



THE AUSTRALIAN BIRD BANDER'S MANUAL

Compiled by KIM W. LOWE

AUSTRALIAN BIRD AND BAT BANDING SCHEMES
AUSTRALIAN NATIONAL PARKS AND WILDLIFE SERVICE
FIRST EDITION 1989

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Australian Bird and Bat Banding Schemes

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Foreword

The responsibility for the administration of the Australian Bird and Bat Banding Schemes was transferred from the Commonwealth Scientific and Industrial Research Organization to the Australian National Parks and Wildlife Service on 1 July 1984. As a result of the transfer the opportunity was taken to review the administration of the schemes. The review involved extensive consultation with banders, government agencies and users of the data collected by the schemes. One of the recommendations of the review involved the preparation of a comprehensive guide to all aspects of bird banding in this country.

With the publication of the Australian Bird Bander's Manual this goal has been achieved. The manual will be an invaluable reference for all banders participating in the banding schemes. It contains the rules and instructions of the banding schemes and, of equal importance, it is intended to provide guidance to banders. The Australian National Parks and Wildlife Service greatly appreciates the cooperation of those who have contributed to the preparation of this manual.

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Preface

This manual aims to be a comprehensive guide to all aspects of bird banding in Australia and its Territories. It is particularly directed to trainee banders but it will introduce all banders to new techniques and provide a broad overview of banding activities. The manual encourages banders to constantly review their practices and should help banders through unfamiliar situations. The manual sets out the basic ethical and procedural practices for all Australian bird banders.

This manual is supplied to all persons currently holding an authority to band birds under the auspices of the Australian Bird and Bat Banding Schemes and is not available to the general public.

This edition supercedes the Bander's Manual provided by the Australian Bird and Bat Banding Schemes while under the control of the CSIRO.

This edition has been designed on a loose-leaf format to enable the inclusion of updated sections of the manual. Suggestions for improvement are welcomed. The contents of each section are listed at the start of each chapter.

Thanks go to the British Trust for Ornithology whose Ringer's Manual provided a useful model on which to base this edition.

Bill Phillips developed the initial concept of this manual and produced an early draft. Mark Clayton, Perry De Rebeira, Peter Driscoll, Alan Fletcher, Brian Foreman, Stephen Garnett, Jeff Hardy, Bill Lane, Bruce Male, David Peters, David Purchase, Geraldine Richards, Annie Rogers, Tony Stokes, Max Waterman, Steve Wilson and Eric Woehler's valuable advice is greatly appreciated. The substantial assistance of Ken and Danny Rogers who wrote chapter 6 and section 4.2 (respectively) is gratefully acknowledged. Perry De Rebeira provided the illustrations. Chris Mobbs did the style editing. Thanks go to all for their help.

CHAPTER 1 The Australian Bird and Bat Banding Schemes

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| 1.1 <i>The history, roles and aims of the schemes</i> | 1.4 <i>The ethics of banding</i> |
| 1.2 <i>Outline of workings</i> | 1.5 <i>The bander's responsibilities</i> |
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1.1 The history, roles and aims of the schemes

The Australian Bird Banding Scheme began officially in 1953 as a technical service run by the Commonwealth Scientific and Industrial Research Organization (CSIRO) in collaboration with the State and Territory fauna authorities. The aims of the Scheme were then, and remain today, to gather information about the habits, life histories, plumage and movement patterns of the birds that occur in Australia and its Territories.

Bird banding was first conducted in Australia in 1912 when Short-tailed Shearwaters and White-faced Storm-petrels were banded by members of the Bird Observer's Club and the Royal Australasian Ornithologist's Union. The scale of banding grew only slowly until 1947 when a joint scheme was established by CSIRO and the Tasmanian Fauna Board to band Short-tailed Shearwaters. Soon after, several State fauna authorities started independent schemes for the banding of waterfowl.

The Australian Bat Banding Scheme was officially launched by the CSIRO Division of Wildlife Research in 1960 although bats were first banded in Australia in 1957. The Bat Banding Scheme came about through the collaborative efforts of the Australian Speleological Federation and the State fauna authorities.

As with bird banding the aim of bat banding is to gather accurate information on the habits, life histories and movement patterns of these most secretive mammals. In Australia there are about 60 bat species currently recognised. Little is known of their status, habitat needs and general biology.

Banding is possibly the most valuable tool for ecologists and conservationists in describing the life histories of birds and bats. The results of banding have enabled all wildlife authorities in Australia to devise more sensitive and effective conservation strategies for threatened and endangered species and management programs for game and pest species. In addition, banding has provided an invaluable insight into the biology of a vast number of Australia's bird and bat species which will help us to recognise and anticipate environmental changes that may threaten some species.

In 1984, the CSIRO transferred the Australian Bird and Bat Banding Schemes (ABBBS) to the Australian National Parks and Wildlife Service (ANPWS). At that time there had been about two million birds of some 830 species banded on behalf of the Bird Banding Scheme. The annual recovery rate of banded birds throughout this time was around 10 per cent or some 200 000 birds.

At present there are over 600 authorised banders operating under the auspices of the ABBBS. Between 80 000 and 100 000 birds and bats are banded annually. All banding in Australia, including colour marking, is coordinated through the ABBBS. Qualified banders undertake projects of their own design or cooperate with a team of others in large scale banding exercises.

All banding must have specific aims that are relevant to furthering our understanding of the biologies of the target species. Banders should not treat banding solely as a recreational activity despite the obvious enjoyment gained by examining birds and bats at close range.

The publication of results for the utilisation and information of others is a high priority of the ABBBS and several hundred such works have been produced. All researchers, whether amateur or professional, may apply to the ABBBS to gain access to banding data for publication.

The efforts of the Australian Bird Banding Scheme are not restricted to Australia and its External Territories. Bands have been provided for bird banding at various times in Malaysia, Brunei, Vanuatu and Fiji because no national banding scheme is or was operating in these places. At present there are banders using Australian bands in the Philippines, Indonesia and Papua New Guinea.

The Australian Bird Banding Scheme plays a major role in the efforts to monitor and describe the migration of the birds moving to and from Australia. Most notably the annual autumn migration of waders from Australia to their Arctic breeding grounds and their return in the spring has been the subject of concerted effort over the past few years. This information has been vital in the assessment of species for inclusion in the agreements with Japan and China for the protection of migratory birds.

Since the ABBBS were transferred to the ANPWS they have undergone several major changes. They are no longer simply a technical service but now take an active role in initiating and directing research programs relating to particular groups or species. Banding data collected since July 1984 are now computer stored, making retrieval and analysis much simpler. Data collected before this time are being selectively converted to a computerised system. An increase in staff has also allowed the schemes to take a more active role in advising banders on how to design banding projects and analyse data. Banders are also being encouraged to improve the quality of data collection through a range of new field recording sheets.

Overall the ABBBS have had a most productive past, contributing a vast amount of information to our understanding of Australian birds and bats. With the new initiatives it is hoped that banding will continue to fill the gaps in our knowledge while at the same time placing greater focus on particular aspects of species behaviour, habitat needs and breeding biology.

1.2 Outline of workings

The ABBBS operate fundamentally as a service organisation for all banders. Apart from supplying bands, banding pliers and some stationery items free of charge, the ABBBS is responsible for ensuring that all authorised banders have the necessary skills to safely capture and band birds and/or bats.

The ABBBS also have an important role in furnishing the finders of banded birds or bats with the relevant banding details. An essential part of this activity is verifying the finding and banding details to ensure the legitimacy of movement and longevity records prior to their publication.

The recruitment and training of new banders is a high priority. Trainees gain the skills necessary to become authority holders through 'apprenticeship' to an experienced bander. Banding Authorities are issued only to persons who have exhibited the essential skills to warrant endorsement by one or two experienced banders. Before a Banding Authority can be issued, a permit to trap, band and release birds must be obtained from the relevant State or Territory fauna agency. Such permits are not issued unless the ABBBS have advised the State or Territory agency that the person can undertake the work without threatening the well-being of the animals to be encountered.

The ABBBS also facilitate the analysis of banding data by interested persons. Researchers, both professional and amateur, can gain access to data providing they have legitimate research goals and the permission of the bander/s concerned.

Another important role of the ABBBS is to bring together and to disseminate information which may improve the skills of banders or improve the efficiency of banding operations. The ABBBS produce an information sheet called the Bander's Bulletin to keep banders informed of banding activities.

STAFF RESPONSIBILITIES

The ABBBS currently employ a staff of four. The officer-in-charge is the Coordinator, second-in-charge is the Secretary and there are two clerical assistant/data-processors.

The responsibilities of the Coordinator are to:

- oversee the administration of the schemes;
- liaise with other banding schemes;
- carry out public relations;
- coordinate international recoveries of bands;
- design and maintain the computer database system;
- ensure confidentiality and access to data; and
- develop policy proposals relating to new banding objectives.

The Secretary is responsible for:

- design, purchase, issue and use of all bands;
- vetting and enrolling new banders;
- annual renewal of banding authorities;
- processing banding data onto the computer system;
- processing domestic recoveries of bands; and
- the organisation of the colour marking scheme and the issue of Colour Marking Authorities.

Banders should direct their enquiries to the relevant officer based on this list.

REGIONAL ORGANISERS

Apart from the staff located in the Canberra office, the ABBBS also have representatives in each State and Territory. The Regional Organisers and Sub-region Organisers assist the Coordinator and Secretary by informal liaison with State/Territory governments, banders and other people. They are also involved with bander training and recruitment and all are experienced banders who give their time and efforts voluntarily.

The names and addresses of current Regional Organisers are given below. They welcome banders to contact them.

Australian Capital Territory — Mr Mark Clayton, CSIRO Wildlife and Ecology, PO Box 84, Lyneham, ACT 2602. Tel. 062 42 1725.

New South Wales — Mr Bill Lane, Lot 6 Fairview Road, Moonee via Coffs Harbour, NSW 2450. Tel. 066 53 6009.

Northern Territory — vacant

Queensland — Dr Peter Driscoll, Fahey Road, Mount Glorious, Qld 4520. Tel. 07 289 0237.

South Australia — Mr Max Waterman, Debmar Park, 28 Gordon Avenue, St. Agnes, SA 5097. Tel. 08 42 3665.

Tasmania — Mr Alan Fletcher, 115 Clarence Street, Bellerive, Tas 7018. Tel. 002 44 1187.

Victoria — Mr Ken Rogers, Lot 17 Ninks Road, St. Andrews North, Vic 3761. Tel. 03 710 1345.

Western Australia — Mr Perry De Rebeira, 12 Glenwood Avenue, Glen Forrest, WA 6071. Tel. 09 298 8999.

1.3 Project types

All banding carried out under the auspices of the ABBBS must be project oriented with specific and realistic research goals. All new projects must be approved by the Coordinator BEFORE any birds are banded. Applications to commence a new project should be made on the form available from the banding office.

INDIVIDUAL PROJECTS

The majority of banders operate banding projects of their own at sites of their choosing. In most cases the 'A' class bander in charge of the project has one or more 'B' or 'C' class banders to assist with the work. See section 2.1 for details of the classes of banding authorities.

CORPORATE PROJECT

For larger scale banding programs, such as wader banding and bird rehabilitation groups (see below), a number of banders may work together as a corporate body. This ensures that for these long running projects the banding data remains united under one identifying Banding Authority number and corporate name. Bands are issued in the group's name to an 'A' class bander who acts as the banding leader. This 'A' class bander is responsible for accounting for the bands and for submitting all banding records.

COOPERATIVE PROJECTS

Cooperative banding stations are places where any suitably qualified bander can visit and band birds or bats. The prime aim of the banding stations is to promote banding at locations where banders are not resident and little banding has taken place. Each cooperative banding station has a data curator who is responsible for coordinating visits by banders, for any necessary liaison with landowners/fauna agencies, and for submitting data to the banding office. Complete details of cooperative banding stations may be obtained from the banding office (See also chapter 10).

REHABILITATED BIRDS

Banding is the most effective way of determining the success of attempts to rehabilitate sick, injured or orphaned birds to the wild. Most projects are run through wildlife refuges, zoos or amateur animal welfare groups. Approval from the Coordinator to band rehabilitated birds and bats must be gained (as with all other banding projects) prior to undertaking the banding. Banders also must hold appropriate State/Territory wildlife permits to keep the native fauna during rehabilitation.

1.4 The ethics of banding

'ANIMAL SAFETY COMES FIRST'

Although the primary reason for banding is scientific, banders must remember that it is a privilege to be allowed to catch and handle wildlife. The welfare of any bird encountered should always remain of paramount importance to banders. Banding can be an enjoyable recreational activity but should never be considered as simply a hobby.

The fundamental assumption of banding is that a properly designed and manufactured band, applied correctly, will not handicap or harm the bird. If this basic assumption is violated then the welfare and/or the survival chances of the animal concerned will be unjustifiably compromised. In addition, the basic aim of studying wild and healthy birds will not have been achieved.

Every bander should strive to minimise any stress placed upon birds during banding operations and be prepared to accept advice or innovation which may help to achieve this goal. At all times banders should observe the actions of other banders with a critical eye and where pertinent, offer suggestions on how to improve any part of the banding procedure. Banders receiving such advice should accept it in the spirit it is offered and not allow personal pride to interfere. Where animal welfare is the issue there is no place for an inflated ego.

Every effort should be made to minimise the time interval between capture and release. Methods should be constantly examined to ensure that the handling time and collection of additional data is not prejudicial to the survival of the bird. If necessary, be prepared to streamline the procedures during a banding operation, either in response to adverse weather conditions or to reduce a backlog of unprocessed birds/bats. If necessary, animals should be released unbanded or the trapping devices rendered temporarily inoperative in order to keep the handling time to a safe period.

Banders should not consider that some bird mortality is inevitable in banding. Any mortality should result in a complete re-appraisal of the methods being used and action must be taken to reduce the chances of repetition.

Injured or sick animals should not be banded unless they are to be rehabilitated and released into the wild and specific approval to band them has been given by the Coordinator. Equally, birds must always be released close to the point of capture (unless special circumstances pertain) so as to minimise the animal's efforts to relocate familiar environs or territories. Some experimental techniques require additional permits from State/Territory agencies. All unusual banding treatments (rehabilitation, transportation and experimentation) must be recorded on field data sheets for each event (see chapter 11).

1.5 The bander's responsibilities

All banders have specific responsibilities to:

- ensure that the safety of all birds encountered during banding activities receives absolute priority;
- ensure that the behaviour of all persons involved in banding activities is appropriate to this privileged situation and does not damage the reputation of the ABBBS;
- report instances of misconduct, negligence or incompetence during banding activities so that appropriate action can be taken;
- ensure that a current State/Territory permit to trap, handle, band and release birds is maintained while in possession of a current Bird Banding Authority;
- carry Bird Banding Authorities and State/Territory permits whenever actually engaged in bird banding;
- notify in advance, the appropriate local State or Territory fauna officers of intended banding activities;
- provide complete and accurate banding records to the ABBBS at least once per year (and preferably more frequently) or upon request;
- obtain a Colour Marking Authority from the ABBBS before undertaking any form of colour marking and to adhere to the conditions under which an authority is issued;
- inform the banding office of information which may help to improve standards and which may be passed to other banders;
- strive for accuracy in collecting and recording data;
- analyse or promote the analysis of banding data so that these can be used for conservation purposes; and
- accept constructive criticism and advice on how to improve banding practices and techniques.

1.6 The cardinal sins of banding

The cardinal sins of banding are:

- never band a bird until the species has been determined. For species in which the sexes take different band sizes, do not band a bird until its sex has been ascertained;
- never use anything but the approved band size unless you feel strongly that another size is preferable for the well being of the bird. If the approved size band is not available release the bird unbanded; do not use the next closest size;
- never undertake a band size trial unless you have the appropriate equipment to safely remove the band should it prove unsuitable;
- never re-use a band which has previously been placed on another bird;
- never use bands supplied by the ABBBS on captive birds. They are exclusively for use on free-ranging birds;
- never use bands on issue to another bander without formally notifying the banding office; and
- never modify bands without the prior approval of the Secretary.

1.7 Access to banding data

Banders and other interested persons are encouraged to analyse and publish data collected under the auspices of the ABBBS. Access to data is strictly controlled and confidentiality of data may be requested by any bander.

Banders wishing to secure restricted access for their data must apply in writing to the Coordinator, specifying precisely the banding records to be protected. A five year moratorium, from the date of banding, will then be imposed on each banding record.

If a bander does not formally notify the ABBBS of the need for confidentiality then it will be assumed that responsibility for controlling access to the data is transferred to the Coordinator.

The Coordinator will allow access to such data only if the request is considered to be legitimate and if a written undertaking is given that all banders responsible for the data will be acknowledged in any resultant publication(s).

If requests are made for access to confidential data, the Coordinator will contact the bander(s) concerned enquiring as to whether they wish to make an exception for the release of some or all of the confidential data.

If requested by a finder, band recovery data will be treated similarly with the five year moratorium starting from the date of the recovery. Details of band and recovery that are required for 'Recovery Reports to Finder' and for publication by the ABBBS in the *Corella Recovery Roundup* and similar journals, are exempt from the moratorium.

Confidentiality of records is designed to protect the interests of the banders who intend to analyse and publish their own data. When the five year moratorium expires, the Coordinator will discuss the bander's progress towards analysis and whether a further five year moratorium should be applied to the data.

Apart from data nominated by banders, the Coordinator may impose a moratorium on data for selected species e.g. endangered species. These data will be protected from unauthorised use by security barriers within the computer database.

Requests for access to banding data will be carefully vetted and no person will be granted sole rights of access. All publications that use banding data must acknowledge that the data were collected under the aegis of the ABBBS and copies of any publications should be lodged with the banding office. The collection of research papers held at the banding office is concrete evidence of the value of the schemes.

1.8 Public relations

It is important that banders always act to maintain the public image of banding and the ABBBS. To the uninformed the activities of the average bander may be considered sufficiently unusual to arouse suspicion. This is not an unexpected reaction given that banders routinely operate in isolated locations and at odd hours. Banders must always be prepared to courteously dispel such suspicions if approached. Produce Banding Authorities and State/Territory permits; provide the enquirer with the schemes' publicity pamphlet and be prepared to explain what you are doing.

Banders must also be prepared to cope with a wide range of reactions to banding activities. Members of the public may be fascinated, intrigued, apprehensive or opposed to banding so caution should be exhibited when dealing with enquirers. If an enquirer is opposed to banding, try to reason with them and explain the precautions which are taken to minimise the risks to the birds and bats. It is most important to stress that information gained from banding is primarily used for conservation purposes.

If for any reason, adverse publicity is likely to result from a banding incident, immediately advise the Coordinator. Banders are not encouraged to actively seek publicity for their own projects without first consulting with the Coordinator. A copy of any published information relating to the ABBBS should be forwarded to the Coordinator soon after the event.

Banders need not feel anxious about discussing banding with the public. Banding is supported by State, Territory and Commonwealth governments because it has a vital role in conservation. Most people are supportive of banding when made aware of the ethics and skills that are held by banders. Although banders should not seek publicity, banding activities must be available for public scrutiny.

The activities of the ABBBS are described in a publicity brochure which may be obtained from the banding office.

1.9 Annual reports

A brief description of the activities of the ABBBS is given in the annual report of the ANPWS. A more detailed and technical account is given in the yearly reports of the ABBBS. Banders will receive a copy of the ABBBS yearly report when it is published. Additional copies of each report may be obtained from the banding office.

CHAPTER 2 Bird Banding Authorities and State/Territory Permits

- 2.1 Bird banding authorities
 - 'A' class authority
 - 'B' class authority
 - 'C' class authority
- 2.2 Bird banding authority endorsements
 - Level I: rehabilitated birds only
 - Level II: basic capture methods only
 - Level III(A): mist-nets
 - Level III(B): cannon-nets
- 2.3 Procedures for obtaining and renewing banding authorities and endorsements
 - Initial enrolment
 - Rejection of an application
 - Acceptance of an application
 - Annual renewal
 - Transfer from 'B' or 'C' to 'A' class
 - Transfer from 'C' to 'B' class
 - Re-activation of a resigned authority
- 2.4 Referees
- 2.5 State/Territory permits to trap, band and release protected birds
- 2.6 Resignation and cancellation of banding authorities
- 2.7 Banding in other countries

2.1 Bird banding authorities

Before a person can be provided with bands they must be issued with a Bird Banding Authority from the ABBBS and a separate permit from the State/Territory fauna agency to trap, band and release birds. The banding authority allows the holder to use the bands supplied by the ABBBS but does not give the holder permission to trap, band and release birds. The Banding Authority will be endorsed to indicate the types of trapping methods the bander is permitted to use.

New banders are usually trained through an 'apprenticeship' with one or more authorised banders. A substantial amount of training is required before the trainee is permitted to operate without the direct supervision of an authorised bander.

Banding Authorities are issued on the strict understanding that when surrendered or cancelled, all equipment that was issued by the ABBBS and previously unsubmitted banding data is to be immediately returned to the Secretary.

The ABBBS does not accept responsibility for any injuries to persons or damage to property which may result from banding activities.

There are three types of Bird Banding Authorities issued by the ABBBS; the conditions and qualifications required for each type are given below. In addition, Banding Authorities are subject to specific endorsement depending on the specialised skills required by the bander to safely trap and band the birds (see section 2.2).

'A' CLASS AUTHORITY

'A' class Banding Authorities are issued to highly competent and experienced ornithologists who are responsible for a specific banding project. As the person responsible for a particular banding program the 'A' class bander is required to provide the ABBBS with a complete and

accurate record of all banding activities. Only 'A' class banders will be issued with banding equipment and bands. Should the bands be redistributed among the 'B' class banders involved with a project, the 'A' class bander remains accountable for their use and the submission of data relating to their use. Leaders of corporate banding groups must be 'A' class banders.

The 'A' class bander is also responsible for ensuring that the bird handling and banding techniques employed during a study are always of the highest standard and that the welfare of the birds remains of paramount concern to all.

Qualifications:

1. The applicant must be at least 18 years of age.
2. The applicant must have had considerable recent (i.e. within the previous two years) experience in all of the appropriate aspects of bird banding, preferably as a 'B' or 'C' class bander. The applicant's experience must include substantial practice with the trapping methods for which the applicant is seeking endorsement.

For want of a better measure, the applicant must have processed (captured, removed from the trap or net, identified species, attempted to accurately age and sex birds, banded birds and recorded banding data) a minimum number of birds of the types, and using the methods of trapping relevant to the endorsement required in his/her proposed project. The minimum requirement for each endorsement is given in the description of the endorsements in section 2.2.

All applicants must be fully competent in the use of the relevant traps or nets irrespective of the number of birds that the applicant has processed.

3. The application must be supported by referee reports from:
 - a. the bander responsible for training the applicant.
 - b. an independent referee who is a bander, who holds the appropriate endorsement and who has recently observed the applicant processing at least fifty per cent of the minimum qualification for that endorsement. In some cases, particularly for trainee banders from remote areas, the second referee may not be required and/or the fifty per cent minimum may be reduced at the discretion of the Secretary.
4. The application must be accompanied by a complete and detailed description of the proposed project for consideration by the Coordinator.

'B' CLASS AUTHORITY

'B' class authorities are issued to experienced banders who may possess bird handling and banding skills equivalent to an 'A' class but who only assist in projects coordinated by others, i.e. they are not responsible for a project of their own. The holder of a 'B' class authority must operate under the general supervision of an 'A' class bander, but not necessarily in the presence of the 'A' class bander.

'B' class banders will not be supplied directly with bands and other equipment by the ABBBS and any data they collect must be submitted under the authority number of their 'A' class bander or corporate group.

Qualifications:

1. The applicant must be at least sixteen years of age.
2. The applicant must have had considerable recent (i.e. within the previous two years) experience in all of the appropriate aspects of bird banding, preferably as a 'C' class bander. The applicant's experience must include substantial practice with the trapping methods for which the applicant is seeking endorsement.

For want of a better measure, the applicant must have processed (captured, removed from the trap or net, identified species, attempted to accurately age and sex birds, banded birds and recorded banding data) a minimum number of birds of the types, and using the methods of trapping, relevant to the endorsement required in the project that he/she is assisting. The

minimum requirement for each endorsement is given in the description of the endorsements in section 2.2.

All applicants must be fully competent in the use of the relevant traps or nets irrespective of how many birds that the applicant has processed.

3. The application must be supported by referee reports from:
 - a. the bander responsible for training the applicant.
 - b. an independent referee who is a bander, who holds the appropriate endorsement and who has recently observed the applicant processing at least fifty per cent of the minimum qualification for that endorsement. In some cases, particularly for trainee banders from remote areas, the second referee may not be required and/or the fifty per cent minimum may be reduced at the discretion of the Secretary.

'C' CLASS AUTHORITY

'C' class authorities are issued to trainee banders who intend to eventually progress to 'B' or 'A' class level. The holder of a 'C' class authority must always operate under the direct supervision of an 'A' or 'B' class bander. 'C' class authorities may be held for no longer than two years. 'C' class banders may not hold trapping method endorsements.

Qualifications:

1. The applicant must be at least fourteen years of age.
2. The applicant need not have had previous experience in handling and banding birds although some previous experience is desirable. There must be a real intention to proceed to the other classes of Banding Authority.
3. The application must be supported by a current 'A' or 'B' class bander who shall be responsible for the training and conduct of the 'C' class bander.

'C' class banders operating in Tasmania and Western Australia are required to hold a State permit to trap, band and release birds. In the other States/Territories 'C' class banders are covered by the permit held by their 'A' or 'B' class trainer. In all cases, the State/Territory agencies will be notified about the anticipated enrolment with the ABBBS of a 'C' class bander.

2.2 Bird banding authority endorsements

The Banding Authorities of bird banders are subject to a system of endorsements to use trapping methods. These endorsements are in recognition of the varying levels of specialist skills required to safely undertake different types of bird catching and banding.

The system of endorsements is hierarchical in design (see fig.2.1). At the first level are persons with no capture skills, and who will be endorsed to band only rehabilitated birds. The second level covers all basic capture techniques, such as by hand, hoop net, cage trap, clap-nets and all raptor traps. The third level has two branches which include endorsements for either mist-netting or cannon-netting.

Implicit within the hierarchy is that banders holding Level II endorsement automatically qualify to band rehabilitated birds (Level I) and those holding Level III endorsement (either A or B or both) can undertake banding which falls within Levels I and/or II. The proviso is that the banding must be part of a project already approved by the Coordinator.

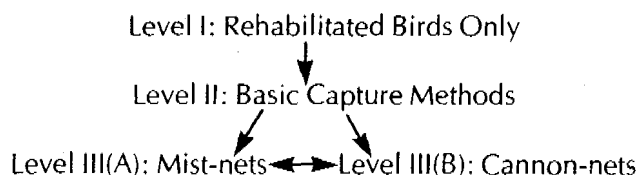


Fig.2.1: Outline of the system of Banding Authority endorsements.

Endorsements are renewed annually along with the Banding Authority and are not intended to be held in perpetuity once granted. They should relate to projects that the bander intends to be involved with during the forthcoming year.

If an enrolled bander wishes to diversify into another type of banding, and this requires an additional endorsement, then application must be made to the ABBBS for that endorsement (and to commence a new project if required).

Bird Banding Authority cards will be endorsed with one of the following comments:

- Nil (trainee bander)
- Rehabilitated birds only
- Basics (not mist- or cannon-nets)
- Mist-nets
- Cannon-nets
- Mist-nets and cannon-nets

LEVEL I: REHABILITATED BIRDS ONLY

Banders may be enrolled in the ABBBS with the endorsement to band birds rehabilitated following sickness or injury. The banding must conform to the ABBBS guidelines for banding such birds and must be part of an approved banding project.

Banders holding the Level I endorsement require referee reports to progress to either Level II or III endorsements. Level I endorsement does not infer that the bander is competent to treat the bird's sickness or injury. Banders may also require a permit from the State/Territory fauna agency to keep the bird during the rehabilitation period. It is the bander's responsibility to determine when such permits are required.

The minimum qualification for this level is twenty birds processed (see section 2.1 for definition of processed).

LEVEL II: BASIC CAPTURE METHODS

This endorsement includes all banding that can be undertaken without the use of mist-nets or cannon-nets. Banders requiring this endorsement are those who band nestling birds, birds that can be captured by hand (e.g. shearwaters and penguins in burrows), those species that can be trapped with hand-held or thrown nets (e.g. albatross) and all raptor trapping devices.

Banders who hold Level II endorsement may band rehabilitated birds with the prior approval of the Coordinator.

The minimum qualifications for this level are:

- raptor traps — 20 birds processed; or
- other methods — 100 birds processed (see section 2.1).

LEVEL III(A): MIST-NETS

Banders wishing to undertake banding studies using mist-nets must first gain mist-net endorsement. Learning to correctly use mist-nets requires tuition from experienced operators. Even banders with considerable experience in other capture techniques may not possess sufficient skills to safely use mist-nets.

Banders holding the mist-net endorsement are automatically given endorsement for banding rehabilitated birds and birds caught using basic trapping methods, providing that the project requiring these trapping methods has been approved by the Coordinator.

The minimum qualification for this level is 100 birds processed (see section 2.1).

LEVEL III(B): CANNON-NETS

Endorsement to use cannon-nets will not be given readily and applicants will be expected to show proficiency in all aspects of their use, particularly the safety practices. This endorsement also covers other explosively propelled trapping devices such as rocket-nets and nonnacs. Only

banders who will lead a cannon-netting operation are required to hold this endorsement. Other banders, who assist but do not take charge, do not require this endorsement. For these banders, Level II is necessary and Level III(A) is desirable.

Cannon-net endorsed banders are automatically permitted to band rehabilitated birds and those captured using basic methods, provided that the project requiring these trapping methods has been approved by the Coordinator.

Holders of mist-net endorsements are NOT automatically endorsed to use cannon-nets and vice versa. These endorsements will be refereed independently of each other.

The minimum qualification for this level is 500 birds processed (see section 2.1).

A permit to operate an explosive device or to handle explosives may be required from the State/Territory government. Enquiries on this matter should be directed to the relevant State/Territory fauna agency.

2.3 Procedures for obtaining and renewing banding authorities and endorsements

INITIAL ENROLMENT

Application forms for persons wishing to enrol as banders are available from the Secretary. Upon request three copies of the application form will be forwarded. Applicants are asked to complete two copies and return them to the banding office for consideration. It is recommended that the third copy be completed and retained as a personal record.

Upon receipt of the application forms the Secretary will decide whether or not the applicant has sufficient experience for the application to be considered further (see section 2.1 'Qualifications').

REJECTION OF AN APPLICATION

If the application is refused on the grounds of lack of experience, both the applicant and their 'A' or 'B' class trainer(s) will be advised on the additional experience required. The application will then be held in abeyance for up to six months during which time the applicant is expected to gain the necessary skills. When the trainer(s) feel that the applicant has gained the experience required they are expected to complete and return the referee report forms previously forwarded to them.

ACCEPTANCE OF AN APPLICATION

If the applicant for a Bird Banding Authority appears to satisfy the enrolment requirements in the first instance, referees report forms will be sent to two of the three referees nominated by the applicant. In the event that these two referees disagree on the suitability of an applicant then the third referee will be consulted.

In most cases referees are not considered qualified to comment on the abilities of a prospective bander unless they have recently observed the person processing at least the required number of birds (see section 2.1). The Secretary may also decide that for certain types of bird banding the requirement for two referees can be waived and only the applicants trainer will be consulted.

Once satisfactory referees reports are received, the applicant will be notified that he/she is accepted as a bander and is eligible to apply to the relevant State/Territory fauna agency for a permit to trap, band and release live birds. At the same time the ABBBS will notify the appropriate State/Territory agency that the applicant will be enrolled as a bander upon the issue of the necessary State/Territory permit. In some States and Territories 'C' class banders do not require such a permit (see section 2.1).

Upon receipt of a State/Territory permit, the applicant is required to send a photocopy to the ABBBS. At this time the enrolment as a bander will be completed and an ANPWS Bird Banding Authority card (and the relevant equipment for 'A' class banders) will be sent to the bander.

ANNUAL RENEWAL

All Bird Banding Authorities are renewable annually on 1 July. About six weeks before this date all currently enrolled banders will be sent a renewal form. Banders are required to sign and return this form, along with any previously unsubmitted banding data, by 30 June. Failure to submit banding data will result in cancellation of the Banding Authority.

The 30 June deadline is strictly enforced because the ABBBS is required in July to inform each of the State and Territory fauna agencies of those persons who are authorised to band for the coming year. Banders who do not meet the 30 June renewal date will have their Banding Authority and, in turn, the State/Territory permit cancelled.

If banders are unable to meet the 30 June deadline for any reason they should contact the Secretary and make alternative arrangements.

It is the bander's responsibility to ensure that they renew both their ANPWS Banding Authority and their State/Territory banding permit.

TRANSFER FROM 'B' OR 'C' TO 'A' CLASS

Banders who hold a 'B' or 'C' class Banding Authority and wish to commence a project of their own must apply for an 'A' class authority.

The procedure for doing this is similar to that for initial enrolment (see above). The necessary application forms describing the proposed project can be requested in writing or by using the standard 'pink' requisition form.

Providing the proposed project is approved by the Coordinator, referees will be consulted in the usual way.

Referees for 'B' or 'C' to 'A' class transfer must be familiar with the banding skills of the applicant and greater emphasis will be put upon the banders abilities to operate an independent banding program.

TRANSFER FROM 'C' TO 'B' CLASS

Banders who hold a 'C' class Banding Authority and wish to operate without the direct supervision of an 'A' or 'B' class bander must apply for transfer to a 'B' class authority.

The necessary 'C' to 'B' class transfer form may be obtained from the banding office. Referees will be consulted regarding the applicant's banding skills, particularly the applicant's ability to operate without direct supervision.

RE-ACTIVATION OF A RESIGNED AUTHORITY

Banding Authorities and endorsements may be re-activated by sending completed application forms to the Secretary. Normal enrolment procedures will apply except that authorities and endorsements that are re-activated within two years of resignation need not be refereed. The Banding Authority will not be re-issued until the applicant has notified the Secretary that the relevant State/Territory permits have been re-issued. Re-activated authorities will use the same authority number that was held previously by the bander.

2.4 Referees

The refereeing of applicants for Banding Authorities and endorsements is an important aspect of the ABBBS operations. It is only through careful and conscientious refereeing that the level of skill currently present within the banding community can be maintained and improved. All references are treated with strict confidence.

References may only be given by banders who currently hold the endorsement for which the applicant is seeking.

Banders who are asked to referee applicants should treat this as a very serious matter. If you are asked to referee a person that you have never seen engaged in banding activities, return the form stating this to the Secretary. The applicant will be advised that he/she must nominate a more

suitable referee. All referees must have recently seen the applicant processing the required number of birds captured using the trapping method for which the endorsement is sought. Under no circumstances should referees feel obliged to recommend the applicant simply because they have been nominated by the applicant or because the applicant might become a 'good' bander.

If you have observed the applicant involved in trapping and banding but only to a limited extent (i.e. less than the fifty per cent requirement) you should ask the person to make themselves available, at a mutually suitable banding session, to enable further assessment and testing of their abilities. In such cases the onus is very much on the applicant to make themselves available at your convenience and not vice versa.

Referees will be advised when an application for a Banding Authority, has been refused by the Secretary. If the applicant is asked to obtain more experience, a second referee report will be forwarded with an explanation for the initial rejection of the application. When referees consider that the applicant has gained the necessary experience, the referee reports should be completed and returned.

2.5 State/Territory permits to trap, band and release protected birds

It is the bander's responsibility to ensure that they always hold the necessary and current permits to trap, band and release protected birds from the relevant State/Territory fauna agency. The Banding Authority alone does not confer rights on the holder with regard to the capture of wildlife; it simply gives permission to use bands and the equipment issued by the ABBBS for the purposes of banding.

Without the relevant and current State/Territory permit, the Banding Authority is not valid.

At the time of initial enrolment, banders must satisfy the requirements of the ABBBS with respect to trapping and handling skills, etc. before applying for a State/Territory permit. A Banding Authority will only be issued on the condition that the relevant State/Territory permit is also held (and vice versa). Thereafter the bander is required to ensure the continuity of his/her State/Territory permit while holding a current Banding Authority.

One of the strict conditions of all State/Territory permits to trap, band and release protected birds is that they be released at the point of capture following banding. This is a policy supported by the ABBBS. If a bander wishes to relocate a nuisance bird, special permission must be obtained from the relevant State/Territory fauna agency. Similarly, special permission must be obtained from the State/Territory fauna agency before birds are kept in captivity during a period of rehabilitation prior to banding and release. In both cases, the unusual treatment of the bird must be recorded on the field datasheets (see section 11.3).

2.6 Resignation and cancellation of banding authorities

Banders should notify the Secretary when they intend to resign their Banding Authority. All equipment issued to the bander by the ABBBS must be returned so that it may be accounted for and can then be issued to other banders.

The Secretary of the ABBBS may cancel a Banding Authority when a bander fails to observe the rules and standards of the ABBBS. Cancellation of the authority immediately invalidates the bander's State/Territory permit and so the continuation of banding is prohibited.

2.7 Banding in other countries

Under special circumstances bands provided by the ABBBS can be used in countries other than Australia. Permission to do so must be given by the Coordinator.

In such cases the conditions pertaining to the issue of a Banding Authority within Australia also hold, i.e. a permit to trap, band and release birds must be held by the applicant for the relevant country before the Banding Authority will be issued.

CHAPTER 3 Bird Banding Supplies

- 3.1 *Supplies available*
- 3.2 *Procedures for obtaining banding supplies*
 - Bands*
 - Banding pliers*
 - Band size gauges*
 - Stationery*
- 3.3 *Band specifications*
 - Aluminium*
 - Alloy*
 - Incoloy*
 - Monel*
 - Stainless steel*
 - Band wear studies*
 - Bird bands*
- 3.4 *Transfer of bands to another bander*
- 3.5 *Return of bands and other equipment upon resignation or cancellation of the banding authority*
- 3.6 *Obtaining other banding supplies*

3.1 Supplies available

The ABBBS provide metal bands, pliers, stationery and other equipment free of charge to all persons holding 'A' class banding authorities. Mist-nets and weighing equipment are not provided by the ABBBS but can be purchased through the Australian Bird Study Association (see section 3.6 for further details).

'B' class banders may not requisition banding supplies although the 'A' class in charge of the project may choose to redistribute bands and other equipment to his or her authorised helpers. Even in such cases all data must be submitted under the authority number of the 'A' class bander to whom the bands were issued. Bands for the use of corporate banding groups must be ordered by the 'A' class bander in the group's name and using the group's authority number.

3.2 Procedures for obtaining banding supplies

Banding supplies are issued by the ABBBS only on Thursdays. Unless the Secretary considers the request to be urgent and unavoidable, telephone requests for supplies will not be accepted. Bands may be requested by telex or fax. The ANPWS telex number is AA62971 and the fax number is 062 473528. Telexed and faxed requests for bands should be addressed for the attention of the Secretary, ABBBS.

Requests for banding supplies should not be made in letters dealing with other matters. If the appropriate 'pink' (Requisition for Banding Supplies) forms are not available, details of supplies needed should be forwarded on a separate sheet of paper.

BANDS

Bands should be requested on the standard 'pink' form. The number of each size required should be listed; taking care to specify the metal type appropriate for the target species. This information can be obtained from the List of Approved Band Sizes which is the product of many years of field testing of sizes and metal types. To ensure that the best available bands are used, the recommendations on the list should be adhered to.

When requesting bands the approximate number of each size presently held in stock should also be recorded. This enables the Secretary to anticipate the future band requirements for that particular band size and type.

Banders are asked not to stockpile vast numbers of bands and to return any which are no longer of use for the work currently being undertaken.

When bands are issued the information is stored on computer and a receipt is produced listing the band numbers against an authority number. This receipt is enclosed with the bands when they are forwarded to you. Please carefully check that the bands received correspond with the computer record, sign the form and return it to the banding office as soon as possible. In this way we can be certain that you have actually received the bands and that all bands are accurately accounted for. This computer record is used to automatically check that banding records subsequently submitted under your authority number correspond with the bands issued to you. It is therefore vital that this band checking take place and the numbers be confirmed with the banding office or you may be held responsible for the use of bands you did not receive (see also section 3.4).

Banders who fail to acknowledge the receipt of bands will not be issued with further bands until the acknowledgement has been received at the banding office.

BANDING PLIERS

There are two types of banding pliers available; small, 5-hole pliers and large, 2-hole pliers. The smaller pliers are meant for use on band sizes up to and including size 8 and the larger pliers for all other sizes. Section 5.2 gives more specific details of plier use.

Banding pliers can also be requested on the 'pink' form. 'A' class banders are not entitled to more than one pair of each size plier unless they are required for the use of 'B' class banders. Please do not request more pliers than you require as they cost the ABBBS a considerable amount. Additional pliers may be purchased from the Australian Bird Study Association.

BAND SIZE GAUGES

Band size gauges are not currently provided by the ABBBS. There are few species for which band sizes are not presently recommended, and where there is concern over which band size to use, the diameter of the tarsus should be measured using callipers. Reference to table 3.1 should allow the correct band size to be selected.

STATIONERY

Apart from the data sheets used to record and submit data to the banding office, there are many other stationery items supplied free of charge by the ABBBS. These include the List of Approved Band Sizes, Enrolment forms, Trial of Band Size forms, 'green' Despatch/Acknowledgment forms and Application for Colour Marking forms. All can be obtained using the 'pink' requisition form.

3.3 Band specifications

At present there are thirty different band sizes issued for use on birds. The specifications of these bands are given in tables 3.1.

The ABBBS currently uses five different materials for bands; aluminium, alloy, incoloy, monel and stainless steel.

ALUMINIUM

These bands are not durable, but their light weight is important for small species. On some species and in some habitats these bands have lasted for many years, but in other situations (such as cormorants nesting among rocks) the bands have worn quickly.

ALLOY

These magnesium-aluminium alloy bands are almost as light as pure aluminium, but are stronger and more durable. Overseas experience has shown that when used on passerines, alloy bands have a potential life of at least fifteen years.

Table 3.1 Specifications of the bands used by the ABBBS for birds

<i>Size</i>	<i>Internal Diameter(mm)</i>	<i>Height (mm)</i>	<i>Gauge (mm)</i>	<i>Shape</i>	<i>Metal</i>
01	2.0	5.5	0.38	C	AY
02	2.3	5.5	0.38	C	AY
03	2.8	5.5	0.5	C	AY
03	2.8	5.5	0.35	V	IN
04	3.3	5.5	0.5	C	AY
04	3.3	5.5	0.35	V	IN
04	3.3	5.0	—	C	ML
05	4.0	5.5	0.5	V	AY
05	4.0	5.5	0.35	V	IN
06	4.5	7.0	0.5	V	AY
06	4.5	5.5	0.35	V	IN
07	5.5	7.0	0.7	C	AM
07	5.5	7.0	0.56	V	IN
08	6.5	6.5	0.7	C	AM
08	6.5	6.5	0.7	C	SS
09	8.0	10.0	0.7	C	AM
09	8.0	10.0	1.0	C	SS
10	9.5	10.0	1.0	C	AM
10	9.5	10.0	1.0	C	SS
11	11.0	12.0	1.0	C	AM
11	11.0	12.0	1.0	C	SS
12	14.0	12.0	1.5	C	AM
12	14.0	12.0	1.0	C	SS
13	16.0	12.0	1.5	C	AM
13	16.0	12.0	1.0	C	SS
14	20.0	16.0	1.0	C	SS
14	20.0	16.0	—	C	ML
15	22.0	12.0	1.0	C	SS
16	Shearwater band		1.0	—	SS
17	Australian Pelican band		1.0	—	SS
18	Royal Penguin band		—	—	ML
19	Little Penguin band		—	—	SS
20	9.0	5.0	1.0	C	SS
21	11.0	5.0	1.0	C	SS
22	13.0	5.0	1.0	C	SS
23	4.0	5.0	0.7	C	SS
24	5.5	5.0	0.7	C	SS
25	6.5	5.0	1.0	C	SS
26	King Penguin band		—	—	AM
27	12.5	12.0	1.0	C	SS
28	18.0	12.0	1.0	C	SS
29	Adelie Penguin band		—	—	SS
W	Emperor Penguin band		—	—	AM

Abbreviations:

Shape: C = opened circular butt-ended bands shaped like a 'C'
V = butt-ended bands which are supplied as a rounded 'V' shape to help overcome 'spring-back'.

Metal: AM = aluminium
AY = alloy (magnesium-aluminium)
IN = incoloy (nickel-chromium alloy)
ML = monel (copper-nickel alloy)
SS = stainless steel

INCOLOY

These bands, which are made from a nickel-chromium alloy, have all the virtues of stainless steel and in addition are less prone to 'spring-back'. They are particularly suitable for use on waders.

MONEL

These bands, which are made from an alloy of copper and nickel, are considerably more resistant to abrasion than either aluminium or alloy bands. However, because of 'crevice attack' (the electrolytic corrosion associated with the characters stamped into the band) they are not suitable for some species which inhabit marine environments, especially in tropical waters. They are difficult to close tightly due to 'spring back'.

STAINLESS STEEL

These bands are extremely durable and appear to be immune to crevice attack and staining. However, like monel bands, they are difficult to close tightly due to 'spring-back'. They are particularly valuable for use on parrots, birds of prey and the larger long-lived species.

BAND WEAR STUDIES

Bands that have been removed from birds should be returned to the ABBBS for inclusion in the studies of band wear. This is especially important for bands that are showing wear but all bands can be used in the study.

Samples of unused bands are removed from batches of new bands when they arrive at the banding office. Worn bands are mainly returned by the public who have removed them from dead birds. Banders should inspect all the bands on retrapped birds for the state of wear on the bands. Banders should replace worn bands and return them to the ABBBS (see section 5.6). Worn bands should only be removed from birds when it can be done safely, otherwise a new band should be put on the bird's other leg (or flipper). This will allow the approximate time of the loss of the worn band to be determined and the identity of the bird to be recognised for longer.

Worn bands can be compared with the unused samples from the same manufacturing batch and the degree of wear estimated. Such comparisons are usually made within a single band type (size and metal) that has been used on one species. If sufficient samples of worn bands are available, a statistical analysis of the weight changes, for example, can predict the time that the band is likely to remain on a bird's leg. When bands become very worn they may injure or fall off the bird. In the latter case, the life-span of the bird will be underestimated. The collection of accurate estimates of life-spans of birds is one of the basic goals of the ABBBS. This information on band wear is vital for the assessment of metal types given in the List of Approved Band Sizes. Band wear is difficult to predict and the return of bands to the ABBBS is important to the assessment and development of improved band types.

BIRD BANDS

Of the thirty different band sizes available for use on birds (see table 3.1), there are five sizes designed primarily for use on waders (sizes 3, 4, 5, 6, and 7 in incoloy), one for shearwaters (size 16), one for use on pelicans (size 17), five sizes for use on penguins (sizes 18, 19, 26, 29 and W), six for parrots (sizes 20, 21, 22, 23, 24 and 25) and the remaining sizes are for general use.

All except two types of bird bands issued by the ABBBS have a standard numbering system comprising a three digit prefix which indicates the band size, and a five digit identifying serial number (fig. 3.1a). The prefix also indicates which 100 000 bands within that band size series are currently being issued e.g. a band with prefix 032 is a size three band from the third 100 000 issued. The first 100 000 for each band size has the last number of the prefix as 0, the second 100 000 as 1 etc.

INFORM WILDLIFE GPO BOX 8
CANBERRA 2601 AUSTRALIA

111- 00622

Figure 3.1a. Standard bird band. The message on the band varies with the size of the band and includes the word Australia if the band is likely to be recovered outside Australia. Bands manufactured with the CSIRO administered the ABBBS include the letters CSIRO in the message.

The exceptions to the above numbering system are the readable bands and the size W penguin bands. The readable bands, which as the name suggests, are designed specifically for bird recognition without capture. These bands are the same internal diameter as standard bands, however, the height of the band is greatly increased to accommodate extra large numbers or letters (fig. 3.1b). Such bands have been used in the past on Silver Gull, Masked Booby and Brown Booby. In the former case the bands carry only the serial number, whereas for Boobies a different system operates where an 'A' or 'B' is followed by a four digit serial number. In both cases the numbers run up the band rather than around it and are repeated four times on the band. The size W penguin bands are applied to the flippers and have the 'W' prefix and a four digit serial number.

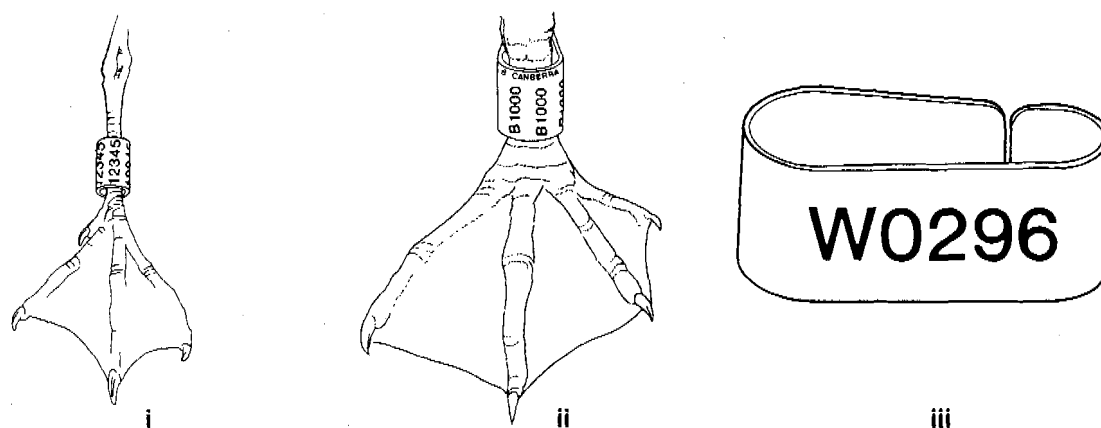


Figure 3.1b. Readable bird band.

- i. silver gull
- ii. booby
- iii. penguin

3.4 Transfer of bands to another bander

Banders should transfer bands to another bander only in an EMERGENCY (bands may only be transferred to another 'A' class bander). Only complete strings may be transferred and the Secretary must be notified, by the bander transferring the bands, WITHIN ONE WEEK OF THE TRANSFER. Failure to do so may lead to the suspension of band issues to the bander who transferred the bands.

These strict rules are required because recording the transfer of bands between banders is a tedious and time consuming job for the ABBBS staff.

Incomplete strings of bands may be used by a bander to whom the bands were not issued, but all banding data must be submitted in the name and number of the bander to whom the bands were issued.

3.5 Return of bands and other equipment upon resignation or cancellation of the banding authority

It is a condition of the granting of an 'A' class Banding Authority that upon resignation or cancellation of the authority all bands, previously unsubmitted banding records and other equipment will be returned to the banding office. Not only does this make bands and other equipment available for the use of others but it also enables us to account for all bands issued.

The return of banding pliers and band size gauges is particularly important as they are expensive items for the ABBBS to purchase and can be used only for bird banding.

3.6 Obtaining other banding supplies

Banding supplies such as pliers, colour bands, mist-nets, and weighing scales can be purchased from the Australian Bird Study Association (ABSA). Price lists for these items can be obtained from the banding office using the 'pink' requisition form or by writing to the ABSA PO Box A313, Sydney South, NSW 2000.

CHAPTER 4 Catching, Handling and Releasing Birds

- | | |
|---|--|
| 4.1 <i>Catching birds for banding</i> | 4.3 <i>Cannon nets</i> |
| 4.2* <i>Mist-nets</i> | 4.4 <i>Snare traps</i> |
| <i>Basic equipment</i> | 4.5 <i>Cage traps</i> |
| <i>Siting mist-nets</i> | 4.6 <i>Clap and sprung traps</i> |
| <i>Setting-up mist-nets</i> | 4.7 <i>Corral traps</i> |
| <i>Operating mist-nets</i> | 4.8 <i>Catching by hand or handheld nets</i> |
| <i>Extraction</i> | 4.9 <i>Holding birds in the hand</i> |
| <i>Mist-netting hazards</i> | 4.10 <i>Holding birds in bags and cages</i> |
| <i>Banding stations</i> | 4.11 <i>Releasing birds</i> |
| <i>Specialised types of mist-netting</i> | 4.12 <i>Stressed or injured birds</i> |
| <i>Mist-net repairs and modifications</i> | |

* by Danny Rogers

4.1 Catching birds for banding

There are many methods of catching birds for banding. This chapter reviews the methods commonly used in Australia. Comprehensive references for trapping methods are provided by Davis (1981), McClure (1984), Mead (1974), Bateman (1971) and Lockley and Russell (1953). Banders are encouraged to refer to these guides but should be aware that some procedures in these guides may not be suitable for Australian conditions. Detailed knowledge of how to operate trapping devices and the dangers that they pose to birds is an essential prerequisite for their use. Reading the literature and discussions with banders experienced in these techniques are important in this respect.

The safe use of all trapping devices may be affected by weather conditions. Conservative judgement and constant scrutiny of the trapping devices is required by banders.

4.2 Mist-nets

Mist-netting is the most commonly used means of catching birds in Australia. Mist-nets are easily transported and erected and have proved successful in a variety of habitats. In the hands of experts, mist-netting is also a safe capture method. When misused by unskilled or irresponsible operators, mist-nets can be lethal to birds.

The last review of mist-net use in Australia was written by Wilson et al (1965). Their booklet is rather dated but is still well worth reading; it is available from the banding office. I have also drawn heavily on the *British Ringers Manual* (BTO, 1984) and banding experience in Australia, in compiling this section. It is hoped that the section will help mist-netters to carry out mist-netting with maximum safety and efficiency.

Most of this section deals with general mist-netting principles that can be applied in most situations. There is also a subsection on types of mist-netting in which special techniques and safety precautions must be applied. Mist-netting is described under the following headings:

- Basic equipment
- Siting mist-nets
- Setting-up mist-nets
- Operating mist-nets
- Extraction
- Hazards
- Banding stations

- Specialised types of mist-netting
- Mist-net repair and modifications

BASIC EQUIPMENT

Mist-nets

Mist-nets are fine nylon or polyester nets which are suspended between two upright poles (see figure 4.1). They are almost invisible against a dark background. The mesh of mist-nets is supported by a variable number (two to six) of taut, strong, horizontal threads called shelf-strings. Each shelf-string has a loop at each end which are used to string the net onto poles. The shelf-strings are connected by side-strings to form a large rectangular framework. This rectangular string framework is threaded through a far larger rectangle of the fine-meshed mist-net. The surplus net drapes over the shelf-strings to form deep pockets. A bird is captured in a mist-net when it flies into the mist-net mesh between shelf-strings. It then falls into a mist-net pocket and is unable to escape.

There are many different types of mist-net, most of which can be purchased from the Australian Bird Study Association, PO Box A313, Sydney South, NSW 2000. Different types of mist-net suit different types of mist-netting; when purchasing a mist-net one should keep the following parameters in mind.

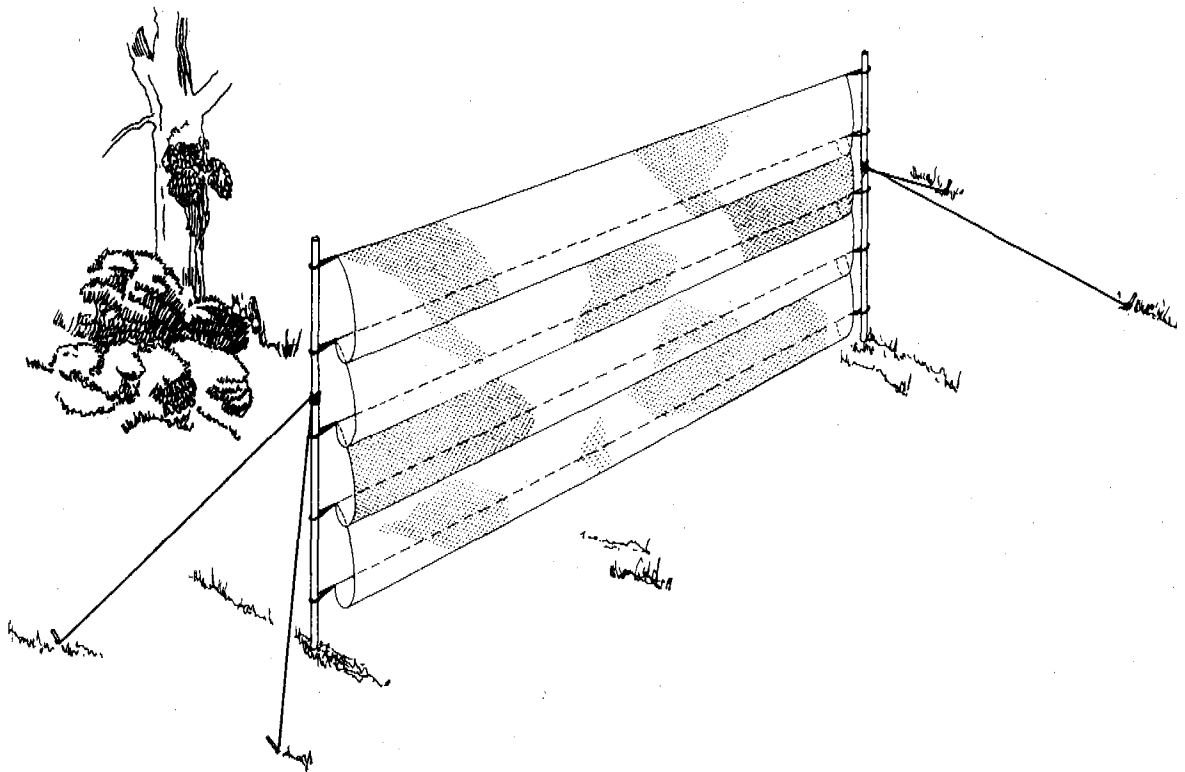


Figure 4.1. Mist-net set-up for catching birds.

Mesh size

Nets with a variety of mesh diameters are available; the type preferred depends on the size of bird one intends to catch. Large birds can be pocketed in small meshed nets, but do not get tangled and often escape. Small meshed nets are also more visible than large meshed nets. Small birds may fly straight through large meshed nets or struggle through after being pocketed. Small birds caught in large meshed nets are often difficult to extract.

The mesh diameter of a net is the distance between the end knots of an individual mesh which has been stretched taut. Nets of the following mesh diameters are widely available.

- 2 $\frac{3}{8}$ inches. For the larger flying birds; these nets have probably been used mostly for catching ducks. It should be noted that some flying birds are too large to be caught in mist-nets of any mesh size. Swans and pelicans can tear a passage through a mist-net even if it stays erect once they have flown into it.
- 1 $\frac{1}{2}$ inches. The mesh size most commonly used for catching waders.
- 1 $\frac{1}{4}$ inches. Suitable for passerine netting.
- 1 inch. Sometimes used for catching the smallest passerines (cisticolas, emu-wrens) since extractions are made simpler. These nets are seldom used since they are more easily seen than nets of a larger mesh size.

Number of Shelves

Most mist-nets now sold have four shelves. These nets are adequate for most mist-netting but there are some situations where banders get better results with single or double shelf nets (techniques for making these from multi-shelf nets are described later in this section). In areas where the canopy is lower than the mist-net (e.g. mallee heath) the upper shelves of a mist-net are unlikely to catch any birds and only serve to make the nets conspicuous to birds, predators and public. In such cases, the choice between single and double shelved nets depends on the height of the canopy.

Mist-netting in an area with no background vegetation is likely to be most successful with single shelved mist-nets, since a flying bird is less likely to see them silhouetted above the horizon. For this reason, single shelf mist-nets are often used for catching waders. Double shelved mist-nets can be useful in reed-beds, simply because it is difficult to reach the top-shelf of a mist-net while standing in deep mud.

Length of mist-nets

Thirty, forty and sixty foot mist-nets are readily available. The appropriate choice of mist-net length depends almost entirely on the length of available mist-net runs at the banding site. In exceptional cases where guying is insecure, it is easier to tension a short net than a long one. In windy conditions, long mist-nets can be more visible than short ones.

Poles

Mist-net poles should have the following characteristics. They should be long enough to allow the mist-net set to stay clear of the ground when the pockets are set to the desired depth. As a rough guideline poles at least 3m long are recommended for four-shelf mist-nets; longer poles should be used when setting nets over water or deep mud. Poles should also be strong enough to set mist-nets so that the shelf-strings are as taut as the mist-netter wants them. Mist-netters who cannot spread or tension a net appropriately because their poles are inadequate do not need to revise their net-setting techniques — they need new poles.

A variety of mist-net poles have been used by Australian mist-netters, the most common of which are mentioned here. Some of these poles are described in more detail by Wilson et. al. (1965).

Cane, particularly bamboo, makes light, durable, long and suitably robust mist-net poles. In addition, the nodes on cane poles help retain the positions of shelf-strings and guy ropes. Poles of Rangoon cane are easily purchased since they are used for fishing rods. Poles can be purchased pre-treated with varnish. Many mist-netters may be able to cut their own cane poles; 'home-made' cane poles tend to split unless bound at intervals with tape.

Wooden poles (often dowel) in two or three separable sections have been widely used, and are popular since they are easy to carry and pack in a car. Such poles are usually screwed together, or joined by a ferrule attached to the lower section. Many banders have made mist-net poles by attaching 'sleeves' of plastic piping to dowels.

Metal poles are similar to wooden poles, with aluminium tubing the most useful and durable.

Saplings roughly cut, are occasionally used, particularly if extra poles are needed quickly. Although convenient and expedient, they can be awkward to use, particularly for birds in the top shelves as net loops do not slide easily on the poles. The cutting of saplings might be illegal in some locations.

Galvanised pipes are placed in the ground, sometimes set in concrete, by banders regularly using the same sites. Poles are slotted quickly into the pipe and guying is minimised.

Guys

Mist-netters are advised to take more guy ropes into the field than they believe are necessary. The type of guy used is generally unimportant, provided it is strong enough to tension a net adequately (see section on setting nets in trees). Guys of about six metres length are suitable for attaching to pegs, with a single guy at each end of the net. Mist-netters who tie to nearby vegetation often require longer guys; a length of ten metres is generally adequate.

Baling twine, available from hardware shops, is cheap, non-elastic, does not slip much when knotted and is strong enough for mist-netting purposes. It tends to fray and it must be replaced occasionally.

Net-chopping equipment

Banders should always carry something to cut nets when difficult extractions need to be done quickly. Fine scissors are adequate. Seam-rippers (available for less than a dollar from haberdashers) are especially recommended. They can be used to cut nets and are unlikely to cause injuries. They are also useful when one wants to pick up a single mist-net strand during an extraction (see section on extraction)

Bird-bags

Once a bird is extracted it must be kept in a safe place until it has been carried to the banding station and processed. Bird bags are designed for this purpose and are described in section 4.10.

Pegs

Many mist-netters tie their guy ropes to pegs, although this practice is not necessary in sites where there is suitable vegetation for attaching ropes. Pegs are indispensable in other sites; mist-netters who frequently use a particular run may find 'permanent pegs' convenient. Ordinary tent pegs are adequate in hard ground, but longer, more robust pegs are required for mist-netting in soft mud or sand. Garden stakes make good, though expensive, sand pegs.

Torch

Mist-netters working at night must have an adequate light source for awkward extractions. Torches are suitable since they are wind-proof and their light can be directed at problem areas. Headlamps are more suitable as they allow one person to work with both hands.

Furling Stick

Furling sticks are hooked sticks which can be used to pull down high shelf strings. When birds are caught in the top shelf of mist-nets, furling sticks can be used to hold down the top shelf string to reduce the tension of the net on the bird during extraction. In eucalypt forests it is generally possible to improvise with fallen branches.

SITING MIST-NETS

Mist-nets are most effective when placed in sites where birds are likely to fly and where they are inconspicuous to flying birds.

There is no substitute for bird-watching in an area before mist-net sites are chosen. In cases where this cannot be done, the following points may be helpful:

- high numbers of birds may turn up where food concentrations occur; mist-netting near flowering trees and shrubs, or near fruit trees, can be effective;
- waterholes are effective 'bird-magnets' in dry areas, especially in hot weather. Mist-netting near waterholes is described in the section on specialised types of mist-netting;
- feeding birds often fly into the nearest dense cover when alarmed. Nets between clearings and dense shrubs are often successful;
- birds are often found in high densities in narrow lines of cover along watercourses, roads etc. In such habitats, they tend to move parallel to the line of cover, so mist-nets are most successful when set across it;
- edge environments, where two habitats meet, often have a high density of birds. In addition, birds flying from one habitat to another (i.e. from forest into heath) often fly at mist-nettable height;
- it is wise to check that no bird nests are near to mist-nets. Frequent disturbance of nesting birds during net checks is likely to make them desert the nest. The presence of a nest may be indicated by the frequent recapture of the same bird on the same day. If this occurs, it is advisable to move the net.

The principles for setting a mist-net that birds will not see are equally simple. Mist-nets are more obvious when set in sunlight than when set in shade. However the most important factor is the background visible to the bird. Mist-nets are least visible when set against a dark background.

For these reasons, mist-nets are especially inconspicuous when set in a 'corridor' such as a footpath through dense vegetation. Some mist-netters have the impression that mist-nets should only be set in such sites, but this is not the case. Open mist-net runs often work well provided there is a dark background. Furthermore, 'corridor' mist-net runs can be unsuccessful sometimes, since birds are reluctant to fly through dense vegetation, and often fly along corridors, rather than across.

SETTING-UP MIST-NETS

Most experienced mist-netters have slightly different methods of erecting mist-nets and all believe that their practices are the best. The technique used to set a mist-net is trivial, provided the erected mist-net meets the following standards:

- the poles must not sway; the net should be set on a rigid framework of poles and guys so that it will not fall over, even if hit by large animals or people;
- the shelf-strings should be taut so that there is no chance of the net sagging onto the ground when full of birds. This consideration is especially important for nets set above water;
- the shelf-strings should be set with a suitably deep pocket for captured birds to fall into;
- it should be possible for one person to adjust the tension of the mist-net.

Described below is the mist-net setting technique with which I am most familiar. I believe it to be the best available technique, but dubious trainees may wish to read about the techniques described by Low (1957), Wilson et. al (1965) or McClure (1984).

Preparing the site

Once a net run has been selected, it should be paced out, and a pole placed at each end of the net run. Vegetation that may get tangled in the erected net should be removed discretely. This prevents the net and captured birds from being damaged. It is usually possible to tie vegetation back instead of destroying it. Tea-trees, prickly wattles and particularly bracken, can make a horrendous mess of a mist-net if they become entangled.

When planning to set the bottom shelf of a mist-net low, banders are advised to rake leaf litter away from the net line. If this is not done, the bottom shelf will, and captured birds may, sustain unnecessary damage or injury. Raking a net-run also makes birds in the bottom shelf easier for the bander to see. The practice also reduces the chance of ant attack on bottom shelf birds. Raking net-runs is also advisable for those trainees who may drop nets while setting them.

Tying guys

Guys should be tied to vegetation or a pair of pegs between thirty and sixty degrees from the line of the mist-net. Knots connecting guys to vegetation should always be tied lower than those connecting the guys to the pole. Solo mist-netters have to tie guys at each end of the net run before taking out a mist-net.

It is convenient to use a single guy at each end of a mist-net, tied to the pole and to two other points. This means that only one knot needs to be retied when adjusting the net. A convenient knot for attaching single guy ropes to poles is illustrated in figure 4.2. Guys satisfactorily hold up nets when tied near the centre of the pole. Usually, when setting a four shelf mist-net, two or three mist-net loops are set below the knot and two or three above. It is not necessary to tie guys to the tops of poles, as is widely believed.

A tree less than 30 cm behind a pole can be used for guying. In these situations a single guy, directly behind the net, will suffice, since it is so short it does not allow the pole to sway much.

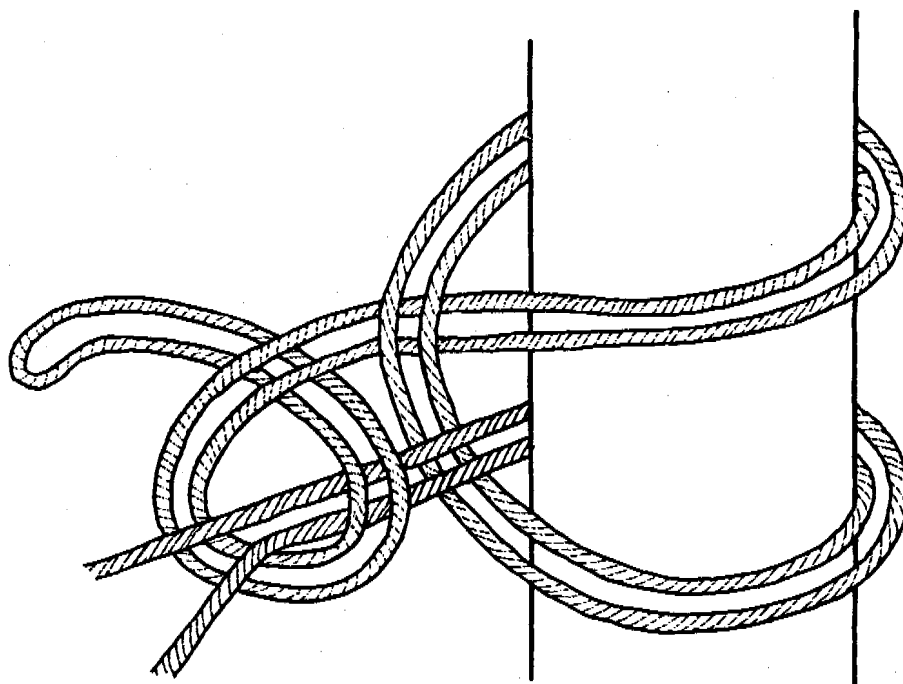


Figure 4.2. A convenient knot for attaching single guy ropes to poles.

Storage of nets

Mist-nets are conveniently stored folded in large bird-bags. The loops should be tied together at each end; this can be done with a separate short length of string, or by feeding the top loop through the others two or three times. The drawstring of the bird-bag container is passed through the top loop or loops of one end of the mist-net before the bird-bag is tied up. Also attach key-ring labels to the top loops of the mist-nets; these record the type of mist-net, notes on their condition, and the names and banding license numbers of the mist-net owners.

Taking out the net

Open the bird-bag and take out, and untie the loops from one end of the net. Mist-nets are now sold with white top loops. It is convenient to mark the top loops of mist-nets in some fashion if this has not already been done. Starting from the top loop, get the others in order; by stretching the side-strings it is easy to see if this has been done correctly.

Place the ordered loops on the mist-net pole. Tie the guy between the appropriate loops, about midway up the pole. Leave the loops drawn together (telescoped) save for those of the top shelf, which should be fully spread. Walk towards the other pole, carefully taking the net out of the bag. The net should be kept taut, as this keeps the pole erect and prevents the net from picking up material from the ground. Keeping the top shelf string clear of the others, ensures that the net does not become twisted.

Once at the other end, order the loops and place them on the pole, checking that there are no crossed shelf-strings. Pull the net as taut as possible, and tie the guys to the poles, using the knot shown in figure 4.2.

If you intend to catch immediately, spread the shelf-strings so that each pocket is a suitable depth for catching birds. As a rough guideline of the required depth; when catching passerines a bird-bag tossed into a pocket should come to rest some 15 to 30 cm below the shelf-string. Deeper pockets may be required if you intend to catch large birds.

OPERATING MIST-NETS

A bird in a mist-net is vulnerable to predators, weather and getting themselves more tangled. They also miss out on valuable feeding time. For these reasons, mist-nets should be checked at half-hour intervals. More frequent checking tends to scare birds from the net-sites, but is essential in some situations; these are discussed later in this section.

Between the half-hourly net-checks, a bander should be able to process all the birds caught in the previous net-round. If this is not possible, then too many nets have been opened, and some or all of them should be closed until any backlog of birds is cleared.

The number of nets a mist-netter can operate safely depends on the local catching rate, and his or her experience and competence. Even an experienced mist-netter may have difficulty operating a forty foot multi-shelf net set by a waterhole in dry conditions.

Mist-netters working at a new site should start cautiously by setting-up only a few nets until they are familiar with the local catching rate. This may take some time, since catching rates at a site may depend on season, time of day and weather. Even a long-used site may produce surprises. There have been cases where literally hundreds of birds, perhaps startled by a hawk, simultaneously and unexpectedly stopped feeding in the canopy and flew into the mist-nets below.

While on a net round, a mist-netter has several duties to perform. Obviously, all captured birds should be extracted. Remember that small birds can be inconspicuous in a mist-net. It is good practice to walk the length of a mist-net while checking it, so that birds in the bottom shelf or near the far pole do not go undetected.

During each net round, mist-netters are advised to check that their nets have remained correctly tensioned and spread. Remove leaves, twigs and other rubbish from nets while on net-rounds rather than at the end of the weekend; such rubbish can damage nets, and injure the birds if left for a long time. Some net repairs are most easily completed before putting the net away (see section on mist-net repairs and modifications).

Always be quiet when checking a net, and spend as little time near it as possible. It is not difficult to frighten birds away from mist-nets. If taking 'rookies' mist-netting, it is wise to explain this need for silence before going on a net-check.

Furling mist-nets

Mist-nets can be furlled when a mist-netter wishes to stop catching but intends to resume later and is therefore reluctant to take down the nets. Nets may be furlled in bad weather, or when a bander is over-extended. Most commonly, mist-nets are furlled overnight. Mist-nets must be furlled or taken down at night unless the mist-netter is prepared to check them as frequently as he or she does during the day. The atrocious practice of checking nets at dusk, and then leaving them open and unattended until dawn, is unacceptable. In cold or wet weather this could lead to the death of any nocturnal birds or bats captured.

There are two ways of furling nets. In both, the first step is to telescope the net by bringing the loops together at each end of the mist-net. The net can then be furlled by 'spinning' or 'draping'. Spinning entails twirling the telescoped net until all of the pockets have wound themselves around the shelf-strings (see fig 4.3a). Loose 'ends' of pocket should be tucked in. The resultant furlled net looks impregnable; however nets furlled in this fashion tend to unwind, particularly when it is windy. For this reason the shelf-strings of such furlled nets should be tied at intervals with ties — usually string or bird-bags. It is easy to furl a mist-net by spinning, but they take time to open which can be difficult on cold mornings.

A better furling technique involves draping folds of the net over the closed shelf strings in alternate directions at intervals of no more than one metre (see figure 4.3b). It is usually unnecessary to drape each fold over the net more than once. Banders may prefer to 'multi-drape' a net if it is windy, or if the furlled net is being left for some time. A net furlled in this way may not look particularly capture proof however, it is far less likely to become unfurled than a spun net, particularly in windy conditions. Spreading the shelf strings opens the net instantly.

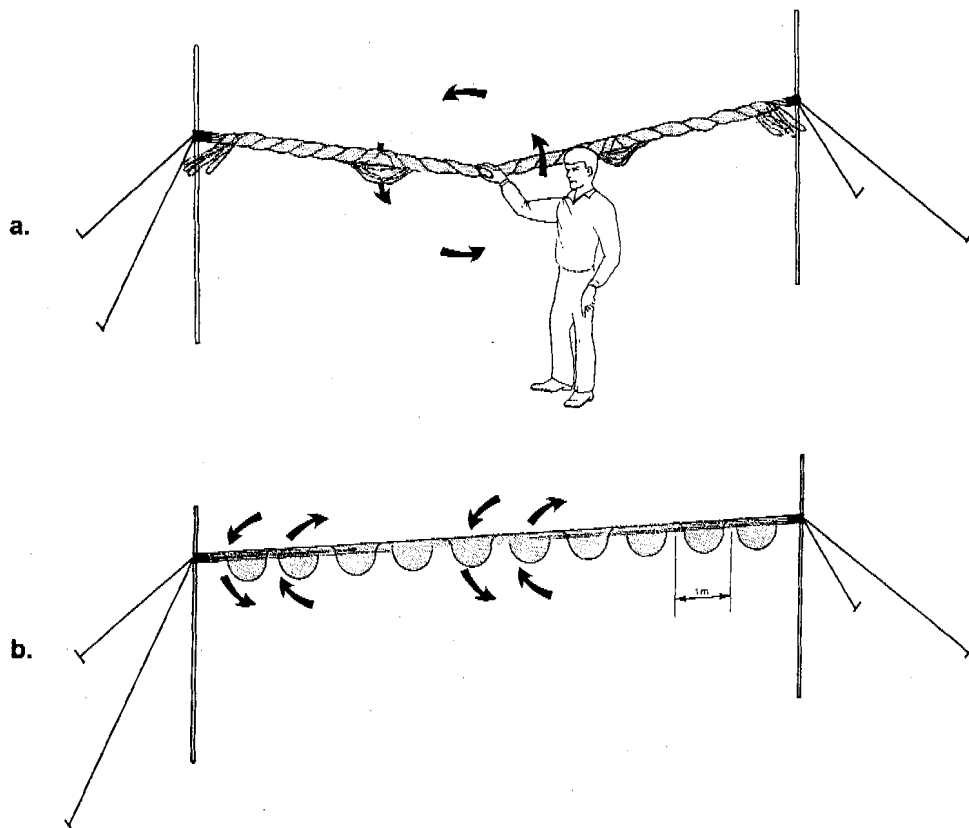


Figure 4.3. Two methods of furling nets. Note that loose ends of the net pockets should be tucked into the shelf-strings.

a. spinning

b. draping

EXTRACTION

Personal requirements

For most people, extracting birds from mist nets is an acquired skill. A lucky few can pick it up in no time, but most have to learn the hard way — through an extended training period under the supervision of an experienced extractor. The basic requirements of a mist-netter are:

- a paramount concern for the welfare of the captured birds;
- a patient disposition to work out the problems and solve them appropriately — rushing can lead to worse tangled birds;
- vigilance to monitor the health of birds in nets, and the preparedness to cut nets so that birds may be released quickly;
- good eyesight — despite what some may say, it helps tremendously to see what you are doing;
- sensitive fingers — much extraction work, increasingly as experience is gained, is done by touch as troublesome strands of net are often obscured by feathers;
- the ability to work out how birds have become caught — again experience is the best teacher;
- some knowledge of avian anatomy — it helps to know how much force can be applied in particular situations;
- dexterity.

Many might think that they do not have these attributes. They are usually wrong. Few people who want to be banders do not have the temperament and skills to use a mist-net. The main problem prospective banders may have is finding someone to train them. It is demanding, if ultimately rewarding, for the trainer.

The three basic phases to clearing a mist net are described below.

What's in the net

Occasionally, the bander will find both small and large birds in the net at the same time. Sometimes the large birds may have tried to eat the small birds. It is always best to remove the large birds first as their movements can injure the smaller ones. Large birds tend not to get badly caught and, if approached from the side, can run along the pocket and out the end, possibly harming other birds in the net. It is best, but not always possible, to approach the net quickly, at right angles to the net from the side that the bird entered, so as to retain the large bird without harming the smaller birds.

Always check the bottom shelf thoroughly, preferably by walking along it. Birds close to or on the ground can often be hidden by vegetation or litter. First, clear the birds caught in the bottom, since these birds are most vulnerable to ants, to trampling by people, to cold and to battering on the ground if they struggle in the net.

Birds caught high in a net can present problems. Arms rapidly become tired if extracting a bird much above head level. As they tire the tendency is to pull the bird downwards; this can create tensions in the net which can harm the bird. The net should be lowered to a reasonable height before starting extraction. This can be done either by pulling down the shelf string above the bird (e.g. with a furling stick) or by tilting the mist-net poles. Any birds caught in the lower shelves should first be removed before using the latter method.

Whole bird problems

Each bird caught in a net presents a unique extraction problem. Before trying to extract a bird it is essential to work out where the bird flew into the net and how it has subsequently been tangled. It is essential to find the 'bare belly'. Once this is found, extraction is usually straightforward. It implies that one side of the bird is clear of net so that, if the other is cleared, the bird will be freed.

The first problem is to work out from which side of the net it flew in. This can usually be determined easily by pulling the shelf-string above the bird away from the net. Often, the bird will be lying on its back with its belly clear of the net, but occasionally some clearing of net is necessary to expose the belly. If you can't see how the bird became entangled gently stretch the netting around the bird or gently blow the feathers aside to see the net where it is caught on the

thigh, wing, etc. When this is done the bird, held by the 'knees' between the thumb and the second finger (with the first finger between the knees to prevent pressing them together) can be lifted out of the pocket and away from the net. Usually a lot of net will fall away or can be cleared from the bird making it easier to see what remains to be done.

Difficulties begin when the bird is 'double pocketed'. This term is used to describe all situations in which a bird is caught not only in the net of the pocket but also in other pieces of net. This can happen in several ways, sometimes in more than one way at the same time. The most common occurrences are:

- the bird gets tangled in extra net through the pocket;
- the bird flies into the net just below a shelf-string and its momentum carries it over and around the shelf string and back into the net again from the same side as the first entry
- the bird flies into the net just to the side of a side string, goes round it and back into the net again;
- the bird manages to fly in circles in the net, putting a twist in the net, before flying into the net again somewhere else;
- the bird gets caught and, before coming to rest, flies through a hole in the net (when anything might happen); this is possibly the hardest problem of all as the integrity of the net, which is usually taken for granted, is lost;
- an extraction problem made worse by trying to take the bird out of the wrong side of the net or by not clearing 'double pockets' first.

In all these cases, and any others that might occur, the bander has first to work out what happened and then to remove the various levels of net in the reverse order to that in which they were accumulated. Any twists have to be unravelled before extraction can proceed. This is easily said, and sometimes easily done, but these are the situations with which the lone bander must be able to cope quickly. While dealing with one problem bird, there may be birds in other nets requiring attention. The bander must be prepared to cut 'difficult' birds out of the net, if the bird appears to be suffering or if other birds are placed at unnecessary risk. All netting must be removed from a bird before it is released, so birds that have been 'chopped out' should be examined carefully.

PROBLEM AREAS

Given that the bander has cleared most of the net from the bird and can see bare belly, a few problems might still be encountered. How they are solved will depend on what they are. The older books say clear the feet first, the wings next, and the head last. Later publications suggest, correctly, that any rules are over-simplistic and that each bird should be treated according to the situation. Some find the following order effective: one foot (if unavoidable), the wing on the same side, the head, the other wing, the other foot; in effect, 'rolling' the bird out of the net. Only experience can teach a bander the procedure to follow.

The problems that might occur concern feet and legs, wings, head, and tongue.

Feet and legs

Extraction of feet and legs is time consuming; sometimes because the feet or legs are actually caught, but usually because the bird is clutching the net tightly. Many banders find it convenient to extract other parts of the bird first, since in time the bird is quite likely to let go of the net of its own accord. Birds are most likely to release the net if they are held in the bander's grip, presumably because their weight is supported by the bander. It is often possible to hold a netted bird in the bander's grip as soon as one foot has been released. Blowing on the abdomen of the bird is said to encourage birds to release the net. This can also be done by gently prising back the hind-claw.

Inevitably, however, situations will occur when the bander has to free a foot. If it is not too tightly caught, this can usually be effected by 'stroking' the net towards the toes. With the legs straight, the toes relax and the netting is easily freed. This should not be tried if the net is tightly

caught around the foot; net caught under the fleshy pad of the sole of the foot can, if pulled too hard, injure the pad. In these cases, it is necessary to free the net strand by strand; a seam-ripper, pin, or even a twig can be useful for picking up tightly caught strands. Clearing the hind claw first often makes it easier to clear the rest of the foot.

When extraction of the feet does not clear as much net as expected, it is often because the bird is 'thighed'. When birds go into the net feet first, strands of the net can get caught round the base of the 'thighs' where they are difficult to see and access. Fairy-wrens are particularly prone to this. Often, the offending strand can be seen by gently blowing aside abdomen feathers to expose the base of the leg. If it is possible to create sufficient slack in the net by releasing other parts of the bird, the net round the thigh becomes easier to clear.

Wings

The problem with wings is the carpal joint. Squares of net can get caught over it and they must be cleared without damaging the wing. With many small birds, just opening the wing creates sufficient slack for the net to be lifted easily over the joint; it may even fall away of its own accord. When it is more tightly caught, it is most easily cleared by getting a thumb or fingernail under the net strand on the underside of wing and lifting it over. It is best to 'work with the grain' of the feathers, so that feather barbs or whole feathers are not bent from their normal position. Therefore it is better, but not always possible, to slide the net over the inner side of the carpal joint rather than over the outside.

For tightly 'carpalled' birds, this can not be done if the procedure will force the feathers out of their natural alignment. This could damage the wing to the extent that the bird cannot fly. This occurs most commonly in birds with 'high' carpal joints, e.g. waders, but can occur in any species. In these cases, it is usually possible to thread the entire wing through the mesh-hole that the carpal joint is stuck in so that the wing is free except for one or more squares of net around the join of the wing and body. This operation involves bending the primary feathers 'with the grain' — it looks messy but the feathers are restored to their normal arrangement by the bird's preening. Clearing the base of the wing is straightforward. The net may get caught behind the innermost joint of the wing, but is easily seen and cleared from the underside of the wing.

Tightly 'carpalled' birds can be effortlessly extracted if one strand of the net that surrounds the carpal joint is cut.

Head

Thick feathering conceals the fact that a bird's neck is considerably narrower than its head. This poses problems in some birds e.g. whistlers, lorikeets; their heads are slightly larger than a square of mesh and the birds only squeeze their skulls through with the aid of considerable flying momentum. It is difficult to replicate this procedure in reverse. Some banders consider extracting the head harder if left until last.

The basic procedure is to pick strands from the back of the head (the nape) and pull them over the top of the head. The problem is finding the right strand of net to pull. The head, not surprisingly, is often double pocketed and pulling the wrong strand can just tighten others. Gently blowing the feathers aside can expose the strand that you want to deal with.

Tongue

There are two backward facing barbs on the upper surface of a bird's tongue. Occasionally, more frequently with larger birds, one or more net strands can get caught behind these barbs. When this occurs the bander must be careful not to pull the bird away from the net or to create unnecessary tension in it; this can pull the tongue into positions for which it was not designed and possibly damage it.

Clearing a 'tongued' bird can be difficult as the net strands have to be picked backwards over the barb. A seam ripper, pin, or twig is often useful for this operation. For badly 'tongued' birds, and particularly if the net has cut the tongue, it is much better to cut the net and clear the bird

quickly. Fiddling can only aggravate a bad situation. When cutting the net hold the relevant strand to make sure that the tongue is not stretched. The assistance of another person will help greatly.

Handy Hints

Raptors appear and are ferocious. Pay no attention to the bill, it will not hurt you. The feet, which are their weapons, are another matter. Give them a stick to grasp and they will usually leave you alone.

Large parrots have powerful beaks which can deliver a painful bite. You can ignore their feet. Leather industrial gloves provide reassuring protection. In their absence (and also as additional insurance), a bird bag over the bird's head (when free) will usually quieten the bird.

Lorikeets, shrike-tits and the like are too small to be handled with industrial gloves but any thin glove which still allows sensitive handling might help. The sooner the birds can be held in a bander's grip, the sooner their bill can be immobilised by upward pressure on the lower mandible.

The Golden Rules

FIND BARE BELLY
WHEN IN DOUBT, CUT IT OUT.

MIST-NETTING HAZARDS

Mist-netting is not a risk-free business. Apart from the fact that every bird caught is potentially at risk if it not properly handled, there are other things which can spoil a banding day.

Predators

Birds caught in mist-nets are vulnerable to predation by other animals. The bander should watch for these and take the appropriate action if they occur. This action will depend on circumstances but may include checking the net more frequently, closing nets, moving nets to other sites, setting nets higher, and raking mist-net runs. Predators to be wary of include:

- other birds:
 - kookaburras, corvids and currawongs seem to be the worst; once they have found the net, they keep it under observation and attack any bird that is caught. Once they have found a net it is advisable to close or move it if it can't be kept under constant observation;
 - raptors will occasionally attack netted birds. They are usually put off by the experience and do not revisit the net;
- ants will attack birds that are in contact with the ground. Ants are seldom a problem if the net is set high enough to keep captured birds clear of the ground. Net-poles set near ant nests will usually result in ants crawling over the net and captured birds. Ants will leap off birds if they are gently shaken. Birds should not be sprayed with insect repellent;
- some reptiles;
- domestic animals, particularly dogs.

Weather

Mist-netting is essentially a fine weather activity. Birds caught in mist-nets are vulnerable to extreme weather conditions. In these conditions, either check the nets more frequently, keep them under constant observation, or close them. Climatic extremes to avoid include:

- *Heat.* Birds caught in nets in hot weather, particularly if exposed to direct sunlight, rapidly suffer from heat stress and may die;
- *Cold.* The feathers of a bird caught in a net are disarranged and less efficient at insulation. In cold conditions, this can lead to a rapid cooling of the bird and death. The smaller the bird the more vulnerable it is. Some species, e.g. Brown Thornbills and White-tailed Geryones, seem

to be particularly susceptible. Also, extraction can be more difficult if the bander has cold and insensitive fingers. When there is snow or frost on the ground, nets should be set sufficiently high so that a bird caught in the bottom shelf does not come into contact with it.

- **Wind.** Although a mist-net is mostly holes, it is surprising how they catch the wind. Depending on how it is caught, a bird can be buffeted and pulled in conflicting directions in windy conditions. Battering against the ground and adjacent vegetation is also possible. Shorter nets give fewer problems in wind. A further reason for not netting in wind is that catching rates tend to be low since the nets are more visible and birds which do hit them tend to bounce off, rather than getting pocketed.
- **Rain.** Rain gets under the disarranged feathers and can cause rapid cooling. Feathers stick to wet fingers during extraction and lose their shape and insulating ability. Releasing a wet bird in this state and in the rain is not a good idea; they should be dried first by hanging them in a bird bag near a fire or car heater.

Public

The well meaning, generally uninformed public will cut birds out of your nets with scissors and release them with net draped over them, report you to the police, ride trail bikes, cycles, horses etc. through your nets, abuse and distract you, and generally make you wish you had erected your nets elsewhere. This would have been a better idea in the first place. The bander who works sites where the general public may come into contact with his or her activities must recognise that these problems might occur and must be prepared to act as a public relations officer for banding. With the possibility of interruption and interference, it is best not to spread nets over too wide an area. Erecting signs saying what you are doing is worthwhile.

Keeping birds overnight

Sometimes with late afternoon or evening catches, more birds can be caught than can be processed in daylight. Many birds will not fly away on release if it is too dark. If birds might be sitting on eggs or tending young, they should be released that same evening, unbanded and unprocessed if unavoidable. At other times, birds can be safely kept overnight.

The birds should be in individual bird bags and placed side by side on a flat surface with the drawstring or the head of the bag weighted down with a heavy object to prevent movement. In a suspended bag they cannot fluff-up their feathers for warmth. The birds should be in a place where they are safe from predators and cannot get trampled on; a car boot or floor (with door slightly ajar) is a good place. Bags containing birds should never be left suspended overnight.

Most birds can be processed early next morning without problems (although many will appreciate a drink of sugared water). Some smaller species (e.g. thornbills) should, however, be released as soon as it is sufficiently light; these birds should be processed the previous evening.

BANDING STATIONS

A banding station is a location close to the net sites where all birds are brought for processing. It should not be too close to nets as birds may be scared away and released birds may be instantly recaptured. It should not be too far away as this leads to a long net round (although this is not necessarily a problem if there are sufficient people).

A properly set up banding station allows the efficient and quick processing of birds. The basic requirements of a banding station are:

- a decent sized level surface on which equipment, reference books etc. can be spread out. Usually this will be a table, and if you have a table, you will probably need chairs.
- a banding box with all the banding and processing equipment you will need. Other things that can be kept in the banding box are equipment for removing badly fitted or illegible bird bands, a magnifying glass, a file (for filing down some kingfisher bands), net mending equipment, net cutting equipment, writing (and erasing) tools and so on;
- a safe place for hanging bird bags.
- all the data sheets and reference books you are likely to need.

SPECIALISED TYPES OF MIST-NETTING

The previous section has described the basic mist-netting technique. There are many variations to the technique which can be employed when the bander wishes to catch particular species. A few comments are made below on some of these variations. More information is given in the references already cited.

Canopy nets

Many birds stay high in the canopy and are rarely caught in ground level mist-nets. These can be caught if a mist-net is raised to a sufficient height. Many different types have been described. Canopy nets basically operate on a pulley system. The net is raised by two guys passing over high points of attachment and tied to the top of the mist-net poles. Guys tied to the bottoms of the poles are used for tensioning and for lowering the net to extract birds. When a bird is caught, the net is lowered by manipulating the guys to maintain the tension in the net. Other canopy net arrangements are described by McClure (1984).

Nets at roosts

Birds can be caught in large numbers in a short time as they enter or leave a roost. The bander working a roost should ensure that there are sufficient experienced netters at hand to process the birds captured, sufficient bird bags and/or keeping cages, and sufficient torches if the extractions are to be made in the dark.

Nets should be tightly tensioned with secure guying points. So many birds can be caught in such a short time that, unless these precautions are taken, the weight of the birds can knock the net over or weigh it down so much that it rests on the ground (or in the water at a wet roost).

Nets near dams and waterholes

In hot weather, enormous numbers of birds can be caught near dams and waterholes, especially in the morning. At sites where you have not netted often (or at all) be cautious about the number of nets that are set-up. A rule of thumb would be to use no more than two forty-foot nets per extractor. Always leave a net-free approach to the water so that captured birds do not have to 'run the gauntlet' past the nets to get a drink after release. Kangaroos may be a hazard to nets in the evening when some birds come to drink e.g. bronzewings.

Dark and dirty water is a good net background. Provided that nets are set in shade many birds may be caught in open positions. Single or double-shelf nets are effective where there is no suitable background for nets. Beware of heat stress on captured birds. Site the banding station well away from the nets. Watch out for predators which also congregate near waterholes.

Nets in reed beds

Many species of birds live and breed in reed beds and good catches can usually be obtained due to the large concentrations of birds present. Mist-netting in reed beds usually requires net runs to be cut. This should never be done when birds are breeding. The bander should avoid unnecessary damage and that the concerns of others are respected, e.g. botanists, who have an interest in reed beds. The mist-netter should never walk through reed beds to drive birds into the nets — it is unnecessary and may unintentionally damage nests. Set the nets well above the water so that birds won't drown when they weigh down the net. On sites to be used repeatedly, laying down a base to walk on (such as chicken wire set over rushes) will help to avoid a quagmire which would make the top shelf of nets difficult to reach.

Wader netting

Mist-netting waders at night is quite different from netting bush birds during the day and some special precautions are needed. The Victorian Wader Study Group has developed a code of conduct of which the following is a summary:

- adequate torches are essential;
- two experienced banders for each set of four nets;
- extra experienced people if nets are set far apart;
- nets further apart than 500 metres should be operated by separate teams;
- all extractions to be done by, or under the supervision of, experienced wader mist-netters;
- banders experienced in extracting passerines during the day are to be thoroughly tested before operating independently;
- large catches must be anticipated at new sites and preparations made accordingly;
- nets set over water must be set sufficiently high and secure to ensure that, with a large catch, no bird touches the water;
- in tidal water, the nets should be set above the high tide water level.

Nets at night

Bush bird banders may also wish to band at night to catch nocturnal and crepuscular birds. If nets are left open, they must be checked as frequently as they are during the day. Gliders and bats may also be caught and have to be extracted.

Flicking

Birds that drink on the wing by dipping into small water holes in open situations can often be caught by 'flicking'. Three people are normally required. The mist-net is attached to the poles (with each loop doubled to prevent slippage) and laid flat on the ground with the bases of the poles at either side of the water hole. One person is stationed at each pole. When the birds come in, the net is flicked over, through 180 degrees, and laid flat on the other side of the water hole. The tension must be maintained in the net at all times. The third person extracts any birds that have been caught.

A variation to this method can be operated by a single bander. One pole is securely guyed in a vertical position at the side of the water and the net is 'flicked' by the bander from the other side.

MIST-NET REPAIRS AND MODIFICATIONS

Unfortunately mist-nets are not indestructible. Birds may have to be cut out, the net can tear against vegetation, banders walking by the net can drag sticks into the net, and, worst of all, a great variety of things can jump, run or drive through them. Nets can also catch and be torn on banders, buttons, and binoculars. Mist-nets are expensive and most banders will at some time have to effect repairs and modifications. The only equipment needed is a netting needle, spare netting thread and shelf-string material, and a few spring loaded clothes pegs to keep unnecessary folds of net getting in the way.

Most net repairs are carried out with the net erected and are much easier if there is little wind. Some prefer to mark tears and holes with white thread and to repair nets while sitting at a cloth covered table. Tears are easily stitched up by sewing together the two sides. Every few centimetres or so, a knot should be tied in the netting thread to hold the mend permanently in place. Tears can also be 'remeshed' — the mesh is reconstructed square by square so that it is hard to see where the tear was. Wilson et al. (1965) describe this procedure in detail. Sewing tears is considerably faster than remeshing but has the disadvantage of occasionally leading to some troublesome extractions.

Small holes can usually be treated as a tear. Large holes, i.e. missing net, are more of a problem. These are fixed either by sewing in a patch of netting material (obtained from a previously damaged net) or by reconstructing the mesh square by square.

Major damage to a net is usually not worth trying to repair. It is often better to cut the net down to a smaller size either by shortening it or by reducing the number of shelves. There is little involved in shortening a net. The net is erected and the length of the shortened net is marked on all shelf-strings, so that they are all of equal length. New side strings and loops are attached before the remainder of the net is cut-off. The damaged area of net should not be discarded, since it may be useful in later net repairs. Reducing the number of shelves in a net follows a similar procedure. It may be necessary if a shelf has been destroyed, or if single or double shelf mist-nets are required. In the latter case, a new shelf string is needed. This is threaded through the net, parallel to, and two or three mesh-holes away from an older shelf-string. After the new shelf-strings have been tensioned to the same extent as the older ones, and new loops attached, the nets can be cut apart.

The bottom shelves of the net usually catch the most birds and sustain the most damage. Where the top shelves have sustained little damage, it may be possible to keep the whole net workable by using it upside down and by not worrying too much that the new top shelves are of poor quality. If this is done, and whenever the top shelf-string has to be replaced, it is necessary to tether the top string with a second string, tied every foot or so, to prevent the net blowing along the string even in light breezes. Single and double shelf nets constructed from multishelves should also be tethered.

Broken shelf strings can be knotted as a temporary expedient. However, the net tends to catch on the knot and is easily ripped when trying to adjust the net. It is better to replace broken shelf-strings completely.

Broken side strings and loops are best repaired with the net standing as soon as they are broken. Sorting out the net loops in their absence is a horrible problem.

4.3 Cannon nets

Cannon nets employ explosively propelled devices to throw a net over an area where birds have congregated. It is a technique requiring considerable skill and in Australia it is virtually restricted now to the catching of waders. In the past waterfowl, parrots eagles and other species have been captured using these devices. Rocket-nets and 'NONNAC's' (Rowley and Chapman, 1981) are similar devices. A special licence to use explosives may be required from the State/Territory government.

A great deal of training is required before a bander is proficient in this trapping method. The following points come from the code of practice for using cannon nets:

- strict limits to the size of expected catches must be imposed for each set of capture conditions taking into account temperature, species involved and the size of the extracting and processing teams;
- wind direction can seriously effect net firing and changes in wind conditions must be considered before firing the net;
- catching areas must not be tacky and at least half of the birds must not be wetted during the catching and extracting phases;
- all members of the banding team must be allocated a post-catch job and know their job before firing; no bird should be kept for more than 3.5 hours when trapping in intertidal areas or four hours in non-tidal areas.

A copy of the code of practice for using cannon nets may be obtained from the banding office.

4.4 Snare traps

The principal snare trap used to date in Australia is the bal-chatri as described by Lane (1966) and McClure (1984). It is mainly used to capture raptors but a variety of other birds such as kookaburras (Anderson, 1966) may be captured. Cam (1985) describes how many birds can escape from this trap. Llewellyn (1973) reviewed the use of snare traps.

Banders must ensure that birds trapped with snares are removed from the traps as soon as possible to minimise any danger to the bird from pulling against the snare. Covering the head of the bird with a dark cloth or a hood will reduce it struggling (Hardy, 1983).

4.5 Cage traps

These traps are operated by attracting birds into a cage with a bait such as food. Rowley (1968) trapped crows using meat, grain and fruit baits while Robertson (1966) used sweetened water to attract honeyeaters into his backyard trap. Lane and Liddy (1965) describe a range of walk-in traps. Birds of prey, such as goshawks and sparrowhawks, have been captured in a drop-lid trap (the design may be obtained from the banding office). Consideration must be given to regularly checking traps, particularly to prevent captured birds from harming other captured birds, and attacks from predators.

4.6 Clap and sprung traps

These traps rely on a spring to throw a net over an area or to close a door on a cage. Some traps are triggered by a bird; others are triggered by the bander. Reilly (1968) and Cam (1985) used sprung traps for trapping robins and raptors while Parry (1968) found a clap trap effective for catching kookaburras. Banders normally operate only one or two traps at a time and captured birds should be quickly removed from the traps. Zap traps described as an elastic propelled variation of the cannon net are described by Underhill & Underhill (1987).

4.7 Corral traps

Waterfowl rendered flightless during moult and precocial 'runner' chicks of seabirds can be herded into net corrals before they are able to fly and after they have gathered into mobile creches (Liddy 1963). There is a tendency for the chicks to crush into one corner of the corral and they must be quickly quietened, banded and released.

4.8 Catching by hand or with hand-held nets

The adults of a few species of birds, such as albatrosses or nesting seabirds in burrows, may be captured by hand during daylight. Generally nestlings may only be caught by hand and banded during the short time when the leg is sufficiently large to safely retain a band and when they are too young to attempt to leave the nest (because a bander has disturbed them). If a bander has any suspicion that nestlings are likely to flush from the nest on his or her approach banding should not be attempted.

Visits to nests for banding must be kept to a minimum time so that eggs and young do not overheat/cool down in the parents' absence and to reduce the risk of the parents deserting the young. This is particularly important in colonies of nesting birds where the banding party should work together in a small area i.e. disturbing only a small part of the colony at any one time. The nest and its immediate surrounds should not be significantly modified by the bander. Caution regarding attracting predators to the nest must also be exercised. Further detailed cautions for banding nestlings are given in section 5.8. The ABBBS recommends that banders should complete RAOU Nest Record Scheme sheets for all nests that are visited for banding.

Hand-held nets are useful for catching some seabirds onshore or at sea. A successful project of catching albatrosses and giant-petrels has relied on this technique (Gibson 1977). Banders catching breeding adults must carefully monitor the possible effects of their activities on the eggs and young of the adult birds.

Pratt (1967) describes a most unusual technique in which one end of a long pole is gently pushed against the breast of perched juvenile and nestling birds, which usually will then sit on the pole. The birds are then lowered to the ground, banded and returned to the nest or perch with the pole. Banders should be careful with this technique and preferably be instructed by an experienced bander.

4.9 Holding birds in the hand

Birds are fragile and must be handled carefully. Holding the bird by only one wing, one leg or the tail is dangerous for the bird. Great care must be taken not to hold the bird too tightly or too loosely. In the former case the bird will soon gasp for breath; in the latter case the bird may flick and injure its wing (and/or escape).

It is recommended that the ringer's grip be employed (see fig. 4.4). In this grip the bird is held resting on its back in the bander's palm. The bird's neck is held loosely between the first and second fingers of the left hand (right hand for left-handed banders) and the other fingers and thumb form a loose cage around the bird. The legs of birds with sharp claws may be held between the third and fourth fingers to immobilise them. In this grip birds may be safely held during banding and processing. Hands should be kept as dry as possible to avoid feathers sticking to them.

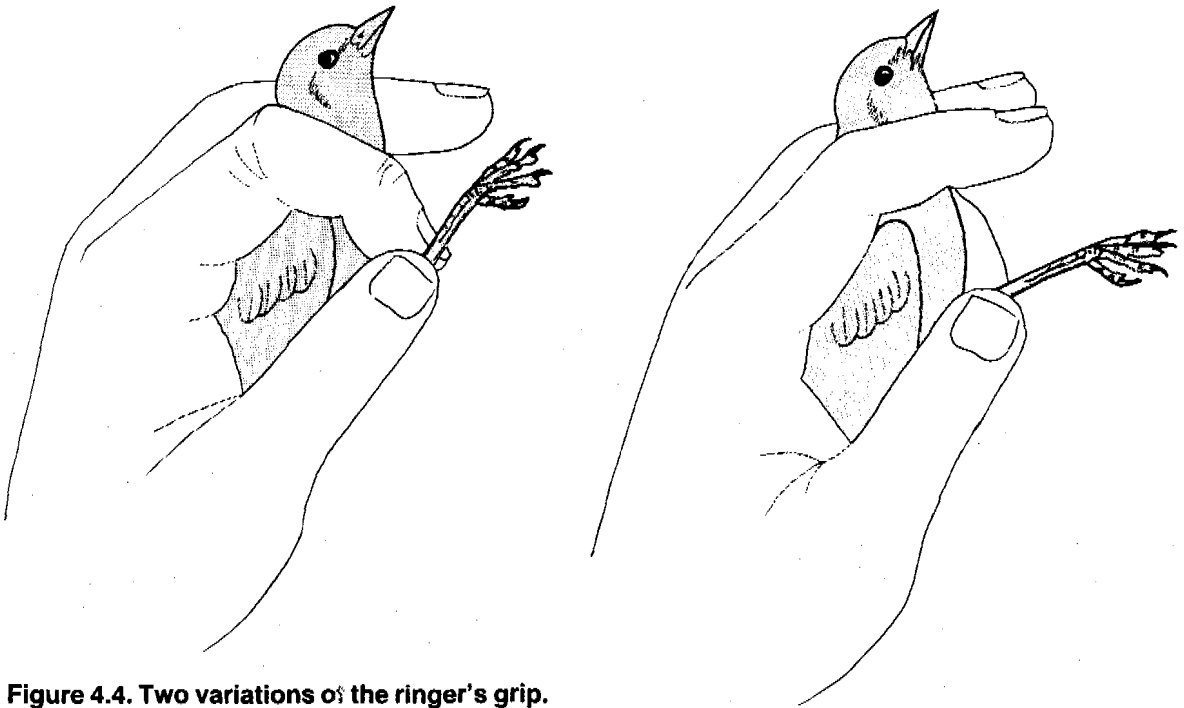


Figure 4.4. Two variations of the ringer's grip.

Birds that are too large to hold in one hand should be held with two hands by one bander and measured and banded by another bander. If the bander is alone, a large bird may be held resting on its back on the bander's legs that have been drawn together in the sitting position. The bird's head may be covered loosely with a cloth or placed loosely into a bird bag which allows plenty of fresh air.

Banders must take care with herons and gulls which are likely to lunge with the bill at the bander's eyes. Raptors generally attack with the feet and claws rather than their bills. Parrots and cockatoos can inflict painful bites with their bills.

Birds should only be handled for as long as is necessary.

4.10 Holding birds in bags and cages

It is often necessary to hold birds in bags or cages for a short period either to transport them to a banding station or because too many birds have been caught to process them all immediately. A variety of holding bags have been described (Lane, 1963; McClure, 1984) and basic features are soft cloth material, usually opaque, with no edges protruding into the bag which might tangle and injure the enclosed bird. A portable holding cage was described by the Shorebird Study Group (1988).

The cord used to make drawstrings should be soft, smooth and easy to unknot. It is customary to secure birds in bags by pulling the drawstring closed and looping it around the top of the bag.

The drawstrings should be long enough to allow the secured birds to be carried around the bander's neck. This is the safest way to carry birds over rough terrain as it leaves the hands free to break a fall. It is also the safest place to hold birds when other extractions have to be done later in the net round. Bagged birds hung on trees may be forgotten. Bags left in mist-net pockets can fall out; they can also create tensions in the net that add to the difficulties of extraction and may injure other netted birds.

Holding bags with birds inside should be placed in safe positions to avoid trampling, suffocating or overheating the birds. That is, they should NEVER be placed on chair-seats, on the ground or laid unsecured on tables. Bags containing birds should be hung in cool spots on hot days and warm spots on cold days. The bags should be hung in a way that will allow the birds to be processed in the approximate order in which they were trapped i.e. first in, first processed. Only one bird should be placed in each bag but when it is necessary to break this rule, never put different species in the same bag. Holding bags should be regularly cleaned to avoid possible disease transmission between birds.

Holding cages may be wetted in hot weather to cool the enclosed birds. All of the birds in one cage should be of similar size to avoid large birds injuring small birds.

4.11 Releasing birds

Birds should always be released by or under the supervision of experienced banders. Birds should not be thrown into the air but released by opening the hand (passerines) or placed onto the ground (parrots, hawks and other large biting birds) facing into the wind. Waders should be released onto an area of shore clear of nets and people, and, at night, in sight of the water (so that they can get their bearings). At night, birds should not be released near a light and all birds should be given time to adjust to night conditions after being held near lights, especially after flashlight photography. Some birds have poor night vision and should be kept overnight, otherwise they may fail to find a safe roost. Generally, birds with large eyes have better night vision than birds with small eyes.

4.12 Stressed or injured birds

Occasionally the capture and handling of birds can cause stress or injury. Banders should always be alert for the symptoms of stress. An early sign is when a bird closes its eyes and keeps them closed when not being held by the bander. They may also hunch-up their necks and maintain a stiff and unusual looking posture. At the first signs of stress, banders should quickly assess the best course of action to follow; to release the bird as soon as possible (even if nets have to be cut) or to treat the bird with the simple techniques given below.

Honeyeaters and heat-stressed birds will drink sugared water while held in the hand. Cold and wet birds can be warmed by a fire. Birds that do not readily fly may be suffering from a slight strain to the wings. It is best to place them on a perch in good cover when they will usually recover rapidly. In cold weather small birds (e.g. thornbills) showing signs of stress should be placed into holding bags and kept in a warm, safe place. If the bird is left alone for half-an-hour or so it will usually recover fully.

Stressed birds should be (and usually are) a rare occurrence. When they occur, it is best to review practices to ascertain if a change could be beneficial. In many cases, it is just the act of capture, holding, and handling that causes stress. The bander will soon learn which species are vulnerable. Giving them preferential treatment and minimising handling will often be all that is required.

Injured birds should only be treated by experts. Well meaning banders can do more harm than good by not seeking help from veterinarians or experienced wildlife rehabilitators. In some cases mercy killing may be the most humane action. Common sense must guide banders in these situations.

CHAPTER 5 Banding Birds

- 5.1 Basic procedures
- 5.2 Banding pliers
- 5.3 How to close bands
 - Standard bands
 - Non-standard bands
 - Special band sizes
- 5.4 Ideal band size and band size trials
 - Ideal band size and metal type
 - Band size trials
- 5.5 Birds which cannot be banded
- 5.6 Removing bands and opening overlapped bands on live birds
- 5.7 Replacement of worn bands
- 5.8 Banding pulli (nestlings & chicks)
- 5.9 Banding sexually size dimorphic species
- 5.10 Modifications to bands
- 5.11 Guidelines for banding rehabilitated birds
- 5.12 Experimental techniques used on banded birds

5.1 Basic procedures

Extreme care should be used whenever placing a band on the leg of a bird. A poorly applied band may inconvenience or injure the bird making the banding an unjustifiable exercise. The application of the band to the bird is a critical stage of the banding operation and warrants special attention.

Most experienced banders establish a set routine when banding to ensure that errors do not occur. A good routine to follow is presented below.

Step 1: Check that the bird is not already wearing a band (i.e. examine both legs above and below the knee). Double-bandings most commonly occur during 'ring and fling' exercises or if a large back-log of birds is being hastily cleared. Be sure to take extra care in such circumstances.

Step 2: If the bird is a recapture, immediately record the number before examining the bird further. Many a recaptured bird has escaped before writing the number on paper! Bands on recaptured birds which are especially worn should be removed and replaced by a new one (see section 5.6 and 5.7 for further information).

Step 3: If the bird is unbanded, determine the species and refer to the current List of Approved Band Sizes for the correct band size and metal type to use. If males and females of that species take different band sizes, attempt to determine the sex of the bird. If this cannot be done confidently the bird must not be banded. Full plumage description and measurements should be recorded so that sex characters may be investigated. If there is no approved band size a trial of band size may be attempted in suitable situations (see section 5.4).

Step 4: Select the correct string of bands, removing the next band in the sequence. Check your records to ensure that the band is the next to be used and that none have been lost or numbers duplicated during manufacture.

Step 5: Record the complete band number and select the appropriate banding pliers (see section 5.2) in preparation to apply the band to the bird's leg.

Step 6: Carefully close the band around the bird's leg (see section 5.3) using the ABBBS pliers and then examine the band to ensure that no sharp edges are protruding and that it is satisfactorily closed. If the band is too tight or too loose, it should be removed immediately (see section 5.6) and replaced with a more appropriate band. All instances where the approved band size is found to be unsuitable must be reported to the banding office as soon as possible using a Trial of Band Size form (see section 5.4).

Step 7: Recheck that the correct band number has been recorded. If further measurements or plumage descriptions are to be made, proceed as soon as possible to ensure that handling time is kept to a minimum.

Step 8: Release the bird at or near the site of capture.

5.2 Banding pliers

All standard bands supplied by the ABBBS should be closed using the appropriate banding pliers.

There are two different types of pliers available for closing standard bands. The small, 5-hole pliers (fig. 5.1a) are intended for closing all size 1 to 8 bands; the size 23, 24 and 25 parrot bands and the size 16 shearwater bands. The large pliers (fig. 5.1b) are for closing size 9 to 15 bands. The specialised size 17 pelican band and size 18, 19, 26, 29 and W penguin flipper bands cannot be closed using the standard pliers (see section 5.3).

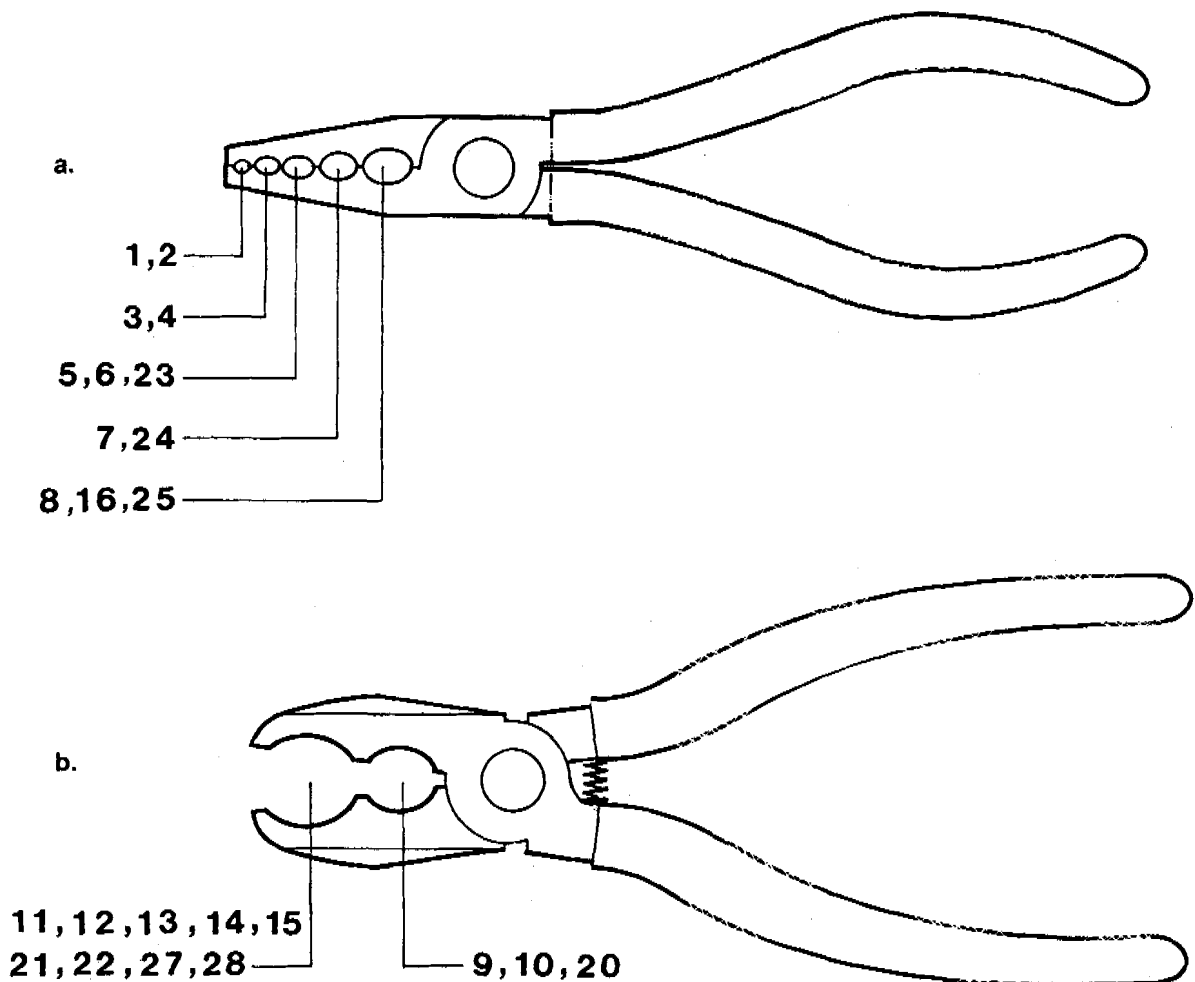


Figure 5.1. Pliers recommended for closing ABBBS bands. Numbers refer to the band size that should be closed in each hole of the pliers.

- a. small, 5 hole pliers
- b. large, 2 hole pliers

5.3 How to close bands

This section describes how ABBBS metal bands should be closed. The application of colour bands is described in section 9.2.

STANDARD BANDS

Most of the 23 standard band sizes currently available from the ABBBS, are provided opened in a 'C' shape, ready to be applied to the bird's leg. However, some bands are also provided opened in a rounded 'V' shape (all of the incoloy bands and size 5 and 6 alloy bands). The 'V' shape helps to overcome spring-back and thereby facilitates the tight butting of the ends of these bands.

Note that none of the bands supplied by the ABBBS are intended to be overlapped and this should be avoided.

The method of closing 'V' shaped bands is the same as closing 'C' shaped bands and is described below.

Step 1: Fit the band in the appropriate hole of the banding pliers (see figs. 5.1a and 5.1b) with the gap of the band aligned with the open jaws (figs. 5.2a and 5.2c). Close the band by gently squeezing the handles of the pliers so that the two ends are brought together. Bands should never be closed with the fingers because the bands may close unevenly and this will result in gaps between the butt-ends of the bands and/or overlap.

Step 2: Once the initial closure of the band has been completed, the pliers should now be positioned around the band with the gap aligned at right angles to the open jaws (figs. 5.2b and 5.2d). By squeezing the pliers with increasing pressure, the band should become fully closed and completely circularised. This stage is essential for 'V' shaped bands as the effect is to bow the sides of the band out into the cavity within the banding pliers thus resulting in a rounded band.

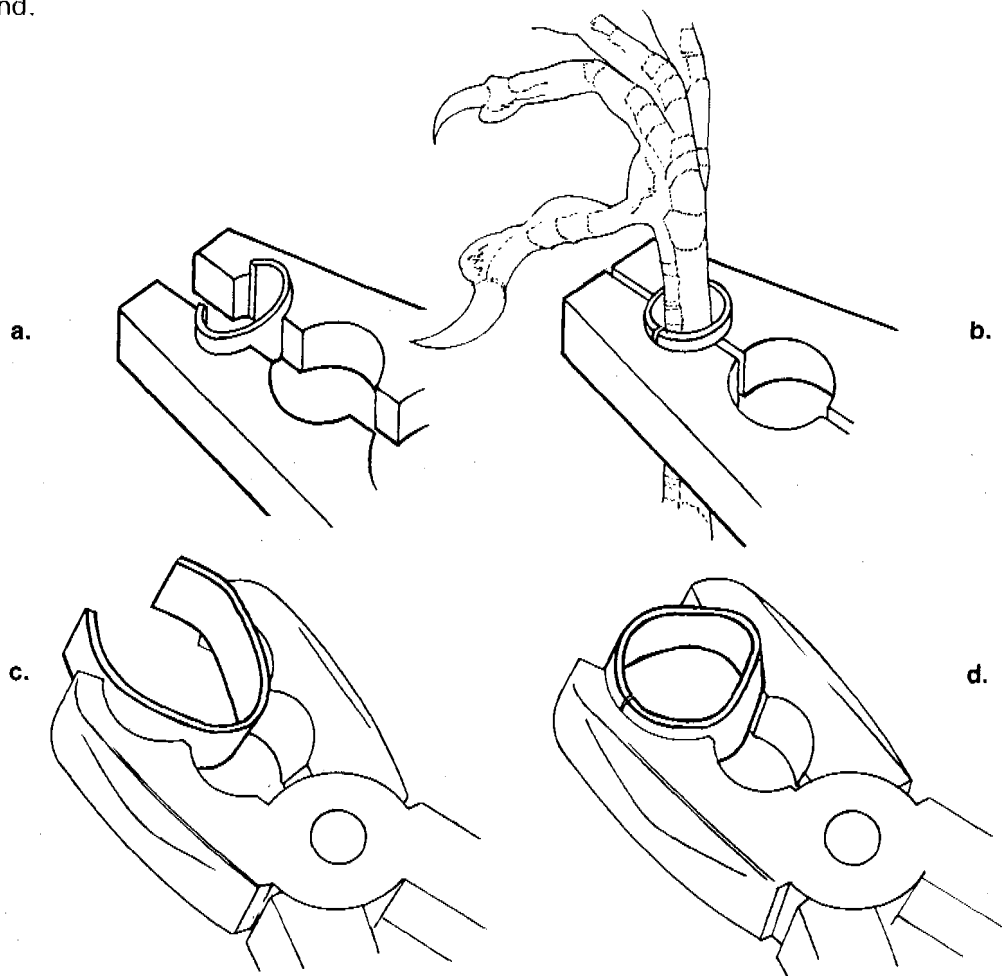


Figure 5.2. Closing bands. The correct hole in the pliers should be used for both steps of closing a band.

- a. step 1 for 'C' shaped bands**
- b. step 2 for 'C' shaped bands**
- c. step 1 for 'V' shaped bands**
- d. step 2 for 'V' shaped bands**

Step 2 of the banding operation is also vital for stainless steel bands where greater spring-back occurs. For some of the larger stainless steel bands it is necessary to slightly overlap the ends of the band in Step 1 so that with spring-back the ends of the band close together. Step 2 then enables the ends of the band to be flattened together.

With bands that are difficult to close completely because of spring-back, it is useful to repeat Step 2 with the band in a number of different positions within the hole in the pliers.

Note that bands should be closed so that there is no gap between the ends. On some of the larger bands this is difficult to ensure but the gap must not exceed 1 mm. If this cannot be achieved then remove the band from the bird. It is equally unacceptable to release a bird wearing an overlapped band, so band opening pliers and other equipment should always be kept available to overcome this problem should it arise (see section 5.6).

NON-STANDARD BANDS

Penguin flipper bands

Sizes 18 (*Royal Penguin*), 19 (*Little Penguin*), 26 (*King Penguin*), 29 (*Adelie Penguin*) and W (*Emperor Penguins*).

Penguin flipper bands are oval shaped with the opening along one side. Little Penguin bands can be closed with the fingers whereas the others require the use of large banding pliers or modified standard pliers. Size 18 bands are provided as flat strips that must be shaped on a jig before use on birds.

Pelican bands

Size 17

Pelican bands are oval shaped with the front end slightly expanded. The opening is at the rear end of the band. These bands are closed with the fingers or a modified pair of standard pliers.

Shearwater bands

Size 16

These bands have been designed specifically to match the oval shape of the legs of shearwaters. The bands can be closed with small ABBBS pliers or using long-nosed pliers with serrated tips as shown in fig. 5.3.

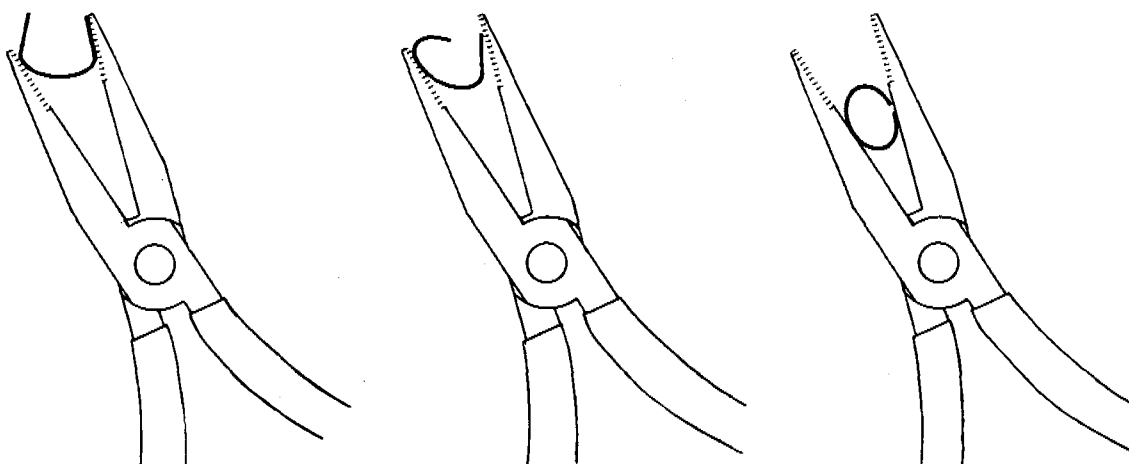


Figure 5.3. Closing size 16 bands with serrated, long-nosed pliers.

SPECIAL BAND SIZES

For the following species ABBBS bands must be modified before use on birds.

Azure Kingfisher bands

The ABBBS do not supply a band which is suited to banding Azure Kingfishers. To band this species, the bander must file down a size 4 aluminium band until it is 3.5 mm high. This entails removing the number prefix from the band so that only the 5-digit serial number remains. Do not use size four alloy bands for Azure Kingfishers as the return address is on the outside (unlike the size four aluminium band where it is on the inside) and is removed when the band is filed down.

Other kingfishers

Recent banding in northern Australia has indicated that for several other kingfishers, such as Forest and Little Kingfishers, bands may need to be modified before the band can be used. All band modifications must be approved in advance by the Secretary. Banders must take special care with modifying and trialling bands in these situations. Full documentation is essential.

Rainbow Bee-eater bands

Adult Rainbow Bee-eaters can be banded in the standard way using a size 4 aluminium band. However, if the bander wishes to band Bee-eater pulli the size 4 aluminium band needs to be modified as for the Azure Kingfisher (see above). Great care needs to be taken with banding Bee-eater pulli.

5.4 Ideal band size and band size trials

The List of Approved Band Sizes has been slowly increasing since the Scheme's inception as more species are encountered. As such there are only a few rare bird species for which the ABBBS do not currently have an approved band size. However, the Approved Band Size List is updated periodically as banders discover geographical variations in the band sizes suited to various species.

It is the bander's responsibility to constantly monitor band sizes and to advise the banding office of any instance where they use a non-approved band size. This information should be forwarded to the banding office on a Trial of Band Size form as soon as possible after the event.

The use of a band, other than that approved by the ABBBS, due to carelessness alone is considered a serious matter and if done repeatedly will result in cancellation of the Banding Authority.

IDEAL BAND SIZE AND METAL TYPE

The ideal band is one which is not so loose as to slip down and bind the toes and not so tight as to constrict the leg. Apart from potentially inconveniencing or injuring the bird, bands that are tight may also wear faster due to increased contact with the leg. Conversely, bands that are too loose will move about more, also increasing the amount of wear. Ideal band size is therefore a compromise between these two extremes.

For species with long legs (e.g. egrets) loose bands are potentially dangerous as the hind toe may flatten against the tarsus and get caught in the band. Loose bands are also a potential danger for species with long, slender bills (e.g. avocets) where the bill may get caught in the band during feeding. **For the avocets it is recommended that the band be placed on the tibia.** For all other species, bands should only be placed on the tarsus unless the Secretary has given written permission to band on the tibia.

One of the basic principles of banding is that the band should outlive the bird. It is therefore advisable to use the best possible material for the bands used on each species. There are several metal types available and those recommended are given against each species in the Approved

Band Size list. For example, it is pointless putting aluminium bands on birds which nest on rocky substrates. Similarly, birds with strong bills, such as parrots, should only be banded with the specially designed stainless steel bands (see section 3.3). If softer bands are used on parrots, the band will either be removed rapidly by the bird or so disfigured as to injure the bird.

BAND SIZE TRIALS

The aim of the band size trial is to determine which band is best suited to each species and each sex for size dimorphic species. Band size trials should be done on adult birds because they have fully matured legs and show sexual dimorphism.

Only living or freshly dead specimens should be used to determine the ideal band size. Band size trials should not be attempted on live birds if the bander does not have the appropriate pliers or other equipment for safely removing the band should it prove unsatisfactory.

The procedure is to first determine the cross-sectional shape of the bird's leg. If the leg is approximately circular in cross-section one of the standard bands may be suitable; otherwise the non-standard bands should be considered. The dimensions of the leg should be measured and compared with the internal diameter and height of the bands as shown in table 3.1. Consideration should also be given to what metal type is suited to the species under investigation. If a band with a suitable size, shape and metal type is not available the trial must not take place. Trials for penguin flipper bands must be discussed in advance with the Secretary who will provide the dimensions and shapes of these bands.

All band trials should be recorded on Trial of Band Size forms and sent to the banding office as soon as possible. The List of Approved Band Sizes may be amended on the basis of these forms.

5.5 Birds which cannot be banded

The only species which may not be banded is the Gang-gang Cockatoo, because they have mutilated all bands that have been trialled. If a suitable new band is found this moratorium will be lifted and all banders advised.

There are a variety of other situations where the bird in the hand cannot be banded, irrespective of the species. These situations are listed below :

- the species cannot be identified;
- the sex of the bird cannot be determined and males and females have different approved band sizes;
- the bander does not have the approved band size available;
- the safety of the bird would be jeopardised by retaining it in order to band it;
- sick or injured birds (unless part of a project approved by the Coordinator); and
- captive birds.

5.6 Removing bands and opening overlapped-bands on live birds

The bands provided for birds are, by design, difficult to remove. Extreme care should be used when applying bands so as to avoid situations where the bander must consider removing or opening the band. The 'A' class bander in charge of the project must accept responsibility for removing or opening poorly applied and inappropriate bands and should be suitably equipped to do so.

If a band must be removed there are a number of ways this can be achieved. The manner by which this is attempted depends to a large extent upon the state of the band, the fragility of the bird's leg and the equipment available.

When an error in banding is detected, the 'A' class bander must make the decision as to whether or not the band should be removed. The welfare of the bird must be the primary consideration when making this decision. If the wrong band size has been used, it may be preferable to leave a band which is slightly too large or too small on the bird rather than attempting to remove it. If the band is left on the bird the circumstances should be noted on the field data sheet containing the banding data.

Most band removals are best done by two people; one to hold the bird securely and immobilise the banded leg and one to remove the band.

For bands which are too large, thus providing ample space between the bird's leg and the band, modified circlip pliers are the best way of removing the band (see fig. 5.4). Circlip pliers are available in straight or bent-nose forms and the points should be filed down to a fine taper to allow small bands to be removed.

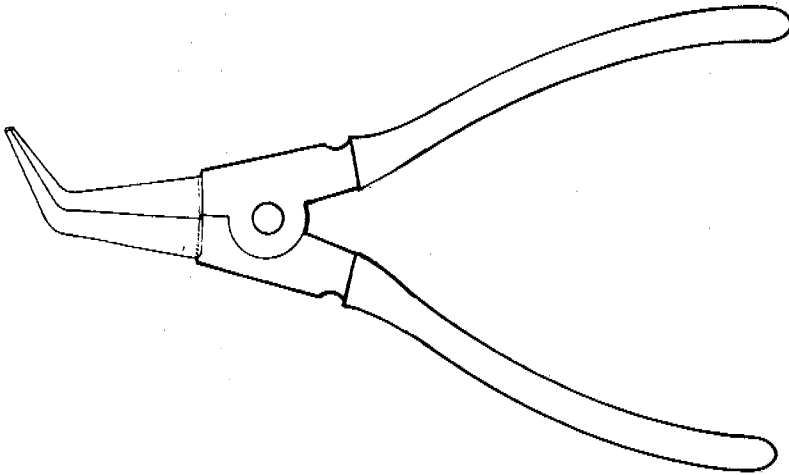


Figure 5.4. Modified circlip pliers for removing bands that are too large for birds. They should only be used if there is ample space between the bird's leg and the band to insert the tips of the pliers.

The most difficult part of removing small bands is usually getting the initial separation in the ends of the band so that greater purchase can be gained. Two pairs of Spencer-Wells surgical forceps can be used in the manner shown in figure 5.5. Alternatively, loops of fine wire or strong cord can be used with reverse-action circlip pliers as shown in figure 5.6.

The final method of band removal is simply to file a groove in the band at the point opposite to the opening. Once the band is sufficiently weakened it should open relatively easily. The obvious danger with this method is the potential to injure the leg.

Removal of bands is not easy and is most definitely a hazardous procedure for the bird. A little extra care and concentration during banding should ensure that banders rarely have to confront the problem of band removal.

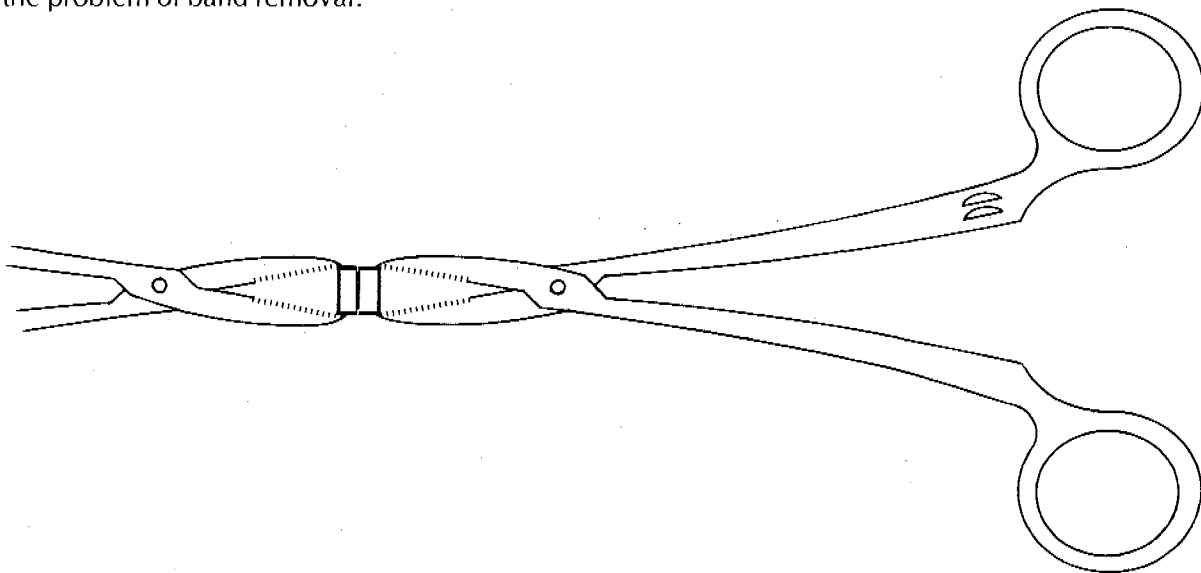


Figure 5.5. Spencer-Wells forceps may be used to open small bands.

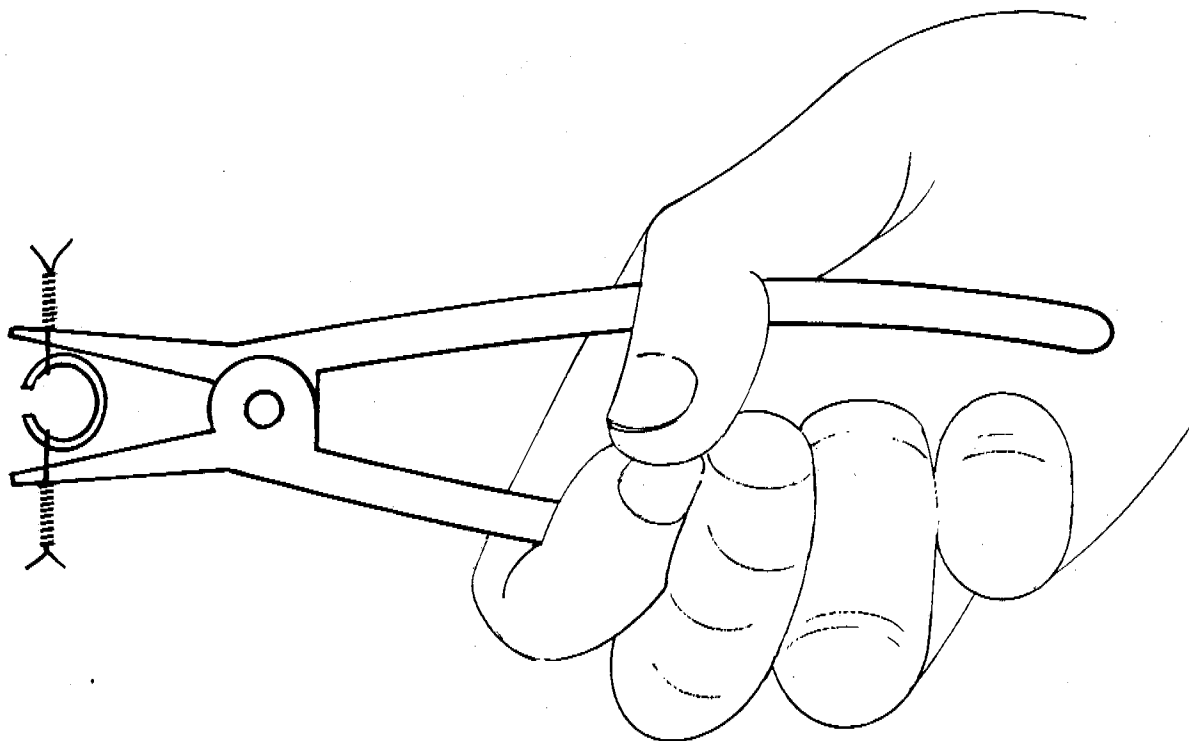


Figure 5.6. Reverse-action circlip pliers and loops of fine wire or strong cord set-up for opening a small band.

5.7 Replacement of worn bands

For any bird which is retrapped, the band should be closely examined to assess the degree of wear.

The band should be removed and replaced if:

- the return address or any part of the band number is so worn as to make reading difficult;
- the band is so worn as to suggest that it will fall off in the near future; or
- due to wear the band represents a hazard to the bird.

Note that the above considerations apply particularly to foreign bands where interpretation may be difficult or questionable in the field situation.

Where bands are removed and the bird re-banded, both numbers should be bracketed on the datasheet submitted to the banding office with the comment 'this bird rebanded with band number ???-?????'. See section 7.4 for further details on how to record such information.

Bands that are removed should be attached to the relevant data sheets and returned to the banding office. The band can then be incorporated into the on-going band wear studies (section 3.3) or if difficult to read, subjected to etching techniques to enable the numbers to be interpreted.

5.8 Banding pulli (nestlings and chicks)

The banding of pulli should be approached with caution. Thoughtless or ignorant actions may jeopardise the survival chances of the brood concerned or a large number of young birds in a breeding colony. Most importantly, novices should only undertake this form of banding if under the close supervision of an experienced pulli bander.

Most passerine young should be banded about the time that the feathers appear; any later than this and there is an increased risk that they will desert the nest and perish. The large, downy young of hawks, owls, gulls, and waders may be banded, but ducks and gallinaceous birds (moorhens and coots etc.) should not be banded until they are feathered.

There are a number of basic rules applying to pulli banding. These are listed below:

- do not band any young bird until the foot is large enough to retain the size of band currently approved by the ABBBS for the adult of that species;
- under no circumstances band a pulli with anything but the band size currently approved by the ABBBS for the adult of the species;
- if there is no band size currently recommended for a species, under no circumstances band the young;
- if males and females of a species require different band sizes, do not band the young unless the sex has been established;
- on no account should a nest or its surrounds be destroyed in order to obtain young for banding; and
- be conscious of the possibility of attracting predators (such as currawongs) to nests.

5.9 Banding sexually size dimorphic species

Species which are sexually size dimorphic must not be banded unless the bander can distinguish males from females. This applies for pulli as for adults.

5.10 Modifications to bands

Banders must not modify the bands provided by the ABBBS in any way without the prior approval of the Secretary. The only exception is the modification necessary to band Azure Kingfishers (all ages) and Rainbow Bee-eater pulli (section 5.3).

Modifications include any procedure which defaces, reshapes, colours or alters the band in any way.

Once approval is given for bands to be modified, the details of the modification must be recorded on the data sheets submitted to the banding office.

5.11 Guidelines for banding rehabilitated birds

Rehabilitated birds may only be banded as part of a project approved by the Coordinator of the ABBBS. To band rehabilitated birds without this approval contravenes the conditions of the ABBBS banding authority and the State/Territory banding permit.

General conditions for banding rehabilitated birds are that:

- only non-captive birds that are independent of direct human assistance are to be banded (this excludes one-legged, non-flying and tame birds). Birds that are being rehabilitated must not be banded until immediately prior to release. If such releases are not successful and the bird has to remain in captivity, the band should be removed, if this can be done without harming the bird. The band must be returned to the ABBBS with full details of the attempted release and removal of the band. Birds with injured legs that have healed must be banded on the uninjured leg;
- bands are issued to an individual 'A' class bander or to an 'A' class bander who is leading a corporate banding group. The bands must only be used for this project. The 'A' class bander in charge of the banding project is responsible for the use of the bands and for submitting banding records in the required format;
- the date and place of releasing rehabilitated birds must be recorded on the field data sheets as the banding date and place. As well the date and place from where the injured bird originally came must be recorded (so that the subsequent return of the bird to its original place may be determined); and
- data must be submitted to the ABBBS regularly to avoid unnecessary requests from the banding office if rehabilitated birds are recovered. Ideally data should be sent to the banding office within one week of banding.

5.12 Experimental techniques used on banded birds

The ABBBS banding authority does not authorise banders to use any experimental techniques (such as stomach flushing, water turn-over techniques, blood sampling, seed extraction from the crop, transporting birds from the site of capture, etc.). Banders must have the necessary State/Territory permits for the experimental techniques.

If these experimental techniques are employed, banders must record the details on the field data sheets so that due allowance can be made for data arising from the banding (see chapter 11).

CHAPTER 6* Collecting Bird Banding Data

- 6.1 Introduction
 - 6.2 Species identification
 - 6.3 Age codes
 - 6.4 Methods of ageing birds
 - Abdomen condition
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* Written by Ken Rogers

6.1 Introduction

There is one basic reason for banding birds. This is to mark individuals so that they can be recognised if they are encountered later on. Observations of banded birds may yield information on movements, longevity or behaviour. Study of the bird in the hand may reveal information on life histories.

Catching a bird for banding may place it under some stress and banders are encouraged to maximise the amount of information that is gained from catching it. This chapter describes some of the techniques that are available to study the bird in the hand. Since methods in this area are still being developed there is a need for banders to continue to assess and improve the techniques that they use.

BTO (1984) uses the phrase 'field taxonomy' to describe all the information which can be gained from the study of live birds in the hand which cannot easily be gained in other ways. This can be used in many different types of study, for example;

- ageing and sexing;
- longevity;
- moult;
- flight;
- energetics;
- sub-speciation;
- ecology;
- feeding;
- breeding.

The bander is well placed to gain information which cannot easily, if at all, be gained from other sources. Traditionally, much of our detailed knowledge of birds has been gained from the study of museum collections. BTO (1984) stresses the complementary contribution of museum workers (the traditional taxonomists) and banders, albeit in a somewhat limited context. The considerable advantages the bander has over the museum worker are given as:

- a virtually inexhaustible supply of birds to study;
- the opportunity to study birds in all stages of plumage (museum collectors tend to select newly moulted birds);
- the opportunity, through retraps, to observe how plumage alters with the age of the bird;
- the opportunity to see both plumage and soft parts in their fresh natural colours (in skins the feathers often, and the soft parts generally fade).

The information a bander takes from a bird will depend in part on the purposes of the project, the time available for processing, and the bander's familiarity with the techniques. It is not expected, nor indeed necessary, that banders apply all the techniques to all the birds they catch. In most situations this would endanger the welfare of the birds and so should be avoided.

There is of course little point in taking good information from birds if it is not also properly recorded. Banders who work in teams can gain considerable advantage from using one member of the team as a scribe to record the observations. The scribe can also ensure that all the information required from a bird is taken before it is released and that the right size band is applied to each bird.

6.2 Species identification

Banders must be able to identify the birds they catch before banding them. This is to ensure that the correct size band is fitted.

This rule can be relaxed in only a few cases. For example, a bander may catch a previously undescribed young bird or a hybrid. Recaptures in such cases can provide useful information. In these cases, if the bander has a good idea of the species, and is absolutely certain of the correct band size to fit, the bird may be banded and details of the encounter recorded. Full documentation is essential in this situation.

The bander must not only get the species right, but must also get the species number right. These numbers are used for the identification of banding records in the ABBBS database. Species numbers are given in the band size lists issued by the ABBBS. The primary source of species numbers is the RAOU checklist of Australian birds (RAOU, 1975 a, b) which covers all Australian territories. Numbers for species not in the Australian checklist have been allocated on the basis of political regions such as Papua New Guinea, Indonesia, Fiji, and the Philippines. The numbers are given in separate lists for each country.

6.3 Age codes

Knowledge of the ages of the birds caught adds immensely to the scientific value of the information collected by banders. It is hard to think of any banding study which is not enhanced if the birds caught are accurately aged. This information allows, for example, monitoring of breeding success and life span estimation. Knowledge in these areas provides base line data for a wide range of population monitoring, conservation, and management studies.

There is, however, something of a problem in that there are a number of different schemes available for describing the ages of birds. Dwight (1902) provided a scheme based on the appearance of birds in different stages of their biological development (e.g. immature, adult). This system allows the incorporation of plumage and bare part colours but implies a knowledge of life histories that is often not available. Humphrey and Parkes (1959) give a system which overcomes the latter objection by being restricted to plumage phases. However, the system requires complete knowledge of plumage succession, i.e. age dependent moult sequences, for application.

Perhaps of more interest and use to the bander are the age code schemes adopted by banding schemes in other countries. The systems in use throughout Europe (BTO, 1984) and North America (Canadian Wildlife Service, 1984) are based on calendar age and distinguish between ages which are precisely known and those which are not. Being based on the calendar year, all birds automatically become one year 'older' on January 1st. This is a convenience allowed by the temporal imperatives which apply to breeding and moult in the Holarctic but which apply with far less force in tropical and sub-tropical areas.

Originally, the ABBBS operated with a simplified version of the Dwight system. In 1981 the ABBBS encouraged the development by interested banders of a more precise scheme based on calendar time. This scheme was adopted as the standard in Australia in 1984 and banders are now required to provide an age code from it to all the birds they catch.

This scheme is believed to be the most appropriate single scheme considering the range of climatic conditions which apply throughout Australia. However other schemes do have advantages and banders may find value in using them to supplement the required information.

Apart from the special codes for pulli and juveniles, the age code scheme consists of a number and, often, a plus (+) or minus (-) sign. The number records the year of its life in which the bird is living. The plus sign indicates that the bird is within that year or older; the minus sign indicates that the bird is within that year or younger. Some examples are given below:

- P = Pullus. A young bird, either in the nest or out of the nest, but which cannot fly.
- J = Juvenile. A young bird in juvenile plumage which has left the nest and is able to fly.
- 1 = 1st year. A bird within its first year of life.
- 1+ = 1st year or older. A bird within its first year of life or older. N.B. This code applies to any bird of unknown age.
- 2- = 2nd year or younger. A bird within its second year of life or younger.
- 2 = 2nd year. A bird within its second year of life.
- 2+ = 2nd year or older. A bird within its second year of life or older.

The scheme can be continued to whatever age is required. Higher age codes will mostly apply to recaptures when the age can be calculated relative to the age of the bird at first capture. For example, the age of a bird recaptured between five and six years after its initial banding, when it was aged as 1+, can be recorded as 6+.

Banders should have little difficulty in determining the proper code to use in an individual case. A few words of clarification on some of the codes may be helpful.

There is no code 1-. A bird cannot be in its first year or younger. The code P for Pullus is for nestlings and runners of all species. It should not be used for adults of species which are flightless. The code J for Juvenile may cause difficulties for some who associate the word 'juvenile' with different ageing systems. The purpose of the J code is to determine as accurately as possible when the bird was fledged; it is a good idea to record the percentage of juvenile plumage, even if the bird is aged as an immature; the age code can then be reviewed in the light of information gained later (Rogers et al., 1986).

There are three circumstances under which a bird can be aged 1+:

- its age is completely unknown (i.e. what used to be called Free-flying);
- it is known to be a full adult but the time to acquisition of adult plumage is unknown;
- it is known to be a full adult and that this plumage is acquired within one year of hatching.

Using the 'How aged' code 'U' (for unknown) distinguishes the first circumstance from the other two, for which the appropriate 'How aged' code should be used. As the knowledge of when birds acquire adult plumage increases the use of the 1+ code in the second circumstance should diminish. Birds assigned the age code in the second circumstance can often be recoded based on this improved knowledge.

Note that the same age code does not necessarily apply at all times of the year. For example, an adult bird may be aged as 2+ in the autumn and 1+ in the following spring. This means that all characters which identify an immature bird as being in its first year are lost before it is a year old. Adult birds are therefore indistinguishable from birds fledged the previous spring (Rogers et al., 1986).

6.4 Methods of ageing birds

There are several characters on the bird which enable the bander to determine its age. Observation of the presence or absence of these characters is the first step in determining its age. If the species is described in a field guide, e.g. *Bander's Aid* (Rogers et al., 1986) or *Bird in the Hand* (Disney, 1974), the bander may be able to determine the appropriate age code for the bird. If it is not covered in the guides, or not well covered, it is good practice to record the characters observed. This information will be available to assist the determination of age classes for the species in future guides. If the information is not recorded, then an opportunity has been lost.

The sequence of ageing is known for only a few Australian species. It is generally inadvisable, in consequence, to determine age on the basis of only one or two characters.

This section describes a number of characters which are known to vary with ages of birds. Not all characters apply to all species and some require a level of subjective judgement to use. With practice, it becomes easier to detect the characters which differ with age for particular species. The ABBBS 'How aged' code is given in the heading in brackets.

ABDOMEN CONDITION (O)

In many species, first year birds have an area of bare skin on the abdomen; usually this is dry and flaky in appearance. This is not a brood patch.

BILL COLOUR (O)

The bill colour of many species often changes with age; usually it becomes darker. Note that the bills of the adults of some species become paler in non-breeding condition (e.g. Fuscous Honeyeaters) so care is needed in applying this character.

BREEDING CONDITION (O)

The observation of active breeding condition in a bird (e.g. brood patch or cloacal development; see section 6.5) may allow an age code to be assigned if it is known that breeding in the species does not occur before a certain age.

CLOACAL DEVELOPMENT (C)

The development of the cloaca has been found useful for ageing some species of ducks (Taber 1963): *Disney (1967) described a method for passerines in Australia.*

CONTOUR FEATHERS (F)

Juvenile contour feathers are usually weaker and looser than adult ones and may be a different colour. These downy feathers are often retained longest in the rump and undertail coverts (Rogers et al., 1986).

EMARGINATIONS (F)

Some juvenile birds have broader, less emarginated primaries than adults. Emargination has been found to be a reliable ageing character in some fruit-doves (Boles, 1979).

EYE COLOUR (I)

Eye (iris) colour may differ between immatures and adults. Note that in some species, e.g. Striated Thornbills, the eye colour can change while the bird is being handled.

FEATHER WEAR (F)

Most birds moult all their feathers at least once a year. There are exceptions, particularly in young birds and in large birds which may retain some feathers for several years. Old feathers are worn and abraded and are noticeable; often the web of the feather is completely worn away

leaving a protruding shaft. If the moult strategy is known, this may allow precise ageing. Birds with two ages of fully grown feathers in the wing, noticeable by the contrast in colour, wear, and texture, will usually be in at least their second year. Feather wear can be a useful age indicator in less extreme cases. A bird caught in the autumn with slightly worn inner primaries, indicated by a wear 'shadow' where the feather tip is not protected from sunlight etc. by the adjacent feather, is unlikely to be a bird of that year. Some first year birds moult flight feathers in autumn at the same time as adults; others do not. The ones which do not moult will have very worn primaries in the spring and summer after fledging. In some species, only birds of the first (spring) brood moult in the autumn. These may be indistinguishable from adults the following spring.

FEET AND LEGS (O)

Feet and legs of immatures are usually softer than those of adults and slightly swollen. They may also be of a different colour, usually paler. The soles of the feet may also change colour with age.

GAPE FLANGE (O)

The gape (or oral) flange of most juveniles is usually obvious and puffy. As the bird ages, the puffiness decreases and the gape may change colour. Adults of some species always show conspicuous gapes and others may develop them in post-breeding condition so some caution is needed. This frequently occurs in honeyeaters. Gape flange size can be recorded conveniently on a three point scale: '1' for the normal inconspicuous gape flange of adults, '3' for the puffy juvenile one and '2' for something in between (Rogers et al., 1986).

MEASUREMENTS (M)

In most species, the immatures are usually a little smaller than adults. Usually this size difference is insufficient to allow ageing. In some cases, however, it may be. Juvenile spoonbills, for example, have bills which are obviously smaller than those of adults. The moulting tail of an immature Yellow-tufted Honeyeater may have fully grown new feathers protruding beyond the line of the tail formed by the older, unmoulted feathers (Rogers et al., 1986). Many birds, especially raptors, are heaviest before they have begun to fly (Clark, 1981).

MOULT (F)

When the moult strategy of a bird is known, particularly if it is known that birds of different ages moult at different times, the observation of active moult in a bird may allow ageing.

PALATE (O)

The palate and the soft flesh of the throat may both differ in colour between young birds and adults.

PARTIAL COVERT MOULT (F)

In some birds, immatures moult only some of their greater coverts in their first year. When immature coverts are patterned differently to those adults, birds can be aged on their presence.

PLUMAGE PATTERN (P)

Most birds go through a series of moults after fledging before attaining the plumage that, with the exception of changes between breeding and non-breeding plumages, they will retain for the rest of their lives. These moults may lead to differences in plumage patterns which allow an age code to be assigned to an individual bird.

SKULL OSSIFICATION (S)

"It is safe to assume that all young passerine birds leave the nest before their skulls are completely ossified. At first, the skull consists of one single layer of bone. Gradually a second layer is developed on the inside, separated from the first by an air space ... but united with it by numerous, thin bony columns." (Svensson, 1984). Svensson reports that the time between fledging and full ossification of the inner skull is, in the Palaearctic, normally three to six or seven months although there are exceptions and considerable variations.

'The examination of the skull ossification is executed as follows: hold the bird in the left hand with the head of the bird between the thumb and index finger and the bill ... fixed in a light grip between finger and thumb. Either blow air from behind, possibly using a drinking straw or other small tube, to part the feathers, or ... wet the tip of a finger ... and part the feathers of one side of the crown, either far back on the skull or just behind the eyes The feathers will stay apart easier when wet. ... When the skin between two rows is free it may be wetted, because this will increase its transparency. Gently stretch the free skin with your right thumb and index finger and examine the skull through this 'key-hole'. ... Due to the elasticity of the skin, the 'key-hole' can be slid around quite a bit when looking for the demarcation line between single-layered and double-layered skull. If no demarcation line is found and one is uncertain whether the skull is single- or double-layered (which sometimes happens), one should make a new 'key-hole' in front or behind on the skull.' (Svensson, 1984).

SYNCHRONOUS GROWTH BARS (G)

When a bird simultaneously grows all its tail feathers, the growth bars in the tail will line up across the whole width of the tail and will follow its shape. This is usually the case for a bird's first tail. This character can be difficult to see and may not be visible in some birds. This character does not work for all species; Turquoise Parrots leave the nest with only their outer tail feathers fully grown (Bruce Quin, pers. comm.) and this may apply to other hole-nesters. A few species moult all their tail feathers almost simultaneously as adults and there is always the possibility of this in other species when the original tail has been lost accidentally. Ducks and other waterbirds moult all their flight feathers simultaneously. In juvenile birds, synchronous growth bars may be visible in the wings. Useful references on growth bars include Riddle (1908), Michener and Michener (1938), and Wood (1950). Occasionally, there is a brief but severe reduction in food availability while the tail is growing. This causes a weakness or fault bar in the tail feathers which is noticeable. These fault bars line up across the tail in young birds (Roberts, 1982).

TAIL FEATHER TIPS (F)

The tips of the feathers of a bird's first tail are often noticeably more pointed than those of adults. This is a structural character due to a smaller number of barbs. The tail feathers of juvenile ducks are notched.

UNDERWING FEATHERING (F)

Immatures often grow their underwing feathers last and can be identified by pink bare skin over the wing bones and muscles.

VERIFIED AGE SPECIFIC BEHAVIOUR (V)

In some well studied species the minimum age of a breeding bird is well known. Examples are Little Penguin (3+) and Wedge-tailed Shearwater (4+).

Other observations of age specific behaviour may emerge from detailed study. Bruce Quin (pers. comm.) reports differences between the calls of juvenile and adult Turquoise Parrots; these birds always call in flight following release.

WING COVERT TIPS (F)

Wing coverts are often the last of the juvenile feathers to be moulted. A bird with worn and brown or buff tips to coverts will usually be an immature. Note, however, that adults of some species have similar coverts to the juveniles.

6.5 Methods of sexing birds

Knowing the sexes of birds banded adds considerably to the value of other information collected from them. For some species, where the two sexes require different band sizes (e.g. Painted Button-quail, Rufous Songlark, most raptors), determination of the sex is required before the bird is banded.

This section describes a number of characters which may be used to sex birds. Not all characters may apply to all species and some require a level of subjective judgement to use. With practice, it becomes easier to detect the characters which differ with sex for particular species. The ABBBS 'How sexed' code is given in the heading in brackets.

BARE PARTS (O)

Some species can be sexed on bare (soft) part colours. Examples include Common Starling and Rufous Songlark (on bill), Budgerigar (on cere), Masked Booby (on face and legs).

BROOD PATCH (B)

A brood patch is a vascularised area of bare skin which is used in incubation. It allows the warm blood of the sitting bird to come into close contact with the egg. Birds can be examined for brood patch by blowing underneath the feathers of the abdomen to expose its skin. A developing brood patch may have some feathers remaining on the abdomen but the exposed skin will be red and slightly thicker than usual. A fully developed brood patch is completely naked (or nearly so) and the skin is thickened and pink to red. Individual blood vessels may be conspicuous. After incubation, the area slowly returns to normal. As the swelling recedes, it becomes crinkled and yellowish. After this stage, it is reduced in size by the growth of new feathers. The size of a brood patch can be recorded conveniently on a three point scale with '1' indicating a small brood patch and '3' a full size one. The score can be qualified by a '+' or '-' sign to indicate if it is developing or receding (Rogers et al., 1986).

The presence of a brood patch is not necessarily indicative that the bird is either a female or a breeding or an incubating bird. Males may develop a full or partial brood patch, as do juveniles and immatures of some species. Some cuckoos, not noted for participating in incubation, have been observed with fully developed brood patches (Rogers et al., 1986).

COPULATION POSITION (X)

The relative positions of two copulating birds may be used to sex individuals, either caught in the act or immediately afterwards or identified from colour bands, as generally it is the male which mounts the female. This is not infallible; cases of inverted mating and of males mounting males have been recorded (Garnett, 1978).

CLOACAL PROTUBERANCE (C)

A bird's cloaca enlarges when it is in breeding condition and several species can be sexed on its shape. In males, the cloaca points upwards or forwards (rather than backwards) and will usually in consequence show a crease between its front and the abdomen. Some species may also show a bulge behind the cloaca (see Seminiferous tubules below). The female cloaca usually points backwards and shows no crease. The cloaca is examined by blowing the feathers apart to expose it; the feathers should never be wetted and moved apart with the fingers. This may be physically dangerous to the bird and may transmit infections between the bander and the bird — in both directions. Examination of the cloacas of birds of known sex is a good way of learning.

The warning on how to examine cloacas is reinforced by Svensson (1984), 'The cloacal region is a vulnerable part of the bird. A puff of breath is the only recommendable 'tool' when examining this tract.'

All ages of waterfowl can be sexed on the presence of either a pseudo-penis or clitoris (Taber 1983).

EGG IN THE OVIDUCT (E)

A bird that has a well formed egg in its oviduct can be sexed as a female. The shape of the egg can be clearly seen distending the abdominal wall when examining for brood patch and cloaca. Palpation of the abdomen is not necessary and is not recommended; it is likely to harm the bird. A bird that lays an egg in a bird bag (regrettably it has happened) can also be sexed as a female.

LAPAROTOMY AND LAPAROSCOPY (L)

The sex organs of a bird can be examined directly by incision (laparotomy) or by insertion of an optical device (laparoscopy). Banders wishing to use these techniques must go through intensive training in their use and may require special State/Territory permits to apply them. These are not techniques for general use and should only be used if the information is required for a specific study and can be obtained in no other way.

MEASUREMENTS (M)

Some birds of species in which the sexes differ in size but not in apparent external appearance can be sexed on measurements. The development of sexing criteria from measurements is a job for the statistician. Rogers et al. (1986) give a general description of the method that is used. Most banders will be restricted to the use of published sexing criteria. There must always be an element of uncertainty in the assignation of sex using a measurement based sexing criterion. The bander must have aged the bird correctly, must take the measurement or measurements in the same way as those on which the criterion is based, and must be aware that geographical size variation may make the criterion inapplicable in some parts of the country. For these reasons, it is generally better to record only the measurements in the field and only to assign a sex based on them if it is required for a particular study.

PLUMAGE PATTERN (P)

Known differences in plumage pattern between the sexes of a species provide the easiest sexing criterion to apply. It may be necessary to determine the age of a bird before it can be applied. For example, at some times of year, second year Golden Whistlers are indistinguishable from adult females (Rogers et al., 1986). At these times, birds cannot be sexed as females on plumage although it is known that the male and female plumages are dramatically different.

SEMINIFEROUS TUBULES (T)

During the breeding season, the seminiferous tubules at the back of the cloaca of some male passerines may be seen through the skin. They appear as tiny convoluted white tubules. They are absent in females. Disney (1967) gives more information but his method of examination is not recommended by Svensson (1984).

VERIFIED SEX SPECIFIC BEHAVIOUR (V)

Some activities of some species are specific to one sex only (e.g. nest building). Individual birds can be sexed on the basis of behaviour if it is well documented and the bander is certain that it was done by a particular banded bird (e.g. immediately prior to capture or on release or by a bird with a unique combination of colour and metal bands). The distinctive calls of some waterfowl and seabirds may allow the use of this code.

6.6 Measurements

Banders are encouraged to record body dimensions and weight (or mass) of the birds captured. Such measurements are of value in many different ways. Physical measurements of birds, also known as morphometrics, have been used in studies of:

- flight
- migration
- energetics
- geographical variation
- size dimorphism.
- feeding
- ecology
- moult
- identification

There are many measurements that can be taken from the live bird in the hand. It would not be possible (let alone sensible) for banders to take all these measurements on all the birds they catch. It is also not possible, nor would it be prudent, for the ABBBS to rule on what measurements should be recorded on particular species. This choice must be left to the bander and to circumstances. The measurements a bander will take will depend on, among other things, whether he/she is working on a specific project or whether he/she is providing general data for the ABBBS. Previous work may indicate the most useful measurements for a particular study and purpose. In the absence of any information, the more measurements that can be taken safely the better.

A comment on the last point is perhaps necessary. The trapping and handling of a bird undoubtedly places it under stress. This can only be justified if the banding activity causes no lasting harm to the bird and also if sufficient information is gained from the bird to justify having trapped it in the first place.

Before describing the measurements, some comments are made on the accuracy and precision of measurements and on weighing and measuring equipment.

ACCURACY OF MEASUREMENTS

Most would agree that there is little point in taking measurements if they are not taken as accurately as possible. The phrase 'as accurately as possible' implicitly recognises that all measurements are only estimates of the true size of what is being measured. Inevitably, there will be differences, known to statisticians as errors, between the unknown true values and the estimates. 'As accurately as possible' means minimising these errors in the field in order to maximise the usefulness of the estimates. There are five sources of statistical error to consider.

Individual measurer error.

If the same measurer were to take the same measurement many times on the same bird, the measurements would generally differ slightly from each other. These differences are likely to be larger for inexperienced measurers. They can be minimised by developing a reliable technique and applying it consistently. Repeating measurements occasionally as a check is a good idea.

Between measurer error.

A bander may take consistent measures but these may differ from the consistent measures of others. This is unavoidable to a large extent and arises from the slightly different ways people take the same measurements. The effect of between measurer error can be corrected explicitly for analytical purposes by calibrating the measures of different measurers against each other. This has been done, for example, in several studies where a group of banders is banding the same population. For an Australian example, see Rogers (1984). Calibration between measurers is not always appropriate. If, for example, results are for general use, it is better that measurer variation is built into them; they are then more likely to be less sensitive to the differences between measurers.

Seasonal variation.

The measurements of a bird can and do change with the seasons and the passage of time. Feathers become worn and abraded and gradually shorten from the maximum length achieved when the feather is newly grown. For this reason, many prefer to use measurements of the more solid parts of the bird in analysis as they are not so subject to shortening with age. This may be true in many cases but it is not so in all. Jordan (1988) reports seasonal changes in the bill lengths of Eastern Spinebills which may be caused by changes in feeding behaviour. Nothing can be done to minimise this source of error. It can however be accommodated if banders record information relevant to the measures, such as date. For feather measurements, it is also useful to record the state of wear of the feathers measured. This is described in section 6.7.

Instrument error.

The use of poor quality measuring instruments can introduce measurement errors of unknown size. There are obvious advantages in banders using the best quality instruments that they can afford. Perhaps the most common practices that lead to instrument error are the use of unbutted rulers for wing lengths and unbutted calipers for head-bill measurements. Even good instruments can lead to errors if not properly used. For example, many banders use dial calipers for several measurements. These can give inaccurate measures if grit or sand gets lodged in the cogs (which should not happen with proper care); this can cause slippage and an incorrect reading on the dial, even if the calipers have been correctly used. Measuring equipment is described later in this chapter.

Precision of measurements

The precision of a measurement refers to the number of figures which are read from the instrument and recorded. It is not to be confused with the accuracy (or reproducibility) of the measurement.

The precision will be determined in part by the instrument and in part by what is being measured. The divisions on the scale of a measuring instrument will determine the maximum precision with which it can be used. For example, a weighing balance with minimum scale divisions of half a gram, measurements can be read to the nearest tenth of a gram, with the last figure being estimated by interpolation. If the minimum scale division is 5 grams, measurements can only be recorded to the nearest gram. Greater precision of recording is possible if the instrument is fitted with a vernier scale, as are most calipers.

There is, however, little point in recording measurements to specious precision if the measurements themselves are subject to the sources of error discussed above. So, it may be possible to read a caliper to the nearest one hundredth of a millimetre, but it is meaningless to do so if the inherent errors in the measurement are of the order of one millimetre.

Guidelines to the precision with which measurements should be recorded are given below. These will be appropriate in most circumstances; they may give spurious precision with larger birds, but this will fall out in analysis. Different levels of precision may be appropriate in particular studies depending on the purposes for which the data are being collected.

If a ruler is used, measure to the nearest millimetre.

If a caliper instrument is used, measure to the nearest tenth of a millimetre.

If a spring balance is used, interpolate one fifth of a scale division.

For consistency in the ABBBS data base, all weights should be recorded in grams and all body dimensions in millimetres. Do not add false decimals. A measurement recorded as 57.0 mm implies that it has been measured to the nearest one tenth of a millimetre; if it has been recorded to the nearest millimetre, record it as 57 mm.

WEIGHING AND MEASURING EQUIPMENT

Scales and balances

A number of suitable weighing scales and balances are commercially available but probably the most popular are those made by Pesola and Salter. These can be bought from the Australian Bird Study Association. The address and a current price list are available from the banding office.

Scales are available in sizes ranging from 5 gm to 10 kg maximum weight. They occasionally need recalibration (as described below) but are generally robust and accurate. They may seem expensive but they last a long time. Some banders have been using the same scales for over 15 years and they are still accurate.

Calibration of Pesola and Salter balances (by David Peters)

Pesola and Salter balances used for weighing birds are usually reliable but they need to be checked regularly to make sure that they are giving the correct reading. There are two simple checks which can be made to ensure that the balance reads the true weight.

The first of these, checking the zero, should be performed before starting banding each time (i.e. preferably once each day). This check is simple and is merely to hold up the balance with no load on it and check that it actually does read zero. If it does not read zero with no load, the linearity test (described below) must also be performed as the balance may have been damaged.

To adjust the zero on Pesola balances may require the balance, depending on its type, to be taken apart or it may be a simple adjustment. In the latter case, there are two knurled nuts or discs on the top of the balance and adjustment of the zero is done by loosening the top (lock) nut, twisting the balance tube until the zero is set correctly and then re-tightening the lock nut. Re-check the zero after this operation has been completed.

For the other Pesola balance type, the adjustment is more complicated and necessitates dismantling the balance by first removing the split ring and jaws from the bottom of the balance. Do not at any time extend the balance spring more than it would be extended during normal weighing or you will alter the linearity of the balance or otherwise damage it irreparably. After the split ring has been removed, carefully loosen the nut at the top of the balance and take out the balance spring and shaft. Without stretching the spring, adjust the zero by screwing the indicator up or down the shaft as necessary, then re-assemble the balance completely. Check the zero again and repeat the entire process as necessary until the zero reading is correct. It is essential that the balance be re-assembled completely between zero checks because the zero depends on the correct position of the top nut and on the weight of the split ring and jaws. This process is tedious but with care can be achieved in one or two attempts.

With the Salter balance, the zero can be adjusted easily by turning the knurled nut at the top of the balance. Therefore it is essential that the zero is checked before weighing commences and it should be checked regularly during use as it is quite easy to accidentally move the zero adjustment. Also, because the two ends of the Salter balance are similar, it is possible to use the balance upside down. Readings taken this way will be incorrect.

Loss of linearity of the balance is a serious problem and often indicates that the balance spring has been damaged. Loss of linearity means that the balance does not read, say 20 grams when a 20 gram load has been placed on it despite reading zero when not loaded at all. All weights will therefore be inaccurate. Non-linearity of the balance cannot usually be rectified, and a new set of scales is needed.

One final point, any zero error is overcome by making all weighings by difference (i.e. by weighing the bird plus the bag and then subtracting the weight of the bag weighed on the same balance). However, checking for a zero error is important because it is an excellent indicator that the linearity has been affected and non-linearity is a serious problem. If you find that the zero on your balance is incorrect, always check the linearity before using the balance any more.

Weighing bags and cones

A bird must be held in a bag or weighing cone to be weighed. As noted above, the weight of the bird is found by subtracting the weight of the bag from the total weight measured. The advantage of this method is that the balance does not need to be correctly zeroed. Many banders use bird bags or other cloth bags for weighing. The weight of the bag can change in the course of a banding session due to changes in atmospheric humidity and the accumulation of bird droppings and feathers. This necessitates frequent re-weighing of the bag; this is inconvenient if there are large numbers of birds to be weighed — but even more necessary. Statisticians will note also that the variance associated with the estimate of the weight of a bird measured in this way is the sum of the variances of the two measurements and is therefore less accurate than it might be. In other words, an avoidable source of instrument error has been introduced to the weight measurement.

This source of error can be avoided for all practical purposes by using accurately pre-weighed plastic weighing cones. They should be pre-weighed to a higher level of precision than will be required for recording bird weights. These may be constructed easily of any suitable, preferably opaque, plastic with the join being either stapled or heat sealed. The latter minimises the risk of a bird's claw getting caught and damaged. The angle of the cone should be about 30 degrees and the tip should be cut off to allow the ingress of air. A set of cones to accommodate birds of different sizes is a good idea and will cost little. Birds do not struggle during weighing, another advantage, and the weight of the cones is invariant.

Calipers

Most banders prefer to use either vernier or dial calipers for taking measurements for which a ruler cannot be used. Calipers are preferable to dividers (which have traditionally been used) as they are safer to use for both bird and bander and provide more accurate measurements. Modifications to the calipers are strongly recommended if head-bill measurements are to be taken. Calipers are best modified by fixing a butt to one end against which the back of the bird's skull is placed. Sharp tips and edges should be filed down without damaging the measuring faces (see fig. 6.1a).

Calipers are generally available at commercial outlets and also from the Australian Bird Study Association. Stainless steel calipers, although more expensive, are much better than cheaper alternatives. They are easier to use, the scales are easier to read, they do not rust, they are made to higher standards and so are more accurate, and they last for ever. In hot weather and when heated by direct sunlight, they are not as subject to instrument error as plastic calipers due to a lower coefficient of expansion.

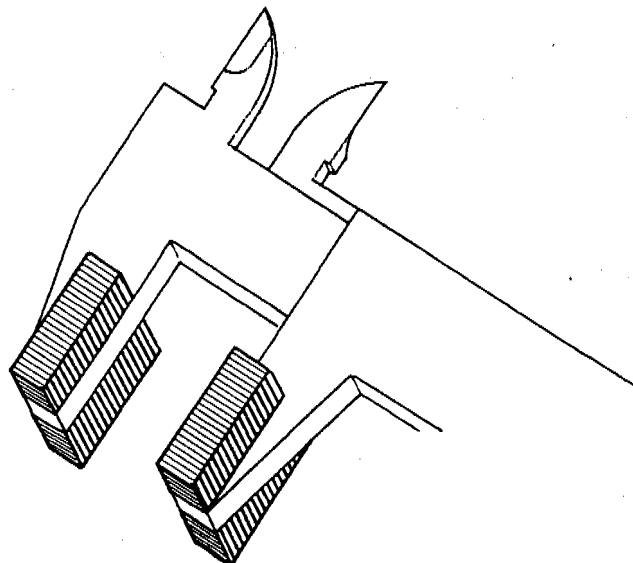


Figure 6.1a. Calipers modified by fixing butts to the ends. The butt on the sliding end may not be required.

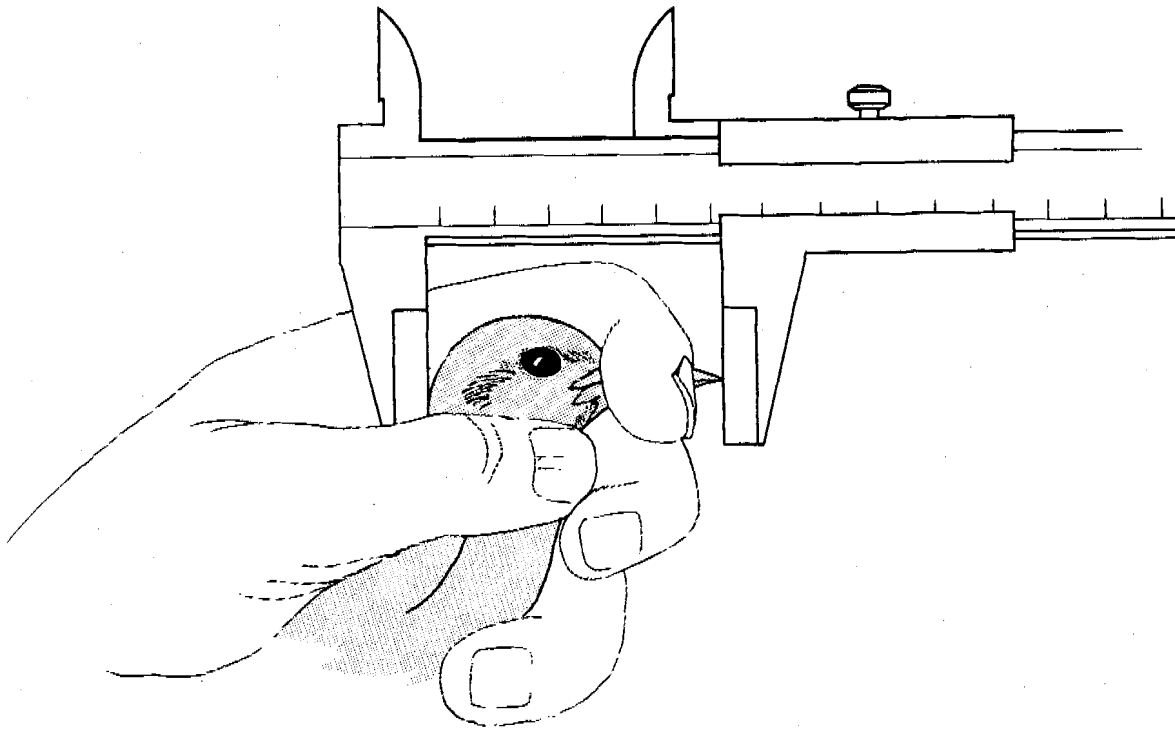


Figure 6.1b. The other butt is essential for head measurements when the back of the bird's head is placed against the butt.

Rules

Most banders will require a minimum of two flat rules. Ideally, they should be made of stainless steel and will be durable, rigid, and thin. A butted rule is essential for accurate wing length measurements for most species. An unbutted rule is used for tail lengths and for several other measurements that can be taken.

The wing lengths of raptors are usually measured using a flexible metal rule as the conventional measurement cannot be used because the wings cannot be straightened and flattened.

A new wing length measurement has recently been developed in Europe and is favoured because of its repeatability. This is the length of the eighth primary and is measured by inserting a transparent unbutted ruler between it and the ninth primary. A special rule has been developed for this measurement but it is not yet available in Australia.

RECOMMENDED MEASURING METHODS

Listed below are the currently approved methods for measuring the body dimensions of birds. The ABBBS approved measurement code is given in the heading in brackets. If a method other than that described below is used, the ABBBS must be consulted in order that a new code can be assigned to it. A general comment on the use or applicability of the measurements is given in some cases.

A bander may have some doubts as to the accuracy of some recorded measurements. This can arise for a number of reasons, perhaps the most common being measurements relative to a feather tip where the tip is worn or abraded. Unchecked trainee measurements may also be dubious. Sometimes, measurements of particularly large or small birds may seem strange. In these cases, it is a good idea to bracket the measurements to indicate their possible inaccuracy. By the same token an apparently doubtful measurement which has been checked and confirmed can be underlined. These simple devices will be found to be useful when it comes to analysing the data.

Whole animal measurements

Total length (LE)

This is measured by placing the bird flat on its back on a ruler and measuring the distance between the tip of the longest tail feather and the tip of the bill. The head is bent backwards to give the maximum measurement possible (see fig 6.2). This is not a reproducible measurement and may harm the bird if not carefully taken. It is only really useful for identifying species or sexing birds for which no other data are available e.g. separating Slender-billed and Buff-rumped Thornbills.

A more reproducible method involves laying the bird on its back and while holding its legs with one hand the bird's head is gently turned to one side. This avoids arching the neck into the unnatural position produced by the other method.

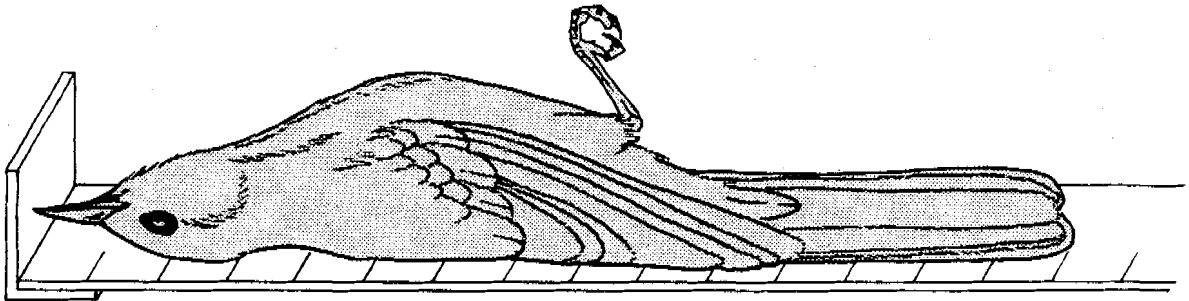


Figure 6.2. The method of taking the total length measurement.

Wing span (WS)

This is measured by placing the bird on its back on a rule and measuring the distance from wing tip to wing tip (see fig 6.3). The measurement can be taken with a much smaller risk to the bird by two people. One holds the bird on its back by its legs and bill, the other spreads the wings and measures the wing span. This method obviates the necessity of suspending the bird by its carpal joints as is required by the method illustrated.

CAUTION: wing span measurements should only be taken if the bander has been trained in the correct method of use. Apart from obtaining highly variable (and therefore useless) data, banders untrained in taking this measurement safely may overstretch the wings and permanently damage the bird.

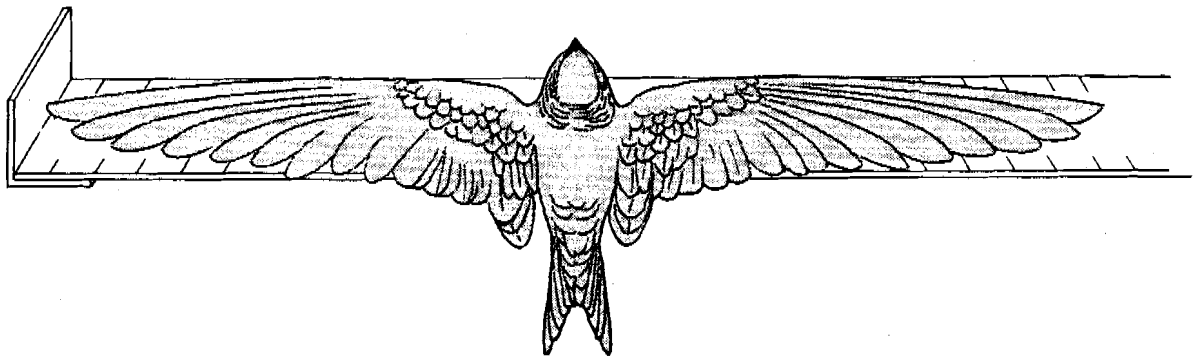


Figure 6.3. Measuring the wing-span of a swift.

Tail and wing measurements

Tail length (TA)

The tail is measured by inserting a thin unbutted ruler between the undertail coverts and the tail and moving it forwards until it butts gently against the body of the bird. The longest feather should be measured and, if necessary, straighten and flatten the tail. The measurement is illustrated in figure 6.4. Do not take this measurement from above the tail as this may damage the preen gland. Note that the rule should not be placed between two tail feathers; this will give an inaccurate measurement.

Some banders prefer to separate the central tail feathers and pass the ruler along the split until it reaches the base of the feathers. This 'split' technique may give repeatable measurements but can also result in damage to the preen gland and is not recommended.

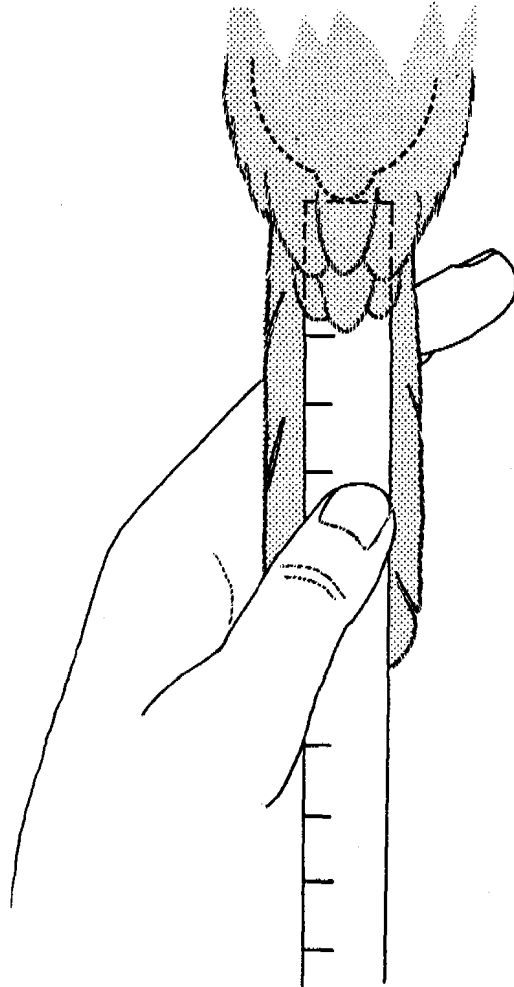


Figure 6.4. The tail length measurement taken on a bird with its belly facing up. The outline of the bird's abdomen and the rule are indicated by the dotted line.

Tail fork length (TF)

This is measured as the difference between the longest and shortest tail feathers on the closed tail. The tail should be held in line with the body and not flexed up or down (Rogers et al., 1986).

Wing length

There are three recognised measures of wing length. All should be taken with a butted ruler.

1. Unflattened, unstraightened wing (minimum chord) (WU)

The carpal joint (bend in the wing) is placed against the butt of the ruler with the wing in the naturally folded position. The length of the longest primary is then recorded without straightening or flattening the feather. This method is useful for large birds or for museum specimens where the feathers are more rigid and difficult to manipulate. The method is not recommended for live birds because the curvature of the wing varies with time and so the measurement is quite variable.

2. Flattened, unstraightened wing (WC)

The carpal joint is laced against the butt of the ruler with the wing in a naturally folded position. The primaries are then flattened against the rule without straightening them. This method is rarely used nowadays.

3. Flattened straightened wing (maximum chord) (WL)

The carpal joint is placed against the butt of the ruler and the the primaries are flattened and straightened on the ruler to give the maximum measurement. This is the preferred wing length measurement because of its repeatability. A common mistake is the failure to keep the wing in a natural position as close as possible to the bird while taking the measurement; this leads to an inaccurate measurement due to the structure of the wing. See fig. 6.5.

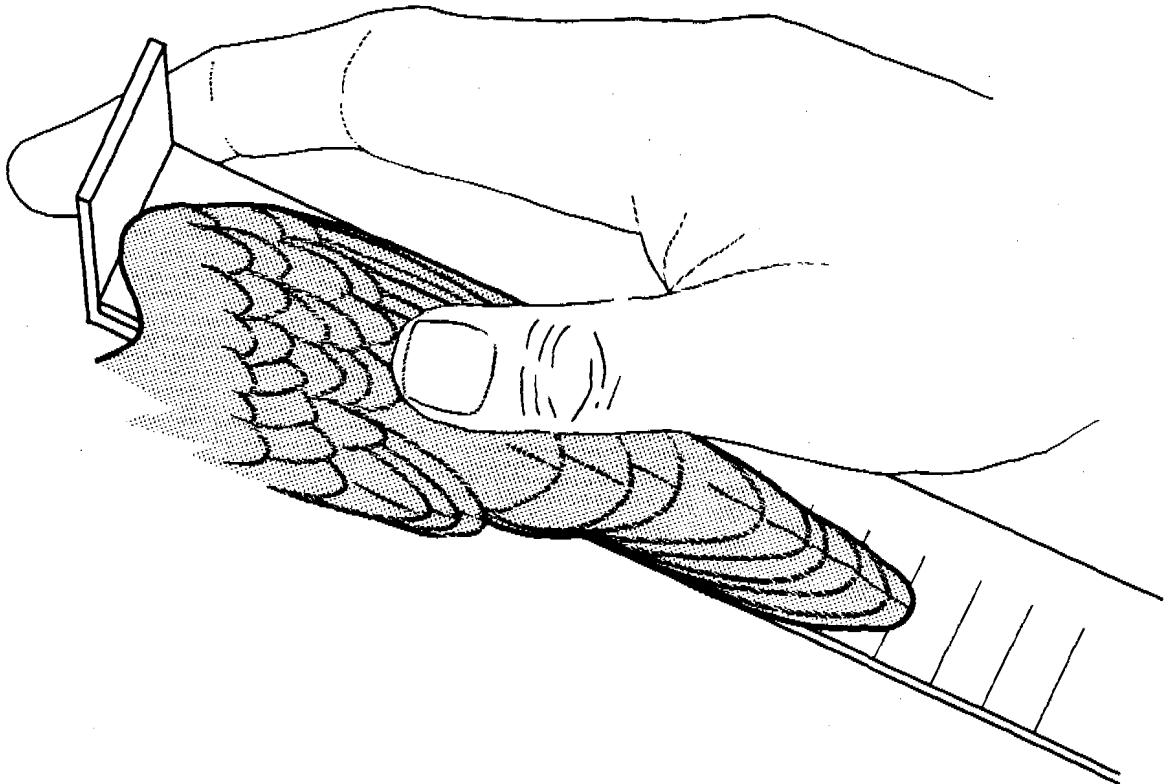


Figure 6.5. The flattened, straightened wing length measurement. It is usually necessary to hold the carpal joint of the wing against the butt of the rule with one finger and flatten and straighten the feathers with another finger. The wing should be held as close as possible to the bird's body during the measuring process.

Length of primary feathers (L1.x)

This is measured by inserting a thin unbutted ruler between adjacent primaries and measuring the distance from the base to the tip of the feather without flattening or straightening the feather. The second number in the code, 'x', indicates which feather is measured. As noted above, the 8th primary measurement has been adopted as the standard wing length measure by European banding schemes.

Length of secondary feathers (L2.x)

Measured as the length of primary feathers and recorded similarly.

Width of primary feathers (W1.x)

This is measured at the widest point of the feather, usually near the base, and without flattening the feather. The second number in the code, 'x', indicates which feather is measured.

Head measurements

Head-bill length (HB)

Also known as Total Head Length or Overall Head. This is illustrated in figure 6.1b for a right-handed bander. Accurate (and reproducible) measurements, to within 0.1 mm can be taken. The head is rocked gently up and down to ensure that the maximum measurement is obtained. Care is needed to ensure that the tip of the bill, which is flexible, is not pressed and a too short measurement obtained. Great care is needed for birds with delicate bill tips (e.g. avocets, spinebills) which are easily broken. The bird's legs can be held between the ring and little fingers; this keeps claws out of the way and prevents premature release when changing the position of the hand on the bird's head (Rogers et al., 1986). Note that the use of unbutted calipers can make it difficult to find the back of the bird's head, which curves sharply. Much of the value of this measurement is lost if calipers are not suitably modified. This method is suitable for nearly all species. Exceptions are the parrots, raptors, and owls whose bill shape (and strength) precludes accurate measurement.

Head depth (HD)

This is the greatest dorso-ventral measurement that can be taken through the vertical axis of the head. It is normally measured as the distance from the middle of the bird's throat to the point vertically on top of the head.

Head width (maximum) (HW)

This is measured at the widest part of the head which is usually just behind the eyes.

Bill measurements

Bill length (BK)

For species with high foreheads, this is measured from the anterior margin of the skull (i.e. where the skull meets the top of the bill) to the tip of the bill. See figure 6.6. Suitable for some non-passerines and most passerines.

Culmen length — exposed (CL)

This is measured from the point where the forehead feathers no longer cover the culmen to the tip of the bill. This measurement includes the cere if present. This measurement is suitable for flat headed birds such as waders and herons for which Bill Length (BK) cannot be measured. Note, however, that it is less accurate as wear or moult of the forehead feathers will influence the measurement. See figure 6.7.

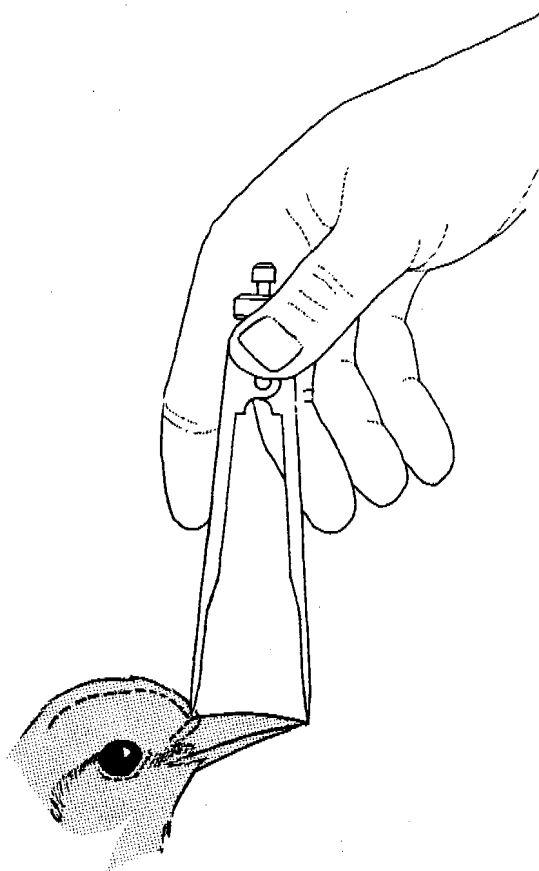


Figure 6.6. Measuring the bill length from the tip to the margin of the skull (which is indicated with a dotted line). The points of the divider must be blunt and not pressed hard against the bill.

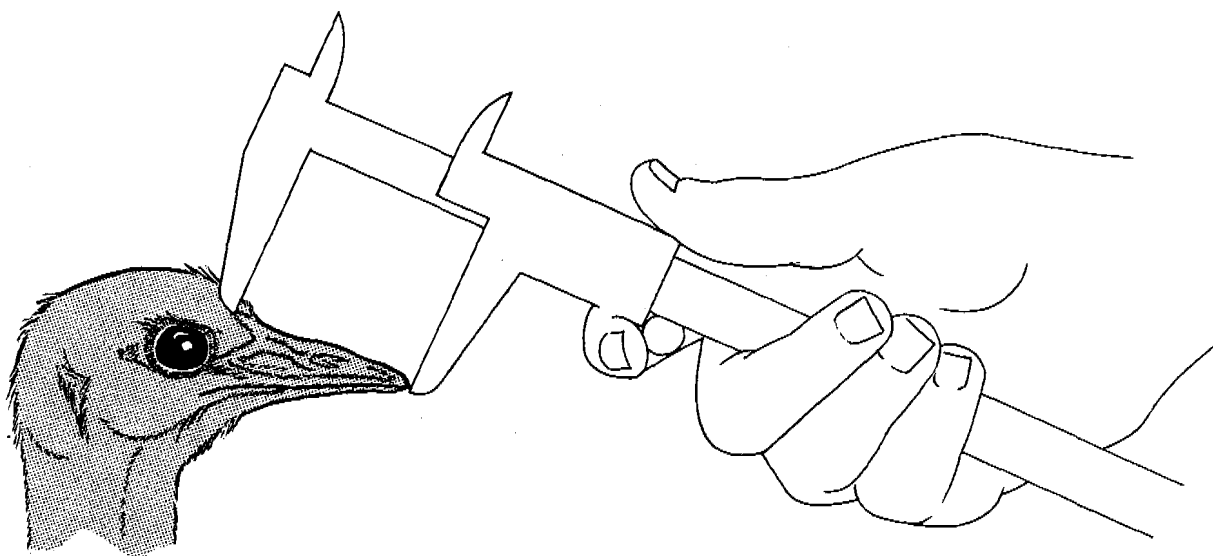


Figure 6.7. Measuring the length of the exposed culmen. The ends of the calipers should be blunt and must not be pressed hard against the bill.

Culmen length — without cere (CC)

For species with a recognisable cere, the exposed culmen is measured from the anterior margin of the cere to the tip of the bill. See figure 6.8. Suitable for parrots and raptors, for example.

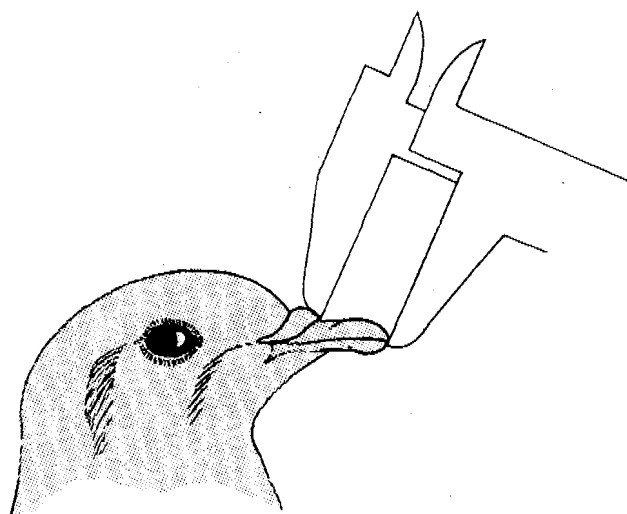


Figure 6.8. Measuring the length of the exposed culmen without the cere. The ends of the calipers should be blunt and must not be pressed hard against the bill.

Bill depth (BD-base or BD-nostrils)

This is the bill depth or height measured from either the base of the exposed culmen or from directly above the nostrils (nares) to the ventral edge of the lower mandible directly below. Suitable for herons, waders etc. i.e. birds with 'flat' foreheads.

Bill width (BW-base, BW-gape, or BW-lores)

BW-base is measured at the same point on the bill as the exposed culmen begins. BW-gape is measured at the point where the upper mandible meets the lower. BW-lores is measured at the point where the feathering of the lores ends anteriorly. Although not as useful as other bill width measurements, it has proved useful in the past for particular species e.g. plovers.

Bill width maximum (BW-maximum)

For many species, not just wide-billed ones, it is useful to record the maximum width of the bill irrespective of where it occurs.

Foot and leg measurements

Tarsus (or tarsal) length (TR)

This is measured from the intertarsal joint to the lower edge of the last undivided scute (scale) before the toes diverge. It is illustrated in figure 6.9. In practice, this measurement can be difficult to repeat as the boundary points are not always clear.

Tarsus length with foot (TZ)

This is measured by gently bending the foot downwards and measuring from the notch at the 'knee' to the 'ankle'. Figure 6.10 illustrates the method which generally gives more reproducible measurements than TR.

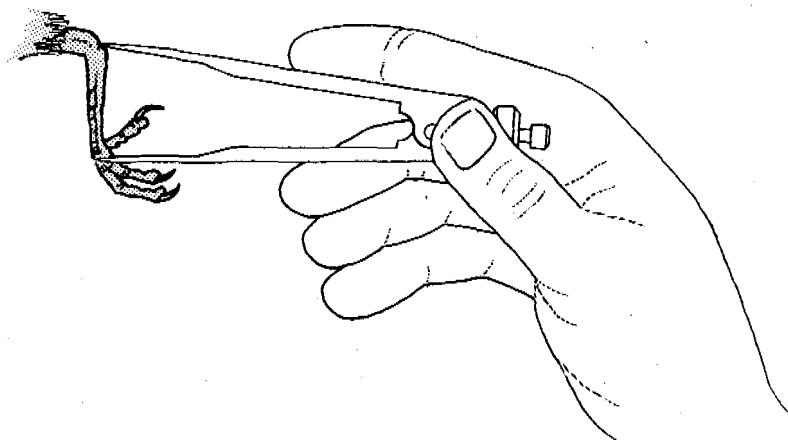


Figure 6.9. Measuring the tarsus length. The points of the dividers should be blunt and must not be pressed hard against the leg.

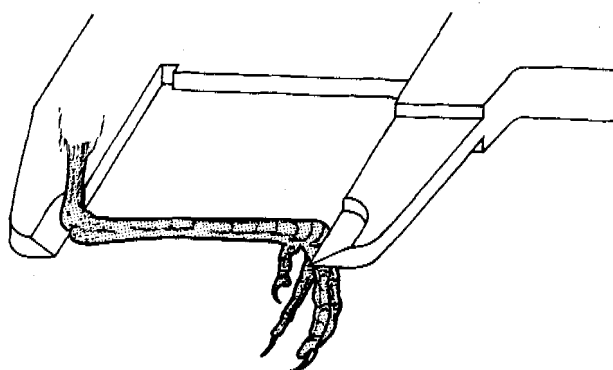


Figure 6.10. Measuring the tarsus length with foot.

Tarsus plus middle toe length (TT)

This is measured by laying the leg flat on a butted rule with the 'knee' placed against the butt. The toes are then gently flattened onto the ruler and the distance to the furthest part of the toe recorded. Claw length should not be included in the measurement.

Tarsus width (TW)

This is measured as the anterior-posterior diameter of the tarsus at its mid-point. Some banders record tarsus width at the distal and proximal ends. These should be recorded as TW(distal) and TW(proximal). Maximum tarsus width can also be measured and recorded as TW(max); this is a useful measurement for trials of band size.

Claw length (CA)

This is measured from the tip of the claw to the point where the claw goes under the skin, on the upper surface of the claw. Any claw can be measured and should be recorded in the data indicating to which claw it applies e.g. CA-hind.

6.7 Describing plumage and bare parts

There is much that is not known of many Australian bird species. Banders are well placed to add much new information. A particularly important contribution that banders can make is the accurate description of the birds they catch. This information may be useful in several ways, for example, in complementing the descriptions of museum skins (for which soft/bare part colours may not have been recorded on collection), in ageing and sexing, and in providing information on geographical variation and sub-speciation.

Banders have developed a plumage description sheet which has been adopted by the ABBBS to encourage and help banders to record this type of information. Use of the sheet should make it quicker and easier for banders to record systematically descriptions of the birds they catch. It is hoped that, in time, sufficient information will have been collected using these sheets to allow all Australian species to be aged and sexed. Sheets submitted to the ABBBS will be available to all bona fide users who are requested to acknowledge that the data have been supplied by banders.

A copy of the plumage description sheet and the instructions for its use are appended at appendix 6(I).

It takes some time to take a full description but, as with many things, it becomes easier and quicker with practice. It is also not necessary to take a description of every bird. Most banders will be aware of which birds (and which ages) are not well described in the literature or field guides that they use. This will suggest when it might be useful to describe an individual bird. It would be unusual to take more than two or three descriptions in the course of a banding day. Remember that the well being of the birds is paramount. Descriptions should not be taken if it is likely to be of detriment to the bird being handled or to other birds waiting to be processed or extracted from nets.

FAT DEPOSITS

Migratory birds put on weight in the form of subcutaneous fat prior to migration. This can be viewed through the skin in three areas, in the clavicle and on the thighs and flanks. It is perhaps most easily visible in the clavicle region where a pit is found on birds with low weights. A four point scale has been used (BTO, 1984), to describe this accumulation of fat. The scores are:

- 1 = clavicular pit is concave; devoid of fat;
- 2 = clavicular pit partly covered with fat (surface slightly concave);
- 3 = clavicular pit fully covered with fat (surface horizontal); and
- 4 = clavicular pit is convex, filled with fat.

While the weight of a bird reflects fat accumulation, weights do not necessarily give an indication of the preparedness for migration of an individual bird. It is possible that this may be given by the clavicular fat deposit.

6.8 Recording moult

The feathers of a bird wear, fade and become more brittle from the constant movement, abrasion, and exposure to sunlight that occur in the normal course of its life. This can be observed on the bird in the hand. Most birds replace their entire plumage every year by the process known as moult. Moult is an essential part of a bird's life as it allows the bird to maintain the condition, insulating capacity, and colour of its plumage. Condition is essential for flight; insulating capacity is necessary for conserving energy; colour is important in many species for displays, social behaviour and camouflage. In fact, moulting is one of the most fascinating and perhaps most important things that birds do.

It might be thought then that the Australian ornithological literature would have many papers on moult. In fact, it has very few. This is all the more surprising as the range of climatic conditions in Australia is such that there is considerable variety in the way birds have adapted moult into their annual cycles. No one is better placed than banders to collect information on moult for future study. Museum collections are usually too small for the purpose.

Two moult recording sheets have been developed by the ABBBS to encourage and facilitate the recording of moult data. These are shown in appendix 6(II) with the instruction sheets.

The sheets allow for moult to be recorded in one of two ways. The stage of growth of individual feathers can be recorded using standard codes (see section 11.4). This method is usually applied to the flight feathers, particularly the primaries. Alternatively, the state of moult is recorded for a whole feather tract (e.g. flanks), again using standard codes. These are mostly used for body feathers and for coverts but can, and often are, applied to the flight feathers. Moult in the body feathers is readily detected either by blowing under the feathers or by raising the feathers with a

convenient tool, e.g. a pencil tip. This exposes the waxy sheath at the base of growing feathers. Great care must be exercised in examining for moult in areas where carelessness could hurt the bird e.g. near the ear coverts (not a good idea to blow in this area), the preen gland, the cloaca.

Many workers find it useful to record the state of wear of fully grown feathers with a more sensitive scale than '5' for new or '0' for old (see section 11.4). The codes 'N' for new feather, 'S' for slight wear, 'O' for worn, and 'V' for very worn have been suggested (Rogers et al., 1986). Note that '5' and 'S' can often be confused on field data sheets; the two schemes do not combine well. Recording to this level of detail is essential for determining the sequences of moult in many species (e.g. primary moult in many large raptors) and for ageing many others (e.g. waders). In these cases, three ages of fully grown feather are commonly observed; this cannot be recorded on a two point scale. This issue will be discussed more fully in D. Rogers (in review).

For more detailed information on moult recording see Ginn and Melville (1983) or Rogers et al. (1986).

6.9 Bander's diary sheet

Many banders find it useful to maintain a log or diary of their banding activities. This can provide a useful reference of circumstances which might effect trapping success (e.g. weather, growth of vegetation, trapping effort, seasonal factors) and which might help them to operate their projects more effectively. To assist banders who wish to do so, the ABBBS has designed a Diary Sheet which will enable them to record this information systematically. A copy of the sheet is shown in Appendix 6(III). The sheet is designed specifically for mist-netters; banders who use other capture methods are welcome to modify the sheets for their own purposes. A separate sheet is required for each day's banding.

Completed data sheets which are submitted to the ABBBS will be filed; they will not be processed into the ABBBS data base. They will be made available to bona fide researchers who wish to analyse them. Banders are, however, encouraged to examine their own sheets as they are in the best position to interpret the data and benefit from the exercise.

6.10 Glossary

There are obvious advantages if all banders use the same terms to describe the different parts of the bird. This assists communication in the field and the use of reference sources. Terms a bander may encounter or wish to use are defined below. Also given are the meaning of some common terms the bander might encounter in the literature.

abdomen. or belly. That part of the bird containing the excretory, reproductive, and main digestive organs. Also to the ventral surface of the same region.

adult. A bird that has reached its fullest development. For practical purposes, a bird which has attained the plumage and soft part condition which, apart from changes associated with breeding, it will retain for the remainder of its life.

alar. Pertaining to the wing.

alula. The bastard wing. A small number of quill feathers attached to the first digit, used in swimming by some ducks and in flight, particularly by birds of prey.

anterior. More to the front.

bare parts. or soft parts. Used to describe all areas of the body surface not covered by feathers, namely the bill, gape, eyes, legs and feet, wattles, etc.

barb. or ramus. Projections from the feather shaft (rachis) to which barbules are attached.

barbule. Projections from the barbs which 'hook' one barb to adjacent ones.

belly. See *abdomen*.

biometrics. The application of statistical methods to biological data or the data which are used in such studies.

brood patch. or incubation patch. A vascularised area of usually bare skin on the abdomen used in incubation. See section 6.6 for more detail.

carpus/carpal joint. The foremost part of the folded wing.

castellation. Small square holes found in the edges of wing and tail feathers due to abrasion in domed nest or nesting hole. Usually on young birds.

caudal. Of the tail.

clavicle. also furculum, fused clavicles, wishbone. Sometimes used to denote the depression at the base of the birds neck.

cloaca. or vent. The body exit serving both excretory and sexual functions.

cloacal protuberance. The enlargement of the cloaca which occurs in breeding condition.

contour feathers. The outer feathers covering the body. Usually applied only to the small body feathers but strictly speaking includes all flight feathers.

coverts. Contour feathers that overlie the bases of flight feathers. Also, feathers that cover the ear opening.

culmen. The dorsal ridge of the upper mandible.

dimorphic. Occurring in two forms.

distal. Furthest from the centre of the body or from the point of attachment to e.g. a limb. The opposite of proximal.

dorsal. To do with the back or the upper surface of the body. The opposite of ventral.

dorso-ventral. The plane through an object connecting with both dorsal and ventral surfaces.

down. Feathers characterised by a loose fluffy texture unlike the closely knit texture of contour feathers.

eclipse. A post-nuptial plumage stage of short duration in some species, mostly ducks. Has been used incorrectly as a convenient label for changes in soft parts and plumages often occurring after breeding.

eye. See *iris*.

emargination. An abrupt narrowing of the web of a primary towards the tip. Usually restricted to the narrower outer web. See *notch*.

eyebrow. or supercilium. The feather marking, often a stripe, over the eye.

eye stripe. See *eyebrow*.

fault bars. Transverse lines of weakness in feathers associated with feeding deficiencies during growth. Feathers often break here.

feather tract. An area of skin bearing contour feathers.

flight feathers. Primary, secondary and tail feathers.

furculum. See *clavicle*.

gape flange. or oral flange gape or rictus. The soft junction of the upper and lower mandibles. 'Gape' is often used to indicate the area exposed by the open bill e.g. in *Caprimulgiformes*.

gorget. A throat or upper breast band.

greater coverts. Collective term for the primary and secondary coverts.

growth bars. Alternate, often barely visible, bands of darker and lighter shading in feathers.

gular. Of the throat.

*humeral*s. Remiges growing from the humerus, the innermost bone of the birds wing.

immature. A bird which is not an adult. Often used to distinguish birds which have moulted the plumage with which they left the nest from those which haven't. See *juvenal*, *juvenile*.

incubation patch. See *brood patch*.

irides. See *iris*.

iris. or eye (sic) or irides. The coloured area of the eye surrounding the pupil. May show inner and outer rings of different colours.

juvenal. Specifically relates to the first plumage of contour feathers worn by young. See *immature*, *juvenile*.

juvenile. Used to describe non-adult birds, more often those which should properly be called *juvenal*. See *immature*, *juvenal*.

mandible. Usually used by banders to indicate the upper and lower parts of the bill.

marginal coverts. Line of small coverts above the lesser coverts effectively forming the leading edge of the wing.

morphometrics. Measurements of the size and structure of birds; the study of these data.

nares. The openings of the nasal cavity in the upper mandible, the nostrils.

notch. An abrupt narrowing of the inner web of a feather. Usually applied to primaries.

nuchal. Of the nape.

oral flange. See *gape flange*.

orbital. The area around the eye.

oviduct. The passage through which an egg is passed when laid.

palate. Skin covering the palate bones which form the roof of the mouth.

patagium. The fold of skin between the body and the posterior margin of the upper wing.

pennaceous. Applied to feathers in which the barbs form a coherent vane.

posterior. More to the rear.

preen gland. A gland which secretes oil for the maintenance of feather condition. Located above the base of the tail feathers.

primaries. The outer remiges, growing distally from the carpal joint.

proximal. Nearest the centre or the point of attachment to e.g. the wing. The opposite of distal.

rachis. The feather shaft.

ramus. See *barb*.

rectrices. The tail feathers.

remiges. The primaries and secondaries.

rosethorn. A marking at the tip of a feather which narrows proximally, the tip of the rachis having the same colour as the web.

riatal bristles. Bristles in the area of the gape.

secondaries. *Remiges*, growing from the ulna.

shaft. See *rachis*.

skull ossification. The pneumatisation of the skull roof. See section 6.4.

soft parts. See *bare parts*.

speculum. A patch of distinctive colour in the wing, usually in ducks.

sub-adult. A bird which is not adult but which is in its second year or older.

supercilium. See *eyebrow*.

tarsus. Properly, the tarsometatarsus, the bone between the 'knee' and the foot.

tertials. Innermost secondaries; their tips do not line up with those of the true secondaries on the open wing.

tibia. Properly, the tibiotarsus, the bone above the 'knee'.

vent. See *cloaca*.

ventral. Relating to the lower surface of the body. The opposite of dorsal.

web. Of feathers, the vane-like parts on either side of the shaft. Of feet, the fleshy membrane between the toes.

wing point. The number of the longest primary in its natural, closed position.

wishbone. See *clavicle*.



Australian Bird Banding Scheme

PLUMAGE AND SOFT PARTS DESCRIPTION SHEET

Notes on Use

The purpose of this sheet is to make it simpler for banders to systematically collect complete plumage and soft parts descriptions from birds of all age and sex classes. By providing these sheets the Bird Banding Scheme hopes to encourage banders to contribute their information to a national campaign aimed at documenting ageing and sexing criteria. This information is sadly lacking for a vast number of Australian species.

Banders may choose to retain the data they collect for their own use and ultimate publication or submit it to the Banding Scheme. Sheets submitted to the banding office will be available to all bona fide users as is all banding data and the same conditions of use will prevail. In particular, the sheets will be available to persons preparing species descriptions of ageing and sexing criteria for publication in appropriate journals or field guides (e.g. "Corella" or "Bander's Aid" revisions). Any information submitted to the ABBS will be fully acknowledged should it be published.

Using the sheet

The core banding data normally recorded on the standard Type I data sheet should be recorded at the top of the form. This information will assist future examination and cross referencing of the description and give precise location details to assist in detecting any geographical variations in plumage patterns. The method and status codes are important to enable recognition of plumage and soft part descriptions taken from dead birds (e.g. road kills). The colour and condition of the soft parts of a dead bird may be markedly different from those of a live bird. If dead birds are used for plumage and soft part descriptions an estimate of how long the bird had been dead should be recorded in the "Other Points" section at the bottom of the page.

The sheet has been designed for ease of use and is laid out in a logical order for examining a bird in the hand, i.e. head to tail down the back, followed by the underparts, feet and upper and lower wing.

The colour descriptions should be as simple as possible (e.g. yellow, grey-brown) rather than complex and difficult for others to comprehend and recognise. Colour charts can be useful; their major advantage being that they allow consistent information to be collected. The major disadvantage with using colour charts is that they are time consuming and cumbersome to use. If you choose to use a colour chart when collecting plumage and soft

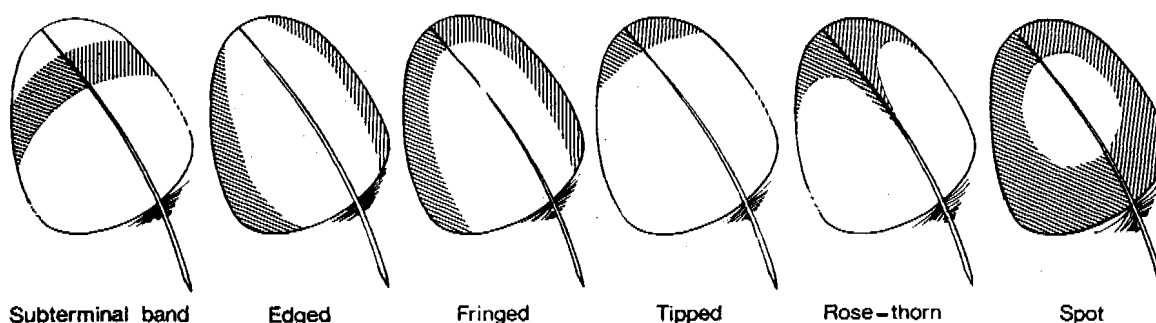
parts descriptions be sure to record the full details of the chart in the "Other Points" section.

When taking plumage and soft parts descriptions always be aware of the effects changing ambient light levels may have on the colour perception as well as the differences in colour perceived by different processors. Ideally these descriptions are only done by one observer at any one site and care should be taken to avoid a wide range of light levels.

Some birds have very complex plumage patterns that require more detailed description and in some cases require the description of individual feather types. The standard feather types are illustrated below.

If there is insufficient space on the front of the sheet to record the complete details for any feather group or soft part, simply tick the "cont" box and continue the description on the back of the form.

Should you encounter any difficulties in using this form please contact the banding office. It should be stressed that the collection of a complete plumage and soft parts description may be very time consuming and should only be attempted when there are sufficient personnel on hand to ensure that the handling time of birds caught is not significantly increased. Plumage and soft part descriptions should not be taken to the detriment of any bird.



The "Plumage and Soft Parts Description Sheet" came from an original concept by A.Rogers. The sheet was drafted and prepared by A.Rogers, E.B.Male and W.R.Phillips. Diagrams were provided by P.De Rebeira.

March 1987



AUSTRALIAN BIRD BANDING SCHEME

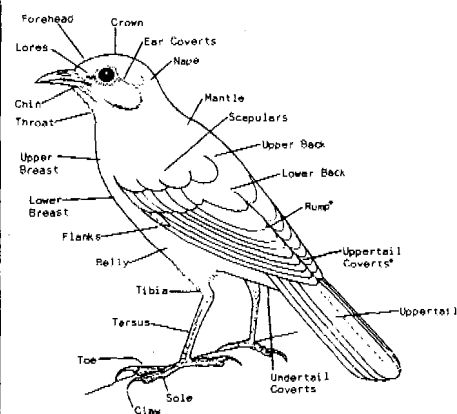
Plumage and Soft Parts Description Sheet

Species: _____ No.: _____ Age: _____ Sex: _____ Band No.: _____ - _____

Location: _____ State: _____ Locode: _____ Method: _____ Status: _____

Date: _____ Bander: _____ / _____ Auth No.: _____ Processor: _____

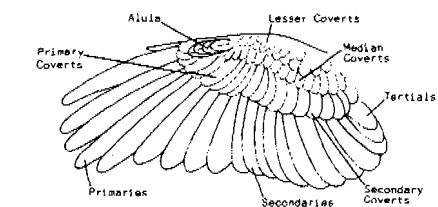
BILL:	cont	EYE:	cont
Upper Mandible(CK-U)	<input type="checkbox"/>	Inner Iris(CY-I)	<input type="checkbox"/>
Lower Mandible(CK-L)	<input type="checkbox"/>	Outer Iris(CY-O)	<input type="checkbox"/>
Cere(CK-C)	<input type="checkbox"/>	Ring-Skin(CY-S)	<input type="checkbox"/>
Gape Flange(CG)	<input type="checkbox"/>	Ring-Feathers(CY-F)	<input type="checkbox"/>
Palate(CP-P)	<input type="checkbox"/>	General(CY)	<input type="checkbox"/>



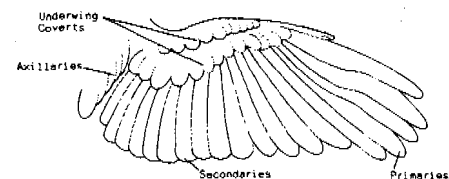
HEAD & SHOULDERS:	cont
Lores(CO)	<input type="checkbox"/>
Forehead(CH)	<input type="checkbox"/>
Crown(CV)	<input type="checkbox"/>
Ear Coverts(CE)	<input type="checkbox"/>
Nape(CN)	<input type="checkbox"/>
Mantle(CM-M)	<input type="checkbox"/>
Scapulars(CS)	<input type="checkbox"/>
Other Face Marking	<input type="checkbox"/>

* Covered by wing feathers

LEGS & FEET:	cont	UNDERPARTS:	cont
Tibia(CQ-U)	<input type="checkbox"/>	Chin(CI)	<input type="checkbox"/>
Tarsus(CQ-L)	<input type="checkbox"/>	Throat(CT)	<input type="checkbox"/>
Toes(CQ-T)	<input type="checkbox"/>	Upper Breast(CZ-U)	<input type="checkbox"/>
Claws(CQ-C)	<input type="checkbox"/>	Lower Breast(CZ-L)	<input type="checkbox"/>
Soles(CQ-S)	<input type="checkbox"/>	Flanks(CF)	<input type="checkbox"/>
		Belly(CX)	<input type="checkbox"/>
		Undertail Coverts(CD)	<input type="checkbox"/>
		Undertail(C5-L)	<input type="checkbox"/>



UPPERWING:	cont
Primaries(C1-U)	<input type="checkbox"/>
Secondaries(C2-U)	<input type="checkbox"/>
Tertiaries(C2-T)	<input type="checkbox"/>
Primary Coverts(C3)	<input type="checkbox"/>
Secondary Coverts(C4)	<input type="checkbox"/>
Alula(C6)	<input type="checkbox"/>
Median Coverts(C7)	<input type="checkbox"/>
Lesser Coverts(C8)	<input type="checkbox"/>



UNDERWING:	cont
Primaries(C1-L)	<input type="checkbox"/>
Secondaries(C2-L)	<input type="checkbox"/>
Axillaries(C2-A)	<input type="checkbox"/>
Underwing Coverts(C9)	<input type="checkbox"/>

OTHER POINTS: _____ cont
☐

BILL:

Upper Mandible(CK-U) _____

Lower Mandible(CK-L) _____

Cere(CK-C) _____

Gape Flange(CG) _____

Palate(CP-P) _____

EYE:

Inner Iris(CY-I) _____

Outer Iris(CY-O) _____

Ring-Skin(CY-S) _____

Ring-Feathers(CY-F) _____

General(CY) _____

HEAD & SHOULDERS:

Lores(CO) _____

Forehead(CH) _____

Crown(CV) _____

Ear Coverts(CE) _____

Nape(CN) _____

Mantle(CM-M) _____

Scapulars(CS) _____

Other Face Marking _____

BACK:

Upper Back(CM-U) _____

Lower Back(CM-L) _____

Rump(CR) _____

Uppertail Coverts(CU) _____

Uppertail(C5-U) _____

LEGS & FEET:

Tibia(CQ-U) _____

Tarsus(CQ-L) _____

Toes(CQ-T) _____

Claws(CQ-C) _____

Soles(CQ-s) _____

UNDERPARTS:

Chin(CI) _____

Throat(CT) _____

Upper Breast(CZ-U) _____

Lower Breast(CZ-L) _____

Flanks(CF) _____

Belly(CX) _____

Undertail Coverts(CD) _____

Undertail(C5-L) _____

UPPERWING:

Primaries(C1-U) _____

Secondaries(C2-U) _____

Tertials(C2-T) _____

Primary Coverts(C3) _____

Secondary Coverts(C4) _____

Alula(C6) _____

Median Coverts(C7) _____

Lesser Coverts(C8) _____

UNDERWING:

Primaries(C1-L) _____

Secondaries(C2-L) _____

Axillaries(C2-A) _____

Underwing Coverts(C9) _____

Appendix II. Moulting recording data sheets.



Australian Bird Banding Scheme

MOULT RECORDING DATA SHEETS

Notes on Use

The Bird Banding Scheme has in the past provided cards for recording the moulting activity of Australian birds. With the advent of the computerised banding database the type of information that was recorded on the "moulting cards" can be easily stored on the computer. This provides many advantages over the card system, such as a vastly improved ability to manipulate the data for analysis.

There are two types of data sheet available for recording moulting information; Type I and Type II. The Type I sheet is intended for use by those banders who are only just beginning to, or only occasionally, record moulting data and the Type II sheet is for more experienced moulting recorders. The two sheets are provided "back-to-back" on the one sheet so that banders may choose which format they prefer to use.

Moulting data are computer stored using a series of codes; one for the feather tract or group and one for the stage of the moulting. These codes are given below:

FEATHER TRACT OR GROUPING :

Head & Body :	Forehead & Lores (MH)
	Crown (MC)
	Ear Coverts (ME)
	Nape (MN)
	Mantle & Back (MM)
	Scapulars (MS)
	Rump (MR)
	Uppertail Coverts (MU)
	Undertail Coverts (MD)
	Belly (ML)
	Flanks (MF)
	Lower Breast (MB-L)
	Upper Breast (MB-U)
	Throat (MT)
	Chin (MI)
Wing & Tail :	Primaries (M1)
	Secondaries & Tertiaries (M2)
	Primary Coverts (M3)
	Secondary Coverts (M4)
	Tail (M5)
	Alula (M6)
	Median Upperwing Coverts (M7)
	Lesser Upperwing Coverts (M8)
	Underwing Coverts (M9)
	Axillaries (MA)

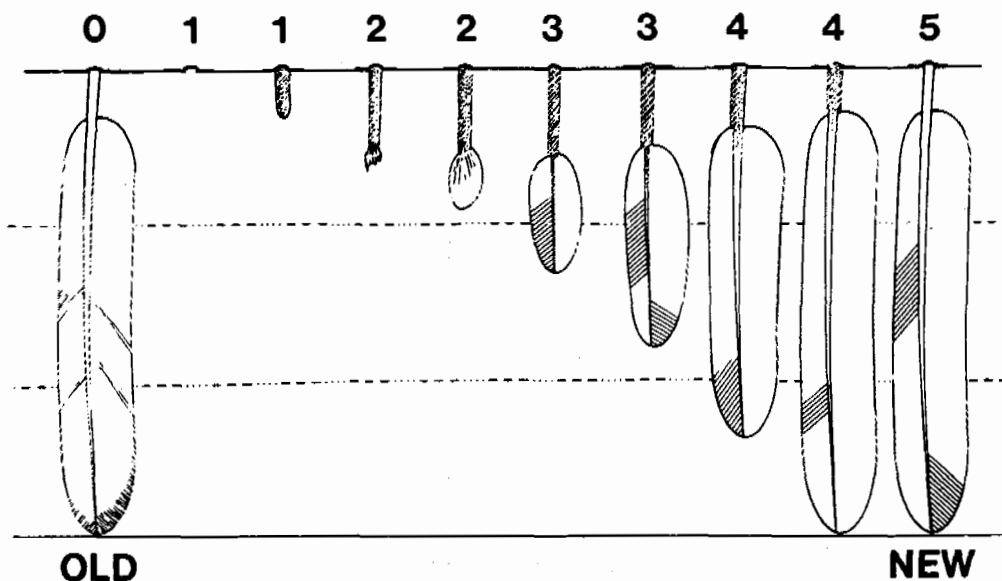
STAGE OF MOULT :

Record stage for complete feather grouping as:

- O = No moult activity
- S = Slight moult activity
- A = Active moult
- C = Moult completed

Record stage for each feather as shown below :

- 0 = Old feather
- 1 = Missing or new feather in pin
- 2 = New feather less than 1/3 grown
- 3 = New feather 1/3 to 2/3 grown
- 4 = New feather 2/3 to fully grown with trace of waxy sheath
- 5 = New feather fully developed



If you encounter any difficulties in using this sheet please contact the banding office. The collection of complete moult descriptions is time consuming and should only be undertaken when there are sufficient personnel available to ensure that the handling time of birds is not significantly increased. Moult descriptions should not be taken to the detriment of other birds being banded.

The "Moult Description Sheet" was designed and prepared by W.R. Phillips. Diagrams were provided by C.P.S. de Rebeira. (9/87)



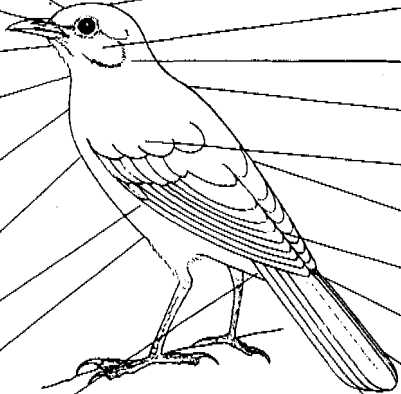
AUSTRALIAN BIRD BANDING SCHEME

Moult Recording Sheet - Type I

Species: _____		No.: _____		Age: _____		Sex: _____		Band No.: _____ - _____	
Location: _____		State: _____		Locode: _____		Method: _____		Status: _____	
Date: _____		Bander: _____		Auth No.: _____		Processor: _____			

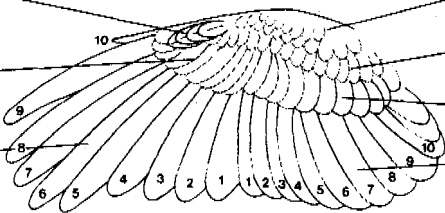
BODY :

<p>Forehead (MH) <input type="checkbox"/></p> <p>Lores (MH) <input type="checkbox"/></p> <p>Chin (MI) <input type="checkbox"/></p> <p>Throat (MT) <input type="checkbox"/></p> <p>Upper Breast (MB-U) <input type="checkbox"/></p> <p>Lower Breast (MB-L) <input type="checkbox"/></p> <p>Flanks (MF) <input type="checkbox"/></p> <p>Belly (ML) <input type="checkbox"/></p> <p>Undertail Coverts (MD) <input type="checkbox"/></p> <p>• Covered by wing feathers in diagram</p>	<p>Crown (MC) <input type="checkbox"/></p> <p>Ear Coverts (ME) <input type="checkbox"/></p> <p>Nape (MN) <input type="checkbox"/></p> <p>Mantle (MM) <input type="checkbox"/></p> <p>Scapulars (MS) <input type="checkbox"/></p> <p>Back (MM) <input type="checkbox"/></p> <p>Rump (MR)* <input type="checkbox"/></p> <p>Uppertail Coverts (MU)* <input type="checkbox"/></p> <p>Tail - Right (M5-R) <input type="checkbox"/></p> <p>Tail - Left (M5-L) <input type="checkbox"/></p>
---	--

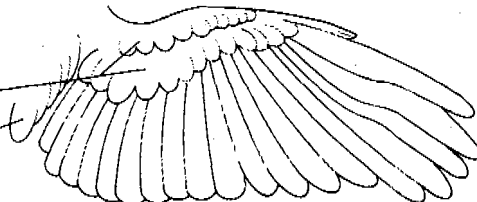


UPPERWING :

<p>Alula (M6) <input type="checkbox"/></p> <p>Primary Coverts (M3) <input type="checkbox"/></p> <p>Primaries Right Wing (M1-R) _____</p> <p>Left Wing (M1-L) _____</p>	<p>Lesser Coverts (M8) <input type="checkbox"/></p> <p>Median Coverts (M7) <input type="checkbox"/></p> <p>Secondary Coverts (M4) <input type="checkbox"/></p> <p>Secondaries (& Tertiaries) Right Wing (M2-R) _____</p> <p>Left Wing (M2-L) _____</p>
--	--



UNDERWING :

<p>Underwing Coverts (M9) <input type="checkbox"/></p> <p>Axillaries (M) <input type="checkbox"/></p>	
---	---

OTHER POINTS : _____

RECORDING CODES :

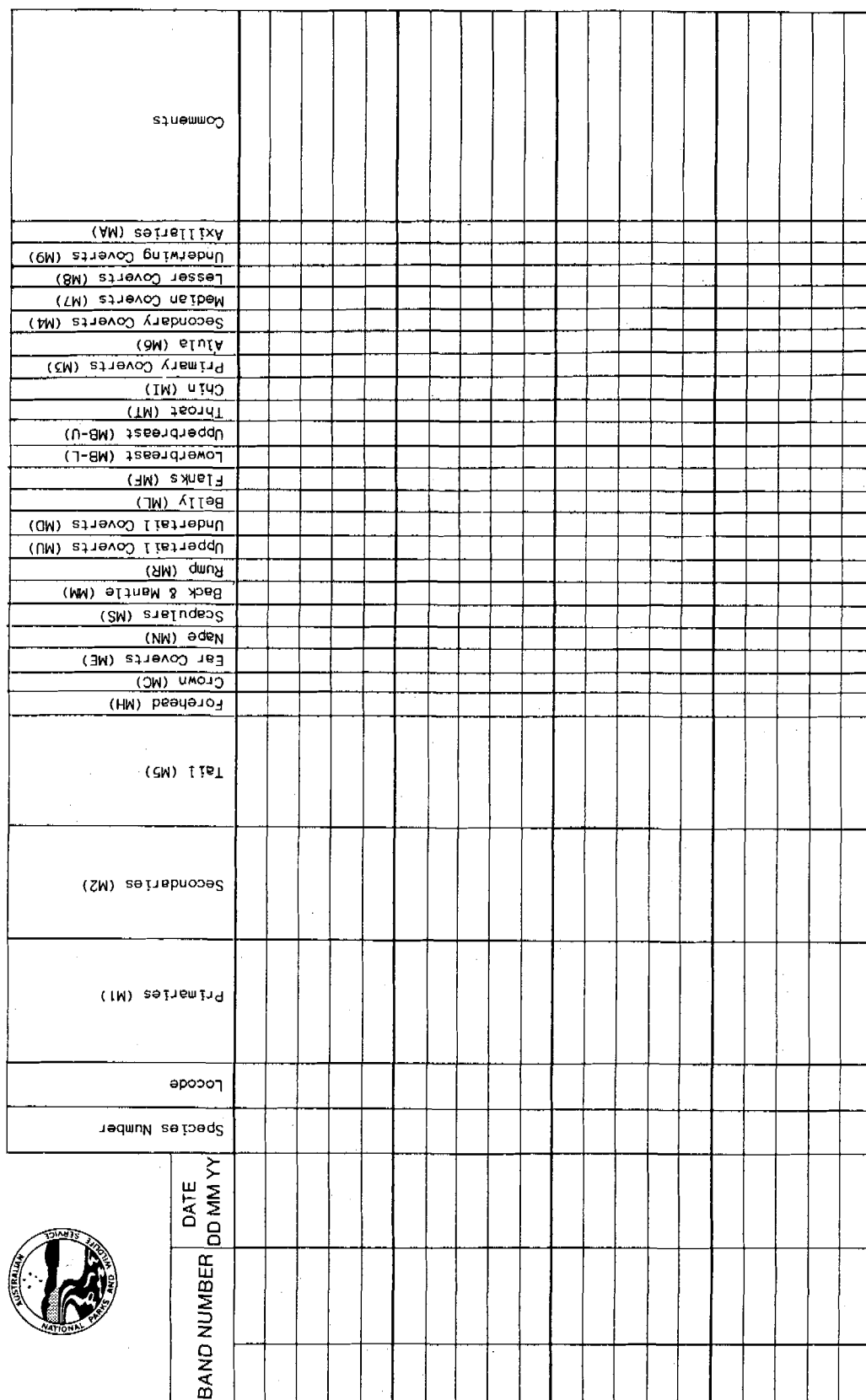
Wing and Tail : 0 = old feather, 1 = missing or new feather in pin, 2 = new feather less 1/3 grown, 3 = new feather 1/3 to 2/3 grown, 4 = new feather 2/3 to fully grown with trace of waxy sheath, 5 = new feather fully developed

Body Moults (including wing coverts) : 0 = no moult activity S = slight moult activity
A = active moult C = completed moult

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BANDER :

AUTHORITY NUMBER :



AUSTRALIAN BIRD AND BAT BANDING SCHEMES
GPO Box 8 Canberra ACT 2601



Bander's Diary Sheet

Appendix III. Bander's diary sheet.

Bander : _____ Authority No. : _____

Location : _____ State : _____

Location Code : _____ Date : ____ / ____ / ____

Mist-net Details :

Number of Nets Dimensions (m) Mesh Size (mm) Total Net Area (m²)

Totals

Netting Times :

Morning Session : _____ Time Zone : _____

First Net Opened _____ hrs. Last Net Closed _____ hrs.

Afternoon Session : _____

First Net Opened _____ hrs. Last Net Closed _____ hrs.

Total Rain-free Hours of Netting : _____ hrs.

Total Catch Effort (net area in m² x rain-free hours) : _____

Vegetation / Habitat Description (tick the appropriate box):

Projective Foliage Density of Tallest Stratum

Tallest Stratum	Dense (70-100%)	Mid-dense (30-70%)	Sparse (10-30%)	V.Sparse (<10%)
Tall Trees(>30m)				
Medium Trees(10-30m)				
Small Trees(5-10m)				
Tall Shrubs(2-8m)				
Small Shrubs(0-2m)				
Hummock Grasses				

Other Details : _____

Weather Conditions :

Wind Strength	Min. Max.	Nil Nil	Light Light		Moderate Moderate			Strong Strong		Gale Gale	
Cloud Cover	Min. Max.	0/8 0/8	1/8 1/8	2/8 2/8	3/8 3/8	4/8 4/8	5/8 5/8	6/8 6/8	7/8 7/8	8/8 8/8	
Shaded Air Temperature(C)	Min. Max.	0 0	0-5 0-5	5-10 5-10	10-15 10-15	15-20 15-20	20-25 20-25	25-30 25-30	30-35 30-35	35-40 35-40	
Relative Humidity(%)	Min. Max.	0-20 0-20		20-40 20-40		40-60 40-60		60-80 60-80		80-100 80-100	
Precipitation		Nil		Light		Moderate		Heavy		Snow	
Ground Cover Snow (cm.)		Nil		< 5		5-10		10-15		>15	
Moon Phase		0		1/4		1/2		3/4		Full	
Sunrise Time : _____ hrs. Sunset Time : _____ hrs.											

Other Details : _____

Special Circumstances Influencing Catch (give details) :

Flowering plant species nearby : _____

Time since last : rain _____, fire _____, drought _____

Proximity to urbanised areas : _____

Proximity to drinking sites : _____

Raptor overhead : _____

Birds called into net : _____

Birds flushed or driven into net : _____

Others : _____

CHAPTER 7 Instructions for Completing Field Data Sheets

- | | |
|-------------------------------------|--|
| 7.1 General | 7.4 Completing the body of the sheet |
| 7.2 Using the correct data sheet | Band number |
| Type 1, 2 and 3 field data sheets | Retrap |
| 7.3 Blocks on the top of each sheet | Species name |
| Bander | Species number |
| Authority number | Age |
| Locodes | How aged |
| | Sex |
| | How sexed |
| | Date |
| | Locode |
| | Time |
| | Method |
| | Status |
| | Weight |
| | 7.5 Additional information codes |
| | 7.6 Birds injured or killed during banding |

7.1 General

The use of a computer system to store and retrieve data is a major innovation in the ABBBS. The computer allows speedy and accurate retrieval of any type of banding data which can then be made available to researchers, to banders and to members of the public who find bands. The proper utilisation of a computer database requires a series of codes to describe the type of information being stored. Many of these codes already exist. For example, each bander is identified by their bander's authority number; each species has a species number; age and sex codes have been employed for some time; and the date and time are also codes.

Several new code systems were introduced into the recording of banding data in 1985. These describe the banding location, the methods used to determine the age and sex of each bird that is banded, how the bird is encountered, what its condition, or status, is after the encounter. As well codes have been allocated for types of measurements and for the description of plumages and soft parts. None of these codes have to be remembered by banders; reference to these instructions will quickly provide the relevant code. The complete list and explanation of all approved codes is given in chapter 11.

7.2 Using the correct data sheet

TYPE 1, 2 AND 3 DATA SHEETS

The ABBBS uses three types of field data sheet. These sheets are:

- Bird Banding Type 1- for banding and recovery details of birds not carrying colour bands (see fig. 7.1);
- Bird Banding Type 2- for recording banding and recovery details of colour banded birds (see fig. 7.2);

Figure 7.1. Field data sheet, type 1.

AUSTRALIAN BIRD BANDING SCHEME FIELD DATA SHEET

BANDER J. BLOGGS

AUTHORITY NO. 0099

LOCODES A1 JACKS

06 WADERSITE 1

05 HOME

BAND NUMBER	RETRAP	SPECIES NAME	SPECIES NUMBER	AGE	HOW AGED	SEX	HOW SEXED	DATE DD MM YY	LOCODE	TIME ED	METHOD	STATUS	WEIGHT BIRD + BAG BIRD	HB	WL	NET SITE	TA
014	90301	Brown Thornbill	475	1+	P	U		21 04 85	A1	1012	03	13	15.5/5.0/10.0		48		46
	302	Striated Th.	470	1+	P	U				1017			17.0/10.0/7.0		53		41
	303	Buff-rumped Th.	484	1+	P	U				1022			18.5/10.0/8.8		—		—
023	31401	Scarlet Robin	380	1+	P	F	P			1042							
014	90305	Striated Th.	470	1+	P	U				1045			18.5/10.0/8.5		54		42
032	68001	W. Thr. Treec.	558	1+	P	F	P			1156							
014	90301	R Bm. Th.	475	1+	P	U				1157							
014	90306	Striated Thornbill	470	1+	P	U		12 05 85	A1	0723	03	13	11.8/5.0/6.8	25.7	54	R8	42
014	90307	"	470	1+	P	U				0733							
014	90308	Brown Th.	475	1+	P	U				0745			12.8/5.0/7.8	27.2	55	R1	48
041	35781	R } Curlew Sandpiper	161	1	P	F	U	13 05 85	06	2100	03	14					
041	40001	THIS BAND USED TO REPLACE BAND NO. 041-35781										03 13					
041	40002	Curlew Sand.	161	1+	P	F	U			2103							
041	40003	"	161	1+	P	F	U										
061	75001	} Blackbird	999	P		U		26 05 85	05	1100	08	13	51.0/10.0/41.0				} BROOD 3/3 BANDED 1/2
	002												55.0/10.0/45.0				
	003												49.0/10.0/39.0				
	75004	"	999	P		U				1135							

AUTHORITY NO. 0099

[illegible][illegible]

Figure 7.2. Field data sheet, type 2.

0099

BANDER

J. BLOGGS

AUTHORITY NO.

DEFINE COLUMNS AND INSERT DATA CODE AT HEAD OF COLUMN

[illegible]

Figure 7.3. Additional data sheet.

- Bird Banding Type 3- for recording additional measurements and detailed descriptions of banded birds (see fig. 7.3). The banding or recovery details of birds included on this data sheet are also recorded on a Type 1 or Type 2 sheet.

These sheets supersede all 'schedules' that were previously used. Only these field data sheets will be accepted by the ABBBS. The field data sheets can be used for all types of encounters with birds. Initial banding data, live recovery (both near and remote from the banding site) and dead recoveries can all be recorded on the same sheet. As well, all species of birds can be included on the same sheet, irrespective of the band prefix or banding locality.

All core banding data (the band number, through to status columns excluding time) are mandatory and must be submitted on Type 1 or 2 data sheets. The other data and data sheets are not mandatory but banders are encouraged to use them.

The field data sheets can be used as 'running sheets', that is, recording banding/recovery data of birds as they are encountered in the field. There is now no need to transcribe data from field records for submission to the banding schemes. If you prefer, you may record single strings of bands on the one sheet and have a different sheet for each string.

Type 1, 2 and 3 data sheets should be completed as described in sections 7.3 to 7.6. If you require more information please contact the banding office.

Data sheets for co-operative banding stations

Type 1 data sheets have been modified for use at Co-operative Banding Stations. These field data sheets have large LOCODE boxes suitable for the complete six character LOCODE (fig 7.4).

Data sheets for rehabilitated birds

Modified Type 1 data sheets may be requested from the ABBBS for use in these projects.

Data sheets for recording moult data

The ABBBS has developed a data sheet for recording moult data. Details of the recording system are given in section 6.8.

Data sheets for recording plumage patterns

The ABBBS has developed a data sheet for recording the plumage patterns of birds. Details of the sheets and recording system are given in section 6.7.

7.3 Blocks on the top of each sheet

BANDER

The 'A' class bander's name including initials. 'B' class banders must submit all data under the name of the 'A' class project leader. 'A' class banders from corporate banding groups should record the group's name in this box.

AUTHORITY NUMBER

'A' class bander's or banding group's ABBBS authority number.

LOCODES

The LOCODE is a six character code that defines one banding or recovery site. The locations of all banding and recovery sites are stored in the computer database using LOCODES. Only 'A' class banders may register LOCODES.

The LOCODE consists of two parts: the first four characters are for the bander's ABBBS authority number; the last two characters are the bander's unique code for one banding site. For example, bander number 100 has banded birds at the site that he codes as 'A1'. The LOCODE for this site is therefore '0100A1'. The two character code can be two numbers, two letters or one of each. Because these two characters are related to the bander's authority number in the LOCODE,

BANDER

J. B. LOGGS

AUTHORITY NO.:

0099

LOCODES

8	5	0	8	0	1	M	0	0	T	W	I	N	G	E	E
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

[illegible]



AUSTRALIAN BIRD & BAT BANDING SCHEMES

LOCODE REGISTRATION SHEET

A CLASS BANDER'S DETAILS:

Name: JOE BLOGGS Auth No. 0099
Address: GPO BOX 1234
SYDNEY
State NSW Postcode 2001

Date: 8/8/88

LOCODE: A1 CODE NAME: JACKS (Up to 10 characters)
LOCATION: FARM DAM 3.5 KM NE OF ORANGE (Up to 40 chars.)
STATE: NSW
LATITUDE: N (S) DEGREES 35 MINUTES 21 SECONDS
LONGITUDE: (E) W DEGREES 138 MINUTES 56 SECONDS
ELEVATION: 35 METRES ABOVE SEA LEVEL

LOCODE: _____ CODE NAME: _____ (Up to 10 characters)
LOCATION: _____ (Up to 40 chars.)
STATE: _____
LATITUDE: N S DEGREES _____ MINUTES _____ SECONDS
LONGITUDE: E W DEGREES _____ MINUTES _____ SECONDS
ELEVATION: _____ METRES ABOVE SEA LEVEL

LOCODE: _____ CODE NAME: _____ (Up to 10 characters)
LOCATION: _____ (Up to 40 chars.)
STATE: _____
LATITUDE: N S DEGREES _____ MINUTES _____ SECONDS
LONGITUDE: E W DEGREES _____ MINUTES _____ SECONDS
ELEVATION: _____ METRES ABOVE SEA LEVEL

Figure 7.5. Locode registration sheet.

several banders can have the same two characters in their LOCOCODES without causing confusion in the database. For example, code CS for banders 1000 and 1234 become LOCOCODES 1000CS and 1234CS. Banders operating at the same site can use the same or different characters in their LOCOCODES.

The LOCODE should be registered with the banding office, using the 'Location Code Registration Sheet' (fig. 7.5), as soon as a bander allocates a LOCODE for his/her use. The ABBBS may also allocate LOCOCODES on behalf of banders so it is important that there are prompt exchanges of the details of new LOCOCODES between the banding office and banders, and vice versa. When the completed forms are sent to the ABBBS the LOCOCODES will be registered on the computer and a printout will be returned to the bander to check and as an acknowledgement of the registration of the LOCOCODES.

Each LOCODE has a checkword of up to 10 characters which is also recorded on the 'Location Code Registration Sheet'. The checkword is compared with the LOCODE by the computer to check if the correct LOCODE has been recorded. The 10 character checkword can be any word or words that the bander chooses and should be a word that helps the bander remember the correct LOCODE. The checkword MUST be recorded each time a new sheet is used and the checkword MUST match the checkword recorded on the 'Location Code Registration Sheet'.

LOCOCODES for endangered species or those requiring confidentiality should not divulge accurate co-ordinates of nest or other sites. Procedures for maintaining the security of such places may be obtained from the banding office.

A LOCODE can be a precise location (identified to within a few metres) when long term banding sites are used. However, the preferred minimum for recording is to within one minute of latitude and longitude. A LOCODE can also include an area where several banding sites have been used and probably will not be used again, such as in the banding of birds of prey or nestlings. Each bander must determine how accurately the banding site should be recorded, depending on the likely movements of each species being banded. For example, a LOCODE for a sedentary species should be precise (i.e. within 1 km, or 1 min of latitude and longitude) but for a migratory species LOCOCODES could include a broad area, say within 5 km (or 5 min of latitude and longitude) of a central location. LOCOCODES covering larger areas than this are not acceptable. For broad areas the location given on the 'Location Code Registration Sheet' should say something like 'within X km of Sandy Creek, 12 km NW of Echuca'. This includes a place name that appears on the 1:250 000 map sheets. See fig. 7.5 for an example of a completed 'Location Code Registration Sheet'.

LOCOCODES for corporate groups and for co-operative banding stations are used in the same way.

There is space on the field data sheets for 3 LOCOCODES and if more LOCOCODES are used then extra boxes can be drawn at the bottom of the sheet by the bander. In the first box record the unique 2 character code; then the 10 character check word. The 2 character code is also used in the body of the table in the column headed 'LOCODE'.

7.4 Completing the body of the sheet

BAND NUMBER

The band prefix (first three numbers) should be recorded in the first column and the serial number (the last five numbers) should be recorded in the second column. When a band is replaced or the bird is rebanded (i.e. a band is added but none are removed from the bird), record both band numbers on consecutive lines and link the band numbers with a bracket on either side of the numbers. The old band number should be recorded first and the recovery details recorded as is usual. Next to the new band number record 'this band used to REPLACE (or REBAND the bird carrying) band number ???-?????'. There is no need to record any other data unless these have changed since the bird was recovered e.g. the bird was released another day or at another location (the latter requires special authority from the fauna agency). Removed bands should be attached to the data sheet and returned to the ABBBS for band wear studies.

Siblings (nestlings from the same nest) should be bracketed together on the field sheet or cross referenced to other band numbers. Indicate the number of banded birds in each brood as a fraction of the entire brood size i.e. all live nestlings.

RETRAP

For newly banded birds leave this column blank. For recaptures (dead or alive) of birds that you have banded, or that you know the banding details record 'R' for retrap. For recaptures (dead or alive) of birds with unknown banding details record 'C' for control. These codes are important as they indicate to the banding office staff how to process the record i.e. as a recovery or as a new banding. Banders will be automatically notified of the banding details of recaptured birds recorded as 'C'.

SPECIES NAME

This column is mainly for your use in the field and for later checking. You may use any abbreviation as required. The species type is recorded on the computer using only the species code (see next entry). The use of the species name column may also allow errors in using species codes to be determined at a later time. All banders are encouraged to use this column.

SPECIES NUMBER

This is the species code number assigned by the ABBBS and is given in the List of Approved Band Sizes. The banding scheme species code is the same number as the species number in the RAOU Australian Checklist. Birds not on the RAOU Australian Checklist, such as some birds from Fiji or Papua New Guinea, have been assigned a code and banders should contact the banding office to obtain the relevant List of Approved Band Sizes. Species that do not have a recommended band size on the Approved Band Size list must not be banded unless a 'Trial of band size form' is completed and sent with the field data sheet (See section 5.4).

AGE

The age code system introduced in July 1984 is described in section 6.3.

HOW AGED

The code for describing the character or characters that you used to determine the age of the bird. Methods of ageing birds are described in section 6.4. Other codes are:

- U = Unknown. i.e. you have aged a bird 1+ because it is free-flying but of unknown age and hence you have not used any character to age it.
- R = Character from the 'Bander's Aid' (Rogers et al. 1986). If this publication is the primary source of information on ageing record this 'how aged' code. Thus a plumage code from the 'Bander's Aid' should be recorded with how aged codes 'RP'.

Banders are encouraged to record the two most important characters used to determine the age of each bird except where a character from the 'Bander's Aid' is the primary deciding character.

SEX

Record 'U' for unknown, 'F' for female and 'M' for male.

HOW SEXED

The character(s) used to determine the sex of each bird. Methods of sexing birds are described in section 6.5. Other codes are:

- D = Dissection. For dead birds only!

- R = Character from the 'Bander's Aid' (Rogers et al. 1986). If this publication is the primary source of information on sexing, record this how sexed code. Thus a plumage code from the 'Bander's Aid' should be recorded with how sexed codes 'RP'.

Banders should record the two most important characters used to sex each bird except where a character from the 'Bander's Aid' is a primary deciding character.

DATE

The date of encountering the bird recorded as two numbers for each of day, month and year. For example the 1st of July 1985 should be recorded as 010785. If the exact date is not known do not make up a date but use approximate date conventions e.g. '000785' for sometime in July 1985 or '000085' for sometime in 1985.

LOCODE

Record the two characters from the LOCODE box (at the top of the sheet) where each bird was encountered.

TIME

The time of day when the bird was banded (more particularly when weighed). Record time on the 24 hour clock (i.e. 2 pm is 1400 hrs.) and indicate in the box at the head of this column the time standard e.g. ES for Eastern Standard, CS for Central Standard Time, WS for Western Standard Time, CW for Central Western Standard Time, ED for Eastern Daylight Saving Time, CD for Central Daylight Saving Time. The time can be recorded precisely for each bird or every few birds. Time may also be recorded in hourly blocks so that the hour is recorded against the first bird encountered that hour and then all animals encountered during that hour are indicated by a vertical line (down the centre of the time column) between successive hourly records. This date is not mandatory.

METHOD

A series of codes to define how the bird was encountered. A full list of approved method of encounter codes is given in section 11.2.

STATUS

A code to define what the outcome of the banding encounter was i.e. what is the 'status' of the bird and the band. The full list of status codes is given in section 11.3.

WEIGHT

The column where the weight of the bird should be recorded. Banders often fail to correctly account for the weight of the weighing bag and so space has been allowed for the weight of the bird in the bag and the weight of the bag alone. This measurement is not mandatory.

7.5 Additional information codes

A series of two digit codes defining 'additional information' about the bird or banding circumstances. The full list is given in section 11.4. Only a little of the additional information is mandatory. These codes are provided to encourage measurement and description of birds.

7.6 Birds injured or killed during banding

As of 1 January 1987 all banders are required to provide the ABBBS with complete records of any mortalities which result from banding activities. These include not only birds which have been banded but also those which die or are mercy killed before they are banded.

The submission of banding mortality data requires the complete honesty and integrity of banders. The banding mortality data are collected so that they can be monitored for the activities of all banders who participate in the banding schemes. By collating data on such a broad scale, species or practices associated with high mortality rates can be detected earlier than through an uncoordinated or individual approach. The early detection of problems can then lead to attempts to remedy these problems. Banders should not feel as though they are personally on trial. Rather they should realise the fundamental importance of providing these data is to promote the maintenance of high standards of ethical behaviour and practices by all banders. Banders not providing these data are not conforming to the high standards that are required. Animal welfare is the prime consideration in all banding activities (see section 1.4).

All mortalities should be recorded on field data sheets as if the bird had been banded and released i.e. giving at least all of the details up to and including the 'Status' code on the data sheets. Examples of how to complete the data sheets are shown in figure 7.6. Dead unbanded birds are given the code band number of 'MORTALITY' so that these records can be added to the ABBBS database. Method and Status codes are given in chapter 11.

In addition to the standard (core) banding data you should also provide details of how the mortality resulted using the 'DC' code (stands for death cause). There are nine 'DC' codes and if none of these adequately describe the cause of death contact the banding office for advice. The 'DC' codes are listed in section 11.4.

Where reference is made to injury in these codes it refers only to cases where death ultimately results from the injury. Birds or bats that are injured during banding activities and are then rehabilitated and released are not covered by these codes.

Details of banding mortalities must also be shown on the 'green' Despatch/Acknowledgement of Datasheets form (see section 8.1).

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Line 5 (016-88888) banded bird injured during measuring, mercy killed, band left on bird, bird donated to museum collection.

CHAPTER 8 Submitting Banding Data to ABBBS

- 8.1 *Submitting data on field data sheets*
 - Despatch/acknowledgement of data sheets form*
 - Location code registration sheets*
- 8.2 *Submitting banding data via electronic media*
 - Datafile design*
- 8.3 *Types of compatible media*
 - Disc*
 - Magnetic tape*
 - Modem*
 - Emulation of data*
- 8.4 *Despatching data on electronic media*
- 8.5 *Establishing computer databases for banding data*

8.1 Submitting data on field data sheets

'A' class banders are required to submit one copy of their completed field data sheets to the ABBBS and are encouraged to keep another copy for their own records. Their copy will serve as a back-up in case the original data sheets are lost. 'B' class banders must submit data sheets through their 'A' class project leader and the sheets must be completed in the name (and authority number) of the 'A' class project leader or corporate banding group.

Data sheets should be sent to the banding office at frequent intervals, and at least every three months. Banders who band several times each month and those who band species that are known or suspected of moving from the banding site (such as seabird nestlings, waterfowl, some raptors, some waders and migratory passerines) should submit data sheets more frequently. These groups of birds have relatively high recovery rates and so it is likely that the ABBBS will have to seek banding data from banders unless data are sent in soon after banding. Banders must send in all previously unsubmitted banding data when their banding authority is resigned or cancelled and before their authority is renewed in July each year.

DESPATCH/ACKNOWLEDGEMENT OF DATA SHEETS FORM

The 'green' Despatch/Acknowledgement of Data Sheets form must be used whenever banding data are submitted to the banding office. The form should be completed in DUPLICATE by or on behalf of the 'A' class bander and forwarded with the field data sheets. When the forms and data sheets are received at the banding office the number of data sheets received and the last banding date on these sheets are checked against the information that was recorded by the bander on the 'green' forms. Any errors will be noted on the 'green' form and one copy of the form will be returned to the 'A' class bander as confirmation that the data have been received at the banding office.

Banders should complete all parts of the form except the 'Office Use' boxes. An example of a completed form is shown in fig. 8.1. It is recommended that banders send data to the banding office in small batches as this will make it simpler for banders to complete the form.

LOCATION CODE REGISTRATION SHEETS

Location code registration sheets should be sent to the banding office as soon as the bander has used a new LOCODE. At the very latest these sheets should be submitted with the data sheets in which the new LOCODE is first used (see section 7.3).

Upon receipt of the location code registration form the new LOCODE(S) will be registered on the ABBBS database. A computer printout of the new LOCODE will be immediately returned to the bander for checking and as confirmation that the LOCODE has been registered with the ABBBS. Banders should retain these printouts as their permanent record of the LOCODE details.

8.2 Submitting banding data via electronic media

Banders who store banding data on a computer should consider the direct transfer of information to the ABBBS computer database via some form of electronic medium. Not only will this save time when submitting your banding records but it will also reduce the chances of errors being introduced into the data through rekeying and other manipulations. Banding data which have been organised according to the data file layouts required by ABBBS can be transferred to the ABBBS computer system by floppy disk, magnetic tape or computer modem. Similarly, data downloaded from the ABBBS database could be transferred via these means to your database. More details concerning the specifications and use of electronic media transfer are given below. For further information on this aspect of your banding activities please contact the Coordinator.

DATAFILE DESIGN

The ABBBS database has two types of files: one type stores the detailed data using the various codes (most of which appear on the field data sheets) and the other stores the information for decoding the codes used in the previous files. For example, species codes appear in the first type of file and the English and scientific names relevant to each species code are stored in the second type of file.

To submit your data to the ABBBS you should construct files of the first type using the same layout as the files on the ABBBS computer database. The complete details of the layout and conventions used in these files may be obtained from the Coordinator.

8.3 Types of compatible media

The ABBBS can transfer data via floppy disc, magnetic tape and computer modem. Details are given below.

DISCS

The types of discs that can be read and written to by the ABBBS are:

- Hewlett Packard MS-DOS 3½ and 5¼ inch;
- IBM PC-DOS 3½ and 5¼ inch;
- Applesoft and CPM 3½ and 5¼ inch; and
- other 3½ and 5¼ inch systems that can be read with PC-Alien software.

For details contact the Coordinator.

MAGNETIC TAPES

The ABBBS have a 9 track tape drive. Data should be sent in 1600 bpi, ASCII, blocking factor = 1, record lengths all equal, record length not to exceed 150 characters.

MODEM

The ABBBS have a modem set at baud rate 2400. Data transfer is possible through this device. Use of modems will have to be negotiated with the Coordinator.

EMULATION OF DATA

For data that cannot be transferred via one of the media discussed so far it may be cost effective for the ABBBS to have data emulated to a compatible system. However this is rather expensive and will only be acceptable for large amounts of data.

8.4 Despatching data on electronic media

All data that are submitted to the ABBBS on electronic media must be accompanied by two copies of the fully completed Despatch/Acknowledgement of Data Sheets form. This form is essential for the efficient processing of electronic media because the forms have several functions in the clerical system in the banding office. Mortalities and control retraps must also be signalled on the form. Computer generated facsimiles of the form will be accepted providing they contain all the information which is normally required.

Hard copies of the banding data are also needed and should be sent with the electronic media. The hard copy should ideally be copies of the data sheets that were completed in the field, or as a second choice, a facsimile data sheet produced by you or your computer. The hard copy is essential for error checking, office filing and storage routines.

The second copy of the Despatch/Acknowledgement form will be returned to banders. When the banding data have been transferred to the ABBBS database they will be printed. Printouts will be examined in the banding office and sent to banders for the customary error checking and as acknowledgement that all data have been transferred successfully. It is important that banders carefully check these printouts because the data have not undergone the error-checking that is made when the ABBBS staff key in the data.

8.5 Establishing computer databases for banding data

The ABBBS can advise banders about establishing databases for banding data because these offer tremendous advantages to banders and the ABBBS. The ABBBS is able to provide free of charge sophisticated database programs for storing banding data and for sending these data to the banding office on computer media rather than on data sheets. These programs have been developed by and in association with banders and are compatible with the ABBBS database. For further information contact the Coordinator.

CHAPTER 9 Colour Marking Studies

- 9.1 Colour marking authorities
- 9.2 Colour banding
 - Schemas
 - Colour band specifications
 - Application of colour bands

- 9.3 Other colour marking methods
 - Plumage dyes
 - Wing tags
 - Nasal saddles
 - Coloured collars
 - Leg flags
 - Others
- 9.4 Submission of colour marking data
 - Reporting sightings of colour markings

9.1 Colour marking authorities

The ABBBS has responsibility for authorising and coordinating all forms of colour marking of birds in Australia and its territories. The functions of this service are to avoid the conflicting use of colour markers by researchers and to maintain a national database on the use of colour markers. Prior to commencing any type of colour marking study, banders are required to apply in writing (preferably on the appropriate form) stating the reasons for undertaking a colour marking project, the location of the study and the species involved. **For known or potential international migrant or vagrant species, banders should submit applications at least two months in advance to allow the Secretary to clear the proposed colour marking with the appropriate foreign banding schemes.**

The ABBBS maintains a register which lists the particulars of all forms of colour marking. This data coupled with knowledge of the movement habits of species allows the Secretary of the ABBBS to select appropriate types of colour markers for use by banders. The Colour Marking Authority (CMA) specifies the details of the colour marking approved for the bander.

If a bander wishes to incorporate new species or vary the details given on the CMA in any way, prior approval must first be given by the Secretary. Failure to do so may jeopardise another researcher's project and the bander's permission to continue colour marking.

Only 'A' Class banders may apply for Colour Marking Authorities.

Field officers of the State and Territory fauna agencies may ask to examine a CMA and so it should be carried whenever you are engaged in colour marking activities.

Colour Marking Authorities are renewed annually at the time of renewing banding authorities (i.e. 30 June). It is a condition of the CMA and the use of ANPWS bands that all details of colour marking are provided on the banding data submitted to the ABBBS.

9.2 Colour banding

At present there are four standard colour banding schemas recommended by the ABBBS. Depending upon the species and the needs of the project, banders are encouraged to use one of the schemas listed below.

Banders should carefully consider the logistics of the proposed colour banding project, bearing in mind cost and the practical aspects of observing large numbers of colour banded birds. As well, very careful consideration should be given BEFORE commencing a project to how many individual colour band combinations may be required. Experience has shown that it is far better to over estimate useage of combinations than to run out of combinations in the middle of the project, thus necessitating the use of a second schema. Consideration will also be given by the Secretary to the likely use of schemas for each species by other researchers in the future. Colour bands last for many years which may restrict the re-use of a schema for a long time period.

Because there are so many banders now undertaking colour banding studies it is no longer acceptable to request permission to colour band 'all species encountered'. Colour banding should not be used to aid in the ready recognition of retraps !

The colour banding system cannot function for the benefit of all without certain restrictions and adherence to these guidelines by all banders. In the past there has been instances of studies being invalidated by banders who have duplicated the schemas used by another bander. By operating as a central co-ordinating body, the ABBBS can assist banders by preventing the repetition of such events.

Banders should also consider the possibility that colour bands may influence the reproductive behaviour and success of the target species thus introducing biases into the data collected. The paper by Burley, Krantzberg and Radman (1982) is a good illustration of this effect.

SCHEMAS

The four basic colour band schemas recommended by the ABBBS are described below. They are designed to minimise the possible confusion which can result when colour bands are lost from birds. Because loss of colour bands is a relatively frequent occurrence banders are strongly urged to use one of these schemas. The schemas are summarised in table 9.1.

Table 9.1 Summary of the band positions to be used for the four standard colour banding schemas

<i>Schema Number</i>	<i>Left Tarsus</i>	<i>Right Tarsus</i>
1	one colour band	metal band only
2	metal band only	two colour bands
3	two colour bands	one colour over metal band
4	one colour over metal band	three colour bands

Schema 1 : Site/age cohort recognition (sedentary species)

For projects where the only requirement is to recognise the individuals from a particular site or age class, a single colour band can be used. The Secretary, in consultation with the bander will nominate an appropriate colour to be used based on the previous or current work being done on the species.

For Schema 1 the band positions are:

- Colour band : Left tarsus
- Metal band : Right tarsus

Because this schema has only a few colour combinations there must be exceptional circumstances for its use. It is generally only applicable to sedentary species.

Schema 2 : Site/age cohort recognition (all species)

Where the bander wishes to colour band birds to be able to recognise both the site and year of banding, two colour bands are used.

For Schema 2 the band positions are:

- Metal band : left tarsus
- Two colour bands : right tarsus

In the event of the bird losing one of the colour bands, individuals banded according to Schema 2 will not be confused with those from Schema 1 as the metal band is on the opposite leg.

Schema 3 : Colour banding for individual recognition (known sedentary species, species being studied by no other bander and species with short tarsi)

Where the bander wishes to recognise individual birds and one of the above conditions pertains, a three colour band schema can be used.

For Schema 3 the band positions are:

- Two colour bands : left tarsus
- One colour over metal band : right tarsus

Using the six recommended colours (see below) Schema 3 allows for 216 combinations at any one site or for any one species.

Schema 4 : Colour banding for individual recognition (known or potential migrants)

For species known to disperse long distances or those suspected of doing so, a four colour band schema should be used so as to maximise the number of unique combinations available.

For Schema 4 the band positions are:

- One colour over metal band : left tarsus
- Three colour bands : right tarsus

Using the six recommended colours (see below), there is a maximum of 1296 combinations available for each species. Should a species of Schema 4 type lose a colour band, it should not be confused with a Schema 3 bird as the metal bands are on different legs.

For Schema 4, banders are allocated combinations from the 1296 that are available. To avoid duplications only these must be used. Notwithstanding what was said in an introductory paragraph, when applying to colour band species of dispersive habits it is important to be conservative with the number of combinations requested. Extravagant requests will be pruned to realistic numbers so as to avoid unnecessary waste of combinations.

If the combinations provided to a bander are exhausted, the bander should not proceed to colour band using combinations of his/her own invention. This will undoubtedly duplicate the work of another bander and therefore invalidate both studies.

When applying to renew a CMA (i.e. at the time of banding authority renewal) the number of unused Schema 4 combinations should be calculated. The application should include the requirements for the coming twelve months of colour marking. When a colour marking study is completed the schema sheets, that were provided at the time of receiving the CMA, should be returned to the ABBBS showing the combinations not used.

Special cases

If there is a special case for not using one of the above schemas, please contact the Secretary.

COLOUR BAND SPECIFICATIONS

The range of colour bands presently available in Australia is shown in table 9.2. It is important to use the correct size of colour band otherwise birds may be seriously injured.

The size XF colour bands should be reshaped for use on species taking size 1 metal bands. They can be reshaped around 2.0 mm diameter wire by submerging the colour band and wire in very hot water. XF bands may also need to be reduced in height for small species, particularly when more than one colour band is applied to the same leg.

Table 9.2 Specifications of colour bands available in Australia

<i>Metal Band Size</i>	<i>Colour Band Size</i>	<i>Type</i>	<i>Material</i>
1	XF (*)	Split	Celluloid
2	XF	"	"
3	XCS	"	"
4	XCL	"	"
5	XB	"	Celluloid/Darvic PVC
6	X3	"	"
7	1FB	Wrap-a-round	"
8	2FB	"	"
9	3FB	"	"
10	4FB	"	"
11	5FB	"	"
12	6FB	"	"
13	8FB	"	"
14	9FB	"	"
15	10FB	"	"

(*) N.B. there is no smaller colour band than XF available. XF is slightly larger than the size 1 metal band and should be reshaped to the correct diameter if used on species that take size 1 metal bands. On some small species XF bands may also need to be reduced in height.

Availability of colour band supplies

The ABBBS does not provide any colour marking supplies. All enquiries should be directed to the Secretary, Mist Net and Colour Band Service, Australian Bird Study Association, PO Box A313, Sydney South, NSW 2000. A current price list and the details of ordering supplies from the ABSA can be requested from the banding office using the standard 'pink' form.

Recommended colours

For many years the ABBBS has received reports of colour bands fading so much that positive identification of the colours is unreliable. Celluloid bands seem to fade much more than Darvic PVC bands and some colours fade rapidly. By contrast, Darvic PVC bands are relatively UV-resistant and little fading occurs. Unfortunately, the smaller bands are currently only available in celluloid because of the technical limitations of the material.

In trials carried out with celluloid bands (where they were exposed to natural weather conditions for nearly 15 months) several colours faded sufficiently to warrant recommendation against their use. These colours were Dark Green and Light Blue (where the bands were virtually indistinguishable at the end of the trial); Dark Pink (faded to Pale Pink) and White (which faded to Yellow).

On the basis of these trials (which were admittedly harsh) the ABBBS recommends that only the following colours be used when celluloid bands are necessary.

Red, Black, Dark Blue, Light Green, Orange and (Yellow or White)

N.B. Yellow and White are bracketed to indicate that they should not be used as separate colours.

Purple performed relatively well in the 'exposure trial', but is preferred as the first reserve when other combinations are exhausted.

During the fading trials with Darvic PVC bands, all colours tested (Dark Blue, Black, White, Grey, Light Green, Dark Green, Yellow, Orange, Red and Brown) showed relatively less fading than the celluloid bands, and all colours were easily recognisable after the trial. The Black band became brittle and broke. Light Blue was not tested.

Even though most Darvic colours may be reliably used the ABBBS recommends the six standard colours be used as a first preference.

APPLICATION OF COLOUR BANDS

Split type colour bands (usually made of celluloid)

A special applicator will be provided whenever you purchase the smaller, split-type colour bands. As indicated in figure 9.1, the band is opened by sliding it onto the fluted end of the applicator. By positioning the fluted end of the applicator parallel with the tarsus of the bird, the applicator can be withdrawn leaving the plastic band surrounding the bird's leg. Be careful not to over-expand the colour band as you may encounter difficulties in getting it completely closed again. Leave the band on the applicator for as little time as possible to avoid this problem. The split-type band should then be sealed with Acetone (nail polish remover). The band should be held closed with the fingers for 30 seconds to allow the bonding agent to take effect.

Alternatively, celluloid bands can be sealed by firmly closing them with banding pliers.

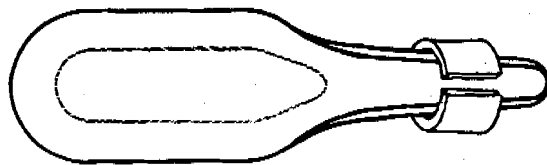


Figure 9.1. A split type colour band on an applicator.

Wrap-a-round colour bands

These bands should be applied by rolling the band on to the leg so that the outside coil is transferred to the inside of the band when fitted to the bird's leg (fig. 9.2). The bands should be sealed with acetone (celluloid bands) or the glues (PVC bands) mentioned in the next section. The sealant is applied between the surfaces of the band that are overlapping and the band is held closed until it is sealed.

When placing more than one wrap-a-round colour band on the same leg, it is important that the bands be sealed. If this is not done, the bands may intertwine and tighten around the leg with obvious detrimental effects for the bird.

Sealing agents for colour bands

All colour bands should be sealed to avoid tangling of the band with twigs, fibres and other materials which may injure the bird. Several serious injuries associated with unsealed bands have been reported. This is particularly pertinent for birds which feed in the leaf litter of the forest floor. In addition, bands left unsealed may entrap mist-net strands, making extraction of the bird awkward and potentially jeopardise the well-being of the bird.

Celluloid colour bands can be sealed closed with acetone (nail polish remover). Recent trials have shown that these bands may be effectively sealed by firmly closing them with banding pliers. The seal has lasted for two years and no sealing agent is required.

Darvic PVC bands cannot be sealed with acetone. They can be sealed with PVC glues such as 'Bostik Clear PVC Solvent Cement — 1921', 'Selleys PVC glue' or one of the standard Supaglues. The Bostik cement is probably preferable to the others as it seals in about 20 seconds. The others take up to three times as long to seal. The various Supaglues available are not favoured as they are difficult to use and can be hazardous to the bird (and the bander) if not handled carefully.

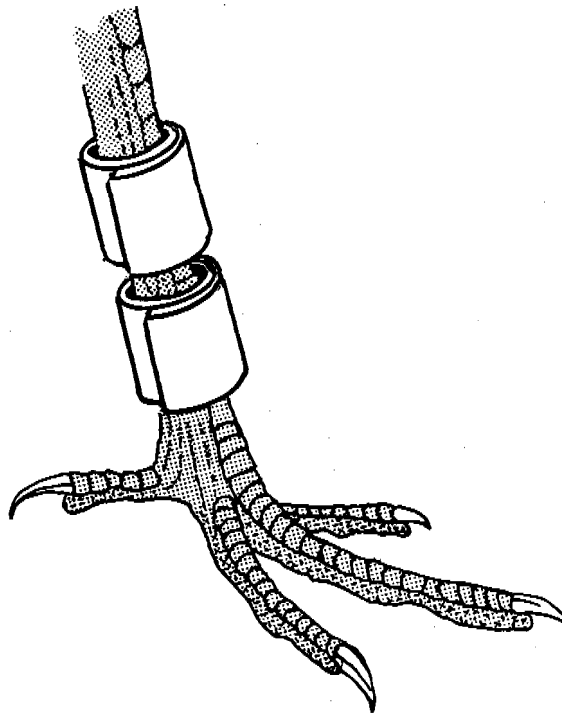


Figure 9.2. Two wrap-a-round colour bands rolled onto a bird's leg. The bands must be rolled into the same shape configuration (i.e. with the same direction in the bands spiral) to minimise the chance of the bands intertwining after being sealed.

9.3 Other colour marking methods

There is a variety of colour marking methods which can be used to aid the remote recognition of birds. All such methods can potentially affect the bird and this should be considered when designing a project which involves any form of colour marking. Some examples of where colour marking has been shown to affect the biology of the target species are given under the relevant categories below.

The use of any of these methods requires the issue of a Colour Marking Authority PRIOR to commencing the colour marking.

PLUMAGE DYES

These are generally water resistant stains or paints in a variety of colours which will persist for several weeks or months depending upon the species and their habits. They can be applied to appropriate body regions to indicate different sites of encounter.

Plumage dyes have one major advantage over other colour marking methods in that they are relatively quick to apply and thus many birds can be marked.

WING TAGS

Wing tags can be made from flexible plastic fabrics (Southern 1971) or rigid, lightweight metals (Rowley and Saunders 1980). The plastic tags are attached to the bird by folding the appropriately shaped material over the leading edge of the wing and then fastening the two ends together with either nylon line or rivets. The fastening should be positioned between the secondaries and the scapulars. With the metallic tags, a single disc is attached to the wing using nylon line or fine stainless steel wire.

Wing tags have been used on many species, including pelicans, egrets, cockatoos and rosellas. No standard design suits all species and careful consideration must be given to this aspect of any study intending to use patagial tags.

Wing tags can be adorned with various numbering systems or colour codes to enable the remote recognition of individual birds. There is some evidence that wing tags may make the bearer more vulnerable to predators as well as human observers (Southern and Southern 1985). Increased mortality rates should be considered as a possible side-effect of patagial tagging.

NASAL SADDLES

Nasal saddles are coloured, plastic tags which are applied to the nasal region of the bird's bill. Only waterfowl can be colour marked in this way. The saddles are held in place by a nylon line passed through the nasal openings. The tags can be notched or coloured in ways which allow the recognition of individual birds. For further information on this form of colour marking see Davey and Fullagar (1985).

COLOURED COLLARS

Coloured plastic neck bands can be used on species such as Black Swan and Cape Barren Goose. The collars are adjustable and very obvious making the potential for sightings quite good. For further information consult Braithwaite (1966).

LEG FLAGS

Thin strips of adhesive tape have been applied to the outside of closed metal bands. A trailing end of tape produces a flag. The flags have been used successfully in the northern hemisphere but, in recent trials on waders, the tape does not stay on the bands for long periods under Australian conditions. More durable tape and glues are presently being trialled.

OTHERS

There are a variety of other methods which can be used to colour mark birds. For further information contact the banding office or consult Marion and Shamis (1977) or Rowley (1964).

9.4 Submission of colour marking data

All colour marking details must be recorded with the banding details forwarded to the banding office on the Type II Data sheets (see fig. 7.2) or modified Type I sheets.

The codes for colour marking methods and for the colours used in these markers are listed in section 11.4.

Reporting sightings of colour markings

Any sightings of colour marked birds should be reported to the banding office using the standard data sheets. The sightings are reported as retraps or controls in the same manner as recoveries of metal bands are reported. The method and status codes for the sighting of a colour marked bird are given in chapter 11.

CHAPTER 10 Cooperative Banding Stations

- 10.1 Background
- 10.2 Administration
- 10.3 Bander's responsibilities
- 10.4 Colour banding
- 10.5 Data analysis
- 10.6 Authorised cooperative banding stations
 - Bullamon Plains, Qld
 - Widgee, Qld
 - Burrendong Arboretum, NSW
 - Charcoal Tank, NSW
 - East Hills, NSW
 - Fowler's Gap, NSW
 - Mootwingee, NSW
 - Munghorn Gap, NSW
 - Pappinbarra, NSW
 - Weddin Mountains, NSW
 - Blackwood, Vic
 - Coolart, Vic
 - Rotamah Island, Vic
 - Flinders Island, Tas
 - Eyre, WA
 - Rottneest Island, WA
- 10.7 General

10.1 Background

Cooperative Banding Stations are places where any authorised bird bander can band birds subject to certain conditions being satisfied. These types of banding station have been maintained in Australia for many years, the best known being those conducted by banders in New South Wales. In 1985 the concept was expanded to establish Cooperative Banding Stations in places remote from the population centres. The prime reason for establishing such stations is to encourage banding in locations where no banders are resident so that little studied species and migrations through such areas can be investigated.

The Coordinator of the ABBBS approves the establishment and oversees the maintenance of the stations. The aims and objectives of each Cooperative Banding Station must be clearly defined and may be of a general nature e.g. to study the bird community in a location where little other banding has been conducted.

One set of LOCODES will be registered for each banding station by the Data Curator and ALL banders should use these LOCODES.

10.2 Administration

Banders who have some association (through their profession, personal contact or previous banding) with the location and/or the landowners are appointed as Data Curators. Data Curators liaise with the landowners and control the access and conduct of banders operating at the station. As well, a Local Contact person may be nominated for on-site liaison.

Data Curators also maintain a register of all banding records and are responsible for obtaining banding records as soon as possible from banders who operate at the station. All banding records should be provided immediately to the ABBBS on the modified data sheets (see section 7.2). Data Curators will be provided with a computer printout of data as soon as these data are processed at the ABBBS. Data Curators will also maintain records of the precise location of the banding sites at the station, provide notes on potential hazards with banding and suggested net numbers and layouts.

Data Curators are also encouraged to develop notes on ageing and sexing species at that site so that banders who are unfamiliar with these species will have assistance in the determination of these characters. All of the materials will be gathered into a kit, copies of which will be loaned to banders and may be obtained from the Local Contact.

10.3 Bander's responsibilities

Banders operating at the station must comply with the following guidelines:

- hold a current 'A' or 'B' class Banding Authority with the appropriate endorsement;
- obtain permission from the Data Curator to band at the site at least two weeks in advance of the visit;
- follow the Data Curator's directions for conduct and trapping site location;
- be in possession of a permit from the State or Territory fauna agency concerned;
- provide one copy of all banding data to the Data Curator (sometimes through the Local Contact) and one copy to the ABBBS at the earliest possible time after banding (some curators require cards to be completed for each bird in addition to data sheets). Modified field data sheets for use at banding stations are available from the ABBBS;
- use the LOCODES assigned for the station by the Data Curator. Banders should not register LOCODES in their own names;
- record the trap site where each bird was captured; and
- register new trapping sites with the Data Curator including a map of the new site (this may be hand drawn and the site should be marked so that other banders can find the site). Any alterations to habitat when establishing new trapping sites must be approved by the landowner in advance.

Banders must ensure that good public relations and cooperation with other banders are maintained. These requirements are particularly important for the successful operation of Cooperative Banding Stations. Any failure in this regard may reflect adversely on the ABBBS and could jeopardise the existence of the banding station concerned. Landowners have generously granted access to their properties and banders must adhere to the landowner's instructions. If banders do not rigorously heed these requirements they will lose the privilege of operating at the stations.

Banders are encouraged to take measurements of the birds, record the details of moult activity and must take special care to assess age and sex of all birds handled. The latter may require detailed descriptions of plumage patterns so that these can be traced through time and so diagnoses of age and sex will become better defined. Data Curators may provide advice to banders as to which measurements are most applicable for each species. Such detailed examination and measurements are important for many species because this information is being collected at very few other places.

All retraps of birds should be recorded; this includes multiple retraps on the same day. These data may allow determination of minimum home ranges of the birds and will permit estimates of survival to be calculated. In short, maximum yields of information are sought from each banding period. Banders should also attempt to keep a list of birds sighted, but not banded, so that new species can be added to the list of species sighted at the banding station. An up to date list is provided in the kit for each station. The list will help banders to determine the identity of unfamiliar species prior to banding.

10.4 Colour banding

Some Data Curators will hold Colour Marking Authorities for birds at the banding station. Data Curators may provide colour bands and lists of approved color combinations for banders to apply to species in accordance with the Colour Marking Authority. Banders should take special care to ensure the correct combinations of colour bands are used. Banders are also responsible for recording the use of colour bands on the data sheets. Sightings of colour banded birds should be

recorded on the data sheets. Colour dyes may also be applied by visiting banders in accordance with a Colour Marking Authority. No other form of colour marking can be performed by proxy at the Cooperative Banding Stations, without the prior approval of the Secretary of the ABBBS.

10.5 Data analysis

All data collected at the Cooperative Banding Station are available for analysis by any person authorised by the Coordinator of the ABBBS. In practice most Data Curators will be best informed about the birds at the station and would be encouraged to analyse data obtained. Analyses will be encouraged two to three years after the establishment of the station. Any publication using data derived from a banding station is subject to the normal requirement that the ABBBS, major banders and the landowners, are acknowledged.

10.6 Authorised cooperative banding stations

BULLAMON PLAINS, QLD

In south central Queensland, 3 km north of Thallon on the cattle station owned by the Willis family. Birds include Masked Woodswallow, Spotted Bowerbird and Ground Cuckoo-shrike. Data Curator: Dr Kim Lowe, GPO Box 8, Canberra, ACT 2601. Tel. 062 46 6180.

WIDGEE, QLD

Approximately 20 km west of Gympie in south-east Queensland on the property of banders Peter & Bevy Hughes. The property consists of areas of araucaria vine scrub, eucalypt forest and grasslands. Banders may camp on the property. Birds include Dusky Honeyeater, Little Shrike-thrush, Red-backed Fairy-wren, White-throated Honeyeater, Chestnut-breasted Mannikin and Spectacled Monarch. Data Curators: Mr & Mrs Peter Hughes, Hawkins Rd., Widgee via Gympie, Qld 4570. Tel. 071 84 0198.

BURRENDONG ARBORETUM, NSW

In the Burrendong State Recreation Reserve on the western side of Burrendong Dam 20 km south-east of Wellington. Birds include Plum-headed Finch, Diamond Firetail, Brown Quail and Black-chinned Honeyeater. Data Curator: Mr Darryl Smedley, 25b Railway Street, Baulkham Hills, NSW 2153. Tel. 02 218 7304.

CHARCOAL TANK, NSW

At the Charcoal Tank Nature Reserve 10 km south-west of West Wyalong on the Newell Highway. Birds include Shy Heathwren, Mulga Parrot, Variegated Wren (Purple-backed form), Gilbert's Whistler and Southern Scrub Robin. Data Curator: Mr Mark Clayton, CSIRO, PO Box 84, Lyneham, ACT 2602. Tel. 062 42 1725.

EAST HILLS, NSW

In the southern suburbs of Sydney. Birds include Latham's Snipe. Data Curator: Mr Darryl Smedley, 25b Railway Street, Baulkham Hills, NSW 2153. Tel. 02 218 7304.

FOWLER'S GAP, NSW

On the Silver City Highway 100 km north of Broken Hill at the University of New South Wales Arid Zone Field Station. Birds include Chirruping Wedgebill, Chestnut-crowned Babbler, White-winged Fairy-Wren, Zebra Finch, Southern Whiteface and Apostlebird. Data Curator: Mr Win Filewood, 26 Trelawney Street, Eastwood, NSW 2122. Tel. 02 858 5302.

MOOTWINGEE, NSW

At Mootwingee National Park 110 km north-east of Broken Hill. Birds include Black and Pied Honeyeater, Bourke's Parrot, Hall's Babbler, and White-fronted honeyeater. Data Curator: Mr Nick Sheppard, 3 Jacaranda Place, Broken Hill, NSW 2880. Tel. 080 88 2488.

MUNGHORN GAP, NSW

At the Munghorn Gap Nature Reserve 35 km north-east of Mudgee. Birds include Turquoise Parrot, Yellow-tufted Honeyeater, Little Cuckoo-shrike, Rock Warbler and Regent Honeyeater. Data Curator: Mr Darryl Smedley, 25b Railway Street, Baulkham Hills, NSW 2153. Tel. 02 218 7304.

PAPPINBARRA, NSW

At the Pappinbarra Field Studies Centre inland from Wauchope. Birds include Brown Cuckoo-Dove, Azure Kingfisher, Noisy Pitta, Black-faced Monarch, Rose Robin and Regent Bowerbird. Data Curator: Mr David Geering, 1/22 Fry Street, Grafton, NSW 2460. Tel. 066 42 1207.

WEDDIN MOUNTAINS, NSW

On a private grazing property adjacent to the Weddin Mountains National Park approximately 10 km south-west of Grenfell. Birds include a great diversity of species especially honeyeaters including Black and Striped Honeyeater. Data Curator: Mr Richard Allen, PO Box 1275 Woden, ACT 2606. Tel. 062 96 1426.

BLACKWOOD, VIC

At the Garden of St. Erth at Blackwood. Birds include various honeyeaters and birds of the wet gullies such as Rose Robin and Leaden Flycatcher. Data Curator: Dr Stephen Garnett, Garden of St Erth, Blackwood, Vic 3458. Tel. 053 68 6650.

COOLART, VIC

At the Coolart Reserve near Balnarring. The habitat is coastal scrub and the main aim of the project is to band bush birds that move through the area, including the Bass Strait migrants such as the Grey Fantail, Flame Robin, Spotted Pardalote and Silvereye. Data Curator: Mr Gordon Cameron, 66 Balnarring Road, Merricks North, Vic 3926. Tel. 059 82 1602.

ROTAMAH ISLAND, VIC

In the Gippsland Lakes National Park at the RAOU Bird Observatory. Birds include unusual plumaged White-browed Scrubwrens and many bush birds. Data Curator: The Wardens, Rotamah Island Bird Observatory, PO Box 75, Paynesville, Vic 3880. Tel. 051 56 6398.

FLINDERS ISLAND, TAS

At the Patriarch's Wildlife Refuge 35 km north-east of Whitemark. Birds include Tasmanian endemic species and birds migrating across Bass Strait. Data Curator: Dr Bill Wakefield, 12 Alt Na Craigh Avenue, Lenah Valley, Tas 7008. Tel. 002 49 1311.

EYRE, WA

In the Nuytsland Nature Reserve at the RAOU Bird Observatory. Birds include many species of honeyeater such as White-fronted, Yellow-plumed, Purple-gaped and Western Spinebill. Data Curator: The Warden, Eyre Bird Observatory, Eyre Telegraph Station, Cocklebidy via Norseman, WA 6443. Tel. 090 39 3450.

ROTTNEST ISLAND, WA

Off-shore from Perth. Birds include Osprey, Red-capped Robin and an endemic race of the Singing Honeyeater. Data Curators: Dr Denis Saunders and Mr Perry De Rebeira, CSIRO, Locked Bag No.4, PO Midland, WA 6056. Tel. 09 252 0107.

10.7 General

Contact the Data Curator of the banding station for further information and permission to operate there. Nominations for Cooperative Banding Stations are welcome and should be directed to the Coordinator, ABBBS.

CHAPTER 11 Approved Method, Status and Additional Information Codes

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- 11.3 Status codes
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- 11.4 Additional information codes
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- 11.5 List of approved method codes
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- 11.7 List of approved additional information codes

11.1 General

This chapter provides details of how to use the approved method, status and additional information codes. The codes are organised into the types of codes and then within each code type into logical groups for easy reference. A list of the approved codes and brief descriptions are given in section 11.5 (method codes), section 11.6 (status codes) and section 11.7 (additional information codes). Species codes are given in the List of Approved Band Sizes (See sections 6.1, 6.2); age codes are described in section 6.3; and sex, how aged and how sexed codes are given in section 7.4.

The code system should be viewed as a series of inter-related code types which together fully describe the details of a banding encounter. For example, in combination, the method and status codes describe why the bird was encountered and what the status of the bird and band are after the encounter has been concluded. Some special cases will also require the coding of additional information, such as the location where rehabilitated birds were obtained. Measurements and other information are stored using the additional information codes.

From the onset of developing the codes to be used in the ABBBS database, every attempt was made to define codes in a logical manner. The aim was to make the codes easy to remember so that banders would not need to constantly refer to lists of codes. Generally this aim has been

achieved. For example, method of encounter codes that are closely related have been kept together in the list of codes. Another example is that codes used to describe the moult of parts of the bird all begin with the letter 'M'.

The use of the code system during its first year of operation necessitated the allocation of a few extra codes which could not fit in to the pre-existing series. No doubt this sort of change will continue to occur at a low rate. The over-riding philosophy in the code system is never to permit a radical change of the whole code system and never to reallocate a code to a radically different situation. In a few words, the present code system will be used for many years with only minor modifications.

New approved codes may only be allocated by the Coordinator to whom applications for new codes must be made in writing.

11.2 Method of encounter codes

Method codes describe how the bird was encountered. These codes are used for initial banding, recovery and retraps of banded birds. A detailed account of the circumstances defined by each of the codes within each code group is given below. Please note that one code may be included in more than one code group. The code groups have no significance of their own, but are used only to allow easy location of each code.

This section presents method of encounter codes in the following groups and order:

- bander trapping techniques and sightings
- traps not operated by banders
- bird or band tangled in an object
- sickness or injury
- collisions
- shot or taken as part of control program
- poisoning
- taken by animals
- band has affected chance of recovery
- found at nest
- miscellaneous
- found dead, cause unknown

Presumed reasons for an encounter are not normally permitted. Do not, for example, guess how a bird was killed. You should find a code which best matches the situation of the encounter. At the simplest level this may be 'found dead' (code 99). It is crucial that codes must accurately define the encounter. **If you cannot find a suitable code then fully describe the situation in writing and send the description to the banding office where codes will be assigned.**

A hierarchy exists within the codes. Code 54 (beachwashed) overrules codes 99 and 95 because code 54 caters for the transportation of a dead bird's body by water currents. Any dead bird or its remains that are found on a beach require the use of code 54. However, live birds found on the beach require the use of other codes e.g. 25, 28, 29. If only a leg and band are found then the bird may be still alive so use code 58. Code 56 (trapped or killed because it was banded) has priority over all other relevant codes because it is important to recognise data from birds that were selected from the wild purely because they were banded.

Codes 90 and 91 (listed on the cover of field data sheet pads) are now OBSOLETE and should not be used.

BANDER TRAPPING TECHNIQUES AND SIGHTINGS

These codes need little description.

- 03 = trapped in mist net
- 04 = trapped in cage trap including drop traps, funnel traps
- 05 = trapped with cannon, rocket or other explosively propelled net
- 06 = trapped in clap trap, sprung trap, etc.

- 07 = trapped with Bal-chatri, snare
- 08 = trapped by hand or handheld net (e.g. nestlings) EXCEPT encounters where the bird was captured by hand because it was behaving abnormally MUST NOT use this code. Examples of such abnormal behaviours are sick/injured birds, birds that collided with a window, nestlings that have fallen from their nests, birds found on ships at sea, adult birds on nests, etc. All of these encounters must be coded with another code. See also codes relating to scientific collecting and control programs.
- 09 = trapped using a light device e.g. spotlight
- 0A = trapped with a Dho-ghaza NB: code is zero not the letter 'o'
- 0R = located using radio telemetry NB: code is zero not the letter 'o'
- 13 = hand caught at roost or nest (not nestlings)
- 24 = trapped using narcotic drugs
- 46 = colour marking sighted in the field of one bird from a cohort of identically colour marked birds ie colour mark identifies a single banding date and/or place for more than one bird. Use status code 26 (section 11.3) as well
- 47 = band number read in the field (using binoculars or naked eye) but the bird was not trapped. Use status code 26 (section 11.3) as well
- 48 = colour marking sighted in the field and the band number was inferred from the colour marking. Use status code 26 (section 11.3) as well
- 49 = band number and/or colour marking sighted on adult bird at its nest. Use status code 26 (section 11.3) as well
- 59 = colour marker found, (band number inferred). Use status code 00 (section 11.3) unless there is strong evidence for death (e.g. wing, head)

TRAPS NOT OPERATED BY BANDERS

See the section below on the use of fishing gear. Traps not operated by banders are:

- 14 = trapped as attracted to domestic birds. If to protect domestic birds (e.g. goshawks trapped/shot as a result of attacking cage birds) use method code 65
- 15 = deliberately trapped for the aviary
- 22 = trapped accidentally in trap for terrestrial animals (e.g. rat trap, rabbit trap)
- 23 = trapped accidentally in marine/aquatic animal trap (NOT fishing gear; e.g. aquatic insect trap)
- 97 = found inside an artificial structure that was not intended to trap birds e.g. letterbox, chimney

BIRD OR BAND TANGLED IN AN OBJECT

- 16 = trapped because band tangled in natural object (e.g. grass, animal hair)
- 17 = trapped because band tangled in human object (e.g. fence wire, twine, fishing gear WHILE NOT being used for fishing)
- 18 = trapped because band tangled in fishing gear while gear being used for fishing (e.g. nets, hooks, lines)
- 19 = trapped because bird tangled in natural object
- 20 = trapped because bird tangled in human object (e.g. for nets protecting crops but not traps used to catch birds; fishing gear WHILE NOT being used for fishing)
- 21 = trapped because bird tangled in fishing gear that is being used for fishing (e.g. nets, hooks, lines)

SICKNESS OR INJURY

Birds may be encountered when they are sick or injured and are usually caught by simple methods. DO NOT USE METHOD CODE 08 FOR THESE BIRDS. If possible, precisely assess the cause of the sickness or injury and use one of the precise method codes (e.g. 27, 28, 29, 94). If this is not possible use one of the general method codes (eg 25, 26). Use precise codes only when you

are confident of the cause of the sickness or injury. The important factor to highlight when coding is that the bird was debilitated in some way and that it was not captured using normal trapping or banding techniques.

Birds that are injured during banding are coded with the usual trapping method code and the injury recorded using the 'IN' additional data code (see section 11.4).

Birds that die during banding are coded with the usual trapping method code and the cause of death recorded using the 'DC' additional data code (see section 7.6).

- 25 = found sick or injured (specify the type of injury)
- 26 = exhausted
- 27 = encountered because it was injured by band (give full details of how the band injured the bird)
- 28 = oiled
- 29 = burnt or scorched by fire
- 30 = found near electricity wires (but collision or electrocution not witnessed)
- 92 = injured or killed by human (not for food) e.g. children killing a bird
- 94 = electrocuted
- 95 = found in still water. Note also that birds found in large bodies of water (lakes, rivers, the sea) require the use of method code 54 as they may have moved from the site where they entered the water

COLLISIONS

Collisions with mobile vehicles may result in the bird being transported by the vehicle. If this is possible (e.g. bird wedged in radiator grill of car) use method code 55 (see below). It is also important to distinguish if a vehicle is mobile when the collision occurs (see method code 37).

- 30 = found near electricity wires but collision not seen. If collision was seen use method code 38 or if electrocuted use method code 94
- 31 = collided with a moving road vehicle. If found on road but collision with car not seen use method code 39. If collision is with window of immobile vehicle use method code 36
- 32 = collided with a moving train (compare with method code 37)
- 33 = collided with a moving aircraft (compare with method code 37)
- 34 = collided with a moving ship (compare with method code 37)
- 35 = collided with a lighthouse or stationary night light such as ship at anchor (but not while mobile)
- 36 = collided with a window or other transparent material such as windbreaks or windows of stationary vehicles
- 37 = collided with a building (but not a window) or non-wire fencing or immobile vehicle (eg car, train, aircraft, ship) but not a window. These are all THICK man-made objects
- 38 = collided with a mast, tower, pole, wire fence, aerial wires. These are all THIN man-made objects. If found near electricity wires but not seen to collide with them use method code 30
- 39 = found on highway or road but not certainly hit by a vehicle ie collision not seen
- 3A = collided with a natural object such as a tree or cliff
- 55 = bird found in or on a car, train, aircraft, or ship but possibly encountered at a site away from where the bird was discovered. This code indicates that the bird may have been transported from the actual site of encounter

SHOT OR TAKEN AS PART OF CONTROL PROGRAM

Taken includes shot or trapped.

- 61 = shot — reason unknown
- 63 = taken for scientific study (not banding)
- 64 = taken to protect crops e.g. birds feeding on crops

- 65 = taken to protect domestic animals e.g. goshawks shot in the act of harassing domestic birds, cormorants feeding on captive fish stocks. If transported use Status codes 24 or 25
- 66 = taken for aircraft-strike prevention program e.g. culling gulls near airports
- 67 = taken for food and/or feathers or ceremonial reasons (e.g. traditional hunting)
- 68 = shot for food and/or sport (e.g. duck shooting)
- 69 = taken for human health reasons e.g. magpie attacks, prevention of water supply contamination by birds, etc.
- 6A = taken for nature conservation programs e.g. birds culled to prevent interference with the breeding of another species
- 70 = shot with an arrow or spear. This code takes priority over other shot/taken codes

POISONING

- 72 = poisoned — unknown if intentional
- 74 = unintentionally poisoned by bait for other animals e.g. bait laid for rabbits kills birds
- 75 = unintentionally poisoned by aerial spraying of crops
- 76 = unintentionally poisoned by industrial wastes includes accidental releases of poisons from vehicles and industrial sites
- 77 = intentionally poisoned
- 78 = intentionally poisoned by aerial spraying or other bird control program
- 79 = poisoned by lead shot

TAKEN BY ANIMALS (EXCLUDES HUMANS)

For all codes the act of predation must be seen or there must be convincing evidence of the type of predation e.g. footprints at the site of death or the predator is seen with the bird. If there is the possibility of scavenging by wild birds use method code 88.

When birds are taken by animals during banding activities record the trapping method code as usual and record the cause of death using the 'DC' additional data code (see section 7.6).

- 80 = taken by an unknown animal
- 81 = taken by a domestic or wild cat
- 82 = taken by a domestic or wild dog
- 83 = taken by a domestic animal (not a cat or dog). Specify the type of animal as additional information. This includes zoo animals
- 84 = taken by a wild mammal (not a cat or dog). Specify the species of mammal as additional information
- 85 = taken by wild bird. Give the species of bird as additional information
- 86 = taken by a wild fish. Give the species of fish as additional information
- 87 = taken by a wild reptile. Give the species of reptile as additional information
- 88 = carcass of banded bird being eaten by scavenging animal(s)

BAND HAS AFFECTED THE CHANCE OF RECOVERY

Method codes 90 and 91 are now OBSOLETE.

- 16 = trapped because band tangled in natural object (e.g. grass, animal hair)
- 17 = trapped because band tangled in human object (e.g. fence wire, twine, and fishing gear WHILE NOT being used for fishing)
- 18 = trapped because band tangled in fishing gear whilst gear being used for fishing (e.g. nets, hooks, lines)
- 27 = injured by band. Specify how band has injured the bird
- 56 = trapped/killed because bird was banded

FOUND AT NEST

- 08 = nestling banded in a nest
- 49 = band number or colour marking sighted on a bird at a nest
- 52 = nestling hand raised after it was abandoned by its parents or its nest was destroyed
- 98 = found dead in or near a nest (adults and pulli) including all birds found dead in a breeding colony

MISCELLANEOUS

- 40 = band found on bird but no indication of how the bird was encountered. This code is mainly for use by the banding office
- 41 = band returned but not known if the band was found on a bird. Mainly for use of banding office. Use status code 02
- 42 = band only found, definitely not on bird or its skeleton. Use status code 02
- 43 = band number reported but not returned and not known if band found on bird. Use status code 00
- 44 = band lost. Use status code 00 and record date and site of loss
- 45 = band destroyed or damaged by bander. Use status code 00 and record date and site of damage/destruction
- 50 = captive bred bird. Includes eggs laid in wild, raised in captivity
- 53 = banded after death for experiment
- 54 = dead bird found floating in the sea, a lake, a stream, etc where it is likely that the bird was carried by the water currents to the finding location. This is a high priority code and any dead bird or its remains found on a beach requires the use of this code. If only leg and band is found the bird may be still alive and use method code 58 and status code 02. For live birds found on the beach use method codes e.g. 21, 25, etc.
- 57 = band found on a species other than that banded
- 58 = leg (or wing) and band only found. Use status code 02
- 71 = accidentally injured or killed in an explosion
- 92 = injured or killed by human not for food (e.g. children killing a bird)
- 93 = injured or died during experimental activities e.g. injured during physiological experiments
- 95 = found in still water i.e. the bird could not have been moved more than 100 metres by water currents. Examples are a dam, swimming pool.
- 96 = captive bird that came from the wild. For use with captives that are released. Use status code 13
- 97 = found inside an artificial structure that is not intended to trap birds e.g. letterbox or chimney
- 9A = banding data not known

FOUND DEAD, CAUSE UNKNOWN

- 99 = found dead, cause unknown.

11.3 Status codes

The status code is used to describe the last known status or condition of the bird and the band. Status codes are also used to highlight unusual treatments of birds (such as rehabilitation or transportation) which may affect the survival of the bird. Status codes may also indicate how recently a bird has died i.e. fresh, partially decomposed, dried out skeleton.

The codes can be grouped as shown below. Note that the status code relates to the situation of a bird at one time and in subsequent encounters the status may be different. For example, the status code may vary from banding (13), to first retrap (bird sick but rehabilitated = code 16) to second retrap (bird injured, kept in captivity = code 19) to final encounter (died, band removed = code 05).

The codes groups are as follows:

- bird status is unknown
- bird was dead (not decomposed)
- bird was mercy killed
- bird died before banding
- rehabilitation successful or failed
- bird released alive or in the wild
- bird transported from site of encounter
- bird held in captivity
- bird alive, unknown if captive

In all cases when a band is removed from a bird it must be returned to ABBBS (attached to the data sheet where it is reported) for use in the study of band wear.

BIRD STATUS UNKNOWN

- 00 = status of bird and band unknown
- 01 = status of bird is unknown and the band was left on the bird
- 02 = status of bird unknown and the band was removed from the bird

BIRD WAS DEAD

- 03 = bird was dead and band status is unknown
- 04 = bird was dead and the band was left on the bird
- 05 = bird was dead and the band was removed from the bird
- 27 = bird was partially decomposed and the band status is unknown
- 28 = bird was partially decomposed and the band was left on the bird
- 29 = bird was partially decomposed and the band was removed from the bird
- 30 = bird was a skeleton or dried out carcass, band status is unknown
- 31 = bird was a skeleton or dried out carcass, band was left on bird
- 32 = bird was a skeleton or dried out carcass, band removed from the bird

BIRD MERCY KILLED

Birds that were found alive but seriously injured and were killed to prevent further suffering.

- 06 = bird was mercy killed and the status of the band is unknown
- 07 = bird was mercy killed and the band was left on the bird
- 08 = bird was mercy killed and the band was removed from the bird

BIRD DIED BEFORE BANDING

The status code 99 is used for unbanded birds that die before banding.

- 99 = bird died before banding. See also section 7.6

REHABILITATION SUCCESSFUL OR FAILED

Birds that are found sick or injured and attempts have been made to rehabilitate the birds to the wild. If the bird died before treatment of any kind could be given, code this as attempted rehabilitation that failed.

- 09 = rehabilitation was attempted but bird died, band status is unknown
- 10 = rehabilitation was attempted but bird died, the band was left on the bird
- 11 = rehabilitation was attempted but bird died, the band was removed from the bird
- 15 = bird was rehabilitated and released alive, the band status is unknown
- 16 = bird was rehabilitated and released alive with the band
- 17 = bird was rehabilitated and released alive, the band was removed from the bird

Birds that are to be held in captivity for some time while they are rehabilitating should be coded as alive in captivity (see status codes 18–20) and the status code should be updated when they are released or die.

BIRD RELEASED ALIVE OR IN THE WILD

- 12 = bird released alive, the status of the band is unknown
- 13 = bird released alive with the band
- 14 = bird released alive, the band was removed from the bird
- 26 = bird alive in the wild with the band. This code is only for use with method codes 46,47,48 and 49 (section 11.2)
- 33 = bird flew away without the band. For use when bands are removed by the bird or fall off. If the band was removed by a human, use codes with '... band was removed from the bird'.

BIRD TRANSPORTED FROM SITE OF CAPTURE

When birds are transported by a human from the site of their capture to another location this special treatment should be coded. This would usually occur if the bird was causing trouble, such as magpies attacking people or goshawks raiding aviaries. If a rehabilitated bird is transported use status codes 15,16,17 as this treatment has PRIORITY over the transportation.

- 24 = bird transported and released with the band
- 25 = bird was transported and the band was removed from the bird

BIRD HELD IN CAPTIVITY

If a bird was captured for the aviary either permanently or temporarily use these codes. They are also for use when birds are held captive during rehabilitation.

- 18 = bird is alive in captivity, band status is unknown
- 19 = bird is alive in captivity with the band
- 20 = bird is alive in captivity, the band was removed from the bird

BIRD ALIVE, UNKNOWN IF CAPTIVE

- 21 = bird is alive, unknown if captive, band status is unknown
- 22 = bird is alive, unknown if captive, band left on bird
- 23 = bird is alive, unknown if captive, band removed from the bird

11.4 Additional information codes

These codes are used to define measurements, special treatments of birds (such as from where and when a transported bird came), relationships between birds (father, mother, mate, etc), moult and colour descriptions.

The codes are grouped as follows:

- measurements
- relationships between birds
- colours of birds
- moult codes
- colour marking methods**
- banding injuries and deaths**
- rehabilitation and transportation**
- experimentation and captives**
- bands removed or replaced**
- miscellaneous

The groups marked ** have mandatory additional data.

Terms used to describe the parts of birds are given in section 6.10.

Measurement code TL (for tarsus length) has now been replaced by code TR because of confusion with code TA (for tail length).

MEASUREMENTS

All measurements of length are to be recorded in millimetres and all weights are to be recorded in grams. All measurements should be made accurately (see section 6.6).

A full description of the methods used to take these measurements is given in section 6.6.

- BD = bill depth and the position on the bill should be specified e.g. at base, at nares, etc.
- BK = bill length to skull i.e. from bill tip along the top line to where the bill meets the skull
- BL = bill length. This code is used when the method of measurement is not known by the banding office
- BW = bill width specifying at which point on the bill
- CC = exposed culmen (to cere) i.e. from bill tip along the top line to where the bill meets the cere
- CL = exposed culmen length i.e. from tip of bill along the top line to where the bill meets the feathers
- CW = culmen width specifying at which point on the bill
- HB = head and bill length (total head length or overall head length) i.e. from bill tip to back of skull
- HD = head depth specifying points of measurement
- HW = maximum head width
- LW = wattle length e.g. wattlebirds, lapwings
- WC = wing length (flattened, unstraightened)
- WL = wing length (flattened, straightened)
- WS = wing span
- WU = wing length (unflattened, unstraightened)
- L1 = length of a primary feather specifying the number of the feather (outer feather = number 9 or 10)
- L5 = length of a tail feather specifying the number of the tail feather (inner feather = number 1)
- TA = tail length
- TF = tail fork length e.g. swallows
- TT = tarsus plus toe (excluding the claw) length
- TR = tarsus length specifying which method used
- TU = nasal tube length
- TW = tarsus width specifying where on the tarsus
- TZ = tarsus length with the leg and foot flexed
- CA = claw length specifying which claw
- FT = flipper thickness (mm)
- FZ = flipper width (mm)
- PM = plumage measurement specifying what plumage e.g. crest length
- WT = body weight
- LE = total length of the bird i.e. distance from tip of bill along the back to the tip of the tail

RELATIONSHIPS BETWEEN BIRDS

These codes are for use when the genetic relatedness of birds is known. Do not make any guesses about relatedness; a less specific code for birds that are associated is WI (bird with another banded bird).

The code is used as additional data for a banded bird that is the subject of the code description ie additional information for a male bird with band 123-45678 who has a sister with band 123-11111 would be 'SI = 123-11111'. The relationship could be coded for each bird so that additional information for the bird with band 123-11111 would be 'BR = 123-45678'. Data can be submitted for each of these co-relationships or for just one of them.

- BR = brother of
- SI = sister of

- SB = sibling of (e.g. brother or sister of but sex is unknown)
- DA = daughter of
- SO = son of
- YO = young of (e.g. son or daughter of but sex is unknown)
- FA = father of
- MO = mother of
- PT = parent of (e.g. mother or father of but sex is unknown)
- PA = breeding partner of (e.g. mate of)
- WI = with another banded bird (e.g. in burrow) but not known if these birds are breeding together

COLOURS OF BIRDS

The colours of all parts of a bird can be coded. The part of the bird is specified using the following codes and the actual colours can be coded as the additional information using a specified colour chart (e.g. Naturalist's Colour Guide published by the American Museum of Natural History) or more general colour information.

For feather parts the codes generally have the same second character as the second character of the moult codes e.g. colour code for the tail is 'C5' and the moult code for the tail is 'M5'. The codes are listed in a sequence which moves systematically across the birds wing, then to the head, then down the back and finally along the underside of the bird.

A full description of plumage and soft parts is given in section 6.7.

- C1 = colour of primaries
- C2 = colour of secondaries
- C3 = colour of primary coverts
- C4 = colour of secondary coverts
- C6 = colour of alula (bastard wing)
- C7 = colour of median upperwing coverts
- C8 = colour of lesser upperwing coverts
- C9 = colour of underwing coverts
- CE = colour of ear coverts
- CH = colour of forehead
- CV = colour of crown
- CO = colour of lores
- CI = colour of chin
- CP = colour of palate
- CK = colour of bill (specifying part of bill)
- CG = colour of gape
- CY = colour of eye (specifying the part of the eye e.g. iris, eyering)
- CN = colour of nape
- CM = colour of mantle and back
- CR = colour of rump
- CS = colour of scapulars
- C5 = colour of tail
- CU = colour of upper tail coverts
- CD = colour of under tail coverts
- CF = colour of flanks
- CQ = colour of leg(s) specifying the part of leg if required
- CX = colour of belly
- CZ = colour of breast
- CT = colour of throat

MOULT CODES

The moult codes are similar to the codes used for colour descriptions of plumage. The moult codes are also set-out in the same order as the colour codes.

- M1 = moult of primaries
- M2 = moult of secondaries
- M3 = moult of primary coverts
- M4 = moult of secondary coverts
- M6 = moult of alula (bastard wing)
- M7 = moult of median upperwing coverts
- M8 = moult of lesser upperwing coverts
- M9 = moult of underwing coverts
- ME = moult of ear coverts
- MH = moult of forehead and lores
- MC = moult of crown
- MI = moult of chin
- MN = moult of nape
- MM = moult of mantle and back
- MR = moult of rump
- MS = moult of scapulars
- M5 = moult of tail
- MU = moult of upper tail coverts
- MD = moult of under tail coverts
- MF = moult of flanks
- ML = moult of belly
- MB = moult of breast
- MT = moult of throat

Moult can be recorded in two ways; details of these and the feather groups is given in section

6.8. The score codes are listed below:

For complete feather groups —

- O = No moult activity
- S = Slight moult activity
- A = Active moult
- C = Completed moult

For individual feathers —

- 0 = Old feather
- 1 = Missing or new feather in pin
- 2 = New feather less than $\frac{1}{3}$ grown
- 3 = New feather $\frac{1}{3}$ to $\frac{2}{3}$ grown
- 4 = New feather $\frac{2}{3}$ to fully grown with trace of waxy sheath
- 5 = New feather fully developed

COLOUR MARKING METHODS

The codes for colour marking fall into two groups; the colour marks carried by a bird at a certain date (including the application of the colour mark) and the codes to describe the removal and/or replacement of colour marks.

Describe the colours that are used with the following symbols:

- b for dark blue
- c for crimson
- e for grey
- g for dark green
- k for pink
- n for black

- o for orange
- p for pale or light green
- r for red
- s for light blue
- u for purple or mauve
- w for white
- y for yellow
- z for brown
- m for the METAL band

When colour marks are first put on a bird use the following codes:

- CB = colour bands. List colour and metal bands from the top band to the lowest band on each leg bone e.g. listed as LUrLDyRUBRDm where LU stands for the left tibia (i.e. left upper leg), LD stands for left tarsus (i.e. left 'down' leg), RU for right tibia (i.e. right upper leg) and RD for right tarsus (i.e. right 'down' leg).
- DY = colour dyed (specify colour and area dyed)
- LF = leg flags (specify colour and position on leg)
- NC = neck collar (specify colours and patterns)
- NS = nasal saddle (specify colours and patterns)
- TG = tail tag (specify colours and patterns)
- WG = wing tag (specify colours and patterns) e.g. a light green wing tag with 'A7' written in white paint is coded as 'WG = p + wA7'

When colour marks are removed and not replaced use these codes:

- RM = these colour marks were removed at this date and not replaced with any other colour marks

When colour marks are removed and replaced with a different colour combination use the codes:

- RE = these colour marks were removed and replaced at this date. Specify as additional data the old colour marks.
- RW = these colour marks are replacements of colour marks previously carried by this bird. Specify as additional data the new colour marks.

BANDING INJURIES AND DEATHS

- IN = bird has an injury. Specify what is the injury and when it occurred
- DC = cause of death for banding mortalities. See section 7.6 for details. The 'DC' codes are:
 - H = injured/died due to heat stress
 - C = injured/died due to cold stress
 - P = injured/killed by a predator whilst in the trap
 - I = injured/killed by trap
 - D = found dead in trap, cause unknown
 - R = injured/died as a result of removal from trap
 - E = injured/died in holding bag/cage
 - B = injured/died during or as a result of banding or measuring
 - T = taken by predator

REHABILITATION AND TRANSPORTATION

When banded birds are released after rehabilitation or transportation from their site of encounter, some additional information is needed. That is, the site and date of both encounter and release must be recorded. One set of place and date information is recorded for the banding/recovery 'core data' and the other set is recorded as 'additional data'. Which set is used for which purpose depends on whether the encounter is with an unbanded or banded bird.

If the bird is unbanded when encountered, code the site and date of encounter as additional data (using the codes EA and EO) and the release place and date in the core data i.e. the banding

record. If the bird is banded when encountered, code the site and date of encounter as core data (i.e. the recovery data) and the release place and date in additional data (using the codes RA and RO).

The additional data codes are:

- EA = the location of encountering an unbanded bird that was rehabilitated or transported. Use latitude and longitude or a locode.
- EO = the date of encountering an unbanded bird that was rehabilitated or transported.
- RA = the release site of a retrapped bird that has been rehabilitated or transported.
- RO = the release date of a retrapped bird that has been rehabilitated or transported.

EXPERIMENTATION AND CAPTIVES

Records of banded birds that undergo experimental treatment and/or are held in captivity must be flagged to indicate these situations. The flags are the additional information codes:

- EX = bird has had some experimental treatment. Codes for the treatments are 'W' for labelled water experiments, 'R' for radio tags attached, 'A' for stomach flushing method A (water) and 'B' stomach flushing method B (copper sulphate), 'H' for blood sampled. Other codes are available from the Coordinator
- SC = site of captivity of bird

BANDS REMOVED OR REPLACED

When metal bands are removed and replaced use these codes. Additional data for the removed band is:

- RW = this metal band was replaced with band number '123-45678'

Additional data for the replacement band is:

- RE = this metal band replaces band number '876-54321'

It is necessary to have a 'RW' entry associated with the recovery data (the old band) and a 'RE' entry associated with the banding data (the new band).

Alternatively this can be recorded on the field datasheets as 'This band was used to REBAND the bird that carried band number ???-?????'. See section 7.4.

If a new band is placed on a bird that is already banded and the old band is not removed, use the code:

- OB = the number of another metal band carried by the bird e.g. the number of a foreign band.

Alternatively this can be recorded on the field datasheets as 'This bird also carries band number ???-?????'. See section 7.4.

MISCELLANEOUS

- BB = banded by a person other than the person to whom the bands were issued e.g. a B class bander
- BM = band is inscribed with other marks e.g. cockatoos with a painted groove
- BP = condition of brood patch
- BS = brood size
- FS = fat score
- FW = feather wear state
- GS = crop fullness index e.g. gizzard score
- HO = host species of a cuckoo or other parasitic bird
- LB = the location of a band held in a scientific collection e.g. on a bird in a museum. Each institution has its own code. Contact the Secretary for these codes
- NE = clutch size e.g. number of eggs
- OB = bird also carries another metal band
- PG = Gibson plumage index score (for Wandering Albatross)

- PP = plumage pattern such as silvereye type, morph type, race, subspecies, full adult plumage
- PR = processor name or authority number (for recording individual variations in measuring)
- PS = pupil structure e.g. shape of pupils in Pied Oystercatchers
- ST = shape of tail feather tip
- TS = trapping or capture site e.g. individual net site
- WP = wing point i.e. the longest wing feather

11.5 List of approved method codes

The list of all approved method codes in the abbreviated form in which they are stored in the database is given here. The descriptions for each code are brief and may be misleading without consulting the fuller descriptions given in section 11.2.

PRIORITY codes are marked **.

- 00 METHOD UNKNOWN — SEEKING DATA
- 01 PROBABLY TRAPPED DEVICE UNKNOWN
- 02 TRAPPED DEVICE UNKNOWN
- 03 TRAPPED IN MIST NET
- 04 TRAPPED IN CAGE TRAP
- 05 TRAPPED WITH CANNON NET
- 06 TRAPPED IN CLAP TRAP, SPRUNG TRAP, ETC
- 07 TRAPPED WITH BAL-CHATRI
- 08 TRAPPED BY HAND OR WITH HANDHELD NET
- 09 TRAPPED USING LIGHT DEVICE
- 0A TRAPPED WITH DHO-GHAZA
- 0R LOCATED USING RADIO TELEMETRY
- 10 TRAPPED IN HARP TRAP
- 11 TRAPPED IN MONOFILAMENT MIST NETS
- 12 TRAPPED WITH TRIP WIRE OVER WATER
- 13 HAND CAUGHT AT ROOST OR NEST
- 14 TRAPPED AS ATTRACTED TO DOMESTIC BIRDS
- 15 DELIBERATELY TRAPPED FOR THE AVIARY
- 16 TRAPPED BECAUSE BAND TANGLED IN NATURAL OBJECT
- 17 TRAPPED BECAUSE BAND TANGLED IN HUMAN OBJECT
- 18 TRAPPED BECAUSE BAND TANGLED IN FISHING GEAR
- 19 TRAPPED BECAUSE BIRD TANGLED IN NATURAL OBJECT
- 20 TRAPPED BECAUSE BIRD TANGLED IN HUMAN OBJECT
- 21 TRAPPED BECAUSE BIRD TANGLED IN FISHING GEAR
- 22 TRAPPED ACCIDENTALLY IN TRAP FOR TERRESTRIAL ANIMALS
- 23 TRAPPED ACCIDENTALLY IN MARINE/AQUATIC ANIMAL TRAP
- 24 TRAPPED USING NARCOTIC DRUGS
- 25 FOUND SICK OR INJURED
- 26 EXHAUSTED
- 27 INJURED BY BAND
- 28 OILED
- 29 BURNT OR SCORCHED BY FIRE
- 30 FOUND NEAR ELECTRICITY WIRES
- 31 COLLIDED WITH A MOVING ROAD VEHICLE
- 32 COLLIDED WITH A MOVING TRAIN
- 33 COLLIDED WITH A MOVING AIRCRAFT
- 34 COLLIDED WITH A MOVING SHIP
- 35 COLLIDED WITH A LIGHTHOUSE OR STATIONARY NIGHT LIGHT

- 36 COLLIDED WITH A WINDOW OR OTHER TRANSPARENT MATERIAL
- 37 COLLIDED WITH A BUILDING, NON-WIRE FENCE, IMMOBILE VEHICLE
- 38 COLLIDED WITH A MAST, TOWER, POLE, WIRE FENCE, AERIAL
- 39 FOUND ON HIGHWAY/ROAD; BUT NOT CERTAINLY HIT BY CAR
- 3A COLLIDED WITH A NATURAL OBJECT EG TREE, CLIFF
- 40 BAND FOUND ON BIRD, NO FURTHER DATA ON METHOD OF ENCOUNTER
- 41 BAND RETURNED, NOT REPORTED IF BAND ON BIRD
- 42 BAND ONLY FOUND
- 43 BAND NUMBER ONLY REPORTED
- 44 BAND LOST
- 45 BAND DESTROYED OR DAMAGED
- 46 COLOUR MARKING SIGHTED IN FIELD (COHORT ONLY)
- 47 BAND NUMBER READ IN FIELD (BIRD NOT TRAPPED)
- 48 COLOUR MARKING SIGHTED IN FIELD (BAND NO. INFERRED)
- 49 BAND NUMBER/COLOUR MARKING SIGHTED ON BIRD ON NEST
- 50 CAPTIVE BRED BIRD
- 51 SUCKLING YOUNG HAND RAISED (BATS ONLY)
- 52 NESTLING HAND RAISED (ABANDONED OR NEST DESTROYED)
- 53 BANDED AFTER DEATH FOR EXPERIMENT
- 54 FOUND FLOATING IN SEA OR FRESHWATER OR BEACHWASHED**
- 55 FOUND IN/ON CAR, SHIP, ETC POSSIBLY ENCOUNTERED ELSEWHERE
- 56 TRAPPED/KILLED BECAUSE IT WAS BANDED**
- 57 BAND FOUND ON A SPECIES DIFFERENT TO THAT BANDED
- 58 LEG (OR WING) AND BAND ONLY FOUND
- 59 COLOUR MARKING FOUND (BAND NUMBER INFERRED)
- 60 NOT ALLOCATED
- 61 SHOT-REASON UNKNOWN
- 62 NOT ALLOCATED
- 63 TAKEN FOR SCIENTIFIC STUDY (NOT BANDING)
- 64 TAKEN TO PROTECT CROPS
- 65 TAKEN TO PROTECT DOMESTIC ANIMALS
- 66 TAKEN FOR AIRCRAFT STRIKE PREVENTION PROGRAM
- 67 TAKEN FOR FOOD, FEATHERS, CEREMONIAL REASONS
- 68 SHOT FOR SPORT/FOOD
- 69 TAKEN FOR HUMAN HEALTH REASONS
- 6A TAKEN FOR NATURE CONSERVATION REASONS
- 70 SHOT WITH ARROW OR SPEARED**
- 71 ACCIDENTLY INJURED/KILLED IN EXPLOSION
- 72 POISONED — UNKNOWN IF INTENTIONAL
- 73 NOT ALLOCATED
- 74 UNINTENTIONALLY POISONED BY BAIT FOR OTHER ANIMALS
- 75 UNINTENTIONALLY POISONED BY AERIAL SPRAYING OF CROPS
- 76 UNINTENTIONALLY POISONED BY INDUSTRIAL WASTES
- 77 INTENTIONALLY POISONED
- 78 INTENTIONALLY POISONED BY AERIAL SPRAYING FOR BIRDS
- 79 LEAD POISONED (LEAD SHOT)
- 80 TAKEN BY UNKNOWN ANIMAL
- 81 TAKEN BY DOMESTIC OR WILD CAT
- 82 TAKEN BY DOMESTIC OR WILD DOG
- 83 TAKEN BY DOMESTIC ANIMAL (SPECIES?)
- 84 TAKEN BY A WILD MAMMAL (SPECIES?)
- 85 TAKEN BY A WILD BIRD (SPECIES?)
- 86 TAKEN BY A WILD FISH (SPECIES?)

- 87 TAKEN BY A WILD REPTILE (SPECIES?)
- 88 CARCASS BEING EATEN BY SCAVENGING ANIMALS
- 89 NOT ALLOCATED
- 90 OBSOLETE
- 91 OBSOLETE
- 92 INJURED/KILLED BY HUMAN, NOT FOR FOOD OR REASON UNKNOWN
- 93 INJURED/DIED DURING EXPERIMENTAL ACTIVITIES
- 94 ELECTROCUTED
- 95 FOUND IN STILL WATER
- 96 CAPTIVE BIRD (WAS FROM THE WILD)
- 97 FOUND INSIDE AN ARTIFICIAL STRUCTURE
- 98 FOUND DEAD IN/NEAR A NEST (PULLI AND ADULTS)
- 99 FOUND DEAD, CAUSE UNKNOWN
- 9A BANDING DATA ARE UNKNOWN

11.6 List of approved status codes

The list of all status codes in the abbreviated form in which they are stored in the database is given here. The descriptions for each code are brief and may be misleading without consulting the fuller descriptions given in the section 11.3.

PRIORITY codes are marked **.

- 00 STATUS OF BIRD AND BAND IS UNKNOWN
- 01 STATUS OF BIRD IS UNKNOWN AND THE BAND WAS LEFT ON THE BIRD
- 02 STATUS OF BIRD IS UNKNOWN AND THE BAND WAS REMOVED
- 03 BIRD WAS DEAD AND THE STATUS OF THE BAND IS UNKNOWN
- 04 BIRD WAS DEAD AND THE BAND WAS LEFT ON THE BIRD
- 05 BIRD WAS DEAD AND THE BAND WAS REMOVED FROM THE BIRD
- 06 BIRD WAS MERCY KILLED AND THE STATUS OF THE BAND IS UNKNOWN
- 07 BIRD WAS MERCY KILLED AND THE BAND WAS LEFT ON THE BIRD
- 08 BIRD WAS MERCY KILLED AND THE BAND WAS REMOVED FROM THE BIRD
- 09 REHABILITATION ATTEMPTED BUT BIRD DIED, STATUS OF BAND UNKNOWN
- 10 REHABILITATION ATTEMPTED BUT BIRD DIED, BAND LEFT ON THE BIRD
- 11 REHABILITATION WAS ATTEMPTED BUT BIRD DIED, BAND WAS REMOVED
- 12 BIRD WAS RELEASED ALIVE, STATUS OF BAND IS UNKNOWN
- 13 BIRD WAS RELEASED ALIVE WITH THE BAND
- 14 BIRD WAS RELEASED ALIVE AND THE BAND WAS REMOVED
- 15 BIRD WAS REHABILITATED & RELEASED ALIVE, BAND STATUS IS UNKNOWN**
- 16 BIRD WAS REHABILITATED & RELEASED ALIVE WITH THE BAND**
- 17 BIRD WAS REHABILITATED & RELEASED ALIVE, BAND WAS REMOVED**
- 18 BIRD IS ALIVE IN CAPTIVITY AND STATUS OF BAND IS UNKNOWN
- 19 BIRD IS ALIVE IN CAPTIVITY WITH BAND
- 20 BIRD IS ALIVE IN CAPTIVITY AND BAND WAS REMOVED FROM BIRD
- 21 BIRD ALIVE: UNKNOWN IF RELEASED OR CAPTIVE, BAND STATUS UNKNOWN
- 22 BIRD ALIVE BUT UNKNOWN IF RELEASED OR CAPTIVE, BAND WITH BIRD
- 23 BIRD ALIVE: UNKNOWN IF RELEASED OR CAPTIVE, BAND REMOVED FROM BIRD
- 24 BIRD TRANSPORTED TO NEW SITE AND RELEASED WITH BAND
- 25 BIRD TRANSPORTED TO NEW SITE AND BAND REMOVED
- 26 BIRD WAS ALIVE IN THE WILD WITH THE BAND
- 27 BIRD PARTIALLY DECOMPOSED AND BAND STATUS UNKNOWN
- 28 BIRD PARTIALLY DECOMPOSED AND BAND LEFT ON BIRD
- 29 BIRD PARTIALLY DECOMPOSED AND BAND REMOVED FROM BIRD
- 30 BIRD WAS SKELETON/DRIED OUT CORPSE, BAND STATUS UNKNOWN
- 31 BIRD WAS SKELETON/DRIED OUT CORPSE, BAND LEFT ON BIRD

- 32 BIRD WAS SKELETON/DRIED OUT CORPSE, BAND REMOVED FROM BIRD
- 33 BIRD FLEW AWAY WITHOUT THE BAND
- 99 BIRD DIED BEFORE BANDING

11.7 List of approved additional information codes

The list of all additional information codes in the abbreviated form in which they are stored in the database is given here. The descriptions for each code are brief and may be misleading without consulting the fuller descriptions given in the section 11.4.

- AD ADDITIONAL DETAILS PERTAINING TO A METHOD CODE
- BB BANDED BY PERSON OTHER THAN PERSON TO WHOM BANDS WERE ISSUED
- BD BILL DEPTH (MM)
- BI BAND INJURY (SCORES 0 TO 3)
- BK BILL LENGTH TO SKULL (MM)
- BL BILL LENGTH (MM)
- BM BAND INSCRIBED WITH OTHER MARKS
- BP BROOD PATCH CONDITION
- BR BROTHER OF
- BS BROOD SIZE
- BW BILL WIDTH (MM)
- C1 COLOUR OF PRIMARIES
- C2 COLOUR OF SECONDARIES
- C3 COLOUR OF PRIMARY COVERTS
- C4 COLOUR OF SECONDARY COVERTS
- C5 COLOUR OF TAIL
- C6 COLOUR OF ALULA (BASTARD WING)
- C7 COLOUR OF MEDIAN UPPERWING COVERTS
- C8 COLOUR OF LESSER UPPERWING COVERTS
- C9 COLOUR OF UNDERWING COVERTS
- CA CLAW LENGTH (MM)
- CB COLOUR BANDS WORN AT THIS DATE
- CC EXPOSED CULMEN (TO CERE) LENGTH (MM)
- CD COLOUR OF UNDER TAIL COVERTS
- CE COLOUR OF EAR COVERTS
- CF COLOUR OF FLANKS
- CG COLOUR OF GAPE
- CH COLOUR OF FOREHEAD
- CI COLOUR OF CHIN
- CK COLOUR OF BILL (SPECIFY IF TIP, BASE, ETC)
- CL EXPOSED CULMEN LENGTH (MM)
- CM COLOUR OF MANTLE AND BACK
- CN COLOUR OF NAPE
- CO COLOUR OF LORES
- CP COLOUR OF PALATE
- CQ COLOUR OF LEG(S) [SPECIFY PART OF LEG IF REQUIRED]
- CR COLOUR OF RUMP
- CS COLOUR OF SCAPULARS
- CT COLOUR OF THROAT
- CU COLOUR OF UPPER TAIL COVERTS
- CV COLOUR OF CROWN
- CW CULMEN WIDTH (MM)
- CX COLOUR OF BELLY
- CY COLOUR OF EYE (SPECIFY IF IRIS, EYERING, ETC)

CZ COLOUR OF BREAST
 DA DAUGHTER OF
 DC DEATH CAUSE (FOR BANDING MORTALITIES)
 DW DENTITION WEAR
 DY COLOUR DYED
 EA REHABILITATED OR CAPTIVE BIRD OR BAT, LOCATION ENCOUNTERED AT
 EL EAR LENGTH (MM)
 EO REHABILITATED OR CAPTIVE BIRD OR BAT, DATE ENCOUNTERED ON (YYMMDD)
 EX EXPERIMENTAL TREATMENT-SEE CODES
 FA FATHER OF
 FL FOREARM LENGTH (MM)
 FS FAT SCORE
 FT FLIPPER THICKNESS (MM)
 FW FEATHER WEAR STATE (SPECIFY FEATHER GROUP)
 FZ FLIPPER WIDTH (MM)
 GS CROP FULLNESS SCORE (G FOR GIZZARD?)
 HB HEAD AND BILL LENGTH (MM) = TOTAL HEAD LENGTH = OVER ALL HEAD LENGTH
 HD HEAD DEPTH (MM)
 HO HOST SPECIES OF A CUCKOO
 HR HEAD TO RUMP LENGTH (MM)
 HW MAXIMUM HEAD WIDTH (MM) IN ANIMAL HAS AN INJURY; SPECIFY BODY PART
 IN ANIMAL HAS AN INJURY
 L1 LENGTH OF PRIMARY FEATHER (SPECIFY WHICH FEATHER) MM
 L5 LENGTH OF TAIL FEATHER (SPECIFY WHICH FEATHER) MM
 LB LOCATION OF BAND OR BIRD IN A MUSEUM COLLECTION
 LE TOTAL LENGTH (MM)
 LF LEG FLAG
 LP LUNAR PHASE (0,0.25,0.5,0.75,1)
 LW LENGTH OF WATTLE (MM)
 M1 MOULT OF PRIMARIES
 M2 MOULT OF SECONDARIES
 M3 MOULT OF PRIMARY COVERTS
 M4 MOULT OF SECONDARY COVERTS
 M5 MOULT OF TAIL
 M6 MOULT OF ALULA (BASTARD WING)
 M7 MOULT OF MEDIAN UPPERWING COVERTS
 M8 MOULT OF LESSER UPPERWING COVERTS
 M9 MOULT OF UNDERWING COVERTS
 MB MOULT OF BREAST
 MC MOULT OF CROWN
 MD MOULT OF UNDER TAIL COVERTS
 ME MOULT OF EAR COVERTS
 MF MOULT OF FLANKS
 MH MOULT OF FOREHEAD AND LORES
 MI MOULT OF CHIN
 ML MOULT OF BELLY
 MM MOULT OF MANTLE AND BACK
 MN MOULT OF NAPE
 MO MOTHER OF
 MR MOULT OF RUMP
 MS MOULT OF SCAPULARS
 MT MOULT OF THROAT
 MU MOULT OF UPPER TAIL COVERTS

NC NECK COLLAR
 NE CLUTCH SIZE (NO. EGGS)
 NS NASAL SADDLE
 OB BIRD ALSO CARRIES ANOTHER METAL BAND
 PA BREEDING PARTNER OF
 PG GIBSON PLUMAGE KEY FOR WANDERING ALBATROSS
 PM PLUMAGE MEASUREMENT (MM) SPECIFY PLUMAGE TYPE
 PP PLUMAGE PATTERN EG SILVEREYE TYPE,MORPH TYPE,RACE,SUBSPECIES
 PR PROCESSORS NAME OR AUTHORITY NUMBER
 PS PUPIL STRUCTURE
 PT PARENT OF
 RA BIRD OR BAT TRANSPORTED FROM CAPTURE SITE AND RELEASED AT (LAT LONG)
 RB READABLE BAND
 RC REPRODUCTIVE CONDITION (SCORES 1 TO 9)
 RE THIS BAND IS REPLACEMENT OF BAND NUMBER OR COLOUR MARKS
 RM COLOUR MARKING REMOVED AND NOT REPLACED
 RO BIRD OR BAT TRANSPORTED FROM CAPTURE SITE AND RELEASED ON
 RW THIS BAND WAS REPLACED WITH BAND NUMBER OR COLOUR MARKS
 SB SIBLING OF
 SC SITE OF CAPTIVITY FOR BIRDS & BATS HELD CAPTIVE
 SI SISTER OF
 SO SON OF
 ST SHAPE OF TAIL FEATHER TIP
 TA TAIL LENGTH (MM)
 TF TAIL FORK LENGTH (MM)
 TG TAIL TAG
 TL OBSOLETE CODE FOR TARSUS LENGTH (MM)
 TR TARSUS LENGTH (MM)
 TS TRAPPING/CAPTURE SITE EG INDIVIDUAL NET SITE
 TT TARSUS PLUS TOE (EXCLUDING NAIL) LENGTH (MM)
 TU NASAL TUBE LENGTH (MM)
 TW TARSUS WIDTH (MM)
 TZ TARSUS LENGTH (MM) WITH LEG & FOOT FLEXED
 VL LENGTH OF DIGIT FIVE (MM)
 WC WING LENGTH (FLATTENED, UNSTRAIGHTENED) MM
 WG WING TAG
 WI WITH OTHER BANDED BIRD
 WL WING LENGTH (FLATTENED, STRAIGHTENED) MM
 WP WING POINT (IE LONGEST WING FEATHER)
 WS WING SPAN (MM)
 WT BODY WEIGHT (G)
 WU WING LENGTH (UNFLATTENED, UNSTRAIGHTENED) MM
 YO YOUNG OF

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