Total vegetation cover soil protection Region:LGA Mackay_(R) QLD

Date: August 2022

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

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

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

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

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

Erosion protection: Wind erosion 50% total vegetation cover

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

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

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

Erosion protection

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

Rainfall

• Millimetres rainfall each month (black line).

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

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

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

Acknowledgment of data:

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

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

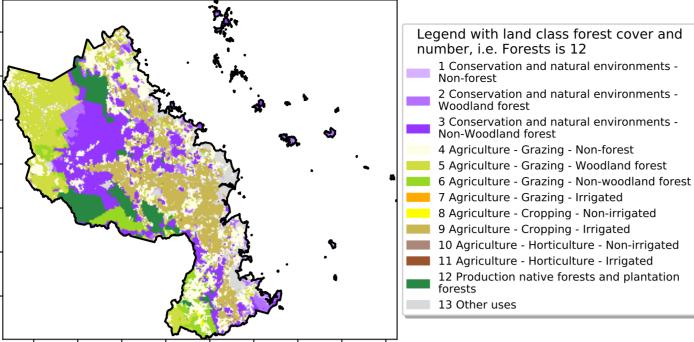


Vegetation Cover Aug 2022

Land use and forest cover

Proportion of each land class in area





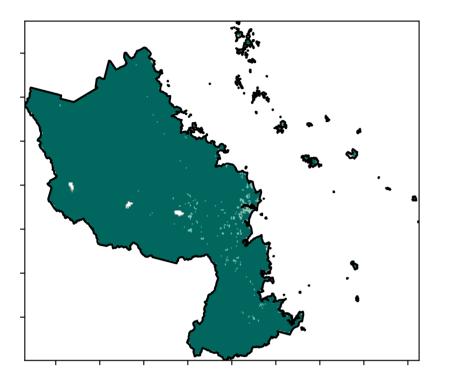
12%200%

· 52% 70%

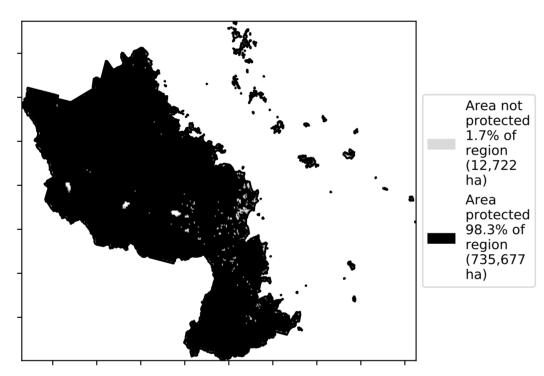
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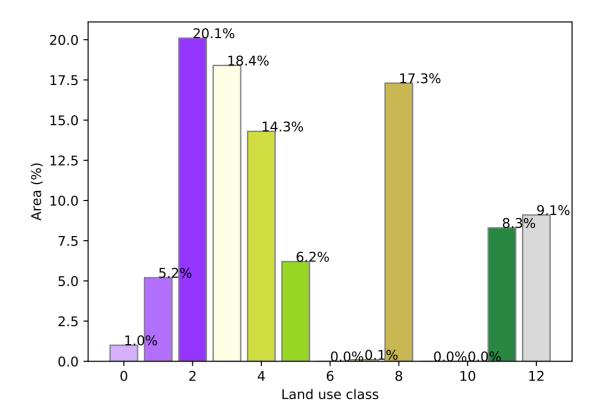
0.30%

Total Vegetation Cover [%]

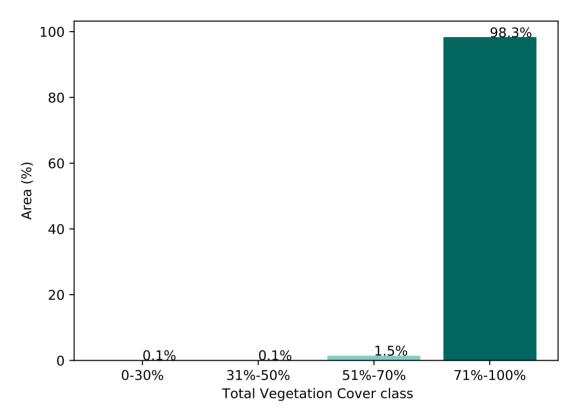


% Area protected from water erosion (>70%)

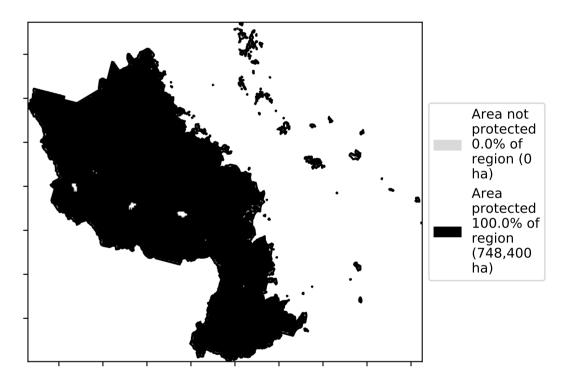




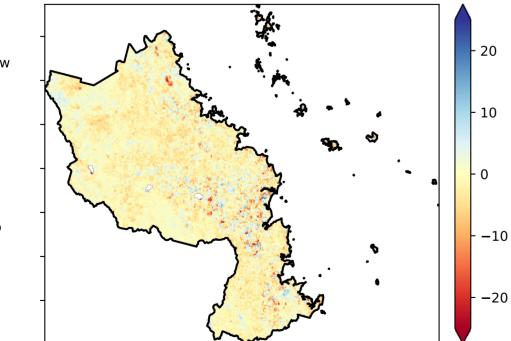
Proportion of vegetation cover class in area



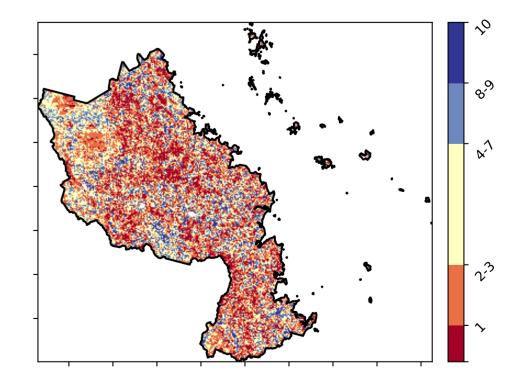
% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]

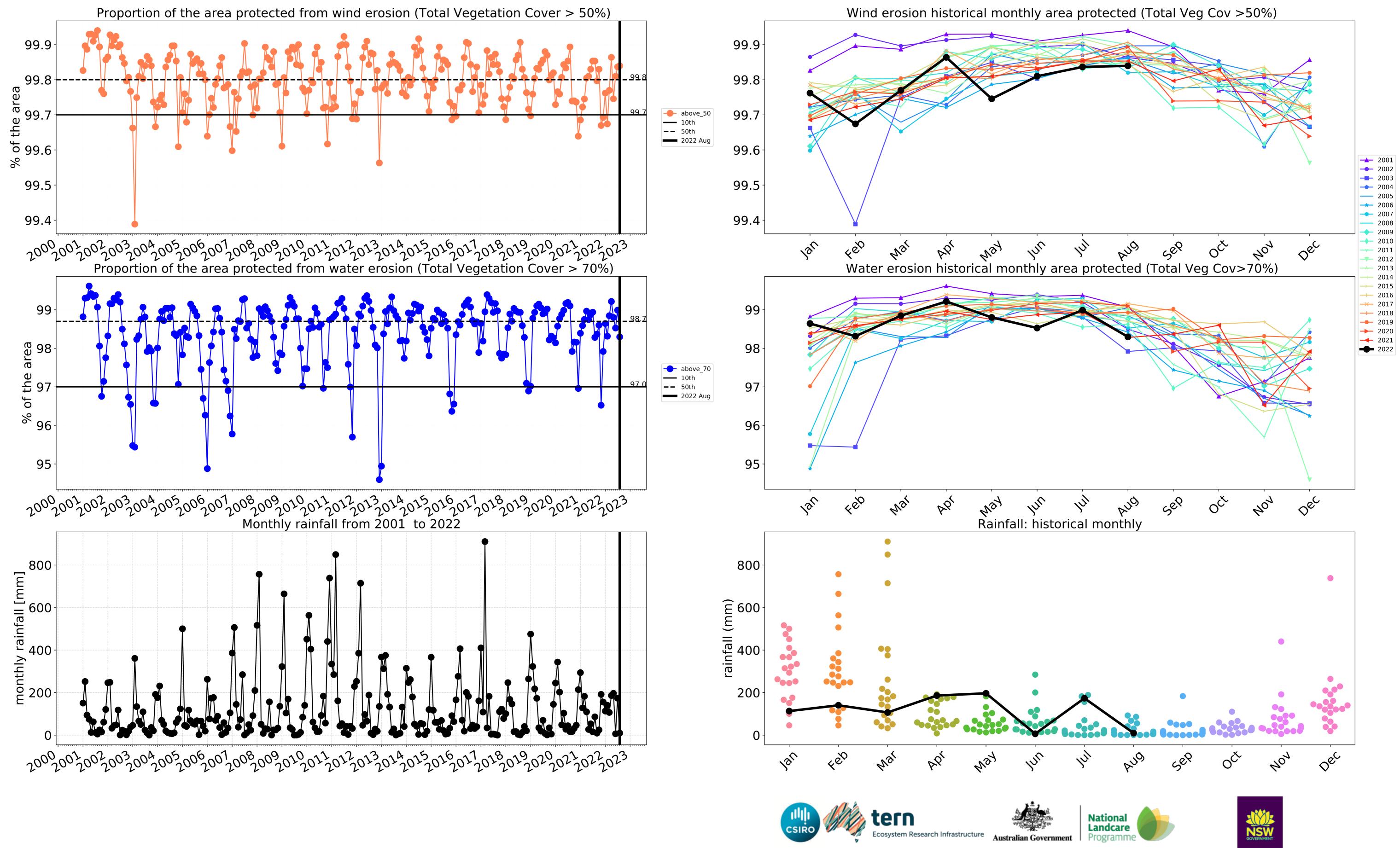


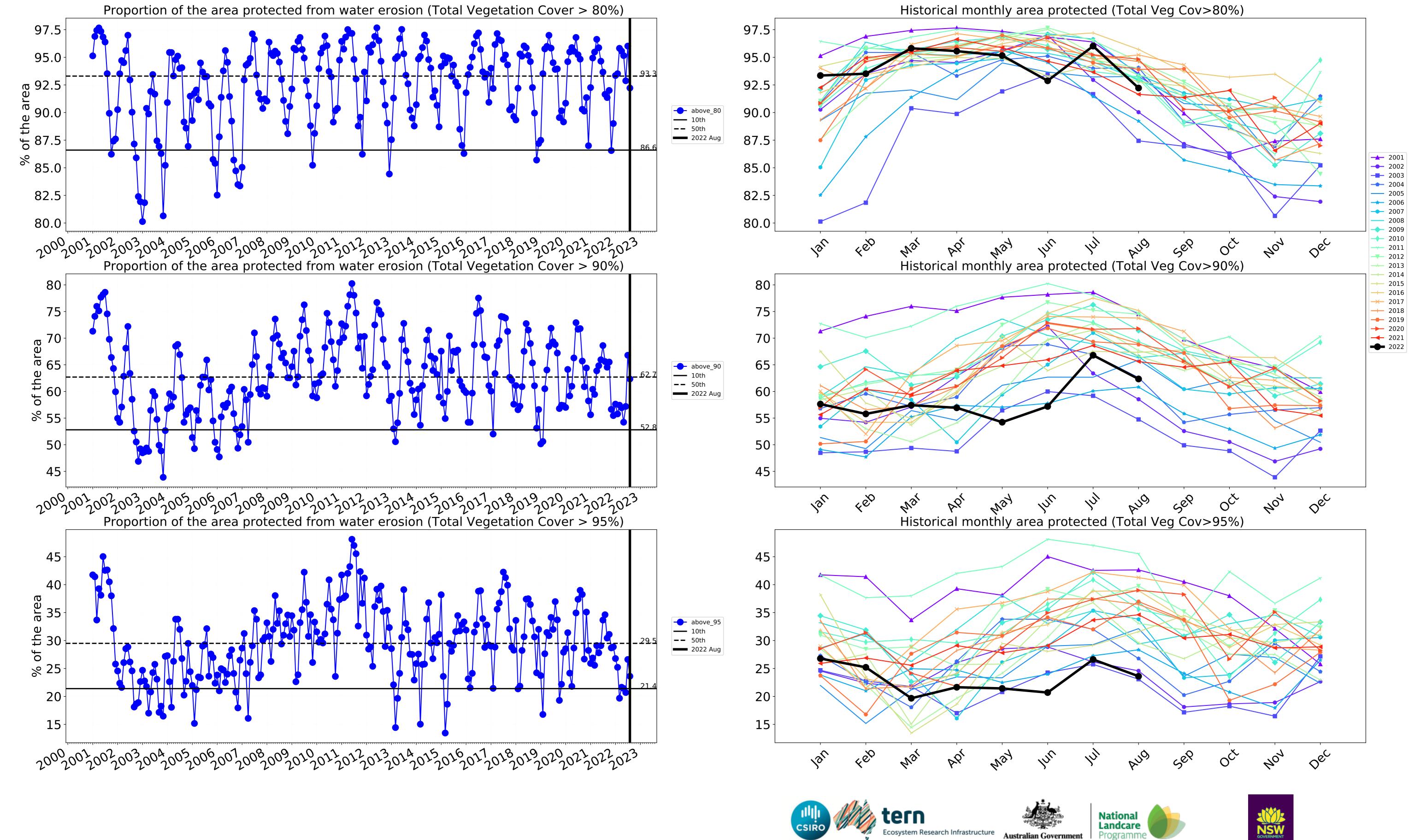
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019. **Total Vegetation Cover Decile [%]**





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





Australian Government

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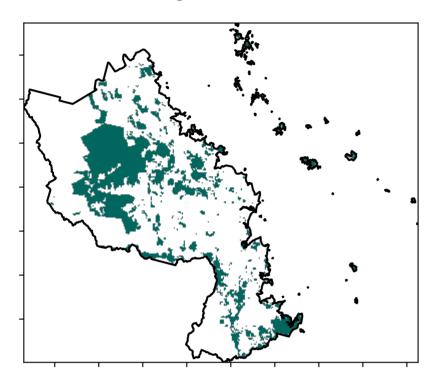
Conservation and natural environments

Catchment Scale Land

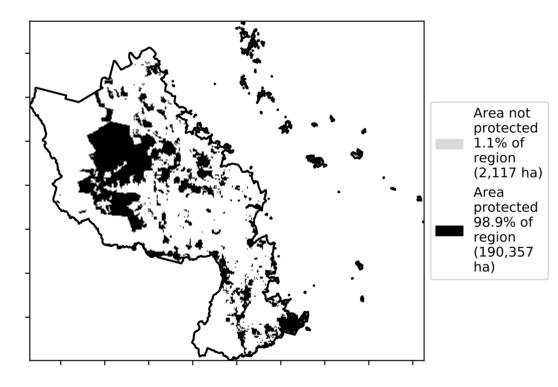
Land use and forest cover

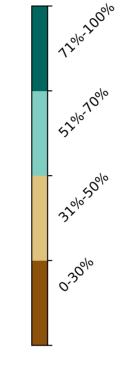
1 Conservation and natural environments - Non-forest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments - Nonwoodland forest

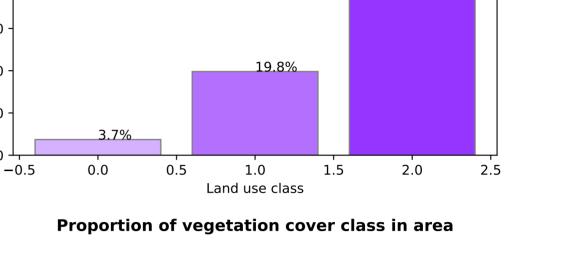
Total Vegetation Cover [%]



% Area protected from water erosion (>70%)









76.5%

80

70

60

50

Area (%) 05

30

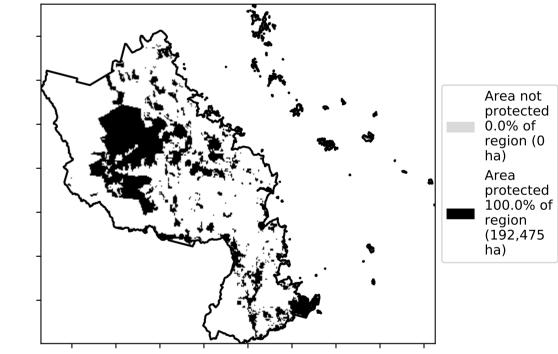
20

10

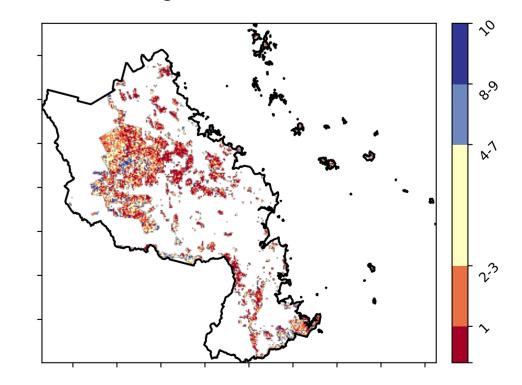
0

98.9% 100 80 60 Area (%) 40 20 0.9% 0.1% 0.1% 0 31%-50% 71%-100% 0-30% 51%-70% Total Vegetation Cover class

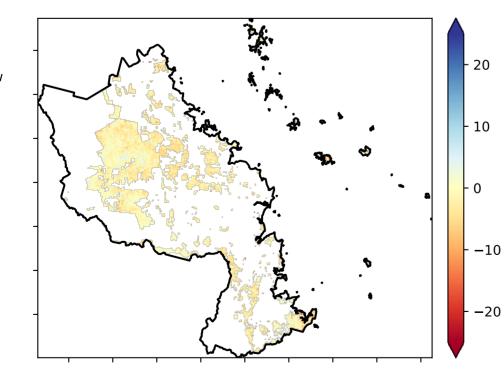
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



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

Catchment Scale

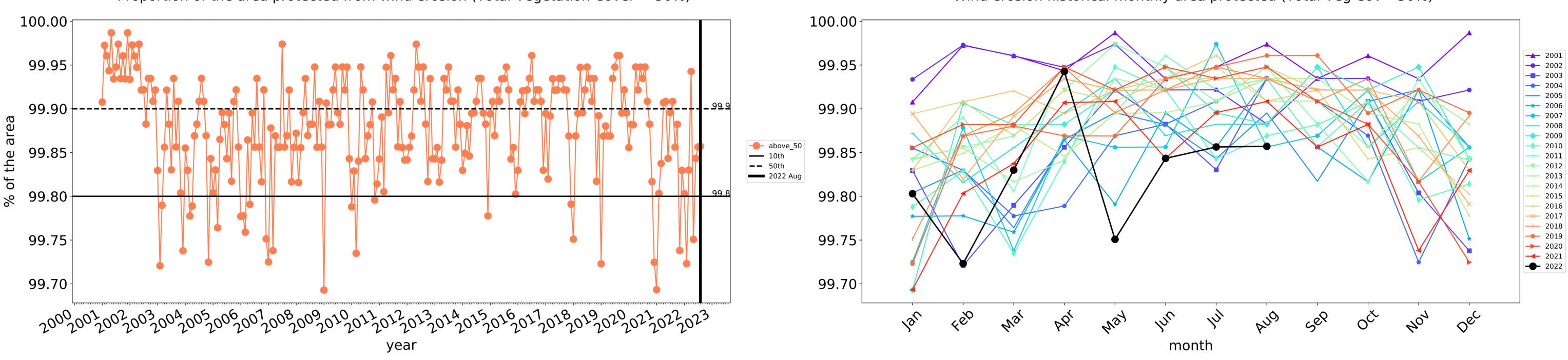
Derived from

Use of Australia

(2018) and Forests

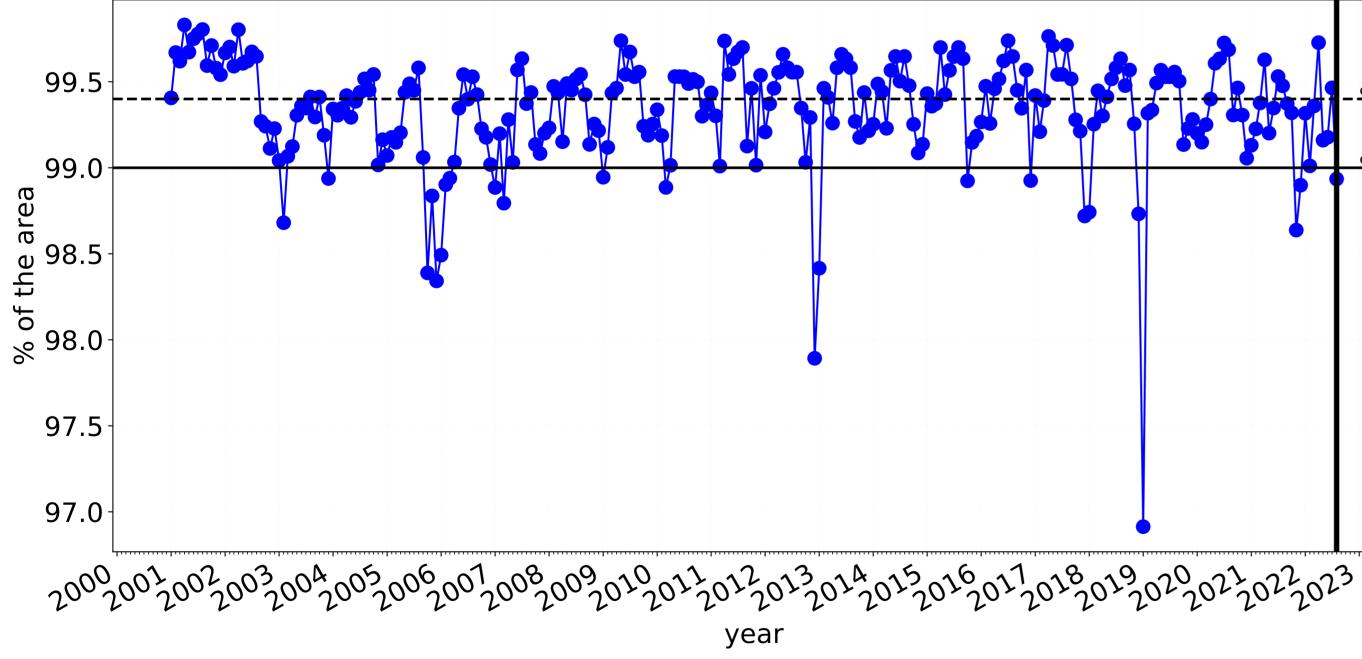
of Australia (2018)

Land Use and Forests of Australia (2018)



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

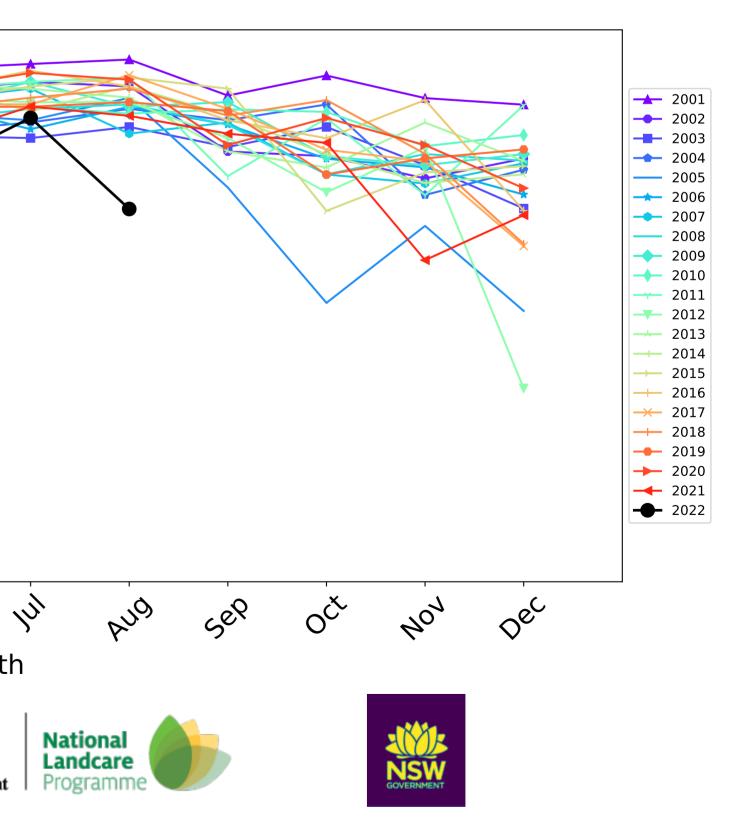
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

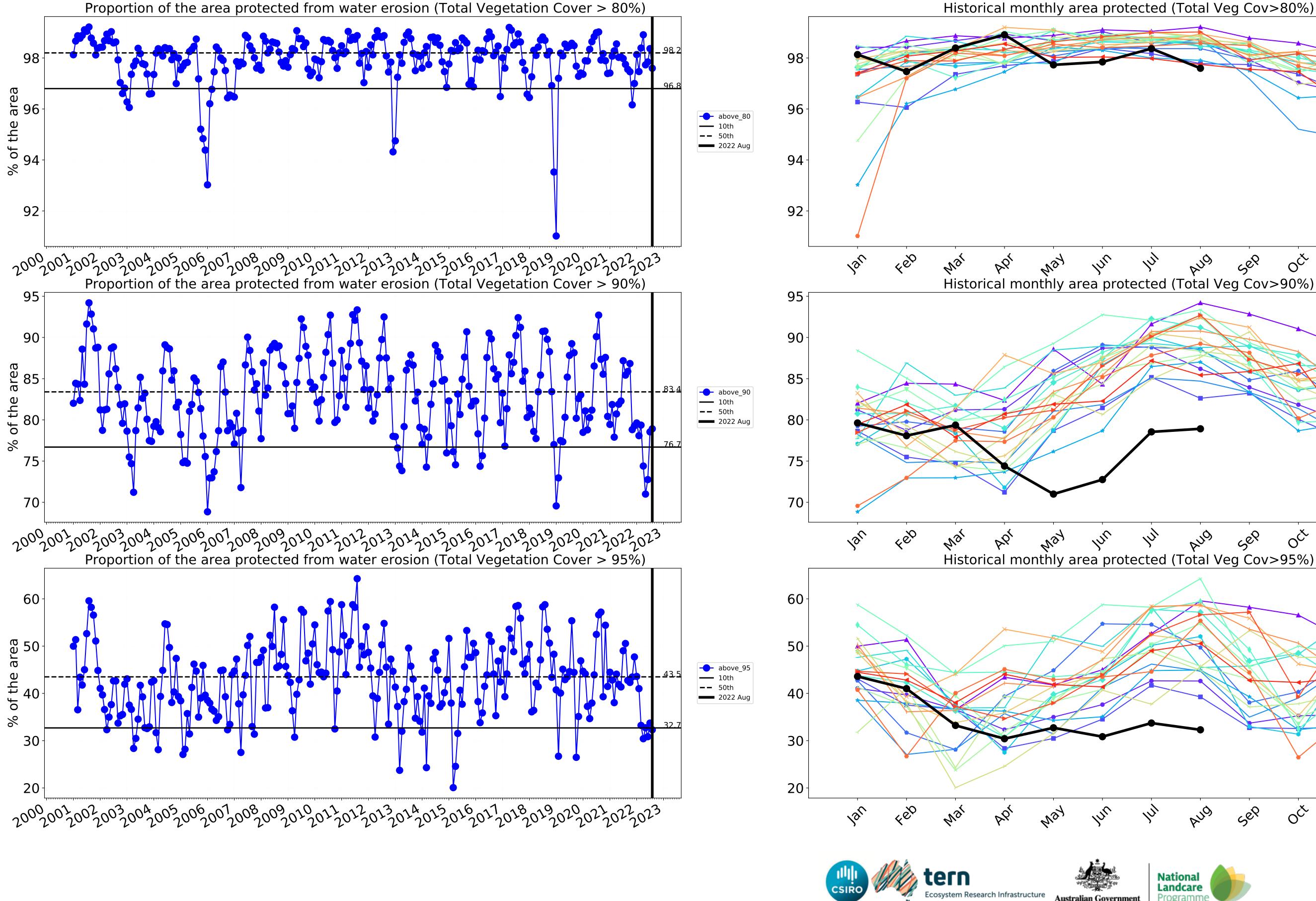


99.5 99.0 --- above_70 **—** 10th **--** 50th 98.5 98.0 97.5 97.0 4eb 1ar May In hug, PQ' month min tern CSIRO Ecosystem Research Infrastructure Australian Government

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

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





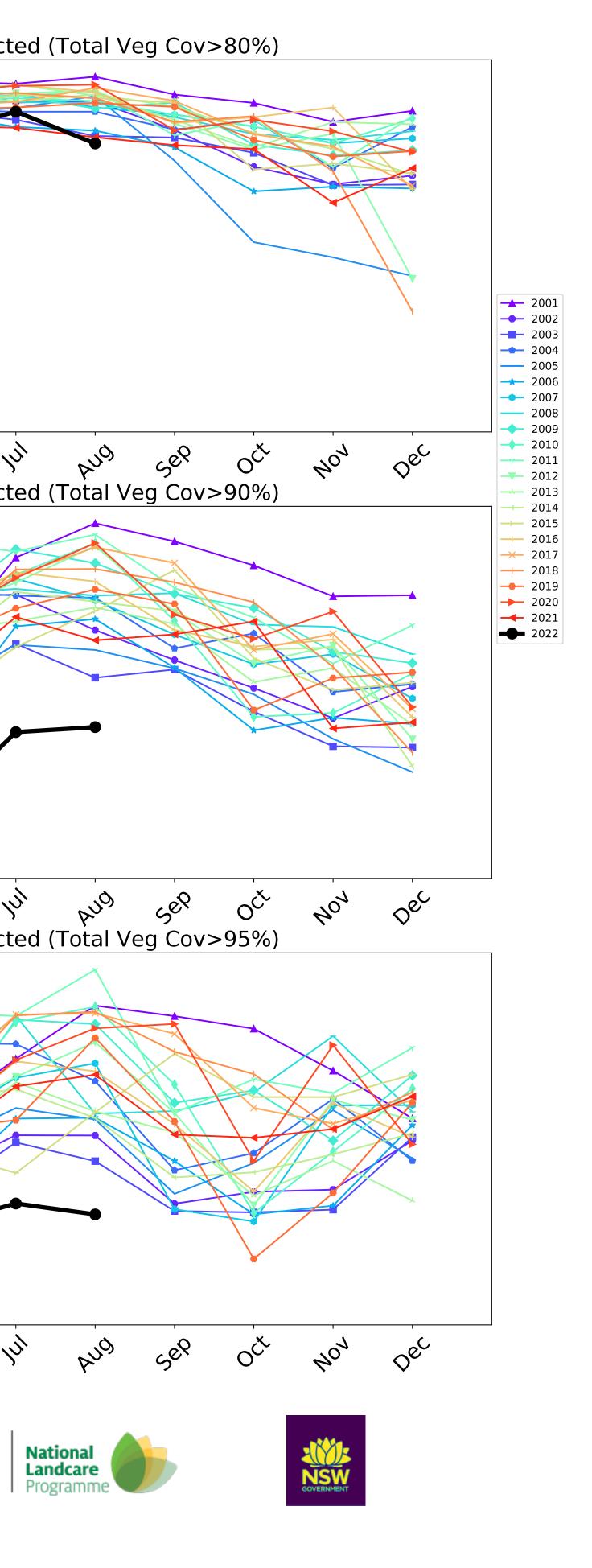
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Conservation and natural environments non forest

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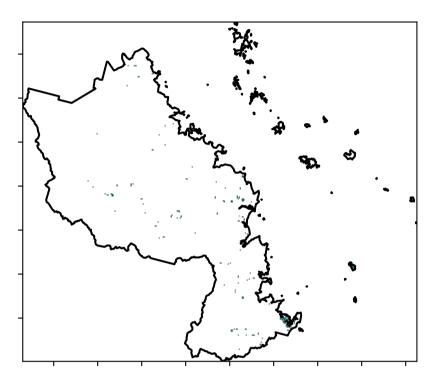
32°1050010

0.30%

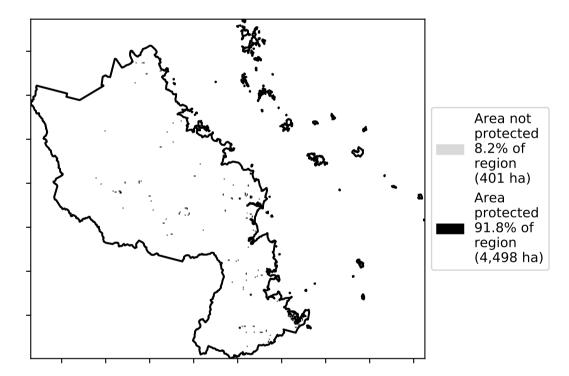
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

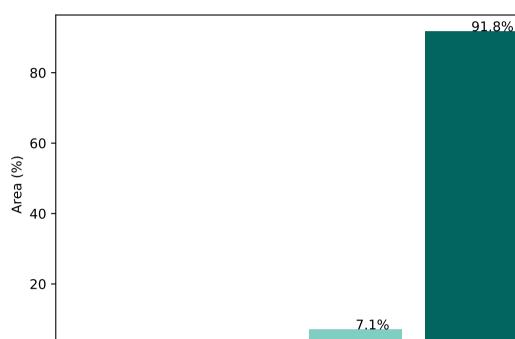
Total Vegetation Cover [%]

Land use and forest cover



% Area protected from water erosion (>70%)

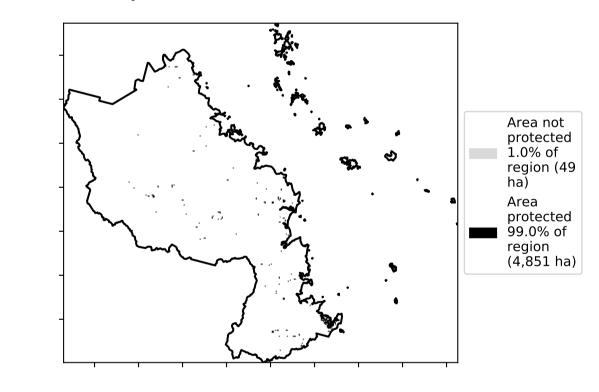




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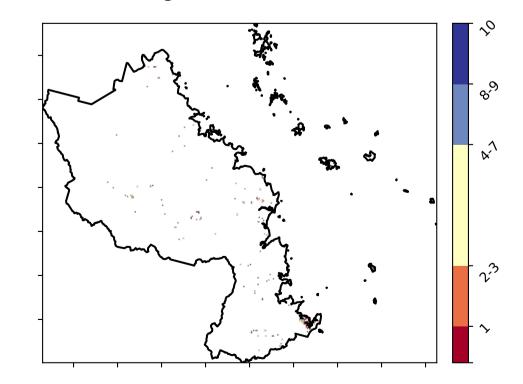
0.1% 1.0% 0-30% 31%-50% 51%-70% 71%-100% Total Vegetation Cover class

% Area protected from wind erosion (>50%)

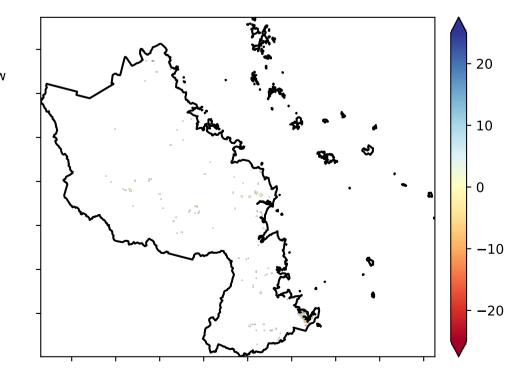


Proportion of vegetation cover class in area

Total Vegetation Cover Decile [%]



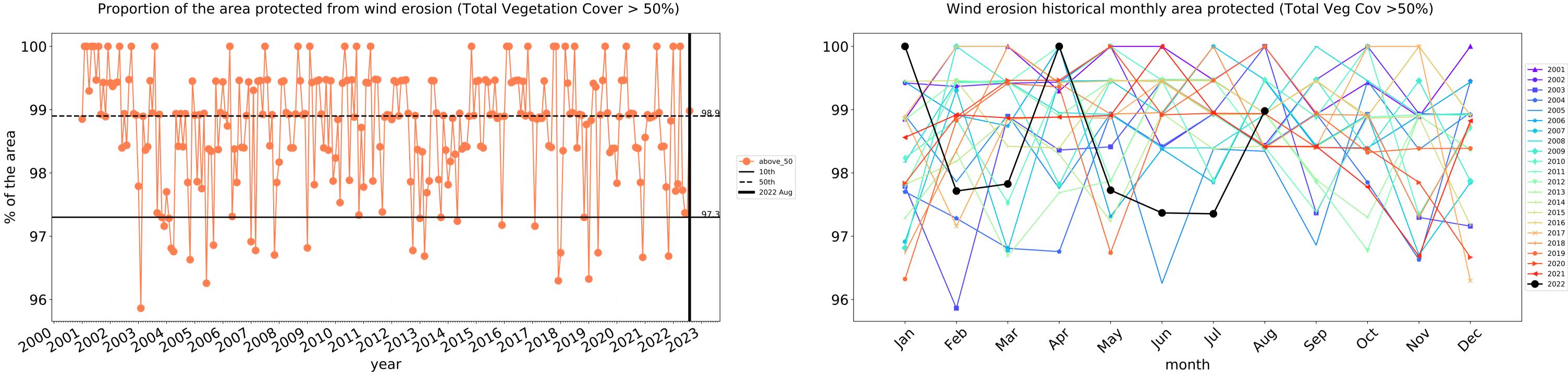
Total Vegetation Cover Anomaly [%]



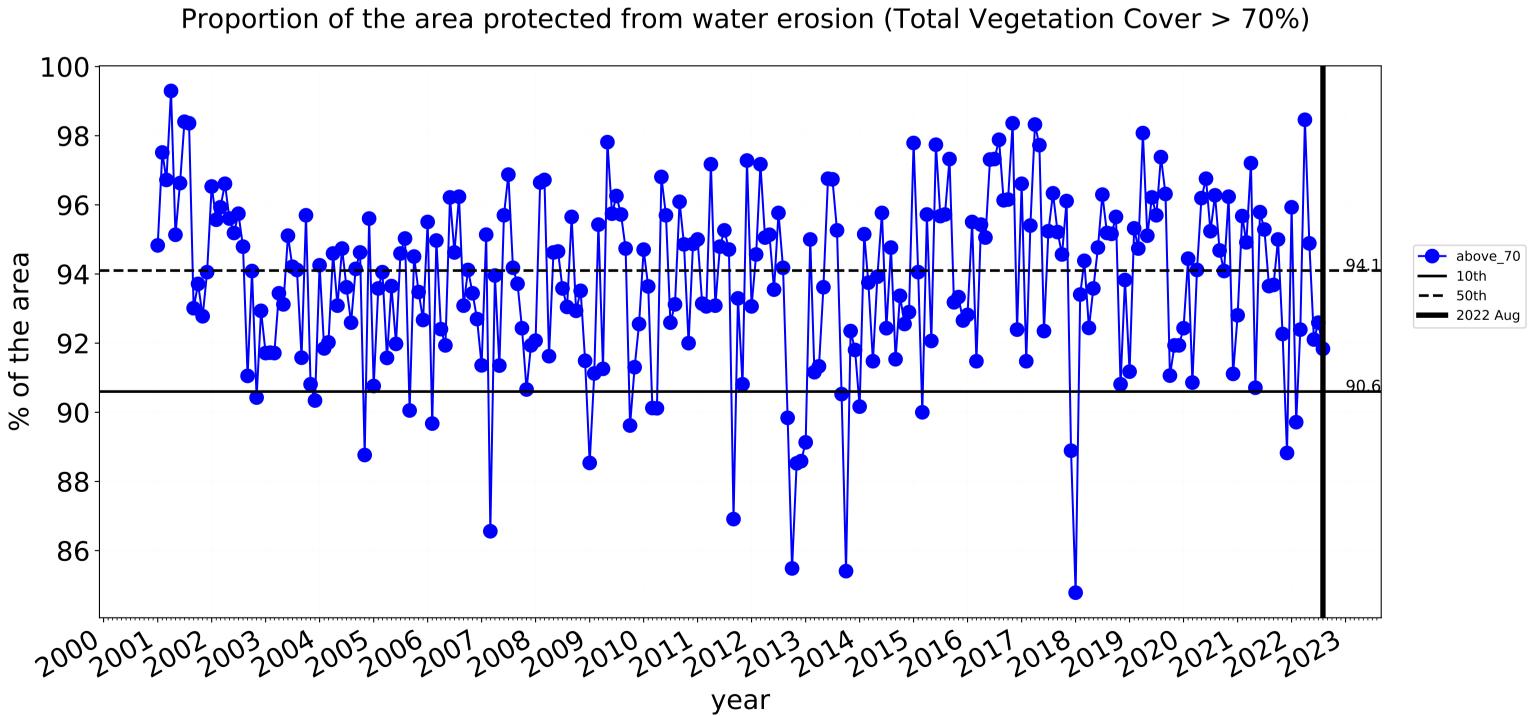
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



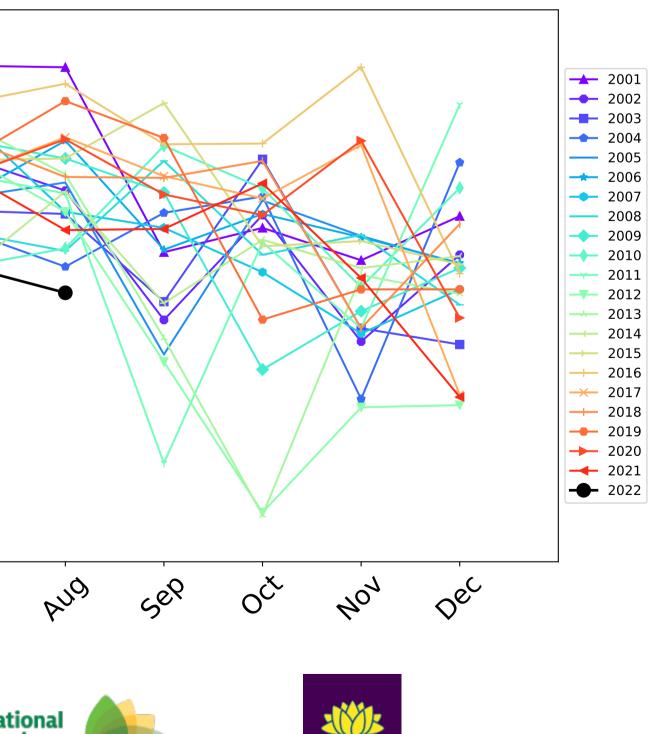
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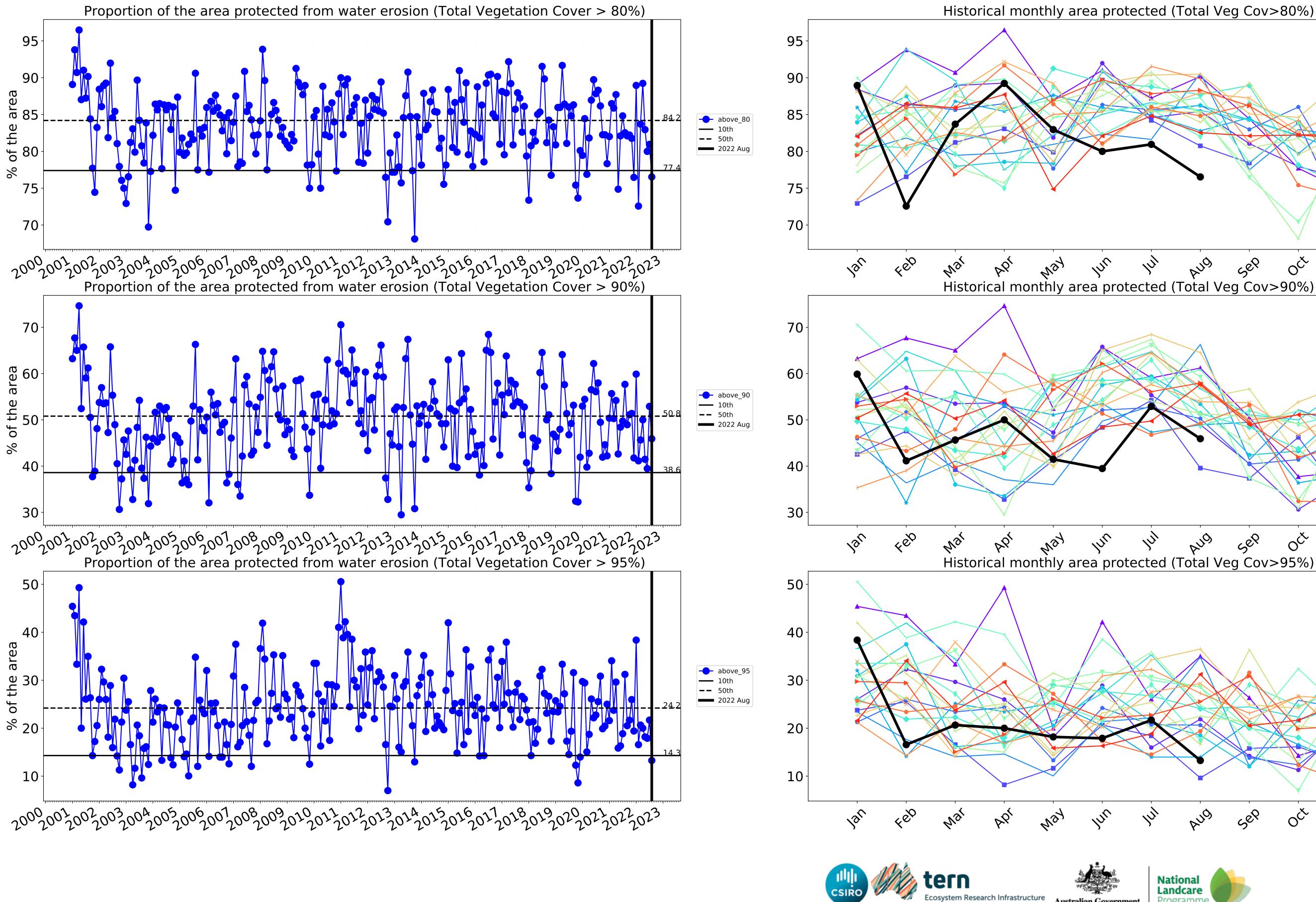


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



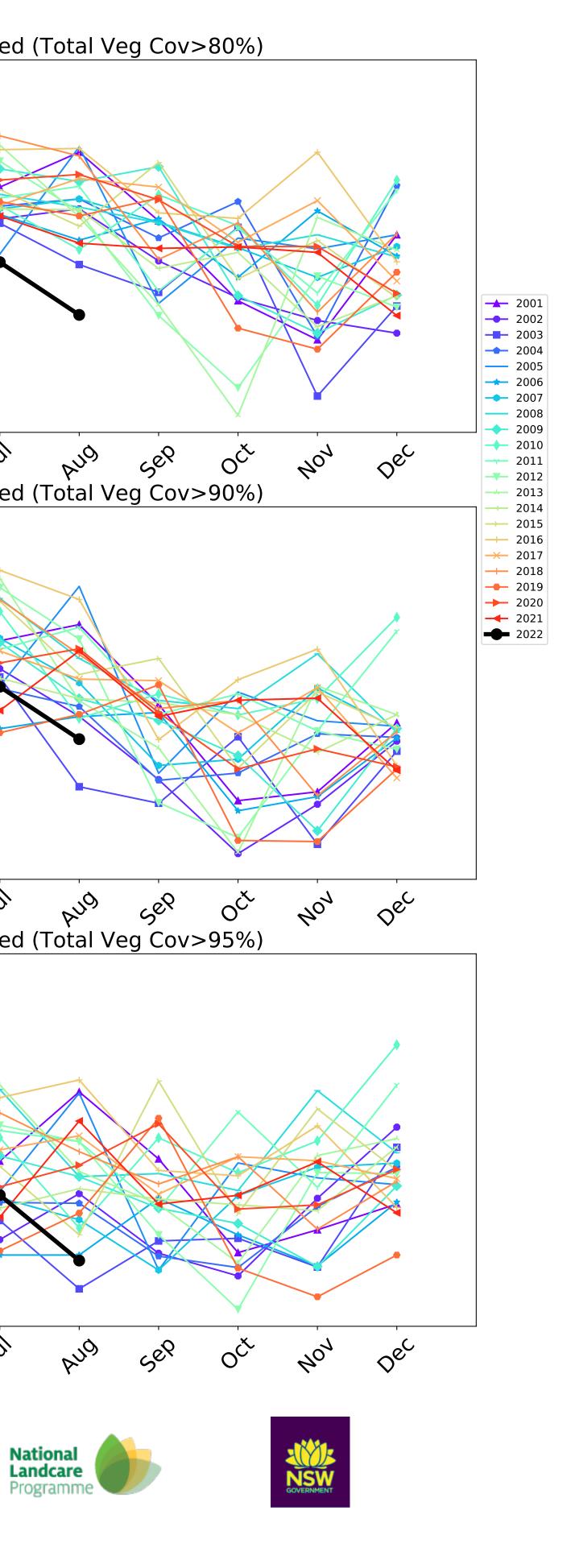
Water erosion historical monthly area protected (Total Veg Cov>70%) 100 98-96 94 92 90 88 86-4eb OČ Jan May AUD Sep In 1/1/ 291 Mai month National Landcare NSW Ecosystem Research Infrastructure Australian Government Programm





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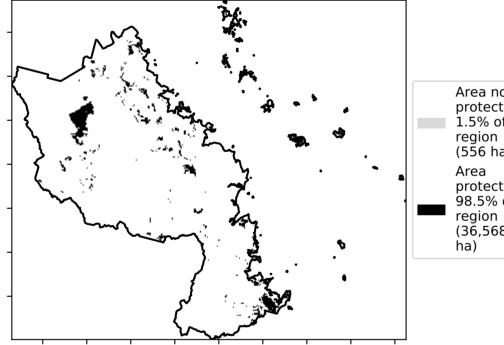
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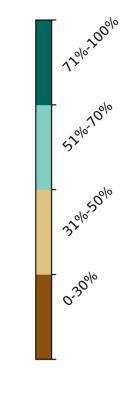
Conservation and natural environments Woodland forest

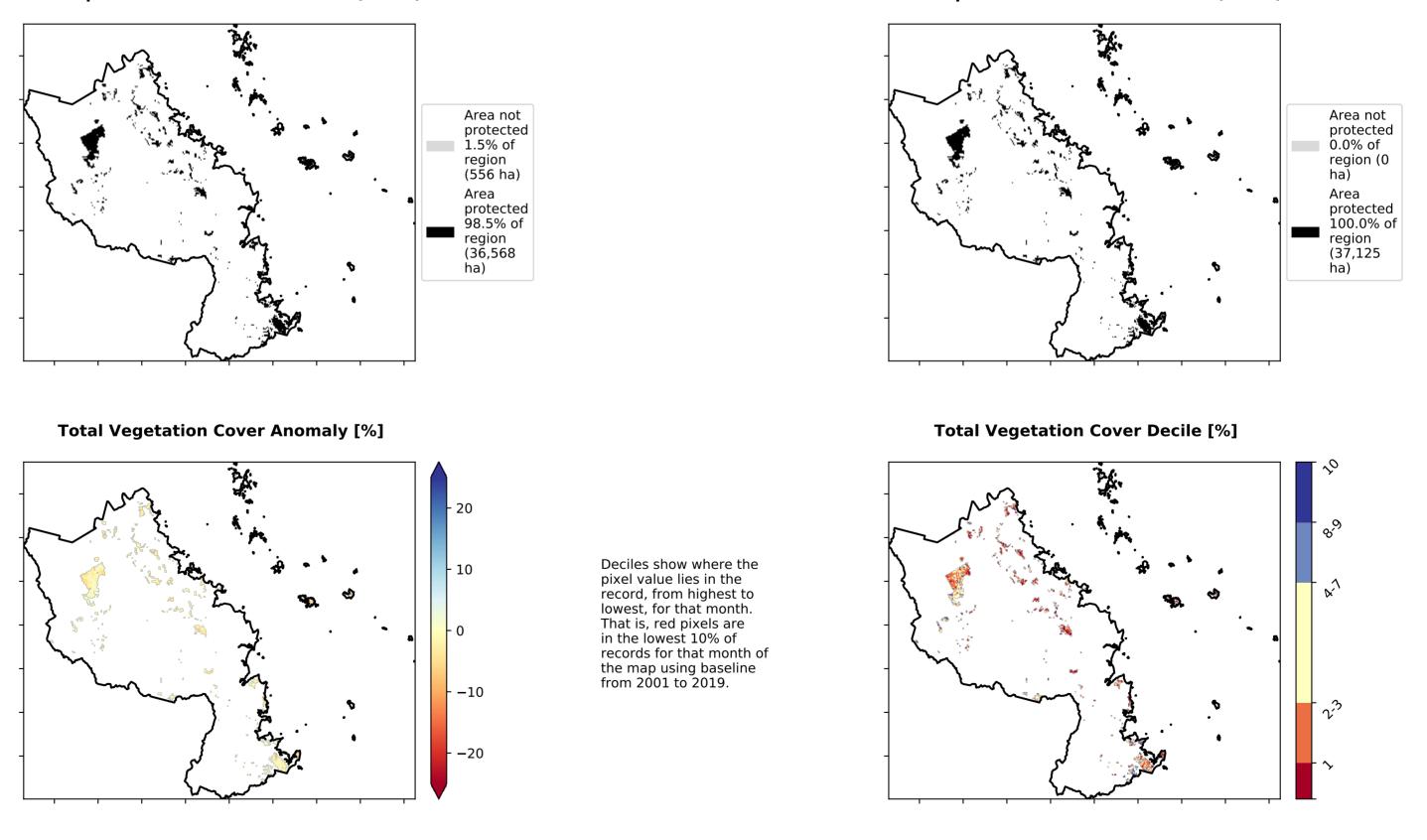
Catchment Scale Land Use and Forests of Australia (2018) 1 Conservation and natural environments - Woodland Catchment Scale Land forest Use of Australia (2018) and Forests of Australia (2018)

Total Vegetation Cover [%]

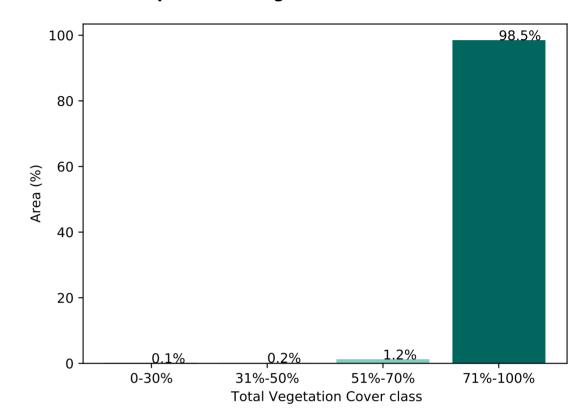
% Area protected from water erosion (>70%)







Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

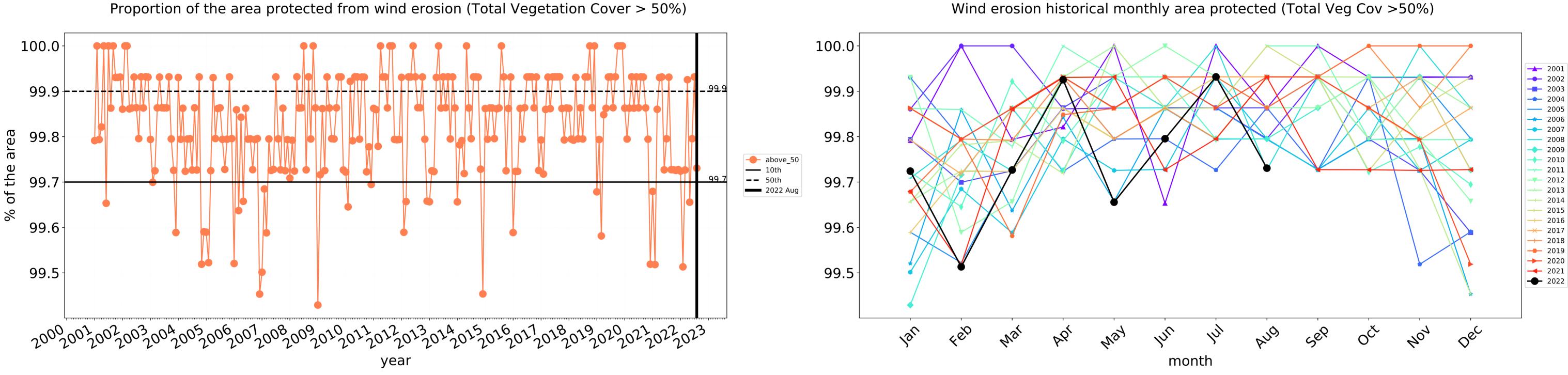
Land use and forest cover





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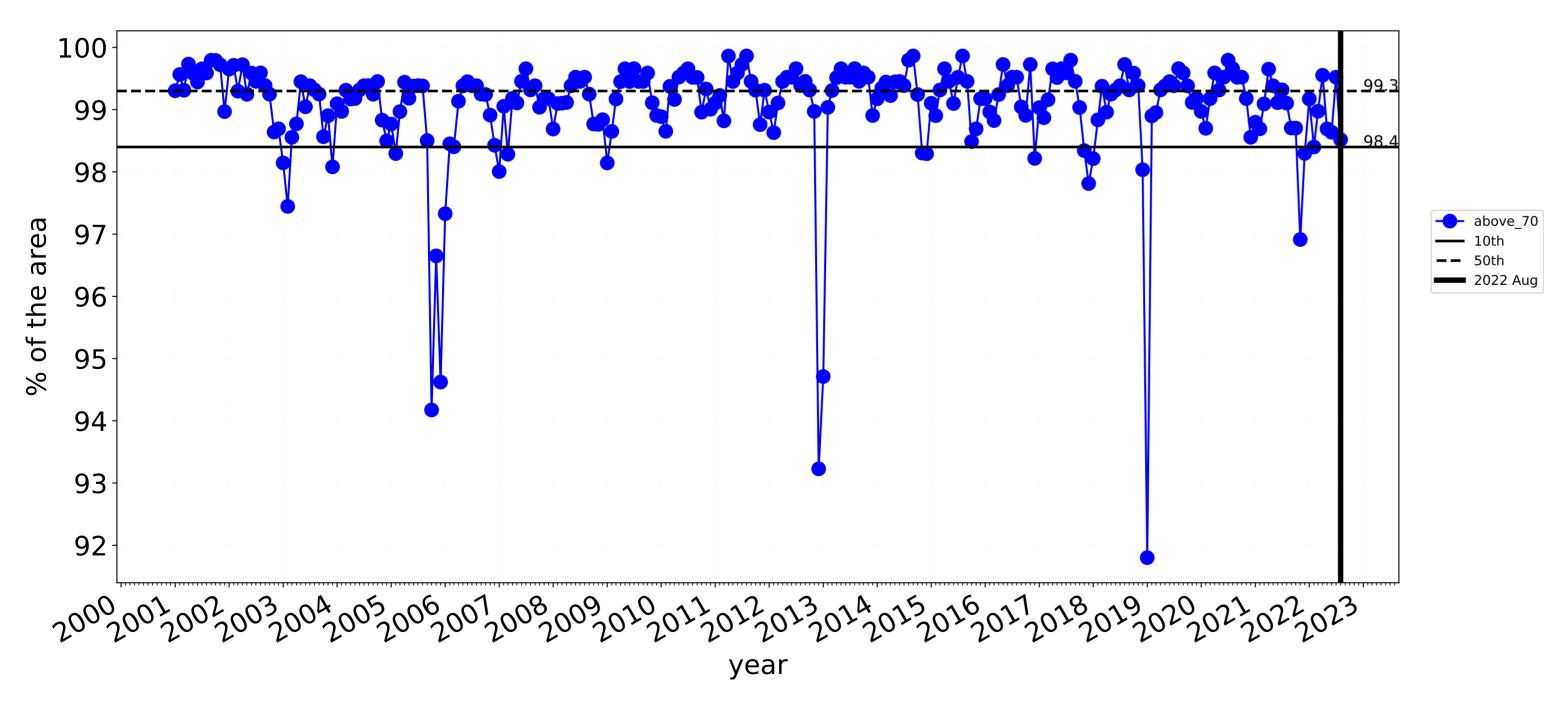
Derived from



100

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

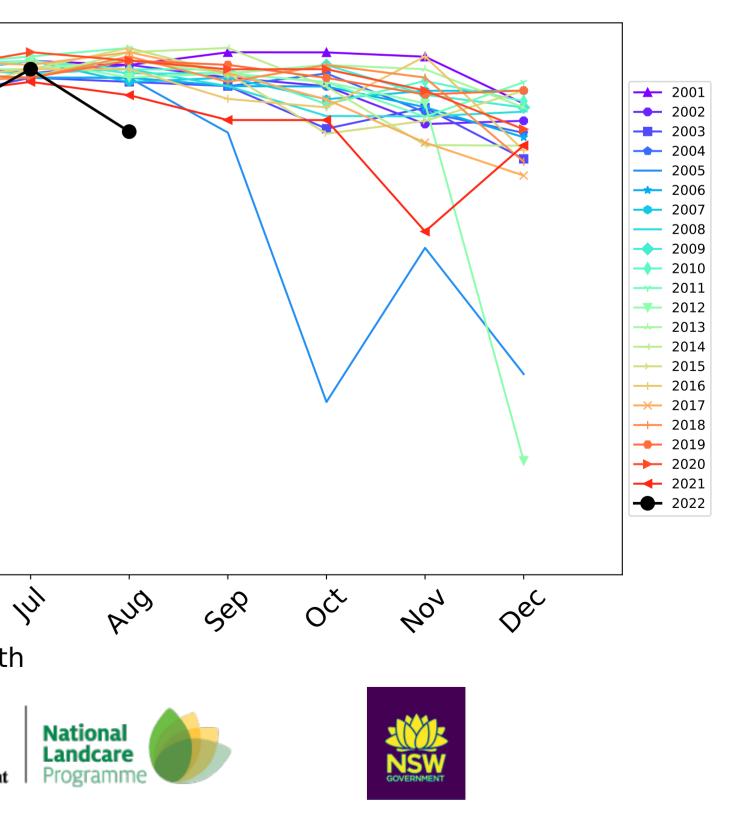
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

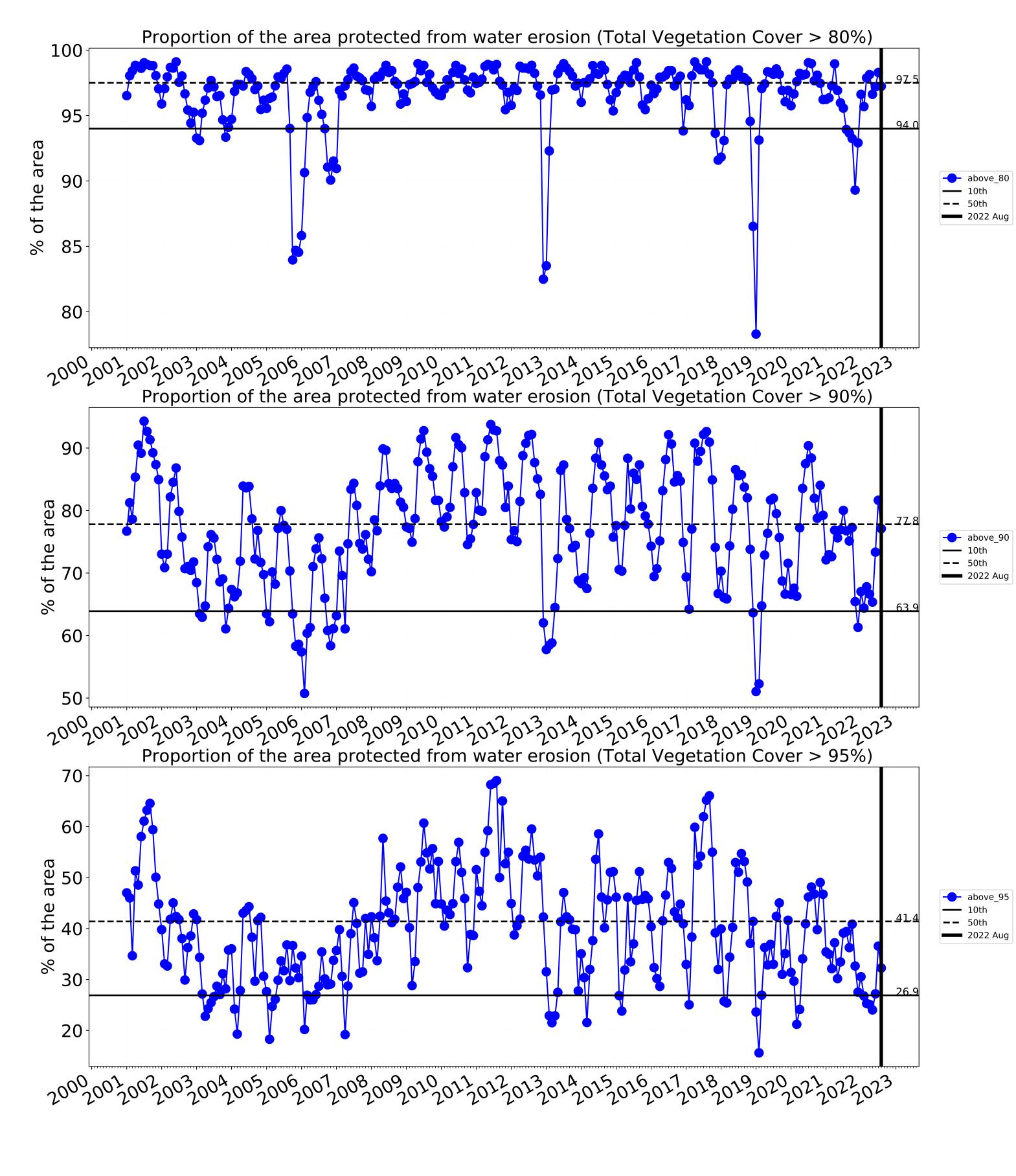


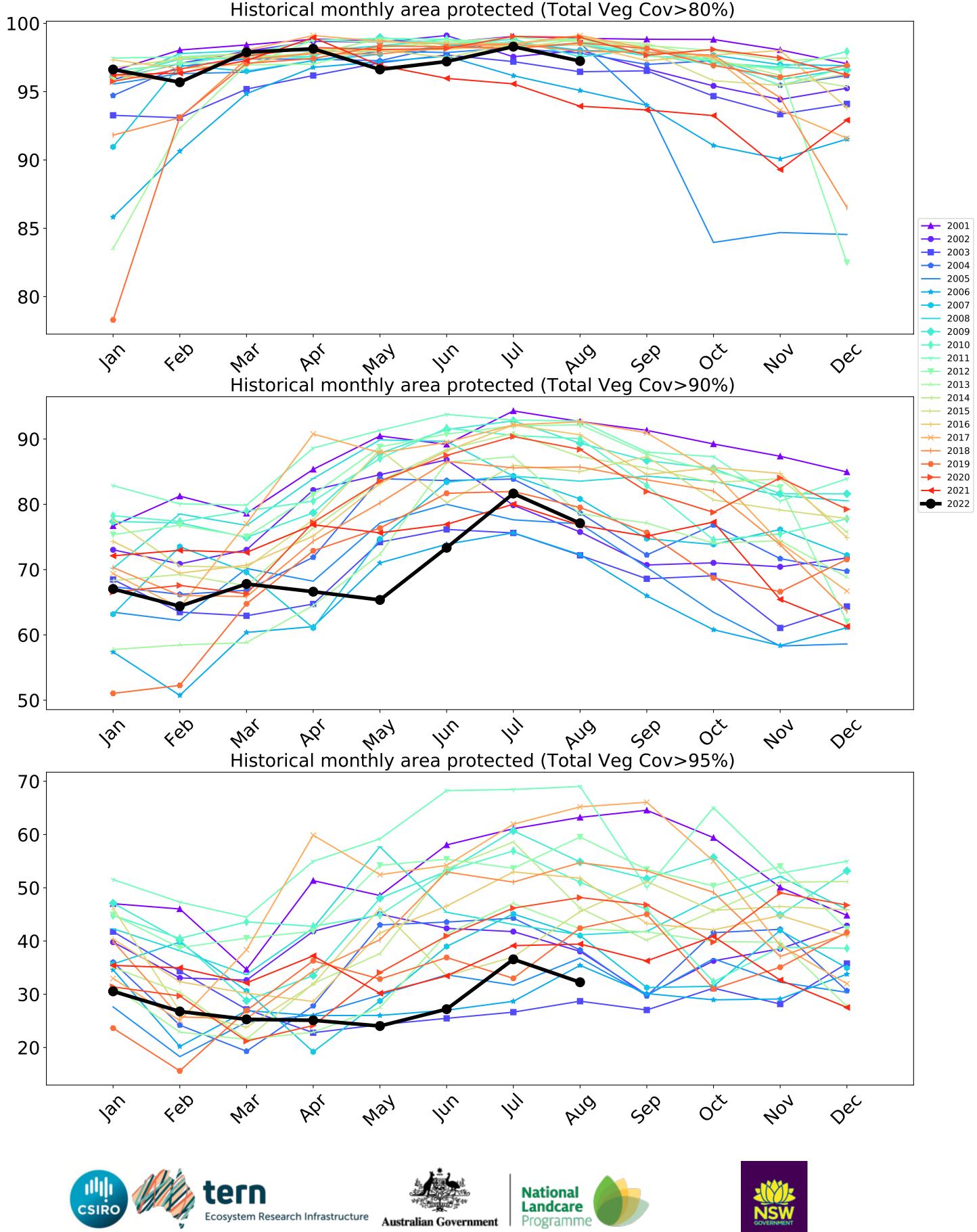
99 98 97 96 95 94 93 92 4eb Jan way In Mai PQ1

> month tern Ecosystem Research Infrastructure Australian Government

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





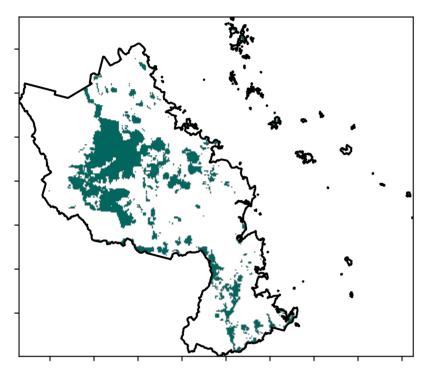




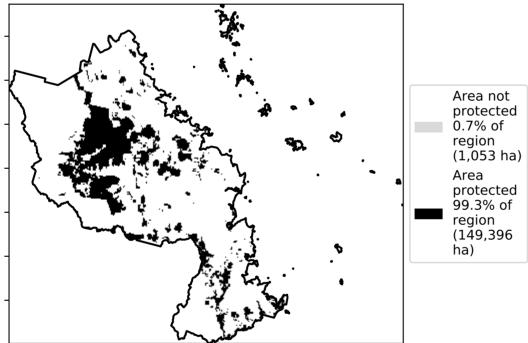
Conservation and natural environments Forest (non woodland)

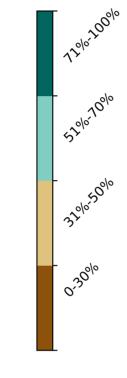
Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Conservation and natural environments - Non-woodland forest Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Total Vegetation Cover [%]



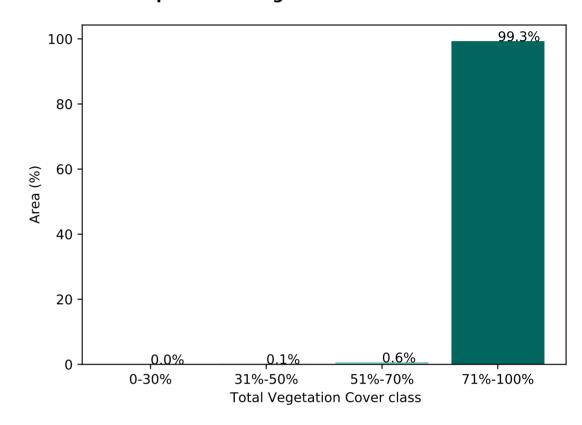
% Area protected from water erosion (>70%)



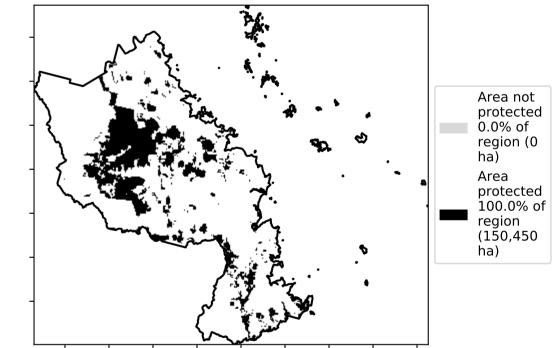




Proportion of vegetation cover class in area

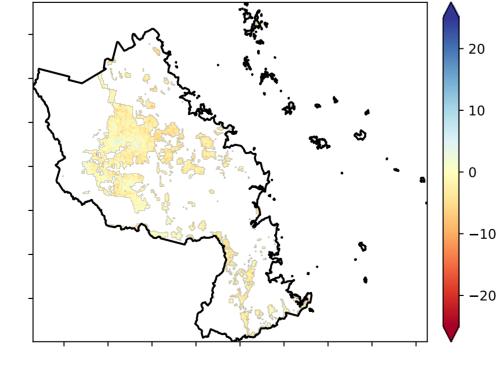


% Area protected from wind erosion (>50%)



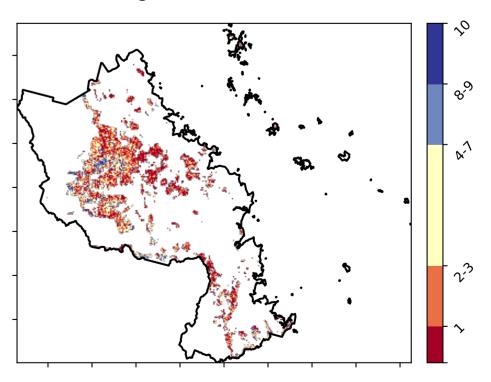
Total Vegetation Cover Anomaly [%]

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

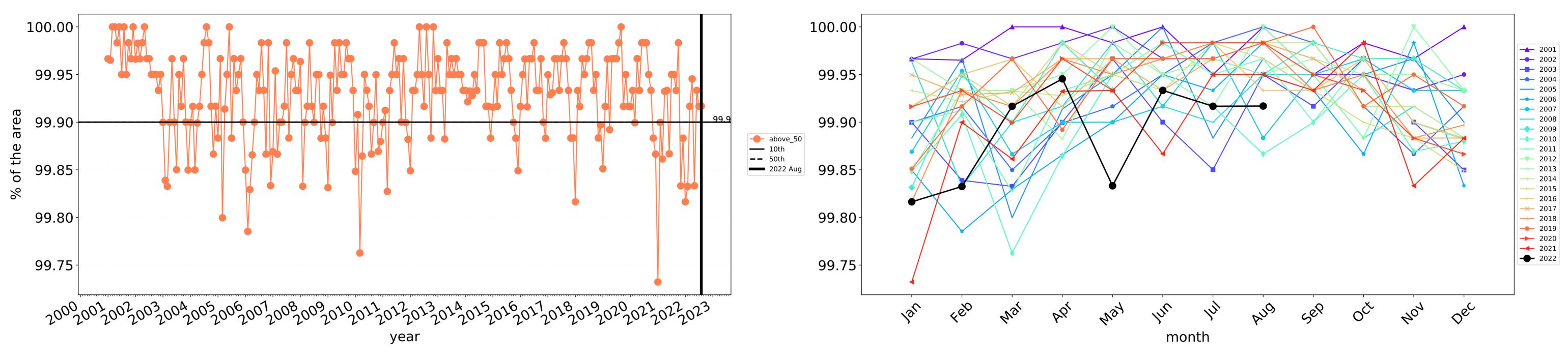


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the man using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

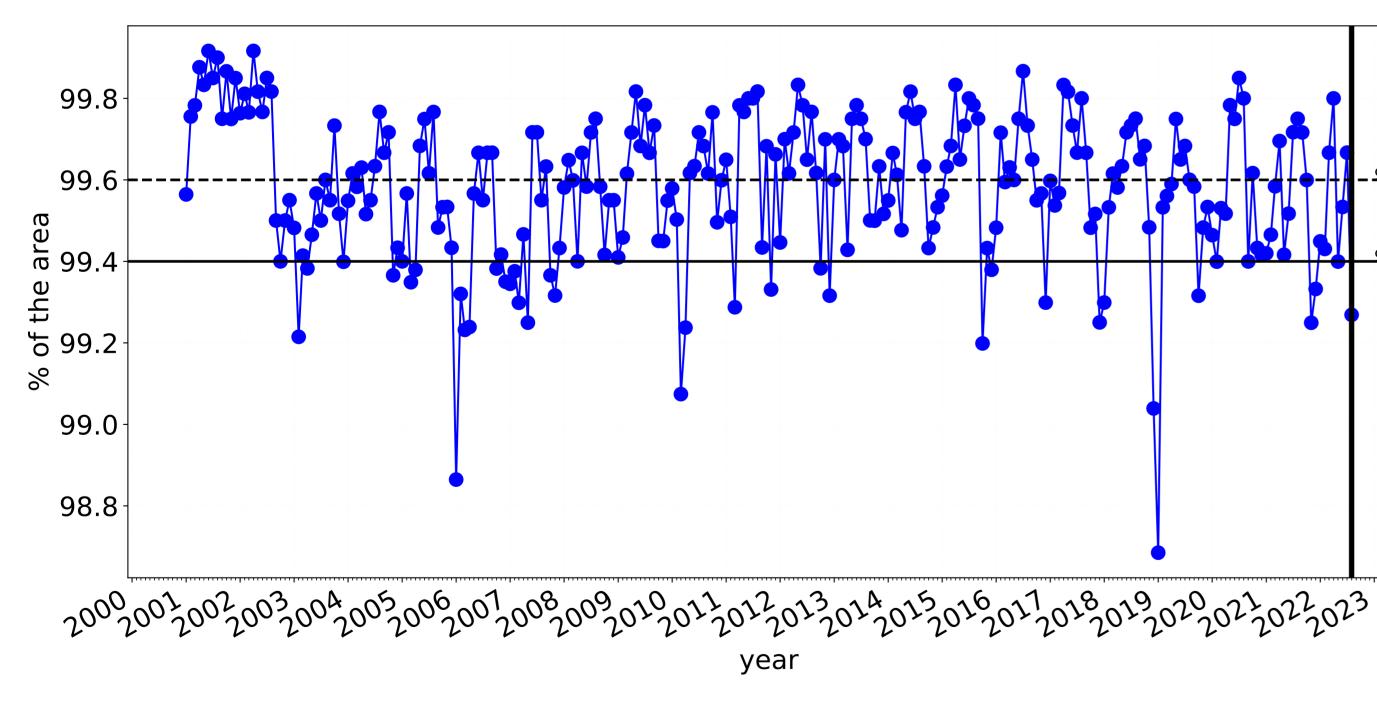


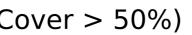




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

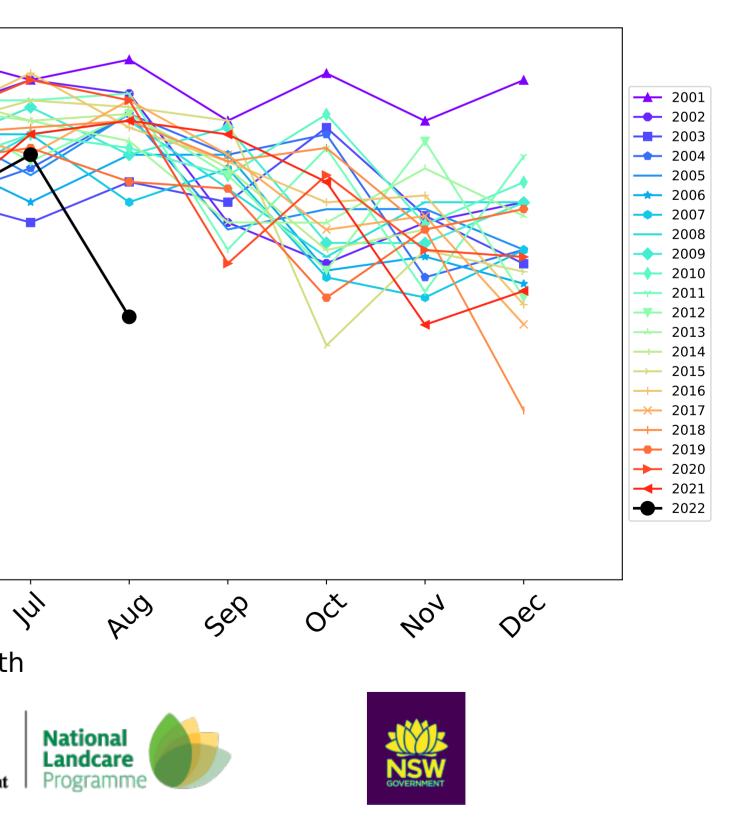


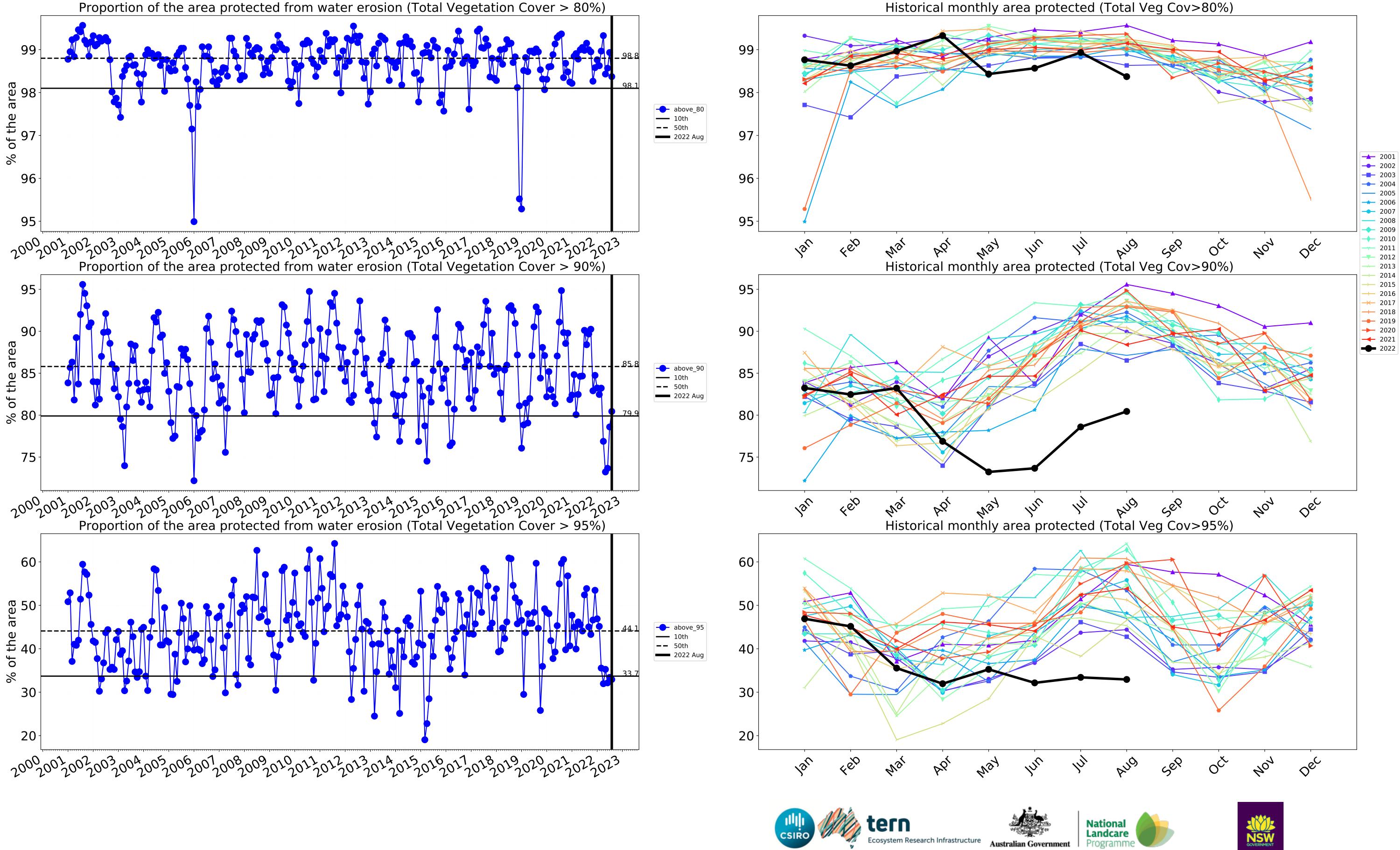


Wind erosion historical monthly area protected (Total Veg Cov >50%)

99.8 99.6 ---- above_70 **—** 10th **--** 50th 99.4 2022 Aug 99.2 99.0 98.8 feb 1ar May In PQ' W31 month tern Ecosystem Research Infrastructure Australian Government

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

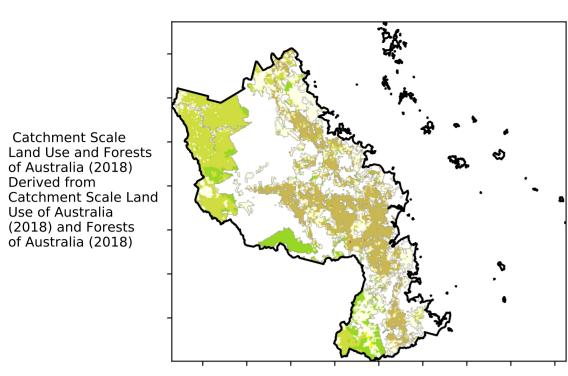




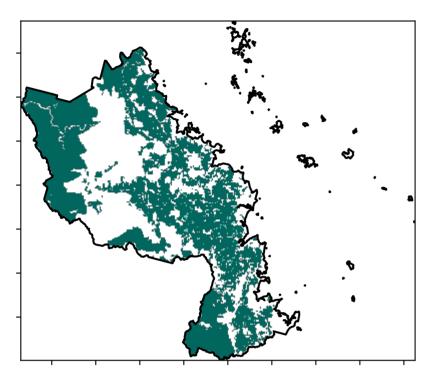


Agriculture

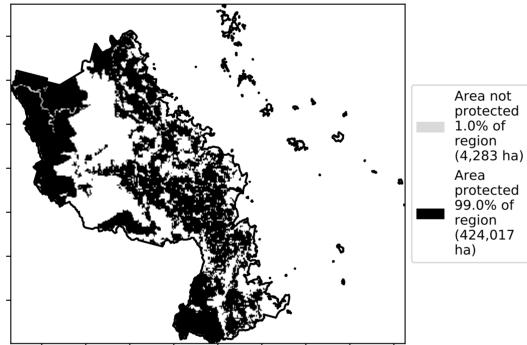
Land use and forest cover

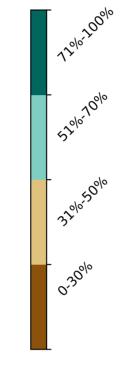


Total Vegetation Cover [%]



% Area protected from water erosion (>70%)





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

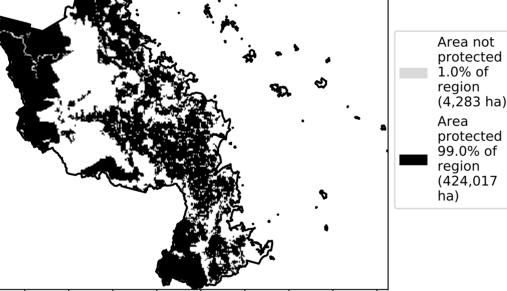
4 Agriculture - Grazing - Irrigated 5 Agriculture - Cropping - Non-irrigated

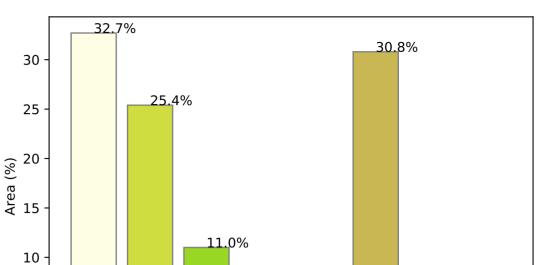
7 Agriculture - Horticulture - Non-irrigated

6 Agriculture - Cropping - Irrigated

8 Agriculture - Horticulture - Irrigated

3 Agriculture - Grazing - Non-woodland forest





Proportion of each land class in area

Proportion of vegetation cover class in area

Land use class

0.0%

3

0 1 9

5

4

0.0%

6

0.0%

7

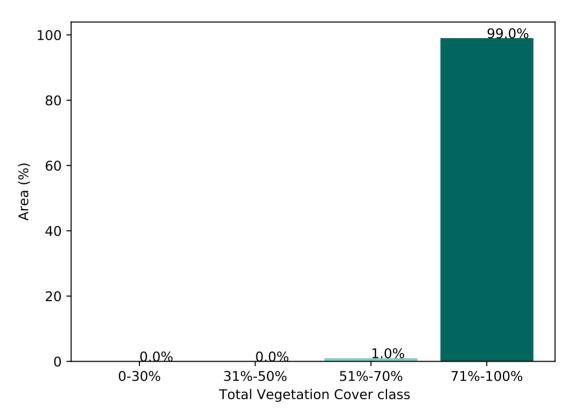
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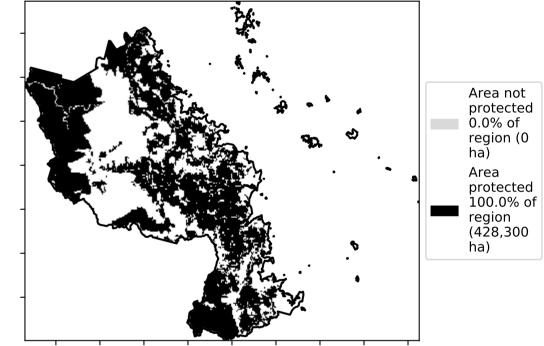
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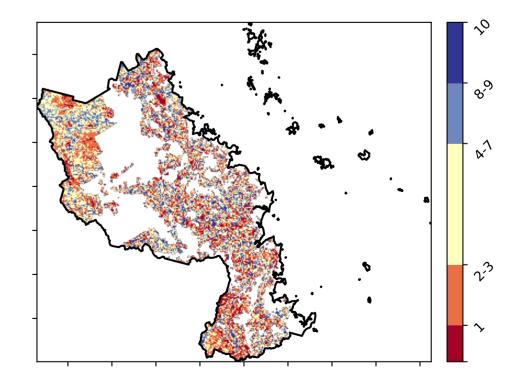
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% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

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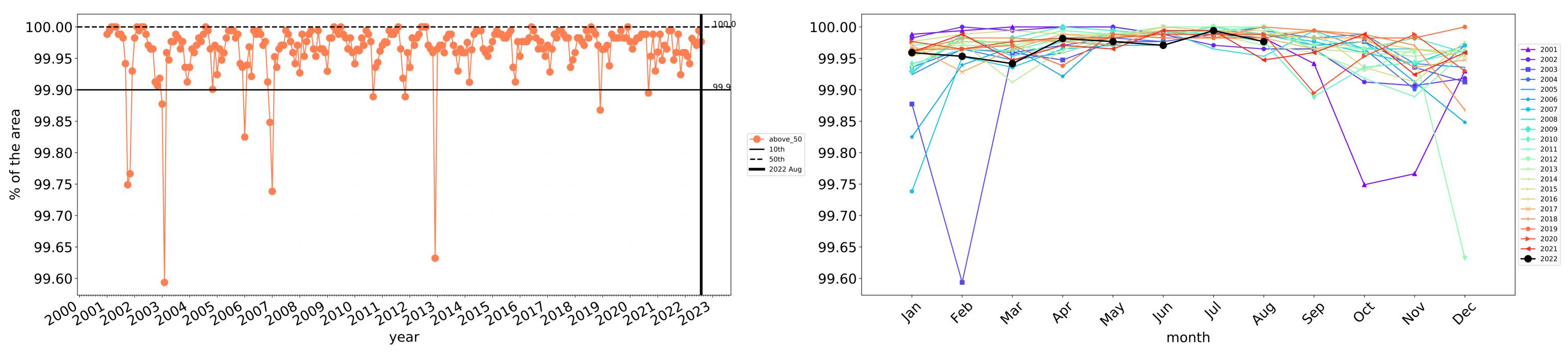
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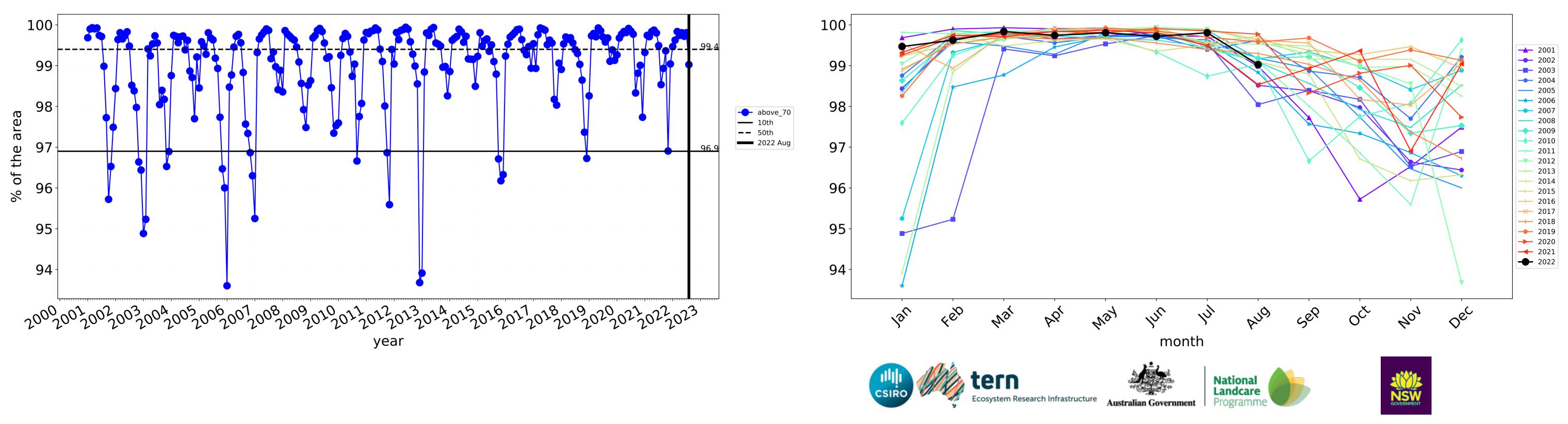
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

of Australia (2018)



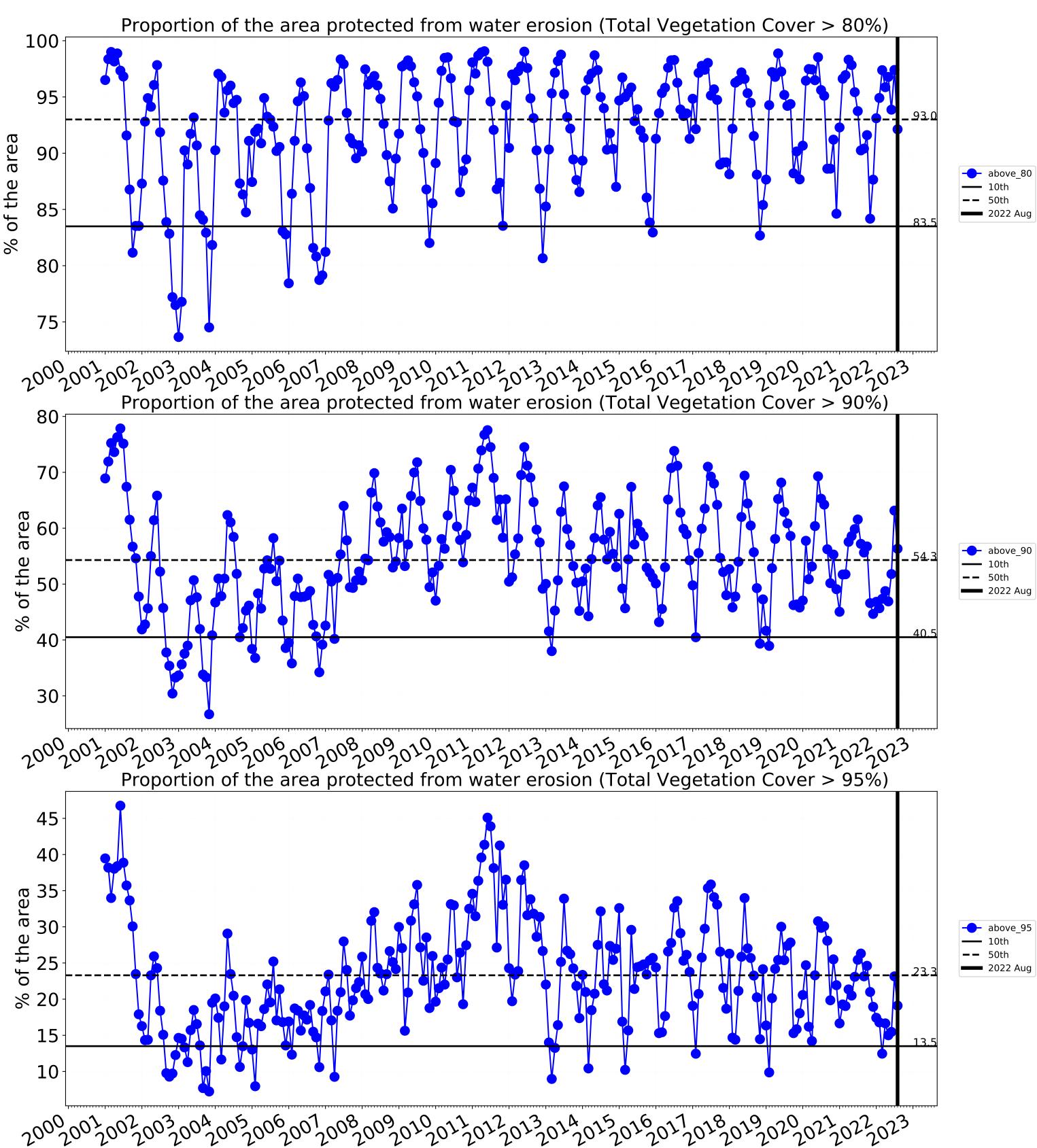
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

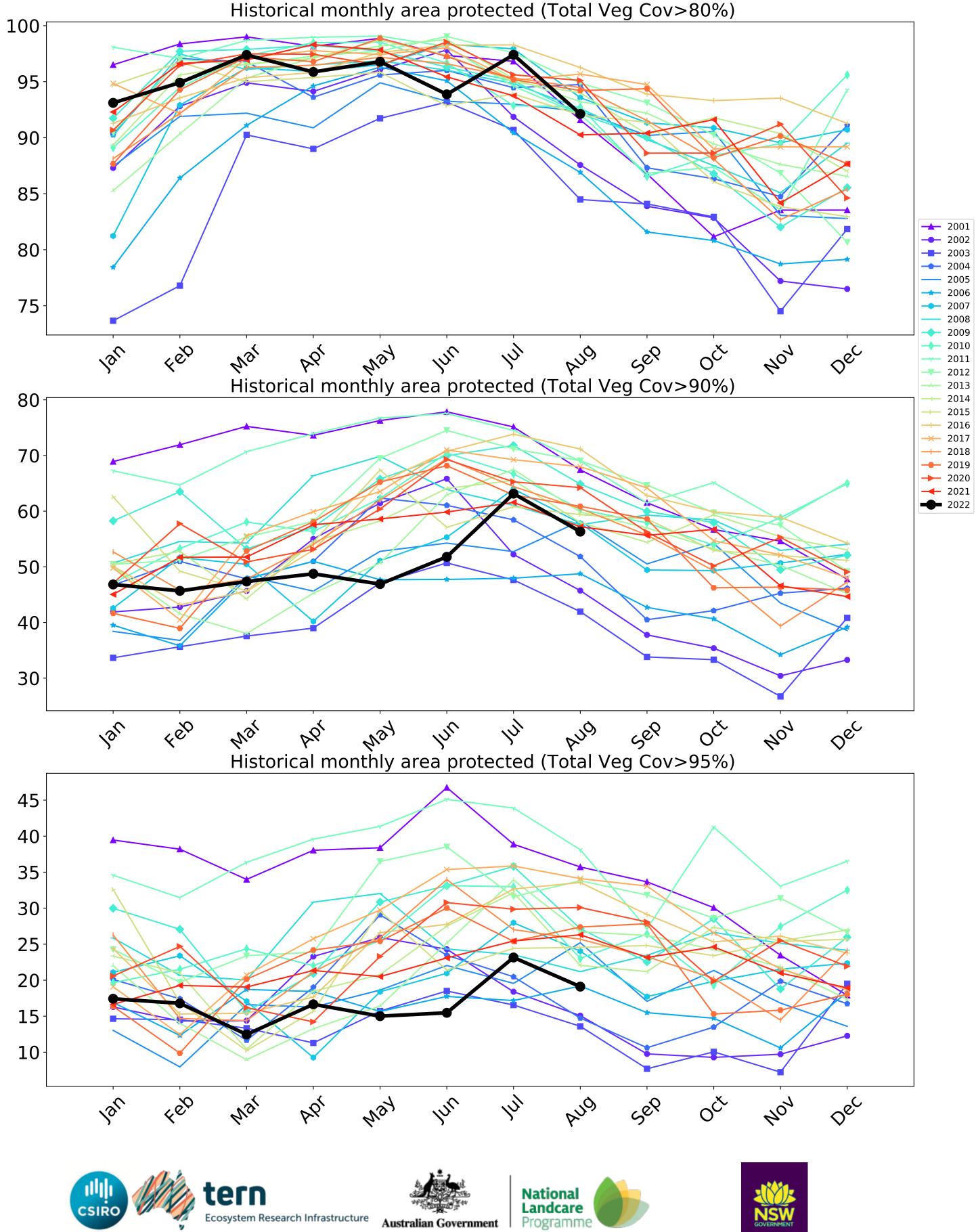
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

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

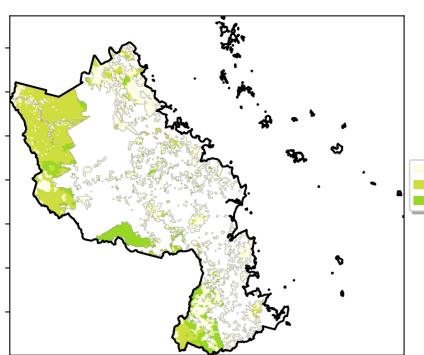






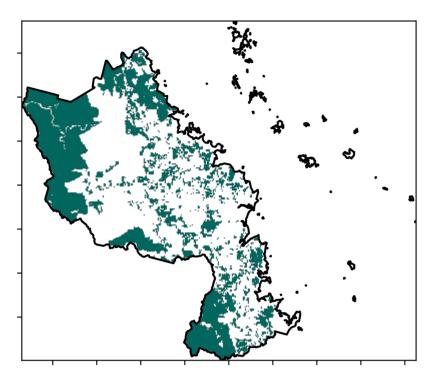
Grazing

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

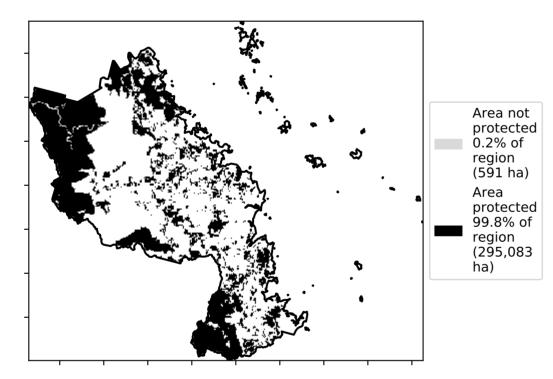


Land use and forest cover

Total Vegetation Cover [%]



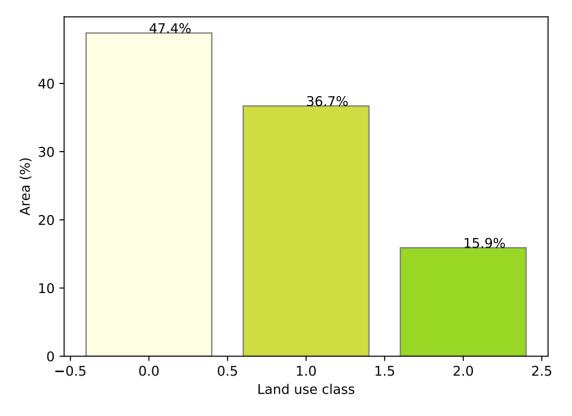
% Area protected from water erosion (>70%)



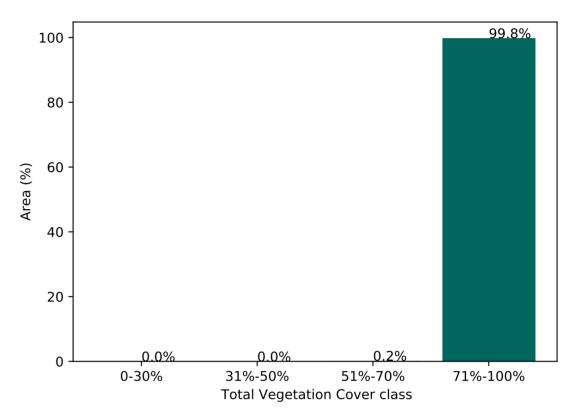
1200,1000 · 520/07/00/0 32005000 0.30%

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

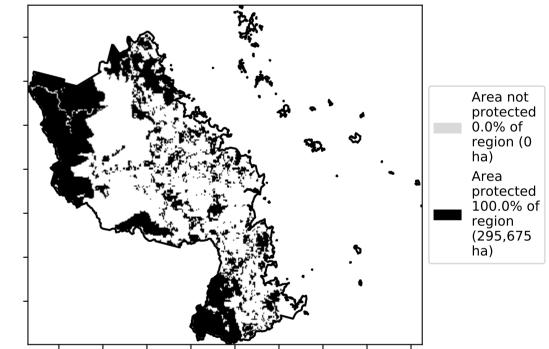
Proportion of each land class in area



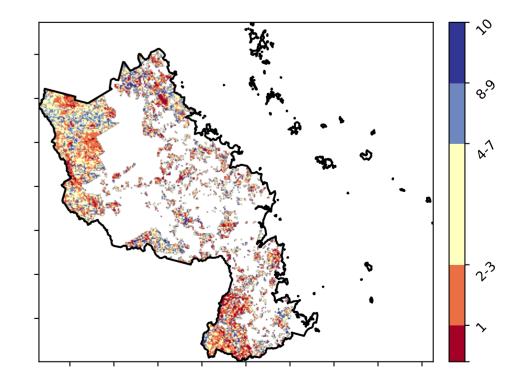
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

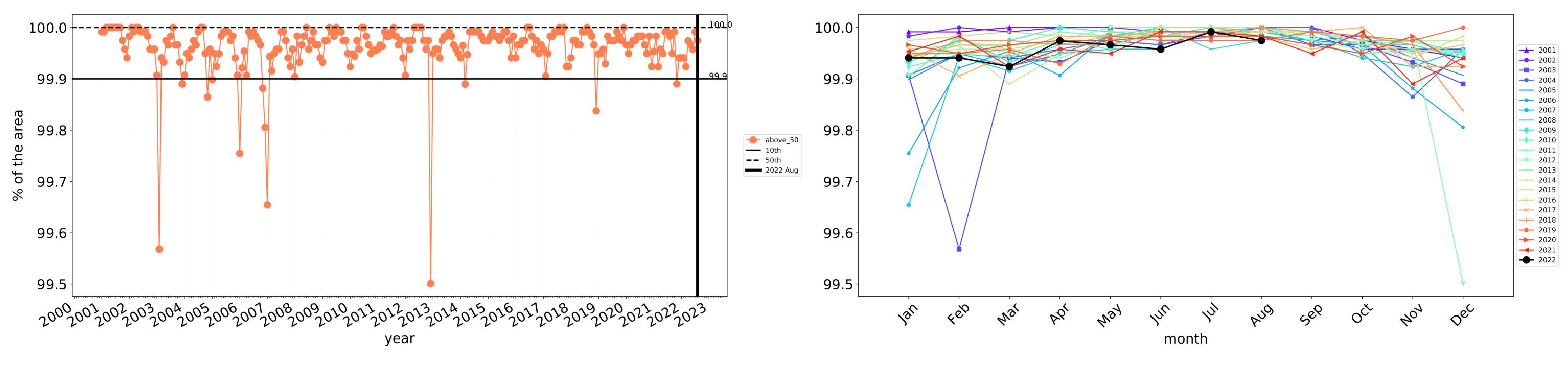
፞፝፞ዾዸ - 20 - 10 0 -10 -20

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



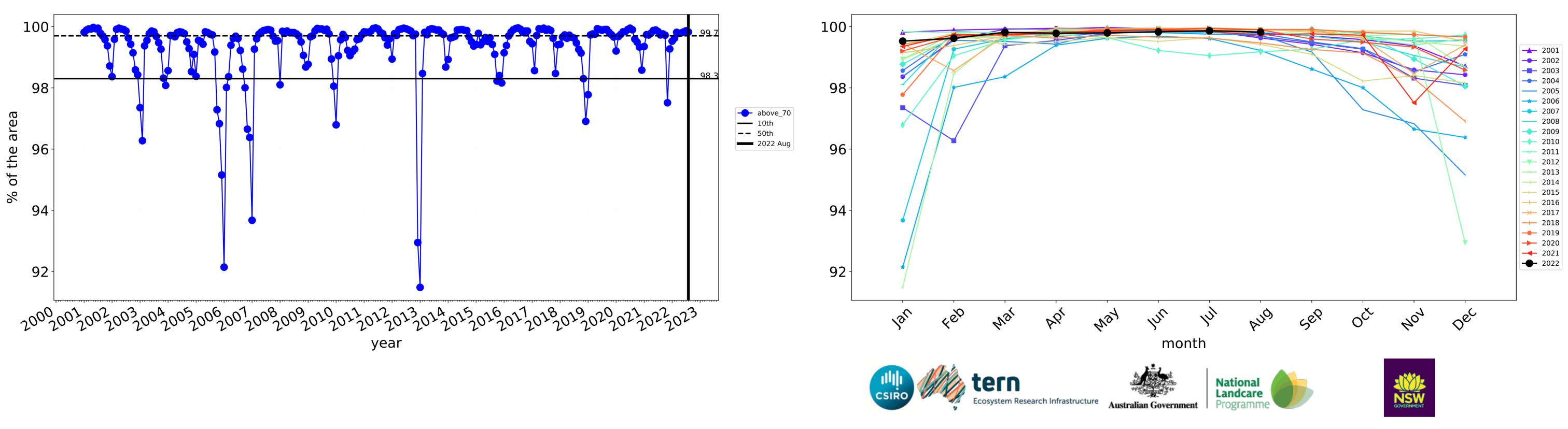


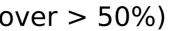
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

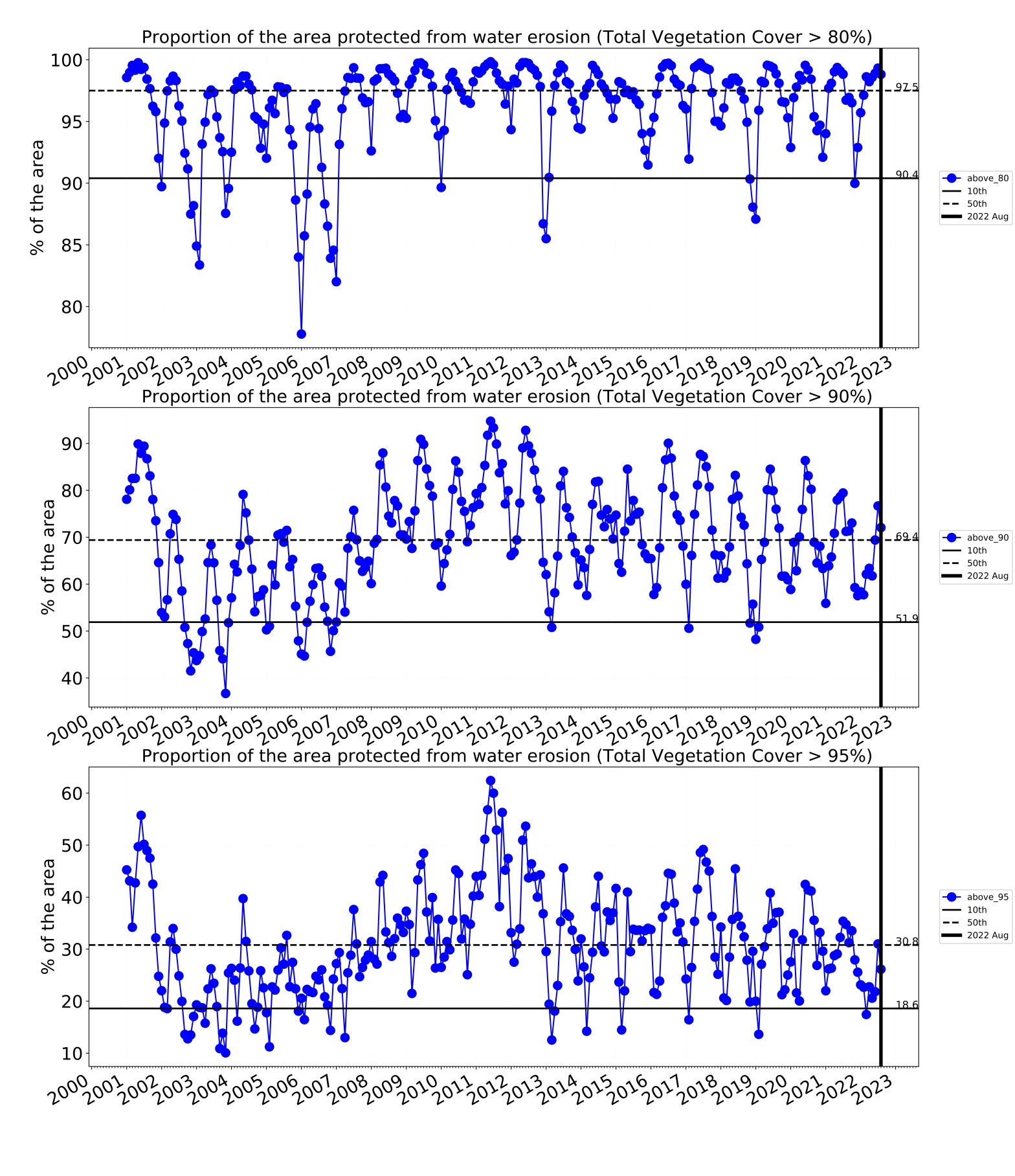
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

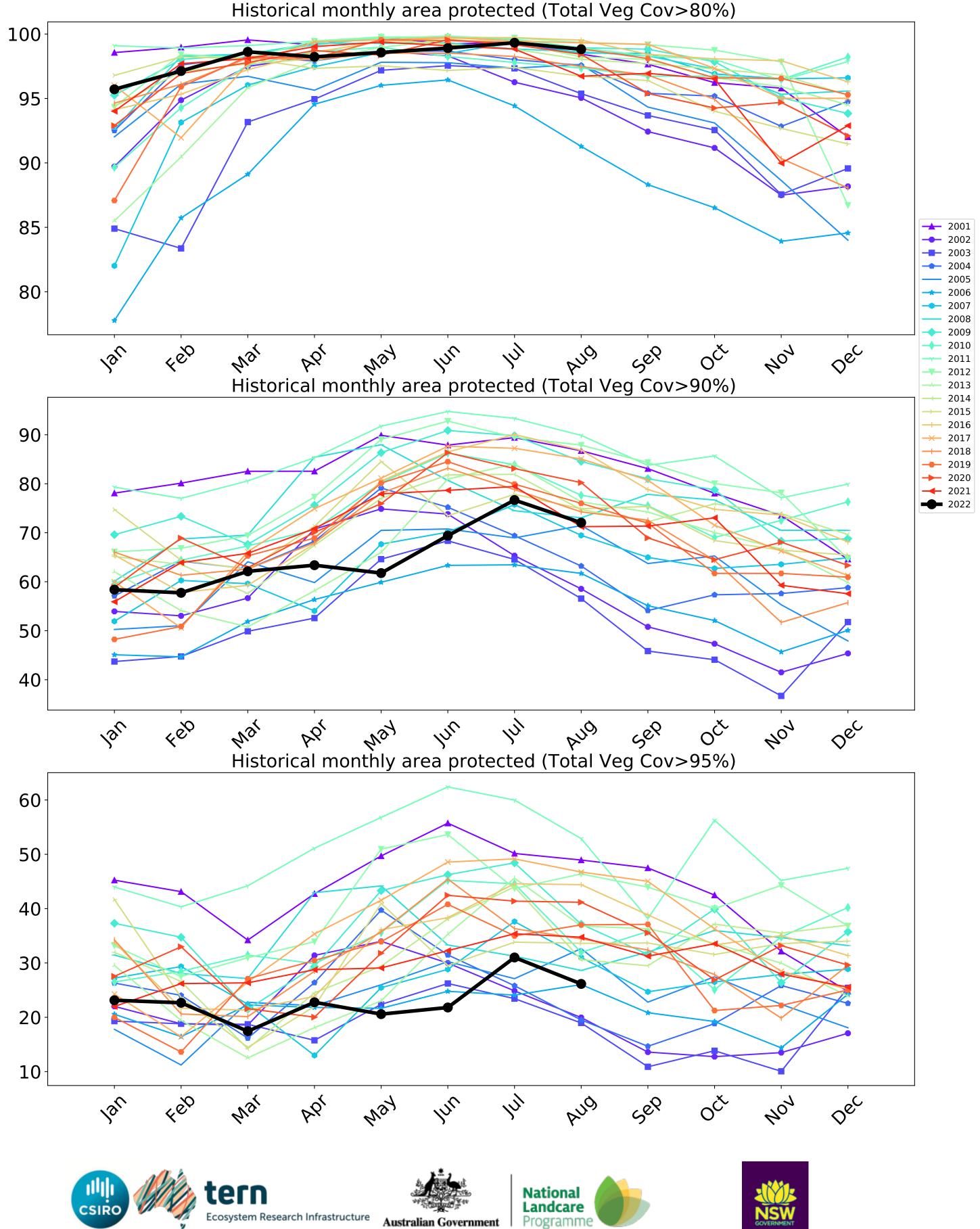




Wind erosion historical monthly area protected (Total Veg Cov >50%)

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





CSIRO Ecosystem Research Infrastructure Australian Government

Grazing non forest

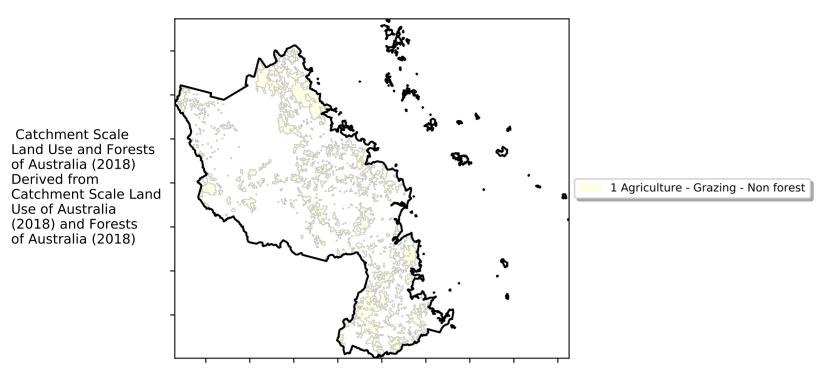
12%200%

· 52°1070010

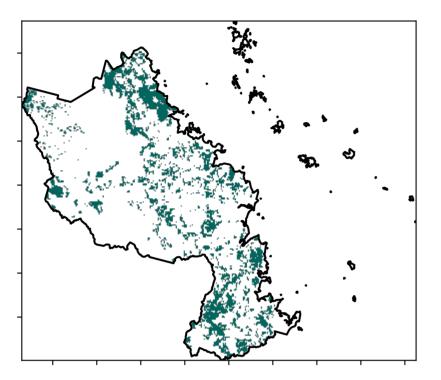
· 320050010

0.30%

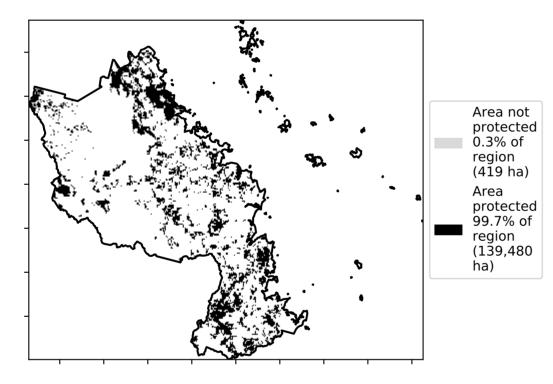
Land use and forest cover



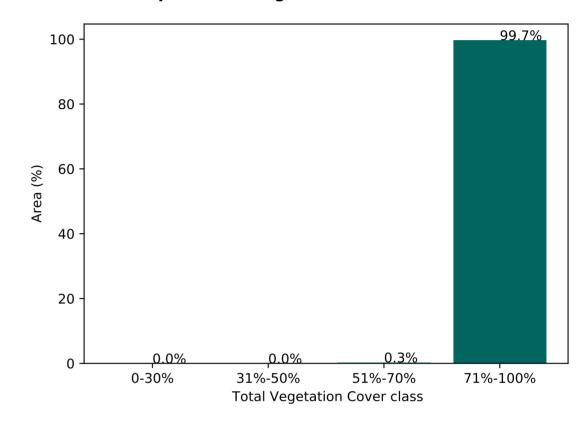
Total Vegetation Cover [%]



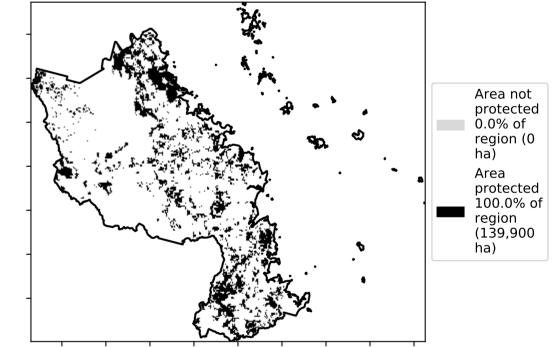
% Area protected from water erosion (>70%)



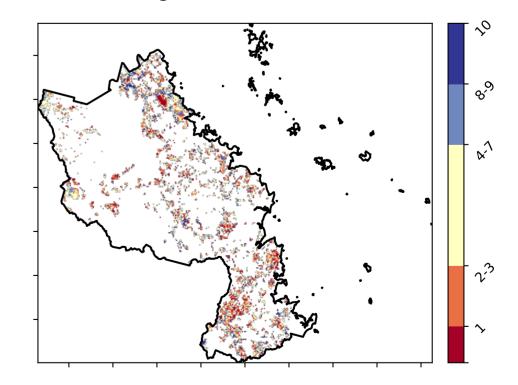
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

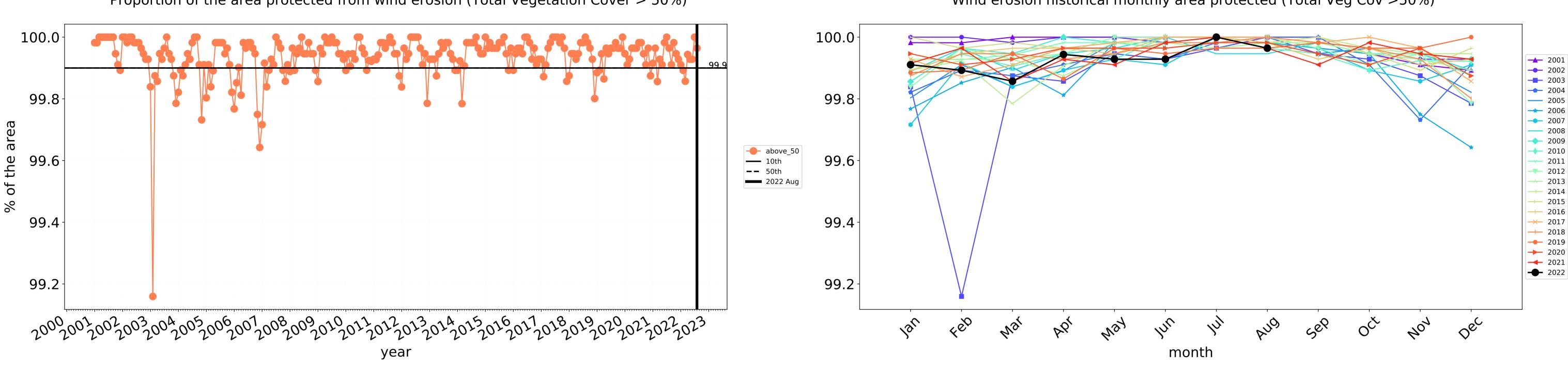
26 - 20 - 10 0 -10 -20

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



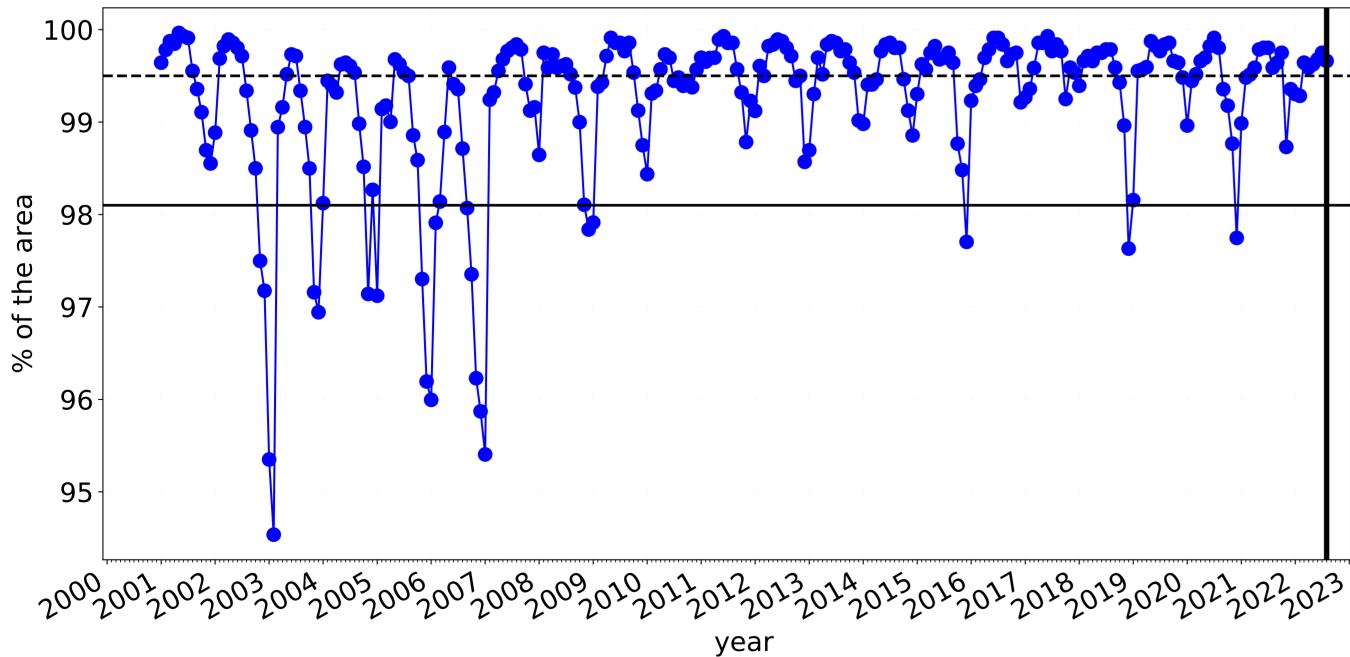
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.







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

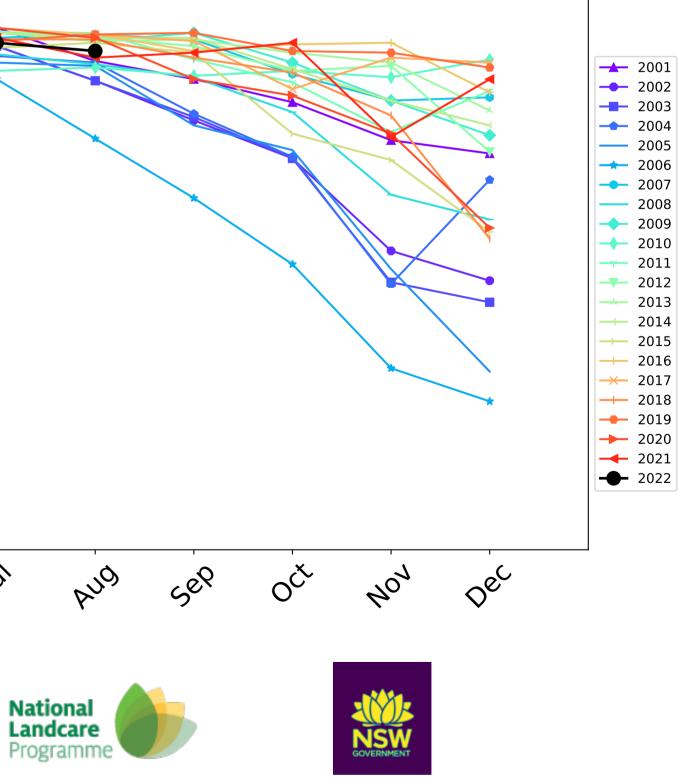


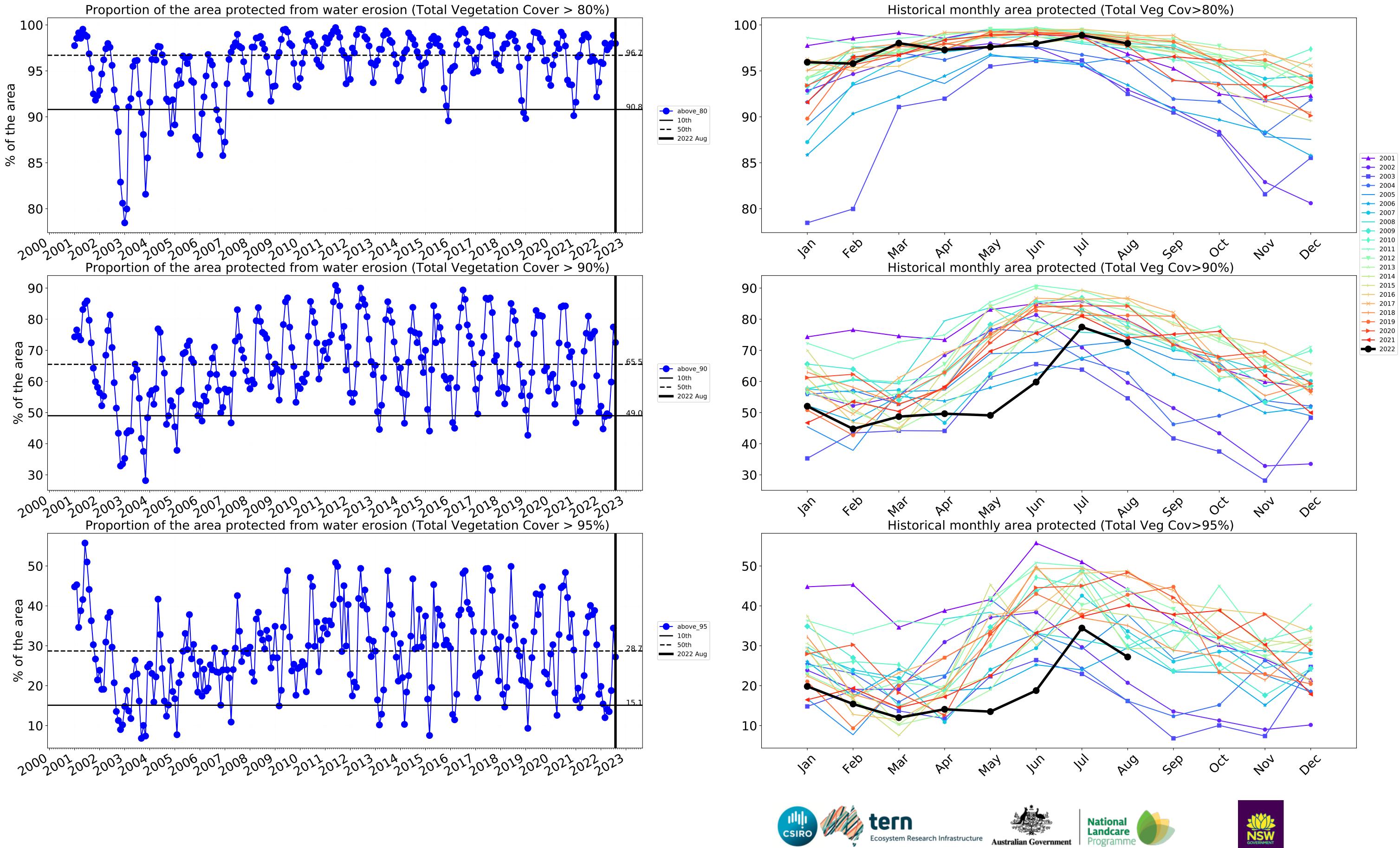
100-<u>99.5</u> 99 ---- above_70 98 **—** 10th **——** 50th 2022 Aug 97 96 95 4eb Jan May PQ In 1st Mai month tern Ecosystem Research Infrastructure Australian Government

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

2**3**

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







Grazing Woodland forest

12%100%

52°1070010

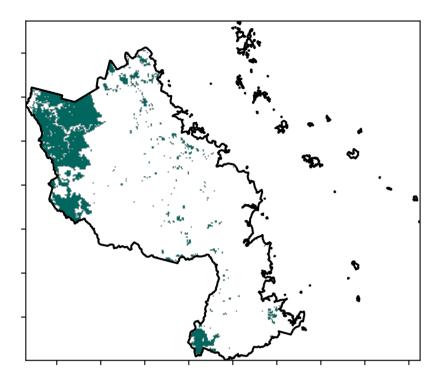
· 3200-50010

0.30%

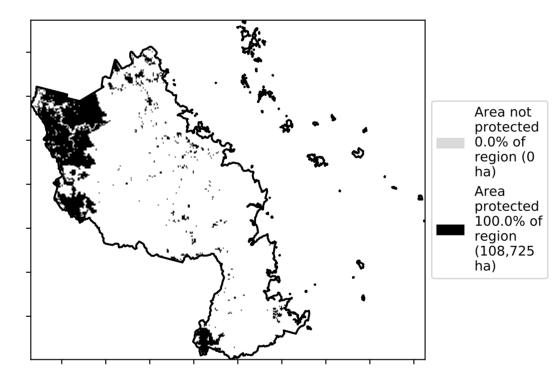
1 Agriculture - Grazing - Woodland forest

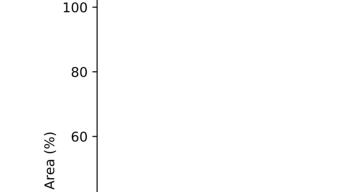
Total Vegetation Cover [%]

Land use and forest cover



% Area protected from water erosion (>70%)





0.0%

0-30%

40

20

0



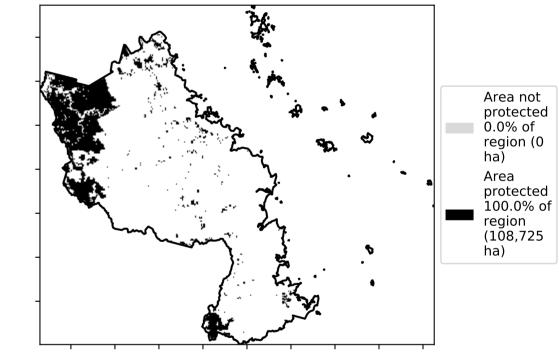
0.0%

Total Vegetation Cover class

% Area protected from wind erosion (>50%)

31%-50%

Proportion of vegetation cover class in area



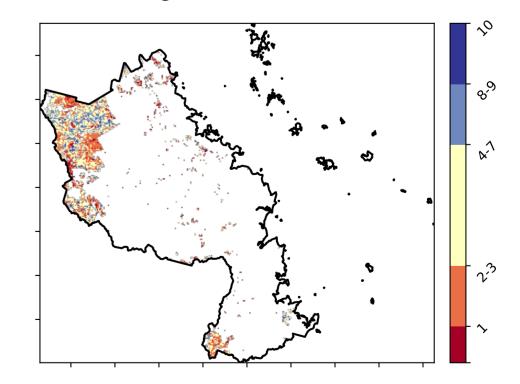
0.0%

71%-100%

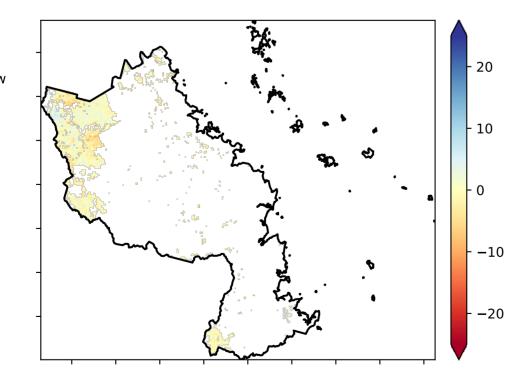
51%-70%

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

Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



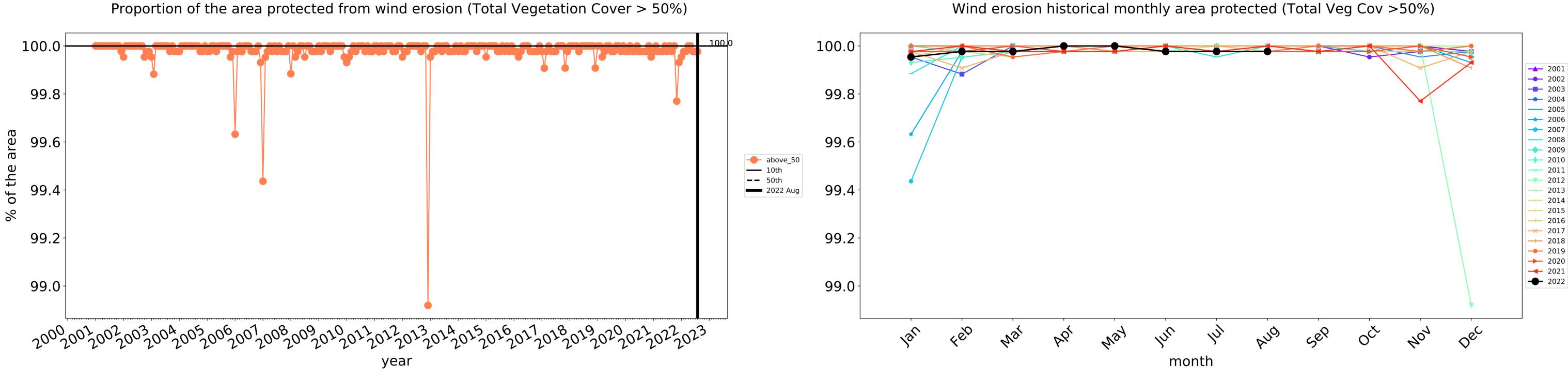
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





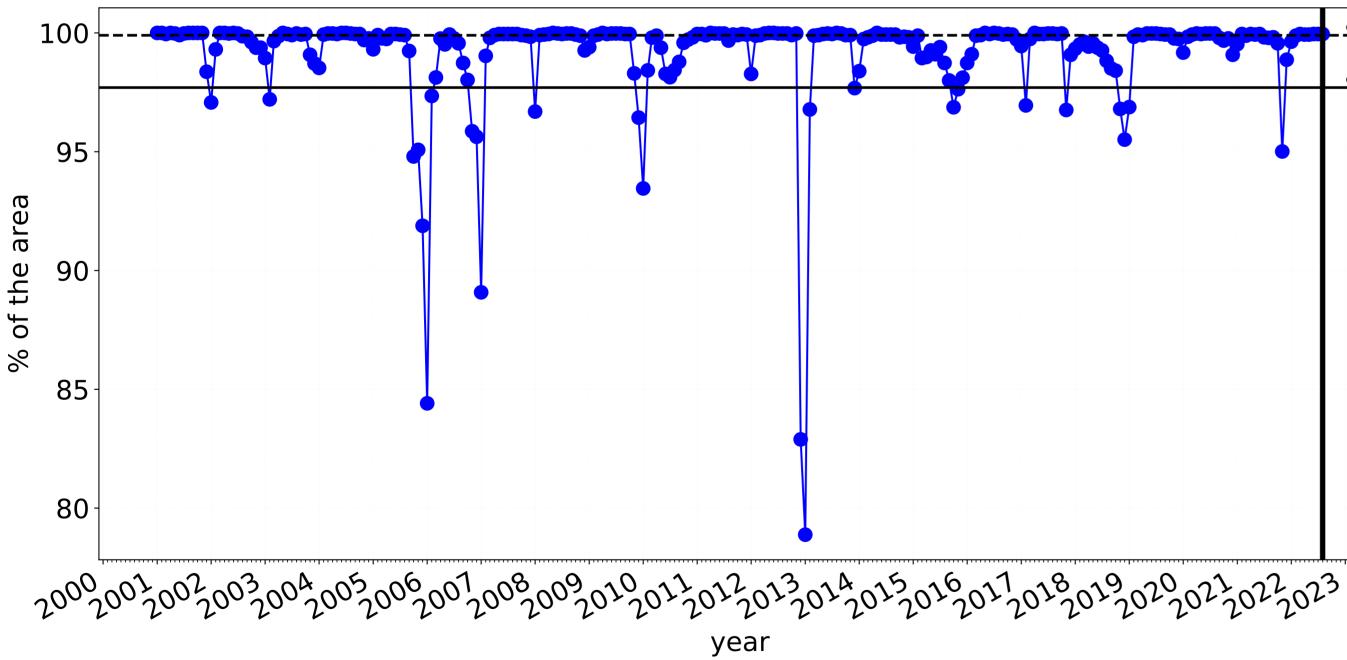
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.





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

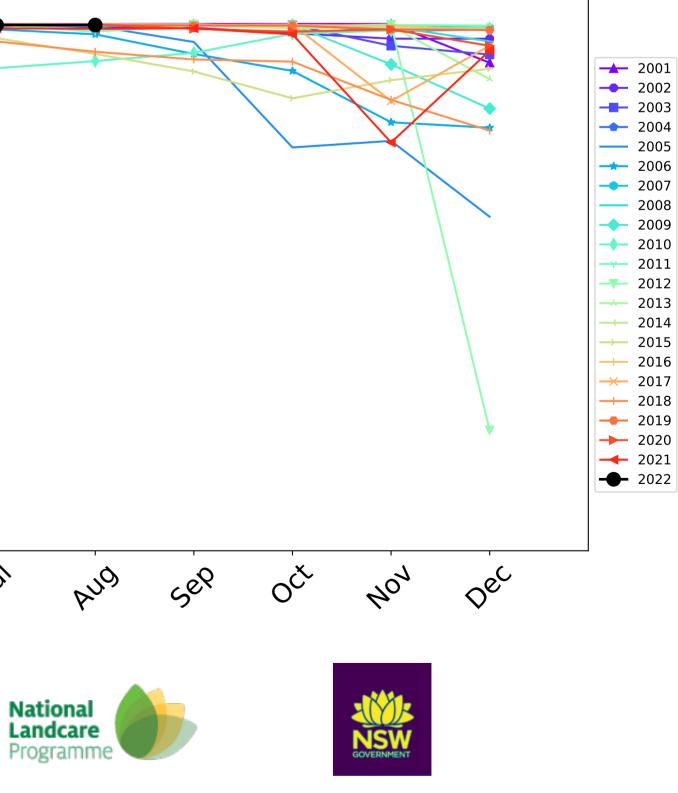
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

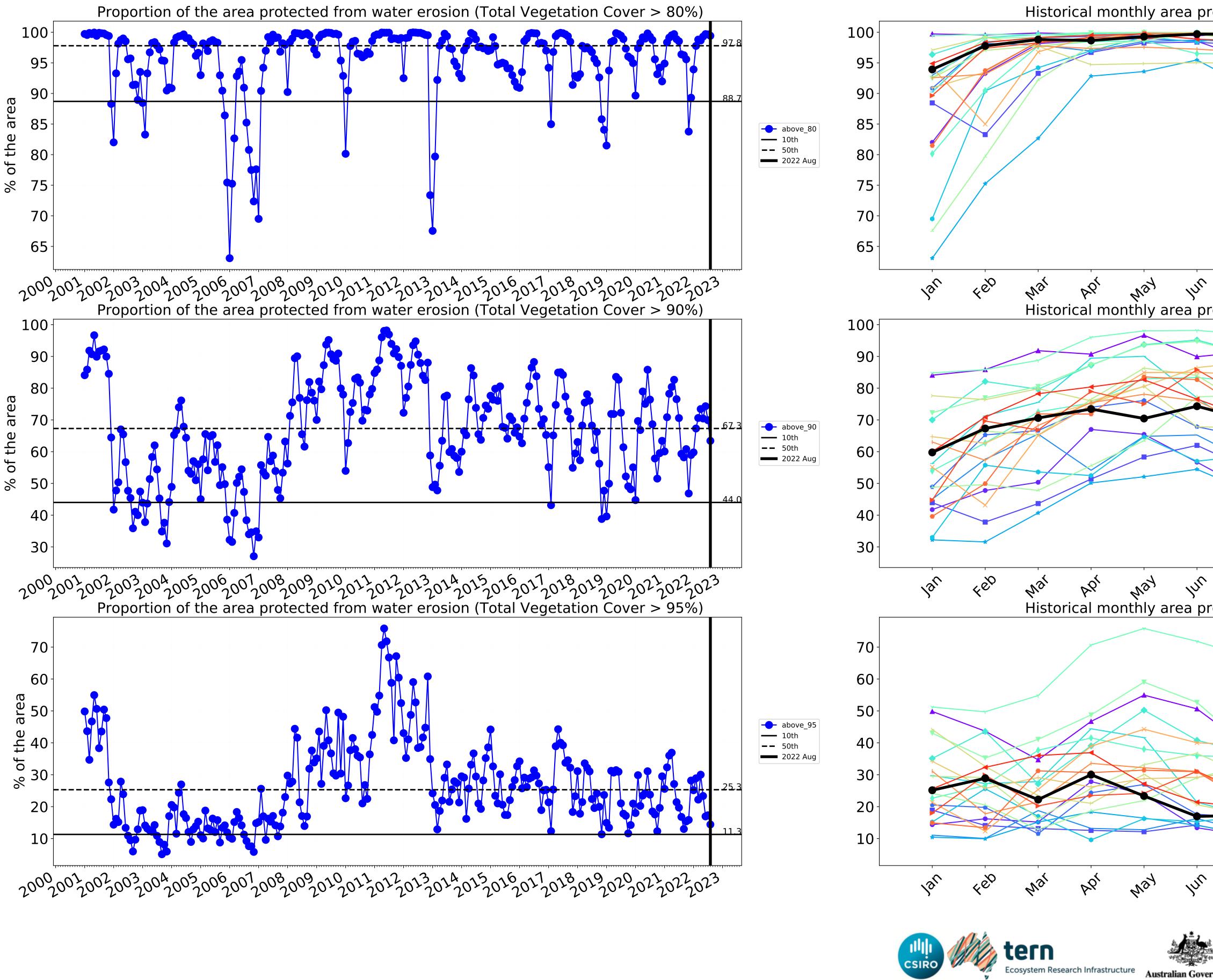


_ _99.9 100 95 ---- above_70 **—** 10th **——** 50th **—** 2022 Aug 90 85 80 Jan 4eb In way 1st War P.Q month tern Ecosystem Research Infrastructure Australian Government

23

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



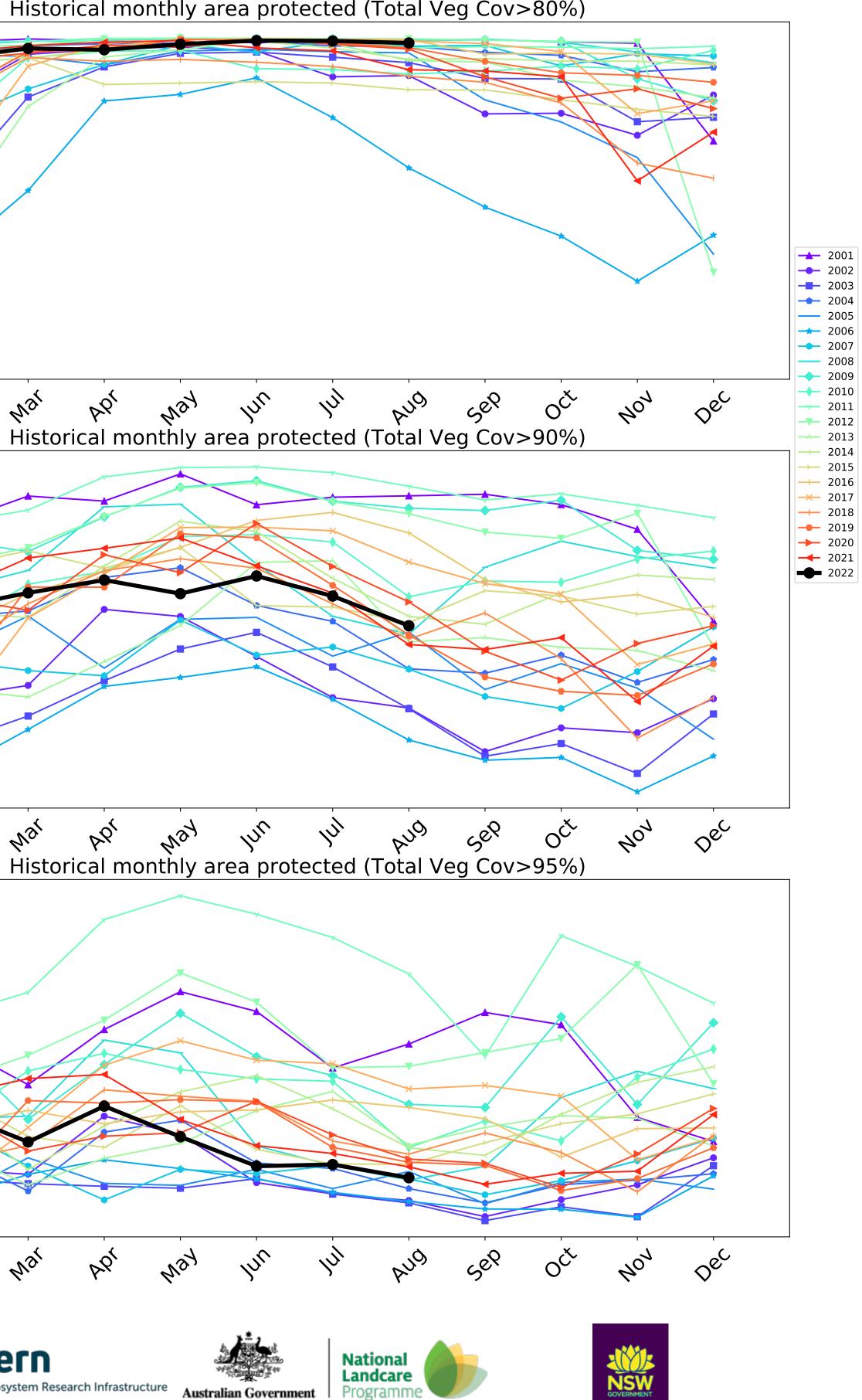


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1's

Australian Government



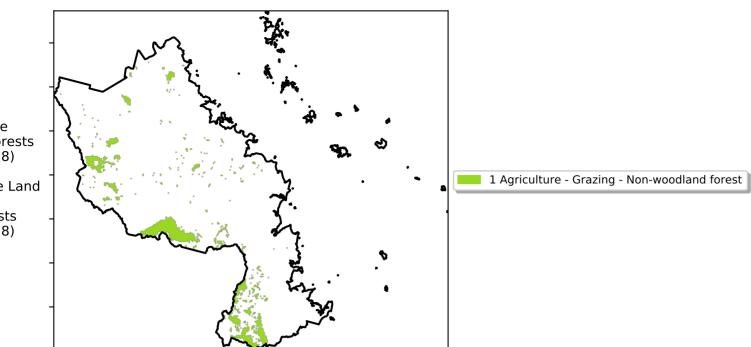
Grazing - Forest (non woodland)

12%100%

52°1070°10

· 320/0500/0

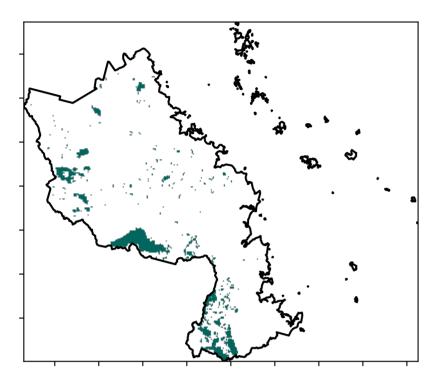
0.30%



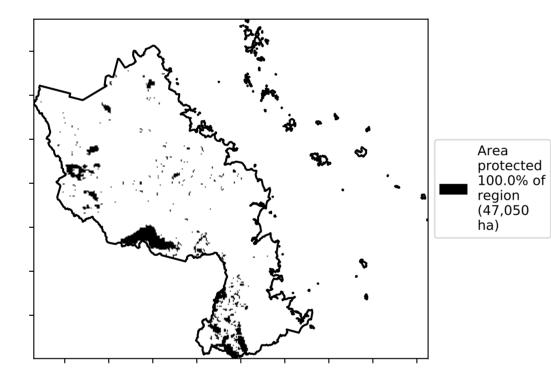
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Total Vegetation Cover [%]

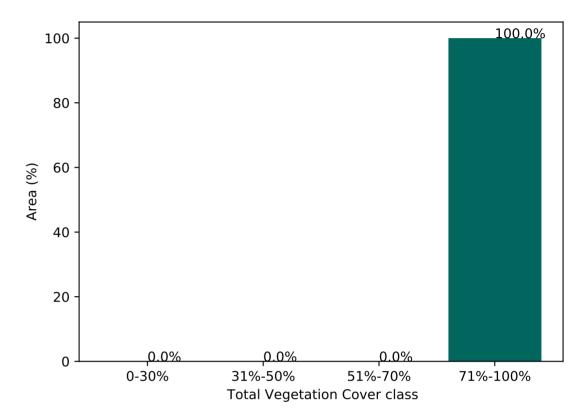
Land use and forest cover



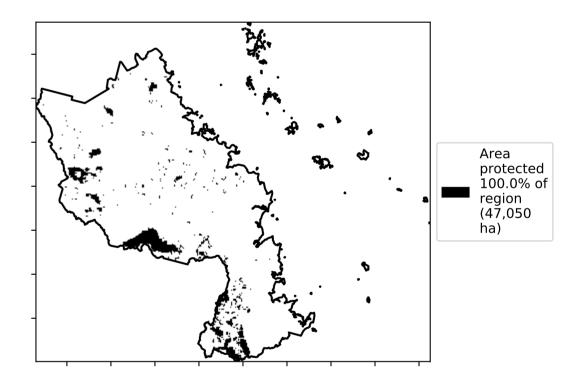
% Area protected from water erosion (>70%)



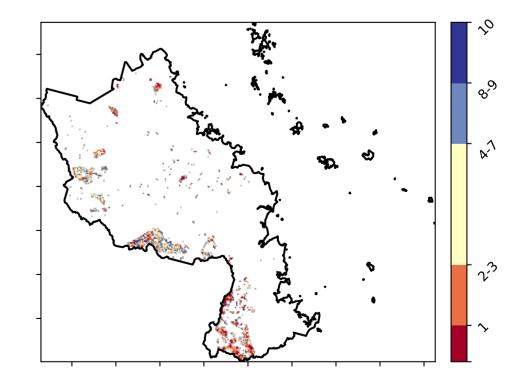
Proportion of vegetation cover class in area



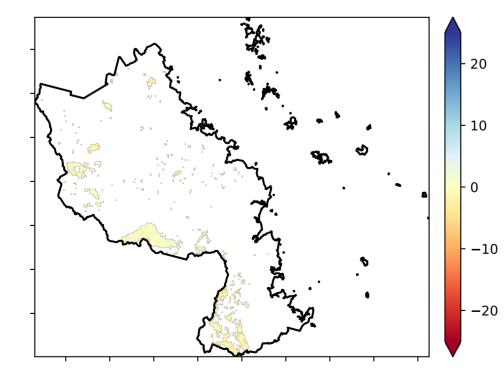
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



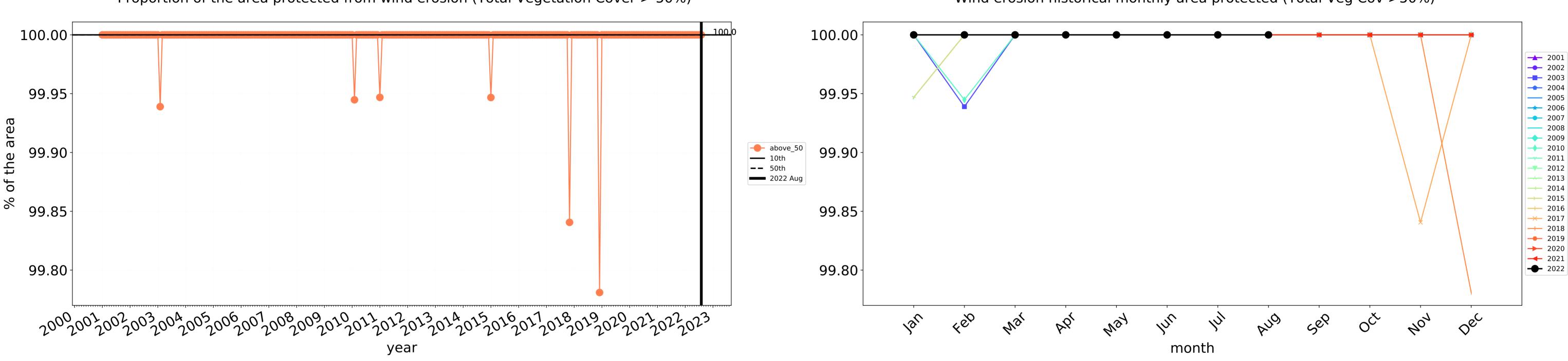
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





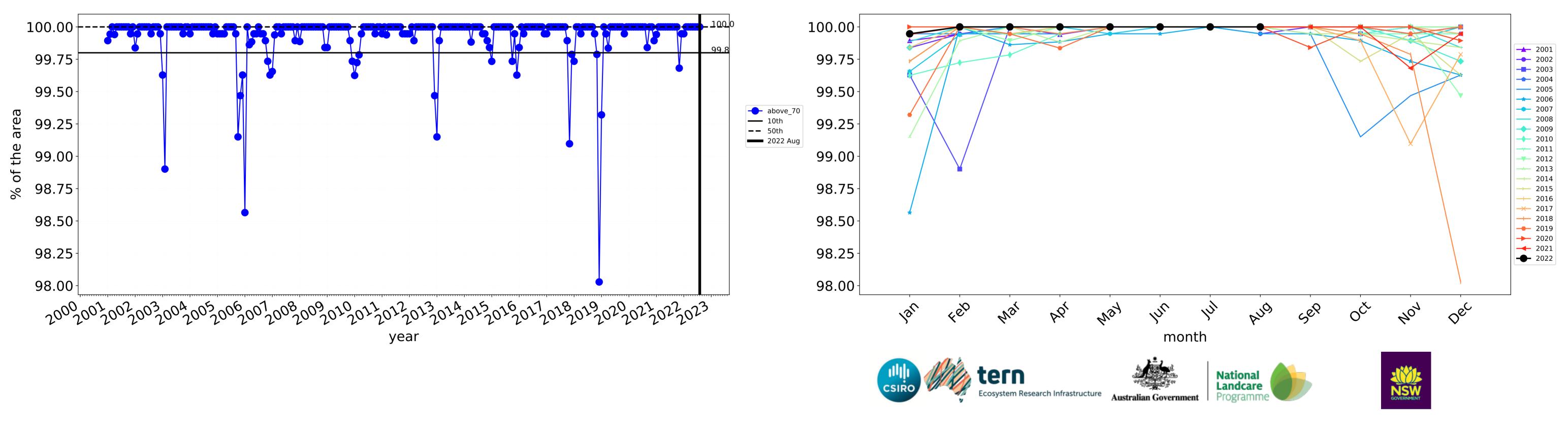
22

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



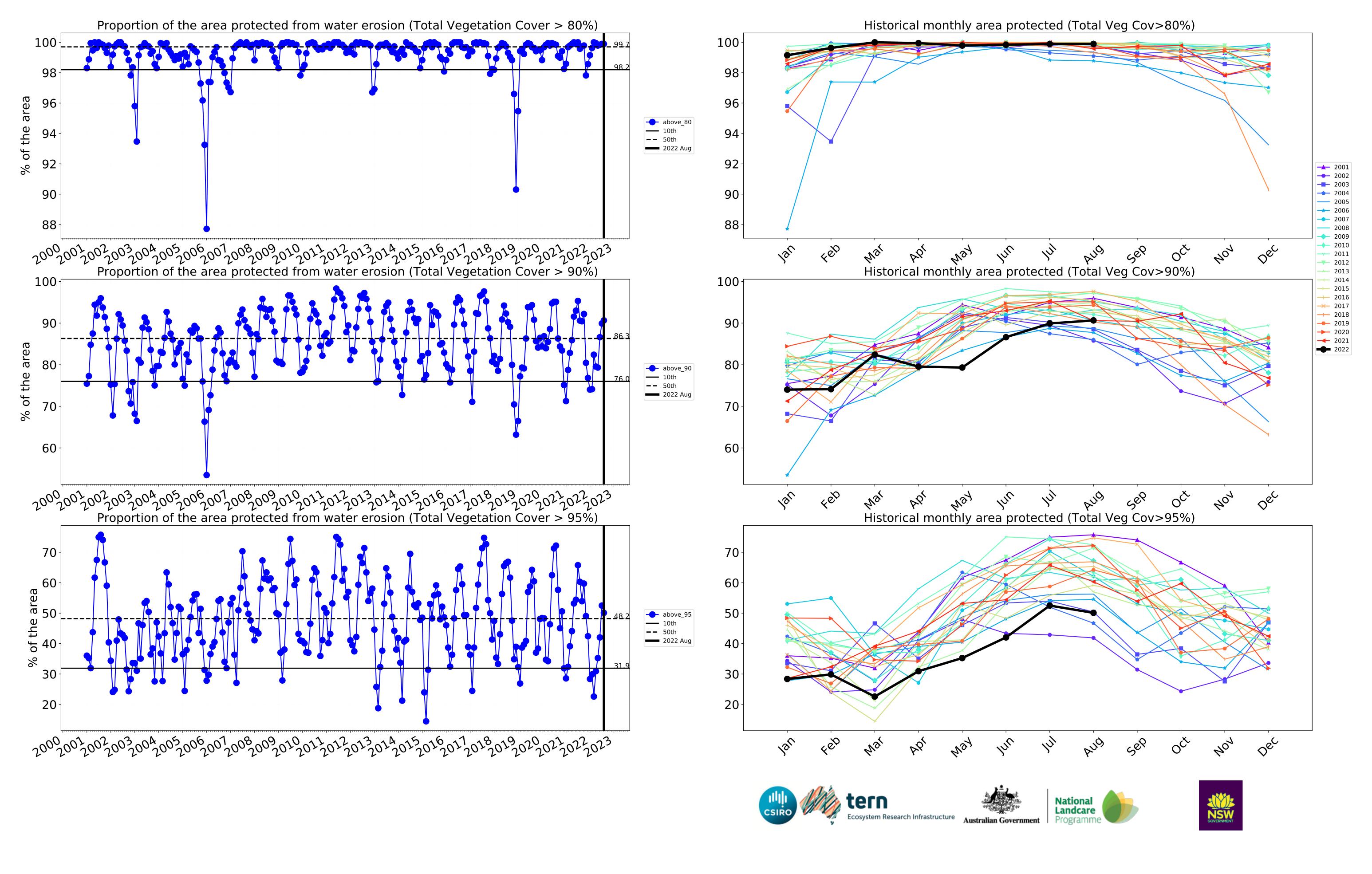
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



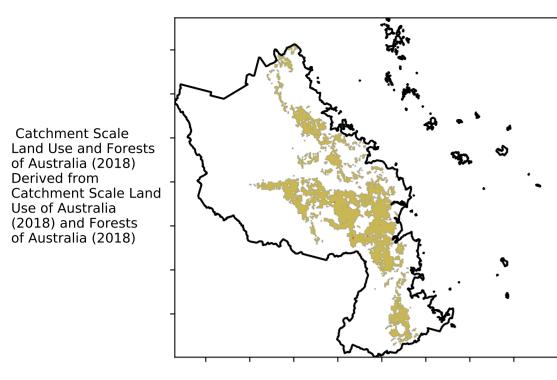
Water erosion historical monthly area protected (Total Veg Cov>70%)

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



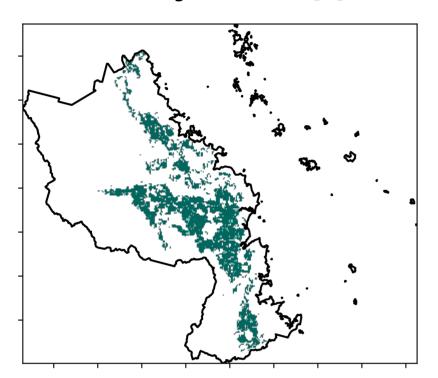
Irrigation

Land use and forest cover

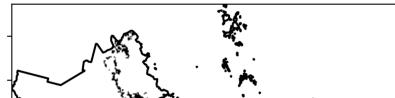


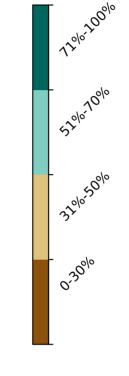
1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated 3 Agriculture - Horticulture - Irrigated

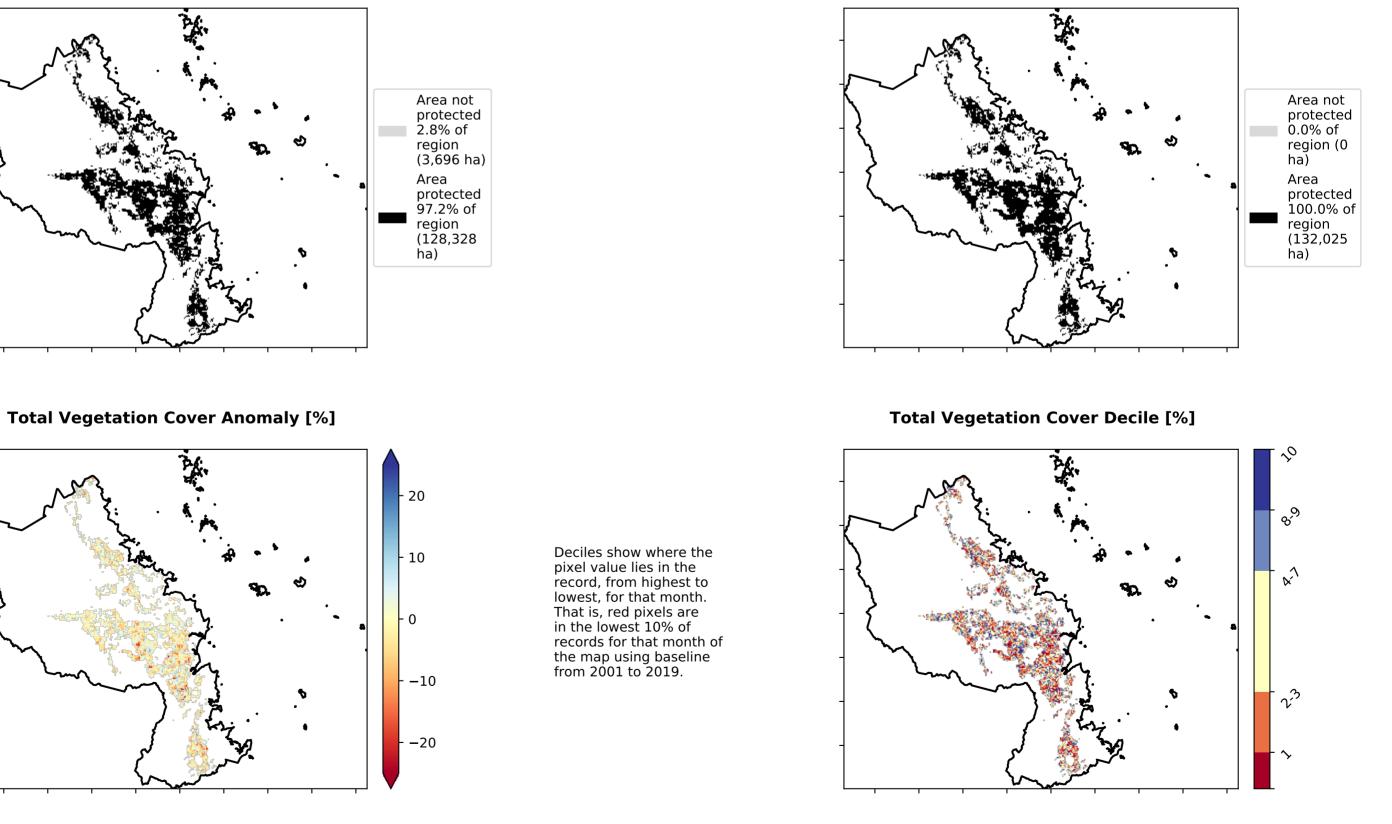
Total Vegetation Cover [%]

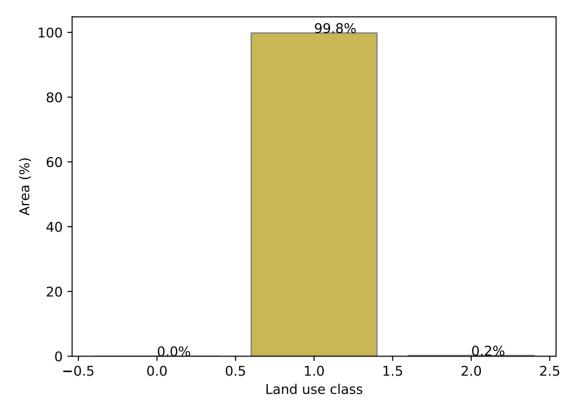


% Area protected from water erosion (>70%)



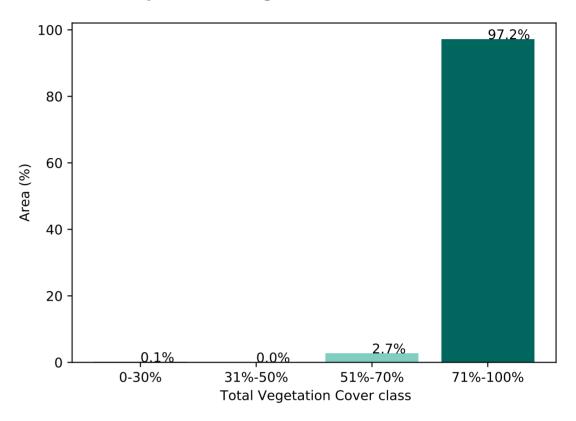




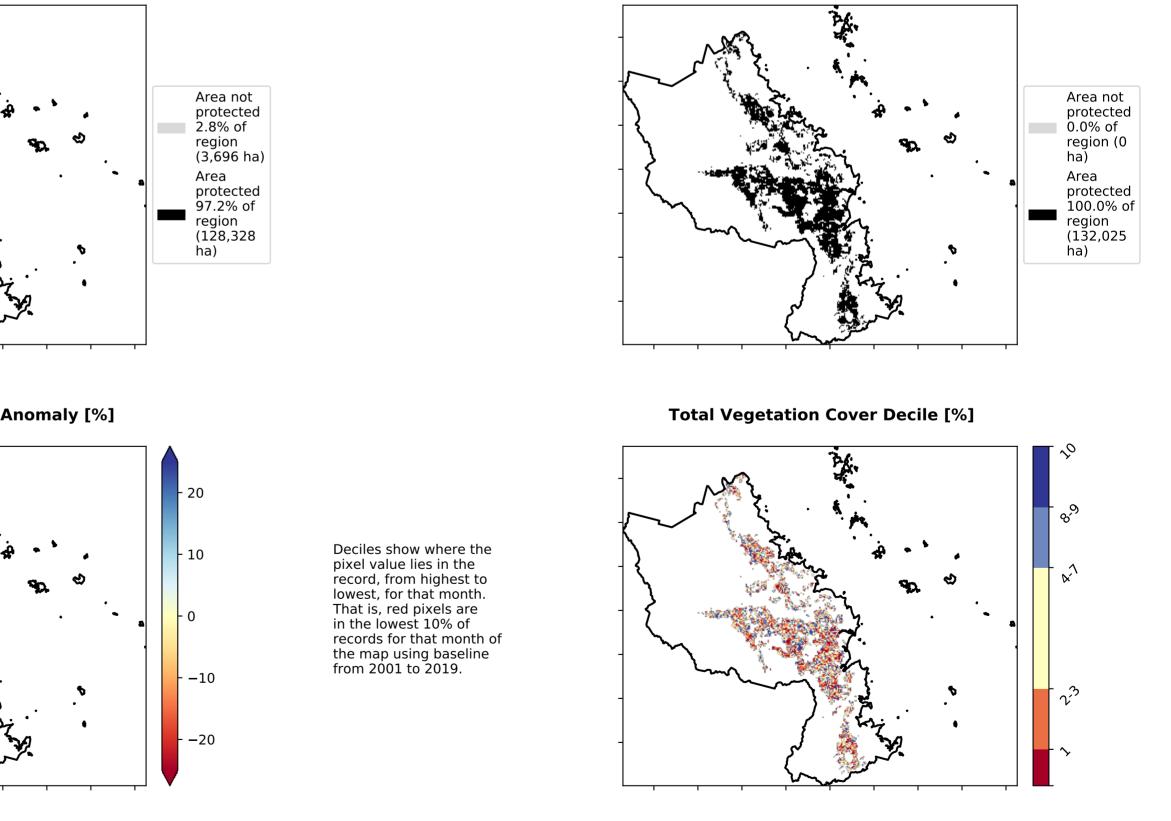


Proportion of each land class in area

Proportion of vegetation cover class in area



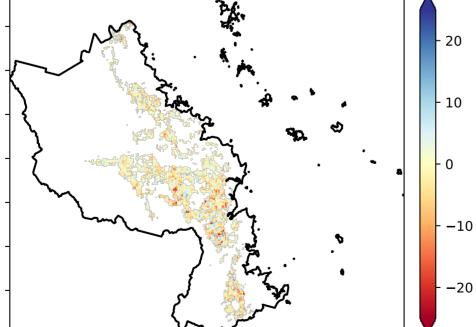
% Area protected from wind erosion (>50%)

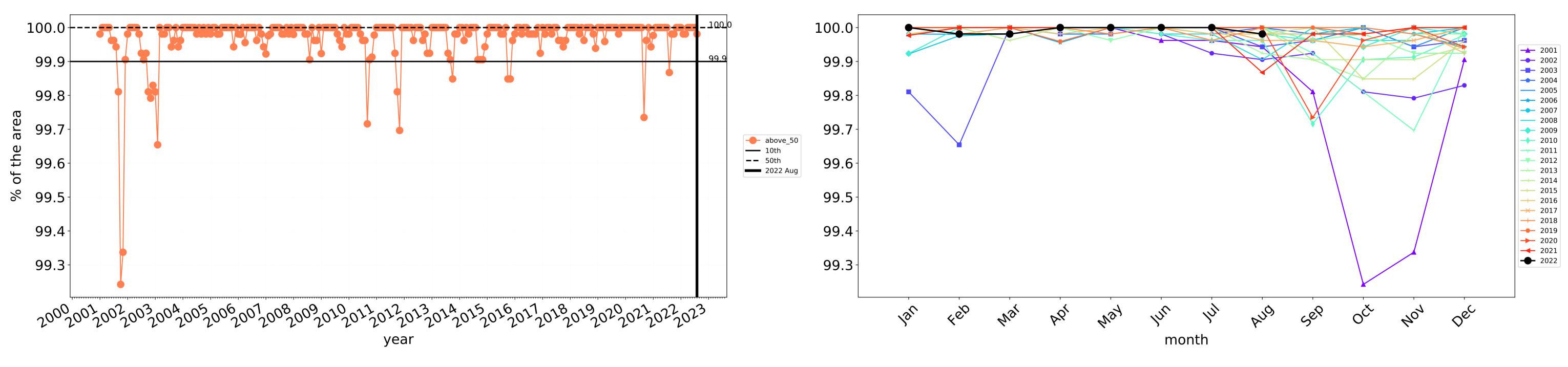






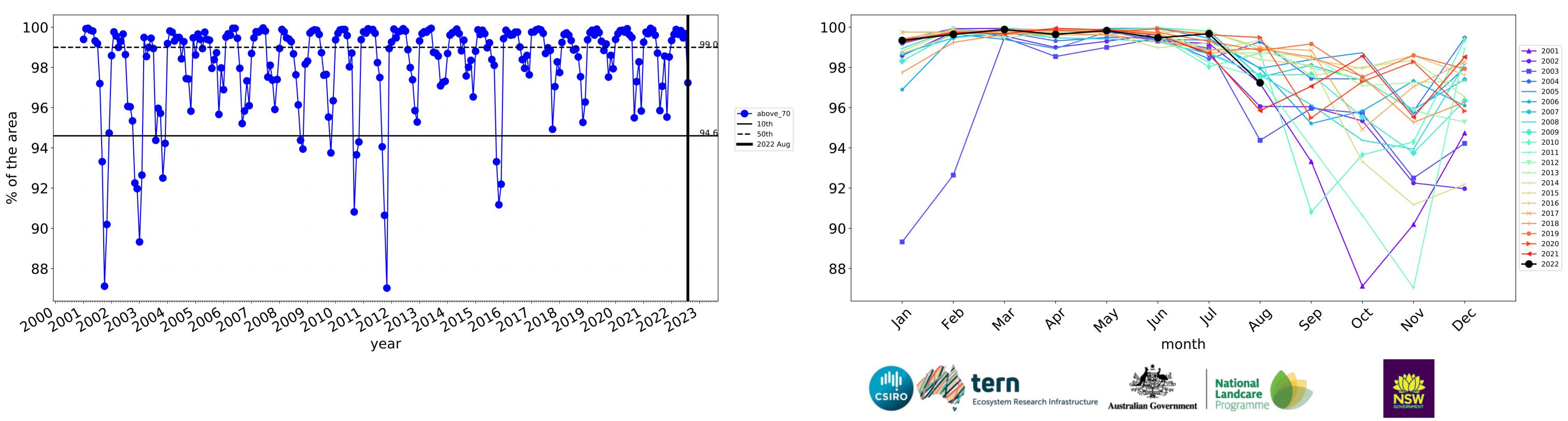
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

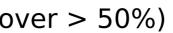




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

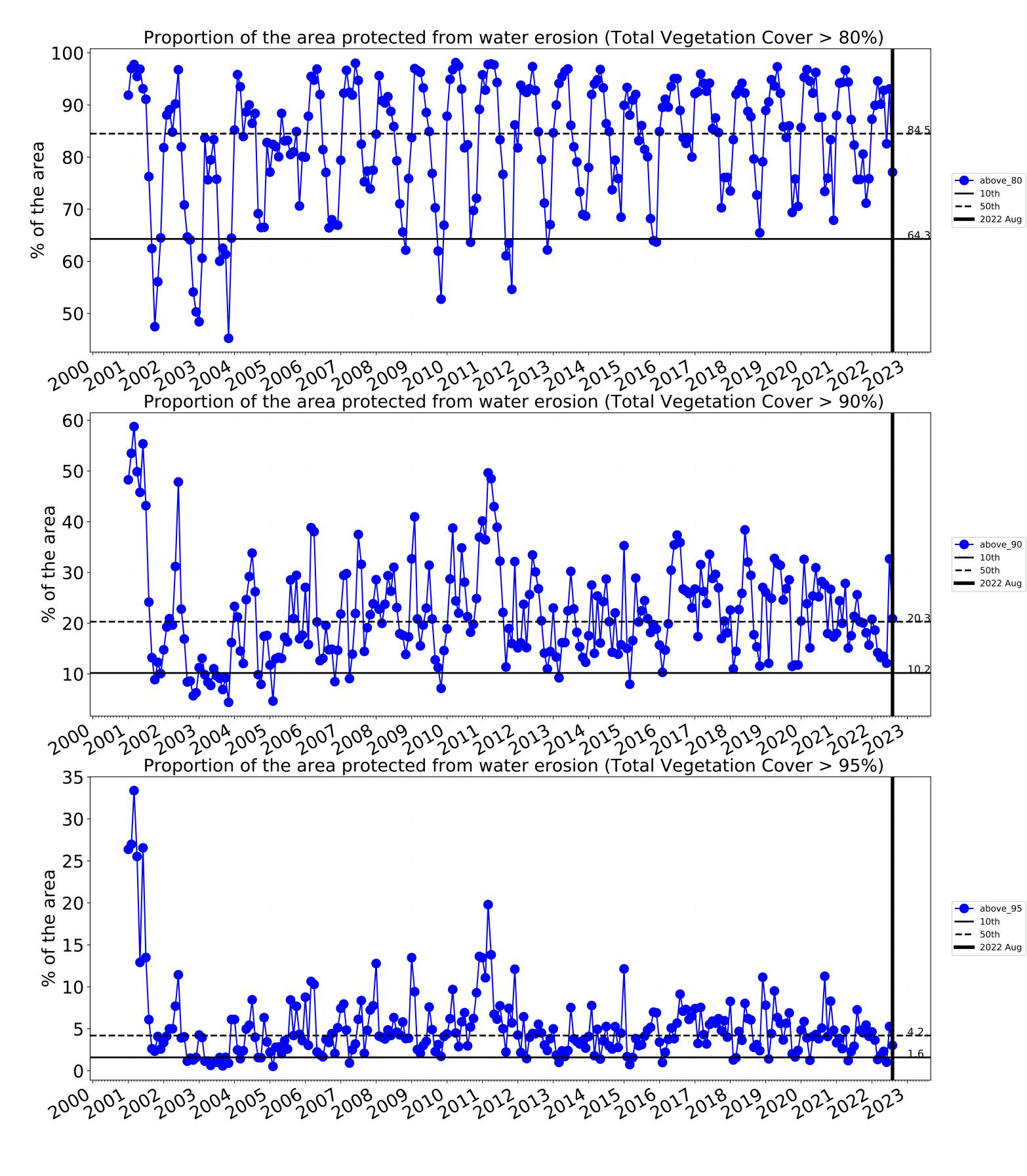
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

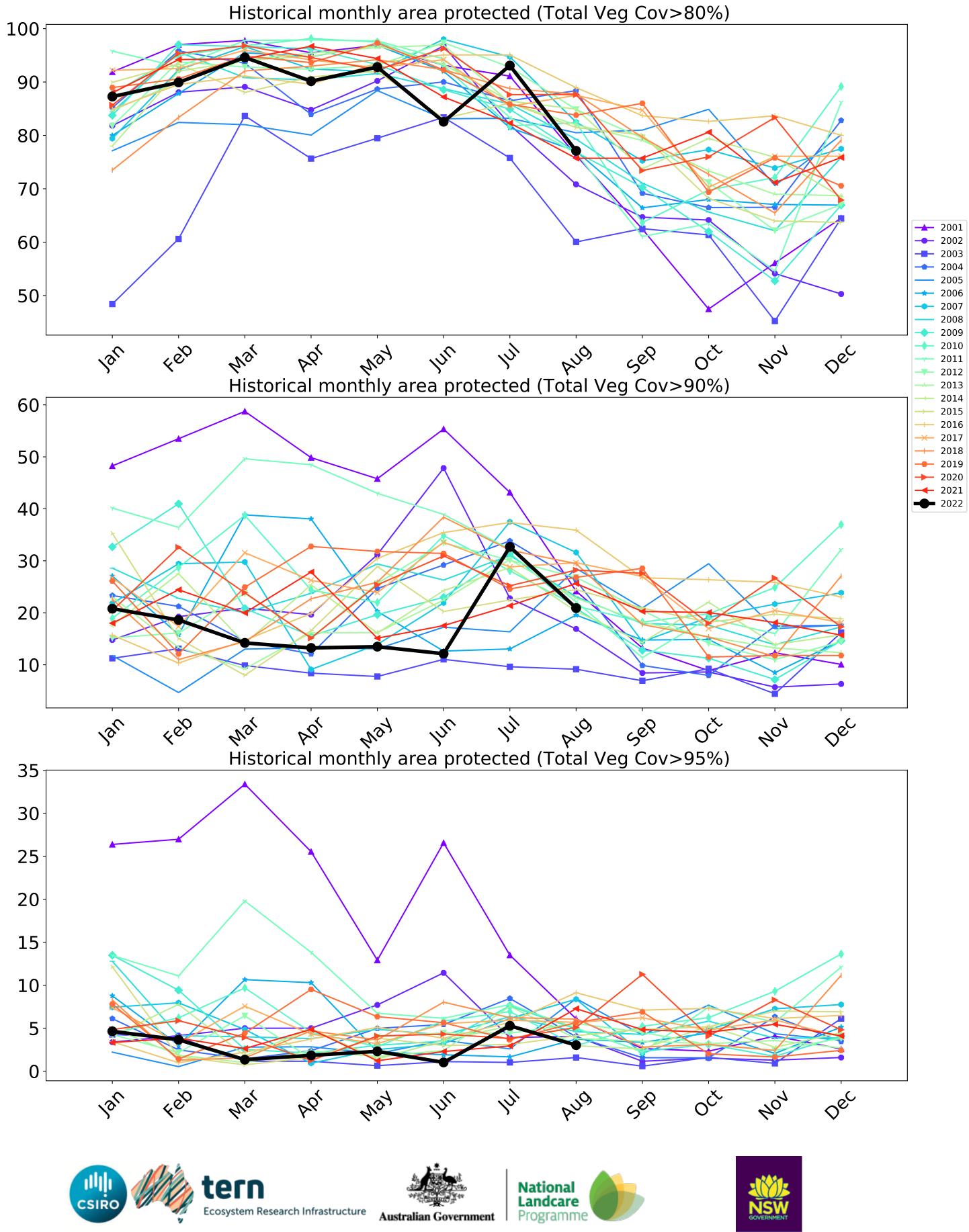




Wind erosion historical monthly area protected (Total Veg Cov >50%)









Production native forests and plantation forests

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

12%200%

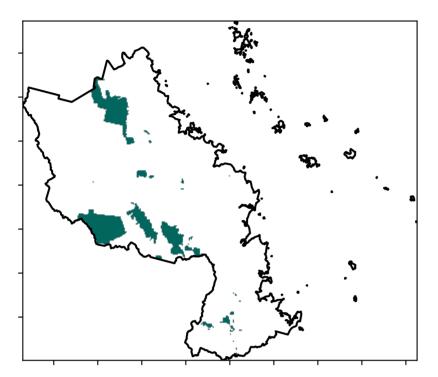
· 52°10010

· 320050010

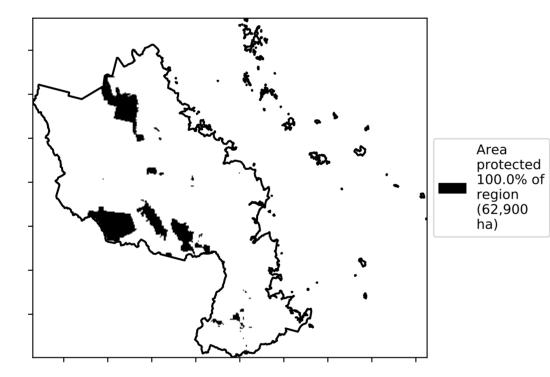
0.30%

Land use and forest cover

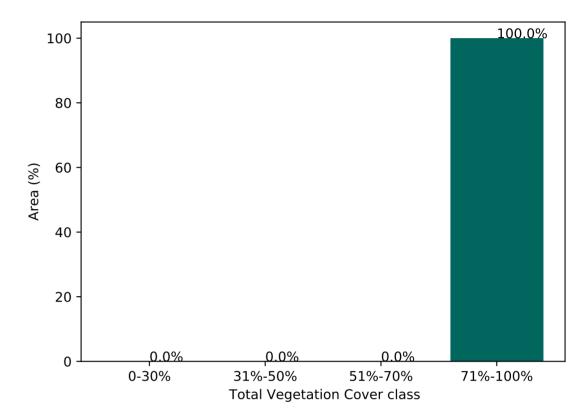
Total Vegetation Cover [%]



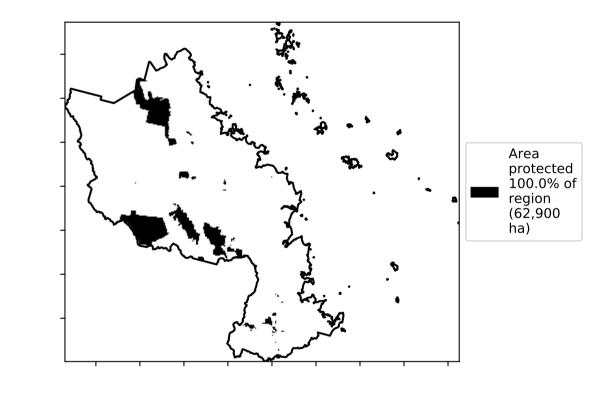
% Area protected from water erosion (>70%)



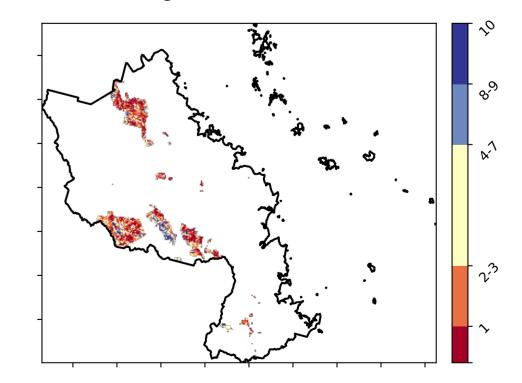




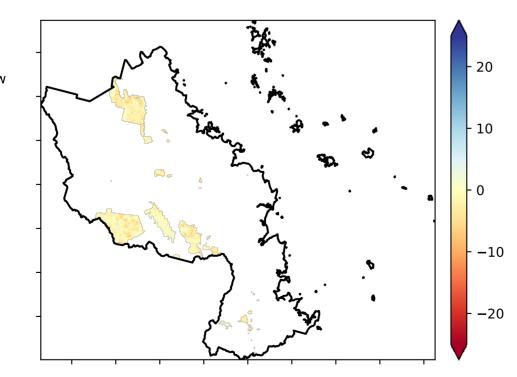
% Area protected from wind erosion (>50%)

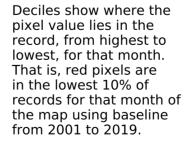


Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]





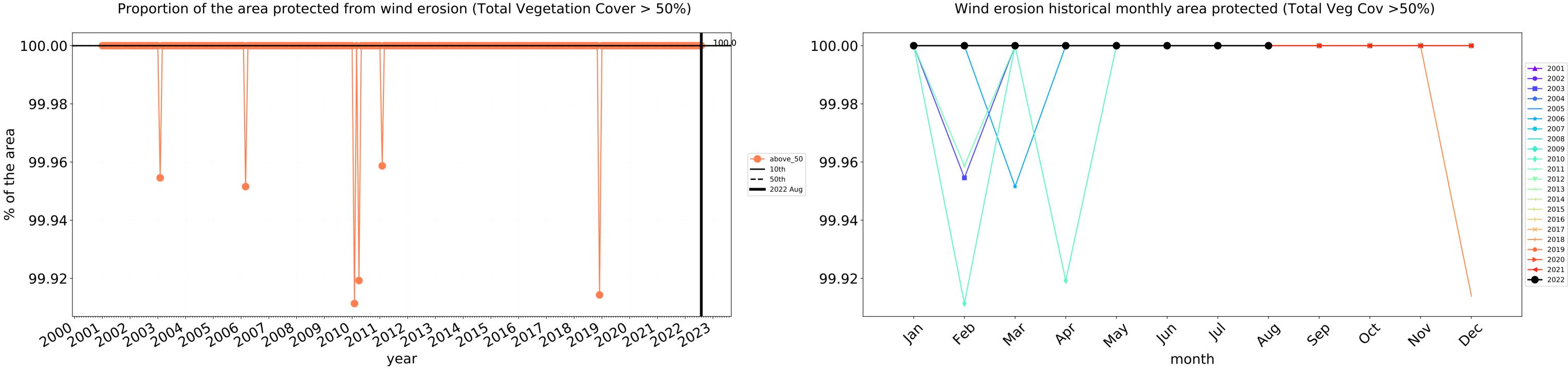




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

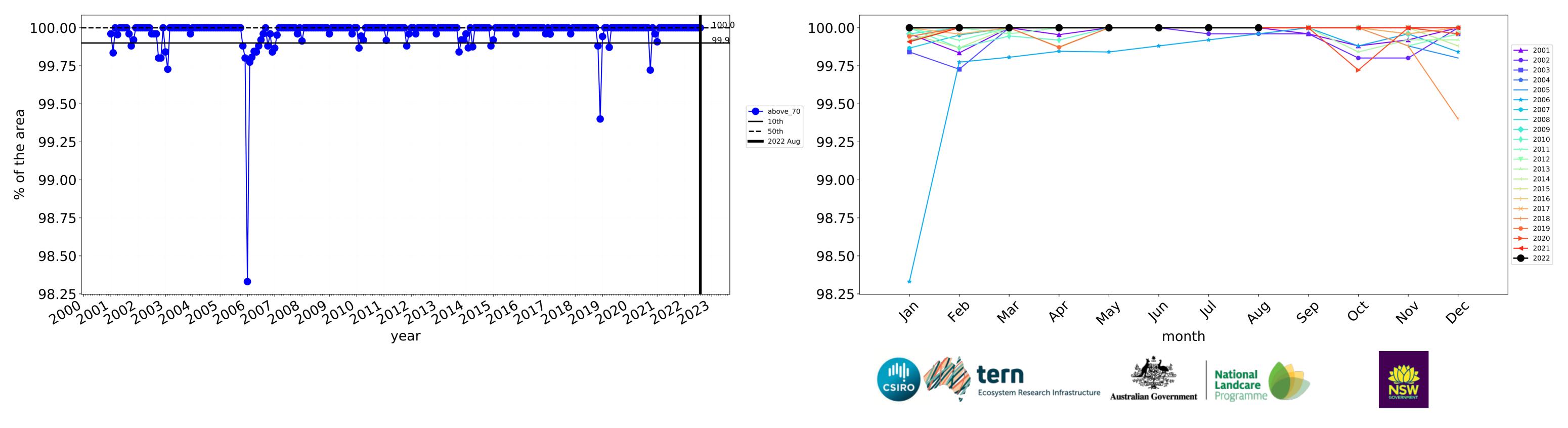


Production native forests and plantation forests timeseries

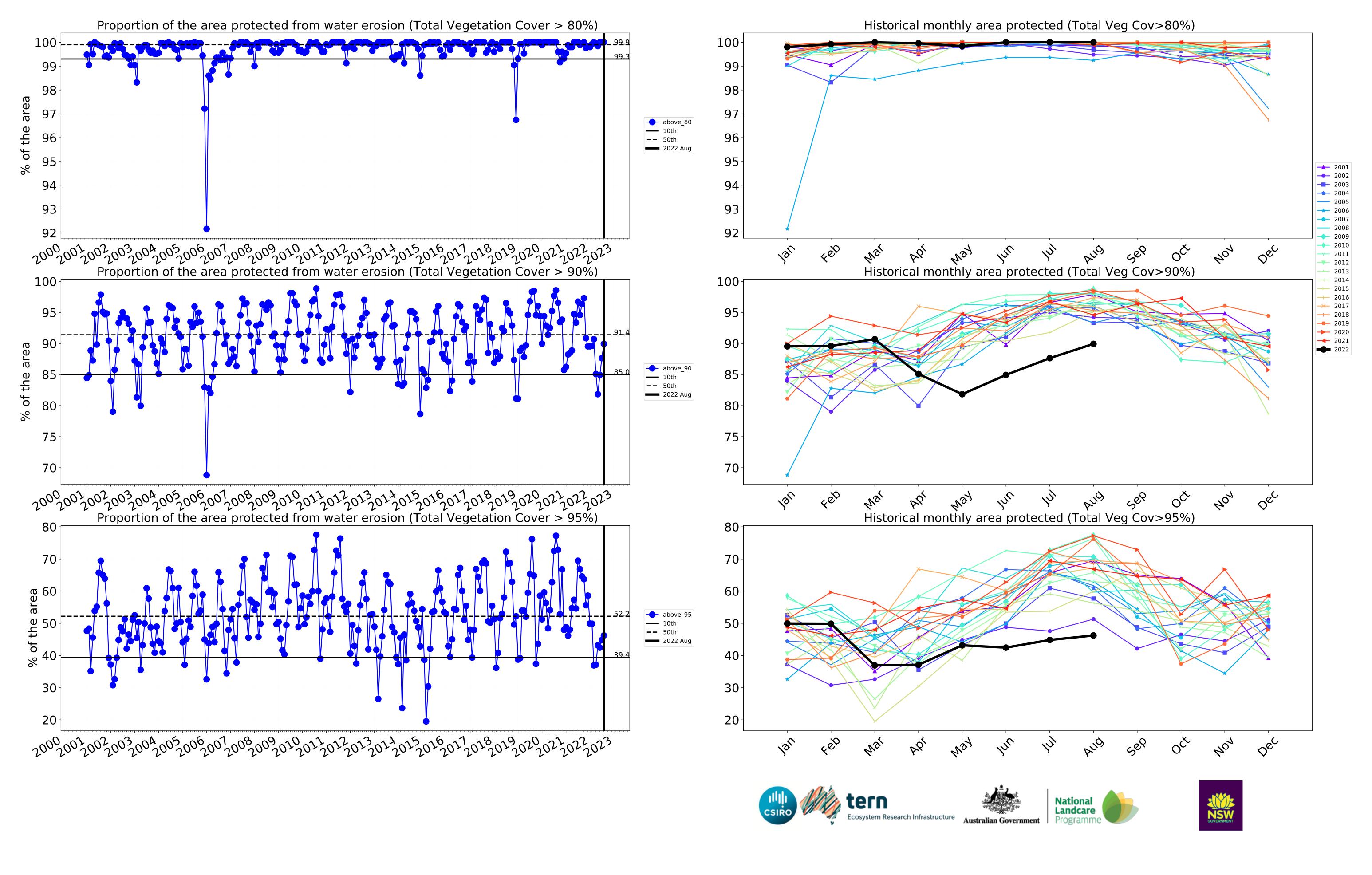


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



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



Mackay_(R) (748,400 ha and no data 12,911 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	748,400	99.9% 747,975	99.8% 747,200	98.3% 735,650	92.2% 690,175	62.3% 466,575	23.6% 176,725
Conservation and natural environments	192,475	100.0% 192,425	99.9% 192,200	98.9% 190,425	97.6% 187,850	78.9% 151,900	32.3% 62,175
Conservation and natural environments non forest	4,900	100.0% 4,900	99.0% 4,850	91.8% 4,500	76.5% 3,750	45.9% 2,250	13.3% 650
Conservation and natural environments Woodland forest	37,125	99.9% 37,100	99.7% 37,025	98.5% 36,575	97.2% 36,100	77.1% 28,625	32.3% 11,975
Conservation and natural environments Forest (non woodland)	150,450	100.0% 150,425	99.9% 150,325	99.3% 149,350	98.4% 148,000	80.4% 121,025	32.9% 49,550
Agriculture	428,300	100.0% 428,250	100.0% 428,200	99.0% 424,125	92.1% 394,575	56.3% 241,250	19.1% 81,825
Grazing	295,675	100.0% 295,625	100.0% 295,600	99.8% 295,150	98.8% 292,175	72.1% 213,050	26.1% 77,300
Grazing non forest	139,900	100.0% 139,875	100.0% 139,850	99.7% 139,425	98.0% 137,075	72.5% 101,450	27.2% 38,050
Grazing Woodland forest	108,725	100.0% 108,700	100.0% 108,700	100.0% 108,675	99.4% 108,100	63.4% 68,950	14.4% 15,675
Grazing - Forest (non woodland)	47,050	100.0% 47,050	100.0% 47,050	100.0% 47,050	99.9% 47,000	90.6% 42,650	50.1% 23,575
Irrigation	132,025	100.0% 132,025	100.0% 132,000	97.2% 128,375	77.1% 101,800	20.9% 27,600	3.0% 4,000
Production native forests and plantation forests	62,900	100.0% 62,900	100.0% 62,900	100.0% 62,900	100.0% 62,900	89.9% 56,575	46.2% 29,075

