

Australasian Wader Studies Group
(including the Victorian Wader Study Group)

Cannon-netting Induction Manual



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Written by

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Introduction

Purpose

This induction manual is a brief explanation of all the field activities that are undertaken by the Australasian Wader Studies Group (AWSG) and the Victorian Wader Study Group (VWSG). The manual is designed to allow first timers and those who have not had much experience to better understand:

- What the main safety messages (for you and the birds) are,
- What all the terms that are used mean and
- How things are done (recognising that much innovation is involved with particular catching sites).

Why band waders?

The Mission Statement of the AWSG is “to ensure the future of waders and their habitats in Australia through research and conservation programs and to encourage and assist similar programs in the rest of the East Asian-Australasian Flyway and network of shorebird sites”. The VWSG has as its principal aim “to gather, through extensive planned fieldwork programs, comprehensive data on waders and terns throughout south-east Australia on a long-term basis.”

The banding is outcome oriented and strategically targeted to obtain biometric, phylogenetic or movement information primarily for the conservation of shorebirds.

This scientifically collected information is intended to:

- form a factual base for conservation considerations,
- be a source of information for education of a wider audience,
- be a means of generating interest of the general community in environmental and conservation issues and
- be a major contribution to Australian, Flyway and Worldwide knowledge of waders and terns

Manual layout

The manual starts with the critical Do's and Don'ts for the safety of birds and people (these are repeated at the relevant sections within the manual).

Then comes the Glossary for a quick 'ready reckoner' of the terms (eg twinkle / jigglers / chocolate block) many of which are partially explained in context with the descriptions of activities later in the manual.

This is followed by descriptions of:

- Setting the net

- Making a catch and
- Processing the birds

The manual is not a complete operators manual and several parts of the process (for example loading cannons and testing firing boxes) are not described in detail.

By understanding more about what is involved, we hope that your experience is more enjoyable and ensures the safety of the birds and people.

Acknowledgements

Information used in the preparation of this manual has been sourced from a range of places including:

- Australian Bird Bander's Manual, Commonwealth of Australia 1989
- Australasian Wader Studies Group (AWSG)/VWSG Information Sheets 1 & 2
- VWSG information sheets
- VWSG Bulletin – Journal of the Victorian Wader Study Group
- VWSG website < www.vws.org.au >
- Wash Wader Ringing Group website <www.wwrg.org.uk>
- Members of AWSG/VWSG who willingly pass on their extensive knowledge and experience
- Chung Yu Chiang of the Taiwan Wader Study Group for use of some of his photos

Join the VWSG

To become a member of the AWSG < www.aws.org.au > and/or the VWSG www.vws.org.au , please go to their website and download an application form from the 'Membership' or 'Contact Info' page.

1 Important Do's and Don'ts

For people and bird safety

Several things are important to be aware of without the need to fully understand what is involved with a full wader catch and banding session. These points include:

1 TREAT EQUIPMENT WITH CARE - Cannon-netting equipment includes POTENTIALLY DANGEROUS ELECTRICAL AND EXPLOSIVE COMPONENTS. Always handle equipment with care, and do not handle equipment at all unless asked to do so.

2 ASK FOR GUIDANCE - The team will always have a leader and include a number of experienced people; if you are in doubt about anything ASK SOMEONE TO EXPLAIN; all experienced people would sooner explain something several times than have an accident caused through a misunderstanding. When first involved in setting nets, there are certain jobs (eg. circuit testing and loading cartridges) that you will not be asked to do, as they require specialist knowledge and are not covered in this manual. However, do not feel disappointed if you are not participating to the full - it is a good opportunity to watch and learn from others.

3 GET BEHIND THE NETS WHEN THEY ARE BEING CIRCUIT TESTED - When a net has been set it is tested electrically. Because there is a small risk of the net being fired accidentally, the person testing the net shouts, "TESTING" to warn others. When you hear this you should get behind the net (up the beach on a beach set), and stay there until the 'all clear' is given.

4 TREAT PERSONAL HEALTH WITH CARE

- Cannons, projectiles and nets are heavy – lift and carry them with care, sharing the load wherever possible.

- Always wash hands carefully after handling birds or equipment.

- Drink plenty of water, especially in hot weather.

5 DON'T DRAG THE COVERING MATERIAL ACROSS THE BIRDS IN THE NET - lift the covering material tightly across the birds and lay it down on the net.

6 NEVER WALK ON COVERING MATERIAL WHEN IT IS OVER THE NET!!!

To help achieve a successful catch

7 AVOID DISTURBING WADERS BY BEING CAREFUL GETTING IN AND OUT OF CARS WHEN IN VIEW OF THE BIRDS – NO SLAMMING CAR DOORS!

8 NO SUDDEN MOVEMENT WHEN IN SIGHT OF THE WADERS.

2 Glossary

ABBBS – Australian Bird and Bat Banding Scheme – this organisation must approve all banding projects, licenses banders and records all information on banded and recovered birds.

Age codes – All birds can be classed (generally on plumage characteristics that relate particularly to each species) in a particular age group coded as: juvenile (sometimes used when clear juvenile plumage), 1, 2 (all birds after August 1 if definitely in their second year), 2+ (most adults – the ‘+’ means this year or older), 3, 3+,4+ (the latter three groups only used where these ages can be identified through plumage change and/ eye or bill colour).

Angle – an adjustable angle gauge for setting the right trajectory for the cannons.

Back of the net / behind the net – This is the side of the net set where the cannons are.

Bands (rings) – metal bands with a unique individual number stamped on them. Bands come in a range of sizes and types to suit the birds to be banded. Waders are banded with special bands of hard metal, which are difficult to close. Please note that experience with softer bands will not be an adequate guide on its own to banding waders.

Bander's grip – the safe and secure way to hold a bird. The forefinger and middle finger are on either side of the neck, the palm is against the back of the bird and the thumb and other fingers are wrapped around the body.

(Right) This Ruddy Turnstone is being held in the bander's grip, showing the leg flags, band and a geolocator on the left tibia.



Base camp – the place where all those involved with a catch who do not have active roles (like twinkling, in the hide/firing position etc) wait until the cannons are fired.

Black powder – the explosive material used to power the projectile out of the cannon taking the net over the birds.

Cable – see Firing Cable.

Callipers – a tool that can be used to measure the bill and head lengths of the birds.

Camouflage – the material (eg sand, seaweed, tide-wrack, grass, cut reeds, dried algae) found at the site that is used to cover the furled net in a way that disguises it from the birds.

Cannon – the device (steel pipe with a steel plate welded to its base) that holds the cartridge and projectile.



(Right) Cannons being cleaned and loaded with fresh cartridges (Chung Yu Chiang).

Cannon net (large mesh / small mesh) – the net that is carried over the birds by the projectiles blown from the cannons. The net can be made of a large or small mesh. Both have their own advantages eg large mesh nets can push out into the wind (small mesh nets hold back in the wind more), large mesh nets are used if the catch is likely to be wet as birds can push their heads through the mesh and hold them out of the water, whereas the small mesh net may hold birds under water. Small nets allow the birds to run under them and make for easier extraction.

Cartridge – a stainless steel container that holds the black powder and electric igniter that is inserted in the base of the cannon. The cartridge is connected to the firing box by wire to the cable at a 'chocolate block'.



(Left) Cartridge

Catch – a catch is when the net has been fired over the target birds and successfully constrained them under the net. A series of actions is needed before the catch is complete. These may include moving the net from water, but always involves covering the net with shade cloth, removing birds from the net and placing them in keeping cages. Then the processing of the catch can take place.

Chocolate block – an electrical connecting device that allows two cables to be joined together by peeling the protective plastic covering back and screwing down onto each of the two bare wires.

Covering material – this is usually large pieces of shade cloth laid across the top of the net after a catch has been made and, if it was a wet catch, after the birds are safely out of the water. **Never walk on the covering material once it is over the net!**

Circuit tester – commercial tool to make sure there are no breaks or short-circuits in the system after all the cannons have been connected up. The circuit tester is also used to test the firing box.

Data sheets – all data is recorded in the field onto prepared data sheets. The data relates to personnel involved, date, time, location, moult, age, weight, wing length, head and bill measurements, leg band number and leg flag colour / combinations.

Decoy – models of waders or terns, which are sometimes placed in the catching area to encourage target species to land. Rarely used with waders, but occasionally needed to encourage Oystercatchers to land near the net.

Engraved flag – see Leg flag

Extract - remove birds from the net. A task done by experienced banders, but learners get a chance if there are few birds, good conditions and no safety concerns for the birds.

Firing box – This device delivers the high voltage current down the cable to detonate the igniters in the cartridges in the cannons. It is placed at the firing position and managed by experienced, licensed people. There can be two firing cables attached to one firing box. Either net or both nets can be fired at once as needed.

Firing cable – this is electrical cable that runs behind the cannons (connected to each cannon at a chocolate block) and out to where the firing position is.

Firing position – this is where experienced people can sit (out of view of any birds near the net) and see what is happening at the net to ensure there are no safety risks to the birds or people (twinklers in particular) as well as determine that the target birds are within the catchable area.

Front edge (of the net) – this is the edge of the net that is carried out over the birds (often into the water) and where people should run to when the net is fired to make sure birds are safely removed from the water or to prevent them escaping. This edge has the ropes attached to it that connect to the projectiles and sits on top of a furred net with the projectile ropes sitting on top and the back rope sitting underneath the net on the ground).

Furling – A process to ensure the net will fly out without catching on debris or having twists and tangles hold up its expansion over the birds. To do this, after the net has loosely been placed on the ground along its determined line, start at one end and get hold of the front line of the net, then gather up the rest of the net (removing any debris) until the back line is reached. Place the furred net on top of the back edge with the front line on top, and proceed along the rest of the net. Someone may need to hold his or her foot on the section of furred net as the next section is done before moving on. This operation is usually a team effort where people work shoulder to shoulder to minimise debris or having a twisted net. When finished, the projectile ropes sit on top of the front edge of the net.

*(Right) Team furling a net on
80 Mile Beach WA (Chung Yu
Chiang)*



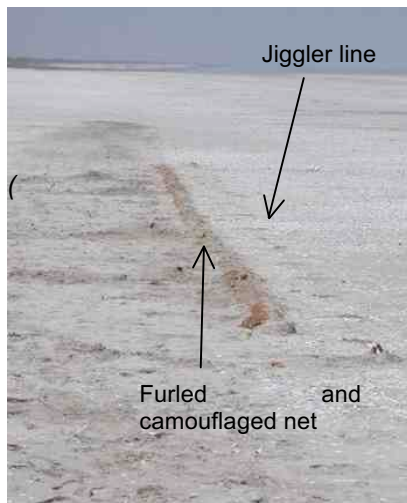
Furled net – a net that is in place having been furled. It is ready for camouflaging and should fire well without tangles or catching on debris.

Galah wire – an alternative name for electrical wire (due to the early wire being grey and pink).

Hide – when the area has no natural cover that can hide people in the firing position from view of the birds near the catching area, a hide is put up to provide that protection. It is usually made from wind breaks using army camouflage material wrapped around and over several posts to hold three to six people. Rarely, a hide may be needed to prevent people at base camp from being seen. Vehicles can also be used as hides where convenient.

Igniter – this is inserted into the cartridge to enable the detonation of the black powder and subsequent propulsion of the projectile out of the cannon to carry the net over the birds. The firing box produces the high voltage current that comes down the firing cable to the igniter.

Jiggler – when birds are in the danger area (within 2m in front of the set net), they need to be moved for their safety and to allow a catch to occur. To do this, a string with small pieces of material attached at intervals a metre or two apart may be laid down about 50cm in front of the net. This string goes all the way back to the firing position. The jiggler has a piece of heavy elastic on the end fixed just past the end of the net furthest from the firing position so that the string can be pulled tight and let go causing the pieces of material to move and frighten the birds in danger to move away from the immediate area. Care must be taken when unwinding and winding up the jiggler to avoid getting tangles.



Left) A furred net with a jiggle line in position on Eighty Mile Beach, WA (Chung Yu Chiang)

Jump ropes – these hold the back of the net from following the front edge of the net out over the birds. They are attached to the back edge of the net and tied to pegs hammered into the ground about 10cm behind the net. They have a piece of elastic attached to one end of the rope to provide some 'give' when the projectiles pull on the net and are about 2m long to allow the back edge of the net move forward also.

Keeping cages – cages made of hessian or shade-cloth that have several compartments in them. They sit on the ground and are fixed by having metal hoops sewn in that can be pushed into the ground to secure them. Sand/rocks are used to hold down the edges (internally and externally to ensure birds do not move between compartments and/or escape). When birds are extracted from the net they are placed in these cages until ready for processing. When the compartments are full, they are covered with more shade-cloth to keep the birds quiet and cool. Birds are segregated by species in separate compartments and the numbers placed in each compartment are controlled.

(Right) Keeping cages (well covered around the edges to prevent birds escaping)



Knocker - a hammer or mallet.

Leg flag – a flag is a coloured plastic leg band with a small extension that can be seen through binoculars or telescopes at a distance. Flag colours are co-ordinated across the flyway so that it is known where any bird with a flag was banded. For example, Victorian waders have orange leg flags on the upper leg, South Australia has orange over yellow and north west Australia has yellow on the upper leg. Over the past 14 years, flag development has continually advanced, with the most recent changes being new engraved codes on the flags that reduce the need for multiple leg bands when trying to identify individual birds in the field.

Moult score – a standard way of describing what stage of moult the bird is at. In Australia, the moult is scored from the inner most primary feather on the wing to the outer primary. The development of a feather is then scored from a pin (or missing) feather as '1' through to a new fully-grown feather as '5' and '0' for an old primary (see Section 5.2 Moult in waders in Australia). The recording of the moult uses the stage of feather growth as the base and the number of feathers in that stage of growth as the power (eg $0^5 5^1 4^1 3^3$). All the powers must add up to ten (the number of visible primary feathers on most waders). Second year birds have more complicated moult scoring.

Pegs (long and short) – wooden stakes that are used to secure the net and to attach the jump ropes to. They can be short or long, depending on conditions at the site.

Permit - anybody handling wild birds in Australia must be covered by a licence from the Australian Bird and Bat Banding Scheme and have the appropriate state and National Parks permits. Licensed banders are authorised to supervise students/helpers who do not have their own licences. An 'A class' bird bander with cannon-net endorsements must be present to authorise the firing of the net. Other licence holders need only have a 'basic capture methods' endorsement in order to remove birds from the nets.

Processing - A bird is processed when its biometrics, or body measurements are taken and recorded on data sheets. This happens when the birds are caught for banding, although depending on the purpose of the study and the time available to handle the birds, not all measurements are taken for every bird. Various measurements taken include (see Section 5 Processing Waders in Australia):

- Age
- Bill length
- Head and bill length ie total head length
- Wing length
- Weight
- Stage of moult

The bird has a unique identifying metal band placed on its leg (for identifying on recapture or recovery) and usually a leg flag as well for identification of the bird's banding region.

Processing team – a team of three to five people who work together to process the birds. There is a nominated leader who oversees the processing by the team.

Projectile – a metal weight that is placed in the cannon and attached to the net by ropes. When the net is fired, the projectile is ejected from the cannon and carries the leading edge

of the net over the birds unfurling the rest of the net behind it. When detaching the projectile from the net after catching, make sure the shackle stays with the projectile, not on the net ropes.

Recce – reconnaissance - prior to catching, people visit the site where the catches are planned to see where the birds are roosting and moving to at high tide. This is critical to know where to set nets.

Recovery - A recovery is when a banded bird is found dead, or is captured in a different region to that in which it was banded. What happens in these cases is that the metal band number is reported to the Australian Bird and Bat Banding Scheme in Canberra who enter information into the Recoveries Database and prepare a recoveries report. Engraved Flags and multiple colour bands that are successfully read in the field are treated as 'recoveries' as they also identify the individual bird seen.

Release – following processing, birds are released to find their way back to the flock. This must occur within four hours of firing the net.

Retrap – a retrap refers to a bird that has been banded before and is re-caught in the same location/region.

Runner – when the birds are extracted from the net by experienced banders, people are needed to carry the birds from the net to the keeping cages. These are the runners and are generally the inexperienced people in the catching team. It is important that new runners find out how to hold birds properly and do not attempt to carry more than one bird at a time.

Ruler – a measuring device to determine the length of the wing.

Danger area - Because a cannon-net is set on the ground, there is an area immediately in front of the net that would be dangerous for any bird to be standing in when the net is fired (see Figure 3.1). For this reason this area is carefully measured out relative to the angle at which the cannons have been set (usually around 2m in front of the net). Under no circumstances is the net fired when any bird is in this danger area (or 'in danger'), even if it means a catch can't be made. A jiggler is used to try and clear any bird from the danger area prior to firing. Similarly there must be no persons or property in line with the front of the nets when firing. Although this is a negligible risk, if a projectile was to break free from the net this would be extremely hazardous. Cannon netting is always carried out with paramount safety of birds and people.

Safety markers - prominent and recognisable markers (eg a stick, bush, rock) are placed two metres in front of the net and at each end of the net so that those checking for safety of the birds know what the area is that they must have no birds in.

Scales – equipment to measure the weight of the birds. They have a series of tubes that can be matched to the bird's size and then birds are placed inside the tube to determine the bird's weight.

Tide-wrack – the dried vegetation and other material that is left at the top of the tide along the beach (seagrass, seaweed etc). This can also be referred to as "grot".

Twinkle/tinkling - Twinkling refers to the process of gently encouraging birds to move into the catching area in front of the net. This can take many forms, from:

- using a four-wheel drive vehicle as is the case on the vast Eighty Mile Beach in north-west Australia, to
- having people walk slowly along a beach, to
- having people (with protective waders of course), carefully move across the ponds at the Werribee Sewage Treatment Plant, or
- having people crawl along on their bellies - commando style - or to
- people simply making themselves visible by standing up from a hidden position

All these methods are used in different situations to encourage appropriate movement by the target birds.

Wet catch - On a beach catch the leading edge of the net often reaches the sea when fired. When this happens the team members must get into the sea in front of the net **AS QUICKLY AS POSSIBLE, TAKING CARE NOT TO TREAD ON THE NET**, (and avoiding tripping over projectile ropes!). The first person at the net should pull up the projectiles (a fast runner is usually nominated in advance for this task). Work with the rest of the team to move the net with the birds still in it. Hold your arms out in front of you like a fork lift truck, gather the net into your arms concertina-fashion (do not roll it), **LIFT** it up the beach and put it down on dry land. Do not drag or pull the net up the beach as this could damage the birds. Ensure the projectiles do not drag on the net or birds. A co-ordinated effort by the whole team working side-by-side is as important as speed. Listen to the senior members for instructions - do not work by yourself on individual birds. Do not try and take birds out of the net until instructed to do so.

3 Setting the net

The following outlines the various activities that collectively result in a net being set ready for catching. While in general the activities are in sequence, some can be done concurrently.

These steps are generic in nature and innovation at some sites can lead to some variation to what is described here.

Site selection - On the beach or where the site is subject to tidal influence, the net placement is relative to the expected height of the water at high tide to minimise the likelihood of catching birds in the water. Catching needs to occur near high tide as that is when the waders are roosting and resting from feeding on the mudflats/shoreline. Roosting sites and birds' movements have generally been observed through a recce in the day/s preceding the catch to ensure the confidence in where to set the net. Nets can sometimes be set below the high tide mark.

(Right) Selecting the site to set a net at Roebuck Bay, WA.



Mark the ends of the net – generally the leader will place two pegs where the expected ends of the net will be, or they could just point out the start and end by markers that exist eg stones/bushes.

Fix the ends - Start by finding and pegging the back right corner of the net. The jump rope, which will arrest the progress of the net when fired, is not used at this stage. The rest of the net is pulled from the bag directly to where the other end has been marked by the leader. Peg this end making sure the back line is taut.

Straighten the net - Work from one end and ensure that the net is not twisted. Try not to spread out the rest of the net at this stage especially if working in an area covered with tide-wrack or other debris (i.e. keep it to a narrow strip along the backline of the net).

Square up the ends - Working as a pair find the two front corners of the net, pull the net so that each corner is level with the corresponding back corner and square up the rest of the net.

Peg the jump ropes – Peg the three intermediate jump ropes (for a four cannon net) about 10cm behind the back line making sure that they are not twisted round the net. At this stage

the jump ropes are pegged directly (not on the elastic) to hold the net firmly in place until the net has been furled.

Furl the net - The rest of the net should now be 'furled'. To do this start at one end, get hold of the front line of the net; gather up the rest of the net concertina fashion (checking for debris) until the back line is reached. Place the furled net on top of the back edge with the front line on top, and proceed along the rest of the net. Always take care that the Bottom Rope is on the bottom, and the Top Rope on the top! Someone may need to hold his or her foot on the section of furled net as the next section is done before moving on. When complete, the projectile ropes sit on top. This operation is usually a team effort where people work shoulder to shoulder to minimise debris or having a twisted net.



Pull in the corners – After furling, the front corner of the net sits above the back corner. Take the point where the innermost projectile rope (for the end cannon) attaches to the front line of the net and drag it (keep it low and close to the net) back toward the centre of the net until the corner of the net (the end of the front line) is close to lining up to the front of the end cannon. Repeat this for both ends of the net. This needs to happen to allow the net to expand to a full rectangle. If it is not done, the projectile gets pulled back in toward the centre before it is fully extended and the net fails to fully expand.

Set the jump ropes – Take the short rope off the pegs and attach the elasticised end of the rope to the peg.

Dig in cannons - Dig holes for the cannon, as indicated by an experienced team member. The two end cannons are sited about 5m in from the ends of the net and point outwards slightly (visualise pointing at a spot about 8m in front of the end of the net). The other (middle net) cannons point straight out and are sited directly behind the mid point of each of the sets of projectile ropes. The holes should be dug so that the muzzles of the cannon are about 1m from the net and the back of the holes should be solid to resist recoil upon firing.

Placing cannons – When a hole has been dug place the cannon in it with the electrical wire uppermost and readily available to connect up. Once the licence holder has set the angle of the cannon cover all but the muzzle of the cannon and tidy up the area. If setting in loose sand or where it is difficult to dig, it may be necessary to put rocks on and behind each cannon to counteract the recoil. If in a sandy area, smooth over the top of the cannon so it will be obvious if anyone stands on it and alters the angle of the cannon.

Install projectiles – Connect the ropes to the projectile with the shackle and then insert the projectile in the cannon, ensuring that it reaches the bottom while making sure that your body is not in line of the potential fire of the barrel. Turn the bolt in the shackle back a quarter of a turn from fully screwed in (to make it possible to remove after firing).

Arrange projectile ropes – Arrange projectile ropes on top of the netting and ensure that the projectile will not catch on the netting when fired. Tidy up the ropes so that they lie along the line of the net. The ropes can also be carefully tucked under the front fold of the netting to break up their outline or placed behind the net. The leader will advise of their need.

Lay out firing cable - Lay the firing cable 1-2m behind the net so that the chocolate blocks correspond to the positions of the cannons. The cable is then unwound to the firing position, or hide, which has been chosen by the licence-holder. If more than one net is set make sure that it is known which cable is attached to which net and position the cable drums in the same relative positions as the nets. Ensure none of the chocolate blocks are lying on wet ground.

Connect cannons to firing cable - Connect the cannon wire to the chocolate block of the firing cable, making sure that there is no bare wire left exposed which could cause a short-circuit. In doing so, be sure that the connecting screw in the chocolate block is in contact with bare wire, not wire insulation. Prop the connected chocolate block up in the air.

Lay jiggle line - Often a jiggle is set about 50cm in front of the line of the net, giving the licence-holder a means of removing birds from the danger area in front of the net. Attach the elasticised end to a peg about one metre beyond the line of the net, run the jiggle cord in front of the net and continue to the firing position. Place two or three metal hoops on the firing position side of the net to guide the jiggle cord through. Return to the net and pull some slack in the jiggle at the pegged end. At the point where the jiggle turns to go to the firing position, lightly secure with a hoop. Ensure that the jiggle moves freely through the hoop. Also arrange the jiggle in front of the net so that it lies limply. Camouflage the jiggles (pieces of cloth) by covering with sand/soil. Lay this after the firing cable has been laid so the jiggle is across the top of the firing cable if they cross paths.



Set net ends - Take the ends of the net off the pegs and attach the jump ropes to the end pegs instead, in the same way as was done for the middle ropes.

Camouflage the net – most situations require the net to be camouflaged with material relevant to the site (eg sand on the beach, grass around wetlands). Make sure this is not too heavy to restrict the carriage of the net over the birds.

The leader (licence-holder) ensures that they, or someone with experience, will:

- Put out safety markers (~2m).
- Put out catching markers (~6-10m).
- Check the electrical circuit.
- Check that the jump-ropes are correctly attached and that the net is tidy.
- Check that the shackles are properly attached and that the projectiles will clear the net when fired.
- Check that the cannons have not been disturbed since their angle was set.
- Check that there are no projections (sticks/stones etc) in the catching area.
- Ensure that the cable drums at the firing position are clearly identified with the correct nets.
- Check that the jiggle is in place.
- Make sure they can see the markers from the firing position.

Dos and Don'ts

DO TREAT EQUIPMENT WITH CARE

First, and most important, cannon-netting equipment includes POTENTIALLY DANGEROUS ELECTRICAL AND EXPLOSIVE COMPONENTS. Always handle equipment with care, and do not handle equipment at all unless asked to do so.

DO LISTEN CAREFULLY TO INSTRUCTIONS AND ASK FOR GUIDANCE

The team will always include a number of experienced people; if you are in doubt about anything ASK SOMEONE TO EXPLAIN; all experienced people would sooner explain something several times than have an accident caused through a misunderstanding. When first involved in setting nets, there are certain jobs (eg. circuit testing and loading cartridges) that you will not be asked to do, as they require specialist knowledge. However, do not feel disappointed if you are not participating to the full - it is a good opportunity to watch and learn from others.

DO GET BEHIND THE NETS WHEN THEY ARE BEING CIRCUIT TESTED

When a net has been set it is tested electrically. Because there is a small risk of the net being fired accidentally, the person testing the net shouts, "TESTING" to warn others. When you hear this you should get behind the net (up the beach on a beach set), and stay there until the 'all clear' is given.

DO TREAT PERSONAL HEALTH WITH CARE

Cannons, projectiles and nets are heavy – lift and carry them with care, sharing the load wherever possible.

Drink plenty of water especially in hot weather.

Wash your hands carefully after handling birds or equipment before eating.

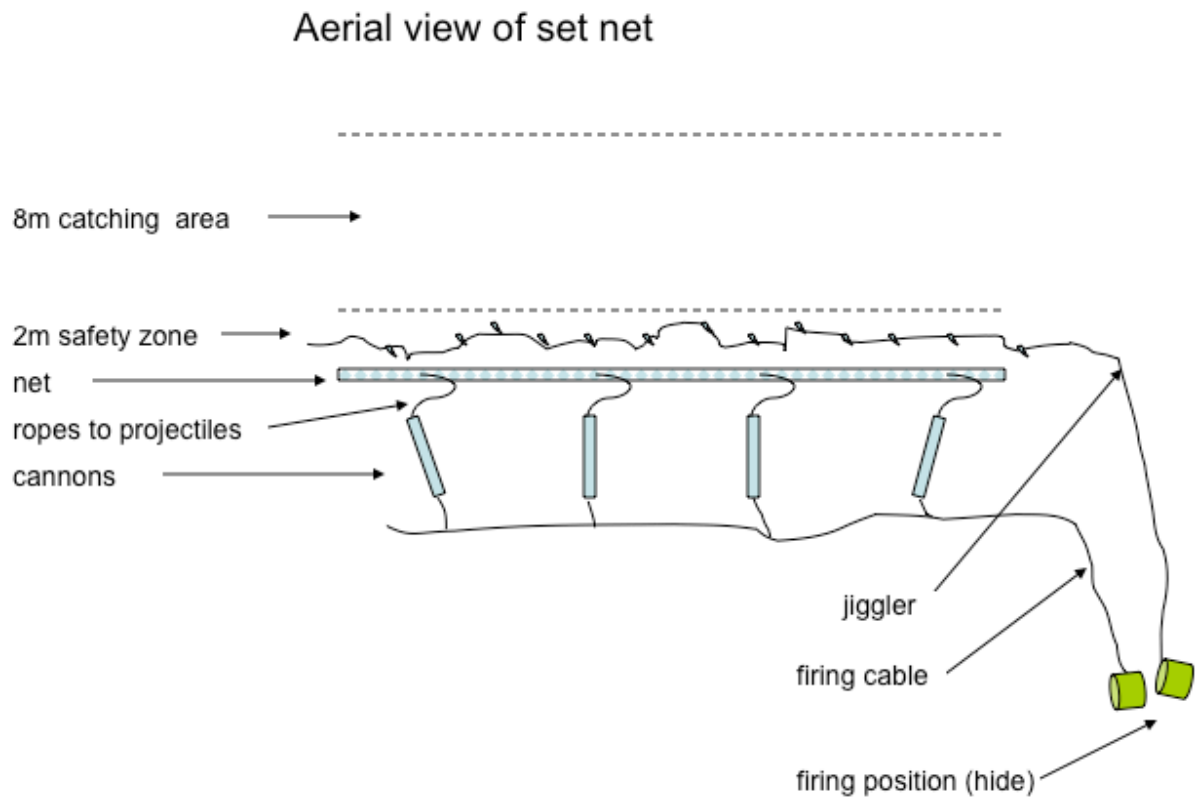
DON'T STAND ON CANNONS AFTER THEY ARE SET

Stepping on a cannon after it has been set can change the angle and lead to malfunction of the net and or harm to the birds upon firing.

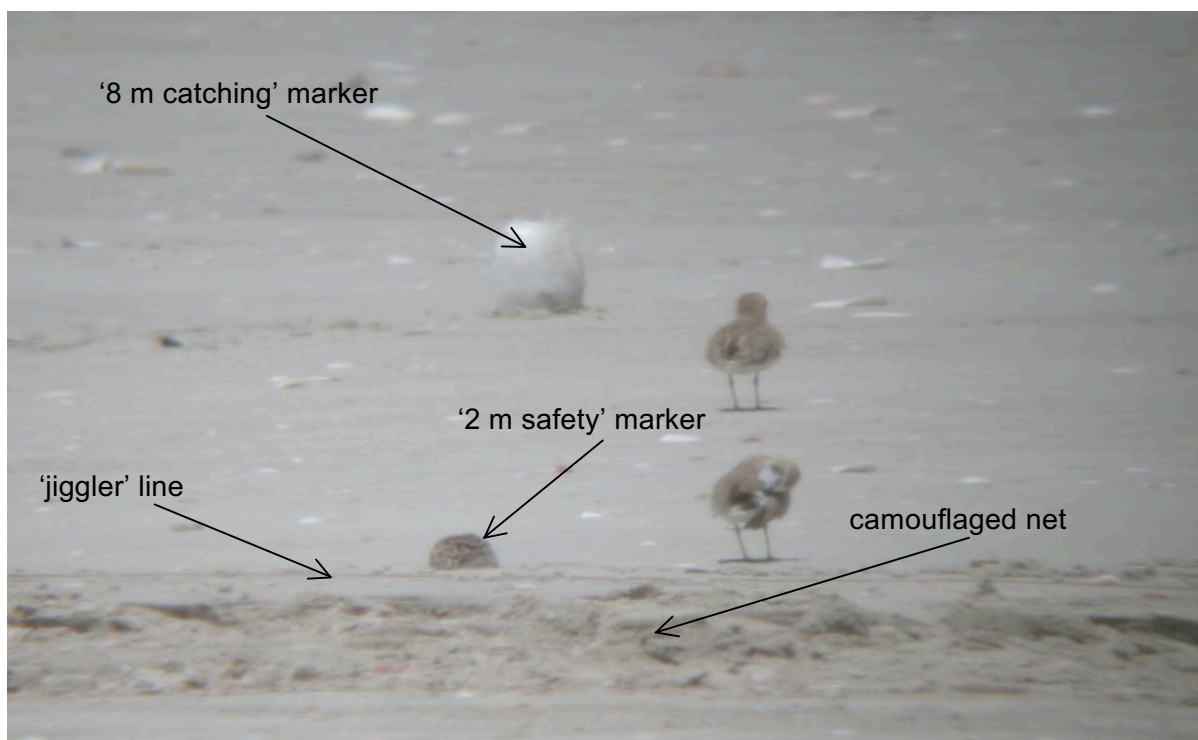
DON'T WAIT TO BE ASKED TO DO SOMETHING – ASK

The adage 'many hands make light work' is important so offer to do the next job if it is not clear what to do next.

Figure 3.1 Aerial view of the relative location of the components of a set net



(Below) Camouflaged net at Eighty Mile Beach WA (Chung Yu Chiang)



4 Making a catch

Overall process

New helpers are unlikely to have much to do during the actual catching process – just enjoy the bird spectacle. During the wait you will be briefed on what to do when the catch is made (and may be reading this manual). Listen carefully as different circumstances will require different responses. Sometimes circumstances change during the catching attempt. Make sure you are in a position to know about these changes. You particularly need to know what to do when you get to the net and what you need to take to the net. If the catch is to be wet listen carefully to the lifting instructions – this needs to be well co-ordinated and done quickly.

However, the process of catching is described here so you are in a better position to appreciate all that is going on.

When the team arrives back at the base camp, if there are birds in the catching area ready to go, a catch can be made straight away, but generally things are not so easy and a wait is necessary.

The roles to catching include:

- Waiting at base camp
- Twinkling
- Firing the net (in the hide/firing position)
- Run to the net – ensure the Safety of the birds (get the net out of the water if a wet catch)
- Cover the net
- Set up holding cages
- Extract the birds
- Process the birds
- Release the birds
- Pack up equipment.

Waiting at base camp

Most people in the team wait at a position that is within striking distance of the net (either running or in cars) where they listen to the radio traffic about what is going on. This means they are aware of when a catch is imminent (unless a sudden landing surprises everyone).

The 'rules' around the base camp are to stay with the group (loo breaks are an exception), be aware of the noise level and keep out of sight of the waders (contain the desire to just sneak a quick look over the bank).

When the action starts to hot up, be ready to run to the front of the net as quick as you can unless you have an allocated task of getting covering material or taking holding cages to the net. These need to be carried swiftly too.

Dos and don'ts

Whilst at base camp, keep out of sight, relatively quiet and stay with the group.

Twinkling for a catch

Twinkling refers to the process of using a vehicle or person on foot to move birds into the catching area. This can occur close to the net or can require people to go to other areas and disturb birds hoping to send them back close to the where the net has been set.

When near the net, the ideal is to have birds land or walk into the area under their own volition, but sometimes they need to be 'pushed' into the catching area – this is where the twinkler comes in.

The twinkler is in radio contact with the leader who is controlling the catch.

At the catching site

Along the edge – people stand or move slowly toward roosting birds moving along the edge of the water. Generally this is walking slowly, but can require a belly crawl like a commando to move wary birds

In the water – approaching from the waterside of roosts is occasionally needed to get birds to move off small islets in the water (this has been done by foot, boat and hovercraft, but is usually by foot in wetlands/lagoons and is rarely done on the coast)

If the waders fly, drop your profile if possible, but keep very still.

Away from the catching site

Unlike at the catching site, twinkling away from the site generally means trying to get the birds to leave your area and fly to where the catch is taking place.

Wave and make noise – visibility and scaring birds off the site is the aim so get active and vocal

Stay in radio contact – you need to know when the leader wants you to return or whether to stay to avoid birds returning so radio contact is needed.

Act promptly – catching waders is tide dependent so time is generally of the essence – if you go to twinkle away from the catching area, do it promptly.

Dos and don'ts

Do be really careful getting in and out of cars when in view of the waders to avoid disturbing them.

Don't make sudden movements when in sight of the waders around the catch site.

Firing the net (ABBBS licensed and experienced people only)

In the hide (or at the firing position if no hide), people have responsibility to make sure the electrics are working, that is, the firing box charges appropriately, the cable/s are properly connected and instructions from the leader are carried out swiftly but carefully. There are three stages to firing, first the firing box is 'armed' or charged ready to release a high voltage current down the cable, then the net is 'switched in' meaning the current can go when the firing occurs and then the firing button is pushed following the clearance call of '3-2-1-FIRE' by the leader. Sometimes the process may get to switch in the nets only to have a disturbance where birds are lost and the whole process repeats itself. The time between steps can also be condensed if birds suddenly drop into the catching area, but the steps must all be followed to create a firing opportunity.

People in the firing position are also on watch for bird species and numbers in the catching area and any that are in danger (if they are positioned to see this). Firing cannot take place if there are birds in the danger area (including on the net!). If there are any birds in danger, the jiggler can be used to try and move those in danger away without disturbing the birds in the catching area.

Radio contact between the firing position and the leader must always be maintained.

Before leaving the firing position all nets must be disconnected from the firing box (to ensure there is no accidental firing of any unspent cannons).

Dos and don'ts

Do disconnect all nets before leaving the firing position.

Run to the net

This is critical to ensuring the safety of birds, especially if it is a wet catch as it often is at coastal catches. Be aware that different techniques apply to large and small mesh nets!

If it is a wet catch, team members must get into the water in front of the net AS QUICKLY AS POSSIBLE, TAKING CARE NOT TO TREAD ON THE NET (and avoiding tripping over projectile ropes!). The first person at the net should pull up the projectiles (a fast runner is usually nominated in advance for this task). Work with the rest of the team to move the net with the birds still in it. Hold your arms out in front of you like a fork lift, gather the net into

your arms concertina-fashion (do not roll it), LIFT it up the beach and put it down on dry land. Do not drag or pull the net up the beach as this could damage the birds. Ensure the projectiles do not drag on the net or birds. A co-ordinated effort by the whole team working side-by-side is as important as speed. Listen to the senior members for instructions - do not work by yourself on individual birds.

When a small mesh net is used, the leader may go to the back of the net and hold up the net like a tent, to allow birds to run up the beach. This allows the front of the net to then be moved further forward without any birds getting caught up in it. If this 'tenting' technique is being used, it is important that nobody else is at the back of the net as their presence discourages the birds from running up the beach.

However, each catch can be slightly different so listen carefully to the instructions from the leader and follow them as closely and promptly as possible.

Dos and don'ts

Do listen carefully to instructions and act as quickly as possible.

Don't drag the net when birds are under it.

Cover the net

As soon as the birds are safe, the covering material should be placed over the net to calm the birds (minimising feather damage from flapping birds) and avoid overheating (if it is hot). It is important that the covering material (sheets of shade cloth) is carried over the birds, pulled tight and laid down on the net without pockets forming – don't drag the covering material across the net/birds. Watch carefully where you are putting your feet. Several pieces may be needed to completely cover all the birds.

It is critical that once the covering material is down that no-one walks on it as there is no way of knowing if there are any birds under the material.

Dos and don'ts

Do lift the covering material across the birds, stretch it tight and lay it down on the net.

Don't drag the material across the birds/net.

Don't walk on covering material when it is over the net!!!

Set up keeping cages

As the covering material is being placed over the net a separate team should be assembling the keeping cages.

A decision as to where the keeping cages are to be erected and if any preparation is needed before the cages are erected (for example, if the ground is particularly hot, muddy or wet, there may be a layer of hessian placed on the ground under the keeping cages), will be made by the person appointed to be in charge of the cages. They will be set up as close as possible to the net for easy transfer, but in a position that enables efficient positioning of the processing teams.

The cages are fixed by pushing sewn-in metal hoops into the ground. If these hoops need to be hammered in, place a wooden peg on the top of the hoop and hit that to reduce damage to the material sewn around the hoops.

Sand/stones are used to hold down the edges (internally and externally to ensure birds do not move between compartments and/or escape). When birds are extracted from the net they are placed in these cages until ready for processing. When the compartments are full, they are covered with more shade cloth to keep the birds quiet and cool.

(Right) Keeping cages well covered with shade cloth to keep the birds quiet and cool until they can be processed.



The keeping cage controller will advise the runners which compartments to place each bird in. When approaching the keeping cages, runners should clearly let the person in charge know what bird/s species they have in their hand (species and number).

Extract the birds

Once the keeping cages are set up, extraction of the birds can start. Except on small catches, it is usual for the most experienced people to extract birds from the net. However, whenever possible – on small catches or towards the end of extraction on medium size catches – less experienced people will be given the opportunity to learn to extract under close supervision.

Extracting waders from a cannon-net can present problems and is different from extracting passerines from a mist-net so an experienced wader extractor will be asked to train/supervise new extractors. The main differences are: do not hold waders by the legs (they have relatively weak legs), multi-layered and multi-bird extraction (due to lifted nets out of water) and pulling wings through the net mesh.

Usually the people extracting the birds pass them to 'runners' to take to the keeping cages. New and inexperienced runners will be instructed on the best way to hold birds (eg see Bander's grip in the glossary) and should not attempt to carry more than one bird at a time.

Each compartment can carry a limited number of birds depending on their size and aggression (eg five Stilts, 25 Red-necked Stints or one Gull-billed Tern) and only one species should be put in any compartment.

Each species will be allocated a separate keeping cage compartment so listen carefully and follow the directions of the cage controller. Also, particularly when a large catch is involved, look for any labels they may have placed on the compartments and place the bird in the appropriately labelled compartment. A small clump of sand on a closed compartment means it has its quota of birds so don't add any more.

Take care when walking around the edges of the cages and avoid stepping over them.

Be careful when extracting birds to avoid letting birds escape or you could find yourself 'fined' a drink or other measure of sustenance for others in the team.

Dos and don'ts

Do ask for help if there are any difficulties with extraction.

Do follow the directions of the cage controller as to where to place birds in the keeping cages.

Setting up shade

In very hot weather, shade is erected above the birds to help keep them and the processing teams more comfortable. Team leaders will instruct on what to do. This is particularly important when on expeditions in north west Australia.

Process the birds

Once the birds are all safely in the keeping cages, there is a chance for refreshments before starting to process the birds.

A leader will be nominated for each team and each team may be responsible for processing different species, depending on the catch. One team member will record all the measurements on prepared data sheets.



(Left) Processing this Grey Plover included measuring the bill length (also note the data sheet).

As well as the processing teams, there is always a flagging team where all the birds that are processed (at a minimum banded and aged for adult/juvenile identification through to full process of weight, wing length, head & bill length, bill length and full moult score recording) are passed through. See Section 5 for illustrations of wader measurements.

Waders are banded with special bands of hard metal (to withstand the corrosion of the sea), which are difficult to close. Please note that experience with softer bands will not be an adequate guide on its own to banding waders. Bands are placed on the left leg. The majority of species are banded on the lower leg, but several species are banded on the upper leg (eg Ruddy Turnstone and Double-banded Plover). Flags are placed on the right leg. The configuration and colour of these flags depends on the site.

Dos and don'ts

Do get actively involved and learn what you can about the waders.

Releasing waders

Take care when releasing waders by placing them on the ground and giving them time to walk and fly off or allow them to fly from your hand into the wind.

Do not throw them into the air, nor place them on your open hand above the ground.

For long-legged waders, or when banding at night, a screen may be provided to shield the release area from the processing teams and light.

Special precautions are necessary when predators such as raptors are in the vicinity. Decisions as to how, and when, releases are to be made will be made by the catch leader.

Dos and don'ts

Do take care when releasing waders and follow instructions.

Pack up the equipment

Once the birds are all safely processed and released, the remaining task is to pack up all the equipment.

After firing/catching

All pieces should be collected being careful to make sure that all components are brought back to the trailer. This means whoever is carting the projectiles should make sure they are all picked up and carried back and that they all have their shackles attached.

The net may have been laid out to dry before processing (depending on time) or may still be wet. Either way, when packing it up, jump ropes need to be tied up and the team generally gives it a 'partial furl' to reduce tangles and debris before it gets put into the net bag.

All the cannons are pulled up out of the sand and the connecting wire is pulled out from the cannon. But, do not disconnect the cable until each cannon has been found and removed from its hole. Cannons can be cleaned up to remove mud if possible before taking back to the trailer. Never wind used electrical wire around the cannon as this can lead to it being mistaken for a loaded cannon.

The net pegs should be pulled out by the one person to make sure they are all accounted for – there are different numbers depending on the size of the net. Find out how many there should be and get them all.

Cables should be wound up from the firing position and be firm on the drum to allow easy unravelling when the next net is set. Walk toward the net as you wind the cable, do not drag the cable toward you.

Be really careful with the jiggler to make sure it winds on the drum firmly and no-one should move it from the net end or they can become frustratingly tangled (think an overrun spool on a fishing reel and double it because of the pieces of material attached!).

When folding up the shade cloth, remember that time is of the essence when it will be used again, so it generally gets folded in from the ends to the middle several times and then rolled up the last bit. Tie the pieces up with a quick release knot (ask an experienced person to show how to do this if needed) to avoid wasted time when using it next.

Keeping cages need to be given a good shake before closing them. Take care to tie them in such a way as that they will not only be easy to carry but will also reassemble quickly next time they are used.

All equipment should be carried back and placed next to the trailer. Someone will take charge of the packing and control what gets put where. It depends on what the next activity is as to what gets put in where, although generally the heavier cannons and projectiles go on the bottom of the trailer to keep the weight low and even.

After no firing

This process is similar to packing up after firing except it is much easier as everything is exactly where it was put. The main difference is that cannons are removed and the

connecting wire is removed from the chocolate block, not the cannon. The wire is then rewound around the base of the cannon like a newly loaded cannon.

The net can just be picked up and placed straight in the bag, brushing off the camouflage as you go.

Unloading cannons (TO BE DONE BY TRAINED PERSONNEL ONLY)

Fired cannon can be taken apart and the cartridge removed and cleaned.

If an unfired cartridge is “stuck” in a cannon, it should be emptied by **removing the igniter** and draining out all the powder or fired as above. Under no circumstances should a pole, metal or wood, be used to try and remove the cartridge via the mouth of the cannon by ramming or hammering as this may result in the cartridge discharging and personal injury.

Dos and don'ts

Do account for all pieces of equipment

Do continue to help until the task is complete

Do leave the equipment beside the trailer. Leave the packing to the nominated packer.

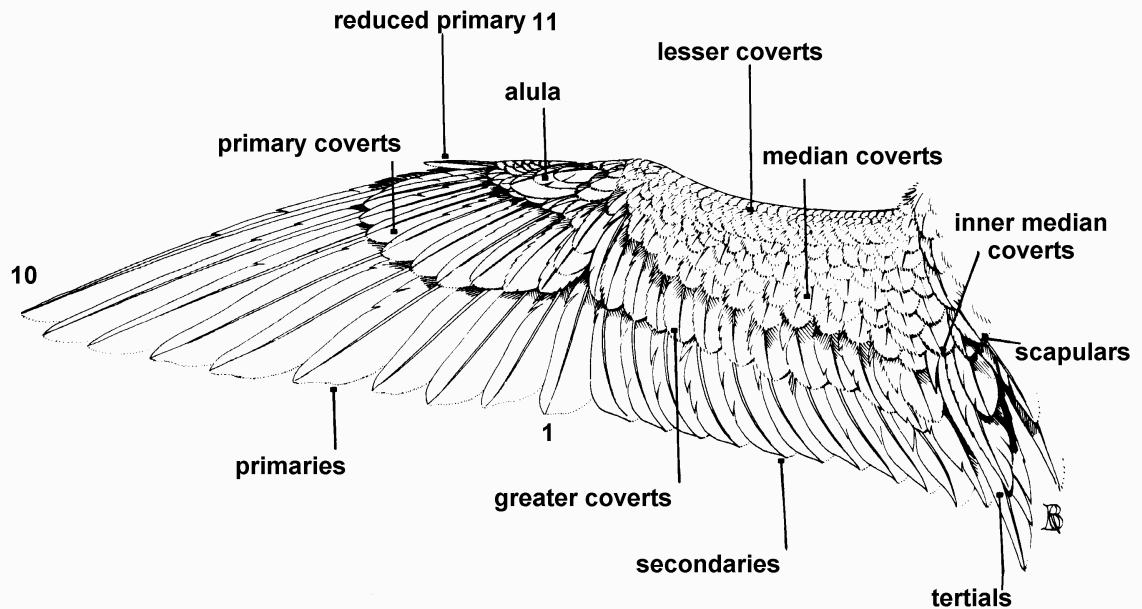
Do always wind the jiggler up from its storage drum

Don't pick up and drag the jiggler from the end near the net

Do be careful when emptying unfired cartridges that are stuck - either remove the igniter and drain the powder or fire the cannon to render the cartridge safe.

5 Processing Waders in Australia

Nomenclature of wing feathers

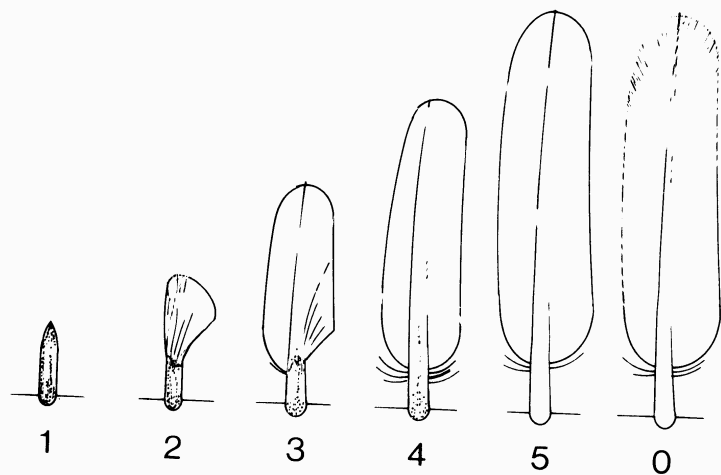


Nomenclature of wing feather tracts

In Australia the moult is scored from the inner most primary to the outer primary i.e. Primary one to primary 10 as shown below.

Primary Mould in waders

- 1: Pin or missing
- 2: Between pin & 1/3 grown
- 3: Between 1/3 & 2/3 grown
- 4: Between 2/3 & full-grown with blood still in the shaft
- 5: New & full grown – no blood in shaft
- 0: Fully grown, faded & worn (after August 1 on an adult)

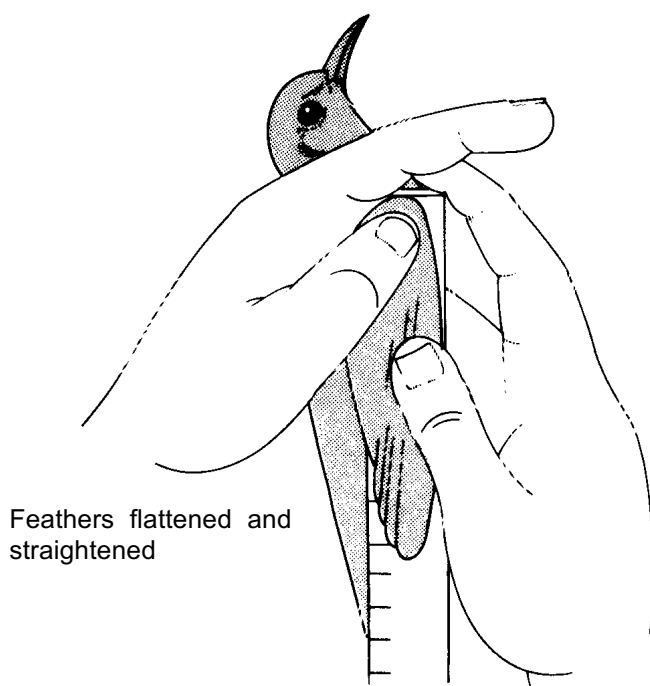


- R: Replacement feather (after August 1)
- V: Very worn feather (after August 1 on a second year bird)
- J: A juvenile feather

Moult score

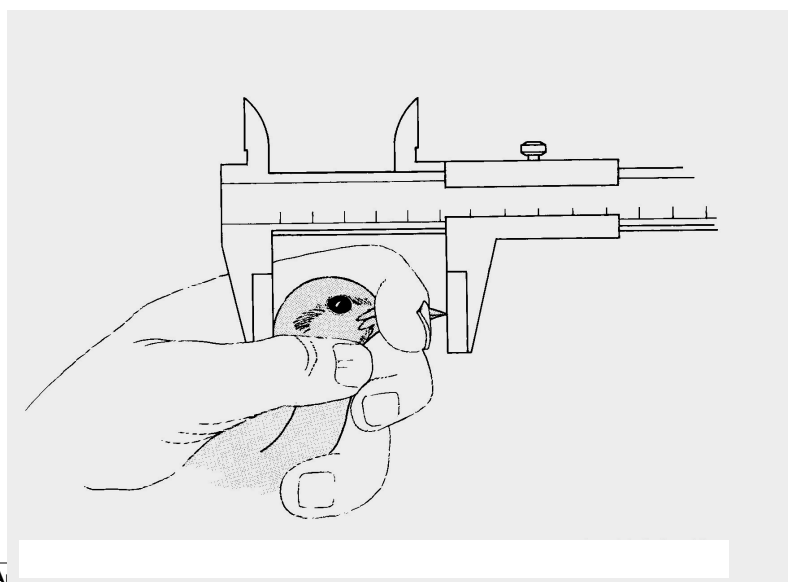
Moult score is written on data sheets as the stage the feather is at (see below) followed by the number of feathers of that stage – for example 5¹4¹3¹2¹1⁰5 means one feather at each stage with five older worn feathers.

Wing measurement



The wing length measurement used is maximum chord, i.e. the straightened flattened wing – see figure. The carpal joint is set against the butt end of the ruler and held gently in place with the thumb. With fingers and thumb of the other hand, the primary feathers are smoothed, straightened and flattened, to give maximum measurement possible. In practise the wing cannot be completely straightened. The measurement is taken with the wing held in as natural a position as possible, close to the body of the bird. Do not insert your finger between the body of the bird and the wing being measured.

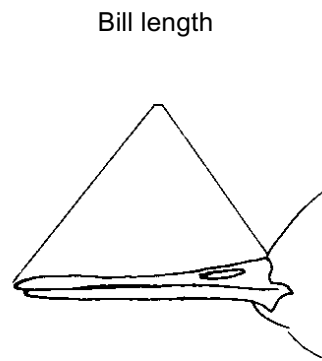
Total head length



The back of the bird's head must be against the callipers.

Bill length

Bill length is the measurement taken from the tip of the bill to the junction between the bill and the skin where the feathers start – see the diagram below.



The material used in Section 5.1 & 5.2 is reproduced from the AWSG/VWSG “Information Sheet 1 – Primary Molt” and Section 5.6 from “Information Sheet 2 – Measuring Waders”. Figures in Sections 5.4 & 5.5 are reproduced, with thanks, from The Australian Bird Bander’s Manual, Commonwealth of Australia 1989.