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

Date: March 2023

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

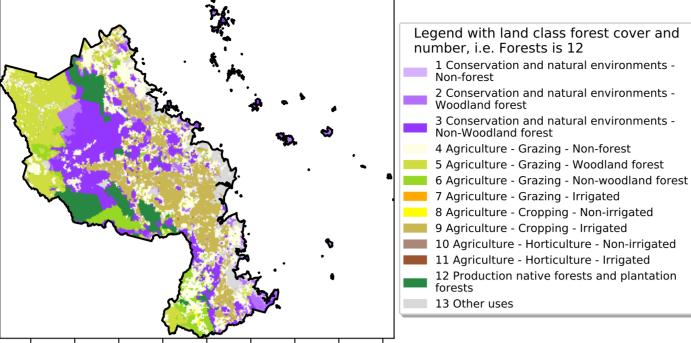


Vegetation Cover Mar 2023

Land use and forest cover

Proportion of each land class in area





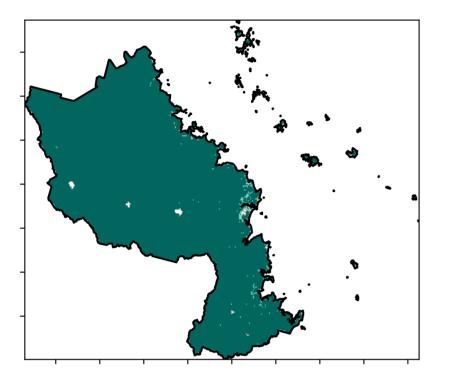
12010-20091

· 52% 70%

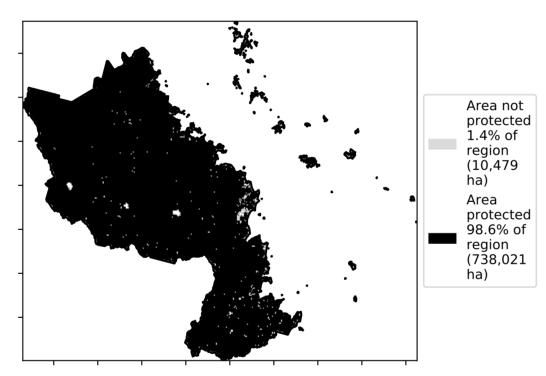
320050010

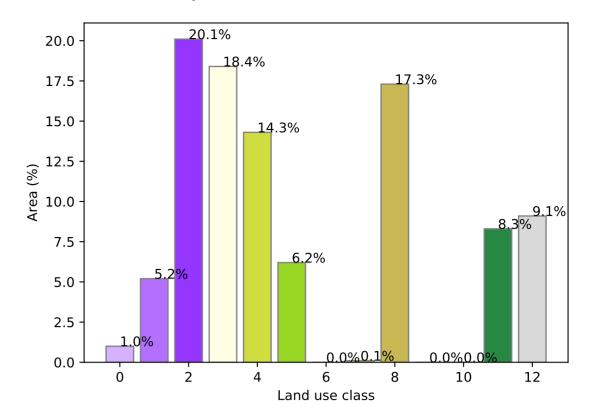
0.30%

Total Vegetation Cover [%]

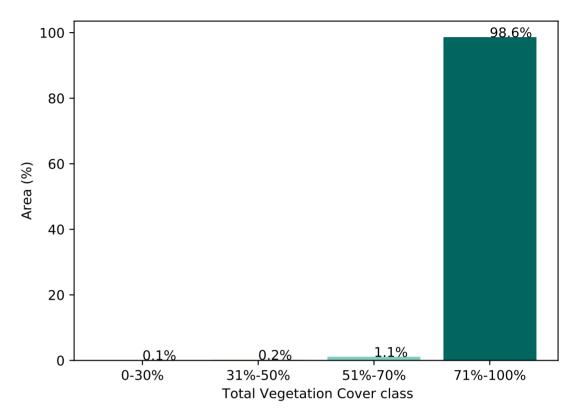


% Area protected from water erosion (>70%)

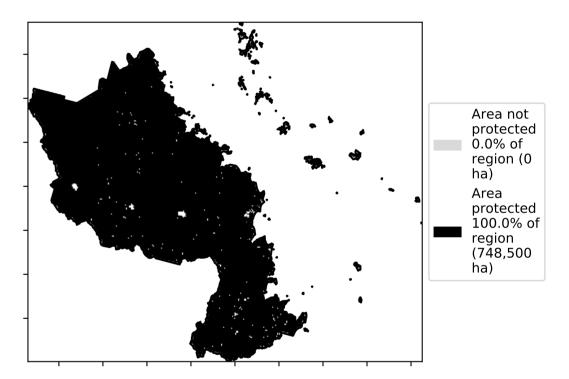




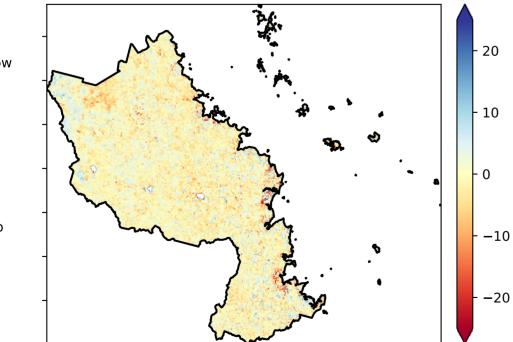
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

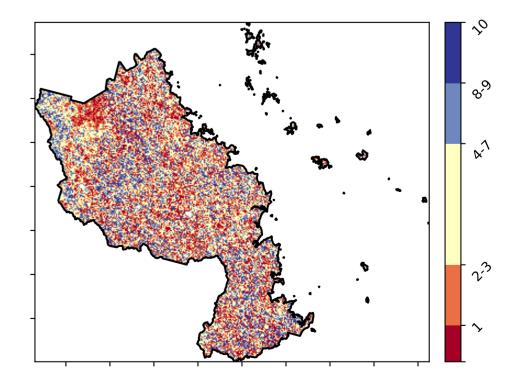


Total Vegetation Cover Anomaly [%]



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.

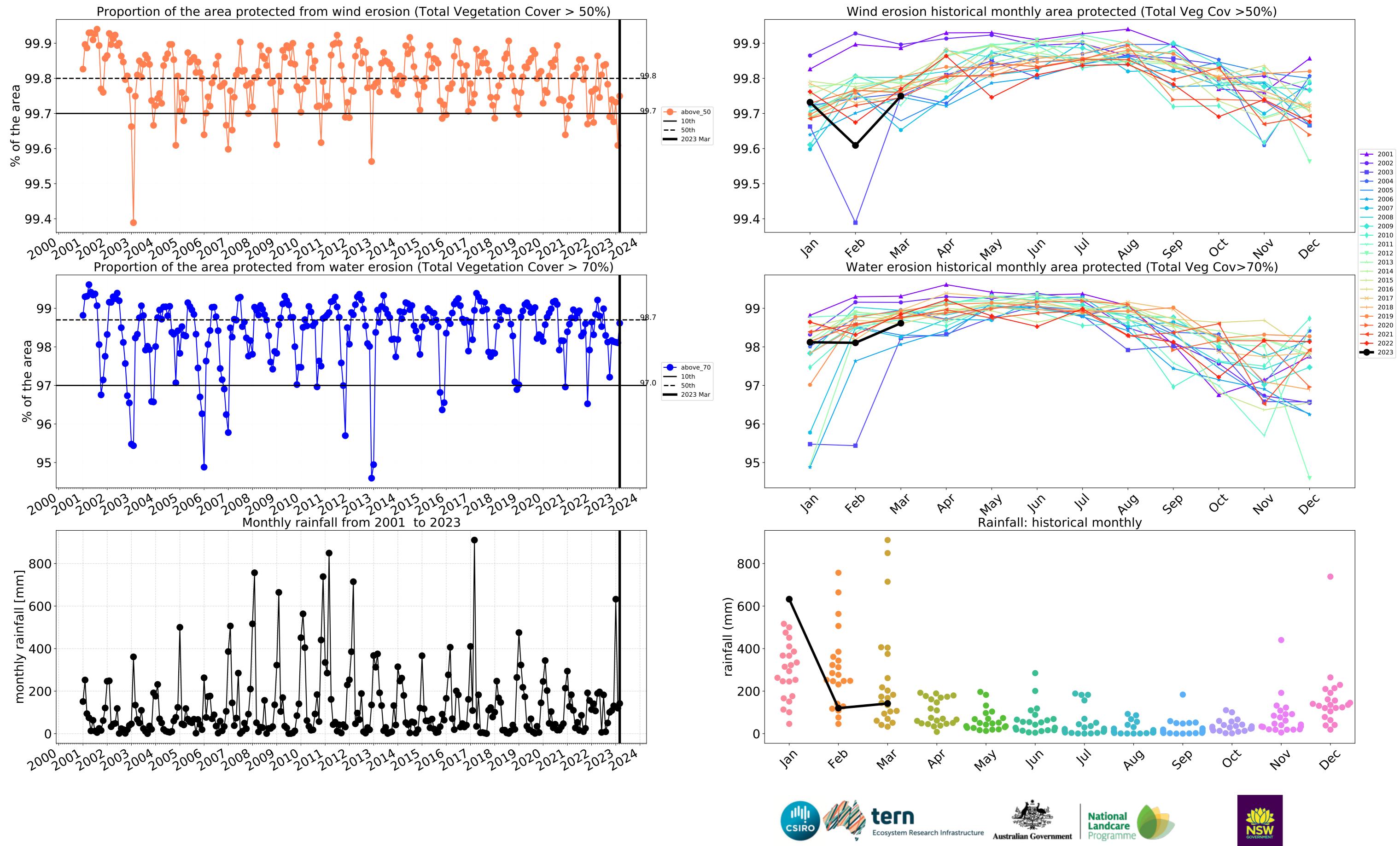
Total Vegetation Cover Decile [%]

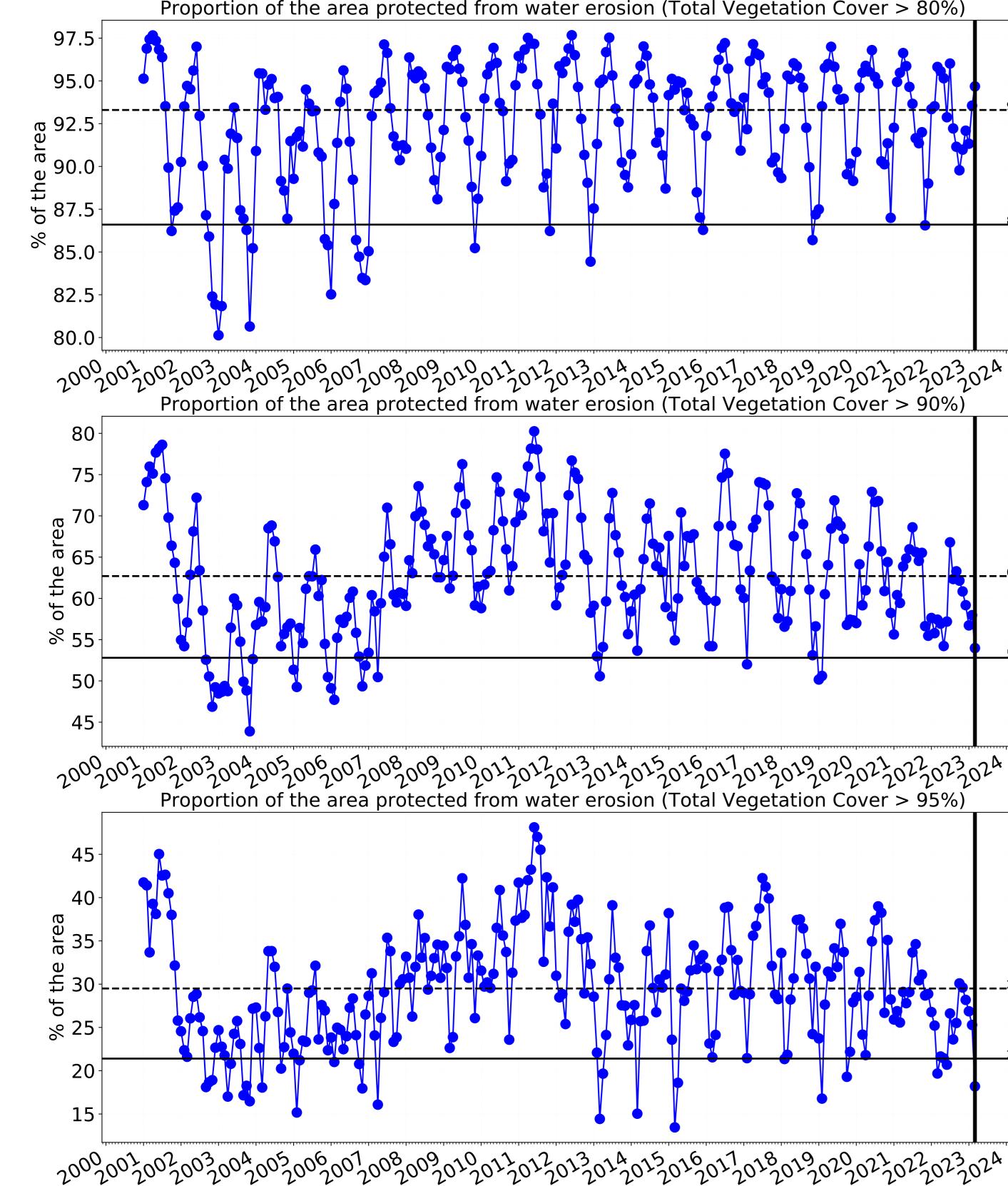




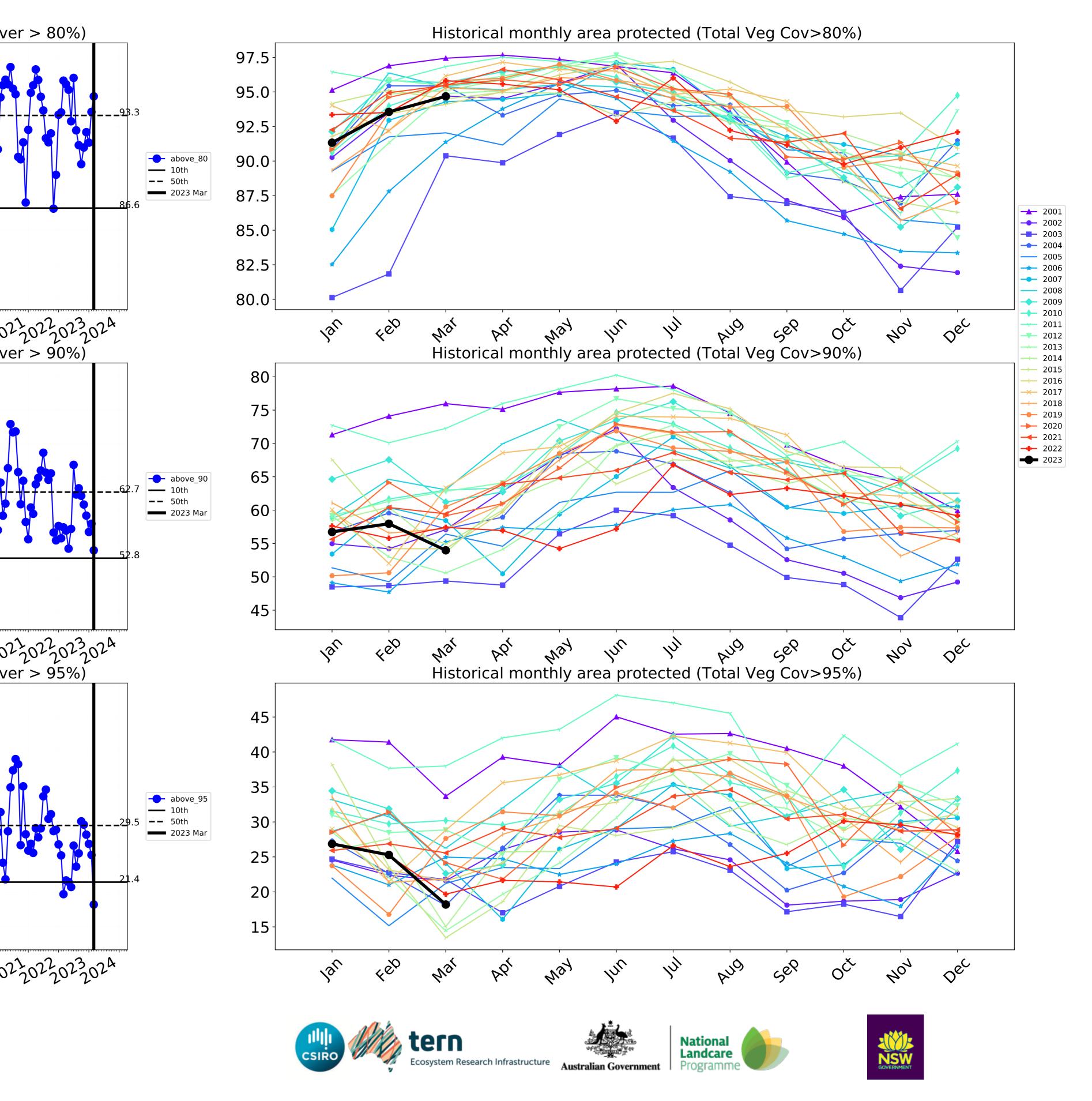
-20

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 > 80%)



4

Conservation and natural environments

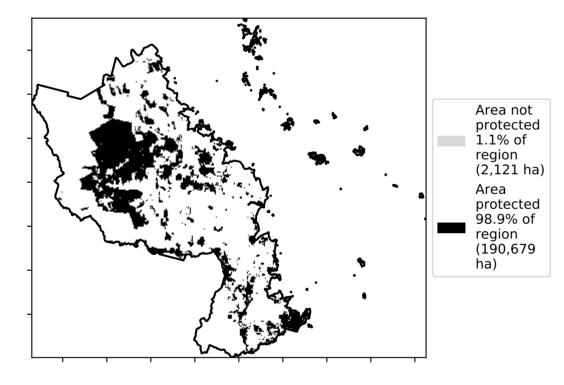
Catchment Scale Land

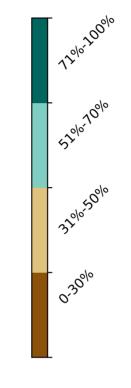
Land use and forest cover

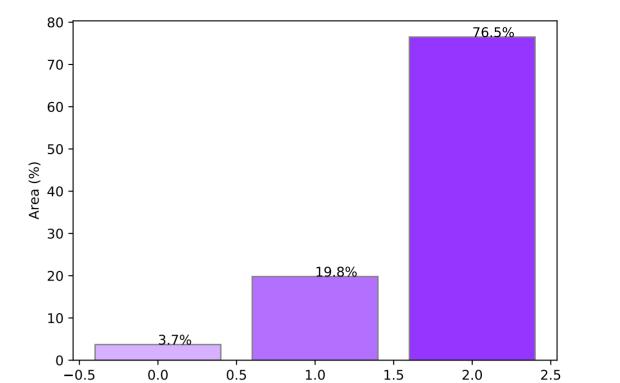
1 Conservation and natural environments - Non-forest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments - Nonwoodland forest

Total Vegetation Cover [%]

% Area protected from water erosion (>70%)



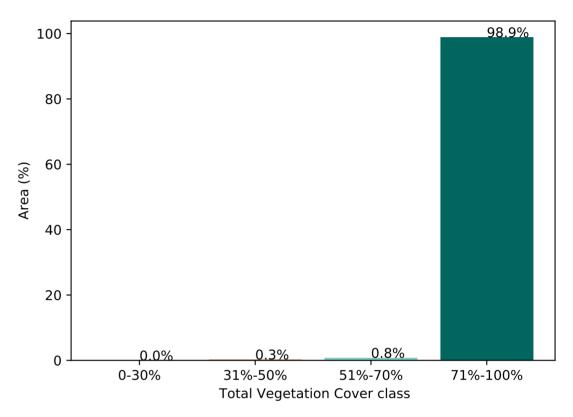




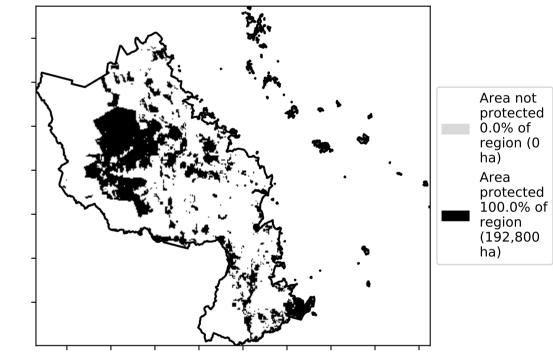
Proportion of each land class in area

Proportion of vegetation cover class in area

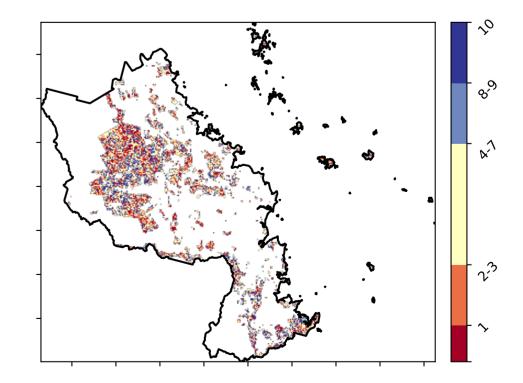
Land use class



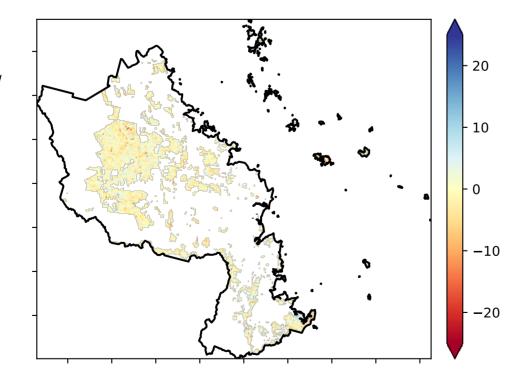
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



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





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

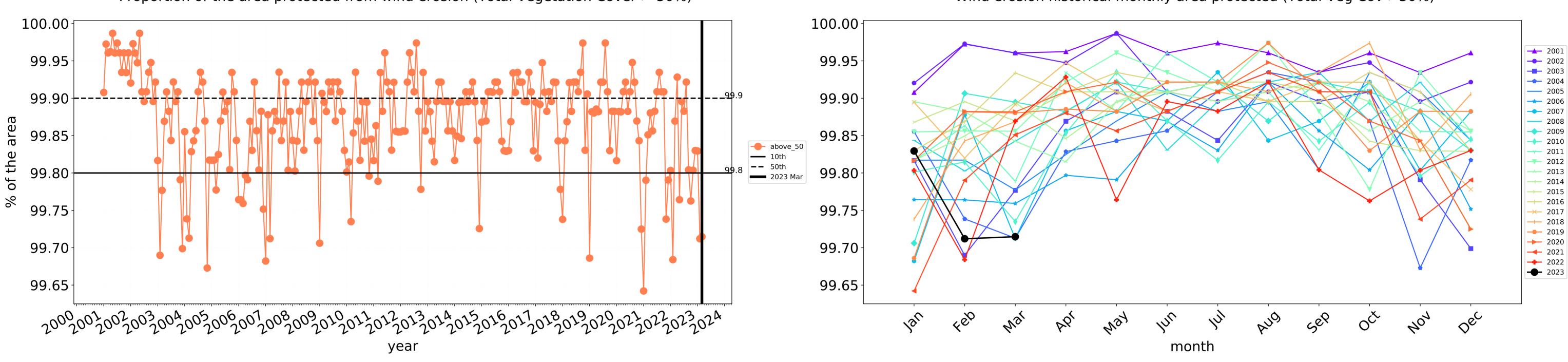
Derived from

Use of Australia

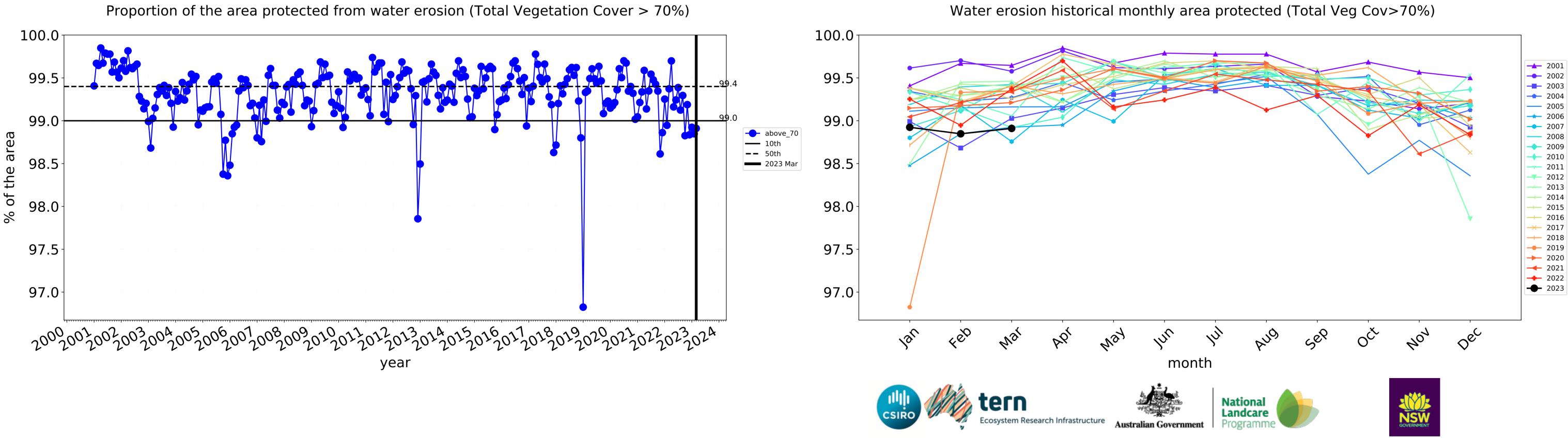
(2018) and Forests

of Australia (2018)

Land Use and Forests of Australia (2018)

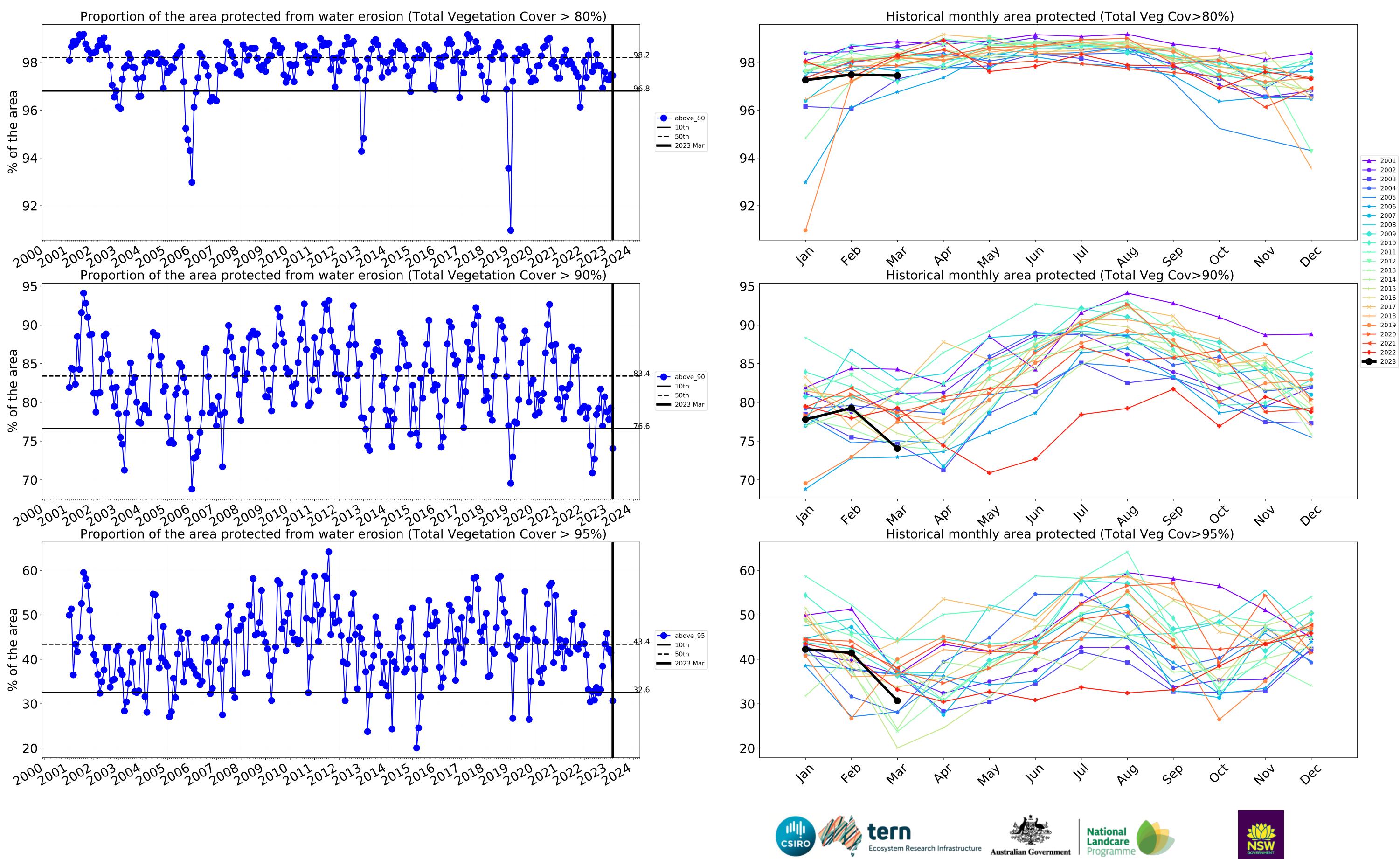


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



Conservation and natural environments timeseries

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





Conservation and natural environments non forest

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

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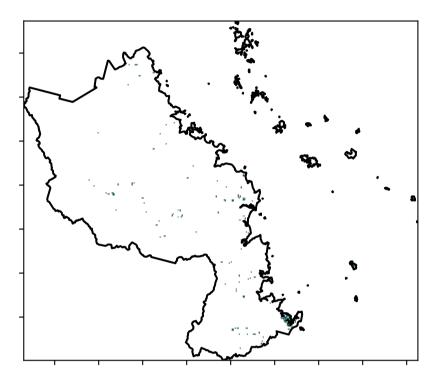
52% 70%

32°1050010

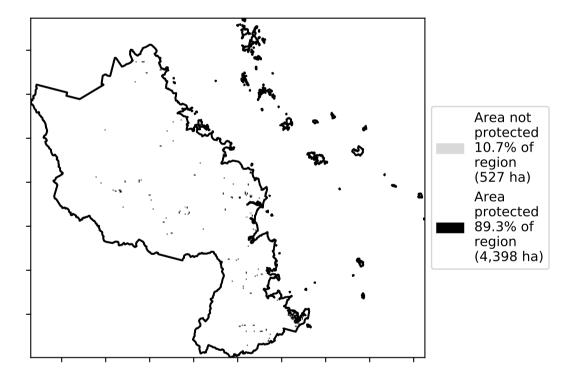
0.30%

Land use and forest cover

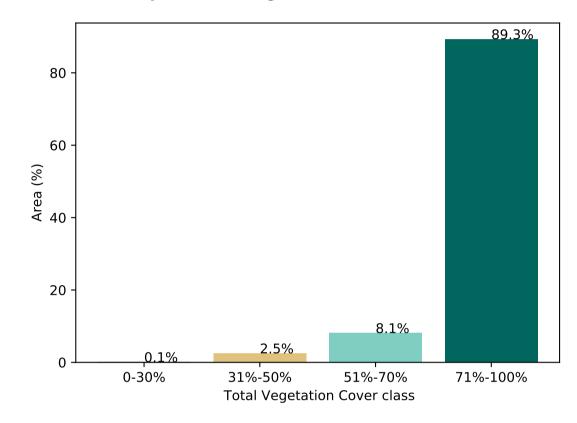
Total Vegetation Cover [%]



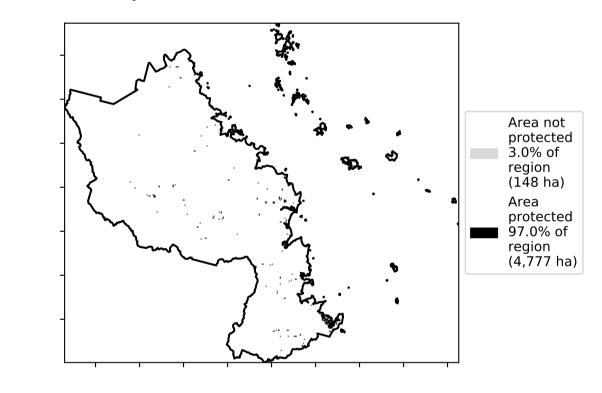
% Area protected from water erosion (>70%)



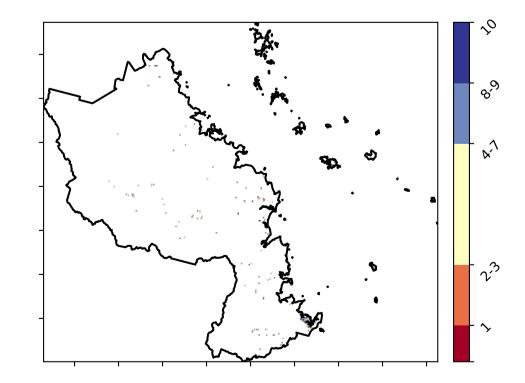




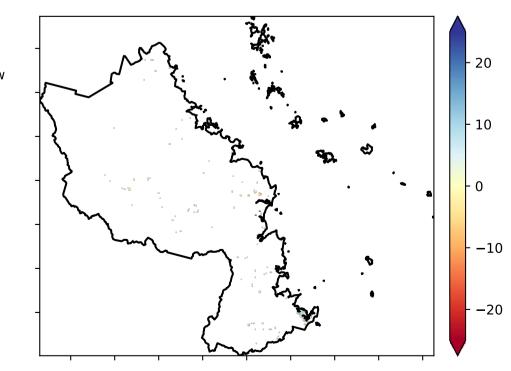
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



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.

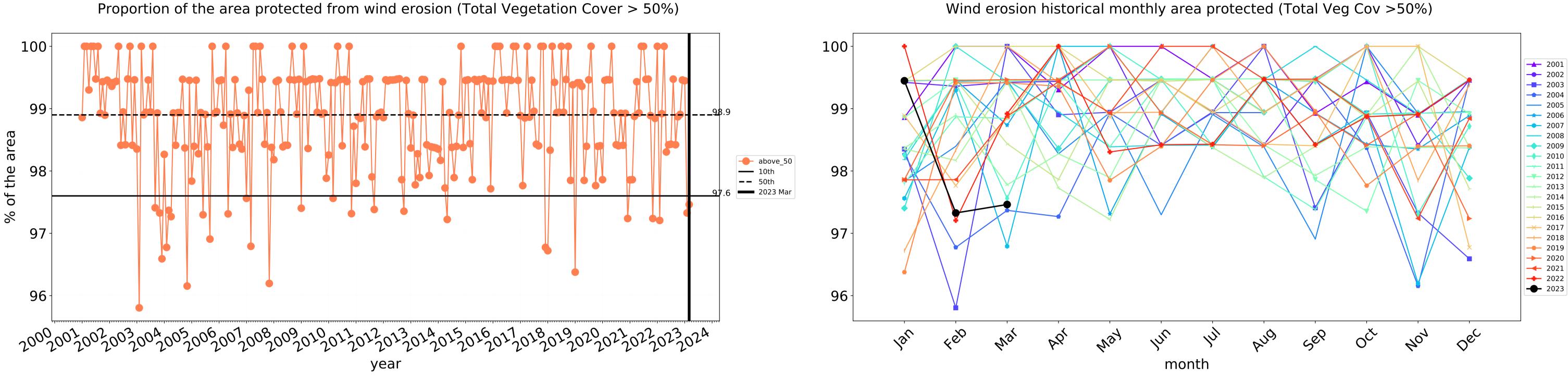


Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

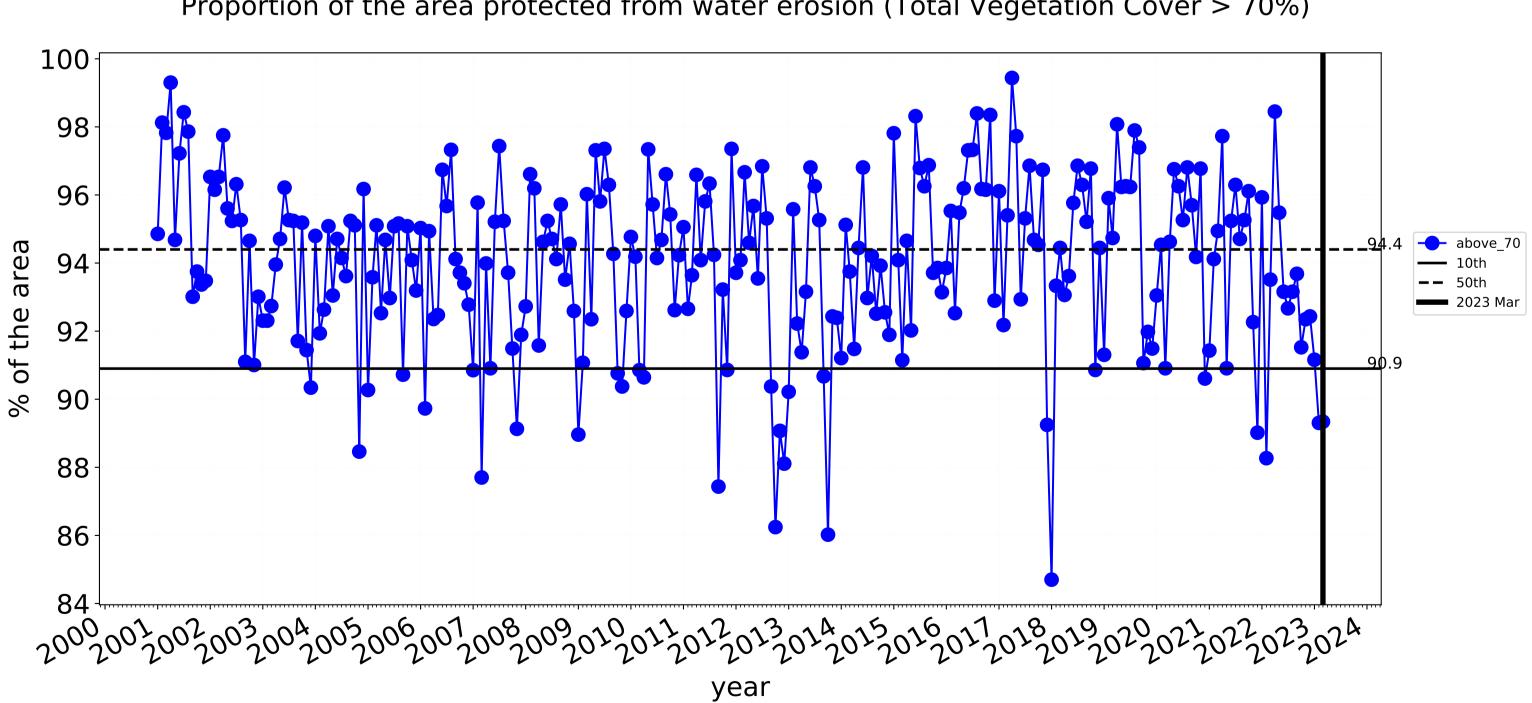
Derived from

Use of Australia





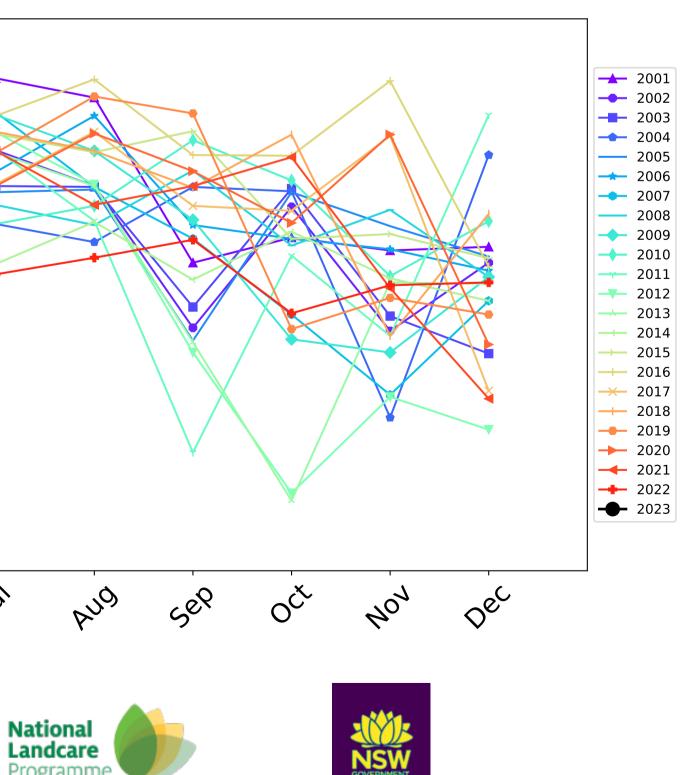
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

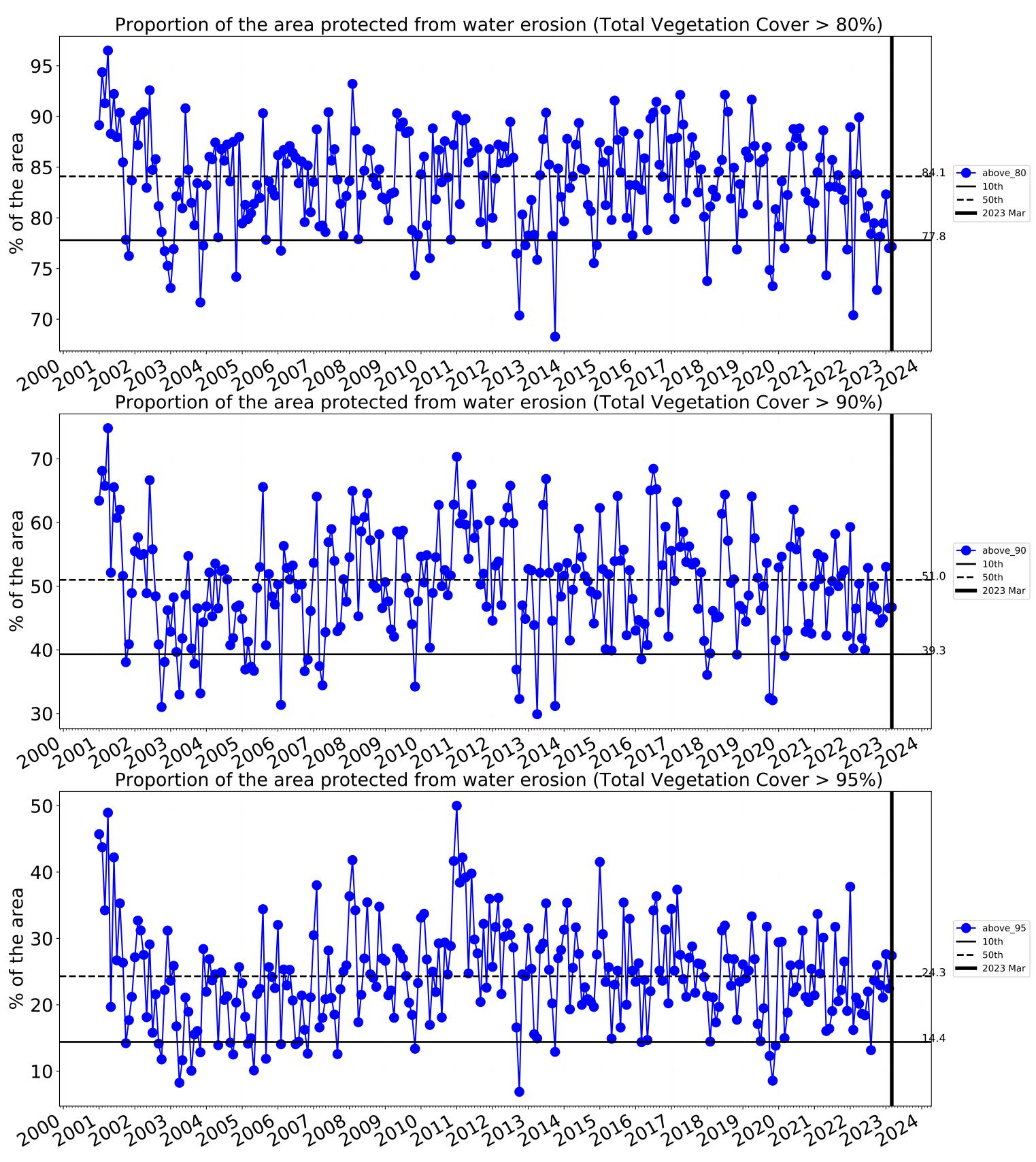


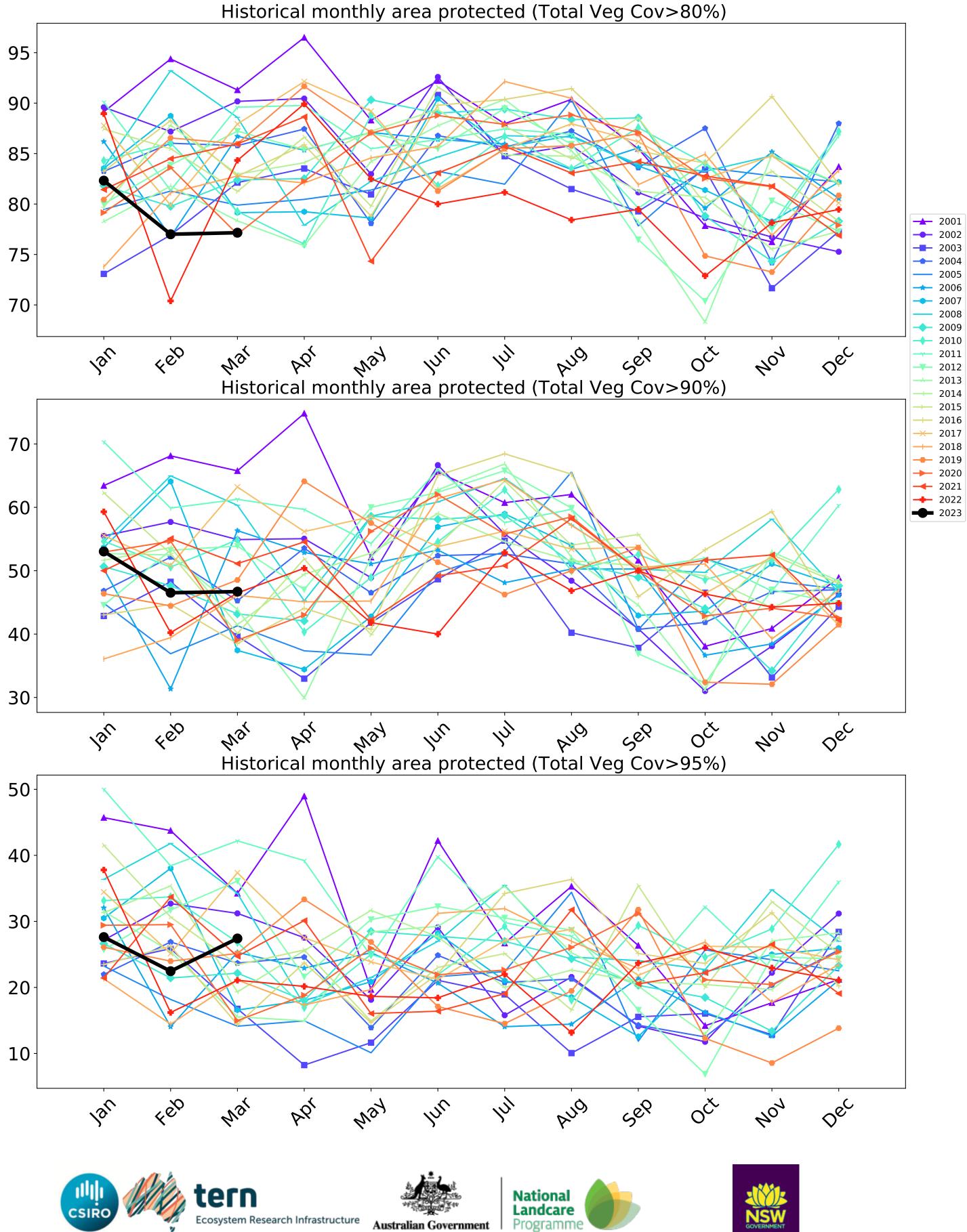
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

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





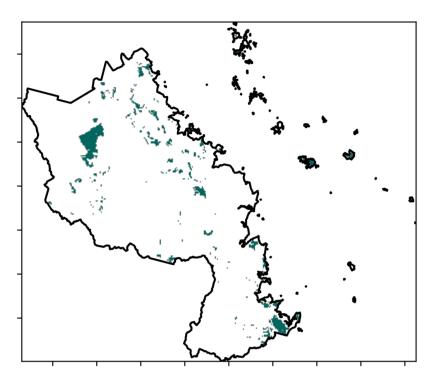


Conservation and natural environments Woodland forest

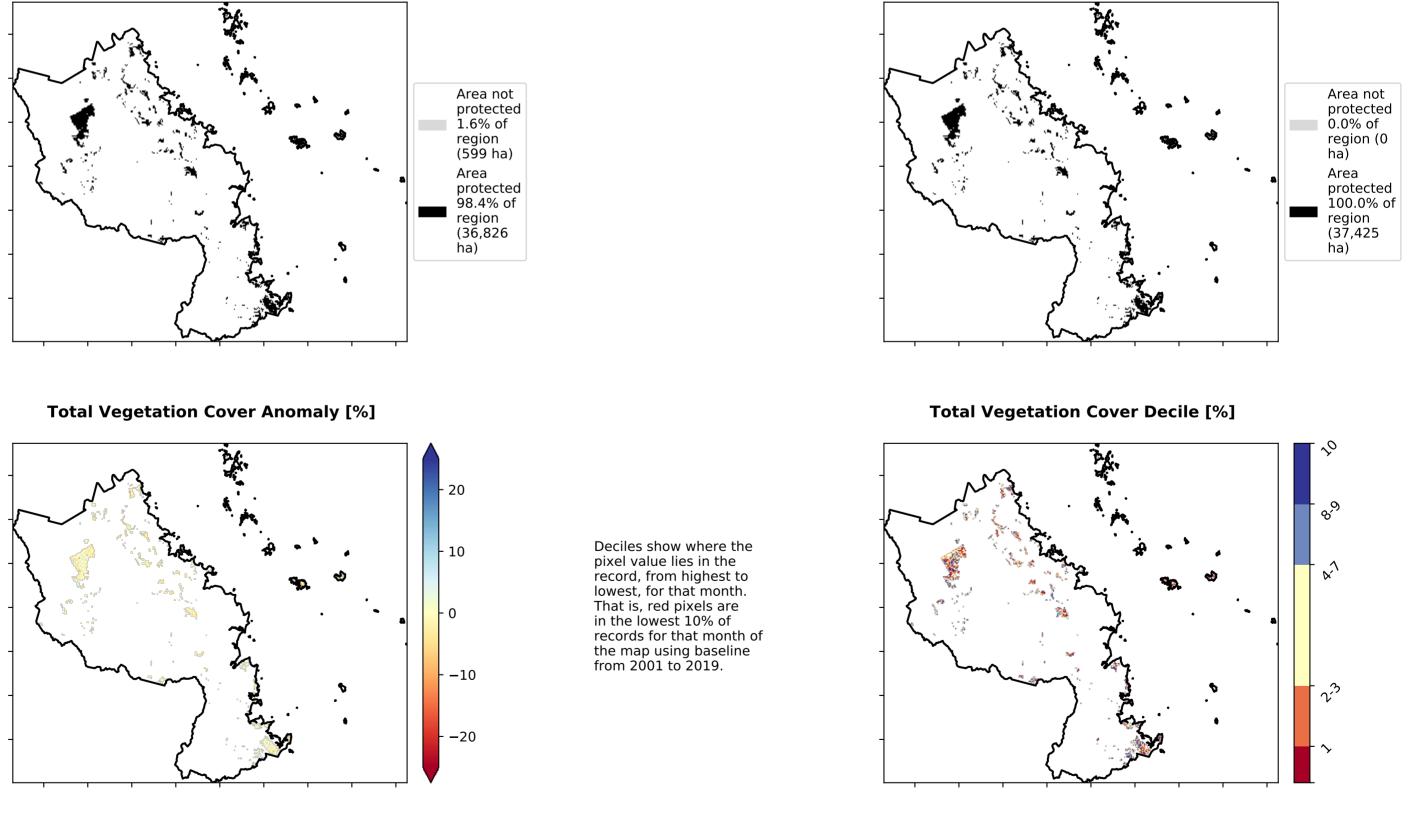
Catchment Scale Land Use and Forests of Australia (2018) 1 Conservation and natural environments - Woodland Catchment Scale Land forest Use of Australia (2018) and Forests of Australia (2018)

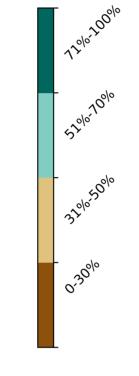
Land use and forest cover

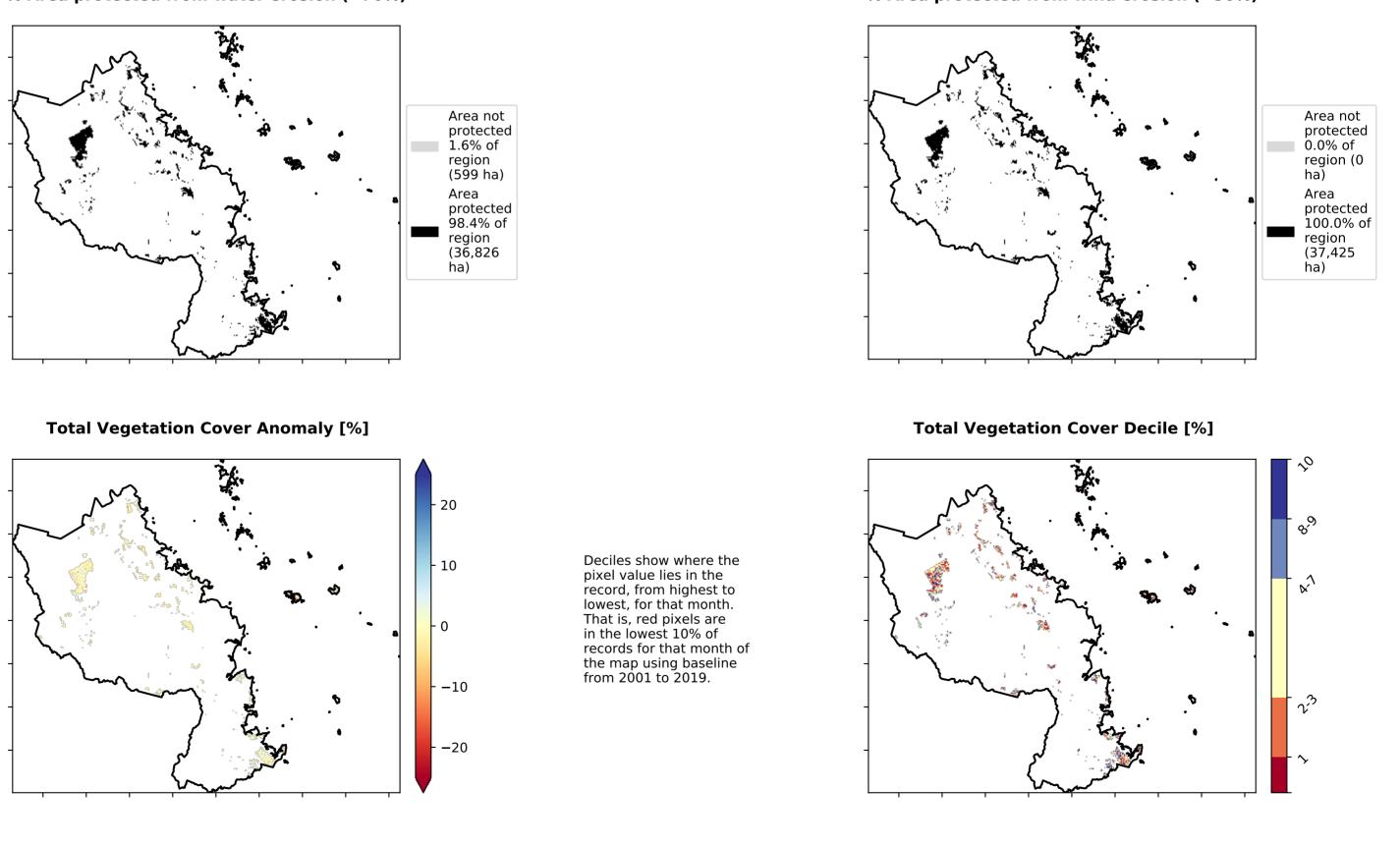
Total Vegetation Cover [%]



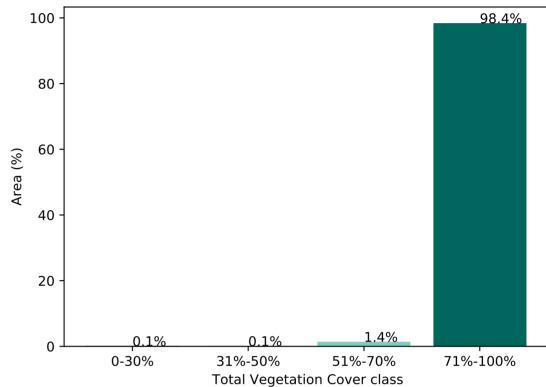
% Area protected from water erosion (>70%)







Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

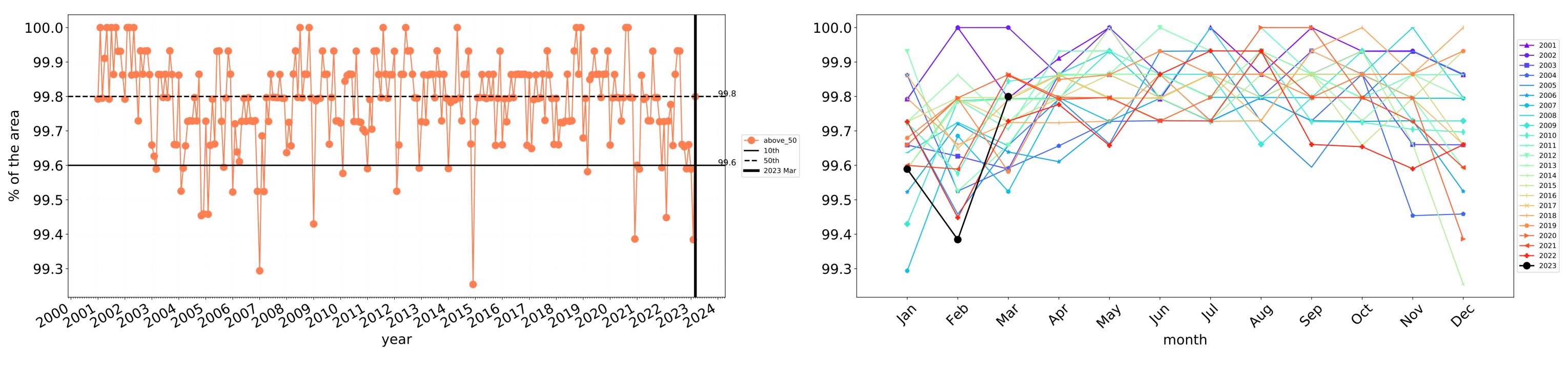




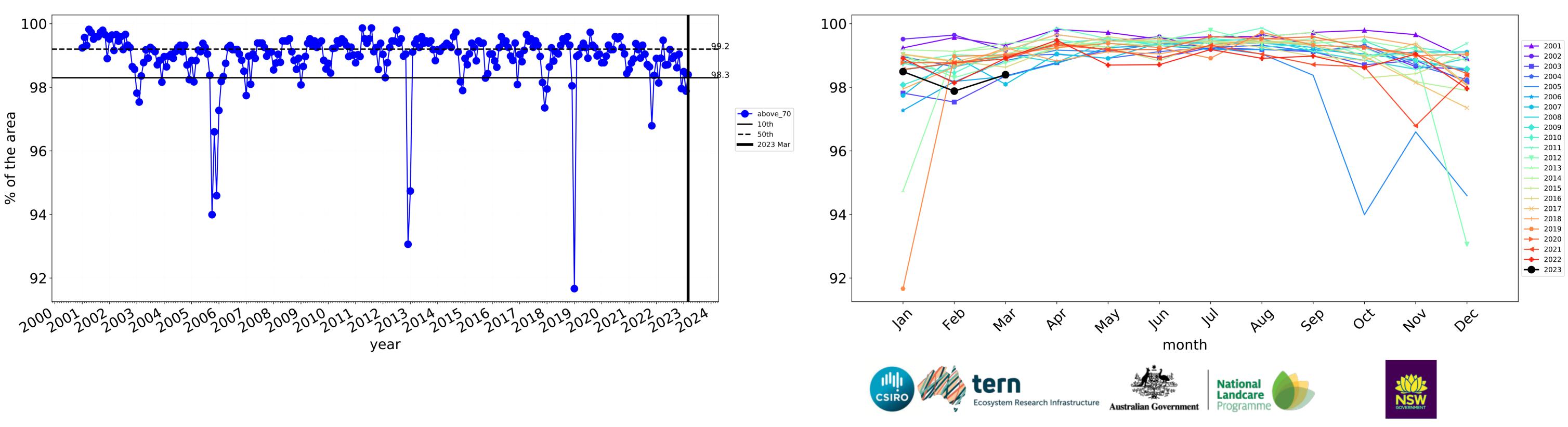


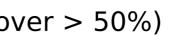
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Derived from



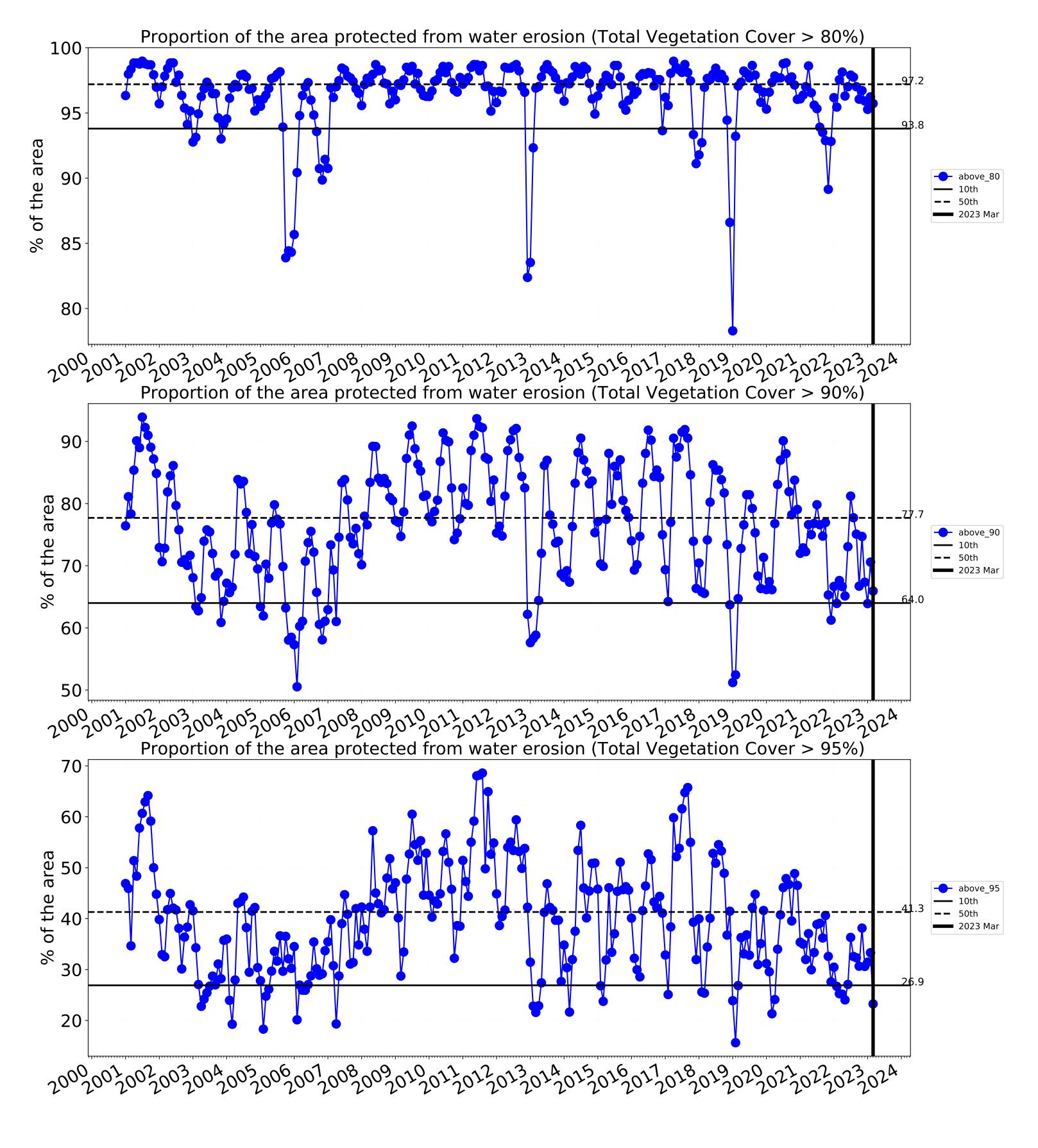
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

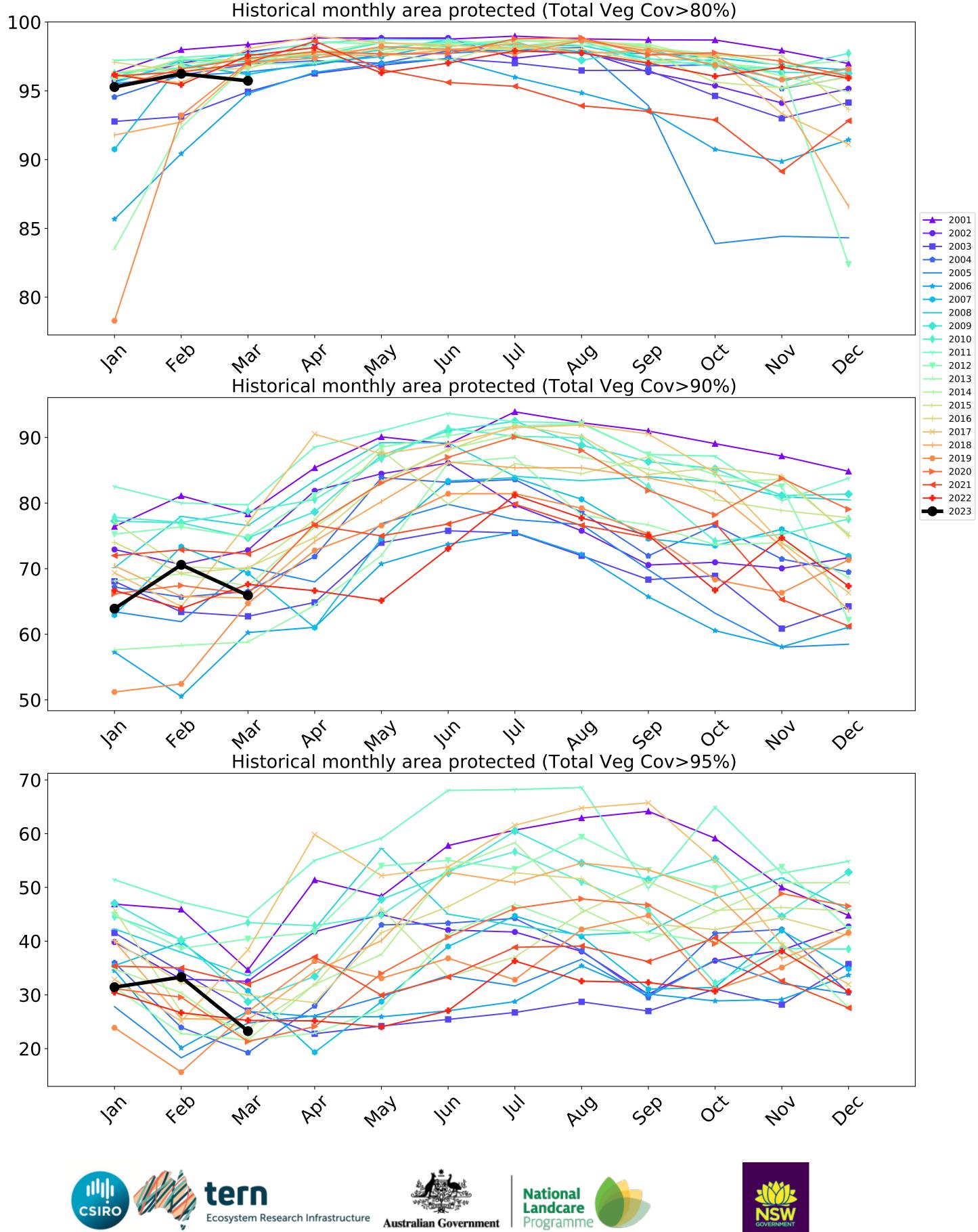




Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

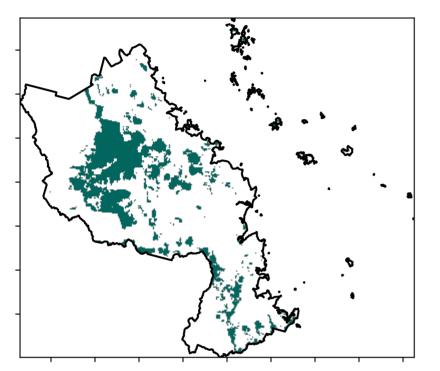




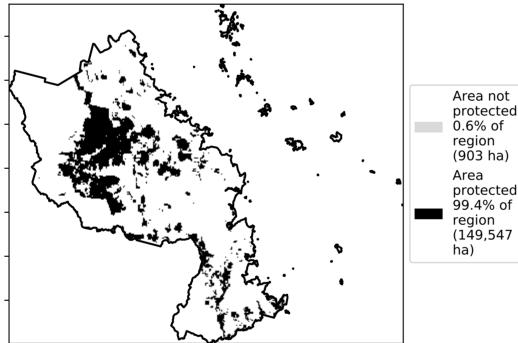
Conservation and natural environments Forest (non woodland)

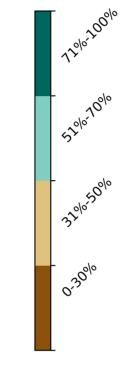
Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Conservation and natural environments - Non-woodland forest Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

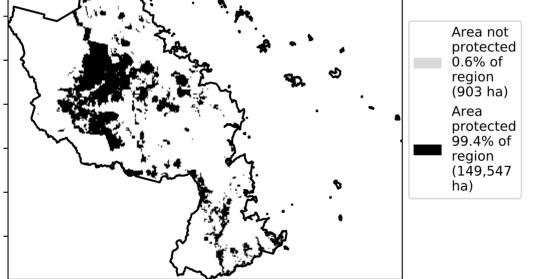
Total Vegetation Cover [%]



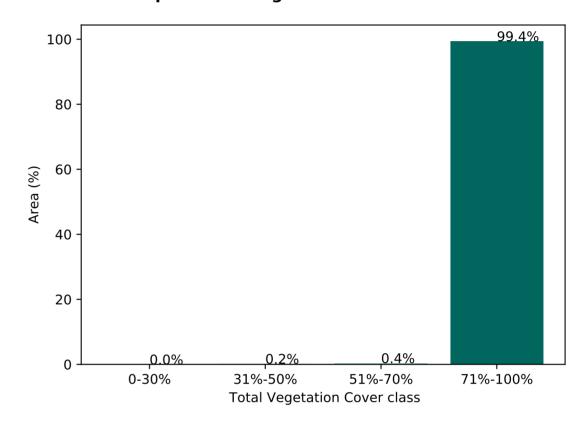
% Area protected from water erosion (>70%)



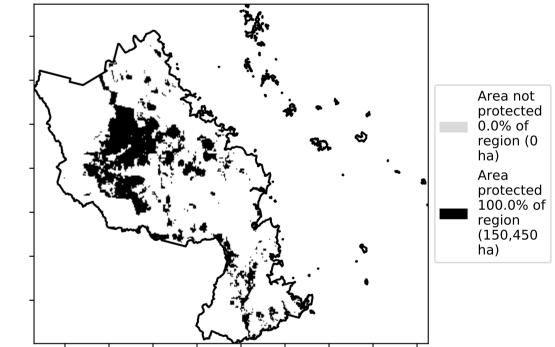




Proportion of vegetation cover class in area

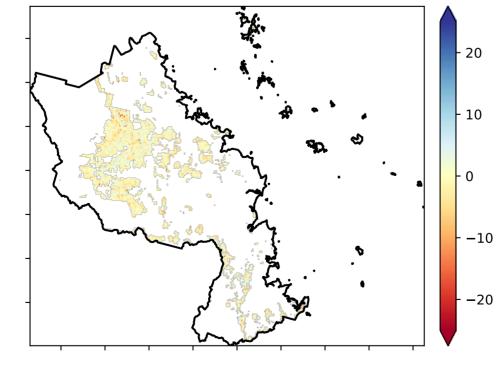


% Area protected from wind erosion (>50%)



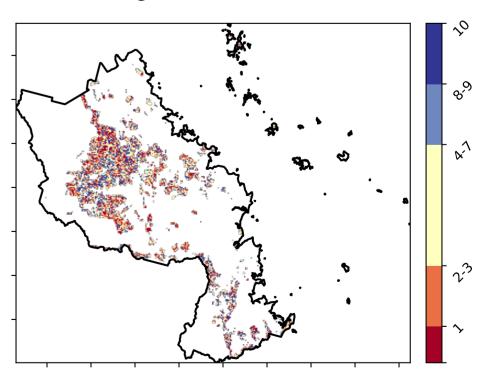
Total Vegetation Cover Anomaly [%]

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.

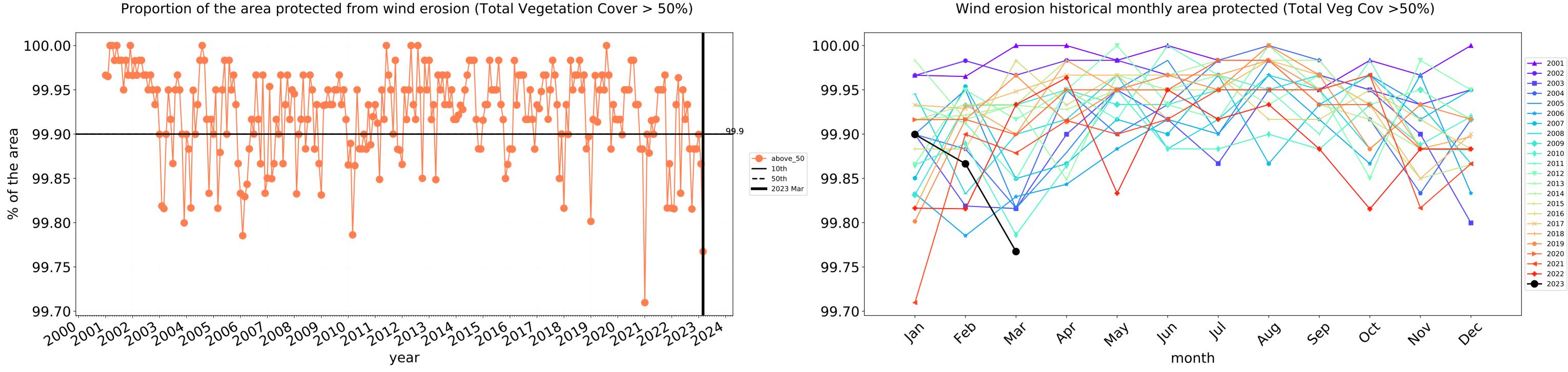


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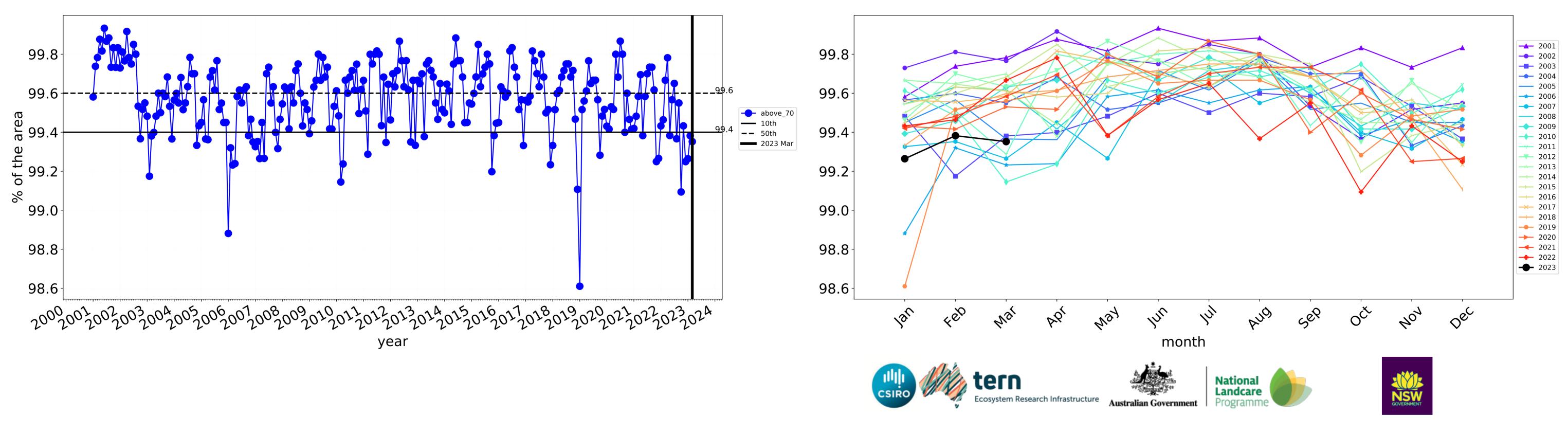
Total Vegetation Cover Decile [%]



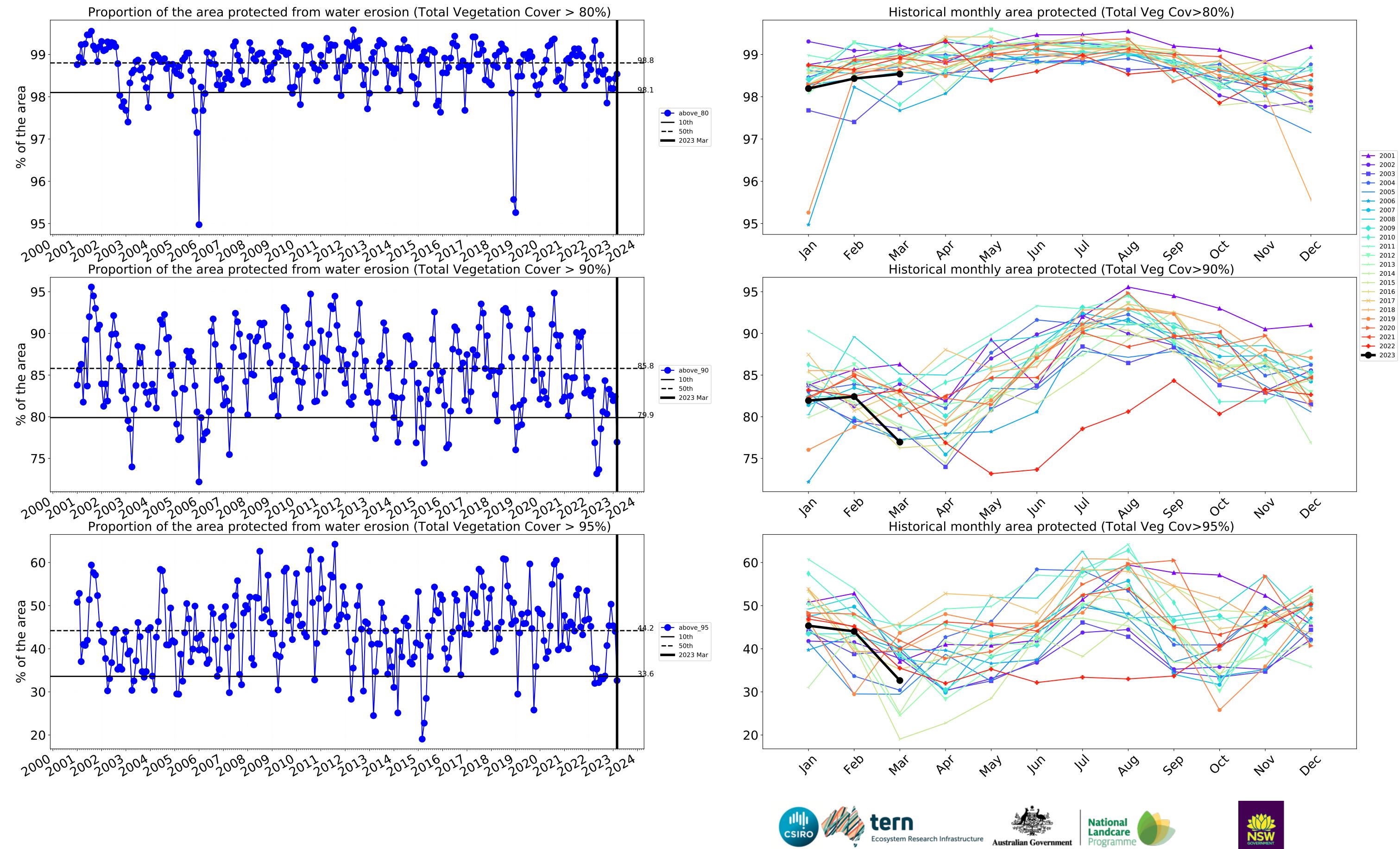




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



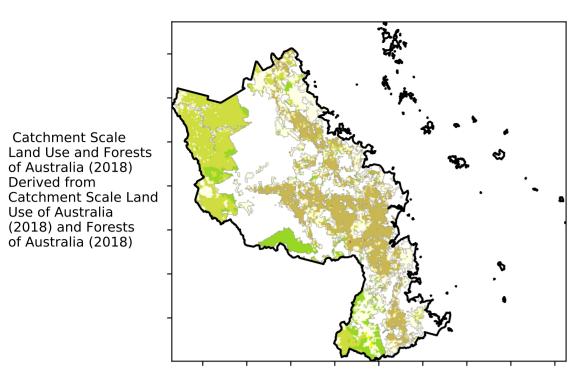
Water erosion historical monthly area protected (Total Veg Cov>70%)



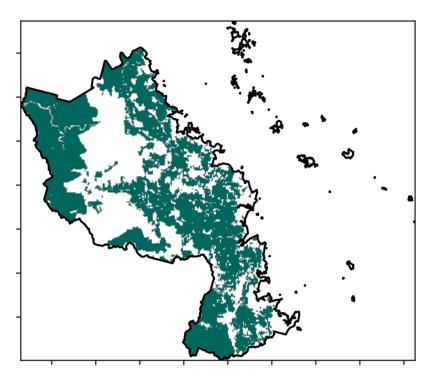


Agriculture

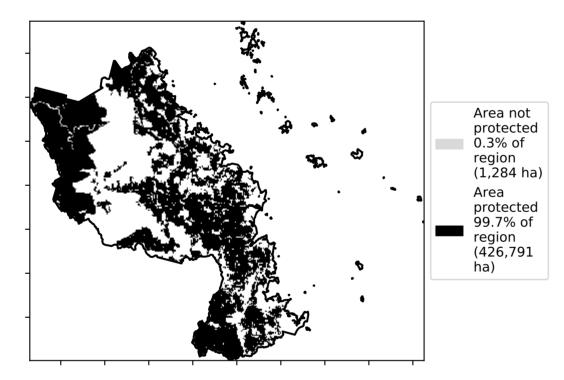
Land use and forest cover

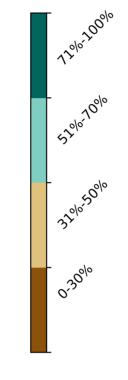


Total Vegetation Cover [%]



% Area protected from water erosion (>70%)





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

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

7 Agriculture - Horticulture - Non-irrigated

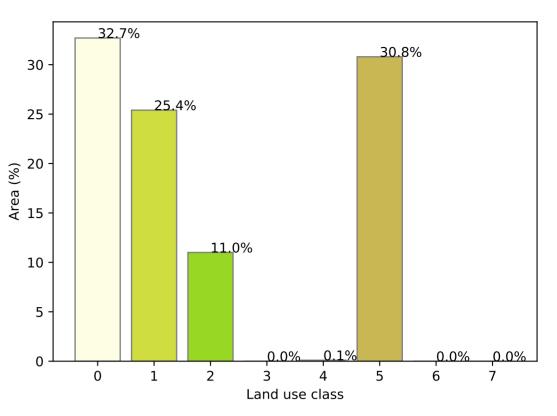
6 Agriculture - Cropping - Irrigated

8 Agriculture - Horticulture - Irrigated

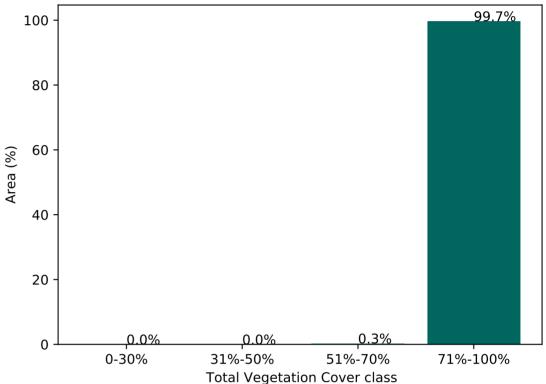
3 Agriculture - Grazing - Non-woodland forest



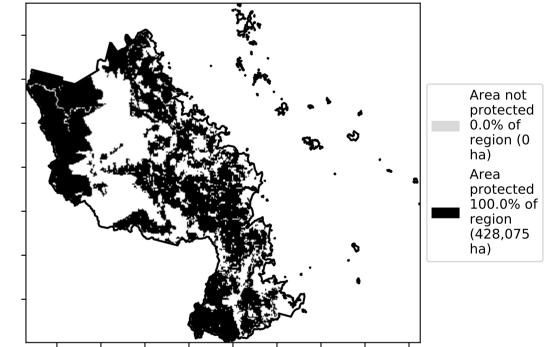
Proportion of each land class in area



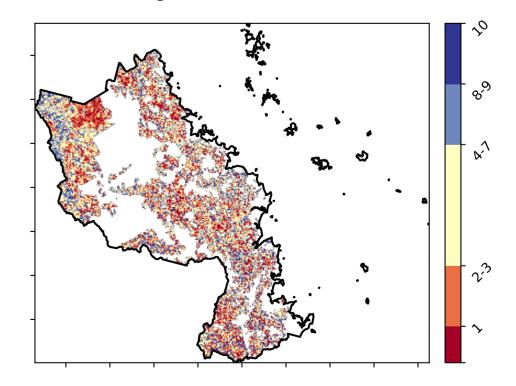
Proportion of vegetation cover class in area



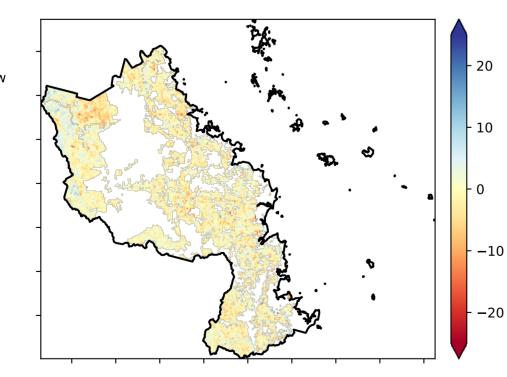
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



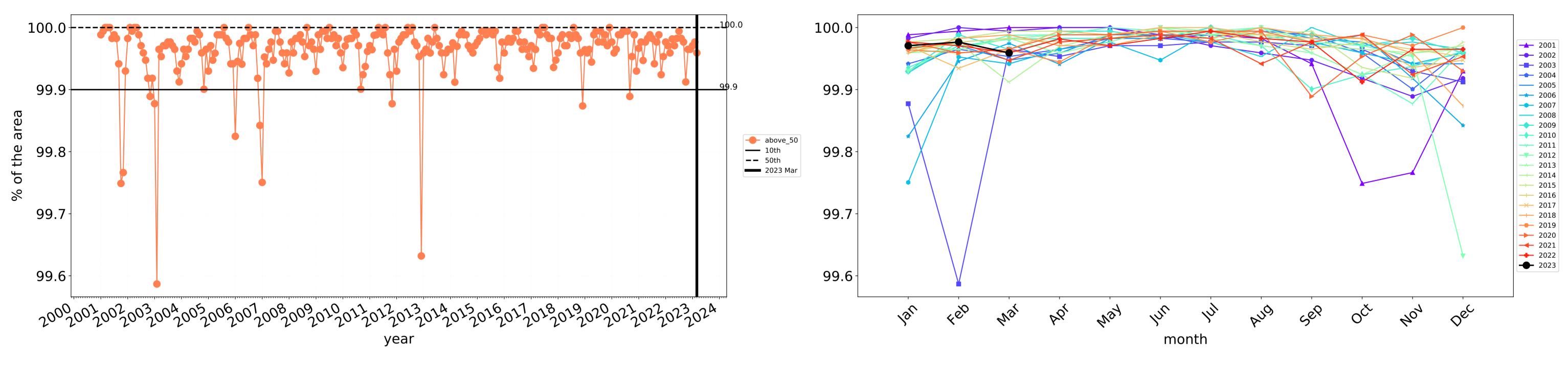
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





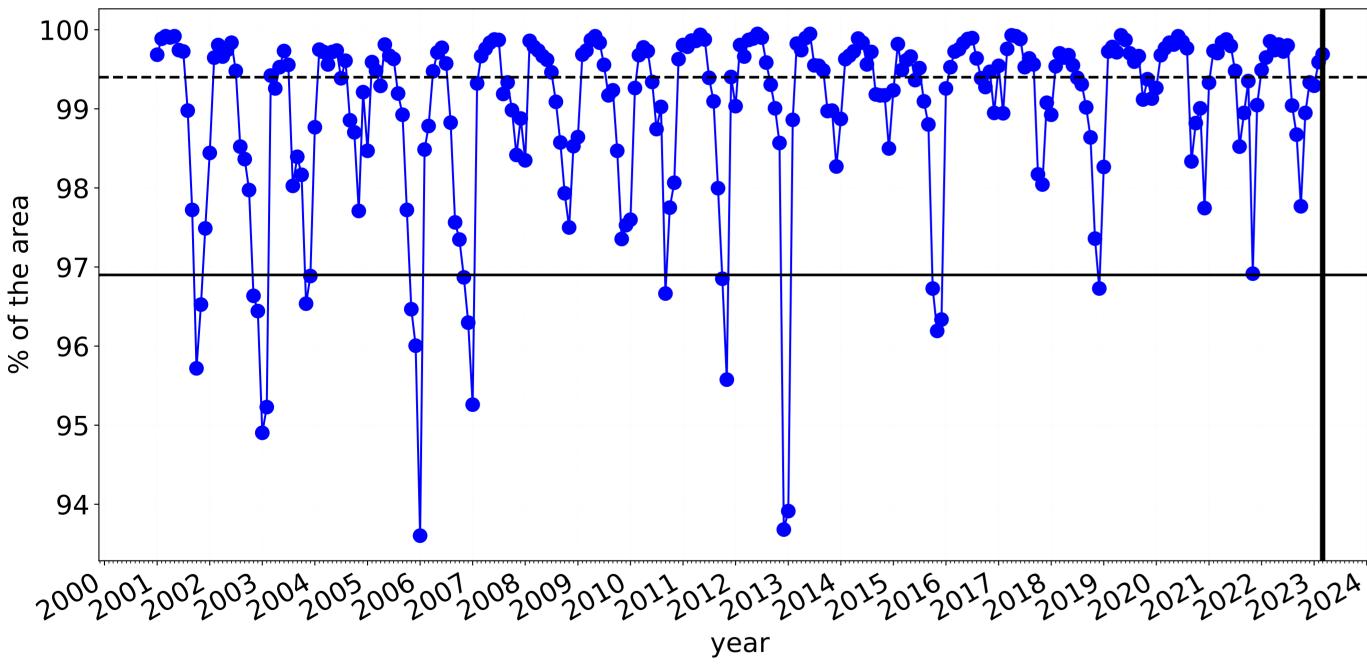
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

of Australia (2018)



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



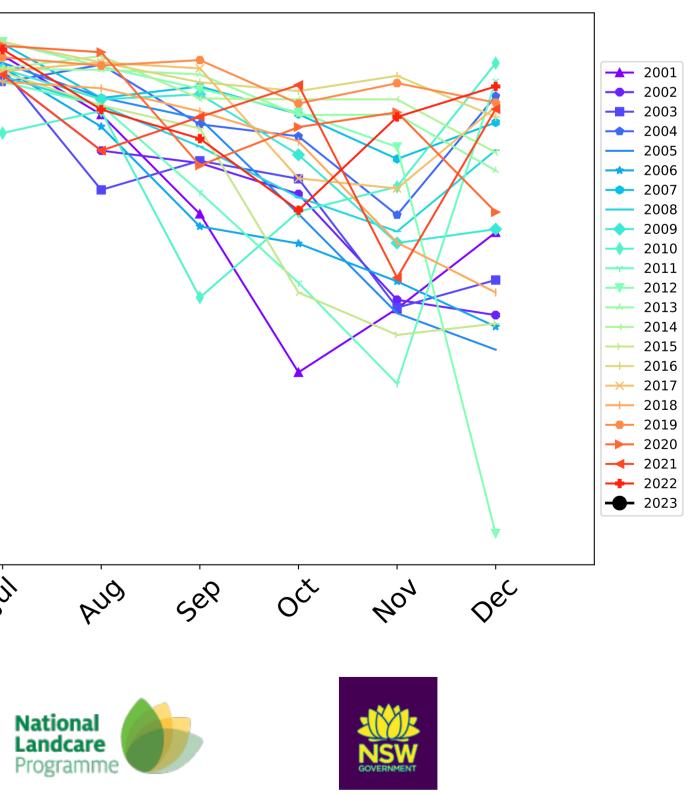


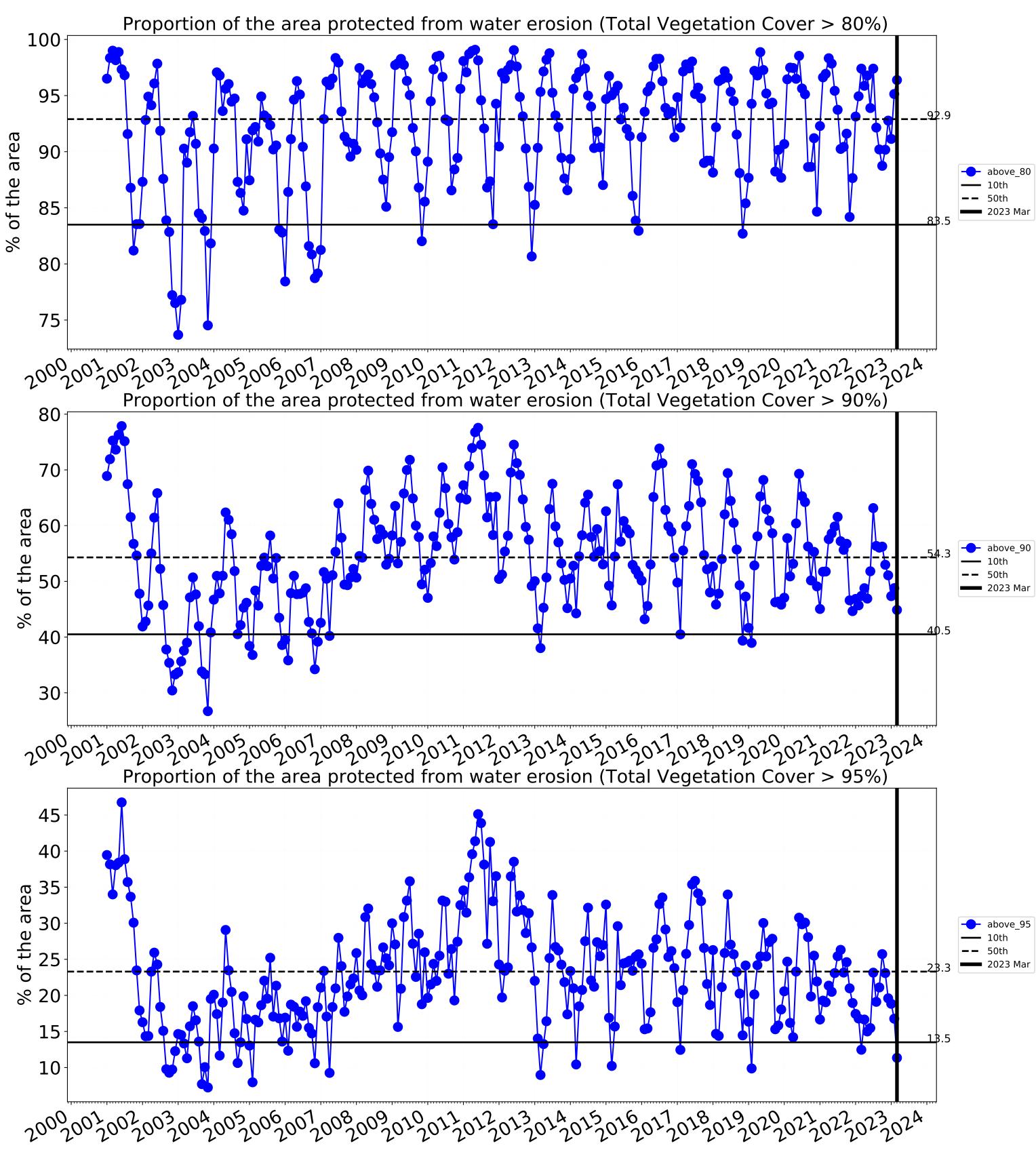
Wind erosion historical monthly area protected (Total Veg Cov >50%)

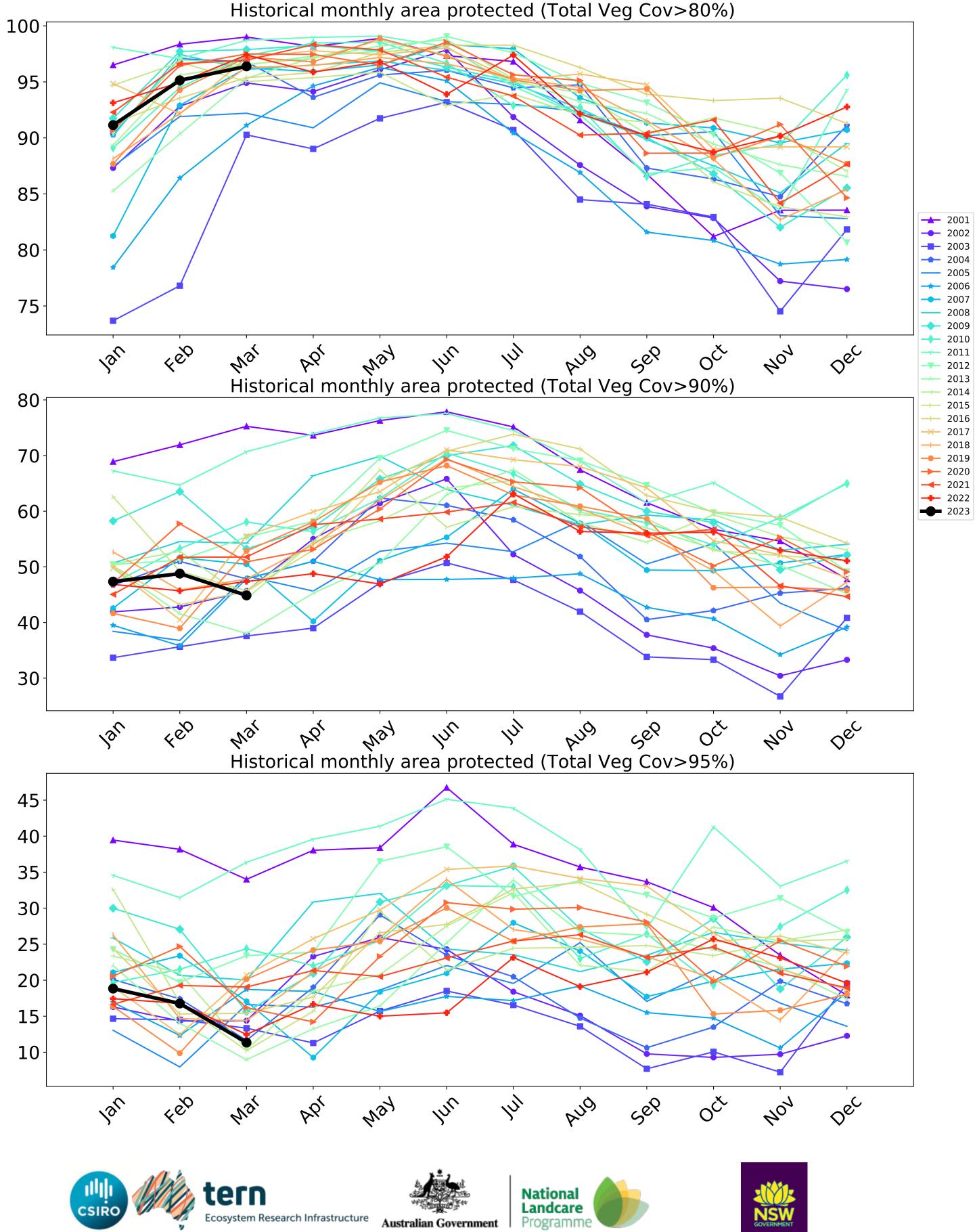
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Water erosion historical monthly area protected (Total Veg Cov>70%)









Grazing

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

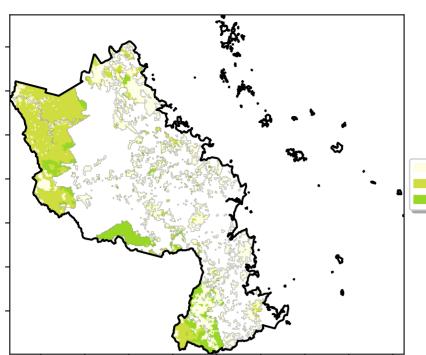
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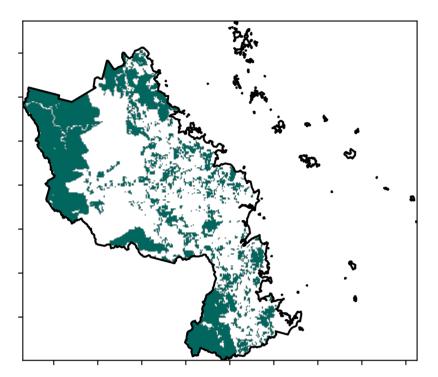
0.30%

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

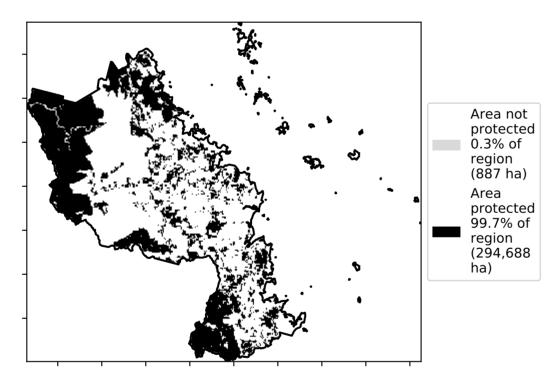


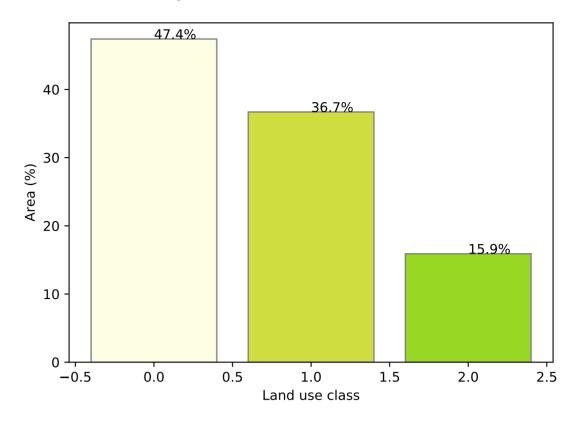
Land use and forest cover

Total Vegetation Cover [%]



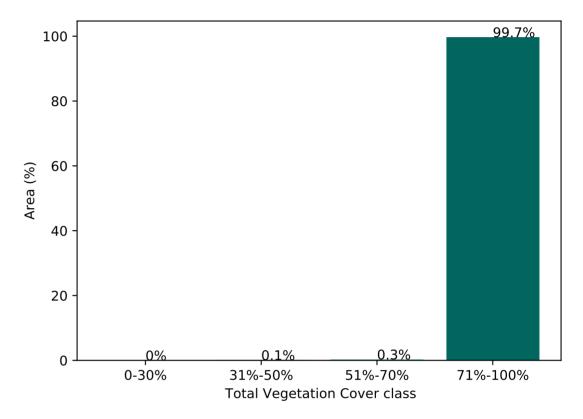
% Area protected from water erosion (>70%)



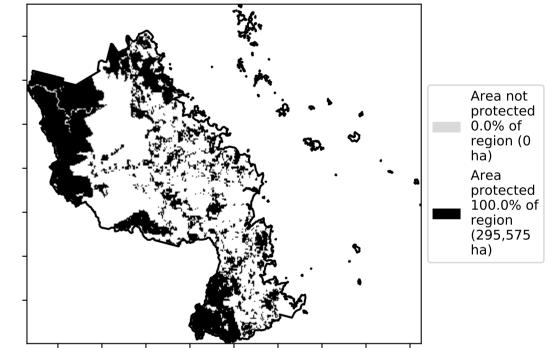


Proportion of each land class in area

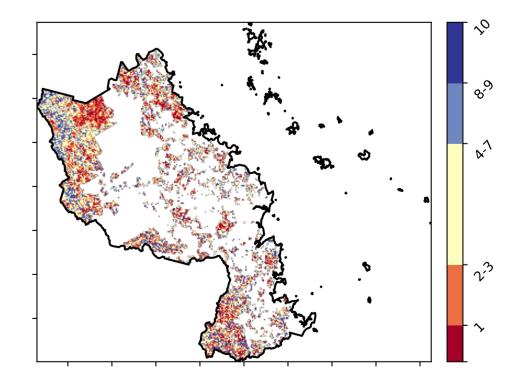
Proportion of vegetation cover class in area



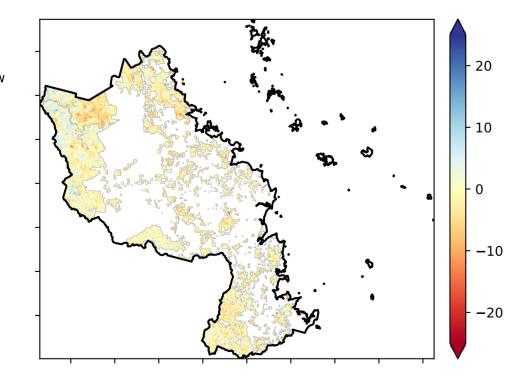
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

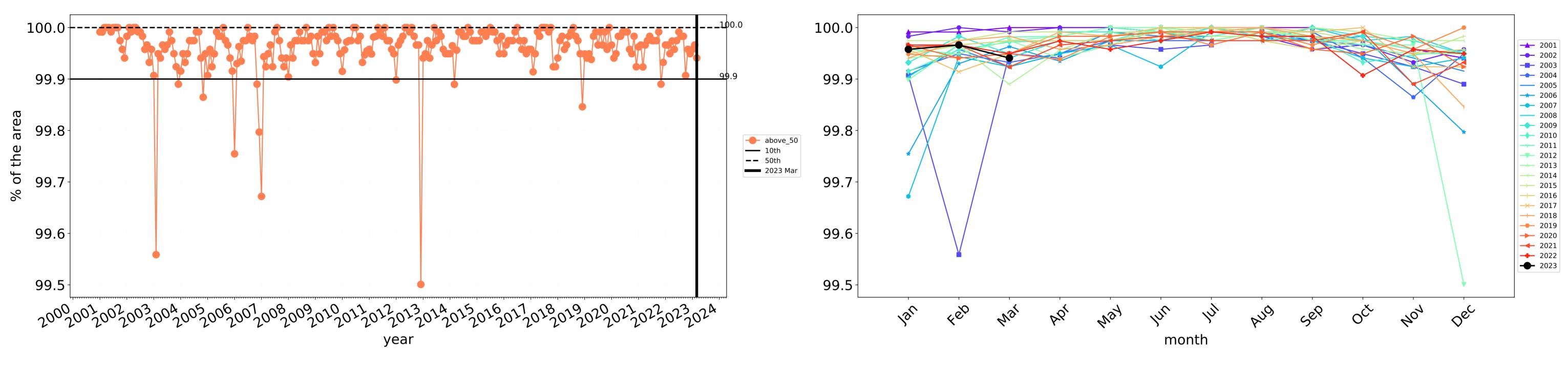


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

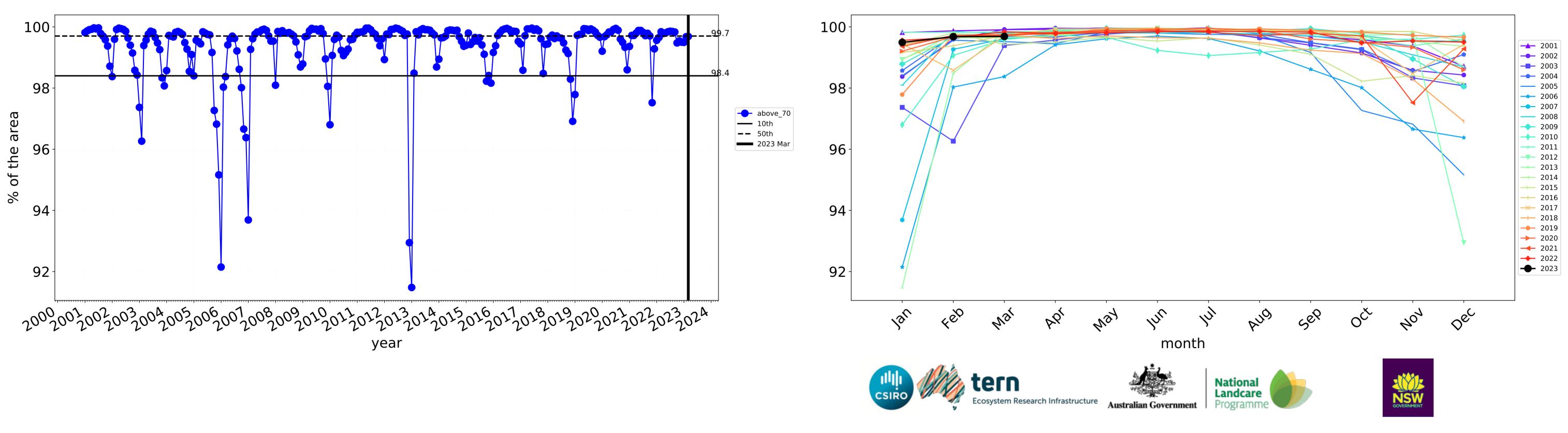




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

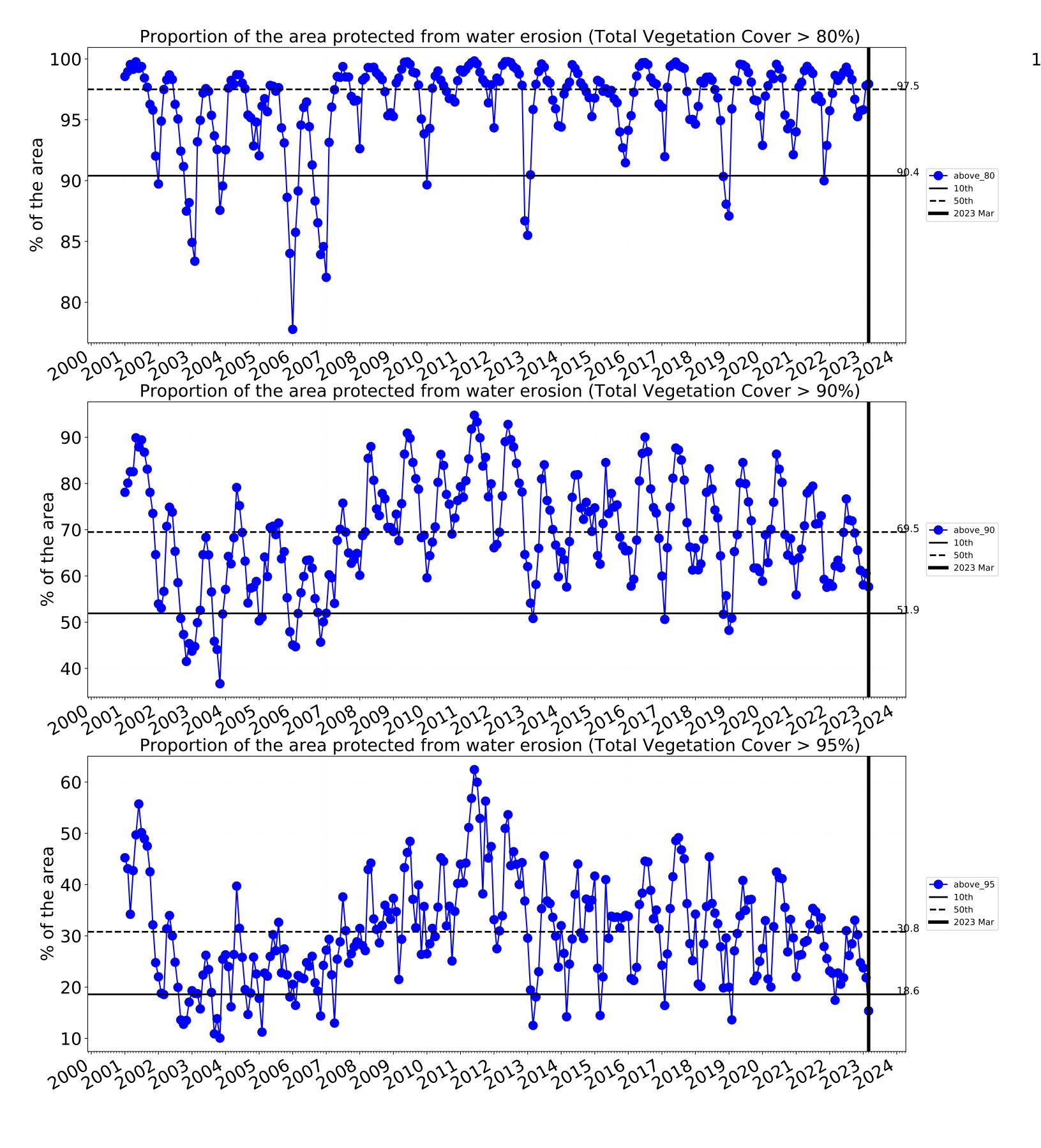


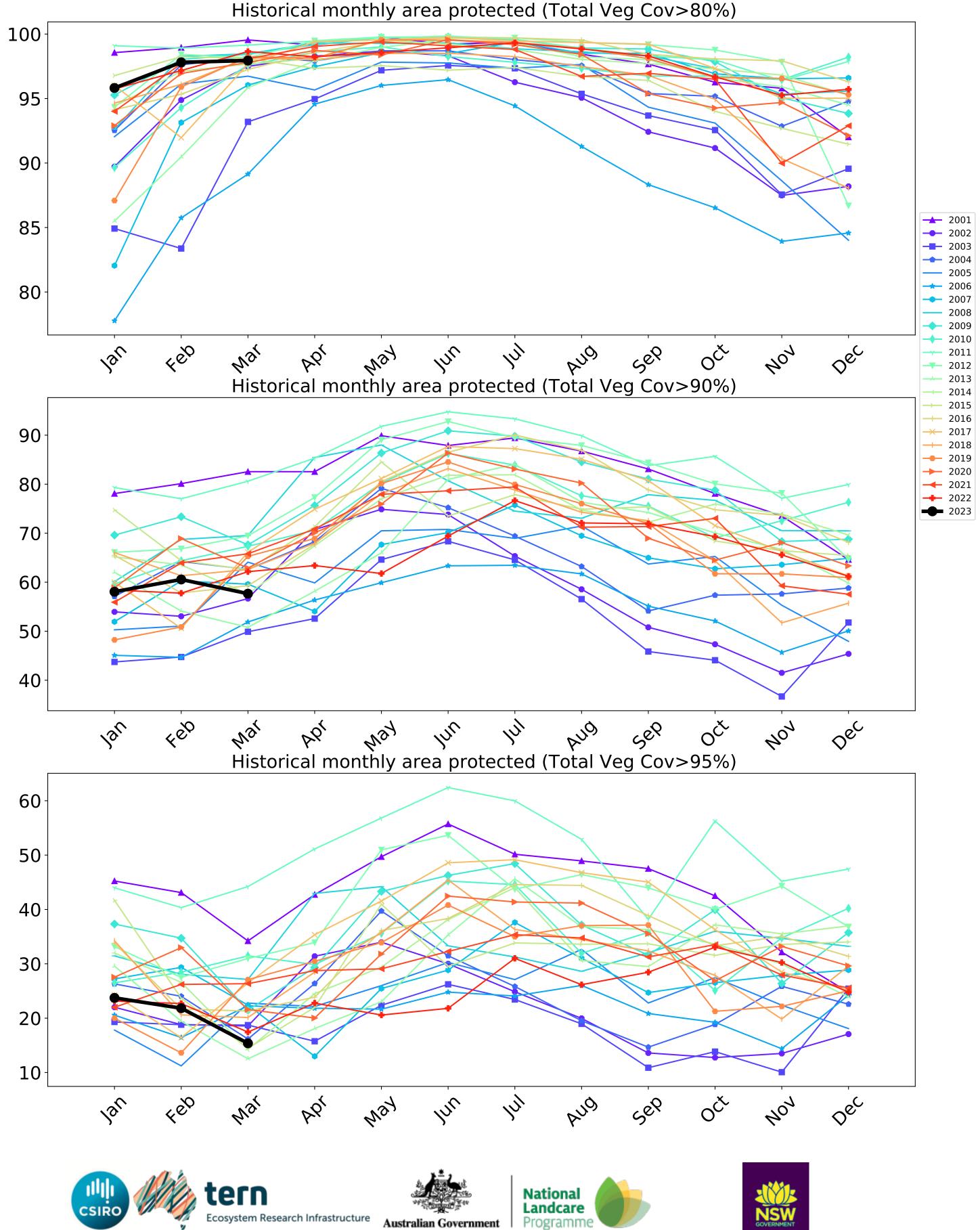
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

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







Grazing non forest

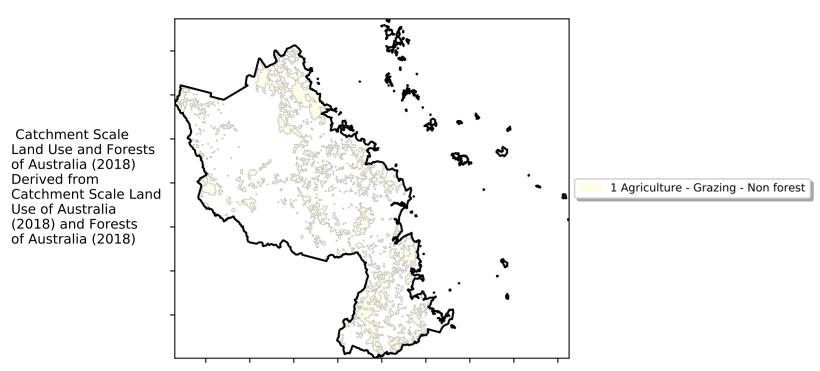
12%200%

· 52°1070010

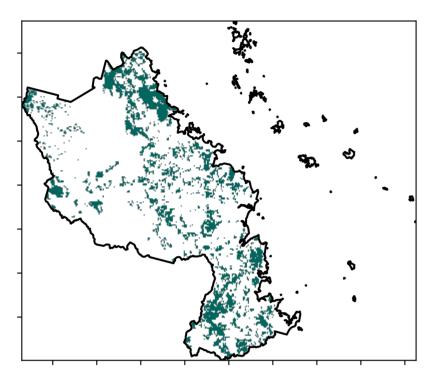
· 320050010

0.30%

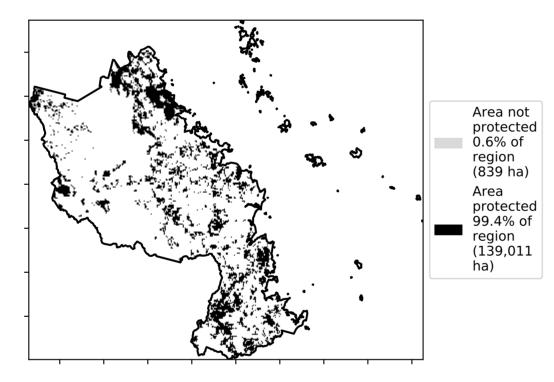
Land use and forest cover



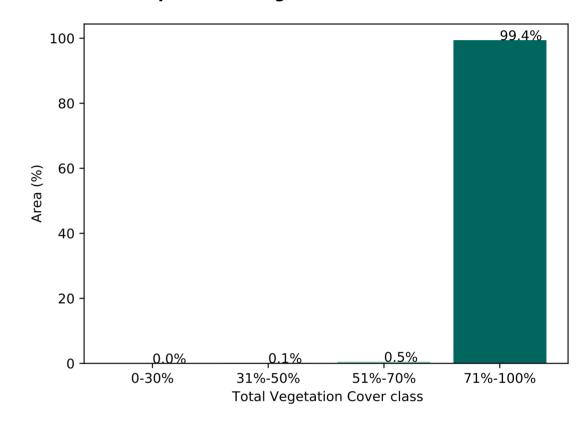
Total Vegetation Cover [%]



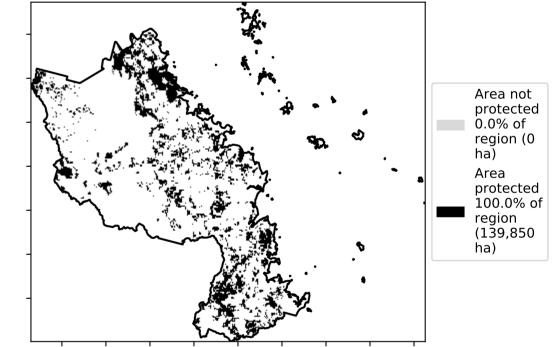
% Area protected from water erosion (>70%)



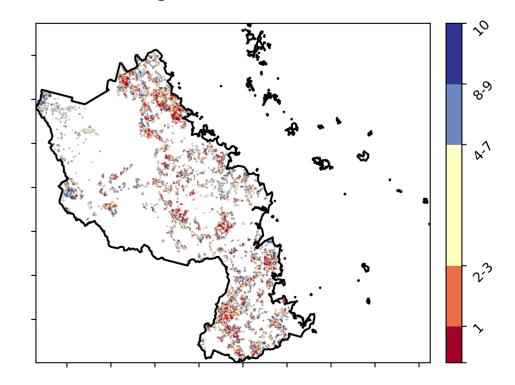
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

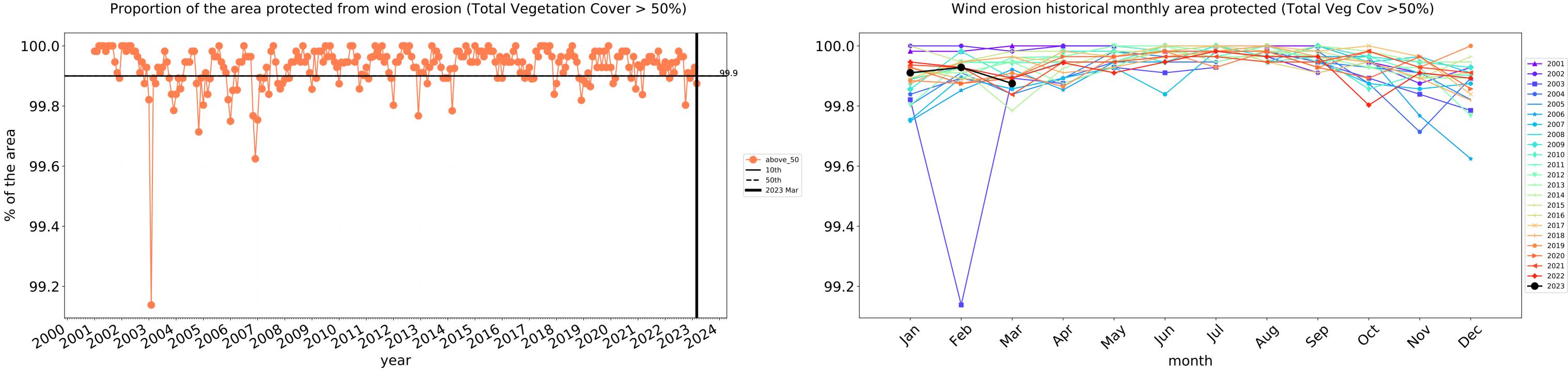
26 - 20 - 10 0 -10 -20

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.



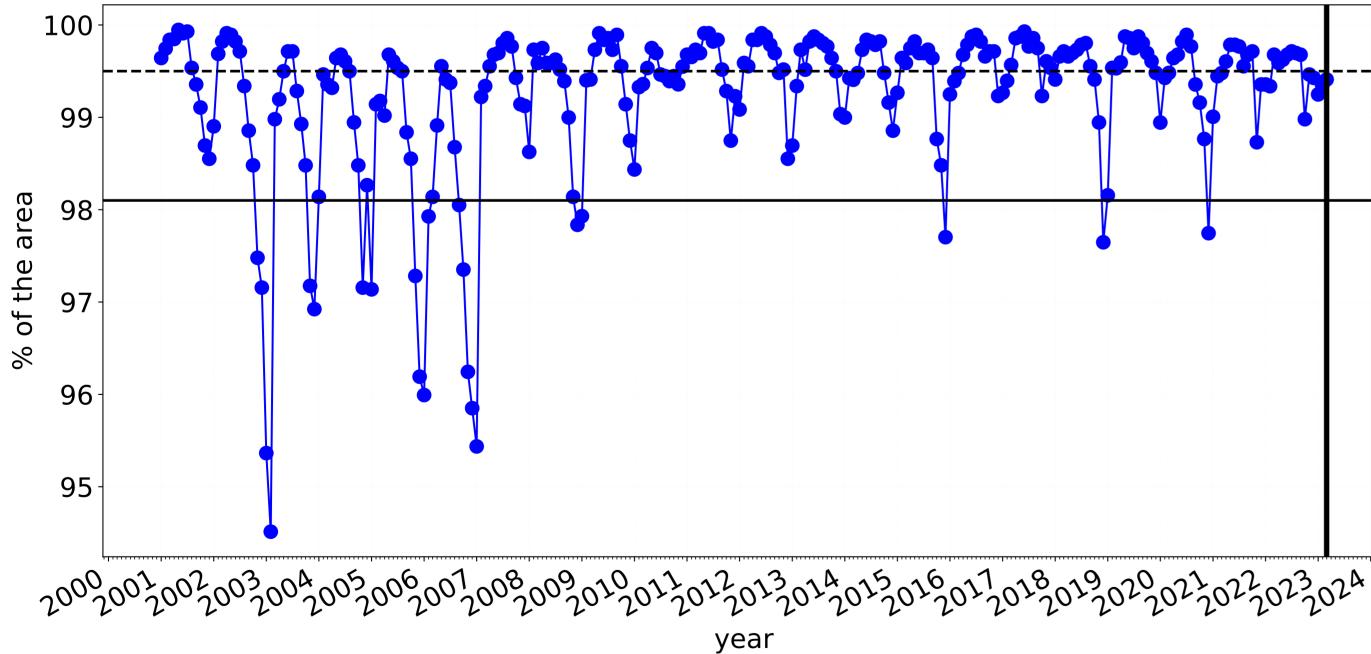


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



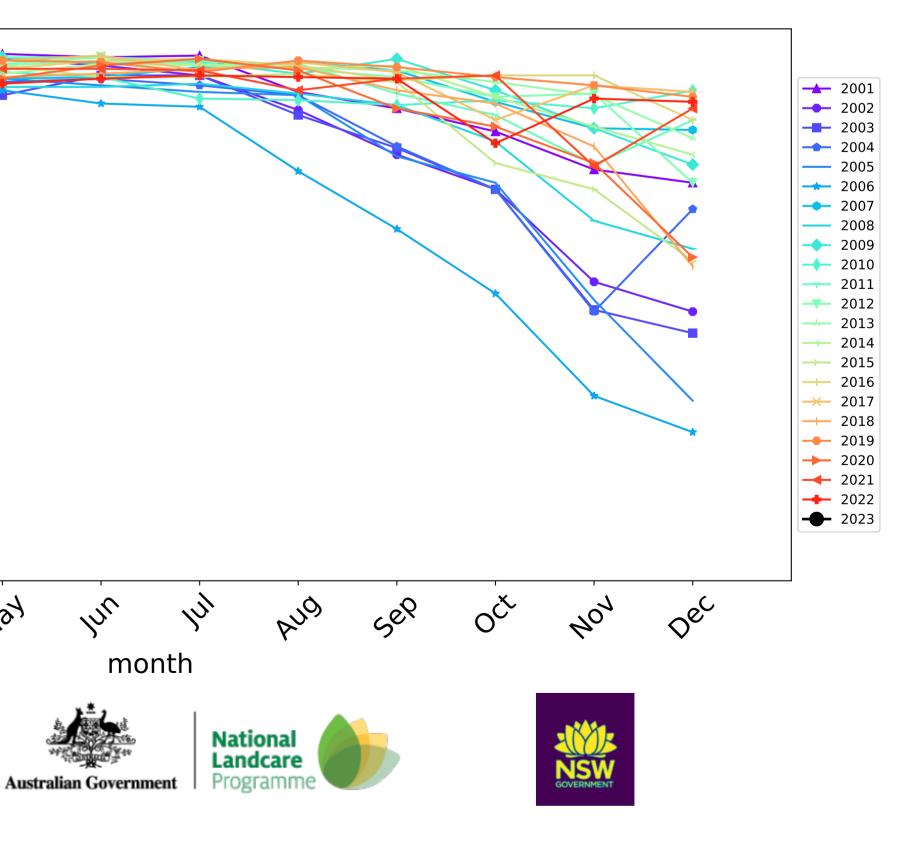
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

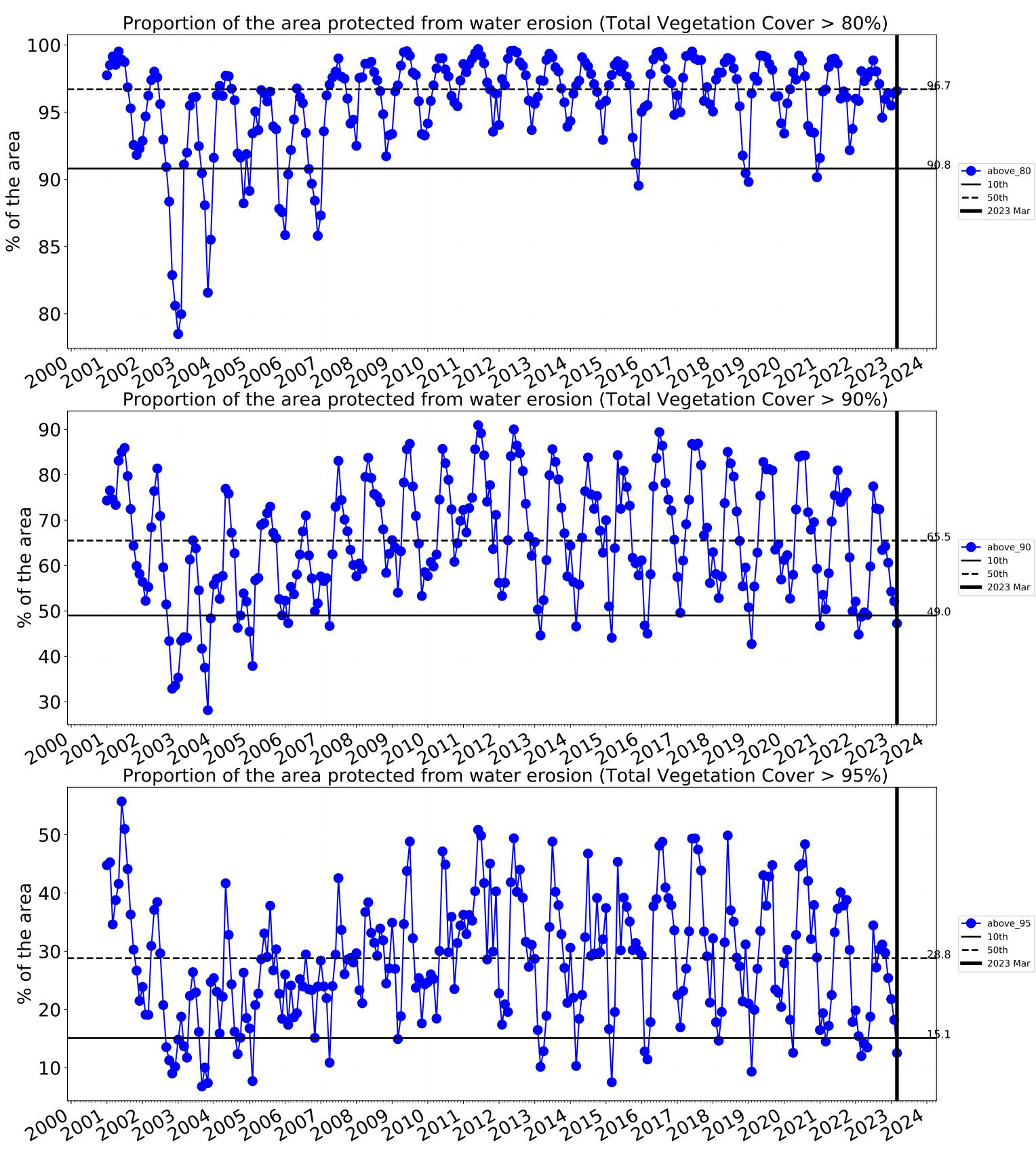


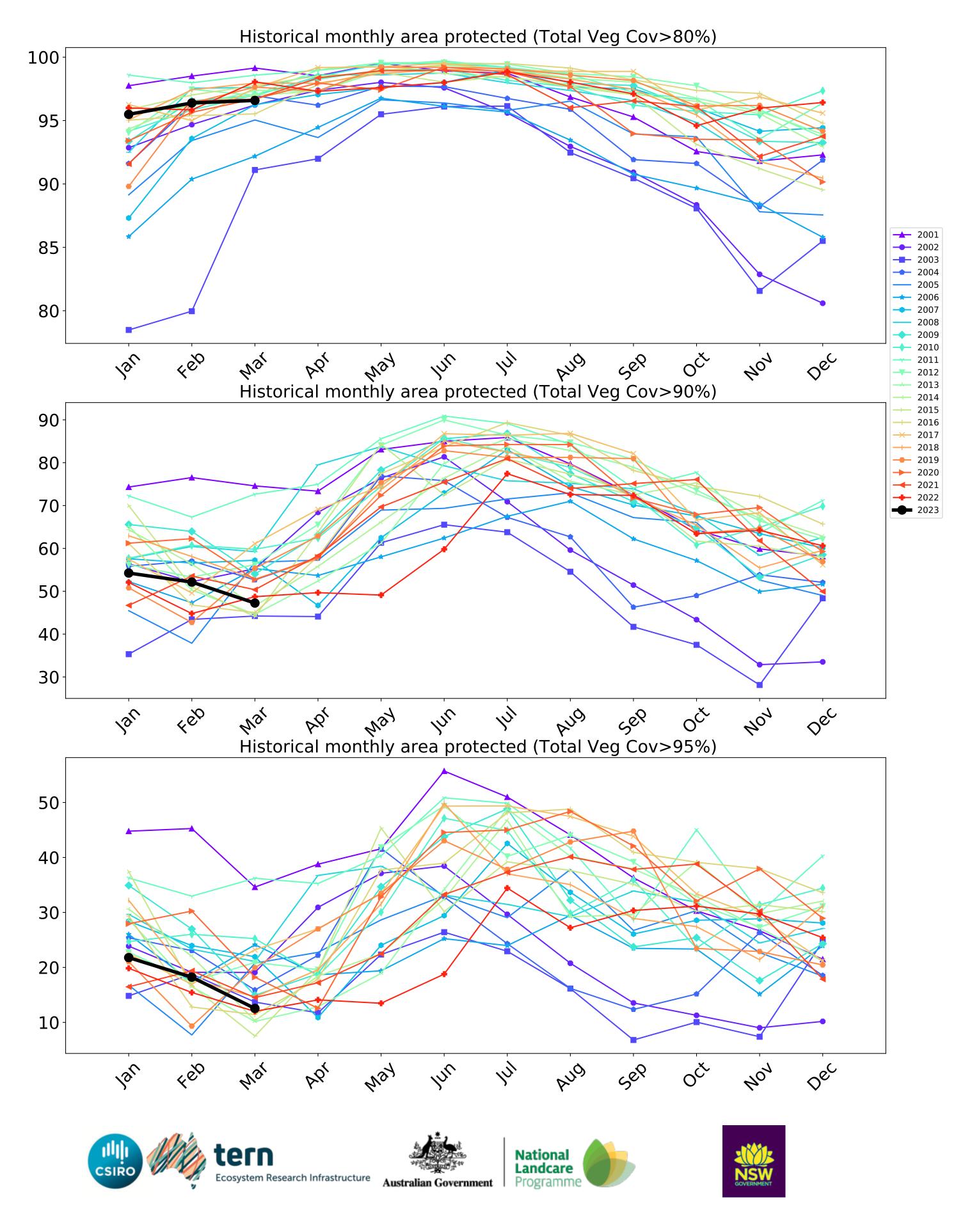


100-99 --- above_70 98 **—** 10th **——** 50th **—** 2023 Mar 97 96 95 4eb Jan PQ May In Mai month tern Ecosystem Research Infrastructure

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





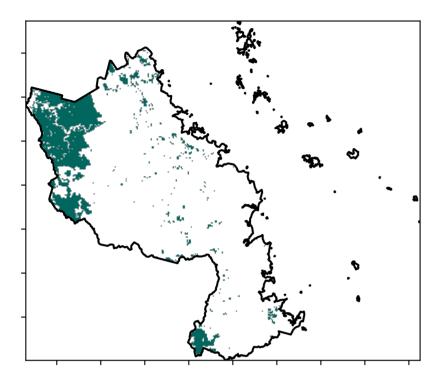


Grazing Woodland forest

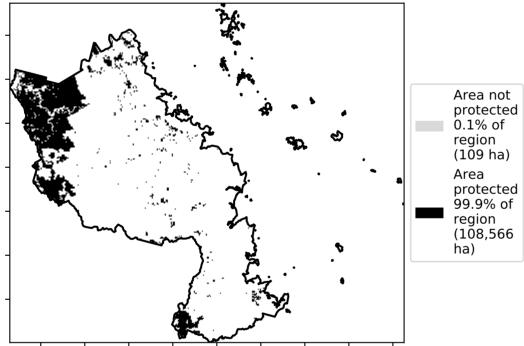
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018) 1 Agriculture - Grazing - Woodland forest

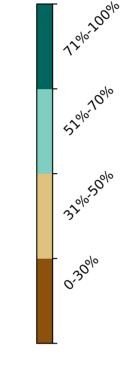
Total Vegetation Cover [%]

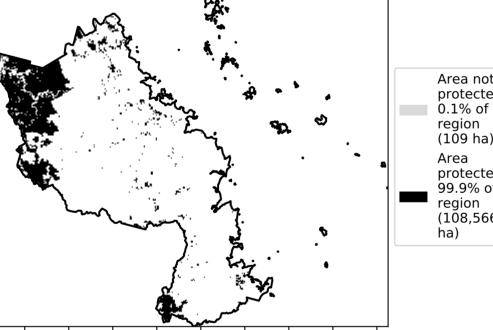
Land use and forest cover



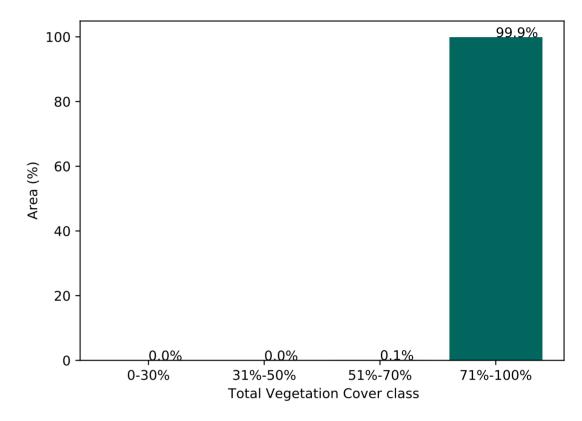
% Area protected from water erosion (>70%)



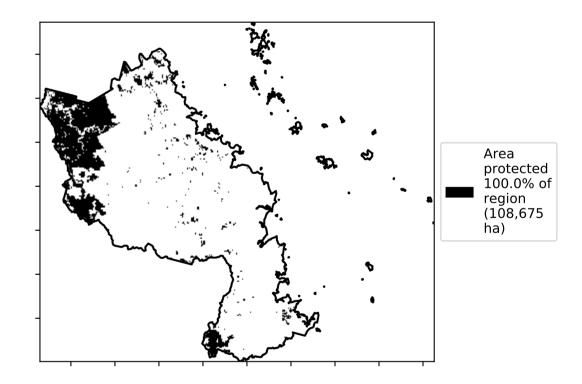




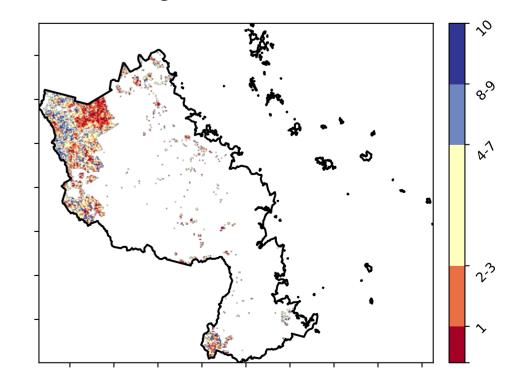
Proportion of vegetation cover class in area



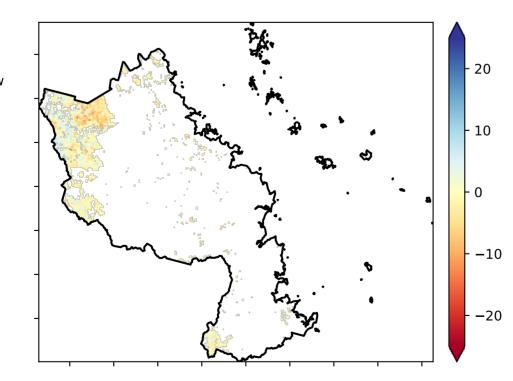
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

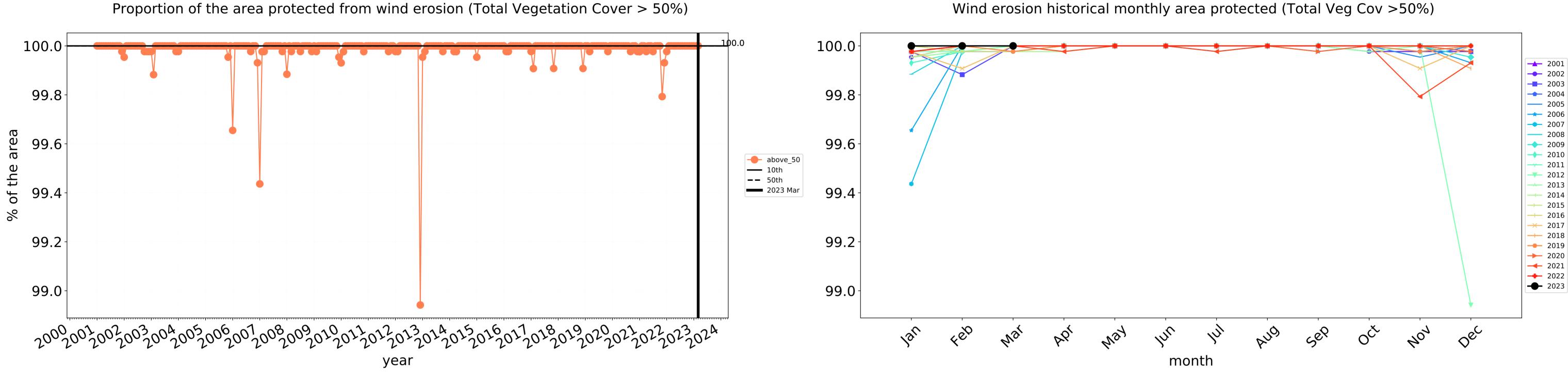


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

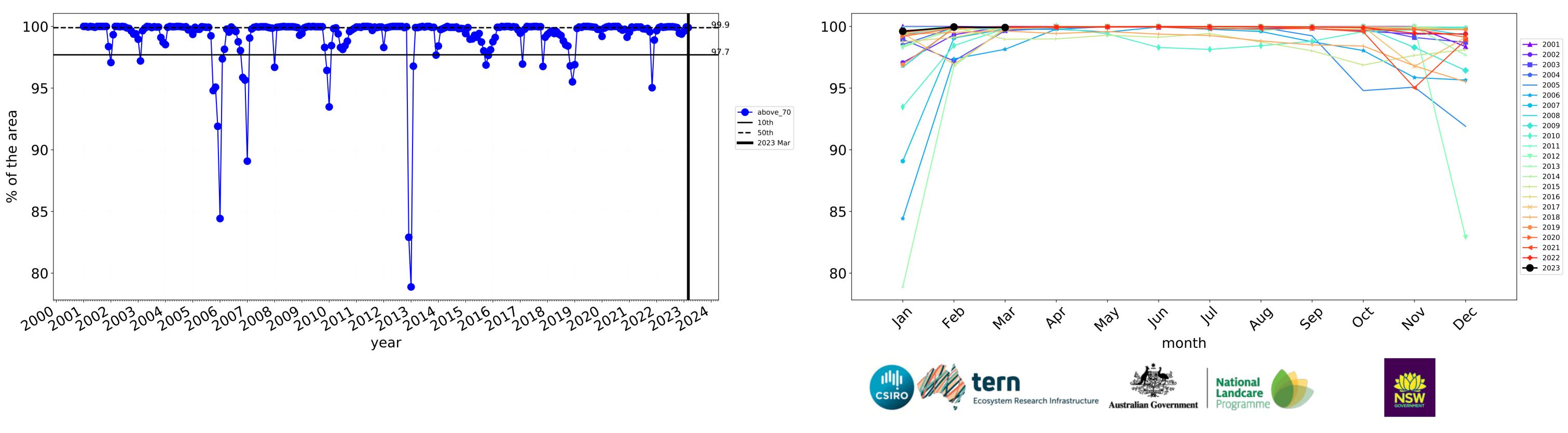




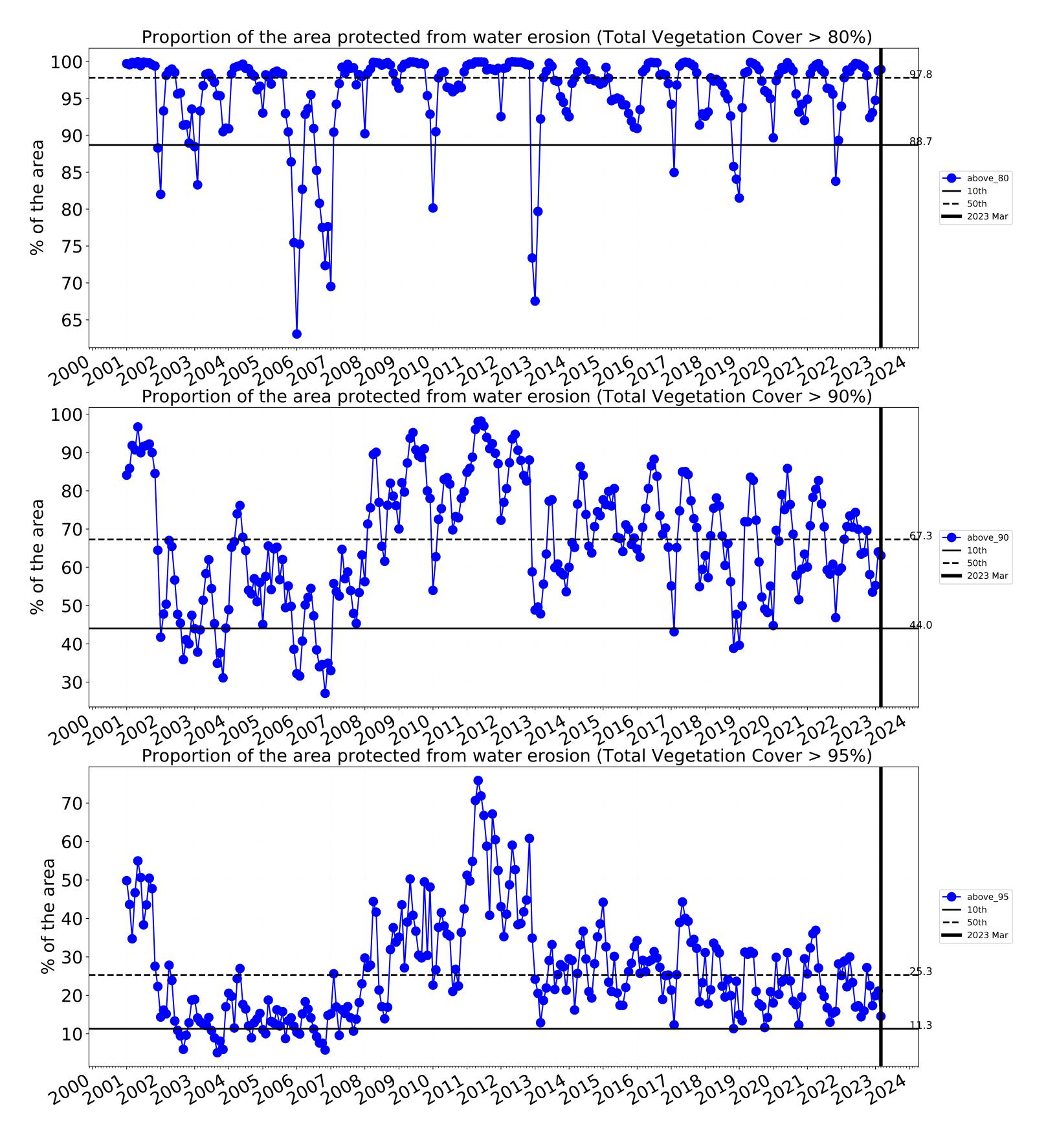
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

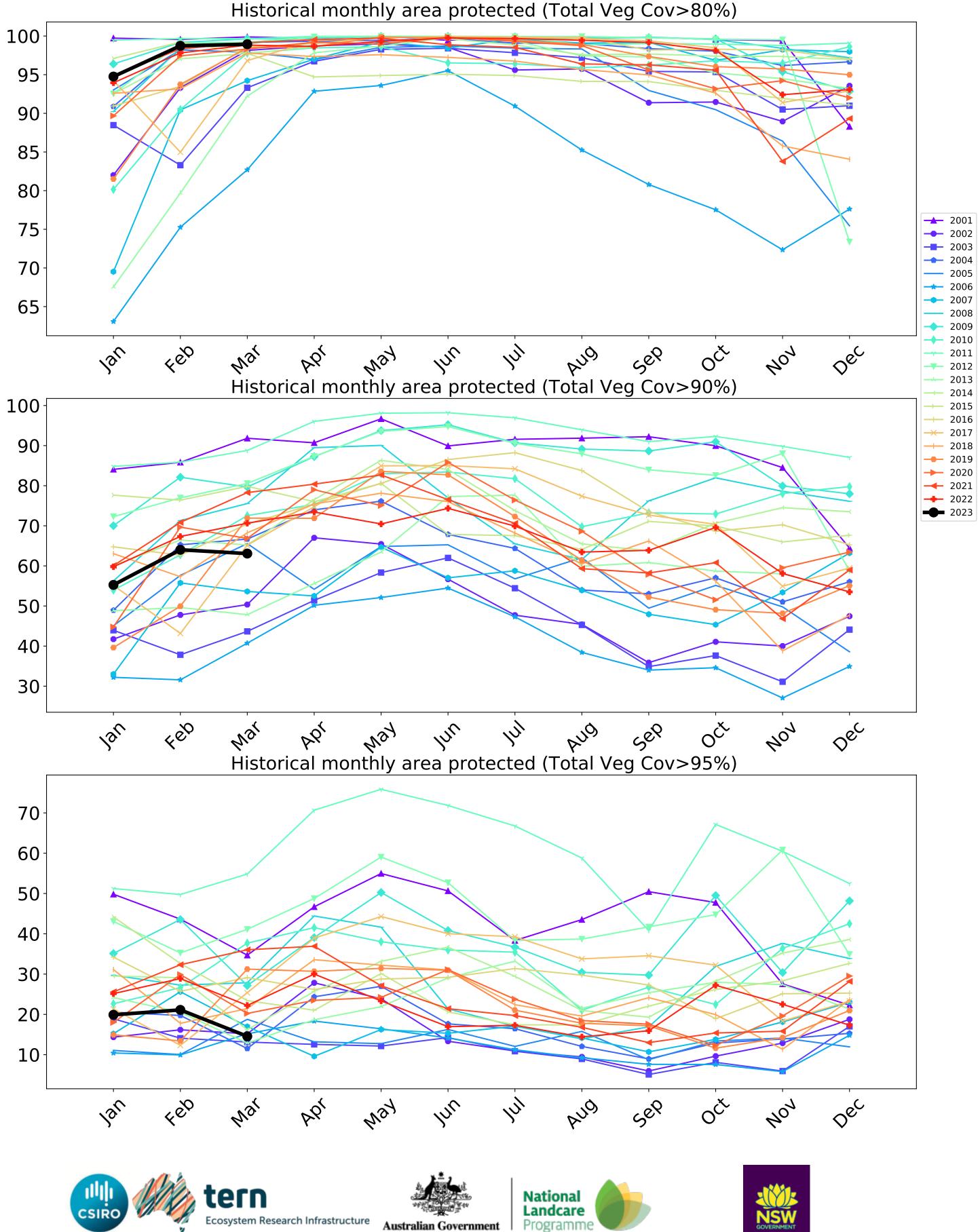


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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







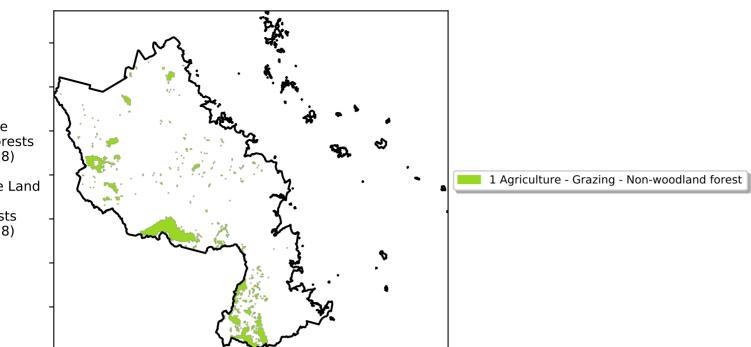
Grazing - Forest (non woodland)

12%100%

52°1070°10

· 3201050010

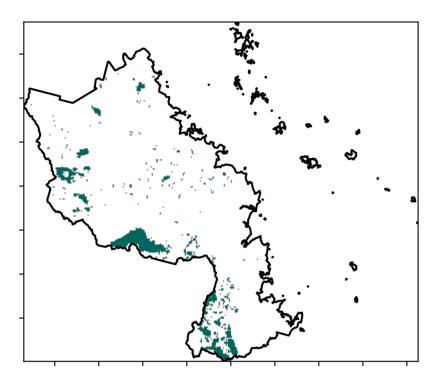
0.30%



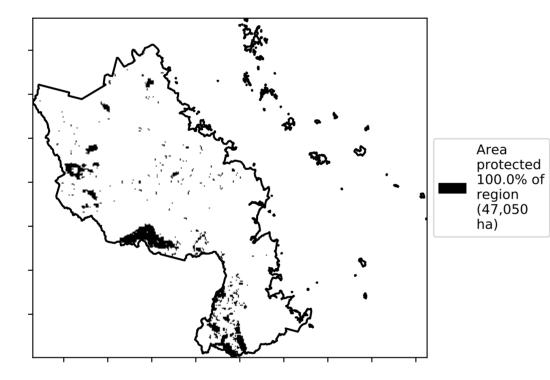
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Total Vegetation Cover [%]

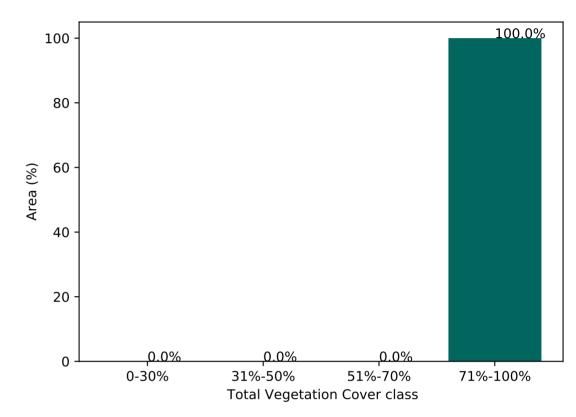
Land use and forest cover



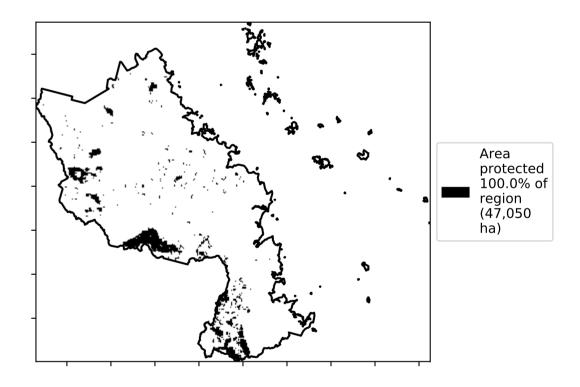
% Area protected from water erosion (>70%)



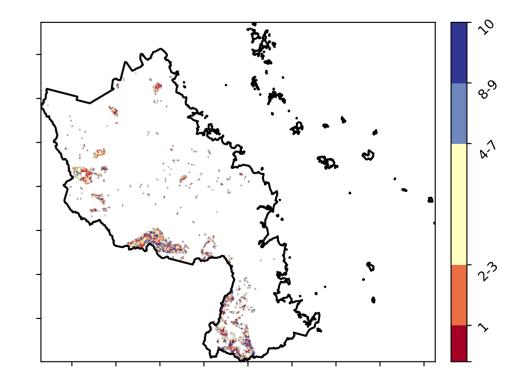
Proportion of vegetation cover class in area



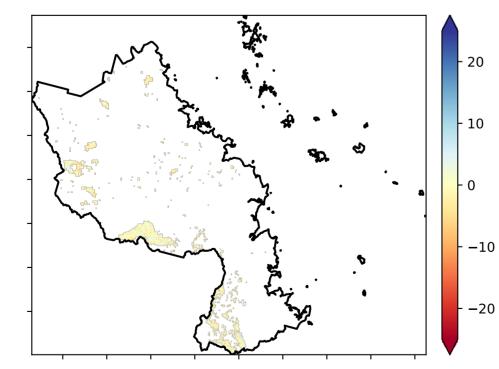
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



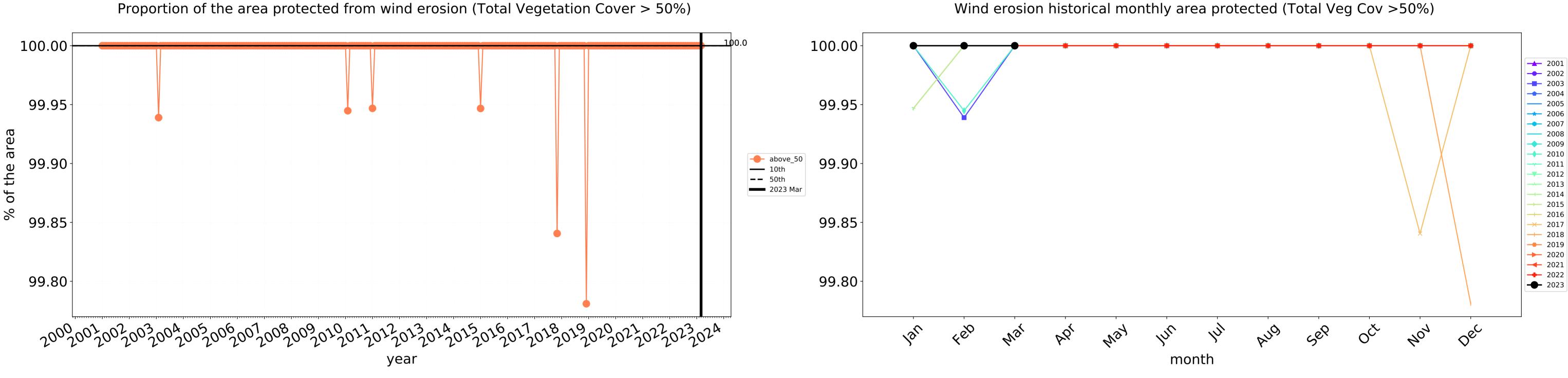
Total Vegetation Cover Anomaly [%]



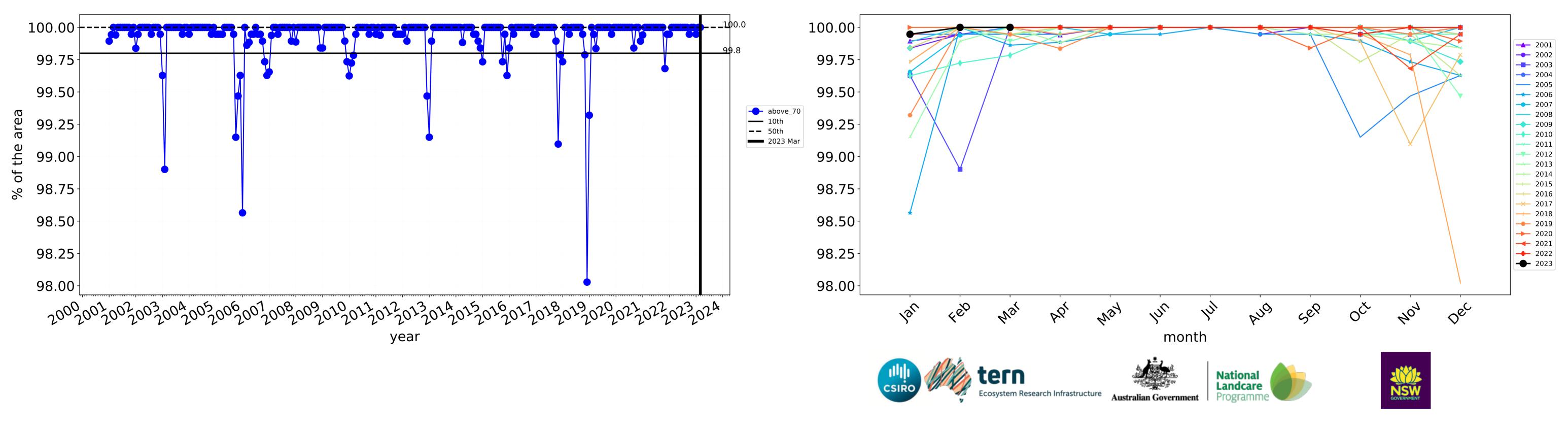
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



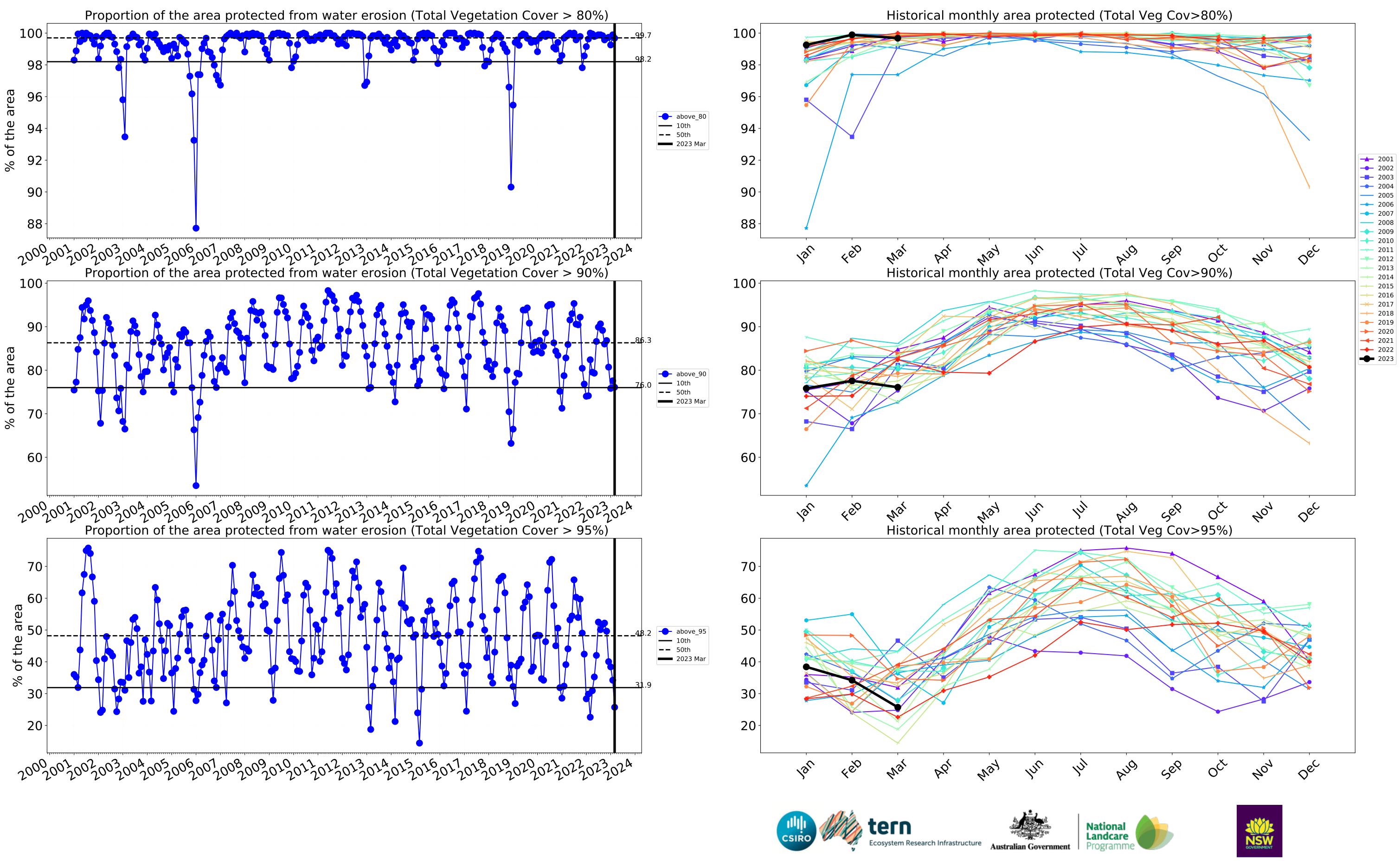
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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



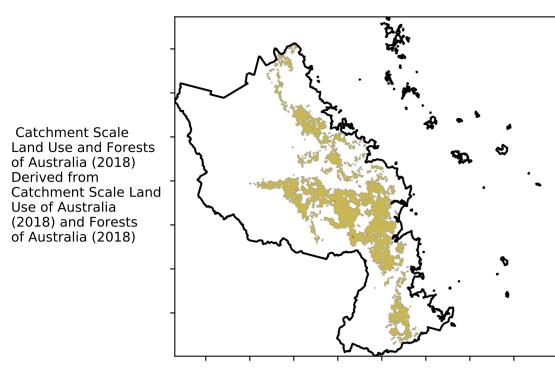
Water erosion historical monthly area protected (Total Veg Cov>70%)



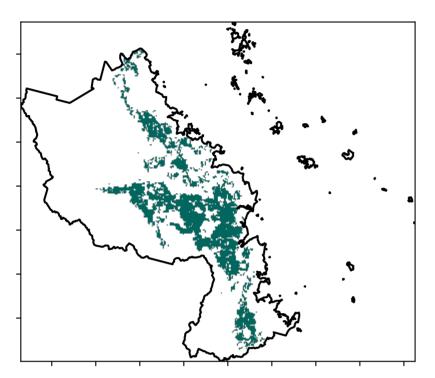


Irrigation

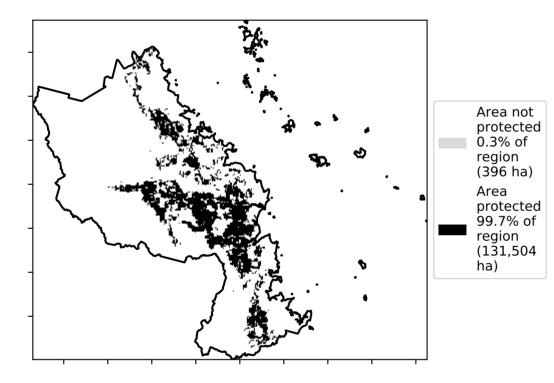
Land use and forest cover

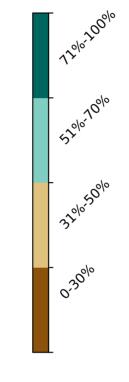


Total Vegetation Cover [%]

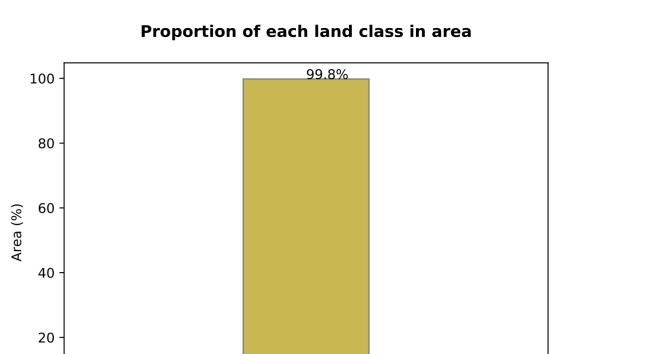


% Area protected from water erosion (>70%)





Agriculture - Grazing - Irrigated
Agriculture - Cropping - Irrigated
Agriculture - Horticulture - Irrigated



Proportion of vegetation cover class in area

1.0

Land use class

1.5

0.2%

2.0

2.5

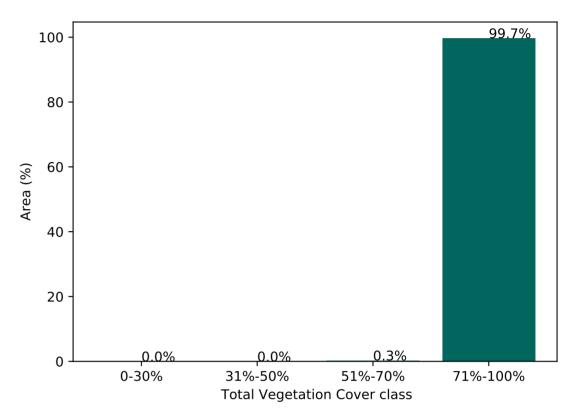
0.0%

0.5

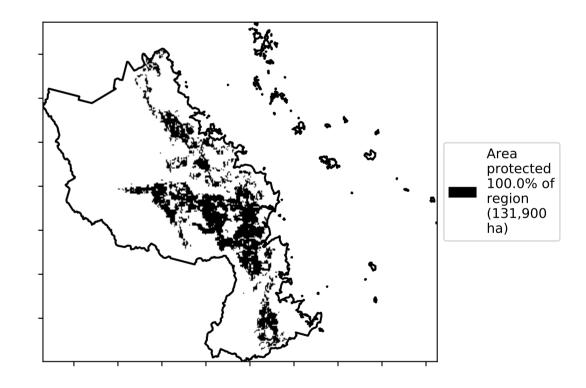
0.0

0

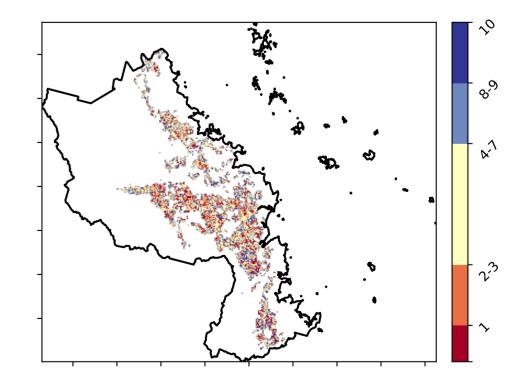
-0.5



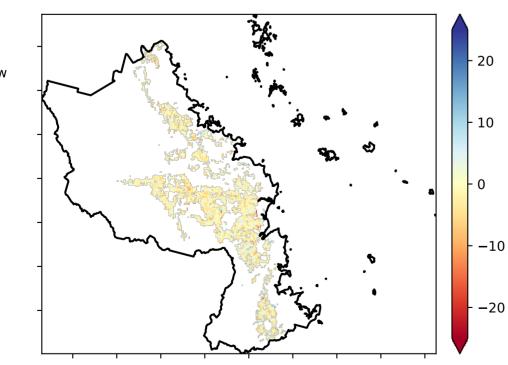
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

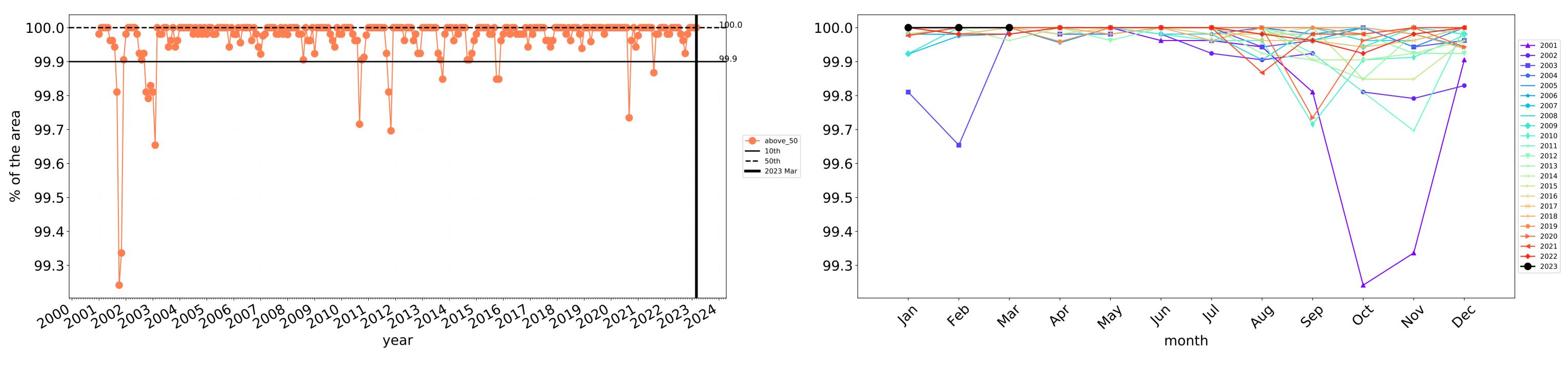


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

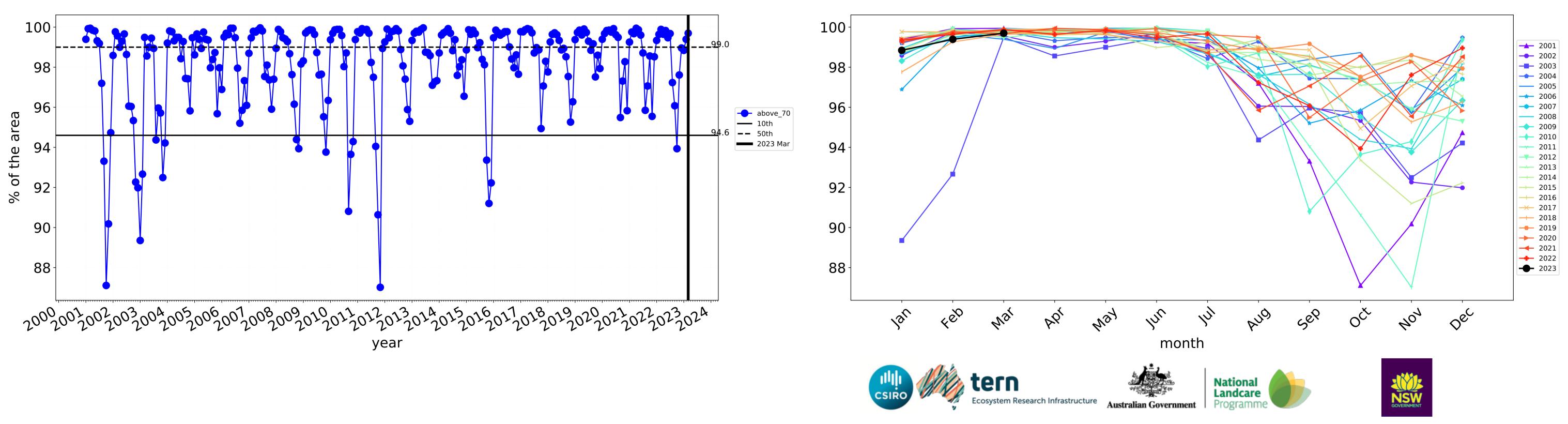


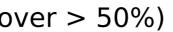


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



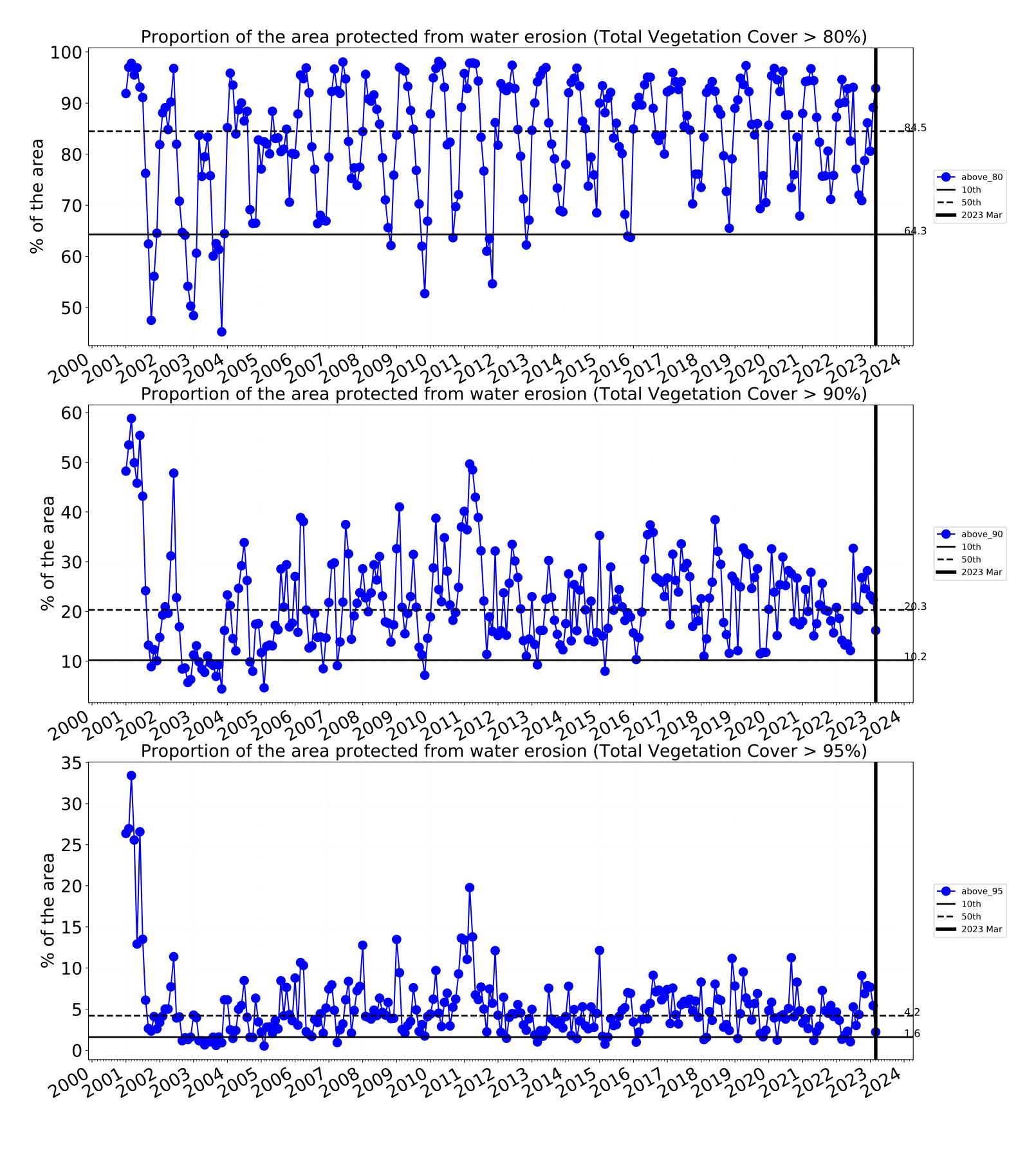
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

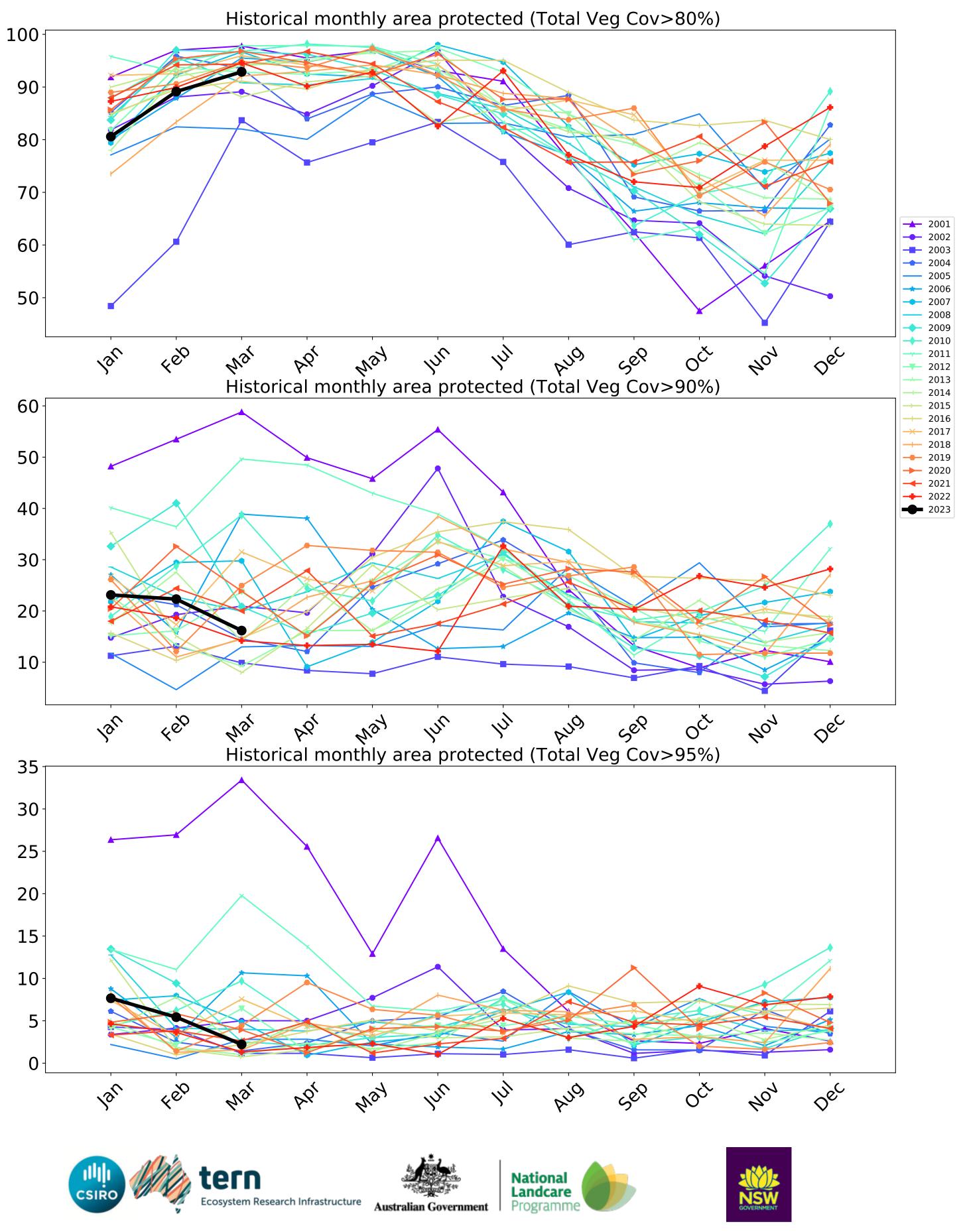




Wind erosion historical monthly area protected (Total Veg Cov >50%)

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



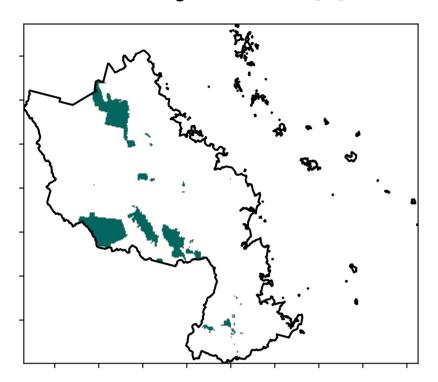


Production native forests and plantation forests

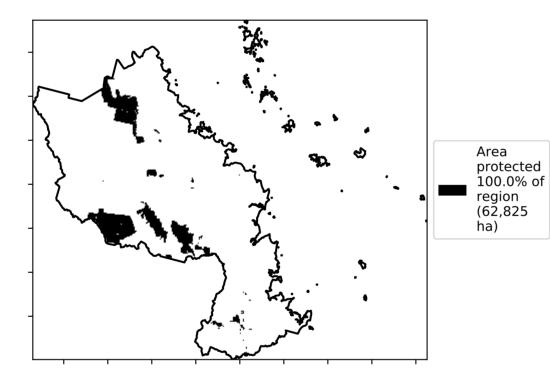
Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Production native forests and plantation forests Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

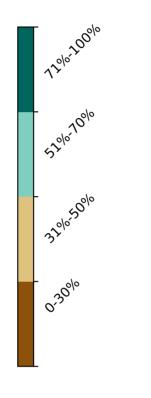
Total Vegetation Cover [%]

Land use and forest cover

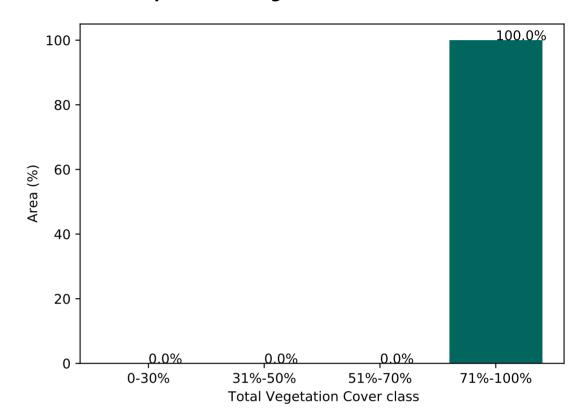


% Area protected from water erosion (>70%)

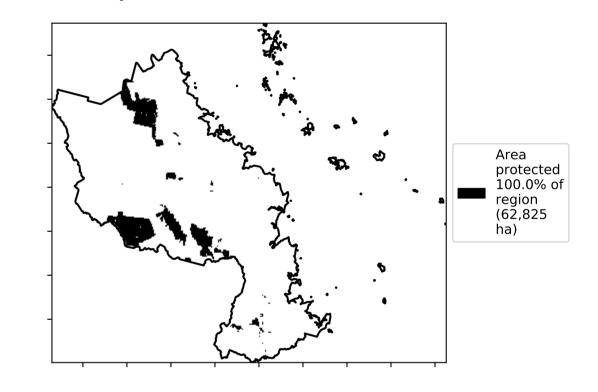




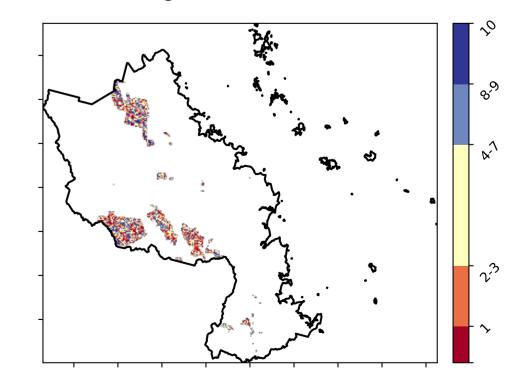
Proportion of vegetation cover class in area



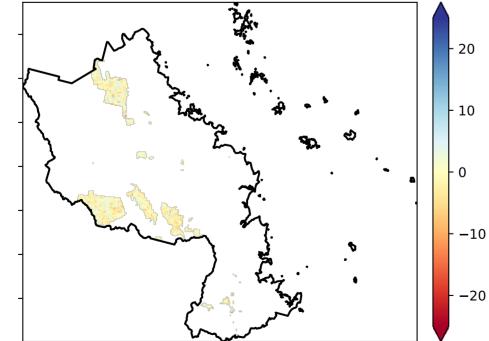
% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]



CSIRC



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.





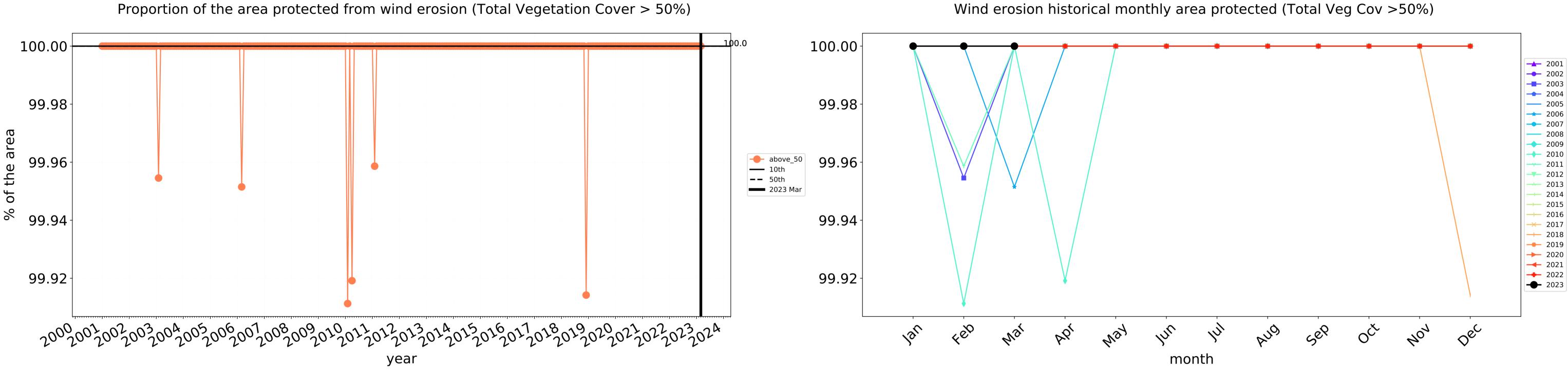
are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

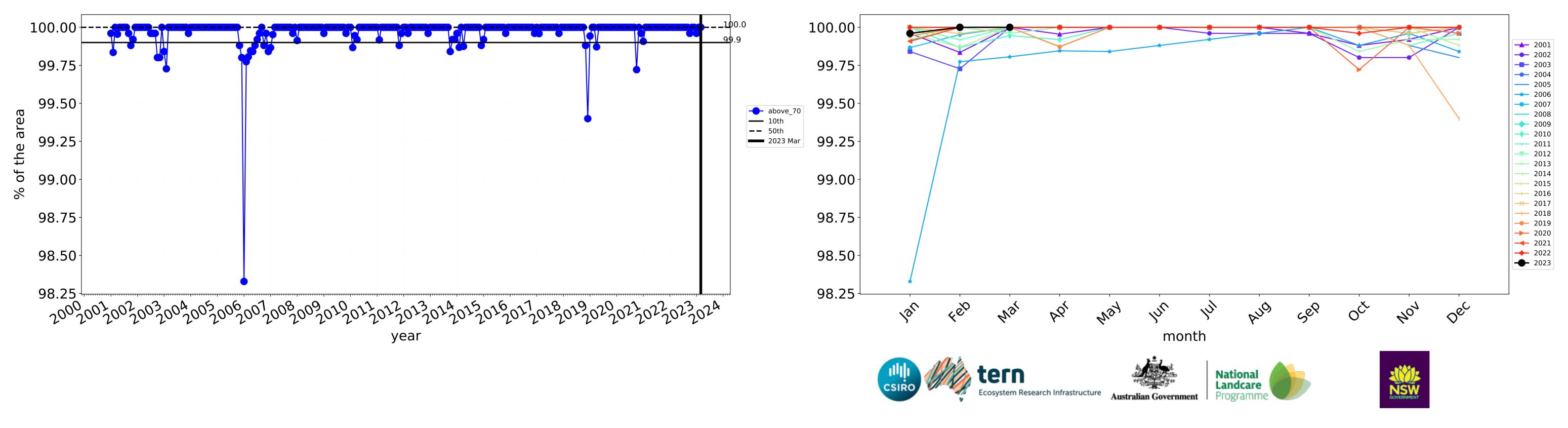
Anomaly show how many percetage points each pixel is from the mean That

the mean. That

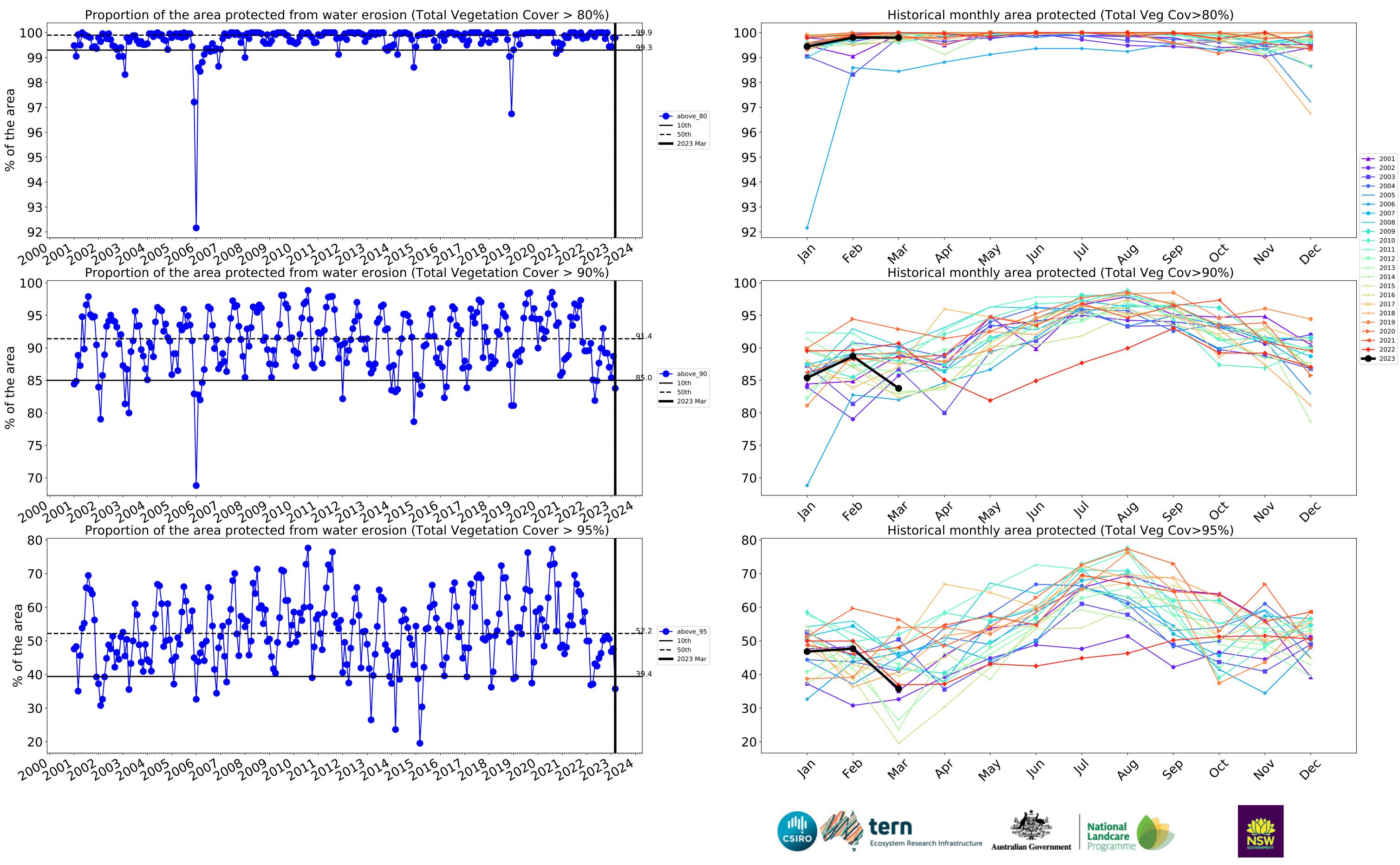
is, red pixels

Production native forests and plantation forests timeseries





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





Mackay_(R) (748,500 ha and no data 12,811 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	748,500	99.9% 748,125	99.7% 746,625	98.6% 738,125	94.7% 708,675	54.0% 404,025	18.2% 136,175
Conservation and natural environments	192,800	100.0% 192,775	99.7% 192,250	98.9% 190,700	97.4% 187,875	74.0% 142,750	30.7% 59,150
Conservation and natural environments non forest	4,925	100.0% 4,925	97.5% 4,800	89.3% 4,400	77.2% 3,800	46.7% 2,300	27.4% 1,350
Conservation and natural environments Woodland forest	37,425	99.9% 37,400	99.8% 37,350	98.4% 36,825	95.7% 35,825	65.9% 24,675	23.2% 8,700
Conservation and natural environments Forest (non woodland)	150,450	100.0% 150,450	99.8% 150,100	99.4% 149,475	98.5% 148,250	77.0% 115,775	32.6% 49,100
Agriculture	428,075	100.0% 428,050	100.0% 427,900	99.7% 426,750	96.4% 412,600	44.9% 192,100	11.3% 48,550
Grazing	295,575	100.0% 295,550	99.9% 295,400	99.7% 294,650	97.9% 289,500	57.7% 170,425	15.4% 45,450
Grazing non forest	139,850	100.0% 139,825	99.9% 139,675	99.4% 139,025	96.6% 135,075	47.2% 66,075	12.5% 17,525
Grazing Woodland forest	108,675	100.0% 108,675	100.0% 108,675	99.9% 108,575	98.9% 107,525	63.1% 68,550	14.6% 15,825
Grazing - Forest (non woodland)	47,050	100.0% 47,050	100.0% 47,050	100.0% 47,050	99.7% 46,900	76.1% 35,800	25.7% 12,100
Irrigation	131,900	100.0% 131,900	100.0% 131,900	99.7% 131,500	92.9% 122,500	16.2% 21,325	2.2% 2,925
Production native forests and plantation forests	62,825	100.0% 62,825	100.0% 62,825	100.0% 62,825	99.8% 62,700	83.8% 52,625	35.7% 22,450

