

# **REPORT INTO THE DIAGNOSIS OF DEVIL FACIAL TUMOUR DISEASE AT TROWUNNA WILDLIFE PARK**

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## **EXECUTIVE SUMMARY**

On 30 October 2006 Devil Facial Tumour Disease (DFTD) was diagnosed in two Tasmanian devils at the Trowunna Wildlife Park. This is significant as it is the first time DFTD has been diagnosed in a wildlife park, and also that this wildlife park was the source of four devils sent to Denmark in April 2006.

The devil with the most advanced lesions, and therefore believed to be the first case, was examined under anaesthetic in March with no evidence of DFTD seen. It is therefore likely that the infection was not present in the wildlife park at the time of preparation of the devils for export.

The low prevalence of disease in the wildlife park (3 infected out of 43) is consistent with recent introduction of the disease.

Although there is no conclusive evidence of direct contact of captive devils with wild devils, lesions detected on the infected devil and events occurring in the park at the time lesions were first observed, are consistent with infection being introduced into the wildlife park population by a wild devil in May 2006.

There is no evidence to suggest that infection was introduced in a way other than direct contact with an infected devil. This means that the introduction of infection is consistent with the hypothesis that DFTD is transmitted as an allograft of tumour cells.

The condition of the walls of the enclosures and management practices mean that the level of biosecurity on this wildlife park is much lower than that of the DPIW managed facilities which housed the insurance population until December 2006. This means that the insurance population devils in DPIW facilities were not exposed to the same risk of disease introduction.

Although all the devils on the wildlife park have been examined under anaesthetic for DFTD, as there is no test which will identify animals which are incubating the disease it is not possible to completely rule out future detection of infection in further devils in the wildlife park.

## **BACKGROUND TO DFTD**

Devil Facial Tumour Disease (DFTD) is a neoplastic disease found in Tasmanian Devils. It is visually characterised by single or multiple spherical growths typically on the face, neck and inside the mouth. These growths may first appear as swellings under the skin or raised plaques inside the mouth. The growths progressively increase in size. Subcutaneous lesions will eventually burst through the skin, often appearing as friable ulcerated masses with secondary bacterial infections. Lesions inside the mouth may evert the lips and cheeks and damage the supportive structure of the teeth. The disease generally appears to be progressive and fatal, however it has not been proven that this is always the case.

The only available diagnostic test for DFTD is histopathology on tissue samples from lesions. There is no screening test available that can be applied to apparently healthy animals to determine if they are covertly infected by the disease.

Cytogenetic research strongly suggests that the tumour is an infectious tumour cell that can be 'transplanted' from one Devil to another. The method of transmission is presumed to be via bite wounds obtained during fighting.

The first signs of DFTD-like lesions were found at Mt William National Park in 1996. Since then it appears that the disease has moved as a front across the state, causing dramatic population collapses in its wake. Prior to the incident in this report DFTD had not been diagnosed in any Tasmanian devil in a wildlife park.

## **DETAILS OF INVESTIGATIONS AT TROWUNNA WILDLIFE PARK**

### ***BACKGROUND***

On 20/10/06 DFTD was detected in two Tasmanian devils at Trowunna Wildlife Park. This was the first time DFTD has been detected in Tasmanian devils in a wildlife park.

The two infected devils, Marooka, a 4year old male, and Mareeba, a 5year old female, were examined under gaseous anaesthesia on 22/10/06 and showed clinical evidence of DFTD. The clinical diagnosis was subsequently confirmed on laboratory testing of biopsy samples.

Following the detection of DFTD in these two devils, all devils in the wildlife park, with the exception of two juveniles still in the den, and devils at the associated facility Devils@Cradle, were clinically examined under anaesthetic and biopsy samples taken from any suspicious lesions. This resulted in the detection of a third infected devil, Nipper, a 6year old male. All other devils were free of evidence of the disease.

The apparent prevalence is 3 out of 43 devils at Trowunna Wildlife Park. This low prevalence is consistent with recent introduction of the disease.

### ***DEVILS WITH DFTD***

**Marooka** when examined on 20/10/06 had an irregular, raised, ulcerated mass, about 8cm by 5cm, on the right cheek. There was also a 5cm long purulent wound on the

left flank of the animal. Laboratory examination of biopsies from both lesions confirmed the mouth lesion as DFTD and the flank wound as suppurative dermatitis.

Marooka was one of eight devils (4 adults and 4 juveniles) that were isolated as potential devils for export to Denmark. All of these devils were examined under anaesthetic on 2/3/06 and no sign of DFTD was seen on any of these animals. The animals were examined again, without anaesthesia, on 15/3/06 and 27/3/06, and again there was no evidence of DFTD. Two adult and two juvenile devils were exported to Denmark in April 2006.

Observations of Marooka suggest a progressing lesion. In mid May a scratch of sufficient severity to be noted by park staff was seen on Marooka's cheek at the location where the tumour later developed. In June this appeared to have developed further. In September Mr Kelly thought it looked like an abscess on scar tissue. It was treated with topical anti-microbial spray and later (in September) was taken to Dr Lerner for treatment.

As Marooka demonstrated the most developed lesions it is suspected that he has been infected the longest and may have infected Mareeba and Nipper.

**Mareeba** when examined on 20/10/06 had a 1.5cm irregular raised ulcerated mass on the left lower lip. A biopsy of the lesion was collected and DFTD confirmed by laboratory examination. This devil had been in Big Den pen since 1/1/06 and was moved to pen (HA1) on 13/10/06 to be isolated for treatment for a slow healing "abscess" wound on her back. The wound on her lip was known to animal keepers and had possibly been there since breeding time (February to March). The lesion had been watched but had not been seen to change.

**Nipper** is one of the last devils at Trowunna that was caught in the wild. Originally caught by Nick Mooney, Nipper was held at Bonarong Park until transferred to Trowunna in 2003. The lesion on Nipper was first detected on 31/10/06 as part of the program to examine all devils in the wildlife park. On 31/10/06 Nipper is described as having a discharging wound on the left flank that appeared reluctant to heal. He also had an ulcerated lesion inside his mouth near the right commissure, approx 15mm x 10 mm. A biopsy taken from this mouth lesion was confirmed as DFTD.

#### ***MOVEMENTS OF THE INFECTED DEVILS.***

Compiled from information supplied by staff at Trowunna.

Marooka

PEN	DATE
Top Back	1/1/06 to 13/2/06
Top Right	13/2/06 to 16/2/06
Top Back	17/2/06 to 18/2/06
Top Right	18/2/06 to 20/2/06
Little Den	20/2/06 to 21/2/06
Big Den	21/2/06 to 1/3/06
HA1	2/3/06 to 31/3/06
Big Den/Bush Den	31/3/06 to 28/8/06
(move between the two)	

Bush Den	28/8/06 to 15/9/06,
ANU 6	15/9/06 to 28/9/06,
Stable	28/9/06 to 18/10/06,
Cottage 5	(in isolation) since 18/10/06.

ANU and Cottage 5 are both outside the perimeter fence.  
While in Big Den Marooka had direct contact with Mareeba, and one day (20/6/06) contact with Nipper.

#### Mareeba

Big Den	1/1/06 to 13/10/05
HA1	(in isolation) since 13/10/06.

#### Nipper

ANU1	1/1/06 to 20/6/06
Big Den	20/6/06 (one day only. Removed for fighting with Marooka)
ANU1	20/6/06 to 3/11/06
Cottage 1	(in isolation) since 3/11/06

ANU and Cottage 1 are both outside of the perimeter fence.

### ***TIME LINE OF EVENTS***

Marooka was examined under anaesthetic on 2/03/06, and examined without anaesthetic on 15/03/06 and 27/03/06 with no evidence of DFTD.

In mid May Marooka was seen to have a scratch on his cheek at the location where the tumour later developed. This injury was significant enough to warrant documentation and management by staff. At this time he was in Bush Den, a pen with a log wall with some gaps between the logs allowing potential contact with a devil outside the pen but inside the perimeter fence. There were a number of other devils in the pen with him at the time of the injury.

May / June – Misty was in oestrus (detected with pouch young in August). This was a fairly late mating as breeding usually occurs between February and May. At the time of mating she was in the Bush Den with Marooka and other devils. The significance of this is that the oestrus female may have attracted a wild male into the park at about the time the scratch was noticed on Marooka.

In June there was a branch down across the wall of the Big Den pen. Two female devils (Maleny and Meandara) escaped from this pen at the time. Maleny was caught within the park fence within 12 hours of escape and placed in a different pen. Meandara was not recaptured.

Also in June after the branch was down in Big Den, a wild male devil was trapped in the vicinity of the park outside of the perimeter fence. This wild devil was found on veterinary examination to have DFTD.

In September Mr Kelly thought the lesion on Marooka looked like an abscess on scar tissue which he then treated with topical anti-microbial spray. Marooka was taken to Dr Larner for treatment in September 2006.

In October after a period away from the park Mr Kelly noticed the lesion on Marooka appeared to be getting worse and not responding to treatment. This prompted a call to Jemma Bergfeld in DPIW leading to the subsequent examination of the devils and diagnosis of DFTD. Mareeba was examined as well because of the lesion on her back.

The tumour on Marooka was excised by Dr Larner in mid November. On 30 November only a healing scar could be seen from outside of the pen. Marooka was still on antibiotic treatment at the time.

### ***ASPECTS OF THE WILDLIFE PARK***

Trowunna Wildlife Park is set adjacent to an area of bushland that acts as a wildlife corridor. Since the park was established it has been normal to have evidence of wild devil activity outside the perimeter fence. A trap had been set outside the perimeter fence to look for any evidence of DFTD in wild devils in the area.

In the past 25 years about 12 devils have escaped from the park (as opposed to loose within the perimeter fence). Some have been re-trapped outside of the perimeter fence, others have been found killed on roads. The latest escape was Meandara in June 2006.

Also in the past the bush area outside the perimeter fence has been used for soft release of rehabilitated devils.

There is a fence enclosing the “wildlife park” part of the property (referred to in this report as the perimeter fence). This is a 2 metre high chain wire fence with the base cemented into the ground. This fence was established to keep in kangaroos and ensure visitors entered by the front gate. The fence was not installed as a biosecurity barrier. As the fence runs through some bush and large trees it would be impossible to guarantee that it was devil proof for 365 days a year. The escape of Meandara in June 2006 demonstrates that the perimeter fence was not devil proof at that time.

Not all devil pens are contained within the perimeter fence. Pens outside the perimeter fence are:

- ANU research pens used for research trials.
- ABC pen. Constructed as a film set. Currently empty and left open to see if there is any wild devil activity.
- Cottage pens.

### **ACTIONS TAKEN FOLLOWING DIAGNOSIS OF DFTD**

In response to the confirmation of DFTD in two devils at Trowunna Wildlife Park Veterinary Officer Rick Campbell visited Trowunna Wildlife Park on 25 and 27 October 2006 with the broad aim to,

- discuss the disease situation and biosecurity arrangements with Mr Kelly,
- to try and determine how the disease got into the park,

- to try and determine the extent of the problem,
- develop a program to manage the disease, and
- review the biosecurity in and around the park.

During the 25/10/06 visit the following course of action was agreed:

1. No movement of animals between pens as an initial response. Once the situation clarified movement between pens to be allowed to facilitate risk management. Such movements to be recorded and notified to DPIW.
2. No movements of animals out of or into the park. An Infected Area Notice was issued.
3. Staff contact with devils kept to a minimum.
4. Feeding displays to continue but public are not to handle the animals.
5. Any animals showing any signs of swellings to be removed from public display.
6. Work is to be done to increase the security of the pens. This involved increasing the height of the metal fencing and modifying the stone fence around one of the main display enclosures.

All devils, except two juveniles still in the den have undergone veterinary examination under general anaesthetic. Examinations were undertaken by Dr Wells at Trowunna on 30/10/06 & 31/10/06, and by Dr Bergfeld who examined the remaining 3 devils at Trowunna and the devils at Cradle on 22/11/06. During these inspections all devils were examined under anaesthetic and biopsy samples were taken of any suspect lesions. These examinations lead to the detection of the lesions in Nipper. No evidence suggestive of DFTD was found in any of the other devils.

## **HISTORY OF PERVIOUS DISEASE**

Information provided by Dr Brian Larner to Rick Campbell on 26/10/06

- Dr Larner indicated that he has seen about 10-12 devils from the wildlife park with lesions on them over the last 4 years. These were usually granulating lesions with a break in the skin. Most of the lesions he has treated have been on the body of the animals. No laboratory tests were conducted on these animals.
- Dr Larner has treated these animals with a combination of debridement of granulation tissue, then suturing the wound to almost close it up, antibiotic cover and the introduction of a strict nutritional program. The lesions usually cleared up after about 3 weeks.
- Dr Larner claims that Marooka is the first devil which has not responded to treatment.
- Dr Larner said that the lesions on this animal looked different, he was confident that it would clear up, but progress was slow.
- Dr Larner indicated that Marooka had a very advanced lesion compared to others seen and had been treated for 4 weeks, Dr Larner believed that the lesion was no longer increasing in size and that it was responding to treatment.

## **BIOSECURITY CONSIDERATIONS**

During inspection by Rick Campbell on 27/10/06 a number of issues were identified with respect to the security of the devil enclosures. These concerns relate to possible areas where a devil could enter the pens, although undetected exit would be more difficult. There was also concern that deteriorating log walls on some pens may

possibly allow contact between a devil in the pen and a devil loose inside the perimeter fence.

Three sets of pens (Cottage, ANU and ABC) are outside of the perimeter fence. In these pens the only separation between wildlife park devils and wild devils in the pen wall. Movement records show movements of devils between pens outside of the perimeter fence and those pens within the fence.

As stated previously the perimeter fence, a 2 metre high chain wire fence, does run through areas of bush and can not be guaranteed to be always devil proof.

Prior to the detection of DFTD wildlife park management were not applying any specific biosecurity protocols to prevent DFTD (eg protective clothing or footbathing), although Mr Kelly did indicate he had a copy of the biosecurity guidelines for minimising the risk of DFTD. These guidelines are in the document "*Reducing the potential for the transmission of Devil Facial Tumour Disease (DFTD) to captive Tasmanian devils*", DPIWE December 2004. The exception to this is the isolation period of the devils prepared for export to Denmark, in which case the conditions of the export protocol were followed for the isolation period. The use of gloves and footbaths was instituted after the diagnosis of DFTD in the park.

Following detection of DFTD, infected devils had been isolated and fed last, usually by Mr Kelly. While the two devils in the Cottage pens are well removed (about 200m) from the rest of the park, Mareeba in Holding Pen 5 is within the main area inside the perimeter fence. During a visit on 30/11/06 it was noted that pens containing infected devils were not locked and had no warning notices as a reminder for staff to take precautions.

#### ***DESCRIPTION OF PENS AT INSPECTION ON 27/10/06***

Big Den, Little Den and Bush Den, these pens have stone and log walls. The stone walls are only about 900mm high and have a rough outer surface, which affords footholds. The insides have smooth vertical concrete walls. It would not be difficult for animals to climb up these walls in some places. The log wall is made of 3 or 4 logs laid on top of each other and fitted into a stone pillar at the ends. Gaps between the logs are plugged with mortar. Over time the logs have begun to rot and the mortar has fallen out in some places, this would allow devils to make contact between the gaps. There is also a risk that branches may fall from surrounding trees and form a bridge.

There is a corner of the pens which has a large tree in it and has a shingle roofed shelter built around it. Devils from outside could climb up onto the wall at this point and then walk around the wall to access any of the Den pens.

As a matter of urgency sheets of roofing iron are to be placed along all these walls, both stone and log. The ideal in the long term would be to relocate the devils in this pen and use it for other species.

Top Pens(TBD, TFR, TFC, TFL), these are a block of 4 pens separated by a service passageway (3 pens on 1 side & 1 on the other). Three pens have a one metre deep moat as the front, this prevents animals from getting out but animals could get in

(devils do not generally jump down from heights). The end walls are stone capped with sheet metal. The back pen has sheet metal walls all round to a height of about 1000mm.

The front pens are to have a clear perspex or glass wall added to them, above the moat, which will prevent animals from jumping but still retain the appearance of no wall. The end walls will have metal sheeting placed on the vertical surface to prevent animal entry.

The walls of the back pens are currently being raised to 1400mm by the addition of another sheet of roofing iron.

ANU Pens, these extend beyond the perimeter fence. They have metal sheeting on them but it needs to be made higher. These pens are only used for old devils who are no longer able to be displayed or used for breeding programs. Additional sheeting to be placed around these pens to better secure them.

Round House, The part of this which is used for devils has a single sheet of roofing iron around it (800mm high), this will be increased to the equivalent of 2 sheets high and a gate will be added to the passageway which leads to the central service room.

Stable & Holding Area, this has solid walls, which do not allow access by animals from outside Mareeba is held in HA1.

Cottage, this is the isolation area where Marooka and Nipper are currently being held. It is completely removed from the rest of the park (200M away). This area is only visited for cleaning and feeding as the last job before completion of the day's activities.

## **POSSIBLE SCENARIOS FOR INTRODUCTION OF INFECTION**

### ***SCENARIO 1***

The available history indicates that a significant scratch was first seen at the site of the DFTD tumour on Marooka in May. At the time there was a female, Misty, on oestrus in the same pen. This could have acted as an attractant to a wild male.

At this time Marooka and Misty were in the Bush Den, a pen with some log walls with gaps between the logs which potentially could allow contact with a devil outside the pen but inside the park fence. This means it is possible for contact with a wild devil without it having to enter and then leave the pen.

There were a number of other devils in the pen with Marooka at the time that could have inflicted the injury.

From what is already known about the rate of development of DFTD lesions, the size of the lesions on Marooka in October are consistent with infection occurring in May.

Therefore a possible scenario is that an infected wild devil attracted into the park in May 2006 around the time the lesion was first seen on Marooka, inflicted the wound on Marooka and introduced the infection.

Marooka has had prolonged contact with Mareeba being in the same pen between March and August allowing plenty of opportunity to pass on infection.

The time when the lesion in Mareeba's mouth first appeared is not certain. If it occurred prior to May then this scenario would not explain how she became infected.

Marooka had only the one contact with Nipper (20/6/06) at which time they were seen to be fighting. Nipper was removed after less than a day. This appears to be long enough after the proposed infection in May to suggest transmission of disease to Nipper was possible.

This is considered to be the most likely scenario.

### ***SCENARIO 2***

That Marooka was infected by a wild devil entering his pen in June.

In June a tree branch fell into the Big Den in which Marooka and Mareeba were housed, allowing the escape of two of the female devils from the pen. This event would also have allowed the escape of any wild devil that was in the pen. This event is at about the same time that the lesion on Marooka's face was noticed to get worse. Shortly after this a wild DFTD infected male devil was trapped outside of the park's perimeter fence indicating that at least one infected devil was in the area.

This scenario relies on a wild devil breaching the perimeter fence to enter the park then enter the pen, fight with Marooka and then escaping. Mr Kelly believes that this is unlikely.

Infection of Marooka in June would allow sufficient opportunity for him to subsequently infect Mareeba and precedes his contact with Nipper.

### ***SCENARIO 3***

Was Marooka inapparently affected at the time of examination in March?

As the lesion did not appear to be much more than a scratch until September this would indicate a latent period of at least 6 months which is longer than appears normal but is still within the longest recorded latent period of 10 months.

There is nothing to suggest when or how Marooka may have been infected prior to March.

Infection could have been transmitted to Marooka and Nipper during contact with them in the Big Den.

This scenario appears unlikely.

### ***SCENARIO 4***

That Nipper may be the index case.

Nipper was wild caught and may have been covertly carrying infection since before capture. (Note – there is no evidence from research conducted to date of long term covert infection). Alternatively as Nipper spent January to June in the ANU pens outside of the perimeter fence it is possible contact in some manner with a wild devil outside of his pen.

In this scenario Marooka would have been infected on 20/6/06 by fighting with Nipper. Mareeba could have been directly infected by Nipper on the 20/6/06 or by Marooka who was in the pen a further 2 months after his postulated exposure.

This scenario is discounted as due to the much more advanced lesions on Marooka compared to Nipper and Mareeba. Also the rate of development of the lesion on Marooka would need to be much more rapid than any other observed to date.

### ***SCENARIO 5***

That Mareeba as the index case.

Mr Kelly has indicated that the lip wound on Mareeba had been present for some time, possibly since the breeding season. She had prolonged contact with Marooka between 21/2/06 and 28/8/06 and was in the same pen in May when the scratch was noticed on Marooka.

Nipper however was only in the same pen for one day and was removed for fighting with Marooka. It is possible that Mareeba also had a fight with Nipper on that day.

In this scenario it would be expected that the lesion on Mareeba would be more advanced than that on Marooka and Nipper. As this is not the case this scenario appears unlikely.

### **DISCUSSION**

The low prevalence of DFTD in the devils at the wildlife park is consistent with a recently introduced infection.

As Marooka has the most advanced DFTD lesions and as such is likely to have been infected prior to the other two devils, Mareeba and Nipper. Marooka has direct contact with the other two infected devils and could have passed the infection on to them.

As Marooka was examined under general anaesthetic on 2/3/06 with no evidence of DFTD it is likely that the infection occurred after that time.

There are no earlier examinations of Mareeba and Nipper that can be used to help determine when their lesions may have developed.

The tumour on Marooka appears to have developed at the site of a severe scratch wound noticed in May. From what is already known about the rate of development of DFTD lesions, the size of the lesions recorded in October are consistent with infection in May. Infection in May is consistent with Marooka being able to infect the other two devils. It also coincides to the time that a DFTD devil was trapped outside the park.

The condition of the pens and management procedures observed during the visits to the wildlife park following the detection of DFTD indicate that the park was not following the DPIW's recommended biosecurity arrangements. There are a number of areas identified where biosecurity could be improved.

While there are areas of concern with biosecurity, it must be remembered that the wildlife park was set up for breeding and displaying devils. Biosecurity is only one aspect of animal management and this report is not intended to provide comment on other areas of management. Mr Kelly has an obvious passion and empathy with the devils and has a lot of experience and success in managing and breeding the species.

While a clear pathway for introduction of the disease into the park can not be demonstrated, there is a plausible scenario suggesting how this may have occurred. All are explained with direct contact with an infected devil and are consistent with the current hypothesis that DFTD is an allograft of tumour cells transmitted between devils by direct contact.

DFTD has been known to be present in wild devils in this area of Tasmania for some time, with early visual evidence in 2003. The fact that the disease has not appeared in the wildlife park until recently indicates that some level of barrier does exist between the wild and captive population. Unfortunately disease has been able to penetrate this barrier.

Unfortunately it has not been possible to conclusively demonstrate how DFTD entered the park captive devil population. To have done so would have assisted in developing management strategies to prevent further introduction of disease as part of a program to progress towards clearing this captive population from suspicion of the disease.

Dr Larner's description of previous treatment of lesions on devils from Trowunna suggests that he has had some success in treatment of lesions on devils. It would seem however that the previous lesions presented differently to that seen on Marooka, and no laboratory tests were conducted to determine the nature of these previous lesions. The lesion on Marooka was the first one he had seen around the mouth and appeared much more advanced than previous lesions seen and was less responsive to treatment. Mr Kelly also indicated that the lesion on Marooka looked different and that it did not seem to be responding well to treatment. The lesion was sufficiently different for Mr Kelly to seek an opinion from Dr J Bergfeld of the DFTD Team at the Mt Pleasant Laboratories in October 2006. The differences with the recent lesion on Marooka suggests that it is likely that the earlier lesions seen on the devils were not DFTD but were due to some other condition. This is consistent with the conclusion that DFTD was introduced into the wildlife park fairly recently.

DFTD was gazetted as a List B disease under the Animal Health Act 1995 on 13/09/06. This means that suspicion of the disease must be notified to an inspector. By reporting the condition to an inspector (Dr Bergfeld) when it became apparent that it was something different to lesions seen in the past, Mr Kelly has fulfilled this obligation.

## **PROPOSED ACTION**

Three Tasmanian devils at Trowanna, namely Marooka, Mareeba and Nipper, are currently known to be infected with DFTD. These are still at the park but isolated from other devils. Mr Kelly has requested to be able to keep these devils and treat them. It should be noted that two of the devils, Nipper and Mareeba, are aged and may not live much longer anyway.

The park is considered as infected with DFTD and as such devils in the park do not meet the criteria for movement between wildlife parks. Movement restrictions currently in place reinforces this.

As DFTD is known to occur in wild devils in the area around Trowunna Wildlife Park the presence of infected devils does not pose any additional risk to the wild population.

Although all devils at the wildlife park have now been examined under anaesthetic for signs of DFTD, it is still possible that more devils may develop signs of the disease in the future. As such all devils in the park remain suspect for the disease and need to be monitored for some time to identify any further infected animals.

Immediately removing the known DFTD infected devils will not remove the suspicion of exposure to DFTD. However maintaining the infected devils on the park or under the care of the same staff will prolong the possible exposure period.

Mr Kelly has been advised by the Chief Veterinary Officer that if a program can be developed to remove the suspect DFTD status from the devils on Trowunna Wildlife Park, in addition to any other requirements of the program, any time period required after the last exposure will not commence until after the last known infected devil has been removed from the park.

It is recommended that the known infected devils should be kept well isolated from other devils (outside the perimeter fence and preferably in the cottage pens which are physically removed from the rest of the park). Also devils with known contact with the infected devils should be regarded as high risk and an effort should be made to prevent direct contact between these high risk devils and other devils on the park.

While the perimeter fence may not be a secure biosecurity barrier it is recommended that devils in pens outside this fence should not be moved into pens inside the fence where they can have direct contact with other captive devils.

It is not known at this stage if the infective tumour cells can survive outside the animal either on meat or other material. To minimise the risk of indirect transmission on fomites it is recommended that the park adopt appropriate biosecurity precautions. These requirements also extend to contamination of pens and low risk devils should not be placed in pens that have recently contained infected devils.

**APPENDIX 1**

Photo of Trowunna showing devil enclosures



## PEN IDENTIFICATION

TBD	Top back den
TFL	Top front left
TFC	Top front centre
TFR	Top front right
RH1	Round House 1
RH2	Round House 2
RH3	Round House 3
RH4	Round House 4
O1	Office 1
O2	Office 2
LD	Little den
BGD	Big den
BHD	Bush den
SP	Snake pit
HA1	Holding area 1
HA2	Holding area 2
HA3	Holding area 3
HA4	Holding area 4
HA5	Holding area 5
Stable	
ANU 1,2,3,4/5,6	
ABC	
C1	Cottage 1
C2	Cottage 2
C3	Cottage 3
C4	Cottage 4
C5	Cottage 5

Cradle Mountain: this refers to the devils which are held at Cradle Mountain and which were sourced from Trowunna