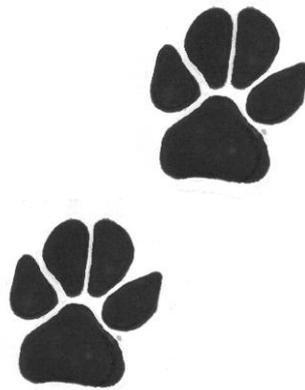




GNARALOO FERAL ANIMAL CONTROL PROGRAM

Final Report 2011/12

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GNARALOO FERAL ANIMAL CONTROL PROGRAM

Season 2011/12

1 Objectives

The feral animal control program being conducted during the sea turtle breeding season 2011/12 at Gnaraloo compliments the fox control programs completed by Gnaraloo and APMS during the three previous turtle breeding seasons, namely 2008/09, 2009/10 and 2010/11.

One of the primary objectives of the specialized *Gnaraloo Feral Animal Control Program* 2011/12 is to protect significant sea turtle rookeries along the coast of Gnaraloo Station by reducing critical threats during the annual turtle breeding season, through minimising towards zero all feral animal predation of turtle eggs and hatchlings. The Gnaraloo sea turtle rookeries include endangered loggerhead (*Caretta caretta*), endangered green (*Chelonia mydas*) and critically endangered hawksbill (*Eretmochelys imbricata*) turtles. Other important objectives include increasing biodiversity protection, values and outcomes station wide in order to protect native fauna such as small to medium sized mammals, marsupials, ground nesting birds and reptiles from predation and extinction by feral pest animals such as foxes, cats and wild dogs, including around the Lake MacLeod wetland system. The *Gnaraloo Feral Animal Control Program* also targets protection of authorized pastoral stock.

The *Gnaraloo Turtle Conservation Program (GTCP)* independently assesses and gauges the outcomes of the *Gnaraloo Feral Animal Control Program* through daily monitoring for any evidence of presence or activity by feral predators in the targeted rookery (including tracks, disturbance and predation). The objectives of this monitoring is informed adaptive management, integration of the GTCP and the *Gnaraloo Feral Animal Control Program* for most effective and efficient on-ground protection of the Gnaraloo sea turtle rookeries, response in real time to control any identified feral animal presence in the rookeries and to improve the results and effectiveness of the *Gnaraloo Feral Animal Control Program*. Monitoring results are provided to the *Gnaraloo Feral Animal Control Program* for immediate corrective action.

APMS staff also monitors the results of the *Gnaraloo Feral Animal Control Program* during regular visits.

2 Program expansion during 2011/12

During the season 2011/12, adjustments and changes were made to the *Gnaraloo Feral Animal Control Program* as a result of the findings and recommendations of baiting works and surveys at Gnaraloo since the season 2008/09.

Gnaraloo and APMS expanded the scope of works during 2011/12 to target not only foxes and feral cats but also wild dog monitoring and control in order to integrate declared animal control responsibilities into the program. Note: the program was formerly known as the *Gnaraloo Fox Control Program*, but because of the expanded target species it is now the *Gnaraloo Feral Animal Control Program*. The program was also expanded during 2011/12

to cover extended baiting areas, including the Gnaraloo Bay Rookery (*refer Figure 2*) and the new northern Gnaraloo Cape Farquhar Rookery (*refer Figure 3*). The Gnaraloo Bay Rookery extends from the GTCP beach point named Gnaraloo Bay North (**GBN**) (23.76708°S; 113.54584°E) to Beach Point 9 (**BP9**) (23.72195°S; 113.57750°E), an area of approximately 7 km long. The Gnaraloo Cape Farquhar Rookery extends from the GTCP beach point called Gnaraloo Farquhar South (**GFS**) (23.64168°S; 113.61544°E) to Gnaraloo Farquhar North (**GFN**) (23.57697°S; 113.69830°E), about 14 km long.

The Gnaraloo Fox Control Program Report 2010/11 recommended that –

“The need to determine where new fox threats are likely to come from and removing that threat is as important as removing all the foxes within the target area. The area around Lake MacLeod is an important ecological and biological system and the presence of foxes is also likely to have significant negative impacts on conservation values ...The control of foxes needs to be ongoing to maintain the protection of the sea turtle nests with the advantage of also protecting other high conservation areas on and adjoining Gnaraloo Station.”

As a result, the *Gnaraloo Feral Animal Control Program* was also expanded to include the remaining Gnaraloo property, extending to its eastern most boundary with the Lake MacLeod wetland system.

3 Methodology

Similar strategies and program activities were conducted during 2011/12 compared to work undertaken since the season 2008/09 as far as baiting methodology and bait types are concerned.

The expanded feral animal control program 2011/12 again consisted of a three-pronged strategy to immediately control feral animals that posed threats to sea turtles in the Gnaraloo Bay Rookery, the Gnaraloo Cape Farquhar Rookery and in the adjacent buffer zones.

Baited areas were divided into four main areas, based on the priority of each area for feral animal control (*refer Figure 1*):

1. The areas immediately behind the coastal turtle rookeries, including the Gnaraloo Bay Rookery and the Gnaraloo Cape Farquhar Rookery. These areas are the highest priority for feral animal control. This includes the beach areas where the turtle nests are located and the areas immediately behind the primary dunes, up to approximately 2 km inland (**Core Bait Areas**).
2. Surrounding Hinterland ranging from 2 - 8km inland from the Gnaraloo Bay Rookery and the Gnaraloo Cape Farquhar Rookery, given accessibility and fox activity (**Buffer Bait Areas**).
3. All beaches north and south of confirmed turtle rookeries, from Gnaraloo’s southern to northern boundary.
4. The remaining Gnaraloo property (i.e. the areas of Gnaraloo other than above, extending inland to its eastern most boundary with the Lake MacLeod wetland system, particularly surrounding water points and sources).

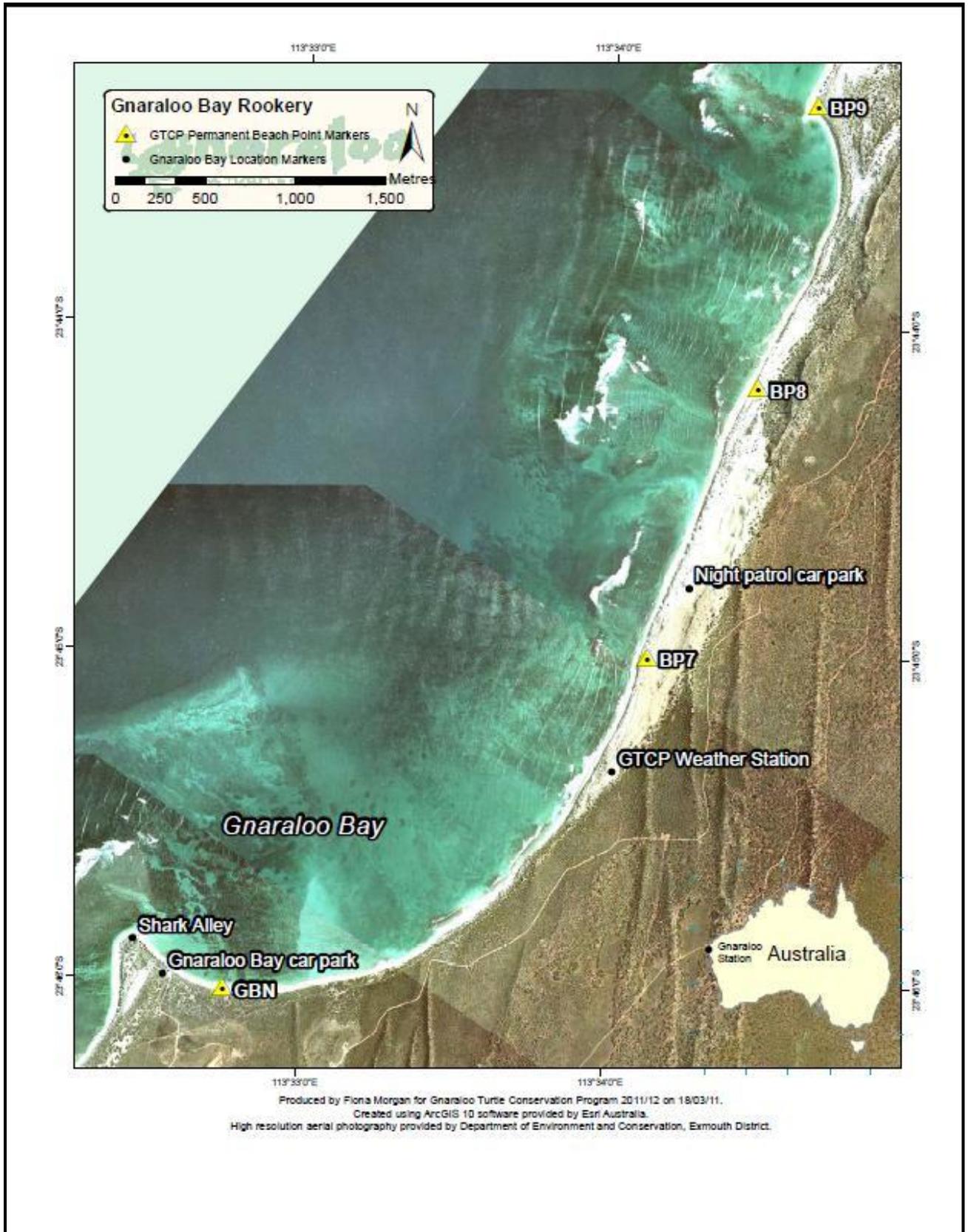


Figure 2: The Gnaraloo Bay Rookery.
 (Map courtesy of *Gnaraloo Turtle Conservation Program 2011/12*)

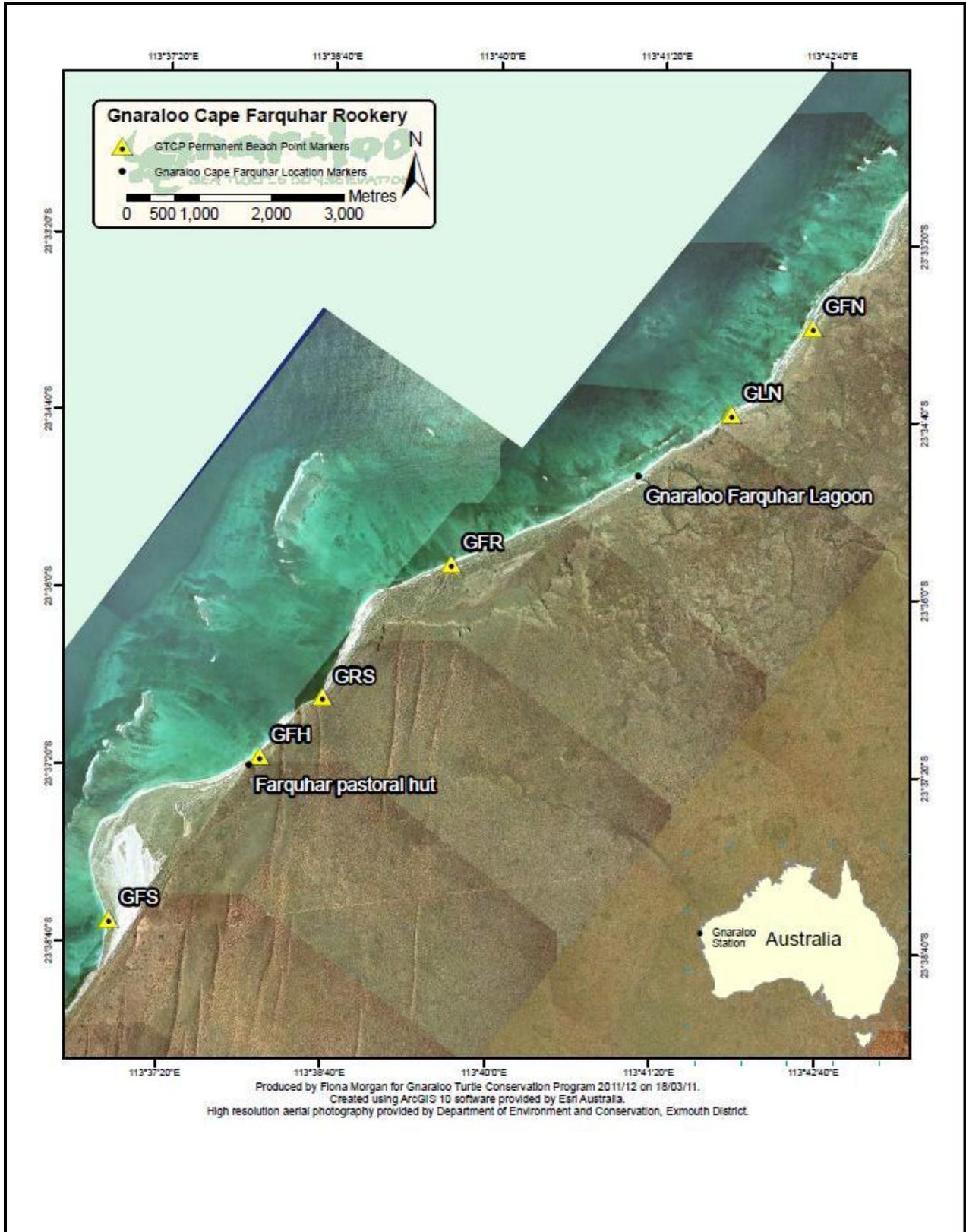


Figure 3: The Gnaraloo Cape Farquhar Rookery.
 (Map courtesy of *Gnaraloo Turtle Conservation Program 2011/12*)

Baiting of the Core Bait Areas is to control feral animals that would have an immediate effect on sea turtles (eggs and/or hatchlings), while baiting the Buffer Bait Areas is to reduce the level of incursions by feral animals into the Core Bait Areas.

Note: Because of domestic pets (dogs) brought by guests, baiting does not occur at the Gnaraloo Bay public area, at or around the Homestead precinct or 3Mile Camp (*refer Figure 1*). However, fox baits are laid in the area and surrounds at 6Mile, accessible to the public as a shore fishing area, as this is essential to protect the Gnaraloo Bay Rookery.

Feral animal monitoring, control and baiting surveys during 2011/12 included:

No.	DATES	ACTIVITY	APMS PERSONNEL
1	17 – 21 November 2011	Assessment and baiting	3
2	5 – 9 January 2012	Assessment and baiting	2
3	27 – 28 February 2012	Assessment and baiting	2
4	11 - 17 April 2012	Assessment and baiting	2

Baiting primarily utilised Dried Meat Baits (**DMBs**) produced by APMS, with some 1080 impregnated fowl egg baits also used. A total of 2,144 baits were used: 2,000 DMBs and 144 egg baits were used during the season 2011/12.

Similar to the season 2010/11, rates of bait lay varied from an average of 4 baits/km² in the Core Bait Areas to 1 - 5 baits/km² in the Buffer Bait Areas, depending on the terrain, vegetation and level of targeted feral animal activity. Average baiting rates were 2.2 baits/km².

As for season 2010/11, baiting occurred over the entire Gnaraloo Station during 2011/12. During 2011/12, Total Core Bait Areas consisted of approximately 66 km² and total Buffer Bait Areas of approximately 248 km² (given the additional baiting around the northern Gnaraloo Cape Farquhar Rookery).

In addition to the scope of work under the baiting programs at Gnaraloo since 2008/09, APMS adopted the following measures during 2011/12 to improve information on feral animals and their movements and to continue to improve the control program through the adoption and use of “adaptive management” systems of review:

- 1 A series of transects were developed where the locations of fox, feral cat and wild dog activity (sightings, tracks, scats) were recorded using a GPS and downloaded onto a database and maps. Transects covered the Core Bait Areas and Buffer Bait Areas through to Lake MacLeod. In the short to medium term, this information is helpful for evaluating where baiting is fully effective or needs improvement, where foxes and other feral animals were recorded more frequently before and after baiting and likely pathways for movement of foxes and other feral animals into areas (runs), including monitoring and assessing the incidence of wild dogs and any control required.
- 2 Transects consisted of both daylight surveys and night time spotlighting. The same APMS personnel were used to ensure consistency between survey events.
- 3 An increased assessment on the numbers and distribution of feral cats and the impact that fox and wild dog baiting had on their population levels.
- 4 An increased emphasis placed on decreasing incursions of foxes into control areas from control borders. This included undertaking increased baiting in areas that form

the edge of the Buffer Bait Areas (as well as on-ground monitoring of fox and feral cat activity). Use of 6mg baits in these areas may decrease incursions of wild dogs as well as control foxes.

- 5 Integration of declared animal control responsibilities into the *Gnaraloo Feral Animal Control Program*. This includes adapting fox control to include wild dog control and monitoring.
- 6 Integration of the Farquhar rookery into the Gnaraloo Fox Control program to protect this important turtle nesting area.

Mapping of fox, feral cat and wild dog activity and results for the season 2011/12 are described below. Unfortunately the results of the APMS monitoring that was conducted during April 2012 is not available due to the theft of the GPS unit.

4 Results

Fox numbers were determined to be at low to moderate levels across all areas monitored at Gnaraloo during 2011/12. The highest number of foxes occurred in the areas from 6Mile to 9Mile, around Lake MacLeod and near the northern most coastal boundary of Gnaraloo. Monitoring of baiting sites indicated that foxes removed baits and a corresponding decrease in fox activity followed. Fox activity rapidly declined within 24 - 48 hours of baits being laid.

Baiting area coverage during 2011/12 extended from 3 km south of the Gnaraloo Homestead area to Gnaraloo's northern most boundary and eastwards towards Lake MacLeod from the south eastern boundary of Gnaraloo (*refer to Figure 4*). Feral animal activities (tracks and scats), inclusive of fox, feral cat and wild dog, were recorded (*refer to Figure 4*).

Evidence of foxes in the area 8 km east of Cape Farquhar may indicate there is permanent water in this area which has not been mapped. Anecdotal evidence suggests there may be water in rock holes as semi-feral sheep are known to exist in this area that is difficult to include in the station's annual mustering and shearing program given the inaccessibility of the terrain.

Evidence of wild dogs was found (tracks and scats) near 17Mile West, 15Mile Escarpment, 12Mile, 9Mile, 7Mile and at Lake MacLeod. Some tracks were less than 2 hours old.

During 2011/12, in addition to the Core Bait Areas and Buffer Bait Areas, to minimise the number of foxes that may be moving along the coast to the Gnaraloo Bay Rookery and the Gnaraloo Cape Farquhar Rookery, supplementary fox baiting was again undertaken along the coast from the 3Mile landfill area to the northern most boundary of Gnaraloo (during the seasons 2008/09 and 2009/10, baiting only extended as far north as Cape Farquhar), as well as from the beach up to a maximum distance inland of approximately 10-15 km. Baits were laid in areas where foxes were evident and around potential pathways and water points.



Figure 4: Bait coverage areas (blue lines) and feral animal activities recorded during 2011/12. Red triangles indicate Fox tracks / scats, Purple triangles show Feral cat tracks / scats and Yellow triangles indicates Wild dog tracks / scats.

As undertaken since 2008/09, baits were again strategically placed by APMS staff to maximise uptake based on the fox activity observed since 2008/09. This method generally produces a rapid knockdown using the minimum number of baits. Bait placement was not confined to vehicle tracks to minimise the probability of foxes encountering multiple baits while ensuring all fox movements and territories were adequately covered. The strategic bait placement was complimented by standard baiting in other areas.

The baiting program resulted in effective wild dog control being achieved as wild dog activity (i.e. tracks and scats) at Gnaraloo at the completion of each baiting event was not found in areas where wild dogs had previously been active.

Feral cat activity appeared to decline in areas where baiting had occurred, based on observations from APMS personnel during surveying and monitoring. Increased monitoring by APMS during the season 2012/13 will improve knowledge on the impact of fox baiting on feral cat populations at Gnaraloo.

The *Gnaraloo Turtle Conservation Program 2011/12* (GTCP) independently monitored the results and outcomes of the *Gnaraloo Feral Animal Control Program 2011/12* through daily monitoring of the Gnaraloo Bay Rookery for any evidence of presence or activity by feral predators from 10 November 2011 – 28 February 2012. The GTCP scientific team observed and recorded no fox impacts (disturbance including digging or predation) on the sampled turtle nest set (eggs and hatchlings) in the Gnaraloo Bay Rookery during the monitoring period. The GTCP scientific team recorded tracks of fox, feral cat and wild dog in the Gnaraloo Bay Rookery during the monitoring period 2011/12. The GTCP scientific team recorded fox tracks on 4 occasions in the Gnaraloo Bay Rookery during the monitoring period, namely:

- Sub-section GBN – BP7 (29 November 2011 and 9 December 2011); and
- Sub-section BP7 – BP8 (15 February 2012 and 17 February 2012).

The GTCP scientific team recorded dog and feral cat tracks in every sub-section (GBN - BP9) of the Gnaraloo Bay Rookery through the monitoring period. While feral cat tracks were an almost daily occurrence (mostly GBN - BP7), dog tracks were more rare. The dog tracks were mainly recorded at the southern end of the rookery (near the GBN car park). Given this location, coupled with the fact that the tracks were often accompanied by human footsteps, showed signs of running / playing and stayed relatively close to the bay, they were attributed as guests with domesticated pets who were at the bay during the afternoon or evening. The dog tracks recorded in the northern sub-sections of the Gnaraloo Bay Rookery (BP7 - BP9) were often along the tops of the dunes, or near the border of the vegetation, were mostly alone and unaccompanied by human prints, suggesting they belonged to wild dogs.

Spotlight transects were conducted during each APMS field survey, with 1 - 3 transects conducted each time. The spotlight transects were conducted along the main track extending from Cape Farquhar south to the Gnaraloo Homestead area. During these spotlight assessments, the Spinifex Hopping-mouse (*Notomys alexis*) were seen on 4 occasions during November 2011. No foxes or feral cats were sighted whilst spotlight transects were undertaken.

5 Waypoint List – January 2012

12/23/2011 12:47:35 PM

Num	Name	Latitude	Longitude	Alt(ft)	Description
1	043 -23	43.4491	113 35.2667	96	GNA CAT TRACK
2	044 -23	36.0659	113 39.4848	46	CAT GNA
3	045 -23	36.0686	113 39.4807	47	GNA FOX
4	046 -23	48.6683	113 31.9411	85	GNA FOX
5	047 -23	47.1055	113 31.6756	47	GNA FOX
7	049 -23	55.5500	113 32.1015	94	GNA FOX
8	050 -23	55.5513	113 34.1702	74	GNA FOX
9	051 -23	53.9843	113 39.3462	34	GNA FOX
10	052 -23	53.9821	113 39.3453	32	GNA CAT
11	053 -23	47.6903	113 43.6848	45	GNA FOX
12	054 -23	47.9168	113 38.8162	93	GNA CAT
13	055 -23	47.9063	113 37.8931	104	GNA CAT
14	056 -23	47.9452	113 35.1721	130	GNA DAT

6 Discussion and recommendations

No turtle nests in the Gnaraloo Bay Rookery were impacted by feral animals including foxes during the season 2011/12, as independently monitored and assessed by the GTCP scientific team 2011/12 daily during the period 10 November 2011 – 28 February 2012. This is consistent with the results of the previous season 2010/11 and indicates that carefully designed and implemented programs on feral animal control can achieve ongoing effective results so long as the program is adapted to changing conditions.

APMS supported the monitoring by the GTCP through providing training to the GTCP scientific team during 2011/12 in predator track identification in order to identify and distinguish with confidence and accuracy fox, wild dog and cat tracks as this is an essential monitoring component and check / balance of the efficacy of the *Gnaraloo Feral Animal Control Program*.

It is evident that foxes are re-invading the baited areas from Gnaraloo' northern and eastern boundaries. The control of foxes must be ongoing to maintain the protection of the sea turtle nests with the advantage of also protecting other high conservation areas on and adjoining Gnaraloo Station.

It is interesting to note that wild dogs were not present on Gnaraloo Station during 2009/10 and only one dog was reported during the previous season 2010/11. Increasing wild dog incursions at Gnaraloo may be due to movement of young adults from natal home ranges from surrounding stations. The movement is likely to be around Lake MacLeod and from the northern boundary generally. Intensive baiting in areas where wild dog leads are likely and where dog activity has been found or expected, using good quality Dried Meat Baits, means baits are more likely to be taken by the dogs, although some wild dogs do not readily take baits in sheep areas due to higher food accessibility. The significant reduction in fox numbers at Gnaraloo since baiting commenced in 2008/09 would increase the availability of baits for wild dogs, as well as improve the efficiency of any dog trapping that may need to be done in future where bait uptake by wild dogs is ineffective at controlling the wild dogs present.

Wild dog control needs to continue under the *Gnaraloo Feral Animal Control Program*.

The continued success and results of the *Gnaraloo Feral Animal Control Program 2011/12* was due to a number of factors including a combination of structured site baiting events, effective quality baits (for example, use of good quality Dried Meat Baits as opposed to sausage baits), strategic bait placement (as opposed to standard placement), integration with and the adaptive link with the GTCP including daily monitoring of the effectiveness of the feral animal control program by the GTCP scientific teams during the turtle breeding season, targeted follow-up baiting in real time when required necessary by such independent monitoring, the removal of feral animals, including foxes, from high risk adjoining areas prior to the dispersal of juvenile feral animals to the sea turtle rookeries and beaches as well as effective communication, liaison and knowledge share between program partners. This combination of activities means that feral animals including foxes can be reduced to a level where finding evidence of feral animals is the key rather than recording the level of feral animal predation.

As previously stated, the need to determine where new feral animal threats are likely to come from and removing those threats is as important as removing all the feral animals in the target areas. The area around Lake MacLeod is an important ecological and biological system and the presence of feral predators such as foxes, feral cats and wild dogs is also likely to have significant negative impacts generally on biodiversity and conservation values there.

Monitoring of bait take by feral animals, through use and employment of remote cameras and sand plots with photo records, would be useful in future to determine the outcome and fate of different bait types and whether baits are being consumed by feral cats. It is recommended that these additional activities be included in the *Gnaraloo Feral Animal Control Program 2012/13*. Consideration could also be given to including GPS tracking of some foxes and feral cats to determine movements and control of these animals during the annual baiting program.

7 Conclusion

The *Gnaraloo Feral Animal Control Program 2011/12* again achieved 100% protection of sea turtle nests (eggs and hatchlings) in the Gnaraloo Bay Rookery, as daily monitored and independently assessed by the GTCP scientific team 2011/12 during November 2011 – February 2012. This is consistent with the results of the previous season 2010/11 and demonstrates that complete protection of sea turtle rookeries can be achieved through effective feral animal control programs so long as such programs are adapted to changing conditions.

Sustained continued monitoring, assessment and control of feral animals (including foxes, feral cats and wild dogs) must be ongoing on Gnaraloo Station during future seasons to ensure that the *Gnaraloo Feral Animal Control Program* remains at its current level of effectiveness and maintain the protection of the significant endangered sea turtle rookeries and keep feral animal numbers to a minimum. This will have the added advantage of also protecting other high conservation areas on and adjoining Gnaraloo Station, including protection of the Lake MacLeod wetland system and native fauna from predation and extinction. It will also add valuable data on conservation efforts and predator control over the medium to long term.

It is again strongly recommended that structured fox baiting events at Gnaraloo continue to be undertaken in future prior to the beginning of the annual turtle breeding season and as soon as feral animal tracks are observed by the GTCP in monitored rookeries. These baiting events should be repeated at the beginning of each month during the Gnaraloo turtle breeding season (November – April) and prior to the annual fox breeding season (May), not only to protect eggs whilst incubating but also to reduce predation on emerging hatchlings later during the season. Juvenile foxes disperse during late summer and autumn, re-invading areas where effective control has been achieved (Thomson et al 2000) and it is important to continue fox control through this period.

8 Funding and resourcing

Funding support by the Australia Government, under its Caring for our Country Program: Community Coastcare 2008, to the *Gnaraloo Feral Animal Control Program* concluded at the end of the financial year 2010/11 (refer to Table 1). Despite a lack of available external funding assistance at the time, a decision was made by Gnaraloo and APMS to continue and to expand feral animal control at Gnaraloo during 2011/12 as the objectives and outcomes of the GTCP and the *Gnaraloo Feral Animal Control Program* would have been significantly compromised without ongoing and consistent feral animal control. The investments in and positive results of both programs would have been lost if the numbers of feral animals posing threats to the endangered sea turtles at Gnaraloo had been allowed to again increase to pre-2008/09 levels and sea turtle predation at Gnaraloo returned to that seen at the commencement of 2008/09 when up to 100% of turtle nests (eggs and/or hatchlings) were predated by foxes in certain locations.

The Department of Environment and Conservation (DEC) (WA) secured funding from the Australia Government, under its Caring for our Country Program: Business Plan 2011/12, for integrated feral animal control in the Ningaloo Coast World Heritage Area to reduce the impacts of feral animals on threatened species and habitats on the Ningaloo coast. This work is not confined to DEC tenure only, but also includes pastoral tenure on the Ningaloo coast. DEC made an offer to Gnaraloo and APMS during February 2012 for funding contribution to the *Gnaraloo Feral Animal Control Program* for work undertaken during 2011/12 – 2012/13 (refer to Table 1).

9 Summary of program since 2008/09

The GTCP and the *Gnaraloo Feral Animal Control Program* have been successfully planned, developed and managed by Gnaraloo and APMS since 2008/09. The GTCP engages a community network, comprising of a pastoral leaseholder / land manager, his management teams including scientific advisor, scientific volunteers, community volunteers, schools, universities and the public, in biodiversity conservation and protection of endangered marine species and critical coastal habitat on the Gnaraloo coast in the Ningaloo Coast World Heritage Area. The *Gnaraloo Feral Animal Control Program* has been revised and improved each year since on-ground works commenced during 2008/09 to better protect the Gnaraloo sea turtle rookeries (refer to Table 1). The sea turtle rookeries at Gnaraloo occur on public lands (UCL: the area between the low water mark to 40m Above High Water Mark), not on

any of the leases managed by Gnaraloo, and is therefore not part of the usual legal obligations or responsibilities of Gnaraloo to monitor and protect the most significant rookeries.

The *Gnaraloo Feral Animal Control Program* is fully supported and endorsed by the Department of Agriculture and Food (WA).

TABLE 1: ACTIONS AND RESULTS UNDER THE GNARALOO FERAL ANIMAL CONTROL PROGRAM SINCE 2008/09

Annual program	Operators	Target feral species	No. of baiting events	Bait details	Timing of baiting events	Co-occurrence with G turtle breeding activities	Protection targets	Area coverage	Results & Achievements	Funding: Financial & In-kind contributions
The inaugural Gnaraloo Fox Control Program 2008/09	APMS Gnaraloo	Fox	2 APMS structured baiting events	Strategic bait placement predominantly, supported by standard bait placement at 200m intervals at times	Dec 08 5 days	At start of annual G turtle breeding season as predicted at time	Turtle egg clutches Minimise fox disturbance and predation of endangered sea turtles to 0%	Gnaraloo Bay Rookery (GBR) (length of 7.6km) Total bait area equalled approximately 55km ² for Core Bait Areas and 185km ² for Buffer Bait Areas	Fox numbers were high to very high at the commencement of the program during 2008/09. After fox control commenced, there was a significant reduction of fox activity across the entire area. After the initial reduction, juvenile foxes moved into the area from elsewhere in search of new territories. The GTCP independently monitored the effectiveness of the fox control program through recording the number of turtle nests impacted (i.e. disturbed including digging and/or predated) by foxes, daily during Dec 08 – March 09. Results showed that foxes began impacting on turtle nests immediately after nesting occurred. Fox control reduced turtle egg clutch disturbance and/or predation from an average of 5 nests/night prior to fox control to 0 nests/night within 5 days of commencing fox control. Nest protection decreased with time lag between structured baiting events. Once turtle nests hatched, foxes preyed on turtle hatchlings. Fox tracks were recorded throughout the GBR for the entire monitoring period. The strategic bait placements rapidly reduced fox numbers with fewer baits needed than for standard bait placement and a reduced	Gnaraloo APMS DEC Australian Government (Caring for our Country, 2008/09, 2009/10, 2010/11)
				984 Baits total, including Dried Meat Baits produced by APMS (DMBs), Dried Sausage Baits, Foxoff Econobaits, 1080 fowl egg baits After strategic baiting was first conducted, an average baiting rate of 5 baits/km ² (646 baits over 120km ²) (Dec 08) and 1.4 baits/km ² (336 baits over 240km ²) (Jan 09)	Jan 09 4 days	During middle of annual G turtle breeding season as predicted at time				

									<p>incidence of multiple bait take by individual foxes. DMBs were the more preferred bait by foxes. Foxoff was readily consumed by foxes and effective for a rapid knockdown effect on the fox population. 1080 egg baits were readily taken by foxes if placed on beach. Where there is a readily available food source such as turtle eggs, Dried Sausage Baits were found to be relatively ineffective compared to DMBs, with an uptake of less than 10% when both baits were presented. Recommendation for Dried Sausage Baits not to be used in future.</p> <p>As primary objective is increased turtle survival rates through reduced fox impacts on turtle nests, recommendation for continued future assessment and monitoring by GTCP of the effectiveness of the fox control program.</p> <p>A dramatic increase in feral cat activity occurred after the removal of the foxes.</p>	
Gnaraloo Fox Control Program 2009/10	APMS Gnaraloo	Fox	3 APMS structured baiting events Additional	Strategic bait placement predominantly, supported by standard bait placement at times	Nov 09 4 days	At start of annual G turtle breeding season as confirmed by GTCP 2008/09	Turtle egg clutches during beginning and middle of G season Turtle	Extended bait areas, including: Gnaraloo Bay Rookery; G coastline from 3Mile	<p>Fox numbers were moderate to high at the start of Nov 09.</p> <p>The GTCP independently monitored the effectiveness of the fox control program, daily during Nov 09 – Feb 10. Fox control</p>	Gnaraloo APMS DEC Australian Government

			support baiting by G	800 Baits total, including DMBs produced by Department of Agriculture (WA) and by APMS, Foxoff Econobaits, 1080 fowl egg baits Baiting rates varied between 5 baits/km ² in Core Bait Areas to 2-5 baits/km ² in Buffer Bait Areas depending on the terrain, vegetation and level of fox activity. Bait rates above 5 baits/km ² cannot be used as this is maximum allowed rate on label and uptake of baits does not increase at higher baiting rates	Dec 09 4 days; Dec 09 – Feb 10 Periodic support baiting by G; Feb 10 3 days	During middle of annual G turtle breeding season as confirmed by GTCP 2008/09	hatchlings later during G season Minimise fox disturbance and predation of endangered sea turtles to 0%	landfill area to Cape Farquhar (34km), including from beach up to a maximum distance of ~8km inland (distances inland varied from 2 - 8km as result of accessibility and fox activity)	during Nov 09 resulted in a significant initial reduction of fox activity and in 0% turtle nests being impacted by foxes in the GBR, lasting for approximately 1 month after a structured baiting event. The number of turtle nests impacted by foxes remained low during Nov - Dec 09. There was an increased incursion of adult and juvenile foxes into the GBR during Dec 09 - Feb 10, partly as result of occupation by foxes from outside baited areas and impacts of a large bushfire at G during Jan 09. This, coupled with reliance on standard bait placements in the GBR during Dec 09 - Feb 10, resulted in increased disturbance and predation of turtle nests by foxes in the GBR during Dec 09 – Feb 10. Fox tracks were recorded in the GBR during the entire GTCP Day monitoring period. Continued use of DMBs were recommended for all areas except turtle beaches, where 1080 impregnated fowl eggs were found to be most effective fox baits.	(Caring for our Country, 2008/09, 2009/10, 2010/11)
Gnaraloo Fox Control Program 2010/11	APMS Gnaraloo	Fox Feral cat	5 APMS structured baiting events 1 Additional APMS site inspection	Strategic bait placement predominantly, supported by standard bait placement at times 1,200 Baits total, including DMBs produced by APMS, Foxoff Econobaits,	Oct 10 7 days; Nov 10 3 days Dec 10 1 day Assessment only;	At start of annual G turtle breeding season During middle of annual G turtle breeding season	Turtle egg clutches during beginning and middle of G season Turtle hatchlings later during G season Minimise fox disturbance and	Extended bait areas, including: All areas baited during 2009/10; G coastline from 3Mile landfill area to G's northern most border,	Fox numbers were moderate at the start of Nov 2010. The fox control program resulted in 100% protection of sea turtle nests (eggs and hatchlings) in the Gnaraloo Bay Rookery (GBR), as monitored and independently assessed by the GTCP scientific team 2010/11, daily during November 2011 – February 2012. No fox tracks were recorded and	Gnaraloo APMS DEC Australian Government (Caring for our Country, 2008/09, 2009/10,

				<p>1080 fowl egg baits</p> <p>Rates of bait lay varied from average of 4 baits/km² in Core Bait Areas to 2 - 5 baits/km² in Buffer Bait Areas, depending on the terrain, vegetation and level of fox activity</p>	<p>Jan 11 2 days;</p> <p>Feb 11 7 days</p>		<p>predation of endangered sea turtles to 0%</p>	<p>including from beach up to a maximum distance of ~10 – 15km inland (distances inland varied as result of accessibility and fox activity);</p> <p>Station wide on entire G (area of ~92,000ha, incl 60km of coastline), including western edge of Lake MacLeod</p>	<p>0% turtle nests (eggs or hatchlings) were disturbed or predated by foxes in the GBR during the monitoring period.</p> <p>APMS monitored sand plots at 19 selected bait sites to determine the level of bait take during structured baiting events. Results indicated that foxes removed all baits and a corresponding decrease in fox activity followed. No bait stations were visited by foxes without the fox taking the bait. In one area, no further fox activity was evident after 7 baits were taken by foxes. Fox activity rapidly declined within 24 - 48 hours of baits being laid, which suggests that bait caching is not significant during the particular time of the year with these baits at this baiting rate.</p> <p>The considerable rainfall that occurred at G during 2010/11 did not have an impact on the effectiveness of the fox control program, probably due to the type of baits used (DMBs) which take considerable rainfall before they are affected and higher bait uptake as a result of strategic bait placement.</p> <p>Fox control had additional positive outcomes including biodiversity conservation through protection of other native fauna station wide (such as small to medium sized mammals, marsupials, ground nesting birds and reptiles), including at and around the significant inland Lake MacLeod wetland system.</p>	2010/11)
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Gnaraloo Feral Animal Control Program 2011/12	APMS Gnaraloo	Fox Feral cat Wild dog	4 APMS structured baiting events	Strategic bait placement predominantly, supported by standard bait placement at times 2,144 Baits total, including 2,000 DMBs and 144 fowl egg baits Rates of bait lay varied from average of 4 baits/km ² in Core Bait Areas to 1 - 5 baits/km ² in Buffer Bait Areas, depending on the terrain, vegetation and level of targeted feral animal activity. Average baiting rates were 2.2 baits/km ²	Nov 11 5 days	At start of annual G turtle breeding season	Turtle egg clutches during beginning and middle of G season Turtle hatchlings later during G season	Extended bait areas, including: All areas baited during 2010/11; northern Gnaraloo Cape Farquhar Rookery (length of 14km) Total bait area equalled approximately 66km ² for Core Bait Areas and 248km ² for Buffer Bait Areas	Fox numbers were low to moderate at the start of Nov 2011. Highest number of foxes in areas from 6Mile - 9Mile, around Lake MacLeod and near the northern most coastal boundary of G. The feral animal control program resulted in 100% protection of sea turtle nests (eggs and hatchlings) in the Gnaraloo Bay Rookery (GBR), as monitored and independently assessed by the GTCP scientific team 2011/12, daily during Nov 11 – Feb 12. There was 0% fox impacts (i.e. disturbance including digging and/or predation) of the sampled turtle nest set (eggs or hatchlings) in the GBR. The GTCP recorded fox tracks (on 4 occasions), feral cat tracks (almost daily) and wild dog tracks (more rare) in the GBR during the monitoring period. Monitoring of baiting sites by APMS showed foxes removed baits and corresponding decrease in fox activity followed. Fox activity rapidly declined within 24 - 48 hours of baits being laid. APMS tracked and mapped locations on G where fox, feral cat and wild dog tracks and scats were recorded during 2011/12. Evidence of wild dogs was found near 17Mile West, 15Mile Escarpment, 12Mile, 9Mile, 7Mile and at Lake MacLeod. There were 4 confirmed sightings of Spinifex Hopping-mouse (<i>Notomys alexis</i>) on G in Nov 11 during spotlight assessments by	Gnaraloo APMS DEC Australian Government (Caring for our Country, 2011/12, 2012/13)
					Jan 12 5 days; Feb 12 2 days	During middle of annual G turtle breeding season	Minimise fox disturbance and predation of endangered sea turtles to 0% Authorized pastoral stock			
					Apr 12 7 days	Towards end of annual G turtle breeding season and start of peak G fox breeding season				

									<p>APMS.</p> <p>Additional positive outcomes included biodiversity conservation through protection of other native fauna station wide (such as small to medium sized mammals, marsupials, ground nesting birds and reptiles), including at and around the important inland Lake MacLeod wetland system.</p>	
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Note: Reports 2008/09 to date (refer to Reference list below) with details of program works, results, discussion and recommendations are available on request.

10 References

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