

Marine Institute

Dundalk Bay SPA: Oystercatcher Monitoring 2014/15

May 2015

ATKINS



Marine Institute Bird Studies

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1. Introduction

1.1 Atkins (Ecology) was commissioned by the Marine Institute to provide ornithological services in relation to the appropriate assessment of cockle fishing on the Dundalk Bay Special Protection Area (SPA).

1.2 An Appropriate Assessment of the Dundalk Bay Fisheries Natura Plan, 2011-2016 was published in June 2011. The assessment recommended that: -

“The activity [cockle fishing] can proceed, as described in the FNP, on the basis that habitat effects are insignificant or short lived. However, annual review and adaptive management of the proposed cockle fishing activity, in light of monitoring and research data on the feeding ecology of Oystercatchers in Dundalk, should be introduced as a condition in the 2011-2016 FNP. If this condition is not introduced then the activity should not be allowed to proceed.”

(Source: Table 32, p. 188 of Appropriate Assessment of fisheries and aquaculture on Dundalk Bay SAC and SPA, Marine Institute, June 2011).

1.3 The assessment specified the following monitoring and research:

1. Obtain data on the diet of Oystercatchers and their dependency on cockles, and any age-related, seasonal and/or weather-related variation in this.
2. Monitor numbers and spatial distribution of Oystercatchers each year 2011-2016. The Oystercatchers index data for a given autumn-winter needs to be available the following spring.
3. Determine the ratio of adult: juvenile Oystercatchers as diet and dependency of juvenile Oystercatchers on cockles is less.
4. Evaluate mortality of discarded cockle and other bivalves. Undersized cockle may be an important dietary component of Knot.
5. The activity of the cockle fleet (effort and landings) be monitored annually.

(Source: Table 32, p. 188 of Appropriate Assessment of fisheries and aquaculture on Dundalk Bay SAC and SPA, Marine Institute, June 2011).

1.4 This report presents the results of low tide counts carried out between October 2014 and February 2015, which addresses item 2 of the above.

1.5 The low tide count programme was designed by Tom Gittings and Paul O'Donoghue. Fieldwork was carried out by Tom Gittings, John Fox, Breffni Martin, Peter Phillips, Richard Nairn and Chris Peppiatt.

1.6 The data analysis and report writing was done by Tom Gittings; Paul O'Donoghue assisted with project design, document preparation and undertook document review. Data entry was carried out by John Deasy.

2. Methods

Survey design

2.1 The objectives of the counts were to: -

- obtain accurate estimates of the Dundalk Bay Oystercatcher population; and
- record the distribution of birds in relation to areas fished for cockles.

2.2 Previous analyses have shown that high tide I-WeBS counts do not produce consistent data on Oystercatcher numbers. Therefore, co-ordinated low tide counts are required for this purpose. These also allow accurate recording of the low tide distribution.

2.3 Each low tide count was carried out by four counters. This number of counters was required to cover the entire site within a single low tide period, while avoiding potential double-counting and taking account of safety considerations.

2.4 During the winter, large numbers of Oystercatchers left Dundalk Bay to feed on fields. It was not feasible to make systematic surveys of field-feeding birds during the low tide counts, although notes were made on any such birds encountered. In addition, targeted surveys of field-feeding birds were carried out in November and December 2014.

Survey area

2.5 The overall study site was the Dundalk Bay SPA. We divided the SPA into four zones: the upper shore, the main sandflats, the intertidal habitat in the outer bay, and the subtidal zone below the main sandflats (Figure 2.1). In addition, outside the SPA, counts were also carried out between Dunany Point and Cruisetown.

Zones

2.6 The main sandflats comprised the open sandflat habitat extending from the North Bull to Annagassan. The boundary with the upper shore generally followed the boundary between the *muddy fine sand with Pygospio elegans* and *fine sand with Angulus tenuis* biotopes, as mapped by NPWS (2011). However, this boundary was modified around Annagassan, Castlebellingham and Blackrock, so that it followed tidal channels, and excluded upper shore zones. At North Bull, the eastern boundary was the western boundary of low tide count sector OZ467. At Annagassan, the eastern boundary was the western boundary of low tide count sector OZ475. The main sandflats zone corresponds very closely to the area licensed for cockle dredging in 2011.

2.7 The upper shore zone comprised all of the intertidal habitat within the SPA to the west of the main sandflats. It should be noted that “*upper shore*” is a loose description of the areas included within this zone and, in many cases, areas within this zone are exposed for shorter periods than areas within the main sandflats.

2.8 The outer bay (intertidal) zone included the northern shore east of the North Bull and the southern shore east of Annagassan.

Count units

- 2.9 The subsites used for the NPWS Baseline Waterbird Survey 2010/11 were used as the basis for sub-dividing the counts (Figure 2.2). These subsites cover the entire SPA, apart from small sections of the Castletown River (upstream of the Newry Road), and the Fane River (between the seawall and the Dublin Road). However, as these subsites were designed for counting from shore, and do not reflect the major habitat divisions within Dundalk Bay, we further divided the subsites.
- 2.10 Where the subsites include more than one zone, these were divided into sub-divisions representing the different zones. Further sub-divisions were also used to reflect major habitat differences within the subsites (e.g., mussel beds), to divide between counters, or to allow finer scale geographical recording. In total 46 sub-divisions were used for the counts (Table 2.1 and Figure 2.3).
- 2.11 We made the following amendments to the boundaries of the subsites, compared to the boundaries used for the BWS: -
- The division between subsites 0Z473 and 0Z474 was amended to follow the current alignment of the River Glyde tidal channel (Figure 2.2). The boundary used for the NPWS BWS was based on the alignment of this tidal channel as shown in the Discovery Series mapping, which is out of date. However, in practise, it is likely that counters would have followed the reality on the ground.
 - The Lurgangreen mussel beds sub-division overlaps the boundary between subsites 0Z496 and 0Z497. For simplicity, we allocated the whole of the sub-division to subsite 0Z497.
 - The Sandymount mussel beds sub-division overlaps the boundary between subsites 0Z495 and 0Z496. For simplicity, we allocated the whole of the sub-division to subsite 0Z496.
- 2.12 For the purposes of analysing distribution patterns we combined the sub-divisions into areas to make geographically and ecologically meaningful units (Figure 2.4). Four sub-divisions were not included in any of the areas, as no Oystercatchers were recorded in these sub-divisions: these comprise three sub-divisions which are almost entirely occupied by saltmarsh (sub-divisions 22, 31 and 33), and the Lurgangreen goose fields (sub-division 45).

Table 2.1 - Sub-divisions used for the Dundalk Bay low tide counts, 2014/15

Number	Sub-division	NPWS BWS subsite	Area	Counter
1	Giles Quay East	OZ466	GILES	Counter 1
2	Giles Quay West	OZ466	GILES	Counter 1
3	Loughanmore	OZ467	GILES	Counter 1
4	Annaloughan upper shore	OZ468	GILES	Counter 1
5	Annaloughan main sandflats	OZ468	NBULL	Counter 1
6	Rockmarshall upper shore	OZ469	DUND	Counter 1
7	Rockmarshall main sandflats	OZ469	NBULL	Counter 1
8	Jeninstown upper shore	OZ464	DUND	Counter 1
9	Jeninstown main sandflats	OZ464	NBULL	Counter 1
10	Bellurgan East upper shore	OZ465	DUND	Counter 1
11	Bellurgan main sandflats	OZ465	NBULL	Counter 1
12	Bellurgan West upper shore	OZ465	DUND	Counter 1
13	Dundalk Harbour East	OZ494	DUND	Counter 1
14	Dundalk Harbour West	OZ494	DUND	Counter 1
15	Between bridges	OZ494	DUND	Counter 1
16	Ballymascanlon South mudflats	OZ463	DUND	Counter 1
17	Ballymascanlon South fields	OZ463	FIELDS	Counter 1
18	Ballymascanlon North mudflats	OZ462	DUND	Counter 1
19	Ballymascanlon North fields	OZ462	FIELDS	Counter 1
20	Castletown River upper shore	OZ495	DUND	Counter 1
21	Castletown River upper shore	OZ495	SBULL	Counter 1
22	South Bull saltmarsh	OZ495	OTHER	Counter 2
23	South Bull (north) main sandflats	OZ495	SBULL	Counter 2
24	Sandymount mussel beds	OZ496	BLACK	Counter 2
25	Blackrock upper mud/sandflats	OZ496	BLACK	Counter 2
26	South Bull main sandflats (south)	OZ496	SBULL	Counter 2
27	Fane River lower tidal channel	OZ496	BLACK	Counter 2
28	Lurgangreen main sandflats (north)	OZ496	FANE	Counter 3
29	Lurgangreen mussel beds	OZ497	BLACK	Counter 2
30	Lurgangreen mudflats	OZ497	BLACK	Counter 2
31	Lurgangreen saltmarsh	OZ497	OTHER	Counter 3
32	Lurganreen main sandflats (south)	OZ497	FANE	Counter 3
33	Seabank saltmarsh	OZ472	OTHER	Counter 3
34	Seabank upper shore	OZ472	CASTLE	Counter 4
35	Seabank main sandflats	OZ472	FANE	Counter 3
36	Castlebellingham upper shore	OZ473	CASTLE	Counter 4
37	Castlebellingham main sandflats	OZ473	FANE	Counter 4
38	Annagassan upper shore	OZ474	CASTLE	Counter 4
39	Annagassan main sandflats (north)	OZ474	ANN	Counter 4
40	Annagassan main sandflats (south)	OZ461	ANN	Counter 4
41	Salterstown headland	OZ460	SALT	Counter 4
42	Salterstown-Corstown	OZ460	SALT	Counter 4
43	Corstown East	OZ461	SALT	Counter 4
44	Dunany Point	OZ461	SALT	Counter 4
45	Lurgangreen goose fields	OZS03	OTHER	Counter 4
Additional area outside Dundalk Bay SPA				
46	Dunany Point-Cruisetown	-	-	Counter 4

NBULL = main sandflats in the North Bull; main sandflats in the SBULL = South Bull; FANE = main sandflats between the Fane and Glyde; ANN = main sandflats at Annagassan; south of the Glyde; GILES = upper shore/outer bay between Fitzpatricks and Giles Quay; DUND = upper shore in Dundalk Harbour and adjoining areas; BLACK = upper shore from Blackrock to Lurgangreen; CAST = upper shore from Seabank to Annagassan; SALT = upper shore/outer bay from Salterstown to Dunany Point; OTHER = sub-divisions in which no Oystercatchers have been recorded in any of the low tide counts carried out since 2011.

Count dates and timings

- 2.13 The count dates and low tide times and heights are shown in Table 2.2. The counts started 2-3 hours before low tide and finished 1-2 hours after low tide (Table 2.3). This timing meant that there was substantial exposure of the main sandflats throughout the duration of the counts, which meant that the potential for major movements of Oystercatchers was avoided (apart from between the North and South Bull).

Table 2.2 – Low tide count dates, 2014/15

Month	I-WeBS Date	Low tide count		
		Date	Low tide time	Low tide height
September	no count	19/09/2014	15:24	1.6 m
October	28/10/2014	16/10/2014	11:58	1.7 m
November	no count	15/11/2014	11:22	1.8 m
December	12/12/2014	17/12/2014	13:43	1.7 m
January	26/01/2014	16/01/2015	13:27	1.6 m
February	no count	16/02/2015	15:29	0.8 m

Table 2.3 – Timings, and weather conditions, of the low tide counts of Oystercatchers, 2014/15

Date	Time relative to low tide:		Wind	Visibility (number of subsites):		
	start	finish		good	moderate	poor
19/09/2014	-179	50	E2-3	11	6	0
16/10/2014	-168	44	SE2-4	18	2	2
15/11/2014	-155	90	SE1-3	22	2	1
17/12/2014	-186	80	SW/W2-3	12	6	2
16/01/2015	-116	137	W0-4	20	0	0
16/02/2015	-152	72	W/NW1-2	19	0	1

Times are in minutes. Wind shows the predominant wind directions/speed recorded during the counts.

- 2.14 The counts were carried out by four counters. Each counter was given a laminated A5 instruction sheet with full details of the methodology and maps of the subdivision boundaries.
- 2.15 The sub-divisions covered by each counter are shown in Figure 2.5.
- 2.16 One counter covered the northern side of the bay from land-based vantage points, starting in Dundalk Harbour (0Z494) and working round to Giles Quay (0Z466). Another counter covered the southern side of the bay from land-based vantage points, starting with the upper shore zone at Seabank (0Z472) and working round to Dunany Point (0Z461). A third counter covered the main sandflats zone from Seabank to the Fane River tidal channel: the main sandflats zones of 0Z472, 0Z496 (south of the Fane), and 0Z497. This counter started in the main sandflats zone at Dromiskin (0Z472), and walked north along the main sandflats to the Fane River tidal channel, before returning to the shore at Lurgangreen. The fourth counter covered the upper shore zone from Lurgangreen (0Z497) to the South Bull (0Z495). This counter also covered the main sandflats in the South Bull: 0Z495 and 0Z496 (north of the Fane).
- 2.17 The counts were carefully coordinated to minimise the risk of bird movements affecting the counts. The counters covering the southern part of the middle of the bay and the southern shore of the bay began the count together, to avoid any double-counting of birds around the border between 0Z472 and 473. The counter covering the South Bull area coordinated with the counter covering the

northern shore of the bay, so that errors due to movements of birds between the North and South Bull were avoided.

Low tide count methodology

General methodology

- 2.18 The counts were divided by the sub-divisions, as shown in Figure 2.3. Within the sub-divisions, the counts were divided by substrates (hard versus soft substrate). Numbers of feeding, roosting/other and flying birds were counted separately.
- 2.19 When flying birds were recorded, notes were made about the movement of the birds, and, if there was potential for double-counting, other counters were notified.
- 2.20 Where relevant, additional notes were made about the distribution of birds within sub-divisions.
- 2.21 For each sub-division count, the start/finish times, and the accuracy of the count, were recorded. If the accuracy was recorded as LOW, notes were made about the details of the factor(s) affecting the count.
- 2.22 Weather details were recorded for each subsite counted.

Additional methodology for the Fane-Glyde section

- 2.23 The procedure for the counts carried out of the main sandflats between the Fane and the Glyde (walking along the sandflats), allowed finer-scale recording of Oystercatcher distribution. Each sub-division was divided into 500 m transect sectors: six sectors in 0Z472, five in 0Z497 and two in 0Z496 (south of the Fane River tidal channel). The birds were counted separately in each of these sectors. A GPS unit was used to record the transect path and the position of the birds relative to the transect path was also recorded.

Surveys of field-feeding birds

- 2.24 Targeted surveys of field-feeding birds were carried out on 28th November and 5th December 2014.
- 2.25 On 28th November, an 86 km route from Cooley to Dunany (Figure 3.4) was surveyed between 09:30 and 16:00 hours. The weather was calm but overcast with high humidity. Visibility was poor and this limited photography and identification of distant flocks (though Oystercatchers are normally particularly easy to identify even at distance due to their black and white plumage). The survey was carried out on a rising tide (with low tide at 09:21).
- 2.26 On 5th December, a 109 km route was surveyed from Cooley to Corstown (via Kilcurry, Mullabohy and Knockbridge; Figure 3.5) between 09:30 and 16:00 hours. At dusk the Fane estuary was monitored for birds flying in to roost along the Fane. The weather was calm with clear skies and visibility was good. The survey was carried out on a falling tide (with low tide at 16:51).
- 2.27 Typically fields adjacent to the road were scanned from the car or from various viewpoints some known, some advised by others. The main focus was on numbers; time limited the scope for checking habitat type and other details (see photos in Appendix A).
- 2.28 For each flock encountered, the following parameters were recorded:
 - the location (mapped on an aerial photo);

- the habitat type (Fossitt code);
- the extent of flooding in the area;
- the time;
- the size of the flock;
- numbers feeding and roosting;
- age composition (if possible); and
- any other relevant details.

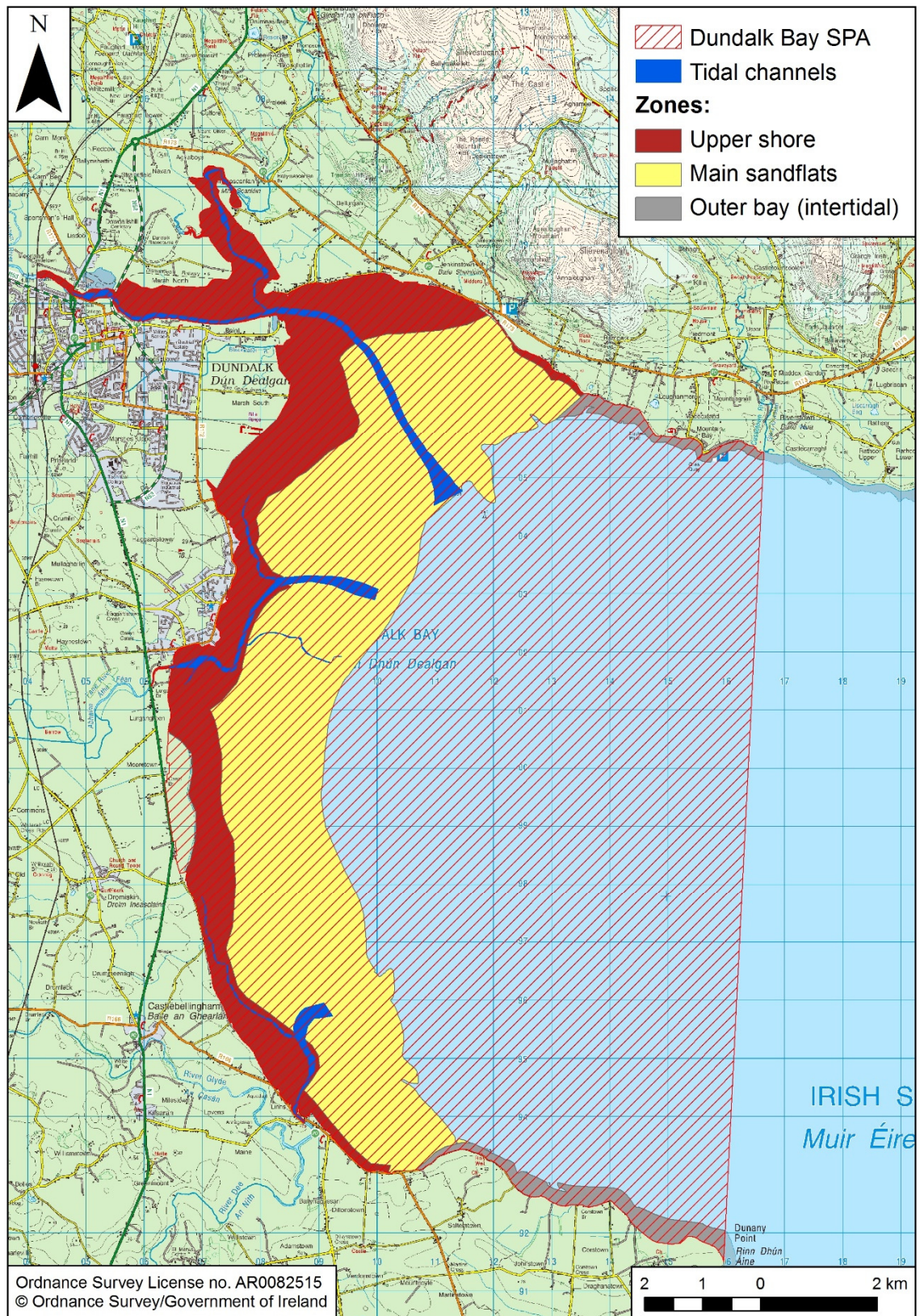


Figure 2.1 - Dundalk Bay SPA.

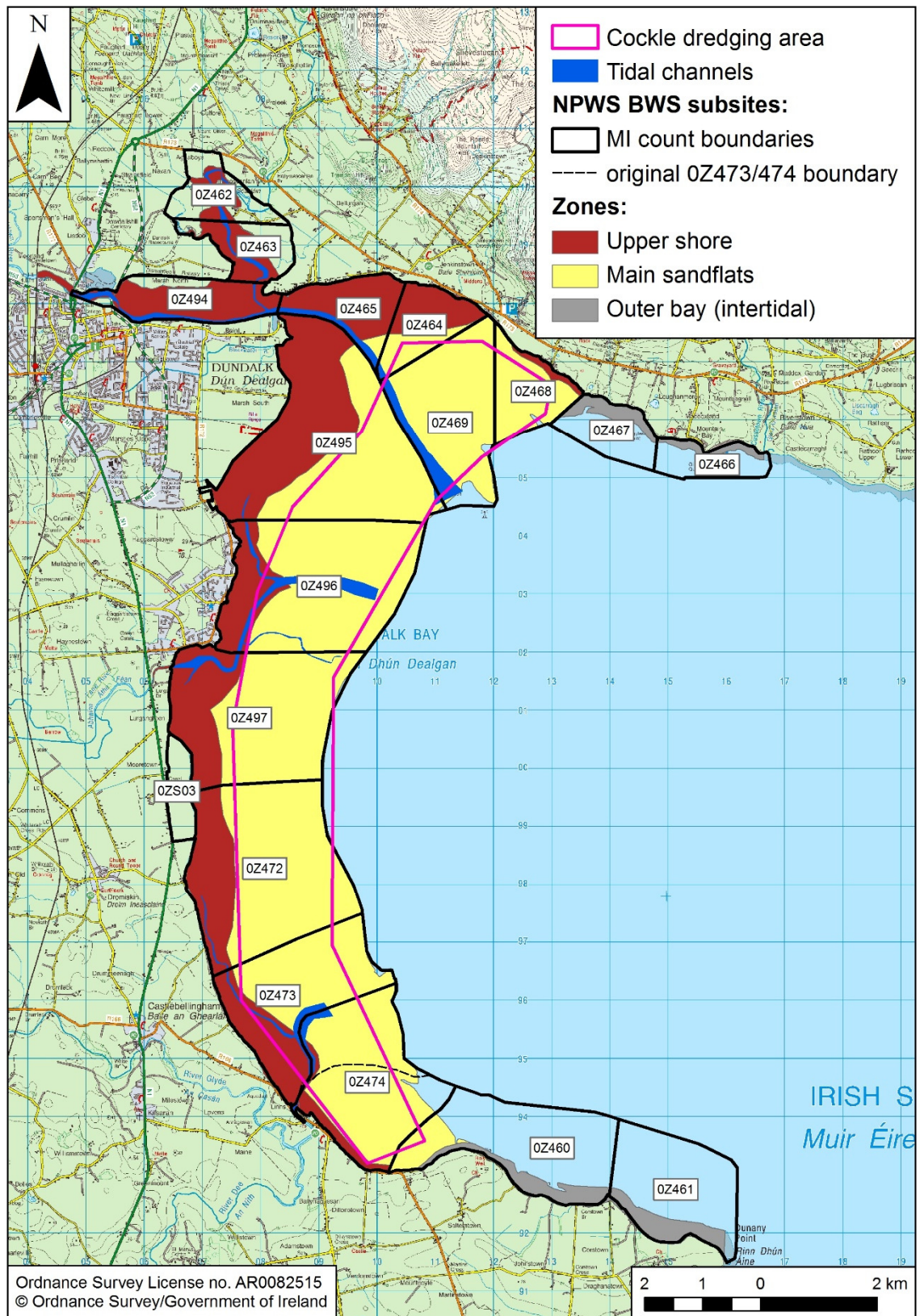


Figure 2.2 - NPWS BWS subsites.

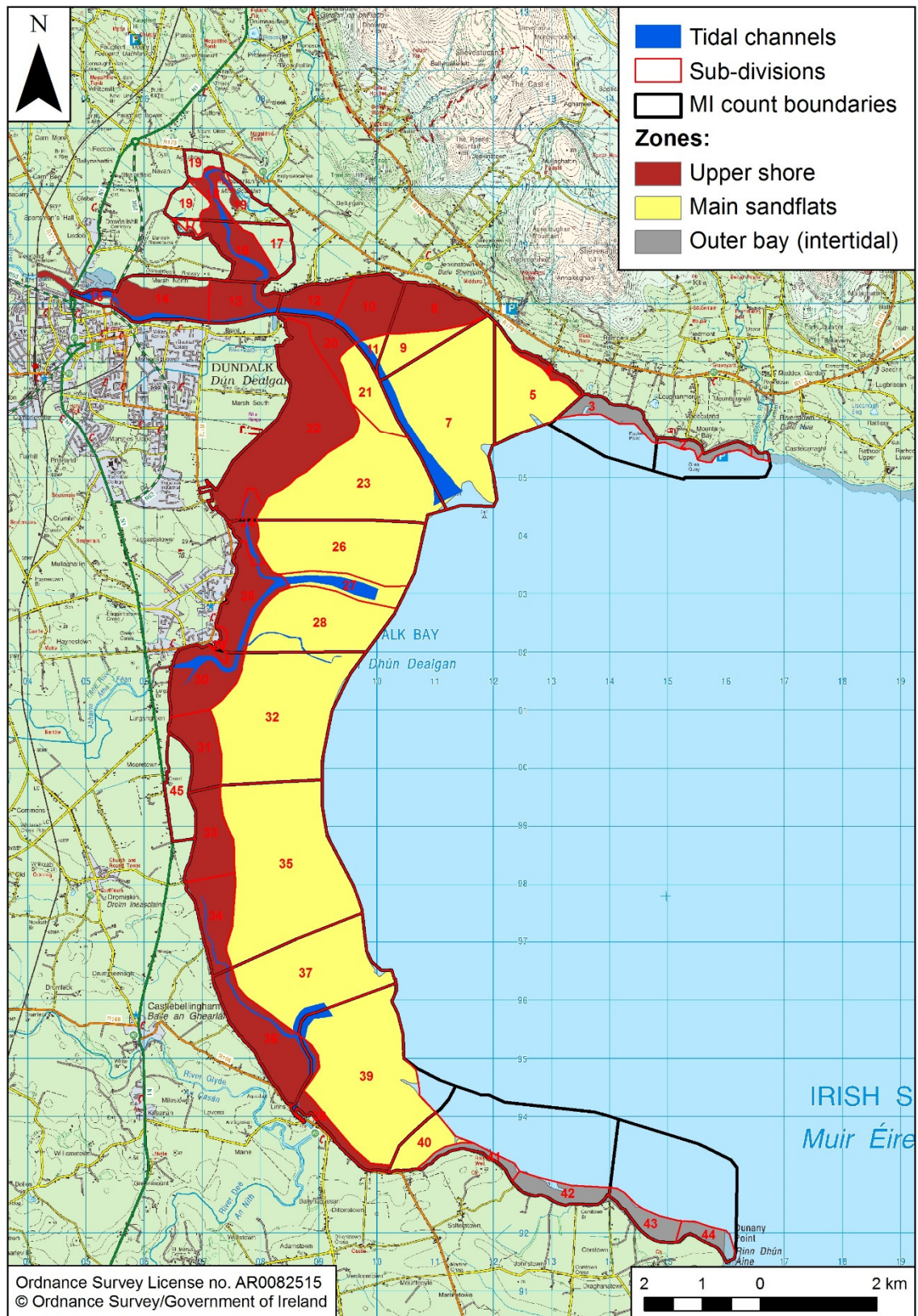


Figure 2.3 - Sub-divisions used for the low tide counts.

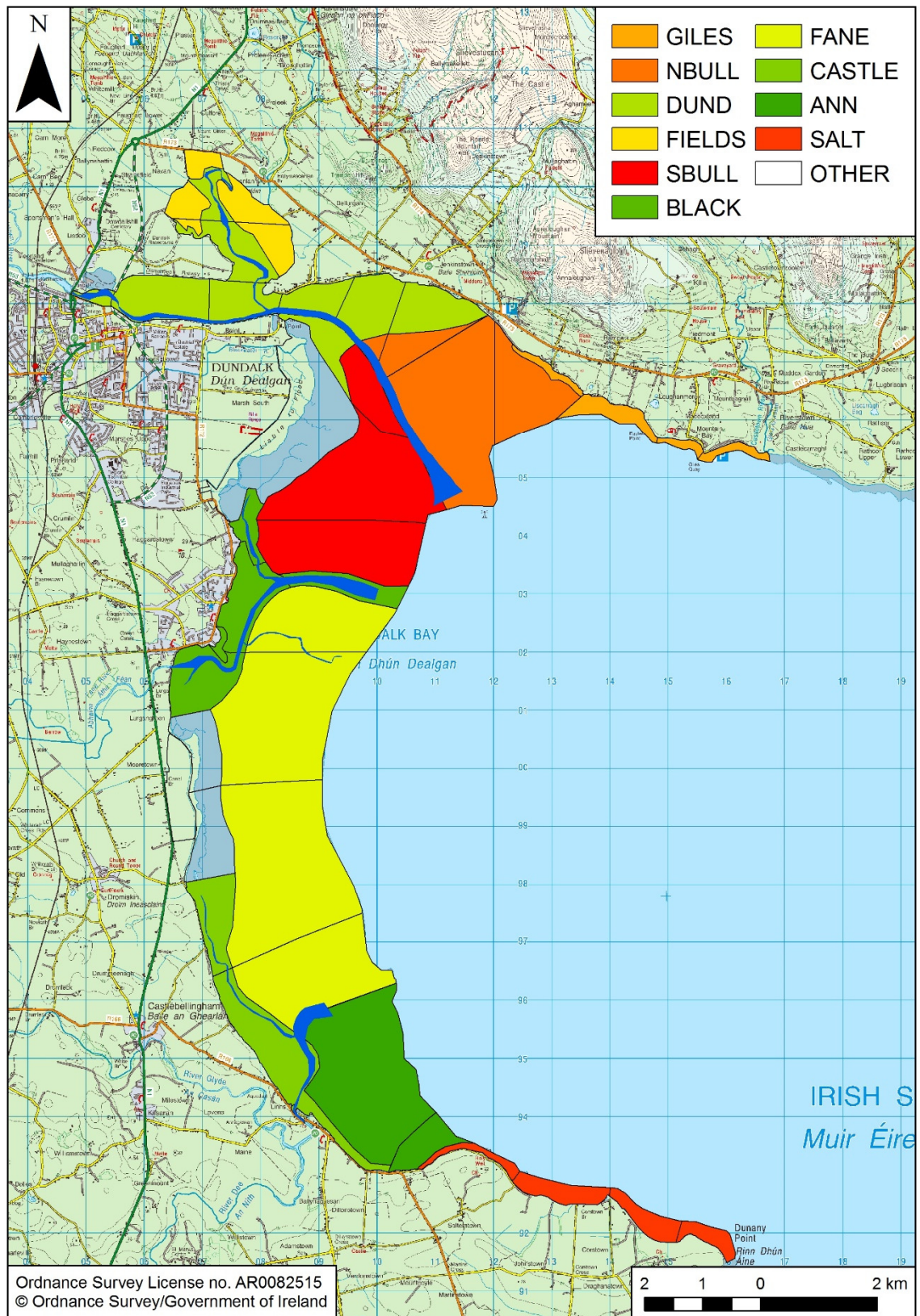


Figure 2.4 - Areas used for analysing Oystercatcher geographical distribution patterns.

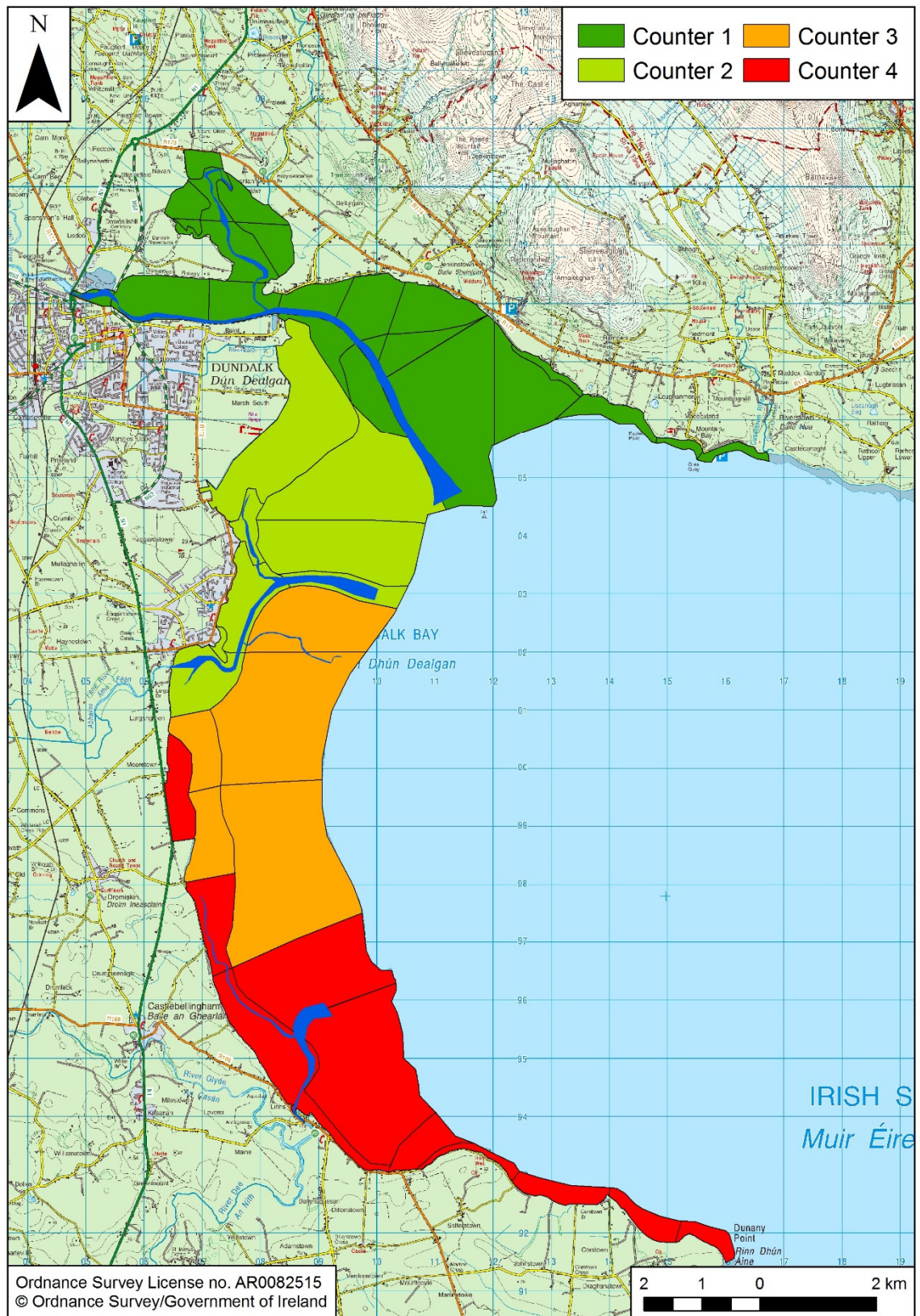


Figure 2.5 - Sub-divisions counted by each counter.

3. Results

Low tide counts

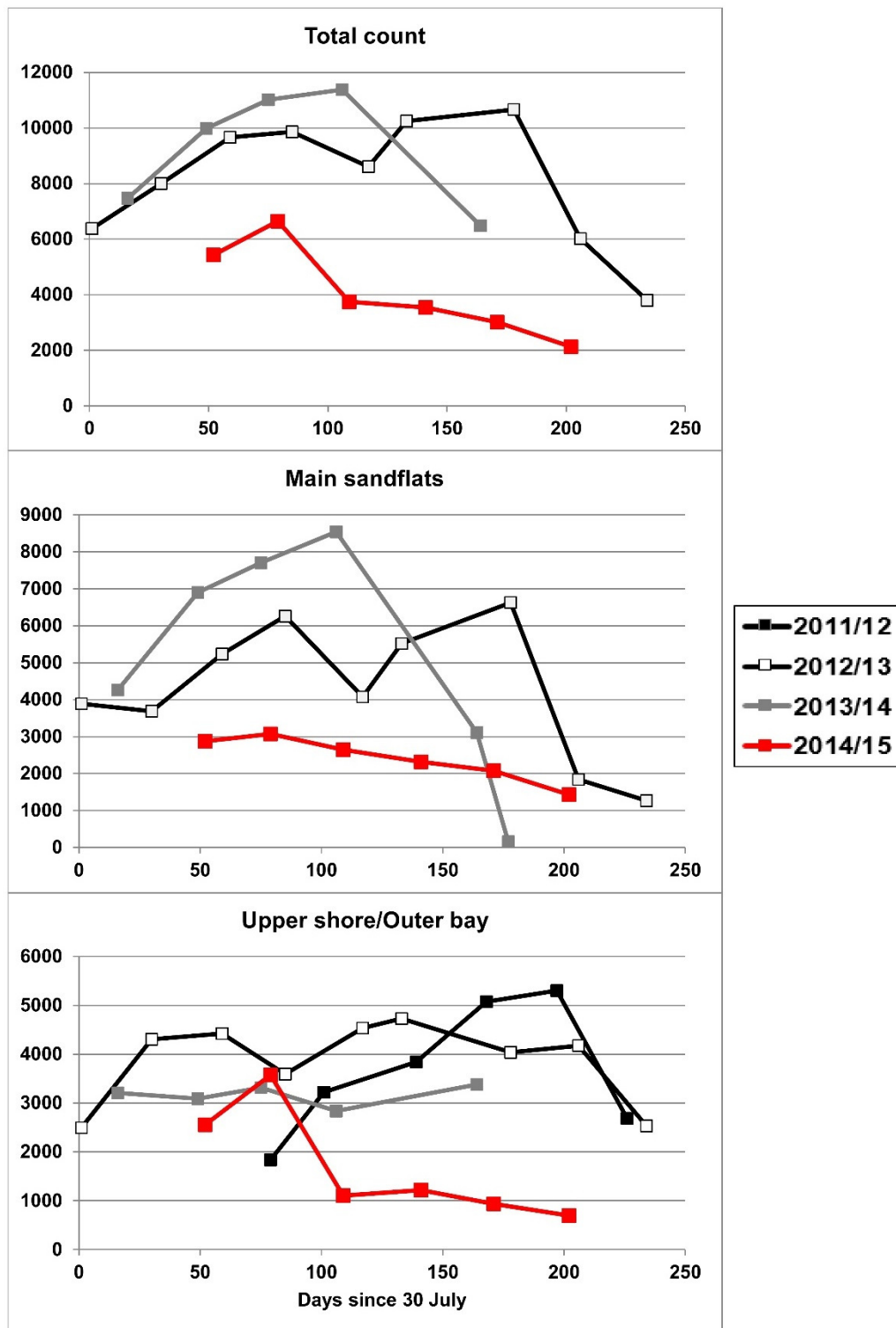
Numbers and distribution

- 3.1 The overall totals recorded are shown in Table 3.1, and are compared to data from previous winters in Text Figure 3.1.
- 3.2 Overall numbers were much lower than recorded in the previous two winters, with a peak count of 6648, compared to peak counts of 10,661 in 2012/13 and 11,379 in 2013/14. The difference in the peak counts was largely due to lower numbers on the main sandflats. In September and October, the numbers in the upper shore/outer bay were comparable to previous winters. The peak count occurred in October. This was followed by a sharp decline between the October and November counts, which was largely due to loss of birds from the upper shore/outer bay. Between November and February, numbers in both the main sandflats and the upper shore/outer bay showed a steady gradual decline.
- 3.3 The distribution of Oystercatchers between the nine areas within Dundalk Bay is shown in Table 3.2. This shows that the loss of birds from the upper shore/outer bay between the October and November count occurred across all the upper shore/outer bay areas. The subsequent gradual decline was not evenly spread across the areas. The overall percentage distribution of birds between these areas has been broadly similar across the three winters with full low tide count data (Table 3.4). However, there does appear to have been a decline in numbers using the Salterstown-Dunany Point area, and this decline is more marked when data from 2011/12 is included (Table 3.4; during 2011/12 the low tide counts were only carried out in the upper shore/outer bay zones). The distribution of birds between the transect sectors in the Fane-Glyde section of the main sandflats did not show a consistent pattern across the winter (Table 3.5).
- 3.4 During the low tide counts, Oystercatchers were never recorded in the only fields included within the NWS BWS subsites (the Ballymascanlon North and South fields sub-divisions, and the Lurgangreen goose fields sub-division). However, incidental observations of Oystercatchers feeding in fields elsewhere in the Dundalk Bay area were made during the low tide counts from November onwards (Table 3.6). These included one large flock of ca. 1000 birds in flooded fields behind the beach at Corstown Bridge on the November count (Figure 3.1), while a total of 1370 birds were recorded in fields on the February low tide count (Table 3.6). Some additional observations of birds feeding in fields were also made on the day after the February low tide count (Figure 3.3).

Table 3.1 - Dundalk Bay Oystercatcher count totals, 2014/15

Date	Main sandflats	Outer bay	Upper shore	Total	% on main sandflats	Dunany-Cruisetown
19/09/2014	2876	851	1702	5429	53%	104
16/10/2014	3074	1104	2470	6648	46%	138
15/11/2014	2644	261	843	3748	71%	0
17/12/2014	2321	246	974	3541	66%	79
16/01/2015	2077	191	745	3013	69%	41
16/02/2015	1432	243	455	2130	67%	37

Dunany-Cruisetown totals are shown separately because this area is geographically discrete and is outside the Dundalk Bay SPA.



Text Figure 3.1 - Oystercatcher numbers in Dundalk Bay, as recorded by low tide counts, 2012/13-2014/15, and 2011/12 (upper shore/outer bay only).

Table 3.2 - Distribution of Oystercatchers between areas within Dundalk Bay, 2014/15

Date	Main sandflats				Upper shore/Outer bay				
	NBULL	SBULL	FANE	ANN	GILES	DUND	BLACK	CAST	SALT
19/09/2014	588	770	1331	243	178	468	530	704	673
16/10/2014	477	749	1386	462	203	391	714	1365	901
15/11/2014	467	775	1329	73	45	126	273	444	216
17/12/2014	227	460	1503	144	8	177	299	498	210
16/01/2015	310	704	848	215	26	158	194	374	184
16/02/2015	75	568	712	77	166	82	119	237	94

NBULL = main sandflats in the North Bull; main sandflats in the SBULL = South Bull; FANE = main sandflats between the Fane and Glyde; ANN = main sandflats at Annagassan; south of the Glyde; GILES = upper shore/outer bay between Fitzpatricks and Giles Quay; DUND = upper shore in Dundalk Harbour and adjoining areas; BLACK = upper shore from Blackrock to Lurgangreen; CAST = upper shore from Seabank to Annagassan; SALT = upper shore/outer bay from Salterstown to Dunany Point.

Table 3.3 - Mean percentage distribution of Oystercatchers between areas within Dundalk Bay, 2012/13-2014/15

Winter	Main sandflats				Upper shore/outer bay				
	NBULL	SBULL	FANE	ANN	FITZ	DUND	BLACK	DROM	SALT
2012/13	7%	11%	28%	3%	3%	3%	14%	13%	18%
2013/14	9%	18%	35%	2%	2%	4%	7%	11%	11%
2014/15	8%	18%	31%	5%	3%	5%	8%	14%	8%

Includes counts from July-March (2012/13), August-January (2013/14) and September-February (2014/15). See Table 3.2 for area codes.

Table 3.4 - Mean percentage distribution of Oystercatchers between areas within the upper shore/outer bay zones of Dundalk Bay, 2012/13-2014/15

	FITZ	DUND	BLACK	DROM	SALT
2011/12	9%	5%	11%	13%	62%
2012/13	6%	6%	26%	26%	35%
2013/14	7%	11%	22%	31%	30%
2014/15	7%	14%	21%	37%	20%

Includes counts from October-March (2011), July-March (2012/13), August-January (2013/14) and September-February (2014/15). See Table 3.2 for area codes.

Table 3.5 - Distribution of Oystercatchers between transect sectors within the Fane-Glyde section of the main sandflats, 2014/15

Subsite	Transect sector	19/09/2014	16/10/2014	15/11/2014	17/12/2014	16/02/2015
OZ472	S1	7%	4%	11%	5%	38%
	S2	5%	9%	5%	8%	44%
	S3	12%	14%	8%	13%	0%
	S4	5%	13%	3%	15%	0%
	S5	10%	7%	9%	11%	0%
	S6	3%	17%	14%	7%	0%
OZ497	S1	12%	6%	6%	11%	0%
	S2	22%	12%	8%	2%	0%
	S3	4%	2%	6%	10%	10%
	S4	4%	4%	4%	10%	2%
	S5	4%	4%	5%	5%	1%
OZ496	S1	5%	4%	14%	1%	1%
	S2	6%	4%	9%	3%	3%

Transect sectors are arranged in sequence from south to north. Data shown is the percentage of the total count for the Fane-Glyde section of the main sandflats.

Table 3.6 - Incidental observations of field-feeding birds during the low tide counts

Date	Nearest sub-division	Observations
15/11/2014	Dundalk Harbour East	40 on playing fields
	Salterstown-Corstown	c. 1,000 feeding in flooded field behind beach at Corstown Bridge
	Dunany-Cruisetown	c. 250 feeding in flooded field opposite Cruisetown (northern end)
17/12/2014	Dundalk Harbour East	41 feeding on playing fields
	Bellurgan East	7 feeding in fields
	Jeninstown upper shore	26 feeding in fields
	Salterstown-Corstown	150 birds feeding inland in a field; in addition 20 birds flying inland towards same site
	Dunany-Cruisetown	1 bird inland in a field
16/01/2015	Dundalk Harbour East	56 feeding on playing fields
	Salterstown-Corstown	Flocks of 150 and 290 inland in fields
	Dunany-Cruisetown	10 in a field with other waders
16/02/2015	Giles Quay East	OC in flight flew inland from sea
	Loughanmore	4 in fields this area.
	Between bridges	554 on fields in three locations on the south bank of the Castletown River
	Between bridges	200 in fields in two locations above the old bridge
	Dundalk Harbour East	109 feeding on playing fields
	Castlebellingham upper shore	123 feeding in field
	Salterstown-Corstown	Flocks of 30 and 350 inland in fields

See: Figure 3.1 for location of flocks in the Castlebellingham upper shore, Salterstown-Corstown, Dunany-Cruisetown areas; Figure 3.2 for location of flocks in the Dundalk Harbour East, Bellurgan East, Jeninstown upper shore and Loughanmore areas; and Figure 3.3 for location of flocks in the between bridges area.

Behavioural notes

- 3.5 The brief for this survey did not include collection of behavioural data. However, the following are some general comments on Oystercatcher behaviour in Dundalk Bay in the winter of 2014/15. These are based on observations made in the South Bull and Fane-Glyde sub-divisions of the main sandflats during the low tide counts.
- 3.6 As reported above, the numbers of Oystercatchers on the main sandflats were much lower than in the previous winters that we have monitored. This meant that birds occurred at much lower densities and, consequently, there appeared to be a very low incidence of kleptoparasitic behaviour compared to previous winters.
- 3.7 A significant proportion of Oystercatchers fed on cockles. However, in contrast to previous winters, small clams also appeared to form a significant component of the diet. Opened shells of both *Angulus tenuis* and *Donax vittatus* were abundant on the lower part of the sandflats (particularly in the Fane-Glyde sub-division), while in previous winters very few shells of these species were observed.
- 3.8 We directly observed Oystercatchers taking small clams. Birds feeding on small clams appeared to feed mainly on/close to the tideline. The feeding action used was similar to that used for small cockles, although the birds typically made a characteristic stationary ploughing-type action with the bill inserted up to half-probe depth when searching. In any case, only small numbers of opened small cockle shells were observed, so it is reasonable to assume that the majority of such birds were feeding on small clams.
- 3.9 In a small sample taken from near the tideline in the Fane-Glyde sub-division, *Angulus tenuis* were recorded in three out of seven 2 cm deep cores (using an adapted version of the design of Luczak *et al.*, 2013). This indicates that *Angulus tenuis* were available to shallowly probing Oystercatchers.
- 3.10 The *Donax vittatus* shells often had strands of seaweed attached, and we also found large clumps of seaweed with intact *Donax vittatus* shells attached. Therefore, Oystercatchers may have been scavenging *Donax vittatus* from seaweed washed up by the tide.
- 3.11 A significant proportion of the birds were feeding on sea squirts during the November count, while freshly predated sea squirts were also recorded on the December and February counts.

Field feeding surveys

28th November

- 3.12 A total of 2472 birds were recorded.
- 3.13 In the Cooley area, small numbers (5-30) were seen in a few fields.
- 3.14 429 birds were observed in the Dundalk area. Good numbers (30-150) were seen in fields along the Castletown River, notably amenity grassland along the south side of the river.
- 3.15 368 birds were observed in the Blackrock/Loakers/Shore Road area. Medium numbers were seen in the wet fields between Red Barnes Road and South Bull and in Dundalk Golf Course. It is likely that there were further birds in this area that could not be observed from the road. Golfers reported large numbers on occasion.

- 3.16 1340 birds were observed in the Dromiskin/Castlebellingham/Cricket Grounds area. These included very large numbers in one agricultural field (>1000) with much smaller numbers elsewhere, some in flight. The field seemed to have been churned up by livestock creating a mosaic of wet habitat.
- 3.17 252 birds were observed in the Annagassan/Salterstown/Dunany area. These comprised small to medium numbers seen in wet fields. A small flock was seen dropping into hidden agricultural land behind a large cattle farm.

5th December

- 3.18 A total of 1259 birds were recorded.
- 3.19 179 birds were observed in the Cooley area. These comprised small numbers (flocks of 3-85) in a few fields, all of which were seen in sheep fields with the exception of a small flock on Greenore Golf Course.
- 3.20 385 birds were observed in the Dundalk area. These included good numbers (flocks of 35-170) in fields along the Castletown River, notably amenity grassland along the south side of the river and south from Waterville on the Point Road.
- 3.21 368 birds were observed in the Sportsmans Hall/Kilcurry/Kilcurely/Carrickmacross Road area. Small numbers were seen in the wet fields near the Kilcurry River, Kilcurley, Sportsmans Hall, Dundalk rugby grounds and the vicinity of Knockbridge. It is likely that there were further birds in this area that could not be observed from the road. At Mullabohy, about 8 km from the nearest roost site, a flock of 120 birds was seen in a flooded field.
- 3.22 86 birds were observed in the Dromiskin/Castlebellingham/Cricket Grounds area. A field which previously held more than 1000 birds was abandoned. Small flocks (4-12) were seen in a few other fields (mainly sheep-grazed) in the cricket grounds area.
- 3.23 241 birds were observed in the Corstown/Salterstown/Dunany area. These comprised small to medium numbers seen in wet fields. A medium flock (112) was seen in a field with horses.

Table 3.7 - Results of field-feeding survey on 28th November 2014

Location	Time	Oystercatcher count			Habitat details	
		total	roosting	juveniles	type	notes
Cooley	10:00-11:00	83	0		GA1	with sheep in one field
Dundalk	11:00-13:00	429	0	15 of 50 assessed	GA2	
Blackrock	13:00-14:00	368	0		GA1 and GA2	one field churned up by livestock; GA2 on golf course.
Dromiskin	14:00-15:00	1340	50	18 of 50 assessed	GA1	main field churned up by livestock
Dunany	15:00-16:00	252	6		GA1	field heavily fertilised with slurry

Habitat types: GA1 = improved agricultural grassland; GA2 = amenity grassland (improved) (Fossitt, 2007).

Table 3.8 - Results of field-feeding survey on 5th December 2014

Location	Time	Oystercatcher count			Habitat details	
		total	roosting	juveniles	type	notes
Cooley	10:00-11:00	179	40	12 of 42 assessed	GA1	with sheep in several fields and in Bellurgan estate (cattle)
Dundalk	11:00-12:00	385	0	3 of 25 assessed	GA2	amenity grassland and sports fields
Sportsmans Hall to Carrick-macross road	12:00-14:00	368	0	0 of 50 assessed	GA1 and GA2	
Dromiskin	14:00-15:00	86	0	18 of 50 assessed	GA1	main field churned up by livestock
Corstown	15:00-16:00	241	6		GA1	field heavily fertilised with slurry
Fane estuary	16:30	400	0		Flying to roost, mainly down the Fane	

Habitat types: GA1 = improved agricultural grassland; GA2 = amenity grassland (improved) (Fossitt, 2007).

Notes on field feeding observations

- 3.24 The Oystercatchers generally preferred either soft loamy fertilised amenity grassland or improved agricultural grassland, particularly after the presence of livestock. On 5th December, birds were seen using fields in the presence of sheep (Cooley) and horses (Corstown). Birds were not seen on arable fields and were not seen in the company of other species with the exception of Curlew. Typically Lapwing, Redshank and Golden Plover used the same type of substrate (short grass or ploughed), while geese stuck to flooded areas of arable fields apparently rooting at winter crops. While there are many flooded fields in the area, the Oystercatchers seem to be very selective, and, unlike wildfowl, will tolerate nearby hedgerows if the substrate is right.
- 3.25 The most common feeding method was a form of stabbing combined with ploughing. Birds seemed to be consuming earthworms almost exclusively, though it is possible that there was another more shallow lying prey item in the field at Dromiskin. There was considerable aggression in the most crowded field, though no kleptoparasitism was observed.



Figure 3.1 - Location of incidental observations of field-feeding flocks recorded during the low tide counts in the southern part of the bay.



Figure 3.2 - Location of incidental observations of field-feeding flocks recorded during the low tide counts in the northern part of the bay.



Figure 3.3 - Flock locations recorded around Dundalk Harbour in February 2015.

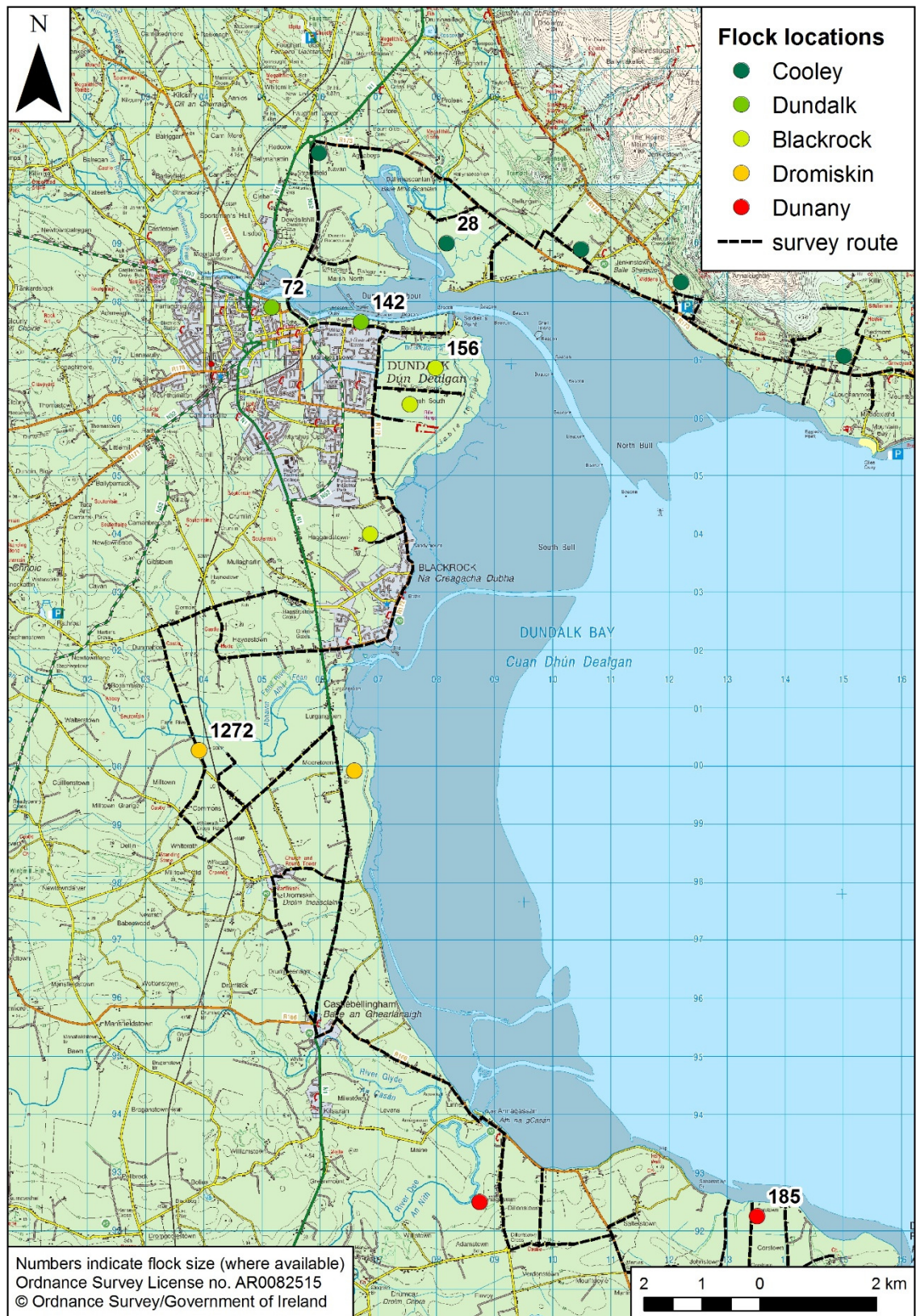


Figure 3.4 - Locations of flocks recorded on the field-feeding survey on 28th November 2014.

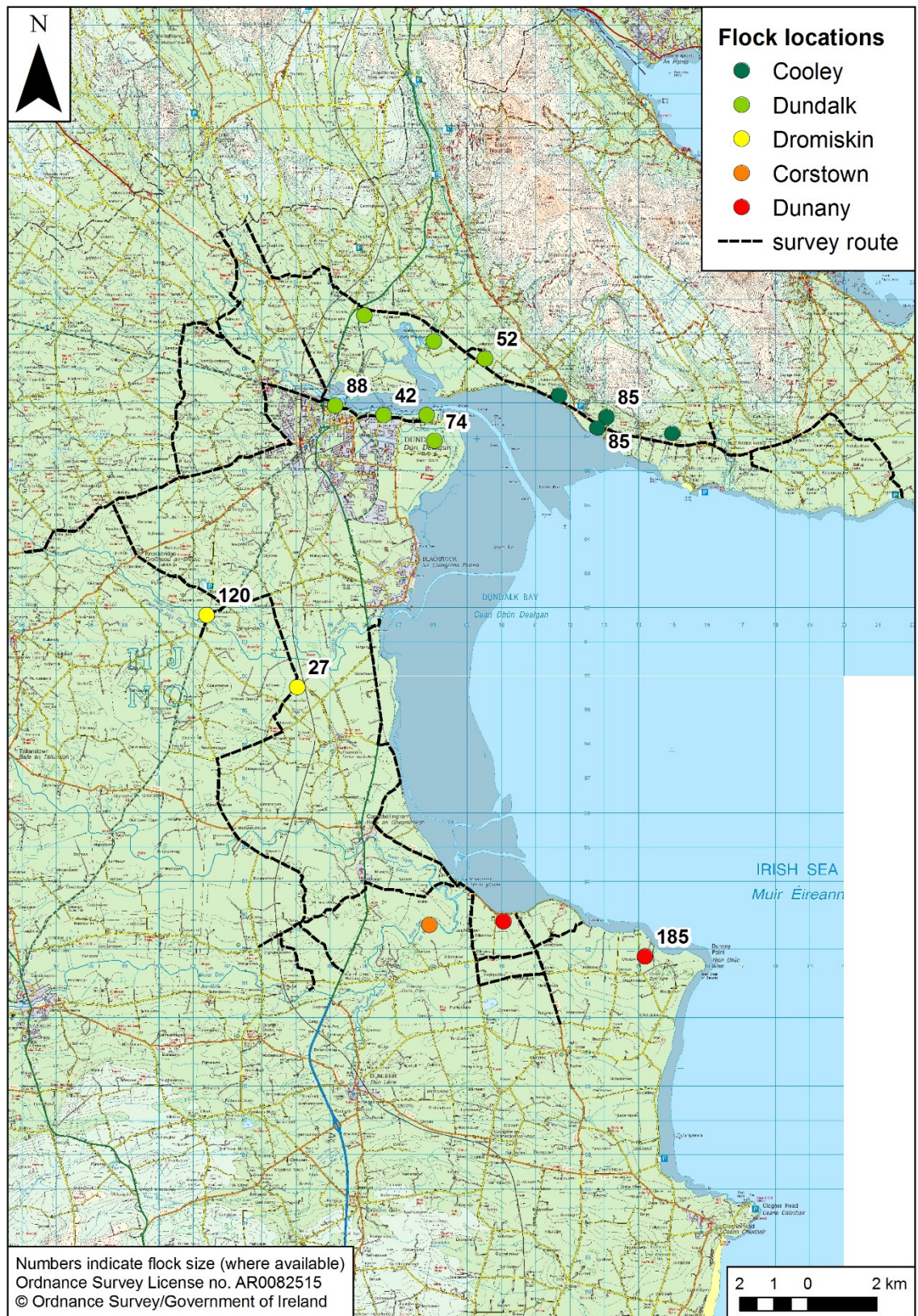


Figure 3.5 - Location of flocks recorded on the field-feeding survey on 5th December 2014.

4. Discussion

Summary of annual and seasonal trends

- 4.1 Over the past three winters (2012/13-2014/15), we have monitored Oystercatcher numbers in Dundalk Bay by carrying out full low tide counts of the entire site. This followed partial monitoring in 2011/12 in which we only carried out low tide counts of the upper shore/outer bay zones.
- 4.2 The pattern of the counts each winter indicate that they have a high degree of accuracy, with smooth trends from month to month. However, there have been marked differences between winters in the total numbers and seasonal trends (Table 4.1).
- 4.3 In 2012/13, the counts began in late July. The numbers quickly built up to nearly 10,000 birds by later September, with a very gradual further increase until January, before a sharp decline in February and March. Note that the short-term decline in November was due to birds feeding on flooded fields at Bellurgan, and if these birds are added to the total the overall numbers fit almost exactly into the September-February long-term trend. Overall, the numbers on the main sandflats and upper shore/outer bay showed similar seasonal patterns, although the latter did not start declining until the March count.
- 4.4 In 2013/14, the counts began in mid-August. The numbers had again built up to around 10,000 by the September count, and showed a further gradual increase to over 11,000 birds by the November count. There was no count in December (due to logistical issues), but by early January there had been a large decrease to just over 6,000 birds. This decrease was due to loss of birds from the main sandflats, with numbers on the upper shore/outer bay actually showing a slight increase. There was no further coordinated count of the entire site, but a count of the main sandflats in late January indicated that there had been an almost complete disappearance of birds from that zone.
- 4.5 In 2014/15, the counts began in mid-September. Overall numbers were much lower than in the previous two winters, only rising to 6648 birds by mid-October. This was due to lower numbers on the main sandflats, with numbers on the upper shore/outer bay similar to previous winters. There was then a sharp decline in the November count, which was mainly due to loss of birds from the upper shore/outer bay zone. Numbers then showed a further gradual decline across the rest of the winter.
- 4.6 Therefore, across these three winters there has been a trend for Oystercatchers to leave Dundalk Bay at an increasingly earlier stage of the winter. In the first two winters, birds left the main sandflats before they left the upper shore/outer bay, while last winter the converse was the case. However, last winter the numbers on the main sandflats were much lower than during the same periods in the previous two winters.
- 4.7 The departure of birds in 2013/14 and 2014/15 coincided with periods of very wet weather with extensive flooding of fields in the hinterland around Dundalk Bay. In January 2014, no systematic field-feeding survey was carried out but there were casual observations of flocks of 100s of Oystercatchers in the hinterland around Dundalk Bay, while a flock of around 1200 were encountered around 15 km inland along the River Fane, just west of Inishkeen. In 2014/15, the field-feeding survey carried out in late November/early December, indicated that most/all of the birds that left Dundalk Bay in October/November 2014 were feeding in fields around Dundalk Bay: there was a decrease of 2900 birds between the October and November counts, while 2472 birds were seen in the field feeding survey in late November (which did not cover all the potential habitat).

Table 4.1 - Comparison of Oystercatcher numbers in the peak periods of the last three winters (2012/13-2014/15)

Winter	Peak period	Mean count	Peak count	Mean % on main sandflats
2012/13	Sep-Jan	9807	10661 (Jan)	56%
2013/14	Sep-Nov	10795	11379 (Nov)	71%
2014/15	Sep-Oct	6039	6648 (Oct)	50%

Causes of trends

4.8 There are two questions that need to be answered:

- Why do Oystercatchers leave the intertidal habitat in Dundalk Bay to feed on fields?
- Why were Oystercatchers numbers on the main sandflats much lower in 2014/15 compared to the previous two winters, even before the departure of field-feeding birds?

Field-feeding

4.9 Field-feeding by Oystercatchers is a well-known phenomenon and, at some sites, a significant proportion of the population habitually feed on fields. However, at Dundalk Bay, field-feeding has traditionally been regarded as being of very minor importance for the Oystercatcher population.

4.10 Field-feeding is generally regarded as being a sub-optimal strategy for Oystercatchers, which provides supplementary food resources when resources within the intertidal zone are limited. Field-feeding may, therefore, be an indicator of the population being under stress (Goss-Custard et al., 1996).

4.11 Large-scale movement of birds from the intertidal zone in Dundalk Bay to fields in the hinterland of Dundalk Bay indicate that birds were able to obtain a higher intake rate by feeding on fields than they were by feeding in the intertidal zone. This could occur due to low densities of suitable prey in the intertidal zone, or exceptional feeding conditions in the fields. It is certainly likely that feeding conditions in the fields were improved by heavy rainfall and flooding, which would make prey more accessible. If this was the only factor causing the movement of birds to the fields, we would expect to see similar patterns in other east coast sites.

4.12 The reason that the field-feeding birds appeared to mainly come from the main sandflats in 2013/14, but from the upper shore/outer bay in 2014/15, is probably related to the relative numbers in the two areas. In 2013/14, numbers of the main sandflats were very high, prior to the departure of presumed field-feeding birds. These birds were mainly feeding on small cockles, following an exceptional late summer spatfall event. Small cockles are only profitable for Oystercatchers when they occur in very high densities, so it is possible that by December 2014, the density of small cockles had fallen to a level that could no longer support the numbers of Oystercatchers present, and the potential intake rate from feeding on fields now exceeded (for many birds) the potential intake rate from remaining on the main sandflats. In 2014/15, numbers on the main sandflats were very low, even prior to the departure of field-feeding birds. Therefore, birds were not experiencing high levels of interference competition and had little incentive to leave the main sandflats.

4.13 The fact that birds on the upper shore/outer bay left to feed on fields in 2014/15, but apparently did not do so in 2013/14, indicates that feeding conditions in these areas were poorer in 2014/15. In this context, it is interesting to note that there has been a consistent decline across four winters in the numbers feeding in the Salterstown area, which held very high numbers of Oystercatchers in 2011/12. High levels of winkle picking activity has been noted in this area on several counts, while

there may also have been some collection of seed mussels from this area, and it is possible that these activities are associated with the decline in Oystercatcher numbers in this area.

Low numbers in 2014/15

- 4.14 The low numbers of Oystercatchers in the September and October counts apparently predated the movement of birds to fields: while we did not carry out any field-feeding surveys at this time, there were no casual observations of large numbers feeding on fields, weather conditions were not unusually wet, and there was no widespread flooding. Therefore, we consider that these low numbers indicate that around 4000-5000 Oystercatchers failed to return to Dundalk Bay in the winter of 2014/15. As Oystercatchers are generally very site faithful (Hulscher *et al.*, 1996), the disappearance of around 45% of the population between two winters is a remarkable event, which requires explanation.
- 4.15 It is interesting to note that this number is almost exactly the number of birds that disappeared from Dundalk Bay between the November and January counts in the previous winter (4891 birds). This could indicate a large-scale mortality event. There were no reports of large numbers of Oystercatcher corpses being found around Dundalk Bay, but the mortality could have occurred elsewhere as birds dispersed away from Dundalk Bay, and/or on spring migration due to birds being in poor condition. It is also possible that some unrelated factor (such as mortality on breeding grounds) could have caused the loss of birds.

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Appendix A

Field Feeding Oystercatcher



Plate A1 – Field feeding at Dunany (B. Martin)



Plate A1 – Field feeding at Dromiskin (B. Martin).

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