

BIRD BANDER

Readable Band Numbers and "Scotchlite" Colour Bands for the Silver Gull

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The problem of sight identification of large numbers of non-sedentary birds for years without the necessity to retrap has been solved by numbered bands that can be read with binoculars or telescope. Improved colour bands serve as a check on the accuracy of sightings. Results show that the movements of individual Silver Gulls (*Larus novaehollandiae*) are much more complex than the recoveries of standard bands have indicated.

Each band recovery provides information on the whereabouts of the individual at two points in time. Unless these dates are unusually close, there is no indication of the route followed by a migratory bird or the movements of an apparently sedentary one. Two recent Straw-necked Ibis recoveries (*Aust. Bird Bander*, 1970; 8:42) are good examples; earlier recoveries from the same sample banded in the Macquarie Marshes, New South Wales, in 1955 show that these birds, recovered at Hay and Griffith, N.S.W., this year, could have been anywhere in eastern Australia or New Guinea in the interval.

Large-scale banding of young and trapped adults, relying mainly on recoveries by the public, can show the extent to which age/sex categories are sedentary or mobile, can define the general directions, distances and seasons of their movements, and can provide some information on mortality and longevity. But the longer the banded bird survives the more its eventual recovery has to be interpreted in terms of earlier recoveries of the same species. Retrapping, especially mist netting, provides valuable multiple recoveries that are filling in the picture of individual histories, and there are many species, notably the smaller inhabitants of denser cover, for which this is the most feasible method.

Bird watchers the world over must have seen millions of banded birds without being able to retrap them, or would prefer to avoid this disturbance when the only information required is the identifying band number and other visible characters. Although some observers have patiently read numbers under very favourable conditions, a vast amount of valuable data remains just out of reach.

Coloured plastic collars with figures, letters or symbols, facilitate individual recognition in long-necked species; a harness with dorsal tag has been used on some ground birds; and plastic wing tags, held by a pin through the patagium, have proved suitable only in some species. Two forms of wing tag were unsuccessful on Silver Gulls owing to their tendency to flip under the wing and eventually come off. Improved leg bands seem to offer most hope for cradle-to-grave visual identification of the individual in many species.

Colour banding is useful in special studies but is limited by the number of trained observers and their area of search, by the durability of materials, and by the number of available combinations which normally precludes individual colour banding of young. Six distinctive colours—black, blue, green, red, white, yellow—provide 432 three-colour combinations in the current

Silver Gull study in South Australia, and these have had to be reserved for breeding adults. Single colours, and various types of two-colour combination, denote season and place of banding of groups of chicks or free-flying gulls.

The recovery of 1,500 Silver Gulls from 54,217 banded mainly as chicks during 1953-63 indicated the general pattern of seasonal movements of this species throughout south-eastern Australia (Murray and Carriek 1964). But one record for each bird does not reveal the constancy or complexity of the individual's performance, and the requirement was for continuing records of individual birds throughout their known dispersal areas of several hundred miles during five or even ten years of life. In collaboration with two helpful suppliers, one of us (R.C.) developed a five-figure numbered band capable of being read at normal gull distances with good binoculars or telescope, and the other (M.D.M.) developed a wide range of colour combinations from "Scotchlite" bonded on aluminium. Thus each bird, chick or adult, could have a readable numbered band on one leg and a colour band on the other which (hopefully) would survive in good condition as long as the bird. The failure of the small size 8 monel band on the Silver Gull necessitated return to aluminium.

The Numbered Bands

Tests showed that legibility of the number depends (apart from good light and optical aids) on each figure having a clean-cut black paint inlay, on the size, spacing and distinctive shapes of the ten figures, and on a right-angle rather than oblique view of the figure. Early attempts to have the address and prefix also on the outside were abandoned in favour of putting these inside. No doubt this reduces the number of birds reported by the public, but these would add little to results already obtained and the priority was for sight records of live birds. So it was possible to repeat the number with $\frac{1}{4}$ " figures four times across the $\frac{1}{2}$ " band and retain sufficient spacing, $\frac{1}{8}$ " between numbers and $1/16$ " between figures. One number is usually in full view, and when a space is central more than half of each adjacent number can be seen clearly.

It is important to be able to compare different numbers on the same band, especially if imperfections of the black paint make a digit difficult to read, or make a 7 look like a 1, and so on. To repeat the number only three times so as to make room for the legend would lower the



• Adult Silver Gull, banded L-B W(5) R-50889 at Montagu Island, N.S.W. in 1965 and photographed a year later nesting with the same mate 50 yards from the previous site.

Photo: M. D. Murray

quantity and accuracy of sightings. To repeat it five times by reducing the three interspaces (the stamp must be at least $1/16$ " from the edge of the band) might improve sightings. The best compromise seems to be four, retaining the option to insert a shortened $1/16$ " legend stamped lightly in the three $\frac{1}{4}$ " interspaces.

It pays to do the job of inlaying the figures with black paint to perfection. Briefly, the bands are immersed in "Alodine Aluminium Conditioner", washed, dried, painted with "Durepon Black" + Catalyst, left half-an-hour, excess paint (outside the figures) carefully wiped with a sponge dampened with thinners, dried overnight, and sprayed twice with "Scotchlite Finishing Clear." One man can treat only 100 bands at a time, otherwise the excess paint hardens and a cold chisel and sledgehammer are required. He can do 500 bands per day. Details of the materials and method are lodged with the Australian Bird-banding Scheme, Canberra.

Smooth round-holed pliers, the same size as the outside diameter of the band, are supplied with the bands. These bands have been used in New South Wales in 1965-66 and in South Australia in 1967-70. Apart from those that had paint imperfections from the start, the numbers remain clearly legible.

The Coloured Bands

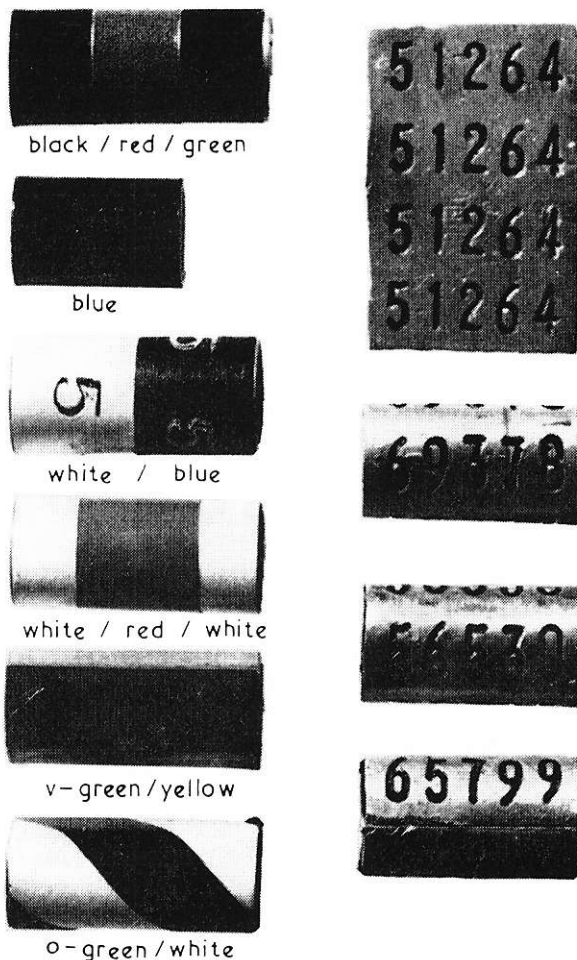
Gull bands are exposed to the same ravages of weather that are so successfully withstood by "Scotchlite" road and marine signs and advertisements. The vivid "Scotchlite" (reflective) colours and "Scotchcal" (non-reflective black and white) are ideal. The non-pressure-sensitive type with a dull, not a silvery, backing can be heat-bonded to aluminium so firmly that it cannot be peeled off; hard abrasion or chiselling are necessary.

Commercially pure aluminium sheet (22 gauge) is cleaned by etching with 0.5% caustic soda and well washed. The "Scotchlite" sheet is pressed to the aluminium for a maximum of two minutes at 180°-200°C generated by infra-red lamps, in a vacuum, i.e. atmospheric pressure, which removes air bubbles.

The reverse side is covered with white "Scotchcal" to improve wear against the leg and to prevent corrosion of the aluminium in polluted waters. The manufacturers supplied us with one square-foot sheets of single colours, sometimes overlaid by ¼" or ⅓" strips of another colour, and cut these to flat band sizes 15/16" x ½" or 15/16" x ⅔" when required. He has also supplied cleaned aluminium for us to return for bonding with three-colour combinations in position. When flat, the band can be punched with figures or letters to identify sub-groups.

The band is warmed until hot to the touch and then shaped in a simple jig. This prevents cracking of the "Scotchlite", but good bonding does not peel in the field even if it is cracked, and this is further ensured by spraying twice with "Scotchlite Finishing Clear". Colour bands fit the pliers used for numbered ones, but can be scratched by too heavy pressure.

Most of the colour bands used during the past six years are still clearly identifiable, and many have suffered only slight wear at the edges. Partial or complete loss of red from some series may be due to use of pressure-sensitive material, and peeling of one batch of green/yellow bands is attributed to faulty bonding.



• Silver Gull bands about 4/3 natural size. The aluminium bands (right), have black paint sealed into the deeply impressed figures. The "Scotchlite" colour-bands (left) are at top, an individual three-colour combination band followed by five group-bands.

Photo: S. R. Harris

Observing and Recording

The accuracy of reading the band number, and colours, in the field depends on the quality of the band, the weather, the distance, the observer's eyesight and visual aids. Steadiness throughout the whole operation is important; Ira Savage achieves this by using a portable stand to rest binoculars and elbows. The capacities of observers and equipment have to be tested and checked on bands alone and on free-living banded birds. The individual three-colour combinations,

and occasionally other distinctive features, are a useful check on the accuracy of band-number sightings. When all factors are favourable, the number can be read correctly at 40 ft with Zeiss 8 x 30 binoculars, at 60 ft with Zeiss 15 x 50, at 85 ft with Bushnell 9 x 30 zoom telescope, and at 180 ft with Beck Magla 100 x telescope. Close focussing of binoculars can be improved, e.g. Zeiss 15 x 50 can be adjusted to focus down to 8 ft instead of the standard 15 ft, but a small lower-power aid is useful for distances up to 10 ft.

One needs to be self-critical and it pays to read the same band at intervals so that more than one of the numbers is seen, and to have observers checking one another. A number that is considered certain is written 12345; a doubtful figure is shown 12(3)45; and one not identifiable is omitted 12-45. A simple recording system is needed for each leg, so that a bird with metal on its left leg and $\frac{3}{4}$ " red-white-black (reading downwards) on its right is written L-12345 R-R W BK; one with $\frac{3}{4}$ " blue banded by narrow white is w B-w to distinguish it from the triple-banded W.B/W; and vertical and oblique stripes are written v-G Y or o-BK/W.

It also helps to have the band number reading up the leg so that the last digits are more easily seen; along with the colour they will often identify the individual in a large sample similarly colour-banded. The colour band, not often wrongly identified, is an important check on the number, and personal familiarity with the marking system and the problems of observation in each species are necessary for detection of errors.

Results

During 1967-70 1,510 adult and 15,020 young silver gulls have been banded in South Australia: 1,170 and 8,480 of these were banded in 1968-70 in the main study area around Beachport, and the rest between Adelaide and the Coorong. Since January 1969 frequent searches have been made, mainly in the Beachport area. Also, reports are received from ten regular and some fifty occasional observers living between Adelaide and Port Phillip Bay, Victoria, as well as odd sightings and the usual recoveries by the general public.

Altogether 2,280 birds have been resighted, and in the total of over 14,000 acceptable sightings and recoveries, 34 individuals have detailed life-histories with 50 or more records each.

Almost 14% of the Silver Gulls banded in South Australia in 1967-70 have now been

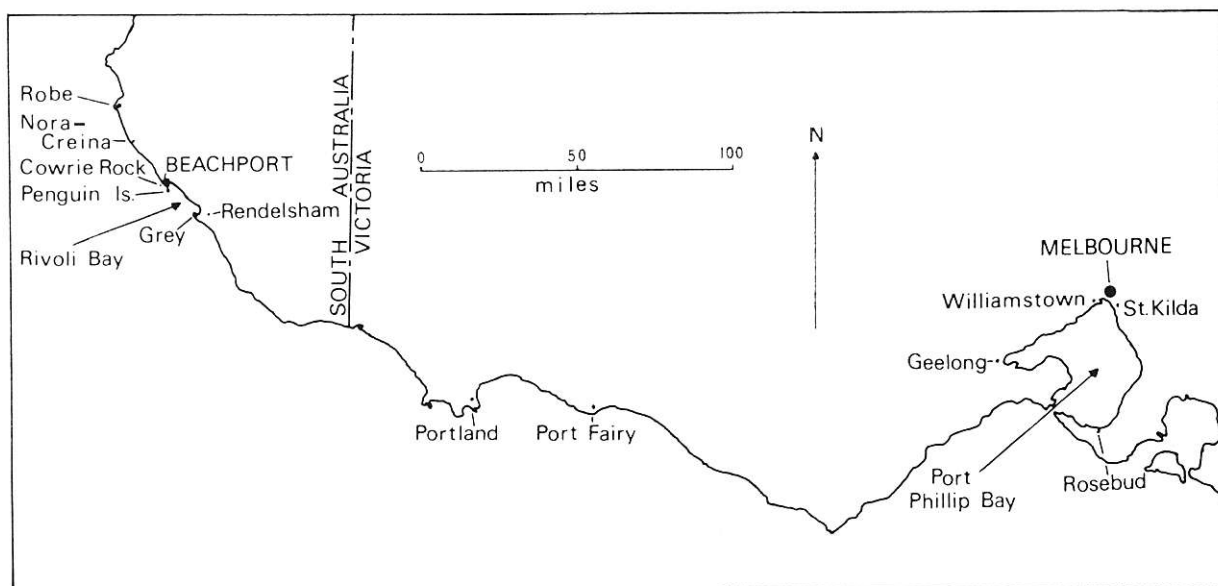
reported. The Beachport area birds, constituting 58% of the total, are being more intensively studied than the rest; over 22% of them have been sighted. These figures are nearly five and more than seven times the 3% recovery rate of standard bands. There are now 85 acceptable sightings for every 100 birds banded, and about 140 per 100 for the Beachport sample. The present volume of results, steadily increasing, is 28 times that of the standard bands, 47 times in the case of the Beachport sample, and it is limited only by the observation coverage that is possible.

Multiple records of individual birds are revealing a wide range of highly sedentary, nomadic, and consistent as well as irregular migratory behaviour by young and adults alike, as the following examples show.

1. Adult L-53674 R-W/G was clap-netted on 31 May 1969 on Beachport esplanade; its number has been read 110 times up to 10 June 1970. Its daytime record is 65 times resting on the esplanade, 36 times feeding on adjacent beaches within 400 yards, twice within 800 yards, and seven visits to the village all within 500 yards. **A highly sedentary bird.**

2. Adult L-69124 R-W/G was drugged on 2 May 1969 in Rivoli Bay (seven miles south of Beachport and two miles north of Grey). Up to 25 May 1970 it had been seen 34 times including six visits to Grey, four to Beachport, and one six miles inland to Rendelsham. **A mobile bird.**

3. Chicks L-62554 R-Y and L-62836 R-Y were banded at Penguin Island, Beachport on 14 September 1968. Neither featured in the Beachport searches in 1969. Both were seen at Geelong, Victoria (300 miles east via the coast), the former on 8 October 1969 and the latter on 30 October and 15 November 1969. Then 62554 was sighted on 24 and 27 January 1970 at Beachport and 1 and 3 February at Grey, while 62836 was at Beachport during 9 January to 4 February 1970. Both returned to Geelong, the former by 13 February and the latter by 25 February. But while 62836 was seen there in May and twice to 14 June, 62554 was last seen at Geelong on 16 February and then at Robe on 21 May and Beachport on 24 May. **Two young birds migrated to the same place in their first and second years, and one returned to the breeding place much earlier in its second year.**



• Figure 1. Map showing places of banding and recovery of Silver Gulls mentioned in the text.

4. Chick L-60273 R-Y was banded on Penguin Island, Beachport, on 10 September 1968. It was seen at Williamstown, Port Phillip Bay, Vic. (over 300 miles east via the coast) on 13 July 1969, twice at Beachport on 21 August 1969, back at Williamstown on 30 September 1969, and in Rivoli Bay a mile from Beachport on 10 and 11 January 1970. **A commuter with an unexpected timetable.**

5. Chick L-61997 R-B/W was banded on Cowrie Rock, Beachport, on 10 September 1968, seen at Grey on 27 April 1969 and Beachport-Grey in January-February 1970, then at Portland, Vic. (100 miles east) on 19 April and 19 May 1970. On 25 May it was back near Grey, and from 1 to 16 June at Portland. **A migrant, which paid a brief visit to its natal area in the non-breeding season.**

6. Breeding adult L-63697 R-Y/BK/B was trapped on the nest at Cowrie Rock on 18 September 1969. It was in Portland on 30 January, 21 February and 11 May 1970, back at Beachport on 24 May, and again at Portland on 3 June 1970. Its mate, L-63293 R-Y/R/R, probably the male, was seen 22 times up to 6 June 1970 within 800 yards of Cowrie, and three times up to one-and-a-half miles; one of the latter, on 24 May 70, must have brought the pair close together. **A sedentary male, and**

migrant mate which visited the breeding area briefly in the non-breeding season.

7. Breeding adult L-B/B/B R-53707 was trapped on the nest at Penguin Island on 21 October 1969. It lived at Melbourne and adjacent beaches from 9 March to 24 May 1970, and returned to Rivoli Bay by 9 June 1970. Its mate, L-BK/W/G R-53746, was at Portland on 19 May 1970. **A migrant that remained at one place in the non-breeding season; its mate went in the same direction.**

8. Breeding adult L-57404 R-B/BK/BK, was trapped on the nest at Nora Creina (14 miles north-west of Beachport) on 12 August 1968. It was reported six times in March and April 1969 at Rosebud, Port Phillip Bay, and then seen repeatedly on the same beach for some weeks. It was at Nora Creina on 24 October 1969, again at Rosebud on 9 November 1969 and 11 and 14 May 1970. Its mate, L-57399 R-B/BK/R was 14 miles north at Robe on 10 February 1969.

Breeding adult L-57441 R-B/Y/R was trapped on the nest at Penguin Island on 16 August 1968 and seen locally until 27 January 1970. From 6 March to 15 June 1969 it was seen four times at Albatross Lookout, Port Fairy, Vic. (130 miles east) and on 4 July at the rubbish dump there. On 29 September 1969 it

was back on Penguin Island and around Beachport until 2 February 1970. On 18 May 1970 it was seen at Albatross Lookout, and on 22 May at Beachport.

Two migrants which returned to exactly the same non-breeding season location in successive years, but on very different dates.

These results raise the question whether large-scale banding for small return is the best that can be done now that there is a growing body of bird observers ready to respond to the potentiality of readable band numbers. Band sighting is a rewarding aspect of bird watching that could grow in popularity; it offers the satisfaction of co-operative effort to piece together the often unsuspected patterns of bird movements, and it provides everyone with the opportunity for detailed study of more settled individuals, perhaps at their non-breeding season location, about which little is known. The social status and feeding and other habits of the individual in widely different situations are also virtually unexplored; for example, do mates cohabit away from the breeding place? The country that develops readable bands, or other long-lasting visual identification, and a network of observers, will document the life histories of its birds more meaningfully than ever before, and get much more for its money, in quality as well as quantity of information. The characteristics of each species determine what is possible, and perhaps the readable number and abbreviated prefix, combined with a less conspicuous address on the outside of the band, offers the best compromise.

Acknowledgements

We greatly appreciate the advice and co-operation of Mr G. C. Lambourne of Lambournes (Birmingham) Ltd in the production of numbered bands exactly to our requirements, and of Mr F. E. Riley of Booster Industries (N.S.W.) Pty Ltd, who treated our unprofitable orders with every courtesy. The numbered bands were supplied by the Australian Bird-banding Scheme, and a grant from the Australian Research Grants Committee supports the Silver Gull study in South Australia. Permission for field work was given by the Chief Guardian of Fauna, N.S.W., and the Department of Fisheries and Fauna Conservation and the National Parks Commission of South Australia. We are particularly grateful for assistance from Graeme Harrington, National Parks Ranger in the Beachport area.

The somewhat tedious task of band preparation, and most of the banding, were done by Wim Vestjens in N.S.W. in 1964-66 and by Mawson Institute staff in S.A. in 1967-69, assisted by others too numerous to name. Susan Ingham, who kept the records until 1969, now makes them, e.g. L-B/B/B R-53707 (see example 7). John Ottaway has done much of the field work in 1970 and has programmed the data for computer analysis, while Stuart Harris assists with records and drew the map for Figure 1.

Among many unpaid helpers, the elite band of observers who report band numbers, mostly from places outside our own home range, are making a significant and much appreciated contribution to the results. With apologies to many others, lack of space precludes mention of more than the top eleven, currently these are Gracie Bowker, Chriss Carrick, Susan Ingham, I. Bevege, D. G. Cameron, P. Fox, W. R. Garrett, G. Langridge, I. Savage, J. M. Truran, and V. Yeoman.

Reference

- Murray, M. D. and Carrick, R. (1964). 'Seasonal Movements and Habitats of the Silver Gull, *Larus novaehollandiae* Stephens, in South-eastern Australia', *C.S.I.R.O. Wildl. Res.*, 9:160-188.

Postscript

We have just seen the reference to these readable band numbers in the Fifteenth Annual Report of the Australian Bird-banding Scheme. We emphasize that assessment of the validity of sight records requires first hand experience of the problems peculiar to each species and project, as well as knowledge of the overall result and close liaison with the field observers. Apart from the cost, the close range necessary to obtain legible photographs of numbers is well within the capacity of ordinary binoculars, though this method has a use when more than visual proof is required.

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