Improving management tools for feral cats, Western Australia, 2023-25

A report to the Commonwealth government under the Federation Funding Agreement - Environment Enhancing National Pest Animal and Weed Management – Tranche 2 – *Supporting Communities Manage Pest Animals and Weeds Program* (2021-22 to 2025-26).

GOVERNMENT OF WESTERN AUSTRALIA

Department of **Biodiversity, Conservation and Attractions**

PARKS AND WILDLIFE SERVICE

Acknowledgements

Many hands make light work and there were many collaborators across the state involved in the field work. Thanks go to the regional DBCA staff of the Wheatbelt, South Coast, Pilbara and Midwest regions and to the Yindjibarndi, Juluwarlu and Ngurrawaana Aboriginal Corporations. And to the WA Feral Cat strategy and Western Shield team, who arranged the logistics in manufacturing, sweating and deploying the feral cat Eradicat baits.

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- Capture and radio collaring of feral cats was conducted under Department of Biodiversity, Conservation and Attractions Animal Ethics Committee permit AEC 2024/19H.
- Camera monitoring using lures was conducted under Department of Biodiversity, Conservation and Attractions Animal Ethics Committee permit AEC 2023/24D.

Front Cover Image: DBCA staff collaring a feral cat in Stirling Range National Park,

Photo credit: Abby Martin DBCA.

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Introduction

Over the past two decades, research projects at the landscape-scale have been conducted in Western Australia to support the successful development and registration of a targeted feral cat bait (i.e., Eradicat®), which is to assist in the conservation of native wildlife (Algar and Burrows 2004; Algar et al. 2013a; Comer et al. 2018; Lohr and Algar 2020). Aerial baiting has long been acknowledged as the most effective and cost-efficient method of controlling feral cats, especially across broad-scale areas, when there is minimal risk to non-target species (Short et al. 1997; Algar and Burrows 2004; Algar et al. 2007; Algar et al. 2013a; DE 2015).

Effective and cost-efficient implementation of feral pest management programs can be greatly enhanced by an understanding of the pest species' pattern of movement through the landscape with an emphasis on preferences of habitats where the majority of time is spent. Refinements of technologies such as GPS data-logger radio-collars that can now be fitted to cats are able to provide precise and frequent data on their location. Consequently, we can now be smarter in the way we bait. Instead of a broad-scale, blanket approach; we can be strategic and develop baiting programs based on habitat preferences, home range and distribution patterns and likely bait encounter rates. These refinements may assist in fine-tuning techniques to provide optimal control efficiency and effectiveness of field operations to target this pest species.

The design of feral cat management programs needs to be defined by specific circumstances and environments, with variables including climate, topography and non-target species all affecting delivery and success. Large-scale programs have the flexibility to specifically target individuals and/or preferred habitat and to concentrate effort. Previous work (e.g., Tiller et al. 2021; Menon et al. 2024) has highlighted the crucial importance of research into the patterns of feral cat movement prior to establishing a long-term baiting program to ensure optimal efficiency of the program. The principal aim of this research project was to i) determine the home range and movement patterns of feral cats in different climatic zones and ii) to assess whether this information would assist in providing targeted management and improve baiting efficacy at a landscape-level.

Methods

Sites

Four sites were selected to examine feral cat movements and the efficacy of targeted baiting efforts (Figure 1). These sites were selected as they represented four major climatic zones of Western Australia (WA), are managed reserves, and were earmarked to have feral cat baiting programs implemented through the Feral Cat Strategy 2024–2027.

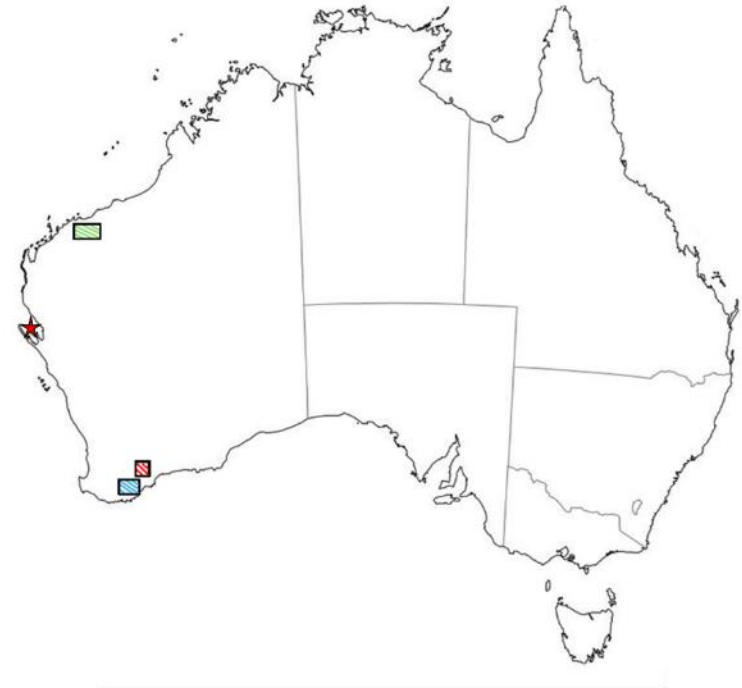

Figure 1. Locations of the four study sites to examine feral cat spatial ecology and baiting programs. Red indicates Lake Magenta Nature Reserve, blue indicates Stirling Range National Park, and green indicates Millstream-Chichester National Park. The red star indicates Francois Peron National Park, a site that was abandoned.

Francois Peron National Park

Francois Peron National Park (FPNP) is an ex-pastoral station that is part of the Shark Bay World Heritage Area. The park is 525km2 in size and the traditional lands of the Malgana people who DBCA are working with to establish joint management. It is located in the Midwest, Gascoyne region of WA approximately 800km north of Perth. The site lies within the Victoria Sand Plain District and is characterised by extensive flat to gently undulating sandplain with minor dune fields (Payne *et al*. 1987). Five broad vegetation units occur across the peninsula – *Acacia ramulosa* scrub, *Acacia* thicket, *Acacia ligulata/Triodia plurinervata* shrub steppe, *Acacia/Lamarchea* thicket and the steppe of the birridas (Beard 1976). A minor association occurs in small, near coastal strips. This is variously a *Spinifex longifolius* grassland or myrtaceous heath. The *Acacia* scrub occurs on undulating sand dunes and is dominated by *Acacia ramulosa*, which grows to ~3 m. The *Acacia* thickets occur on the exposed western side of the peninsula and are dominated by dense, low *A. ligulata*. The shrub steppe is dominated by *Triodia plurinervata* grassland. The *Acacia/Lamarchea* thicket occurs on dunes in the exposed northwest portion of the peninsula. It exists as a low dense scrub to 1.5 m, dominated by *A. ligulata* and *Lamarchea hakeifolia*. The birridas are variously vegetated with steppe, many with large areas of bare, saline and alkaline clay. The 25-year mean annual rainfall for this area is 188.9 mm. (BoM, 2025)

Lake Magenta Nature Reserve

Lake Magenta Nature Reserve (LMNR) is a 1,080 km^2 reserve managed by the Department of Parks and Wildlife in Western Australia's southern Wheatbelt Region. The study area consists mostly of mallee (mostly stands of *Eucalyptus platypus*) with dense shrubby understory, mallee with hummock grass, and some eucalyptus woodlands (*E. salmonophloia*), with an ephemeral salt lake and *Melaleuca* shrublands/open shrublands in the north-east (Dell 1976). The reserve is surrounded by farmland, with corridors of remnant vegetation connecting patchy woodlands around the reserve (DCCEEW 2020). There is a network of roads arranged through the reserve, and an extensive ephemeral stream network. It has an average annual rainfall of 446.5 mm per year, with the majority falling between June and August. (BoM, 2025) While the amount of permanent water in the reserve is limited, the farmland surrounding the reserve contains regular dams as permanent water sources for livestock.

Stirling Range National Park

Stirling Range National Park (SRNP) is a 1,159 km^2 reserve managed by the Department of Parks and Wildlife in Western Australia's South Coast Region. The park consists of five major vegetation communities – thicket, mallee heath, and woodland vegetation with a mountain range of metamorphosed sandstone and shale running east–west through the centre of the park (Keighery 1993). Thicket communities are typically dominated by mountain kunzea (*Kunzea montana*), *Dryandra* species, and *Banksia* species. Mallee heath can be divided into two major types; one dominated by mallee jarrah (*Eucalyptus marginata*), and the other by tallerack mallee (*E. tetragona*). Woodland communities commonly consist of jarrah, marri (*E. calophylla*), bullich (*E.* megacarpa), karri oak (*Allocasuarina decussata*), and wandoo (*E. wandoo*). There is also a sedge swamp in the south-eastern margin of the park, and samphire communities that fringe the salt lakes. It has an annual rainfall of 619.1 mm per year, receiving the majority of its rain from June to September. (BoM, 2025)

Millstream-Chichester National Park

Millstream-Chichester National Park (MCNP) is a 2,400 km^2 reserve managed by the Department of Parks and Wildlife in Western Australia's Pilbara Region. It contains multiple large rivers (George River in the centre, Harding River in the north-west, Portland River in the west, and Fortescue River in the south-west). There are also multiple gorge systems associated with these rivers and their tributaries as well as natural springs that feed these rivers. The study area in MCNP was restricted to an area in the south-west of the park into which the Portland and Fortescue Rivers flow. The flats beside the rivers and creeks carry an irregular woodland of river red gum (*E. camaldulensis*), desert honey-myrtle (*Melaleuca glomerata*) and blue-leafed wattle (*Acacia* cyanophylla). In the north, there is a grass savanna on 'crabhole plains' of cracking clay, where wanderrie grass (*Eriachne benthamii*) is dominant with kangaroo grass (*Themeda australis*). Also, present are areas of tree steppe comprising snappy gum (*E. brevifolia*) and bloodwood (*Corymbia dichromophloia*) and shrub steppe of various *Acacia* spp., both with an understory of *Triodia* (Beard 1975). It has an average annual rainfall of 371.3 mm per year, with the majority falling between December and March during cyclone season. (BoM, 2025)

Cat Trapping and Radio-collaring

Feral cat trapping was conducted in the same manner at all four sites (Figures 1,2, and 3). Trap sets were located at 0.5 km intervals along linear track transects. Trap locations are presented in Figures 1, 2, and 3. Where possible, trap sets were preferentially deployed on the side of the track where the prevailing night wind would carry the trap lure odour across the track. Trap site locations were recorded using a GPS (Garmin Rino 750, Garmin Ltd, USA) and marked using flagging tape tied to vegetation on the opposite side of the track. Pan tension was set so that the pan was depressed at a weight of 0.5 kg (5 N downward pressure or force); this is approximately 25% of the lowest bodyweight of an adult feral cat. Five N is also more than double the force that many non-target species, locally present, would apply to the trap pan and therefore this arrangement would potentially exclude these smaller species.

The trap set comprised paired padded leg-hold traps (#1.5 Victor ‘Soft Catch’ traps Woodstream Corp., Lititz, PA, USA) as open-ended trail trap sets, parallel to the track (see typical examples, Plates 1a and b). Trap setting followed the protocols outlined in the DBCA SOP – ‘Padded leg-hold traps for capture of feral cats’ (DBCA 2021). Vegetation, sticks, or rocks were used as a barrier along the trap sides to guide the feral cat over the traps and an aid to excluding non-target species. A mixture of cat faeces and urine (“pongo”) was used as the trap set lure. The lure was placed centrally at the side of the trap set against a barrier to prevent access from anywhere outside the designated trap channel. The lure was refreshed after five days.

Cats were anaesthetised, using drugs that induce amnesia to optimise the chance of recapture, when fitting radio-collars. As bodyweight is difficult to determine prior to anaesthesia, a standard dose was administered that is suitable for a 3.5 kg (lower dose) – 5.0 kg (upper dose) animal. Cats were sedated with a standard mixture of 0.15 – 0.20 mL Medetomidine HCl (100 ug/g; Pfizer Animal Health) and 0.15 – 0.20 mL Butorphanol tartrate (0.4 mg/kg; Bayer Australia) followed by 0.2 – 0.3 mL Ketamine HCL (4 mg/kg; Pfizer Animal Health), all given intramuscular. The time to sedation is approximately 5 minutes. After fitting the collar, 0.15 – 0.20 mL (200 ug/kg) of Antisedan (Atipamezole 5 mg/mL; Pfizer Animal Health) was given as a reversing agent.

Adult feral cats > 3.3 kg were fitted with LiteTrack Iridium 130 g satellite collars (< 4% bodyweight) (Lotek NZ Limited). Smaller adult feral cats (2.3 – 3.3 kg) were fitted either with W500 90 g (Advanced Telemetry Solutions) or LiteTrack 60RF 73 g (Lotek NZ Limited) GPS data-logger/radio-telemetry collars. All collars were programmed to obtain fixes at 60-minute intervals. The sex, weight, coat colour, and trap location (number) were recorded with a DNA tissue sample taken for captured individuals and following their recovery all were released at the trapped location. Non-target captures were also recorded.

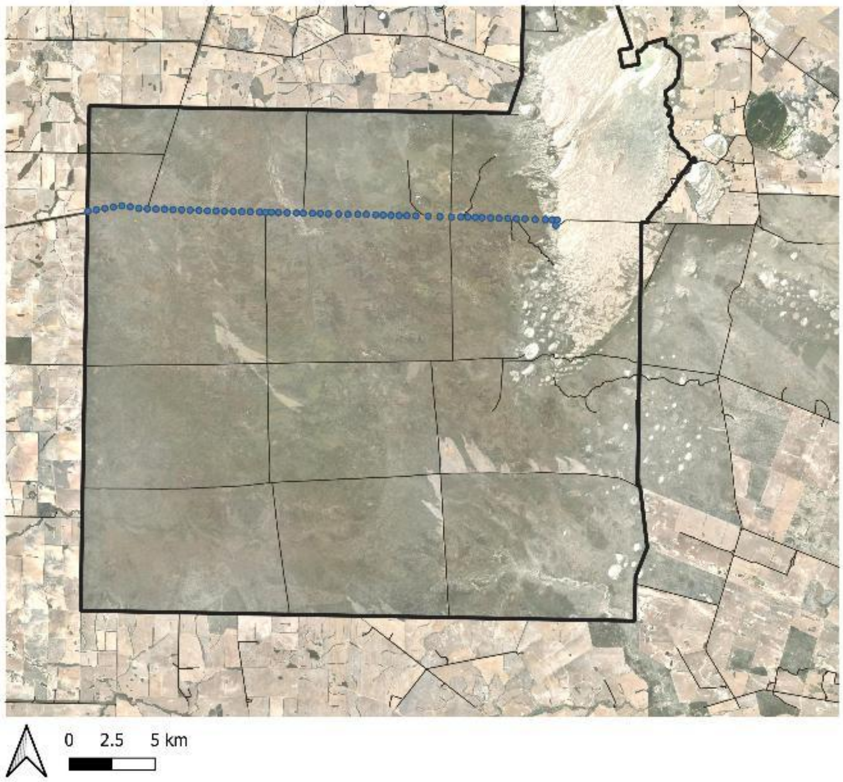

Figure 1. Feral cat trap locations at LMNR (blue dots; n = 57)

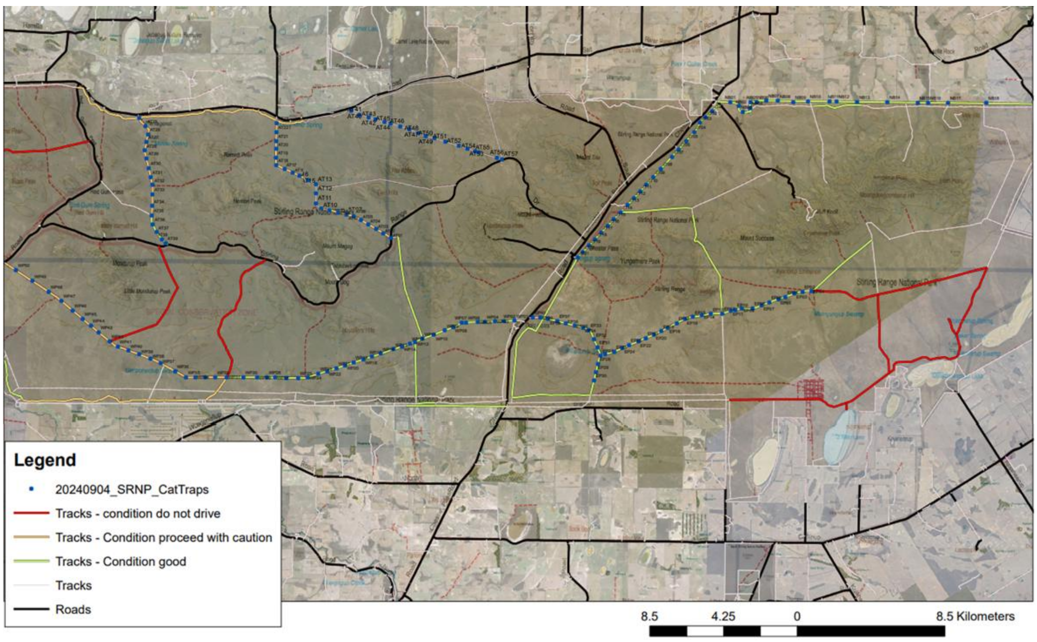

Figure 2. Feral cat trap locations at SRNP (blue dots; n = 186)

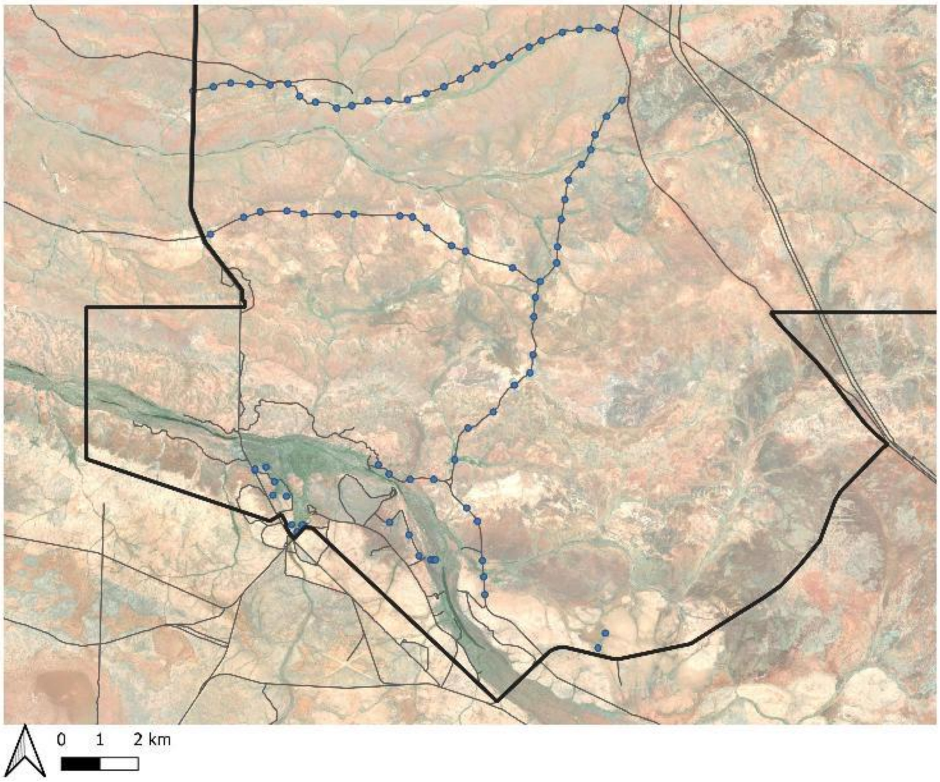

Figure 3. Feral cat trap locations at MCNP (blue dots; n = 89)

Spatial Analyses

Prior to analyses, all data were cleaned. Records with no geographic location (i.e., "blanks") were removed and outliers were identified using the "distHaversine" function from the "*dplyr"* package (Wickham et al. 2023). Here, the time difference between consecutive timestamps as well as the distance travelled between points based on latitude and longitude were calculated (determining the speed in m/sec.), and outliers were identified using the interquartile range method. Lower and upper bounds were calculated based on the first and third quartiles of the speed distribution, and a 1.5 threshold multiplier was applied to control sensitivity. A horizontal dilution of precision (HDOP) cut-off value of 9 was applied, whereby all fixes with an HDOP value above 9 were removed (Comer et al. 2020). This was done based on previous work done with the same collars in a similar area.

Home ranges feral cats were calculated using continuous time movement models (ctmm), implemented in the "*ctmm"* R package (Fleming et al. 2023). All animals were checked for range residency prior to analyses using empirical variograms (a pre-requisite for ctmm analyses). Movement models were fitted to the telemetry data, and the top model in each case (based on AIC results) was used to estimate the autocorrelated kernel density estimation (AKDE) of the 95 % (home range) and 50 % (core) isopleth home range for each animal (Fleming et al. 2015; Fleming et al. 2017; Silva et al. 2022). The overlap of individuals home ranges before and after aerial baiting was also examined to determine if baiting caused a significant home range shift.

To examine how feral cats moved in relation to aerially deployed Eradicat™ baits, bait drop points were collected from the plane and projected using QGIS. These then had a 120 m buffer placed around them to simulate the carry distance after being deployed from the aircraft. In the direction of travel (as determined by the flight path), a 200 m by 40 m polygon was generated at the edge of the 120 m buffer to simulate the bait swathe of each drop. The Euclidean distance from each bait was then calculated. Feral cat interactions with these bait swathes were visualised using the "*recurse*" package, and the number of GPS points that fell within the bait swathes was counted. Due to the coarse nature of collar fixes, trajectory crossings of the bait swathes were also calculated. This was done by connecting consecutive points with trajectory lines and identifying how many bait swathe crossings occurred per animal using the "*dplyr*" package (Wickham et al. 2023). Here, a GPS fix that falls within a bait polygon is referred to as a "bait intercept", while trajectories that cross polygons (i.e., the GPS points do not fall within the polygon but the line that joins two fixes does), are referred to as "trajectory crossings".

Finally, resource selection function analyses were performed. This was done using the "rsf" command in the "*ctmm*" package. Several habitat rasters were selected that may contribute to feral cat habitat use. First, a Digital Elevation Model (DEM) layer was sourced from Geoscience Australia (Gallant et al. 2009). This is a 3-second (30 m) ground surface raster that provides high-resolution spatial data on topographic features (sourced from: https://ecat.ga.gov.au/geonetwork/srv/eng/catalog.search#/metadata/69888 on 12/05/2025). Second, foliage projective cover (FPC) was sourced from CSIRO (Donohue & Renzullo (2025); sourced from: CSIRO Data Access Portal - Australian total, woody and grass foliage cover (version 3 on 18/05/2025). This represents a 250 m resolution estimate of total foliage cover derived from MODIS and 16-day NDVI imagery. Finally, Euclidean distance layers were calculated from Western Australian government layers of roads and hydrography. All rasters were scaled prior to analyses and then resampled using the DEM layer as the reference. Resource selection function analyses were conducted on these models, and the average suitability at each site for each set of collared cats was estimated.

Camera Traps

Lake Magenta

Ninety camera traps were deployed at LMNR from the 20 February to 16 June 2024 (Figure 4). They were installed in pairs, 50 m apart, whereby one camera was lured with an EzyLure 1M dripper (CritterSolutions, Christchurch NZ) that dispensed 0.25 mL of cat urine every 6 h dripping onto a wooding stake, and the other camera was "lured" with a wooden stake, without any urine or scent lures. Camera traps were set-up approximately 1.2 km apart, approximately 40 cm off the ground, facing in a north–south direction, to avoid interference from the rising or setting sun. The EzyLure was installed on a wooden stake approximately 1.2 m off the ground and approximately 3 m in front of the camera within 10 m of a road or track.

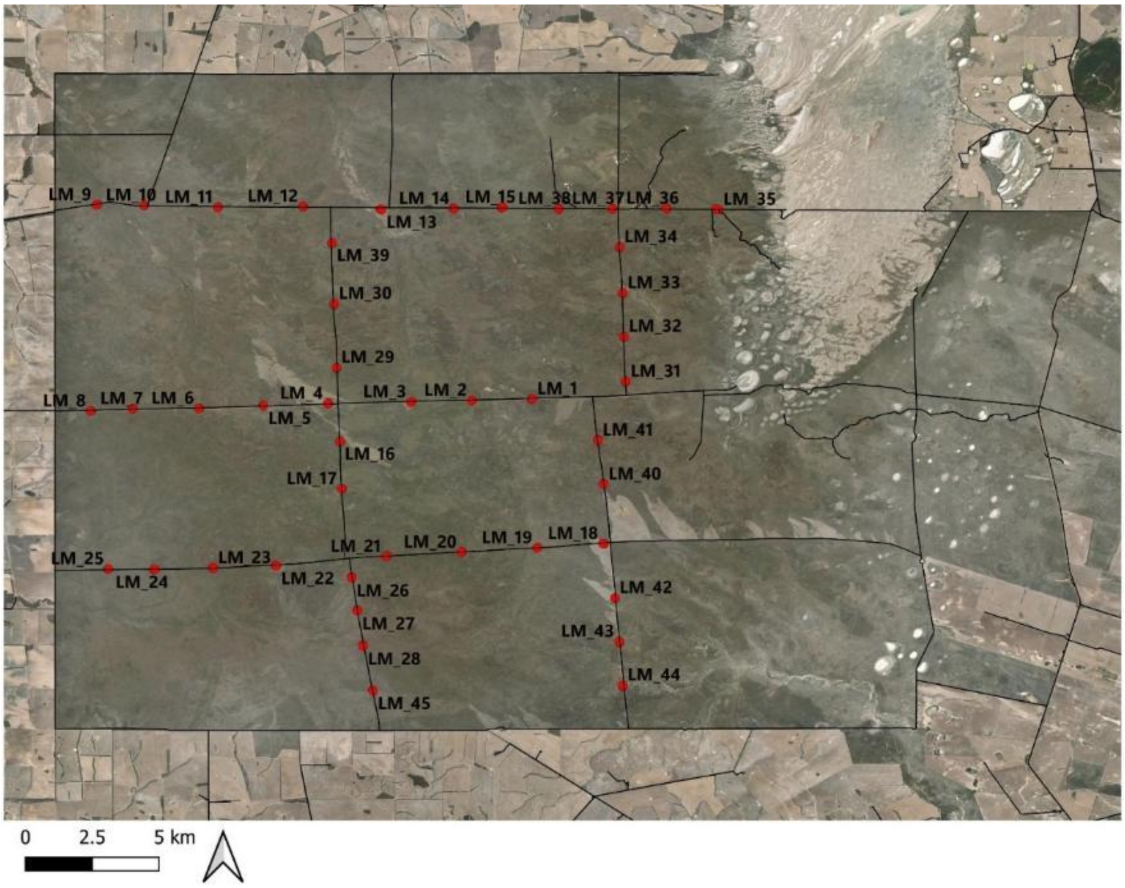

Figure 4. Locations of camera traps set at the LMNR from February to June 2024. Each red point represents a pair of cameras, 50 m apart, one lured with cat urine, and the other "passive". n = 90 (45 paired sites).

Camera Trap Analyses

To analyse feral cat activity at camera traps, the number of "events" was used. Here, an "event" was defined as a sequence of photographs of one species that occurred more than one hour after the event of the same species. This time-frame was used in an attempt to avoid repeated counting of the same individuals (Tobler et al. 2008; Rovero et al. 2017; Bruce et al. 2018). To investigate how feral cat activity is influenced by baiting, analyses were split into two periods based on the timing of aerial baiting. The "Before" period represents the time between camera installation and aerial baiting (20 days) and the "After" period is the same timeframe as the before period (i.e., 20 days) that begins 10 days after baiting. At LMNR, this timeframe was 17 days before and after because baiting was brought forward due to weather conditions. The "bait" period represents the 10-day active period following bait where the population is not closed due to the likelihood of cats dying in this timeframe; these data were removed from analyses. This 10-day bait period was estimated by taking the average time of death for 29 GPS-collared feral cats at four sites from different climatic zones from eight years of baiting (removing those that died over one month later). The average time until death was 10.24 days (range: 1 – 21), so here we assumed the median active bait period to be 10 days.

To examine if there were significant differences between bait periods, a paired Sign test was used. Detection events were first converted to rates (events per day) to account for variation in sampling effort. The Sign test was chosen as the data are not normally distributed and zero-inflated. The Sign test provides a conservative approach with limited assumptions, that only evaluates the direction of change between paired observations. A paired Sign test was also used to examine differences between passive and lured sites. All data were visualised using "*ggplot2*" (Wickham et al. 2016)

Baiting

Baits were supplied by the Harvey Bait Factory. Conventionally, an aircraft, outfitted with purpose-designed bait delivery hardware, flying at a speed of approximately 110 kt and 500 ft (above ground level) is used to deploy the baits within a predefined area. Fifty baits are released at each drop point, along flight transects 1 km apart, to achieve an application rate of 50 baits km^{-2}. The ground spread of 50 baits is approximately 200 x 40 m (DBCA, 2024). Aerial baiting using Eradicat™ baits was conducted at LMNR on 9–10 March 2024 using a blanket-baiting approach (Figure 7). In addition, there was routine ground-baiting conducted on 14 February 2024 (Probait™) and on 15 May 2024 (Eradicat™). At SRNP, aerial baiting using Eradicat™ baits was conducted on 20–21 March 2025, as well as follow-up ground baiting on 30 April 2025, and Probait™ baiting (fox baits) throughout the study period (Table 1). Here, baiting was more targeted, removing high-altitude areas from the bait cells, as none of the collared cats were using this part of the landscape (Figure 8). At MCNP, aerial baiting was conducted on the 21 June 2025. To examine the effectiveness of targeted baiting, flight paths and bait drops were designed based on habitat preferences observed from the other sites as well as previous work done in the region and observations made while trapping. Following the exclusion zones defined by the region and stakeholders (including watercourse and road exclusions), a targeted bait drop was designed to ensure baits fell within 500 m of hydrography/drainage lines or roads/tracks (Figure 9).

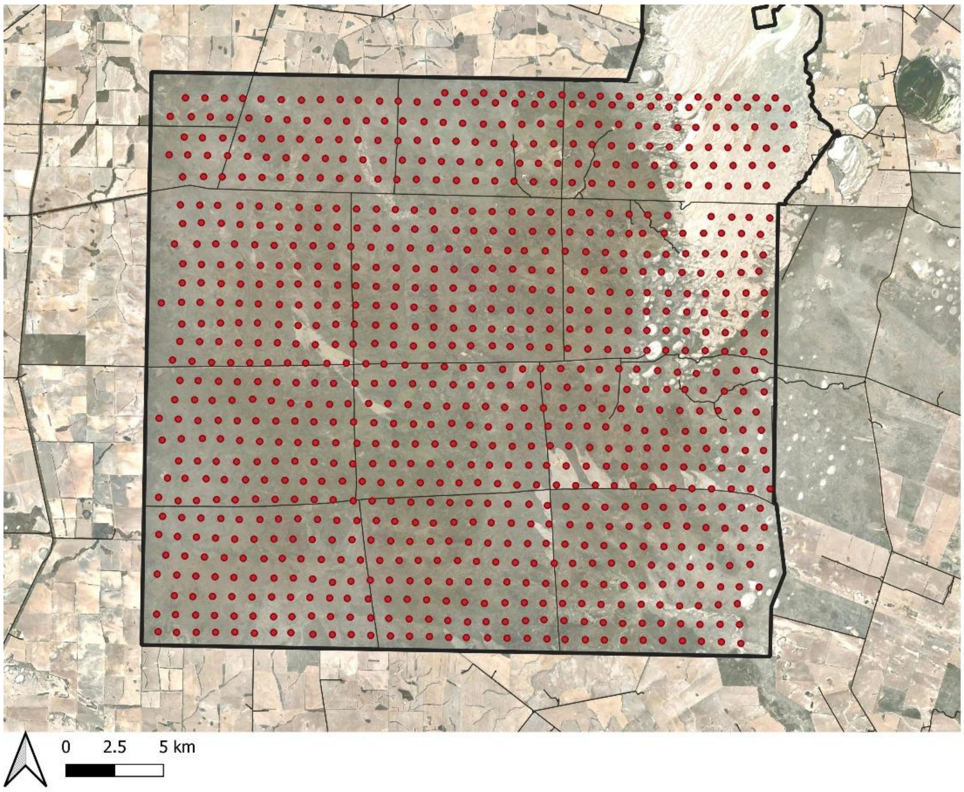

Figure 7. Eradicat™ bait drop locations at LMNR using a blanket baiting approach.

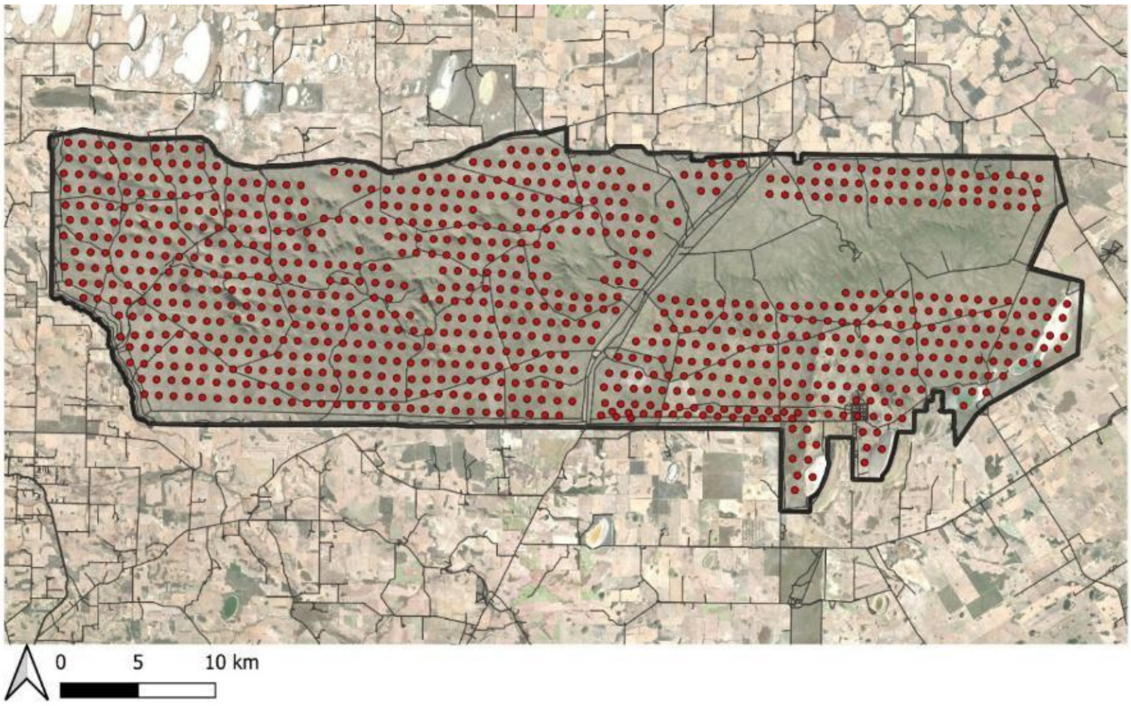

Figure 8. Eradicat™ bait drop locations at SRNP using a blanket baiting approach, but excluding high-altitude areas based on information from collar data.

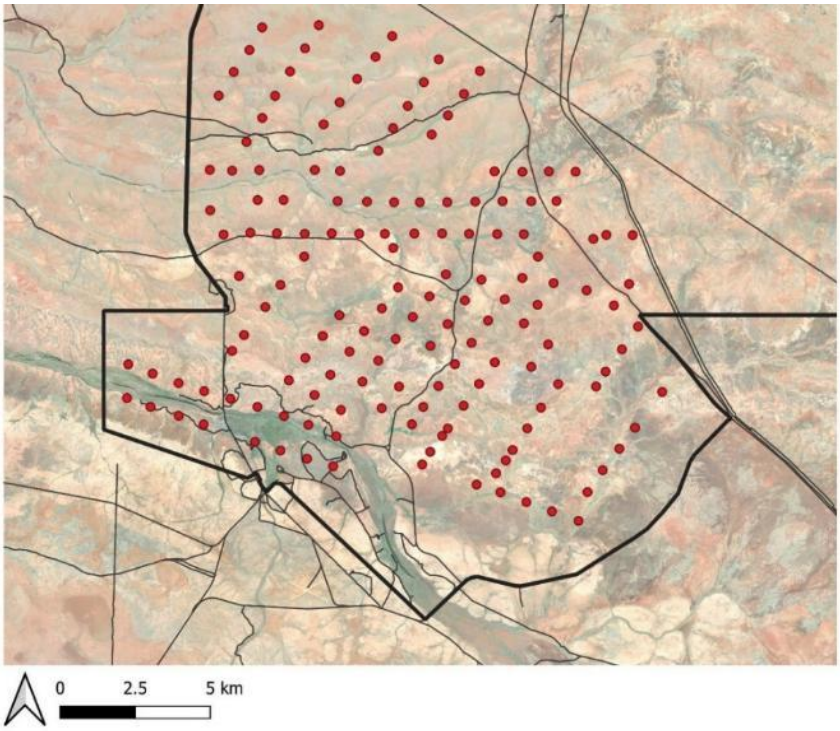

Figure 9. Eradicat™ bait drop locations for MCNP using a targeted baiting approach, only dropping baits within 500 m of a hydrography feature or road.

Bait degradation monitoring

In conjunction with bait delivery, monitoring work was conducted for a sample of prepared baits to measure bait longevity of toxic baits at the Millstream-Chichester National Park site. The method used was based on that developed on the South Coast (Clausen *et al*. 2017). This camera-based method does not allow for collection and identification of ants but the general impact on baits by invertebrates (and vertebrate consumption) can be measured.

Sites were chosen as representatives of the three main environments in which the baits are deployed: Riverine; Hills-spinifex; and Cracking Clay. Each site had three baits assessed, with one bait excluded from vertebrate consumption by being place inside a cage whilst the other two were tethered with wire to the base of the camera post. The tethering of the bait is an attempt to promote a sustained interaction by vertebrate taxa to allow for both identification and understanding of the type of interaction (e.g. curious or incidental engagement or consumption). Cameras (HC600; Reconyx, Wisconsin, USA) were placed approximately 50 cm vertically and sideways over the bait (Plate 1) to allow for invertebrate observations. They were programmed to photograph the baits every hour and to be triggered by any activity they could detect. The cameras were set approximately 8 m from the next to simulate the average position of fall of an aerially deployed bait.

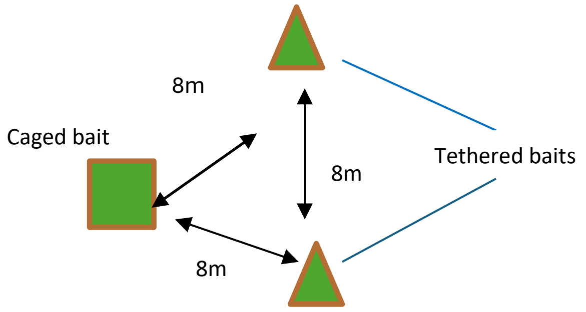

Plate 1. Camera and bait placement setup for bait degradation monitoring for simulating aerially deployed *Eradicat* baits. Images: L.Clausen/DBCA

Results

Francois Peron

Fieldwork commenced in March 2023 at Francois Peron National Park with an intended feral cat satellite radio-collaring program and rabbit population control works. There was to be a fence repaired for this trial, including installation of a floating fence at the western coastal edge to prevent any possible incursion. The fence was to provide an effective block to both feral cat (*Felis catus*) and rabbit (*Oryctolagus cuniculus*) movement. However, this site was required to be abandoned due to fencing work not being completed, sudden ill-health of key staff and limited ability to run the rabbit control component.

Lake Magenta

Spatial Analyses

To examine feral cat movements at LMNR, 11 feral cats (nine male, two female) were collared with GPS collars (Table 2; Figure 10). One collar failed and the two female collars were unable to be retrieved, so eight male cats were used for analysis. Of the collared males, five died following aerial baiting. Two animals (93060 and 93064) were non-range resident prior to baiting, and of the three animals that survived, one (93064) was non-range resident after baiting. Details of their home ranges can be found in Supplementary Material Table S1.

Table 2. Information for collared feral cats at LMNR.

Collar ID	Sex	Weight (g)	Date Collared	Date Died
93060	M	3900	10/02/2024	19/03/2024
93061	M	3800	10/02/2024	13/03/2024
93064	M	3200	13/02/2024	Survived
93065	M	4000	15/02/2024	23/03/2024
93066	M	4600	13/02/2024	19/03/2024
93068	M	5400	8/02/2024	Survived

93070	M	4100	12/02/2024	Survived
93071	M	3400	13/02/2024	15/04/2024
93062	M	4400		Collar failed
51564	F	2000		Not recovered
51561	F	2000		Not recovered

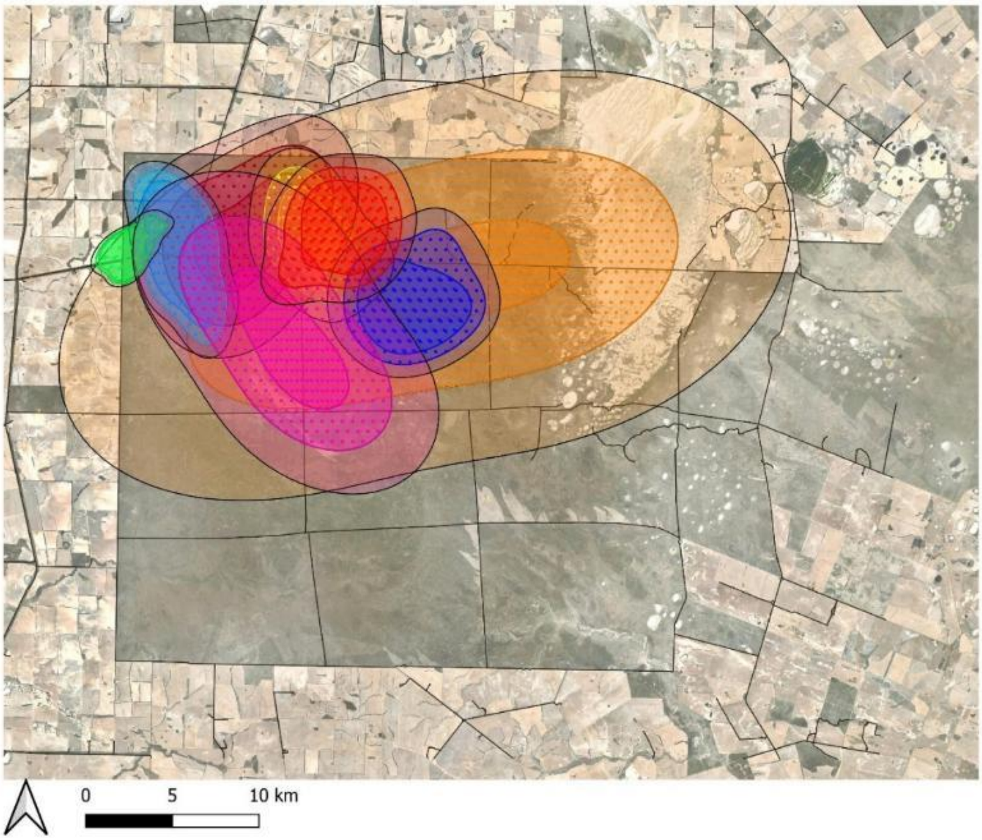

Figure 10. AKDE home ranges of feral cats at LMNR prior to baiting. Each colour represents the home range of a different GPS collared cat, with the outer line representing the upper 95% confidence interval, the inner line representing the lower 95% confidence interval, and the shaded area representing the estimated 95% AKDE home range.

All animals examined (n=8) had at least one site (i.e., pair of cameras) in their home range before (average before: 8.5 sites [range: 1 – 29]) and after the baiting period (average after: 7.33 [range: 2 – 16]). The average distance to a camera (both passive and lured) throughout the study period was 2,274.38 m (range: 1,345.7 – 2,913.30 m). The average minimum distance collared animals recorded to a camera (i.e., the average of the closest distance each animal was to a camera (lured or passive) throughout the collaring period) was 165.93 m (range: 13.87 – 441.00 m), while the minimum distance was 13.87 m (this animal (93060) had 15 sites in its home range prior to baiting and died following control effort). Every animal, therefore, had opportunity to visit a camera throughout the study period.

Three collared animals were detected on cameras throughout the study period, one on a lured camera and one on a passive camera. All three detections were following baiting. The image taken with the passive camera (nine days after baiting; left-hand image in Figure 11) was likely individual 93066 based on the collar movements around the time this image was captured. One of the images taken with the lured camera (47 days after baiting; right-hand image in Figure 11) has a collar that does not match any of the data analysed here. Based on the antenna, this suggests it was one of the females who's movement data were not retrieved, and that she survived baiting (as the image was captured over a month and a half after baiting). The final image (bottom image, Figure 11) was taken 53 days after baiting and is likely animal 93068 based on time and date data from the GPS collars.

Figure 11. The only three instances of collared feral cat detections at passive (left) and urine-lured (right) cameras at LMNR. The animal on the left is likely 93066, as this camera lies in between two points from the collars that were captured at the correct time and date. The animal on the right was not one of the ones examined in the collar analysis and is likely one of the females as indicated by the presence of an antenna. Finally, the animal on the bottom is likely animal 93068 who survived baiting.

Feral cats that survived aerial baiting all increased their core and 95% home ranges following control (Figure 12). Likewise, all animals, except one, exhibited high site fidelity post-baiting, indicating that their home ranges did not shift following control (Table 3; Figure 13). Of particular note, the largest cat with the largest home range survived baiting (93064).

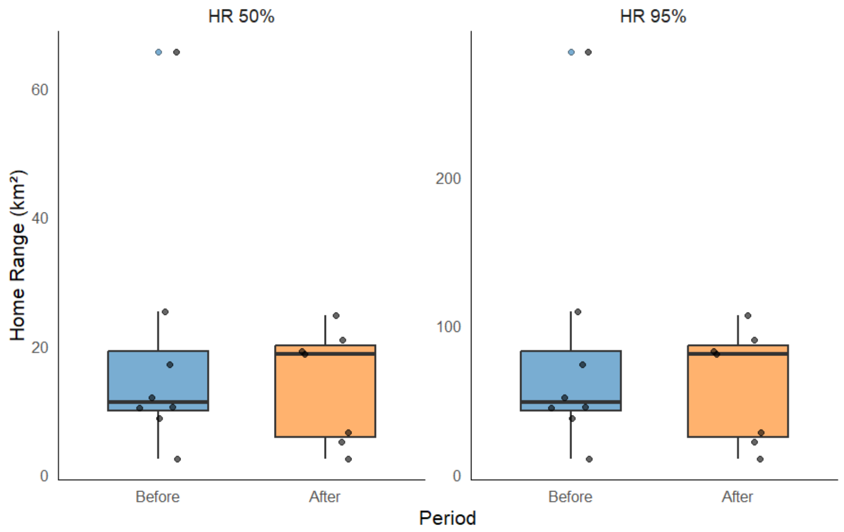

Figure 12. Box-and-whisker plots of 50% home ranges (left) and 95% home ranges (right) of feral cats at LMNR (removing outlier 93064).

Table 3. Individual home range overlap (i.e., proportion home range overlapping before and after baiting).

	low	est	high
93064	0.34	0.95	1.00
93068	0.63	0.90	1.00
93070	0.49	0.68	0.86

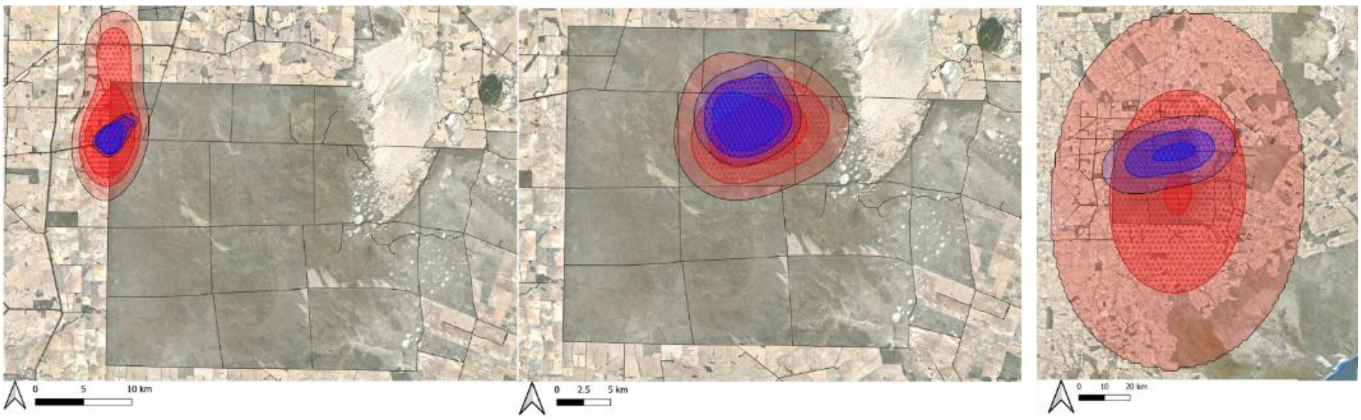

Figure 13. Home ranges of collared cats that survived baiting before (blue) and after (red) aerial control (left: 93070; centre: 93068; right: 93064).

Regarding interactions with baits, the average number of days following baiting before the animals died was 9.5 days (range: 4 – 14 days). In the 15 days following baiting, the average distance collared animals spent from a bait was 556.35 m (range: 333.65 – 1,522.48 m; Figure 14). Only five cats had GPS locations that intercepted a bait drop, and all but 93071 only intercepted once; 93071 intercepted two bait swathes. One of these animals (93064) did not die from baiting. In terms of trajectory crossings (i.e., the line between two GPS fixes; Figure 15), the average number of intercepts was eight (range: 0 – 11).

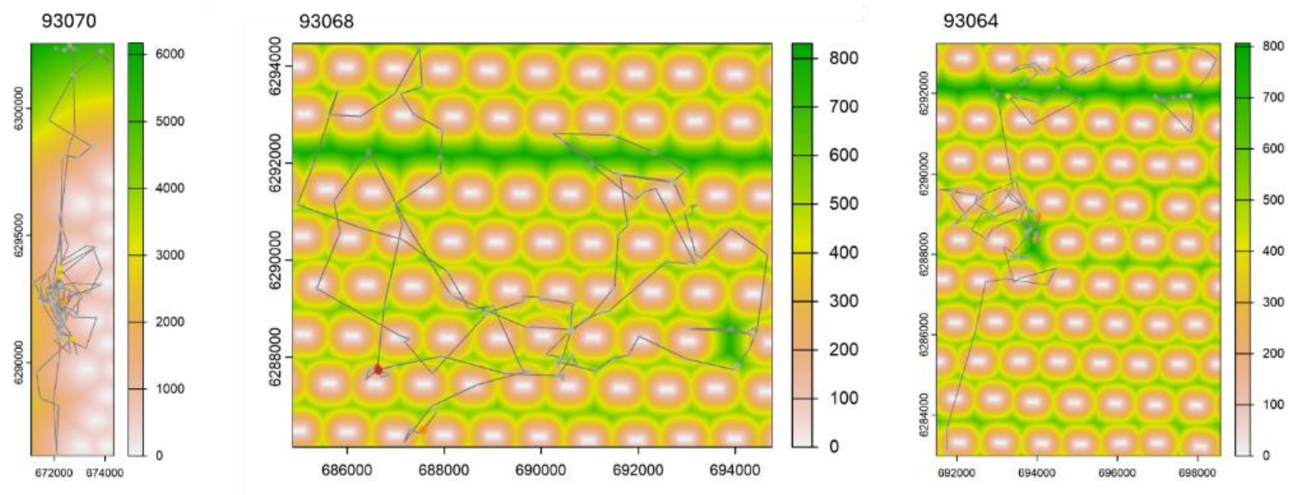

Figure 14. Feral cat interactions with bait drops 15 days after baiting of the animals that survived baiting. Colour gradients indicate the distance (m) from each bait drop. Grey lines on these maps indicate the feral cat trajectories for 15 days after aerial baiting.

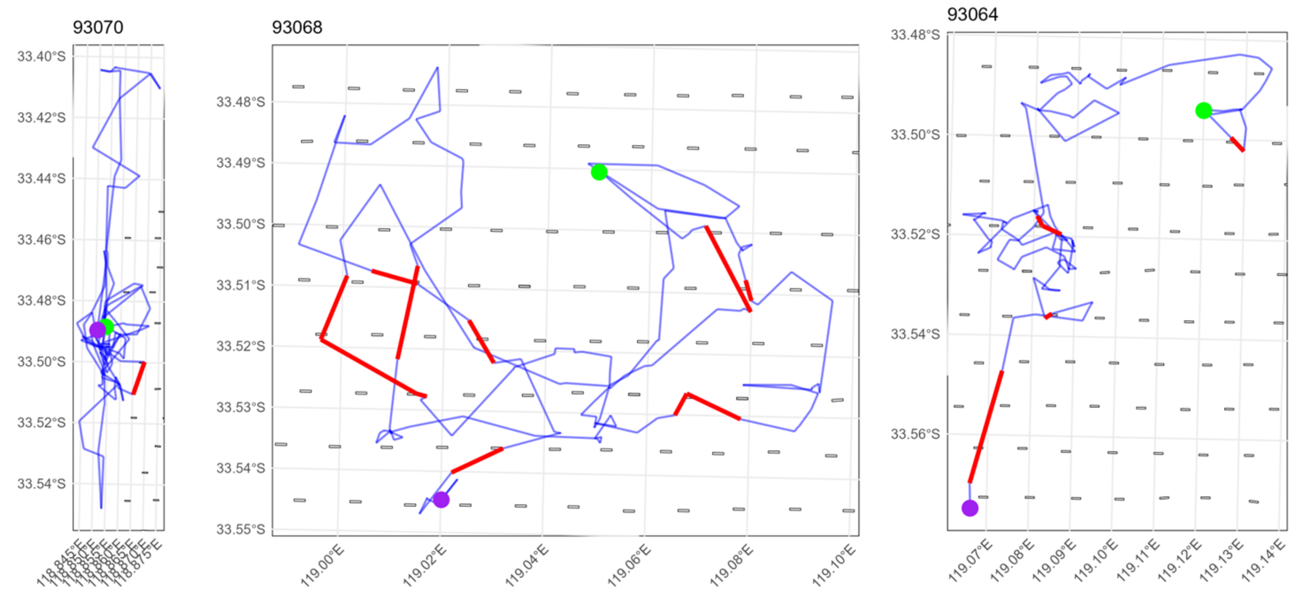

Figure 15. Feral cat interactions with bait drops. Small black rectangles indicate the 40 x 200 m swathe of each bait drop, taking 120 m carry distance from the plane into account. Blue lines represent the trajectories of the collared feral cats 15 days after the aerial drop, with red lines indicating the intervals where the trajectories crossed a bait drop. These three animals survived aerial baiting (93070: left; 93068: centre; 93064: right). Green points indicate the "start" and purple points indicate the "end" of the 15-day bait period. Plots of the animals that died following baiting can be found in Supplementary Material Figure S1.

Animal 93071 died over a month after baiting. Over the 15 days after baiting, its average distance from a bait was 391.90 m (range: 0 – 2879.87 m), it only intercepted a bait drop once between baiting and death (4 days after baiting), and its trajectories crossed bait drops 9 times (Figure 16). Within the 24 h prior to its death, its average distance from a bait drop was 332.03 m (range: 255.96 – 520.45 m).

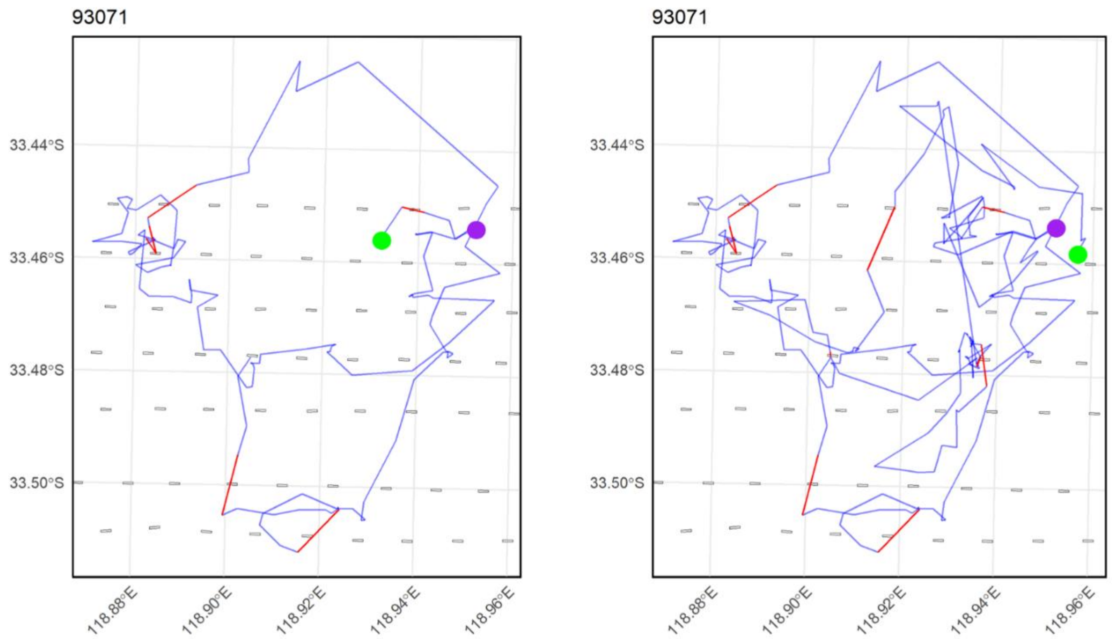

Figure 16. Animal 93071 movements in relation to bait points 15 days (left) and until death (right). Green points indicate the “start” and purple points indicate the “end” of the analysed period.

Feral cats appeared to be highly variable in how they used habitat (Figure 17). When taking the mean of the population level resource selection functions, distance from roads (i.e., increasing distance from roads) was the only variable favoured by feral cats (Table 4); this was; however, highly variable (Supplementary Material Figure S2), where some cats selected habitat closer to roads (93060 and 93064) while others preferred habitat closer to (93068) or further away from hydrography lines (93061).

Table 4. Population average resource selection functions estimated from utilisation distributions at LMNR.

	low	est	high
FPC	-2.09	0.28	2.65
Hydrography	-1.77	0.63	3.02
Roads	2.11	7.94	13.78

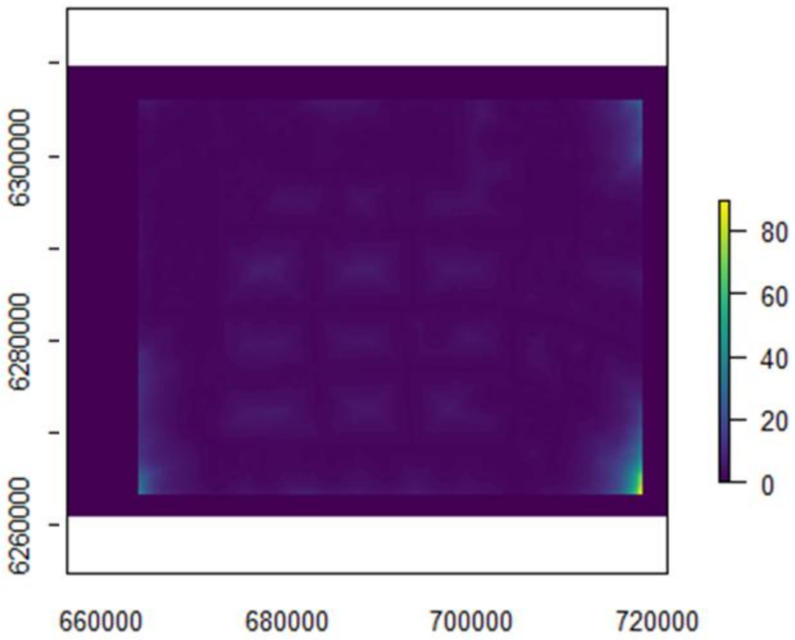

Figure 17. Average habitat suitability map estimated from resource selection function analysis for feral cats prior to baiting at LMNR. Scale indicates the degree of suitability with 100 being the highest (most suitable), and 0 being the lowest.

Camera Trapping

There were 24 feral cat detections (437 images) during this period (15 before baiting (0.833 detections per day), and 9 after baiting (0.500 detections per day)). Despite 62.5% of the radio-collared cats dying as a consequence of baiting, there was no statistically significant difference in feral cat detections before and after baiting (p = 0.481; 95% CI [0.000, 0.000]; Figure 18). Paired comparisons of lure types during this bait period indicated a significant difference in detections with urine-lured cameras (n = 16) detecting more feral cats than passive-lured cameras (n = 9; p = 0.039; 95% CI [0.000, 0.000]; Figure 19). Although the median paired difference was zero due to many sites having tied counts, the test detected an overall directional effect favouring urine lures. Likewise, when comparing detections between lures across the entire period the cameras were active (n = 116 days), urine-lured cameras detected significantly more cats (n = 37) than passive cameras (n = 21; p = 0.019; 95% CI [-0.000, 0.009]). Detection rates across stations were moderately variable, with no extreme outliers.

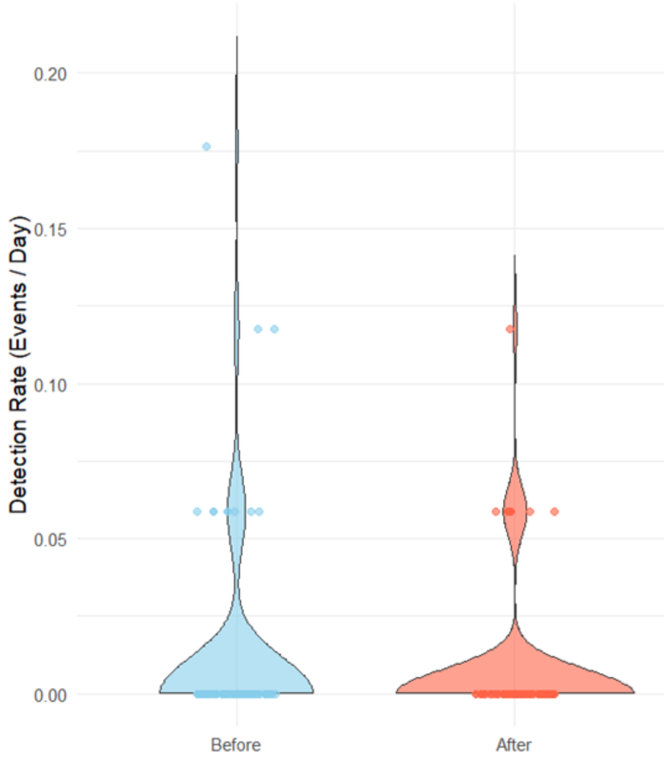

Figure 18. Violin plots showing differences in total detections before and after aerial baiting.

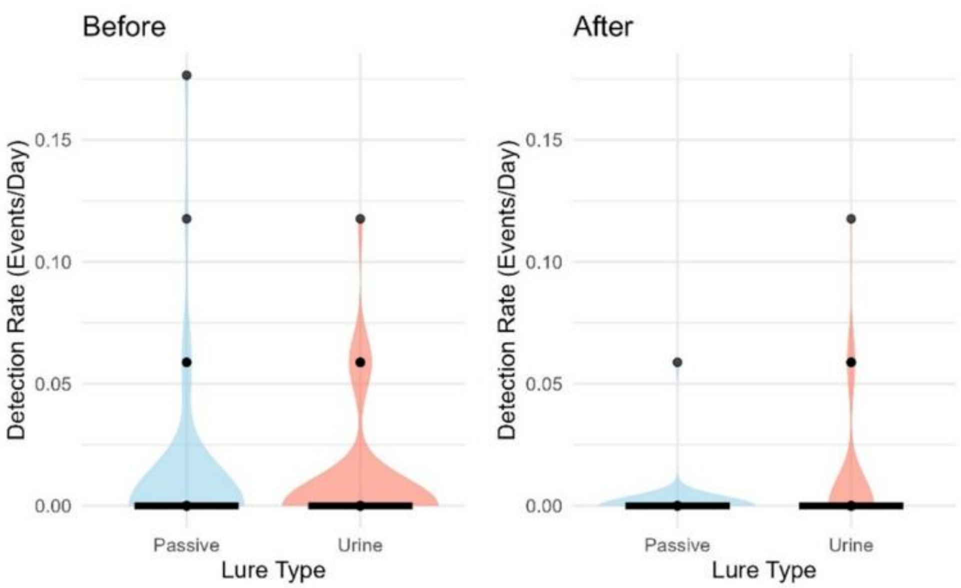

Figure 19. Differences in detections at passive (blue) and lured (red) cameras before (left) and after (right) aerial baiting. Bold lines represent the median of the data.

When using the entire dataset, feral cats spent more time on average in front of the lured cameras (1 m 10 s [range: 0 m 00 s – 10 m 57 s]) compared with the passive cameras (15 s [range: 0 m 01 s

– 1 m 41 s]). Of the passive cameras, 15/21 detections did not interact with the control lure, six sniffed it, and one of those also rubbed it. Of the lured cameras, only 8/38 detections did not interact with the lure. One approached, but did not interact, 29 sniffed the lure, and of those, three climbed the lure, three sprayed the lure, and one rolled on the ground in front of the lure.

Stirling Range National Park

Spatial Analyses

Twenty-six animals were captured and 25 animals were collared at SRNP (25 male, 0 females; Table 5; Figure 20). One feral cat 94301 died nine days after the aerial baiting, the other three (94022, 94299, 94245) died following either Eradicat ™ or Probait™ ground baiting (Table 1).

Table 5. Information for feral cats collared at SRNP where aerial baiting with Eradicat™ took place 20–21 March 2025 (Table 1).

Collar ID	Cat ID	Sex	Weight (g)	Date Collared	Date Died
94305	24M21	M	3900	4/09/2024	Survived
94022	24M22	M	4500	4/09/2024	17/05/2025
94023	24M23	M	4580	4/09/2024	Survived
94304	24M24	M	3800	5/09/2024	Survived
94236	24M25	M	5710	5/09/2024	Survived
94024	24M26	M	4430	5/09/2024	Survived
94306	24M27	M	5290	5/09/2024	Survived
94241	24M28	M	4840	5/09/2024	Offline 16/12/2024
94019	24M29	M	6560	5/09/2024	Survived
94240	24M30	M	5190	5/09/2024	Survived
94021	24M31	M	4330	6/09/2024	Survived
94308	24M32	M	4990	6/09/2024	Survived
94020	24M33	M	3000	6/09/2024	Survived
94303	24M34	M	4700	7/09/2024	Survived
94307	24M35	M	4800	7/09/2024	Survived
94302	24M37	M	4400	8/09/2024	Survived
94245	24M38	M	5510	9/09/2024	18/07/2025
94243	24M39	M	4070	9/09/2024	Survived
94237	24M40	M	4800	10/09/2024	Survived
94299	24M41	M	5420	10/09/2024	29/09/2024
94298	24M42	M	3900	10/09/2024	Survived
94301	24M43	M	4570	11/09/2024	30/03/2025
94244	24M44	M	4000	11/09/2024	Survived
94238	24M45	M	4840	12/09/2024	Survived
94242	24M46	M	5200	13/09/2024	Survived

Table 1. Dates of 1080 baiting (Probait and Eradicat) as well as delivery method at SRNP during the study period.

Date	Bait type	Delivery
11-12/09/2024	Probait	Aerial

17-21/10/2024	Probait	Ground
11-13/12/2024	Probait	Aerial
14/01/2025	Probait	Ground
20-21/03/2025	**Eradicat**	**Aerial**
30/04/2025	Eradicat	Ground
15-16/07/2025	Probait	Ground

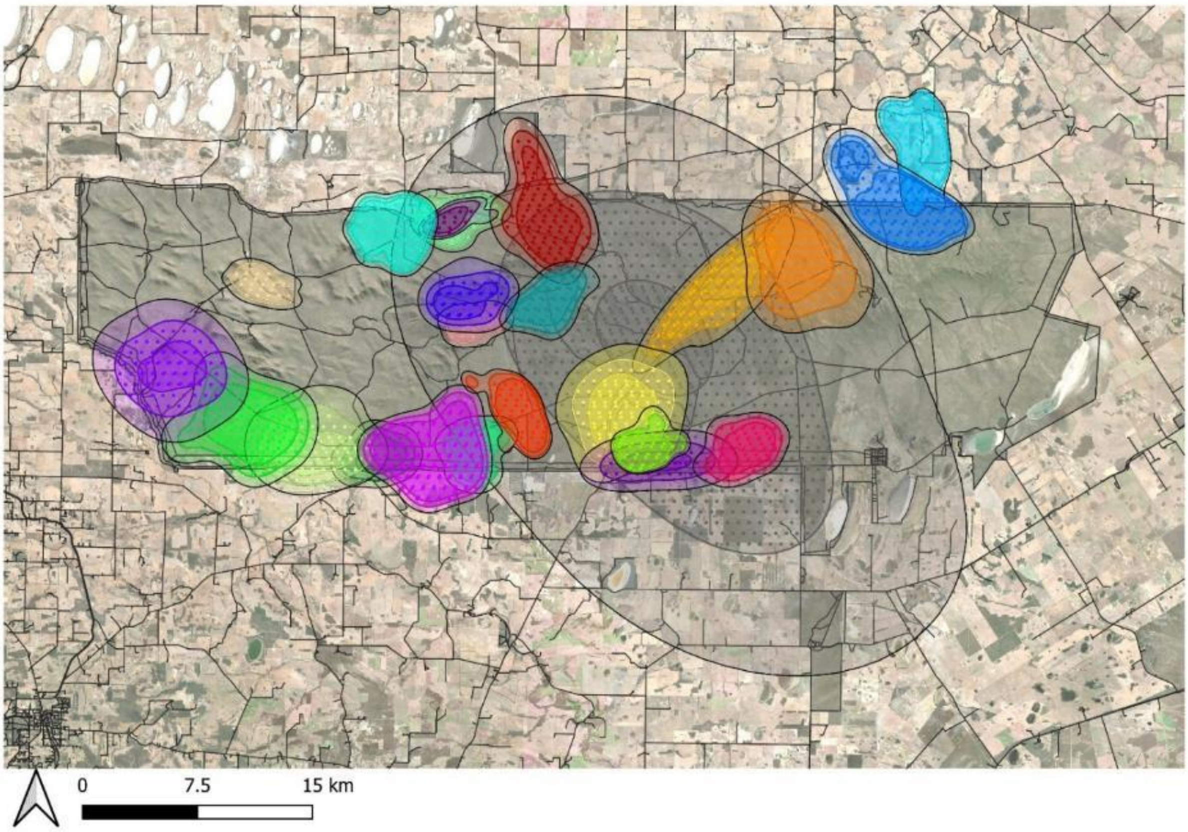

Figure 20. Feral cat home ranges prior to baiting at Stirling Range National Park. Different colours indicate different animals, with the outer line being the high confidence interval, the shaded area being the estimated home range, and the inner shaded area being the low confidence interval.

In an attempt to conserve battery life, some collars (n=17) were programmed with low download rates which required physical recovery for full data retrieval. Many of these collars were not recovered due to the cats failing to take a bait and/or battery expiry. As a result, there was not enough data for home ranges of these individuals to be considered range resident. We examined the home range overlap of animals that had sufficient data between the post-capture and pre-bait period (Supplementary Material Table S2, Supplementary Figure S3 and S4), and due to the high overlap, we opted to use the post-capture home range for individuals with insufficient data pre-baiting to compare with post-baiting home range. These individuals are marked with an asterisk in Supplementary Material Table S3.

The average 95% home range size of feral cats the feral cats pre-baiting was 47.41 km^2 (low CI: 17.41 km^2, high CI: 98.15 km^2; Figure 21; Supplementary Material Table S2), and the average home range after baiting was 46.73 km^2 (low CI: 11.23 km^2, high CI: 115.63 km^2). In terms of core home range, the average size was 10.95 km^2 (low CI: 4.12 km^2, high CI: 22.71 km^2) before baiting and 10.81 km^2 (low CI: 2.59 km^2, high CI: 26.76 km^2) after baiting. When excluding animal 94305, these dropped to a 95% home range of 35.11 km^2 (low CI: 16.47 km^2, high CI: 62.50 km^2) before baiting, and 27.70 km^2 (low CI: 9.61 km^2, high CI: 59.47 km^2) after baiting.

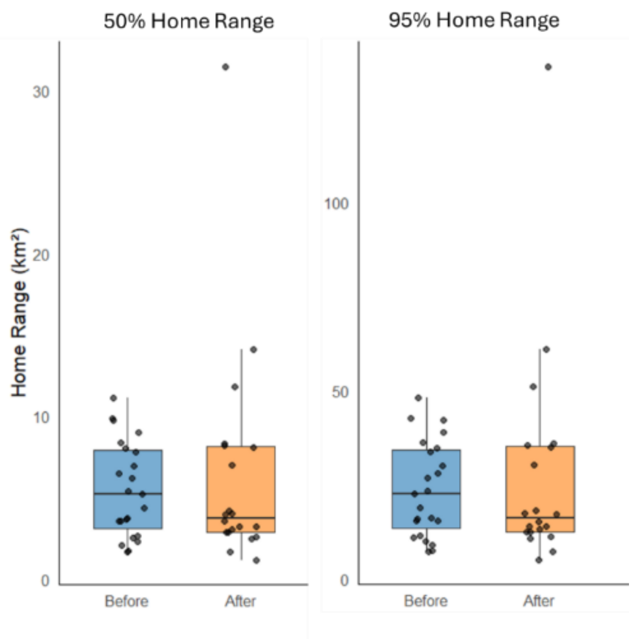

Figure 21. Box-and-whisker plots of 50% home ranges (left) and 95% home ranges (right) of feral cats at SRNP (removing outliers 94305 and 94299).

Every cat (with sufficient data) had baits within its home range (Supplementary Material Figure S5). There were four mortalities at the Stirling Ranges – only one was within nine days of the aerial Eradicat™ bait drop (94301). Within 24 hours of death, it had been within 200 m of a bait drop for all recorded points, and within 100 m once. Another mortality was 18 days after ground baiting with Eradicat™ (the animal died 17/05/2025 and Eradicat™ baiting occurred on 30/04/2025), and the other two were 17 days of ground baiting with the fox targeted bait, Probait™ (94299: died 29/09/2024, two weeks after ground baiting with Probait™ on 11–12/09/2024 and 94245: died 18/07/2025; three days after ground baiting with Probait ™ on 15-16/07/2025).

For the animals with sufficient data, the average distance animals spent from aerially deployed Eradicat baits in the following 15 days after baiting was 602.11 m (range: 233.34 m – 1,534.90 m), and the average number of times trajectories crossed bait swathes was 4.55 times (range: 0 – 14 times). Three animals, which were captured on the periphery of the baited area, did not cross a bait swathe during this time (94022, 94240, and 94302; Figure 22). Plots of the remaining animals can be found in the Supplementary Material Figure S6. Ten animals had points that intercepted a bait swathe (average: 1.25, range: 0 – 10 times). One animal (94307) intercepted a bait drop 10 times over the 15 days post-baiting (Figure 23) but never took a bait.

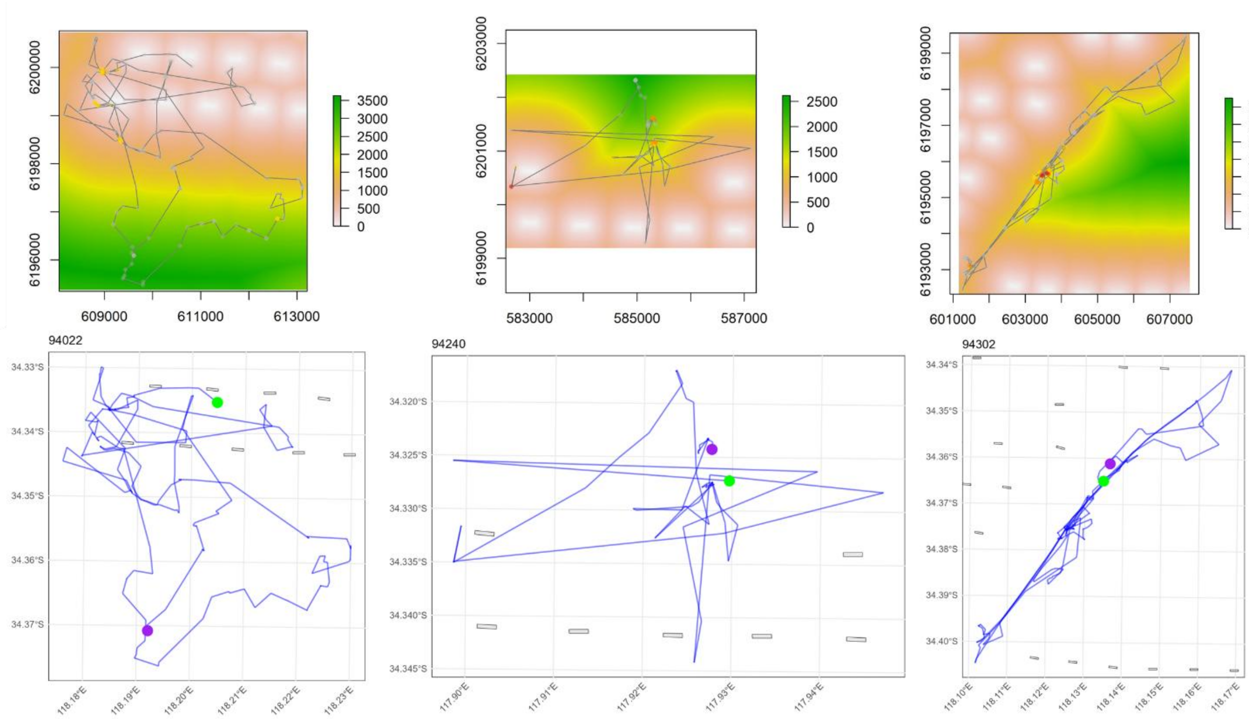

Figure 22. Movement patterns of the three feral cats at SRNP that did not encounter a bait drop in the 15 days following aerial control, where green indicates the "start" and green indicates the "end" of the 15-day period.

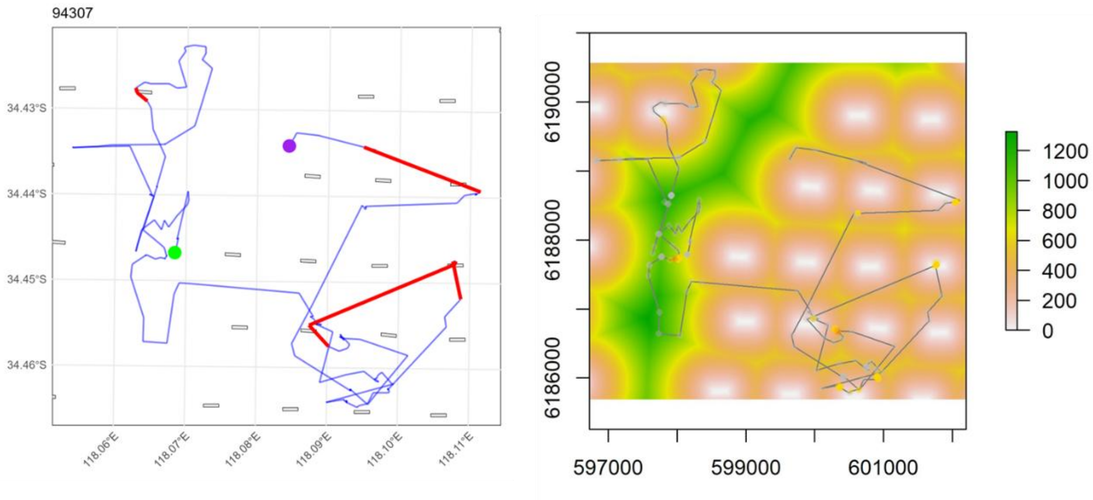

Figure 23. Movement patterns of animal 94307 that encountered aerially dropped Eradicat™ baits seven times within 15 days post-baiting. Here, green indicates the "start" and purple indicates the "end" of the 15-day period This animal survived this and all subsequent baitings.

Feral cats appeared to be highly variable in how they used habitat (Figure 24; Supplementary material Figure S7). Some cats selected for (94022) or against (94306) high foliage cover, while others heavily selected hydrology lines (94021). However, when taking the mean of the population level resource selection functions, foliage projective cover and distance from roads (i.e., high foliage cover and decreasing distance from roads) were favoured by feral cats (Table 6). If we were to use this information only, the map of habitat suitability for feral cats at Stirling Range National Park would more represent Figure 25.

Table 6. Population average resource selection functions estimated from utilisation distributions from feral cats prior to baiting at SRNP.

	low	est	high
FPC	0.69	1.67	2.65
Hydrography	-7.92	-1.48	4.95
Roads	-6.49	-4.60	-2.71

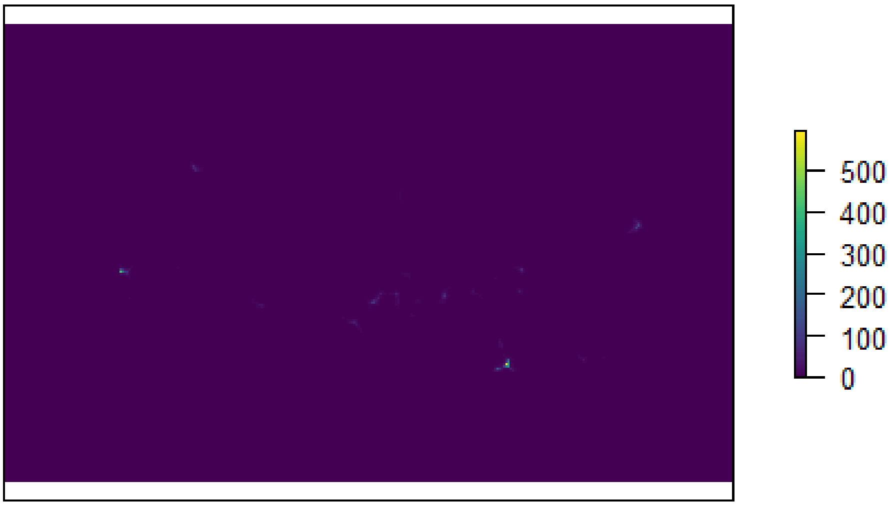

Figure 24. Average habitat suitability map estimated from resource selection function analysis for feral cats at SRNP prior to baiting. Scale indicates degree of suitability, with 600 being the highest (most suitable) and 0 being the lowest.

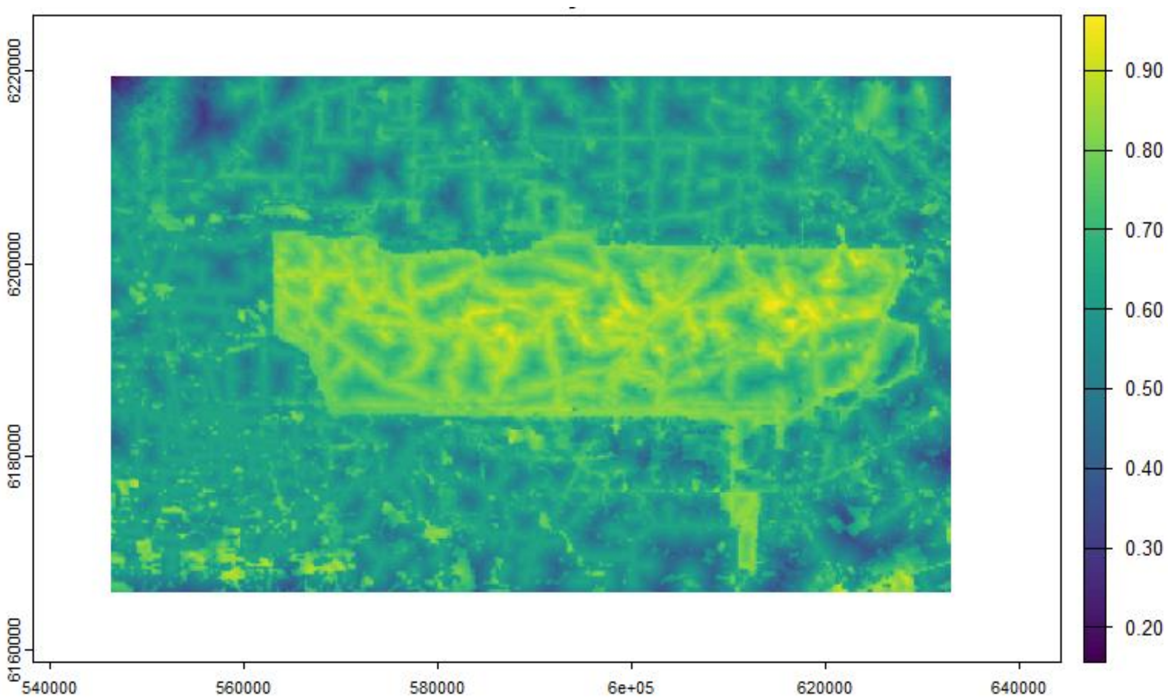

Figure 25. Habitat suitability of feral cats based purely on top variables output from mean resource selection function analysis. Here, yellow is highly suitable fading to dark blue which is least suitable.

Millstream-Chichester National Park

Spatial Analyses

Five feral cats were collared at Millstream Chichester National Park study area, four male and one female (Table 7). Data from one feral cat was recovered (Figure 27); after three males collars had technical issues. The female cat was detected alive from an aircraft post-bait but the collar data was unable to be downloaded. This animal, a male, died eight days after baiting. It had a home range size of 12.44 km^2 before baiting (CI: 7.00 – 19.41 km^2) and increased this to 34.93 km^2 (CI: 5.65 – 90.31 km^2) after baiting. Despite this increase, this animal exhibited an 83.6 % overlap in home range before and after baiting (Figure 28).

Table 7. Information for feral cats collared at MCNP where aerial baiting with Eradicat™ took place 20 June 2025

Collar ID	Cat ID	Sex	Weight (g)	Date Collared	Date Died
94923	MCNP2501	male	4100	4/05/2025	unknown
94920	MCNP2502	male	4500	5/05/2025	unknown
35764	MCNP2503	female	2900	5/05/2025	Alive
94921	MCNP2504	male	4600	8/05/2025	unknown
94927	MCNP2505	male	5000	13/05/2025	29/06/2025

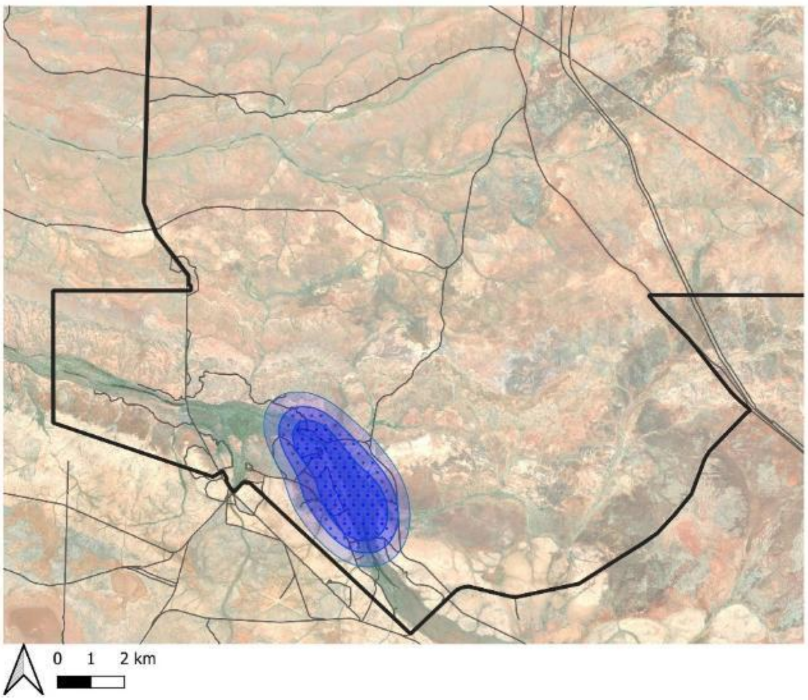

Figure 27. Feral cat home range prior to baiting at MCNP. The outer line indicates the high confidence interval, the shaded area being the estimated home range, and the inner shaded area being the low confidence interval.

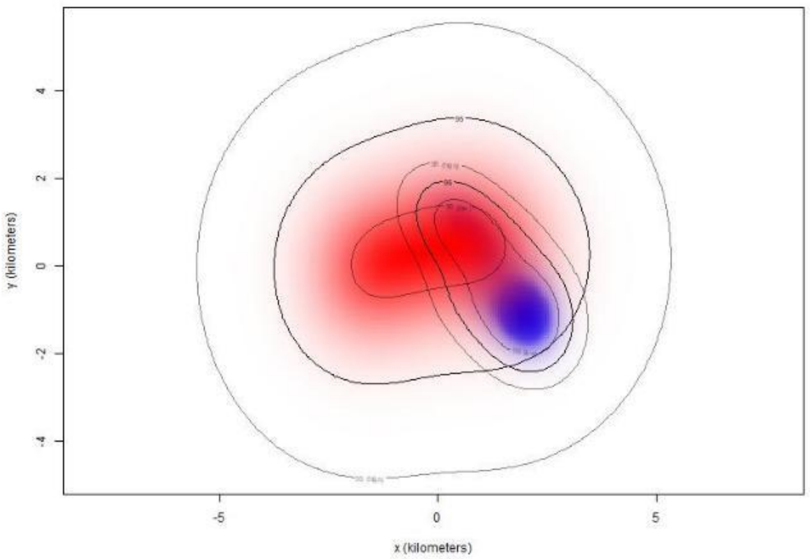

Figure 28. Home range overlap of the male feral cat collared at MCNP. Blue indicates the home range before baiting and red indicates the home range after baiting. Note – the animal did not exhibit range-residency “after” aerial control, as not enough data were collected prior to death, hence the broad confidence intervals.

Animal 94927 had trajectories that crossed bait swathes on two occasions (Figure 29) and, on average, was 677.2 m away from a bait drop in the eight days between baiting and its death. The nearest distance a GPS point was to a bait drop was 111.43 m.

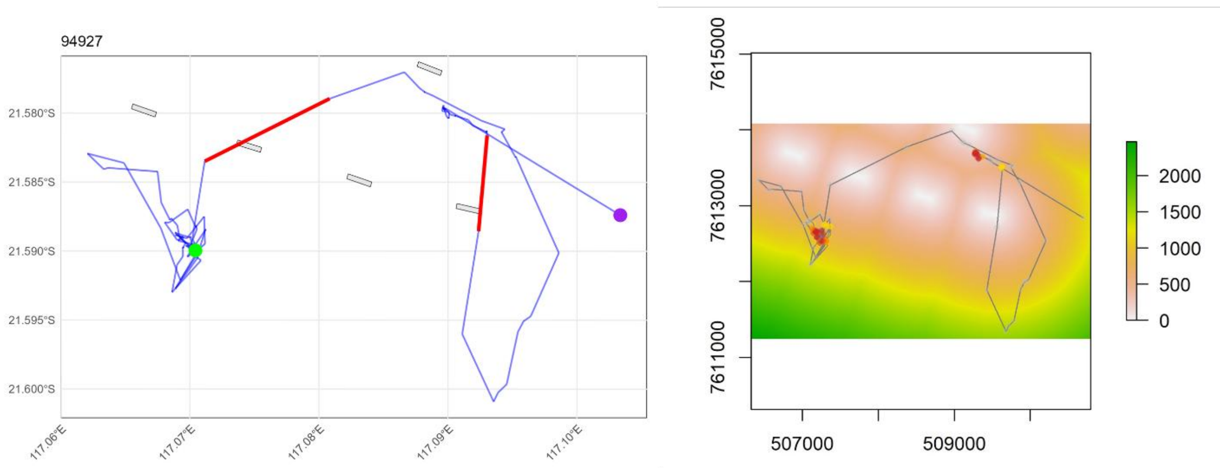

Figure 29. Movement patterns of animal 94927 that encountered aerially dropped Eradicat™ baits at MCNP, where green indicates the “start” and purple indicates the “end” of the 15-day period. This animal died within nine days of baiting.

Animal 94927 exhibited no preference for a particular habitat using resource selection functions (all confidence intervals crossed zero; Table 8). When plotting the results from these analyses; however, Figure 30 indicates some preference for higher FPC and closer distance to roads, although these data are likely not robust.

Table 8. Resource selection functions estimated from utilisation distributions from one feral cat prior to baiting at MCNP.

	low	est	high
DEM	-24.51	-10.34	3.82
FPC	-1.10	2.27	5.63
Hydrography	-33.72	-13.01	7.69
Roads	-11.30	14.39	40.08

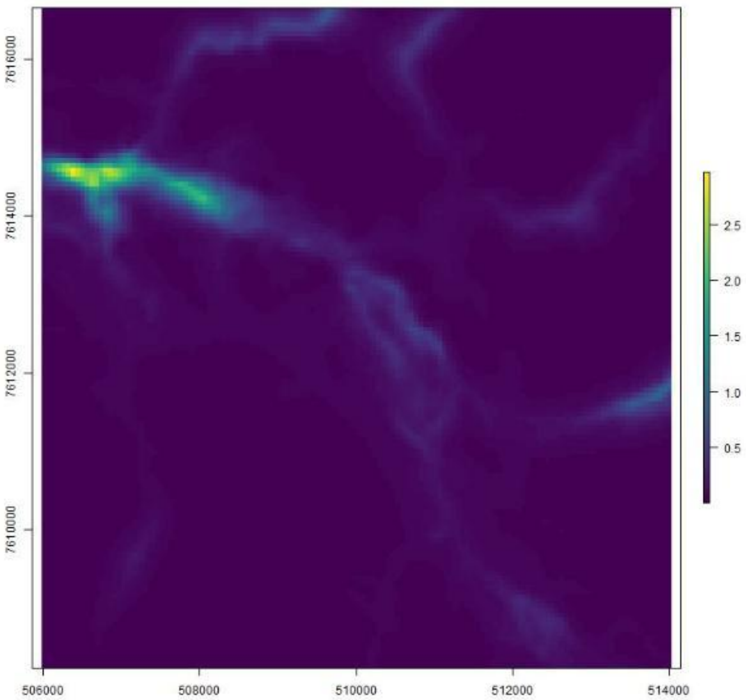

Figure 30. Habitat suitability map estimated from resource selection function analysis for the feral cat at MCNP prior to baiting

Bait degradation monitoring

Bait monitoring was conducted for 18-19 nights at three sites representative of the baited area: Riverine, Hills-spinifex and Cracking clays. There was minimal bait degradation by invertebrates recorded on any of the baits during the study period and baits that persisted to the conclusion of the survey continued to show minimal to no degradation by invertebrates. Ants were recorded on baits in the Hills and Cracking clays at the outset but had very little interaction with the baits. Invertebrate presence and damage was minimal to non-existent.

Of the tethered baits, one of the Riverine baits was taken by an uncollared feral cat (*Felis catus*) on the first night after laying the baits (Figure 31). This same cat then proceeded to attempt to access the caged bait and persisted for about five minutes before giving up. The same cat did not present at the third tethered (accessible) bait that was approximately eight metres away. There was only two other mammal interactions by a Euro (*Osphranter robustus)* and a Common Field Rat, neither of which tried to consume the bait.

Table 9. Interactions of animals with monitored baits at Millstream-Chichester National Park.

Site Habitat	Common Name	Scientifc Name	Num of Capture Events	Num of *Interaction events
Riverine	Feral Cat	*Felis catus*	2	2
	Macropod	*Osphranter sp.*	1	1
	Pallid cuckoo	*Heteroscenes pallidus*	1	0
Hills - Spinifex	Common Field Rat	*Zyzomys argurus*	1	1
	Large Ant		2	0
	Insect		3	3
Cracking Clays	Small Ants		5	1
	Spider		14	1

*Interaction is defined as touching, smelling or eating the bait

Figure 31. Feral cat consuming monitored bait on first night (20/6/2025) after baiting.

Weathering of baits appeared to peak at around Day 5 where the baits are showing signs of desiccation and likely hardening to become difficult for a cat to chew. Although the baits would still have a lethal level of toxicity to feral cats the likelihood of a cat consuming the bait is significantly reduced due to the reduced palatability and the ability for the cats to detect the bait through its scent.

Discussion

Data collection on movement patterns and habitat use, using satellite radio-collars, was only available for the LMNR and SRNP sites, although our home range analyses for these sites reflect those of other studies (e.g., Comer et al. 2020; Comer et al. 2023). It must be noted that radio-collar data collection at the SRNP and MCNP were limited by technical issues; collars either did not transmit data or did not receive schedule changes to increase fixes.

Despite these impediments, analysis of the data indicated that feral cats are highly variable in habitat preference, and this varies widely between individuals within a population as well as between populations. Preferred habitat is likely prey resource dependent (Moseby et al. 2009; Recio & Seddon 2013) and therefore selected by the more dominant individuals in the population, pushing other individuals into habitat that may be considered sub-optimal. However, cats as a population are ubiquitous across the landscape and found in a range of ecological contexts with high variability. This makes their effective management and associated monitoring very difficult. Since resource use differs between individual feral cats, targeted baiting will likely only impact individuals that favour the habitats being targeted and miss those that do not. This targeted bait approach effectively creates a mosaic for reinvasion, where there are only certain areas where bait uptake is possible. These patches may well be too small; however, to have a significant impact on the population. Removal of feral cats across the landscape will therefore potentially provide a more cost-effective use of control effort as it will reduce the rate of re-invasion into these core preferred areas. As such, we recommend maintaining broad-scale baiting (stratified baiting), so all individuals in the population have the opportunity to be exposed to a bait, rather than those that show a preference for the targeted habitats.

Bait uptake varies between individuals and locations. For example, baiting caused a 62.5% reduction in collared animals at LMNR, and a 40% reduction in camera trap detections, while aerial baiting only resulted in one death at SRNP, despite almost all animals intercepting a bait swathe; all other deaths at SRNP were associated with track-based ground baiting (with either Eradicat™ or Probait™). For LMNR, the reasons two of the cats survived baiting could be attributed to 1) lack of bait encounters (93070; Figure 15, left) 2) the size of the home range (93064; Figure 13, right), 3) something that is difficult to assess - non-target uptake of baits resulting in the bait not being in the location when the intercepts occurs or 4) the cats simply were not interested in the baits. Animal 93068 (Figure 13, centre), on the other hand, was the smallest feral cat that was collared (3,200 g) while animal 93071 (Figure 16) that died over a month after baiting was also below average weight (3,400 g). Both spent most of their time within the park and had many opportunities to encounter baits. Animal 93068 intercepted a bait drop once two days after baiting and had 10 trajectory crossings with bait drops, while animal 93071 took four days to encounter a bait drop, and had six trajectory crossings with the swathes. Both animals also had two of the smallest mean distances spent from a bait drop (93068: 323.36 m, and 93071: 391.90 m). These two animals had every opportunity to take a bait during this study, and while 93071 did die over a month after baiting, it cannot be confirmed if this death was related to the aerial bait drop.

Bait uptake at SRNP by collared cats was low; three animals had no intercepts with a bait swathe and only one died as a result of aerial baiting. This could be caused by the population's previous exposure to baits, especially given that the majority of cats caught were older adult males. It has been documented that baiting removes the females and young males in a population (Lohr & Algar 2020). SRNP had previously been baited with Eradicat™ in autumn 2024, which potentially created a population of individuals that are less likely to take baits.

Bait interactions were only assessed at Millstream-Chichester National Park and had extremely low levels of non-target interest, three individuals across three different family groups. Although not recorded here or published, this is significantly different in areas where this method has been undertaken in long-term baited sites. This may be an artefact of the arid climate and low diversity of mammals or possible because caution to something new in the environment. Surprisingly, there were no dingo interactions with the baits even though their presence with notable during the feral cat collaring process.

Recommendations

In conclusion, feral cats demonstrate a high degree of variability between individuals within a population and between different sites, making them extremely difficult to monitor and manage. Likewise, bait susceptibility also varies between individuals and populations. Here, we recommend continued use of the stratified landscape baiting approach to reduced "gaps" in the bait cell. More targeted baiting (such as at Millstream-Chichester National Park) essentially targets pockets that exclude animals that do not select those habitats, creating a mosaic for reinvasion. Feral cats are throughout the landscape and management practice should reflect that.

Previous studies have also had difficulty detecting changes in feral cat populations, prompting researchers to try new methods to improve detections (e.g., Stokeld et al. 2015; Nichols et al. 2017; Meek et al. 2024). The camera number, spacings and days the cameras are active should be considered carefully for each environment to reach the minimum detection rates, but improving camera trap set-ups may also benefit monitoring. It is known that feral cats can both hear and see infrared cameras operating (Meek et al. 2014), and this perception may influence the camera trap's ability to detect a cat (i.e., the animal may not enter the field of view if it perceives that camera trap). Although detections improved with the use of urine lures (also seen in Lohr et al. 2024), different camera trap set-ups such as different angles may assist to improve detections.

Understanding the nuances of the different environments and how feral cats use the landscape in the presence of a different vegetation communities and how the local the suites of species might influence behaviour and movement can potentially improve a targeted approach to baiting, But gaining knowledge for each landscape even within the same biome is a massive task given the demonstrated individual behaviour of feral cats. Localised management actions will assist in creating efficiencies and improved efficacy in cat control but need to be informed from the basis of investigated prescriptions and protocols that have been built over time with experience and understanding. Universal improvements need to look at potential bait enhancements in the way they are presented and potentially delivered in an effort to ensure a bait intercept results in uptake.

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Appendix 1 – Lake Magenta supplementary material

Table S1. Core (50%) and 95% home range sizes (km^2) before and after aerial baiting at Lake Magenta Nature Reserve. In brackets, est indicates the estimated home range, and the low and high represent the respective confidence intervals of that home range.

Collar #	Before/After	HR 50% (low)	HR 50% (est)	HR 50% (high)	HR 95% (low)	HR 95% (est)	HR 95% (high)
93060	Before	7.44	25.25	53.76	32.16	109.15	232.33
93061	Before	5.87	10.34	16.05	25.38	44.68	69.35
93064	Before	11.79	65.69	164.97	50.94	283.90	712.97
93065	Before	3.82	8.63	15.37	16.52	37.32	66.44
93066	Before	6.93	10.45	14.70	29.93	45.19	63.52
93068	Before	6.86	11.99	18.52	29.64	51.81	80.06
93070	Before	1.59	2.34	3.23	6.87	10.11	13.98
93071	Before	6.82	17.12	32.08	29.48	74.00	138.66
93060	After	5.45	20.92	46.61	23.54	90.42	201.46
93061	After	0.80	6.53	18.14	3.45	28.22	78.42
93064	After	19.83	507.19	1756.31	85.72	2192.02	7590.63
93065	After	3.12	4.99	7.30	13.49	21.58	31.55
93066	After	1.74	2.44	3.25	7.53	10.54	14.04
93068	After	11.09	24.75	43.81	47.91	106.98	189.36
93070	After	9.60	18.70	30.78	41.48	80.81	133.04
93071	After	8.60	19.10	33.71	37.17	82.54	145.70

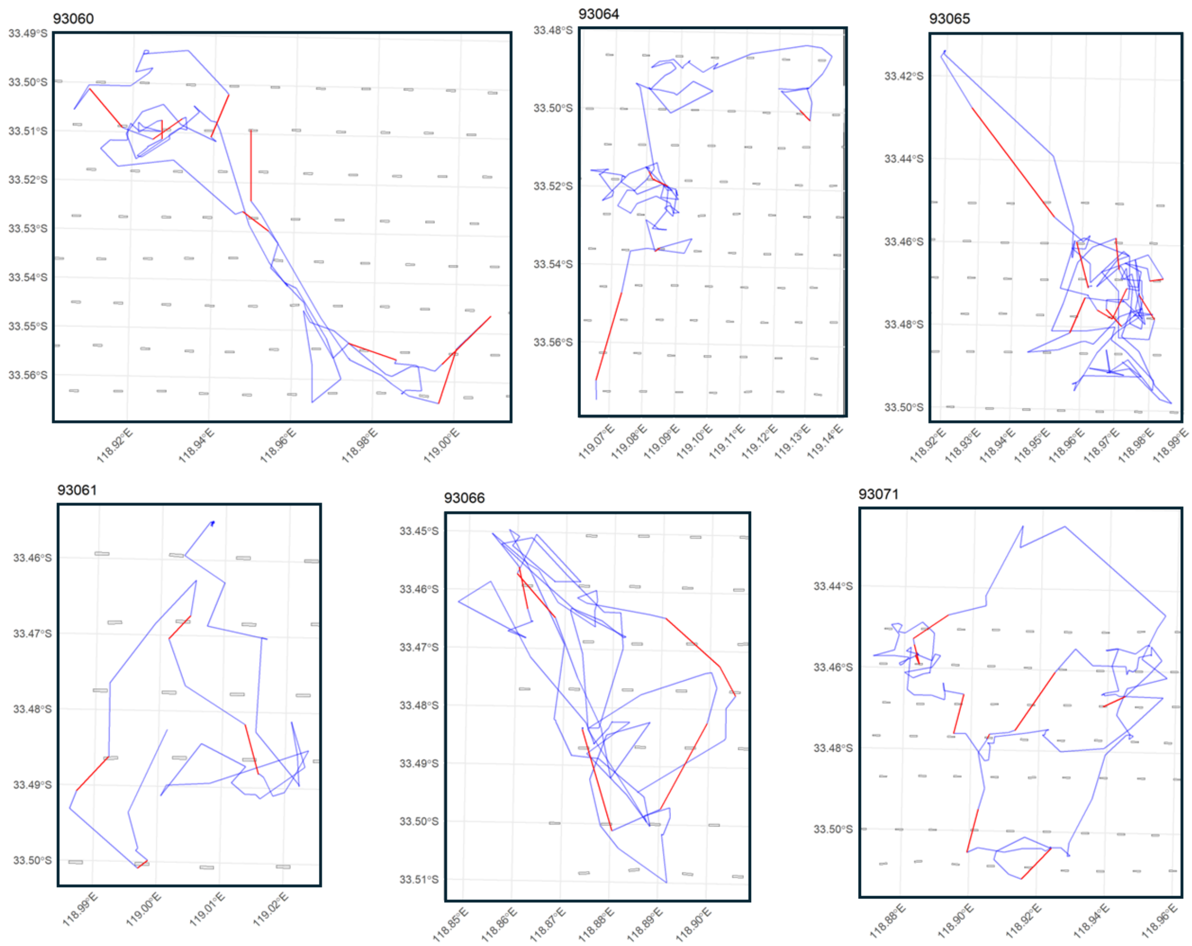
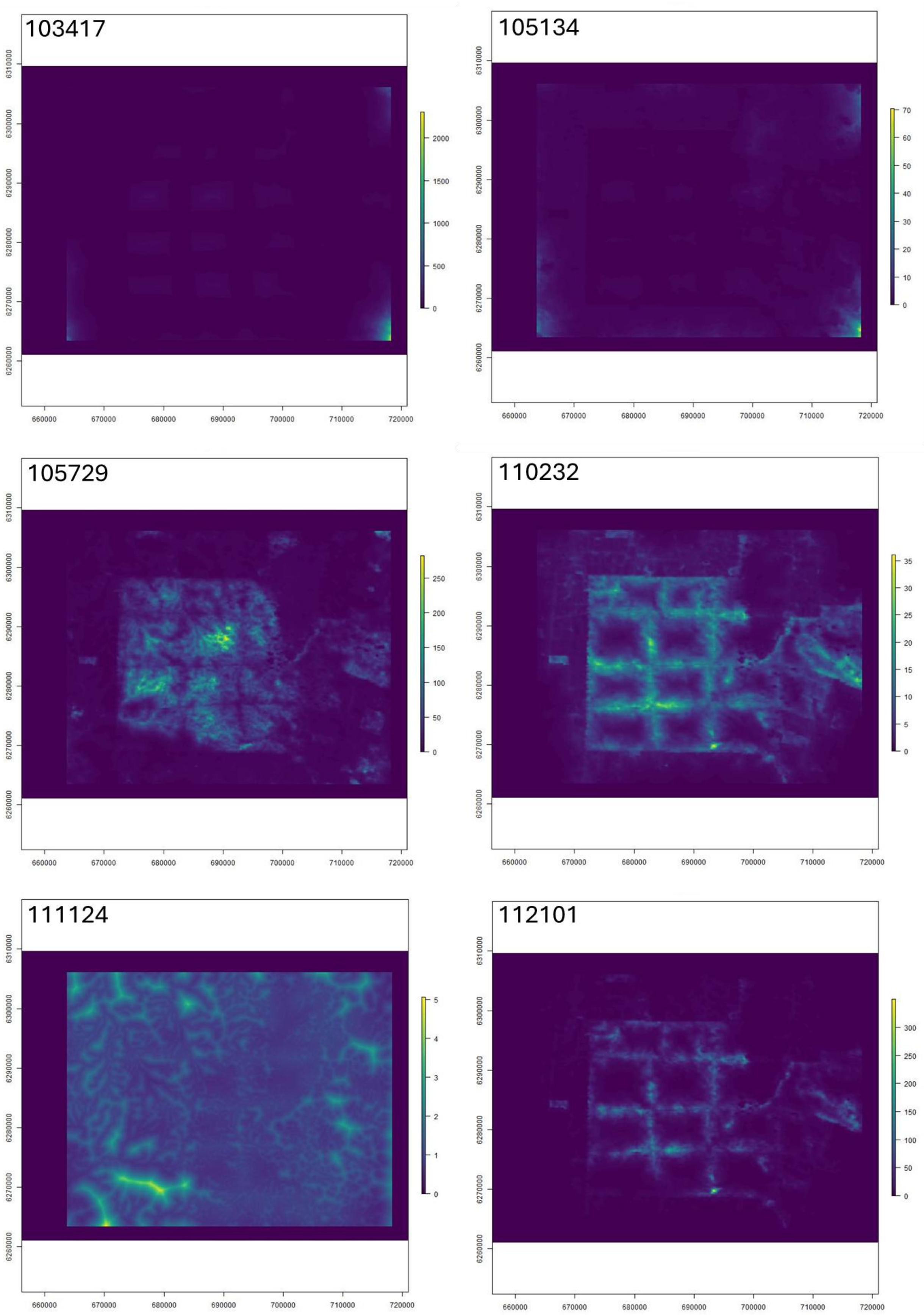


Figure S1. Trajectory intercepts between feral cat GPS points at Lake Magenta Nature reserve of animals that did not survive aerial control. Small rectangles represent the bait swathes (40 x 200m), blue lines indicate the trajectories between consecutive GPS fixes, and red lines indicate trajectories that cross a bait swathe.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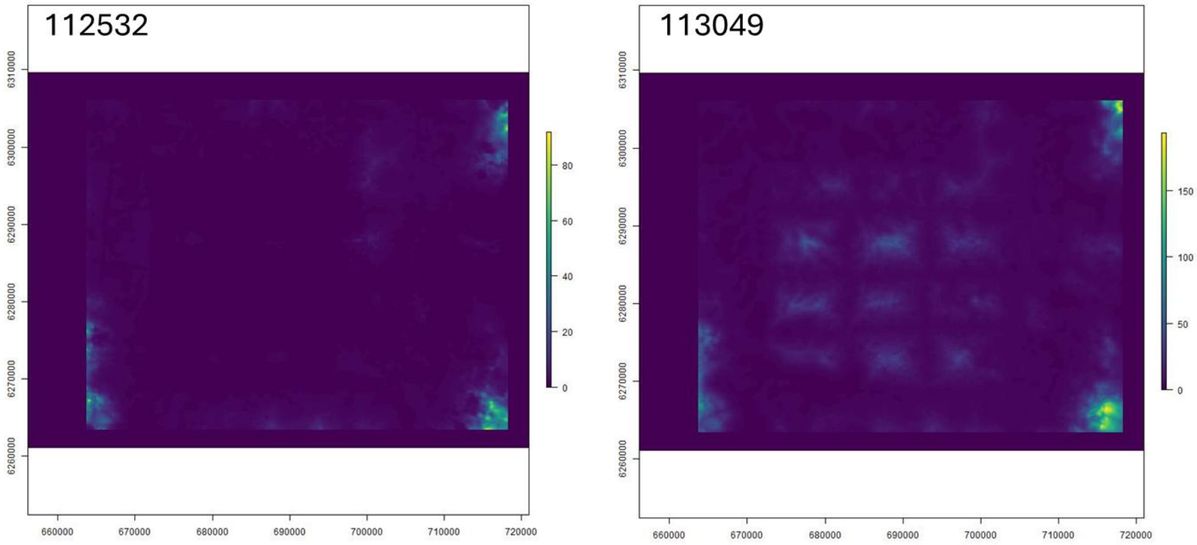


Figure S2. Habitat suitability maps estimated from resource selection function analysis for each of the collared cats at Lake Magenta Nature Reserve

Table S2. Proportion home range overlap of cats with sufficient GPS fixes between post-capture and pre-baiting (Supplementary Material Figure S7). Animal in bold was the only animal to exhibit low home range overlap (Supplementary Material Figure S8).

Collar #	low	est	high
94305	0.27	0.89	1.00
94022	0.81	0.97	1.00
94304	0.70	0.85	0.95
94024	0.80	0.97	1.00
94306	0.64	0.88	1.00
94021	0.81	0.91	0.98
94020	**0.32**	**0.53**	**0.75**

Appendix 2 – Stirling Range National Park supplementary material

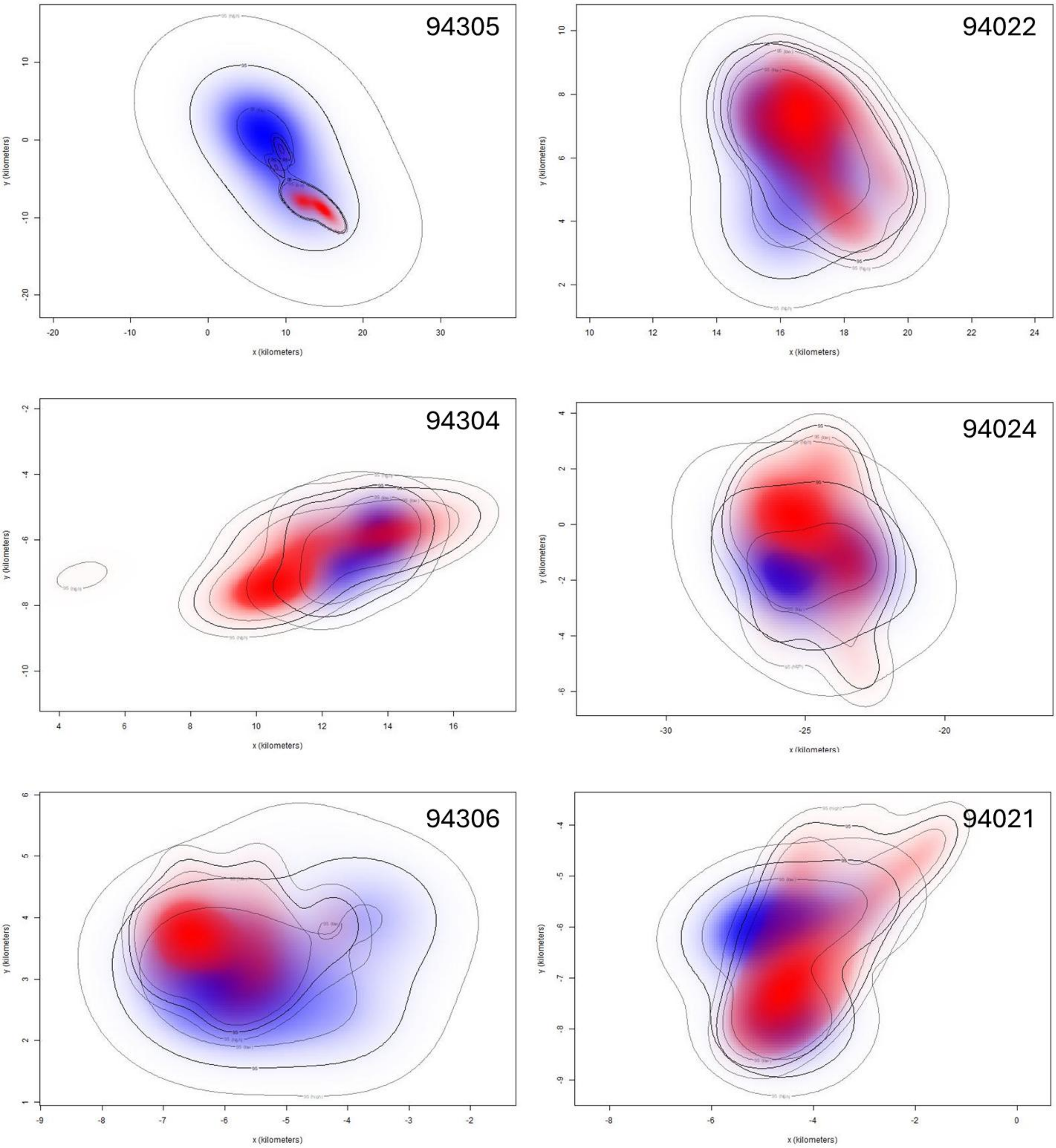


Figure S3. Home range overlap for the feral cats between the post-capture and pre-bait period that had sufficient data at Stirling Range National Park

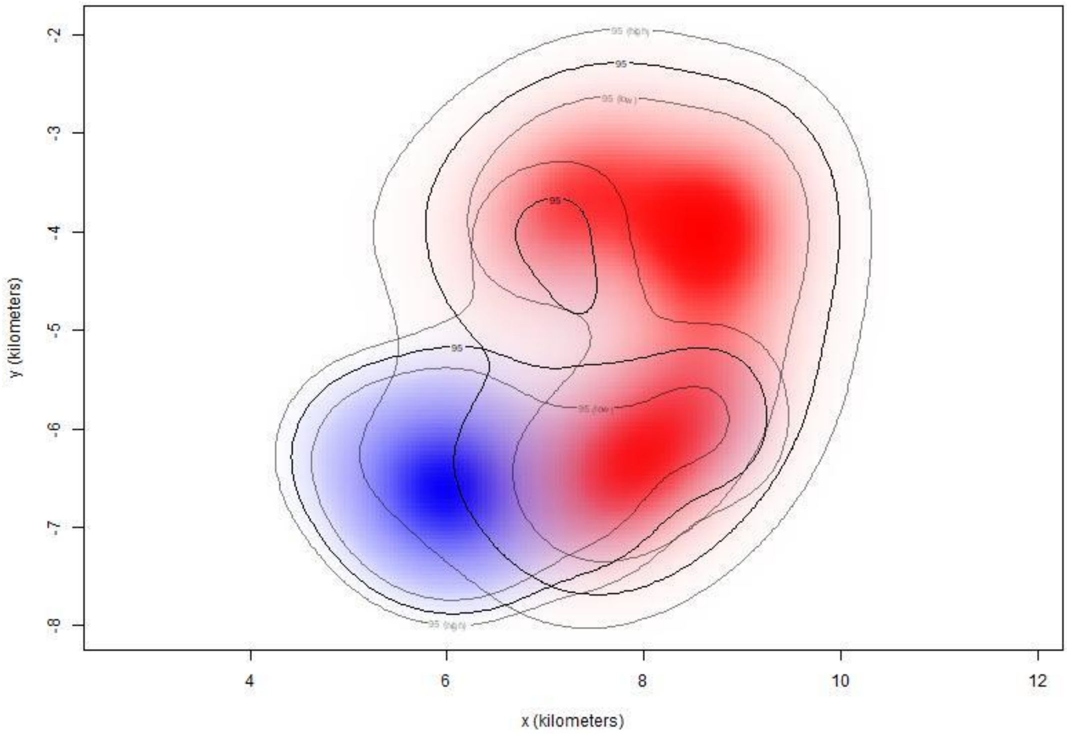


Figure S4. Home range overlap for animal 94020 for one month post-capture (blue) and one month pre-bait (red), demonstrating the low home range overlap.

Table S3. Home range sizes of feral cats at Stirling Range National Park before and after baiting. Several collars experienced issues uploading data. In some cases (marked with an asterisk), these data were supplemented with one month post-capture data, and in other cases (bold), data are missing or insufficient for analyses.

Collar #	Before/After	HR 50% (low)	HR 50% (est)	HR 50% (high)	HR 95% (low)	HR 95% (est)	HR 95% (high)
94305	Before	9.29	78.71	220.64	40.14	340.18	953.59
94022	Before	4.46	9.00	15.11	19.28	38.90	65.30
94023*	Before	2.57	3.59	4.79	11.09	15.52	20.69
94304	Before	2.22	3.76	5.69	9.59	16.23	24.59
94236*	Before	8.65	11.14	13.94	37.40	48.15	60.24
94024	Before	2.63	8.41	17.48	11.37	36.34	75.54
94306	Before	1.68	3.56	6.14	7.28	15.41	26.53
94241*	Before	7.46	9.87	12.61	32.23	42.65	54.50
94019*	Before	5.08	6.24	7.52	21.96	26.98	32.51
94240*	Before	5.19	6.52	8.01	22.42	28.19	34.61
94021	Before	2.16	3.68	5.61	9.33	15.92	24.24
94308*	Before	5.78	9.75	14.75	24.99	42.16	63.75
94020	Before	1.62	2.53	3.64	7.01	10.93	15.71
94303*	Before	3.10	5.22	7.90	13.38	22.58	34.14
94307*	Before	3.20	5.40	8.16	3.83	23.33	35.27
94302*	Before	3.94	8.07	13.64	17.05	34.87	58.96
94245*	Before	2.61	4.40	6.65	11.26	19.00	28.73
94019*	Before	1.41	2.34	3.50	6.09	10.11	15.14
94237*	Before	1.56	2.64	3.99	6.76	11.41	17.25
94299*	Before	16.41	68.56	157.29	70.94	296.32	679.79
94242*	Before	1.23	2.08	3.14	5.32	8.98	13.58
94298*	**Before**						
94301*	Before	4.64	7.84	11.85	20.07	33.87	51.22
94244*	Before	1.04	1.76	2.66	4.50	7.59	11.48
94238*	Before	0.99	1.67	2.52	4.27	7.21	10.91
94242*	Before	4.12	6.95	10.52	17.81	30.05	45.45
94305	After	10.08	98.88	286.65	43.56	427.34	1238.88
94022	After	3.89	8.34	14.46	16.81	36.05	62.49
94023	After	1.76	3.97	7.08	7.59	17.17	30.60
94304	After	2.90	8.22	16.24	12.55	35.51	70.21
94236	After	2.02	3.08	4.36	8.75	13.32	18.84
94024	After	2.82	14.13	34.36	12.19	61.06	148.52
94306	After	1.12	1.71	2.43	4.83	7.40	10.50
94241	**After**						
94019	**After**						
94240	After	2.67	4.21	6.10	11.55	18.21	26.37
94021	After	1.87	2.88	4.11	8.08	12.45	17.75
94308	After	4.69	11.84	22.25	20.29	51.19	96.15
94020	After	2.13	3.55	5.32	9.21	15.33	22.98

94303	After	2.37	31.50	97.33	10.23	136.15	420.64
94307	After	3.23	8.11	15.19	13.97	35.05	65.67
94302	After	1.90	3.22	4.89	8.22	13.93	21.13
94245	After	1.95	4.02	6.81	8.44	17.36	29.45
94019	After	2.05	7.04	15.06	8.86	30.43	65.08
94237	After	1.24	2.87	5.15	5.38	12.39	22.28
94299	**After**						
94242	**After**						
94298	After	2.04	3.21	4.64	8.80	13.86	20.06
94301	**After**						
94244	After	1.38	2.49	3.92	5.95	10.75	16.95
94238	After	0.57	1.20	2.06	2.45	5.18	8.92
94242	After	1.87	2.60	3.44	8.09	11.23	14.88

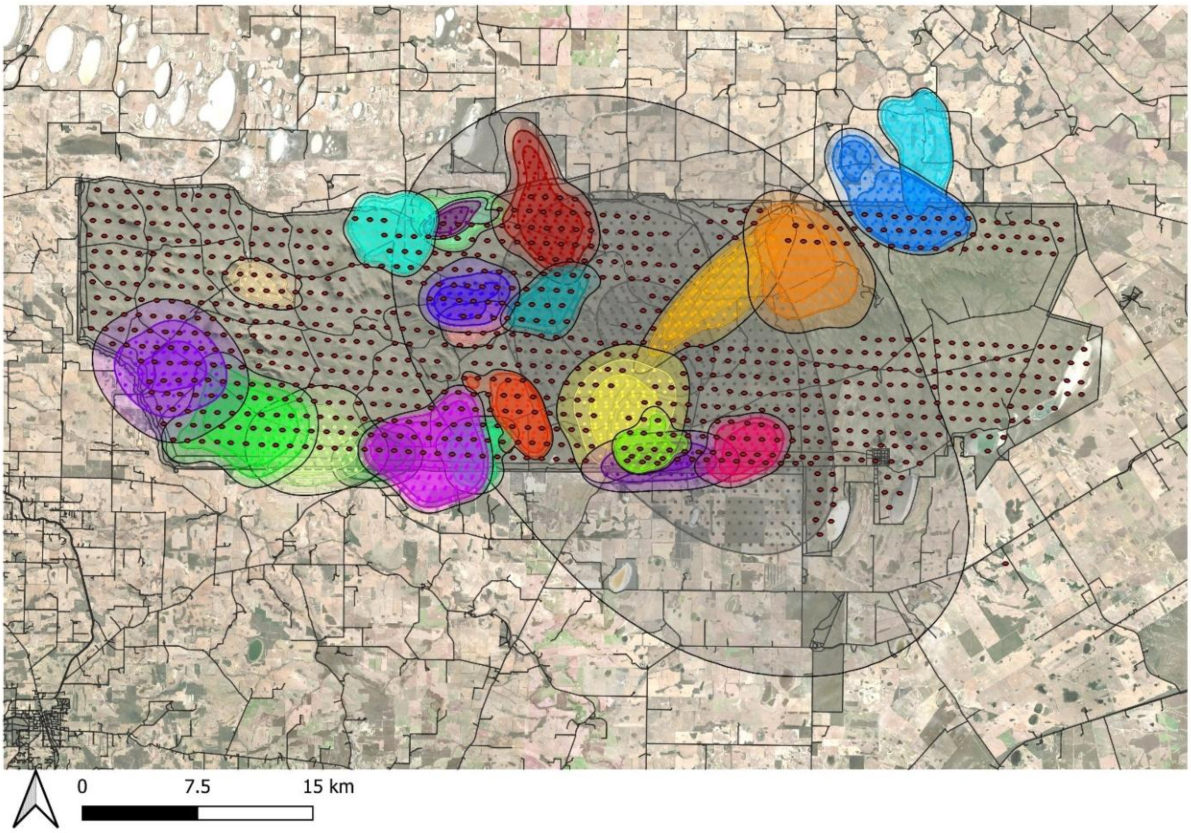
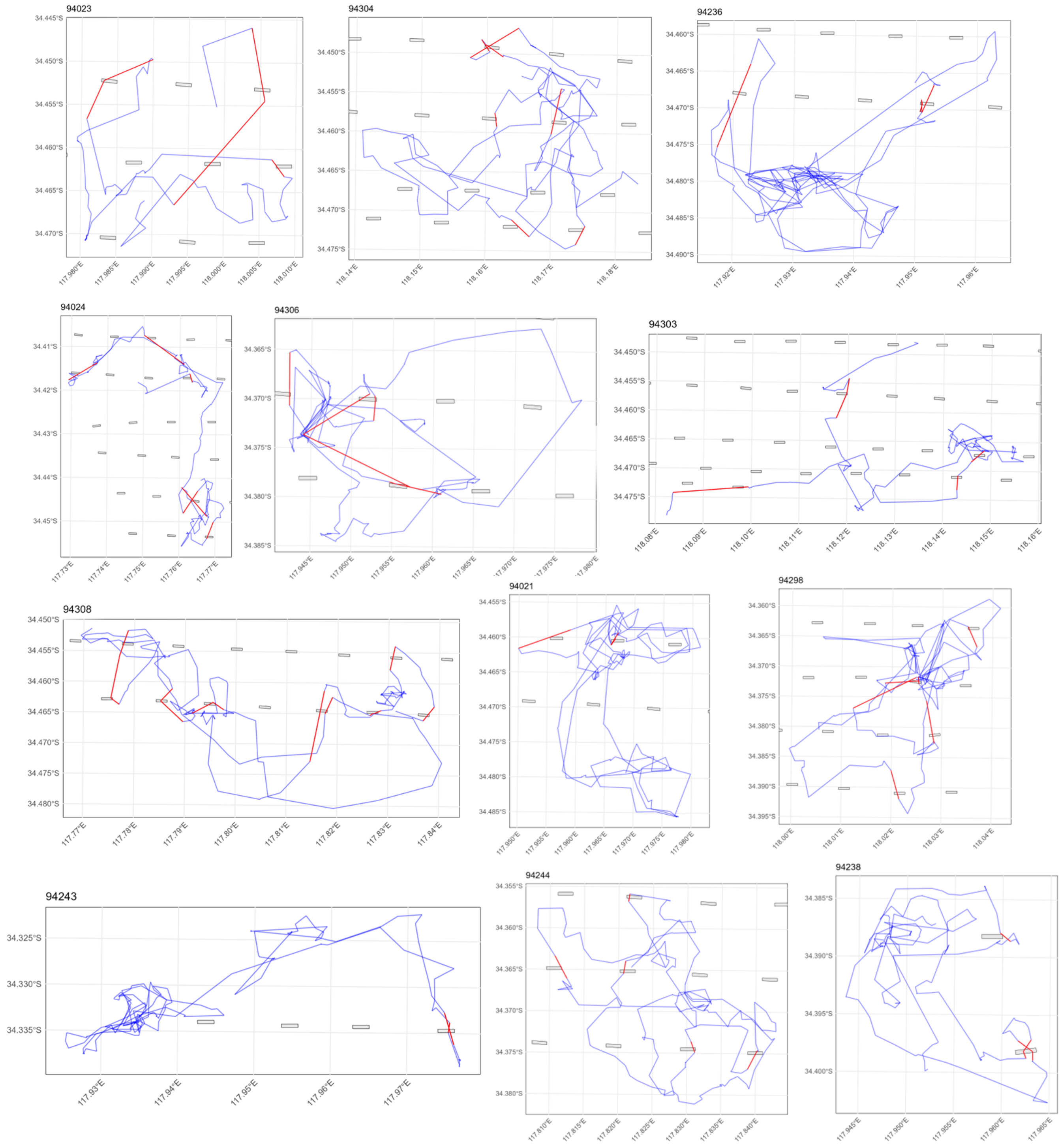


Figure S5. Relationship between baits and feral cat home ranges at Stirling Range National Park. Orange triangles represent a drop of 50 baits, with points 1 km apart (i.e., 50 baits/km^2, as per Eradicat™ prescription.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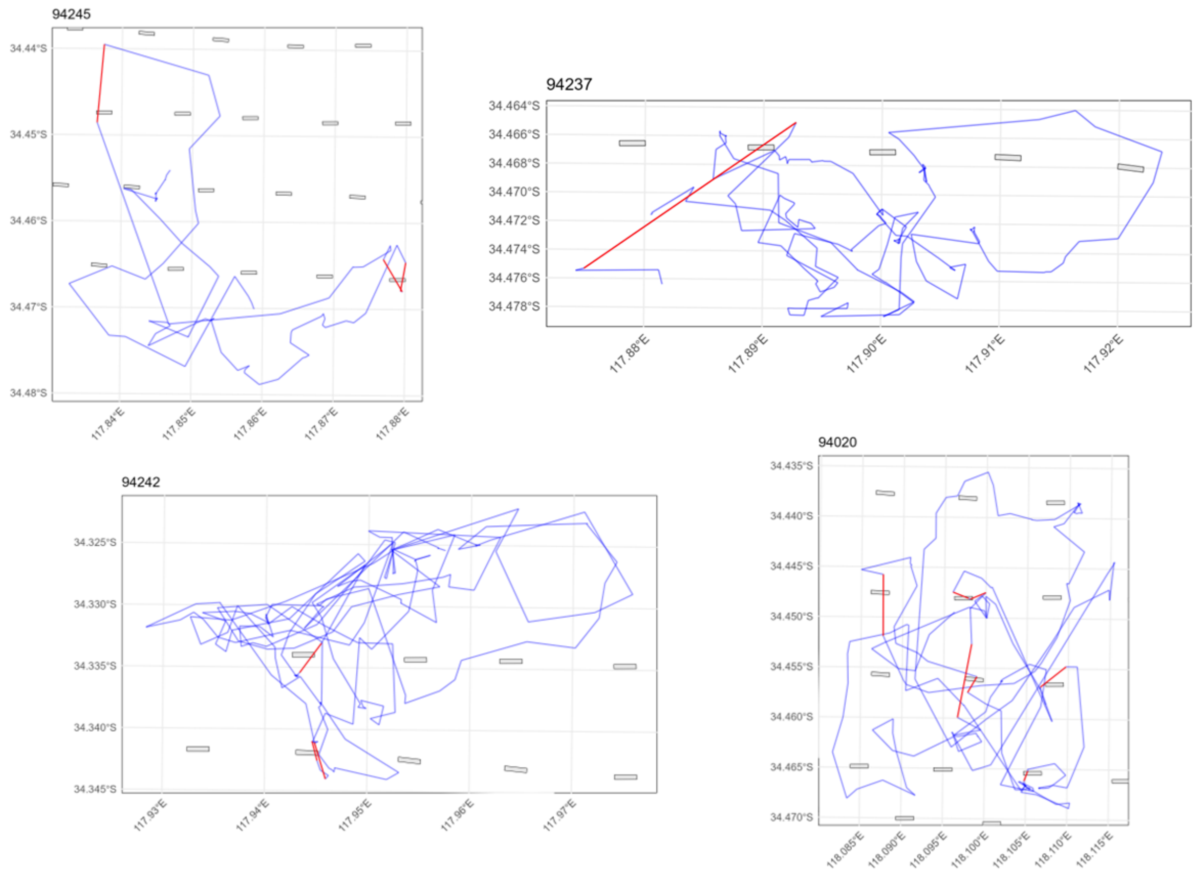
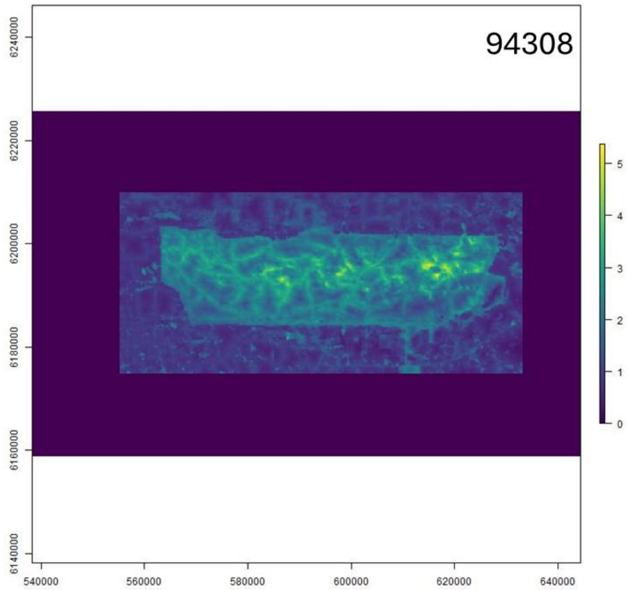


Figure S6. Feral cat interactions with bait drops at Stirling Range National Park. Small black rectangles indicate the 40x200 m swathe of each drop, taking 120 m carry distance from the plane into account. Blue lines represent the trajectories of the collared feral cats 15 days after the aerial drop, with red lines indicating the intervals where the trajectories crossed a bait drop.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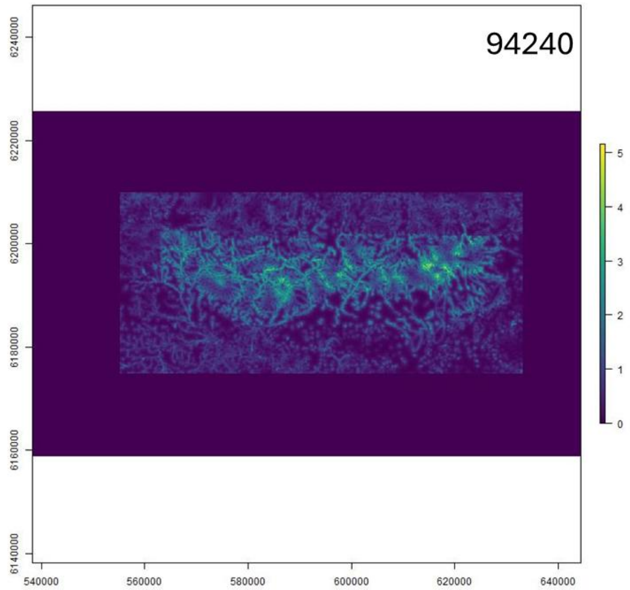
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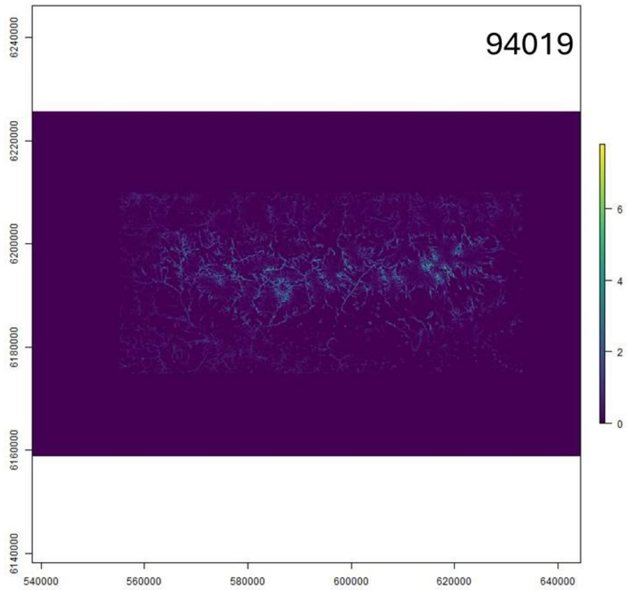
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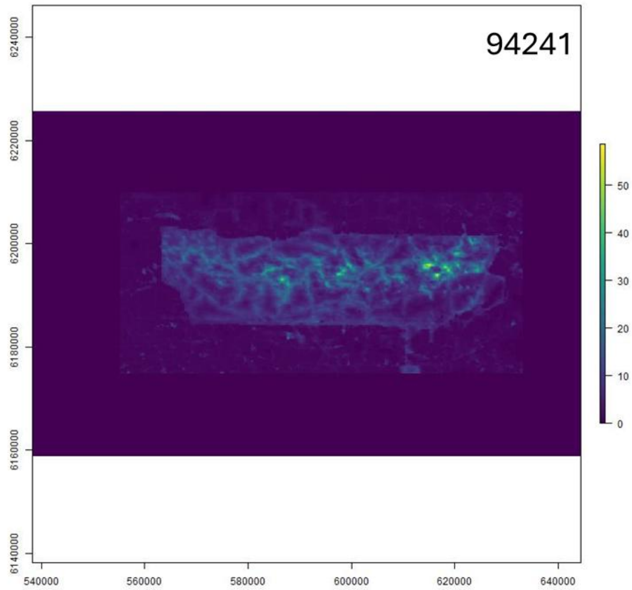
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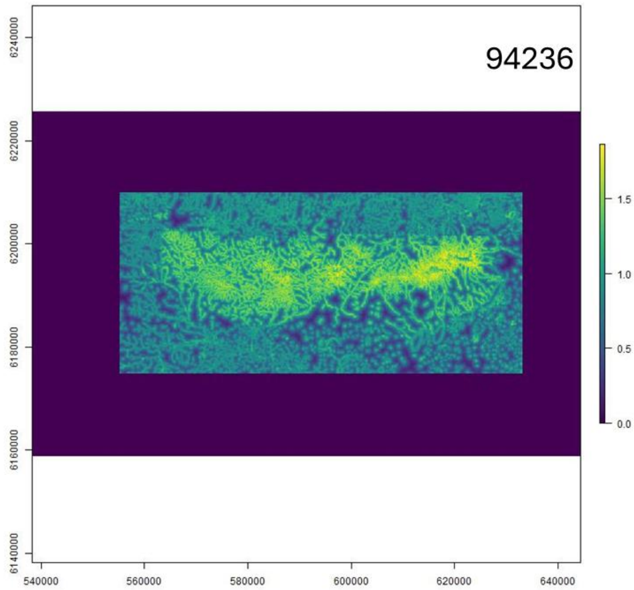
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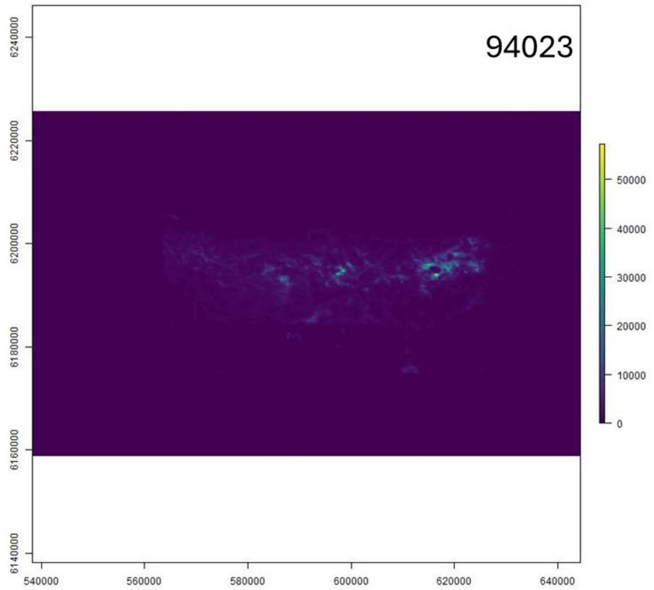
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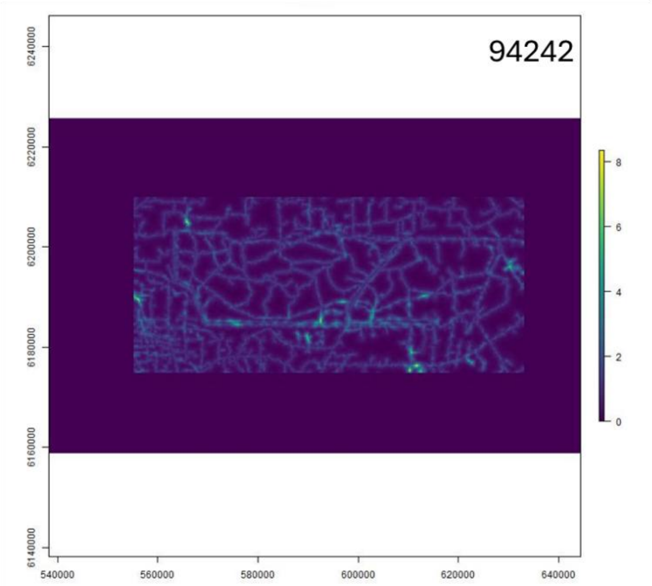
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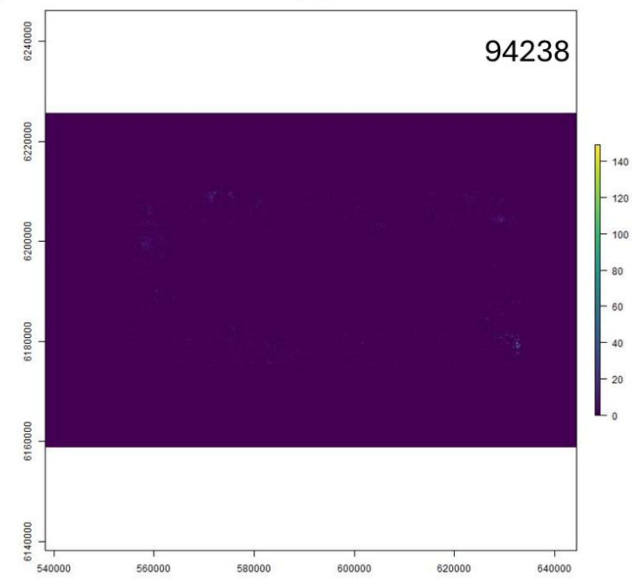
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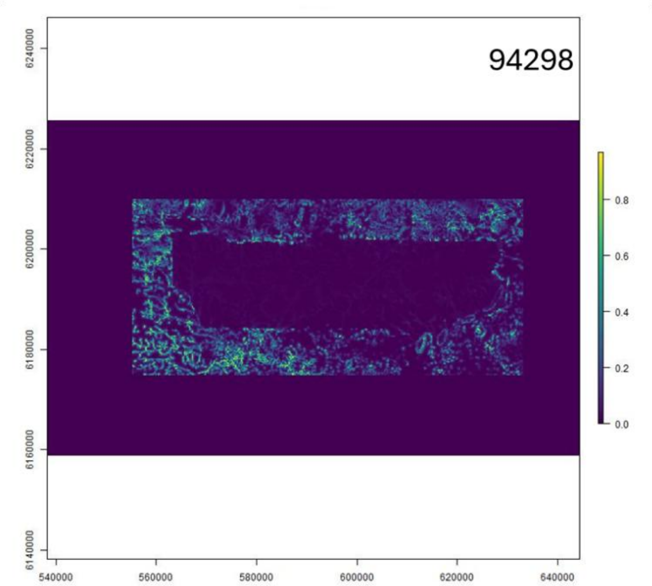
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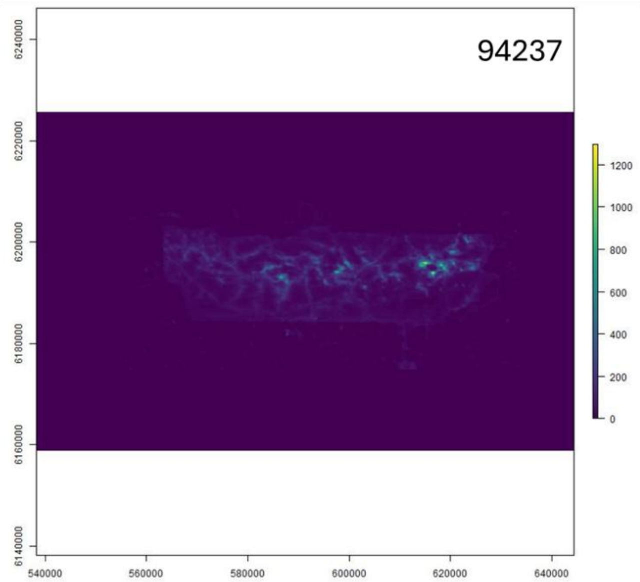
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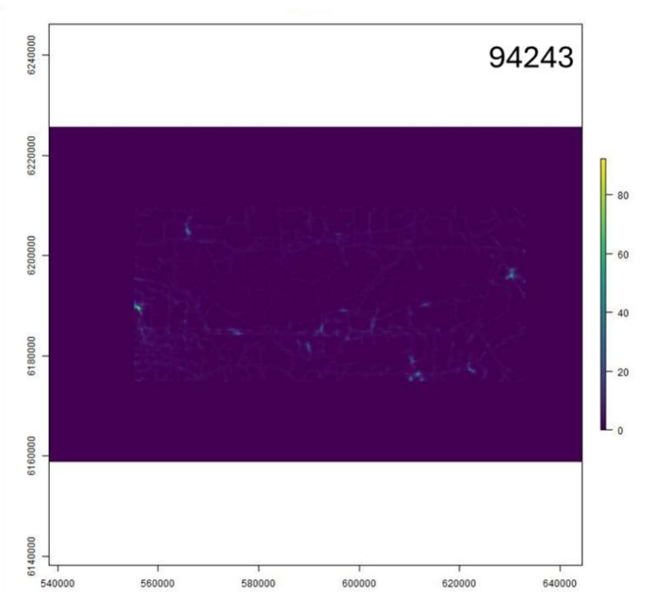
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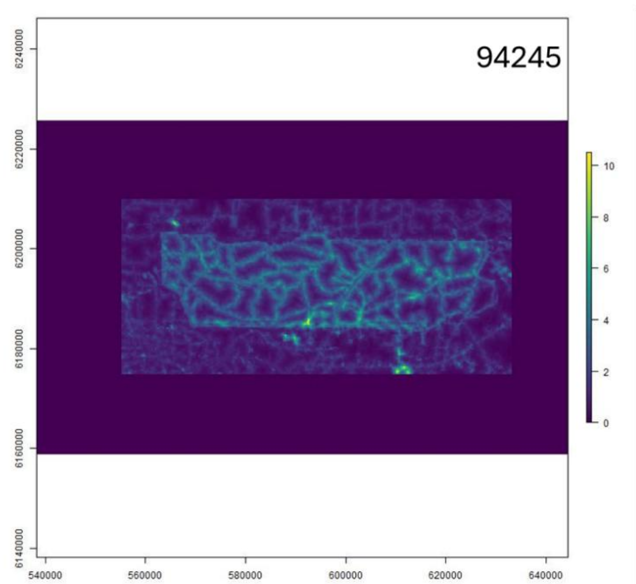
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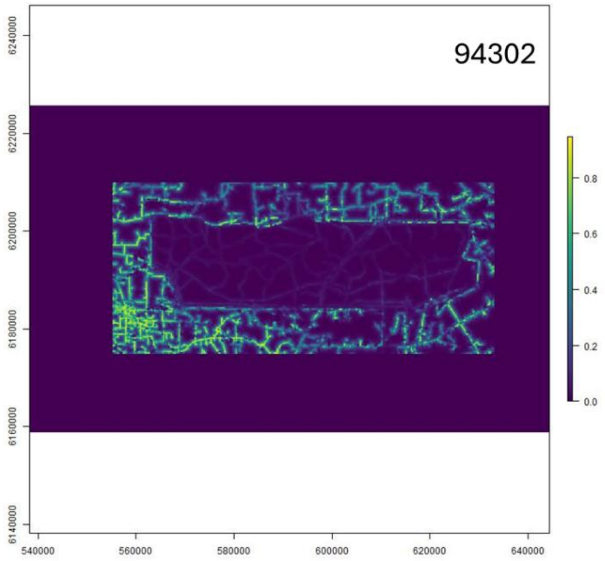
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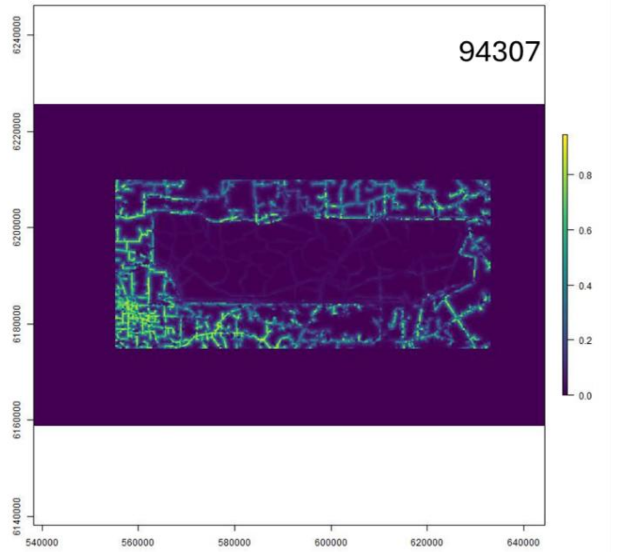
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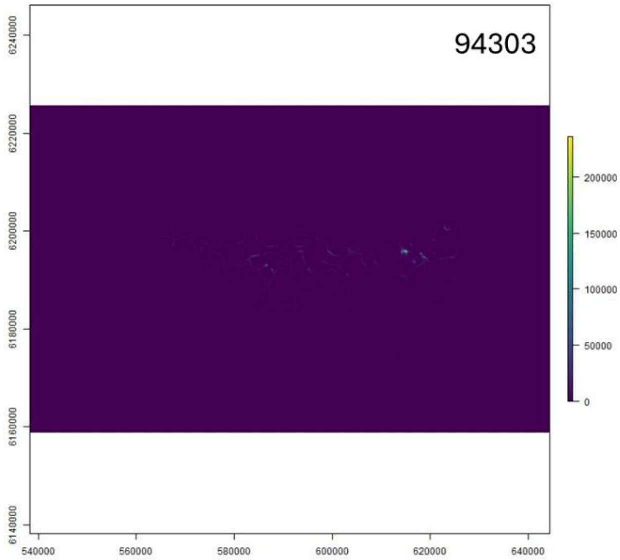
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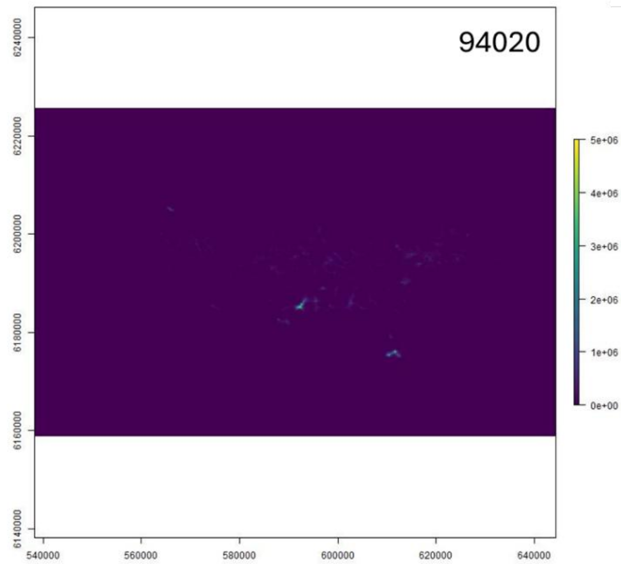
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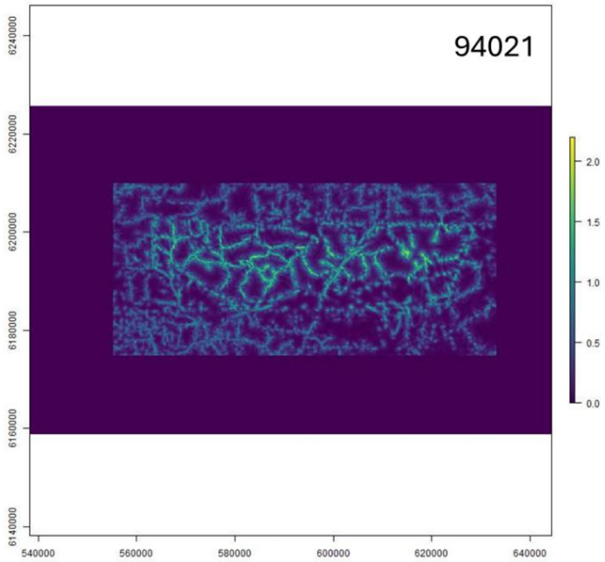
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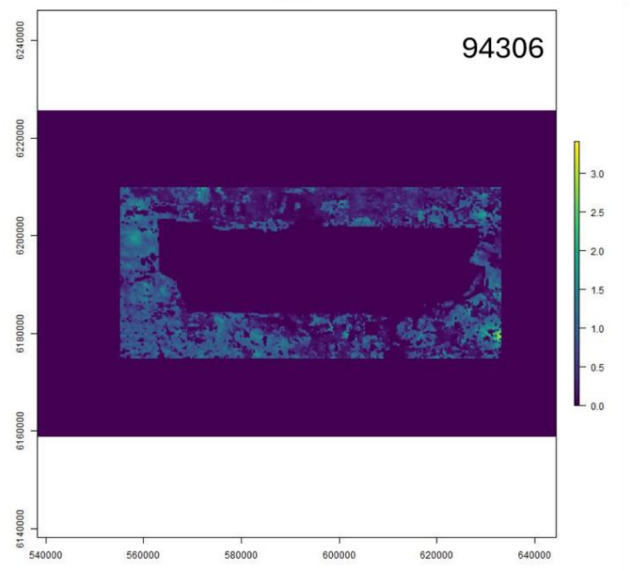
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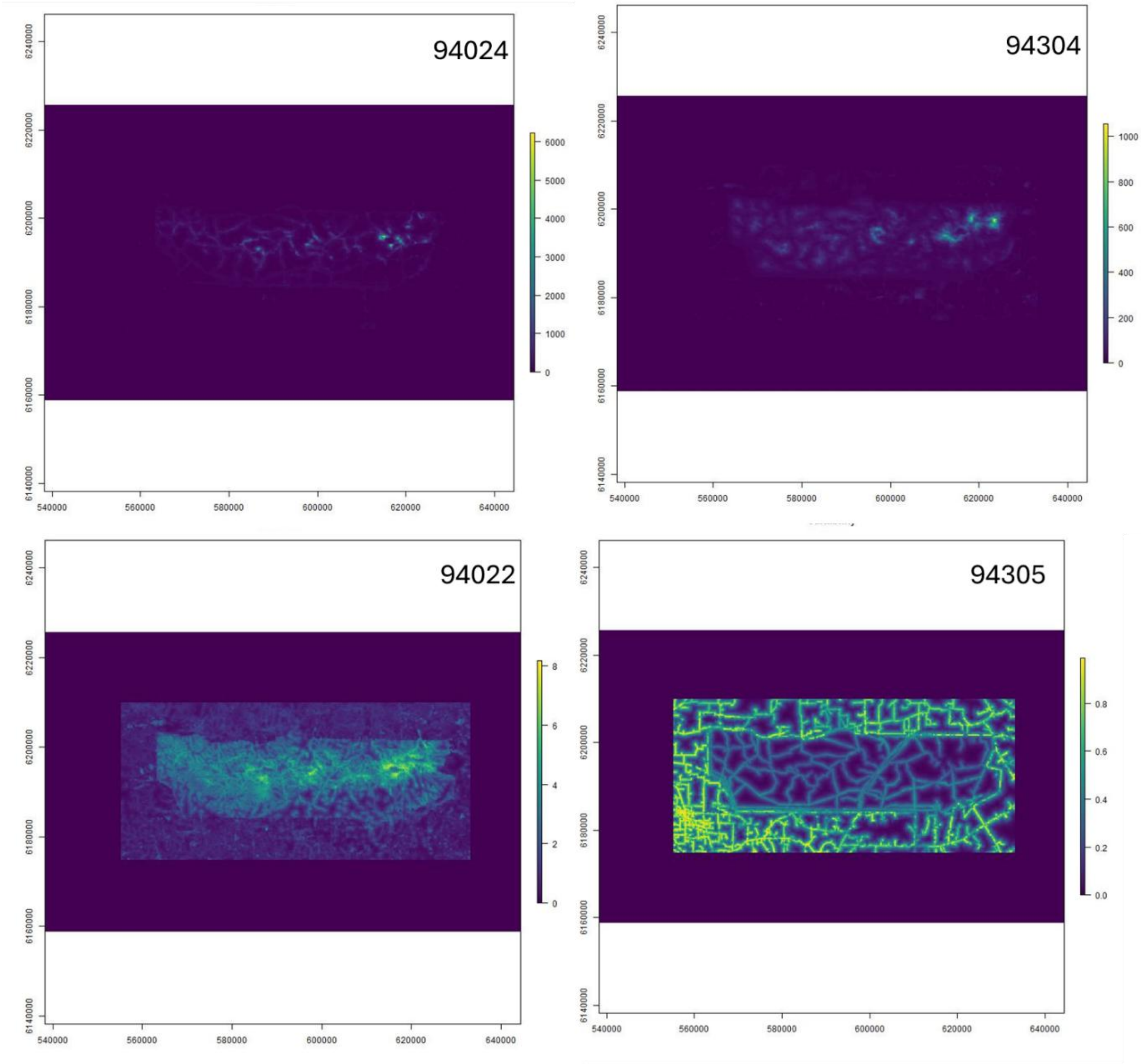

Figure S7. Habitat suitability maps estimated from resource selection function analysis