

Code of Practice

Wildlife management

Taking, handling and transportation of crocodiles

Code of Practice for the Taking, handling and transportation of crocodiles

Nature Conservation Act 1992



The State of Queensland, Department of Environment and Science, 2008.

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Approved in accordance with section 174A of the *Nature Conservation Act 1992*.

1. Introduction

During and after capture, crocodiles are often severely stressed and are easily killed or injured by inappropriate handling. This is particularly true of large crocodiles.

The following guidelines, based on collective experience from Queensland and the Northern Territory, are specified in order to minimise the likelihood of injuring crocodiles during and after capture.

Purpose

The purpose of this code of practice is to provide guidance on the safe taking, handling and transportation of crocodiles, to ensure that the likelihood for escape of, injury or illness to the crocodile is minimised.

2. Taking

Crocodiles in the wild can only be captured/taken by Department of Environment and Science (DES) officers or by people with skills and training in crocodile capture and handling techniques who are authorised to undertake the activity under a permit or authority issued by DES.

In considering the best capture methods, it must be recognised that:

- crocodiles usually struggle before they can be restrained;
- metabolism during struggling is anaerobic and acidosis (an increase in lactate and hydrogen ion concentrations in the blood causing an acid base disturbance) can result;
- where live capture is undertaken, crocodiles need to breathe freely and deeply after capture to flush out carbon dioxide and recover from acidosis;
- restraining methods and anaesthetics or immobilising agents, if used, must not impair breathing, especially with large crocodiles (>4.5m); and
- minimising damage to the skin is often a key priority (skin damage is also often a good indicator of poor handling).

There are four main periods where stress is most likely to occur: the capture itself; retention in a capture device; handling; and transportation. Capture methods can be divided into 'direct' (where a person actively captures a crocodile, for example through harpooning) and 'indirect' (where a person is not present when a crocodile is captured, for example through trapping) methods.

A permit or authority holder must, as soon as is practicable, notify the nearest Conservation Officer of the capture of a problem crocodile taken under the provisions of the *Nature Conservation (Estuarine Crocodiles) Conservation Plan 2007* ('estuarine crocodile conservation plan').

3. Trapping

All traps and other equipment used for trapping crocodiles must be in sound working order and be free of sharp or abrasive components, which could injure a trapped animal. This equipment must not be used in situations that could cause injuries or unnecessary trauma to crocodiles. For example, a mesh trap must not be set below the high tide level and a floating trap must not be left exposed at low tide. Measures must also be taken to ensure trapped crocodiles do not overheat or dehydrate while they remain in the trap.

Capture devices must be checked regularly (daily wherever possible) and the crocodiles removed promptly. Where delays are unavoidable, or to minimise the risk of injury to crocodiles (through struggling) and people, when removing crocodiles from traps or other equipment, veterinary advice may be sought and immobilising agents may be used.

Specific authorisation under the provisions of the *Nature Conservation Act 1992* must be obtained if it is proposed to use 'protected wildlife' as bait for crocodile capture purposes. The use of any live animal as bait is prohibited.

4. Harpooning

Harpooning is a quick, efficient method of capturing targeted crocodiles, which reduces the period of struggling (and therefore stress).

So as not to damage muscle and other underlying body tissues, all harpoons must be designed and built to ensure that the harpoon barbs penetrate no deeper than just below the skin of a crocodile (barbs must be no longer than 2.5-3cm to prevent unnecessary penetration).

Where possible, a harpoon should be placed in the neck area of a crocodile. The skin on the neck does not contain osteoderms and therefore the harpoon head is less likely to be deflected. The neck is very muscular and is usually the area exposed when the animal is in the water and is therefore the preferred target.

The time of struggling must be reduced to a minimum to reduce stress, and the crocodile must be restrained as soon as practical after the initial capture effort.

The harpooning of crocodiles greater than 3.5m long is not recommended.

5. Snares

The use of snares is an effective technique in the capture of crocodiles and has historical applications both in Australia and internationally.

The snare should be designed so as to restrain the top jaw of the crocodile and must be adequately tethered to prevent the animals escape. The snare requires a self locking mechanism to secure the jaw effectively and is best constructed of stainless steel wire cable. The cable may be plastic coated to reduce superficial trauma to the crocodile during snaring.

Operational snares must be supervised to ensure the crocodile is recovered and restrained as soon after capture as possible to reduce struggling, risk of stress and exposure to potential conspecific aggression.

6. Netting

Crocodiles inhabiting small waterholes or creeks/streams may be captured by nets. Nets used for this purpose are of nylon cord construction, usually with a mesh size of 50 to 60mm across the diamond.

Seine nets are used as tangle nets, are usually set in one location and must be monitored intensively for signs (float movement) that a crocodile has become entangled. Nets must be monitored constantly and never left alone for any period of time. Nets set in one location must be checked regularly by lifting the lead line to the surface, exposing the entire drop of the net. This allows non-target species to be quickly removed and returned to the water.

Drag nets can also be used to target the capture of a specific crocodile in water holes or small impoundments. The dragging of nets may expose the operator to potential interaction with the crocodile and must only be implemented if infrastructure exists to eliminate this risk.

7. Restraint

Attempting to restrain large crocodiles by tying ropes at multiple points on the body is rarely effective and can lead to severe injuries if the animal struggles.

The most effective method for holding an animal for any length of time is for it to be unrestrained within a specially designed crocodile transport box or floating trap. If this cannot be organised, the animal should be restrained by fixing two top jaw ropes behind the large eye-teeth of the top jaw, the jaws should be tied and/or taped together and the top jaw ropes tied to a swivel on a fixed rope between two stationary anchor points. This allows the animal to move around freely within a defined area. The animal must always be tethered in the shade. The limbs should remain free (see *Limb restraint* below). Experienced DES staff can provide advice on suitable tying techniques.

Great care must be taken to ensure that crocodiles are not exposed to direct sunlight for any length of time. Direct sunlight can kill within hours through overheating. Crocodiles held out of water for more than a day or two must be covered with sacks and watered regularly to prevent sunburn which causes cracking and bleeding between the scales.

Care must be taken to ensure the crocodile is not attacked by ants or that moist parts of the body, like eyes and nostrils, or open wounds, do not get fly-blown.

The condition of restrained animals must be monitored regularly.

8. Limb restraint

As soon as the jaws are secured, the eyes must be covered with a wet sack (hessian bag) to reduce visual stimulation, if any additional tying is to be carried out.

If it is essential to restrain the limbs temporarily (to prevent struggling), use only wide webbing or tape (5-10cm wide), tied loosely so as not to restrict the blood circulation.

Do not restrain the limbs of crocodiles for longer than two hours. This procedure invariably causes oedema (fluid accumulation) in the feet and can cause severe tissue damage or loss of limbs.

9. Rolling or pulling crocodiles

Lack of care when rolling large crocodiles or lifting them in rope traps can cause dislocation or breakage of limbs.

If it is necessary to roll or drag a crocodile for any reason, then ensure the limbs are tucked in parallel to the body and held in place. It is best to drag crocodiles using the top-jaw ropes used to restrain the jaws. If dragging male crocodiles, it is essential to ensure the penis is not extruded, as dragging can cause trauma to this organ.

Do not use the limbs as levers or vantage points under any circumstances.

10. Cloacal prolapse

The cloaca of crocodiles, where the reproductive and excretory organs are found, is a delicate and weakly muscled sac. If large crocodiles are lifted or transported without supporting the cloaca, it is possible to cause collapse of these muscles and severe injury or death.

If lifting large crocodiles inside or outside traps it is essential to bind sacking or other support around the base of the tail to prevent cloacal prolapse or trauma to the extruded penis. However, it is critical that any binding used to minimise cloacal prolapse is removed as soon as practicable to allow the animal to urinate and defecate normally.

11. Use of drugs

Drugs such as Pavulon and Valium have some value in crocodile handling, but can be dangerous in inexperienced hands. All crocodiles can be handled safely and effectively without drugs. Use of some drugs on large crocodiles (more than 3m) under stress can cause acidosis and death.

Drugs must not be used except under the supervision of an experienced person or qualified veterinary practitioner.

Pavulon or other agents with a respiratory depressant effect must not be used on harpooned crocodiles during or for several hours after capture.

Valium is an effective agent for calming very large crocodiles in traps during removal operations. Its effect is short-lived, typically lasting 2-3 hours. As with many drugs, giving repeated 'top-up' doses can be dangerous.

Complete recovery from the effects of drugs must be confirmed before crocodiles are released to the wild or captive environments with bodies of water. A crocodile compromised by the effects of drugs can potentially submerge in water and drown.

12. Dehydration

Contrary to popular belief, large crocodiles will not dehydrate rapidly if left in shade out of the water for a period of days. Nonetheless, captive animals must be wet regularly and given water to drink.

Crocodiles do not drink sea water, but do drink fresh water.

13. Transport

The method of transport used for live crocodiles will generally be determined by the size of crocodile(s) involved. Care must always be taken to avoid the effects of exposure, including dehydration, overheating (>35°C), excessive cooling (<20°C) and struggling, and to minimise transport time.

Smooth interiors for containers and padding around the snout of the crocodile can minimise snout damage, and are recommended. When transporting crocodiles, it is essential to have full support under the head, body and tail base to avoid damage to essential organs.

A simple restraining board with webbing straps is effective for crocodiles up to 3m long for short-term transport under supervision. Transporting crocodiles short-term within the confines of a floating mesh trap is often an effective means of reducing handling and stress on wild caught crocodiles, however, due regard must be given to potential exposure and/or cloacal prolapse. Crocodiles may also be transported in a vehicle or vessel for short distances if adequately restrained. A solid ventilated box is necessary for long-distance transport or unsupervised cartage. Recommended designs for boards and boxes are available from DES regional and local offices.

Ensure that the head is not lower than the body during transport so that any regurgitated fluids can flow back down the oesophagus rather than pool at the opening of the glottis. If the mouth of a crocodile is tied closed, a stick or block must be placed between the teeth to hold the mouth slightly ajar. This will minimise the risk of drowning the animal if it vomits under restraint. Where possible, crocodiles should not be fed for at least three days prior to transport to minimise risks.

Where possible, boxes should have smooth material that will limit frictional damage to the skin and claws when the animal moves or struggles. Crocodiles must be regularly doused with water during transport.

Despite their size, crocodiles are delicate animals and are easily killed by pounding on hard surfaces during boat or truck transportation. Transport overland across unmade roads must be avoided wherever possible. Suitable cushioning must be used to minimise vibration and shocks where these are unavoidable.

Where possible, crocodiles should not be subjected to large public gatherings and display during transport or handling operations. Visual stimulation should be reduced by covering the eyes or keeping the crocodile in a dark container. Captured animals are already in a stressed condition and noise and handling must be kept to a minimum.

If excessive struggling has not occurred, chemical immobilisation with drugs can be considered where necessary. In the specific case where immobilising drugs have been administered to large (>4.5m) crocodiles after prolonged periods of struggling, artificial ventilation of the lungs is sometimes undertaken to enhance the removal of carbon dioxide, and bring about quicker recovery from the effects of capture.

As the effects of capture stress may persist for many days, animals must be closely monitored for the first few days after release.

14. Euthanasia

In certain circumstances, such as when a crocodile has attacked a person, it may be necessary to euthanise the animal. Crocodiles in the wild may only be euthanised by DES officers or by a 'prescribed officer'¹ authorised to undertake the activity under a crocodile management authority issued by DES. Euthanasia must only be undertaken by trained and experienced personnel.

Crocodiles can be euthanised by shooting, spinal severance or administration of appropriate drugs by a veterinarian or other qualified person. It is important to use the most humane method of killing so the animal is killed instantly or instantaneously rendered insensible to pain until death supervenes. Care must be taken regarding the type of euthanasia chosen should the meat be required for pet or human consumption.

Crocodiles of any size may be shot by rifle through the back or side of the cranial platform, or between the eyes. The use of a captive bolt is considered an acceptable method of euthanasia with reservations. These reservations are based on equipment being fully functional and personnel that are trained and skilled in the procedure to ensure operator safety and animal welfare. Anatomic references for targeting rifle shot or captive bolt gun should be consulted when using these methods.

Shooting: Large or small crocodiles

Free range –

- Minimum .30 + calibre 150gn
- 12 Gauge Shotgun with Sg or SSG ammunition at very close range.

Captive or restrained –

- up to 2m long – '22 shorts with solid projectiles (low velocity),
- 2-3m long – '22 long rifle or '22 magnum with solid projectiles,
- 3m or longer – only high velocity centre-fire rounds.

Nape-stab: Under 2m long

Crocodiles that are firmly secured can be killed rapidly and humanely with a hard hammer-blow to a sharp metal chisel positioned between the skull and the first cervical vertebra, just behind the cranial platform. This severs the spine and shocks the brain (thus stunning the animal).

¹ **Prescribed officer** means a police officer, public service officer or an inspector under the *Fisheries Act 1994* (refer *Nature Conservation (Estuarine Crocodile) Conservation Plan 2007*).

The brain must then be destroyed by 'pithing' (insertion of a rod into the brain) as soon as possible. Due to the physiology and neural organisation of crocodiles, some reflex activity may be evident after killing – this is not indicative of inhumane or improper methods of killing.

Pentobarbitone sodium injection: Under 1.5m – The “two stage” technique

- Stage 1 – a pre-euthanasia tranquilisation, heavy sedation or anaesthetic is administered either intravenously or intramuscularly,
- Stage 2 – intravenous, intracardiac, or intraperitoneal injection of euthanasia solution should be administered.

15. Relevant legislation

Nature Conservation Act 1992

Nature Conservation (Administration) Regulation 2017

Nature Conservation (Wildlife Management) Regulation 2006

Nature Conservation (Estuarine Crocodile) Conservation Plan 2007

Animal Care and Protection Act 2001

16. Definitions

Problem crocodile

- (1) An estuarine crocodile in the wild is a **problem crocodile** if the chief executive considers the crocodile is, or is likely to become, a danger to humans.
- (2) Also, an estuarine crocodile in the wild is a **problem crocodile** if—
 - (a) the crocodile has passed over, through or under a crocodile prevention barrier on land, other than land in a protected area, on which aquaculture fisheries resources, stock or a working dog normally live; and
 - (b) the chief executive considers the crocodile is, or is likely to become, a danger to the resources, stock or dog.
- (3) Without limiting subsection (1), the chief executive may consider an estuarine crocodile is, or is likely to become, a danger to humans if—
 - (a) the crocodile has attacked, is about to attack, or is behaving aggressively towards, a person; or
 - (b) the chief executive reasonably believes the nature of the crocodile's location or behaviour makes the crocodile a threat, or a potential threat, to the safety or wellbeing of humans.

Example for paragraph (b)—

An estuarine crocodile is in an urban area, or a public area commonly used by persons for recreation and in which estuarine crocodiles do not normally live, and has been in the area for an extended period or is frequently in the area.

- (4) Without limiting subsection (2)(b), the chief executive may consider an estuarine crocodile is, or is likely to become, a danger to aquaculture fisheries resources, stock or a working dog if the crocodile has attacked, is about to attack, or is behaving aggressively towards, the resources, stock or dog.
- (5) In this section—

crocodile prevention barrier means a barrier that is reasonably likely to prevent crocodiles from passing over, through or under it.

Taking

In relation to an animal, includes hunting, shooting, wounding, killing, skinning, poisoning, netting, snaring, spearing, trapping, catching, dredging for, bringing ashore or aboard a boat, pursuing, luring, injuring or harming the animal or attempting to do any of these things.

Other terms are defined in the *Nature Conservation Act 1992* and Regulations and *Nature Conservation (Estuarine Crocodile) Conservation Plan 2007*.

17. Specialist references

Code of practice – *Crocodile farming*

Guideline – *Allocation of crocodiles of concern to farms or zoos*

Guideline – *Classification and removal of crocodiles of concern*

Management program for *Crocodylus porosus* in Queensland 2007 - 2017

Draft Code of practice on the humane treatment of captive and wild Australian crocodiles (available from the Department of the Environment, Water, Heritage and the Arts website: www.environment.gov.au)

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