

**BASIC COURSE IN WILDLIFE
REHABILITATION MANUAL
2013**

Introduction to wildlife rehabilitation

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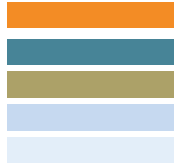


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March 2013



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Acknowledgements

The Department of Environment and Conservation (DEC) gratefully acknowledges the contributions of experienced wildlife rehabilitators to this course manual. All contributors have many years of skill and experience in rescuing, rehabilitating and releasing sick, injured or orphaned wildlife back into their natural Western Australian habitats.

Acknowledgements for sections of this manual are as follows:

Sick and injured wildlife:	Perth Zoological Parks Authority
Care of birds:	Kanyana Wildlife Rehabilitation Centre
Care of raptors:	Society for the Preservation of Raptors Inc
Care of reptiles:	Ruth Haight, Turtle Oblonga Rescue & Rehabilitation Network Inc
Care of mammals:	Sue Turner, Kooikuna Sanctuary, Woorooloo sue.turner@bbnet.com.au
Wildlife legislation:	Nature Protection, DEC Department of Agriculture and Food

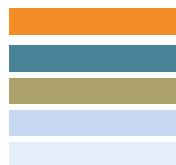


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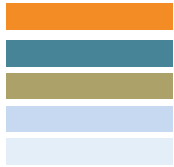


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Useful contacts

Armadale Reptile Centre, Wungong	9399 6927	armadalereptilecentre@iprimus.com.au
Australian Wildlife Health network		www.wildlifehealth.org.au
Birds Australia	9383 7749	www.birdsaustralia.com.au
Community Involvement Unit (DEC)	9334 0279 9334 0251	community.involvement@dec.wa.gov.au
Darling Range Wildlife Shelter	9394 0885	www.darlingrangewildlife.com.au
Department of Agriculture and Food Pest and disease information service	1800 084 881 (Free call)	www.agric.wa.gov.au
Invasive Animals Cooperative Research Centre		www.invasiveanimals.com
Kanyana Wildlife Centre, Lesmurdie	9291 3900	kanyanawildlife@kanyanawildlife.org.au
Kooikuna Wildlife Sanctuary	9573 1578	sue.turner@bbnet.com.au
Malubillai Wildlife Carer's Network, Victoria Park	0412 609 104	
Mandurah Wildlife Rescue & Hospital	9582 3938	www.mandurahwildlife.com.au
Native Animal Rescue, Malaga	9294 3434	www.nativeanimalrescue.org.au
Native Arc, Bibra Lake	9417 7105	www.nativearc.org.au
Turtle Oblonga Rescue & Rehabilitation Network	0427 810 085	www.turtleoblonganetwork.org.au
Wildcare Helpline	9474 9055	community.involvement@dec.wa.gov.au
Wildlife Watch (DEC) Illegal activity	1800 449 453 (free call)	





Realities of wildlife care

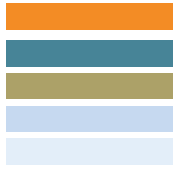
Financial costs

- basic setup includes a dedicated area; a laundry won't do – a shed or container will
- electricity, water, sinks with hot and cold taps
- dedicated wildlife fridge for food and medications
- dedicated freezer for dead animals, that is separate to frozen wildlife food
- veterinarian bills and supplies
- gloves, disinfectants, cleaning equipment, tissues, paper towels, garbage bags
- hot boxes, heat lamps, enclosures, maintenance tools and materials
- heaters, air conditioning or fans
- live food, various seeds, joey milk formula, fresh fruit and vegetables
- vehicle for transporting animals, pet paks
- stationery items, computer, internet connection
- microwave, wheat hot packs, thermometers.

Personal costs

- Time – as well as taking up a lot of your waking hours and even your non-waking hours, the unpredictable nature of wildlife caring will play havoc with your work schedules, household and family routines.
- Family dissention – before you begin, it is important that your family fully supports you and understands the demands this will make on your time and how they will, in turn, be affected
- Emotional wear and tear, which doesn't diminish with experience.





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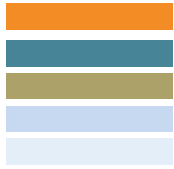
Vetiquette

It is essential that you establish and maintain a good relationship with your vet, and the vet clinic staff.

Your vet is your most important ally.

- Whilst wildlife rehabilitation is your choice, be mindful of the fact that vets are not obliged to treat your wildlife free of charge. Vets are running a business with staff wages to pay, and a clinic to maintain; this is something which should be borne in mind at all times.
- Make an appointment with your local vet to discuss whether he/she is willing to work with you, and how such an arrangement could work. Ask the vet to establish at the outset his/her guidelines for dealing with you. For example, they may place a limit on the number of animals per week, ask that your visits be restricted to particular days of the week.
- Whilst many vets are willing to work with wildlife rehabilitators, providing their expertise free of charge, they cannot afford to provide consumables free of charge and nor should they be expected to do so.
- Before commencing a course of treatment for any animal, discuss the cost with the vet. Isoflurane anaesthetic is very expensive as are x-rays and pins, which are around \$30 each. Medications too, can be expensive.
- Always phone beforehand.
- Avoid visiting or phoning the clinic during its busy times. Ask the vet when you should call – often a good time to call is after lunch, once the morning rush is out of the way. If you're part of a rehab group, delegate or roster one person to call at the appointed time each day.
- Be professional, courteous and organised in your approach. Be punctual.
- Be prepared with any necessary equipment, for example thick gloves, towels, carry-boxes.
- Ensure the animal is securely contained in an easily accessible container (bird cages are unsuitable).
- Take the animal's history/treatment sheet with the animal; the vet needs all the facts.
- Your vet may receive injured wildlife from the public and may call on you to take these animals into care as soon as possible. It is important that you collect the animals within the agreed time frame. Make sure that you leave a printed copy of your contact details with the vet staff and make sure that you are contactable at all times. Vet clinics are busy and don't have time to keep calling you. Make a point of phoning late on Friday to see whether any animals have been brought in; otherwise these animals may be left in the clinic over the weekend.

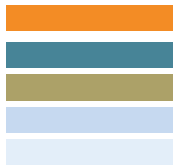




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- Offer to provide the clinic staff with a simple form which they can give to wildlife rescuers to facilitate the process of obtaining a history of the animal involved.
- If your vet receives marsupials, provide the clinic with a variety of pouches.
- Offer to provide specialised food for any (not just your) wildlife being cared for by the clinic, especially animals being held overnight.
- Offer donations of disposable items you've sourced from your hospital or GP.
- Show your appreciation with flowers, cakes for morning tea, chocolates.
- Remember to credit your vet and vet clinic staff when dealing with the media, in your publications and on your website.
- Don't forget to say **Thank you**, and say it often.





The Do's and Do Not's of rehabilitation

DO ✓	DO NOT ✗
✓ Phone the Wildcare Helpline if you are unsure how to find help for an injured animal in the wild.	✗ Feed animals in the wild. Under no circumstances feed milk to birds
✓ Reduce stress at all stages of rehabilitation. Stress kills wildlife!	✗ Keep wildlife in a busy room with pets and children, TV or radio blasting. Resist neighbours wanting to cuddle or disturb wildlife you are caring for; no "Show and Tell"
✓ Take injured wildlife to an accredited wildlife rehabilitator as soon as possible.	✗ Assume that because you have attended the basic course that you can now start caring for wildlife on your own.
✓ Learn how to care for sick and injured wildlife with a qualified mentor.	✗ Try to care for animals you are not familiar with. Pass them onto a carer who has the experience.
✓ Follow first aid procedures for birds: assess, rest, warmth and fluids, hydrate before feeding.	✗ Put wild birds in wire cages. Their frantic fluttering will cause feather damage on the wire cage which can delay release for months.
✓ Network with other rehabilitators so you have like-minded people for advice, second opinions and emotional support.	✗ Spread misinformation. Admit if you don't know the answer. Ask questions until you find the truth.
✓ Contact people with suitable release sites who are willing to assist with the final stage of rehabilitation. Contact a DEC Wildlife Officer for assistance.	✗ Take on a species without having a suitable release plan and site.
✓ Dispose of dead animals in an approved incinerator. Ask your vet to dispose of frozen dead animals.	✗ Release a territorial species for example, a magpie into another clan's home range - this is certain death.
✓ Conduct yourself in a polite and professional manner when dealing with the public. Bad news travels a lot faster than good and all other carers will pay for any indiscretions.	✗ Throw diseased dead animals in the garbage. They will end up at the tip and scavenger species will spread the diseases.

Minimum Standards for Wildlife Rehabilitation in Western Australia

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First Published 2008

ISBN 1 921094 13 3

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ACKNOWLEDGMENTS

This document was based on the Minimum Standards for Wildlife Rehabilitation, 3rd edition, published by the International Wildlife Rehabilitation Council (IWRC), San Jose California www.iwrc-online.org and the National Wildlife Rehabilitators Association's (NWRA) www.nwrawildlife.org, St. Cloud, Minnesota USA, Minimum Standards for Wildlife Rehabilitation, 3rd edition, 77 pages; Miller, E.A., editor, 2000. We would like to formally acknowledge these two groups for allowing us to reproduce significant text from their publications.

The first edition of Minimum Standards for Wildlife Rehabilitation has resulted from the suggestions and contributions of many wildlife rehabilitators via consultation. This edition was compiled by Michelle Rouffignac, RVNAVN, Nursing Supervisor, Perth Zoo, whilst on secondment with the Department of Environment and Conservation.

The Department of Environment and Conservation wishes to acknowledge the significant contributions made by the following wildlife rehabilitation groups and individuals, listed in alphabetical order. Without their expertise and knowledge we would not have this comprehensive set of Standards to work with. This was no small task, and we thank them for their many efforts.

Members of the Wildlife Consultation Group and individuals:

Armadale Reptile Centre. armadalereptilecentre@iprimus.com.au

Chidlow Marsupial Hospital – Liz Appelt

Darling Range Wildlife Shelter. www.darlingrangewildlife.com.au

Dave Mell – Manager, Nature Protection Branch Department of Environment and Conservation (DEC). www.naturebase.net.au.

Deidre Patterson – Black Cockatoo Rehabilitation

Diana Anderson – Black Cockatoo Rehabilitation. www.kimani.com.au.

Dr. Colleen Sims – DEC Project Eden. www.naturebase.net.au.

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Kanyana Wildlife Rehabilitation Centre. www.kanyanawildlife.org.au.

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Malubillai Wildlife Carers Network Inc.

Marg Buckland – Manager, Community Involvement Unit, Department of Environment and Conservation (DEC). marg.buckland@dec.wa.gov.au

Margaret Larner – Australian Seabird Rescue

Marra Apgar - raptor@echidna.id.au

Michelle Hazelwood – Wildlife Consultation Group

Mieke Gaikhorst – Wildlife Consultation Group

Perth Zoological Gardens Veterinary Department www.perthzoo.com.au

Peter Lambert – Supervising Wildlife Officer, Nature Protection Branch, DEC. www.naturebase.net.au

Pingelly Marsupial Retreat pingellywildlife@westnet.com.au

Ruth Haight – Wildlife Consultation Group

Stuart Payne – WA Conservation of Raptors

Sue Turner – Kooikuna Wildlife Rescue joeyplus@hotmail.com

Terry High – Rapt in Raptors

Tess Hunt (Deceased) – Wildlife Consultation Group, Great Southern Care Wildlife

Ute Wicke – Wildlife Consultation Group

Yvonne & Fred Varris – Black Cockatoo Rehabilitation fvarris@bigpond.net.au

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CODE OF ETHICS

A Wildlife Rehabilitator's Code of Ethics

1. A wildlife rehabilitator should strive to achieve high standards of animal care through knowledge and an understanding of the field. Continuing efforts must be made to keep informed of current rehabilitation information, methods and regulations.
2. A wildlife rehabilitator should be responsible, conscientious and dedicated, and should continuously work toward improving the quality of care given to wild animals and birds undergoing rehabilitation.
3. A wildlife rehabilitator must abide by local, state and federal laws concerning wildlife, wildlife rehabilitation and associated activities.
4. A wildlife rehabilitator should establish safe work habits and conditions, abiding by current health and safety practices at all times.
5. A wildlife rehabilitator should acknowledge limitations and enlist the assistance of a veterinarian or other trained professional when appropriate.
6. A wildlife rehabilitator should respect other rehabilitators and persons in related fields, sharing skills and knowledge in the spirit of cooperation for the welfare of all fauna.
7. A wildlife rehabilitator should place optimum animal care above personal gain, with the primary goal to rehabilitate wildlife for release back into the wild within the natural range of that species.
8. A wildlife rehabilitator should strive to provide professional and humane care in all phases of wildlife rehabilitation, respecting the wildness and maintaining the dignity of each animal in life and in death. Releasable animals and birds should be maintained in a wild condition and released as soon as appropriate. Non-releasable animals and birds that are inappropriate for remaining in captivity should be euthanased.
9. A wildlife rehabilitator should encourage community support and involvement through volunteer training and public education. The common goal should be to promote a responsible concern for living beings and the welfare of the environment.
10. A wildlife rehabilitator should work on the basis of sound ecological principles, incorporating appropriate conservation ethics and an attitude of stewardship.
11. A wildlife rehabilitator should conduct all business and activities in a professional manner, with honesty, integrity, compassion, and commitment, recognising that an individual's conduct reflects on the entire field of wildlife rehabilitation.

FOREWORD

Western Australia is one of the most biologically diverse regions in the world. The south-west of WA is one of the world's 34 internationally recognised terrestrial hotspots for biodiversity and the only one recognised in Australia.

The State comprises a 2.5 million square kilometre mainland; more than 12,800 kilometres of coastline, over 20,700 kilometres when island coastlines are included; more than 3,700 offshore islands; 26 of Australia's 80 bioregions, from sub-alpine areas to tropical rainforest and desert; 141 of Australia's 207 mammal species, 25 of which are unique to WA; 439 reptile species, 187 of which are unique to WA; and 518 of the 760 bird species recorded in Australia, 14 of which are unique to WA.

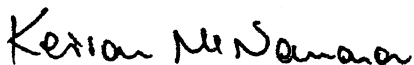
Natural and human induced events often lead to sick, injured and orphaned native animals. It is necessary to ensure that the welfare of sick, injured and orphaned native animals is dealt with in a humane way. The management of injured wildlife is a shared responsibility across the community. Rehabilitators, however, are special people who volunteer to assist in the recovery of sick, injured and orphaned wildlife so that they can be returned to the wild. Hundreds of people across WA perform this valuable community service.

To assist rehabilitators in this task, the Department of Environment and Conservation is pleased to provide these *Minimum Standards for Wildlife Rehabilitation in Western Australia*.

This document reflects many years of knowledge and experience from volunteer wildlife rehabilitators and veterinarians in the care and rehabilitation of sick, injured and orphaned wildlife. The *Minimum Standards* are based on accepted veterinary practices, personal observations, common sense, good judgement and many thousands of hours of dedicated commitment. The document will be reviewed and updated periodically as new techniques become available. I encourage all wildlife rehabilitators and other interested parties to provide feedback and comments for consideration in future editions.

The *Minimum Standards* represent a new benchmark for wildlife rehabilitation. I am sure they will provide very useful guidance for rehabilitators and associated organisations. The Wildlife Rehabilitators Code of Ethics is an integral part of these standards that incorporate the principles of high standards of animal care, responsibility, integrity, compassion, safe working environments and professionalism.

I am very pleased to present the *Minimum Standards for Wildlife Rehabilitation in Western Australia* and commend it to all wildlife rehabilitators.



Keiran McNamara
DIRECTOR GENERAL
DEPARTMENT OF ENVIRONMENT AND CONSERVATION

STATEMENT OF PURPOSE

The Department of Environment and Conservation (DEC), Western Australia, is pleased to provide this endorsed Minimum Standards for Wildlife Rehabilitation (Minimum Standards). The purpose of these Minimum Standards is to ensure the welfare of native animals and birds in all stages of the wildlife rehabilitation process and maximise the potential to return native animals and birds to the wild.

Wildlife rehabilitation is defined as the temporary care of sick, diseased, injured or orphaned wildlife, for the purpose of caring for it until it recovers or becomes capable of fending for itself.

For the purpose of these Minimum Standards, wildlife/native animals and birds has the same meaning as fauna as defined in the Wildlife Conservation Act 1950, as amended – *any animal indigenous to any State or territory of the Commonwealth of Australia or the territorial waters of the Commonwealth, and any animal that periodically migrates to and lives in any State or territory of the Commonwealth or the territorial waters of the Commonwealth and any animal declared as fauna pursuant to the Act.*

These Minimum Standards are a cooperative effort that represents the most current knowledge, expertise and techniques in our field. They are a reflection of what we have learned collectively and have successfully applied. All rehabilitators are encouraged to explore and understand the principles underlying these standards, and to apply them in the everyday care of wild animals and birds. Minimum standards for wildlife rehabilitation apply not only to the facilities used for rehabilitation, but also to all aspects of the work involved.

The Minimum Standards is a document created by and for wildlife rehabilitators. This document is intended to help increase the number of rehabilitated wildlife that is successfully returned to wild populations by providing:

- recommendations and information regarding wildlife care;
- minimum standards for rehabilitation; and
- mechanisms for self evaluation.

These Minimum Standards do not apply to animals and birds kept beyond the normal scope of wildlife rehabilitation. Animals and birds that are kept for educational display, research or captive breeding purposes have different housing requirements based on the needs of the individual. Those specific needs are not addressed in this document.

The Minimum Standards is a living document that is updated constantly as the field of wildlife rehabilitation grows and improves. The procedures and cage sizes described herein have been provided by experienced wildlife rehabilitators, and are considered to be **MINIMUM** standards i.e. more detailed procedures or larger cages are certainly acceptable and encouraged. Because wild fauna undergoing rehabilitation are individuals, each with different needs based on injuries and unique behaviours, recommended cage sizes and techniques may not apply to every case. The wildlife rehabilitator is encouraged to improve techniques for housing, pre-release conditioning and other aspects of the rehabilitation process, so long as basic natural biology, comfort and hygiene needs are met. Cage dimensions can be modified to accommodate special needs of the facility, fauna or new advancements in the field.

This document is a foundation upon which each wildlife rehabilitator can build an appropriate and effective system. The goal is to give each animal or bird the best chance of post-release survival in its natural place in the wild. Wildlife rehabilitators should combine information from Minimum Standards, wildlife course material, current publications, veterinarians, experienced mentors and personal experience, along with common sense and good judgment to make the best decisions for each individual animal or bird. All rehabilitators are encouraged to improve upon these standards as they strive to provide the best possible care.

An effort should be made by the rehabilitator to obtain as much information as possible through reference and natural biology literature and contact with other rehabilitators. Through an understanding of each species' behaviour and natural biology, proper choices can be made to provide suitable temporary captive housing and habitats. All rehabilitators should be prepared to provide temporary housing for any species they are likely to encounter, including those species rarely encountered.

The Wildlife Conservation Act and Regulations govern the activities of wildlife rehabilitators in Western Australia. DEC has responsibility for implementation of that legislation and the policies that affect the management of wildlife. Wildlife rehabilitators are asked to ensure that they work with DEC in its efforts to manage sick, injured and orphaned wildlife in accordance with the legislation.

The Wildlife Rehabilitator's Code of Ethics is a part of these Minimum Standards and is based on the principles of honesty, integrity, responsibility and treating others as we would have them treat us. The Code of Ethics provides basic rules of conduct for each of us to incorporate into our practice. The resulting self-respect, peer respect, community respect and credibility will increase our effectiveness in animal care, networking, fund-raising, volunteer management, educational efforts and all aspects of wildlife rehabilitation. Ethical and professional conduct by each wildlife rehabilitator will also contribute significantly to the credibility of our field as a whole, which in turn, will benefit all of us. We are proud of this collaborative effort. We encourage all wildlife rehabilitators to actively use this document to help improve the care, treatment and successful release of wildlife.

This document will be reviewed in 2011. For comments please go to the www.naturebase.net website.

CHAPTER 1 - CHRONOLOGIC OUTLINE OF THE REHABILITATION PROCESS

The goal of this section is to provide a blueprint for successful rehabilitation and guide the rehabilitator through the care and clinical process.

(1) Admission of the animal

- Gather history from the person presenting the animal or bird
- Record all information
- Provide relevant educational material to the presenter
- Report any Specially Protected Fauna, poisoning or gunshot victims to DEC
- Follow any instructions from DEC regarding Specially Protected Fauna

(2) Immediate Care of the animal

- Evaluate the animal quickly when transferring to a holding box/pouch/cage etc.
- Examine for critical conditions and administer emergency care as needed
- Provide quiet rest space in a quarantine area, separated from domestic animals and pet birds, human traffic and potential irritants such as cigarette smoke
- Domestic animals must not be in proximity to any wildlife under care where its presence will interfere with its care.

(3) Health Assessment

- Weigh (there may be some reasonable limitations to weighing large animals)
- Visual exam
- Palpate limbs
- Examine whole of animal
- Assess nutritional status and body condition
- Visit to Veterinarian if required

(4) Provision of Treatments

- Provide fluids
- Manage wounds and/or injuries
- Administer medications
- Provide nutrition
- House in appropriate facility
- Employ appropriate techniques to minimise imprinting as required

(5) Stage 1 - Intensive Care

- Monitor weight
- Provide ongoing, appropriate nutrition
- Treat medical problems as needed
- Provide supportive housing and habitat

(6) Stage 2 - Acclimatisation

- Monitor weight
- Provide ongoing, appropriate nutrition
- Treat medical problems as needed (should be minimal)
- Climate acclimatisation
- Environmental acclimatisation

- Provide comfortable, appropriate housing and habitat with mental stimulation
- Minimise interaction with human activity
- Provide environmental physical therapy as needed

(7) **Stage 3 - Pre-Release Conditioning**

- Provide larger, outdoor housing to develop natural behaviours
- Monitor weight and general condition
- Minimise interaction with human activity
- Provide ongoing, appropriate nutrition, introducing a more natural diet
- Exercise daily, as appropriate for that species
- Soft/Hard Release Plan developed

(8) **Release Evaluation**

- No evidence of disease
- Ability to self feed e.g. forage, catch live prey
- Normal mobility and function, reasonable level of physical fitness and stamina necessary for foraging, breeding or territory defence behaviour if predicted
- Normal behaviour (the animal exhibits reasonable responses to human activity, predator avoidance, exhibits normal socialisation with both same and other species)
- Normal weight/condition for that species/sex/season
- Suitable release sites available
- Where authorisation is issued by DEC, the animal is identified for possible follow-up

(9) **Release**

- Appropriate habitat and within its natural range for that species.
- Choose appropriate season/time of year (migration, breeding season, etc.)
- Choose appropriate time of day
- Identify forecasted weather for suitability
- Provide food if appropriate
- Provide proper/safe transportation
- Monitor post-release if possible

WILDLIFE REHABILITATION “FACILITIES” REVIEW

Rehabilitation facilities and individual rehabilitators may benefit from doing a regular self-evaluation or self-review.

A form used to assist in this type of self-evaluation is found in Appendix A, Form 1. The purpose of this check list is to provide wildlife rehabilitators with a tool to use for checking the service they are providing to ensure wildlife receives appropriate housing and medical treatment, and to protect both wildlife and humans from disease and contamination by monitoring appropriate standards.

Not all items contained in the form will apply to everyone. For example, an independent rehabilitator working from home probably does not require a grievance committee - but this form does provide an easy reference to be sure important considerations are not overlooked when changes, such as facility growth, occur.

CHAPTER 2 - RECORDING AND REPORTING REQUIREMENTS

Records are a vital part of any rehabilitation program, and are particularly important when an individual or an organisation is trying to learn from previous work in an effort to improve the care given to wildlife. Records should be kept on all animal admissions.

Animal admission forms and animal examination forms can be used to ensure that vital information is gathered for each animal. An example of an Animal Admission Form is found in Appendix B, Form 2 and an example of a Bird Examination Form is found in Appendix C, Form 3. Records can be consolidated for healthy litters or clutches of animals and birds raised for release. Daily forms for animals and birds by enclosure or cage are required to verify that food, medications, and care are being provided. These records must be kept on file by the rehabilitator for future reference, should this be required.

All animals and birds (dead or alive) that indicate suspected poisoning or other criminal activity should be reported to DEC immediately upon acquisition.

All Specially Protected Fauna, as listed in the Wildlife Conservation (Specially Protected Fauna) Notice, published yearly in the Government Gazette must be reported to a DEC Wildlife Officer or the WILDCARE Helpline number within 72 hours. This list can be found on the State Law Website, or by contacting Nature Protection, Kensington for a current copy.

Pursuant to the Wildlife Conservation Regulations 1970, Section 57 "marking of wild fauna", and the Pet Herpetofauna Regulations, in conjunction with a Regulation 17 Licence to Take Fauna for Scientific Purposes, a current license is required from DEC to mark for identifying animals and birds post release. To make an application for a Regulation 23 Licence the rehabilitator must write a letter of request to the Administrative Officer, Wildlife Licensing Section. The applicant would have to demonstrate that they are sufficiently experienced and trained and that their research and proposed method or means of capturing and marking fauna are satisfactory. They would also have to demonstrate that they will collect the data on the outcome of the marking (sightings, microchip data) and make a report on this to DEC as part of a scientific research program.

If animals and birds are marked in any way, the rehabilitator is no longer 'caring for sick or injured fauna' (Regulation 28A.) but is conducting research. A rehabilitator must demonstrate to DEC that they have the expertise to do this and that it has scientific merit.

Record keeping has been placed in two categories:

- required information
- recommended information

Required Information

- Species, sex (if determined), age (estimate)
- Date admitted
- When and where found
- Name/address/phone number of finder
- Presenting injury/problem
- Initial weight
- Case or acquisition number
- Record of notifying DEC in cases of Specially Protected Fauna, including who was notified, when and by what method (phone, fax or e-mail)
- Record of notifying DEC in cases of animals and birds being shot, poisoned or falling victim to other illegal activity
- Final disposition:
 - i.e. released (including date, time & location)

- release weight
- transferred to whom (must supply name and address)
- placed with whom (must supply name and address)
- died, euthanased (disposal of carcass to WA Museum, DEC or buried/incinerated)
- o Recipient information if transferred or placed:
 - name, address, permit number
 - purpose of transfer (including the transfer or placement of carcasses for educational purposes)
- o Permanent identification details e.g. band, microchip, where applicable
- o Any additional information required by DEC.

Recommended Information

- o Any additional history that might be provided by the presenter (regarding cause of injury, severity or time of injury/problem, any care given by the presenter, etc.)
- o Physical examination data
- o Daily treatment information and ongoing notes
- o Data regarding veterinary services (where applicable)
- o In suspected poisoning cases, any additional information describing the site where the animal was found, climate, other species present, circumstances, etc.

CODING STANDARDS

Coding standards should conform to specifications listed. The code letters used by wildlife rehabilitators and rehabilitation centres should be strictly defined for comparison purposes. Referenced categories should correspond to the following:

R (RELEASED): Any healthy, recovered fauna that is returned to its natural habitat

Note: released animals and birds do NOT include transferred, placed or pending animals and birds.

T (TRANSFERRED): All transferred animals and birds must be recorded in the wildlife rehabilitator's records.

- (1) Any animal transported to another facility or wildlife rehabilitator for further rehabilitation efforts. (Note: if the animal is known to have been released by the receiving facility, it is still recorded as a 'T' by the original facility and as an 'R' by the receiving facility).
- (2) Any animal determined to be non-releasable while undergoing wildlife rehabilitation efforts that is placed in a non-rehabilitation situation.

NOTE: For Specially Protected Fauna, agency permission is ALWAYS required prior to transfer of live animals and birds. For long-term care of permanently incapacitated animals and birds the recipient must possess the proper approval and licence. Contact must be made with the local Wildlife Officer to confirm permission and/or approval.

For an individual centre's information, this can be further subdivided into (optional):

TR (TRANSFERRED FOR REHABILITATION)

P (PENDING): Any fauna still undergoing rehabilitation efforts. These animals and birds are only added to summary statistics after final resolution.

DIC (DIED IN CARE): Any fauna that dies subsequent to any handling, exam, treatment, or implementation of lifesaving measures in the care facility.

DOA (DEAD ON ARRIVAL): Any fauna that dies before any lifesaving measures or treatments can be implemented in the care facility.

EAC (EUTHANASED AFTER CARE): Any fauna that is suffering or non-releasable that is euthanased.

EOA (EUTHANASED ON ARRIVAL): Any fauna euthanased after an initial exam, without further treatment measures being done.

In the case of all Specially Protected Fauna, Nature Protection Branch DEC must be notified by phone, fax or email the first working day following the receipt of such an animal. Permanently incapacitated animals, i.e. physically or mentally impaired or imprinted animals, may not be suitable for release. Consultation with Nature Protection DEC is necessary to reach a decision in these cases.

VETERINARY POLICY

The Veterinary Practice Act 1996 precludes non-veterinarians from practicing veterinary surgery or veterinary medicine. In instances where surgery or medicine needs to be administered and veterinarians are not able to directly examine the animal, the rehabilitator should make every effort to obtain veterinary advice.

The legal prescription of medical care for sick or injured wildlife is the responsibility of a veterinarian. The veterinarian may delegate a portion of this responsibility to a rehabilitator by means of a formal mutual agreement in writing and submitted to the Veterinary Surgeons Board (VSB) for record and to refer to during a yearly audit of such agreements. The veterinarian must comply with the Veterinary Surgeons Regulation, 1979, 28A, 29 and 31 in relation to the prescription and supply of the drug(s).

Such an arrangement allows the veterinarian to prescribe a specific treatment protocol for a specific type of illness or injury without having to see each individual animal (e.g. the veterinarian may prescribe a certain antibiotic to be given at a specific dosage, frequency and duration for all cat attack victims). This type of arrangement also requires that an appropriate veterinarian/rehabilitator/wildlife animal relationship exists and has the following components:

- The veterinarian has assumed the responsibility for any medical judgments regarding the health of sick or injured wildlife and the need for medical treatments.
- Furthermore, the veterinarian has current personal knowledge of the general conditions and care of wildlife in the rehabilitator's care. This is to be achieved by:
 - (a) medically appropriate and timely visits to the premises at which the wildlife is kept, or
 - (b) timely transport of wildlife to the facility of the attending veterinarian
- The veterinarian and the rehabilitator must maintain a record of mutually agreed veterinary procedures and medications and a record of timely visits to the site. This is for the purpose of a yearly audit.
- If the veterinarian intends to keep and treat any animal for more than 24 hours, the animals and birds must be housed within the sizes stipulated in these Minimum Standards, in an area that is quiet and removed from domestic animals and human traffic.
- The veterinarian is available for follow-up in case of adverse reactions or failure of the current treatment.
- Any agreement must abide by the laws and regulations governing the practice of veterinary medicine.

FEASIBILITY AND FATE

Once an animal or bird comes into rehabilitation, it is faced with one of four fates; death from its injuries or illness, permanent confinement due to factors preventing release, successful rehabilitation and release, or euthanasia. This section addresses euthanasia.

Euthanasia may be a difficult task for the rehabilitator to perform. Where possible a Veterinarian should be consulted regarding the decision to euthanase. Fauna should not be considered for release if they are permanently incapacitated and not likely to survive in the wild. Incapacities include, but are not limited to, being vision impaired, amputated or poorly healed broken limbs, imprinting, or having a high likelihood of infecting wild animals and birds with disease. Other reasons exist that animals and birds should not be released and these animals and birds may be candidates for euthanasia.

Euthanasia by chemical overdose is for most classes of animal and bird the preferred method but must only be carried out by a Veterinarian or persons authorized by the Veterinary Surgeons Board under the supervision of a Veterinarian.

DEC has a formal agreement in place with an approved group to provide a professional service to euthanase injured large fauna on request. These volunteers abide by a Code of Conduct developed collectively by DEC and volunteers.

ACCEPTABLE EUTHANASIA METHODS

Euthanasia is defined as the induction of death with minimal pain, stress or anxiety. Wildlife rehabilitators who direct the operation of a facility must make these decisions, as well as supervise the euthanasia procedures. They must also exhibit understanding and compassion for those who have been involved with the case.

While no ideal euthanasia agent exists, the procedure of choice should approach as closely as possible the following criteria:

- Produces rapid loss of consciousness and death
- Exhibits consistent and predictable action
- Is easily and safely administered by properly trained personnel
- Causes minimal psychological stress to the animal
- Causes minimal emotional effects to observers and participants
- Is not subject to abuse by humans
- Interrupts consciousness and reflexes simultaneously
- Is not a sanitation or environmental problem
- Is economical and readily available

The method of euthanasia is only as humane as the knowledge and skill of the operator performing it. The safety of the operator shall be given as much consideration as the humaneness of the method.

Below is a brief description of the accepted methods of euthanasia recommended for use in wildlife as documented in the "Euthanasia of Animals Used for Scientific Purposes", 2nd Edition, produced by The Australia & New Zealand Council for the Care of Animals in Research & Teaching Ltd (ANZCCART). Refer to Table 1, identifying acceptable methods for various species. None of these methods should be used without proper training and, in the case of regulated substances, without proper licensing. Each wildlife rehabilitator is urged to seek and learn to use those methods which he/she feels are humane and within their legal and practical limits.

PHYSICAL METHODS:

Cervical dislocation:

Causes death by severing the spinal cord and destroying ascending sensory (pain) pathways, resulting in depression of central nervous system (CNS), respiratory and cardiac functions. Grasping the body of the animal or bird and the base of the skull, the neck is hyper-extended. The neck is rotated in a down and away motion relative to the body position using the thumb and forefingers, separating the first cervical vertebra from the base of the skull and severing the spinal cord.

Advantages: Clean; safe to perform; moderately rapid; special equipment not required.

Disadvantages: Must be performed by skilled personnel. May be aesthetically objectionable to staff/volunteers/public. Should only be performed on small birds and mammals; may remain conscious for a brief period following dislocation (may convulse prior to death).

Decapitation:

Causes death by severing the spinal cord and destroying ascending sensory (pain) pathways, resulting in depression of CNS, respiratory and cardiac functions.

Advantages: Moderately rapid; effective in reptiles, though movement may continue following decapitation. The brain of reptiles must also be pithed or otherwise destroyed to ensure that there is no residual brain activity.

Disadvantages: Must be performed by skilled personnel. May be aesthetically objectionable to staff/volunteers/public. Should only be performed on small animals and birds; animal may remain conscious for a brief period following decapitation (may convulse prior to death).

Gunshot:

Causes immediate unconsciousness by direct and rapid destruction of brain tissue when positioned properly.

Advantages: Rapid; can be used on most species.

Disadvantages: Must be performed by skilled personnel. Requires special equipment and will require firearm permit. May be aesthetically objectionable to staff/volunteers/public. Potential for human injury.

Penetrating captive bolt:

Causes immediate unconsciousness by direct and rapid destruction of brain tissue when positioned properly. Bolt is positioned properly against the skull and fired. This is one of the few options for euthanasing large ruminants and carnivores.

Advantages: Rapid.

Disadvantages: Must be performed by skilled personnel. Requires special equipment and may require permit. May be aesthetically objectionable to staff/volunteers/public. Must be done at close range (nearly direct contact to the animal's skull) and the animal must be properly restrained or sedated to ensure accuracy.

ADJUNCT PHYSICAL METHODS (should not be used as sole method):

Stunning (blunt force trauma):

Striking of the skull, resulting in unconsciousness of the animal.

Advantages: Rapid unconsciousness.

Disadvantages: Not a sole method of euthanasia - usually followed by exsanguination (bleeding – see below); requires skill to be done properly; may be aesthetically unappealing; should not be used if the brain must be examined (as with suspect Lyssa Virus cases).

CHEMICAL METHODS (inhaled agents):

Carbon Dioxide:

Advantages: Rapidly acting gas that can be used with minimal handling of the animal or bird. It is easily available in compressed cylinders; is rapid.

Disadvantages: hazardous to human health, requires specialised equipment and training. Useful for small animals and birds in chambers. Causes death by irreversibly binding with haemoglobin in the red blood cells.

Table 1: Recommended Techniques for the Humane Euthanasia of Animals and Birds by DEC Personnel Under Field Conditions.

RECOMMENDED TECHNIQUES FOR THE HUMANE EUTHANASIA OF ANIMALS BY CALM PERSONNEL UNDER FIELD CONDITIONS						
	Technique: <input checked="" type="checkbox"/> Recommended <input type="checkbox"/> Not recommended					
	Stunning or anesthesia followed by				Carbon dioxide inhalation	Shooting
Species	Blunt trauma	Cervical dislocation	Decapitation	Spinal severance and brain destruction		
Rabbits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Baby up to 3 weeks	<input checked="" type="checkbox"/>
Dingoes/Dogs	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/> Pups	<input checked="" type="checkbox"/>
Cats	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Bats	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Neonates only		<input checked="" type="checkbox"/>	
Small mammals	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Neonates only		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Kangaroos and wallabies	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Pouched young	<input checked="" type="checkbox"/> Pouched young		<input checked="" type="checkbox"/> Quokkas only	<input checked="" type="checkbox"/> Brain shot
Birds	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Chicks, small and medium sized adults only	<input type="checkbox"/>		<input checked="" type="checkbox"/> Chicks, small and medium sized adults only	<input checked="" type="checkbox"/> Large species 3kg and over only
Lizards and snakes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tortoises and turtles	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
Crocodiles	<input checked="" type="checkbox"/> Juveniles	<input type="checkbox"/>	<input checked="" type="checkbox"/> Juveniles	<input checked="" type="checkbox"/> Juveniles	<input type="checkbox"/>	<input checked="" type="checkbox"/> Brain shot only
Amphibians	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fish	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Small fish only	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Mice and rats	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Animals over 150g must be stunned first	<input checked="" type="checkbox"/> Neonates only		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Cetaceans, sirenians and pinnipeds	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/> Brain shot only for small species <input checked="" type="checkbox"/> Explosives for large species

(From Chapman, T. Sims C & Mawson P (2005) *Minimising Disease Risk in Wildlife Management* Department of Environment and Conservation. Pp: 37.)

NON-ACCEPTABLE METHODS OF EUTHANASIA

(Methods considered inhumane and/or unacceptable for euthanasia of wildlife)

Many techniques have been used to euthanase wild animals and birds, but many of these are also considered inhumane (therefore not true euthanasia) or extremely dangerous, and are not condoned under these Minimum Standards. Methods which are not approved for use in wildlife are:

Methods not acceptable for any reptile:

- decapitation alone
- stunning or blow to the head alone
- intracardiac, intramuscular, intracoelomic, intrahepatic and intrapulmonary injection of sodium pentothal without prior anaesthesia
- inhalation anaesthetics such as halothane, isoflurane, methoxyflurane, carbon dioxide alone.

Hypothermia

Cooling (3-4°C) will reduce a reptile's metabolism and reduce locomotion and hence facilitate handling, however it should be remembered that cooling does not reduce the ability to feel pain. It has been stated that cooling (followed by freezing) is not acceptable for euthanasia purpose in animals as there may be an initial period of discomfort due to ice crystal formation, both on the skin and within the body. Euthanasia of reptiles by injectable agents or by physical methods is preferable.

In addition, the following are not considered to be acceptable forms of euthanasia for any animal:

- air embolism (injecting air into a vessel)	- decompression (suffocation)
- burning	- drowning
- carbon monoxide (eg car exhaust)	- exsanguination (allowing animal to bleed to death)
- chloral hydrate	- household product and solvents
- chloroform	- neuromuscular blocking agents
- cyanide	- strychnine

(From Reilly, J (2001) *Euthanasia of Animals Used For Scientific Purposes* ANZCCART, Adelaide, AVMA Panel on Euthanasia (2000) Pp: 72-73, AVMA Panel on Euthanasia (2000), 2000 Report of the AVMA Panel on Euthanasia" *JAVMA* Vol 218(5): 670-696, Glenn Shea, Larry Vogelneust and Rupert Woods, pers. comm.).

Post Mortems

A post mortem may be performed by the rehabilitator and used as a teaching opportunity. Carcasses that do not undergo a post mortem may be transferred to local natural biology museums, universities or other institutions for study and/or addition to their collections. The wildlife rehabilitator may contact these institutions and arrange for proper handling of the carcasses so that the institutions can gain the most benefit from them (e.g. carcasses may need to be frozen, placed in formalin, etc.). Specific data may also need to be recorded by the rehabilitator, such as date and location animal was found, live body weight, etc. In many cases, the information provided by the rehabilitator can be as valuable as the specimen itself. DEC must be contacted and a plan determined for the post mortem or removal of all Specially Protected Fauna.

If the wildlife rehabilitator desires to keep specific parts or portions of carcasses including eggs, larvae, semen, carcass, skin, plumage or fur for educational purposes they must contact DEC Wildlife Protection for advice. Consideration will be given to issuing a letter of authorisation to keep such items. Special letters are not required for the rehabilitator to possess feathers for imping purposes.

DISPOSAL OF CARCASSES AND ANIMAL WASTE PRODUCTS

Each animal or bird that dies or is euthanased while under the care of a wildlife rehabilitator should always be examined carefully to confirm that the animal really is dead (lack of pulse or heart beat, eye reflex.) If in any doubt, consultation with veterinary staff is recommended. The rehabilitator may be required to transfer the carcasses of Specially Protected Fauna to a specified location. All other carcasses and all animal waste products should be disposed of in accordance with acceptable practices as required by local council or shire By-laws. Carcasses and organic wastes suspected of disease contamination or those that have been euthanased using potentially harmful chemical methods, such as Sodium Pentothal, should be deep buried or incinerated. Burial of carcasses should be at a depth that will discourage scavenger species from unearthing them.

DEC does not condone the feeding of fauna carcasses to captive wildlife under any circumstances. The Wildlife Conservation Act - Section 16, provides information on the taking of protected fauna and notes that it is illegal to feed protected fauna out to another animal or bird.

CHAPTER 3 - HUMAN HEALTH RISKS

Much is known about specific wildlife diseases, but there are many diseases that are unknown. This is why the basic principles of personal and equipment hygiene must be followed at all times to minimise the risk of exposure to disease agents and minimise the risk of spreading disease.

A zoonotic disease is a disease that we can catch from animals and birds. It is important to remember that we can also transfer diseases to animals and birds that we care for. Wildlife rehabilitators should be constantly aware of the potential for disease transmission and utilise appropriate protective wear, e.g. gloves, eye protection, masks, overalls. Appropriate techniques when handling wildlife must also be used.

Some of the main zoonotic diseases to be aware of:

Reptiles – Salmonella, Mycobacterium and Cryptosporidium

Birds – Salmonella, Psittacosis (Chlamydiaophila psittaci) and Mycobacterium

Mammals – Salmonella, Ringworm, Sarcoptic mange, Q Fever, Toxoplasmosis. Toxoplasmosis is a concern if there is direct contact with cat faeces. Also, handling raw meat, including post mortems of native mammals is considered a route of transmission and disposable gloves must be worn.

Bat Viruses – Lyssa, Menangle and Hendra Virus

Specific outbreaks of a disease that are transferable to humans should be reported immediately to your doctor (to establish if the Health Department requires notification), the local veterinary practice (to establish if the disease is notifiable to the Department of Agriculture) and DEC. Strict quarantine and hygiene protocols should be observed in the case of such outbreaks.

All rehabilitators are advised to acquire all necessary vaccinations e.g. Tetanus. Rehabilitators handling bats should have pre-exposure rabies vaccination for Lyssa Virus. Rehabilitators who become pregnant are advised to consult with their doctor for additional information on safety during pregnancy. It is recommended that children involved in helping rehabilitators be of school age and older.

If at any time a rehabilitator suffers an illness for which a diagnosis has been difficult or treatment not effective, the following advice should be provided to your medical practitioner:

“This person works with sick, injured and orphaned native animals and birds and may be subject to exposure of zoonotic agents. Zoonotic disease are caused either by apparently new agents or by previously known micro organisms, appearing in places or in species in which the disease was previously unknown. In considering a diagnosis, especially in cases of generalised symptoms or where diagnosis becomes difficult, the possibility of one of these agents being involved should be considered.”

HUMAN HEALTH RESPONSIBILITIES

Domestic animals and birds should not be allowed at a rehabilitation facility. If this is unavoidable, domestic animals and birds must not have direct contact with, or direct exposure to, wildlife that is being conditioned for release.

A program for rodent and insect control is recommended for wildlife care facilities; however, if pesticides are used, care should be taken to avoid contaminating both human and animal food (and animal housing areas) with pesticides.

The rescuer or individual presenting an animal to a rehabilitator should be questioned regarding the possibility of any contact with the animal, such as bites or scratches. If injured, the individual should immediately be referred to his/her own doctor for medical attention. If the bite or injury is from a suspect bat, the animal should be presented to a veterinarian. The veterinarian is responsible for reporting the incident to the State Veterinary Officer who then determines the fate of the bat as per the AUSTVETPLAN. Euthanasia and subsequent testing for Australian Bat Lyssa Virus may be considered.

MINIMUM STANDARDS FOR THE CONTROL OF DISEASES TRANSMISSIBLE FROM ANIMALS AND BIRDS TO HUMANS

- Maintain a high level of personal hygiene such as washing hands before and after handling animals and birds and before eating. Lavatory facilities should be accessible with hand-washing sinks and suitable washing agents.
- Clothing should be clean and changed as often as necessary. It is suggested that the facility provide protective clothing to volunteers and where possible, launder them on-site.
- Shoes and boots should be kept clean of faecal matter, dirt and cage litter.
- Disposable gloves and surgical masks must be available for use if requested and for cleaning contaminated animal quarters.
- Eating, drinking and smoking should be restricted to designated areas away from animals and birds, animal food preparation areas and animal waste materials.
- All supervisory staff must be given basic information on zoonoses. Personal hygiene rules should be established and the supervisory staff should set an example.
- Animal food must be packaged separately from human food, if being stored in the same refrigerator. The storage of animal carcasses (if being kept for samples) in the same refrigeration/freezer as food for human consumption is not ideal and should be avoided if at all possible. If unavoidable, the carcass must be double bagged in heavy duty plastic.
- Keep up to date with information about any specific diseases that may be encountered when working with wildlife.

MINIMUM STANDARDS FOR THE CONTROL OF DISEASES TRANSMISSIBLE FROM ANIMAL TO ANIMAL

- Cages should be cleaned of food and faeces daily and disinfected at the end of use. A spelling period (keeping the enclosure empty) with access to sunlight is highly recommended.
- Hands must be washed in-between handling animals and birds that are not housed together.
- Cages should be designed for efficient cleaning. When possible, seamless, nonporous materials (such as stainless steel, fibreglass or plastics) should be used for cage construction and food containers.
- Dedicated cleaning tools must be used for each aviary or holding cage/box if a contagious disease is confirmed or suspected.
- Animal enclosures should be kept clean by having an adequate and routine cleaning regime in which responsibilities are clearly defined and assigned to volunteers.
- Animals and birds confirmed or considered to have contagious diseases must be kept isolated from all non-infected susceptible animals and birds. Isolation may be as simple as a separate hotbox or a cage set away from all others. As a minimum, a barrier e.g. towel must be positioned between cages/enclosures. Dedicated tools must be set aside for this environment and quarantine measures put into place.
- Newly acquired animals and birds should be housed separately from in-house animals and birds upon arrival and for a period of time which allows the rehabilitator to establish any disease risk.
- Animals and birds that are presented together (litter mates or nest mates) may be housed together during this period. They should not be added to a group pen until it has been established that they are in good health.

CHAPTER 4 - DISEASE CONTROL

Proper disease control is a serious concern for rehabilitators and permit-granting agencies. As a basic principle, personal and equipment hygiene must be followed at all times to minimise the risk of exposure to disease agents and minimise the risk of spreading disease. Upon arrival all animals and birds should be isolated in a separate area (quarantine) until their health status can be determined. This can be as simple as an isolated hotbox or cage positioned away from other animals. Sick animals and birds should be maintained in quarantine throughout the period of their rehabilitation. It is recommended that animals and birds of different species are kept separate.

Facility cleanliness is an integral part of disease prevention and containment. Proper cleaning agents combined with a sensible cleaning schedule will reduce the spread of disease within a facility. Cleaning protocols may vary considerably based on the species and condition of animals and birds in care, facility type, and cage construction. Choice of cleaning agents must be made with these variables in mind. The timing of cleaning efforts is another important feature of effective disease prevention. Suggestions for proper and regular cleaning maintenance will help rehabilitators prevent disease within their facility.

It would be beyond the scope of these standards to note all available options for detergents and disinfectants on the market. What is most important to consider is implementing an effective minimum standard cleaning regime with special consideration given to any changes if a particular disease outbreak occurs and the management of the situation at this time, as some disinfectants work better against specific disease entities. Consult with a local veterinary practice for current information on new products available and their effectiveness for your situation.

STANDARDS TO PREVENT DISEASE TRANSMISSION WITHIN THE FACILITY

Minimum Standards required:

Regular cleaning and disinfecting with hospital-grade disinfectant and drying and sunlight (UV radiation) should be applied to all furniture, equipment and enclosures. The act of physically cleaning with hot water and detergent is the most effective method of removing most (but not all) of the biological containments and agents that can transmit disease. The use of a disinfectant is an essential follow-on step to cleaning and this process will kill most (but not all) of the remaining biological agents of a disease.

Detergents are cleaning compounds and include both soaps and synthetic detergents. While soaps are non-antibacterial, the physical scrubbing action of cleaning removes many of the microorganisms. Detergents alone do have minor disinfectant action against vegetative bacteria, however, they are not effective against fungi or viruses. Additionally, they lose their disinfecting effectiveness in the presence of blood or tissue debris.

Examples: Dish detergents and laundry detergents.

Disinfectants destroy microbial organisms or decrease the rate of their activity. Selection of a disinfectant for use in the facility should be based on its spectrum of activity. A disinfectant that will be effective against bacteria, fungi and viruses, with low toxicity and good biodegradability, is ideal. Ensure that all residue is rinsed from all equipment after the disinfectant has had the appropriate contact time.

Example: Chlorine (bleach) is effective for general everyday use and is inexpensive. The disadvantages include: the spectrum of activity is not as broad; its lack of efficacy when organic matter is present e.g. if you have not cleaned adequately in the first instance, your disinfecting process will be much less effective; and bleach is highly corrosive and breaks down in light.

Example: Essential Chemicals F10 ®XD or SC, Virkon® or Viraclean®. These broad-spectrum activity disinfectants are effective for most situations. The disadvantages include lack of efficacy when organic matter is present; these products are more expensive than chlorine.

Drying and Sunlight Drying and exposure to sunlight (UV radiation) e.g. hanging hessian bags in the sun will kill most (but not all) bacteria. Bacteria flourish in warm moist environments.

Thorough drying of enclosures and equipment is an important requirement to ensure proper and effective disinfecting.

CHAPTER 5 - RELEASE CONSIDERATIONS

Successful release of a rehabilitated animal is predicated on an understanding of biological and non-biological factors. These include medical and physical readiness and life-stage of the animal, release strategy and the habitat available.

Establishing and following minimum standards for release conditioning will aid in the initial decisions for treatment, husbandry care protocols and evaluation of readiness for release. For all wild animals and birds undergoing rehabilitation, the following criteria must be met prior to release.

Serious consideration should be given to the likelihood of being able to meet the following minimum release standards, before instigating a course of long-term treatment and rehabilitation. Euthanasia should always be considered as the preferred option if it is unlikely that the animal cannot be fully rehabilitated, or if the rehabilitation will involve significant levels of stress and/or pain for the animal in long-term and intensive treatment/rehabilitation programs. Before an animal is considered for placement in long-term captivity (for education or captive breeding), its suitability and adaptability to captivity should be assessed. In many cases, an adult wild animal is likely to suffer significant physical and psychological stress in captivity and would be an inappropriate candidate for this purpose.

STANDARDS FOR RELEASE

Minimum standards for release candidates:

- Demonstrate recovery from the original injury or from injuries incurred while in care.
- Be no longer in need of medical care.
- Exhibit no signs of active disease.
- Must demonstrate an appropriate level of physical fitness.
- Must possess adequate vision to find/catch food, avoid predators and have full physical function.
- Exhibit locomotive skills necessary for that species to survive. Navigate in a complex environment.
- Demonstrate an appropriate fight or flight behavioural response.
- Demonstrate proper foraging behaviour (ability to recognise, source and harvest food).
- Demonstrate normal species behaviour (e.g. not improperly imprinted, appropriate nest construction, ability to define territory).
- Be of correct age for independent survival. In the case of foster care, must be positioned within appropriate social group.
- Be of correct weight for that sex, species, age and season.
- Possess pelage, scales, skin or plumage that is adequate for that species to survive.
- Exhibit waterproof pelage/plumage sufficient for that species.

WHERE TO RELEASE

Rehabilitated animals and birds must, where possible, be released where the animal originated from, within the animal's normal home range and where such fauna is ordinarily found in the wild. This practice minimises the unnatural spread of parasites, diseases, and genetic material among wild populations and maximises the animal's chance of survival.

If information regarding the location where the animal originates from is not available, or the site is no longer suitable due to habitat loss or other reasons, an alternative suitable site must be selected. Selection must comply with Regulation 28A of the Wildlife Conservation Regulations, 1970, as set by DEC and should meet all habitat requirements of the animal. The rehabilitator may contact DEC for current information on suitable release sites.

In some circumstances juvenile animals and birds, especially those that were brought into rehabilitation as infants, may not be able to be released at the site of their capture. Release sites should be selected based on the same criteria as noted above.

DEC must be notified of any pending release of a Specially Protected Fauna.

WHEN TO RELEASE

Consideration must be given to the species, its natural biology and the most appropriate time to release.

As a minimum standard the following must be considered:

- Is it breeding season? Is this the correct time or incorrect time for this species?
- Is it nocturnal? Release early evening, to allow maximum number of night time hours to become familiar with the local surrounds and locate appropriate daytime refuge sites.
- Is it diurnal? – Release at dawn to provide maximum number of daytime hours to become familiar with the local surrounds and locate appropriate night time refuge sites.
- Is it migratory? If so, where should it be released?
- Is the current and forecasted weather going to have an impact on its survival?

SOFT AND HARD RELEASE CONSIDERATIONS

Consideration must be given to the selection of release technique employed for a group and/or individual.

Minimum standards:

In general, young altricial animals and birds benefit from “soft” release, while adults and young precocial animals and birds are often best served with a “hard” release.

Mammals

- Hand-reared marsupials are better suited to a soft release program.
- Hand-reared marsupials being released into DEC monitoring transects, (that is, an established predator-proof environment with ongoing scientific monitoring), may have a hard release if determined appropriate by DEC staff.
- Adult mammals that have been in captivity for a short period of time due to injury or illness and are being returned to the original encounter site are suited to a hard release.
- Adult mammals that have been in care for an extended period must be assessed to determine that the animal has all the necessary skills to cope with a hard release i.e. has the ability to re-establish territory.
- Hand-reared bats that have been socialised and conditioned to find their own food and can fly with complete accuracy can be hard released at a site where other bats are known to roost.

Birds

- Hand-reared birds that have been conditioned effectively during fledging and weaning can be soft released in a group. Assessment of the birds close to release time must be made to determine suitability for type of release.
- Adult birds that have been in captivity for a short period of time due to injury or illness and are being returned to the original encounter site can be hard released as quickly as possible.
- All birds must be able to waterproof themselves before being released.
- Species that recognise each other as the same may benefit from being released in a group to aid in picking up behavioural cues from others in the group.

Reptiles

- Rarely require a soft release and can be moved through Stage 2 (refer to Chapter 6) quite quickly and then released at the original encounter site where appropriate.
- The exception to this may be those that are born in captivity by default and then released.
- Experience demonstrates that Shingleback lizards that are born in captivity must be over 150gms in bodyweight before being released. Where possible, they must be released in the mother's home range.
- If a winter release is necessary, reptiles need to be fasted and only released when the gut is empty of food (several days of no stool after an appropriate amount of stool is passed following the last feed).

Amphibians

- Rarely require a soft release and can be moved from Stage 1, through Stage 2 (refer to Chapter 6) quite quickly and then released at the original encounter site where appropriate.

In all cases of release the rehabilitator must comply with the conditions listed as minimum standard for attempting a release.

SELECTION OF RELEASE SITE

The following factors are to be considered when selecting a release site:

- Suitability of habitat for the species;
- Adequacy of food supply and long-term food sources;
- Proximity of busy roadways;
- Absence of natural or introduced predators (e.g. domestic cats), human developments;
- Absence of dangerous/toxic species of plants;
- Absence of current or pending damage licence practices in the area;
- Presence of existing populations of that species, free from known disease. Consideration must be given to the density of conspecifics at the proposed release site and whether there is likely to be vacant territory available for the released animal to occupy without excess aggressive interactions with resident animals and birds; and
- Domestic animals and birds must not be present at the immediate release site.

Releases must occur within the parameters of local and state regulations and within the natural range of the species.

TRANSPORTATION OF ANIMALS AND BIRDS

Animals and birds must be transported in an appropriate secure carrier. The process of transporting must be as stress-free as possible.

Minimum standards:

- Carrier size and construction must be appropriate to avoid any injury and undue stress to the animal in transport;
- Appropriate carrier size to allow the animal to stand but not necessarily turn around;
- Minimise noise around the animal;
- Minimise light and visual stimuli around the animal;
- Appropriate ventilation and climate control must be effective during transportation;
- Appropriate food and water must be available if the journey is extended;
- Appropriate crate size according to International Animal Transport Authority (IATA) Regulations must be maintained in the event that the animal is being flown to a release site;
- The animal must not travel in the boot of a car; and
- Domestic pets must not be transported with wildlife.

CHAPTER 6 - HOUSING REQUIREMENTS BASED ON STAGES OF CARE

Appropriate cage space is conditional to the species, the behaviour of the individual, the nature of the injury and the specifics of treatment and recovery. Recommended cage dimensions are based on approximations of space requirements during three recovery periods, each defined by the activity level required of the animal(s). These are:

Stage 1 – Intensive Care (sick/injured/hand-rearing)

Stage 2 – Acclimatisation

Stage 3 – Pre-release

The following paragraphs describe the three stages and the housing best suited to the stage. Indoor caging is replaced by outdoor caging as the animal progresses through the rehabilitation process. Animals and birds requiring large expanses of water (for example, grebes, pelicans, pelagic birds, and many marine animals) present some challenges to wildlife rehabilitators and this staged approach may not apply directly to such species.

During the process of recovering from an injury or illness and the rehabilitation period, an animal or bird should not be moved from rehabilitator to rehabilitator unless this is essential and in the best interest of the animal or bird. This type of disruption may lead to stress-related illness and possible separation anxiety. This is particularly important when dealing with hand-reared mammals.

STAGE 1 - INTENSIVE CARE

Intensive Care (IC) has two main purposes: to restrict activity and to maximise environmental support by provision of medication, heat, humidity and supplementary nutrition. IC is maintained primarily indoors. An animal that is sick/injured or is in the very early stages of recovery will have its movements restricted but will be provided with enough room to maintain a normal alert/upright posture and to stretch its body, limbs and tail, but not enough to leap, fly or run. Conditions requiring restricted activity include re-hydration, hypothermia, fractured bones and wound care. Any animal with severely debilitating conditions such as shock, toxicity, neurological impairment or other conditions that require close supervision and management should be considered for IC. The holding area should be small enough to facilitate easy observation and capture, thereby minimizing capture stress and the possibility of injury during repeated periods of capture and treatment. Animals and birds confined to their pouch/nest prior to weaning and fledging are included in this category.

Restricted activity areas are provided by housing in hotboxes, pet packs, veterinary cages and other small enclosures. Refer to the Department of Environment and Conservation 'Basic Wildlife Rehabilitators' Course Manual for more comprehensive information on options for IC housing. Perches close to the cage floor (relative to the size of the bird) and/or walk-ups to perches should be provided to avoid further injury or damage to tail feathers. Padded perches should be provided to minimise bumblefoot in raptors and waterbirds. Hiding areas such as boxes/pouches or towels must be provided for those species with more reclusive behaviour such as snakes and marsupials.

STAGE 2 - ACCLIMATISATION

Acclimatisation and physical therapy comprise the next phase of the rehabilitation process with the animal recovering from illness or injury; in the case of orphaned animals and birds, Stage 2 is the process of weaning/fledging. Stage 2 can be maintained with a combination of housing indoors and outdoors. Movement is now encouraged to build up strength and to provide gentle physiotherapy where needed. This physical therapy may be voluntary or enforced by the rehabilitator. Periodic capture and medical treatment may still be necessary and the animal must be in an appropriately sized holding to facilitate this. These enclosures are also used for fledged birds and mammals in the process of weaning. Macropod "joey yards" may fall into this category, with a set-up being as simple as a veranda or small section of garden with *ad lib*

access to hanging pouches and/or a secure enclosure. Outdoor caging should provide the opportunity for short flights or walks/runs. Perches and walk-ups to perches (birds) or hiding areas and nest boxes (all animals and birds) are appropriate furnishings. Semi-aquatic and pelagic species should be supervised in tubs or pools of water provided for exercise.

STAGE 3 - PRE-RELEASE

Unlimited activity using large outdoor aviaries/enclosures is essential in this stage. This environment provides physical and psychological experiences and conditioning or reconditioning through extended flights for birds and walks, runs and/or climbs for reptiles/mammals. This housing should allow animals and birds to improve their strength, develop stamina and coordination, restore muscle tone, and continue to acclimatise to current weather conditions and other elemental stimuli e.g. wind, noise and the general environment. Physical therapy should be primarily voluntary, although some may be provided by care-givers. Pre-release aviaries/enclosures should be used to prepare fledged birds and weaned mammals for release. There are often one or two additional stages factored into Stage 3 for hand-reared macropods.

Reptile and amphibian species are often an exception to requiring a staged rehabilitation process. Most lizards, snakes, tortoises and amphibians can move from Stage 2 directly to release. The larger varanid species may require a Stage 3 pre-release period in their rehabilitation to ensure fitness on release.

NUTRITIONAL ACCLIMATISATION

As an animal or bird progresses through Stage 1 and moves into Stage 2, its nutritional needs must be considered and a plan put into place. An early move to a natural diet is essential in many species due to the possibility of unknown nutritional deficiencies in captive diets and the unavailability of commercial products in the wild. All animals and birds should be fed a nutritionally balanced, palatable diet in a form and presentation that they will recognise and be exposed to once released. Nutritional balance is essential for all animals and birds and is particularly critical in the case of fast growing young animals and birds. DEC does not condone the feeding of live prey, other than insects and fish, during rehabilitation.

Minimum standards:

Nutritional needs in the case of preparing for soft releases

- Consideration is given to providing a standard bowl of food close to a release hatch or the aviary door in preparation for when the hatch/door is open and the animal or bird can return for the food.
- Consideration is given to changing the presentation of the food to allow it to be scattered in the aviary/enclosure in place of presenting a bowl of food.
- If the animal is still returning and eating all food provided by 8 weeks post-release, a review of the release must be completed and a plan implemented.
- Wean the animal off the supplemented food slowly and systematically.

Nutritional needs in the case of preparing for hard release

- Does the animal recognise natural food; does it eat the food?
- Is it on a wild diet prior to release?
- Can it forage and catch its own food locally?
- Is it maintaining weight on a wild diet?

Food intake must be monitored regularly during Stage 2 and Stage 3. As a minimum requirement during Stage 2, body weight must be taken every 2 weeks. When the opportunity presents, body weights can be taken more frequently. Body condition scoring may be a substitute in cases of larger animals and birds. During Stage 3 weighing the animal is not recommended due to the need to handle the animal. However if there are concerns about the animal or bird's food intake and body condition, a weight must be obtained and body condition assessed. A plan to improve the status can be set from here. A release weight (where achievable and appropriate) or a comment on body condition is a requirement for your records.

ENVIRONMENTAL ACCLIMATISATION

To minimise unnecessary stress, animals and birds must be taken through a process of environmental acclimatisation at each stage of their rehabilitation.

Stage 1 to Stage 2

- Reduce the amount of supplementary heat being provided. This can be reduced over one or two days by turning the thermostat/dimmer or reduce the wattage of the heat source. Reach the point where the animal is still in its IC environment but is not receiving supplementary heat.
- Reptiles may require a thermal gradient.

Stage 2

- Moved to an ambient temperature environment. Can be inside for evening and outside for periods during daytime.
- Progress to spending all time outside but still in the smaller holding cage, protected from inclement weather.
- May provide supplementary heat at night only, and on days when there is cooler weather.
- Provided with more space
- Provided with basic structure in the environment to meet needs e.g. perches, climbing structure.
- Reptiles in many cases may move from Stage 2 to immediate release. Large varanids may be an exception to this, where developing a level of fitness is essential prior to release. These monitors will benefit from going into a pre-release environment.

Stage 3

- No supplementary heating.
- Outside all the time with access to inclement weather and protection.
- Larger environment for fitness to develop.
- Almost non-existent human interaction.

CHAPTER 7 - BASIC REQUIREMENTS FOR HOUSING DURING REHABILITATION

The natural biology and behaviour of any species must be considered in the enclosure design process. Not only does the enclosure provide for security from escapes and protection from outside interferences and predators, it provides habitat in which the animal can learn or relearn behaviours specific to that species. Caging should provide animals and birds undergoing rehabilitation the opportunities necessary for complete recovery from injuries and/or for learning and practising vital behaviours such as foraging or hunting. Cage design and furniture should address and encourage species-specific patterns of foraging, play, rest or sleep, hiding or predator avoidance, and social responses to conspecifics or cage mates, including reproductive behaviour. Minimum standards for appropriate habitat furnishing can be found in the specific housing sections that follow.

Wildlife rehabilitators should be able to provide enclosures or cages of appropriate size made from appropriate materials that contain appropriate furnishings for all ages of all species that they commonly care for. The cage/enclosure/aviary sizes recommended in the standards are minimal, and the suggested materials work well for many rehabilitators. Alternative techniques for housing and pre-release conditioning are encouraged, but must meet basic natural biology, comfort, husbandry and hygiene requirements. Assigning cage size strictly by species is not always realistic; variations in an individual's size and variations in an individual's behaviour due to age and season, will affect appropriate cage size. Dimensions can be modified to accommodate special needs of the facility or the individual animal and new advancements in the field.

Minimum standards for enclosures are based on good judgement and sound practical sense. All enclosures must be structurally sound, constructed of materials appropriate for species housed, maintained in good repair, and designed to protect the animal from injury, abuse, or harassment, while containing the animal and restricting the entrance of other animals and birds. Enclosures must provide sufficient shelter from overheating, excessive rain and cold temperatures. Each animal must be able to turn about freely, and lie or sit comfortably, unless medically restrained. The construction material must be of sufficient strength and be of a nonporous, waterproof finish (when reasonable) to facilitate effective cleaning and disinfection.

The facility or home set-up should have reliable and adequate water and electricity. Food and bedding must be stored in an appropriate manner that protects it from spoilage, infestation and contamination. Waste must be properly disposed of in accordance with all regulations, in a manner that minimises vermin infestation, odours, and disease hazards. The facility must provide fresh air in a manner that avoids drafts, odours, water condensation, and provides auxiliary ventilation. Lighting must be adequate to allow for inspection and cleaning, while not stressing animals and birds. The facility must be sufficiently drained to protect against sewage back-up and to rapidly eliminate water accumulation.

Many indoor and outdoor cages can be constructed for multi-species use. These cages can be quickly modified to accommodate different species through substituting different perches or other furnishings. A separate cage is not needed for each species the rehabilitator intends to treat, but cages should be able to be adequately cleaned and disinfected and adapted to meet the minimum standards required for the species.

Many young animals and birds, e.g. fledgling magpies or juvenile kangaroos, must be group-housed with conspecifics to avoid imprinting on and/or socialisation to humans. Efforts must be made to network with other rehabilitators to place individual (single) young animals and birds with others of its own species and to place a large species that requires extensive rehabilitation space in an environment conducive to its recovery.

GENERAL INDOOR HOUSING

Indoor holding is generally in effect when an animal is in Stage 1 of the rehabilitation process and is sick/injured or is being hand-reared. This is a critical time for the animal and stress must be reduced as much as possible.

Minimum standards include:

- Location in an area that provides quiet and minimal visual stimuli.
- Provision of visual barriers, positioning cage fronts away from human activity, and placing the enclosures far from noise and high traffic areas.
- When possible and species-specific, provision of natural daylight. Full-spectrum, UVB, UVA and visible lighting should be used when natural lighting is not feasible. Any artificial light source should be timed to mimic current seasonal daylight cycles.

GENERAL OUTDOOR HOUSING

Animals and birds undergoing rehabilitation must be housed in secure outdoor enclosures prior to release to allow for adjustments to climate and external natural stimuli. Large, outdoor enclosures provide opportunities for exercise, behavioural rehabilitation, and climate adjustments, while smaller outdoor caging may be used for Stage 2 acclimatising.

The selection of minimum cage sizes is determined by the animal or bird's ability to make a full recovery. None of the Stage 1 or Stage 2 sizes are recommended for extended or permanent care (with the exception of reptiles). Housing for animals and birds kept permanently (e.g. for educational, exhibit or captive-breeding purposes) is not addressed in this document. Refer to Wildlife Conservation Regulations, 1970, Section 31, Code of Practice for Exhibited Animals and Birds in Western Australia and General Standards for Exhibiting Animals and Birds in NSW. The information available on appropriate size aviary/enclosure for all captive wildlife species is limited and it is the opinion of DEC that the rehabilitator adopt (where feasible) the Stage 3 pre-release sizes (as noted in this document) for housing fauna used for education and breeding purposes.

Special consideration must be made in the design of outdoor enclosures to provide adequate and proper shelter, safety, and habitat for all animals and birds in rehabilitation. Enclosures should be made secure against rodents and potential predators, including adequate perimeter control. For example, a cement floor and foundation with suitable mesh and cover. Refer to each section "Housing Requirements" for detailed information. Enclosures and their contents should duplicate natural conditions wherever practical. Design should provide for ease of cleaning, proper ventilation, adequate light, and temperature control. Proper substrates and furnishings appropriate for each species should also be provided in each enclosure. Fresh water for drinking and/or bathing must be available in each enclosure.

Each outdoor enclosure must possess an area that provides necessary protection from the elements, yet still enables the animal to be conditioned for survival in the wild. All cages should have a roofed portion and contain means of protection from inclement weather and for security. Feeding areas (and the food within) must be protected.

Outdoor enclosures ideally protect the animal without habituating it to human activity. To avoid habituation to humans and/or imprinting, enclosures should be surrounded by a fence or placed out of view. As in the design of indoor housing, minimal human contact, both visual and auditory, is essential. Domestic animals and birds and other potential predators must be prevented from contacting animals and birds in rehabilitation, as predator avoidance is an important factor in survival of rehabilitated animals and birds. Consideration of these variables when designing outdoor enclosures is vital for proper rehabilitation of wildlife.

Outdoor housing alone may not be adequate for full conditioning of certain species or certain injuries. For example, the fitness-conditioning requirement for successful release of a pelican recovering from a leg fracture

may exceed that provided by most rehabilitators. The large cages or deep pools necessary for proper conditioning of some species are not available to all wildlife rehabilitators. In many instances, cooperation with other rehabilitators or wildlife professionals may ultimately be the most successful strategy an individual rehabilitator has available to them.

Transferring animals and birds to other rehabilitators with more appropriate caging must be considered. The successful release and continued survival of rehabilitated animals and birds is the goal of rehabilitators; networking to share information, skills and equipment is vital to the success of rehabilitation.

CHAPTER 8 - AVIAN HOUSING REQUIREMENTS

Cage sizes specify the minimum and are calculated for the species at different stages of rehabilitation. Intelligent substitution of height and ground area requirements is encouraged; for example, while pheasants and egrets are the same size, one requires ground space while the other needs height. Substitutions resulting in larger sized or differently shaped cages are encouraged.

Multiple occupancy by several members of the same species is not only acceptable, but is often beneficial, particularly in acclimatisation caging for fledgling birds. You may need to house more than one species together and in these circumstances it is optional to house similar sized birds of similar lifestyles, i.e. diurnal with diurnal, social with social, to avoid aggression. Individuals of certain species (e.g. herons, egrets) may be extremely aggressive and may require separate housing.

HOW MANY BIRDS IN AN AVIARY?

It is very difficult to provide Minimum Standards for the maximum numbers of birds that can be safely housed in an aviary. Observation of the birds in the wild will often give the best indication of what to be aware of when trying to gauge the concentration of birds in a confined space. If you are housing a species that forms groups, a clear guide is the average number of birds in a group in the wild. If the birds are not a flocking species, set a limit on the number going into an aviary. *Caring for Australian Native Birds, Chapter 53 - Housing, Page 60, Heather Parsons, 1999, Kangaroo Press.* Observation for signs of overcrowding is essential.

GENERAL AVIAN FURNISHINGS

Many types of cage furnishings are appropriate for birds undergoing rehabilitation.

Minimum standards:

- Perches must be customised to the appropriate size and material for the species using them. Perch diameter, appropriate size and substrate of the perch will vary with the natural biology of the species (e.g., limb-perchers vs. ledge-perchers) and should be designed with the goal of minimising foot damage.
- Perching sizes are relevant to the ability of the longest toes to curl one-third the way around the perch.
- Bowls or pools for bathing should be provided for all birds whose medical condition does not prohibit them from getting wet.
- When perching is required, each cage should have a minimum of two perches (excluding Stage 1 housing) for birds capable of perching.
- Perches must not be positioned directly over each other or over food or water containers.
- Outdoor caging must contain some sort of nest box for cavity nesters or a sheltered area for other birds. Nest boxes and shelters provide a natural space that reduces stress and enhances security.
- Access to normal, natural weather variants such as sun, rain and wind etc.

Construction Materials

Many different types of construction materials are used for avian enclosures for rehabilitation. Selection of appropriate material is important for the proper construction of adequate enclosures.

Minimum standards:

- Aviaries must have a double-door entry system for housing birds that can fly in confined areas. Aviaries may have a single-door entry system for housing birds that do not fly, or may not be able to gather flight capability in confined areas.
- Aviaries must be lockable.
- Rodent and predator proofing must be in effect.
- Building materials for the structure must be sturdy.
- Solid walls for aviaries are to be constructed of Zinalume, weathered galvanised materials or other materials of a suitable nature.
- A minimum of one third of the aviary must be protected from the elements. This can be achieved with construction of solid material to provide cover and security. Screening with natural foliage e.g. trees or shrubs planted around the outside of the aviary may also provide cover and security.
- All surfaces must be of non-toxic materials including paint, treated woods and metals.

Flooring Considerations

Flooring or substrate for aviaries varies with types of birds.

Minimum standards:

- For perching birds concrete base is adequate.
- For ground birds substrates such as mulch, leaf litter or sand are appropriate but should be changed as often as necessary, and twice a year at a minimum.
- Some organic flooring e.g. sawdust, straw, wood shavings and other such flooring materials can carry fungal pathogens such as aspergillus and should be used with caution. Raptors and waterbirds are particularly susceptible to these pathogens.
- Natural flooring is ideal in very large enclosures. This natural flooring must be turned over on a regular basis to allow aeration, depending on the number and size of birds housed in the enclosure.
- Suitable substrates for small holding cages include newspaper, cloth material, paper towels, raised netting over newspaper and rubber mats. The selection of substrate is dependent on the species being housed.

HOUSING FOR SONGBIRDS

The songbird (passerine or perching) group of birds includes a large number of individual species with wide ranges in size, behaviour, habitat, foraging techniques, food items, and subsequent rehabilitation requirements. These requirements must be understood and addressed to ensure successful rehabilitation and eventual release of healthy, well-adapted individuals that are prepared for survival in the wild.

Understanding the natural biology of any species in rehabilitation is necessary when considering caging arrangements. Songbirds have many natural predators such as other birds, snakes and small mammals, as well as domestic animals and birds that are associated with people (e.g. cats and dogs). Care should be taken to reduce exposure of these birds to potential predators, thereby reducing stress and/or potential injury.

The requirements for pre-release conditioning caging vary greatly among songbird species. The rehabilitator must understand the natural biology of the species and consider the bird's needs during rehabilitation and pre-release conditioning. As an example, some species generally fly straight from their nests, requiring very little pre-fledge training, whilst others leave the nest early and spend a lot of time on the ground while developing flight feathers. During this time, the fledglings follow the adults and learn appropriate survival behaviours. Larger songbirds require space to exercise and practice flying, so a larger aviary is recommended to house these species.

Construction Materials

External wire on outdoor caging for songbirds should be made of galvanized mesh. The use of chicken wire or chain-link is not recommended, as the large openings allow predator entry or accidental escape of inhabitants if the interior lining becomes torn or loosened. Wire screening has been used successfully without causing damage to feathers.

Furnishings

Understanding the natural biology of the species being rehabilitated, and then adapting the aviary accordingly for that species will give birds a great advantage when released. Cavity dwellers/nesters should be provided with some sort of hide box or cavity-type container. Aviaries that are furnished with natural plantings help reduce stress and provide the birds with natural shading, perching, hiding, and foraging opportunities.

Table 2: Minimum Standards for Housing Various Avian Species

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 8: Avian Housing Requirements.

Species	Length of bird	Stage 1 WxLxH	Stage 2 WxLxH	Stage 3 WxLxH <i>General considerations</i> <i>W = 3 x wing span</i> <i>L = 10 x wing beats</i>	Mesh size & weight
Pigeons/Doves Nightjars	25 to 35cm	32x20x32cm	57x45x45cm	2x2x2m	25x12.5mm
Honeyeaters Wagtails Wrens/Finches Wattlebirds Tree martins Swallows	>22cm	32x20x32cm	57x45x45cm	2x3x2m	6.5mm ² 19 - 23g
Butcherbirds Mudlarks	<40cm	32x20x32cm	85x85x60cm	2x3x2m	25x12.5mm
Magpies Raven Currawong	>50cm	50x53x64cm	85x85x60cm	2x5x2m	25x12.5mm
Neophema Lorikeets	>22cm	32x32x32cm	85x85x60cm	2x3x2m	12.5mm ² 20g
Kingfishers Bee eaters	>28cm	32x32x32cm	85x85x60cm	2x5x2m	6.5mm ² 23g
Kookaburra Tawny Frogmouths	>50cm	55x53x64cm	85x85x60cm	2x6x2m	25x12.5mm
Larger Parrots	>40cm	55x53x64cm	85x85x60cm	2x5x2m	1.6x1.25mm or 25x12.5mm 16 --18g
Cockatoos	>60cm	60x59x70cm	2x2x1m	5x6x2m	4x2.5mm 8- 12 g
Mallee Fowl Coucal Brush turkey	>60cm	42x67x48cm	2x2x1m (soft roof, or false ceiling)	5x15x4m (ensure roof material is soft bird netting and ensure plenty of natural cover and trees for high roosts)	25x25mm (line large enclosures with shade cloth for protection and visual barriers)

HOUSING FOR WATERBIRDS

Waterbirds, as the name implies, are those birds that spend much of their time in, on or around the water. At Stage 3 (pre-release), waterbirds all require a water pool in their outdoor caging. The size of the pool varies from species to species. The natural feeding, drinking and bathing behaviour of each species should be considered in the design of the pool, including depth of the water to accommodate such behaviours.

Water quality must be considered when housing waterbirds. Birds more easily align their feathers in fresh soft water. Water softness of 2-3 grains or 30-50mg per litre calcium carbonate is optimal. Higher concentrations of minerals in hard water appears to interfere with waterproofing. Hall (sighted Clumpner, 1990) found that after birds have been in the above water for 24 hours and are waterproof, they may be moved to harder water or to salt water.

As a pelagic bird moves into the stages of pre-release, providing salt water in the pool can be considered. This is an expensive exercise, both in time and money. Alternatively, the bird's salt requirements can be met by providing salt tablets in its diet. It is essential for true pelagic birds to be 100% salt tolerant prior to release; however, most other aquatic species will tolerate the change from fresh water to salt water with less intensive acclimatisation.

The cage sizes recommended in this manual are minimums and may not accommodate for flight, but do allow for a bird to flap its wings fully extended without coming into contact with enclosure sides. Every bird would benefit from as large an area as possible and the rehabilitator is encouraged to construct larger cages whenever reasonable. Large cages intended for animals and birds with greater space requirements can be designed to be subdivided or furnished for other species when needed.

Construction Materials

Construction materials for aquatic bird aviaries will differ to those for most other avian species.

Minimum standards are:

- All materials should be easy to clean and disinfect.
- Only use materials that are impervious to water or that can be sealed to become impervious.
- Materials utilised for walls should provide visual barriers, minimise chances of injury, provide adequate ventilation and protect against predators and domestic animals and birds.
- Pool materials include plastics, fibreglass, rubber, cement and natural ponds.
- Pool design must allow for a graduated side and/or roughened surface to minimise damage to the bird's keel when exiting the pool.
- Any sharp or abrasive areas must be covered to prevent injury and substrates should be appropriate to prevent husbandry-related injuries to feet.

Most waterbirds spend the majority of their time in or near large bodies of water and are conditioned to seeing open sky overhead, the majority of the roof on an outdoor cage should be open, allowing for a clear view of the sky. Netting works well for this application and will prevent injury from collisions if the bird flies upwards. This type of construction is psychologically beneficial to the bird and it encourages them to exercise.

Many of these birds are colonial foragers and nesters. Group housing for species that are colonial waterbirds may reduce stress whilst in captivity. A precise knowledge of the species' natural biology will help in determining if the birds in rehabilitation are too territorial for group housing or what the optimum number of individuals might be for any given enclosure dimensions.

Furnishings

Some factors in successful habitat construction are species-specific:

Diving species require deep pools and often will not enter a shallow pool such as a children's paddling pool. Rocks or short pilings for perches are required for some divers, but should never be used for small ducks and grebes, as these types of perches are too high and would cause keel damage if used.

If waterproof, ducks, grebes and swans will remain in the water rather than perch; if not waterproof, netted floats or padded haul-out areas should be provided for these species.

Hérons & egrets require tall cages to prevent head trauma, as they tend to jump rapidly upwards.

Wading birds bathe regularly, requiring pools up to 25cm in depth. Because they are wading birds, the depth should be graduated.

Terns and oystercatchers will fly over and feed off water, but they do not float or bathe in deep water. These species benefit from graduated pools, with the depth proportionate to their size (e.g. shallower for smaller terns).

All waterbirds are prone to foot problems such as Pododermatitis (bumblefoot) if they are housed in unsuitable numbers or kept on inappropriate substrate i.e. if overcrowding or stressful group dynamics promotes aggression over perching spots and/or perches have rough or abrasive surfaces. All perches must be easy to keep clean of urates and faeces.

Table 3: Minimum Standards for Housing Waterbirds & Seabirds

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 8: Avian Housing Requirements.

Species	Stage 1 WxLxH	Stage 2 WxLxH	Stage 3 WxLxH	Pool size and depth	No of birds	Codes
Duck Moorhens Coots Grebe	40x40x40cm	60x60x60cm	2x4x1.75m Alternative: 4.3m round gazebo style	Pool size: min surface area of water 1m ² 50cm deep pool	2	H AW FP ON PT AP
Darter Cormorant	42X67x48cm	1.2m ²	2x2x1.75m	Pool size: min surface area of water 1m ² 50cm deep pool	1	
Stilt Egret Heron Spoonbills	42X67x48cm	1.2m ²	2x2x1.75m	Pool size: min surface area of water 1m ² 50cm deep pool - graduated	1	AW AG ST
Oystercatchers Dotterel Plover	32x32x32cm	60x60x60cm	1.5x1.5x1.75m	Pool size: min surface area of water 1m ² 25cm deep pool - graduated	1 smaller size 2 larger size	AW
Swan	70x70x70cm	1.2m ²	2x2x2m	Pool min surface area of water 2.4m 60cm deep pool	2	PT AP
Pelican	1.2x1.2x1.2m	3x3 m ²	3x3M Alternative: 3x9M round gazebo style	Pool size: min surface area of water 3m ² 70cm deep pool	1 2-3	PT AP SO ST
Little Penguin	40x40x40cm	1x1 m ²	3mx3m	Pool size: min surface area of water 2.4m ² 30cm deep pool	3	AG AP H SO
Small seabirds Include terns and seagulls	40x40x40cm	1x1 m ²	2x2x1.75m	Pool size: min surface area of water 1m ² 30cm deep pool	2	N PT PP
Albatross Giant Petrel	70x70x70cm	1.2 m ²	2.5x2.5m	Pool size: min surface area of water 2.7m x 3.3m with 70cm deep pool. Walls 60cm above depth of pool	1	N PT PP SO AG

Table 4: Codes for Special Housing Requirements Used in Table 3, Minimum Housing for Waterbirds & Seabirds

AG	Note that these birds can be extremely aggressive, even with conspecifics. Use caution and observe the birds' interactions when introduced, before housing together unattended.
AP	These birds require pre-release conditioning aviaries that contain pools to swim in and standing/perching surfaces.
AW	These birds require pre-release conditioning aviaries that contain shallow wading pools and a variety of perches, especially up high.
FP	These birds have very sensitive feet. Provide as much wading area (in addition to a "swimming" pool) as possible in all housing to help prevent husbandry injuries.
H	Provide natural vegetative material or human-devised areas for cover.
N	Should be housed on tightly stretched, suspended netting as a substrate whenever bird is not in water.
ON	When an individual of these species is housed in IC and is emaciated (pronounced keel) or not standing, it should be housed on suspended net/shade cloth bottom caging to protect feathers and keel until standing normally and of normal weight. Otherwise, when standing normally and keel is not extremely pronounced, housing substrate is covered with towelling or matting.
PP	These species, during pre-release conditioning, require only pool space. Prior to release, individuals must be able to stay in a pool full-time, without a haul-out area, for a minimum of 48 hours without compromise to their waterproofing.
PT	During recovery, bird should be allowed pool time as long and as often as medical condition allows.
SO	Surface overflow of pool required to maintain water quality. This can be achieved by constantly trickling a hose or by overflowing pool, filtering and recirculating water.
ST	As soon as they are standing, these stiff-tail-feathered birds should have a stump or stump-like perch to avoid feather breakage and soiling.

HOUSING FOR RAPTORS

General Raptor Housing Considerations

Sizing for raptor housing is based on a combination of the size and flight styles of the bird. While the cage information states a minimum rectangular size, consideration may be given to L-shaped enclosures to facilitate evaluation of flight and angling abilities, when space is limited on a suburban block. As with other caging, the rehabilitator is encouraged to expand and enhance these minimum requirements, and create caging most suitable to their location, facility, caseload and experience, keeping in mind the natural behavioural and physical needs of the birds.

The needs of raptors present several challenges to achieve successful release. Generally, these birds are large predators that mostly hunt on the wing. Due to the aggressive nature of some raptor species, some species should never be mixed, and in some species of falcon, male and female should not be mixed.

Appropriate conditioning is crucial not only for foraging, but for territory defence and other behaviours. Large flight aviaries are the easiest way to achieve fitness conditioning, but it should be noted that using large flight aviaries is not the only acceptable technique for pre-release preparation. In several instances flight in an aviary is not adequate, and post-release survival will be unlikely. Raptors that arrive in care before learning to hunt, and after fledging, are most affected. Species which actively pursue agile prey will require more extensive flight exercise, since even the largest aviary will cover only a fraction of the space of an actual hunt and pursuit.

The sport of falconry is not practiced in Western Australia and all rehabilitators wishing to use falconry-based training techniques (free flying and creancing) for pre-release conditioning, assessment and release, must have written approval from DEC to do so. Rehabilitators must obtain ongoing advice on the use of these complicated release techniques such as "hacking back" (for chicks), creancing and free flight training while they learn to use them. Raptor rehabilitators experienced in these techniques can be contacted through the Community Involvement Coordinator at DEC.

During free flying and creance training, smaller-sized cages as noted for Stage 1 and 2 recommendations will be sufficient to house birds. In some instances, Stage 1 is more appropriate until a bird is conditioned to tethering and the training involved in flight conditioning. Raptors in stages immediately prior to release often need more exercise than can be provided by many rehabilitators. Cooperation amongst rehabilitators is essential to ensure that birds are housed with an appropriately skilled rehabilitator with the correct environment for housing the bird.

Construction Materials

Wherever possible, the frame for the structure should be on the outside to avoid the birds trying to perch on it or getting limbs caught between it and the wall material. This also makes cleaning easier. Acceptable materials include:

- sealed (treated) wood, corrugated metal sheeting (Zincalume, steel, tin etc.);
- plastic and moulded fibreglass (indoor housing);
- opaque polycarbonate and fibreglass sheeting (reinforced with other materials);
- milled wooden or metal vertical bars / pickets / slats;
- woven shade cloth;
- plastic-coated chain link; and
- UV-stabilized nylon net (anti-bird for small birds or trawler netting for large birds).

Wire mesh must not be used on any surface where the bird can come into direct contact with it. Good quality wire mesh can be used for external structures as predator proofing. Wire doors on pet carriers used as hospital boxes must be covered on the inside.

High stress raptors such as kites and hawks should be housed in facilities that eliminate or minimise visual and auditory stress. Solid-sided walls and/or vertical slats with no more than one-inch gaps may be advisable. When secluded cages are not available, or when additional visual occlusion is necessary, translucent material (e.g. bed linen) may be hung on the outside of the slatted cage. These materials allow some light to enter the enclosure, and slits or holes in the material allow for better ventilation than solid-sided cages.

Furnishings

Minimum standards:

- Stable and easily cleaned furnishings.
- All perching substrates must be chosen carefully, based on the natural biology and size of the species. Natural branches with fibrous bark, blocks, and ring perches are appropriate for certain species of raptors. Perch coverings may include artificial material such as padded bandaging and true Stadium AstroTurf (this is preferred over the fake grass known as "Astroturf") and when used, more than one surface substrate may be offered per perch in each enclosure. Coverings must not be able to unravel.
- Perches should have some degree of "give" for landings.

- Perches must be positioned to avoid the bird hitting walls with wing or tail feathers when landing and taking off of the perch. At least two perches should be placed in each cage (excluding Stage 1), preferably at different heights and different angles. Movements up to perches, down to feed or water, or across to another perch also provide important exercise.
- Pools must be a minimum of 5 - 15cm deep and wider than the length of the raptor.

When circumstances allow, rehabilitated adult birds should be released in a suitable habitat as close as possible to the point of their capture.

Table 5: Minimum Standards for Housing Raptors

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 8.

Species	Stage 1 WxLxH	Stage 2 WxLxH	Stage 3 WxLxH	Codes
Pacific Baza	35x50x40cm	1.2x1.8x1.8m	2.4x4.8x2.4m	
Letter-winged Kite	35x50x40cm	1.2x1.8x1.8m	2.4x4.8x2.4m	SM
Black Shouldered Kite	35x50x40cm	1.2x1.8x1.8m	2.4x4.8x2.4m	SM
Collared Sparrowhawk	35x50x40cm	1.2x1.8x1.8m	2.4x4.8x2.4m	SM, JH
Australian Hobby / Little Falcon	35x50x40cm	1.2x1.8x1.8m	6x20x4m	SM, FF, JH
Australian Kestrel	35x50x40cm	1.2x1.8x1.8m	2.4x4.8x2.4m	
Boobook Owl	35x50x40cm	1.2x1.8x1.8m	2.4x4.8x2.4m	
Barn Owl	45x70x55cm	1.2x1.8x1.8m	2.4x4.8x2.4m	
Square-tailed Kite	45x70x55cm	2x2x2m	6x20x4m	JH
Red Goshawk	60x80x70cm	2x2x2m	6x20x4m	SM, FF, JH
Black Breasted Buzzard / Kite	45x70x55cm	2x2x2m	6x20x4m	JH
Spotted Harrier	45x70x55cm	2x2x2m	3x15x3.6m	JH, SM+ floor hide
Swamp Harrier	60x80x70cm	2x2x2m	6x20x4m	JH, SM+ floor hide
Brahminy Kite	45x70x55cm	2x2x2m	3x15x3.6m	SM, JH
Whistling Kite	45x70x55cm	2x2x2m	3x15x3.6m	SM, JH
Little Eagle	45x70x55cm	2x2x2m	3x15x3.6m	SM, JH
Black Kite	45x70x55cm	2x2x2m	3x15x3.6m	SM
Brown Goshawk	45x70x55cm	2x2x2m	3x15x3.6m	SM, FF, JH
Grey Goshawk	45x70x55cm	2x2x2m	3x15x3.6m	SM, FF, JH
Brown Falcon	45x70x55cm	2x2x2m	3x15x3.6m	
Black Falcon	45x70x55cm	2x2x2m	6x20x4m	SM, FF, JH
Grey Falcon	45x70x55cm	2x2x2m	6x20x4m	SM, FF, JH
Peregrine Falcon	45x70x55cm	2x2x2m	6x20x4m	SM, FF, JH
Masked Owl	45x70x55cm	2x2x2m	3x15x3.6m	
Grass Owl	45x70x55cm	2x2x2m	3x15x3.6m	SM+ floor hide
Rufous Owl	45x70x55cm	2x2x2m	3x15x3.6m	
Barking Owl	45x70x55cm	2x2x2m	3x15x3.6m	
Osprey	60x80x70cm	2x2x2m	6x20x4m	
White-bellied Sea Eagle	60x80x70cm	2x2x2m	6x20x4m	JH
Wedge-tailed Eagle	60x80x70cm	2x2x2m	6x20x4m	JH

Table 6: Codes for Special Housing Requirements Used in Table 5, Minimum Housing for Raptors

FF	Free (uncaged) Flight exercise needed to reach adequate fitness (unless bird has been in care for less than a week)
SM	Special Materials suggested - lining aviaries with shade cloth will reduce injury in most cases, and avoiding net-roofed aviaries will stop kites from getting toes entangled.
JH	Juveniles cannot learn to Hunt adequately in a cage, and will need to learn these skills during free flight if they are too old to hack back.

CHAPTER 9 - REPTILE AND AMPHIBIAN HOUSING REQUIREMENTS

GENERAL REPTILE HOUSING CONSIDERATIONS

It has been recognised through extensive consultation with experienced herpetologists in Western Australia that wild reptiles require minimal conditioning prior to release. Therefore, in most species, it is appropriate to release on recovery from Stage 1 or at Stage 2.

Enclosure or holding cage sizes listed in Table 7 are minimum sizes that are acceptable for most circumstances. Some reptiles and amphibians may have special keeping requirements that these recommendations will not cover adequately. As for all wildlife species, understanding the specific requirements and behaviours and applying that knowledge to the housing, both in terms of size, substrate and general furnishings, is essential for proper care. For example, a snake species that ambushes prey would require less space than one that pursues prey. The minimum standard is to provide adequate space for the reptile to move and locate food and to provide an appropriate area to hide and/or bask, depending on the needs of that species.

The natural biology of each species will help to determine their preferences for microhabitat, thereby influencing husbandry practices.

Minimum standards for basic husbandry:

- Housed in a secure, escape-proof enclosure of correct size based on minimum standards.
- Appropriate provision of supplementary heating, humidity and temperature gradient relevant to the species.
- Effective provision of lighting according to the species' needs. This may include ultra violet (UV), covering both UVB and UVA, and full or true spectrum lighting.
- Appropriate enclosure furniture to provide an environment conducive to stress reduction and healing.
- Provision of drinking water in such a way that the species identifies it e.g. some reptiles require misting to drink – they will not drink from standing water.
- Provision of food that the reptile will eat.

Construction Materials

- Commercially purchased reptile enclosures, ranging from small holding boxes for lizards to large snake boxes, are available.
- Range of various sized heavy duty plastic or fibreglass containers with secure fitting lids provide suitable short-term housing.
- Treated wooden holding boxes with glass or Perspex front or top lid are suitable. The wood must be sealed and allow for thorough cleaning and disinfecting.
- Glass tanks are suitable but lack insulation and can be heavy to move around and difficult to store.
- Security of the caging, in order to prevent injury to the animal.

Substrates

Selection of an appropriate substrate is extremely important to the long-term health of any reptile.

- Newspaper is safe, hygienic, easy to clean, absorbent and inexpensive.
- Recycled paper cat litter pellets are safe, hygienic and easy to clean.

- Dry leaf litter (from a clean area) may be used in the absence of any obvious wounds.
- Peat or Sphagnum Moss can be used for specific applications with certain fossorial or burrowing reptiles. Observe for fungal build up. The material should be discarded after use.
- Carpet or Astroturf to cover abrasive brickwork, for aquatic tortoise set-ups.
- Paper towelling (unbleached) is recommended for amphibians. Do not use printed paper.
- Sand – should be limited to those that habitually live in sandy areas. Generally, sand is abrasive, and may be ingested, causing impactions.
- For reptiles that are gravid, moistened sand or vermiculite may be considered.

Furnishings

If an animal must be kept for an extended period, cage accessories may contribute to the animal's mental health. An understanding of the species' natural biology and habitat preferences is essential in providing the minimum standard of care in captivity. All reptiles must be allowed to hide, climb and bask as needed.

Table 7: Minimum Standards for Housing Reptiles

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 9.

Species	Stage 1 & 2 WxLxH	Stage 3 WxLxH	Max # per enclosure
Stimson's Python Black-headed Python	1/2 body length x 3/4 body length x 1/3 body length	NA	1
Young pythons up to 1 metre long	30x90x50cm		
Carpet Pythons	1/2 body length x 1/2 body length x 3/4 body length	NA	1
Death Adder	50x30x45cm	NA	1
All other venomous snake species Up to 1.5 metre	45x90x45cm	NA	1
Small Geckos	40x20x30cm	NA	2
Bluetongue Lizards	30x90x40cm (3ft tank)	NA	2
King Skinks	50x90x30cm	NA	1
Dragons	30x90x40cm (3ft tank)	NA	
Varanids Stage 1, 2 & 3 will rely on the length of the monitors body	2x body length 1.5x body width 60cm high	3 x body length 2 x body width 60cm high	1
Adult long Neck Tortoises	50 x 90 x 30cm	100x150x100cm pool with a dry land area. 20cm deep body of water General considerations: 5x animal's length 3x animal's length depth of water 3x animal's width Water must be heated >16°C for feeding to occur	1
Amphibians	50x25x30cm	NA	4

CHAPTER 10 - MAMMAL HOUSING REQUIREMENTS

General guides for mammal housing are difficult to define, due to the variation in size, temperament and life history in mammals. A "one-size or style-fits-all" approach fails when you are housing mammals ranging from bats to kangaroos. However, some principles do apply to all mammal housing. For example, double door or similar construction is effective in preventing escapes; visual barriers between cages and between humans and cages provide stress relief to mammals; pre-release cages should be isolated and placed in an area similar to release habitat, if possible.

Mammals that are sick, injured or being hand reared may be housed in a hospital box, pet carrier, glass tank and a variety of suitable hand rearing options, including basket, esky and hanging pouch. Consideration must be given to the size of the mammal and the rehabilitator's preferences based on experience and knowledge.

The task of hand rearing mammals and the standards required to complete this process is beyond the scope of these Minimum Standards. There are many tried and tested methods and a vast number of experienced rehabilitators that hand rear the wide range of mammal species in Western Australia. For the purpose of the Minimum Standards housing sizes, we have placed all hand rearing cases into Stage 1 for their basic needs. This does not include the information required on the in-depth daily care the mammal requires during this period. This information must be sourced using the vast network of rehabilitators available in WA, in addition to appropriate reference books as listed in these Standards under "Recommended Reading".

STANDARDS FOR BASIC HUSBANDRY

Minimum standards are:

- Supplementary heat for mammals in Stage 1 (and possibly Stage 2) must be provided.
- Appropriate humidity must be provided.
- Suitable materials for nesting and security must be provided.
- Suitable furniture and substrate must be provided.
- Companionship must be provided if appropriate to the species.

HAND REARED MACROPODS AND REHABILITATION STANDARDS

Hand reared macropods are being successfully rehabilitated and released with the following methods as being agreed minimum standards:

- Juvenile macropods **must** be placed with others of the same species or family as they enter into the Stage 2 process, **if not earlier**.
- Stage 2 joeys will need access to a safe joey exercise area with unlimited access back into their "pouch".
- Companion animals and birds such as cats and dogs **must** be excluded from all areas where joeys are exercising during Stage 2 and 3 as they begin to acclimatize outside of the pouch and explore the area.
- The joey exercise area will be a secure environment where the joey can see out beyond the immediate area and receive environmental stimulation such as smells and changes in weather.
- Stage 3 – It is at the discretion of the rehabilitator to complete Stage 3 using an additional two-stage approach.
 - Stage 1: joeys may move into a small exercise yard approximately 10mx10m.
 - Stage 2: move into the pre-release conditioning yard as noted as Stage 3 Minimum Standard sizing (20mx30m).

- Final Stage 3 will include no “hands-on” contact with rehabilitator. The macropod will be prepared environmentally and nutritionally for a soft or hard release.

CONSTRUCTION & FURNITURE

Echidna - Deep packed substrate; a minimum of 20cm to provide for digging. Large termite logs for provision of food sourcing enrichment and physical activity; a concrete base or wire undermine yard is essential for housing in Stage 3.

1.2m high smooth walls to stop escaping and to avoid predators entering. 50cm fencing set below the substrate to reduce escape by digging. If using chain link fence, a smooth barrier minimum of 60cm high must be installed to avoid climbing out. Effective shade must be provided to allow for temperature gradient and access to sunlight.

Bats - In addition to abrading, wire mesh corrodes with urine. A non-abrasive surface, such as polyethylene mesh, is preferable for all enclosure and holding-box construction. Provision of shelter against inclement weather is achieved with the minimum standard of one third of the enclosure completely sheltered. Avoid placing any sharp objects in the environment to reduce wing membrane trauma when flying and landing. Provide suspended landing spots e.g. towels, flannelette squares, at each end of the enclosure to encourage flight and landing activity.

- Flying Fox - Roosting sites e.g. cloth squares pegged to the roof of the enclosure, should be provided as high up as possible. Food stations and water bottles for holding blossoms must be provided with easy access.
- Insectivorous Bat - Roosting pouches or boxes must be placed at each end of the enclosure preferably along the ceiling. A bright light source (to attract insects) should be set up on the outside of the enclosure, in the middle of the ceiling. This provides the bat with a flight path from one length of the enclosure to the other with the opportunity to catch insects along the way. If the light source is positioned inside the enclosure it must have a wire cover over the globe to prevent bats from having contact with hot light fixtures. Provision of appropriate water source.

Small Dasyurid and Antechinus - Glass tanks or wooden holding boxes with fine 6.5mm² mesh doors or lids for pre-release conditioning of very small mammals are ideal. Generalisations are difficult to make for such a large and diverse group, so refer to the natural biology of the species undergoing rehabilitation for a better understanding of appropriate habitat requirements. Small nest boxes must be provided. A basking lamp may be utilised.

Chuditch - Semi-arboreal mammal, so ensure provision of both ground space with substrate and some logs for climbing. A nest box must be provided. If possible, provide a nest box at ground level and one off the ground with access to a climbing branch. A hammock made from flannelette material is often favoured if provided. A basking lamp may be utilised.

Honey and Pygmy Possums - Enclosure must have fine 6.5mm² mesh on the outside to prevent escapes and vermin predation. Require a complex arrangement of vertical and horizontal climbing branches. A nest box must directly communicate with a climbing branch. Leaf litter substrate. If an enclosure is not available for pre-release conditioning, a veranda aviary may be considered with additional fine mesh added. A large glass tank may be used, but this does not allow for acclimatising to the inclement weather.

Sugar Gliders - Standard enclosure set up, but minimise furniture to allow for gliding. Sheltered nest box with communicating branch to food. Consider provision of supplementary heat to encourage activity for quicker release.

Possums - Nocturnal arboreal mammals, so height to the enclosure is important. Provision of climbing branches at various heights to promote climbing is required. Aim to maximise the use of all vertical space to reduce their need to come to the ground for any reason. Good foliage cover provides security and will encourage activity.

- Brushtail Possum – Heavier duty climbing branches, ropes can be used for climbing. Appropriate sized nest box and nesting material must be provided. Browse holders positioned high up near the nest boxes to allow for provision of native flora.
- Ringtail Possum – Lighter weight climbing branches, ropes can be used for climbing. Drey and/or nest box with nesting material must be provided. Foliage holders positioned high up near the nest boxes to allow for provision of native foliage and flowers.

Bandicoot – Nocturnal, terrestrial mammal. Provision of appropriate floor space and substrate for foraging to a minimum of 10cm deep. Provision of 0.5m solid structure up the sides of the enclosure to avoid climbing/jumping. Enclosure mesh no greater than 1.2cm. A nest box must be provided but bandicoots will nest just under the leaf litter, tussocks and in hollow logs.

Bilby – Nocturnal, terrestrial mammal. Require burrowing environment. Stage 2 holding enclosure must be filled with dry clay-free river sand to a minimum depth of 23cm. Service area can be reduced to 5cm depth. 15cm diameter black polypipe, laid out in U formation, creating a 6.5m tunnel directly to the nest hutch. Nest hutch minimum size 40cm² with top-lifting lid in addition to front access attaching directly to the piping. Stage 3 enclosures or yards require natural vegetation and soil/substrate containing sufficient fine grain/clay to hold burrow structures up to 2m deep with 20cm diameter tunnels without collapse. Natural shrub/tree vegetation with good root systems. This allows for normal burrowing and food foraging behaviour. Thermoregulation is essential in the acclimatisation of bilbies that are being released back into the wild and natural substrate allows this through self-selection of burrow depths. To prevent escape, a minimum of 60cm wide chicken wire, mesh skirt on the inside of fences at a depth of ~ 50cm is usually sufficient in a minimum size enclosure of ~ 10mx10m. This size enclosure could hold several young animals or a pair of adults. Young bilbies have been known to climb and if a roof is not utilised; an internal overhang should be included on all sides and corners. This is in addition to an outward-facing overhang described below, to prevent predator incursions.

Small macropods - Predator-proof fencing is essential. Enclosure mesh must not exceed 5.5cm². Outward-facing overhang of approximately 60cm, at an angle between horizontal and 45°. Secure spots to shelter and nest, including shrubs, tussocks and small 'A' framed wooden shelters (avoid placing anything on the fence line). Protected feeding station or "shed" facing away from prevailing winds. Rounded corners on fences may help to prevent animals and birds injuring themselves by guiding animals and birds around corners, instead of ending in an abrupt 90° turn.

Large macropods – Large open yard, relatively free of obstacles; east facing shelters large enough to allow more than one animal to congregate. Protected feeding station or "shed" facing away from prevailing winds. Provision of dust baths.

Wallaby – Well covered habitat, shrubs, 'A' framed hides. Rock Wallaby requires elevated platforms; these can be made of piles of rocks, weatherproof tables, platforms and branching trees. Small cave like structures will provide security and promote natural behaviour. Protected feeding station or "shed" facing away from prevailing winds.

YARD REQUIREMENTS FOR MACROPODS

Yards of varying sizes are required for appropriate rehabilitation. The size will vary depending on the stage of development the macropod is currently at.

Minimum standards for pre – release yards for Large Macropods and Wallabies are:

- Predator-proof fencing incorporating minimum of 50mm² mesh fencing to a minimum height 1.8m.
- Wire placed 35cm beneath the ground, or external deterrents e.g. barbed wire, or a moat around the base of the mesh.
- If climbing species are to be enclosed by unroofed fences, then the fences must be made of material that is not climbable and a minimum height 2m or rimmed by a 45-degree outrigger (0.5m wide facing into the enclosure).

- Minimal furniture to reduce accidents and injuries.
- Shade through the yard.
- Self feeders and water troughs for minimum disturbance.
- There are variations in developmental stages of macropod joeys when they reach Stages 2 & 3. This will be determined by access to other macropods, health and the experience of the rehabilitator. This will have an impact on the size of the yard that the macropod is placed in. To allow for rehabilitator discretion, two sizes have been included at Stage 3 as Minimum Standard, and the larger sized yards are always preferred where available.

It is uncommon that fully-grown, wild adult kangaroos survive the injuries associated with motor vehicle accidents and therefore they are not commonly in rehabilitation and release programs.

Table 8: Minimum standards for Housing Mammals:

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 10.

Species	Stage 1 WxLxH	Stage 2 WxLxH	Stage 3 WxLxH	Max # in Stage 3
Insectivorous Bat	18x25x20cm	59x60x70cm	3x5x2m	6-8
Fruit Bat	30x43x36cm	59x93x59cm	4.5x13x4m	4-6
Dunnarts and Antechinus species	20x32x32cm	30x91x40cm	30x91x40	6
Pygmy Possum Honey Possum	20x32x32cm	60x26x30cm	1x1x1m	2
Sugar Glider	20x32x32cm	90x90x90cm	2x5x1.75m	4
Ring tail Possum	30x43x36cm	90x90x90cm	.90x1.8x1.8m	2 must be related)
Brush tail Possum	30x43x36cm	1x1x2m	2x3x1.75m	1
Bandicoot	<u>juveniles</u> 20x32x32cm <u>adults</u> 30x43x36cm	1x1x0.8m	2x3x1m	1
Bilby	30x43x36cm	2x4x1.75m	10x10m	2
Chuditch	<u>juveniles</u> 20x32x32cm <u>adults</u> 30x43x36cm	1x1x.8m	2x3x1.75m	2
Echidna	50x71x51cm	60x91x53cm	6x6x1.2m	2
Small macropods	50x71x51cm	60x91x53cm	15m ²	15
Wallabies	60x91x53cm	5x5m	20x30m	7-10
Large macropods	60x91x53cm	5x5m	See notes on 2 stages in Stage 3 Stage 1 - 10x10m Stage 2 - 20x30m	7-10

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GLOSSARY

- Acclimatisation – To habituate to a new climate or environment.
- Altricial – Very young birds that are hatched and require feeding by parent bird.
- Arboreal – Tree-climbing.
- Astroturf – Fake grass.
- Bumblefoot – Swelling on the feet of birds, where infection enters through an abrasion.
- Carcass – The dead body of an animal.
- Colonial – Living in groups or colonies.
- Conditioning – The learning process.
- Conspecific – Belonging to the same species.
- Contagious – Carrying or spreading a disease.
- Creance – A cord secured to the leg of a raptor to prevent escape during training.
- Diurnal – Active during daylight.
- Disposition – Mental inclination, or willingness.
- Euthanase – The induction of death, with minimal pain, stress or anxiety.
- Falconry – The art of training falcons.
- Fauna – Collective term for animals.
- Foliage – Leaves, flowers and branches.
- Hard release – Release of an animal with no supplementary food and/or shelter.
- Herpetologist – One who studies reptiles and amphibians.
- Imping – A technique in which unbroken feathers from one bird are used to repair the feathers of another.
- Imprinting – Make an impression that produces an effect; in fauna, the process whereby an animal becomes too familiar with humans and/or their companion animals.
- Isolation – Complete separation from others.
- Microhabitat – Very small, isolated habitat.
- Migratory – Making regular seasonal geographical movements.
- Nocturnal – Active during the night.
- Optimum – The best or most favourable.
- Pelage – Hair, fur, wool or other soft covering of a mammal.
- Pelagic – Of the ocean surface or open sea.
- Post Mortem – Examination of the body after death.
- Precocial – Active soon after birth or hatching.
- Quarantine – The act of isolating individuals, for the duration of the incubation period of most diseases for which they may have been exposed.
- Records – Written document for the purpose of preserving evidence.
- Rehabilitation – Restoration to former health, rights and privileges.
- Soft release – Release of animal with provision of supplementary food and/or shelter for a time.
- Substrate – Material placed on a cage bottom.
- Terrestrial – Living on the ground.
- Thermoregulation – Regulation of body temperature.
- Varanid – Genus of medium to large terrestrial lizards.

Appendix A:

Facility Review

The information and questions contained in this form are a means for rehabilitation facilities and individual rehabilitators to do a self-evaluation or self review. The purpose is to provide wildlife care-givers suggestions to save time (for example, keeping reference materials at the phone), to ensure wildlife receives appropriate housing and medical treatment (exam area, caging and veterinary treatment), and to protect both wildlife and humans from disease and contamination (food preparation, disinfecting, housekeeping).

Not all items contained in the form will apply to everyone; for example, an individual rehabilitator probably does not require a grievance committee, but this form does provide an easy reference to be sure important considerations are not overlooked when changes such as facility growth occur.

Facility Review

1. ORGANISATIONAL STANDARDS

Safety

Is there a fire alarm?

Is there a fire extinguisher(s)?

Are eating, drinking, smoking, etc., restricted to designated areas?

Is there a first-aid kit available for staff/volunteers?

Are material data safety sheets (MSDSs) readily available/easily accessible for those chemicals used at the facility (disinfectants, cleansers, certain drugs, etc.)?

Telephone Services

For those providing help, assistance, and directions to the public, are protocols established to provide assistance in the following areas:

Humanely preventing or reducing wildlife problems, conflict situations, and injury?

Determining if animals and birds in fact need to be rescued?

Providing strategies and techniques to give opportunities for mother animals and birds to retrieve temporarily displaced young or to re-nest?

Suggesting safe capture, restraint and transport techniques to minimise risk of injury to animals and birds and to humans?

Procedures

Does the organisation have operational policies available to staff members and volunteers (e.g., operations manual, rules derived from Board decisions, or training materials)?

Does the individual or organisation comply with local ordinances and have current state/provincial/federal permits for the work being done?

Is there a grievance policy for staff/volunteers?

Is there a training policy for staff/volunteers?

Are there continuing training opportunities for staff (paid and volunteer) who have completed basic skills training (staff training sessions, DEC Courses, etc.)?

Is there a liability insurance policy for volunteers to protect the facility and/or organisation? Is there a workers' compensation policy for employees?

What after-hours services are available for emergency cases (on-call person, emergency veterinary clinic services, etc.)?

Are there written policies to instruct the volunteers regarding rules of the organisation as they relate to animal care, reporting procedures, rules on conduct?

Ongoing Education

Are manuals/books available on providing humane solutions to human-wildlife conflicts?

Are publications available which describe each species and its natural biology?

Is pertinent information collected on wildlife rehabilitation?

Do you collect such information and share it with other members?
Do you attend continuing education classes or conferences on wildlife rehabilitation?

2. RECEIVING AREA

Public Information

Are there written policies or procedures for staff and volunteers dealing with wildlife problems?
Do you have information available to the public on the services provided for wildlife?

Facilities

Is the reception area neat and presentable?
Is it organised so that resident patients are not subject to stress during the intake of new animals and birds?

3. EXAMINATION AREA

Is the area clean?
Is the area set up so that animals and birds can be examined safely?
Are first-aid supplies available?
Are there scales available to weigh animals and birds as part of intake and assessment?
Are animals and birds awaiting exam/treatment provided a warm, quiet and dark place?
Are facilities arranged and/or constructed to minimise stress on the animals and birds?
Are the sound and activity levels minimised to reduce stress on the animal?
Are capture and handling equipment easily accessible and in good working order? Are they used safely?
Are capture, handling, and restraint procedures safe for animals and birds and humans?
Are the people handling wildlife trained in safe handling techniques?

4. FACILITIES FOR FIRST AID/INTENSIVE CARE

Are the following available for use when necessary?
- Heat sources (hotbox, lamps, heat pads)
Is the area clean?
Is it a low-use area?
Are needed medications on hand?
Are other medications available by prescription or through supporting veterinary clinics?
Are prescription drugs kept in locked, secure location?
Is there a log for using prescription drugs?
Are emergency medications available?
Are these facilities available at a veterinary clinic if necessary:
- Experienced wildlife veterinarian/nurse?
- Anaesthetic equipment?
- X-ray equipment?
- Housing facilities?

5. INITIAL CARE FACILITIES

Do the cages meet minimum caging standards for the species handled?
Are they constructed so that they can be cleaned and disinfected (e.g. stainless steel, fibreglass, sealed wood, 'pet paks')?
Are the cages cleaned regularly (as appropriate for the species and cage type)?
Is the area adequately ventilated in an appropriate manner?
Is there adequate lighting (full-spectrum light at the appropriate hours)?
Are isolation facilities available?
Is the area away from the main flow of human activity?
Is there access to the area by domestic pets?

6. PRIMARY EXERCISE CAGING

Do they meet minimum caging standards for the species being handled?

Are they cleanable?

Is there a regular cleaning schedule?

Are they safe for the handlers and animals and birds being held (e.g. no loose or sharp wires or nails, double doors, etc.)?

Are they secure (e.g., locking, sturdy, safe from predators)?

7. HYGIENE

Is there a standard procedure and schedule for cleaning and disinfecting cages, feeding utensils, syringes, food storage containers, and food, water, and bathing bowls?

Are cleaning and disinfecting supplies available and stored properly?

Is human protective gear (gloves, masks, goggles) available?

Are instructions on the proper use of disinfectants displayed?

Is there a designated area for storage, cleaning and disinfecting of dirty items?

Is there a designated area for storage of clean and disinfected items?

8. HOUSEKEEPING & MAINTENANCE

Is there a reasonable schedule for:

- Daily cleaning?

- Weekly cleaning?

- Seasonal cleaning?

Is there a continuing program for repair and upkeep of the facility?

9. FOOD PREPARATION & STORAGE

Is the area clean, orderly?

Are adequate foodstuffs and supplies available?

Are foodstuffs stored separately e.g. fruit and vegetables not next to meat products?

Are perishable foodstuffs dated (open formula)?

Appendix B:

Animal Admission Form

Species: _____ Age (e.g. adult/chick/juv): _____

Sex: _____ Date: ID(e.g. legband #): _____

Rescuers name & address: _____

Contact number(am/pm): _____ Mobile: _____

HISTORY

Exact location animal was found (include details of what park, beach or street, in a backyard, building site, footpath, etc): _____

Date and time you found the animal? _____

What is wrong with the animal (any obvious injuries)? _____

What was the animal doing when found - i.e. - lying curled up, flapping frantically but not flying, lying on it's back, not standing, etc)? _____

Has any medical treatment been given, if so what? _____

Has the animal been seen by a vet, if so, which one? _____

Did you feed the animal? _____ If yes, what & how? _____

How has the animal been housed? (e.g.- in a box, cage, heating supplied)? _____

What else did you do to help the animal? _____

Are you willing to pick the animal up for release if needed? _____

Appendix C:

Animal Examination Form

Bird

Date: ___/___/___ Species: _____ Arrival weight _____

Case#: _____ Time _____

Body Condition: Emaciated Underweight Normal Overweight

Comments on Body Condition: _____

Age/Sex: _____

Hydration: Good Fair Poor

Attitude:

Nares: Clear Remarks: _____

Respiration: Remarks: _____

Crop: Full Empty Remarks: _____

Gi Tract/Abdm: Remarks: _____

Droppings: None Remarks: _____

Eyes: Remarks: _____

Ears: Remarks: _____

Feathers: Remarks _____

Ecto-Parasites: Remarks _____

Skin: Remarks: _____

Feet: Remarks: _____

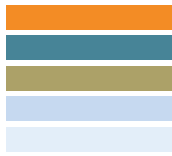
Nervous System: Remarks: _____

Musculoskeletal: Remarks: _____

Injuries/Problems (Wounds, Etc.): _____

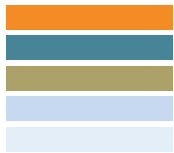
Note: BAR = Bright, Alert, Responsive _____

3-Day Assessment:



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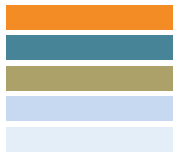
BASIC COURSE IN WILDLIFE REHABILITATION

HANDBOOK 2013

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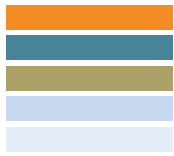
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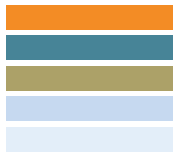
Module one: Sick and injured wildlife

Module objectives

At the end of this module, you will have acquired some basic knowledge on the following areas:

- How to transfer an injured animal safely
- Aware of potential OSH risks – bites/scratches and awareness of zoonotic disease
- Viability of the animal – knowing when and how to make a decision to progress or not.
- Immediate First Aid – an understanding of which cases need immediate care and what to do.
- Health Assessment of the animal – how to conduct a physical examination and what to look for.
- Supportive therapy – a basic understanding of what's required.
- Housing – Basic intensive care sets for birds, reptiles and mammals





1 Transfer of wildlife

Rescue of injured, sick or orphaned wildlife may be done by:

- Members of the public
- Wildlife rehabilitators
- Shire Rangers
- Department of Environment and Conservation Wildlife Officers
- RSPCA
- Veterinary Nurses
- Veterinary Surgeons

A wildlife rehabilitator should foster a positive relationship with a local vet clinic that is happy to treat sick and injured wildlife. A rehabilitator may need to visit local vet clinics to them and discuss with the vet staff (vets and nurses) if they are interested in working with the local sick and injured wildlife. Vet staff may not have the level of knowledge and skills in wildlife care in comparison to that of companion animals, but this can be developed over time and a synergistic relationship with a local rehabilitator will help this development.

The veterinary nurses in the clinic may be very keen to help the rehabilitator with the more complex cases that require hospitalisation and where the knowledge of both parties for nursing the patient back to health is required.

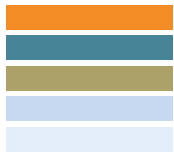
If this veterinary care is provided at minimal or no cost, the rehabilitator may want to consider ways in which they can assist the clinic staff. Offering to help with providing reading material on wildlife care, sourcing donations of disposable items or from the local hospital or GP surgery or providing specific food items for animals may be appreciated.

Most of all it is important for all parties to RESPECT each other's ideas, opinions and morals and beliefs.

Transport of wildlife to the rehabilitator

As the first point of contact, usually by phone, the rehabilitator can advise the rescuer to:

- Consider their own safety – esp. snakes, raptors, emus and large macropods
- Cover the animal with clothing/towel/dark pillow case (remove any threads or use inside out)
- Look around for “thrown” pouched young of any female marsupial
- Use an appropriate sized container for example, cardboard box/pet carry case with ventilation holes, pillowcase taped/tied securely. Tall plastic garbage bin (for echidnas).
- Secure in car for the journey (not in boot, unless absolutely necessary)
- Reduce stress – cover, turn off radio. Keep cat, dogs & children away
- Deliver to the rehabilitator or a vet clinic ASAP for triage, minimalise delays



Transport Options

- Pet pak with secure door
- Cardboard box – secure the box to avoid escape.
- Pillowcase - check for loose threads and turn inside out if necessary. This is a good option for many birds as they can injure themselves in boxes.
- Bucket with a lid and air holes
- Larger birds for example, pelicans may need to be wrapped in a large blanket and held in someone’s arms. (This may need two people, one to hold head and bill). Gently wrap the bill together to avoid injury to anyone. **It is very important to put something in-between the bills to allow the bird to breathe.**

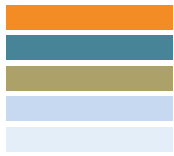
Admission Records HISTORY! HISTORY! HISTORY!

All animals have a history, even wild animals:

What is it?	I.D. species as closely as possible (“bird” is inadequate) - age, sex, if possible
Where did it come from?	Exact location a must for territorial species e.g. magpies, will kill “trespassing rivals” released into their territory
When was it found?	Date and time of day (for release work-up)
What were the circumstances?	Cat attack, hit by car, fallen from nest? etc
Has it been fed, medicated, surgery?	What is follow-up care?
Name and phone number of rescuer?	In case rehabilitator needs more information
Is it a wild animal or escaped pet?	Leg-bands, microchip, clipped wings, “talking”. Keep Lost/Found book with newspaper notices

Develop a wildlife admission/records form. This will help you maintain critical information for future use. See an example of one in the *Care of Birds* section produced by Kanyana Wildlife.





2 Occupational Safety and Health (OSH)

Zoonosis	=	Disease acquired by humans from contact with animals
Anthroponosis	=	Disease acquired by animals from contact with humans
Sapronosis	=	Disease acquired from the environment for example, soil

There are at least 200 diseases known which are transmissible from animal to human or human to animal contact.

Due to this public health significance, special consideration must be given to working in an environment where you are at an increased risk of exposure to zoonoses over that of the general population. Veterinary personnel and wildlife rehabilitators are amongst the first-line group most exposed to zoonotic possibilities.

Due to the peculiar nature of some of these diseases and their modes of transmission, diagnosis of the disease in humans and animals can often be difficult. When considering the variety of diseases which people contract from animals or animal products, or diseases which animals can contract from people, it is essential to have some knowledge of:

- The biological agent causing the disease, eg virus, bacteria, fungus or parasite;
- The animal involved: this defines the pattern of transmission of the disease;
- The mode of transmission of the disease from the animal reservoir to humans; or
- The mode of transmission of the disease from human reservoir to the animal.

In some cases animals may carry the disease without showing any signs, or transmit the disease to humans during an acute infection. The most common routes of infection are ingestion (taken in via the mouth) and aerosol (airborne) contamination.

It is important to develop safe practices for working with all animals. Wild animals present an extra challenge, as they are mostly terrified of close contact with people and are desperate to escape. Refer to each of the section for detailed information on how to handle animals.

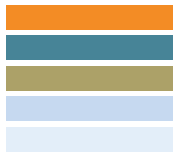
Potentially dangerous parts of animals to be aware of include:

Birds

- strong, sharp beaks (parrots) can bite
- talons (raptors) can cause serious injuries
- sharp claws on smaller birds
- large birds with powerful wings (pelicans) or legs (emus)
- long, stabbing beaks (herons) can cause eye injuries (use eye protection at all times)

Reptiles

- all reptiles have the potential to bite
- some lizards/monitors have sharp claws and whipping tails
- venomous snakes should only be approached by experienced handlers



Amphibians:

- Some species can secrete toxins. Use dampened unbleached paper towel or wear wet disposable gloves (avoid latex gloves as the frog may absorb the latex).

Mammals:

- Claws and teeth – use heavy gloves or thick towels for possums, flying foxes, chuditch, echidnas and bandicoots. Use soft leather gloves for protection from microbats.

First aid for bites and scratches to the PERSON

Animals provoked in desperate situations are capable of defending themselves with great force. The effects from animal bites/scratches can range from death to trauma to relatively minor abrasions.

The teeth, beak and nails of animals, especially carnivores may be heavily contaminated with potential pathogens. Even the smallest scratch should not go untreated.

The skin is the largest and most effective barrier against the transmission of pathogens into the body's system. If the integrity of the skin is broken, micro organisms have an access point into the body and infection can enter your system.

The bite or scratch of an animal can transmit many infectious diseases. There are a number of specific local and systemic infectious diseases that must be taken into account following an animal bite. If an animal bite does not penetrate the skin contusions may be the only trauma. Bite wounds that do penetrate the skin are usually going to be contaminated by pathogenic organisms in large quantities. There is also the potential to be exposed to tetanus, therefore it is important to maintain a current vaccination against tetanus.

It is recommended that the person treating the wound should wear disposable gloves.

All wounds must be cleaned as soon as possible after any trauma. Early cleansing reduces the chances of bacterial infection.

In the event that someone is bitten or scratched:

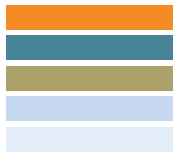
- Stop bleeding using direct pressure on the wound
- Gently flush wound in warm running water
- Apply antiseptic (eg. Betadine)
- Cover wound with dressing to prevent further contamination
- Seek medical attention for a deep wound, especially onto bone or into a joint and for any scratches or bites from bats

Bacteria from the teeth and claws of carnivores/predators may require more aggressive treatment e.g. a course of antibiotics.

Reptile's skin can harbour many pathogens. Always wash your hands after handling a reptile and in between handling individual reptiles. Maintain good standards of hygiene.

Principles of zoonotic disease prevention





Immunisation

Any person directly involved in working with animals should have a current Tetanus vaccination. If you care for any bat species it is highly recommended that you are vaccinated against Rabies Virus.

Hand washing

This simple procedure is a highly effective personal hygiene measure used to reduce the risk of infection by the faecal oral route. Hands should be washed before handling animals, animal feed, bedding, and enclosure furniture. It should be done after cleaning, waste handling, handling objects potentially contaminated by the animal and the animal itself. Even if gloves have been worn during handling hands should still be washed. Detergent and hot water are extremely effective against killing the majority of zoonotic pathogens.

Disinfectants

A working knowledge of the correct disinfectants to use in the presence of a zoonotic disease is required. This ensures that the cleaning component of the husbandry routine will be effective. Consideration must be given to the occupational health and safety aspects of the selected products and the effect this can have working with such products. Educating yourself in appropriate handling of chemicals is essential. In addition, knowledge of the effects that the chemical may have on the animals in the immediate area is essential for their well being.

Aerosols and droplets

High-pressure hoses when used to clean areas can create infectious aerosols and droplets. In addition to this it creates a potential environment for cross contamination within animal holding areas. Occupational exposure to the most common infectious agents e.g. Salmonella, can be safely managed using commonsense practices and good personal hygiene. If you are handling a known infected animal this constitutes a higher risk of exposure by aerosol transmission and you should take more stringent protective measures. The simple practice of collecting and disposing of the bulk of faecal matter prior to hosing is effective in decreasing the volume of contaminated aerosols. The correct use of the hose nozzle allows one to direct the water spray to avoid unnecessary splashing.

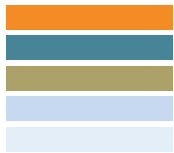
Protective clothing

Coveralls and gloves should be used during the cleaning of cages. In situations where a known zoonotic disease is present, additional protective measures should be taken. This may include the use of eye protection and/or facemasks and these may become compulsory attire as a part of a protocol when working in the area.

Protective equipment

Restraint gloves of a quality that affords protection to the handler are essential. Nets in good condition and strong enough to hold the animal must be available. Petpaks, crates, hessian bags, calico bags etc must be checked and maintained to ensure the animal cannot escape and subsequently become a potential danger to the handler.





Food preparation areas

When possible food preparation areas for animals must be separate from areas where food is prepared for human consumption. Cooked and uncooked foods should be prepared in separate workstations. Humans must not consume the food prepared for animals. In areas where meat products are prepared, hot water and detergent must be available to clean all chopping and knives. Separate chopping boards should be used for meat, fruit and vegetables.

Cleaning and quarantine at home

It is good practice to have a separate assessment area for new arrivals that is away from where you house your current wildlife cases. Ensure that your hands are washed after handling all wildlife, particularly in-between assessing or treating individuals of the same species and especially after handling reptiles. Antibacterial gel in a pump container works well in between handling animals. Change your top if you have contaminated the one you are wearing. Quarantine should be considered to avoid the transfer of any infectious diseases.

Consideration should be given to setting up a dedicated set of tools for cleaning each cage, hotbox, enclosure or aviary. This may include dustpan and brush sets, scrub brushes, rake and any other equipment necessary. These cleaning tools are used for the animals in that enclosure only and are to be cleaned and disinfected at the end of that period.

All food and water bowls must be thoroughly cleaned with detergent and hot water in the first instance. Once the dishes are cleaned, they can then be soaked in a disinfectant solution for a minimum of 10 minutes, rinsed in fresh water and left to dry.

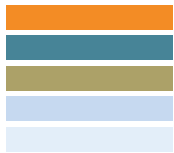
General cleaning: Disinfecting is not required for day-to-day cleaning when an animal is in the environment or is being immediately returned to it. In many cases it can be quite stressful. Consideration must be given to how much cleaning is done versus the stress it may cause to the animal. This stress can be due to the invasion on the animal's space and also the loss of its own scent in the environment. Maximise the opportunities to clean when the animal needs to be caught up and taken out of its cage for any other reason.

Quarantine cleaning: At the end of an animal's stay, everything that has been used for housing the animal including the cage, perches, hides, climbing structures, nest boxes must be cleaned and disinfected. Place the items out in the sunlight for drying.

Animals with infectious diseases: If you suspect, or have confirmation, that an animal in your care is carrying an infectious disease you must isolate the animal and place it in a "quarantine" environment and, and all items required to care for the animal from any contact with other animals in your care. This may include setting up a separate area away from the other animals. You must take extra precautions when you work with the animal to avoid transferring any pathogens to the other animals.

If a separate environment is not possible due to facility restrictions you must ensure that a full set of dedicated cleaning and handling tools is kept aside for that animal. You should consider your routine and make every attempt to work with the animal - cleaning, feeding





and treating – after you have cared for other animals. Wash your hands, change your clothes and wash all items separately after working with animals that are in isolation.

Common zoonotic diseases

It is beyond the scope of this manual to cover information on all the diseases you may come into contact with whilst working with animals.

See Appendix A for specific information on common/important zoonotic diseases.

Viability of the animal

That is a very important question.

The main difference between wild and domestic animals is that the “Law of The Jungle” allows only the strongest to survive in the wild. Therefore, most wild animals are in peak physical condition and exhibit no congenital abnormalities that would interfere with survival.

Those animals that do not fall into this category fail to attract a mate and pass on their genes, are preyed upon, rejected or killed by their own kind, die and are “recycled” into the food chain, or come into care via human intervention at a vet clinic or wildlife facility.

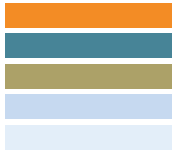
Good care can keep an animal alive until it makes a full recovery; however, unless a wild born animal is fully functional, it is considered **non-viable for release**. Inability to see, dig, a bird that can't fly or comprehend danger, imprinting on humans and being unable to recognise natural food means the animal should not be released.

Many species of wild born animals have life spans of 20 plus years and life in the close presence of humans may be highly stressful and can result in immune system breakdown. Hard decisions need to be made, sooner rather than later to prevent undue misery and suffering. Constant assessment of each rehabilitation case, at every step of the process, is our ethical responsibility.

Where an animal in care is determined to be unsuitable for release but a case can be made for it to remain in captivity, the rehabilitator is legally obligated to contact DEC Nature Protection Department for an assessment by a Wildlife Officer. The case may also require a medical report by a Veterinarian. There is a variety of Legislative Acts that provide for wild animals to remain in captivity.

All **notifiable species** (those listed by the Department of Environment and Education) must be made known to a DEC Wildlife Officer when a Rehabilitator cares for them. DEC must be notified prior to a decision to euthanasia, where humanely possible.

There are no “owners” to pay the bill and your resources are best spent on viable cases. This is the downside of caring for wildlife and it's ironic that those people who care the most about wildlife are faced with making these necessary judgements. Currently there are no official statistics on survival rate of rehabilitation, but anecdotal evidence from experienced rehabilitators suggest that 50% success is considered good. This does not include success of release – just those animals that survive in care.



Care of sick and injured wildlife

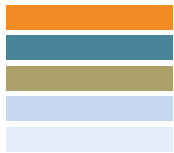
Fortunately, there are rewards that far outweigh the negatives; otherwise no one would care for wildlife. Releasing an animal back to the wild after nursing it back to health is one of those special moments that will stay with you for the rest of your life.

Time is not on our side. After recovering from injuries etc, the animal needs to build up its strength before release. Long term cases, other than hand-rearing young, often succumb to complications due to the stress of captivity. Rather than put an animal through this trauma, with no guarantees, euthanasia is often the kindest choice. Only experience with successes and failures will teach you when to decide on euthanasia. Other colleagues who work on wildlife may have useful experiences and it is always advisable in borderline cases to refer to someone else e.g. veterinary staff for additional information.

Networking with veterinary staff and wildlife rehabilitators constantly allows us to review our techniques and management practices, which will reduce the number of animals suffering in spite of our care.

Often animals present with very few external signs but fail to respond to treatment because of the irreparable damage sustained to internal structures. Performing post mortem examinations is educational and can support your decisions and provide a database of normal anatomy for the various species.





Small birds	cervical dislocation
Larger birds	skull fracture
Reptiles	skull fracture or decapitation. Do not freeze any reptile. This is not a humane option
Amphibians	stun first prior to decapitation.
Small-mammals	cervical dislocation/skull fracture

Eutha

nasia

The preferred method for euthanasing an animal is by overdosing it with an anaesthetic drug. Veterinary staff must perform this procedure. However in some situations when a vet clinic is not open or you are not near a vet clinic and an animal is obviously suffering you may need to euthanase using a more physical method.

These guidelines are taken directly from ANZCCART Euthanasia of Animals for Scientific Purposes 2001 (Under Review).

If you hold a current firearms licence shooting a large animal is often the most humane option. The Wildcare Helpline can also provide advice and guidance.

If the animal is a known endangered species you must contact DEC to notify them that you have the body and you may be required to submit the body to DEC for an authorised post mortem.

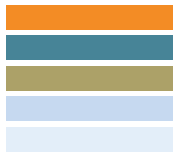
Post mortem (Necropsy)

There are two very important reasons for performing post mortems on wildlife cases.

- 1 To determine cause of death and consideration for potential “disease outbreaks” that could threaten that species.
- 2 To learn! There is nothing more valuable as a learning tool than being able to practice many times over the practical skills that you require dealing with small complicated anatomy. Examples of this include recognising air sac locations, size and location of crops and stomachs. You can also practice stomach/crop-tubing techniques on dead animals.

In addition to these practical skills you can achieve a far better understanding of the anatomy of an animal if you open it up and look at how and where organs sit.

If **your local veterinary clinic** is involved in a case with you, the staff may be interested in performing the post mortem together. If you want to submit samples of tissues to a



laboratory to have diagnostic histopathology performed you will need to consider the cost of this.

Significant wildlife health issues

Management of wildlife in WA is vested with DEC. DEC should always be advised of significant wildlife health issues and any domestic wildlife health issues that have the potential to impact on wildlife and biodiversity.

The Australian Wildlife Health Network coordinates the communication of wildlife disease information nationally. Each state has an AWHN coordinator. To contact the WA AWHN coordinator, visit www.wildlifehealth.org.au. The Commonwealth Department of Agriculture, Fisheries and Forestry (DAFF) and the Department of Agriculture and Food WA (DAFWA) are responsible for investigation and control of diseases which may affect animal production, food safety and trade. In addition these Departments make contributions to protection of human health and biodiversity. In most cases the AWHN coordinator will undertake further communication within DAFF and DAFWA on any cases of note.

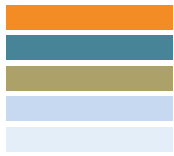
Certain diseases are notifiable and the National and State notifiable disease lists can be found on the DAFF and DAFWA websites: www.daff.gov.au and www.agric.wa.gov.au. If one of these diseases is diagnosed or suspected it must be reported to the Chief Veterinary Officer for WA. This can be done through any DAFWA veterinary officer, or by making a submission to DAFWA's Animal Health Laboratory.

A number of notifiable diseases and poisoning events can affect a range of species including production animals, wildlife and humans. **Disease presentation can vary widely**. For this reason, all health events in wildlife that are **significant, unexpected and unusual** must be reported to DEC and DAFWA.

Wildlife are the natural host of diseases such as avian influenza, Newcastle disease, West Nile virus, Hendra virus, rabies and Australian bat lyssavirus. Elsewhere in the world, wildlife can be a major reservoir of bovine tuberculosis. Wildlife can be important indicators of poisoning events. Laboratory investigation by DAFWA is desirable in most cases of significant wildlife health events. Contact your state AWHN coordinator if such a disease is suspected.

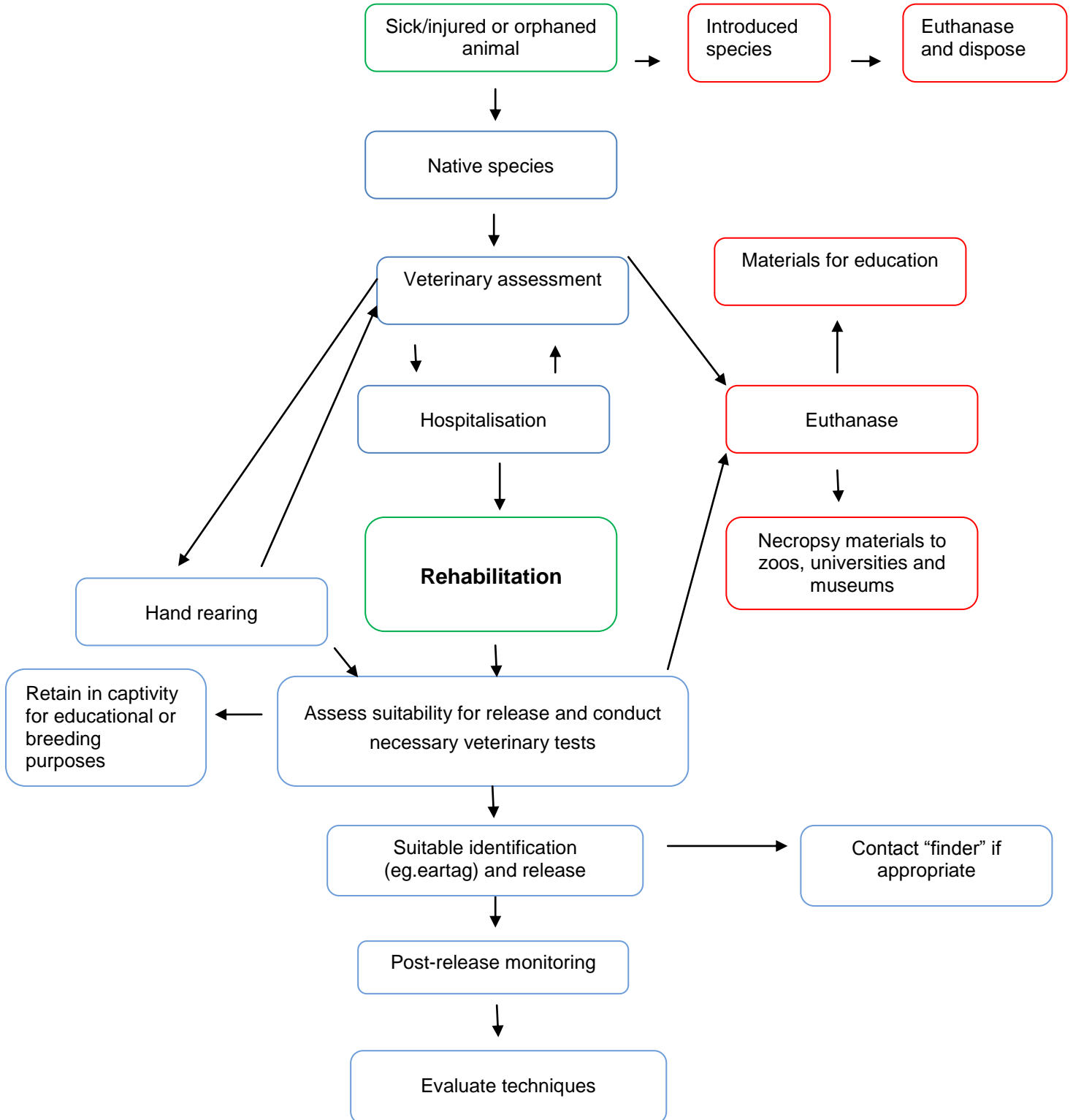
Care of individual injured or sick animals remains the task of wildlife refuges and wildlife carers registered with DEC and with support from their veterinary service provider.

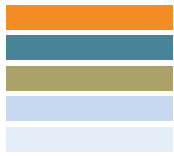




Flowchart of wildlife rehabilitation procedures

Copy from Rehabilitation and Reintroduction of Native Fauna. Wildlife Proceeding 233 Post Graduate Committee. with permission from Erna Walraven.





3 Immediate first aid

Vital signs of life need to be assessed as a first priority.

- Wildlife species are usually stoic. They hide signs very well to avoid being picked off by another animal. Sometimes it will take time and distant observation to determine if there is a problem. However... if there is a life threatening condition, this must be addressed as soon as the animal is in your care. Otherwise, you may not have an animal to care for.
- Is it breathing? What is the quality, and gross sounds of breathing? This should be assessed prior to handling the animal as an observation, even if you simply listen to the sounds coming from inside a box/pillowcase. Any animal's heart and respiratory rate will alter after it is exposed to the stress of handling. Respiration should return to normal after 3-5 minutes of handling. If increased breathing sounds are obvious, consider if the animal's upper respiratory system is blocked with blood or mucous. A gentle swabbing of the mouth with a cotton bud may remove blood and mucous.
Only experienced snake handlers should work with venomous snakes.
- Heartbeat - does it have one? The heart can beat without an animal breathing for a period of time but the heart will eventually stop if it is not breathing.
- In mammals and birds, the colour of mucous membranes (MM) will give you some indication of circulatory health. Normal MM colour may be pink to pale. An overheated mammal may demonstrate very red coloured MM. A mammal that is having difficulty breathing may have very pale to blue tint MM. In birds, it is best to check around the sclera (eyes) and the commissure for MM colour. MM colour is not reliable as an indicator of health in reptiles. Some reptiles may demonstrate a brightly coloured oral cavity e.g. yellow. This is a defence mechanism and should not be confused with a clinical condition.

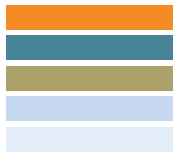
Hypothermia

This is described as the core body temperature falling below the normal range. Clinical signs of hypothermia may include cold to touch, unresponsive, unconscious, trembling, slow heart rate, pale mucous membranes (MM). Animals that are hypothermic need to be warmed up as quickly and stress free as possible. A warm room is a good start.

A good quality hot box with a thermometer probe is an essential item for small animals. If the animal is too big or destructive for a hot box, you can place it in a secure holding box (petpak) with an infrared heat lamp angled through the door. When providing any type of external heat a maximum/minimum thermometer should be placed in the environment to monitor the temperature as it increases.

All reptiles are ectothermic and rely on the external delivery of heat or shade to allow them to thermo-regulate. They cannot regulate their own body temperature. It is important to know what the preferred body temperature is of a species you may have in your care prior to addressing hypothermia. Refer to the section on Care of Reptiles for additional information.





Hyperthermia

This is described as the body temperature rising above its normal range. This occurs when the animal has been exposed to heat or is overheated as a result of exertion or stress.

Clinical signs of hyperthermia include muscle twitching, seizures, panting, open mouth breathing, wings held away from body (birds), bright red MM, trembling and collapse.

Rapid action must be taken if an animal is showing signs of heat stress. Conversely, care must be taken not to plunge the body temperature too quickly as the circulatory system may collapse. Remove any source of heat directly affecting the animal. Place the animal in an air-conditioned room if possible or use fans to move cool air toward the animal.

More aggressive steps include placing cool wet towels over extremities and ice packs can be wrapped in a towel and placed in-between legs of macropods. It is very important to continually monitor the animal's response and body temperature.

Shock and dehydration

Shock occurs when there is failure of the body's circulation to provide blood supply to the tissues.

All animals that come into care should be assumed to be in shock and treated with supportive therapy. Supportive therapy that can be provided by the rehabilitator include providing heat, quiet stress free environment and providing oral fluids (if this is not too stressful).

Signs of shock include: collapse, hypothermia, increased heart rate, increased respiration, pale MM (mammals), head nodding, closed eyes, fluffed feathers (birds).

The simple process of handling an animal in shock can be enough to kill it. Provide supplementary heat and a dark quiet environment and check on approximately every hour for signs of improvement. Do not overly disturb the animal..

Always assume that injured wildlife presented to you will have some degree of dehydration. A wildlife rehabilitator can provide supplementary oral fluids. Please refer to "Caring for Sick/Injured Animals" for more details on this process.

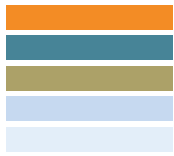
Managing haemorrhage

Haemorrhage (bleeding) may internal or external. There is little that you can do for internal bleeding other than support and observe. Internal bleeding can be difficult to detect without the use of diagnostic tools.

External haemorrhage is bleeding on the body surface. In very small animals, even a few drops of blood may be too much and prove fatal.

In the event of haemorrhage you should:

If the bleeding is in a spot where bandaging is not an option, provide digital pressure by pinching the apposing sides together for a few minutes.



Care of sick and injured wildlife

Alternatively stem the blood flow by placing a wad of gauze over the site and bandage this into place firmly. (Birds need to expand their chest to breathe - do not bandage too tightly). If possible, avoid the use of cotton wool as it sticks to the site.

If toenails are bleeding a cake of soap scraped against the nail, leaving a wedge of soap plugging the bleeding capillary is effective. Potassium permanganate, ferric chloride or pepper also works well to stop bleeding. Broken pin/blood feathers may bleed profusely. Options here include clamping the shard feather until the bleeding stops. Feather plucking is extremely painful and should be done only if essential. In some cases the bird requires an anaesthetic to do this. Always pull feathers in the direction of growth.

Fractured bones

First priority - get the animal to a vet as soon as possible.

An open fracture is when the bone sticks out through a wound in the skin. This type of fracture requires immediate veterinary attention due to the increased risk of infection and the degree of pain. The rehabilitator can perform initial first aid prior to taking the animal to a vet clinic (warmth, quiet environment, oral fluids). If the animal is small you will need to take care in restraining it as you may cause additional damage to the area. Sometimes this is impossible to avoid. It is preferable not to stabilise or dress the fracture unless you are experienced.

Analgesia and other medications

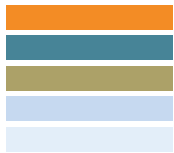
After an initial assessment, if the animal injury constitutes some degree of pain then pain relief must be considered. This will need to be assessed and administered by a veterinarian. Veterinarians can also provide additional fluid support and antibiotics as required.

Nutritional needs

Many animals may require supportive feeding as a part of their first aid care. Neonates may need to be fed soon after they have arrived in your care and been assessed. All animals should be warmed to their correct body temperature prior to being fed.

Birds and small mammals with a rapid metabolism such as nectar feeders may show signs of trembling, seizure or collapse. This can be associated with hypoglycaemia (low blood sugar) if they are not given a high-energy supplement when required.





4 Health assessment of an animal

Wild animals will always classify some “other” animals as dangerous and a threat to them. Humans fall under this category. Therefore it is important to be efficient in your assessment and any future handling of an animal. Do not unnecessarily disturb your patient. The more time spent handling it and treating it, the longer any recovery will take. Do not pat, pet, stroke or encourage any human contact. This is very stressful for the animal and may lead to human imprinting in orphaned young animals.

There are reasons you should consider what you are wearing when you assess an animal. Always consider the quarantine aspects of handling wildlife and the risks associated with contaminating your clothing and other animals in your care. Neutral colours blend in with the environment and may, in some small way, decrease the amount of stress the animal is experiencing whilst being handled and examined.

Prior to disturbing the animal, place the transport carrier on a set of scales and note the weight. When you remove the animal for an assessment, weigh the empty container and calculate the difference to give you your weight.

Weigh your animal and record this weight. This is very important if the animal stays in your care for any length of time as losses of body weight become significant.

When an animal is first removed from its transport container check to see if there is anything in the bottom of the cage/bag e.g. blood, faeces, urine, and vomit. If you have concerns about parasite burdens, you may wish to discuss with your local vet clinic the options for testing the faecal sample.

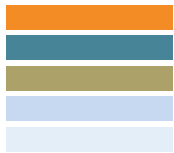
If it is possible, in the first instance observe from a distance. Set up an environment for the animal and spend some time watching it. Move on to a hands-on examination and assessment after observations.

What do we look for when we assess a BIRD?

Consider the anatomical adaptations specific to the well being of that species. e.g. missing or seriously broken limbs (particularly major wing bones), crushed beaks, damaged mouth. These can be irreparable and euthanasia may need to be considered on the grounds that the animal will not be able to function.

Before handling the bird:

- A healthy bird would generally be alert and may be aggressive when handled. Wild birds that appear quite “calm” should be considered to be in a state of shock.
- Determine its age. A rough idea e.g. very young, juvenile, sub-adult or adult. Does it look young? Plumage can tell you a lot here. Invest in a good bird identification book
- Respiration rate will increase when a bird is handled. Character and sounds of respiration are important. Gurgling, clicky sounds are abnormal, and may be heard without having to handle the bird
- Look at its posture. Are the wings symmetrical and evenly tucked in? Can it stand on both legs? Does it position its feet normally? Is the bird “fluffed up”?
- While handling the bird:



Care of sick and injured wildlife

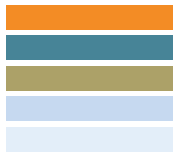
- Keep initial handling quick, quiet and efficient. Remember that the bird is likely to be in shock and excessive handling may cause rapid deterioration.
- What body condition is it in? Get a feel for the musculature over the keel area. Some wild birds naturally have a more protruding keel, however generally birds in good condition should have rounded muscle either side of the keel.
- Air sac rupture may present directly under the skin, this can feel like a soft bubble. Seabirds have natural pockets of air more directly under their skin. This is normal and is for buoyancy control and protection from diving hard into the water or landing. Don't confuse this with ruptured air sacs.
- Blow the feathers gently and expose the skin to observe for bruising. In addition to obvious discoloration of bruising you may see yellow and green bruising indicating trauma of greater than 2 days old.
- Eyes, sinus and nose all communicate with each other. The eyes should be open, clear and centrally positioned. They should be moist and shiny without discharge. Dehydrated birds may present with dull eyes and "dry looking" skin.
- Nares (nostrils) should be clear of crust and discharge. They should be open, and the same size.
- Beak should be symmetrical and evenly apposed.
- Oral cavity: any abnormalities can result in the bird not being able to eat? Is the tongue intact? Are there plaques, lumps or discharge in the mouth?
- Does it have lice, ticks, mites or flat fly? Blow the feathers to note lice. Check around the eyes for ticks. Waterbirds e.g. swans may have flat fly burdens. A healthy bird will tolerate a parasite burden; an unhealthy bird can be compromised even further.
- Waterbirds should be checked for fishing line or evidence of hooks around the beak. Do not pull on any line that is coming from the mouth unless you determine it is just hooked in around the mouth. It may be attached to a fishing hook that has been swallowed. It is recommended that any sick waterbird be referred to a vet for Xray to check for internal fish hooks.
- Is the cloacal vent area soiled? This can indicate diarrhoea, inability to preen itself (weak), or that it has been on the ground for a while.
- Does it have a full set of toes and toenails? Condition of feathers should be assessed. Are they untidy, abnormal feather growth, any bald areas, broken, soiled, worn? Any material on them eg oil, blood. Birds spend more time per day on feather maintenance than on eating; therefore feather disturbance may be a clue to injury.

What do we look for when we assess a REPTILE?

If you do not know the preferred body temperature of the reptile in your care, use the range of 25-30°C as a general rule. Find out the correct temperature required as soon as possible. See "Care of Reptile" section.

Consider the anatomical adaptations specific to the well being of that species. e.g. missing limbs, crushed head with no viable tongue. These are often irreparable and euthanasia may need to be considered on the grounds that the animal will not be able to function.





Freshwater turtles

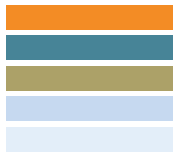
- Is it alert or depressed? Can it lift its head? Can it lift its body up by its legs and move around? How quick is its withdrawal response of head and legs when disturbed?
- Nostrils should be clear of crust and discharge. They should be open and the same size.
- Eyes should be free to open, clear and shiny. There should be no swelling on the eyelids or around the socket of the eyes.
- Is its mouth closing evenly? Check for necrotic (rotten) areas in the mouth. Check for fishhooks.
- Do the carapace (top shell) and plastron (bottom shell) appear normal? **Care should be taken when handling turtles with fractured shells, as it is possible to inflict more harm if pieces of shell are dislodged.** Check it for damaged scutes and fractures. The shedding of scutes is a normal physiological process that should not be confused with shell damage. A vet must examine all turtles with fractured shells.

Snakes

Only an experienced person should handle/restrain venomous snakes for examination.

Wash your hands prior to handling a snake to ensure that you do not get mistaken for “food” if you have other animal smells on you.

- If the snake is quite big and “active” you may need two people to safely handle it. You will need to assess its overall movements to give you some idea of its neurological function.
- How is its muscle tone? A healthy snake will retain its coil and will stretch out to investigate its surroundings. An unhealthy snake will feel flaccid, limp and may have a “sunken in” look to it. Generally, a snake in good condition will have muscular tone and a rounding of muscle with no signs of spinal bones. Confirmation of body condition with the assistance of an experienced herpetologist is useful.
- Does it have any lumps on its body?.
- Tongue flicking is a natural behaviour and is the snake’s mechanism for picking up scent droplets. This is a healthy behaviour. Hissing may indicate aggression.
- Nostrils – clear with no retained scales or discharge. Check for snout rub marks. This could indicate the reptile has been kept in captivity.
- Eyes should be symmetrical and look bright. A cloudy or dull appearance will indicate the snake is in pre-slough or it may have retained spectacles. See “Care of Reptiles”.
- Open the snake’s mouth by holding the snake behind the head and gently pulling down under the lower jaw. Support the rest of the body in a bag as you open the mouth.. Check for discharge, plaques or trauma in the oral cavity. Is the tongue intact?
- Scales – are they dull and slightly opaque looking? If a snake is in pre-slough it is preferable not to handle it. The snake at this time is physiologically vulnerable and all of its senses are impaired and this can lead to uncharacteristic aggression. Handling



a snake in pre-slough can lead to disrupting the process of the slough and damaging new scales.

- Are there damaged scales –wild snakes may have damaged, but healed scales from prey hunting. If scales are damaged but there are signs of inflammation and tenderness, this is not normal. Check for ticks and mites on the scales. Check the ventral (underbelly) scales for signs of burn or haemorrhage
- Cloaca – the normal cloaca should be a closed slit, free from dirt, faeces, swelling, and discharge.

Lizards/dragons

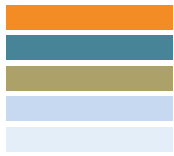
- Can it lift its head up? Can it lift its body up by its legs and move around? How alert is it? Does it show interest in its surroundings? Is it defensive or aggressive?
- Good body condition is noted by muscle tone and a rounding of muscle with minimal protruding hip bones or vertebrae along the tail
- Does it have any lumps on its body?
- Lizards and dragons will often puff out their body to appear larger and look more threatening
- Eyes should be free to open, clear and shiny.
- Nostrils should be clear of crust and discharge. They should be round and open and the same size. Frothing and blowing bubbles from the mouth is not normal and can be a sign of respiratory infectious disease. Place this animal in isolation immediately from all other reptiles. Consult a veterinarian.
- Mouth – to open the mouth (in all blue tongue lizards) place fingers over the nostrils and the mouth will open. Is the tongue intact? Any discharge/plaques/trauma in oral cavity?
- Are there damaged scales? Check for ticks and mites on the scales and around the ears. Check the ventral scales for signs of burns or haemorrhage.
- Check all digits for retained slough that may have a tourniquet effect on toes. Moisten and gently remove the retained slough from digits. You may notice the loss of digits in wild lizards and this is often due to retention of scales during a slough and subsequent constriction of the digit. They manage well without them.
- Cloaca – no protrusions, dirt or discharge

What do we look for when we assess a MAMMAL?

Consider the anatomical adaptations specific to the well being of that species. e.g. broken hind legs or tails on large macropods; damaged beak in echidnas; and damaged prehensile tails in possums. These are more often irreparable and euthanasia may need to be considered on the grounds that the animal will not be able to function.

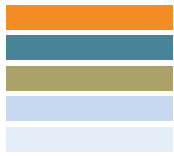
- Respiration - observe from a distance – character, unusual sounds? Is it distressed? As soon as it knows you are there, its respiratory pattern will change.
- What is its demeanour like? Alert and responsive or dull and unresponsive? Stress indicators in macropods include a “shocky” type of stare and wet forearms. If a macropod is presented to you in this state initially determine that it is not





hyperthermic. Treat according to the notes in “Immediate First Aid” and action must be taken to alleviate its stress. Place it in a quiet dark area with cooling or warmth (depending on its status) and observe from a distance for an hour. You may need to intervene sooner than this if it is obviously deteriorating. Seek veterinary attention.

- Is it co-ordinated? Normal posture? If it is a larger macropod species, ensure it is not going to injure itself if it is incoordinated. Use of hay bales and hessian to corner if off in a quiet spot can be considered. An empty shed with no sharp objects inside may be considered as an option.
- General body condition can be difficult to assess in mammals. It is preferable to weigh and refer to a recommended weight range for that species. However, a good hands-on examination will give you an idea if the mammal is in reasonable body condition.
- Look at its fur. Is it matted anywhere? This may indicate that there is a wound beneath the fur, or it has been in the mouth of another animal (cat or dog).
- Eyes – should be open, bright and free of discharge. Do the pupils react to light?



5 Specifics

Caring for sick/injured wildlife

Tender loving care that we lavish on our companion animal cases must be avoided at all costs when caring for wildlife. The exception to this is hand rearing orphaned mammals at a time when bonding and physical contact makes up for an important part of their psychological well being. This must be monitored and the introduction of a “mate” at the appropriate stage of hand rearing is essential. See Care of Mammals.

It is important to remember that whilst you cannot provide lots of hands-on care of sick or injured wildlife, there are many aspects of nursing care that you can put into use. This can have an impact on the length of time that an animal is in your care. Wildlife may present in an advanced state of ill health. Their natural biology instills on them “survival of the fittest” therefore they will be stoic in their health decline until they are often seriously compromised.

It is essential that you are able to source some information on the natural biology of a species if you are going to care for it. You will need to know the appropriate way to house, handle and feed the animal. Refer to each of the Sections on Caring for Birds, Reptiles and Mammals in this manual

Birds

Birds fluff their feathers in an attempt to conserve body heat. Sick birds do not maintain their body temperature therefore they often look fluffed up.

Ambient temperature to house most sick adult birds is 31 – 33° with a relative humidity of 50 – 70%.

By providing a warm environment we take the workload away from the bird and it can concentrate its energy on recovery and healing. If the environment is too dry we may risk further dehydration of the bird. Choices of oral hydration include:

Oral fluids

Assume new bird patients are 5-10% dehydrated.

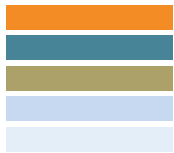
Fluid choice: Spark , Vytrate or Lectade - follow instructions for dilution rates. Pedialyte or Gastrolyte can be purchased from the local chemist and are also as effective but are flavoured and are expensive in comparison.

Small birds - you can try to encourage voluntary drinking by dipping its beak in a shallow bowl of water. If it does not drink you may need to provide fluids from a syringe or eye dropper. Tilt the head back **slightly** and gently place a drop on the tip of the beak. Observe for swallowing and stop immediately if the animal coughs or splutters. Crop tube or gavage delivery is suitable for most birds but should only be done by an experienced person.

Fluid therapy administered orally can be given at the following rates:

- Bird with a crop – 20ml/kg (e.g. parrots, fowl, pigeons, doves)
- Bird without crop – 10ml/kg (e.g. magpies, honeyeaters, frogmouths, waterbirds, cuckoo shrikes)





Care of sick and injured wildlife

- In general, we have found that birds will tolerate greater volumes than this – closer to 5 - 10% of bodyweight (ie 5-10ml per 100g body weight) can be provided slowly, always observing the bird. In practice, oral fluid therapy should be limited to a maximum of 3 times a day to avoid stressing the bird. Generally, twice a day is adequate.

Waste material

You can tell a lot by looking at bird's droppings. Small birds will defecate more regularly than larger birds. Faeces consist of three parts in birds; faeces (green or brown), urates (white to creamy white) and urine (clear and watery). The consistency varies with species and will vary according to what you feed a bird when it is in your care.

- An important non-invasive observation tool is recognising normal versus abnormal faeces.
- Diarrhoea – faecal (green/brown) part is more runny than normal
- Urine should only extend a few mm past droppings. Anything more than this may be excessive and could indicate stress, or some underlying disease .

These observation skills come with time.

Respiration

When caring for birds it is important to understand how they breathe.

Bird lungs do not expand and contract like mammal's lungs. Air is pushed through the lungs by the expansion and contraction of the balloon-like air sacs located throughout the body, especially in the upper and lower abdomen.

- During restraint, care must be taken to avoid compressing the air sacs so the bird can't breathe.
- Bandaging the body with contracting material e.g. conforming crepe bandage can compress the air sacs and impair respiration.

Internal and External Parasites

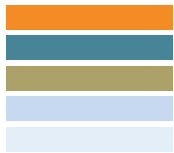
Many wild birds presented to you will have a burden of ectoparasites. Whilst a healthy wild bird appears to be able to cope with parasitic burdens, an immuno-compromised bird may not cope as well. For lice and flat fly you can use a standard bird lice powder. Apply sparingly and wearing gloves rub the powder through the feathers. Ticks can be found around the eyes and commissure in many birds. These can be gently removed with forceps.

Internal parasitic burdens can also be extremely debilitating for some birds. Your local vet clinic may be able to check faecal samples for parasites for you.

Pain in birds

It is not always easy to identify signs of pain in birds. Possible signs include:

- collapse, less response to humans



- Increased aggression
- Increased respiration
- Abnormal posture, locomotion
- Spending additional time on cage floor
- Picking, plucking over painful area

There are a number of drugs that are being routinely used for analgesia (pain relief) in birds. Discuss signs of pain you are observing with the veterinarian and they will be able to discuss pain relief options with you.

Other medications

Your veterinarian may prescribe other medications (eg antiparasitic drugs, antibiotics) for specific illnesses.

Reptiles

One of the most important aspects of caring for a sick reptile is ensuring it is kept at its preferred body temperature (PBT) in an optimum environment. *Please refer to the “Caring for Reptile” section for detailed information regarding husbandry requirements for reptiles in care.*

Reptiles are ectothermic - they regulate their internal body temperature by moving between hot and cool areas in the wild.. It is difficult for a reptile to dissipate heat so it is important to provide a small temperature gradient for sick/injured reptiles. .

As a general rule most reptiles will function in a temperature range of 25 – 30°. However, it is important to source the correct PBT as soon as possible.

Sick reptiles benefit from being in an environment with approximately 3-6° gradient from one end of their “holding box” to the other. At the heated end aim to keep the temperature approximately 3° higher than the reptiles preferred body temperature (PBT). The mid range in the box will be their PBT and the cooler end ranged down by a only one or two degrees. If a reptile is in your care and is very sick, the increased temperature improves metabolic activity and this will assist in the healing process.

Healthy reptiles should always be provided with a full temperature gradient.

Oral fluids

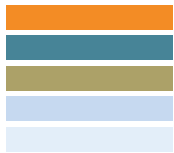
Assume 5-10% dehydration in the new reptile patient.

Many reptile species, can be soaked in a shallow bucket or container with a volume of warm water or misted to begin the process of improving or correcting hydration.

Vytrate or Lectade are the preferred choice for oral rehydration - follow instructions for dilution rates. Pedialyte or Gastrolyte can be purchased from the local chemist and are also as effective but are flavoured and expensive in comparison.

Stomach tube delivery of electrolyte solutions is good option in reptiles. If the reptile is kept at its preferred body temperature (PBT) warm oral fluids are taken up very quickly by the body and will have a positive impact on hydration. Oral fluids also promote gastrointestinal





activity. Disadvantages of providing oral fluids by stomach tube include the stress of administering, poor uptake if the reptile is not at its PBT and the potential to regurgitate the fluid.

The oesophagus is quite large in size as food that passed down it is often consumed in large sized pieces. You can pass a lubricated rubber tube down the oesophagus to give oral fluids. You may need a person to help restrain the reptile first and ensure you place a rubber mouth gag (piece of rubber tubing works well) to avoid the reptile biting down on the tube and swallowing it.

Fluid therapy administered orally can be given at the following rates:

Snakes & lizards	1 – 2 % bodyweight (ie 1-2ml per 100g body weight)
Turtles	2 – 3 % bodyweight(ie 2-3ml per 100g body weight)

Do not exceed this amount.

In practice, oral fluid therapy should be limited to a maximum of once a day to avoid stressing the reptile.

Soaking works very well for turtles. They may drink the water at the same time. Place a turtle in a container (one it can not get out of) with warm water that comes reaches just below the level of the turtles chin. For turtles it is recommended every 3rd day for 2-3 hours.

Place a snake in a bucket with a few centimetres of warm water with a rock in the bottom.. Set a timer for approximately 15 minutes. The reptile may get chilled if you leave them too long. Make sure there is a secure fitting lid to contain the snake in the bucket.

Waste material

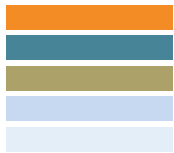
Reptiles do not generally defecate every day. Snakes may take up to a week to defecate after being fed. Reptiles will generally pass formed faeces. The initial portion of the faeces is usually urates (white and chalky). Abnormal faeces may appear excessively green in colour. This can be an indication of not eating (anorexia), or other disease.

Internal and external parasites

Many wild reptiles presented to you will have ticks attached to them. These are usually seen buried in-between scales particularly around the head. Check the ear holes on lizards as ticks are commonly found in these cavities. Whilst a healthy wild reptile appears to be able to cope with these ectoparasitic burdens, an immuno-compromised reptile may not cope as well. Ticks can be gently removed with forceps.

Snake mite is a highly contagious parasite that can also spread other diseases. If you see mites under the scales of a snake, consult an experienced veterinarian about how to eradicate it.

Internal parasitic burdens can also be debilitating for some reptiles. Your local vet clinic may be able to check faecal samples for parasites for you.



Medication use in reptiles

Prior to providing any medications to a reptile it should be warm and well hydrated.

Reptiles are unable to utilise drugs effectively or safely if they are cold and dehydrated, so you risk ineffective treatment or drug toxicity.

Pain in reptiles

It is not always easy to identify signs of pain in reptiles. Possible signs include:

- Immobile, collapse
- Inappetence
- Abnormal posture, locomotion
- Increased aggression

There are a number of drugs that are being routinely used for analgesia (pain relief) in reptiles. Discuss signs of pain you are observing with the veterinarian and they will be able to discuss the options with you.

Turtle shell repairs

A brief note on shell fractures and possible repairs.

It is important to control infection before repair to any shell fracture. Fibreglassing is not considered an acceptable method and should not be used. Infection becomes trapped underneath the fibreglass and eventually affects the animal's health. All shell repair and shell wound management should be done under anaesthesia by a veterinarian.

Wound care

Some of the more common wound injuries you may see include thermal burns, whipper sniper injuries and cat/dog bites. A veterinarian should check all wounds in the first instance. They can provide you with a treatment plan for the reptile including cleaning and dressing the wounds at home.

Mammals

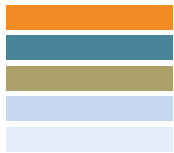
If you are listed to take any bat species, you must consider the zoonotic diseases bats are capable of carrying. You should be vaccinated against Rabies. All rehabilitators that work with bats must be aware of the appropriate protocols for testing dead bats for Lyssavirus and Hendravirus. See the [Department of Health and Ageing website](#) for guidelines for members of the public handling bats

Oral fluids

Vytrate, Lectade - follow instructions for dilution rates. Pedialyte or Gastrolyte can be purchased from the local chemist but are flavoured and expensive in comparison.

Offering fluids from a syringe or eye dropper may be successful in small native mammals, but must be done very carefully. Always proceed with caution and offer very small quantities whilst getting your technique correct. Hold the mammal in a pouch, just have the head sticking out and gently drop some fluids on its lips. Observe for swallowing and stop





immediately if the animal splutters or coughs. Alternatively a visit to a local veterinary hospital for fluids delivered subcutaneously may be more effective. Your role in this situation may be to hold the mammal steady whilst veterinary staff administer fluids.

In practice, oral fluid therapy should be limited to a maximum of twice a day to avoid stressing the mammal.

Waste material

As with all mammals you need to observe for urine and faecal output. The animal’s natural diet will dictate what its stool looks like. It is always important to observe the first faeces that the animal passes once it is in your care. Once you introduce a “captive” diet, changes may occur to the look of the faeces.

Ambient temperature provided for mammals:

Normal healthy fauna -	25° or room temperature
Sick/injured adults	28°
Weaned young	28°
Furred juveniles	32°
Furless orphans	35°
Sick or injured insectivorous bats	25°

Core body temperature for most marsupials is 35-37°. This is substantially lower than eutherian (placental) mammals. Hyperthermia can be a problem in marsupials.

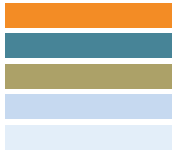
Echidnas, body temperature is much lower at 27-32°. It is preferable to keep the ambient temperature around 25°. This species are prone to heat stress.

Internal and external parasites

During initial examination the mammal should be checked over for external parasites. Whilst the mammal may live with its external parasite burden in the wild without any undue effects, it is important to consider the animal’s health and the impact that burden is having whilst it is in its compromised state. Internal parasite burdens can have a profound impact on the health status of an animal if it is likely to cause clinical disease.

Drugs

Marsupials, particularly young animals, may develop diarrhoea or gut imbalances when placed on antibiotic therapy. Supportive treatment during these times include the use of Impact Colostrum replacer and probiotics to assist the gut to establish balanced flora.



Care of sick and injured wildlife

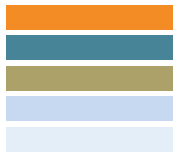
There are a number of drugs available for tranquillisation and sedation of mammals to reduce stress. These drugs are veterinary use only, so consult with your veterinarian if you feel that a mammal is very stressed. These drugs are commonly used in macropods to help avoid "exertion myopathy"

Pain in mammals

Native fauna are very good at masking pain. This is a pre-requisite for survival in the wild. Unfortunately, it does not help us one bit. We must be diligent in our observations. Signs associated with pain may include:

- Aggression
- Over-grooming or lack of grooming
- Inactivity; hiding at the back of the cage
- Hunched posture
- Inappetence





6 Housing

Housing sick/injured birds

Heating

In intensive care situations external additional heat can be set up in the following ways:

- If the room has a heater, put this on and monitor the temperature.
- Place a heat lamp (use a coloured globe) directly over the cage or box, ensuring it is far enough away from the bird not too burn it. Also ensure the electrical wire is not hanging anywhere close to the bird.

A globe placed underneath the bird is not as effective as heat from above or the side.

Note: Always place a thermometer in the room (not so close to the bird that they can destroy it). The ambient temperature should range from 28-32°C with the cooler end of the range for seabirds with dense insulating plumage.

Wild birds are stressed by close human presence. Screen a portion of the cage to provide some security for the bird but ensure that you are able to observe the bird when needed. Always work quickly and quietly around birds to avoid excessive stress. If the bird is too stressed, minimise contact with it on a needs basis e.g. if you need to medicate it you should cover all options at this time by cleaning and feeding. If there is no scheduled medicating then keep husbandry down to a minimum, whilst maintaining a standard of hygiene appropriate to the birds needs.

Lighting

Birds do not have any special lighting needs. However all diurnal birds benefit from natural sunlight. It promotes feeding response and is essential for general wellbeing.

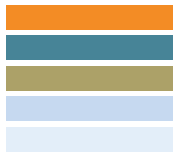
Perches

It is essential that the correct size perches be selected for each bird species. Perches should be made of untreated hardwood. Pesticides or chemicals should not have been sprayed on the perches. The ideal perch allows the bird to grip without placing pressure on any one part of the foot and avoids sores developing. More than one perch should always be supplied. One perch should go directly to a feed station. To avoid excess soiling of perches they should not be placed directly above each other. To avoid contamination by faecal droppings perches should not be placed above food and water bowls.

Perches should be replaced frequently, especially if soiled by faeces. Contaminated perches can be a source of bacterial infection. The perch should be sized so that the longest toes curl two-thirds of the way around the perch

Native vegetation

Native vegetation should be offered frequently. Check what the bird's diet is in the wild, for appropriate natural food to feed out. Even birds that don't eat the vegetation benefit by using it as a perch or for screening and security. It is important not to overcrowd a cage too much



as it becomes difficult to catch the bird(s). Small fresh amounts of vegetation offered frequently are preferable.

Types of cages

There are suitable commercially made cages that can be used to house sick/injured birds. You may need to modify a cage slightly depending on the species of bird. e.g. raptors feel more secure if you cover the sides of the cage. They will damage feathers on the wire, so soft lining on the inside of the cage may be necessary. Doors may need to be made bigger. This is particularly important if you are going to care for larger cockatoos. The standard cockatoo cages come with very small doors.

Never place a cage on the floor with a bird in it. This is very threatening for a bird. Never place the cage in a cat/dog environment, even if you have covered the cage over. This is a very stressful environment. Do not keep a cage covered over 24 hours a day. Most birds you will deal with will be diurnal. They require daylight to stimulate feeding. Cover them over at night for security. Observe for feather damage and take steps to rectify this e.g. move to bigger cage, protect feathers.

Intensive care set-up – most small birds (not able to perch)

A hot box is the preferred housing for these birds. These birds can be very depressed and after initial treatment should be placed in a quiet heated environment.

- Place the bird in a small padded container (ice cream container or take away containers work well) to aid in keeping upright
- Do not put food or water in until the bird is able to perch. If it is able to move itself around a small amount of food can be either scattered or in the case of nectar feeders placed in vertical conical type feeder. This situation needs to be assessed at the time.
- Observe for overheating (bird open mouthed breathing, panting)
- Cover the door of the hotbox with a towel to avoid additional stress. Check you don't cover any necessary ventilation holes.

Intensive care set-up (able to perch)

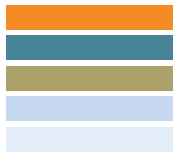
A hot box is still the preferred housing for these birds. Adjust the thermostat according to the bird's needs. A relevant size perch e.g. doweling rod or small branches can be wedged securely in the box ensuring the bird has enough head height to perch properly. Alternatively use a small budgie cage. You can install a heat lamp over one end of the perch. Use a smaller wattage globe e.g. 60 – 80w.

- Small bowls for food and water can be provided.
- If using a hot box, cover the perspex door with a towel to avoid additional stress but keep in mind the bird may not feed well if it is kept in a dark environment constantly.

Short term holding

- If using a budgie cage, place a sheet of newspaper in the tray underneath.





- Perches can depend on the bird. Dowelling rods or branches are adequate. They must be wedged securely in.
- Small feed bowls or D-feeders can be used.
- Native vegetation and blossoms can be added.
- Vertical feeders can be used to offer nectar.

Pigeons & doves

- Due to the flighty nature of these birds it is important to have them in an environment where it is easy to catch them up and they are unable to damage themselves in the process. Throwing a small hand towel over them quiets them down and assists with preventing shock moulting.

Large parrots (corella, galah, black cockatoos) magpies, magpie larks, crow, ravens shrikes, currawong & butcher birds

Care should be taken when handling large parrots as they have the potential to deliver a severe bite.

Intensive care set-up (not able to perch)

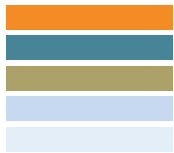
A cockatoo cage (without a perch and lined on the inside) are suitable.

- Line the base with sheets of newspaper
- Pad out the base with bedding (ensure there are no threads or holes in the bedding for the bird to get caught up in) roll a towel into horseshoe to give the bird some support around it.
- Small amounts of food and water can be offered in flat dishes (if the bird is able to feed for itself).
- Observe the bird for signs of improvement as they can chew at the box once they have enough strength.

Intensive care set-up (able to perch)

A cockatoo cage is the preferred set up in this case.

- A suitable size perch can be installed depending on the bird species
- The height of the perch can be set depending on the bird's ability to move around. Ensure the tail feathers are not touching the base or sides of the cage and the head has clearance.
- In addition to the room being warm, the bird may benefit from some direct heat. A Portaflood 80 - 100w infrared (IR) heat lamp can be stationed directly above one end of the perch on the outside of the cage (preferably the end away from water). Ensure the electrical cables are not within reach of the bird.
- Food and water can be offered in metal feeders (commercially available).
- Line the base with sheets of newspaper. The soiled top sheet(s) can be peeled away each day to keep hygiene standards up and minimise the stress on the bird.



Short term holding

Preferably a bigger cage would be suitable e.g. verandah style tall cockatoo cage. If this is not an option you can maintain your bird in the smaller table top cockatoo cage. These cages can be moved into an outside area during the day. Ensure that the cage is protected from predators.

- In best situations the bird should have access to direct sunlight. Put the cage out in the sun but cover half the cage with a large blanket or sheet to provide a shaded area. Place the cage in a sheltered/safe environment at night.
- Provide native vegetation

Waterbirds

For our purposes we can categorise waterbirds according to size. The major difference will be dietary requirements.

All setups are suggested with adult birds in mind. You will need to resource separate information for orphaned neonates.

General information for all types of water birds.

Substrate

Foot damage (“bumblefoot”) will be of concern if water birds stay on hard abrasive surfaces such as concrete, abrasive AstroTurf® or hard wood perches for extended periods. If a perch is provided it must be either soft paperbark perches or covered with thin sheets of rubber matting secured to the perch (electrical ties work well for this). Alternatively you can pad the perch by wrapping bandaging or strips of towel around it. Hygiene is of the utmost importance. The smallest crack or graze on a bird’s foot will fill with urine and faeces if the surface is not easy to keep clean. Rubber is preferred due to its ease of cleaning. It can either be wiped or hosed down.

Water proofing

Fresh and salt water birds can be kept out of water for a couple of weeks if necessary. A slow return to waterproofing must be considered. Short periods of access to water i.e. sprinklers put on in the area or spray with water can be considered. You need to check that water is rolling off the bird and that the bird is not saturated.

Salt tolerance

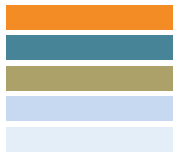
Every effort should be made to maintain salt tolerance during a seabird’s care . Salt tablets can be provided in the bird’s fish, fish can be offered in a bowl of salted water and there are options for spraying the bird with salt water to keep its preening up.

Ducks, swans, geese, darters, cormorants, herons, egrets, coots

Intensive care set-up

- If the bird is not able to keep upright use horseshoe shaped padding to assist.





- Large pet pak or sturdy box in a heated room works for most.
- The birds usually make lots of mess with food and faeces. Bedding will create lots of laundry but is preferred as they do tend to slip around on the newspaper. Rubber matting is also suitable.
- Adult swans and geese require a larger cage. Collapsible dog cages or soft sided cat/dog carriers are suitable as they have a larger door. Cover the front of the cage to decrease stress.

Stilts and other types of wader birds.

Stilts will need to be housed in a tall box or petpak for intensive care due to their long legs. As a last resort, use a birdcage and place a towel over the cage floor. Sheets, blankets or towels are a good option for substrate.

Penguins and Seabirds (terns, petrels, albatross, pelicans)

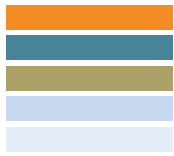
Most rehabilitators will not have an optimum environment for seabirds as their needs are highly specialised. Refer to . [Western Australian Seabird Rescue](#) for expert knowledge on these species

Seabirds have soft feet as they spend lots of time on the wing or swimming and minimal time on hard surfaces. Care should be taken with cage bases to alleviate sores on the surfaces of their feet. Softer substrate such as foam, or a blanket is preferred. See perching notes at the beginning of the section on waterbirds.

Sharp, long pointed beaks are an anatomical feature of these birds. Care must be taken when handling them as they will strike out and seriously injure the handler if not careful. Safety glasses are recommended.

Intensive care set-up

- Terns and other smaller seabirds can be housed in the smaller hotboxes or petpaks for intensive care.
- Large box or large pet pak in a heated room works well. Darters, Petrels and Pelicans may be too big for this and can be placed in a collapsible dog cage with blankets/flannelette sheeting on floor. Cover the cage front over to decrease stress.
- A large rubber mat for substrate is suitable for pelicans and large seabirds. This can be hosed down and will allow the bird to grip onto the floor surface.
- Use a square deep storage type tub for drinking water.
- Observe bird for overheating.
- Seabirds and penguins often will not feed for themselves in hospital. Force-feeding may need to be considered. Force feeding of seabirds takes skill and experience and should not be undertaken by inexperienced rehabilitators.



Housing sick/injured reptiles

General information

Regardless of the health status of the reptile they all require specific heating, lighting and humidity requirements. Please refer to the Care of Reptile section for lighting, general heating, temperature gradients and humidity.

Items required for most setups:

- Appropriate UVA/UVB lighting e.g. Reptistar® fluorescent tube
- Heat lamp or heat pad
- Rocks and branches for climbing and to assist with sloughing
- Hiding structures such as bark, leafy foliage, hollow bits of timber (ensure you can get the reptile out easily), upturned ice- cream container (with wide door cut out), cardboard boxes.
- Timer, thermometer, extension cord etc.

Substrate

- Sick/injured reptiles are kept on newspaper. This is simple and effective.
- If the species requires a humid environment moist substrate can be considered. Caution is needed as a confined moist environment can lead to health problems such as fungal and upper respiratory infections.
- Pillowcases can be used to pad the base of any box, check for loose threads.
- Do not use any printed paper material as substrate with frogs. Plain unbleached paper towels are the best option if there is a need for paper substrate.

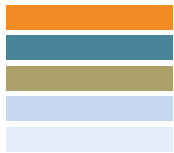
Hides

- Suitable hides for a reptile will vary depending on the species.
- Snakes feel secure if they can touch all sides of their hide with their coiled body. The use of a box, ice cream container or upturned tub works well. The “door” must be a minimum of twice the body width of the snake to ensure it does not get stuck if it doubles backs on itself.
- Lizards are also content sitting inside a box. They will hide under the newspaper substrate or climb inside a hollow log.
- Smaller lizards or geckos may like to wedge themselves into tight crevices. Secure squashed toilet roll cardboard or bark slivers together.

Heating

- First preference for providing heat for a sick reptile is a hot box. If this is not available, a combination of a heated room and the use of a direct heat source such as a heat lamp or pad. A thermometer can be positioned in the room to determine ambient temperature and thermometers should be positioned at the warmest spot in the enclosure to ensure that the hot end is within the reptiles PBT. (preferably a few degrees warmer).





- Never place uncovered heat lamps into an enclosure as reptiles may rub or wrap themselves around the lamp, causing thermal burns. If the lamp does not have a casing around it, it must be positioned outside the enclosure. A large flat rock, slate or tile positioned in the enclosure under the heat lamp will hold and radiate heat. Standard or Infrared (IR) Portaflood globes (red/blue) are an effective and inexpensive source of heat and allows for a dark period throughout the night while maintaining a heated environment. The globe's wattage will determine how much heat is produced. Globes come in a range of 40–175 watt. A heat pad can be positioned under the tub or tank. Check that the pad is plugged into the thermometer and that the probe is securely taped onto the heat pad. Heat pads should never be positioned inside the enclosure.

Types of cages

There are various inexpensive options to set up temporary housing for sick or injured reptiles. **A secure enclosure is very important**. Reptiles are very good escape artists and can squeeze out of the smallest of openings. Check that the lid you are using is secure.

Some options are:

- Various plastic tubs with a mesh lid on top, or Perspex sliding front door to fit. Various sizes from systema tubs from the supermarket to larger shallow or deep tubs (species dependant).
- Small plastic fish tanks.
- Wooden boxes with glass front door (The wood should be treated for waterproofing to allow adequate cleaning.)
- Secure hotbox
- Glass tank set up with a tight fitting wire mesh lid.

Note: Wire mesh cage fronts are avoided, as reptiles will often rub their snout against the mesh. In general, all wire mesh ventilation should be installed in an inaccessible position to reduce these risks.

Commercially available reptile boxes are ideal if your budget can accommodate this.

Snakes - these notes apply only to non-venomous snakes.

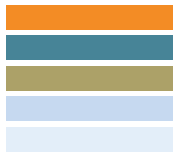
Intensive care

This is required if the reptile is in a debilitated state. For smaller snakes a hotbox setup can be used. For larger snakes use a plastic tub with a mesh lid. A heated environment is essential – the use of both a heat pad and a heat lamp both at the same end of the enclosure may be necessary. The hot box should be maintained a few degrees warmer than the PBT for the period the reptile is considered in need of intensive care.

Short term care

Plastic tub with mesh lid or wooden boxes with glass or Perspex front are suitable. A heat lamp can be placed on the top of tub's mesh lid. A heat pad can be positioned underneath a portion of the tub.





Lizards, monitors, geckos, dragons, skinks and goannas

Intensive care

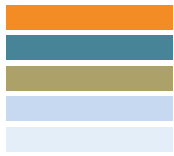
This is required if the reptile is in a debilitated state. Place the animal in a heated environment. A hotbox is ideal for smaller species. If a larger set up is required use a secure holding box and position a heat lamp directly over a basking area or directly over a hide.

Short term care

The interior of the cage can be set up according to the habitat in which the reptile is found e.g. sand, dry timber and leaves for desert species, moist soil and plants for species from wetter, forested regions.

- Plastic tubs work well for most of these animals. Take care with the smaller climbing species as they may cling to the mesh lid.
- Glass tank set up is also an option for larger species but does not retain heat very well.
- Plastic pet fish tank can be set up for very small species. Heat can only be offered with the use of a heat pad and consider placing the tank in a heated room.
- Frilled lizards prefer a vertical position on a branch. You can turn a box vertically and set up a vertical post for the lizard to hold on to. The door then opens to the front of you. Basking light is essential.
- Geckos prefer hides made from multiple layers of cardboard, flat rocks or bark-compressed closely together.
- Larger monitors need more space. In most cases you will need to forward these on to a suitable facility that can house and provide medical care.





Turtles

Intensive care

Turtles may present with shell fractures. Shell injuries need to be assessed immediately and if treatment is viable the shell needs to be stabilised (even if it is temporary bandage) and the reptile must be seen by a veterinarian for pain management and supportive treatment. These turtles can be placed in a tub on a padded towel with a heat lamp until they are strong enough to be moved into a short term setup.

Short term care

Medium sized plastic tubs work well with a mesh cover to avoid escapes if a turtle needs to be kept out of water. Provide an adequate hide spot and a heat lamp at one end. It is very important to provide good padding on the base as aquatic turtles are not used to being on hard surfaces and may develop foot ulcers.

This setup should be indoors where the ambient temperature is warmer. If the tortoise needs to stay dry you can mist it 3 or 4 times a day. A shallow dish of water can be provided and will allow the turtle to put its head under water but they often tip the bowls up. It is stressful and dehydrating for an aquatic turtle to be kept out of the water for extended periods so talk to your veterinarian about allowing limited water access when managing a shell fracture. Specialist husbandry care may be required and you should consult with a more experienced rehabilitator for support.

If the turtle does not need to be kept dry, the above setup works well replacing padding for water (place the pool on an angle to allow water to pool in one half) and a haul-out area in the other half. The minimum water depth must be the equivalent of the width of the turtle's carapace. This ensures that the turtle can turn itself back over in the water if it rolls onto its back.

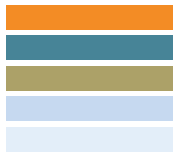
Gravid aquatic turtles

Provide an environment where they can lay eggs if they choose to. Many females will not lay their eggs at this time and will retain them; this rarely causes any problem and there is generally no need to force them to lay. Consult a veterinarian if you are concerned. Follow the notes for short term set up. The haul out area should include a fine well-packed moist layer of sand for laying eggs.

Marine turtles

Marine turtles present due to stranding or are discovered on the beach in a weakened state. Care of sick and injured marine turtles requires experience and special knowledge. Contact DEC and establish which organisation is able to offer appropriate care.. For interim housing place a small amount of salted water in a container with a thick piece of foam on the base. The water should be just deep enough for the animal to be able to lift its head out of the water for air.





Amphibians

Most frogs you will care for will be local species endemic to the area. In general, the kind of environment setup in a cage should mimic, as closely as possible, the habitat of the species to be maintained. For example burrowing species should have at least 10 centimetres depth of moist (not wet) soil or sand; while ground dwelling species need less soil but adequate leaf-litter, rocks, bark or hollow logs in which to hide. Arboreal species should be supplied with smooth climbing structures.

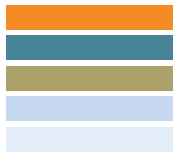
Intensive care

Place the frog in a plastic container with holes drilled into the lid for ventilation and a moistened unbleached paper towel. Place half of the container on a heat pad set at the species PBT.. Monitor temperature very closely as the frog can dehydrate and overheat very quickly.

Short term care

- If the frog is a local species it does not require additional heating. Set it up in a plastic fish container, size dependant on the species.
- If a substrate is required in the enclosure, only use non-printed unbleached matter e.g. paper towels.
- Place something for the frog to hide under in the tub. Covering half the water bowl will provide a secure spot for a frog to sit in the water and not be exposed. Fake leaves are also a good option. Avoid terracotta hides. Frogs skin is very sensitive and rub lesions start up when they rub against rough surfaces.
- Place a shallow water bowl in the tub. A rock or branch should be placed in the bowl to allow live food, such as crickets, to get out. sdfaS
- A length of PVC piping with sealed ends can be placed at an angle in the enclosure for the frog to sit on.





Housing sick/injured native mammals

The following is a list of the species of native mammals for which you may need to set up short-term temporary housing:

Possums: Brushtail possum; pygmy possum; ringtail possum
Echidna
Various bandicoots including quenda (southern brown); Western barred
Bilby
Carnivorous marsupials: Western quoll (chuditch); mulgara; phascogales; antechinus; dunnarts
Various macropods: Kangaroo; qallaby; quokka; bettongs
Bats : Microchiroptera (small insectivorous); Megachiroptera (large fruit eating bats - will only see if living in far north WA)

General information

It is important to accurately identify the mammal you are dealing with. There are a number of good mammal identification books available. Most of these will give you basic information on the species and this will help you in selecting a suitable environment to house the mammal.

Strong emphasis must be placed on providing an environment that is as stress-free as possible for the species, given its confines. A quiet spot away from companion animals is essential for disease control as well as stress.

Heating and lighting

Refer to previous information provided on appropriate temperatures to keep mammals. Warming the room up is a good starting point; then determine if the mammal requires additional direct heat, such as a hotbox or heat lamp (red or blue globe), positioned over a holding box. Always position a thermometer in the heated area to monitor your temperature.

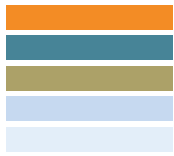
Water and feeding

If the mammal is in a confined area, mobile, and its movements are coordinated, provide only a small shallow water bowl. Many mammals will not drink for the short time you have them in your care. Refer to the “Care of Mammals” for dietary information.

Intensive care

For very small mammals:

- A hotbox is preferred. This can be “furnished” with a small container e.g. takeaway container or cardboard box to use as a nest. This can be lined with cloth e.g. flannelette that does not have loose threads on it to create a “hide spot” for security.



Care of sick and injured wildlife

- If a hotbox is not available, a small plastic or glass tank is suitable with a heat lamp suspended over the lid. Ensure the tank has a secure lid and the mammal cannot escape.
- Micro Bats are very small and can escape from the smallest holes. Good options include small plastic fish tanks or rodent carry-cases or a small “6 pack” esky with a secure mesh lid. You will need to line the insides of your “box” with material to allow the bat to hang. Provide a “hide spot” e.g. a second layer of material up against the material. The bat will position itself behind the hide, hanging onto the material.
- Newspaper, or cloth material such as calico, can line the base of a hotbox or tank. Leaf litter or sand can be used if this is appropriate for that species, however consider your hygiene and disease control needs.

For larger mammals:

- A medium-large size pet pak is effective with some small adjustments. It is preferable to use a pet pak that is designed to remove the top half. This allows you improved access to the mammal. Check that there are no gaps big enough for escape. Cover the outside of a pet pak with a heavy dark blanket. Set up a “nest” consisting of a cardboard box, size relevant to the mammal. A heat lamp can be angled to point in through the door.

For macropods

Small macropods can be housed as noted above. Larger kangaroos will need a bigger area.

- It is important to provide a quiet enclosed environment.
- A collapsible dog cage, lined with a rubber mat for grip, would be suitable if the macropod is very sick. Again, ensure that it is in a traffic-free area and that no companion animals are close by. Follow the same steps as noted above.
- If the macropod is able to stand up you may need to place it in a small empty room, such as a store-room (no windows) or an empty outside shed. You will need to provide additional heating and rubber matting on the floor for grip.

The emphasis here is on a quiet darkened area with no traffic to spook the macropod.

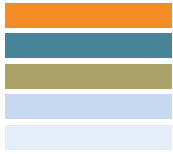
Short term care

Consideration should be given to providing a slow return to the animal’s normal climate when it has been kept at a warmer temperature due to its illness. This can be achieved in increments by turning the heat down, and then off, then move the mammal’s holding cage to an outside area during the day.

For very small mammals:

- Move the mammal out of a hotbox environment and set it up in a tank. You can use the same set up as noted for intensive care. Refer to “Care of Mammals” notes for more information.



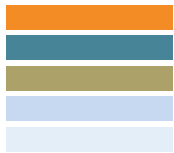


For medium sized mammals:

You will need to provide an aviary environment if this is possible. Verandah-style cockatoo cages set up with climbing structures and nest box are an option for arboreal marsupials in short term care.

For macropods

Unless you have a small enclosed holding yard with grass substrate, you may find it difficult to hold larger macropods for any period of time once their health has improved. Consider making arrangements with a local rehabilitator who has the appropriate setup for these mammals.



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8 Appendix A: Zoonotic diseases

Psittacosis

General information

This disease is transferred from birds to humans. It is also known as avian chlamydiosis, chlamyophilosis, parrot fever, parrot disease and ornithosis. The microorganism that causes this disease is a bacteria called *Chlamydophila psittaci* (*C.psittaci*). (It was previously known as *Chlamydia psittaci*.) This disease can infect all bird species but is particularly common in psittacines and pigeons. (Note that *C. trachomatis* is the strain of Chlamydia that is the cause of sexually transmitted Chlamydia in humans and this strain of bacteria is not found in other animals.)

Mode of transmission

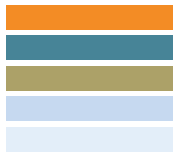
- The bacteria may be shed in faeces, urine, eye and mouth secretions, and feather dust.(it may live for several months in dried debris or secretions)
- Infected birds may be lifelong carriers and shed the bacteria intermittently during times of stress
- Inhalation of the organism is the main mode of transmission to humans.

Clinical signs of the disease in the bird

- Infected birds may not show any signs, .but symptoms may include:
- Depressed or lethargic, fluffed up
- Sneezing or nasal discharge
- tail bobbing
- Green colored urates
- Loss of appetite, weight loss
- conjunctivitis

Clinical signs of the disease in the human

- Persistent flu like symptoms (fever, headache, chills, muscle aches) ranging from mild respiratory tract infection to severe pneumonia.
- Dry cough, shortness of breath, tight chest
- Complications can include hepatitis, heart infections, arthritis and rarely neurological problems (encephalitis).
- The disease is rarely fatal in properly treated patients, but awareness of potential exposure and early diagnosis are vital
- Symptoms usually appear from 5 – 14 days after exposure but longer incubation periods have been reported
- Humans more than 50 years old or those that are immuno-compromised are more susceptible.



- Recovery after infection is usually complete. Immunity can be for a short duration. Re-infection is possible.
- Pregnant women exposed to *C. psittaci* can contract gestational psittacosis (which can affect the foetus) but this is very rare.

Recommendation for preventive measures

- Wet down areas of dried faecal matter prior to picking up or raking
- Avoid creating aerosols in the environment
- Keep bird boxes clean and free from dried up faecal matter
- Avoid known contaminated areas if you are immuno-compromised or pregnant (or wear protective equipment – face mask and gloves)
- Strict quarantine of new arrival birds. If you are a private aviculturist it is important to quarantine your own birds effectively
- Avoid stress on birds at all times. Poor nutrition, prolonged transport and overcrowding of birds contribute to increased stress and decreased immunity.
- Migrating birds can be a source of infection. Protecting aviary birds from wild bird faeces will assist in reducing transmission.
- Use correct environmental disinfection

Essential measures if disease risk is upgraded

Wear a face mask and gloves when performing husbandry in aviaries containing birds suspected of being infected with chlamydophilia

Psittacosis is a notifiable disease and both confirmed and probable cases should be reported to the WA Department of Health.

For your interest

New world parrots (Asian species) are more susceptible to this disease than Australian or African species of psittacines.

Macaws, Cockatiels, Budgies, parakeets, lovebirds are most commonly affected but it is also seen in raptors.

Different strains of chlamydophilia also affect native mammals, particularly koalas and possums. They cause conjunctivitis, urinary infections and infertility in these animals. They are not zoonotic in native mammals.

Rarely, ill dogs and cats can also spread psittacosis to humans but it is thought that the mammalian organisms are of low infectivity for humans as opposed to the avian strains. For example there have been cases of pet cats being infected with *C. psittaci* by pet birds. These cats have infected their owners with chlamydial conjunctivitis. However mammal to mammal infection of avian Chlamydia is very rare. (This includes human to human transmission).



Salmonellosis and Campylobacteriosis

General information

Salmonella and Campylobacter are just two of the many bacteria that cause diarrhoea in both animals and humans.

There are thousands of salmonella types and most of them occur in many wild and domestic animals. *Salmonella typhimurium* is the most commonly encountered species of salmonella in birds.

Campylobacter can be found in the gastro-intestinal tract of many wild and domestic animal species. Avian species are especially common carriers of campylobacter. (having a much higher prevalence rate than mammals). The most common type is *Campylobacter jejuni*.

Mode of transmission

- **Ingestion.** Transmitted to people through faecal contamination of fomites, food or water.
- Food is the most common vehicle for transmission.
- Wild, scavenging birds can help spread the disease.. Many will also carry Campylobacter
- May also be transmitted from human to human by faecal contact.
- The young, very old and immune-compromised are at most risk

Clinical signs of the disease in the bird

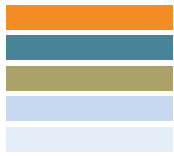
- No signs or sudden death (especially in chicks and fledglings)
- Generalized illness – lethargy, anorexia
- Loose watery or bloody faeces, gastroenteritis
- With Campylobacter infections hepatitis can occur
- With chronic Salmonellosis, birds may suffer from arthritis and spleen, kidney or heart damage

Clinical signs of the disease in the human

- Campylobacter symptoms occur within 2-5 days of exposure
- Salmonellosis occurs within six to seventy-two hours after exposure (usually 12-36)
- Abdominal pain and vomiting
- Diarrhoea and fever
- Salmonella may also cause headaches
- Salmonella can continue to be shed by infected humans for several weeks beyond the acute stage of infection

Recommendation for preventive measures

- High level of personal hygiene (hand washing after contact with animals and animal products)
- Protect bird feed stations to avoid wild birds being attracted to the area



Care of sick and injured wildlife

- Wash work stations, food preparation areas and food consumption areas down with hot water and detergent. These bacteria are not highly resistant to physical or chemical agents and are readily destroyed.
- Avoid overcrowding and unsanitary animal environments. Feed trays should not be positioned under perches.
- Meat products (including dead mice and day old chicks) should be defrosted in a fridge and stored separately from non meat products.
- Cold foods should be stored below 5°C and hot above 60°C

Essential measures if disease risk is upgraded

- Wear gloves when handling potentially contaminated material
- The WA Dept of Health requires notification of confirmed cases of Salmonellosis and Campylobacteriosis

For your interest

- These are the most widespread zoonotic diseases in the world
- Salmonella organisms can survive for up to approximately four months in the soil and stagnant water
- The most common cause of Salmonellosis and Campylobacteriosis is from eating contaminated and undercooked poultry. Salmonella may also be contracted from raw or undercooked eggs, and other food (eg. Vegies) that have been contaminated. Food that is left at room temperature for extended periods or food that is refrigerated in large quantities is also at risk.
- Pups and kittens held in overcrowded and unsanitary conditions can also be infected with both organisms and transmit them to humans
- Both organisms can be transmitted from human to human.



Dermatophytes (Ringworm)

General information

Several species of fungi cause the clinical condition Ringworm. *Microsporum* spp and *Trichophyton* spp are the two most common. Ringworm is highly infectious and domestic pets can be a primary source. Care must be taken when moving between the home environment and working with zoo animals if ringworm is diagnosed in a pet. Cats are the most common carriers, followed by dogs. It is more common in young and immune compromised animals. All mammals potentially carry zoonotic ringworm infections.

Mode of transmission

- **Direct** contact with infected animals and humans
- **Indirect** contact with infected fomites e.g. tools and grooming items
- **Indirect** contact with communal areas such as floors and chairs etc
- Transmission is enhanced by fresh breaks in the skin

Clinical signs of the disease in the animal

- Bald to partially bald patches, may have some scaliness
- signs may not be evident in some species (eg. Long haired cats)

Clinical signs of the disease in the human

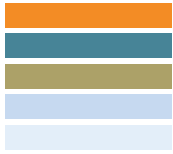
- classically presenting as a round lesion with inflamed and scaly skin
- Usually itchy
- Bald to partially bald patches

Recommended preventive measures to take

- Observe animals closely for clinical signs
- Good husbandry standards, remove soiled and mouldy bedding regularly
- Wear gloves and protective clothing when directly handling suspect animals

Essential measures if disease risk is upgraded

- Avoid all direct contact with infected animals
- During treatments of infected animal, appropriate attire should be worn e.g. disposable gloves, full length clothing
- Foot baths or dedicated gumboots for the area
- Dedicated tools
- Knowledge of appropriate disinfectant techniques relevant to be effective against the fungus (the vet dept will advise on this)
- Wash hands immediately after coming into contact with infected animal
- Observe yourself for clinical signs and if evident discuss with your Supervisor



For your interest

- This disease can be highly infectious.(including from human to human). However not every animal or human that comes into contact with the fungus will be infected as it can depend on immune status and skin condition.
- Ringworm infection in humans is also known as tinea. The most common types of tinea (foot and nail infections) are caused by fungi that live only in humans.
- Most fungal infections in humans are caused by human ringworm infections.
- Fungal spores can live in the environment for up to 2 years. Effective treatment of ringworm must also include the environment.



Australian Bat Lyssavirus

General information

Australian Bat Lyssavirus (ABL) was first identified in 1996. ABL is closely related to but not identical to classical rabies virus. It has been found in megachiroptera (fruit bats/flying foxes) and microchiroptera (insectivorous bats). The mega and micro bats both carry different variants of the virus but both have been proven to be pathogenic to humans.

Mode of transmission

- **Direct contact with infected saliva** This may be via bites and scratches or by saliva contacting the mucous membranes (eyes, nose, mouth or open wounds/abrasions on the skin)
- Contact with bat blood is not considered a high risk for infection
- Bat urine and faeces does not contain ABL (however it may contain other pathogens – see below)

Clinical signs of the disease in the human

Incubation period for ABL is still unknown. It may be as short as a week and up to several years.

- Signs are consistent with signs of rabies
- Anorexia, cough, fever, headache, nausea, sore throat, tiredness and vomiting
- Anxiety, agitation and apprehension
- The encephalitis phase will show as a variety of bizarre behaviours, disorientation, hyperactivity, excessive salivation, hyperthermia and hyperventilation
- Coma, cardiac or respiratory arrest

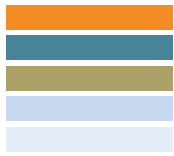
Clinical signs of the disease in the bat

An infected bat may not show any symptoms. However a bat with disease may show the following:

- Difficulty or inability to fly
- Muscular weakness – partial wing or hind limb paralysis
- Depressed and unresponsive
- Unduly aggressive or unusually docile

Compulsory preventive measures to take

- All staff working with bats are to understand and implement the Perth Zoo Bat Handling and Exposure Policy
- Only staff that are vaccinated against and have demonstrated an adequate titre level of antibodies via blood testing are to work with bats



Care of sick and injured wildlife

- These staff must also be serum tested every two years to measure antibody levels in case a booster vaccination is required
- Appropriate handling techniques and PPE to be used in capture and restraint of bats
- Avoid all direct contact with saliva and excretions from bats i.e. wear disposable gloves when collecting soiled food & water bowls

Essential measures if disease risk is upgraded

- In the event of an exposure, the wound or membranes must be cleaned thoroughly and immediately.

Further relevant information

- Lyssavirus infection is a notifiable disease (WA Dept of Health)
- Bats are also natural reservoirs for Hendra virus and Menangle virus – both of which are found in bat urine and faeces. To date there is no evidence that bats can transmit these viruses directly to humans (however precautionary care should still be taken). Hendra virus is transmitted to humans via horses which have direct or indirect contact with bats. Menangle virus is transmitted via pigs having contact with bats.



Psittacosis

General information

This disease is transferred from birds to humans. It is also known as avian chlamydiosis, chlamydophilosis, parrot fever, parrot disease and ornithosis. The microorganism that causes this disease is a bacteria called *Chlamydophila psittaci* (*C.psittaci*). (It was previously known as *Chlamydia psittaci*.) This disease can infect all bird species but is particularly common in psittacines and pigeons. (Note that *C. trachomatis* is the strain of Chlamydia that is the cause of sexually transmitted Chlamydia in humans and this strain of bacteria is not found in other animals.)

Mode of transmission

- The bacteria may be shed in faeces, urine, eye and mouth secretions, and feather dust.(it may live for several months in dried debris or secretions)
- Infected birds may be lifelong carriers and shed the bacteria intermittently during times of stress
- **Inhalation** of the organism is the main mode of transmission to humans.

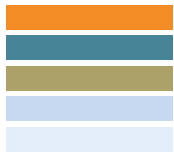
Clinical signs of the disease in the bird

Infected birds may not show any signs, .but symptoms may include:

- Depressed or lethargic, fluffed up
- Sneezing or nasal discharge
- tail bobbing
- Green colored urates
- Loss of appetite, weight loss
- conjunctivitis

Clinical signs of the disease in the human

- Persistent flu like symptoms (fever, headache, chills, muscle aches) ranging from mild respiratory tract infection to severe pneumonia.
- Dry cough, shortness of breath, tight chest
- Complications can include hepatitis, heart infections, arthritis and rarely neurological problems (encephalitis).
- The disease is rarely fatal in properly treated patients, but awareness of potential exposure and early diagnosis are vital
- Symptoms usually appear from 5 – 14 days after exposure but longer incubation periods have been reported
- Humans more than 50 years old or those that are immuno-compromised are more susceptible.
- Recovery after infection is usually complete. Immunity can be for a short duration. Re-infection is possible.



- Pregnant women exposed to *C. psittaci* can contract gestational psittacosis (which can affect the foetus) but this is very rare.

Recommendation for preventive measures

- Wet down areas of dried faecal matter prior to picking up or raking
- Avoid creating aerosols in the environment
- Keep bird boxes clean and free from dried up faecal matter
- Avoid known contaminated areas if you are immuno-compromised or pregnant (or wear protective equipment – face mask and gloves)
- Strict quarantine of new arrival birds. If you are a private aviculturist it is important to quarantine your own birds effectively
- Avoid stress on birds at all times. Poor nutrition, prolonged transport and overcrowding of birds contribute to increased stress and decreased immunity.
- Migrating birds can be a source of infection. Protecting aviary birds from wild bird faeces will assist in reducing transmission.
- Use correct environmental disinfection

Essential measures if disease risk is upgraded

- Wear a face mask and gloves when performing husbandry in aviaries containing birds suspected of being infected with chlamydia
- Psittacosis is a notifiable disease and both confirmed and probable cases should be reported to the WA Department of Health.

For your interest

- New world parrots (Asian species) are more susceptible to this disease than Australian or African species of psittacines
- Macaws, Cockatiels, Budgies, parakeets, lovebirds are most commonly affected but it is also seen in raptors
- Different strains of chlamydia also affect native mammals, particularly koalas and possums. They cause conjunctivitis, urinary infections and infertility in these animals. They are not zoonotic in native mammals.
- Rarely, ill dogs and cats can also spread psittacosis to humans but it is thought that the mammalian organisms are of low infectivity for humans as opposed to the avian strains. For example there have been cases of pet cats being infected with *C. psittaci* by pet birds. These cats have infected their owners with chlamydial conjunctivitis. However mammal to mammal infection of avian Chlamydia is very rare. (This includes human to human transmission).



Salmonellosis and Campylobacteriosis

General information

Salmonella and Campylobacter are just two of the many bacteria that cause diarrhoea in both animals and humans.

There are thousands of salmonella types and most of them occur in many wild and domestic animals. *Salmonella typhimurium* is the most commonly encountered species of salmonella in birds.

Campylobacter can be found in the gastro-intestinal tract of many wild and domestic animal species. Avian species are especially common carriers of campylobacter. (having a much higher prevalence rate than mammals). The most common type is *Campylobacter jejuni*.

Mode of transmission

- **Ingestion.** Transmitted to people through faecal contamination of fomites, food or water.
- Food is the most common vehicle for transmission.
- Wild, scavenging birds can help spread the disease.. Many will also carry Campylobacter
- May also be transmitted from human to human by faecal contact.
- The young, very old and immune-compromised are at most risk

Clinical signs of the disease in the bird

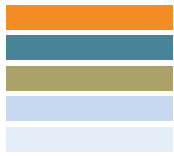
- No signs or sudden death (especially in chicks and fledglings)
- Generalized illness – lethargy, anorexia
- Loose watery or bloody faeces, gastroenteritis
- With Campylobacter infections hepatitis can occur
- With chronic Salmonellosis, birds may suffer from arthritis and spleen, kidney or heart damage

Clinical signs of the disease in the human

- Campylobacter symptoms occur within 2-5 days of exposure
- Salmonellosis occurs within six to seventy-two hours after exposure (usually 12-36)
- Abdominal pain and vomiting
- Diarrhoea and fever
- Salmonella may also cause headaches
- Salmonella can continue to be shed by infected humans for several weeks beyond the acute stage of infection

Recommendation for preventive measures

- High level of personal hygiene (hand washing after contact with animals and animal products)



Care of sick and injured wildlife

- Protect bird feed stations to avoid wild birds being attracted to the area
- Wash work stations, food preparation areas and food consumption areas down with hot water and detergent. These bacteria are not highly resistant to physical or chemical agents and are readily destroyed.
- Avoid overcrowding and unsanitary animal environments. Feed trays should not be positioned under perches.
- Meat products (including dead mice and day old chicks) should be defrosted in a fridge and stored separately from non meat products.
- Cold foods should be stored below 5°C and hot above 60°C

Essential measures if disease risk is upgraded

- Wear gloves when handling potentially contaminated material
- The WA Dept of Health requires notification of confirmed cases of Salmonellosis and Campylobacteriosis

For your interest

- These are the most widespread zoonotic diseases in the world
- Salmonella organisms can survive for up to approximately four months in the soil and stagnant water
- The most common cause of Salmonellosis and Campylobacteriosis is from eating contaminated and undercooked poultry. Salmonella may also be contracted from raw or undercooked eggs, and other food (eg. Vegies) that have been contaminated. Food that is left at room temperature for extended periods or food that is refrigerated in large quantities is also at risk.
- Pups and kittens held in overcrowded and unsanitary conditions can also be infected with both organisms and transmit them to humans
- Both organisms can be transmitted from human to human.



Dermatophytes (Ringworm)

General information

Several species of fungi cause the clinical condition Ringworm. *Microsporum* spp and *Trichophyton* spp are the two most common. Ringworm is highly infectious and domestic pets can be a primary source. Care must be taken when moving between the home environment and working with zoo animals if ringworm is diagnosed in a pet. Cats are the most common carriers, followed by dogs. It is more common in young and immune compromised animals. All mammals potentially carry zoonotic ringworm infections.

Mode of transmission

- **Direct** contact with infected animals and humans
- **Indirect** contact with infected fomites e.g. tools and grooming items
- **Indirect** contact with communal areas such as floors and chairs etc
- Transmission is enhanced by fresh breaks in the skin

Clinical signs of the disease in the animal

- Bald to partially bald patches, may have some scaliness
- signs may not be evident in some species (eg. Long haired cats)

Clinical signs of the disease in the human

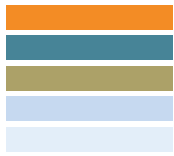
- classically presenting as a round lesion with inflamed and scaly skin
- Usually itchy
- Bald to partially bald patches

Recommended preventive measures to take

- Observe animals closely for clinical signs
- Good husbandry standards, remove soiled and mouldy bedding regularly
- Wear gloves and protective clothing when directly handling suspect animals

Essential measures if disease risk is upgraded

- Avoid all direct contact with infected animals
- During treatments of infected animal, appropriate attire should be worn e.g. disposable gloves, full length clothing
- Foot baths or dedicated gumboots for the area
- Dedicated tools
- Knowledge of appropriate disinfectant techniques relevant to be effective against the fungus.
- Wash hands immediately after coming into contact with infected animal
- Observe yourself for clinical signs and if evident discuss with your Supervisor



For your interest

- This disease can be highly infectious.(including from human to human). However not every animal or human that comes into contact with the fungus will be infected as it can depend on immune status and skin condition.
- Ringworm infection in humans is also known as tinea. The most common types of tinea (foot and nail infections) are caused by fungi that live only in humans.
- Most fungal infections in humans are caused by human ringworm infections.
- Fungal spores can live in the environment for up to 2 years. Effective treatment of ringworm must also include the environment.



Australian Bat Lyssavirus

General information

Australian Bat Lyssavirus (ABL) was first identified in 1996. ABL is closely related to but not identical to classical rabies virus. It has been found in megachiroptera (fruit bats/flying foxes) and microchiroptera (insectivorous bats). The mega and micro bats both carry different variants of the virus but both have been proven to be pathogenic to humans.

Mode of transmission

- **Direct contact with infected saliva** This may be via bites and scratches or by saliva contacting the mucous membranes (eyes, nose, mouth or open wounds/abrasions on the skin)
- Contact with bat blood is not considered a high risk for infection
- Bat urine and faeces does not contain ABL (however it may contain other pathogens – see below)

Clinical signs of the disease in the human

Incubation period for ABL is still unknown. It may be as short as a week and up to several years.

- Signs are consistent with signs of rabies
- Anorexia, cough, fever, headache, nausea, sore throat, tiredness and vomiting
- Anxiety, agitation and apprehension
- The encephalitis phase will show as a variety of bizarre behaviours, disorientation, hyperactivity, excessive salivation, hyperthermia and hyperventilation
- Coma, cardiac or respiratory arrest

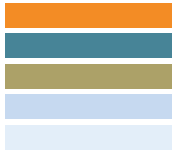
Clinical signs of the disease in the bat

An infected bat may not show any symptoms. However a bat with disease may show the following:

- Difficulty or inability to fly
- Muscular weakness – partial wing or hind limb paralysis
- Depressed and unresponsive
- Unduly aggressive or unusually docile

Compulsory preventive measures to take

- All staff working with bats are to understand and implement the Perth Zoo Bat Handling and Exposure Policy
- Only staff that are vaccinated against and have demonstrated an adequate titre level of antibodies via blood testing are to work with bats
- These staff must also be serum tested every two years to measure antibody levels in case a booster vaccination is required
- Appropriate handling techniques and PPE to be used in capture and restraint of bats



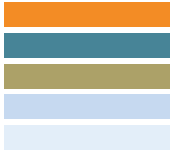
Care of sick and injured wildlife

- Avoid all direct contact with saliva and excretions from bats i.e. wear disposable gloves when collecting soiled food & water bowls

Essential measures if disease risk is upgraded

- In the event of an exposure, the wound or membranes must be cleaned thoroughly and immediately.
- Lyssavirus infection is a notifiable disease (WA Dept of Health)
- Bats are also natural reservoirs for Hendra virus and Menangle virus – both of which are found in bat urine and faeces. To date there is no evidence that bats can transmit these viruses directly to humans (however precautionary care should still be taken). Hendra virus is transmitted to humans via horses which have direct or indirect contact with bats. Menangle virus is transmitted via pigs having contact with bats.

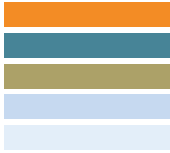




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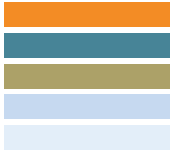


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March 2013

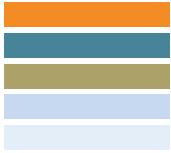
Module two Care of birds



Department of
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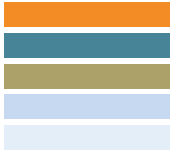
Module objectives

This module aims to provide you with knowledge and some practical skills to understand the care and rehabilitation of wild birds.

At the end you should be able to:

- describe the difference in stress levels between wild and pet birds
- identify common species - adult and juvenile
- describe anatomical features that affect viability of injured birds
- explain the importance of history and keeping accurate records
- demonstrate or explain safe methods of handling and restraint during examination of birds
- describe adequate feeding and husbandry for various types of birds
- describe the stages of rehabilitation and how to plan for release of recovered birds
- outline basic skills needed for rehydrating distressed birds
- state where to get resources for rehabilitation and mentor support
- explain or appropriately use words in the Glossary (see *Minimum Standards*)





1 Stress

All wild birds in captivity will be highly stressed. Levels of stress in wildlife are up to 500 times greater than that experienced by pet birds.

On admission, consider this bird has been through a huge trauma. Any small stress factor in the next few days is enough to cause the death of the bird.

Stress can and does KILL

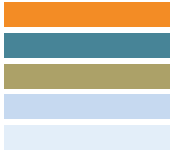
The following are common stressors:

- any noise is stressful; radios, loud voices
- presence of predators such as dogs and cats
- disturbance at night from rats, mice or owls
- poor shelter lacking privacy and protection from extremes of weather
- lack of food or water
- dietary deficiencies
- bullying from other birds
- lack of exercise for example, confined too long in a hot box
- escape from housing and the subsequent trauma of chase and recapture
- pain, parasites and infection
- lack of hygiene.

To minimise stress:

- keep noise levels as low as possible and reduce handling to a minimum
- when handling, cover the bird with a dark cloth, especially the head
- approach the bird slowly
- maintain appropriate heat & humidity in a suitable habitat
- provide a quiet darkened area where the bird can relax its preservation reflex in order to rest and repair
- offer the appropriate diet for the age, species and condition of the bird
- ensure the enclosure is secure to prevent escapes and the subsequent trauma of recapture

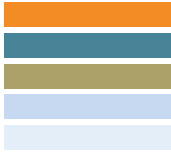




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- transport animal to professional help ASAP
- reduce changes in environment and carers for hand-reared young
- plan ahead for releases from day one.

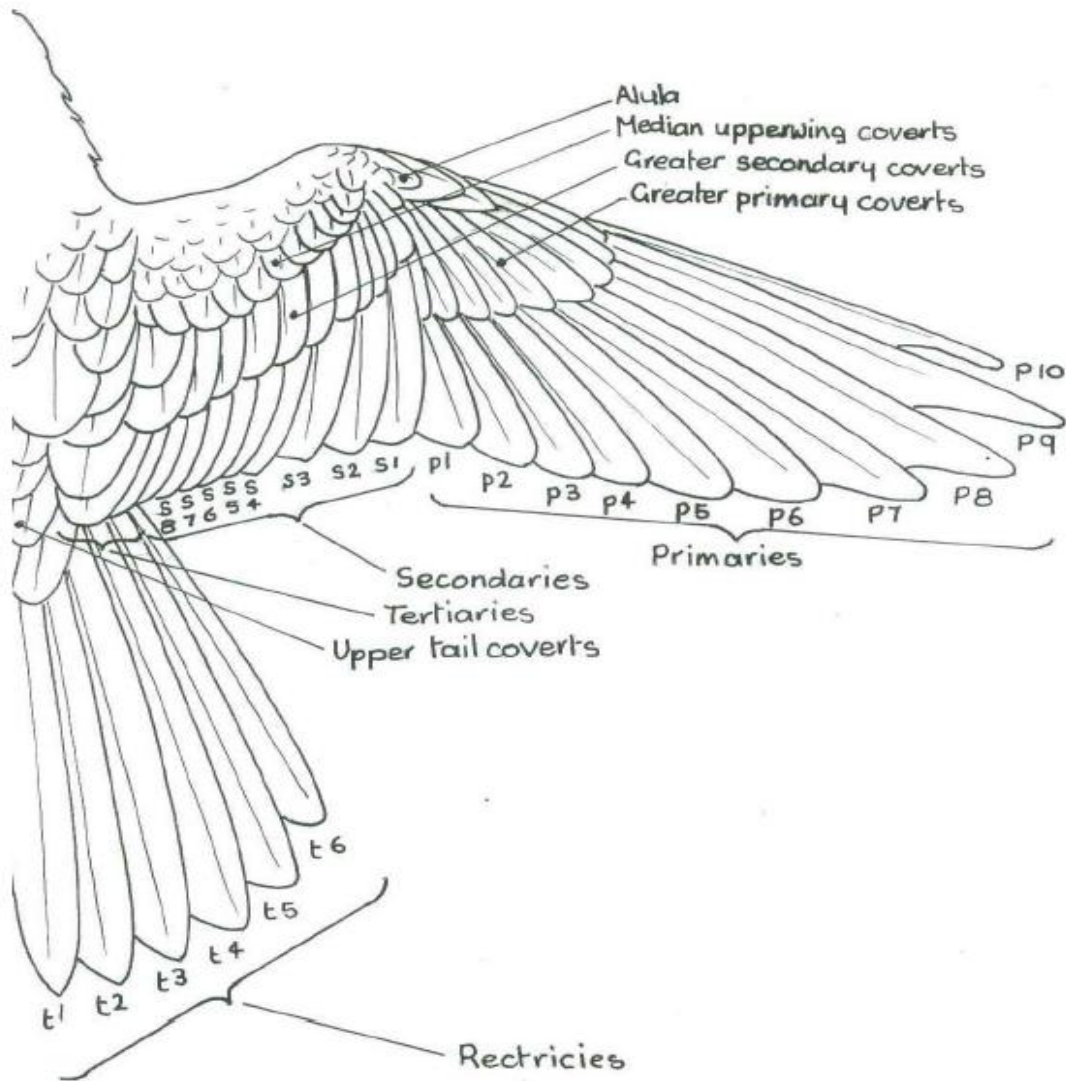




2 Bird anatomy

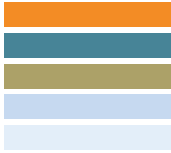
There are over 800 species of birds in Australia and over 8,000 in the world. Birds have adapted to a wide variety of habitats and have modified anatomy in order to feed, breed and fly. Flightless birds, including the emu, once flew.

All birds have one thing in common - FEATHERS. The main flight feathers are the Primary and Secondary feathers on the wings and the tail feathers (rectrices).



Flight feathers of an Australian Kestrel (A. Roderick)



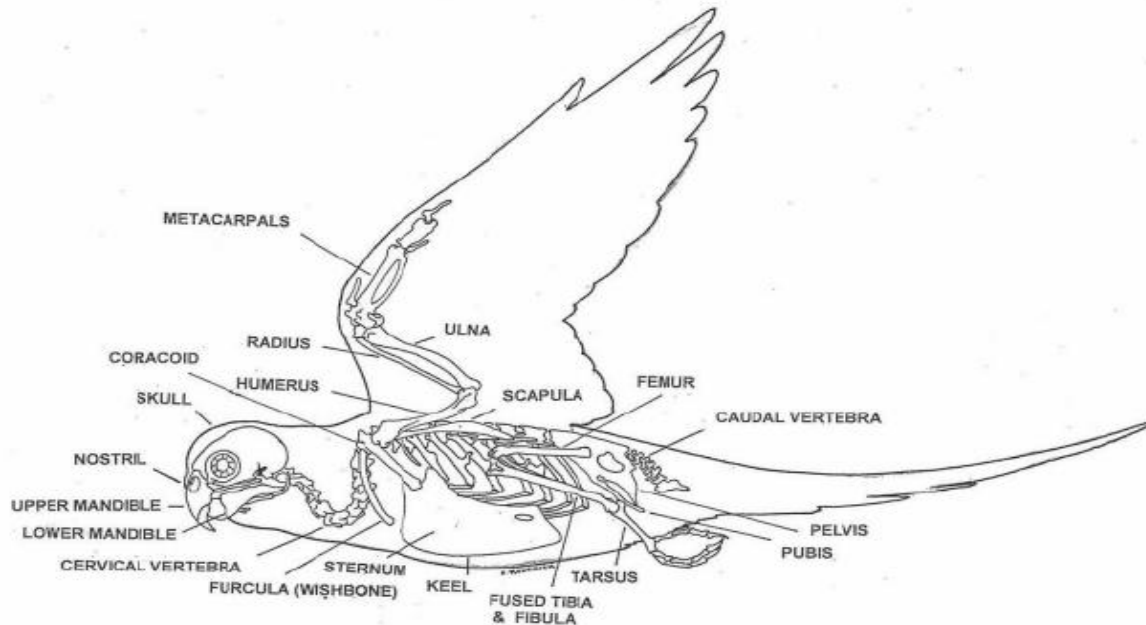


Feathers

A bird spends more time preening than any other activity. Feathers are essential for flight, insulation, waterproofing, courtship and often camouflage. Feathers are essential for survival. Poor feather condition indicates malnutrition or illness. A feather grows from the follicle, encased in a sheath. A blood vessel inside the sheath nourishes the feather until growth is complete. This is called a blood feather. A bird can bleed-out if a blood feather is broken or cut. Pluck the remains of the feather out apply pressure to the follicle. Mature feathers do not have a blood supply and broken feathers can be plucked to stimulate growth of a new feather.

Major feather damage, especially to primary, secondary and tail flight feathers, will affect flight and survival. These cases will be long term to give feathers time to grow (extra protein in the diet will assist with good feather quality). Imping or grafting of broken feathers greatly reduces the time in captivity. However, this technique is not applicable or effective in all cases. To provide the best opportunity for this to work the person must have the technical experience required.

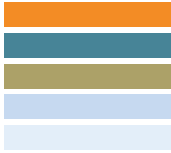
Skeletal structure



THE PARTS OF THE SKELETON OF A PARROT

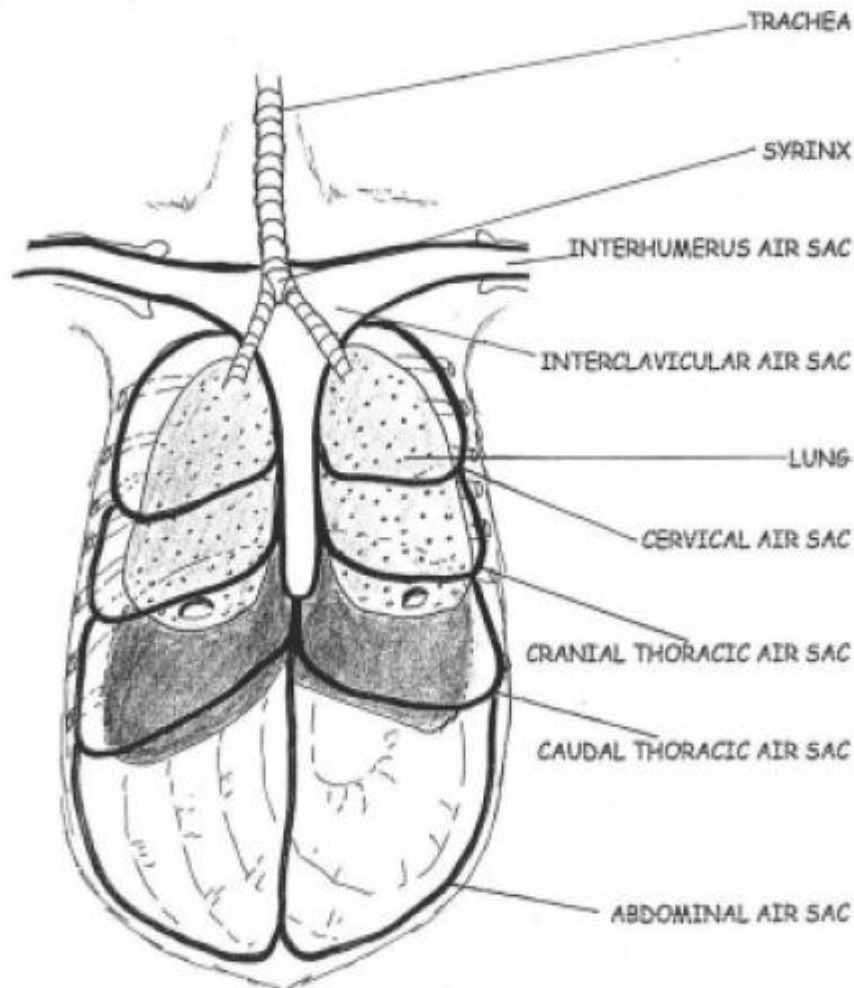
Many bones are fused for stability in flight making the torso of a bird rigid. Pneumatic bones are hollow and lightweight with air sacs inside and even light pressure can do damage. Fractures of pneumatic bones for example humerus, are open fractures in that the bone is now open to the external environment (by way of the air sacs) and is





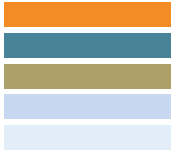
exposed to infectious agents. A fracture with broken skin is also an open or compound fracture. Birds with open fractures need a course of antibiotics. Wings joints (shoulder, elbow and wrist) need to be fully functional for a bird to fly well enough to survive. If a bird seems well but cannot fly, an X-ray may reveal even subtle fractures that compromise function.

Respiratory System



Birds do not have a diaphragm. The lungs are fixed and connect with air sacs throughout the body cavity. Trauma, such as car impact or falls from nest can not only rupture the air sacs but also cause bleeding into the air sacs and membranes surrounding various organs. Complications are common.

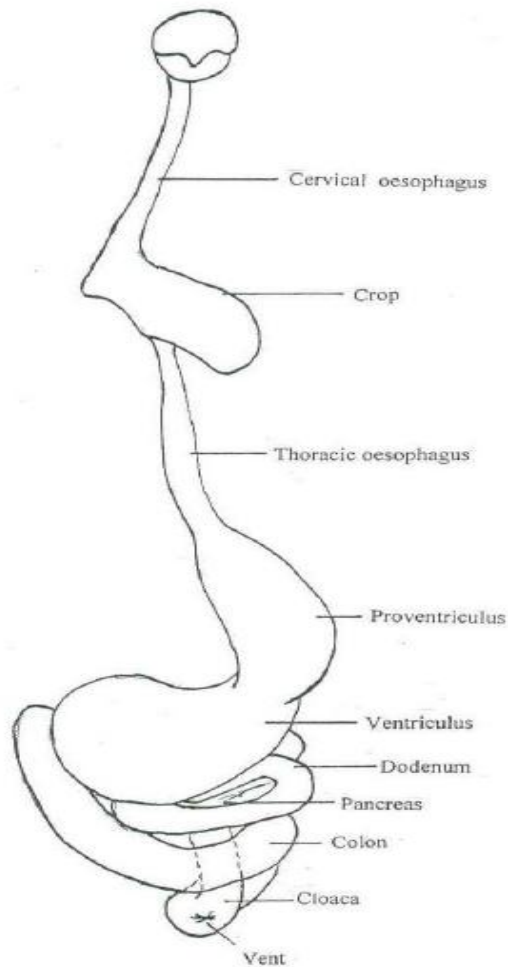
Air sacs need to be intact for a bird to get lift and fly.



Flightless birds for example, penguins and emus also have air sacs and pneumatic bones. Emus have thickened air sac membranes that act like a diaphragm.

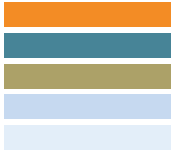
Digestive system

DIGESTIVE SYSTEM OF A PARROT



Carnivores

Have a short un-differentiated gut. They eat whole animals and are able to digest most of this in the proventriculus (glandular stomach). Any indigestible bones, feathers and fur are compacted into a dry pellet and regurgitated as a casting. Castings from owls



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contain no bones as they have gastric juices strong enough to dissolve bone.

Insectivores

Magpies, tawny frogmouths, kookaburras, ravens and butcherbirds etc. eat a large amount of hard-shelled insects and produce castings of shiny beetle exoskeletons coated in thick mucous. Allow time for the passing of the previous days casting before force-feeding these birds.

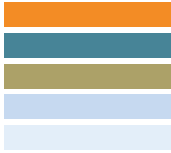
Nectivores

Have a redundant caecum and the ventriculus (the grinding stomach or gizzard) is not as muscular as the diet of tiny microscopic pollen grains and liquid nectar does not need grinding.

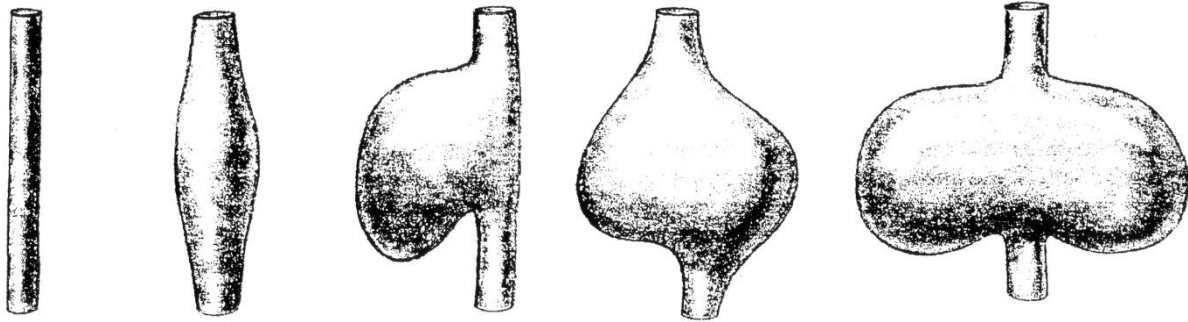
Granivores

Parrots, fowl, pigeons and doves have a crop, which holds a larger portion of food than either their proventriculus or ventriculus. This is a useful piece of anatomy when administering food or re-hydration fluids via a tube into the crop. Granivores also have a well-developed caecum and differentiated small and large intestines.





Not all birds have crops



No crop	Fusiform	Unilobe	Transverse	Bi-lobed
Insectivores Owls Coots Frogmouths Cormorants Gulls Penguins	Ducks Geese Finches Raptors	Gallinaceous (fowl-like)	Parrots Cockatoos Budgerigars	Doves Pigeons

From Roskopf W. J. & Woerpel R. W., 1996 (eds) Diseases of Cage & Aviary Birds.

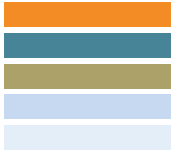
Urogenital system

Birds don't have a urinary bladder. The kidneys produce solid white urates and clear, non-concentrated urine. These pass through the Cloaca where they combine with faeces from the colon to form the dropping. Watery droppings do not indicate diarrhoea just an increase in urine output usually due to stress.

Males have two testes inside the body cavity whereas females have only the left ovary; the right is redundant.

Only a few bird species, including ducks, have a penis. Drakes should not be housed with females of other species to prevent internal injury from mating.





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Tongues

Tawny Frogmouth - paper thin, almost redundant, take care when force feeding

Honeyeaters - brush tipped to hold pollen, prone to thrush infection which may lead to the tongue constantly protrude beyond the beak tip

Kookaburras - tongue often sticks to roof of mouth when dehydrated

Magpies/Butcherbirds/Ravens - throat worm lesions under and around tongue can make swallowing painful.

The tongue of many birds is a hard structure attached to the Hyoid apparatus, a cartilage coil that pulls it in and out of the beak. Head injuries that involve the Hyoid apparatus, result in reduced function of the tongue. Swelling due to oral infection or trauma can affect the tongue, making eating and drinking difficult.

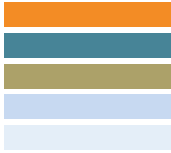
Birds have a choanal slit in the roof of the mouth.

Rapid growth and development

Tiny altricial (non-independent) nestlings grow from egg-sized blind, featherless hatchlings to fledged and ready to fly in 2 – 4 weeks.





Nestlings have a swelling around the vent. This is the Bursa of Fabricius – a lymph node in the cloaca of immature birds which provides a barrier to infection (B cells) whilst the bird is still in the nest and diminishes as the bird develops toward fledging.

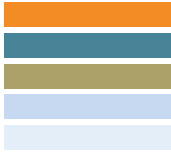




Beaks


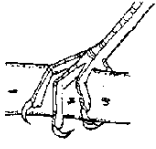

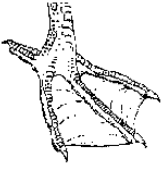
A bird's beak is capable of performing many tasks such as preening, nest building, defence and feeding its young. Despite all these talents the primary use of its beak is to gather food. The shape of its beak can give us a clue to what it eats. The table below contains a selection of common beak designs together with explanations of how its beak is perfectly adapted to catch/eat its preferred food source.

Cracking	Picking	Tearing	Striking
			
Cracking beaks are usually thicker and stronger than other types of beaks. The size of a bird's beak can help indicate the kind of seed or nut the bird is adapted to eat.	These birds use their specialized beaks to pick their food out of the air, off the ground, or even from under tree bark. Some even have bristles around their mouth which work together like a net to help catch e.g. tawny frogmouths.	Raptors have sharp, hooked beaks they use to pierce prey, pull off fur, tug away skin, pluck out feathers, and tear meat into bite-sized, easy-to-swallow chunks. A unique 'tooth' called a tomia helps kill the prey quickly.	Long slender, pointed beaks are perfect for striking. These birds often stalk their prey in shallow water and quickly strike when they find something suitable to eat. Once in a while they may also spear their prey.



Feet

Birds' feet are covered with heavily scaled skin. This "scaly" skin is helpful because it actually strengthens the foot. This scaly skin helps to prevent wear and tear due to walking and perching. A bird's feet and toes are made up mostly of tough tendons and bones. The feet don't have very many nerves, blood vessels or muscles. The table below contains some common bird foot designs and provide informations about their unique features.

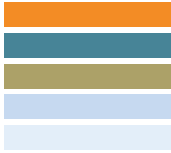
Wading	Perching	Grasping	Swimming
			
<p>Not all birds swim through water. Some prefer to wade through shallow water. These birds typically have long, slender legs that allow them to walk effortlessly through water. Many also have long toes too.</p>	<p>Perching birds typically have small featherless feet. They have thin tendons that extend down from the leg muscle and attach to the toes. When the bird lands on a branch these tendons tighten causing the toes to lock around the perch.</p>	<p>Many grasping birds are birds of prey. They have sharp, powerful claws called talons which they use to catch their prey. The back talon is often longer than the 3 forward pointing talons. The bird will typically push its long talon through the prey to kill it.</p>	<p>The swimming birds' feet work a lot like paddles. The webbing between their toes allow them to propel themselves through the water. By closing the space between their three front toes on the forward stroke, the feet are instantly less resistant. This prevents them from swimming backwards.</p>

Evolution has played an important role in creating a complementary beak and feet match which gives the bird its best chance of survival.

Interesting beak & feet facts

- Beaks grow from the growth plate close to the skull. A broken beak that has two-thirds of the length remaining has a good chance of returning to normal function once it has healed. Poor prognosis for one-third or less remaining, as the growth plate will be affected and the beak usually deforms preventing the bird from eating, preening, nest-building and defence.
- Pittacine Beak & Feather Disease (PBFD) and Cnemidocoptes mites can also deform beaks and occasionally claws

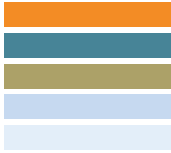




BASIC COURSE IN WILDLIFE REHABILITATION HANDBOOK 2013

- Pelagic or seagoing birds, for example Albatross, have nasal salt glands to extract salt from seawater which is excreted as tears through tube-like nostrils. They will need to be provided with salt tablets, given access to seawater or 3% saline to prevent atrophy of the gland
- Pelagic birds that spend most of their life at sea; have poorly developed feet and have difficulty walking on land. It is normal for these birds to sit and only occasionally stand to stretch. Soft, absorbent substrate is needed to cushion the feet and prevent Bumblefoot (inflammation or infection of the weight-bearing surface of the foot). Rubber sheets are a good option as they can be cleaned easily.
- Birds lack the enzyme that liquefies puss so an abscess is full of thick, cheesy material that does not drain and needs to be manually removed under anaesthetic in order to clean the wound.





3 Identification / admission

Species identification

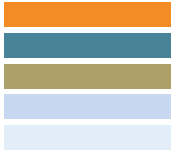
- Identification of species is essential to establishing diet and habitat requirements.
- Beaks indicate diet.
- Feet indicate habitat.
- Baby birds can be very difficult to identify.
- Nests can also be an identifying tool.
- A good bird field guide is essential. Make sure you get one with distribution maps beside each entry. We've all made the mistake of identifying a bird and later realising that it's only found in southern Tasmania. Latest publication is by West Australian, Michael Morcombe; this book includes nest illustrations which is a bonus not usually featured in book of this type.
- Digital cameras are the latest ID tool and rehabilitators commonly e-mail pictures of birds they've been unable to identify – usually babies.
- Highly recommended is a Baby Bird ID Manual from WIRES, NSW which may be ordered on line at <http://www.wires.org.au/shop/orderfrm.htm>.



Record keeping

- Begin your record keeping as soon as the animal comes into care with information gathered from the Rescuer. **HISTORY, HISTORY, HISTORY!**
- Some birds, on admission, will need to be leg-banded for ongoing individual identification for example, one nestling from a clutch may require medication, or to identify a poor feeder within a clutch. Birds should be housed with others of its own species. Magpies and kookaburras must be returned to their exact territory on release - See *sample Wildlife Admission Record*.
- Registered wildlife rehabilitators are required to submit monthly reports to DEC detailing all admissions and their outcomes. The information gathered on your admission sheet will provide the necessary information for these monthly reports.

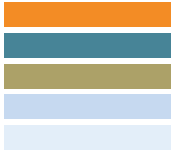




BASIC COURSE IN WILDLIFE REHABILITATION HANDBOOK 2013

Keeping a detailed treatment history is a valuable learning tool as well as a resource of information for similar cases received in the future - *See sample Treatment Sheet.*





BASIC COURSE IN WILDLIFE REHABILITATION
HANDBOOK 2013

Sample Wildlife Admission Record

Admission Sheet

Admission Number: 17694

Species: Magpie, Australian (*Magpie*)
 Legbands - Left: Red Right: Red, Ppl
 Age: Adult Sex: Male

Admitted: 12 Mar 13 7:21 AM

Rehab Stage	Stage							
	Date							

Feeding
 Feeding Method: Standard Feeds per day: 6
 Feeding Regime: Elongated Meatballs, a small dish of parrot seed and peanuts
 Water in a wide deepish dish.

Rescuer
 Name: Address:
 Phone - Home: b:

Rescue Circumstances
 Where Found: Belmont - Other - see specific location
 Date of Incident or Date Found: 11 Mar 13
 Primary Cause: Attacked by Cat
 History: put magpie in a hot box with a dish of water

Diagnosis: Trauma L Leg

Treatment Plan

Tests
 Vet visit X-Ray Faecal Exam Blood Test Biopsy Histo Path PM

Third Day Assessment (Record under Examinations and Diagnoses tab on Patient Details screen)

Date Due: 14 Mar 13 Date Done: _____

Assessment: _____

Entered on System VC Code: _____ Signature: _____

Pre-Release Assessment (Record under Examinations and Diagnoses tab on Patient Details screen)

Date Done: _____ Weight: _____ g

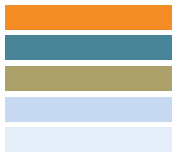
Assessment: _____

Entered on System VC Code: _____ Signature: _____

Notes

Outcome _____ **Date** _____ **Entered on System** **VC Code** _____





BASIC COURSE IN WILDLIFE REHABILITATION
HANDBOOK 2013

Sample Frequent Feeding Sheet

Frequent Feeding Sheet

Date: 12 March 2013

Admission Number: 17694

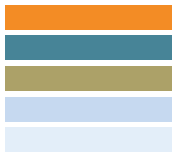
Species: Magpie

Latest Weight Recorded: 292g on 12 Mar 13

Feeding Method: Standard Feeds per day: 6
Feeding Regime: Elongated Meatballs, a small dish of parrot seed and peanuts
Water in a wide deepish dish.

Feeding Done

Date	Feeds (Record amount taken)													
	7am	8am	9am	10am	11am	Noon	1pm	2pm	3pm	4pm	5pm	6pm	7pm	8pm



BASIC COURSE IN WILDLIFE REHABILITATION

HANDBOOK 2013

Sample Treatment Sheet

Keeping a detailed treatment history is a valuable learning tool as well as a resource of information for similar cases received in the future.

Admission No. BIRD

Species BIRD

Treatment + Frequency BIRD

Date: 27/11/2011

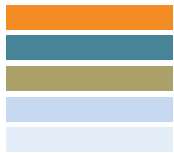
Page No. 1 of 1 (or 2 or 3)

Fluids	AM	PM	Time		Initial	Dose	Time	Initial	Dose	Time	Initial	Dose	Time	Initial	Dose	Time	Initial	Dose		
			Initial	Dose															Initial	Dose
SPARK TID x Sol. (10%)	MD		Time																	
			Dose																	
			Initial																	
	PM		Time																	
			Dose																	
			Initial																	
BAYTRIL BID x Sol	AM		Time																	
			Dose																	
			Initial																	
	PM		Time																	
			Dose																	
			Initial																	
METACAM BID x Sol.	AM		Time																	
			Dose																	
			Initial																	
	PM		Time																	
			Dose																	
			Initial																	
FRAGYL - for anaerobes SID x 7d 0.06ml per 100gr	AM		Time																	
			Dose																	
			Initial																	
	PM		Time																	
			Dose																	
			Initial																	

Patient Location _____

(See Kamernadocuments/Hospital/Forms/Form 6.5/Pr Treatment sheet)





Handling

- do no harm to the bird and don't let the bird harm you
- **STRESS KILLS** so don't handle a bird that is stressed, put it in a quiet, dark box and let it calm down for 10-15 minutes
- before handling the bird, have everything ready- catching net, towels, gloves close, leg bands, medicine - to minimise handling time
- turn off ceiling fans, heaters and remove hazards (sharp objects) and pets
- dim the lights if possible
- remove water bowls from the bird's box
- use towels (no lose threads) or gloves to pick up the bird- immobilize the head
- to reduce stress cover the head with a dark cloth
- hold the wings close to the bird's body to prevent further injury or flapping
- cover the bird's eyes with the towel to minimise stress
- **DO NOT RESTRICT THE CHEST** – it needs to move its chest to breathe
- if the bird escapes your hold- **DO NOT PANIC**- go to **ACTION PLAN**

Action plan for escaped bird

- close and guard doors
- turn off lights- birds will instinctively go up towards light
- keep noise and movement to a minimum
- nominate one person only to stalk the bird
- once caught, rest the bird in a dark box until it is calm
- escaping and capturing more than once is often fatal due to physiological effects of high stress levels

Handling skills

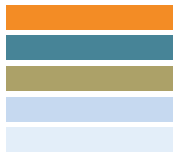
Skills are best learnt alongside an experienced mentor. Start with medium size birds that are not aggressive, doves & pigeons, to build your confidence and train your hand's muscle memory. Every part of your hand is used in handling a bird.

Do not attempt to handle aggressive birds, especially parrots until you are ready and confident.

Small birds

- these birds move quickly and are escape risks
- use a small cloth to cover the whole bird and prevent escape
- move your hand under the cloth to grasp the bird in your hand





- the bird's head can be gently held between your index and 2nd finger
- nestle the bird's body in the palm of your hand which you close around it like a cage; the bird can breathe & wriggle but not escape
- press feet and legs gently into your palm
- when finished, release your hold when the bird is inside the hot box or cage and all escape holes are blocked with a towel.

Small parrots

- using a hand towel grasp the bird's head from behind with your thumb and index finger placed on the side of the face - immobilise the beak
- wrap the towel around the bird to keep the wings close to its body
- support the feet with your other hand

Large parrots

- use a larger, thick towel to restrain the head as with the small parrot
- wrap the towel around the body to contain both wings and feet
- heavy leather gloves may be used to avoid being bitten or scratched

Raptors

- refer to notes on raptors in separate section of this manual
- talons and powerful feet and legs are the main danger with these birds

Darters, herons and egrets

- A combination of long, retractable necks, sharp pointy beaks and lethal accuracy present a real threat to your eyes; always wear **SAFETY GLASSES** when handling these birds.

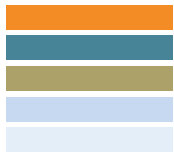
Water birds

- Pelicans, Ducks, Swans, Ibis frequently pass very smelly, fluid faeces in order to lighten their bodies for flight. Face the bird's vent away from your body.
- Tuck the bird's head under your armpit, hold the powerful wings close to the bird's body, wrap your arm around the bird and grasp the legs underneath, support the bird against your body. A large Pelican only weighs 7Kg.
- Always grasp the beak closer to the bird's face, never at the far end as it will break.
- Protect your eyes.

Emus

- Most emus that come into care are young - handle similarly to a duckling.





- Never attempt to handle an adult wild emu; the powerful legs and central toe are a very real danger- life threatening!

Call the WILDCARE Helpline (08) 9474 9055 for assistance

Transport

Refer to the Minimum Standards of Wildlife Rehabilitation in WA document.

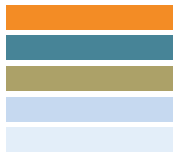
Short distances

- cars need to be air conditioned in hot/cold weather
- reduce noise- turn off radio/CD player
- carry boxes need to be placed in a secure location (seat belt) out of direct sun and drafts
- place a cloth inside the box for grip
- small birds can be placed in an appropriate sized cardboard box which is then secured inside the carry box
- air holes are essential but should not be large enough for wings to be caught in.
- the container must be large enough for the bird to fit comfortably but not large enough to fly or move around.
- cover with a dark cloth to reduce stress

Long distances

- air travel is common for wildlife rescued in remote areas
- birds need to be hydrated before travelling
- place the bird in a small container within a sturdy airport pet pak
- label clearly **LIVE ANIMAL** with destination and contact detail on the outside
- prior arrangements need to be made with the aircraft carrier so the animal is stowed in the warmest part of the pressurised cargo hold and secured
- small birds will need a wheat pack heated for 90 seconds in a microwave, wrapped inside a towel next to the box
- do not put water or food dishes inside the carry box with the bird; these will move around during the flight and injure the bird
- ensure there is someone at the destination to collect the bird on arrival
- quarantine arrangements need to be made in advance for birds travelling from interstate. Have all paperwork ready when collecting the bird





Seasonal wildlife admissions

The majority of Kanyana's admissions are in September, October, November, December and January with the busiest months October and November.

The most numerous bird species are – Doves followed by Magpies, Ringneck parrots, Galahs, Ducks (Pacific Black and Wood), and Singing Honeyeaters. The species you encounter will vary according to where you live.

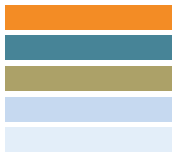
August (spring)

Spring heralds the start of the season, beginning with ducklings.

- Ducklings– Hotbox temperature 35°C and reducing as feathering increases.
- Ducklings need to be encouraged to drink. Tapping water with your finger will help get drinking started.



- Drinking is to be encouraged as soon as possible, ideally within one hour of admission. Add Spark® to drinking water for rehydration. All Kanyana's hospital patients are given the vitamin supplement Soluvet® in their water.
- Keep ducklings dry; wet ducklings should be dried as quickly as possible. Special drinking-water containers are required to prevent swimming which leads to chilling and drowning.
- Chick Starter should be served dry otherwise they get it on their feathers, which causes feather plucking by their companions. As the ducklings begin to feather their food should be restricted to daylight hours otherwise they grow too quickly; their hock ligaments can't cope with their increased body-weight, crippling them which leads to euthanasia. Ducklings will eat continually if food is available.
- Finely shredded lettuce in water or growing grass (not lawn grass) is excellent if available. Try sprouting wheat grass. Although Black Ducklings will eat some grass, they're more insectivorous than Mountain and Wood Ducks which are more herbivorous.
- Soft surface is needed underfoot for example, artificial turf (easily hosed clean), a thick towel or bubble wrap covered with a towel. This is to prevent Bumblefoot.
- Group same age and species together by networking with other rehabilitators. Ducklings do much better in the company of other ducklings
- Broody chooks make excellent foster mothers. To introduce ducklings, place ducklings under a broody hen at night. A feather duster in the hotbox can also be used as mother substitute



September – October

Clutches of juvenile honeyeaters. – Singing, Brown, New Holland and Wattlebirds.

Insectivores: Magpies, mudlarks and cuckoo shrikes (that also eat fruit).

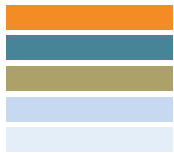
Honeyeaters

- Nectar recipe (included in the *Recipes* section) made daily.
- Provide nectar in column feeders to discourage babies from bathing in open dishes of nectar which causes feather damage and can cause death as babies have no way of regulating their body heat as they rely on dry feathers to keep themselves insulated.
- Chopped fruit (well ripened and juicy), sized according to size of mouth.
- Mealworms (chopped for small mouths) dipped in water and/or nectar.
- Meatballs (elongated rather than a ball) dipped in water and/or nectar. Vary size according to size of mouth ie about size/shape of large grain of rice for small or baby bird - ●
- Forceps feed a minimum of 10 times daily (during daylight hours). *See section on Feeding Timetable - Babies.*
- Keep a record of feeds.
- Provide fresh flowers.
- Moisten air with tray of water in hot box (under floor).
- Birds spend most of the day grooming to keep feathers in peak condition for insulation and waterproofing. Sick birds don't groom themselves and this in itself is a sign of ill health.
- Wattlebirds - beware imprinting, minimise contact and handling as much as possible

Magpies

- Territorial. Leg band with coloured plastic leg bands (which are removed before release) for extra identification to ensure that they are returned to their original territory.
- Magpies should be returned to the wild as soon as possible. Kanyana's average return time is about 2-3 weeks which is about the time it takes the feathers, partly in quill, to develop. Many magpies are admitted as flightless juveniles because their feathers are still partly in quill. The feathers must fully developed before birds can make upward flight to at least two metres
- It is also possible to group juvenile magpies and adults for release as a group. However, they can only be released in unclaimed





territory. Unclaimed territories are almost impossible to find and twice daily supplementary feeding (backfeeding) is required for up to 8 weeks

- Meatball mix recipe (included in the *Recipes* section).
- Size of meatball about the size of an elongated pea for fledgling magpies -
- Forceps feed juveniles 6- 8 x daily. Dunk meatball in water before feeding.
- Frequent changes of lining paper and drinking water to aid feather protection.
- Monitor faeces, with microscope if necessary, for Coccidia and other internal parasites.

Cyclical diseases

There are three which occur in magpies – calcium deficiency, throat worm and avian pox. The clue to the presence of the first two diseases is that the baby is being pecked by their group.

November – December

Galahs, 28s and redcap parrots (granivores), lorikeets (nectivores), frogmouths (carnivores)

Frogmouths Note: Frogmouths are not owls. They belong to the Nightjar family.

- Frogmouths – thawed small & large mice (the preferred food) or meatballs.
- Thawed mice can be injected with Insectivore for added nutrition.
- Frogmouths have to be taught to catch live food before they can be released.
- Prevent imprinting in frogmouths by passing them on to a specialist rehabilitator.



Tawny frogmouth

Imprinting: the potential loss of learned behaviour unique to the species and the loss of the bird's ability to identify with and relate to its own kind.

Mark Shephard 1994

28s, Redcaps and galahs (mainly young fledglings)

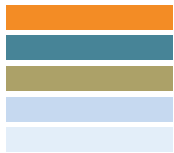
First wave Avian Gastric Yeast (AGY) previously known as Megabacteria. AGY is a contagious wasting disease mainly affecting young parrots and galahs

- Kanyana's routine – check all faeces – diarrhoea often black. Birds with a poor prognosis are euthanased.
- temperature 35-30°C hot box
- rehydrate with tubed, warmed (35°C) medicated fluids before weaning back onto food



Redcap parrot





- spoon or syringe feed parrot rearing mix until eating normally
- feed 3 to 6 times daily according to size of bird and how quickly the crop empties
- cleanup thoroughly after feeding to keep feathers in good condition
- When self-feeding – start on a mix of quick oats and canary seed, then small parrot seed, galah seed, marri seeds, whole gumnuts. Chunky, well-ripened fruit

December-January

Second wave of honeyeaters, kookaburras, herons & egrets and bee-eaters and sacred kingfishers

Herons & egrets

- Herons and egrets – thawed whitebait in fresh cold water, meatballs, small and large, thawed mice
- Herons and egrets have huge appetites until they reach their adult body weight at which point there will be a dramatic reduction in their food consumption



Egret

Bee-eaters and sacred kingfishers

- Kingfishers – mealworms, thawed white bait and live Gambesi fish in fresh water.
- Rainbow Bee eaters – bees (catch with forceps), mealworms, meatballs.
- Kingfishers and Bee-eaters are migratory. Migratory birds must be 100% fit by March.
- Migratory birds which miss migration are unlikely to survive if unable to fulfil their urge to migrate.

February-March

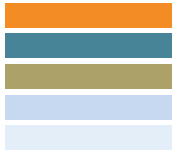
Doves and pigeons (granivores)

- breed all year round
- crop stasis is common as a result of falls from nests (food solidifies in the crop due to trauma, bacterial infection or dehydration)
- can be tube fed warm rehydration fluids
- use Probiotics to restore the natural gut flora, particularly after the use of antibiotics which destroy natural gut flora
- Passwell hand-rearing mix
- dove and pigeon seed when self feeding.



Bronzewing pigeon





April-May

Mistletoe birds

- Mistletoe berries in the wild
- chopped fruit and mealworms in captivity



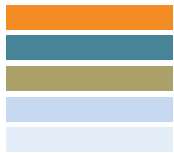
Mistletoe bird

June-July (winter)

Second wave of AGY affecting galahs, and Psittacosis (zoonotic disease)

- cold temperatures contribute to illness
- diarrhoea and weight loss
- apple green urates, nasal mucous causing staining can indicate Psittacosis (zoonotic disease)
- if in doubt when handling parrots, wear a disposable face mask





4 Stages of rehabilitation

Rehabilitation begins the moment the bird comes into care.

The aim is to rehabilitate a bird as quickly as possible and, if it's an adult bird, return it to its own territory as soon as possible.

Stage 1 of rehabilitation: Intensive care

See section on *Caring for sick and injured wildlife*

Stage 2 of rehabilitation: Acclimatisation

The bird now needs more room to move, to be able to stretch its wings, preen and perhaps bathe, take in some sun, light and fresh air and to have more privacy and less human intervention. Minimising human contact reduces the risk of susceptible juveniles (Wattlebirds, Galahs and Frogmouths) becoming imprinted.

Initially 2-3 hours outside during the best part of the day may be all the bird can take. Return it to the unheated hospital box and try again the next day until the bird is able to remain out for most of the day returning to the unheated hospital box overnight. For this stage of rehabilitation a larger cage, but not necessarily an aviary is required.

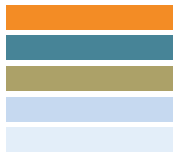
Observations on a daily basis should be made of each bird during this second stage of rehabilitation.

- Is the bird eating and drinking?
- Is it grooming and bathing?
- Is it moving around in a relaxed manner or is it stressed and over-active?
- Is it relating to the other birds?
- Is it agitated and wanting to escape?
- Is it fearful of people? This would be a good sign at this stage.
- Is it displaying roosting behavior at dusk for example, a little agitated and constantly changing perch position?
- Are the droppings normal?
- Is weight maintaining with the increased activity? Weigh two to three times a week.

Stage 3 of rehabilitation: Pre-release

This stage is essential to rebuild flight muscles. To do this, the length of the aviary should be long enough for the bird to fly from one end to the other, using all flight muscles. In general terms, the larger the bird the larger the aviary needs to be. However, small birds such as swallows and tree martins which are on the wing for hours at a time need large narrow aviaries similar in size to those required for large raptors. Native foliage in the aviary helps to provide natural shelter as well as foot exercise from landing on different diameter branches. All birds need to regain their waterproofing and this can be aided by rooftop sprinklers on aviaries. A bird which is not waterproof will look bedraggled and wet after a





light shower. A light spray of water at least once a day will cause the bird to preen which distributes the oil/powder - down through the feathers, making them waterproof. This may take several days.

Birds should be up on perches and flying around for most of the day and off the ground for the night.

In the aviary important observations are the same as for the second stage but from further away:

- self feeding ability
- interaction with other birds
- whether preening and bathing
- normal faeces
- constant weight is necessary - weigh on a weekly basis
- Interaction between different species is of paramount importance. Most birds are aggressive to anything that is smaller in size, so the grouping of similar sized birds is important for example, Singing Honeyeater will not be happy with a Raven or even the more aggressive Little Wattle Bird. Care also needs to be taken as to which species are put in adjacent aviaries as the aggressor may peck through the wire at the smaller bird for example, a White Faced Heron can peck through the wire and kill a Honeyeater in an adjacent aviary.

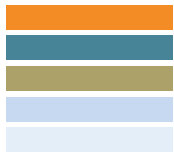
A bird needs to be 100% fit for release. When the bird is ready for release you should phone the rescuer to arrange for the release of the bird at the site where it was originally found. At Kanyana we endeavour to keep the rescuer involved as their participation in the release is a powerful educational tool. Prior to release you need to check the long range weather forecast to ensure that the bird has 2-3 days of moderate weather after release. All adult birds need to return to their flocks/mates and the area where they know the location of food and water sources as well as the risk posed by the local predators. For very territorial birds such as magpies and kookaburras, return to their original territories is a matter of life or death. Leg banding with coloured bands matched to admission number for species such as magpies and kookaburras ensures a return to their original territory. Kanyana aims to return juvenile magpies to the wild within days, 3 weeks if possible although successful returns have been made after 6 weeks. Leg bands are removed before release.

Stage 3 of rehabilitation (hand-reared birds): Pre-release

The preceding points apply to this group of birds; the hand-reared birds differ in the following points:

- Moving them through the stages at the appropriate time for example, not continuing hand feeding too long.
- Grouping the species together for a release as a group, if appropriate.
- Watching for weather changes because their immature plumage makes them more vulnerable. In spring, which is when juveniles are likely to come into your care, the





weather can be very changeable and it may be that you need to bring them in at night if cold temperatures are forecast.

- Continue weighing 2-3 times weekly.
- Provide adequate shelter in the aviary.
- At dusk, herd birds into sheltered areas off the ground.

Soft release

Soft release describes a gradual return to the wild whereby an animal receives support, shelter and natural food until it is entirely able to fend for itself. As a group, the birds are moved into a release aviary. This aviary, which is sited in a suitable location, has a release hatch. Whilst in the release aviary they are able to interact with other local birds and become acquainted with the area. After 3-4 weeks the release hatch is opened and the birds are free to go when they are ready. This can take some hours or even a day before they summon the courage to take the big step out into the wild. The hatch is left open and food continues to be placed in the aviary for the birds to come and go as they wish. Some will return to sleep in the aviary periodically. Their need to return for food decreases as they find their own supplies in the wild.

Hard release

Hard release describes a release directly to the wild without further support. Hard release is often employed when an animal comes into care as an independent adult and when after being successfully rehabilitated is returned to its home territory within a short period of time.

Pre-release evaluation

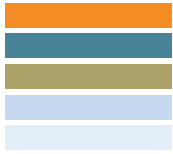
The bird should:

- be of correct weight for its sex, species, age and the season (see Attachment *Common species weight ranges*)
- be of correct age for independent survival
- demonstrate proper species behavior (not imprinted and should demonstrate normal fear of people and domestic animals)
- be free of disease and/or parasites;
- not be a disease carrier risk to the local population

Conditions for release

- Monitor weather forecasts to ensure that the bird has 2-3 days of moderate weather after release.
- Provide proper/safe transportation to the release site.
- Choose appropriate season/time of year (migration, breeding season, drought).
- Choose appropriate time of the day. We favour late afternoon (particularly in summer) - 1 to 2 hours before sunset. This gives the animal time to find a roost for the night but limits the amount of time they may be subject to potential stressors for



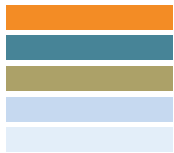


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example, being chased by other birds. A late afternoon release after having been well-fed during the day means they can concentrate on getting their bearings and finding a roost.

- Provide food if appropriate.
- Back feed if necessary.
- Monitor post-release if possible (can be carried out by the Rescuer).





5 Housing

Refer to the *Minimum Standards of Wildlife Rehabilitation in WA* document for cage sizes for various bird species at Stages I II & III of rehabilitation.

Also see section on Housing in *Sick and injured wildlife*.

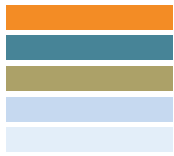
Hot boxes for Stage 1 Intensive Care, are available from commercial suppliers. Smooth, seamless surfaces of non-porous material are more hygienic and easier to clean than wooden or fibre-board boxes. Line the floor with newspaper and kitchen paper but leave a gap at both sides to allow warm air to circulate around the bird. Free-standing perches can be used depending on the bird's physical needs and state of health.

Small cages for Acclimatisation Stage 2 - should have easy access sized doors to enable safe handling. You need to get both hands through the door to catch the bird safely when it is time to tube feed it or bring it inside for the night. Shade-cloth lining around the walls will help preserve feather condition, give privacy and still allow sunlight to filter through. This material is also easy to clean.

Aviaries require:

- Safety doors, preferably locked, are essential. Safety door kits are available to convert existing aviaries. Keep the design simple and easy to service.
- Vermin (snakes, rats & mice) proof fine mesh, including floor (fine mesh or concrete).
- Suitable building materials to prevent damage to the birds.
- Metal is preferred, as wood can harbour parasites and is difficult to clean.
- Non-toxic materials - new, unweathered wire can cause heavy-metal poisoning if ingested by parrots. Remove all lumps of metal from new wire and scrub the mesh with a mixture of 2 cups of vinegar in a bucket of water- wash off after 30 minutes.
- Orienting with open mesh walls facing north to allow access to sunlight and solid walls on the south to shelter from the elements.
- Privacy areas for birds to retreat when threatened- emotional security reduces stress.
- At least two perches (preferably natural branches) placed at each end of the aviary to encourage flight exercise to build up muscles for release.
- Native plants or large, freshly cut branches can be fixed to the walls to help reduce stress and provide birds with natural shading, perching, hiding and foraging opportunities. Make sure there is enough clearance for birds to fly the length of the aviary and so you can net the bird for routine weighing or release.





As a rule of thumb, 4 wing beats determines the length of the aviary for most species to build up flight muscles.

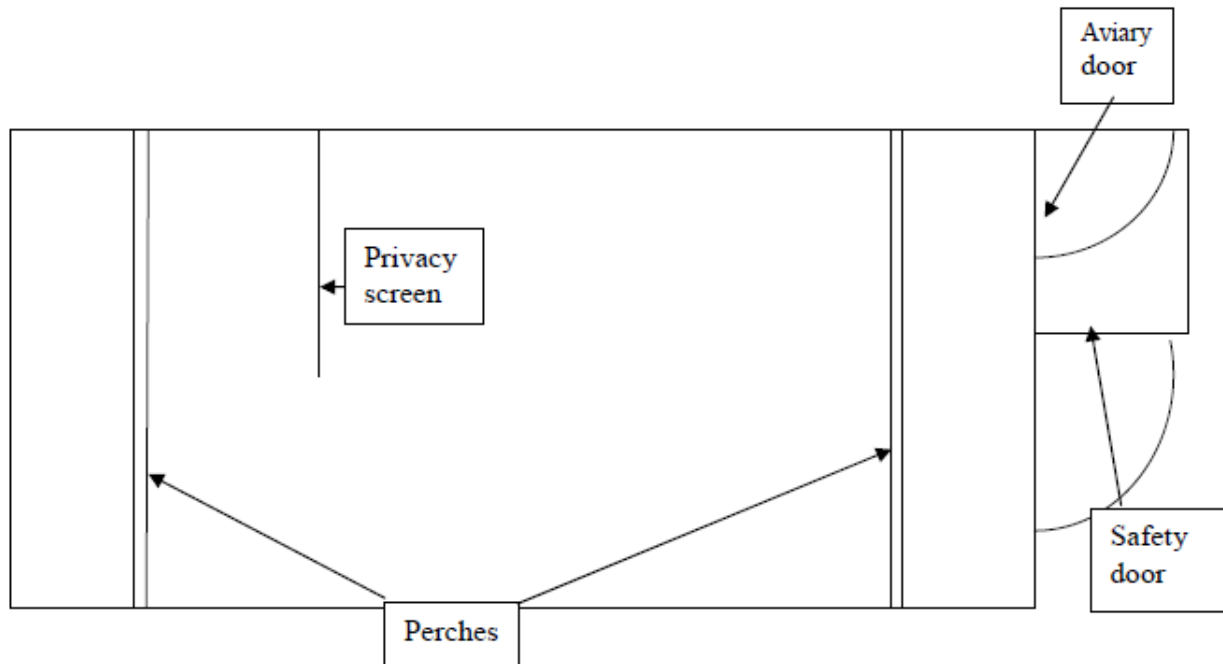
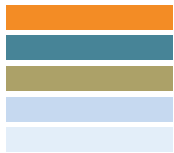


Figure: Aviary layout

Caring for Australian Native Birds by Heather Parsons has good information on aviary design and furnishings



6 Nutrition / diet / feeding

Diet

A balanced diet

- Good nutrition is vital. Food quality and hygiene are equally important when dealing with sick animals
- A **balanced** diet appropriate to species and age of the animal is essential. Food must be of the best quality. *If in doubt, throw it out.*
- Bird seed which is sold without use-by dates is best purchased from bird specialist shops which have a high turnover.
- All Kanyana’s hospital patients are given a vitamin supplement, either in the meatball mix or in their drinking water (Soluvet)

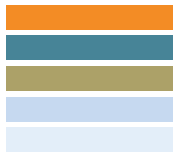
Water +

Protein	Fat and Oil	Carbohydrate and Fibre	Vitamins and Minerals
Growth & repair	Energy & insulation	Energy	Grit & sunlight
Sources	Sources	Sources	Sources
Fish, Rats and Mice Flower Pollen and Nectar Sprouted Bird Seed Insects, Mealworms And Cockroaches	Mealworms (Very High Fat) Sunflower Seeds Egg Biscuit Linseed	Seed – Wheat Sprouted Bird Seed Fruit Nectar	Calcium: Phosphorus (2 Parts Calcium to 1 Part Phosphorus) Insects Muscle Meat (Phosphorus) Sodium & Potassium

Generally speaking birds obtain their energy from either carbohydrate, or protein. Carbohydrate is found in seeds, nectars and fruits which are eaten by Granivores, Nectivores or Omnivores. When bird seed is sprouted its food value changes increasing the protein content. Carnivores and Insectivores obtain their protein needs from animals and insects.

- Almost all birds, whatever their traditional diet, feed their young insects (protein). The exception being doves, pigeons, finches and parrots which obtain their protein needs from seed .
- **ALL** land birds are highly insectivorous at breeding time.
- Specially formulated commercial food mixes are **scientifically** designed to provide a **balanced** diet; they should not be adulterated with additives such as high protein





cereal, dry milk powders, which will cause a dietary imbalance in the original formulation.

- Tubed fluids or spoon fed slurries should be given at 39 - 40° C. Your skin is about 35°C, so this will feel too warm on your skin but birds have much higher body temperatures. Any other foods should be given at room temperature not out of fridge for example, fruit mush.
- To provide extra nutrients or medication, nutrients such as *Insectivore* can be injected into food for example, a mouse.
- Food can also be coated to provide extra nutrients or medication for example, meatballs with nectar, mealworms with *Insectivore*. Tablets can be secreted in food for larger birds for example, salt tablets placed in fish for waterbirds.
- Our mealworms are enriched with *Insectivore* which is added to the bran in which they are stored, and on which they feed. Keep mealworms in a crisper in the fridge to prevent them drying out or dying (expensive!) Add a piece of carrot or spinach for moisture.

Feeding timetable (babies)

Our feeding chart is designed around our daily hospital shifts; feeds can and should begin earlier but certainly no later.

Feeds per day	Approximate feeding times									
3 x daily	8.30				12.30				4.30	
5 x daily	8.30		10.30		12.30		2.30		4.30	
8 x daily	8.30	9.30	10.30	11.30		1.30	2.30	3.30	4.30	
10 x daily	8.30	9.30	10.30	11.30	12.30	1.30	2.30	3.30	4.30	5.30

Nectivores (nectar feeders)

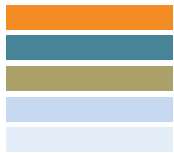
Honeyeaters (all types) including wattlebirds, spinebills, lorikeets

- Nectar is perishable. Make daily (see *Recipe* section) and keep in fridge. Change cage supplies frequently, particularly in hot weather, as bacteria breeds rapidly in the warm nutritious medium.
- Provide nectar in column feeders to discourage bathing in open dishes of nectar which causes feather damage and can, in the case of babies which have no way of regulating their body heat, cause death by chilling.

Babies – large-rice-grain sized meatballs (see *recipe*) dipped in nectar mix, chopped mealworms dipped in nectar.

Juveniles – as above but larger, or if self feeding as for adults. When beginning to self-feed forceps-feeding must be continued to ensure they maintain and gain bodyweight.





Wattlebirds because of their propensity for *imprinting* need to be weaned as quickly as possible, grouped and put out in an aviary with human interaction kept to a minimum.

Adults – nectar mix, diced and chopped well-ripened juicy fruits, Lorikeet & Honeyeater food, whole mealworms and fresh unsprayed flowers.

Insectivores (insect eaters)

Magpies, magpie larks, bee eaters, cuckoos, swallows and tree martins, robins, wrens and fantails.

Cuckoo-shrikes and silvereyes which also eat fruit and nectar.

- Insects are largely protein (about 65% with 10% fat, & 20% carbohydrate). Insects in their larval stage can contain as much as 40% fat and as such are not an ideal substitute. For this reason our mealworms are enriched with Insectivore which is added to the bran in which they stored, and on which they feed and become insectivore pellets.

Babies - rice-grain sized meatballs dipped in water, chopped mealworms dipped in water.

Juveniles – as above but larger, or if self feeding as for adults.

Adults – meatballs about the size of a large pea, whole mealworms. Bee eaters need bees which can be caught with forceps.

Mealworm note. If forceps-feeding whole mealworms, pinch them by the head to kill them as they can bite the bird in the mouth or throat. Birds which are self-feeding will work this out for themselves. Never feed dead or mouldy mealworms. Birds are very susceptible to toxins in mould.

Carnivores (meat eaters – small animals and insects)

Frogmouths, ravens, butcherbirds, kingfishers and kookaburras, raptors & owls

- Mice should be completely thawed and can, if necessary, be injected with Insectivore for added nutrition.

Babies – pea sized or larger meatballs dipped in water, mealworms dipped in water.

Frogmouths are fed whole mice sized according to mouth size. Boobooks and Kookaburras will eat chopped mice

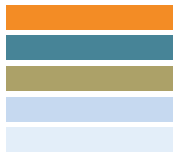
Juveniles - as above but larger sized pieces of food, or if self feeding as for adults

Adults – mice, day-old chickens, meatballs. Kingfishers are fed on live Gambesi fish and thawed whitebait in fresh water

Frogmouths have to be taught to catch live food (moths, insects and mice) which is why we pass any Frogmouths we receive onto a specialist rehabilitator. Frogmouths are prone to imprinting and should be treated in the same way as Wattlebirds, minimising human contact as soon, and as much, as possible.

Omnivores (eat almost anything)





Ravens

As for carnivores

- Ravens like to dunk their food in water and love watermelon.

Granivores (grain and seed eaters)

Parrots, doves, pigeons, cockatoos, galahs and corellas.

Note: Lorikeets are not Granivores but Nectivores

- Buy good quality seed (higher quantities of high protein seeds versus low protein seeds) from bird specialist shops which have a high turnover (bird seed is sold without use by dates).
- Birds prefer high protein/high fat seeds and will always pick these out first.
- Low protein seeds are lacking in amino acids.
- High protein seeds include oats, sunflower, safflower, niger and rape.
- Low protein seeds include white millet, yellow millet (*Panicum*), canary & kalo (Red Sorghum).
- Egg biscuit is not a complete food and for this reason should only be used as a supplement as it is quite low in protein.
- Seed should be supplemented with seeding grasses, soaked sprouted seed, mealworms, green leafy vegetables, fruit and nuts.

Parrots, cockatoos, galahs and corellas

Babies – Parrot rearing mix given on bent spoon.

Juveniles – as for adults

Adults – seed and supplements according to species

Doves, pigeons, finches, quail

Babies – Parrot rearing mix by tube into crop, weaned on to budgie seed with grit added

Juveniles – as for adults. Pigeons are given pigeon seed.

Adults – seed according to species.

Frugivores (mainly fruit-eaters but do eat some insects)

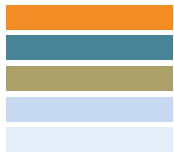
Mistletoe birds, cuckoo shrikes and silvereyes

Babies - rice-grain sized meatballs dipped in water, chopped mealworms dipped in water, ripe juicy fruit sized according to mouth

Juveniles – as above but larger sized pieces, or if self feeding as for adults

Adults – whole mealworms, with larger quantities of fruit





Herbivores / waterbirds (grass/vegetation)

Ducks, swans, moorhens and swamphens.

Babies – Chickstarter and finely shredded greens (lettuce, spinach) in small amount of water

Juveniles – as for adults

Adults – layer pellets, sprouts, shredded greens in water. Black ducks particularly enjoy insects and will eat whole mealworms. Although Wood ducks and Mountain Ducks will eat mealworms they prefer herbage.

Fisheaters / waders

Egrets and herons

- Herons and egrets have huge appetites until they reach their adult body weight at which point there will be a dramatic reduction in their food consumption.
- Thaw all frozen products in **cold** water.
- When feeding thawed fish, one feed daily should be supplemented with Vitamin B which is destroyed by the freezing process – another reason for giving *Soluvet* in the drinking water.
- Offer thawed fish in fresh water.
- ALWAYS wear safety glasses around these birds.

Babies – White bait and pinky mice

Juveniles – day-old chicks, small furred mice and whole fish

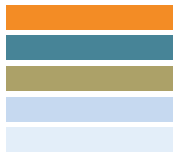
Adults – whole fish, day-old chicks, mice and baby rats

Seabirds

Pelicans, cormorants, seagulls and terns

- Pass seabirds onto a seabird specialist.
- Insectivore, vitamins or medication can be injected into fish to boost the nutrients or deliver medication.
- It is essential that seabirds (except seagulls) be given salt water, not fresh water.
- Seagulls don't have salt-glands and so can drink fresh water.
- If no seawater is available, make up saltwater (see recipe).
- Sitting the birds briefly in tepid seawater will often stimulate them to drink.
- For rehydrating, administer the usual products. Do not use seawater/salt water recipe for rehydrating; it is not the same as .9% normal Saline.





- Frozen fish must be thawed in cold water.
- When feeding thawed fish, one feed daily should be supplemented with Vitamin B which is destroyed by the freezing process.
- Offer thawed fish in salt water.
- ALWAYS wear safety glasses around these birds.

Babies – tube with liquidised fish

Juveniles - thawed whitebait

Adults – thawed boosted fish in salt water



Emus

- Babies are fed Chick Starter crumbles and fresh water ad lib.
- Older birds will eat emu pellets available from stock feeder outlets, chopped, vegies & greens.

Feeding techniques

Tube/crop feeding (see Attachment Tube feeding, Crop needling & Oral rehydration)

Dropper or syringe feeding

Note: Any dropper used must be plastic, not glass.

Spoon feeding

Using a teaspoon with bent-up sides narrowing toward the tip is ideal for parrots and galahs which will self-feed using this method.



Forceps feeding

Particularly useful for babies. Hold food above head or gently touch the side of the beak.

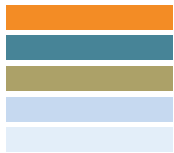
Assisted feeding: Also called force feeding; assisted feeding is a better description of the procedure.

Hold the beak open and place food at the back of the mouth. Close the beak and gently stroke the throat to encourage the bird to swallow

Recipes

There are as many diets as there are rehabilitators. These are our recipes which are designed to provide a substitute diet containing the necessary balance nutrients and minerals





Note: These recipes should not be made publicly available; they are for use by wildlife rehabilitators. The feeding of wild animals is not recommended and should not be encouraged.

Kanyana meatball mix:

1 kg	Human consumption mince (best quality, low fat), or minced lamb heart
85g	Chick starter
85g	Insectivore powder
85g	Egg & Biscuit
½ tblsp	Calcium Carbonate
14g	SF50 multivitamin powder (or good Avian multivitamin)

Mix well and freeze in small quantities for at least 3 days to kill-off toxoplasmosis which is present in meat for human consumption. Meat mix may be frozen for up to 3 months.

Perth Zoo's approximated Insectivore/Omnivore recipe:

1.5 kg	Minced meat (ox heart with fat removed is preferable)
50g	Carrot, grated
1.125kg	Cheese, grated
25 g	Calcium carbonate
1.75 kg	Dog kibble, good quality, crushed eg Eukanuba
½ tsp	SF50 vitamin power or equivalent multivitamin powder for birds
2	Eggs, hardboiled, without the shell
1 ½ tblsp	Insectivore powder Mealworms or other insects if possible

[Dietary breakdown: crude fat 24.85%, crude protein 35.41%, Calcium 1.28%, Phosphorus 0.78%]

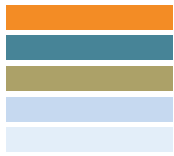
Kanyana's nectar mix:

9g	Insectivore
18g	Lorikeet & Honeyeater mix
300ml	Water

This mixture is perishable. Make daily and keep in fridge. Change cage supplies frequently, particularly in hot weather, as bacteria breeds rapidly the warm nutritious medium.

Other options are commercially prepared Lorikeet and Honeyeater foods made by Wombaroo, Vetafarm, Passwell and Avion





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Perth Zoo's nectar mix:

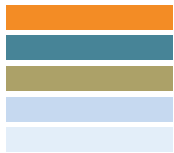
24g	Sustagen
440g	Fruit, mixed chopped eg apple, pear, banana, pawpaw
48g	Heinz high protein baby cereal
1.4litres	Warm water
5 drops	Pentavite

Saltwater recipe 3.2%:

32g salt to 1 litre of water

Note: Do not use seawater/salt water recipe for rehydrating; it is not the same as 0.9% normal Saline.





7 Common Problems

Anthropogenic (human impact):

- car accidents
- introduced predator species- cats, dogs, foxes, rats
- poisoning- insecticides, herbicides, lead, rodent baits
- Metabolic Bone Disease - 27% of magpies admitted in the breeding season, had calcium deficiency or Metabolic Bone disease. It is thought to be caused, to some degree, by people feeding calcium deficient food to adult birds who then feed it to young birds. Calcium deficient babies don't behave normally; their behaviour is erratic and they will often cease to beg for food, or will beg for food and then back away when it's offered. The parents seem to recognise this abnormality and actively reject the baby. The base of the bottom beak is often soft and birds sometimes have a broken bone which isn't due to an accident. Calcium deficiency, if caught early enough, is treatable with oral Calcium Carbonate.

DO NOT FEED BIRDS IN THE WILD

Parasites

Throat worm

34% of magpies admitted in the breeding season had throatworm .

It can be seen when the babies open their mouths to beg for food. Lesions are obvious and on closer inspection you will actually see the worm. Some birds are so severely affected that their ability to swallow is impaired. However treatment is quite simple.

Coccidea

Potentially lethal single celled protozoan causes gut bleeding, smelly diarrhoea, loss of appetite and weight. Keep isolated and treat per vet's instructions.

Infectious

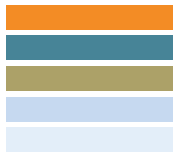
These problems are serious threats to all parrot species especially the endangered **Black cockatoos**, affected cases should be **ISOLATED**.

See section *Cleaning and quarantine at home*

Avian Pox

15% of magpies admitted in the breeding season had pox. It presents mainly in juveniles with lesions on exposed skin around the beak and on the face and on legs & feet. Magpies and Mudlarks are extremely prone to Pox usually with lesions visible on the legs. In most cases, this resolves when the immune system of the bird responds to the infection but in some cases, if there is no immune response, the lesions become generalised, including internally. As it's a viral disease there's no treatment and severe cases will die. It's





infectious between birds (mainly magpies and mudlarks) and thought to be spread by mosquitoes.

Avian Gastric Yeast (AGY) previously called Megabacteria

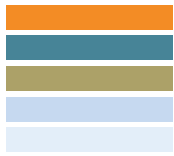
In 2010 these parrots tested positive to AGY

- 15% of Ringnecks
- 21% of Galahs
- 15% of Red-capped parrots

Beak and Feather Disease

6% of parrots and lorikeets admitted in 2010 were euthanased because they had clinical signs of PB&FD





8 Practicalities

Sources of supplies

There are many suppliers other than those we've listed. The suppliers listed are the ones we use often because they're the closest. If you network with rehabilitators in your area you may find more conveniently located sources/suppliers.

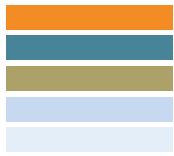
Food supplies

Network with other rehabilitators, buy in bulk to share the cost of supplies. When you're starting out you'll only need small quantities. If you share purchases with other rehabilitators, you'll save money and food supplies are less likely to spoil or reach their use-by date.

Sources of supplementary diet compounds

Supplementary Diet	Supplier	Emergency Substitute
Calcium Carbonate (not Calcium Sulphate !)	City Farmers, some vets, chemists can order	Sesame seeds, ground into powder
Calcium Sandoz Syrup	Vets, City Farmers	
Chickens (dead, day-old)	Hatcheries	
Chickstarter and layer pellets	Supermarkets, City Farmers, petshops	Egg & Biscuit
Cockroaches (Woodies), live & frozen	Bugs n things, West Jade Worms	Slaters, moths
Crickets, live	Bugs n things West Jade Worms	
Egg & Biscuit	Bird & Fish Place, pet shops	
Fish, Gambesi (live)	Bird & Fish Place, aquarium supplies	
Fish, Whitebait, human consumption quality not bait quality	Sealanes, Ciccerellos, supermarkets, etc	
Granivore (we use Passwell Parrot Rearing mix)	Bird specialists, City Farmers	
Grit (size depends on species)	Pet shop, City Farmers	Clean course sand
Honeyeater & Lorikeet food (we use Wombaroo)	Vets and pet shops	Honey & water (1 tspn in 1 cup warm water) or pureed fruit or pureed baby food (fruit)
Insectivore (we use Wombaroo)	Vets, City Farmers and pet shops	Live insects
Lorikeet and Honeyeater food (we use Wombaroo)	Bird specialists, City Farmers	As above
Mealworms	Sml qty – some pet shops Lge qty – Bugs n things, West Jade Worms. Farm your own	Earthworms, chopped



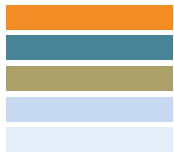


Supplementary Diet	Supplier	Emergency Substitute
Mice (frozen)	Sml qty – some pet shops Lge qty – Murdoch Uni - must be ordered in advance	Trap own mice providing no poison baits laid
Parrot rearing mix (we use Passwell, Vetafarm or Avion)	Bird specialists, City Farmers	
Probiotic powder (Protexin)	Vet, City Farmers	
Seed, Marri (for Red Capped Parrots)	We collect our own	
Seeds, bird	Specialist bird suppliers (buy qty you require), City Farmers ,pet shops and supermarkets	
Vitamin, SF50 (Avian), freezable	Specialty Feeds, Glen Forrest Stockfeeders (manufacturer & supplier)	Any good avian multivitamin
Vitamin, Pentavite	Chemist	

Sources of equipment and products

Product	Source	Emergency Substitute
Aviaries	Quokka Newspaper	
Bandage, cohesive	Vet, some Chemists	
Betadine (antiseptic)	Stock supplier (cheaper), Chemist	
Cages and petpaks	Quokka, local swapmeet	
Carbosorb	Vets	
Chlorhexidine (sterilising)	Vets	
Coban, Nexcare, narrow (cohesive/self sticking bandage)	Chemist	
Crop Needle, No.10 or 12	Bird & Fish Place	
Dermaclens (wound care)	Vet	
Dermasol (hand cleaner)	Chemist	
De-solv-it (disperses oil)	Supermarket, Hardware (paint section)	
Eye-dropper, plastic not glass	Chemist	
F10 (sterilising)	Vets	
Ferric Chloride (stops bleeding)	Chemist	Ground pepper
Forceps, long metal, round-end	ABM Surgical, Chemist	
Forceps, plastic	GP, hospital, day surgery centres	
Globes	Lamp Replacements, Lighting shops	
Hartmans (sterile rehydrating solution)	Vets	
Heat lamp, protective wire frame	Lamp Replacements	



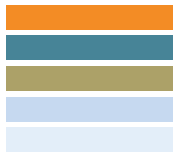


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Product	Source	Emergency Substitute
Heat lamps	Lamp Replacements	
Hotboxes	Kimani	Pet pack with lamp
Milton (sanitising)	Supermarket, chemist	Methylated Spirits
Nilstat (anti-fungal)	Chemist	
Opticin or Tricin (ophthalmic ointment)	Vet	
Rehydrating Fluids – Spark Polyaid, 1stAid, etc	Bird & Fish Place. vets	Rehydrating sachets from chemist
Rescue Remedy, Bach	Chemist, Health Food shops	
Safety door kits for aviaries	Bird & Fish Place	
Saline, normal	Vet, Chemist	
Solugel (wound dressing)	Chemist	
Soluvet (vitamin supplement)	Bird shops, pet shops	
Spark (rehydrating)	Bird & Fish Place	Rehydrating sachets from chemist
Spoon, bent, parrot feeding	Op shop teaspoon, EPNS not stainless, DIY	
Surgical scissors, blunt end	Chemist	
Syringes	GP, hospital, day surgery centres	
Digital temperature gun	Chemists, Pharmacy Direct Pet shops	
Thermometers, digital (hot box)	Kimani, Dick Smith, Tandy, Aust Geo	
Trouble lamp (in wire cage)	K-mart, Big-W, Super Cheap Auto	
Tubing (for tube feeding)	Medical facilities (catheter tubing)	
Ungvita (tar on reptiles)	Chemist (bay section)	





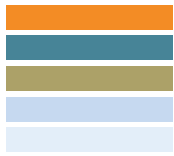
Fluid replacement chart for birds

Assuming 10% dehydration

Each dosage divided into 3 or 4 amounts for each 24 hr period

WEIGHT in grams	STABILISATION DOSAGES			MAINTENANCE
	millilitres over 1st 24 hrs	millilitres over 2nd 24 hrs	millilitres over 3rd 24 hrs	millilitres over 24 hr period
10	1.00	0.750	0.750	0.50
12	1.20	0.900	0.900	0.60
14	1.40	1.050	1.050	0.70
16	1.60	1.200	1.200	0.80
18	1.80	1.350	1.350	0.90
20	2.00	1.500	1.500	1.00
25	2.50	1.875	1.875	1.25
30	3.00	2.250	2.250	1.50
35	3.50	2.625	2.625	1.75
40	4.00	3.000	3.000	2.00
45	4.50	3.375	3.375	2.25
50	5.00	3.750	3.750	2.50
55	5.50	4.125	4.125	2.75
60	6.00	4.500	4.500	3.00
65	6.50	4.875	4.875	3.25
70	7.00	5.250	5.250	3.50
75	7.50	5.625	5.625	3.75
80	8.00	6.000	6.000	4.00
85	8.50	6.375	6.375	4.25
90	9.00	6.750	6.750	4.50
95	9.50	7.125	7.125	4.75
100	10.00	7.500	7.500	5.00
105	10.50	7.875	7.875	5.25
110	11.00	8.250	8.250	5.50
115	11.50	8.625	8.625	5.75
120	12.00	9.000	9.000	6.00
125	12.50	9.375	9.375	6.25
130	13.00	9.750	9.750	6.50
135	13.50	10.125	10.125	6.75
140	14.00	10.500	10.500	7.00
145	14.50	10.875	10.875	7.25

Note: Administer the volumes as close as practical to the above recommendations.



WEIGHT in grams	STABILISATION DOSAGES			MAINTENANCE
	millilitres over 1st 24 hrs	millilitres over 2nd 24 hrs	millilitres over 3rd 24 hrs	millilitres over 24 hr period
155	15.50	11.625	11.625	7.75
160	16.00	12.000	12.000	8.00
165	16.50	12.375	12.375	8.25
170	17.00	12.750	12.750	8.50
175	17.50	13.125	13.125	8.75
180	18.00	13.500	13.500	9.00
185	18.50	13.875	13.875	9.25
190	19.00	14.250	14.250	9.50
195	19.50	14.625	14.625	9.75
200	20.00	15.000	15.000	10.00
205	20.50	15.375	15.375	10.25
210	21.00	15.750	15.750	10.50
215	21.50	16.125	16.125	10.75
220	22.00	16.500	16.500	11.00
225	22.50	16.875	16.875	11.25
230	23.00	17.250	17.250	11.50
235	23.50	17.625	17.625	11.75
240	24.00	18.000	18.000	12.00
245	24.50	18.375	18.375	12.25
250	25.00	18.750	18.750	12.50

Mealworms

At \$100 per kilo, it's worth breeding your own mealworms. An added benefit of having your own mealworm farm is that you always have a variety of sizes of mealworm available as well as beetles. Most mealworms sold are full-size and as such are unsuitable for smaller birds and babies. Some birds such as magpies, kookaburras and ravens relish the beetles.

A mealworm farm is cheap to set up, doesn't smell and needs very little attention

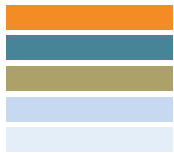
A note of caution: Mealworms are very high in fat and low in protein and are not recommended as a whole food unless they are fortified (gut-packed) with Insectivore.

Set-up

To begin you'll need :

- lidded plastic storage crate (shallow rather than deep, these cheap storage crates come in a variety of sizes and are readily available from Bunnings, K-mart, Red-dot and WA Salvage. Eventually, you'll need additional crates to separate the adult beetles and the full-size mealworms.
- fibreglass flyscreening, 15-20cm larger than container, to cover the top
- Hessian or shadecloth (available from Spotlight and hardware stores respectively)





- supply of bran and pollard (available from some supermarkets, stockfeeders, or City Farmers)
- supply of mealworms (around \$10 for 100 grams)
- vegetable scraps – whole or chopped pieces of carrot, broccoli stalks, silver beet leaves

What to do:

- Cut a square opening (about $\frac{1}{4}$ to $\frac{1}{3}$ of the lid size) from of the lid of the plastic container
- Fill container with a 75mm layer of equal parts of pollard and bran
- Cover with a two layers of hessian, cut to size
- Place mealworms into the bran/pollard mix, under the hessian
- Add a handful of vegetables between the two layers of hessian
- Cover with the flyscreening before securing the plastic lid

Maintenance

Food - feed weekly by placing a few vegetable scraps between the two layers of Hessian. Avoid moist/juicy vegetable scraps as these can cause mould if moisture seeps into the bran/pollard mix. Large chunks of vegetable scraps are best as they don't dehydrate as quickly eg broccoli stalks, whole carrots, cabbage, etc. Mealworms do require some moisture which they obtain from the vegetable scraps. The bran/pollard medium is also a source of food.

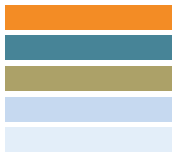
Hygiene

Whilst a mealworm farm doesn't require much care, neglect can cause moulds and bacteria to develop which can in turn compromise the health of birds which are fed on these contaminated mealworms. Too deep a layer of the bran/pollard mix can contribute to these problems as can excessive moisture from moist vegetables. As the colony grows a fine, grey dust (droppings) settles on the bottom of the container. The bran/pollard mixture can be topped up as needed, depending on the size of the colony. However, make sure the level is not too close to the lid as the worms can escape.

Avoid overcrowding by splitting the colony every six months or so. this will not be necessary if you are constantly harvesting the worms as a live food. The mature mealworms and beetles should be separated (use a coarse sieve) into freshly prepared containers. Any surplus, mature mealworms can be put into small take-away food containers with holes in the lid. Add a small amount of the bran/pollard mix, a couple of tablespoons of Insectivore powder and a small piece of carrot. Store the container in the fridge; the low temperature halts the development of the mealworm into the adult form beetles

Insects are largely protein (about 65% protein with 10% fat & 20% carbohydrate). Insects in their larval stage can contain as much as 40% fat and as such are not an ideal food





substitute. Adding Insectivore powder to the bran/pollard mix, known as *gut packing*, enriches the protein content of the mealworms.

Temperature

Keep in a cool, dark and dry location out of direct sunlight and away from heat, preferably somewhere with a stable temperature and humidity. The ideal climate is considered to be 25 degrees with 50% humidity.

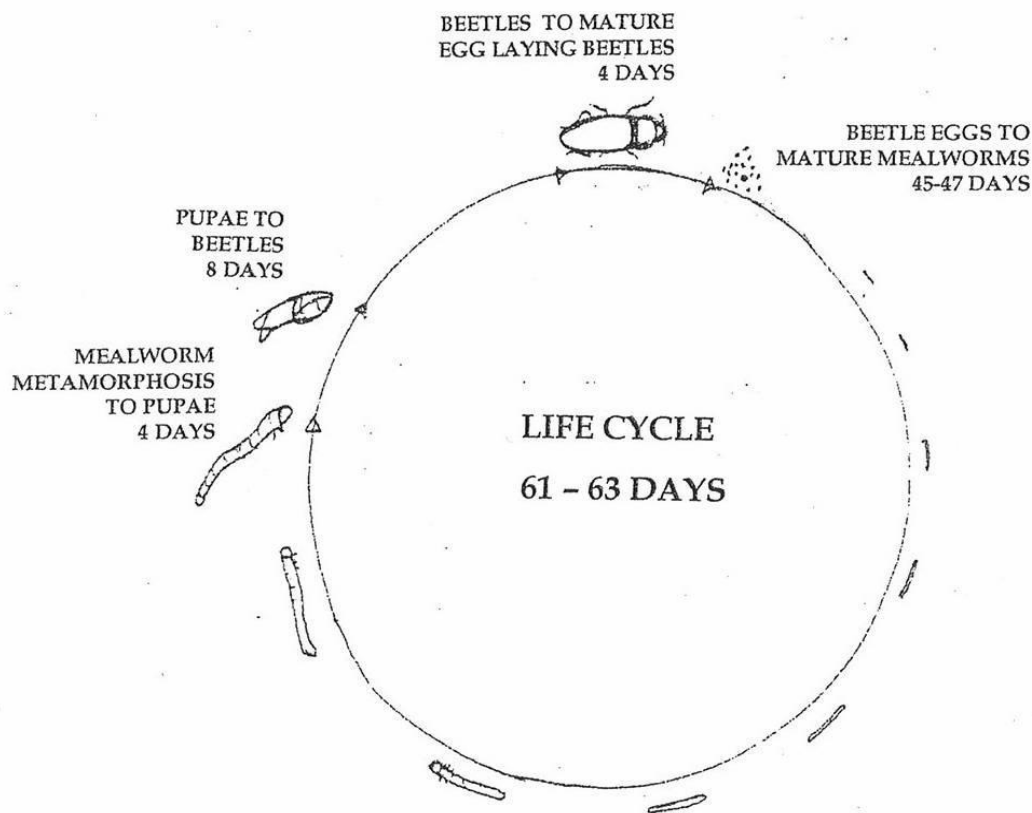
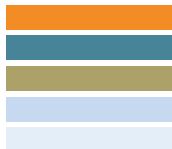
Life cycle

Mealworms are the larval stage of the four-life-cycle phase of the beetle *Tenebrio molitor*. This life cycle is 61-63 days.

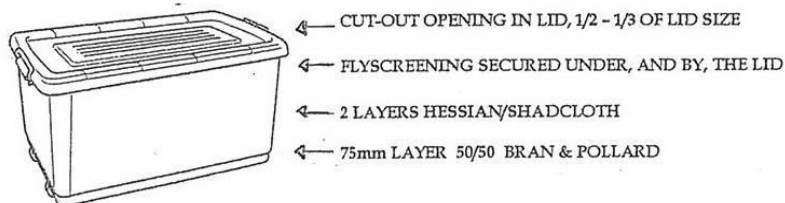
The adult beetle lays its eggs indiscriminately in the bran/pollard mix. The eggs hatch into 2mm mealworms with voracious appetites causing fast growth. As they grow, they periodically shed their skins (the hessian/shadecloth layer aids this process) until they reach their full size of 35 mm. The mealworms then go into a deathlike state for 4 days after which white mummy-like pupae emerge. After 8 days, the pupae become beetles which quickly mature into egg-laying beetles which begin the life cycle over again.

- | | |
|---|------------|
| – Beetle eggs to mature mealworms | 45-47 days |
| – Mealworm metamorphosis to Pupae | 4 days |
| – Pupae to beetles | 8 days |
| – New beetles to mature egg laying beetle | 4 days |



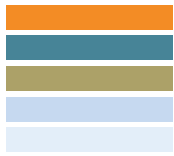


MEALWORM FARM



Caution

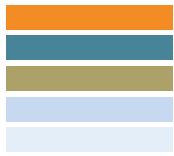
When working with the Mealworm Farm you should wear a mask and gloves as the dust can cause allergic reactions.



Weight ranges of species common to Perth area

Bat, Chocolate Wattled (Average 9g)	8-12
Bat, Gould's Wattled (Average 14g)	10-18
Bobtail (See Lizard, Shingleback)	
Budgerigar	30-40
Butcherbird, Grey	75-110
Butcherbird, Pied	120-160
Cockatoo, Black, Red-Tail	570-870
Cockatoo, Black, White-Tail, Shortbill	610-770
Cockatoo, Black, White-Tail, Long Bill	610-770
Cockatoo, Corella, West, Long Bill	580-860
Cockatoo, Corella, East, Long Bill	550-650
Cockatoo, Corella, Short Bill	370-630
Cockatoo, Major Mitchell	300-440
Cockatoo, Sulphur Crested	400-700
Coot, Eurasian	395-555
Cuckoo, Pallid	80-90
Cuckoo-Shrike, Black-Faced	120-140
Dove, Diamond	25-35
Dove, Peaceful	45-60
Duck, Pacific Black	900-1100
Duck, Wood (Maned Goose)	700-800
Eagle, Wedge Tailed, Male	2000-4000
Eagle, Wedge Tailed, Female	3200-5300
Emu	3-5.5 Kilos
Falcon, Brown, Female	550-750
Falcon, Brown, Male	400-550
Fantail, Grey	9-13
Finch, Zebra	10-12
Frogmouth, Tawny	370-430
Galah, Pink & Grey	300-480
Goshawk, Brown, Female	470-700
Goshawk, Brown, Male	230-375
Grebe, Little	180-220
Gull, Silver (Seagull)	300-350
Heron, Night(Nankeen)	540-850
Heron, White Faced, Grey	500-600



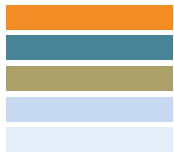


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Honeyeater, Brown	8-12
Honeyeater, New Holland	20-25
Honeyeater, Singing	22-30
Honeyeater, White Cheeked	18-22
Kestrel, Male	120-200
Kestrel, Female	150-250
Kingfisher, Sacred	40-50
Kookaburra	350-460
Lizard, Shingleback (Bobtail)	250-500
Lorikeet, Rainbow	100-150
Magpie, Australian	300-380
Magpie- Lark	85-100
Moorhen, Dusky	500-600
Owl, Barn, Male	280-320
Owl, Barn, Female	350-450
Owl, Boobook, Male	230-375
Owl, Bookbook, Female	190-360
Pardalote, Spotted	7-9
Pardalote, Striated	10-12
Parrot, Red Capped	100-160
Parrot, Ringneck (28)	120-170
Parrot, Rosella, Western	50-80
Pidgeon, Bronzewing Common	250-400
Pidgeon, Crested	150-200
Possum, Brushtail, Female	1200-3500
Possum, Brushtail, Male	1330-4500
Possum, Ringtail	900-1100
Raven	450-670
Robin, Scarlet	12-15
Seagull (See Gull, Silver)	
Silvereye	9-13
Sparrowhawk, Collared, Male	130-190
Sparrowhawk, Collared, Female	210-280
Spinebill, Western	6-8
Swallow, Welcome	10-20
Swallow, Wood	30-40
Swamphen, Purple	600-700



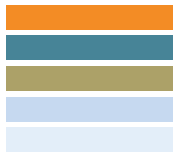


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Swan, Black	4000-5000
Thornbills	6-7
Twenty-Eight (See Parrot, Ringneck)	
Wagtail	17-22
Wattlebird, Little	80-95
Wattlebird, Red	105-125
Weero (Cockateil)	80-90
Wren, Splendid	7-9
<i>Weights are in grams unless otherwise indicated</i>	

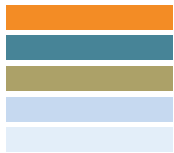




9 Skills needed to competently care for sick birds

- 1 able to identify species and stages of growth of common bird species
- 2 ability to distinguish between normal behaviour and abnormal/ ill health
- 3 manage animals in a way that reduces stress
- 4 husbandry & handling skills:
 - a) handling of various species
 - b) tube feeding skills – for example tube feeding and hydration for specific species of birds
 - c) passerines (perching birds)
 - d) parrots small & large
 - e) water birds
- 5 strapping and bandaging
- 6 understanding the three main stages of rehabilitation
- 7 understanding the importance of having a management and release plan from day one.



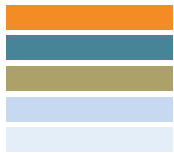


10 Recommended reading

WHITE, SHARON. Caring for Australian Wildlife
WALRAVEN, ERNA. Guide to the care of Urban Wildlife
HAND, SUZANNE J. Care and Handling of Australian Animals
SIMPSON and DAY. Field Guide to the Birds of Australia
SLATER, P. P & R. The Slater Field Guide to Australian Birds
MORCOMBE, MICHAEL. Field Guide to Australian Birds
PARSONS, HEATHER. Caring for Australian Native Birds
MC WHIRTER, Dr Pat. Everybird
FOWLER, Dr Anne. Raising & Rehabilitating Orphaned Birds
FOWLER, Dr Anne. Assessment & Treatment of Burnt Wildlife
HENDERSON, Norm. Wildbird Rescue
HENDERSON, Norma. Australian Bird Rehabilitation Manual

Websites

ROSE, Dr Karrie. Australian Registry of Wildlife Health. *Wildlife Health Investigation Manual*
<http://arwh.org/>
WIRES, NSW. [WIRES, NSW](#)



11 Appendix Crop feeding

(by tubing) pigeons & doves and crop needling parrots

All birds can be tube fed; for birds without crops the quantity needs to be less than that for a bird with a crop. Birds with crops can take larger quantities of food. Parrots may be fed using a plastic tube, however please use care to ensure they do not bite through the tubing. Kanyana does not use metal crop needles.

Some birds have no crop whilst others have differing types of crops (see diagram)

A crop is an out-pouching of the oesophagus which acts as a repository for dry food to become warm and moistened before it passes into the stomach (proventriculus). Whilst owls don't have a crop, the size of the food they consume and the slowness with which it passes through to the stomach (proventriculus) may give the external appearance of a crop.

The crop is located just above the keelbone.

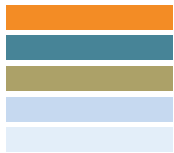
Equipment

- Parrot Rearing mix, and probiotic powder (optional)
- Spark® or Hartmans® (if animal is shocked or dehydrated)
- warm water 35°C
- small mixing bowl, small spoon & warm water bath
- 10 ml and/or 25ml syringes & plastic tubes (sterilise by totally immersing in Milton® solution for 1 hour)
- metal crop needles (sterilise in F10 disinfectant 1:250 for 2 minutes. Do not use Milton for metal crop needles.)
- lubricant
- plastic tubing,
- matches & scissors.
- scales
- dark handling towel

Procedure for crop feeding

- Select appropriate food and determine amount needed by weighing the bird. Amount to be fed is determined by calculating the daily amount recommended by the manufacturer and dividing that by the number of feeds per day Babies require several feeds a day
- Rinse sterilized tubes, crop needles & syringes to remove all traces of sterilising agents
- Check end of tube for rough edges, use only smooth ends. For new tubing, cut end at angle and pass through heat of match to soften and smooth the cut edges.





- Prepare enough Parrot-Rearing Mix with warm water to a thick slurry. One rounded teaspoon to 10ml of water will give the correct consistency. Use syringe to draw up 10ml water.
- Place the bowl in warm water to keep it at the bird's blood temperature (39 - 43°C)
- Before attaching tube or needle, fill syringe with 1ml more than you require, eliminate air bubbles. Then attach, and lubricate tube
- Take a dark coloured towel and use it to catch the bird. The bird should be weighed before feeding both for your written records and for the purpose of determining the amount of food required.
- Keep the bird wrapped in the towel for the procedure
- Check that the crop is empty !
- Take a moment to calm yourself and make sure the bird is comfortable
- Gently open the beak and extend the neck upwards to straighten neck and accommodate the tube/crop needle, tip the head slightly backwards
- Insert the tube/crop needle into the mouth from the bird's left side. Pass it over the tongue and down the right side of the bird's throat so that you can see the feathers on the right side of the neck ruffle. It may be necessary to twist and twirl crop needles gently down the throat.

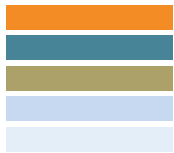
DO NOT USE FORCE !!!

- Withdraw and start again if there is any resistance.
- Pass the tube down very gently until you feel some resistance which will be the base of the crop. Withdraw the tube slightly and gently push the contents of the syringe into the crop. Watch the back of the throat for welling of fluid
- Remove the tube, keeping the head elevated to prevent backflow into the airway.
- Ensure that you clean every bit of slurry off the feathers as it sets like cement and ruins the feathers
- Check that the bird is OK and return it to its box/cage
- Record the amount fed and time of feeding

Note: Orphaned babies, birds in shock or those which are dehydrated need to be rehydrated. Oral Spark, or subcutaneous or oral Hartmann's Solution may be used. Rehydration needs to be continued for 72 hours, and feeding must be gradually introduced during this time.

Other foods such as Insectivore can also be administered by tube (birds) or crop needle. We blend Insectivore in an electric coffee grinder to create a finer power for tubing as the Insectivore swells and thickens when mixed with water, blocking tubes and syringes.

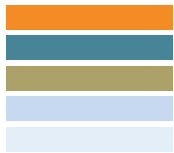




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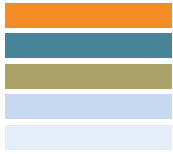


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March 2013

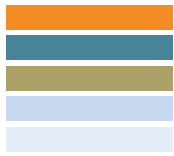


Photo – J Baker



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Environment and Conservation

Our environment, our future 



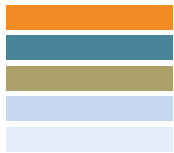
Module three Care of raptors

Module objectives

At the end of the raptor module today, you should be able to:

- describe the unique physiological features of raptorial birds
- correctly identify a bird as raptorial (diurnal bird of prey / owl)
- describe the special requirements for the safe handling of raptorial species, list the things to look out for and be able to discuss safety guidelines for you and your patient
- describe the particular care and rehabilitation needs of raptorial birds, particularly the need for free-flight in hard-chasing species
- discuss the dietary needs of raptorial birds and how to go about meeting those needs
- identify common problems – just as raptorial birds have special needs, they also have their own particular issues of which the competent rehabilitator must be aware
- discuss how to set up a facility to suit raptors
- explain the additional rehabilitation techniques required for free-flying raptors
- discuss how to find sources of information, assistance and support for rehabilitators when it is needed.



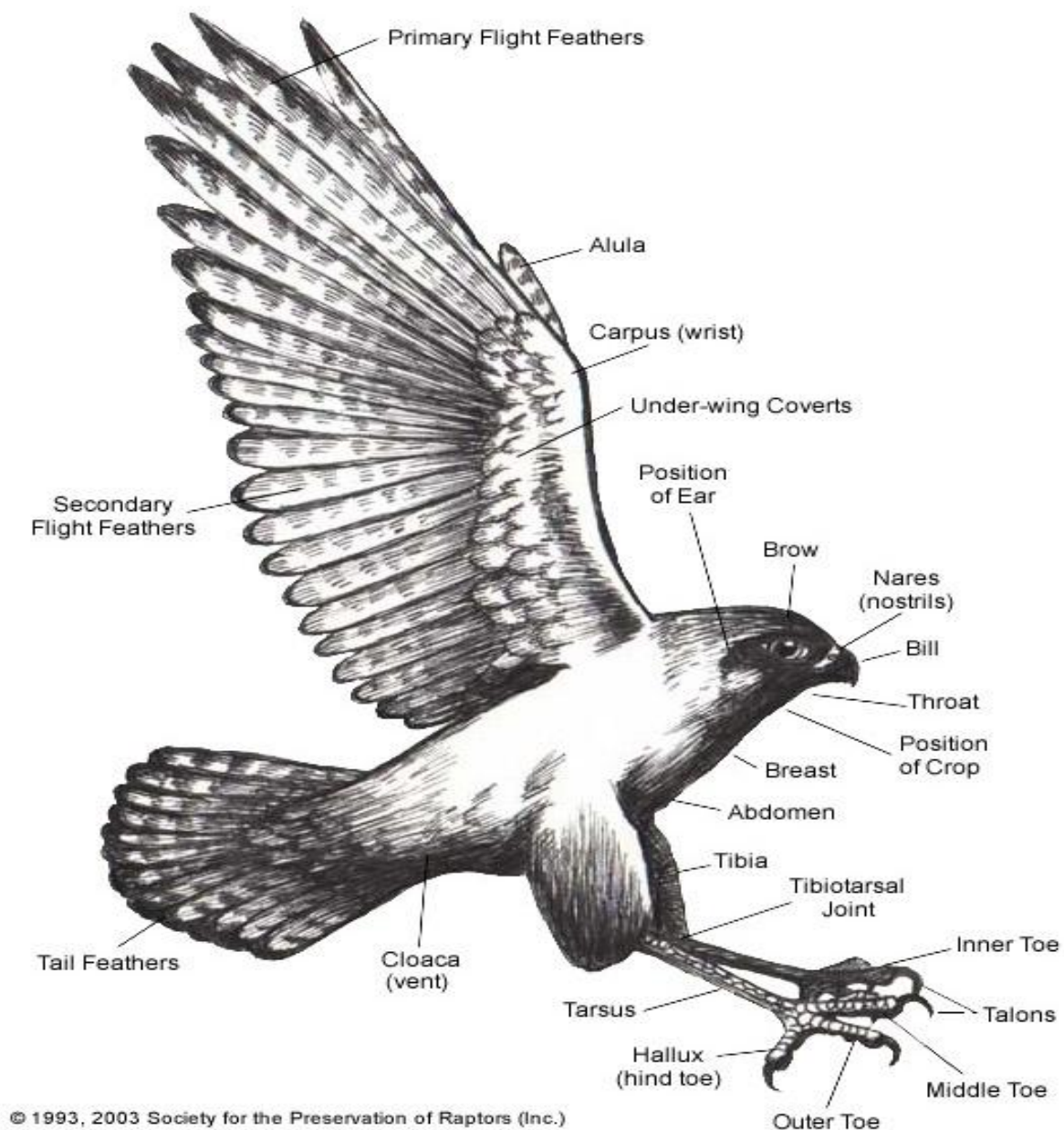


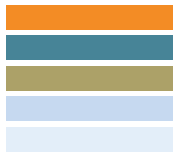
1 Raptor anatomy

Raptor anatomy is avian anatomy with a few specialised adaptations which relate directly to the way these birds survive in the wild.

Nothing on a raptor is there to make the bird look attractive. Everything about a raptor is there to make it a better hunter – and therefore a better survivor.

External anatomy of a raptor





The head and neck

A raptor's beak looks formidable. It is designed for tearing flesh from bones. However, with the exception of the Kestrel and the Brown Falcon, both of which species are notorious for biting, the beak is seldom used for attack or defence. It is generally a tool used for eating. In the falcons, a feature to look for is the tomial tooth, a notched structure on both sides of the beak. The tooth is used in hunting to sever the cervical vertebrae of birds captured in flight. This stops the prey animal from struggling and makes it easier for the raptor to retain its prey.

As with all birds, beak injuries vary in severity. Proximity to the cere and the quick is a critical factor in determining how the injury will heal. Beak abnormalities can make it difficult for the bird to eat and this can be fatal out in the wild. In captivity, some birds (particularly Brahminy Kites) will develop overgrown beaks which must be "coped" back into shape prior to release using a file or Dremel-type tool. Coping is a skill which must be acquired and practiced during the rehabilitator's mentorship period.

The cere and external nares allow the bird to breathe with a closed beak. In the stooping falcons, particularly Peregrines and Black Falcons, the structure of the nares mitigates the velocity of the air flow during high-speed flight, enabling the bird to breathe normally at speeds of well over 100 km/hr. Injuries to the cere, nares and sinuses may lead to the bird losing consciousness due to oxygen deprivation in the stoop. This would be fatal in the wild.

As with most birds, a raptor's sense of smell is largely vestigial. They do not detect prey by scent.

Brow ridges protect the eyes. A raptor's eyes are relatively large and critical to their survival. Most diurnal species have brow ridges to some degree.

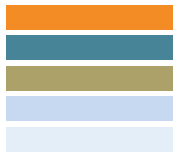
Raptor eyes are highly specialised and are the main tool used for detecting prey. The retina in a raptor's eye contains a very high number and density of cones, the cells used for day vision and colour vision. The proportion of cones to rods is very high in the diurnal raptors, and lower in the Owls. Diurnal raptors tend to be effectively "night blind," whilst Owls can see extremely well by both day and night. Diurnal raptors have outstanding colour vision with the ability to detect more of the spectrum than humans, while Owls perceive colour in a more muted way, sacrificing colour perception for super-enhanced night vision.

A raptor's visual acuity is far greater than that of a human. Wedge Tailed Eagles have been documented hunting brown rabbits in brown grass from over a kilometre away. Owls tend to be slightly long-sighted, appearing to have some difficulty discerning details at very close quarters (within 10 cm of their faces) but they make up for it with very sensitive whiskers and feathered feet. Owls will always close their eyes to feed to protect their vision.

Eye injuries are common in raptors. They are often impact-related and stem directly from car and/or window strikes. A blow to the head can cause impact-related cataracts, which are usually permanent, leaving the bird non-releasable. Even without cataracts, severe concussion can impair a raptor's vision for up to three or four months.

As with most birds, the ears on a diurnal raptor are located behind the eye. Diurnal raptors tend to use their eyes more than their ears for hunting. Owls, however, rely on a combination





of sight and hearing when hunting in the dark. The Barn or *Tyto* owls in particular have highly specialised, asymmetrically placed ears hidden underneath the facial disc. The ears are extremely large and sensitive. Barn Owls, the most common representative of genus *Tyto* can detect tiny sounds – and zero in on their location to within a couple of centimetres – anywhere within a six metre radius. Hearing in these birds is critical to their survival, and ear damage can easily render them non-releasable.

Tyto owls also have a distinctive facial disc and ruff. The feathers making up these features are highly specialised and serve two purposes, which are the guiding of light into the eyes and sound into the ears. The facial disc and ruff must be intact on an owl when the bird is released.

As with most birds, a raptor's neck is long and flexible. A raptor has exactly the same requirement as all birds do to preen every feather on its body, so the main difference between a raptor's neck and the neck on any other bird is that the raptor has very strong, wiry musculature to support the tearing of flesh from bones using the beak. At rest, in their normal posture, owls look to have short necks, but the neck is just as long as on other birds. The resting position of an owl's neck is very similar to that of a Pelican.

Diurnal birds of prey – ie: eagles, hawks, falcons (Order Falconiformes) have crops, while owls (Order Strigiformes) do not. These physiological differences should be kept in mind when considering the delivery of fluids, medication and nutrition via tube.

Shoulders, wings, plumage and body

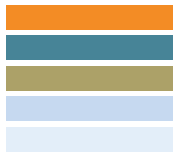
As with the vast majority of birds, a raptor's body design centres around flight. All birds have hollow bones, light but efficient musculature, wiry tendons and air sacs. The exact shape and function of a raptor's shoulders, wings and body will vary from species to species and are dependent on each species preferred hunting techniques.

Eagles have broad, powerful wings with a deep chord measurement that allows them to get airborne and soar. They are not built for long-distance endurance flapping, but for finding thermals and soaring. Despite their size (Wedge Tailed Eagles have an average wing span of around two metres) these birds are highly manoeuvrable and extremely fast under acceleration. Their preferred prey is six-to-eight week old rabbits, which they run down, flying low to the ground.

Hard-Chasing Hawks such as the Brown Goshawk have broad wings for soaring and short bursts of speed. Canopy hunters such as Goshawks and Sparrowhawks are able to dart and duck through trees, branches and undergrowth without injury due to their fast reactions and agility.

Hovering raptors such as Australian Kestrels and Black Shouldered Kites have long wings with a high aspect ratio to allow for maximum manoeuvrability and adaptability in turbulent conditions such as strong coastal sea breezes.

Stooping raptors such as Peregrine Falcons have high-speed wings for a combination of soaring and diving. Their feathers tend to be more rigid than the feathers of other birds due to the need for laminar flow over the body (and particularly the wings and tail) at high



velocity. Peregrines, Little Falcons, Black Falcons and Grey Falcons *must be absolutely feather perfect* on release if they are to hunt successfully and survive.

Owls have extremely soft plumage and their wings are highly specialised with the first primary flight feather on each wing bearing a very delicate fringe along the leading edge. Flight feathers also have a “frayed” trailing edge and a rounded tip. The sound produced in flight comes from the turbulence generated by the movement of the wings through a body of air. This generates vortices (swirling spirals of air) which trail behind the wings and it is the movement of that air that we and other animals detect as noise. The leading edge fringe on an owl’s wing acts as a series of baffles. These baffles direct air across the top of the wing and behind the trailing edge, leading to increased laminar flow over the lifting surface (which increases lift and decreases drag) and also breaks down the trailing vortices into micro-vortices which make *no sound*. Owls hunt terrestrial fauna with very keen hearing and rely on their stealth for success. The lack of sound produced by the wings is also a factor when the owl is quartering (flying low over open country) and listening for the tiny sounds made by prey animals.

As with most birds, raptors are frequently handed in with impact injuries from incidents such as car strike, wire strike or window strike. The internal injuries sustained in impacts are treated in exactly the same way as with any other bird. The rehabilitator must remain mindful that the raptor must be returned to an extremely high level of fitness following any injury or illness if it is to survive on release.

Legs and feet

The legs and feet of a raptorial bird are its weaponry, used for both attack and defence. A raptor kills using its feet and as such, the legs and feet are the most powerful part of the bird.

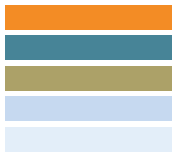
Compared to most other birds, the leg and foot bones are larger, with more musculature and specialised tendons all designed around a single purpose: that of making the bird an effective killing machine.

Diurnal raptors have the usual avian arrangement of three toes forward and one back. Owls have two toes forward, one back and one double joined toe which can swing into the forward or backward position. The swinging toe is positioned forward for grasping prey and backward for parrot-like climbing and perching in trees and hollows.

The foot of a raptor can adjust its grip to suit any size of prey. Pressure is exerted from the end of the hind and forward toes as well as the inside of the toes themselves. The toes are controlled by two powerful muscles which act together - the flexor digitorum longus which contracts the fore toes and the flexor hallucis longus which contracts the hind toe. Another muscle, the tibialis anterior, flexes the leg joint, which is undoubtedly useful at the moment of strike when a raptor may hold the prey close to the body.

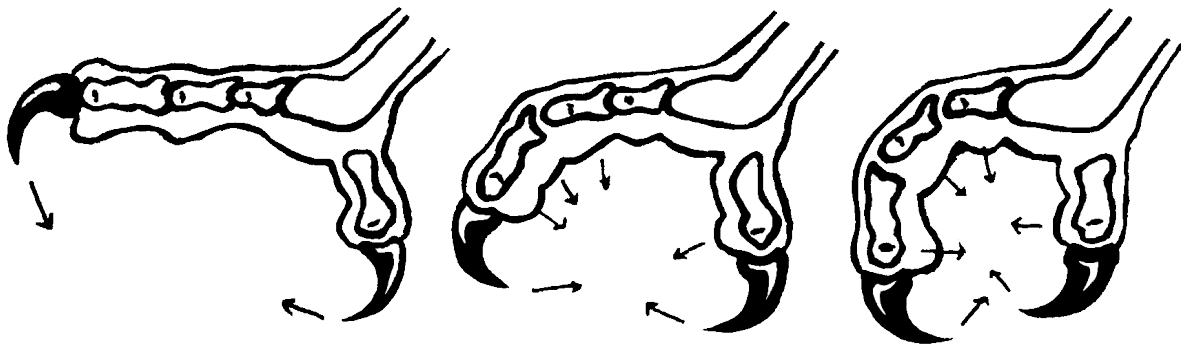
The middle toe is elongated in several bird-catching species such as Sparrowhawks and even more so in the rare Red Goshawk. The elongated toe is used as a hook for mid-air capture.

The two outer toes are used for restraint and grasping, while the hind talon, the hallux, is thicker and more powerful than the other three. The hallux is the killing talon.



Permanent damage to the hallux will render raptors non-releasable. Damage to other toes may be assessed on an individual basis, especially in older, experienced birds, but in young birds, permanent foot damage will equate to a death sentence in the wild.

The structure of a raptor's foot



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Original illustration by Craig Willmoth

original illustration by Craig Willmoth

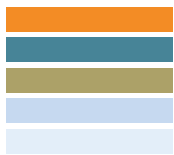
Tail

As with all birds, the tail is an essential part of flight. The tail primaries are aerodynamic lifting and control surfaces which allow the bird to steer, balance turns, sideslip, brake, dive and swoop. Just as with wing primaries, tail primaries must be in perfect condition for a raptor to be releasable.

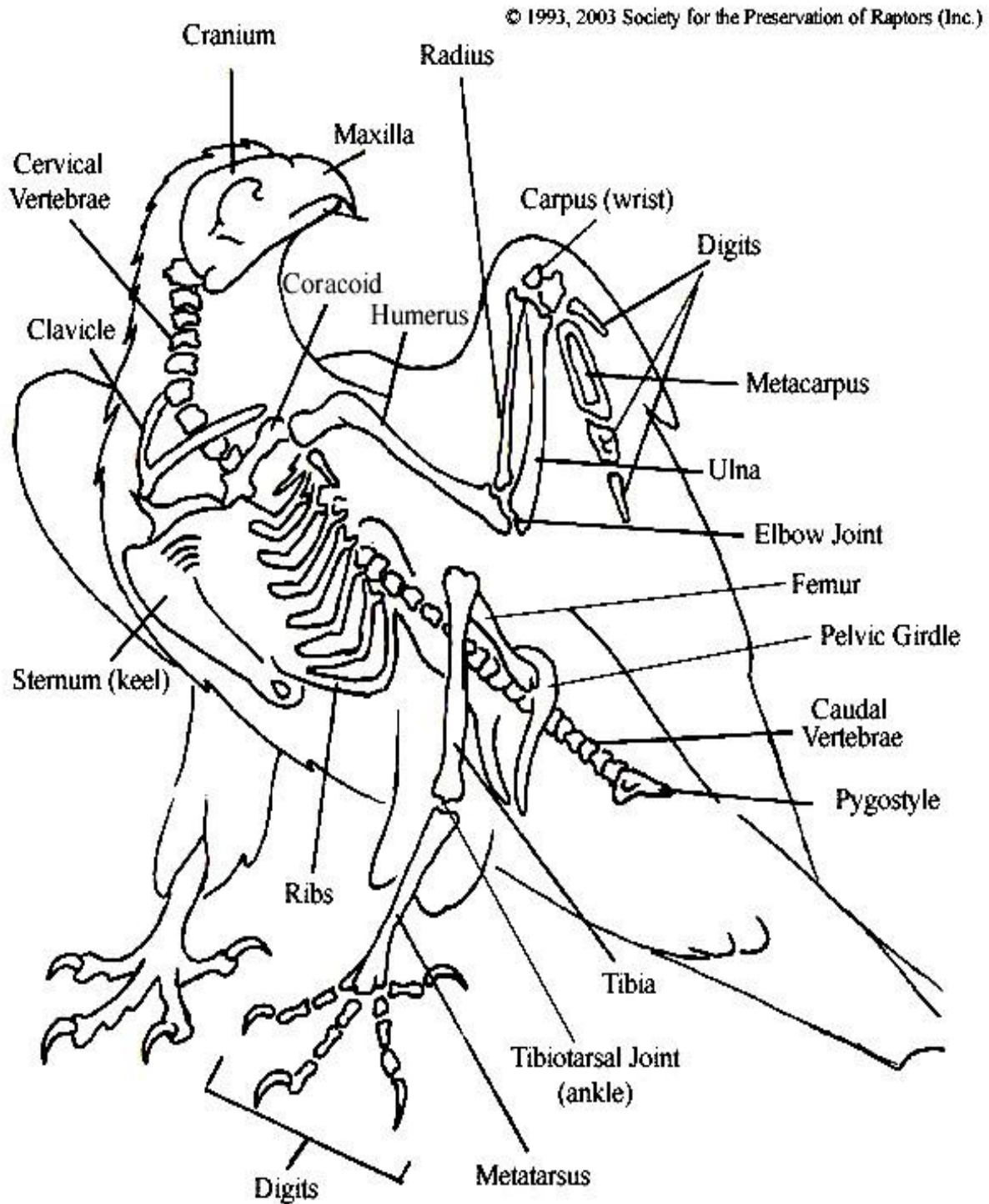
Dirty tail coverts can be an indication of poor health and/or disease. If a bird is not lifting its tail sufficiently for clearance when defecating, this can indicate a back (spine, soft tissue or kidney) or pelvic injury. Small, frequent mutes which stick to the tail feathers may be symptomatic of Coccidiosis, or in female birds, egg binding.

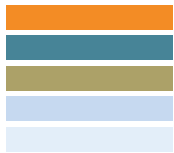
Discoloured mutes can be an aid to diagnosis. Green mutes are indicative of bile passing through the digestive system (starvation) while pink mutes are indicative of kidney dysfunction.





Skeletal structure of a raptor





2 Raptor identification

In the most general of terms, a raptor may be described as a carnivorous bird with a hooked beak which takes its prey using its feet. Taxonomically, they are grouped as Order Falconiformes, comprising the Families Falconidae and Accipitridae. For practical purposes, Order Strigidae (owls) are also considered raptorial in nature. Broadly speaking, therefore, the rehabilitator may consider raptors to be eagles, falcons, hawks and owls.

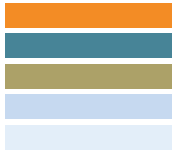
Identifying a bird as a raptor is relatively straightforward. Key signs to look for are as follows:

- Forward facing eyes – all predators tend to have eyes that face forward, giving good binocular vision and depth of field. Eye colour may vary from black (Tyto owls) through dark brown to light brown, grey or greenish brown right through to red-orange, bright yellow and even (in juvenile Sparrowhawks, for example) green. Reaction to light should be rapid and marked, but this may vary in the case of head injury or neurotoxin poisoning. Most diurnal raptors will have a brow ridge to some degree. In the owls, the eyes face completely forward and the head is tilted so that the beak points downward when held in the normal position.
- Hooked beak – a raptorial beak tends to have a distinct curvature ending in a pronounced hook. If the beak is straight with a small hook on the end, you may be dealing with a seabird, butcher bird or corvid.
- Powerful legs, feet and talons – raptors kill using their feet. The legs and feet are the most powerful part of the bird. For your own safety, if there is any doubt regarding identification, assume that the feet are dangerous.
- Colouration – raptors tend to be brown with mottling, spots, stripes and/or bands. The main exceptions to this are the Black Shouldered Kite, which is white with black markings on the wrists, the White Bellied Sea Eagle which has a white belly and head with grey wings and mantle, and the Barn and Masked Owls, which may appear at first glance to be white, albeit with mottled brown and gold wings, mantle and a striped tail.

It is recommended that anyone taking in birds have a good identification guide to hand.

The ability to identify a raptor with some accuracy is useful for several reasons:

- You need to know precisely what you are going to remove from a box before you do so. Different birds react in different ways. A Goshawk may roll on its back and strike out with extremely long outstretched legs and talons. A Brown Falcon or Kestrel may huddle at the bottom of the box. A Sparrowhawk or Little Falcon may come darting out of the box accelerating through approximately twenty kilometres per hour as it hits your face.
- You need to know what that bird normally eats in the wild. Some birds prefer mice, others are bird eaters, and for others, rabbit is the primary food source. Mimicking the wild diet as closely as practicable will help to optimise the bird's general state of health whilst in care.



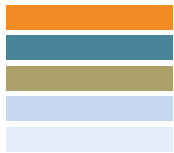
BASIC COURSE IN WILDLIFE REHABILITATION

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- You need to know how you are going to house it – do you have a suitable aviary or should the bird be transferred to a more appropriate facility once you have it stabilised?
- You need to know what sort of rehabilitation programme you will need to implement for this particular species based on how it behaves and how (and what) it hunts in the wild.

In some cases, the bird will not be a raptor. Surprising as it may seem, many members of the public cannot tell a Tawny Frogmouth from a Wedge Tailed Eagle, or a Mallard from a Goshawk.





3 Admission, handling and examination techniques

On admission, the handler must beware of feet and talons. Raptors have incredibly fast reaction times and can cause serious injuries in under a second.

The overriding difference between raptors and other birds is that raptors are equipped with very powerful feet and talons which can inflict serious injury to a handler. The beak, while having little actual bite down power, can rip and tear flesh very easily. If you are footed by a raptor you must extend the bird's leg to enable it to disengage the locking mechanism of its clenched feet.

Usually, the injured raptor will arrive in a cardboard box with some form of padding to grip onto to retain its balance during transport. Removing the bird from the box can be a delicate operation and is best done with a thick glove on one hand and towel draped over the open end of the box as you slowly open it.

Caution should be taken at this point not to under-estimate any bird of prey: even if the bird appears lethargic and easy to handle, it may muster the energy to defend itself from a perceived threat (the handler) at any moment.

If you have any doubts about your experience handling raptors, **get help!** Do not attempt to handle the bird on your own and risk serious injury to yourself or your patient.

Upon opening the box, preferably in a darkened room (unless you are dealing with a nocturnal bird, in which case darkening the room will simply place you at a disadvantage) use your gloved hand to distract the bird while you gently place a towel over the bird's head. The main stimulus for raptors is visual, and by removing that stimulus with the towel, they become slightly easier to handle.

If the bird is standing up, gently press it to the bottom of the box while keeping the towel in place, and locate the feet.

Next, grasp the bird gently around the shoulders with your free hand, keeping the wings folded in the natural position against the body.

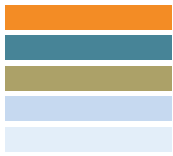
Manoeuvre your hands down the length of the bird's body, engaging the legs.

Grasp the legs firmly, but not so tightly that you will cause discomfort or injury to the bird. Make sure your grip is not too close to the toes and talons, **remember**; even small raptors have powerful gripping feet.

After removing the bird from the transport box, it must then be transferred to an appropriate intensive care box.

Once the bird has stabilised, you will need someone to assist you with the initial examination and administration of rehydration fluids. Manipulation of wings and legs to ascertain fractures or dislocation will require two people. The more you handle raptors, the more competent you will become.





Safe position and restraint



One handed pigeon grip



Two handed pigeon grip

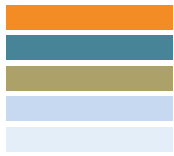


Checking the mouth



Checking the wing





4 Rehabilitation techniques, stages and release considerations

The successful rehabilitation of a bird of prey requires:

- Time
- Knowledge
- Practical skills / training
- Equipment
- Aviaries and / or free-flight venue (open space / rural / semi-rural)
- Patience

It is virtually impossible to carry out a meaningful pre-release assessment of a raptor unless the individual carrying out the assessment has a thorough knowledge of how a fit, healthy specimen of the species in question should look and behave. Each species is different and many of them, such as the hard-chasing hawks and the owls have specialist strategies used to hunt and survive. Knowledge and experience is required in order to be able to make the right decision when it comes to the disposition of the bird.

As apex predators, raptors occupy that perilous space at the top of the food pyramid, where their smaller numbers and dependence on every other link in the food chain leaves them extremely vulnerable to any kind of impact on the environment as a whole.

In the wild, we expect to see an average 85% natural attrition rate in the first year of life. This encompasses nestling mortality and the loss of fledglings as they attempt to learn and acquire the skills required to be a successful predator.

Over the first three years of life, the challenges faced by raptors raise the average mortality rate to 98%. Approximately 2% of raptors will survive to the age of three.

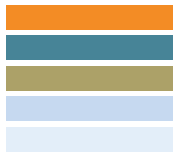
Raptors must be consistently successful predators in order to have any chance of survival on release. To be consistently successful, they must be completely fit, feather perfect and have the right balance of aggression and caution in order to survive.

The successful rehabilitator will *know their species*. An understanding of the challenges faced by raptors and the way in which each species meets those challenges is essential to understanding how to appropriately rehabilitate and condition each bird for release and maximise its chances of survival on its return to the wild.

It may take eighteen months or more to rehabilitate a single raptor, particularly in the case of the 'hard chasing' species such as the Brown Goshawk or the Peregrine Falcon. Peregrines in particular push their bodies to a phenomenal level when hunting. The fastest recorded speed for a Peregrine Falcon was 280km/hr¹ in the stoop or hunting dive. There is no aviary that can be built by humans to effectively duplicate the conditions under which a Peregrine Falcon can exercise to that degree.

¹ Terminal Velocity – Ken Franklin / National Geographic 1999





First, however, the bird must be returned to a state of health sufficient to allow for strenuous exercise.

Stage 1: Intensive care

Intensive or primary care for raptors is much the same as for any kind of bird. The patient must be stabilised in a warm, quiet location for a short period of time prior to initial assessment and rehydration. Its hospital box should be large enough for it to move comfortably, with restrictions, within a limited area.

Small to medium-sized raptors can be accommodated in the standard, commercially-available heated hospital boxes, however these tend to be too small for larger species, especially birds such as Wedge Tailed Eagles and White Breasted Sea Eagles.

Larger raptors require a box whose dimensions are approximately 90 cm x 90 cm x 90 cm. In a box of this size the bird can stand, turn, but not extend its wings or attempt to fly. When in intensive care, the bird's movements need to be restricted. An eagle-sized heated box can be custom made if you have the wherewithal (resources, skill, funding) or you can use an unheated box in combination with a heat pad. If using heat pads with birds, do not cover the entire floor with the pad and ensure the bird has a perch (or a rolled towel if it cannot stand) so that it can get away from the heat source if it needs to. Monitor the temperature inside the box carefully so that it remains constant at a comfortable level.

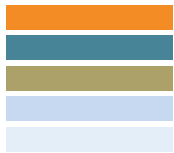
As with most birds, raptors are most comfortable if they can perch. A perch in a hospital box needs to be large enough for the bird to balance without gripping too hard, with a textured surface (such as an astroturf covering) and a stable base.

If a raptor cannot perch, lay it gently on its chest with its feet beneath it, and support its body using a rolled towel in a "U" shape with the open ends of the "U" facing back toward the tail. To avoid tail primaries becoming soiled and damaged with faeces and urates from the mutes, a tail sheath may be fitted. A tail sheath may be made up from an appropriately sized envelope with one end cut off, and attached by slipping it over the tail feathers before securing it with a low-adherent tape such as Leukosilk which will not leave a residue.

Fluid therapy: as with all sick and injured wildlife, it is standard practice to assume that the bird has lost 10% of its body weight due to dehydration. See the section on fluid therapy for birds in *Sick and Injured Wildlife* for oral rehydration rates.

Following serious injury and/or prolonged periods without water, the bird may be in too deep a state of shock for fluids administered orally to be absorbed via the gut. In some cases, particularly with Southern Boobook Owls, which are extremely sensitive to stress, the bird may regurgitate orally administered fluid, which creates the additional risk of aspiration. In cases such as these, fluid (sterile saline or Hartman's solution) may be administered via the subcutaneous route by a suitably qualified person.

Only an animal health professional may administer fluids using an intravenous or intraosseous injection. Competent wildlife rehabilitators may be trained in administering subcutaneous fluids. This is an advanced topic and will not be covered at this stage of training.



Stage 2: Acclimatisation

Once the patient has been rehydrated, it is time to reintroduce food. If a raptor is unable or unwilling to eat voluntarily, it may have to be tube fed. Supplements such as Poly-Aid Plus will provide simple amino acids and avian probiotics to help the digestive system adjust and restore some gut flora. The next step up is meat slurry.

The nozzle on a standard luer slip syringe has a very small internal diameter, so any meat slurry administered via tube must be finely minced to the point where individual pieces of meat cannot be distinguished with the naked eye. Many domestic food processors cannot cut meat finely enough to be tubed, so while initial processing can be done mechanically, the slurry may need to be minced by hand at the end stage to get it fine enough to pass through the nozzle of the syringe.

See section 5 “Nutrition, Diet and Feeding” for information on making up slurry.

As the bird gains weight and strength, it will begin to attempt escape from its restrictive housing. It now needs to be staged into a larger box. Some birds may go straight into a small aviary or mew (see “Housing”) but those which have been seriously ill or badly injured will require a week or more in a ‘jump’ box. A jump box is so named as it allows the bird to jump around but not engage in active flight.

Jump boxes may be situated indoors or in a sheltered spot outside, safe from predators such as dogs, foxes and cats. As raptors are not prone to chewing on their enclosures and can injure themselves on metal bars or wire, wooden dowels and slats are most appropriate. Aviary wire may be used in construction if it is lined with shade cloth to protect the occupant.

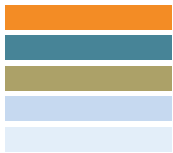
Stage 3: Pre-Release

When the bird is ready for flight it will, once again, indicate a desire to leave the restrictive jump box or other small enclosure. The flight aviary is the next, and either final or penultimate stage in rehabilitating the bird.

Owls can generally only be rehabilitated in flight aviaries so it is important that you have an enclosure large enough to allow the bird to fly some distance. This not only affords the bird valuable exercise but gives the rehabilitator the opportunity to assess the bird’s flight in terms of speed, accuracy, aerodynamic effectiveness and silence. An owl *must* be able to fly silently in order to hunt effectively. If it cannot do this, it will starve to death in the wild.

Many minor injuries suffered by raptors simply require time to heal. Head trauma is a common injury which is sometimes best treated with a minimum of intervention. Broken bones will require a minimum of six weeks’ rest following fixation and recovery time after surgery to remove fixation devices. Damaged plumage may require up to a year to regrow.

Some species of raptor do best if they are free-flown in order to regain full hunting fitness. Birds such as Peregrine Falcons and Brown Goshawks have been shown to do better in the wild if they are flown rather than rehabilitated solely in an aviary. Birds such as Wedge Tailed Eagles and owls, however, require large aviaries in which to exercise and regain their health. Free-flight exercise calls on skills similar to those employed by falconers in those



countries where falconry is legal. However, flying for rehabilitation does not involve the flushing of game nor the flying of a hunting bird for the purposes of killing other fauna. Rehabilitation flight is conducted bloodlessly, using a lure and operant conditioning training techniques. During flight, the bird is encouraged to exhibit natural flight techniques and is constantly assessed for fitness and ability while flying to the leather lure being swung by the rehabilitator. Raptors trained in this manner become neither 'tame' nor 'friendly' and should return to normal wild behaviour patterns within approximately two weeks of release.

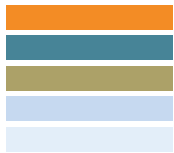


A Peregrine tiercel is in training to fly to a leather lure with a piece of meat attached. Even over a short distance, the bird is moving too fast for the camera to capture any detail

When working with wild animals, particularly those which need to be 'manned' and trained for free flight, patience is the rehabilitator's most valuable tool. If a raptor fails to meet the standard for the next stage of rehabilitation or release at any time, then the rehabilitator must reassess the process, go back to the last successful point and begin again. It is often necessary to consult with other experienced rehabilitators and animal health professionals in order to obtain a positive outcome.

There is a tremendous body of knowledge to be found among those who have made raptor rehabilitation their life's work, both in Australia and overseas. Not everyone is in a position to carry out free-flight rehabilitation, and as such birds are frequently transferred between facilities in order to receive the best care. It is possible for a raptor rehabilitator to specialise in one or more particular stages of rehabilitation, be it primary care, intermediate care or advanced rehabilitation.

At each stage, careful, patient handling and assessment will contribute toward a successful outcome for the bird.



Hand rearing orphans

As with all wild animals, it is important not to let a bird imprint on humans. In the first weeks after hatching, a young chick will think the parent is whoever feeds it. Ideally, a young bird will be returned to its parents, however in many cases this is simply not possible.

The next best thing is foster parenting. Many experienced rehabilitators keep pairs of carefully selected permanently disabled raptors as foster parents. Birds with the right temperament will readily take in orphaned conspecifics and rear them successfully.

Where foster parents are not available, however, the rehabilitator must step in. The use of mirrors, a bird puppet or just feeding a bird through an opening in a box or with a sheet over your head may help in preventing inappropriate imprinting.

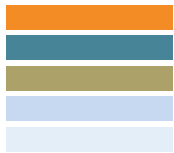


Puppet feeding can prevent inappropriate imprinting

Tiny portions of flesh should be fed at first. Bone, fur or feathers are not necessary at this stage: casting material can be introduced as you go, over a period of approximately two to two and a half weeks.

A newly hatched chick's digestive system is very delicate and just beginning to function. Too much food initially may cause digestive problems. At three days a chick can normally handle a full crop or proventriculus. Never force feed a young bird, rather stimulate it to feed by mimicking parent calls and touching the beak gently as encouragement. A young hand raised bird should be encouraged at an early age to start tearing up food for itself to help it develop strong back and neck muscles.

In the wild, young birds enter a stage known as “branching” as their primary feathers grow in. In the branching stage, the young birds will hop around on the edges of the nest and the surrounding tree branches (hence the name) stretching and flapping their wings. This



developmental stage is critical in the formation of strong muscle, connective tissue and bone.

The gentle stresses placed on the bird's growing body by branching activity dictates the growth of the tiny "strut" structures inside the bird's hollow bones which give the skeleton its strength and durability. It stretches tendons and ligaments and builds and tones muscle in preparation for flight. If a youngster is confined to a nest box and not permitted to engage in branching activity at the correct stages of growth, it may not become physically strong enough to survive in the wild.



This cross-section of an eagle humerus shows the internal structure of the bone.

Placing the nest box in a small, secure enclosure such as a jump box or even a porta-cot (this is especially suitable for owlets if they are kept indoors) can give young birds the exercise they need while still keeping them safe and protected.

Hacking or soft release techniques

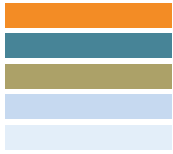
The "hacking" or "soft" method of release has been around for hundreds of years and is best suited to the young juvenile bird. Basically, the idea is that the fledgling imprints to the feeding hack box/aviary and the area in which it is located.

The fledgling is placed in the box from which it is fed every day. After release, food is continually provided at the hack site to which the bird can return if not successful in hunting for itself in its first weeks of freedom. The hack box should be mounted on a pole or placed in the fork of a tree. It should be erected in an area free from human disturbances and should provide protection from the weather and from predation from animals such as cats and foxes. Wire can be placed around the lower sections of the pole or tree to prevent animals from climbing up to the hack box. Care should be taken that the hack site is not located in the territory of another raptor which may take exception to intruders. Feeding, both prior and after release should be done at night so the bird or birds do not associate humans with food.

It is generally agreed that hacking is more successful when there is more than one bird involved in the process.

Development of three dimensional hearing skills in young owls

Owls have highly specialised hearing: unlike human ears, *Tyto* owl ears are positioned asymmetrically on their skulls. The left ear is set high and forward, while the right ear is set



BASIC COURSE IN WILDLIFE REHABILITATION

HANDBOOK 2013

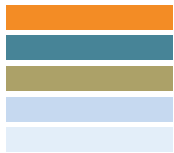
low and back. Skin flaps in front of the ear opening direct and deflect sound waves, while the fine, hair-like feathers (filoplumes) on the facial disk channel sound into the ears. These "displaced" ears allow owls to hear in three dimensions. *Ninox* owls do not have asymmetric ears, but have very keen hearing nonetheless and rely upon it when hunting.

A healthy owl should be able to hunt in total darkness, as its hearing allows it to pinpoint the location of its prey by sound alone.

It should be noted that all hand reared or very young owls must have their hearing location system fine tuned before being released so that they can locate prey using their hearing rather than their eyesight.

This is accomplished by introducing live crickets into the aviary. Commence initially using crickets confined within a large flat dish containing approximately 2½ cm of leaf litter. Leaf litter should be gradually increased as the owls become more adept at catching their prey. Owls that are ready for release should be able to locate and catch crickets at night under 15 cm of leaf litter.





5 Housing

Like most native fauna, raptors are shy, frightened creatures when in captivity. When you are bringing the bird back into peak condition, an unsuitable holding enclosure can retard or even defeat all your good intentions.

Primary care

The size of a primary care enclosure will depend on the species. For example, an Australian Kestrel would require a box 60 cm x 60 cm x 60 cm with solid walls, full size door, with all windows dowelled vertically. If the bird continually bangs around in the box you will have to use a suitable cardboard box to avoid further injury. This will apply to all birds in general with adjustment in size according to the species.

- Small raptors 90 x 90 x 90 cm
- Medium raptors 90 x 90 x 90 cm
- Large raptors 120 x 120 x 120 cm

A suitable perch is required and there must be adequate room for the bird to stand, turn around and feed.

Recovery and initial exercise enclosure

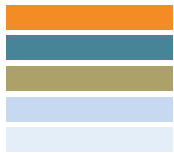
The general principle in designing housing is to make the enclosure as natural as possible without endangering the bird. Access to wind, rain, shelter, sun and fresh air are crucial as is protection from predators, like cats, dogs, foxes and other raptors and reduction of stress from humans or other fear-inducing elements.

Ensure that the building does not harm the frightened raptor when it flies against the wire, into a corner or up to a perch. Wild birds are not “cage-wise” and can injure themselves in their panic at being confined. This can exacerbate capture myopathy, especially in highly-strung species such as Black-shouldered Kites. Bare wire in a raptor enclosure is essentially an accident waiting to happen, but with modification, a wire aviary can house a raptor.

Wire aviaries can be lined to provide suitable housing for some raptorial species. Shade cloth can be used on the inside of an aviary to provide protection and privacy for the bird. Hessian can be used on wire aviaries to prevent feather damage, however it is really only suitable for enclosures containing larger bird species. Small species like Black-shouldered Kites or Sparrowhawks can get caught up in the hessian weave and cause themselves serious injury or even death.

The most forgiving type of aviary is designed using heavy-duty orchard netting with bush-pole supports, wire only being used for the lower sections from ground level to waist height. Netting prevents a great deal of unnecessary feather and wing damage which is caused by a bird constantly clinging on or crashing into wire.

Timber slats are ideal for climbing species such as Little Falcons and Black-shouldered Kites, which can (and will) damage their plumage clambering up shade cloth, wire, netting or hessian. The slats must be close enough that a small bird cannot poke its head through the gap.



All aviaries, regardless of construction, should be made predator proof. Rabbit wire (which looks like heavy-duty chicken wire) or weldmesh should be buried around the outside of the aviary and attached using ring clips or cable ties to the exterior aviary wall. This prevents predators such as foxes, dogs, cats and Chuditch from digging in to the aviary and killing the occupants. One or two council-type concrete slabs or half-slabs abutting the door frame on the outside of the entrance where rabbit wire can't be attached will keep animals from digging in under the door.

As the injured raptor recovers, the size of the enclosure must be adjusted to increase the amount of exercise. Depending on the degree and extent of injury, the rate of recovery will vary.

Your initial exercise enclosure should be designed to cope with the extremity in the transition stage. During the first two weeks of conditioning the exercise should be of a moderate duration and intensity. It is the rehabilitator's responsibility to determine the end of exercise periods. This can be ascertained by close observation of external signs, eg. Unusual or severe fatigue, drooping wings, difficulty breathing, inability to perch. A mixture of common sense and good judgment must be used when determining the end of exercise periods.

Enclosure sizes should be in accordance with DEC Minimum Standards.

Shared Accommodation

Different species should not be housed together. Only birds of the same kind should be housed together and even then, observation and monitoring should be ongoing to see if all goes well in the aviary. Even juveniles placed with mature birds of the same species may be vulnerable and should be watched closely. Peregrine Falcons in particular should never be housed together with other species, as they will attack and kill them. Kestrels are known to become quite aggressive during the autumn months and will even kill their own offspring. Large mature eagles for example, Wedge Tailed Eagles and Sea Eagles – (particularly those that have been human imprinted through inappropriate hand-rearing) will attack any smaller bird put in the aviary with them, as well as any careless or unmindful keeper.

Perches

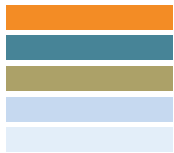
It is important that perches in an aviary be of varied sizes and surfaces to protect and lessen foot trauma. Astroturf is very useful. The rough scratchy surfaces keep feet clean and free from bumble-foot. Perches should be located at either ends of the aviary and at two thirds the height. Swinging or hung perches are also desirable and promote good exercise for feet and legs.

Food should be fed from a wooden block on the floor. The best perches in most situations are fresh natural branches. If a bird is incapable of flying to a perch, a ladder formation should be constructed to enable it to climb by series of steps to its required roost.

Pre-release housing

When setting up rehabilitation aviaries, the DEC Minimum Standards document should be used as a guideline for minimum sizes for enclosures. In general, the larger the enclosure, the more exercise a bird can get. Birds such as Wedge Tailed Eagles do well in 30 m (100 ft)

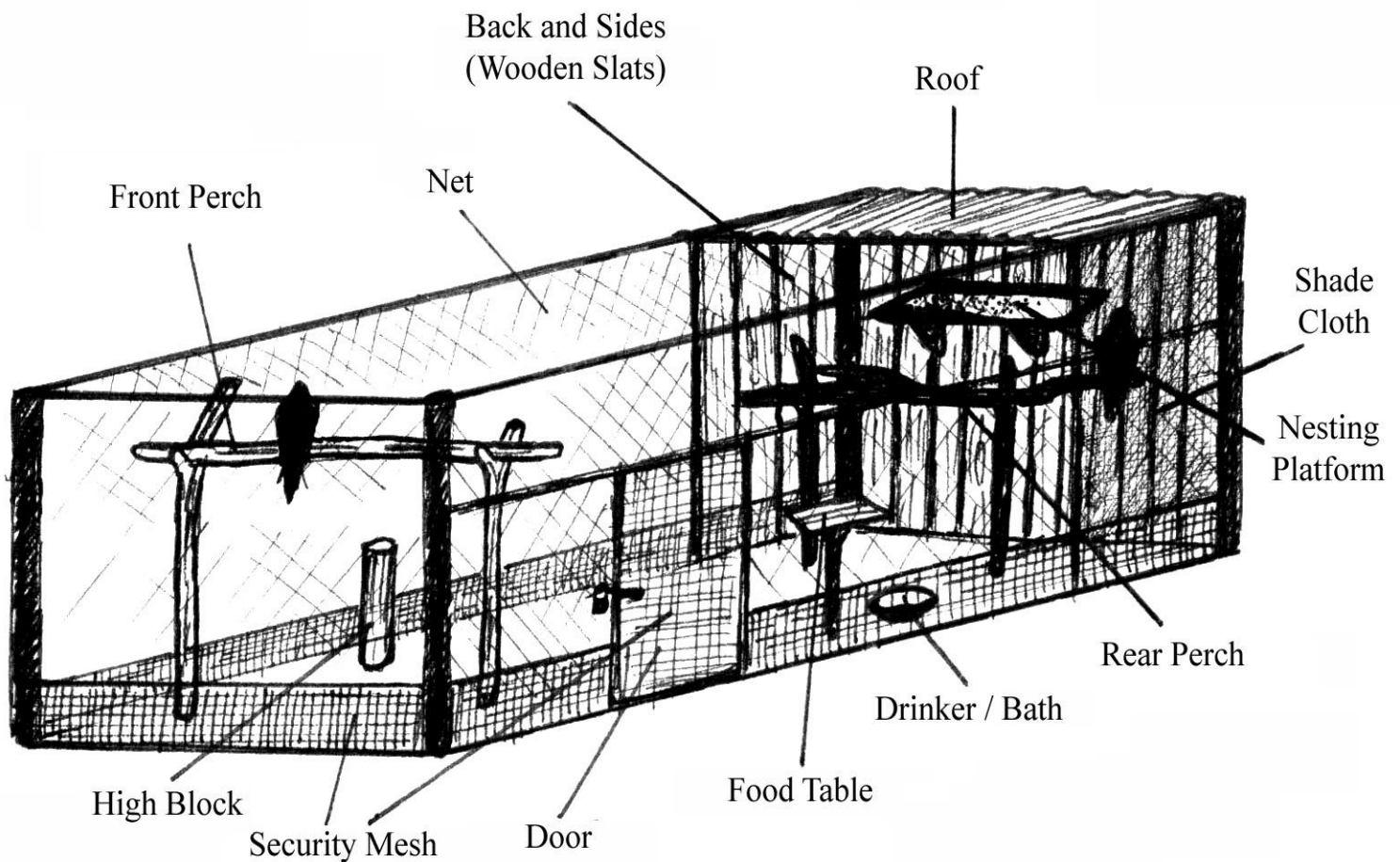


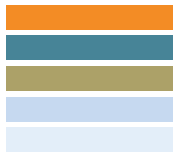


aviaries and this size of enclosure will accommodate every other Australian species as well.

As an enclosure of this size is very difficult to build, other alternatives – particularly free-flight conditioning – can be used, although these alternatives require a great deal of experience and should not be attempted without proper help or instruction under a mentorship programme.

Orchard netting aviary





6 Nutrition, diet and feeding

Raptors are true (or obligate) carnivores with special requirements. A raptor with a functioning digestive system requires:

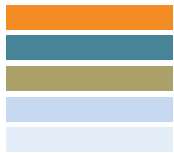
- Whole food with casting material (fur, feathers, scale, bone)
- Gut flora – fresh food or avian probiotics
- Correct balance of iron, vitamins, minerals and trace elements
- Food which the raptor can *recognise* as prey.

In the early stages of rehabilitation, when a raptor is recovering from shock, its system requires a gradual return to a normal diet, so it is best to avoid offering rich meats such as offal. Raw chicken tenderloins with the tendon removed can be minced down to a fine paste, then mixed with water, electrolytes, insectivore mix, vitamin supplements and even drugs for delivery via tube. For most small to medium birds, the following recipe may be used:

- 1 raw chicken tenderloin
- ½ teaspoon powdered insectivore supplement
- Water to mix
 - Remove the tendon from the meat and mince to a fine paste with a sharp knife. While mincing, sprinkle the insectivore supplement over the meat and work it in using the knife blade. When thoroughly combined, place in a bowl and add water, a little at a time, until the mixture acquires a smooth consistency suitable for passing through a syringe.
 - When warming the slurry, it is best to do so in the syringe immediately prior to delivery, using a bowl of warm (not hot) water. Any leftover slurry may be refrigerated for up to 24 hours. Slurry may be frozen for up to three months but loses its nutritional value after that time.
 - If medication is to be added, measure out the amount of slurry to be given, then add the dose of medication prior to warming. *Check with your vet that warming will not affect any drugs to be given.* If probiotics are being used, add these on a feed-by-feed basis as per medication.
 - For larger birds, such as Wedge Tailed Eagles, increase the amounts. For fish-eating birds such as Ospreys, a fish fillet may be substituted for the chicken.

Once a raptor is well enough that it does not need to be tube or force fed, it needs to feed itself. Newly admitted wild raptors will not always recognise your offerings as food. Opening food up to show blood will stimulate a sick bird to eat. Remember, green droppings indicate the presence of bile – the bird's stomach is empty. If a bird is too sick to tear food, cut the food into smaller portions. It may be a bit messy, but is better than having a sick bird go hungry or expend energy it can't afford to use up just to feed itself. Remember, while it is recommended that a sick or convalescing bird be held in a darkened environment, they do need some light to see to feed.





Cutting a mouse open along the ventral surface and spreading the rib cage so that blood and internal organs are visible may stimulate a raptor into feeding. Another trick is to feed a conspecific or similar raptor where the sick bird can see it. On seeing another raptor feed, the sick bird may be stimulated to eat by itself.

It is important to find a balance between allowing the raptor to recognise that the strange lump of red stuff you've put in the box with it is actually food, and running the risk of the bird developing an inappropriate *prey image*.

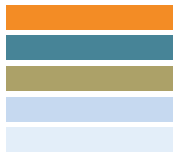
Prey imaging is what happens when a raptor recognises a particular type of animal (from its size, shape, markings etc) as food. If a raptor in care comes to think of domestic fowl such as chickens or ducks as food, then it may well take to hunting these creatures following release. Under these circumstances, the rehabilitator has drastically increased the raptor's chances of coming into conflict with human interests, and the bird will most likely end up being illegally shot.

Domestic fowl such as 'grown-on' (six weeks or older) roosters, quail and pigeons have excellent nutritional value, but to avoid inappropriate prey imaging, these birds should be de-identified before feeding in. To do this, remove the feet, head, primary and secondary flight feathers. For the sake of hygiene and to reduce the smell in an aviary or hospital enclosure, it is also advisable to remove the lower gastrointestinal tract. The resultant carcass is recognisable as a dead bird, but not specifically recognisable as a domestic animal. In this way, the raptor can self-feed and obtain the nutrition it needs without fixating on prey that could ultimately lead to an untimely demise at the hands of an angry poultry keeper or aviculturist.

Removal of the lower gastrointestinal tract is also desirable if feeding in larger animals such as rats or rabbits. A good and experienced shooter will generally gut a rabbit on the spot. If you are fortunate enough to receive donated rabbits from a shooter, or if you have the wherewithal to go out and shoot vermin for yourself, remember to conduct an impromptu necropsy while preparing the food. At any sign of disease or toxicity, the carcass should be discarded in its entirety.

Whenever preparing food that is not Certified Pathogen Free to ISO 9001:2000 it is wise to conduct an examination and freeze the carcass. The animal should have been healthy up to the point where it was killed by an external cause (eg: shooting or carbon dioxide induction.) Being certain of the cause of death will ensure you do not inadvertently introduce pathogens or toxins into the hospital or rehabilitation environment.

Birds of prey require fur or feathers in their diet at least four to five times a week. This is required because raptorial birds regurgitate a fur ball (known as a cast or pellet) each day. This cast collects all the grit and bone material from the crop - it keeps the crop clean. If fur or feather is not used a raptor may succumb to a syndrome known as 'slimy crop' which can cause severe health problems. Captive raptors have been known to die of slimy crop. It may be argued that not all raptors require fur or feathers to regurgitate a cast. Some birds in the wild live on insects, frogs, snakes and other reptiles etc. However, unless you can provide a diet containing chitin and scale on a regular basis, fur and feather is your only recourse. Fur,



feather, scale, bone and chitin are just as critical in a raptor's diet as vegetable roughage is for a human, if not more so.

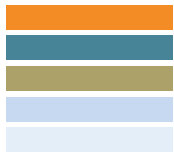
Frozen food should always be properly thawed prior to being fed in. **Never** feed frozen or partially thawed food to a bird. By feeding frozen food you may cause "freeze burn" to the bird's mouth and crop.

It is difficult to over feed a bird of prey. You can feed it the wrong food and therefore produce an over weight bird. A bird may gorge if it hasn't eaten for a few days, but normally if too much food is offered the bird will just leave it or may perhaps cache it in a small hiding place somewhere in its aviary. If you find this happening, remove the discarded food. If left it will only make your aviary smell and invite unwanted flies and maggot infestation. Offer less food at the next feeding or even a starve day. Feed your bird at the same time of the day, preferably late afternoon. Aviaries should be raked over every day, and perches given a good rub down every once in a while.

Fresh water should be provided every day in a dish or container that is large enough for the bird to also use as a bath. It is important to note that although birds of prey obtain moisture or fluid from their food it is important that fresh clean water is always available. Water is usually taken early morning, but in hot weather on a regular basis. Bathing water should not be offered in a hospital box, particularly if a bird has a bandaged wing because should it get wet it will be unable to dry itself properly.

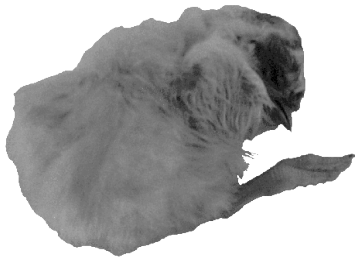


Water for drinking and bathing



Notes on food types

Day old chickens are available from some hatcheries. The egg industry has little use for cockerels and culls approximately 50% of each hatch by sex using painless carbon dioxide gas induction. The culls are subsequently made available for purchase. Day old chicks are not a complete food as they lack calcium. They are very high in water and fat (the yolk sac in a day old chick is very fatty and high in cholesterol.) They are a good, cheap 'filler' and a good supplement to clean meat as the down provides roughage for casting.



Day old chick

'Grown on' chickens can be used to feed large raptors. Some breeders of fancy poultry strains cannot sex their birds until they reach at least six weeks of age. The culled cockerels are a good source of protein, calcium and roughage. The nutritional value will depend on the feed consumed by the cockerel during its short life. It is important to remember that the larger the bird, the more challenging it will be to pluck and draw. It is recommended that larger fowl be drawn before feeding in as the viscera can have a strong odour and are usually discarded (sometimes quite creatively) by the raptors. Experience has shown that it is easier to draw your fowl beforehand than it is to scrape dried entrails off perches and aviary walls!



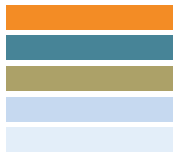
'Grown on' six week bantam

Mice can be obtained from various suppliers or you can breed your own. Do not use mice caught around your home or backyard, as you run the risk of feeding in poisoned rodents.



Adult mouse

Rats usually work best for larger birds. If they are not gutted, you will find yourself cleaning the aviary more often because the birds won't eat the gut and will undertake the same sorts



of interior decorating activities with rodent intestines as they will with chicken gut. Take the same precautions with rats as you would with mice. Secondary anticoagulant rodenticide poisoning can be deadly to raptors.

Rabbits - Preferred by Wedge Tailed Eagles and particularly Australian Little Eagles. Be careful you know where they came from. Whilst Myxomatosis is not necessarily a problem, we have little information on the effects of the Calicivirus and its effects on raptors. If you are getting your rabbits from a rabbit breeding centre, they will most certainly carry a much larger fat content than wild rabbits. Rabbits are easiest to prepare if gutted as soon as possible after killing, then frozen with the skin on. *Remember to ensure that there are no lead pellets in rabbits that have been shot.* Lead poisoning can be fatal.

Beef - Lean and fresh with no fatty portions. Beef is low in vitamin B and calcium. If feeding beef in the long term, an avian vitamin supplement should be added in accordance with specialist veterinary advice. Commercially purchased mince is not recommended, even in slurry. The small pieces of chopped meat can get stuck under the upper mandible and mince may contain a high proportion of fat or even preservatives, which are not good for raptors. Sausage meat is not at all suitable for animal use as it contains meal, salt and sometimes other food additives.

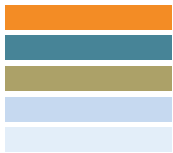
Quail - can be obtained from bird shops etc. Adult quail is considered a 'complete' food as it has a high nutritional value and is rich in vitamins, minerals and trace elements. As with all grown on poultry, quail should have the lower legs and heads removed together with the false crop. Many birds will pluck the wing feathers so to save time cleaning the aviary later, it is wise to remove the primary and secondary feathers. Quail should be gutted. If the bird is on a restorative diet, the quail should be either plucked or skinned.

Ox Heart can be given small portions as a treat every now and then. It is good to offer to a sick or starving bird just brought in as an initial starter. It is very digestible and gets into the system quickly, but like all offal, it is high in fat and is not recommended as a staple or regular item in a bird's diet. Wedge Tailed Eagles are particularly partial to ox heart and care should be taken to see that they don't eat too much of it in relation to other whole foods.

Liver should, as a general rule, be avoided. It is very rich, contains a great deal of vitamin A, bile and fat. In an emergency, if you have nothing else to hand, small quantities can be used, and as a very rare treat, it may be given, but liver generally does not form part of the regular diet for the captive raptor other than the small quantities given in other forms of whole food.

Pigeons are nutritious and well received by raptors, particularly birds like the Goshawk, Sparrow hawk, Australian Hobby and Peregrine Falcon. It is highly inadvisable to feed them fresh. Pigeons should be frozen for at least 24 hours prior to feeding in order to kill any protozoans it may harbour. The head and crop of the pigeon should be removed before feeding it to your raptor as this is where the majority of dangerous microorganisms will accumulate. *Remember to ensure that there are no lead pellets in pigeons that have been shot.* Lead poisoning can be fatal.

Road kill and other 'found' food can be risky. Granaries often poison feral pigeons, so make sure you know where your pigeons came from. Be sure road kills do not come from an area where chemicals or pesticides may have been used. Feeding grasshoppers or



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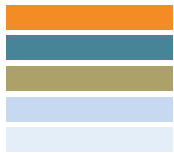
insects to kestrels is unwise unless you are sure they have come from an area where there has been no chemical spraying. It is very easy to accidentally cause secondary poisoning.

Tirings - Tough or bony pieces of meat can be given to a bird to prolong its meal and help prevent boredom. Chicken necks trimmed of fat make excellent tirings. Most raptors are partial to them and they help keep the beak in trim. Rabbit with bone will help keep a bird's beak in trim also. The motion of tearing and pulling at the tirings will also exercise the bird's back and neck muscles. For larger birds, ask your butcher for good sized bones.

Supplements – Your vet should be able to advise you whether or not dietary supplements are appropriate on a case by case basis. As you gain experience, you will be able to make your own informed judgements. Special care is necessary when administering dietary supplements to very young birds as it is absolutely critical that the balance of these minerals in their diet be correct for their bones to develop properly. Avian probiotics are recommended for birds which are prescribed antibiotics. Give probiotics after the antibiotic course is finished. If avian probiotics are not available, lactose-free probiotics in powder or capsule form are available from most pharmacies. Dairy-based products should not be given as raptors are not lactose tolerant.

In general, a healthy and well fed raptor is one that is offered a variety of food which mimics as closely as possible what it would eat in the wild.





7 Common problems

Aspergillosis

This fungal disease kills birds by forming nodules in the lungs. An affected bird will experience respiratory challenges which progress to the point of extreme distress and eventual death. Aspergillosis is caused by birds being exposed to the *Aspergillus* fungus which often grows in straw and other moist organic substrates. Anti-fungal medications need to be prescribed by your vet. An important consideration when admitting a bird with aspergillosis is that it will not be releasable. The damage caused by the lung nodules is *permanent* so if you are looking at a severe case and/or the bird may not be suitable for placement in a permanent facility following recovery, it may be kindest to euthanise on diagnosis. To prevent aspergillosis infections, avoid the use of straw or wood shavings as aviary substrate. Eucalyptus leaf litter has natural antibacterial and antifungal properties so it is suitable, but other non-native types should be avoided.

Broken flight feathers:

Broken primaries in particular can mean the difference between life and death for an apex predator. A bird with badly damaged or broken flight feathers may have to be held over until its next moult. In some cases, a suitably trained and experienced veterinarian may be able to carry out a repair procedure called “imping.” This is usually done under a general anaesthetic so the bird must be under the care of a vet. Imping can reduce time in rehabilitation for species such as Peregrine Falcons, Little Falcons and Brown Goshawks, so if you have cadavers from these species with good primary feathers, it can be wise to save the wings in the freezer for later use in imping procedures.

Bumblefoot

Bumblefoot is a condition which can develop from a lesion on a bird’s foot, or from pressure applied over a period of time. It is a chronic condition which will not heal without intervention, and can lead to potentially fatal complications. Bumblefoot occurs almost exclusively in captivity (eg: medium to long term rehabilitation or permanent housing of a non-releasable bird) and is often the result of environmental and/or behavioural factors.

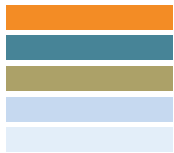
Bumblefoot usually begins as a lesion or “hot spot” on a weight or pressure bearing part (usually the underside) of a raptor’s foot. Pressure on the lesion (walking, standing, especially landing) aggravates the wound site. The wound site may ulcerate and may become infected.

This type of wound does not heal readily and becomes a chronic and persistent condition. In some cases, it may spread, even breaking through the top of the foot in extreme cases.

In other cases, the bumble does not break open but may become encapsulated. If an encapsulated bumble is infected, surgical intervention by a veterinarian experienced in the treatment of bumblefoot is required.

Open bumbles are more common than closed (encapsulated) bumbles. Open bumbles are similar in their nature to human pressure sores. There can be limited blood flow to the area,





which leads to a slow rate of healing. The wound may be exudating with slough and pus, the latter of which indicates infection.

Your vet may carry out surgical debridement and antibiotics may be prescribed to combat any infection. This is followed up with intensive advanced wound care. As with all wounds, the bumble must be kept clean, warm and moist. It must be checked, cleaned, debrided and re-dressed at least once a week.

Capture myopathy

In layman's terms, capture myopathy is not entirely unlike acute hypertension in humans. It is induced through the intense psychological pressure caused by human contact and confinement. Capture myopathy is common in the more nervous species of raptor, most particularly adult Black Shouldered Kites (for whom it is almost a foregone conclusion) and to a lesser extent, some Little Eagles.

Coccidiosis

Coccidians are parasitic protozoans normally present in the environment. When they are present in the body in large numbers they produce disease. Coccidians induce disease by destroying the lining of the intestines. More severely affected birds may show signs of rapid weight loss, depression and diarrhoea. Coccidiosis is usually treated using coccidiostats (anti-coccidial medications) which must be prescribed by your vet. Raptors do not appear to contract this disease often. It can be prevented by good hygiene.

Concussion

Head trauma can cause swelling of the brain which in severe cases may be fatal. Indicators include blood in the eye, cloudy eye, disorientation, uneven pupils, sluggish nictitating membrane or even paralysis. Recovery of concussion victims can be difficult to assess, as most of the damage is internal and cannot be seen by the rehabilitator. Initial treatment for head trauma is to rehydrate and keep the bird warm and quiet in a darkened box. Your vet may administer an anti-inflammatory injection to reduce swelling. Recovery can take up to four months. Careful ongoing assessment of the patient by someone with experience dealing with the species is essential.

Feather mite

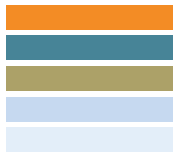
Feather mites are exoparasites that damage feathers. They are generally too small to be seen with the naked eye. Your vet will advise you on how best to control them. Feather mites can also live on moulted feathers.

Fits/Convulsions

Often a prelude to death. Usually indicates poisoning, injury, starvation or inadequate diets. In extreme cases of fitting a vet may sedate a bird. Always seek immediate veterinary attention.

Flat fly

Hippoboscids or flat flies are often found infesting the feathers of raptors, particularly Southern Boobook Owls. Applying a good insect repellent to the human handler (*not the bird!*) can be a good idea if treating a bird known to be affected by flat flies as they can be



difficult to remove from human clothing and hair and they will bite. Removal agents are available from the vet.

Fractures

Treatment of fractures in raptors is similar to the treatment of fractures in other birds. Seek veterinary advice immediately where a fracture is suspected or evident.

Fret marks

Strange patterns or unusual colour formations called "fret marks" or "stress marks" on tail feathers may indicate that the bird has suffered stress, starvation or possibly poisoning. Fret marks may also be caused by the feathers being bent while still growing. Raptors need sunlight for healthy growth of body and feathers. These can be indicators of dietary problems or even metabolic bone disease.

Heat stress

Once out of primary care and out in an aviary, raptors are far more likely to die from heat stress than from the cold. They require shelter from all extreme weather conditions. Little Falcons are particularly susceptible to overheating. Ensure their enclosures are shaded with perches well off the ground. Hosing shadecloth-lined aviaries with cool water on hot days can help raptors cope with very hot weather.

Metabolic Bone Disease (MDB)

This disorder occurs in birds which were not fed a properly balanced diet when very young. Rehabilitators rarely see this in wild birds as nestlings which do not receive a proper diet usually die before they fledge and are hardly ever found, rescued and handed in. It is common, however, in orphans which have been hand reared by well meaning but untrained members of the public or those confiscated by rangers and wildlife officers after having been illegally taken from the wild to be kept as pets. In severe cases, bones will be soft and/or deformed. Young birds with MDB often present with splayed legs and are unable to stand. Unfortunately, euthanasia is usually the outcome for victims of MDB. MDB in hand reared orphans can be prevented by feeding in whole natural food with the right proportion of bone to ensure the correct calcium/phosphorus balance. If too little calcium is present in the diet, bones will not grow properly, but if too much is given, uptake will be blocked and the outcome will be the same as if too little was provided.

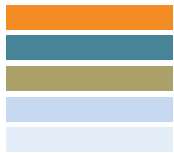
Pain

Like most wildlife, raptors are very stoic and will not betray their pain to a carer or rehabilitator unless it is very severe. Animals do experience pain and it is important to remember that where there is injury and inflammation, there is almost always pain and/or discomfort accompanying it. Ask your vet about how best to manage pain for each animal in your care. Pain management drugs for wildlife should only be administered under veterinary supervision. See the section on Sick and Injured Wildlife in this manual for more information.

Poisoning (primary)

It is very difficult to specify which poison is affecting a sick raptor. If poison is suspected,





one usually can only list those toxic substances the bird may have come into contact with and then speculate. Tests can be done later, but in the short term it is best to keep the bird at room temperature in a darkened box. Organochlorides, organophosphates, PCB, DDT, dieldrin, lindane, mercury, thallium and lead are all toxic substances implicated in raptor poisoning. **If you suspect poisoning, seek veterinary assistance immediately!**

Poisoning (secondary)

Probably the most common agent in secondary poisoning of raptorial species (particularly owls) are the rodenticides commonly available from supermarkets and hardware outlets. The active ingredients – warfarin, brodifacoum and bromadiolone – can persist in an active state within the digestive tract of a rodent for up to ten days. If a rodent which has taken a bait is then taken by a predator, that predator can suffer the same effects. Look for lethargy, darker than normal mucous membranes in the mouth and a bruised appearance of the skin underneath the feathers. There is an antidote which is more effective the faster it is administered. Seek veterinary assistance **immediately**.

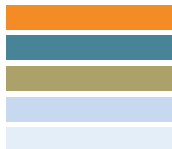
The next most common agent in secondary poisoning is the neurotoxic bait used to poison pigeons around grain terminals. Pest control agents are obliged to remain on site when these baits are being used in order to collect all fallen bird in an attempt to avoid secondary poisoning of wildlife. Unfortunately, sometimes a pigeon will take only a small dose and fly away to die later or be taken by a predator. Look for paralysis, fits, blindness and other problems with the central nervous system. There is no antidote, but your vet may be able to treat the symptoms. Seek veterinary assistance **immediately**.

Ordinary insecticides such as cockroach baits and surface sprays and result in poisoned insects being eaten by raptors. As insecticides are neurotoxins, the symptoms are similar to those for the pigeon poison, but generally not as fast acting. Insecticide poisoning is frequently fatal to raptors. Seek veterinary assistance **immediately**.

Trichomoniasis (also known as canker or frounce.)

Main infection from pigeons and doves - highly contagious. This disease is caused by a type of microorganism called a flagellated protozoan of the species *Trichomonas gallinae*. The organism is transmitted by raptors feeding on infected birds, and by faeces and oral secretions contaminating water supplies. Trichomoniasis is *always* lethal if not treated promptly. Trichomonads burrow into the lining of the mouth, oesophagus, crop and/or gastrointestinal tract causing extensive damage. A thick yellow plaque builds up on the surface. Symptoms include coughing and gasping – the affected bird will often flick food away with a shake of its head or an odd shuddering or lifting of the shoulders indicating that it is trying to transfer food from crop to stomach – lethargy, reduced appetite, reduction in fitness levels (particularly apparent in birds undergoing a free-flight rehabilitation programme) possible vomiting, diarrhoea, loss of weight, bad breath.

An atypical form of trichomoniasis occurs when the trichomonads are present in the GI tract below the crop, where they cannot be seen without an endoscope. If a bird eats but fails to regain or maintain weight, is lethargic and has bad breath or mutes that smell “fishy,” suspect trichomoniasis and seek veterinary assistance as soon as possible.



Observation of trichomaniasis patients suggests that they may benefit from pain management as well as treatment to eliminate the trichomonads. Talk to your vet about pain management as part of your treatment plan.

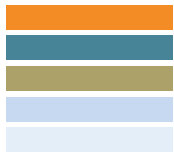
Trichomaniasis is highly contagious. Strict infection control protocols must be observed and any patient with confirmed or suspected trichomaniasis must be quarantined until it is confirmed that the patient is clear of infection.

Worms

Raptors do suffer from worm infestation on occasions, a very thin bird may indicate worms. We do not recommend the use of Panacur or Ivomec as raptors can be very sensitive to these particular medications and it is extremely easy to overdose to the point of toxicity.

Wounds

Like all wildlife, raptors may present with a wide variety of wound types. Proper wound care in combination with appropriate pain management will ensure a quick recovery with minimal scarring. There are many different types of wounds and each type requires treatment and therapy specific to that type of wound. Wound management is acknowledged as a specialist field in human nursing and the valuable information available from health care professionals is often transferable to animal health as well. Discuss your treatment plan with your vet.



8 Practicalities

There are several factors to consider when setting up your facility to admit and rehabilitate raptors.

Training and Mentoring

Procedures such as administration of subcutaneous fluids, tubing, bandaging and physiotherapy can only be carried out once the rehabilitator has been properly trained and has been assessed by an appropriate person as competent. These practical skills are covered elsewhere in the course, and ongoing training should be conducted during the first twelve months of volunteering. Continuing education is vital for all rehabilitators, whether their experience encompasses five weeks or five decades. Knowledge and techniques are constantly being updated, and the responsible rehabilitator needs to keep pace with progress.

Equipment

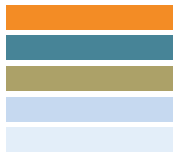
The right equipment for the right job is essential. Syringes, feeding tubes, needles, dishes, dressings, bandages and permitted and/or properly prescribed drugs must all be kept in appropriate, clean, safe storage. In addition, anyone handling dangerous animals should invest in Personal Protective Equipment (PPE.) PPE includes leather gloves, safety glasses and latex gloves as well restraints such as bag nets, hoods, abas and towels to make capture and handling as safe as possible for both rehabilitator and patient. A set of good sharp knives for food preparation should be kept separate to utensils used for human and/or pet food. If you are going to take large raptors, especially Eagles, standard hospital boxes will not be large enough and you will need to either build them yourself or have them custom made, which can be expensive.

Appliances

Raptors are obligate carnivores and they require whole food. The average domestic fridge/freezer may not be large enough to accommodate items such as rabbits, chickens and bags of frozen mice. It is also generally considered inadvisable to store raptor food (particularly wild-caught food) in the same freezer as the family lamb roast. At least one separate freezer in a configuration to suit the individual rehabilitator's circumstances will be required to keep food. Safe refrigerator space may be required for food in the hotter months as well as items such as drugs, topical applications and Hartmann's solution. Blenders/food processors and microwave ovens are considered luxury items but if available, are excellent labour-saving devices.

Space

A defrosting space (for example, a sink top) is required for the defrosting of food. In addition, a clean preparation area kept separate from any human food preparation area is necessary. A work bench for food preparation, examination and equipment maintenance must be kept clean, tidy and in good condition. Aviaries should be built away from children's play areas, pets and domestic animals, and should meet DEC Minimum Standards in terms of size.



Storage

Organised storage space is essential for smooth, safe operation of a rehabilitation facility. If staff or volunteers are involved, labelling helps to keep storage in order.

Networking

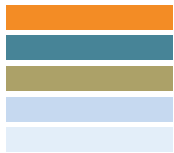
All wildlife rehabilitators, regardless of their speciality, should have started with a mentor. During the mentorship period, it is wise to meet and establish relationships with other rehabilitators with similar interests. Since raptor species should not be mixed, it is rare for a single rehabilitator to have the space and resources to build a lot of large aviaries. The most economical way to rehabilitate raptors is to network. If you develop a particular skill with Falcons, for example, you may wish to hand Goshawks or Owls on to rehabilitators who already have them in care, and they in turn can hand Falcons on to you. Your network can also be invaluable in the sharing of knowledge and resources. Most importantly, a network provides a sympathetic ear, a sounding board, a shoulder to cry on, and someone who knows how you take your tea (or other beverage of choice, as the case may be.)

Occupational Safety and Health

The responsible rehabilitator must be mindful of hygiene, infection control and biosecurity issues as well as general and fire safety around the facility.

Disaster planning

In the event of fire, flood, severe weather or other disasters, it is essential to have an emergency response plan for your facility. This is especially important if you have volunteers in attendance, as you are responsible for their safety as well as your own and that of the fauna you have in care.



9 Skills needed to competently care for raptors

Since raptors are birds, the competent rehabilitator will need all of the skills required to care for birds, plus a few more specialist skills required to give these unique birds a second chance at life in the wild.

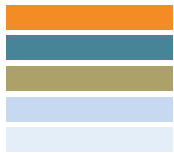
Primary care for raptors is the same as for any bird, with consideration being given to the requirement for a raptor to be completely fit and healthy on release. Unlike some species, raptors cannot be released carrying any kind of impairment or disability, so the rehabilitator must be able to accurately assess each patient's chances of making a full and complete recovery. In the early days, while experience and expertise are still being established, the input of mentors and experienced animal health professionals is vital.

Due consideration must be given to safety, as per the section on admission.

It is in the advanced stages of raptor rehabilitation that a particular set of skills comes into play. It is simply not possible to build an aviary large enough to provide adequate flight exercise for hard-chasing predators such as Peregrine Falcons, Brown Goshawks and Wedge Tailed Eagles that have lost hunting fitness through medium to long term confinement.

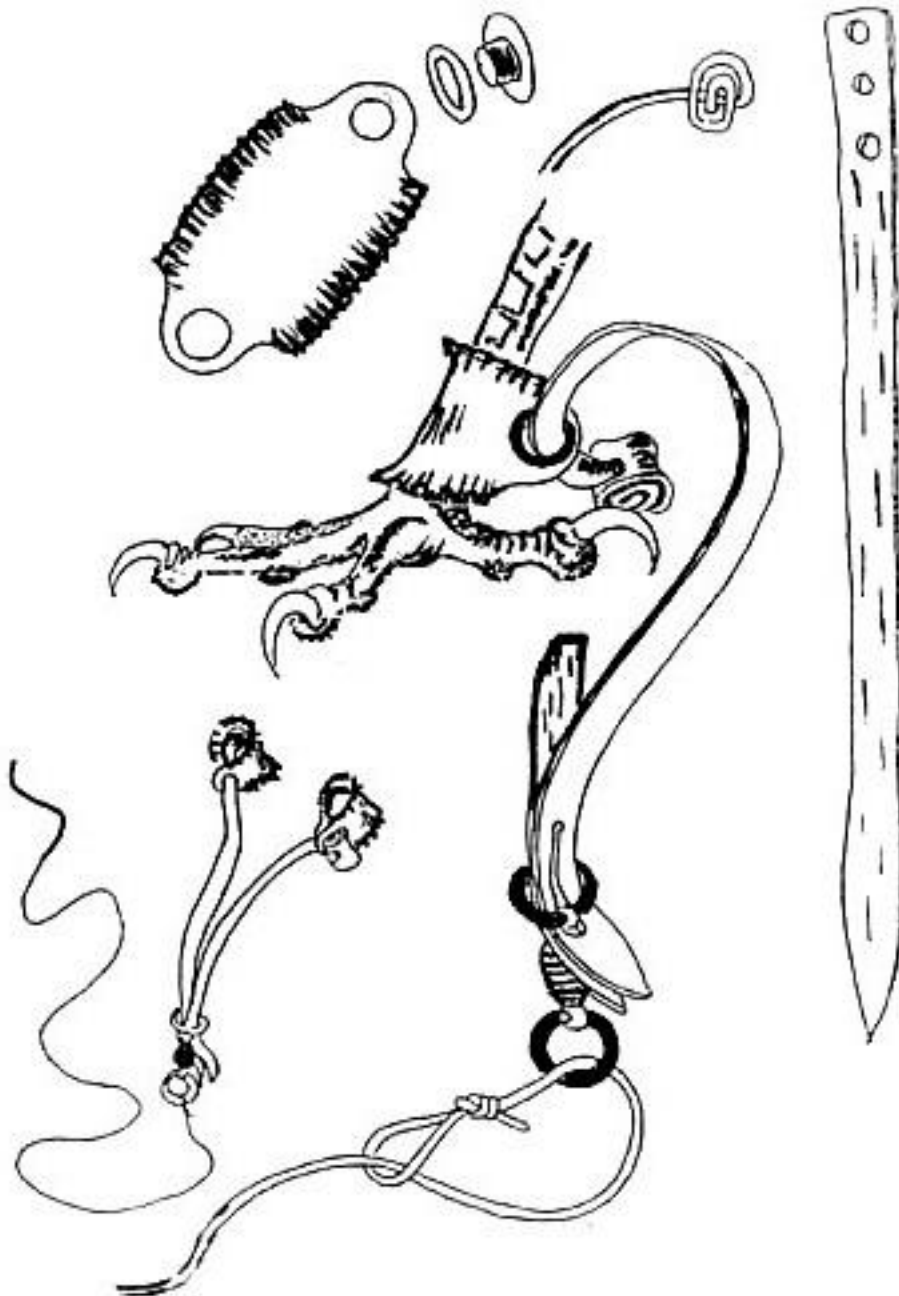
This is where the manning and training of a raptor using a mix of falconry-type equipment and operant conditioning is necessary to bring the hunter back to the point where it is fit and capable of obtaining food. Without free flight, many birds will simply die of starvation due to lack of hunting fitness. Free flight also affords the rehabilitator the opportunity to more accurately assess a bird's recovery from wing injury, feather damage or respiratory issues. In free flight, problems which were not apparent in an aviary may come to light.

The skills needed for free flight rehabilitation cannot be learned purely from books and other media. Practice is the best way to effectively learn. In addition, the rehabilitator must learn how to make, maintain and repair the specialised equipment required to carry out free flight rehabilitation.



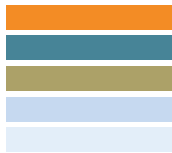
Jesses, swivel and line

(illustration by Craig Willmoth)



It is important to note that whilst free flight rehabilitation uses a lot of the same basic equipment as the sport of falconry, it is not falconry. Free flight rehabilitation bears the same sort of resemblance to falconry that cross country horse riding does to fox hunting: they use the same animals and similar gear, but the intent and the outcomes are very different.





10 List of useful reference material for rehabilitators

Recommended reading

Identification and general knowledge:

The Birds of Prey of Australia: a Field Guide – Stephen Debus

Hawks in Focus – Jack and Lindsay Cupper

Birds of the Night (Owls, Frogmouths and Nightjars) – David Hollands

Eagles Hawks and Falcons of Australia – David Hollands

Australian Birds of Prey – Penny Olsen.

Raptor care

Captive Raptor Management and Rehabilitation – Richard Naisbitt and Peter Holz

Medical Management of Birds of Prey - Patrick Redig

Care and Rehabilitation of Injured Owls - Kathleen McKeever

Medical / Veterinary

Avian Medicine - Jamie Samour

Wildlife Health Investigation Manual – Karrie Rose (Australian Registry of Wildlife Health)

Wound Care Manual – Keryln Carville (Silver Chain Nursing Association)

Video / DVD

Bird of Prey Management Series – Nick Fox

The Ultimate Guide: Birds of Prey – Discovery Channel

Terminal Velocity – Ken Franklin / National Geographic

Hunters of the Skies – Lindsay Cupper

Wings of Silence – John Young Wildlife Enterprises

Internet resources

Society for the Preservation of Raptors (Inc.) – www.raptor.org.au

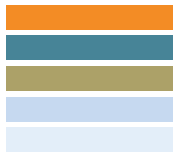
Australian Wildlife Health Network – www.wildlifehealth.org.au

Australian Fauna Care – www.fauna.org.au

Australian Wildlife Rehabilitation Conference – www.awrc.org.au

Avian Medicine Online – <http://www.avianmedicine.net/ampa.html>

Please note that at the time these notes were compiled, the details of the web sites listed above were correct and accurate and to the best of our knowledge, contained appropriate content. The nature of the internet is such that web addresses and content are subject to change without notice. No responsibility is taken for content on the web sites listed above. Internet users should be aware of internet security and safety issues and take appropriate precautions such as the installation of anti-virus, security and firewall applications before browsing the world wide web.



11 Appendix C: Raptorial species

ORDER FALCONIFORMES - Diurnal raptors

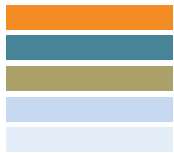
Family Accipitridae - Eagles and Hawks

- Osprey (*Pandion haliaetus*) [other names: White-headed Osprey, Fish Hawk]
- Pacific Baza (*Aviceda subcristata*) [other names: Crested Hawk, Lizard-Hawk]
- Letter-winged Kite (*Elanus scriptus*) [no other names]
- Black-shouldered Kite (*Elanus notatus*) [no other names]
- Black Kite (*Milvus migrans*) [other names: Fork-tailed Kite, Allied Kite, Black-eared Kite, Pariah Kite, Firebird, Stubble-hawk, Shitehawk]
- Brahminy Kite (*Milvus indus*) [other names: Red-backed Sea Eagle]
- Whistling Kite (*Milvus sphenurus*) [other names: Carrion Hawk, Whistling Eagle]
- Square-tailed Kite (*Lophoictinia isura*) [no other names]
- Black-breasted Buzzard (*Hamirostra melanosternon*) [other names: Black-breasted Kite]
- Brown Goshawk (*Accipiter fasciatus*) [other names: Australian Goshawk]
- Grey Goshawk (*Accipiter novaehollandiae*) [other names: White Goshawk, Grey-backed Goshawk]
- Collared Sparrowhawk (*Accipiter cirrhocephalus*) [other names: Australian Sparrowhawk]
- Little Eagle (*Hieraaetus morphnoides*) [no other names]
- Red Goshawk (*Erythrotriorchis radiatus*) [no other names]
- Spotted Harrier (*Circus assimilis*) [other names: Allied Harrier, Jardine's Harrier]
- Swamp Harrier (*Circus approximans*) [other names: Marsh Harrier, Gould's Harrier, Swamp Hawk]
- White-bellied Sea Eagle (*Haliaeetus leucogaster*) [other names: White-breasted Sea Eagle]
- Wedge Tailed Eagle (*Aquila audax*) [other names: Eagle-Hawk]

Family Falconidae - Falcons

- Grey Falcon (*Falco hypoleucos*) [no other names]
- Brown Falcon (*Falco berigora*) [other names: Brown Hawk, Cackling Hawk]
- Australian Kestrel (*Falco cenchroides*) [other names: Nankeen Kestrel]
- Australian Little Falcon (*Falco longipennis*) [other names: Australian Hobby]
- Peregrine Falcon (*Falco peregrinus*) [other names: Peregrine, Black-cheeked Falcon]
- Black Falcon (*Falco subniger*) [no other names]





NOTE:

"Chicken Hawk" is a name variously applied to a great many raptors, if not all of them at some stage or another, but most commonly to the Brown Goshawk and the Collared Sparrowhawk. It is by no means an official name and its vernacular meaning is usually, "otherwise unidentified bird of prey."

ORDER STRIGIFORMES - nocturnal raptorial birds

Family Tytonidae, Genus *Tyto* - Barn Owls

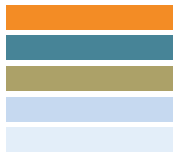
- Barn Owl (*Tyto alba*) [other names: Delicate Owl, Screech Owl, White Owl, Ghost Owl]
- Grass Owl (*Tyto longimembris*) [other names: Eastern Grass Owl]
- Masked Owl (*Tyto novaehollandiae*) [other names: Cave Owl, Chestnut-faced Owl]
- Sooty Owl and Lesser Sooty Owl (*Tyto tenebricosa*) [other names: Whistle-bomb Bird]

Family Strigidae, Genus *Ninox* - Hawk Owls

- Powerful Owl (*Ninox strenua*) [no other names]
- Rufous Owl (*Ninox rufa*) [no other names]
- Southern Boobook (*Ninox novaeseelandiae*) [other names: Spotted Owl, Boobook Owl, Mopoke, Morepork]
- Barking Owl (*Ninox connivens*) [other names: Winking Owl, Screaming Woman]

NOTE:

Tawny Frogmouths and Papuan Frogmouths are often erroneously referred to as Owls. They are not Owls but belong to their own family – the Frogmouths (essentially a kind of large Nightjar.) They are not raptorial, but catch insects using their large and powerful beaks. They can subsist on a carnivore diet supplemented with insects, so as a general rule, a facility set up to rehabilitate raptors can also accommodate Frogmouths. These birds are notorious for refusing to self-feed in captivity so the rehabilitator will need to have the time and patience to hand feed them. DO NOT under any circumstances attempt to house Frogmouths with Owls as the Owls will kill and eat the Frogmouths.



Raptorial species found in Western Australia

Southern, Central and Eastern WA

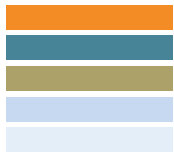
- Brown Goshawk
- Collared Sparrowhawk
- Wedge Tailed Eagle
- Little Eagle
- White Bellied Sea Eagle
- Osprey
- Peregrine Falcon (specially protected)
- Little Falcon
- Brown Falcon
- Australian Kestrel
- Black Shouldered Kite
- Whistling Kite
- Square Tailed Kite
- Southern Boobook
- Barn Owl
- Masked Owl
- Barking Owl (found in the South West and then only rarely)

Pilbara and Kimberley Regions

All of the above plus:

- Black Kite
- Brahminy Kite
- Red Goshawk (endangered / specially protected)
- Grey Falcon (rare and endangered)
- Barking Owl





12 Appendix D: Bibliography and acknowledgements

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Care and Management of Injured Raptors 1993 edition – Philip Pain and Noelene Jenkins

Caring for Birds of Prey – Jerry Olsen

Seminar for Aviculturists on Diseases of Cage & Aviary Birds – M.E. Fowler, R. Jakob-Hoff, D.A. Pass

Notes on the Care of Sick, Injured and Orphaned Wildlife – Susan Smith

Captive Raptor Management and Rehabilitation – Richard Naisbitt and Peter Holz

Medical Management of Birds of Prey – Patrick Redig

Care and Rehabilitation of Injured Owls – Kathleen McKeever

Wound Care Manual – Keryln Carville

The Birds of Prey of Australia: a Field Guide – Stephen Debus

Bird of Prey Management Series – Nick Fox

Terminal Velocity – Ken Franklin

The Ultimate Guide: Birds of Prey – Discovery Channel

Contributing authors

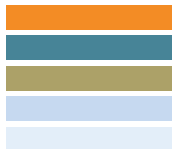
Philip Pain – Eagles Heritage Raptor Wildlife Centre / Society for the Preservation of Raptors Inc

Noelene Jenkins – Society for the Preservation of Raptors Inc

Nancy Tang – Society for the Preservation of Raptors Inc

Original illustrations

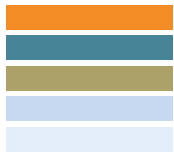
Craig Willmoth



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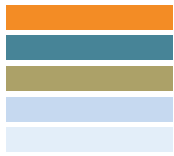
March 2013



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Environment and Conservation

Our environment, our future





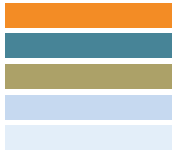
Section four (part one) Care of reptiles

Module objectives

The aim of this module is to prepare you for taking on the challenge of caring for reptiles. We will discuss:

- basic anatomy of reptiles and amphibians
- identification and admission of the animal into care
- stages of rehabilitation
- defining the nutrition, diet and feeding needs
- identify the common injuries and problems you may experience as a rehabilitator
- practicalities to make your rehabilitating experience easier
- skills needed to competently care for sick and injured reptiles and amphibians
- sharing some favourite reference books



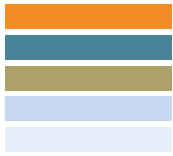


1 Occupation Health and Safety (OH&S) Review

For those new to wildlife care, developing good hygiene practices is often low on their priorities. But, it is vital that correct habits are adopted from day 1.

Wash hands in soap and water (preferable but hand wipes, spray hand-wash are more practical when busy) after handling each animal and any material, equipment, food, water dishes that the animal has had contact with **BEFORE** you touch your face, wipe your eyes, nose or mouth; before you pick up the phone or handle food and kitchen ware used by people





2 An introduction to reptiles

This **CLASS** of vertebrates are **ECTOTHERMIC**, which means they do not generate body heat but need to be warm in order to grow, digest, reproduce, heal and metabolise drugs. They gain heat from – sunlight, either directly (basking) or indirectly (hot rocks, warm shallow water). A reptile will move to or from heat in order to regulate its internal environment to its **Preferred Body Temperature (PBT)**

Reptiles have adapted to a diverse landscape, especially arid ecosystems and are well represented in WA. Geckos are soft skinned and need moist retreats, turtles are aquatic but need to dry out for an hour or two each day, and Bobtails like to bask in the sun but will cook if unable to move away when they have reached their maximum internal temperature. With such specific needs, even small changes can cause death or dysfunction. Consequently, captivity can put huge strains on reptiles. When sick or injured, the stress is multiplied manifold.

When taken into care, knowledge of the species and its behaviour as well as physical and psychological requirements is needed and rehabilitation should not be attempted unless you have all of this in place. Learning from experienced rehabilitators is essential. Reptile metabolism is slow so healing may take several weeks to months before the animal is ready for release. This commitment means no holiday trips away from home

In the north of the state, reptiles are warm and active all year but in the SW where winter temperatures fall below 10⁰C, reptiles become inactive and stay hidden in burrows or deep leaf litter only venturing out to bask on sunny days

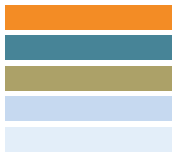
Reptiles come in all shapes and sizes. The species you will deal with depends on the habitat in your area. Always check distribution maps to correctly identify the animal.

Common names differ from place to place which can cause confusion especially when people get it wrong for example, calling a bobtail a goanna. Avoid this by including the **scientific name** in your records. The two words are the **Genus** and **species**

NB: Few wildlife centres rehabilitate snakes. Do not approach snakes. Identification of venomous snakes can be difficult. Seek expert assistance from a trained Reptile Remover through your local Ranger, DEC Wildlife Officer or WILDCARE HELPLINE 974 9055

If an endangered snake is rescued, contact DEC Wildlife Branch for instructions

Reptiles can be grouped into Lizards, Snakes (snakes evolved from a burrowing lizard), and Turtles.



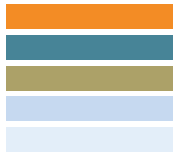
Lizards

- **Large skinks** Diurnal = Active in daytime
 - Bobtails/Shingleback
Tiliqua rugosa
 - Western Bluetongue
Tiliqua occipitalis
 - King skinks
Egernia kingie
- **Small skinks** Diurnal
 - Fence skink
Cryptoblephalus plagiocephalus
 - Cool skink
Acritoscincus trilineatum
- **Dragons** Diurnal
 - Western Bearded dragon
Pogona minor
 - Western Heath dragon
Tympanocryptis adelaidensis
 - Ornate crevice dragon
Ctenophorus ornatus
 - Thorny devil
Moloch horridus
- **Legless lizards** Diurnal
 - Burton's legless lizard
Lialis burtonis
 - Common scaly foot
Pygopus lepidopus
- **Monitors** (Goannas) Diurnal
 - Gould's monitor
Varanus gouldii
 - Southern heath or Rosenberg's monitor
Varanus rosenbergi
 - Black-tailed monitor or Mournful goanna
Varanus tristis
- **Geckos Nocturnal** = Active at night
 - Marbled gecko
Phyllodactylus marmoratus
 - Barking gecko
Underwoodisaurus milii

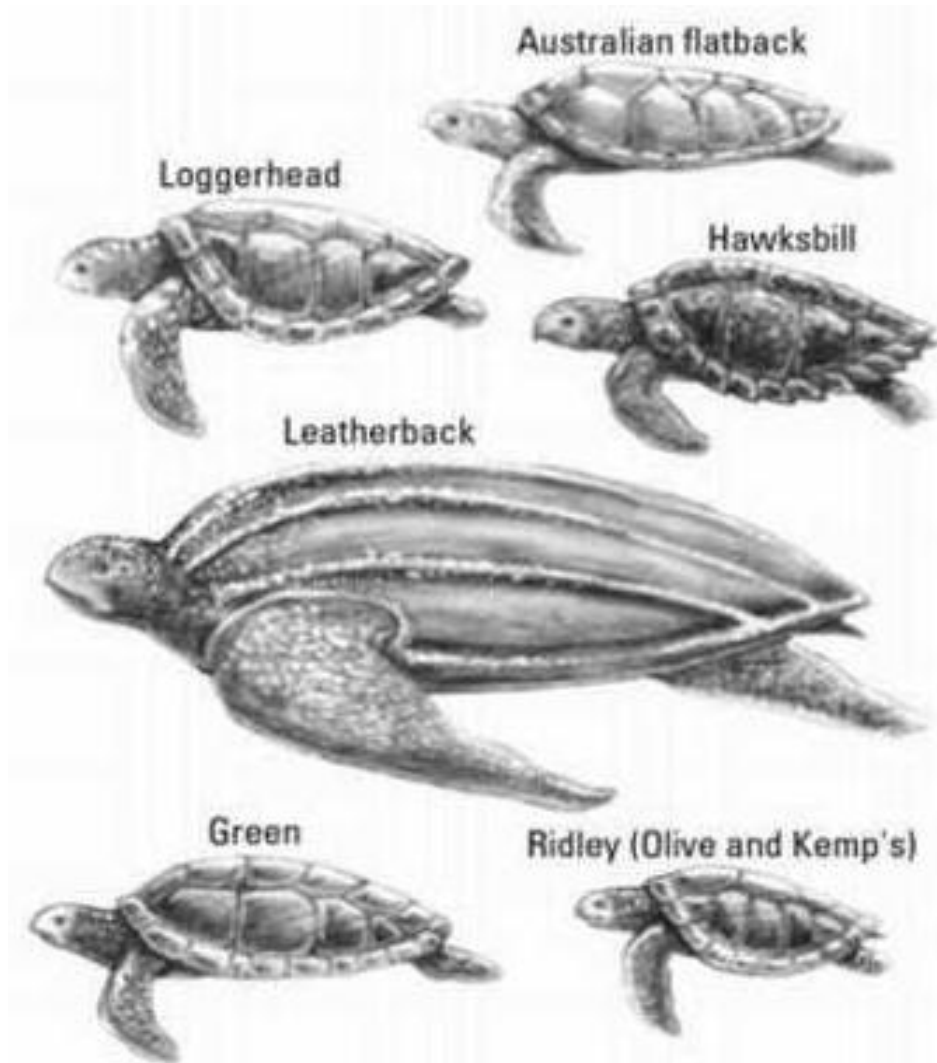
Snakes

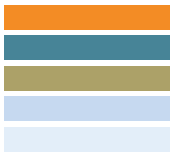
- **Pythons** (Non-venomous)
Arboreal = live in trees
Terrestrial = on the ground & in rocks
 - Stimson's python
Antaresia stimsoni
 - Southwestern carpet python
Morelia spilota
 - **Blind or worm snakes**
Non-venomous burrowers
 - Fat blind snake
Ramphotyphlops pinguis
 - **Venomous land & sea snakes**
- ## Turtles
- **Freshwater turtles**
 - Oblong turtles
Chelodina oblonga
 - Flat-shelled turtle
Chelodina steindachneri
 - Western swamp turtle/tortoise
Pseudemydura umbrina
(endangered)
 - **Marine turtles**
 - Green turtle
Chelonia mydas
 - Olive Ridley
Lepidochelys olivacea
 - Loggerhead
Caretta caretta
 - Flatback
Natator depressus
 - Hawksbill
Eretmochelys imbricata
 - Leatherback
Dermochelys coriacea





Marine turtles





3 Reptile anatomy

All vertebrates have a repeating pattern; *we are all just another way of being a fish.*

Two upper and two lower limbs that have one bone joined to the body which then divides into two bones after the joints and then into multiple bones at the ends, a spine that connects the skull to the limbs by way of shoulder and pelvic girdles, and continues to the tip of the tail. Adaption over millennia have seen some features morph or become redundant with only vestiges remaining

Skeletal system

Lizards & Snakes

The ribs extend to the full length of the body.

Legless lizards and some pythons have vestigial flaps for hind legs.

Small skinks can drop their tails at any fracture point below the vent, to foil a predator. This is an expensive loss of resources for the lizard but may save its life.

Most need UV light to metabolise Calcium (nocturnal geckos are an exception).

Young Mournful goannas (*Varanus tristis*) have prehensile tails and are mostly arboreal for the first few years of their lives.

Monitors have upright limbs while other lizards are flat or close to the ground.

Turtles

The turtle's shell is living bone. The top shell (Carapace) is made of bony plates from flattened ribs that are joined to each other and the vertebrae by jagged *suture* joints similar to the joints of our skull bones.

The bottom shell (plastron) evolved from the sternum and is joined to the upper shell by a bony bridge on each side. The pelvis and shoulder girdles are fused to both shells making it a solid structure.

Turtles use the UVA & UVB of the light spectrum to synthesise Vitamin D – a vital factor in calcium metabolism. They need daily exposure to dappled sunlight or a UV lamp, for strong healthy bones.

Respiratory system

Reptiles have no diaphragm- therefore can't cough.

Lizards and Snakes

The opening to the airway (glottis) is closed when not breathing, there is no epiglottis.

The lungs are hollow sacs and can extend to add more surface area for gas exchange.

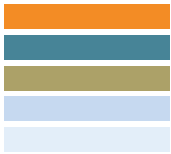
Snakes have a vestigial left lung, the lower 2/3 of the right lung functions as an air sac.

Most reptiles can breath-hold and can use anaerobic respiration (without oxygen).

Open mouth breathing is a sign of stress or respiratory disease.

Turtles





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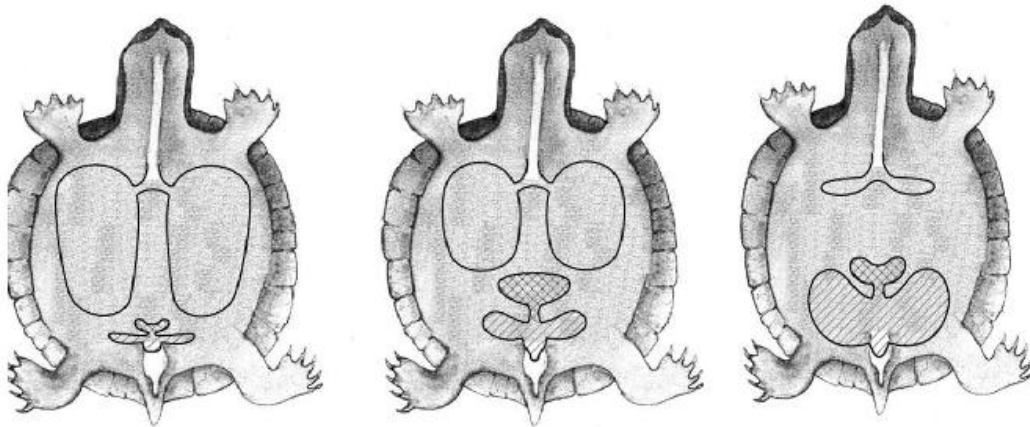
Module four (part one): Care of reptiles

The opening to the airway is well forward in the mouth, below the nostrils.

This divides into two large lungs that occupy the full length of the body when inflated.

Turtles can survive for long periods without oxygen by using anaerobic respiration.

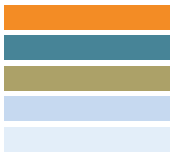
Buoyancy is achieved by altering the amount of air in the lungs to balance urine held in the bladder and pond or river water in the cloacal bursae (ballast tanks).



TO RISE TO SURFACE	EQUILIBRIUM	TO DIVE TO BOTTOM
LUNGS INFLATED BLADDER AND CLOACAL BURSAE EMPTIED OF WATER	LUNGS & BLADDER-CLOACAL BURSAE AIR - WATER BALANCE	LUNGS DEFLATED BLADDER & CLOACAL BURSAE FULL OF WATER

Marine turtles use the same muscles to expand the lungs as they do to move their forelimbs. When on land they move slowly as they have to alternate breathing with forward motion of a very heavy body.





Gastro-intestinal system or GI tract

Lizards and snakes

Only an experienced person should handle/restrain venomous snakes for examination.

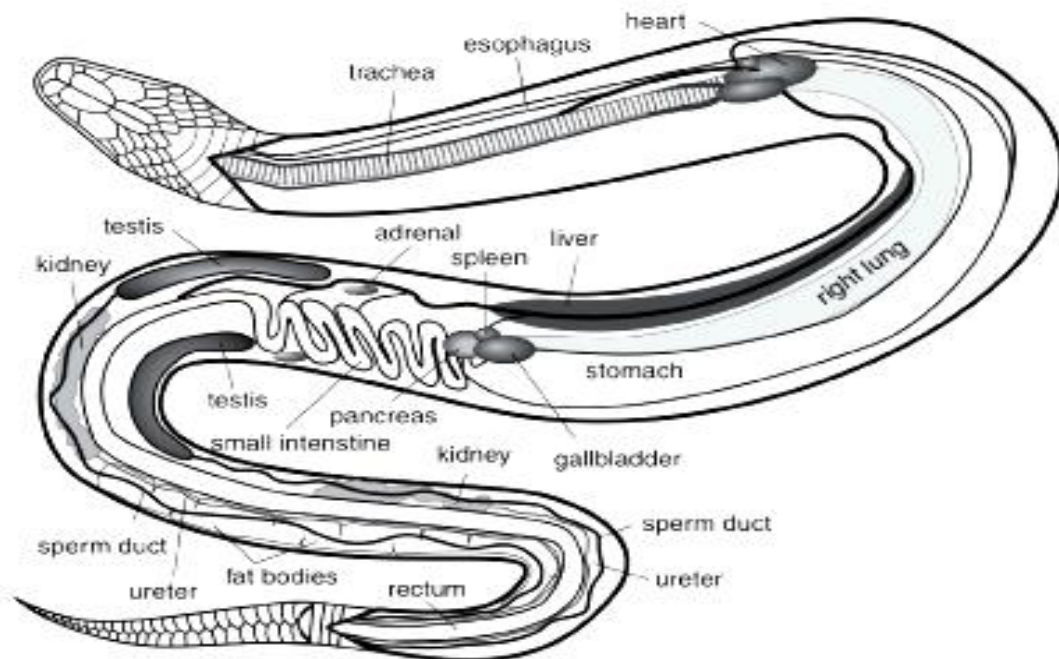
Tongues vary from flat broad blue tongue with mobile tip for smelling (large skinks) to soft, moist, fleshy tongue of geckos to forked tongue of monitors and snakes.

Snakes can disarticulate their jaw & *walk* along the body of their prey in order to swallow.

Simple gut for most species – stomach, liver, gall bladder, pancreas, intestine, colon/rectum.

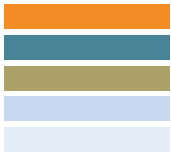
Venom injected into the prey by specialised teeth, speeds up digestion.

Digestion can be prolonged to several weeks when large prey animals are swallowed whole.



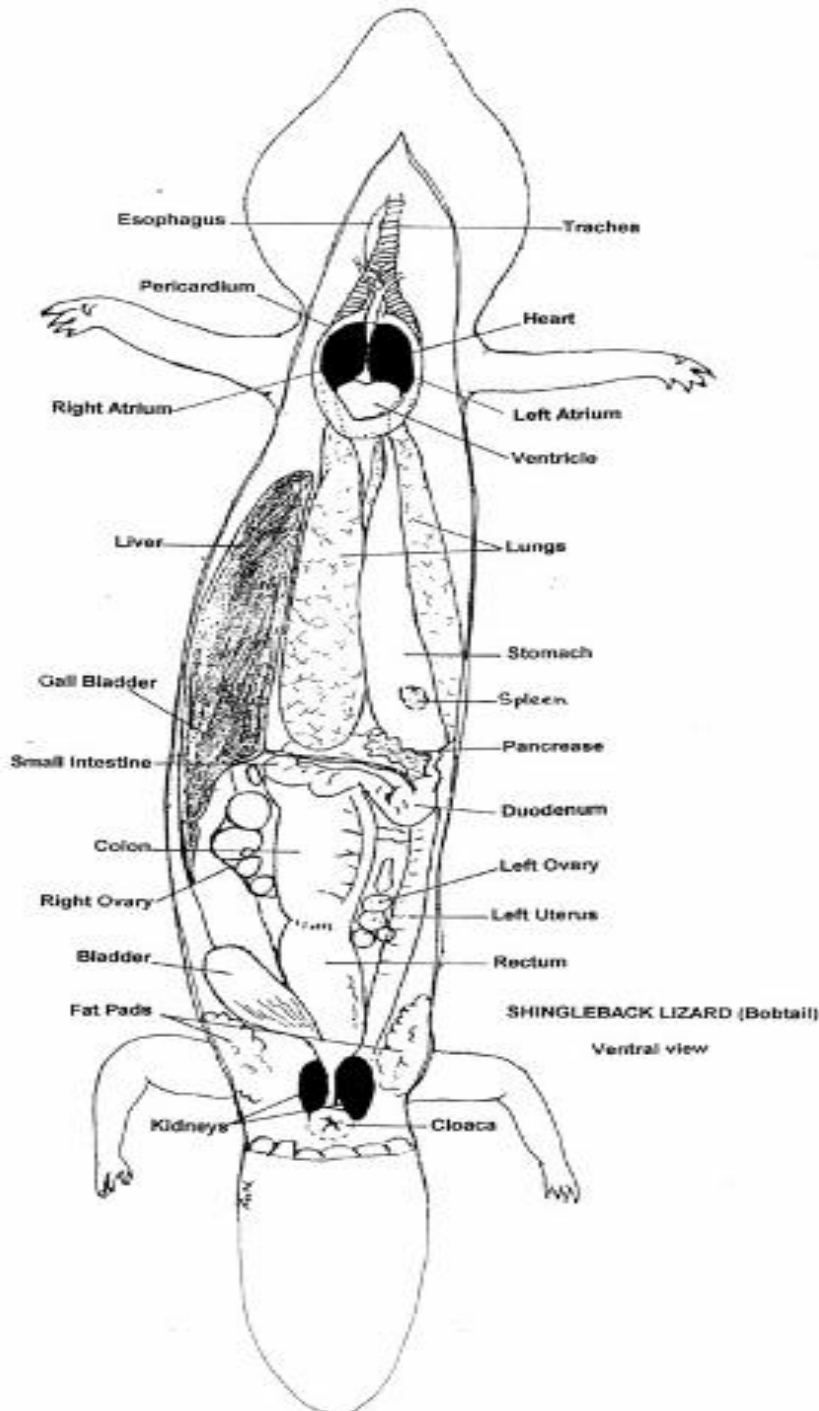
Male snake

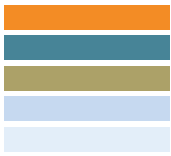
Female Bobtail



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Module four (part one): Care of reptiles



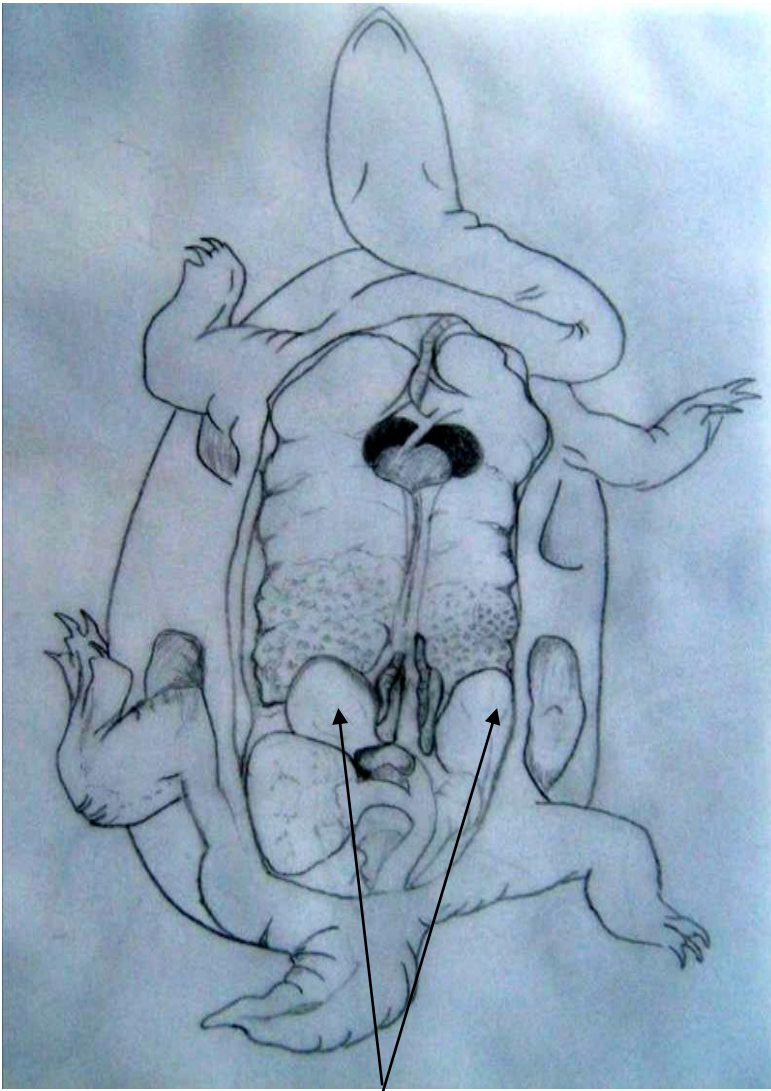


Turtles

The tongue is a hinged trapdoor used to keep food in the mouth before swallowing. Like most carnivores, the gut is simple – stomach, liver, gall bladder, pancreas, intestine, colon and cloaca.

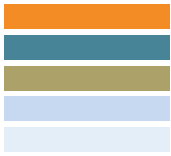
Digestion only occurs if the turtle is at its PBT and takes from 4-5 days to go through the gut. If fed and then allowed to chill down for long periods, food will rot in the gut and the bacterial infection will kill the animal.

One of the causes of **floaters syndrome** (buoyancy malfunction) is intestinal blockages (impaction). This can occur if the turtle becomes dehydrated and faeces dry into an immovable plug in the cloaca, blocking the bladder and/or bursae.



Cloacal Bursae of the Oblong turtle





Circulatory system

Lizards and snakes

Three chambered heart – one ventricle (lower chamber) and two atria (upper chambers). Red blood cells have a nucleus and are oval in shape. Reptiles are better equipped to survive major blood loss compared to mammals as reptile blood cells take less time to regenerate

The circulation from the hind legs can be diverted to the kidneys before going back to the heart and onto the rest of the body. There is concern that drugs injected into the hind legs can be excreted before they reach the target area.

Turtles

The heart has three main chambers but by extending a muscle inside the heart, blood is prevented from entering the lungs during dives when the lungs are deflated.

Immune system

Wild reptiles can carry parasites including blood parasites without clinical signs of disease until stressed (captivity).

Slow metabolism delays the immune response if the reptile is not kept at the **Preferred Body Temperature** for that species. Reptiles and birds lack the enzyme that liquefies pus so it is a hard cheese-like substance that needs to be surgically removed while the animal is anaesthetised.

Nervous system

Reptiles have a small, smooth, elongated brain and several ganglia (bundles of nerves) along the base of spine that work as an extra *brain* for quick responses. Even if the spinal cord is severed above pelvis the reptile may still be able to move back legs which makes assessment difficult

A neurological examination by a veterinarian will not always reveal the true picture so X rays taken from above and from the side will show the full extent of the damage. Paralysis will also affect the ability to defecate and urinate leading to impaction. If the animal is eating, not eliminating wastes and gaining weight too rapidly, suspect a blockage due to neurological impairment.

The senses

The senses are part of the neurological system.

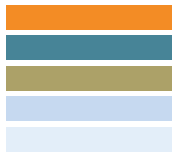
The eye – sight

Some snakes and geckos have vertical pupil slits

Geckos and snakes don't have eyelids, legless lizards do.

Geckos can't move their eyes or blink so use their tongue to keep the eye moist and clean

Snakes have a clear scale (spectacle) covering the eye which is shed when they slough



The ears - hearing

Some small skinks have ear flaps but most reptiles have no outer ear only an opening that may be covered by skin. Turtles have excellent hearing and communicate in the water by *hoos* and clicks. A long series of clicks is used to echolocate prey and obstacles in murky water of their habitat.

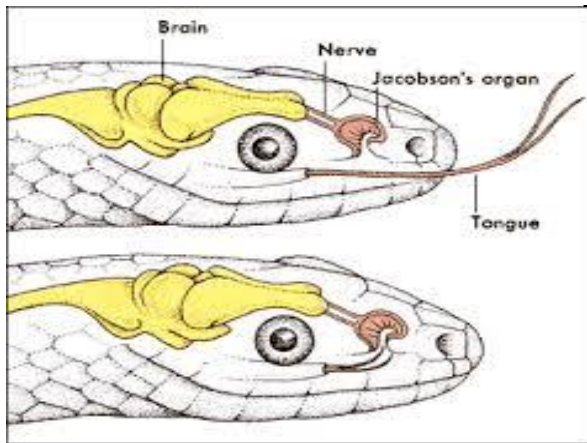
For many years it was thought that snakes didn't have ears therefore could not hear as we do. Recent research shows that snakes have inner ears and can hear. Snakes bury their head in soil to better hear approaching small animals.

Smell and taste

Most reptiles use the nostrils to breathe and the tongue to taste and smell.

The tongue is used to collect information from the surroundings which is then transferred to the Jacobson's organ in the roof of the mouth

A choanal slit in the roof of the mouth is normal in reptiles, in humans this is a defect (cleft palate)



Touch

Reptiles lack heat receptors in the ventral (belly) surface of their skin and can suffer horrific burns on heated surfaces before they move away.

Snakes can detect minute changes in temperature from sensors on their skin between the nares (nostrils) and eyes.

Turtles flinch when lightly touched on the shell. The shell is not a suit of armour; it is living bone, nerves and blood vessels.

Small skinks drop their tails when grabbed

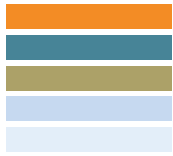
Urinogenital system

Kidneys: sea turtles & crocodiles excrete ammonia, freshwater turtles excrete urea, and other reptiles pass clear urine with solid white urates, an adaptation to arid conditions.

The bladder in freshwater turtles is part of a complex flotation mechanism – the urine can be used as ballast to assist diving.

The cloaca literally means sewer and is where faeces, urine, eggs, and live young pass into the outside world.





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Module four (part one): Care of reptiles

Snakes and Lizards have bi-lobed hemipene instead of a single penis, that emerge from pockets on the underside of the tail. They act independently depending on which side the male mounts the female during mating.

Turtles have a single, large penis placed inside the body. During mating it travels down and out of the cloaca. Testicles are located inside the body.

Several species of snakes and lizards are **viviparous** (bear live young) and have placentas. Marbled geckos and oblong turtles lay eggs with hard shells; other reptile species have soft-shelled eggs

Integument system (Covering of the body)

Skin

Reptile skin covers the scales but is not elastic enough to expand during growth and must be shed (ECDYSIS) on a regular basis. Shedding/sloughing takes a few weeks from start to finish. The skin first becomes cloudy including the spectacle of snakes and geckos, then splits. Snake skin is shed in a single piece, lizards in chunks. The animal is very vulnerable at this time and should not be disturbed (they can be very cranky). Tough cage furniture will assist shedding.

Scales

Tough rugosa scales of the bobtail have bony plates and act like solar cells soaking up energy from the sun. Snakes grip with ventral scales. Scales may be very small and soft. The number and arrangement of scales can be used in identification of species and each individual animal.

A turtles' shell has large scales called scutes that shed gradually, one after the other.

Teeth

All reptiles can bite but not all have teeth.

Bobtails have redundant stumps used for grasping and tearing food which is swallowed whole, not chewed. They de-shell snails like birds de-husk seed and reduce strong men to tears

Turtles have no teeth but can bite down hard with strong jaws at lightening fast speed.

Monitors have sharp teeth that are replaced when they fall out

Non-venomous snakes have needle sharp teeth

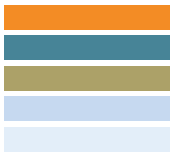
Claws

Used for climbing, hunting and defence, absent in some species, well developed and extremely sharp in others. They can be retractable.

Turtles are good climbers so must be housed with smooth sides, up to 50cm high, in the enclosure. Wire mesh is unsuitable housing material for reptiles.

Geckos have feet pads with minute hairs that grab even smooth surfaces allowing them to climb windows and walls to locate invertebrates





Tails

Small skinks and geckos can drop their tail. Snakes have short tails, lizards' tails are long.

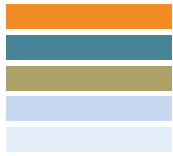
Monitors can whip their long tails as a defence

Water monitors and sea snakes have blade like tails to propel them through water

Bobtails store fat in their tail and may not survive winter if more than 2/3 is damaged.

Male reptiles usually have longer tails than the females of the species





4 Admission, identification and handling

Rehabilitation

The aim is to return a healthy, fit animal back to the wild. It must be able to cope with all the challenges with no compromising impairment.

There are three basic stages

Stage 1 – Intensive care medication, dressings, fluids, cleaning (daily handling),

Stage 2 – Recovery and transition to good health (less handling but close monitoring)

Stage 3 – Peak fitness and body condition (minimum handling prior to release)

An animal is moved to each of the stages when it is able to cope without relapse.

Admission

This is the interface between rescue and rehabilitation. Data capture is so important for wildlife because there is a very limited knowledge base. Although we focus on the individual, the data collected can shed light on the Big Picture of wildlife health which is important if we are to argue with authority on wildlife issues.

See Reptile Admission form in Appendix of The Minimum Standards for Wildlife Rehabilitation document

First, check the animal while it is still in the rescue box.

Look for any immediate life threatening signs – bleeding, strangulation (from loose threads on towels), birthing emergencies in live bearing species, prolapsed gut. See **First Aid** below

If the problem is not urgent, close the box and place it in a warm, secure place then continue to collect information from the rescuer.

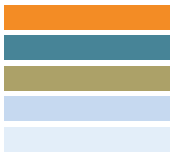
As well as a detailed history, ask the rescuer

- Are rodent baits used that could have caused secondary poisoning of the reptile?
- Was the animal found in or around a fire or hot BBQ cooking plate? (reptiles are attracted to heat)
- Was the animal trapped for long periods without food and water?
- Are any other sick, injured or dead animals in the same area?

First aid

- Clear the airway of mucous, blood, dirt if possible
- Apply pressure with gauze swabs, to stop bleeding. Bandage with *VETWRAP* and take to the vet
- Prolapsed gut/rectum: this often happens if the animal is run over by a car. Moisten swabs with warm saline and apply to the exposed tissue and take the animal immediately to the vet
- Do not warm the animal as the reptile's metabolism will be slow when cold and use less resources during this critical time and can be used to advantage





A Cool skin with puncture wounds from a cat attack

Rehabilitators often need to be detectives to get a correct history. Guilt is often the reason that a person is unwilling to tell that their own pet has attacked the animal. Try not to be judgemental, simply ask if there were cats/dogs around.

Identification

In order to provide appropriate care, the animal needs to be correctly identified.

There is such a variety of colour within a species, depending on the age and location of the animal, that to positively identify a reptile, a good photographic reference book, with distribution maps, is essential.

See **RECOMMENDED READING LIST** at the end of this chapter.

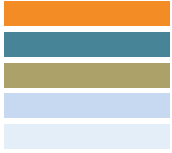
Do not approach a snake unless an experienced snake handler has identified it as non-venomous and has it under control.

When describing reptiles, the body is usually **measured from snout to vent (S-V) or (SVL)** and then the tail length is added. This is because some species drop their tails and then regrow a tail that is not always the same dimensions and colour as the original

Freshwater turtles are measured by the **straight carapace length – SCL**

Marine turtles are usually measured by the **curved carapace length – CCL** because of their size,





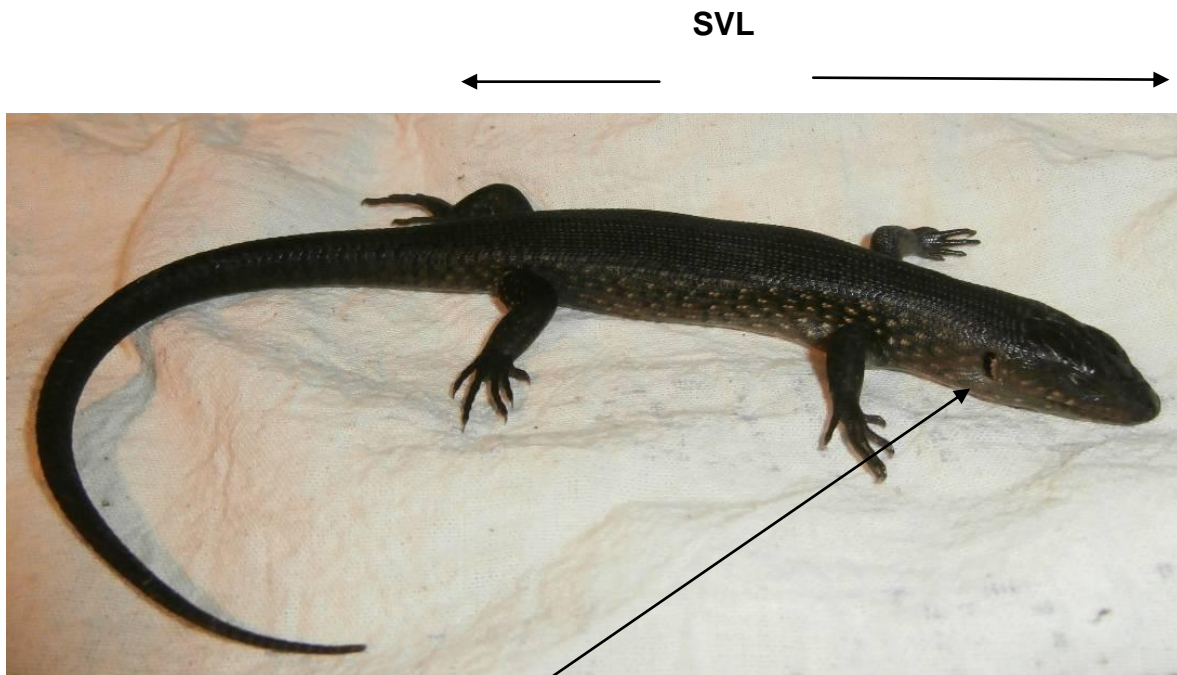
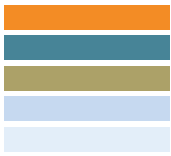
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Module four (part one): Care of reptiles



Rosenberg's or Heath monitor (*Varanus Rosenberg*) is identified by a double row of six white spots on the lower lip





Juvenile King skink (note ear opening)

Scale patterns are used to positively identify some species, particularly snakes. This can be painstaking but by quickly taking a photocopy of the animal's ventral surface (belly), scale counting can be done without distressing the animal by prolonged handling. Be sure to cover their eyes first.

Rosenberg monitors can be identified by the double row of 6 white dots along the lower lip.

The end of a Gould's monitor's tail is solid cream/yellow

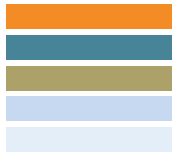
If several animals of the same species are in care, individuals can be identified by using non-toxic markers, nail polish or adhesive dressing. Bobtails have a central scale on the skull that is above the pineal gland. This scale should be left uncovered to allow light in to maintain the animal's diurnal rhythm.

Once the animal is identified, warm it to its PBT for 20 – 30 minutes in a darkened room or covered box to de-stress.

The animal will be more active when warm so contain it now.

Place in appropriate sized sack. Twist and fold over the top and tie securely.





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Module four (part one): Care of reptiles

Assessment

Review Care *of sick and injured wildlife 4.2 Assessment of a reptile*

*** A reptile must be at its PBT before it is assessed**

Observation and species familiarity is a rehabilitator's best tool. To know the abnormal behaviour of the species it is necessary to know what is normal. Reading and studying the behaviour of healthy animals will build a body of knowledge that is never complete.

Distant observation

Note if the animal is

- Hunched or bloated
- dragging its legs or unable to stand and lift its body off the table
- dull, sunken or constantly closed eyes, discharge
- pale oral membranes (a cold reptile will have pale gums)
- Bones prominent over pelvis and spine
- Open-mouth breathing, blocked nostrils
- Colour changes to skin, is it in the process of shedding, check toes for constrictions
- Puncture wounds – these can be difficult to find
- Asymmetry can indicate swelling/fractures or foreign body

A healthy animal will have bright eyes and an active menace response

Viability

Some conditions are not treatable

- Fly strike - It is kinder to euthanase an animal with a body cavity or skull wound that is fly blown with maggots inside.
- Spinal fractures should be euthanased. If immediate veterinary attention is not available, strap the animal to a flat board allowing enough slack for it to breathe but not bend the spine, and take it straight to the vet.
- Evisceration (intestines protruding from body wound) is life threatening. If immediate veterinary attention is not available- if the prognosis is poor, euthanasia is advised. If any intestinal contents are present then the gut is ruptured and the animal should be humanely euthanased. Make the animal comfortable and organise a vet trip.
- Loss of an eye or blind if the animal is to survive in the wild.
- Crushed head – very painful and will not heal back to normal

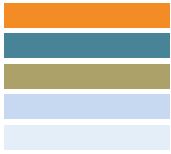
Euthanasia by freezing an animal is not humane.

Handling

A distressed wild animal will use the last of its strength to escape. Reptiles often freeze, so seize this moment, and be firm and decisive. Reptiles are strong; take care not to drop them. Gloves may be needed.

Use a pouch or cloth bag to contain quick moving species. You can then open a portion of the bag to examine the animal part by part. Stress kills so reduce the time spent on the examination.





- Lizards -grasp firmly behind the head with one hand and over the pelvis with the other. Beware of the sharp claws and whip-like tail in large monitors – two people may be needed to safely handle a large animal
- Large skinks (Bobtails and Western Bluetongues) are terrestrial and stress less (bite less) when supported under their long bodies with your other hand, the length of your forearm or on a table
- Small lizards – cage them in your hand but do not grasp the tail as they will *drop* it as a defence; to grow a new tail will reduce precious energy stores
- Turtles - wrap them in a thick towel to disarm sharp claws or flaying long necks. Smaller turtles can be grasped at both sides of the shell at the bridges

WEIGH THE ANIMAL NOW so medication and fluid amounts can be calculated

Close examination

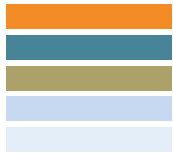
Use the **Reptile Examination Form** (See end of chapter) as a check list

- **Demeanour** - Can it lift its head up? Can it lift its body up by its legs and move around? How alert is it? Does it show interest in its surroundings? Is it defensive or aggressive? Skinks and dragons will often puff out their body to appear larger and look more threatening. Turtles will flail their necks and expand their throat to look fierce.
- **Body condition** is noted by muscle tone and a rounding of muscle with minimal protruding hip bones or vertebrae along the back and tail or the neck in turtles.
- Scales: damaged, discolouration, dry patches
- Parasites/Ticks: check behind the legs and around the ears.
- Check the underbelly for signs of burns, puncture wounds and maggots
- Note any lumps or swelling on the body, asymmetry
- **Eyes** should be free to open, clear and bright.
- Eye damage- many species have a protective clear scale, spectacle, over the eye. Gently flush with warm saline from a syringe (take care to avoid further eye damage from the end of the syringe by holding it above the eye).
- **Nostrils** should be clear of crust and discharge. They should be round and open and the same size. Frothing and blowing bubbles from the eyes, nose and mouth is not normal and can be a sign of respiratory infectious disease for example, Bobtail Flu. Place such an animal in isolation immediately away from all other reptiles. Consult a veterinarian.
- **Mouth** – to open the mouth place fingers gently over the eyes or nostrils. Breathing difficulty -check for airway obstruction if the mouth gapes in defence Place a smooth object (syringe barrel) between the jaws to keep the mouth open and use a moist cotton bud to gently remove dirt etc. Note the opening of the airway is clear
- Tongue is it intact. Look for discharge/plaques/trauma in oral cavity



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Module four (part one): Care of reptiles

- **Fractured limbs** can be bandaged with soft, padding, then pre-stretched cohesive non-adherent bandage for support. Place the limb in a natural position before bandaging. Splints are not used for reptiles with short limbs. Strap the limb to the side of the body for support
- **An animal's pain can be halved by simply immobilizing the fracture**
- **Fractured ribs** – do not strap. If air is leaking from the lungs, seal the hole with Solugel, cover with a non-adhesive Melolin dressing and keep in place with an adhesive dressing (for example, Fixomull) then take it straight to the vet.
- **Toes and claws** - check for injuries
- Cloaca – protrusions, dirt or discharge

Record keeping

Use the examination sheet provided to record your findings. Always number your patients and keep daily records of treatment given, vet visits, test results for blood/biochemistry and X rays. Note behavioural changes, feeding, basking and sloughing observations as well as urine and faeces output.

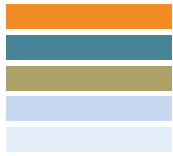
Diarise vet re-visit dates and take your records in a plastic sleeve with your name and contact details. Highlight your request for treatment to assist the vet staff when organising their daily list of procedures.

Record the date and weight at release and the location of the release site.

As a good public relations exercise, inform the rescuer of the outcome and don't forget to keep your records for DEC.

A yearly summary will be less of a worry if all your documents are up to date. This summary can be used for grant applications to show the amount of rehabilitation you have achieved, what species and the success rate.





Bobtail - Hunched posture can indicate spinal injury +/- gut pain. Flat tail is a sign of starvation

Large skinks with acute flu will have bubbles from eyes and nose and thick mucous in the throat. Chronic cases will be very underweight, lethargic and anaemic



Bobtail - Pale mucous membranes at PBT - Anaemia/blood loss/Bobtail Flu

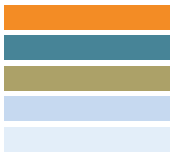
Treatment

Once a **Treatment Plan** has been drawn up, medication and rehydration will begin.

Fluids/rehydrating

- Most reptiles that come into care are dehydrated from loss of body fluids, pain & stress
- A warm (at its PBT), hydrated animal can begin to function and heal almost immediately.
- Beware- animals often dramatically spring back to life once hydrated. Don't assume they will still be weak and inactive 2 hours later.
- Reptiles need fluids replaced to a % of their body weight – **snakes & lizards 1-2%, turtles 2-3%**





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- 0.9% (Normal) Saline is the fluid of choice for rehydrating reptiles
- Fluids are given by a tube into the stomach by a trained person. Incorrect technique can result in a painful wound or more serious injuries- ruptured organs, suffocation and death. Avoid oral fluids when head injuries may include a fractures jaw
- Never prise open the mouth with force. Jaw bones are quite thin and will easily fracture. A smooth flat applicator inserted at the side of the mouth is the preferred method



- The thin top of an animal treats pouch can be used to open the mouth from the side to insert a stomach tube
- Use non-abrasive gags - plastic syringe barrel or rubber spatula can be used to keep the mouth open during examination and when passing a blind-ended stomach tube to give fluids.



Blinded-ended stomach tube

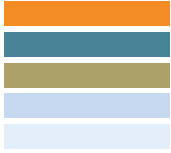
Most cases will show improvement in 3-4 days of intensive care treatment. However, the patient may reach a Plateau or start to deteriorate. Look for the trend.

Re-assess and decide if the Treatment Plan needs changing. Continue to assess the animal's progress at every step. The stress of captivity can severely compromise its ability to cope and if we cannot help the animal euthanasia is the kindest treatment

Wounds

- Flush superficial wounds with warm saline using a 25g needle and a 10 – 20ml syringe with a steady flow. Avoid spray droplets entering your eyes
- Large wounds will need surgical debridement under anaesthetic by a veterinarian





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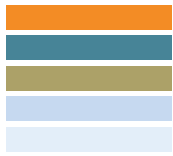
Module four (part one): Care of reptiles

- Reptile pus is hard and will not liquefy; it has to be surgically removed under anaesthetic

Once first aid has been given, the animal will need to rest and de-stress in a warm darkened box that is appropriate for the species and its age.

Dressings and wound care are for advanced rehabilitators and are not included in these notes





5 Housing

Review *Care of sick and injured wildlife 6.2 Housing Sick/Injured Reptiles*

See Reptile & Frog Husbandry Table

Basic

A secure vivarium with:

- heat and light, a cool area
- smooth, non-absorbent, easy to clean surfaces,
- ventilation
- room for limited movement (a recovering animal needs to conserve its strength).
- well insulated if housed without climate control.

The furniture should provide the reptile with:

- privacy hides to de-stress and sleep
- platforms to access heat and light without needing to climb or exert too much energy.
- a safe environment. Sturdy material which will not injure the reptile

Do no harm

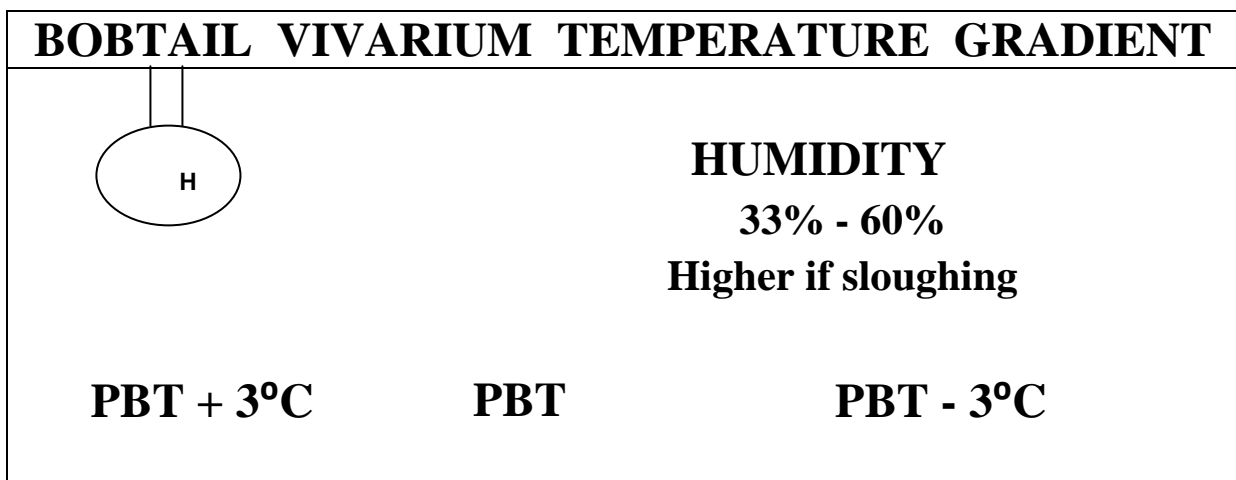
- humidity chambers or large circumference water dishes that allow adequate evaporation to create the correct humidity for the species.

Aquariums can be used but are not ideal because they lose heat through the glass and have poor ventilation at substrate level.

Large reptile display enclosures are for healthy captive animals. Hospital housing is smaller to conserve the animal's energy for healing. A reptile can quickly overheat in a bird hospital hot box

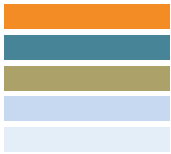
Heat

Housing must provide a **temperature gradient** as reptiles do not generate body heat and need to absorb heat from the environment. By moving from warm to cool areas the animal can maintain a body temperature within the range it needs to function.



- Heat lights and ceramic heat emitters are hot so care must be taken to prevent contact burns to the animal or yourself.





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Module four (part one): Care of reptiles

- Heat pads or heat cords placed under the vivariums need air space to prevent overheating and a fatal melt-down. Cake cooling racks or feet on each corner allow air flow.
- Thermostats are essential to control the heat delivered from basking lamps and pads
- Climbing species like monitors, need to be housed with a heat emitter and lights that are covered with wire mesh to prevent burns
- Sick or injured reptiles may not be able to move or may be too sick to be aware of the surroundings. It is important to place a reptile near the heat source but not directly under it, to prevent overheating which can be fatal.



Night-time heat globes can be red or blue

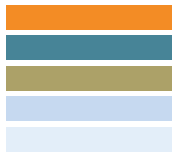


Ceramic heat emitter



Terrestrial lizard vivarium above.

Monitor vivarium with covered heat & light, below



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- Metal cage fronts cause damage to the face, cover the cage with smooth surfaces for example, Perspex, preferably tinted, or cover with a dark cloth on the inside

Light

- Reptiles need the UVA & UVB of the light spectrum to metabolise calcium for good health. UV light cannot penetrate glass or Perspex. Remove covers from light boxes and replace with wire mesh
- Natural sunlight is best but shade must be available and only put the animal outside if the air temperature (measured in the shade) is below 30°C for a total of 1-2 hours per week.
- A normal photoperiod for the season can be provided using a daylight lamp and a timer set for Winter 10 hours/day, Summer 14 hours/day, Autumn & Spring 12 hours/day
- Darkness can greatly reduce stress levels. Small hollow cardboard tubes, boxes, cloth pouches, bark and leaves can be used for privacy, or simply cover the front of the enclosure with a towel.

Humidity

- Correct humidity is vital for life. Each species has a humidity requirement. Prolonged cutaneous (skin) dehydration can lead to organ failure. If humidity is too low during sloughing, the old skin hardens and cuts like a knife into the flesh below it.
- Provide shallow soaks for reptiles when sloughing their skin

See Reptile & Frog Husbandry Table

- Humidity chambers for some gecko species can be made simply with margarine containers. Line the lid with moist tissues or damp sphagnum moss and place the container (with cut-out doorways), over the top. Ensure all cuts are super-smooth to prevent injuries. Change tissues frequently or mould will grow – a health hazard.
- A wide shallow water dish has a large surface area for evaporation. When housing young lizards, do not use tiny water dishes with low surface area as they will need the same humidity as the adults

Turtles are aquatic but need to dry out daily; they are air breathing but can stay submerged for long periods. This group presents a challenge for housing as one habitat is not enough. Then there is Dry-dock when injuries preclude the turtle from staying in the water.

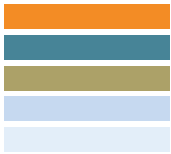
A turtle enclosure needs both a haul out area for basking and a depth of water to allow the head to be submerged for eating. The turtle will also use the water for defecating and urinating so good filtration is a must.

Dry docking – wounds with dressings have to be kept dry and clean. However, a turtle needs to be in water to eat and eliminate wastes. The wound has to be covered with a waterproof dressing before the turtle is placed in a tub of 25°C water for 1hour/day. Partially cover the tub as privacy will reduce stress and encourage feeding.

Water quality

Most reptiles are able to drink good quality tap water available in Perth but as water quality changes depending on local soils and treatment, it is best to use either rain water or tap water that has been standing for 24 hours to release the chlorine, or cold boiled water.





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Module four (part one): Care of reptiles

Good water quality is essential. Turtles can be long-term patients. They excrete a lot of wastes that build up to toxic levels in a few days if filtration and oxygenation is not kept up. Turtles need three times the filtration used in fish aquariums. Skin disease due to poor housing can result in septicaemia and death. Enclosures must have smooth surfaces to prevent abrasion of the skin which allows bacteria to enter the bloodstream. Any breach of the skin is an avenue for infection.

Freshwater turtles are losing their habitat and many more are coming into care. A network has been set up to deal with their rescue and rehabilitation.

See *Turtle Oblonga Rescue and Rehabilitation Network* in **Practicalities**

Marine turtles are cared for at the Rockingham Environmental Centre, *Naragebup*, by their *WA Marine Turtle Rescue & Rehabilitation* volunteers. If you find a marine turtle, wrap it in a wet towel and contact them.

See **Practicalities** for contact details

Security

To protect the animal from predators and from escaping before they are fit and able to survive, the enclosures must be secure. Turtles are excellent climbers so walls have to be to smooth to above their standing height (50cm) and non-see-through.

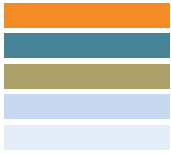
Snakes and lizards are able to flatten their bodies and squeeze through small gaps so doors must be closefitting or locked.

Locks should be placed in the centre of the door to prevent the reptile forcing a gap at either top or bottom of the door. Reptiles are very strong.

Reptile incubators

These incubators have no fan or egg roller mechanism. Unlike birds' eggs, reptile eggs should not be rotated. The egg must stay in the same orientation or the blood vessels inside will rupture and the embryo will die.





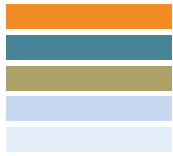
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On hatching the neonate will stay in the cracked egg shell until all of the yolk sac is absorbed into the opening at the centre of the abdomen. If you receive such eggs, allow several days for this process to complete. House the animal in a reptile incubator with high humidity 80 – 90% and a temperature of 28⁰C



Eggs in vermiculite



6 Diet and feeding

In order to heal and grow, patients need good nutrition.

Omnivorous species eat meat protein (rats, mice, smaller lizards, eggs, invertebrates and carrion) as well as vegetation - berries, fruit and flowers. The Large skinks and the *egernia* species are omnivorous but most reptiles are either **carnivorous or insectivorous** and hunt live food.

- Because reptiles don't convert food energy to heat energy, they can go without food for long periods- 6 – 9 months for some species. Fat stores inside the body and tail are used throughout this non-feeding period
- Young, sick or debilitated animals will need feeding daily once they are hydrated
- All reptiles need to be at their preferred body temperature (PBT) in order to feed and digest.
- Reptiles have a slow metabolism and can take a week to process food through the gut. They need to remain at their PBT during this time or the food will rot inside them - this is deadly.
- Many species are triggered to eat by movement.

See **Reptile & Frog Husbandry Table** for diet of various species.

Wild reptiles are notorious for refusing to eat in captivity and will need intervention if they are to recover.

Assist Feeding

Debilitated animals may lack the strength to eat. Large skinks can be spoon feed a slurry of fruit and Wombaroo Reptile Supplement mix (RSM) or raw egg yolk. They use their fleshy tongue to lap it from the spoon. Remove the plate from the enclosure if feeding raw egg yolk as the lizard will walk through it and become coated

Strips of raw liver (high in Vitamin B) can be fed with tweezers, to stimulate appetite.

Tube Feeding

Carnivores don't lap and need to be fed blended pinkie mice or rats made into slurry with Reptile Supplement Mix, via a stomach tube. This technique is dangerous unless the person has been trained to do it correctly. **The food must not enter the airway.** The head should be held high afterwards to stop regurgitated fluids entering the airway.

Live food

Crickets, mealworms and cockroaches are an excellent food for hunters. The movement stimulates their hunting instinct.

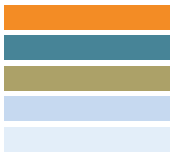
Suspending a morsel from a wriggling, blunted satay stick, chop sticks or tongs will attract the reptile's attention

Soak marine crustaceans and fish to remove salt before feeding to non-marine reptiles.

Supplements

The freezing process destroys vitamins which are essential for good health and appetite so a supplement is used when feeding insects, mice etc that are kept frozen. Commercial





products from Wombaroo, Vetafarm etc can be added to boost the vitamin and mineral content of the food. Follow the manufacturer's instructions to make a slurry, pellets or meatballs, as this is formulated to suit reptiles and prevents calcium deficiency when a meat diet is fed.

Whole foods – mice, rats, fish can be injected with the supplements prior to feeding.



Use a straw to insert supplement powder into a fish's mouth

Self Feeding

Feed appropriate sized food for the age and size of the reptile.

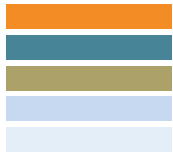
Bobtails have tiny redundant teeth and eat by grasping and tearing food into small pieces and swallowing it whole. This is fine if the plant is rooted in the ground but in captivity a piece of fruit or vegetable that is too big to swallow will not be eaten

Water

Provide clean, fresh water daily in accessible containers that do not spill

Most reptiles are able to drink good quality tap water available in Perth but as water quality changes depending on local soils and treatment, it is best to use either rain water or tap water that has been standing for 24 hours to release the chlorine, or cold boiled water.





Release requirements

Physical condition

- Must be healthy , disease-free and fit enough to defend itself
- Must be able to recognise, catch, manipulate, consume and digest its natural diet.
- Must be capable of normal movement and have adequate fitness for sustained activity.
- Must have sensory ability (sight, smell, hearing, touch), as most reptiles hunt for their food. Turtles have the ability to echolocate in murky water but depth perception on land needs two functioning eyes.
- Must be of an appropriate weight for the age, sex, and time of year for that species.
- Must show appropriate wariness of humans and domestic animals i.e. not imprinted.
- All wounds must be healed
- Bobtails need 2/3 of original length of the tail for fat storage to over-winter
- If released in the cold months, reptiles must be gut-empty. Fast them for 1-2 weeks at their PBT, and record stools passed. Gut passage time varies with age and species

Release site

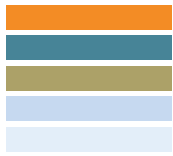
- Release where found or in the nearest suitable habitat at a safe location
- The habitat must contain appropriate prey, shelter etc. as required by the species
- The habitat cannot be a current or future development site due to the longevity of reptiles

Timing of release:

- Release as soon as possible, particularly because reptiles frequently do not eat once taken into care.
- Do not release in severe winter weather, after a bushfire or flood or during a drought
- Diurnal species should be released in the morning, giving them a full day to explore and look for food and shelter before nightfall.
- Nocturnal species should be released at late afternoon.
- Release should preferably take place during a period of fine weather for the next few days.

Hard release

- Generally, reptiles do not require back-feeding or close monitoring post release
- Hatchlings can be kept until they express predator awareness/avoidance behaviour and then hard released into good cover vegetation.



7 Common problems

Trauma

Gardening accidents

Mowers, whipper-snippers, shovels can all cause deep wounds. Reptiles hide in long grass and are less active on cool mornings. Suggest to the public that they rake through long grass before mowing etc.

Treatment

Surgical debridement, wound dressings, fluids, antibiotics, pain relief and **PBT**.

Reptile skin is not elastic so when the skin is sutured through the scales a gap is left to heal by granulation otherwise the new scales will grow and cut into the skin it is sutured onto.

Long-term care – it can take months of wound care for the tissues to heal and regrow the scales.

Dog/cat/bird attacks

Puncture wounds, spinal injuries from shaking, evisceration, maggot infestation.

Treatment

Surgical debridement, wound dressings, fluids, antibiotics, pain relief and PBT.

Many are not treatable and have a high mortality – euthanasia is the kindest treatment for maggots in body and cranial cavities

Car accidents

Horrendous head trauma, fractured bones/ribs, torn organs, blood loss

Treatment: Flat head injuries are euthanased. Check viviparous females for live unborn and turtles for viable eggs

Fishing line/hook foreign body

Turtles swallow bait fish on tackle, entanglement in discarded fishing line. Bobtails ingest balloons causing blockages

Treatment

X ray, surgery, fluids, PBT, antibiotics, pain relief, supportive care

Heat Stress

Reptiles can heat up quickly but cooling down is a much slower process. If unable to move from the heat source, internal temperatures can quickly reach fatal levels.

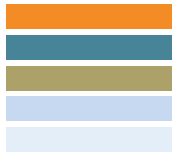
Treatment

Cold packs, tepid water (2 parts cold to 1 part boiling water) baths, add cooler water gradually. Hold the head above water. Cool fluids given by stomach tube will bring down the core temperature.

Never place frozen packs on or near reptiles. Contact will cause freezer burns to skin and necrosis (death) of internal organs- reptiles cannot generate body heat.

Illness





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Module four (part one): Care of reptiles

Poisoning – primary or secondary Warfarin (rodenticide), organochlorides/organophosphates pesticide/herbicides

Treatment - Fluids & Vitamin K for Warfarin but other poisons are not treatable - euthanase

Infectious Disease – Bobtail Flu

Treatment - Fluids, heat, antibiotics, nebuliser, supportive care (90% success rate)

Entrapment/starvation/dehydration

A reptile will crawl into a small space after an animal, eat it and be unable to squeeze out the entrance. An adult will have to wait until it digests its dinner but a growing juvenile will be trapped for months until its skin and bone

Treatment - rehydrate, assist feed, heat and long-term support

Parasites

External - ticks, mites, leeches

Treatment - Physical removal with tweezers and a cotton alcohol swab, Reptile Mite spray

Internal – roundworms, tapeworms, blood parasites

Treatment - Oral medication after a faecal test to identify the parasite

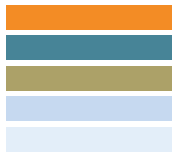
Note: Ivermectin is toxic for turtles

Dysecdysis

Incomplete or problems shedding the skin or scutes in turtles

Treatment - Increase hydration and humidity, add a humidity chamber, and reduce heat over the hide. Commercial products are available from reptile pet shops. Seek veterinary assistance





8 Practicalities

Supplies

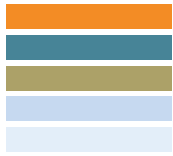
Reptile Food, housing and accessories

Pet Magic	www.petmagic.com.au
City Farmers	www.cityfarmers.com.au
Bird, Fish & Reptile Place	www.birdfishandreptileplace.com.au
Better Pets & Gardens	www.betterpetsandgardens.com.au
Gary Davies vivariums, knowledge and snake handling training	www.westaussiereptiles.com.au
Gumtree second-hand vivariums	www.gumtree.com.au
Bunnings ponds, tubs, wire mesh tops	www.bunnings.com.au
Hova Bator Reptile incubators	www.incubatorwarehouse.com

List of useful reference material for rehabilitators

- Reptile Medicine and Surgery by Mader second edition (good husbandry section)
- Caring for Injured Native Reptiles and Frogs by Anne Fowler 2008
- Health Care and Rehabilitation of Turtles and Tortoises by Amanda Ebenhack 2012
- Keeping Eastern Long-necked Turtles by Darren Green 1999
- Caring for Australian Freshwater Turtles in Captivity by Craig Latta 2008
- Reptiles and frogs of the Perth Region by Bush et al





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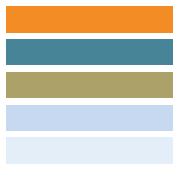
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Module four (part two): Care of frogs

9 Skills needed to competently care for sick and injured reptiles

- Ability to identify common species by sight and by reference material
- Knowledge of common species' normal behaviour, diet, housing and release site needs
- Ability to administer medications prescribed by the vet and follow through with treatment plans
- Handling skills for common species of lizard, non-venomous snakes and turtles
- Record keeping
- Have techniques to reduce stress for wild reptiles in captivity
- Good people skills when dealing with the public, veterinary staff etc
- Organisational skills – time management, record keeping, numeracy skills for calculating correct medication doses
- Computer skills for reports, grant applications, documenting case histories





Module four (part two) Care of frogs

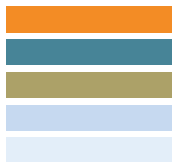
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March 2013





Module four (part two) Care of frogs

1 Introduction

Frogs require advanced skills, they are not for those with basic rehabilitation skills and experience.

A frog is an amphibian. *Amphi - bios* means *BOTH – LIFE* as their first life (larvae) is an aquatic tadpole and the second life is a terrestrial, burrowing or arboreal frog.

Frogs need high humidity 75% - 95%. They are often found in microclimates of moisture surrounded by dry land. It is important to identify the exact location so the animal can be released there after rehabilitation. There are over 80 species of frogs in Western Australia.

Frogs' skin can absorb oils and soapy residue from your hands, so handle them carefully using a damp towel or powder-free latex gloves or wash your hands well in rainwater if possible

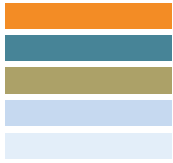
Frogs are very fragile and the survival rate of injured or displaced frogs is low.

Added to that, the chytrid fungus has caused some species of frogs to become extinct.

Frogs should only be released into their home range without contact with other frogs in care. Quarantine each frog and use strict hygiene protocols.

Chytridiomycosis is a highly infectious disease of amphibians caused by the pathogenic amphibian chytrid fungus *Batrachochytrium dendrobatidis*. Research has shown that the fungus is widespread across Australia and has been present in the country since at least 1978. It is also found in Africa, the Americas, Europe, New Zealand and Oceania. The disease has been known to be active for at least 15 years in some south-west Western Australia species, such as the orange-bellied frog *Geocrinia vitellina* and the western green and golden bell frog *Litoria moorei*, without impact on their populations. More information about the government threat abatement plan can be found at <http://www.deh.gov.au/biodiversity/threatened/tap/chytrid>



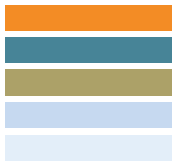


2 Anatomy

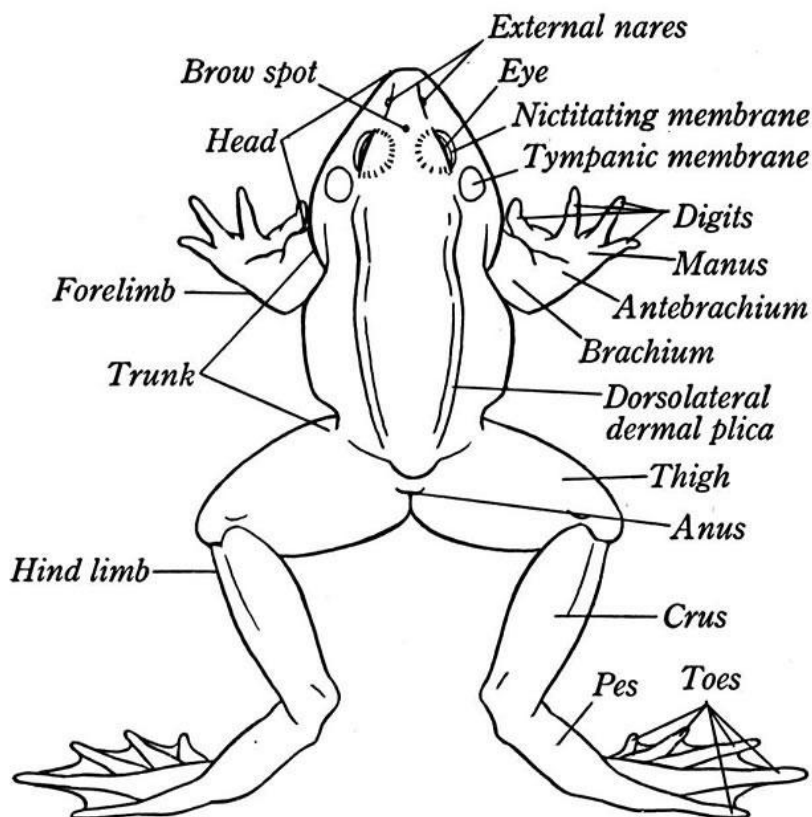
- Frogs skin is thin and porous. Making it easy to absorb chemicals and toxins
- Frogs are very fragile and the survival rate of injured or displace frogs is low.
- Climbers (for example, Western green tree frog *Litoria moorei*) have long slender legs
- Burrowers (for example, Moaning frog *Heleioporus eyrie*) have short shovel-like legs
- Ground (Terrestrial) frogs (for example, Western banjo frog or Pobblebonk *Limnodynastes dorsalis*) have long, muscular legs and jump amazing distances
- Some species do not go through the tadpole stage in water but hatch as miniature frogs
- The eyes have a third eyelid or nictitating membrane to protect it from sharp insects

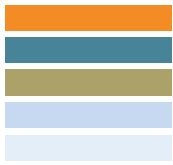


Moaning frog *Heleioporus eyrie* (Photo - Justin Bianchini, Wanneroo Times)



Frog anatomy diagram





3 Identification, handling and admission

Identification

A good photographic reference book, with distribution maps, is essential.



The distribution map for the Moaning frog *Heleioporus eyrie*

There are also some Smart phone apps that give the vocal sounds to identify frogs
See the **recommended reading list** at the end of this chapter.

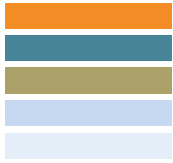
Cane toads (*Bufo marinus*) are not native to Australia and are a declared pest animal.
Australia has no native toads - **however, do not confuse cane toads with large species native frogs.**

Transport

- A plastic container, with a wet towel inside, a tight fitting lid with a few air holes
- Secure this container inside the vehicle (not in the boot) to prevent it tossing around during transport
- Do not transport in water, they are air breathers and can drown if unable to hold their head above the water

Handling & equipment

- For Advanced carers - Frogs can die from the stress of handling alone
- A fine, wet net can be used to scoop up a frog from its moist environment
- Some species survive in dry soil by secreting a protective skin to retain moisture so make sure they are put into a moist, not dry container if this sac is ruptured.



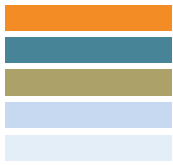
- Cup your hands over the frog to prevent it suddenly leaping into the air
- Limit the handling time to a minimum by having everything ready
- Frogs' skin can absorb oils and soapy residue from your hands, so handle them carefully using a damp towel or powder-free latex gloves or wash your hands well in rainwater first.

Admission

- Check if the frog has a righting reflex by placing it on its back- it should turn over
- Check the skin for puncture wounds, discolouration or differences in appearance
- Look for asymmetry, swelling on one side
- Trauma to limbs – leg(s) hanging down, flaccid muscles. Tape limbs into a natural position
- Flush wounds with 0.9% saline

Fluids/Rehydrating

Frogs absorb fluids through their skin but are very sensitive to processed water. Rain water, distilled or cool, boiled water is best. Put the frog into a shallow dish of water at its PBT.

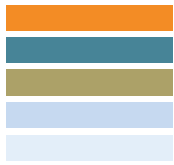


4 Housing

- House in a simulated environment. Burrowing frogs need to burrow, usually backwards, in a soft substrate. Tree frogs need short branches and damp rock shelves
- Due to diseases such as Chytrid fungus, all frogs need to be housed separately and strict hygiene protocols observed otherwise a released frog may carry pathogens to a naive (unexposed) wild frog population
- Hermit crab terrariums are easy to clean, have good ventilation and small openings for feeding as well as large openings to do general maintenance
 - Place four jar lids in each corner of the base and place a stiff wire mesh false floor on top. Cover this with gravel for 2-3cm
 - Then put a layer of 50/50 reconstituted palm peat/fine washed sand up to 10cm deep, depending on the species
 - Place leaf litter and dry bark pieces on top
 - Sink a shallow water dish into the soil (no chlorinated water)
 - Place a heat source at one end (a covered Infra-red 50w globe) to maintain a temperature range of 15 - 20°C
 - Maintain humidity by spraying rain water several times a day. Artificial green foliage inside the container will hold droplets of water for drinking. Live plants in pots of soil can harbour moulds and should not be used in small enclosures
 - Cover the container with fly-proof mesh
 - Simulate a rain shower with tepid rainwater every 2-3 days to remove faeces and to keep the substrate moist. This allows good bacteria to break down the nitrates which are toxic to frogs

Water quality

- water must be de-chlorinated.
- use rain water or cooled, boiled water
- change water daily
- never put more than one frog per container and don't re-use water for other frogs
- **disinfectants are toxic to frogs – scald utensils and tubs with boiling water. Rinse your hands after disinfecting them between patients.**



5 Diet and feeding techniques

All frogs are carnivores/insectivores and eat live invertebrates

Diet

- Crickets, moths, flies, slaters, beetles, ants, spiders, mealworms and earthworms.
- Only put a few into the enclosure each day.
- Frogs feed at night

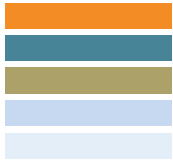
Feeding techniques

- Gut pack insects and worms by feeding them a mixture of
- endive and carrot
- 70 – 80% chick crumble
- 20 – 30% calcium carbonate

A healthy frog has a huge appetite but may not feed if sick or injured

- Place mealworms, or other food onto a blunted satay stick and wriggle it to stimulate prey movement

Good nutrition is essential for healing. Even if the animal is not self feeding, eventually you will need to assist feed to provide essential nutrients.



6 Rehabilitation and release requirements

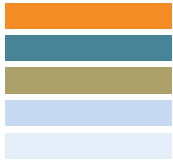
- Specialist care by advanced rehabilitators
- Quarantine all patients by housing separately and in a separate room from other reptiles
- Some medication can be given by sitting the frog in a dish of the prescribed solution
- Frogs must be released into the microclimate where they were found

Euthanasia

Humane euthanasia can be achieved by crushing the skull, NOT freezing.

7 Common problems

- Habitat loss
- Herbicide/Insecticide spray toxicity
- Ignorance/mistake identity by well-meaning people eradicating cane toads



8 Contacts

Deborah Pergolotti Cairns Frog Hospital

P. O. Box 2731, Cairns, FNQ 4870

web: www.fdrproject.org.au email: curator@fdrproject.org.au

Ph: (07) 4053-4367

mob: (0428) 114 266

Climate watch: <http://www.climatewatch.org.au/species/frogs>

9 Recommended reading

- Australian Wildlife Rehabilitation Conference notes www.awrc.org.au
- *The Role of Carers In Disease Surveillance and Frog Conservation* by Deborah Pergolotti,
- Reptiles and frogs of the Perth Region by Bush et al





Reptile and frog husbandry table

Reptile	Common name	Preferred body temp (PBT)	Diet RSM = Reptile Supplement Mix (Wombaroo)	Habitat
Large skinks Up to 40cm Terrestrial, Diurnal.	Bobtail (Shingleback) <i>Teliqua rugosa</i> West. Bluetongue <i>Teliqua occipitalis</i>	28-33°C	Omnivorous Lettuce, tomato, apple, banana, snails, dandelion blossoms, egg, meatballs & RSM	Diurnal, terrestrial. Vivarium with Newspaper substrate ½ PVC pipe hollows for hiding Wide, shallow water bowl for humidity 50 – 70% (especially if shedding) Rocks for rubbing skin when shedding Basking heat lamp or ceramic heat emitter 33°C at hot spot
Small skinks Snake-like eye spectacle Terrestrial, Diurnal	Fence skink <i>Cryptoblepharus plagiocephalus</i>	28-30°C	Insectivorous Insects, worms, mealworms, small meatballs & RSM	UVA & UVB light spectrum , seasonal photoperiods Seasonal photo-period Winter 10 hours. Summer 14 hours Climate controlled room -temp < 30 °C Substrate: newspaper
Small Dragons Terrestrial, Diurnal.	Bearded Dragon <i>Pogona minor</i>	28-36°C	Insectivorous Insects, worms, mealworms, small meatballs & RSM. Likes vegetables and flowers occasionally	Diurnal, terrestrial. Hollows for hiding, will drink water from sprayed leaves UVA & UVB light spectrum Seasonal photo-period Winter 10 hours. Summer 14 hours Climate controlled room temp < 35 °C Substrate - newspaper If there are no wounds - a small sand box for digging (enrichment)
Monitors Forked tongue Terrestrial, Diurnal.	Gould's Monitor (Sand monitor, Racehorse goanna, Bungarra) <i>Varanus gouldii</i>	25-39°C	Carnivorous Baby rats & mice, meatballs & RSM, egg	Diurnal, terrestrial Vivarium with low ceiling to conserve monitor's energy Hot basking spots - high 30s – low 40s. Monitors climb so shield heat source to prevent burns Thick branches under heat for basking or use under-floor heat cord



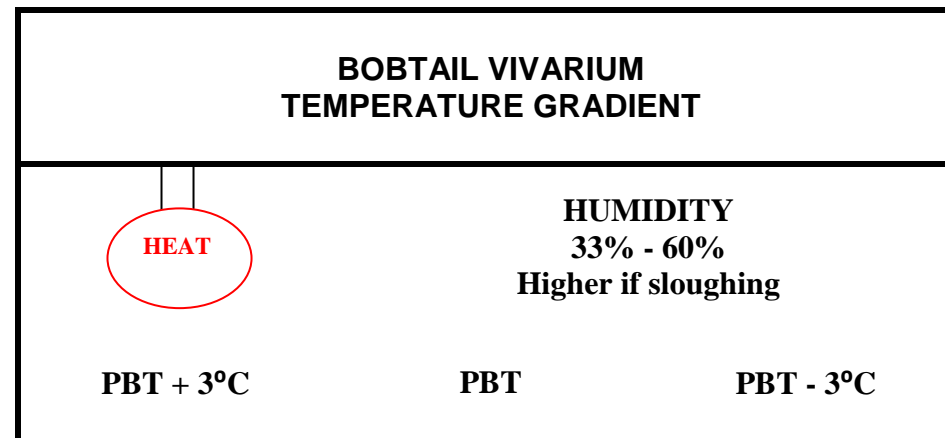
Reptile	Common name	Preferred body temp (PBT)	Diet RSM = Reptile Supplement Mix (Wombaroo)	Habitat
Monitors cont.	Mournful Goanna (Black-Tailed Monitor) <i>Varanus tristis</i>	25-39°C	Carnivorous Baby rats & mice, meatballs & RSM, egg	PVC tube with dark calico bag attached, for hiding and capture UVA & UVB daylight light lamp Seasonal photo-period Winter 10 hours. Summer 14 hours Substrate – indoor/outdoor carpet, newspaper
	Southern Heath Monitor <i>Varanus rosenberg</i>	25-39°C	Carnivorous Baby rats & mice, meatballs & RSM, egg. Hatchlings eat termites	
Geckos Terrestrial, Diurnal	Marble Gecko <i>Christinus marmoratus</i>	26-28°C Temperatures over 30°C can be fatal.	Insectivorous Insects, worms, mealworms, meatballs & RSM	Diurnal, terrestrial. UVA & UVB light spectrum Seasonal photo-period Winter 10 hours. Summer 14 hours Temperatures over 30°C are fatal. . Humidity 60% will drink water from leaves sprayed with rain water Climate controlled room -temp < 30 °C Substrate: newspaper with small hides of leaves
Terrestrial, Nocturnal	Barking Gecko <i>Underwoodisaurus milii</i>	26 – 28°C Temperatures over 30°C can be fatal.	Insectivorous Insectivore Insects, worms, mealworms, meatballs & RSM	Nocturnal, terrestrial. Red or Blue light globes at night Humidity 60% - need access to humidity chamber. Rainwater spray Position hides (PVC half pipes) within temperature gradient Climate controlled room -temp < 30 °C Substrate: newspaper
Legless lizards Eyelids and external ear hole, lack broad belly scales, have a very long tail (while snakes have a long body and short tail)	Burton's Legless lizard <i>Lialis burtonis</i> Closely related to geckos	26-28°C	Insectivorous/carnivorous Insects, worms, mealworms, egg, soft fruit & meatballs sprinkled with RSM Hide food under leaf litter	Diurnal Half bury cardboard tubes in the soil for privacy. Rock caves at the centre of the heat gradient Climate controlled room -temp < 30 °C Seasonal photo-period Winter 10 hours, Summer 14 hours Substrate: newspaper

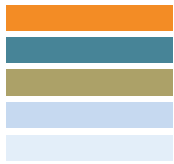


Reptile	Common name	Preferred body temp (PBT)	Diet RSM = Reptile Supplement Mix (Wombaroo)	Habitat
Fresh-Water Turtles Diurnal	Oblong turtle (Long necked Turtle) <i>Chelodina oblonga</i>	Air Temp 22-30°C Water Temp 16-28°C	Carnivorous Fish, molluscs, crustaceans, mealworms, earthworms, mosquito larvae, birds and ducklings Feed in separate feeding tub	Diurnal Good water filtration at higher temp Under tub heat pad or aquarium heater set to 28°C UVA & UVB light spectrum, seasonal photoperiods Seasonal photo-period Winter 10 hours. Summer 14 hours Smooth substrates and furniture to prevent abrasions Haul out area for basking, must be private Climate controlled room -temp < 30 °C Substrate: bath mat on bottom of tub, bubble-wrap in dry dock
	Western swamp Turtle <i>Pseudemys umbrina</i>	Critically Endangered – must pass on to Perth Zoo, or DEC		
Snakes Blind or Worm Snakes Non venomous, forked tongue	Common blind snake <i>Ramphotyphlops australis</i>	26-28°C	Insectivorous Ant eggs, larvae and pupae, termites	Live underground, emit bad odour when threatened Dark pipes/tubes with dark cloth bag attached Secure, locked vivarium with glass or Perspex front Substrate: newspaper If there are no wounds - a small sand box for digging (enrichment)
Pythons Non venomous, forked tongue, no bladder	Southern Carpet Python <i>Morelia spilota</i>	30-33°C	Carnivorous Mice, small rats. Feed weekly when at PBT	Active day & night Like branches to climb when healthy A box hide close to the heat that is easy to access Shallow water dish at warm zone Substrate: newspaper
	Stimson's Python <i>Antaresia stimsoi</i>	30-33°C	Carnivorous Mice, small rats. Feed weekly when at PBT	Nocturnal, terrestrial but likes low objects to climb onto or into Shallow water dish at warm zone Substrate: newspaper



Amphibian	Common name	Preferred Body temp (PBT)	Diet	Habitat
Frogs Nocturnal	Western Green Tree frog <i>Litoria moorei</i>	Air Temp 15-20°C Water Temp 22-26°C Fatal if over 30°C	Insectivorous Small insects (crickets) and spiders, earthworms, moths. Gut-pack insects on 80% chick starter 20% calcium carbonate	Nocturnal Blue/Green lamps High humidity- water spray x 4/day Use rain water, distilled water or stand tap water for 24hrs to remove chlorine Plastic leaves for collecting droplets Shallow water dish at warm zone Substrate: see notes

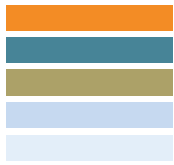




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BASIC COURSE IN WILDLIFE REHABILITATION

HANDBOOK 2013

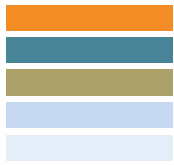
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March 2013





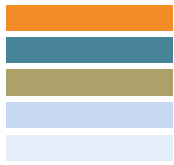
Section five Care of mammals

Module objectives

By the end of the course the participant should be able to:

- outline how Australia's unique native mammals have evolved over millions of years.
- explain distinguishing features of some mammal species. Outline how the categories are separated according to the way each species reproduces their young.
- demonstrate or explain how to safely and confidently handle mammal species in order to minimise stress to the animal and ensure your own safety.
- describe DEC requirements that apply to rehabilitation and release of endangered/threatened native mammals.
- explain appropriate methods of release for different mammals and the legal requirements according to the *Minimum Standards for Wildlife Rehabilitation in WA*.
- explain each animal's needs in each stage of rehabilitation and how to implement a suitable recovery and release program.
- describe the differing physiology of some mammal species and the associated habitat requirements
- describe accepted minimum mammal housing requirements and how to set up at home.
- explain the importance of providing the correct diet for differing species and when to use natural or supplementary diets.
- outline some conditions that present when mammals come into care and the importance of veterinarian and mentoring support.





Introduction – Sue Turner

I have been caring for native animals in WA for some twenty years and have considered it a great privilege to work with such unique and beautiful animals. Caring for wildlife can be extremely rewarding and fulfilling, but like all good things it does come at a cost. As is the case for most rehabilitators at our busy times of the year, the tasks and responsibilities sometimes seem overwhelming.

Caring for native animals is an act of compassion to help an animal that would have no chance of surviving if left in the wild. In most cases the problem is the result of human progress. By caring for them we give them a second chance. I believe as wildlife rehabilitators we have an obligation to ensure that each animal receives the best care and attention that we can provide, and that they must be given the chance "to return to a free and natural life amongst its own kind". Most of us seek no rewards, but only that of knowing that even in a small way, we are helping an animal in distress.

The notes that follow are designed as a basic guide for the care of sick, injured, orphaned or displaced native mammals. The information has been compiled from the knowledge and skills that I have gained from working with skilled veterinarians, many wildlife professionals and organisations throughout Western Australia. It takes many years to gain the knowledge and skills essential to care for wildlife. Whilst we can always learn from literature and by attending workshops and courses "hands on" (practical skills) will always be the most important tool we have. It is essential that new rehabilitators get as much hands on experience as possible before commencing to care for any animal. Experienced wildlife mentors are then needed to support you.

The care of mammals is a large category, which covers hundreds of species and sub-species. It would be impossible to detail each one in such a short time frame, so I have focused on the animals that you are most likely to encounter. The animals that come into care will vary depending on where you live. You are most likely to encounter animals which exist within your own area.

Most of the animals we care for are of the "common variety", but occasionally a rare or endangered animal will present. There are special DEC requirements regarding any animal listed as "threatened, endangered or vulnerable". DEC must be informed within 24hrs that you have the animal in care.

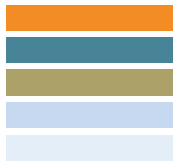
To ensure the animal has the best chance in some situations DEC will require the animal to go to a wildlife rehabilitator that specialises in that particular species. Most would only be released in areas that are monitored under the **Western Shield Program**.

These areas are baited for foxes and feral cats, and are closely monitored by DEC and Murdoch University.

Some animals might enter the Western Shield breeding programs.

Contact a wildlife officer at DEC Kensington for further information.





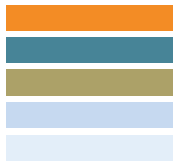
1 Mammal anatomy

Monotremes (egg laying mammals)

- Echidnas are the only monotreme living naturally in Western Australia.
- Sides and back are covered with spines; in between is brown/black hair.
- Long snout with mobile sticky tongue used to collect food and burrow into termite mounds, no teeth.
- During feeding, ingest soil and substrate and this is reflected in their faeces.
- Incredibly strong forelimbs with large clawed feet, used for burrowing into nests.
- In breeding season the females develop a deep (8cm) ventral pouch on their usually flat abdomen, prior to laying one egg, which rolls into the pouch from the cloaca.
- Temperature regulation is achieved by varying the metabolic rate (which is lower than eutherian mammals) and therefore controlling heat production. In winter months they will enter torpor.
- Body temperature is much lower than any other mammal.
- Males have a spur on their ankle. Unlike male platypus the spur does not contain a poisonous gland.

Marsupials

- The most distinguishing feature of a marsupial is their urogenital anatomy. The cloaca is used for both reproduction and excretion of urine and faeces. The penis is inside the cloaca, not obvious.
- Female marsupials possess a pouch. In some this is only developed during the breeding season or is only there whilst young are suckling. Burrowing marsupials (bilby, boodie) have backward facing pouches.
- Kangaroos and wallabies birth canal remains open after the first birth, all other marsupials birth canal is transient and re-forms at each birth.
- Joeys are very small, underdeveloped and completely altricial.
- The number of toes on the hind feet of marsupials can be used as criteria for grouping them.
- Dasyurids (carnivorous marsupials) have five separate digits on their hind limbs.
- In all other families the first digit is greatly reduced, the second and third are partially fused and reduced in size. This condition is known as syndactylism, this syndactyl claw is used for grooming.
- As for monotremes, marsupials have a much lower metabolic rate than eutherian mammals; therefore the body temperature range is much lower. Some species show varying degrees of torpor and may appear dead on examination.
- Response to high temperatures includes salivation, profuse sweating and licking forearms.
- Marsupials have significant dental adaptations based on their natural diet. Wallabies and pademelons are fodderers and eat softer unabrasive herbage, Macropods are grazers. Grazers eat the more abrasive grasses, often with much higher fibre content. Rock Wallabies are in-between the two.



- Macropods are foregut fermenters. Microbial fermentation occurs throughout the fore stomachs. Possums are hindgut fermenters. Microbial fermentation occurs in the cecum and in brushtailed possums in the proximal colon.
- The smaller marsupials such as carnivorous marsupials, pygmy possums and feathertail gliders have an incredibly fast metabolism in comparison to larger marsupials. They compensate for this by eating a very concentrated diet and entering into periods of torpor.
- Bandicoots are often mistaken for feral rats. Brown Bandicoots disperse from their mother at a very young age while they are still small and similar in size to a rat. On the other side of the coin, people find injured rats and believe they are an Australian native and take them to rehabilitators or vet clinics for treatment.

Some features specific to species

Chuditch

- partly arboreal
- does not need to drink (but should always be offered water in captivity)
- can enter a torpid state for periods, especially on cold mornings.

Phascogales

- most efficient of all the arboreal species
- will share nest with others of same species
- long sharp claws to assist with grip when climbing
- can rotate hind feet backwards to assist with climbing up and down with equal ease
- in most cases males die soon after mating - this is a normal phenomenon.

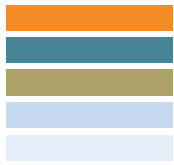
Numbat

- terrestrial
- diurnal
- bands across back
- sticky tongue for termite/ant feeding
- lack strength in forearms for digging into mounds so relies on food attached to surfaces of mounds, branches and ground coverings.

Bandicoots

- terrestrial
- nocturnal
- short forelimbs and hind limbs more like macropods
- forefoot elongated with claws on second, third and fourth toe which assists with digging
- strong thighs to assist with propulsions forward
- only marsupial whose reproductive system is closer to the eutherian mammals.
- Bilbys
- terrestrial
- nocturnal
- strong forelimbs, stout claws to use for digging and burrowing
- long slender tongue, ingest soil and ground coverings which is reflected in their faeces





- poor vision but acute hearing and smell.

Larger possums

- arboreal but does spend extensive time on the ground
- nocturnal
- four limb gait
- long flexible tail
- scent glands under chin, on chest and around anus

Pygmy possum

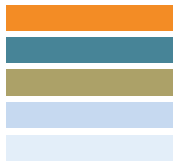
- arboreal
- long prehensile tail for climbing

Macropods

- powerful hind limbs, long feet
- bound on hind legs when travelling at speeds
- use tail as additional limb for movement at slow speed
- cannot "walk" or move backwards - uses hands to walk on
- can move legs alternatively when swimming.

Potoroos & Bettongs

- nocturnal but active early morning/late evening
- terrestrial
- prehensile tail for carry nesting matter in
- Bettongs have longer hind legs and hind feet
- short muscular forearms for foraging



2 Identification

All mammals belong to the class **Mammalia** and are categorised into three classes according to the way they reproduce. Some families are further divided into sub species.

Placental mammals (Eutherian mammals)

Placental (or Eutherian mammals) give birth to fully formed young that develop inside the mothers body with the aid of a placenta. Newborns are sparsely covered with hair. Eyes and limbs are well developed. The young suckle milk from the mother's teats until they reach independence

Animals in this category are:

- bats
- native rodents
- marine mammals

Bats – Order Chiroptera

Australian bat Lyssa and Hendra Virus is known to affect both mega and micro bats. These viruses can be life threatening if you are bitten or scratched.

If you wish to work with bats it is essential that you are fully vaccinated.

Please contact your doctor for further information.

DEC recommends that unless you are vaccinated you refer all bats to the 24hr WILDCARE HELPLINE on 9474 9055

Eighty species of bats live in Australia; they are nocturnal placental mammals capable of sustained flight. They are divided into two suborders Mega Bats and Micro bats

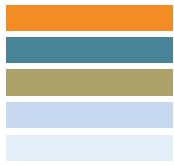
Mega bats

The largest bats are the mega bats. Australia's twelve species of mega bats include flying foxes, blossom bats and tube nose bats.

Mega bats play an important role in the pollination of trees and the dispersal of seeds. These bats hang upside down to rest and wrap their wings around their bodies; they find food by sight and smell as well as the sound of other bats feeding.

Mega bats have two claws on the first and second fingers, big feet and a non-existent or short tail. Young are born furred with eyes open and weighing approx 75gms. Most mega bats, or fruit bats, are found in the north west of Western Australia as they prefer warmer climates; it is unlikely that you will encounter them in the south west of Western Australia.





Micro bats

Micro bats are tiny bats with small eyes and tiny feet. They have complex nose constructions, large ears, and a prominent tail with one claw on the thumb of each wing. Young are born furless with eyes closed. Tiny insectivorous micro bats (about the size of a mouse) will fit into your hand.

Bat species most likely to come into care:

- Gould's Wattled Bat
- Chocolate Wattled Bat and
- White Striped Mastiff Bat.



Baby micro bat



Adult Micro bat

The tiny insectivorous bats (micro bats) will fit into your hand. They are often mistaken for baby bats

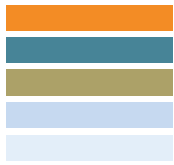
Native rodents

Due to their small size native rodents are rarely seen in care; they generally make a nice meal for many other predatory animals.

Australia is home to many different species of native rodents. Unfortunately most people are only aware of the introduced rodents called vermin. The larger of the species are rats, and the smaller mice.

Carnivorous marsupials (dasyurids) have needle-like upper and lower incisors with well developed canine teeth. Rodents have two upper and two lower incisors both of which are long and curved for gnawing. Native rodents do not have canine teeth.

Native rodents are usually herbivores, but do eat insects at some time.



Notomy native mice



Muridae native rats

Species sometimes seen in care:

- Water rats
- Rock rats
- Hopping mice
- Bush rats
- Long haired rats
- Melomys, tree rats

Marsupials (Metatherian mammals)

Female marsupial mammals bear partially developed young after a brief gestation period. Babies are blind, furless and their tails and hind limbs are incomplete. Using well developed forelimbs, they drag themselves, unaided, from the cloaca and continue their development, attached to a teat on the mother's belly, which is protected by a pouch or temporary folds of skin.

This is the most common type of animal coming in into care

Animals in this category are:

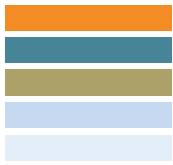
- Kangaroos
- Wallaroos and wallabies
- Possums & gliders
- Bandicoot

Dasyurids – Carnivorous marsupials

Dasyurids are carnivorous marsupials. The word Dasyurids means hairy tailed animal, so most of these animals have brushes on their tails. This group includes:

- mouse size dunnarts
- rat sized phascogales
- cat sized quolls
- Tasmanian Devil (largest dasyurid)

Western quolls (chuditch) are sometimes (but rarely) found on the outskirts of Perth. Other species in this group are **Antechinus** and **Planigales**. Some of these species are now highly endangered.



Western Quolls have been reintroduced into many areas of Perth as part of the Western Shield Program

Female Dasyurids have up to 12 nipples. They can produce large litters but generally not all will survive. Some species have a pouch, while others have just folds of skin covering over the nipples. The mother drags many babies around with their mouths each attached to a nipple. As they get older the babies cling onto their mother's back



*The Kultarr tiny Dasyurids
found only in central Australia*



The Dunnart mouse size Dasyurid

Bandicoots (Peramelempphia) Quenda

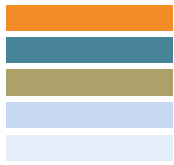
Short eared bandicoots and the bilby belong to the Peramelideaa family.

Animals most likely to be encountered are the southern brown bandicoots.

Of the ten species of bandicoots found in Australia, three are now extinct, and another two are endangered.

Bandicoots are ground dwelling marsupials with coarse sleek fur and long pointed snouts. Bandicoots are omnivorous animals feeding at night by digging conical shaped holes looking for invertebrates, plant roots and tubers.

During the day they sleep in a small indentation, covering themselves with leaf litter and vegetation. Unlike other marsupials, bandicoots have rudimentary placentas. The babies hang from cords attached to the womb.



The female bandicoot has a backward facing pouch and sometimes two or more young are carried in the pouch for approx seven weeks. Breeding seasons are long and the female can produce 2 -3 litters a year. Once the young leave the protection of the pouch they are very vulnerable. Juveniles often die from starvation or exposure.



The southern brown bandicoot is still found living in small families in suburban areas of Perth, especially in the hills. Sadly they are often mistaken for rats.

The Bilby now critically endangered, is a long eared bandicoot. They are now part of the Western Shield program. Only found in reduced remote areas especially around Broome.

Possums

(Sub order - Phalangerida)

Australia has 27 climbing marsupials referred to as possums; they are grouped into six family groups including the tiny pygmy possums and the larger brush tail and Ring tail possums as well as a variety of gliders.

All possums have a single pair of front lower incisors and long flexible tails, the females have a forward facing pouch. Most possums are arboreal, nocturnal animals.

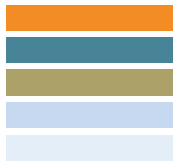
Six of these species include gliders which have a flexible membrane extending between the front and back legs on each side of the body allowing the animal to glide through the forest canopies. **Most** gliders are only found in warmer rainforest areas such as Queensland.

Common brushtail possum - found in most areas including residential areas where they co-habitate with humans, living in roofs of sheds and houses they have thick brushy tails, some with a white tip; colours vary from black to grey and white. Mature males have a scent gland on the front of their chests, which stains the fur red.

Common ringtail possum – much smaller than the Brush tail and generally now found along the coastline from Busselton through to Albany, where the thick canopies of vegetation (including Peppermint trees) provide them with food, shelter and safety. These animals have now been classified as endangered.

Honey possum - Common in urban areas is not a true possum. Their tongue is brush tipped to extract pollen and nectar from native plants. They are rarely seen in care.





Pygmy possum - Found in most areas but not often seen in care due to size Very tiny, the size of a mouse, average weight 8- 12 grams. Has a smooth light fawn coat with white underbelly and a strong prehensile tail that coils up tightly. Can go into a state of torpor in cold weather, sometimes found hanging from leaves.



Brush Tail Possum mum & baby



Ring tail Possum

Kangaroos and wallabies

Australia is home to 42 species, ranging in size from large reds and eastern and western grey kangaroos, to the tiny musky rat kangaroos which only weigh 500grms.

The group includes desert dwellers, tree climbers, burrowers and rock hoppers. Found in habitats that range from lush rainforests to stony desserts and salty mangroves.

Kangaroos and wallabies are **macropods**. The term refers to a large group of terrestrial marsupials that have strong and powerful back limbs that enable them to hop at great speed using little energy.

Kangaroos and wallaroos are large macropods that live in dry open grass and woodlands. They survive by eating large quantities of coarse grasses such as kangaroo tussock and spinifex grass.

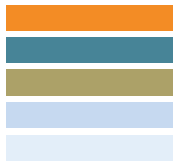
Species likely to be encountered: -

- Red kangaroos from the North West of the State
- Euros (wallaroos) and
- Western greys (these two species are found in most areas of the state).

Wallabies are medium sized macropods which also live in open grasslands and woodlands with dense scrub for shelter nearby. They eat short green grasses, as well as shrubs and herbs.

Species likely to come into care:

- Agile wallaby
- Black gloved wallaby (western brush wallaby).
- Tammar wallabies - rarely seen on the mainland (found on Garden Island, having different DNA to mainland tammar).
- Black footed rock wallabys



Bettongs and potoroos (rarely seen in care) are very small macropods which build nests in thick tussock grass and dense scrub. More nutrients are needed in their diets for example, fallen seeds, berries, grass, roots, plant tubers, fungi and insects. Most species are now endangered and part of DEC Western Shield.



Brush tail bettong (woylie) only found in restricted areas as part of DEC Western Shield Program woylies have been reintroduced in baited & monitored areas

Monotremes – Prototherian mammals

Only two animals make up this category:

- Echidna
- Platypus (The platypus is not found in Western Australia).

Female monotremes lay a soft shelled egg. The baby hatches after a brief incubation period blind hairless and with hind legs incompletely formed. It feeds on milk which oozes out of a mammary duct on its mothers belly. The echidna carries her egg and developing young in a pouch, once spikes appear on the baby it is left in a nursery burrow to complete its development.

Short beaked Echidna

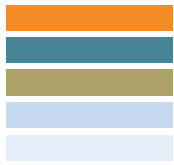
Echidnas are animals that require specialised care and must be passed on to a suitably qualified Registered Wildlife Rehabilitator.

The short-beaked echidna belongs to the family of Tachyglossidae.

The echidna is an egg laying mammal that is found in many varied environments, ranging from rainforests to arid grasslands. In colder parts of Australia, such as Tasmania they are often found living in the snow.

Even though the echidna is one of the most widely distributed mammals in Australia, it is rarely seen. Instinctively they quickly bury themselves in the ground if they sense danger, or roll into a tight prickly ball if a predator is around.

Both male and female echidnas have a **temporary pouch** and a rudimentary non-venomous spur on both back feet. During breeding time the females pouch deepens slightly to accommodate a 15 millimetre long leathery egg.



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The echidna can be active at all times - both day and night -preferring the cooler temperatures. They are extremely sensitive to weather conditions, hibernating in cold weather and foraging at night to avoid the heat.

The beak (nose) is as a sensory organ, used to detect the electrical impulses of ants and termite mounds. With their powerful claws and feet they break open the mound, and insert a long sticky tongue (approx 17cm) into the nest. The insects are crushed between horny plates on the back of the tongue and the roof of the mouth. A lot of soil and termite matrix is also consumed.

Echidnas are solitary animals with an established home range. Sightings of multiple echidnas are usually hopeful males following a female during the mating season (usually winter).

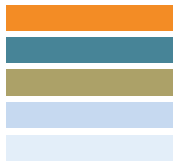


Adult Echidna



A baby echidna is called a puggle





3 Handling techniques

It can take many years to be competent in the handling of native animals.

The objectives always are:

- 1 Minimise the stress levels of animals.
- 2 Ensure that you do not contribute further to the animals injuries.
- 3 Secure the animal as quickly as possible so it doesn't further injure itself.
- 4 Ensure your own safety at all times.

Handling should always be kept to a minimum and be undertaken by the most experienced person. **If you are not confident call a more experienced rehabilitator.**

In most instances mammals will feel more secure if their head, face and eyes are covered. So a thick towel or blanket that the animal can be wrapped in is essential. Smaller animals such as macropods can be secured in a strong pouch which can be tied at the top if necessary.

Please note: This method should only be used as a temporary measure for transport or capture, and never used as a permanent method of restraint.

Larger animals that need to be relocated or transported might need to be sedated chemically.

This requires an injectable anaesthetic, as the use of these drugs are strictly controlled this needs to be carried out by your veterinarian, or a rehabilitator authorised by the VSB (Vet surgeons Board) and the Health Department.

Once the animals is wrapped or secured in it can be placed in an appropriate sized transport cage.

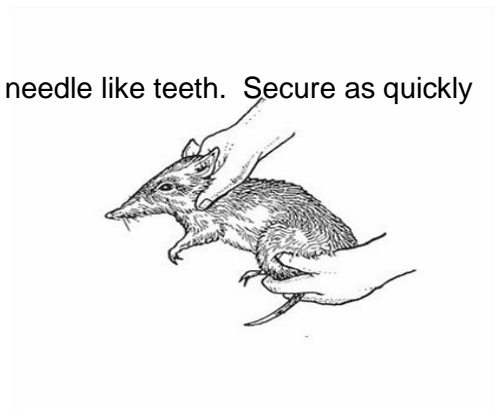
The container should be large enough to allow some movement and a towel or rug should be on the bottom to stop the animal slipping and absorbing body fluids.

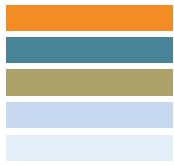
All animals should be safely contained for their safety and yours when transported in the car.

Cardboard boxes, washing baskets, cane transport containers are not strong or secure enough.

Bandicoots

These are strong animal with sharp claws and rows of needle like teeth. Secure as quickly as possible in a strong pouch and transport pack.





Bats (micro / mega)

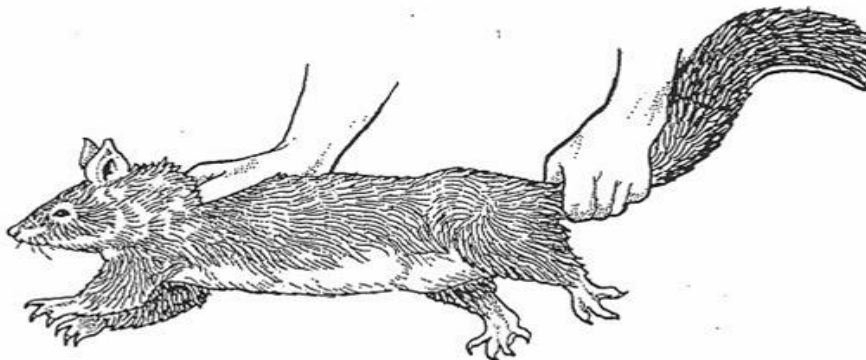
If handled at all gloves must be worn. Bats have sharp teeth. Secure in cloth bag. Transport cages can be used for the larger species (mega bats).

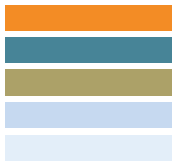


(See notes on Lyssa & Hendra Viruses)

Possums

All possums can inflict a nasty bite, and should be handled with great care. Secure as quickly in a strong transport pack. Even a small baby possum is capable of a nasty bite-so handle carefully. Place in a secure pouch and tie at top if needed.





Kangaroos & wallabies (most macropods)

The strongest part of any macropod is the base of the tail. Never pull the arms or legs or hold around the neck.

Medium to small animals will settle if placed in a strong pouch where their head is covered over. The pouch must be the correct size and allow some movement. The pouch can be tied at the top for transport. (This should never be used as a long term method of restraint).

Large strong transport crates can also be used. The crate should be well padded with bedding for comfort and to prevent the animal slipping around. The crate should allow the animal some movement.

Larger animals might have to be chemically sedated for transport. This ensures the animal does not suffer from stress, and does not endanger the rescuers

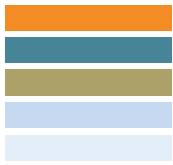
This must only be carried out by a veterinarian or rehabilitator approved by the Vet Surgeons Board WA

The back legs are extremely powerful in even the smaller species. Each foot has an elongated central claw which can inflict lots of damage. Keep well away from the body or face. They can also inflict a nasty bite.



The strongest point of a macropods body is the base of the tail (nearest to body). Never hold around the neck body or pull legs. They can then be transferred into a large pouch. Even older macropods will settle once there head and face are covered. Watch out for the back legs even a small joey can inflict a powerful kick.





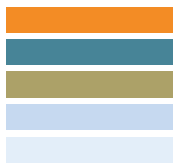
- Smaller joeys must be well supported.
- Never hold by legs or arms. Transfer immediately into a correct size pouch.
- The pouch provides warmth & security and will minimise stress.
- Never allow a small joey to stand or run around

Echidnas

Echidnas are extremely difficult animals to handle. They are very strong with spikes and powerful front and hind feet. Instinctively they roll up in a tight ball. A thick towel or blanket is best to roll the animal in and transfer to a **very strong** transport crate.

Never hold an echidna by its front or back legs.





4 Stages of rehabilitation

The care of mammals

Regardless of the species of animal, or the reason it has come into care, you must ensure you have the stages of rehabilitation in place, and work towards these goals at all times. The same basic principles will always apply.

Identification	The animal will need to be identified so you know the species. What sort of diet and housing, and management will it require?
Assessment	It will be examined to find out why it has come into care. Is it sick, injured, misplaced or has been orphaned? Is there any other reason?
Treatment	After through assessment, a treatment plan should be implemented. Will the animal require vet attention, or can you provide the appropriate care. If orphaned a foster care and feeding program should be implemented.
Recovery	After treatment, and assuming the animal has made a full recovery, it will begin the next stage of the rehabilitation process; you should now be preparing and assessing it for the final step – release!
Release	Once you are assured that the animal is fully recovered - strong, healthy, mature and independent enough the final stage will be release.

Ensure that release is always your final goal for each animal. There is little point starting the process, if you don't have all the steps in place, and are not fully prepared for the animal's release.

Release procedures

There are two options for animals when it comes to release time:

Hard release method

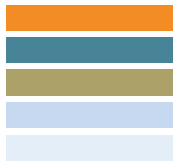
This is where the animals are taken to a suitable release site, and just let go.

This method is ideal for older animals or animals which have been in care for a short time. If at all possible the animals should go back to where they were found or as close as possible to the site. Some species will have families or mates that they can return to, and generally they have a well established home range. They will have knowledge of the food and water sources, places of shelter and local predators.

Only if the area is classed unsafe or unsuitable would you look for an alternative.

Negatives - as the animals generally disperse from the site, it is impossible to monitor their progress.





Soft release method

This is a slow transition back to the wild and is a preferred method for animals that have been hand raised and had a lot of human contact. Pens or enclosures are erected at these sites. The animals will spend several weeks adjusting to their new home and local animal populations.

The **advantage** of this method is that you can monitor the animals closely, and intervene if necessary with any stress or adjustments problems.

Negatives - as these sites are generally on private properties, they are not easy to come by. Most rehabilitators have established their own release sites over the year, and as the number of animal they can release there is limited, most are unable to release additional animals other than their own..

Caring for the animal is sometimes the easy part, ensuring that it has a suitable area to be released in can be the difficult part. **It is important to work towards finding your release area, well ahead of time.** Don't wait until the last minute to find you don't have access to a suitable release site.

Criteria for release

- 1 all animals must be 100% fit and healthy on release
- 2 fully weaned and independent of man
- 3 able to recognise and prefer the companionship of their own species
- 4 eating a natural diet
- 5 acclimatised to all weather conditions
- 6 able to find natural shelter
- 7 active at the correct time of day/night – nocturnal/diurnal
- 8 able to identify predators & to hide when alarmed

Special considerations: Never release an animal that is humanised or a male that has been de-sexed; experience had shown us that these animals do not cope with release. Castrated males are not accepted by either male or female of the species. They are general bullied and ostracised, and condemned to a lonely life.

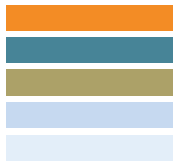
Note: Castration of any male native animal is an illegal procedure unless DEC approval has been given. There are sometimes special circumstances for example, if the animal is classed as derelict (not releasable) and a DEC licence has been approved.

This procedure can only be carried out under anaesthetic by a veterinarian. The vets also require DEC permission.

Research, information gathering and permission are essential before you consider release.

There is much competition in most areas, so careful consideration must always be given to the effects not only on local populations of animals (the number of resident animals) but also on long term environmental issues of that area.





Other issues that must be considered are suitability of habitat and availability of food. Animals released into unsuitable areas causes a huge problem each year. Wildlife officers and rehabilitators are constantly being called to remove offending animals. If the release involves kangaroos and wallabies, special consideration must also be given to nearby land owners and agriculture.

We must understand that not everyone shares our love of wildlife, and it is irresponsible to release any animal that can pose a problem.

In a lot of these cases the poor animal will also perish, as the area is quiet often completely unsuitable for them.

In rural areas damage licences (licence to cull) are issued by DEC to land owners if kangaroo populations become too large.

DEC wildlife officers and rangers have background and knowledge of most areas and should be contacted if need be.

Fire Control

DEC also have a controlled burn plan for most bush land and country areas (DEC fire management). DEC will be able to notify you if any area will be targeted in the near future.

Criteria for DEC Kangaroo Wallaby License

- property must be in a rural semi rural shire zone
- shire & DEC permission must be granted
- shire permission also involves consent of any adjoining neighbours
- must consist of a Min of 10 acres of property
- must have suitably erected enclosure to meet *Minimum Standards for Wildlife Rehabilitation in WA*.

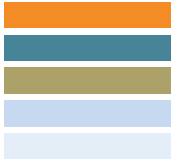
Note: Most kangaroos and wallabies can live for 20 - 25yrs in captivity; consider carefully before you take it on.

Regulation 16 license

Approved rehabilitators have DEC permission to keep native animals and use them for education purposes.

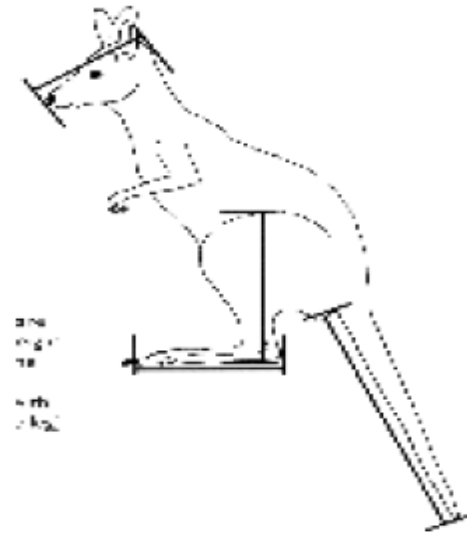
If any native animals are used for any sort of public display a **Regulation 16 licence** is required.

Contact a Wildlife Officer at DEC Kensington for further information.

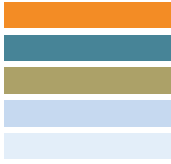


How to assess a joey's age

Measure areas shown.



Western Grey									
Age in days	120	150	180	210	240	270	300	330	360
Head (mm)	62	74	85	96	105	113	120	129	135
Hind foot (mm)	59	80	103	127	150	174	195	203	210
Tail (mm)	120	164	212	263	315	367	416	453	487
Weight (g)	213	410	735	1245	2010	3015	4585	6175	7910
Red Kangaroo									
Age in days	140	160	180	200	220	230	240	250	260
Foot (mm)	115	150	170	200	220	230	232	235	240
Tail (mm)	185	230	290	350	415	440	470	495	520
Head (mm)	75	85	90	100	112	120	122	128	
Weight (g)	620	890	1220	1620	2820	3610	4400	5200	
Euro									
Foot (mm)	95	120	143	166	174	182	187	191	
Tail (mm)	180	225	275	332	357	385	402	420	
Weight (g)	385	550	800	1400	2400	2900	3400		



Development - kangaroos, wallaroos and wallabies

Neonatal joeys

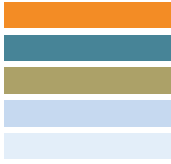


Sadly even though these joeys appear to be well developed the brain and nervous systems are not fully developed. They have no chance of survival and should be euthanased as soon as possible.

Furless joeys are extremely hard to raise. Only the most experienced and committed registered rehabilitators should take these animals on. Attention to detail, and intense nursing is required if these animals are to survive. Even in wildlife circles there are few who want to undertake this commitment.

Once a joey's eyes are open or starting to open it is classed as viable, but needs to be with an experienced rehabilitator. It is not recommended for new carers to take these joeys on as even in experienced hands the survival rate is low.

Very tiny furless joeys, will be permanently attached to the mothers teat, the mouth is a small opening at the front. Ears are down and eyes are closed. Care must be taken when removing them from the pouch, as the mouth is sealed onto the teat. It is sometimes better to cut the teat off (of course only if the mother is dead) as it will eventually let go on his own accord.



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Although these babies appear to be well developed, and will wriggle around and sometimes call, their internal organs, brain and nervous systems are not fully developed; sadly their chance of survival is extremely low.

In recent years some rehabilitators have had some success with these tiny babies but found they often have health issues at a later date such as cataracts or poor bone density and developmental issues.

It is generally recommended that joeys under 200g be euthanized

It is essential to correctly identify the species, as wallabies and wallaroos (euros) at this size would be viable.



Western grey 300g



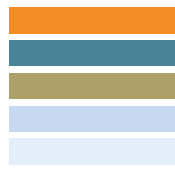
500g furless joey

At three months of age the joeys eyes start to open and the ears will stand up. These joeys are viable but should be passed onto a rehabilitator specialising in furless animals to ensure their best chance of surviving.

In the wild, joeys are dependent on their mothers for the first 18 months to two years of their life, even post pouch joeys stay with her for security and protection for many years. The rehabilitation of these animals is much longer than any other native animal we care for.

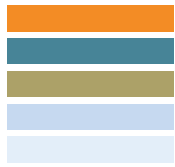
There are seven stages of rehabilitation. It can take two to two and a half years of rehabilitation before an orphaned macropod is independent enough to be released.





Stages of Development – Kangaroos, Wallaroos and Wallabies

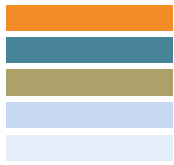
	1	2	3	4	5	6	7 (pre-release)
Appearance	Furless, pink skin, delicate, eyes closed, ears down	Furless, dark colour under skin, eyes open, ears up	Very fine covering of fur	Short, sleek fur	Long sleek fur	Dense, waterproof fur, toughened feet pads	Good body condition overall, in excellent health. Sleeps during the day under natural shelter, grazes late afternoon, night and early morning; prefers the company of other macropods to humans, darts quickly for cover when alarmed
Behaviour	Pouch-bound, wriggles, unable to stand	Quite active in pouch, may try and stand in pouch	Very active in pouch, can stand in pouch, starting to groom	Emerging from pouch, hops awkwardly near pouch	Gaining confidence out of pouch, becoming better coordinated, grazes near pouch	Confident out of pouch, well coordinated and agile, grazes day and night	
Warmth	Constant 32°C	Constant 32°C	Constant 30°C, starting to maintain own body temperature	28°C in cold weather and at night; able to maintain own body temperature	Not required by day. 20°C-25°C at night	Not required	
Food	Milk fed 2-3 hourly around the clock	Milk given 4-hourly around the clock	Milk – 5 bottles daily e.g. 6am, 10am, 2pm, 6pm and 10pm.	Milk – 4 bottles daily plus solid food	3 bottles of milk daily, joey needs to graze outside.	2 bottles of milk daily and decreasing, prepare to wean, grass dominates the diet	Natural food, decrease supplementary food
Faeces	Yellow custard appearance	Thick yellow custard appearance	Mustard toothpaste appearance	Olive green toothpaste appearance, forming soft pellets	Soft dark green pellets	Firm pellets	
Skin Care	Apply lotion to whole body every 6 hours	Apply lotion twice daily to whole body	Apply lotion daily to tail, feet and paws.	Only if required to feet and paws	Not required	Not required	



Stages of Development – Kangaroos, Wallaroos and Wallabies

	1	2	3	4	5	6	7 (pre-release)
Special Requirements	Very hard to rear Need specialist care e.g. suitable humidity Recommend euthanasia	Hard to rear successfully Strict hygiene absolutely essential Only for experienced carers	Understand how to establish gut flora. Introduce solid food to pouch. Safe area inside to house joey.	Solid food and water left near pouch Position pouch so joey can hop out and in again unaided. Access to grassy area outside for short intervals.	Able to house joey outside all day in well-fenced grassy enclosure. Joey's bedding to be kept outside in a protected area e.g. an open shed. Able to house a group of the same species.	Able to house joey outside in well-fenced grassy enclosure day and night. Natural shelter available e.g. shrubs Reduce human contact	Aim to release in groups at the age when young in the wild would normally be independent of their mothers.





Hand raising orphaned kangaroos and wallabies

Raising an orphaned joey can be a rewarding experience but it is a decision that needs careful consideration. Becoming a foster parent to an orphaned joey is demanding, time consuming and expensive, so before you take it on you must consider all your commitments; financial, work, family and social.

Of all the animals cared for, orphaned kangaroo joeys will spend the longest time in care.

It takes approximately two years until these animals are independent and mature enough to be released. So it is also an extremely long commitment.

- If joeys are to do well they need a quiet stress-free environment, where a structured daily routine of feeding, resting, and eventually exercising, can be established.
- Initially the joey will need to be with you 24/7 and will suffer stress if left alone for even a short time, so even a part-time job, or evening out, can cause problems.
- Most full time rehabilitators either don't work or work from home, or have a support person (adult) at home to assist them.
- Foster caring is best suited to people who can commit to long-term care, as joeys stress when handed from carer to carer.
- If you can only care for a joey for a short time it should be passed on to another carer at the outset; you could assist with babysitting.

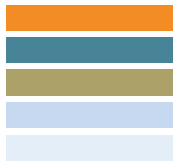
The work environment /taking a joey to work

- There are special circumstances where joeys can be taken to work; of course permission from your employer is essential.
- As much consideration needs to be given to the suitability of the work environments as to the home environment.
- Generally while the joey is small and is happy to sleep in a basket all day it is not a problem, but as he gets older he will become active and need to exercise during the day.
- These joeys will still need three to four feeds a day, and close supervision, so it will be too young to be left all day at home.

Work places where the joeys will be in busy noisy or unsafe areas, or where they are in close and regular contact with the public, children and domestic animals, are not considered suitable environments (refer to DEC Minimum Standards for Wildlife Rehabilitation in WA).

Infants and young children

- Infants and young children and joeys do not go together under any circumstances.
- Even if children are not permitted to touch the joey the consistent high pitched noise levels of children playing/crying will cause stress on the joey.
- Stress is a predisposing factor that leads to disease and sometimes death in macropods.
- Even visiting children such as grandchildren should be closely supervised at all times
- Bacterial infections such as Salmonella, e-coli and fungal infections such as ringworm are commonly seen in orphaned and especially debilitated joeys.
- Sore throats coughs and colds (staph infections) can also be passed from humans.



Some of these conditions are fatal to a young joey.

Infants especially are particularly vulnerable to many zoonosis (transferable disease) that native animals can carry.

Family pets

- Some pets especially some breeds of dogs, are not compatible with wildlife.
- Instinctively dogs tend to chase joeys while they are exercising. Sniffing around the joeys pen out of curiosity, can panic the animal causing injury and stress.
- Some breeds, especially dogs bred for hunting small animals such as terrier breeds, especially the Jack Russell and Greyhound, seem to be the worse culprits.
- Joeys must be kept separate from dogs especially in exercise areas. (DEC Minimum Standards for Wildlife Rehabilitation in WA)

If you take your joeys out to visit anywhere, they need to be kept safely away from resident animals.

Cats

Cats can carry diseases such as toxoplasmosis which is a protozoa, this is spread from contact with the cat faeces. It can also be spread through the house as the cats sits on furniture and bedding. Visiting cats defecate in your yard leaving eggs that hatch usually in wet conditions in the soil. The joeys are infected by ingesting the infected soil. The cats litter tray is also a problem. Toxoplasmosis is fatal to all marsupials.

Foster carers check list

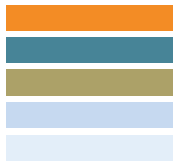
- Do you have the knowledge and skills to care for this animal or an experienced mentor who will guide you through the process?
- Do you have the time to give the animal the care and attention it will need?
- Can you provide a suitable environment in which it will progress well both at home and at work?
- Are there young children in the family?
- Are there any dogs or family pets that would be a problem?
- Do you have a cat?
- Do you have safe and secure exercise area?
- Can you commit to the animal's long term care?
- Do you have the support of a partner and other family members?
- Can you commit to the financial expenses including vet care costs?
- Do you have a pre release and release plan established?
- Are you emotionally going to be able to let the animal go when the time comes; some people find it extremely difficult at release time?
- We must remember that the objective is always release.

Hand rearing

The first days in care - the stabilising process

- Each joey will present with different issues on admission but as the stress levels are extremely high at this point their condition is always classed as critical.





- Regardless of whether the animal has been cared for by another carer or member of the public the same process of stabilisation must always apply (never presume the joey is OK because someone else has cared for it).
- With some animals the process might take several days or even weeks.
- A high percentage of these animals come from road casualties; the animal could have been on the side of the road or on its own for many hours, or even days. So we must always presume that there may be some sort of injury.
- Most animals present cold and in shock. They will be dehydrated and suffering from stress and separation anxiety.
- If an injury is present, they may also be in considerable pain.
- Some injuries and problems are not always obvious at first; it is only with close monitoring and trained eyes that these problems are identified.
- Prompt identification of injuries and commencement of treatment for stress, pain relief, fluid rehydration, and the regulation of body temperature can be the difference between life and death for these animals,

New rehabilitators must have a mentor to assist them during this process.

An animal's condition is stable when:

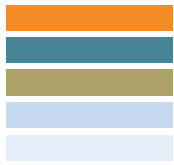
- thoroughly examined with no evident injuries or health problems
- body temperature is normal
- rehydration levels are normal
- joey can suckle from a teat and is feeding well
- emptying bladder and bowels correctly; this ensures his system has adjusted to the new formula (bladder empties after each feed, bowels are used once or twice daily)
- weight is stabilised (a joeys weight may drop by a small amount in the first few days but this should correct itself once it begins to feed well)
- seems happy and content in new environment.

As with human babies every joey's temperament is different. Whilst some settle into care easily, others remain stressed and can be extremely difficult. New carers or members of the public generally lack the calmness and confidence that an experienced carer has acquired. This unfortunately contributes to their stress levels.

If the joey doesn't respond and start feeding after 48hrs, more experienced help might be required. Whilst veterinarians are essential if the joey is sick or injured, unless they have had skills in hand rearing, an experienced wildlife mentor is usually best suited to deal with any management issues. It might be suggested that they take the joey for a short period to settle it in and check for any potential problems.

If the joey remains difficult it is general best that they remain permanently in experienced hands.

Tiny or furless animals are classed as in critical condition until they are furred. The care of these animals is a specialised area, and should only be undertaken by the most dedicated of registered rehabilitators who are suitably skilled and experienced in this critical area of care. To ensure these animals have the best chance of surviving, they should be passed onto suitably experienced registered rehabilitators.



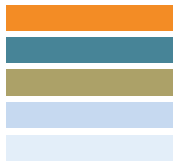
DEC can assist you with a list of wildlife professionals who specialise in this area.

When the joey arrives

- A new joey will be stressed, so make sure it is in a quiet area of the house well away from noises of domestic pets, children, TV, radio.
- If you have prior notice prepare a nice warm bed with warmed pouches of the appropriate size; it will help tremendously if it can be placed into a warm environment straight away. Pouches can be made of any soft, warm material (see notes below). In an emergency a jumper or fleecy pillow case is ideal.
- It is better if only one person handles the joey until it gains confidence and is less stressed.
- Allow it to settle for a short time and address issues of stress body temp and security firstly.
- It is always best to give the animal nourishment as soon as possible (milk formula) but consideration needs to be given to dehydration.
- In less severe cases once feeding commences the hydration level will normalise.
- If once warmed the animal will not feed dehydration could be the issue.
- In severe cases IV fluids will need to be administered (see your vet).
- Check the animal at regular intervals to ensure it is warm enough (additional well wrapped heat pads or hot water bottles may need to be added) and that it isn't too hot. Monitor closely. (Furred joeys, once warmed need the heat reduced to prevent them overheating).
- Once the animal is warm and comfortable, you can commence your assessment, checking for injuries as detailed above.
- It is not imperative that you identify the species at this point as its care will be the same regardless.
- Accurate weight is essential to work out the amount of formula needed.
- Always follow the manufacturer instructions for amount needed.
- Small amounts at regular interval are always best.

Security

- Orphaned joeys require an artificial pouch which simulates the security of his mother's pouch. Pouches can be made from any materials, for furless and finely furred animals, flannelette or a soft fabric liner with a woollen outer liner. (Fabric should not be fluffy as it can block the nose and mouth).
- All pouches should be rounded at the corners without seems or loose threads and be large enough to allow movement.
- Young or stressed animals will require additional heat source to give a pouch temp of 30°C.
- Eskies, well lined with doonas or blankets, make excellent containers and will hold the temp for several hours.
- Well wrapped heat packs or water bottles are added around the animal (do not place the animal directly on top as this can cause overheating). Bottle temperature should be 40°C.



- Animal should be checked at regular intervals especially through the night to ensure the temperature is constant.
- Always have separate containers for sick or tiny joeys and never put two or more joeys in together as their body temperatures will vary, generally one will overheat or one will be too cold.

Hygiene

- Good hygiene is essential when raising orphaned joeys. At all times the animal must be kept in clean and dry bedding.
- Thoroughly clean all feeding utensils with warm soapy water and rise well. Any milk leftover in bottles should be discarded.
- Furless animals will require sterilised equipment.
- Bottles and teats can be washed as above then soaked in hot water and stored in sealed containers or in the fridge.
- Milton is not recommended as it leaves a residue that is toxic to marsupials.
- The area the joey is kept in must be kept clean and sanitary.
- With older joeys that are out of the pouch the area needs to be swept and mopped regularly to remove all traces of faeces and left over food. (The same must apply to outside areas and pens).
- Animals must be kept in a smoke free environment at all times.

Toileting

Should be carried out after each feed. The cloaca needs to be stimulated gently with a damp tissue. Older joeys prefer to stand on the ground while being stimulated (ensure it is in a small sectioned off area). Be careful not over stimulate as this can cause a prolapse.

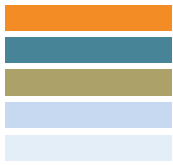
Milk feeding

Newly arrived joeys feed better with their head and face covered. The hungrier they are the more they clench their teeth together and it sometimes takes a few attempts to get the teat into the mouth. Sometimes dropping a small amount of milk onto the front of the mouth will stimulate the joey to lick its lips and you can then put the teat in from the side of the mouth.

Teats

There are many types of shapes of marsupial teats available. Generally a nice soft one is better for small or new joeys. Thin narrow teats are made for furless animals becoming slightly thicker as they get older. Most are available at vets, stock feeders and some pet shops. Always make sure you have a couple of spares, as the rubber perishes quickly. Teats need a small hole, never cut the end off, as the hole will be too big. A steady flow of milk should come through so the joey is suckling without too much difficulty. If the hole is too big it will gag and choke and go up the joey's nose. If the milk is inhaled it can cause pneumonia.

The flow of milk is also controlled by a hole in the side of the bottle. By taking your finger on and off the flow can be adjusted. It takes a bit of trial and error to get this right; each joey will



feed differently. Once an animal has a favourite teat, it will not want to part with it, and it can be difficult to introduce a new teat. The milk flow can also be slowed down by using a syringe with the teat on the end. This is only possible while they require small quantities of formula.

If you have more than one joey you must mark the teat so each will always have its own. In the pouch the female has four nipples, but the joey will use the same one through its development.

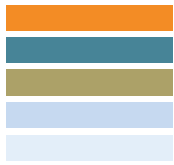


This technique does help prevent them gulping the milk too fast, causing inhalation and possible pneumonia.

Older joeys



Some older joeys might prefer to lap from a bowl which will reduce hands on contact with the joey and in the long run be easier to manage.



There are many formulas on the market now for hand raising wildlife; all are either low or no-lactose formulas. Baby and normal powdered milk formulas might be OK in an emergency situation but joeys do not do well on them long term.

Preferred formulas

- 1 **Biolac** - specially designed formula in four stages, changes as the joey progresses. It is generally the recommended formula by veterinarians and carers as it is easy to use and most animals do extremely well with this product. Available from Biolac NSW or some vets.
- 2 **Wombaroo** - as with Biolac, formula changes as the joeys develop. Available from wildlife suppliers, some pet shops and some vets. Accurate weight and measurement and close monitoring is essential with Wombaroo. As the product works on extremely low margins malnutrition, dehydration and constipation are a common problem. Mentor support with a carer who is familiar with the product use is strongly recommended.
- 3 **Divetelact** - is a universal formula based on cow's milk. It has two strengths, has been around for many years and can be used on many different types of animals. It can be a good short term formula, as it is readily available from most pet shops, stock feeds and vets. Divetelact contains lactose so whilst fully furred joeys seem able to tolerate it, furless, small, or joeys that are debilitated in some way will do better on a formula that caters for all their nutritional needs at every stage of development.

All formulas have instructions on packaging detailing quantity of milk; you will need to know the animal's exact weight. New joeys will usually only drink small amounts, but you must still ensure it receives the daily minimum requirement for its weight.

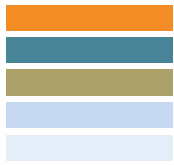
A change of formula should always be considered if joeys are not feeding or progressing well. Wombaroo has a bitter taste and some animals will not take to it. Changes must be made gradually so the gut is not affected.

Mentor advice should be sought if you feel you have a problem in their area.

Never use any formula that is out of date or has not been correctly stored in a sealed container in a cool area. Some suppliers repackage formula from a large container. Always check the formula is fresh; it should have a sweet taste and be a white or creamy colour. The milk can become stale or rancid and will cause severe gut problems and even death if used. Discard any formula once passed the used by date. Once a formula is made up it only lasts for 24hrs, add a date and time when made up so you remember when it needs changing.

Feeding example

- Unfurred joeys require three hourly feeds over a 24/7 time clock.
- Just furred require four hourly over a 24/7 time clock.
- Furred require four – five hourly over a 24/7 time clock.
- Fully furred & eating solids can go between five – six hourly over a 24/7 time clock.
- Debilitated or new joeys require three – four hourly over a 24/7 time clock.



- Once joeys progress onto solid foods, **and are eating sufficient**, the blood sugar levels are maintained.

Weighing

All joeys must be weighed on admission and at regular intervals to allow any adjustment to milk quantities, and to ensure that the animal is progressing as well as it should.

Under-feeding will cause dehydration and malnourishment, over-feeding can cause diarrhoea and severe gut problems.

Most formulas are based on 10-15per cent of the animal's body weight given **over a 24hr period**. *Note : Wombaroo formula works on much smaller volumes/ percentages.*

Most small joeys should have an average weekly gain of 100-200gms. Older animals can gain as much as 500gms -1kg a week. Weights should be consistently increasing or stable, never decreasing.

An unstable weight or weight loss is usually an indication of some sort of problem joeys are generally weighed weekly until they reach 4 - 5kg and thereafter monthly until pre-release.

Any adjustments to the formula should be made very gradually to allow the gut to adjust.

Never change from one brand of milk formula to another unless you have to,

Socialising

Orphaned joeys are best raised with others of the same species and, preferably, the same age. They need to know from an early age that they are a kangaroo and not a domestic animal or human.

Never raise one joey on its own, two together is the preferred option.

Once a joey is furred it must be placed with another of the same age and species, if you don't have access to another it is your responsibility to find another rehabilitator who can take your joey on (*DEC Minimum Standards for Wildlife Rehabilitation in WA*).

Single joeys become too humanised; these animals rarely accept others of their own kind and usually die from stress or injuries at the pre-release and release stages. Raised with others from an early age, they learn the social interaction of their own species.

This also helps when it is pre-release time as the joeys bond closely to each other; not to you.

If you need any help with this process contact DEC,

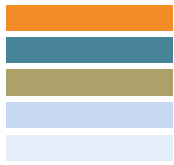
Solids

While the joey is in the pouch it will sample what its mother eats as she bends down to graze.

Introduction of solid foods into a joey's diet is an important stage and promotes tooth eruption and placement and toughens the soft palate and gums (making the animal less susceptible to gum infections).

Introduce a variety of solid foods at an early age (once joey is furred):

- Native vegetation and grasses (with roots attached). Make sure that grass and vegetation has not been contaminated with garden sprays, fertilisers or animal faeces.



- Kangaroo muesli (available from pet shops and stock feeders) is used as a supplementary food and should be available to the joey once furred.
- Whilst natural foods are always best, hard fruit and vegetables such as apples, carrots can also be used as supplementary foods if natural foods are not available
- Avoid foods high in salt, fat or sugar content. Never give meat of any kind.
- Food can be added to the pouch to encourage nibbling.

Avoid bread as it can potentially lead to lumpy jaw from bread being impacted around the teeth and infection developing.

Older joeys will stand to eat, food bowls need to be next to pouch. Fresh water and dried feed should be available at all times.

This is a critical time for joey as the digestive process must change from a simple (monogastric) system to one that is dependent on fermentation by bacteria.

Animals must be completely converted to a natural diet and not reliant on artificial foods at release time

Exercise

Exercise is vital for proper muscle nerve and bone growth. In the wild the joey would leave the pouch for short periods and hop around and exercise.

Furless or tiny joeys are generally 100% pouch bound and stretch and flex their limbs in the mothers pouch for exercise. As their bones are fragile and soft the joey should never be allowed to stand or given additional exercise at this stage.

Once the joey has a **dense fur** it can be gently encouraged to exercise in a small restricted area for a short period after each feed. The rehabilitator and pouch should always be close by until it gains confidence. If the joey becomes stressed it should be returned to the pouch immediately.

Whilst some will jump back themselves others will need to be taught how to roll back in. They will seem awkward and unbalanced at first, similar to a human baby taking its first steps, until they learn to coordinate and balance their long legs. It can take many weeks until they are confident enough.

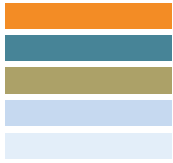
The exercise periods should be increased and eventually they will spend longer periods out of the pouch and returning for short rest periods. They should never be forced to stay out of the pouch if nervous, it is best to let each joey go at its own pace as some will take longer than others

This can be a time when injuries and accidents can happen, never leave any joey totally unsupervised.

Some species such as euros and wallabies will leave the pouch themselves at an earlier stage and exercise themselves.

The importance of vitamin D (sunlight)

As the joey gets older the pouches can be hung outside in the joey pen in a shady area where it can have access to sunlight (vitamin D). This promotes strong, healthy bone growth through absorption of ultra violet rays (sunshine).

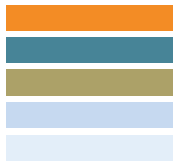


BASIC COURSE IN WILDLIFE REHABILITATION

HANDBOOK 2013

Remember the pouch is air-conditioned by mum, so never put outside in hot or very cold conditions.





5 Housing

Bats

Mega bats

Initially they can be housed in a wire cage so they can grip with their feet to the top of and hang upside down. Transfer to an aviary ASAP for lots of exercise.

Micro bats

These bats are so tiny they can squeeze through the smallest hole. A fish tank with a secure lid is ideal. Eventually they need a small secure aviary for exercise. A light is ideal to attract insects and encourages self feeding.

Native rodents

A hot box is ideal for housing a baby rodent with a smaller container such as a mouse-house from pet shops. Alternatively, use a fish tank with a tight fitting lid, with sand on the bottom and logs to provide hiding places.

Dasyurids – Carnivorous marsupials

Larger animals will need an aviary as big as possible. Logs branches or nesting boxes can be used. Use leaf litter on floor. Animals can chew through wire, aviaries needs to be strong as for echidnas. Small to medium animals require a secure fish tank or mouse container as for rodents.

Bandicoots

These animals are very active at night and a small aviary is ideal. Floor must be solid as they can dig out. They can climb up wire so a lining of sheet metal around the base of the enclosure is recommended. Lots of places to hide, logs boxes and dense soil and leaf litter on bottom.

Possums

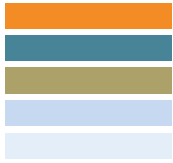
Most possums, even small ones, need space. As a nocturnal animal they will generally sleep all day and need lots of room to climb around at night.

House inside initially, which provides the required safety and warmth. Hot boxes are ideal for furless and tiny possums, with hanging pouches so they can climb in and out. Progress quickly to a nursery box, and later to an aviary.

Nursery boxes and rabbit hutches make ideal housing. Possums can squeeze through a small opening so housing must be very secure.

Eventually a small patio aviary with plenty of space will be needed. Lots of logs and branches to climb on, nesting boxes and places to hide will be required.

Large aviaries are essential for rehabilitation to ensure they have plenty of exercise and so that they become well developed at climbing and balancing techniques. Put leaf litter on the ground. All feeding bowls should be up high, off the ground.



Kangaroos, wallaroos and wallabies

Furless joeys - The mother's pouch allows the joey to stretch and move around, allowing the Achilles tendons to stretch promoting bone growth and development in a young joey. Developmental problems occur if the animal's movement is restricted.

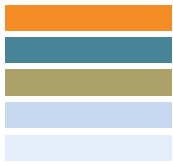
Eskies or thermo-bags, well-lined and padded with blankets or sheep skins are preferred. For warmth, well-wrapped heat pads or water bottles are added and if set up correctly this method will keep the temperature constant for many hours and provide a slightly moist environment.

Polystyrene boxes also make ideal containers for furless joeys as they will maintain a warm, moist environment.

Electric blankets are subject to power surges and power cuts. Heat pockets can develop if the blanket is not kept completely flat. As joeys will urinate there is a risk of electrocution. Generally electric blankets overheat the animals and dry the skin out too much, so are not recommended. (Sadly many joeys have been literally cooked on electric blankets). Hot boxes can be used short term.



Polystyrenes boxes make well insulated housing for furless joeys. They should be well padded and heat pads and temperature probes can be used.



Thermo bags also retain the heat well for small joeys

Hanging bags can be used at most stages of development except for furless joeys. They should be of a strong and sturdy, and large enough to allow the joey to move around. The joey will often get in and out himself at this stage. They should always be well padded to prevent head and neck injuries.

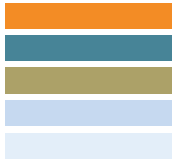
Any hanging bag should be strongly secured and well padded to prevent injury as joey jumps in and out.



All housing should be kept clean and dry at all times.

Waterproof liners can be used to protect bedding from soiling and wetting. Young joeys will quite often need to be taught how to get in and out of the pouch.

Pouches can be hung outside in pens when the joey is old enough.



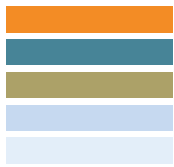
Short beaked echidna

Echidnas can be extremely hard to house as they are masters of escape. Initially, if the animal is being monitored or is sick, a strong wooden box is enough to allow movement around in, is ideal. As echidnas are sensitive to heat, it is not usually necessary to add additional heat, unless in very cold climates.

Older animals will require a stronger aviary with solid floor; with smooth sheeting around the base of the sides to prevent climbing.

Immature animals can be housed in eskies with shredded paper.





6 Nutrition, diet and feeding

Bats

Mega bats

Natural habitat

Most of these species are found in warm humid environments such as Broome, the Northern Territory, Queensland and the north of NSW.

Natural food	Flowers and fruits from native trees and lily-pilly Bats need to consume 35 -50% of their bodyweight daily.
Supplementary food	Combination of chopped ripe fruit - apples, pears, grapes, melons, peaches, apricots etc sprinkled with Wombaroo high protein supplement. Fresh water must be available at all times. Feed should always be given early to late evening.
Orphaned young	Wombaroo Flying Fox milk replacer, or any human baby formula.

Hand rearing

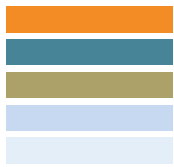
Baby flying foxes require heat in a secure box. Wrap the baby securely in a soft cloth to replicate the effect of the mother's wings wrapping around its body. The ambient temperature should be 28°C. Do not use direct heat as wing membranes become dry. Baby bats should always be placed with their head lower than their feet.

Eventually it will need a small aviary with places to roost. Bats must have access to natural sunlight, this helps prevent fungal infections of the wings, and is essential to the development of a young bat. All bats are prone to bacterial infections and should be kept clean at all times; all feeding utensils and enclosures need to be thoroughly cleaned daily.

Wombaroo milk formula or most low-lactose formulas can be used with the bat receiving 15 to 20% of its bodyweight over a 24hr period. Solid food can be introduced at approx 10 weeks. Pureed fruit can be given, at ten weeks with small pieces of fruit, sprinkled with Wombaroo Insectivore Mix, gradually introduced. Eventually eucalypt flowers, native figs and lily pilly fruit can be offered.



Baby fruit bats (mega bats) like to be wrapped to assimilate the mother's wings being wrapped around them.



Micro bats

Tiny insectivorous micro bats (about the size of a mouse) will fit into your hand.

Micro-bats feed on insects, using echo location to navigate and find food. Micro-bats can consume up to 50% of their own body weight in insects each night. These tiny bats help to control insect populations, hibernating in winter or when food is scarce. The average weight in most species is 8-12gms.



Micro bat fed with syringe



Feeding mealworms

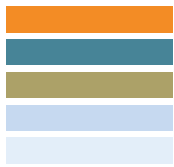
Natural habitat

Found in most suburban areas as well as country, micro-bats spend the day in caves, buildings (modern day caves), tree hollows or in rock crevices. Some roost inside curled up leaves or under tree bark.

Natural Diet	Mosquitoes, midges, flies, wasps, moths, beetles, cockroaches, ants, crickets and fresh water.
Supplementary diet	Meal worms coated with Insectivore Mix.
Feeding tips	Warm the bat in your hand before feeding. They may need live food at first.
Orphaned young	Wombaroo Insectivore bat milk replacer or any other low- lactose formula. Introduce solids gradually, firstly headless meal worm pieces graduating to whole meal worms and insects

Hand rearing

The same principles will apply as with Mega bats - a warm moist temp of 28°C. With young bats immature enough to require bottle feeding, the undigested milk formula is visible through the skin in the abdomen. Feed formula as per manufacturer's instructions so that the abdomen is rounded - usually every two to three hours. It is important not to overfeed. The genitalia need to be stimulated with a soft tissue until the bladder empties.



Droppings are firm like mouse dropping. The bat must be kept clean at all times. It takes time for the bat to learn to recognise food. You may have to rub the mealworm’s innards on its lips to stimulate the bat to feed.

Native rodents

Water rats, Melomys, tree rats, rock rats, hopping mice, bush rats and long haired rats.

Natural Diet	Native vegetation, new growth, shoots, grasses, fruits, berries, roots and tubers. Water rats are carnivores and eat fish, yabbies, and gilgies. Fresh water is always required.
Supplementary food	Rat and mouse cubes, selected seeds, chopped fruit and veggies

Orphaned young

As these are such tiny babies, they are rarely seen in care but sometimes several might be found at the base of a tree curled up in leaf litter. The family cat may bring one in.

Feeding - tiny drops of any infant-rearing milk formulas will do. Encourage lapping as soon as possible and introduce solids once the animal is furred and the eyes are open.

Dasyurids – carnivorous marsupials

Natural Diet	Small insects, beetles, cockroaches, crickets and spiders. Medium to large rats and mice, young chickens - fresh water.
Supplementary diet	Small mice, meal worms, fruit and berries. Womboroo small carnivore mix.
Orphaned young	Any marsupial milk formula. Encourage lapping as soon as possible and introduce solids early.

Bandicoots (Quenda)

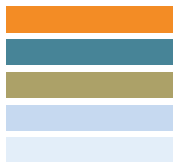
The survival rate of young once they leave the pouch is low due to death via predation, starvation or exposure.

Natural habitat

Still found in suburban gardens in the hills of Perth. Prefer dense moist low growing vegetation, which attracts insects and new growth.

Natural Diet	Insects, beetles, crickets, grass hoppers, insect larvae, earth worms, snails, berries and seeds soft roots and tubers, insects and fungi.
Supplementary diet	Meal worms, Wombaroo small carnivore mix, cheese, hard boiled eggs, assorted chopped fruits and vegetables finely cut.
Orphaned young	Feed as per Dasyurids and Rodents. A hot box initially then nursery box or small fish tank is ideal.





Baby bandicoots prefer to lap milk

Possums

Common species likely to be seen:

Common brushtail possum

Found in most areas including residential areas where they co-habitat with humans, living in roofs of sheds and houses they have thick brushy tails, some with a white tip; colours vary from black to grey and white. Mature males have a scent gland on the front of their chests, which stains the fur red.

Common Ringtail possum

Much smaller than the brush tail and generally found now along the coastline, Busselton thru to Albany, where the thick canopies of vegetation (including Peppermint Trees) provide them with food, shelter and safety. These animals have now been classified as endangered.

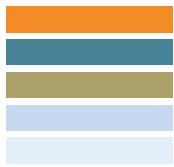
Honey possum

Common in urban areas and is not a true possum. Their tongue is brush tipped to extract pollen and nectar from native plants. They are rarely seen in care.

Pygmy possum

Found in most areas but not often seen in care due to size. Very tiny - size of a mouse, average weight 8- 12 grams. They have a strong prehensile tail that coils up tightly. Can go into a state of torpor in cold weather and are sometimes found hanging from leaves.

Possum diets vary depending on the species, but most are herbivores, searching at night for new growth and blossoms from native trees. Some species also eat insects.



Some species such as ring tail and pygmy possums have several babies; they are initially carried in the pouch, but finish their development in a nest or a drey. Ringtails are known to have many nests within their home-range.



Ringtails build a nest or Drey

Brushtail possum

Natural foods	Mostly leaves especially new growth leaf tips and blossoms and buds from native trees particularly eucalypt varieties, flowers, buds, fruit, berries, herbs, fungi and occasional insects.
Supplementary diet	Variety of fruit and vegies, cheese, hard boiled eggs, gum leaves, grevillea, bottle brush lots of variety all new growth and blossoms

Ringtail possum

Natural foods	New growth leaves especially eucalypt varieties, peppermint leaves, native flowers and fruit.
Supplementary diet	Variety of native plants and blossoms, assorted fruit and vegies.

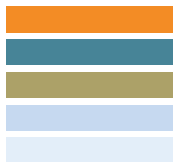
Pygmy possums

Natural foods	Nectar from native flowering arthropods – moths, beetles. Pollen fruit berries and seeds
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Honey possums

Natural foods Supplementary diets	Native flowering plants and fruits Nectar feeders - pygmy, honey possums and gliders - lorikeet and honey-eater food. Flower and fruiting branches, meal worms, nuts, seeds and insects.
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Note: All possums need lots of variety in their diets and fresh foliage daily



Foliage will keep better if kept moist and can be placed in containers of water in enclosures. Once dried out or wilted it should be replaced with new.

Orphaned young

Furless or tiny possums require 24/7 experienced care, and should be passed on if you have had no previous experience. As with all immature marsupials they require a constant temperature, require housing and regular feeds. Furless or debilitated animals will require 2 to 3 hourly feeds 24/7.

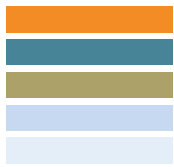
Wombaroo Possum formula or Biolac M100 or Divitelact can be used. Special possum teats are available to attach onto a syringe. Encourage to lap milk as soon as possible, adding lots of natural foliage and blossoms once furred. Fruits such as apple, banana, melon, kiwi fruit and avocado; fruit bread and breakfast muesli can be added once furred and can be added into the pouch.

Note: it has been found that ring tail possums need a natural diet and should not be given fruits. (*see notes above*).

Possum joeys usually develop much quicker than other marsupial joeys. Once furred, they need space to climb around, and will prefer to sleep undisturbed most of the day. Once they are lapping milk, they can be left to drink and eat for themselves.



Baby possums require 24/7 care as all marsupials and need to be with a rehabilitator that specialises in their care.



Kangaroos and wallabies

Since European settlement the larger Macropod species have fared well and in most areas their status is abundant. Sadly the medium and small animals have not done as well.

Many of these species are now extinct, while others are either endangered or threatened.

Since the introduction of DEC's Western Shield Program, some species have moved up from these categories but will always remain conservation dependant.

Loss of natural habitat and the introduction of predators such as the fox and feral cats have had the biggest impact but introduced species such as rabbits, pigs and goats now compete with these animals for food and shelter.

Natural Food	Native grasses, all sorts of bark on branches, grass roots and dirt, green leafy branches, fallen leaves, native fruits and berries.
Supplementary Food	<i>See recipe below</i> -commercially made roo, horse, goat, rabbit or alpaca muesli, grass roots, sand, dirt attached to native bushes, Gravillea, Albany Woolly bush, root vegetables, carrots, sweet potatoes corn, apples (whole fruits not scraps or peel). Avoid soft foods although they can be given occasionally. Dry feed should be available at all times with native foods and any fruit and vegies added once daily. Fresh clean water at all times.

Kangaroo muesli recipe

Equal parts of:

- Lucerne chaff Horse or pony muesli
- Large parrot seed Flaked barley

Other things can be added to the mix for variety for example, Weetbix, rabbit & guinea pig pellets.

Note: I have found that most kangaroos do not like kangaroo pellets, but you can add to the mixture.

Short beaked echidna – monotreme

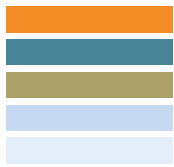
The baby echidna, (called a puggle) is initially carried in the female's pouch. Once it develops spikes, it will be left in a nursery burrow the female has prepared. The temperature in the burrow is approx 15°C and the puggle is in a constant state of torpor.

The mother will return to feed the puggle every five days. At approx 12 months of age the young echidna will emerge from the burrow, and is completely independent to also lead a solitary life.

During this time the puggle is vulnerable to predators, goannas and foxes.

If the beak of the echidna is damaged it will not be able to find ants and termites

Natural food	Ants and termites
Supplementary food	<i>See Echidna diet below.</i> Food should be in heavy flat bottomed bowls.



Immature echidnas are fed for months with a high-fat milk composition which seeps through a patch on the mother's abdomen. The milk is high in iron and low-lactose.

See below for supplementary formulas.

Orphaned young

These animals require specialised care and must be passed on to suitably skilled rehabilitators. Generally feed once daily. Warm baby in your hand beforehand until it starts sniffing around the palm of your hand. Ensure that your hands are washed and well rinsed so the puggle does not consume fomites or chemicals from the soap on your hands. A small amount of milk can be placed there and it will lick it up with his tongue. Allow it to suckle small amounts at a time. Faeces should be yellow and will toilet itself.

Accurate records and daily weighing is essential, the puggle should have significant daily weight gains. Solids should be introduced at approx 800g. Release weights 2kg.

It is usually not necessary to feed a puggle straight away; so place it in an esky with shredded paper. In hot environments it might be necessary to add a cool brick to the esky as puggles need to be kept in a state of torpor with temperatures 19-23°C. Paper should be changed daily to ensure the environment is kept clean at all times.

Feeding

- Wombaroo Echidna Milk Re-placer multi-stage formula
- Divetelact scoop=50ml + 2.5mls cream +2.5mls of olive oil
- Feed 15-20% of bodyweight daily.

Stages of development

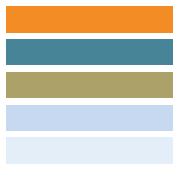
- birth weight - 0.5g
- two days - 1gm
- 30 days - light fuzz over body
- 50 days - spines erupt and eyes open

Adult diets (Make in smaller or larger amounts as required)

- 250g fresh lean beef mince
- 32g bran
- 1 egg
- 47g olive oil
- 2.75g Equine E (available stock feeders)
- 2.75g Calcium Carbonate
- 38g Glucodin.

Mix all ingredients well. Make into patties of 80g (1 daily for an adult echidna).

Mixture must be frozen for a minimum of three days before use to kill any Toxoplasmosis organisms in fresh meat. Keep in freezer and take out as required.



7 Common Problems

Problems with hand reared joeys

Stress

ALL diseases and most problems encountered with fostering joeys can be contributed to stress. Stress causes physiological changes within the joey, resulting in a weakened immune system, hormone imbalances and gastrointestinal disturbances.

The problems listed below are quite often the secondary condition, with stress being the trigger. It is important to minimise stress as much as possible at all stages of rehabilitation:

- initially at the time of admission
- when it's emerging from the pouch
- at the time of release.

Although some animals may appear calm and quiet at times, it does not mean they are not sensitive to their environment and any stressful factors. A joey can be stressing lying in his basket in a noisy area, or from being handled inappropriately, or from a visit to the vets.

Symptoms include lethargy and depression, poor appetite, failure to thrive, declining body condition, and many physiological symptoms such as anxiety fear and frustration.

Never dismiss or under estimate their stress levels at any time.

Diarrhoea

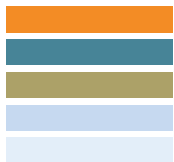
Diarrhoea can be caused for many reasons. The key is always to find what is causing the problem or any treatment will only have a short term effect. Stress still remains the main cause, but the problem then develops into a more severe problem where veterinary attention and antibiotic treatment may be required.

Other causes of diarrhoea

Non infectious diarrhoea:

- stress.
- unsuitable environment - small children, too much noise, separation anxiety from orphaning
- inappropriate care (generally caused by well meaning people who have no experience in caring for orphaned macropods)
- overfeeding
- formula unsuitable for macropods
- formula out of date or stale (do not use after used by date or if not stored correctly; it can become contaminated or goes rancid)
- grass should be introduced slowly to joeys as some animals will over indulge
- wrong diet (foods containing sugars)
- use of antibiotics, excessive vitamin supplements, poisoning and parasites may also cause scouring.

Infectious diarrhoea:



If untreated the diarrhoea often develops and causes a bacterial or fungal infection. This will require veterinarian assessment and treatment. A faecal sample needs to be taken before the vet can prescribe antibiotic treatment.

Do not let diarrhoea go untreated. Dehydration from persistent diarrhoea kills more joeys than any other cause.

Consult your mentor if condition persists for more than 24 hours.

Treatment

Check formula is not out of date and is not stale. Check weight to ensure you are not over-feeding. Decrease formula by 10mls for each feed for a 24 hour period.

Add a ¼ teaspoon of natural yoghurt to first and last bottles (yoghurt must contain the three cultures – AB and C).

Gastrolite may replace the milk formula (same quantity) for a 24 hour period. Mix as per pack instructions. The animal will be hungry during this time as fluids will only keep him hydrated and not nourished, try to encourage it to eat solid foods.

Note: It can take several weeks for the gut flora to re-establish - treatments might need to continue for several days or weeks. It is not an overnight cure. If the condition worsens discontinue treatment and contact your vet immediately.

If and when the diarrhoea is resolved, reintroduce the milk formula at half strength slowly increasing to full strength over the next week. Kao Magma - available from the chemist - can be added to the first and last bottle of the day; this will help bind and settle the tummy (contact a professional before proceeding to obtain the correct dose rates).

These methods are not suitable for furless animals as they need sustained levels of nourishment.

Inner Heath Plus (**non Dairy formula available** from chemist) - this product works similar to natural yoghurt establishing the animal gut flora. ¼ teaspoon can be added to first and last bottle, mix in well with milk first.

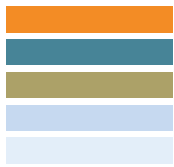
Note: If the problem is due to the stress and inappropriate care the problem will continue to return. The animal must be re homed into a more suitable environment.

Hypoglycaemia

Hypoglycaemia is often the cause of sudden death in hand reared joeys and is generally caused by inexperience or inadequate care.

Developing joeys are totally dependent on milk to maintain their blood sugar levels, so if the feeds are not frequent enough, the animals suffers a dramatic decrease of sugar (glucose) in the blood. Joeys are sometimes found unconscious or flat, they can also have convulsions or fits. This generally happens through the night, when the joey has gone too long between feeds, and carers often wake to find the joey has died. Furred joeys sometimes collapse after exercise, as they use up their energy reserves.

Formula-dependant joeys must be fed continuously around the clock to ensure their blood sugar levels are maintained.



Signs of Hypoglycaemia

- Weakness
- Muscle twitching (ataxia)
- Seizures or convulsions
- Visual / neurological disturbances
- Paralysis

Treatment

If the joey is convulsing, place glucose powder (honey or sugar if not available) onto joey's lips. Glucose is then absorbed and transported to the joeys' brain; this will quiet often save the joey's life.

Prevention

Ensure you can commit to the feeding program needed for the age of the joey.

Pneumonia

Pneumonia is one of the leading causes of death in hand-raised joeys. A number of bacteria and viruses can cause pneumonia, with stress usually being an underlying cause. Malnourished joeys are more likely to develop this disease which is often accompanied by diarrhoea and septicaemia. These animals should always be watched carefully for some time, and their chest checked by a vet at regular intervals.

This can also be caused from milk aspiration (inhalation of milk during feeding) so care must be taken especially with small joeys.

Signs of Pneumonia

Joey will have laboured breathing; the chest may have rattles and wheezes. There may be a nasal discharge and sometimes a cough. Animal will be quiet and look unwell, often refusing its bottle or only drinking a small amount. Keep warm and take to vet immediately. Antibiotics are needed. If detected in the early stages and the correct antibiotics are given the animals usually recover well, advanced stages usually result in death.

Thrush

Thrush is a yeast infection (*monilia candida albicans*) most commonly seen on the mucous membrane of the oral, oesophagus or gastrointestinal tract.

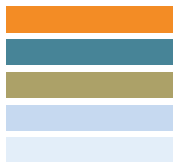
It often follows antibiotic treatment. Grey and white curds around the mouth and cloaca are sometimes seen. The saliva in the mouth will appear rusty colour if wiped. Joey will refuse to drink due to painful white plaques in the mouth; green, loose, smelly diarrhoea can result.

Treatment is urgent. (Consult your mentor/vet for correct diagnosis and treatment).

Strict hygiene is essential.

Bloat/Colic

Hand raised joeys are susceptible to tummy upsets or colic/bloat. In a lot of cases the problem is just wind trapped in the intestine or under the rib cage. This is an extremely serious condition,



and the animal can die if not treated. Vet treatment may be required for pain medication, if the problem persists.

In less serious cases, once the tummy muscles relax the discomfort will pass.

Treatment

Coloxyl Infant Colic drops available from chemists, can work if the problem is not too advanced. Usually a two to four drop dose can be repeated within 24 hours, if needed.

Stimulating the animal's cloaca also helps gas to pass and encourages movement of faeces. In some situations the animal can recover unaided.

Sometimes the problem is more severe, and a blockage has formed in the bowel. Euros and Reds are renowned for this as they habitually chew carpets, fabrics and the bedding they are kept in. In severe cases the bowel can twist. This condition is very serious, major surgery is usually required. (Prognosis is usually poor, and euthanasia is recommended).

Colic can also be caused by overfeeding, changing milk formulas, inappropriate formula or diet, or stress.

Signs of Colic

Animals will generally start refusing bottles. The abdomen is tight and bloated and there is little or no bowel movements and the condition progressively worsens. Animals are in severe pain and contort their bodies and stretch to try to get comfortable, they sometimes grind their teeth consistently. Gum colour is pale.

Coccidia

This is a severe, even fatal disease caused by protozoa. It is particularly prevalent in joeys at the weaning stages or when they start to spend time outside, grazing on areas occupied by older kangaroos. The eggs can survive in damp grassy areas. Coccidia usually appear after long wet periods followed by warm weather, for example the start of winter.

Known to mostly affect Western and Eastern Greys (no recorded cases have been found in Reds or Euros) hand-reared joeys are very susceptible as they do not receive the antibodies that mum would have supplied to them while in the pouch.

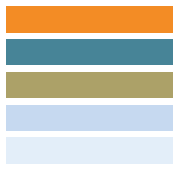
Signs of Coccidia

Animals usually hunch over and appear generally unwell and lethargic. Dark red or black foul-smelling diarrhoea is usually the next stage which is not always seen.

Urgent Vet attention is required.

Treatment

- Keep animal warm and well hydrated. Baycox plus antibiotics is the usual treatment.
- Prognosis is not good in advanced stages, some success in the early stages.
- Coccidia is highly contagious to other joeys and it is necessary to immediately put all animals housed in the same area in quarantine as they will all be infected. Do not accept new animals or pass animals on to anyone else at this infectious stage.



Nose bleeding/Besmoidis

Discharge from the nose is sometimes mistaken for a foreign body, but will become persistent and the bleeding usually increases.

Treatment

Although long term antibiotics are needed, treatment is usually successful. Possibly spread by midgies in humid weather (contagious from animal to animal).

Capture myopathy - floppy neck

Not a lot is understood about this problem; it is sometimes called stress myopathy. Both wild and tame kangaroos that are subjected to unusual exertion, such as being chased by dogs or hunters, or in the capture process, may become overheated and acidotic (changes in the body's metabolism due to muscle activity). Some animals just drop dead while others suddenly collapse several weeks after the event.

Signs of myopathy

Lethargy, depression, inability to stand, loss of muscle tone in the neck and hind limbs as the muscle tissue is actually breaking down.

Treatment

- Corticosteroids, antibiotics, sedatives and vitamin E can be tried. Prognosis is generally poor in severe cases, whereas mild cases are self-limiting.
- Prognosis is improved if capture is quick, thus minimising stress. Nervous macropods being transported or introduced to unfamiliar enclosures should always be sedated. It is always better to try again later, if the capture process becomes prolonged.

Tetanus and pulpy kidney (used to be called lockjaw)

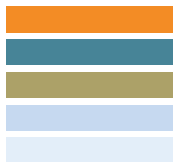
Occasionally seen in marsupials; the tetanus bacteria which can lie dormant in the soil for years enters the animal through an open wound. The wound sometimes goes undetected as it is usually under the foot. The toxins then attack the muscles and nervous system. Not a lot of cases are recorded in the Perth area but rehabilitators in the North West of the state report a high incidence and find it necessary to vaccinate all joeys before they are placed outside.

Signs of Tetanus

- Animals sometimes appears to be stiff, walking with difficulty, salivating and have difficulty breathing. The jaw will stiffen making it impossible to eat.
- Ears will stiffen and be upright and the facial expression is worried. Muscle twitching and spasms are visible as the condition worsens. In advanced cases the animal can't open its mouth.

Treatment

- Prevention with Tetanus vaccine, in areas where the bacteria is prevalent. Treatment of infected animals is generally not successful, and euthanasia is recommended.
- Animals undergoing surgery should be routinely vaccinated.



Intestinal worms

Tape worms and round worms can occur in macropods. Kangaroos usually carry a small amount of these worms naturally which do not affect the animal's health

In a stressful situation, if the animal has presented in poor condition, or has been ill worms may increase and cause diarrhoea causing failure to thrive and lethargy.

Routine worming is not recommended with native mammals as is the case with domestic animals. If you suspect your joey has worms, consult your vet before any treatment. Usually a faecal culture will identify the type of worms, and ensure the appropriate medication and dose rate is given.

Lumpy jaw

This can affect most macropods. It presents with a swelling of the jaw, lips and face. A bad smell in the mouth is also a sign, and the animals lose condition and weight as they can't eat properly.

Cause

Trauma to the gums or mouth from a sharp object, or decaying and infected teeth.

Older animals can also present with this problem as their teeth usually decay as they age. Infection enters the jaw, and usually by the time the problem is obvious it is well advanced and untreatable. Surgery can be performed in younger animals to remove the infected tooth or section of jaw bone, but the animal's ability to tolerate this process must be considered. In mature animals it is better to euthanase.

Avoid feeding soft foods such as bread, as these foods increase the chance of gum disease and tooth decay.

Toxoplasmosis

This is a parasite that can be contracted from cats. It is acquired by exposure to the cat faeces and all ground feeding mammals are at risk. Joeys will instinctively scratch around outside and can be exposed to areas where cats have defecated. Visiting cats and feral cats are sometimes the cause.

This disease is known to also affect ground-feeding animals like bandicoots.

If cats live inside the house the litter tray kept out of reach of joeys at all times. It is generally not recommended that rehabilitators have cats, especially if you wish to work with joeys.

Treatment

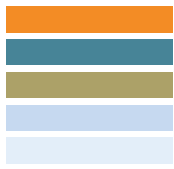
There is no known treatment for toxoplasmosis; exposure to the parasite will result in rapid death.

Salmonellosis

Caused by infection with the bacteria *Salmonella*, which is shed into the environment by infected animals. Refer to *Sick and injured wildlife module, Appendix A: Zoonotic disease* for more details.

Pox

This is a viral problem occurring in kangaroos usually in pouch-emerging joeys.



Signs of Pox

Irregular nodules which are wart-like with a roughened surface. There is eventually hair loss in these areas. Lesions are usually found on the legs, tail and feet but can spread around the face.

Treatment

The virus is self-limiting and the lesions usually fall off after two to three months; they do not appear to cause the animal any discomfort or problems.

Hair loss

Hair loss and dry and flaky skin can have a number of causes for example, urine scalding from wet bedding, rough fabric in bedding, overheating, ringworm, mites, vitamin E deficiency and also stress.

Sometimes only one joey in a group will be affected. Generally the elimination of stress and good management will see the hair grow back. One vitamin E capsule added to the milk formula daily will also help.

Ringworm

Bald patches usually appear around the face and ears. As the condition spreads it causes hair loss all over the body. Animals will sometimes scratch profusely. Refer to *Sick and injured wildlife module*, Appendix A - Zoonotic Diseases for more details.

Mites

Mites are a tiny parasite which exists under the animal's skin. They are not visible to the human eye and must be identified by the vet. The animal usually scratches and bald spots can appear. Treatment is effective. Some are zoonotic parasites.

Fungal skin infections

There are many fungal skin infections that can affect native animals. Any dry, flaky, inflamed, raised or bald patches should be investigated by your vet. Some of these conditions are zoonotic.

If you suspect your joey has any sort of problem or is unwell, it is best to get advice as soon as possible. Don't be afraid to ask for help, some problems can be resolved by just a simple phone call! In most cases early detection is the key to resolving most of the common problems that relate to hand raised animals.

Sadly when they are left, the condition can often develop into something much worse, or a secondary condition. The outcome might not always be as good.

If you can not commit, the joey should be passed onto a carer who can.

For Help and Support:-

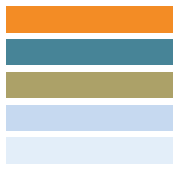
Contact Sue Turner Available 24/7

Phone 08 95731578

Mobile 0409 836877

The **24hr WILDCARE HELPLINE** on 9474 9055 can put you in touch with a registered professional rehabilitator in your area if necessary.





8 Practicalities

Guidelines to equipment needed

- digital scales
- hospital box
- heat pads hot water bottles (minimum of four)
- nursery box (second stage care or larger animals)
- cages - assorted sizes
- eskies (no lids needed)
- aviaries (depending on the type of mammal)
- hot water bottles and/or heating pads
- transport crates
- thick gloves
- blankets, towels - **lots!** (No loose threads or holes).
- assorted feed and water bowls (heavy duty flat bottomed)

Joey equipment

- milk formula
- bottles & teats assorted sizes
- mixing jugs and plastic bottles for storing milk formula in fridge
- bottle brush
- pouches - **lots!** different sizes
- hanging pouches for older joeys (seven for transport).
- warm bedding, blankets, doonas, and fleecy sheets.
- hot water bottles and/or heat packs

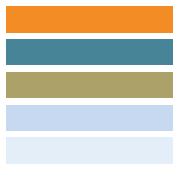
Basic first aid supplies

- Betadine
- Vytrate and/or Gastrolite
- Glucodin
- lots of cotton wool
- cotton buds
- bandages
- Paddle Pop sticks for splinting
- disposable surgical gloves

Emergency kit for rescues

- transport packs
- eskies and hanging bags for joeys
- bedding as above & towels
- thick gloves





- good torch
- hot packs and water bottles
- pouches - assorted sizes

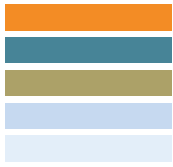
Keep your emergency kit prepared and ready. Non perishables can be kept in the car, just adding hot-packs etc before you leave.

Basic Joey Kit

- artificial heat source - heat pads or hot water bottles - four minimum
- hanging bag - for older joeys
- basket - for small joeys
- esky / thermo bag - for furless joeys
- milk formula - Biolac or Wombaroo recommended
- feeding bottles - two for each joey
- marsupial teats – minimum six - all sizes (always have a few spares on hand)
- syringes – furless tiny joeys 10ml - 20ml
- small bottle brush
- plastic mixing jug
- rehydration solution - Vytrate Gastrolite, or similar
- Glucose powder for hypoglycaemic joeys

Pouches

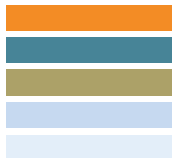
- inner liners made from any soft and warm material – (Cotton /flannelette for warmer climates)
- outer liners - wool knitted outer pouch for small furless or debilitated joeys – twelve minimum per joey - assorted sizes
- Lanolin cream - Paw paw, Eucern or Sorbaline
- thermometer - digital is most accurate
- digital scales
- tissues - lots of (as soft as possible)
- a good supply of clean assorted baby blankets, doonas, sheepskins, bunny rugs, line baskets and eskies to line baskets and eskies
- waterproof sheeting



9 Recommended Reading

Australian Museum Read books. *The Mammals of Australia*,
Parish, Steve and JONES, Cath. *Field Guide to Australian Mammals*
RismilleR, Peggy. *The Echidna: Australian Enigma*
White, Sharon. *Caring for Australian Wildlife*

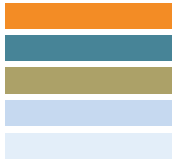




Module six Wildlife legislation and caring for wildlife

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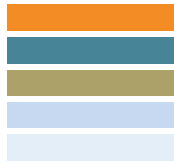
Module six Wildlife legislation and caring for wildlife

Module objectives

At the end of this module, you will have acquired some basic knowledge and be able to:

- Have a basic knowledge of the relevant legislations that apply to wildlife rehabilitation
- Know when you can display rehabilitated wildlife
- Understand the impact of invasive species
- Know the difference between a volunteer rehabilitator and a DEC registered rehabilitator
- Be aware of what is required for a volunteer to be covered by DEC insurance.





BASIC COURSE IN WILDLIFE REHABILITATION HANDBOOK 2013

Module six: Wildlife legislation and caring for wildlife

1 Relevant legislation

All wildlife is protected by the Wildlife Conservation Act and Regulations

Wildlife Conservation Act 1950

This Act provides for the conservation and protection of Western Australian wildlife and the sustainable use of flora and fauna throughout the state. Licences are required for the lawful taking of flora and fauna and to keep most species of fauna in captivity.

Section 14

Under the provision of this section, all fauna is protected unless declared otherwise. Section 14 also enables the Minister to declare, in a Notice published in the Government Gazette, a list of species of fauna and flora that are rare and likely to become extinct, or which are in need of special protection.

Specially Protected Fauna Notice

Members of the public are requested to notify a DEC wildlife officer if they find any rare or specially protected fauna that is sick, injured, orphaned or abandoned.

All black cockatoos, Western long-billed corellas (Muir's), mallee-fowl, albatross and petrels are included in this category.

The *Specially Protected Fauna* list is updated annually and published in the Government Gazette.

[Western Australian Government Gazette: State Law Publisher](#)

Wildlife Conservation Regulations 1970

A regulation 16 licence is required by anyone wishing to keep native fauna in captivity or confinement for educational or public purposes. This licence applies to wildlife parks and other groups or individuals who conduct wildlife displays. *

Regulation 28A

This regulation states that a person may temporarily keep in captivity fauna that is sick, injured, diseased or abandoned juvenile fauna, until it recovers or can fend for itself. It must be released into a place where it is ordinarily found in the wild or handed over to a wildlife officer.

Animal Welfare Act 2002

This legislation provides for the welfare, safety and health of animals and regulates the use of animals for scientific purposes.

The Licensing Unit at the Department of Environment and Conservation, Kensington issues licences.



The Nature Protection Unit issues licences for fauna causing damage (kangaroos, emus, ducks) and for dangerous fauna for example, attacking magpies).



*** Displaying animals**

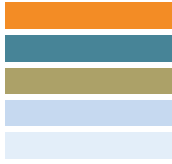
A regulation 16 Licence to Keep Fauna for Education or Public Purposes is required to display any fauna to the public.

Such displays need to be part of a properly planned, structured and targeted educational program.

Fauna kept under Regulation 28(A), being those in your care, cannot be used for display.

There are Regulation 16 Licence holders who can help if a request has been made for animals to be displayed for example, at a school or shopping centre.





2 Caring for wildlife

Rehabilitation

Rehabilitation is the returning of an injured animal back into its natural environment in a healthy state, so it is able to continue its life in the wild.

If rehabilitation cannot be achieved, then all that is happening is the creation of “injured pets”. Assessment of the likelihood of rehabilitation must be made early in the diagnosis of injury, and a decision made on whether the animal will recover for rehabilitation or require euthanasia to save further pain and stress. In exceptional cases a home may be found and a licence issued.

A Wildlife Officer must be notified when an endangered species comes in the care of any person.



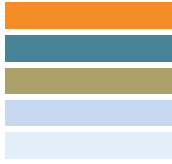
Carnaby's Black-Cockatoo *Calyptorhynchus latirostris*

Volunteer rehabilitator

Rehabilitators are volunteers who care for sick, injured and orphaned wildlife in their own homes under the guidance of a DEC registered wildlife rehabilitator or who volunteer at a wildlife rehabilitation centre.

Working with a DEC registered rehabilitator or centre will assist you to become competent in animal care; hygiene standards for cleaning cages and enclosures; the initial diagnosis or triage; when and how to release different species; an understanding of methods of euthanasia;





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Module six: Wildlife legislation and caring for wildlife

zoonotic disease awareness and precautions; personal hygiene standards and Wildlife Conservation Regulations and licensing procedures.

A medical record should be kept for all wildlife stating when and where the species was found, examination, treatment received, and the outcome. These records should be made available to DEC officers on request.

DEC registered rehabilitator (with own facility)

The procedure to become a DEC- Registered Wildlife Rehabilitator is as follows:

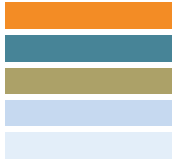
- Complete DEC's Basic Course in Wildlife Rehabilitation.
- Familiarise yourself with guidelines for the rehabilitation of wildlife as documented in "The Minimum Standards for Wildlife Rehabilitation in WA 2008" document and implement these standards where relevant to your facility.
- This publication is downloadable from the DEC website at:
http://www.dec.wa.gov.au/community_and_education/volunteer_programs/wildlife_rehabilitation_and_courses/minimum_standards_for_wildlife_rehabilitation
- Volunteer under the umbrella of a Wildlife Rehabilitation Centre or a DEC Registered Wildlife Rehabilitator until they are able to provide a reference of your proficiency and aptitude. The Community Involvement Unit may provide further details of rehabilitators in your location.
- Obtain written permission from your local council acknowledging wildlife rehabilitation will be carried out on your premises.
- Complete an application form from the Community Involvement Unit at DEC in Kensington. Include digital photos of your facility to assist assessment.
- A DEC wildlife officer will assess your facility. Applicants living in remote parts of the state will be assessed on a case by case basis.
- If approved DEC will provide you with an identification card and list you in the Wildcare Helpline directory. You eligible to apply for DEC Community Conservation grants.

Insurance

DEC holds insurance for all volunteers with the Insurance Commission of Western Australia through Riskcover for personal accident (not workers compensation) and public liability.

International volunteers must provide their own insurance coverage, as Riskcover only covers holders of the Australian Medicare card.





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Module six: Wildlife legislation and caring for wildlife

Volunteers will only be covered if they have completed a Volunteer Registration form (DEC205) and provided proof of commitment through timesheets. This process ensures an identifiable process to ascertain the volunteer's whereabouts in case of an accident, and the need to access insurance coverage.

Some limitations and exclusions to the insurance cover exist:

- Volunteers cannot be registered under 16 years of age.
- The volunteer supervisor must indicate their approval and co-sign the DEC205.
- The insurance does not cover sickness.
- Volunteers are not covered if under the influence of drugs or alcohol.
- Volunteers are not covered whilst driving to and from the place of volunteer work.
- Volunteers are not covered if, in the event of an injury requiring medical attention, advice given by the medical practitioner is not followed.

Procedure in the event of an injury

The person requiring medical attention should be taken immediately to a medical practitioner or medical centre. **Obtain a First Medical Certificate from the practitioner.**

If the visit to the doctor is sufficient aid, the claim goes through Medicare.

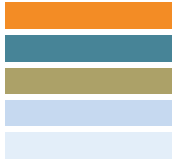
If there is a gap between the Medicare refund and the account, contact the Community Involvement Unit for further instructions.

If further treatment is required, please contact the Community Involvement Unit.

Rewards

- Volunteers contributing 20 hours or more in a financial year receive a 20% discount voucher to be used towards a DEC merchandise purchase (conditions apply).
- Volunteers contributing 50 hours or more in a financial year receive all of the above mentioned awards and the Volunteer Park Pass to DEC's national parks; the pass also proves identification for a 20% discount on all DEC merchandise (excluding the Landscape subscription).
- Volunteers contributing 150 hours or more in a financial year receive all of the above mentioned awards and a lapel badge designed in a unique flora or fauna design.
- Volunteers contributing 300 hours or more in a financial year receive all of the above mentioned awards and a \$30 discount voucher to be used towards a DEC merchandise purchase (conditions apply)





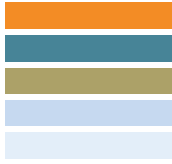
BASIC COURSE IN WILDLIFE REHABILITATION HANDBOOK 2013

Module six: Wildlife legislation and caring for wildlife

- Volunteers contributing 500 hours or more in a financial year receive all of the above mentioned awards the Volunteer Park Pass and a Landscape subscription (for 12 months).
- The Community Involvement Coordinator administers the reward system from DEC state headquarters in Kensington. The hours are collated from the volunteer's daily sign-on register, which is a record of the hours the volunteer has contributed during the financial year 1 July to 30 June.

The rewards can only be issued to a volunteer when a record of their volunteer hours is entered into the Community Involvement Unit's volunteer database. The Government Auditor then sights and approves the rewards to be issued.





3 Invasive Species

Importing and keeping introduced mammals, birds, reptiles and amphibians in Western Australia

Introduced animals and birds can have adverse impacts. Many animals and birds cause severe damage to agriculture and the environment.

They can:

- carry diseases or parasites
- damage agricultural crops
- displace native animals and plants
- damage property
- cause land degradation
- have a negative impact on public amenity.

These primarily introduced species (species that have originated in another country) have been gazetted as 'Declared Animals' under the *Agriculture and Related Resources Protection Act 1976*.

Controlling introduced animals and birds

It can take a long time for escaped animals to reach pest proportions – called a lag phase - but once established in the wild, introduced vertebrates are usually impossible to eradicate.

Sometimes the possible effects of an animal or bird in a cage are not obvious to us but the costs to future generations of importing or keeping a prohibited animal or not keeping a permitted animal in a responsible way can be enormous.

Hence it is more effective to act early to remove species attempting to establish wild populations, but this relies on early reports from the public.

Release of animals into the wild

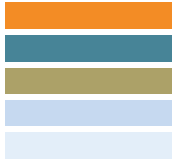
Under s. 83 of the Agriculture and Related Resources Protection Act 1976 (ARRPA) it is an offence to:

- liberate or attempt to liberate in any part of the State an animal that is a declared animal of any category other than category A7 in respect of that part of the State; or
- to abandon, or permit or fail to take reasonable precautions to prevent, the being at large in any part of the State of an animal that becomes a declared animal in that part of the State by reason of being at large.

Under r. 58 of the Wildlife Conservation Regulations 1970:

- A person shall not (a) abandon; or (b) release from captivity or confinement in circumstances which may make the recovery of the bird or animal impossible or uncertain, any bird or other animal, other than a homing or racing pigeon, without the prior permission in writing of the Executive Director.





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Module six: Wildlife legislation and caring for wildlife

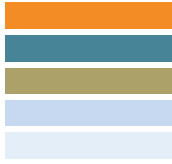
Ethics of keeping or releasing animals and of reporting unusual animals

- Species that cannot be legally released into the wild (for example, all declared species in categories A1 to 6) should be rehomed.
- All rehabilitators should have clear policies regarding whether or not they will rehabilitate pest species like rainbow lorikeets.
- The illegal keeping of species by others should be reported and can be done so anonymously.
- Reporting unusual species at large could result in the discovery of an unknown population of a rare native species, enable the removal of a new introduced species on the verge of establishing a feral population or allow an escaped or released pet animal to be recovered.
- The Department of Agriculture and Food makes all efforts to recapture pet species found at large and rehome them.



Department of Agriculture and Food biosecurity officer with a number of recaptured Indian ringnecks awaiting rehoming.





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Module six: Wildlife legislation and caring for wildlife

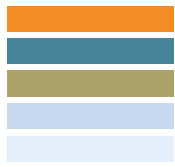
What to do if you see an unusual animal

- Check poster/brochure/website.
- Take a picture – often easier from a vehicle or building (if bird).
- Note description and behaviour.
- Call DAFWA Pest Hotline tel. 1800 084 881– email picture – info@agric.wa.gov.au
- Call the Wildcare Helpline 9474 9055.

Lists of declared animals and birds

The gazetted list of declared animals and birds alters from time to time. An accurate list is available by accessing the Department of Agriculture and Food (DAFWA) internet site (www.agric.wa.gov.au, search for Declared Animals List) or by contacting any office of the Department of Agriculture and Food or the Department of Environment and Conservation (DEC). On the following pages is a list of all known species found here that are not native to WA or only native to parts of WA, along with their status.

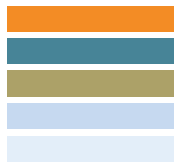




List of all known species found here that are not native to WA or only native to parts of WA, along with their status.

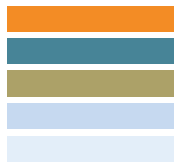
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
A1 = no entry, A2 = eradicate in wild, A3 = no keeping, A4 = import permit, A5 = reduce in wild, A6 = keeping permit, A7 = managed native species			
<i>If a mammal, bird, reptile or amphibian does not appear in these tables and is not native to WA, it is prohibited as a declared animal in categories A1, A2, A3.</i>	<i>It's an offence to release a declared pest into the wild.</i>		
<i>African Clawed Toad, African Clawed Frog</i>	<i>Xenopus laevis</i>	<i>A1,A2,A3</i>	<i>Prohibited.</i>
<i>African Silverbill</i>	<i>Lonchura cantans</i>	<i>A1,A2,A3</i>	<i>Prohibited. This species has previously been assessed (15/09/2003) for recategorisation and found to present too high a risk.</i>
<i>Agile Wallaby</i>	<i>Macropus agilis</i>	<i>A7 (Municipal districts of the Shires of Wyndham-East Kimberley, West Kimberley, Halls Creek and Broome)</i>	<i>Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.</i>
<i>Alexandrine Parakeet</i>	<i>Psittacula eupatria</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>
<i>All strains of domestic goose derived from Anser anser.</i>	<i>Anser anser</i>	<i>excluded from declaration</i>	<i>excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.</i>
<i>Alpaca</i>	<i>Lama pacos</i>	<i>excluded from declaration</i>	<i>excluded from declaration.</i>
<i>American Bison (including hybrids thereof, but excluding Beefalo cattle and all animals of 37.5% and less bison genetic material)</i>	<i>Bison bison</i>	<i>A1,A2,A3</i>	<i>Prohibited. This species has previously been assessed (3/11/2005) for recategorisation and found to present too high a risk. Although categories indicate import and keeping is allowed, it is likely that only wildlife parks will meet permit</i>





List of all known species found here that are not native to WA or only native to parts of WA, along with their status.			
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
			conditions.
Andean Condor	<i>Vultur gryphus</i>	A1,A2,A3	Prohibited. This species has previously been assessed (25/11/04) for recategorisation and found to present too high a risk. Not to be held in private, public or research facilities outside the statutory zoo except by government departments.
Australian Raven	<i>Corvus coronoides</i>	A7 (Eucla and South-west Divisions, excluding those municipal districts within the Perth Metropolitan Region and the districts of Bunbury and Mandurah)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Australian Ringneck, Port Lincoln Ringneck, Twenty-eight Parrot	<i>Barnardius zonarius</i>	A7 (South-west Division, excluding those municipal districts within the Perth Metropolitan Region and the Cities of Bunbury and Mandurah)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Australian Shelduck, Mountain Duck	<i>Tadorna tadornoides</i>	A7 (South-West and Eucla Divisions of WA, excluding those municipal districts within the Perth Metropolitan Region)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Australian Wood Duck, Maned Goose	<i>Chenonetta jubata</i>	A7 (South-West and Eucla Divisions of WA, excluding those municipal districts within the Perth Metropolitan Region)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Axolotl, Mexican Walking Fish	<i>Ambystoma mexicanum</i>	excluded from declaration	excluded from declaration. Species assessed

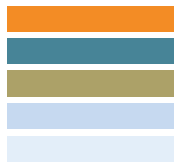




List of all known species found here that are not native to WA or only native to parts of WA, along with their status.

Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
			16/05/03.
<i>Bamboo Parrotfinch, Tawny-breasted Parrotfinch</i>	<i>Erythrura hyperythra</i>	A2,A4,A6	Please report this species if seen in the wild.
<i>Banteng Cattle</i>	<i>Bos javanicus</i>	A1,A2,A3	Although categories indicate import and keeping is allowed, it is likely that only wildlife parks will meet permit conditions.
<i>Barred Parakeet</i>	<i>Bolborhynchus lineola</i>	A1,A2,A3*	
<i>Baudin's Cockatoo, Long-billed Black Cockatoo</i>	<i>Calyptorhynchus baudinii</i>	A7 (Perth Metropolitan Region and City of Albany and the Shires of Denmark, Plantagenet, Cranbrook, Gnowangerup, Tambellup, Broomehill, Kojonup, Woodanilling, West Arthur, Wagin, Katanning, Dumbleyung, Williams, Narrogin, Wickepin, Boddington, Wandering, Brookton, Pingelly, Cuballing, Corrigin, Serpentine Jarrahdale, Murray, Waroona, Harvey, Collie, Dardanup, Capel, Donnybrook/Balingup, Busselton, August/Margaret River, Nannup, Bridgetown/Greenbushes, Boyup Brook, Manjimup)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
<i>Beefalo cattle breed and all animals of 37.5% and more American bison genetic material</i>	<i>Bison bison X Bos taurus</i> (37.5% or more bison genetic material)	A1,A2,A3*	

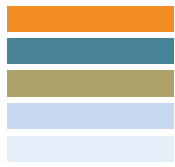




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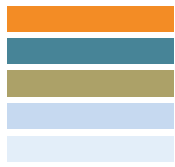
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>Beefalo cattle breed and all animals of 37.5% and less American bison genetic material</i>	<i>Bison bison x Bos taurus (37.5% or less bison genetic material)</i>	<i>excluded from declaration</i>	<i>excluded from declaration.</i>
<i>Black Rat, Domestic Rat</i>	<i>Rattus rattus</i>	<i>excluded from declaration</i>	<i>excluded from declaration. Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes. (See Pestnote)</i>
<i>Blackbuck</i>	<i>Antilope cervicapra</i>	<i>A1,A2,A3</i>	<i>Although categories indicate import and keeping is allowed, it is likely that only wildlife parks will meet permit conditions.</i>
<i>Black-capped Conure, Black-capped Parakeet</i>	<i>Pyrrhura rupicola</i>	<i>A1,A2,A3</i>	<i>Prohibited. This species has previously been assessed (15/09/2003) for recategorisation and found to present too high a risk.</i>
<i>Black-capped Lory</i>	<i>Lorius lorry</i>	<i>A1,A2,A3</i>	<i>Prohibited This species was assessed (25/11/04) for recategorisation and found to present too high a risk.</i>
<i>Black-cheeked Lovebird</i>	<i>Agapornis nigrigenis</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>
<i>Black-headed Caique, Black-headed Parrot</i>	<i>Pionites melanocephala</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild. Species assessed 25/10/2001.</i>
<i>Black-headed Munia, Black-headed Nun</i>	<i>Lonchura malacca</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>
<i>Black-rumped Waxbill, Red-eared Waxbill</i>	<i>Estrilda troglodytes</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild. Species assessed 06/99, 31/10/2000.</i>





List of all known species found here that are not native to WA or only native to parts of WA, along with their status.			
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>Blossom-headed Parakeet</i>	<i>Psittacula roseata</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (15/09/2003) for recategorisation and found to present too high a risk.</i>
<i>Blue and Yellow Macaw, Blue and Gold Macaw</i>	<i>Ara ararauna</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Blue-black Grassquit, Jacarini Finch</i>	<i>Volatinia jacarina</i>	<i>excluded from declaration</i>	<i>excluded from declaration.</i>
<i>Blue-capped Cordonbleu, Blue-headed Cordonbleu</i>	<i>Uraeginthus cyanocephalus</i>	A2,A4,A6	<i>Species assessed 10/12/02. Please report this species if seen in the wild.</i>
<i>Blue-fronted Amazon, Blue-fronted Parrot</i>	<i>Amazona aestiva</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (01/06/07) for recategorisation and found to present too high a risk.</i>
<i>Blue-throated Conure</i>	<i>Pyrrhura cruentata</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (15/09/2003) for recategorisation and found to present too high a risk.</i>
<i>Bobwhite Quail, Northern Bobwhite</i>	<i>Colinus virginianus</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (10/05/89) for recategorisation and found to present too high a risk. (See Pestnote)</i>
<i>Brown Rat, Norway Rat</i>	<i>Rattus norvegicus</i>	<i>excluded from declaration</i>	<i>Excluded from declaration. Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes. (See Pestnote)</i>

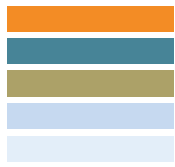




List of all known species found here that are not native to WA or only native to parts of WA, along with their status.

Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>Butler's Corella, Western Corella (northern and central wheatbelt subspecies)</i>	<i>Cacatua pastinator butleri</i>	A7 (Municipal districts of the Shires of Irwin, Mingenew, Morawa, Mullewa, Perenjori and Three Springs)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
<i>California Quail</i>	<i>Callipepla californica</i>	A1,A2,A3	Prohibited.
<i>Canada Goose</i>	<i>Branta canadensis</i>	A1,A2,A3	Prohibited. This species has previously been assessed (31/10/2000) for recategorisation and found to present too high a risk.
<i>Cane Toad, Giant Toad</i>	<i>Bufo marinus</i>	A1,A2,A3	Prohibited. See Pestnote. May not be imported or kept except for scientific or educational purposes by public facilities.
<i>Chaffinch</i>	<i>Fringilla coelebs</i>	A2,A4,A6	Please report this species if seen in the wild.
<i>Chattering Lory</i>	<i>Lorius garrulous</i>	A1,A2,A3	Prohibited. This species has previously been assessed (25/11/04) for recategorisation and found to present too high a risk.
<i>Chestnut-breasted Mannikin</i>	<i>Lonchura castaneothorax</i>	excluded from declaration	Please report this species if seen in the wild. Not native to Western Australia, but protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
<i>Chicken; Domestic Fowl; all bantams; Red Jungle Fowl and all domestic derivatives of the wild form Gallus gallus</i>	<i>Gallus gallus</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.

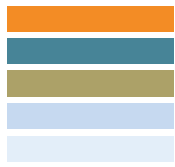




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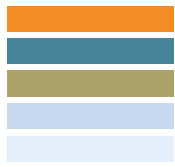
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Chukar, Chukar Partridge, Chukor Partridge	<i>Alectoris chukar</i>	A2,A4,A6	Please report this species if seen in the wild. Special requirements for commercial keeping. eg. limited to certain areas and with certain housing requirements.
Collared Dove, Collared Turtle-dove; Indian Ring Dove; Barbary Dove (fawn or white variations)	<i>Streptopelia decaocto</i>	A2,A4,A6	Please report this species if seen in the wild.
Common Blackbird, Eurasian Blackbird	<i>Turdus merula</i>	A1,A2,A3	Prohibited (See Pestnote)
Common Canary	<i>Serinus canaria</i>	excluded from declaration	Excluded from declaration.
Common Myna, Indian Myna(h), Indian House Myna(h)	<i>Acridotheres tristis</i>	A1,A2,A3	Prohibited. (See Pestnote)
Common Peafowl, Indian Peafowl	<i>Pavo cristatus</i>	excluded from declaration	Excluded from declaration.
Common Starling, European Starling	<i>Sturnus vulgaris</i>	A1,A2,A3	Prohibited. (See Pestnote)
Common Turkey, Includes all domestic derivatives of wild ancestor <i>M. gallopavo</i> .	<i>Meleagris gallopavo</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Common Waxbill, St Helena Waxbill	<i>Estrilda astrild</i>	A2,A4,A6	Please report this species if seen in the wild.
Cordonbleu, Blue-breasted Cordonbleu, Blue-breasted Waxbill	<i>Uraeginthus angolensis</i>	A2,A4,A6	Species assessed 10/12/02. Please report this species if seen in the wild.
Crimson-bellied Conure, Crimson-bellied Parakeet	<i>Pyrrhura perlata</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/03/03) for recategorisation and found to present too high a risk.





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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>Crimson-winged Pytilia, Aurora Finch</i>	<i>Pytilia phoenicoptera</i>	<i>excluded from declaration</i>	<i>Excluded from declaration.</i>
<i>Cuban Amazon, Cuban Parrot</i>	<i>Amazona leucocephala</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (23/04/2007) for recategorisation and found to present too high a risk.</i>
<i>Cuban Grassquit, Cuban Finch</i>	<i>Tiaris canora</i>	<i>excluded from declaration</i>	<i>Excluded from declaration.</i>
<i>Cut-throat Weaver, Cut-throat Finch, Ribbon Finch</i>	<i>Amadina fasciata</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Deer, species within the family Cervidae other than Fallow, Red and Rusa Deer</i>	<i>Family Cervidae (other than Dama dama, Cervus elaphus and Cervus timorensis)</i>	A1,A2,A3	<i>Prohibited.</i>
<i>Derbyan Parakeet</i>	<i>Psittacula derbiana</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Dingo</i>	<i>Canis lupus dingo</i>	A7	<i>Native to Western Australia and gazetted as Unprotected Fauna under the Wildlife Conservation Act 1950. A DEC import permit applies.</i>
<i>Dingo-dog hybrids</i>	<i>Canis lupus dingo x Canis lupus familiaris</i>	A5	<i>(See Pestnotes)</i>
<i>Dog, Wild or Feral</i>	<i>Canis lupus familiaris</i>	<i>A5 (when running wild in agricultural and pastoral areas)</i>	<i>(See Pestnotes)</i>
<i>Domestic Camel</i>	<i>Camelus dromedarius</i>	<i>excluded from declaration</i>	<i>Excluded from declaration (See Feral Camel)</i>

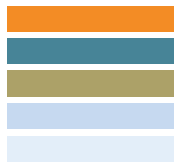




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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Domestic Cat	<i>Felis catus</i>	excluded from declaration	Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes.
Domestic Cattle	<i>Bos Taurus</i>	excluded from declaration	Excluded from declaration.
Domestic Dog	<i>Canis lupus familiaris</i>	Excluded from declaration except as specified for Wild or Feral Dog.	
Domestic Donkey	<i>Equus asinus</i>	Excluded from declaration except as specified for Feral Donkey.	
Domestic Ferret	<i>Mustela putorius furo</i>	A5 (when at large)	
Domestic Goat	<i>Capra hircus</i>	Excluded from declaration except as specified for Feral Goat.	
Domestic Guinea Pig	<i>Cavia porcellus</i>	excluded from declaration	
Domestic Horse	<i>Equus caballus</i>	Excluded from declaration except as specified for Feral Horse.	
Domestic Pig	<i>Sus scrofa</i>	Excluded from declaration except as specified for Feral Pig.	
Domestic Pigeon, Rock Dove	<i>Columba livia</i>	excluded from declaration	Excluded from declaration. Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes. Check local authority regulations regarding number of poultry, etc. which may be kept.

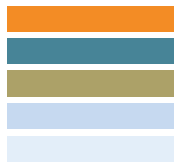




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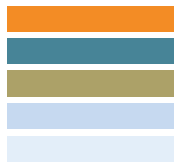
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>Domestic Rabbit (domestic or commercial breeds only, not wild rabbit with wild-type brown colouring)</i>	<i>Oryctolagus cuniculus</i>	<i>A5 (when at large or running wild only)</i>	<i>(See European Wild Rabbit) .</i>
<i>Duck, domestic breeds only</i>	<i>Anas spp.</i>	<i>excluded from declaration</i>	<i>Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.</i>
<i>Dusky Lory</i>	<i>Pseudeos fuscata</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild. Species assessed 15/09/2003.</i>
<i>Dybowski's Twinspot</i>	<i>Euschistospiza dybowskii</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>
<i>Eastern Long-billed Corella</i>	<i>Cacatua tenuirostris</i>	<i>excluded from declaration</i>	<i>Please report this species if seen in the wild. Not native to Western Australia, but protected under the Wildlife Conservation Act 1950. A DEC import permit applies.</i>
<i>Egyptian Goose</i>	<i>Alopochen aegyptiacus</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>
<i>Emu</i>	<i>Dromaius novaehollandiae</i>	<i>A7</i>	<i>Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.</i>
<i>Eurasian Bullfinch, Bullfinch</i>	<i>Pyrrhula pyrrhula</i>	<i>A1,A2,A3</i>	<i>Prohibited.</i>
<i>Euro, Biggada</i>	<i>Macropus robustus erubescens</i>	<i>A7</i>	<i>Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.</i>





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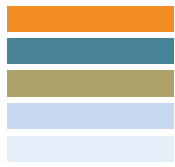
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>European Rabbit (wild rabbit only with wild-type brown colouring, not domestic or commercial breed)</i>	<i>Oryctolagus cuniculus</i>	A1,A3,A5	<i>Wild rabbits held illegally will be confiscated. (See Domestic Rabbit) (See Pestnotes)</i>
<i>European Siskin, Spruce Siskin, Eurasian Siskin</i>	<i>Carduelis spinus</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Fallow Deer</i>	<i>Dama dama</i>	A4,A5,A6	<i>Please report this species if seen in the wild. (See Pestnote) Species assessed 10/03/03.</i>
<i>Feral Camel</i>	<i>Camelus dromedarius</i>	A4,A5,A6	<i>(See Domestic Camel) (See Pestnote)</i>
<i>Feral Donkey</i>	<i>Equus asinus</i>	A4,A5,A6	<i>(See Domestic Donkey) (See Pestnote)</i>
<i>Feral Goat</i>	<i>Capra hircus</i>	A4,A5,A6	<i>Please report this species if seen in the wild. (See Domestic Goat) (See Pestnotes)</i>
<i>Feral Pig, Wild Boar</i>	<i>Sus scrofa</i>	A4,A5,A6	<i>Although categories indicate import and keeping allowed, permission is unlikely. (See Domestic Pig) (See Pestnote)</i>
<i>Fischer's Lovebird</i>	<i>Agapornis fischeri</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Galah</i>	<i>Cacatua roseicapilla</i>	<i>A7 (within the municipal districts of the Shires of Westonia and Yilgarn, within the Eucla Division of WA and the South-West Divisions of WA only, excluding those municipal districts within the Perth Metropolitan Region and the districts of Bunbury and Mandurah)</i>	<i>Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.</i>
<i>Golden Conure, Golden Parakeet</i>	<i>Guaruba guarouba</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (15/09/2003) for recategorisation and</i>



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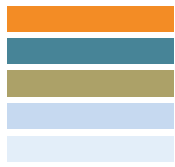
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
			<i>found to present too high a risk.</i>
Golden Pheasant	<i>Chrysolophus pictus</i>	<i>excluded from declaration</i>	<i>Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.</i>
Golden-capped Conure, Golden-capped Parakeet	<i>Aratinga auricapillus</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
Goldfinch, European Goldfinch	<i>Carduelis carduelis</i>	<i>excluded from declaration</i>	<i>Excluded from declaration.</i>
Greater Rhea	<i>Rhea americana</i>	A1,A2,A3*	<i>Please report this species if seen in the wild.</i>
Green Munia, Green Strawberry Finch, Green Avadavat	<i>Amandava formosa</i>	A2,A4,A6	<i>Please report this species if seen in the wild. Species assessed 10/01.</i>
Green Peafowl	<i>Pavo muticus</i>	<i>excluded from declaration</i>	<i>Excluded from declaration.</i>
Green-cheeked Conure, Green-cheeked Parakeet	<i>Pyrrhura molinae</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (18/11/05) for recategorisation and found to present too high a risk.</i>
Greenfinch, European Greenfinch	<i>Carduelis chloris</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
Green-winged Macaw, Red and Green Macaw	<i>Ara chloropterus</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
Green-winged Pytilia, Melba Finch	<i>Pytilia melba</i>	<i>excluded from declaration</i>	<i>Excluded from declaration.</i>
Grenadier Weaver, Red Bishop, Southern Red Bishop	<i>Euplectes orix</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
Grey Parrot, African Grey Parrot	<i>Psittacus erithacus</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (01/10/02) for recategorisation and found</i>





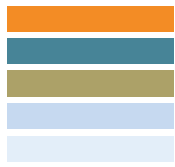
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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
			<i>to present too high a risk.</i>
<i>Helmeted Guineafowl</i>	<i>Numida meleagris</i>	<i>excluded from declaration</i>	<i>Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.</i>
<i>Himalayan Monal Pheasant, Impeyan Pheasant</i>	<i>Lophophorus impejanus</i>	<i>excluded from declaration</i>	<i>Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.</i>
<i>Hooded Siskin, Yellow Siskin, Black-hooded Yellow Siskin</i>	<i>Carduelis magellanica</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild. Species assessed 01/10/02.</i>
<i>Feral Horse</i>	<i>Equus caballus</i>	<i>A5 (running wild in agricultural and pastoral areas only)</i>	
<i>House Crow, Indian or Ceylon Crow</i>	<i>Corvus splendens</i>	<i>A1,A2,A3</i>	<i>Prohibited. (See Pestnote)</i>
<i>House Finch</i>	<i>Carpodacus mexicanus</i>	<i>A1,A2,A3</i>	<i>Prohibited.</i>
<i>House Mouse</i>	<i>Mus musculus</i>	<i>excluded from declaration</i>	<i>Excluded from declaration. Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes. (See Pestnote)</i>
<i>House Sparrow</i>	<i>Passer domesticus</i>	<i>A1,A2,A3</i>	<i>Prohibited. (See Pestnote)</i>
<i>Hyacinth Macaw</i>	<i>Anodorhynchus hyacinthinus</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>
<i>Indian Silverbill, White-throated Munia, Common Silverbill</i>	<i>Lonchura malabarica</i>	<i>A2,A4,A6</i>	<i>Please report this species if seen in the wild.</i>





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Jandaya Conure, Jandaya Parakeet	<i>Aratinga jandaya</i>	A2,A4,A6	Please report this species if seen in the wild.
Japanese Quail	<i>Coturnix japonica</i>	A2,A4,A6	Please report this species if seen in the wild. Special requirements for commercial keeping. eg. limited to certain areas and with certain housing requirements. (See Pestnote)
Jardine's Parrot, Red-fronted Parrot	<i>Poicephalus gulielmi</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/03/03) for recategorisation and found to present too high a risk.
Java Sparrow, Paddy Finch	<i>Padda oryzivora</i>	A4,A5,A6 (In areas south of 26° parallel of latitude). A1,A2,A3 (In areas north of 26° of latitude)	Only permitted to be kept South of the 26° parallel of latitude, prohibited elsewhere. Please report this species if seen north of the 26° South parallel of latitude.
Kalij Pheasant	<i>Lophura leucomelanos</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Lady Amherst's Pheasant	<i>Chrysolophus amherstiae</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Laughing Kookaburra	<i>Dacelo novaeguineae</i>	excluded from declaration	Not native to Western Australia, but protected under the Wildlife Conservation Act 1950. A DEC import permit applies.

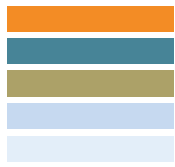




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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Laughing Turtle-dove	<i>Streptopelia senegalensis</i>	excluded from declaration	Excluded from declaration. Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes. (See Pestnote)
Little Corella (eastern subspecies)	<i>Cacatua sanguinea gymnopsis</i>	excluded from declaration	Please report this species if seen in the wild. Not native to Western Australia, but protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Little Corella (Kimberley subspecies)	<i>Cacatua sanguinea sanguinea</i>	A7 (within the municipal districts of the Shires of Wyndham-East Kimberley, Derby-West Kimberley, Perth Metropolitan area)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Little Corella (Pilbara-Murchison and northern wheatbelt subspecies)	<i>Cacatua sanguinea westralensis</i>	A7 (within the municipal districts of the Shires of Carnarvon, Greenough, Irwin, Mingenew, Morawa, Mullewa, Perenjori, Three Springs, Perth Metropolitan area)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Llama	<i>Lama glama</i>	excluded from declaration	Excluded from declaration..
Long-haired Rat	<i>Rattus villosissimus</i>	A7 (Municipal district of the Shire of Wyndham-East Kimberley)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Lovebird species hybrids	<i>Agapornis spp.</i>	A2,A4,A6	Please report this species if seen in the wild.
Luzon Bleeding-Heart, Bleeding-Heart Pigeon	<i>Gallucolumba luzonica</i>	excluded from declaration	Excluded from declaration.
Madagascar Red Fody, Madagascar Weaver	<i>Foudia madagascariensis</i>	A2,A4,A6	Please report this species if seen in the wild.

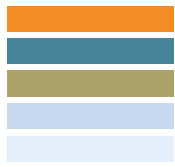




List of all known species found here that are not native to WA or only native to parts of WA, along with their status.

Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Malabar Parakeet	<i>Psittacula columboides</i>	A2,A4,A6	Please report this species if seen in the wild.
Mallard Duck, Mallard, and all <i>Anas</i> strains of domestic duck	<i>Anas platyrhynchos</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Mandarin Duck	<i>Aix galericulata</i>	A2,A4,A6	Please report this species if seen in the wild.
Masked Lovebird	<i>Agapornis personatus</i>	A2,A4,A6	Please report this species if seen in the wild.
Meyer's Parrot, Brown Parrot	<i>Poicephalus meyeri</i>	A2,A4,A6	Please report this species if seen in the wild.
Moustached Parakeet	<i>Psittacula alexandri</i>	A2,A4,A6	Please report this species if seen in the wild.
Muir's Corella, Western Corella (Lake Muir subspecies)	<i>Cacatua pastinator pastinator</i>	A7 (Municipal districts of the Shires of Boyup Brook, Cranbrook and Manjimup)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Mule, Hinny	<i>Equus caballus X Equus asinus</i>	Excluded from declaration.	
Muscovy Duck	<i>Cairina moschata</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Mute Swan, White Swan	<i>Cygnus olor</i>	excluded from declaration	Excluded from declaration. Restricted by DEC to the Avon River, Northam and licensed wildlife parks.
Namaqua Dove, Cape Dove, Masked Dove	<i>Oena capensis</i>	A2,A4,A6	Please report this species if seen in the wild.
Nanday Conure	<i>Nandayus nenday</i>	A1,A2,A3	Prohibited. This species has previously been assessed (18/11/05) for recategorisation and found

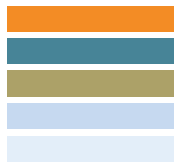




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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
			<i>to present too high a risk.</i>
<i>New Zealand Scaup</i>	<i>Aythya novaeseelandiae</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Northern Palm Squirrel</i>	<i>Funambulus pennantii</i>	A1,A3 (whole of State), A2 (whole of State, except the municipal district of South Perth), A5 (municipal district of South Perth)	<i>Only permitted at large in and adjacent to the zoo. If found outside Perth or in suburbs distant from zoo, contact the Department of Agriculture and Food. (See Pesnote)</i>
<i>Northern Red Bishop, Orange Bishop</i>	<i>Euplectes franciscanus</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Nutmeg Mannikin, Spicefinch, Spotted Munia, Scaly-breasted Munia</i>	<i>Lonchura punctulata</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Nyasa Lovebird, Lilian's Lovebird</i>	<i>Agapornis lilianae</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Orange-cheeked Waxbill</i>	<i>Estrilda melpoda</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Orange-winged Amazon, Orange-winged Parrot</i>	<i>Amazona amazonica</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (23/04/2007) for reclassification and found to present too high a risk.</i>
<i>Oriental Greenfinch</i>	<i>Carduelis sinica</i>	A2,A4,A6	<i>Please report this species if seen in the wild. Species assessed 01/10/02.</i>
<i>Ostrich</i>	<i>Struthio camelus</i>	A5 (running wild in agricultural and pastoral areas only)	<i>Check local authority regulations regarding number of poultry, etc. which may be kept.</i>
<i>Paradise Shelduck, New Zealand Shelduck</i>	<i>Tadorna variegata</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>

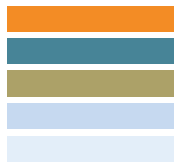




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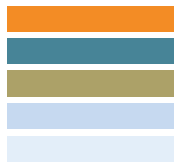
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Paradise Sparrow, Aberdeen Finch, Red-headed Amadina	<i>Amadina erythrocephala</i>	A2,A4,A6	Please report this species if seen in the wild.
Peach-faced Lovebird	<i>Agapornis roseicollis</i>	A2,A4,A6	Please report this species if seen in the wild.
Peach-fronted Conure, Golden-crowned Conure, Peach-fronted Parakeet	<i>Aratinga aurea</i>	A2,A4,A6	Please report this species if seen in the wild.
Pearly Conure, Pearly Parakeet	<i>Pyrrhura lepida</i>	A1,A2,A3	Prohibited. This species has previously been assessed (15/09/2003) for recategorisation and found to present too high a risk.
Pekin Robin, Red-billed Leiothrix	<i>Leiothrix lutea</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/12/02) for recategorisation and found to present too high a risk.
Peters's Twinspot	<i>Hypargos niveoguttatus</i>	A2,A4,A6	Please report this species if seen in the wild.
Pin-tailed Parrotfinch	<i>Erythrura prasina</i>	A1,A2,A3	Prohibited. This species has previously been assessed (1/10/2002) for recategorisation and found to present too high a risk.
Plum-headed Parakeet	<i>Psittacula cyanocephala</i>	A2,A4,A6	Please report this species if seen in the wild.
Purple Grenadier, Purple Grenadier Waxbill	<i>Uraeginthus ianthinogaster</i>	A1,A2,A3	Prohibited. This species has previously been assessed (01/10/02) for recategorisation and found to present too high a risk. Not to be held in private, public or research facilities outside the statutory zoo except by government departments.





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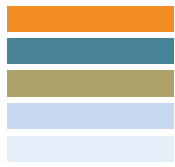
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Rainbow Lorikeet	<i>Trichoglossus haematodus</i>	A5 (in the Perth Metropolitan area), A2 (where at large, in areas south of the 20 ^o parallel of latitude, excluding the Perth Metropolitan area)	Please report this species if seen in the wild South of the 20 ^o parallel of latitude. (See Pestnote). Species assessed 11/05/01.
Red Deer, Wapiti, Elk	<i>Cervus elaphus</i>	A4,A5,A6	Please report this species if seen in the wild. (See Pestnote) Species assessed 10/03/03.
Red Fox	<i>Vulpes vulpes</i>	A5	Foxes cannot be taken onto nature reserves or wildlife sanctuaries. (See Pestnotes)
Red Kangaroo, Marlu	<i>Macropus rufus</i>	A7	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Red Lory	<i>Eos bornea</i>	A1,A2,A3	Prohibited. This species has previously been assessed (25/08/2004) for recategorisation and found to present too high a risk.
Red Munia, Red Strawberry Finch, Red or Indian Avadavat, Tiger Finch, Red Waxbill	<i>Amandava amandava</i>	A2,A4,A6	Please report this species if seen in the wild.
Red Siskin, Venezuelan Siskin, Black-hooded Red Siskin	<i>Carduelis cucullata</i>	A2,A4,A6	Please report this species if seen in the wild.
Red-bellied Parrot, Orange-bellied Parrot	<i>Poicephalus rufiventris</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/03/03) for recategorisation and found to present too high a risk.
Red-billed Firefinch	<i>Lagonosticta senegala</i>	excluded from declaration	Excluded from declaration.



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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Red-billed Quelea, Red-billed Weaver, Dioch	<i>Quelea quelea</i>	A1,A2,A3	Prohibited.
Red-browed Finch	<i>Neochmia temporalis</i>	excluded from declaration	Please report this species if seen in the wild. Not native to Western Australia, but protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Red-capped Parrot, WA King Parrot	<i>Purpureicephalus spurius</i>	A7 (Municipal districts of the Shires of Bridgetown-Greenbushes, Capel, Donnybrook-Balingup, Harvey, Kalamunda, Manjimup, Mundaring, Murray, Plantagenet, Serpentine-Jarrahdale, and the City of Armadale)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Red-cheeked Cordonbleu	<i>Uraeginthus bengalus</i>	A2,A4,A6	Species assessed 10/12/02. Please report this species if seen in the wild.
Red-crested Cardinal	<i>Paroaria coronata</i>	excluded from declaration	Excluded from declaration.
Red-crested Finch, Red-pileated Finch	<i>Coryphospingus cucullatus</i>	A1,A2,A3	Prohibited. This species has previously been assessed (XX/08/08) for recategorisation and found to present too high a risk.
Red-fronted Macaw	<i>Ara rubrogenys</i>	A2,A4,A6	Please report this species if seen in the wild. Species assessed 10/03/03.
Red-fronted Parakeet, Red-fronted Kakariki	<i>Cyanoramphus novaezelandiae</i>	A2,A4,A6	Please report this species if seen in the wild.
Red-headed Parrotfinch	<i>Erythrura cyaneovirens</i>	A2,A4,A6	Please report this species if seen in the wild.
Redpoll	<i>Carduelis flammea</i>	A2,A4,A6	Please report this species if seen in the wild.

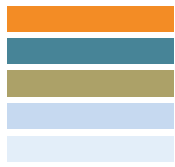




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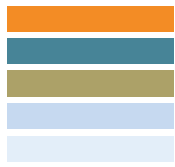
Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Red-shouldered Macaw, Hahn's Macaw	<i>Diopsittaca nobilis</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/03/03) for recategorisation and found to present too high a risk.
Red-throated Parrotfinch, Red-faced Parrotfinch	<i>Erythrura psittacea</i>	excluded from declaration	Excluded from declaration from declaration.
Red-vented Bulbul	<i>Pycnonotus cafer</i>	A1,A2,A3	Prohibited.
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	A1,A2,A3	Prohibited.
Reeves's Pheasant	<i>Syrnaticus reevesii</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Ring-necked Pheasant, Common Pheasant	<i>Phasianus colchicus</i>	A2,A4,A6	Check local authority regulations regarding number of poultry, etc. which may be kept. (See Pestnote)
Rose-ringed Parakeet, Indian or African Ringneck Parrot or Parakeet	<i>Psittacula krameri</i>	A2,A4,A6	Please report this species if seen in the wild.
Ruddy Ground Dove, Talpacoti	<i>Columbina talpacoti</i>	A2,A4,A6	Please report this species if seen in the wild.
Ruddy Shelduck	<i>Tadorna ferruginea</i>	A1,A2,A3	Prohibited. This species has previously been assessed (31/10/2000) for recategorisation and found to present too high a risk.
Rufous-backed Mannikin, Rufous-backed Munia, Red-backed Mannikin, Chestnut Munia, Brown-backed Munia	<i>Lonchura bicolor nigriceps</i>	A1,A2,A3	Prohibited.
Rusa Deer, Timor Deer	<i>Cervus timorensis</i>	A4,A5,A6	Species assessed (18/03/03).
Scarlet Macaw	<i>Ara macao</i>	A2,A4,A6	Please report this species if seen in the wild.





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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
Senegal Parrot	<i>Poicephalus senegalus</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/03/03) for recategorisation and found to present too high a risk.
Sheep	<i>Ovis aries</i>	excluded from declaration	excluded from declaration
Siamese Fireback Pheasant	<i>Lophura diardi</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
Silver Pheasant	<i>Lophura nycthemera</i>	A2,A4,A6	Check local authority regulations regarding number of poultry, etc. which may be kept.
Silver-eared Mesia	<i>Leiothrix argenteauris</i>	A1,A2,A3	Prohibited. This species has previously been assessed (07/12/07) for recategorisation and found to present too high a risk.
Silvereye	<i>Zosterops lateralis</i>	A7 (South-West Division of WA)	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
Slaty-headed Parakeet	<i>Psittacula himalayana</i>	A1,A2,A3	
Song Thrush	<i>Turdus philomelos</i>	A1,A2,A3	Prohibited.
Spotted Turtle-dove	<i>Streptopelia chinensis</i>	excluded from declaration	Excluded from declaration. Advice available from the Department of Agriculture and Food on control or management of problems which this animal occasionally causes.

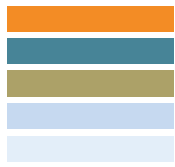




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Common Name(s)	Scientific Name	Current Status under ARRPA*	Comments
<i>Sulphur-crested Cockatoo</i>	<i>Cacatua galerita</i>	A4,A6 (whole of state), A2 (where at large, within areas south of the 20o of latitude, except Shire of Chittering and localities including and between Bullsbrook and Guildford in the Shire of Swan, and the Shires of Murray, Mandurah and Waroona), A5 (Shire of Chittering and localities including and between Bullsbrook and Guildford in the Shire of Swan, and the Shires of Murray, Mandurah and Waroona)	Please report this species if seen in the wild South of the 20 ^o parallel of latitude. (See Pestnote)
<i>Sun Conure, Sun Parakeet</i>	<i>Aratinga solstitialis</i>	A2,A4,A6	Please report this species if seen in the wild.
<i>Swan Goose, Chinese Goose</i>	<i>Anser cygnoides</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept. Species assessed 17/12/03.
<i>Swinhoe's Pheasant</i>	<i>Lophura swinhoii</i>	excluded from declaration	Excluded from declaration. Check local authority regulations regarding number of poultry, etc. which may be kept.
<i>Tree Sparrow, Eurasian Tree Sparrow</i>	<i>Passer montanus</i>	A1,A2,A3	Prohibited. (See Pestnote)
<i>Tricoloured Parrotfinch, Three-coloured Parrotfinch, Tanimbar Parrotfinch</i>	<i>Erythrura tricolor</i>	A2,A4,A6	Please report this species if seen in the wild.
<i>Violet-eared Waxbill, Common Grenadier</i>	<i>Uraeginthus granatina</i>	A1,A2,A3	Prohibited. This species has previously been assessed (01/10/02) for recategorisation and found to present too high a risk. Not to be held in private, public or research facilities outside the statutory zoo except by government departments.

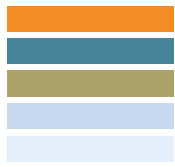




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Water Buffalo	<i>Bubalus bubalis</i>	A1,A2,A3 (in areas north of the 20° of latitude), A5,A6 elsewhere	Please report this species if seen north of the 20° parallel of latitude and at large south of this area. Species assessed 16/05/03.
Western Grey Kangaroo	<i>Macropus fuliginosus</i>	A7	Native to Western Australia and protected under the Wildlife Conservation Act 1950. A DEC import permit applies.
White-bellied Caique, White-bellied Parrot	<i>Pionites leucogaster</i>	A2,A4,A6	Please report this species if seen in the wild. Species assessed 25/10/2001.
White-bibbed Ground-Dove, White-breasted Ground-Dove, Jobi Island Dove	<i>Gallicolumba jobiensis</i>	excluded from declaration	Excluded from declaration.
White-headed Munia	<i>Lonchura maja</i>	A2,A4,A6	Please report this species if seen in the wild.
White-rumped Munia, Bengalese Mannikin	<i>Lonchura striata</i>	A2,A4,A6	Please report this species if seen in the wild.
White-rumped Seedeater, Grey Singing Finch	<i>Serinus leucopygius</i>	A1,A2,A3	Prohibited. This species has previously been assessed (01/10/02) for recategorisation and found to present too high a risk.
Yellow-bibbed Lory	<i>Lorius chlorocercus</i>	A1,A2,A3	Prohibited. This species was assessed (25/11/2004) for recategorisation and found to present to high a risk.
Yellow-breasted Greenfinch, Black-headed Greenfinch, Himalayan Greenfinch	<i>Carduelis spinoides</i>	A1,A2,A3	Prohibited. This species has previously been assessed (10/12/02) for recategorisation and found to present too high a risk.





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<i>Yellow-crowned Amazon, Yellow-headed Amazon, Yellow-fronted Amazon, Yellow-naped Amazon</i>	<i>Amazona ochrocephala</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (01/10/02) for recategorisation and found to present too high a risk.</i>
<i>Yellow-fronted Canary, Green Singing Finch</i>	<i>Serinus mozambicus</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Yellow-fronted Parakeet, Yellow-fronted Kakariki</i>	<i>Cyanoramphus auriceps</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Yellowhammer</i>	<i>Emberiza citrinella</i>	A2,A4,A6	<i>Please report this species if seen in the wild.</i>
<i>Yellow-rumped Seedeater; Angolan Singing Finch</i>	<i>Serinus atrogularis</i>	A1,A2,A3	<i>Prohibited. This species has previously been assessed (1/10/2002) for recategorisation and found to present too high a risk.</i>
<i>Yellow-winged Pytilia</i>	<i>Pytilia hypogrammica</i>	A2,A4,A6	<i>Species assessed 23/04/2007</i>
<i>Zebra Waxbill, Golden-breasted Waxbill, Orange-breasted Waxbill</i>	<i>Amandava subflava</i>	<i>excluded from declaration</i>	<i>Excluded from declaration.</i>

