MANAGEMENT OF CRITICALLY ILL WILDLIFE
The reality and practice of wildlife euthanasia

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ABSTRACT

For many animals presented to wildlife carers, veterinarians or rehabilitations centres, the most humane course of action is euthanasia. The most common reasons for this are serious illness or injury, lack of resources, lack of viability (small joeys), or because the animal is feral. Whatever the reason, the decision to euthanase is generally an ethical one that is based upon minimising or relieving the suffering of an animal. Once a decision to euthanase has been made, it should be performed promptly by a suitably qualified or experienced person. Although not a pleasant task, it is important that wildlife rehabilitators are trained to perform euthanasia. Acceptable techniques for euthanasia vary depending upon species, size and availability of veterinary support and resources. Certain states allow for the possession and use of some restricted drugs by appropriately trained laypersons, others do not. This paper outlines the important principles of euthanasia and gives some guidelines for acceptable techniques that may be used for species commonly presented for care.

1. INTRODUCTION

Commonly, as wildlife rehabilitators, we are confronted with wildlife affected by severe injuries or illness. Given the high potential for suffering, these animals must be treated with sensitivity, compassion and prompt and appropriate veterinary attention. The purpose of this paper is to assist wildlife rehabilitators to confidently assess these cases and perform euthanasia or seek the assistance of a wildlife coordinator or veterinarian.

Although euthanasia is a sensitive issue for wildlife rehabilitators, particularly new rehabilitators, it is a fact of life. Euthanasia is one of the most common veterinary procedures performed on wildlife by both veterinarians and wildlife rehabilitators. It is important to realise that euthanasia is not an indication of failure, it is an act based on ethics and compassion. It is a decision that recognises the following facts:

1. That we cannot save every injured animal's life.
2. That we cannot cure every illness in wildlife.
3. That we cannot provide facilities and resources for the care of every sick or injured wild animal.
4. That we do not have the resources to house every unreleasable animal to a standard that ensures good quality of life.
5. That our primary role as wildlife carers is the relief of suffering.

Importantly, as effective and compassionate wildlife rehabilitators, you must acknowledge these facts. One of the most important realisations is that our most important priority is not to attempt to save every life, but to make decisions based upon the best welfare of the animal – decisions that commonly result in euthanasia.

2. ASSESSMENT AND MANAGEMENT OF CRITICALLY ILL WILDLIFE

Many of the wildlife cases that we rescue or are presented with are victims of severe trauma. The causes of such trauma include road trauma, dog and cat attack, entanglement, shooting and various others.

SEVERE TRAUMA IS A VETERINARY EMERGENCY!

Some wildlife are rescued or presented in a severely debilitated, moribund or dehydrated state. Others have DYSPNOEA (difficulty breathing or open mouthed breathing), SIGNIFICANT BLEEDING, CONVULSIONS, BONE FRACTURES and PAIN.

THESE SIGNS INDICATE A VETERINARY EMERGENCY!

As a wildlife rehabilitator you have an ETHICAL AND LEGAL OBLIGATION to do your best to seek veterinary attention for animals that have conditions that are veterinary emergencies.

Even though you are a volunteer, you have the same legal obligations upon you to seek assistance for an injured animal in your care, as any dog, cat or farm animal owner. As volunteer wildlife rehabilitators we are clearly more driven and motivated by compassion to do this rather than our legal obligation. However, sometimes we may fail to meet these obligations for a variety of reasons.

One of the most important steps to perform when receiving an animal that has trauma or disease is to perform an EXAMINATION. If you don't perform at least a basic examination of your patient, then you will find it difficult to assess whether it needs veterinary attention or euthanasia.

Often a short but systematic examination will enable you to assess whether an animal has minor or major injuries, or minor or severe disease. Remember: SEVERE INJURY OR DISEASE IS A VETERINARY EMERGENCY. If at the end of your examination, you have detected severe injuries or disease, or you feel that the animal may die, then ethically you must either:

1. Seek the assistance of a veterinarian
2. Seek the assistance of an experienced wildlife carer or coordinator
3. Perform euthanasia.

Adopting the "wait and see" attitude, or attending to the problem in the morning is unethical and poor practice. Similarly, failure to perform a basic examination to detect these potential cases is unethical and poor practice.

The following is a procedure chart to assist you in performing a basic physical examination. Remember, this should be done on all of your admissions or rescues. There is no excuse for any experienced wildlife rehabilitator to neglect this procedure:

EYEBALLING

Eyeballing is that part of the examination in which you observe the patient from a distance, either in its rescue box or cage, or in the situation in which you are about to rescue it. Note the following:

Breathing
Demeanour and alertness
Gait (the way it walks/climbs)
Obvious injuries/ fractures
Discharges
Body condition

At this point also think about the likelihood of dehydration, exhaustion etc.

After eyeballing, you can get a reasonable idea of the general state of the patient, and the way you should handle it. It is particularly important to be gentle and minimise stress in patients with severe trauma/ fractures, and those with DYSPNOEA (difficulty breathing). Imagine how you would feel yourself.

After eyeballing you may decide that immediate veterinary assistance or euthanasia is warranted. In such cases it may not be appropriate to progress to a close examination. However, in any case in which euthanasia is not indicated by the eyeballing examination, then you must proceed to a close physical examination.

CLOSE PHYSICAL EXAMINATION

The close physical examination is a systematic and thorough examination of the patient, starting at the head and working down the body. It is important to observe the features of each segment of the body, including the head (and mouth) neck, thorax and abdomen, limbs and tail.

When examining the limbs for fractures, it is important to systematically work from the extremities in towards the body, feeling each bone and joint.

At the end of the close physical examination you should have a basic idea of the state of your patient.

SEVERE INJURIES OR ILLNESS WARRANT VETERINARY ASSISTANCE OR EUTHANASIA.

A note on pain relief

For animals with severe or moderate pain the only drugs with sufficient pharmacological effect to alleviate the pain are the opioids (methadone, morphine etc). For animals with severe trauma, or signs of severe pain, anti-inflammatory drugs such as Metacam, Rimadyl, Finadyne etc are NOT sufficient.

The following are recommendations for pain relief based on severity:

Severe pain:	methadone (4-6 hourly) plus NSAIDS (carprofen, meloxicam) (motor vehicle trauma, dog attack, major surgery etc)
Moderate pain:	buprenorphine (Temgesic) (8-12 hourly), butorphanol (Torbugesic) (3-6 hourly) plus NSAID (Minor surgery, minor trauma)
Minor pain:	NSAIDS

Only veterinarians are allowed to prescribe S8 drugs for use on animals, and their use and storage are strictly controlled. At present there are no rehabilitators or species coordinators licensed to carry S8 (controlled drugs) pain-relieving drugs.

Some wildlife rehabilitators in Queensland are licensed to keep and use veterinary euthanasia solutions, some sedatives/anaesthetics, and some non-steroidal anti-inflammatory drugs (NSAIDS). More information on licensing requirements in the various states is contained in Appendix One at the end of this paper.

If you have an animal showing signs of pain or with injuries or disease likely to cause severe or moderate pain, then you must seek veterinary assistance promptly. Animals that are in severe pain or likely to be suffering severe pain must be monitored closely and regularly following administration of pain relief. Additional doses will most likely be required and some animals may deteriorate and require euthanasia.

CONSTANT MONITORING IS OBLIGATORY IN THE MANAGEMENT OF CRITICALLY ILL PATIENTS, OR PATIENTS WITH SEVERE PAIN.

If you have detected a clinical condition that warrants, or may warrant euthanasia, you are obliged to perform euthanasia or immediately seek assistance from a species coordinator or veterinarian. If the animal must be restrained or transported, then the manner of restraint or containment MUST be appropriate for the injuries or condition.

Animals with multiple or severe fractures must be handled gently and minimally. They must be placed into a cardboard box or cage that is well padded on all sides and bottom with blankets, a doona or towels. Ensure that when placing the animal in the box the fracture is not displaced or likely to become entangled, causing further pain and distress.

Dyspnoeic animals (those with difficulty breathing) must be handled absolutely minimally, and placed in a fully enclosed but not restrictive containment (such as a cardboard box). Even minor stress to these animals may cause marked and unacceptable respiratory distress.

DO NOT attempt to feed or give water to any animal that is dyspnoeic or moribund. Oral fluids are only indicated in those animals that READILY take oral fluids and are able to swallow. Most critical patients don't.

3. EUTHANASIA

Euthanasia is one of the most common veterinary techniques used in wildlife medicine. Its aim is to relieve suffering by causing a rapid, painless and relatively comfortable death to those animals with severe injuries, illness or debility. Euthanasia may also be performed on healthy animals: for example feral animals, or joeys that are too young to be successfully reared. Whatever the indications for euthanasia, its objectives remain the same:

> *To cause immediate or rapid loss of consciousness, followed by death, with a minimum of pain, discomfort or distress.*
>
> EUTHANASIA = GOOD DEATH

Making the decision to perform euthanasia

In some cases, making the decision to perform euthanasia on an animal can be an easy one (although not always a happy one). For example: animals with severe trauma or untreatable disease should give no difficulty in making that decision. However, some cases may not be so straightforward. It is sometimes helpful to consider the following factors:

1. Does the animal have injuries or illness that can be treated successfully? Or, is the joey developed enough to have a good chance of survival?
2. Is (are) there suitable rehabilitators available and capable of caring for the animal for its complete period of rehabilitation?
3. Is there suitable habitat available for the animal to be released into, or a captive institution appropriate for it?
4. Is there appropriate veterinary care available?
5. Is the animal an endangered or rare species?
6. Does it have a GOOD chance of survival in the wild following rehabilitation?

If the answer to some of these questions is NO, then euthanasia may be the most appropriate course of action even if the injuries or illness are not so severe as to normally warrant euthanasia. Also, the rehabilitation and release of geriatric animals that are unlikely to contribute reproductively to a population is questionable.

The question of BAD LUCK versus BAD GENES

Often, wild animals are presented to us because they have been injured or become sick through **BAD LUCK**, often as a result of human activities. Sometimes, however, animals are found in a sick or weakened state without apparent accidental causes. Before treating and releasing these animals, we must first consider whether the illness or failure to thrive, or whatever, is as a result of **BAD GENES**. Natural selection ensures that only the fit animals survive, particularly in times of hardship. During these times, the less genetically "fit" animals die.

This phenomenon ensures the constant "testing" of a species' genes, and selection for "strong genes". If we continually rescue and rehabilitate individuals that are found in a weak or debilitated state, or dying because they are not as strong as others of their species, then we are giving a selective advantage to animals with "weaker" genes, rather than letting nature get rid of those genes. Flying foxes and muttonbirds are just some examples of species for which we may not necessarily be doing the right thing by saving all of the weak individuals.

It's a concept worth thinking about, even if it is hard to put into practice sometimes.

4. EUTHANASIA TECHNIQUES

The basic requirement for a euthanasia technique is that it cause immediate or rapid loss of consciousness and/or death with a minimum of pain, discomfort and distress. Furthermore, the manner in which an animal is treated, handled, contained and restrained before and during euthanasia is as critical for its welfare as the euthanasia technique itself.

Most effective euthanasia techniques therefore require destruction or damage to the brain, or chemical suppression of brain activity. Other desirable characteristics of euthanasia techniques are that they:

1. Can be performed easily and safely by trained rehabilitators;
2. Are reliable (ie reliably cause rapid and painless death);
3. Affect necropsy findings minimally;
4. Are aesthetically tolerable.

Clearly no technique is perfect in all respects, but the use of veterinary euthanasia solutions provides the most effective and acceptable (aesthetic) form of euthanasia for most cases. However, the use of these solutions is regulated by State drugs and poisons legislation such that very few people other than veterinarians may legally possess and use them.

The following are some other methods that when performed by capable persons are relatively humane:

1. Trauma (such as shooting or clubbing) and, under certain circumstances and for certain species, the following:

2. Chloroform intoxication

3. Carbon monoxide intoxication (car exhaust fumes)

4. Asphyxiation with carbon dioxide gas (not readily available to most rehabilitators).

The following methods **ARE NOT HUMANE AND SHOULD NEVER BE USED**. They DO NOT fulfil the requirements of euthanasia:

1. Physical asphyxiation
2. Drowning
3. Hypothermia (placing in the freezer)

Any method that does not induce instantaneous or rapid loss of consciousness without pain, discomfort or distress is not a euthanasia technique, and its use is not excusable under any circumstance.

CHEMICAL METHODS OF EUTHANASIA

1. **Veterinary euthanasia solutions**: most veterinary euthanasia solutions contain a drug called sodium pentobarbitone, which causes anaesthesia, and stops the heart and breathing at high doses. There are some important considerations in the use of these solutions though:

    1. They may only be kept and used by registered veterinarians or other persons appropriately licensed by state health authorities.
    2. They are extremely irritant to tissues, and have the potential to cause severe pain if used or injected inappropriately.
    3. They are hazardous for human health if injected or ingested accidentally (or deliberately) at relatively small doses.
    4. Carcases of animals containing this drug can cause death of animals ingesting the carcase (such as goannas).

To achieve highly concentrated solutions of pentabarbitone sodium, the solutions are made quite caustic, which makes them very damaging to tissues. These solutions can cause severe pain and tissue necrosis (death) if injected by inappropriate routes, or by accidental injection into tissues. Even by the intravenous route, some conscious animals (particularly reptiles) demonstrate significant pain responses upon injection of the drug. Almost invariably now, at our wildlife hospital we anaesthetise patients prior to injection of veterinary euthanasia solutions.

If anaesthesia is not available, then the following routes are recommended to cause minimal pain and distress on injection:

- Intravenous (into a vein)
- Intraperitoneal (diluted at least 50%) (into the abdominal cavity)
- Intrahepatic (diluted 50% and injected slowly) (into the liver)

Intracardiac injection is not desirable in conscious animals.

Injection of euthanasia solutions into conscious reptiles by any route may cause pain and should be avoided if anaesthesia is not possible. Cranial trauma is a more rapid and humane method of euthanasia in these cases.

More in-depth guidelines on the euthanasia of wildlife using veterinary euthanasia solutions are available by application to the Management Committee of Wildcare Australia. These guidelines will only be supplied to registered wildlife rescue organizations demonstrating close supervision and liaison with a registered veterinarian.

2. Chloroform: this is a volatile chemical compound that induces anaesthesia and death at high concentrations. It is useful for euthanasia of small birds, mammals and possibly some reptiles. It is generally used by placing a cotton ball soaked in chloroform into a small airtight container with the animal. Death generally occurs in 5-10 minutes if adequate amounts are used. The advantages of chloroform are that is a cheap and a non-invasive method, which requires minimal or no restraint. The disadvantages are that it cannot be used on large animals, and it is irritant to the respiratory tract, and therefore may cause some distress in animals forced to breath the vapour. Remember that reptiles can hold their breath for prolonged periods of time and will do this to avoid breathing noxious vapours. The most common causes of failure of this technique are failure to use adequate amounts for the space of the container, and failure to maintain the airtight environment for long enough. In reptiles it may be necessary to keep the animals enclosed with the chloroform vapour for a few hours.

3. Carbon monoxide: this is the major toxic principle of motor vehicle exhaust fumes. It causes death by attaching strongly to the haemoglobin molecule in blood that carries oxygen, and thereby starves the tissues of oxygen. Carbon monoxide intoxication is a humane way of euthanasia as it induces a state of sleep initially. Most techniques involve placing the patient into an airtight bag, evacuating all of the air within it, then filling the bag with exhaust fumes from a car. Caution must be taken to ensure that the exhaust fumes are not too hot or smoky, which may result in pain or distress. The technique is most effective in birds and should result in death within minutes.

A note on use of concentrated potassium chloride:

The use of concentrated potassium chloride solutions for euthanasia IS NOT humane unless the animal is deeply anaesthetised. It causes severe muscle spasm and cardiac arrest. Its principal benefit is reducing the toxicity of a carcase (such as a large kangaroo) which may have to be left at the site of euthanasia. Carcases of animals euthanized with veterinary euthanasia solutions do present a potential hazard for scavengers.

TRAUMA AS A METHOD OF EUTHANASIA

Although requiring some mental fortitude and being somewhat unaesthetic, cranial trauma is the most humane method of euthanasia that is available to wildlife rehabilitators *if performed appropriately.* Every wildlife rehabilitator worth their salt is going to have to do it at some stage – so learn how to do it well.

All methods of euthanasia using trauma should aim to cause destruction of, or damage to the brain sufficient to induce immediate loss of consciousness, followed shortly afterwards (and before return of consciousness) by death. Any techniques that do not fulfill these requirements are not acceptable methods of euthanasia, except in extreme circumstances. Remember: all methods of euthanasia should reduce the suffering or distress of an animal – not add to it.

Anatomical considerations:

It is desirable to have some understanding of the anatomical location and size of the brain in species which may be candidates for euthanasia by trauma. In most species, the brain occupies a relatively small proportion of the total head size, and any technique must aim to ensure that the brain is the target of the trauma, not the muzzle, eyes or beak, for example. Particularly in reptiles, the brain is very small relative to the size of the head, and well protected in the braincase and by surrounding tissues, particularly the muscles. In small animals and reptiles it is essential to totally destroy the head to ensure that the brain is destroyed. Decapitation alone IS NOT desirable in any species, particularly reptiles. Refer to Appendix 2 showing the relative sizes and positions of the brain in various taxonomic groups.

It is preferable that traumatic methods of euthanasia NOT be performed in the presence of members of the public or with an audience. Many people find such methods deeply disturbing and it does not present a professional front to the public, even if it is necessary occasionally.

The following trauma techniques can be humanely used to perform euthanasia:

1. **Shooting**: this is only really appropriate for large macropods, and in situations in which there is a clear and safe line of sight to the brain. Occasionally it may be used for small mammals (such as flying foxes) or birds in cases in which there is no other access to the animal, for example: animals caught up in wires or fishing line high in a tree. A firearms licence is required to keep and use a firearm, and it is advisable to contact the local police before discharging firearms. The brain occupies the portion of the head between the eyes and the base of the ears. An appropriate projectile should be used to destroy that portion of the head. The gun must be sighted in perfectly prior to taking the shot – accuracy is paramount in ensuring the brain is destroyed. For animals that are inaccessible (such as high in a tree) a pair of binoculars is useful the check that the job has been done properly. Needless to say, guns are dangerous and should only be used by very experienced and responsible persons.

2. **Clubbing**: it is preferable to use a heavy steel bar, hammer or similar, and ensure that your aim is perfect. The animal should be immobile or adequately restrained to ensure your accuracy. Remember: the only acceptable outcome of this technique is immediate loss of consciousness, and destruction of the brain.

3. **Flicking**: this technique is only suitable for smaller mammals and birds, and involves grasping the animal by the hind limbs and/or tail (with its front or belly facing you), and rapidly flicking its head down onto a hard object such as concrete or the edge of a brick. If effective, the skull should sustain multiple fractures and the brain destroyed or badly damaged. It is not a reliable technique for reptiles because their brain is small and very well protected by the soft tissues and bones of the skull.

DO NOT ATTEMPT ANY TRAUMATIC EUTHANASIA TECHNIQUES HALF-HEARTEDLY. Perform them only if you are confident that you can perform them effectively and humanely.

What to expect with trauma as a euthanasia technique:

If performed effectively, trauma should result in immediate loss of consciousness. This is determined by loss of coordinated movement and loss of the palpebral and corneal reflexes (shutting the eye when it is touched). It is usual for there to be some reflex movement such as kicking with the hind legs (in mammals) or flapping of the wings in birds. This should not persist for more than 1 minute. If the euthanasia has been successful, then breathing should stop virtually immediately, and the heart should stop within minutes.

Traumatic methods of euthanasia are generally not something that you can get used to or feel at ease with. If you are, then you should probably not be a carer. Unfortunately, they are necessary on occasion.

Confirmation of death in animals subjected to euthanasia techniques:

In animals subjected to euthanasia techniques, particularly chemical methods, death must be confirmed definitively before disposal of the carcase. When trauma is used as a method of euthanasia, and destruction of the brain has been achieved, then this is sufficient. In all other cases, however, observation of cardiac arrest must be observed for at least 1 minute in mammals and longer in reptiles. Lack of blink (corneal) reflex is not sufficient confirmation of death.

Disposal of carcases following euthanasia:

Carcases that have been injected with intramuscular anaesthetics, such as Zoletil, and then subsequently euthanized with veterinary euthanasia solutions by any route, pose a health hazard to animals that may scavenge the carcase. It is therefore important that carcases of animals subject to euthanasia using pharmacological methods are disposed of by being wrapped in plastic and buried at a depth of 600mm or more, or alternatively, incinerated. Carcases of animals subjected to euthanasia using trauma, carbon monoxide, carbon dioxide or chloroform inhalation pose little threat to scavengers, and can be disposed of in appropriate areas of bushland.

SUMMARY:

1. The keys to humane management of critically ill patients are: thorough examination; appropriate pain relief; close monitoring; and timely euthanasia when required.

2. Euthanasia is an important and compassionate technique in the management of wildlife with severe trauma and disease.

3. Euthanasia is a technique that is COMMONLY indicated, and is far preferable to allowing an animal to die from traumatic injuries, disease or inadequate care.

4. Animals requiring euthanasia, or that have severe trauma or disease that may warrant euthanasia are VETERINARY EMERGENCIES, that ethically and legally must be dealt with appropriately and promptly.

5. The species coordinators have been trained in euthanasia techniques and should be consulted by rehabilitators requiring assistance with patients. Alternatively veterinary assistance may be sought as appropriate.

6. Euthanasia techniques such as trauma and chloroform intoxication may be performed by rehabilitators adequately trained in these techniques.

7. Drowning, hypothermia and other methods that cause significant pain, distress or discomfort to animals must NEVER be used as euthanasia techniques.

Appendix One

Guidelines on applying to state health authorities for permission to keep and use restricted drugs (S4)

Possession and use of a limited number of veterinary drugs by experienced and responsible wildlife carers can significantly improve animal welfare standards within a wildlife rescue organization.

Whilst all states have provision in their drugs and poisons legislation for approval of non veterinarians to use some restricted drugs, only some states currently license wildlife carers. Those states (Qld, NT), have strict guidelines for the training and licensing of wildlife carers.

Queensland:

The Environmental Health Unit of Queensland Health has issued appropriately trained wildlife carers in two organisations with authority to hold and use a small selection of restricted (S4) veterinary drugs including:

Pentabarbitone sodium (Valabarb, Lethabarb): a veterinary euthanasiate
Alfaxalone and Zoletil: anaesthetics
Diazepam (Pamlin): a sedative
Meloxicam: an antiinflammatory pain reliever.

Northern Territory

Similar process to Queensland: licences have been issued to appropriately trained and responsible wildlife carers.

Contact: Helgi Stone
Chief Poisons Officer
Poisons Control
Dept of Health and Community Services

Western Australia

Poisons Act 1964: has some provision for licensing non-veterinarians on a case by case basis. At present, no independent wildlife carers licensed to hold or use restricted drugs.

South Australia

In SA the Controlled Substances (Poisons) Regulations 1996 provides a mechanism for application for a licence to possess an S4 drug. These applications are forwarded to:

Poisons Licensing
Environmental Health Services
Dept of Health
PO Box 6, Rundle Mall, Adelaide 5000

Victoria

The Victorian Drugs, Poisons and Controlled Substances Act 1981 and its regulations does make provision for non-veterinary persons to hold and use restricted drugs, but there appears to have been no recent or current approvals given for wildlife carers or care groups.

Information can be obtained from the website: http://www.health.vic.gov.au/dpu/health.htm

or by calling the Victorian Health Department or by writing to:

Manager, Drugs And Poisons
Department Of Human Services
G.P.O. Box 1670N
Melbourne 3001

New South Wales

Appears not to have issued any approvals for wildlife carers to hold or use S4 drugs, although the Director General of NSW Health Department can give authority.

ACT

Poisons Act does make provision for Chief Health Officer to issue approvals, but, to date, no approvals have been issued to wildlife carers. New legislation is pending which may clarify the process.

Tasmania

Similar to ACT: no approvals currently issued to wildlife carers, but legislation provides a mechanism in theory for approvals to be issued.

Appendix Two
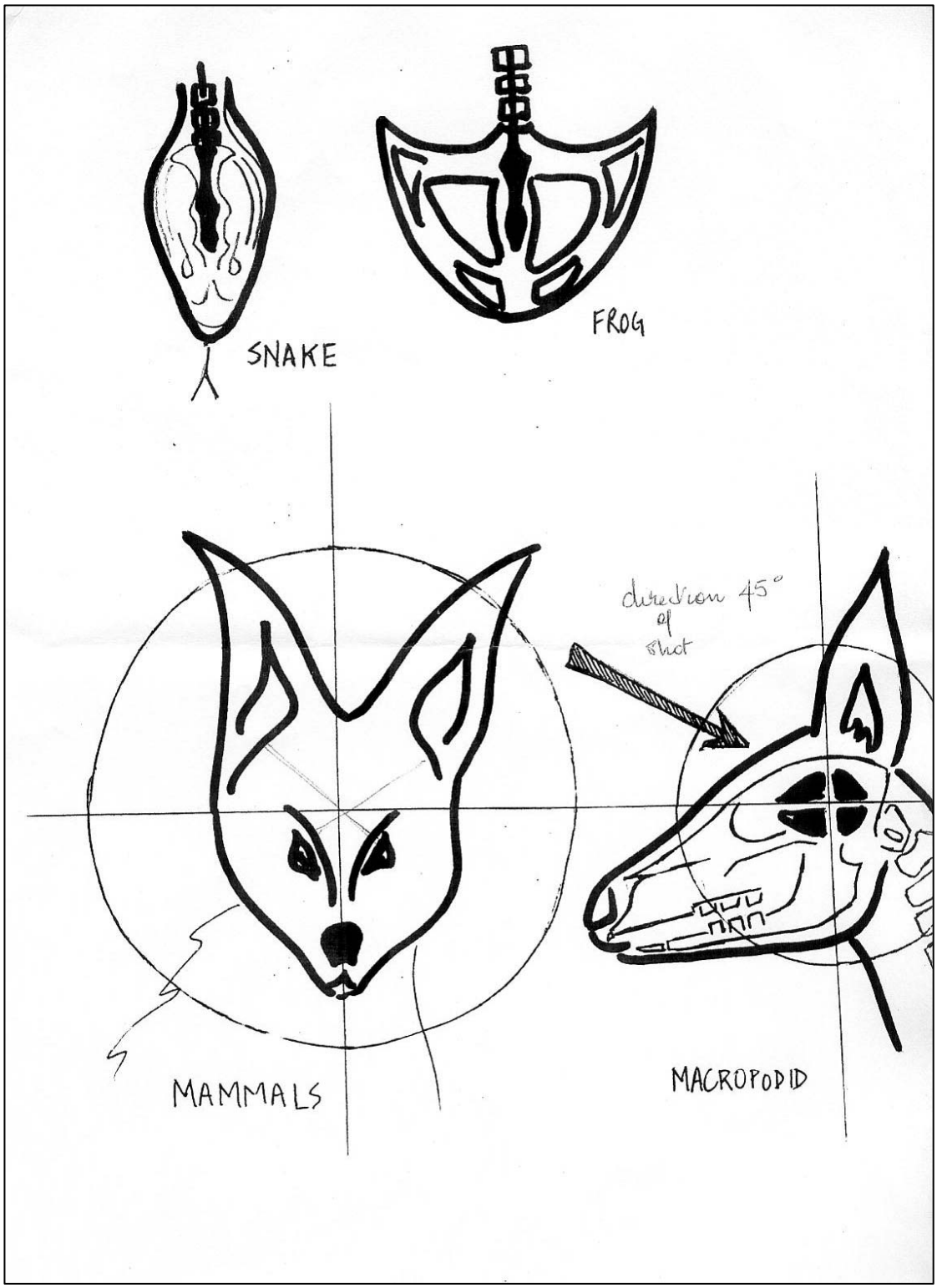
Diagram showing relative sizes and position of the brain in various taxonomic groups.