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

# Date: August 2021

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

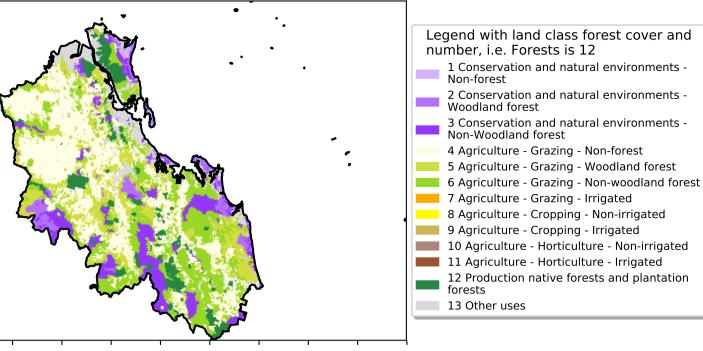


## **Vegetation Cover Aug 2021**

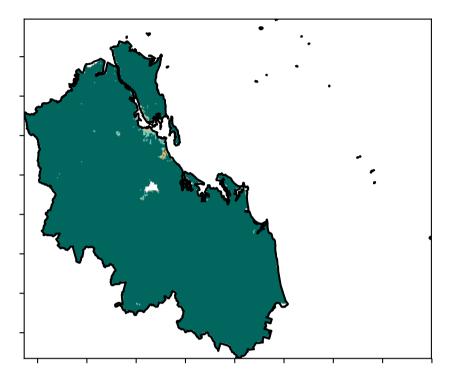
#### Land use and forest cover

Proportion of each land class in area

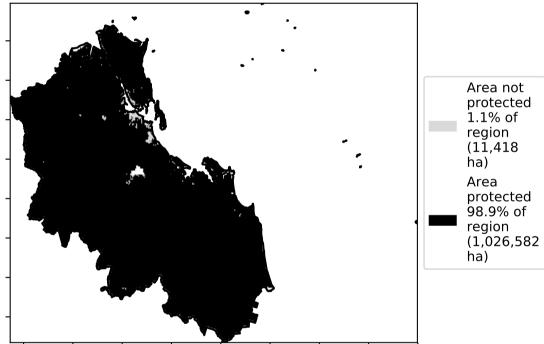


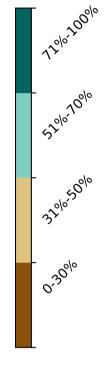


**Total Vegetation Cover [%]** 

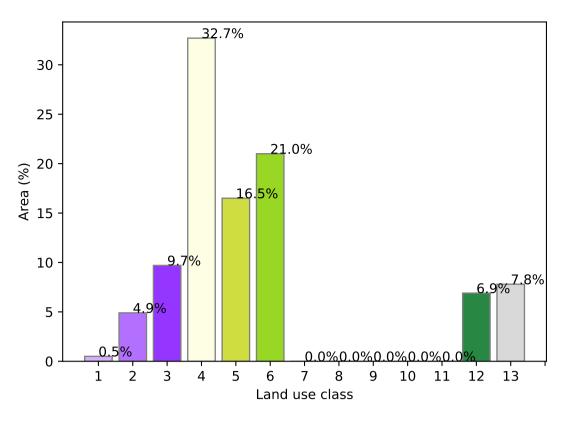


% Area protected from water erosion (>70%)

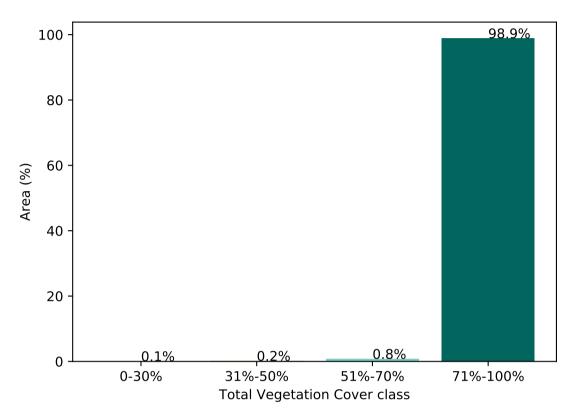




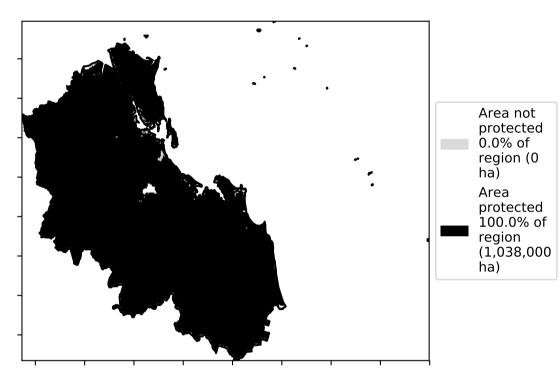
Area not protected 1.1% of



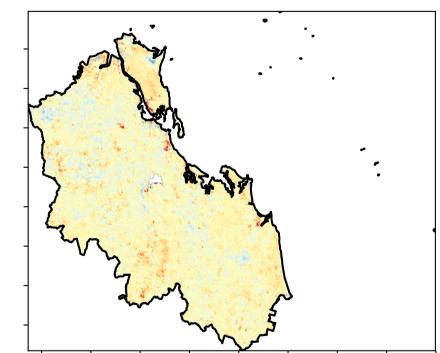
#### Proportion of vegetation cover class in area

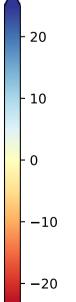


#### % Area protected from wind erosion (>50%)



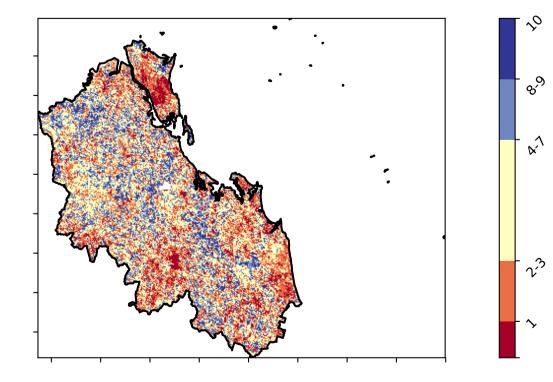
**Total Vegetation Cover Anomaly [%]** 





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.

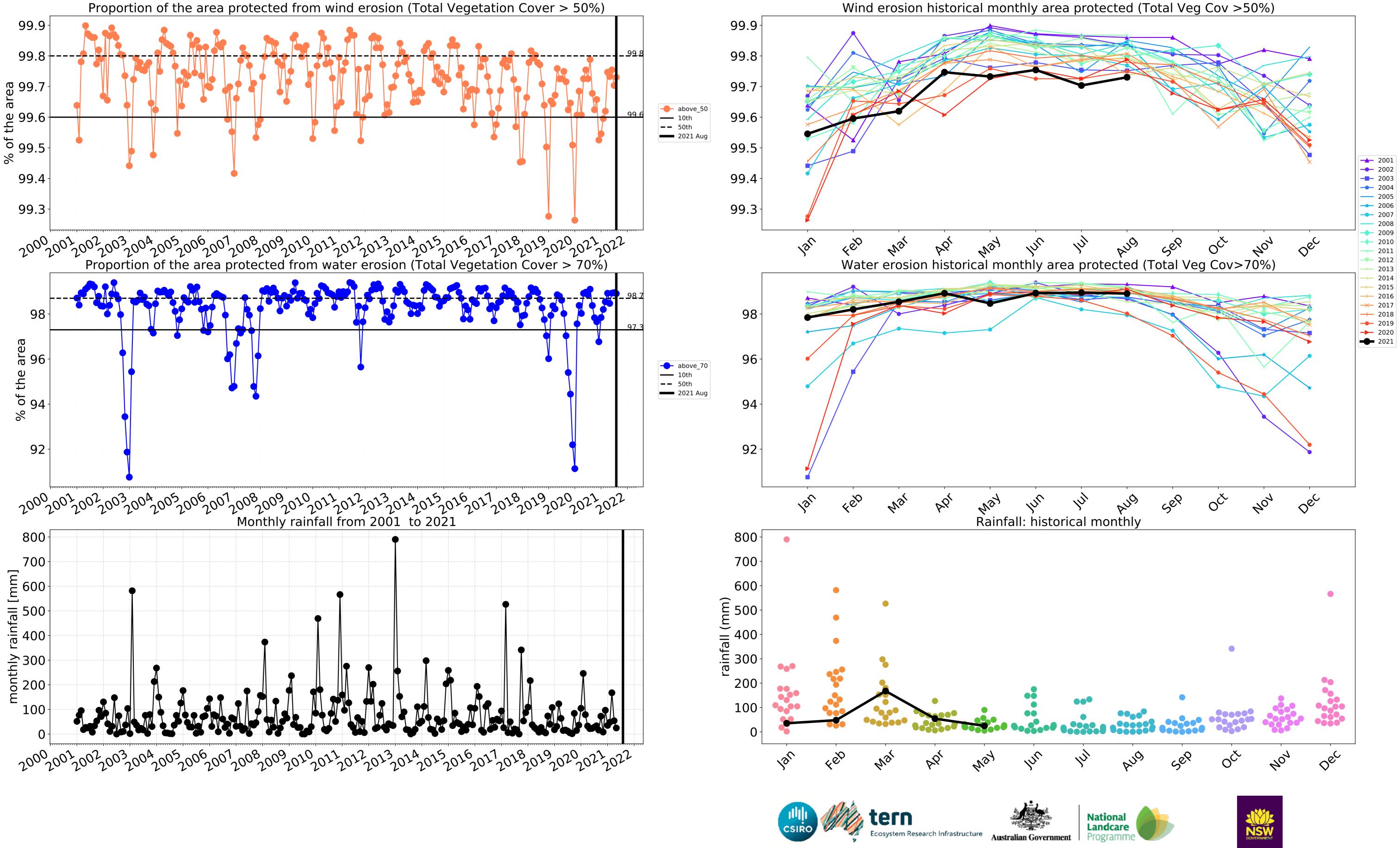
**Total Vegetation Cover Decile [%]** 

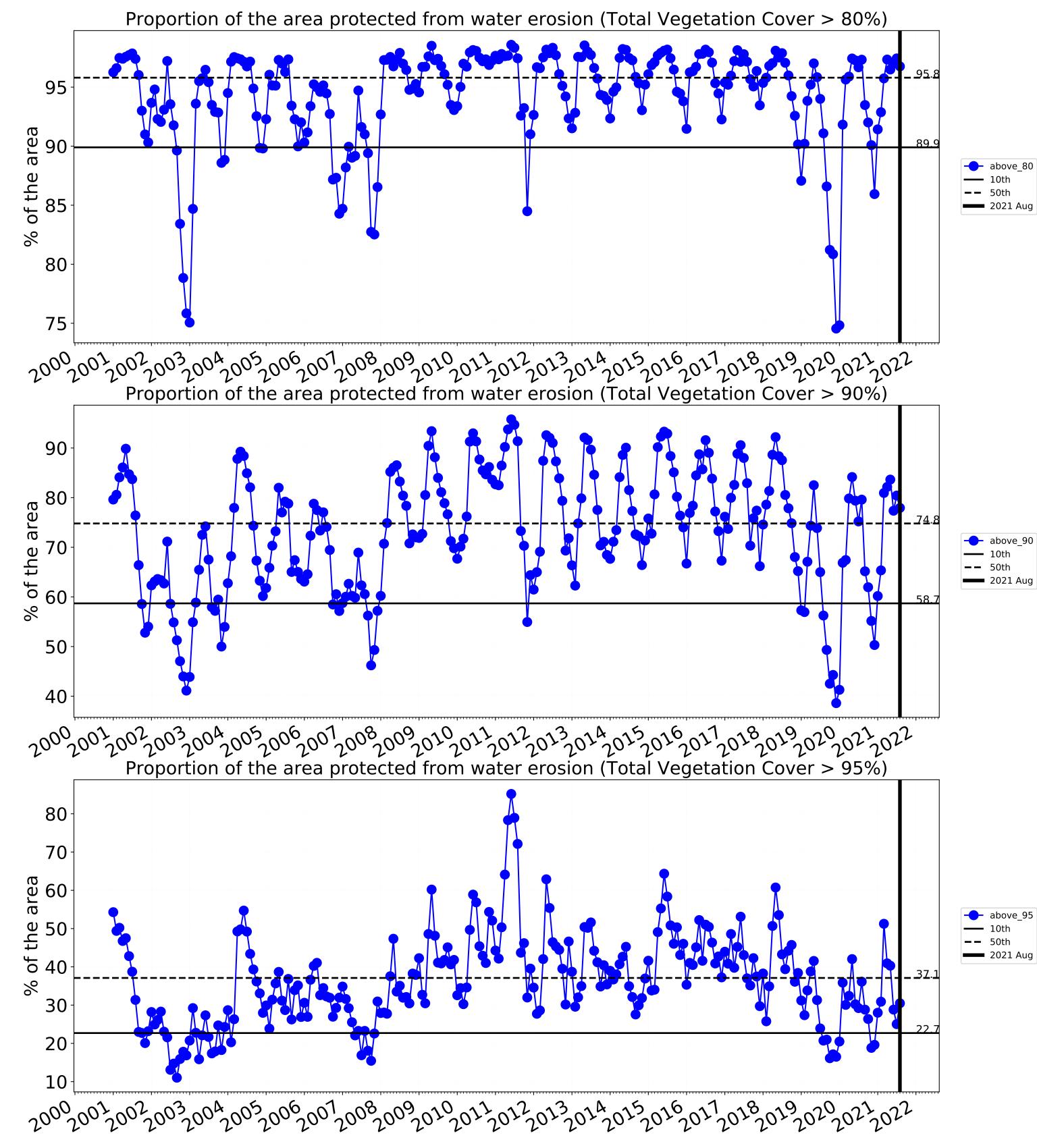


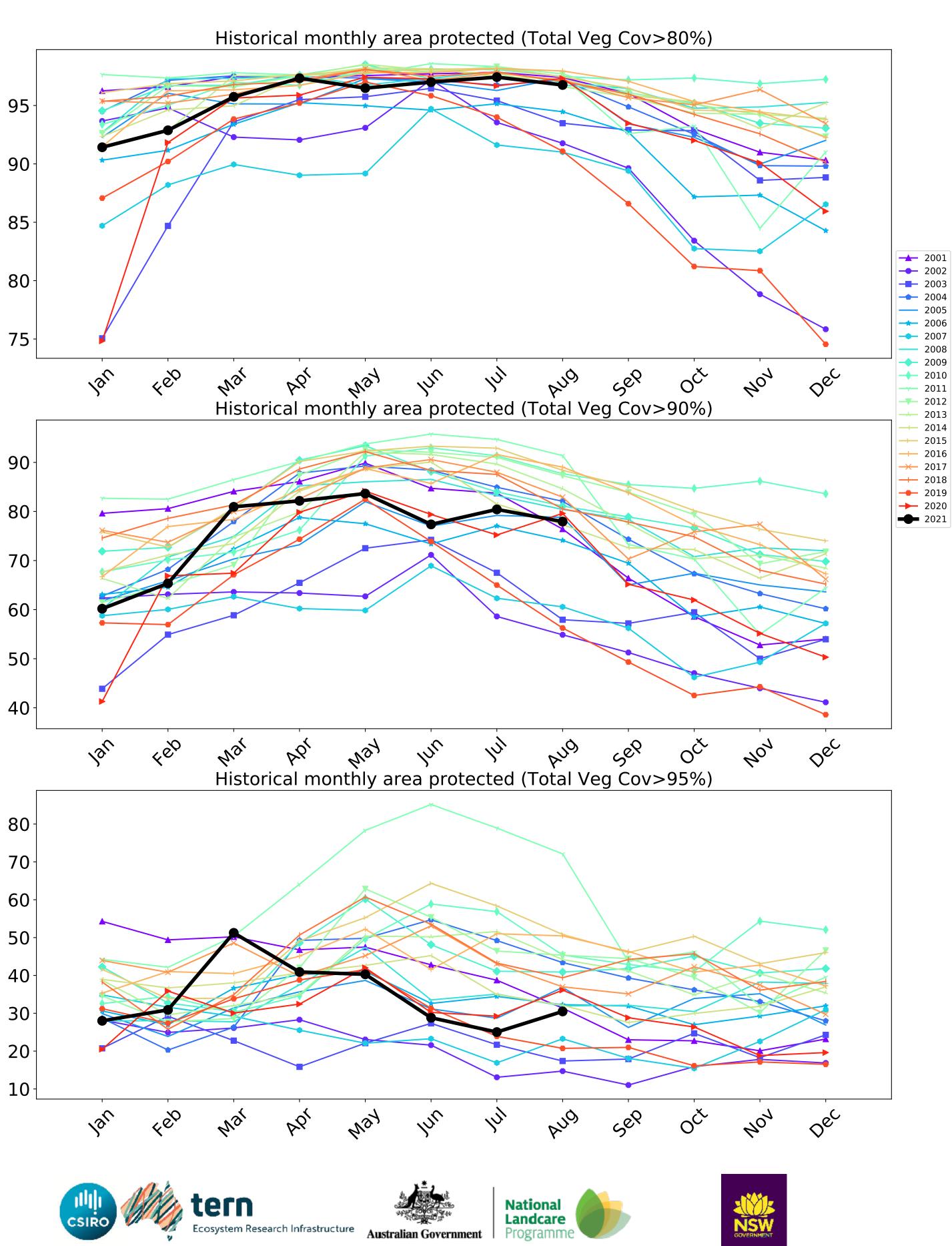


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

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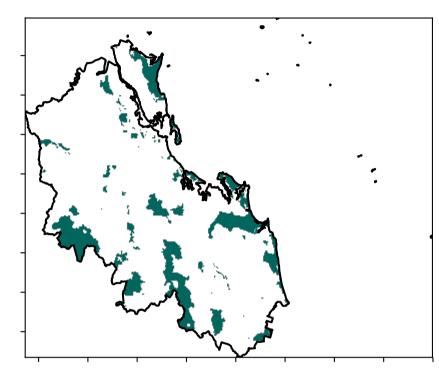


### **Conservation and natural environments**

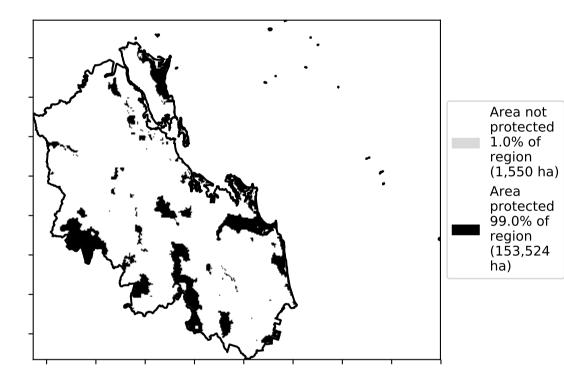
Land use and forest cover

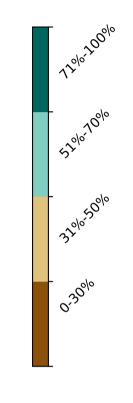
1 Conservation and natural environments - Non-forest 2 Conservation and natural environments – Woodland forest 3 Conservation and natural environments - Non-woodland forest

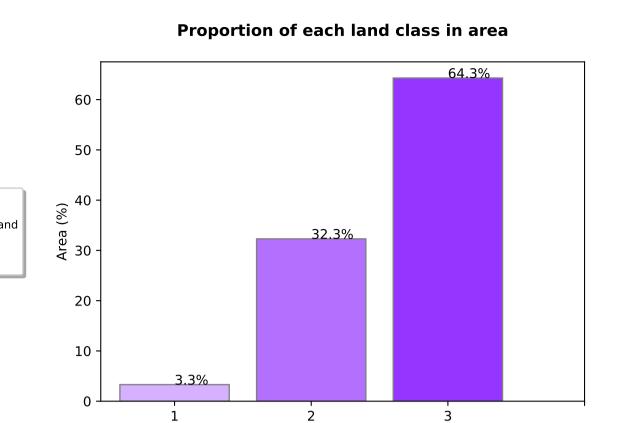
**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





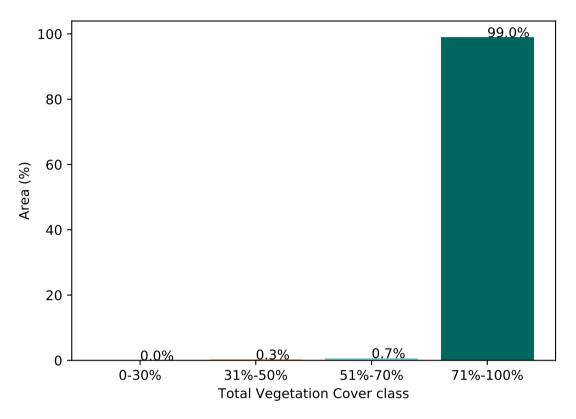


Proportion of vegetation cover class in area

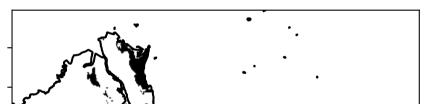
Land use class

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



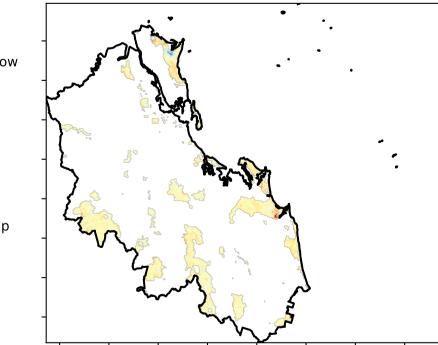
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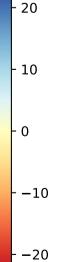
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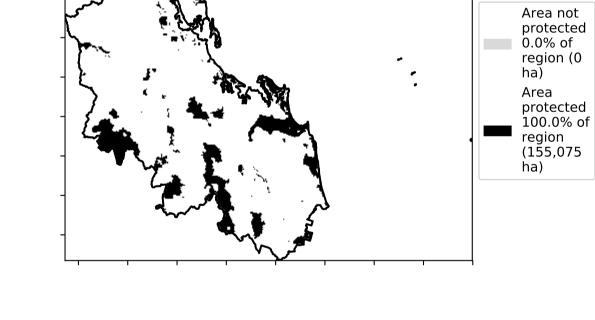
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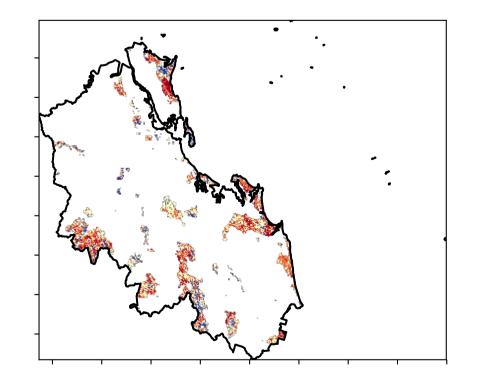
**Total Vegetation Cover Anomaly [%]** 







**Total Vegetation Cover Decile [%]** 





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.

Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land

Derived from

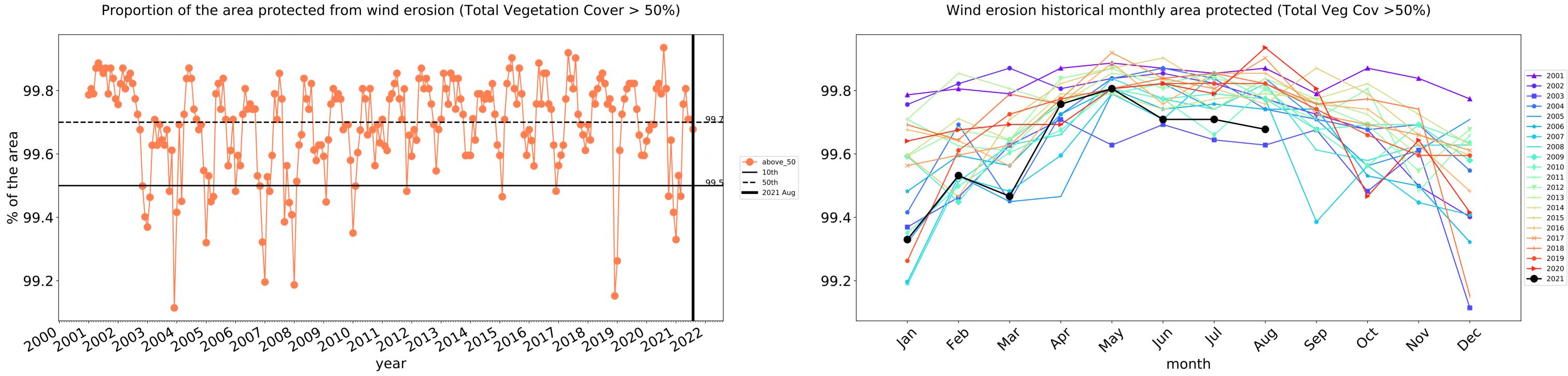
Use of Australia

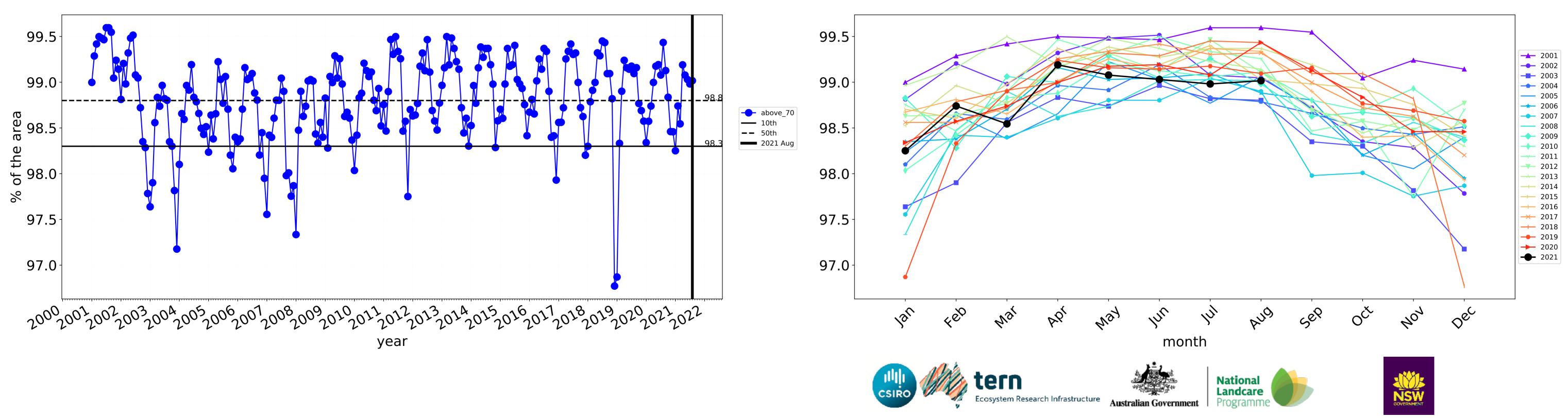
(2018) and Forests of Australia (2018)



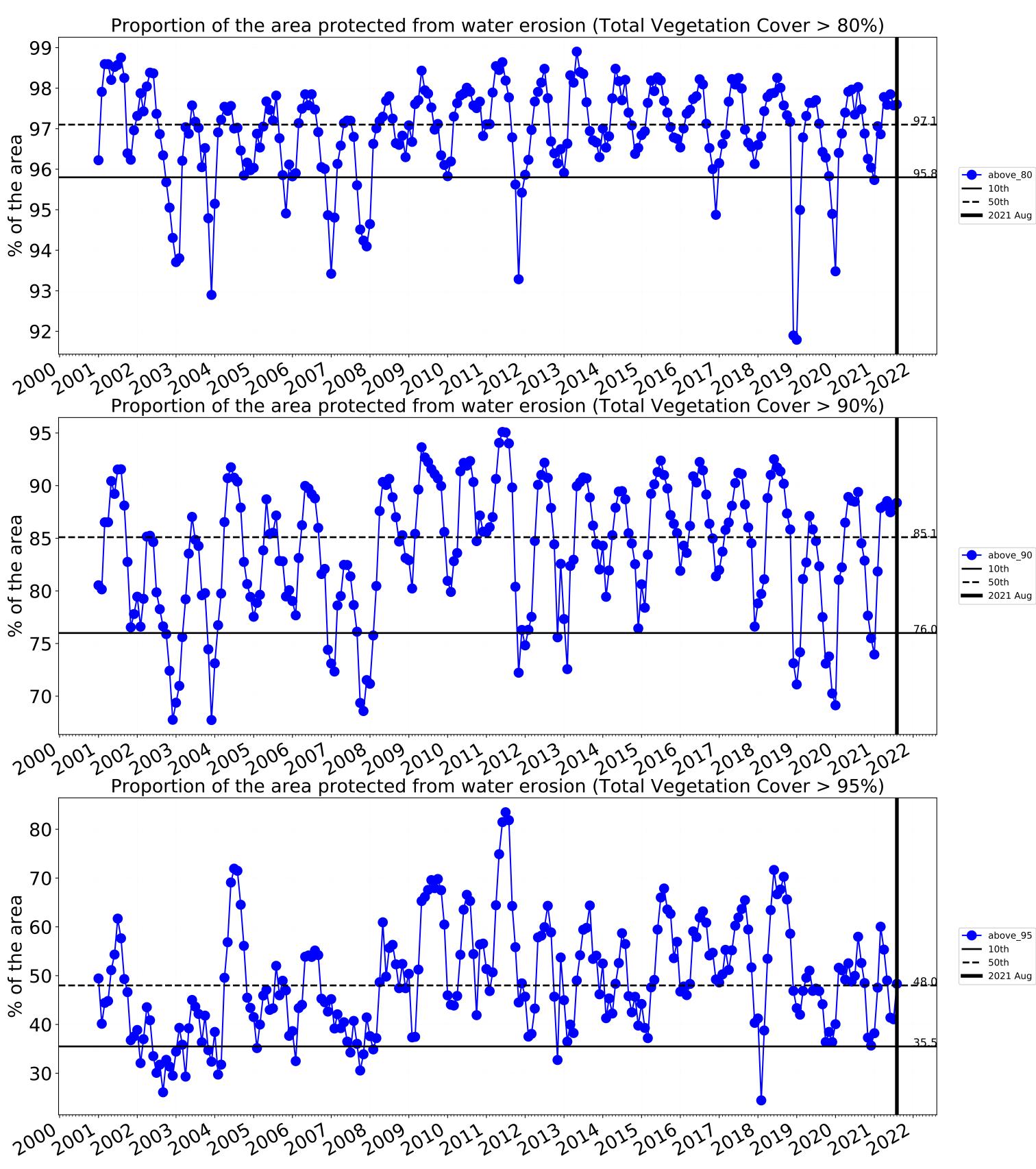


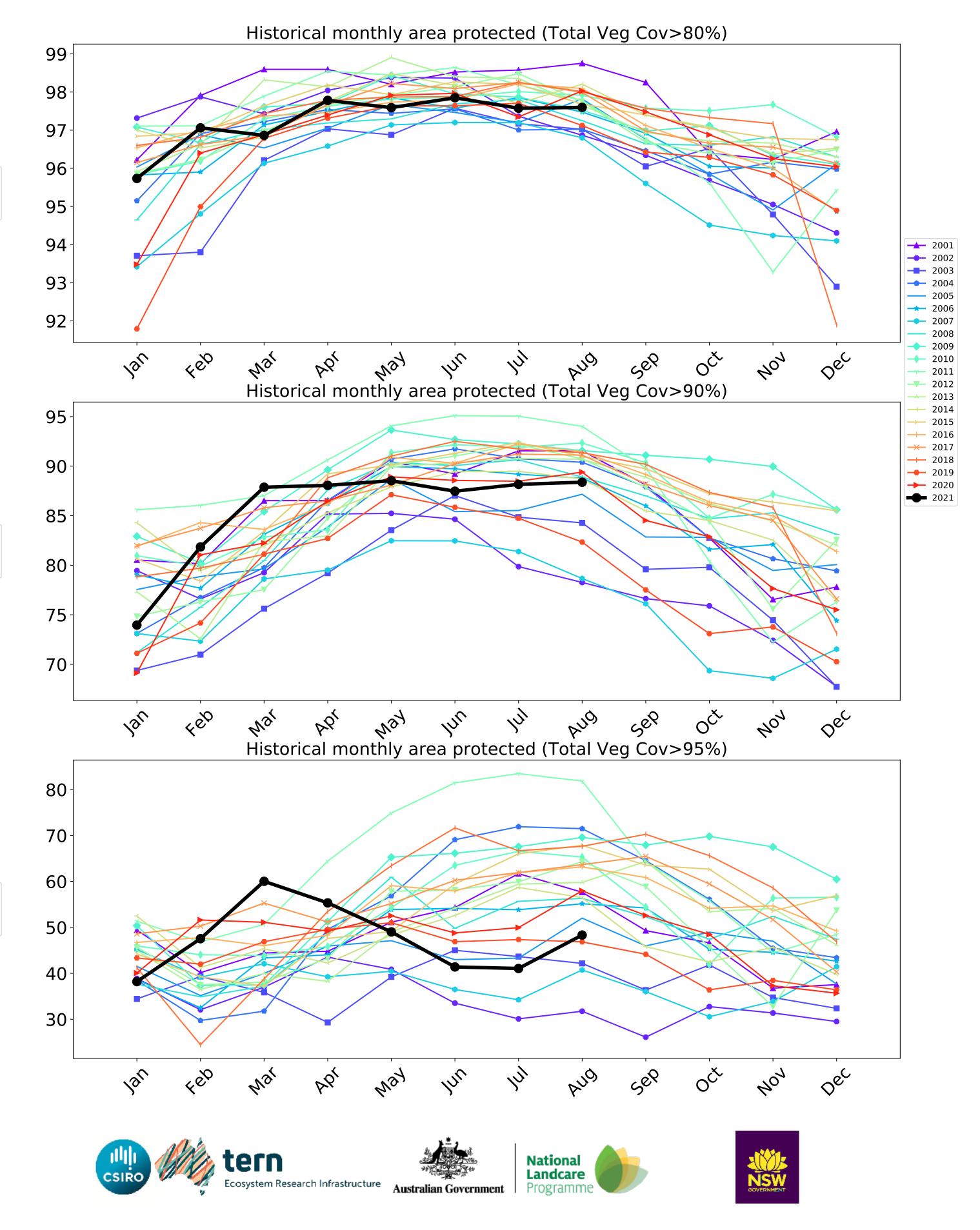
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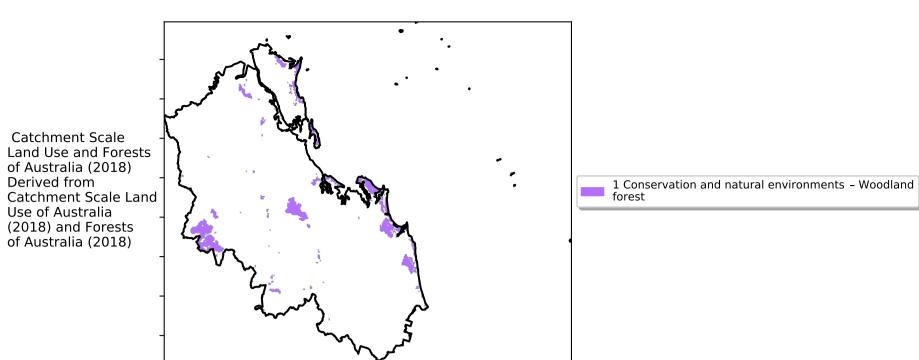
Water erosion historical monthly area protected (Total Veg Cov>70%)



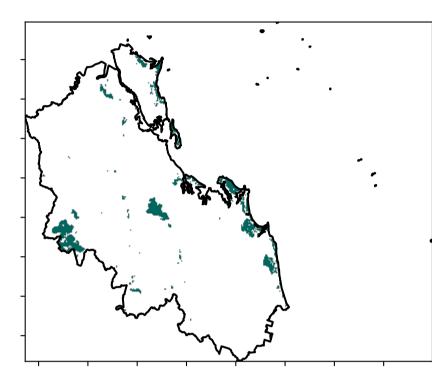


### **Conservation and natural environments Woodland forest**

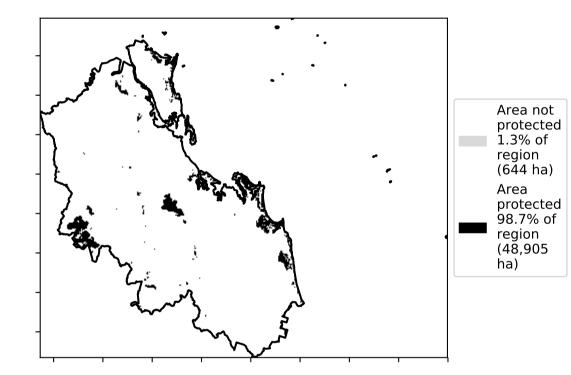
Land use and forest cover

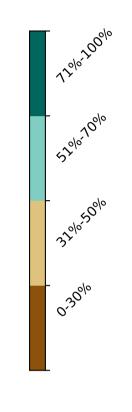


**Total Vegetation Cover [%]** 



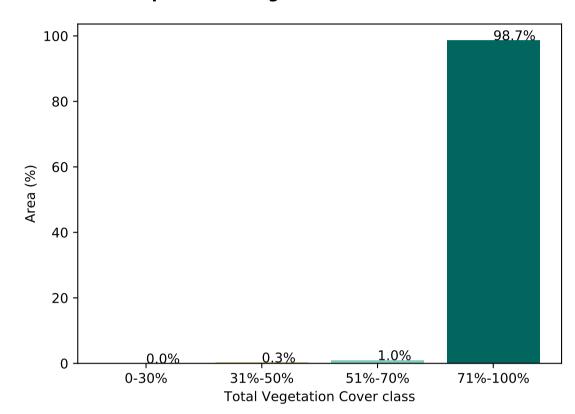
% Area protected from water erosion (>70%)







#### Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



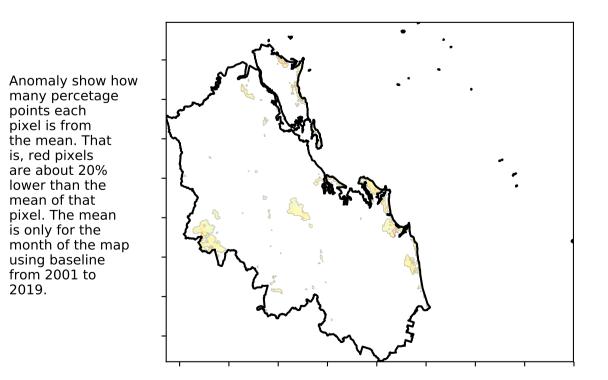
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**Total Vegetation Cover Anomaly [%]** 



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mean of that

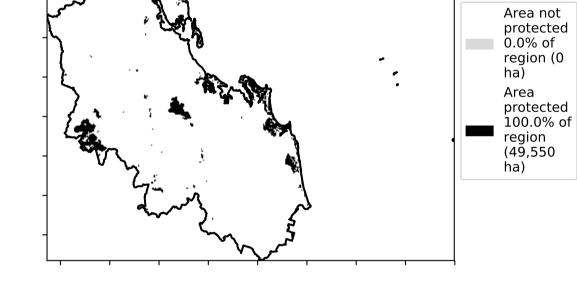
pixel. The mean

using baseline from 2001 to 2019.

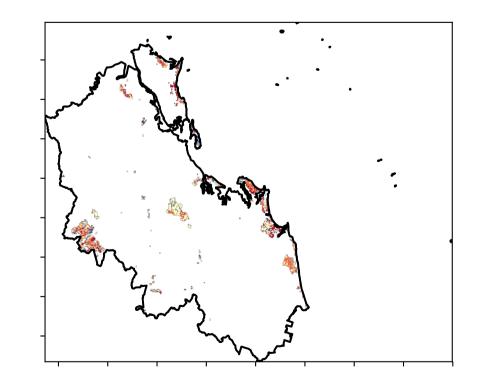
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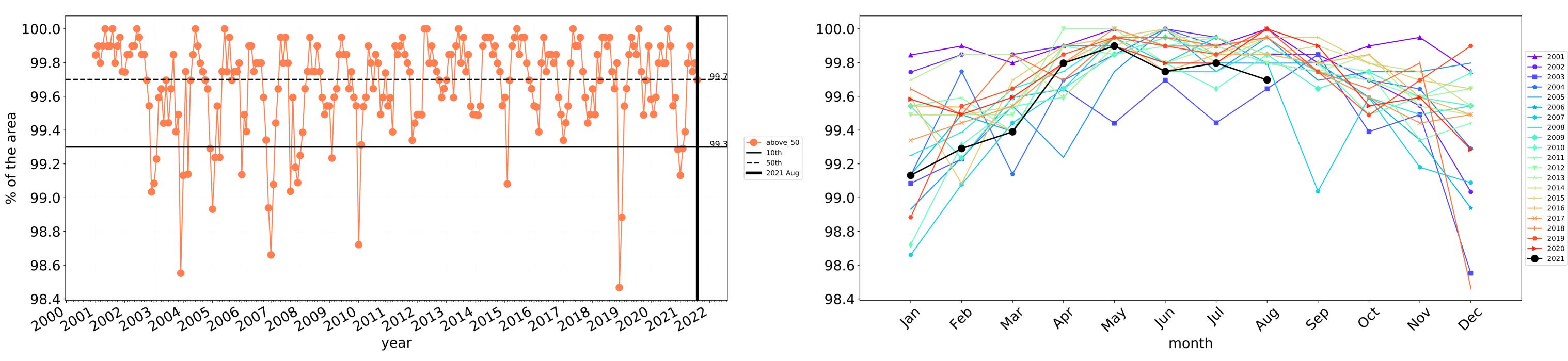


**Total Vegetation Cover Decile [%]** 



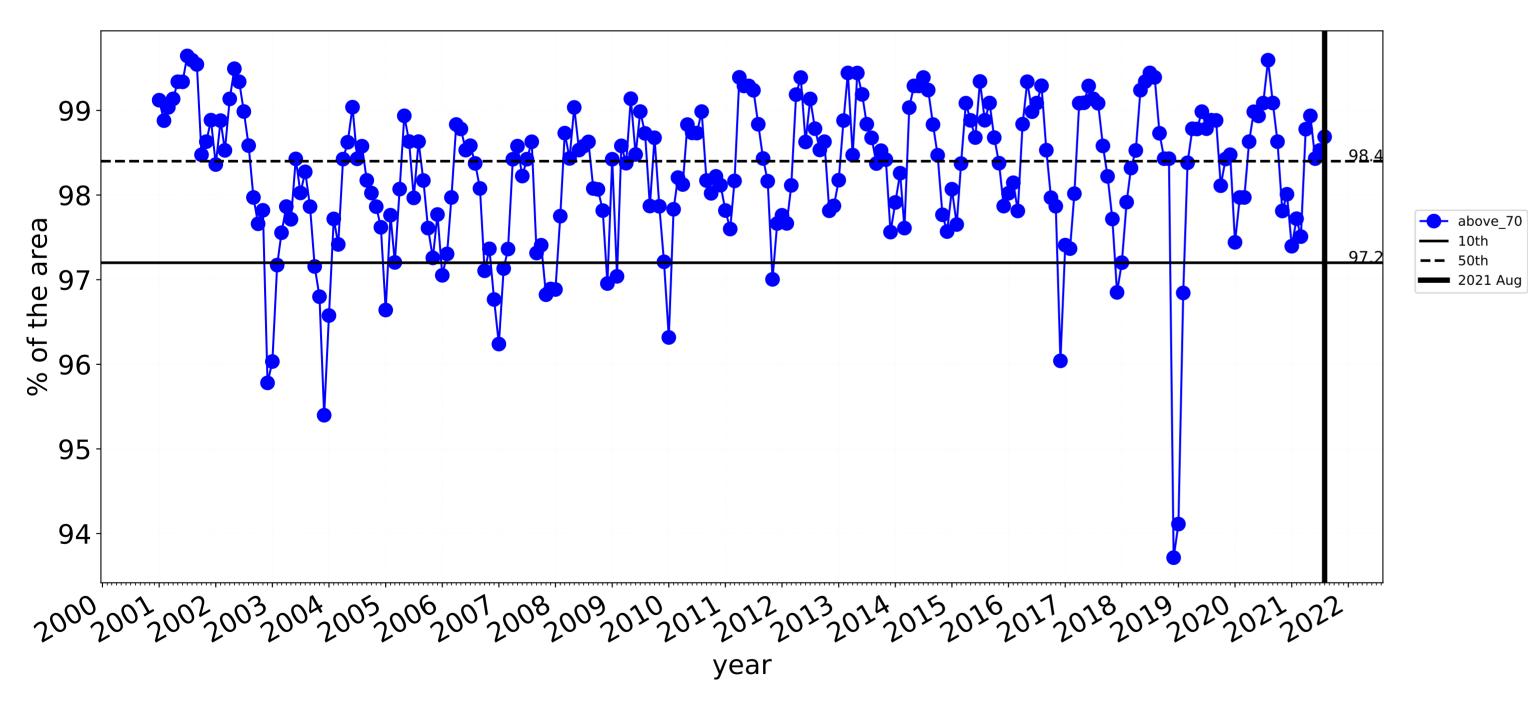


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



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

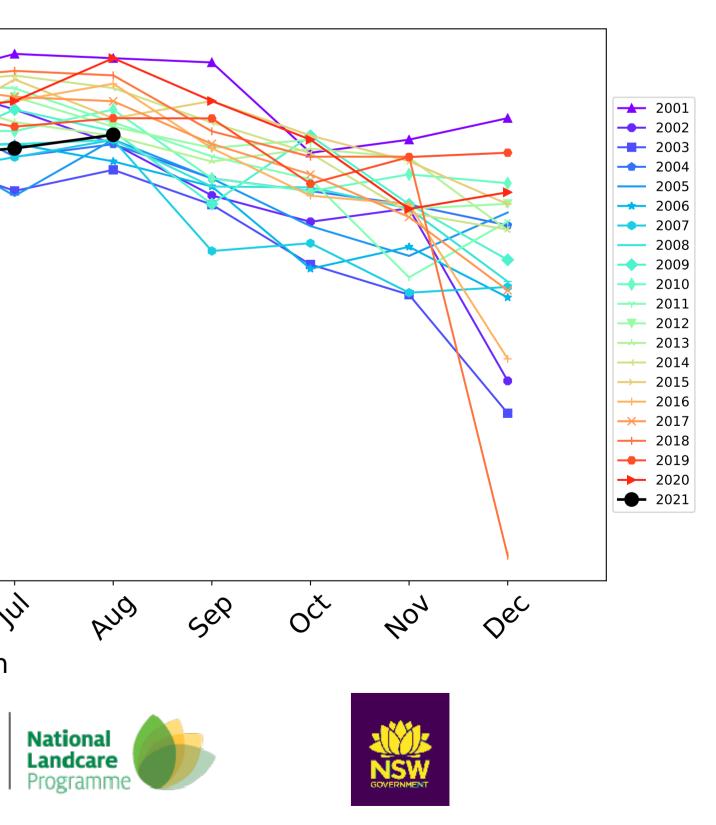
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

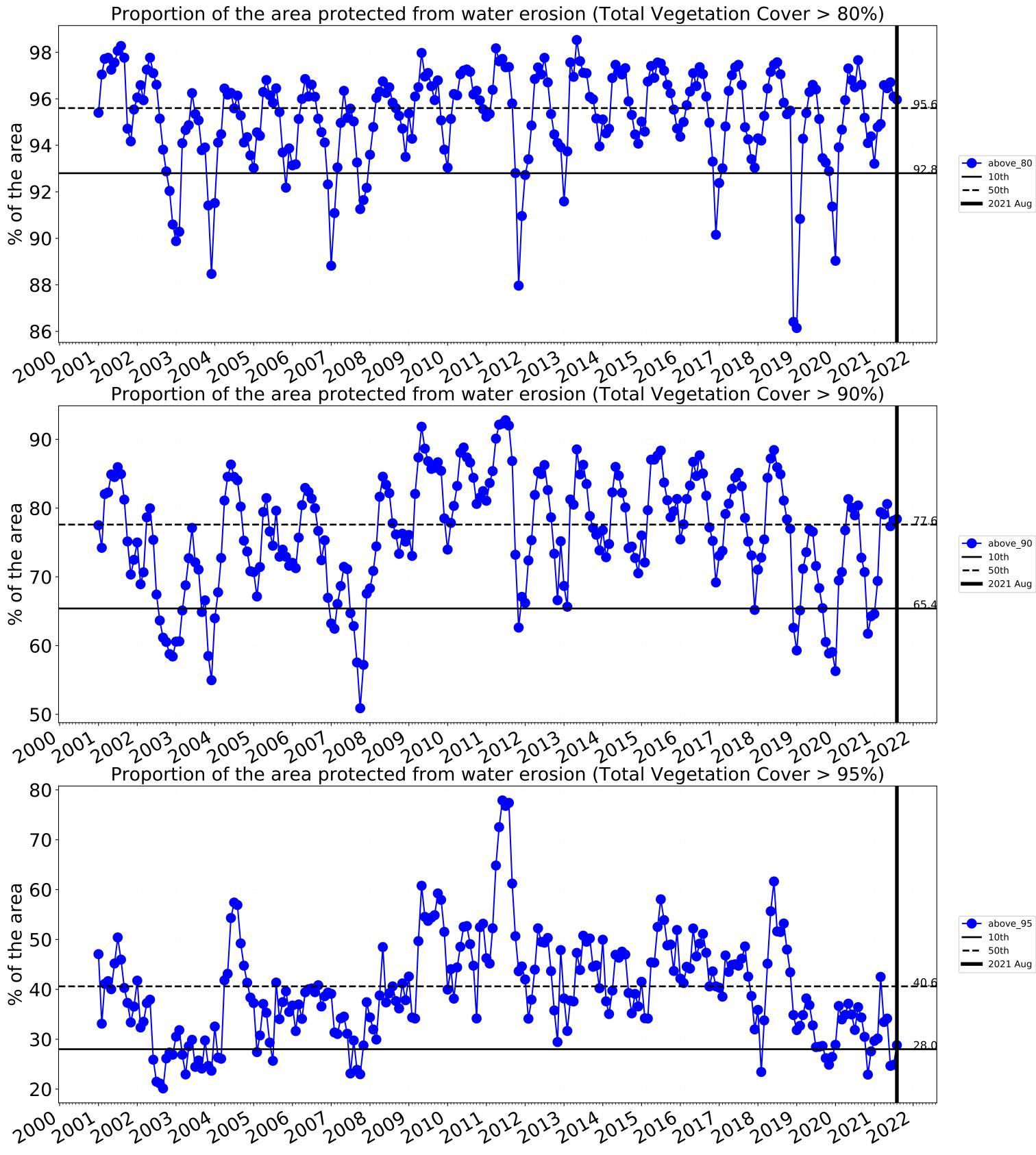


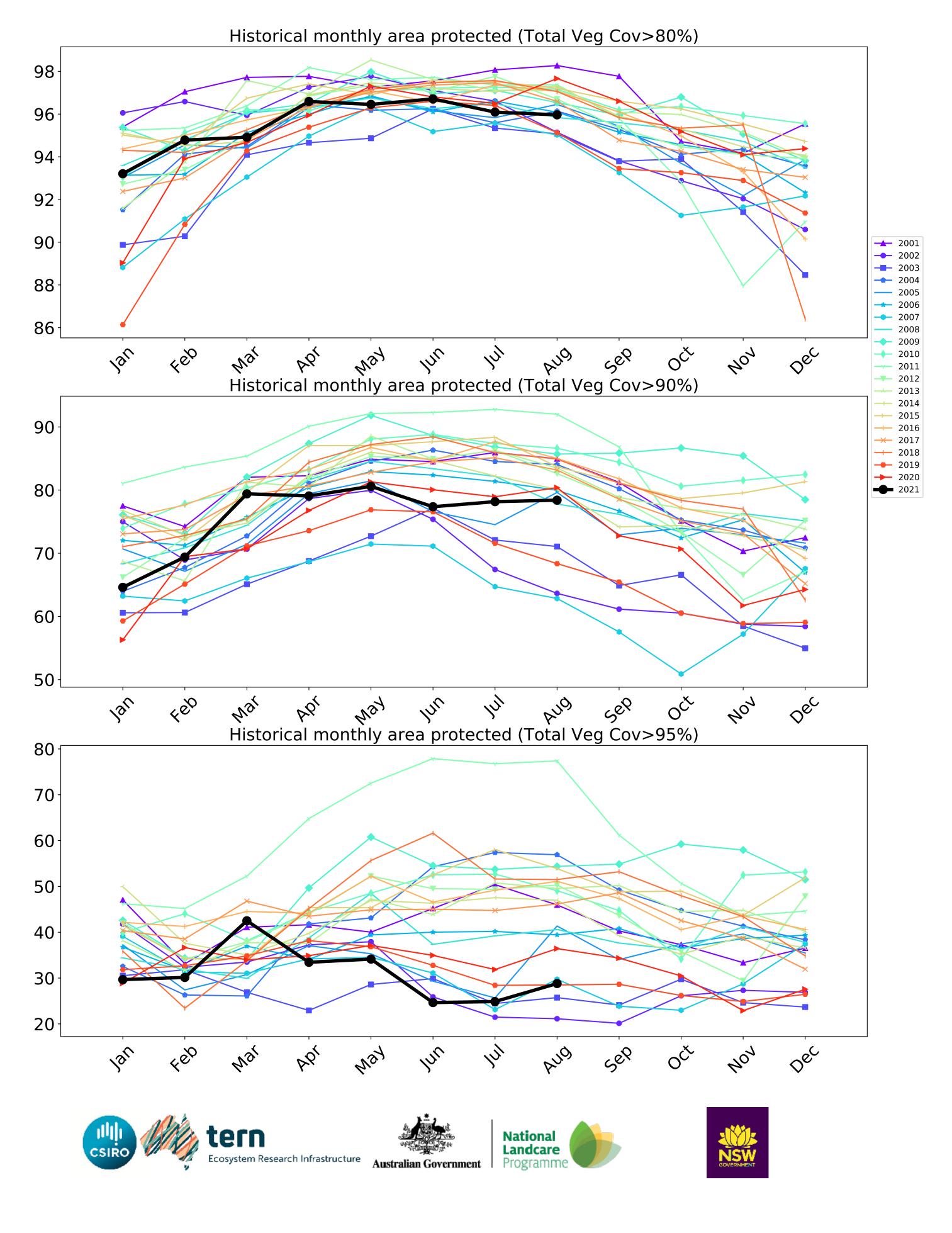
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Water erosion historical monthly area protected (Total Veg Cov>70%)

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



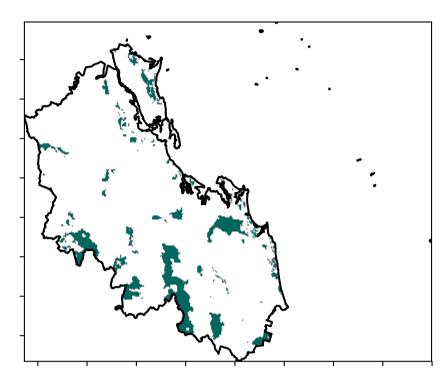




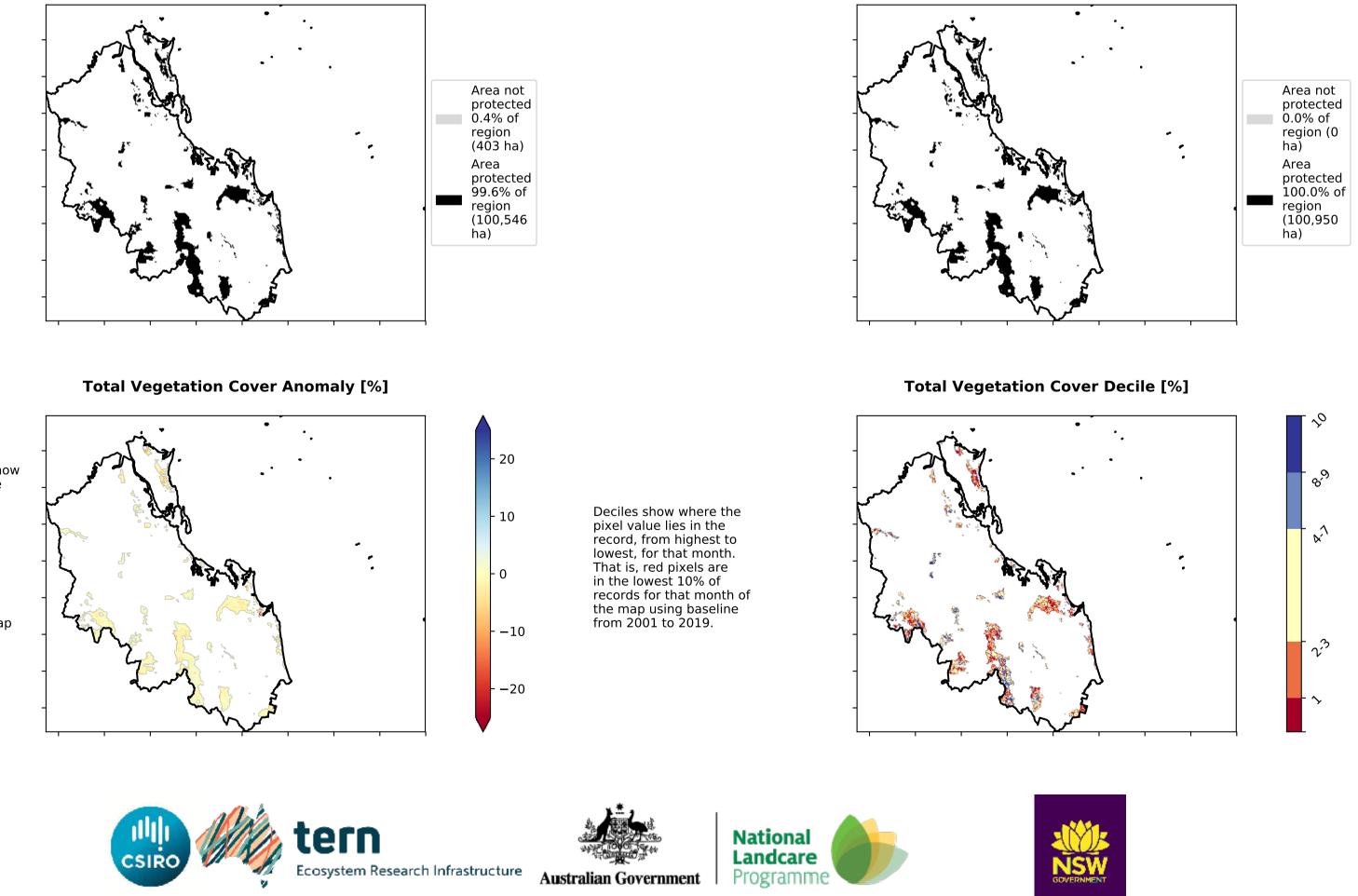
### **Conservation and natural environments Forest (non woodland)**

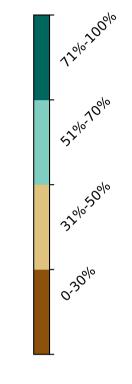
Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Conservation and natural environments - Non-woodland forest Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover [%]** 

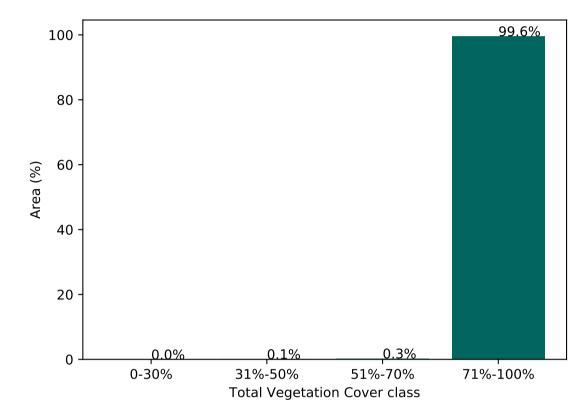


% Area protected from water erosion (>70%)

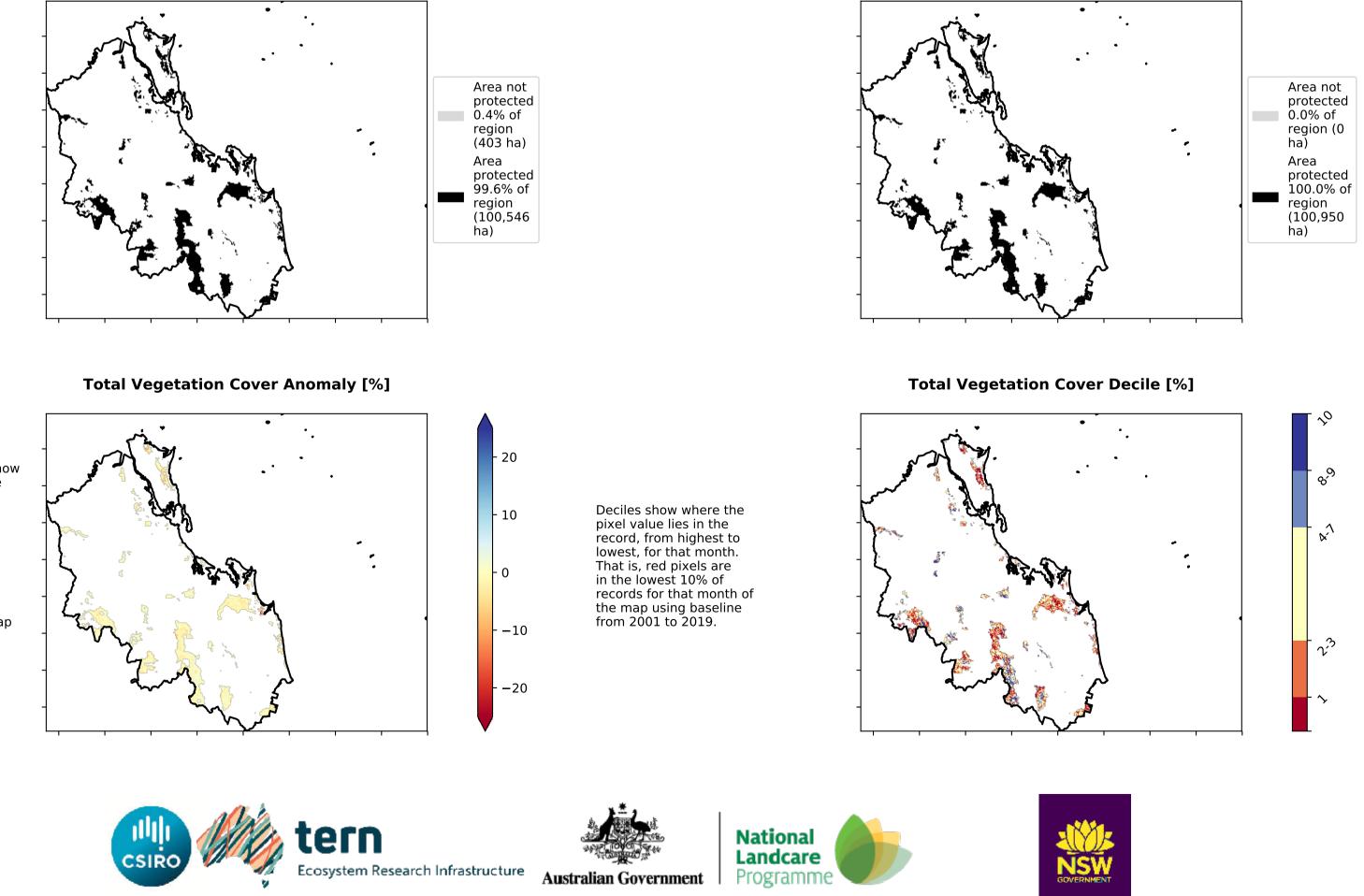




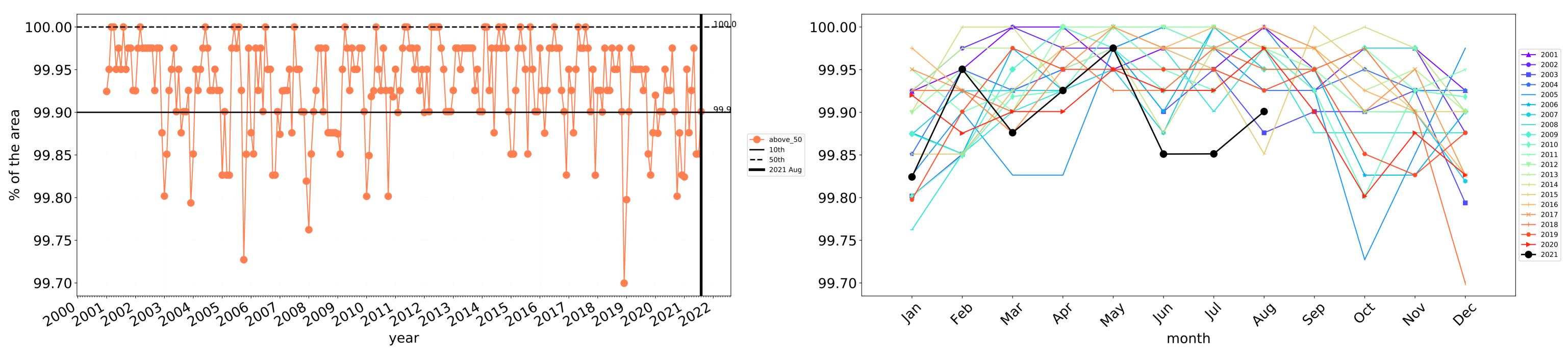
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

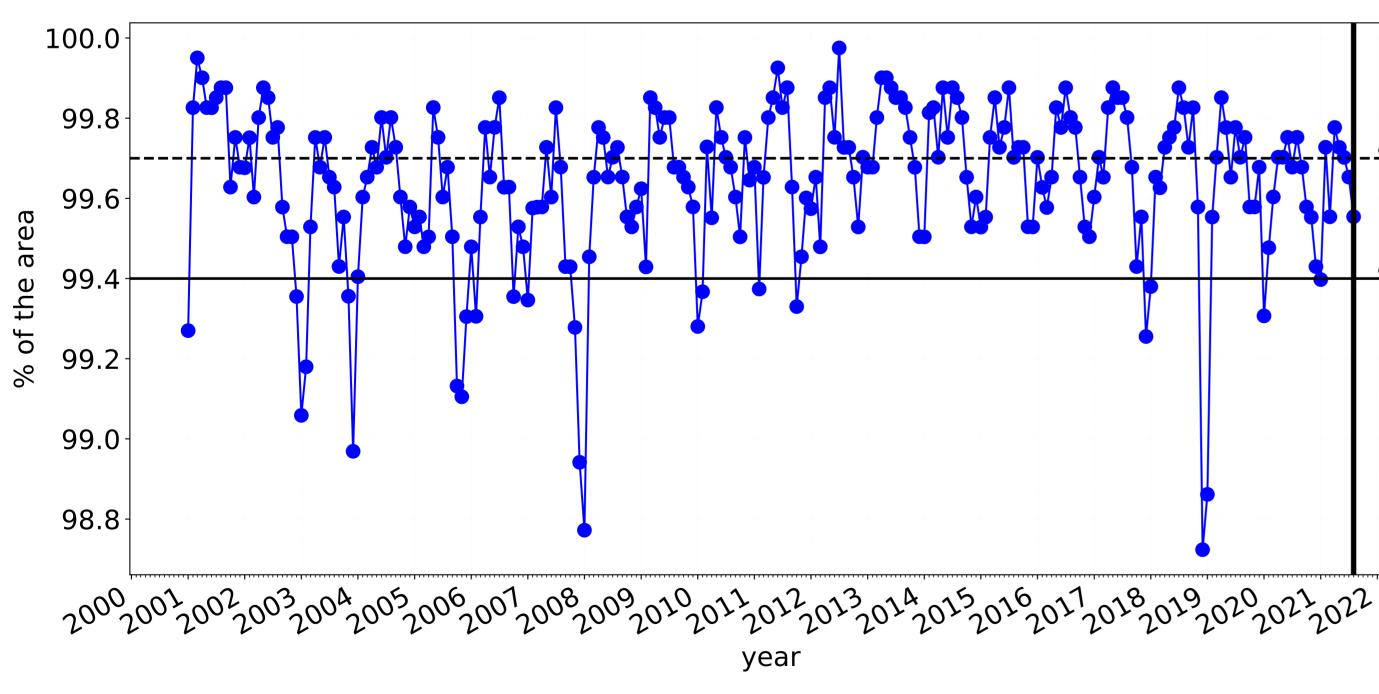


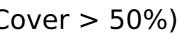
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

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

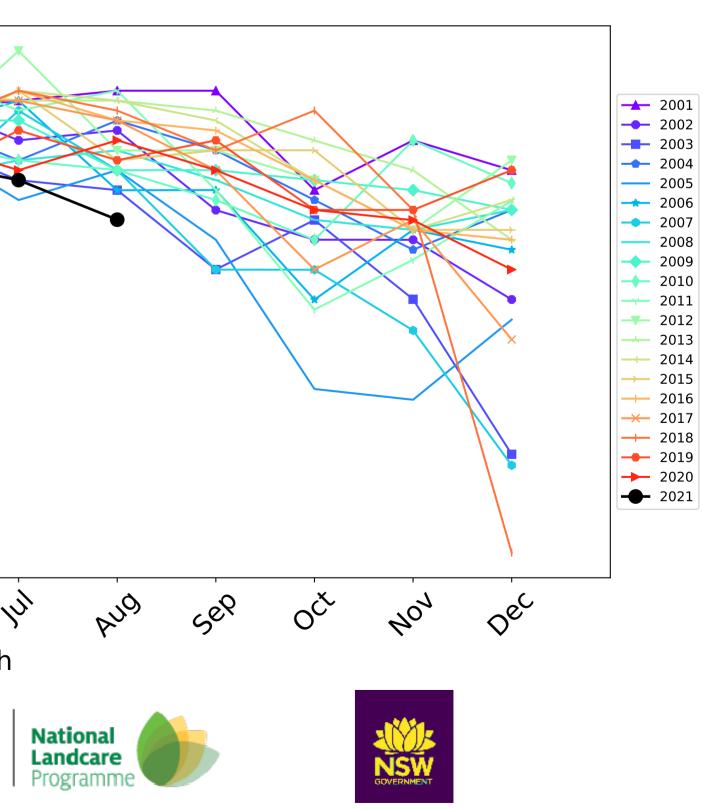


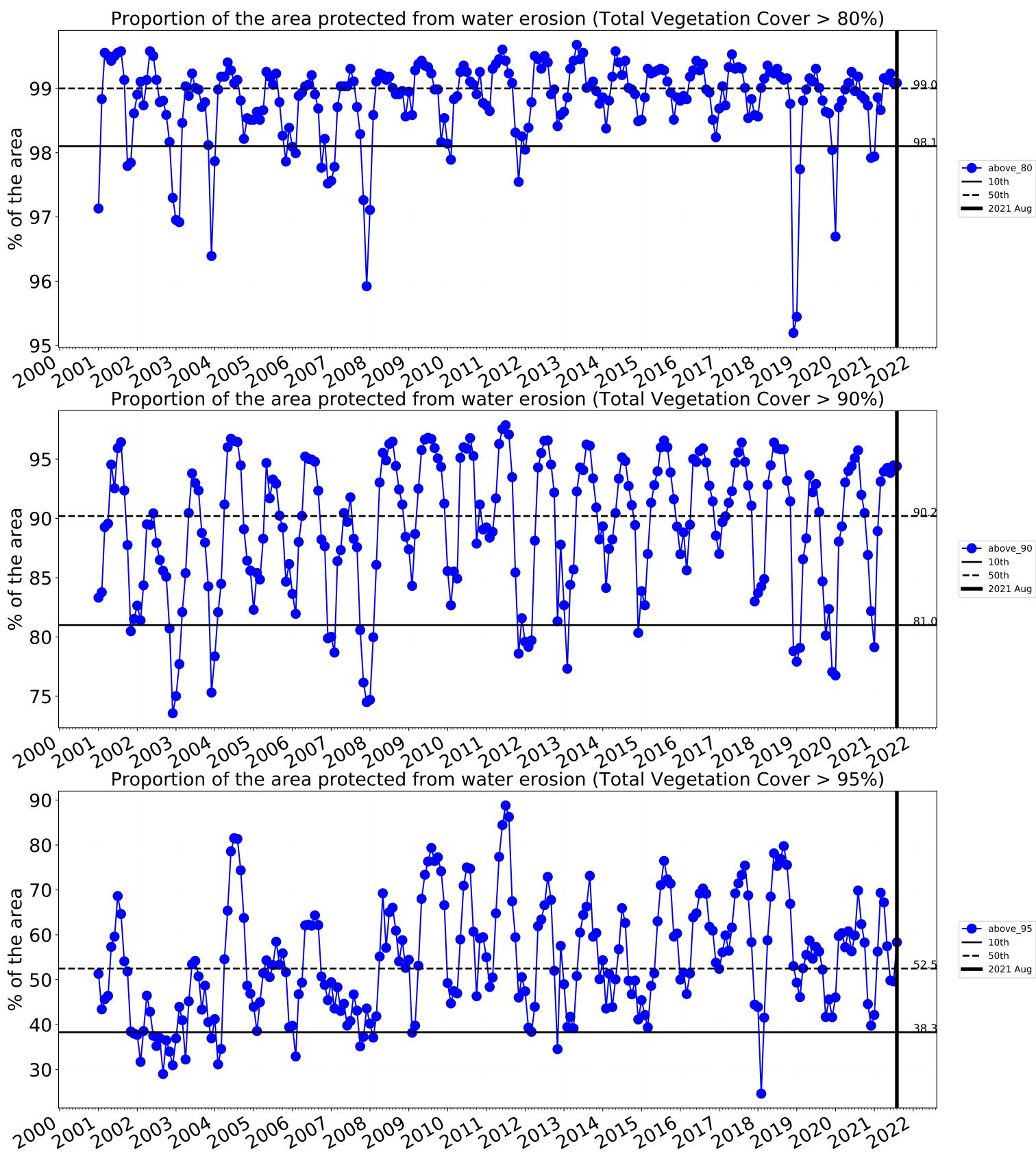


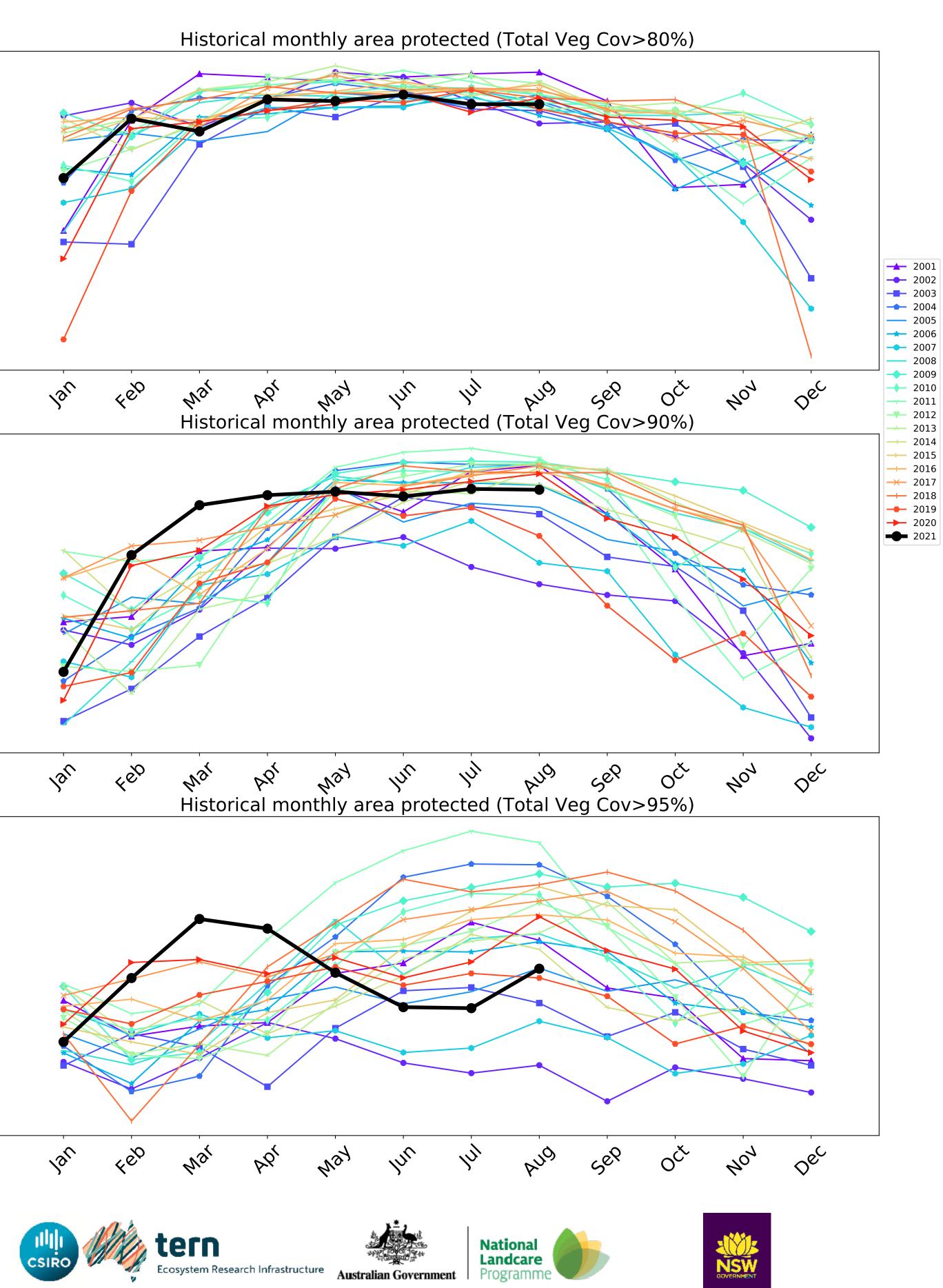
Wind erosion historical monthly area protected (Total Veg Cov >50%)

100.0 99.8 99.6 ---- above\_70 **—** 10th **--** 50th 99.4 99.2 99.0 98.8 Jan feb May In PQ' Mai month tern Ecosystem Research Infrastructure Australian Government

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





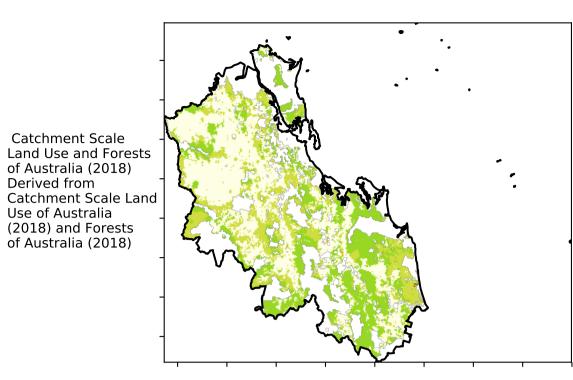




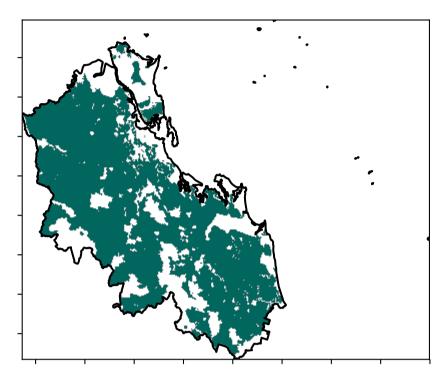
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### Agriculture

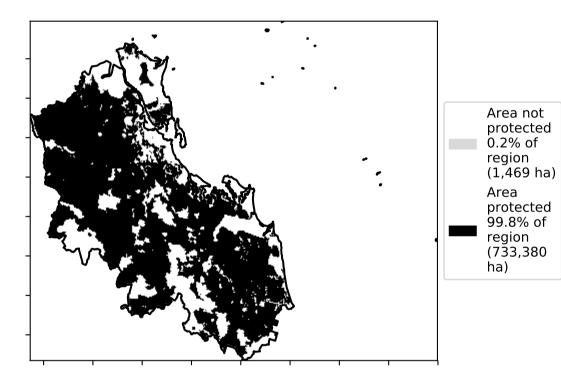
Land use and forest cover

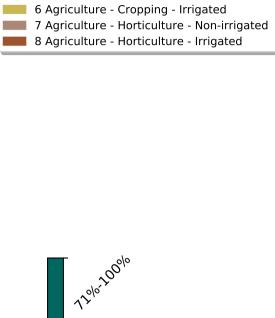


**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





52% 70%

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0-30%

1 Agriculture - Grazing - Non forest

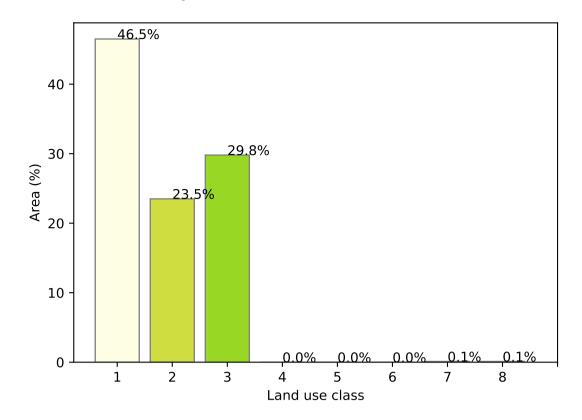
5 Agriculture - Cropping - Non-irrigated

4 Agriculture - Grazing - Irrigated

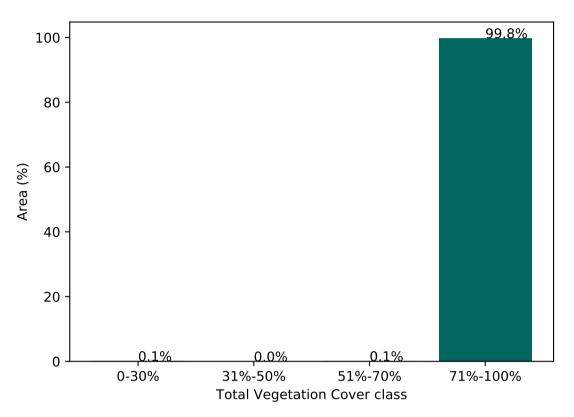
2 Agriculture - Grazing - Woodland forest

3 Agriculture - Grazing - Non-woodland forest

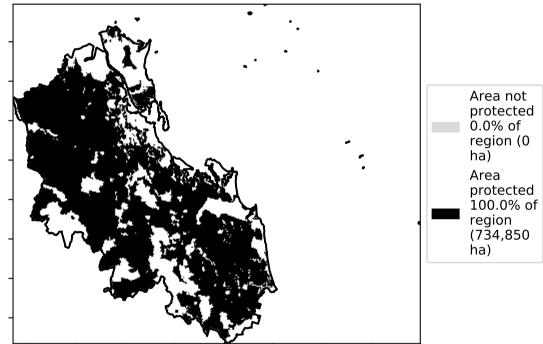
Proportion of each land class in area



#### Proportion of vegetation cover class in area



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



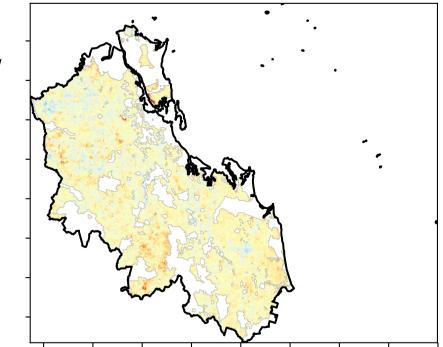
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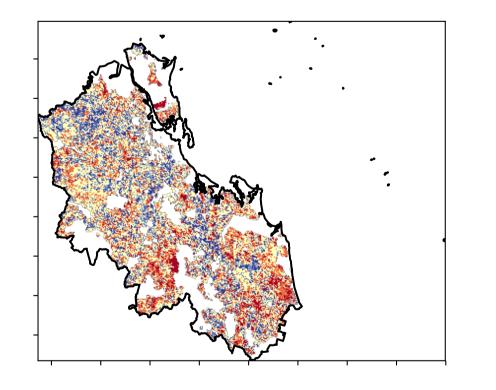
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**Total Vegetation Cover Anomaly [%]** 



**Total Vegetation Cover Decile [%]** 

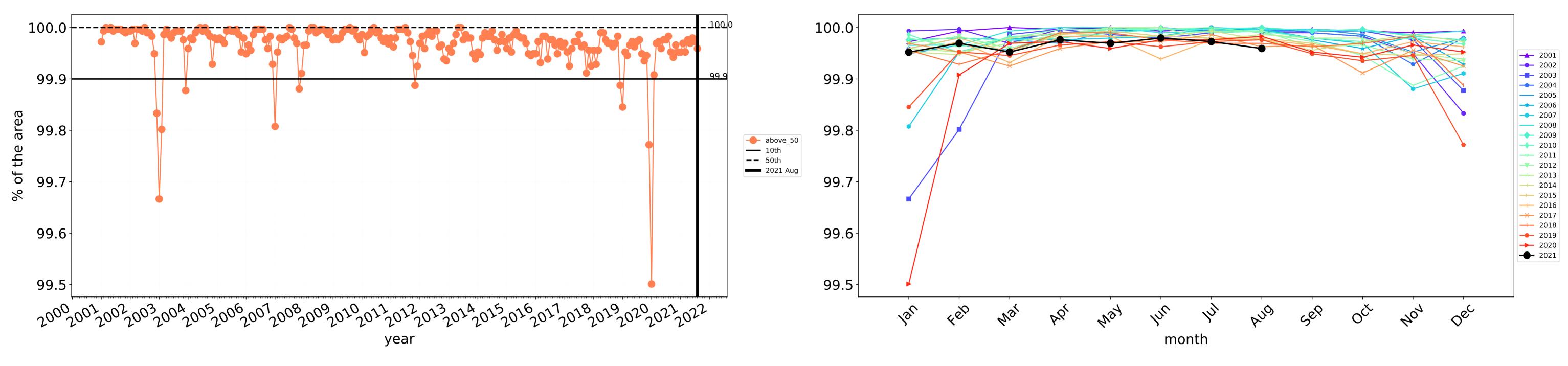




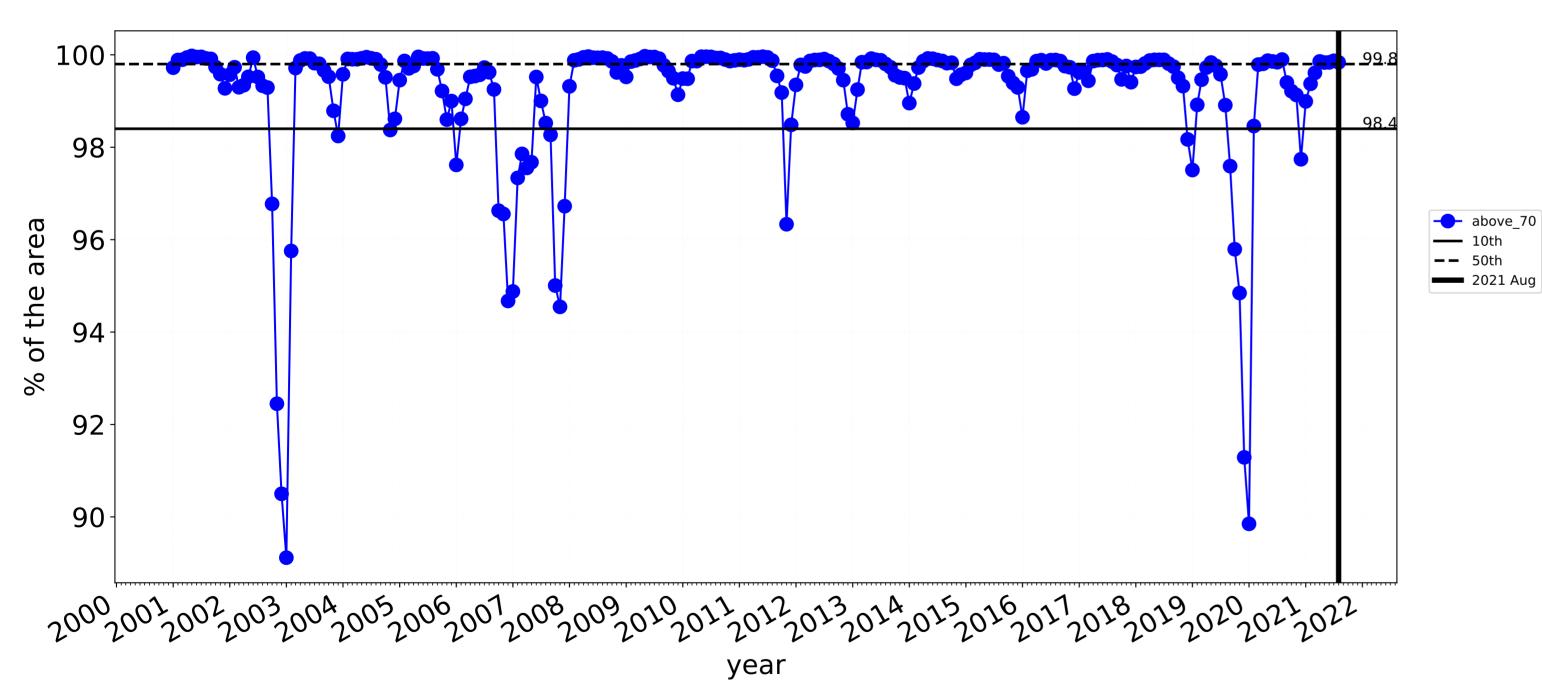
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



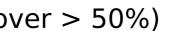
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



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

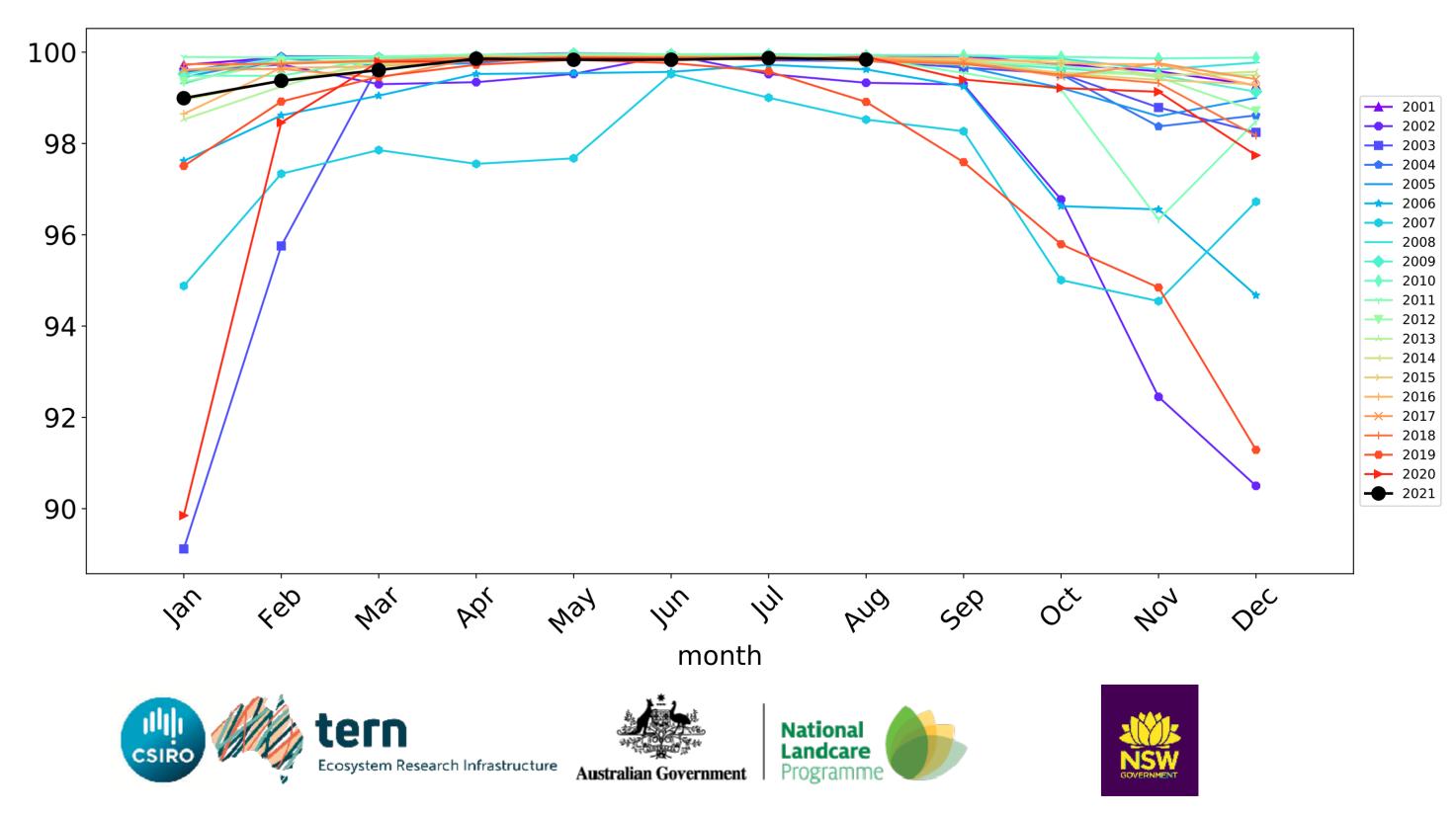


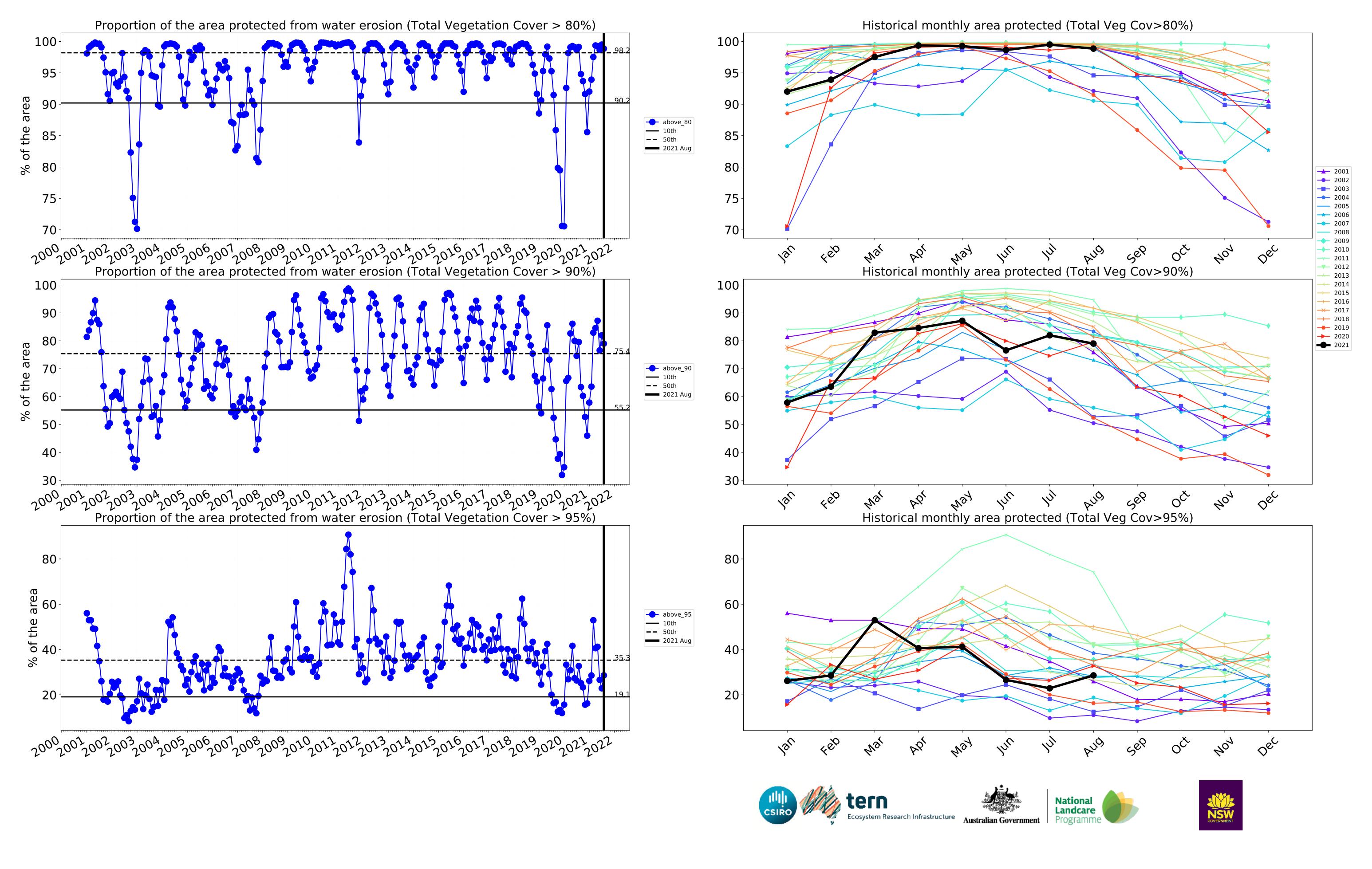
### Agriculture timeseries



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

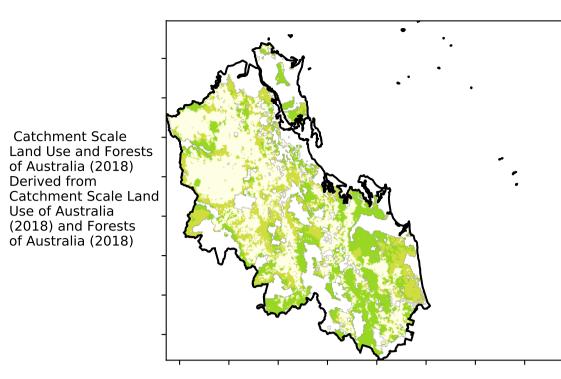
Water erosion historical monthly area protected (Total Veg Cov>70%)



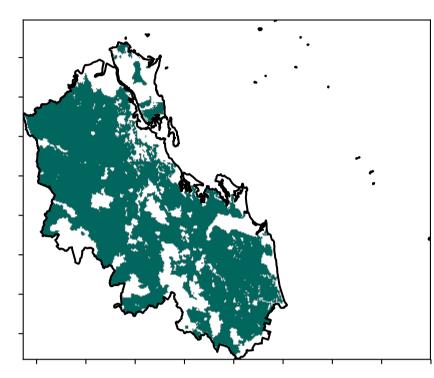


### Grazing

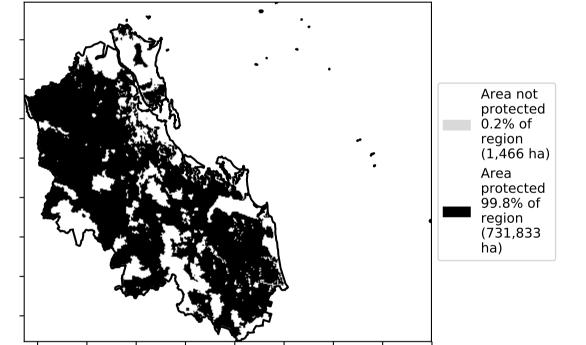
Land use and forest cover

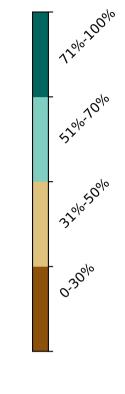


**Total Vegetation Cover [%]** 



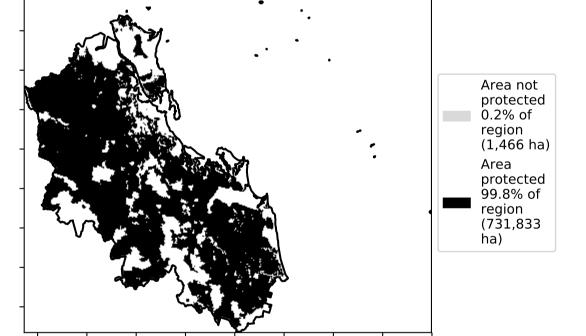
% Area protected from water erosion (>70%)

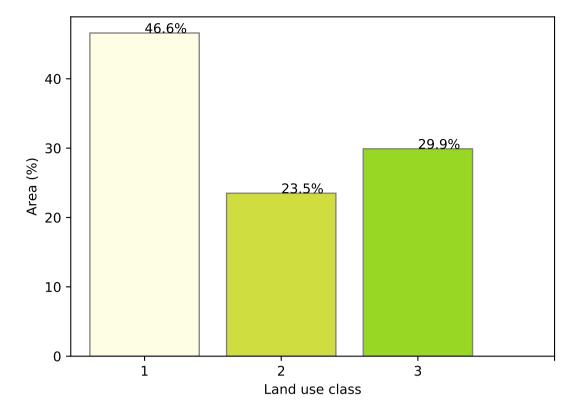




1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest

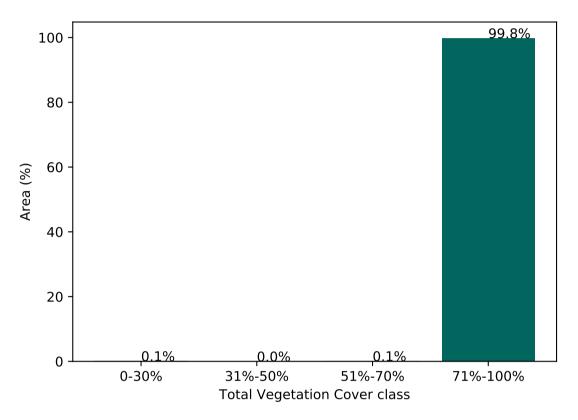
3 Agriculture - Grazing - Non-woodland forest



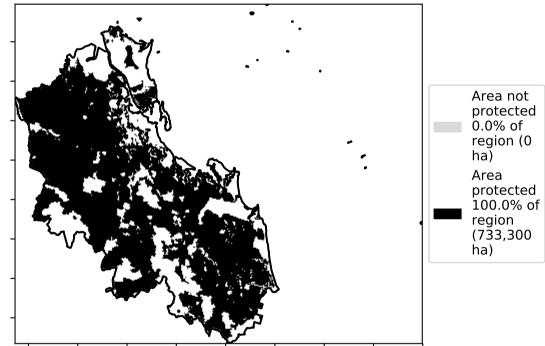


#### Proportion of each land class in area

Proportion of vegetation cover class in area



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



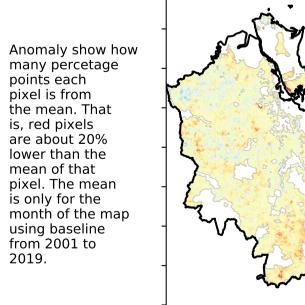
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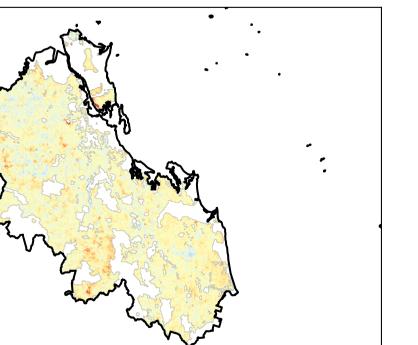
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**Total Vegetation Cover Anomaly [%]** 





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.

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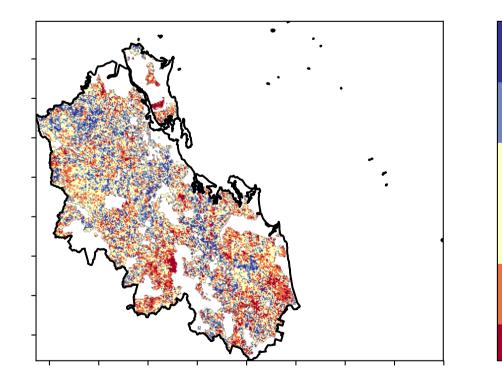
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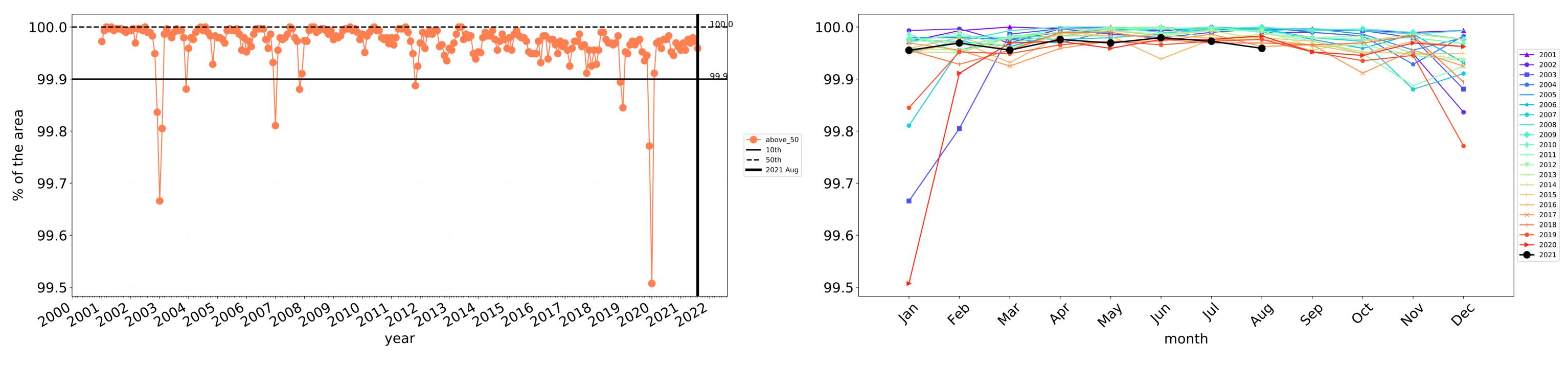
-10

- -20

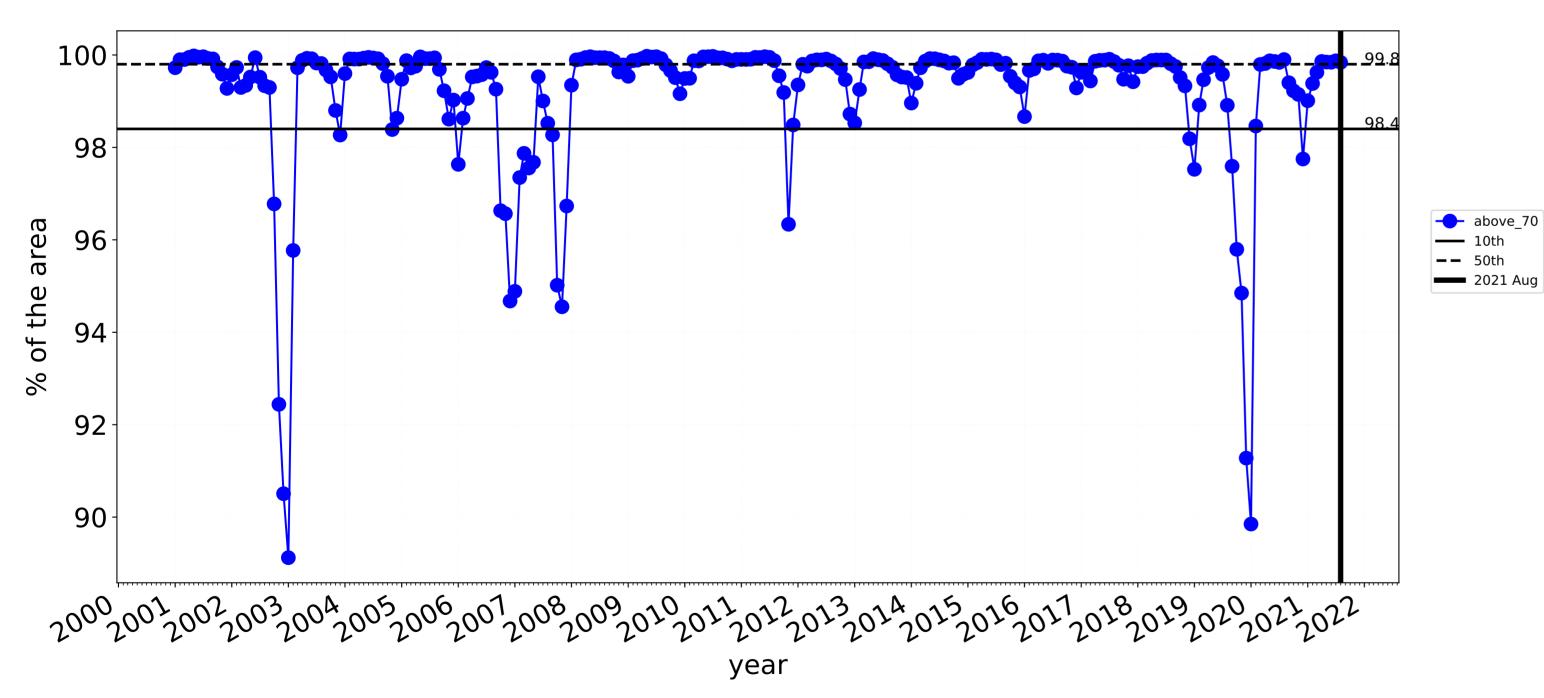
Total Vegetation Cover Decile [%]







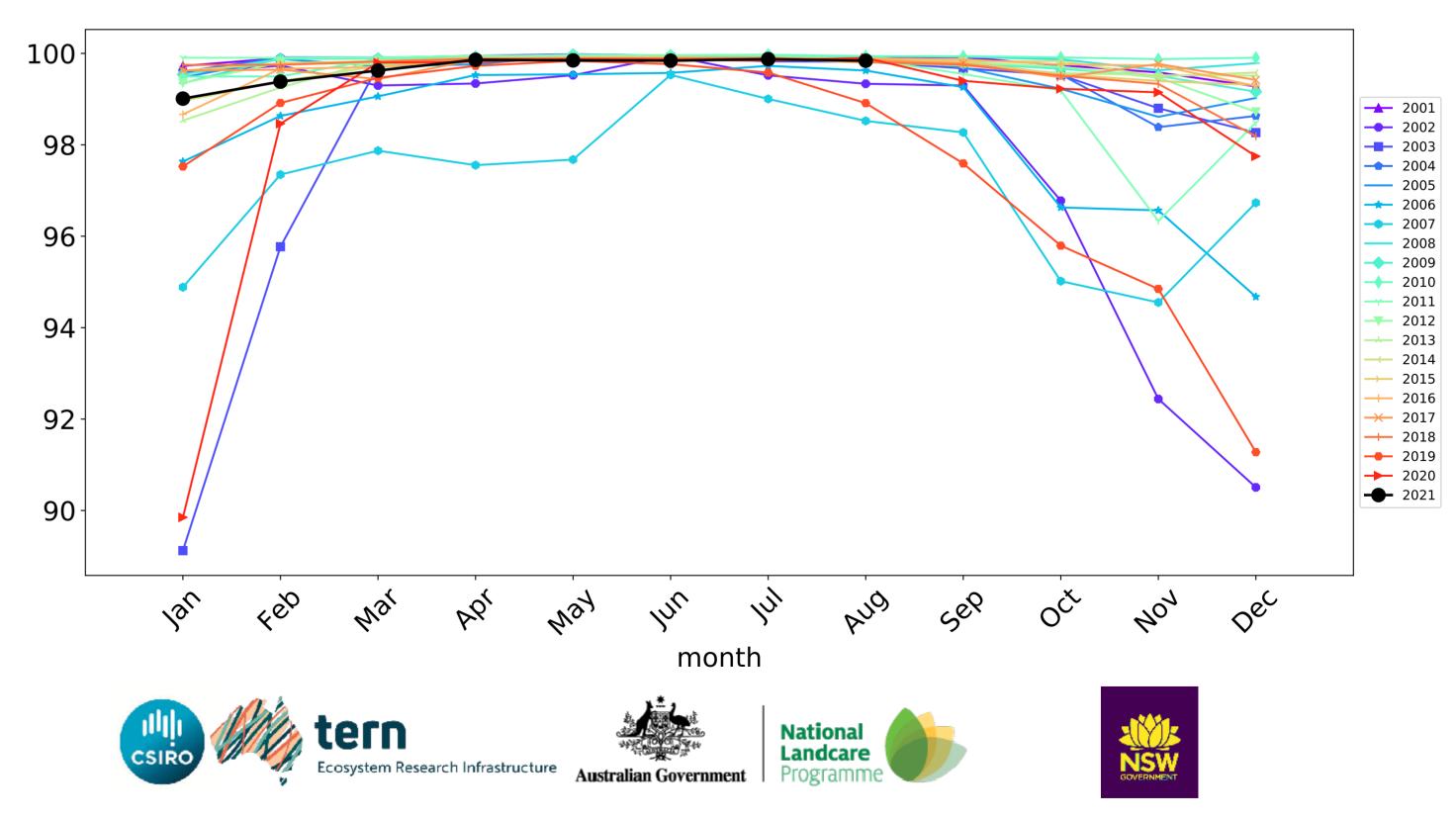
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

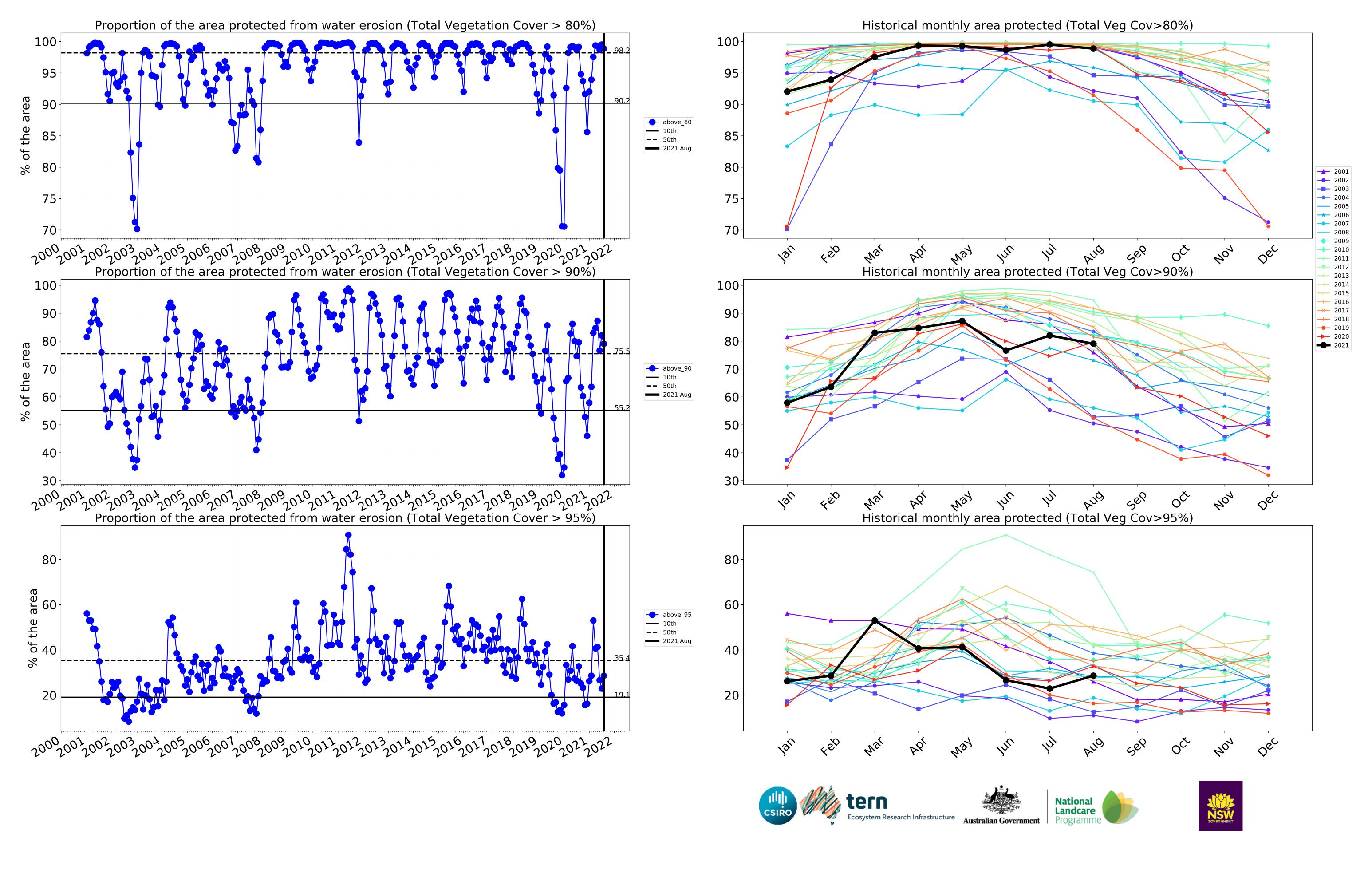




Wind erosion historical monthly area protected (Total Veg Cov >50%)

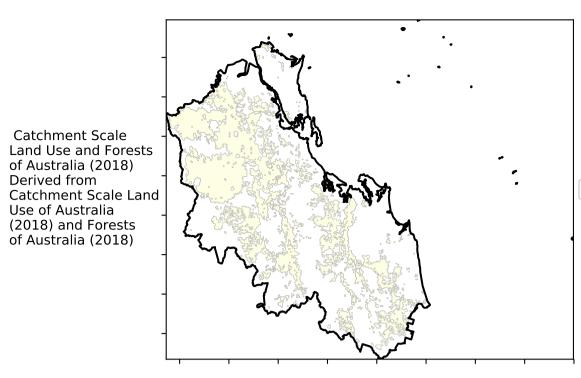
Water erosion historical monthly area protected (Total Veg Cov>70%)





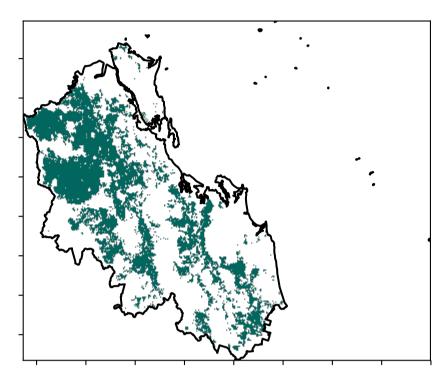
### **Grazing non forest**

Land use and forest cover

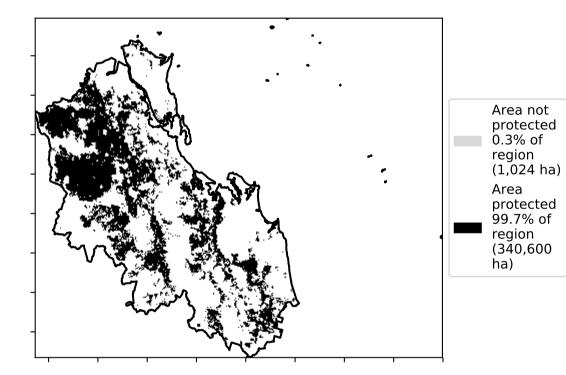


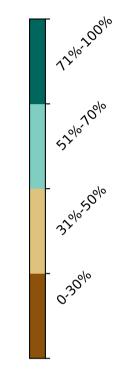
1 Agriculture - Grazing - Non forest

**Total Vegetation Cover [%]** 



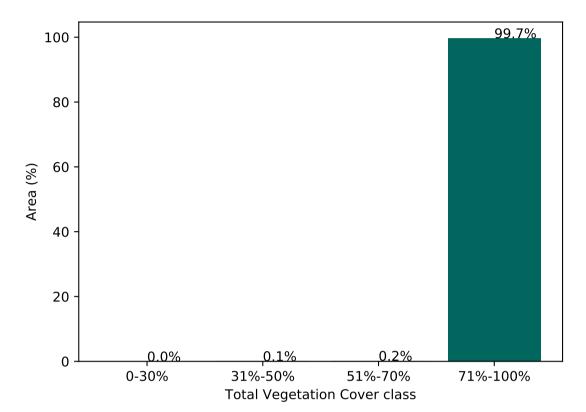
% Area protected from water erosion (>70%)



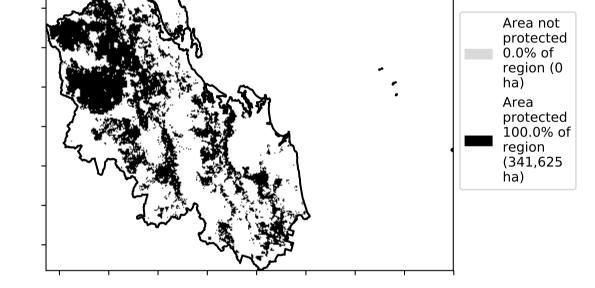




#### Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



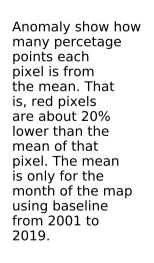
 $\hat{\mathcal{S}}$ 

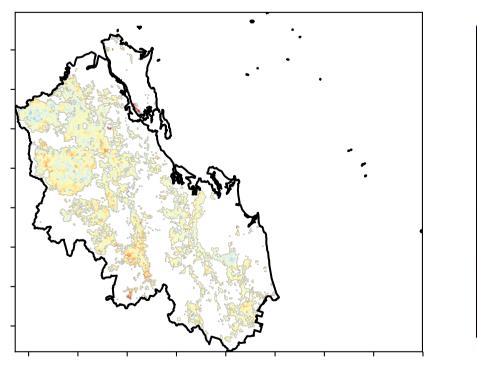
s, S

x.1

2??

**Total Vegetation Cover Anomaly [%]** 

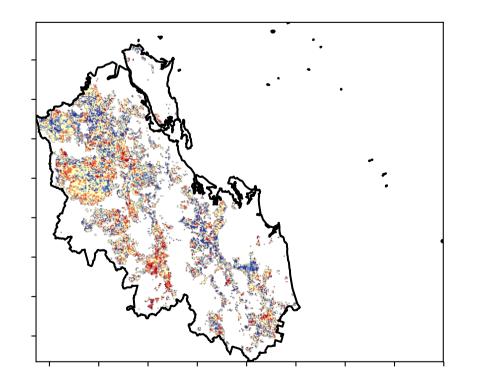






Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

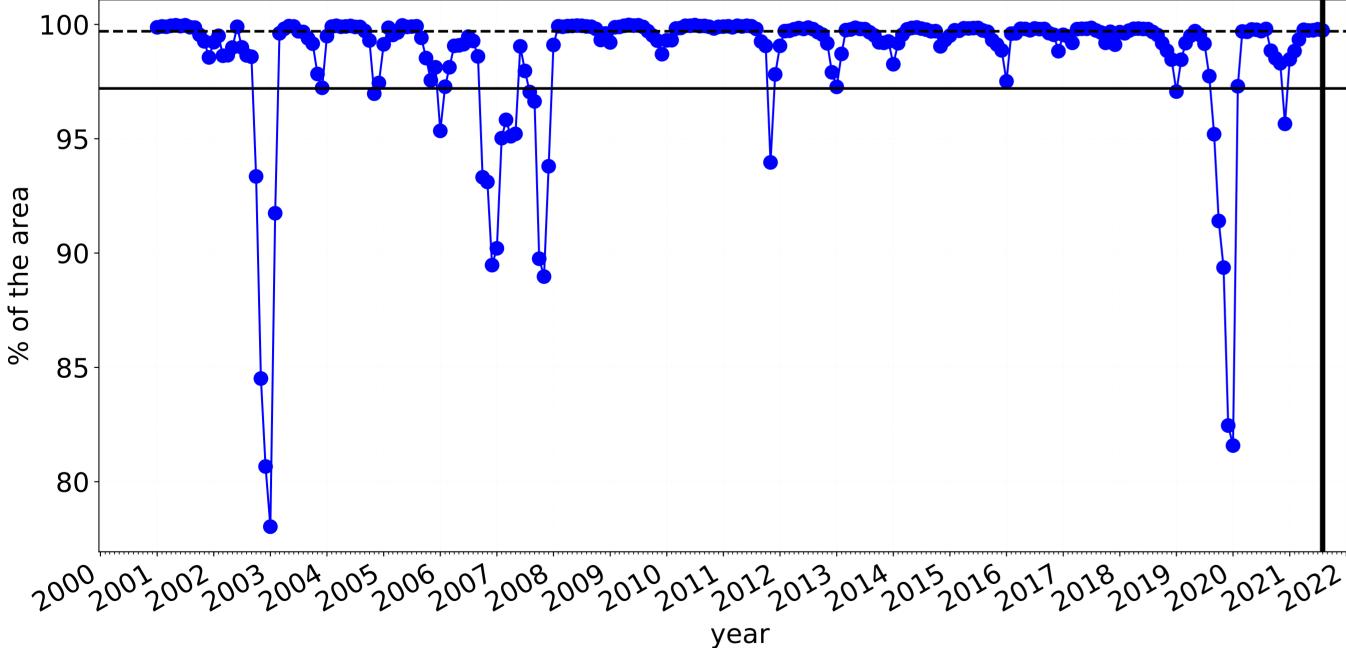






Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



100 95 ---- above\_70 **—** 10th **——** 50th **—** 2021 Aug 90 85 80 Jan 4eb P.Q War **UNU** tern

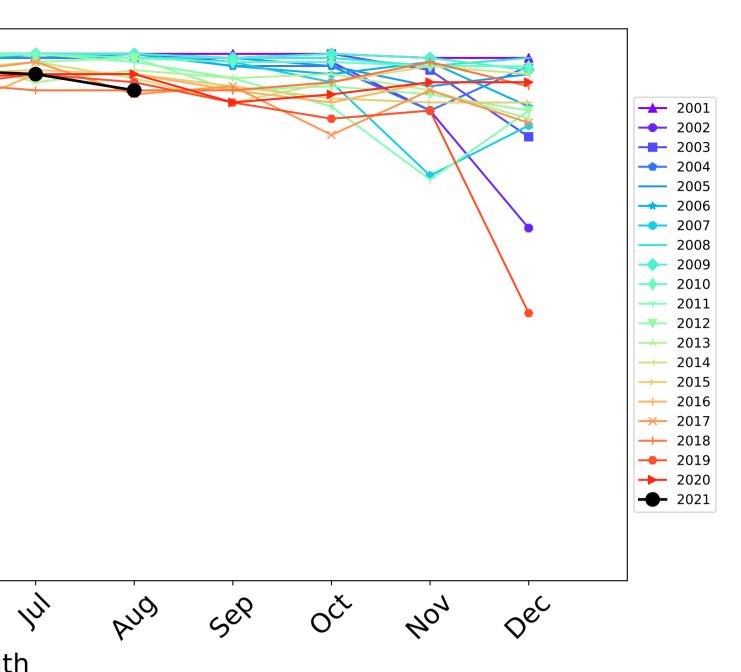
Water erosion historical monthly area protected (Total Veg Cov>70%)

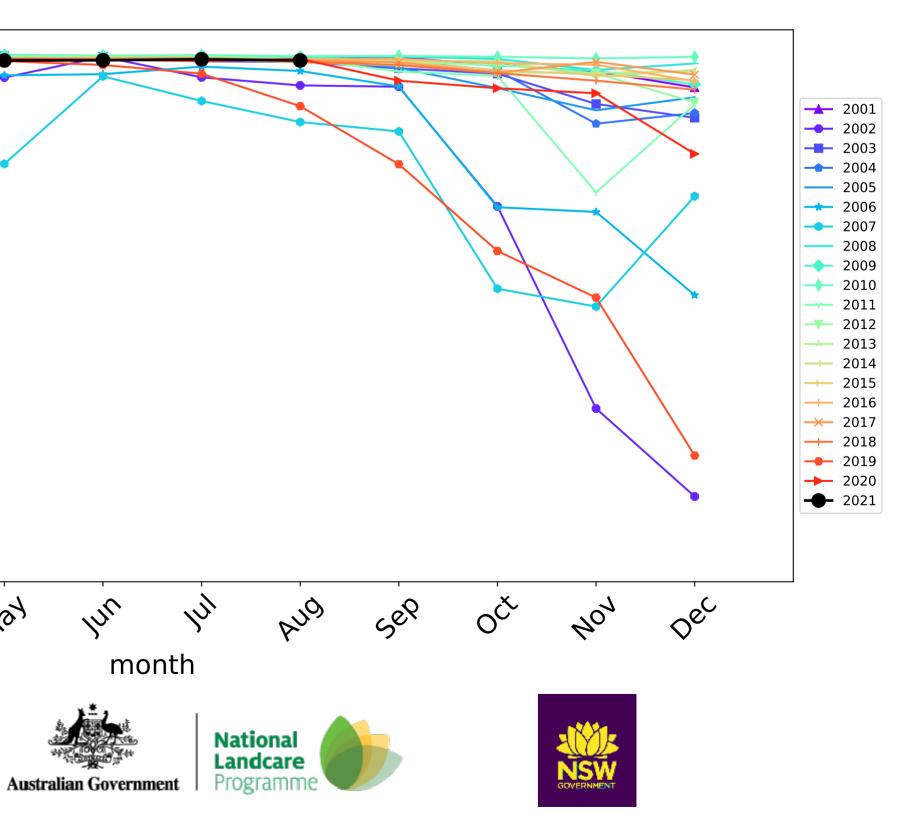
way

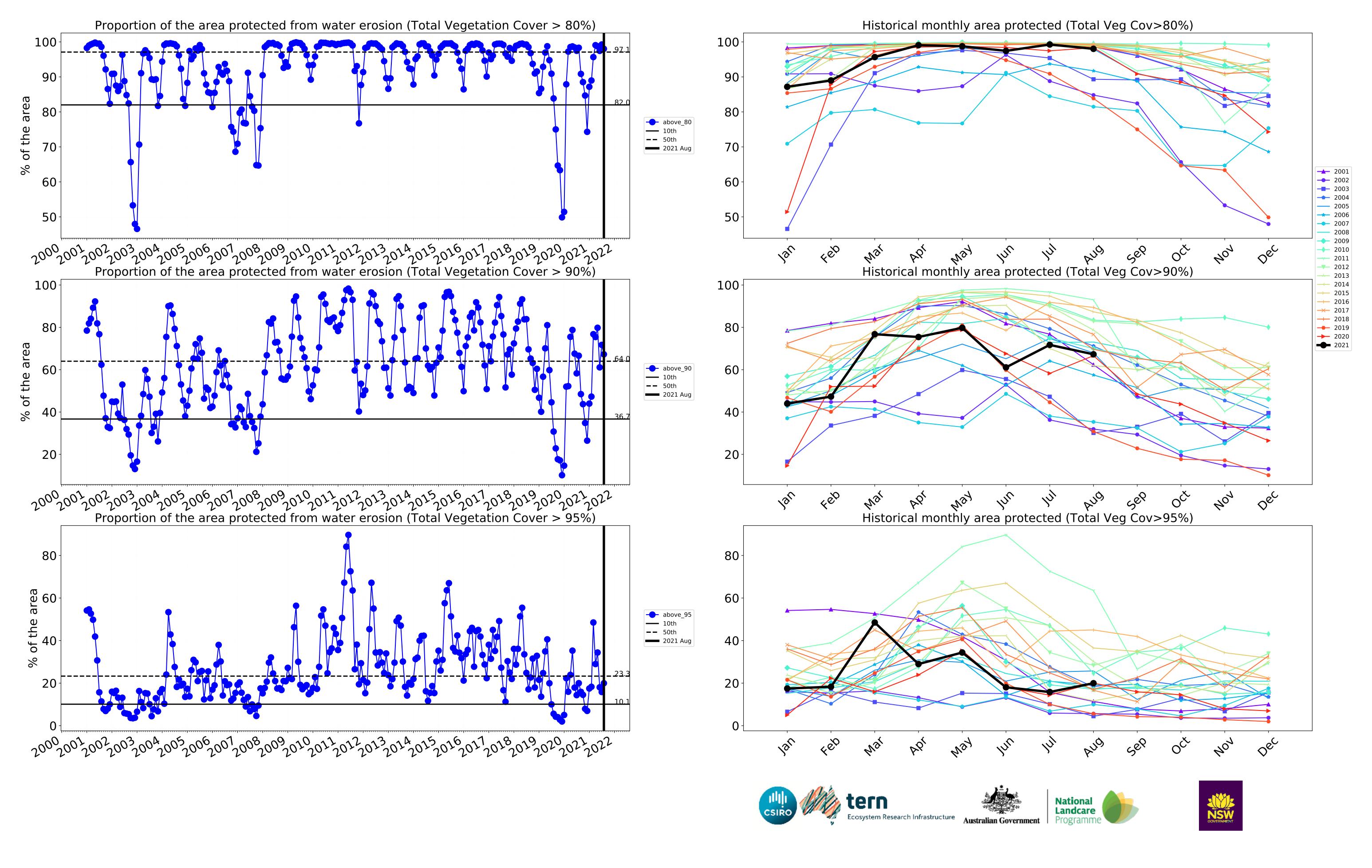
Ecosystem Research Infrastructure

In

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

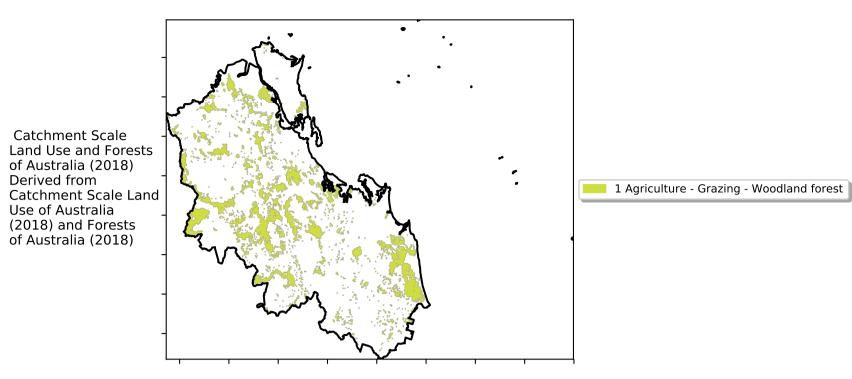




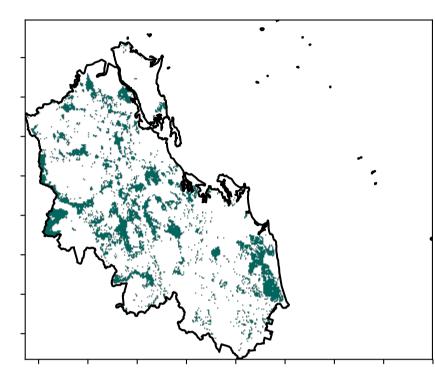


### **Grazing Woodland forest**

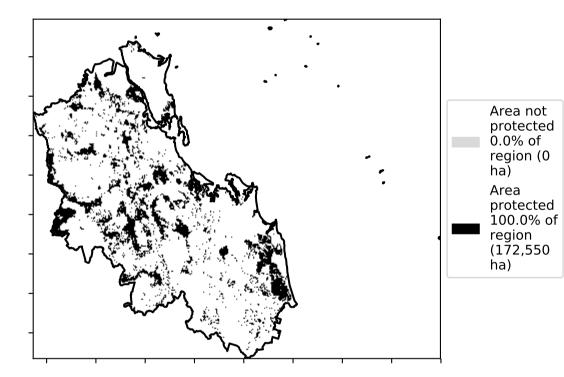
Land use and forest cover

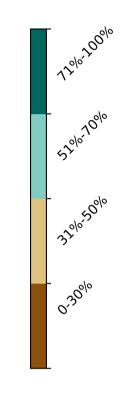


**Total Vegetation Cover [%]** 

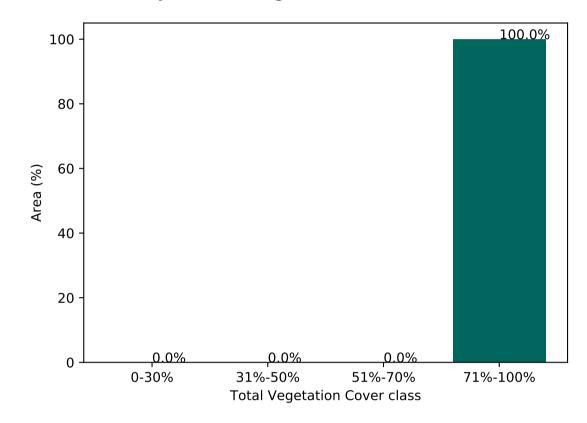


% Area protected from water erosion (>70%)

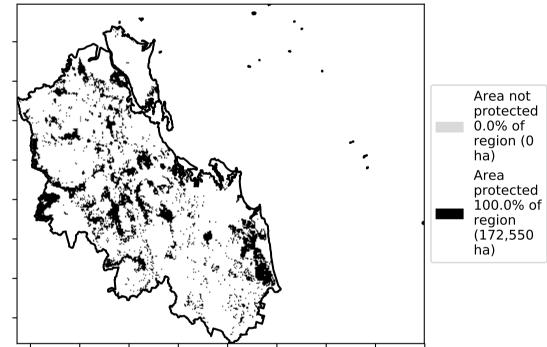




Proportion of vegetation cover class in area



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



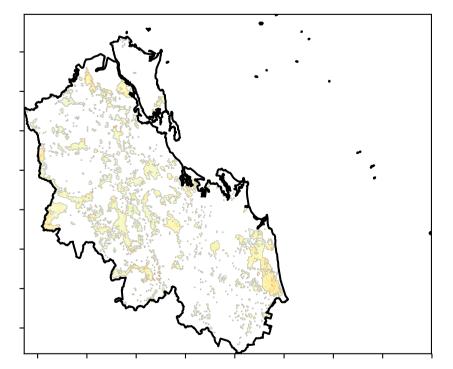
 $\hat{\mathcal{S}}$ 

°,

x.1

2??

**Total Vegetation Cover Anomaly [%]** 

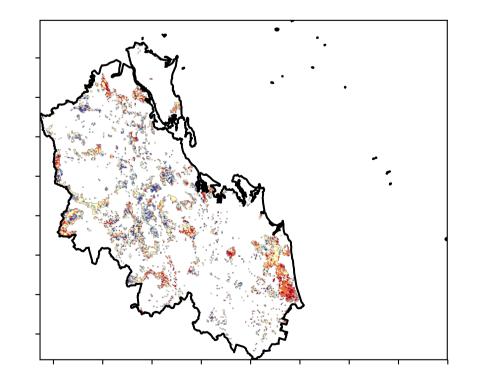


10 0 -10- -20

· 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 the map using baseline from 2001 to 2019.

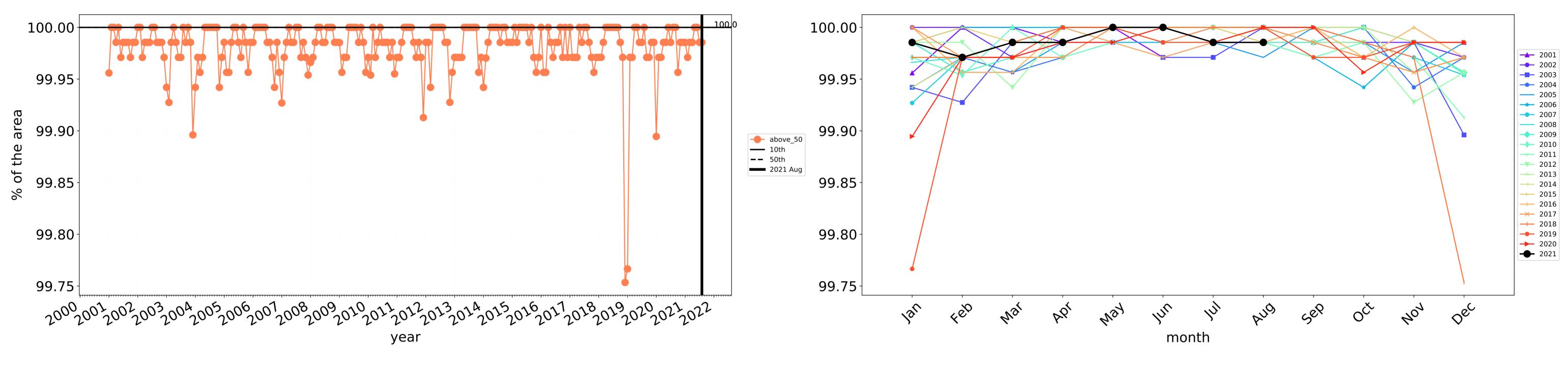
Total Vegetation Cover Decile [%]



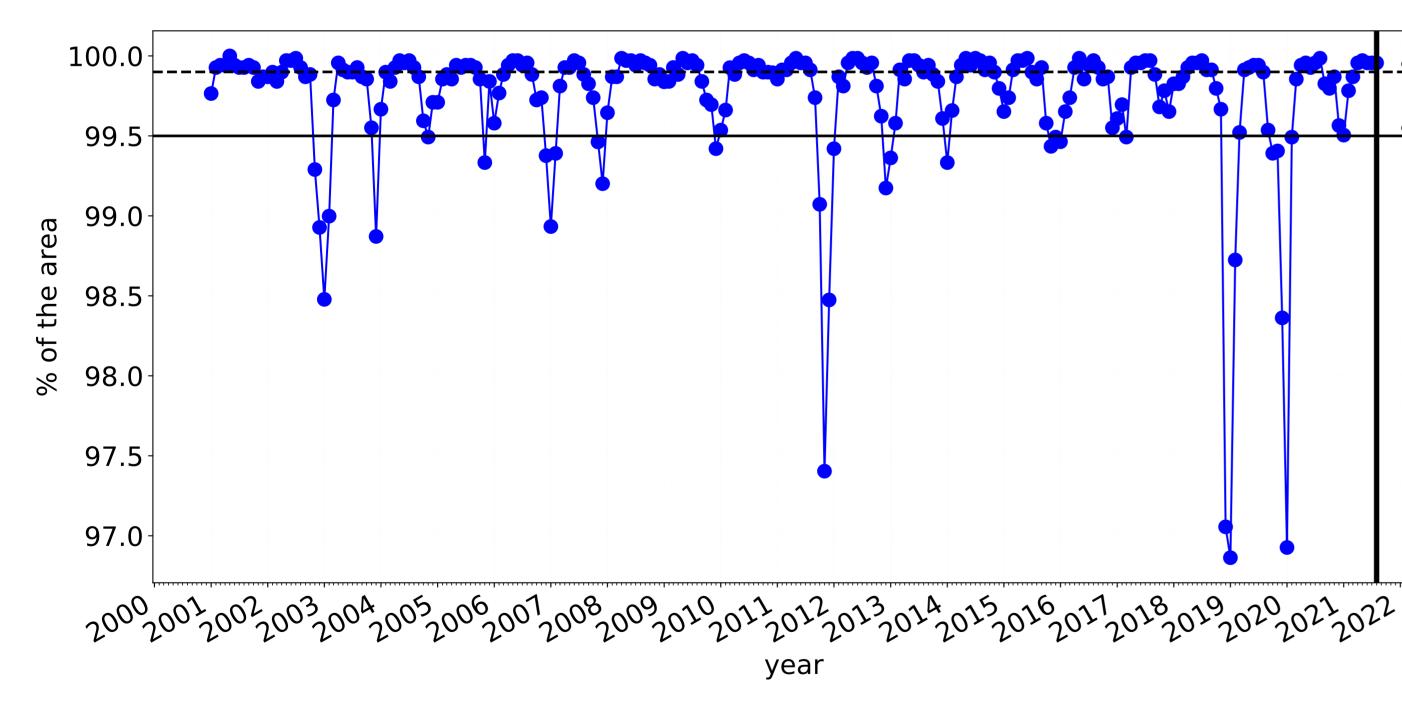


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.





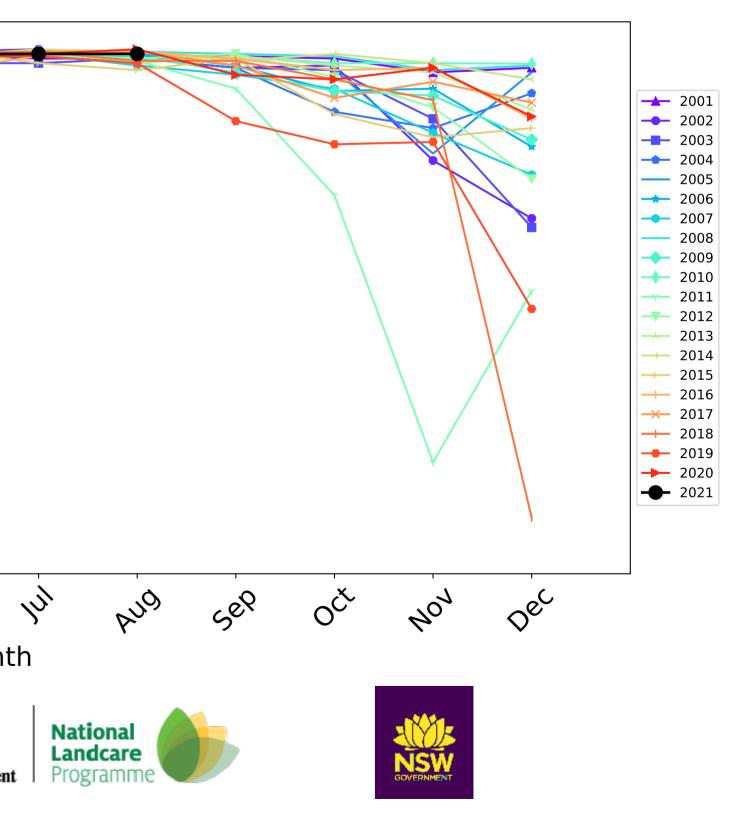
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

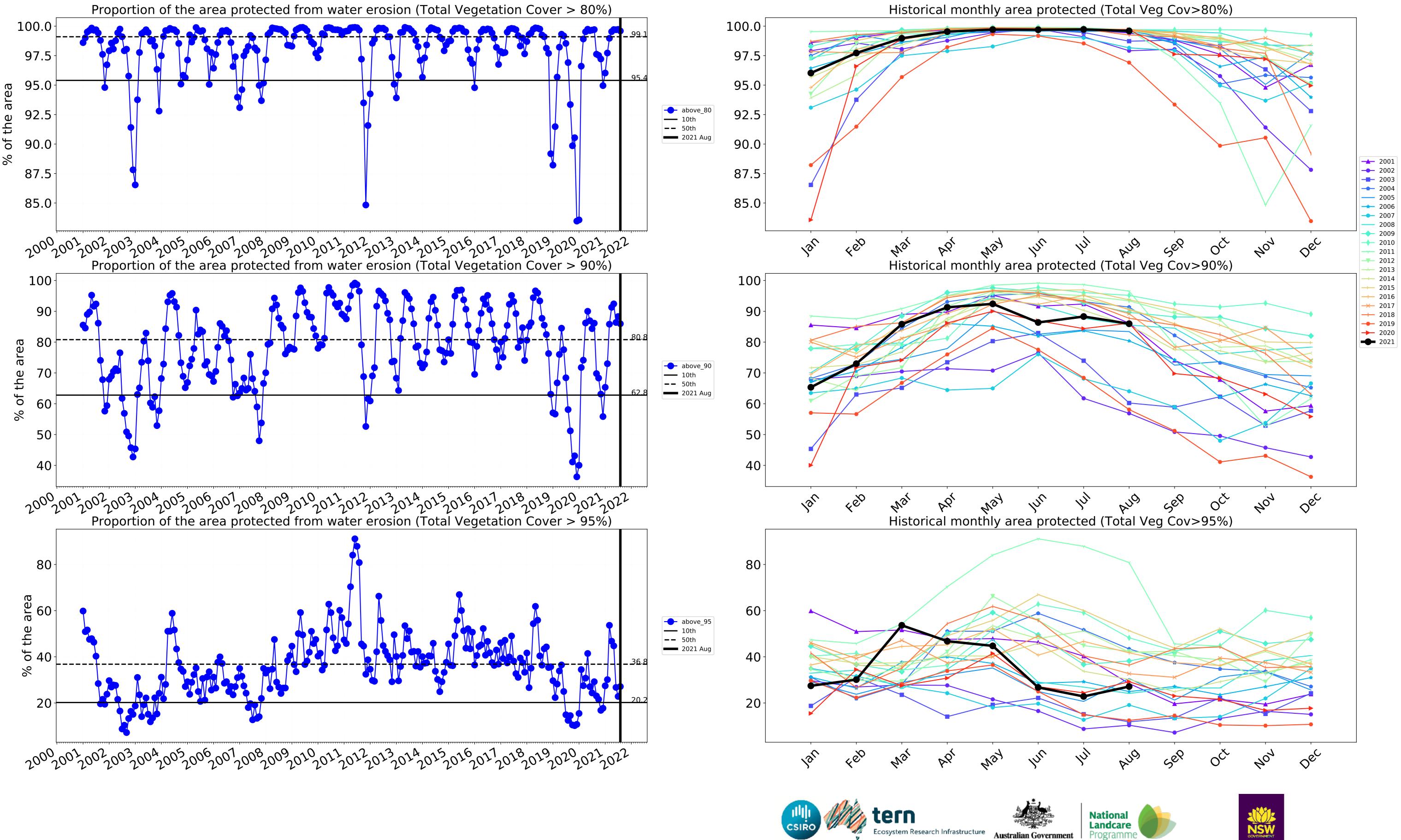


Wind erosion historical monthly area protected (Total Veg Cov >50%)

100.0-99.5 99.0 ---- above\_70 **—** 10th **--** 50th 98.5 98.0 97.5 97.0 feb Jan In May Mai P.Q month tern Ecosystem Research Infrastructure Australian Government

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





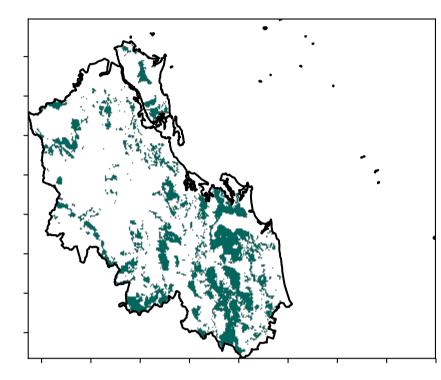
Australian Government

### Grazing - Forest (non woodland)

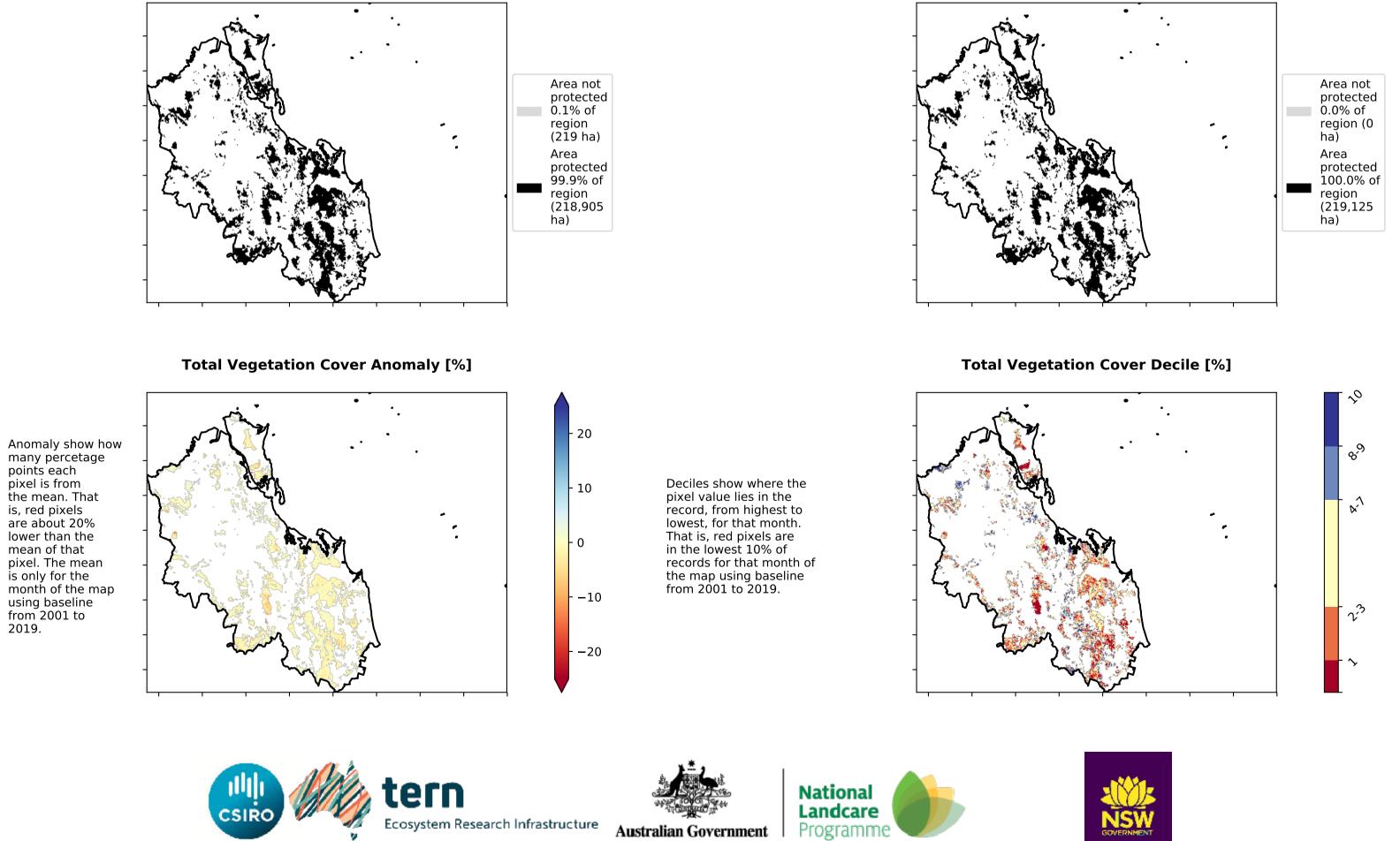
1 Agriculture - Grazing - Non-woodland forest

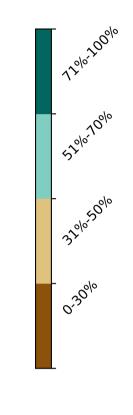
**Total Vegetation Cover [%]** 

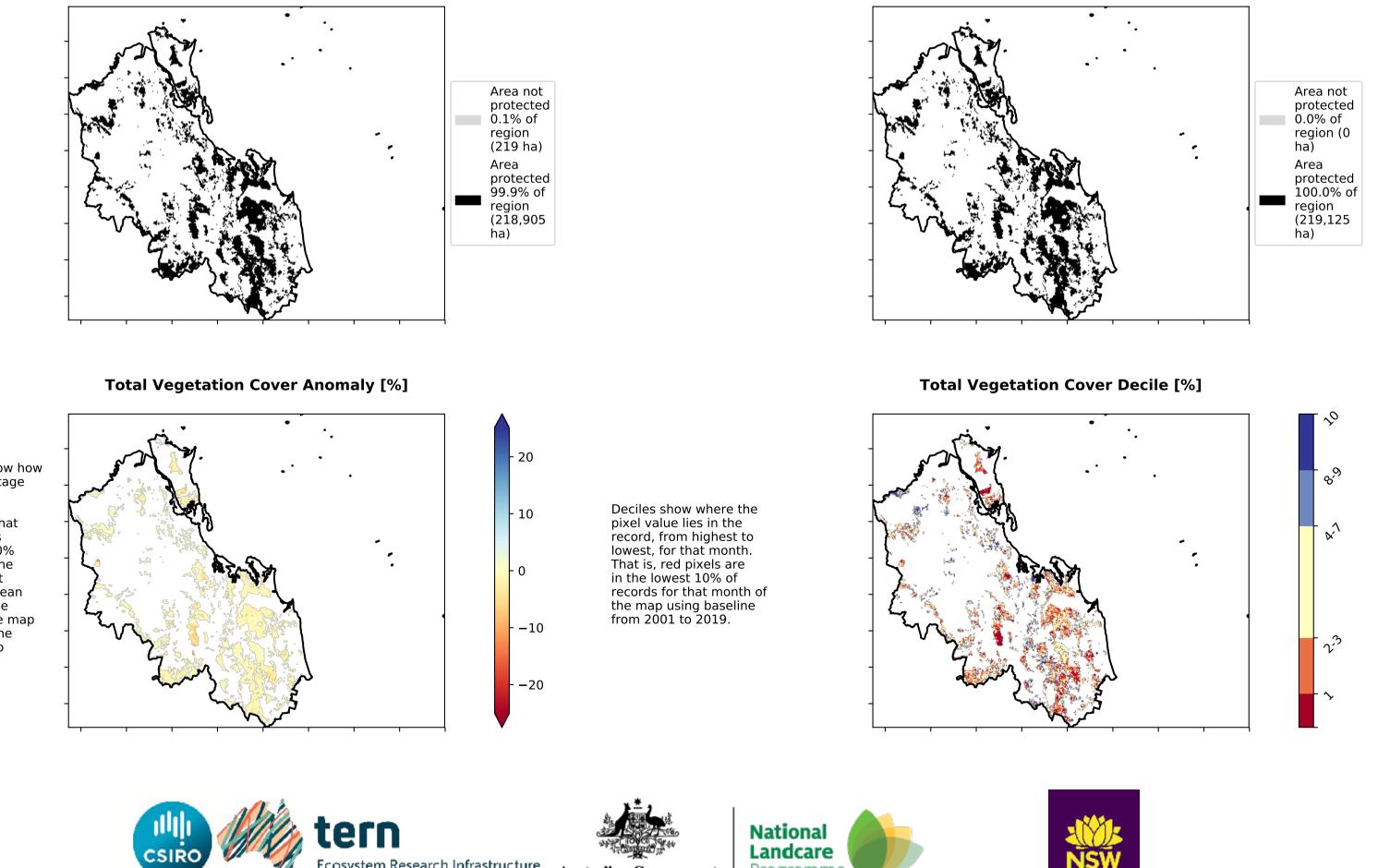
Land use and forest cover



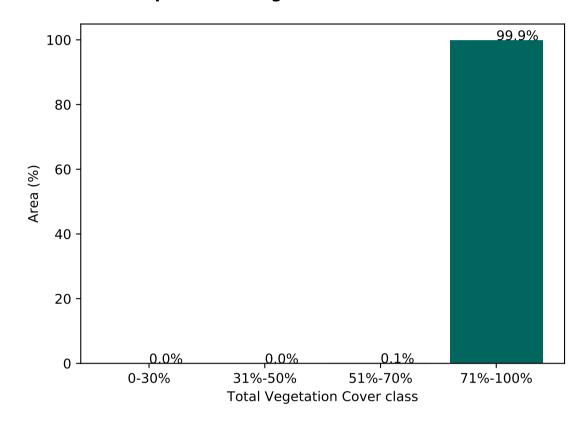
% Area protected from water erosion (>70%)



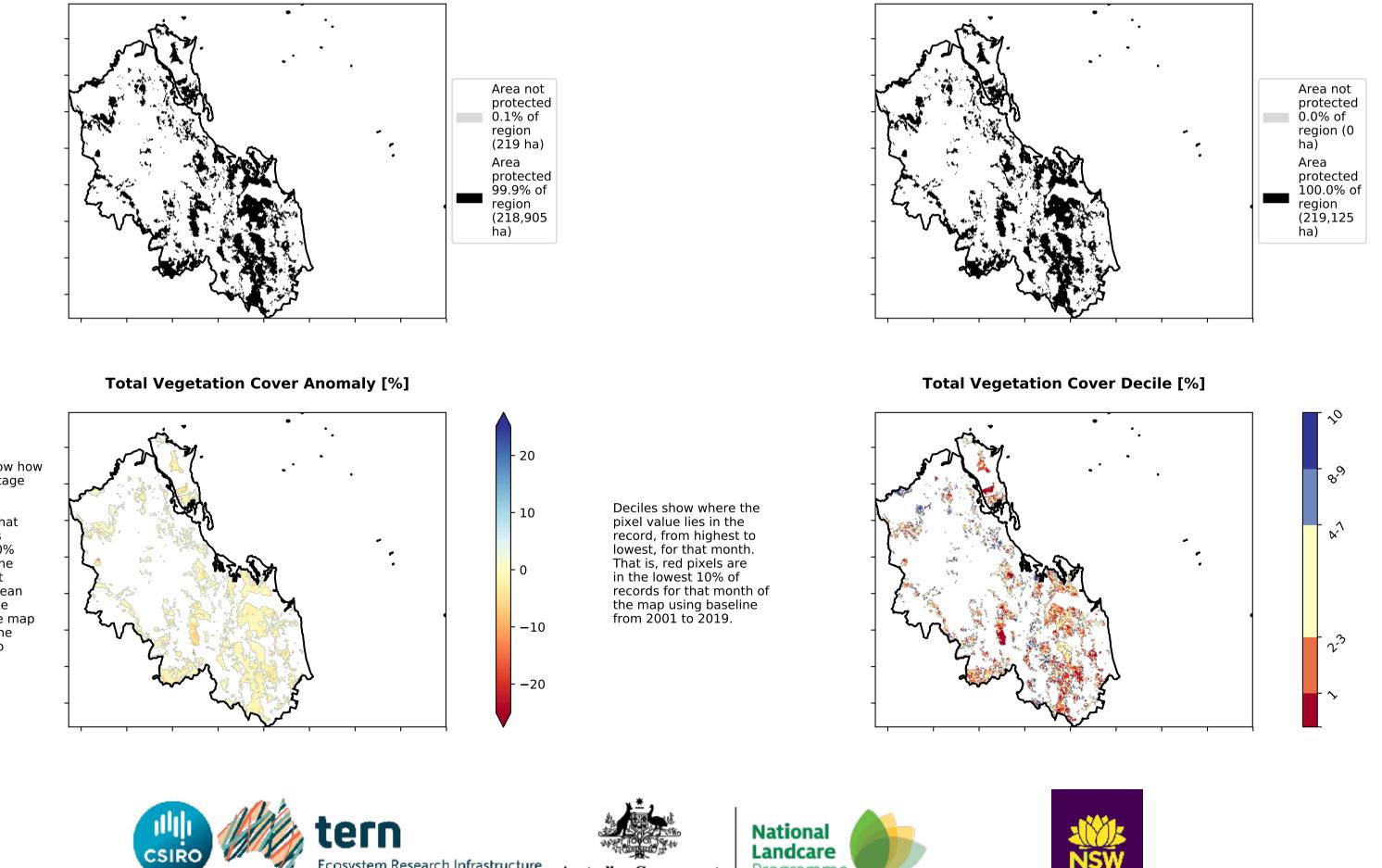




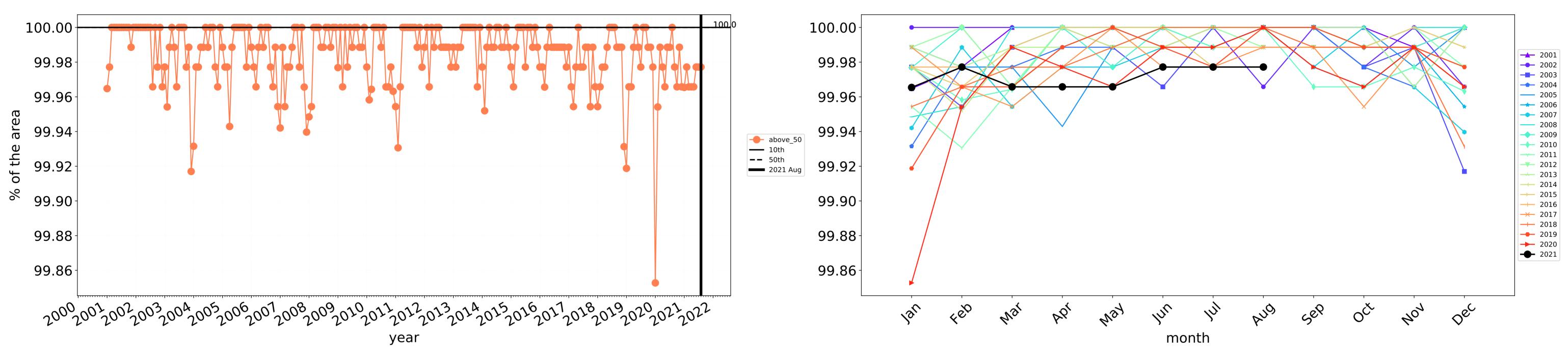
#### Proportion of vegetation cover class in area



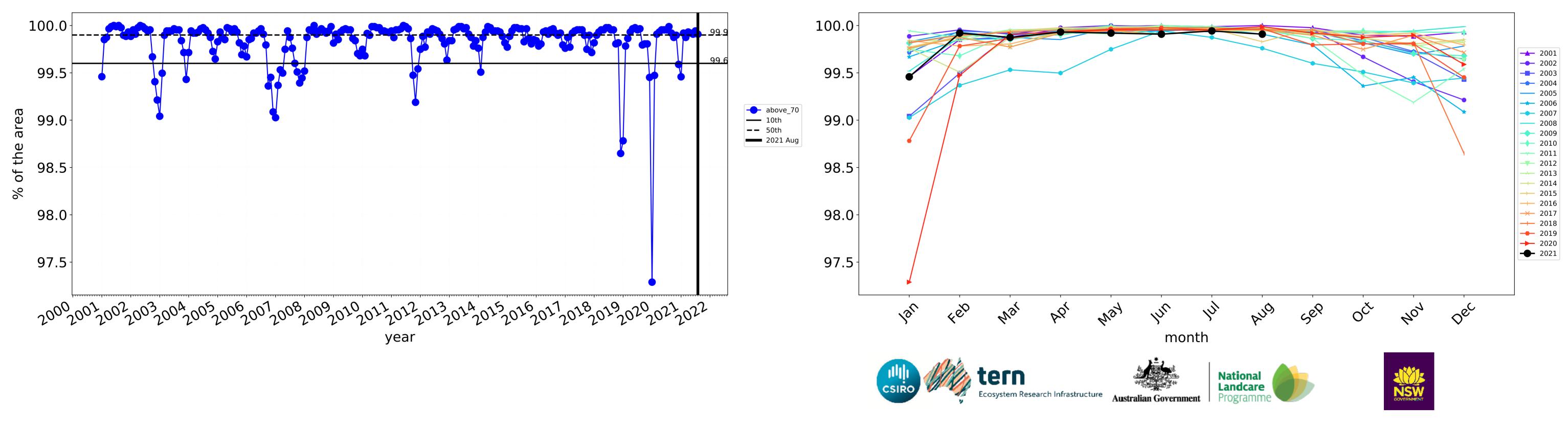
#### % Area protected from wind erosion (>50%)



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

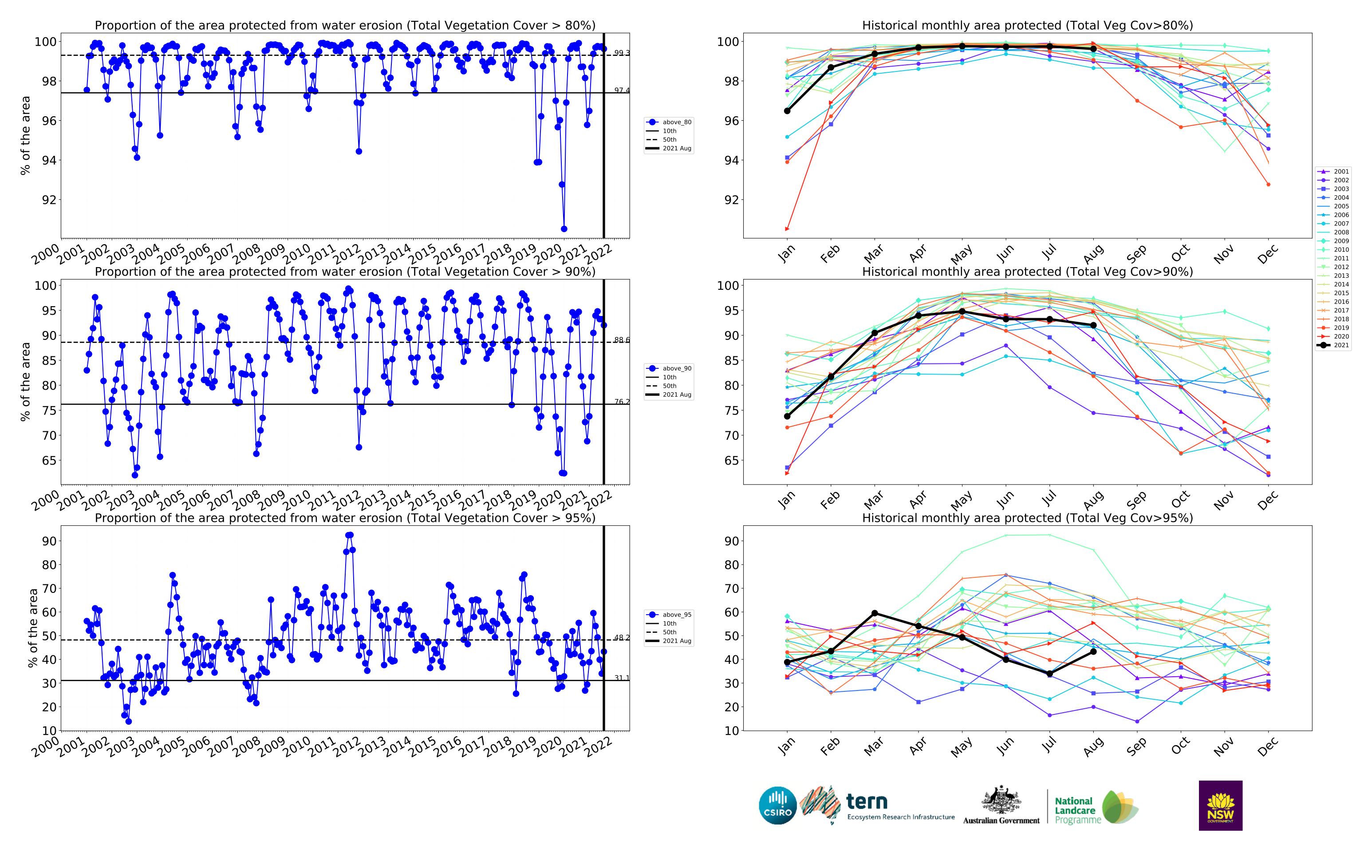


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

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



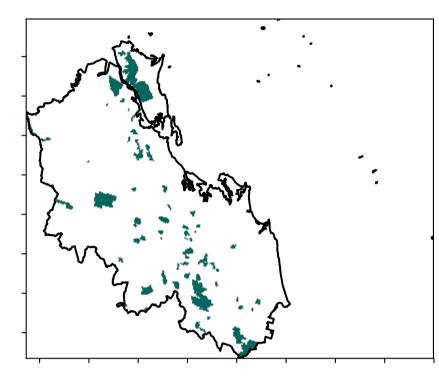
### **Production native forests and plantation forests**

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

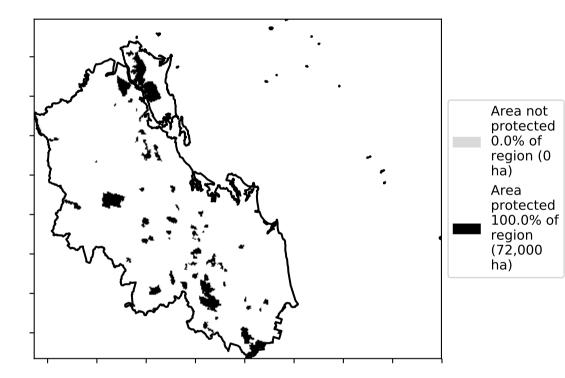
Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

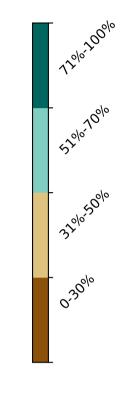
**Total Vegetation Cover [%]** 

Land use and forest cover



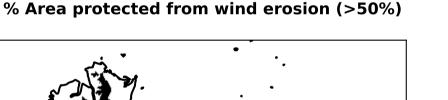
% Area protected from water erosion (>70%)

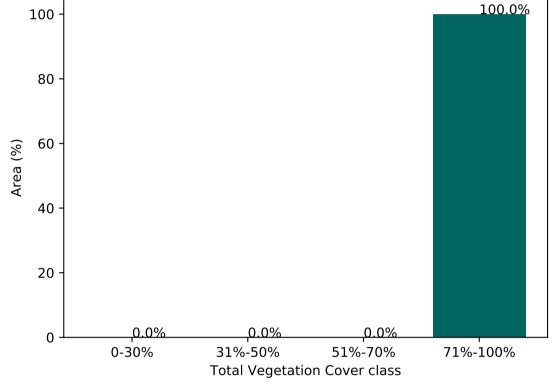




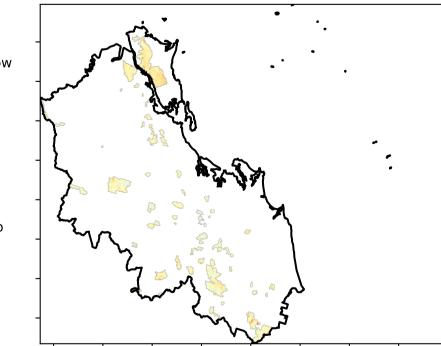


#### Proportion of vegetation cover class in area



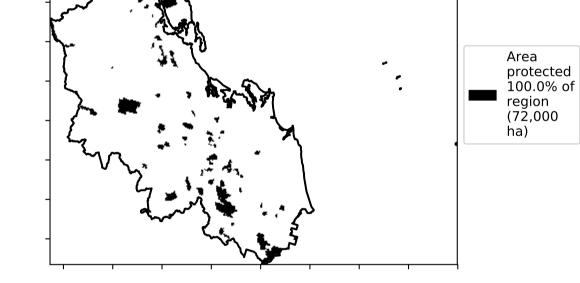


**Total Vegetation Cover Anomaly [%]** 



10 0 -10

· 20



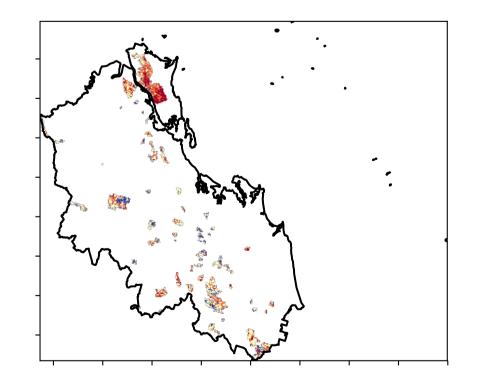
Total Vegetation Cover Decile [%]

\$

s, S

x.1

2<sup>35</sup>





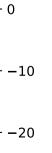
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are

records for that month of

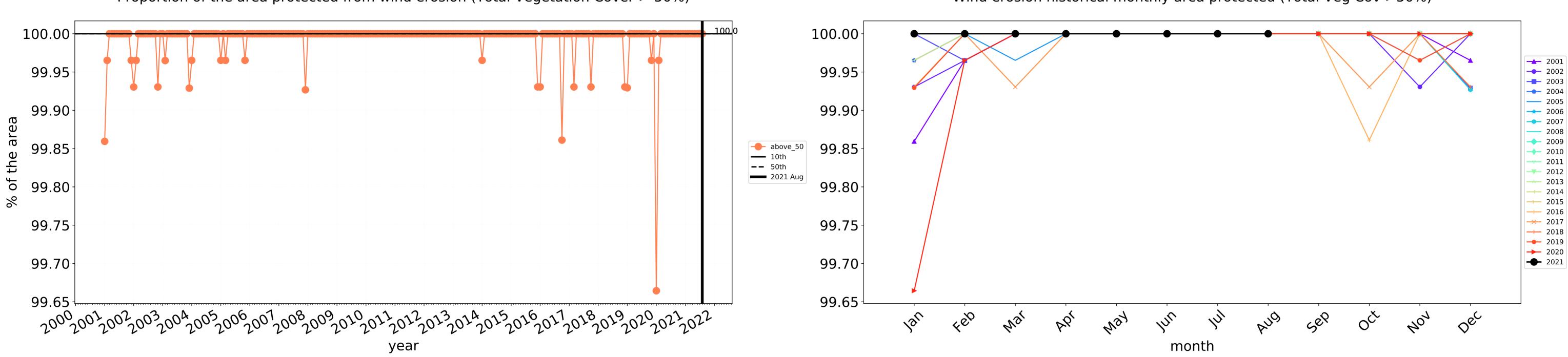
the map using baseline from 2001 to 2019.

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.

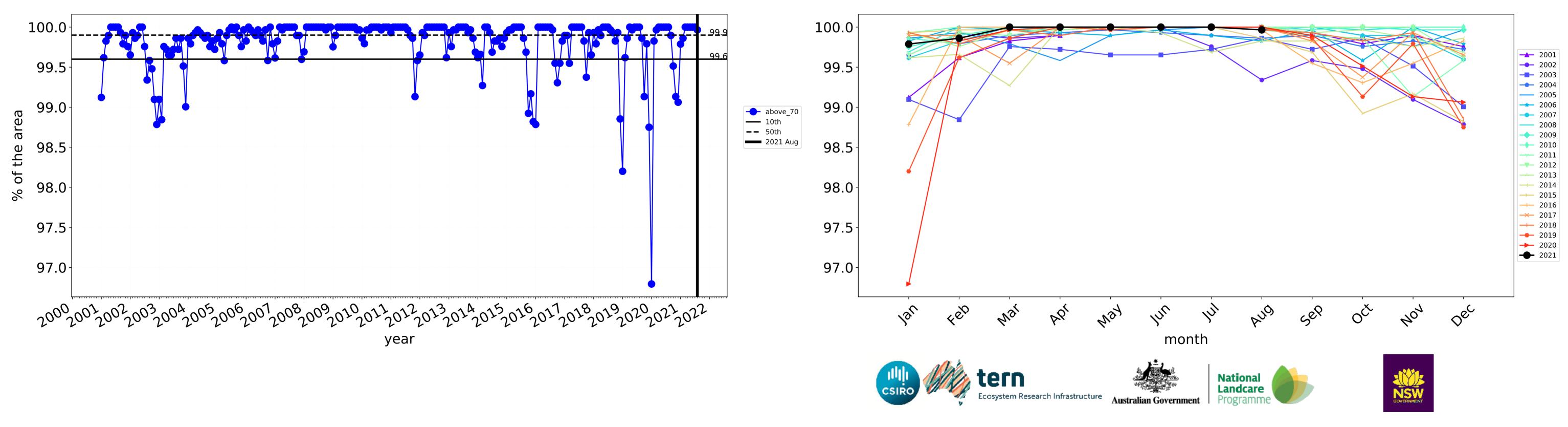


### Production native forests and plantation forests timeseries



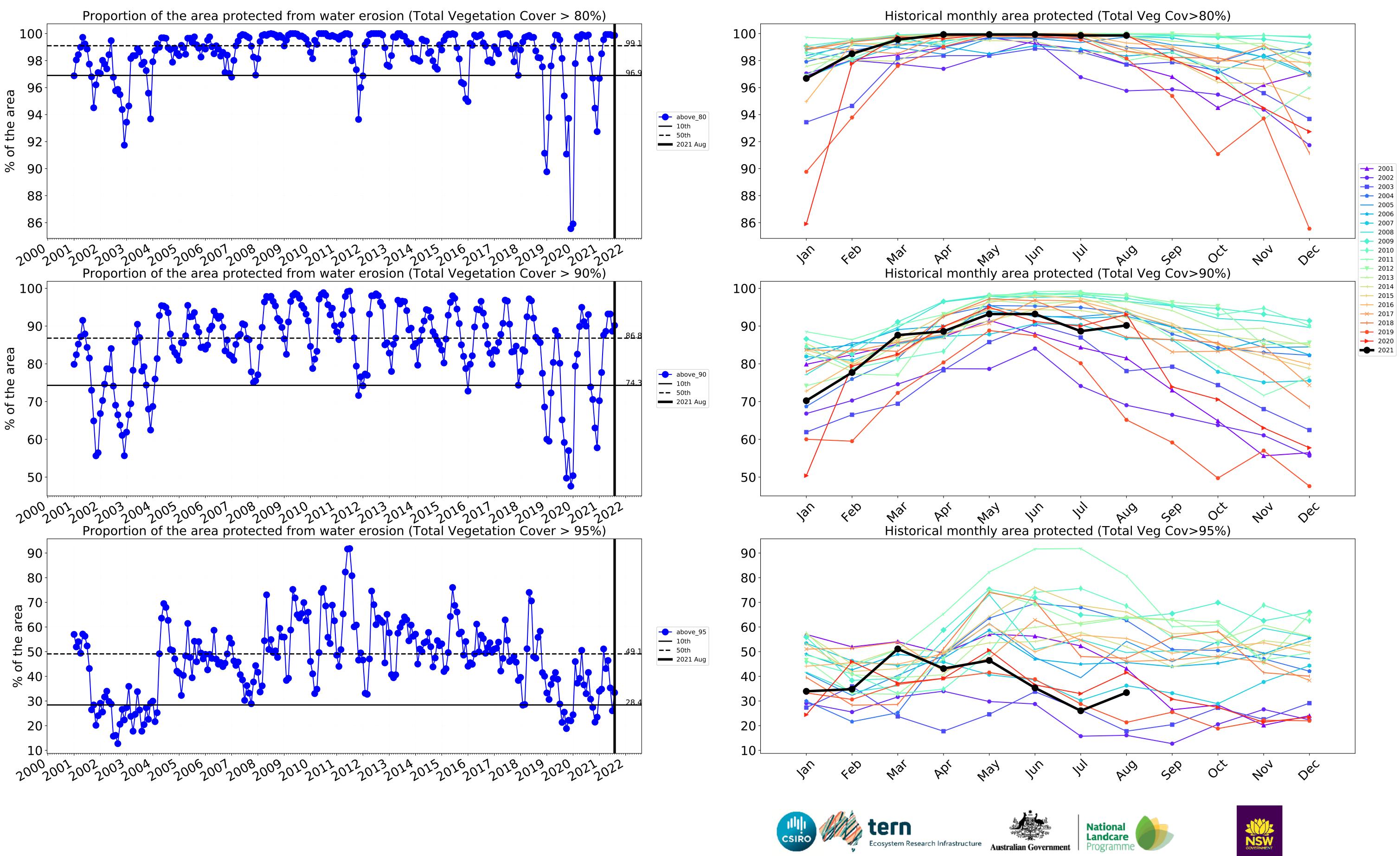
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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





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



# Gladstone\_(R) (1,038,000 ha and no data 10,254 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	1,038,000	100.0% 1,037,600	99.7% 1,035,200	98.9% 1,026,650	96.8% 1,004,350	77.9% 809,000	30.5% 316,450
Conservation and natural environments	155,075	100.0% 155,025	99.7% 154,575	99.0% 153,550	97.6% 151,350	88.4% 137,050	48.3% 74,950
Conservation and natural environments Woodland forest	49,550	99.9% 49,525	99.7% 49,400	98.7% 48,900	96.0% 47,550	78.4% 38,850	28.8% 14,275
Conservation and natural environments Forest (non woodland)	100,950	100.0% 100,950	99.9% 100,850	99.6% 100,500	99.1% 100,025	94.4% 95,300	58.3% 58,900
Agriculture	734,850	100.0% 734,850	100.0% 734,550	99.8% 733,650	98.9% 726,450	79.0% 580,525	28.6% 210,075
Grazing	733,300	100.0% 733,300	100.0% 733,000	99.8% 732,125	98.9% 725,025	79.1% 579,775	28.6% 209,825
Grazing non forest	341,625	100.0% 341,625	99.9% 341,400	99.7% 340,725	98.0% 334,875	67.3% 229,825	20.0% 68,200
Grazing Woodland forest	172,550	100.0% 172,550	100.0% 172,525	100.0% 172,475	99.6% 171,850	86.0% 148,325	27.1% 46,800
Grazing - Forest (non woodland)	219,125	100.0% 219,125	100.0% 219,075	99.9% 218,925	99.6% 218,300	92.0% 201,625	43.3% 94,825
Production native forests and plantation forests	72,000	100.0% 72,000	100.0% 72,000	100.0% 71,975	99.9% 71,900	90.2% 64,925	33.4% 24,050



