CSHAS 2019 Bird Survey Report

Materials and Methods

The seabird survey was conducted from the 10/10/19 to the 28/10/19 using a team of two seabird surveyors per survey leg. The lead seabird observer conducted visual survey effort, while the other seabird observer was responsible for data collection and recording. The observer's survey effort was maximized and optimized during periods of sea state less than or equal to sea state 6 and with visibility of greater than 300m. Additional visual point sampling (e.g., at oceanographic sampling stations or fishing stations) and incidental recording were also employed; however line transect survey effort was prioritised by the observer. Seabird watches were conducted using a standard single platform line transect survey design while the vessel was travelling at a consistent speed and heading. Observations for seabirds were conducted from the monkey island (deck height 12 m above sea level) or the bridge (deck height 10 m above sea level). Observations were conducted from the monkey island preferably, however, as in previous surveys aboard the R.V. Celtic Explorer, access to the monkey island was dependent on weather conditions.

The data collection methodology was based on that originally proposed by Tasker *et al.* (1984) with later adaptations applied to allow correction factors to be applied for missed birds (Camphuysen *et al*., 2004). The method employed used a single platform line transect survey design with sub-bands to survey birds associated with the water, while flying birds were surveyed using a 'snapshot' technique. Observer effort was concentrated in a bow-beam arc of 90^{o} to one side (i.e., to port or starboard) of the vessel's track-line, however, all seabirds observed outside this area were also recorded.

Survey effort for seabirds associating with the water were concentrated within a survey strip of 300m running parallel and adjacent to the vessels track-line and extending to the horizon. All birds surveyed within this region were be recorded as 'in-transect' and assigned to one of four distance sub-bands (A: 0-50m, B: 50-100m, C: 100-200m, D: 200-300m) according to their perpendicular distance from the track-line. This approach allows for the evaluation of biases caused by specific differences in detection probability with increasing distance from the trackline (Camphuysen *et al.* 2004). Seabirds occurring outside of this survey strip were recorded as 'off-transect' and assigned to a separate sub-band (E: >300m). The perpendicular distance to an animal was estimated using a fixed interval range finder (Heinemann, 1981), ensuring each animal is allocated to the correct distance sub-band.

Flying birds were surveyed using 'snapshots', where instantaneous counts of flying birds within a survey quadrant of 300m x 300m were conducted. The periodicity of these 'snapshots' was vessel speed dependent but timed to allow counts to occur as the vessel passes from one survey quadrant to the next. This method minimises biases in counts of flying birds relative to the movement of the vessel (Pollock *et al.,* 2000, Camphuysen *et al.* 2004).

Seabirds remaining with the vessel for more than 2 minutes were deemed to be associating with the vessel (Camphuysen *et al.* 2004) and were recorded as such. Seabirds seen associating with other vessels (i.e. fishing vessels) were also recorded as such.

Searching for seabirds was done with the naked eye, however, Leika Ultravid 8x42 HD binoculars were used to confirm parameters such as species identification, age, moult, group size and behaviour (Mackey *et al.* 2004). A Canon EOS 7D Mark II DSLR camera with a Canon EF 100-400mm F4.5-5.6 IS II USM telephoto lens was used to visually document other information of scientific interest. Data was also collected on all migratory/ transient waterfowl and terrestrial birds encountered.

The Cybertracker (http://www.cybertracker.org/) data collection software package (Version 3.501) was used to collect all positional, environmental and sightings data, and save it to a Microsoft Access database. Positional data was collected using a portable GPS receiver with a USB connection and recorded every 5 seconds.

Each line transect was assigned a unique transect number, and a new transect was started anytime the vessel activity changed (i.e. changing from on-transect to inter-transect). Each subsequent sighting was also assigned to this unique transect number.

Environmental data was timestamped and recorded with GPS data at the beginning and end of each line transect and also as soon as any change in environmental conditions occurred. Environmental data recorded included; wind speed, wind direction, sea state, swell, visibility, cloud cover and precipitation.

Each sighting was timestamped and recorded with GPS data using Cybertracker. Sighting data such as; species identification, distance band, group size, composition, heading, age, moult, behaviour and any associations with cetaceans or other vessels were also recorded on the time stamped Cybertracker sighting record page. Where species identification could not be confirmed, sightings were recorded at an appropriate taxonomic level (i.e. large gull sp., Larus sp., Commic tern, etc.).

Ancillary data such as line changes, changes in survey activity (e.g. fishing/CTD cast) and fishing vessel activity were also recorded.

Results

In total, 117 hours and 33 minutes of survey effort was conducted over the course of CSHAS 2019. In total, 96 hours and 9 minutes of survey effort were conducted using a line transect methodology, while 15 hours and 42 minutes of effort were conducted using the point sampling methodology. A further 15 hours and 41 minutes of effort were conducted as a casual watch.

A total of 4219 seabird sightings were recorded throughout the survey, totalling 28110 individuals. In total, 12476 seabirds were recorded as “in transect”, while 15634 were recorded “off transect”. The species encountered included 32 species from 9 families. A further 25 sightings of terrestrial birds were also recorded, comprising of 85 individuals.

Guillemot (*Uria aalge*) were the most frequently sighted and the most abundant species accounting for 1331 sightings (31.5% of all sightings) and comprising of 7027 individuals in total (25% of all encountered individuals.) Of these, 6095 individuals were recorded as ‘in transect’.

Kittiwake (*Rissa tridactyla*) were the third most frequently observed species accounting for 623 sightings (14.8% of all sightings), however, they were the second most abundant species comprising of 7001 individuals in total (24.9% of all encountered individuals.) Of these, 2555 individuals were recorded as 'in transect'.

Gannets (*Morus bassanus*) were the second most frequently sighted and the third most abundant species accounting for 861 sightings (20.4% of all sightings) and comprising of 6903 individuals in total (24.6% of all encountered individuals.) Of these, 1723 individuals were recorded as 'in transect'.

Fulmar (*Fulmarus glacialis*) were the fourth most frequently sighted and the fourth most abundant species accounting for 403 sightings (9.6% of all sightings) and comprising of 2605 individuals in total (9.3% of all encountered individuals.) Of these, 496 individuals were recorded as 'in transect'.

A number of terrestrial species were also recorded during the survey including 2 sightings (totalling 31 individuals) of redwing (*Turdus iliacus*) a ring ousel (*Turdus torquatus*), and a pair of tufted duck (*Aythya fuligula*).

***Table 1**. Summary of seabird sightings during the survey.*

Common Name	Species name	No. of Sightings	No. of Individuals	In Transect	Off Transect
Arctic Skua	*Stercoratius parasiticus*	28	32	8	24
Arctic Tern	*Sterna paradisaea*	2	2	1	1
Balearic Shearwater	*Puffinus mauretanicus*	4	4	0	4
Black-headed Gull	*Larus ridibundus*	7	10	0	10
Common Gull	*Larus canus*	63	282	39	243
Common Tern	*Sterna hirundo*	2	3	1	2
Cormorant	*Phalacrocorax carbo*	3	3	0	3
Fulmar	*Fulmarus glacialis*	403	2605	496	2109
Gannet	*Morus bassanus*	861	6903	1723	5180
Great Black-backed Gull	*Larus marinus*	90	366	95	271
Great Northern Diver	*Gavia immer*	3	11	1	10
Great Shearwater	*Puffinus graves*	2	2	1	1
Great Skua	*Stercoratius skua*	139	205	42	163
Guillemot	*Uria aalge*	1331	7027	6095	932
Gull sp.	*Laridae sp.*	7	319	75	244
Herring Gull	*Larus argentatus*	35	103	15	88
Kittiwake	*Rissa tridactyla*	623	7001	2555	4446
Lesser Black-backed Gull	*Larus fuscus*	115	1320	142	1178
Little Auk	*Alle alle*	1	1	0	1
Long-tailed Skua	*Stercoratius longicaudus*	2	3	3	0
Manx Shearwater	*Puffinus puffinus*	42	77	32	45
Mediterranean Gull	*Larus melanocephalus*	6	7	3	4
Petrel sp.	*Hydrobatidae sp.*	1	1	0	1
Pomarine Skua	*Stercoratius pomarinus*	18	24	7	17
Puffin	*Fratercula arctica*	21	39	12	27
Razorbill	*Alea torda*	321	1027	507	520
Razorbill / Guillemot	*Alea torda / Uria aalge*	20	616	586	30
Red-throated Diver	*Gavia stellata*	1	1	0	1
Sabine's Gull	*Larus sabini*	2	2	1	1
Sandwich Tern	*Sterna sandvicensis*	2	7	3	4
Sooty Shearwater	*Puffinus griseus*	46	83	24	59
Storm Petrel	*Hydrobates pelagicus*	13	19	9	10
Yellow-legged gull	*Larus michahellis*	5	5	0	5
Total		**4219**	**28110**	**12476**	**15634**

***Table 2**. Summary of terrestrial bird sightings during the survey.*

Common Name	Species name	No. of Sightings	No. of Individuals
Blackcap	*Sylvia atricapilia*	1	1
Brambling	*Fringilla montifringilla*	1	1
Buzzard	*Buteo buteo*	1	1
Common Scoter	*Melanitta nigra*	1	9
Fieldfare	*Turdus pilaris*	1	1
Grey Phalarope	*Phalaropus fulicarius*	2	2
Meadow Pipit	*Anthus pratensis*	6	11
Red-breasted flycatcher	*Ficedula parva*	1	1
Redwing	*Turdus iliacus*	2	31
Ring Ousel	*Turdus torquatus*	1	1
Shelduck	*Tadorna tadorna*	1	1
Snipe	*Gallinago gallinago*	1	1
Starling	*Sturnus vulgaris*	3	18
Tufted Duck	*Aythya fuligula*	1	2
Wheatear	*Oenanthe oenanthe*	1	1
Whimbrel	*Numenius phaeopus*	1	3
	Total	**25**	**85**

References

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