FOX
CONTROL PROGRAM

FOR

GNARALOO STATION

Turtle Predation Minimisation Project

February 2010

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February 2010

1 Program Objectives

The fox control program undertaken at Gnaraloo during February 2010 was to compliment the programs previously completed in December 2008 and January 2009 (for Turtle breeding season 2008/09), November 2009, December 2009 and January 2010 (for Turtle breeding season 2009/10).

The objectives of the program are to minimise towards zero all fox predation and disturbance of marine turtle nests (egg chambers and hatchlings) on beaches along the coast of Gnaraloo Station.

Assessment of the results of the fox control program was undertaken as part of the overall turtle monitoring program conducted by Gnaraloo Station.

2 Program Methodology

Baiting was undertaken using the same program as previously used in 2009, which was a three-pronged strategy in primary locations to immediately control foxes in the turtle beach areas and to control foxes in a buffer zone adjacent.

The three areas have been described in the January 2009 report, and consist of beach areas where turtle nests are located, including the area immediately behind this beach area (core area) and the surrounding hinterland up to 8 km from the turtle rookery (buffer area). Baiting of the core area is to control foxes that would have an immediate effect on turtle nests, while baiting the buffer area is to reduce the level of incursions by foxes into the core area.

Fox baiting during this program utilised Dried Meat Baits (DMB's) produced by the Department of Agriculture and Food's bait factory and DMB's produced by Animal Pest Management Services, Foxoff Econobaits and 1080 egg baits. A total of 800 baits were used in total during the 2009/10 season.

Baits were strategically placed by APMS staff to maximise uptake based on the fox activity seen and on the activity found throughout the baiting program conducted in 2008/09 and during November 2009, December 2009 and February 2010. This method generally produces a rapid knockdown using the minimum numbers of baits by placing baits were they are most likely to be taken, rather than the standard method of bait laying at 200m intervals. Bait placement was not confined to vehicle tracks to minimise the probability of foxes encountering multiple baits. This would ensure a fox would be likely to succumb to the effects of the poison before it had the opportunity to encounter another bait (Thomson *et al*. 2000). The strategic bait placement was complimented by the standard baiting regime.

Baiting rates varied between 5 baits/km^2 within the core area, to 2-5 baits/km2 within the buffer area depending on the terrain, vegetation and level of fox activity. Bait rates above 5 baits/km^2 cannot be used as this is the maximum allowed rate on the label and the uptake of baits does not increase at higher baiting rates (Thomson & Algar 2000). The core area is baited more intensively as these foxes are more likely to have an effect on the turtle nests during nesting period and are more difficult to bait once the food source (turtle eggs) are utilised by foxes.

The Gnaraloo turtle rookery area being monitored during 2009/10 extended from Gnaraloo Bay North to Beach Point 9 (GBN – BP9), an area of 6.69 km long. This area constitutes the core area baited by APMS (refer Figure 1 below).

The total area baited by APMS extended from Three Mile landfill area to 1km north of Cape Farquhar (total distance of 34 km) and from the beach up to a maximum distance of approximately 8 km inland (refer figure 1 below). Distances inland varied from 2-8 km as a result of accessibility and fox activity.

The three fox baiting programs conducted by APMS during the 2009/10 turtle breeding season were from November 1st - 4th 2009, December 15th – 18th 2009 and February 17th – 19th 2010. Gnaraloo Station conducted support baiting from December 18th 2009 to February 28th 2010.

Training of Gnaraloo Station personnel on 1080 use was conducted in November 2009. This allowed the station personnel to use and possess 1080 baits in accordance with the training and authorisation requirements of the Code of Practice On The Safe Use and Management of 1080 and the Poisons (Section 24)(Registered Pesticide 1080) Notice 2000 issued under the Poisons Act 1964.

The training of Gnaraloo Station personnel allowed for the baiting program for foxes to be undertaken during routine station duties as well as in response to fox activity or nest disturbance/predation activity at any time. The baiting effort by Gnaraloo station personnel was not as targeted or as intensive as the APMS programs.

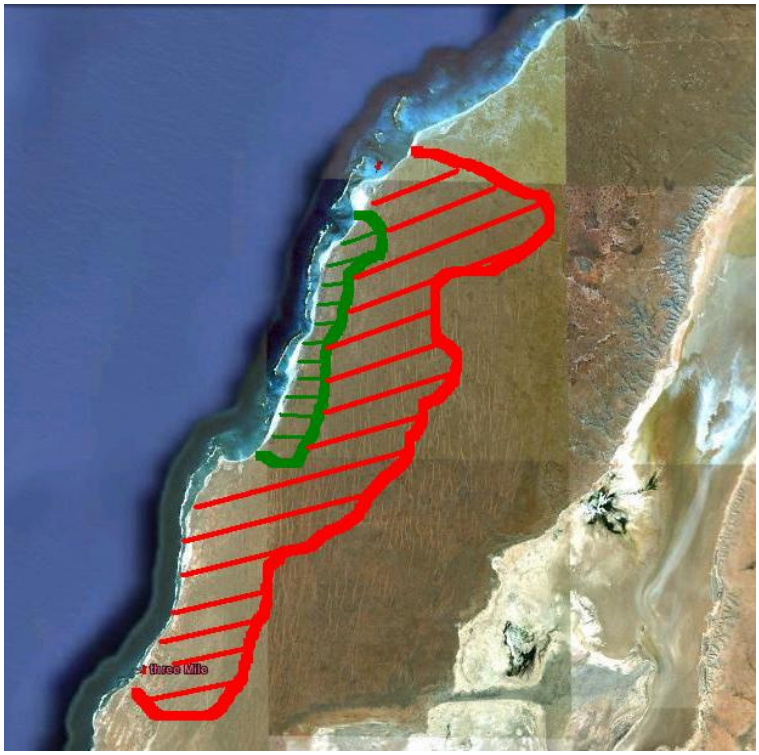

Figure 1: Area of baiting at Gnaraloo. Core area in green, while the Buffer area (surrounding hinterland up to 8km from the Turtle rookery) is red.

3 Results

The baiting program 2009/10 resulted in a significant reduction of fox activity across the entire Turtle Revised Day Study Area (GBN – BP9) for the first half of the 2009/10 turtle season and the number of nests disturbed by foxes remained low throughout November 2009 and December 2009. Fox numbers were determined to be moderate to high across the majority of the assessed area at the commencement of the day turtle program on 1st November 2009.

After the initial reduction in fox numbers from the baiting programs conducted by APMS in November 2009 and mid December 2009, it is apparent that adult and juvenile foxes moved into the area from elsewhere in search for new territories.

During the baiting in December 2009, one feral cat was found that had been poisoned by the 1080 baits.

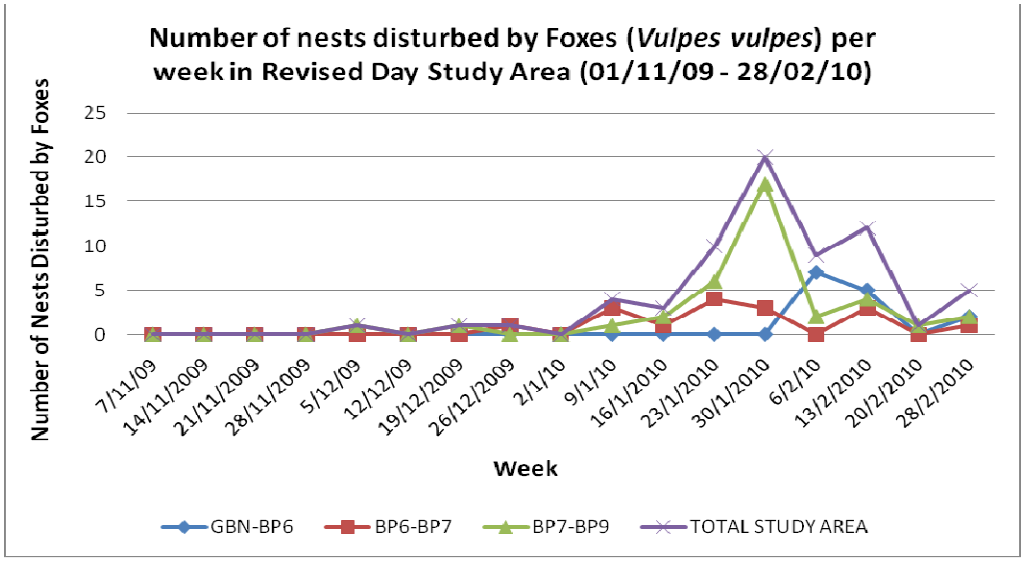

Figure 2: Number of nests recorded as disturbed by foxes (*Vulpes vulpes*) per week in Revised Day Study Area during the 2009/10 season
(**Ref**: Gnaraloo Turtle Conservation Program, Day and Night Monitoring Program 2009/10, Draft Final Report, March 2010)

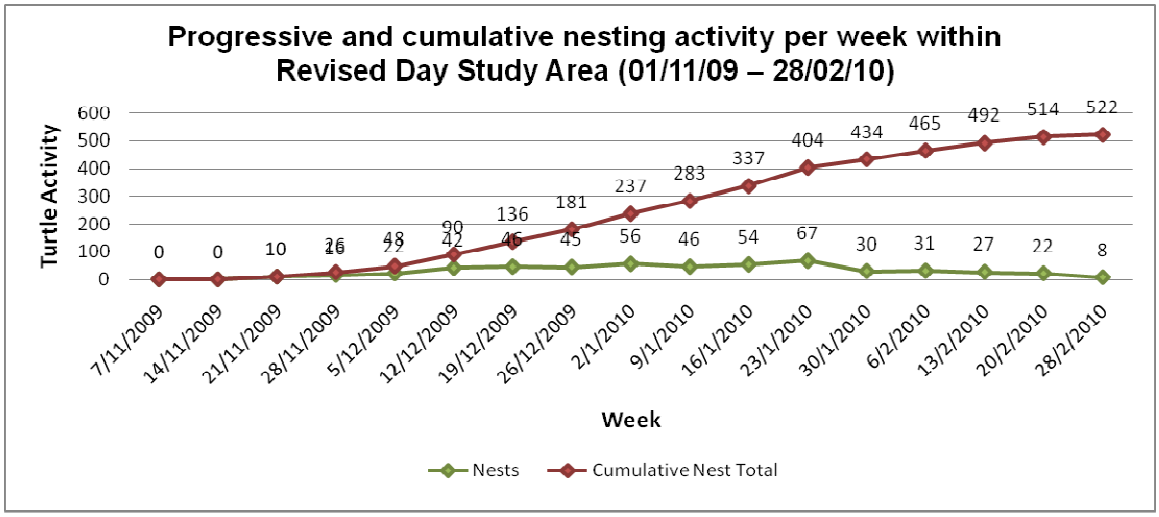

Figure 3: Progressive and cumulative nesting activity per week within Revised Day Study Area for the 2009/10 season
(Ref**:** Gnaraloo Turtle Conservation Program, Day and Night Monitoring Program 2009/10, Draft Final Report, March 2010)

4 Discussion

There was very low level of disturbance of turtle nests by foxes after the first APMS control program in November 2009, although there was some fox activity along the beach reported by the Turtle Day Monitoring Team 2009/10.

A increase in the level of nest disturbance occurred up to the week ending the 30/1/2010. At this time, Gnaraloo Station obtained fox baits and station staff commenced fox baiting. There

was an immediate reduction in turtle nest disturbance from foxes of about 50% during the next week, most likely as a result of the station staff's baiting efforts.

Immediately after APMS staff commenced baiting on the 17/2/2010, fox disturbance of nests declined to zero by the end of that week. The APMS baiting was restricted by a lack of a suitable 4wheel motorbike, which had been used during all previous baiting programs during the Turtle breeding season 2008/09 and November 2009, but was not available during December 2009 and February 2010. The lack of a motorbike meant fewer baits were strategically placed in the core area during December 2009 and February 2010 and there was more reliance on the standard method of bait placement. Once foxes commence disturbing turtle nests, the readily available food source makes bait placement more critical than bait rate. Without placing baits so that they are easily found by foxes, the foxes will direct their attention to the nests, rather than hunt widely for food and encounter baits by chance.

Fox control within the core area must be significantly improved over the normal control rates achieved of 62-88% using standard baiting methods (e.g. Thomson & Algar 2000) if turtle nest disturbance in the core area is to be kept near zero. If a few foxes remain after baiting, the effect on turtle nest disturbance can still be significant. Fox control by baiting should be aimed at achieving control rates at least equal to that obtained from standard baiting methods within the buffer area, but maintaining 100% control of foxes within the core area is the only means of achieving zero nest disturbances by foxes.

Minimising bait rates of lay have the added benefits of reduced caching of baits by foxes (Saunders *et al*. 1999) while maximising bait uptake (such as by strategic bait placement) would minimise the development of populations of bait-shy foxes as a result of high numbers of degraded baits with sub-lethal doses of the poison (Saunders *et al*. 1995).

The greatest amount of disturbance occurred in the Gnaraloo BP7-BP9 within the Revised Day Study Area 200910. This corresponds with increased water available to foxes (and other animals) from the nearby Nine Mile windmill tank and trap yard area. As a result of this, along with the large burnt area from the large bushfire that occurred on Gnaraloo during 17-22nd January 2009, migration of foxes to the coast would be expected to increase dramatically as the summer progressed and food and water became scarce inland.

It is widely recognised that foxes rapidly recolonise areas where control measures have produced substantial reductions in fox population density (e.g. Kinnear *et al*. 1988). Young foxes will generally disperse during autumn, although our experience suggests foxes commence dispersal movements to new territories earlier in northern Western Australian. The higher water and food availability on the coastline at Gnaraloo associated with pastoral infrastructure such as the Nine Mile trap yards / water point and with coastal turtle rookeries may be contributing to the movement of young foxes into this area, forming an "ecological sink". Reduction in the resident fox population in the core area by baiting increases the dispersal of foxes into this vacuum. The movement of foxes into the core area may increase during the dry summer months (corresponding with the annual turtle breeding season) as water sources inland dry up. It is also likely that the buffer area baited for foxes was not enough during 2009/10 due to the large inland area burnt out at Gnaraloo during the January 2009 bushfire. The bushfire may have contributed to higher numbers of foxes dispersing from much greater distances into the core area during December 2009 - February 2010, due to lack of available inland food sources and moisture in their normal terrain. The increased incursion

of foxes into the core area in search of food as a result of this bushfire may have resulted in a higher incidence of turtle nest disturbances in the core area compared to that recorded during the 2008/09 season.

In summary, while the November 2009 baiting works were highly effective and resulted in 0% turtle nest disturbances by foxes in the core area, lasting for approximately one month after baiting works, it is hypothesized that there were an increased incursion of foxes into the core area during December 2009 - February 2010 (as opposed to fox incursion numbers during 2008/09) as a result of impacts of the large bushfire at Gnaraloo during January 2009, which destroyed available inland food sources and moisture. This factor, coupled with reliance on standard placement of baits (as opposed to strategic placement of baits) in the core area during December 2009 - February 2010 (due to unavailability of a suitable 4wheel motorbike to access otherwise inaccessible terrain), resulted in increased nest disturbances by foxes in the core area being recorded during December 2009 - February 2010.

5 Recommendations

The annual turtle season at Gnaraloo is from November – April. To increase the effectiveness of the fox control program (i.e. to reduce turtle nest disturbances by foxes to 0% for longer periods of time), fox baiting should be undertaken annually at the beginning of each month for the entire turtle season (Nov – April) (to protect egg chambers and hatchlings) as well as May (prior to the annual fox peak breeding season).

This would result in at least 7 rounds of targeted fox baiting per year. Once fox numbers at Gnaraloo Station has been significantly reduced, the Gnaraloo fox control program should be reviewed and recommendations made concerning required annual baiting and timing for same.

While support baiting by station personnel should continue, baiting strategies used by APMS staff have a greater result on fox control per unit of effort and cost. As such, monthly APMS baiting should continue in the core area and buffer area, supplemented by station personnel baiting when undertaking routine station duties (including core area, buffer area and whole station).

Fox control within the core area must be significantly improved over the normal control rates (62-88%, using standard baiting methods) if turtle nest disturbances are to be kept near zero. Maintaining 100% control of foxes within the core area is the only means of achieving zero nest disturbances by foxes. Fox control within the buffer area should be aimed at achieving control rates at least equal to that obtained from standard baiting methods.

To achieve 100% control of foxes within the core area, there is a requirement for a suitable 4wheel motorbike to access otherwise inaccessible terrain in order to enable strategic bait placement to maximise uptake by foxes. A lack of a suitable motorbike results in more reliance on the standard method of bait placement in the core area and in fewer baits being strategically placed. Once turtle nest disturbances by foxes commence, this readily available food source makes bait placement more critical than bait rate. Without placing baits so that

they are easily found by foxes, the foxes will direct their attention to the nests rather than hunt widely for food and encounter baits by chance.

The baiting program should be extended from southern boundary of Gnaraloo through to the station's northern boundary and inland up to as far as Lake McLeod, particularly around water points and sources (i.e. whole station, at intervals of at least twice per year). This would offer protection of all possible turtle rookeries along the Gnaraloo coastline, as well as other native fauna on Gnaraloo Station, from fox disturbance, predation and extinction.

Baits used should continue to be Dried Meat Baits in all areas except turtle beaches, where 1080 impregnated eggs should be used. These baits have proven to be the most effective fox baits in this area to date

6 References

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