

meatup FORUM

For the latest in red meat R&D

Near-Real-Time Pasture Monitoring For Every Producer

Nation to paddock in a couple of “clicks”

Phil Tickle

Cibo Labs

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World-Leading Science, Profitable Farms, Sustainable Landscapes

Cibo Labs is bringing new and more effective approaches to the monitoring and management of Australia's grazing lands.

Our goal is to underpin more profitable farms and more sustainable landscapes.

- *How many kg of available pasture do I have per paddock?*
- *How many grazing days do I have ahead of me with no rain?*
- *What are my ground cover levels, and how do they compare to last month?*
- *How is my land condition tracking relative to regional benchmarks?*

Creating the environment for a producer to bring together information on productivity, profitability and natural capital at paddock or property scales every week or month for a fraction of current costs.

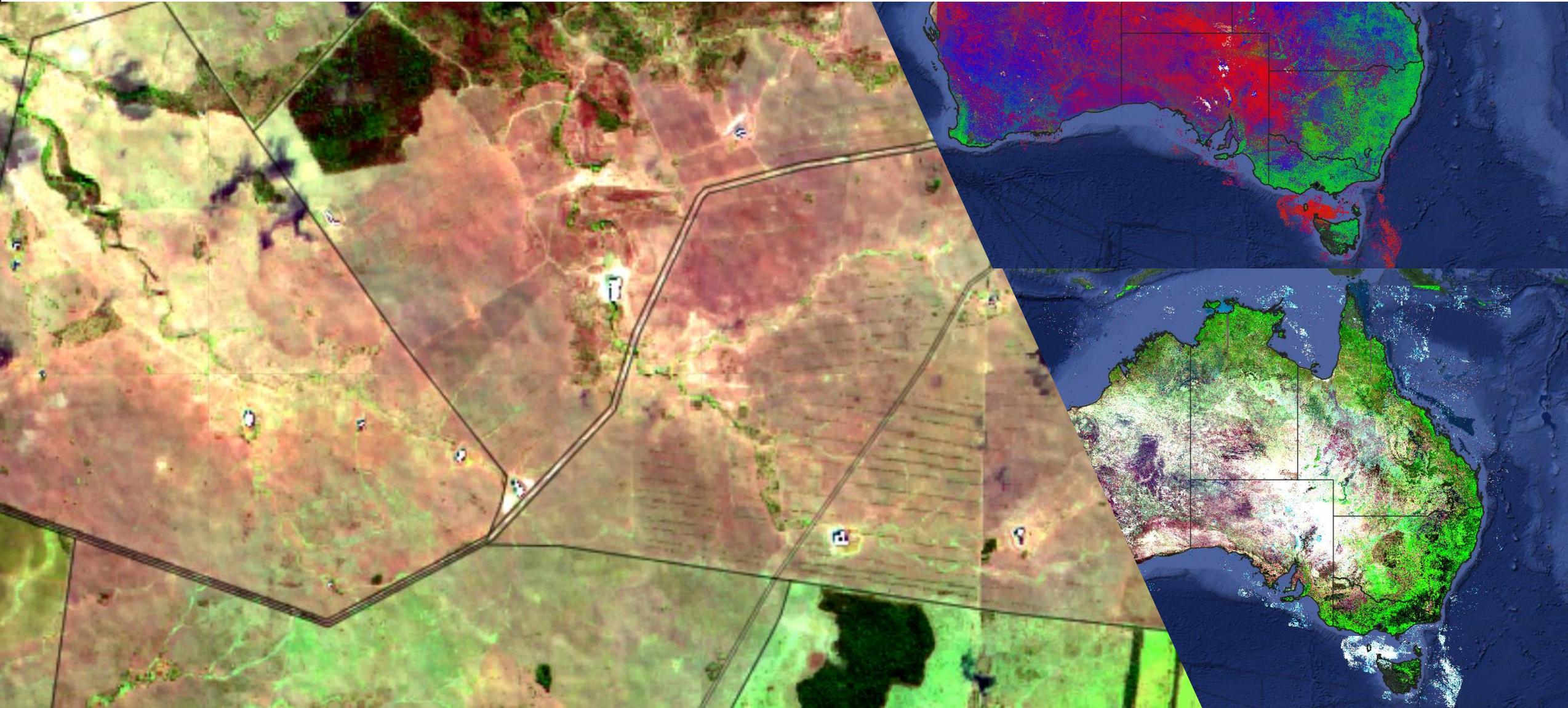
Collaborating with other specialist service providers to deliver seamless information to producers

40 million hectares and counting per week.

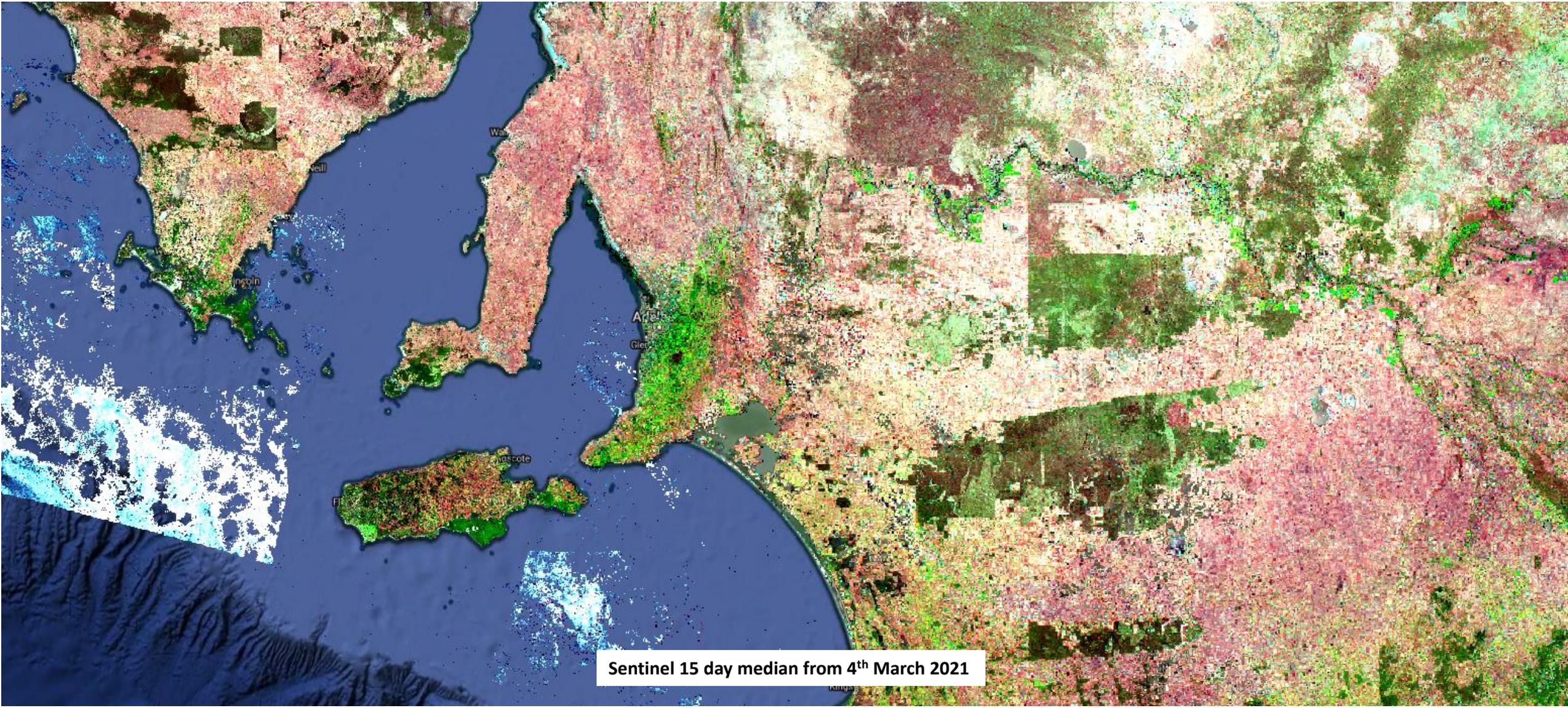


Helping make decisions less complicated, more profitable, lower risk and more sustainable

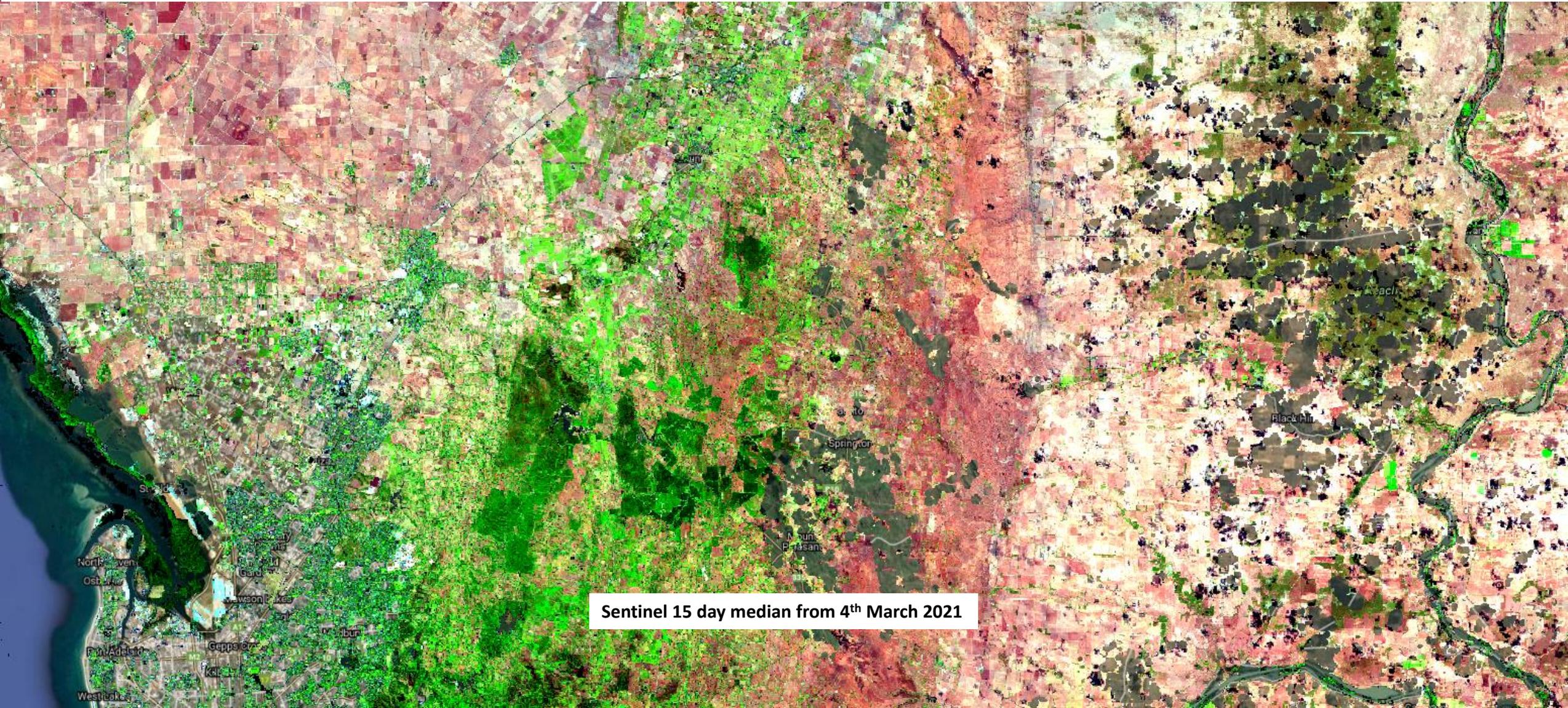
Seamless nation to paddock satellite imagery every 5 days (or daily if you need it)



Seamless nation to paddock satellite imagery every 5 days (or daily if you need it)



Seamless nation to paddock satellite imagery every 5 days (or daily if you need it)



Sentinel 15 day median from 4th March 2021

Seamless nation to paddock satellite imagery every 5 days (or daily if you need it)



Sentinel 15 day median from 4th March 2021

Seamless nation to paddock satellite imagery every 5 days (or daily if you need it)



Novatel Barossa

Sentinel 15 day median from 4th March 2021

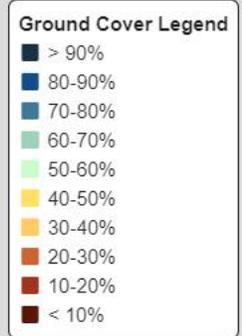
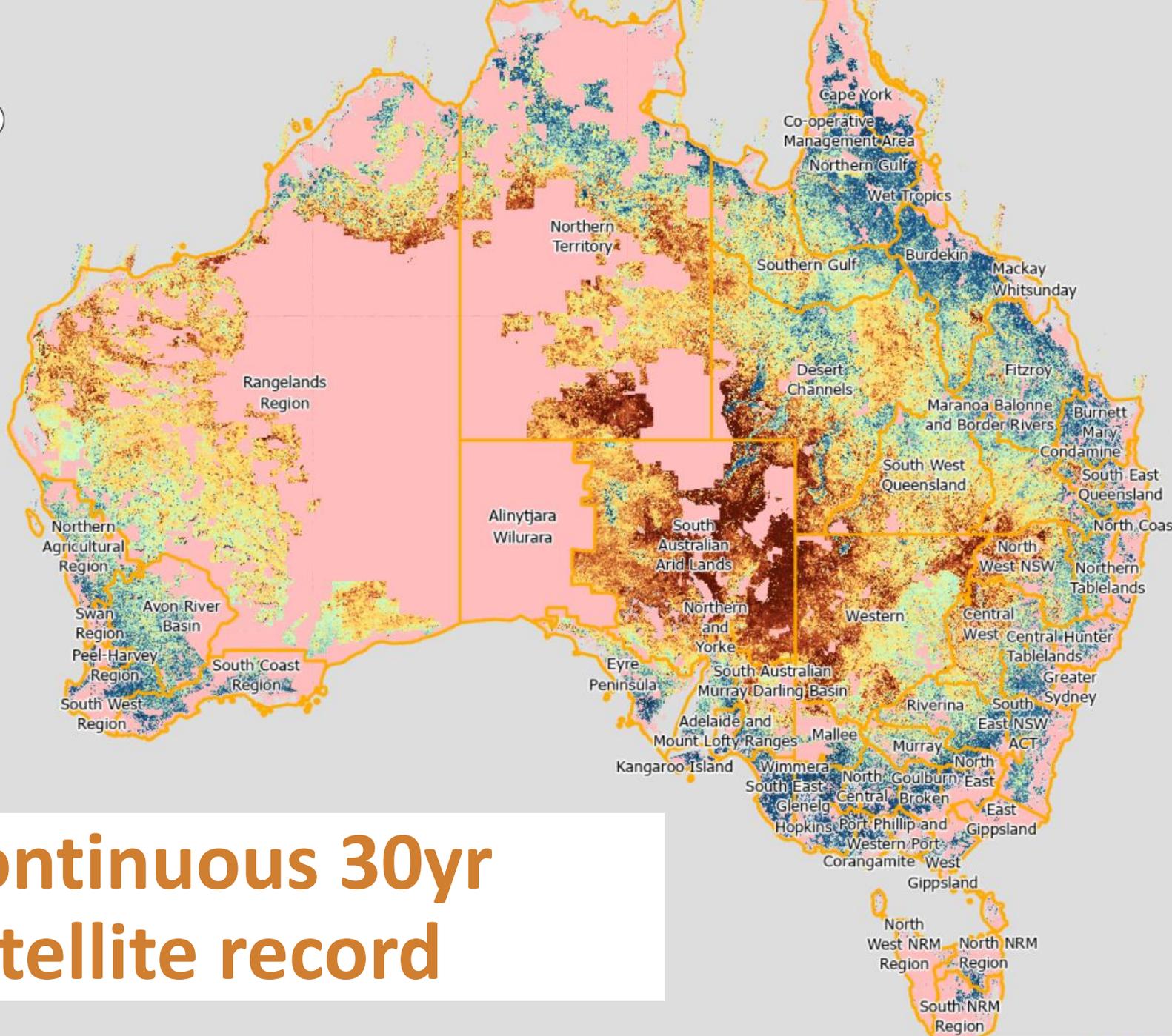
[CLICK HERE](#)



Date: 2020-06



Search...



Continuous 30yr satellite record

1000 km



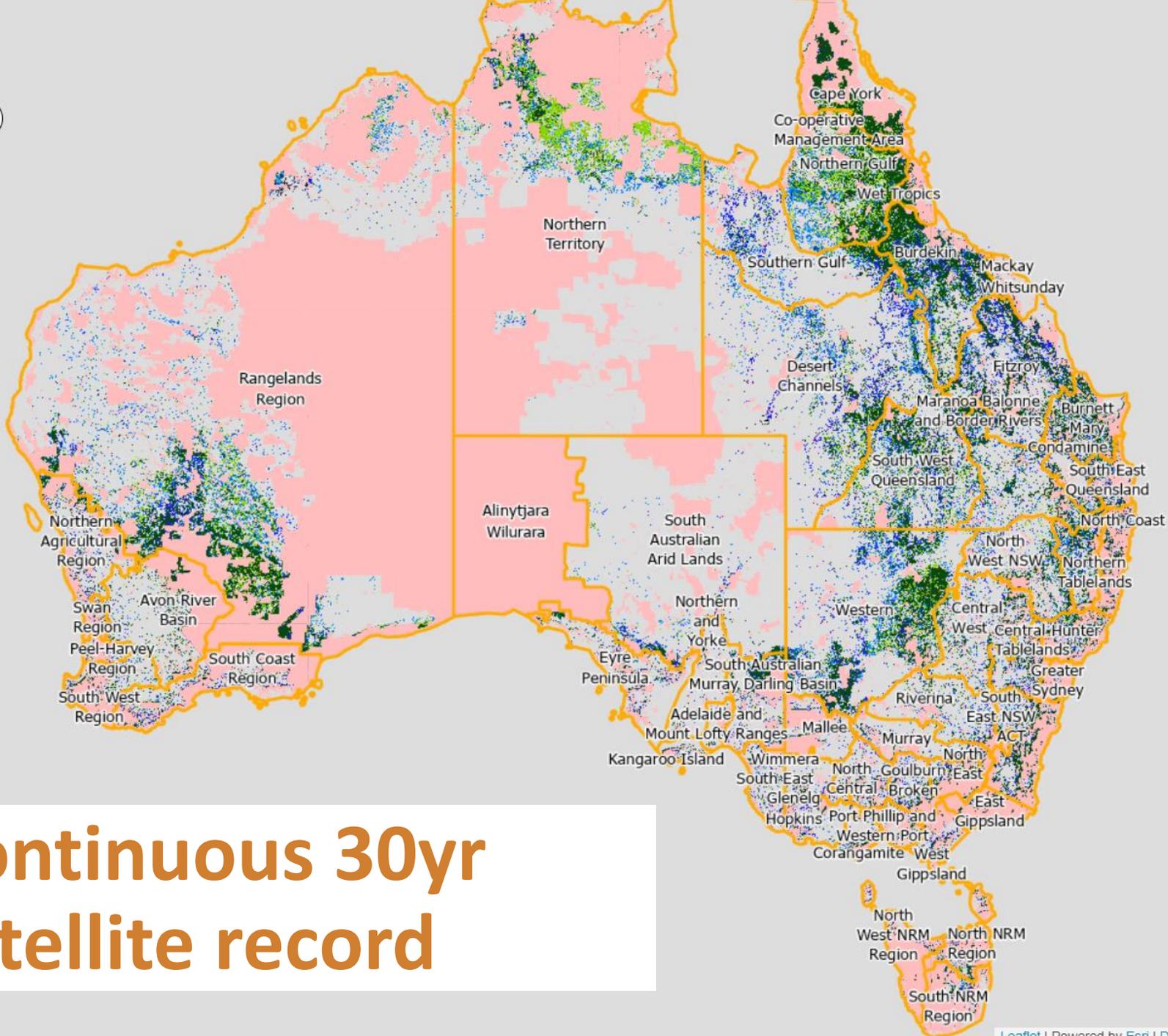
[CLICK HERE](#)



Date: 2018-2019



Search...



Woody Cover Legend

- Primary Forest (no change)
- Primary Woodland (no change)
- Primary Woodland to Primary Forest
- Primary Forest to Primary Woodland
- Secondary Forest (no change)
- Secondary Woodland (no change)
- Secondary Woodland to Secondary Forest
- Secondary Forest to Secondary Woodland
- Primary Forest to Non Woody
- Primary Woodland to Non Woody
- Secondary Forest to Non Woody
- Secondary Woodland to Non Woody
- Non Woody -> Secondary Forest
- Non Woody -> Secondary Woodland

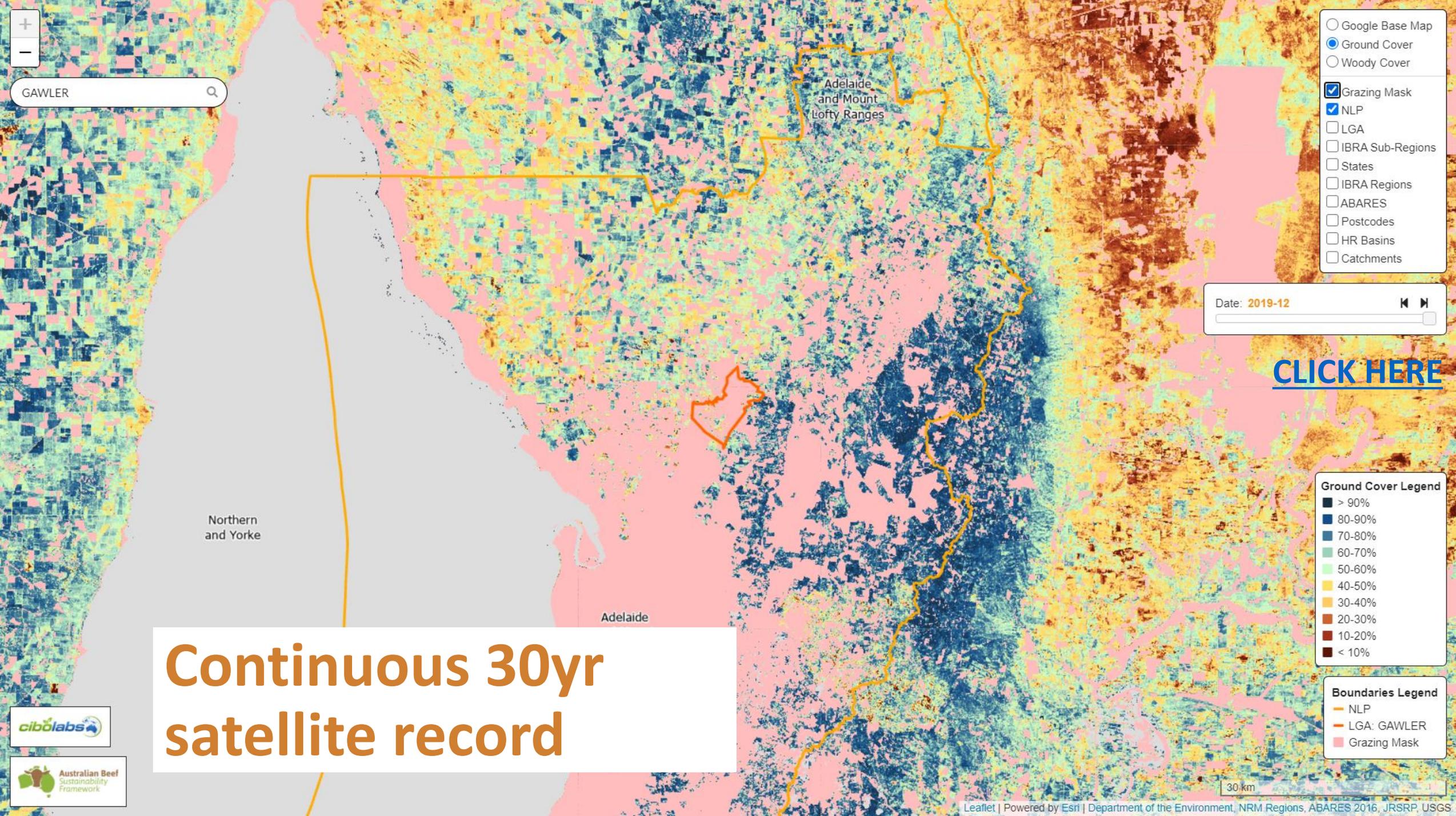
Boundaries Legend

- NLP
- Grazing Mask

Continuous 30yr satellite record

1000 km





GAWLER

- Google Base Map
- Ground Cover
- Woody Cover
- Grazing Mask
- NLP
- LGA
- IBRA Sub-Regions
- States
- IBRA Regions
- ABARES
- Postcodes
- HR Basins
- Catchments

Date: 2019-12

◀ ▶

Progress bar

[CLICK HERE](#)

Northern and Yorke

Adelaide and Mount Lofty Ranges

Adelaide

Continuous 30yr satellite record

- Ground Cover Legend**
- > 90%
 - 80-90%
 - 70-80%
 - 60-70%
 - 50-60%
 - 40-50%
 - 30-40%
 - 20-30%
 - 10-20%
 - < 10%

- Boundaries Legend**
- NLP
 - LGA: GAWLER
 - Grazing Mask

30 km



[CLICK HERE](#)



Date: 2018-2019



GAWLER



Adelaide and Mount Lofty Ranges

Northern and Yorke

Adelaide

- Woody Cover Legend**
- Primary Forest (no change)
 - Primary Woodland (no change)
 - Primary Woodland to Primary Forest
 - Primary Forest to Primary Woodland
 - Secondary Forest (no change)
 - Secondary Woodland (no change)
 - Secondary Woodland to Secondary Forest
 - Secondary Forest to Secondary Woodland
 - Primary Forest to Non Woody
 - Primary Woodland to Non Woody
 - Secondary Forest to Non Woody
 - Secondary Woodland to Non Woody
 - Non Woody -> Secondary Forest
 - Non Woody -> Secondary Woodland

- Boundaries Legend**
- NLP
 - LGA: GAWLER
 - Grazing Mask

30 km

Continuous 30yr satellite record





Vegetation Trends Dashboard 2020
Woody Changes Summary - Page 1

[Next Page](#)

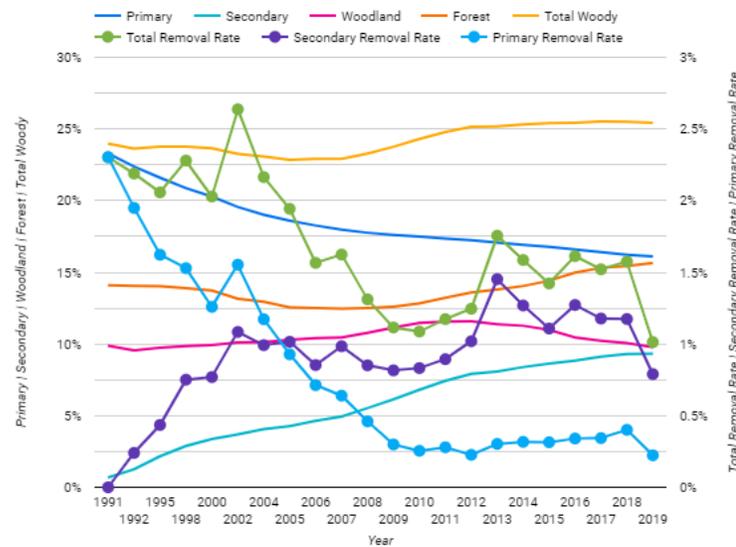
The land parcels used to calculate the statistics in this dashboard can be filtered using the nine regional filters on the right. To reset a filter to include all possibilities, click on the filter, then click the minus symbol in its top left corner.

A forest is defined as woody vegetation with a minimum 20% canopy cover (CC), potentially reaching 2 meters high and a minimum area of 0.2 hectares. Sparse woody is defined as woody vegetation with a canopy cover between 5-19%. Primary forest ($\geq 20\%CC$) or woodland (5-19%CC) is defined as woody vegetation present in 1988. Secondary forest or woodland has been disturbed at anytime post-1988. "Woody" is inclusive of both forest and woodland.

Total Hectares Selected
485.1M

Total Land Parcels
1.3M

- NLP
- Local Government Area
- IBRA Region
- IBRA Sub-Region
- Post Code
- State / Territory
- Basin
- River Region
- Is in RFA



The left y-axis in the above chart represents the percentage of area belonging in the corresponding category. A value of 20% for primary indicates that 20% of the area is classified as primary woody.

Measure	17/18	18/19	10-Year Annual Averages (2009-2018)	10-Year Annual Averages (2010-2019)
National Woody Cover Gain	3.07%	1.73%	3.76%	3.51%
National Forest Cover Gain	1.19%	0.75%	1.59%	1.49%
National Woodland Cover Gain	5.88%	3.23%	6.44%	6.03%
National Woody Cover Loss	-3.15%	-2.02%	-2.84%	-2.82%
National Forest Cover Loss	-1.60%	-1.15%	-1.46%	-1.43%
National Woodland Cover Loss	-5.48%	-3.36%	-4.58%	-4.59%
National Woody Cover Extent	-0.08%	-0.29%	0.92%	0.69%
National Forest Cover Extent	0.90%	1.31%	2.13%	2.19%
National Woodland Cover Extent	-1.56%	-2.75%	-0.65%	-1.27%

The below table is comparing the date period:
(Month and Day choice do not matter)

Jan 1, 2017 - Jan 1, 2018

State / Territory	NLP	Total Woody Area Change	Total Woody Area Change (Ha)	Primary Woody Area Change	Primary Woody Area Change (Ha)
ACT	ACT	5.64%	1,000	-0.03%	-3
NSW	Central Tablelands	2.61%	20,022	-0.3%	-1,508
NSW	Central West	0.57%	9,683	-1.88%	-20,085
NSW	Greater Sydney	0.09%	75	-0.37%	-206
NSW	Hunter	-0.13%	-957	-0.91%	-4,170
NSW	Murray	4.68%	20,895	-0.84%	-1,847
NSW	North Coast	2.04%	11,418	-0.52%	-1,953
NSW	North West NSW	0.92%	17,907	-1.13%	-12,366
NSW	Northern Tablelands	4.98%	72,927	-0.28%	-2,603
NSW	Riverina	4.08%	30,657	-1.09%	-4,307
NSW	South East NSW	1.57%	23,871	-0.26%	-2,872
NSW	Western	-0.24%	-25,499	-0.86%	-58,523
NT	Northern Territory	-1.89%	-197,123	-1.78%	-124,962
QLD	Burdekin	0.38%	33,342	-0.42%	-27,810
QLD	Burnett Mary	-0.33%	-7,379	-0.75%	-12,678

[CLICK HERE](#)

- Data summarised or stored for every land parcel >1ha
- Dominant land use to identify parcels with potential to be grazed

MyFarmKey – A Verifiable Digital Record for every Farm

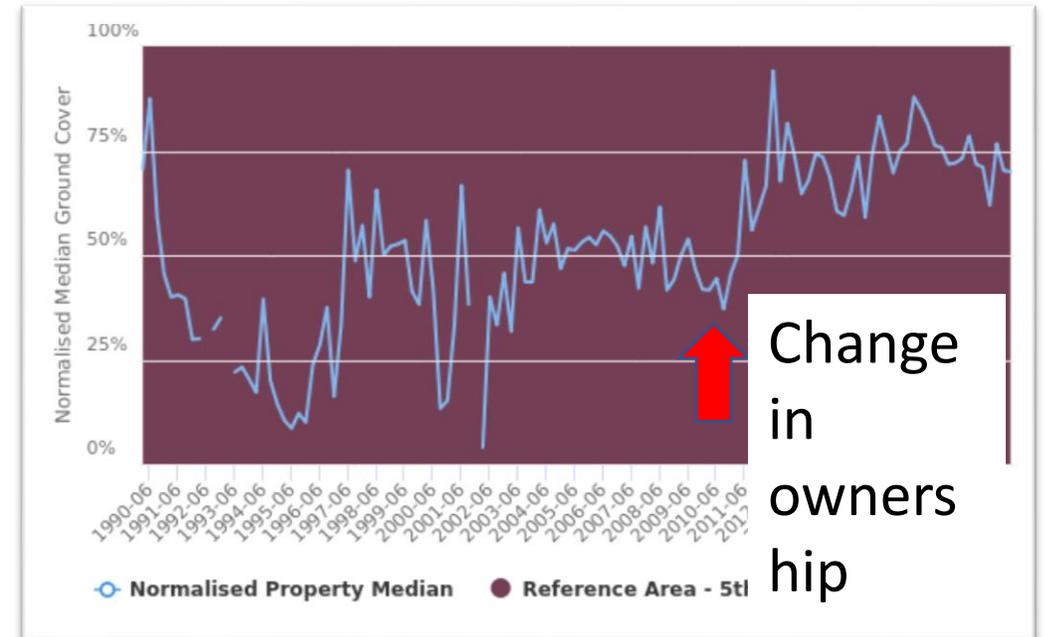
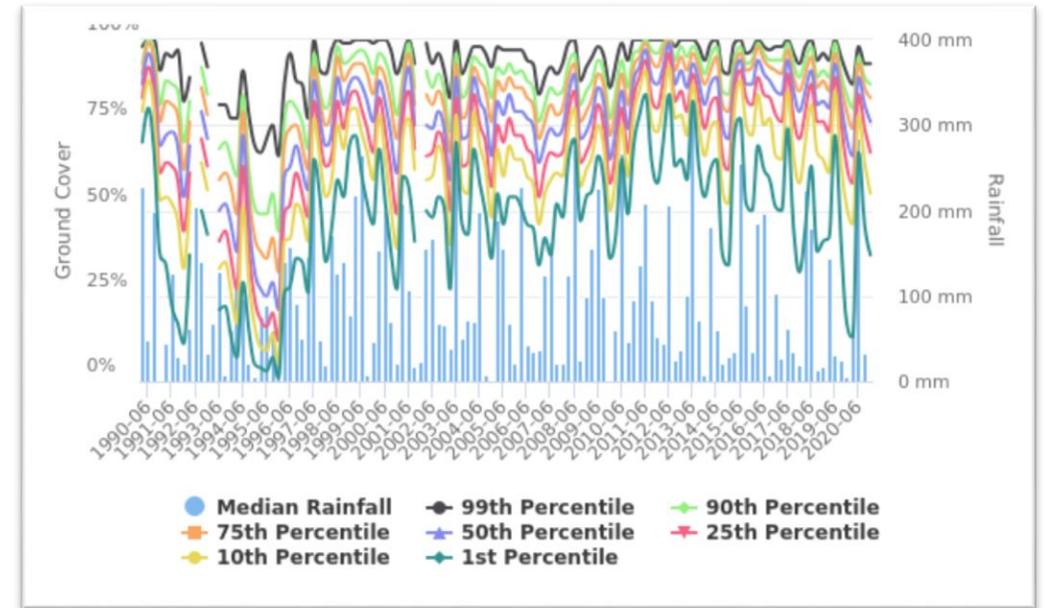
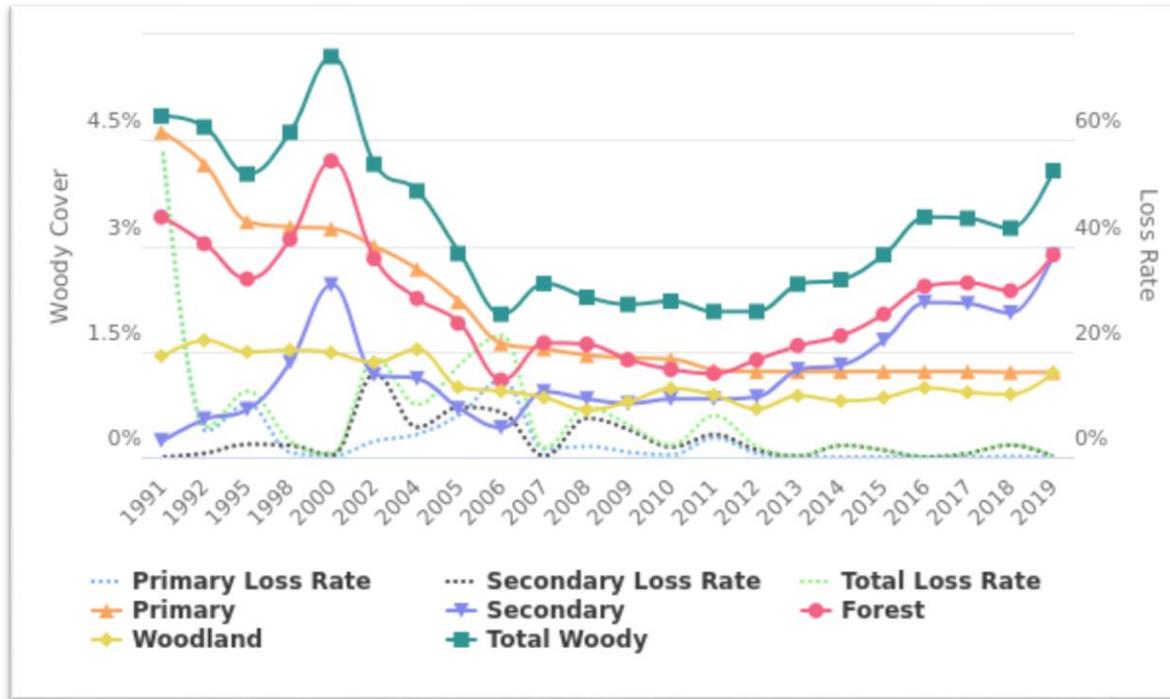
The screenshot displays the 'My Properties' section of the MyFarmKey web application. It features two property cards. The first card is for 'Malanga', with address 'Malanga, 845 Bimbil Road, Thallon QLD 4497, Australia'. The second card is for 'RawdonVlaeEast'. Each card includes a 'Verify with LPA' button and a list of management actions: 'Add Owner Details', 'Edit Property', 'Add Property Key to Cart', and 'Delete'.

The screenshot shows the 'Benchmarking' section of the MyFarmKey web application. It features a satellite map of a farm area with several land parcels outlined in orange. Each parcel is labeled with a unique identifier, such as '10803048', '91/WAL53633', '10803157', '92/WAL53633', '57/WV943', '93/WV943', '10803081', '93/WV943', '10779102', '10779040', '10803117', '52/WV489', '56/WV367', '45/WV146', '46/WV86', '47/WV86', '48/WV85', '33/WV85', and '54/WV528'. The interface includes a 'Chosen property' dropdown set to 'Lorraine', an 'Auto-Select Tool' button, and a section for 'Optional: Visualise Data' with a dropdown menu currently set to 'Woody Cover'.

*Personal, business, front-gate address, land parcels boundaries, land title and LPA credentials integrated into single, verified digital record
Solves the PIC Register problem and delivers immediate value to the producer.*

www.cibolabs.com.au/myfarmkey

MyFarmKey – 30 years of satellite data products and auditable reports in a few minutes



MyFarm Mapper

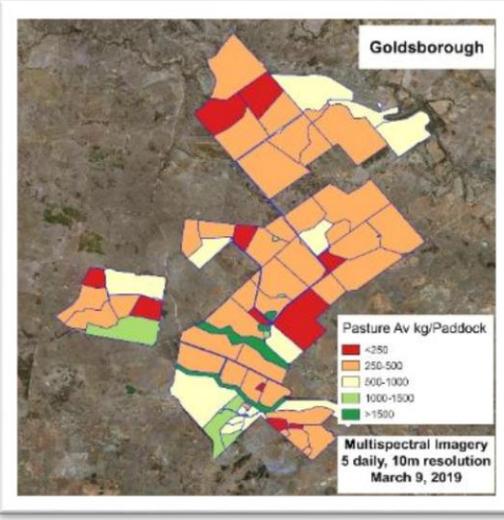
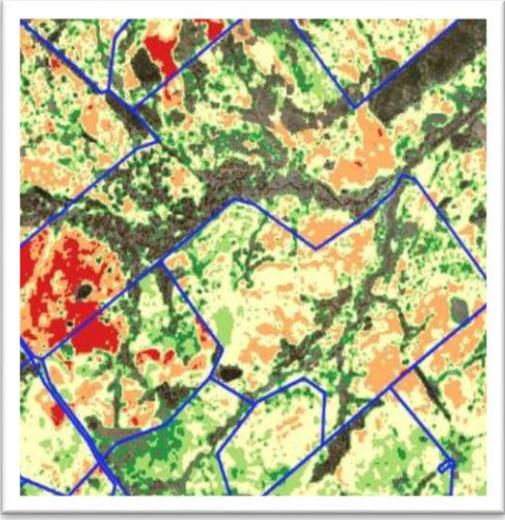
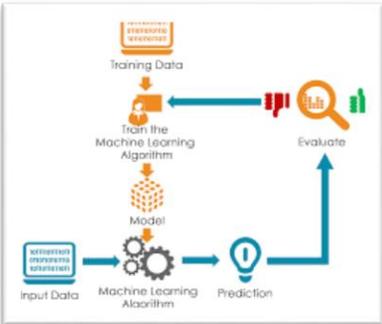
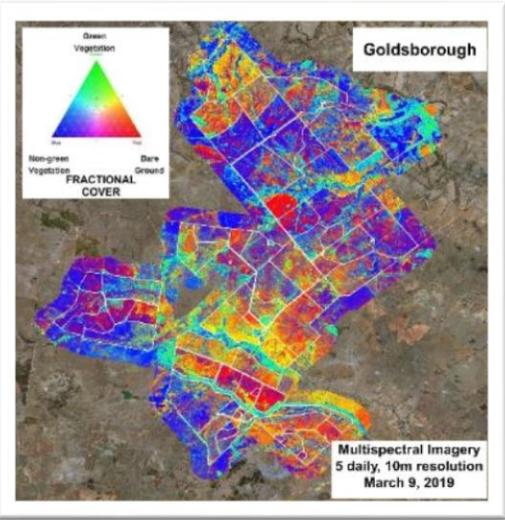
Lack of consistent, high quality farm mapping is a major barrier to technology adoption and system integration

The screenshot displays the MyFarm Mapper web application interface. At the top, the title "MyFarm - Property Mapper" is shown, powered by WebApp Builder. The interface includes a search bar with the text "Find address or place" and a search icon. A legend on the left side lists various farm features and their corresponding symbols:

- Legend:**
 - Emergent Site (yellow triangle with exclamation mark)
 - Fuel Tank (orange fuel tank icon)
 - Gravel Pit (brown gravel pit icon)
 - Mine (yellow triangle with exclamation mark)
 - Mine shaft (red exclamation mark icon)
 - Rubbish Tip (yellow trash can icon)
 - Washdown Area (blue water tap icon)
- MyFarm Water:**
 - Bore (blue location pin icon)
 - Pump (blue pump icon)
 - Tank (blue tank icon)
 - Dam (blue dam icon)
 - Earth Tank (blue earth tank icon)
 - Trough (blue trough icon)
 - Watering Hole (blue watering hole icon)
- MyFarm Piping:**
 - Bore Drain (blue line)
 - Irrigation Channel (pink line)

The map shows a farm layout with various infrastructure elements overlaid on a satellite view. A red line outlines the farm boundary. A yellow dashed line indicates a specific area. Blue lines represent bore drains, and pink lines represent irrigation channels. Various icons representing farm features are scattered across the map. The map includes a scale bar (2km) and coordinates (149.248 -22.640 Degrees). The interface also features navigation controls (zoom in/out, home, refresh) and utility icons (print, full screen). The bottom of the screen shows a navigation menu with the following items: 1. Property Mapper (selected), 2. Projects Management, 3. Select and Download, 4. Ground Cover Change Map, a. Biomass Tools, b. Benchmarking Tools, and c. Advanced Mapper. The bottom right corner indicates "Last update: a minute ago".

Integrated Pasture Assessment and Prediction



Time-series satellite imagery scout maps to optimise field pasture assessments

Directed in-paddock sampling. Detailed pasture yield assessments. Dedicated data collection Apps

5 daily time-series satellite data. Machine Learning based on field data. A “living laboratory” based on producer and Cibo data.

Estimates of pasture biomass for every paddock every 5-15 days. No “black boxes”

Estimates of Feed on Offer for every paddock, property and the company every 5,15-30 days

Objective, repeatable, extendable, defensible...doable, time-saving, cost-effective

- Google Hybrid
 - Esri World
 - Open Street Map
 - Landsat Seasonal Ground Cover
 - Sentinel Seasonal Fractional Cover
 - No background
- CiboLabs Bounds 2021-03-01
 - CiboLabs FOO 2021-03-01
 - CiboLabs Display 2021-03-01
 - CiboLabs Fractional Cover 2021-03-01
 - CiboLabs Total Cover 2021-03-01
 - CiboLabs NDVI 2021-03-01
 - CiboLabs TSDM 2021-03-01
 - CiboLabs Monthly Change 2021-03-01

1.2Mha every 5 days

Connells Lagoon Conservation Reserve



CIBO1185-

- Google Hybrid
- Esri World
- Open Street Map
- Landsat Seasonal Ground Cover
- Sentinel Seasonal Fractional Cover
- No background

- CiboLabs Bounds 2021-02-26
- CiboLabs FOO 2021-02-26
- CiboLabs Display 2021-02-26
- CiboLabs Fractional Cover 2021-02-26
- CiboLabs Total Cover 2021-02-26
- CiboLabs NDVI 2021-02-26
- CiboLabs TSDM 2021-02-26
- CiboLabs Monthly Change 2021-02-26



7,000ha every 5 days



1 km

CIBO1185-

- Google Hybrid
- Esri World
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- CiboLabs Bounds 2021-02-26
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- CiboLabs NDVI 2021-02-26
- CiboLabs TSDM 2021-02-26
- CiboLabs Monthly Change 2021-02-26

7,000ha every 5 days



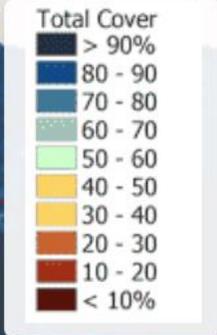
1 km

CIBO1185-

- Google Hybrid
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7,000ha every 5 days



1 km

CIBO1185-

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- CiboLabs Monthly Change 2021-02-26

7,000ha every 5 days

NDVI is not a robust predictor of biomass outside peak growth

NDVI

-  Water
-  Bare
-  Low
-  Medium
-  High
-  Very High



1 km

CIBO1185-

- Google Hybrid
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- CiboLabs Monthly Change 2021-02-26

7,000ha every 5 days



TSDM

Low
Medium
High



CIBO1185-

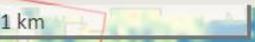
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- CiboLabs Monthly Change 2021-02-26

7,000ha every 5 days



Change	
Red	Large Loss
Orange	Loss
Yellow	No Change
Green	Gain
Blue	Large Gain



3rd Party System integration.

“Live FOO” to Agriwebb

CIBO1142 [XX](#)

Gates are open
E14, E10, C42, E4, C37, C41, C47, C46, C52, C51, E15, E19, E20, E5 [View all connecting gates](#)

STATE
Grazing

TYPE
Natural grasses

TOTAL HEAD
22
1538 across 15 paddocks

TOTAL LSU
28.6
1,544.6 LSU across 15 paddocks

STOCKING RATE
0.1 LSU / ha

FEED ON OFFER
1,614.4 kg DM / ha
1,559.1 kg DM / ha across 15 paddocks

GRAZING DAYS REMAINING
100+ across 15 paddocks

PASTURE GROWTH RATE
No records

ARABLE OR GRAZABLE AREA
1,559.3 ha
22,344.4 ha across 15 paddocks

TOTAL AREA
1,559.3 ha
22,344.4 ha across 15 paddocks

WITHHOLDING PERIOD
Not within withholding

Mobs | History | All

Mobs in E9, E14, E10, C42, E4, C37, C41, C47, C46, C52, C51, E15, E19, E20, E5

Heifers
Brahman - 19 months old [View Details](#)

MOB SIZE
1516

AVERAGE LSU
1

AVERAGE WEIGHT
330 kg

SCORE
N/A

ESI
None

WHP
None

Herd Bulls
Brahman - 3 years 4 months old [View Details](#)

MOB SIZE
22

AVERAGE LSU
1.3

AgriWebb

- Google Hybrid
- Open Street Map
- Landsat Seasonal Ground Cover
- Sentinel Seasonal Fractional Cover
- No background
- CiboLabs Bounds 2020-05-24
- CiboLabs FOO 2020-05-24
- CiboLabs Display 2020-05-24
- CiboLabs Fractional Cover 2020-05-24
- CiboLabs NDVI 2020-05-24
- CiboLabs TSDM 2020-05-24
- CiboLabs Monthly Change 2020-05-24

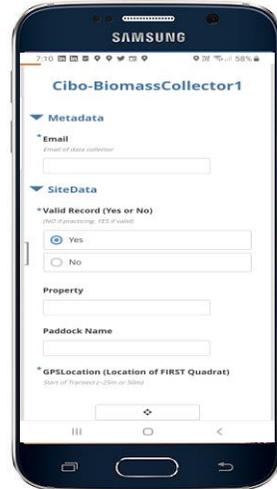
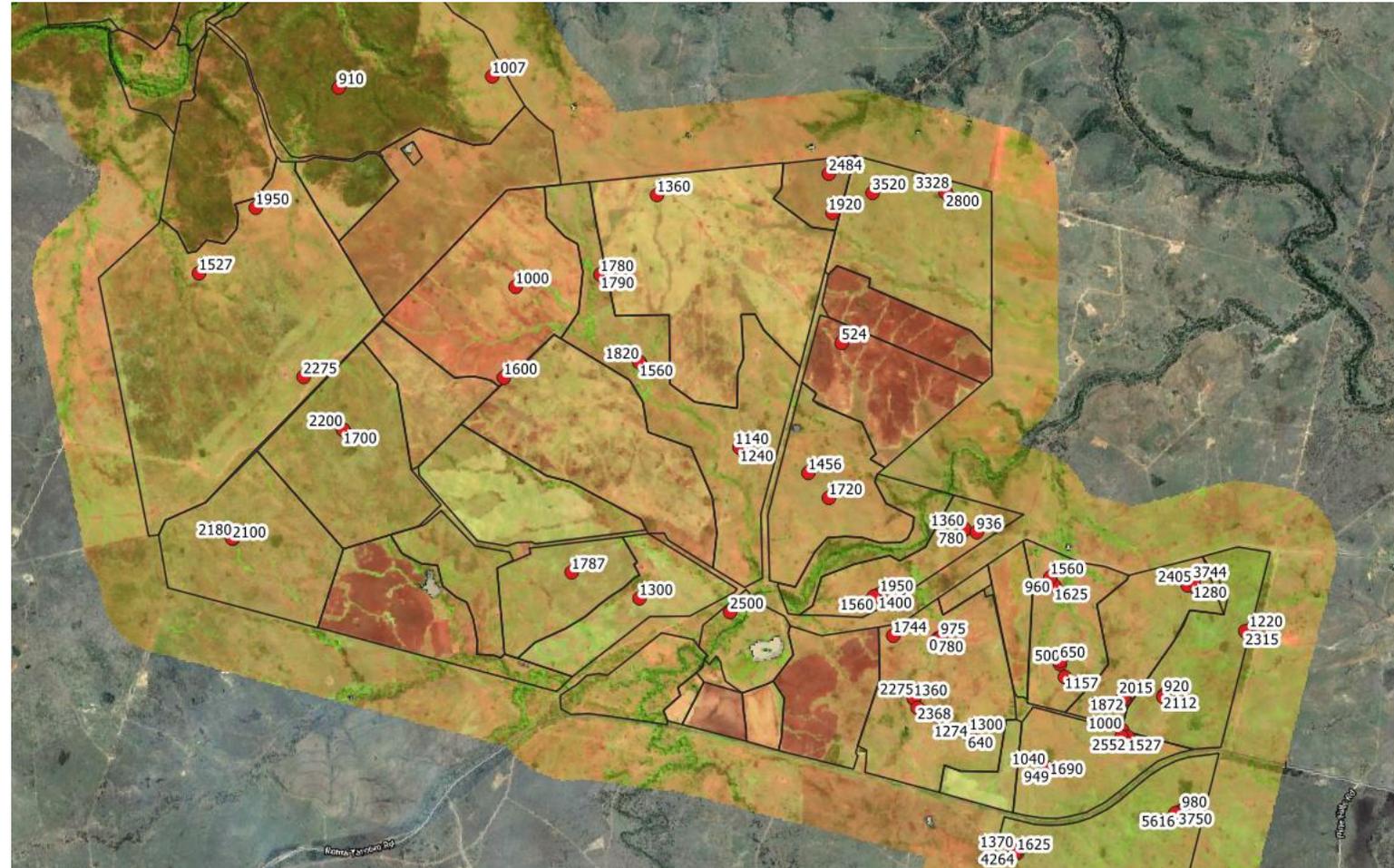
Mooramong

TSDM: 2895 kg/ha
Food on offer: 1249 tonnes DM
Date: 2020-05-24
Valid data: 100% of paddock

Paddock	Landtype	Hectares	TSDM20200524
Mooramong	Hard gidgee	2722	1655
Mooramong	Jump-ups	1302	2805
Mooramong	Open alluvial plains	1774	1928
Mooramong	Open downs	2050	2356
Mooramong	Pebbly downs	430	1991
	Paddock Level	8278	2128

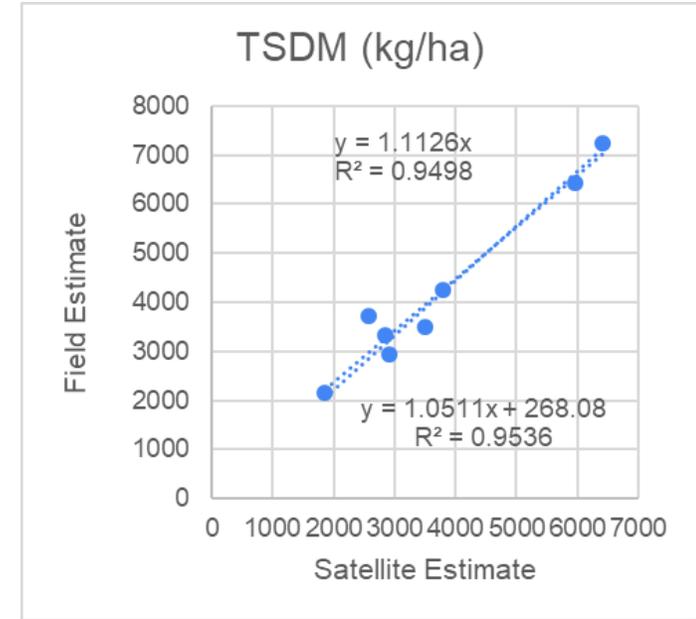
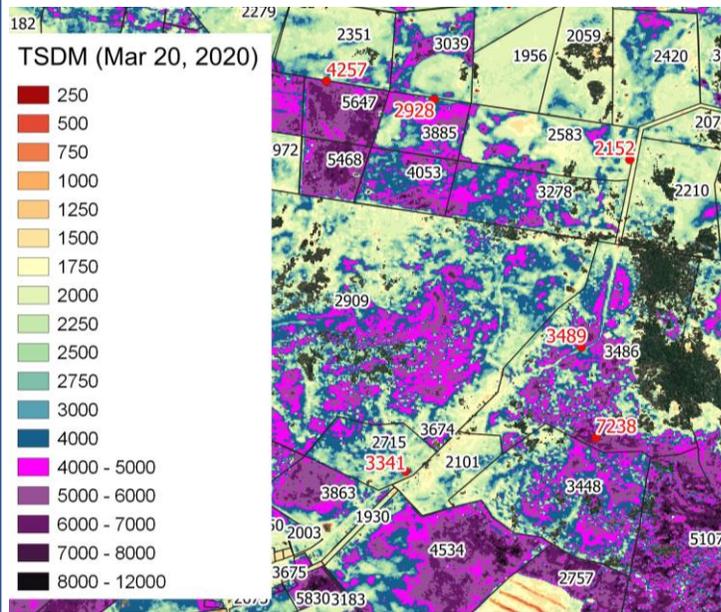


Intensive and extensive field data collection by Cibo Labs and producers to calibrate and validate predictions

A large spreadsheet table with many columns and rows of data. The columns include various numerical and categorical data points, likely representing field measurements and metadata. The table is densely packed with information.

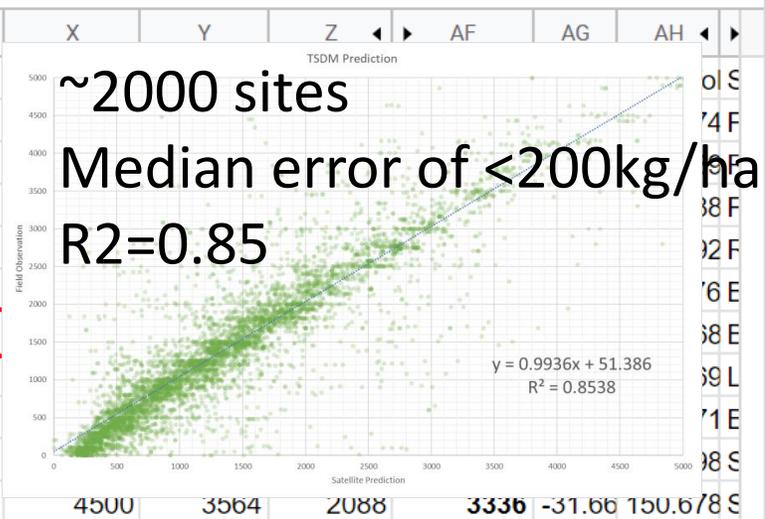
So How Good Are The Biomass Predictions?

Independent client validation PRIOR to Local calibration



fx 150.678319

	L	M	N	O	P	Q	R	S	T	U	V	W
1	Endtime	Valid	Prop Paddock	SiteInfo	SiteInfoL	SiteInfo	SiteInfo	SiteImage	PastureImage	quadrat1	quadrat2	
2	04/07/2020 01:15	Yes	Warr End of Lane	-31.642	150.674	405.58	5	https://cibolabs.a	https://cibolabs.a	5972	1048	
3	04/07/2020 02:15	Yes	Warr Mailboy	-31.639	150.689	539.85	5	https://cibolabs.a	https://cibolabs.a	8320	7244	
4	04/07/2020 02:48	Yes	Warr Mailboy	-31.632	150.688	462.02	5	https://cibolabs.a	https://cibolabs.a	3315	2731	
5	04/07/2020 04:23	Yes	Warr Patersons	-31.617	150.692	421.07	5	https://cibolabs.a	https://cibolabs.a	1980	2070	
6	04/07/2020 04:48	Yes	Warr Sudax	-31.613	150.676	420.37	5	https://cibolabs.a	https://cibolabs.a	3889	1352	
7	04/07/2020 05:14	Yes	Warr Treeless	-31.611	150.668	432.95	5	https://cibolabs.a	https://cibolabs.a	5584	4472	
8	04/08/2020 00:24	Yes	Winc Sth Gangat	-31.658	150.369	377.80	5	https://cibolabs.a	https://cibolabs.a	6200	7100	
9	04/08/2020 01:07	Yes	Winc Sth Windy Ridge	-31.645	150.371	364.43	5	https://cibolabs.a	https://cibolabs.a	4698	4428	
10	04/16/2020 01:37	Yes	Warr Middle Heifer Nth	-31.600	150.698	386.38	5	https://cibolabs.a	https://cibolabs.a	2490	2310	
11	04/16/2020 05:37	Yes	Warr Ryegrass	-31.663	150.678	383.82	5	https://cibolabs.a	https://cibolabs.a	2892	3912	



Publicly Available and Secure Mobile Pasture Apps

7:54 Pasture Biomass Collector

Transect Sampling Type *
Default is 'Dry Matter' sampling

Wet Weight Sample Dry Weight Sample
 Platemeter Sampling

Transect Image *
Take photo looking along intended direction of Transect

Quadrat Size *
Default is '0.25' sampling

0.25 Quadrat Used 0.10 Quadrat Used

▼ Transect Quadrats

Pasture Image
Optional - photo looking down (at elbow height) for paddock surface

TSDM (kg/Ha) *
Total Standing Dry Matter as kg/Ha estimate for location

Estimate Pasture Height (cm)

✓

7:55 Pasture Biomass Collector

WALK TO THE NEXT LOCATION BEFORE CLICKING '+' BUTTON

Walk to next location BEFORE clicking the '+' button, as this will record the GPS coordinates

▶ Auto Populated (read only)

1 of 1

Count of Quadrat(s) *
Minimum of 5 points (view only)

0

Average TSDM (kg/Ha) for Transect
Average calculated based on transect point data (view only)

Average Pasture Height (cm)
Pasture Height (Average of Transect)

▼ Site Information

Dominant Species *
Please use the common name of species. If ground use 'Bare' and if not listed use 'Other'

✓

7:55 Pasture Biomass Collector

▼ Site Information

Dominant Species *
Please use the common name of species. If ground use 'Bare' and if not listed use 'Other'

Co-dominant Species
Please use the common name of species

Sub-dominant Species
Free text for multiple pasture names (separate with comma)

Unpalatable Species (%)
Percentage of Total DM that is Unpalatable Species (Average of Site)

0 100

Unpalatable 3P Species (%)
Percentage of Total DM that is old, rank 3P biomass (Average of site)

0 100

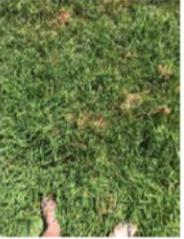
✓

- Available for free
- Data owned by the producer
- Cibo provide secure access to owners data
- Cibo licenced for internal uses and model development.

“Intelligent” photo library being developed

Pasture Biomass Image Library - Achilles Hill.
Submitted By: nhenry@cibolabs.com.au - Submitted Time: February 23, 2021 11:18 AM

Dominant Species: Kikuyu with Co-dominant: Low-THC Hemp	
Sample Id	Kk001
Sample Type	Low
Quadrat Green Fraction (%)	90
Pasture Height (cm)	70 cm
Wet Weight (grams)	140
Dry Matter (%)	45
TSDM (kg/ha)	2,360



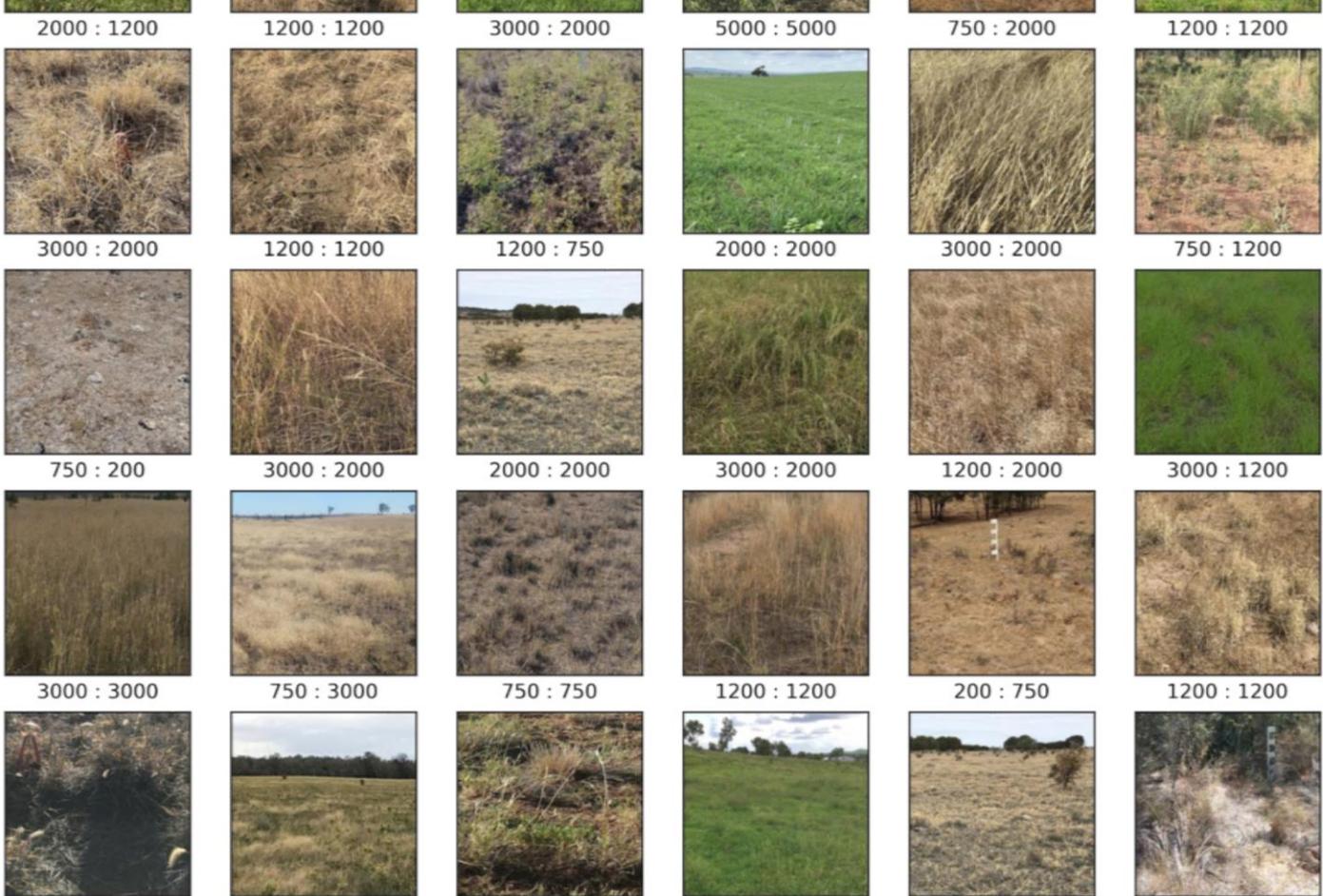
Dominant Species: Kikuyu with Co-dominant: Low-THC Hemp	
Sample Id	Kk002
Sample Type	Moderate
Quadrat Green Fraction (%)	25
Pasture Height (cm)	51 cm
Wet Weight (grams)	200
Dry Matter (%)	70
TSDM (kg/ha)	5,360



Dominant Species: Kikuyu with Co-dominant: Low-THC Hemp	
Sample Id	Kk003
Sample Type	High
Quadrat Green Fraction (%)	30
Pasture Height (cm)	83 cm
Wet Weight (grams)	300
Dry Matter (%)	65
TSDM (kg/ha)	7,560



Photo reference in on device



2000 : 1200 1200 : 1200 3000 : 2000 5000 : 5000 750 : 2000 1200 : 1200

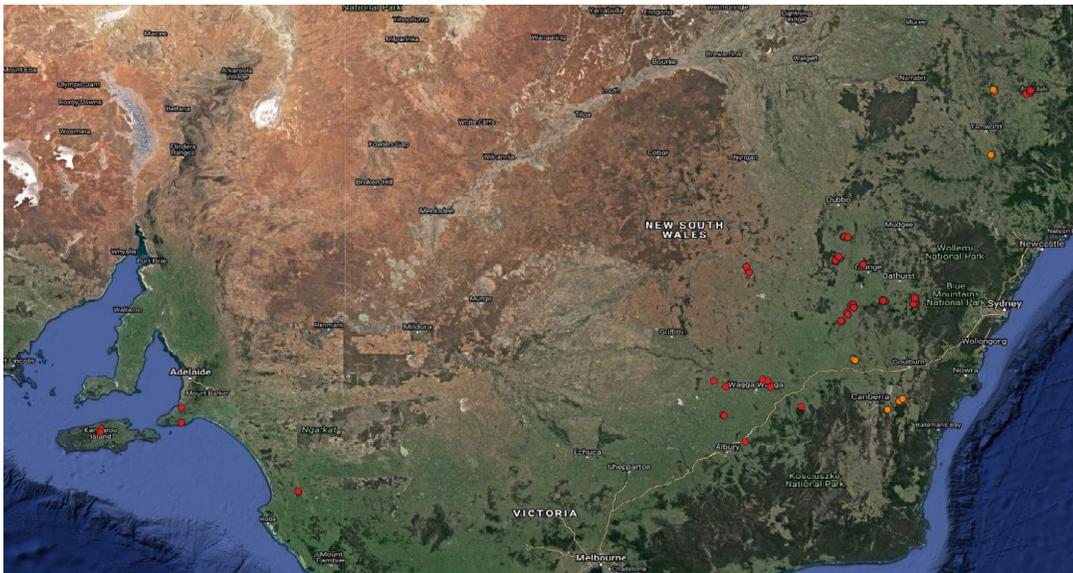
3000 : 2000 1200 : 1200 1200 : 750 2000 : 2000 3000 : 2000 750 : 1200

750 : 200 3000 : 2000 2000 : 2000 3000 : 2000 1200 : 2000 3000 : 1200

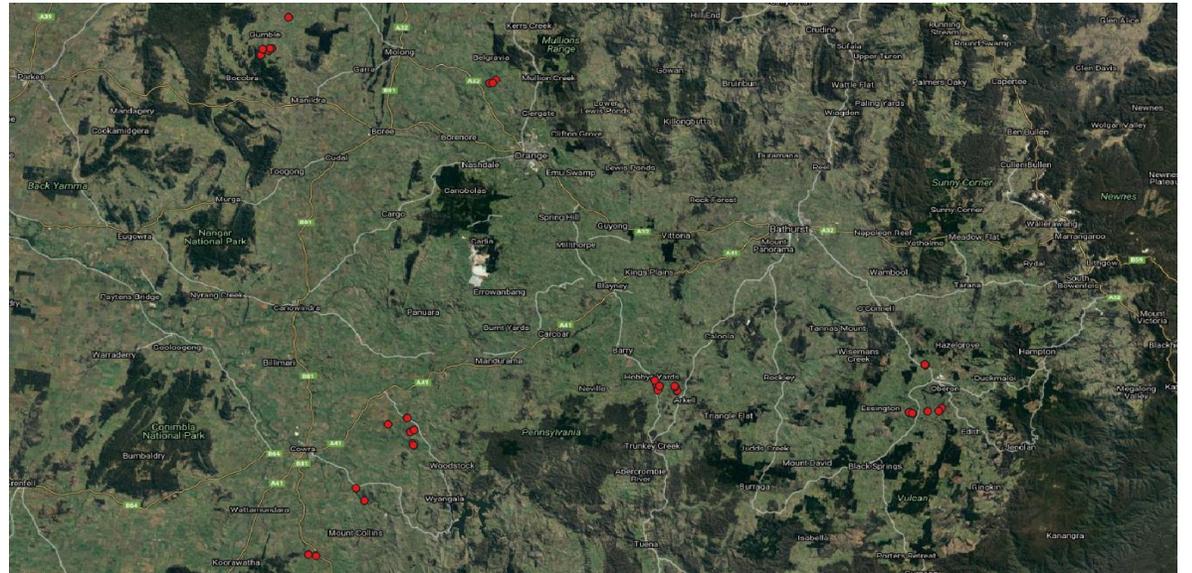
3000 : 3000 750 : 3000 750 : 750 1200 : 1200 200 : 750 1200 : 1200

Computer Vision being developed to predict biomass directly from smart device

Complete revision of southern model underway



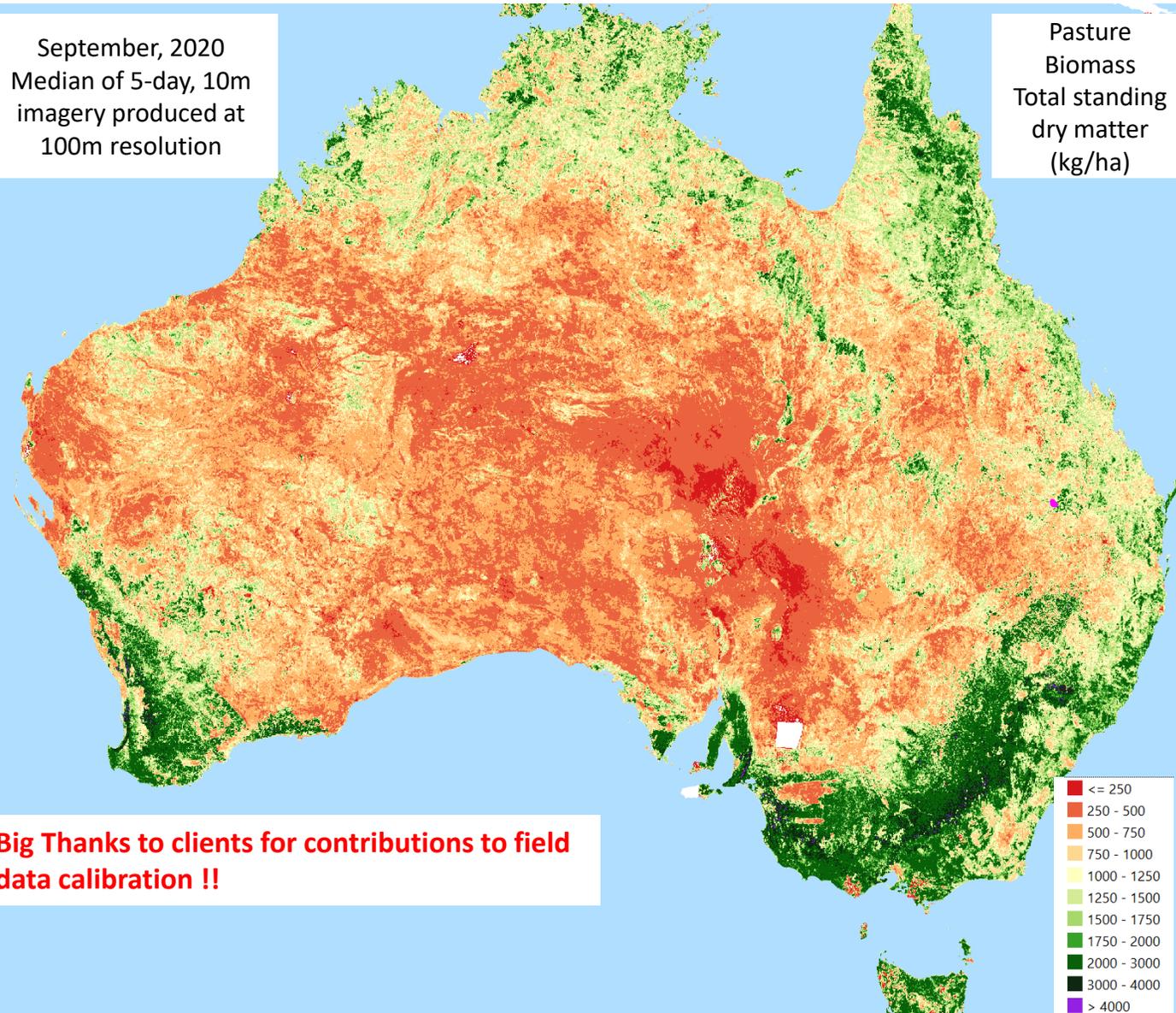
- Southern model currently under-predicting due to “drought data”
- ~1000 additional pasture site collected through collaboration 2018-20, including ~500 during cracker 2020 season
- Integrated northern and southern model planned for mid-2021



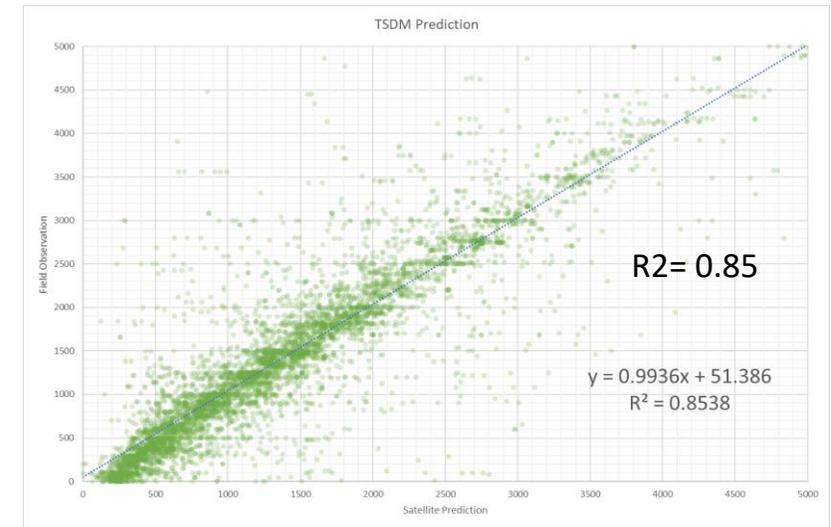
Paddock to Nation Biomass Predictions every month

September, 2020
Median of 5-day, 10m
imagery produced at
100m resolution

Pasture
Biomass
Total standing
dry matter
(kg/ha)



- ~2000 northern pasture sites
- Sentinel-2, 10 bands + woody density
- 50% of the data held back for cross validation
- Median error of 190kg/ha
- Notice woody cover effects minimised



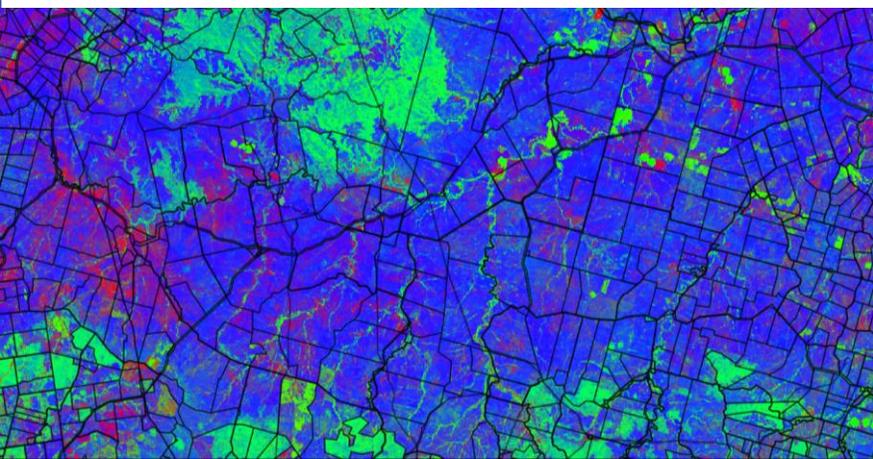
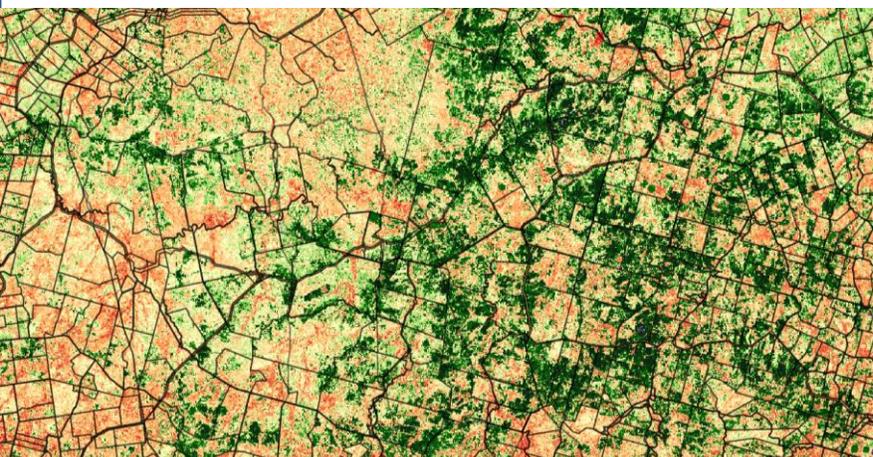
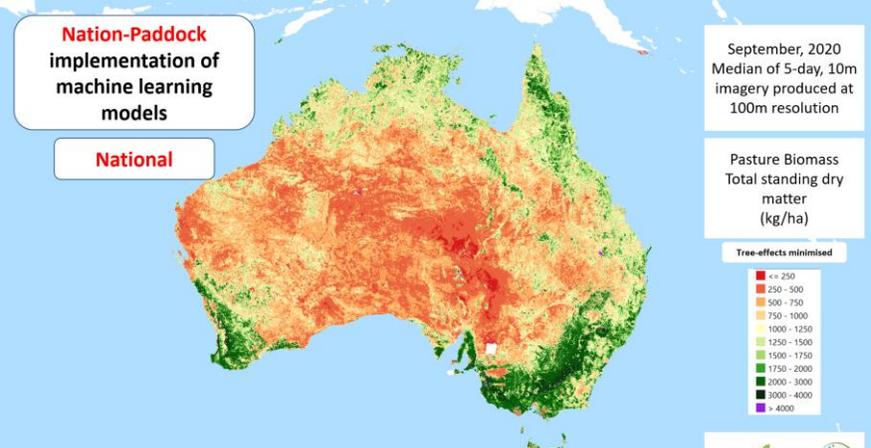
Big Thanks to clients for contributions to field data calibration !!



Satellite Assisted Forage Budgeting

Take control of your stocking rates





Take Home Messages

- We have demonstrated the ability to seamlessly scale from paddock to national levels. Commercial service likely to exceed 50 Mha per week of paddock level predictions.
- National monthly 1ha national biomass and fractional cover products coming in 2021 and has the ability to provide data services to other government platforms.
- On-demand access to RS products for every property in Australia is here through the MyFarmKey. Benchmarking Tree cover, ground cover, carbon potential and pasture biomass.
- MyFarmKey outcomes the limitations of the PIC register and offers immediate value to a producer.
- The old “research paradigms” of often no longer valid – Cibo Labs uses a “living laboratory approach”.
- There are no excuses for not using GPS-based mobile apps.
- Research organisations need to stop using publicly funded research to compete against and duplication industry capabilities that are rapidly developing as largely self-funded commercial services developed in partner with producers. Collaborate...DON’T duplicate.
- Ongoing and increasing collaborative projects focused on both innovation and adoption through B2B collaboration is where value will be generated.
- Still plenty of work to do:
 - Commencing work in pasture quality, land condition and automated land type prediction.
 - Integrated forage budgeting tools
- PGS Satellite Assisted Forage Budgeting program is ready to role out but needs to engage with more with southern providers (post-COVID)
- Expanding carbon and sustainability accreditation products rapidly developing.
- Access to standaised digital farm mapping is a huge barrier to adoption and system integration.

We still need to get the SIMPLE THINGS RIGHT

Thanks for your time



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