2007). *An assessment of the breeding population of grey seals in the Republic of Ireland, 2005*. Irish Wildlife Manuals No. 34. National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin. 60pp.

Ó Cadhla, O. & Strong, D. (2007). Grey seal moult population survey in the Republic of Ireland, 2007. Report to the National Parks & Wildlife Service, Department of the Environment, Heritage and Local Government, Dublin, Ireland. 22pp.

ACKNOWLEDGEMENTS

NPWS: Many thanks to all participants in the fieldwork and data entry, i.e. Carl Byrne, Helen Carty, Pascal Dower, Fiona Farrell, Clare Heardman, Paddy Graham, Gerry Higgins, James Kilroy, Eoin McGreal, Lee McDaid, Oliver Ó Cadhla, Aonghus O'Donaill, Declan O'Donnell, Ger O'Donnell, Barry O'Donoghue, Danny O'Keeffe, Michael O'Sullivan, Andrew Speer, Raymond Stephens, Rebecca Teesdale. Thanks also to Clare Heardman, Declan O'Donnell, Tim Roderick, Denis Strong and Eamonn Kelly for assistance with planning, data provision/review and co-ordination.

We are also grateful to Pat Sweeney for allowing access to the Moy estuary site via Enniscrone Golf Course.

Appendix I – Guidelines for the 2009 Pilot Study

HARBOUR SEAL SURVEY 2009 GUIDELINES

Recording Methods:
Please complete the recording form digitally (if possible) and return as an e-mail attachment. Otherwise return by post. Please complete all boxes on the form (enter n/a for not applicable).

Locations and Sites
Each Survey Location/Bay is a discrete coastal area with a complex of one or more 'haul-out sites' used by individual groups of seals (e.g., Bantry Bay, Moy Estuary). Where a number of haul-out sites are covered, please assign a distinct site letter (a, b, c, etc) and 6-figure grid reference (e.g. H231890) to each one. Please ensure to attach a copy of the relevant OS 1: 50,000 Discovery map(s), showing the location of all haul-out sites (marked by letter) and your vantage point for the count (marked VP).

Frequency of counts during each survey
Counts should cover a minimum period of two hours either side of Low Tide. The ideal is to record five hourly counts, starting at two hours before Low Tide (i.e. Low Tide –2 hrs) or earlier. Finish at Low tide +2 hrs. It would be useful if observers could spend the approx. 4hr period (2 hours before and after low tide) at the site since information on the number of animals hauled-out at various tidal stages is very important.

Time of Day for survey
Wherever possible, counts should be performed on days when Low Tide occurs approximately in the middle of the day or early afternoon (i.e. counting done between 10.00-16.00hrs approx).

Weather
Environmental conditions prior to/during the count can have a very important influence on the sites used by seals and the number of seals ashore at the time. The more precisely you can record weather the better, particularly regarding wind conditions, precipitation type/intensity, cloud cover and even local temperature.

Young seals and adults
Please record all pups and young seals as Juveniles (Juv). Adults should be counted separately. Where relevant, note whether the haul-out site contains both species but record counts of Grey Seals separately. If possible record whether Grey Seals are Adults or Juveniles.

Seals in the water
Any Harbour Seals or Grey Seals seen in the water upon your arrival at the site should be noted. These may (i) move away, (ii) remain nearby or choose to haul out ashore after which they will either be (i) excluded from the next survey count or (ii) included in it, respectively.

Disturbance
Record any disturbance at the time of each count (or in the period between counts) as this will help explain changes, if any, to hourly counts. In the lower part of the form record the type of disturbance and response of the seals (if any).

Contacts
Eamonn Kelly, NPWS, 3rd Floor, The Plaza offices, Headford Road, Galway.
Email: eamonn.kelly@environ.ie Tel. (091) 758432 / (087) 2467005

Appendix II – Datasheet for the 2009 Pilot Study

Comhshaol, Oidhreacht agus Rialtas Áitiúil
Environment, Heritage and Local Government

HARBOUR SEAL SURVEY **Please use CAPITALS or type**

1. Please complete at least one separate form for each day's surveying.
2. Circle or Tick relevant answers where they're provided.
3. A copy of the relevant OS 1:50,000 Discovery map showing all haul-out sites (a, b, c, etc) & your vantage points (marked VP) would also help.
4. Seals already in the water when you arrive should be counted separately.

Survey Location/Bay:	**County:**
Your name:	**Region:** NE ☐ SE ☐ MidS ☐ SW ☐ MidW ☐ W ☐ NW ☐
E-mail address:	**Tel. No:**

Date of survey:	**Time start:**	**Time finish:**
Time of Low Tide (24hr clock):	**Tidal Range:** SPRING TIDES ☐	NEAP TIDES ☐

Grid Reference(s) (if >1 seal haul-out site occurs within Location/Bay give a grid ref. for each site):

(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**	**(g)**
(h)	**(i)**	**(j)**	**(k)**	**(l)**	**(m)**	**(n)**

Haul-out Site ref.	**Time of count**	**Tidal State** e.g. Low -2hr Low +1hr	**Weather** Sunny/ Cloudy/ Rain/Hail/ Showers	**Wind** Dir + Force e.g. SW 3-4	**Total - Harbour Seals**			**Total - Grey Seals**			**Disturbance (Y/N)** Insert details below
					On shore **Adult**	**Juv**	In water	On shore **Adult**	**Juv**	In water	
(a)											

Please record any disturbance during or immediately before the survey count:

None Walker Dog Vehicle Dinghy Fishing boat Aircraft Other activity (please specify)

Briefly state how the seals responded to the disturbance:

Other comments:

Please return completed forms to:
Dr Eamonn Kelly, NPWS, 3rd Floor, The Plaza, Headford Rd, Galway. Email: eamonn.kelly@environ.ie

Appendix III - Participants in the 2009 Pilot Study

Northwest	*West*	*Southwest*
Fiona Farrell	Raymond Stephens	Clare Heardman
Oliver Ó Cadhla	Helen Carty	Declan O'Donnell
Carl Byrne	Gerry Higgins	Danny O'Keeffe
Andrew Speer	Rebecca Teesdale	Paddy Graham
	Oliver Ó Cadhla	Pascal Dower
	Aonghus O'Donaill	Michael O'Sullivan
	Ger O'Donnell	Barry O'Donoghue
	Eoin McGreal	
	Lee McDaid	
	James Kilroy	