

Husbandry Guidelines
For
MASKED OWL
Tyto novaehollandiae
(Aves: Tytonidae)



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Disclaimer

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OCCUPATIONAL HEALTH AND SAFETY RISKS

Whilst doing any cleaning or maintenance of enclosure owls can become unsettled and fly or swoop directly at keepers or into objects in enclosure. It is important to always know where in enclosure the animal is and to work quickly so as not to cause any undue stress to birds by your presence.

Personal protective equipment (PPE) should be worn when cleaning owl enclosures this reduces chance of injury and transmission of zoonotic disease. Recommended PPE includes:

- boots
- long sleeve shirt
- disposable gloves
- eye protection
- dust mask

After any cleaning, maintenance of enclosure, capture and restraint or feeding it is important for keepers to practice good hygiene. Ensure hands are washed before and after performing the above tasks, this prevents transfer of germs and zoonotic disease.

TALONS:

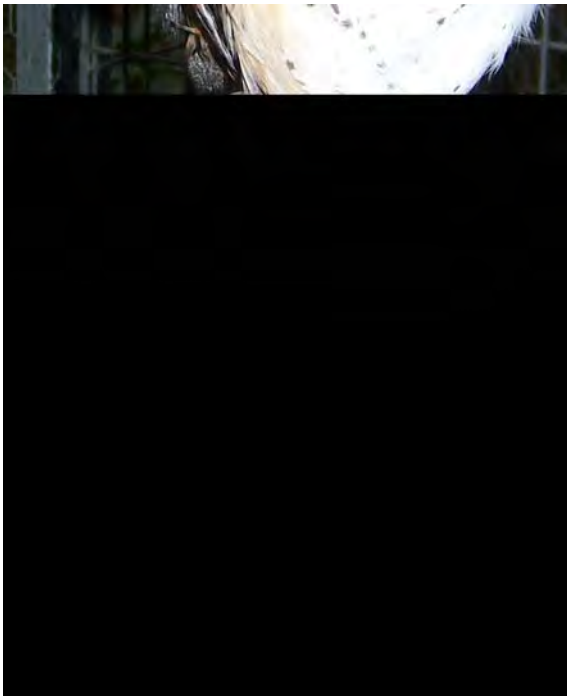


Figure 1 talons of a Masked Owl.

Talons of the Masked Owl can cause light scratches or scratches that break the skin of the handler. Scratches from talons will normally occur on hands and forearms when physically restraining or capturing owl. When capturing and restraining birds of prey it is recommended to use proper PPE such as garden gloves or welding gloves. Long sleeved shirts can protect the forearms. Wearing a hat and safety glasses or eye protection can prevent injury to keepers face, as often when trying to capture birds of prey, in flight they may fly directly/swoop at keepers head or face. If a keeper receives scratches from talons proper first aid practices and good hygiene is of importance to prevent infection.

BEAK:

If using proper restraint techniques discussed in section 7, injuries from beak will not occur. It is mostly during hand feeding that the beak may cause any form of damage to keeper. Hatchling being hand raised can get excited at feed times and may mistake finger as a piece of food and may nibble or latch on to finger which can be uncomfortable, but rarely breaks the skin of finger. Tweezers or curved forceps can be used to place food into beak.

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1 Introduction

Owls make up the order Strigiformes and are divided into two distinct families; Strigidae also known as “typical” owls includes about 167 species world wide. Masked Owls are part of the family Tytonidae which includes about 14 species. (Laurie J. Gage)

Masked Owls are the largest of all *Tyto* owls.

The Australian Masked Owl is a secretive, relatively silent and strictly nocturnal species. They usually keep to heavier forested Eucalypt country and are rarely found more than 300km inland from the coast. (Readers Digest) .Masked Owls are territorial and remain in the same area all their lives .They roost in big hollows in trees, crevices in cliffs and caves.

Masked Owls hunt in the same way as Barn Owls, quartering forest country and clearings low on the wing or listening from low perches, sometimes even standing motionless on the ground. They mainly prey on small terrestrial mammals, possums and medium sized birds.

Masked Owls are known to mate permanently. They may breed at any time of the year depending on seasonal variance and abundance of prey. 2-3 eggs are laid and incubated for 35 days, only the female will incubate the eggs she is fed in the nest by the male each night.

The population of the Australian Masked Owl on the main land is declining and several states have placed this species on the species conservation list.

A significant threat to the Masked Owl is the ongoing loss of old growth Eucalypt forest, nesting habitat, from commercial timber harvesting , land clearance, tree felling for firewood and natural attrition of old growth trees deaths from collisions with vehicles , fences or power poles and electrocution on powerlines may also be a significant source of mortality for this species.

2 Taxonomy

2.1 Nomenclature

Class: Aves

Order: Strigiformes

Family: Tytonidae

Genus: *Tyto*

Species: *novaehollandiae*

(Stephens, 1826)

2.2 Subspecies

Six subspecies are thought to exist although some may warrant species status.

T.n. calabyi (New Guinea)

T.n. kimberli (northern Australia)

T.n. melvillensis (Melville Island, Northern Territory)

T.n. castenops (Tasmanian Masked Owl)

T.n. galei (Far north Queensland)

T.n. novaehollandiae (southern Australia, from Western Australia to Queensland)

There is a possibility that the western Australian population may also be a distinct subspecies. (http://bird.net.au/bird/index.php?title:Masked_owl)

2.3 Recent Synonyms

Mouse Owl was the name given to this species by Latham in 1821.

(http://en.wikipedia.org/wiki/Tyto_novaehollandiae)

There have been no changes to the binomial name of the Masked Owl *Tyto novaehollandiae* since it was described by James Francis Stephens in 1826.

2.4 Other Common Names

- Australian Masked Owl
- Mouse owl (wikipedia)
- Maw Faced Owl
- Cave Owl
- Chestnut-Faced Owl.(Readers Digest)

3 Natural History

The original description of *Tyto novaehollandiae* was by James Francis Stephens in 1826. Published in General Systematic Natural History by George Kearsley Shaw chapter 13 part 2 page 61. Stephens description reads:

“LENGTH about seventeen inches : beak white : face reddish-buff : from the chin a chocolate mark, surrounding the margin of both the face circles, and finishing at the hind head; before the eye dusky black : plumage above dark ash-colour, speckled with grey, dashed with white; this appearance arising from each feather having a darker spot at the end, and within this triangular white mark : the inner webs of the feathers rusty yellow : quills and tail clouded, the latter crossed with five or six bands of black, margined above and below with white : under parts of the body and under wing- coverts pale buff, with a dull dusky spot at the end of each feather : outer quill greatly serrated, the second less so, the edges of the others smooth : legs feathered to the toes, the latter hairy : claws black. Inhabits New Holland.”

3.1 Morphometrics

The masked Owl exists in three basic phases in plumage, (1) dark tawny, with dusky back toned tawny and faintly spotted white, rich ochreish face and ventral surface; (2) intermediate, with dusky back toned pale tawny and coarsely spotted white, whitish face and ventral surface; (3) white, with grey-white back coarsely speckled grey and white, white face and ventral surface. (Readers Digest)

3.1.1 Mass and Basic Body Measurements

Length:

Male: 35-40cm

Females: 40-50cm

Weight: average 660 grams

Tasmanian Masked Owls are the largest of all Masked Owls.

Length:

Male: 35-40cm

Female: 43-57cm

Weight: up to 1260 grams

Wingspan: up to 129cm

3.1.2 Sexual Dimorphism

Females are slightly larger and darker in colour than males. Males have much smaller talons.

3.1.3 Distinguishing Features

The masked owl is similar to the barn owl *Tyto alba* but is generally larger and darker. The facial disc is white and has short brown feathers around dark brown or black eyes forming a heart shape outline. The masked owl exists in several colour forms there is wide variation in plumage. The palest have a white face with a brown patch around each eye, the darkest have a chestnut face. Underparts can be grey to dark brown with buff to rufous mottling and fine pale spots or under parts can be white to rufous brown with variable dark spotting. The wings and tail are well barred. Legs are fully feathered down to the toes and the feet are large and powerful.



Figure 2 dark morph showing heart shaped face

3.2 Distribution and Habitat

The Australian Masked Owl is a barn owl of Southern New Guinea and non-desert areas of Australia.

Masked Owl habitat varies to some extent across its geographic range and in response to vegetation communities, vegetation structure and landscape. They are found across a range of habitats from wet sclerophyll forests, dry sclerophyll forest, non eucalypt dominant forest, scrub and cleared land with remnant old growth trees. there are however several aspects of habitat preference which appear to be in common: Masked Owls require large hollows in old growth eucalypts for nesting; it often favours areas with dense understorey or ecotone comprising dense and sparse ground cover. They are often recorded foraging within 100-300m of the boundary of two vegetation types. Areas near

gullies and along watercourses are frequently used possibly because these habitats provide a greater diversity of prey species.

(http://bird.net.au/bird/index.php?title:Masked_owl)

Australian Masked Owls live in dry eucalypt forests and woodlands from sea level to 1100 meters. Distribution extends from the coast where it is most common to the western plains. Overall sightings fall within approximately 90% of New South Wales. Pairs have a large home range of 500 to 1000 hectares; they are territorial and remain within the same area all their lives. In Australia they are rarely found more than 300km inland.

(http://en.wikipedia.org/wiki/Tyto_novaehollandiae)



Figure 3 Distribution of *Tyto novaehollandiae*

3.3 Conservation Status

The mainland population is declining and several states have placed the masked owl on the species conservation status list: Least Concern

3.3.1 Conservation status

Federal - Vulnerable
NSW - Vulnerable
NT - Near threatened
QLD - Vulnerable
SA - Endangered
TAS - Endangered

VIC - Endangered
WA - Secure

3.4 Longevity

Deaths in the wild are usually a result from not having enough food or falling victim to larger birds of prey or as result of motor vehicle accidents.

3.4.1 In the Wild

The lifespan of the Masked Owl has been estimated at 10 years (Bell 1996), although this is likely to be an underestimate, given the longevity of other owl species.

(www.dse.vic.gov.au)

In Glenys and Derek Lloyd, Birds of Prey book, it states that most owl species live for about 20 years.

3.4.2 In Captivity

In captivity masked owls have a greater life span than prescribed by Bell (Bell.1996)
With some birds known to live past 20 years of age

3.4.3 Techniques Used to Determine Age in Adults

There is no reliable technique for aging the adults. Juvenile and adult masked owls have similar plumage. You could look at feather colour and condition, beak, talon colour and feet as they may turn slightly scaly in older birds, to try and estimate a birds age, although it is best not to judge a birds age by its physical appearance as health factors can affect appearance. Keeping records of individuals hatch date is one way to know its age.

4 Housing Requirements

As directed by the “standards for exhibiting captive raptors in New South Wales exhibited animals protection act” (see appendix 1)

- a) Enclosures shall be constructed of such materials and be maintained in sufficiently good repair to ensure that they will contain the animals at all times and are to be safe for the animals, for the staff attending them and for the public.
- b) Enclosures shall include a covered shelter, enclosed by weatherproof walls which provide roost security and protection from wind, rain and extremes in temperature and sunlight.
- c) Enclosures for raptors shall include a water mist spray or allow the birds access to rain.
- d) Enclosures shall be well drained and have either a readily cleanable substrate or be of a material which can be replaced to avoid the accumulation of faeces, urates, fungi and moulds.
- e) Mesh netting surfaces for raptor enclosures shall preferably be of flexible nylon. Wire mesh shall be flexible to reduce the impact of birds colliding with it. Wire roof surfaces should be as near to horizontal as possible.
- f) The size and shape of enclosures for raptors shall provide freedom of movement, both vertically and horizontally and should not fall below the minimum requirements .
- g) Access to raptor enclosures should be through a double door safety entrance. Doors are to be self-closing and locked upon exiting.

4.1 *Exhibit/Enclosure Design*

The general principle in designing enclosures is to make it as natural as possible without endangering the birds being housed. Access to wind, rain, shelter, sun and fresh air are crucial as is protection from predators and reduction of stress from humans or other fear inducing elements. Ensure the building does not harm the raptor if it flies against wire, into a corner or up to a perch. (Olsen J)

Enclosure should be designed with ease of maintenance and vermin (including rats and mice) control in mind.



Figure 4 masked owl enclosure at Featherdale Wildlife Park

Suitable materials in construction of enclosure

- Flexible nylon mesh netting is suitable for roof of exhibit
- Slated timber or corrugated iron is a suitable building material for uncover area of exhibit
- Suitable size mesh or bird wire may be used on perimeter of exhibit

Unsuitable materials in construction of enclosure.

- Raptors should never be housed behind glass. Adults will fly into glass as an attempt to escape and often die or become permanently paralyzed. (Olsen J)
- Chicken wire can cause physical damage to owl if it was to fly into it.

Wire roof surfaces should be as horizontal as possible. Enclosures should be well drained and have furnishings that are easily cleaned. Substrate should be of a material which can be easily replaced to avoid build up of faeces, fungi and moulds. At Featherdale Wildlife Park substrate in owl enclosures is in the form of old koala branches put through a mulch machine.

Enclosures should include a covered shelter, enclosed by weatherproof walls which will provide roost security and protection from wind rain and sunlight.

Suitable materials for covered shelter and roof

- Bitumex sheets
- Concrete fibre roofs

Plant species for the enclosures.

- Lomandra species
- Mixed grass tussock species
- Eucalypt varieties
- Lilly Pilly species
- Melaleuca species
- Ficus species
- Forest She oaks

And other rainforest or tropical indoor or shade loving plant species

4.2 Holding Area Design

The holding area design can be similar in principle to exhibit/enclosure design but can be much more basic. Size and shape of holding area must allow freedom of movement for the owl. Holding areas should be easily cleaned.

4.3 Spatial Requirements

The minimum size standards for an aviary housing Masked Owls set under the Exhibited Animals Protection Act is;

Width- 3m

Length- 7m

Height - 3m

4.4 Position of Enclosures

Enclosures for housing Masked Owls should not be situated alongside an animal that would predate on the Masked Owl, or next to a species the Masked Owl would consider prey such as a Ring Tailed Possum. Enclosures should be situated in area of less traffic and noise within the park/zoo. Owls prefer living in a darker environment; enclosure should face south to avoid north sun directly in enclosure.

4.5 Weather Protection

Enclosures shall include a covered shelter, enclosed by waterproof walls which provide roost security and protection from wind, rain, and extremes in temperature and sunlight (Exhibited Animals Protection Act).



Figure 5 shelter area of enclosure

4.6 Temperature Requirements

Owls can easily overheat, on days of extreme heat provide Masked Owl enclosures with a fine mist spray or place a garden sprinkler on roof.

They require supplemental heat if temperature in their housing falls below 0 Degrees Celsius. (Arent,Lori R)

4.7 Substrate

- Leafy mulch
- Clean sand
- Pea (1cm) gravel

4.8 Nest boxes and/or Bedding Material

- Masked Owls will typically nest in vertical hollows 40-500cm deep. Nest materials may include soil, sawdust, and mulch.
- At Featherdale Wildlife Park they have found that the owls prefer a nest log as deep or deeper than the height of the owls eye level when upright.
- Ensure there are at least as many nest boxes as the number of owls in enclosure.

4.9 Enclosure Furnishings

The total amount of perches should out number the amount of owls in the aviary. Perches should be uncontaminated natural branches and should vary in diameter and should be thicker than the span of the owl's talons. At least one perch should be fixed no less than

two meters from the ground. Tree stumps may be placed in enclosure to act as a perch or as a feeding stump. Perches ledges and tree stumps should be placed so that owls can perch comfortably without their plumage coming into contact with walls or fixtures. A hollow log should be provided and can be fixed in the shelter under cover area of enclosure. Perches should be placed so to encourage owls to make maximum use of flight possibilities in the enclosure. Avoid competition amongst the birds for the highest vantage point by providing a number of perches at that height. Perches should be placed so that owls do not come into contact with birds in adjoining enclosure.

5 General Husbandry

5.1 Hygiene and Cleaning

When doing any cleaning of enclosures keep an eye on the owls ensure your presence is not causing any undue stress to them. Appropriate PPE should be worn when preparing and using chemicals for cleaning. When pouring bleach from containers wear gloves and eye protection do not breathe in harmful fumes. If bleach comes into contact with skin or eyes rinse immediately and thoroughly with clean water.

DAILY	WEEKLY	MONTHLY	YEARLY
Remove left over food (am)	Remove feathers and pellets	Replace feed stumps	Complete clean out and disinfect
Check enclosure for damage	Light rake exhibit substrate	Rake out all substrate scarify dirt replace substrate	Replace substrate Clean nest logs and replace substrate Replace perches Replant or add plant spp to exhibit
Change water	Bleach water bowl	Check condition of nest logs. if needed spray with insecticide and replace nest material	Shelves, nest boxes, and perches made from wood removed and replaced.
Feed (pm)	Bleach feed stump and upturn		

Daily

In the morning,

- Feed left over from the night before should be removed from enclosure. In summertime bacteria, flies and maggots flourish and multiply in leftovers. Left over, torn up pieces of meat and dead animal is something your park visitors will probably not enjoy seeing.
- Hose off feeding stumps/bowls
- Ensure owls have clean fresh water for drinking and bathing.

Weekly

- Lightly rake enclosure substrate, be sure to remove feathers, pellets and any left over food. Remove pile from enclosure.
- For bleaching water bowls and feed stumps Featherdale Wildlife Park uses Eclipse Liquid Chlorine at a dilution of 1 part chlorine to 1 part water. MSDS for Eclipse Liquid Chlorine is include in the appendix.
- Bleach water bowl, pour small amount of diluted bleach into bowl use a long handled scrubbing brush, scrub bowl be careful not to splash any bleach onto yourself or around owl enclosure.
- Bleach feed stump, pour small amount of diluted bleach onto stump scrub using long handle scrubbing brush.

- Hose out water bowl thoroughly using jet nozzle, take nozzle off hose and overfill water bowl. Ensure all bleach has been rinsed from bowl.
- Hose bleach off feed stump thoroughly and turn stump over.

Monthly

- Rake out old substrate and scarify ground
- Put in fresh substrate
- Replace feed stump
- Check condition of nesting log ensure substrate is clean dry and is deep enough for the owl to be comfortable
- This log check is also a good time to check for insect infestation such as mite so if found logs can be cleaned out or sprayed with a non toxic insect spray

Yearly

- **Do not perform yearly clean at times when owls are nesting or rearing young.** Wait until young have fledged and been moved to new enclosure.
- To perform yearly complete clean out and replacing of perches and nest boxes, catch up all owls in enclosure (see section 7 Handling and Transport).this is a good time to do a thorough physical examination of your owls as well as administering any routine treatments that may be due. (See section 8 Health Requirements).place owls in suitable boxes or pet packs leave in a quiet dark area. Work quickly at the enclosure so owls do not become stressed.
- Remove all perches, shelves, nest boxes to be replaced
- Enclosure should be cleaned from top to bottom
- Firstly hose down walls before scrubbing.
- Scrub walls using a long handled scrubbing brush and disinfectant. Featherdale Wildlife Park uses Power Plus Disinfectant deodoriser at dilution 1 part disinfectant to 20 parts warm/hot water. MSDS for Disinfectant Deodoriser is include in the appendix.
- Thoroughly rinse walls after disinfecting
- Rake out old substrates and scarify dirt.
- Put in new perches, shelves and nest boxes. Ensure they are fitted securely and a position not likely to cause damage and injury to owls.
- Put in new substrate
- Check enclosure for any damage and repair
- Return owls to their enclosure see section 7.6.6 for release from box

5.2 Record Keeping

It is a requirement of the EAPA Standards for Exhibiting Captive Raptors in NSW, that establishments housing owls shall keep records on an individual basis in a form which can be easily examined and analysed. Records and other relevant documents to individual owls should accompany an owl if it is sent to another establishment. Records should provide at least the following for each individual owl in a collection:

- Scientific name, common name, individual identification, house name if it has been given one and any distinctive markings that can be used to identify the individual
- The individuals origin

- Date or estimated date of hatching
- Date of acquisition and disposal
- Medications and treatments administered
- Location i.e. where it is housed in your institution
- Mating observed and offspring details
- Date of death and result of post mortem
- Normal diet

I have put a sample record sheet in the appendix.

5.3 Methods of Identification

Masked Owls can be micro chipped

A more visual identification is to apply size 13 metal SS leg ring or other approved leg band. It is important that leg bands/rings fit closely, leg rings which are too large may become caught on objects such as vegetation or wire. Rings that are too tight may restrict blood flow to the leg.

5.4 Routine Data Collection

- weights
- Veterinary exams conducted
- Changes in diet and food consumption
- Changes in behaviour or any behavioural problems
- Treatments administered
- Movements of individual owls between enclosures and institutions
- Offspring
- deaths

6 Feeding Requirements

- Suitable whole animals shall provide at least 50% of the nutritional and energy requirements of raptors.
- Suitable whole animals for Masked Owl will include – domestic mice, rats, rabbits, birds such as coturnix quail, domestic chickens and any prey which can be naturally obtained.
- Mammal and bird specimens less than 10 weeks of age shall not form more than 25% by weight of the diet fed to raptors in any one week.
- Except on starve days, a sufficient quantity of food shall be provided daily so that there is some left over each day.
- Raptors may be given no more than one starve day per week and there shall be at least three days between any two starve days.

(Standards for Exhibiting Captive Raptors in New South Wales 1995)

6.1 *Diet in the Wild*

A masked owl's typical wild diet includes rodents, rabbits, reptiles, insects, bandicoots, possums and medium sized birds such as magpies and kookaburras.

Masked Owls are nocturnal hunters; they hunt from the perch or on the wing. If too heavy to lift large prey is eaten on the spot or otherwise it is carried off in the bill or feet to a perch or roost where they either feed their young or consume food themselves. Owls prefer to swallow their food whole but larger prey items are usually torn into manageable strips beginning with the head.

A considerable amount of indigestible material accumulates in the bird's gizzard and forms a firm pellet. The pellet is bound together with the swallowed fur and feathers to form a cylindrical capsule that can be passed up the birds' digestive tract. Regurgitation is accomplished with the aid of a reaching movement by the bird, with the head being pumped up and down. Pellets are normally ejected 8-12 hours after a meal but sometimes are retained for up to 5 days. Masked Owl pellets are particularly large sometimes up to 90mm long. (Lloyd, G & R)

6.2 *Captive Diet*

It is important to match a captive diet as close as possible to natural diet. It is illegal to feed out any live mammals as prey food. All food presented to owls must be defrosted thoroughly or freshly and humanely euthanized.

What to feed.

It is never enough to feed just raw meat to a raptor. It is important to include the flesh organ meat, bones and skin of the prey animal. This ensures your raptor is getting the proper balance of vitamins, minerals and casting (pellet) materials as well as the calories it needs to survive. (Arent Lori R,)

A captive diet can include day old chickens, domestic mice and rats, rabbit, chicken pieces, beef pieces and game meats such as deer, pig and goat, at Featherdale food items

are cut to about the size of day old chickens. More than one variety of food should be offered daily.

Birds used for food should be frozen for at least 24 hours at -18degrees Celsius or below or have the upper gastro intestinal tract immediately after euthanasia to remove the risk of trichomoniasis infection.

How much to feed.

As a general rule of thumb

100 – 200gram raptors will eat 20 – 25% of their body weight daily,

200 – 800 gram raptors will eat 15% of their body weight,

800 – 1200 gram birds will eat 10% of their body weight,

Raptors larger than 1200 grams will eat approximately 6 – 8% of their body weight daily.

This amount varies with age, activity level, weather, and even time of year. By monitoring your birds weight and behavior, you can adjust the quantity of food offered. (Arent Lori R,)

At Featherdale the equivalent of four (4) day old chickens per adult are fed to adult Masked Owls daily except on starve days. The EAPA standards for Exhibiting Captive Raptors permits 1 starve day a week. During breeding no starve days are given. On days of extreme wet weather food offered to owls is decreased to 2/3 the normal offered amount. This is because owls are less likely to fly in rain and naturally prey items would be seeking shelter.

When and how often to feed.

Raptors rarely need to be fed more than once a day. (Arent Lori R,).

It is probably wiser to feed owls in the evening or as late as possible in the afternoon if you can, rather than in the morning except if they have young. Being nocturnal, owls tend to prefer feeding during the evening or night time. By feeding them as late as possible the food will be sitting in enclosure for only a short period of time before owls eat. It is a good idea especially in hot weather.

The below table should only be taken as an example of what could be fed to a healthy adult Masked Owl without young over a week. For feeding adults displaying courting behaviours or ones with young see section 10 Breeding.

.feed types should vary and more than one type of food item should be offered to owl daily.

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Amount (= to 1 day old chicken)	Starve	4	3	2	3	4	4

Food item	Starve day	A mix of Game meat,(pig, deer,goat and day old chicks	A mix of Lambs heart and day old chicks	Day old chicken	rabbit	Chicken pieces	A mix of Diced beef and day old chicks
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6.3 Supplements

Calcium powder and Petvite should be sprinkled on food to replace the calcium minerals and trace elements lost through freezing and processing of food sources. About 5 grams sprinkled over food should be the appropriate amount.

Pentavite and calcium Sandoz can be added to the food of young masked owls being hand raised see section 11

6.4 Presentation of Food

Food presentation can be different everyday, this will help stimulate animal and prevent boredom. In the wild owls wouldn't catch prey in exact same spot every night.

Presentation can include:

- Food can be placed onto a short moveable tree stump. (move feed stumps to different locations in enclosure every couple of days)
- Food can be scattered on ground in or near exhibit vegetation.
- Placed on exhibit perches.
- Food can be presented in several bowls scattered around enclosure.



Figure 6 feed stump with lamb heart cut to quarters

7 Handling and Transport

7.1 Timing of Capture and Handling

The best time to capture a masked owl is first thing in the morning before the park/zoo opens and public arrive, the less people around enclosure the less stressful capture will be for staff and the owl. Catching masked owls in the morning can avoid heat and cold stress. Also if anything was to go wrong in the capture you will have all day to resolve the issue.

7.2 Catching Bags



The catching net on the left is the preferred and most recommended catching net to use it made from breathable washable material. The fabric is dark in colour (helps keep caught bird calm) the rim is padded with foam to prevent injury to birds during capture.

Figure 7 bird catching nets/bags

7.3 Capture and Restraint Techniques

Masked owl talons are sharp and the beak can also cause injury to keepers. PPE such as long shirts, safety glasses and a hat may be worn to reduce injury. Welding gloves may also be worn but some keepers find them to be more of a nuisance than a benefit as there is limited grip on the owl and limited hand movement for keepers.

The use of chemical restraint should be limited to surgery apart from this it is not recommended.

HOW TO CAPTURE:

Enter enclosure and observe the flight path of the owls if the owls are calm enough you may be able to simply walk up to them and place capture net over body. Or you could catch the owl in flight by holding net in front of owl whilst in flight.

Once owl is in capture net, fold the top of net over to stop owl escaping net.



Figure 8 owls in catching bag/net

HOW TO RESTRAIN:

Once owl is secure in catching bag carefully place net on ground ensuring the owl is not on its back.

Try to position owl so head is facing bottom of catching bag.



Figure 9 restraining owl in catching bag/net

Place one hand gently but firmly on owls back through catching bag, with your other hand slowly pull bag back so that only the owls upper third of body is still inside the bag.

With free hand reach into bag and place hand at owls neck and wings but do not release the grip from other hand.

Slowly run your free hand down owls body ensuring wings are tucked in.

Once your hand reaches the base of the tail, firmly and gently wrap hand around wings, tail, and feet so they are all held in the one hand.



Figure 10 slowly pulling owl out of catching bag/net

Slowly pull bag completely off owl and hold owl in an upright position.



Figure 11 correct way to hold owl

7.4 Weighing and Examination

Before you begin capture weigh the catching bag and tare scales, any type of scales may be used so long as you get the most accurate ones for you. Before removing owl from catching bags hang or place bag with owl securely inside on scales. Usually birds are less active if placed on their keel onto scales while wrapped in catching bag. You will need to let go of the owl completely to record an accurate weight. Average weight is 660grams. Visual examinations can be carried out during daily enclosure maintenance and feeding. Physical examination is explained in section 8.

7.5 Release



Michael Randy of Featherdale Wildlife Park recommends releasing Masked Owls first thing in the morning so that the owl can be checked on by keepers throughout the day. Masked Owls should be released as close to the front end of enclosure as possible and facing owl towards back of enclosure, away from feed stumps, low perches or other obstacles owls can fly into.

If releasing owl from hand either simply release your grip and allow owl to fly away or place owl on the

ground facing towards the back of exhibit close to door so handler can back out of exhibit quickly.

7.6 Transport Requirements

The EAPA standards for Exhibiting Raptors, Transport Requirements are that transport containers do not allow entry of light except through ventilation holes. Ventilation holes should be pierced around the lower half on all sides of container about 10cm above internal floor height and be about 7.5cm apart. Two holes should be pierced on all sides of container/box 10cm below internal roof height.

The transport container/box should be at least 30cm longer and wider than the length of bird from beak to tail tip and provide at least 15cm head clearance for bird.

If there is no perch in the container/box the floor should be lined firmly with a resistant material which will provide grip for owls talons; I recommend the use of astro-turf.

In situations where owl will not be traveling with an experienced handler, the transport container must be clearly marked 'LIVE ANIMAL, HANDLE WITH CARE, THIS WAY UP, and KEEP COOL'.

Owls must not be subjected to temperatures greater than 30 degrees or less than 10 degrees Celsius during transport.

7.6.1 Box Design

Masked Owl comes under container requirement 20 of the IATA Live Animals Regulations book.

The container should be made of wood, hardwood, non-toxic plastic, fiberglass and synthetics, weld mesh and strong plastic mesh.

The frame should be of solid wood, either screwed or nailed and glued with non-toxic glue.

The sides of the container must be either wood or hardboard. The front must be double with the outer layer of a strong plastic mesh with a distance of 4-5cm between them.

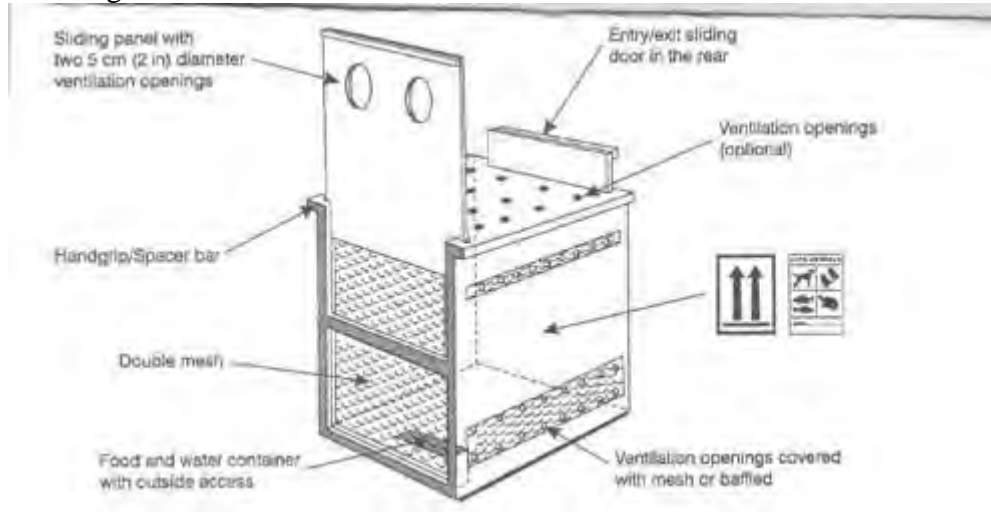
The floor must be solid and leak proof and may be covered with carpeting s bird can get a firm foothold.

The roof must be padded with a soft non destructible padding.

The door can be horizontal or vertical sliding or hinge door and cover the front mesh of the container and it must have at least two observation openings of approximately 5cm in the upper third.

Meshed ventilation openings approximately 2.5cm in diameter must be provided at approximately 5cm distance apart along all four sides of the container. There must be a line of openings near the base large enough to allow some light into the container. The openings must be covered by an external wire mesh all edges must be covered with a smooth material.

Labeling must conform to IATA live standards for live animals.



A modified rigid plastic pet container is also suitable for use in transporting Masked Owl. The following modifications must be made:

A fixed foothold block or non-slip floor lining must be fixed appropriately to the floor of container.

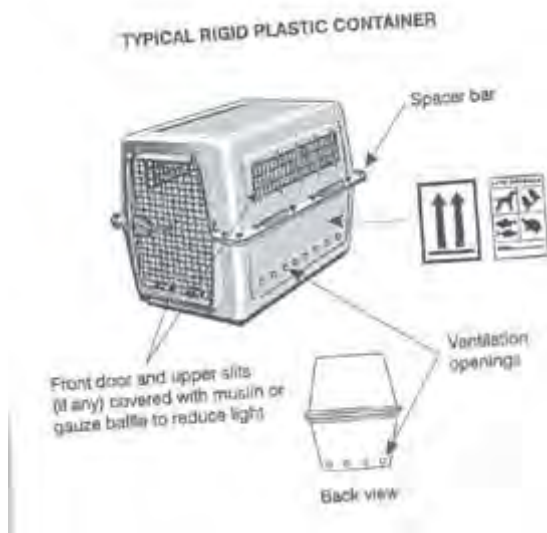
Non-destructible padding must be fixed to the roof.

The doors and ventilation openings must be covered with a suitable material to permit air to enter but keep the container in semi-darkness.

An observation opening/flap must be present.

Labeling must conform to IATA standards for Live Animals.

If a container has wheels they must be removed or rendered inoperable.



7.6.2 Furnishings

A block of wood firmly attached to the floor of transport box/container can act as a perch so owl can have a firm grip and stability while being transported.

7.6.3 Water and Food

Birds do not usually require feeding during a trip less than 24 hours following time of dispatch. If feeding is required due to unforeseen delay, chunks of raw meat must be provided to owls. Moisture can normally be obtained from food, therefore, water must only be offered in very hot weather.

Shipper's instructions on feeding must be followed.

7.6.4 Animals per Box

Only one adult masked owl should be placed into single transport box/container. Young fledglings from the same nest may be transported together in transport box/container.

7.6.5 Timing of Transportation

Transport the bird as quickly and comfortably as possible. Timing from boxing to destination should be minimized.

7.6.6 Release from Box

If releasing from box/container place box on ground in enclosure open door facing to back of enclosure, away from obstacles owl may fly into, and allow owl to exit box in its own time.

8 Health Requirements

8.1 Daily Health Checks

Behavioral

When you enter aviary the bird should be alert acknowledge your presence.

Owl should be perching, not huddled on the ground.

Threat displays are normal behavior, hunched over, swaying and clapping beak.

Monitor the food being taken out has it been eaten, none at all or only a small amount?

Physical

Distant examination

Check for signs of injury, is there any blood?

Check the Wings for damage or injuries.

Check the feet for injury, obvious inflammation, and check talons are free of debris and intact

Check posture, is the owl in a mostly upright position wings by side and not drooping?

Check the beak should be closed, no discharges, no signs of mouth breathing.

Check that the eyes can open no discharges.

Check vent area ensure no accumulated faecal matter

8.2 Detailed Physical Examination

8.2.1 Physical Examination

To avoid any undue stress to the owl being examined, keep the length of examination as short as possible. Using a towel to assist with restraint will also help calm the bird when placed over head/ eyes. Michael Taylor DVM (birds 2000) recommends beginning the examination at the head and working towards the tail of bird.

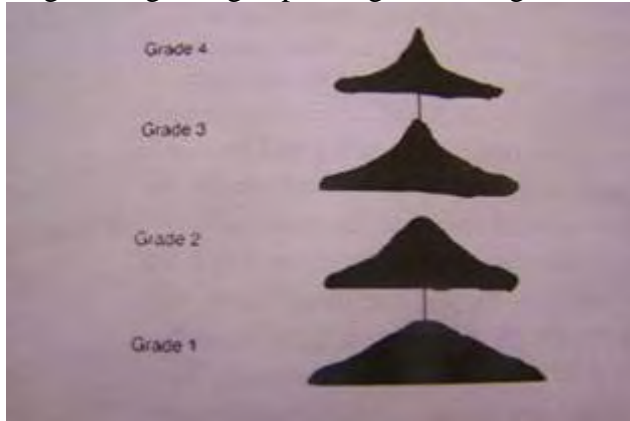
Head

Feathers should be smooth and well groomed. There should be no feather loss. The eyes should be bilaterally symmetrical, the **corneas** should be clear with no discharge, and there should be no excess fluid from the **conjunctiva**. Check the nostrils for fresh or dried debris. Check around ear canal for discharge and feather loss, masked owl ear canals are not bilaterally symmetrical this allows for dimensional sound location of prey. Examine beak for symmetry and shape assesses the quality of **keratin** being produced by checking for soft or irregular areas on the beak. Hold the beak open using a **speculum** or tape loop to examine the oropharynx, use a penlight to illuminate the area. The mucus membrane should be smooth with no debris.

Thorax

The **carina** or keel of the sternum is **palpable** on the ventral mid line, it should be straight and oriented at 90 degrees to the sternal plate the ribs are palpable along the lateral border of the sternum running from the cost sternal junction to the vertebral column, and they should be evenly arranged with a flat lateral surface. The pectoral

muscles should fill the sternum almost to the level of the carina/keel the muscle mass can be given a grading depending on the degree of muscle wasting.



A system uses four grades to describe the cross sectional appearance of the muscle mass as severe (grade 4), marked (grade 3) moderate (grade 2) or mild Grade 1) pectoral muscle atrophy. There is frequently a small fat pad located at the caudal border of the thoracic inlet onto the sternum; this pad will be large in obese birds.

Figure 12 shows the grading of keel muscle mass (Birds 2000)

Wings

Begin the examination by flexing and extending the wing, feel from shoulder to tip of wing for any abnormalities. Pay careful attention to the condition of feathers, especially primary and secondary regimens.

Abdomen

The only part of the abdominal area that is palpable is immediately **caudal** to the sternum and extends to the vent region. Usually in this area the body wall makes a slightly concave line running from the sternal border to the base of the tail. This area should be assessed for distention and for discreet masses. The pubic bones are not fused.

Vent

The vent lips should be smooth and free of urofaeces or debris. The underlying tail feathers should be clean and have no urofaecal staining. The vent lips normally have a symmetrical, slightly oval shape, in ovulating females the vent lips will become more elongated in preparation of the passing egg. The proctodeal mucosa should be a smooth, healthy pink.

Pelvic limbs

Begin at pelvis, flex and extend hip stifle and hock joints while feeling the **femur**, **tibiotarsus**, **metatarsals** and **phalanges**. Examine top and sole of each foot for areas of abnormal wear and ulcerations.

Skin and feathers

Assess the complete feather covering of bird. Checking if feathers appear worn or abnormal, if the bird is going through a normal molt, if there are excess flakes, crusts or other skin lesions present.

After the physical examination and the owl has been released take a few minutes to observe the demeanor, respiratory rate, and stance of bird. The bird's respiratory rate should return to normal in less than 2 minutes for a standard examination.

8.2.2 Chemical Restraint

Do not feed owl for a few hours before a veterinary visit requiring the owl to be anesthetized.

Anesthetic is given via face mask.

Mask down the owl, a towel can be used to assist in restraint.

The anesthetic agent given is isoflurane and oxygen.

Monitor the depth of anesthesia by checking the blink reflex and muscle relaxation.

Ensure owl is always warm and at preferred body temperature whilst under anesthetic.

Placing a heat pad on examination table under a towel with owl placed on top will help keep owl warm.

After procedure is finished hold owl wrapped in towel in an upright position until bird starts to regain consciousness.

Place owl in a warm transport box with no furnishing.

Watch owl closely, ensure there is no regurgitation.

(Robert Johnson, pers comm.)

8.3 Routine Treatments

At Featherdale Wildlife Park the Masked Owls are given 3mls of Panicle all round wormer via a crop needle, once every 6months.

8.4 Known Health Problems

The following is a list of some health problems faced by keepers at Featherdale Wildlife Park; cataracts associated with old age and genetics, prolapsed, intestinal worms, scaly foot, problems with young owls being hand raised regurgitating pellets resulting in diarrhoea and treated orally with sparks.

After some research I found owls can suffer the following health issues;

Bumble foot (pododermatitis)

Signs

Initially a discrete painful reddening or swelling on the sole of the foot, developing into a generalized swelling and osteomyelitis of the lower foot.

Cause

Staphylococcus aureus, *E.coli* or *candida* infections ,secondary to a vitamin A deficiency, lack of exercise, inadequate perches and trauma.

Treatment

Reduce inflammation and swelling using a topical DMSO ointment, correct nutritional deficiencies using ADEC, Vetafarm ;surgical drainage, or even digit amputation; antibiotic therapy; bandaging of pen wounds until they heal. Severe cases may need treatment for several months.

Prevention

Provide a good diet for owl, ensure plenty of exercise, have appropriate sized perches in exhibits and proper hygiene.

Aspergeillus

Signs

Dermatitis, leg weakness due to extension of lesions into muscles and nerves, tail bobbing, mouth breathing, increased respiratory effort and rate.

Cause

Damp litter, damp nest box material, dusty conditions, mouldy feed and poor ventilation. Aspergillosis is generally considered to be a secondary disease, requiring a state of immunosuppression to flourish within the host's body. Predisposing factors include transport, overcrowding, malnutrition, concurrent disease, antibiotic therapy, chemical irritation of the respiratory tract, capture stress and age (very young, very old). transmission is usually by aerogenic route.

Treatment

Treatment and the success of treatment depend on the extent and the location of lesions. Treatment of chronic, widespread sacculitis is unlikely to be successful. Less widespread lesions may respond to the use of I/V and nebulised amphotericin B and the surgical removal of granulomas. Concurrent oral medication with flucytosine, ketoconazole, itraconazole, or fluconazole may respond to air sac catheterization and intra-tracheal amphotericin B.

Prevention

Nest boxes should be cleaned regularly, food must be fresh and mould free, ensure aviaries are well ventilated.

Trematodes (a parasitic disease)

Life cycle

Intermediate hosts, usually snails, are always involved in the life cycle. Other transport hosts such as insects, fish and tadpoles can also be involved. Birds become infected by eating either. Trematodes can be found in the intestinal tract and liver.

Treatment

No effective treatment has been described, although fenbendazole and praziquantel have been reported to decrease egg production dramatically.

Control

Restrict access of intermediate and transport hosts to the birds.

Roundworm

Life cycle

Eggs passed in droppings embryonate after 2-3 weeks in a warm, moist environment; then carried in or on transport hosts which are then eaten by the owl. In the right conditions the eggs can remain infective for several months.

Treatment

Most anthelmintics are effective the most common used are, ivermectin, oxfendazole, levamisole, netobimin, pyrantel and fenbendazole.

Control

Keep owl environment dry, clean feeding stumps and water dishes, and frequent cleaning and removal of faecal material. Regularly worm owls.

Spirurids

Life cycle

Probably involves insect as an intermediate host. The adults are found in small nodules in the mouth and pharynx.

Treatment

Painting the adults with levamisole and then physically removing them one by one seems to be the only effective treatment.

Gapeworm

Life cycle

Eggs are swallowed coughed up and passed in faeces. They can be directly infective or pass through a transport host such as an earthworm. The eggs hatch in the gastrointestinal tract, and the larvae migrate through the bloodstream to the lungs and then to the proximal trachea.

Treatment

Ivermectin can be used to kill the worms, allowing their manual removal, sometimes be repeated by tracheal flushes. Mebendazole and fenbendazole have also been effective.

Control

Exclusion of intermediate hosts by concreting aviary floor, roof aviary to exclude faecal contaminating by wild birds, and maintain a dry clean environment will minimize access of birds to this parasite.

8.5 Quarantine Requirements

- Quarantine should last for **30 days**.
- The first thing to do when a Masked Owl comes into quarantine is check for I.D and the sex of animal. And start a record sheet for the owl.
- Whilst owl is in quarantine monitor food in/out.
- Begin conditioning of owl.

The following are recommendations for appropriate testing procedures for diseases of owls while held in quarantine.

1. Faecal examination, direct and flotation, for trichomonads, other motile protozoa and coccidia
2. Check for ectoparasites, especially *Amblyomma sp.* ticks that can be vectors of cowdriosis-heartwater. If present, treat with an acaricide.
3. Carry out appropriate serological tests for chlamydiosis (psittacosis) and if positive, confirm by cloacal swab cultures. If culture is positive, the bird must be treated if of conservation value or destroyed if not.
4. Faecal cultures for *Salmonella sp.* and *Campylobacter sp.*
5. Collect samples (choanal and cloacal swabs) for virus isolation from all incoming birds. All virus isolation tests should be negative in birds destined for release or entry into captive breeding flocks.

6. Carry out complete Blood Count and PCV.
7. Carry out serology/ELISA, as appropriate, for aspergillosis, *Chlamydia sp.*, paramyxovirus 1 (PMV-1), PMV-2, PMV-3, Eagle herpes virus, pigeon and raptor viruses, adenovirus, avian pox, avian influenza, mycoplasmosis and, for psittacines, “beak and feather virus” disease, All ELISA tests should be negative in birds for release or entry into captive breeding flocks.
8. Check raptors, for oral trichomonosis.
9. Examine blood smears for avian malaria, *Babesia sp.* and *Leucocytozoon sp.*
10. Carry out endoscopy for aspergillosis in rare and valuable species.

9 Behaviour

The Masked Owl is considered to be sedentary and territorial. It may occupy exclusive home ranges and may mate for life. (www.dse.vic.gov.au)

9.1 Activity

The Masked Owl is a secretive, relatively silent, and strictly nocturnal species. (Threatened Fauna Manual for Production Forests in Tasmania).

They roost by day in dense foliage of tall trees, or in hollow tree trunks. Sometimes they will roost in caves or rock crevices. To enter the nest hollow they slide down tail first: a characteristic of the whole Masked Owl group, Barn and Sooty Owls included.

9.2 Social Behaviour

They tend to remain in pairs throughout the year, and may occupy a territory year-round. (Cholewiak, D.2003). When rising each evening the male and the female join each other from separate roosts and greet each other by purring, chattering and clucking to one another. (Readers Digest).

9.3 Reproductive Behaviour

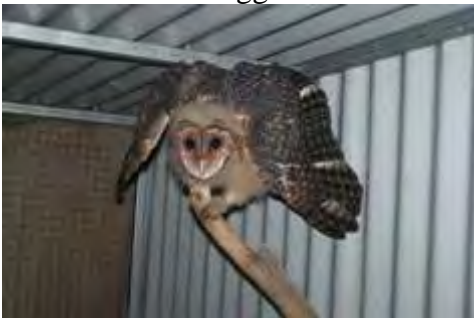
The approach of the breeding season is signaled by a lot of vocalization from both birds around the nest hollow, led by the male. Before mating they go through elaborate head-bobbing and wing-waving. (Readers Digest).

9.4 Bathing

In captivity an owl will bath in water bowl or any other water body in the enclosure.

9.5 Behavioural Problems

- Owls can show aggression towards keepers especially at breeding time. Hand raised owls can become aggressive towards keepers having lost their fear of humans. Aggression towards keepers is shown by swooping at keeper's heads.



repetitive flight patterns.

- Masked Owls display a threat posture in the direction of a threat by crouching, spreading its wings, swaying from side to side, and hissing, snapping and rasping. (Readers Digest).
- A stereotypic behaviour of owls is

9.6 Signs of Stress

- Loss of appetite
- Sitting on ground

- Heavy breathing
- Posture – feathers fluffed or ruffled
- Threat posture
- Flying at speed into objects e.g. perches , enclosure barrier

9.7 Behavioural Enrichment

- Move feed stumps around exhibit rather than always feeding out in the same area of enclosure
- Stake food to perches, masked owls feed on some arboreal species
- to increase the amount of on time on display darken back half of enclosure sides and roof using shade cloth or mesh or allow thick leafy vines to grow up along side and roof of exhibit.
- Frequently changing enclosure furniture can prevent boredom and undesirable behaviour.
- Have recordings of vocalisations of other owls, or vocalizations of prey animals such as rats or possums. Sounds of prey must be accompanied with feed as it could cause a lot of stress to owl to hear food sounds but no presence of food.
- Food can be cut into bigger sized pieces so owl can rip and tear at food as it would in the wild.

9.8 Introductions and Removals

The introduction of any species to a new enclosure or group should be well monitored. To introduce a new bird a cage can be placed side by side or cage in cage for a few days to a week to allow them time to adjust.

Removal of should only be done by experienced staff. The best time of day would be early morning so birds can be monitored throughout day by keepers.

9.9 Intraspecific Compatibility

If two or more male Masked Owls are housed together, they do not show signs of aggression unless there are females present. (Staples C)

9.10 Interspecific Compatibility

At Featherdale Wildlife Park young Masked Owls are housed with Barn Owls *Tyto alba*. as owls reach breeding age the species should be separated as they will become aggressive toward each other.

9.11 Suitability to Captivity

Masked Owls are a nocturnal species so if housed in a darkened environment on display time can be increased.

10 Breeding

10.1 Mating System

Masked owls form monogamous pairs and usually mate for life.

10.2 Ease of Breeding

Masked Owl is fairly easy to breed in captivity provided you have a suitable pair. Featherdale is quite successful at breeding Masked Owls, keepers do not provide anything other than nesting hollows to encourage the owls to breed. (Harris E) Minimal disturbance when owls are nesting is probably one contributing factor to successful breeding.

10.3 Reproductive Condition

10.3.1 Females

- Body length 400-500mm.
- Head bobbing and wing waving towards male.
- Vocalise in response to male's vocalisation.
- When incubating eggs the female forms a brood patch on her abdomen area

10.3.2 Males

- 350-400mm in body length.
- Head bobbing and wing waving towards female.
- Male leads female in vocalisation, around the nest hollow.

10.4 Techniques Used to Control Breeding

At Featherdale Wildlife Park keepers do not stop Masked Owls from breeding. But if breeding was not necessary the following could be used to control breeding

- house sexes separately
- remove nesting logs and nesting materials
- remove clutch of eggs and replace with fake eggs to prevent more eggs being laid

10.5 Occurrence of Hybrids

Masked Owls could possibly breed with the sub species Tasmanian Masked Owl *tyto n. castenops*.

10.6 Timing of Breeding

Masked Owls breed erratically, when conditions are favorable which can be any time of the year.

Tyto novaehollandiae castenops, the Tasmanian race is a seasonal breeder with most egg laying in late October to early November (Higgins 1999).

10.7 Age at First Breeding and Last Breeding

At Featherdale they have started to breed just after getting their adult feathers, approximately 2-3 years of age. Birds at 10-13 years are still successfully breeding to date November 2008. Older birds have laid eggs but the eggs have been infertile.

10.8 Ability to Breed Every Year

Masked Owls are able to breed every year if conditions are favorable.

10.9 Ability to Breed More than Once Per Year

Masked Owls have the ability to double clutch and can breed more than once in a single year.

If eggs or young are removed Masked Owls can lay another clutch of eggs.

10.10 Nesting, Hollow or Other Requirements

Masked Owls can nest on ledges in caves but will typically nest in vertical hollows 40-500cm deep in eucalypt trees. Nest materials may include soil, mulch, or sawdust.

10.11 Breeding Diet

At Featherdale Wildlife Park Masked Owls are fed a variety of foods all year round all that is change around breeding time is the quantity of food. When courting behaviors and eggs are present the food is increased by almost $\frac{1}{4}$ per bird i.e. about the equivalent of 10 day old chicks for the pair. When the masked owls have young food is increased by almost 50% per bird i.e. the equivalent of 12 day old chicks for the pair.

10.12 Incubation Period

Eggs are incubated for about 35 days, by the female. The female is fed in the nest by the male each night. (Readers Digest).

10.13 Clutch Size

Usually 2-3 off-white oval shaped eggs, 43-50 x 35-38mm in size, are laid on alternate nights. (Readers Digest).

10.14 Age at Fledging



Figure 13 approximately 12 weeks of age

Young are brooded by the female for the first 2-3 weeks and then fed by both parents and are fledged in 10-12 weeks. (Readers Digest).

10.15 Age of Removal from Parents

After fledging the young return to be fed by the parents for another month before going on their own. (Wikipedia)

In captivity owls can be removed from their parents and transferred into another enclosure at 12 weeks of age, they are able to perch, fly and feed for themselves.

10.16 Growth and Development

- Downy young – first short white-downed, later long creamy down
- Fledgling- only traces of down
- Immature/juveniles- look similar to adults.

11. Artificial Rearing

Masked Owls have the ability to double clutch so you may want to use artificial incubation and rearing to get as many young as possible from pairs.

If you want to double clutch, the fertile eggs must be removed after they have been candled and place them into your incubator.

Once you have removed the fertile eggs, most, but not all owl species should recycle after about two weeks. (Parry - Jones J)

The hardest of all eggs to hatch in an artificial incubator are those that have had no natural incubation under a bird. So seven to ten days of natural incubation, once the female starts to incubate properly will make your job a little easier. (Parry – Jones J)



Figure 14 Masked Owl only a few days old

11.1Incubator Type

It shouldn't matter the type of incubator used as long as temperature and humidity are correct. It is best to use an incubator that you trust.

For the latest incubator models and to purchase an incubator I suggest the following websites.

- Brinsea Incubation Specialists
<http://www.brinsea.co.uk/index.php>
- A.B. Incubators
<http://www.abincubators.co.uk>
- AIMS- Avian Incubation Management System

This sophisticated database application will calculate the % loss at pip the egg is heading for and compensates for time differences in weighing, to the nearest minute. It tells you the optimum relative humidity to place your egg in.
<http://www.avianmanagement.com/aims.htm>

11.2Incubation Temperatures and Humidity

Jemima Parry – Jones of the Nation Birds of Prey Centre runs all her incubators at 37.3 – 37.4 degrees Celsius.

The humidity will depend on the weight loss the egg is going for, and you will only know that if you weigh it. You will need to know the fresh egg weight, and then calculate 15% weight loss over the incubation period to the time that the egg is due to pip. (Parry – Jones J)

Owl eggs have been successfully incubated at a relative humidity of 55 % to 70 %.
(Holland G)

11.3Desired % Egg Mass Loss

Between the laid and piping dates egg should have a weight loss of 13- 15 %.

11.4Hatching Temperature and Humidity

On the day before hatching humidity should be at 60%RH to prevent the membranes of the egg drying out and therefore making it harder for the chick to hatch. The temperature should be increased to between 18 Degrees Celsius – 22Degrees Celsius for hatching.

11.5Normal Pip to Hatch Interval

It takes between 12-64 hours for a chick to completely hatch from the egg. Each hatchling is different so the first egg may pip and hatch after a day but the second hatchling may take three days. Eggs are normally laid about 2 days apart and will normally hatch in that order.

11.6Brooder Types/Design

Timber brooder box 500mm X 500mm X 500mm, with a clear Perspex panel on the front side able to slide up being clear it will not have to be opened to observe chicks inside. A 40W reflector light is preferable as it will distribute light around brooder. A small bucket with a thick layer of wood shavings or breeders choice kitty litter, sand or dirt makes for a good way to contain a few owl chicks inside the brooder as the chicks grow larger the small bucket can be replaced with a larger one.

11.7Brooder Temperatures

Temperatures will vary depending on the developmental stage and age of the chick; they require a body temperature of around 36 Degrees Celsius .As they have n down on them at hatching it is difficult for them to maintain their own body temperature, so it is important to continually observe gradient temperature to ensure chicks have correct heat.

- Temperature should be set between 27-33 Degrees Celsius for the first two weeks
- Then Temperature can be reduced to between 25-29 Degrees Celsius for a further three weeks

- Then temperatures can be switched off during the day. Because by this stage pin feathers have started to grow

After six weeks from hatching the temperature can be turned off completely, unless there is a cold day and heat is required in which case temperature can be set at 19 Degrees Celsius. Note that the more chicks that are being housed together in brooder the lower the temperature needs to be set as chicks will naturally huddle together for warmth.

-
- After they no longer require artificial heat chicks can be housed in a large strong cardboard box.
- When owl starts to get itself out of box it can be moved to a flight aviary in a quiet location
- When it is able to perch and move from one perch to another the cardboard box can be removed.

11.8Diet and Feeding Routine

- Most birds of prey need no food in the first 12 hours of hatching because they are absorbing their yolk sac.
- Curved forceps or tweezers can be used to place food into open beak.
- The stomach is just to the right of center, if it appears dark in colour or is very hard to the touch, then a large amount of food remains in the stomach and feeding should be delayed until the stomach is soft and flaccid and returns to its normal pinkish colour.
- Even if they beg, they should be given no more and they should never be fed with food still sitting in their crop.
- Never force feed a young bird of prey, using a puppet will stimulate the beak with tweezers or mimic the call of the parents to encourage it to open its beak.



- A nestling's first meal after hatching must be only match-head size bites that are small, soft and easily digested. (Olsen 1990).
- The first two days the food consists of little pieces of mostly heart and some liver approx. 1 - 2 g (Holland G). Pinkie mice can also be fed to young. Chicks should be fed 5 times a day.
- Food should be dipped into calcium Sandoz. As you feed owl only dip every few pieces into calcium Sandoz as too much calcium is not good for owl.
- At 3 days chicks should be able to consume a full crop and keeper can introduce small pieces of bone to muscle but **not** fur or feathers. One – day – old chicks neck vertebrates are ideal.
- From the third day on, one needs to feed the young only four times a day e.g. 7:00 am, 12:00 am, 5:00 pm and 10:00pm.
- Small quantities of fur and feathers can be introduced in the diet in the 2nd or 3rd week. (Olsen J, 1990).day old chicks cut into manageable pieces are ideal.
- At two to three weeks chicks should be old enough to feed themselves as well as still being hand fed, place usual food items into a bowl where chicks are housed and they will discover it and start to feed you will find that the bowl empties quickly and you can fill it up three times a day.
- Once owl refuses to take food from your hand, place food in bowl and leave in box as parent would leave food in nest box for young to learn to tear up food.
- At five weeks of age owl should be offered a greater variety of food items. Size of food can also be increased as owl should start to tear and break up its own food.

11.9 Specific Requirements

- It is best to have two globes in brooder in case one globe is blown through the night, there will be a back up globe so chicks are still provided with warmth and will not become cold and die.

11.10 Pinioning Requirements

Pinioning is defined as an act of cruelty under the “New South Wales Welfare Code of Practice No 4”.

11.11 Data Recording

All records should include detailed information on the location where the bird was found as well as the circumstances of the rescue, if of wild origin.

Birds should be weighed and aged as best as possible. proper development and general health status is best assessed by closely monitoring and documenting body weight, feeding habits and behavior , digestive function, and feather condition.

11.12 Identification Methods

Size is the best way to identify young chicks up to the age of 10 weeks of age after that owls can have leg bands/ rings applied as a means of identification.

11.13 Hygiene

Only clean eggs should be put into the incubator. There are egg disinfectants on the market and one can follow their directions. All the equipment used like the incubator, brooder, nest container etc. must be disinfected after each use.

Keepers at Featherdale Wildlife Park use F10 a veterinary disinfectant in incubators and hot boxes. MSDS for F10 is included in appendix.

11.14 Behavioral Considerations

- If you intend to release owl into wild it is recommended to remain as silent as possible during feeding and cleaning but making owls noises to chick is okay.
- To insure positive imprinting a recording of masked owl vocalizations can be played to the chick.
- Sexual imprinting is a behavioural adaptation that establishes a bird’s identity and gives it a fixed visual perception of what its future mate should look like. Birds typically imprint when they are very young. Raptor imprinting occurs during the period when the birds eyes are beginning to focus. In the wild, young birds sexually imprint on their parents. Later in life they will try to mate with – and defend their territory against- something that looks like mum or dad. Birds raised in captivity can sexually imprint on their human caretakers. When they reach sexual maturity, they frequently become territorial and aggressive toward people during breeding seasons, can be difficult to handle, and are potentially dangerous to their handlers. Human imprints can retain food begging behaviours as adults, which may cause them to “scream” often loudly, when they see their handlers.

Human imprinted birds are sensitive to management changes and may become destructive or resort to feather plucking behaviour if stressed or bored. (Arent Lori R.)

To avoid this negative imprinting it is best not to raise a single Masked Owl and to allow young owl to have visual contact with other masked owl.

11.15 Use of Foster Species

Due to the ease of artificial rearing Featherdale Wildlife Park has not used foster species to raise masked Owls. The best foster species to use to avoid negative imprinting would be the Tasmanian Masked Owl *Tyto novaehollandiae castenops*.

11.16 Weaning

At 5 weeks of age weaning can begin and duration will be approximately 8 weeks so by 12 weeks which is normal fledging age the owls will be weaned. Weaning can begin by placing small amount of feed in dish after a small portion has been hand feed to owl.

11.17 Rehabilitation Procedures

Before rehabilitation of any animal begins it is wise to look into release options as this can greatly influence the rehabilitation procedures.

If rehabilitating animals back to the wild it is important not to negatively imprint or tame the animal in any way.

- Intensive care facilities

Heat boxes are appropriate for injured owls in shock and those that have leg problems and should not or cannot stand. The box should provide a warm, dark, quiet environment away from all house hold noise and activity. The box should be large enough for the bird to stand fully erect and to lie fully extended across the box without causing damage to feathers. The box must allow the keeper easy access for examination, treating and feeding owl.

If a heat box is not available a strong cardboard box can be used as a temporary substitute. Make sure the cardboard box is at the right size to prevent damage to tail feathers. The box must be dark and warm. A hot water bottle or electric blanket placed under cardboard box can provide emergency heat sources. Ensure the bottle does not get cold. A constant temperature of 28-30 degrees Celsius should be provided. A towel in the bottom of the box will give the owl something to grip to and maintain balance.

- Intensive care accommodation

Sometimes the owl recovers enough to be removed from heat box or doesn't require a heat box. In this case a wooden crate or purpose built box can be used to hold owl. **DO NOT USE A WIRE CAGE AS THIS CAN DAMAGE THE OWLS FEATHERS AND CERE.**

Raptors are easily stressed and most will not adapt to captivity so keep the box completely covered and well away from noise, children, cats, dogs and any form of disturbance. A sheet or towel placed over the box can make owl feel safe and hidden.

Provide owl with a perch otherwise wing and tail feathers will be damaged, sometimes feather damage can be so severe that the owl will have to moult out the damaged feathers and grow new ones before it can be released. By this time its wild territory may be gone, taken over by other individuals and original location may not be option as suitable release site.

If the owl can stand but is unable to perch, provide a stable log so tail feathers are off the ground and away from owl droppings.

- Intensive care aviary.

If the owl no longer needs to be housed in a heat box or crate but still needs to be caught for examination or force feeding then it should be housed in a fully enclosed purpose built or a modified aviary, away from any visual and audio disturbance and with maximum protection from extremes of climate. The aviary should be built in a position that will not allow it to become damp. Ideally the aviary should be 3 meters in length width and height and have no projections which could injure the owl.

Put in a few perches in different diameters to prevent diseases of the foot, such as Bumble foot. The perches should be placed in the aviary so the owl can hop from one to the other if it is unable to fly. Perches must be placed so that carer has easy access to the owl.

- Release aviary

The release aviary should be as large as possible. It should be positioned so that the owls are not exposed to direct summer sun or winter winds and storms. Perches should be at different diameters and heights. Hides or nest boxes should be provided. The aviary should be fully enclosed on three sides and part of the roof. This gives the bird shelter and provides protection from the elements and a secure hiding spot and will also allow some sunlight to enter. It is important that the owls have somewhere to hide as visual stress can be severe. (Blair)

- **RELEASE**

There are important considerations for the release site. If the owl can not be returned to the original site of original encounter, the release site must be as close as possible to the encounter location and must not compromise the appropriate habitat for the species. (Parson)

Release sites must have the following:

Food available year round –Masked Owl prey includes rodents, rabbits, bandicoots and possums.

Habitat- wet sclerophyll forests, dry sclerophyll forest, non eucalypt dominant forest, scrub and cleared land with remnant old growth trees. Masked Owls require large hollows in old growth eucalypts for nesting; it often favours areas with dense understorey or ecotone comprising dense and sparse ground cover.

Absence of hazards and predators- roads, power lines, foxes, dogs and cats.

SOFT OR HARD RELEASE?

The two methods of release used by rehabilitators are described as 'hard' and 'soft'. Hard release is returning the animal to the wild, by taking it to a suitable site and releasing it with no support feeding, no follow up other than casual observations and hoping for the best. If the animal is an injured adult that has not been in care for an extended period, hard release is a perfectly good option. Most injured adults only need support and time to re-establish their fitness; they already have the skills to survive in the wild.

Soft release is the better option for young orphan birds that must be educated in the full range of survival techniques. In soft release the bird is allowed to range out from an aviary, learning to feed in the local environment, to be accepted by local birds, and to establish itself within the area. Support feeding is provided in or near the release aviary. The bird can be readily monitored and may be captured if necessary. Soft release techniques can only be undertaken if that particular species naturally occurs in the area. It is not recommended that different species be introduced into an area through soft release practises. This can seriously disadvantage other species. (Parson)

- **Points to check before release**

- Can the owl feed its self and is able to catch prey?
- Can it cope with normal temperature variations?
- Can the owl fly well enough to survive?
- Does it recognise and display alarm at predators and threats including humans?
- Does the owl object to human handling?
- If the owl is juvenile has it been with and recognise others of the same species?
- Is the owl at optimum weight?
- Has it got all its feathers and are they clean and unbroken?
- Has it preened and is it waterproof? You can check by spraying the bird lightly with water and see if the water will bead on its feathers.

If the answer is not yes to all the above points the owl is not ready for release!

Effective rehabilitation is returning to the wild an animal that has been temporarily disadvantaged and may not have survived without your intervention. No matter what type of release you use, it is essential that you are honestly convinced that the bird will be alive and part of the wild society to which it belongs in many months time or even years, after you have given it a second chance to live the life it was born to.

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12 Bibliography

13 Glossary

Carina: projecting part of bird's breastbone: the prominent keel-shaped projection of the breastbone of a bird to which the flight muscles are anchored

Caudal: in hind part of body: situated in or extending towards the hind part of the body

Conjunctiva: membrane under eyelid: a delicate mucous membrane that covers the internal part of the eyelid and is attached to the cornea

Cornea: transparent membrane covering front of eye: the transparent convex membrane that covers the pupil and iris of the eye

Femur: ZOOLOGY large bone in vertebrate leg: a bone equivalent to the human thighbone in other vertebrates

Keratin: fibrous protein: a fibrous insoluble protein that is the main structural element in hair, nails, feathers, and hooves

Metatarsals: foot bone: any of the set of bones between the toes and ankle

Ochriesh: brownish-yellow colour

Oropharynx: upper part of throat: the part of the throat that is located below the soft palate and above the larynx

Palpable: feelable: able to be felt by the hands, especially in a medical examination

Phalanges: ANATOMY finger and toe bone: a finger or toe bone of a human being or vertebrate animal

Sedentary: BIRDS nonmigratory: remaining in the same area throughout the year and not migrating

Speculum: medical instrument: a medical instrument used to hold open a body passage, for example the anus or vagina, so that it can be examined

tibiotarsus: bone in birds leg

Ulcerations: forming of ulcer: the formation of an ulcer. **Ulcer:** external sore: a suppurating sore on the skin that does not heal and results in the destruction of tissue

Thorax: upper part of animal's body: the area corresponding to the human thorax in other vertebrates

14 Appendix

Appendix 1 standards for exhibiting captive raptors in New South Wales.

Standards for Exhibiting Captive Raptors in New South Wales

Exhibited Animals Protection Act

A publication of the Director-General, NSW Agriculture
pertaining to the conditions of display of captive raptors
(pursuant to Clause 8(2) of the Exhibited Animals Protection Regulations, 1995).
Standards for exhibiting captive raptors in New South Wales 2

Clause 1 Facilities

1.1 GENERAL REQUIREMENTS

1.1.1 Construction

- a) Enclosures shall be constructed of such materials and be maintained in sufficiently good repair to ensure that they will contain the animals at all times and are to be safe for the animals, for the staff attending them and for the public.
- b) Enclosures shall include a covered shelter, enclosed by weatherproof walls which provide roost security and protection from wind, rain and extremes in temperature and sunlight.
- c) Enclosures for raptors shall include a water mist spray or allow the birds access to rain.
- d) Enclosures shall be well drained and have either a readily cleanable substrate or be of a material which can be replaced to avoid the accumulation of faeces, urates, fungi and moulds.
- e) Mesh netting surfaces for raptor enclosures shall preferably be of flexible nylon. Wire mesh shall be flexible to reduce the impact of birds colliding with it. Wire roof surfaces should be as near to horizontal as possible.
- f) The size and shape of enclosures for raptors shall provide freedom of movement, both vertically and horizontally and should not fall below the minimum requirements set forth under 1.1.5.
- g) Access to raptor enclosures should be through a double door safety entrance. Doors are to be self-closing and locked upon exiting.

1.1.2 Treatment Facilities

Suitable low light, warm isolation facilities shall be available for treatment of sick animals.

1.1.3 Inter-and Intra-Specific Interaction (Aggression Reduction)

- a) Raptor species of similar size and hunting capacity may be held together in the same enclosure if they are not noted for inter-specific aggression.

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- b) If a raptor is being dangerously stressed by the aggression/presence of other raptor(s) of its own or other species in the enclosure, then arrangements shall be made for it to be housed separately from the other raptor(s) causing the stress.

1.1.4 Enclosure Furniture

- a) The total number of perches and/or ledges shall outnumber the number of birds in an aviary.

- b) Perch(es)/ledge(s) in the covered shelter shall be placed so that a raptor resting on one of these may avoid visual contact with raptors in adjoining enclosures. All perches should be placed so that birds in adjoining enclosures cannot perch within reach of each other through cage wire.
- c) Perches/ledges should be placed so as to encourage the raptors to make maximum use of the flight possibilities within the enclosure. At least one perch should be no less than two(2) metres from the ground.
- d) Competition for the highest vantage point shall be avoided by providing a number of perches at that height.
- e) In addition to the requirements of (a), a number of stumps may also be provided. Enclosures containing raptors which are incapable of normal flight should include rough-barked branches which permit the birds to climb to perches from the substrate.
- f) All perches/ledges/tree stumps shall be placed so that birds can perch comfortably without their plumage coming into contact with walls or fixtures.
- g) Perches shall be constructed from uncontaminated natural branches and vary in diameter and cross-section so that at least some shall have circumferences not less than the talon span of the species to be housed.
- h) Each nocturnal hole-nesting owl shall be provided with at least a darkened corner to hide from the light and provide roost security. Provision of a suitable hollow log is recommended.
- i) Where enclosures contain male and female raptors, sight barriers shall be provided so that the sexes can isolate themselves visually.
- j) Perches must be no closer to the roof of the enclosure than that distance which is needed for the bird's wing to go through its natural arc during take-off and landing.
- k) Perches in breeding enclosures should be positioned so that there is sufficient overhead clearance for copulation.
- l) An aviary for the housing of raptors shall contain a bathing pond/container with a diameter sufficient to allow normal bathing behaviour and a depth not greater than 15cm and not less than 5cm.

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- m) The pond/container shall have a non-slip, cleanable surface and no sharp edges.
- n) The pond/container shall be kept filled with clean fresh water or where the length of the legs of the shortest bird is less than 15cm to a depth equal to the length of that bird's legs.

1.1.5 Space Requirements

An aviary for the housing of raptors shall be of the following minimum size standards:

Name Width(M) Length(M) Height(M)

ORDER CATHARTIFORMES

Family: Cathartidae

Andean Condor *Vultur gryphus* 6 15 5

ORDER ACCIPITRIFORMES

Family: Pandionidae

Osprey *Pandion haliaetus* 3.5 8 4

Family: Accipitridae

Black-shouldered Kite *Elanus notatus* 2.5 6 4

Letter-winged Kite *Elanus scriptus* 2.5 6 4

Black Kite *Milvus migrans* 3 8 4

Square-tailed Kite *Lophoictinia isura* 3 8 4
 Black-breasted Buzzard 3.5 8 4
Hamirostra melanosternon
 Brahminy Kite *Haliastur indus* 3 8 4
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 Whistling Kite *Haliastur sphenurus* 3 8 4
 Collared Sparrowhawk *Accipiter cirrhocephalus* 3 8 4.5
 Brown Goshawk *Accipiter fasciatus* 3.5 10 4.5
 Grey Goshawk *Accipiter novaehollandiae* 3.5 10 4.5
 Red Goshawk *Erythrorhynchus radiatus* 4 10 4.5
 Little Eagle *Hieraaetus morphnoides* 3 8 4
 Wedge-tailed Eagle *Aquila audax* 5.5 10 4.5
 White-breasted Sea Eagle *Haliaeetus leucogaster* 5 10 4.5
 Spotted Harrier *Circus assimilis* 3 8 4
 Swamp Harrier *Circus aeruginosus* 3 8 4
 Crested Hawk (Pacific Baza) *Aviceda subcristata* 2.5 6 4

ORDER FALCONIFORMES

Family: Falconidae

Australian Hobby *Falco longipennis* 3 8 4.5
 Peregrine Falcon *Falco peregrinus* 3 10 4.5
 Black Falcon *Falco subniger* 3.5 10 4.5
 Grey Falcon *Falco hypoleucos* 3 10 4.5
 Brown Falcon *Falco berigora* 3.5 10 4.5
 Australian (Nankeen) Kestrel *Falco cenchroides* 2.5 6 4
 Standards for exhibiting captive raptors in New South Wales 6

ORDER STRIGIFORMES

Family: Strigidae

Rufous Owl *Ninox rufa* 3 7 3
 Powerful Owl *Ninox strenua* 3 8 3
 Boobook Owl *Ninox novaeseelandiae* 3 6 3
 Barking Owl *Ninox connivens* 3 7 3

Family: Tytonidae

Barn Owl *Tyto alba* 3 6 3
 Masked Owl *Tyto novaehollandiae* 3 7 3
 Grass Owl *Tyto longimembris* 3 6 3
 Sooty Owl *Tyto tenebricosa* 3 7 3

Clause 2 Staff

2.1

Raptors shall be under the supervision of a person capable of -

- a) safely handling and/or restraining raptorial birds;
- b) minimising the likelihood of, and danger of, attacks on keepers by raptors;
- c) minimising the stress experienced by raptors;
- d) "manning" (taming) raptors before being displayed;
- e) providing adequate maintenance diets for the raptorial birds held; and
- f) recognising aberrant behaviour and indicators of ill health in the species under his/her supervision.

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2.2

a) If raptors are tethered on display, it shall only be for demonstration or other purposes approved by the Director-General. The tethered raptors shall be under constant supervision to protect them from the public and animal predators. Birds normally used for demonstrations may remain jessed.

b) If raptors are to be tethered, then the person wishing to handle the birds shall first satisfy the Director-General that the person has received adequate training in the manufacture and use of the following falconry equipment:

Aylemerie leather jesses

jess swivels

leashes

gloves

hoods

perches

Clause 3 Records

3.1 Identification

Each raptor shall be individually identified by an approved method of identification, e.g. a leg band.

3.2 Record-Keeping

a) Establishments shall keep records of all raptors on an individual basis in a form which can be quickly and easily examined, analysed and compared with those kept by other establishments because of the potential value for the development of improved management practices.

b) All documents and other information pertaining to each animal from previous locations

must be kept safely. Animals moving to new locations must be accompanied by copies of all records relevant to those animals.

c) The records shall provide at least the following information for each individual:

i) The correct scientific name, common name, individual identification, any personal name and any distinctive markings;

ii) The origin (i.e. details of the wild population or of the parents and their origin, and of any previous location);

iii) The dates of acquisition and disposal, with details of circumstances and addresses;

iv) The date or estimated date of hatching, and the basis on which the date is estimated;

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v) Clinical data, including results of physical examination by a qualified veterinarian and details of, and date when, any form of treatment was given, together with results of routine health examinations;

vi) Breeding and details of any offspring;

vii) The date of death and the results of the post mortem examinations; and

viii) Normal diet (including supplement) and feeding routine.

Clause 4 Diet & food collection

4.1 General

a) Suitable whole animals shall provide at least 50% of the nutritional and energy

requirements of raptors.

b) Suitable whole animals will depend upon the species and will include - mammals such as guinea pigs (for Condors); domestic mice, rats, rabbits (for mammal-eating species); fish (for piscivorous sp.); insects (for insectivorous sp.); birds, such as coturnix quail, domestic chickens (for bird-eating species) and any natural prey species which can be legally obtained.

c) Suitable fish species shall provide at least 25% of the dietary requirements of piscivorous raptor species.

d) Suitable bird species shall provide at least 60% of the dietary requirements of birds of the Accipiter and Erythrotriorchis genera and bird-hunting species of the Falco genera.

e) An establishment applying for a permit to exhibit raptors must satisfy the Director-General that it has guaranteed access to adequate fresh and/or frozen supplies of suitable whole animals.

f) Mammal and bird specimens less than ten(10) weeks of age shall not form more than 25% by weight of the diet fed to raptors in any one week.

g) Except on starve days, a sufficient quantity of food shall be provided daily so that there

is some left over each day.

h) Raptors may be given no more than one starve day per week and there shall be at least three(3) days between any two starve days.

4.2 Quality of Food

a) Food supplied to raptors shall be clean and fresh, obtained from a reliable source and, preferably, bred under laboratory conditions.

b) Before carcasses are offered as food, they shall be cut open and observed for gross lesions suggestive of disease.

c) The following shall NOT be fed to raptors:

- * any animal that has died, or is suspected of dying from any toxic material, including insecticides, rodenticides, and euthanasing chemicals (CO₂ is acceptable).

- * animals showing clinical signs of being infected by disease (especially trichomoniasis protozoa in pigeons and doves).

- * birds which have not undergone treatment to remove the risk of trichomoniasis infection. (Preferred treatment: freeze for at least 24 hours at a temperature equal to or below - 18 degrees Celsius or remove upper gastro-intestinal tract directly after euthanasia.)

- * laboratory mice and rats that have been used in those research programmes which lead to the food animals containing chemicals different from those of normal laboratory fed mice and rats.

- * fatty meat.

- * meat which has not been supplemented with an appropriate calcium additive.

- * animals which have been killed by lead shot.

d) Food items shall be placed on a non-contaminated surface.

Clause 5 Hygiene

a) Substrate of enclosures shall be cleaned at least weekly. The substrate, perches, shelves, nestboxes, food and water containers and other components of the enclosure shall be maintained in a clean and hygienic condition, free from the accumulation of

faeces and urates.

b Excrement, left-over food, fur, feathers and castings shall be removed at least weekly to avoid unhealthy and unsightly accumulation of these matters.

c) Contaminated substrate material shall be removed and replaced as necessary.

d) Solid surfaces within the enclosure shall be disinfected at least bi-annually. These surfaces shall first be washed with soap and water, or steam. Disinfected surfaces shall be rinsed before raptors come in contact with them again. Use of suitable disinfectants shall be under veterinary instruction.

e) Perches, shelves, nestboxes and other items of enclosure furniture made from wood shall be replaced after a period of no more than two(2) years. The items replaced shall be destroyed by burning.

f) Entry of potential pests, such as wild rodents, birds and insects shall be controlled.

g) The use in or around raptor enclosures of insecticides containing chlorinated hydrocarbons and animal poisons, e.g. rodent baits, shall be under veterinary instruction in view of the known toxicity of these substances to raptorial birds.

Clause 6 Veterinary Care

Application for a permit to keep raptors should be accompanied by a statement which briefly

explains the programme by which the veterinarian will monitor -

- * growth of beaks and talons (to avoid bumblefoot)
- * the level of internal parasites
- * incidence of avian tuberculosis.

Clause 7 Transport

7.1 Containers

a) A transport container for raptors shall not allow the entry of light except through ventilation holes. Ventilation holes shall be pierced around the lower half on all sides of the container, about 10cm above the internal floor height and about 7.5cm apart. Two holes shall be pierced on all four sides 10cm below the internal roof height.

b) The dimensions of the transport container shall be at least 30cm longer and wider than the length of the bird from beak tip to tail tip and shall provide at least 15cm head clearance for the bird when standing at rest on the floor of the container or on any perch in the container.

Standards for exhibiting captive raptors in New South Wales 11

c) A perch consisting of a block of wood of sufficient size to allow the bird a firm grip may be firmly fixed to the floor of the container if desired.

d) If the container includes no perch, the floor of the container shall be lined firmly with a resistant material which will provide grip for the birds' talons. (Non-looped artificial grass is recommended.)

e) Access to the container shall be from a hinged or sliding door/lid on the top side of the container. The door/lid shall be well secured during carriage of the bird. The transport container may be constructed of sturdy cardboard, polystyrene, or wood. Use of any other material must first be approved by the Director-General.

f) In situations where the bird will not be accompanied by an experienced raptor handler at all times during its transport, the transport container shall be constructed of wooden sheets and framing sturdy enough to withstand damage in transport. Containers must be clearly marked 'LIVE ANIMAL, HANDLE WITH CARE, THIS WAY UP, KEEP

COOL'.

- g) No more than one raptor shall be enclosed in a compartment of a transport container unless all the birds in the container are young fledglings from the same nest.
- h) It is recommended that the attending veterinarian or an approved raptor rehabilitator be consulted on conditions of transportation before transporting injured or sick raptors for medical treatment or diagnosis.
- i) For journeys less than twenty-four(24) hours duration, the birds to be transported shall not be fed within four(4) hours of departure. Provision shall be made for feeding on arrival at the destination point.
- j) For journeys greater than twenty-four(24) hours, transport containers must include access to food. Birds should be fed once they have been in transit for twenty-four(24) hours.
- k) Provisions (i) and (j) do not apply to nestlings - feeding of these birds shall be under veterinary direction.
- l) Raptors must not be subjected to temperatures greater than 30 degrees or less than 10 degrees Celsius during transport.
- m) Noise must be minimised during transport.
- n) Time from boxing to destination must be minimised.

Standards for exhibiting captive raptors in New South Wales 12

7.2 Release into New Enclosure

- a) Raptors that are to be released into a new enclosure (from the wild or from another enclosure/transport container) should be released at a suitable time, i.e. owls at dusk, diurnals early morning, so as to avoid heat/cold stress and allow time for orientation in a new surrounding. Release should be carried out away from public view (using screens) and separate from other birds when applicable (using partitions).
- b) Raptors may be "manned" (tamed) before being put on display.

Clause 8 Security and public safety

- a) Raptors shall not be enclosed in walk-through aviaries. If the Director-General is satisfied that visitors will not be attacked, exemption to this requirement may be granted.
- b) Any raptor taken from its enclosure for show or performance purposes shall have been trained to accept being tethered and shall at all times be under the control of an experienced handler. The raptor shall be belled and be fitted with jesses which have the owner's name and contact address on them.
- c) Members of the public are not permitted to handle raptors except when the birds are fully "manned" and are under the strict supervision of an experienced handler.
- d) A safety fence shall be provided to keep visitors from coming into contact with enclosures containing White-breasted Sea Eagles or Wedge-tailed Eagles.

Standards for exhibiting captive raptors in New South Wales 13

References

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- Standards for exhibiting captive raptors in New South Wales 14

Appendix 2 MSDS Power Plus Disinfectant Deodoriser

For 11/1/2000 09:10:2 82022889

Page 03

86 VICTORIA ST SMITHFIELD NSW 2164
PH: (02) 9757 2015 FAX: (02) 9725 5218
A.C.N: 053 718 386 A.B.N: 46 053 778 386

EGYPCO CHEMICALS

MATERIAL SAFETY DATA SHEET

NON HAZARDOUS ACCORDING TO WORKSAFE AUSTRALIA
PAGE: 1 OF 3
DATE OF ISSUE: 26/7/01

IDENTIFICATION

PRODUCT NAME:	POWER PLUS DISINFECTANT DEODORISER
PRODUCT CODE:	PP-D
USE:	DISINFECTANT AND LIGHT GENERAL CLEANER

DESCRIPTION

POWER PLUS DISINFECTANT DEODORISER is a commercial grade disinfectant, which is ideal for disinfecting, deodorizing and cleaning all hard surfaces, leaving a pleasant residual fragrance.

FEATURES AND BENEFITS

- Many varieties including: pine, lemon, musk, spices, apple, tutti-fruity & eucalyptus.
- Contains Antibacterial Agent.
- All products are biodegradable.

IDENTIFICATION

UN NUMBER:	NOT APPLICABLE
DANGEROUS GOODS CLASS:	NOT APPLICABLE
SUBSIDIARY RISK:	NOT APPLICABLE
HAZCHEM CODE:	NOT APPLICABLE
PACKING GROUP:	NOT APPLICABLE
IERG NUMBER:	NOT APPLICABLE
POISONS SCHEDULE:	NOT APPLICABLE

July 26, 2001

Page 2

M.S.D.S.**PRODUCT NAME:** POWER PLUS DISINFECTANT DEODORISER**PHYSICAL DESCRIPTION/PROPERTIES**

APPEARANCE: THIN LIQUID WITH A STRONG FRAGRANCE
BOILING POINT (*C): ~100°C
MELTING POINT (*C): 0°C
VAPOUR PRESSURE: NOT APPLICABLE
SPECIFIC GRAVITY: 1000 ± 0.01
FLASHPOINT (*C): NOT APPLICABLE
FLAMMABILITY LIMITS (%): NOT APPLICABLE
SOLUBILITY IN WATER (g/L): FREELY SOLUBLE IN WATER
PH LEVEL: 7 - 7.5

INGREDIENTS

CHEMICAL ENTITY:	CAS NUMBER	PROPORTION
Alkyl Dimethyl Benzyl		
Ammonium Chloride	68424-85-1	1.6%
Nonionic Surfactant	9016-45-9	1-10%
Fragrance		<1%

HEALTH HAZARD INFORMATION

- If swallowed may cause abdominal pain and nausea.
- A mild irritant to eye. Will cause discomfort and reddening of eyes.
- Non-hazardous to skin, avoid prolonged contact though.
- Not volatile if inhaled.

FIRST AID

- If poisoning occurs, contact a doctor or Poisons Information Centre.
- If affected by inhalation remove from contaminated area. Apply artificial respiration if not breathing.
- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- If swallowed DO NOT induce vomiting. Give a glass of water. Seek medical attention.
- In case of accident or if you feel very unwell, seek medical advice immediately.

July 26, 2001

Page 3

M.S.D.S.

PRODUCT NAME: POWER PLUS DISINFECTANT DEODORISER

SAFE HANDLING INFORMATION

- DO NOT mix this product with disinfectant or bleach.
- Keep container closed when not in use.
- Store in a cool place.
- Slippery when split.
- Avoid accidents clean up immediately.
- Contain using sand or soil.
- Wash down with copious volume of water.
- NOT flammable.
- Rubber gloves may be worn to minimize any risks.

OTHER INFORMATION

- This product is TGA approved at dilution of 1:20 with water.
- All the ingredients used in this product are biodegradable.

IN AN EMERGENCY CALL 000 OR NATIONAL POISONS CENTRE. PH: 131 126

Material Safety Data Sheet



This material is hazardous according to criteria of NOHSC.
Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail.

1. Identification of the substance/preparation and of the company/undertaking

Product Name: ORICA ECLIPSE GRANULATED CHLORINE FOR SWIMMING POOLS

Supplier: Orica Australia Pty Ltd
ABN: 004 117 828
Street Address: 1 Nicholson Street,
Melbourne 3000
Australia
Telephone Number: +61 3 9665 7111
Facsimile: +61 3 9665 7937

Emergency Telephone: 1 800 033 111 (ALL HOURS)

2. Composition/information on ingredients

Product Description: Swimming pool chemical, algicide, biocide, oxidant
White solid with a chlorine odour.

Calcium hypochlorite 7778-54-3	>60%	R8, R22, R31, R34, R41, R50
-----------------------------------	------	-----------------------------

3. Hazards identification

Risk Phrases: Contact with combustible material may cause fire. Harmful if swallowed. Contact with acids liberates toxic gas. Causes burns. Risk of serious damage to eyes. Very toxic to aquatic organisms.

Poisons Schedule: S6 Poison

4. First-aid measures

For advice, contact a Poisons Information Centre (Phone eg. Australia 131 125; New Zealand 0 800 764766) or a doctor.

Inhalation: Remove victim from area of exposure - avoid becoming a casualty. Remove contaminated clothing and loosen remaining clothing. Allow patient to assume most comfortable position and keep warm. Keep at rest until fully recovered. If patient finds breathing difficult and develops a bluish discoloration of the skin (which suggests a lack of oxygen in the blood - cyanosis), ensure airways are clear of any obstruction and have a qualified person give oxygen through a face mask. Apply artificial respiration if patient is not breathing. Seek immediate medical advice.

Skin Contact: If skin or hair contact occurs, immediately remove any contaminated clothing and wash skin and hair thoroughly with running water. If swelling, redness, blistering or irritation occurs seek medical assistance.

Eye Contact: Immediately wash in and around the eye area with large amounts of water for at least 15 minutes.

Product Name: ORICA ECLIPSE GRANULATED CHLORINE FOR SWIMMING POOLS
Substance No: 000031064512

Issued:

13/11/2003

Version:

3

Material Safety Data Sheet



Ingestion: Eyelids to be held apart. Remove clothing if contaminated and wash skin. Urgently seek medical assistance. Transport to hospital or medical centre.
Immediately rinse mouth with water. If swallowed, do NOT induce vomiting. Give a glass of water. Seek immediate medical assistance.

Notes to physician: Treat symptomatically. Can cause corneal burns. Delayed effects from exposure to chlorine (decomposition product) can include shortness of breath, severe headache, pulmonary oedema and pneumonia.

5. Fire-fighting measures

Specific Hazards: Non combustible, but will support combustion of other materials.
Fire-fighting advice: Not combustible, however will support the combustion of other materials. Calcium hypochlorite is a powerful oxidising agent and decomposes violently upon heating liberating oxygen, and toxic chlorine gas. In case of fire, area must be evacuated and specialist fire fighters called. Only large quantities of water should be used as an extinguishing agent. If excess water is not available DO NOT attempt to extinguish the fire; use available water to prevent the spread of fire to adjacent property. Attending fire fighters should keep upwind if possible and wear full protective equipment including rubber boots and self-contained breathing apparatus. A fire in the vicinity of calcium hypochlorite should be extinguished in the most practical manner but avoid contaminating this material with the fire fighting agent, including water. Decomposes on contact with water evolving toxic chlorine gas. Once fire is extinguished, wash area thoroughly with excess water. Ensure that drains are not blocked with solid material. Maintenance of excess water during cleaning up operation is essential. Combustible material involved in the incident should be removed to a safe open area for controlled burning or for further drenching with water prior to collection for disposal.

Suitable Extinguishing Media: Water spray (large quantities)

6. Accidental release measures

Wear protective equipment to prevent skin and eye contact and breathing in vapours/dust. Air-supplied masks are recommended to avoid inhalation of toxic material. DO NOT return spilled material to original container. DO NOT add small amounts of water to calcium hypochlorite. Sweep up, avoiding generation of dust, then immediately spread as a thin layer in uncontaminated, dry, open area to reduce the possibility of local hot spots forming. Where a spill has occurred in a confined space or an inadequately ventilated enclosure and the material is damp and evolving chlorine, the rate of chlorine evolution can be reduced by covering the thinly spread solid with soda ash. For large spills notify the Emergency Services.

7. Handling and storage

Handling advice: Avoid skin and eye contact and breathing in dust. Keep out of reach of children.

Storage advice: Store in a cool, dry, well ventilated place and out of direct sunlight. Store away from foodstuffs. Store away from incompatible materials described in Section 10. Keep dry - reacts with water, may lead to drum rupture. Keep containers closed when not in use - check regularly for spills.

This material is a Scheduled Poison: S8 and must be stored, maintained and used in accordance with the relevant regulations

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8. Exposure controls/personal protection

Occupational Exposure Limits:

No value assigned for this specific material by the National Occupational Health and Safety Commission. However, Exposure Standard(s) for decomposition product(s):

Chlorine, Peak Limitation = 3 mg/m³ (1 ppm)

As published by the National Occupational Health and Safety Commission:

Peak Limitation - a ceiling concentration which should not be exceeded over a measurement period which should be as short as possible but not exceeding 15 minutes

These Exposure Standards are guides to be used in the control of occupational health hazards. All atmospheric contamination should be kept to as low a level as is workable. These exposure standards should not be used as fine dividing lines between safe and dangerous concentrations of chemicals. They are not a measure of relative toxicity.

Engineering Control Measures:

Ensure ventilation is adequate and that air concentrations of decomposition product(s) is/are controlled below quoted Exposure Standards. Avoid generating and breathing in dusts. Use with local exhaust ventilation or while wearing dust mask. Keep containers closed when not in use.

Personal Protective Equipment:

Orica Personal Protection Guide No. 1, 1998: F - OVERALLS, SAFETY SHOES, CHEMICAL GOGGLES, GLOVES, DUST MASK.

Wear overalls, chemical goggles and impervious gloves. Avoid generating and inhaling dusts. If dust exists, wear dust mask/respirator meeting the requirements of AS/NZS 1715 and AS/NZS 1716. Always wash hands before smoking, eating, drinking or using the toilet. Wash contaminated clothing and other protective equipment before storage or re-use.

9. Physical and chemical properties

Physical state:	Solid
Colour:	White
Odour:	Chlorine
Molecular Formula:	Ca(OCl) ₂
Solubility:	Soluble in water.
Specific Gravity:	2.1
Relative Vapour Density (air=1):	Not available
Vapour Pressure (20 °C):	Not available
Flash Point (°C):	Not available
Autoignition Temperature (°C):	Not available
% Volatile by Weight:	Not available
Solubility in water (g/L):	Not available
Boiling Point/Range (°C):	Not available
Decomposition Point (°C):	Not available
pH:	11.5 (5% aqueous solution)

10. Stability and reactivity

Stability: Powerful oxidising agent. Calcium hypochlorite (dry or hydrated) and its mixtures are incompatible with

Product Name: ORICA ECLIPSE GRANULATED CHLORINE FOR SWIMMING POOLS
 Substance No: 000031064512
 Issued: 13/11/2003
 Version: 3

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di chloroisocyanuric acid, ammonium nitrate, trichloroisocyanuric acid, or any chloroisocyanurate. Reacts with water liberating chlorine.

11. Toxicological information

No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label. Symptoms or effects that may arise if the product is mishandled and overexposure occurs are:

Ingestion: Swallowing can result in nausea, vomiting, diarrhoea, abdominal pain and chemical burns to the gastrointestinal tract.
Eye contact: A severe eye irritant. Corrosive to eyes. Contact can cause corneal burns. Contamination of eyes can result in permanent injury.
Skin contact: Contact with skin will result in severe irritation. Corrosive to skin - may cause skin burns.
Inhalation: Breathing in dust may result in respiratory irritation. Chlorine, evolved from decomposition when wet, is a severe respiratory irritant, corrosive, and highly toxic. Delayed effects can include shortness of breath, headache, pulmonary oedema, and pneumonia.

Long Term Effects:

No information available for the product.

Toxicological Data:

Oral LD50 (rat): 850 mg/kg

12. Ecotoxicological information

Avoid contaminating waterways.

Environmental fate, persistence and degradation:

This material is biodegradable.

Aquatic toxicity:

Very toxic to aquatic organisms. 24hr LC50 (striped bass larvae) = 0.7 mg/L.

Terrestrial toxicity: Expected to be harmful to terrestrial species.

13. Disposal considerations

Refer to Waste Management Authority. Dispose of material through a licensed waste contractor. Clean containers with water.

14. Transport information

Road and Rail Transport

Classified as Dangerous Goods by the criteria of the Australian Dangerous Goods Code (ADG Code) for Transport by Road and Rail.

UN No: 2880
Class-primary 5.1 Oxidizing Agent

Product Name: ORICA ECLIPSE GRANULATED CHLORINE FOR SWIMMING POOLS
Substance No: 000031064512

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Version: 3

Material Safety Data Sheet



Packing Group: II
Proper Shipping Name: CALCIUM HYPOCHLORITE, HYDRATED
Hazchem Code: 2W

Marine Transport

Classified as Dangerous Goods by the criteria of the International Maritime Dangerous Goods Code (IMDG Code) for transport by sea.

This material is classified as a Marine Pollutant (P) according to the International Maritime Dangerous Goods Code

UN No: 2880
Class-primary: 5.1 Oxidizing Agent
Packing Group: II
Proper Shipping Name: CALCIUM HYPOCHLORITE, HYDRATED

Air Transport

Classified as Dangerous Goods by the criteria of the International Air Transport Association (IATA) Dangerous Goods Regulations for transport by air.

UN No: 2880
Class-primary: 5.1 Oxidizing Agent
Packing Group: II
Proper Shipping Name: CALCIUM HYPOCHLORITE, HYDRATED

15. Regulatory information

Classification: This material is hazardous according to criteria of NOHSC.
 Xn: Harmful
 C: Corrosive

Risk Phrase(s): R8: Contact with combustible material may cause fire
 R22: Harmful if swallowed
 R31: Contact with acids liberates toxic gas.
 R34: Causes burns.
 R41: Risk of serious damage to eyes
 R50: Very toxic to aquatic organisms

Safety Phrase(s): S24/25: Avoid contact with skin and eyes.
 S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 S36/37/39: Wear suitable protective clothing, gloves and eye/face protection.
 S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label whenever possible).
 S61: Avoid release to the environment. Refer to special instructions safety data sheets.

Poisons Schedule: S6: Poison.

This material is listed on the Australian Inventory of Chemical Substances (AICS).

Product Name: ORICA ECLIPSE GRANULATED CHLORINE FOR SWIMMING POOLS
Substance No: 000031064512
Issued: 13/11/2003

Version: 3

RECEIVED 10/07/2007 09:12

To:

From:

Fax:

at: 07-07-10-08:10 Doc: 038 Page: 007

Material Safety Data Sheet



16. Other information

'Registry of Toxic Effects of Chemical Substances', Ed. D. Sweet, US Dept. of Health & Human Services: Cincinnati, 2003.
In: 'The Dictionary of Substances and their Effects', Ed. Gangoli S. Royal Society of Chemistry, 1999.

Reason(s) for Issue:

Change to Poisons Requirements

This MSDS summarises to our best knowledge at the date of issue, the chemical health and safety hazards of the material and general guidance on how to safely handle the material in the workplace. Since Orica Limited cannot anticipate or control the conditions under which the product may be used, each user must, prior to usage, assess and control the risks arising from its use of the material.

If clarification or further information is needed, the user should contact their Orica representative or Orica Limited at the contact details on page 1.

Orica Limited's responsibility for the material as sold is subject to the terms and conditions of sale, a copy of which is available upon request.

Product Name: ORICA ECLIPSE GRANULATED CHLORINE FOR SWIMMING POOLS
Substance No: 000031064512

Issued: 12/11/2003

Version: 3

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RECEIVED 05/10/2007 15:58

FROM : Chemical Essentials Pty Ltd

FAX NO. : 0398419909

Oct. 05 2007 04:06PM P1

*NA. Taken from Market
(from CHEMICAL ESSENTIALS)*

Page 1 of 2										
MATERIAL SAFETY DATA SHEET										
COMPANY DETAILS AUSTRALIAN DISTRIBUTOR: COMPANY: Chemical Essentials (Pty) Ltd Address: 13 Abelia St, Doncaster East, Victoria 3111 Emergency Telephone number: +03 9841 9901 Fax: +03 9841 9909	MANUFACTURER: Health and Hygiene (Pty) Ltd P O Box 347, Sunninghill 2157, South Africa Tel: +27 11 474-1658 Fax: +27 11 474-1670 e-mail: info@healthandhygiene.co.za									
IDENTIFICATION										
PRODUCT NAME: F10SG VETERINARY DISINFECTANT OTHER NAMES: F10 SUPER CONCENTRATE DISINFECTANT										
UN Number: None O & Class: None Hazchem code: None Poisons Schedule: 5										
HAZARDOUS ACCORDING TO CRITERIA OF WORKSAFE AUSTRALIA IN THE PACK CONCENTRATE ONLY (eyes and skin irritant)										
USE: Biodegradable multi purpose disinfectant for all hard surfaces, equipment and airspaces										
PHYSICAL DESCRIPTION/PROPERTIES										
Appearance: Clear, colourless liquid, with a slight natural odour Boiling Point: 110°C Vapour Pressure: Not known Specific Gravity: 1.00 Flash Point: Not flammable Flammability Limits: Not flammable Solubility in water: Soluble										
INGREDIENTS										
<table style="width: 100%; border: none;"> <tr> <td style="width: 40%;">Benzalkonium Chloride</td> <td style="width: 30%;">CAS Number: 68424-85-1</td> <td style="width: 30%;">Quantity (w/w): 5.4%</td> </tr> <tr> <td>Biquanide</td> <td>27083-27-8</td> <td>0.4%</td> </tr> <tr> <td colspan="2">Ingredients not determined to be hazardous</td> <td>to 100%</td> </tr> </table>		Benzalkonium Chloride	CAS Number: 68424-85-1	Quantity (w/w): 5.4%	Biquanide	27083-27-8	0.4%	Ingredients not determined to be hazardous		to 100%
Benzalkonium Chloride	CAS Number: 68424-85-1	Quantity (w/w): 5.4%								
Biquanide	27083-27-8	0.4%								
Ingredients not determined to be hazardous		to 100%								
HEALTH HAZARD INFORMATION										
HEALTH EFFECTS: Acute SWALLOWED: Low: Substantial ingestion may cause irritation to mouth, throat and digestive tract. EYE: Low: Will cause irritation but not serious damage. SKIN: Low: Concentrate may act as mild deodorant to sensitive skin. INHALED: Low: No significant hazard. Chronic INHALED: Low: No significant hazard.										
FIRST AID										
SWALLOWED: DO NOT induce vomiting. Give milk or water to drink. Seek medical advice where necessary. EYE: Rinse eyes with water. Seek medical advice where necessary. SKIN: Wash affected area with soap and water. INHALED: Non-toxic. Avoid long term inhalation of neat liquid. Remove to fresh air. FIRST AID FACILITIES: Contact a doctor or Poison Information Centre (phone 131128) ADVICE TO DOCTOR: Treat symptomatically.										

RECEIVED 05/10/2007 15:58

FROM : Chemical Essentials Pty Ltd

FRM NO. : 0398419909

Oct, 05 2007 04:07PM P2

**F105C VETERINARY DISINFECTANT
F10 SUPER CONCENTRATE DISINFECTANT**

PAGE 2 OF 2

PRECAUTIONS FOR USE

EXPOSURE LIMITS: No data found
Engineering controls: None required
PERSONAL PROTECTION: Not required
FLAMMABILITY: Not Flammable

SAFE HANDLING INFORMATION

Storage and Transport: Store below 30°C in dry conditions
SPILLS AND DISPOSAL: Soak up on an inert material e.g. dry earth and dispose of in an area approved by local authority by-laws. Flush small spills with copious amounts of water.
FIRE/EXPLOSION HAZARD: The product is not flammable or explosive.
OTHER INFORMATION: Ensure good industrial hygiene.
DO NOT mix with soaps or other chemicals.

CONTACT POINT: Managing Director, +63 9941 9901
Chemical Essentials Pty Ltd

KEEP OUT OF THE REACH OF CHILDREN

Issue number: 2
Issue Date: August 2004

Appendix 5 a sample record sheet

MASKED OWL RECORD SHEET DATE RECORDED.....
 I.D..... HOUSE NAME.....APPROX AGE.....

HATCH DATE..... PARENT REARED/HAND REARED

ORIGIN..... NORMAL DIET.....

LOCATIONS

date	enclosure	Number and I.D in enclosure.

MEDICAL RECORDS

DATE	TREATMENT	COMMENTS/SIGNATURE

MEASUREMENTS

DATE WEIGHT

SPECIAL NOTES dietary changes,behavioral problems,etc

BREEDING

DATE	ENCLOSURE	PAIR	OFFSPRING