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

# **Date: November 2019**

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

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

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

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

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

Erosion protection: Wind erosion 50% total vegetation cover

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

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

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

### **Erosion protection**

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

### Rainfall

• Millimetres rainfall each month (black line).

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

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

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

# Acknowledgment of data:

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

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

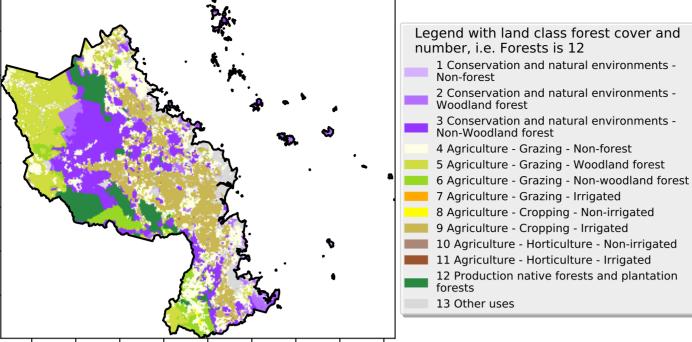


# **Vegetation Cover Nov 2019**

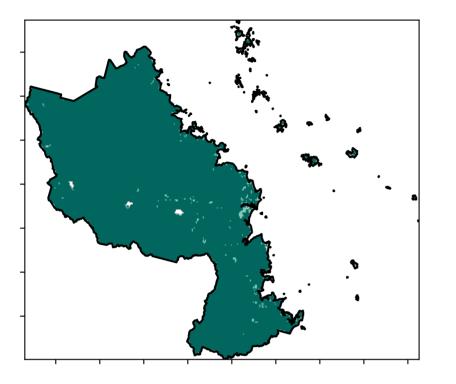
#### Land use and forest cover

#### Proportion of each land class in area

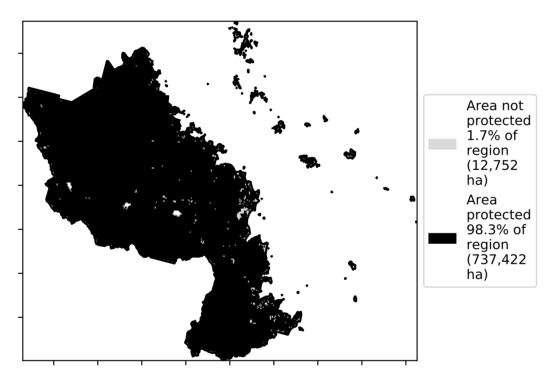


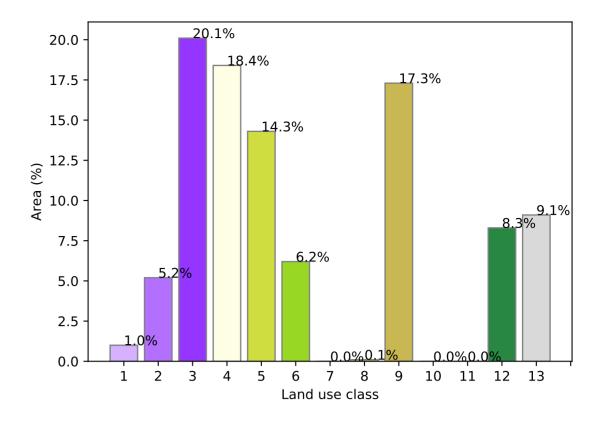


### **Total Vegetation Cover [%]**

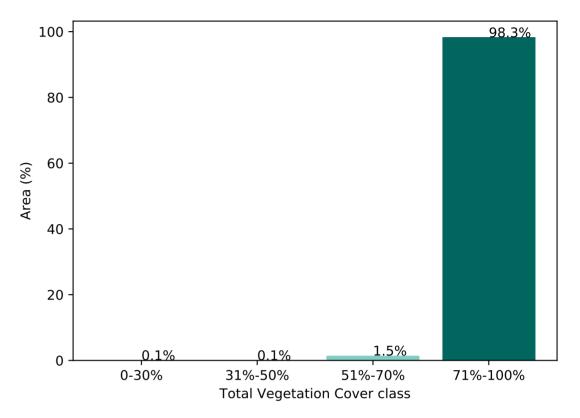


### % Area protected from water erosion (>70%)

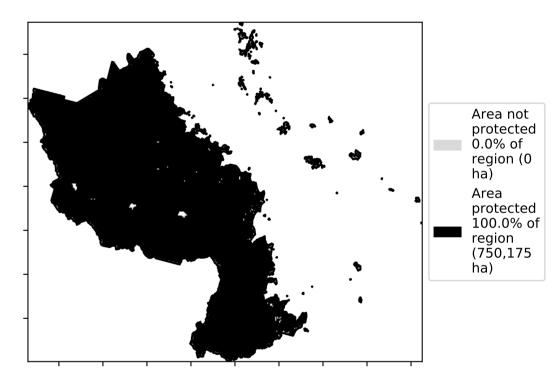




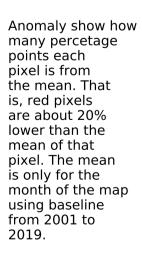
### Proportion of vegetation cover class in area

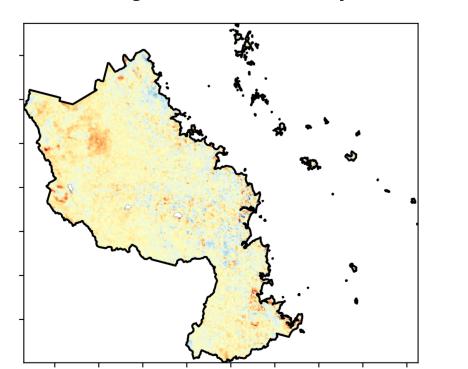


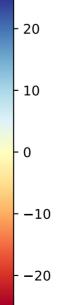
### % Area protected from wind erosion (>50%)









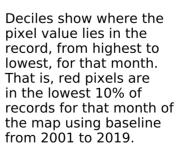


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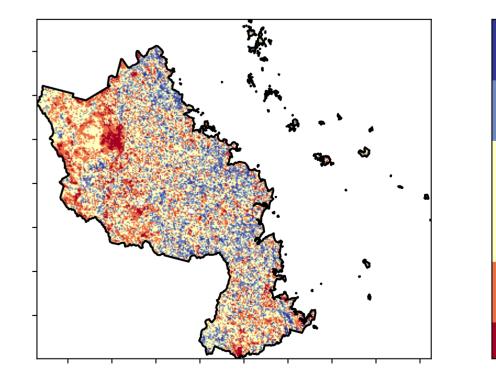
· 52°10'10°10

320050010

0.30%



**Total Vegetation Cover Decile [%]** 



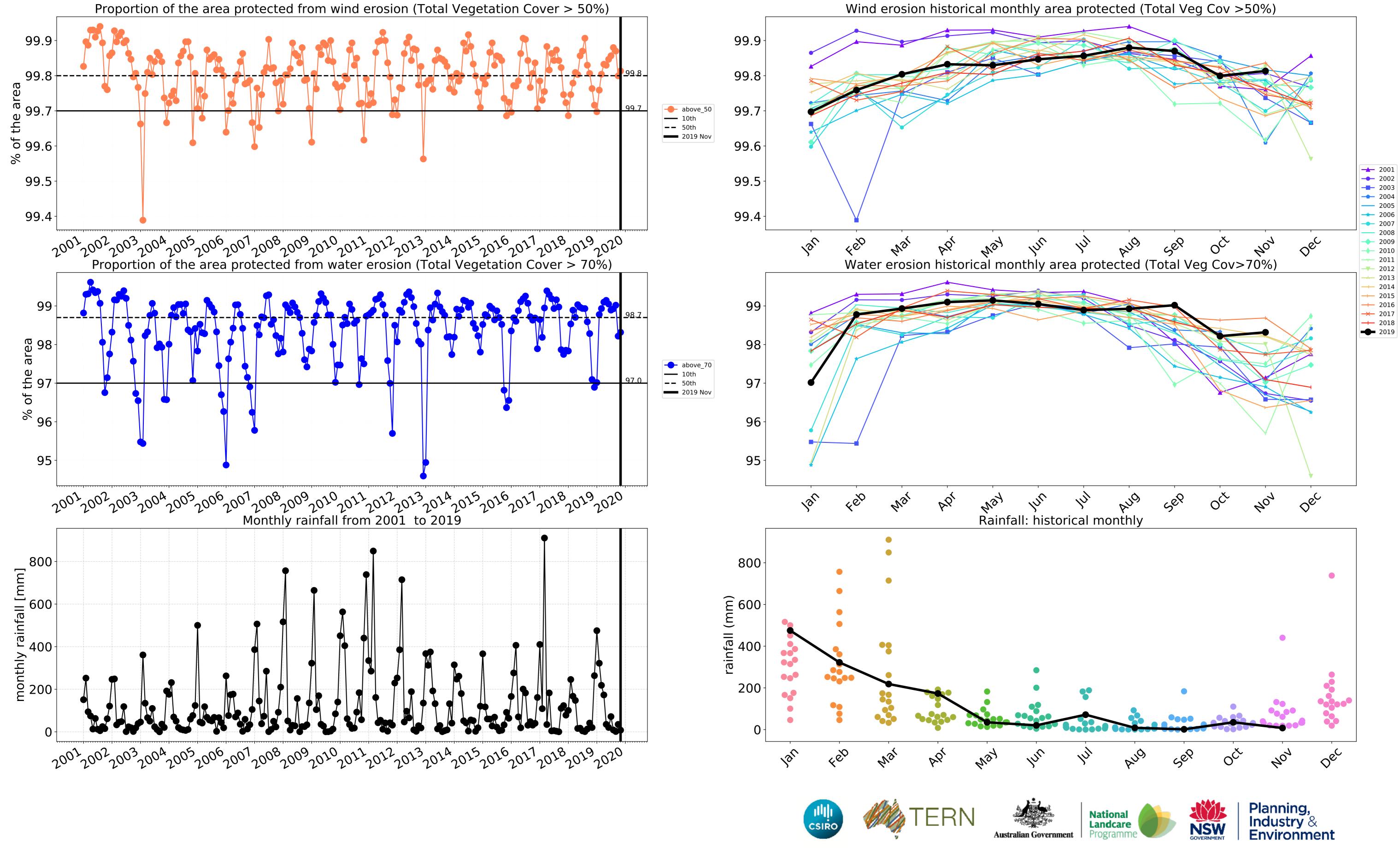
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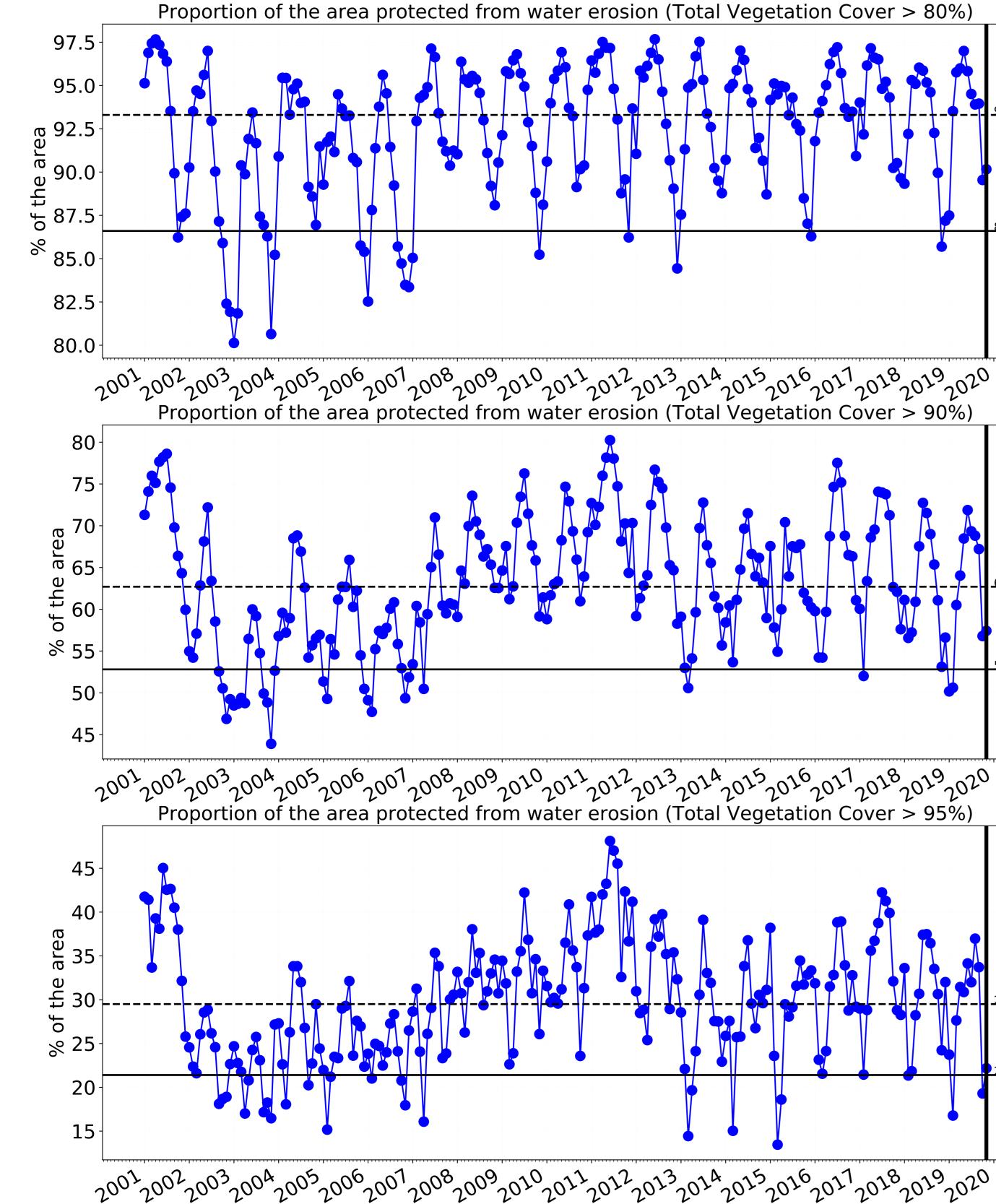
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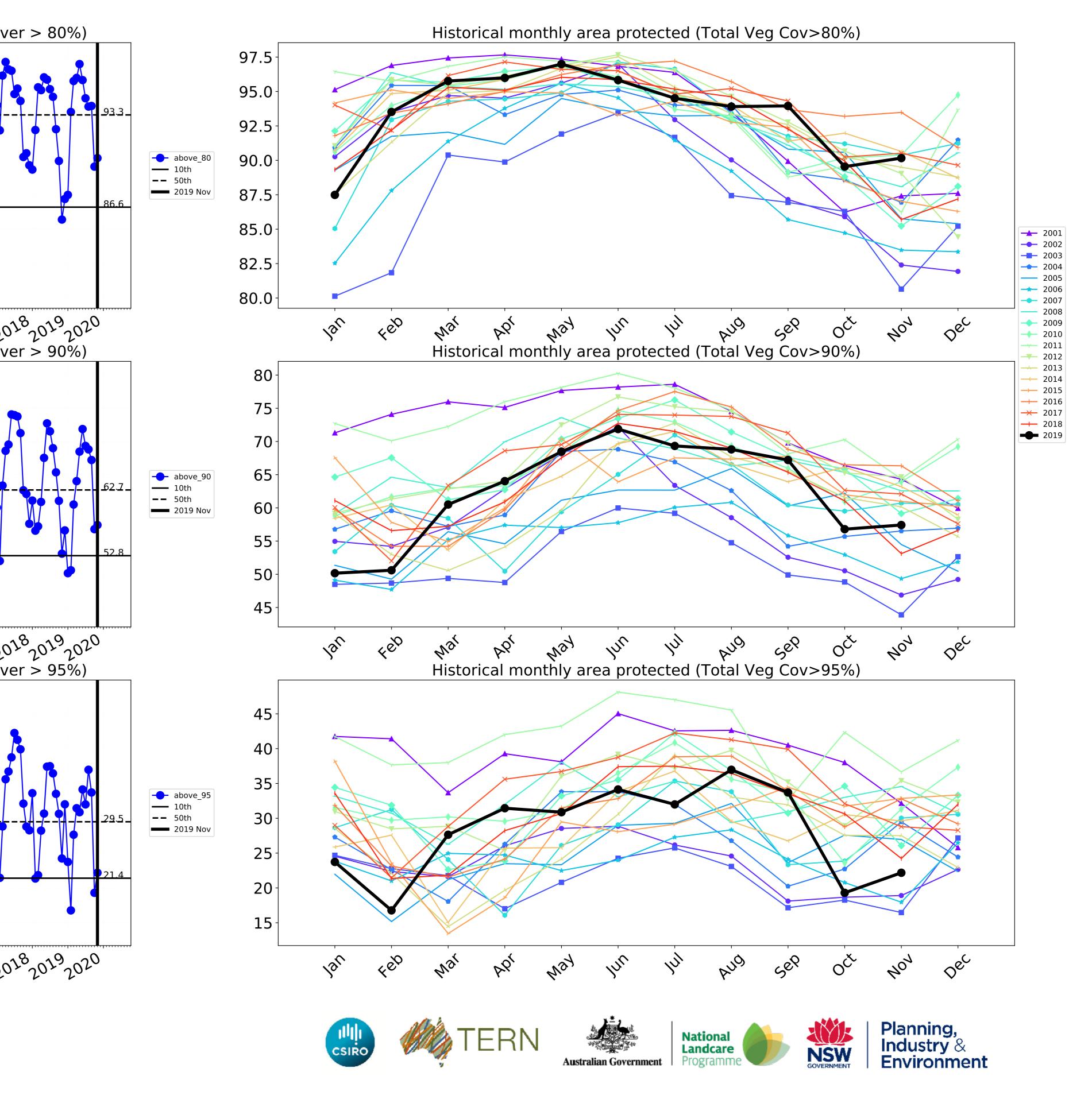
2<sup>35</sup>



2





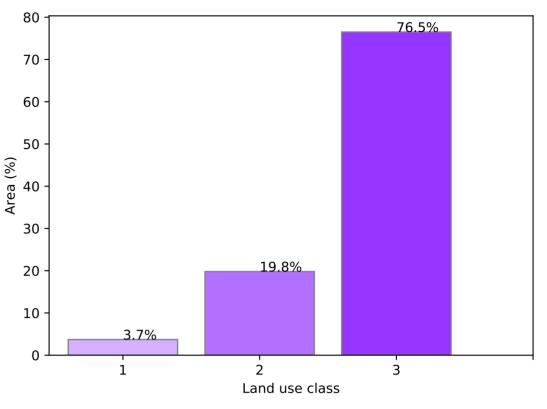


### **Conservation and natural environments**

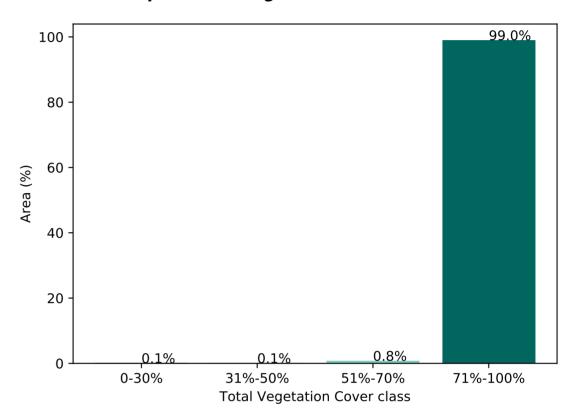
Land use and forest cover

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

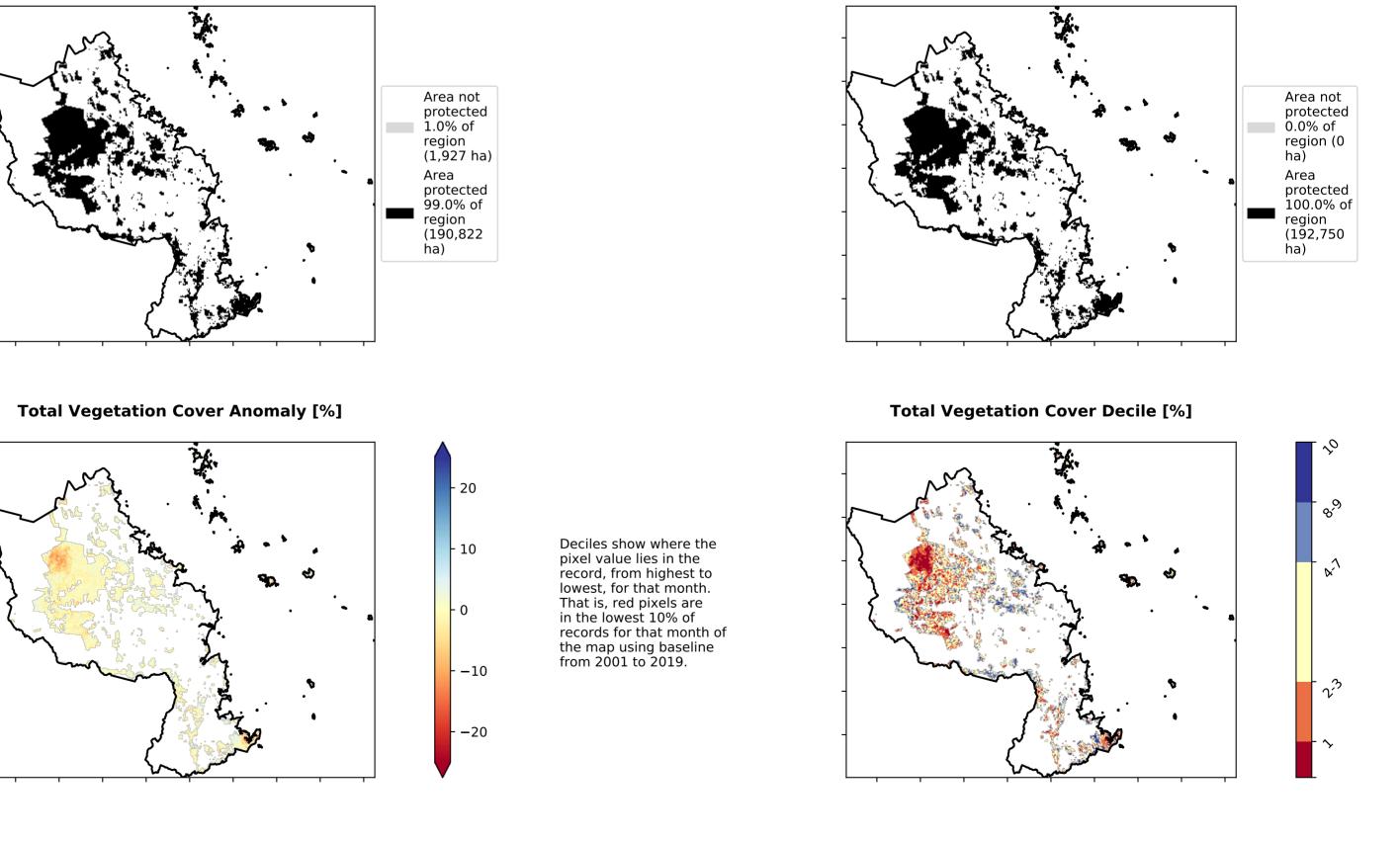
Proportion of each land class in area



Proportion of vegetation cover class in area

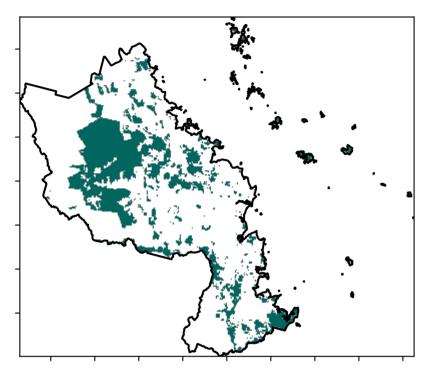


#### % Area protected from wind erosion (>50%)

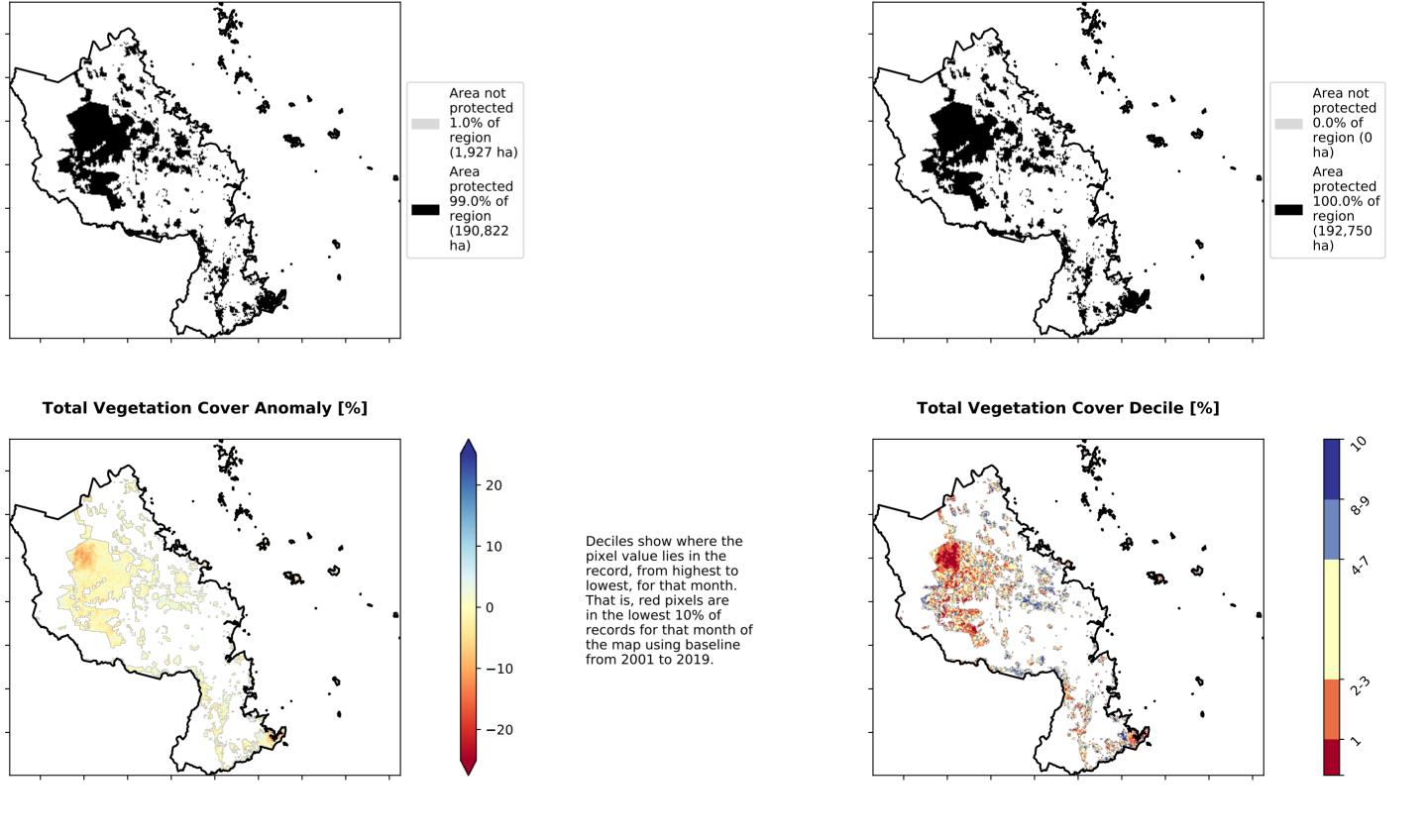


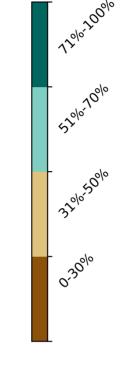
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





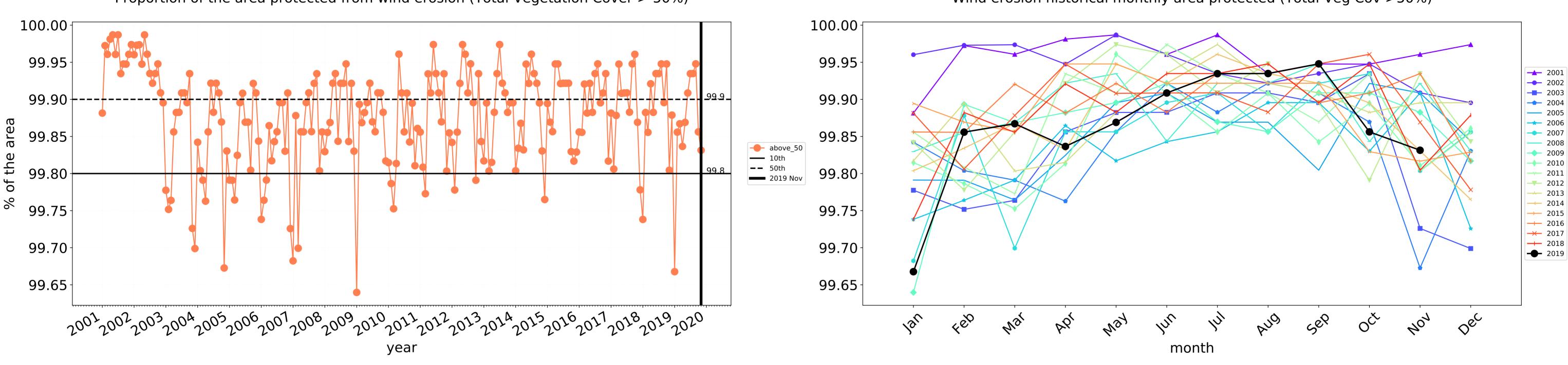


lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.

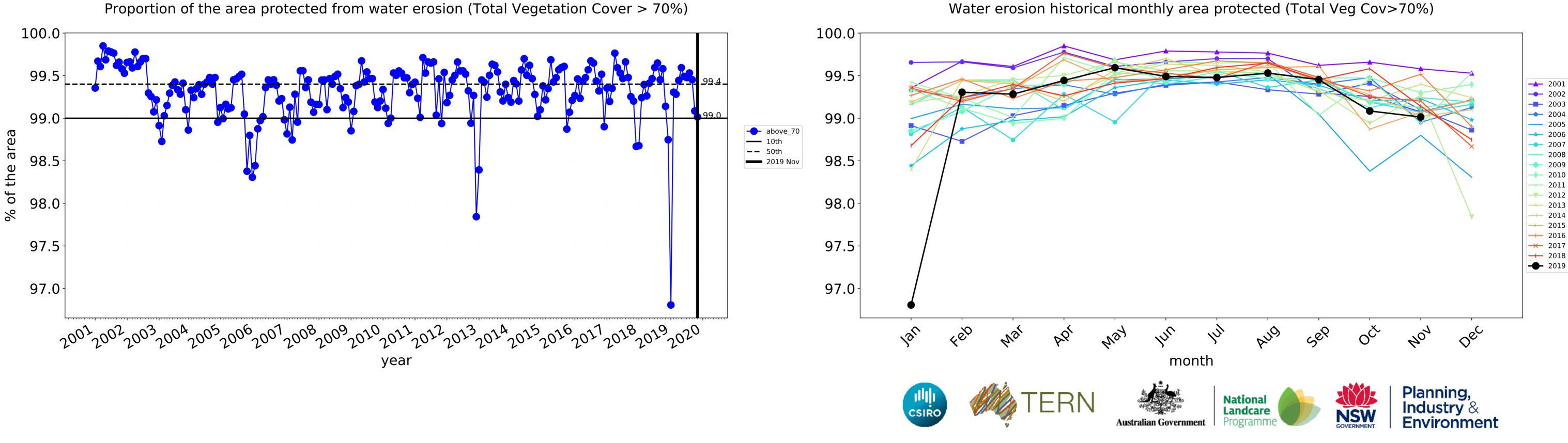
Anomaly show how many percetage points each pixel is from

the mean. That

is, red pixels are about 20%



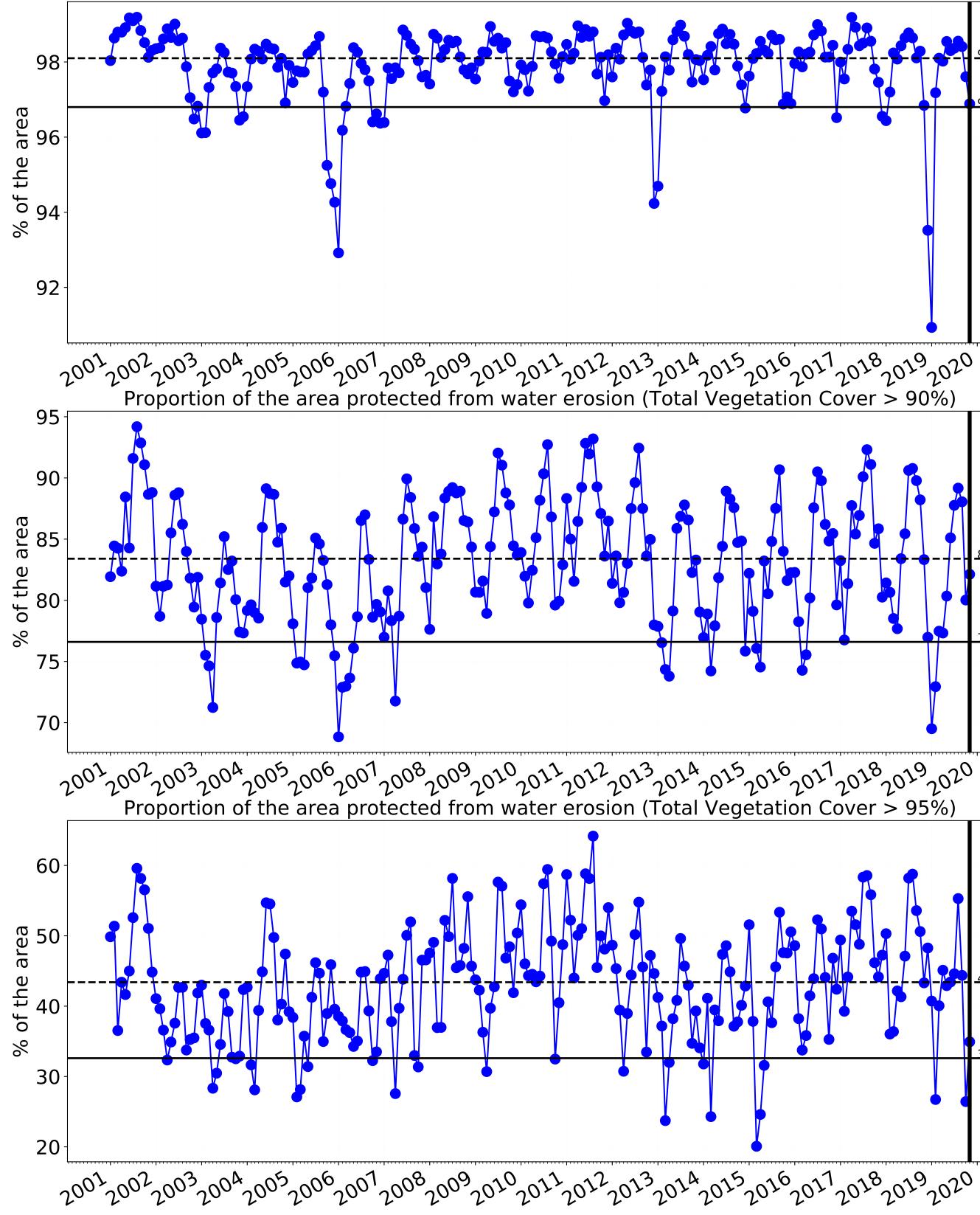
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

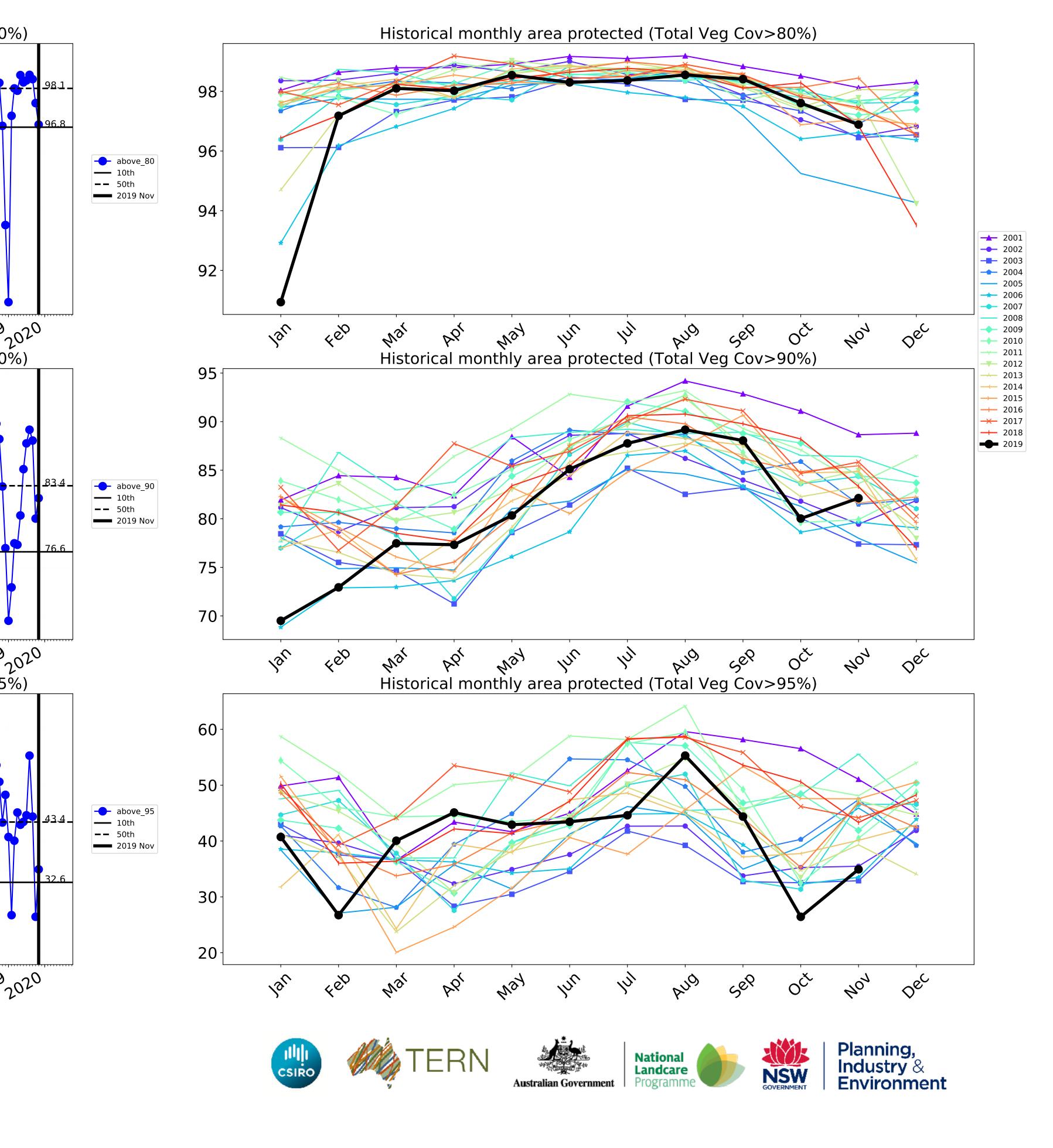


# **Conservation and natural environments timeseries**

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

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





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

ቅዸ Land Use and Forests 1 Conservation and natural environments - Non-Catchment Scale Land forest

12%200%

52°10-70°10

32°10'50010

0.30%

Land use and forest cover

Catchment Scale

of Australia (2018) Derived from

Anomaly show how many percetage points each pixel is from the mean That

the mean. That

is, red pixels are about 20% lower than the

mean of that

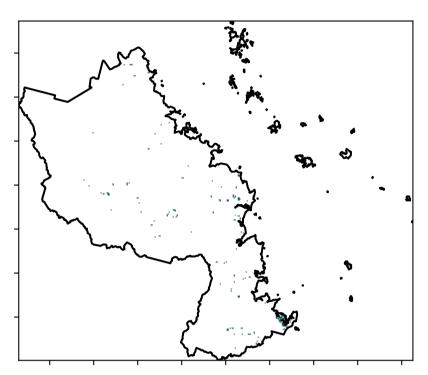
pixel. The mean

from 2001 to 2019.

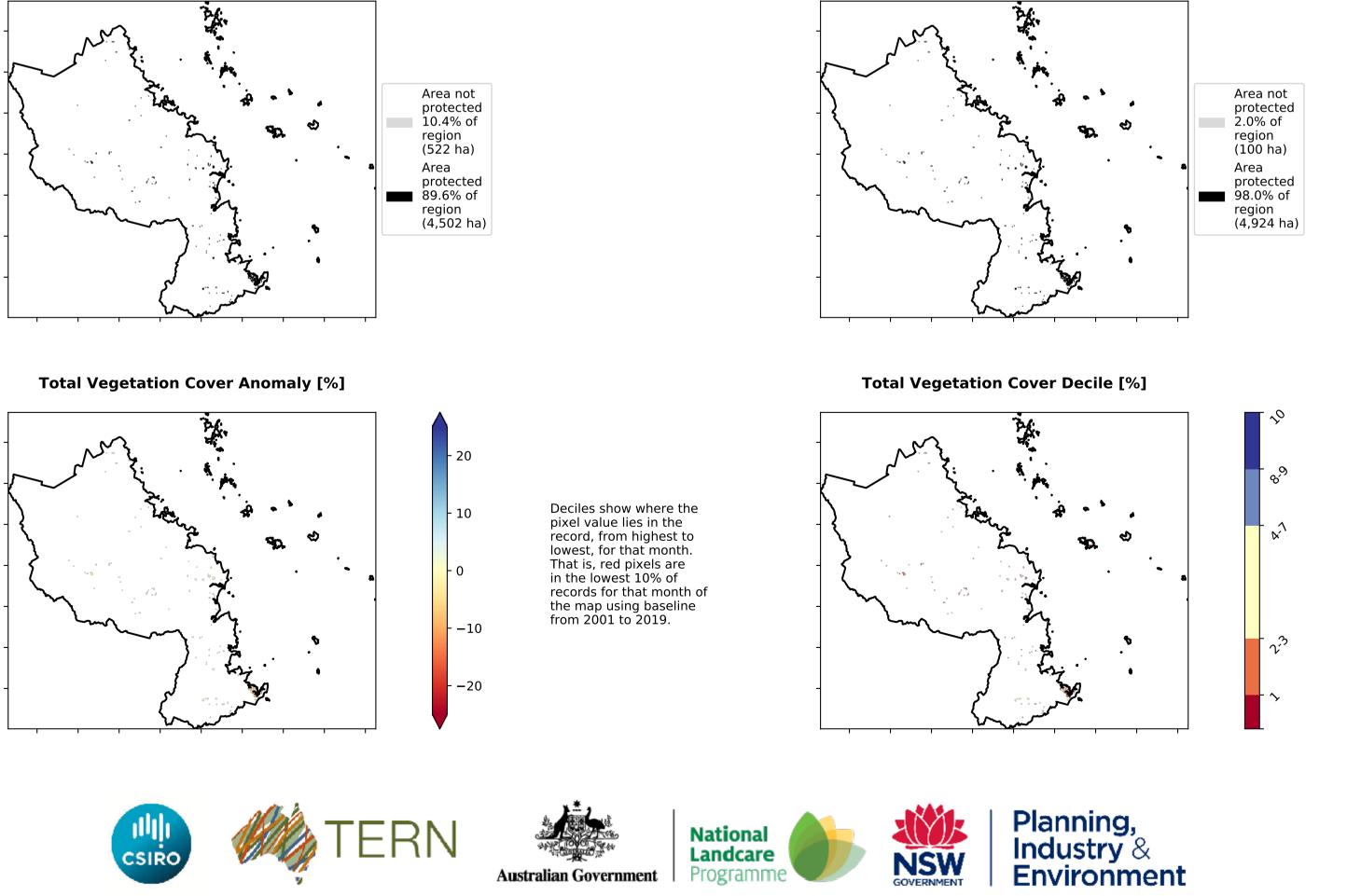
is only for the month of the map

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

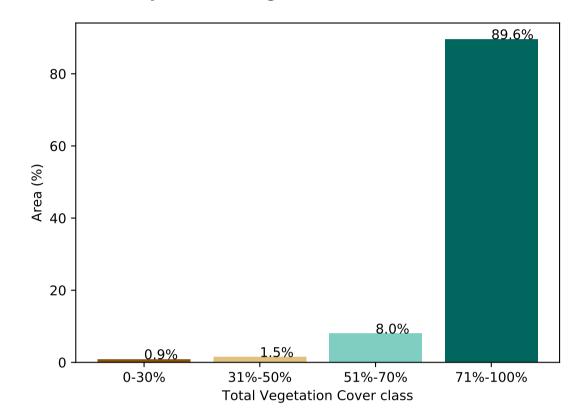
**Total Vegetation Cover [%]** 



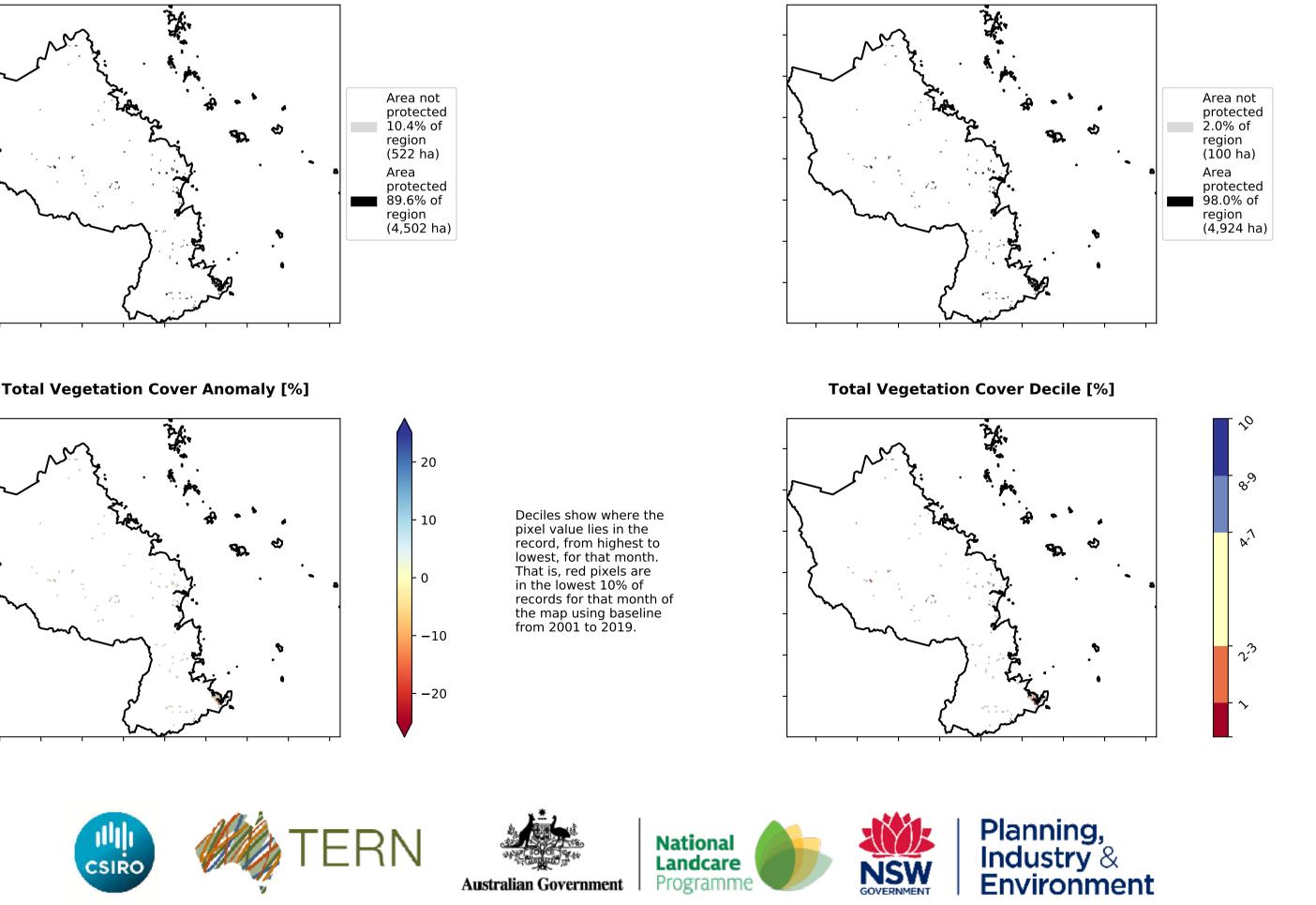
% Area protected from water erosion (>70%)

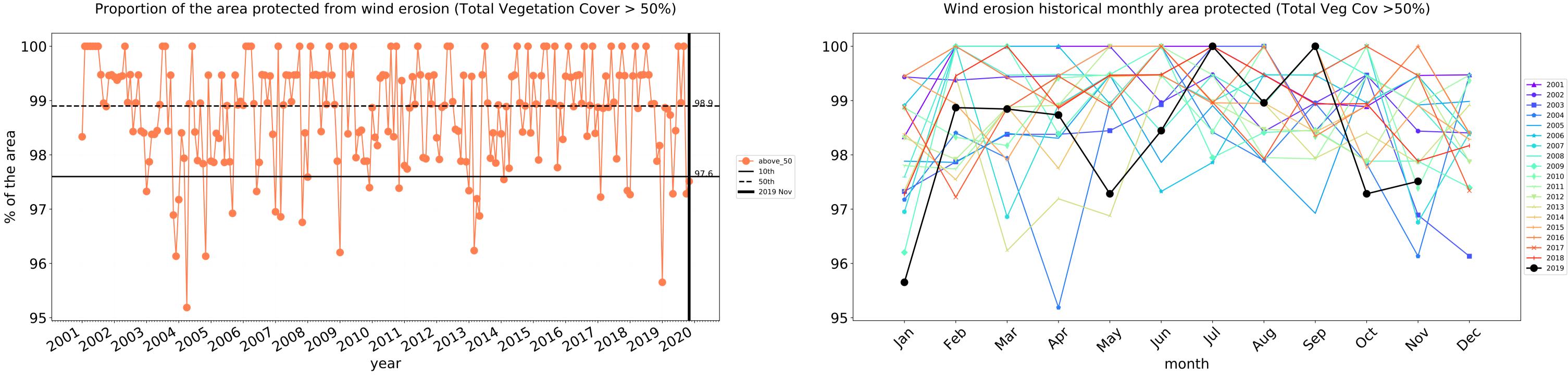






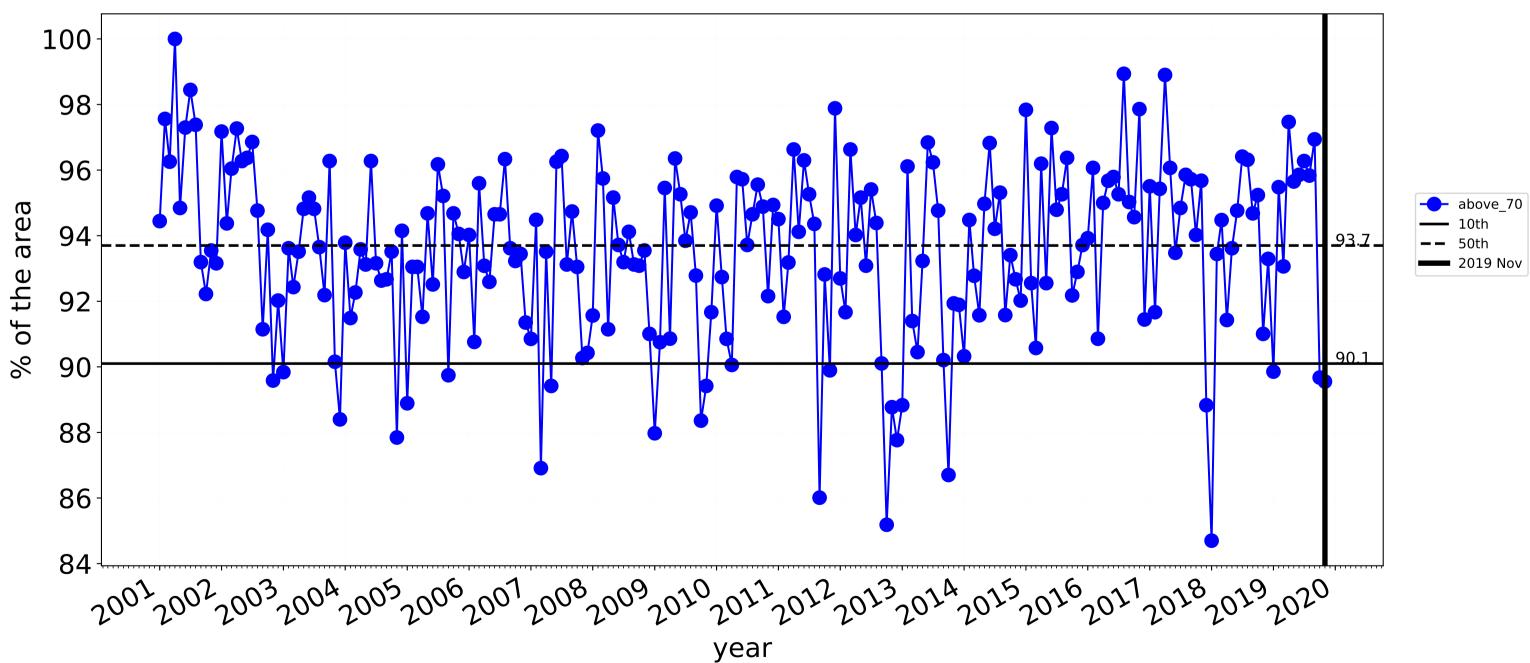
% Area protected from wind erosion (>50%)





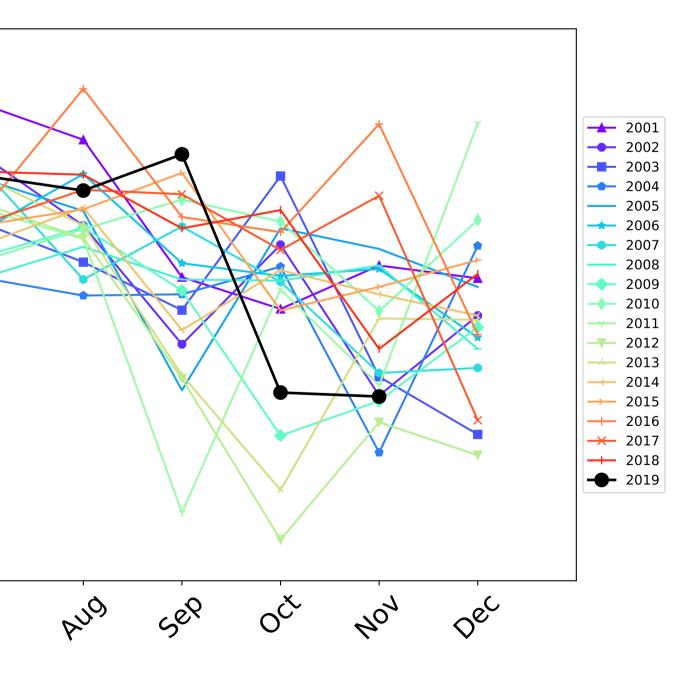
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



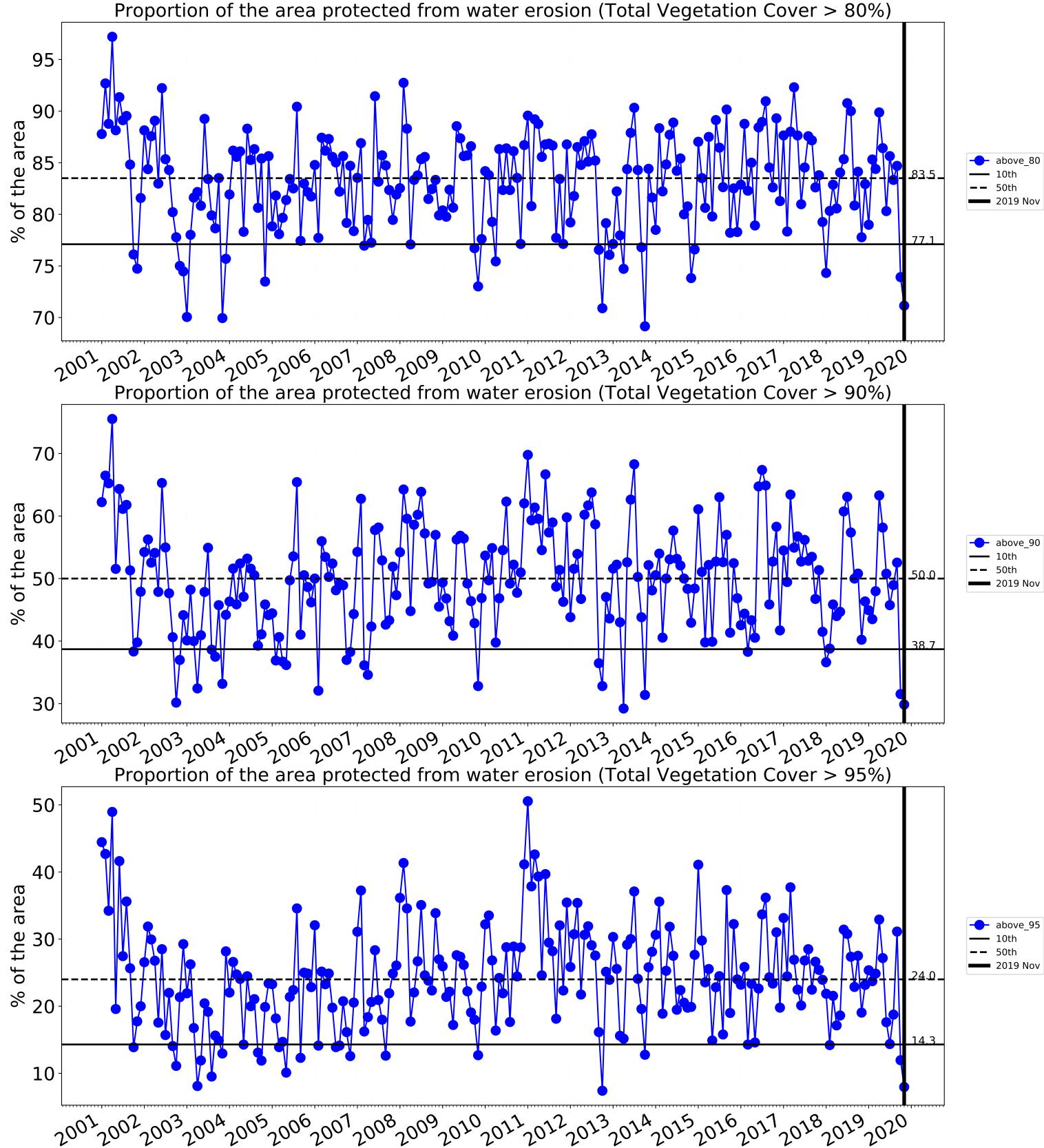


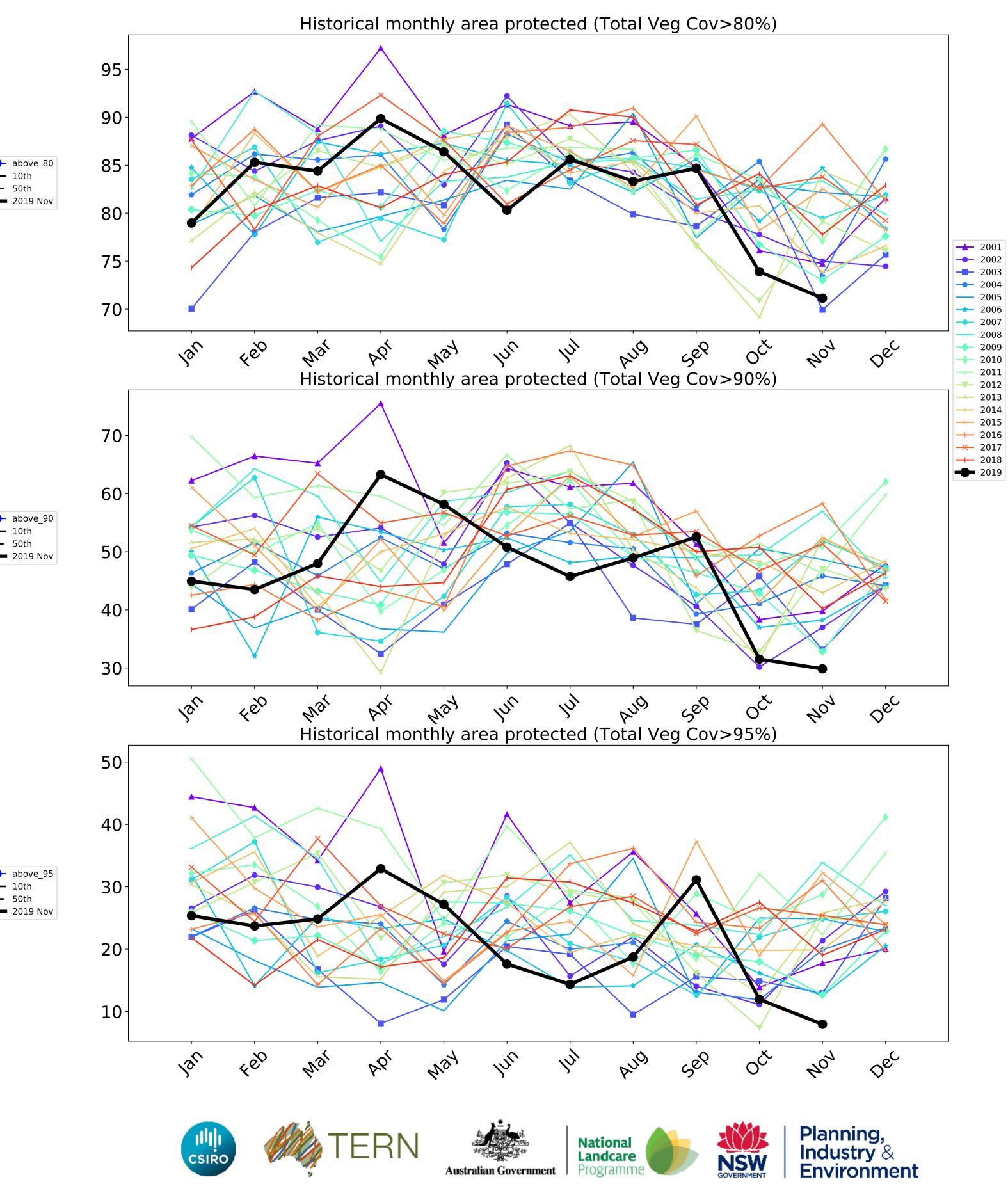
100-98 96-94 92 90 88-86-84 lar feb May In Mai (J) 29, month TERN CSIRO Australian Government

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









# **Conservation and natural environments Woodland forest**

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

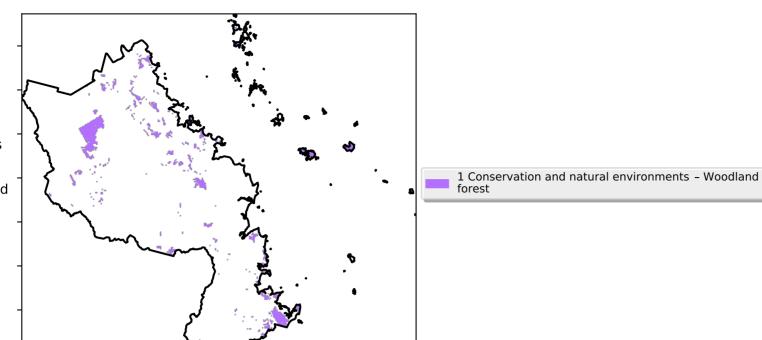
Anomaly show how many percetage points each pixel is from the mean That

the mean. That

is, red pixels are about 20% lower than the

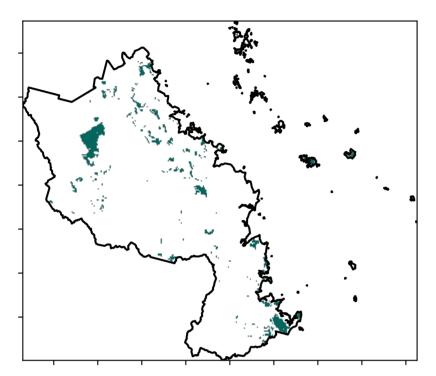
mean of that pixel. The mean is only for the month of the map

from 2001 to 2019.

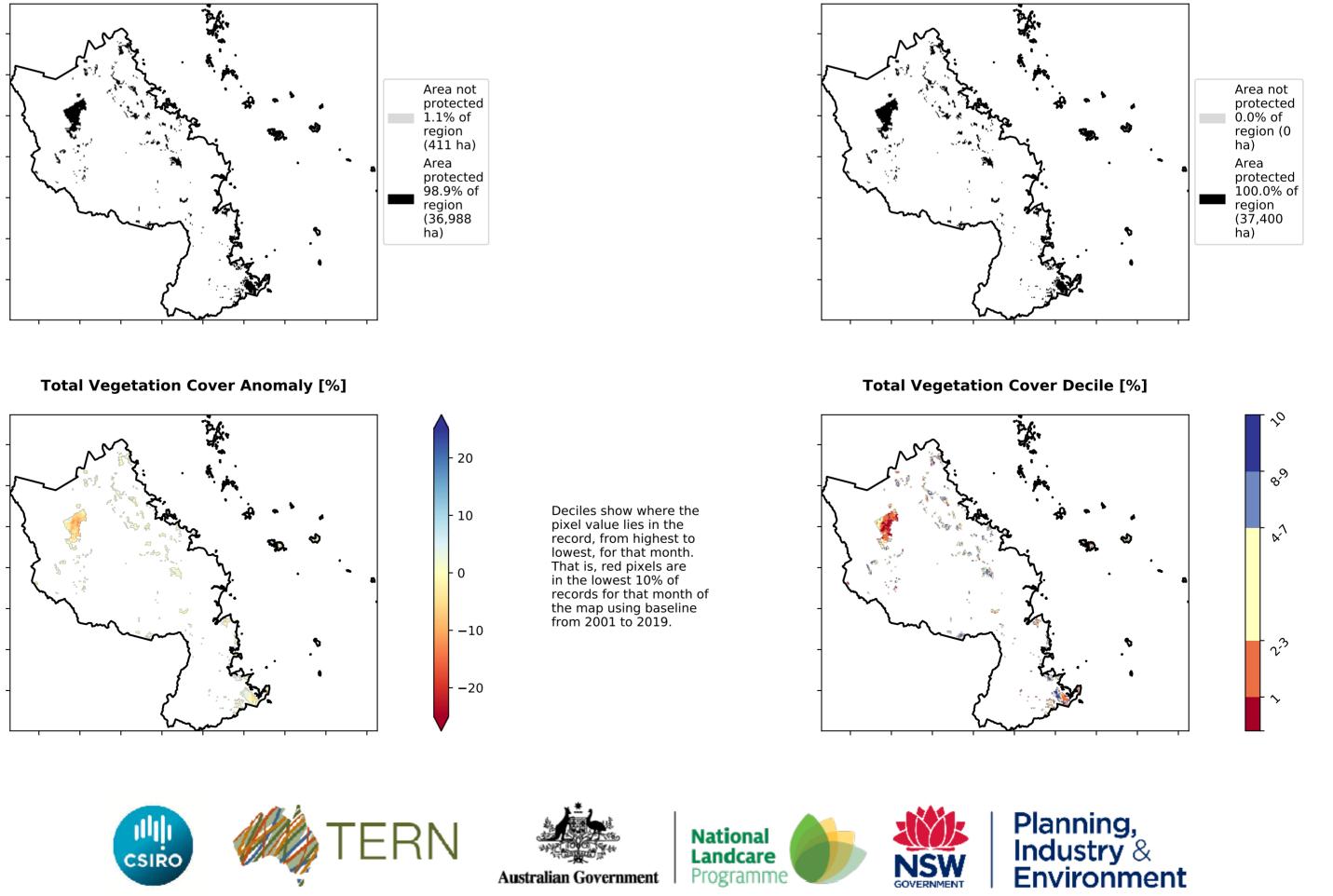


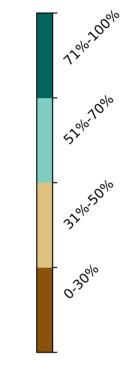
**Total Vegetation Cover [%]** 

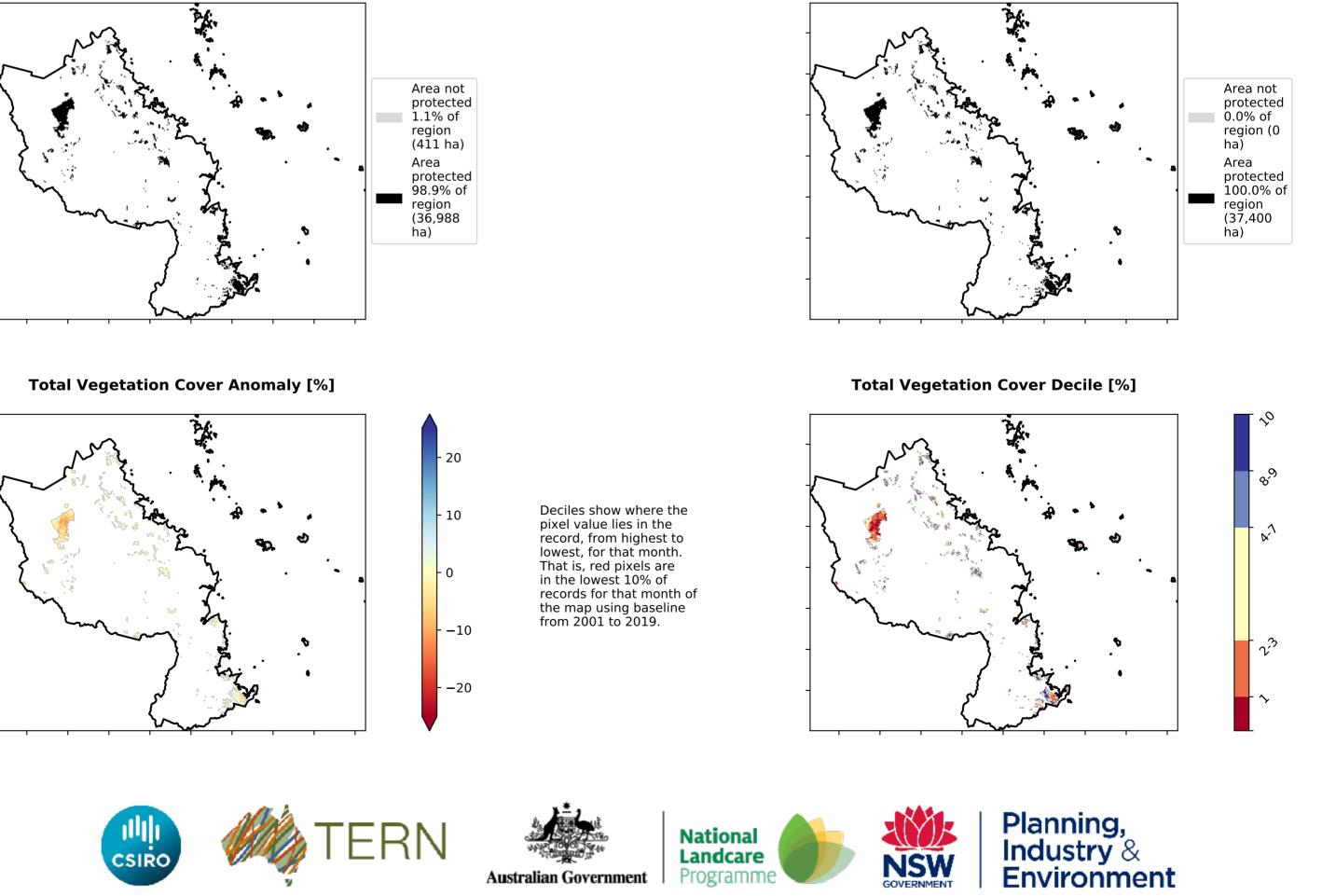
Land use and forest cover



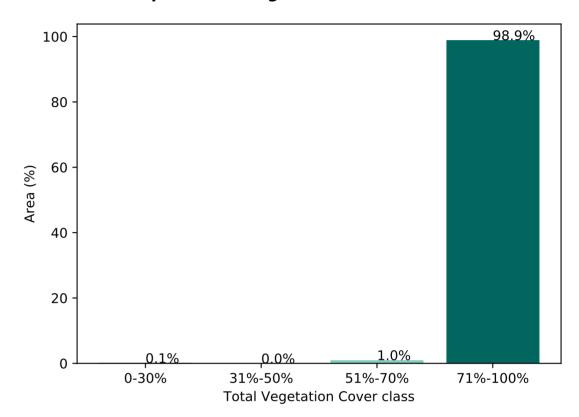
% Area protected from water erosion (>70%)



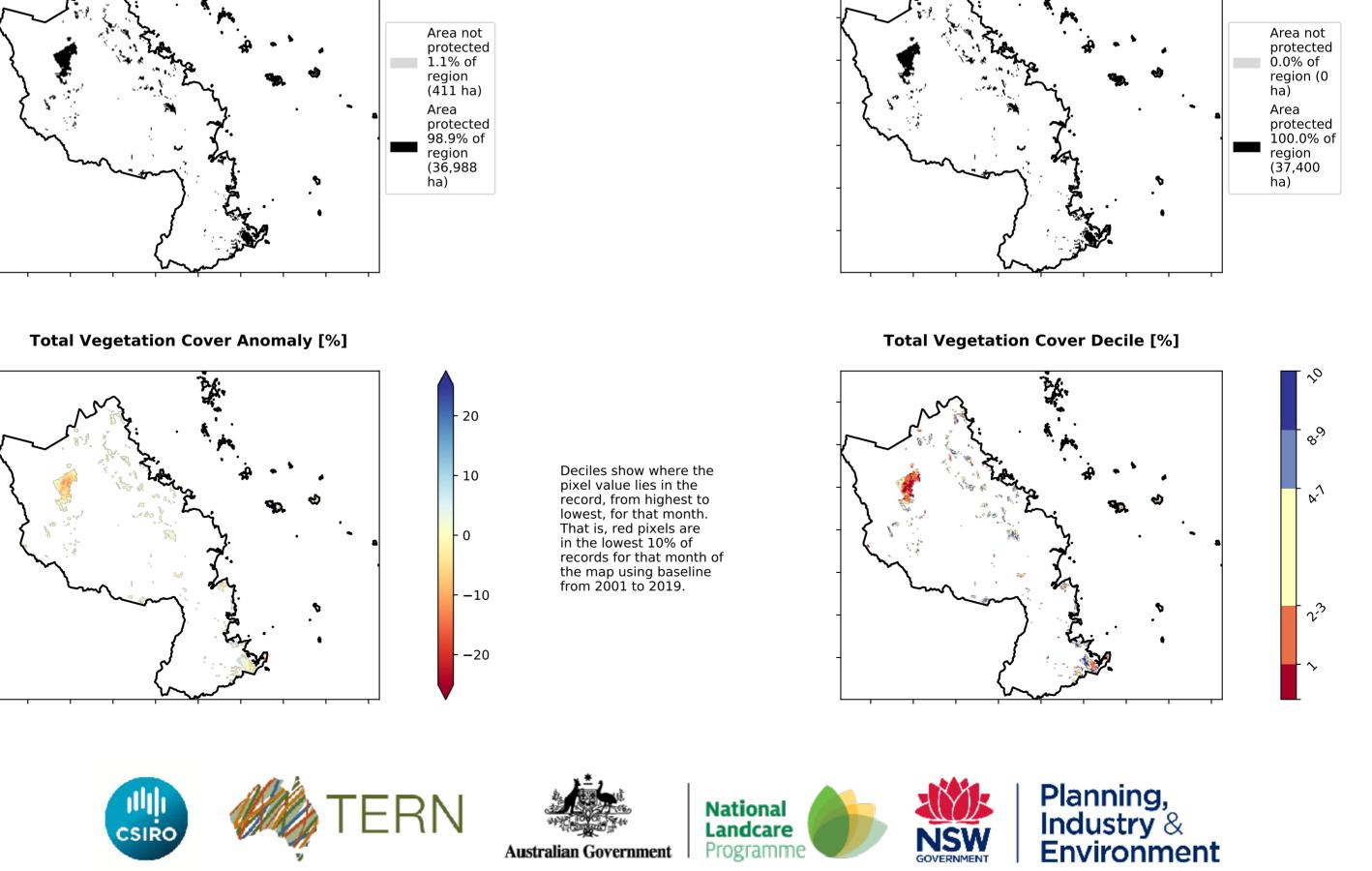


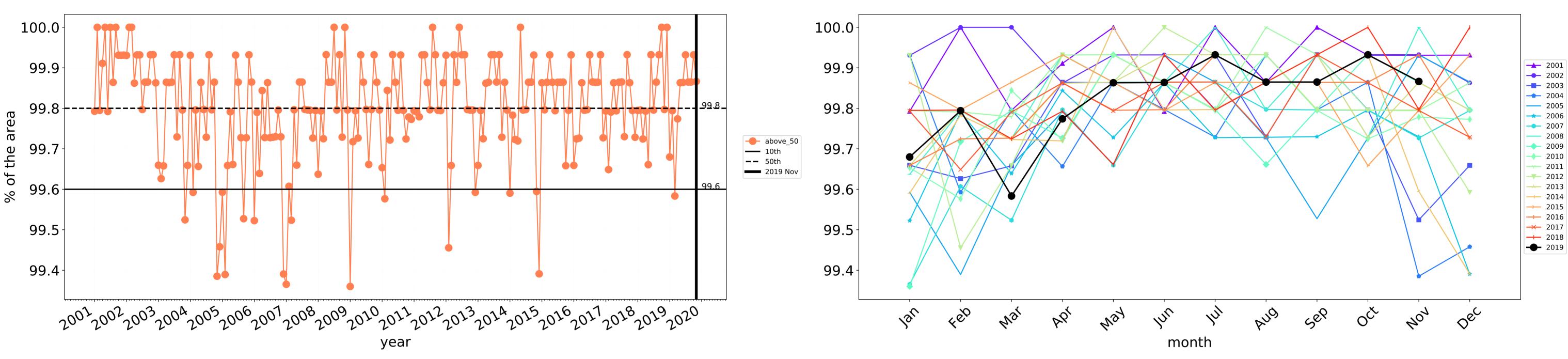


### Proportion of vegetation cover class in area



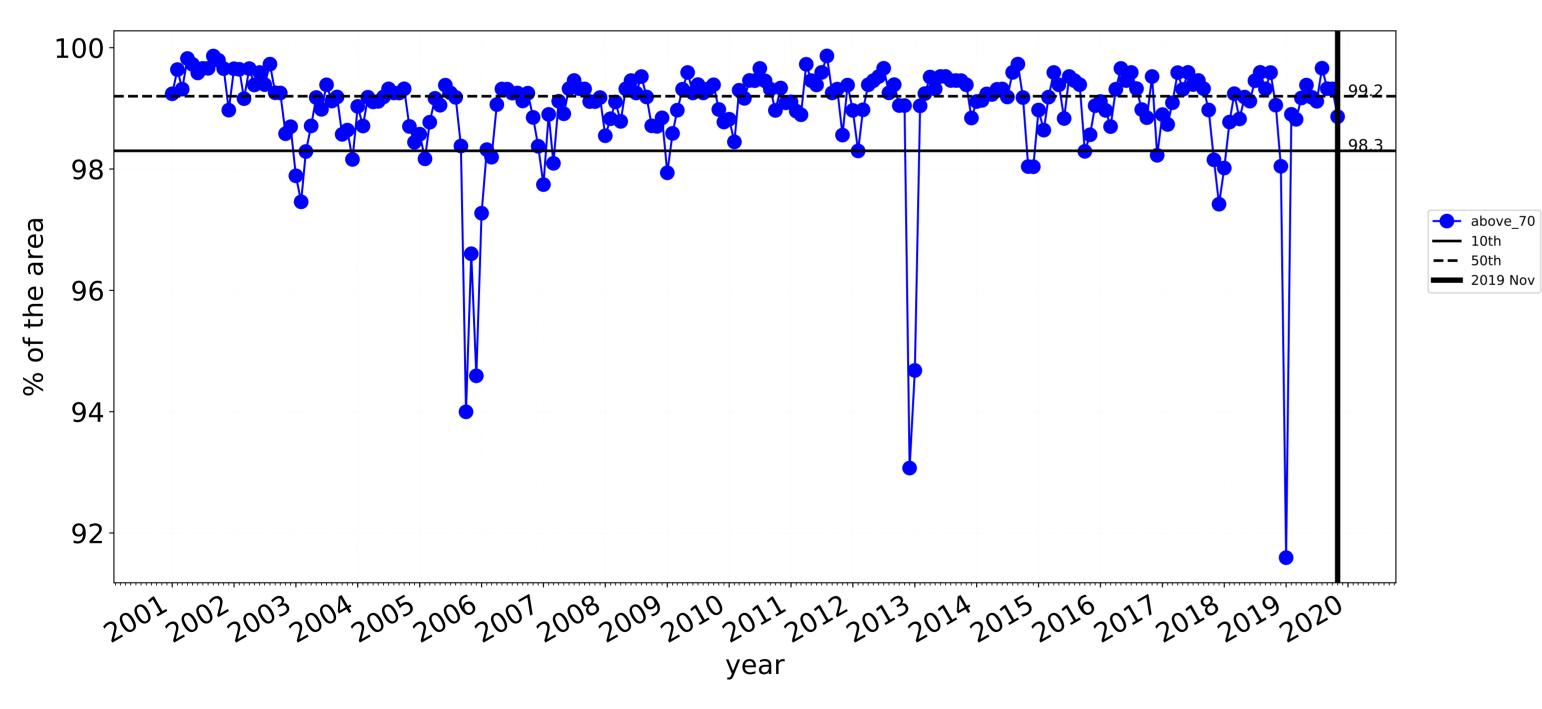
### % Area protected from wind erosion (>50%)

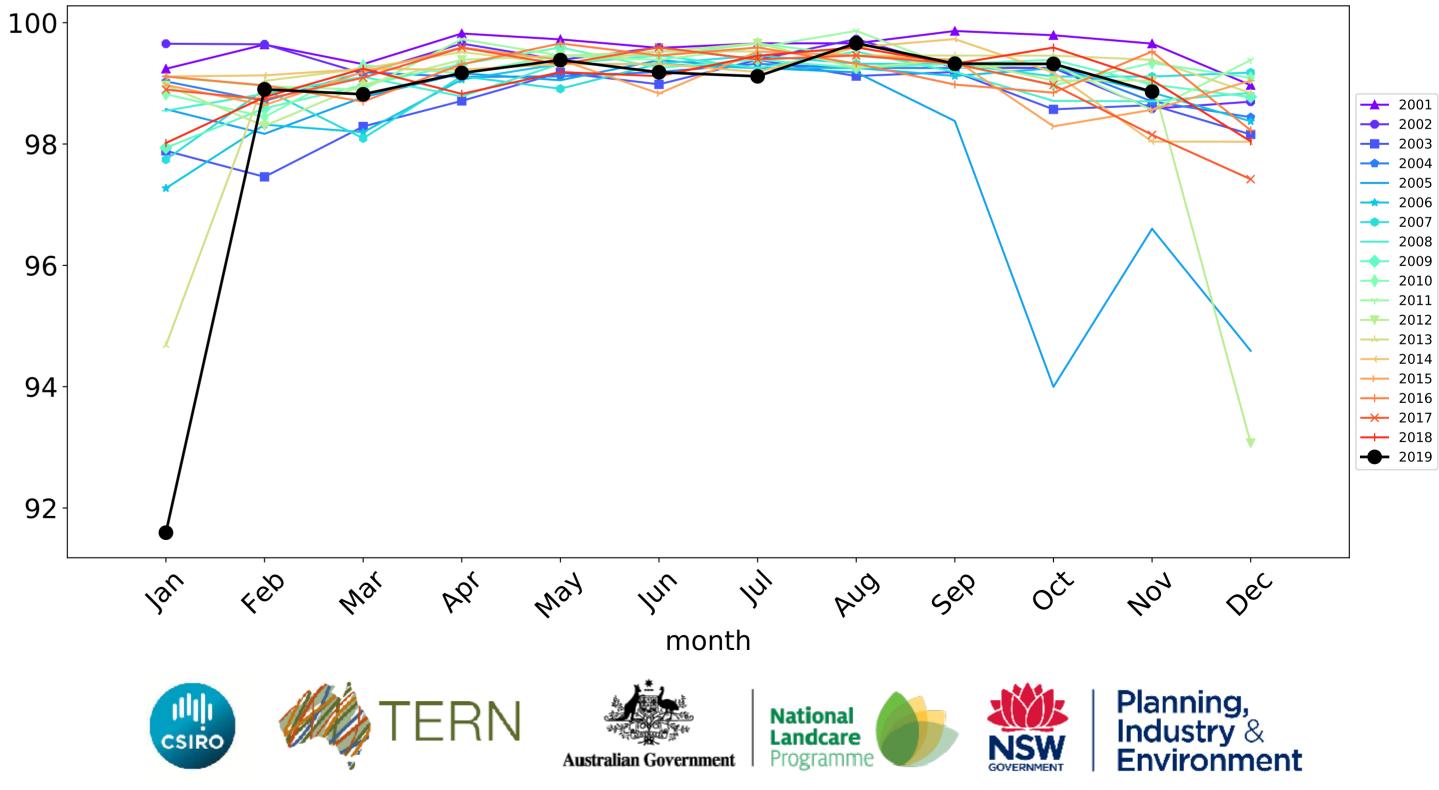




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

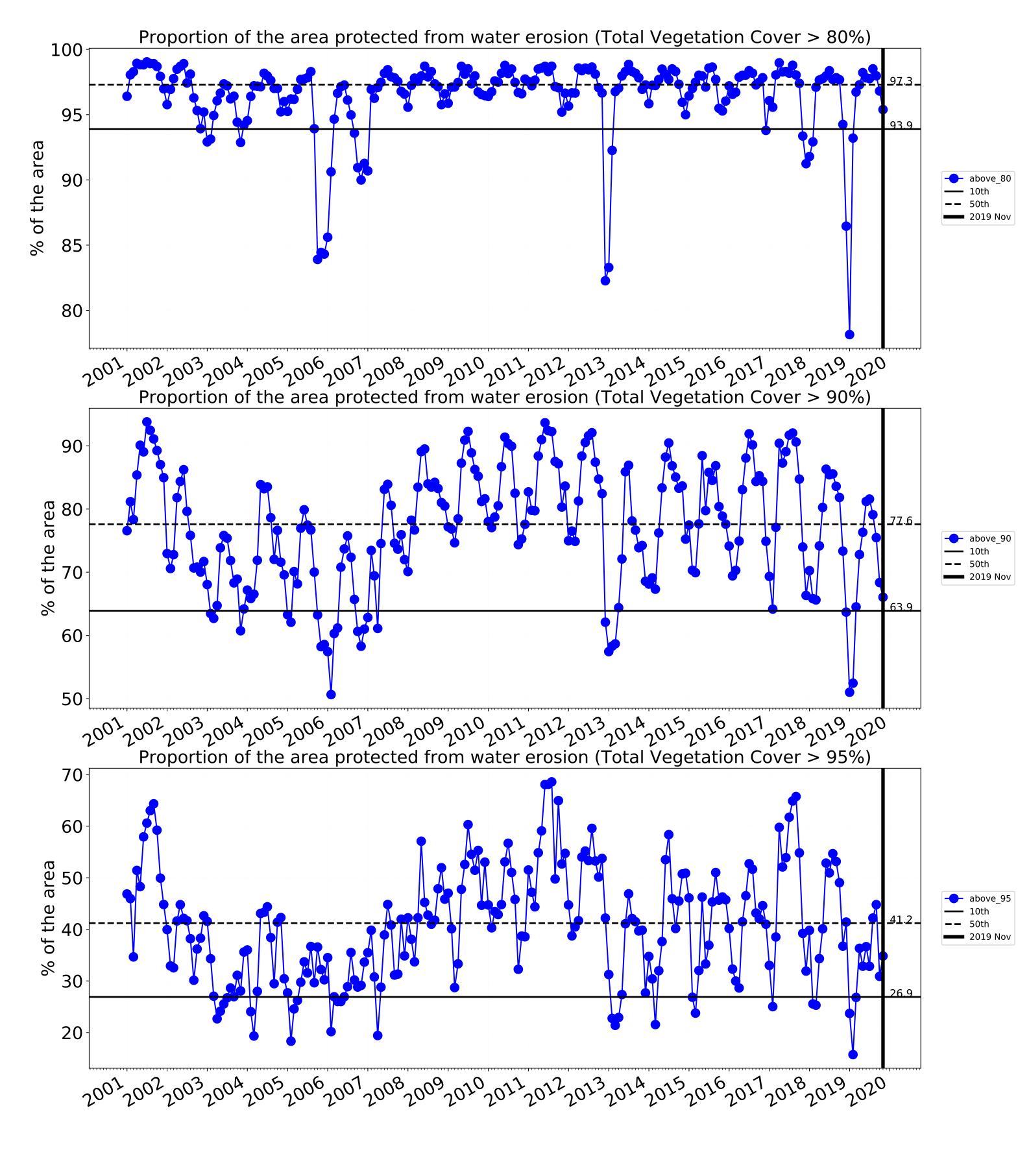
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

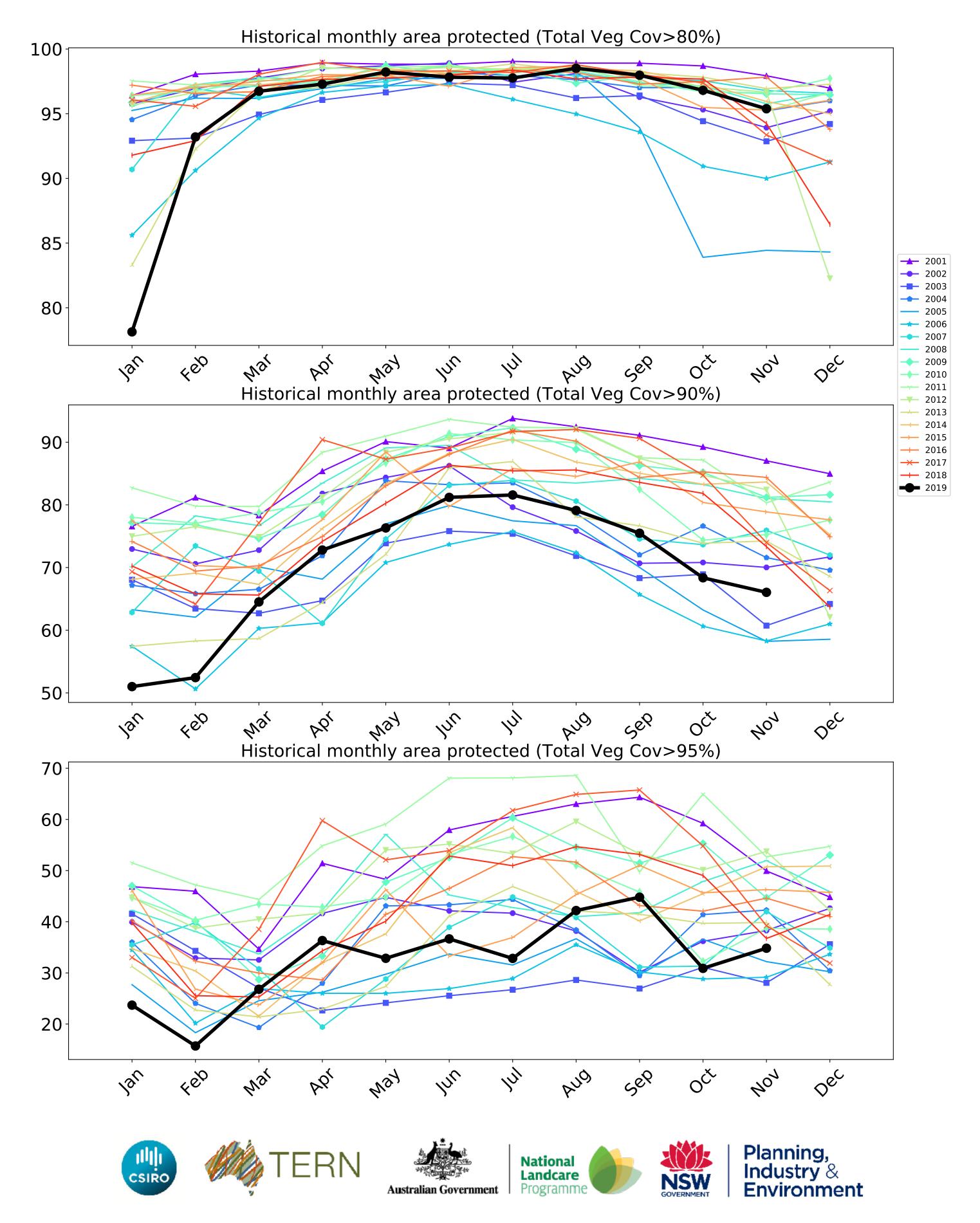




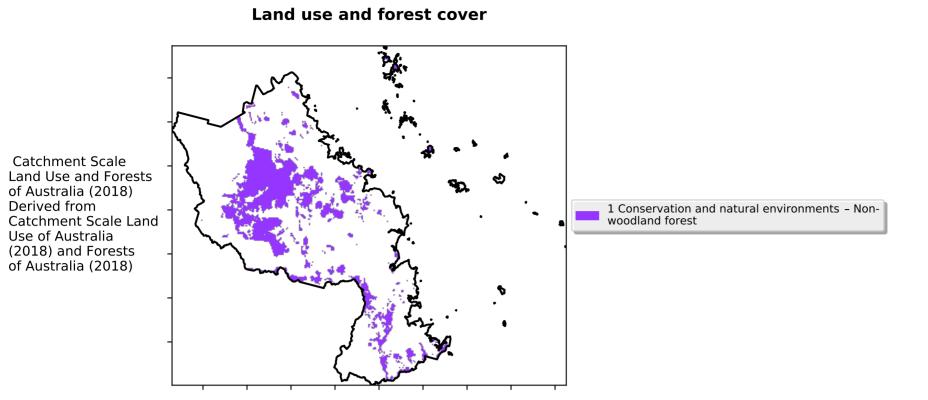
Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

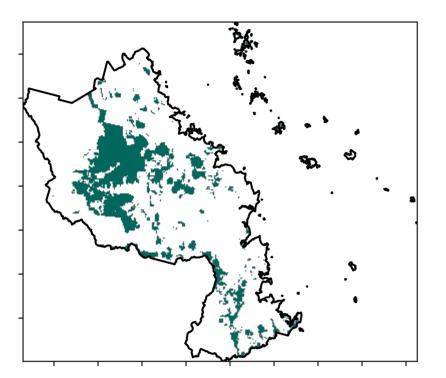




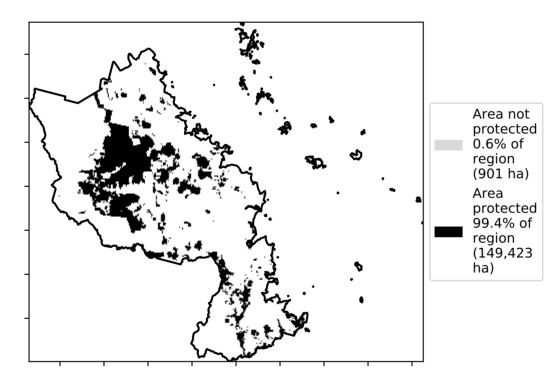
# **Conservation and natural environments Forest (non woodland)**

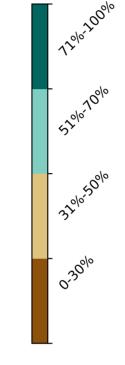


**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





- 20

- 10

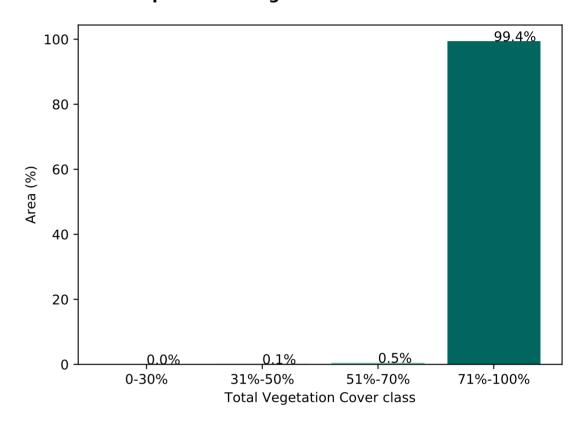
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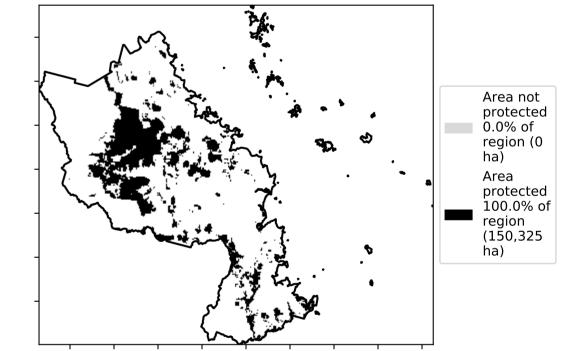
-20



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



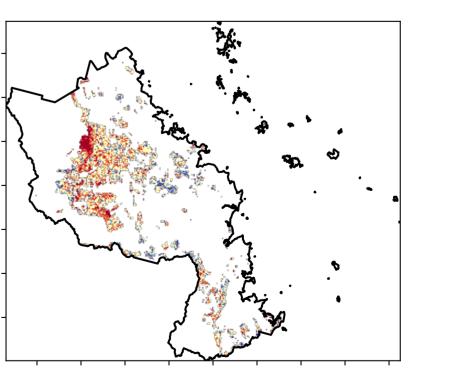
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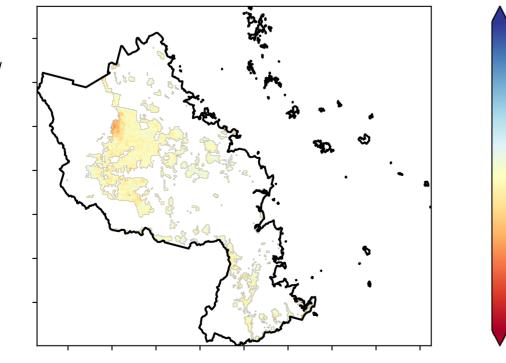
2<sup>35</sup>

Total Vegetation Cover Decile [%]



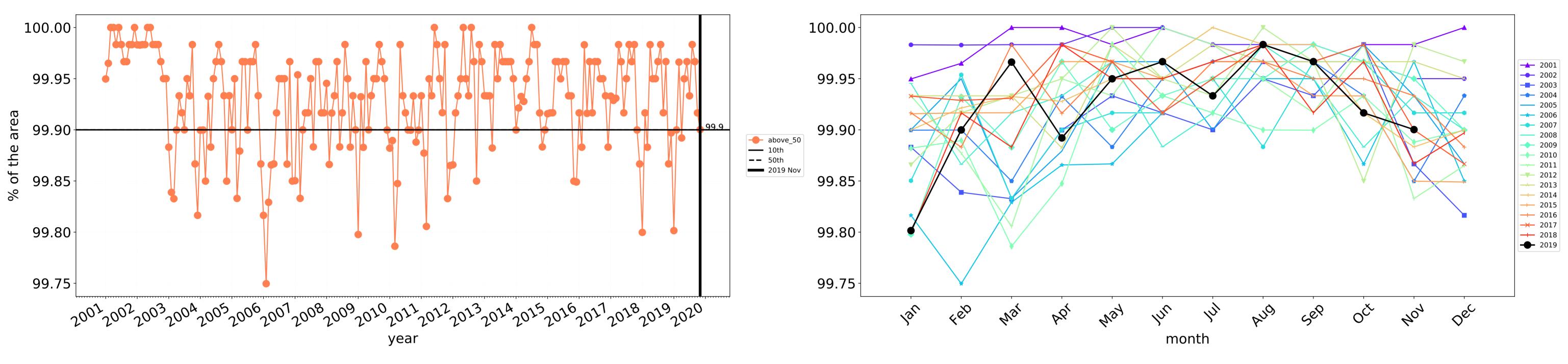
**Total Vegetation Cover Anomaly [%]** 

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 map using baseline from 2001 to 2019.



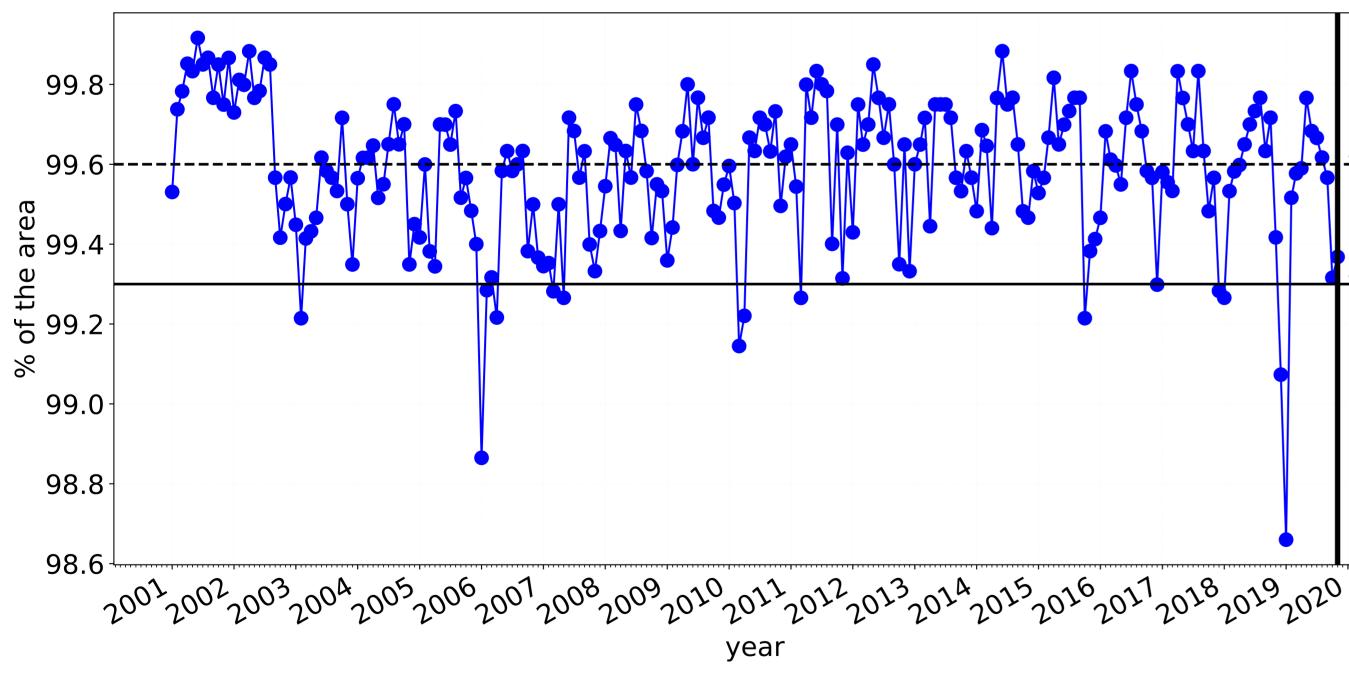
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the man using baseline the map using baseline from 2001 to 2019.

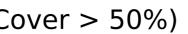




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

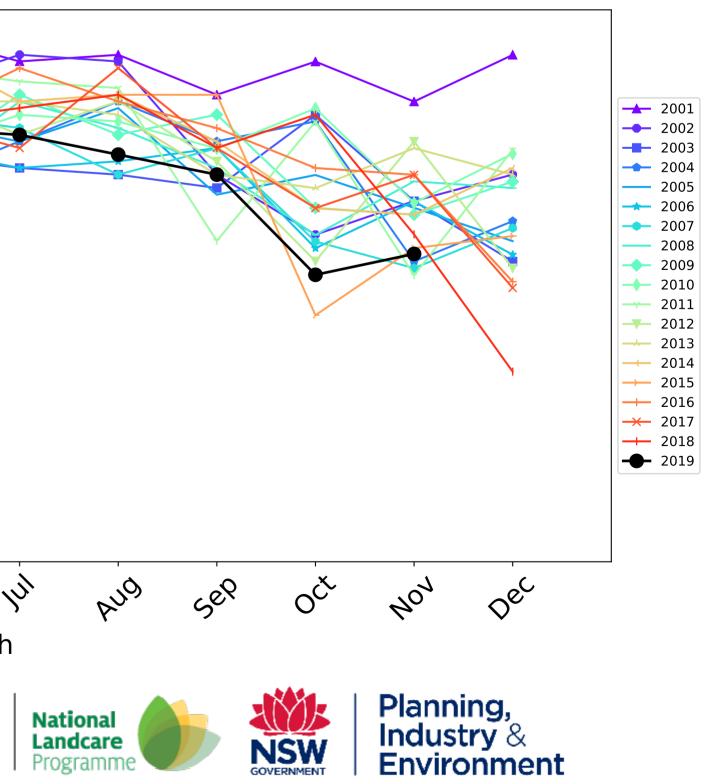




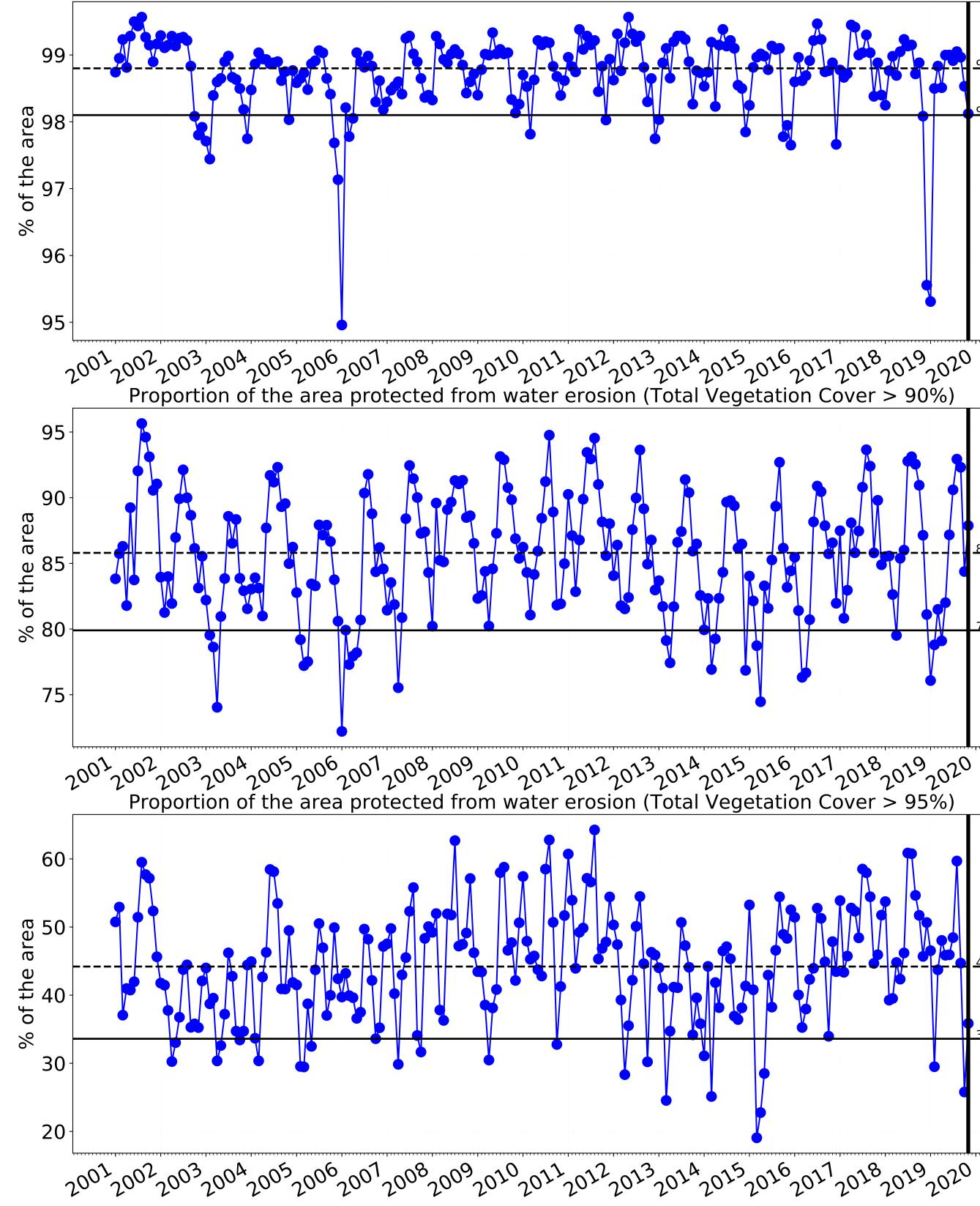
Wind erosion historical monthly area protected (Total Veg Cov >50%)

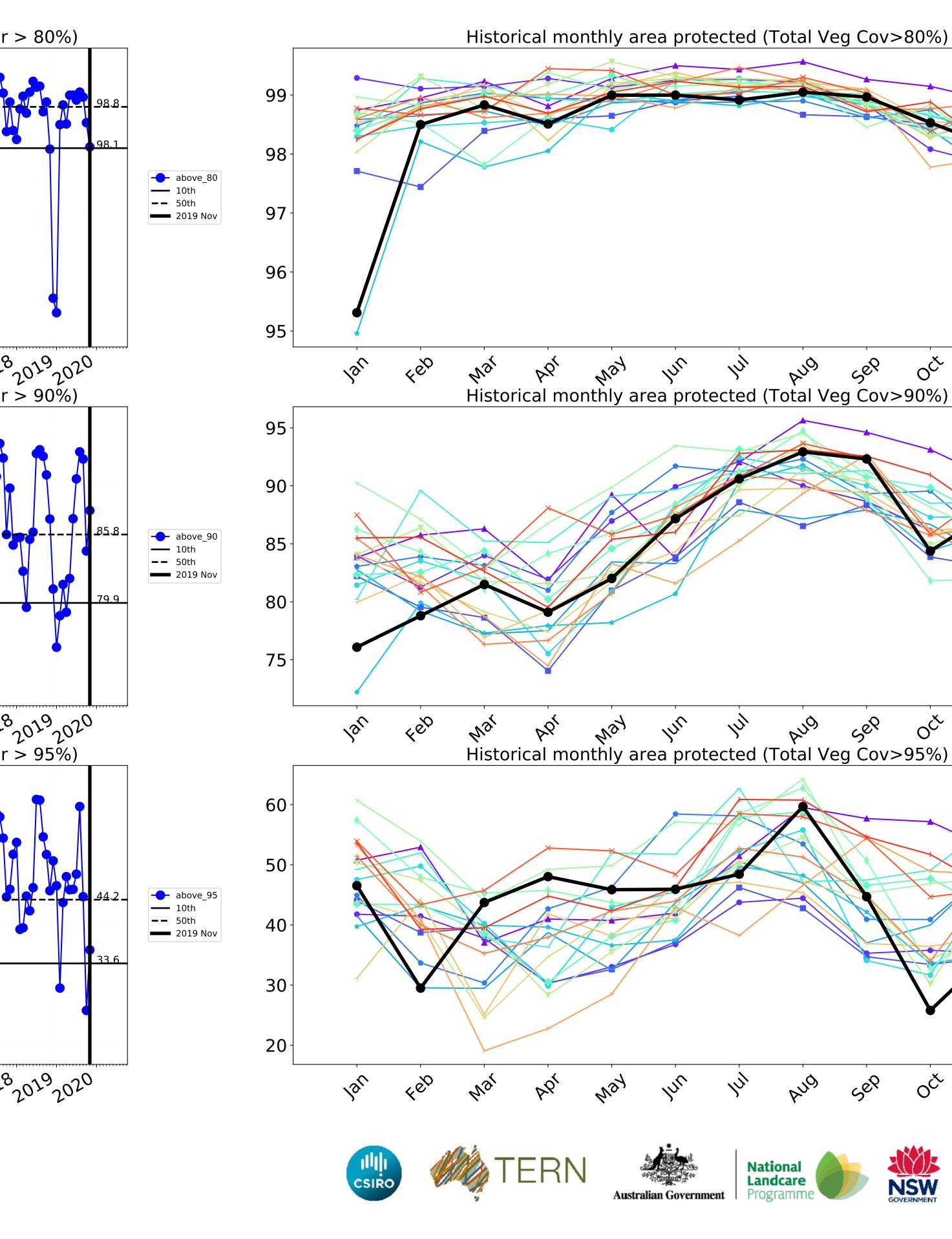
99.8-99.6 ---- above\_70 **—** 10th 99.4 **——** 50th 2019 Nov 99.2 99.0 98.8 98.6 lar feb In May P.Q' Wal month ERN CSIRO Australian Government

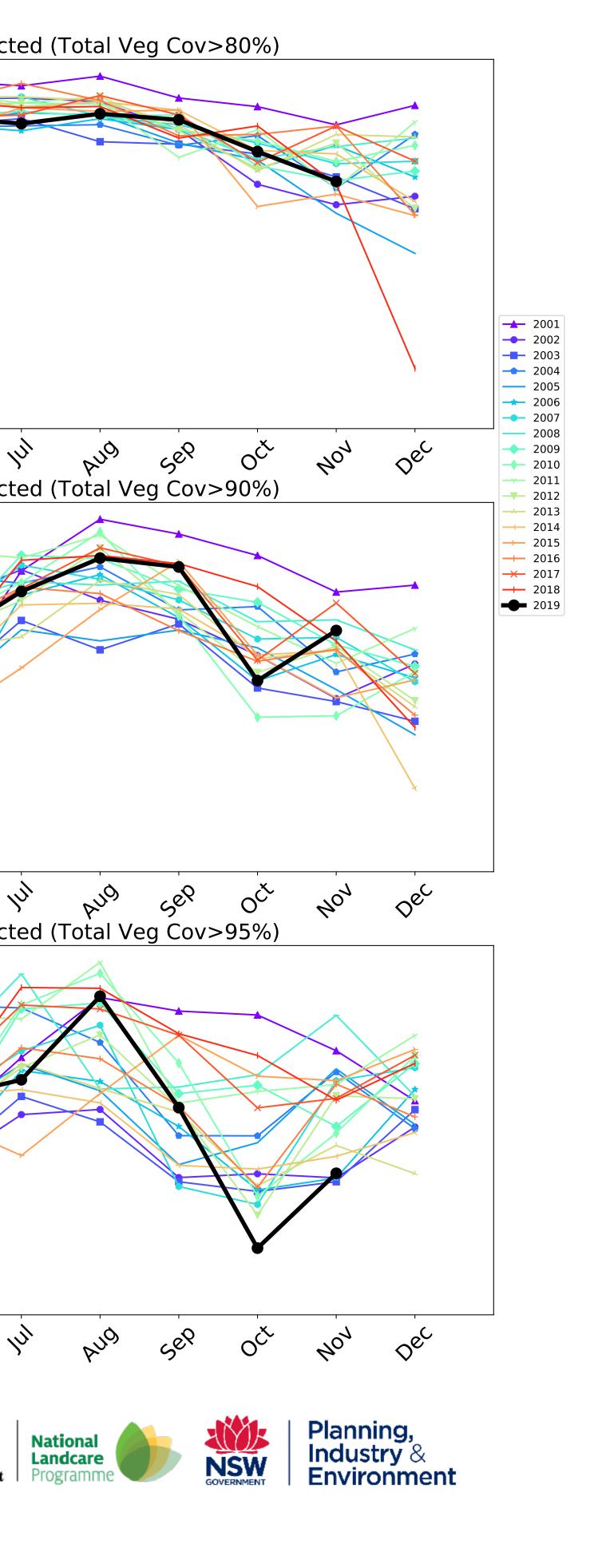
Water erosion historical monthly area protected (Total Veg Cov>70%)



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



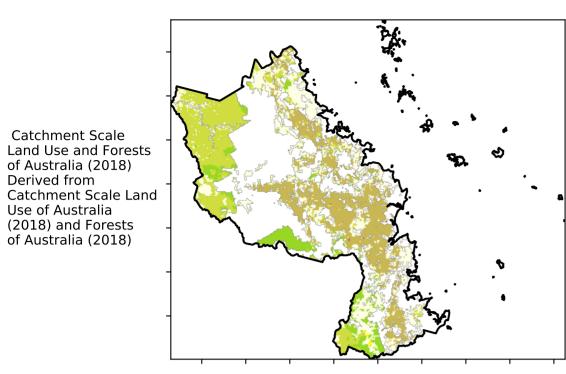




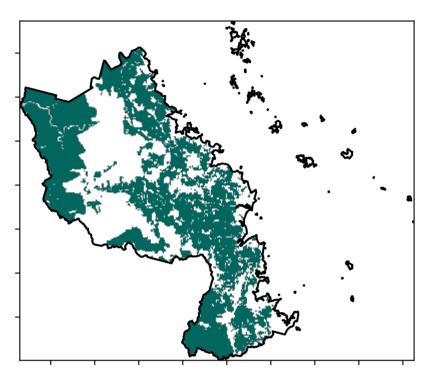
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# Agriculture

Land use and forest cover

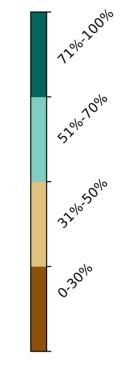


**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)





Area not protected 0.6% of

- 10

0

-10

-20

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

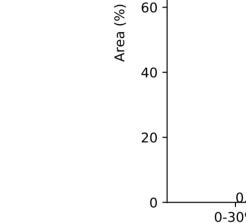
4 Agriculture - Grazing - Irrigated

8 Agriculture - Horticulture - Irrigated

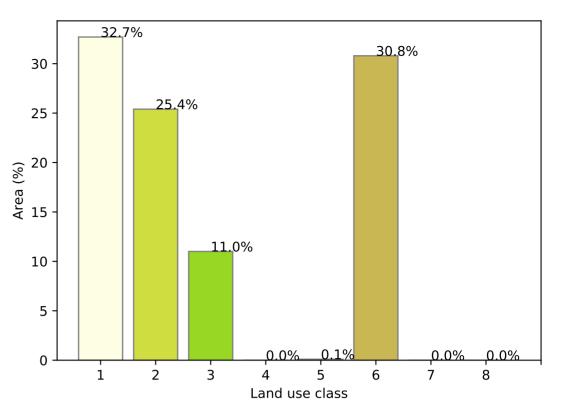
3 Agriculture - Grazing - Non-woodland forest

5 Agriculture - Cropping - Non-irrigated 6 Agriculture - Cropping - Irrigated

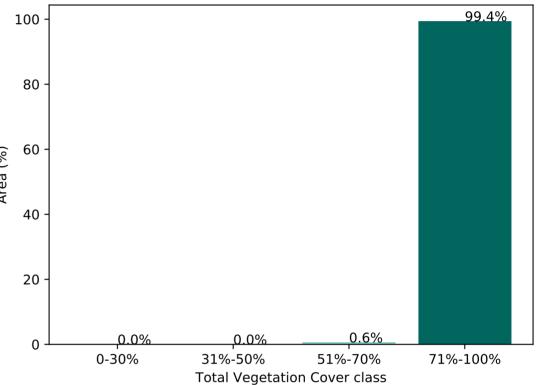
7 Agriculture - Horticulture - Non-irrigated



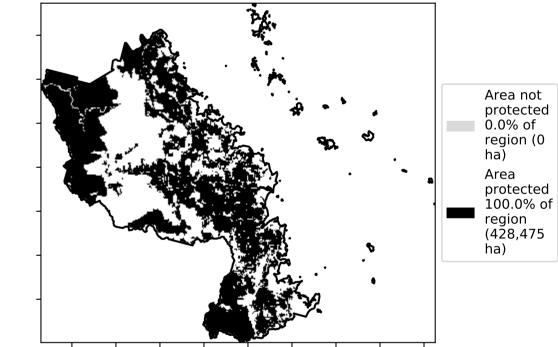
### Proportion of each land class in area



Proportion of vegetation cover class in area



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



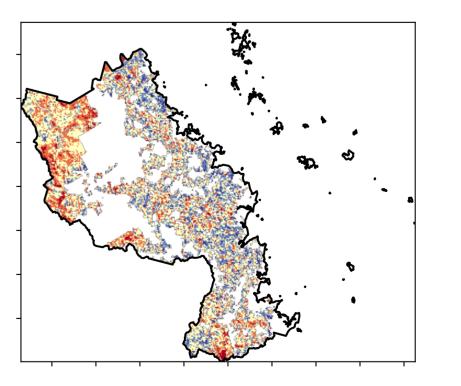
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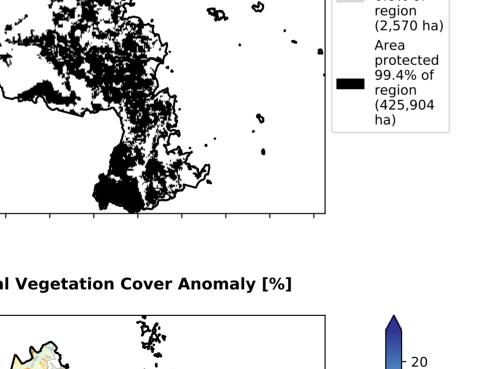
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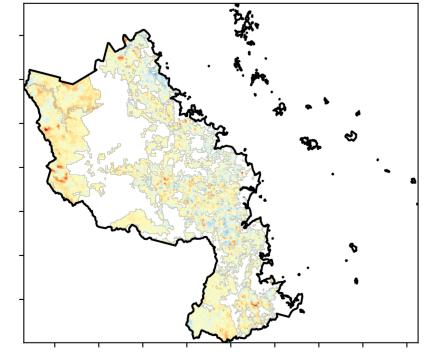
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**Total Vegetation Cover Decile [%]** 





**Total Vegetation Cover Anomaly [%]** 

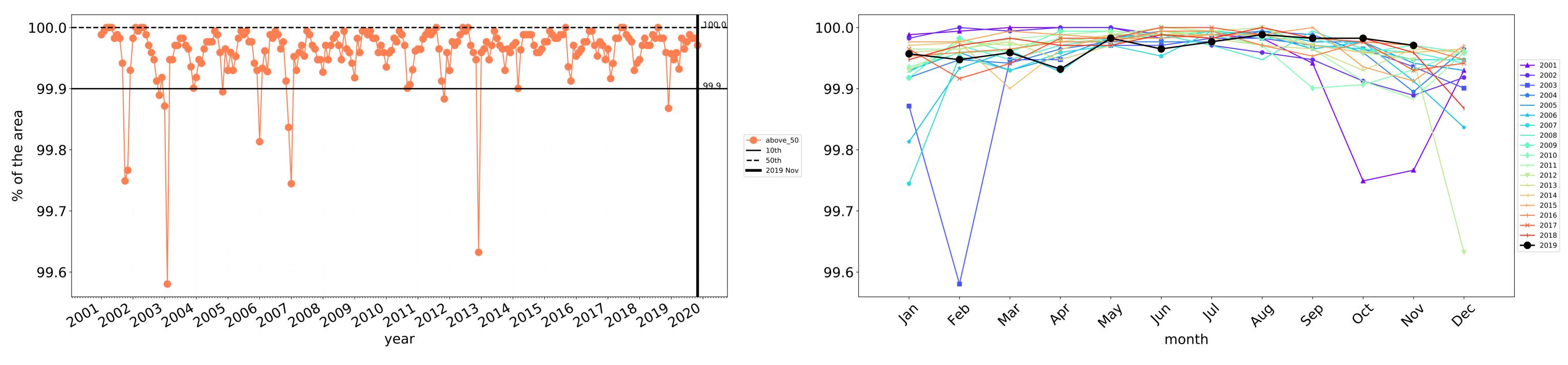


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



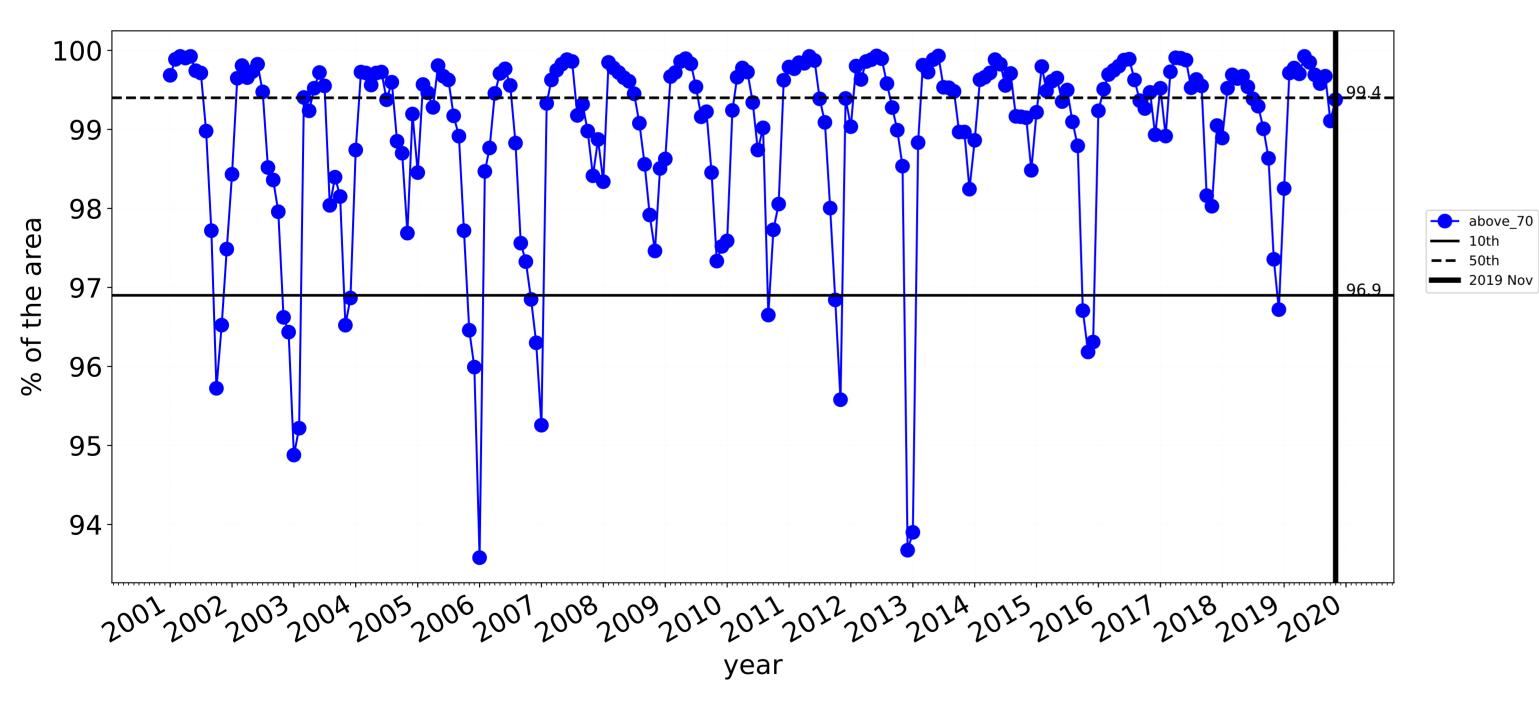
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.

Derived from

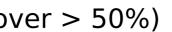


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

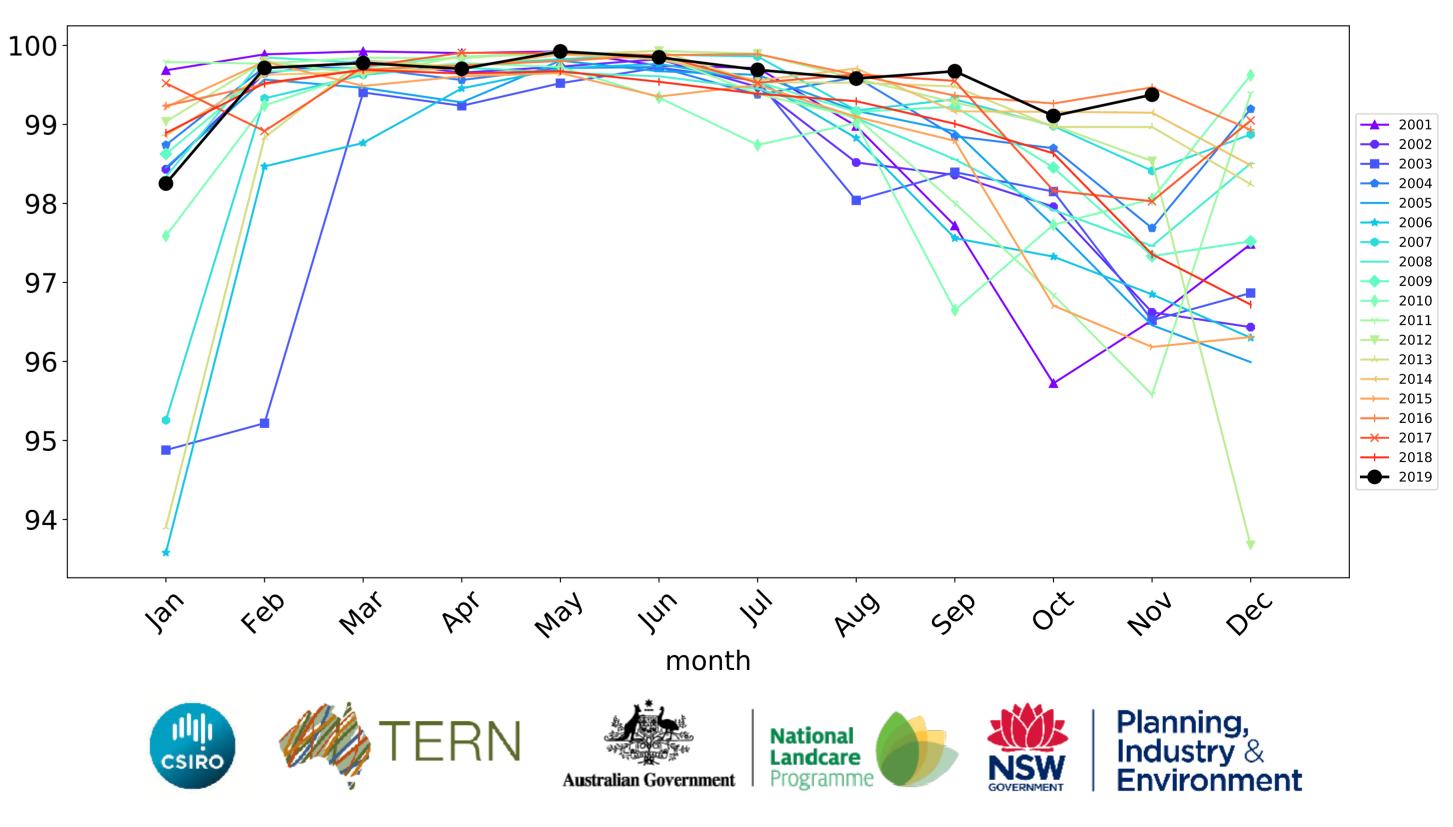


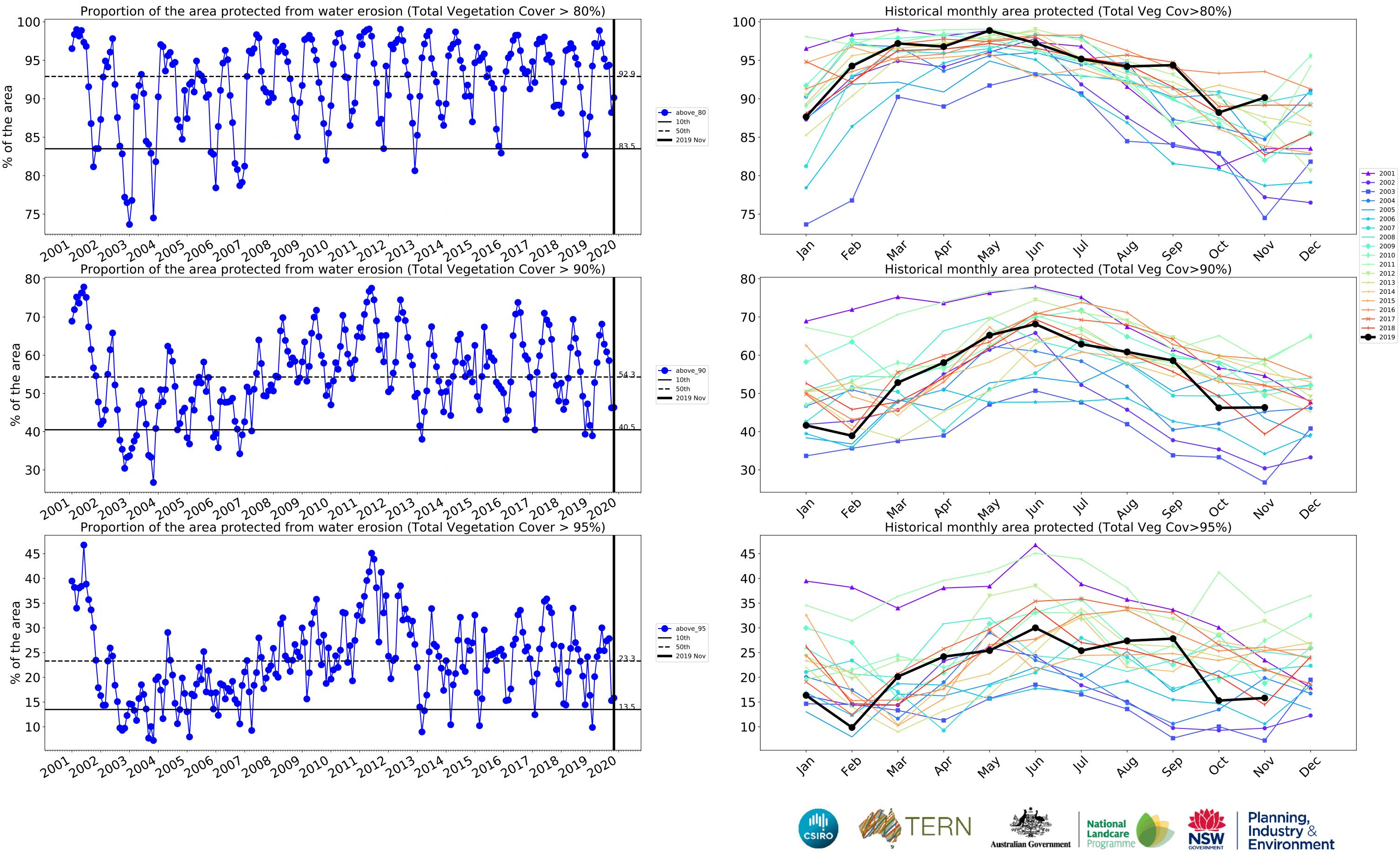
# Agriculture timeseries



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

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





Australian Government

### Grazing

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

12010-2005

52% TON

32%50%

0.30%

- 20

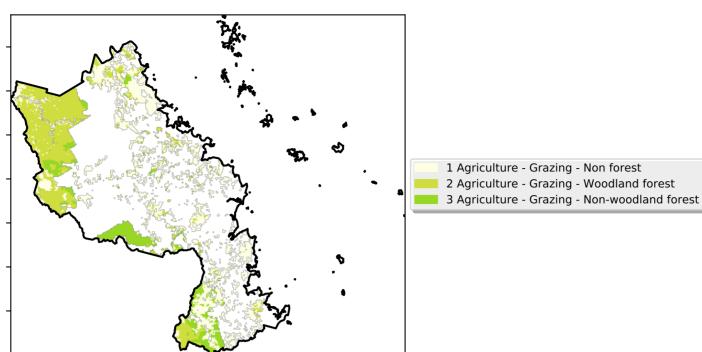
- 10

0

-10

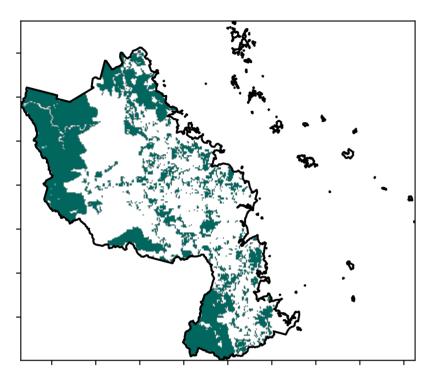
-20

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

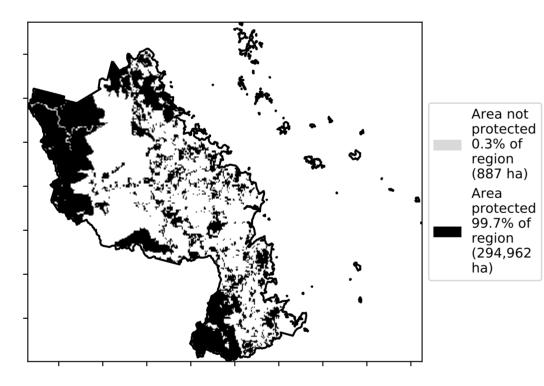


Land use and forest cover

Total Vegetation Cover [%]



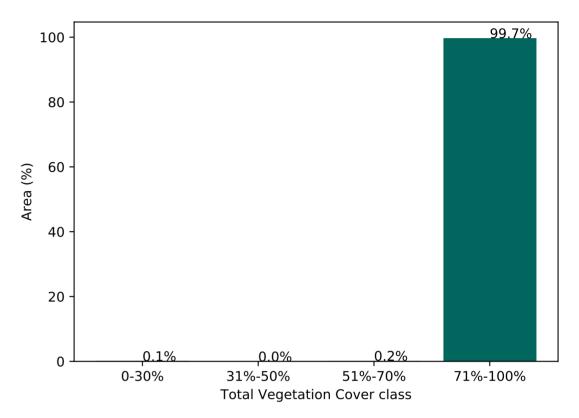
% Area protected from water erosion (>70%)



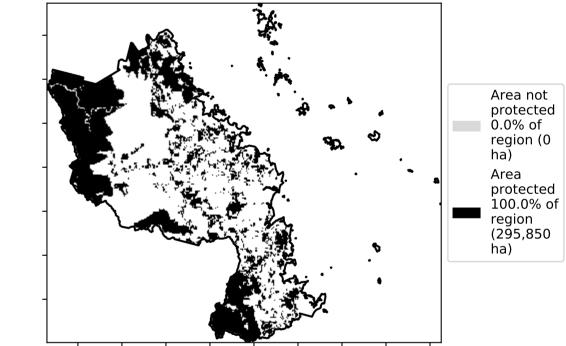
47.4% 40 36.7% 30 Area (%) 20 15.9% 10 0 2 3 1 Land use class

#### Proportion of each land class in area

### Proportion of vegetation cover class in area



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



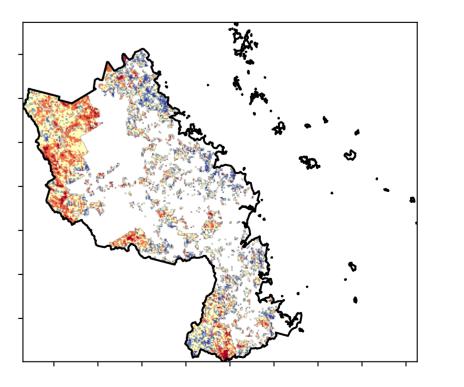
\$

°,

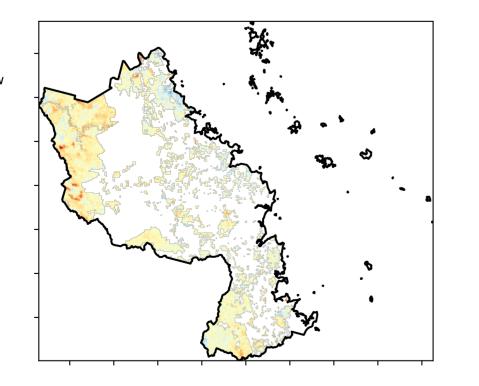
A.1

2??

**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

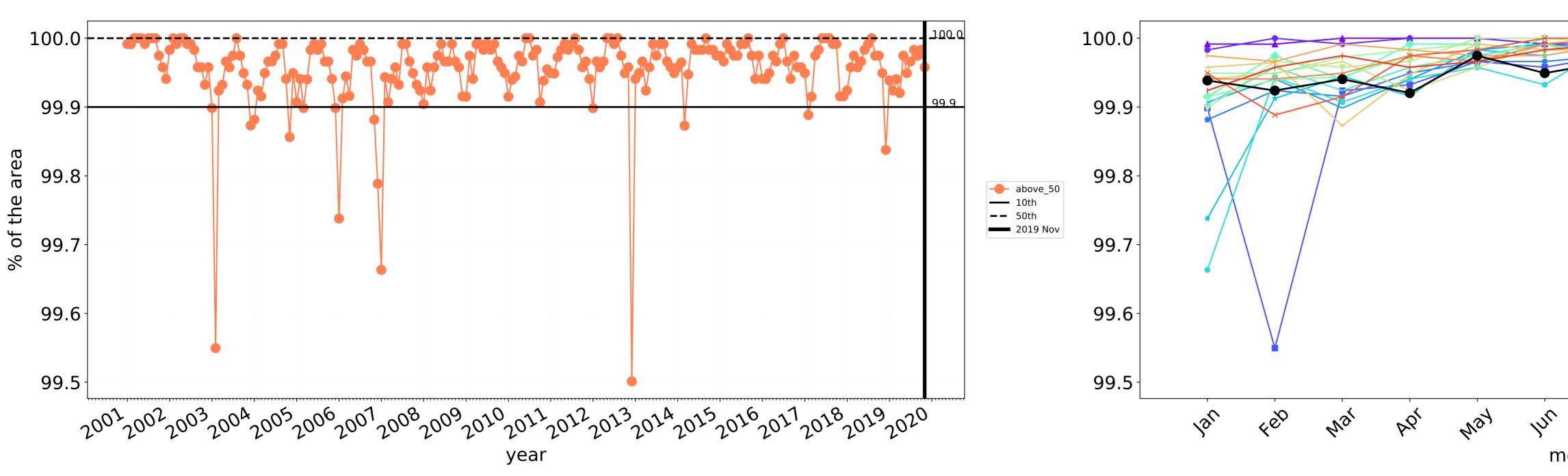


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



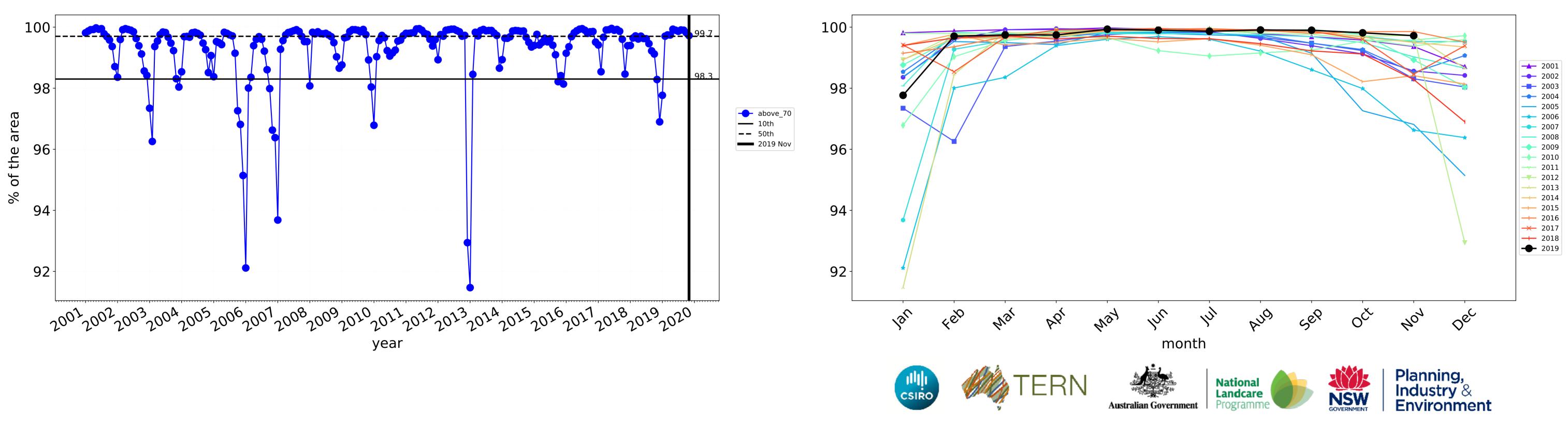
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.



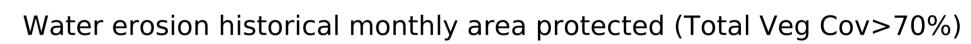


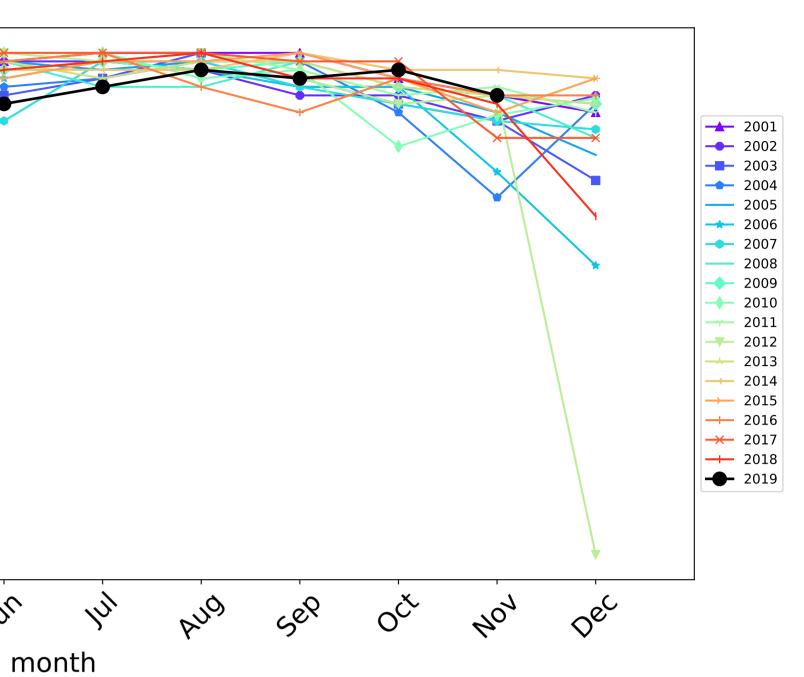
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

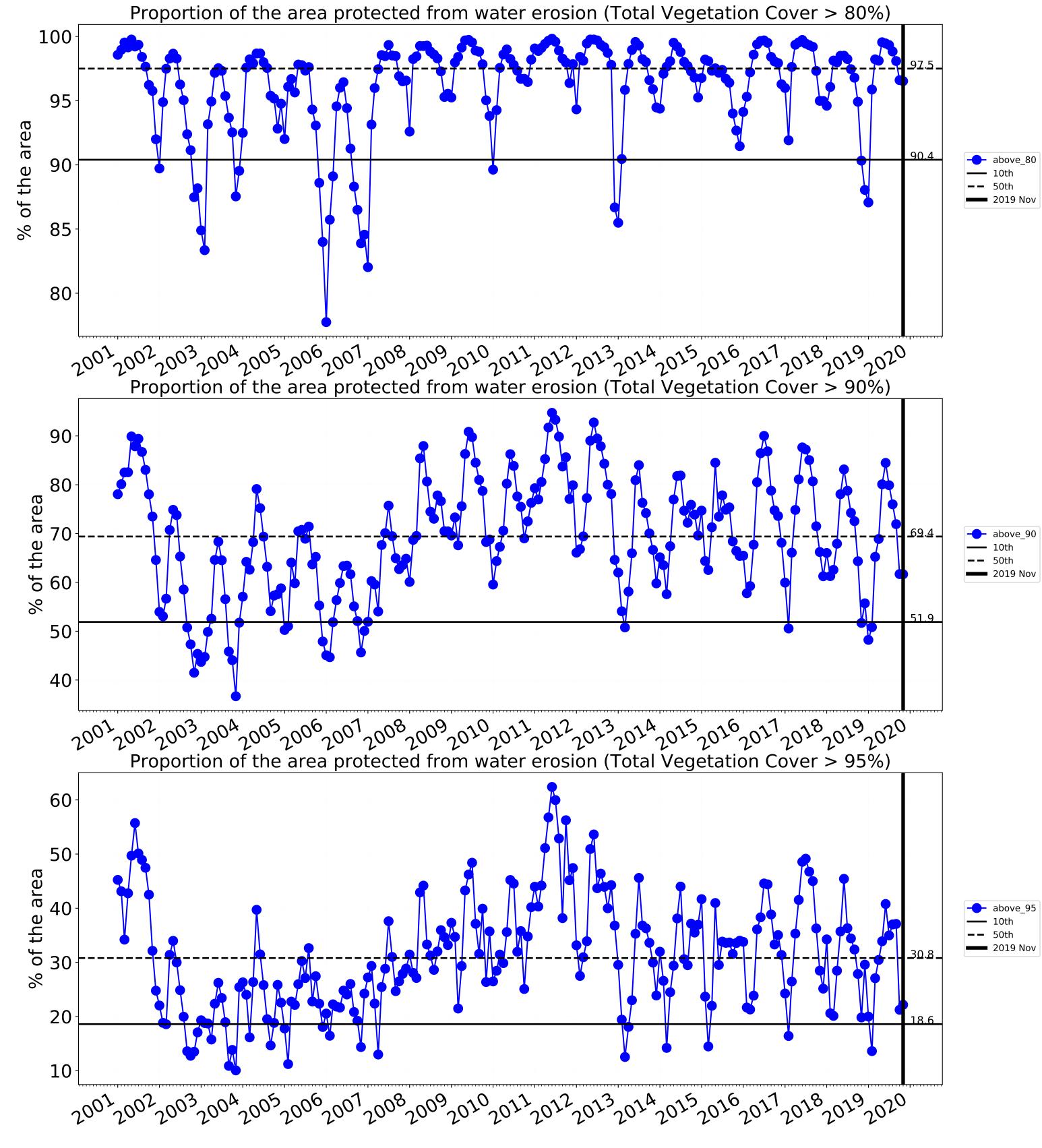
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

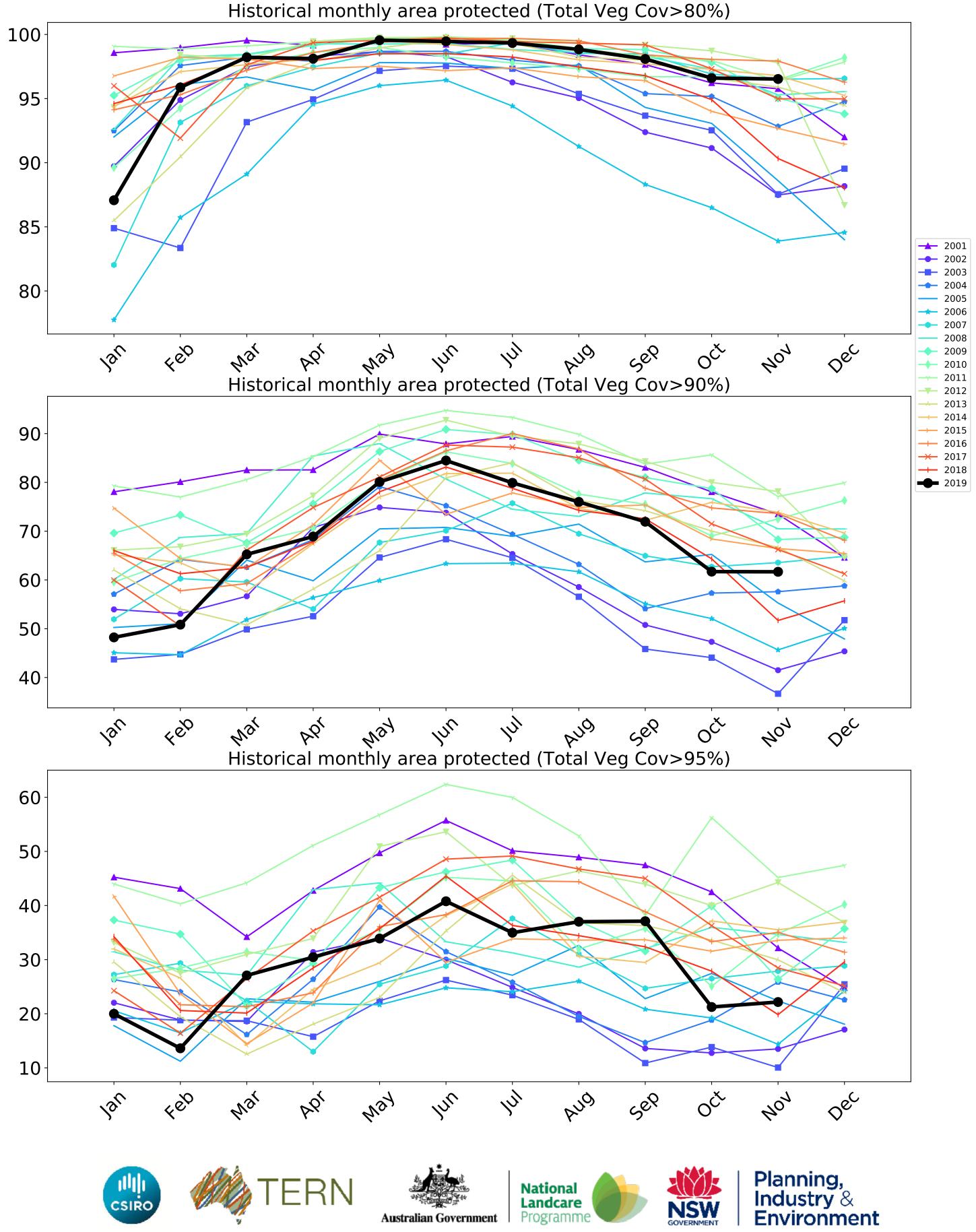


Wind erosion historical monthly area protected (Total Veg Cov >50%)











# **Grazing non forest**

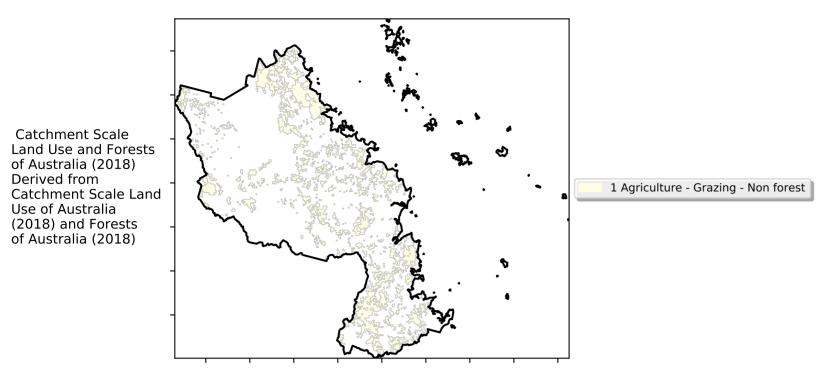
· 12% 200°

· 52°1070°12

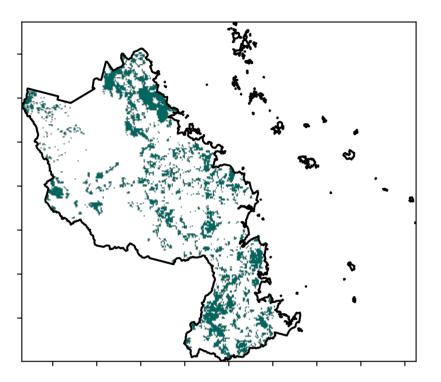
320050010

0.30%

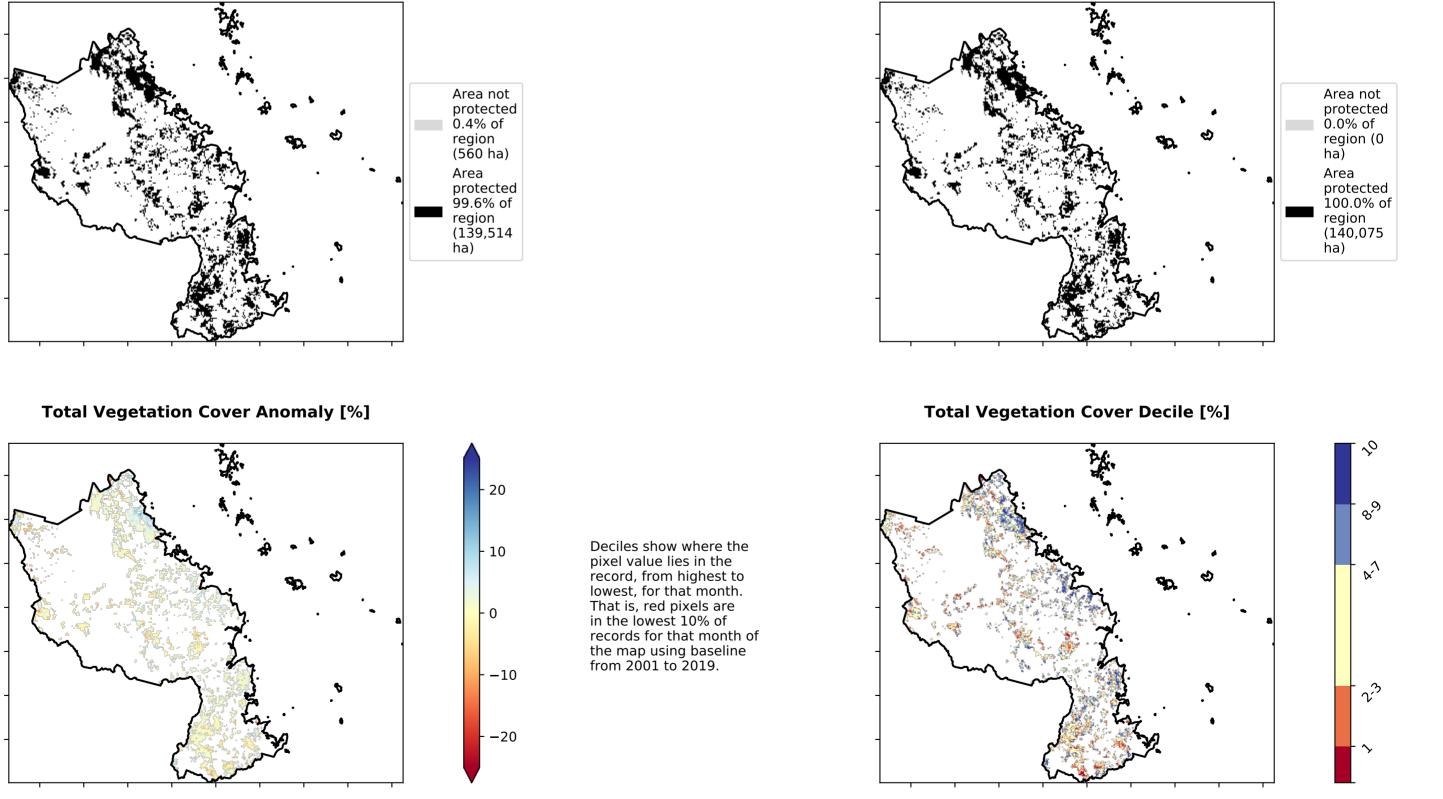
Land use and forest cover



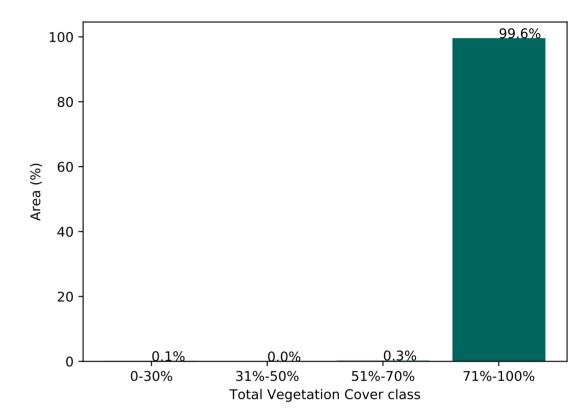
Total Vegetation Cover [%]



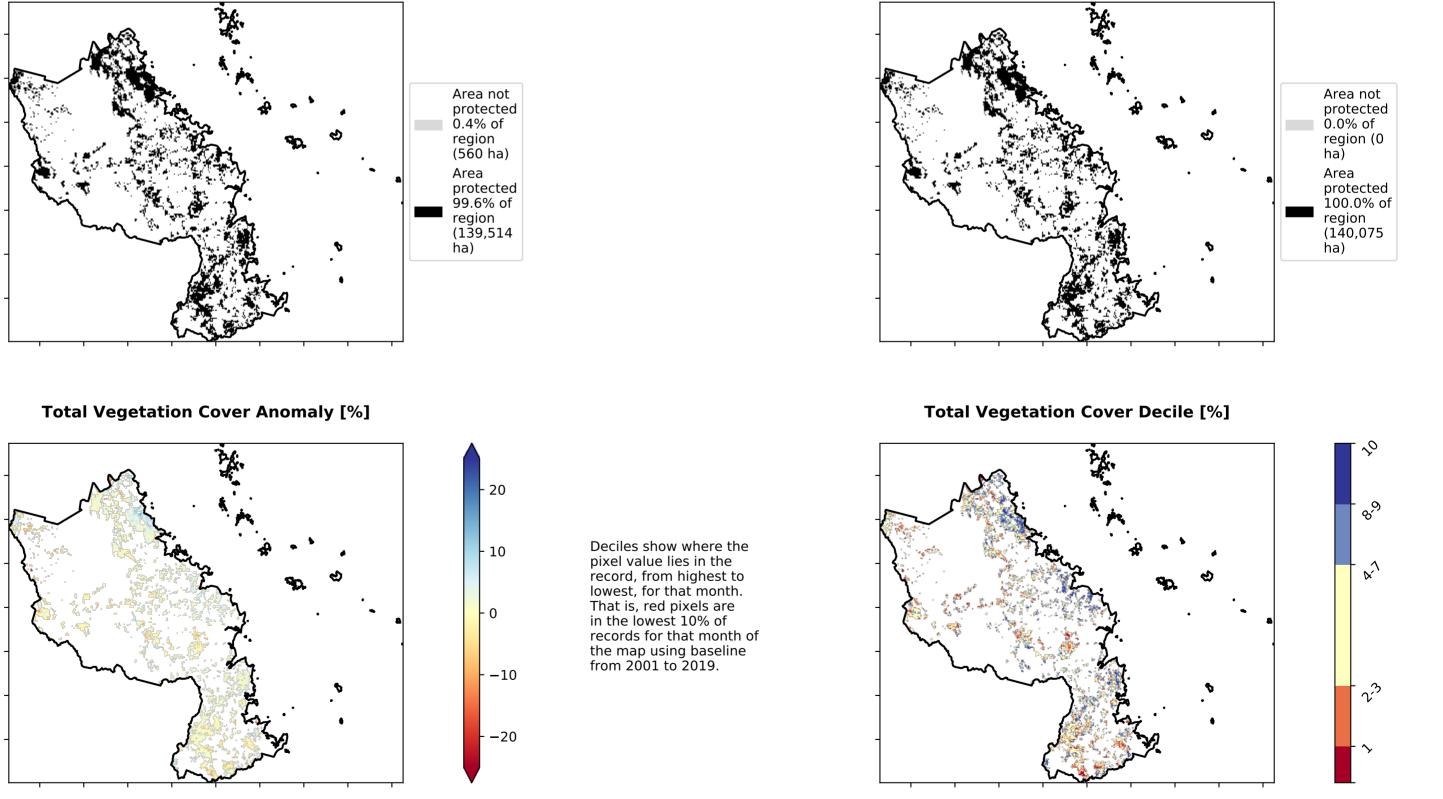
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

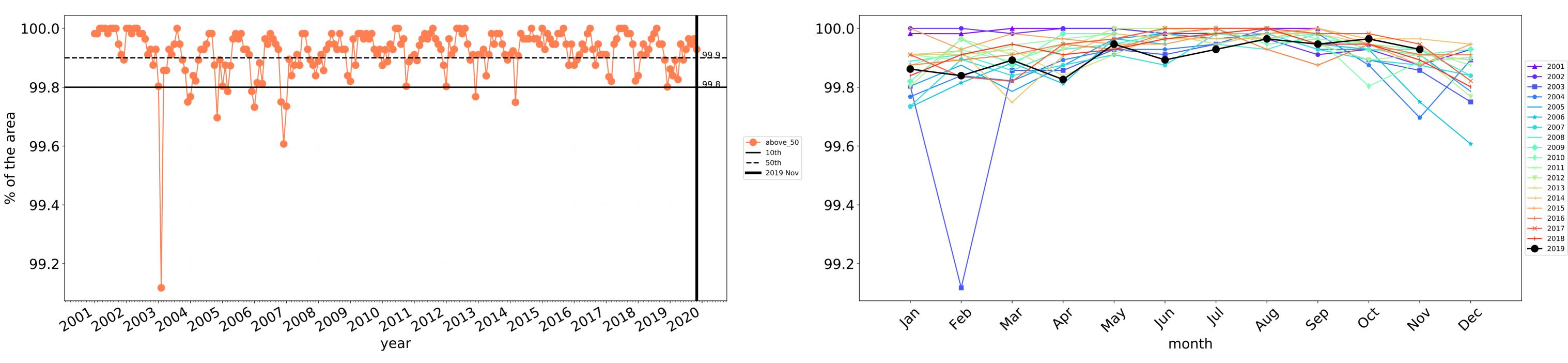


% Area protected from wind erosion (>50%)



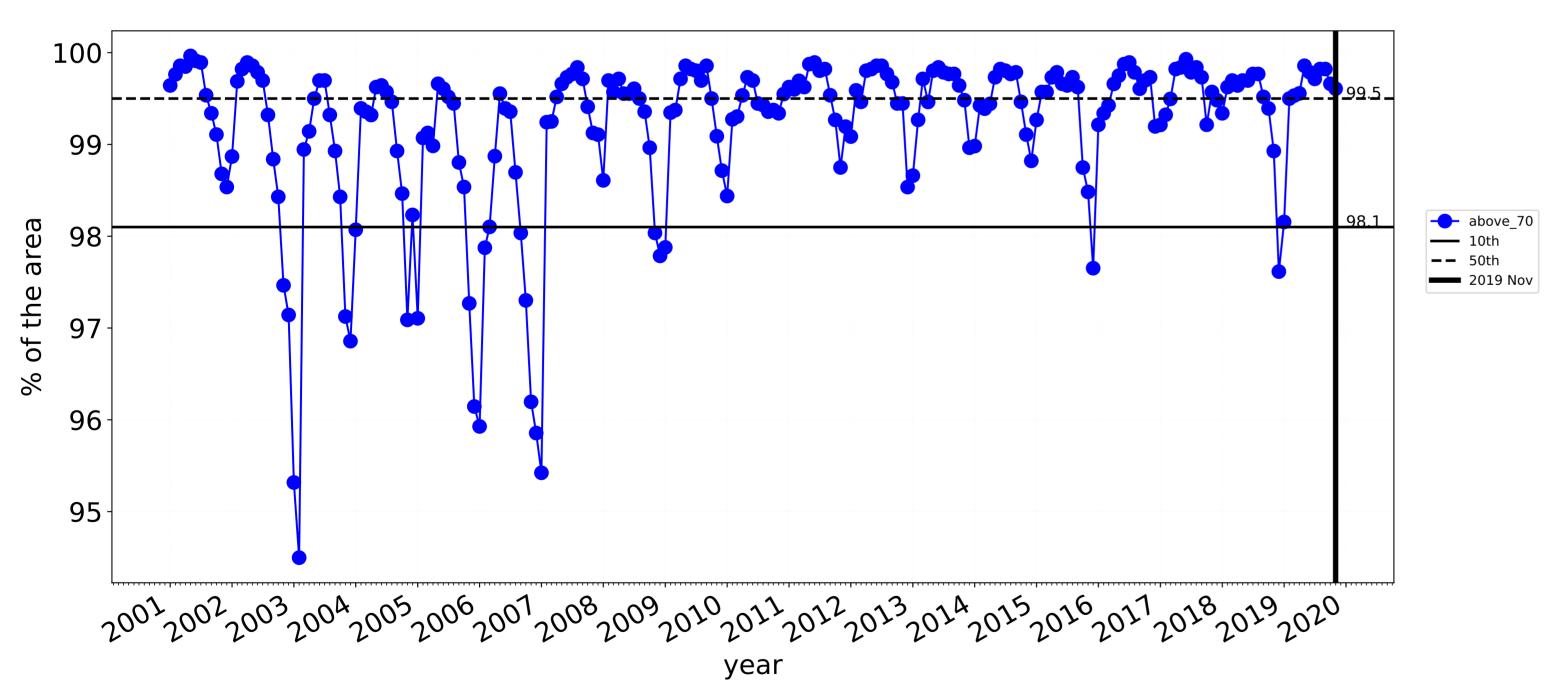


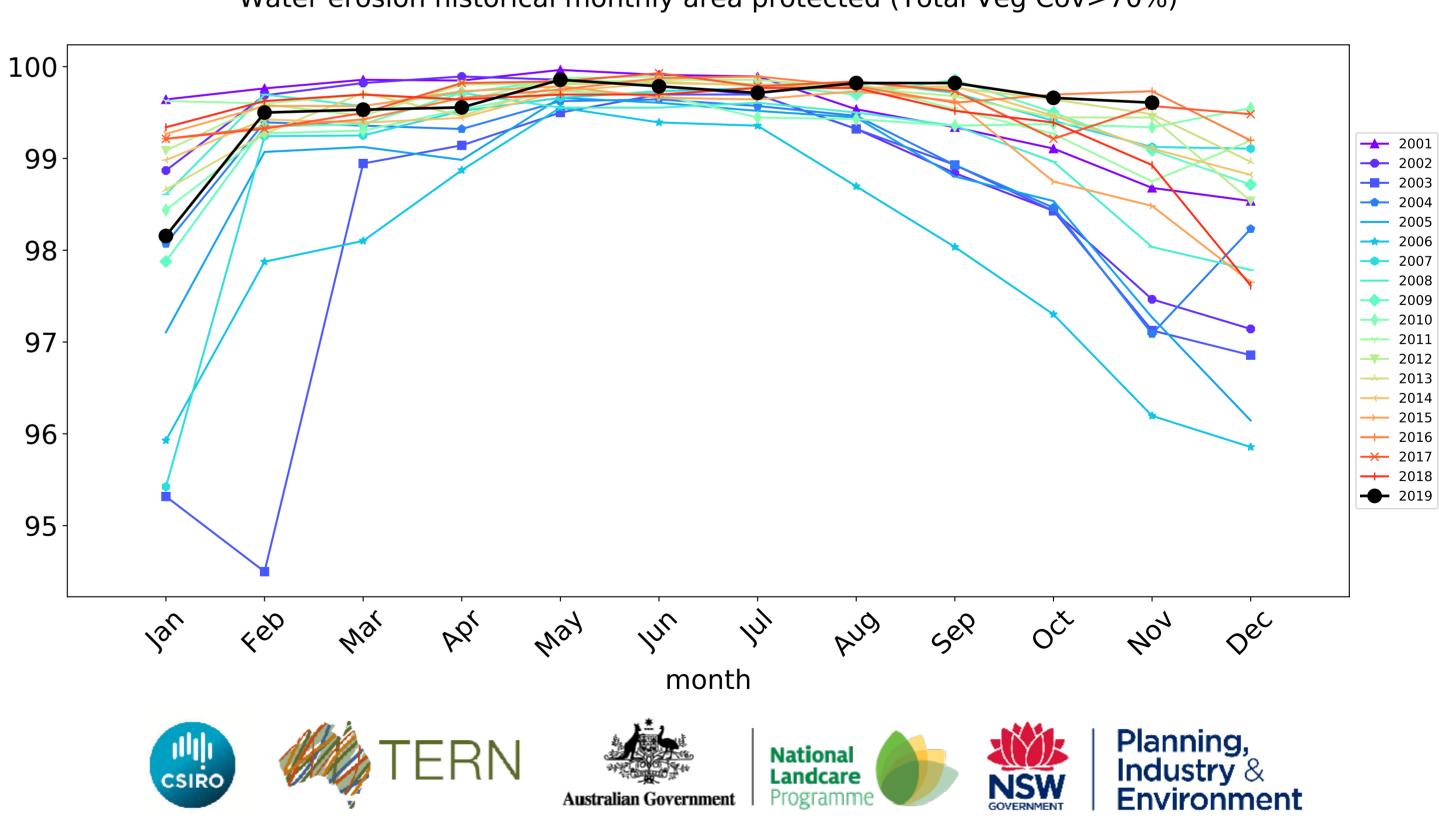
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

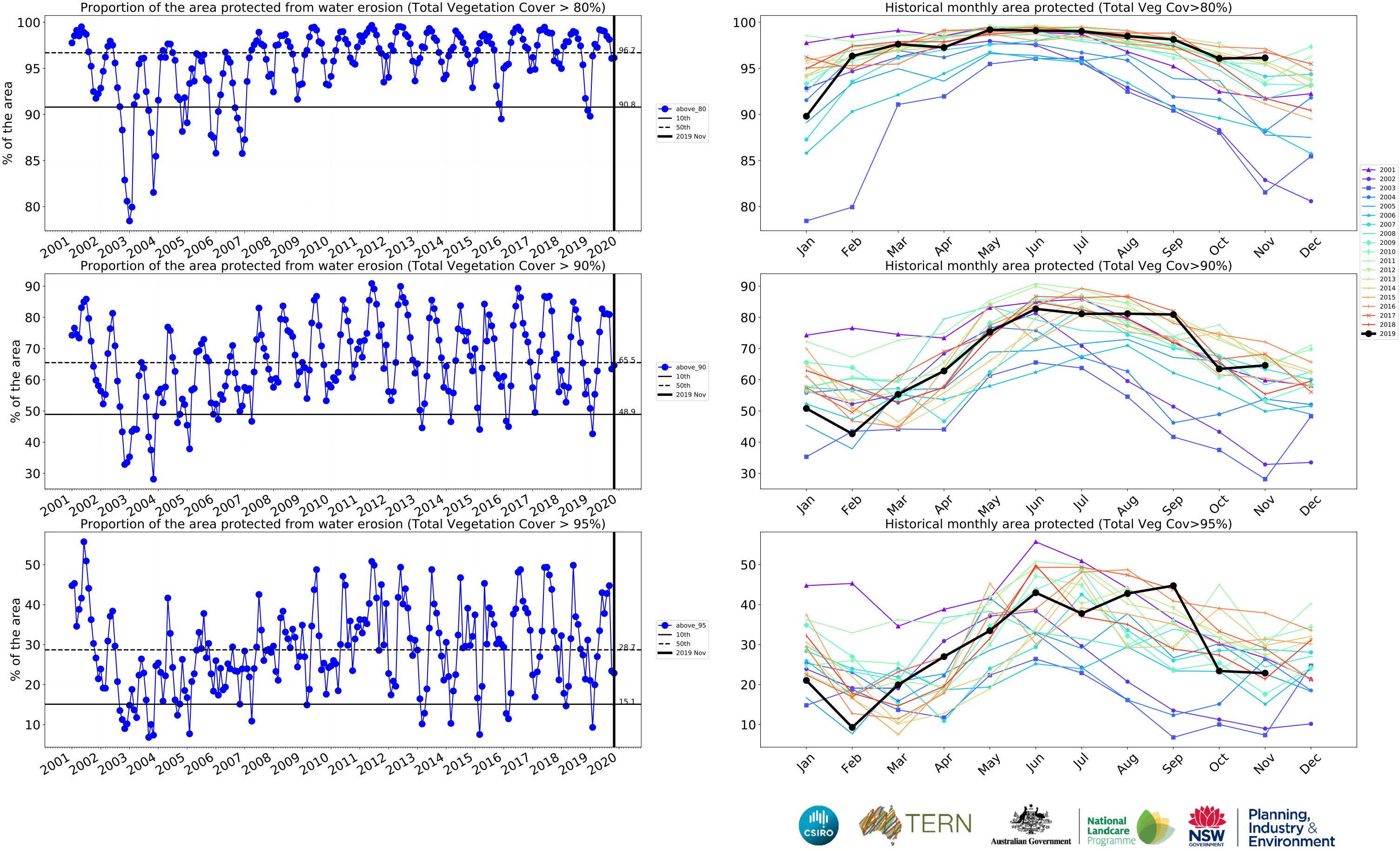
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)





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

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



# **Grazing Woodland forest**

12%200%

· 52°1070010

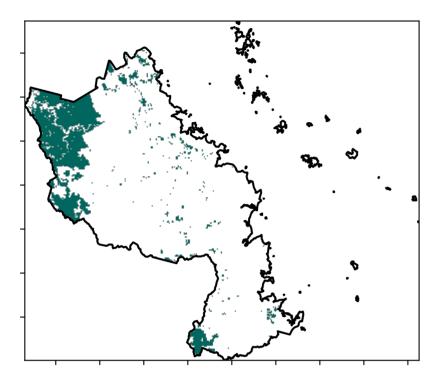
· 32%50%

0.30%

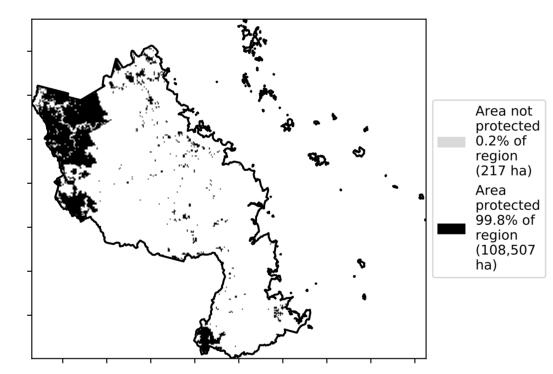
1 Agriculture - Grazing - Woodland forest

**Total Vegetation Cover [%]** 

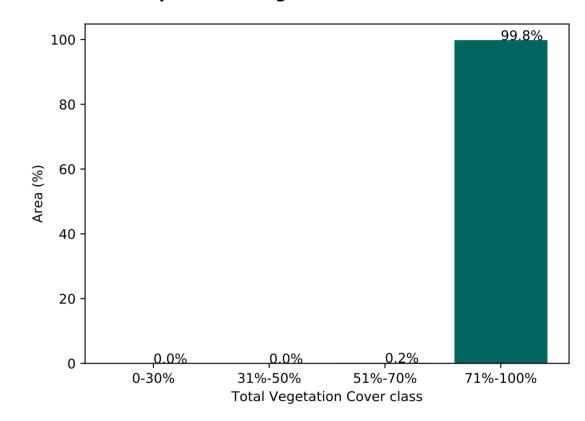
Land use and forest cover



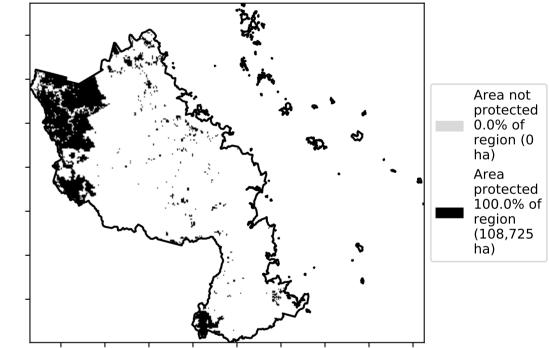
% Area protected from water erosion (>70%)

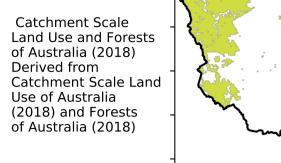


Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)





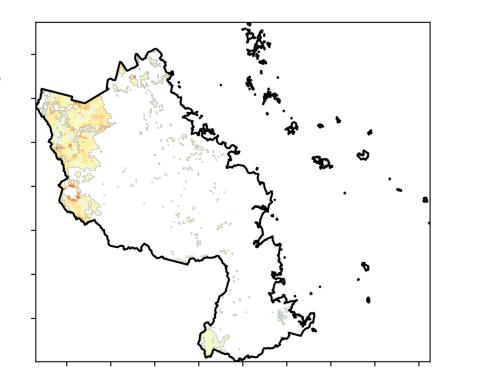
\$

°,

A.1

2<sup>35</sup>

**Total Vegetation Cover Anomaly [%]** 

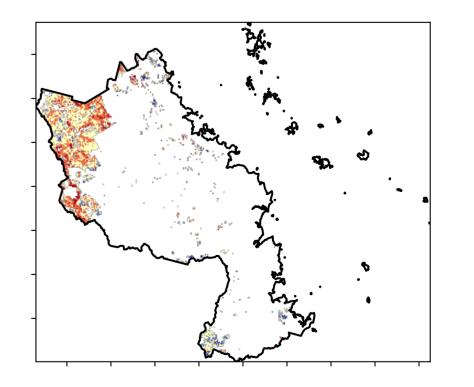


- 10 0 -10

-20

- 20

**Total Vegetation Cover Decile [%]** 



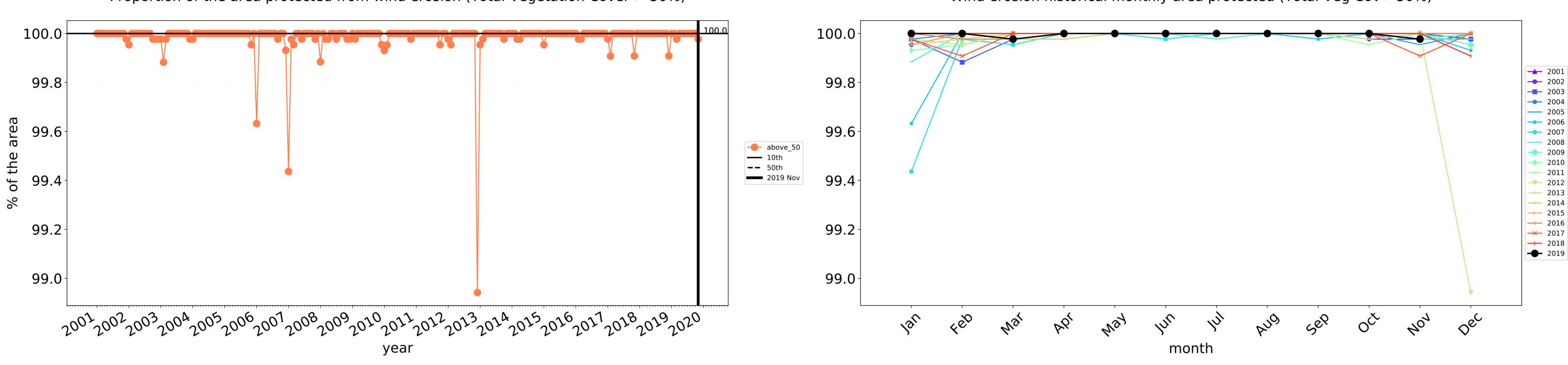


Deciles show where the pixel value lies in the

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

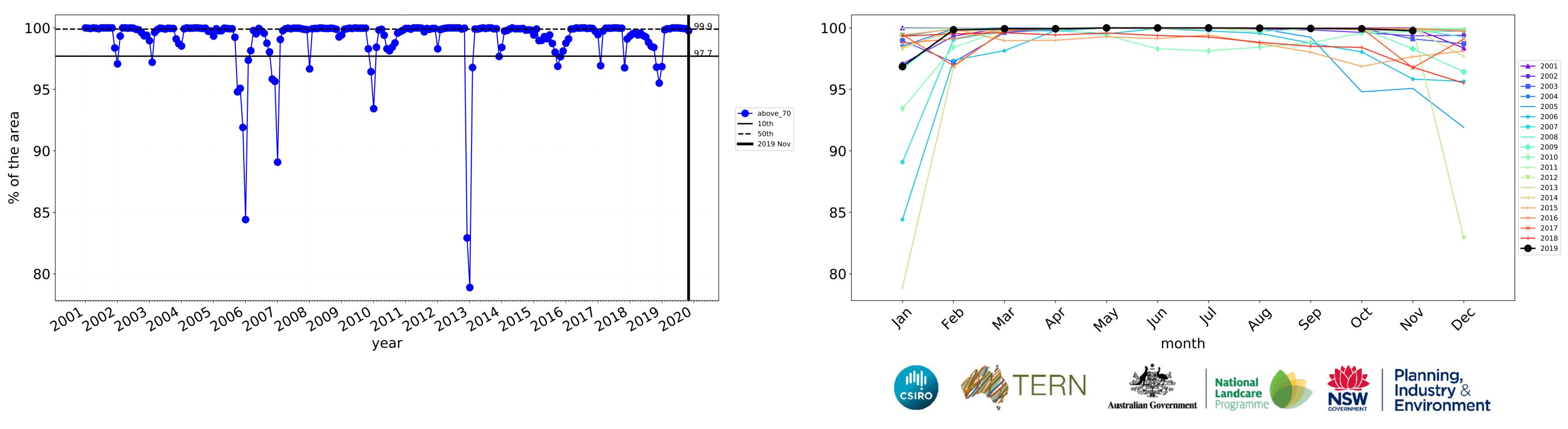
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

# Grazing Woodland forest timeseries



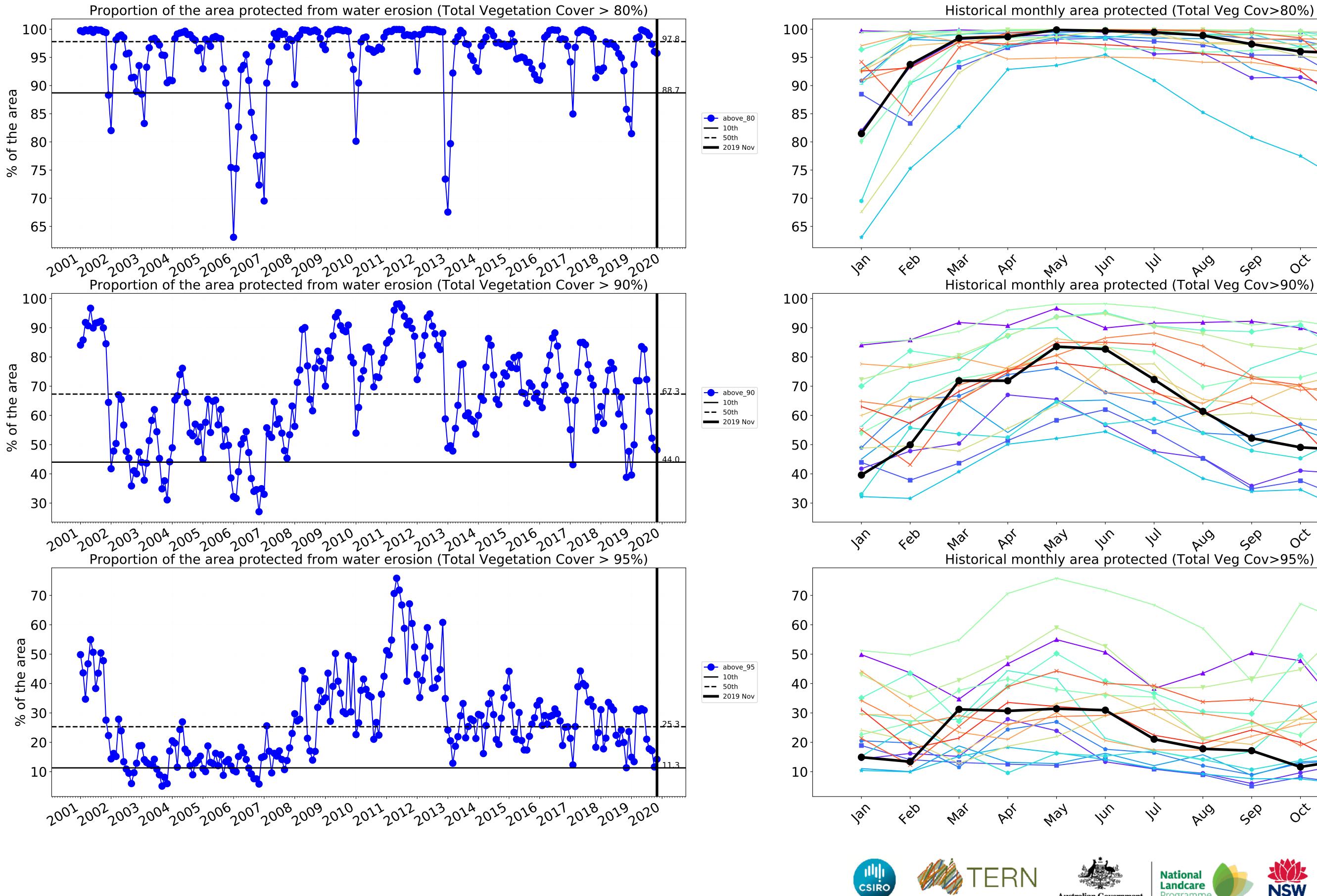
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



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

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

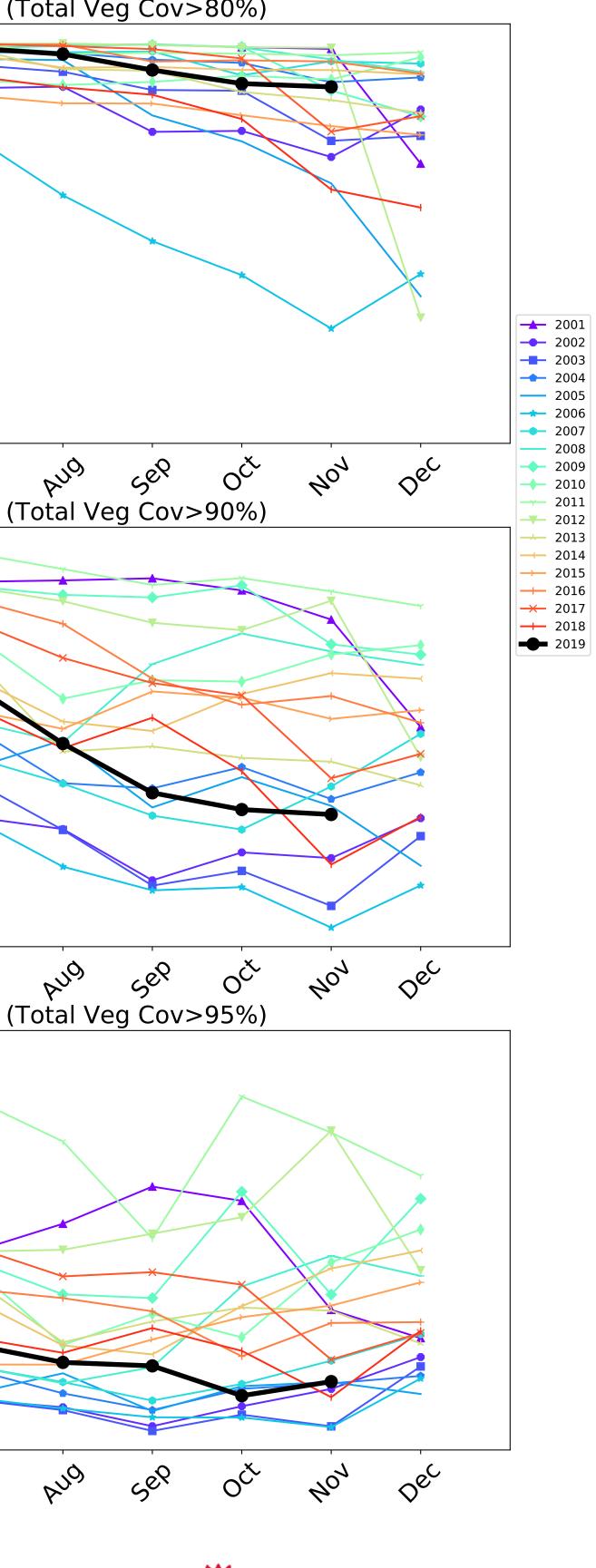


Australian Government

1's

12

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





# Grazing - Forest (non woodland)

12%200%

· 52°10010

· 32°10'50°10

0.30%

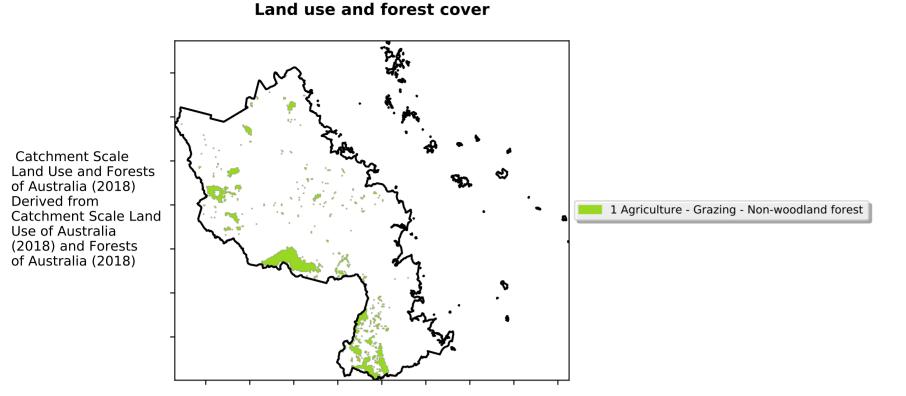
- 20

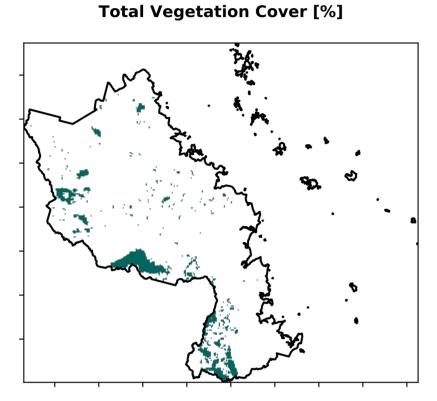
- 10

0

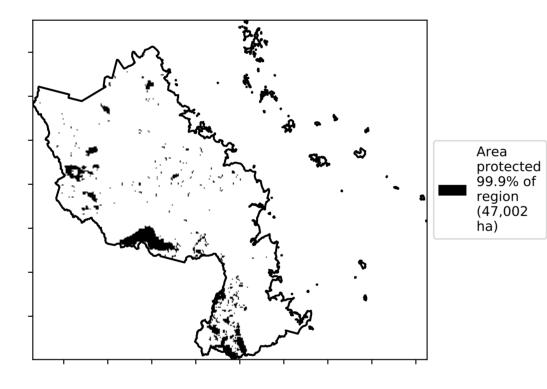
-10

-20

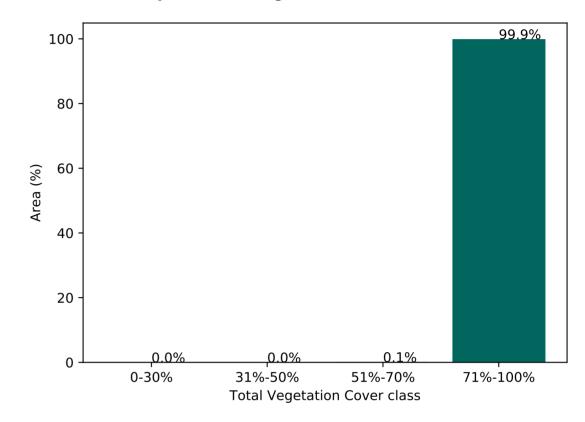




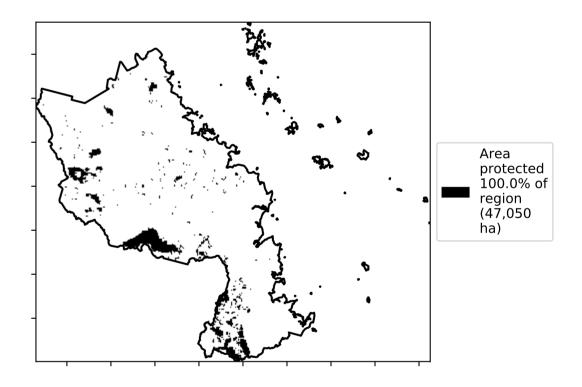
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



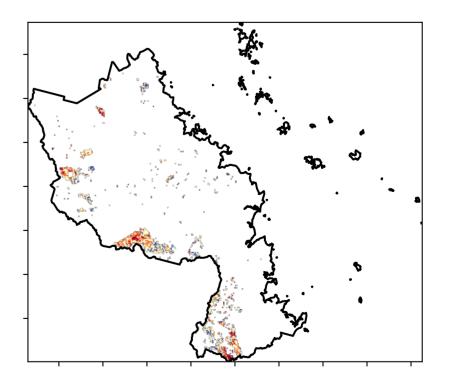
\$

°,

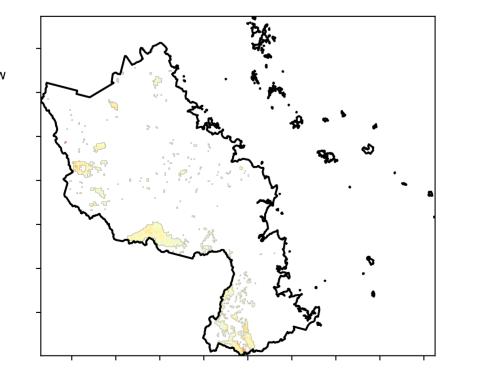
A.1

2??

**Total Vegetation Cover Decile [%]** 



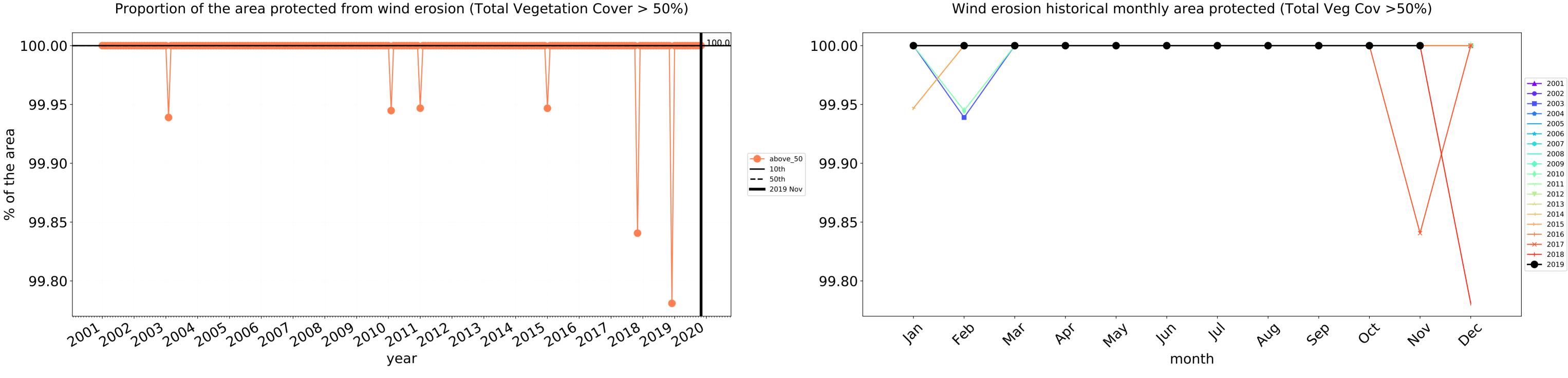
**Total Vegetation Cover Anomaly [%]** 



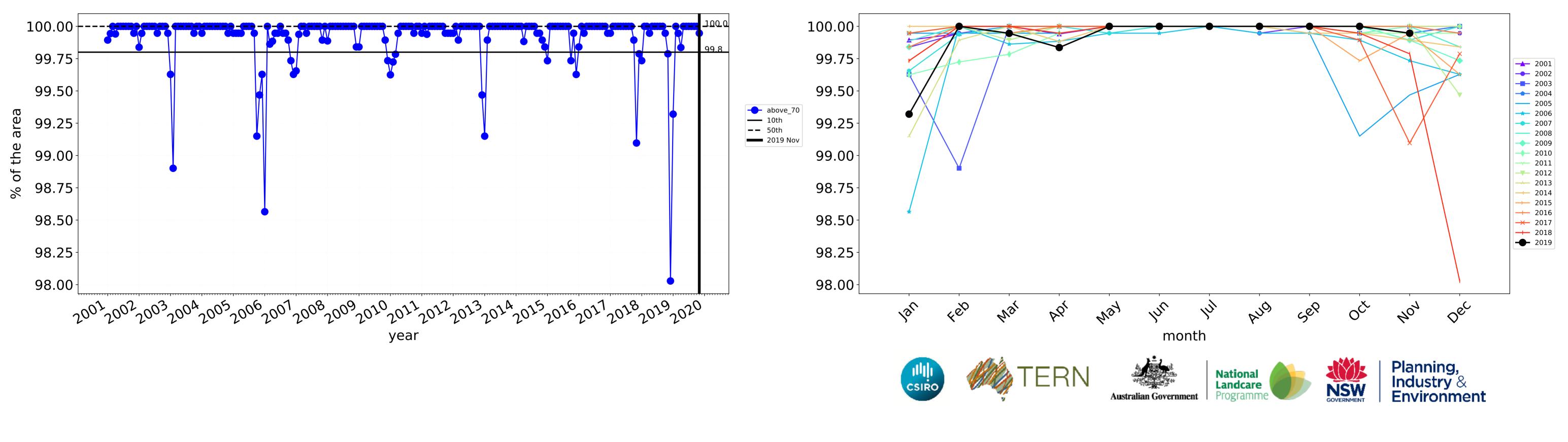
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



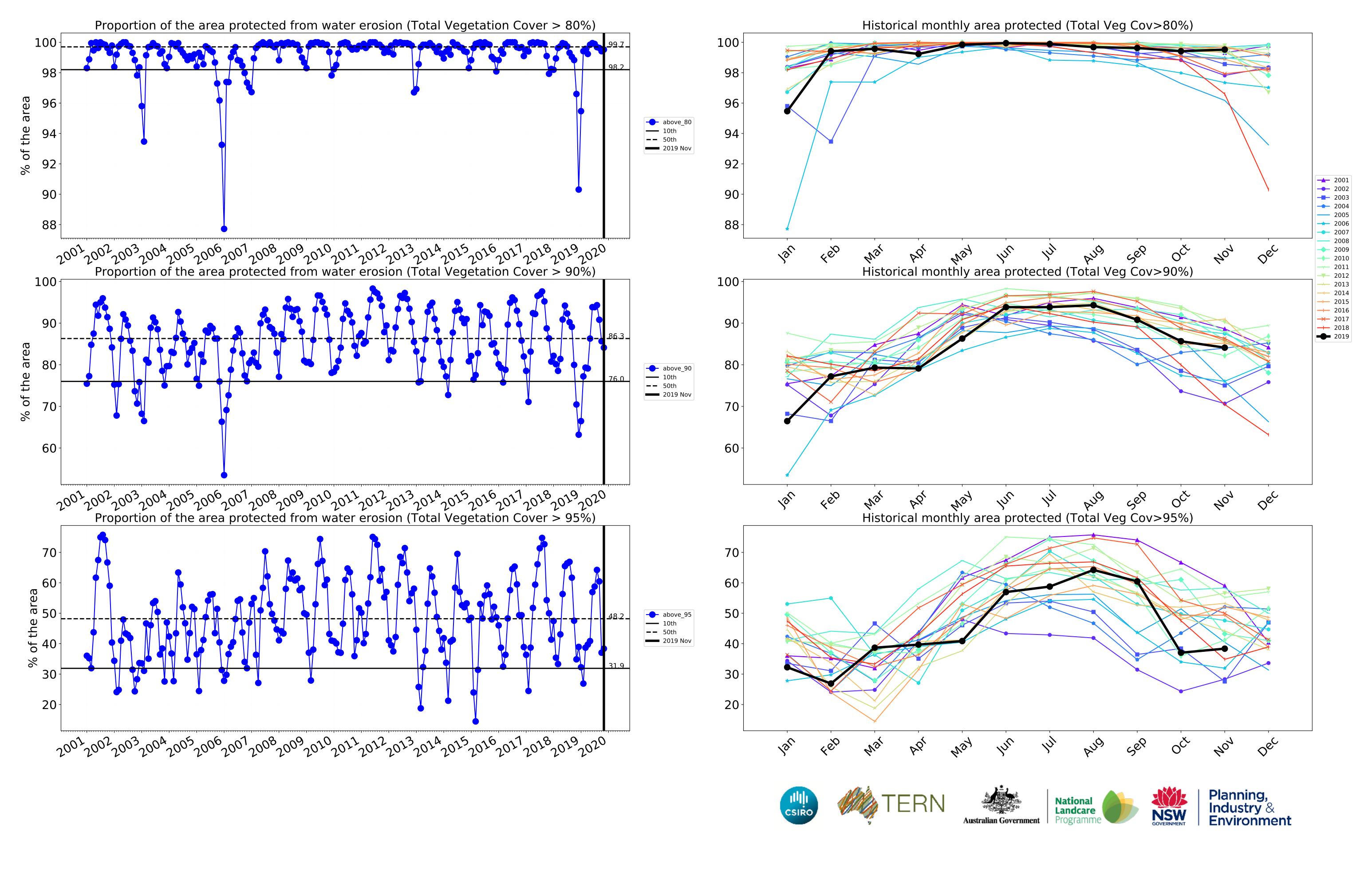
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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



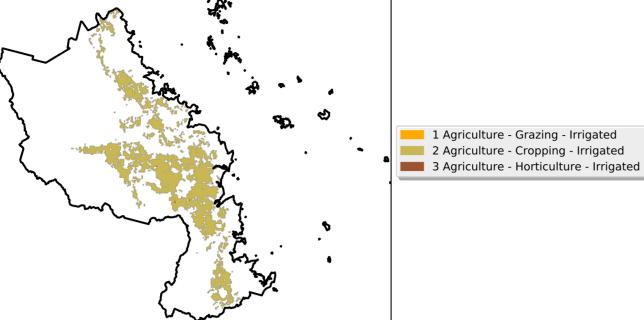
Water erosion historical monthly area protected (Total Veg Cov>70%)



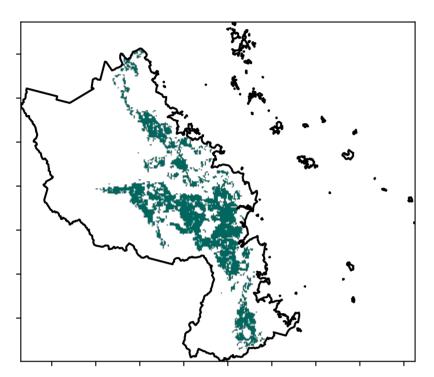
# Irrigation

Land use and forest cover

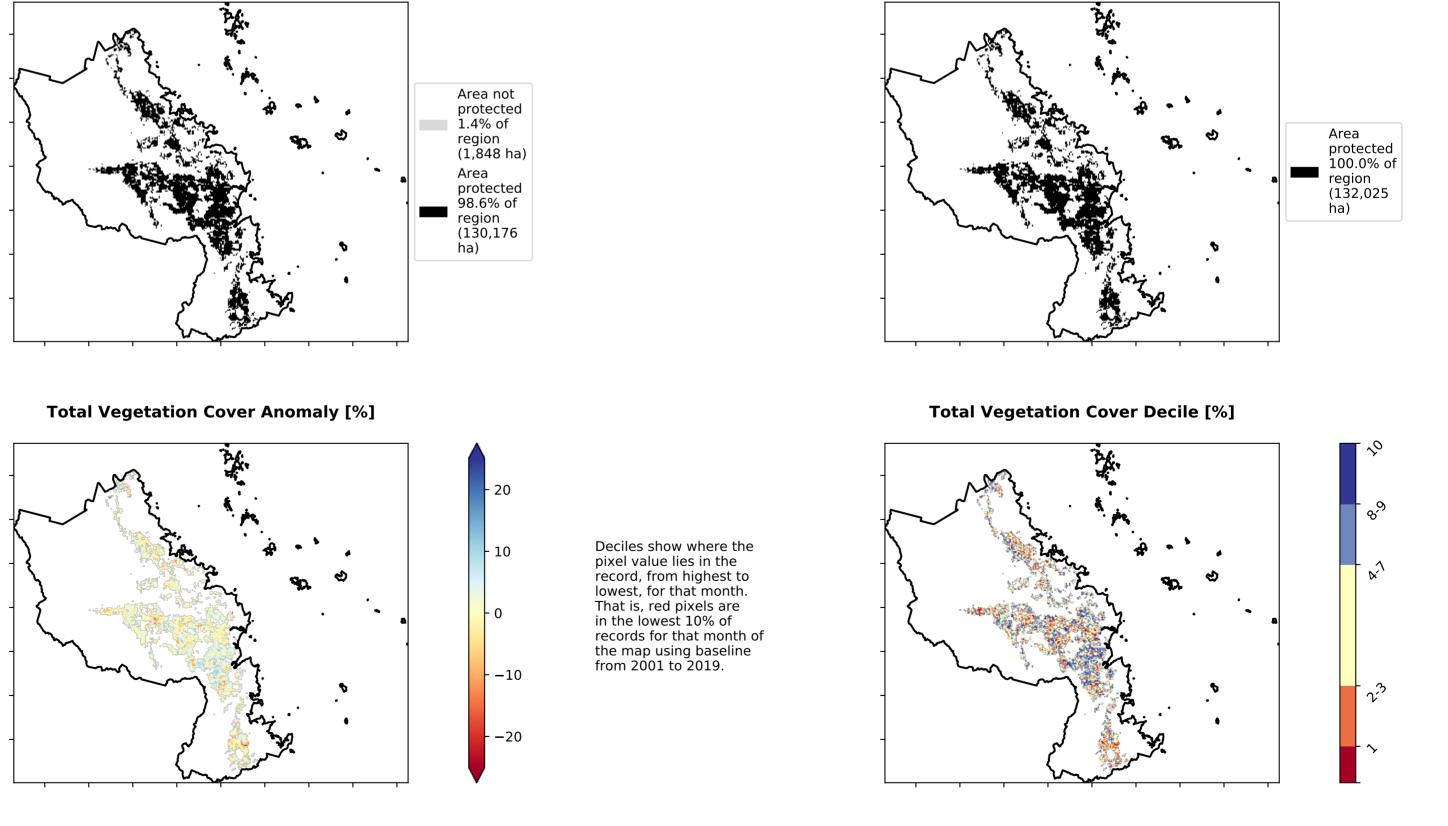


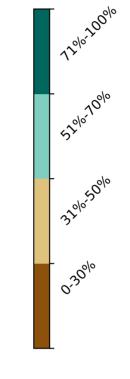


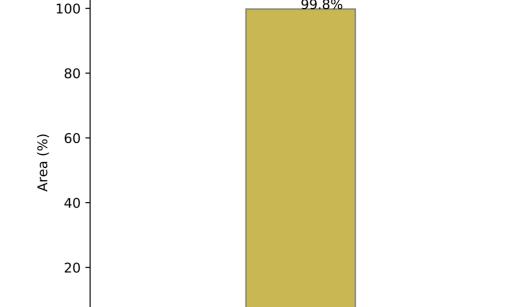
Total Vegetation Cover [%]



% Area protected from water erosion (>70%)







0.0%

1

0

#### Proportion of each land class in area

99.8%

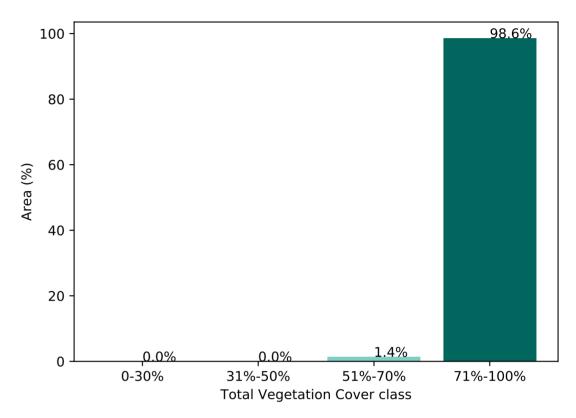
Proportion of vegetation cover class in area

Land use class

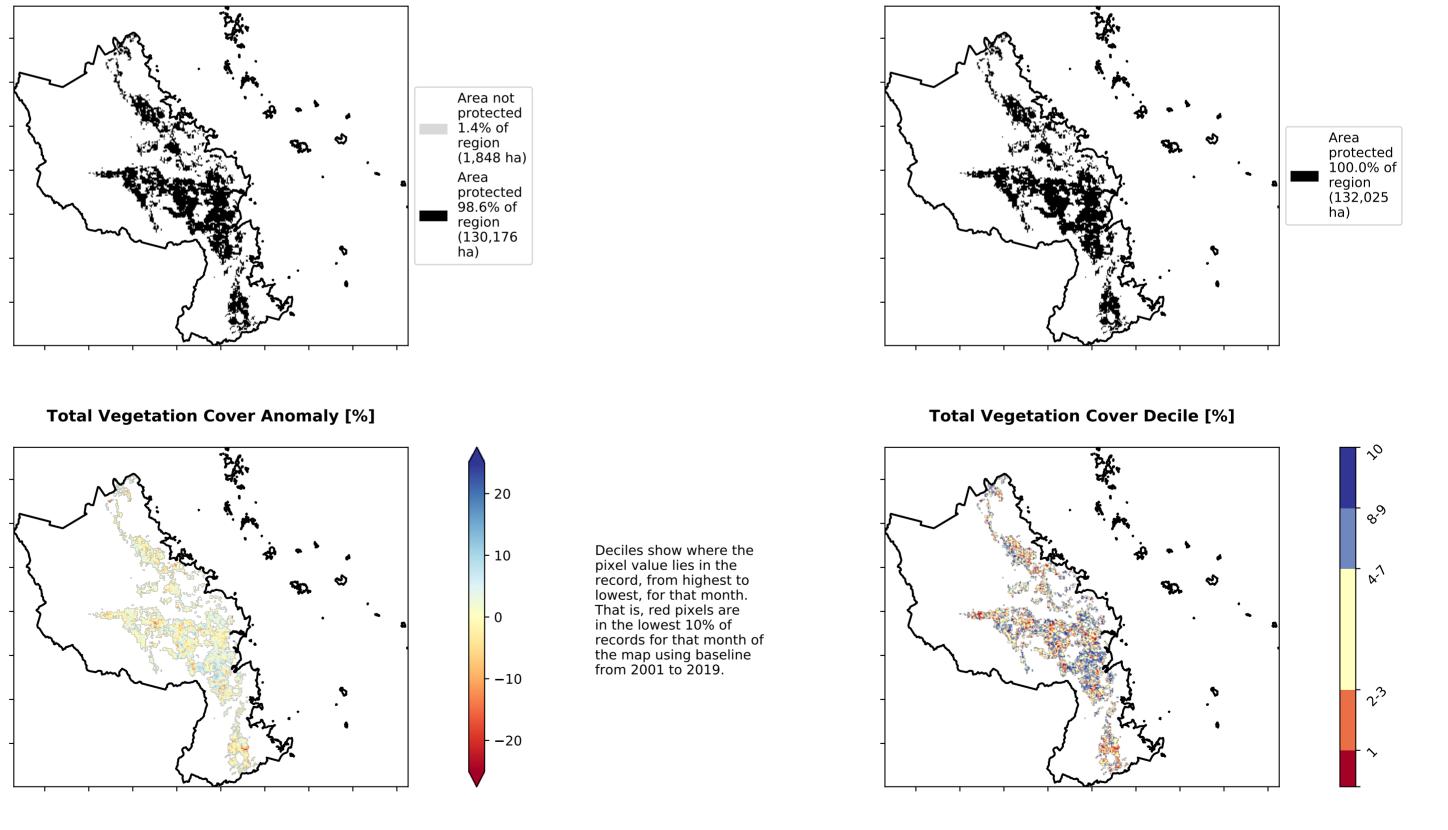
2

0.2%

3

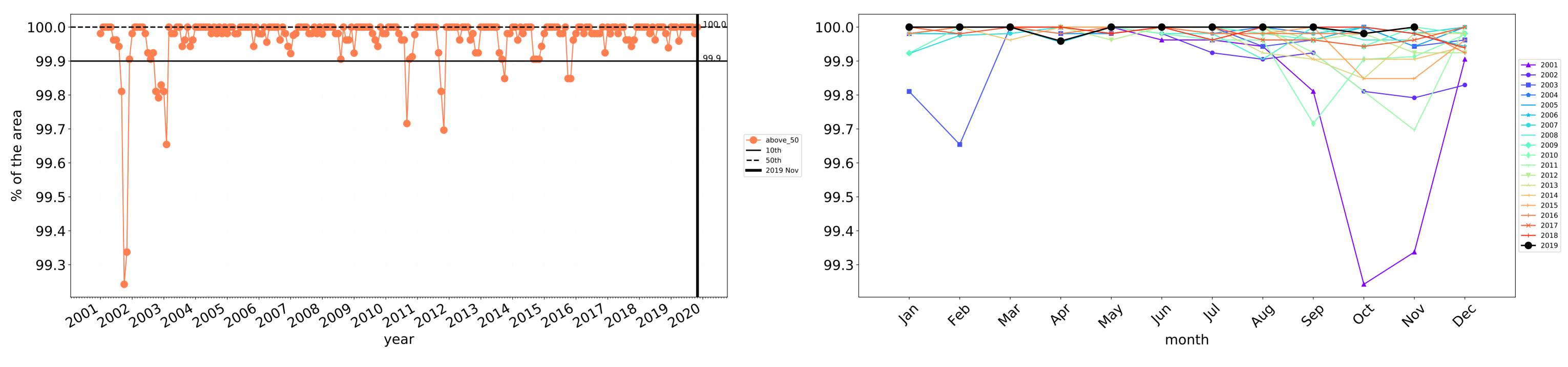


### % Area protected from wind erosion (>50%)



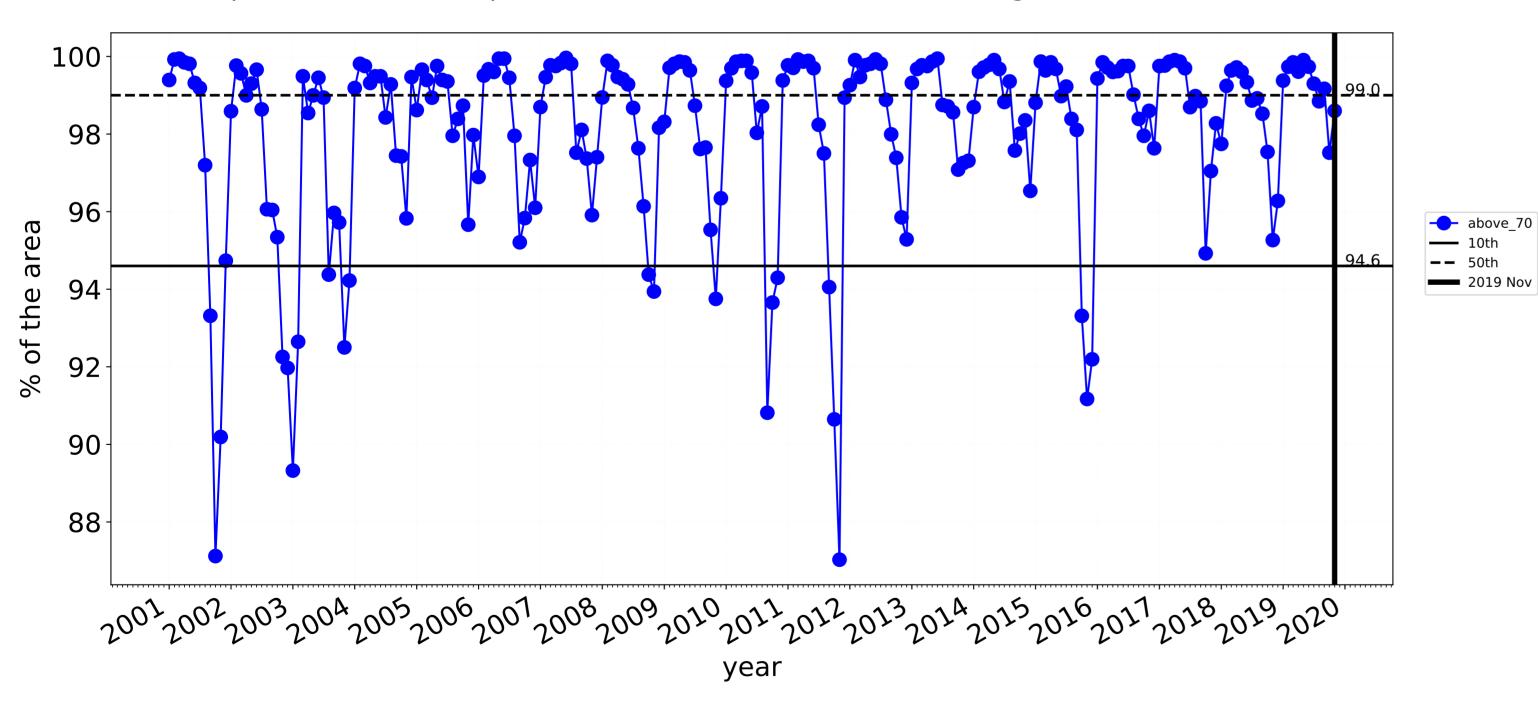


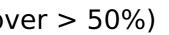
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

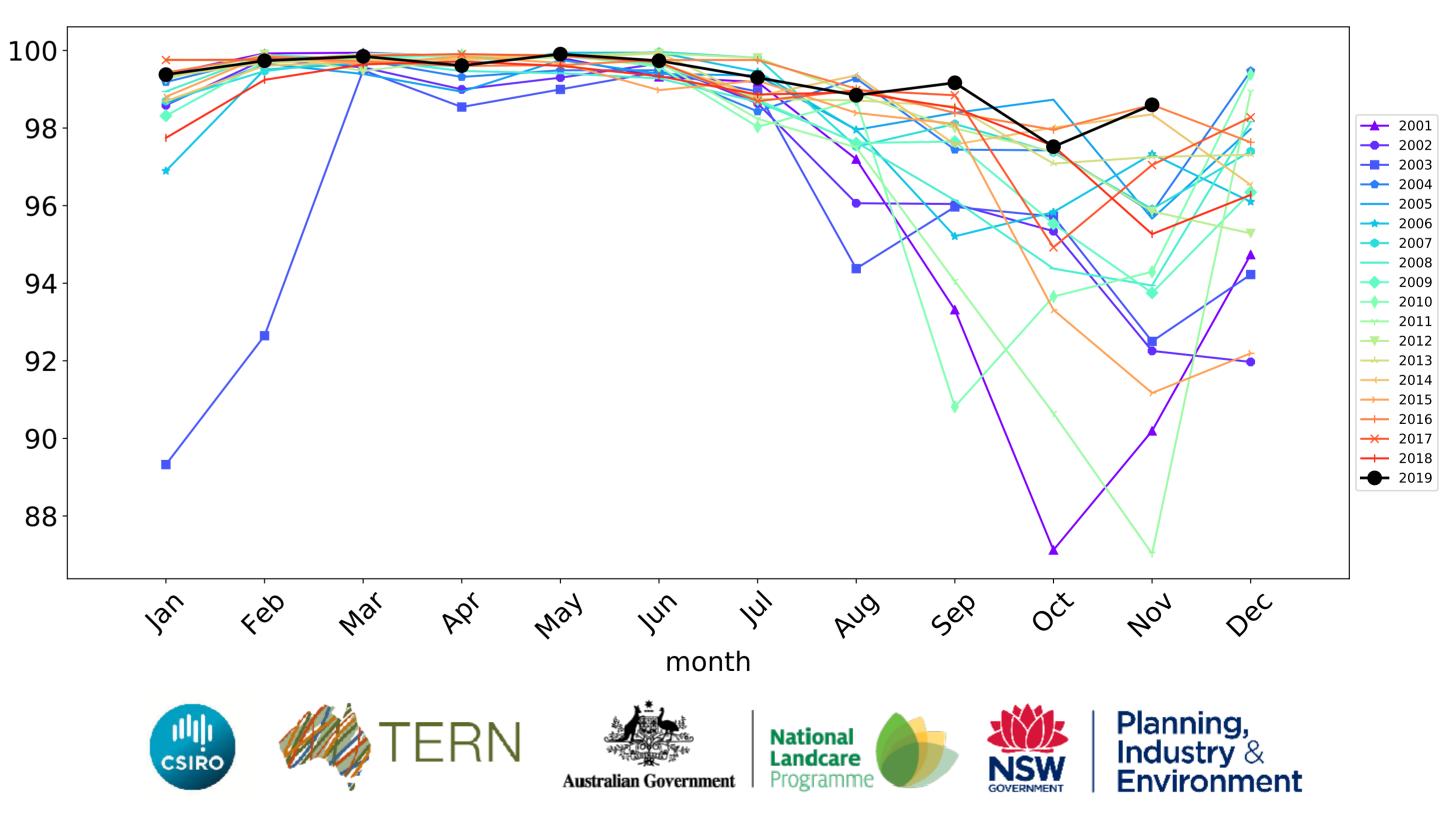
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

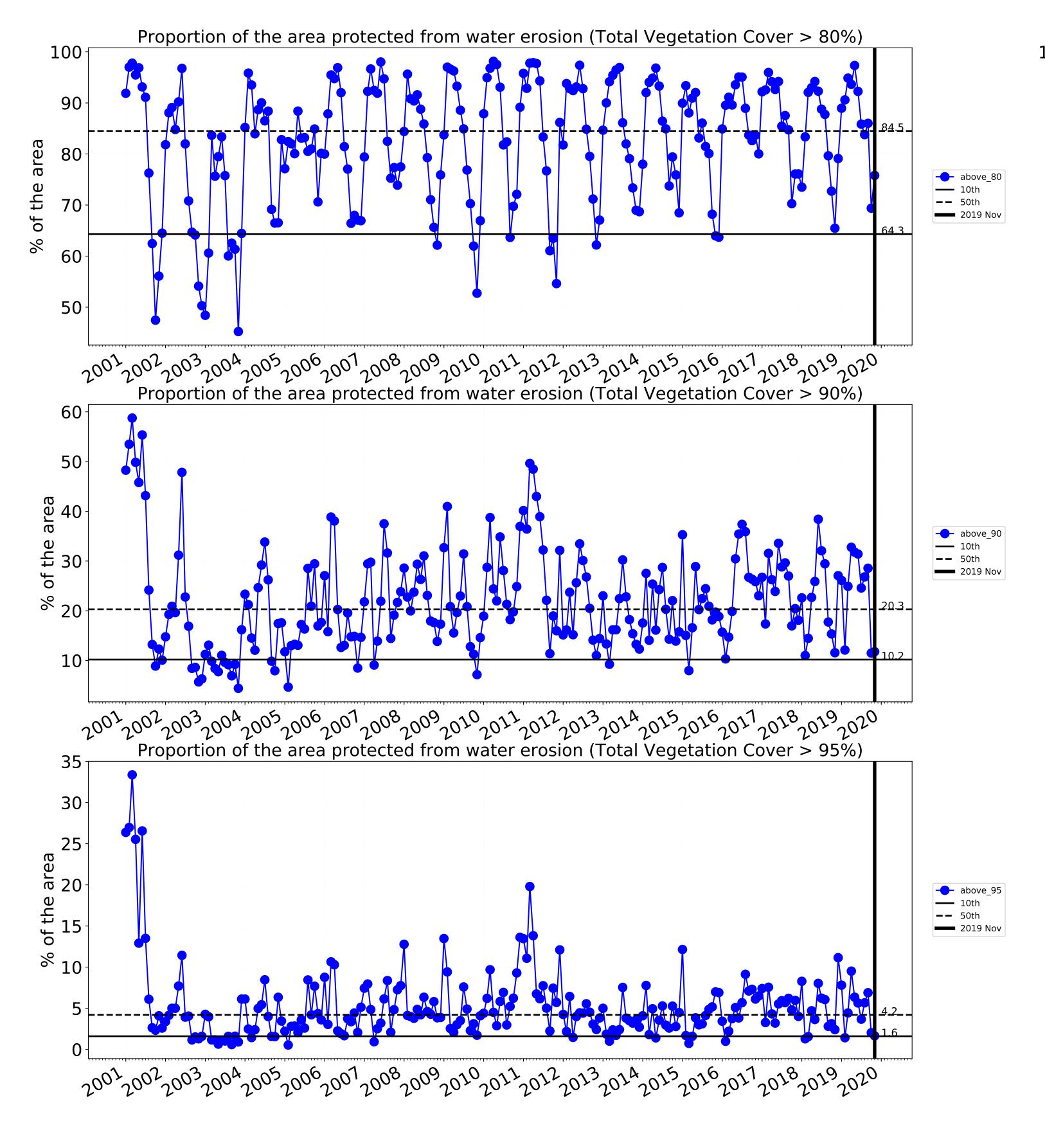


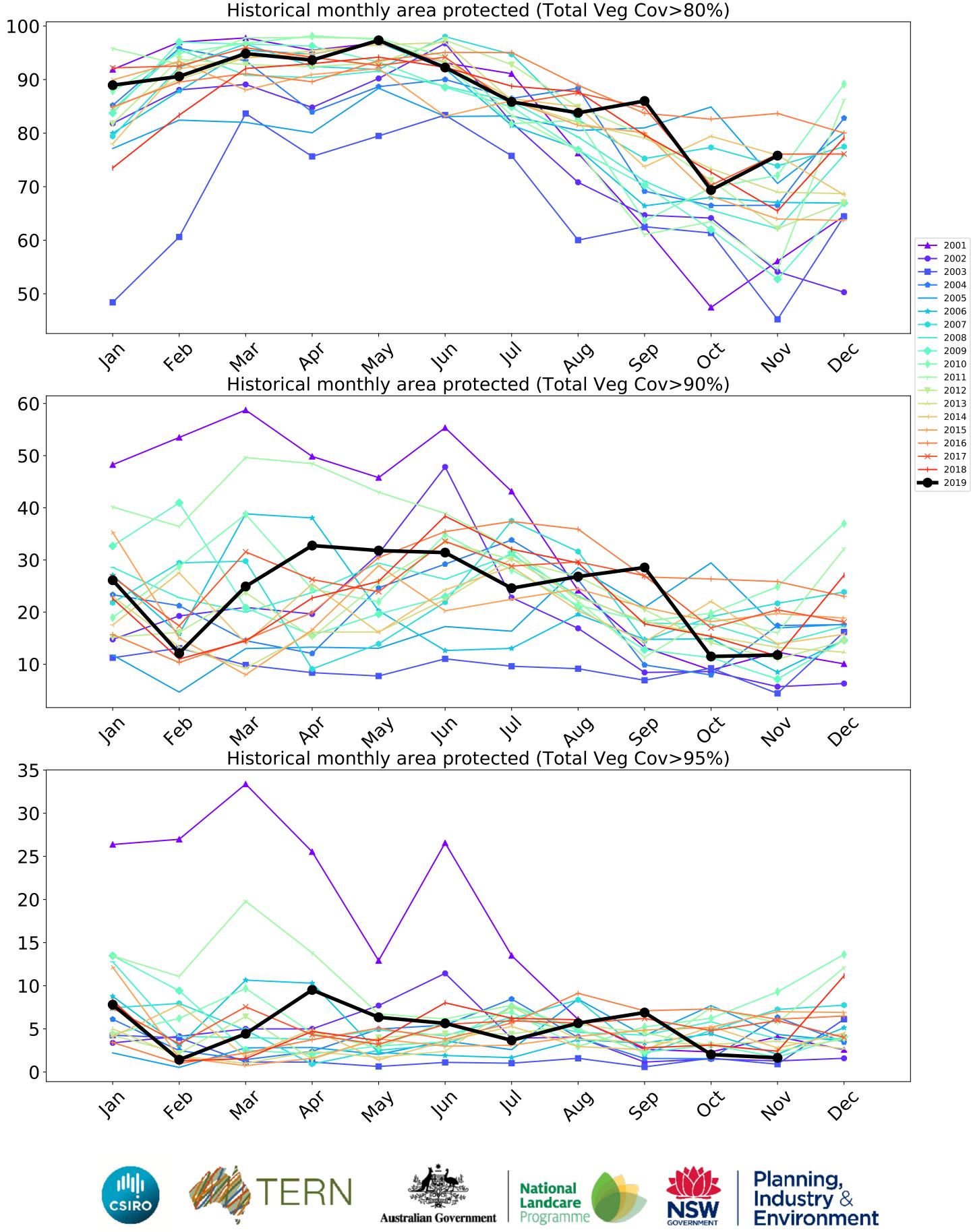


Wind erosion historical monthly area protected (Total Veg Cov >50%)

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







# **Production native forests and plantation forests**

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

12%200%

· 520/07/00/0

· 320050010

0.30%

Land use and forest cover

Derived from

Anomaly show how many percetage points each pixel is from the mean That

the mean. That

is, red pixels are about 20% lower than the

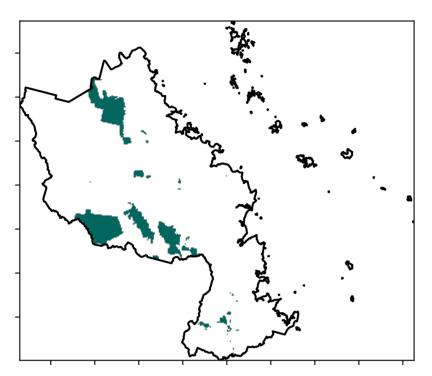
mean of that

pixel. The mean

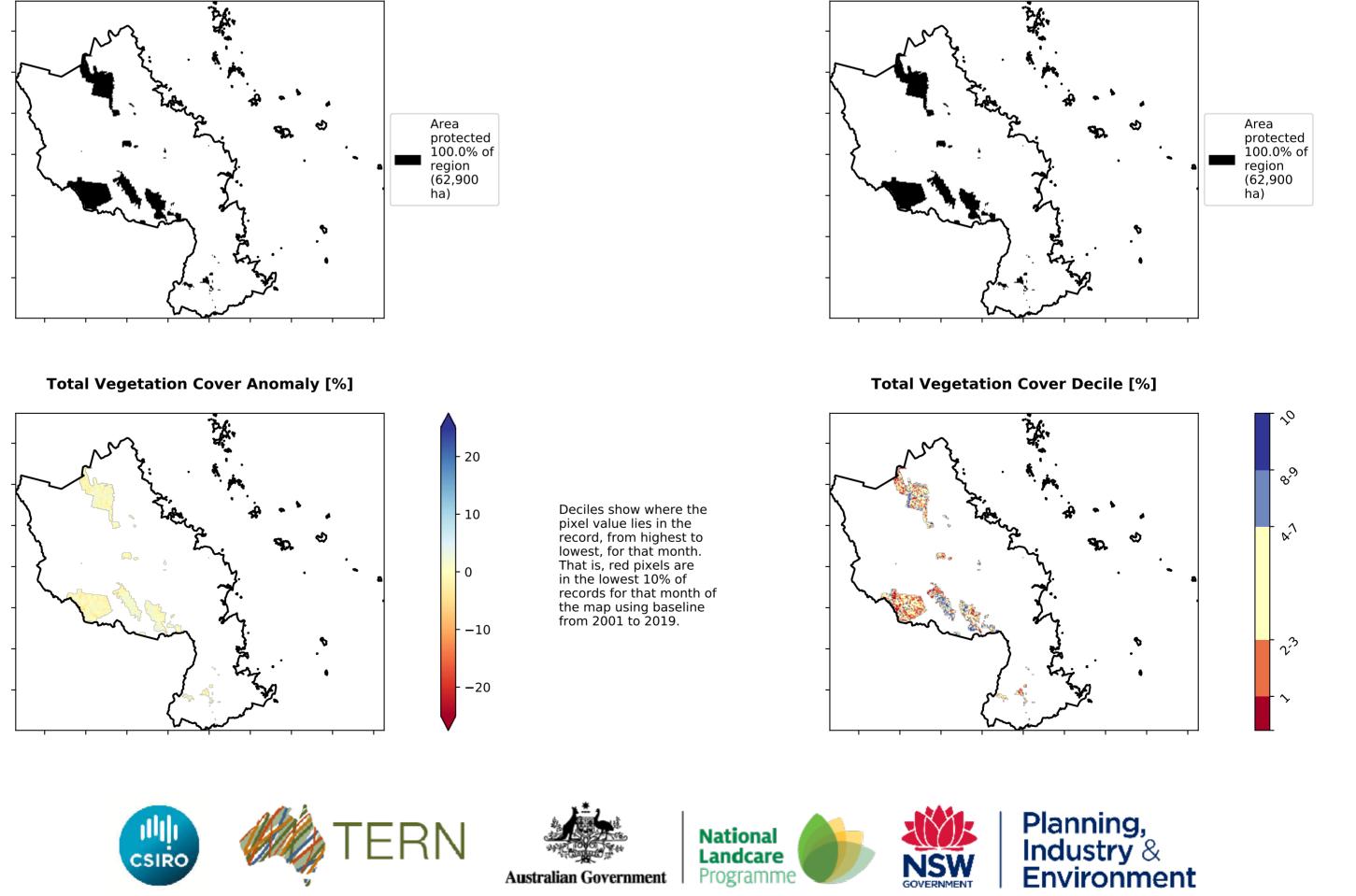
from 2001 to 2019.

is only for the month of the map

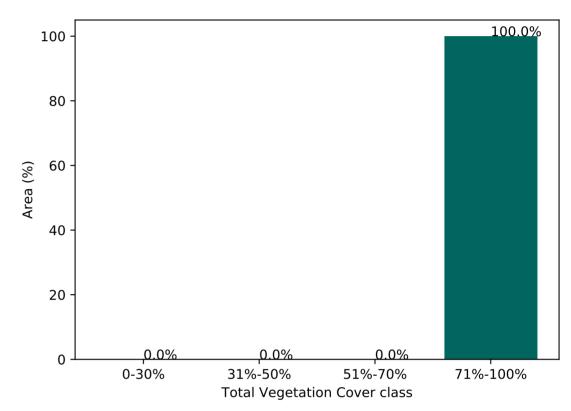
**Total Vegetation Cover [%]** 



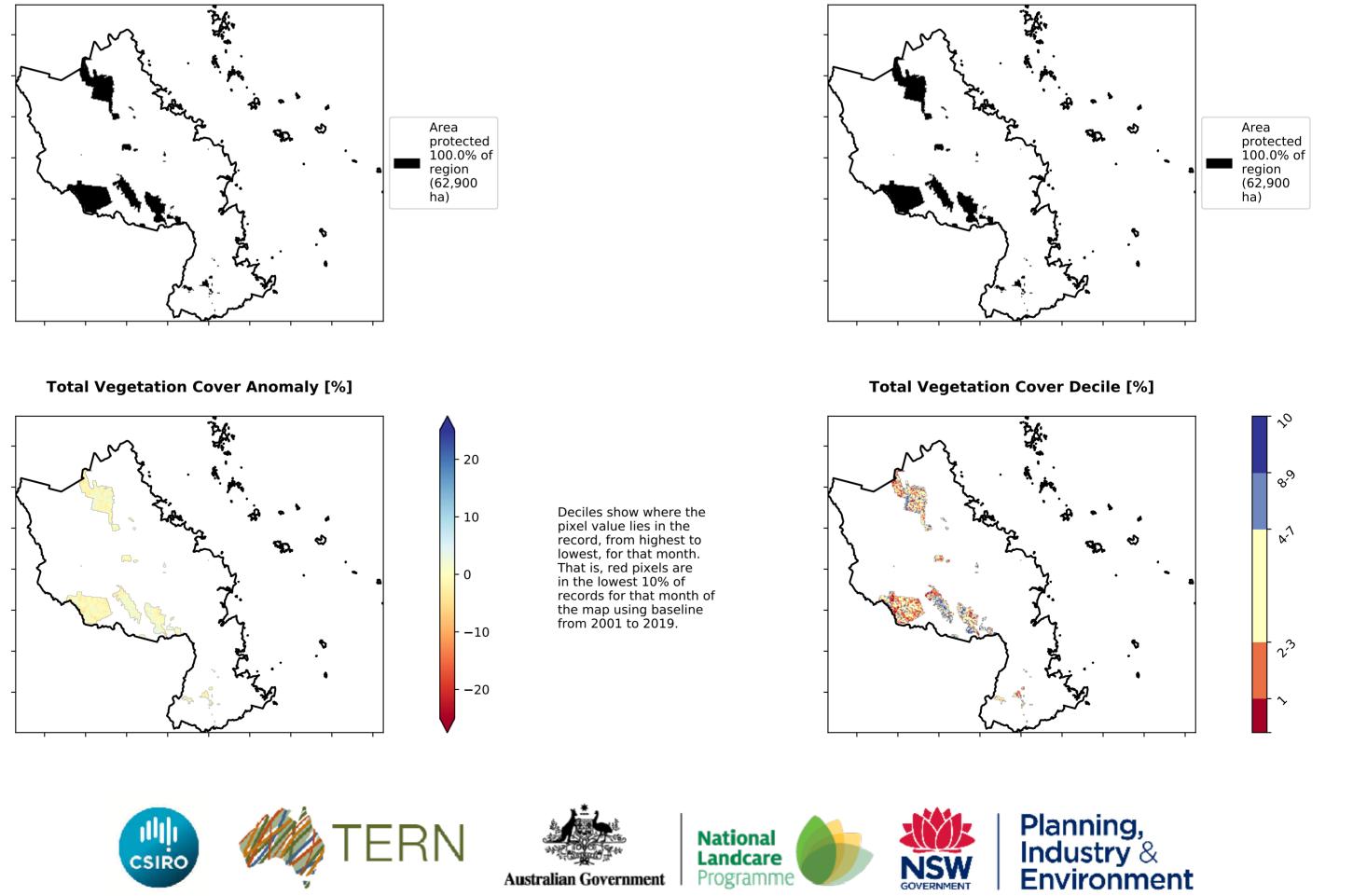
% Area protected from water erosion (>70%)

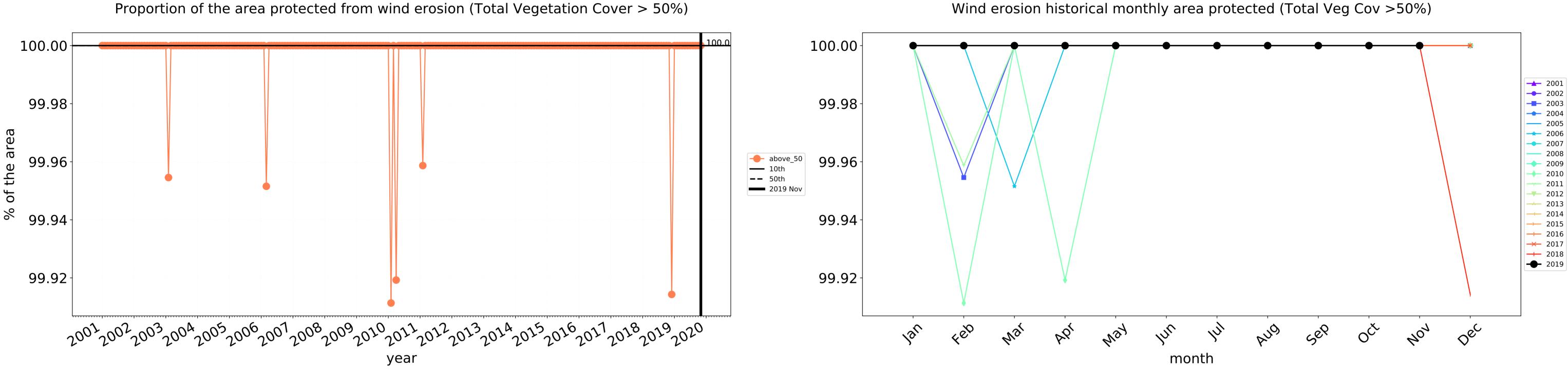




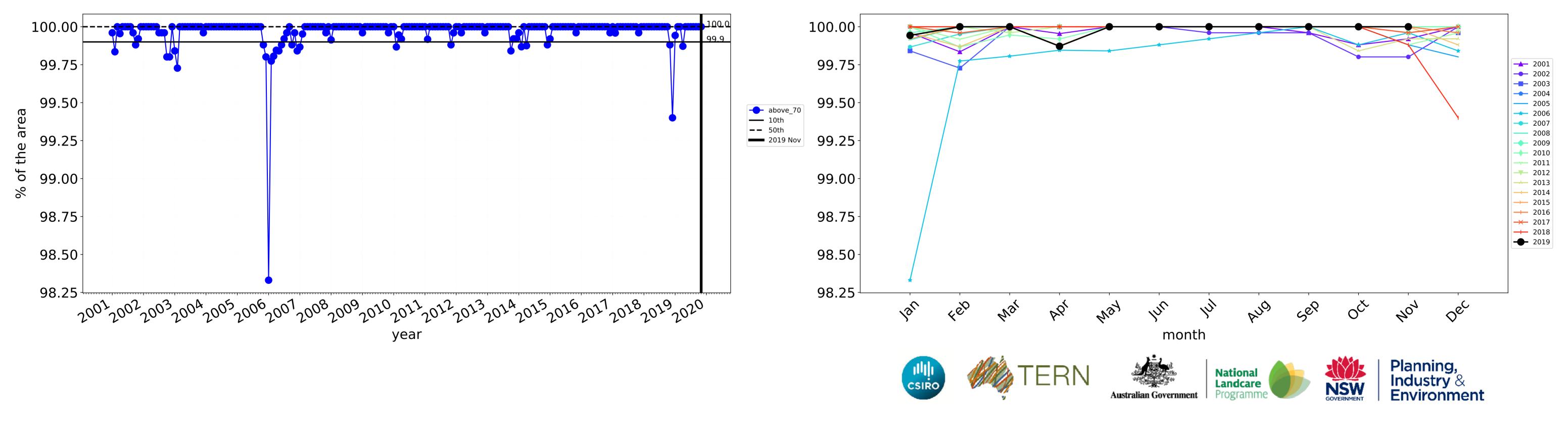


% Area protected from wind erosion (>50%)

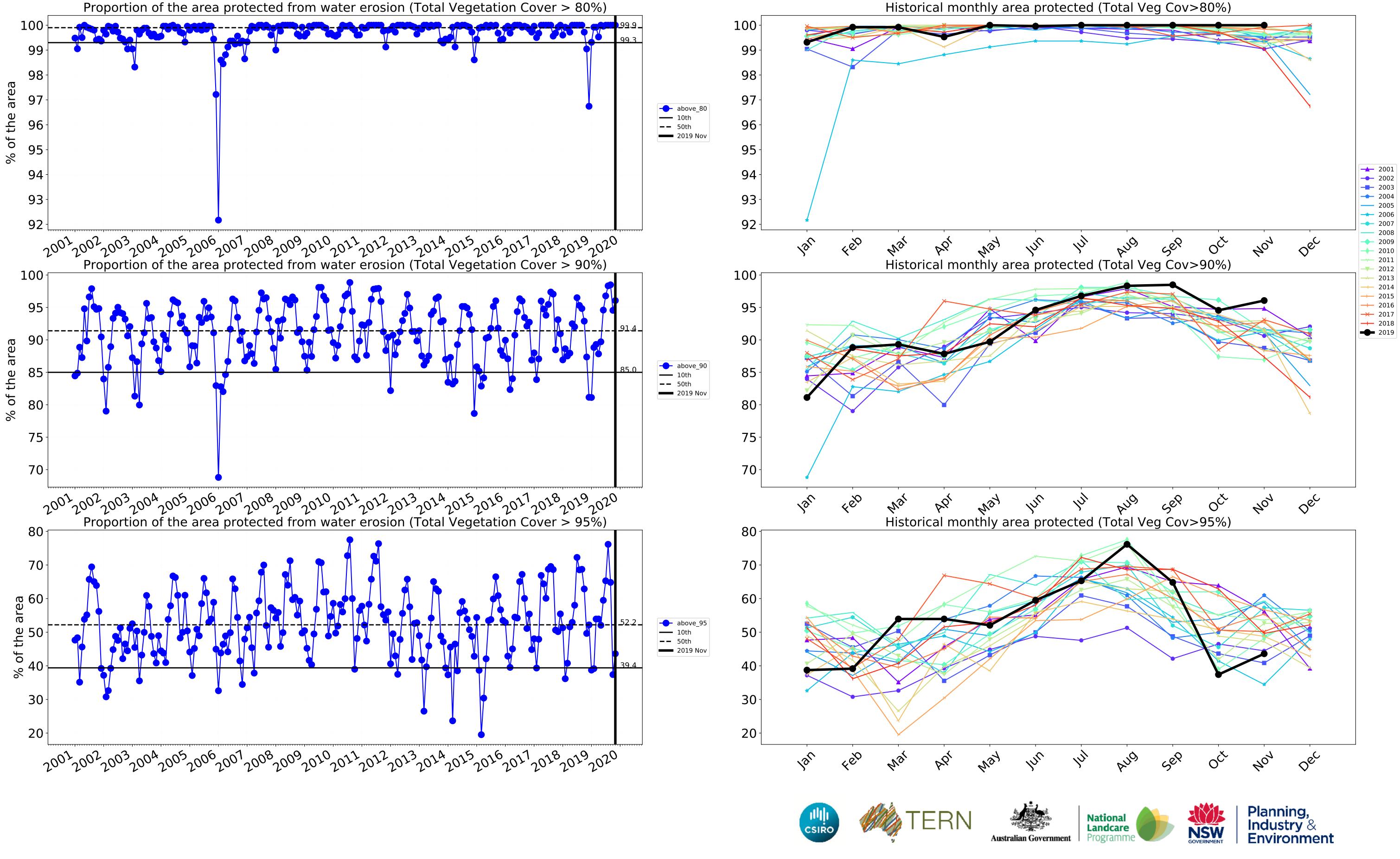




Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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



# Mackay\_(R) (750,175 ha and no data 11,136 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	750,175	100.0% 749,900	99.8% 748,775	98.3% 737,550	90.2% 676,375	57.4% 430,750	22.2% 166,375
Conservation and natural environments	192,750	99.9% 192,625	99.8% 192,425	99.0% 190,850	96.9% 186,750	82.1% 158,300	34.9% 67,325
Conservation and natural environments non forest	5,025	99.0% 4,975	97.5% 4,900	89.6% 4,500	71.1% 3,575	29.9% 1,500	8.0% 400
Conservation and natural environments Woodland forest	37,400	99.9% 37,350	99.9% 37,350	98.9% 36,975	95.4% 35,675	66.0% 24,700	34.8% 13,025
Conservation and natural environments Forest (non woodland)	150,325	100.0% 150,300	99.9% 150,175	99.4% 149,375	98.1% 147,500	87.9% 132,100	35.9% 53,900
Agriculture	428,475	100.0% 428,425	100.0% 428,350	99.4% 425,800	90.1% 386,250	46.3% 198,550	15.8% 67,825
Grazing	295,850	100.0% 295,800	100.0% 295,725	99.7% 295,025	96.5% 285,575	61.7% 182,450	22.2% 65,575
Grazing non forest	140,075	100.0% 140,025	99.9% 139,975	99.6% 139,525	96.1% 134,675	64.6% 90,525	22.9% 32,050
Grazing Woodland forest	108,725	100.0% 108,725	100.0% 108,700	99.8% 108,475	95.7% 104,075	48.1% 52,350	14.2% 15,475
Grazing - Forest (non woodland)	47,050	100.0% 47,050	100.0% 47,050	99.9% 47,025	99.5% 46,825	84.1% 39,575	38.4% 18,050
Irrigation	132,025	100.0% 132,025	100.0% 132,025	98.6% 130,175	75.8% 100,075	11.8% 15,550	1.6% 2,175
Production native forests and plantation forests	62,900	100.0% 62,900	100.0% 62,900	100.0% 62,900	100.0% 62,900	96.1% 60,425	43.6% 27,425

