ECOLOGY AND MANAGEMENT OF THE CHUDITCH

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Introduction

The Chuditch, sometimes known as the Western Quoll or Western Native-cat, is one of four species of native cats in Australia. Two other species occurs in New Guinea. It is a dasyurid marsupial, closely related to the smaller marsupial mice (Pseudantechinus, Ningaui, Sminthopsisetc.) and the larger Tasmanian Devil. It is the largest carnivorous marsupial in W.A. and is **not** a feral cat or related in any way to that group of cats!

The common name Chuditch has been adopted because it is the Nyungar Aboriginal word for this species and it now only occurs in the SW of W.A. The word reflects the explosive hiss the animal makes when it is angry. It was also known by other names to Aboriginal people in other areas and was an important totem animal, particularly to desert people.

Historically, quolls were among the first animals to be reported in Australia, when Captain Cook saw footprints and collected either a Tiger Quoll or Eastern Quoll in 1770 in Botany Bay. A specimen of a quoll, probably the Northern Quoll, was taken by his party at the Endeavour River, Queensland.

Description

The Chuditch is a medium-sized mammal, with males attaining 1.5 kg and females 1.0 kg. It is characterised by up to 60 white spots covering the flanks and back of the body, neck, and top of head. They do not occur on the tail. Much of its tail is covered with an attractive black brush. Fur colouring is brown, with paler fur on the belly. The head colour of older Chuditch tends towards grey. It has prominent, slightly rounded ears and a pointed nose.

The Chuditch was named Dasyurus geoffroii in 1841 by John Gould from a specimen taken from the Liverpool Plains in western NSW - this was the last one from NSW! It derives it generic name Dasyurus from the Greek for furry tail, and geoffroiiafter an eminent C19 British zoologist.

Two sub-species of the Chuditch have been described - D. g. geoffroiibased on specimens collected in eastern Queensland, NSW., and South Australia, and D. g. fortis based on specimens taken from Shark Bay and south-western W.A. The W.A Chuditch were described as being a larger animal but validity of these descriptions has been queried and it is now difficult to confirm because of the lack of specimens outside the south-west of W.A

Distribution and Status

Chuditch formerly occurred in every State and territory of mainland Australia. In the mid 1800's naturalists reported the Chuditch as being reasonably abundant and widespread throughout its range. However, the geographical range of Chuditch contracted dramatically following European settlement. Specimens were last collected in NSW in 1841, in Victoria in 1857, and in Queensland between 1884-1907. The species disappeared from the Nullabor Plain in the 1930's and the arid zone in the mid 1950's. In W.A., it was collected from Derby and Shark Bay in the mid to late 1800's. By 1907 it was absent from areas north of Geraldton, but still numerous in the south-west. It still occurred on the Swan Coastal Plain around Perth in the 1940's and early 1950's, but has now disappeared from this area.

Chuditch are now restricted to the south west of W.A., in an area bounded approximately by Gingin, Southern Cross and Esperance. This is approximately 5 % of their former range. The largest populations are found in the Jarrah forest, but even here they now occur at low to very low densities. They also still persist in localised areas in the central and southern wheatbelt. Chuditch have never been recorded in pure Karri forest.

It is estimated that only 4 500 Chuditch persist in the Jarrah forest and perhaps another 1500 in the wheatbelt.

Reasons for decline probably vary in different areas, but all relate to a decline in the productivity of the environment. Being a carnivore with high energetic demands and at the top of the food chain, the Chuditch would be affected by any loss of productivity in the ecosystem, perhaps more than organisms further down the food chain. It disappeared from the Swan Coastal Plain by the 1940's probably because of habitat loss and persecution, while in the arid areas changed fire regimes and predation may have been responsible. Although it still survives in the wheatbelt (one of our most disturbed habitats) and in the Jarrah forest, it is probably in lower densities than it should be. Recently it has been demonstrated that Chuditch numbers will increase significantly if foxes are controlled in the forest. Foxes can affect Chuditch numbers through direct predation, particularly dispersing young, and through competition for food.

In 1983, the Chuditch was declared a threatened species in W.A. A Management Program has now been prepared for the species. This includes all the biological knowledge for the species and provides management guidelines for operations. In addition, a Recovery Plan has been written detailing the actions and funding required over the next 10 years to ensure the conservation of the Chuditch. Fortunately this has been supported by the Commonwealth Government and Alcoa (through WWFN).

Diet

A Chuditch consumes about a quarter of its body weight in food each night. It eats a wide range of food. In the Jarrah forest, 60 % of the diet is made up of large invertebrates, such as cockroaches, beetles and centipedes. They also eat small mammals such as Mardos and Black Rats, and probably the young of bandicoots and Woylies. Birds, reptiles and freshwater crustaceans are also eaten. The red pulp surrounding Zamia seeds are eaten and captive Chuditch at the Zoo eat banana and pear.

Chuditch forage at night, primarily on the ground, but are also good climbers and will climb to obtain prey or escape from predators. Recreation sites in the forest are often visited by Chuditch seeking BBQ scraps and scavenging in rubbish bins.

Reproduction

Chuditch are seasonal breeders, with animals usually breeding in their first year. Females can enter oestrus from late April to early July. They are promiscuous and will allow several different males to copulate with them over the 4-10 day oestrus period. A female may have another oestrus in August if she does not become pregnant earlier.

The gestation period is very short, only 15-19 days and up to 6 young are born at a very immature stage. They are 5mm long and weigh only 15mg. They grow quickly and double their size in about 12 days. Spots first appear on their body at about 44 days and eyes open at 80 days. Hair starts appearing on the body by after 50 days of age.

They remain in the pouch for 60 days, and are then deposited in a burrow or hollow log. Weaning starts in mid September with the young making some forays away from the den, initially with their mother and later by themselves. They are probably most vulnerable to predation at this stage of their life.

The young finally disperse at 170 days old, usually in December/January.

They live up to 4 years in the wild, and reproductive success decreases with age.

Mortality

Chuditch can be killed in many ways, unfortunately most of these are not natural events. Natural predation by owls and snakes probably affects juvenile animals the most. Accidents such as drowning, and disease also kill Chuditch. Un-natural mortality factors include road kills, shooting, rabbit-trapping, poisoning with strychnine, and predation by foxes and feral cats. Loss of suitable habitat makes Chuditch more susceptible to un-natural mortality.

Den Requirements

The availability of suitable dens for day time refuge and nursery sites, is important for the conservation of Chuditch. In the Jarrah forest, 65% of dens are in earth burrows under rocks or up-rooted trees, and 35% are in horizontal hollow logs. In the desert, Chuditch also denned in hollows in termitaria.

In one year, a female Chuditch will use up to 66 logs and 110 burrows in her home range. Burrows are usually excavated to make them suitable as dens, however logs and hollows must have certain dimensions to be suitable as a den site. These are:

Diameter of hollow (pipe):	8 - 23 cm.
Diameter of log at den:	31 - 110 cm (average 77 cm).
Den log d.b.h:	52 - 191 cm.
Den-entrance distance:	0.7 - 8.2 m (usually > 1.0 m)

Home Range

Both sexes are solitary and occupy large home ranges (males 1500 ha, and females 400ha). Male home ranges may overlap substantially, but female show little or no overlap. The home ranges include a smaller, central core area defined by den locations. Male core areas comprise about 400 ha, and females about 90 ha.

Chuditch Management

As mentioned earlier, a recovery plan for the Chuditch has been prepared and this is now being funded by the ANPWS and Alcoa. The objective of this plan is to downlist the Endangered status of the Chuditch to Vulnerable. That is:

1) To ensure that the Chuditch persists in its present range.
2) To increase population numbers through expansion into its former range.

Six recovery actions are necessary for this to be achieved. These will be implemented over the next 10 years and include:

a) The integration of Chuditch habitat requirements into forest management practices.
b) The development and application of fox control programs that are Chuditch-safe.
c) Monitoring representative Chuditch populations.
d) Research into distribution and habitat requirements in the semi-arid zone, and disease.
e) Captive breeding program.
f) Development of techniques for translocating Chuditch into areas of vacant, suitable habitat.

Integration of Habitat Requirements

a) Response to prescribed burning:

Most of the Jarrah forest is burnt on a 5-7 year rotation to reduce litter loads. The response of Chuditch to this is not fully understood although it is known that they do survive both spring and autumn burns and continue to utilize recently burnt areas. The longer term effects of fire on breeding and recruitment are not known and will be examined in the near future.

Prescribed burning may actually benefit a wide ranging species such as Chuditch, because it establishes a mosaic of different forest vegetation ages which provides the variety of food required by Chuditch.

The most important issues for Chuditch are the retention of suitable denning logs and the quick recovery of arthropod fauna after a fire. A spring burn is more likely to achieve this than an autumn burn. Spring burns do not consume logs on the ground and leave islands of unburnt vegetation including areas along streams and rivers. Smaller burns are preferable to larger burns as there is less chance that the entire home range of a Chuditch would be burnt at the same time.

Thus to benefit Chuditch, based on existing knowledge, smaller spring burns are preferable. Riparian vegetation along creeks and rivers should be protected from fire, or burnt in a small mosaic. This would probably also benefit other species such as the Quokka.

b) Response to logging:

Very little is known about the responses of Chuditch to logging activities. The retention of suitable denning logs in these area is important and the current Jarrah silviculture prescription (2/91) now provides for this to occur. This may have to be revised following further research on this subject.

c) Response to mining:

Chuditch are known to occur in and around bauxite mine sites in the Jarrah forest. Many of these areas are now being rehabilitated and artificial den sites are being created with logs and rocks. Fast growing vegetation is being used to promote early colonization by insects and other invertebrates and so provide food for Chuditch.

Development of Chuditch-Safe Fox Control Programs

Chuditch once occurred in higher densities throughout its range and it is possible that the fox and cat have suppressed Chuditch numbers, as they have done to many herbivorous marsupials, through predation and/or competition for food.

Foxes and cats can be controlled using dried meat baits containing 1080 poison. However, it is possible that chuditch also take the poison baits. Although they do have some tolerance to 1080 it was not known if this is sufficient to prevent mortality or sub lethal sterility effects. Recently it has been demonstrated in the Jarrah forest that fox baiting does not have a detrimental effect on Chuditch, in fact it leads to a population increase. Poison baits are taken by Chuditch but they are not consumed in sufficient quantities to affect the Chuditch. It would appear therefore that fox control in Chuditch areas can be undertaken using dried meat baits containing 1080 poison.

Unfortunately, strychnine is still available to farmers and pastoralists for fox and dingo control. Chuditch are known to have been killed by this non-target specific poison. With 1080 now being more readily available, the APB will be encouraging farmers and pastoralists to use this poison rather than strychnine, particularly in areas where Chuditch are known to occur.

Monitoring Representative Chuditch Populations

Regular monitoring of representative Chuditch populations enables the effect of forest management and disease to be assessed, as well as providing information on the breeding biology, diet and population densities of Chuditch in the forest. Populations are being monitored at Perup, Batalling, Lane-Poole and will be monitored at a site to be selected in the Mundaring District. A population in a semi arid location will also be monitored in the future once a suitable population has been found.

Research into the Distribution and Habitat Requirements of Chuditch in the Semi-arid Area.

Very little is known about Chuditch in the wheatbelt and adjacent mallee areas. Surveys of large reserves (>10 000ha) will be undertaken over the next 10 years and a site for population monitoring established. To date, Frank Hann NP and Lake Magenta NR have been surveyed with positive results. Karroun Hill NR and Jaurdi Station have been surveyed with negative results.

Captive Breeding

A captive breeding program has been underway at the Perth Zoo since 1989. This has been successful with 52 young being produced for release into areas previously occupied by Chuditch. Captive bred Chuditch may also be sent to other Zoos in Australia for display and education purposes.

Translocation

Twenty four captive bred Chuditch were released at Julimar Conservation Park in September and their progress is being monitored. Chuditch were last recorded in this area in 1973. If this trial is successful, Chuditch will be re-introduced to a semi-arid area, probably Karroun Hill Nature Reserve in 2-3 years time. Some apparently suitable areas of the Jarrah forest also lack Chuditch and captive bred animals could also be re-introduced to these areas.

There has also been a request by Dr John Wamsley to re-introduce Chuditch to a 1 000 ha site in the Murray mallee area of South Australia. Chuditch were last recorded in this area in the 1880's.