WESPAS 2019 Bird Survey Report

Materials and Methods

The seabird survey was conducted from the 14/06/19 to the 24/07/19 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, 225 hours and 39 minutes of survey effort was conducted over the course of WESPAS 2019, 125 hours and 3 minutes of survey effort was conducted on Leg 1, while 100 hours and 36 minutes of survey effort was conducted on Leg 2 of the survey. In total, 187 hours and 36 minutes of survey effort were conducted using a line transect methodology, while 38 hours and 4 minutes of effort were conducted using the point sampling methodology.

A total of 4529 seabird sightings were recorded throughout the survey, totalling 34896 individuals. In total, 7333 seabirds were recorded as “in transect”, while 27562 were recorded “off transect”. The species encountered included 28 species from 8 families. A further 23 sightings of terrestrial birds were also recorded, comprising of 56 individuals.

Fulmar (*Fulmarus glacialis*) were the second most frequently observed species accounting for 965 sightings (21.3% of all sightings), however, they were the most abundant species comprising of 8159

individuals in total (32.8% of all encountered individuals.) Of these, 1081 individuals were recorded as 'in transect'.

Gannets (*Sula bassana*) were the most frequently sighted and the second most abundant species accounting for 1265 sightings (27.9% of all sightings) and comprising of 6116 individuals in total (24.6% of all encountered individuals.) Of these, 865 individuals were recorded as 'in transect'.

Manx shearwaters (*Puffinus puffin*) were the third most frequently sighted and the fourth most abundant species accounting for 561 sightings (12.4% of all sightings) and comprising of 3010 individuals in total (12.1% of all encountered individuals.) Of these, 989 individuals were recorded as 'in transect'.

European storm petrel (*Hydrobates pelagicus*) were the fourth most frequently observed species accounting for 524 sightings (11.6% of all sightings), however, they were the third most abundant species comprising of 3425 individuals in total (13.8% of all encountered individuals.) Of these, 860 individuals were recorded as 'in transect'.

On a number couple of occasions species including fulmar, Manx shearwaters, European storm petrel, and puffin became too numerous to accurately count. On these occasions surveying for these species was suspended.

The survey also recorded the first confirmed sighting of a south polar skua (*Stercorarius maccormicki*) in Irish waters.

A number of terrestrial species were also recorded during the survey including 7 sightings (totalling 12 individuals) of swifts (*Apus apus*) a spotted flycatcher (*Muscicapa striata*), and a pair of golden eagles (*Aquila chrysaetos*) which were seen in the Minch.

***Table 1**. Summary of seabird and terrestrial bird sightings during the survey.*

Common Name	Species name	No. of Sightings	No. of Individuals	In Transect	Off Transect
Arctic Tern	*Sterna paradisaea*	13	20	9	11
Arctic Skua	*Stercoratius parasiticus*	2	2	0	2
Auk sp.	*Alcidae sp.*	13	371	212	159
Balearic Shearwater	*Puffinus mauretanicus*	1	1	0	1
Commic tern sp.	*Sterna hirundo / Sterna paradisaea*	1	15	0	15
Common Tern	*Sterna hirundo*	7	9	3	6
Fulmar	*Fulmarus glacialis*	965	8159	1081	7078
Gannet	*Sula bassana*	1265	6116	865	5251
Great Black-backed Gull	*Larus marinus*	31	43	7	36
Great Shearwater	*Puffinus graves*	1	1	0	1
Great Skua	*Stercoratius skua*	109	136	53	82
Guillemot	*Uria aalge*	299	1149	1051	98
Herring Gull	*Larus argentatus*	13	23	2	21
Kittiwake	*Rissa tridactyla*	225	1061	641	420
Leach's Petrel	*Oceanodroma leucorhoa*	3	3	2	1
Lesser Black-backed Gull	*Larus fuscus*	133	541	31	510
Little Tern	*Sterna albifrons*	1	3	3	0
Long-tailed Skua	*Stercoratius longicaudus*	1	1	0	1
Manx Shearwater	*Puffinus puffinus*	561	3010	1989	1021
Pomarine Skua	*Stercoratius pomarinus*	4	4	0	4
Puffin	*Fratercula arctica*	229	445	245	200
Razorbill	*Alea torda*	114	340	274	66
Shag	*Phalacrocorax aristotelis*	1	3	3	0
Sooty Shearwater	*Puffinus griseus*	8	8	1	7
South Polar Skua	*Stercorarius maccormicki*	1	1	0	1
Storm Petrel	*Hydrobates pelagicus*	524	3425	860	2565
Wilson's Petrel	*Oceanites oceanicus*	4	6	0	0
	Total	**4529**	**24896**	**7332**	**27556**
Collared Dove	*Streptopelia decaocto*	2	2		
common scoter	*Melanitta nigra*	3	21		
Dunlin	*Calidris alpina*	1	1		
Feral/ racing pigeon	*Columba livia domestica*	4	5		
Golden Eagle	*Aquila chrysaetos*	1	2		
Pied Wagtail	*Motacilla alba*	1	1		
Redshank	*Tringa totanus*	1	5		
Spotted Flycatcher	*Muscicapa striata*	1	1		
Swallow	*Hirundo rustica*	2	2		
Swift	*Apus apus*	7	12		
	Total	**23**	**52**		

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.