

CSHAS 2022 Bird Survey Report

Materials and Methods

The seabird survey was conducted from the 09/10/22 to the 28/10/22 using a single seabird surveyor on each survey leg. The seabird observer conducted visual survey effort, while also collecting and recording all survey 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 observation deck (deck height 12.9m 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° 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 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, Swarovski EL 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 DSLR camera with a Sigma 100-400mm F5-6.3 DG HSM OS 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 3.522) was used to collect all positional, environmental and sightings data, and save it to a Microsoft Access database. Positional data was collected using the tablets internal GPS receiver 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 bird observation 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 observation 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, 72 hours and 41 minutes of survey effort were conducted over the course of CSHAS 2022. In total, 60 hours and 17 minutes of survey effort were conducted using a line transect methodology, while 9 hours and 6 minutes of effort were conducted using the point sampling methodology. A further 3 hours and 17 minutes of effort were conducted as a casual watch.

A total of 2291 seabird observations were recorded throughout the survey, totalling 9854 individuals (*Table 1*). In total, 2410 seabirds were recorded as “in transect”, while 7444 were recorded “off transect”. The species encountered included 29 species, species groups, from nine families. A further 43 observations of terrestrial migratory birds were also recorded, comprising of 88 individuals (*Table 2*).

Gannet (*Morus bassanus*) were the most frequently encountered species, recorded on 649 separate occasions, accounting for 28.3% of all records. Gannet records comprised of a total of 2826 individuals (28.7% of all individual birds recorded) making gannet the most abundant species recorded on the survey. However, of these, only 471 birds were recorded as ‘in transect’.

Guillemot (*Uria aalge*) were both the second most frequently encountered and the third most abundant species accounting for 455 records (19.9% of all encounters) and comprising of 1216 individuals in total (12.3% of all encountered individuals.) Of these, 580 individuals were recorded as ‘in transect’.

Kittiwake (*Rissa tridactyla*) were the third most frequently observed species accounting for 429 sightings (18.7% of all sightings). Kittiwake were the second most abundant species comprising of 2564 individuals in total (26.0% of all encountered individuals.) Of these, 785 birds were recorded as 'in transect'.

A number of terrestrial/ migratory birds were encountered during the survey. A total of 43 observations of terrestrial/ migratory bird species were recorded during the survey (*Table 2*). These records comprised of 88 individuals from 20 species'. Species recorded included a little egret (*Egretta garzetta*), a common redstart (*Phoenicurus phoenicurus*), a goldcrest (*Regulus regulus*) and a spotted flycatcher (*Muscicapa striata*).

Table 1. Summary of seabird observations during the survey.

Common Name	Scientific name	No. of Records	No. of Individuals	In Transect	Off Transect
Fulmar	<i>Fulmarus glacialis</i>	64	272	31	241
Great Shearwater	<i>Ardenna gravis</i>	14	82	32	50
Sooty Shearwater	<i>Ardenna grisea</i>	29	120	17	103
Manx Shearwater	<i>Puffinus puffinus</i>	21	30	8	22
Storm Petrel	<i>Hydrobates pelagicus</i>	2	3	0	3
Gannet	<i>Morus bassanus</i>	649	2826	471	2355
Pomarine Skua	<i>Stercorarius pomarinus</i>	2	2	0	2
Arctic Skua	<i>Stercorarius parasiticus</i>	9	11	5	6
Long-tailed Skua	<i>Stercorarius longicaudus</i>	1	1	0	1
Great Skua	<i>Stercorarius skua</i>	13	14	2	12
Mediterranean gull	<i>Ichthyæetus melanocephalus</i>	3	3	1	2
Common Gull	<i>Larus canus</i>	13	25	2	23
Sabine's gull	<i>Xema sabini</i>	2	2	1	1
Black-headed Gull	<i>Chroicocephalus ridibundus</i>	8	14	1	13
Lesser Black-backed Gull	<i>Larus fuscus</i>	88	601	60	541
Herring Gull	<i>Larus argentatus</i>	51	345	17	328
Yellow-legged gull	<i>Larus michahellis</i>	1	1	0	1
Great Black-backed Gull	<i>Larus marinus</i>	121	234	67	167
Kittiwake	<i>Rissa tridactyla</i>	429	2564	785	1779
Arctic Tern	<i>Sterna paradisæa</i>	1	1	0	1
Guillemot	<i>Uria aalge</i>	455	1216	580	636
Razorbill	<i>Alca torda</i>	215	770	286	484
Razorbill / Guillemot	<i>Alcidae</i>	20	312	3	309
Puffin	<i>Fratercula arctica</i>	58	142	25	117
Shag	<i>Gulosus aristotelis</i>	17	54	16	38
Cormorant	<i>Phalacrocorax carbo</i>	1	5	0	5
Great Northern Diver	<i>Gavia immer</i>	1	1	0	1
Total		2291	9854	2410	7444

Table 2. Summary of terrestrial birds recorded during the survey.

Common Name	Scientific name	No. of Individuals	No. of Sightings
Racing Pigeon	<i>Columba livia</i>	1	1
European Golden Plover	<i>Pluvialis apricaria</i>	2	4
Eurasian Curlew	<i>Numenius arquata</i>	1	1
Ruddy Turnstone	<i>Arenaria interpres</i>	1	1
Little Egret	<i>Egretta garzetta</i>	1	1
Common Kestrel	<i>Falco tinnunculus</i>	1	1
Eurasian Skylark	<i>Alauda arvensis</i>	2	3
Barn Swallow	<i>Hirundo rustica</i>	2	7
Eurasian Blackcap	<i>Sylvia atricapilla</i>	4	4
Goldcrest	<i>Regulus regulus</i>	1	1
Eurasian Wren	<i>Troglodytes troglodytes</i>	1	1
Common Starling	<i>Sturnus vulgaris</i>	2	15
Song Thrush	<i>Turdus philomelos</i>	1	1
Redwing	<i>Turdus iliacus</i>	2	2
Spotted Flycatcher	<i>Muscicapa striata</i>	1	1
Common Redstart	<i>Phoenicurus phoenicurus</i>	1	1
Grey Wagtail	<i>Motacilla cinerea</i>	2	2
Pied/White Wagtail	<i>Motacilla alba</i>	1	1
Meadow Pipit	<i>Anthus pratensis</i>	12	33
Rock Pipit	<i>Anthus petrosus</i>	1	4
Total		41	88

References

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