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Diet of dingoes in the West Kimberley, and the impact of linear clearing

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ABSTRACT

Generalist predators, such as the dingo (*Canis familiaris*), frequently use linear clearings as movement corridors, increasing their mobility, landscape access, and sometimes modifying predator–prey relationships. We quantified the diet of the dingo in the West Kimberley region of Western Australia and tested the hypothesis that clearing of seismic lines would result in a change to the diet of dingoes. A total of 199 scats were collected from inside and outside the footprint of a seismic survey at three collection time points (before and twice after the disturbance). Overall, the diet of dingoes varied over seasons ($P = 0.003$), and between control and treatment sites ($P = 0.013$); however, there was no evidence of a shift in diet caused by seismic clearing (time × treatment interaction term, $P = 0.848$). Cattle were the most frequently occurring item (frequency of occurrence = 65% of 199 samples; the greatest value recorded in Australia), with greater consumption of cattle in control and treatment sites at the end of the dry season compared to the early dry season, likely driven by an increase in cattle mortality and susceptibility to predation. Despite dingoes using seismic lines as movement corridors, there is little evidence that this results in a change in their diet.

Keywords: canids, cattle, dingo, diet, livestock, macropod, predation, scats, seismic lines, wolves.

Introduction

Linear anthropogenic features are a widespread disturbance throughout terrestrial ecosystems and probably represent the most extensive element of the anthropogenic footprint (Hawbaker and Radeloff 2004; Jones *et al.* 2014; Mjachina *et al.* 2014; Raiter *et al.* 2017). Linear anthropogenic features can have a range of ecological impacts (Forman 2003; Fahrig and Rytwinski 2009), including modifying the access and movement of predators. Generalist predators often use linear anthropogenic features, increasing their ease of movement (McKenzie *et al.* 2012; Dickie *et al.* 2016; Finnegan *et al.* 2018), decreasing their search times for prey (Latham *et al.* 2011; DeMars and Boutin 2018), and even allowing access to novel prey (Fleming and Bateman 2018). For example, in Canada, radio-tracked wolves (*Canis lupus*) are significantly more likely to be recorded close to linear clearings, and travel twice as fast on seismic lines and three times faster on roads compared with undisturbed forest, increasing their daily movements by 12% in summer and 19% in winter (Dickie *et al.* 2016).

The greater use of linear features by predators can have consequences for predator–prey dynamics (Latham *et al.* 2011; McKenzie *et al.* 2012; DeMars and Boutin 2018; Finnegan *et al.* 2018). Increased daily movement by predators and increased access can result in a greater encounter rate between predators and prey (McKenzie *et al.* 2012), which may translate into an increased predation rate (James 2000; James and Stuart-Smith 2000). In turn, this can result in avoidance of linear features by prey species (James and Stuart-Smith 2000; Latham *et al.* 2011; DeMars and Boutin 2018; Dickie *et al.* 2020), causing functional habitat loss and potentially threatening populations of prey species (Dyer *et al.* 2001). While many studies have explored the impact of linear features on predator–prey dynamics, particularly within the industrialised forests of North America, no studies have yet tested for an associated dietary change of the species in question.

In Australia, linear clearings such as highways, station tracks, fence lines, drill pads, and seismic lines are often the only anthropogenic disturbances present in remote landscapes. Dingoes frequently use linear features (Mahon *et al.* 1998; Dawson *et al.* 2018; Raiter *et al.* 2018; Wysong *et al.* 2020), potentially altering the habitat use of these predators, and in turn, their access to different prey species. This increased access could, therefore, result in an alteration to their diet. The diet of the dingo has been studied widely in many parts of Australia, except the Kimberley region of Western Australia. The only information describing the diet of the dingo in the Kimberley is unpublished data included in a review by Doherty *et al.* (2019), and an unpublished study as part of a student project (Byrne 2009). The Kimberley is the most productive cattle producing region in Western Australia as well as an important refuge for many threatened wildlife species. As such, recording diet of dingoes and the effects of development on their diet will provide important and missing information about dingo diet across the continent and the potential impact on relictual wildlife populations.

In the current study, we quantify the diet of dingoes in the West Kimberley, in an area where a seismic survey resulted in a dramatic increase in the availability and distribution of linear features. Prior to clearing, the only linear clearings at the study site were station access tracks that largely directly linked water points with minimal intrusion into the surrounding landscape. After seismic line clearing, the availability of linear clearings away from water points was greatly increased. We explore the impact of the creation of these seismic lines on dingo diet composition.

Methods

Dingo scats were collected across two active cattle stations, Roebuck Plains and Yakka Munga (in the Rubibi and Nyikina Mangala Native Title determination areas), in the West Kimberley region of Western Australia (Fig. 1). Both stations have cattle stocking rates typical of the region (approx. 5 head/km^2) and both semi-regularly control dingoes by baiting and shooting.

The infrastructure at the site is limited to unsealed access tracks (which are effectively permanent), and seismic lines (which are temporary). Seismic lines are 4 m-wide vehicle access tracks cleared throughout the survey area, in either a sparse irregular fashion (2D seismic survey), or in a grid pattern, with ~200 m between parallel lines (3D seismic survey). Seismic surveys have been carried out in the broader

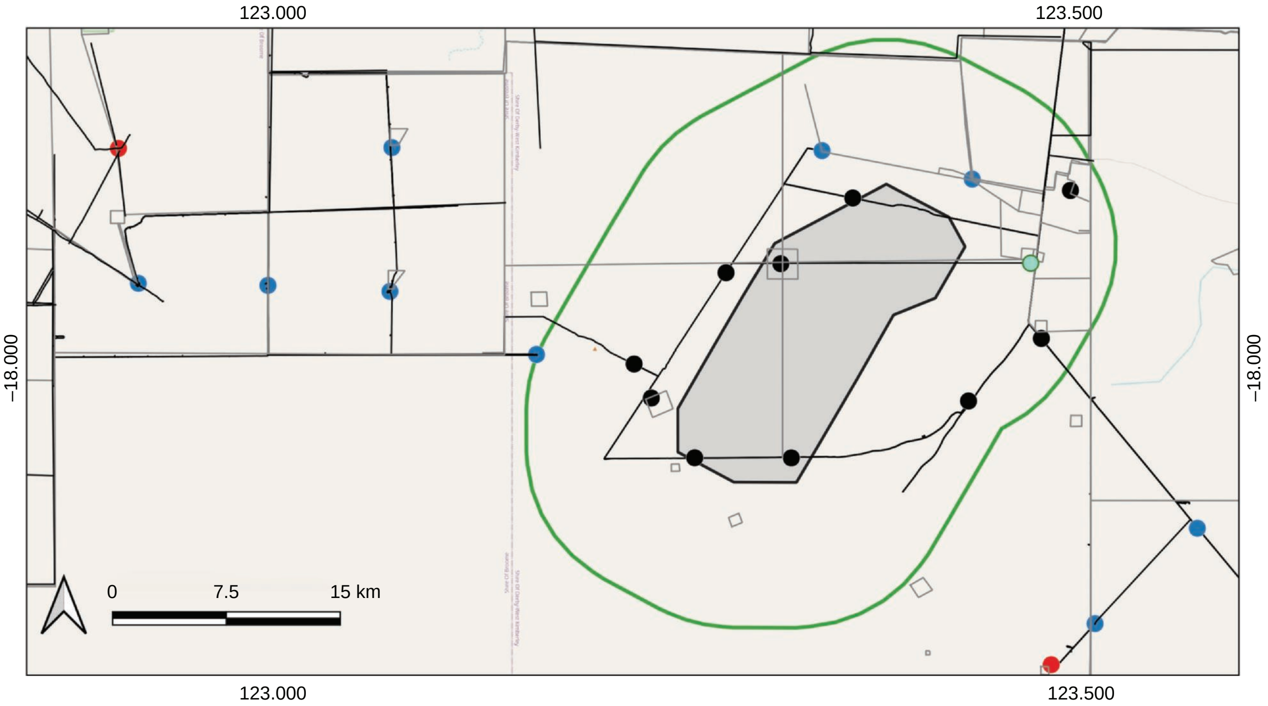

Fig. 1. The study site showing station tracks (black lines), fences (grey lines), a homestead (green dot) and scat collection carried out at water bores and cattle yards (control sites in red, treatment sites in black) where dingoes congregate. Blue dots indicate water bores where no scats were collected. The disturbance area is indicated by the grey polygon with a black border, within which a grid of seismic clearings was carried out in September 2016, and a 10 km buffer around this disturbance area shown in green.

West Kimberley region since the 1960s (Klepacki *et al.* 1985). Seismic lines differ from other access tracks in their temporary nature; they are not maintained but are left to passively recover (Dawson *et al.* 2018). Generally, vegetation structure and composition on seismic lines in the West Kimberley recovers quickly (Dawson *et al.* 2020); therefore, the response of animals to the presence of seismic lines can differ through stages of recovery (Dawson *et al.* 2018).

Using a before–after control–impact (BACI) experimental design, dingo scats were collected during targeted searches around water bores and cattle yards where water was available (Fig. 1) between June 2015 and June 2017. All collection points were within paddocks that contained mixed cattle (bulls, cows, weaners and calves). Samples were collected during three collection time points: 2 months prior to clearing (which occurred in September 2016), 1 and 8 months after clearing (Table 1). Because of mobility of dingoes, we considered all collection points within 10 km of the clearing area as disturbance sites, likely to be influenced by the treatment. Collection points for control sites were located 20 and 45 km away from the disturbance. The 20 km threshold was chosen as a conservative estimate of an independence threshold based on dingo movement patterns determined through tracking data (Thomson 1992*b*); dingoes that visit bores greater than 20 km from the disturbance area were likely to be independent of the disturbance.

Each collection point was searched for at least 15 min but there was no upper limit on the time spent at a collection point if scats were abundant. Scats were collected from water bores and cattle yards for three reasons. First, dingoes display latrine behaviour, using urine and faeces as means of communication, indicating territorial boundaries (Corbett and Newsome 1987; Byrne 2009), frequently at focal points in the landscape such as water points, banks, high mounds of dirt and vehicle routes (Byrne 2009; Wallach *et al.* 2009), making collection of scats relatively efficient. Second, scats were highly visible at these locations, as most water points had yards or fencing of some sort (often to protect water pumping solar panels from cattle) that provided a small ungrazed and un-trampled area where scats remained intact. Third, because we focused our search on a small area, we could be confident that our sampling was of scats that were not present from the previous survey. Dingo scats were identified through morphology, size, colour and odour (as per Moseby *et al.* 2009). All scats were collected individually, into zip-lock sample bags, and frozen at the earliest convenience.

Prior to processing scat samples, scats were thawed, and the total weight of the scat was recorded. Each scat was washed through a 1 mm Endecott sieve with warm water and washed using dishwashing liquid. Undigested matter was then manually extracted and placed on a piece of paper towel to dry for 10–12 h. Once dry, hair, feathers or reptile scales were stored in paper bags, and any soft tissue or skin was stored in 70% ethanol. A representative sample of hair was taken from each scat. Where hair from multiple species were identified, samples of each were collected.

Mammal hair was identified using analysis of the medulla (Brunner and Triggs 2002). Initially, whole mounts were created by laying guard hairs on a glass slide on glycerol and placing a cover slip over the solution. Prepared slides were then placed under a compound microscope using 40–200× magnification. The arrangement of the medulla of the widest region, known as the shield region, was the focal point for species identification. The list of candidate species was limited to those found within the northern region of Western Australia. Hairs that could not be identified to species were identified to genus. Where there was sufficient material, hair samples (n = 165 samples) were sent to a third party for validation (G. Story, Scats About, Pty., Majors Creek, Australia). Bird remains were identified with the help of an experienced ornithologist (T. Douglas, Birdlife Australia). Reptile, invertebrate, and vegetation fragments were unable to be identified to species. Bones were predominantly in small fragments and were therefore also unidentifiable. The frequency of occurrence (FO) of each diet item was calculated as the percentage of scats containing that item.

Sample-based rarefaction curves were created using the 'iNEXT' package (Hsieh *et al.* 2016). We used the *adonis* function in the package 'vegan' (2.5–6) (Oksanen *et al.* 2013) to test for differences in the assemblage of dingo diet over seasons and between control and treatment sites. This analysis requires a matrix showing the presence or absence of each diet item, indicated with a column for each species, and a row for each scat. While cannibalism has been observed in dingoes (Meek and Brown 2017), we considered the scarce presence of dingo hairs in scat samples likely to be incidental (i.e. grooming), and presence of dingo was therefore removed from diet analysis, resulting in 21 diet categories (Table 1). To test the effect of clearing seismic lines on diet composition, we tested for an interaction between seismic line clearing treatment (control or disturbance) and collection time point. The scat collection location (by name; n = 11) was included as a strata variable (analogous to a random factor), to account for potential differences between collection points due to individuals grouping around each collection point.

A further analysis of the two main diet categories (cattle and all macropods combined) was carried out to investigate patterns in the primary species consumed. Other categories, including non-macropod native mammals, introduced mammals, birds, and reptiles were recorded too infrequently to allow robust analysis. Individual generalised linear models were fitted with the presence of each diet category as the binary response variable, and collection time point and seismic line clearing treatment as explanatory variables. Graphical representations of the fitted models were plotted using the *ggeffect* package (Lüdecke *et al.* 2020). All

Table 1. The number of scats containing each species identified (*N* out of 199), and the corresponding frequency of occurrence (FO).

					2 months prior to clearing (%)		1 month after clearing (%)		8 months after clearing (%)	
					Control	Treatment	Control	Treatment	Control	Treatment
Group	**Species name**	**Common name**	***N***	**FO (%)**	**12**	**13**	**51**	**32**	**39**	**52**
Macropods		All macropods			0.31	0.75	0.19	0.24	0.48	0.79
	Notomacropus agilis	Agile wallaby	49	24.6	66.7	15.4	13.7	6.3	56.4	15.4
	Osphranter antilopinus	Antilopine wallaroo	11	5.5	8.3	0.0	0.0	0.0	12.8	9.6
	Osphranter robustus	Euro	5	2.5	0.0	7.7	0.0	3.1	2.6	3.8
	Onychogalea unguifera	Northern nail-tail wallaby	1	0.5	0.0	0.0	2.0	0.0	0.0	0.0
	Osphranter rufus	Red kangaroo	2	1.0	8.3	0.0	0.0	0.0	2.6	0.0
		Unknown macropod	25	12.6	0.0	7.7	9.8	9.4	15.4	19.2
Other native mammals	*Canis familiaris*	Dingo	15	7.5	8.3	7.7	3.9	12.5	5.1	9.6
	Petaurus ariel	Savana glider	3	1.5	0.0	0.0	2.0	3.1	2.6	0.0
	Zyzomys argurus	Common rock rat	4	2.0	0.0	0.0	0.0	6.3	0.0	3.8
	Rattus tunneyi	Pale field rat	1	0.5	0.0	0.0	0.0	0.0	0.0	1.9
	Tachyglossus aculeatus	Echidna	1	0.5	0.0	0.0	0.0	0.0	0.0	1.9
Introduced mammals	*Bos taurus/indicus*	Cattle	130	65.3	25.0	76.9	90.2	90.6	25.6	61.5
	Felis catus	Feral cat	1	0.5	0.0	0.0	2.0	0.0	0.0	0.0
	Sus scrofa	Feral pig	1	0.5	0.0	7.7	0.0	0.0	0.0	0.0
Birds	*Grallina cyanoleuca*	Magpie lark	1	0.5	0.0	0.0	2.0	0.0	0.0	0.0
	Taeniopygia guttata	Zebra finch	2	0.5	0.0	0.0	2.0	0.0	0.0	0.0
	Geophaps plumifera	Spinifex pigeon	1	0.5	0.0	0.0	0.0	3.1	0.0	0.0
	Melopsittacus undulatus	Budgerigar	1	1.0	0.0	0.0	0.0	6.3	0.0	0.0
	Trichoglossus rubritorquis	Red-collared lorikeet	1	0.5	0.0	0.0	0.0	3.1	0.0	0.0
		Unknown passerine	2	1.0	0.0	0.0	2.0	3.1	0.0	0.0
		Unknown bird	8	4.0	0.0	0.0	3.9	15.6	0.0	1.9
Reptiles		Unknown reptile	6	3.0	0.0	0.0	2.0	15.6	0.0	0.0
Invertebrates		Unknown invertebrate	21	10.6	16.7	38.5	13.7	9.4	0.0	7.7

statistical analyses were performed in the R statistical environment (R Core Team 2018).

Results

In total, 199 scats were collected and analysed. Most scats (67%) contained only one prey type, while 22% had two prey types and 11% had three or more. Cattle was the most frequently occurring species in scats (FO 65%), followed by agile wallaby (FO 25%) (Table 1). A diverse range of mammals, particularly macropods, were also recorded. The species rarefaction curve (Fig. 2) suggests that the species present within the diet had not been exhaustively sampled, as an asymptote for species diversity had not been reached.

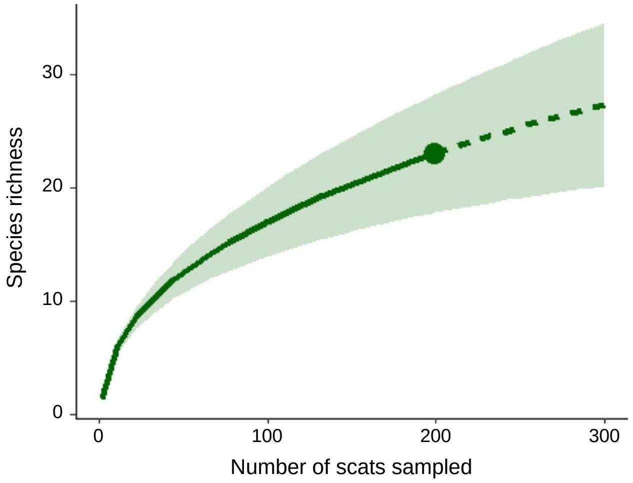

Fig. 2. Species accumulation curve calculated using sample-based rarefaction, indicating that the number of diet items identified in dingo scats from within control and disturbance areas in the West Kimberley was not an exhaustive sample of the local dingo diet. Importantly, this analysis represents only those taxa that were identified to species in scat analysis (i.e. reptiles were pooled into a single column, as were invertebrates).

Dingo diet composition varied significantly between the three collection time points (Adonis $F_{2,198} = 15.198$, $R^2 = 0.127$, $P = 0.003$), and there was a significant difference in diet composition between control and disturbance samples (Adonis $F_{1,198} = 8.149$, $R^2 = 0.034$, $P = 0.013$). However, there was no significant interaction effect between collection time point and seismic line clearing treatment (Adonis $F_{2,198} = 4.198$, $R^2 = 0.035$, $P = 0.848$), indicating that there was no treatment effect for our BACI design.

Frequency of occurrence of the two most important diet items, cattle and macropods, was highly variable between treatment and time points. There was a significant difference between the pre-disturbance (collection time point 1) and immediate post-disturbance (collection time point 2) collections in the occurrence of cattle (GLM, $z = 4.065$, $P < 0.001$) and macropods (GLM, $z = -3.061$, $P = 0.002$, Fig. 3). This corresponds to a significant increase in the consumption of cattle in the post-clearing survey and a significant decrease in the consumption of macropods observed for both treatment and control sites. These changes are therefore likely to represent a seasonal effect.

Generalised linear modelling for the two most common diet items indicated a significant treatment effect in the occurrence of cattle (GLM, $z = 2.458$, $P = 0.014$) and macropods (GLM, $z = -2.128$, $P = 0.033$, Fig. 3), however there was also no interaction effect between treatment and collection time points for these analyses (results presented in Table 2). In the post-disturbance survey (time point 2), when any difference resulting from disturbance was expected to be

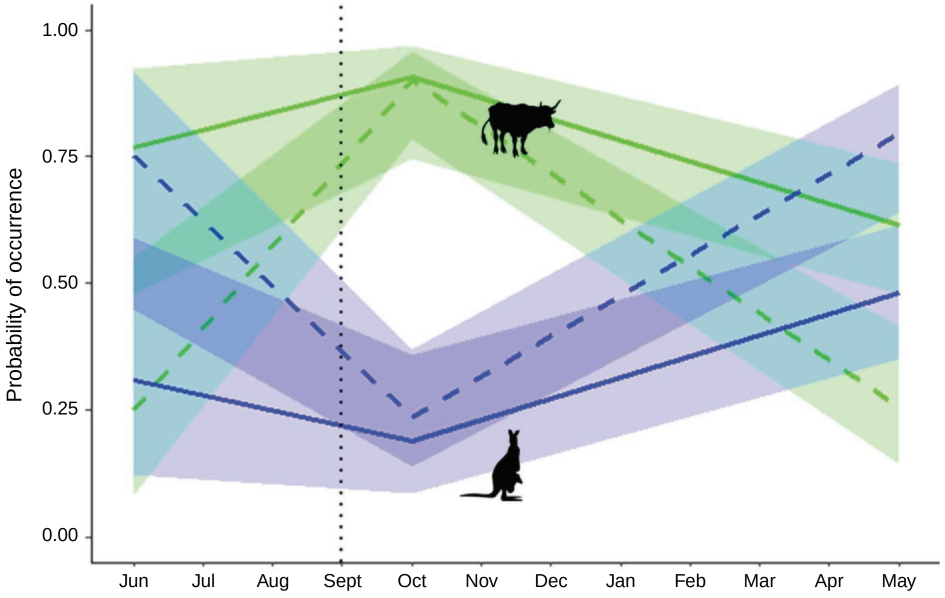

Fig. 3. The predicted probability of occurrence of cattle and macropods in disturbed treatment areas (solid line) and control areas (dashed line) in the diet of dingoes, derived from the fitted generalised linear models. The black dotted vertical line indicates the date of clearing of seismic lines (September 2015) within the disturbance area.

Table 2. Results of the Generalised Linear Models (GLMs) fitted to investigate the effect of disturbance on the probability of cattle or macropod being present in a scat sample.

	Estimate	Standard error	z value	*P*
Cattle				
Intercept^A	−1.099	0.667	−1.648	0.099
Disturbed area	2.303	0.937	2.458	0.014
Collection time point 2	3.318	0.816	4.065	<0.001
Collection time point 3	0.034	0.761	0.045	0.965
Disturbed area × collection time point 2	−2.253	1.211	−1.860	0.063
Disturbed area × collection time point 3	−0.768	1.046	−0.734	0.463
Macropods				
Intercept^A	1.099	0.667	1.648	0.099
Disturbed area	−1.910	0.898	−2.128	0.033
Collection time point 2	−2.277	0.744	−3.061	0.002
Collection time point 3	0.256	0.776	0.330	0.741
Disturbed area × collection time point 2	1.622	1.058	1.533	0.125
Disturbed area × collection time point 3	0.478	1.020	0.469	0.639

^A Reference category is collection time point 1 and control area.

most obvious, the consumption of cattle and macropods was most similar between treatment and control sites. There was no difference in the occurrence of cattle or macropods between collection time point 1 and collection time point 3.

Discussion

Although dingoes frequently use seismic lines as movement corridors (Dawson *et al.* 2018), we found no overall change in dingo diet composition to suggest that clearing seismic lines had any short-term impact. This result may be explained through five likely scenarios. First, while dingoes may prefer to use seismic lines as movement corridors, such a preference may not translate into a discernible change in habitat use, or distance travelled (displacement), and therefore diet. Second, the availability of seismic lines changed the habitat use or displacement of dingoes, but the density of preferred diet species (cattle and macropods) is so homogenous in this modified pastoral landscape, that the altered movement patterns afforded no benefit to dingoes. Third, the sample size of the study may have been too low to detect changes in the less frequently consumed species, especially birds and reptiles, many of which could not be identified to species level. Change in consumption of habitat specialists, restricted to small patches of suitable habitat, may be a better indicator of a change in habitat use and diet in dingoes, although their frequency of occurrence in dingo diet was too low to allow statistical analysis. Fourth, diet of dingoes in the West Kimberley was highly seasonally variable, with significant differences observed over the three collection time points for this ~year-long study. While a BACI experimental design is robust to detect seasonal changes, such strong effects can obscure more nuanced treatment effects, if they occur. Fifth, given the high mobility and large home range of dingoes, the control sites may have been close enough to the disturbance area for resident dingoes to access both areas. In conclusion, we found no evidence to suggest that clearing of seismic lines precipitated a shift in the diet of dingoes, however the drivers for this lack of difference remain unclear.

The seasonal variation in FO of cattle and macropods over the three collection time points may have obscured any potential treatment differences in this study. The underlying differences between control and treatment sites were essentially non-existent in the survey immediately post-disturbance, when the effect of the seismic line clearing disturbance was expected to be most pronounced. The consumption of cattle was greatest in both control and treatment sites for collection time point 2 (October), at the end of the dry season. At this time, the high heat, lack of natural water (excluding water points) and relative lack of forage often result in higher mortality in cattle (O'Rourke 1994; Cobiac 2006; Henderson *et al.* 2013) which become carrion, or weakened animals that are more vulnerable to predation. This seasonal abundance of cattle as prey has also been recorded in another study of dingo diet in the region (Byrne 2009). We believe that this greater vulnerability of cattle is likely the cause for a significant rise in cattle FO for collection time point 2 (October). In turn, the heavy reliance on consuming cattle in this time may have also caused a reduction in consumption of macropods. Future research should investigate seasonal variation in the diet of the dingo. Comparing wet and dry seasons in the Kimberley could give an insight into the variation in cattle consumption across seasons and if consumption is due to carrion or direct predation

While there was variation in the consumption of cattle throughout the study, overall FO averaged 65%. This is consistent with another study from the West Kimberley that recorded cattle FO of 60% in dingo diet (Byrne 2009). Compared with an average FO of 13% for the arid and tropical regions of Australia (Doherty *et al.* 2019), the consumption of cattle in the West Kimberley is very high. An important caveat on all studies using scat analysis is that it is generally not possible to tell whether the presence of a species is the result of direct kill or as carrion. Throughout the duration of the present study, carcasses were regularly observed at the water points and yards where scats were collected, likely because cattle congregate around water points during the day, especially in dry seasons, and are therefore more likely to also die there. As such, it is likely that consumption of carrion made up a substantial component of the dingo consumption of cattle. At the time of fieldwork, the taking of 'killers' (cattle killed and butchered in the field for human consumption) was common at the station, with remains of butchered carcasses left behind, increasing carrion availability. Dingoes also often attack cattle (particularly calves), leaving them with wounds that may heal; this is evident when cattle are processed with carcasses being 'marked down' or rejected by processors due to damage (Hewitt 2009). Therefore, presence in their diet does not mean that dingoes are killing all the cattle that they eat, but conversely, dingoes attack and damage animals without also consuming them.

Excluding the high incidence of cattle, the dingo diet recorded in the current study for the West Kimberley is broadly consistent with findings of a continental-scale review (Doherty *et al.* 2019). At the continental scale, and especially in northern WA, dingoes show a preference for large mammals such as livestock and macropods (Whitehouse 1977; Thomson 1992*a*; Doherty *et al.* 2019). This preference for larger species is especially pronounced when compared to the diet of two meso-predators, feral cats and the red fox (Fleming *et al.* 2021). Medium-sized and small mammals, such as echidnas and native rodents, were present in relatively low frequencies, consistent with other studies in Western Australia (Newsome *et al.* 1983; Byrne 2009; Brook and Kutt 2011; Cupples *et al.* 2011; Allen and Leung 2012; Allen *et al.* 2012, 2016; but see Augusteyn *et al.* 2021). The only arboreal mammal recorded in the current study was the savanna glider, present in low frequency (FO 1.5%). Consumption of gliders by dingoes has also been recorded in north-eastern Australia (Allen *et al.* 2012, 2016; Behrendorff *et al.* 2016). The two feral mammals recorded, feral cat and feral pig, were present in one sample each; both species have previously been reported at low frequencies in dingo diet (Newsome *et al.* 1983; Allen and Leung 2012; Allen *et al.* 2012). Birds and reptiles were in low frequencies in West Kimberley dingo diet, consistent with arid region studies (Whitehouse 1977; Corbett and Newsome 1987; Thomson 1992*a*; Cupples *et al.* 2011).

Our study was focused in the West Kimberley and looked at one type of linear anthropogenic clearing (seismic lines), however this does not reflect the full gamut of impacts of linear anthropogenic clearings. Different types of linear anthropogenic clearings in different environments may exert greater impacts on predator–prey dynamics and could be used differently by both predators and prey (e.g. Latham *et al.* 2011; Dickie *et al.* 2020). Future studies should explore the impacts of a variety of linear anthropogenic clearings (roads, tracks) in different habitats on other mammalian predators in Australia, such as feral cats and red foxes. Both feral cats and red foxes show selection for linear clearings in Australia (Mahon *et al.* 1998; Dawson *et al.* 2018; Raiter *et al.* 2018), but little is known of the resulting impacts on predator–prey relationships. In order to minimise the ongoing catastrophic impacts of these species on Australian native species, understanding the interaction with anthropogenic infrastructure and predator–prey relationships is required.

Limitations of this study

In the current study, the sample size from each seismic line clearing treatment and collection time point was unbalanced, which may have reduced the level of detail that could be gained from the analysis. Precision of diet analysis increases with the number of scats collected and analysed (Williams *et al.* 2012) and the rarefaction curve for this study suggest that a broader diversity of diet items would be recorded for this study site with increased scat collection. Similarly, inclusion of scats from more than two control sites would likely have increased the sample size, however these were the only two suitable collection points (bores and yards) within the same local area at which a suitable number of scats (>5) were found. An increase in the sample size and more control sites in future studies should give a broader diversity of dietary items detected and give further insight into the impact of linear clearings on the dingo diet and seasonal variation.

Another assumption of this study is that the collection locations reliably reflect disturbance locations. The home range of dingoes can be very large (Thomson 1992*b*; Tatler 2019), meaning that dingoes that use areas within the disturbance area may also frequent areas outside the disturbance area. Without understanding of the home range of dingoes within our study site, the assumption that scat samples from our collection points reflects food availability in the local area may not be supported. Future studies in the area could explore habitat use and home range of dingoes by collaring individual animals, which will give a fine scale appreciation of how dingoes interact with linear anthropogenic features. Such data would help indicate the scale of movements likely across this landscape.

Conclusions

In the current study, despite dingoes using seismic lines as movement corridors (Dawson *et al.* 2018), there was no effect of seismic clearing on the diet of dingoes. However, there was a pronounced seasonal shift in diet, with dingoes across both treatment and control areas consuming more cattle and fewer macropods in the late dry season. While the current study represents the highest recorded FO of cattle in the diet of dingoes, it may not represent a corresponding high predation rate. The creation of anthropogenic linear features may affect the behaviour of predators and alter predator–prey dynamics, but we found no evidence that clearing seismic lines presents such a risk in the West Kimberley.

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Data availability. Full details of diet are provided in Table 1.

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