

# Whooper *Cygnus cygnus* and Bewick's *C. columbianus bewickii* Swans in Ireland: results of the International Swan Census, January 2010

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A census of Whooper Swan *Cygnus cygnus* and Bewick's Swan *C. columbianus bewickii* took place over the weekend of 16/17 January 2010 in Ireland. This census was the sixth in a series of international co-ordinated censuses of the European flyways of these species that take place every four to five years. A total of 1,225 count units were covered, 390 in Northern Ireland and 835 in the Republic of Ireland. Some 14,981 Whooper Swans were counted in 387 flocks, representing an increase of 6% in the total number of birds recorded when compared with the 2005 census results. This was the coldest January on record since 1985, and swans were widely distributed, with some occurring considerable distances from their normal wintering haunts. Breeding success was estimated at 17.5% young in the overall population, and was higher in Northern Ireland (19.1%) than in the Republic (16.7%). Habitat usage reflected the cold and dry conditions during the census, with far fewer birds recorded on lakes, which were considerably more frozen when compared with previous censuses, and much higher proportions on dry improved pasture. A total of 14 internationally important and nine nationally important sites were identified, with Loughs Neagh and Beg, Lough Foyle, Upper Lough Erne, the Cashen River and Estuary and Lough Swilly being the most important. The Bewick's Swan continued to decline, and just 80 were counted in six flocks. As in previous censuses, sites in County Wexford supported by far the greatest number of birds.

## Introduction

Each winter, Ireland plays host to more than 10,000 migratory swans distributed across low-lying wetland and grassland habitats. They are predominantly Whooper Swan *Cygnus cygnus*, with small numbers of Bewick's (or Tundra) Swan *C.*

*columbianus bewickii*. Whooper Swans have a widespread breeding distribution across Northern Europe (including Iceland), Russia and Siberia. Their wintering distribution is patchy, although relatively well defined. Five populations are recognised (Brazil 2003, Wetlands International 2006), and birds over-wintering in Ireland come almost exclusively from



**Plate 1.** Whooper Swan (Paddy Dwan).

the Icelandic-breeding population. The breeding range of the Tundra Swan *Cygnus columbianus* spans the northern coastlines of North America, Russia and Siberia. Their wintering range is also quite dispersed. There are five populations of Tundra Swan, two of which are of the race known as Bewick's Swan. The majority of these breed in northern Russia and winter in northwest Europe (Wetlands International 2006). These migratory swan populations have been monitored in Britain and Ireland since the 1950s. The first co-ordinated international census for both species was carried out in 1986, and they have since been conducted every four to five winters, usually in January. These censuses aim to monitor numbers of these species, and also to assess breeding success and changes in habitat preferences.

The Icelandic-breeding Whooper Swan population increased from 16,742 in 1986 to 26,366 in 2005 (Worden *et al.* 2009). Numbers in Ireland over the same period increased from 10,306 (Merne and Murphy 1986) to 14,079 (Worden *et al.* 2009). Therefore, Ireland was found to support just over half of the Icelandic population in winter. The number of Bewick's Swan wintering in Britain and Ireland declined by 5% between 2000 and 2005. In Ireland, however, numbers have declined at a much greater rate, from 2,700 during a census in 1956/57 (Merne 1977), to 382 in 2000 (Colhoun *et al.* 2000, Robinson *et al.* 2004a), despite an increase in Britain over the same period. Just 224 were recorded in Ireland in 2005 (Worden *et al.* 2006). This paper presents the results of the sixth international census, which took place over the weekend of 16/17 January 2010.

## Methods

The overall census in Ireland, Britain and Iceland was co-ordinated by the Wildfowl and Wetlands Trust. Counts in Ireland were organised by the Irish Wetland Bird Survey (I-WeBS) Office and the Irish Whooper Swan Study Group (IWSSG). The census was scheduled for the weekend of the 16/17 January 2010. Most of the surveying was carried out by volunteer birdwatchers and professional staff involved in I-WeBS or WeBS (the Wetland Bird Survey in the UK). Surveyors included conservation staff from the National Parks and Wildlife Service (in the Republic of Ireland), Northern Ireland Environment Agency, Royal Society for the Protection of Birds and Craigavon Borough Council (in Northern Ireland). IWSSG members also undertook surveying, especially in areas not regularly covered by waterbird counters.

Every attempt was made to ensure that all areas which held birds during previous international swan censuses, and in recent winters during regular I-WeBS and WeBS core counts were covered. Full details of the methods have been published in Colhoun *et al.* (2000). Most of the totals in this paper are presented at county level. Site totals are expressed as an amalgamation of totals from those count units which are part of the same wetland complex, and include the collection of roosting and feeding areas used by the same flock(s) of swans.

In order to ensure complete coverage of areas with limited accessibility, an aerial survey was conducted on 22 January and covered the Rivers Suck, Brosna and Shannon Callows (south of Athlone), Lough Derg and the Shannon and Fergus Estuary. However, many of these sites were also at least partially covered from the ground during the census weekend. Once data were compiled, an assessment was made for each site complex of the extent of coverage, and aerial census results were used where ground-based coverage was considered to be incomplete. Habitat usage (proportion of habitats) was compared with previous censuses (2000 and 2005) using the G-test of goodness of fit which is used for frequency data (Sokal and Rohlf 1995).

## Results

### Coverage

Site coverage was good with a total of 1,225 count units surveyed by 181 participants (835 in the Republic of Ireland and 390 in Northern Ireland). A large majority of sites were surveyed on the scheduled weekend or within three days on either side. Some 130 (11%) count units were covered outside this period, and included Upper and Lower Lough Erne, which were uncountable due to fog on the co-ordinated count weekend. In the Republic, 32 count units were covered outside this period, ranging from 10 to 31 January. The

scheduled count weekend marked the beginning of a thaw in what was reported as the coldest January in 25 years (Met Éireann 2010). The temperatures rose slowly and the more normal weather pattern of Atlantic depressions over Ireland became re-established. Due to the severity of the winter, many of the water bodies were almost completely frozen during the census. As a result, swan flocks were reported as being widely dispersed and in locations where they had not previously been recorded.

## Whooper Swan

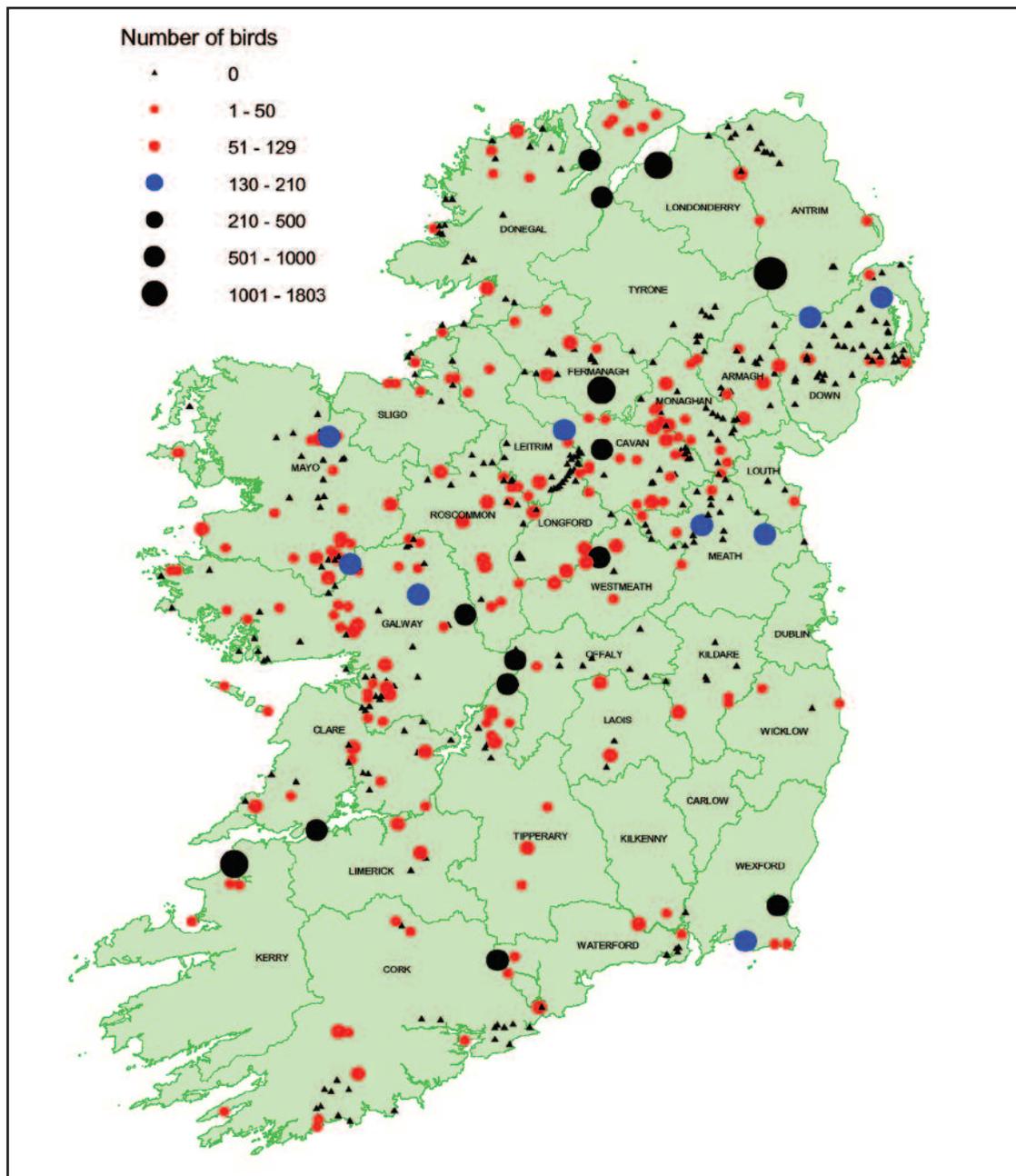
Whooper Swans were recorded in all counties except Carlow and Dublin. In total, 14,981 Whooper Swans were counted in 387 flocks (Table 1). This represents an increase of 6% in the number of birds recorded when compared with the 2005 census results. Increases were recorded in both the Republic and Northern Ireland, with respective totals of 10,365 and 4,616 counted. The distribution of Whooper Swans during this

**Table 1.** Numbers, age structure and brood sizes of Whooper Swans in Ireland in January 2010. Figures in parentheses represent percentage change when compared with the 2005 census.

County	Total	Flocks	Aged	% juv	Total no. of broods	Brood size						Mean brood size
						1	2	3	4	5	6	
Antrim	520 (-13)	13 (0)	515	16.9	47	22	13	9	3			1.85
Armagh	508 (-24)	13 (-41)	508	19.7	46	11	23	7	3	1	1	2.20
Down	548 (33)	10 (0)	544	22.2	37	15	12	6	3	1		2.00
Fermanagh	1,020 (12)	27 (-4)	1,011	16.4	53	17	17	12	6	1		2.19
Londonderry	1,673 (9)	29 (61)	1,092	22.9	117	50	28	21	13	3	2	2.12
Tyrone	347 (74)	10 (-9)	347	12.4	24	14	4	5			1	1.79
<b>NI total</b>	<b>4,616 (7)</b>	<b>102 (0)</b>	<b>4,017</b>	<b>19.1</b>	<b>324</b>	<b>129</b>	<b>97</b>	<b>60</b>	<b>28</b>	<b>6</b>	<b>4</b>	<b>2.06</b>
Cavan	865 (3)	29 (-15)	665	18.3	13	5	5	2		1		2.00
Clare	639 (14)	17 (-29)	512	15.2	44	17	12	11	3	1		2.07
Cork	215 (-33)	10 (150)	188	17.6	10	2	1	3	3	1		3.00
Donegal	767 (-28)	19 (-10)	836	20.9	65	16	23	13	10	2	1	2.42
Galway	1,104 (37)	35 (46)	937	14.6	60	26	17	9	3	4	1	2.08
Kerry	537 (38)	6 (20)	469	13.0	4		1			1	2	4.75
Kildare	112 (129)	5 (67)	112	22.3	10	3	2	5				2.20
Kilkenny	1	1	1	0.0	0							
Laois	151 (107)	2 (100)	149	19.5	3		1	2				2.67
Leitrim	130 (-74)	12 (-66)	124	16.9	0							
Limerick	194 (-19)	2 (-67)	194	21.6	20	7	7	4	1	1		2.10
Longford	210 (-11)	8 (-20)	132	15.2	1			1				3.00
Louth	25	1	0									
Mayo	966 (2)	33 (-6)	698	20.2	19	6	5	2	6			2.42
Meath	416 (65)	7 (0)	225	12.0	5		4	1				2.20
Monaghan	414 (16)	23 (92)	337	19.0	12	1	2	5	1	3		3.25
Offaly	650 (-11)	9 (0)	335	12.2	8	4	1	2	1			2.00
Roscommon	774 (16)	24 (4)	443	15.8	15	7	4	2	1	1		2.00
Sligo	186 (-11)	9 (-25)	182	12.6	8	2	4		2			2.25
Tipperary	276 (-11)	8 (14)	159	17.0	17	1	4	10	2			2.76
Waterford	485 (43)	11 (83)	411	13.4	22	3	10	7	1	1		2.41
Westmeath	566 (59)	7 (40)	529	14.9	29	11	9	5	2	2		2.14
Wexford	641 (38)	5 (0)	196	18.9	11	1	2	3	3	1	1	3.36
Wicklow	41 (-2)	2 (100)	13	15.4								
<b>RoI total</b>	<b>10,365 (6)</b>	<b>285 (-1)</b>	<b>7,847</b>	<b>16.7</b>	<b>376</b>	<b>112</b>	<b>114</b>	<b>87</b>	<b>39</b>	<b>19</b>	<b>5</b>	<b>2.35</b>
<b>All-Ireland total</b>	<b>14,981 (6)</b>	<b>387 (-1)</b>	<b>11,864</b>	<b>17.5</b>	<b>700</b>	<b>241</b>	<b>211</b>	<b>147</b>	<b>67</b>	<b>25</b>	<b>9</b>	<b>2.22</b>

census is illustrated in Figure 1. Swans were reported from many new locations, largely owing to the frozen conditions, and there was considerable variation at county level compared with the 2005 Census (Table 1). Increases were evident in 17

counties and declines in 11. Greatest percentage increases occurred in Counties Kildare, Laois, Tyrone, Meath and Westmeath, while the most significant percentage declines occurred in Leitrim, Cork, Donegal and Armagh.



**Figure 1.** Distribution of Whooper Swan flocks in Ireland in January 2010. Large black and blue symbols represent internationally and nationally important flocks based on 1% thresholds of 210 and 130 birds respectively. Note that the symbol represents a central location of each wetland site, and not the precise location where the flock was recorded.

The 1% flyway and all-Ireland thresholds are currently estimated at 210 and 130 respectively (Wetlands International 2006, Crowe *et al.* 2008). Accordingly, internationally and nationally important concentrations were recorded at 14 and nine sites respectively (Table 2), and large-scale variation in numbers occurred at these sites when compared with the 2005 data. The top three Whooper Swan sites were the same as in the 2005 census, all located in Northern Ireland, at Loughs Neagh and Beg, Lough Foyle, and Upper Lough Erne. The Cashen River (Ballyouneen area) and Estuary in County Kerry, Lough Swilly, Wexford Harbour and Slobs and the Shannon Callows were the most important sites in the Republic. The River Foyle, which is cross-border, also made it into the top eight sites.

Several sites supporting internationally or nationally important concentrations in 2005 did not maintain such numbers in 2010 (Table 2). They include six sites that were internationally important in 2005, namely the Wetlands east of Ballinrobe (on the border between Counties Mayo and Galway), Finn-Lacky Catchment (Monaghan), North Central

Galway Lakes (Galway), Rinn Lough Lakes (Leitrim), Glen Lough (Westmeath) and Tacumshin Lake (Wexford). In contrast, three new sites qualified as being of international importance, namely Wexford Harbour and Slobs, the Little Brosna Callows (Offaly and Tipperary) and Lough Iron (Westmeath).

Table 1 indicates that some 11,864 birds (79% of the total counted) were aged. Of these, 17.5% were first-winter birds (cygnets). The proportion of first-winter birds reported in flocks in Northern Ireland was substantially higher (19.1%) than in the Republic (16.7%). In contrast, family groups were larger in the Republic with a mean brood size of 2.35 per family compared to 2.06 in Northern Ireland. For counties where greater than ten families were checked, mean brood size ranged between lows of 1.79 and 1.85 per family in Tyrone and Antrim respectively, to peaks of 3.25 and 3.36 per family in Counties Monaghan and Wexford respectively. Overall, more than 85% of broods contained one, two or three cygnets, with a maximum brood size of six (nine broods).

**Table 2.** Internationally and nationally important sites for Whooper Swans recorded in January 2010.

Site	County	Count	% change (2005)
<b>Internationally important</b>			
Loughs Neagh & Beg	Antrim, Londonderry, Tyrone, Armagh, Down	1803	19
Lough Foyle	Londonderry, Donegal	883	-7
Upper Lough Erne	Fermanagh	799	29
Cashen River & Estuary	Kerry	506	121
Lough Swilly	Donegal	428	-15
Wexford Harbour & Slobs <sup>1</sup>	Wexford	411	204
River Foyle	Donegal, Tyrone, Londonderry	389	-12
Shannon Callows	Offaly, Galway, Roscommon, Tipperary, Westmeath	364	-16
Lough Oughter Complex	Cavan	361	33
Shannon & Fergus Estuary	Clare, Limerick, Kerry	339	54
River Suck (Aerial)	Roscommon, Galway	331	2
Little Brosna Callows <sup>1</sup>	Offaly, Tipperary	279	1016
Lough Iron <sup>1</sup>	Westmeath	261	+
Blackwater Callows	Cork, Waterford	225	-50
<b>Nationally important</b>			
River Blackwater (Meath) <sup>1</sup>	Meath	207	+
River Lagan <sup>1</sup>	Down, Antrim	204	1569
River Boyne <sup>1</sup>	Meath	190	+
The Cull & Killag <sup>1</sup>	Wexford	181	71
Mullaghmore (Moylough/L. Nalarsagh) <sup>1</sup>	Galway	174	81
River Moy <sup>1</sup>	Mayo	169	635
Strangford Lough	Down	138	-41
Foxhall/ Cloghans Hill <sup>1</sup>	Galway	136	+
East Ballinamore Lakes <sup>1</sup>	Cavan, Leitrim	135	16

<sup>1</sup> Did not qualify in 2005

+ No swans present during the census in 2005

## Bewick's Swan

A total of just 80 Bewick's Swans was recorded, involving six flocks. Most (67 birds) were found at three sites in south County Wexford – the Cull and Killag, Tacumshin Lake, and Wexford Harbour and Slobs. Two flocks of ten and two birds were recorded at Brideswell and Lough Feacle respectively, both in County Roscommon, while just one bird was recorded in Northern Ireland, on the Upper Bann River, north of Derrybrughas in County Armagh. Of 34 birds aged (four flocks), just four (11.8%) were first-winter birds, involving broods of three and one cygnets.

## Habitat

The habitat was recorded for 82% of swans of both species. Whooper Swans were recorded in 21 out of the 30 habitat types available for selection, with over half on dry improved pasture (58% overall) (Table 3), and much smaller proportions were recorded on lakes. Habitat usage differed significantly when compared with previous censuses (Figure 2) ( $G = 88.04$ ,  $df = 48$ ,  $P < 0.001$ ). Usage in 2010 was significantly different when compared with 2005 ( $G = 48.87$ ,  $df = 24$ ,  $P = 0.002$ ) and 2000 ( $G = 54.58$ ,  $df = 24$ ,  $P < 0.001$ ), while there was no significant difference in habitat usage during the earlier censuses ( $G = 25.76$ ,  $df = 24$ ,  $P = 0.366$ ). Habitat was recorded only for the ten Bewick's Swans at Brideswell and the single bird on the Upper River Bann, all of which were on dry improved pasture.

## Discussion

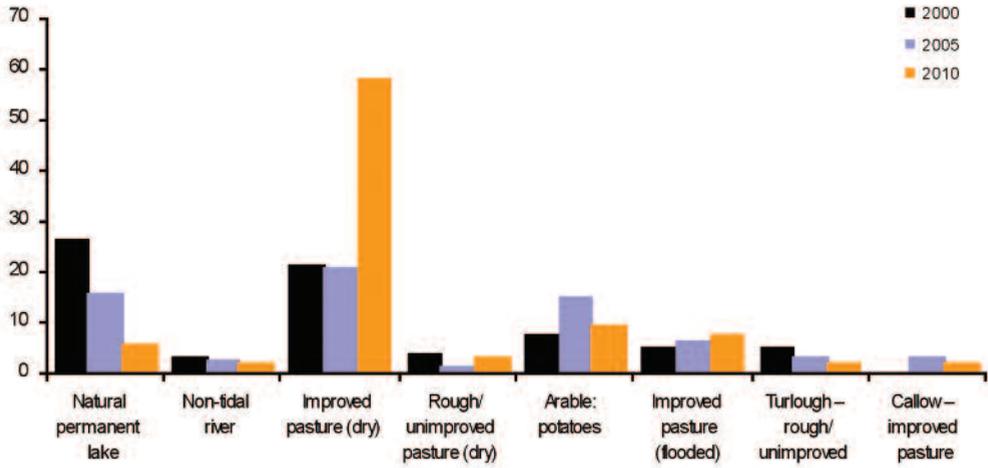
### Distribution and abundance

Despite the difficult survey conditions, with sub-zero temperatures prevalent throughout the first half of January, participation in the 2010 international swan census was relatively high, with the greatest number of participants since 2000 taking part. Greater survey effort was required due to the highly dispersed nature of the swans this winter, with little open water available to them. The aerial survey that took place during the week following the ground census, on 22 January, did not add significantly to the overall numbers, suggesting that ground-based coverage of regular haunts along these large, complex and highly inaccessible wetlands was good. The cold weather during the census shifted many birds away from their traditional areas and habitats. Swans were reported in areas where they have never been recorded before, and were absent from many regular sites, and even whole areas where they are normally found, e.g. north Antrim. The dry and frozen conditions meant that preferred sites and habitats were often unavailable, hence the proportionately high numbers recorded on dry improved pasture compared with previous years, when substantial proportions were recorded on water bodies and potato fields. This redistribution may have resulted in some flocks being missed, or undercounted. Thus, caution is urged in relation to the overall totals presented for both species.

**Table 3.** Habitat usage by Whooper Swans in Ireland in January 2010. Main habitats are given in the table, while those used to a lesser extent are presented underneath as Other habitats.

Habitat	Republic of Ireland		Northern Ireland		All-Ireland	
		(%)		(%)		(%)
Natural permanent lake	574	7.3	147	3.2	721	5.8
Non-tidal river	319	4.0			319	2.6
Improved pasture (dry)	4035	51.2	3236	70.1	7271	58.4
Rough/unimproved pasture (dry)	448	5.7	22	0.5	470	3.8
Reseeded pasture (dry)	133	1.7	58	1.3	191	1.5
Arable: potatoes	381	4.8	814	17.6	1195	9.6
Improved pasture (flooded)	766	9.7	223	4.8	989	7.9
Rough/unimproved pasture (flooded)	188	2.4			188	1.5
Turlough – improved pasture	128	1.6			128	1.0
Turlough – rough/unimproved	276	3.5			276	2.2
Callow – improved pasture	264	3.3			264	2.1
Other habitats (*)	371	4.7	116	2.5	487	3.9
<b>Total Number of Swans Assessed</b>	<b>7,883</b>		<b>4,616</b>		<b>12,499</b>	

(\*) Other habitats: Artificial lake/reservoir (0.4%), Freshwater marsh (1.4%), Saltmarsh/merse (0.2%), Brackish lake (0.1%), Sea loch (<0.1%), Arable: stubble (0.4%), Arable: winter cereal (0.1%), Reseeded pasture (flooded) (0.7%), Callow - rough/ unimproved (0.1%), Other (0.4%).



**Figure 2.** Proportions of birds recorded in key habitats during surveys in 2000, 2005 and 2010.



**Plate 2.** Bewick's Swan (Mark Carmody).

The freezing conditions during the first half of January were especially severe throughout Britain and Northern Europe. It is possible that swans from other parts of Europe moved into Ireland because it was presumably relatively milder here during this period. Thus, co-ordination of counts at local and national level was critical, especially given the thaw that set in during the census weekend. Unfortunately, counts at some of the key sites were not possible during the census period, most notably at Upper Lough Erne, which was counted more than a week later. There are known movements between this site and nearby Lough Oughter in County Cavan, which was counted earlier during the census period. Most wetlands thawed out substantially during the week that followed the census, and at least some of the birds would have been expected to return to their preferred areas. Thus, counts undertaken outside the scheduled weekend, especially later, may have over- or under-represented the true total to some extent.

Nevertheless, the total of 14,981 Whooper Swans recorded represents a continued increase (6%) in numbers in Ireland, albeit at a lower rate when compared to the magnitude of previous increases, especially between 1995 and 2000 (26%, Colhoun *et al.* 2000). The full census results from

Britain and Iceland, due to be published in 2011, will be required in order to confirm whether there has been an increase in the overall Icelandic breeding population. Additional complications arise due to possible interchange between this and the Northwest European population which breeds in northern Europe and winters in northwest and central mainland Europe (Wetlands International 2006). It has been suggested that large-scale increases since the 1980s in the latter population (Laubek *et al.* 1999) has resulted in increasing numbers occurring in Britain, and that such movements may be influenced by severe weather. A judgement on the abundance of the Icelandic population, based on the 2010 census results, may therefore only be speculative given the unusually severe weather conditions occurring during the 2009/10 winter.

There has been an ongoing decline in Bewick's Swan numbers in both Northern Ireland and the Republic of Ireland in recent decades. Numbers have declined from 1,244 in 1984 to 224 in 2005 and to 80 in 2010. Declines have also been reported in parts of England (Worden *et al.* 2006, Calbrade *et al.* 2010). Milder winters in recent years may have reduced the need for extreme movements to the western extremities of this swan's traditional wintering range in order to find



**Plate 3.** Bewick's Swan, Wexford Wildfowl Reserve (Dick Coombes).

suitable wintering conditions. This in turn may have resulted in a contraction in range with more birds wintering on the continent closer to their breeding grounds. However, there was a decline in this population by close to 30% between 1995 and 2005 (J. Beekman unpublished data). Declines at several key sites in Britain (Calbrade *et al.* 2010), including those where supplementary feeding takes place, further points towards a population decline rather than a re-distribution of birds. Ireland's location, on the western edge of this population's range, may well be why there have been greater rates of decline here than elsewhere.

## Breeding success

The estimate for breeding success in the Irish population of Whooper Swans in 2010 was similar to that reported in 2000 (Colhoun *et al.* 2000), but was lower than that reported in 2005 (Crowe *et al.* 2005). A provisional estimate of 15.4% first-winter birds in Britain and Ireland combined in 2010 has been made (Newth 2010). This indicates that the 2009 breeding season was the second poorest reported during the co-ordinated censuses, after an exceptionally poor breeding season in 1990 when just 9.8% of first-winter birds was reported (Robinson *et al.* 2004b, Worden *et al.* 2009). The variation at county and at regional levels possibly reflects a tendency for family groups to congregate at certain sites. However, the distribution of family groups also varies between years (IWSSG data unpublished). Whooper Swans continue to increase in Ireland, although the rate of increase may have been reduced by the decline in productivity during the breeding season of 2009. Meanwhile, Bewick's Swan numbers are in decline, not just in Ireland but also in Britain (Calbrade *et al.* 2010). Full results from elsewhere across the flyways of both these species are required before an assessment can be made of their current status.

The list of sites of significant importance was reasonably consistent when compared with previous years, especially among the top ten sites, although there were some exceptions, most notably the large-scale increases in numbers at Ballyouneen on the Cashen River and Estuary and at Wexford Harbour and Slobs. These coastal sites were probably attractive to the swans during the census period given the frozen conditions, which limited availability of feeding and roosting areas throughout many parts of Ireland. However, increases were not limited to coastal counties during this census when compared with that in 2005. There was a general increase throughout the country in usage of improved pasture, while greatest percentage increases in numbers were seen in inland counties, most notably Laois, Kildare, Tyrone and Meath.

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