West Cape Howe National Park

and

City of Albany

2021 Autumn Fox and Feral Cat Monitoring and Control Program Report

For Torbay Catchment Group

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Introduction

West Cape Howe National Park (WCHNP) is situated in the Torbay Catchment area of South West Western Australia and provides an important refuge for the Western Ringtailed Possum (*Pseudocheirus occidentalis)* (WRTP). The City of Albany (CoA) reserves are located adjacent to the residential areas of the city and extend to the area bounding WCHNP to the west and include the Coastal Macro Corridor from WCHNP through to Torndirrup National Park. The reserves are managed by the Department of Biodiversity Conservation and Attractions (DBCA) and the City of Albany respectively, with a combined total of approximately 5300 hectares (3136ha and 2164 ha).

WRTP is currently classified as Critically Endangered on the International Union for Conservation of Nature (IUCN) Red List, with a population decline of >80% in 10 years (Burbidge and Zichy-Woinarski 2017).

One of the leading factors in the continued decline of the WRTP population is the threatening processes caused by exotic predatory species such as the introduced Red Fox (*Vulpes vulpes*) and Feral Cat (*Felis catus*) (Thompson *et al.* 2009; Burbidge and Zichy-Woinarski 2017).

Torbay Catchment Group (TCG) has been undertaking fox and feral cat control for several years throughout the catchment area (TCG n.d.). WCHNP and the CoA reserves is considered a source of foxes and feral cats within the catchment area with control conducted previously in 2018 and 2019 by APMS. This control, consisting of 1080 baiting and trapping, was undertaken during autumn and spring of 2018 and 2019. The 2018 control programs achieved a reduction of foxes on both areas of land and feral cats of 71% and 50% and of 73% and 66% control of foxes on the two properties respectively during 2019 and 47% control of feral cats on CoA land.

In March 2021 a survey of fox and feral cat occupancy rates was again conducted in WCHNP and CoA land, consisting of camera traps and sand plots.

The control commenced on the 15th March 2021 and was completed on the 26th March 2021. The two weeks of surveying using monitoring cameras and sand plots was followed by two weeks of control, then followed by a post control survey using the same methodology.

The Department of Biodiversity Conservation and Attractions (DBCA) approved the baiting and trapping of foxes and feral cats within WCHNP for the TCG. Camera data from monitoring periods was used to calculate a Relative Abundance Index (RAI) of foxes and feral cats which was compared between periods of baiting and trapping to determine population trends and the effectiveness of the program.

Methods

Site description

The WCHNP site has been described in the previous report. CoA land is similar, with less Karri trees.

Monitoring

Camera traps were used over the course of all three monitoring periods to detect foxes and feral cats that passed in front of them during the day and night. Three types of camera were used during the monitoring periods; Moultrie (Model M-1100i), Browning (Model BTC-5PDX) and Reconyx (Model HC 600 Hyperfyre). A total of 25 cameras were set at locations that had been used in previous programs to ensure consistency between survey and control over consecutive years.

Cameras were set to take images at high resolution in order to minimise captures that could not be attributed to a certain species as can occur when low quality images are taken (Bengsen *et al.* 2011; Meek *et al.* 2015). Cameras were secured to trees, shrubs and picket stakes, and set between the average feet and head height of a fox in order to capture full body images. Where there was substantial grass and leaves in front of the selected camera position, the camera was positioned higher to avoid the movement of thee vegetation interfering with the camera.

Images captured by camera traps were collected and examined to determine the number of capture events that occurred for each camera for each day of the monitoring periods. All images taken were date and time stamped. Capture events were determined by the number of individual foxes or feral cats that were photographed at a particular camera trap on a particular day. Identifying individual foxes was not possible due to their similarity in coat while individual feral cats could on occasion be identified based on significant size differences and coat markings. Events were recorded as being when multiple captures occurred at the same camera trap in a night but not with >5minutes between photographs, except when foxes or feral cats were travelling in opposite directions or multiple animals were detected on the one photograph. In some instances, individual cats could be identified based on coat colouration and patterns.

Sand plots were used during two monitoring periods (pre and post control) as a way to passively assess the presence or absence of foxes and feral cats at multiple locations in the WCHNP. A total of 30 sand plots were set for each of the three monitoring periods and were placed on roads and tracks running through WCHNP as well as CoA land. Sand plots were approximately 1 m in width across the whole track and consisted of lightly raked sand or dirt that would hold an identifiable impression of an animal's footprint. Plots were checked over three consecutive days and footprints were identified and recorded as a presence or absence score for the location. Sand plots were established at intervals of one (1) kilometre to minimise the likelihood of capturing images of the same fox or cat on multiple cameras.

The sand plots were checked over three (3) consecutive mornings and after recording the animal tracks present within the plot, the area was cleared of fox and cat tracks to ensure the next days recording only showed tracks that occurred in the preceding 24 hours.

Cameras and sand plots were placed on tracks to help increase the detection probability of foxes in the area, as foxes are known to frequently traverse tracks and paths (Mahon *et al.* 1998a, Towerin *et al.* 2011).

Baiting

Baiting was undertaken using meat baits injected with 3.0mg of 1080 poison. Baits were laid at a maximum rate of 5 baits/km2 as recommended by Thomson and Algar 2000. Baits were placed at strategic locations to increase uptake and were covered to avoid being taken or removed by birds as birds appear to be the primary non-target group responsible for taking baits laid on the surface (Thomson and Kok 2002; Marlow *et al.* 2008; Moseby *et al.* 2011).

Baits were located across the whole WCHNP, although Shelly Beach Road, Shelley Beach, Dunsky Beach and the Bibbulmun Track were not baited. Poison baits were regularly checked and replaced if they had been taken.

CoA land was not baited as trapping was considered a feasible option on this land and the risks to domestic pets, especially dogs was considered to be unacceptably high.

Trapping

Traps used were Victor 1.5 Soft Catch traps within the WCHNP and Victor 1.5, #1.75 and #3 as well as Bridger #2 within the City of Albany reserves. Trapping in WCHNP consisted of using raised platform traps due to the requirements of DBCA to minimise captures of non-target fauna. A total of 15 traps were used on WCHNP.

Trapping was undertaken simultaneously on the City of Albany reserves that were situated between WCHNP and Torndirrup National Park, with a total of 15 foot-hold traps and five (5) cage traps used. Trap set was using typical Animal Pest Management Services methods and used our proprietary fox and feral cat lures.

Pic 1: Warning signs were erected at all entrances to CoA reserves prior to trapping

Results

Camera Trap Results

Species captured on camera traps over the course of all three monitoring periods included; Red Foxes, Feral cats, Western Grey Kangaroos (*Macropus fuliginosus*), Australian Magpie (*Gymnorhina tibicen*), Australian Raven (*Corvus coronoides*) and Common Ringtail Possum (*Pseudocheirus peregrinus*).

A total of 25 cameras were used for the pre-control survey and post-control survey, with cameras set out for two weeks for each survey period.

SPECIES	RESERVES	EVENTS PRE-CONTROL	EVENTS POST-CONTROL
Fox	WCHNP	20 (11)	7 (3)
	CoA	16 (32)	3 (11)
Feral cat	WCHNP	3 (5)	2 (6)
	CoA	14 (11)	2 (7)

Table 1: Camera monitoring results in each reserve over 2 weeks.
Figures in brackets are results from last year.

As in the last report, camera traps occasionally engage fox and feral cat animals attention possibly due to the audibility of the camera capturing an image, as suggested in Meek *et al.* 2015, or by appearing conspicuous.

Most of the cameras captured images of numerous movements, most of foxes, over a number of nights, potentially indicating that individual animals had regular patterns of movement that took them across the camera zone on multiple nights. This will be further discussed in the trapping section.

Pic 2: Some cameras recorded multiple animals and target species.

The special APMS lures used for trapping were placed in front of some cameras to check if they attracted non-target native fauna. This would determine if the use of these lures on traps posed an increased risk to fauna. None of these lures used showed any sign of attractiveness by bandicoots, kangaroos or birds.

Sand Plots

Fifteen (15) sand plots were located within each of the two reserve systems (CoA and WCHNP). The sand plots were checked for three (3) consecutive nights and this was undertaken twice for each two week period, making a total of 180 nights for each of the reserve systems.

Sand plot data was compared to the results of the camera traps to determine whether cameras captured all target animals or whether some cameras did not capture images of animals that traversed in front of the cameras. Cameras did not miss capturing images of any animals that moved in front of these cameras on any of the three (3) camera types used.

When comparing sand plot data to cameras, nights when rainfall occurred sufficient to potentially make evidence of tracks difficult to interpret, these nights were removed from the data.

Trapping Results

No foxes or feral cats were caught within WCHNP during the trapping period using the fifteen (15) raised platform sets.

A total of 10 foxes and four (4) feral cats were trapped on CoA reserves using standard APMS trap sets and cage traps. A total of 15 foot hold traps and five (5) cage traps were used on CoA reserves.

Pic 2: A male adult fox trapped on CoA land

No non-target animals were trapped on WCHNP or City of Albany land on foot hold traps and cage traps caught three (3) ravens.

A total of nine (9) foxes were trapped (5 male and four female), while three (3) feral cats were trapped (all female).

Foxes were trapped using APMS proprietary lures in combination with social scent lures, while cage traps were set with food as a single lure.

SPECIES TRAPPED	SEX	WEIGHT
Cat	Female	4.3 kg
Cat	Female	2.4 kg
Fox	Female	4.3 kg
Fox	Male	4.2 kg
Cat	Female	3.0 kg
Fox	Male	4.2 kg
Fox	Male	4.9 kg
Fox	Male	4.2 kg
Fox	Male	6.5 kg
Fox	Female	4.9 kg
Fox	Male	4.6 kg
Fox	Female	4.3 kg

Table 2: Trapping results for March 2021

The results of the trapping program in CoA reserves resulted in an estimated 82% reduction in fox population and 87% reduction in the feral cat population.

Baiting Results

Bait take was not measured as it can have significant bias if only comparing the number of baits taken against the numbers of target animals pre and post baiting.

Foxes cache baits (Thomson and Kok 2002) so the number of baits taken may not reflect the actual number consumed. In some locations, bait removal or take by non-target species can be very high (Dundas et al. 2014).

Bait placement is likely to affect the speed at which foxes encounter or find baits (Thomson and Algar 2000). Given that the location that baits were placed in this program were selected based on the extensive baiting and trapping experience of APMS staff, the relatively short time frames between baiting and post-control assessment provide a reasonable means of assessing the efficacy of the program.

The results are simply calculated by comparing pre and post baiting data from camera traps and sand plots for this report.

The results on WCHNP indicated that 1080 baiting resulted in an estimated 71.5% decline of foxes.

Data Analysis

Fox and feral Cat numbers were calculated using a simple calculation based on pre and post assessments of the number of camera events as well as the number of tracks from foxes and feral cats that occurred on sand plots.

Relative Abundance Indices (RAI) will be analysed in more detail after the spring control program.

As described in the previous report, RAI's are often used to track changes in abundance, habitat use variation , species interactions, activity patterns and can be used to track population size changes if individual identification of animals is not viable (Burton *et al.* 2015; Kämmerle *et al.* 2018). Camera traps can be used to calculate RAI's given the assumption that photographic rates are lineally related to animal abundance (Jenks *et al.* 2011). Analysis of photographic rates of capture is a promising way of deriving RAI's and is calculated as the number of captures per camera trap night (Palmer *et al.* 2018). Camera trap nights were calculated by examining capture images to determine periods when the camera was not operational as per Kämmerle *et al.* 2018.

Sand plot presence and absence data was compared against camera trap data which was transformed from count data to presence and absence for the corresponding days in which both survey methods were used. Two tailed t-test assuming unequal variance was used to

compare the two methods ability to detect the presence of Fox and Feral Cat activity in multiple locations.

Discussion

The fox baiting program continues to reduce fox numbers within WCHNP with lower numbers of foxes seen this year pre control compared to the pre control surveys completed in 2020. In once instance, a single camera captured 16 separate events with a fox post control which can bias results of the total number of foxes present based on camera data.

A review of baiting trials across Australia in 2007 indicated that fox reduction after poison baiting varied between 50-97% (Saunders and Mcleod 2007) so both the trapping program and fox baiting program have been successful.

A considerable degree of knowledge has been gained on CoA land during the previous control program and this was further improved when conducting camera trapping and sand plot surveys pre control.

The total number of trap nights on foxes within CoA reserves was 287 trap nights with foot-hold and 67 trap nights with cages. The capture of foxes gives a capture rate of 1 fox per 31 trap nights (1:14 trap nights in 2020). Capture rates on feral cats was 1 per 22 trap nights in CoA land. At WCHNP no foxes or feral cats were caught during the program.

The results of trapping and baiting were similar to last year although CoA control of foxes was higher this year than in the previous two programs. Trapping results on foxes compared favourably to that achieved by the use of 1080 baits (82% cf 71%), indicating that trapping can achieve very effective reductions in fox population levels.

As there were no captures of non-target native fauna or domestic animals during the two week trapping program, it is clear that carefully placed and set-up foot-hold traps can achieve fox control safely.

Foxes and feral cats were in excellent condition with ample reserves of body fat and no evidence of mange on foxes. Stomach contents of foxes determined that 75% of those trapped contained mammal such as bandicoots, possums and species of rat and 22% contained birds.

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