# Total vegetation cover soil protection Region:LGA Mackay\_(R) QLD

# **Date: November 2023**

This report describes vegetation protecting the soil surface from erosion during a chosen month compared to previous years. This report has been generated using MODIS fractional vegetation cover information available in Rangelands and Pasture Productivity (RAPP) map tool https://map.geo-rapp.org/#australia. The report is based on 500 metre pixel data on monthly time steps. Land use forest cover:

Results can be shown for the whole region (polygon), and separated by land use and forest cover classes which are likely to show different cover patterns and targets. Land use is divided into four broad classes: Conservation and natural environments, Agriculture, production native forests and plantation forests (no report), and other (no report). Agriculture is divided into grazing, crops and horticulture which are sub-divided into non-irrigated and irrigated. If forest is present land use is further divided into: non-forest, woodland forest and non-woodland forest. The area of each land use and forest class are shown as a map and chart. The report content is repeated for each land use and forest covers at least 1% of the area of the chosen region. Total vegetation Cover:

The total vegetation cover indicates where soil is likely to be protected from wind and or water hillslope erosion. Total vegetation cover for this month is shown on a map and chart classified into 4 classes.

• 71-100% High cover - protected from wind and usually water erosion (high rainfall, steep slopes, and erodible soils may need greater than 80, 90, 95 and up to 100% cover)

- 51-70% Moderate cover protected from wind erosion
- 31-50% Low cover not protected
- 0-30% Very Low cover not protected

Erosion protection: Wind erosion 50% total vegetation cover

The vegetation cover threshold required to prevent soil erosion is usually 50% to reduce wind erosion, 70% or 80% to reduce water (hillslope) erosion depending on the steepness and rainfall. Areas protected from erosion for the month:

- Map: water erosion protection (>70% cover) percentage area and hectares.
- Map: wind erosion protection (>50% cover) percentage area and hectares. Comparison with previous years:
  - Map: anomaly comparing this month to the average cover from the same month in previous years.
  - Map: deciles rank of month against the same month in previous years.

Anomalies and deciles until September 2019 are calculated comparing to the same months 2001 to 2019. Extra monthly data will be used to calculate anomalies and deciles post September 2019 as they become available. Time series monthly from January 2001 to current:

### **Erosion protection**

- Wind erosion protection time series: percentage of the area of the region with greater than 50% cover for each month (orange lines). Horizontal lines are 10th (cover target) and 50th percentiles.
- Water erosion protection time series: percentage of the area of the region with greater than 70% cover for each month (blue line). Horizontal lines are 10th (cover target) and 50th percentiles.

### Rainfall

• Millimetres rainfall each month (black line).

Each time series is also stacked by year. The black line shows the current year of data. Water erosion protection for higher rainfall and steeper slopes:

Water erosion protection on higher slopes. As slope increases, more cover is required to control water erosion. The thresholds reported are:

- the percentage area with pixels greater than 80% total cover.
- the percentage area with pixels greater than 90% total cover.
- the percentage area with pixels greater than 95% total cover.

### Acknowledgment of data:

- 1. http://www.agriculture.gov.au/abares/aclump/land-use/alum-classification
- 2. http://www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018
- 3. https://www.dpi.nsw.gov.au/agriculture/pastures-and-rangelands/establishment-mgmt/production-management2/groundcover
- 4. MODIS Fractional cover algorithm:

https://doi.org/10.4225/08/5848a3f19a7b3



# **Vegetation Cover Nov 2023**

#### Land use and forest cover

#### Proportion of each land class in area



pixel is from

is, red pixels are about 20%

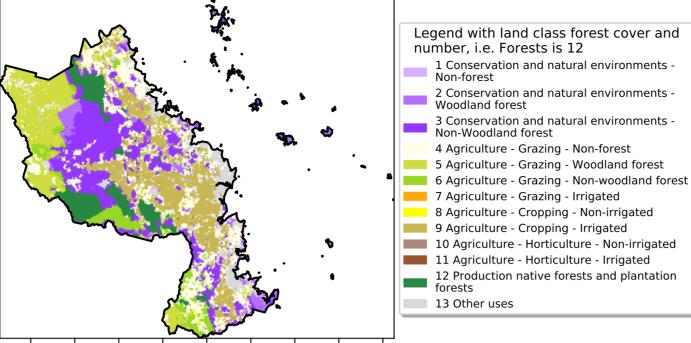
lower than the

mean of that

is only for the

using baseline from 2001 to

2019.



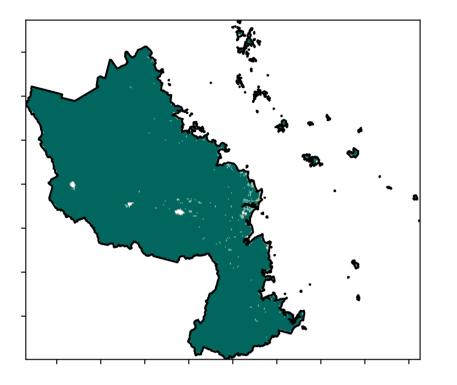
12%200%

· 52% 70%

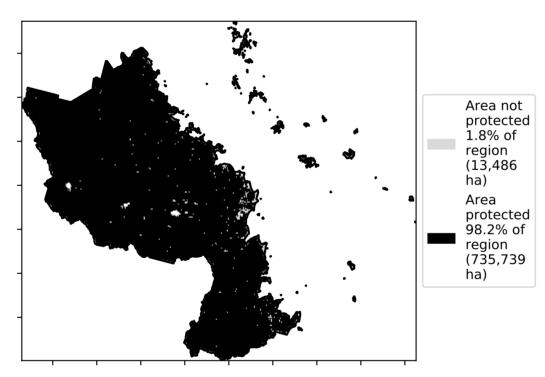
320050010

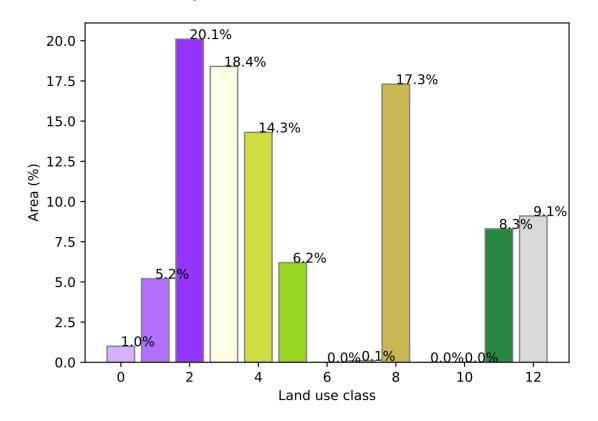
0.30%

#### **Total Vegetation Cover [%]**

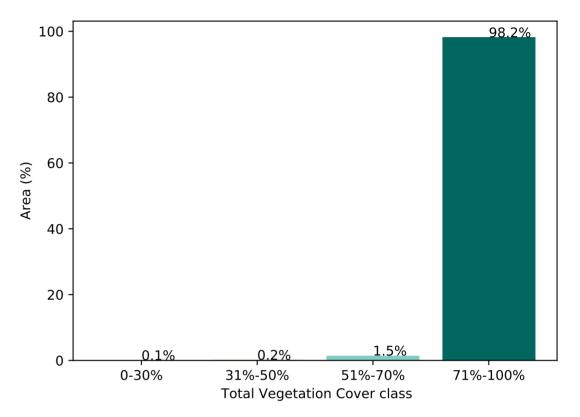


#### % Area protected from water erosion (>70%)

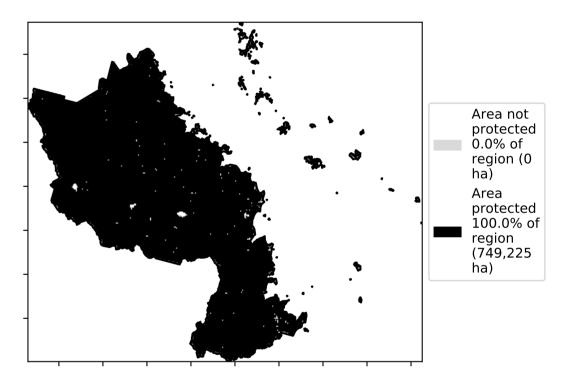




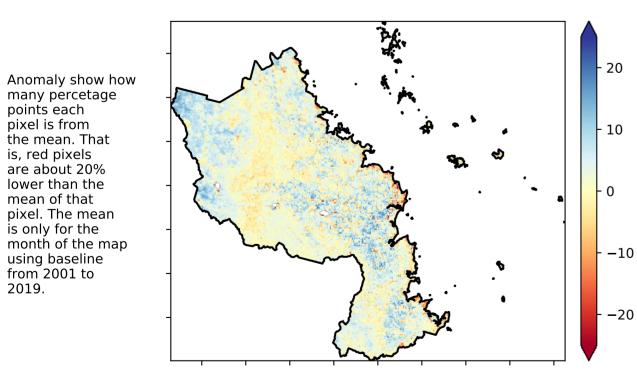
#### Proportion of vegetation cover class in area



#### % Area protected from wind erosion (>50%)

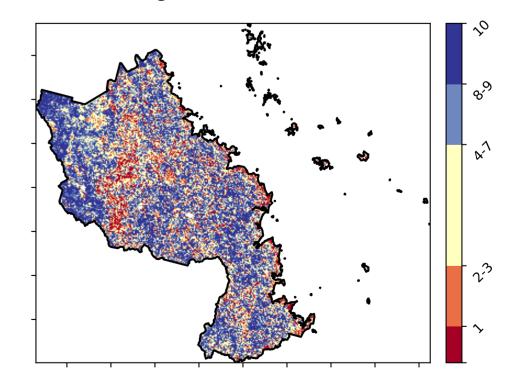


**Total Vegetation Cover Anomaly [%]** 

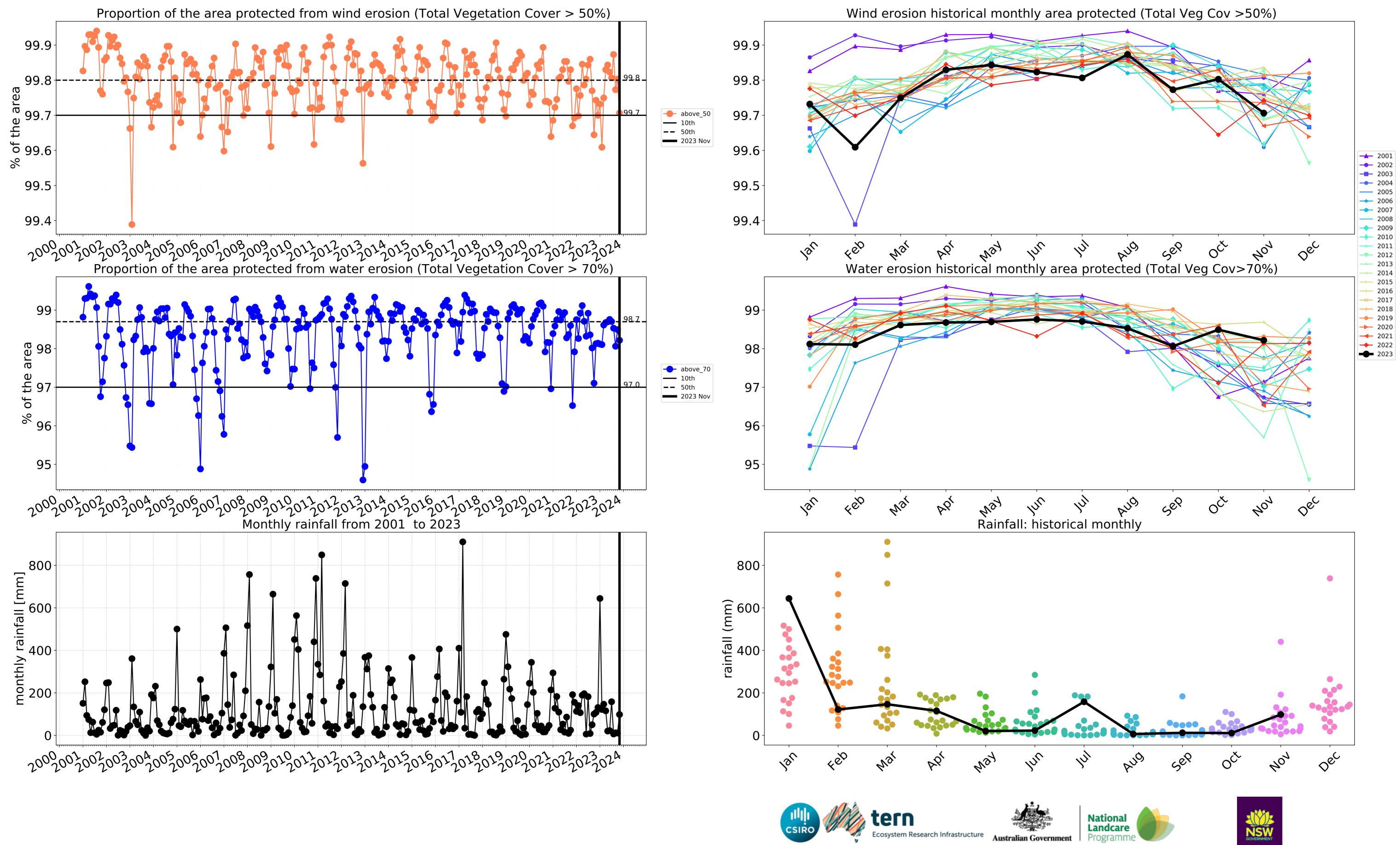


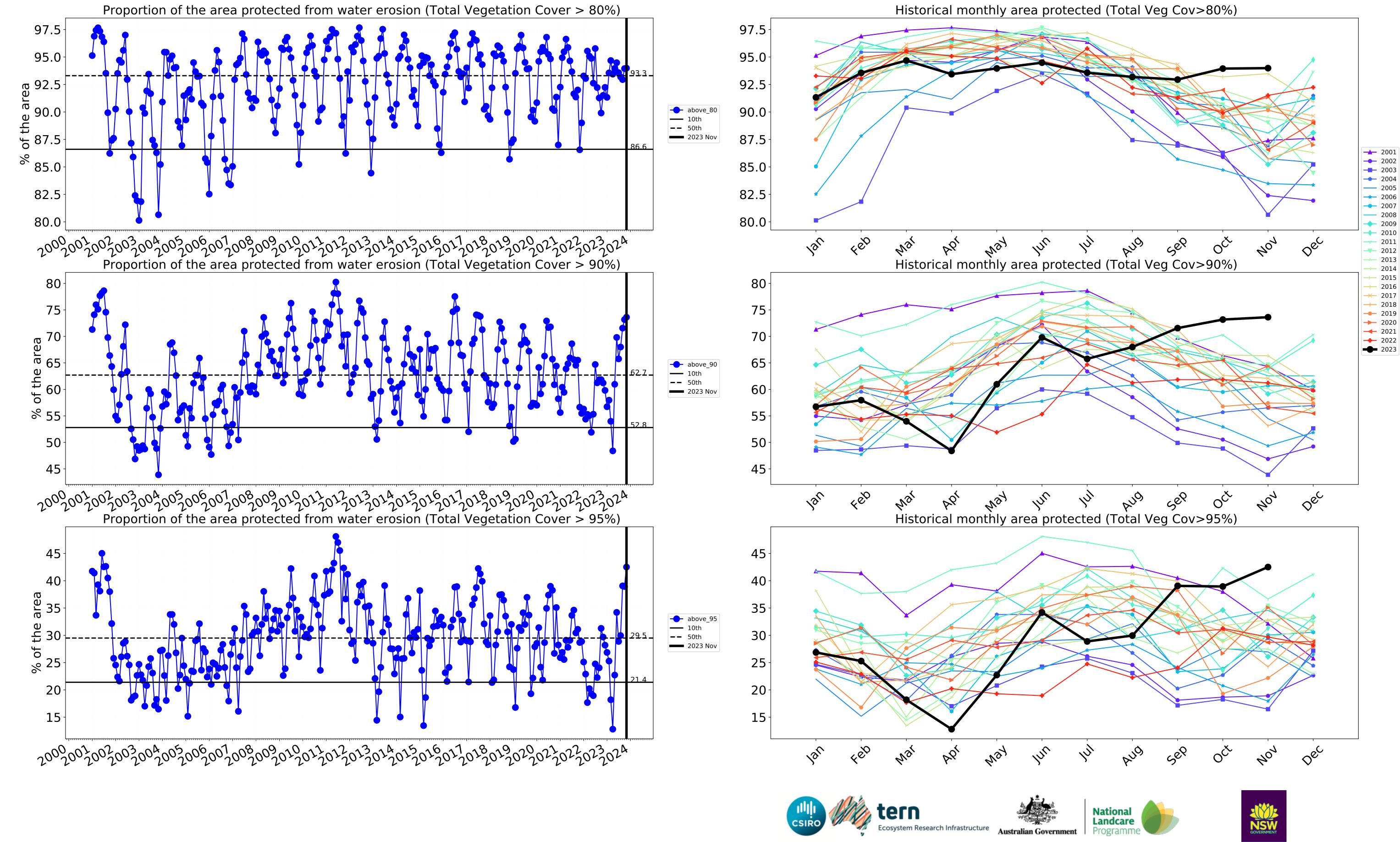
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

**Total Vegetation Cover Decile [%]** 











### **Conservation and natural environments**

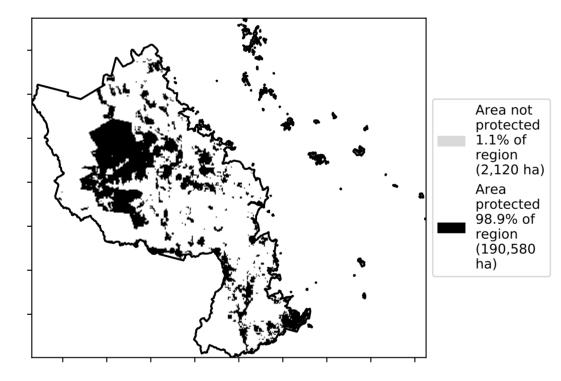
Catchment Scale Land

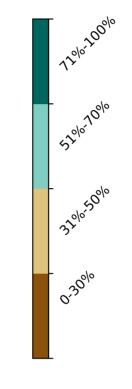
Land use and forest cover

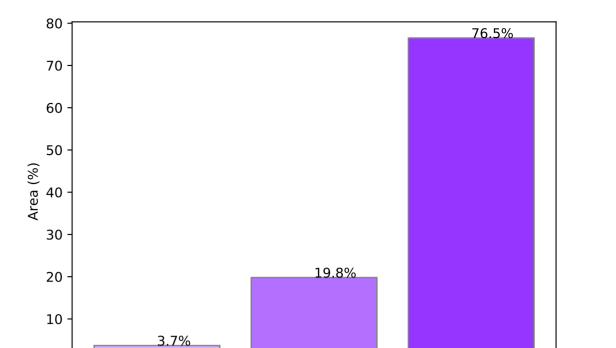
1 Conservation and natural environments - Non-forest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments - Nonwoodland forest

**Total Vegetation Cover [%]** 

% Area protected from water erosion (>70%)







Proportion of each land class in area

Proportion of vegetation cover class in area

1.0

Land use class

1.5

2.0

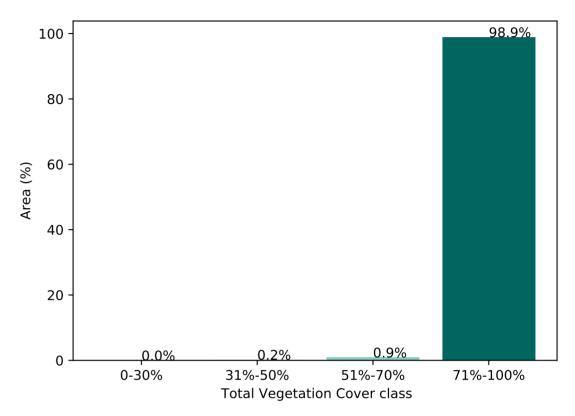
2.5

0

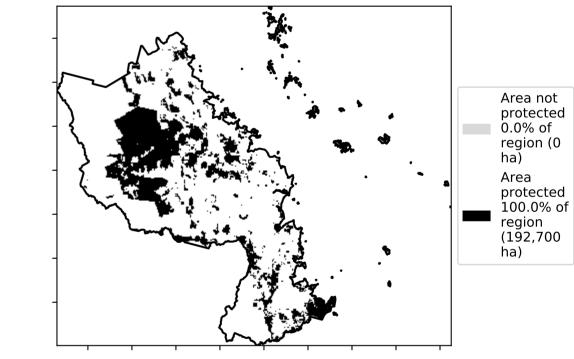
-0.5

0.0

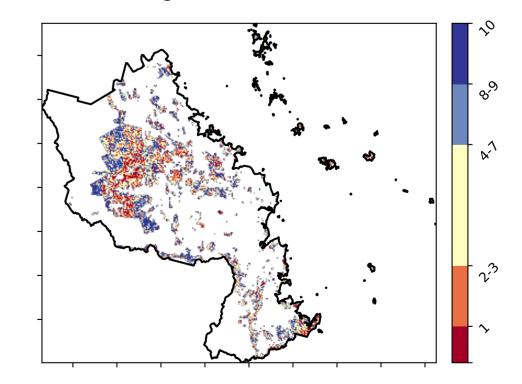
0.5



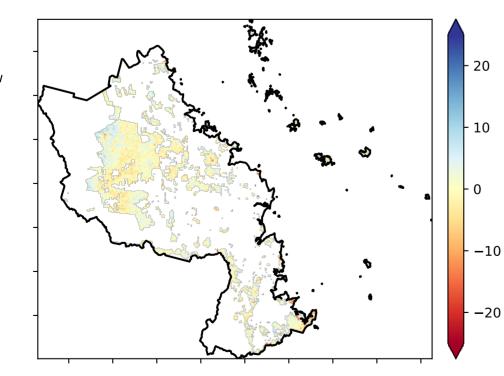
#### % Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 



Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.

Catchment Scale

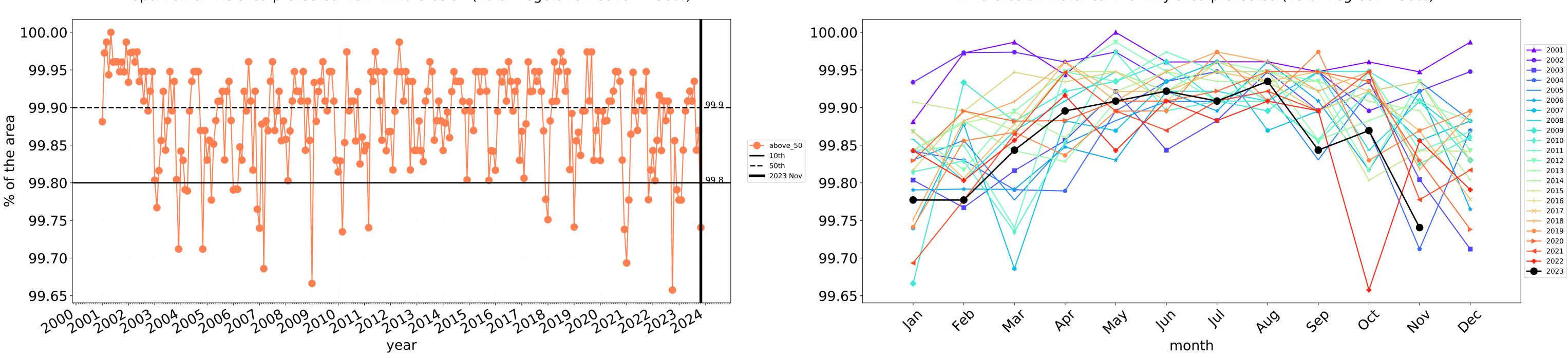
Derived from

Use of Australia

(2018) and Forests

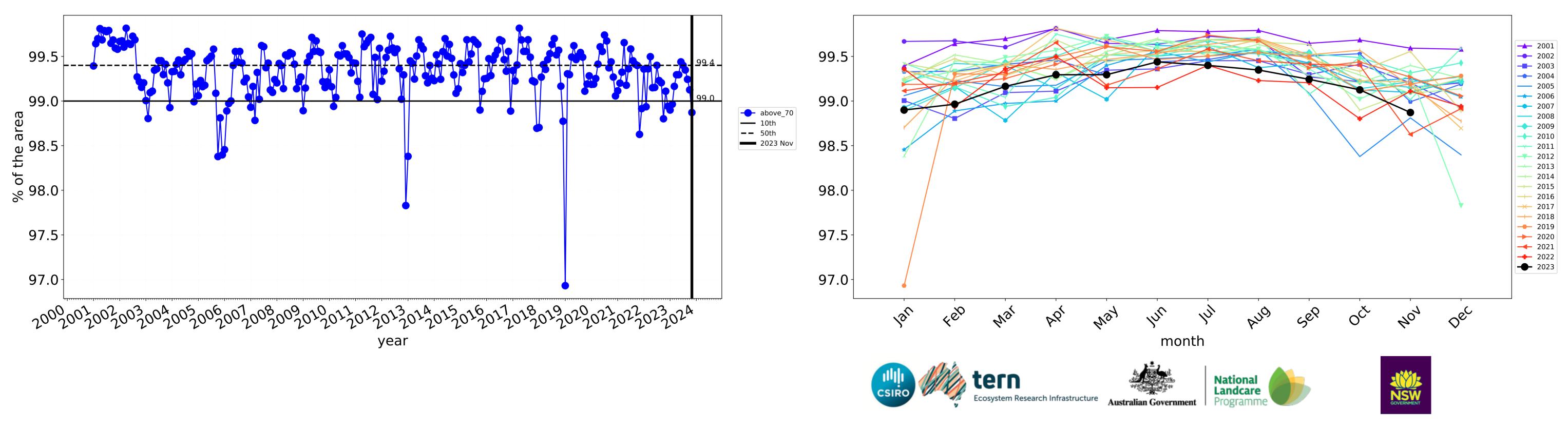
of Australia (2018)

Land Use and Forests of Australia (2018)



Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

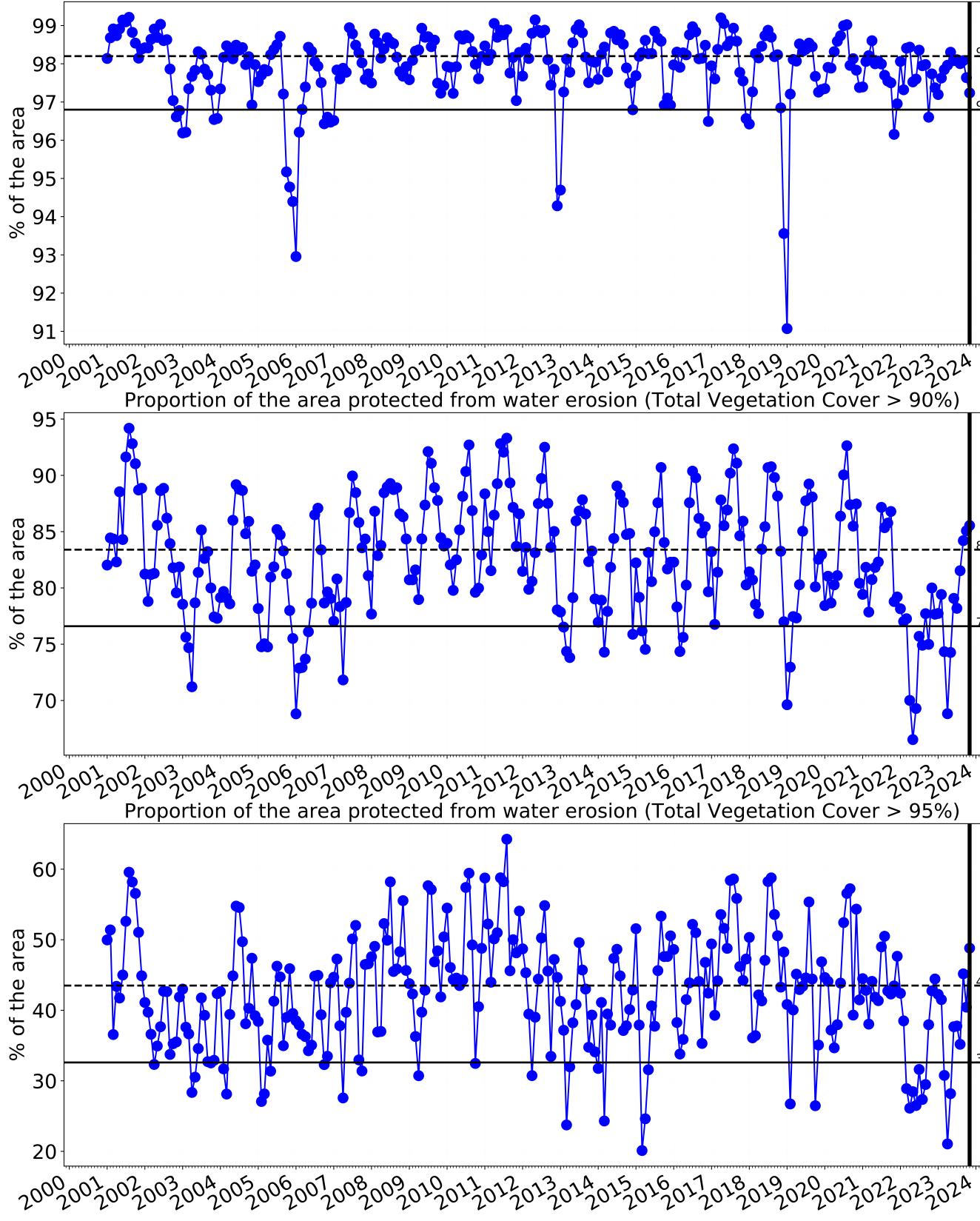
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

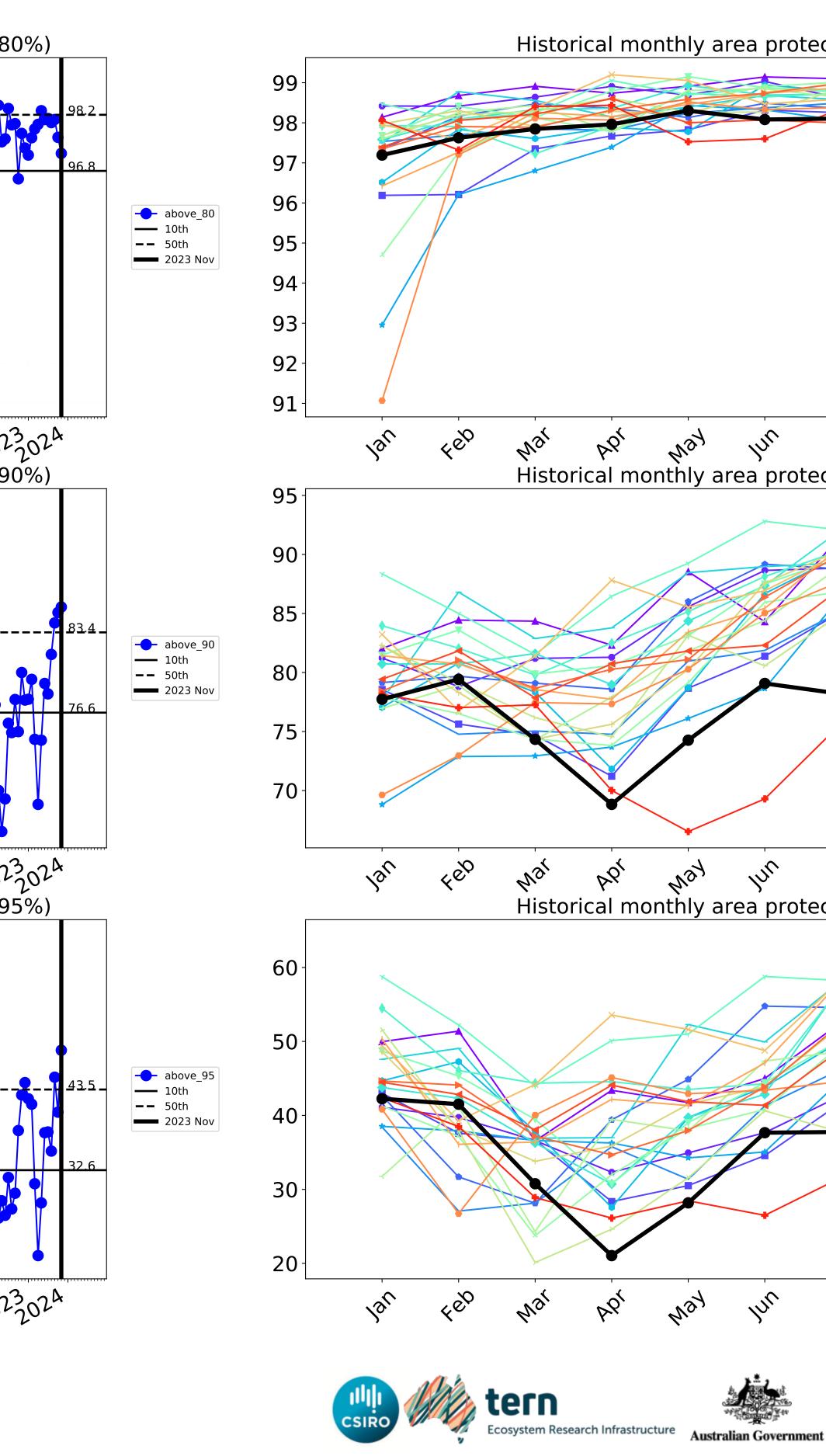


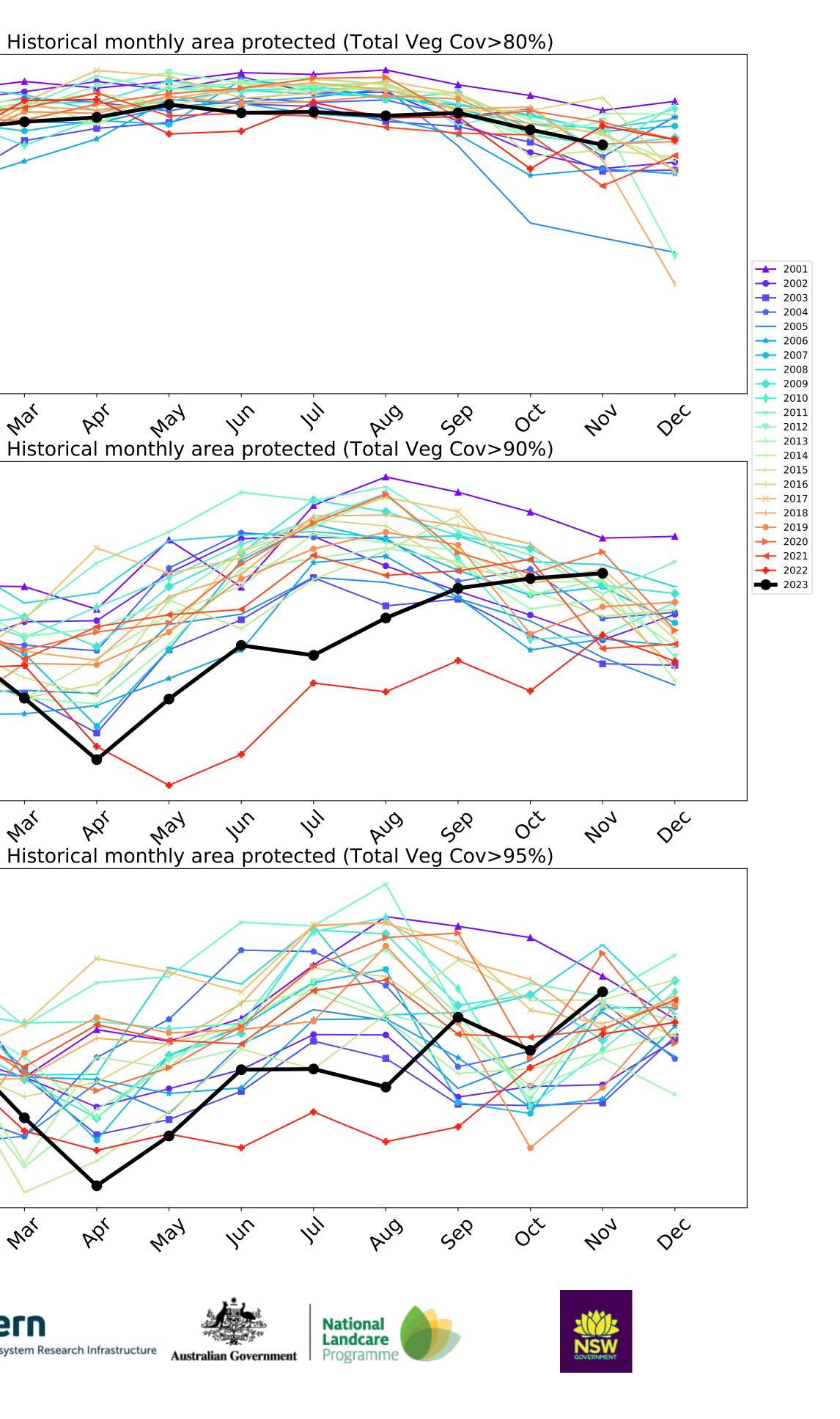
Water erosion historical monthly area protected (Total Veg Cov>70%)

Wind erosion historical monthly area protected (Total Veg Cov >50%)

Proportion of the area protected from water erosion (Total Vegetation Cover > 80%)







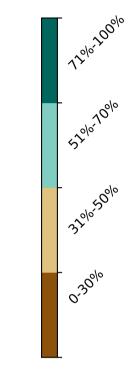
### **Conservation and natural environments non forest**

1 Conservation and natural environments - Nonforest

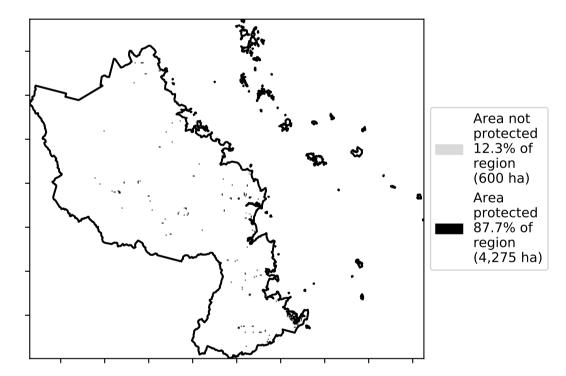
Land use and forest cover

Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

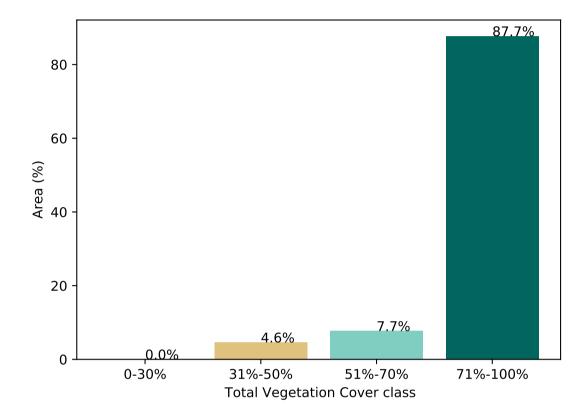
**Total Vegetation Cover [%]** 



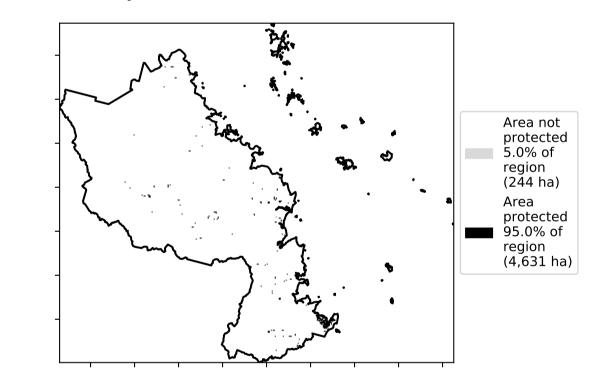
% Area protected from water erosion (>70%)



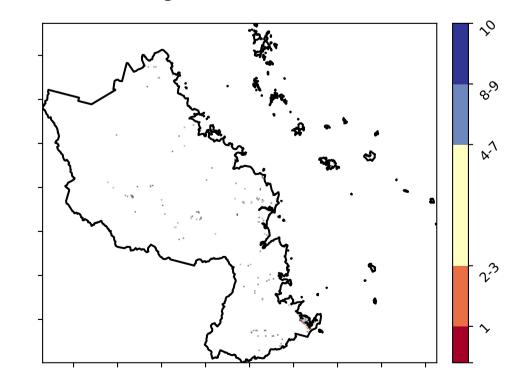
Proportion of vegetation cover class in area



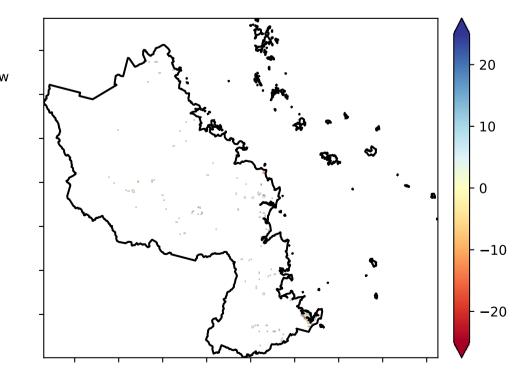
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 





Deciles show where the pixel value lies in the

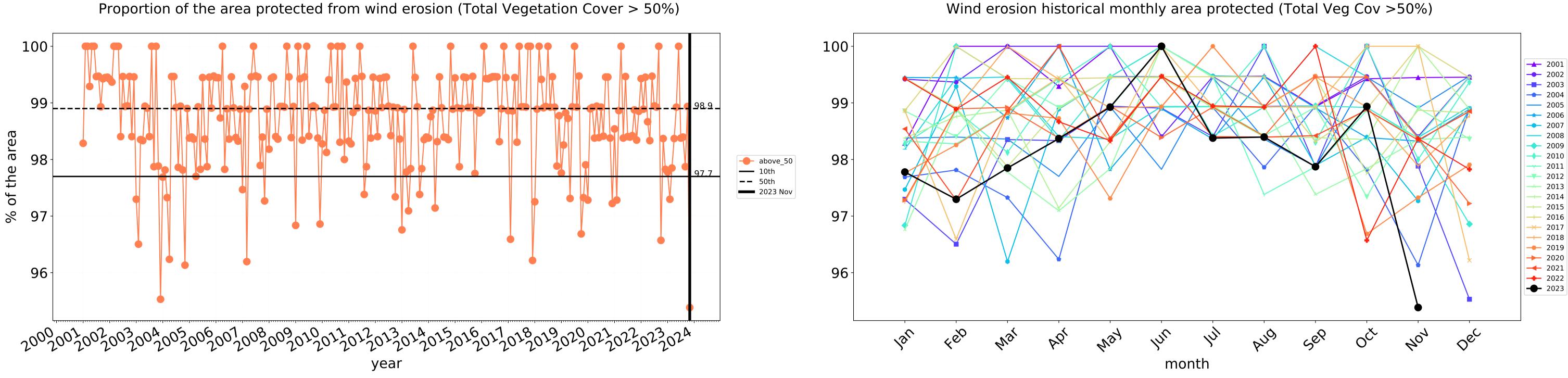
record, from highest to lowest, for that month. That is, red pixels are

records for that month of

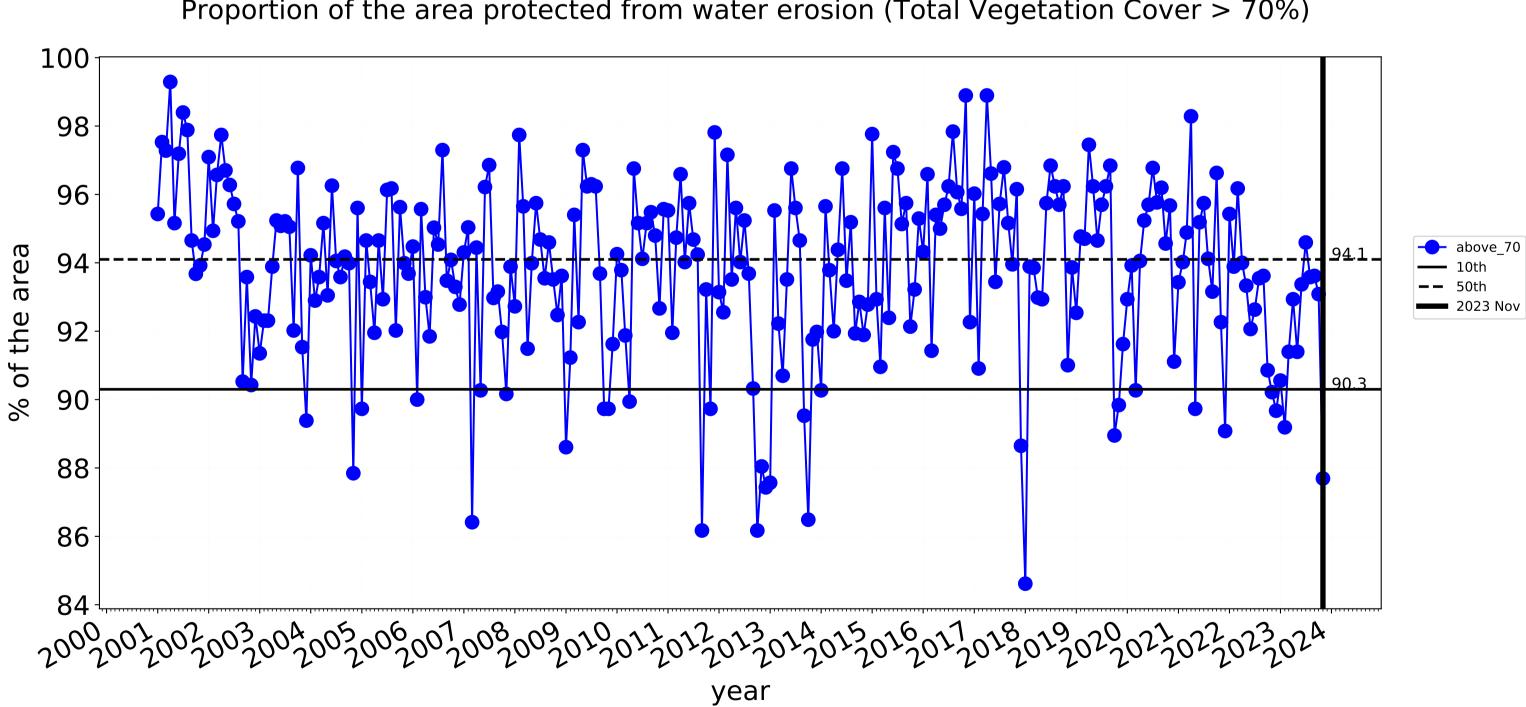
the map using baseline from 2001 to 2019.

in the lowest 10% of

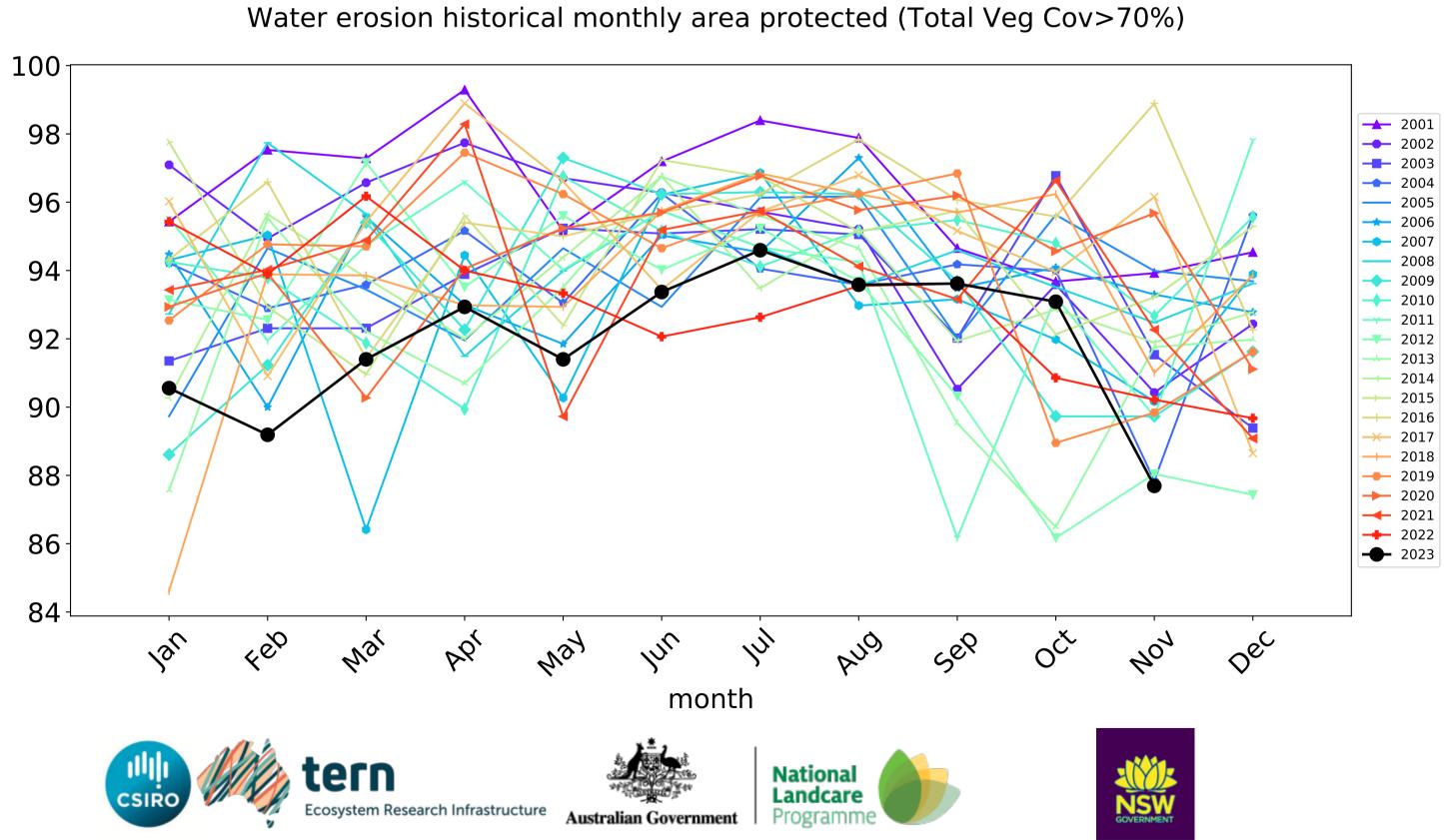
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

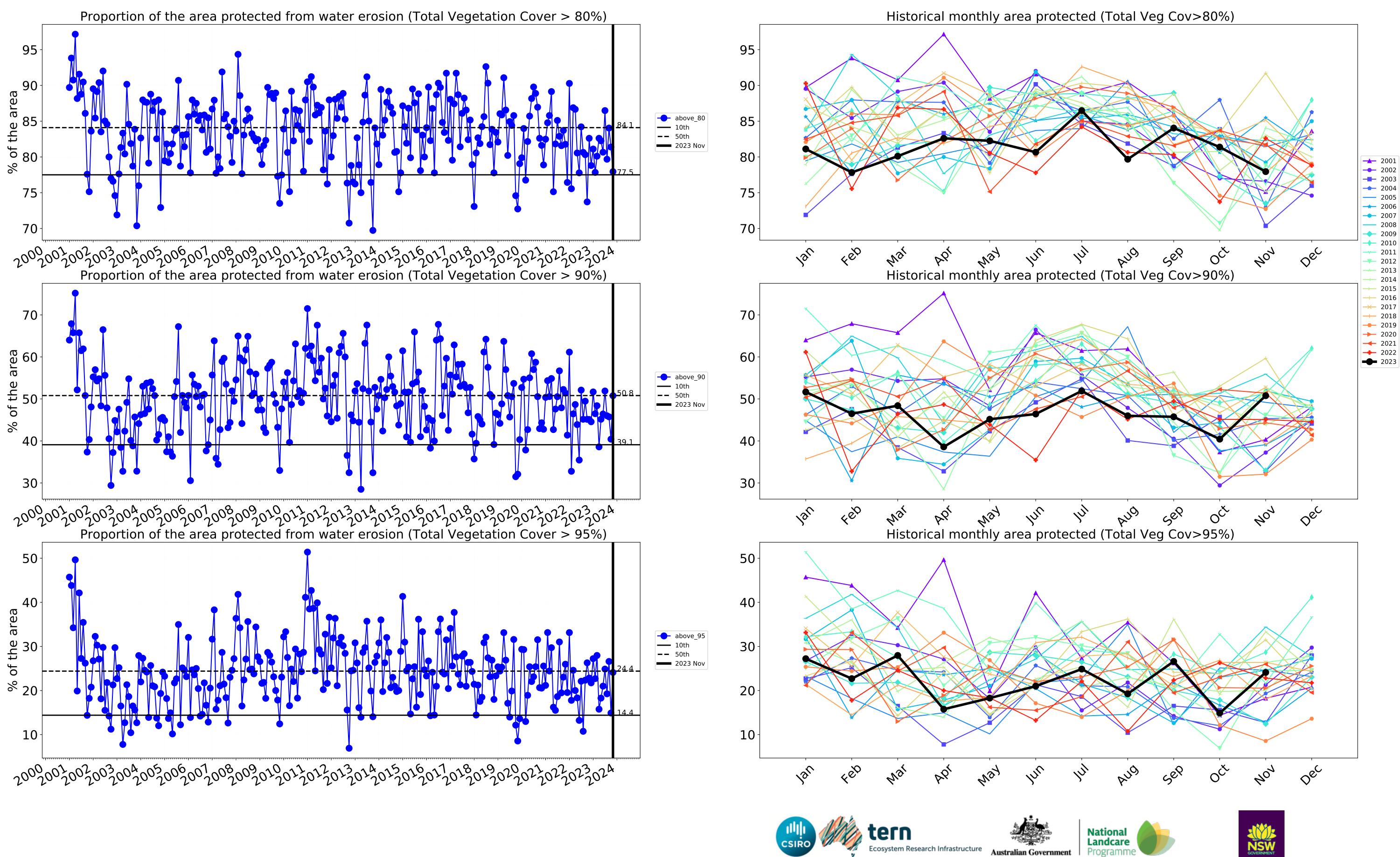


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)





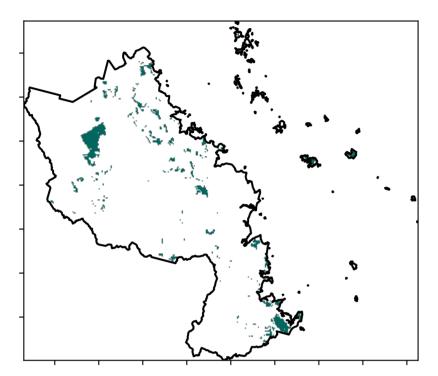


### **Conservation and natural environments Woodland forest**

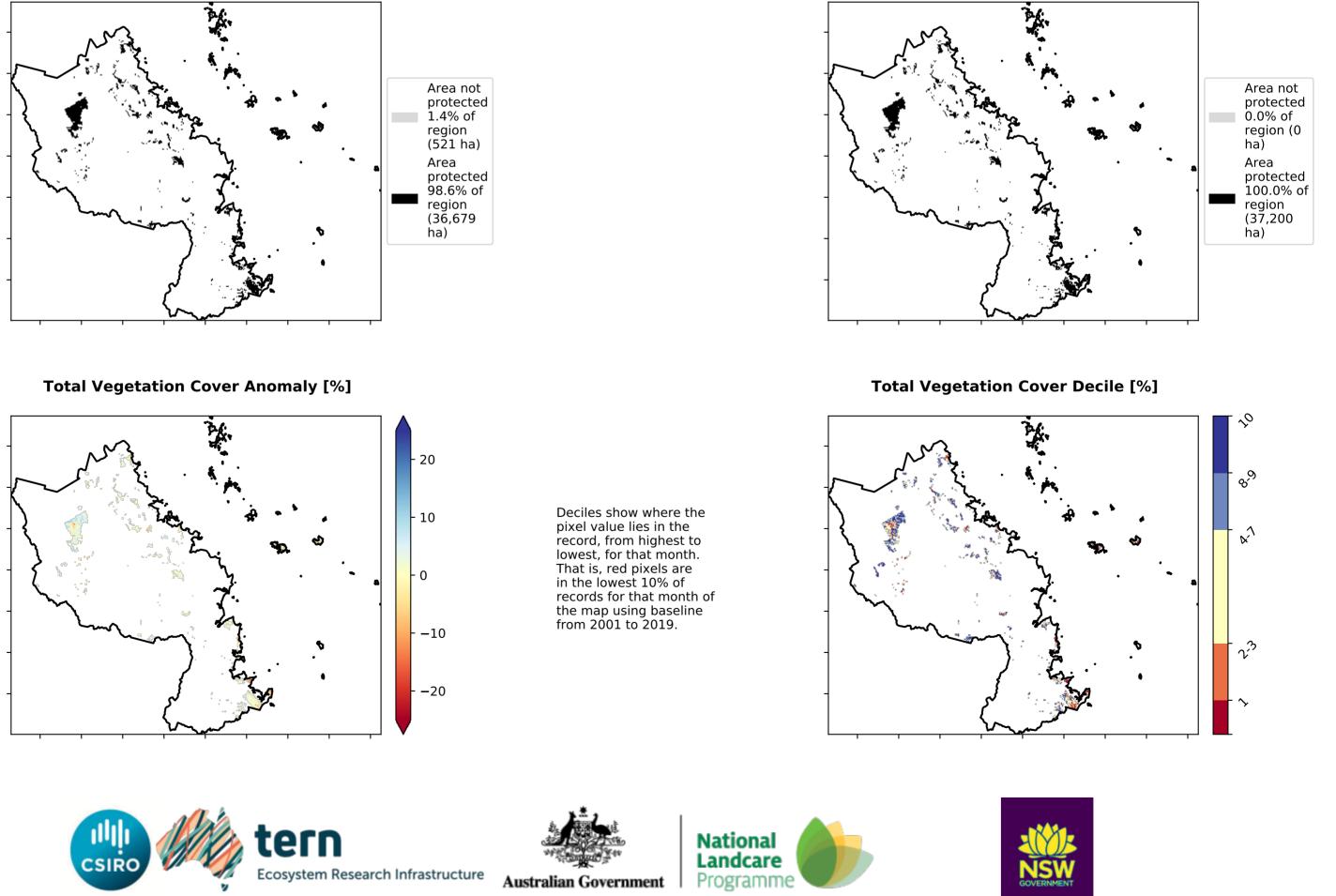
Catchment Scale Land Use and Forests of Australia (2018) 1 Conservation and natural environments - Woodland Catchment Scale Land forest Use of Australia (2018) and Forests of Australia (2018)

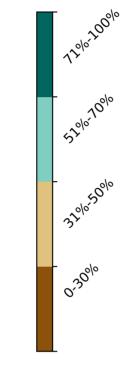
Land use and forest cover

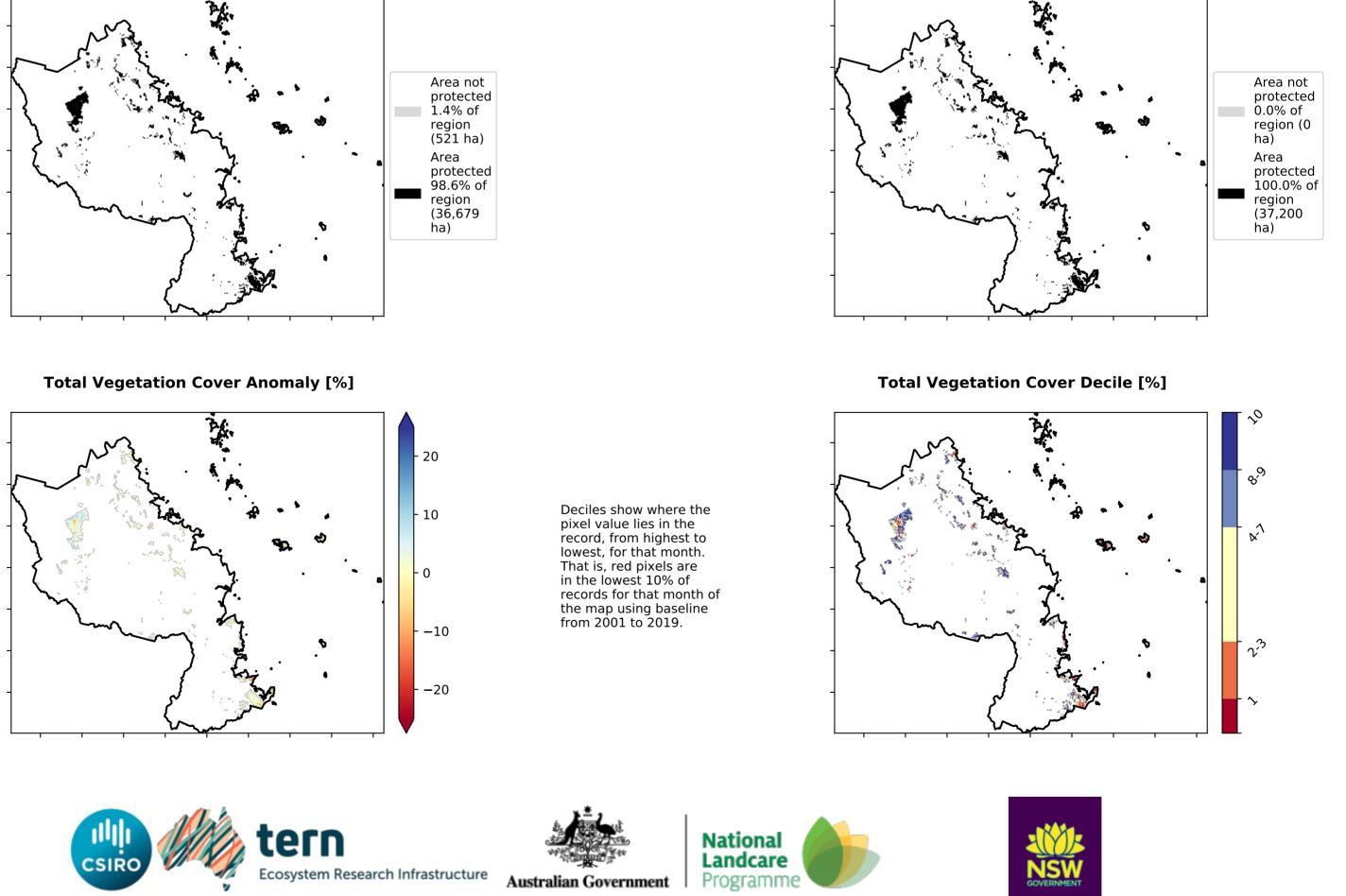
Total Vegetation Cover [%]



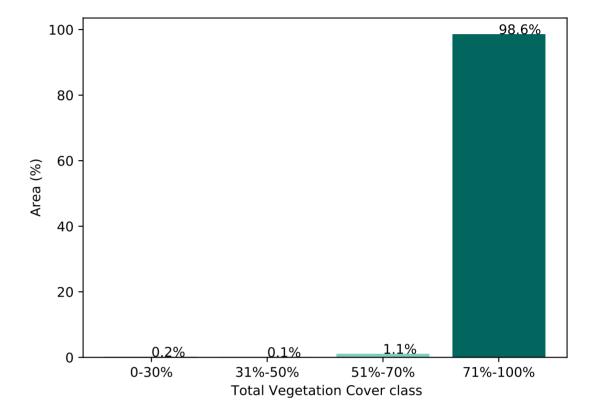
% Area protected from water erosion (>70%)



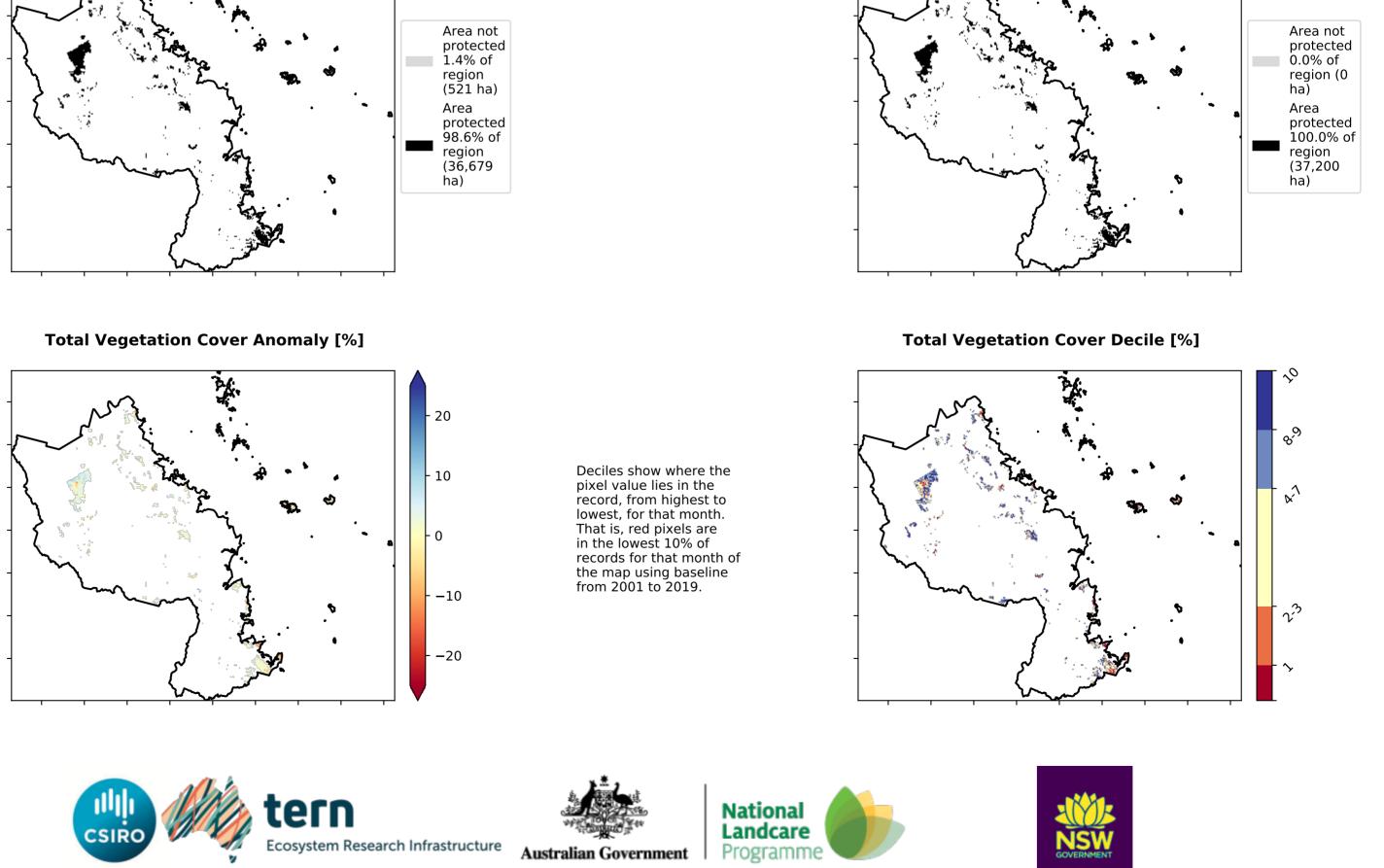




Proportion of vegetation cover class in area



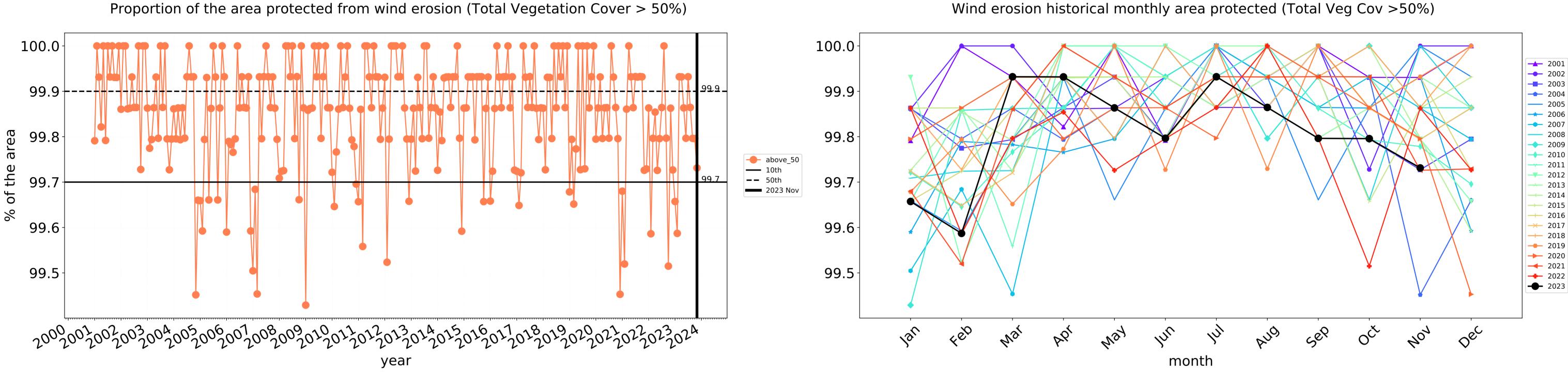
% Area protected from wind erosion (>50%)





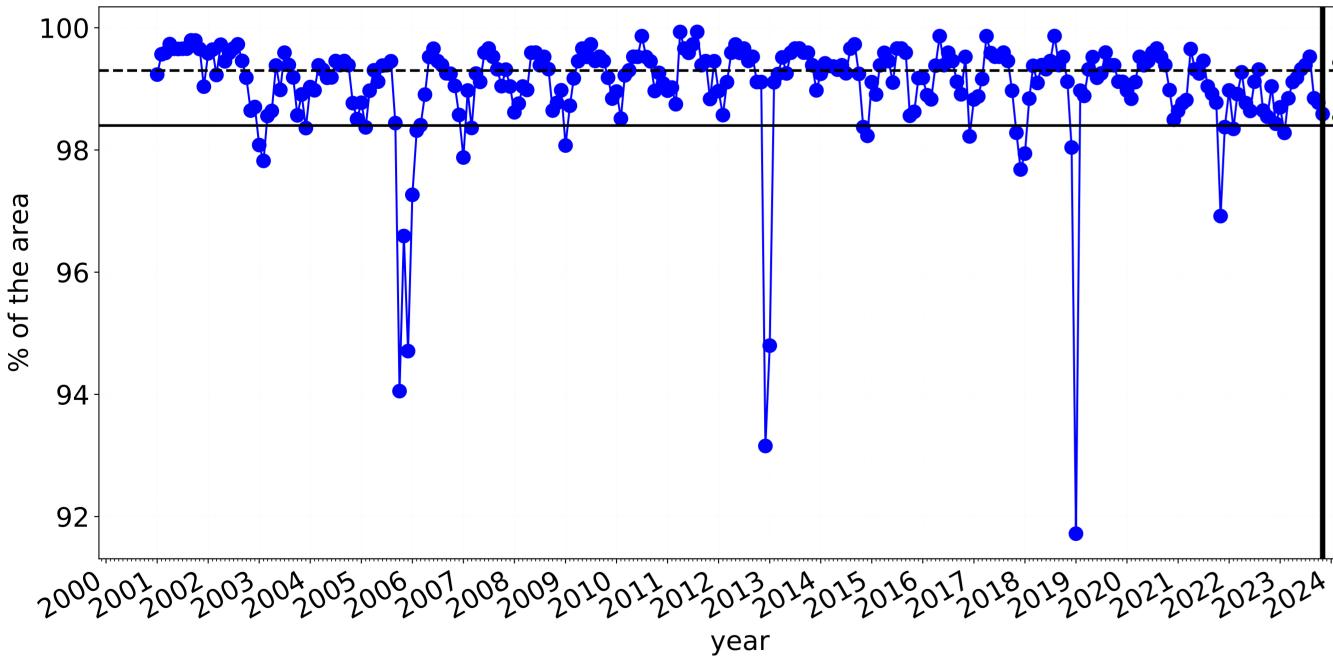
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Derived from



Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

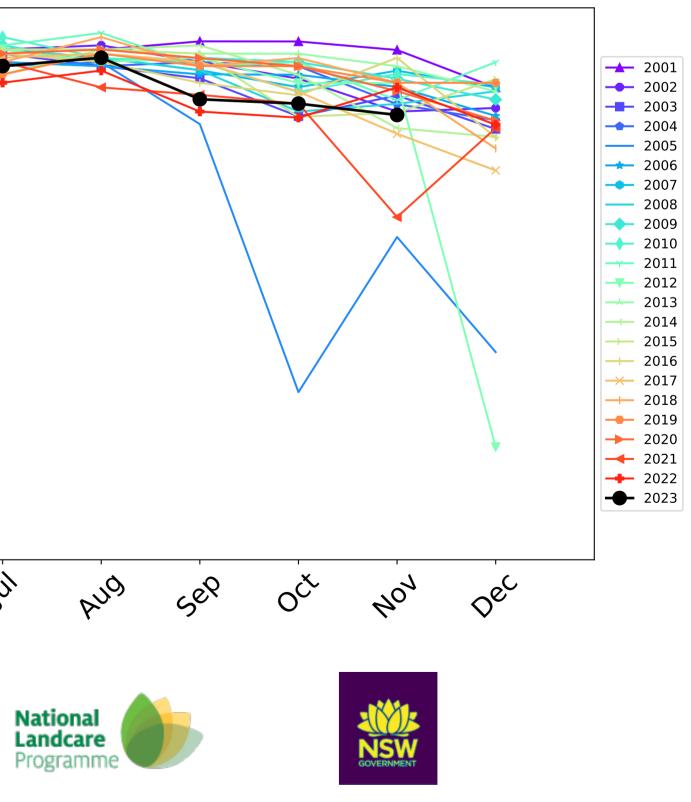
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

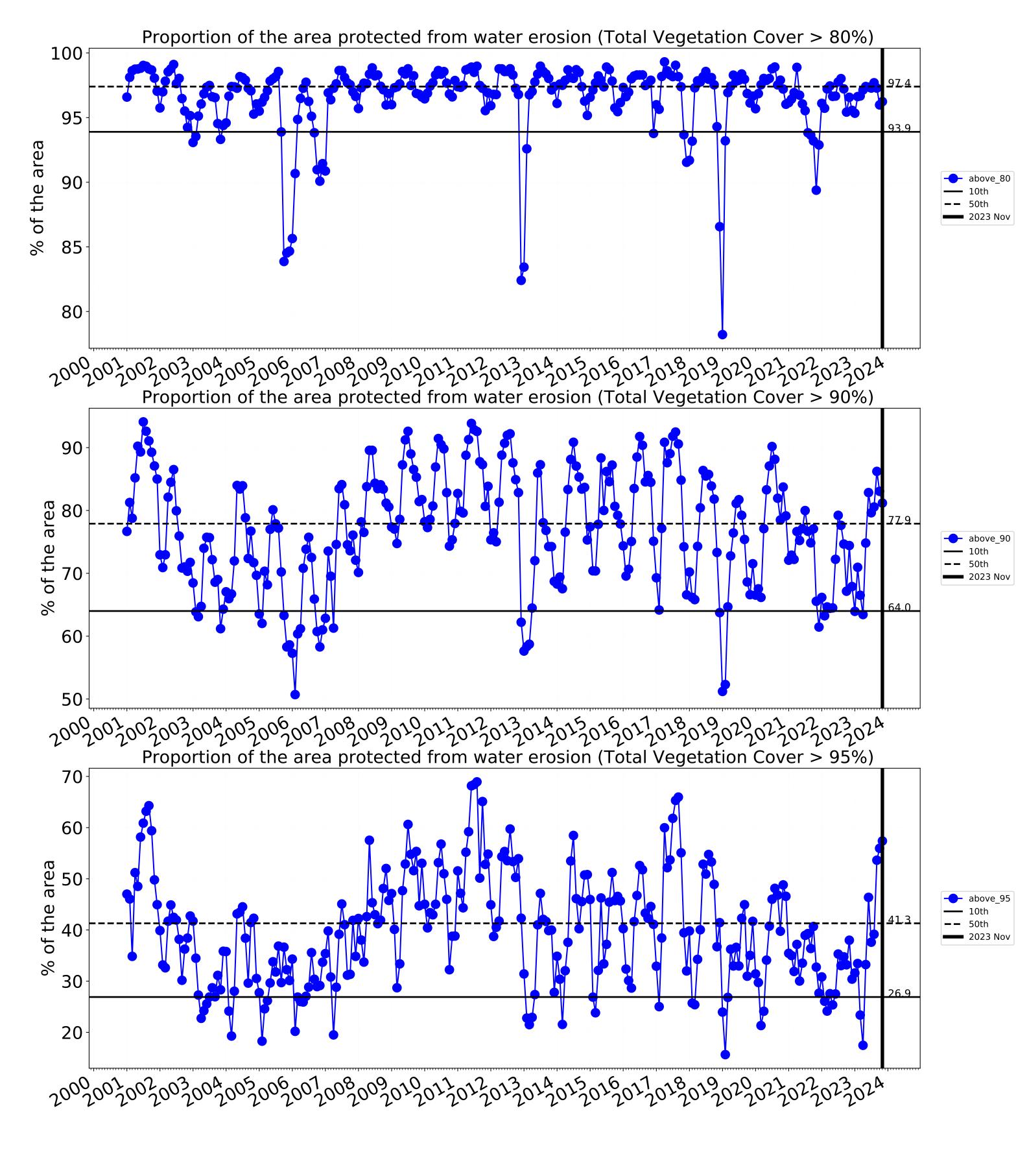


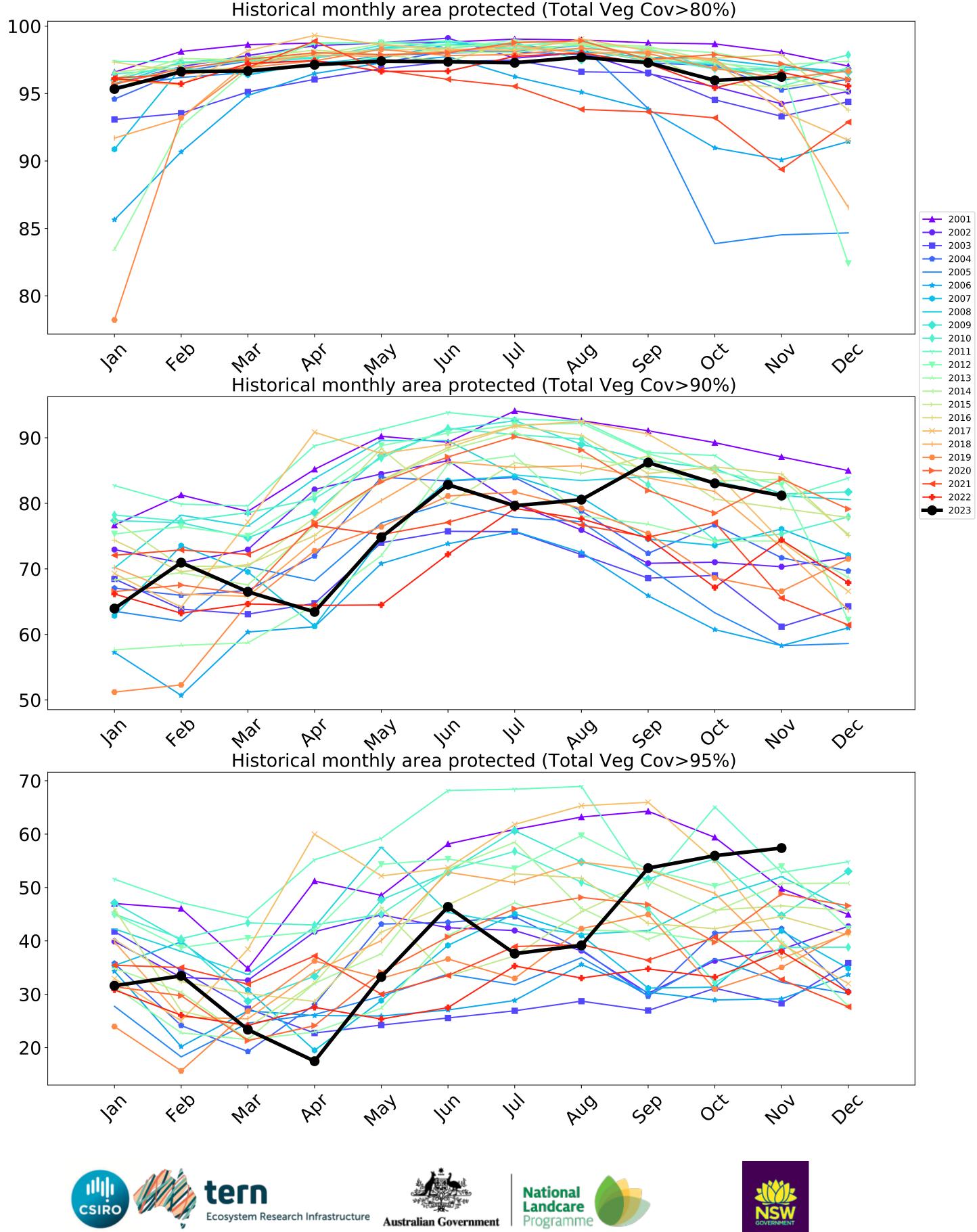
100-98 ---- above\_70 **—** 10th **——** 50th 2023 Nov 96 94 92 4eb Jan In May 1<sup>1</sup><sub>1</sub> Mai PQ' month tern Ecosystem Research Infrastructure Australian Government

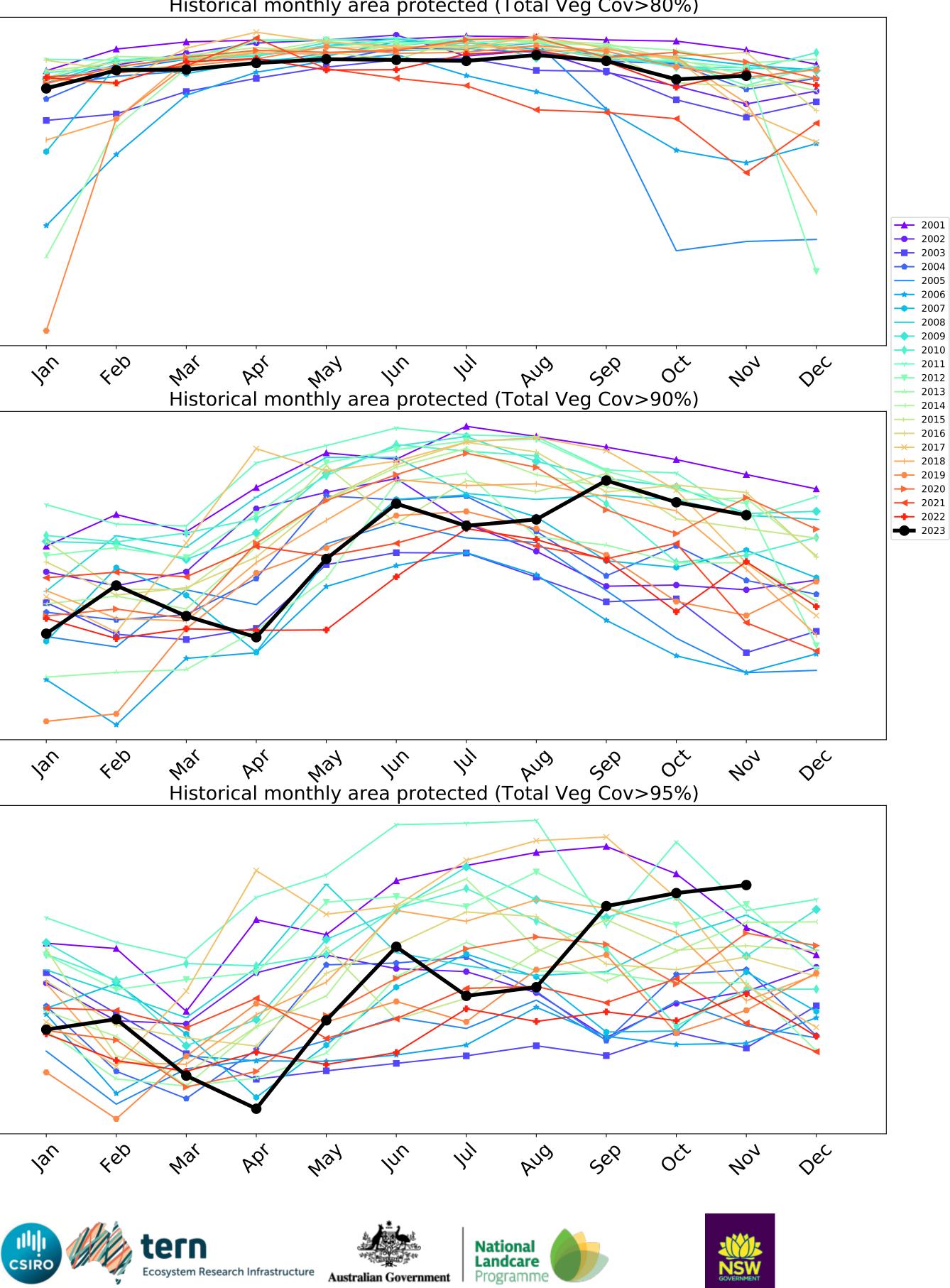
13

Water erosion historical monthly area protected (Total Veg Cov>70%)





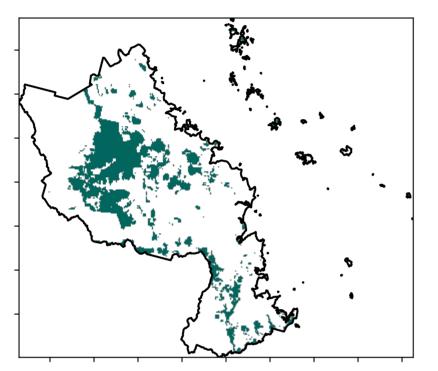




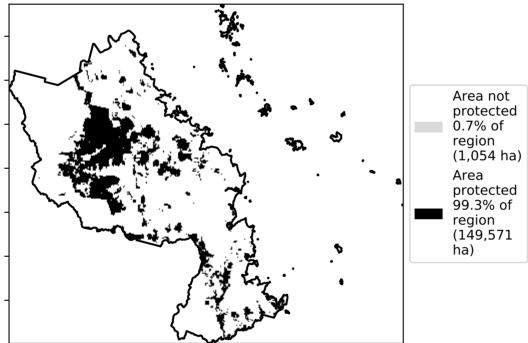
### **Conservation and natural environments Forest (non woodland)**

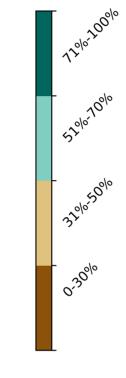
Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Conservation and natural environments - Non-woodland forest Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover [%]** 



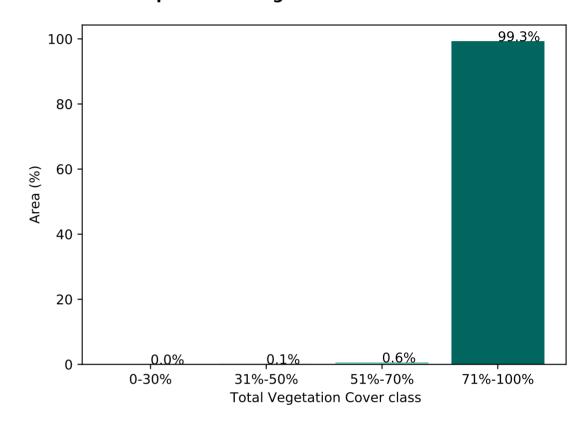
% Area protected from water erosion (>70%)



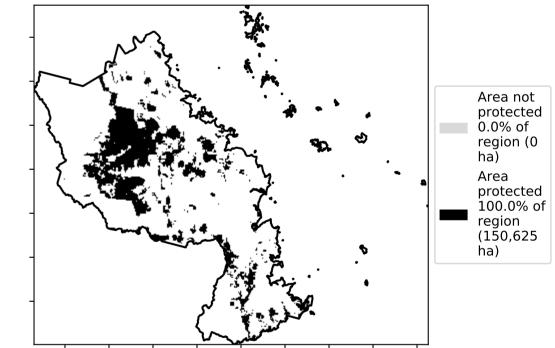




Proportion of vegetation cover class in area

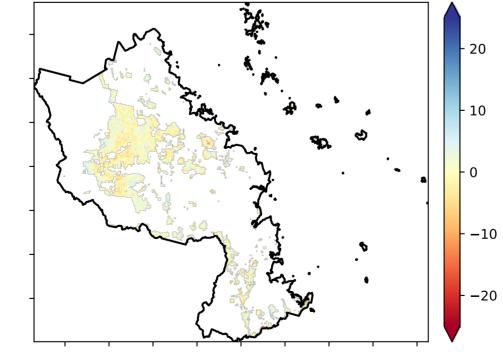


% Area protected from wind erosion (>50%)



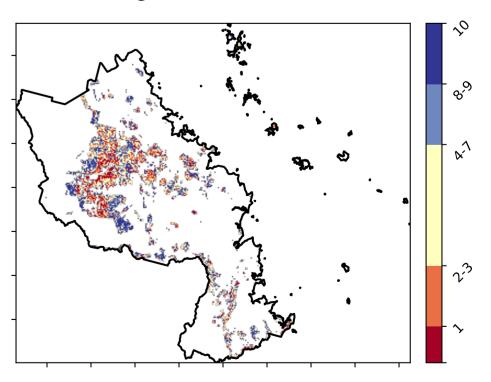
Total Vegetation Cover Anomaly [%]

Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

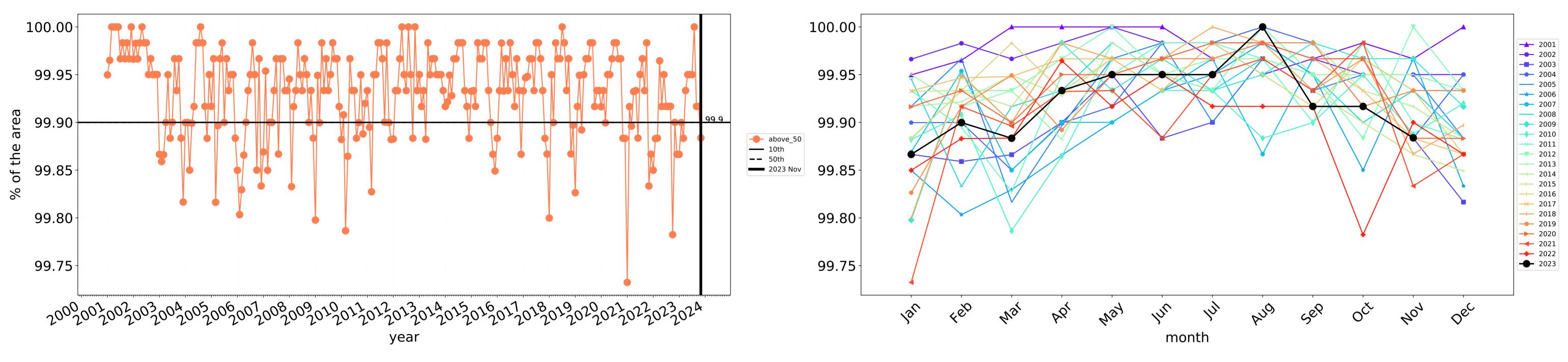


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the man using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

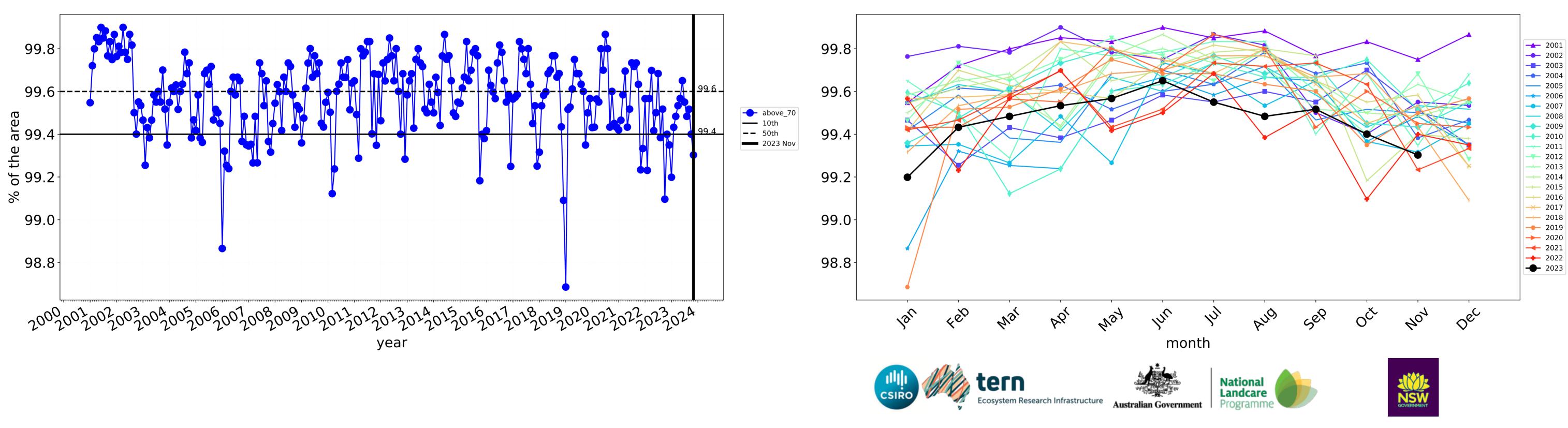






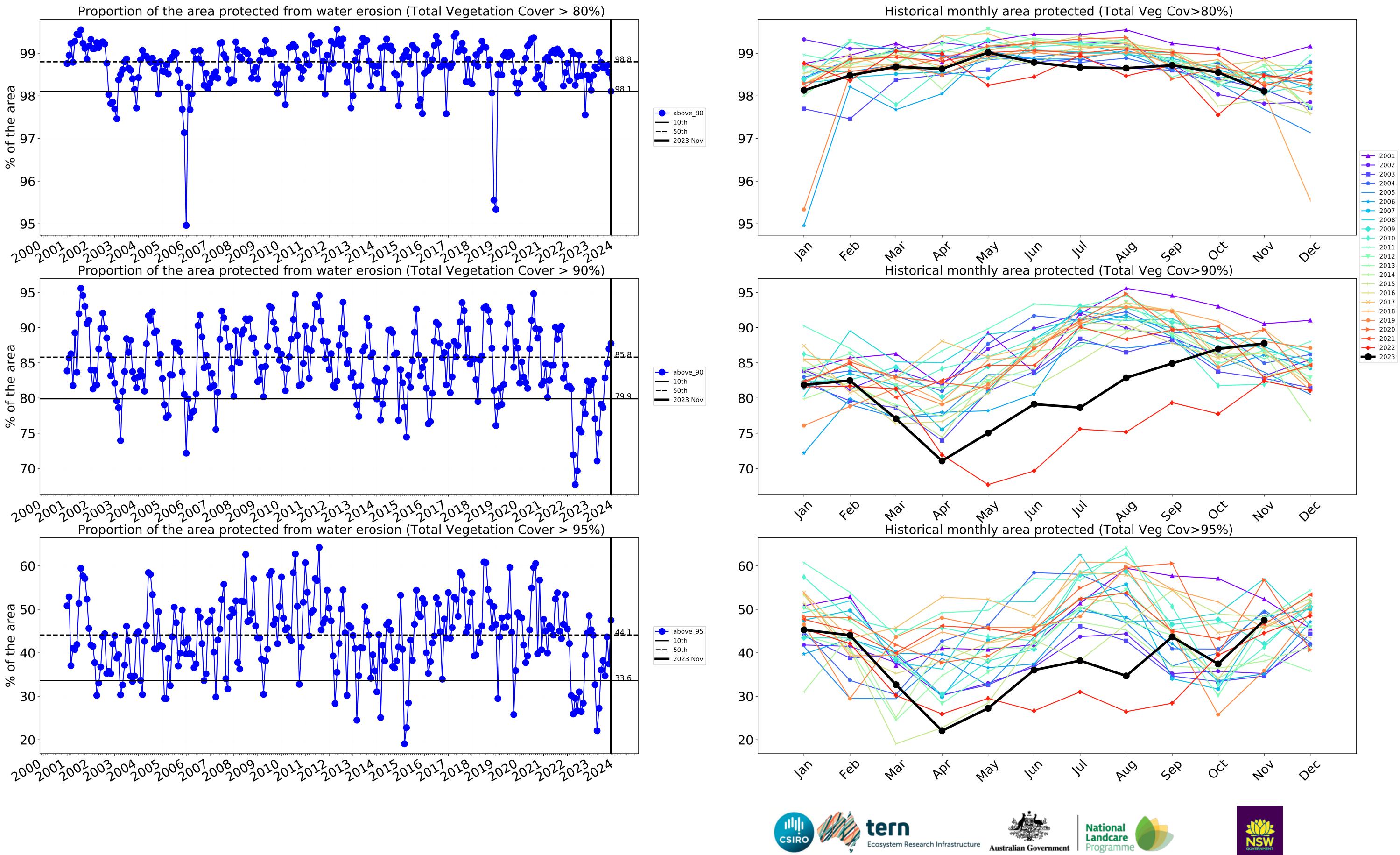
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



Wind erosion historical monthly area protected (Total Veg Cov >50%)

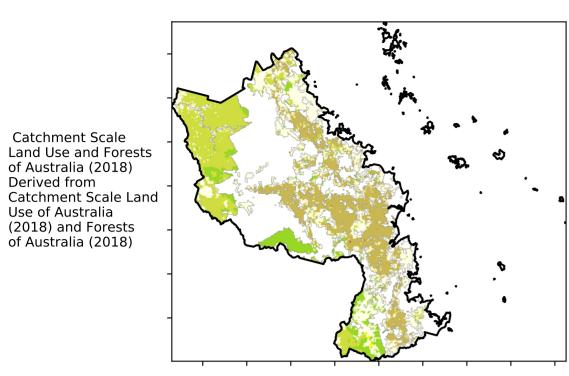
Water erosion historical monthly area protected (Total Veg Cov>70%)



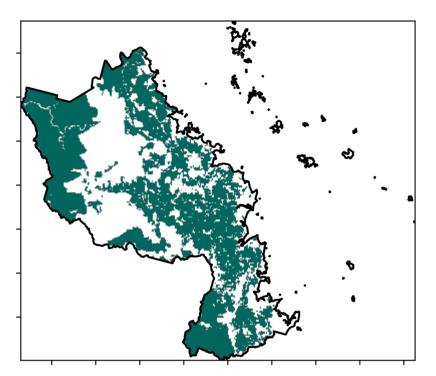


### Agriculture

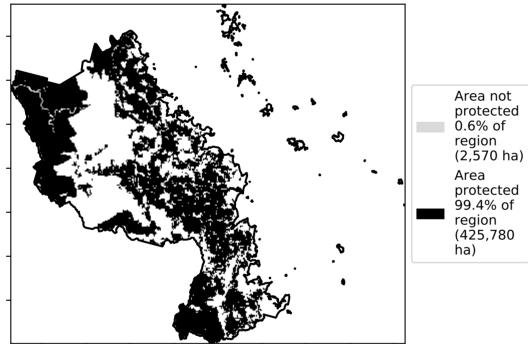
Land use and forest cover

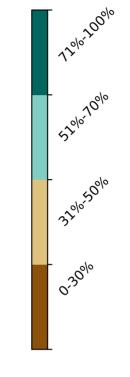


**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest

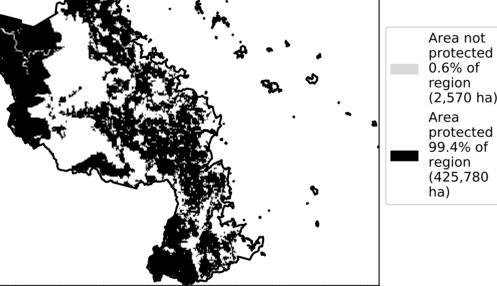
4 Agriculture - Grazing - Irrigated 5 Agriculture - Cropping - Non-irrigated

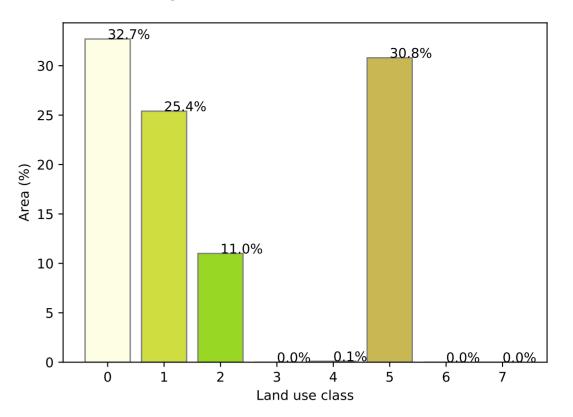
7 Agriculture - Horticulture - Non-irrigated

6 Agriculture - Cropping - Irrigated

8 Agriculture - Horticulture - Irrigated

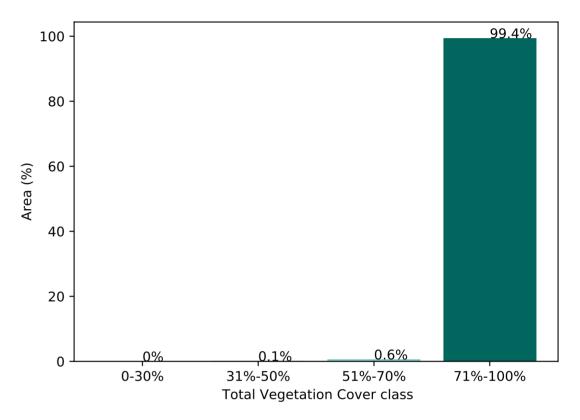
3 Agriculture - Grazing - Non-woodland forest



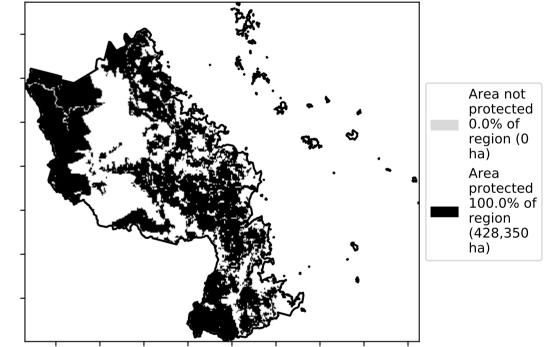


#### Proportion of each land class in area

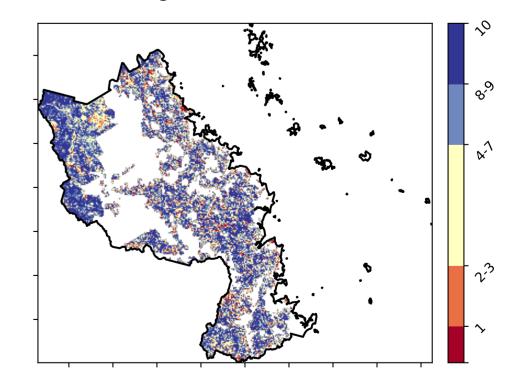
Proportion of vegetation cover class in area



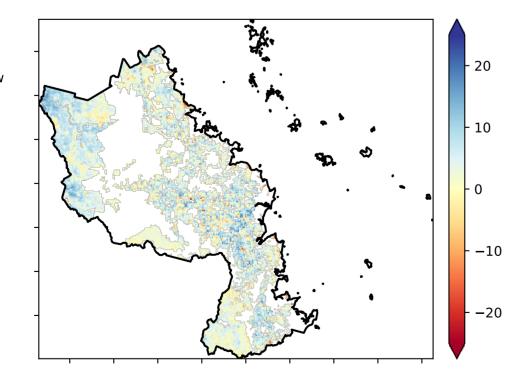
#### % Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 



Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

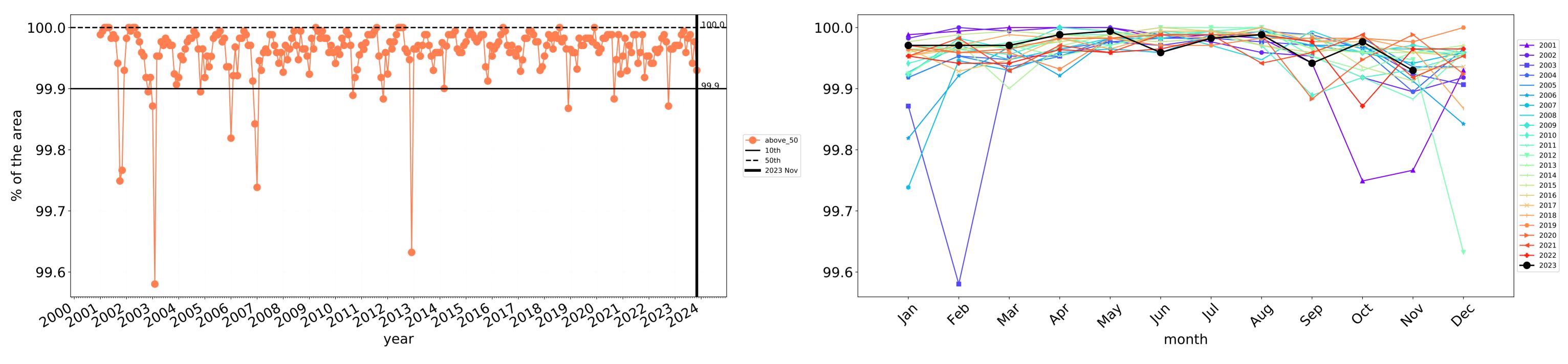




Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

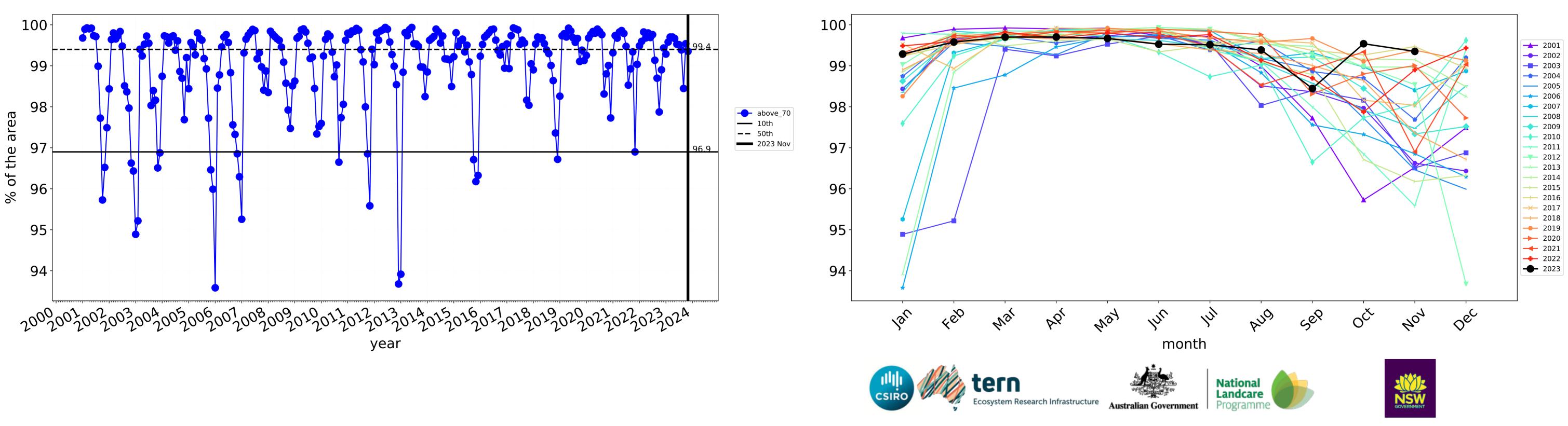
of Australia (2018)

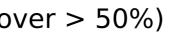




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

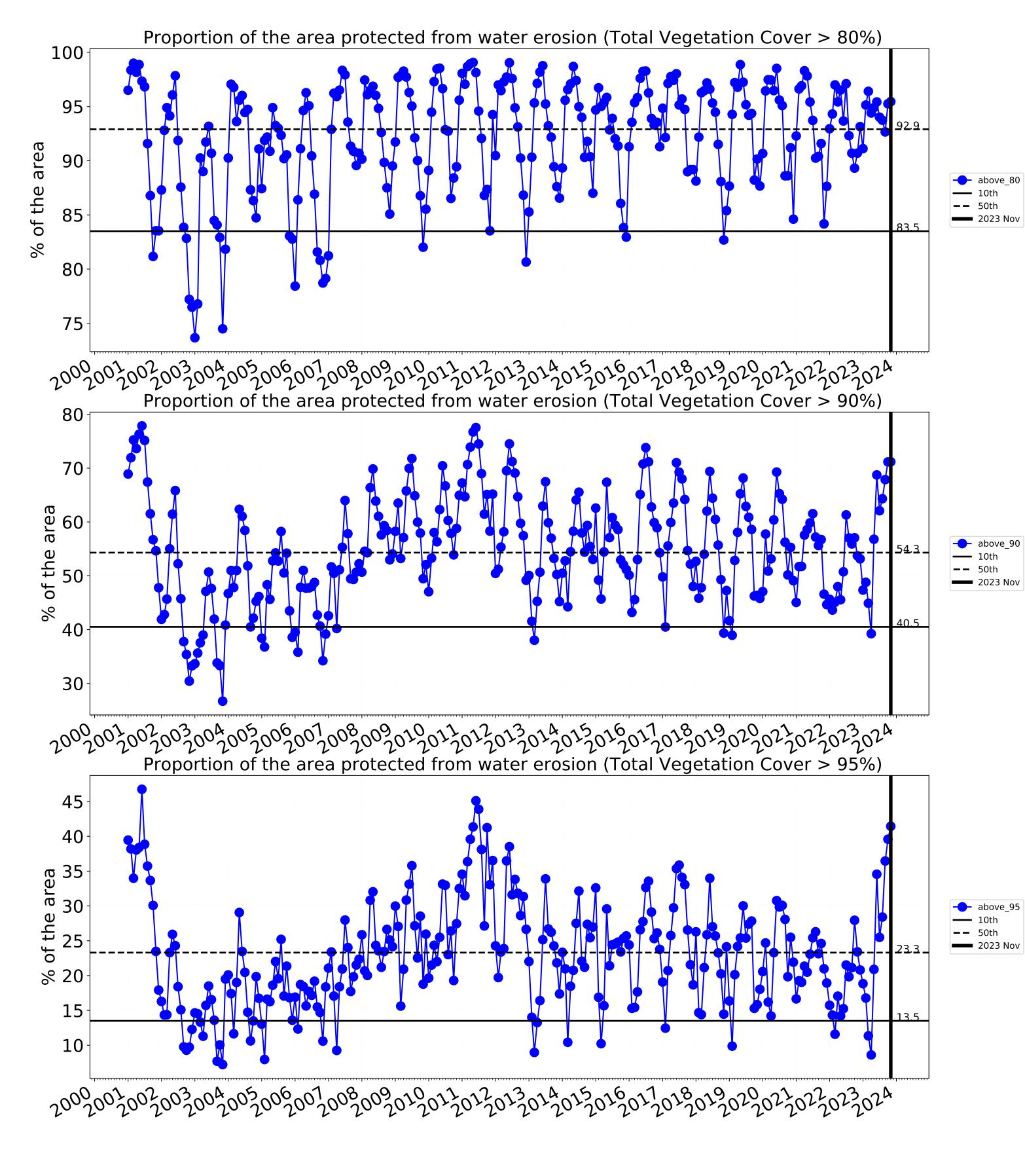


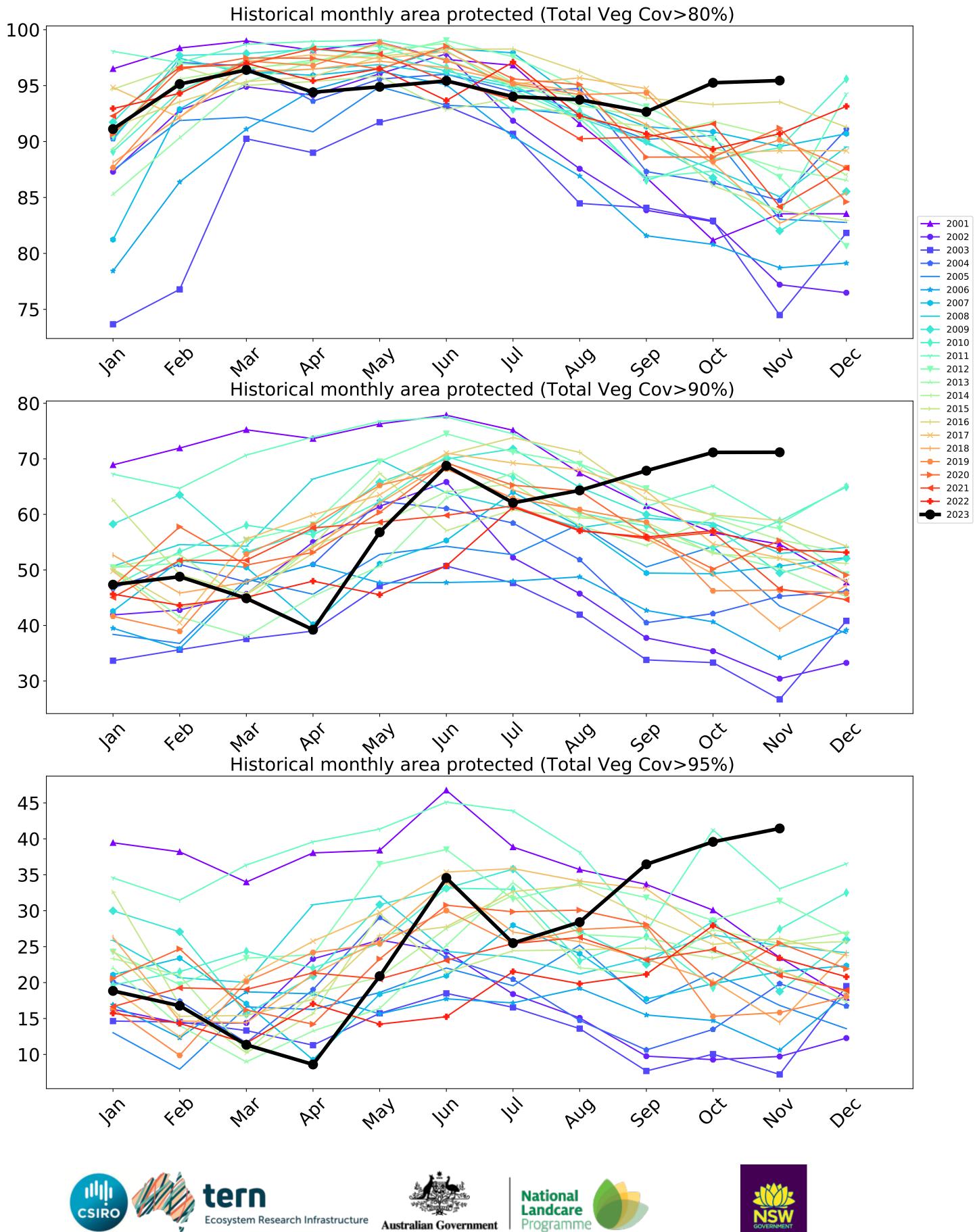




Wind erosion historical monthly area protected (Total Veg Cov >50%)









### Grazing

1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest

1200,1000

· 520/07/00/0

32005000

0.30%

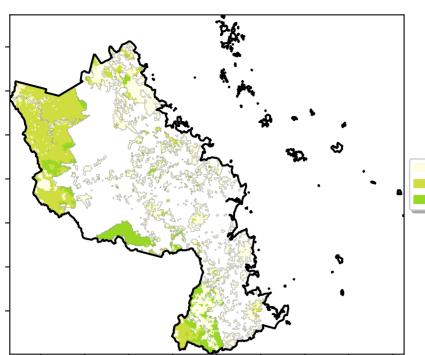
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the

lower than the

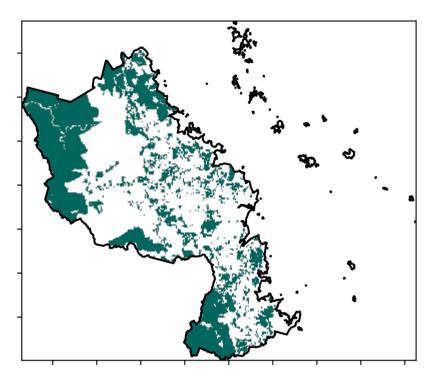
using baseline from 2001 to 2019.

mean of that pixel. The mean is only for the month of the map

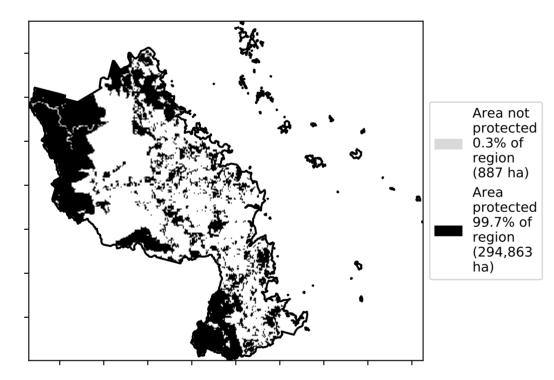


Land use and forest cover

**Total Vegetation Cover [%]** 



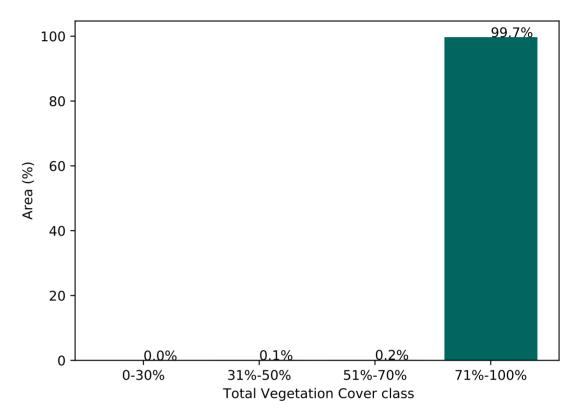
% Area protected from water erosion (>70%)



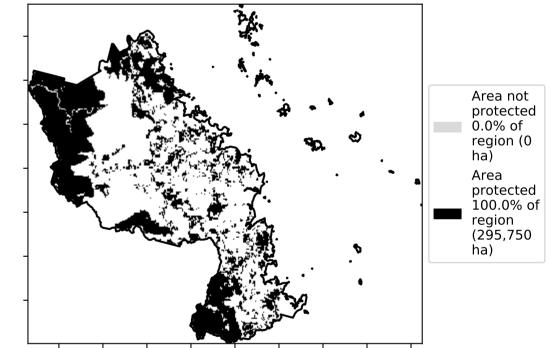
47.4% 40 36.7% 30 Area (%) 20 15.9% 10 0 1.0 -0.5 0.5 1.5 2.0 2.5 0.0 Land use class

#### Proportion of each land class in area

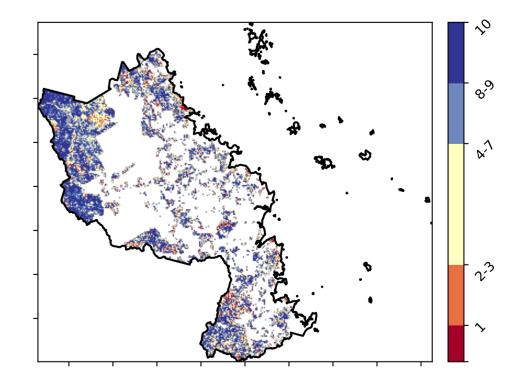
Proportion of vegetation cover class in area



#### % Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 

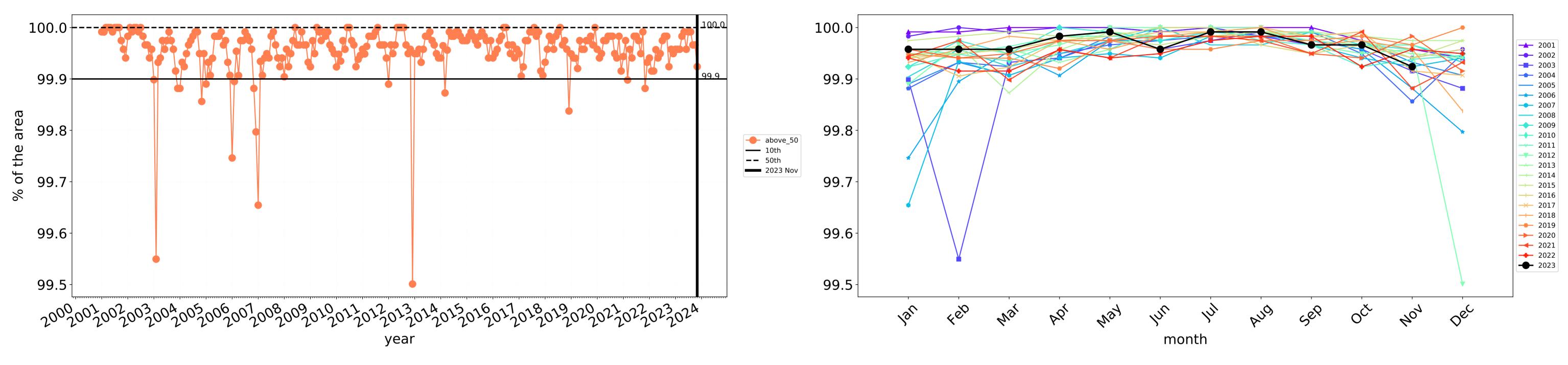


**Total Vegetation Cover Anomaly [%]** 

፞፝፞ዾዸ - 20 - 10 0 -10 -20

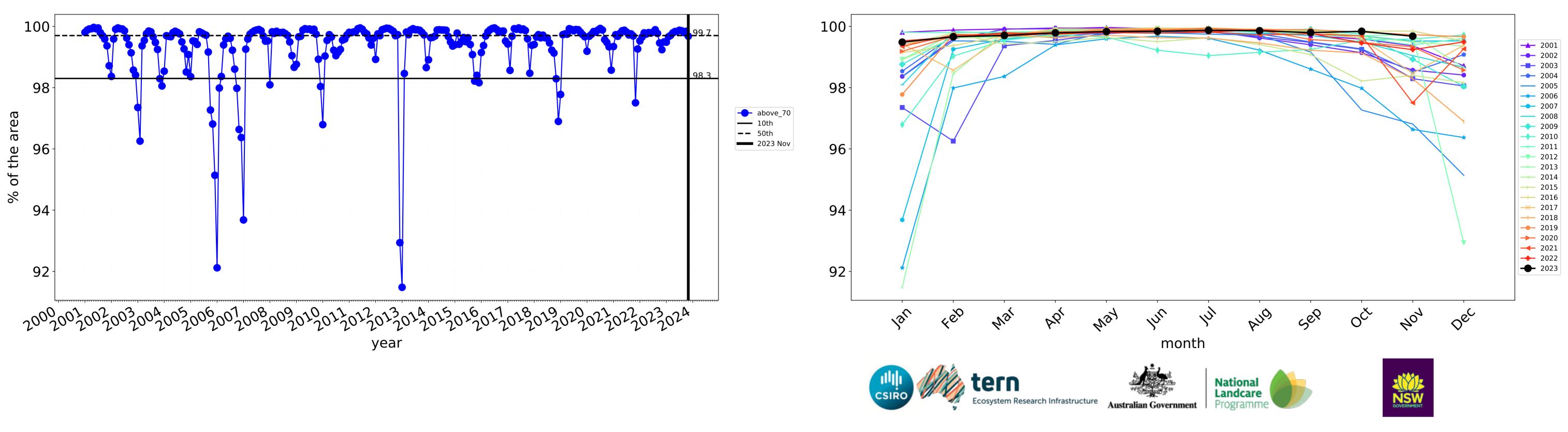
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

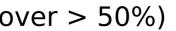




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

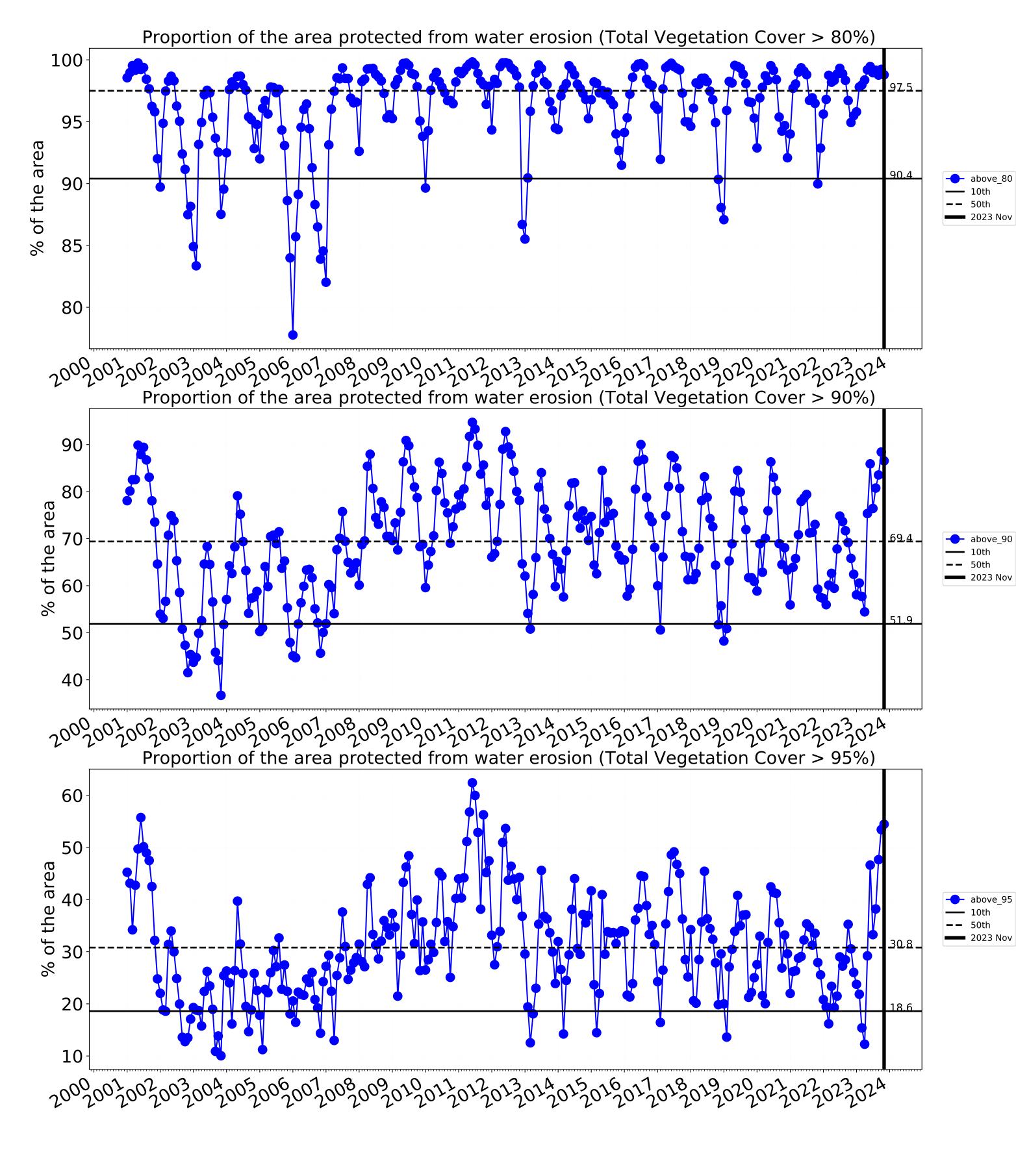
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

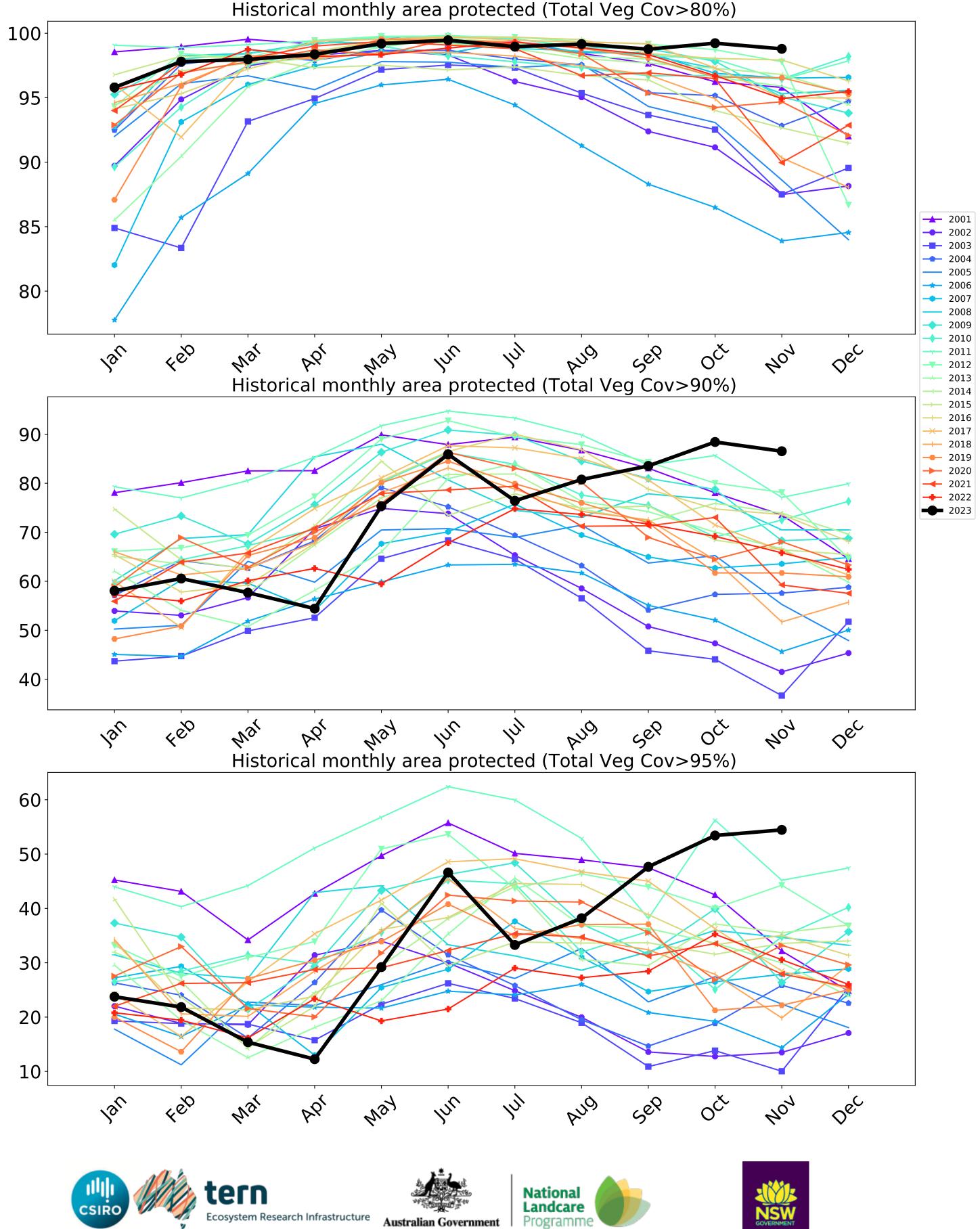




Wind erosion historical monthly area protected (Total Veg Cov >50%)









### **Grazing non forest**

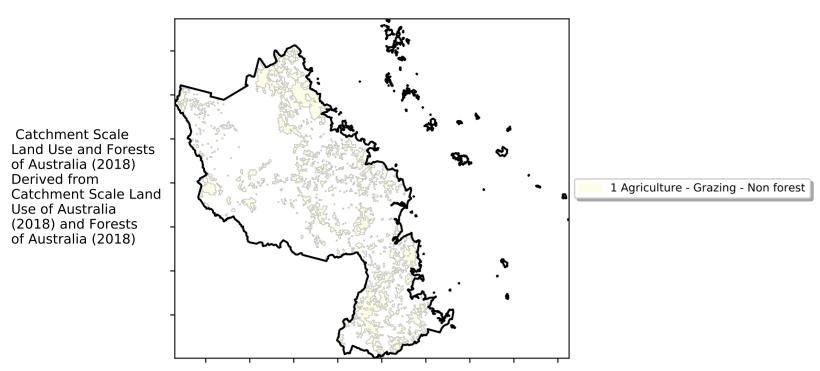
12%200%

· 52°1070010

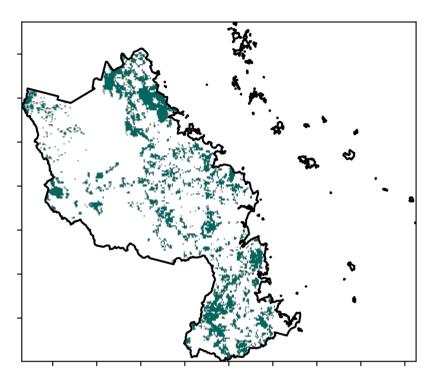
· 320050010

0.30%

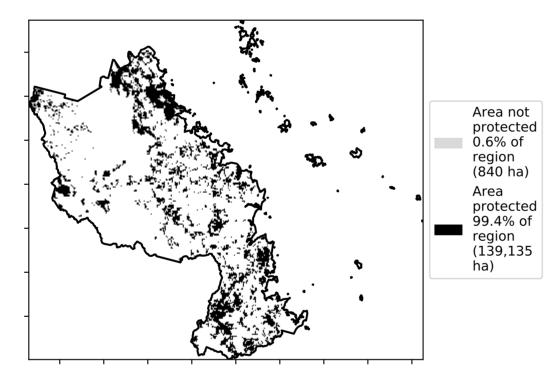
Land use and forest cover



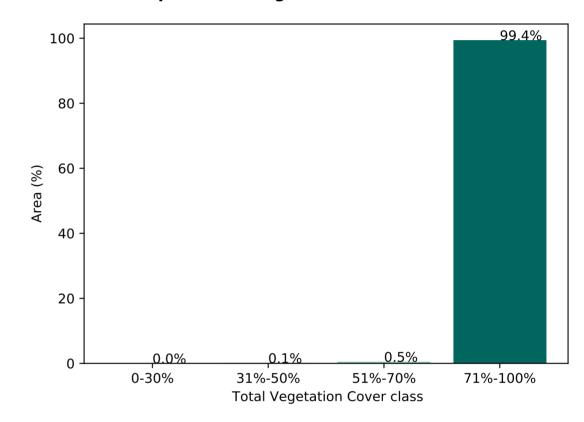
**Total Vegetation Cover [%]** 



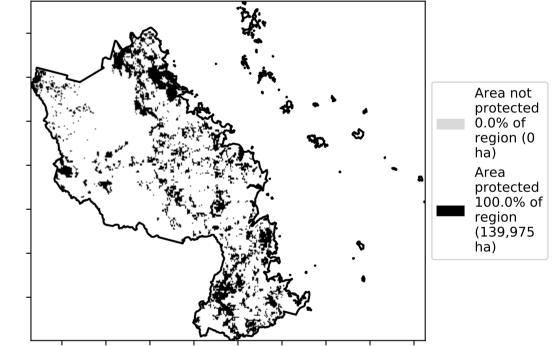
% Area protected from water erosion (>70%)



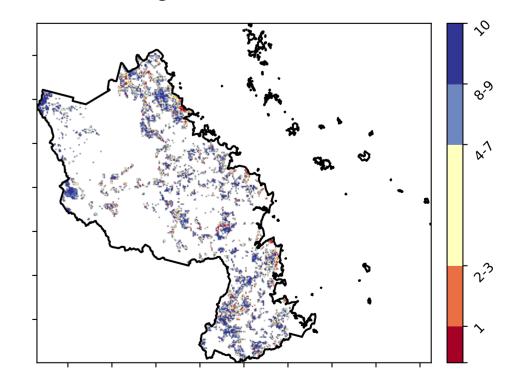
Proportion of vegetation cover class in area



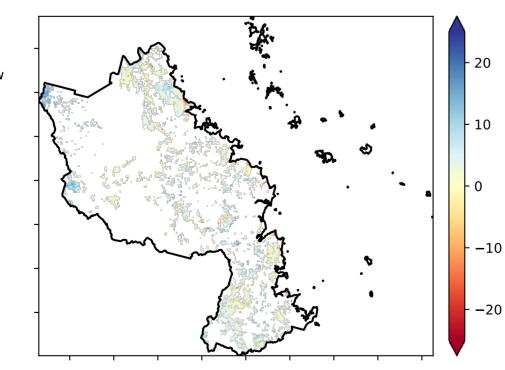
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



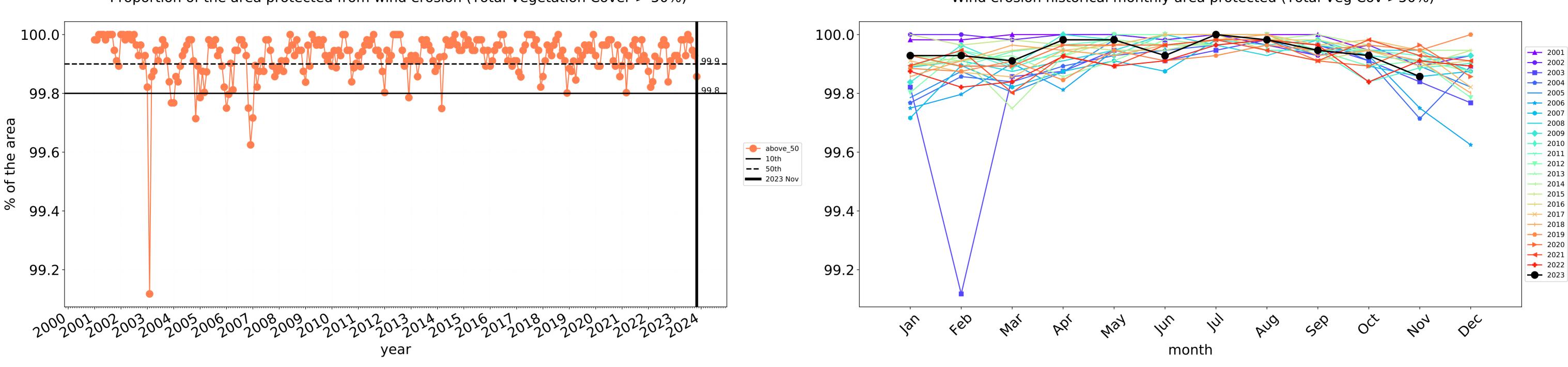
Total Vegetation Cover Anomaly [%]



Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

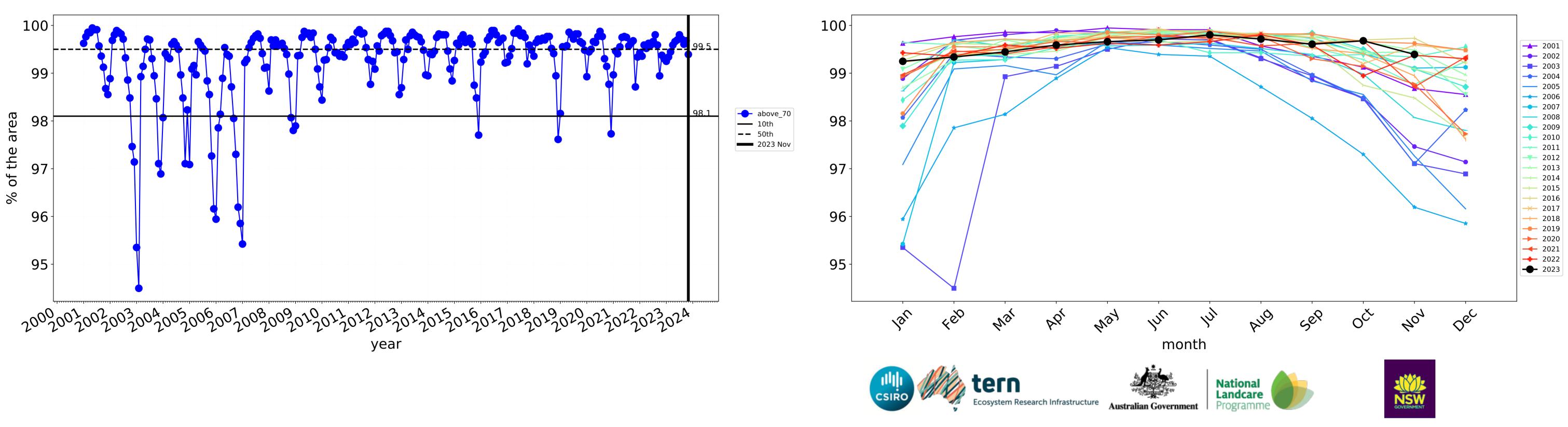


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



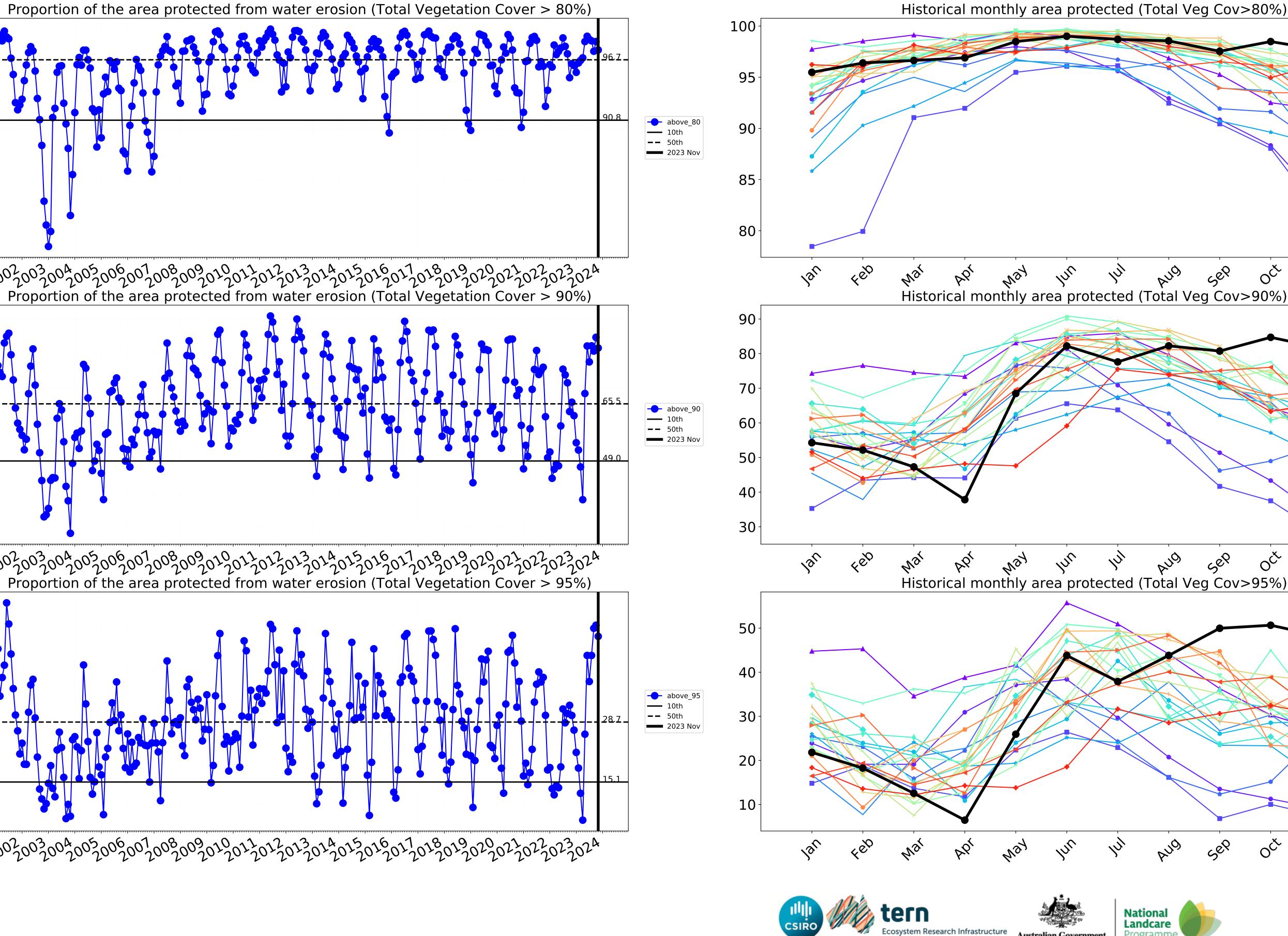
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

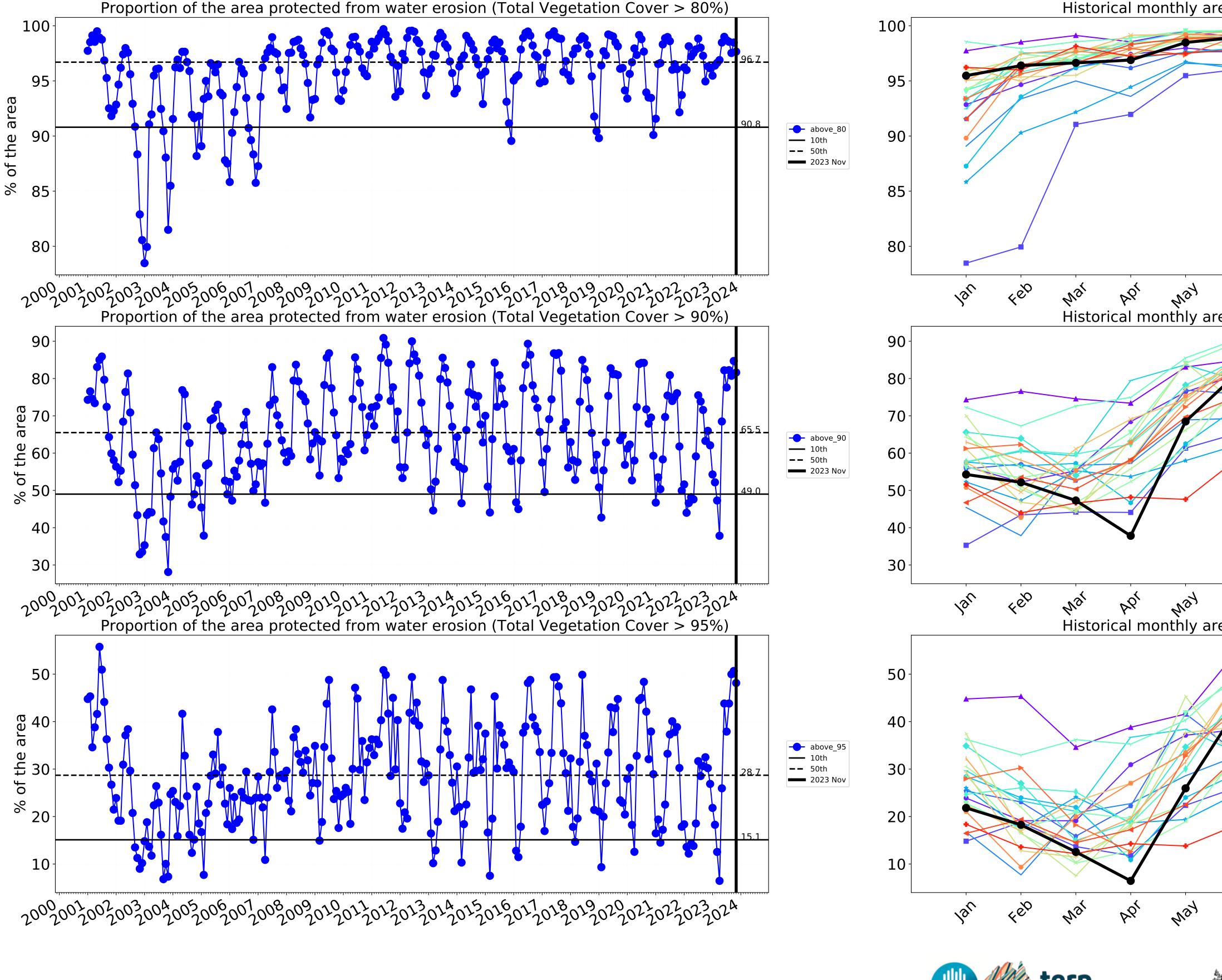






Wind erosion historical monthly area protected (Total Veg Cov >50%)





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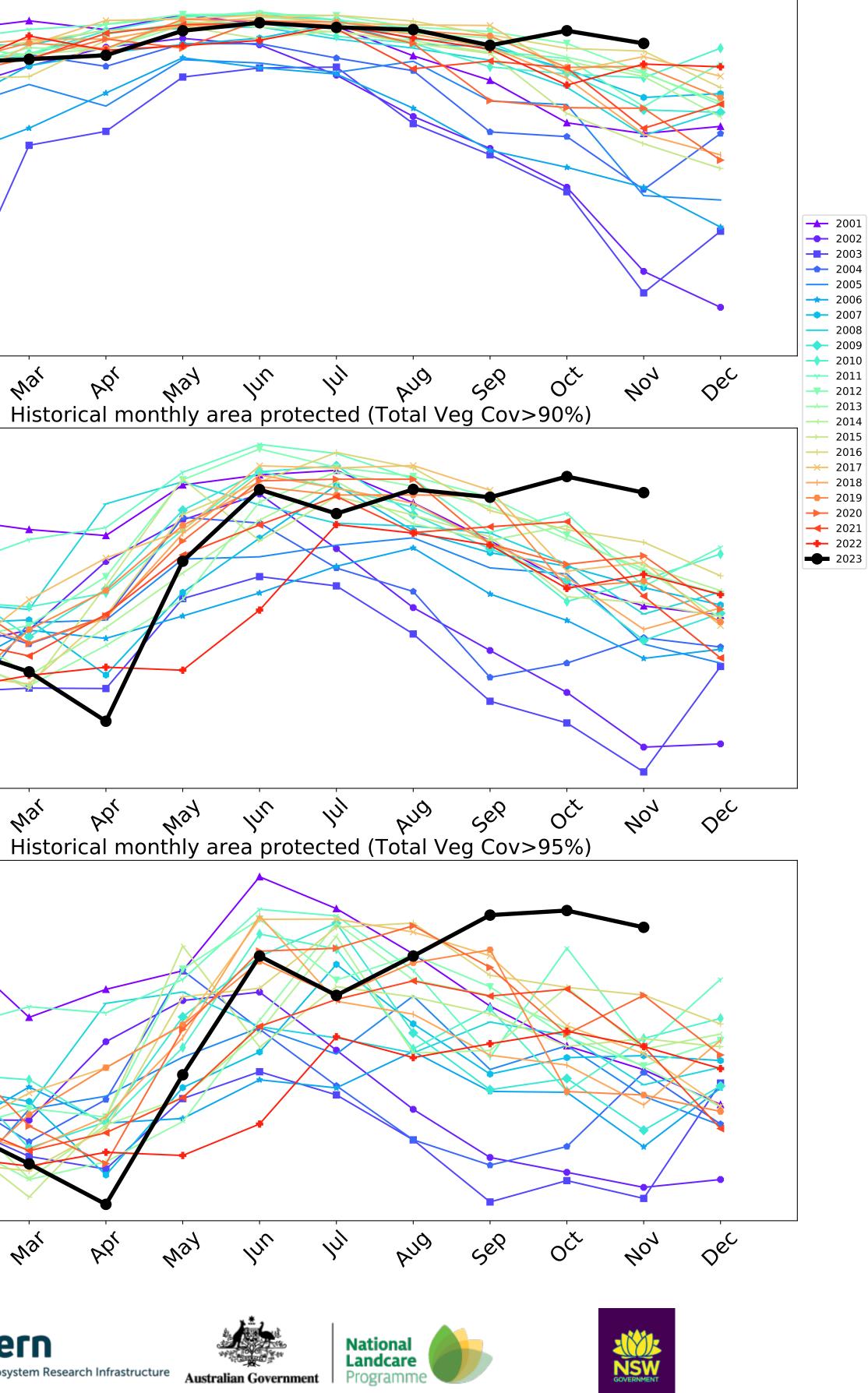


1/2/

1<sup>1</sup>1

1)

1/2/

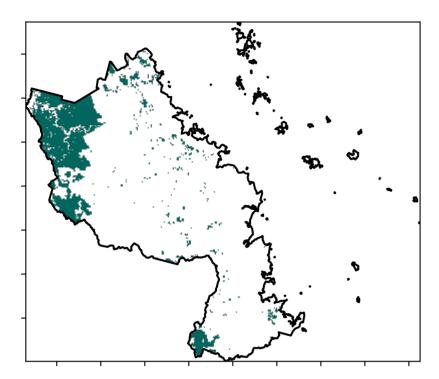


### **Grazing Woodland forest**

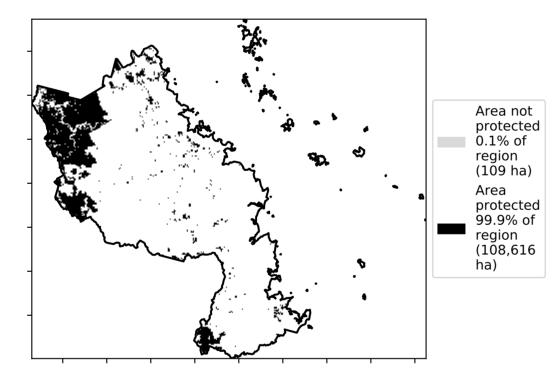
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018) 1 Agriculture - Grazing - Woodland forest

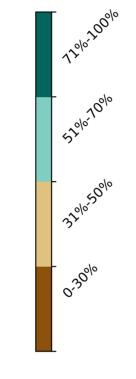
**Total Vegetation Cover [%]** 

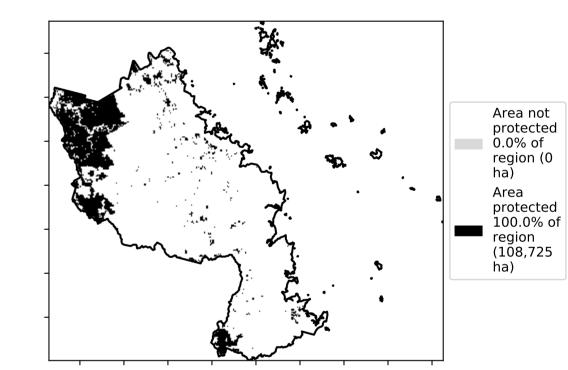
Land use and forest cover



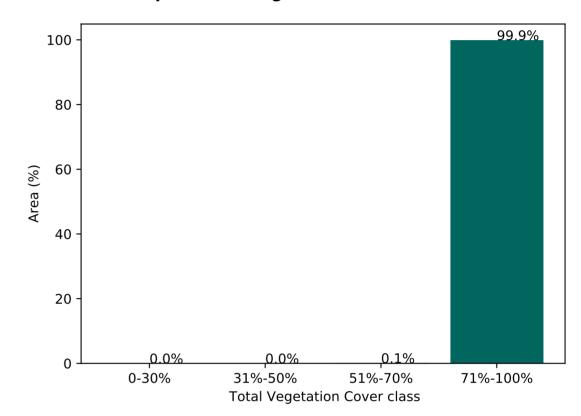
% Area protected from water erosion (>70%)







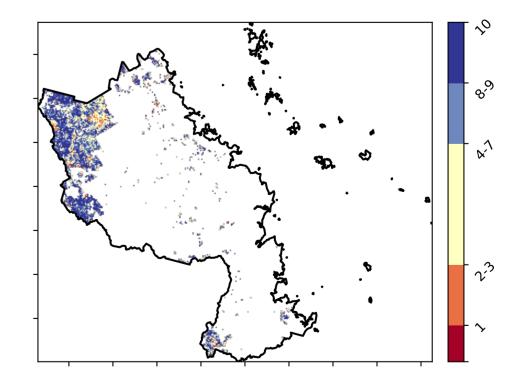
### Proportion of vegetation cover class in area



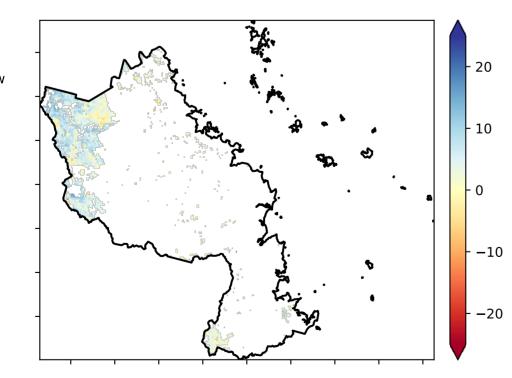
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



Total Vegetation Cover Anomaly [%]



Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

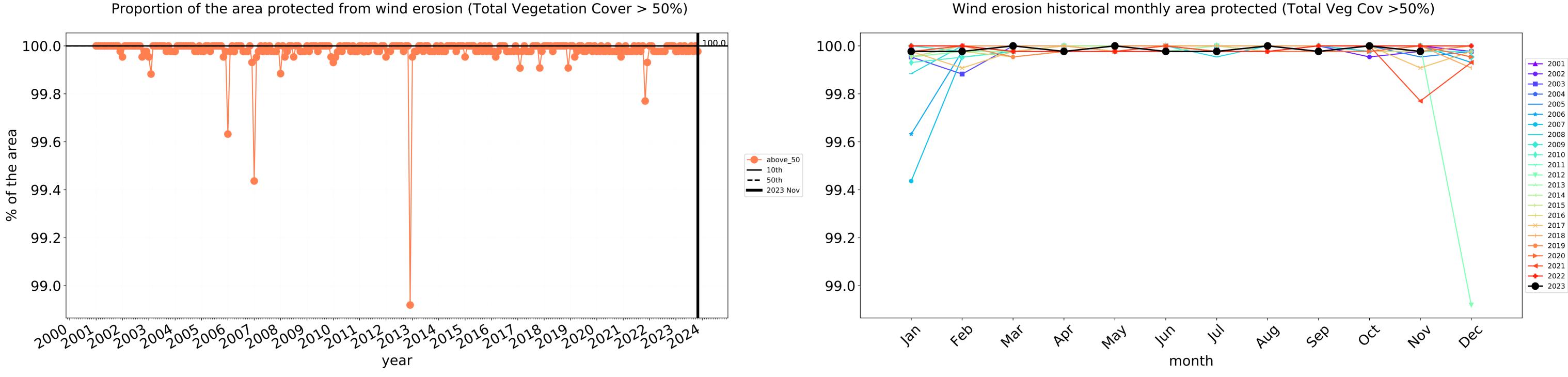




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

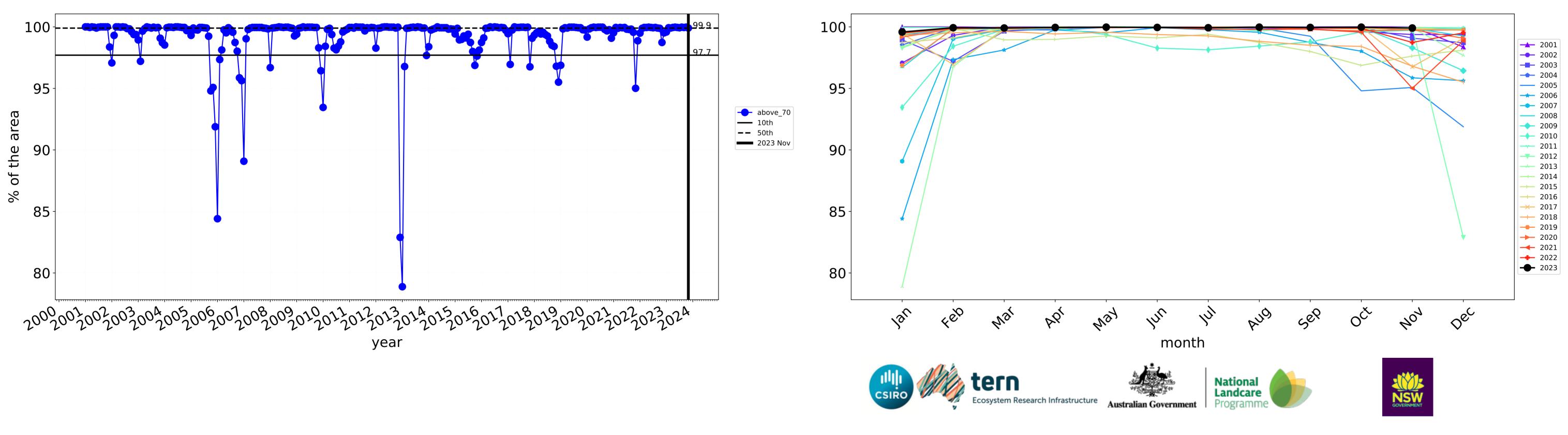


# **Grazing Woodland forest timeseries**

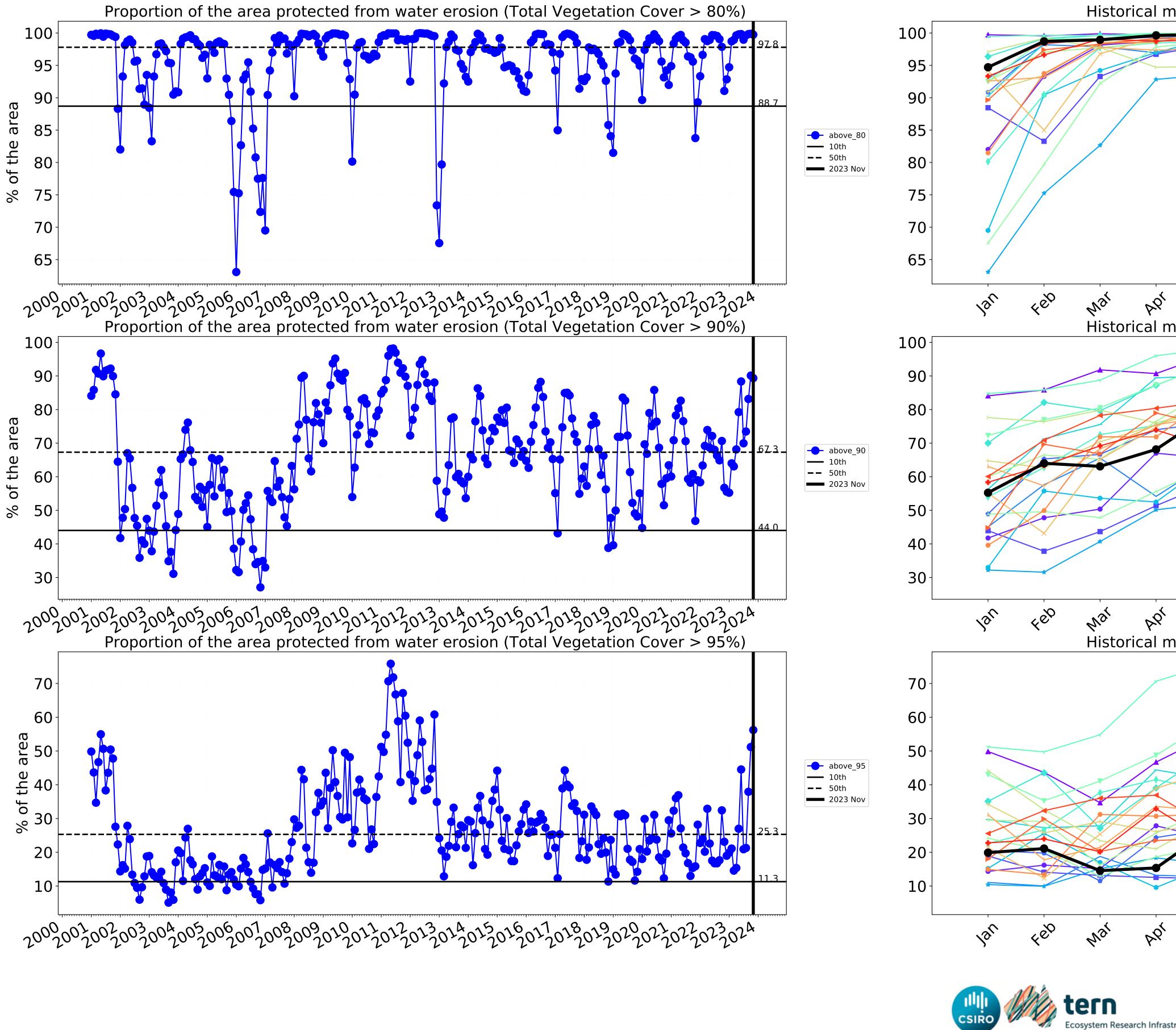


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



Water erosion historical monthly area protected (Total Veg Cov>70%)



Historical monthly area protected (Total Veg Cov>80%)

JUN

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1<sup>1</sup>1

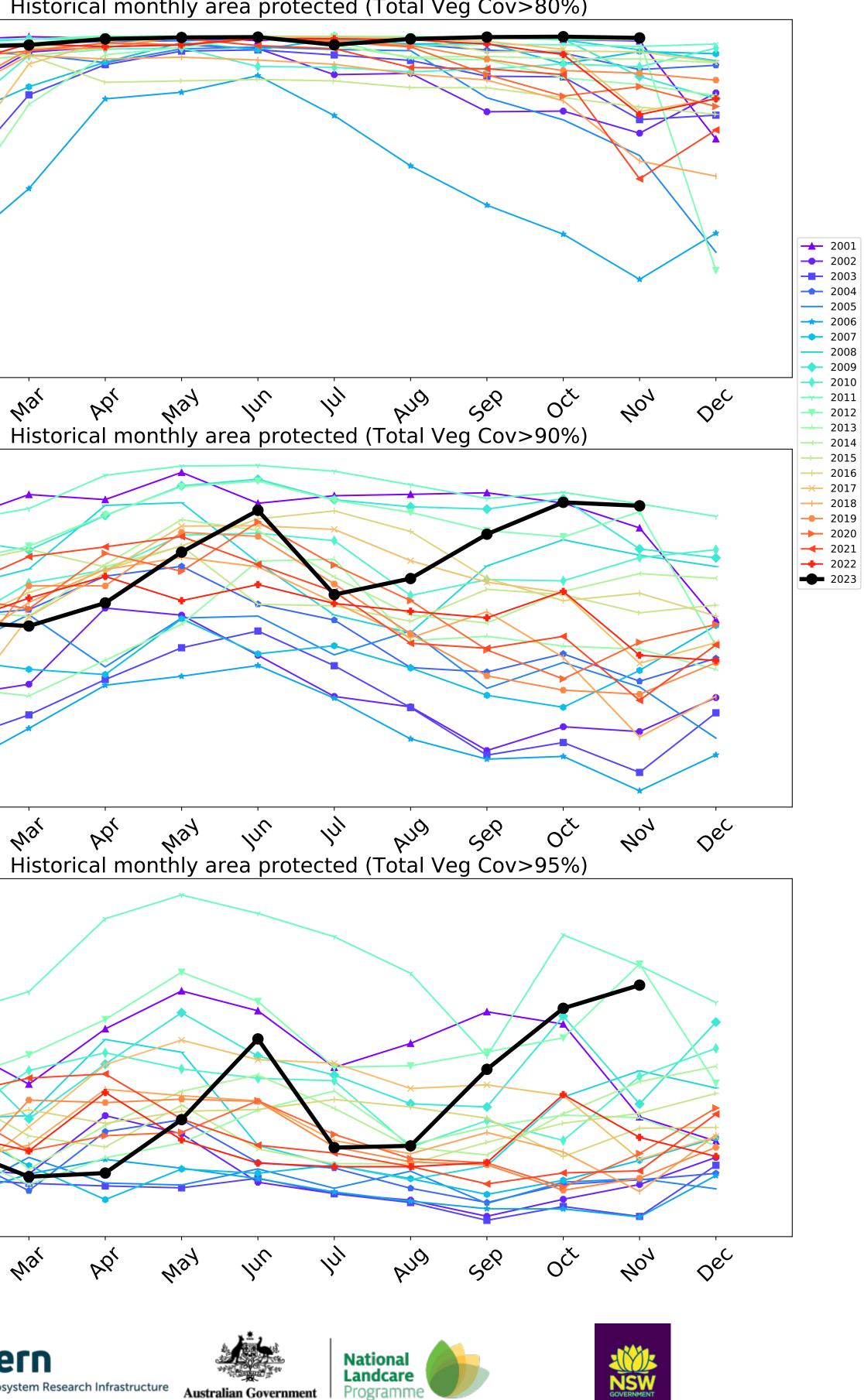
way

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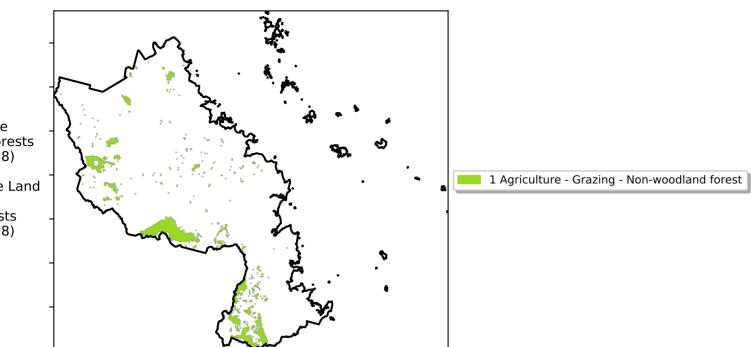
### **Grazing - Forest (non woodland)**

12%100%

52°1070°10

· 3201050010

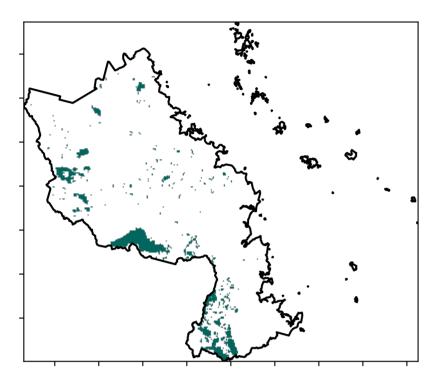
0.30%



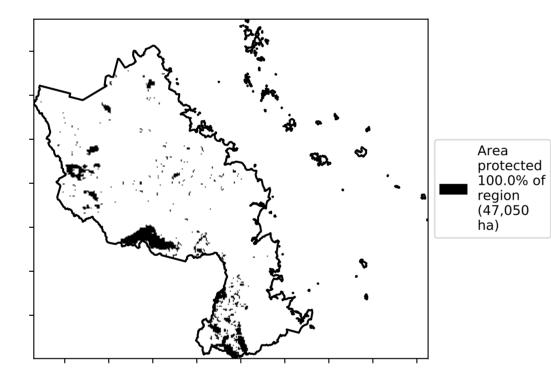
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover [%]** 

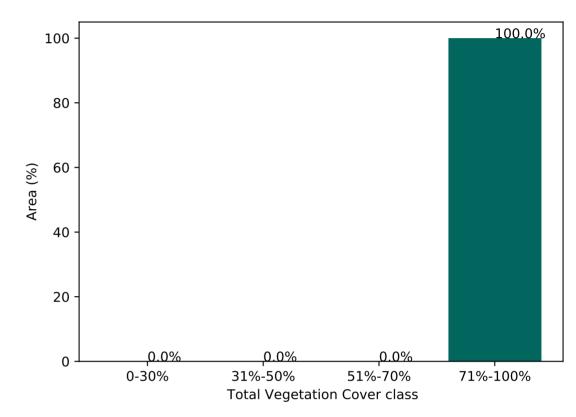
Land use and forest cover



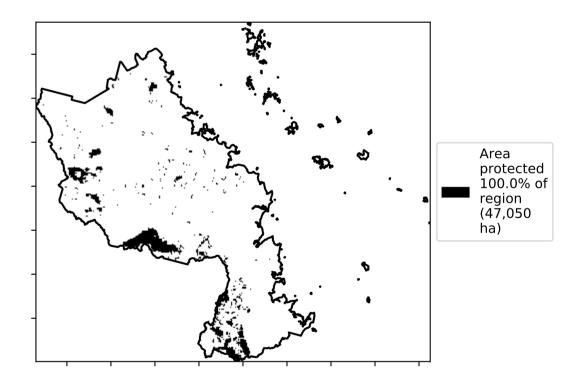
% Area protected from water erosion (>70%)



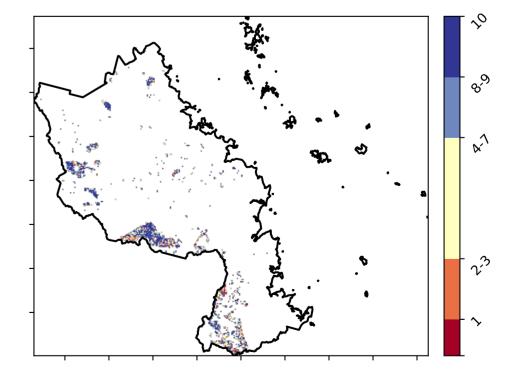
Proportion of vegetation cover class in area



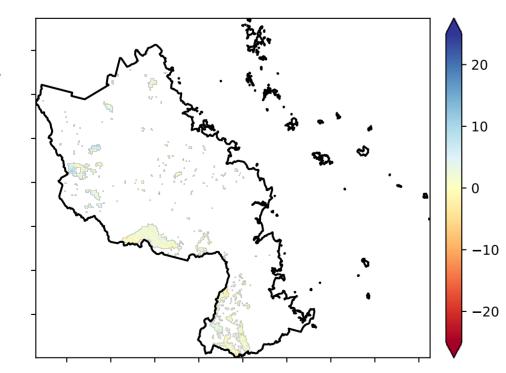
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



Total Vegetation Cover Anomaly [%]

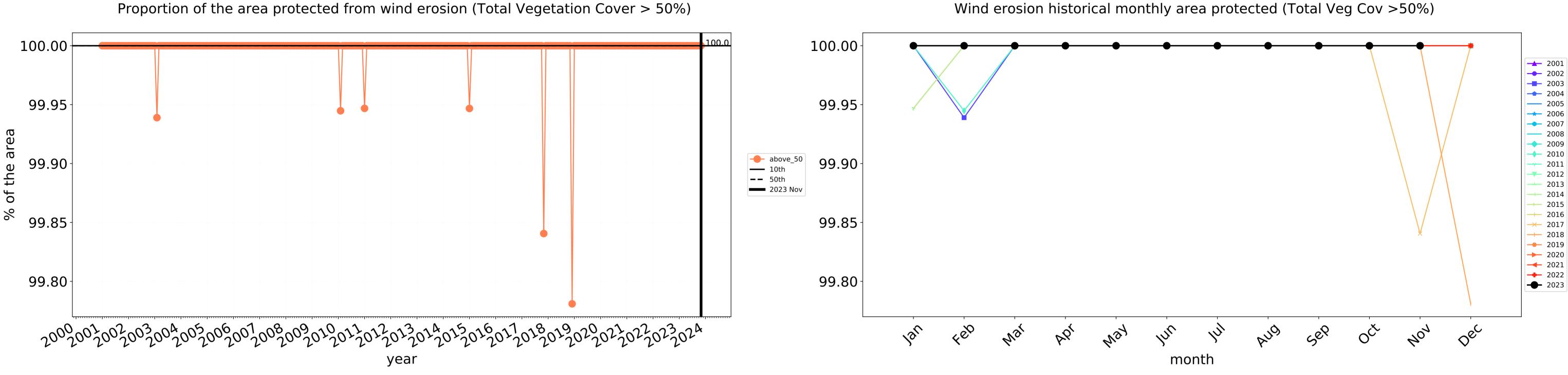


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



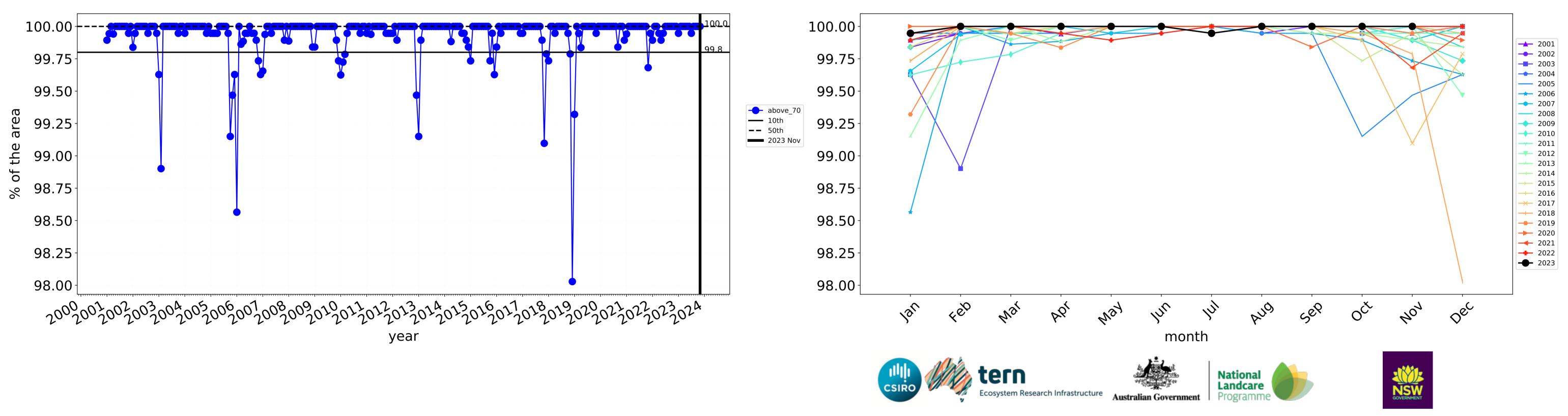


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

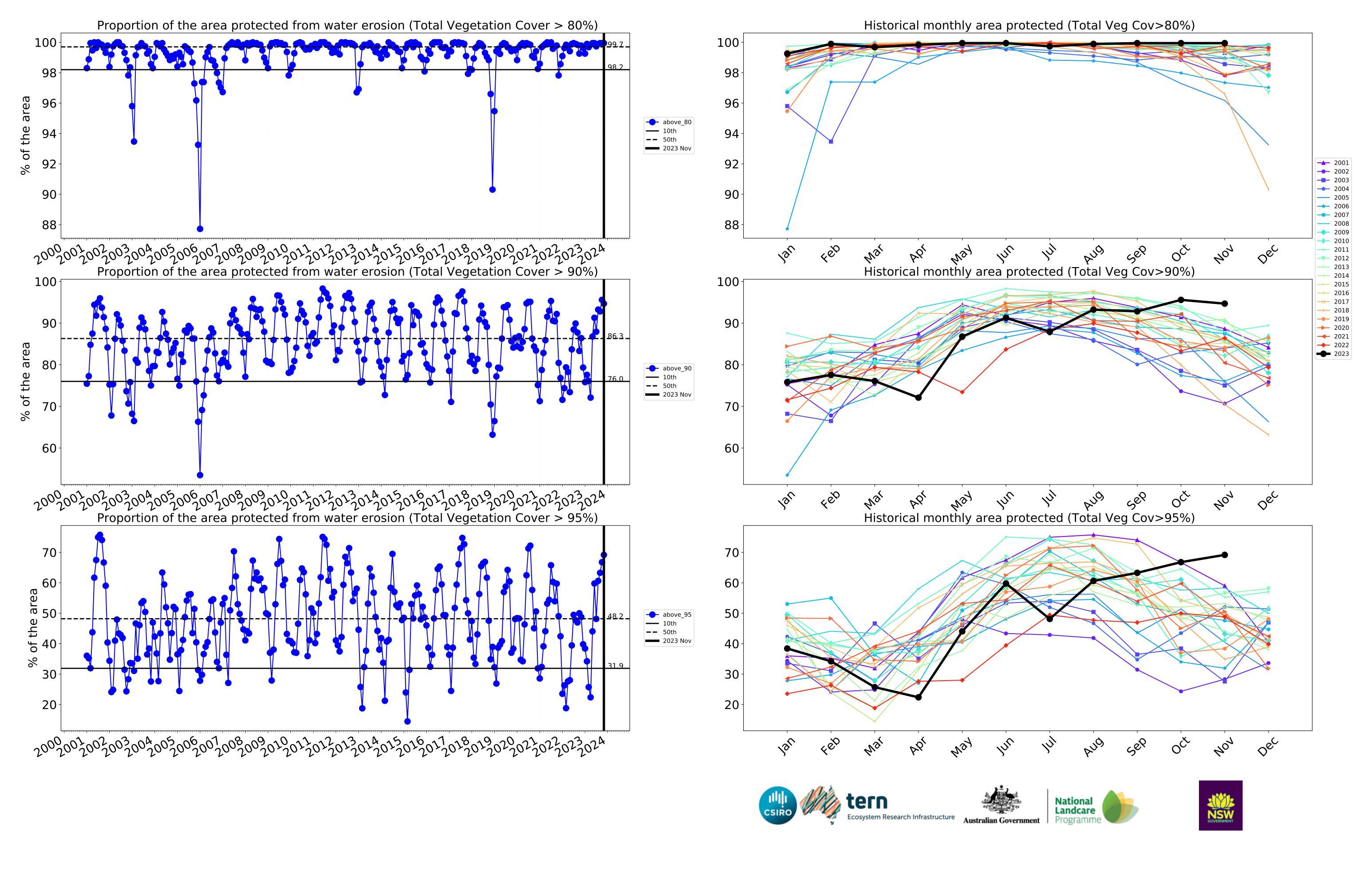


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

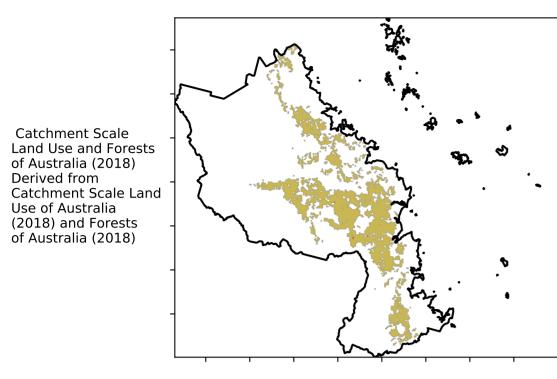


Water erosion historical monthly area protected (Total Veg Cov>70%)



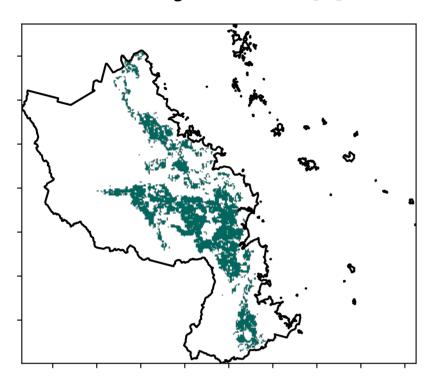
### Irrigation

Land use and forest cover

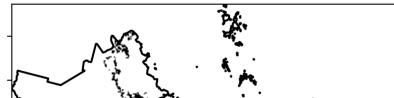


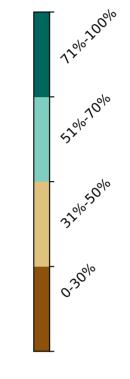
1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated 3 Agriculture - Horticulture - Irrigated

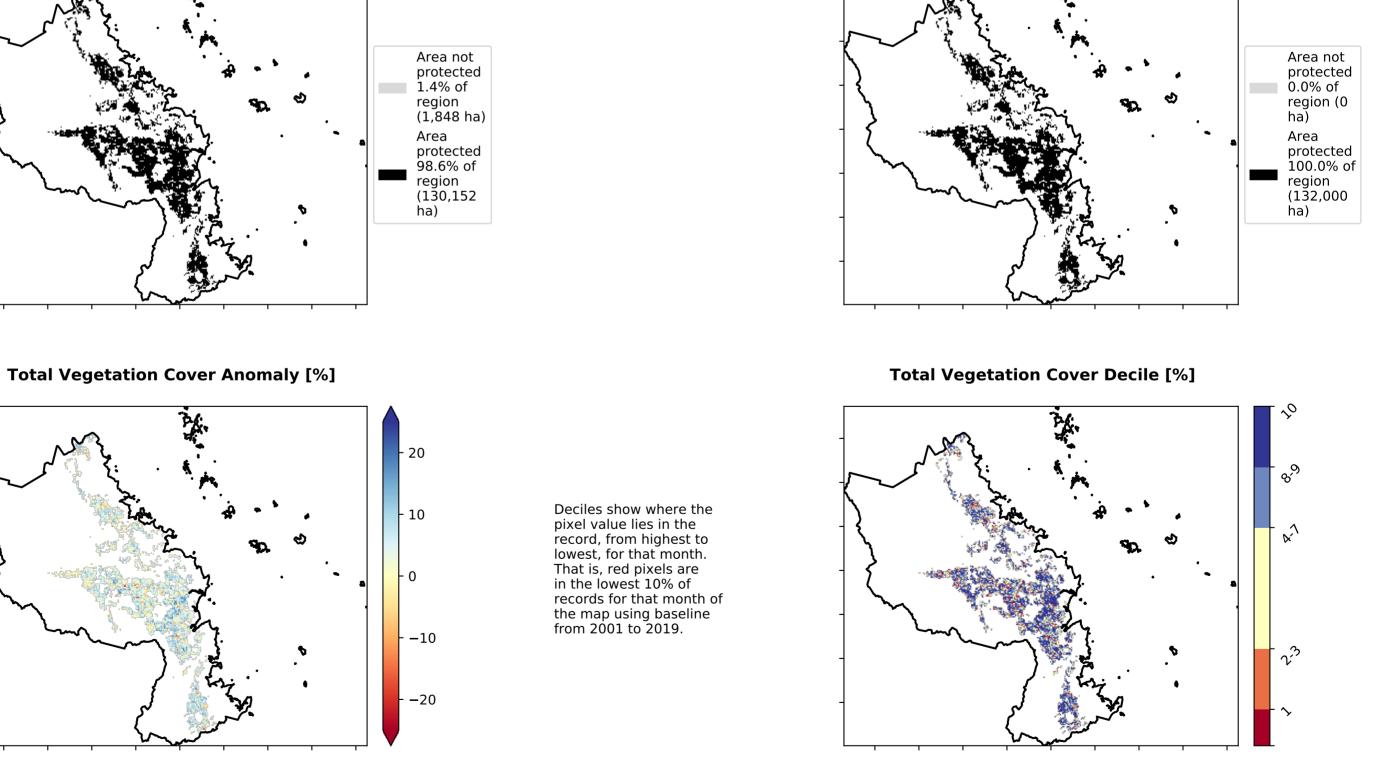
**Total Vegetation Cover [%]** 

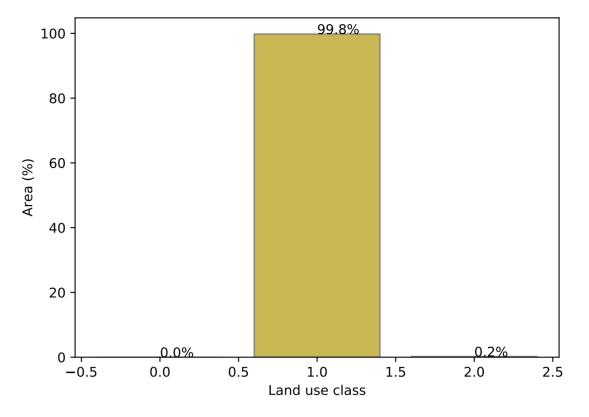


% Area protected from water erosion (>70%)



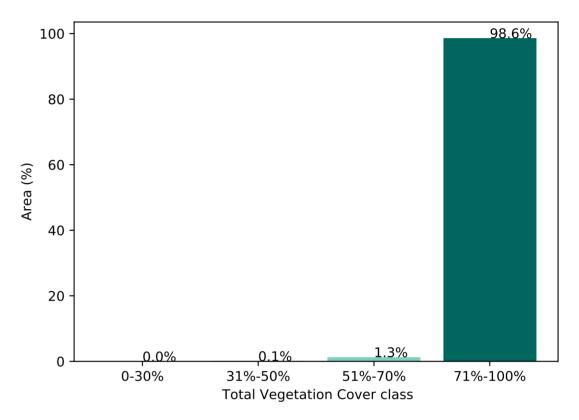




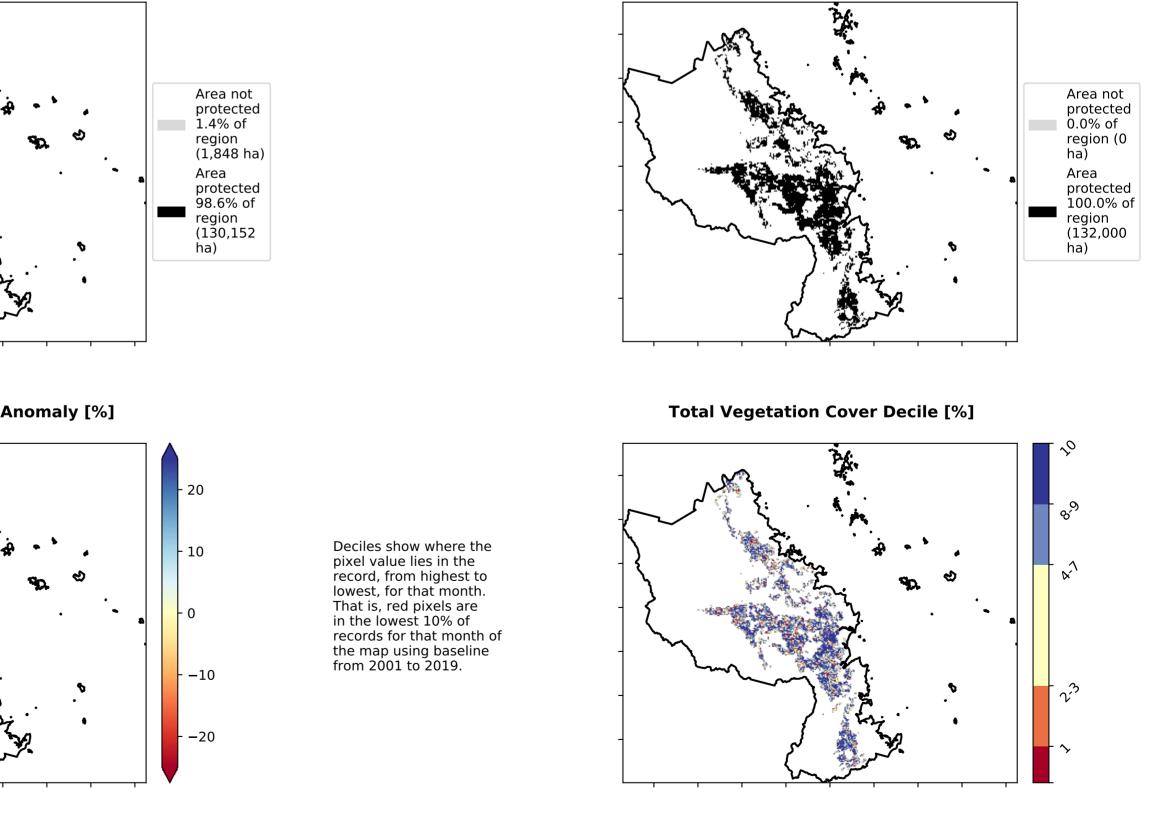


#### Proportion of each land class in area

Proportion of vegetation cover class in area



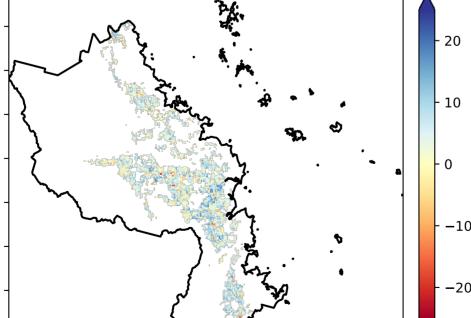
#### % Area protected from wind erosion (>50%)

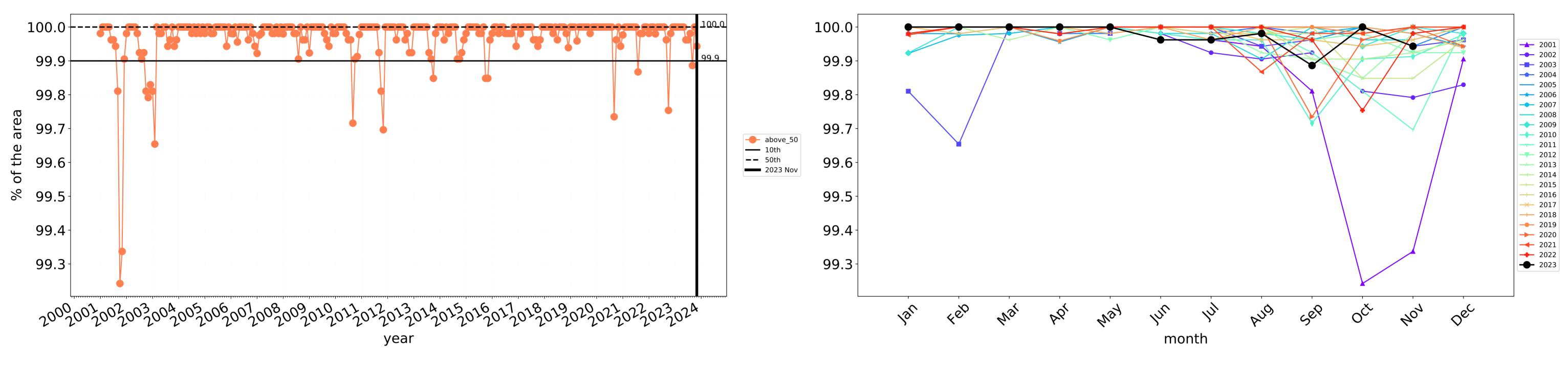






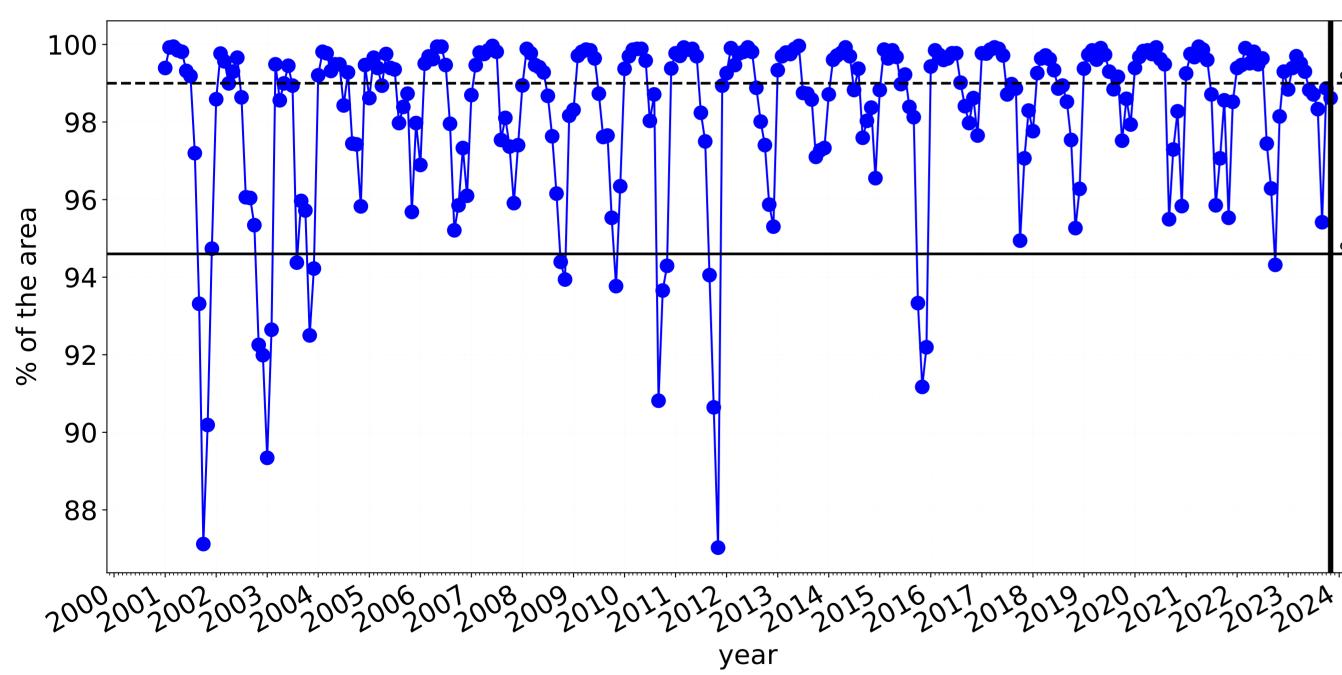
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

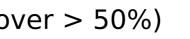




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



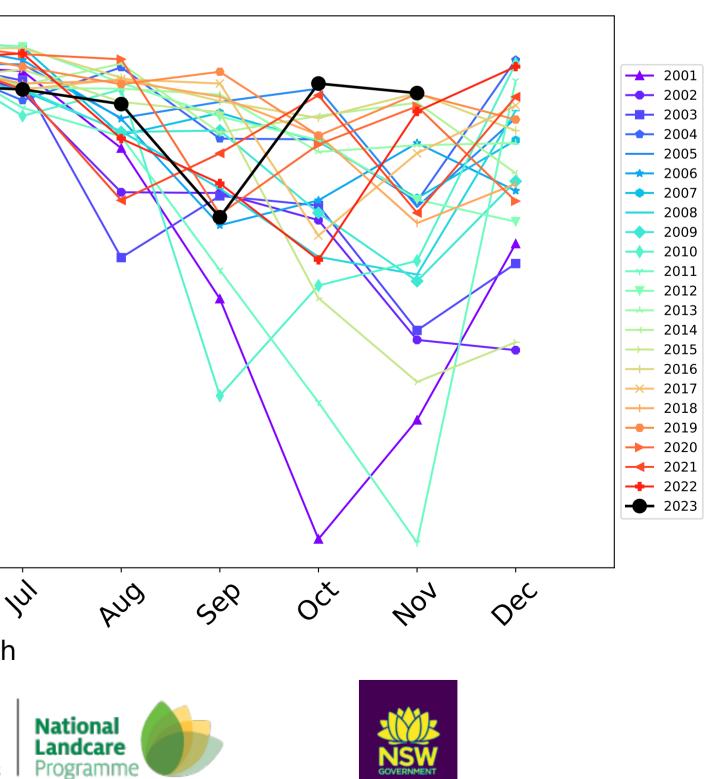


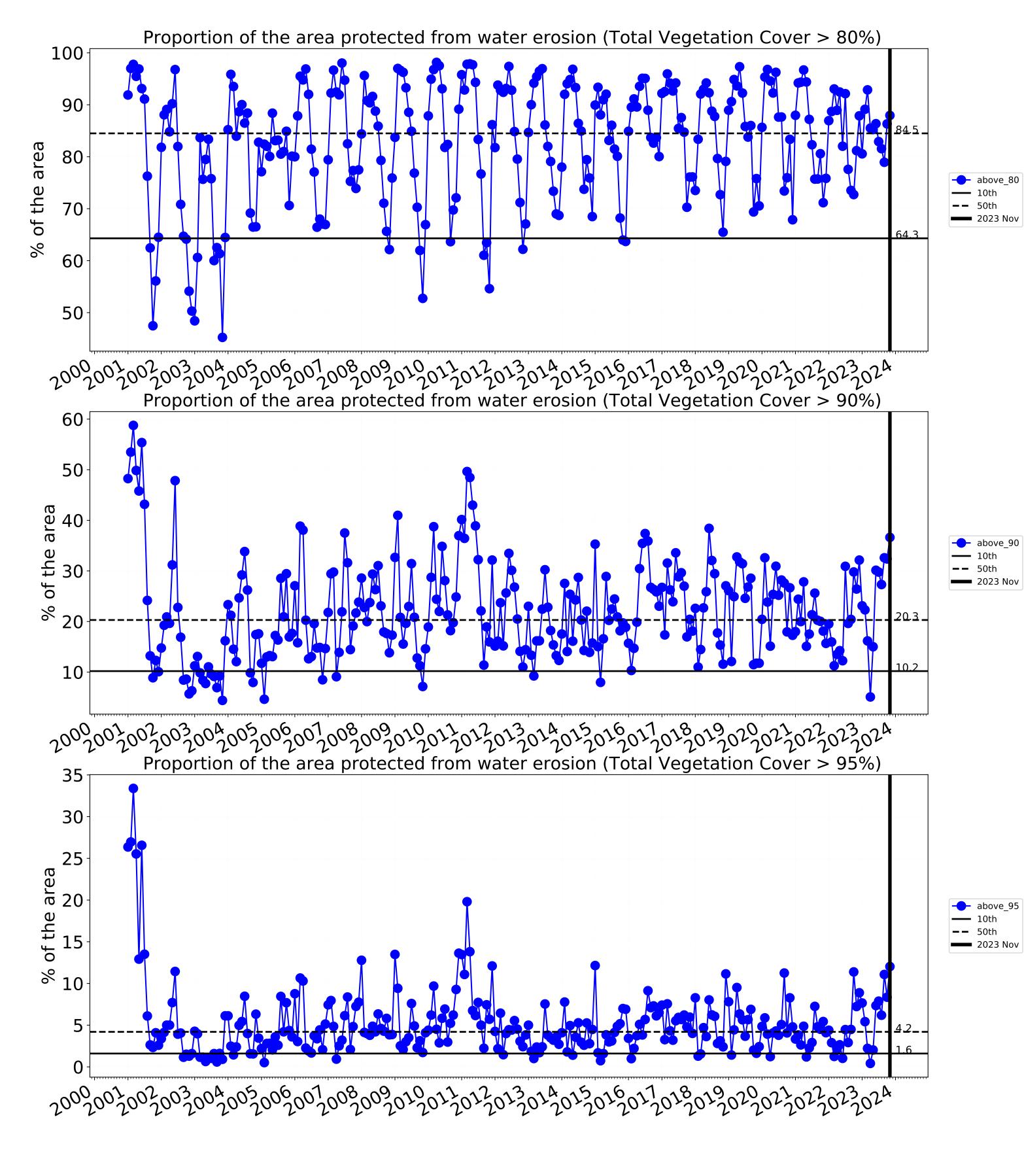
Wind erosion historical monthly area protected (Total Veg Cov >50%)

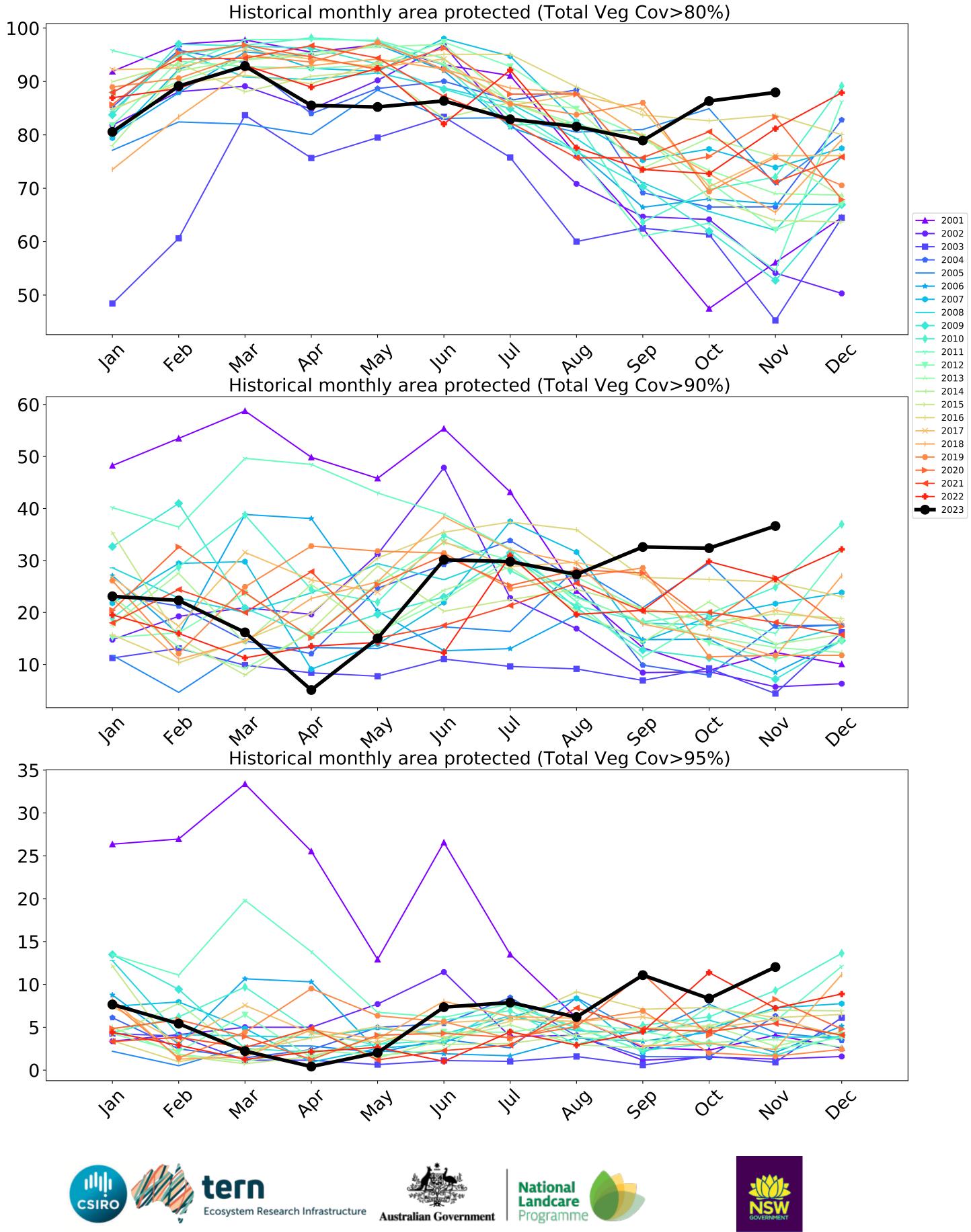
100 98 96----- above\_70 **—** 10th **——** 50th 2023 Nov 94 92 90 88 4eb lar In May PQ Mar month tern Ecosystem Research Infrastructure

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Water erosion historical monthly area protected (Total Veg Cov>70%)









## **Production native forests and plantation forests**

Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Production native forests and plantation forests Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

12%200%

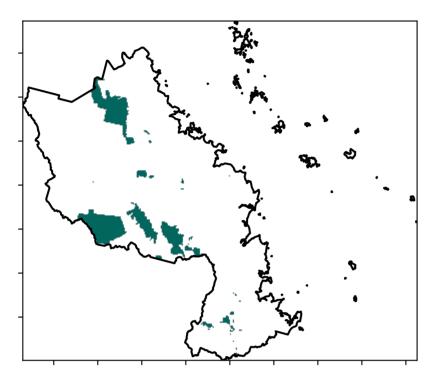
· 52°10010

· 320050010

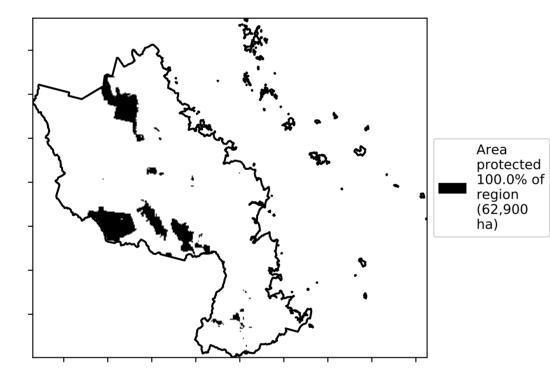
0.30%

Land use and forest cover

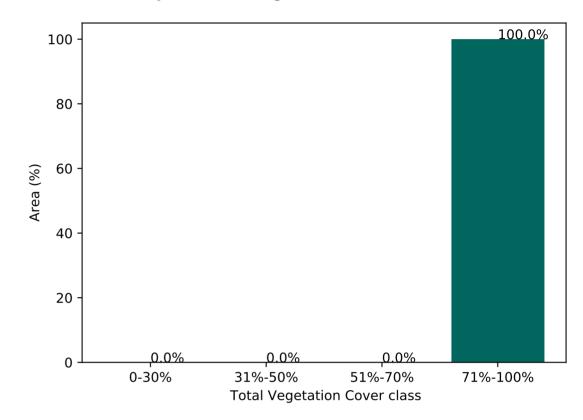
**Total Vegetation Cover [%]** 



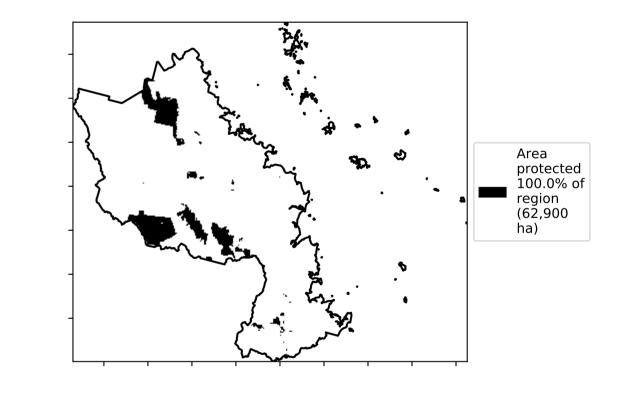
% Area protected from water erosion (>70%)



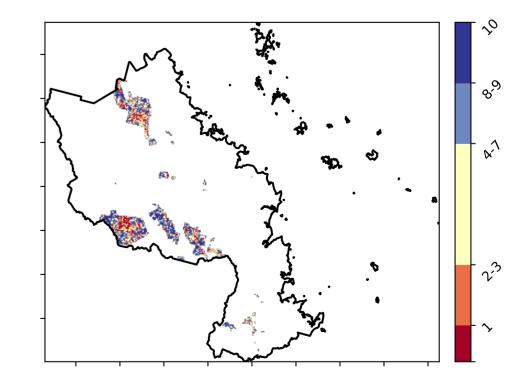




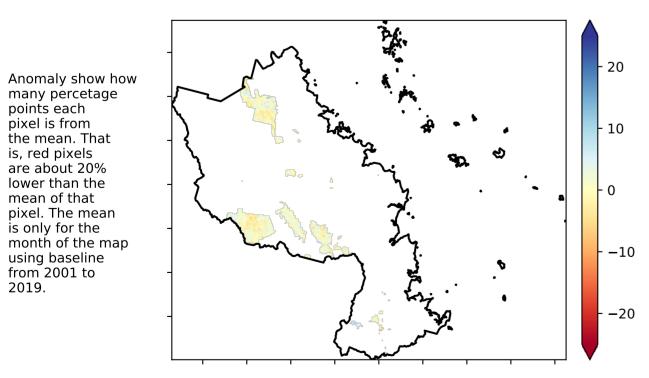
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



Total Vegetation Cover Anomaly [%]



the mean. That

is, red pixels are about 20% lower than the

mean of that pixel. The mean

using baseline from 2001 to 2019.

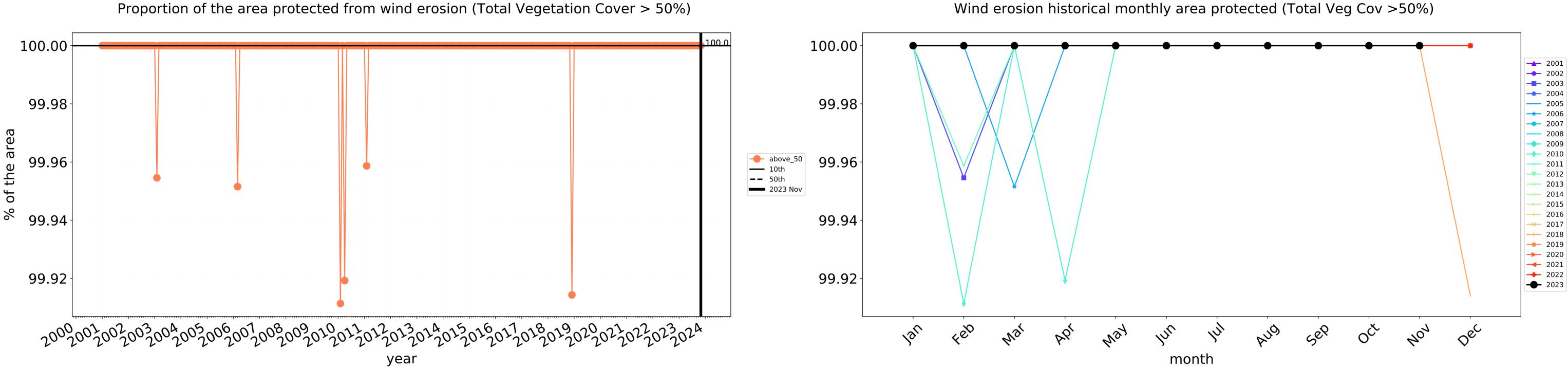




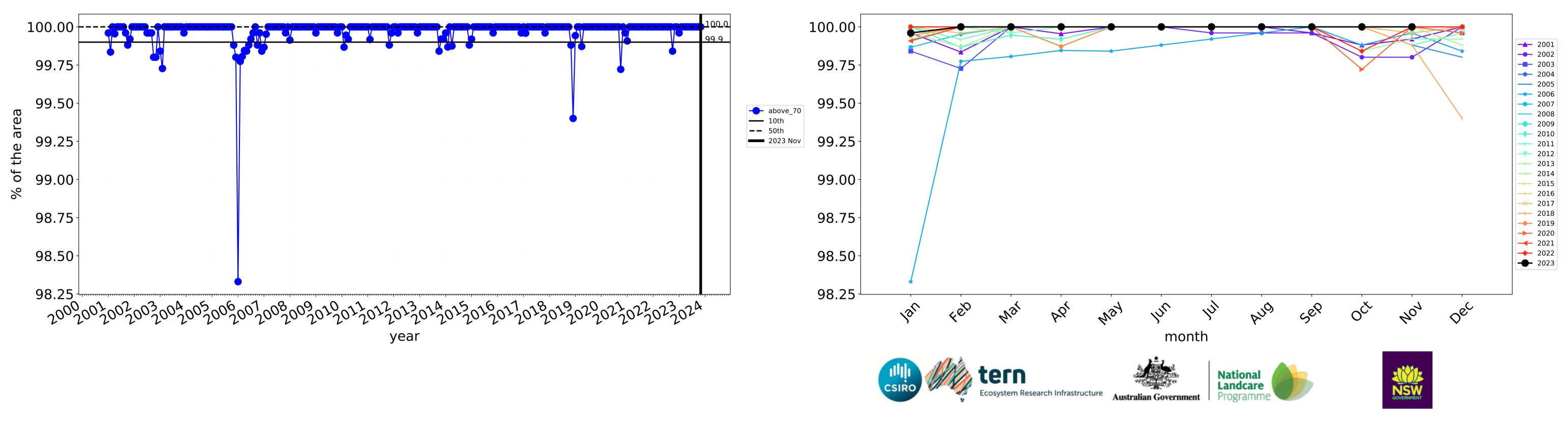
Deciles show where the pixel value lies in the

record, from highest to lowest, for that month. That is, red pixels are

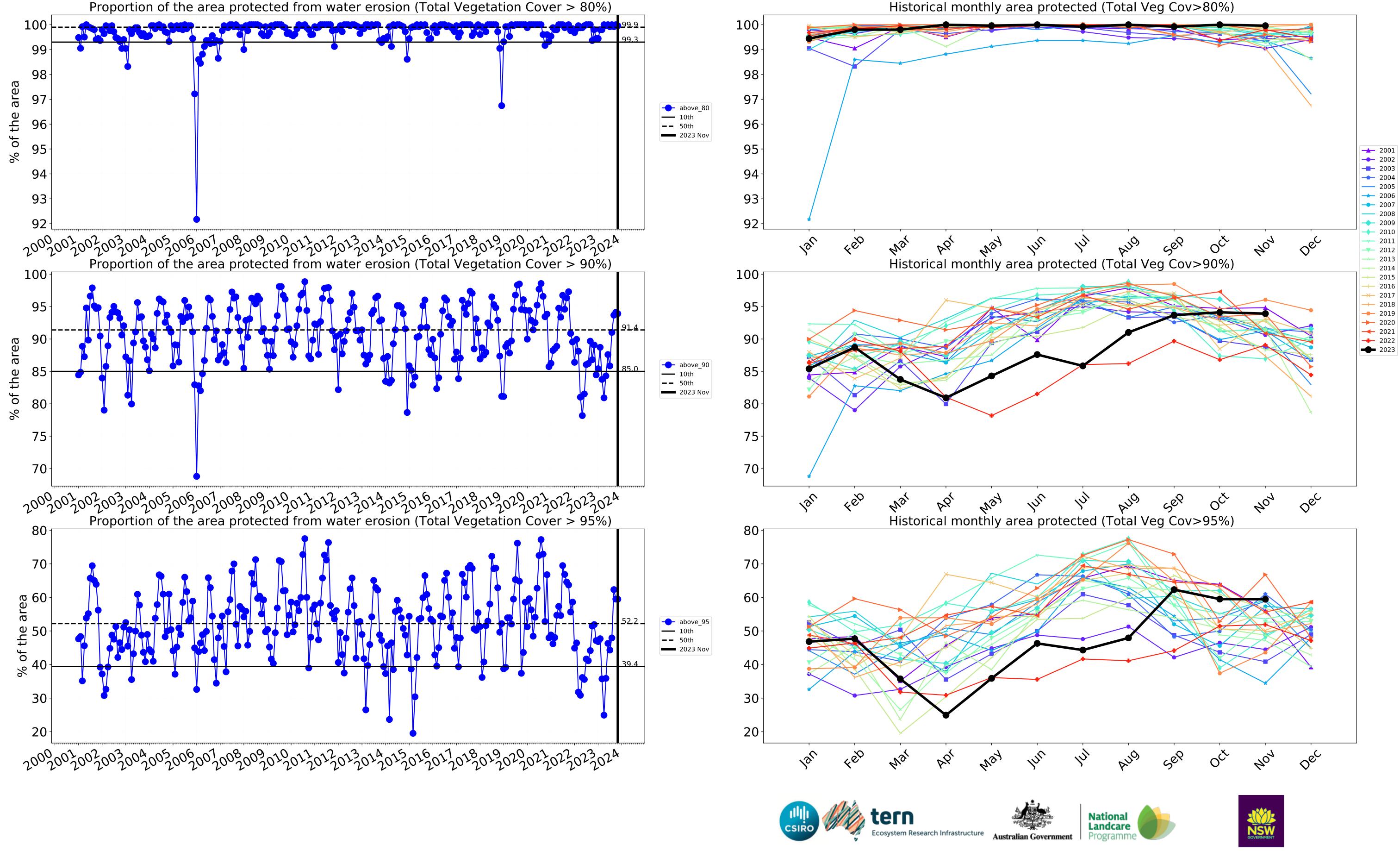
in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



Water erosion historical monthly area protected (Total Veg Cov>70%)



Proportion of the area protected from water erosion (Total Vegetation Cover > 80%)

# Mackay\_(R) (749,225 ha and no data 12,086 ha) Percentage area and hectares protected with TVC threshold 30,50,70,80,90 and 95%

Land use and forest cover Class	area(ha)	above_30	above_50	above_70	above_80	above_90	above_95
Entire region	749,225	99.9% 748,650	99.7% 747,025	98.2% 735,875	94.0% 704,175	73.6% 551,575	42.5% 318,525
Conservation and natural environments	192,700	100.0% 192,625	99.7% 192,200	98.9% 190,525	97.2% 187,375	85.5% 164,850	48.8% 94,050
Conservation and natural environments non forest	4,875	100.0% 4,875	95.4% 4,650	87.7% 4,275	77.9% 3,800	50.8% 2,475	24.1% 1,175
Conservation and natural environments Woodland forest	37,200	99.9% 37,150	99.7% 37,100	98.6% 36,675	96.2% 35,800	81.2% 30,200	57.4% 21,350
Conservation and natural environments Forest (non woodland)	150,625	100.0% 150,600	99.9% 150,450	99.3% 149,575	98.1% 147,775	87.8% 132,175	47.5% 71,525
Agriculture	428,350	100.0% 428,275	99.9% 428,050	99.4% 425,575	95.5% 408,875	71.2% 304,900	41.4% 177,525
Grazing	295,750	100.0% 295,675	99.9% 295,525	99.7% 294,800	98.8% 292,175	86.5% 255,950	54.5% 161,050
Grazing non forest	139,975	99.9% 139,900	99.9% 139,775	99.4% 139,125	97.7% 136,700	81.6% 114,250	48.1% 67,375
Grazing Woodland forest	108,725	100.0% 108,725	100.0% 108,700	99.9% 108,625	99.7% 108,450	89.4% 97,150	56.2% 61,125
Grazing - Forest (non woodland)	47,050	100.0% 47,050	100.0% 47,050	100.0% 47,050	99.9% 47,025	94.7% 44,550	69.2% 32,550
Irrigation	132,000	100.0% 132,000	99.9% 131,925	98.6% 130,175	88.0% 116,100	36.6% 48,350	12.0% 15,875
Production native forests and plantation forests	62,900	100.0% 62,900	100.0% 62,900	100.0% 62,900	100.0% 62,875	93.9% 59,075	59.5% 37,400

