

Preliminary analysis of beaked whale strandings in Ireland: 1800 – 2009

EMER ROGAN & GEMA HERNANDEZ-MILIAN

School of Biological Earth and Environmental Sciences, University College Cork, Ireland.

Introduction

One of the longest continuous time series of stranding records comes from Ireland and the UK (Klinowska, 1985). Systematic records have been kept continuously since 1913 and have been published on a regular basis (MacLeod et al., 2004). The published stranding records of cetaceans in Ireland dates back to the 1800s and these were reviewed by Berrow and Rogan (1997). McLeod et al. (2004) reviewed strandings of beaked whales in the UK and Ireland from 1800 to 2002 and Dolman et al., (2010) examined “unusual” stranding events in the UK and Ireland of deep diving species in 2008. In this review, we update the stranded records of beaked whales, correct some strandings records and add some new unpublished information.

Methods

The data included in this review comes from a number of publications, mostly stranding records submitted to the Irish Naturalists’ journal. These latter records are validated by the Irish Whale and Dolphin Group (<http://www.iwdg.ie/>) following a standard procedure which includes photographic evidence, and are peer-reviewed. In addition to that, extended notes are submitted by individuals of rare and unusual strandings. Total body lengths published in feet and inches were converted to metric. The coastal areas around Ireland were divided into four areas: Irish Sea, Celtic Sea, west Ireland and NW Ireland for geographical comparison. Seasonal patterns were examined by divided the seasons up as follows: winter (December - February), spring (March - May), summer (June - August) and autumn (September – November) “Cause of death” was allocated into three very broad categories: bycatch, live stranding and stranded dead/unknown.

Results

132 records of beaked whales have been recorded, comprising at least five species including northern bottlenose whales (n = 50), Cuvier’s beaked whale (n = 48), Sowerby’s beaked whale (n = 14), Gervais whale (n = 1) and True’s beaked whale (n = 11). An additional eight records are of unknown species. All strandings are summarised in Table 1.

Northern Bottlenose whale (*Hyperoodon ampullatus*)

Northern bottlenose whales (NBW) ranged in length from 336cm to 792cm, with most whales stranded recorded between 550 and 650cm (see Figure 1). Examining the stranding pattern over time, more strandings occurred in the last 30 years then previously recorded. Most of the strandings comprised single individuals, but mass strandings occurred on six occasions where group size varied between 2 to 3 individuals. Of the animals where sex was determined, five individuals were male and 12 were female, with 33 unknown. Significantly more animals stranded during the summer months then other months, and in particular in August (Figure 3) and more animals (n = 22) stranded on the west coast then elsewhere

(Figure 4). Interestingly, the Irish Sea, which is a relatively enclosed and shallow sea, had the 2nd highest number of strandings of this species (n = 16).

Within this species, 37 individuals were recorded as stranded (dead), nine individuals were live stranded and four were recorded as bycatch. The live strandings comprised 7 separate events, one with 3 individuals (1 died, others re-floated), one with two individuals (Mackey et al., 1998) and five incidents of single strandings, of which two animals stranded within a few days of each other between 13 and 19th May 2006 on the west coast. The bycatch animals were reported from the 1800s – two in one net on 25th August 1888 and another individual in 1845.

Stomach contents from one individual, “Dolly” who died after unsuccessful refloating attempts (date) had a stomach full of cephalopod beaks.

Cuviers’ beaked whale (*Ziphius cavirostris*)

Forty seven Cuviers’ beaked whales (CBW) have been reported and of those measured, length ranged from 400cm – 914cm (Figure 1). The upper range reported here is greater than usually recorded for this species. It is likely a result of measurement along the curvature as opposed to a straight line measurement, or the measurement was approximated – it was reported as measuring 30 feet. One of the stranding events comprised two individuals, all other strandings were of single individuals. Of the sex of the individuals that were determined, 15 were male, nine were female, with 25 unknown. More strandings occurred in winter (n = 19) and spring (n = 17) than any other time of year (Figure 3) and most strandings occurred on the west coast (n = 39). No strandings were recorded on the Irish Sea coast (Figure 4). Within this dataset, no live strandings of Cuviers’ beaked whale has been reported.

Sowerby’s beaked whale (*Mesoplodon bidens*)

There have been 14 records of Sowerby’s beaked whale (SBW) reported during this time period. Of these, six were female, six male and two unknown. Length ranged from 370 – 476cm (Figure 2). No strong seasonal pattern in strandings (Figure 3) could be detected and strandings predominately occurred on the west coast, with small numbers in the other geographical areas (Figure 4). One animal live- stranded on 20th August 2004 on the south east coast of Ireland. A second individual that was considered recently stranded in 2006 was a female. On examination of the head, this individual had small needle-like teeth located 21.5cm along the lower jaw from the tip of the jaw. These had previously been reported in this species by Taylor, W. (1900) "Notes on the marine mammals of the north-east of Scotland." *Annals of Scottish Natural History* 34:65-69 (Mead pers comm.). The skull was archived in the Natural History Museum in Dublin. Skin samples were sent to Dr Merel Dalebout (University Sydney, Australia) for genetic analysis and results from these analyses confirmed the identification as a Sowerby’s beaked whale (Rogan, unpublished). This animal appeared in a healthy condition with a dorsal blubber depth of 2.8cm. The stomach contained food remains – gadoid otoliths – however there was no evidence of recent feeding. Another animal had wounds consistent with ship strike (Hurley & Murphy, 2005).

True’s (*Mesoplodon mirus*) and Gervais (*Mesoplodon europaeus*) beaked whale

True’s beaked whale (TBW) has been recorded stranded on the Irish coastline on 11 occasions. Most strandings have been reported from the west coast of Ireland, and no strandings have been reported from the Irish sea coast (Figure 4). A freshly dead individual on the south coast of Ireland on 1st June 1997 was determined on post-mortem examination to

have been a live stranding. This individual, a 385cm female had ice cream wrapping in its stomach, possibly ingested during the live stranding event (Gassner et al., 2005). The skull of this individual has been archived in the Ulster Museum in Belfast and was confirmed with genetic analysis (Dalebout pers comm.). Individuals that were measured ranged in length from 376 cm to 550cm.

There is only one confirmed stranding record of a *M. europaeus* (GBW) on the coastline of Ireland. This individual was a 408cm male that stranded on in the north west coast on 22nd January 1989.

An additional eight beaked whales were recorded but not identified to species level. Many of these individuals were in an advanced state of decomposition and they ranged in length from 427cm to >690cm.

Discussion

Records of stranded cetaceans can be used to infer information on a number of different aspects of their biology, including distribution, timing and routes of migration, diet, contaminant levels, age distribution and reproductive status. However, inherent in this is the interpretation of what these stranded individuals represent. In addition to that, this review spans over 200 years and as with all reviews with a long timespan, there are issues and biases and weaknesses with data interpretation, including misidentification, measurement difficulties, and recording effort. There is no doubt that in Ireland, since the formation of the Irish Whale and Dolphin Group (IWDG) that there is more public involvement in reporting strandings, which is difficult to account for prior to this. In addition to that, more information is being gathered for biological studies and records now include information such as whether the animal stranded alive or not. That said, there appears to be an increase in strandings of beaked whales along the Irish coast in the last 10 years (see Figure 5) and an increase in the records of live strandings (Figure 6).

Most strandings occurred on the west coast of Ireland, which is a large area with a large continental shelf, but elsewhere the shelf edge is quite close to the landmass, particularly in the northwest, where the shelf slopes off quickly to the deep waters of the Rockall Trough. Sightings surveys conducted in these areas have recorded Northern Bottlenose whales, Sowerby's beaked whale and there has been one sighting of True's beaked whale (O'Cadhla et al., 2002; SC/53/O15; SC/63/SM13). The high number of bottlenose whale strandings in August and in the Irish Sea is of note. However, MacLeod et al., 2004 reported a high peak in strandings in September. It may be that the Irish Sea is used as a migration corridor or that bottlenose whales are following species into this area. Sightings of northern bottlenose whales have been recorded in this area (Whooley, IWDG pers comm.). The length frequency distribution suggests that most of these animals are immature, as sexual maturity for Northern bottlenose whale was considered to occur at a length of 6.7-7m for females, while males occur when they are slightly larger (7.3-7.6m) (Evans, 1987; MacDonald, 1987; Minasian et al., 1984).

Acknowledgements

We are grateful to all those people who report strandings to us and to the Irish Whale and Dolphin Group. We are also extremely grateful to all those people who have helped out in post-mortem examination including Mick Mackey, Sinead Murphy, Irene Gassner, Evelyn Philpott and Trish Clayton.

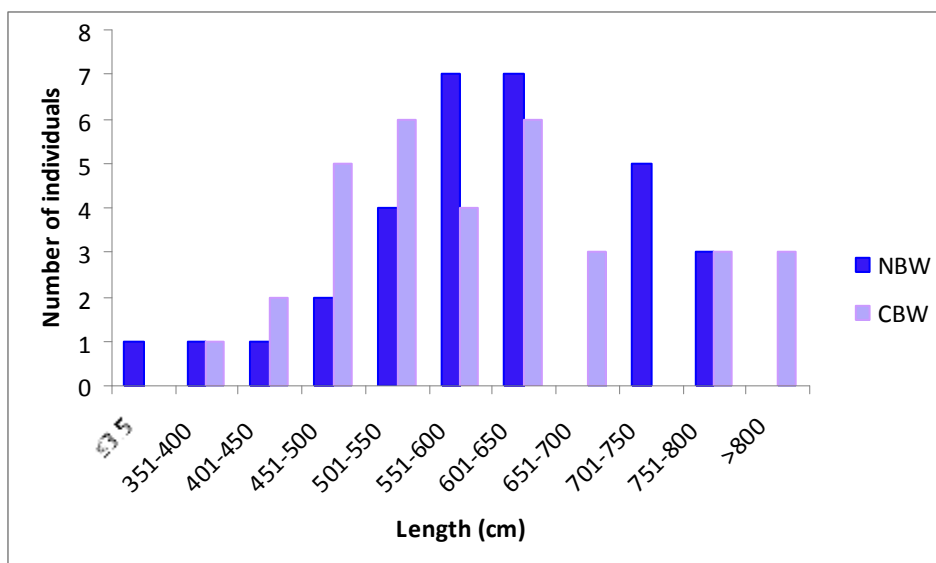


Figure 1 Length frequency distribution of northern bottlenose whale (NBW) and Cuviers' beaked whale (CBW)

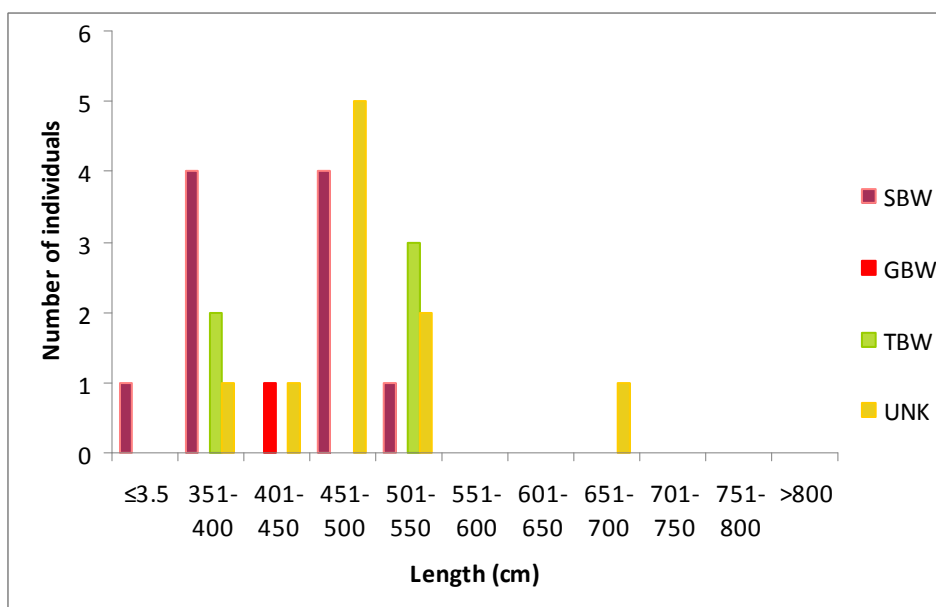


Figure 2 Length frequency distribution of Sowerbys (SBW), Gervais (GBW), True's (TBW) beaked whale and unknown beaked whale.

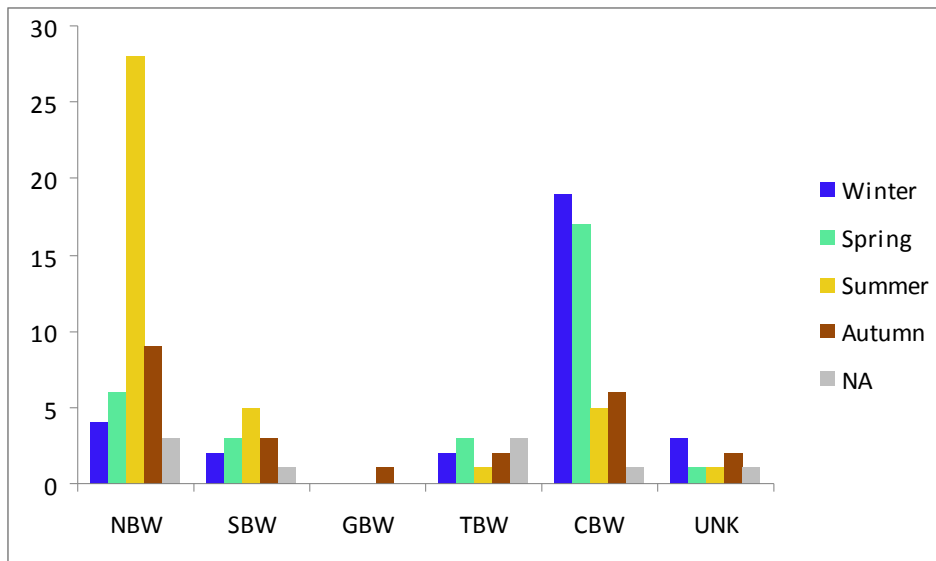


Figure 3 Seasonal distribution of beaked whale strandings along the Irish coastline.

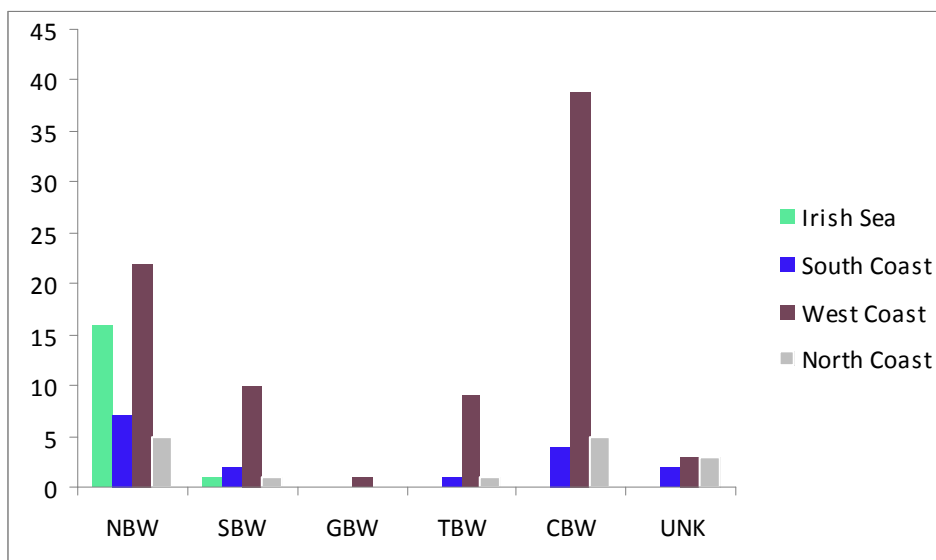


Figure 4 Geographical distribution of beaked whale strandings

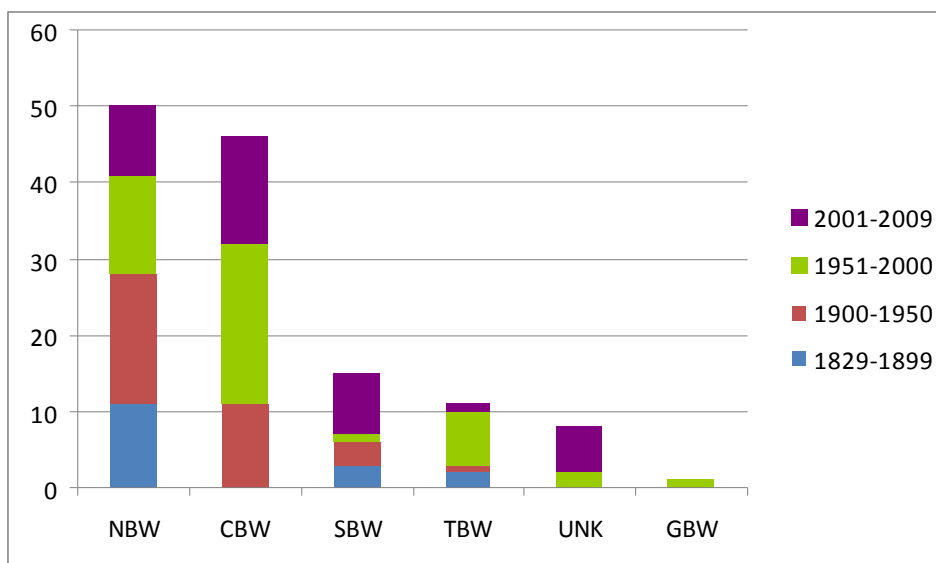


Figure 5 Stranding patterns by species by time

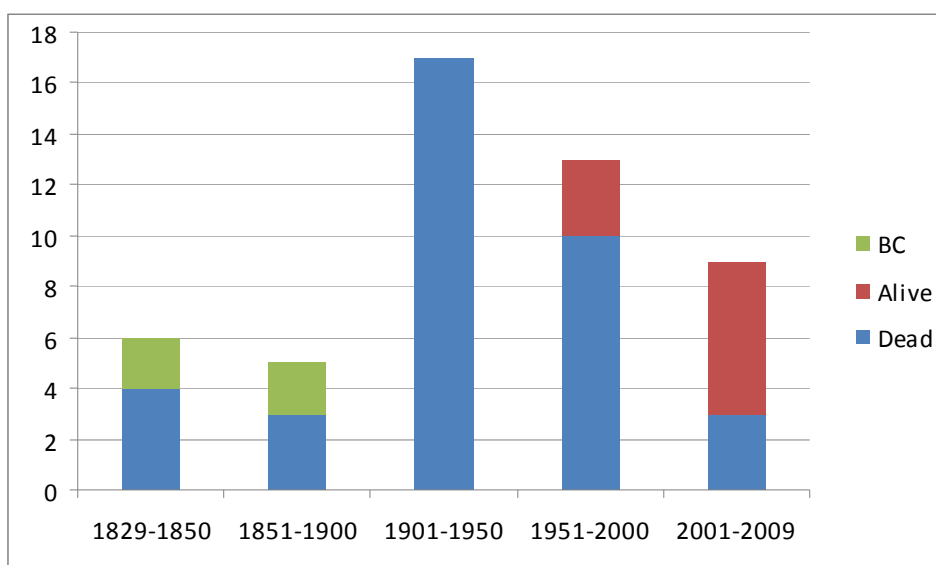


Figure 6 Stranding patterns of bycaught (by), alive and dead individuals

Table 1. Strandings of beaked whales species in the coasts of the Republic of Ireland and North Ireland from 1829 to 2009. NBW, northern bottlenose whale; SBW, Sowerby's beaked whale; GBW, Gervais' beaked whale; TBW, true's beaked whale; CBW, Cuvier's beaked whale; UNK, unknown beaked whale. Sex: F, female; M, male; U, unknown. Age: A, adult; Y, young; U, unknown. Stranding: D, death; A, alive; B, signs of by-catch.

No.	Species	Date	Sex	Size(mm)	Stranding	Place	County	References
1	NBW	20/09/1917	U	762	D	Schull	Co. Cork	Mamm.Rev 27(1) 2008
2	NBW	04/09/1918	U	559	D	Ballvaughan	Co. Clare	Mamm.Rev 27(1) 2008; O'Riordan 1972
3	NBW	12/09/1923	U	518	D	Dundalk Bay	Co. Louth	Mamm. Rev 27(1) 2008; O'Riordan 1972
4	NBW	01/09/1924	U	U	D	Killiney Bay	Co. Dublin	O'Riordan 1972
5	NBW	10/10/1926	U	640	D	Belfast Lough	Co. Antrim	Mamm. Rev 27(1) 2008; O'Riordan 1972
6	NBW	27/08/1931	U	625	D	Aran Is.	Co. Galway	Mamm.Rev 27(1) 2008; O'Riordan 1972
7	NBW	27/08/1931	U	701	D	Aran Is.	Co. Galway	Mamm.Rev 27(1) 2008; O'Riordan 1972
8	NBW	03/09/1932	M	610	D	Ballyvaughan Bay	Co. Clare	Mamm.Rev 27(1) 2008; O'Riordan 1972
9	NBW	27/01/1934	F	U	D	Ballycrovane	Co. Cork	Mamm. Rev 27(1) 2008; O'Riordan 1972
10	NBW	18/08/1936	U	U	D	Dunany Point	Co. Louth	O'Riordan 1972
11	NBW	18/08/1936	U	U	D	Dunany Point	Co. Louth	O'Riordan 1972
12	NBW	07/10/1938	F	378	D	Dungarvan Harbour	Co. Waterford	Mamm.Rev 27(1) 2008; O'Riordan 1972; Macleod 2005
13	NBW	27/01/1947	U	523	D	Carnlough	Co. Antrim	Mamm.Rev. 27(1) 2008
14	NBW	31/08/1947	U	731	D	Whiddy Is., Bantry Bay	Co. Cork	Mamm.Rev 27(1) 2008; O'Riordan 1972
15	NBW	27/09/1954	U	424	D	Ireland's Eye	Co. Dublin	Mamm.Rev 27(1) 2008; O'Riordan 1972
16	NBW	27/09/1954	U	759	D	Ireland's Eye	Co. Dublin	Mamm.Rev 27(1) 2008; O'Riordan 1972
17	NBW	27/09/1954	U	792	D	Ireland's Eye	Co. Dublin	Mamm.Rev 27(1) 2008; O'Riordan 1972
18	NBW	26/09/1959	U	721	D	River Foyle	Co. Derry	Mamm.Rev 27(1) 2008; O'Riordan 1972
19	NBW	30/01/1976	M	592	D	Gormanstown Campside	Co. Dublin	INJ 19(2): 51, Mamm.Rev. 27(1): 2008
20	NBW	31/08/1985	F	612	D	Grogan's Burrow.	Co. Wexford	INJ 21(12): 540-541. mamm.Rev 27(1): 2008
21	NBW	05/12/1985	F	577	D	Ring Strand	Co. Cork	Mamm.Rev. 27(1) 2008; MacLeod 2005
22	NBW	27/06/1991	U	>510	D	Fermoyle	Co. Kerry	Quigley_Flannery_INJ.27.4_2002

23	NBW	19/07/1991	U	U			Strand, Dingle	Co. Cork	Barrow 1992 (ref)(in INJ 27(4): 165-166
24	NBW	17/08/1998	M	600	D		Bear Is.	Co. Cork	INJ 27(4): 165
25	NBW	17/08/1998	U	U	A		Bear Is.	Co. Cork	INJ 27(4): 165
26	NBW	17/08/1998	U	U	A		Bere Island	Co. Cork	INJ 27(4): 165
27	NBW	31/08/1999	F	615	A		Ross Strand, Killala Bay	Co. Mayo	INJ 28(4): 171; Barrow ECS 2010
28	NBW	04/08/2002	F	U	D		Kilkee	Co. Clare	INJ 28(12): 517-519; MacLeod 2005
29	NBW	10/08/2005	F	628	A		Ringaskiddy, Cork Harbour	Co. Cork	INJ 28(10): 414-418
30	NBW	03/05/2006	F	730	A		Fermoyle, Castlegregory	Co. Kerry	O.Connel_Barrow_INJ.28.11_2007
31	NBW	13/05/2006	F	>600	A		Lislary, Ballinfull	Co. Sligo	O.Connel_Barrow_INJ.28.11_2007
32	NBW	19/05/2006	U	336	A		Toberpatrick	Co. Sligo	O.Connel_Barrow_INJ.28.11_2007
33	NBW	27/08/2006	M	496	D		Great Blasket Is.	Co. Kerry	O.Connel_Barrow_INJ.28.11_2007
34	NBW	22/07/2009	F	740	A		Ross Point, Killala Bay	Co. Mayo	O'Connell & Barrow_INJ.31.1_2010
35	NBW	27/08/2009	F	630	A		Whiddy Is., Bantry Bay	Co. Cork	O'Connell & Barrow_INJ.31.1_2010
36	NBW	27/08/2009	M	550	A		Whiddy Is., Bantry Bay	Co. Cork	O'Connell & Barrow_INJ.31.1_2010
37	NBW	12/09/1897	U	U	D		Dunany Point	Co. Louth	O'Riordan 1972
38	NBW	16/09/1839	U	U	B		Ballyholme Bay	Co. Down	O'Riordan 1972
39	NBW	1829-1830	U	U	D		Howth	Co. Dublin	O'Riordan 1972
40	NBW	1829-1830	U	U	D		Howth	Co. Dublin	O'Riordan 1972
41	NBW	1885-1886	U	U	D		Fethard	Co. Wexford	O'Riordan 1972
42	NBW	25/08/1888	U	U	B		Wicklow coast	Co. Wicklow	O'Riordan 1972
43	NBW	25/08/1888	U	U	B		Wicklow coast	Co. Wicklow	O'Riordan 1972
44	NBW	29/10/1845	U	U	B		Cultra	Co. Down	O'Riordan 1972
45	NBW	30/10/1842	U	U	D		Ireland's Eye Is.	Co. Dublin	O'Riordan 1972

46	NBW	31/12/1837	U	U	D		Howth	Co. Dublin	O'Riordan 1972	
47	NBW	5/09/1890	F	550	D		Skerries	Co. Dublin	O'Riordan 1972	
48	NBW	Summer 1910	U	560	D		Ventry	Co. Kerry	Mamm.Rev 27(1) 2007	
49	NBW	summer/1910	U	490	D		Ventry harbour	Co. Kerry	Mamm.Rev 27(1) 2008; O'Riordan 1972	
50	NBW	summer/1910	U	U	D		Ventry harbour	Co. Kerry	O'Riordan 1972	
51	SBW	1872	M	U	D		West coast	west coast	O'Riordan 1972	
52	SBW	21/09/1914	F	361	D		Rosslare	Co. Wexford	INJ 24(6): 108; INJ 24(3): 64; Mamm.Rev. 27(1) 2008; O'Riordan 1972; MacLeod 2005	
53	SBW	03/02/1926	F	U	D		Aran Is.	Co. Galway	Mamm.Rev. 27(1) 2008; O'Riordan 1972; MacLeod 2005	
54	SBW	17/08/1990	F	455	D		Templeboy	Co. Sligo	INJ 24(4): 163; Mamm.Rev. 27(1) 2008	
55	SBW	31/03/2004	M	370	D		Ballyteige Burrow	Co. Wexford	INJ 28(1): 41	
56	SBW	20/08/2004	F	550	A		Pollshone Pt. Courtown	Co. Wexford	INJ 28(9):379-385	
57	SBW	10/08/2006	F	360	D		Doonbeg	Co. Clare	INJ 28(11): 459-466	
58	SBW	12/11/2006	M	476	D		Inishcrone	Co. Sligo	INJ 28(11): 459-466	
59	SBW	25/08/2008	F	460	D		Tra Renvyle	Co. Galway	O'Connell & Berrow (2009)	
60	SBW	10/04/2009	U	400	D		Glasagh Lower, Gweedore	Co. Donegal	O'Connell & Berrow_INJ.31.1_2010	
61	SBW	21/07/2009	U	300-350	D		Kilcummin Strand	Co. Kerry	O'Connell & Berrow_INJ.31.1_2010	
62	SBW	23/11/2009	M	452	D		Spanish Point	Co. Clare	O'Connell & Berrow_INJ.31.1_2010	
63	SBW	31/05/1870	M	U	D		Brandon Point	Co. Kerry	O'Riordan 1972	
64	SBW	9/03/1864	M	U	D		Brandon	Co. Kerry	O'Riordan 1972	
65	GBW	22/01/1989	M	408	D		Kellystown, Ballysadare Bay	Co. Sligo	INJ 23(4): 156. mamm.Rev. 27(1) 2008; Macleod 2005	
66	TBW	09/06/1917	M	518	D		Liscannor	Co. Clare	INJ 16(8): 226-227. Mamm.Rev. 27(1) 2008; O'Riordan 1972; MacLeod 2005	
67	TBW	22/04/1935	M	483	D		Valentia Is.	Co. Kerry	INJ 16(8): 226-227. Mamm.Rev. 27(1) 2008; O'Riordan 1972	
68	TBW	06/10/1967	U	487	D		Cusheen, Ballymore,	Co. Kerry	INJ 16(8): 226-227. Mamm.Rev. 27(1) 2008; O'Riordan 1972	

69	TBW	19/07/1972	F	U	D	Ballinskelligs	Co. Kerry	; Mamm.Rev. 27(1) 2008INJ 21(8): 362
70	TBW	19/11/1987	M	540	D	Doughmakeon Strand,	Co. Mayo	INJ 24(12):508-509; Mamm.Rev. 27(1) 2008
71	TBW	01/06/1997	F	385	A	Long Strand, Owenahincha	Co. Cork	INJ 28(4): 170
72	TBW	20/03/2009	M	470	D	Strandhill	Co. Sligo	O'Connell & Berrow_INJ.31.1_2010
73	TBW	_1899	U	U	D	Galway Bay	Co. Galway	INJ 16(8): 226-227; O'Riordan 1972
74	TBW	<1885	U	376	D	Cruit Island, Donegal Bay	Co. Donegal	INJ 33(12): 142; Anderson 10(6):117-118
75	TBW	1-5/02/1983	M	459	D	Thallabawn Strand, Louisburgh	Co. Mayo	INJ 21(4): 163-164; mamm.Rev. 27(1) 2008; Macleod 2005
76	CBW	01/11/1904	M	640	D	Aran Is.	Co. Galway	INJ 15(7): 212, INJ 13(6):126-127; Mamm.Rev 27(1) 2008; O'Riordan 1972
77	CBW	1969	F	U	D	N Mace Head	Co. Galway	INJ 18(12): 349-350. Mamm.Rev. 27(1) 2008
78	CBW	01/05/1909	U	U	D	Valentia Island	Co. Kerry	INJ 15(7): 212Mamm.Rev 27(1) 2008
79	CBW	13/02/1913	M	793	D	Unionhall	Co. Cork	INJ 15(7): 212; INJ 24(6): 108; Mamm.Rev 27(1) 2008; O'Riordan 1972
80	CBW	18/07/1915	M	579	D	Fethard	Co. Wexford	INJ 15(7): 212; Mamm.Rev 27(1) 2008; O'Riordan 1972; Macleod 2005
81	CBW	03/07/1919	U	550	D	Gweebarra Bay	Co. Donegal	INJ 15(7): 212; INJ 26(7):123; O'Riordan 1972, Macleod 2005
82	CBW	31/12/1929	U	U	D	Rossbeigh	Co. Kerry	O'Riordan 1972
83	CBW	10/02/1931	U	769	D	Achill Is.	Co. Mayo	INJ 15(7): 212. mamm.Rev. 27(1) 2008; O'Riordan 1972
84	CBW	07/02/1935	M	U	D	Inishere, Aran Is.	Co. Galway	INJ 15(3): 72-73; Mamm.Rev 27(1) 2008; O'Riordan 1972
85	CBW	30/11/1943	M	457	D	Slyne Head	Co. Galway	Mamm.Rev. 27(1) 2008; O'Riordan 1972
86	CBW	20/03/1957	M	980	D	Kilkee	Co. Clare	INJ 15(7): 212; O'Riordan 1972
87	CBW	20/11/1964	F	762	D	Dooga, Achill Is.	Co. Mayo	INJ 15(3): 72-73. Mamm.Rev 27(1) 2008; O'Riordan 1972
88	CBW	10/03/1966	M	U	D	Lahinch	Co. Clare	Mamm.Rev. 27(1) 2008; O'Riordan 1972
89	CBW	31/03/1967	M	U	D	Miltown	Co. Clare	Mamm.Rev. 27(1) 2008; O'Riordan 1972

111	CBW	02/03/2007	U	>650	D	Lettergesh Beach, Killary Harbour	Co. Galway	O'Connell & Berrow 2008
112	CBW	27/02/2008	U	>700	D	Aillebrack, Ballyconnee	Co. Galway	O'Connell & Berrow 2009; Dolman et al. 2010
113	CBW	06/03/2008	U	>650	D	Inishcrone	Co. Sligo	O'Connell & Berrow 2009; Dolman et al. 2010
114	CBW	07/05/2008	U	>510	D	Vetry Pier	Co. Kerry	O'Connell & Berrow 2009; Dolman et al. 2010
115	CBW	22/11/2008	U	590	D	Freaghillaun, Ballynakill Bay	Co. Galway	O'Connell & Berrow 2009
116	CBW	08/03/2009	U	530	D	White Strand, Caherciveen	Co. Kerry	O'Connell & Berrow _INJ.31.1_ 2010
117	CBW	28/03/2009	U	465	D	Lenadoon Point, Killala Bay	Co. Sligo	O'Connell & Berrow _INJ.31.1_ 2010
118	CBW	09/04/2009	F	600	D	Terman, Maghery	Co. Donegal	O'Connell & Berrow _INJ.31.1_ 2010
119	CBW	--/06/1964	U	910	D	Slyne Head	Co. Galway	INJ 15(7): 212; Mamm.Rev 27(1) 2008
120	CBW	00/06/1964	U	914	D	Dooloughan,	Co. Galway	INJ 15(7): 212; O'Riordan 1972
121	CBW	1969	F	U	D	Mace Head	Co. Galway	INJ 18(12): 349-350.
122	CBW	9/06/1915-16	U	U	D	Liscannor	Co. Clare	INJ 27(10/11): 164
123	CBW	Summer 1929	U	U	D	Valentia Is.	Co. Kerry	Mamm.Rev. 27(1) 2008; O'Riordan 1972
124	UNK	01/01/1999	U	>500	D	Dogsrock	Co. Wexford	Rendle_Rogan_INJ.26.12_ 2001
125	UNK	04/12/2002	U	427	D	Allihes, Beara	Co. Cork	INJ 28(1): 37-40
126	UNK	29/09/2004	U	U	D	West Strand, Portrush	Co. Antrim	INJ 28(9): 379-385
127	UNK	24/06/2006	U	400	D	Inishtrahull	Co. Donegal	INJ 28(11): 459-466
128	UNK	21/01/2008	U	>520	D	Sherkin Is.	Co. Cork	O'Connell & Berrow (2009); Dolman et al. 2010
129	UNK	13/02/2008	M	550	D	Back Strand, Streedagh	Co. Sligo	O'Connell & Berrow (2009); Dolman et al. 2010
130	UNK	02/04/2008	U	>690	D	Rossnakill, Fanad	Co. Donegal	O'Connell & Berrow (2009)
131	UNK	~1990s	U	U	D	Clew Bay	Co. Mayo	INJ 28(12): 517-519

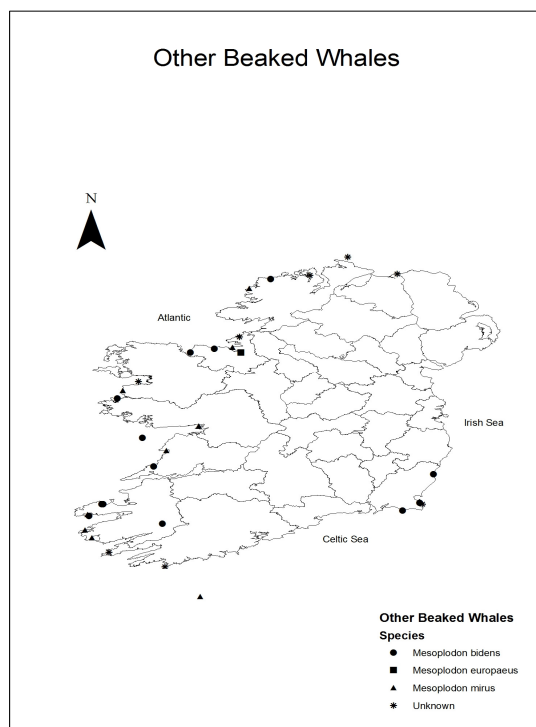
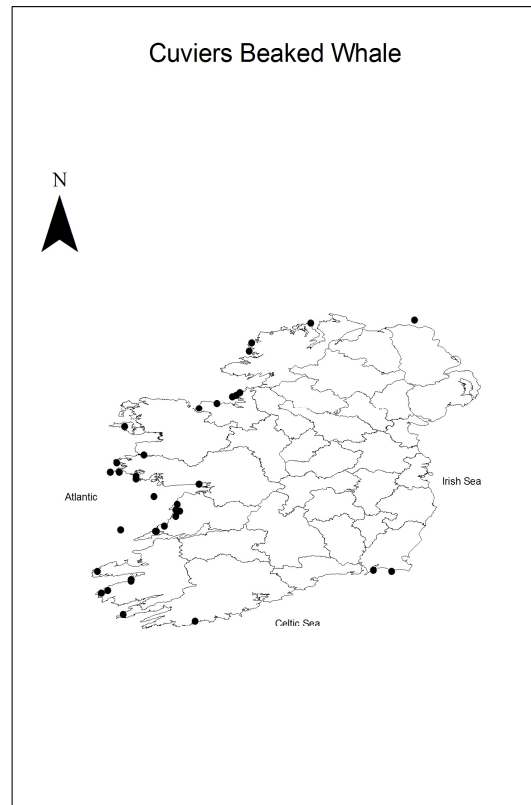
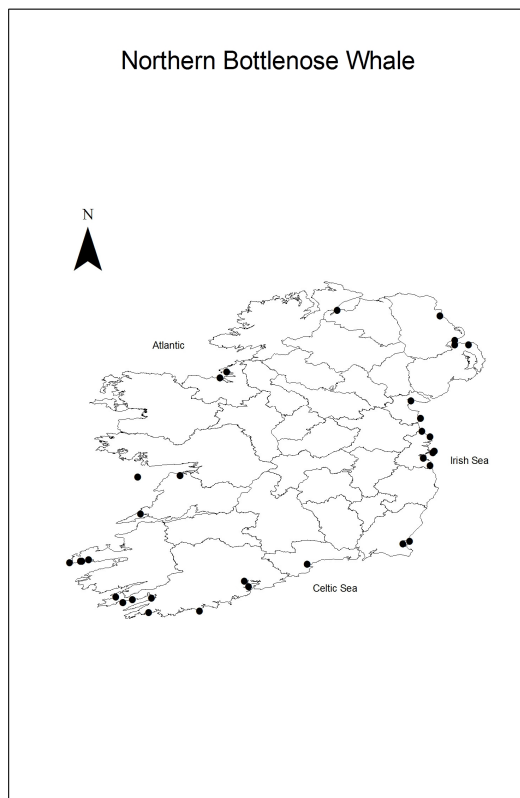


Figure 7 Stranding locations of Northern bottlenose whale, Cuvier's beaked whale and other beaked whale species (True's, Sowerby's, Gervais' and unknown) on the Irish coastline from 1829 to 2009.

References

- Anderson, R.J. 1901. A Note on a Beaked Whale, *Mesoplodon hectori*, Gray. The Irish Naturalists's' Journal 10(6): 117-119
- Anderson, R.J. 1904. The Teeth in *Mesoplodon hectori*. The Irish Naturalists's' Journal 13(6): 126-127
- Anonymous. 1905. Irish Cetaceans. The Irish Naturalists's' Journal 14(8): 183
- Anonymous. 1915. Cetacea Stranded on the Coasts of the British Islands. The Irish Naturalists's' Journal 24(6): 108
- Anonymous 1917. Whales and Dolphins Stranded in Ireland. The Irish Naturalists's' Journal 26(7): 123
- Anonymous 1918. Whales and Dolphins Stranded in Ireland. The Irish Naturalists' Journal 27(10/11): 164
- Anonymous 1919. A new British whale. Nature 103: 237
- Anonymous. 1921. Whales and Dolphins Stranded on the Irish Coast during 1919 and 1920. The Irish Naturalists' Journal 30(6): 71-72
- Anonymous. 1924. The Beaked Whales. The Irish Naturalists' Journal 33(12): 142
- Berrow, S. 2000. Ziiphids recorded in Irish waters. ECS Beaked whale Workshop: Cork
- Berrow, S. 2003. Correction: Cuvier's Whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 27(8): 324
- Berrow, S., Atkinson, J., O'Connell, M. & Wall, D. 2007. Additional Unpublished Stranding Records from the Irish Whale and Dolphin Group. The Irish Naturalists' Journal 28(12): 517-519
- Berrow, S. & Dalebout, M.L. 2002. Cuvier's Whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 27(4): 167-168
- Berrow, S., Dalebout, M.L. & Conroy, J. 2002. Cuvier's Whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 27(4): 168-169
- Berrow, S. Nunn, J., Flannery, K. & Rogan, E. 1995. *Adula simpsoni* (Marshall, 1900) Recorded from a Whale Skull Trawled up off South-West Ireland. The Irish Naturalists' Journal 25(4): 150-151
- Berrow, S. & Rogan, E. 1997. Review of cetaceans stranded on the Irish coast, 1901-95. Mammal Review 27(1): 51-76
- Berrow, S. & Storer, J. 2001. Cuvier's Beaked Whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 26(12): 475-476
- Bruton, T., Cotton, D. & Enright, M. 1989. Gulf Stream Beaked Whale *Mesoplodon europaeus* (Gervais). The Irish Naturalists' Journal 23(4): 156
- Cabot, D. 1965. Cuvier's Whale *Ziphius cavirostris*, on Achill Island, Co. Mayo. The Irish Naturalists' Journal 15(3): 72-73
- Cabot, D. 1966. A Further Example of Cuvier's Whale *Ziphius cavirostris* from the West Coast of Ireland. The Irish Naturalists' Journal 15(7): 212
- Cawley, M., Farley, J.S. & MacLoughlin, E. 1983. Cuvier's Whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 21(4): 185
- Cotton, D.C.F. 1984. Cuvier's Whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 21(8): 259
- Cotton, D.C.F. & Bruton, T. 1992. Sowerby's Whale *Mesoplodon bidens* (Sowerby). The Irish Naturalists' Journal 24(4): 163
- Cotton, D.C.F. & Murphy, S. 2004. Cuvier's Beaked Whale *Ziphius cavirostris* Cuvier, in Co Sligo. The Irish Naturalists' Journal 27(9): 364-365
- Dolman, S. J., Pinn, E., Reid, R.J., Barley, J.P., Deaville, R., Jepson, P.D., O'Connell, M., Berrow, S. Penrose, R.S., Stevick, P.T., Calderan, S., Robinson, K.P., Brownell Jr, R.L. and Simmonds, M.P. 2010. A note on the unprecedented strandings of 56 deep-diving whales along the UK and Irish coast. Marine Biodiversity Records 3: e16
- Fairley, J.S. 1989. Cuvier's Whale *Ziphius cavirostris* (Cuvier). The Irish Naturalists' Journal 23(4): 155
- Gassner, I., Rogan, E. & Bruton, T. 2005. A Live Stranding of True's Beaked Whale *Mesoplodon mirus* True. The Irish Naturalists' Journal 28(4): 170
- Gresson, R.A.R. & O'Riordan, C.E. 1969. Carcase of True's Beaked Whale, *Mesoplodon mirus* True, near Dingle, Co. Kerry. The Irish Naturalists' Journal 16(8): 226-227
- Holmes, J.M.C. & O'Connor, J.P. 1977. A Stranding of a Bottle-Nosed Whale, *Hyperoodon ampullatus* (Forster) on the East Coast of Ireland. The Irish Naturalists' Journal 19(2): 51
- Hurley, J. 1985. Bottle-Nosed Whale *Hyperoodon ampullatus* (Forster). The Irish Naturalists' Journal 21(12): 540-541
- Hurley, J. & Murphy, S. 2005. Sowerby's Beaked Whale *Mesoplodon bidens* Sowerby, in Co Wexford. The Irish Naturalists' Journal 28(1): 41
- Knox, A.G. 1969. A Skull of Cuvier's Whale Found at Naran, W Donegal. The Irish Naturalists' Journal 16(6): 177

- Linnie, M. & Sleeman, D.P. 1984. True's Beaked Whale *Mesoplodon mirus* True. The Irish Naturalists' Journal 21(8): 362
- Mackey, M., Bruton, T. & Hurley, J. 2002. Cuvier's whale *Ziphius cavirostris* Cuvier. The Irish Naturalists' Journal 27(4): 167
- Mackey, M., Bruton, T. & O'Donnell, G. 1998. Cuvier's Whale *Ziphius cavirostris*. The Irish Naturalists' Journal 26 (3/4): 123
- MacLeod, C.D. 2000. Review of the distribution of *Mesoplodon* species (order Cetacea, family Ziphiidae) in the North Atlantic. Mammal review 30(1): 1-8
- MacLeod, C.D., Pierce, G.J. & Santos, M.B. 2004. Geographic and temporal variations in strandings of beaked whales (Ziphiidae) on the coasts of the UK and the Republic of Ireland from 1800-2002. Journal of Cetacean Research Management 6(1): 79-86
- MacLeod, C. 2005 Niche Partitioning, Distribution And Competition In North Atlantic Beaked Whales. Thesis. University of Aberdeen
- Murphy, S. & Rogan, E. 2004. Records from the Irish Whale and Dolphin Group for 2000-2001. The Irish Naturalists' Journal 27(9): 357-364
- Ó Cadhla, O., Mackey, M., Aguilar de Soto, N., Rogan, E. & Connolly, N. 2003. Cetaceans and Seabirds of Ireland's Atlantic Margin. Volume II – Cetacean distribution & abundance. Report on research conducted under the 1997 Irish Petroleum Infrastructure Programme (PIP): Rockall Studies Group (RSG) projects 98/6, 99/38 and 00/13. 83pp.
- O'Connell, M. & Berrow, S. 2006. Records from the Irish Whale and Dolphin Group for 2006. The Irish Naturalists' Journal 28(11): 459-466
- O'Riordan, C.E. (1972) Provisional list of Cetacea and turtles stranded or captured on the Irish coast. *Proceedings of the royal Irish Academy*. 72b: 253-274.
- O'Riordan, C.E. 1976. Marine Fauna Notes from the National Museum of Ireland – III. The Irish Naturalists' Journal 18(12): 349-350
- Philpott, E. & Rogan, E. 2007. Records from the Irish Whale and Dolphin Group for 2005. The Irish Naturalists' Journal 28(10): 414-418
- Philpott, E., Wall, D. & Rogan, E. 2007. Records from the Irish Whale and Dolphin Group for 2004. The Irish Naturalists' Journal. 28(9): 379-385
- Quigley, D.T.G. & Flannery, K. 2002. Northern Bottlenose Whale *Hyperoodon ampullatus* (Forster 1770). The Irish Naturalists' Journal 27(4): 165-166
- Rendle, L. & Rogan, E. 2001. Records from the Irish Whale and Dolphin Group. The Irish Naturalists' Journal 26(12): 472-475
- Rogan E. & Clayton, P. 2005. A Live Stranding of a Northern Bottlenose Whale *Hyperoodon ampullatus* (Forster). The Irish Naturalists' Journal 28(4): 171
- SC/53/O17 O'Cadhla et al., 2001. Summer distribution and abundance of cetaceans in western Irish waters and the Rockall Trough.
- SC/63/SM13 Canadas et al., 2011. Abundance of beaked whales in European waters.
- Scharff, R.F. 1915. A Beaked Whale on the Wexford Coast. The Irish Naturalists' Journal 24(3): 64
- Scharff, R.F. 1916. Cuvier's Whale in Irish Waters. The Irish Naturlists' Journal 25(4): 68
- Scharff, R.F. 1919. A New Irish Whale. The Irish Naturalists' Journal 28(11/12): 130-131
- Scharff, R.F. 1920. A New Irish Whale. A correction. The Irish Naturalists' Journal 29(3): 27
- Sleeman, D.P. 1988. Some Whale Arches in Co. Cork. The Irish Naturalists' Journal 22(12): 538-539
- Smiddy, P. 1997. Cuvier's Whale *Ziphius cavirostris* Cuvier: Correction. The Irish Naturalists' Journal 25 (11/12): 448-449
- Stendall, J.A. 1926. Bottle-Nosed Whale in Belfast Lough. The Irish Naturalists' Journal 1(8): 153
- Viney, M. & Fairley, J.S. (1983) A stranding of True's beaked whale *Mesoplodon mirus* in Co.Mayo. *Irish Naturalists's Journal*. 21(4): 163-164.
- Viney, M. 1994. True's Beaked Whale *Mesoplodon mirus* True. The Irish Naturalists' Journal 24(12): 508-509
- Wilson, J.P.F. & Pitcher, T.J. 1979. A Cuvier's Whale *Ziphius cavirostris* Cuvier Stranding on Rathlin Island. The Irish Naturalists' Journal 19 (10): 372