CSHAS 2020 Bird Survey Report

Materials and Methods

The seabird survey was conducted from the 05/10/20 to the 23/10/20 using a single seabird surveyor per survey leg. The seabird observer conducted visual survey effort while simultaneously recording all data. 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. All observations for seabirds were conducted from the monkey island (deck height 12 m above sea level).

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 3.514) 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 34 minutes of survey effort was conducted over the course of CSHAS 2020. In total, 99 hours and 50 minutes of survey effort were conducted using a line transect methodology, while 14 hours and 45 minutes of effort were conducted using the point sampling methodology. A further 2 hours and 58 minutes of effort were conducted as a casual watch.

A total of 3764 seabird sightings were recorded throughout the survey, totalling 35639 individuals. In total, 11624 seabirds were recorded as “in transect”, while 24012 were recorded “off transect”. The species encountered included 28 species from 8 families. A further 74 sightings of terrestrial birds were also recorded, comprising of 287 individuals from 19 different species.

Gannets (*Morus bassanus*) were the most frequently sighted and the most abundant species accounting for 1165 sightings (31.0% of all sightings) and comprising of 12690 individuals in total (35.6% of all encountered individuals.) Of these, 3148 individuals were recorded as ‘in transect’.

Guillemot (*Uria aalge*) were the second most frequently sighted and the third most abundant species accounting for 1057 sightings (28.1% of all sightings) and comprising of 4377 individuals in

total (12.3% of all encountered individuals.) Of these, 3527 individuals were recorded as ‘in transect’.

Kittiwake (*Rissa tridactyla*) were the third most frequently observed species accounting for 554 sightings (14.7% of all sightings), however, they were the second most abundant species comprising of 9594 individuals in total (26.9% of all encountered individuals.) Of these, 1826 individuals were recorded as ‘in transect’.

Fulmar (*Fulmarus glacialis*) were the fourth most frequently sighted and the fourth most abundant species accounting for 305 sightings (8.1% of all sightings) and comprising of 2068 individuals in total (5.8% of all encountered individuals.) Of these, 424 individuals were recorded as ‘in transect’.

A number of terrestrial species were also recorded during the survey including 24 sightings (totalling 209 individuals) of swallow (*Sturnus vulgaris*), 23 sightings (totalling 42 individuals) of meadow pipit (*Anthus pratensis*) a jack snipe (*Lymnocryptes minimus*), and a pair of gadwall (*Anas strepera*).

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

Common Name	Species name	No. of Sightings	No. of Individuals	In Transect	Off Transect
Fulmar	*Fulmarus glacialis*	305	2068	424	1644
Sooty Shearwater	*Puffinus griseus*	22	55	21	34
Manx Shearwater	*Puffinus puffinus*	25	76	56	20
Storm Petrel	*Hydrobates pelagicus*	13	34	23	11
Leach's Petrel	*Oceanodroma leucorhoa*	2	2	1	1
Gannet	*Morus bassanus*	1165	12690	3148	9542
Pomarine Skua	*Stercoratius pomarinus*	1	1	1	0
Arctic Skua	*Stercoratius parasiticus*	4	6	2	4
Long-tailed Skua	*Stercoratius longicaudus*	1	1	1	0
Great Skua	*Stercoratius skua*	60	75	23	52
Mediterranean gull	*Larus melanocephalus*	3	6	6	0
Common Gull	*Larus canus*	40	135	96	39
Little gull	*Larus minutus*	3	4	4	0
Sabine's gull	*Larus sabini*	1	1	1	0
Black-headed Gull	*Larus ridibundus*	6	47	3	44
Lesser Black-backed Gull	*Larus fuscus*	99	688	135	553
Herring Gull	*Larus argentatus*	43	499	39	460
Yellow-legged gull	*Larus michahellis*	3	3	1	2
Great Black-backed Gull	*Larus marinus*	111	310	103	207
Kittiwake	*Rissa tridactyla*	554	9594	1826	7768
Gull sp.	*Laridae sp.*	3	1620	0	1620
Guillemot	*Uria aalge*	1057	4377	3527	850
Razorbill	*Alea torda*	192	706	519	187
Puffin	*Fratercula arctica*	15	24	14	10
Auk sp.	*Alcidae sp.*	26	2603	1643	960
Shag	*Phalacrocorax aristotelis*	7	9	6	3
Cormorant	*Phalacrocorax carbo*	1	1	1	0
Great Northern Diver	*Gavia immer*	1	1	0	1
Common scoter	*Melanitta nigra*	1	3	0	3
Total		**3764**	**35639**	**11624**	**24015**

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

Common Name	Species name	No. of Sightings	No. of Individuals
Black Redstart	*Phoenicurus ochruros*	1	1
Blackbird	*Turdus merula*	1	1
Blackcap	*Sylvia atricapilia*	3	4
Chaffinch	*Fringilla coelebs*	1	1
Chiffchaff	*Phylloscopus collybita*	1	1
Gadwall	*Anas strepera*	1	2
Goldcrest	*Regulus regulus*	1	1
Goldfinch	*Carduelis carduelis*	2	7
Grey Phalarope	*Phalaropus fulicarius*	1	1
House Martin	*Delichon urbica*	1	1
Jack Snipe	*Lymnocryptes minimus*	1	1
Meadow Pipit	*Anthus pratensis*	23	42
Pied Wagtail	*Motacilla alba*	4	4
Redwing	*Turdus iliacus*	1	1
Skylark	*Alauda arvensis*	1	1
Song Thrush	*Turdus philomelos*	1	1
Starling	*Sturnus vulgaris*	5	7
Swallow	*Hirundo rustica*	24	209
Yellow Wagtail	*Motacilla flava*	1	1
Total		**74**	**287**

References

Camphuysen, K*., et-al* (2004). *Towards standardised seabirds at sea census techniques in connection with environmental impact assessments for offshore wind farms in the U.K.: a comparison of ship and aerial methods for marine birds, and their applicability to offshore wind farm development.* NIOZ report to COWRIE (BAM – 02-2002), Texel.

Heinemann, D. (1981). *A Range Finder for Pelagic Bird Censusing*. Journal of Wildlife Management 45(2): 489-493.

Pollock, C.M., *et al*., (1997). *The distribution of sea-birds and cetaceans in the waters around Ireland.* JNCC Report No. 267.

Pollock, C.M., *et al*., (2000). *The distribution of seabirds and marine mammals in the Atlantic frontier, north and west of Scotland.* Joint Nature Conservation Committee, Scotland 92pp.

Tasker, M.L., *et al*., (1984). *Counting seabirds at sea from ships: a review of methods employed and a suggestion for a standardised approach*. Auk 101: 567-577.