Department of Industry Tourism and Trade

Paddock Power- commercial property results

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NORTHERN TERRITORY GOVERNMENT

Paddock Power Project

- MLA funded project
- Paraway Pastoral and AACo -two commercial collaborators

- Project team has evolved over the last few years, but original team still heavily involved in the project

- Explore the impacts that paddock size and watered area has on productivity and develop the Paddock Power tool to help producers with infrastructure planning.

Paddock Power Overall Objectives

Webinar 1- Dionne Walsh talked about the Investment Calculator and Mapping Tool- design of these was one objective of the Paddock Power project

Webinar 2- what I am going to talk about today- the commercial property datasets

- measure the impact of paddock area and distance-to-water on reproductive performance and calf wastage

- assess the impact of reducing paddock area and/or improving watered area on reproductive performance and calf wastage

Commercial Properties

Properties located on the Barkly tablelands

- Rocklands Station
- Brunette Downs Station

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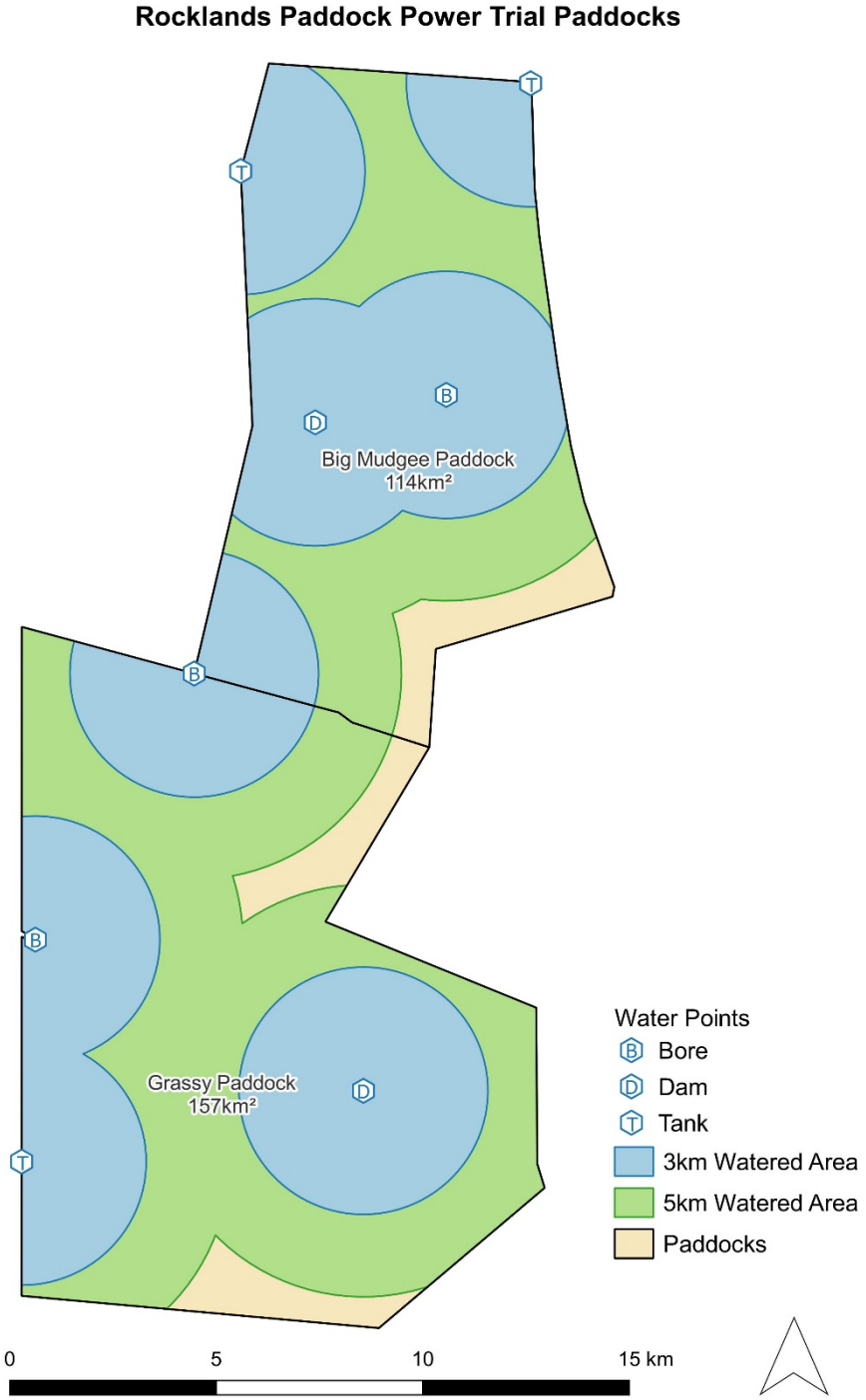
Rocklands Station

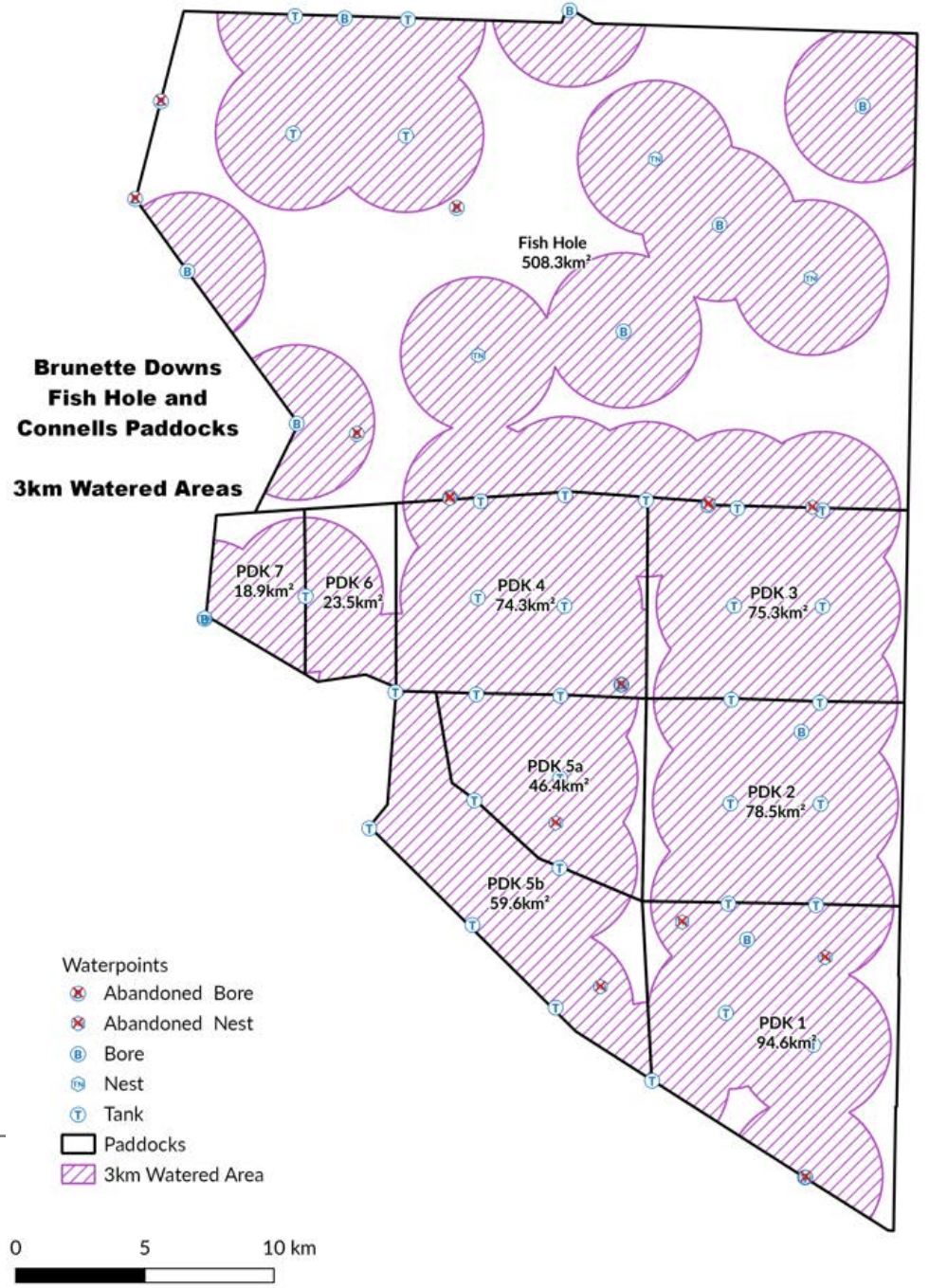
- Big Mudgee Paddock (69% 3km watered area)
- Grassy Paddock (58% 3km watered area)



Brunette Downs Station

- Fishole Paddock (62% 3km watered area)
- Connells Paddock 4 (97% 3km watered area

- Brunette data to be reported once data downloaded from GPS collars deployed last year



What data did we collect?

Crush side data

- Collection at each muster including BCS, weight, lactation status and pregnancy stage

GPS collar data

- 3 deployments at Rocklands 2020-2023
- 1 deployment at Brunette Downs 2022-2023
- Collected GPS data for calving animals (and indicator steers at Rocklands)
- How they behaved in the paddock spatially
- How far they walked and their distance to water
- What impact this had on reproductive outcomes

GPS collars- how do they work?

- Used a ‘store on board’ collar, reduces cost but need to retrieve collar to access the data
- Collars were assembled by NT DITT staff and recording frequency of GPS fixes could be customised to user preference
- Battery life in collars ranged from 2-8 months depending on battery size (6-10Ah)

GPS collar used in the project

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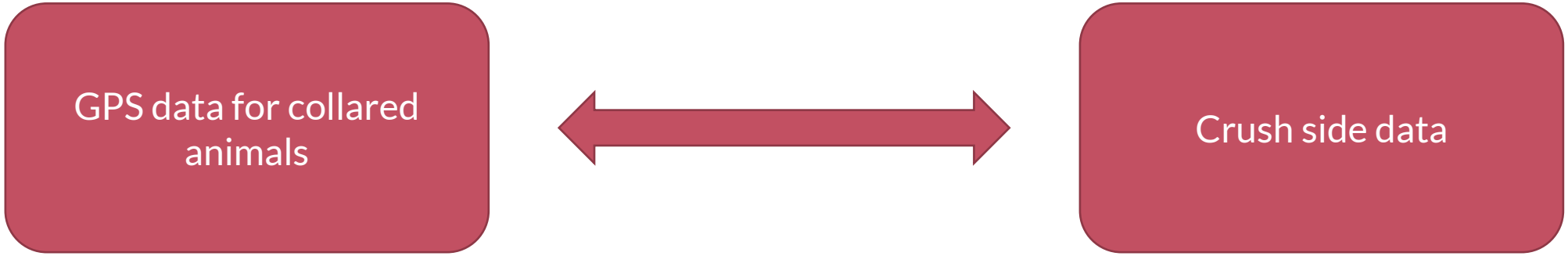
What do we do with it?

- Once GPS data has been cleaned and checked to remove any erroneous data, distance travelled by each animal can be calculated

- This distance data is then combined with the crush side data so that we can see the profile of each animal as well as the spatial behaviours on a daily basis



Let’s look at some results

- Crush side data
- Distance travelled and distance to water
- Home ranges and TSDM

Crush side data- animal performance

Foetal calf loss (not lactating more than 1 month after expected calving date)

- Not a significant difference between paddocks in any year

Foetal calf loss	Big Mudgee	Grassy	P value
2021	15%	27%	>0.05
2022	8%	16%	>0.05
2023	20%	13%	>0.05

Crush side data- animal performance

Annual lactation (percentage of wet cows at the pregnancy testing muster)

- Only a significant difference between paddocks in 2022

Annual Lactation	Big Mudgee	Grassy	P value
2021	80%	76%	>0.05
2022	87%	60%	**<0.05**
2023	80%	86%	>0.05

Crush side data

Pregnant within 4 months (percentage animals pregnant within 4 months of calving

- Only significant in 2022 where Grassy had a higher P4M

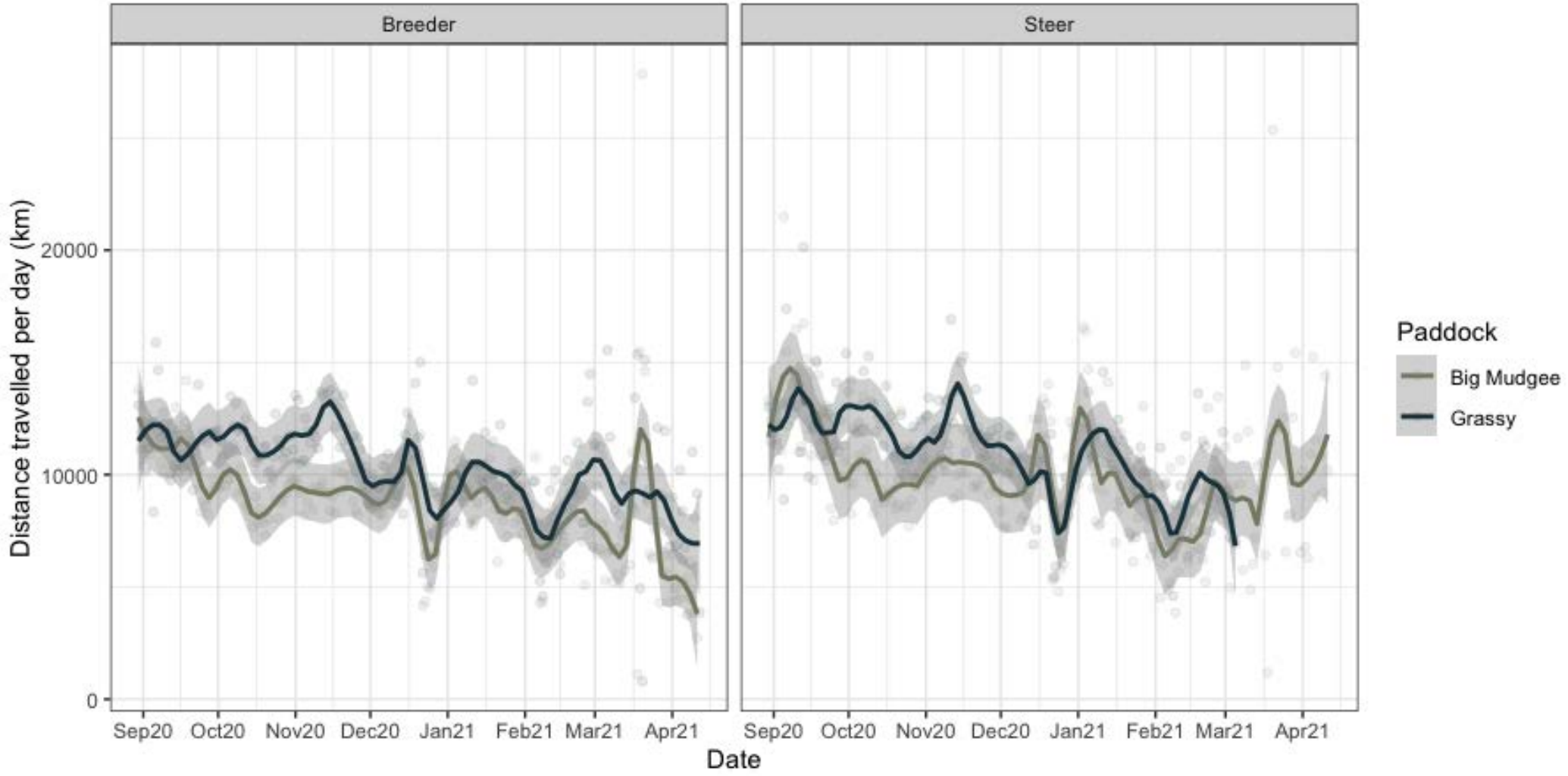
P4M	Big Mudgee	Grassy	P value
2021	46%	25%	>0.05
2022	49%	65%	**<0.05**
2023	64%	82%	>0.05

Distance travelled

- Animals in the well watered paddock (Big Mudgee) tended to travel less than those in the less well-watered paddock (Grassy) ($P < 0.05$).
- Over the study period, animals in the larger paddock (Grassy) travelled around 10.8km a day vs animals in the smaller paddock (Big Mudgee) that travelled 9.2km/day
- Distance travelled tended to be highest at the start of the wet season when rain began (stormchasing) and was lowest towards the end of the dry season (September-October) and in the late wet season (March)
- Dry cows walked slightly further than wet cows but was not significantly different ($P > 0.05$)

Distance travelled

Distance travelled by animals at Rocklands in the first deployment year



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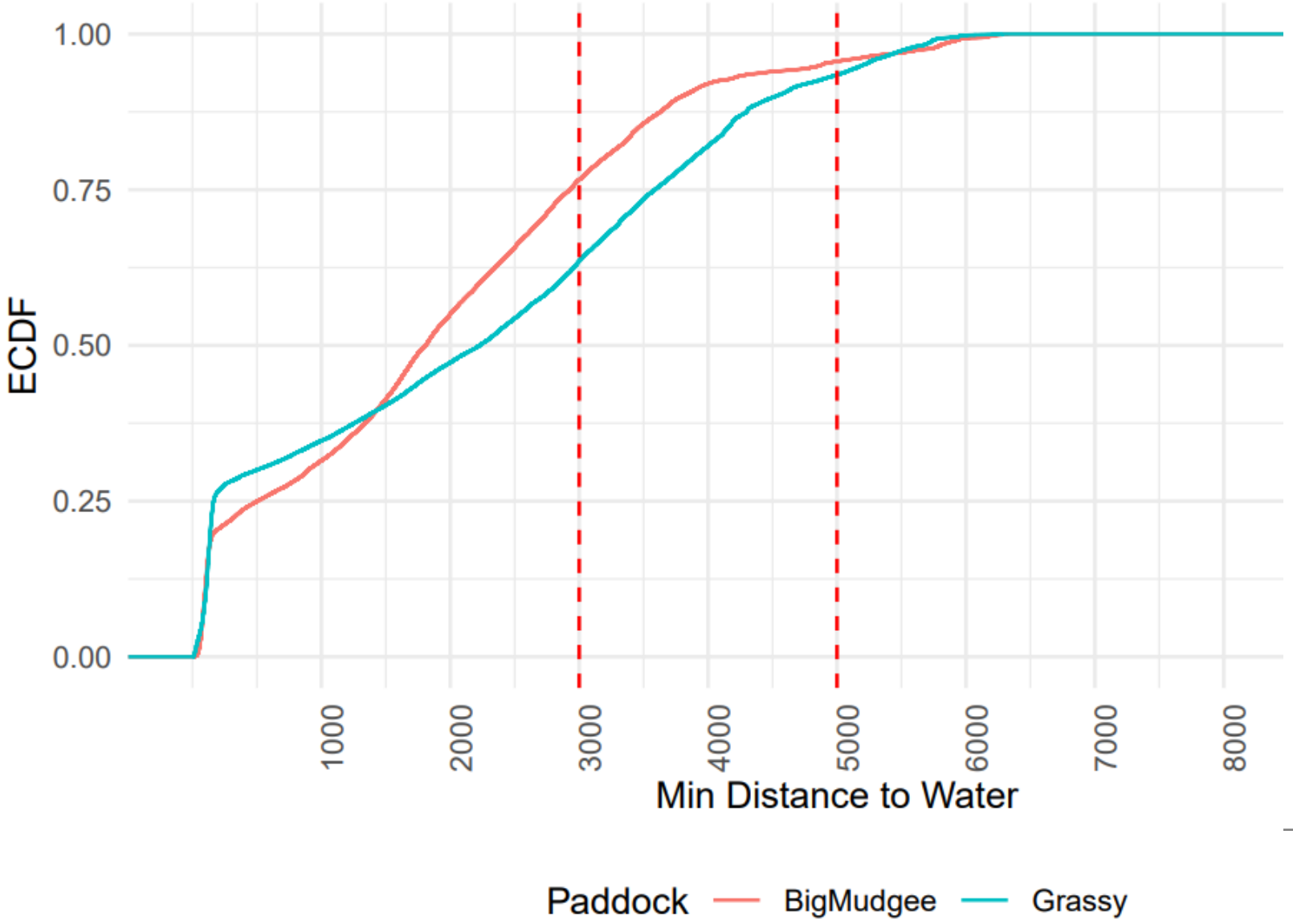
Distance to water



- 2nd deployment average minimum distance to water
- Showing proportion of fixes by all animals in the paddock vs the average minimum distance to water

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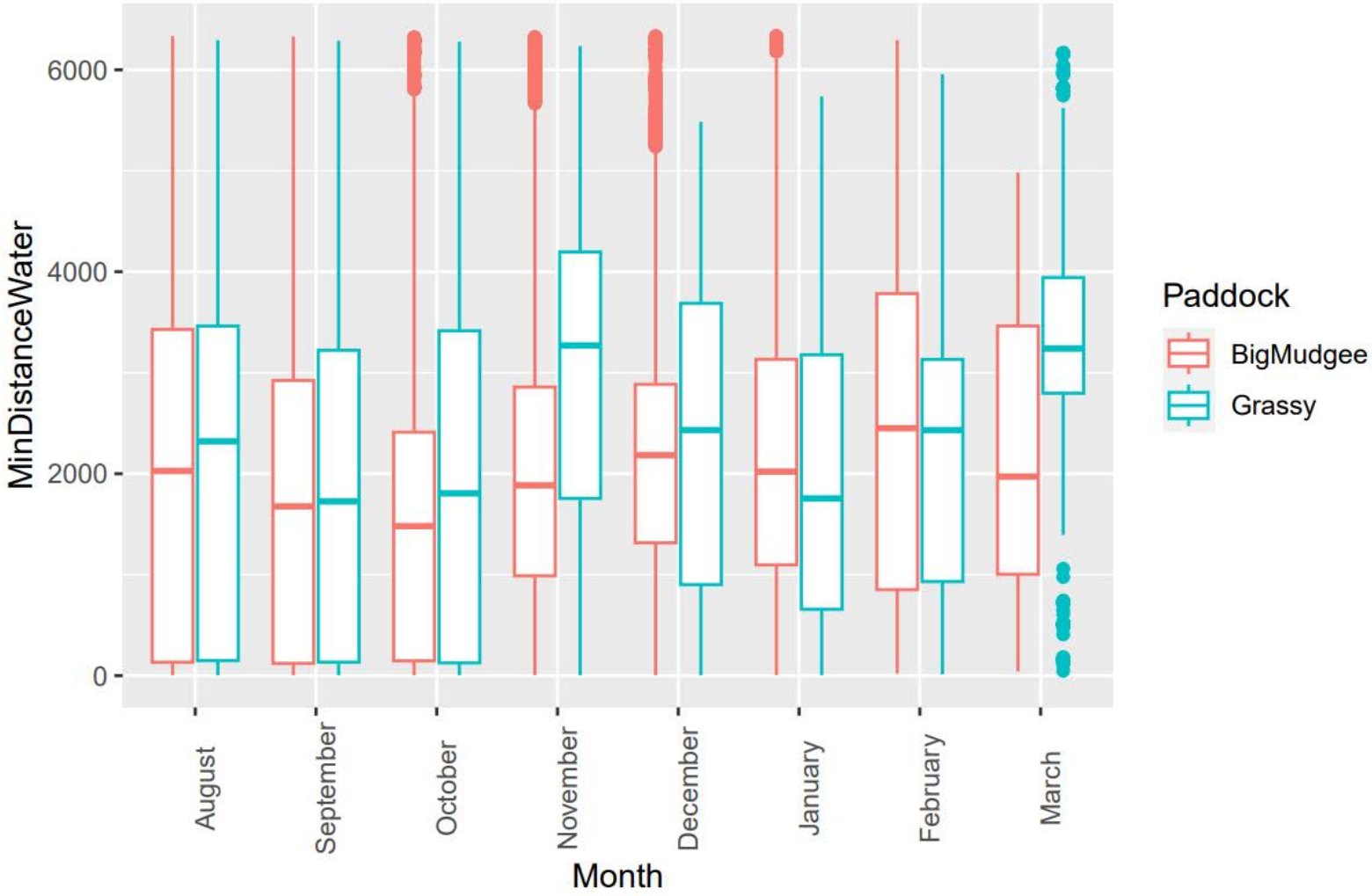
Distance to water

- Animals in Grassy tended to be further from water than animals in the more well-watered paddock (Big Mudgee)
- Further analysis will look at including surface water in the Georgina river system throughout the paddock to account for this



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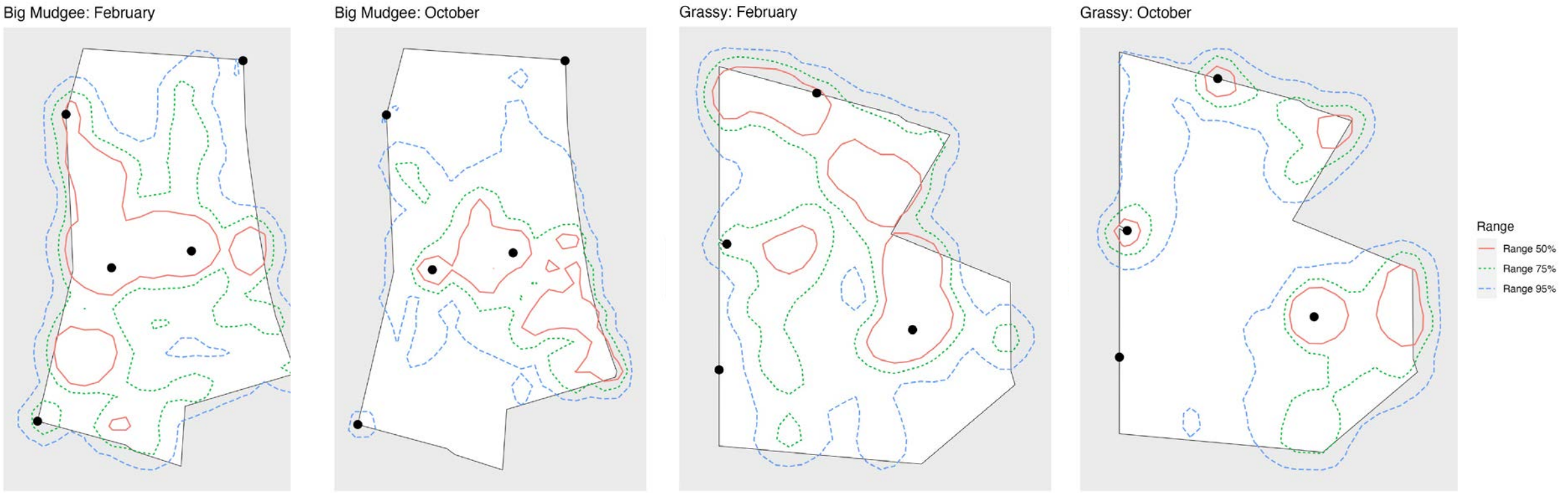
Home range data

What is home range?

- The area/s in a paddock that animals spend the majority of their time
- Home ranges are created by showing the areas in the paddock where most of the GPS fixes occurred either for individual animals or for all animals

2020-2021 Home range

Home range of animals in both paddocks in the wet and dry season



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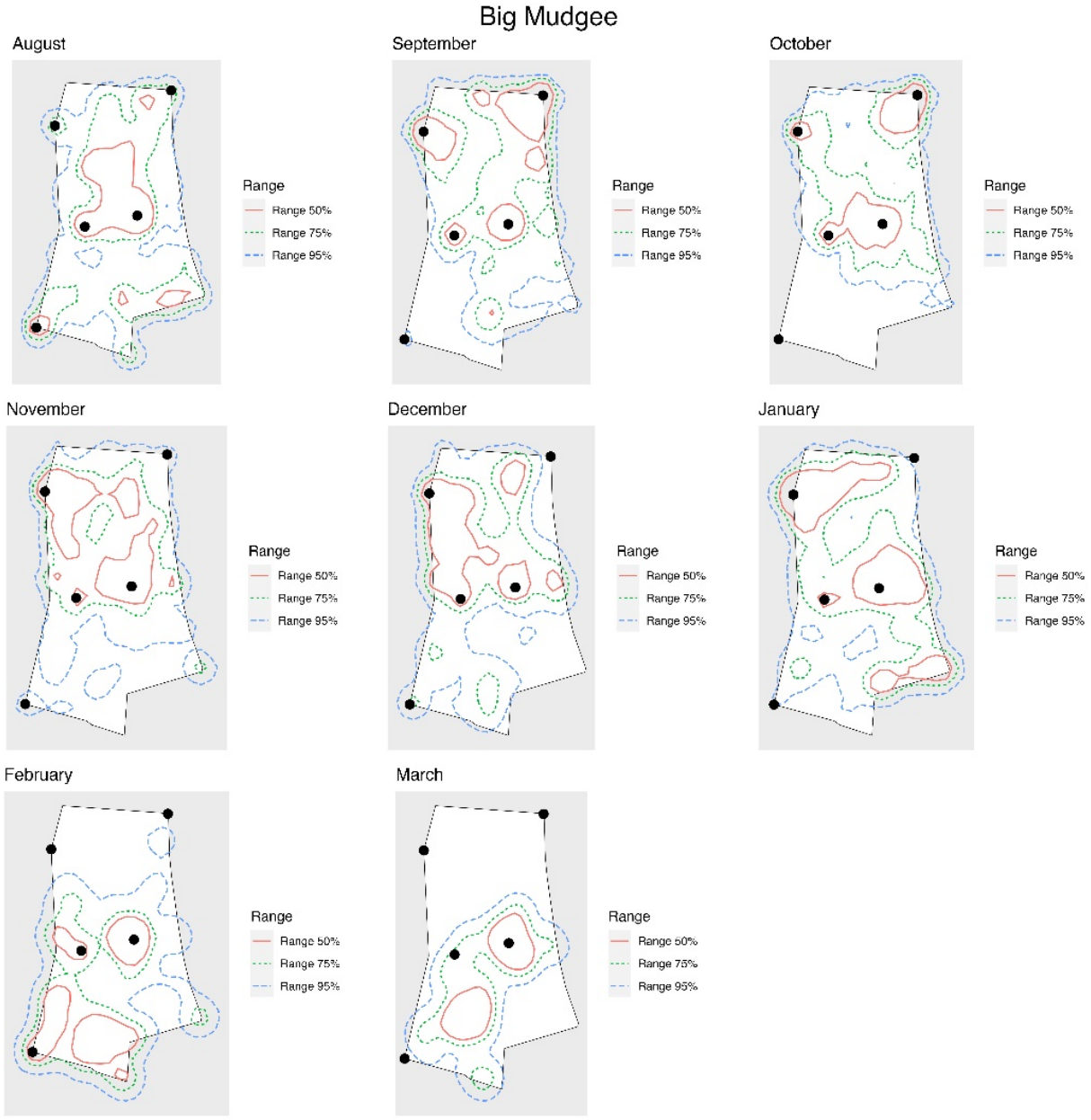
2021-2022 Home range



- What does this data mean in terms of feed on the ground?
- We can underlay Cibo labs data to show TSDM and total cover …..

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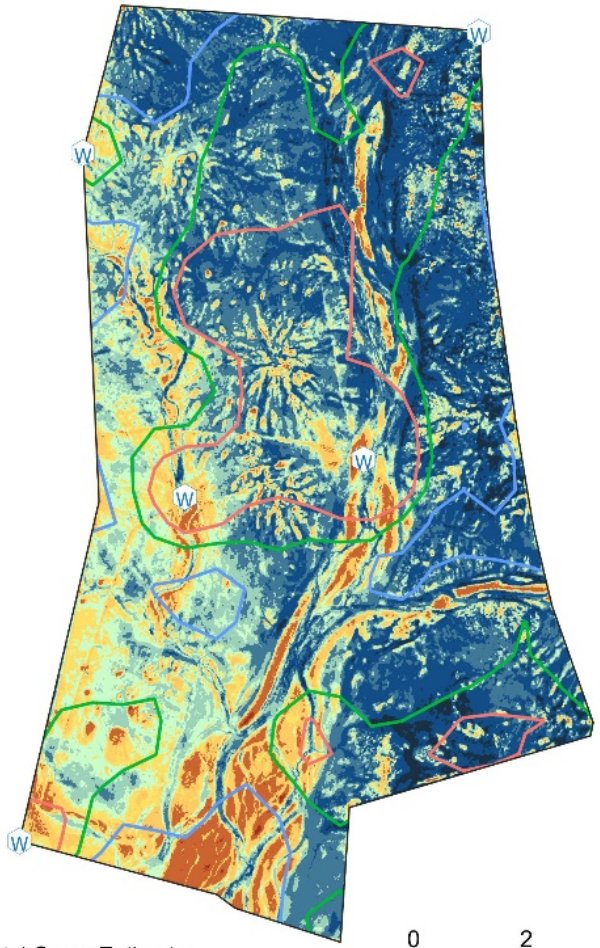
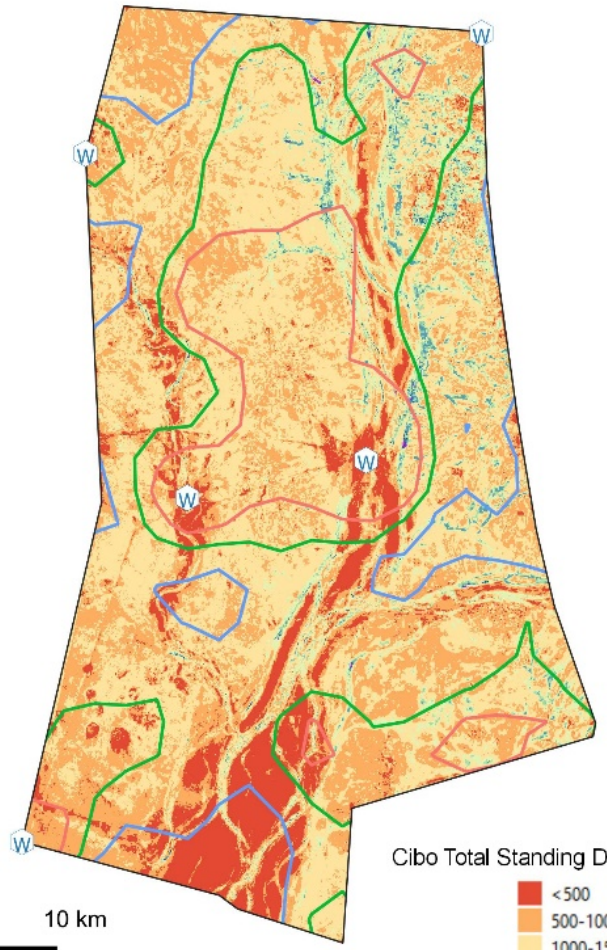
Rocklands Station- Big Mudgee Paddock August 2021





Cibo Total Cover Estimate

- <= 10% Total Cover
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- > 90

0 2 4 6 8 10 km

Animal Home Range Percentile Contours

- 50% Home range
- 75% Home range
- 95% Home range

Cibo Total Standing Dry Matter Estimate

- < 500
- 500-1000
- 1000-1500
- 1500-2000
- 2000-2500
- 2500-3000
- 3000-4000
- 4000 - 5000
- 5000 - 6000
- 6000 - 7000
- 7000 - 8000
- > 8000

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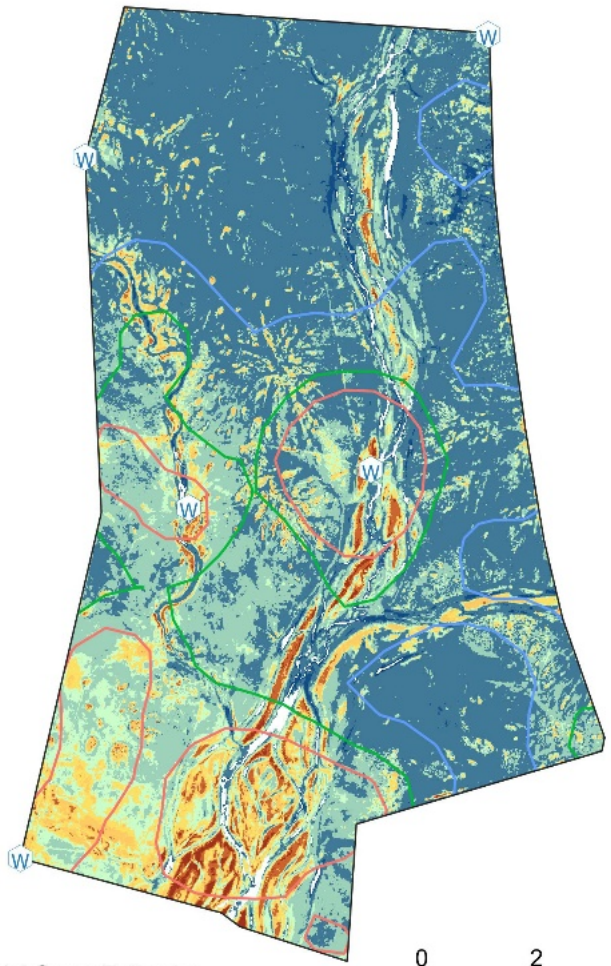
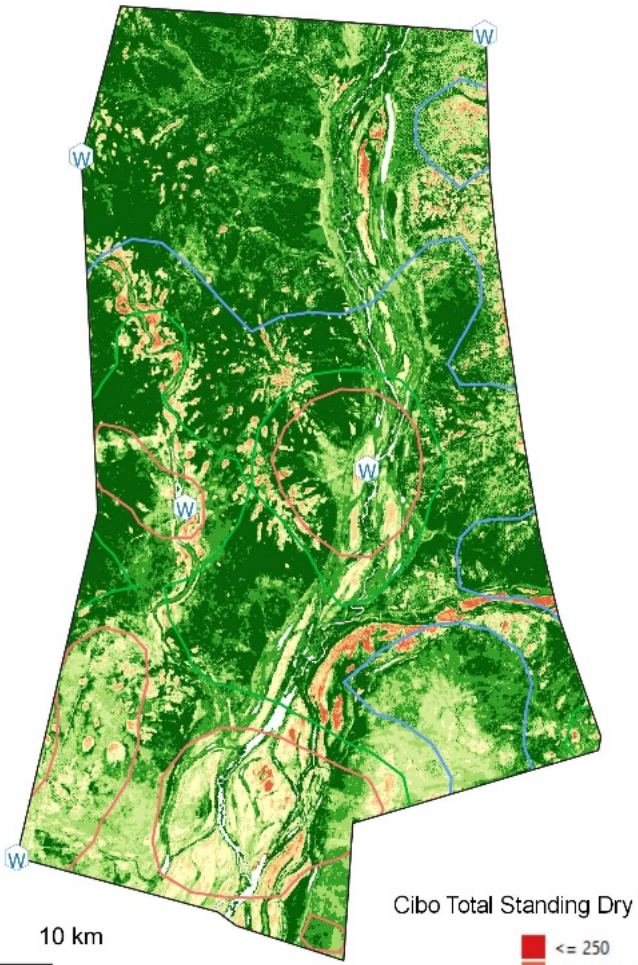
Rocklands Station- Big Mudgee Paddock February 2022





Cibo Total Cover Estimate

- <= 10% Total Cover
- 10 - 20
- 20 - 30
- 30 - 40
- 40 - 50
- 50 - 60
- 60 - 70
- 70 - 80
- 80 - 90
- > 90

0 2 4 6 8 10 km

Animal Home Range Percentile Contours

- 50% Home range
- 75% Home range
- 95% Home range

Cibo Total Standing Dry Matter Estimate

- <= 250
- 250 - 500
- 500 - 750
- 750 - 1000
- 1000 - 1250
- 1250 - 1500
- 1500 - 1750
- 1750 - 2000
- 2000 - 3000
- 3000 - 4000
- > 4000

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What does this data mean?

- Stocking rate reductions in Grassy paddock in 2021 may have impacted the productivity differences observed between the paddocks
- Cattle that are walking further to access feed and water expend more energy doing that therefore less energy goes into reproduction, which could result in lower productivity
- Utilisation rate was around 13.5%, and not at 20%, meaning that we may not be seeing the full impact of differences in watered areas

Take home messages

- There are many factors that influence performance including paddock and management factors- what can we control?
- There is a lot more work to do in this space- results from this study have raised a lot more questions around how animals use paddocks
- A lower utilisation rate may mitigate the impacts of poorly watered paddocks on reproductive performance

Thank you

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