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

## Date: August 2024

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 Aug 2024**

#### Land use and forest cover

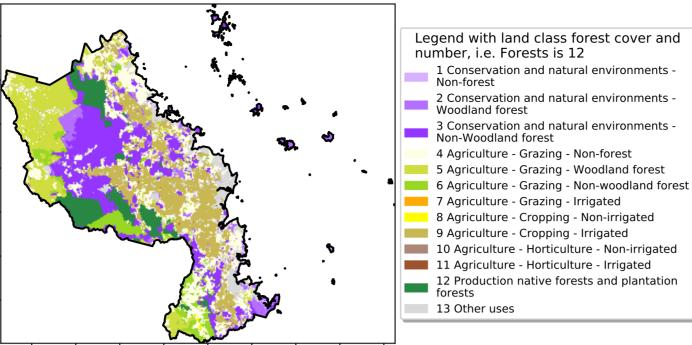
#### Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

pixel is from

is, red pixels

mean of that

2019.



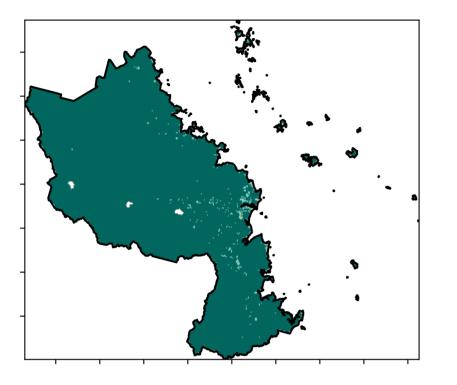
12%200%

· 52% 70%

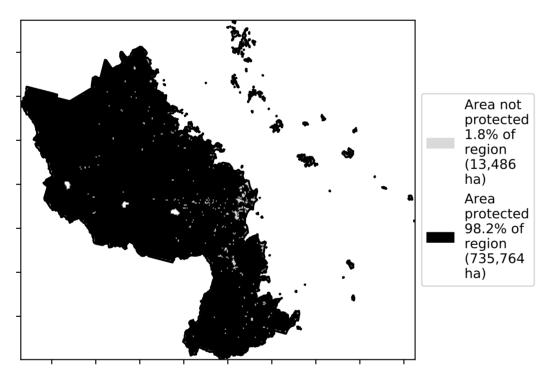
320050010

0.30%

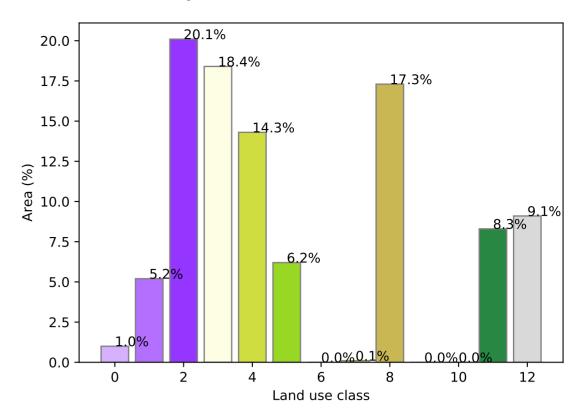
#### **Total Vegetation Cover [%]**



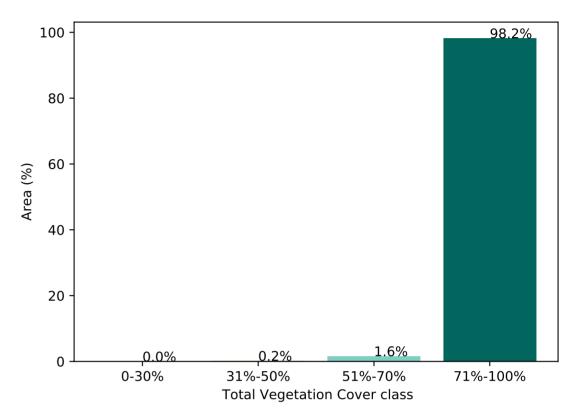
#### % Area protected from water erosion (>70%)



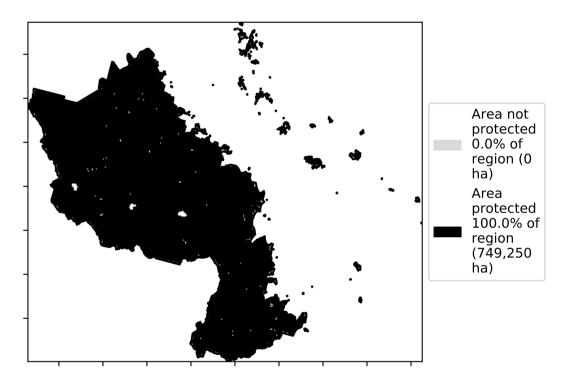
Proportion of each land class in area



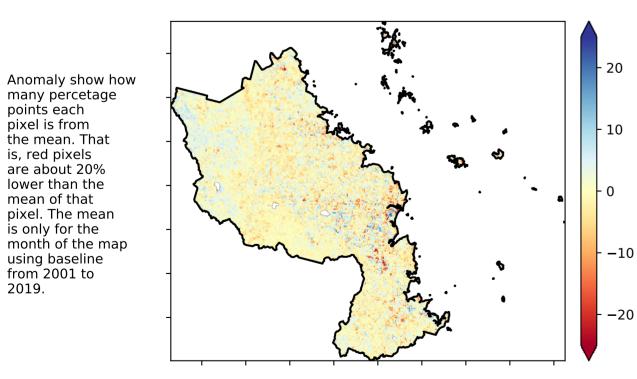
#### Proportion of vegetation cover class in area



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

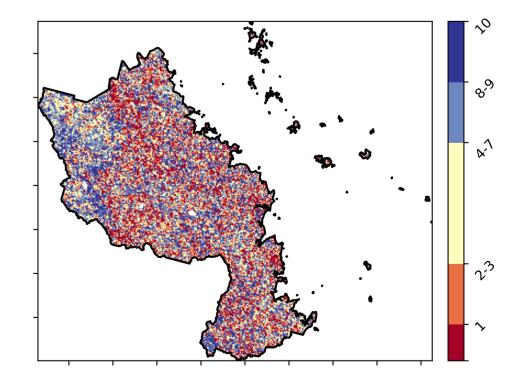






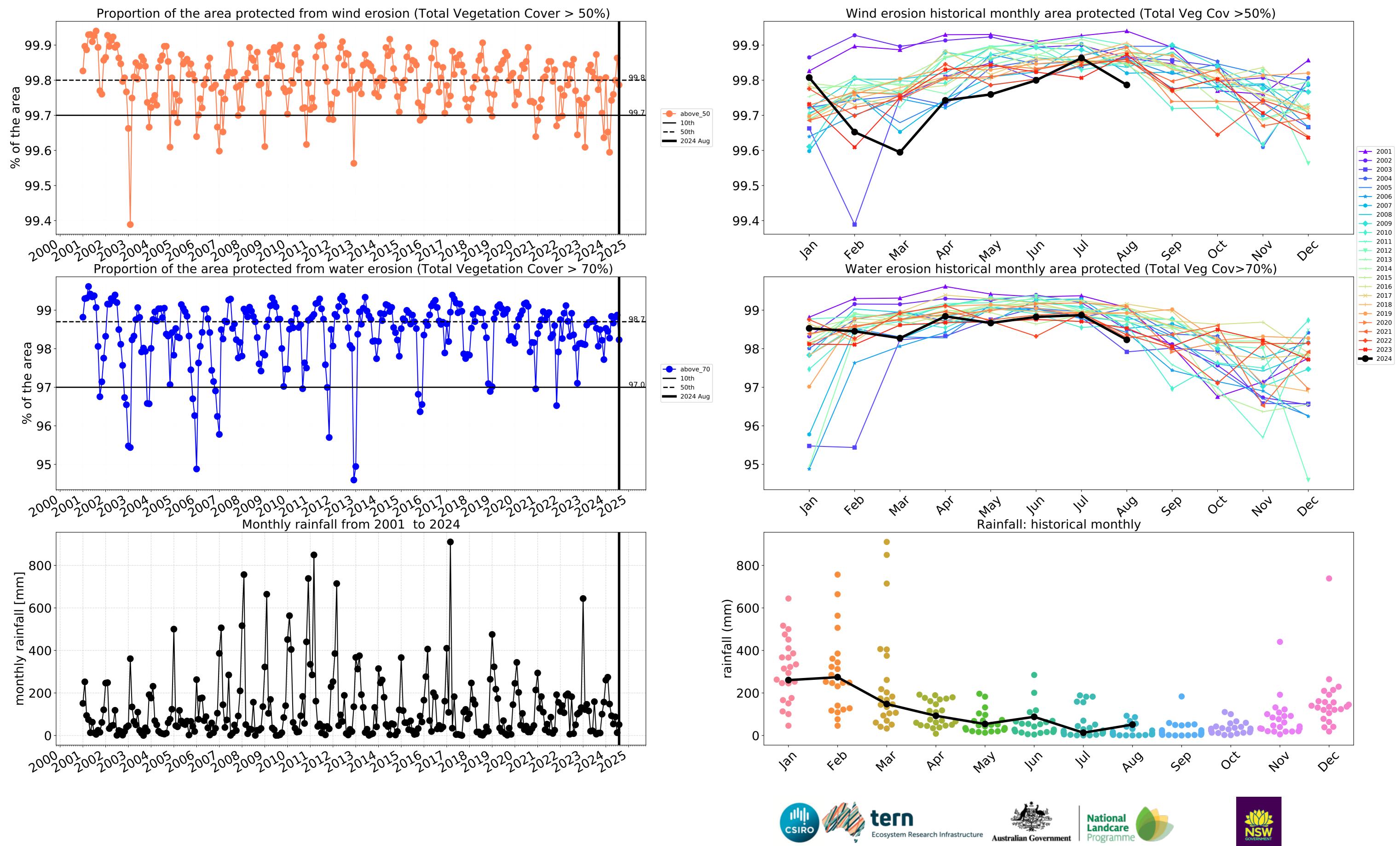
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

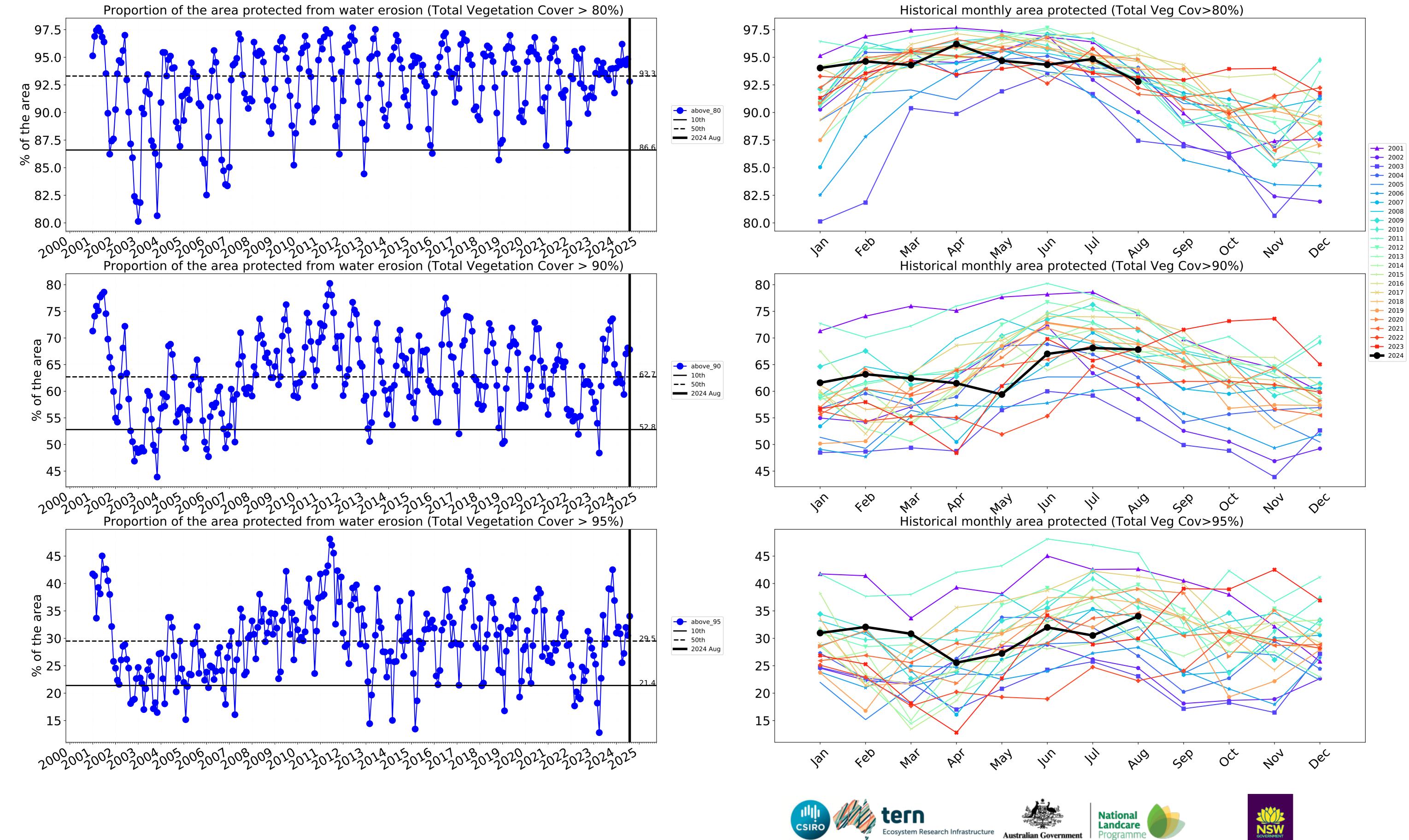
**Total Vegetation Cover Decile [%]** 





2





## **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

80

70

60

50

Area (%) 05

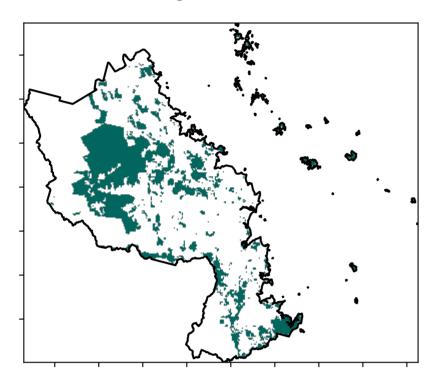
30

20

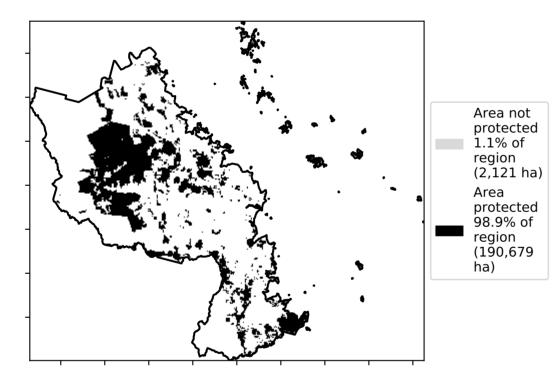
10

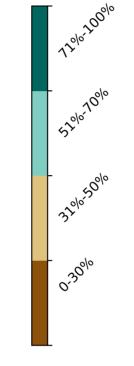
0

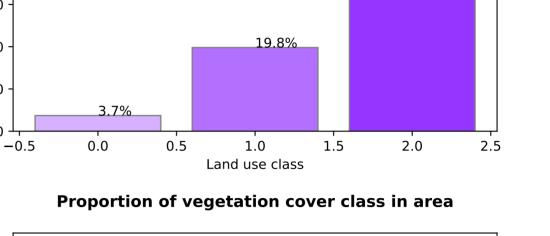
**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





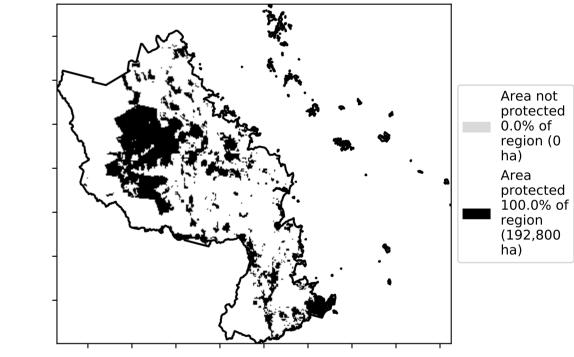




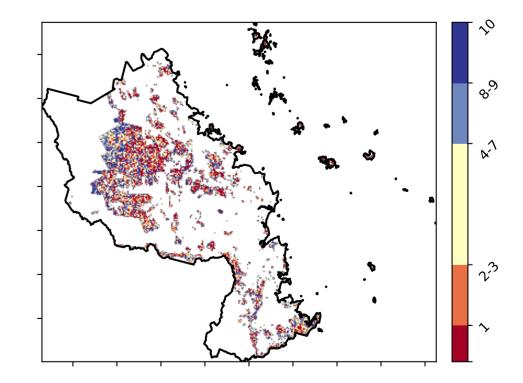
76.5%

98.9% 100 80 60 Area (%) 40 20 0.9% 0.2% 0.0% 0 31%-50% 71%-100% 0-30% 51%-70% Total Vegetation Cover class

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



**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

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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

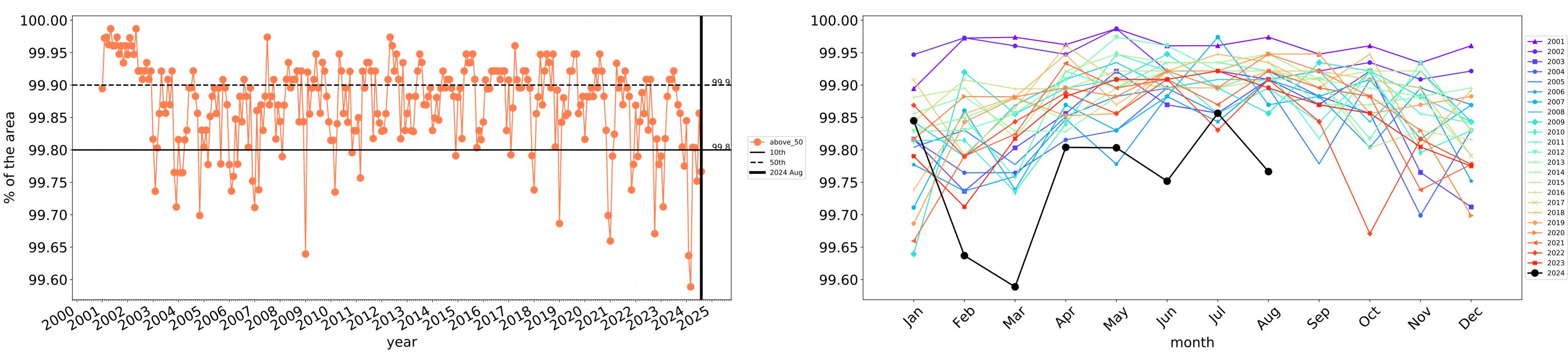
Derived from

Use of Australia

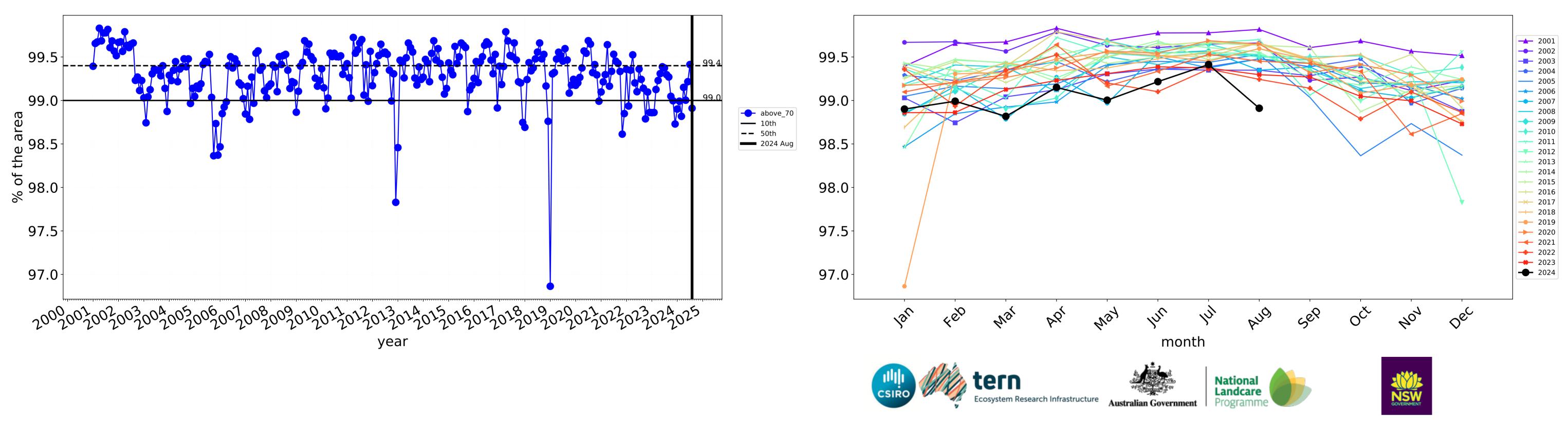
(2018) and Forests

of Australia (2018)

Land Use and Forests of Australia (2018)



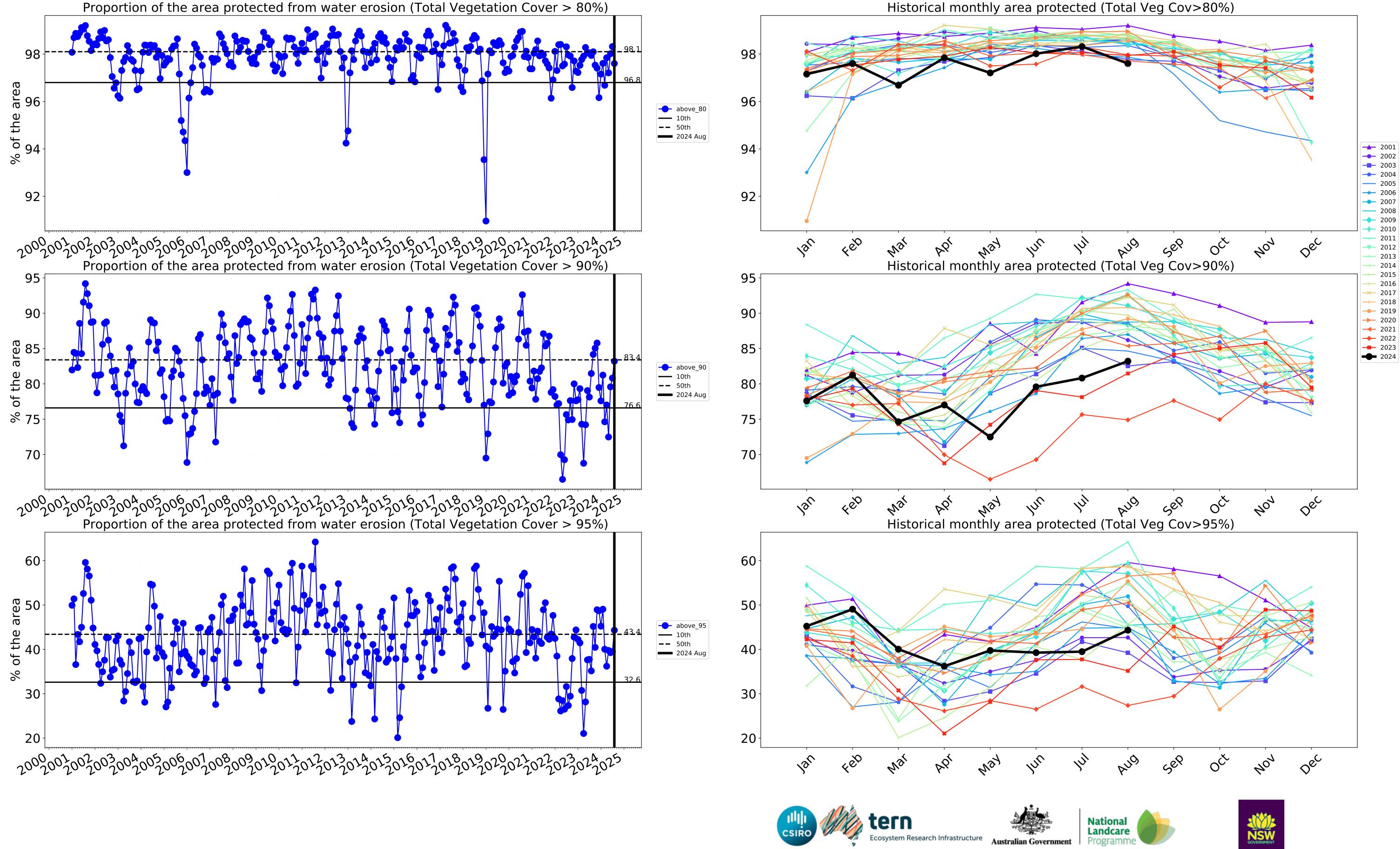
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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**

1200-200%

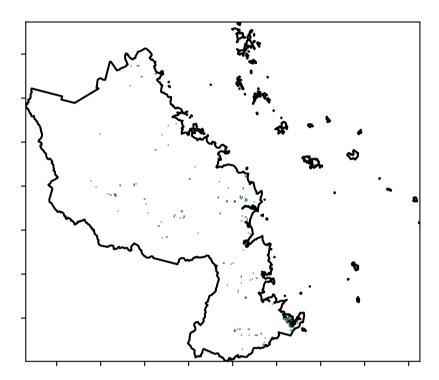
52% 70%

3201050010

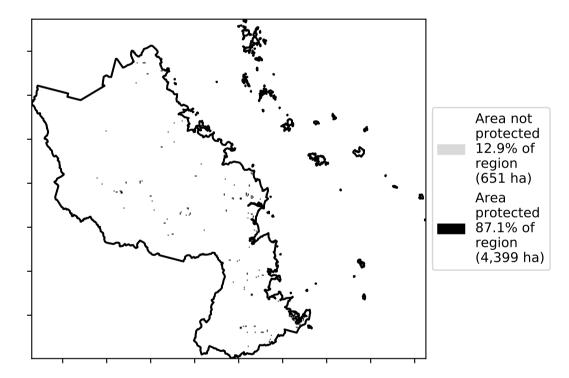
0.30%

Total Vegetation Cover [%]

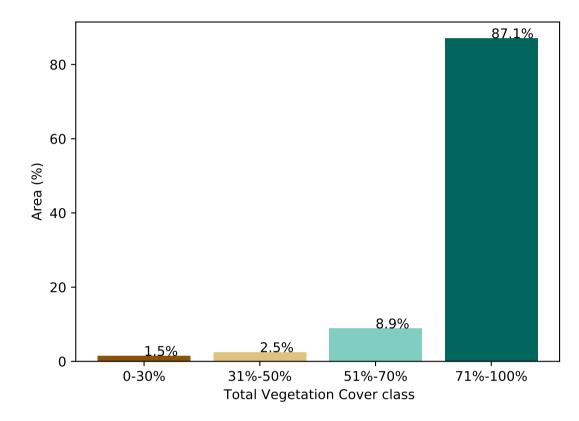
Land use and forest cover



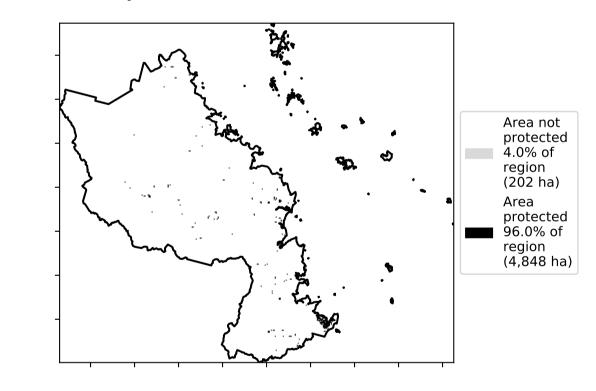
% Area protected from water erosion (>70%)





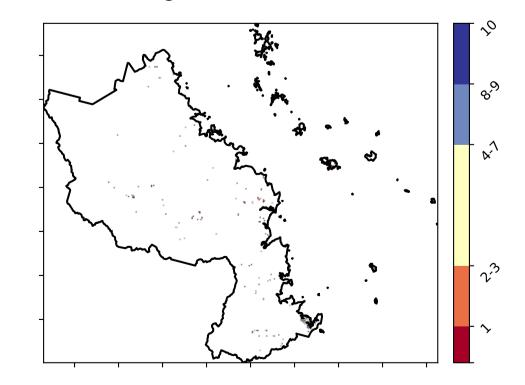


#### % Area protected from wind erosion (>50%)

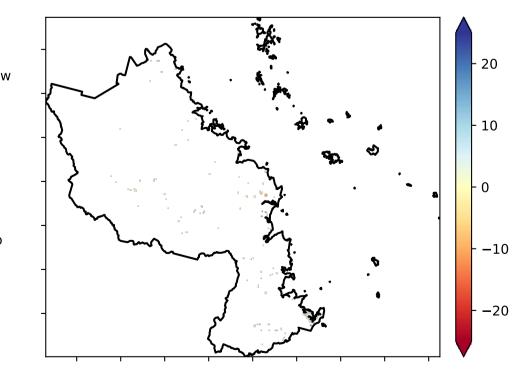


Catchment Scale \_ Land Use and Forests of Australia (2018) Derived from \_ Catchment Scale Land Use of Australia (2018) and Forests \_ of Australia (2018)

**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

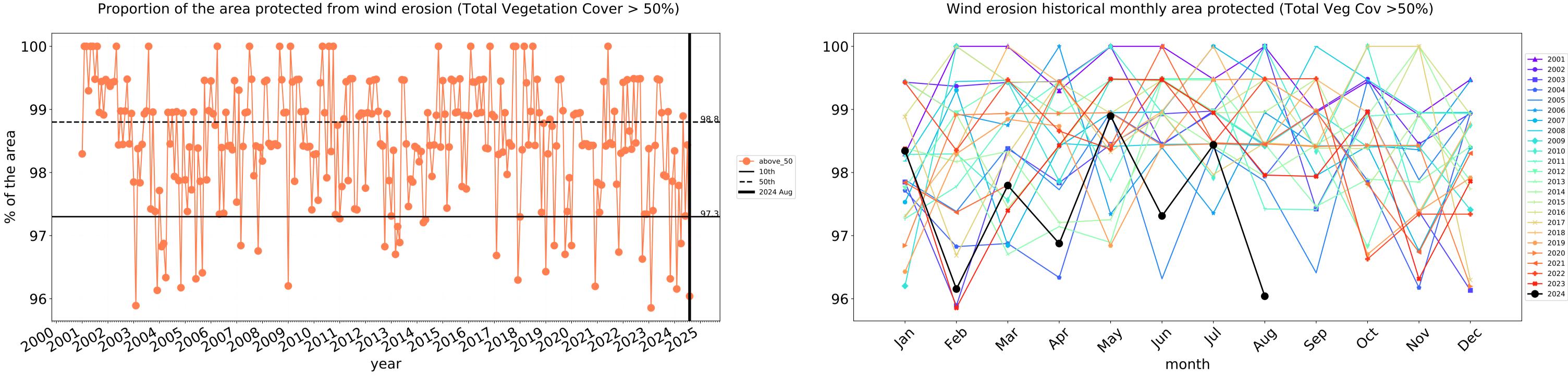


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

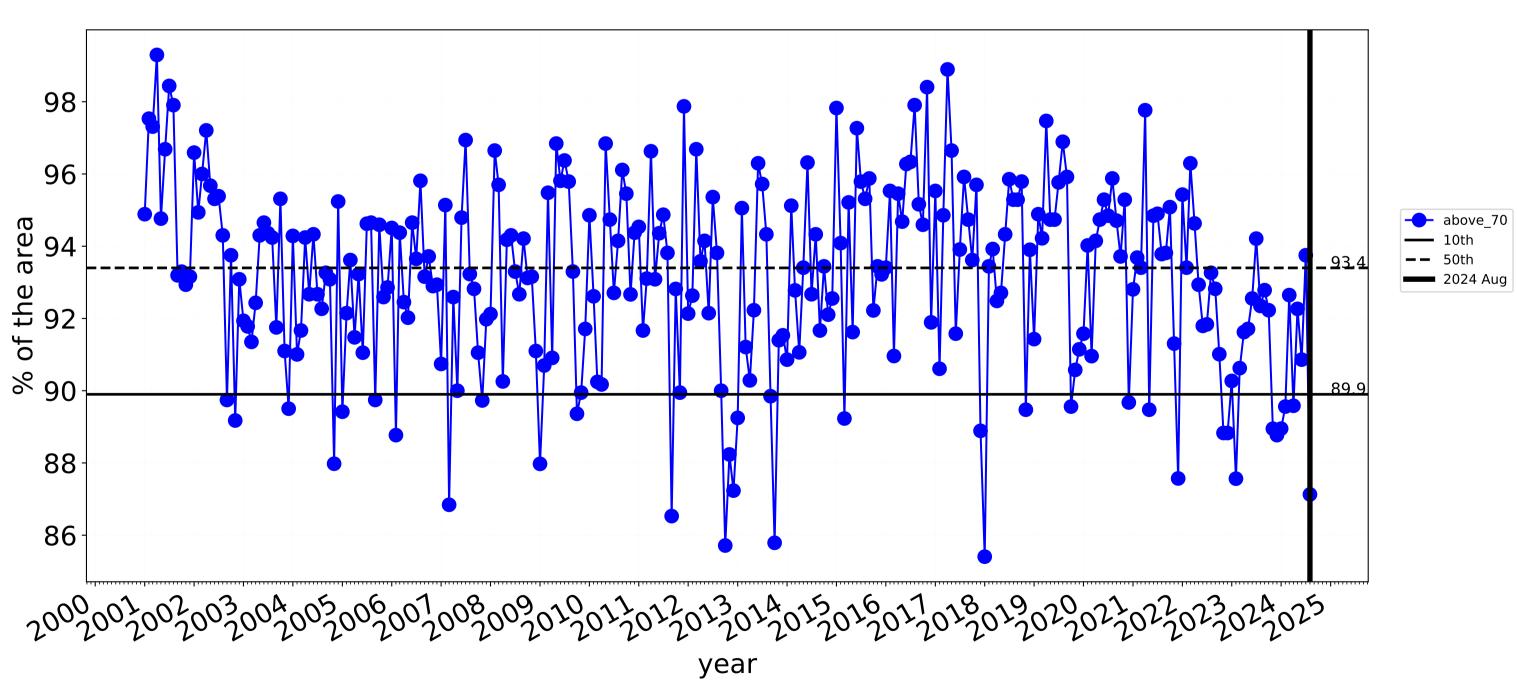




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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



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

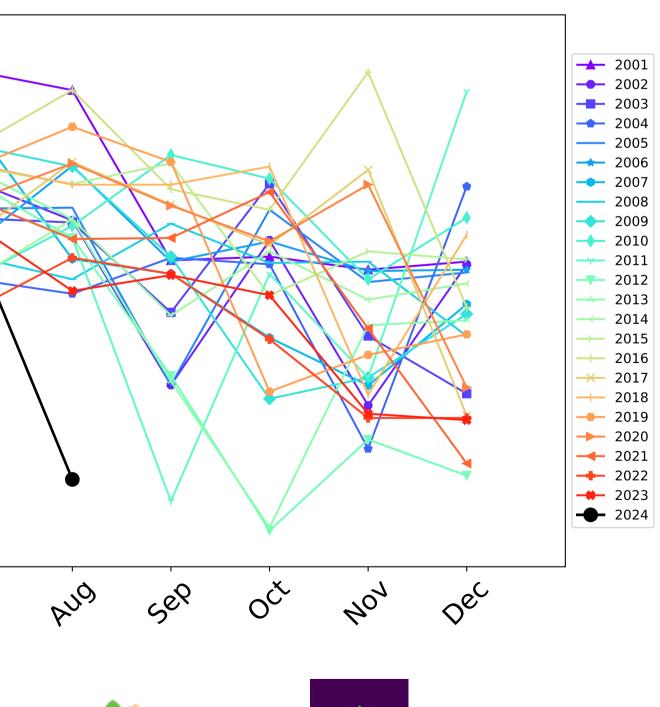
98-96-94 92 90 88-86 4eb way In Jan 1<sup>1</sup> Mai 061 month

tern Ecosystem Research Infrastructure Australian Government

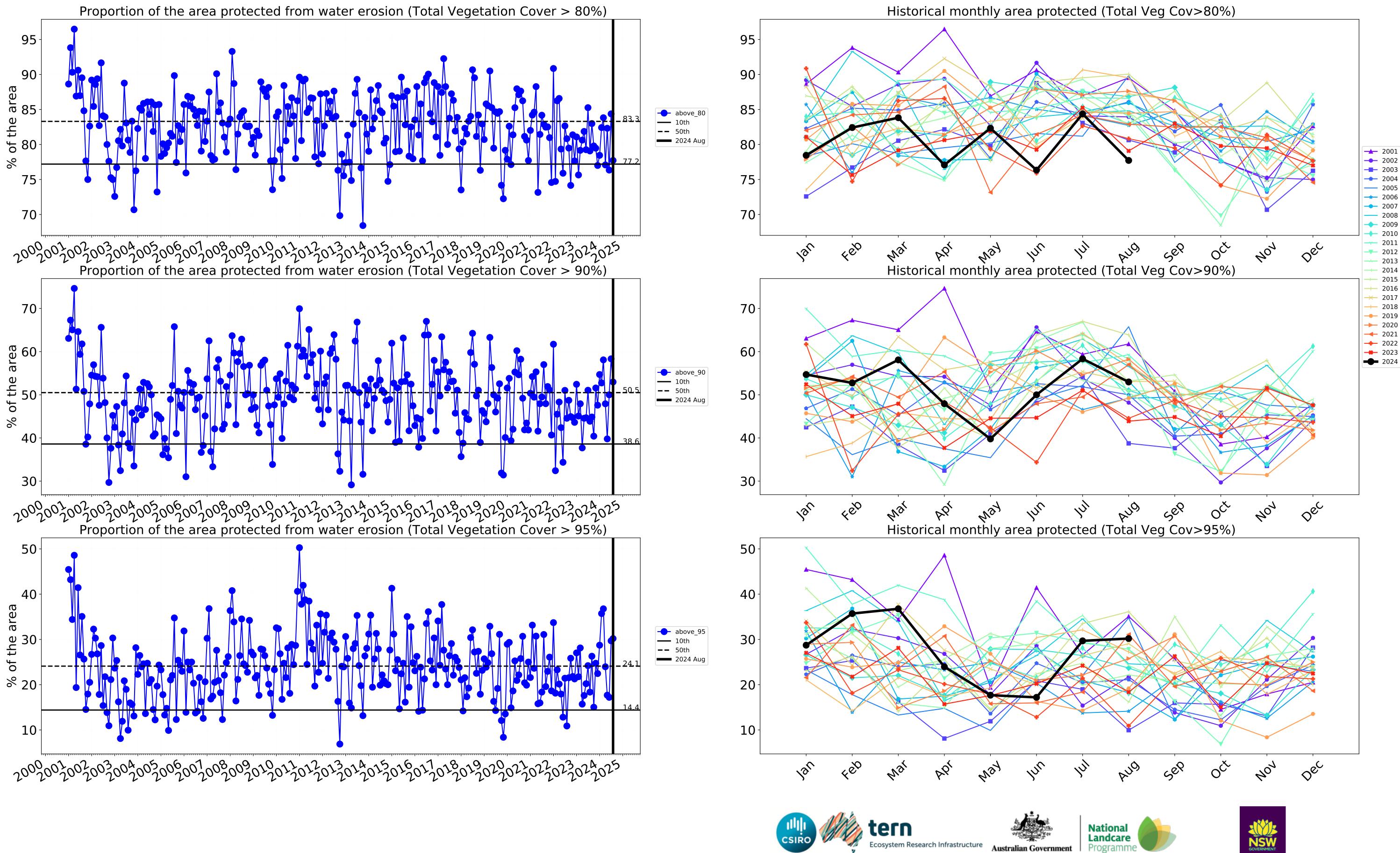
National Landcare

Programm

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



NSW



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

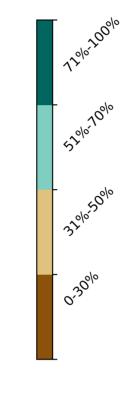
1 Conservation and natural environments - Woodland forest

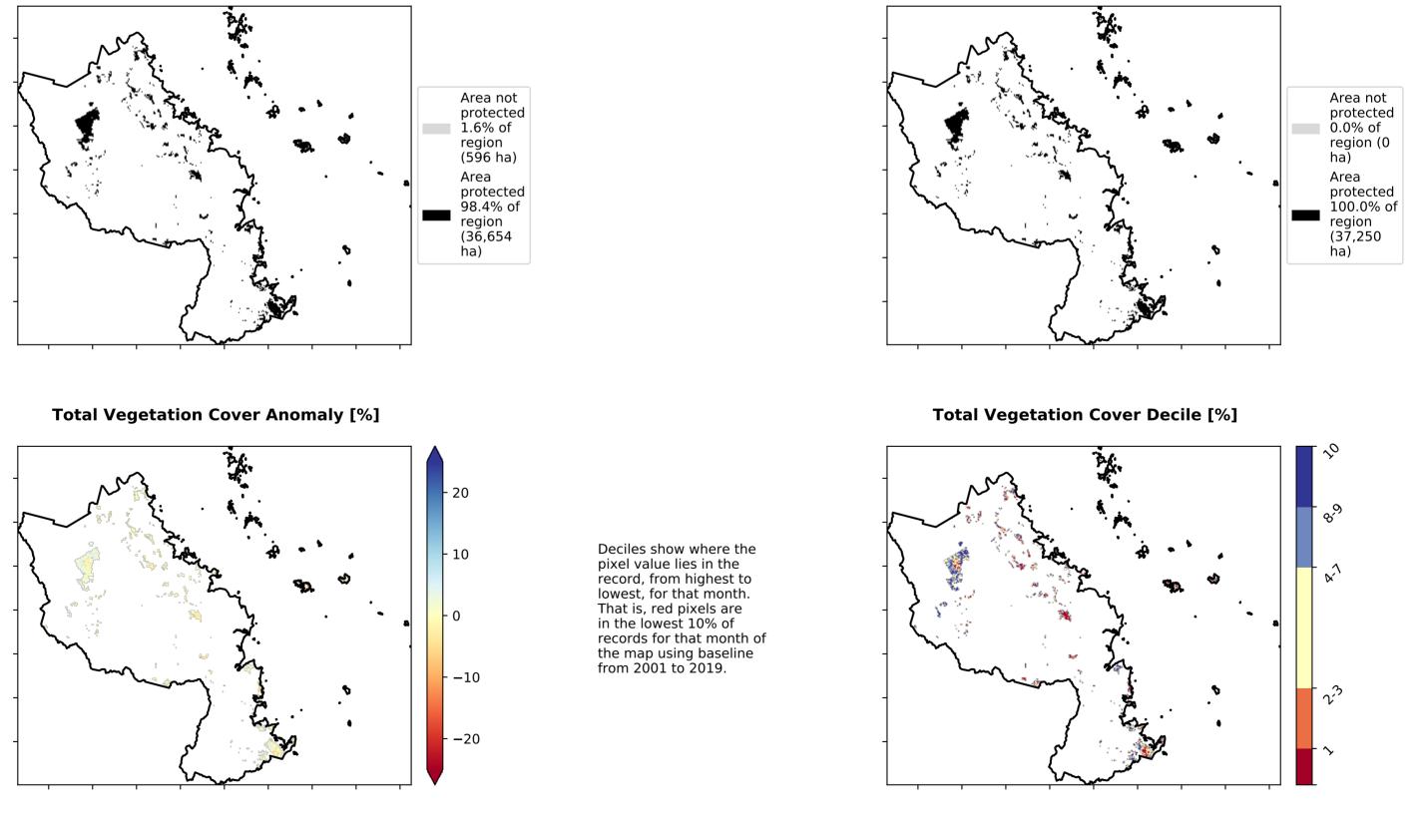
Total Vegetation Cover [%]

Land use and forest cover

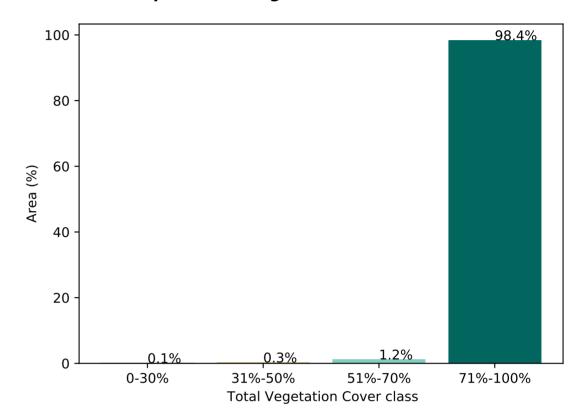
% Area protected from water erosion (>70%)



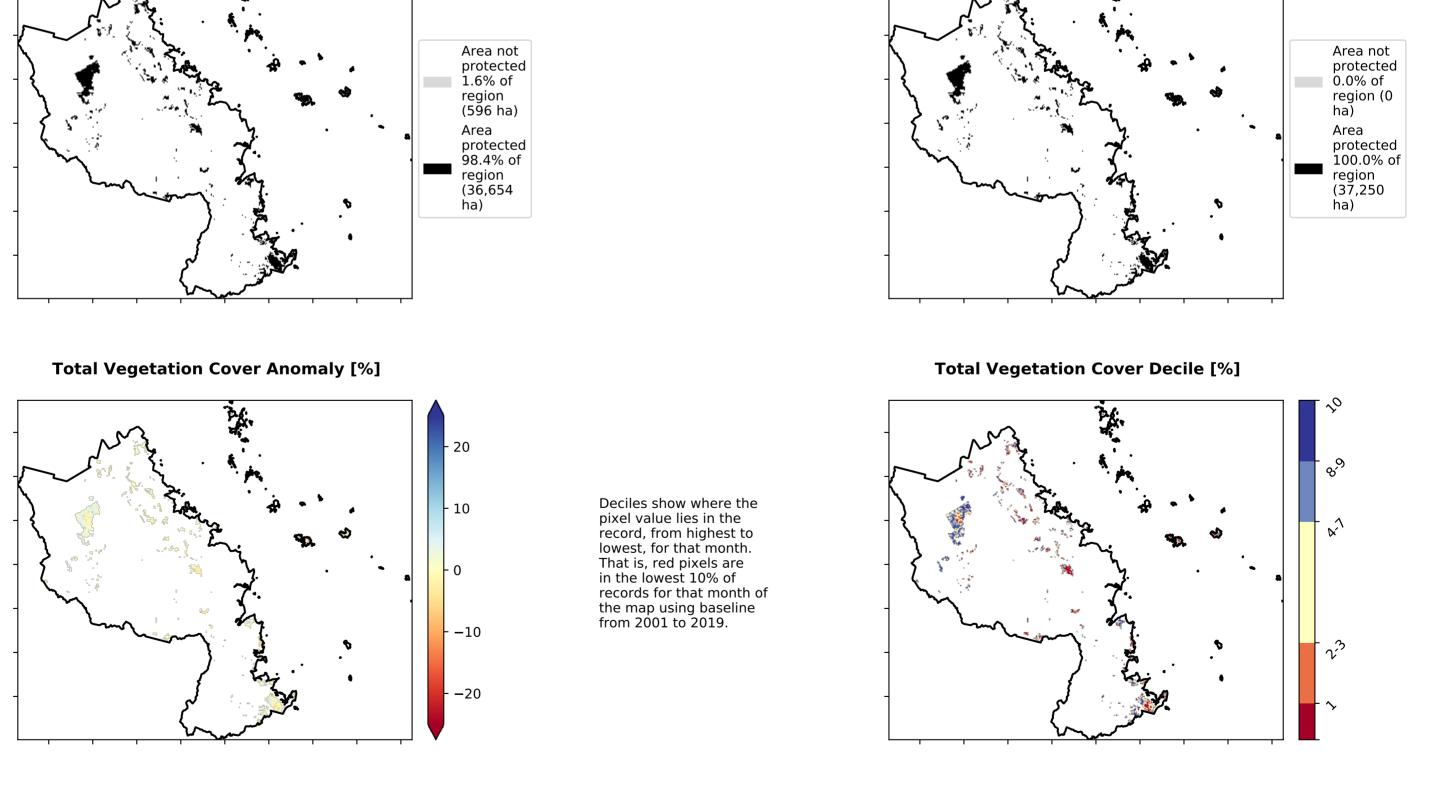




#### Proportion of vegetation cover class in area



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



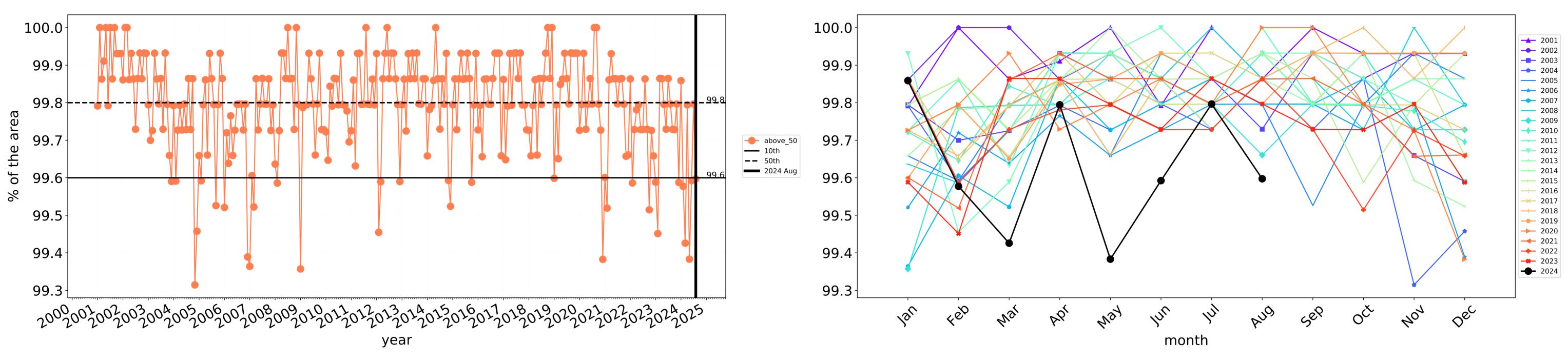
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)



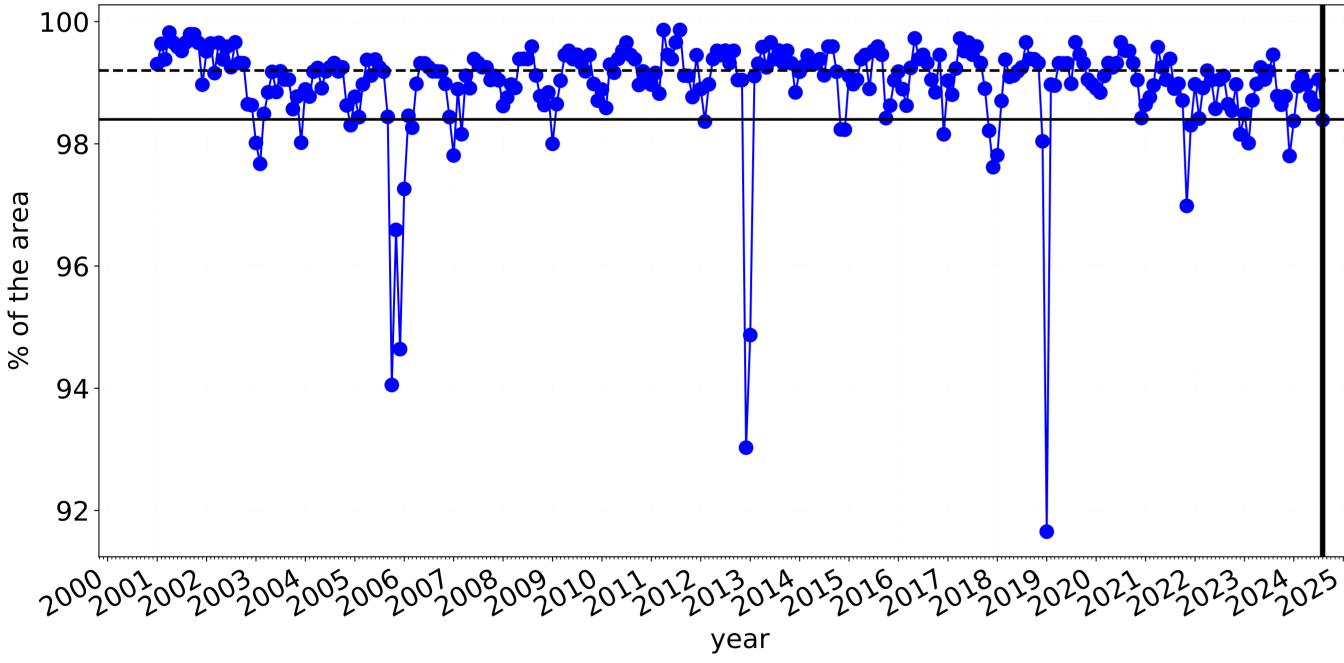


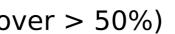
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map

using baseline from 2001 to 2019.



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

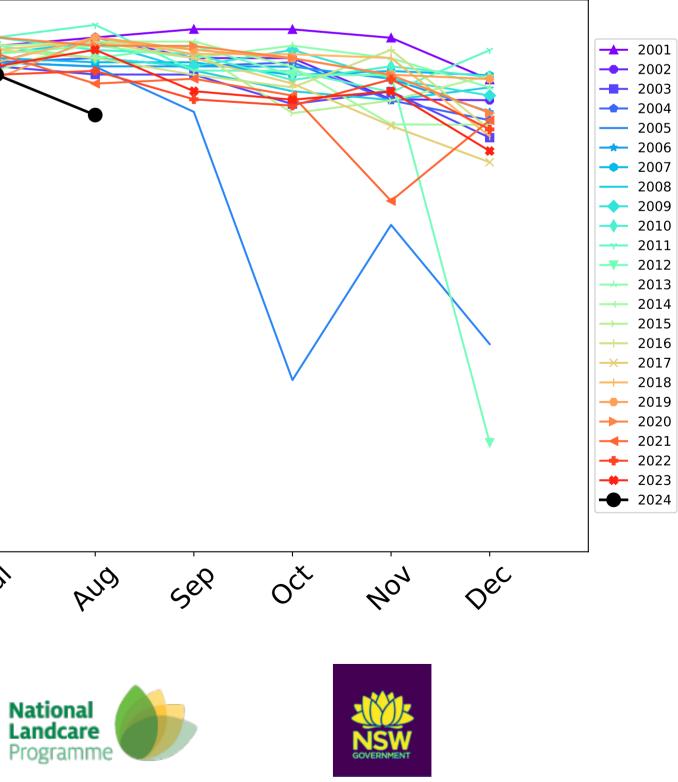


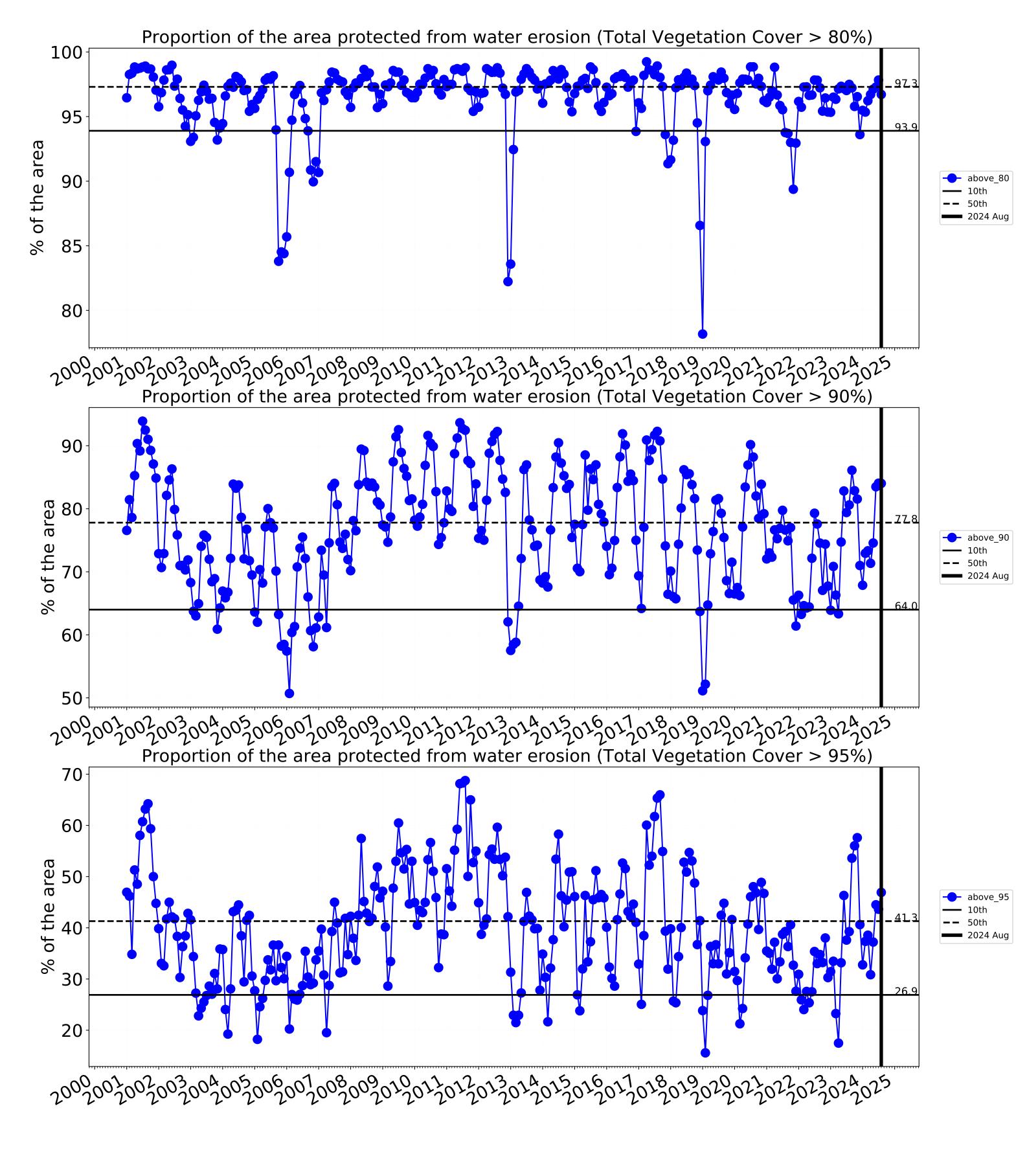


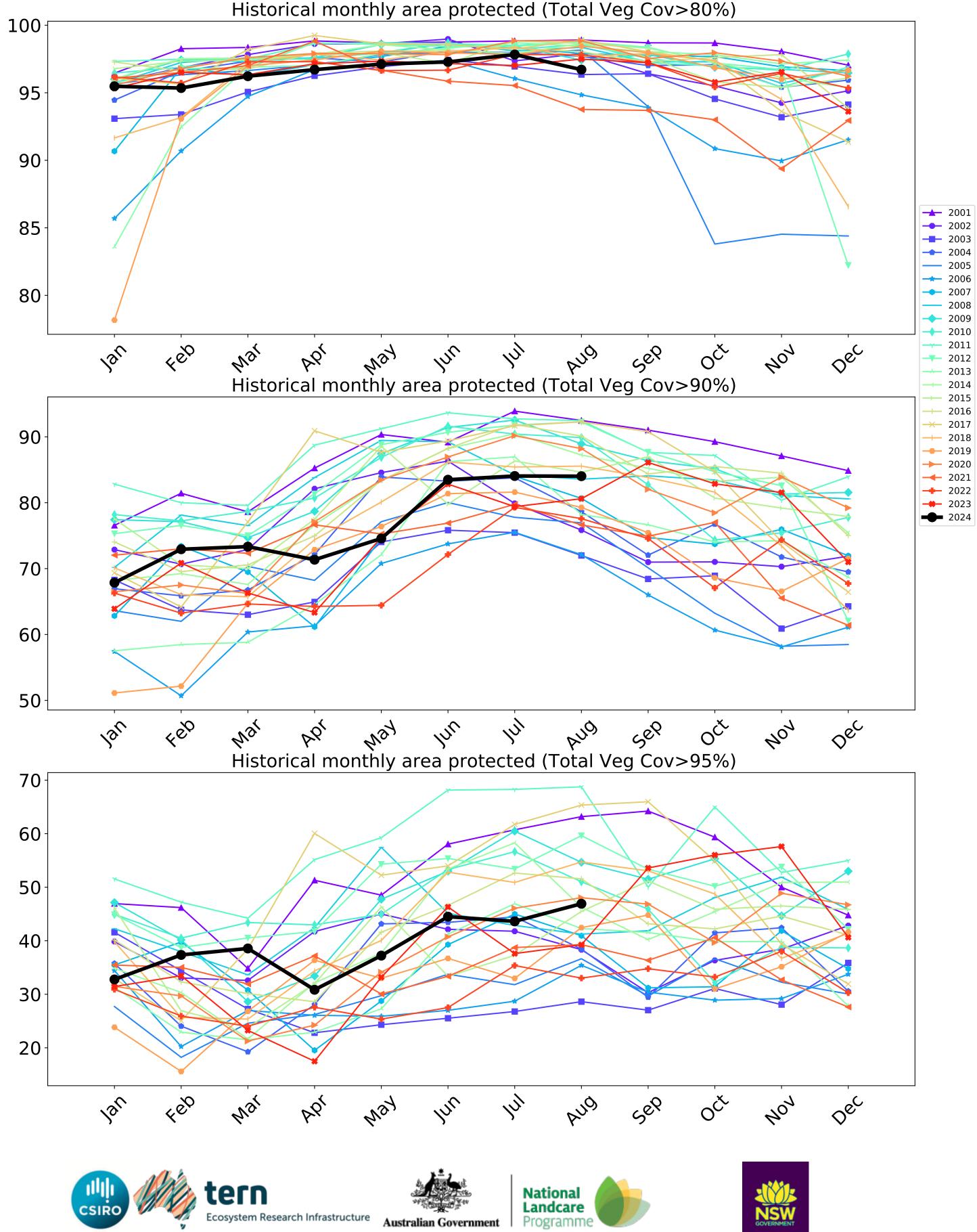
Wind erosion historical monthly area protected (Total Veg Cov >50%)

100-98 ---- above\_70 **—** 10th **——** 50th **—** 2024 Aug 96 94 92 4eb Par In May Mai 291 month tern Ecosystem Research Infrastructure Australian Government

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





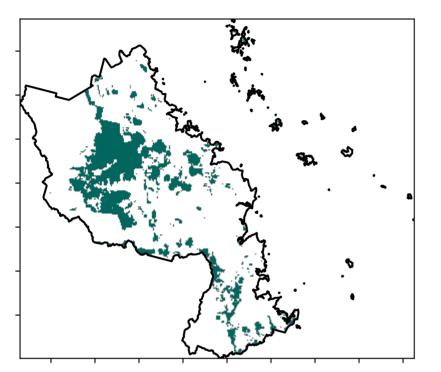




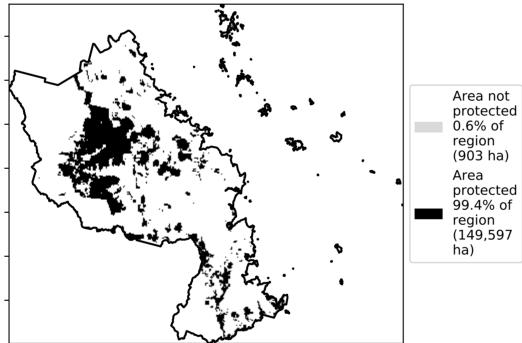
## **Conservation and natural environments Forest (non woodland)**

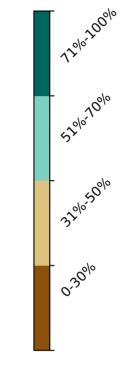
Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Conservation and natural environments - Non-woodland forest Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover [%]** 



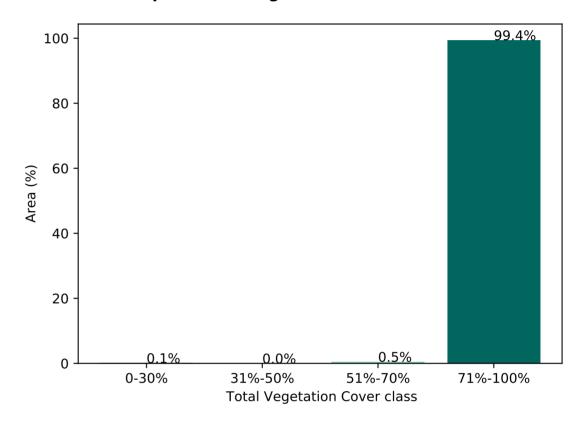
% Area protected from water erosion (>70%)



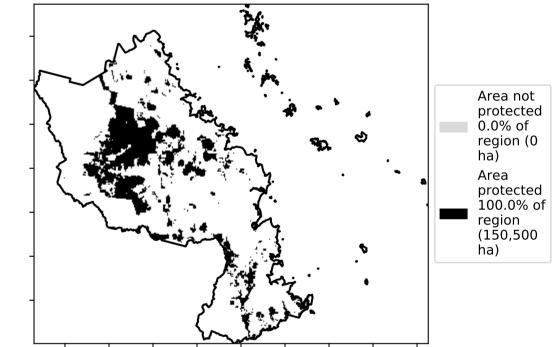






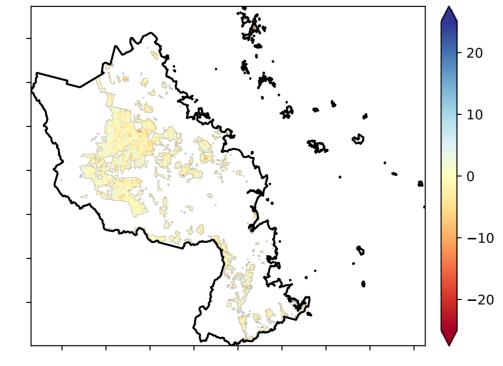


% Area protected from wind erosion (>50%)



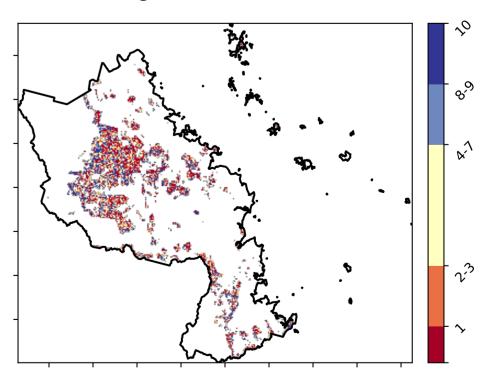
Total Vegetation Cover Anomaly [%]

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.

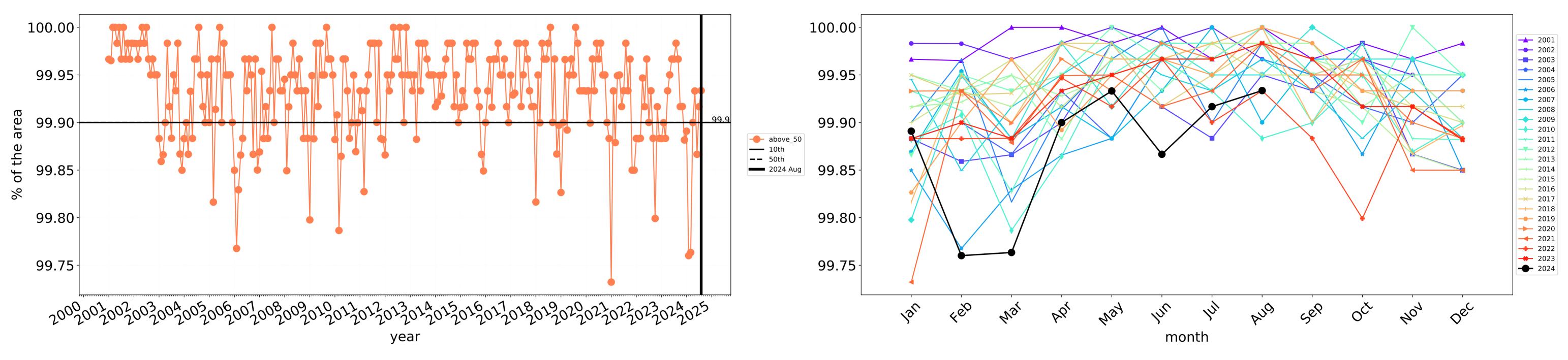


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the man using baseline the map using baseline from 2001 to 2019.

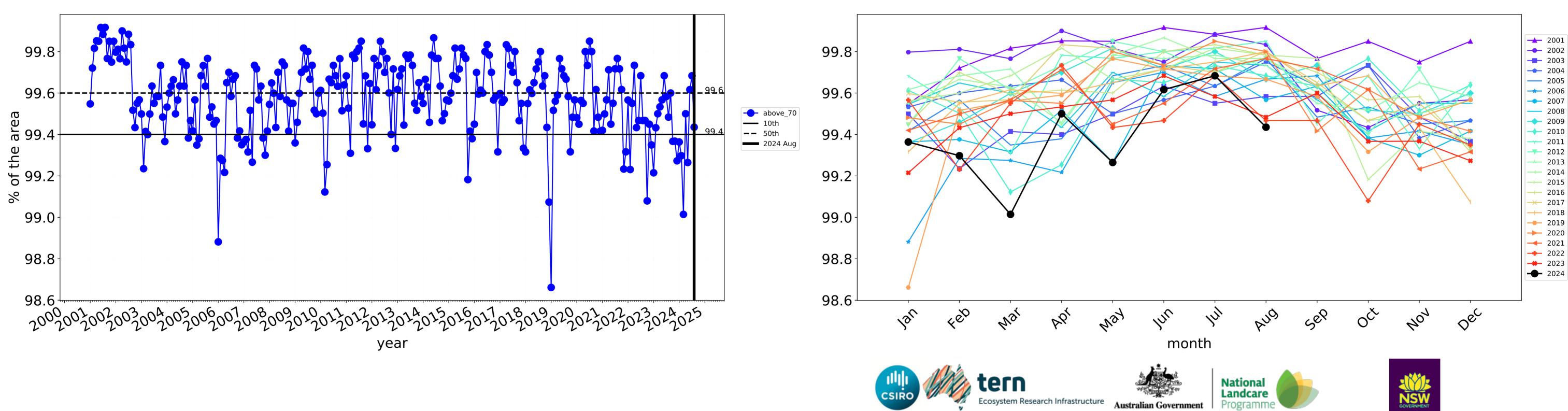
Total Vegetation Cover Decile [%]





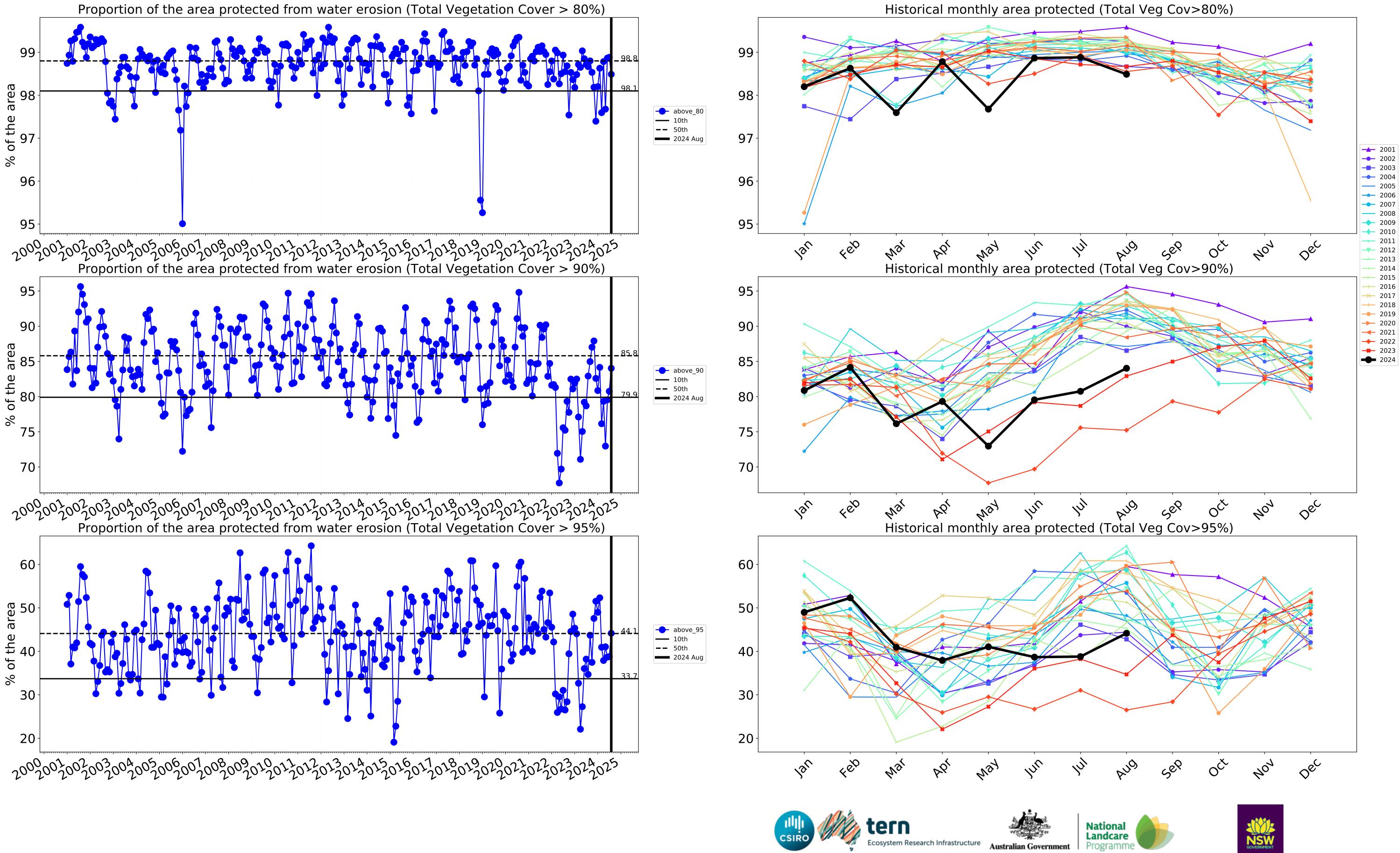


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

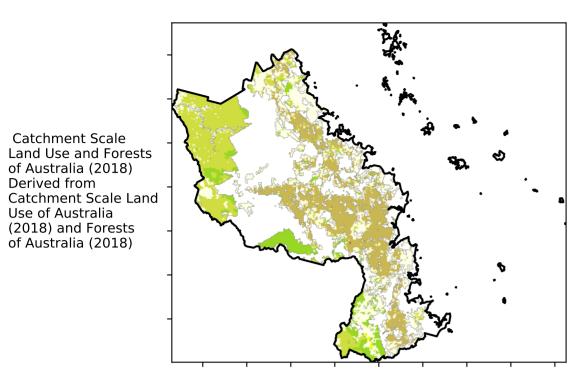
Water erosion historical monthly area protected (Total Veg Cov>70%)



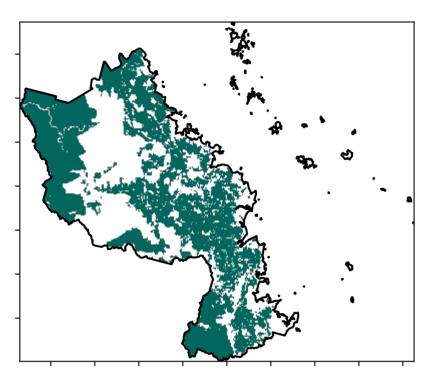


## Agriculture

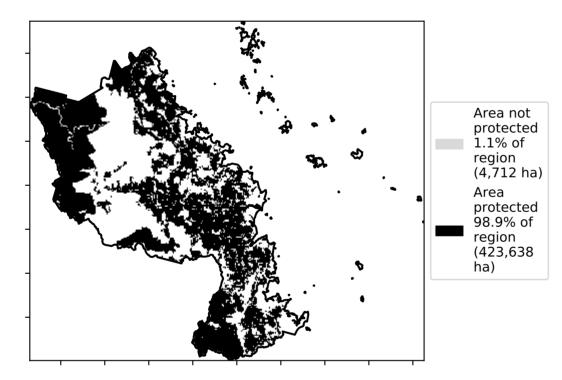
Land use and forest cover

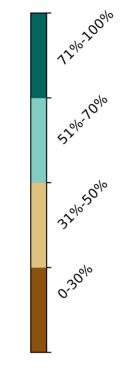


**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





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

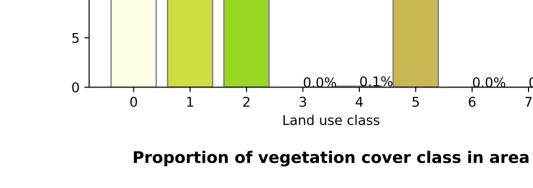
4 Agriculture - Grazing - Irrigated 5 Agriculture - Cropping - Non-irrigated

7 Agriculture - Horticulture - Non-irrigated

6 Agriculture - Cropping - Irrigated

8 Agriculture - Horticulture - Irrigated

3 Agriculture - Grazing - Non-woodland forest



<u>32.</u>7%

25.4%

11.0%

30

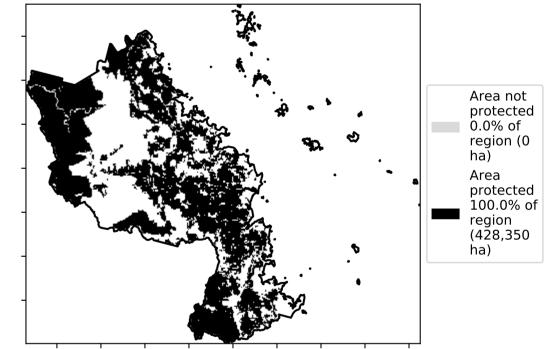
25

20 (%) 15

10

### 98.9% 100 80 Area (%) 60 40 20 1.1%0.0% 0.0% 0 51%-70% 0-30% 31%-50% 71%-100% Total Vegetation Cover class

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



#### Proportion of each land class in area

0 1 9

5

4

<mark>30.</mark>8%

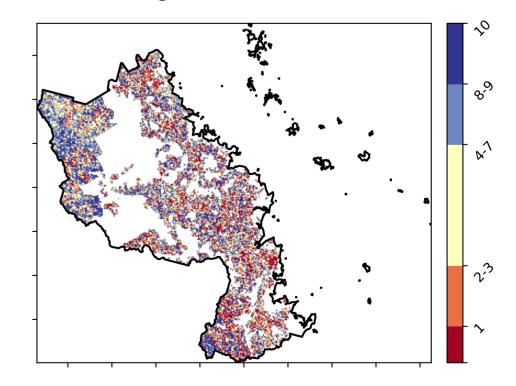
0.0%

6

0.0%

7

**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

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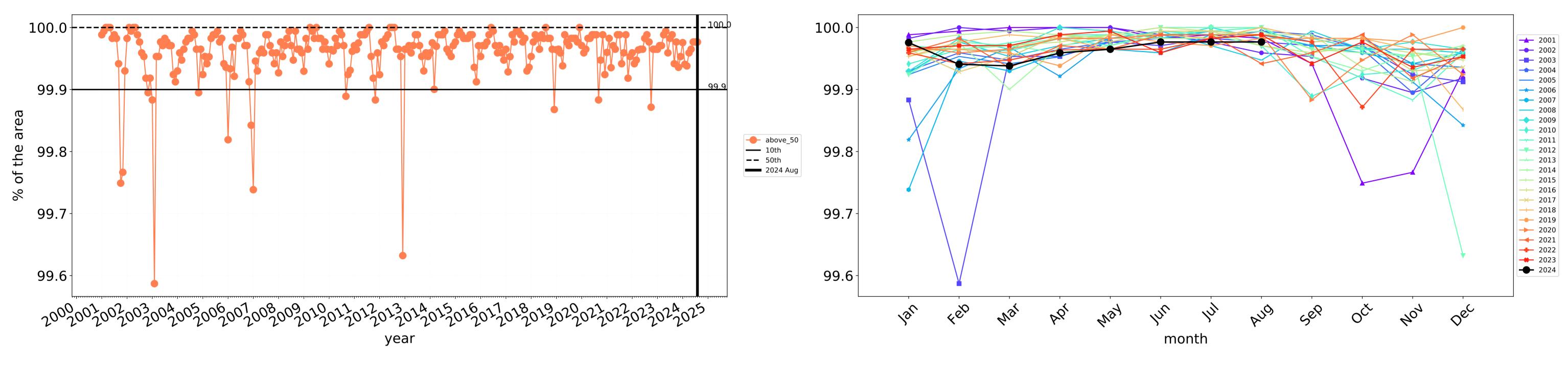
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



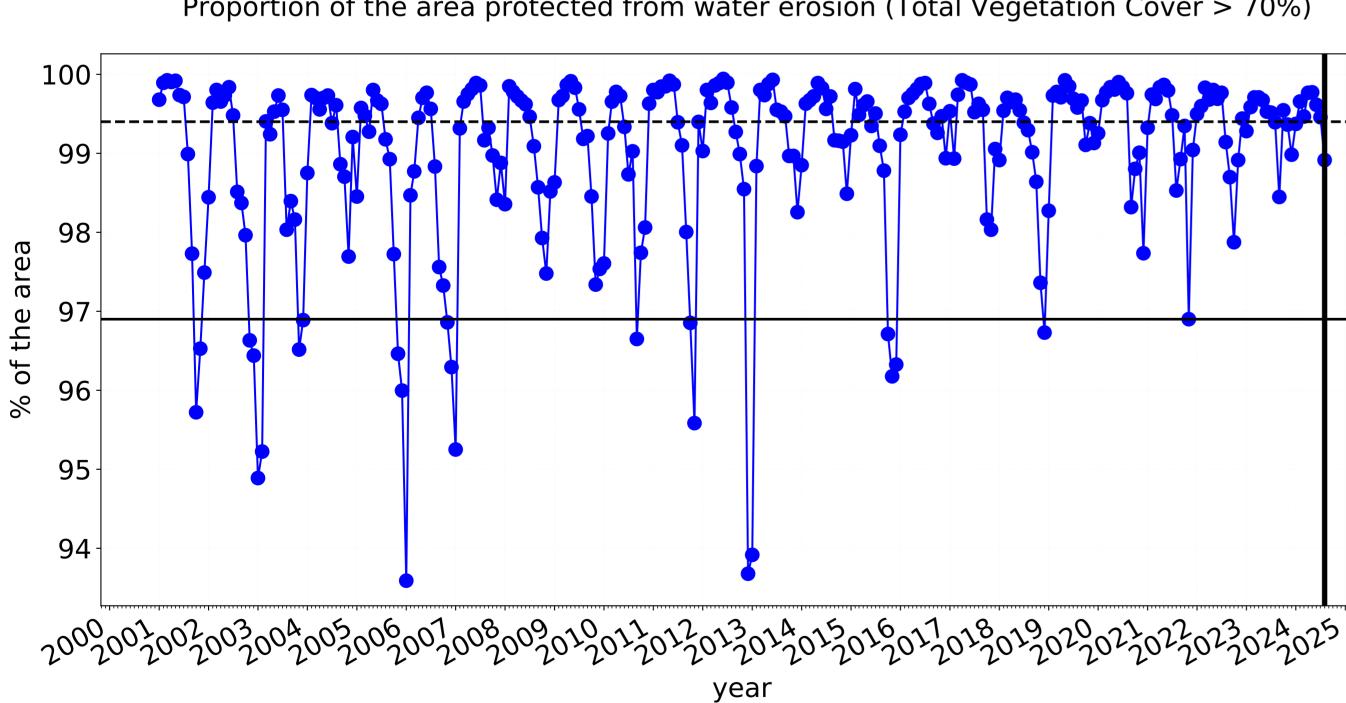


Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

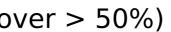
of Australia (2018)



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



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

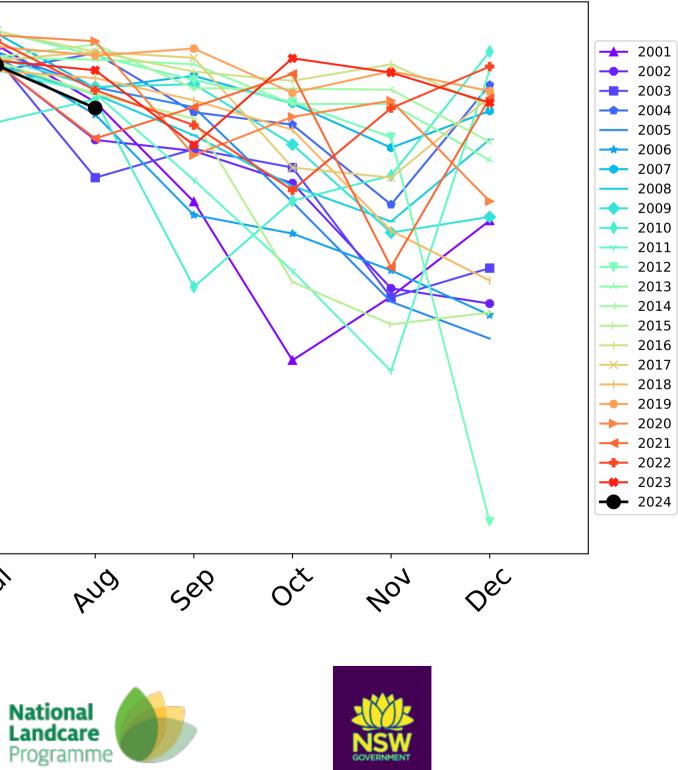


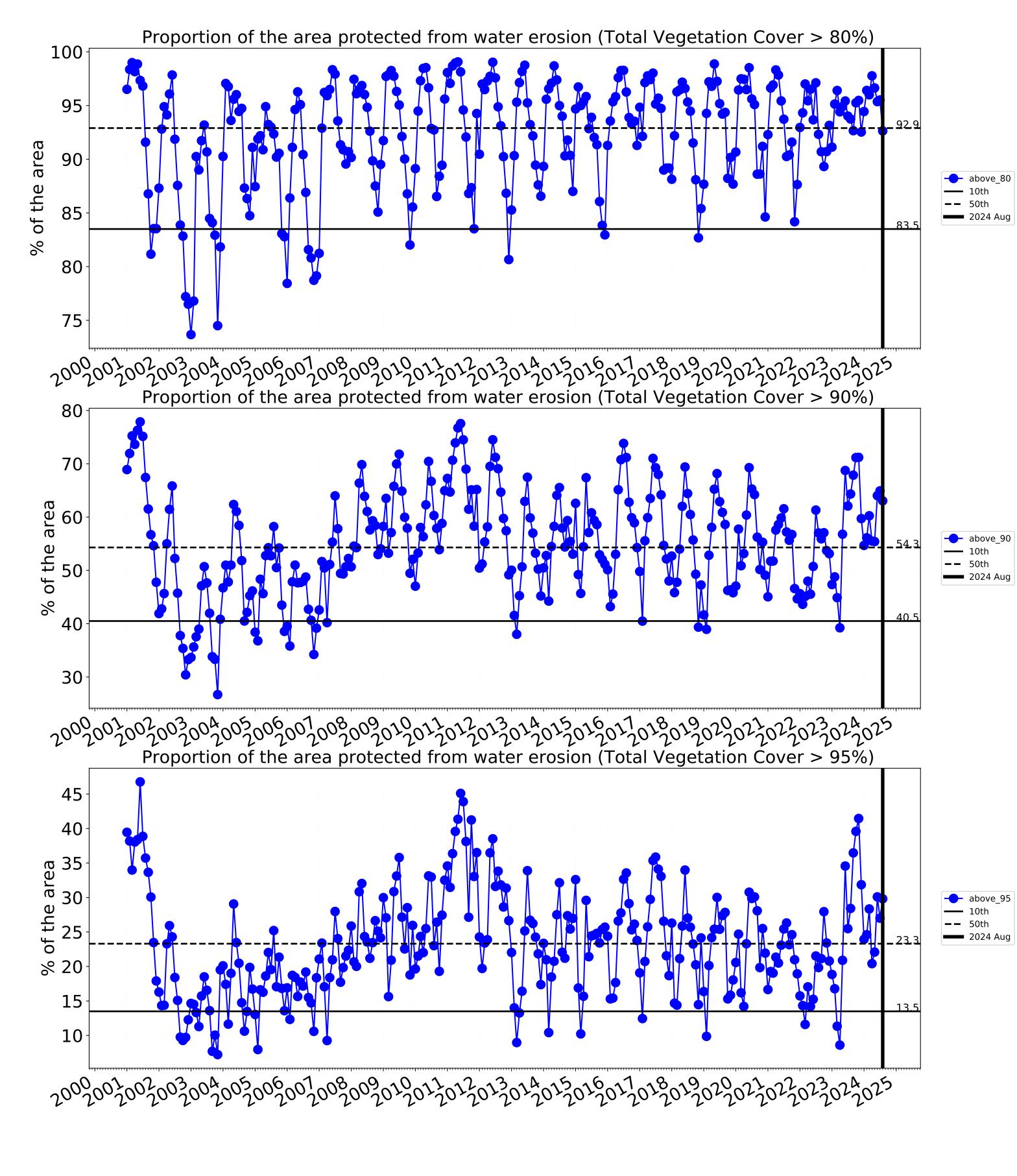
Wind erosion historical monthly area protected (Total Veg Cov >50%)

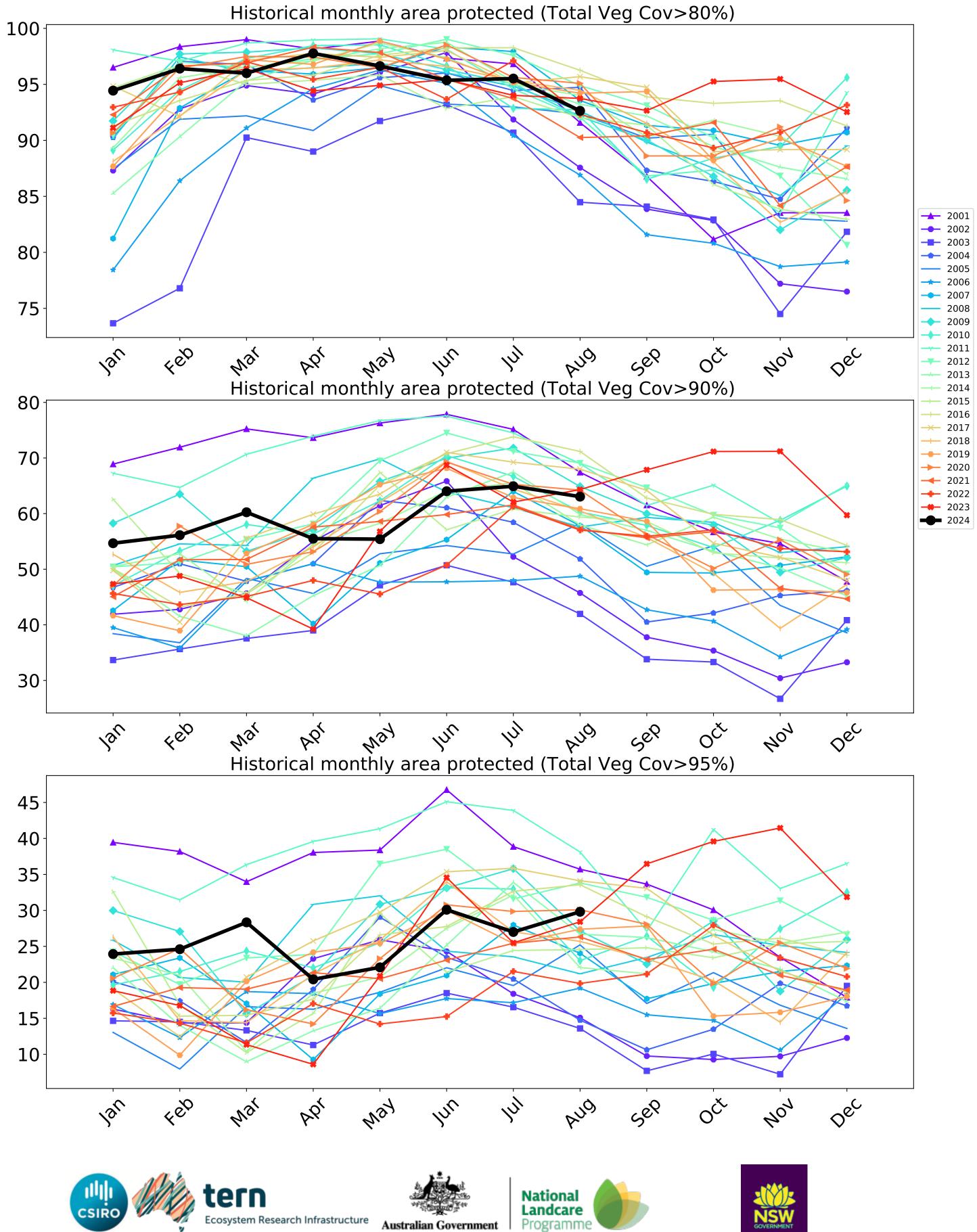
100 99.4 99 98 ---- above\_70 **—** 10th **——** 50th **—** 2024 Aug 97 96 95 94 4e0 Jan In May Mai 1's Þb, month tern Ecosystem Research Infrastructure Australian Government

18

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









## Grazing

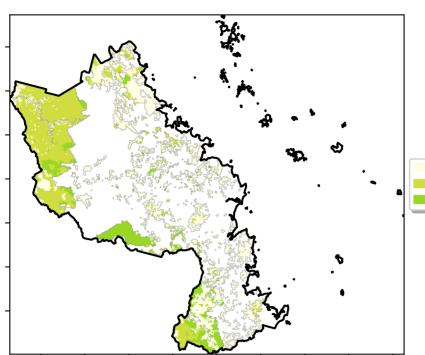
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

the mean. That is, red pixels are about 20%

lower than the

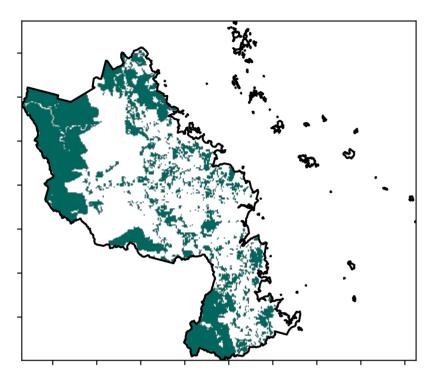
using baseline from 2001 to 2019.

mean of that pixel. The mean

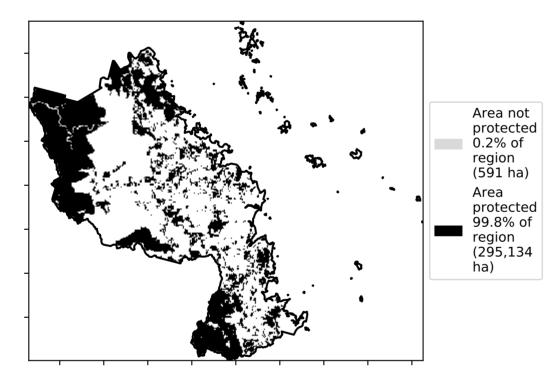


Land use and forest cover

**Total Vegetation Cover [%]** 



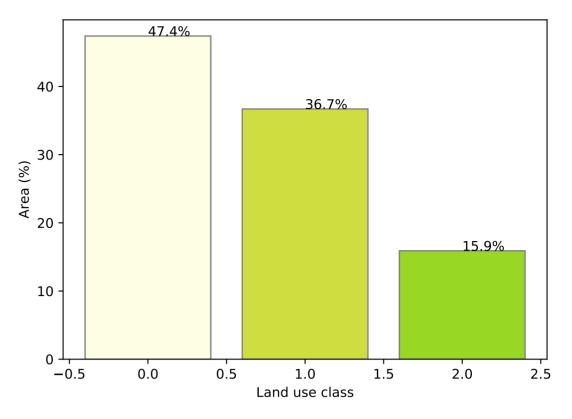
% Area protected from water erosion (>70%)



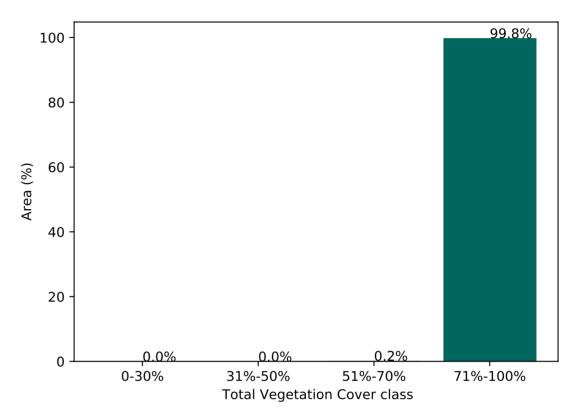
1200,1000 · 520/07/00/0 32005000 0.30%

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

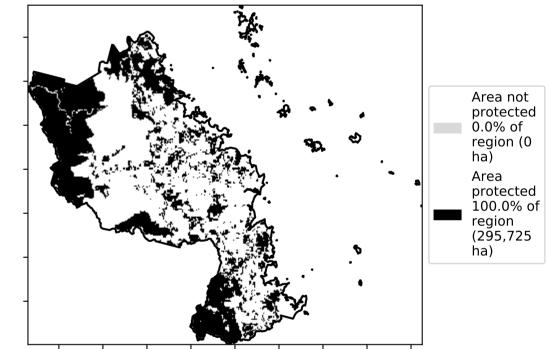
### Proportion of each land class in area



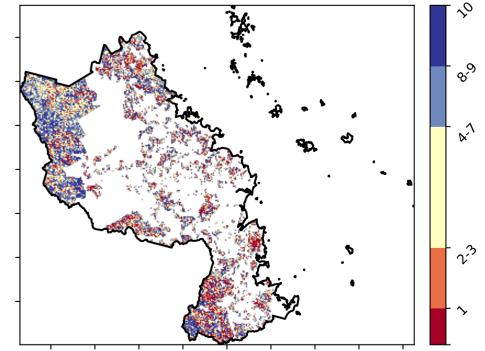
#### Proportion of vegetation cover class in area



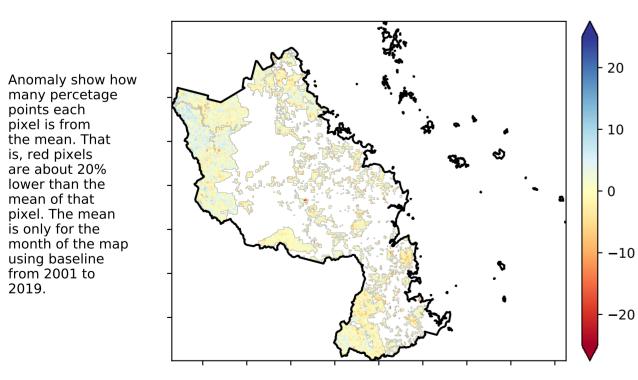
#### % Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 

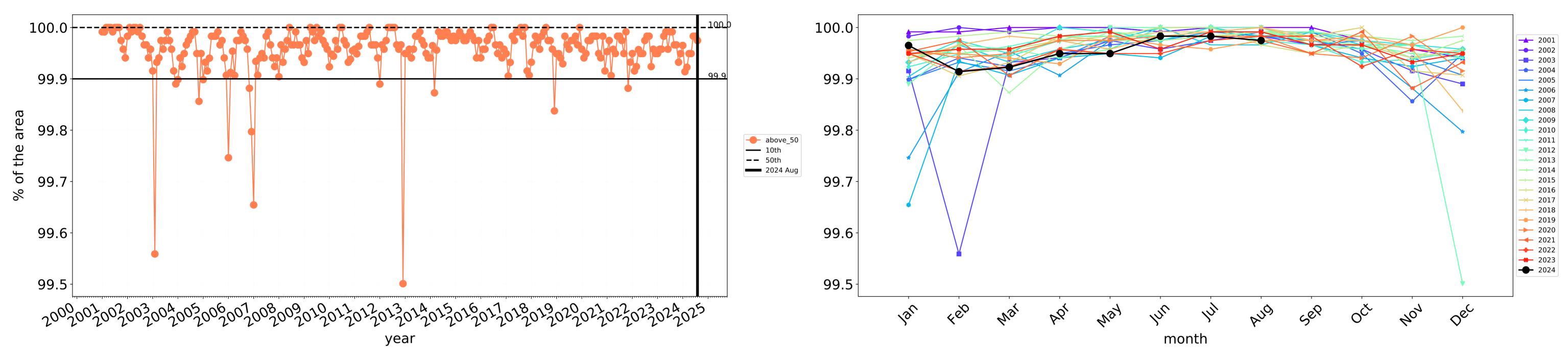


**Total Vegetation Cover Anomaly [%]** 

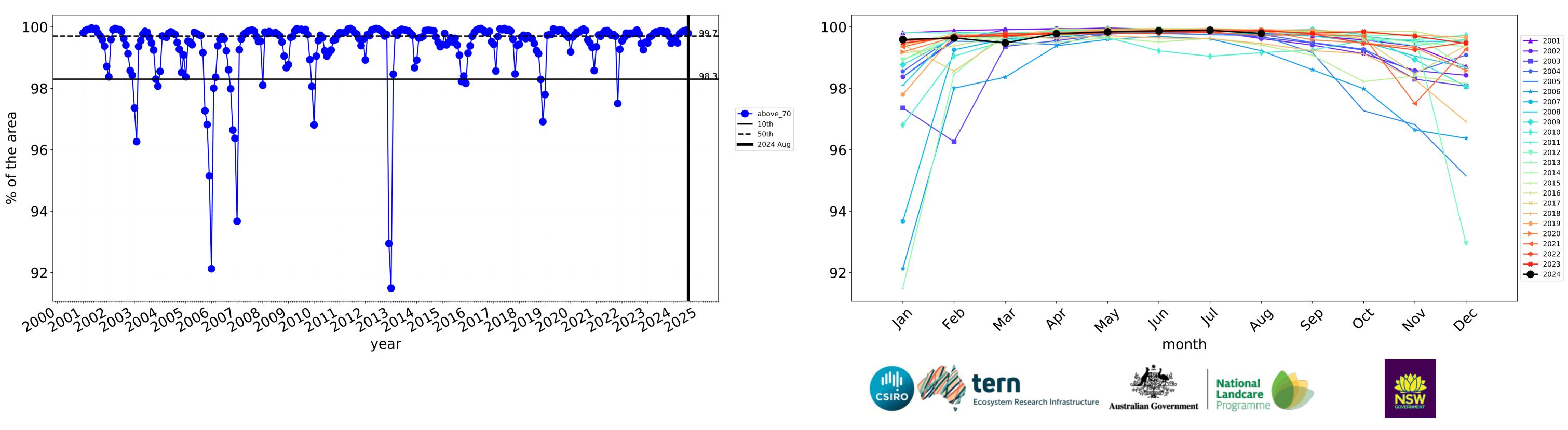


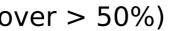
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





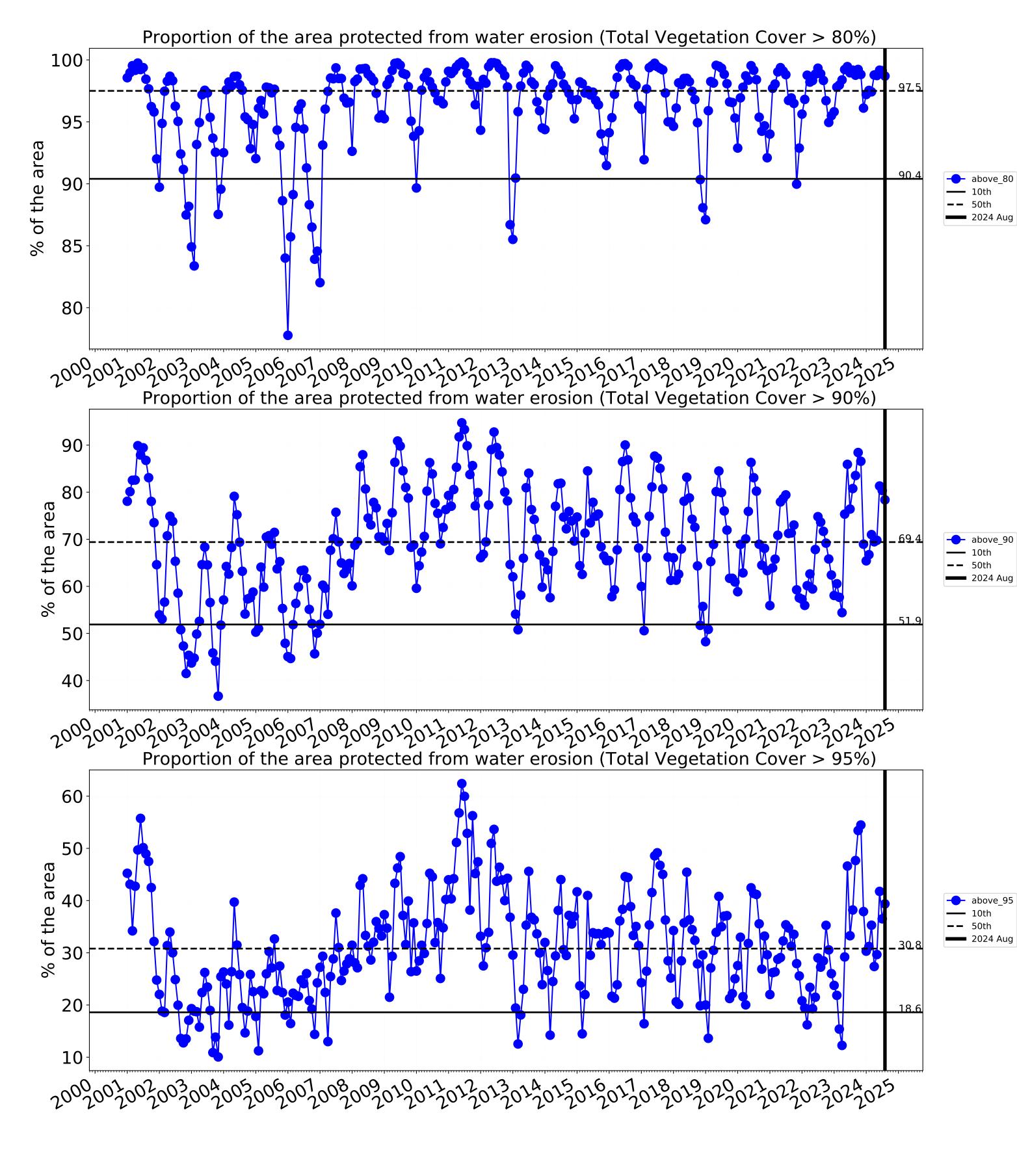
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

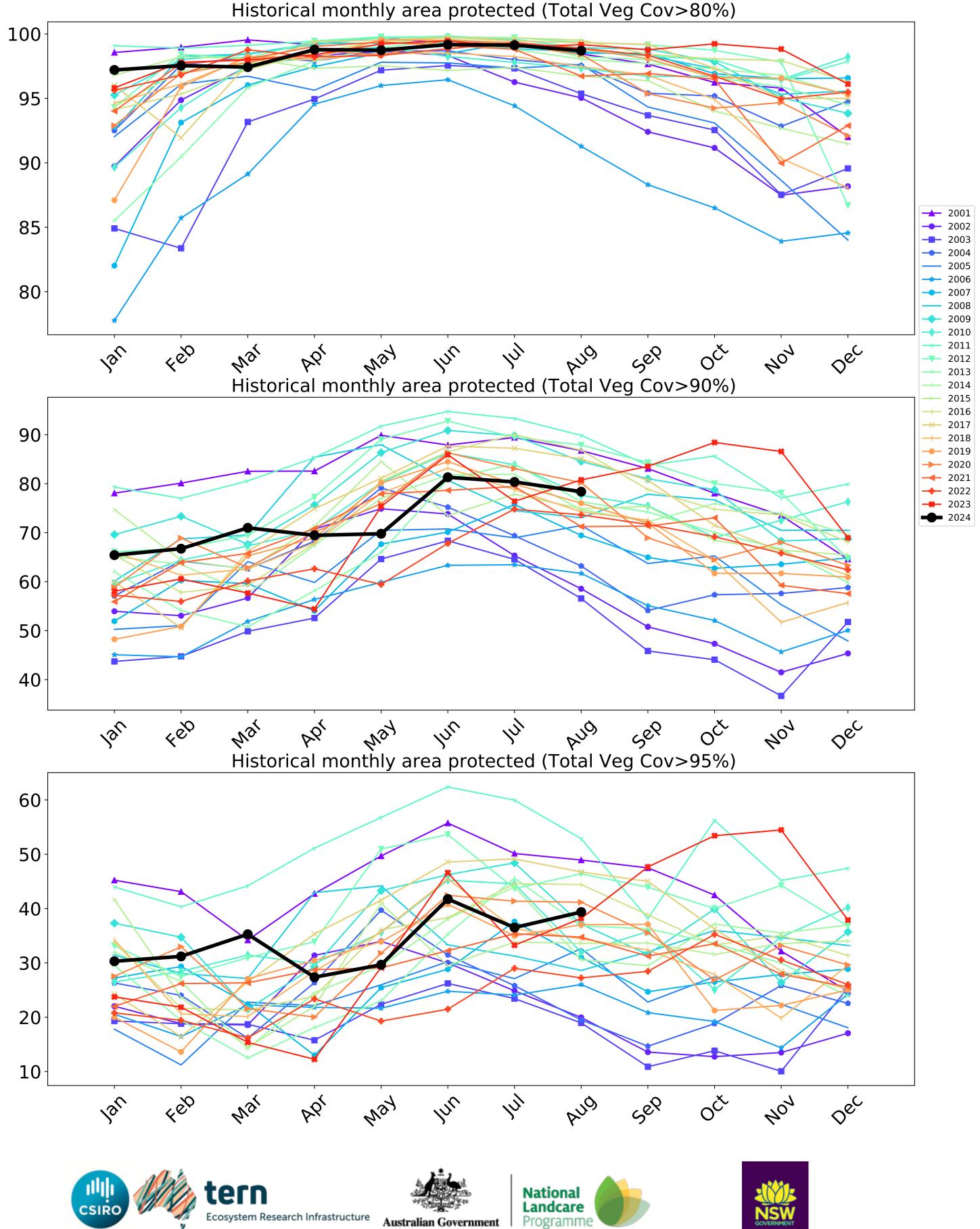




Wind erosion historical monthly area protected (Total Veg Cov >50%)







Ecosystem Research Infrastructure Australian Government

## **Grazing non forest**

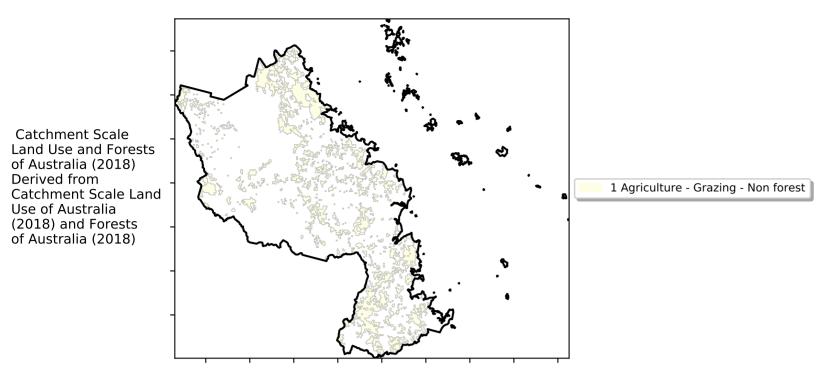
12%2000

· 52°1070010

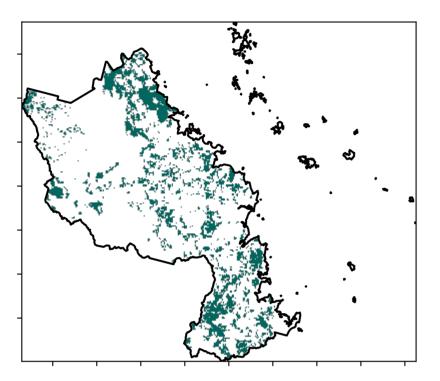
· 320050010

0.30%

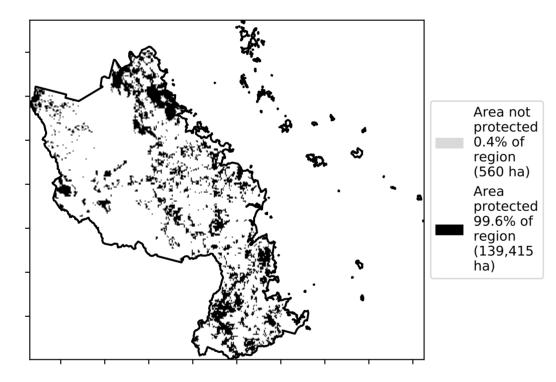
Land use and forest cover



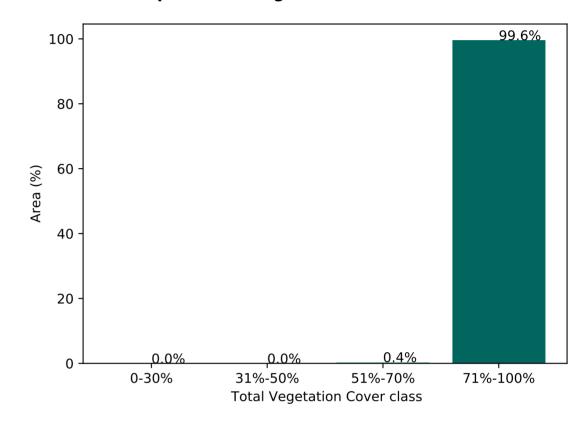
**Total Vegetation Cover [%]** 



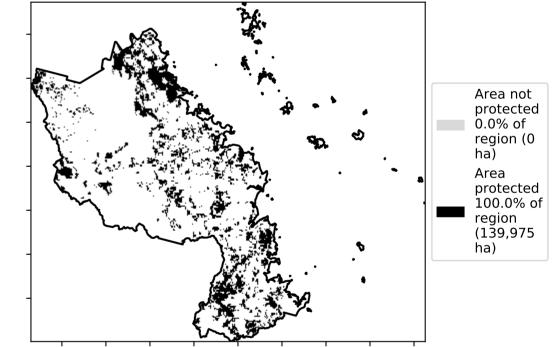
% Area protected from water erosion (>70%)



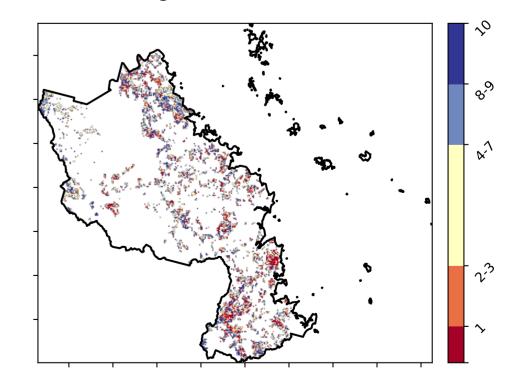
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

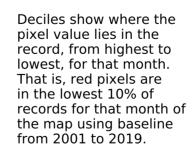


**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

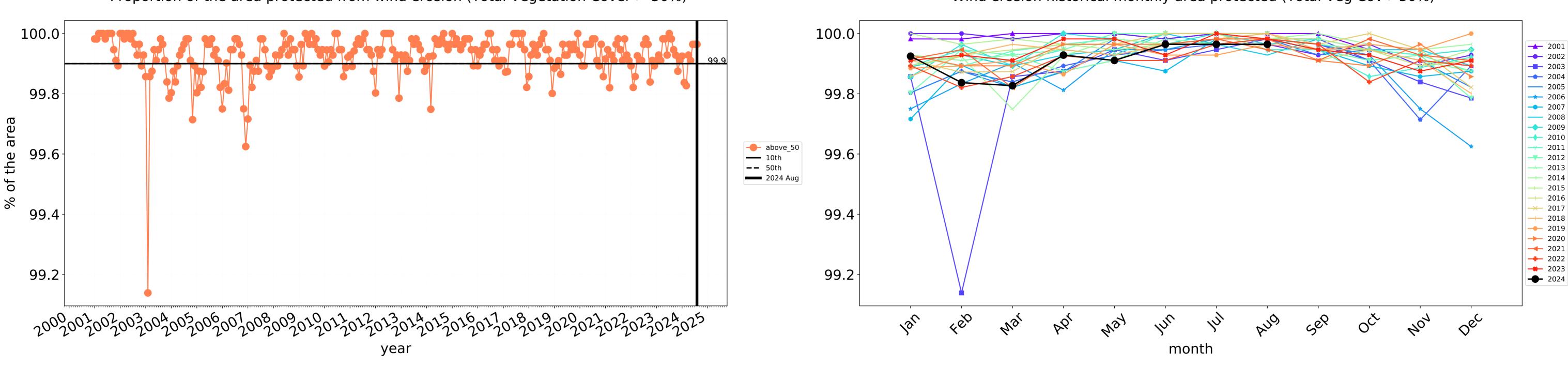
26 - 20 - 10 0 -10 -20





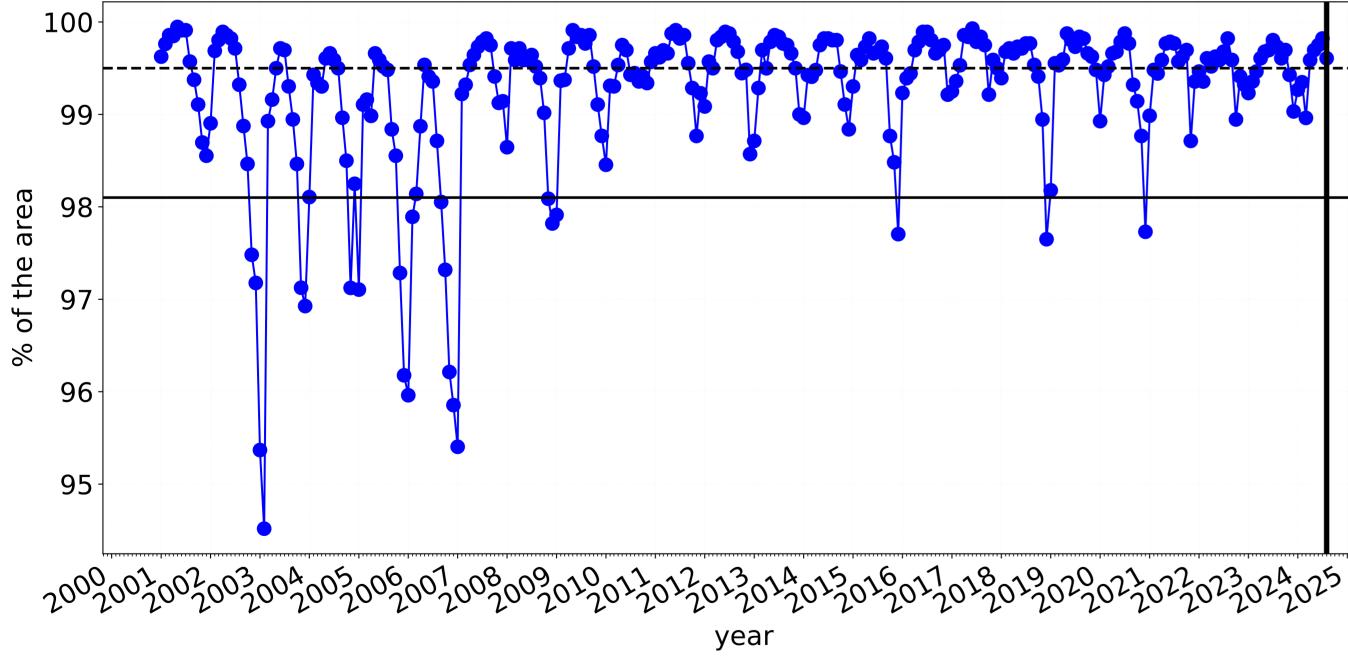


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

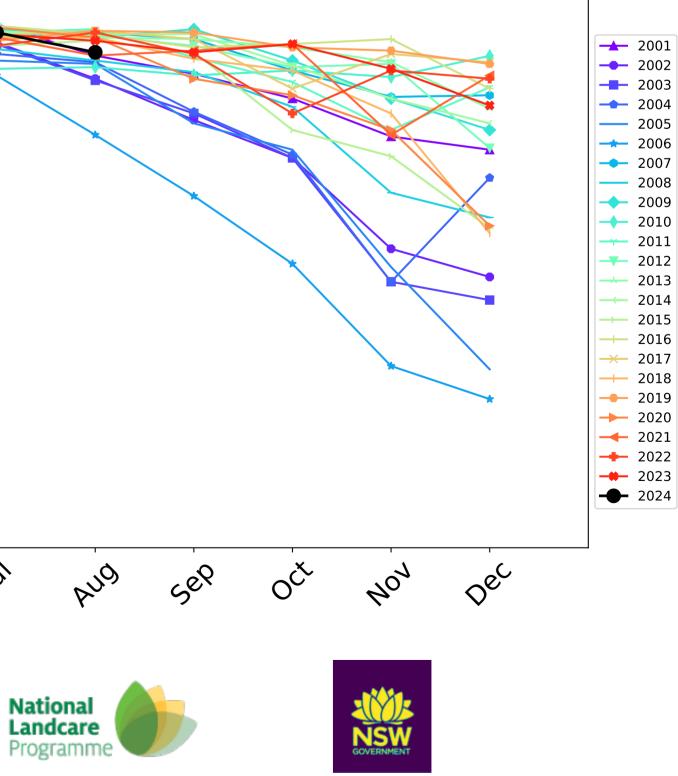


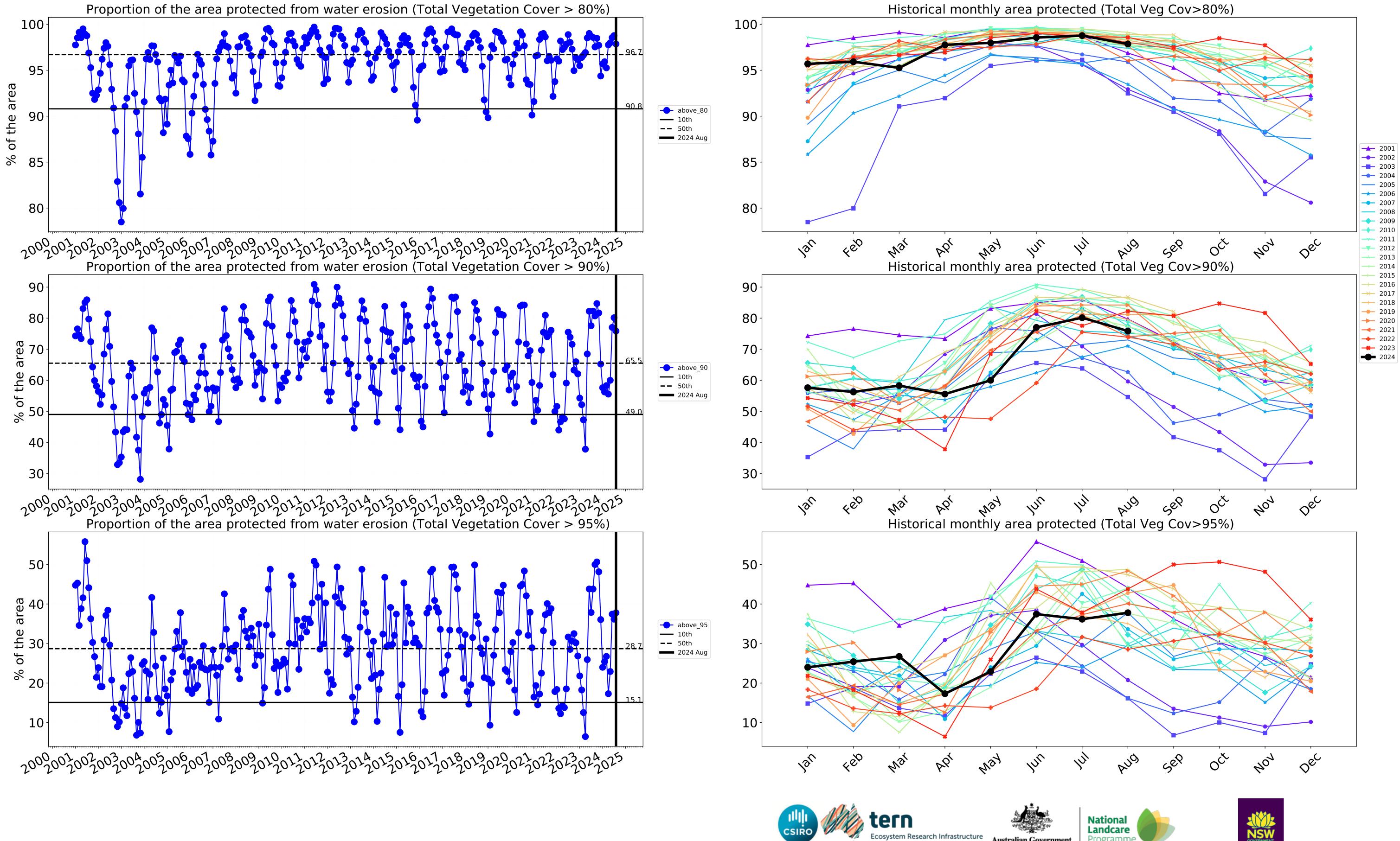


Wind erosion historical monthly area protected (Total Veg Cov >50%)

100-99 98.1 ---- above\_70 98 **——** 10th **——** 50th **—** 2024 Aug 97 96 95 4eb Jan In May PQ 1's Mai month tern Ecosystem Research Infrastructure Australian Government

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





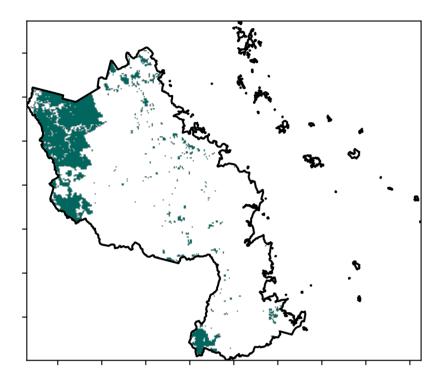


## **Grazing Woodland forest**

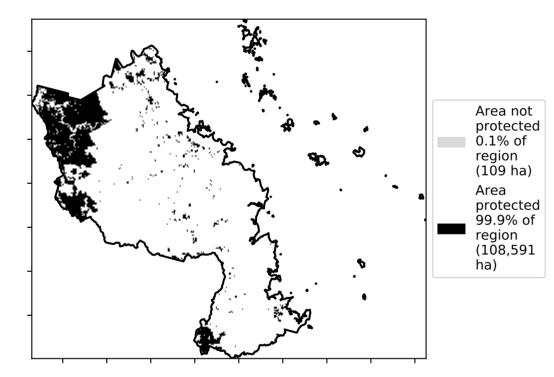
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018) 1 Agriculture - Grazing - Woodland forest

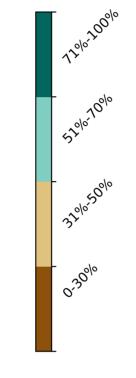
**Total Vegetation Cover [%]** 

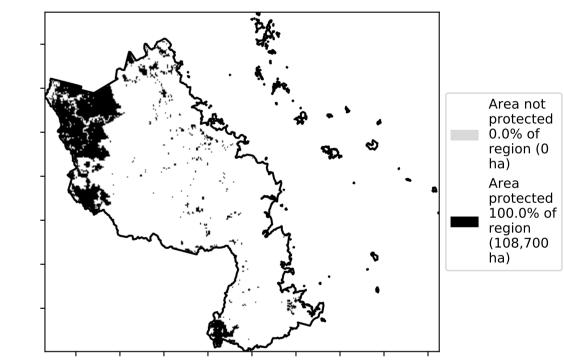
Land use and forest cover



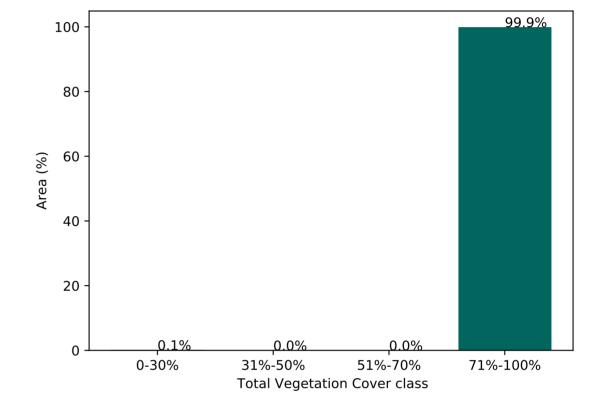
% Area protected from water erosion (>70%)





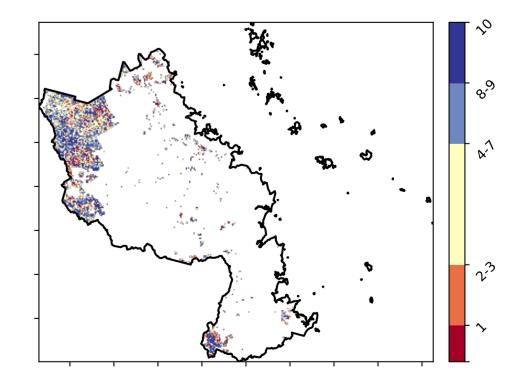


Proportion of vegetation cover class in area

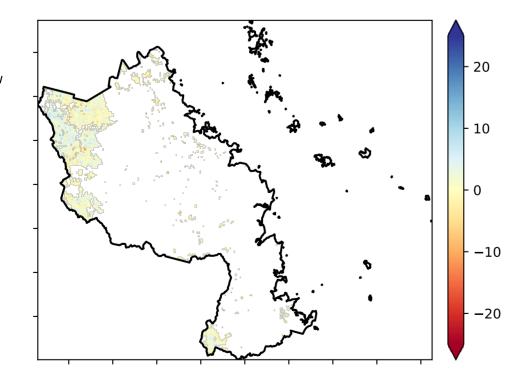


% Area protected from wind erosion (>50%)

**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

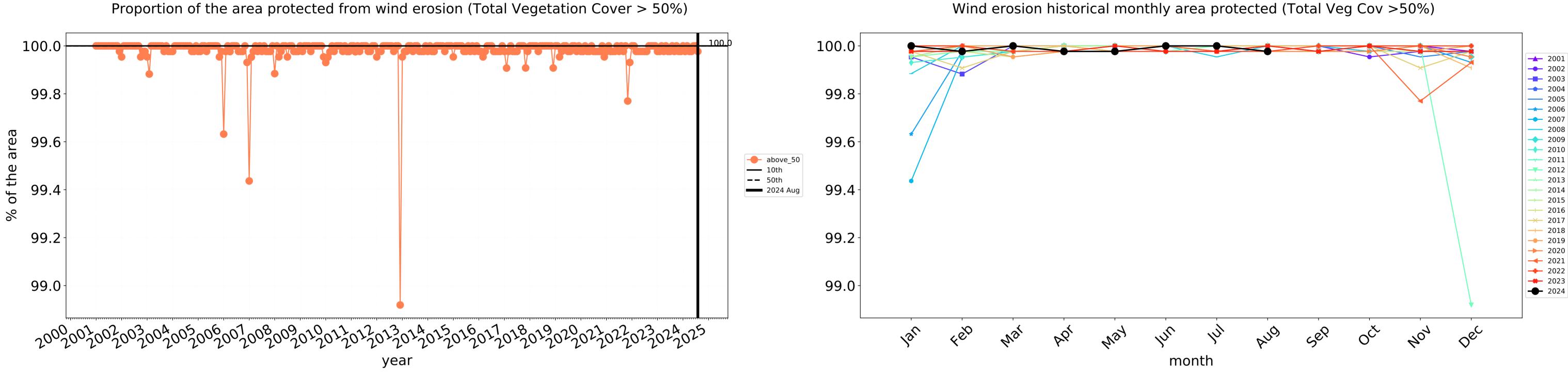


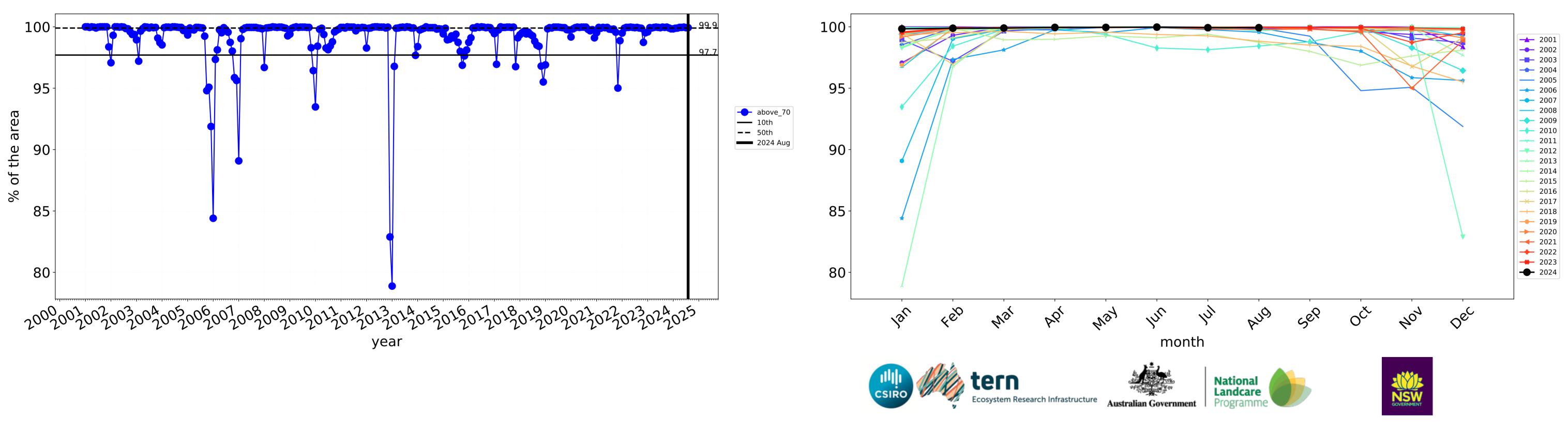
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



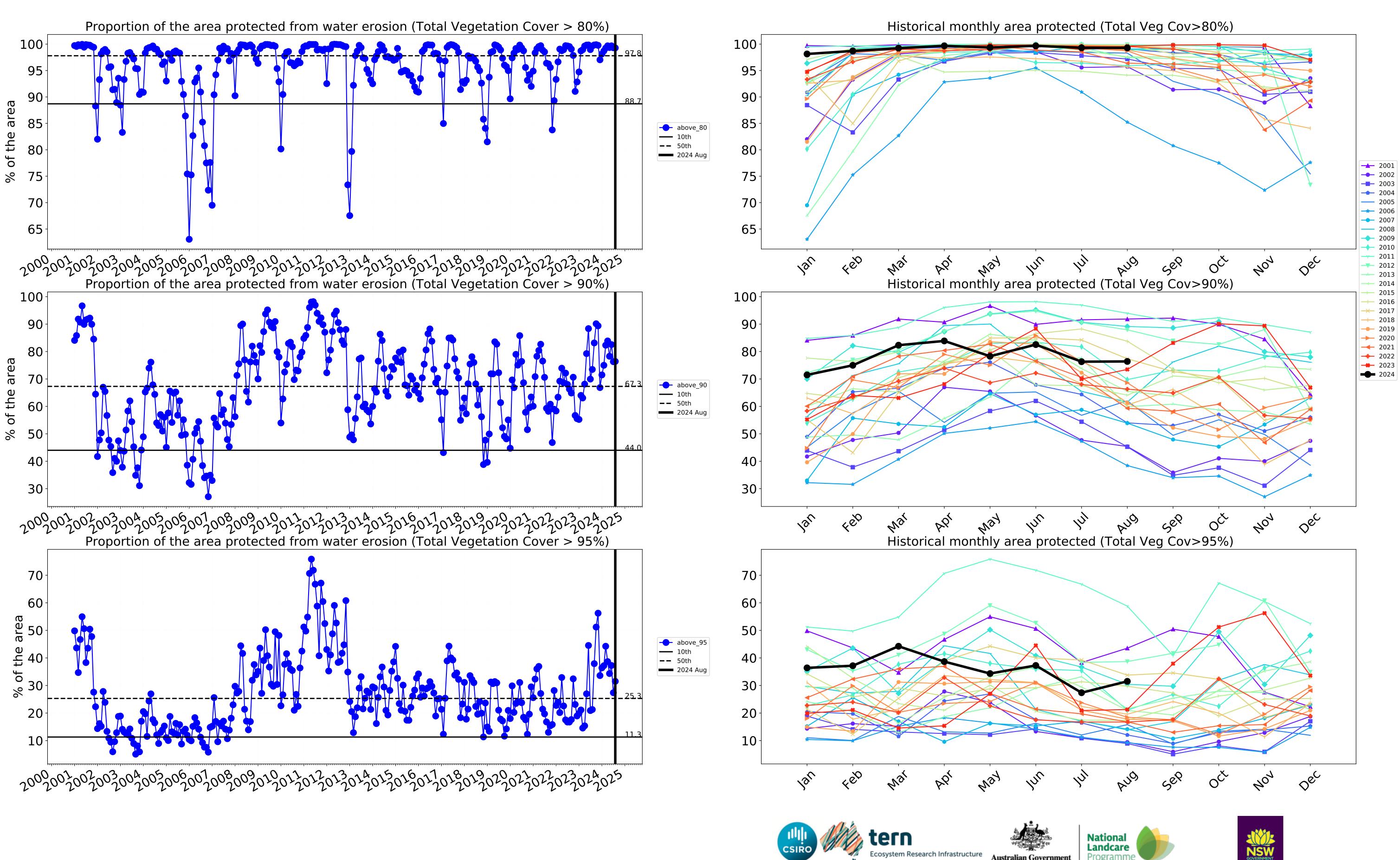


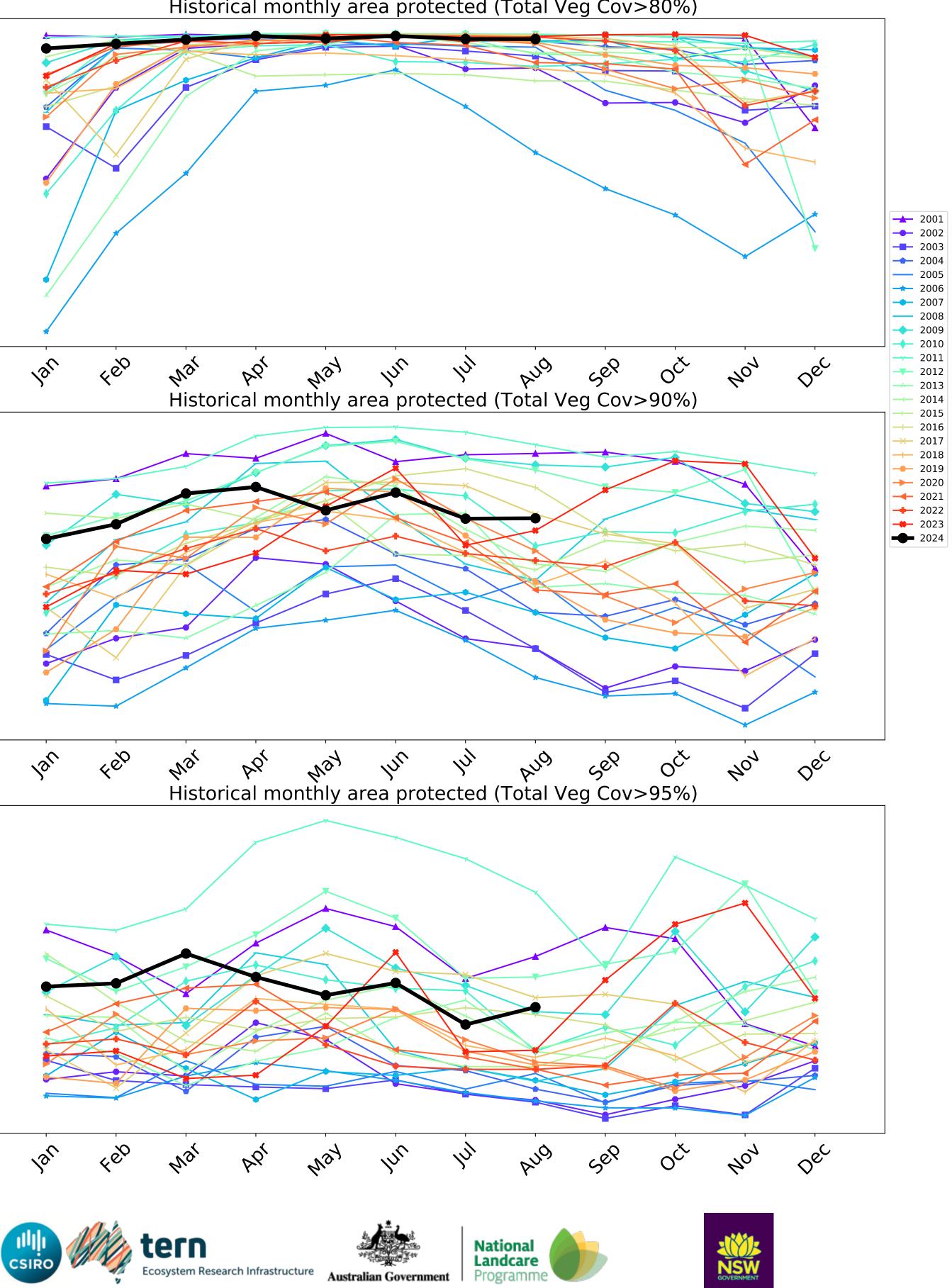
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



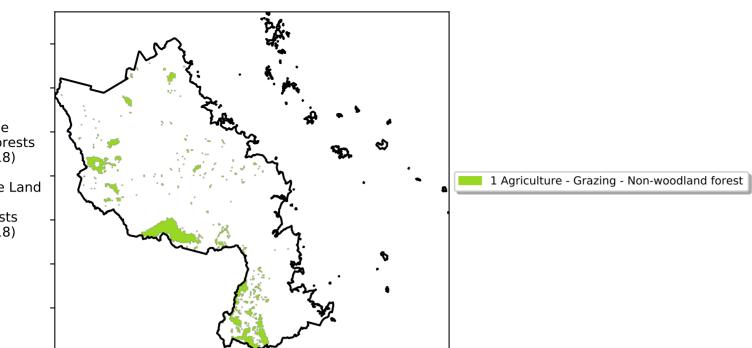


Water erosion historical monthly area protected (Total Veg Cov>70%)



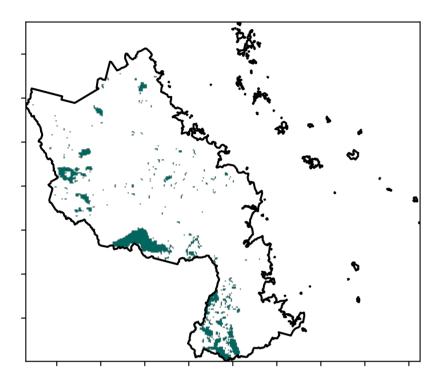


## **Grazing - Forest (non woodland)**

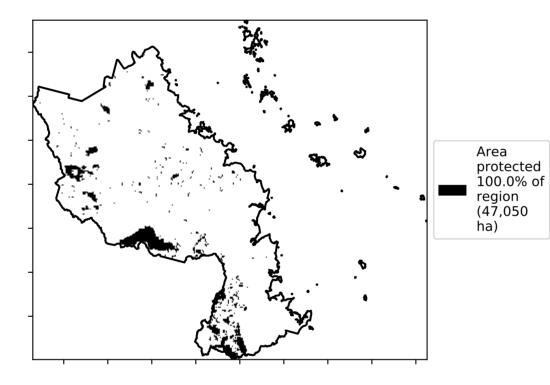


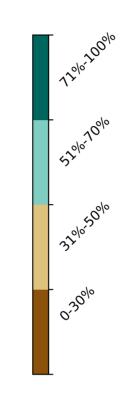
**Total Vegetation Cover [%]** 

Land use and forest cover

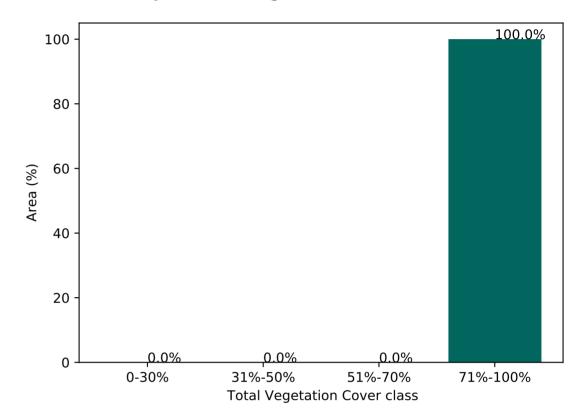


% Area protected from water erosion (>70%)

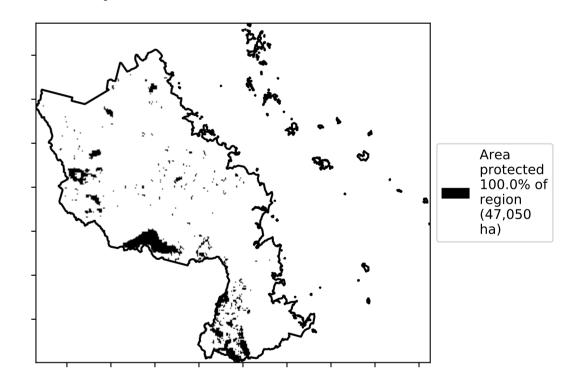




Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

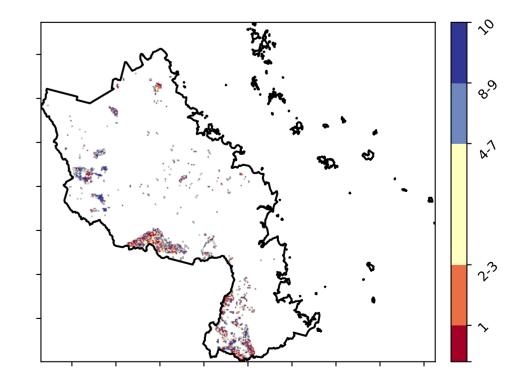


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

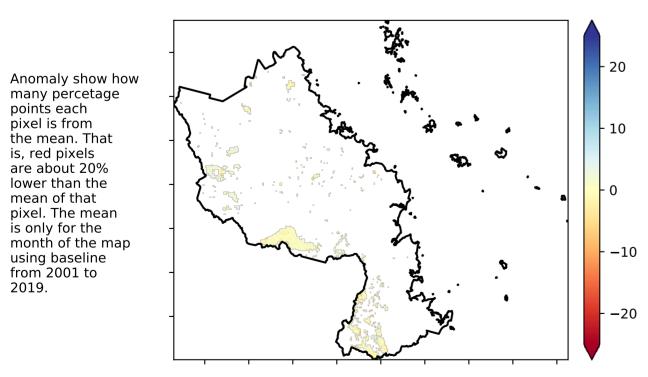
lower than the mean of that

pixel. The mean

**Total Vegetation Cover Decile [%]** 



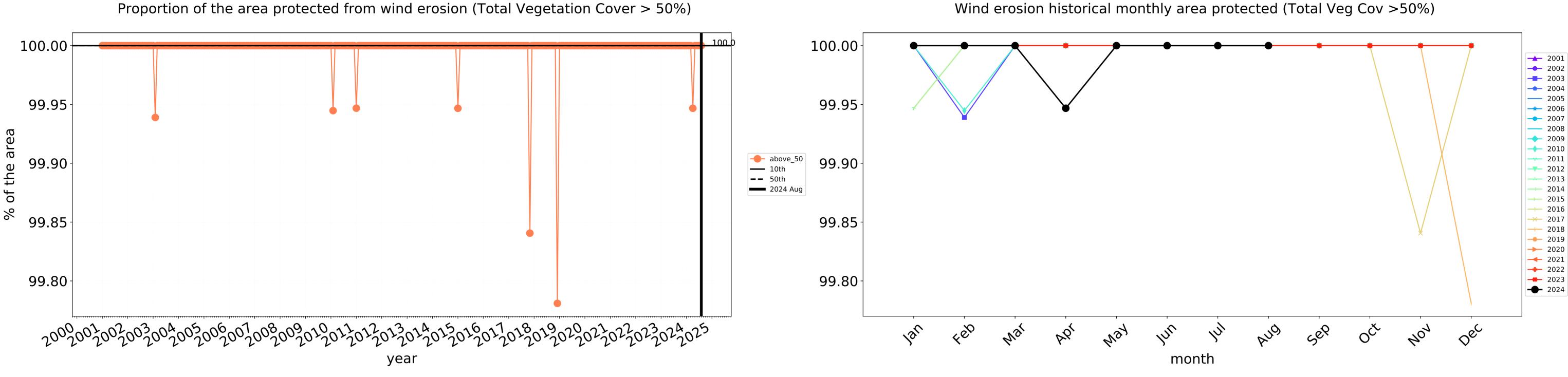
Total Vegetation Cover Anomaly [%]

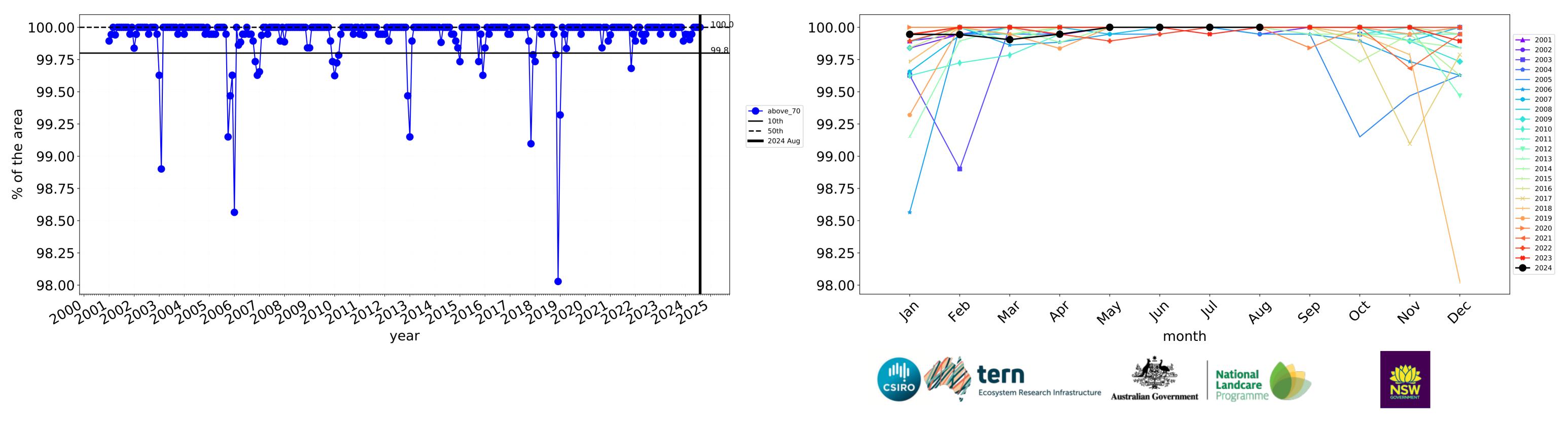


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

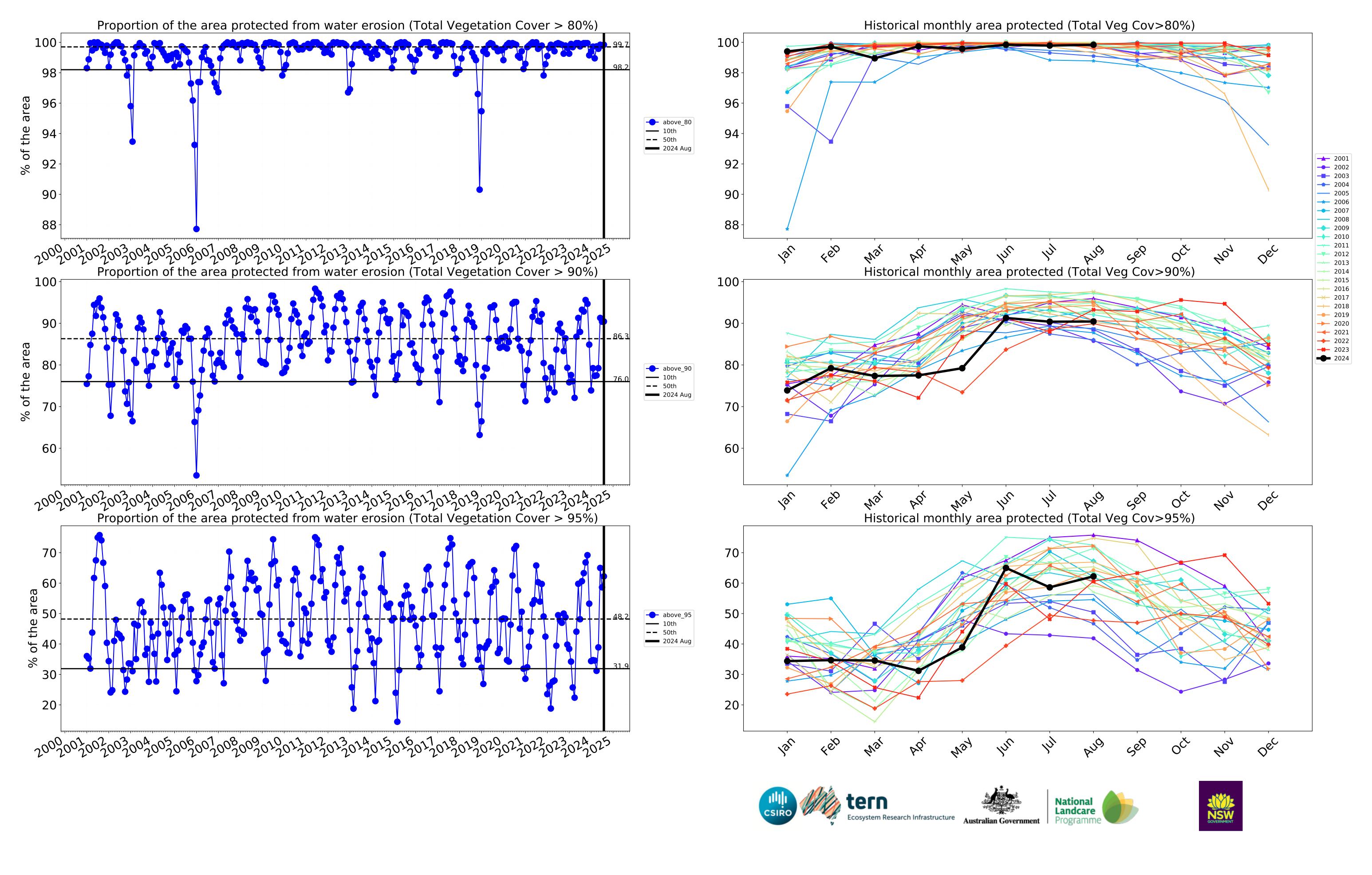








Water erosion historical monthly area protected (Total Veg Cov>70%)

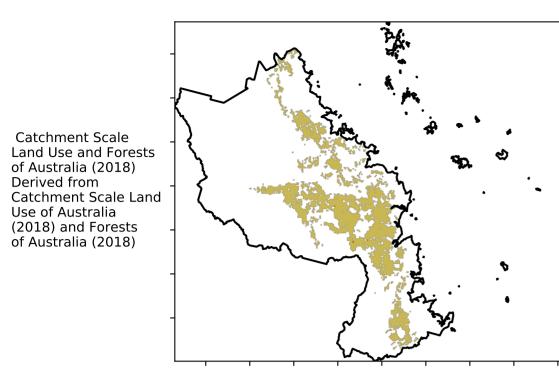


3**4** 

ŀ

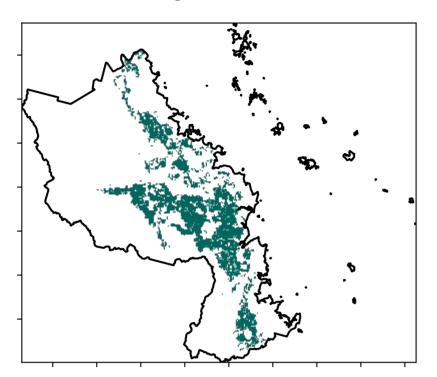
## Irrigation

Land use and forest cover



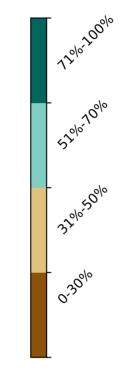
1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated 3 Agriculture - Horticulture - Irrigated

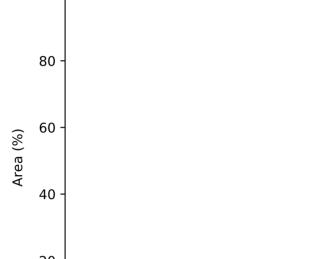
**Total Vegetation Cover [%]** 



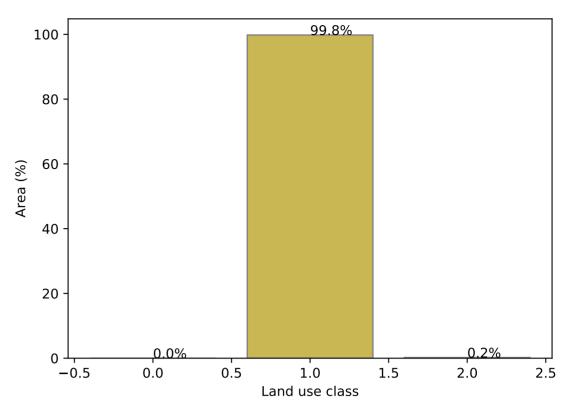
% Area protected from water erosion (>70%)



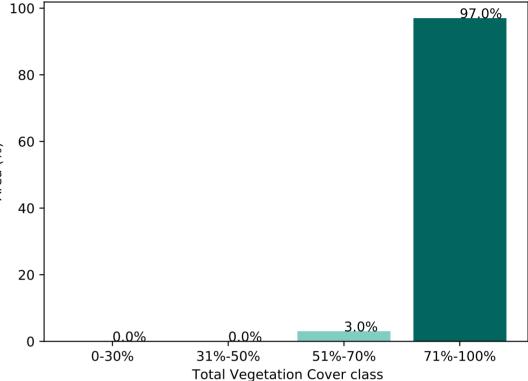




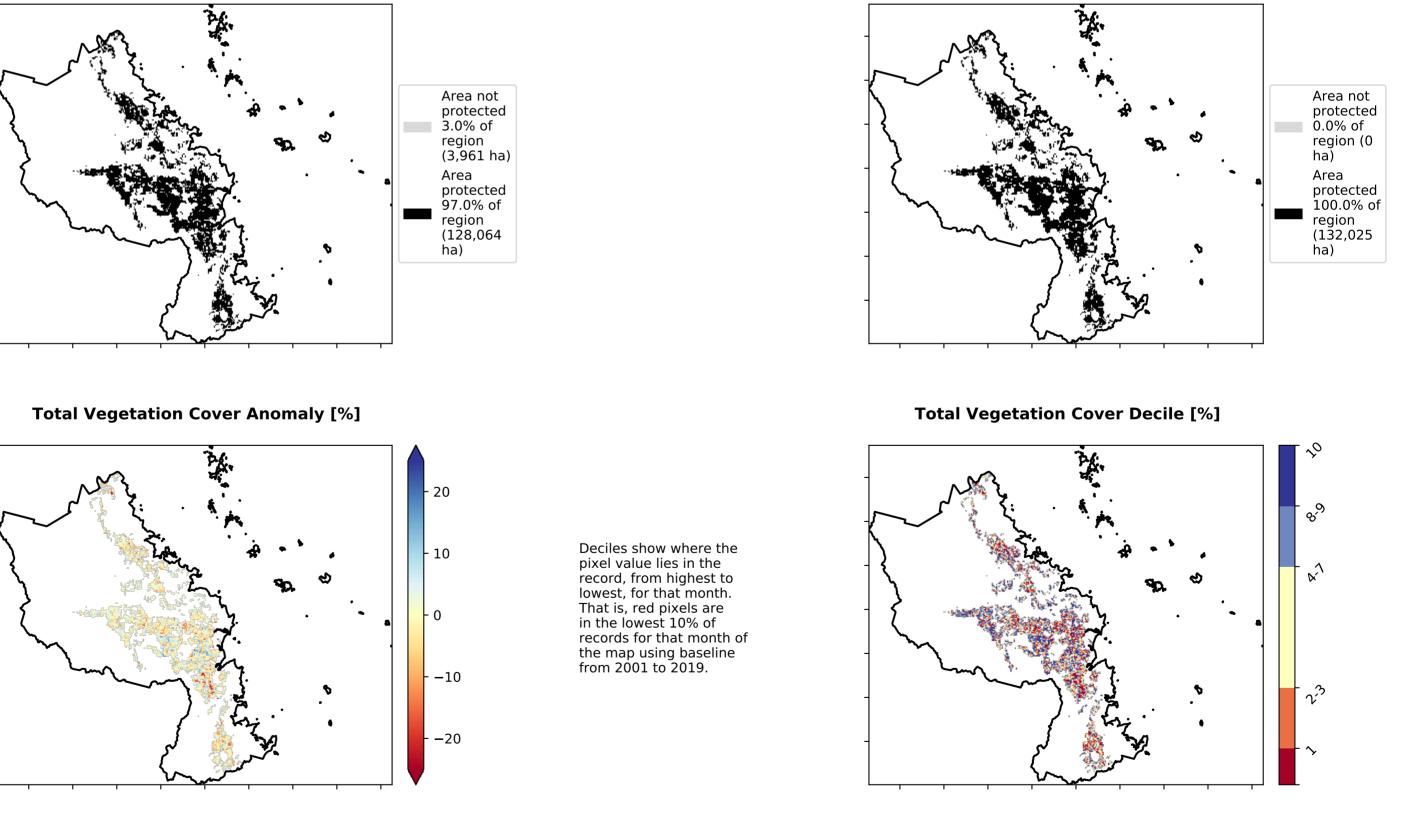
#### Proportion of each land class in area



Proportion of vegetation cover class in area

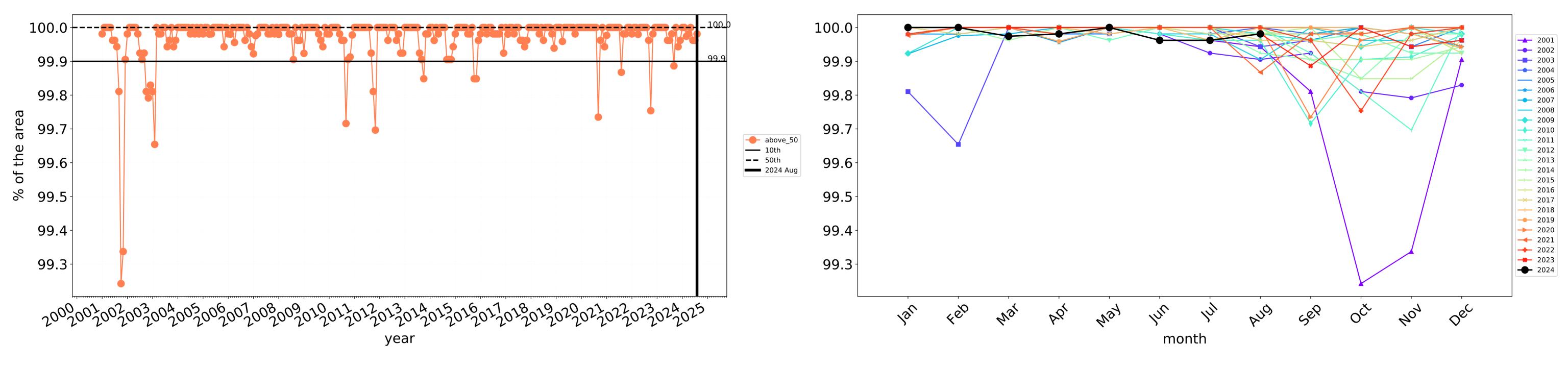


#### % Area protected from wind erosion (>50%)



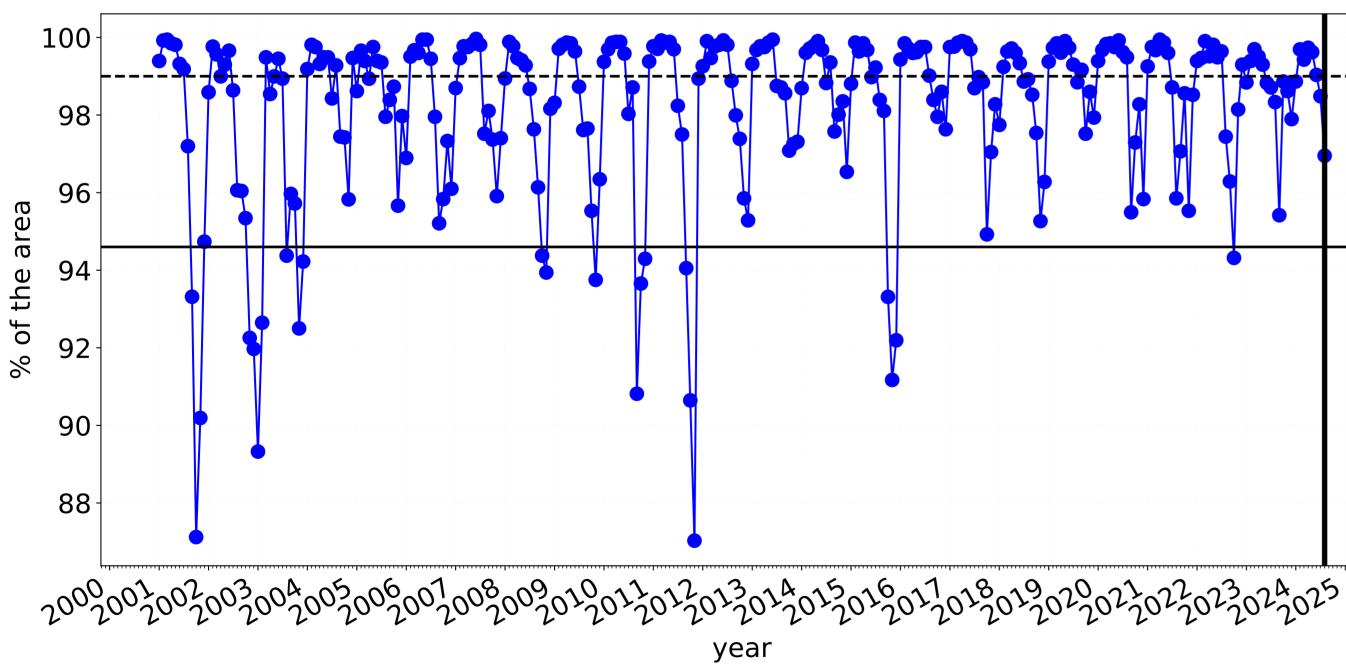


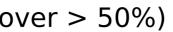




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



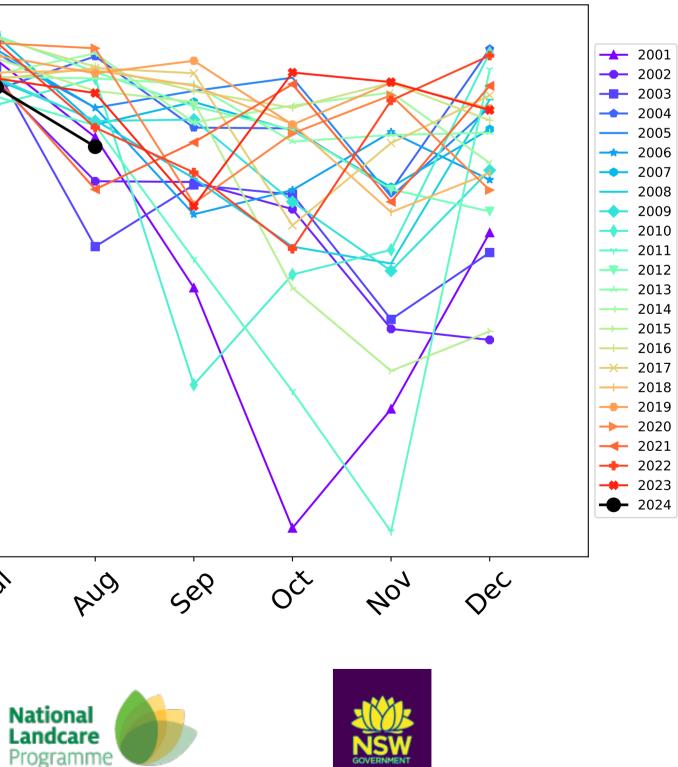


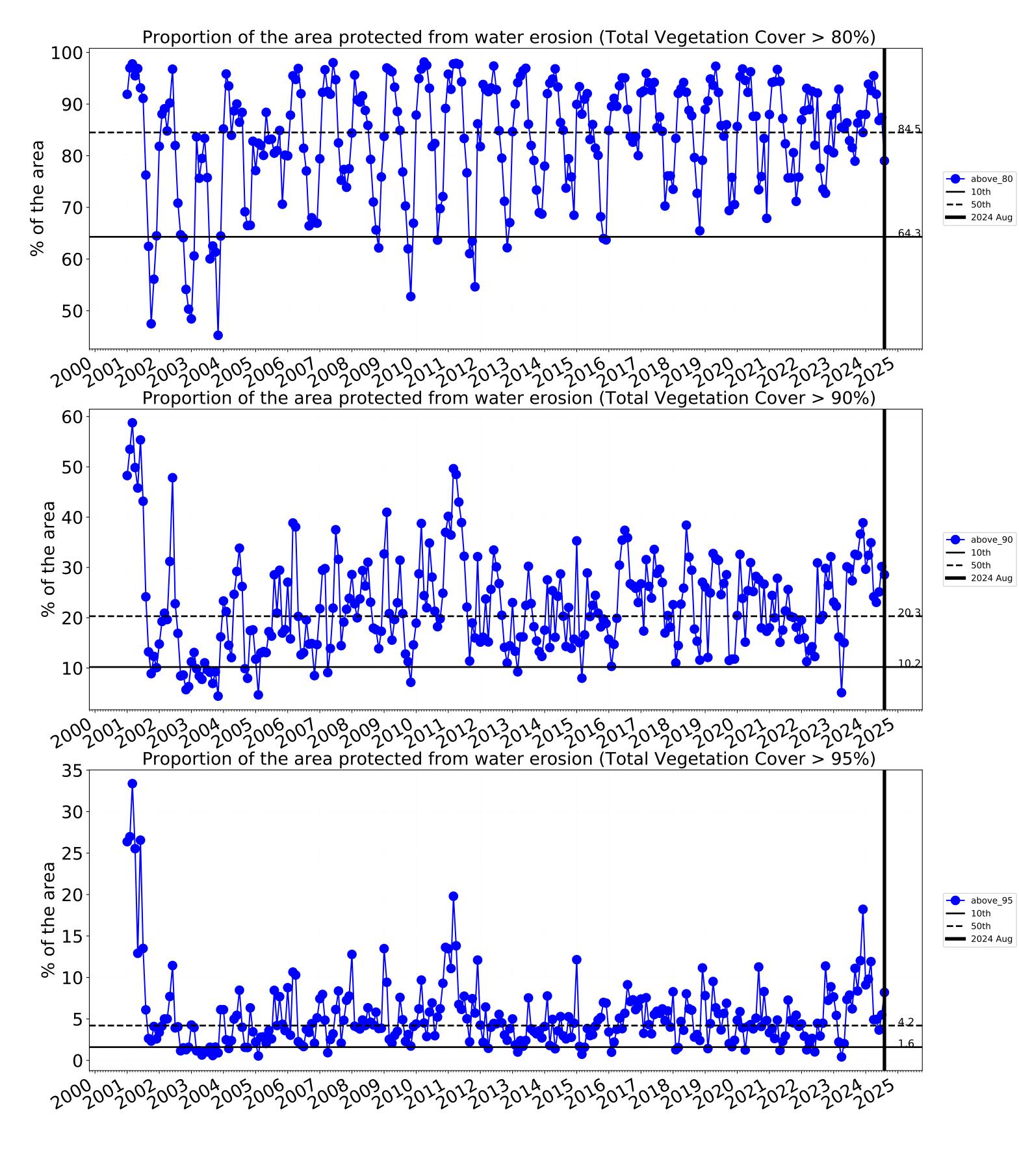


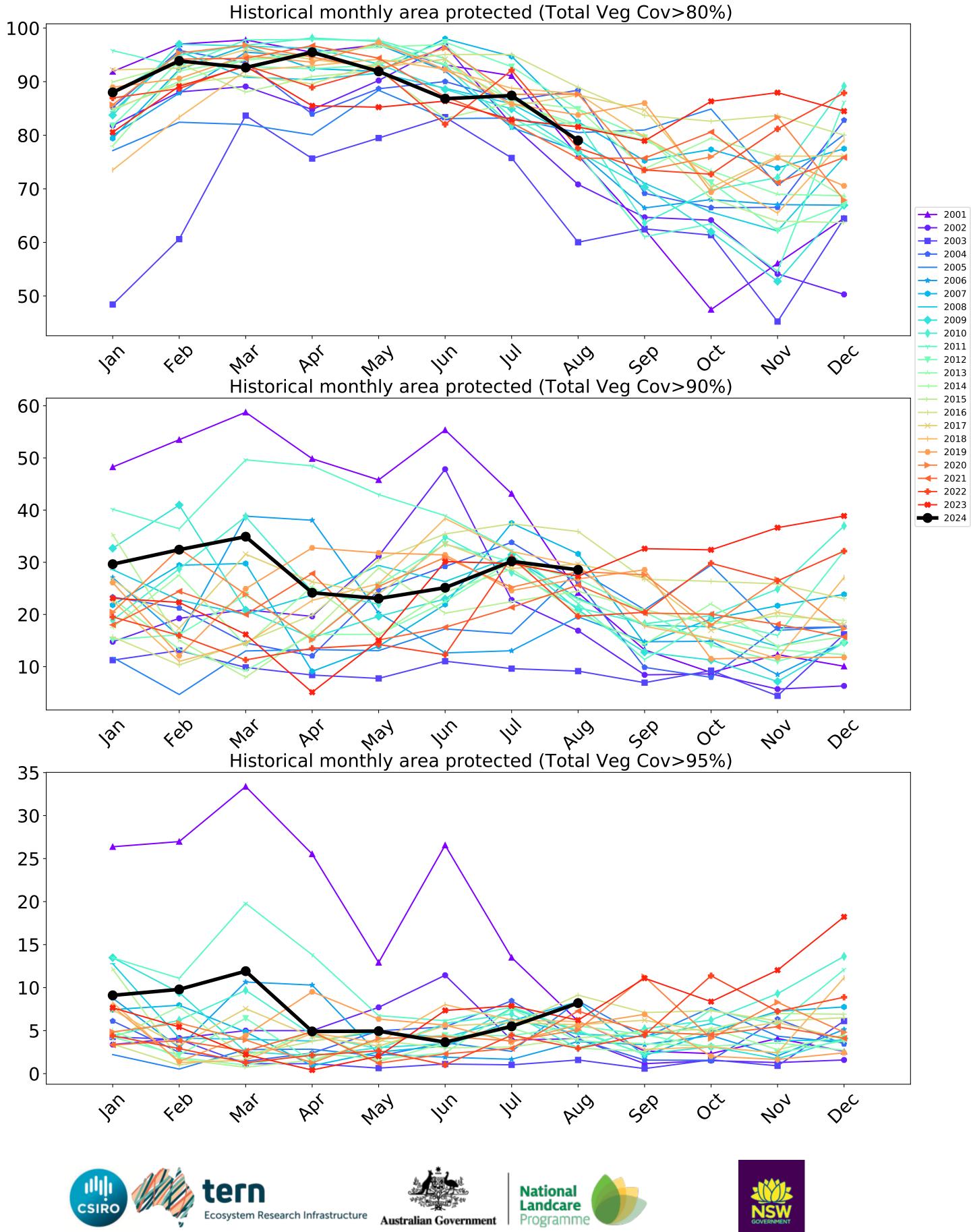
Wind erosion historical monthly area protected (Total Veg Cov >50%)

100 <u>99 0</u> 98 96----- above\_70 **—** 10th **——** 50th 2024 Aug 94 92 90 88 4eb lan In way Mai 1<sup>1</sup>/<sub>1</sub> Þb, month tern Ecosystem Research Infrastructure Programme Australian Government

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%

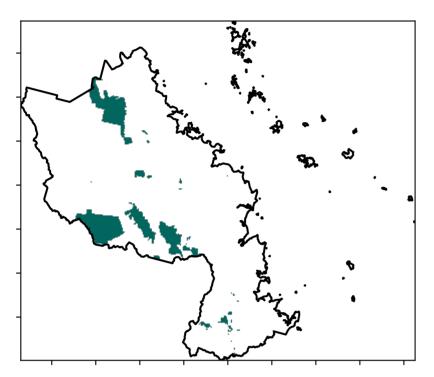
· 52°10010

320050010

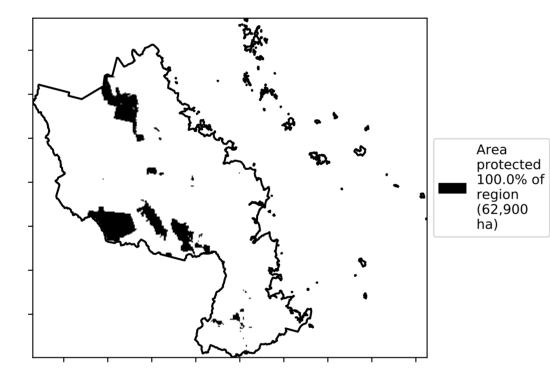
0.30%

Land use and forest cover

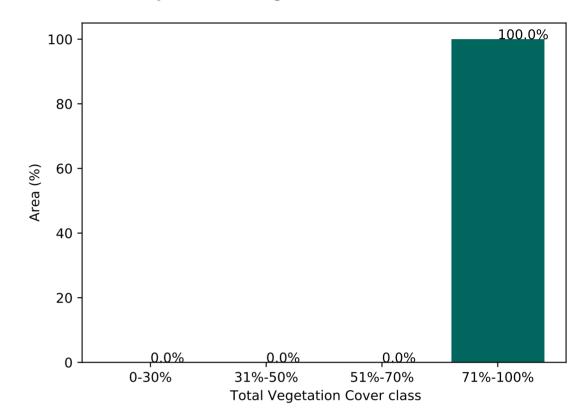
**Total Vegetation Cover [%]** 



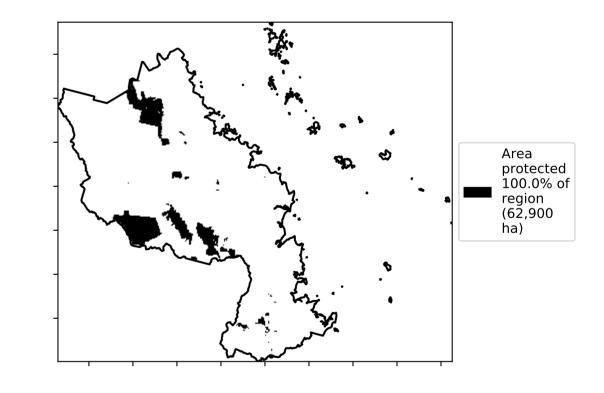
% Area protected from water erosion (>70%)



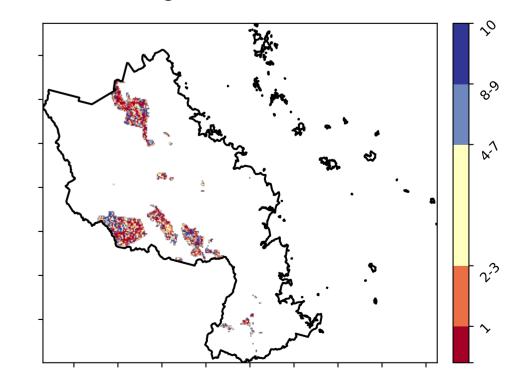




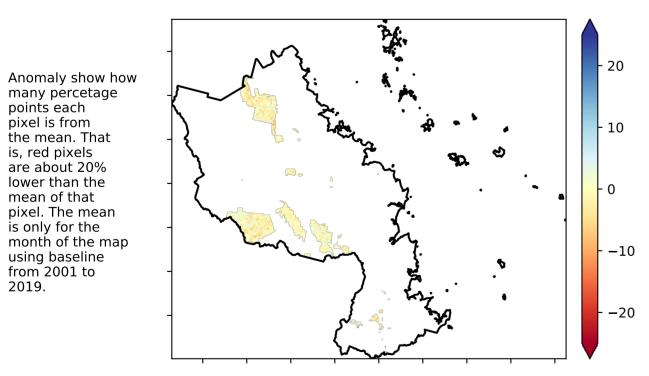
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

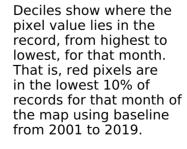


the mean. That

is, red pixels are about 20% lower than the

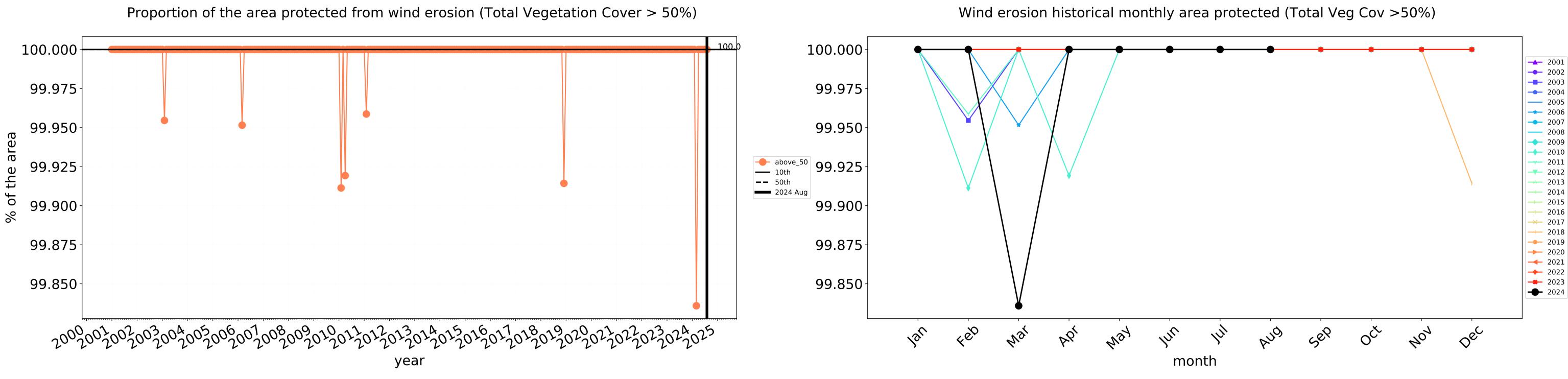
mean of that pixel. The mean

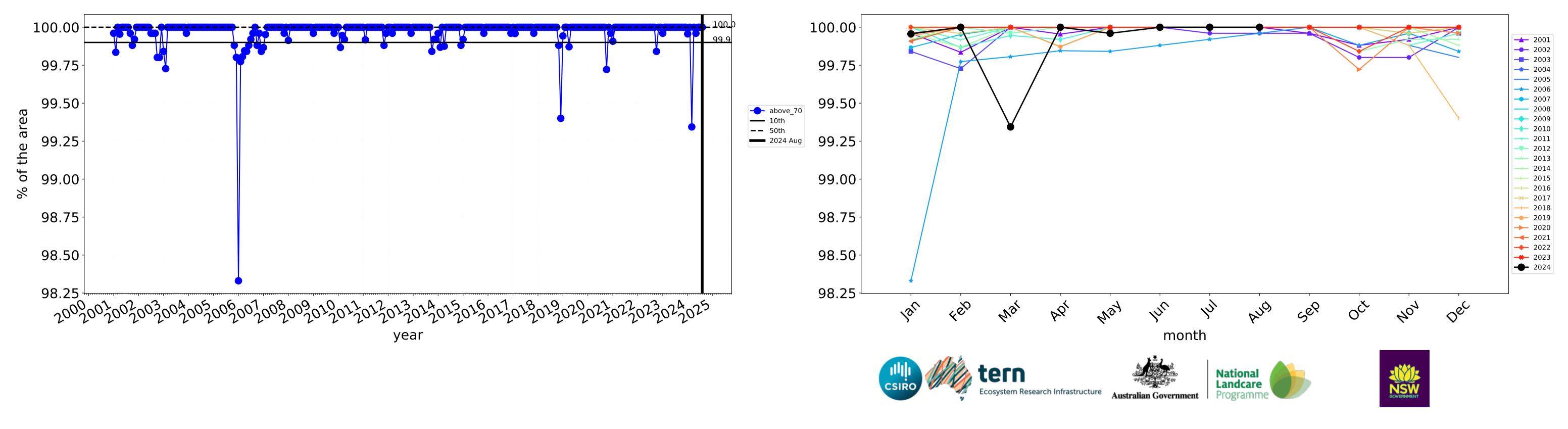
using baseline from 2001 to 2019.



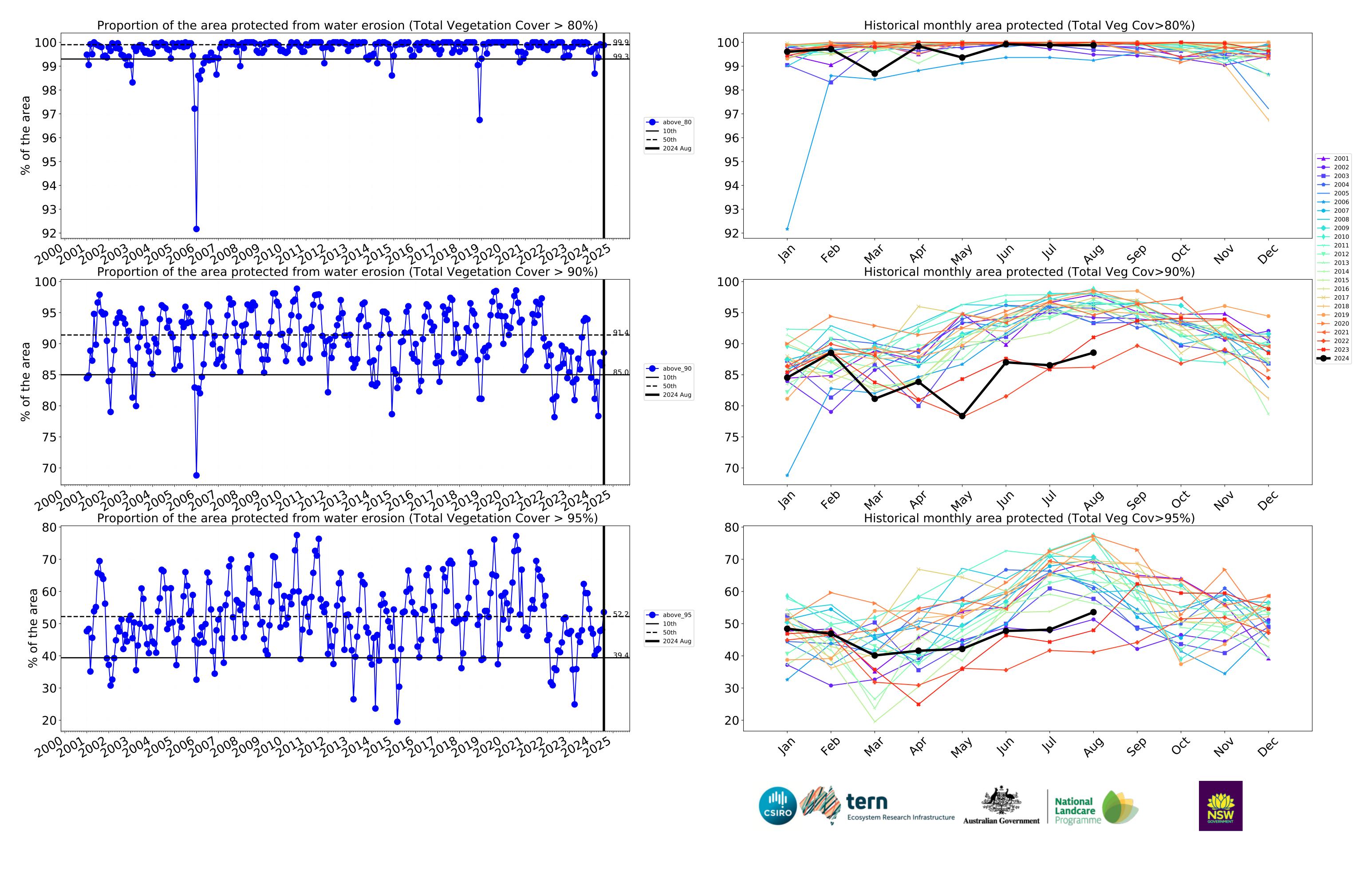








Water erosion historical monthly area protected (Total Veg Cov>70%)



# Mackay\_(R) (749,250 ha and no data 12,061 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	749,250	99.9% 748,800	99.8% 747,650	98.2% 736,000	92.8% 695,300	67.8% 508,225	34.0% 255,025
Conservation and natural environments	192,800	99.9% 192,675	99.8% 192,350	98.9% 190,700	97.6% 188,175	83.2% 160,425	44.3% 85,450
Conservation and natural environments non forest	5,050	98.5% 4,975	96.0% 4,850	87.1% 4,400	77.7% 3,925	53.0% 2,675	30.2% 1,525
Conservation and natural environments Woodland forest	37,250	99.9% 37,225	99.6% 37,100	98.4% 36,650	96.7% 36,025	84.0% 31,300	46.9% 17,475
Conservation and natural environments Forest (non woodland)	150,500	100.0% 150,475	99.9% 150,400	99.4% 149,650	98.5% 148,225	84.0% 126,450	44.2% 66,450
Agriculture	428,350	100.0% 428,350	100.0% 428,250	98.9% 423,700	92.6% 396,800	63.1% 270,075	29.8% 127,700
Grazing	295,725	100.0% 295,725	100.0% 295,650	99.8% 295,100	98.7% 291,875	78.4% 231,775	39.4% 116,425
Grazing non forest	139,975	100.0% 139,975	100.0% 139,925	99.6% 139,425	97.9% 136,975	75.9% 106,175	37.8% 52,900
Grazing Woodland forest	108,700	100.0% 108,700	100.0% 108,675	99.9% 108,625	99.3% 107,925	76.4% 83,050	31.5% 34,250
Grazing - Forest (non woodland)	47,050	100.0% 47,050	100.0% 47,050	100.0% 47,050	99.8% 46,975	90.4% 42,550	62.2% 29,275
Irrigation	132,025	100.0% 132,025	100.0% 132,000	97.0% 128,000	79.0% 104,325	28.6% 37,700	8.2% 10,825
Production native forests and plantation forests	62,900	100.0% 62,900	100.0% 62,900	100.0% 62,900	99.9% 62,825	88.6% 55,700	53.6% 33,700

