

SCAR/SCOR/IABO/ACMRR
GROUP OF SPECIALISTS ON
LIVING RESOURCES OF THE SOUTHERN OCEANS

RECORDING OBSERVATIONS OF BIRDS AT SEA

BIOMASS Working Party on Bird Ecology

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FOREWORD

The purpose of these Handbooks is to disseminate existing information on methods relevant to BIOMASS in time for those methods to be put to use. They are therefore not intended to be definitive treatises, although in some cases this may well be so. Their primary purpose is to provide an early guide. The Handbooks will be reviewed as new information becomes available, and updated if required. A number of Handbooks are in preparation and will be issued as they are completed. The costs of preparation and distribution are subsidized by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA/NMFS). Copies are distributed to individuals whose names are included in the "BIOMASS Directory". The Technical Group on Methods is grateful to those who have volunteered to prepare these Handbooks for the use and guidance of their colleagues and to the CSIRO, Australia for their technical assistance. Our role is to identify the needs for Methods Handbooks and Leaflets and to arrange, if possible, for those needs to be met.

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This Handbook was compiled by members of the BIOMASS Working Party on Bird Ecology. Comments and requests for additional information should be sent to the secretary. The members of the Working Party on Bird Ecology are listed in Appendix 1.

INTRODUCTION

Knowledge of the pelagic distribution and abundance of seabirds is an important element in the assessment of their role as predators in marine ecosystems. This is nowhere more true than in the Southern Ocean where the sum of direct and indirect consumption of krill by seabirds probably exceeds 115 million tonnes, which is slightly larger than the consumption by whales, and two-thirds the consumption by seals, calculated by similar methods.

Acting in response to a request of the Technical Group on Program Implementation and Co-ordination of BIOMASS, the BIOMASS Working Party on Bird Ecology investigated the most effective means of recording observations on birds at sea in the Southern Ocean. In drawing up a set of instructions for observing and recording birds, the Working Party was guided by a need for information which should contribute to a better understanding of the Southern Ocean ecosystem, and make an important contribution to BIOMASS. More particularly the following requirements were considered:

- (a) to obtain detailed information on the spatial and temporal distribution of avian species, their species diversity and their biomass;
- (b) to relate seabird behaviour and distribution to data on the physical and biological features of the environment, collected almost simultaneously;
- (c) to determine to what extent seabirds can be used as indicators of the distribution and abundance of selected prey populations, especially krill and cephalopods; and,
- (d) to assess qualitatively the ability of seabirds to locate and exploit prey populations that are distributed in high-density patches, such as krill swarms.

Accordingly, the Working Party recommended that the standard card developed by SCAR over the last five years should be used for recording birds at sea during FIBEX and SIBEX, and any other opportune cruises in the Southern Ocean. A set of detailed instructions for the use of the SCAR cards was drawn up and distributed through the national committees of all nations adhering to SCAR.

This Handbook presents the instructions and the card formats for recording seabirds at sea. The cards are designed to record the occurrence, distribution and behaviour of seabirds in coastal, offshore and oceanic sub-Antarctic and Antarctic waters. In addition to general information on seasonal distribution, migrations and movements, the cards can be used to assess seabird density and to investigate relationships between bird distribution and oceanographic and topographic features.

Special attempts to keep detailed records of seabirds should be made for areas of potentially high concentrations of krill (e.g. at oceanic divergences and other areas of local water-mixing and shelf-slopes). Also, all associations of seabirds with krill swarms should be recorded. Such aggregations are likely to attract an abundance and diversity of predators and the nature of the interactions between these predators and between them and their prey is of considerable interest and importance. Indeed, the ability of predators to locate krill swarms or patches may be a key feature of their feeding ecology and hence of their impact on krill populations.

INSTRUCTIONS FOR USE OF RECORD CARDS

There are two types of card: the **VOYAGE MASTER** card and the **SEABIRD RECORD** card (Figures 1 and 2). Both of these should be completed for each voyage. The cards are designed to be used by inexperienced observers as well as experts, and as much information as possible should be recorded.

The VOYAGE MASTER Card (Figure 1)

One of these cards should be completed for each voyage. The following information is called for:

1. Name of vessel, overall length and, if possible, displacement.
2. Port of departure, port of destination and dates of departure and arrival.
3. Name and initials of principal observer.
4. Position of ship, and height above sea level of observation post in metres. The flying bridge is often a suitable vantage point.
5. Field of view covered (e.g. 90° quadrant ahead; 180° ahead; 180° laterally, 360°).
6. Equipment type and magnification of optical instruments used (10 X 40 binoculars are ideal for at-sea observations).
7. Additional notes, relevant to any of the above, or to special points of interest of the voyage, particularly including cross reference to oceanographic and hydrographic data collected during the **SAME VOYAGE**.

SEABIRD MAPPING SCHEME		VOYAGE MASTER CARD	
VESSEL		LENGTH	DISPLACEMENT
VOYAGE	FROM	TO	
OBS. POSITION	HEIGHT a.s.l.	FIELD OF VIEW	EQUIPMENT
PRINCIPAL OBSERVER			
NOTES			OFFICE USE ONLY

Figure 1. VOYAGE MASTER card for recording vessel data.

The SEABIRD RECORD card (Figure 2a,b)

Observations should be recorded on the card during a standard observation period of 10 minutes. A new card should be started for each 10-minute period. As many cards as possible should be completed, spread over the daylight hours. At least one normal count and one stern count of seabirds should be made for each $1^{\circ} \times 0.5^{\circ}$ square (latitude and longitude - see F below) and for every hour, whichever gives the more extensive sampling. Continuous observations may be made, but must still be in 10-minute periods, e.g. continuous observation for 1 hour = 6 cards. Observation periods where NIL birds are seen must be recorded as a NIL card (see D below). Where one card is insufficient to record all data for a 10-minute period, then additional cards should be stapled behind the first card. Cards may be used for special isolated observations (see C below).

FACE of CARD (Figure 2a)

A. General reference information

1. *Observer*: Name or initials (if principal observer) on all cards.
2. *Speed*: Mean speed of ship for each observation period in knots.
3. *Date*: Day, Month, Year (e.g. 01/01/79 or 10/05/79 or 29/12/79).

SEABIRD MAPPING SCHEME				10 MINUTE CARD		CARD NO	
OBSERVER				SPEED KTS		WEATHER	
NORMAL COUNT		STERN COUNT		PART CLOUDY		DATE	
ASSOCIATION WITH		DETAILS		CLEAR ☐ CAST		D / M / I	
WHALES				SHOWERS/SQUALLS		START TIME	
SEALS				CONT RAIN FOG			
FISH				SNOW		LAT °	
OTHER				VISIBILITY		LONG °	
NOTES		DEPTH		WIND (BEAUFORT)		N	
				DIRECTION		E	
				0 2 4 6 8		S	
				1 3 5 7 9		W	
		M		SEA TEMP °C		SHIP'S ACTIVITY	
		SALINITY		CALM SLIGHT		1 STEAMING/SAILING	
		‰		MOD ROUGH		2 DROPPING TRASH	
		‰		V ROUGH BERGS		3 TRAWLING	
		BARO. PRESS		PACK ICE 0-2/8		4 OCEANOGRAPHY	
		mm Hg		PACK ICE 2-5/8		5 POTTING	
				PACK ICE 5/8 +		6 LINE FISHING	
				FULL LIST		7 CLEANING FISH	
				PART LIST		8 STATIONARY	
				NIL BIRDS OBSERVED		9 FLYING HELICOPTERS	
						10 WHALING	

Figure 2a. SEABIRD RECORD card (face of card) for recording bird numbers, weather and hydrological conditions and ship's activity.

	SPECIES	TALLY SCORE	TOTAL	FEEDING	SIT ON WATER	SIT ON ICE	SIT ON SHIP	IN HAND	FLYING EAST	ACCOMPANYING	FOLLOW SHIP
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											

Figure 2b. SEABIRD RECORD card (reverse of card) for recording bird behaviour.

4. *Time*: State time of each observation period. Preferably record as Greenwich Mean Time (GMT), and failing this, as standard ship time, both on 24-hour clock. Indicate on VOYAGE MASTER card (under notes) which convention is being used and employ it throughout.
5. *Ship's position*: Latitude and longitude in degrees and minutes (preferably to the nearest 10 minutes). In case of difficulty or uncertainty, record ship's noon position (and mark as such).
6. *Ship's activity*: All activities occurring in the observation period should be marked by circling the number referring to each category (e.g. 1 2 3 4 5 6 7 8 9 0).

B. Weather, wind, sea, etc.

1. Circle **all** categories of weather which occurred in the observation period. These general categories should be used to give an impression of the weather conditions as they may affect observations.
2. The wind scale (Beaufort categories) refers to the mean wind speed for the observation period.
3. Air temperature should be recorded in ° C, wind direction as a compass point.
4. Estimate limit of effective visibility.
5. Sea temperature should be recorded in ° C.
6. When recording pack ice, the categories refer to differing densities of cover.
7. Record water depth in metres.
8. Record salinity in parts per thousand ($‰$).
9. Record barometric pressure in mm of mercury.

C. Full or partial list

1. Part list should be marked (ticked) where:
 - (a) observation period is less than 10 minutes;
 - (b) a special spot record is made of an item of interest outside an observation period;
 - (c) observations are made on a restricted number of species instead of all birds seen.The nature of the part list should be noted on the card (under notes).
2. Full list should be marked (ticked) in all other cases.

D. Nil birds observed

If no birds are observed in the standard 10-minute period then tick the appropriate box.

E. Association with other phenomena

1. The presence of whales or seals should be recorded (tick item).
2. The existence of a fish shoal or presence of oil should be recorded.
3. The presence of a krill swarm should be recorded.

F. Normal or stern count

1. It is important to distinguish between birds which associate with vessels and those which do not do so.
2. While most observations should be made from a flying bridge, either looking ahead or laterally (normal count), it is recommended that at least one 10-minute count per hour of observation should be devoted to a watch astern (stern count), paying particular attention to the species, and number of individuals, in the wake.
3. Mark the box appropriate to each type of count.

G. Notes

1. This space is reserved for any information which is not recorded as standard, or expansion or explanation of standard observations.
2. Descriptions or diagrams of unusual or unidentified species should also be recorded under this space.

REVERSE of CARD (Figure 2b)**H. Species**

1. Record the common name (or unambiguous abbreviation) of the species.
2. Where birds are identified to group, only record as follows: *Prion* sp., Shearwater sp.
3. If unsure, record as A, B, etc., and describe in notes the plumage and flight pattern of the bird.

I. Sex and age

These can rarely be determined in the field although a distinction between adult and juvenile plumages is apparent in some species. The appropriate numbers in the tally score should be followed by J (J = Juvenile), or S (S = Subadult) where such a distinction can be made.

J. Tally score

Use this space as a score pad to tally the number of individuals seen and counted so that the total may be calculated, e.g. 1. 1. 5. 7. 15. 1. 1. (= 31).

K. Total

Use for recording total, produced by addition of tally scores for each species.

L. Activity

1. This is designed to indicate in general terms the activity of the birds observed.
2. All birds are assumed to be flying past, unless otherwise recorded. The other basic categories are feeding and sitting and these can be totalled in the appropriate subcolumn. Birds accompanying or following the ship will generally be recorded only on stern count cards.
3. *Definitions*
 - Flying past = moving past ship from ahead or sides without diverting towards ship.
 - Accompanying = moving around or at sides of ship out to limit of vision.
 - Follow-wake = consistently following the ship within the line of the wake to limit of vision.

For practical purposes, the last two categories can usually be combined.

M. Distance

It is suggested that, in conditions where it is practicable, an attempt should be made to estimate the distance of seabirds from the vessel. This could be done in broad categories, as follows: **A** (0-300 m), **B** (300-1000 m), **C** (1000 m +). The tally scores are recorded in the appropriate distance categories on the back of the 10 minute card. Only categories **A** and **B** are summed for the total score. Bear in mind that at least some seabirds have a tendency to be attracted to ships. The normal extent of this effect can be assessed to some degree by ensuring that stern counts are conducted from time to time. The augmented effect caused

by a ship's fishing activities can probably be assessed by comparing data in relation to ship's activities and it is important that the latter be recorded accurately.

Jettisoning of garbage, unwanted specimens (or parts thereof) or portions of catches will all greatly attract seabirds and should as far as possible be avoided, or at least confined to night-time when detailed seabird observations are impossible anyway. Please bring this matter to the attention of both the senior scientist and the master of the ship.

SIGHTINGS OF COLOUR-RINGED OR COLOUR-MARKED SEABIRDS

Additional interest is attached to sightings of marked birds and such records should be identified clearly on the cards or in supplementary information.

Colour Rings

These are 40 mm Darvic plastic rings with large engraved numbers. Even if the actual number cannot be read, the colour of the ring is very informative. The birds listed below are from Bird Island, South Georgia, and in the Wandering Albatross, each colour is specified to an age class.

Wandering Albatross:	orange, green, red; more than 18 years old. blue, orange, black, white, yellow, red; less than 8 years old.
Black-browed Albatross:	white
Grey-headed Albatross:	blue
Northern and Southern Giant Petrels:	various

Colour Marks

These will be paint marks on the upper breast.

Wandering Albatross:	blue, red - Bird Island breeding birds
Black-browed Albatross:	red - Beauchene Island, Falkland Islands, breeding birds blue, green - Bird Island, breeding birds other colours - Bird Island, non-breeding birds
Grey-headed Albatross:	blue, green - Bird Island, breeding birds other colours - Bird Island, non-breeding birds
Giant Petrels:	mainly black, yellow - Bird Island, breeding birds

SEABIRDS CAPTURED ON BOARD SHIPS

Useful information on the following can be obtained.

- (a) Weight
- (b) Basic morphometric measurements : wing length and bill dimensions (at least length). Tail and tarsus length are less important, except for prions for which bill depth (just anterior to nostril) and bill width (at base) are also important.
- (c) Food : stomach contents, whether of dead birds, or regurgitations by live ones, should be preserved for subsequent analysis.
- (d) Fresh corpses, particularly of prions, should be stored deep frozen. These specimens have a number of potential uses (e.g., pesticide residue analysis) in addition to their value as museum specimens.

Bird banding is not recommended, unless it is done as part of a specific project with defined aims.

CODING SEABIRD DISTRIBUTIONAL DATA

It is recommended that all data recorded on the 10-minute seabird cards be encoded, for computer-assisted analysis, in the form proposed by Cram and Mall (1980) or in a form exactly compatible with this. It is envisaged that the analysis will include geographical plots of seabird distribution and density, as a minimum objective, and more detailed statistical correlations between these and relevant aspects of the oceanographic environment, net-haul data on plankton, and krill acoustic survey information.

REFERENCE

- Cram, D.L., and Mall, M. (1980). Suggested magnetic tape/punched card format for the submission of bird sighting data to the post-FIBEX data interpretation workshop. 18 pp. Mimeo. Fachbereich Informatik, Universität Hamburg, Schleuterstrasse 70, D-2000 Hamburg 13, Federal Republic of Germany.

APPENDIX 1 – NAMES AND ADDRESSES OF MEMBERS OF THE
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