How To ...

CONDUCT A COMMUNITY FAUNA SURVEY

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Land for Wildlife

DEPARTMENT OF
Conservation
AND LAND MANAGEMENT
Conserving the nature of WA

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Cover photo: Jerdacuttup Primary School helping on a fauna survey

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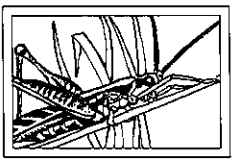


ABOUT THIS BOOK

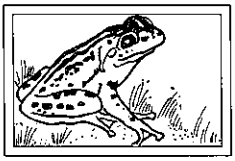
This book is designed to be used by community groups and individuals wishing to find out which vertebrate animals (those with backbones) occur in their area. It explains how you can find out about your fauna, including whether you need to undertake a survey. If a survey is needed, the book describes what is involved - including an overview of different survey methods, planning, what approvals are required, and who should coordinate the work.

Please note that if you do decide that your group needs to capture any wild fauna, you will require a licence from the State wildlife conservation agency, in Western Australia this is the Department of Conservation and Land Management. For readers of this book outside Western Australia references to the Department of Conservation and Land Management throughout the text can be replaced with 'your State wildlife authority'. Further details of licensing are given in the Approvals and Licencing section.

Happy surveying!

Quick Pre-survey Checklist

- Decide the purpose and aims of the study.
- Do background research to find out what is known about local fauna and flora.
- Establish what level of survey is required?
- Is there a competent supervisor?
- Organise a committee and other volunteers to co-ordinate and carry out the survey.
- Choose the survey site/s.
- Apply for relevant licences from your State wildlife authority (in WA from the Department of Conservation and Land Management) and permission from the landowner.
- Conduct a training session using a person experienced in fauna survey.
- Purchase equipment and prepare traps (if needed).
- Set up traplines.
- Conduct surveys.
- Remove all traps and flagging tape and fill in all holes.
- Collate information.
- Inform landholder/s, the wildlife licencing authority, (the Department of Conservation and Land Management in WA) and other interested persons of what you have discovered.



FINDING OUT ABOUT LOCAL FAUNA

- Why do you want to know more about local fauna?
- What sort of information do you need?
- What information is already available?
- What additional information do you need?
- Alternative survey methods

WHY DO YOU WANT TO KNOW MORE ABOUT LOCAL FAUNA?

Some of the reasons why people would like to know more about the fauna living in their area include:

- *to find out which animals live in a specific area* (general survey)
  Many different methods - some very simple, some difficult and time-consuming - can be used to cover all the different animal groups. See Table 1.

- *to find out if a particular animal lives in an area* (specific survey)
  If you are targeting a particular animal such as a chuditch, or Carnaby's cockatoo, then only the method most successful for recording that animal needs to be used. See Table 1 to identify the standard method that could be used, and seek advice from the relevant experts to make sure this will work for the specific species you are interested in.

TABLE 1: SURVEY METHODS

METHOD	BIRDS	MAMMALS	REPTILES	FROGS
Daytime observations	all species	kangaroos, wallabies (occasionally)	occasionally	occasionally
Headtorching	nocturnal birds	small (rarely), large (sometimes)	geckos (often) snakes (occasionally)	all, except smallest species which do not reflect eye-shine
Spotlighting	nocturnal birds	small (rarely), large (sometimes)	often on roads occasionally elsewhere	often on roads, occasionally elsewhere
Hand foraging	no	small marsupials (rarely)	most species	frequently in winter, occasionally at other times
Hair Tube	no	hair samples only	no	no
Elliott trap (30cmX10cm)	no	rodents, small marsupials excluding honey and pygmy possums	bobtails, bluetongues, skinks and snakes (occasionally)	no
Elliott trap (45cmX15cm)	no	rodents, larger marsupials	bobtails, bluetongues, skinks and snakes (occasionally)	no
Cage trap (20cmX56cm)	no	rodents, small placental mammals, larger marsupials	bobtails, bluetongues goannas	no
Pitfall trap	no	some rodents, small marsupials including honey and pygmy possums	most except adult goannas and large snakes	most species
Pitfall/	no	some rodents, small marsupials	as above	as above

- *to monitor fauna living in an area* (specialist survey or monitoring)

  If you have discovered that a rare or interesting animal lives in your area and you would like to monitor it over time, then you will need to carry out several surveys using the same method on each occasion. (This is the sort of work coordinated by the Malleefowl Preservation Group, based in Ongerup, W.A.) It is specialist survey work and you will need to seek expert advice before starting such a monitoring program.

- *to monitor the success or otherwise of revegetation for fauna habitat, the establishment of fauna movement corridors or the protection of remnant vegetation* (specialist survey or monitoring)

  The aims of revegetation or protection of remnant vegetation often include the provision or enhancement of fauna habitat. The success of these efforts can be measured by studying the ways in which fauna are using the given habitat. Again, the various methods given in Table 1 can be used to assess the fauna values of the 'enhanced' habitat. But remember, your results will be more meaningful if you have done a survey before you started the revegetation, to determine how much change has occurred.

A list of contacts for obtaining advice on surveys is given in the Useful Contacts section.

WHAT CAN YOU USE FAUNA INFORMATION FOR?

Your aims might include gathering data for some or all of the following:

- general interest, education, and raise awareness in the community
- help prepare a management plan for a specific area
- help design effective 'bush corridors'
- monitor the development and success of revegetation projects in providing habitat for fauna
- satisfy the monitoring conditions imposed by revegetation funding bodies
- help support an ecotourism venture
- publish a book which includes fauna detail
- input into regional or statewide fauna surveys
- input into the process of environmental assessment
- input into official State of the Environment reporting

WHAT SORT OF INFORMATION DO YOU NEED?

Once you have decided on the reason for wanting to know more about your local fauna, you can start to plan how to collect the information. The first thing to consider is what sort of a survey you need to do. Trapping animals always causes them stress, which, for the sake of the animal's welfare, should be avoided if possible. The least intrusive methods are best for the animals and are also the least expensive in terms of equipment cost and labour.

For example, if a bush corridor has been established with providing habitat for fauna as one of its purposes, then, for the first few years at least, a bird survey is all that may be

required. This can be done by carrying out observations during the day and at night using spotlight surveys for nocturnal birds.

If you are trying to establish or enhance a wetland, then a bird survey plus a frog survey could be carried out. Frogs can be surveyed by tape recording their calls during the breeding season, and comparing the call with a known tape (or asking an expert).

If you want to know which species of mammal live in an area, a combination of hair cones, daytime observations including searches for scats and tracks (see References section) and spotlight searches for nocturnal activity are easy, non intrusive methods to use. Reptiles can often be found by searching under logs, rocks, roadside spoil heaps and raking through leaf litter. Remember to return the habitat as close to its original condition as possible.

WHAT INFORMATION IS ALREADY AVAILABLE?

It is always a good idea to do some background research to discover what information is already available. Find out if there are any books or articles about the fauna in your area. There may be a natural history group such as the Western Australian Naturalists Club or a bird watching group who will have members willing to share their knowledge with you, or a library you could use. Each district, town or suburb usually has at least one local amateur naturalist and they may be able to provide you with valuable information. An advertisement in your local newspaper may put you in touch with interested people.

Surveys may already have been carried out for a management plan or a development proposal in or near your area of interest, so it is worthwhile contacting the Shire and the Department of Conservation and Land Management office to see what information they may have.

The Western Australian Museum holds records of all fauna that has been lodged in their collections. To obtain a computer printout of the fauna that has been collected from your area you need to identify the site by giving the latitude and

longitude of two opposite corners of a square or rectangle enclosing it. You can obtain these reference points from a standard topographic map (if you are not sure how to go about this, there is a clear description in "Bushland Plant Survey", see References section). Always include a larger area than you will be surveying because if the area is too small there may not be any animal specimens recorded from it.

WHAT ADDITIONAL INFORMATION DO YOU NEED?

If, after searching for what is already known about the fauna in your area, you need additional information to achieve your purpose then the level of survey required can be decided. Table 1 gives the survey methods in order of least to most intrusive, which also roughly coincides with the least to the most expensive. If a detailed survey requiring trapping is deemed necessary then the following sections should be read carefully.

ALTERNATIVE SURVEY METHODS

Non-intrusive or simple survey methods include all those which involve observations of fauna or fauna signs without actually capturing and handling the animals. As discussed above, this type of survey does not normally cause stress to the animals and is adequate for most purposes.

Intrusive or detailed survey methods include all techniques which involve actually capturing animals, for example, pit traps, cage traps and mist netting. These provide detailed research information about individual animals and population structure. In this book we give instructions for surveying using pit, Elliott and cage traps. Mist netting, which is used to study flying vertebrate fauna, birds and bats, is not covered. Special licences are required to use mist nets and training is required before licences are issued.

SIMPLE SURVEY METHODS

- Regular walk
- Spotlighting
- Sound recording
- Hair cones and hoops

First decide what sort of a survey is needed, simple or more detailed. Simple surveys can be conducted by group members or individuals without a lot of assistance or much prior planning.

For simple surveys you need:

- a notebook and pen
- some paper bags for specimens such as scats, feathers or hair
- identification books and tapes
- binoculars
- a camera (optional)
- a tape recorder (optional)
- a spotlight torch (optional).

The easiest survey to do is a 'regular walk'.

ESPECIALLY USEFUL FOR BIRDS, LARGE MAMMALS, FROGS AND REPTILES.

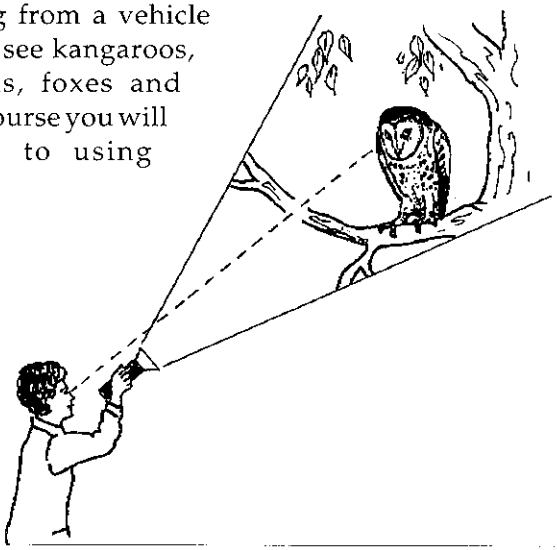
Choose a path through your area that traverses all of the different vegetation types that occur in it. Walk that path at the same time of day 4 times a year, in each different season, recording all that you see or hear. The early morning is best for birds and the early evening for frogs. In your notebook you can record actual sightings, and make drawings of diggings or tracks (a photograph - with a small item for size reference - would record these more accurately). Birdsong or frog calls can be taped, for later comparison with identification tapes. This is an excellent way of assessing the use of revegetation corridors, or a small patch of bushland.

Spotlighting

ESPECIALLY SUITABLE FOR NOCTURNAL BIRDS, MAMMALS, REPTILES AND FROGS.

This technique involves looking down the beam of a torch attached to your forehead or held close to your eyes. A torch held in the hand will not reveal all eye shine so you need to look down the beam. Gecko eyes shine as dull, red dots and can be difficult to detect as you will usually only see one eye. The eyes of spiders are more readily seen than gecko eyes, and they can be distinguished by their sparkling effect that looks much like a star. The eyes of possums and other nocturnal mammals can give quite brilliant eye shine. With a little practice many people become quite proficient at this type of survey technique. The best nights for gecko activity are usually windless, moonless and warm. Nights following light rain from a late afternoon summer thunderstorm can be exceptional.

Spotlighting from a vehicle can be used to see kangaroos, large possums, foxes and rabbits but of course you will be restricted to using tracks.

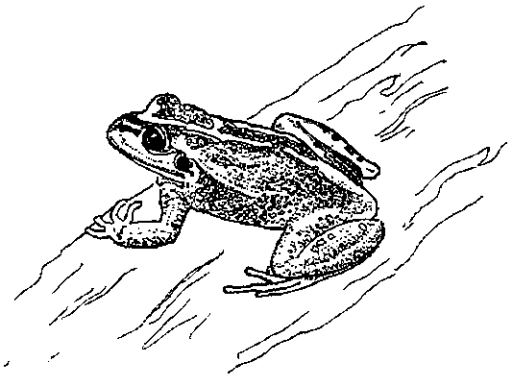


Sound recording

ESPECIALLY SUITABLE FOR BIRDS AND FROGS.

A sound recorder (cassette or disc) can be used to record birdsong and frog calls. The best time to record birds is during the early morning, but not too early as individual calls in the dawn chorus are more difficult to decipher. There are many excellent reference tapes available on birdsong which will help you identify the species you have taped (see Useful Contacts section).

Male frogs can be recorded calling during their breeding season. For some species this is during winter, especially with the first winter rains, other species call during heavy rain associated with summer thunderstorms. Reference tapes for frog calls are available and these include most species (see References section).



Hair cones and hoops

Hair cones and hoops can be used as a method of collecting mammal hair which can then be identified by hair structure characteristics. This method can be used to census many different mammals, and involves little, if any, risk to the animal. The equipment is relatively inexpensive to make. They are good devices to use when vehicle access is not possible or the ground is unsuitable for digging pitfall traps.

A cone is constructed from plastic to suit the size of mammal to be censused (Figure 1). Double-sided adhesive tape is placed along the cone to collect hair from mammals attracted to the bait in a chamber at the end of each cone. A hoop is constructed from a plastic sheet bent into a hoop shape using wire. The adhesive tape is attached to the inside of the hoop and then it is placed over a "runway" in dense vegetation (Figure 2).

These devices can be left in place for up to 2 weeks and either the old tape can be collected and replaced or the cones and hoops can be removed and relocated. The adhesive tape that is collected from each device is covered in waxed paper (lunch wrap) and sent for hair analysis (see Useful Contacts section).

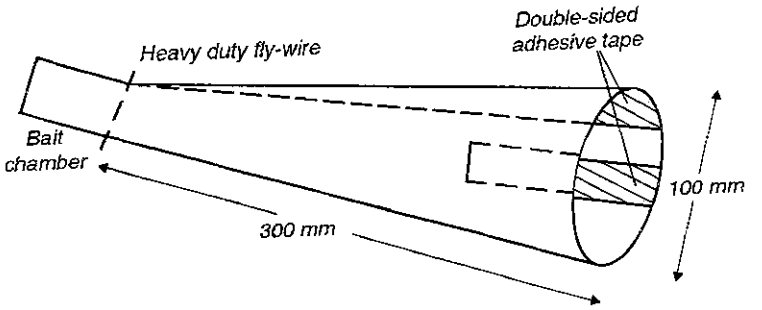
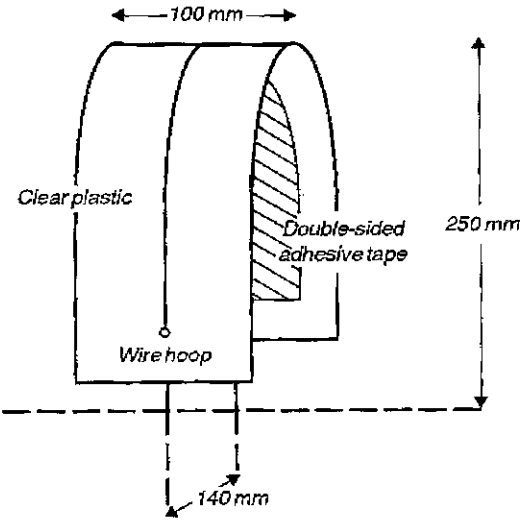


Figure 1: Hair sampling cone



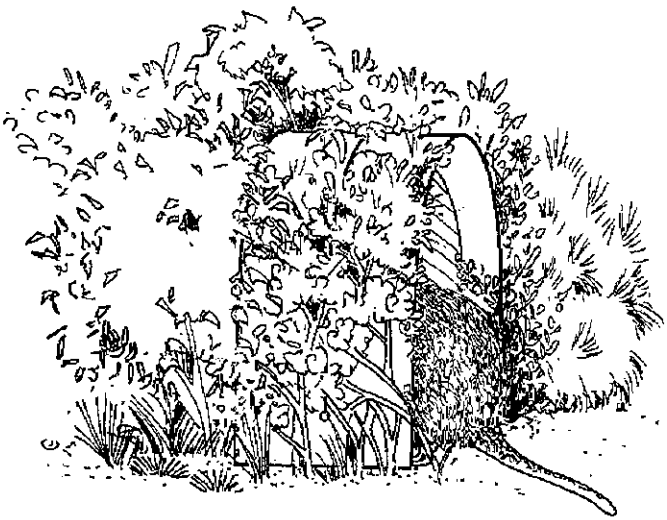
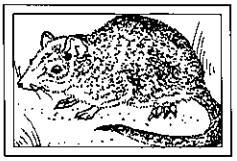


Figure 2: Hair sampling runthrough



DETAILED SURVEY METHODS

So, you have decided that a detailed survey requiring trapping is necessary. The following sections set out in detail how to plan and carry out the survey.

PLANNING THE SURVEY

- Expertise
- Approvals and licencing
- Target areas
- Number of traps to use
- Timing

EXPERTISE

Anyone wishing to undertake fauna surveys that involve the capture and handling of animals needs to be aware at all times of the absolute need to care for the welfare of captured animals and also the requirements for safe handling to avoid personal injury. Experience has shown that some people are not able to safely handle animals, while others learn through training and the observation of competent handlers. It is **absolutely essential** that fauna trapping is only undertaken by people who are experienced in handling techniques, or who are under the direct supervision of a trained and competent person.

APPROVALS AND LICENCING

Written permission **must** be obtained from the landholder or managing agency of the land on which you intend to work before any survey work can be carried out. Staff at your local Shire office should be able to tell you who is the landowner or managing agency.

If your survey will involve capture or trapping of wild fauna a licence to carry out a fauna survey must be obtained from the Department. Before you do any planning it is advisable to contact your nearest departmental office to find out what is required from you for a licence to be considered.

A standard departmental requirement for those wishing to obtain a fauna trapping licence is that the trapping program must involve a person competent in the handling of native fauna. There may be a keen zoologist in your area who would be willing to become involved. Alternatively, your group could organise a workshop and invite a person experienced in fauna trapping to run it. This would be best carried out in the field where he/she could advise you on the siting and setting up of your traps and later could demonstrate animal handling techniques to the group.

Once a licence is granted the person nominated as being responsible for the survey should ensure that all conditions of the licence are adhered to.

If you will be collecting plants as part of your survey then a plant collecting licence is needed. Contact your nearest departmental office for information.

At this stage it is also important to contact your local Department's office for advice on the occurrence of dieback

disease in your area. Dieback disease affects many plant species and is caused by various species of fungus, some which attack roots and others the plant foliage. One of the common dieback disease pathogens is *Phytophthora cinnamomi* which spreads by spores in wet soil and can be carried by vehicles, animals or human feet. Dieback disease is one of the most important threats to conservation of both plant and animal species in the south-west and many areas of forest and heath are closed to vehicles during the wetter months in an attempt to minimise its spread. It is important therefore that you find out about dieback in the area you intend to survey before any other planning is carried out.

TARGET AREAS

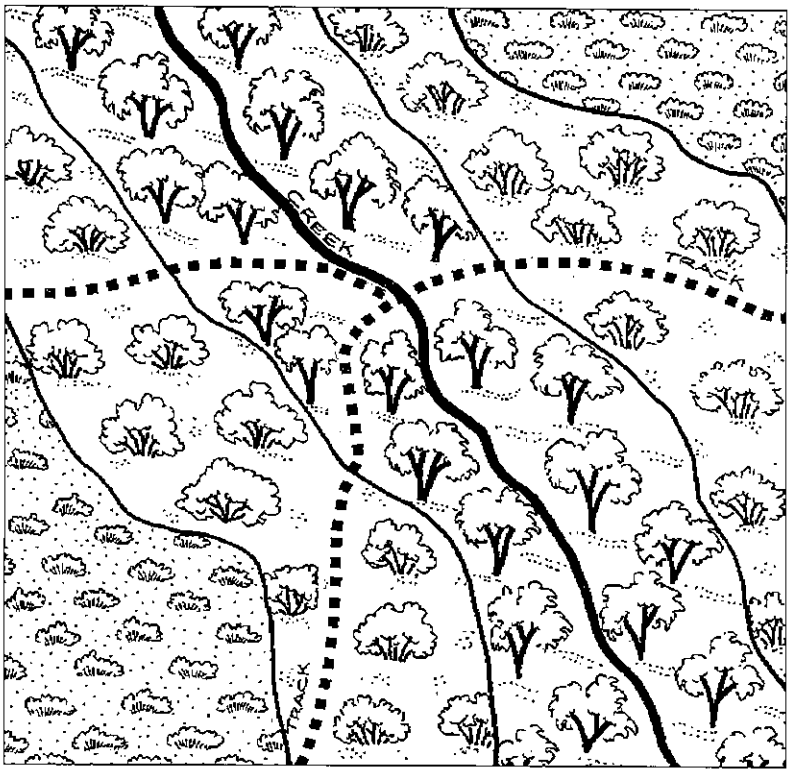
Once an appropriate method or set of methods has been chosen, the next step is to decide where the traps will be sited. Most probably you will not be able to cover the whole area with traps, so choose trap sites that represent all the different fauna habitats present in the area. Each major plant community will usually have some species restricted to it, as well as many in common.

In Figure 3 below each fauna habitat (plant community) has been identified and mapped. This can be achieved by carrying out a detailed plant survey or by simply walking through the whole area identifying different plant communities by looking at the soil and the types of plant growing there. Aerial photographs can assist in this mapping and will also help in siting the traps by giving an overall view of your survey site. A thorough description of plant survey and the use of maps and aerial photography is given in the book "Bushland Plant Survey" (see References section).

In the example there are 3 plant communities and fauna habitats, so you should aim to place traps in each of these areas. Utilising the tracks running through this patch of bush would give easy access to habitats 1 and 2 with a walk to get into habitat 3.

Another factor to consider is that you should put your traps where they will not be disturbed by people passing by. They should be placed in a secure area away from roads, residential areas and recreational areas, especially dog exercise areas.

Figure 3: Example of fauna habitats and plant communities at a survey site



KEY

Habitat 1 Riparian Woodland on sandy loam

Habitat 2 Mallee heath on sandy clay

Habitat 3 Heath on sand

NUMBER OF TRAPS TO USE

The number of traps you need to use in your survey will be related to the size of the area you wish to survey and your survey resources. In general, using traps in multiples of 10 simplifies any analysis of your trapping results.

Spacing of the traps is also determined based on the habitats you are trapping and the purpose of the survey. For a general 'what's here?' survey, traps should be set at places the animals are most likely to use. For a monitoring survey, traps need to be re-set in the same locations. As a rough rule of thumb, standard trapping programs can be based around the following design.

- General fauna surveys should include the use of small cage traps and medium Elliott traps. Pit traps can be included in lower rainfall or coastal areas which are generally richer in small ground-dwelling fauna not readily caught in other traps, or where particular species which are more likely to be caught in pits are being targeted.
- Traps should be placed out in straight lines to maximise the area and habitats being sampled.
- Small and medium Elliott traps can be placed at 20m intervals in a line of at least 10 traps.
- Large Elliotts and small cage traps can be placed in lines of 5-10 traps at 20-50m intervals to target mammals such as bandicoots, and along tracks at 200m intervals to target wider-ranging species such as chuditch (quolls) and woylie (bettongs).
- Large cage traps can be placed in lines of at least 5 traps spaced at 20-50m intervals to target medium sized wallabies such as quokka or tammar.
- Pitfall traps can be set in lines of 5-10 pits with 20m spacings, in each habitat type.

When disturbed the barking gecko makes a sound like the yap of a small dog.

Male western spotted frogs start calling in April and May.

The aptly named turtle frog lays her eggs underground and has no free-swimming tadpole stage.

TIMING

The purpose of the study will generally dictate how many surveys are carried out and Table 2 will help with the timing and frequency of sampling. For example, a survey for frogs in the south-west is best carried out during winter or with rain at other times of year. For a general survey it is ideal if traps are opened at least once each season, if this is not possible then at least twice during the year in spring and late summer/autumn. Table 2 is a guide for an average season bearing in mind that rainfall in the Pilbara and deserts dictates fauna activity. It would be ideal to survey in these regions following substantial rains, although often this cannot be predicted. The comments in the table refer to levels of activity, ease of general observations, and trapping effectiveness.

If possible, plan your trapping program well in advance so that pit traps can be installed when the soil is damp, as it is usually very hard work when soil is hard and dry. If you are using volunteers, remember that free labour has only a limited shelf-life and sweat soaked people seeing sparks coming off the end of the crowbar may suddenly find more important tasks to do tomorrow!

After the pits have been installed their position should be well marked using flagging tape tied securely to trees or bushes close by and the lids must be secured and covered with soil (or old plough disks) until the trapping session begins.

TABLE 2 TIMING OF YOUR SURVEY

SEASON	Summer (Dec-Feb)			Autumn (Mar-May)		
AREA	SW	*Pilbara and deserts	Kimberley	SW	*Pilbara and deserts	Kimberley
BIRDS	moderate	low	high	low	moderate	mod-high
MAMMALS	Low #	low	high	Mod-high#	generally mod-low, high following good rains	mod-high
REPTILES	high	high	high	mod-low	moderate	moderate
FROGS	mod-low, high after substantial rain	high with rain	high with rain	low until rain occurs	generally low-high following good rains	low except near water

SEASON	Winter (Jun-Aug)			Spring (Sept-Nov)		
AREA	SW	*Pilbara and deserts	Kimberley	SW	*Pilbara and deserts	Kimberley
BIRDS	moderate	high	moderate	high	high	mod-high
MAMMALS	mod-high#	generally mod-low high following good rains	moderate	High#	generally mod-low high following good rains	low-mod
REPTILES	low	mod-high	low	high	mod-high	mod-high
FROGS	high	low	low	high	generallly low, high following rain	generally low, high following storms

* Activity in these regions is reliant on the sporadic rainfall and can be non-seasonal.

Activity of Dasyurids (i.e. chuditch, phascogale, mardo) is highest in autumn which is their breeding season, hence they are easier to trap at this time. They are more difficult to trap in spring and can have dependent young. Other medium-sized mammals (i.e. quenda, woylie) are active all year.

Honey possums feed only on pollen and nectar.

A female western pygmy possum can look quite plump when carrying young in her pouch.

A hatchling thorny devil, an ant eater in miniature, begins its journey through life.

A TYPICAL TRAPPING SESSION WOULD LAST FOR 5-6 DAYS, AS FOLLOWS:

DAYS 1-2

- prepare all the traps and bait
- dig in pitfalls and fences (or open traps if already in place)
- set out and bait Elliott and cage traps and leave them open (do not put bait in the pits as it attracts ants)

DAYS 2-5

- check the traps and release all animals early each morning
- ensure that all invertebrates are removed from pitfall traps as they attract ants
- during hot weather check the traps during the day and ensure all traps are well sheltered from direct sun. In very hot weather, close cage and Elliott traps during the day
- replace bait in Elliott and cage traps as necessary and close any pits or move Elliott and cage traps which are affected by ants

DAY 5 or 6

- check the traps and release all animals (including invertebrates that may have been missed earlier)
- put the lid securely on each bucket and cover it with plenty of soil (if you are in an agricultural area old plough discs are excellent to cover pitfall traps)
- collect all other traps and fences and store in a secure place until the next trapping session
- if only one session is being carried out then all buckets and flagging tape must be removed and the holes filled up with soil.

CONDUCTING THE SURVEY

- Equipment
- Home preparation
- Setting up pit traps and drift fences
- Setting up Elliott and cage traps
- Checking the traps
- Handling the animals
- Marking the animals
- Identifying the animals
- Recording your results

It is assumed that your survey grid will consist of pitfall traps with a drift fence, combined with Elliott and cage traps. The following methods are designed to keep stress to the captured animals to a minimum and should be followed carefully.

EQUIPMENT

TRAP ESTABLISHMENT

20 litre plastic buckets with lids

Lid pegs, 2 per bucket

Aluminium drift fences, stakes attached if required

Elliott traps

Cage traps

Flagging tape

Clean, raw fleece wool or **untreated** wool batting for Elliotts during cold, wet weather

Weldmesh grids, 1 per bucket (optional)

PVC tubes, 1 per bucket (optional)

Shovels

Crowbars

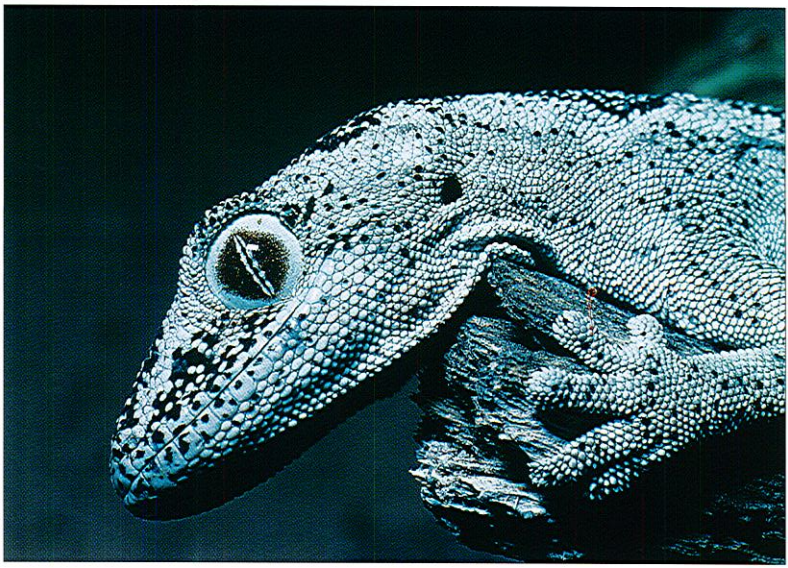
Hand trowels

Bait

Gardening gloves

Plastic bags for Elliotts during cold, wet weather

Bleating froglets are well camouflaged and are variable in colour and pattern.



The western spiny-tailed gecko can squirt sticky liquid from its tail to deter predators.

Small lizards are best held by grasping them gently around the forebody.

TRAP CHECKING

Long barbecue tongs
Calico holding bags
Hessian holding bags
Weighing scales
Vernier calipers
Identification books
Glass jars (for invertebrates)
Gloves
Small spade for ongoing trap maintenance
Data sheets
Notebook
Honey and water for honey possums

HOME PREPARATION

BUCKETS

Most recent surveys have been carried out using 20 litre plastic buckets (see Equipment Suppliers section). Previously, PVC plastic piping was used and during its use a few disadvantages came to light. Among these were the difficulties in checking the pits due to the narrow opening. It was hard to see clearly what was in the pit and also difficult to retrieve animals safely, especially small lizards, centipedes, spiders, scorpions and snakes. For these reasons it is recommended that buckets are used by community groups.

Responsible researchers use the bucket lids or cardboard shelters to provide a degree of protection from rain and sun, which can literally cook animals during the summer. The number of buckets required will depend on the area being surveyed. As a guide 10-20 buckets per fauna habitat is generally adequate. Of course, more buckets means more captures but labour, equipment costs and checking time needs to be taken into account. Keep in mind that all traps have to be checked every morning as early as possible and again during the day in hot weather.

The following preparations are best done at home before the traps are set-up at the site:

- drill 6-8 holes in the bottom of each bucket for drainage. This not only allows water to drain out but it also lets water seep in which, if the soil becomes waterlogged, stops the buckets from popping out of the ground in between trapping sessions. Holes drilled in the sides of the bucket will also prevent problems in wet sites. 1/8th drill-bit is best as bigger holes allow small skinks and blind snakes to escape
- using a hacksaw or wood saw, cut 8cm vertical slots on opposite sides in the top of each bucket to support the wire fence as it passes over the top (Figure 4)
- make pegs to hold the lids over the buckets (2 per bucket). Either use bucket handles straightened out or make some from heavy gauge wire (Figure 5)
- drill 2 opposite holes in the seal of the lids to slide the pegs into. The hole size will depend on the diameter of lid peg. Make the hole tight to prevent the lid falling down (Figure 5).

Figure 4

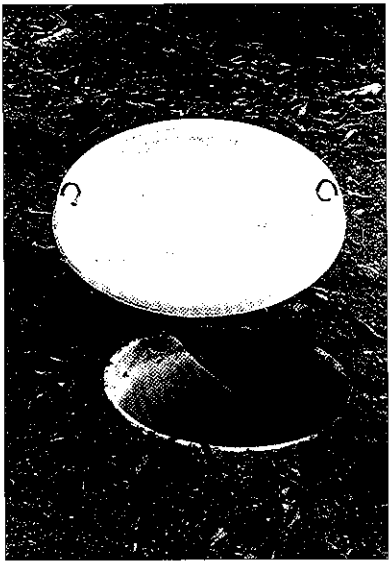


Figure 5

Young goannas, like most reptiles, are more brightly coloured than adults.

Pygmy possums often go into torpor when captured.

The harmless common scaly foot is a legless lizard that mimics poisonous snakes to bluff predators.

FLYWIRE DRIFT FENCE

Aluminium flywire has been found to be the most durable material to use, although it is expensive (see Equipment Suppliers section). The 30m x 0.60m rolls of wire can be cut in half to make 0.30m widths with an electric bench saw or band saw (a hack saw is hard work and makes untidy rolls). The 30m rolls are then torn by hand into 10m lengths, which are generally adequate for most surveys. One roll of 30m x 0.60m flywire will make six 10m x 0.30m drift fences. To make handling and setting up easier a 45cm wooden stake can be attached to each end using shade cloth fasteners (Figure 6).

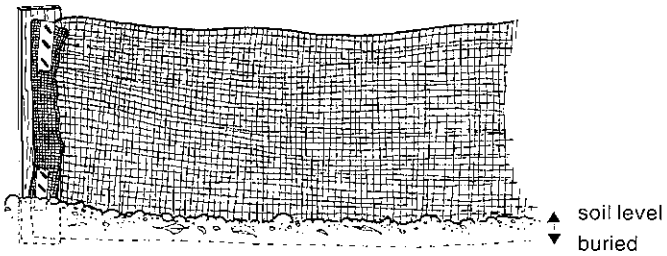


Figure 6: Flywire drift fence

SETTING UP PIT TRAPS AND DRIFT FENCES

> Trapping during extreme weather conditions of either hot, cold or wet should be avoided.

After preparing the pit traps and drift fences at home you are now ready to set them up at the site as follows:

- measure and mark out the position of each pitfall trap with coloured, numbered flagging tape. They can be set out to suit the site, either in a straight line or in a grid arrangement. Each trap can be numbered which makes it easier to ensure that all traps have been checked each day. Ants are usually the biggest problem so to avoid causing captured animals undue stress, site pitfall traps and drift fences away from ant nests and ant trails

- dig in each pitfall trap until the top of the bucket is level with or just below ground level, ensuring that the cut slots are running in the direction of the fence. If trapping in winter or during the wet season, buckets should be just above ground level with a soil ramp constructed to enable animals to fall in but to stop water flooding into the bucket
- fill in around the sides of the bucket with soil and compact it
- unroll the fence and fold under an 8cm section at 90° (Figure 7). Place this drift fence across the centre of the bucket with 5m extending out from each side. Put the fence through the slots in the bucket and pull each end reasonably tight but not too tight. Bang in the stakes at each end of the fence. Put soil along the folded lip and compact the soil with your feet
- smooth the soil and clear away obstructions from around the bucket lip
- place the lid pegs through the holes in the lid and slide the pegs down the side of the bucket in the loose soil until it rests on the fence (Figure 8)

Figure 7

Figure 8

- drift fences will require occasional maintenance to keep them working effectively. Ensure that the 8cm folded lip of the fence is kept covered with soil so that animals cannot get underneath. Ensure that no holes develop in the soil around the edge of the pit trap due to cave-in.

If you find that foxes, cats, or other predators are taking captured animals out of the pitfall traps, then weldmesh grids can be placed in the bottom of each bucket. Sections of 15cm long by 5cm diameter white PVC pipe can also be put in the bottom of each pitfall trap. These pipes provide somewhere for captured animals to hide and can be used on their own or in conjunction with the grids (Figure 9). If trapping is conducted during wet weather, foam trays can be used as floating platforms for the animals to take refuge on to prevent drowning.

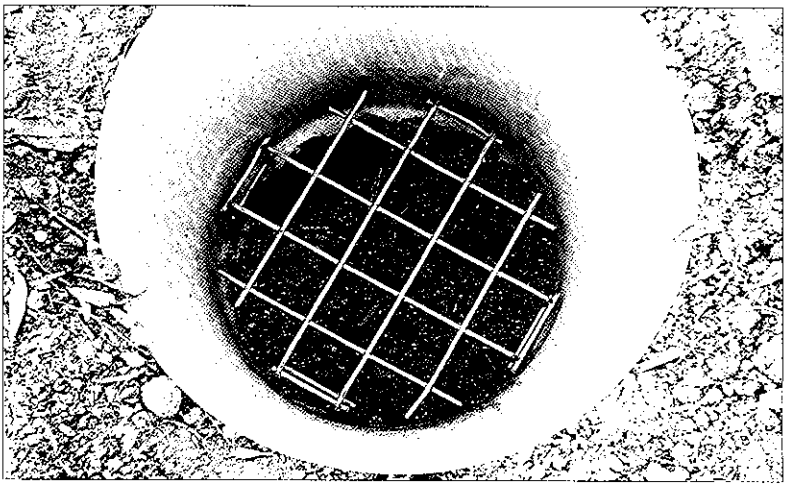


Figure 9

SETTING UP ELLIOTT AND CAGE TRAPS

If trapping during cold, wet weather is unavoidable, the Elliott traps should be placed inside a strong plastic bag. In addition a pad of clean raw fleece wool or **untreated** wool batting should be placed inside each trap, making sure that the treadle mechanism is not obstructed. This ensures that the animal is insulated against cold and possible death when trapped (Figure 10).

During hot weather it is essential to put all traps in a place where they are shaded all day. A dense covering of leaf litter works well if dense shrubs are not available. Folded cardboard can also be used to shelter Elliott traps as shown in Figures 11 & 12.

The rear two-thirds of each cage trap should **always** be covered by hessian to reduce stress to captured animals by providing some degree of protection from rain, sun and predators (Figure 13). Ensure that the latching mechanism is not obstructed by the hessian and that there are no sticks or leaves which prevent the door of the cage from closing completely. Always test that the door closes properly before leaving the cage.

Figure 10

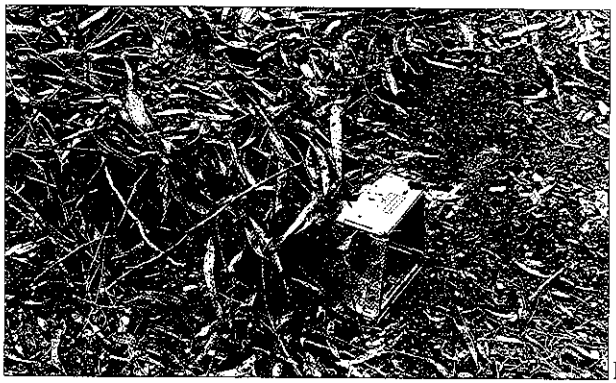


Figure 11

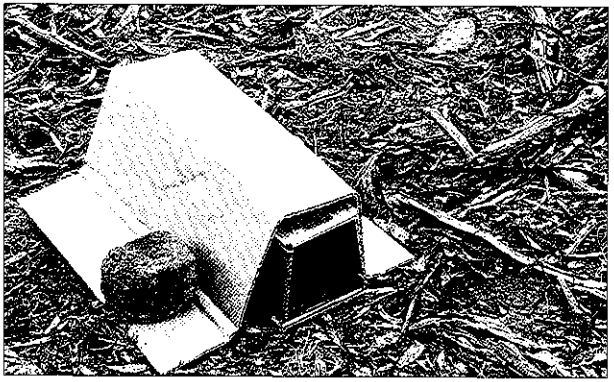


Figure 12

Figure 13

Elliott traps and cage traps are baited with a mixture of peanut butter and oats. Mix together 1 x 375g jar of peanut butter and enough rolled oats to make a mixture that will roll into balls in your hand. This will usually be enough to bait approximately 20 Elliott traps or 10 cage traps.

Put a ping-pong ball sized lump in each Elliott trap and a larger lump on the hook in each cage trap. Replace the bait during the week as necessary.

CHECKING THE TRAPS

Always check the traps as early as possible each morning, especially when ant activity is high. In summer or during hot spells check all the traps twice per day, once early in the morning and again prior to the hottest part of the day (usually 1-3pm). This ensures that the reptiles which are trapped after the early morning checking are saved from heat stress and possible death from ant attack. If it is very hot, then cage traps and Elliott traps should be closed during the day and reopened at sunset.

Make sure the pitfall traps are checked thoroughly by swishing carefully through the soil in the pit with a stick to uncover tiny skinks or camouflaged frogs. Be aware of Elliott traps that may be hidden under a bush. Numbering each trap using flagging tape tied to an adjacent bush and checking it off as you go helps if you are working in dense bush.

Identify each animal that you catch and record its details on a data sheet or in a notebook (see page 49 for sample data sheet).

Be very careful and gentle handling any animals. Protect yourself from bites or stings by holding the animals gently, but firmly. See specific directions in the following sections.

If required, put a mark under each animal's tail (except frogs) with a non-toxic waterproof marker pen. You can use a different colour each day, this will tell you which animals are recaptured, and on which day.

Release each animal in a sheltered spot at the site of its capture and make sure they are out of the way of trampling feet and ants. If possible, release nocturnal species during the late afternoon or after dark.

Ground frogs (not *Litoria* species which are tree frogs) should be revived by part immersion in water if they are dehydrated and then buried lightly in damp soil. For *Litoria* species revive them in water if necessary and put them under dense vegetation (do not bury them).

Honey possums and pygmy possums often go into torpor, that is their body functions slow down and their temperature drops to that of the surroundings. They can be warmed up by using your body heat and then can be offered a honey and water mix before they are released (1 teaspoon of honey to a small glass of warm water).

Fauna trapping **always** carries a risk to the animals despite the best efforts of care. If an animal dies during trapping it is important to preserve it for the WA Museum. Wrap it in moist newspaper, put it in a plastic bag with details of where and when it was captured and then freeze it until it can be taken to the Museum or local CALM office.

HANDLING THE ANIMALS

MAMMALS IN ELLIOTT TRAPS

Open the door of the trap slightly and if it is a mammal try to identify it before any attempt is made to get it out of the trap. Once identified it can be released or put into a bag as follows:

- put the calico holding bag over the front end of the Elliott trap and wrap the excess bag securely around the trap (Figure 14)
- open the door of the trap through the bag and clip it down
- gently tip the trap upside down and shake the animal into the bag

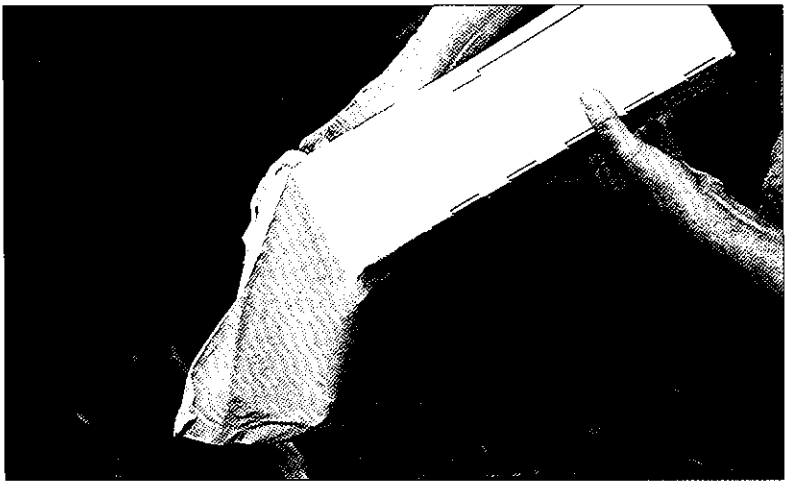


Figure 14

- once you are sure the animal is in the bottom of the bag grasp the top of the bag and tie the tapes securely
- view and identify the animal in the bag, or only partly exposed from it. Small marsupials and rodents can be emptied into a clear plastic bag instead of a calico bag, to assist with this
- mark the animal by exposing only the part you wish to mark
- release the animal from the bag.

MAMMALS IN CAGE TRAPS

Identify the animal in the cage if possible then release it. To release an animal, stand away from the cage door and open it. If the animal doesn't leave of its own accord, try blowing gently onto it from the rear of the cage. Do not shake the animal out!

If it is a small mammal (i.e. not a brushtail possum or a chuditch) and you need to get it out to identify it, try this method:

- slip a hessian handling bag underneath the front of the trap then open the door as you slip the rest of the bag opening over the front of the trap. Blow on the animal to get it to move into the bag
- gently expose the parts of the body needed for identification (feet, tail, ears etc) but keep the animal's eyes covered at all times.

MAMMALS IN PITFALL TRAPS

Identify the mammal, if possible, while it is still in the bucket. If it is a honey possum it can be gently lifted out enclosed in your hand (they have tiny teeth so cannot bite). If it is lively you can safely hold onto the base of its tail (nearest the body, not the tip) as it sits on your hand while you examine it to record details.

> Warning – do not pick quendas (bandicoots) up by the tail as it will come off completely.

If the mammal is anything other than a honey possum you may get bitten if handling it with bare hands. The following method is recommended:

- turn a bag inside out and put it over your hand (wear a glove also)
- grasp the animal gently around the body and turn the bag the right way with the animal inside it, identify and release it.

MAMMALS IN CALICO BAGS

Once an animal is safely inside a bag you can determine its sex, mark it or measure its back feet and tail using the following method:

- hold onto the top of the bag with one hand and manoeuvre the animal with the other hand until its nose is poking into one corner of the bag
- grasp the animal around the body with one hand then pull down the sides of the bag with the other hand. The tail can now be safely lifted to find out the sex or a mark can be put on its tail and the hind foot and tail can be measured
- you may find that once the animal has its nose in the corner of the bag it is quite happy to stay there even when you have put it onto the ground to release it.

If you need to take head or other body measurements then the animal will have to be removed from the bag. This is more difficult to carry out and only a person experienced in handling fauna should attempt these measurements.

SNAKES

> Do not handle these animals unless you are sure they are harmless, or unless you have been appropriately trained.

Leave snakes and legless lizards in the bucket and identify them using one of the books listed in the References section. If it is a venomous snake make sure everyone is standing back out of the way and put on a glove and use a pair of long barbecue tongs to **gently** lift the snake out and release it. If there is any doubt whether it is a venomous snake or a legless lizard always use the tongs to lift it out of the bucket and release it. Large snakes (longer than 50-60cm) do not usually get caught in pitfall traps.

If it is a legless lizard or a harmless snake you can lift it out gently by hand to weigh and then release it. Be aware that a legless lizard will lose its tail if handled roughly.

Blind snakes are harmless and can be handled safely. However, it is best to wear gloves when you handle them as they will often exude a smelly substance from their cloaca (opening for reproduction and excretion).

If your Elliott trap is very heavy it is most likely to be a bobtail or bluetongue. However, care must be taken as large venomous snakes are occasionally caught in Elliott traps. If you suspect you have caught a snake press the door down a little to confirm what you have caught. Each Elliott trap is made with one removable pin along one side. This pin can be removed and the snake can be released safely by pulling out the pin, putting the trap on the ground then moving back out of the way until the snake moves off. This method is also used to release bobtails and bluetongues.

LIZARDS

All Australian lizards are harmless, although a bobtail, bluetongue or goanna will give you a painful bite but these will not, contrary to legend, result in a sore that reappears each year thereafter!

Most skinks (notable exceptions are the bobtail and bluetongue), geckos and legless lizards can lose their tail if handled roughly. The correct way to handle them is by grasping their forebody firmly just in front of the front legs.

FROGS

If you are catching large numbers of frogs it is best to use gloves to handle them as some secrete toxins from their skin, especially when they are alarmed.

If handling them with bare hands be aware that they are very slippery and can shoot out of your hand like a bar of wet soap. Crouch low when examining them so at least they do not have far to fall.

INVERTEBRATES

Spiders, scorpions and centipedes can all inflict a sting or bite so take care when handling them. A safe way of handling

them is to put on a glove and carefully scoop them out using a clean glass jar, then put the lid on and use a hand lens to have a close look. Release the animal when you have finished looking at it.

Many other invertebrates will be captured during pitfall trapping. Some may bite, such as crickets and some beetles, although they are not poisonous. It is best to remove all invertebrates from the trap using a jar, gloves or tongs if you are not sure.

MARKING THE ANIMALS

If you need to know how many individuals you have captured over the survey time then you will need to mark each animal. A short term, relatively safe way of marking mammals and reptiles is to put a mark under their tail using a waterproof, non-toxic marker pen. If necessary, a different colour can be used for each day of the week. Care should be taken when handling geckos and skinks as they will shed their tails if they are roughly handled. Some rodents will also loose the skin from their tail if it is held tightly.

Longer-term marking techniques include tagging and micro-chip implants. These are suitable only for specialist surveys.

IDENTIFYING THE ANIMALS

BIRDS

It is not necessary to go into bird identification here as there are many excellent field guides and bird call tapes available to help you (see References section). Two important points should be mentioned however, and the first is to become familiar with using binoculars before you start the survey. The second point is to become familiar with a few

common birds close to home and then you should find it easier to compare the unknown bird with one you are familiar with. For example, looks like a willie wagtail but has a white throat (restless flycatcher), or looks like a raven with white on its wings (currawong). Familiarise yourself with the field guides and get used to the birds found in your area, it will save much frustration in the field.

MAMMALS

There are two groups of mammals that you will be catching; the marsupials and the placental mammals. Female marsupials have a pouch that ranges from a deep pouch as in brush-tail possums, to a very shallow pouch as in phascogales. When the young are too big for the pouch they are often carried either on the back or underneath the female. Male marsupials have very visible testicles. In southern WA the marsupials you may catch include predatory marsupials (Dasyurids), such as the chuditch, mardo and fat-tailed dunnart. In northern WA you can expect to catch pseudantechinus, planigale and ningaui. Bandicoots and various species of possum may also be captured in many areas of the state.

The placental mammals you may catch include native rodents such as Mitchell's hopping mouse and the southern bush rat. Rodents (rats and mice) are placental mammals and therefore do not have a pouch. After the young are born they are left in a burrow or shelter. Male rodents do not have very visible testicles, except during the breeding season when a dark patch of skin under the anus may be obvious in sexually mature males. You may also catch introduced rodents such as the house mouse and black rat. The house mouse may be captured in bush a great distance from human settlement but black rats are normally caught close to towns or cities or, occasionally, near wetlands away from human settlement. It can be difficult to tell the difference between a house mouse and other native rodents. One fairly reliable method is to look behind the two top front teeth for a notch (Figure 15). A further method is to look at the hind foot pads (see References section).

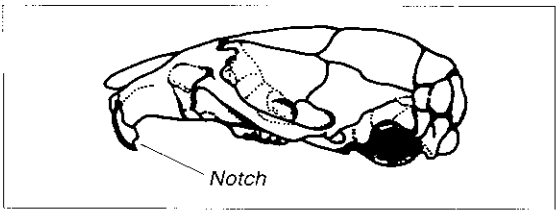


Figure 15: House mouse (*Mus musculus*)

REPTILES

There are six groups of reptile that you may catch, these are skinks, dragon lizards, goannas, geckos, legless lizards and snakes. The books published by the WA Museum given in the References section provide keys and photographs for identifying reptiles.

The two groups that may give you problems with identification are the legless lizards and snakes.

LEGLESS LIZARDS	SNAKES
have ear openings	do not have ear openings
have scales on the belly in 2 longitudinal series	have scales on their belly that are in a single series and extend all the way across the belly
may have flaps of skin where their hind legs would have been in the past	do not have any flaps of skin representing rudimentary legs, except pythons which have a spur
have a short body and long tail which can break (fragile) and is capable of regeneration	have a long body and short tail which is non-fragile and non-regenerating
have an undivided tongue (like ours)	have a forked tongue

FROGS

Frogs can sometimes be very difficult to identify as many species look similar and even the experts have difficulty

identifying them. The books given in the References section are the best to use for identification and a frog call tape is also listed. If you are having difficulty identifying some of the frogs by their appearance the best method is to tape record the males when they are calling (see Sound recording section).

INVERTEBRATES

Although it may not be an aim of your survey to capture invertebrates they will always be caught in pitfall traps. Ants especially may be caught in large numbers, often to the detriment of anything else caught in that trap.

The books listed in the Reference section can be used to identify families of invertebrates. To identify them down to genus and species level may prove more difficult as there are thousands of species and many of them have not been scientifically described. It is best to consult an expert on the particular invertebrate group you wish to identify (see Useful Contacts section).

RECORDING YOUR RESULTS

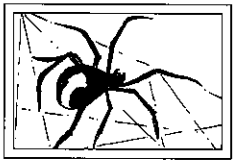
A standard method of recording works best to ensure that information is not lost or forgotten. An example of a data sheet is given opposite. This can be copied or you may want to modify it to suit your needs.

If a report is to be produced that documents your project, then the following information should be included:

- dates of surveys
- weather conditions
- location (a map is best)
- methods used
- results (a list of species that were recorded or captured is usually given)

SAMPLE FAUNA SURVEY DATA SHEET

DATE	SITE	SPECIES	No.	SEX	METHOD	REMARKS



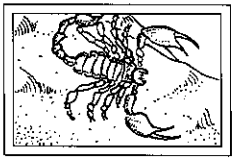
FIRST AID

Despite the most careful precautions, accidents can happen. People handling animals should ensure that their tetanus vaccinations are up to date. The survey team should always carry into the field a good quality first aid kit and written guide, such as those produced by St John Ambulance. It would be ideal if at least one member of the team had first aid training.

Your safety is your responsibility.

ACKNOWLEDGEMENTS

Special thanks to Greg Harold who provided the photographs and also made useful comments on the text. Sincere thanks to Peter Collins, Maureen Francesconi, Kelly Gillen, Penny Hussey, Keiran McNamara, Peter Mawson, and Gordon Wyre who all made helpful comments on earlier versions of the text.



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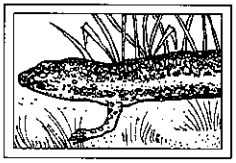


USEFUL CONTACTS

Barbara Triggs (hair and scat analysis)
Dead Finish
Genoa
Victoria 3891 (03) 5158 0445

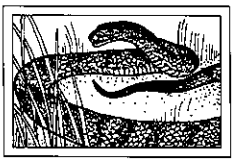
Birds Australia (formerly RAOU) (bird identification books and tapes)
WA Office
Perry House
71 Oceanic Drive
Floreat. 6014 (08) 9383 7749

Dept of Conservation and Land Management
(general wildlife enquiries and books)
Locked Bag 104
Bentley Delivery Centre
WA 6983 (08) 9334 0333
For local offices see telephone directory

Land For Wildlife (wildlife management in rural areas)
Dept. Conservation and Land Management
PO Box 104
Como WA 6152 (08) 9334 0530

Western Australian Museum
(general wildlife enquiries, invertebrates and books)
Francis Street
Perth 6000 (08) 9427 2700

Western Australian Naturalists Club
(general wildlife enquiries and books)
PO Box 156
Nedlands 6009 (08) 9272 1674



EQUIPMENT SUPPLIERS

Please note, that this list is not exclusive, and is not meant as an endorsement of any particular product or company. The list was correct at the time of going to print.

ITEM	SUPPLIER	PHONE	FAX
Plastic Buckets 20 litre with lids	Silverlock & Co 28 Catalano Rd Canning Vale WA 6155	(08) 9455 1366	(08) 9455 1835
Drift Fence Aluminium flywire 30m x 60m	Hardware stores		
Elliott traps Various sizes	Elliott Scientific PO Box 1155 Upwey Victoria 3158	(03) 9754 2171	(03) 9754 8937
Cage traps Various sizes	Sheffield Wire Products 6/14 Sheffield St Welshpool WA 6106	(08) 9351 8778	(08) 9351 8778
Weighing and Measuring equipment	Australian Bird Study Association Inc. 30 Curringa Road Kariong NSW 2250	(02) 4340 4033	(02) 4340 4033
Spring Balances Waterproof paper	Avinet Inc. PO Box 1103, DrydenNew York, USA	0011 1 607 844 3277	0015 1 607 844 3915

ITEM	SUPPLIER	PHONE	FAX
Spring Balances	NBL Services 10 Asquith St Victoria Park 6100	(08) 9361 3321	(08) 9361 5764
Calipers	TISCO Instruments 207 Railway Road Subiaco 6008	(08) 9381 6000	(08) 9388 1587
Field magnifying lenses	York Optical and Scientific 159a Scarborough Bch Rd Mt. Hawthorn 6016	(08) 9201 1971	
Calico holding bags	Can either be made by members of your group or purchased from the Bird Study Group above or, Activ Industries Chilver St Kewdale WA 6105	as above (08) 9353 1613	as above
Hessian Bags	Pope Packaging 33 Furnace Road Welshpool PO Box 68, Cloverdale 6105	(08) 9451 5044	(08) 9451 8387
Weldmesh grids	Can be made by participants		
PVC Pipe	hardware or garden supply stores		
Flagging Tape	Sussex Industries 38 Sussex Street Maylands 6051	(08) 9272 1344	(08) 9370 4304