# **Total vegetation cover soil protection Region:NRM Mackay Whitsunday QLD**

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 Jan 2023**

#### Land use and forest cover

#### Legend with land class forest cover and number, i.e. Forests is 12 1 Conservation and natural environments -Non-forest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments -Non-Woodland forest 4 Agriculture - Grazing - Non-forest 5 Agriculture - Grazing - Woodland forest 6 Agriculture - Grazing - Non-woodland forest 7 Agriculture - Grazing - Irrigated 8 Agriculture - Cropping - Non-irrigated 9 Agriculture - Cropping - Irrigated 10 Agriculture - Horticulture - Non-irrigated **11** Agriculture - Horticulture - Irrigated 12 Production native forests and plantation forests 13 Other uses

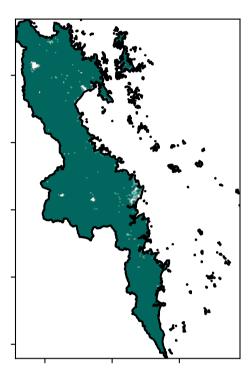
12º10-2001

520070010

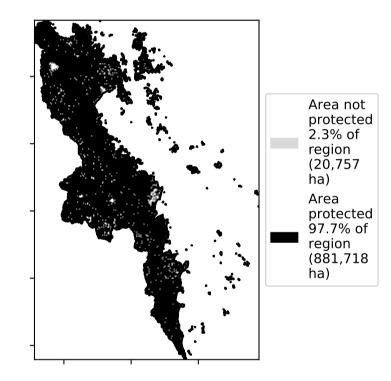
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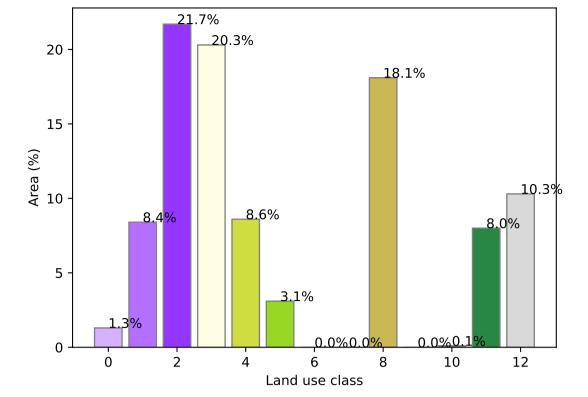
0.30%

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

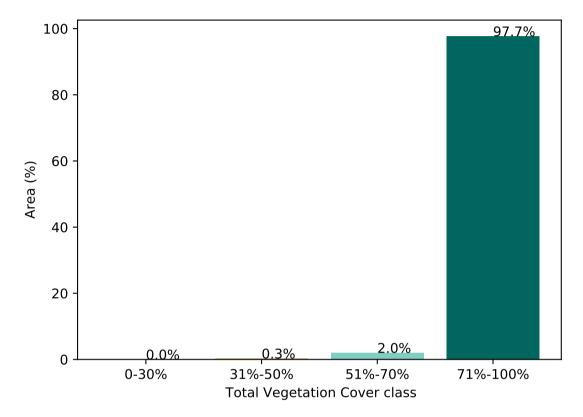


% Area protected from water erosion (>70%)

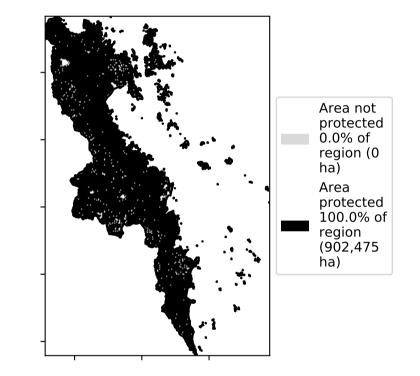




### Proportion of vegetation cover class in area



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



#### Proportion of each land class in area

**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.

Catchment Scale

of Australia (2018)

(2018) and Forests

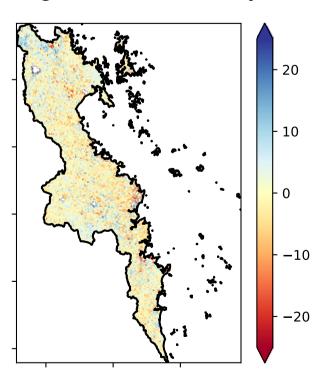
of Australia (2018)

Derived from

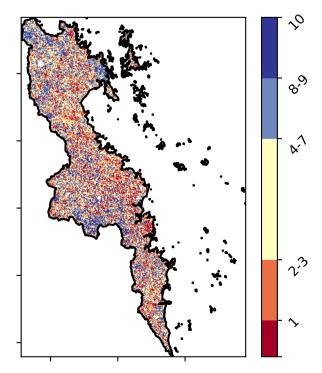
Use of Australia

Land Use and Forests

Catchment Scale Land



**Total Vegetation Cover Decile [%]** 





Deciles show where the

pixel value lies in the

record, from highest to

lowest, for that month.

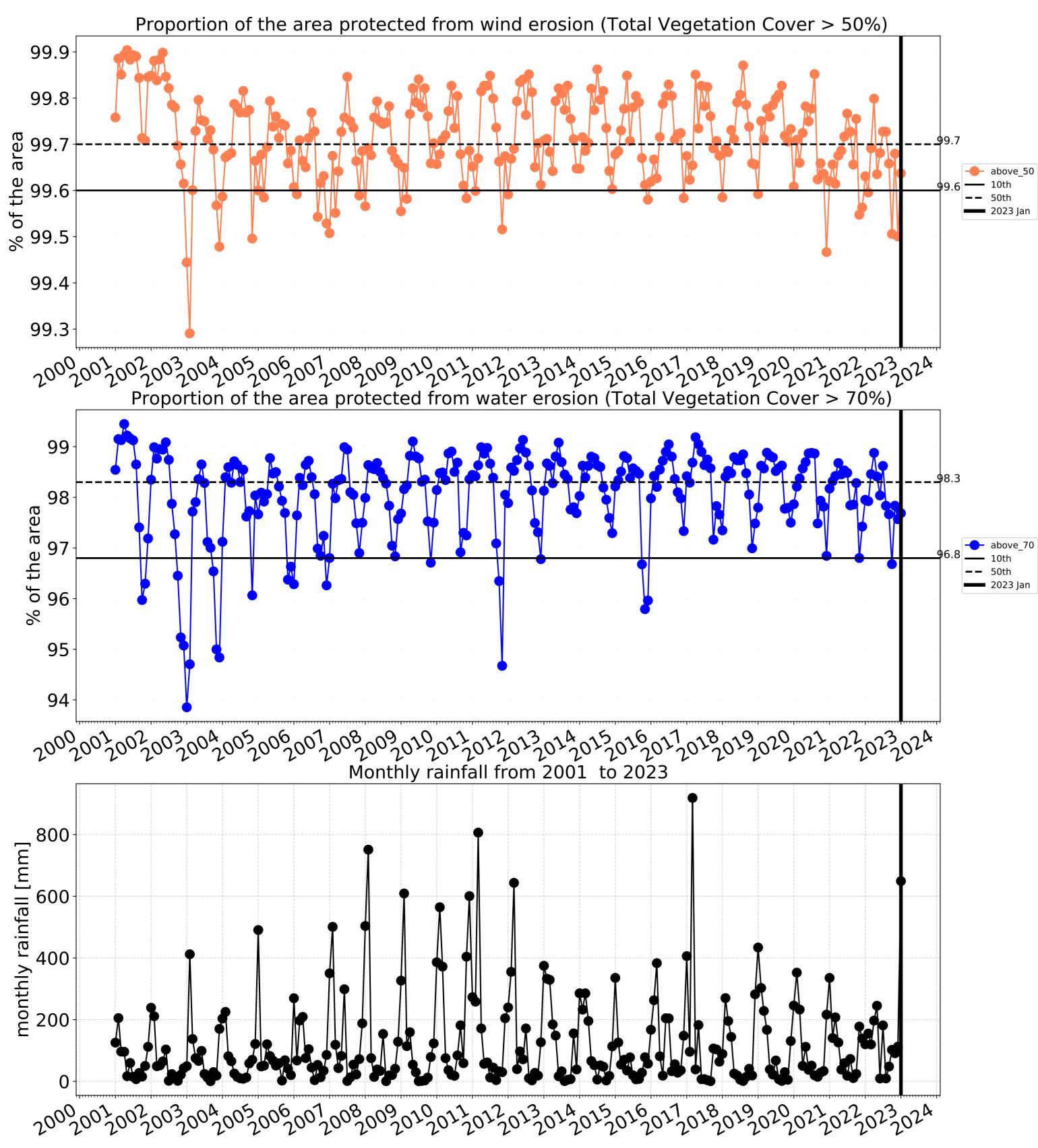
That is, red pixels are

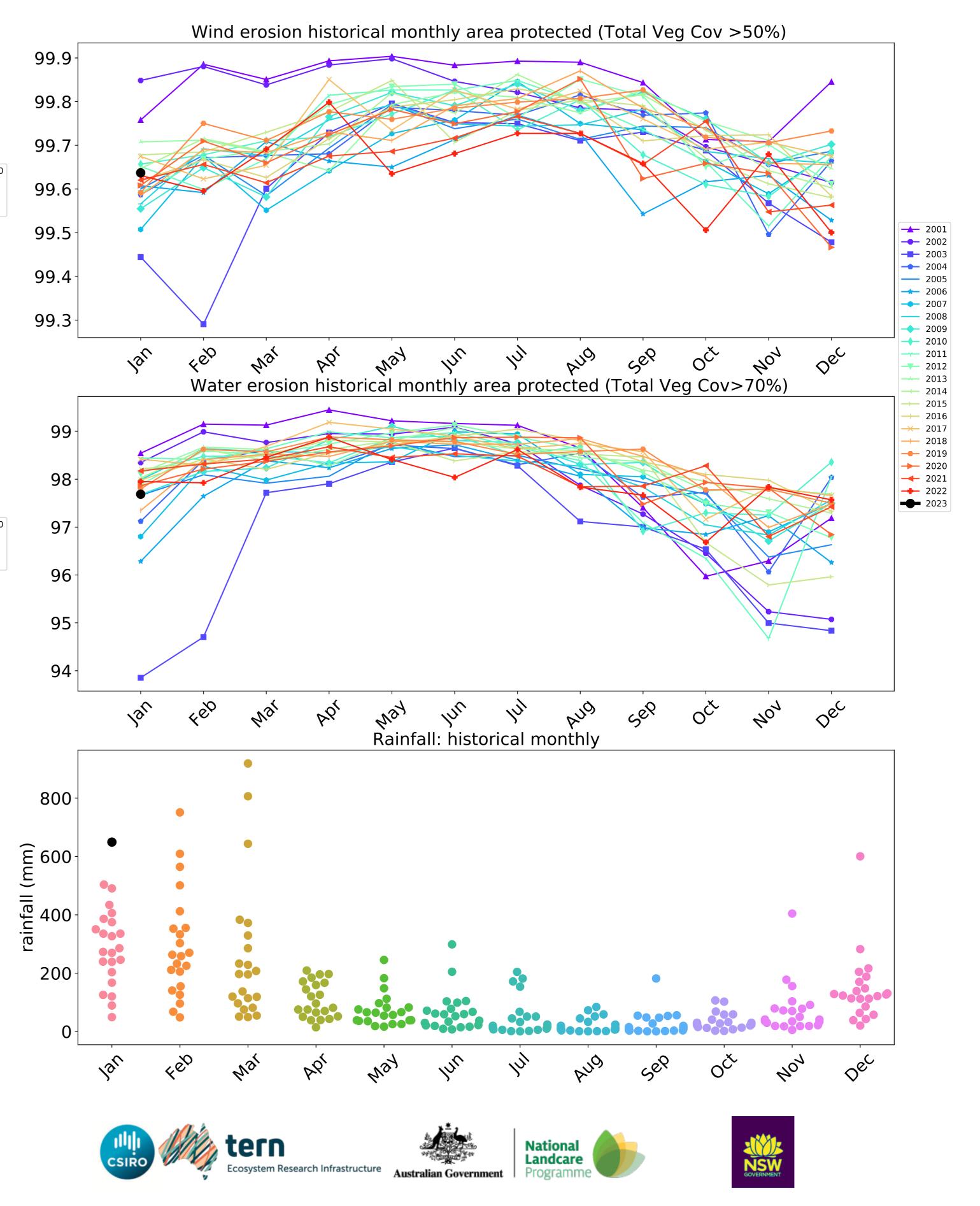
in the lowest 10% of

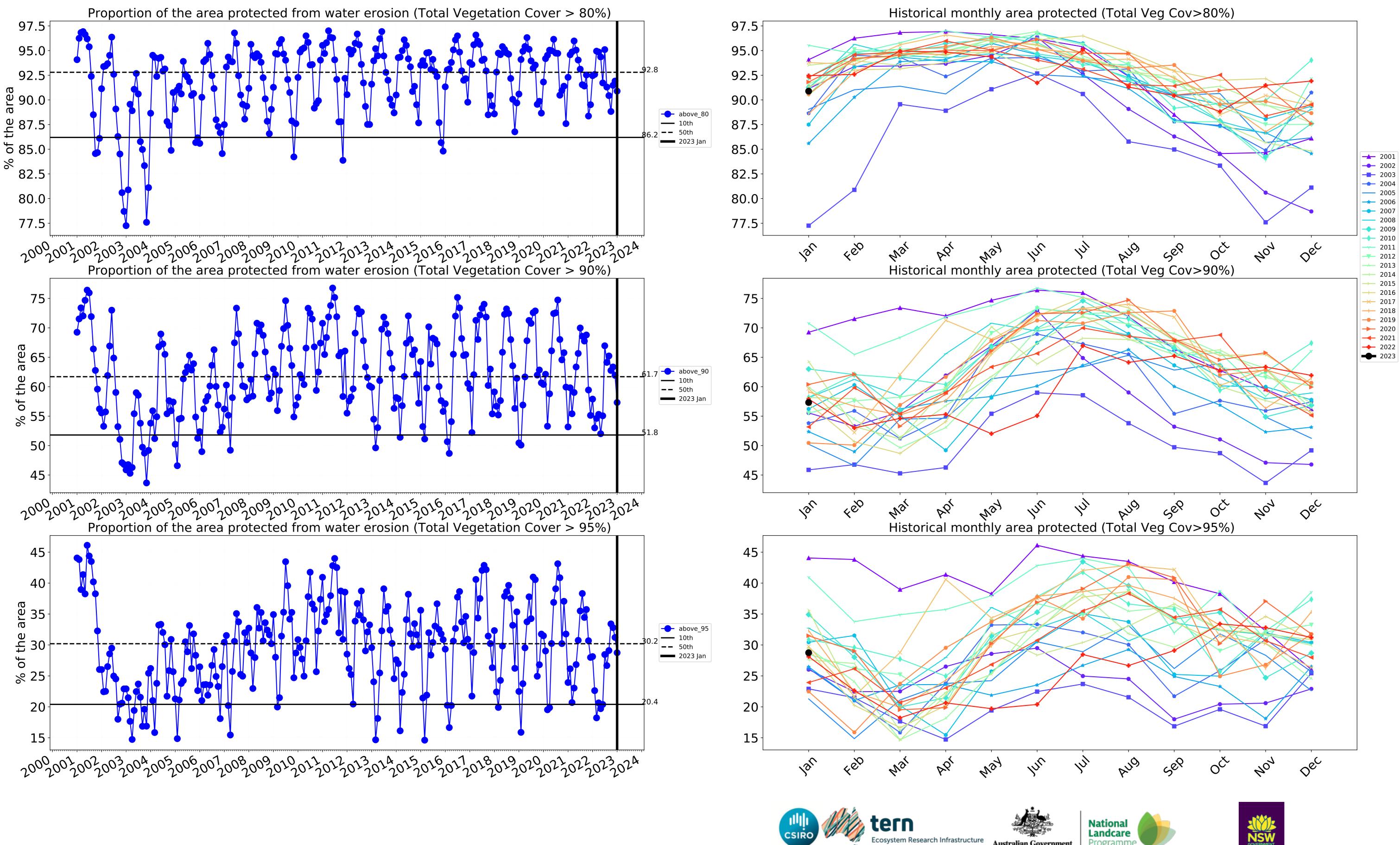
from 2001 to 2019.

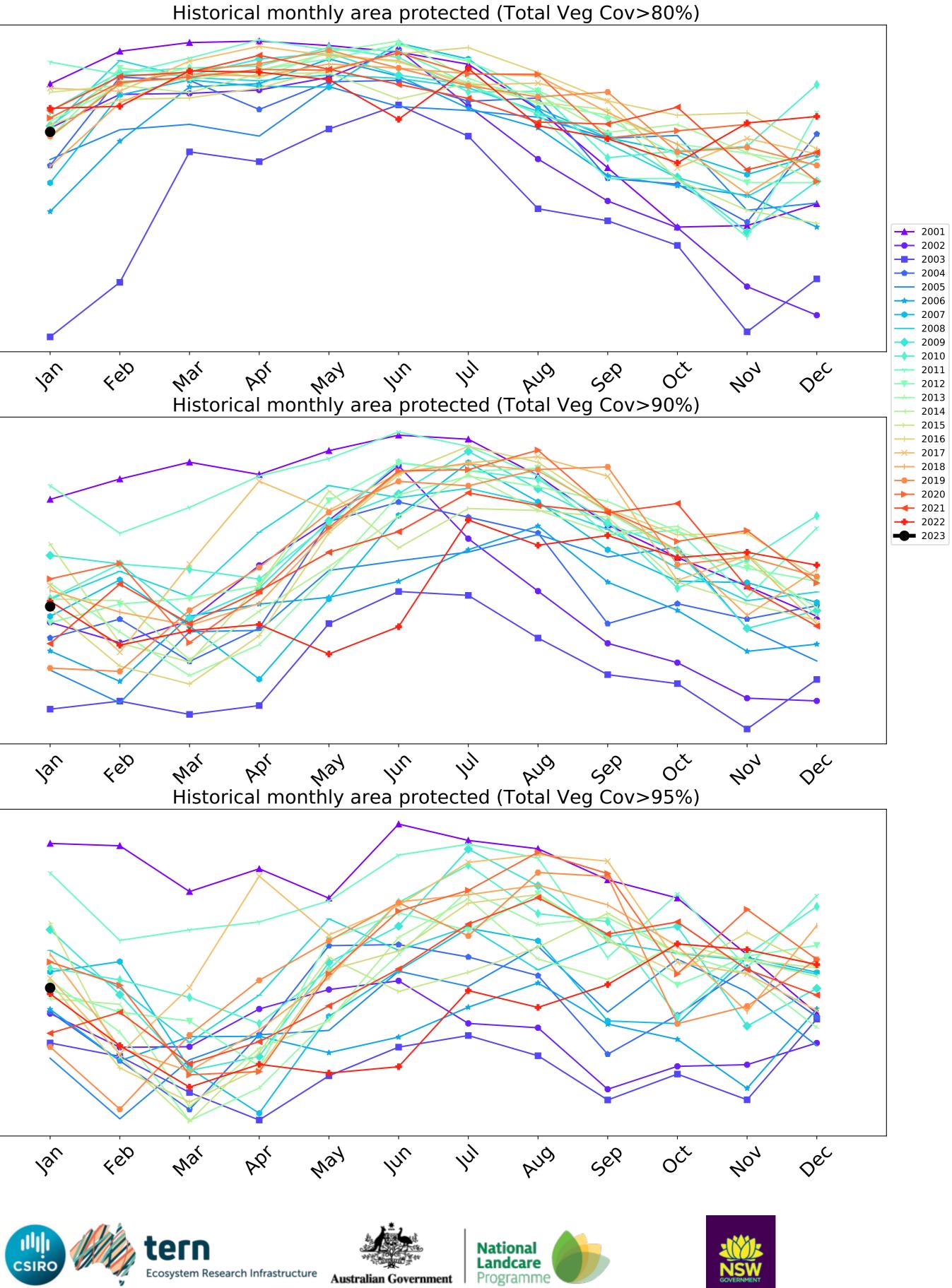
records for that month of

the map using baseline



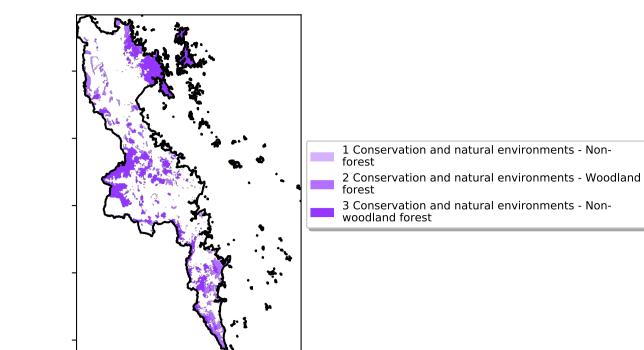




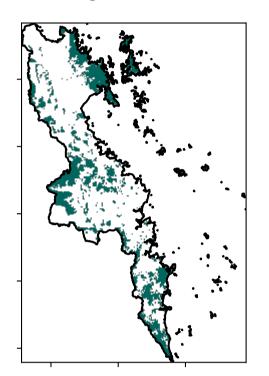


### **Conservation and natural environments**

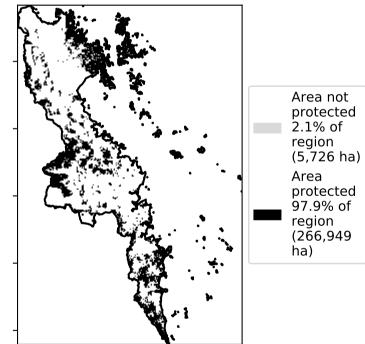
#### Land use and forest cover

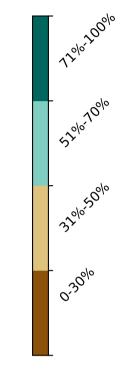


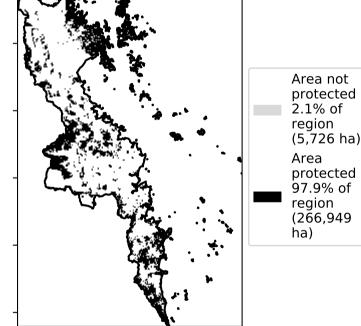
**Total Vegetation Cover [%]** 

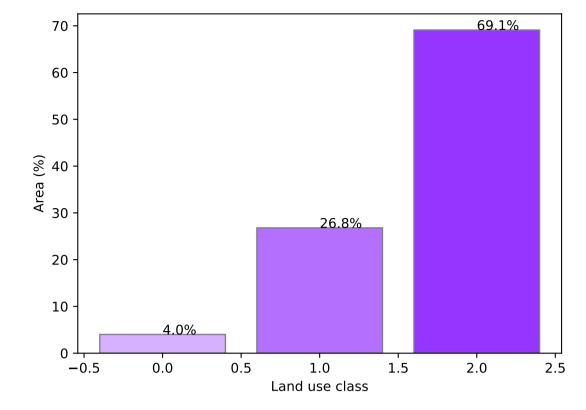


% Area protected from water erosion (>70%)



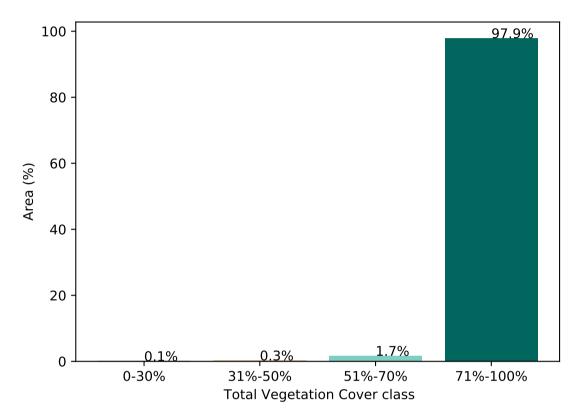




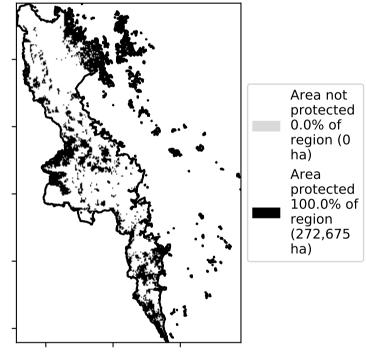


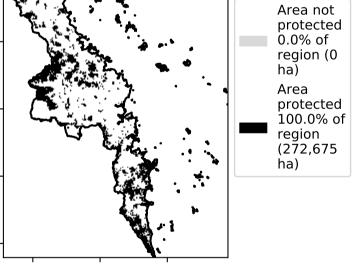
#### Proportion of each land class in area

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)





**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.

Catchment Scale Land Use and Forests

of Australia (2018)

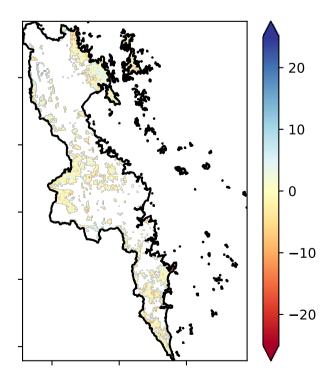
(2018) and Forests

of Australia (2018)

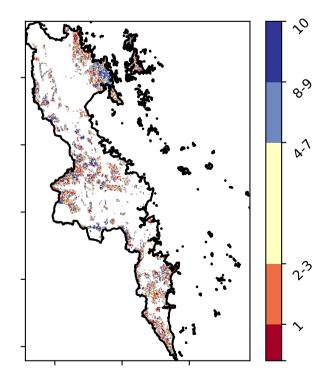
Catchment Scale Land

Derived from

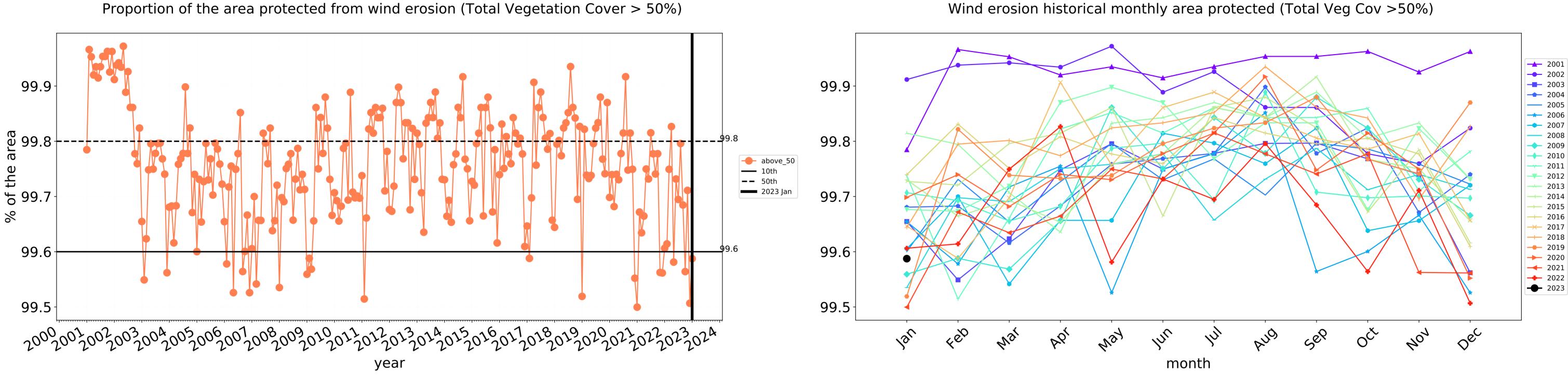
Use of Australia



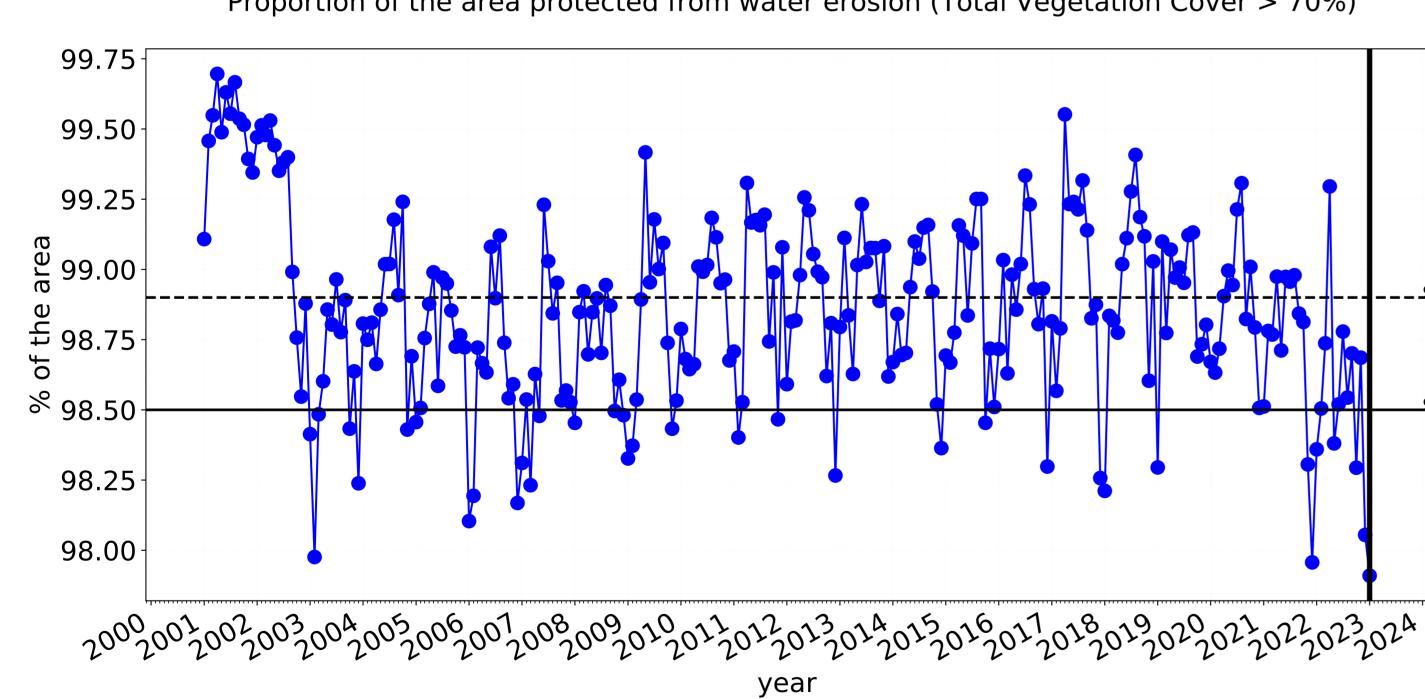
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



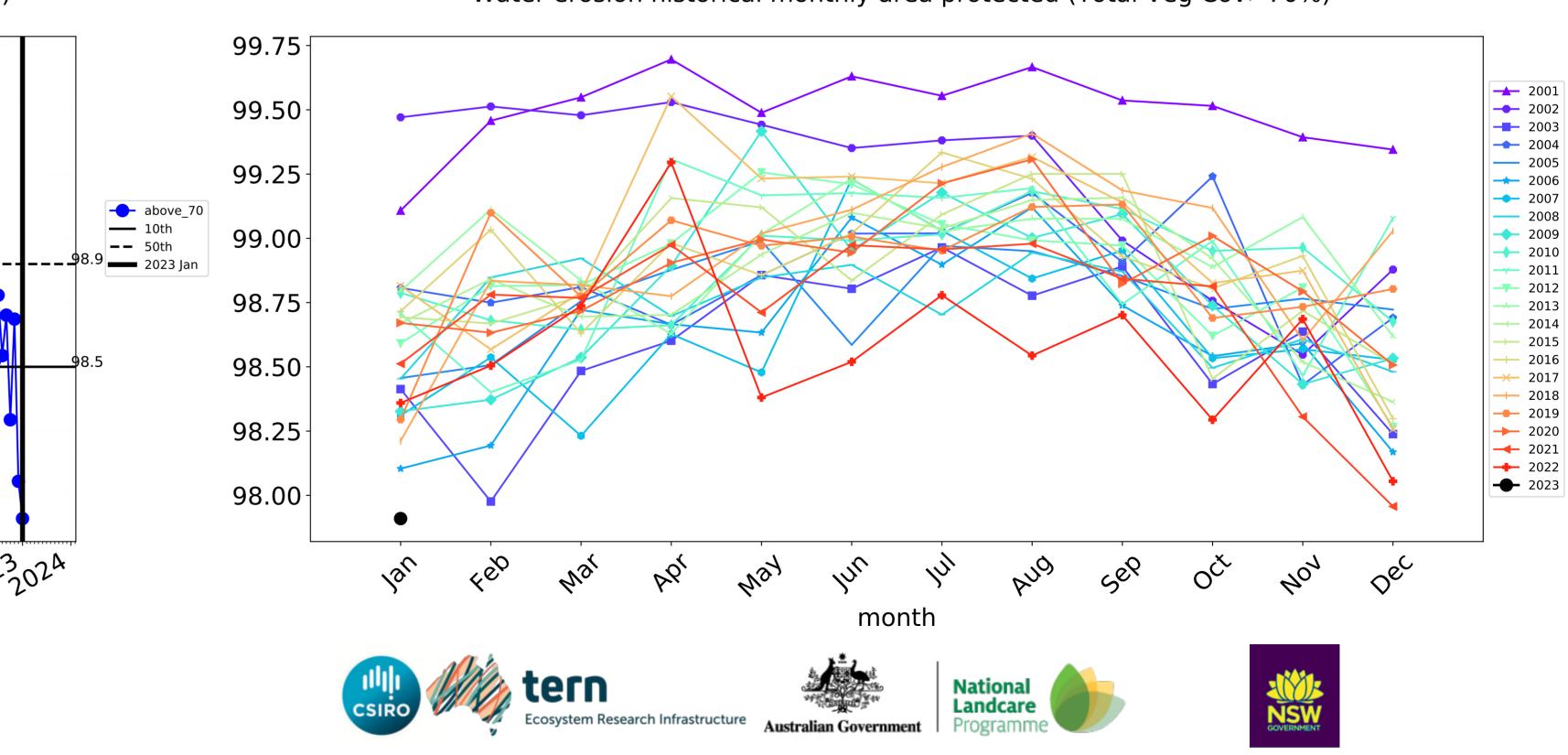




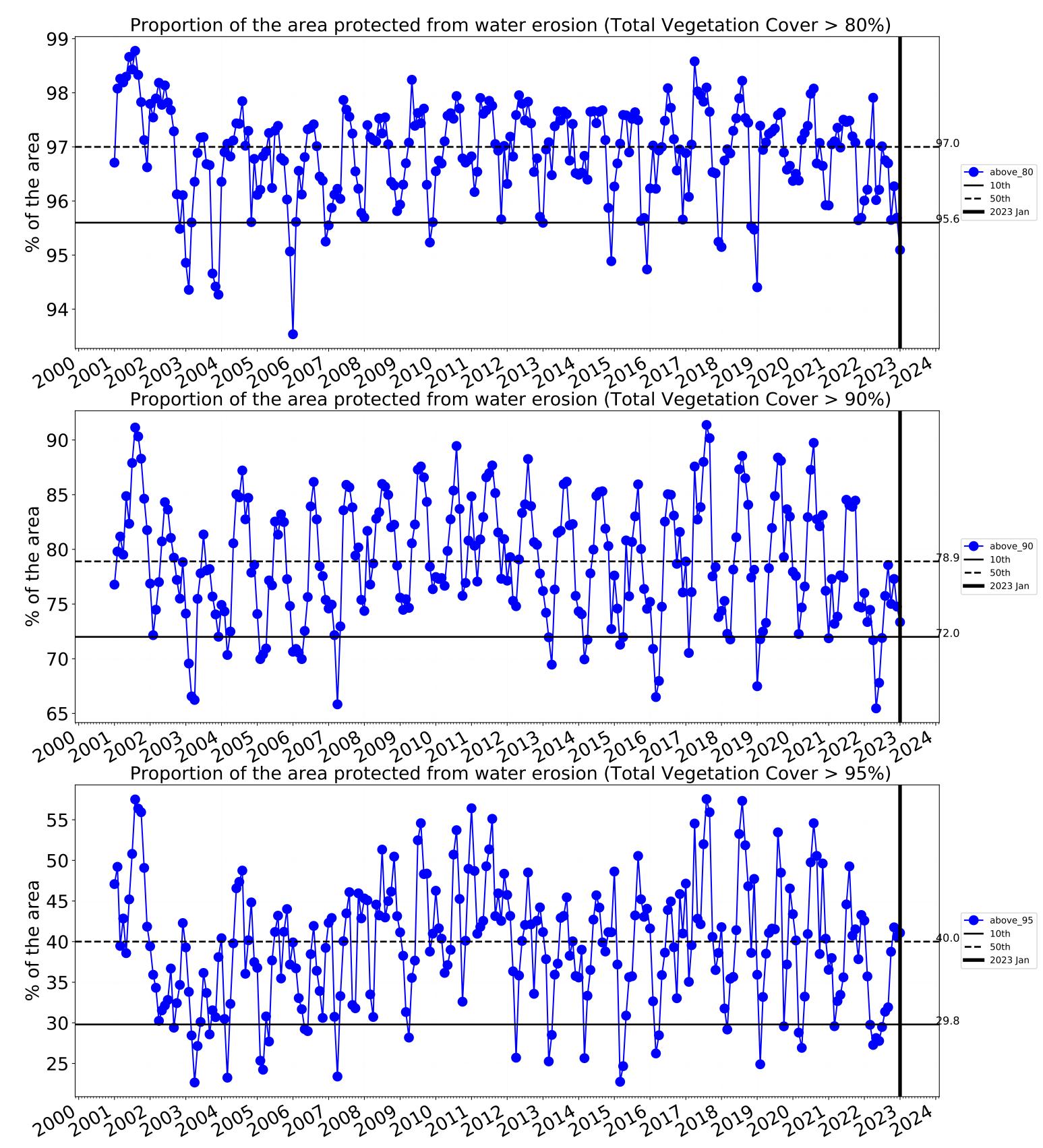
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

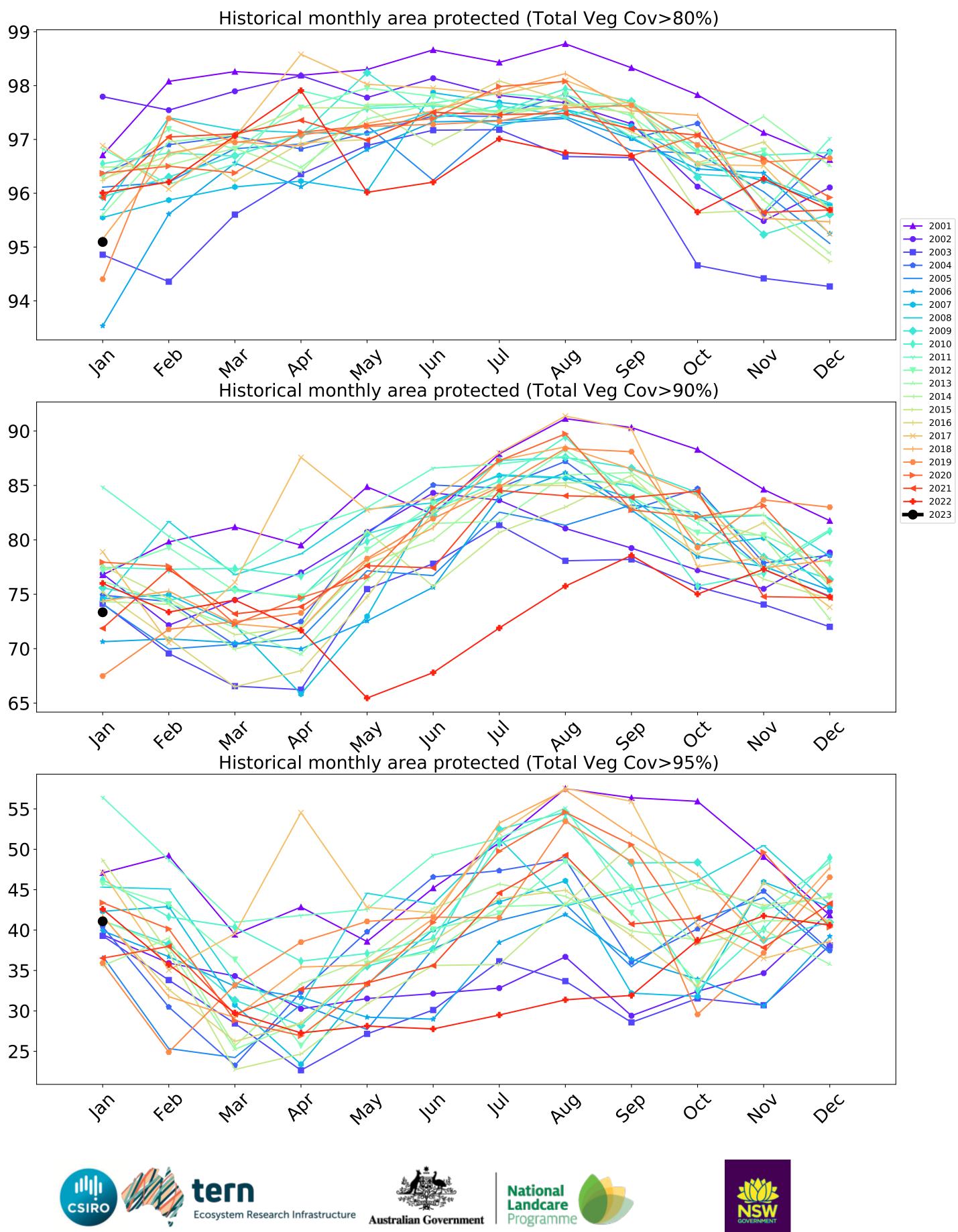


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

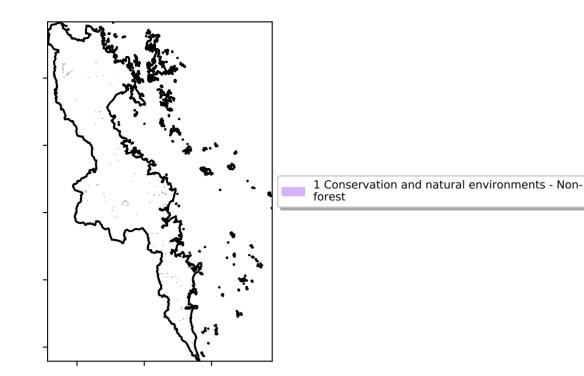




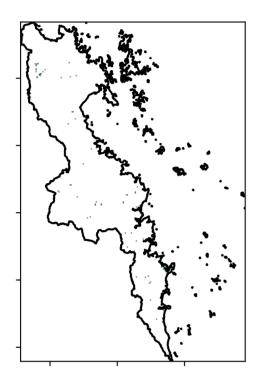


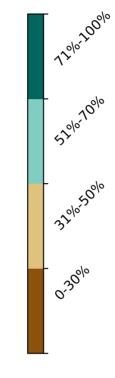
### **Conservation and natural environments non forest**

Land use and forest cover

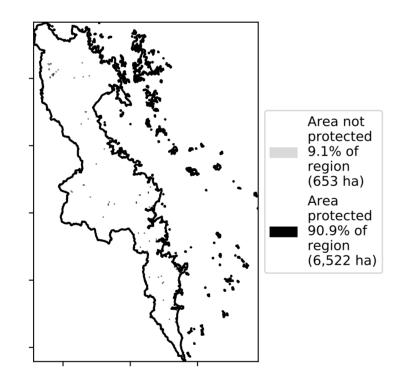


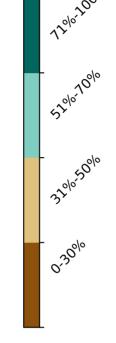
**Total Vegetation Cover [%]** 

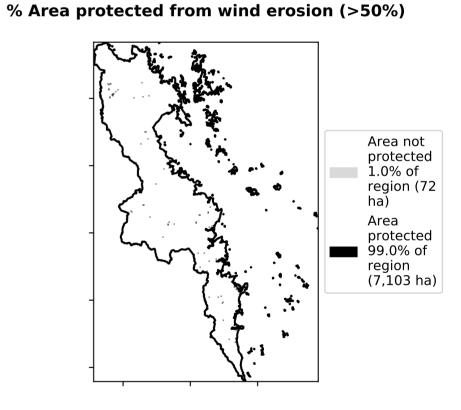




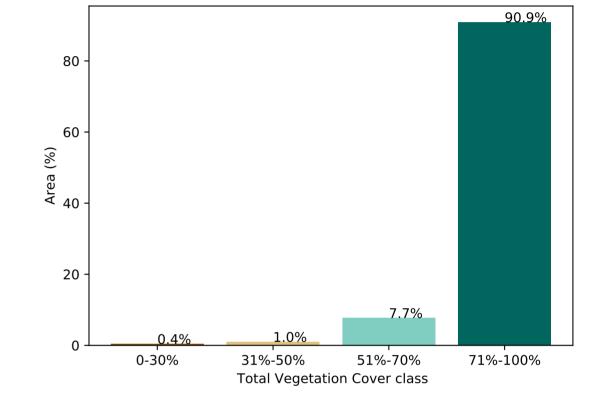
% Area protected from water erosion (>70%)







Proportion of vegetation cover class in area



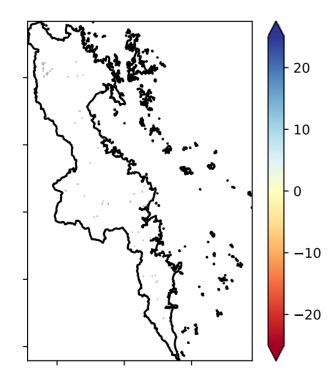
**Total Vegetation Cover Anomaly [%]** 

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.

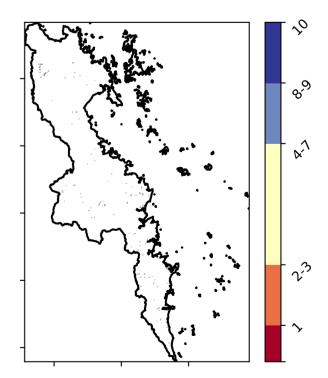
Catchment Scale Land Use and Forests of Australia (2018) Derived from

Use of Australia (2018) and Forests of Australia (2018)

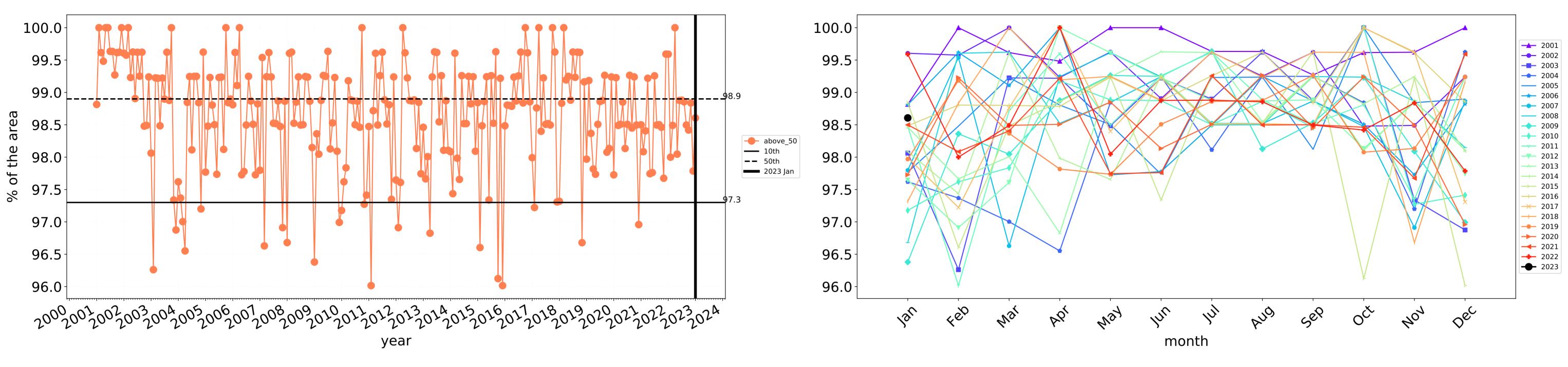
Catchment Scale Land



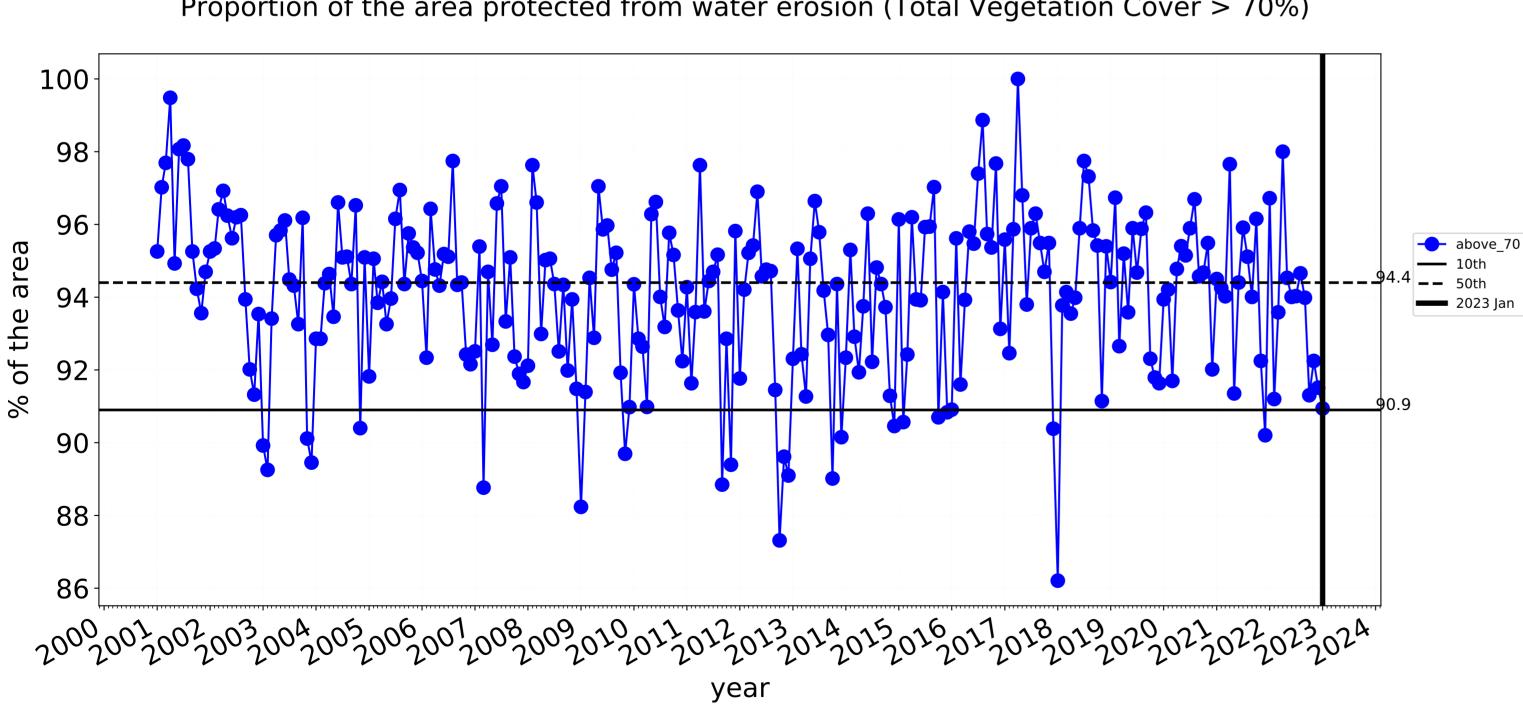
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



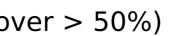




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

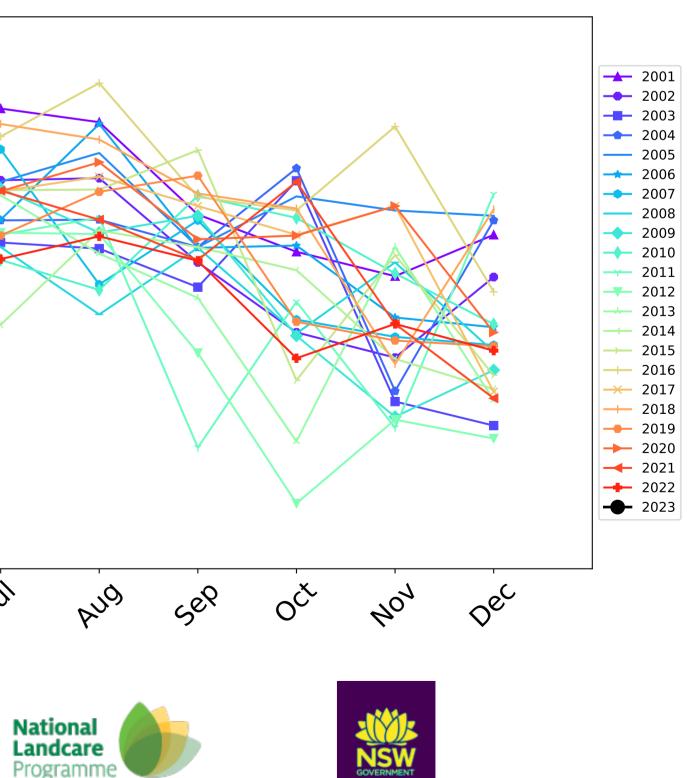


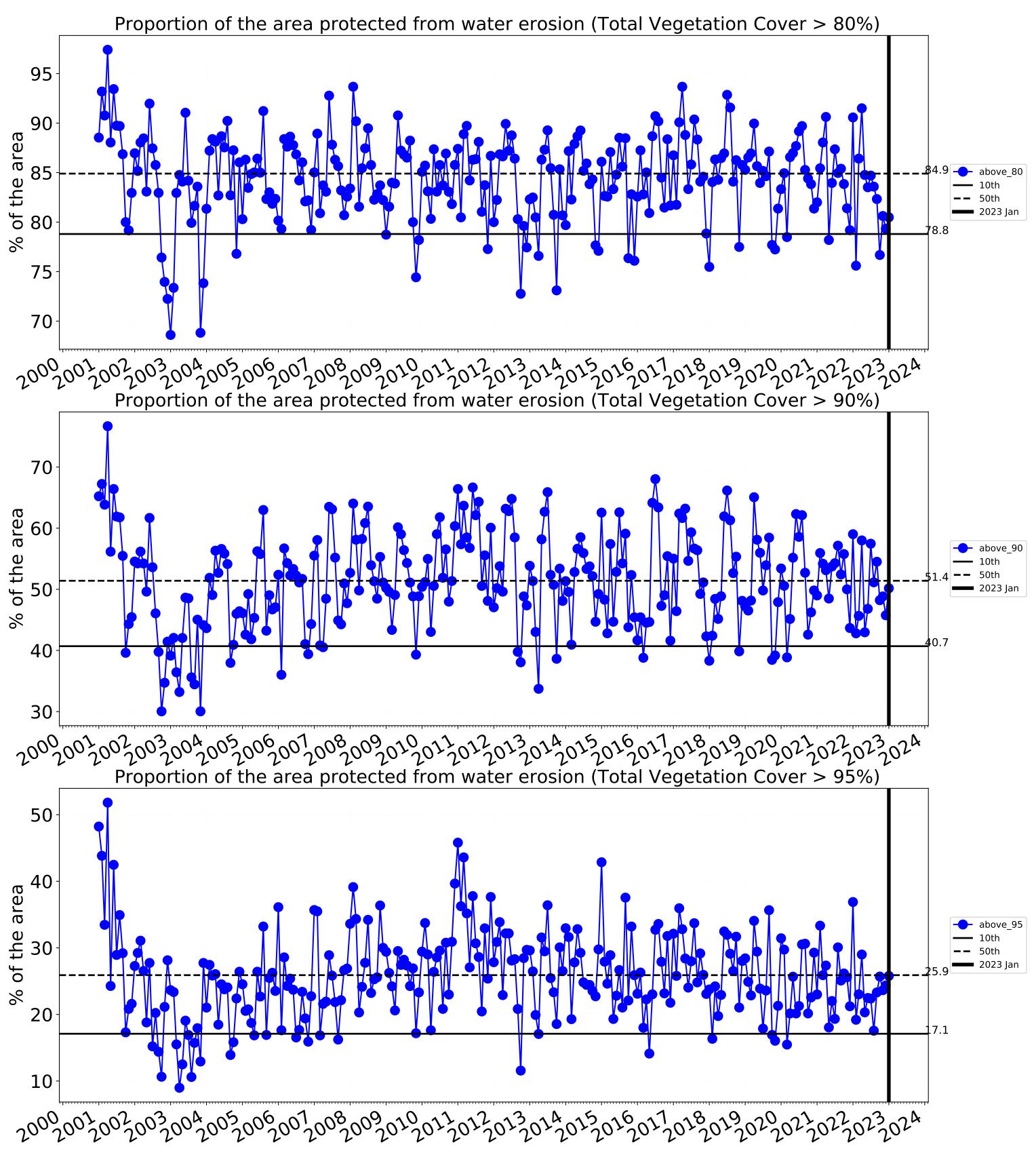
Wind erosion historical monthly area protected (Total Veg Cov >50%)

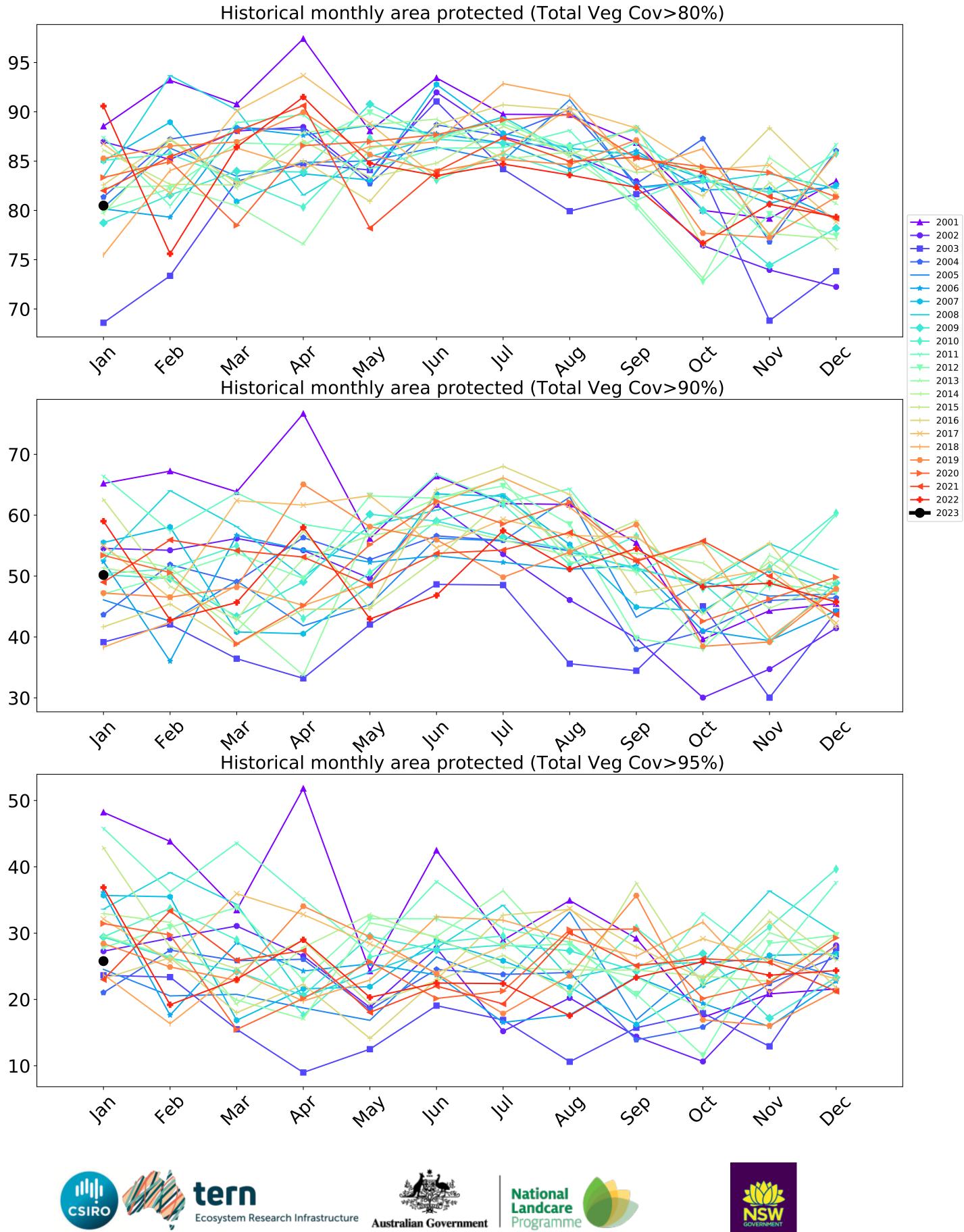
100 98 96 94 92 90 88 86 Jan 4eb In Ma, May month tern Ecosystem Research Infrastructure Australian Government

Programme

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



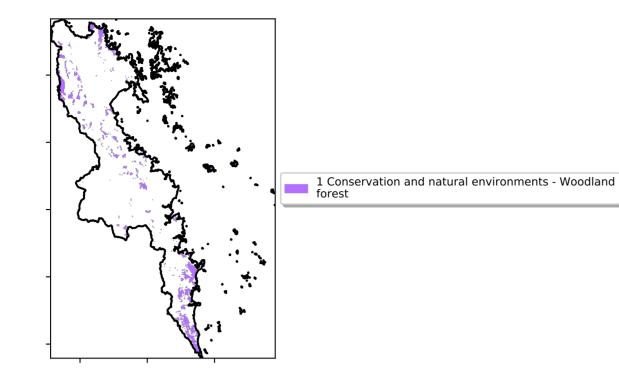




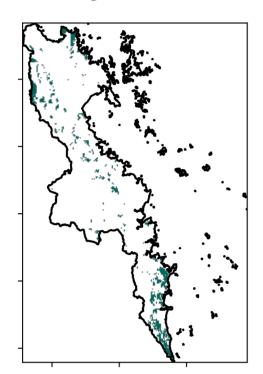


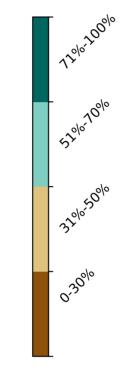
## **Conservation and natural environments Woodland forest**

Land use and forest cover

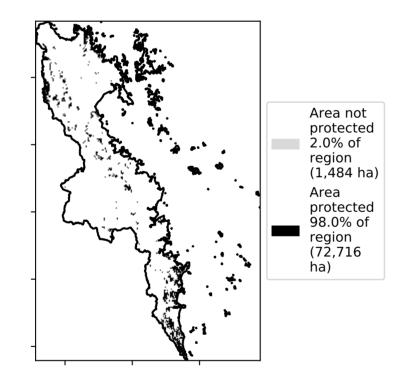


**Total Vegetation Cover [%]** 



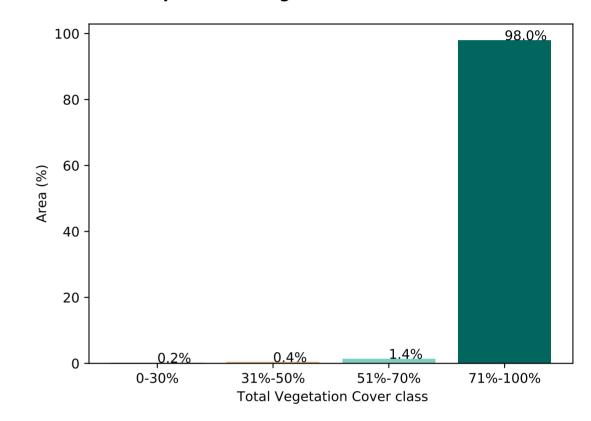


% Area protected from water erosion (>70%)

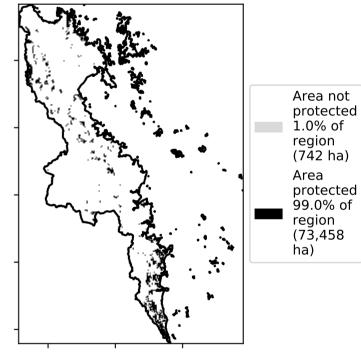




Proportion of vegetation cover class in area



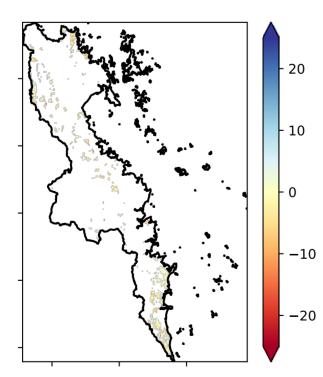
% Area protected from wind erosion (>50%)



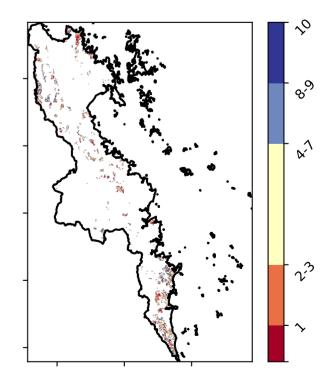
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover 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.

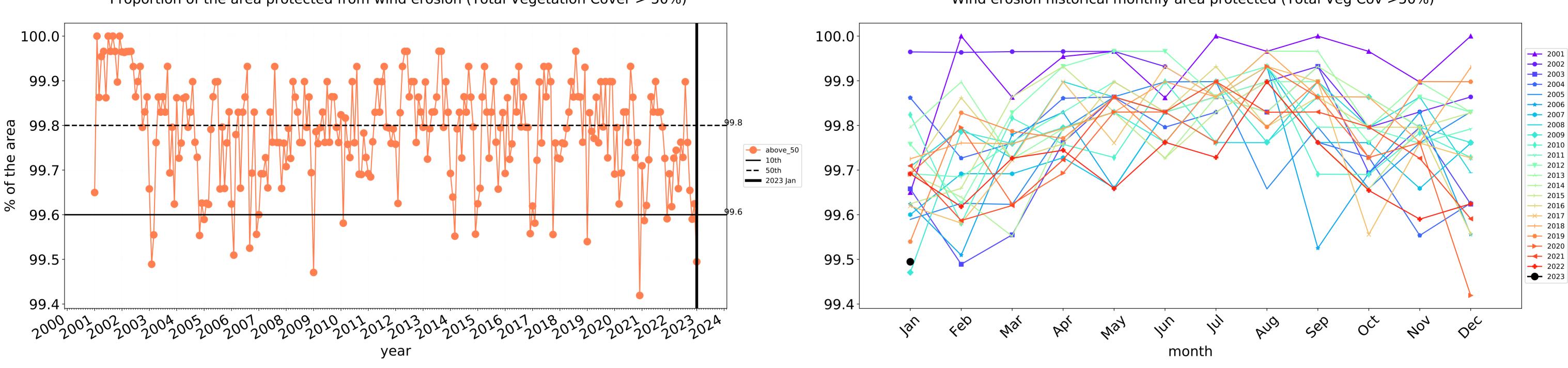


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

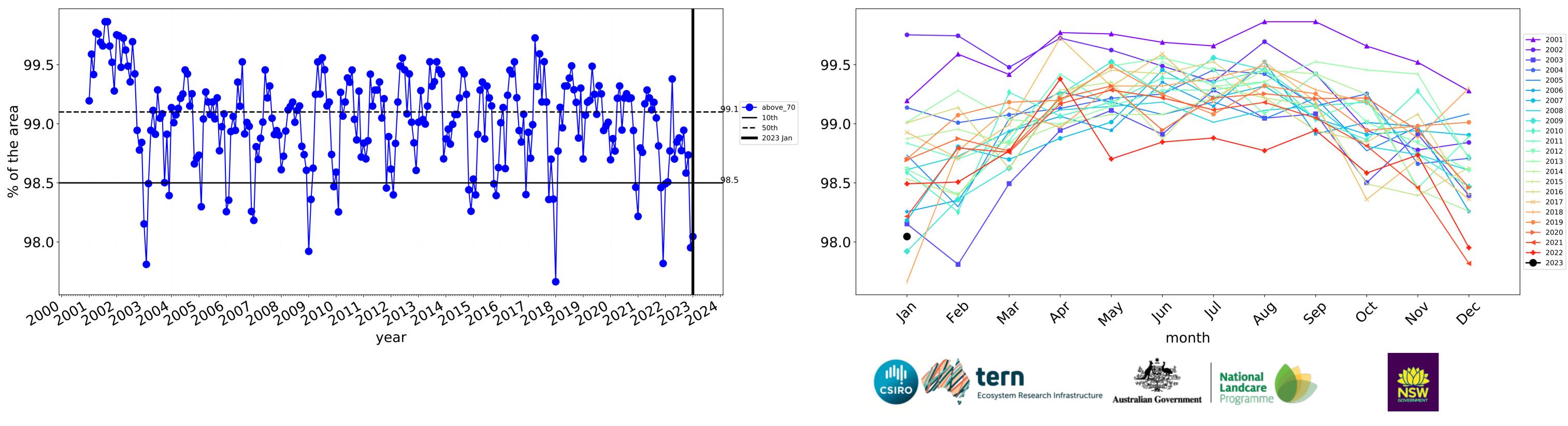






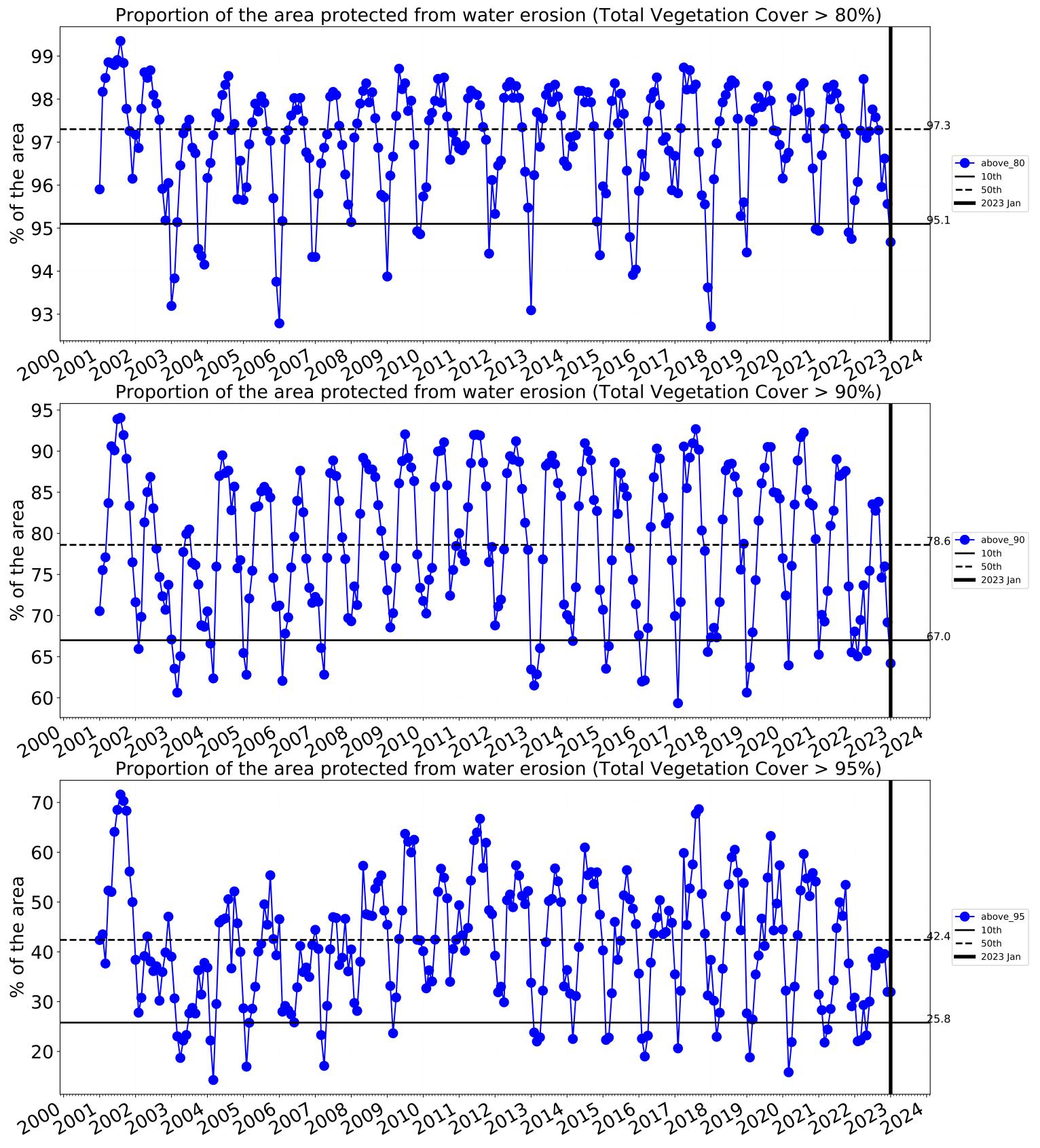


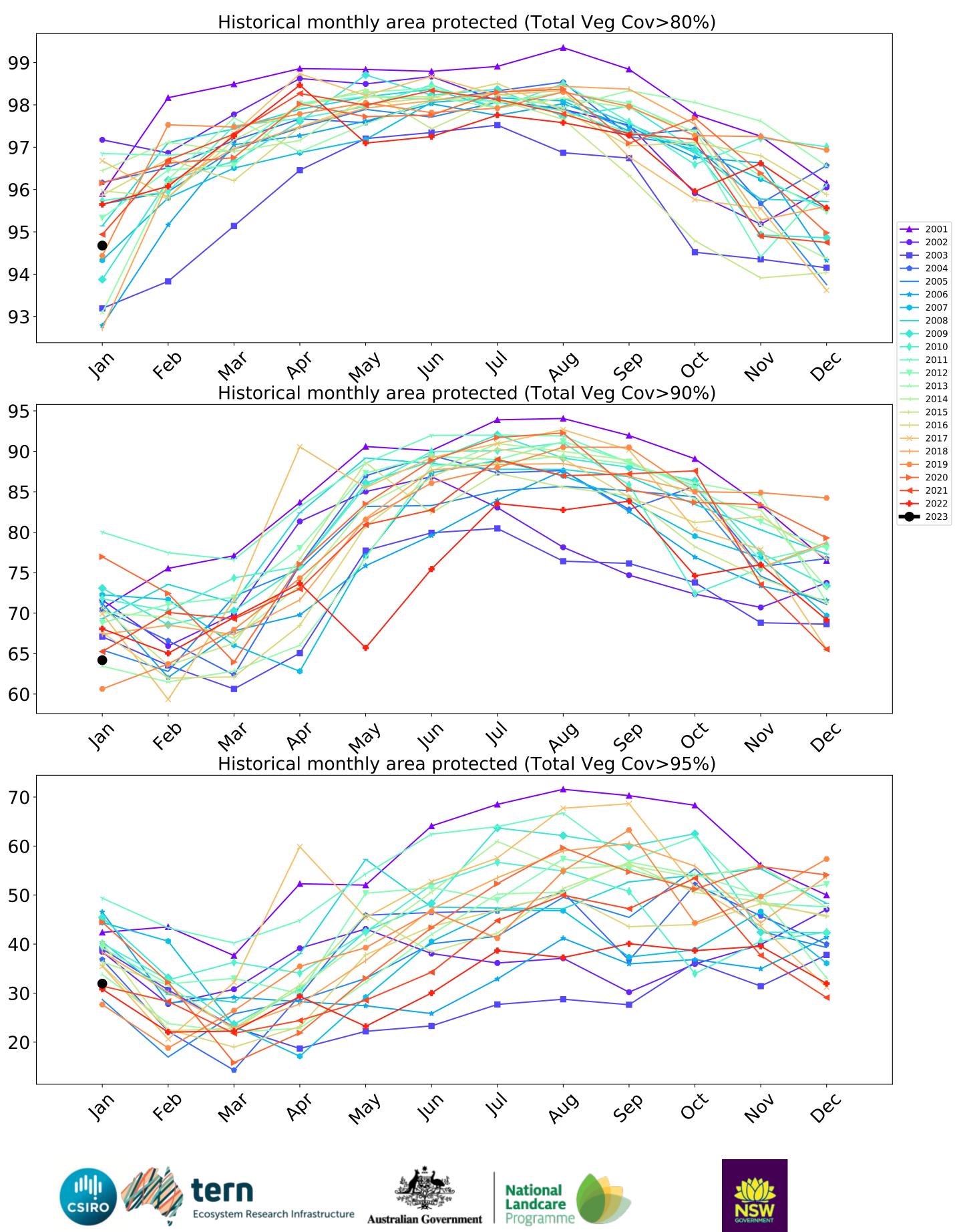
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

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







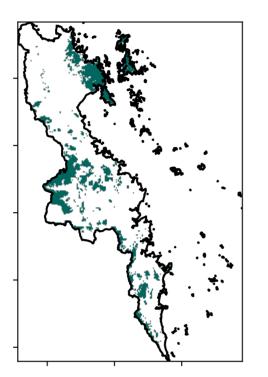
### **Conservation and natural environments Forest (non woodland)**

Land use and forest cover

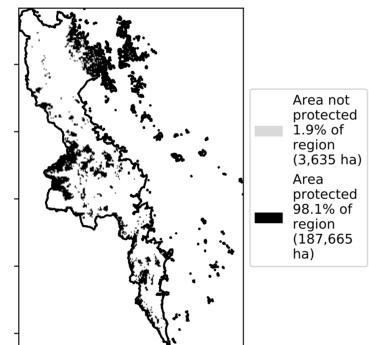


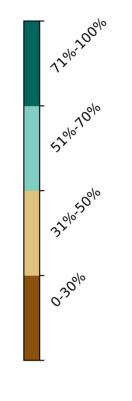
1 Conservation and natural environments - Nonwoodland forest

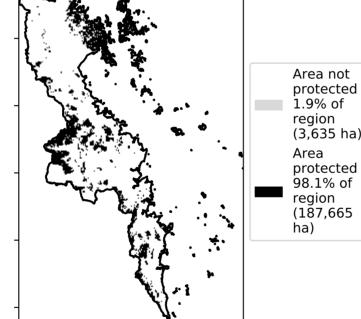
**Total Vegetation Cover [%]** 



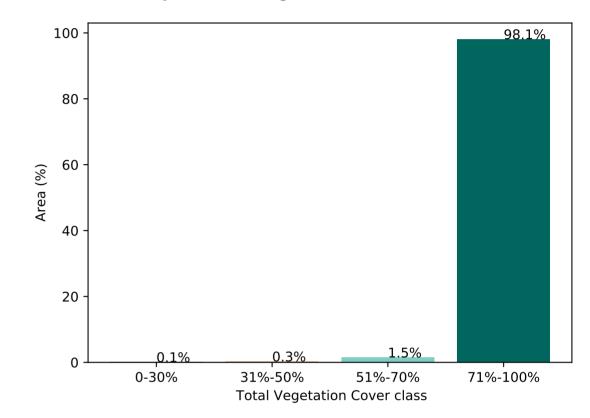
% Area protected from water erosion (>70%)







Proportion of vegetation cover class in area

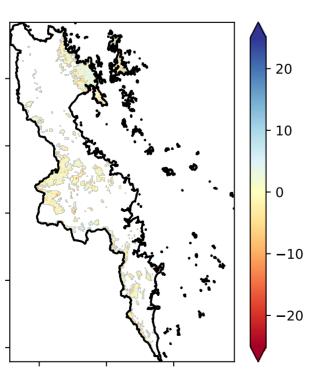


% Area protected from wind erosion (>50%)



**Total Vegetation Cover Anomaly [%]** 

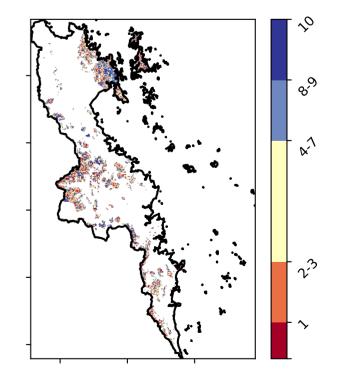
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (191,300 ha)

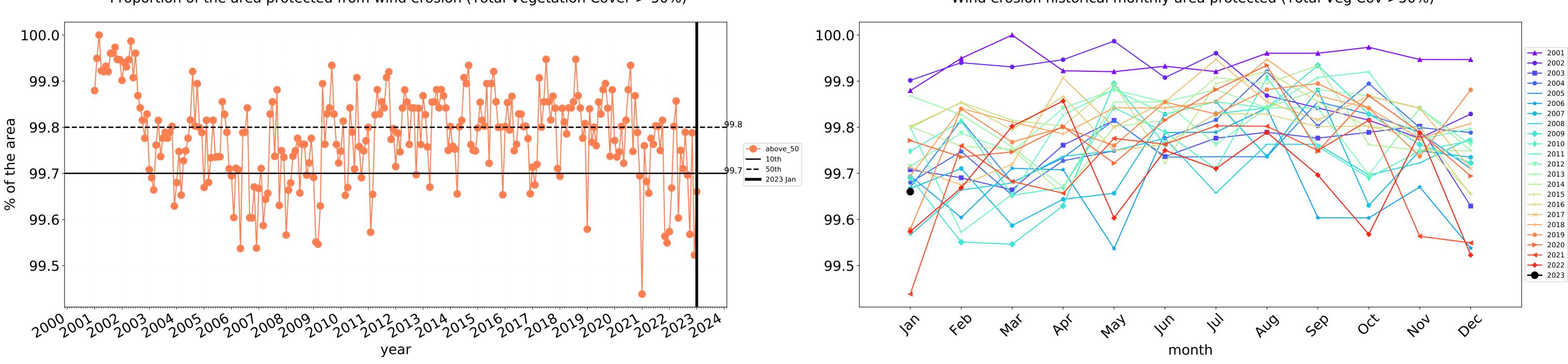
Total Vegetation Cover Decile [%]

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.



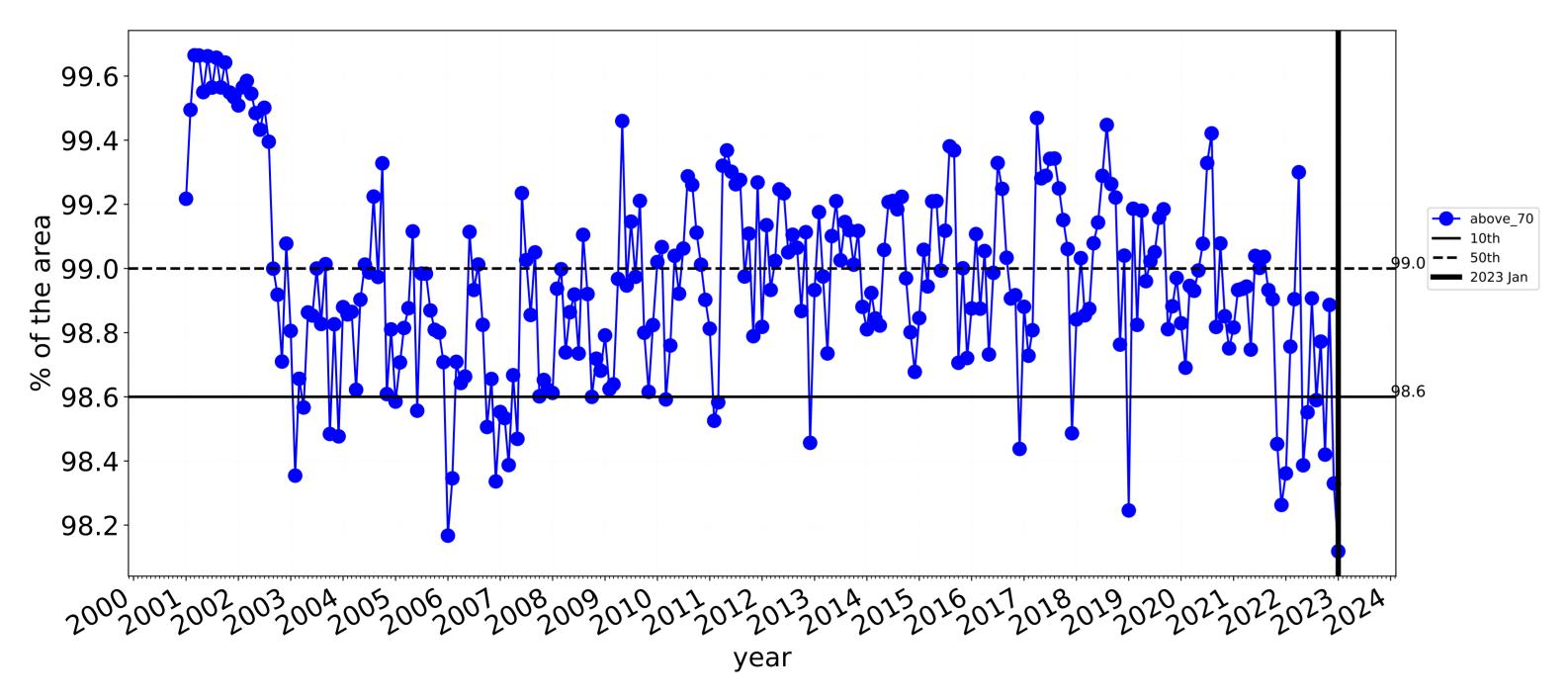


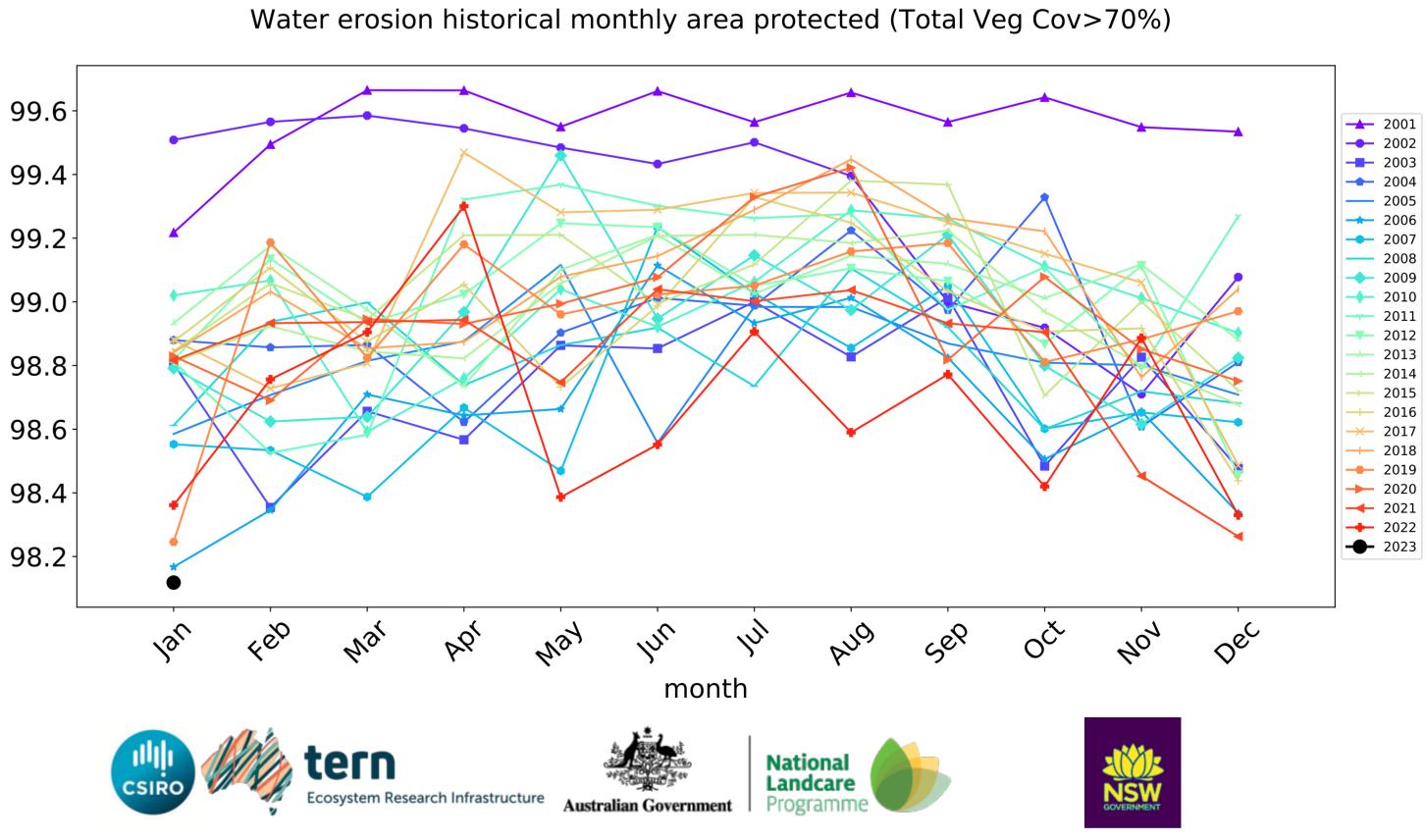
## **Conservation and natural environments Forest (non woodland) timeseries**



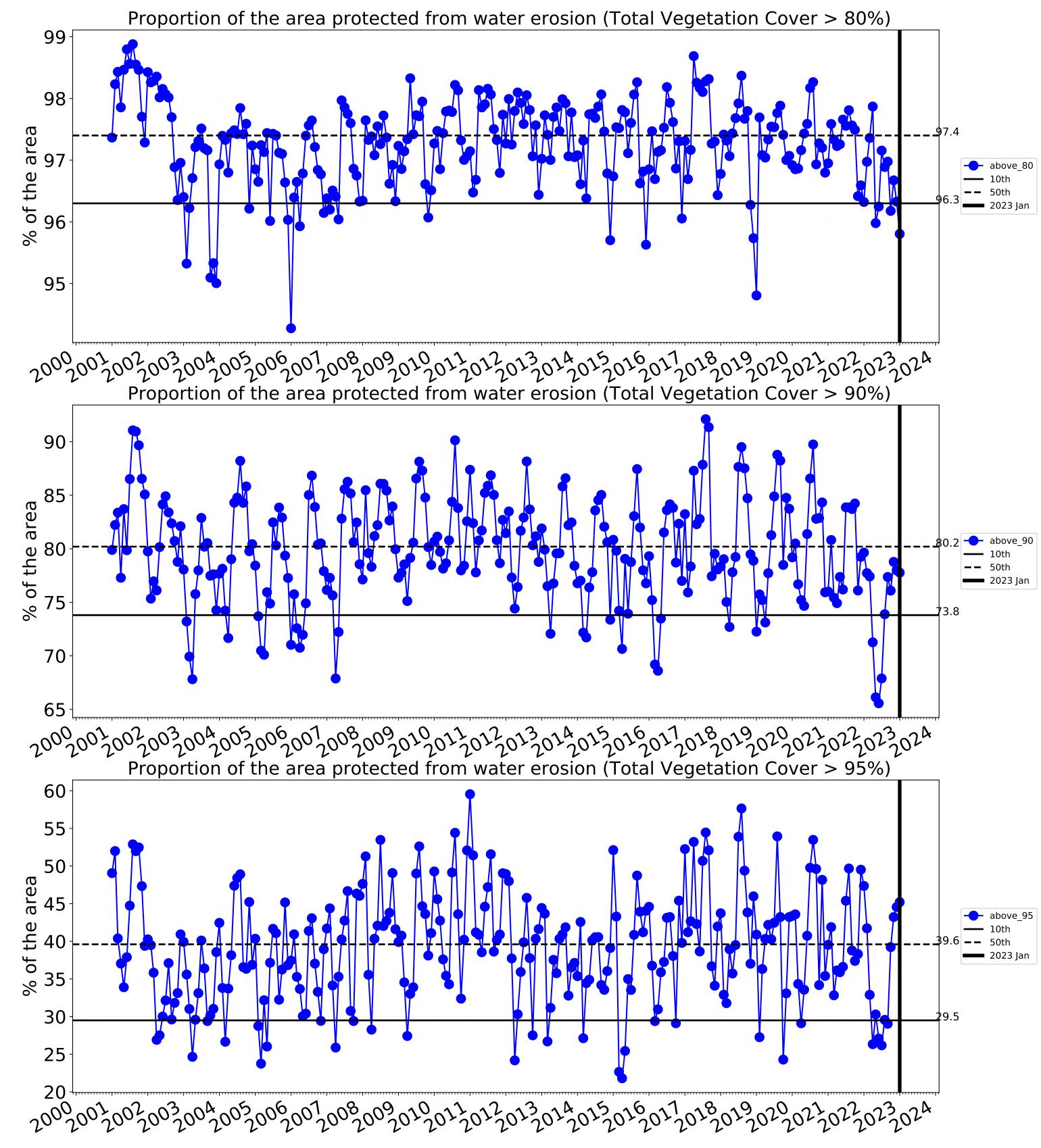
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

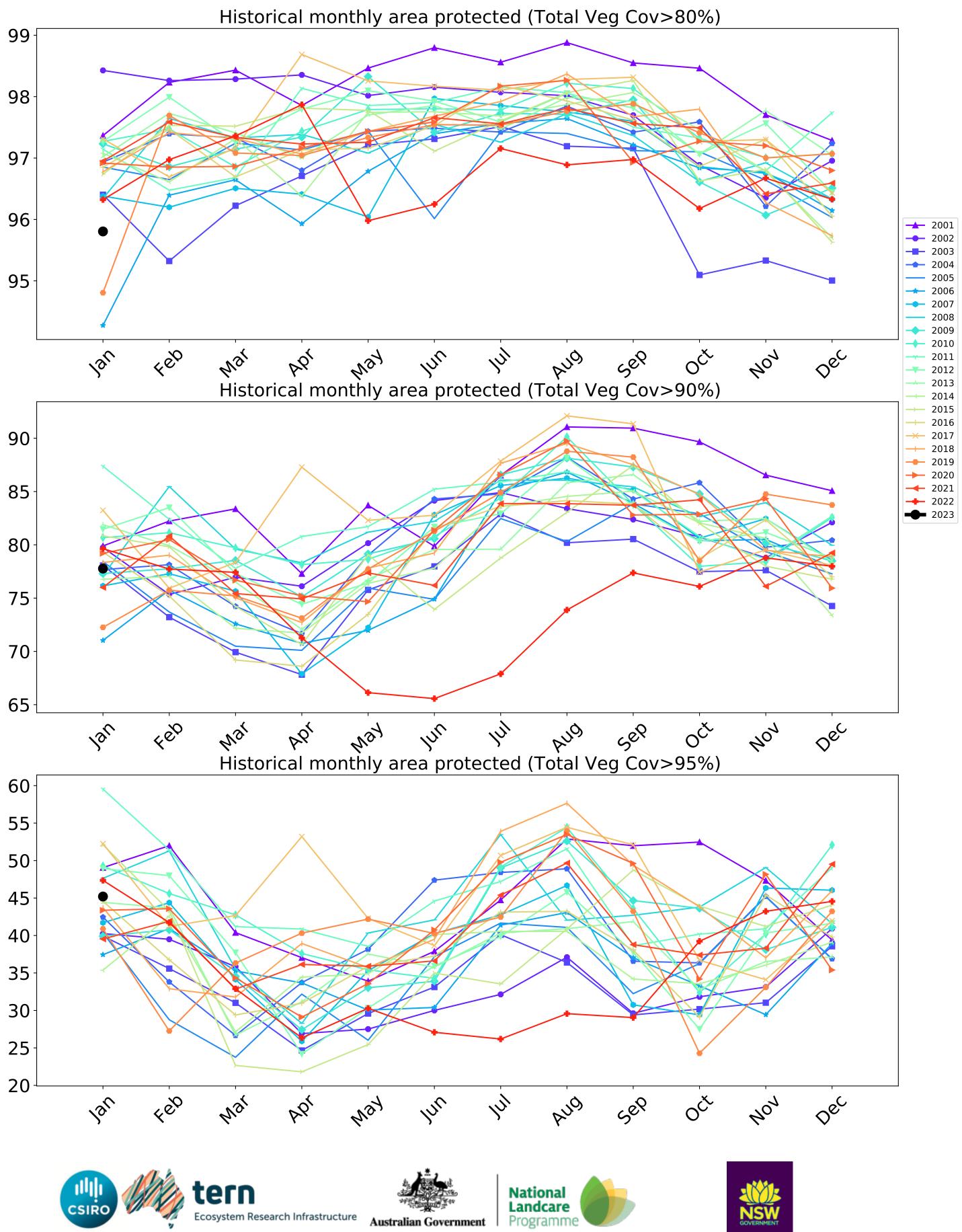
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)





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







### Agriculture

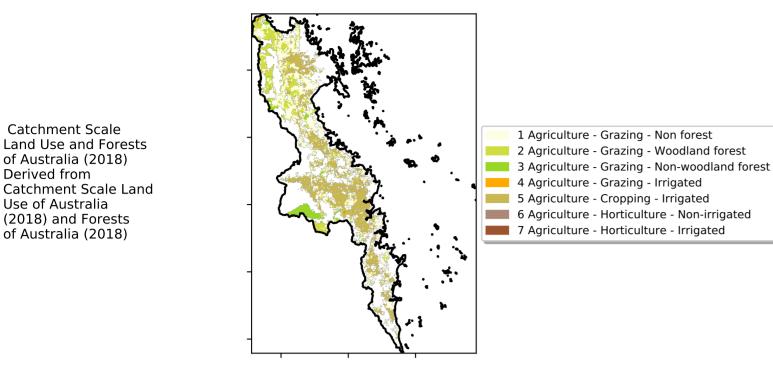
120/02/00/0

· 52% 70%

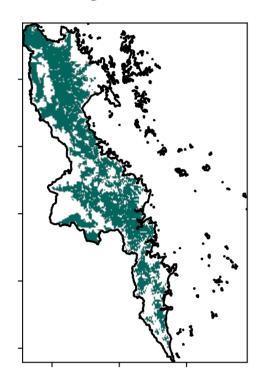
32%50%

0.30%

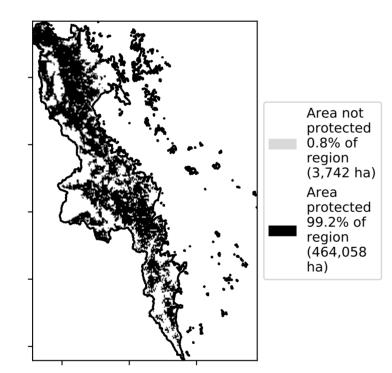
#### Land use and forest cover

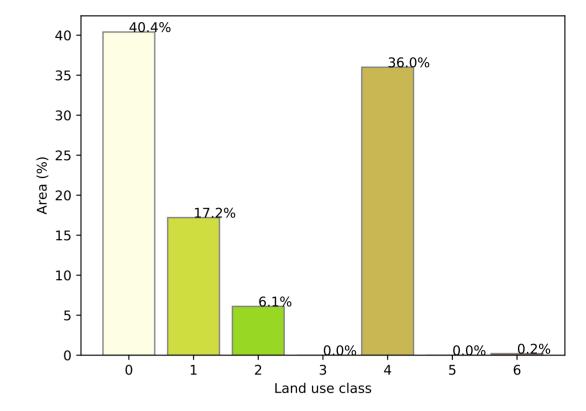


**Total Vegetation Cover [%]** 



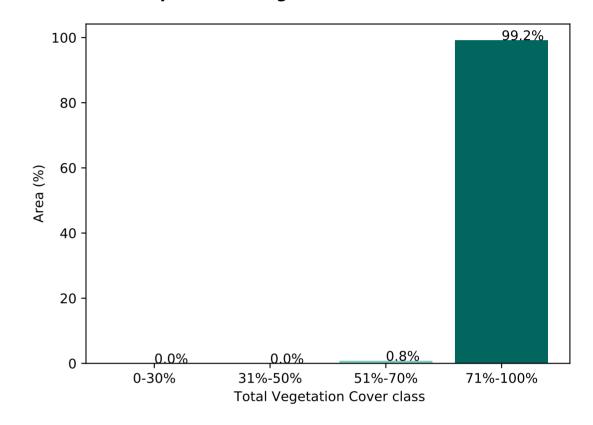




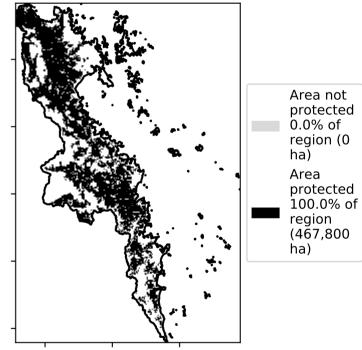


#### Proportion of each land class in area

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



**Total Vegetation Cover Anomaly [%]** 

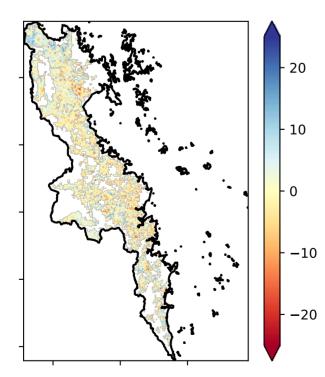
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Catchment Scale

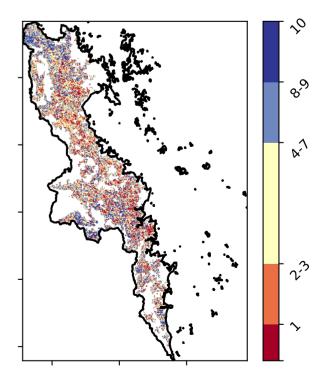
Derived from

Use of Australia

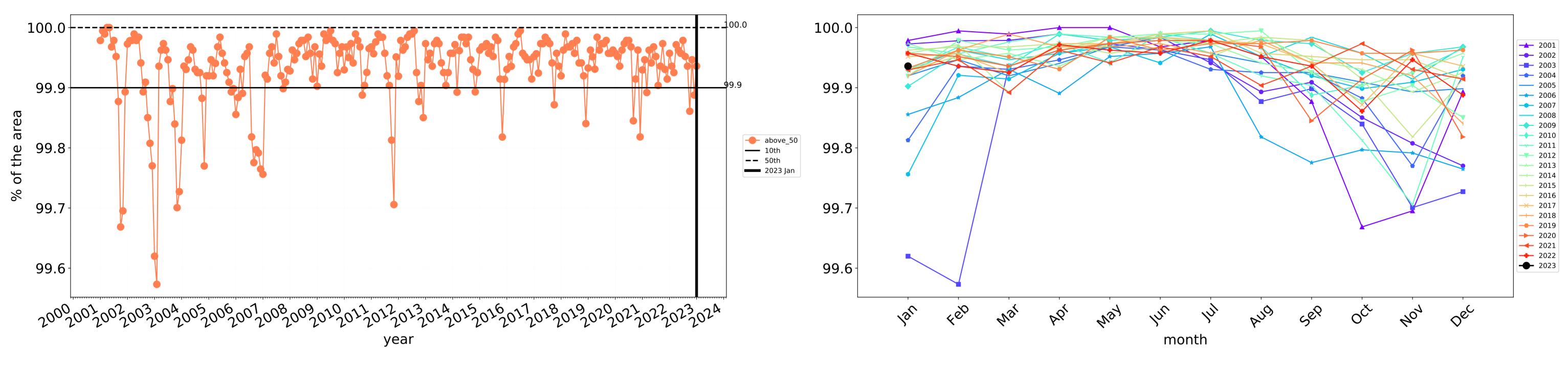
of Australia (2018)



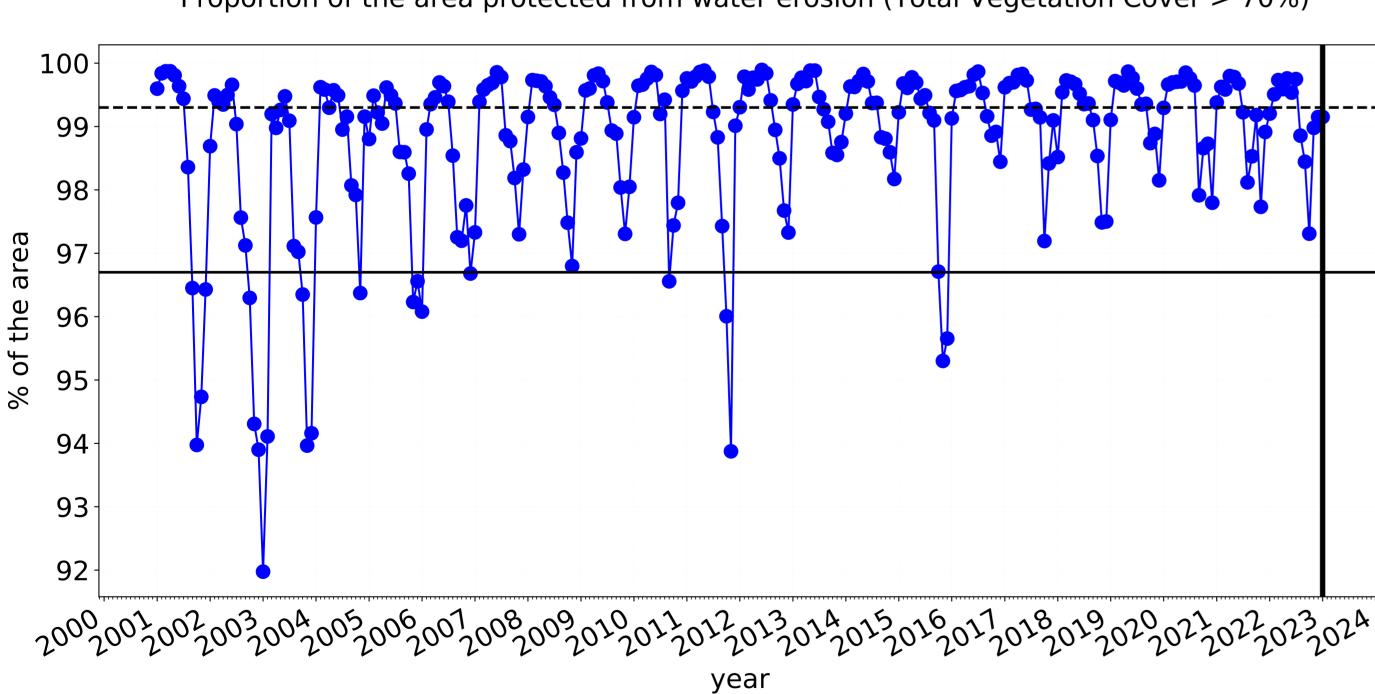
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.







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



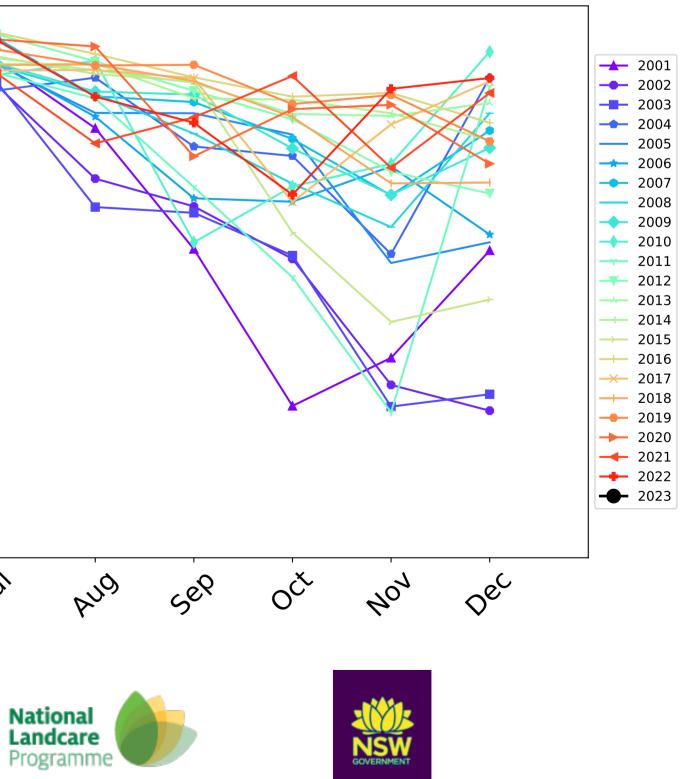
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

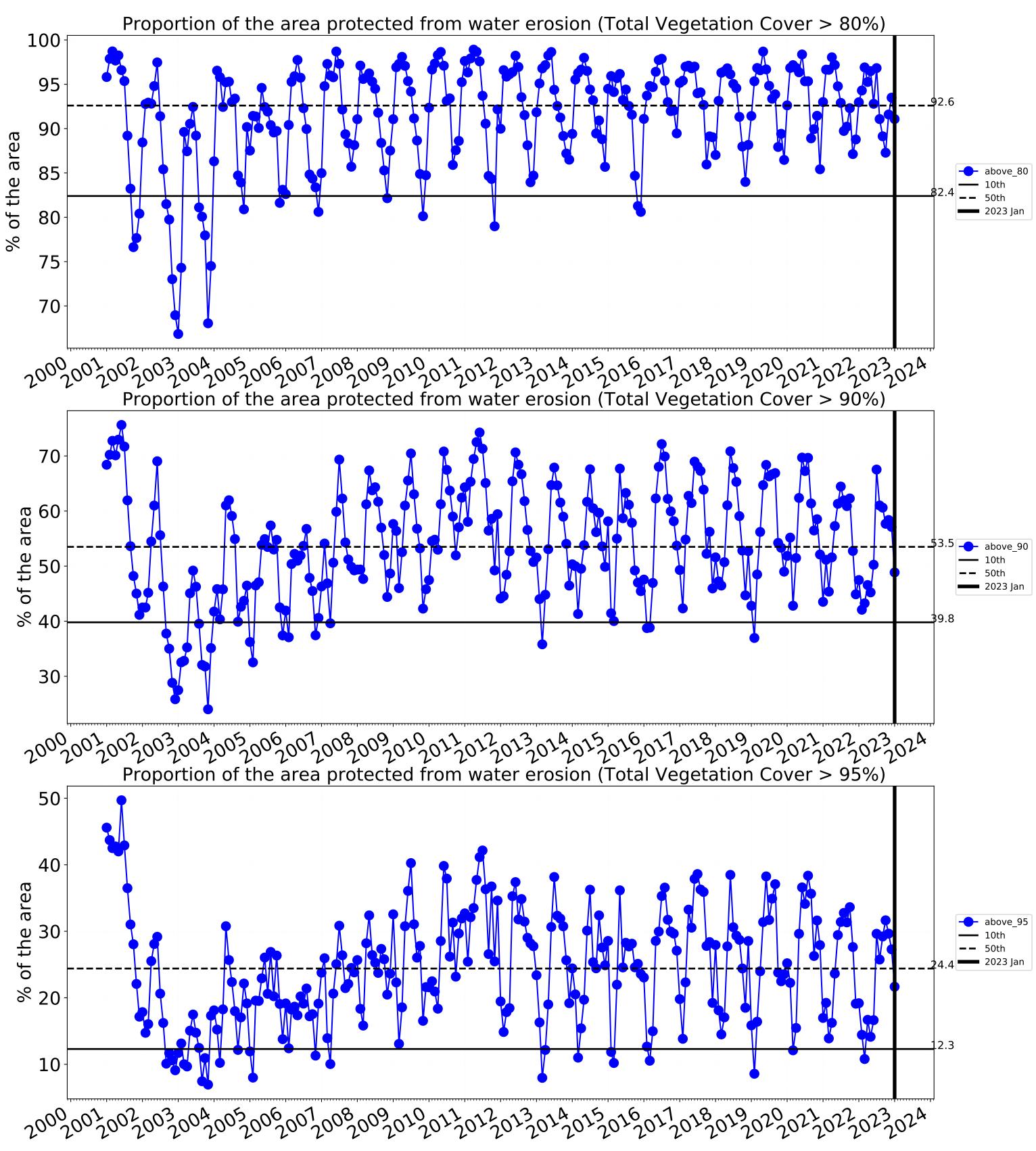
Wind erosion historical monthly area protected (Total Veg Cov >50%)

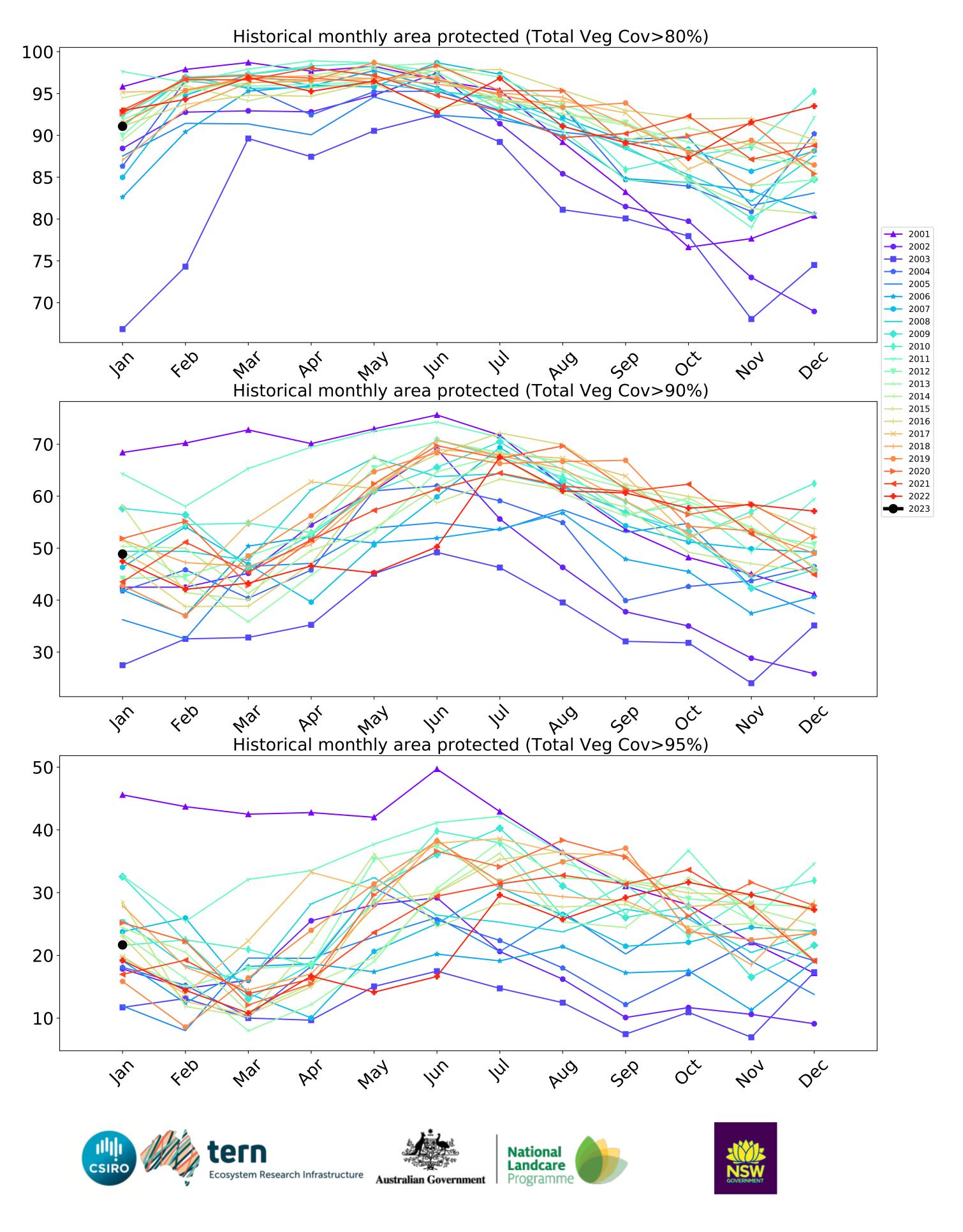
100 99 98 above\_70 ----97 **——** 10th **——** 50th **——** 2023 Jan 96 95<sup>-</sup> 94 93 92 Par 4e0 In May Mai PQ' 1's month tern Ecosystem Research Infrastructure

Australian Government

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



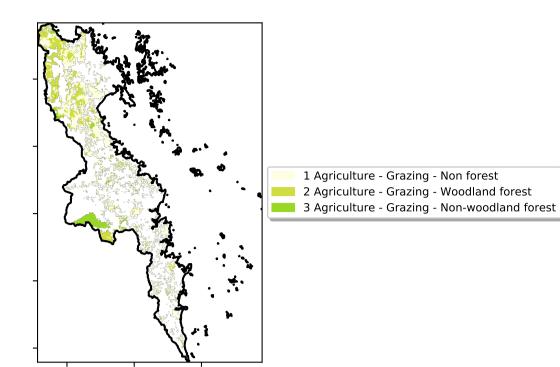




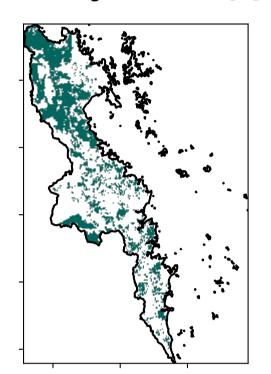
### Grazing

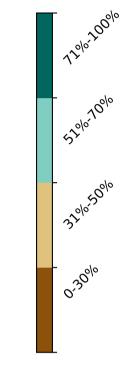
Land use and forest cover

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

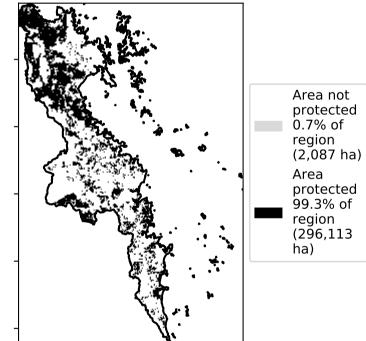


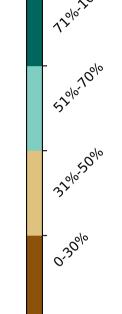
**Total Vegetation Cover [%]** 

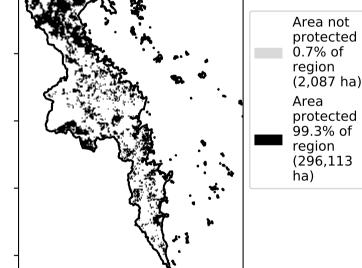




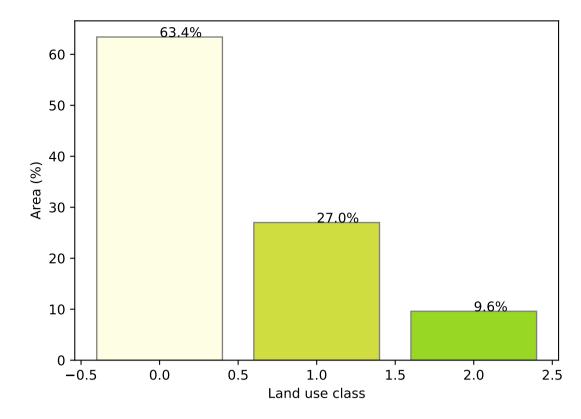
% Area protected from water erosion (>70%)



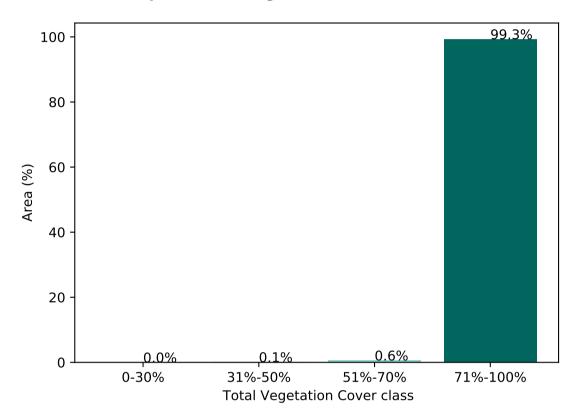




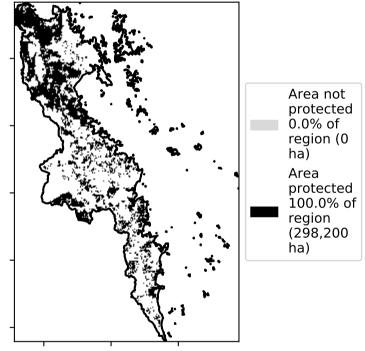
### Proportion of each land class in area



### Proportion of vegetation cover class in area

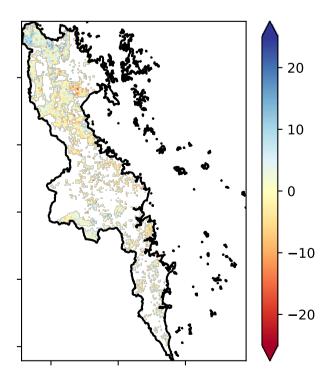


% Area protected from wind erosion (>50%)

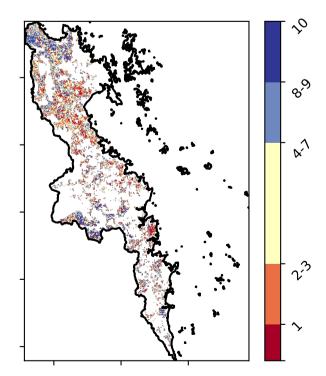


**Total Vegetation Cover Anomaly [%]** 

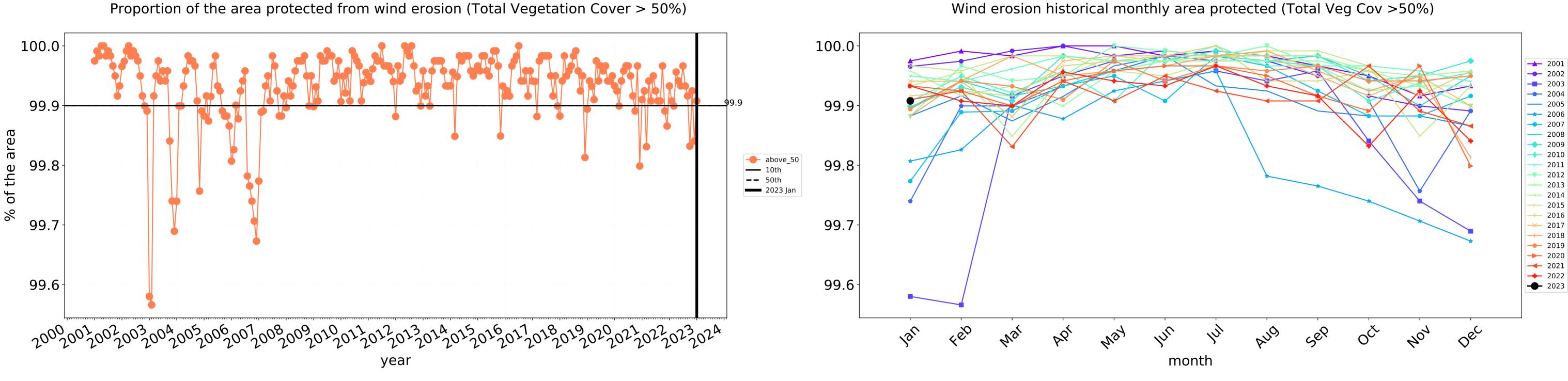
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



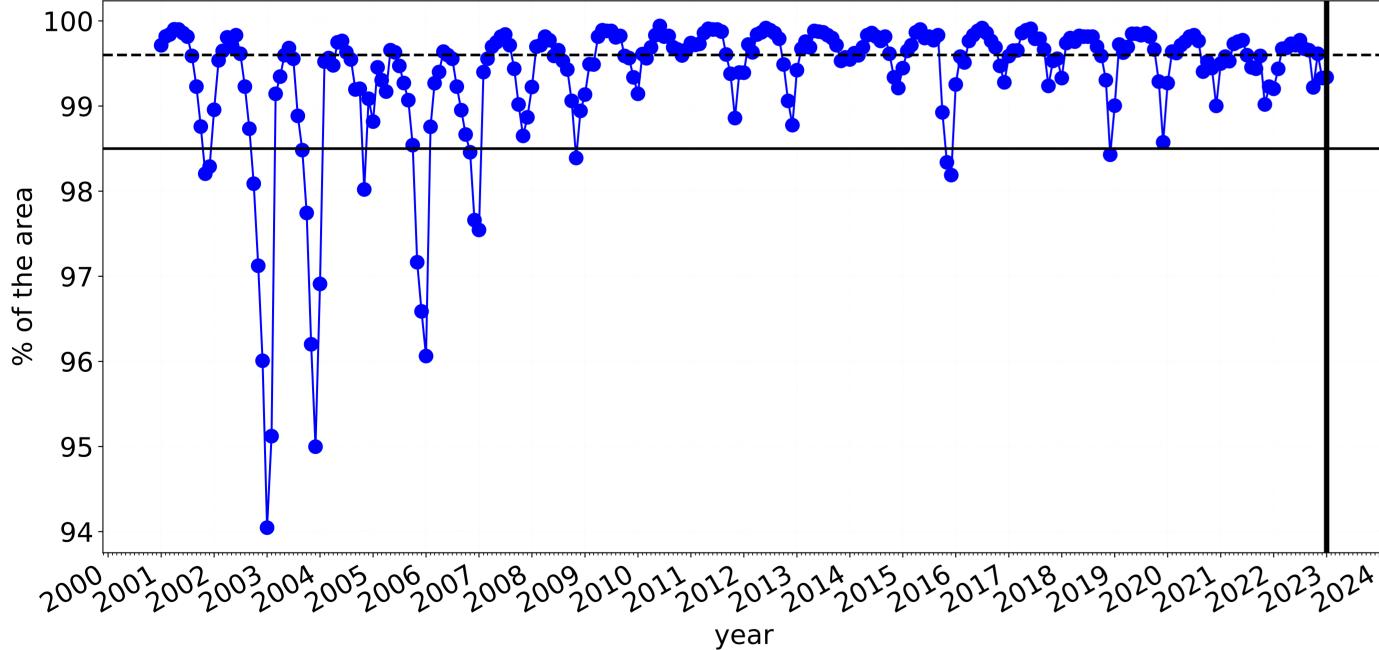
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



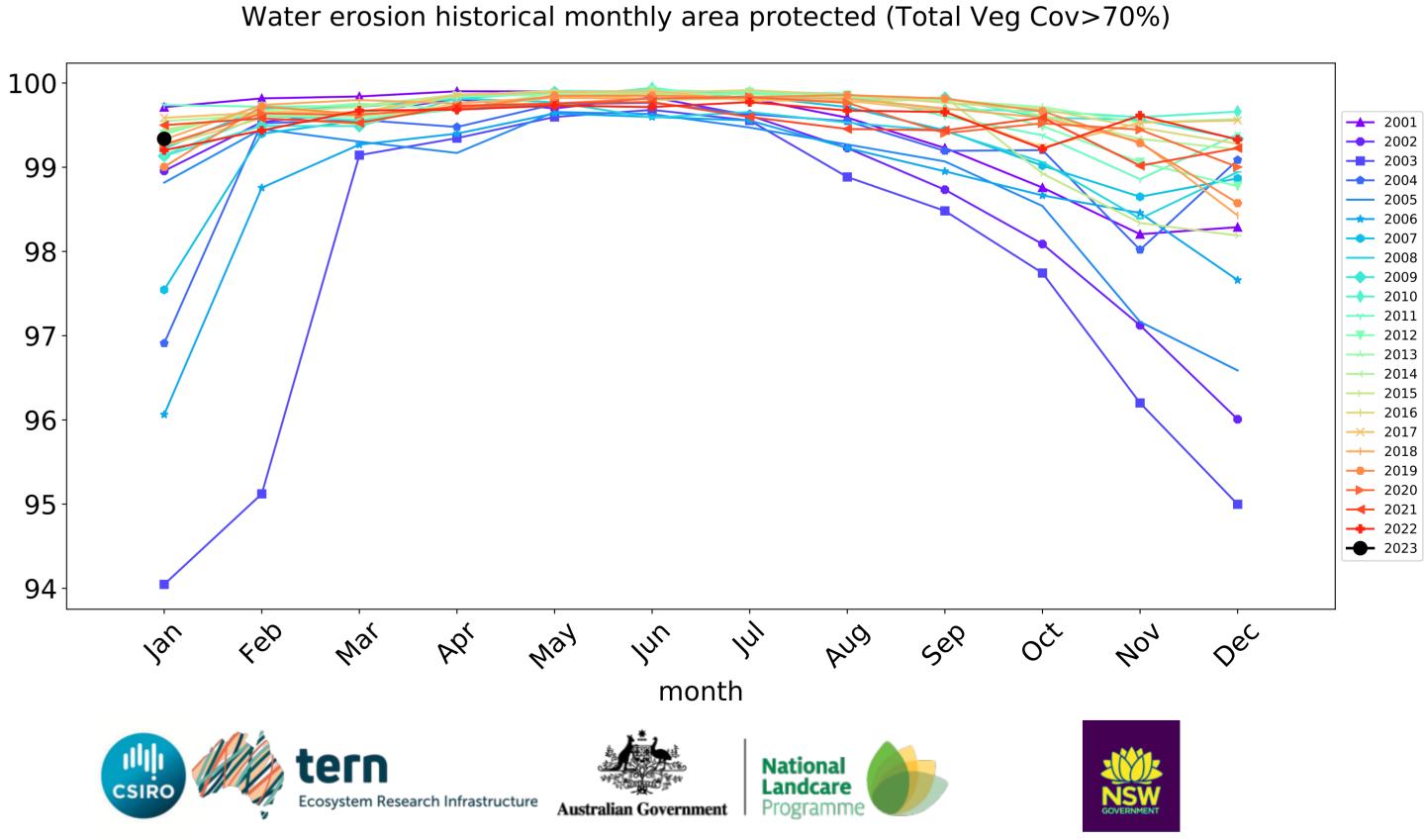


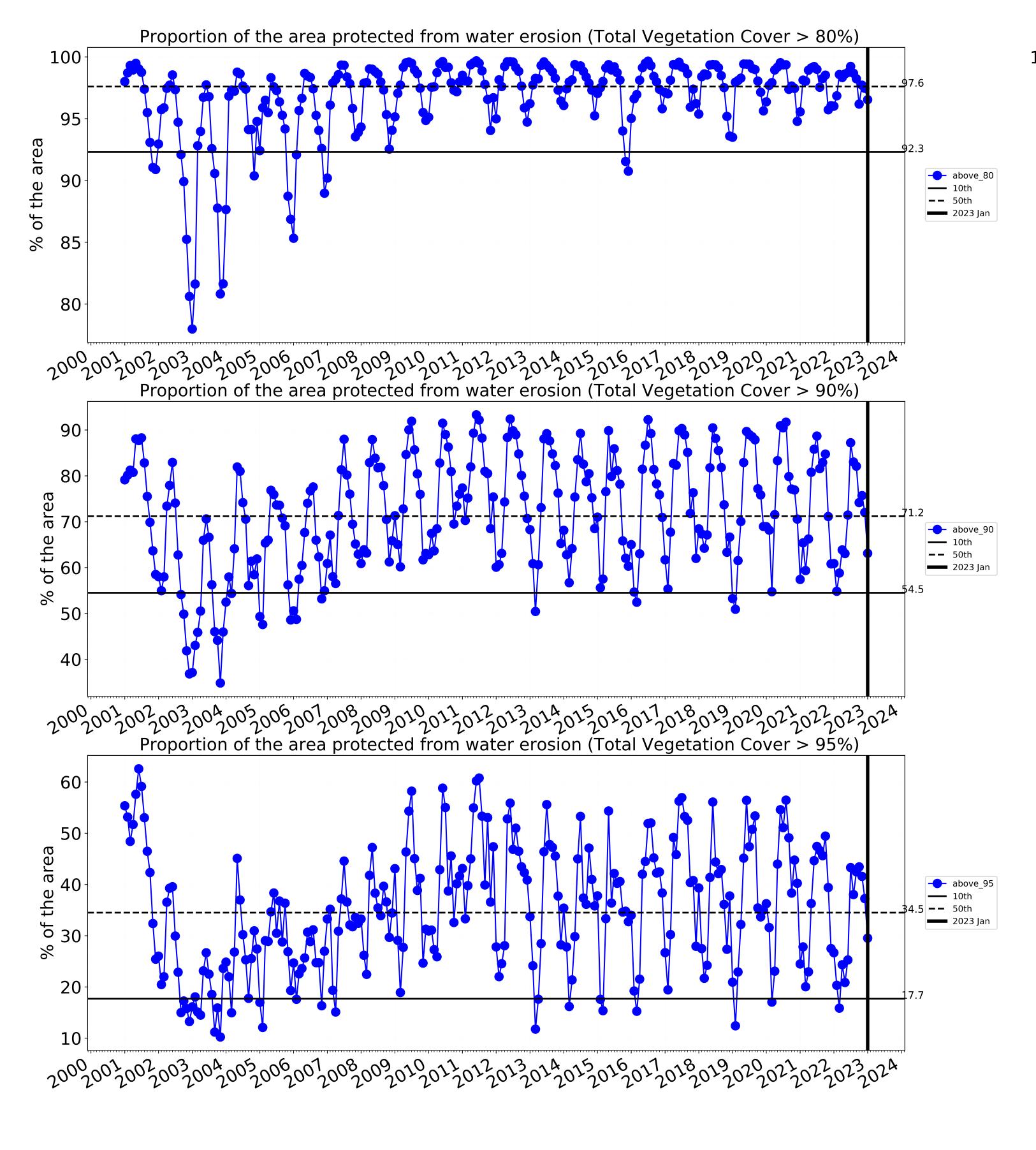


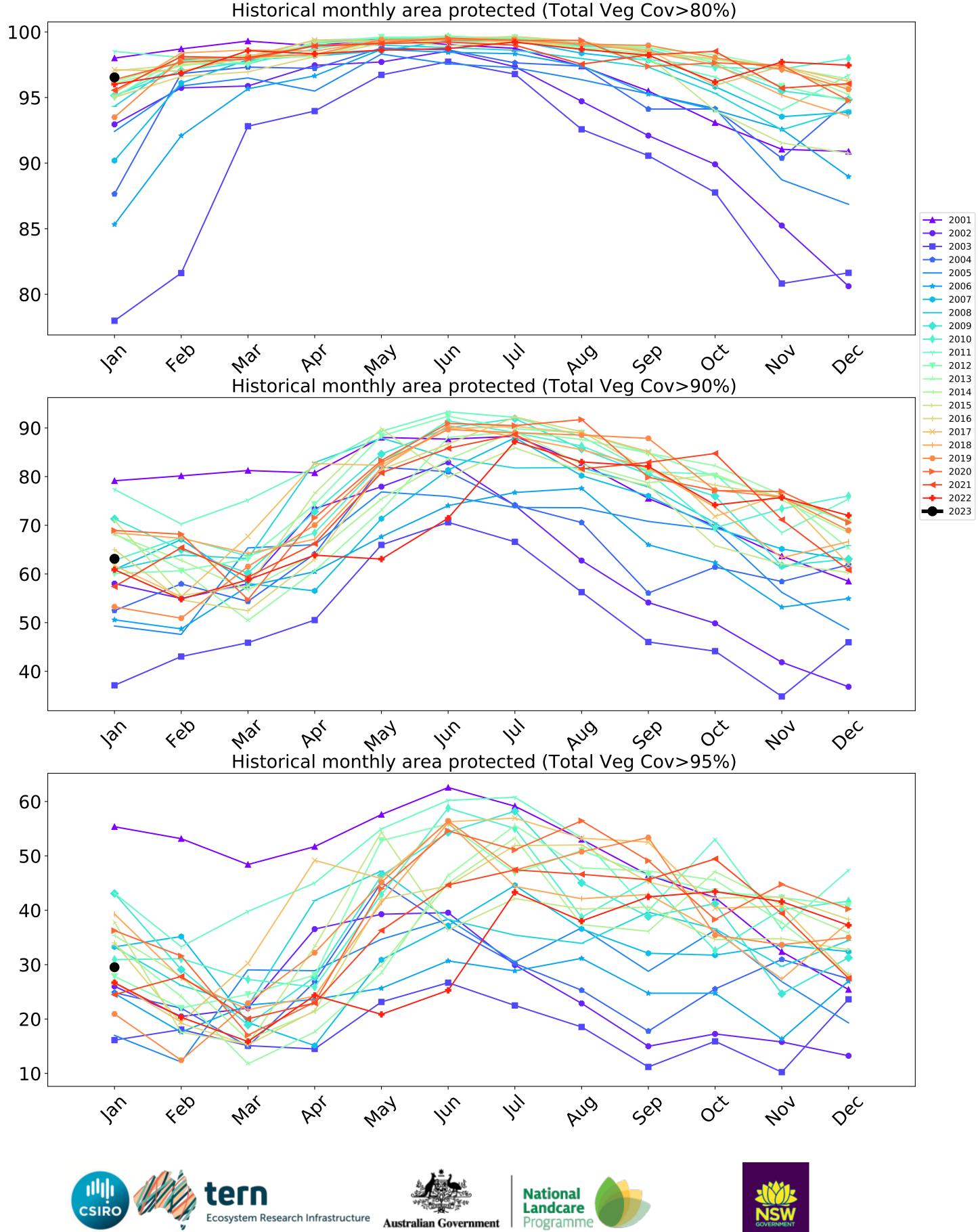
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



---- above\_70 **—** 10th **——** 50th **——** 2023 Jan



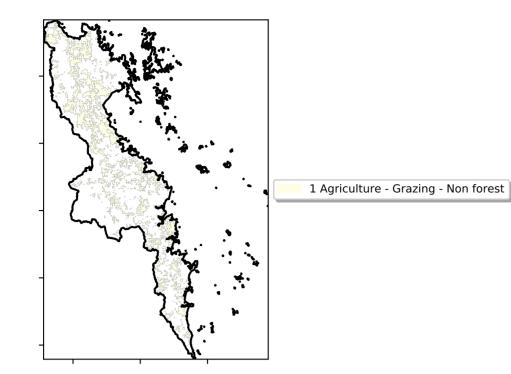




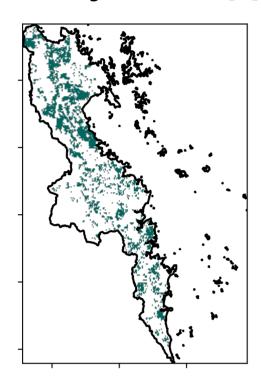


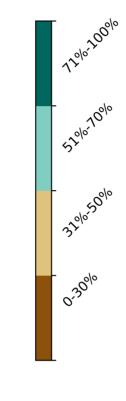
### **Grazing non forest**

Land use and forest cover

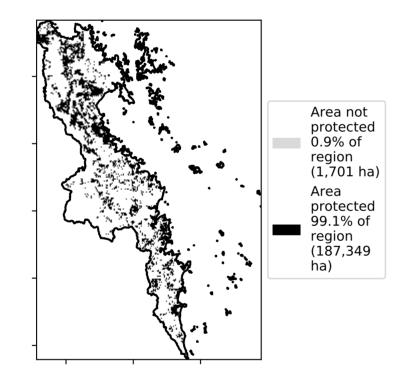


**Total Vegetation Cover [%]** 

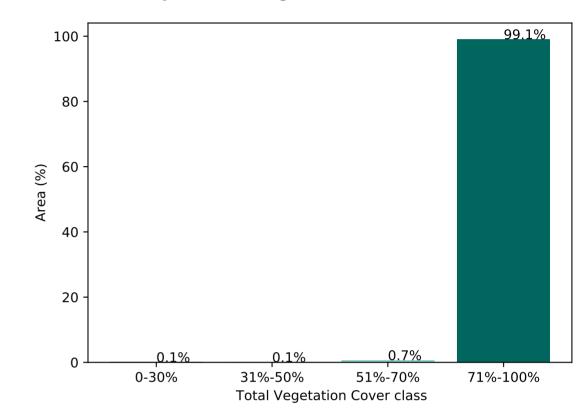




% Area protected from water erosion (>70%)







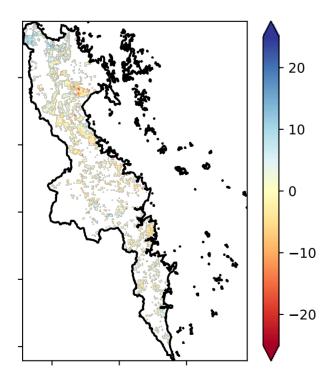
% Area protected from wind erosion (>50%)

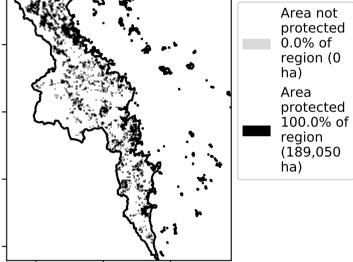


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

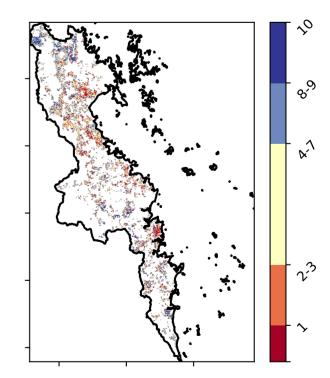
**Total Vegetation Cover Anomaly [%]** 

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.





Total Vegetation Cover Decile [%]





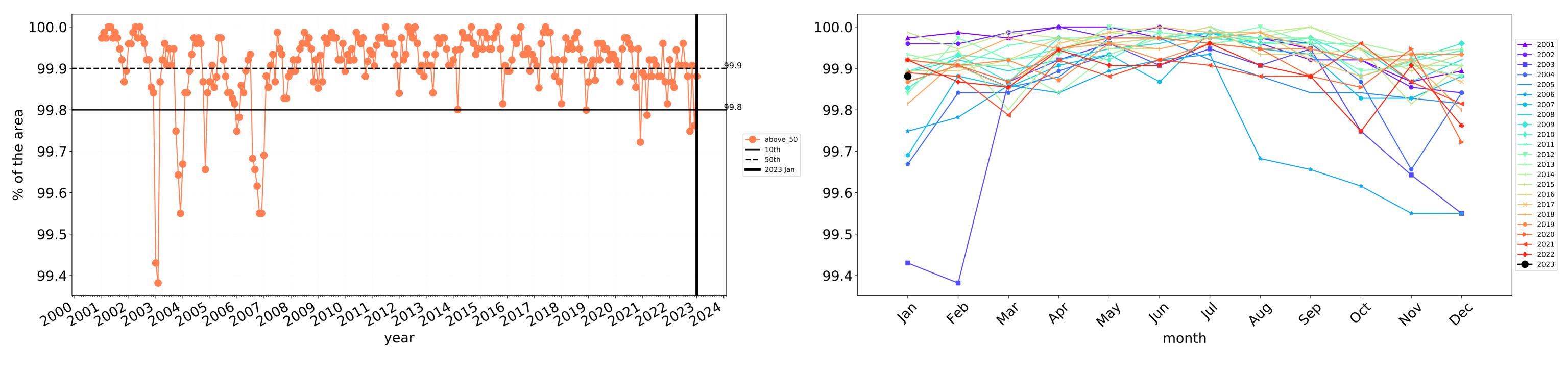
Deciles show where the pixel value lies in the

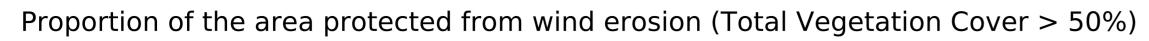
record, from highest to lowest, for that month. That is, red pixels are

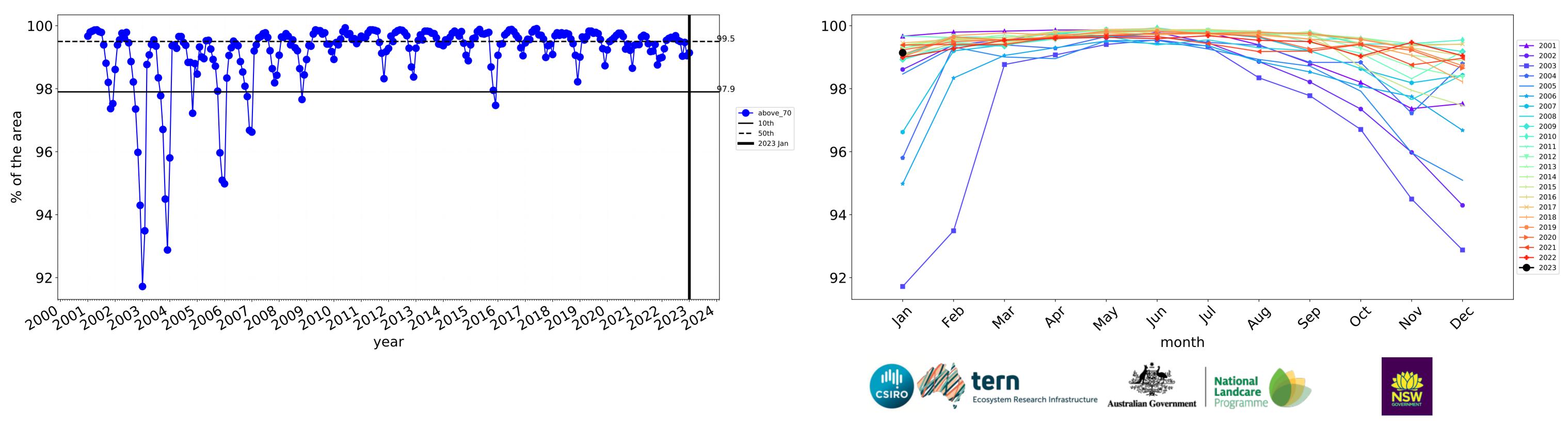
records for that month of

the map using baseline from 2001 to 2019.

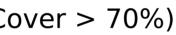
in the lowest 10% of



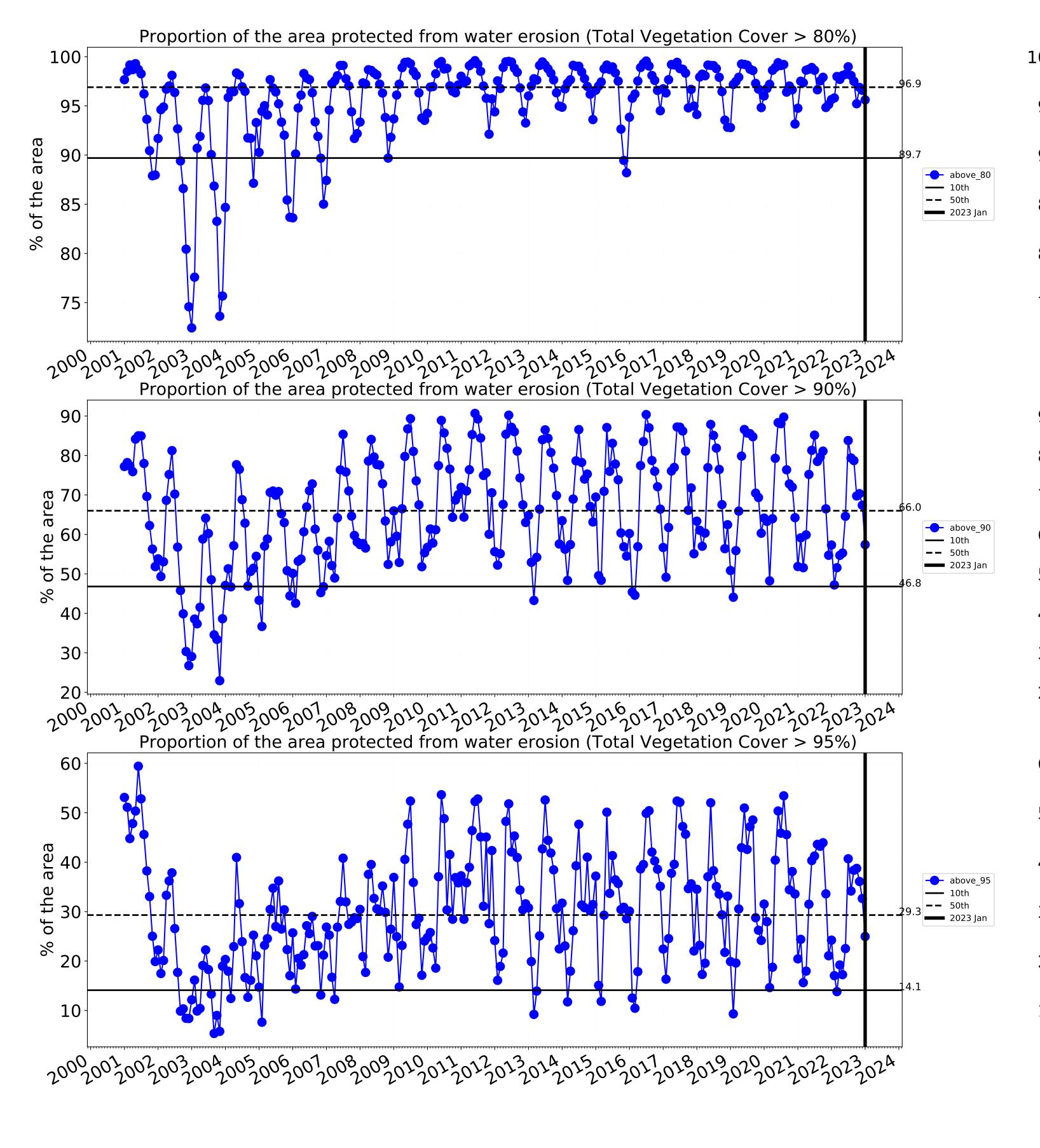


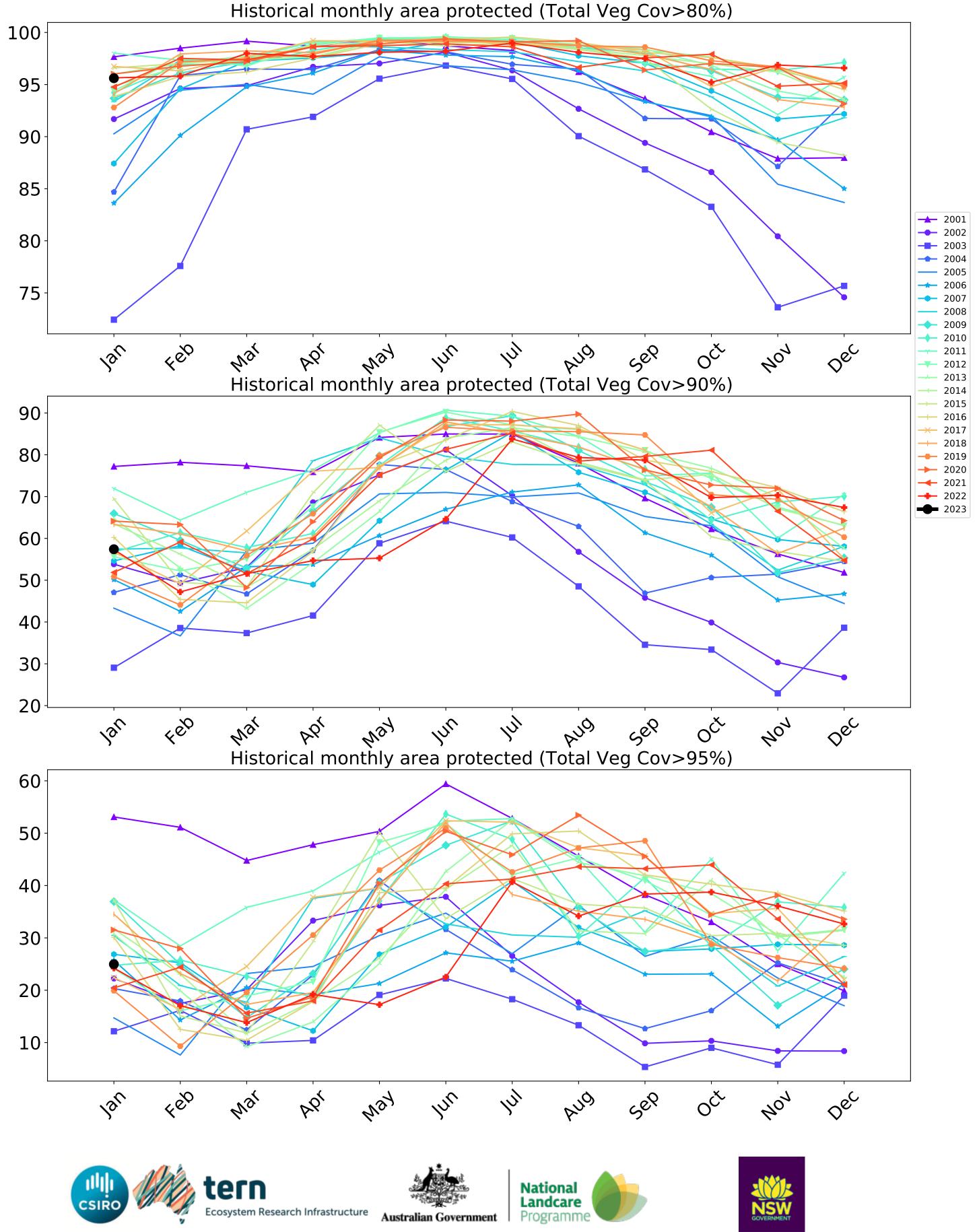


Wind erosion historical monthly area protected (Total Veg Cov >50%)



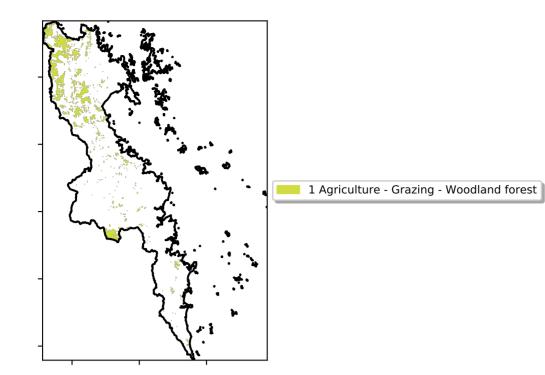
Water erosion historical monthly area protected (Total Veg Cov>70%)



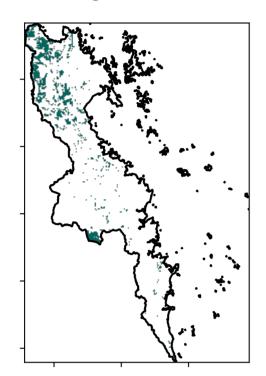


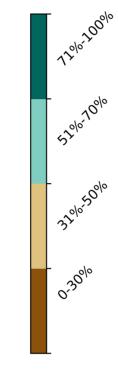
### **Grazing Woodland forest**

Land use and forest cover

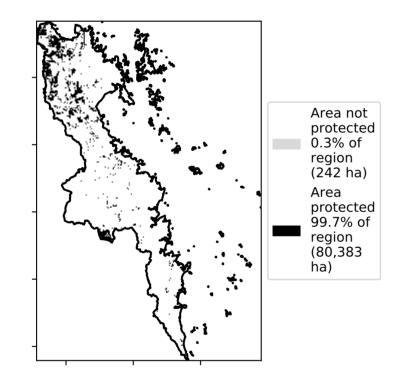


**Total Vegetation Cover [%]** 

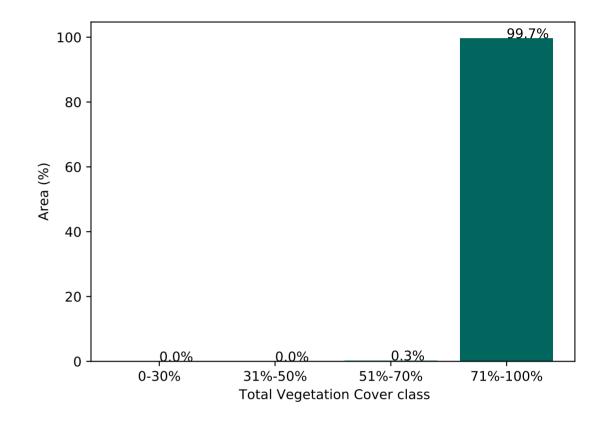




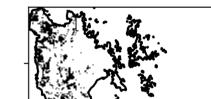
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



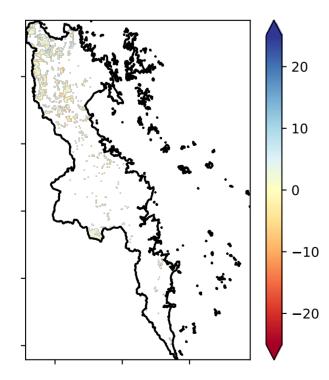
% Area protected from wind erosion (>50%)



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

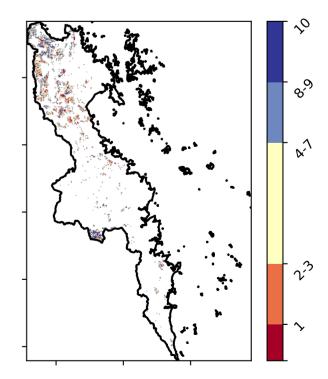
**Total Vegetation Cover Anomaly [%]** 

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.



Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (80,625 ha)

Total Vegetation Cover Decile [%]





Deciles show where the pixel value lies in the

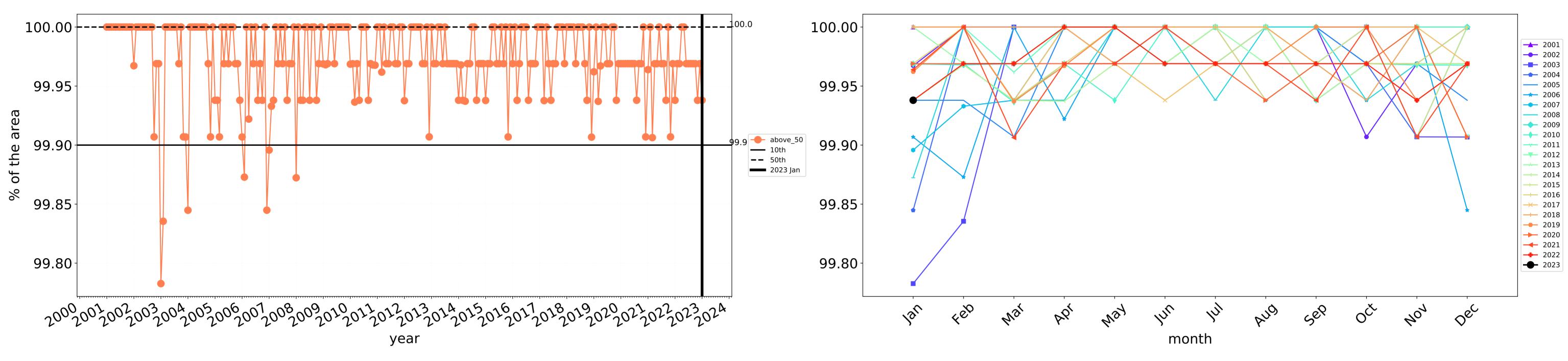
record, from highest to lowest, for that month. That is, red pixels are

records for that month of

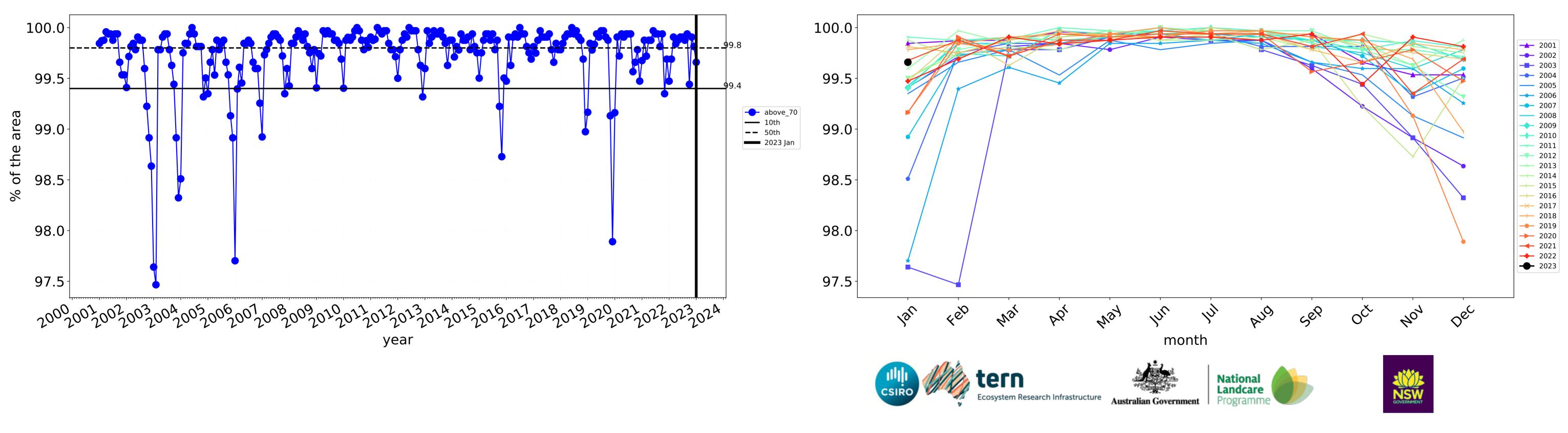
the map using baseline from 2001 to 2019.

in the lowest 10% of



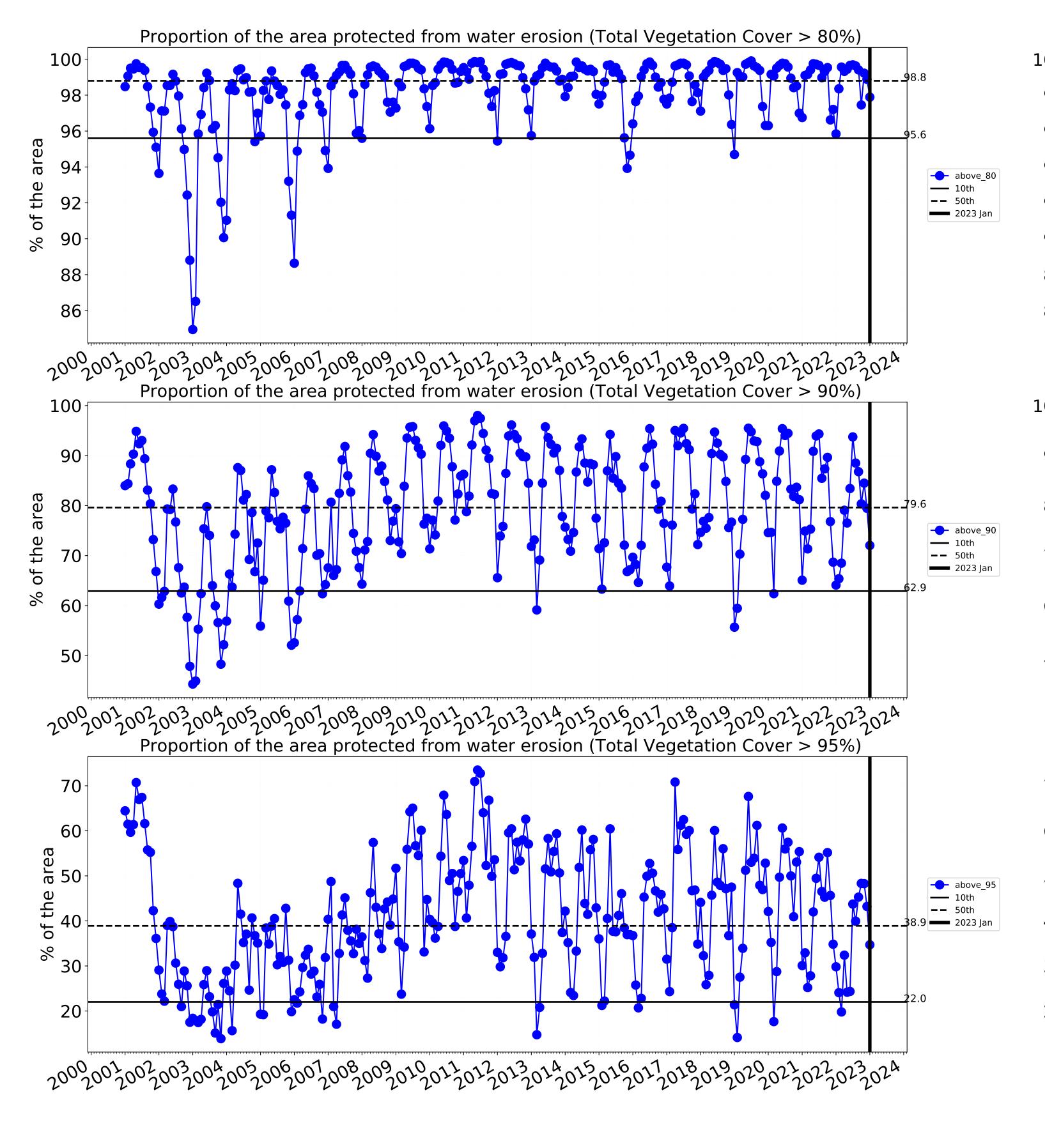


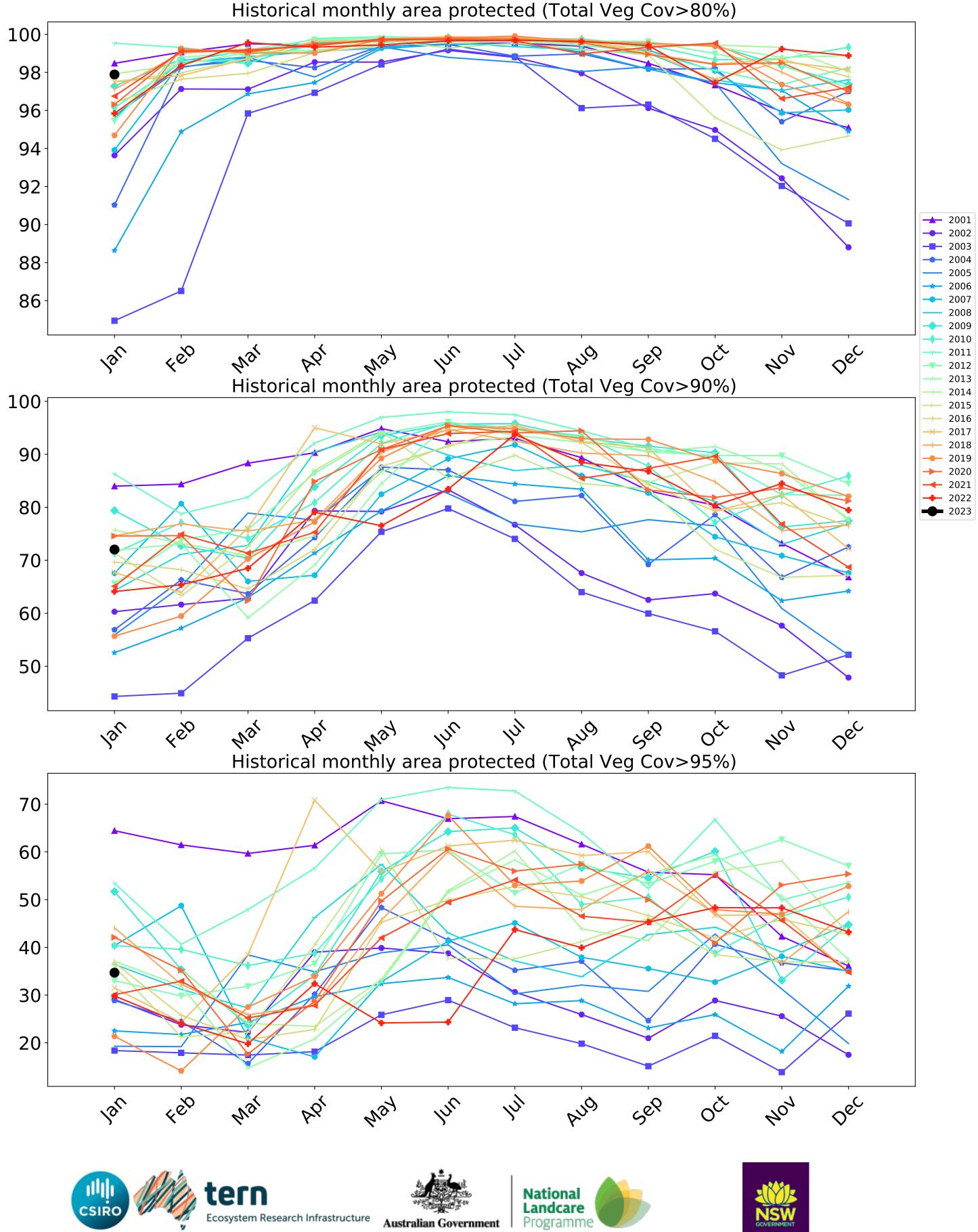
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

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

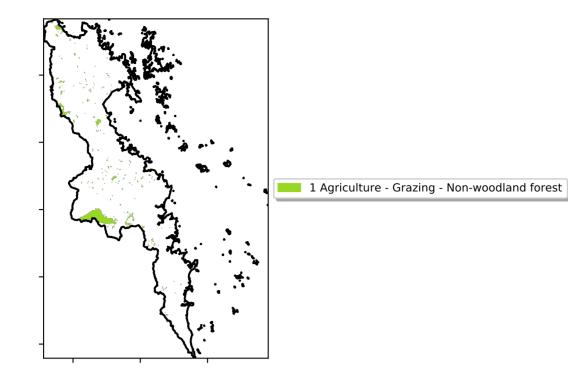


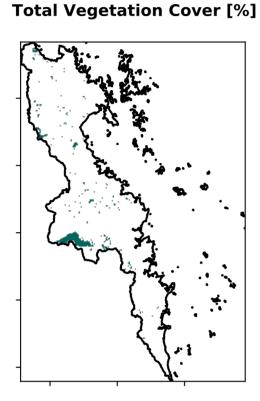


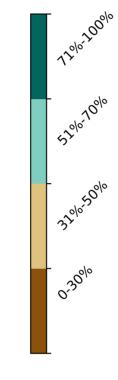


### Grazing - Forest (non woodland)

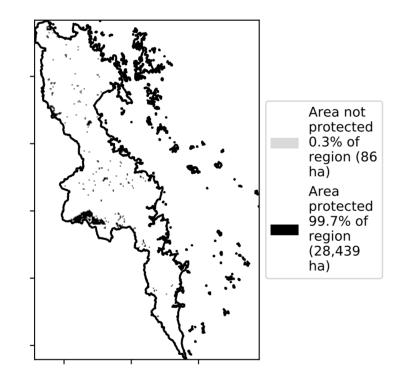
Land use and forest cover

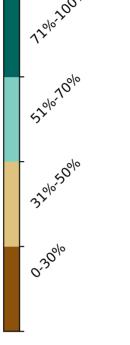




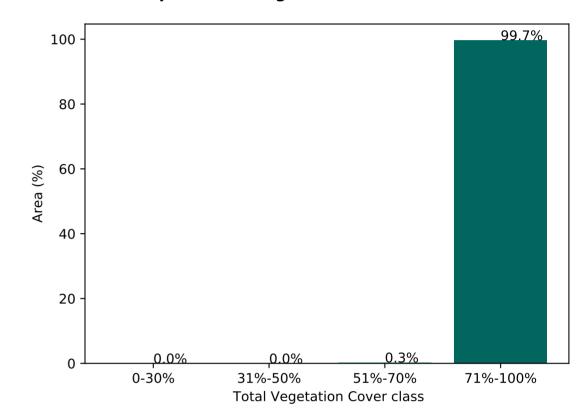


% Area protected from water erosion (>70%)

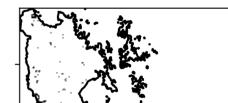




### Proportion of vegetation cover class in area



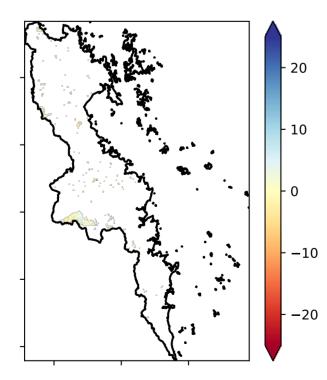
% Area protected from wind erosion (>50%)



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

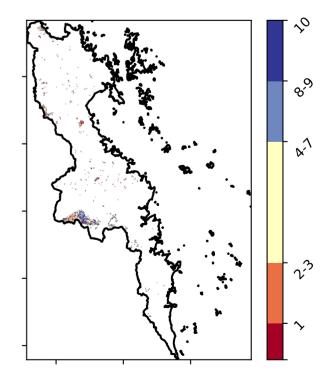
**Total Vegetation Cover Anomaly [%]** 

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.



Area protected 100.0% of region (28,525 ha)

Total Vegetation Cover Decile [%]





Deciles show where the pixel value lies in the

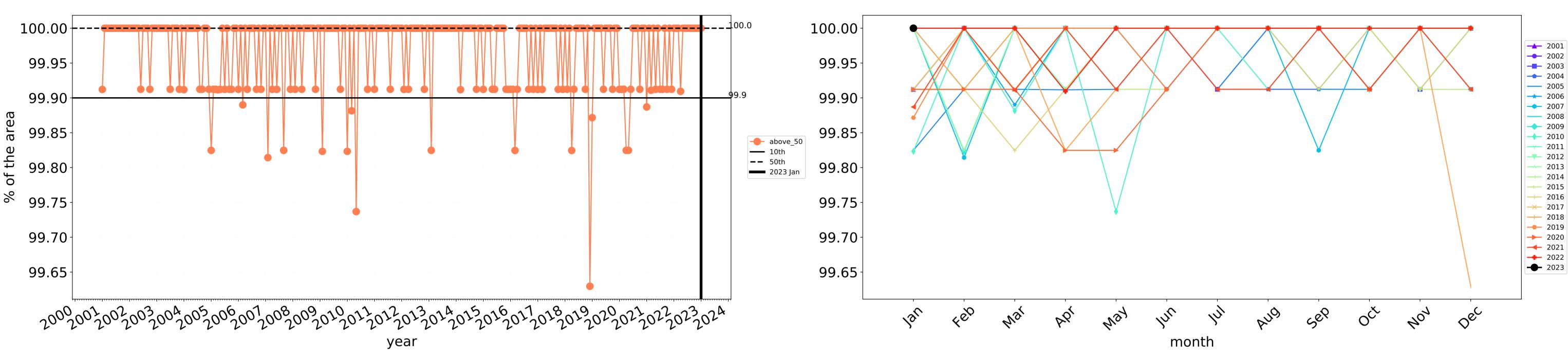
record, from highest to lowest, for that month. That is, red pixels are

records for that month of

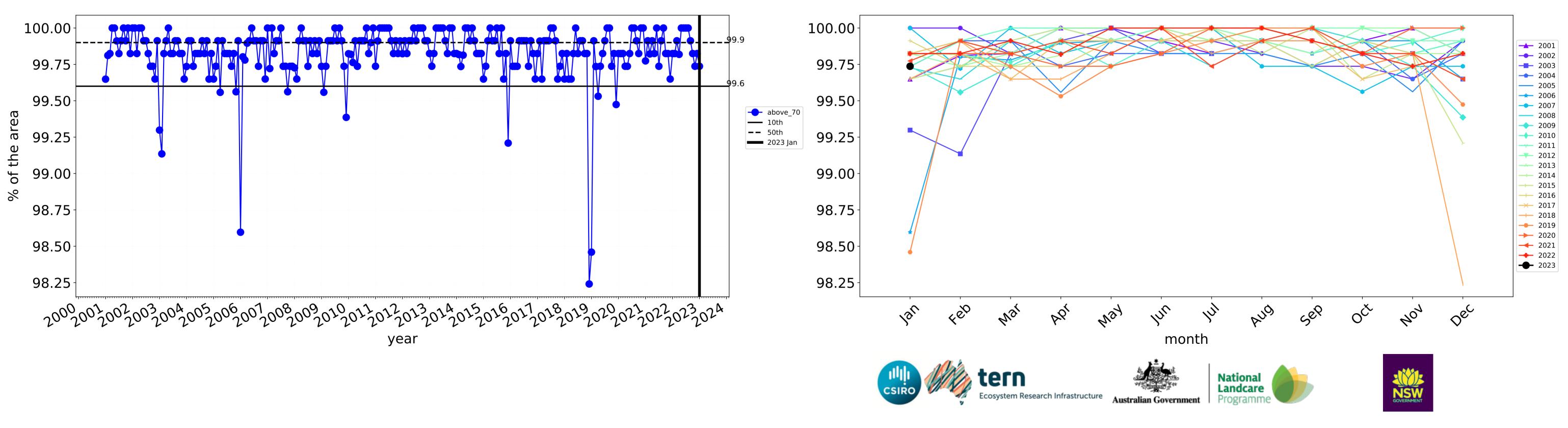
the map using baseline from 2001 to 2019.

in the lowest 10% of



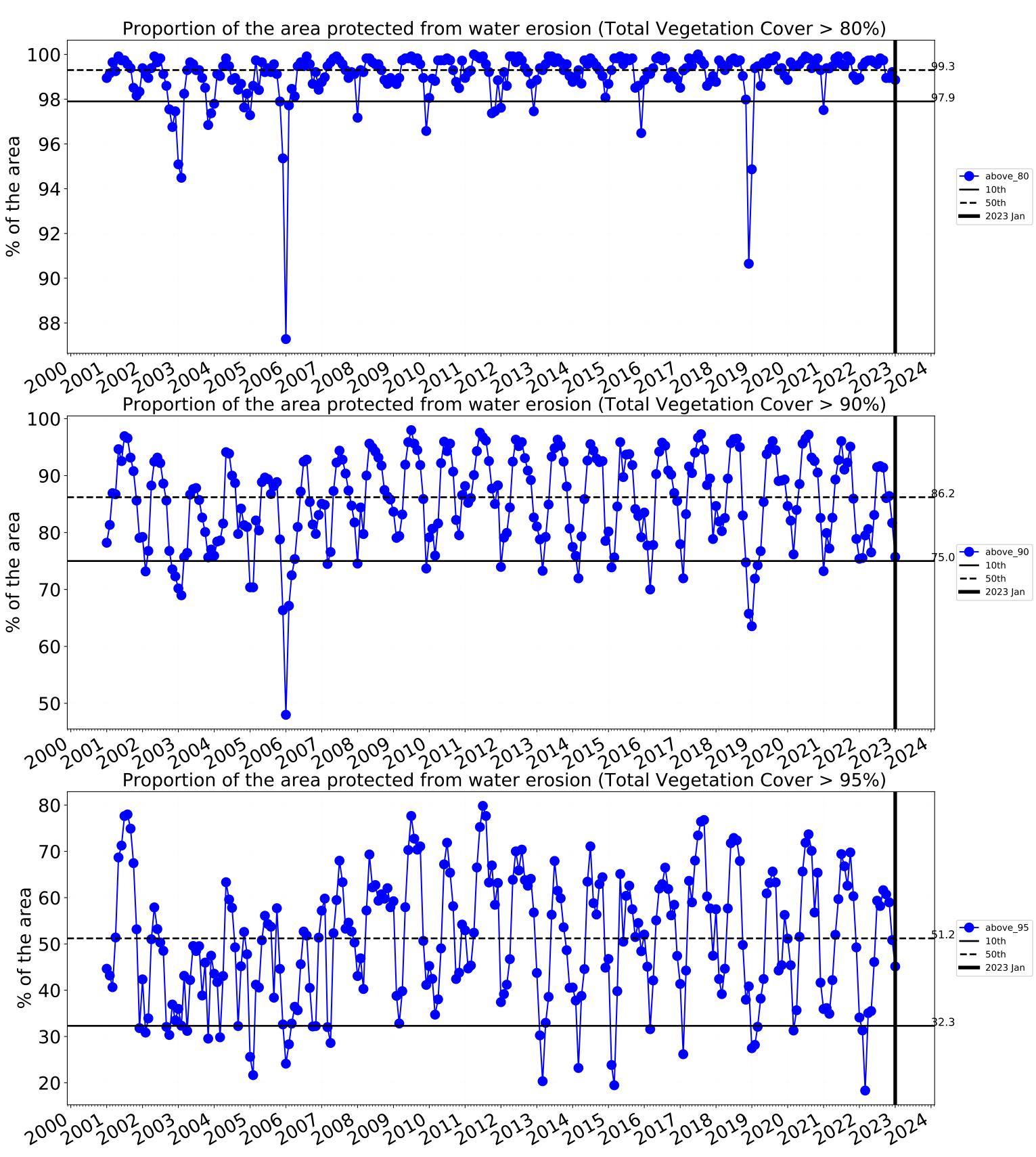


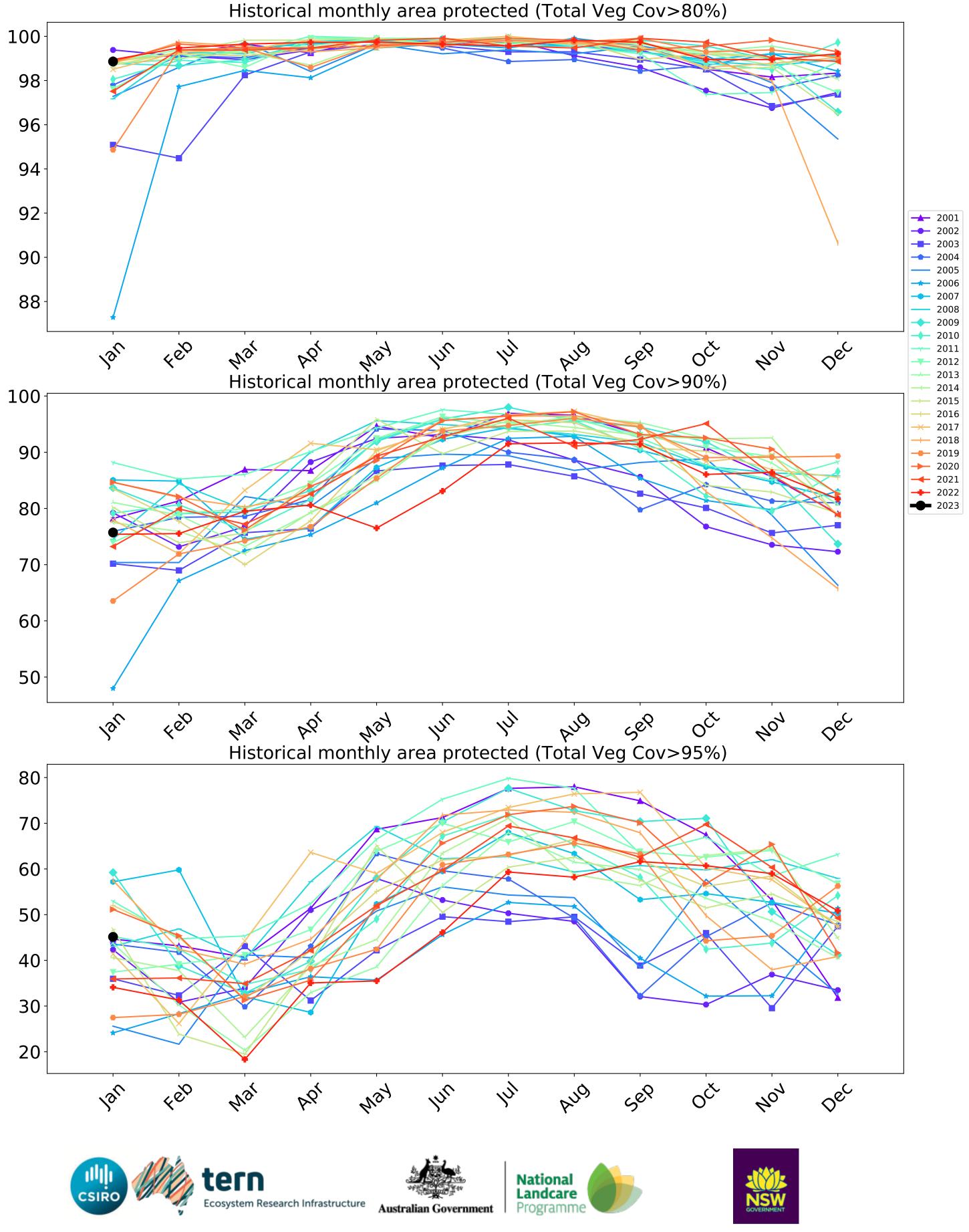
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

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



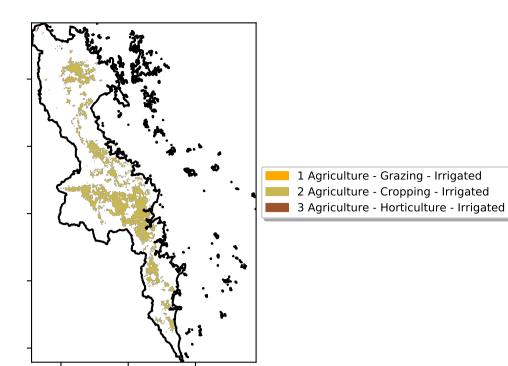




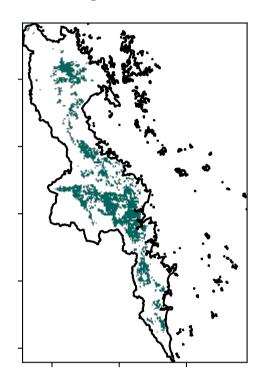
### Irrigation

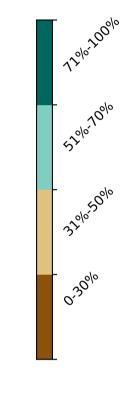
Land use and forest cover

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

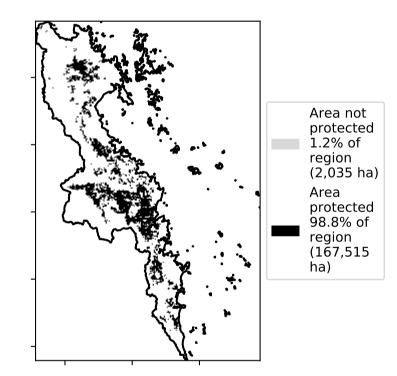


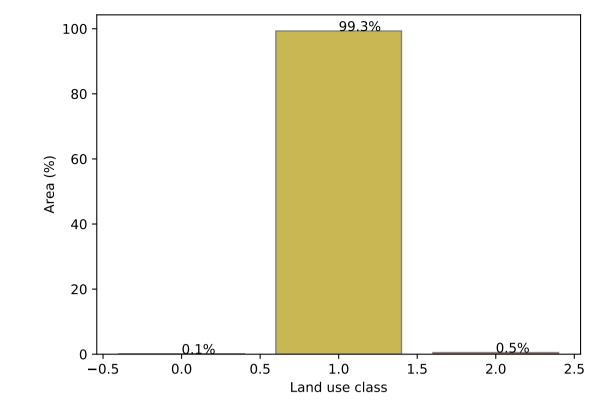
**Total Vegetation Cover [%]** 





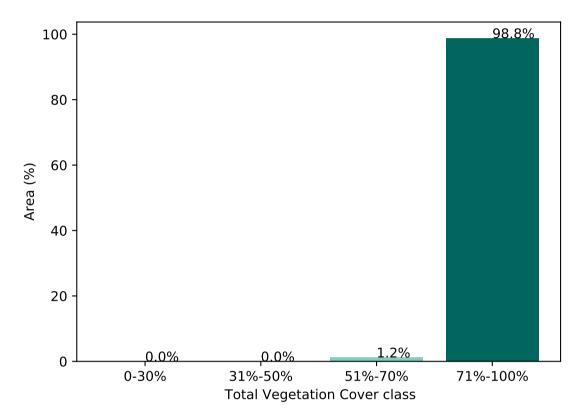
% Area protected from water erosion (>70%)



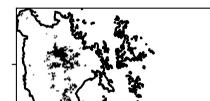


#### Proportion of each land class in area

Proportion of vegetation cover class in area

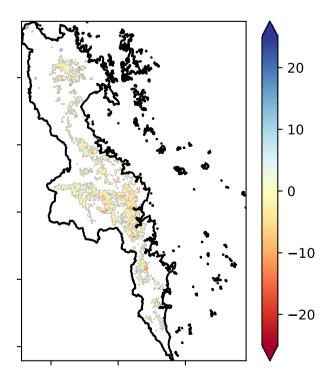


% Area protected from wind erosion (>50%)

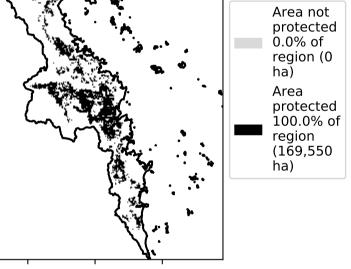


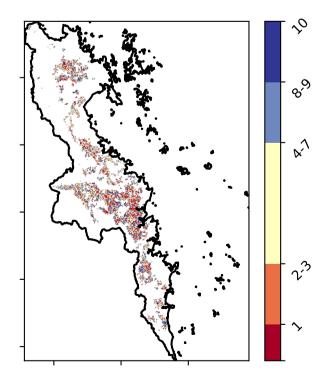
**Total Vegetation Cover Anomaly [%]** 

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

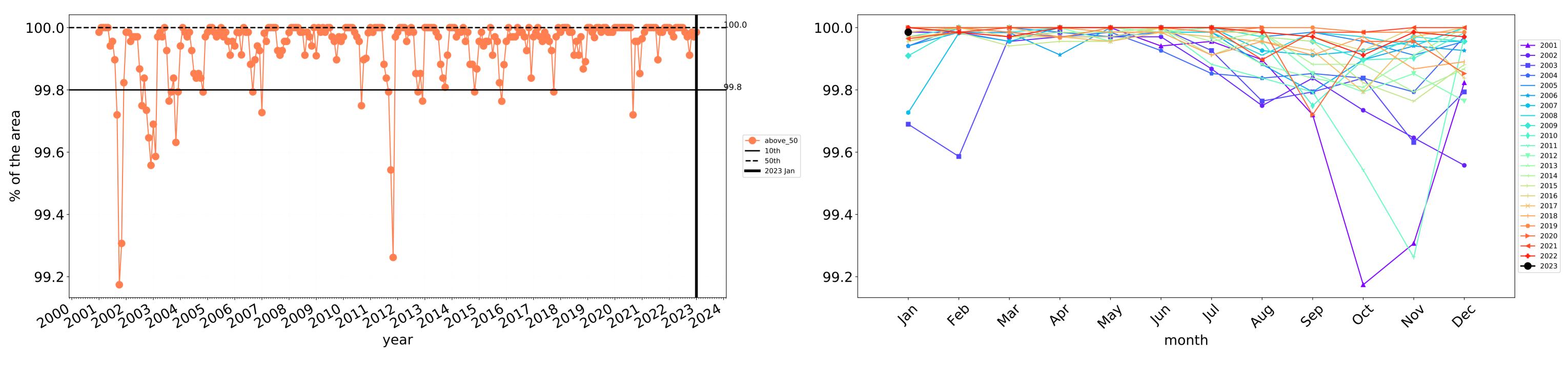


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



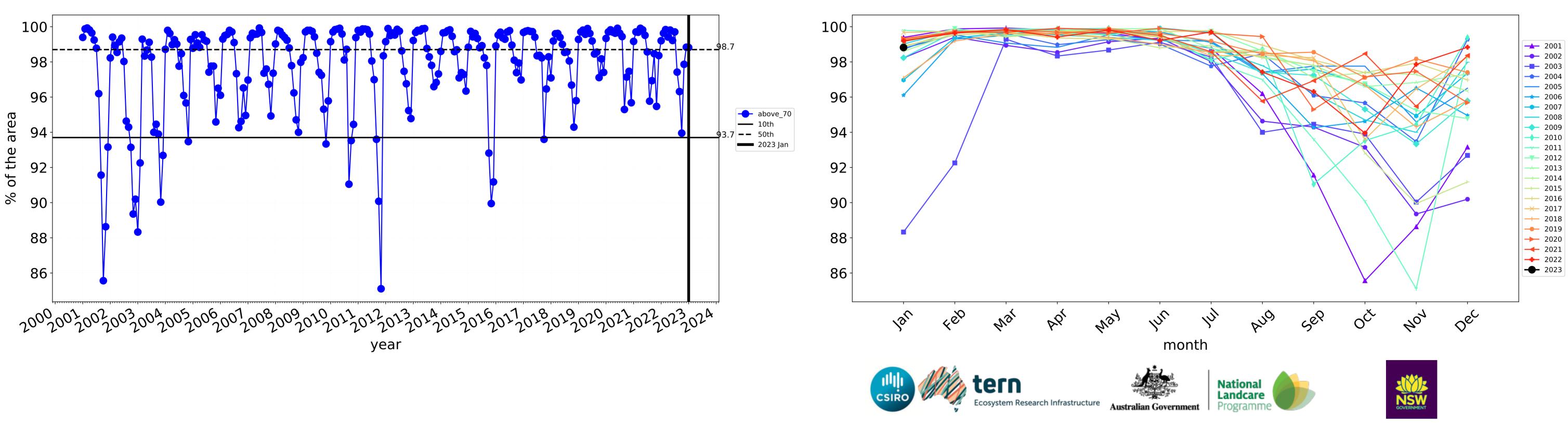






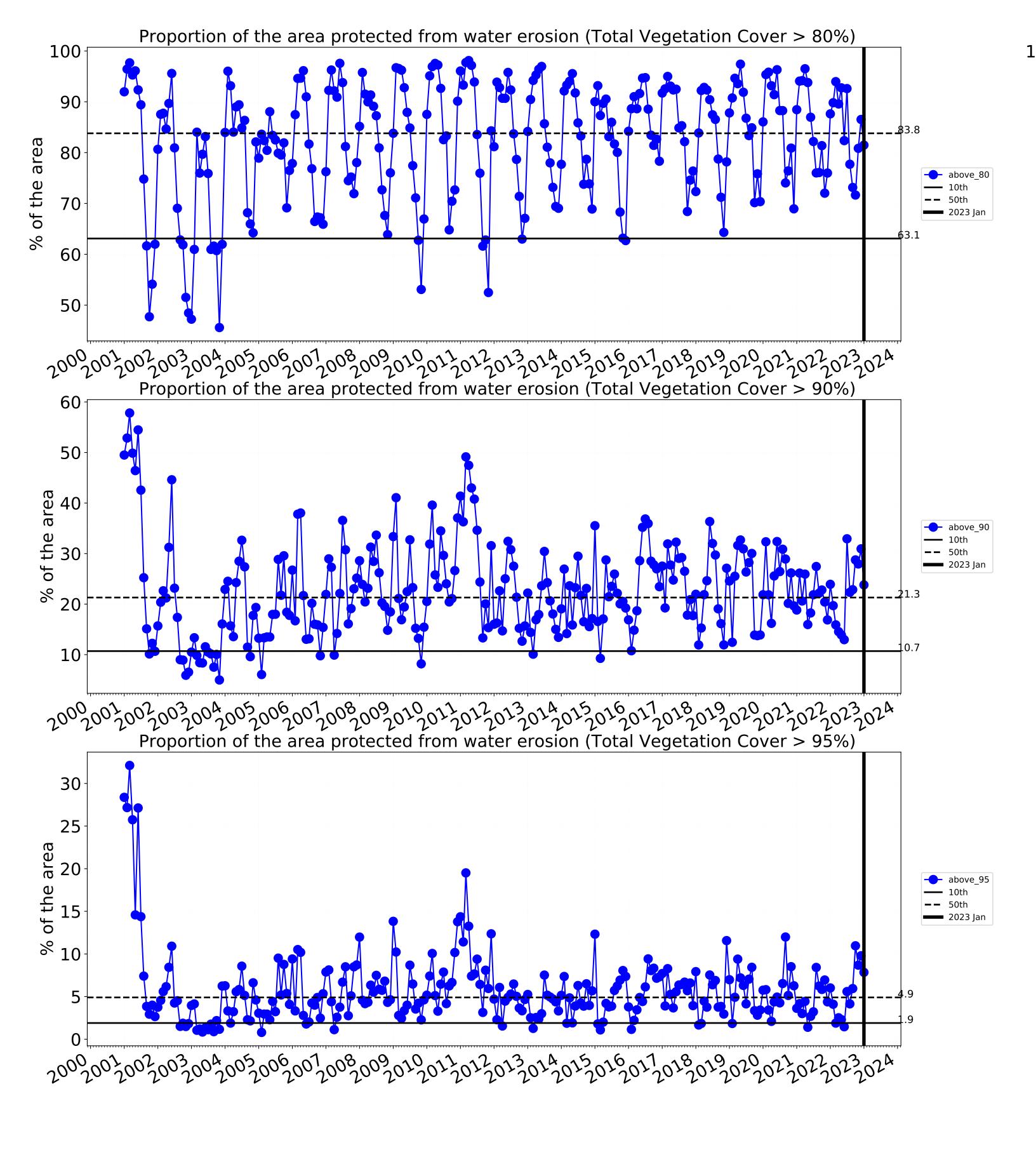
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

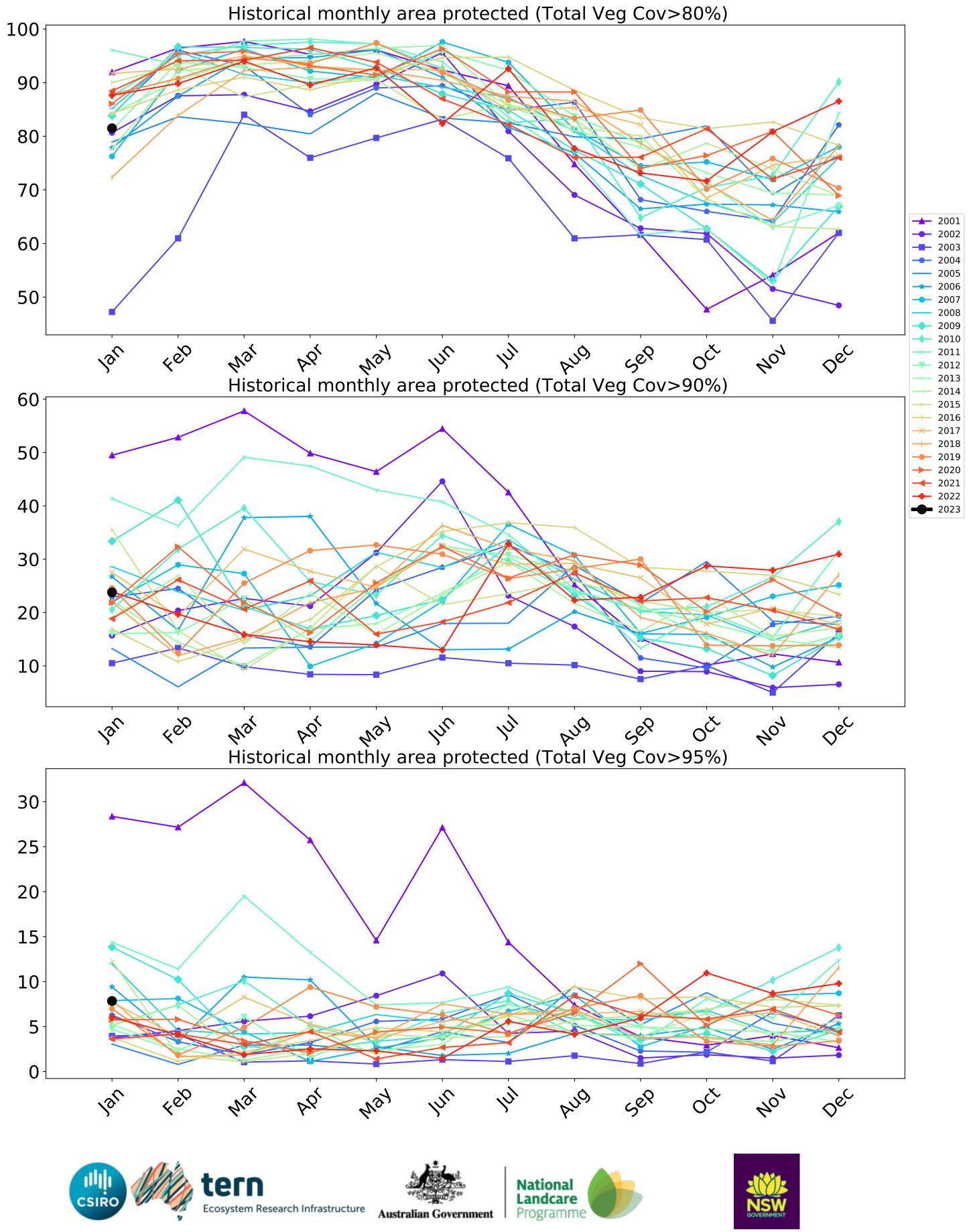




Wind erosion historical monthly area protected (Total Veg Cov >50%)

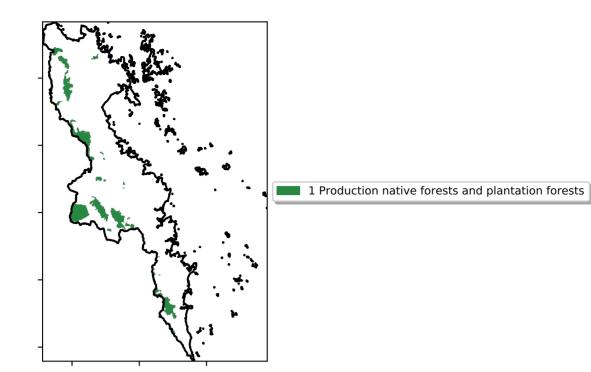




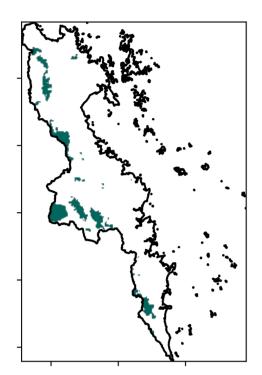


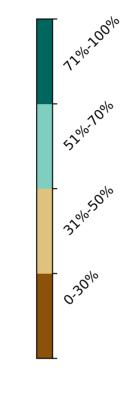
### **Production native forests and plantation forests**

Land use and forest cover

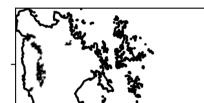


**Total Vegetation Cover [%]** 

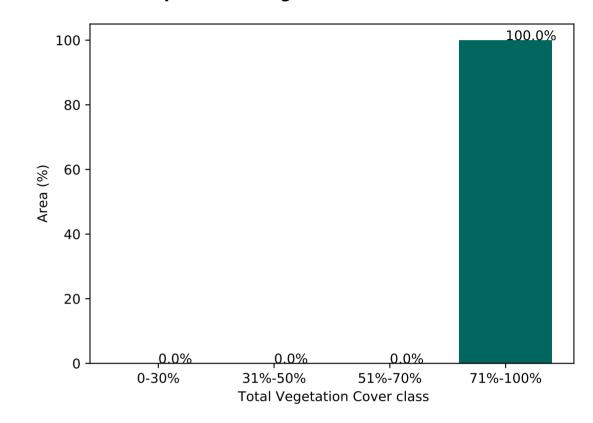




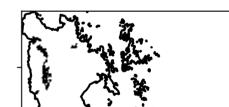
% Area protected from water erosion (>70%)



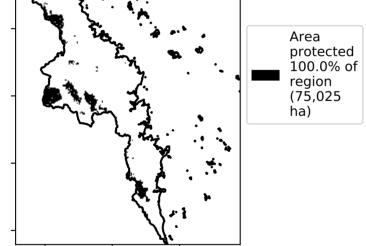
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

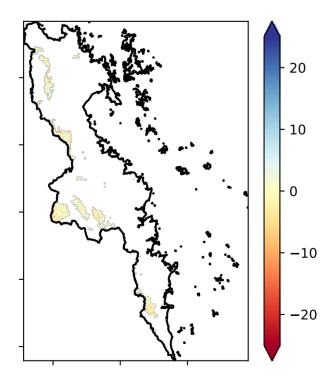


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

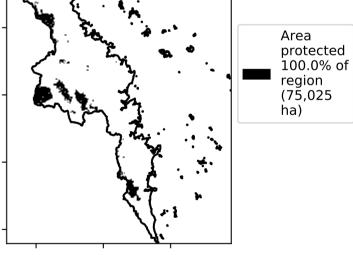


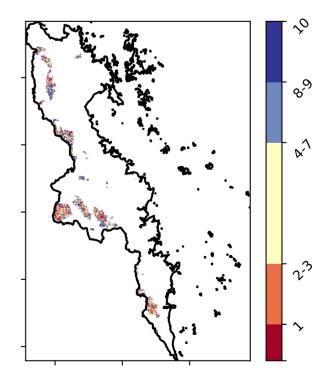
**Total Vegetation Cover Anomaly [%]** 

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.



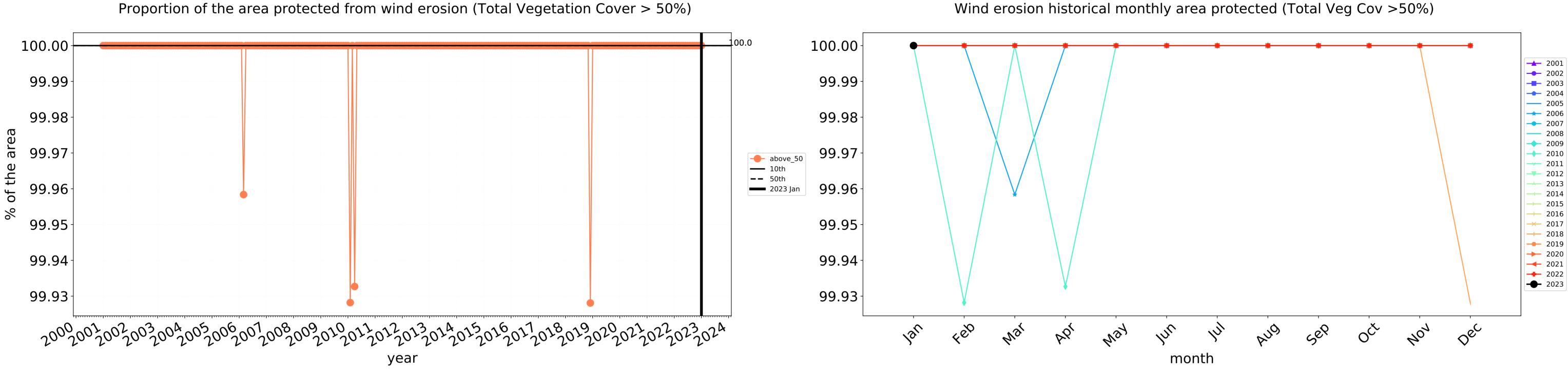
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

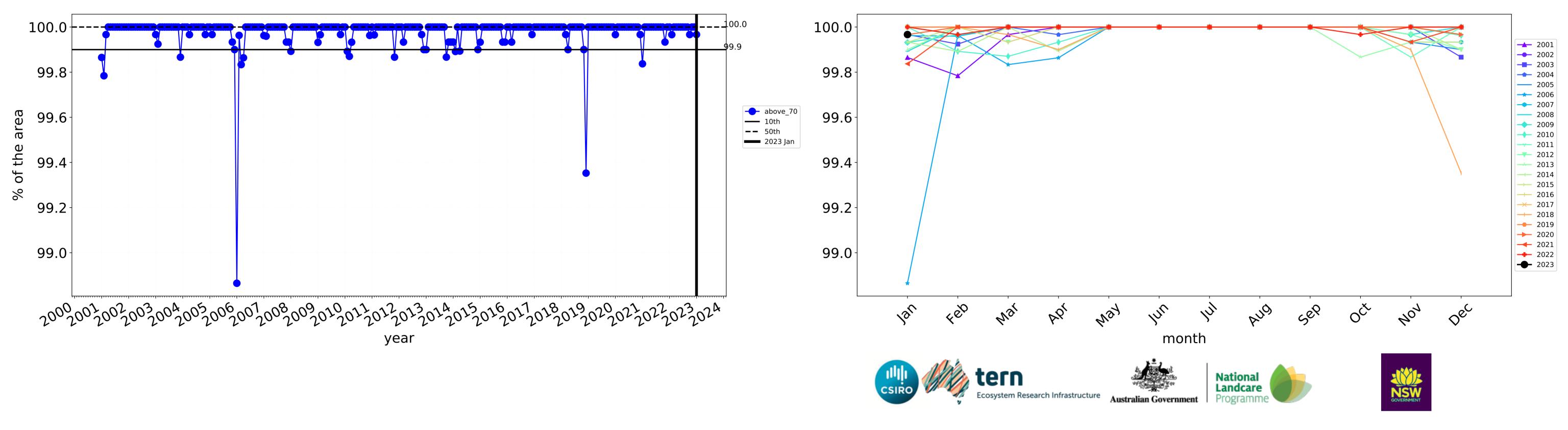




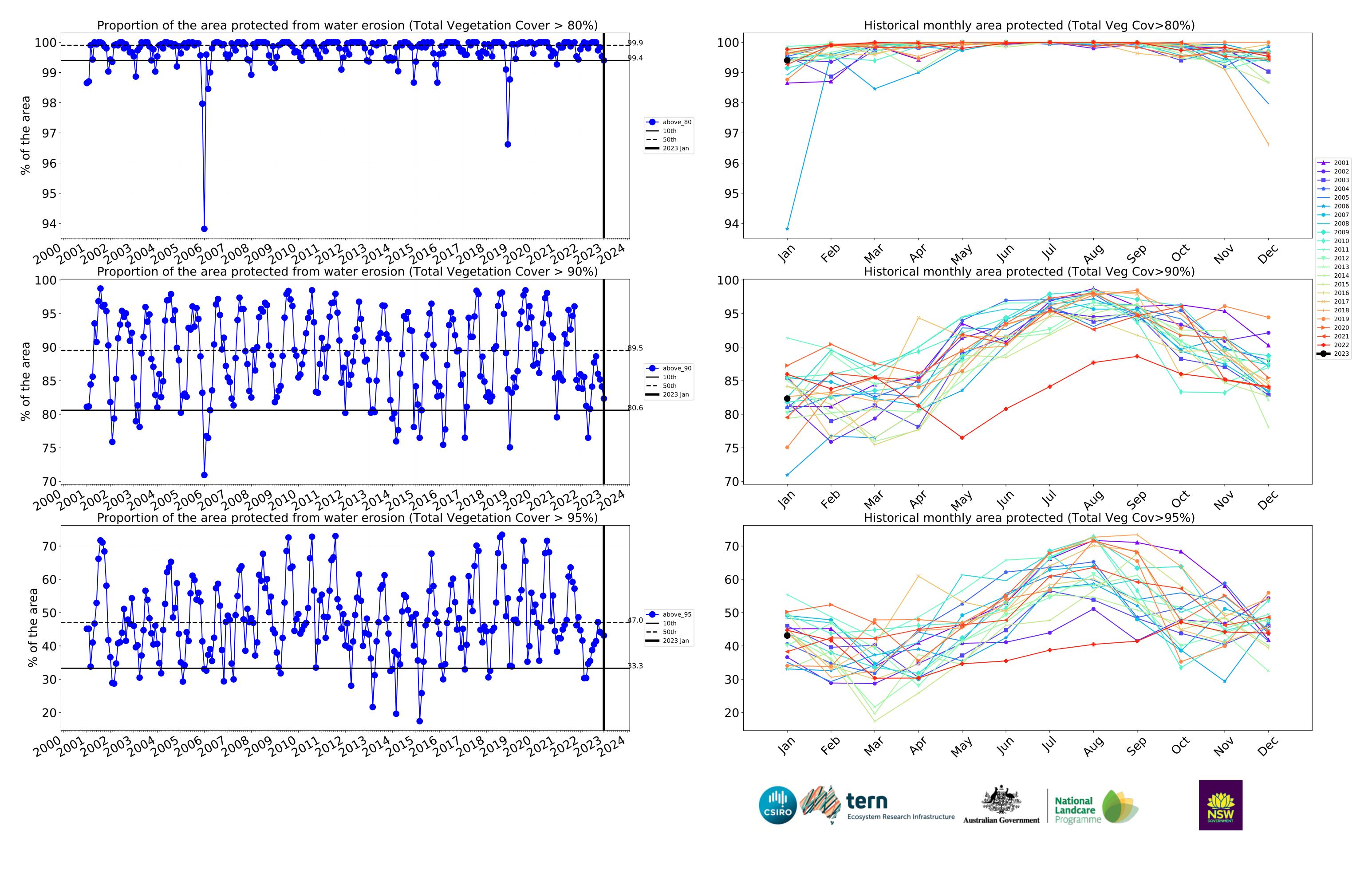








Water erosion historical monthly area protected (Total Veg Cov>70%)



**4** 

# Mackay Whitsunday (902,475 ha and no data 30,585 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	902,475	99.9% 901,750	99.6% 899,200	97.7% 881,600	90.9% 820,250	57.3% 517,300	28.7% 259,425
Conservation and natural environments	272,675	99.9% 272,450	99.6% 271,550	97.9% 266,975	95.1% 259,300	73.3% 200,000	41.1% 112,025
Conservation and natural environments non forest	7,175	99.7% 7,150	98.6% 7,075	90.9% 6,525	80.5% 5,775	50.2% 3,600	25.8% 1,850
Conservation and natural environments Woodland forest Conservation and	74,200	99.9% 74,125	99.5% 73,825	98.0% 72,750	94.7% 70,250	64.2% 47,625	31.9% 23,700
natural environments Forest (non woodland)	191,300	99.9% 191,175	99.7% 190,650	98.1% 187,700	95.8% 183,275	77.8% 148,775	45.2% 86,475
Agriculture	467,800	100.0% 467,725	99.9% 467,500	99.2% 463,825	91.1% 426,075	48.9% 228,575	21.7% 101,350
Grazing	298,200	100.0% 298,125	99.9% 297,925	99.3% 296,225	96.5% 287,875	63.1% 188,200	29.5% 88,050
Grazing non forest	189,050	100.0% 189,000	99.9% 188,825	99.1% 187,425	95.6% 180,750	57.4% 108,525	25.0% 47,200
Grazing Woodland forest	80,625	100.0% 80,600	99.9% 80,575	99.7% 80,350	97.9% 78,925	72.0% 58,075	34.7% 27,975
Grazing - Forest (non woodland)	28,525	100.0% 28,525	100.0% 28,525	99.7% 28,450	98.9% 28,200	75.7% 21,600	45.1% 12,875
Irrigation	169,550	100.0% 169,550	100.0% 169,525	98.8% 167,550	81.5% 138,150	23.8% 40,350	7.8% 13,300
Production native forests and plantation forests	75,025	100.0% 75,025	100.0% 75,025	100.0% 75,000	99.4% 74,575	82.3% 61,775	43.1% 32,350

