Total vegetation cover soil protection Region:NRM Riverina NSW

Date: February 2020

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:

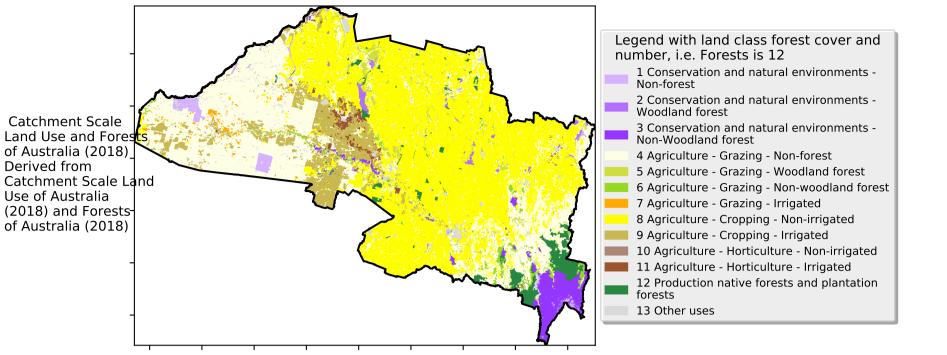
https://doi.org/10.4225/08/5848a3f19a7b3



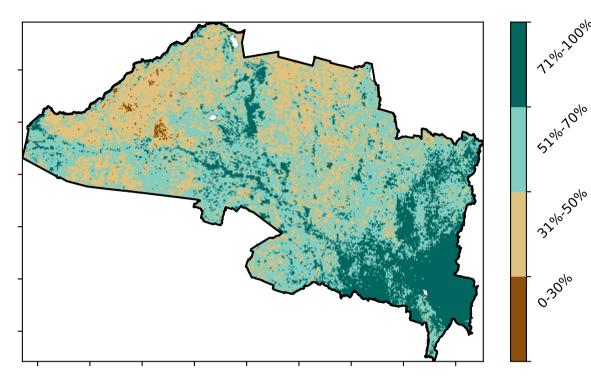
Vegetation Cover Feb 2020

Land use and forest cover

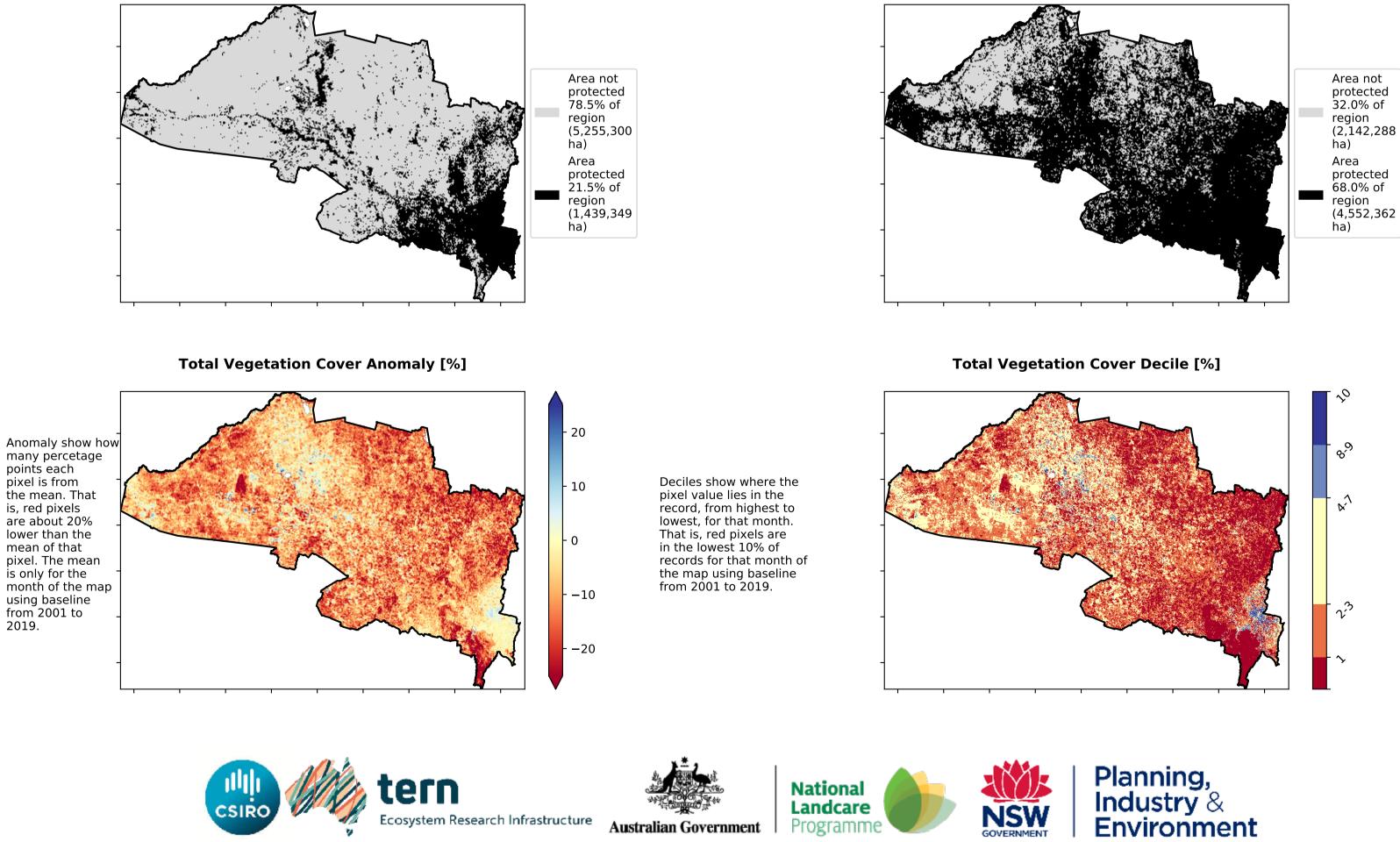
Proportion of each land class in area

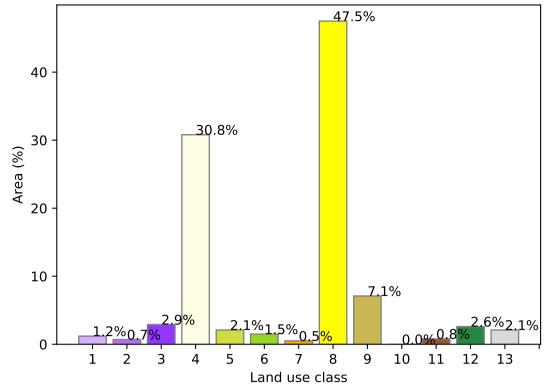


Total Vegetation Cover [%]

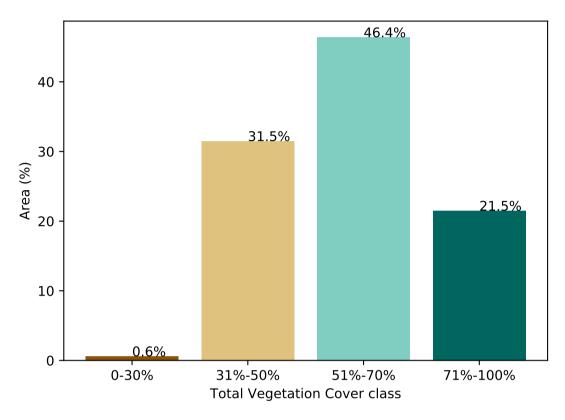


% Area protected from water erosion (>70%)

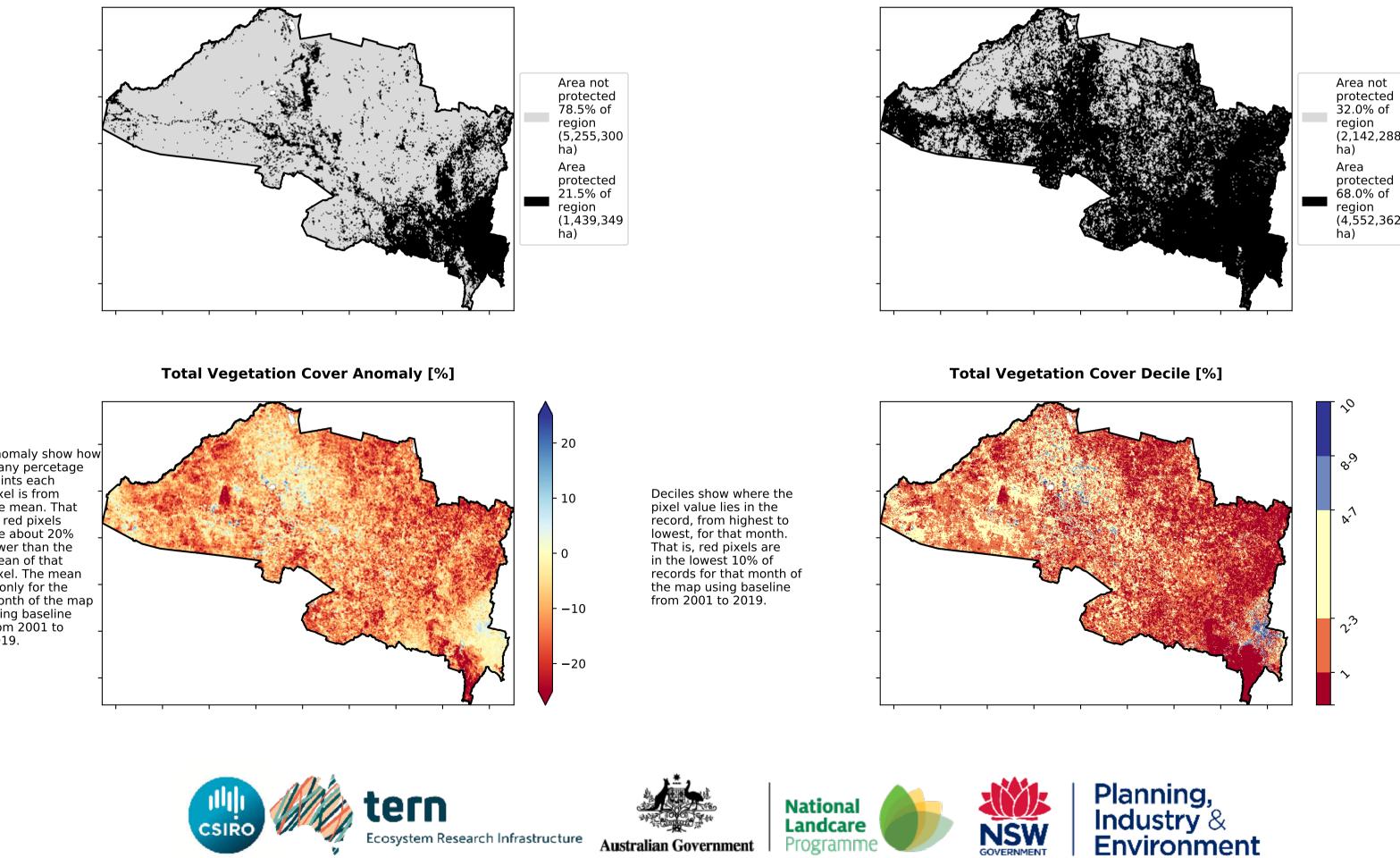


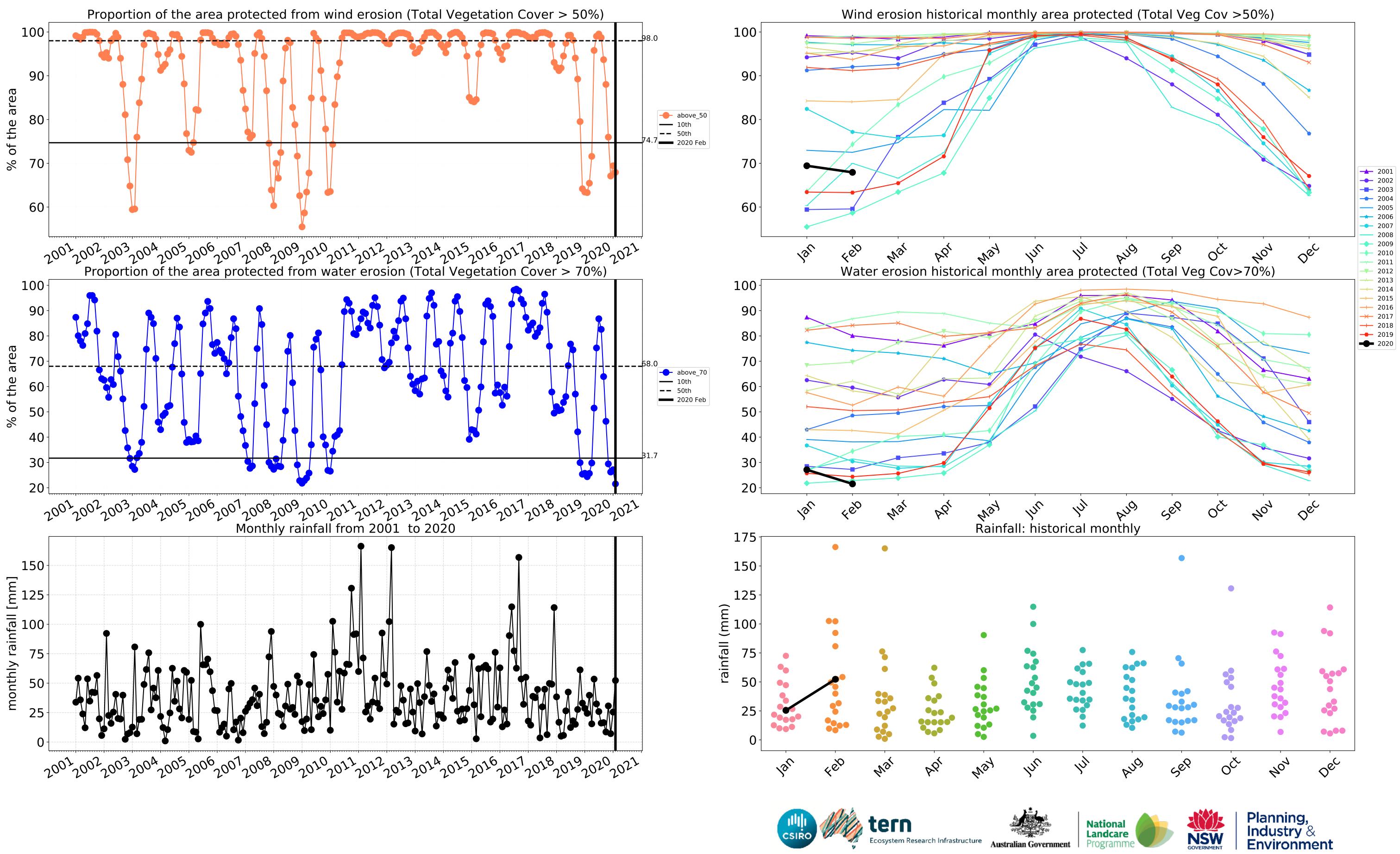


Proportion of vegetation cover class in area



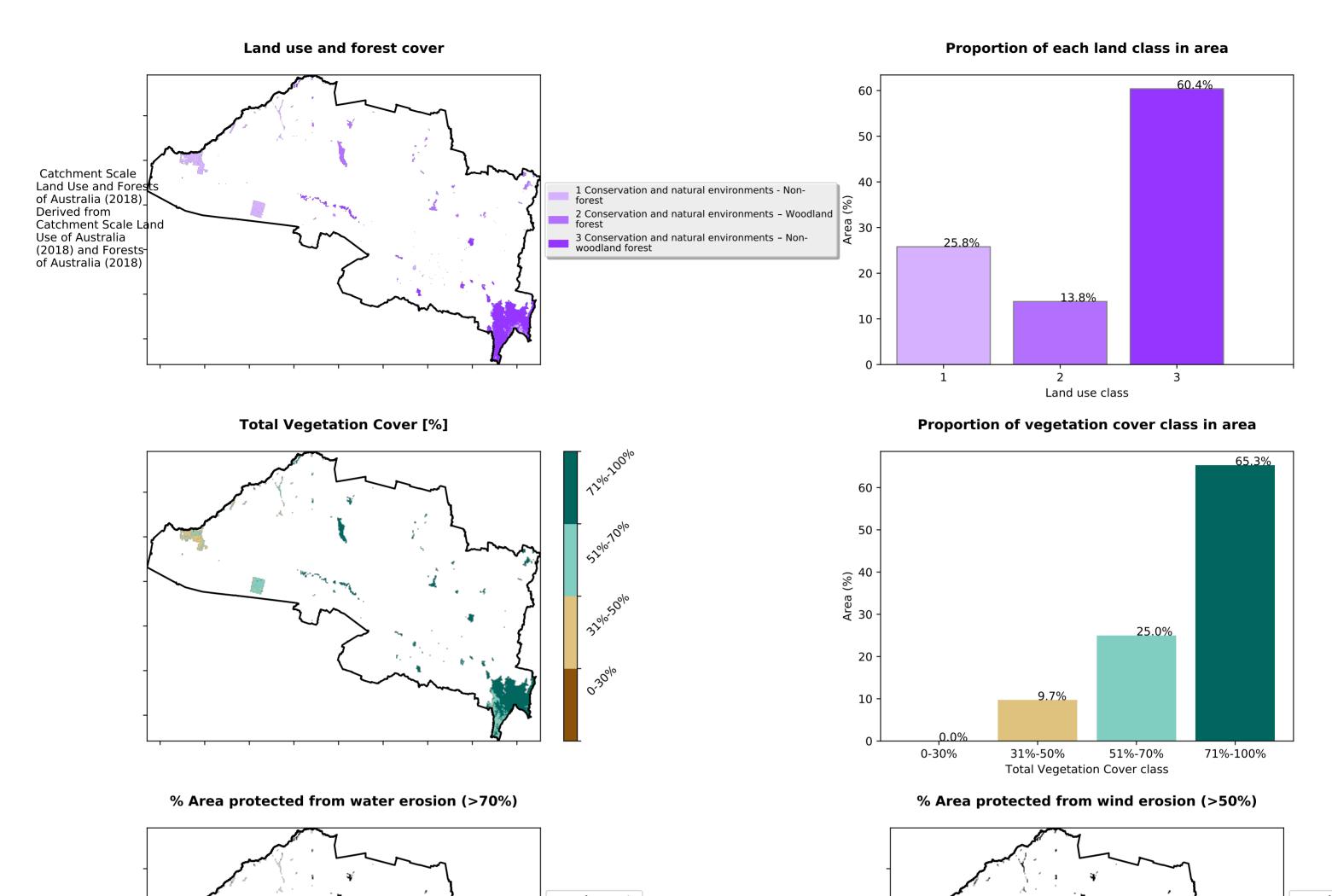
% Area protected from wind erosion (>50%)



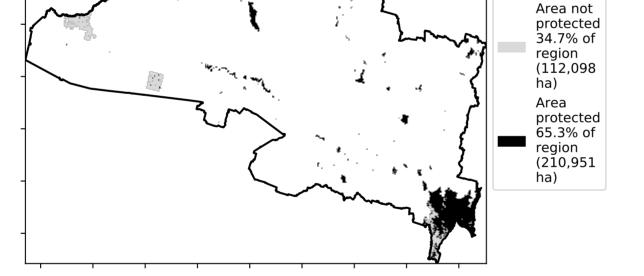


Ecosystem Research Infrastructure Australian Government

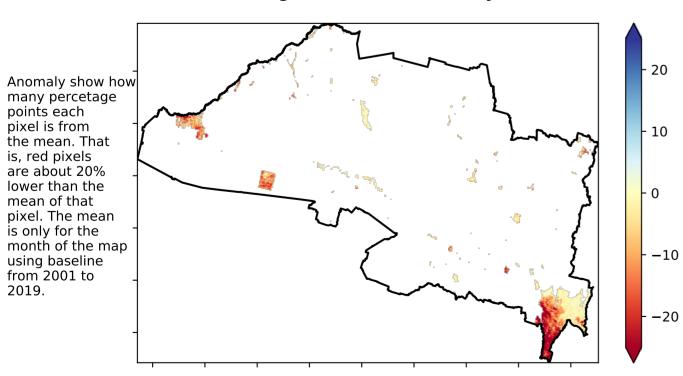
Conservation and natural environments



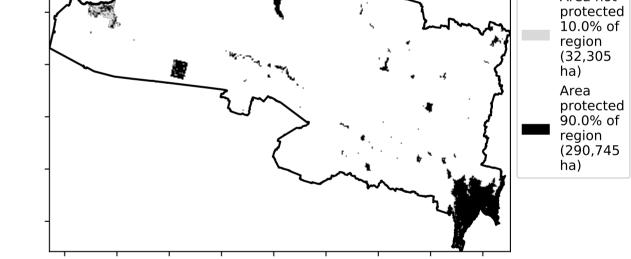
Area not



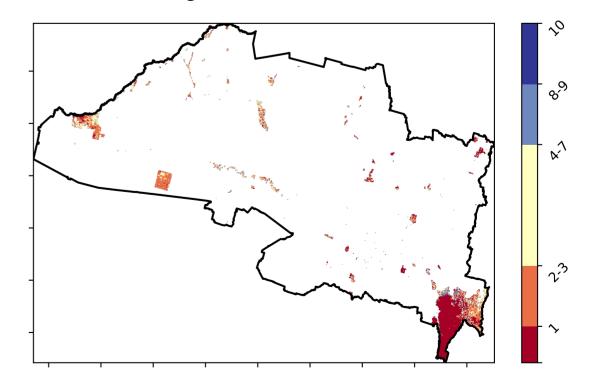
Total Vegetation Cover Anomaly [%]



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.

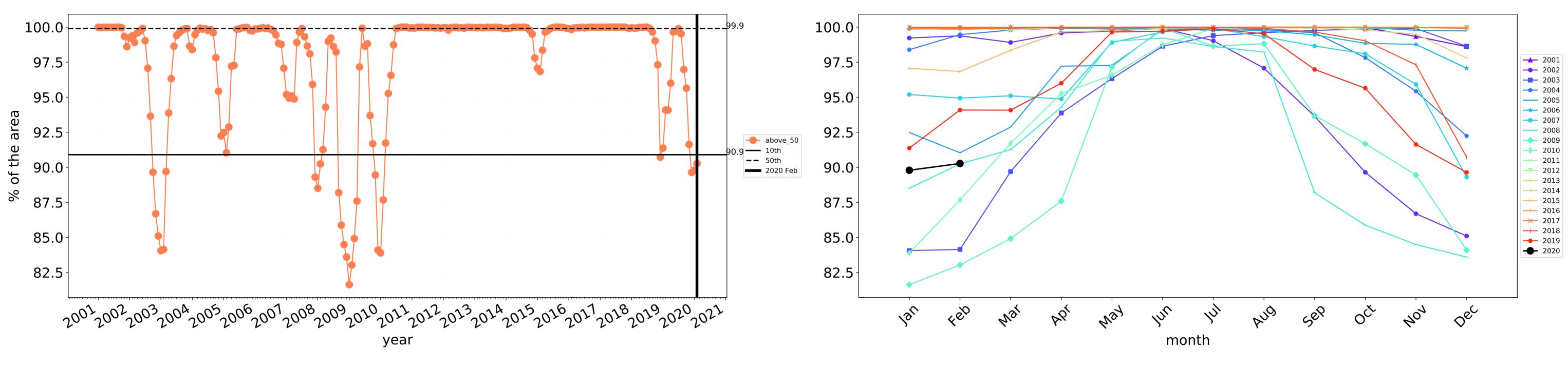


Total Vegetation Cover Decile [%]



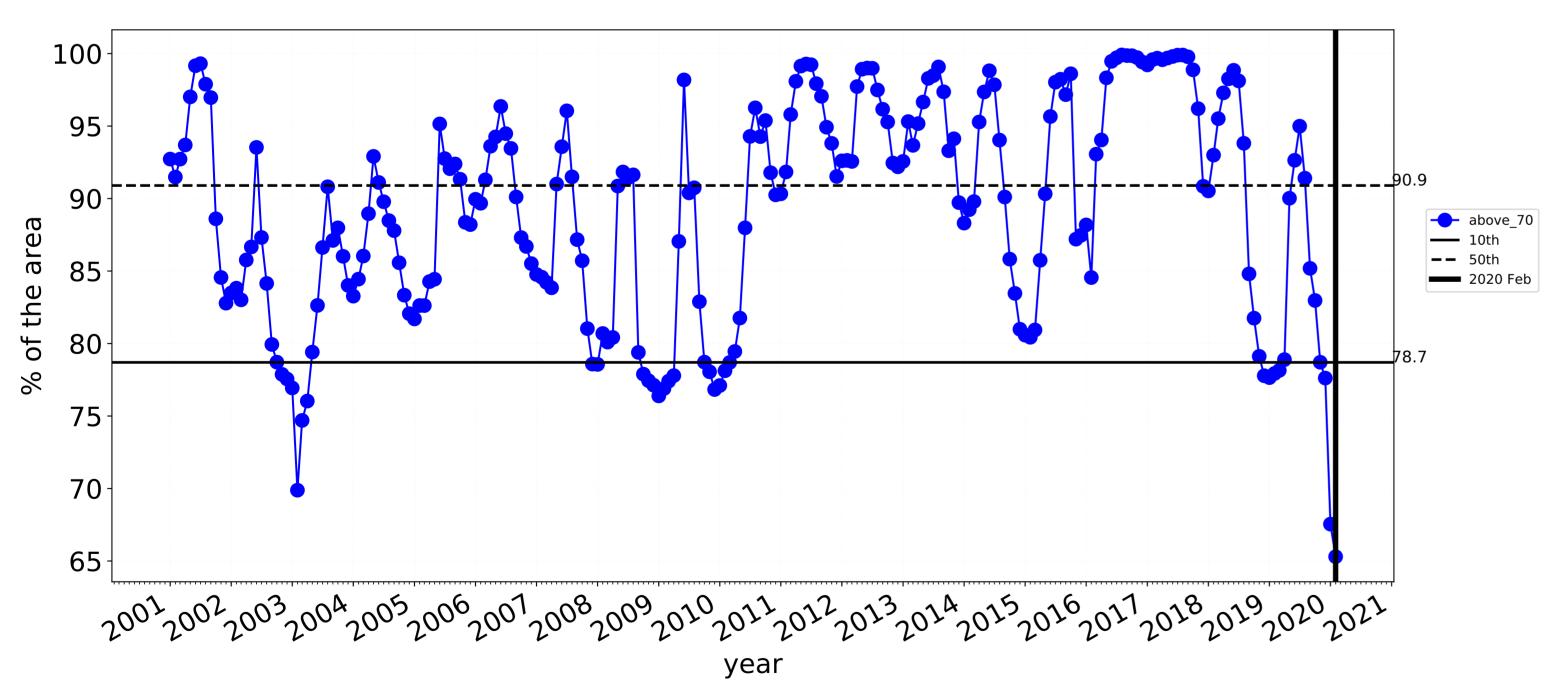


<u>2</u>

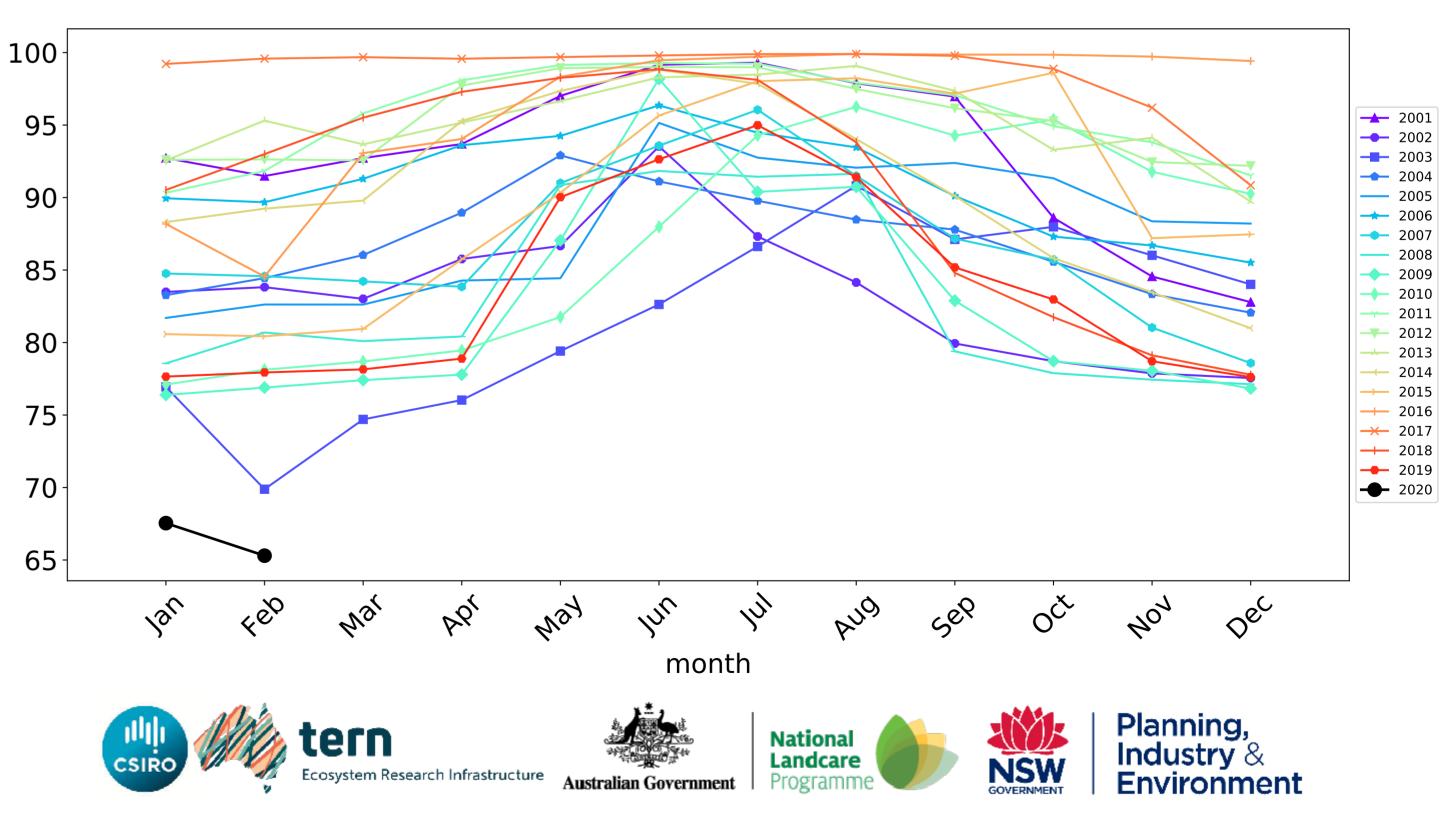


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

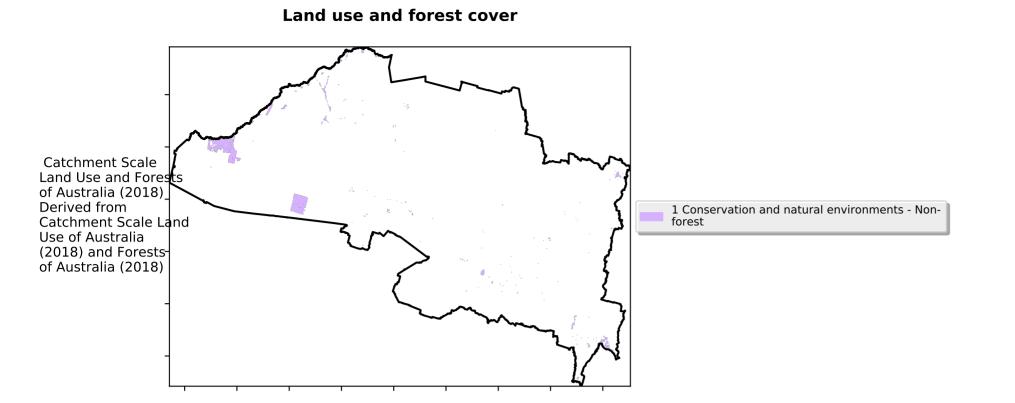
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



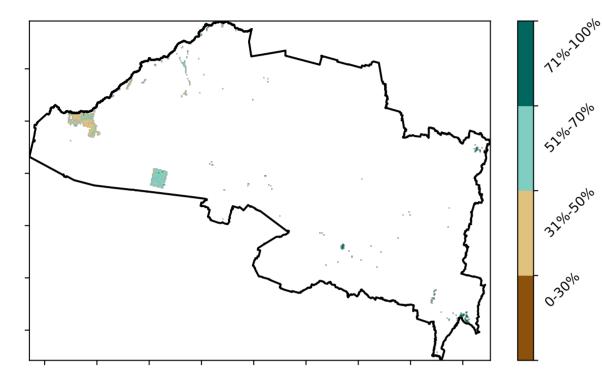
Wind erosion historical monthly area protected (Total Veg Cov >50%)



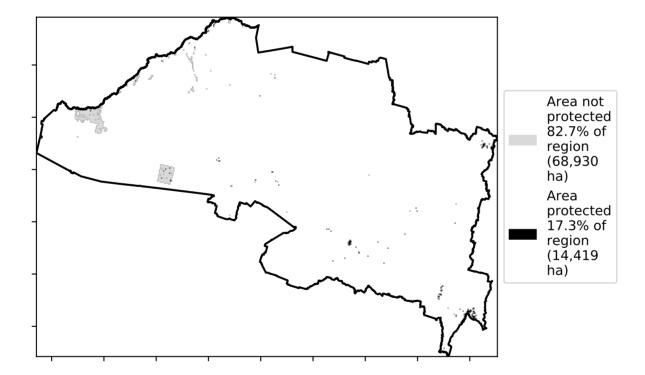
Conservation and natural environments non forest

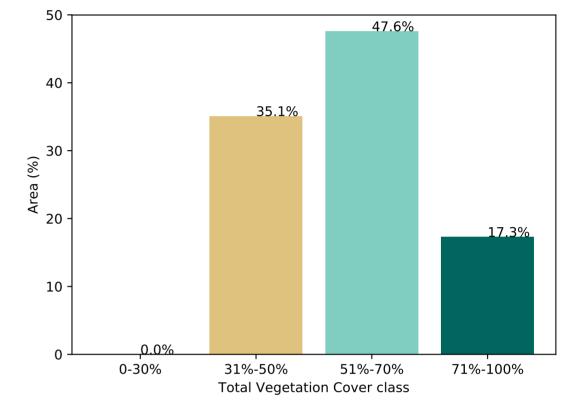


Total Vegetation Cover [%]

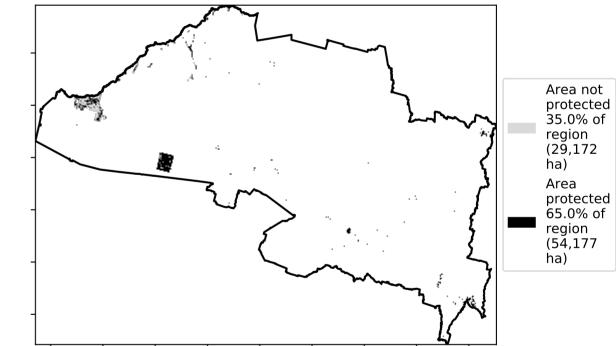


% Area protected from water erosion (>70%)



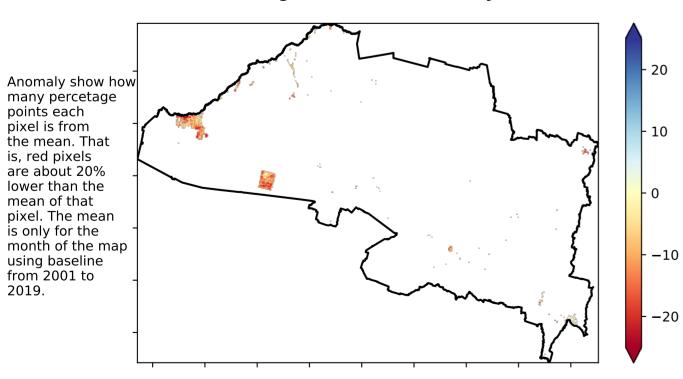


% Area protected from wind erosion (>50%)



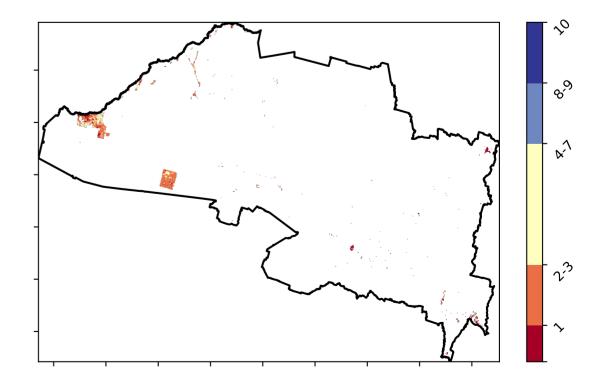
Proportion of vegetation cover class in area

Total Vegetation Cover Anomaly [%]



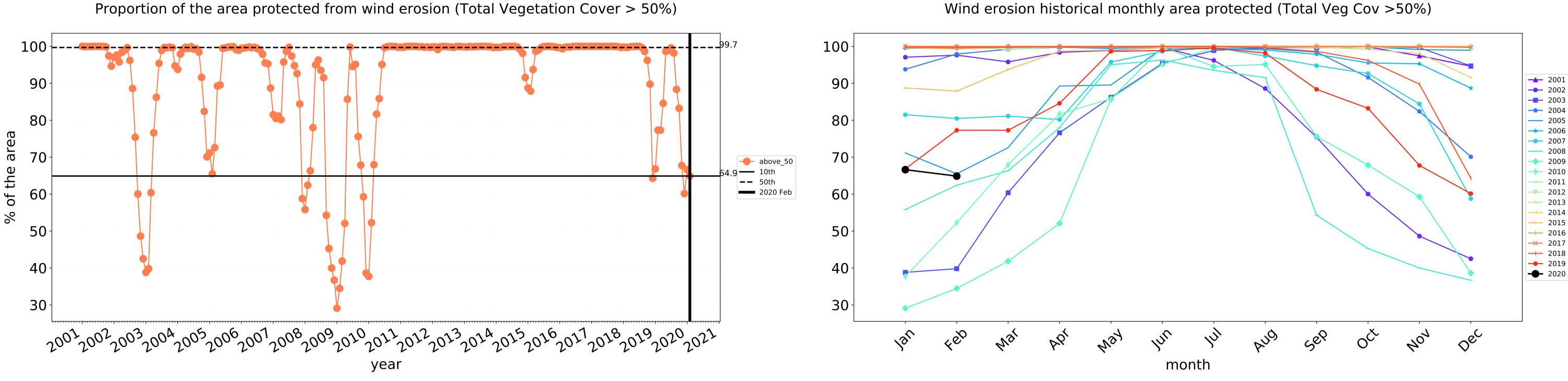
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]



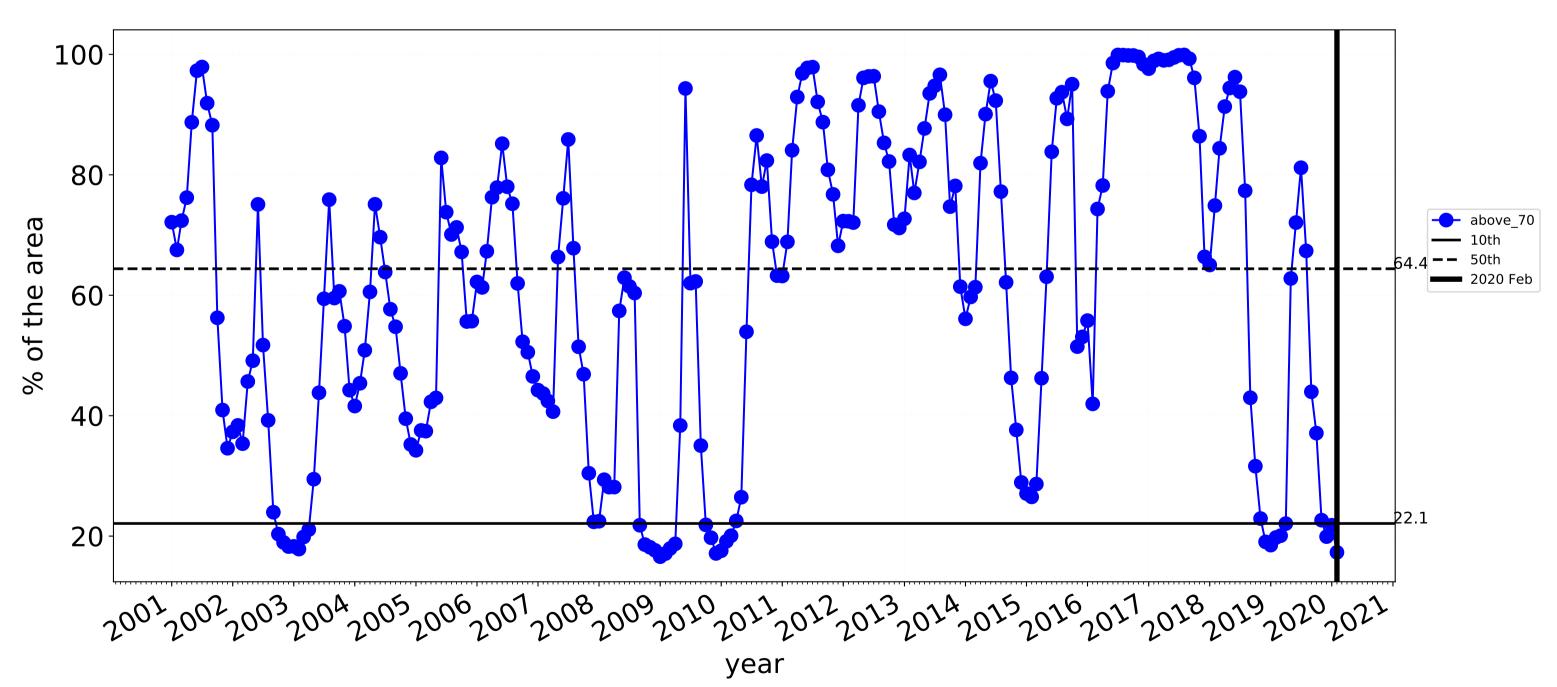


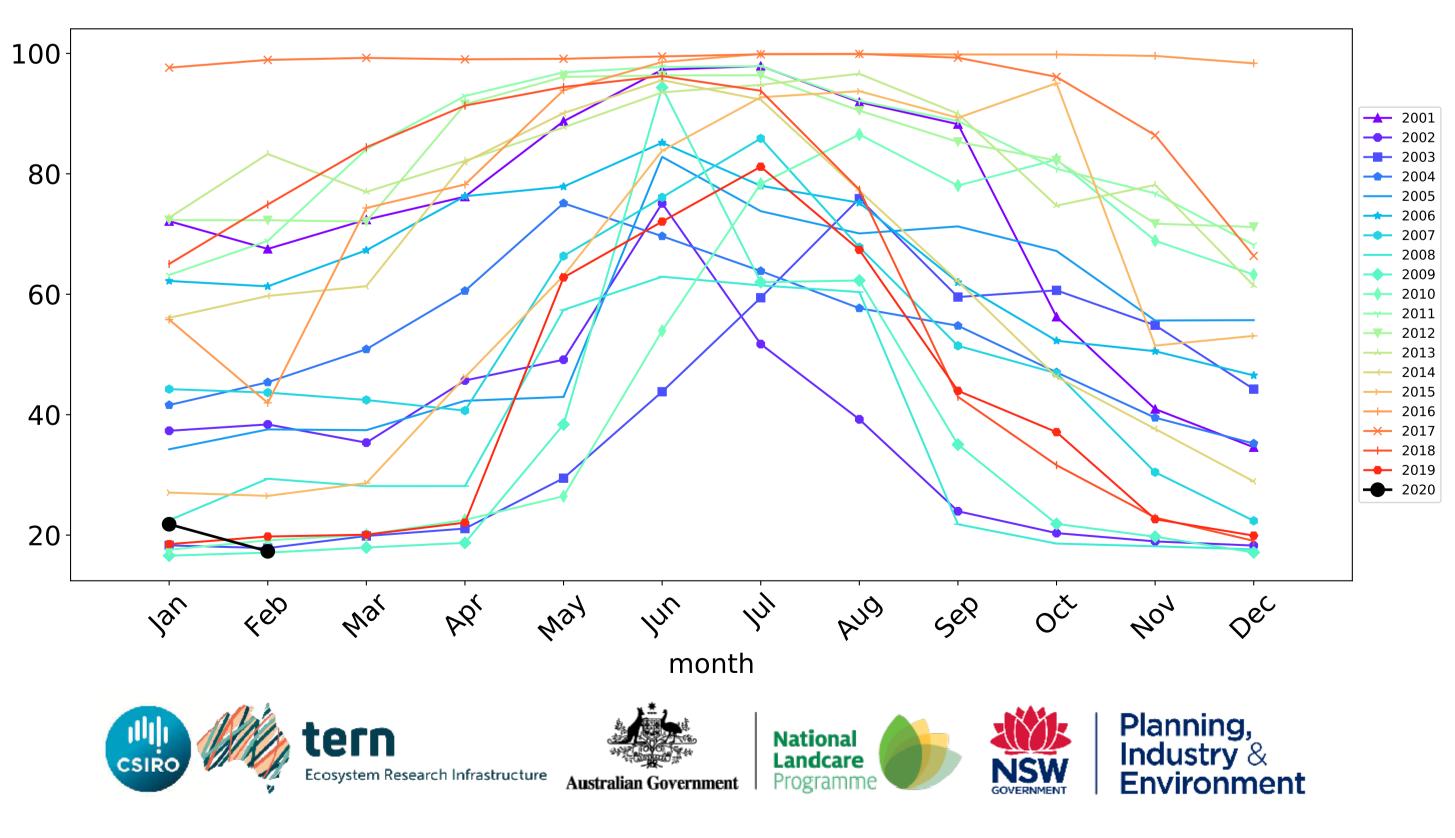
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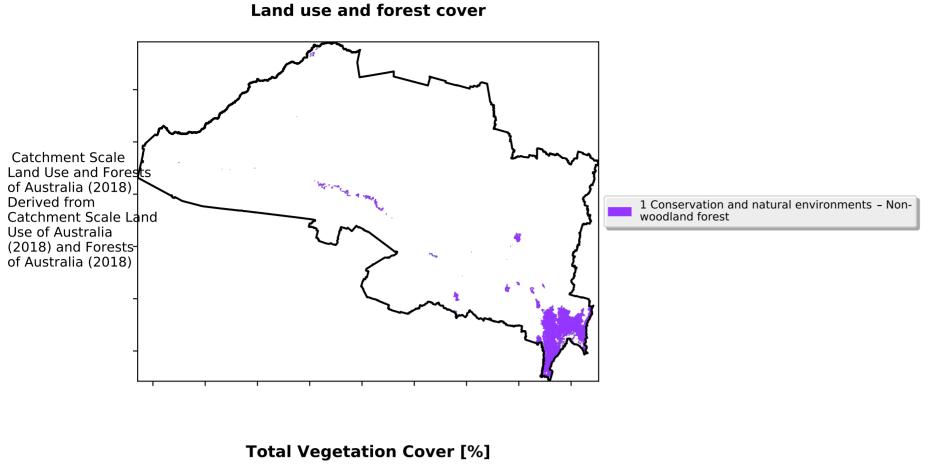
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)





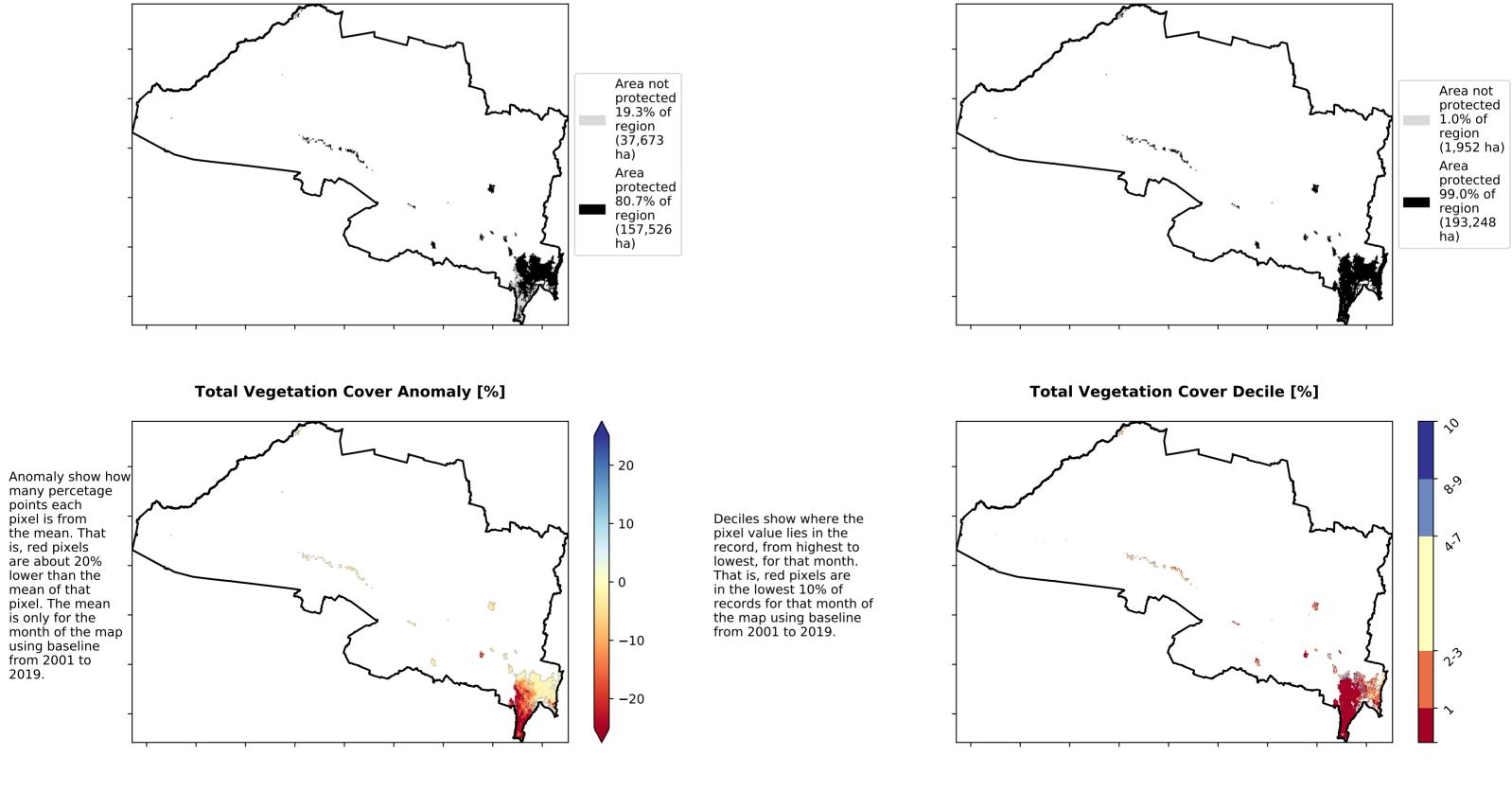


Conservation and natural environments Forest (non woodland)

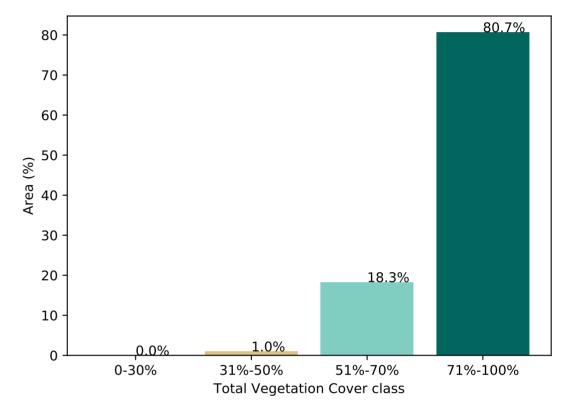


12%-2001 , 52°1070°1 32%50% 0.30%

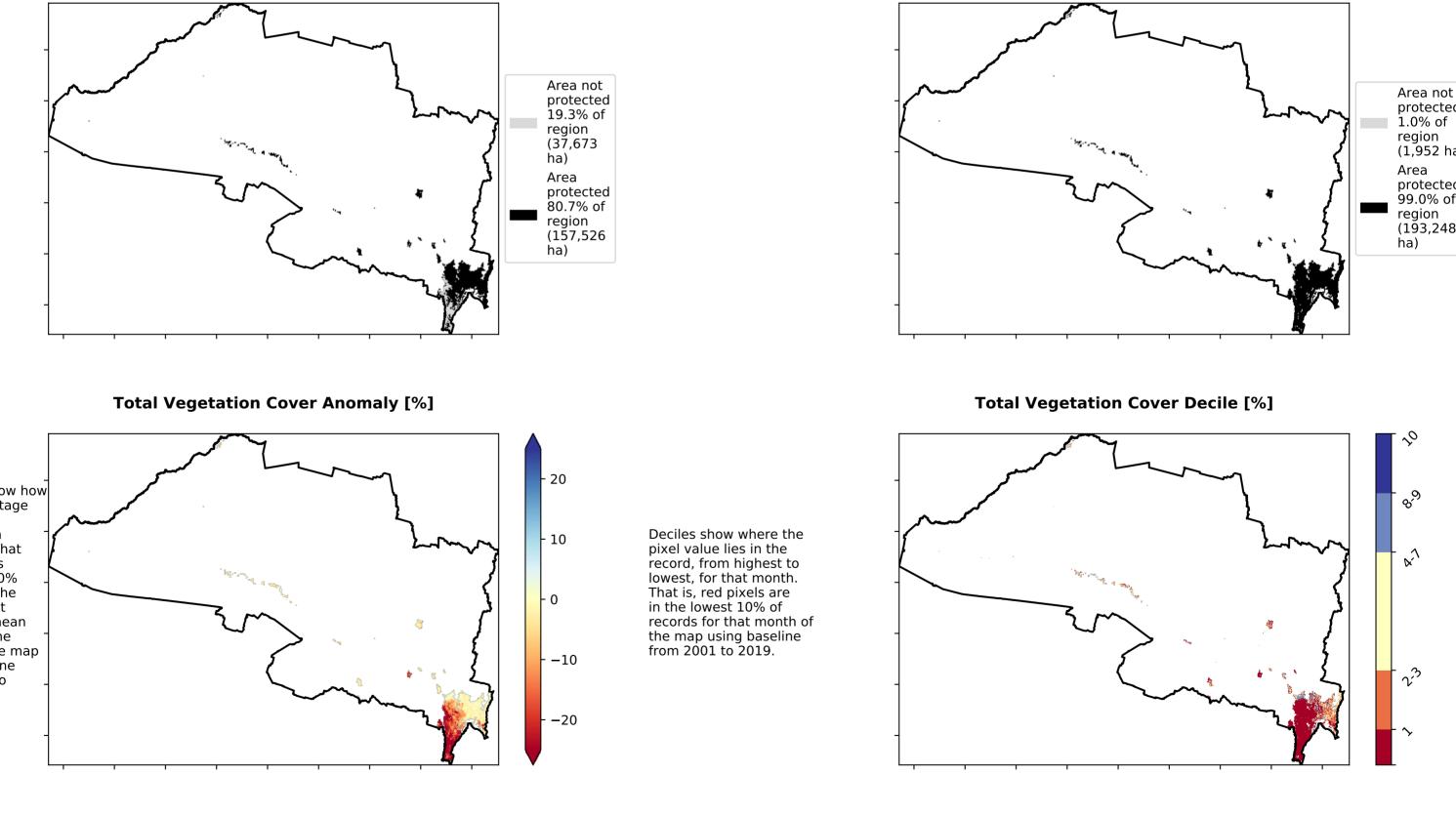
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

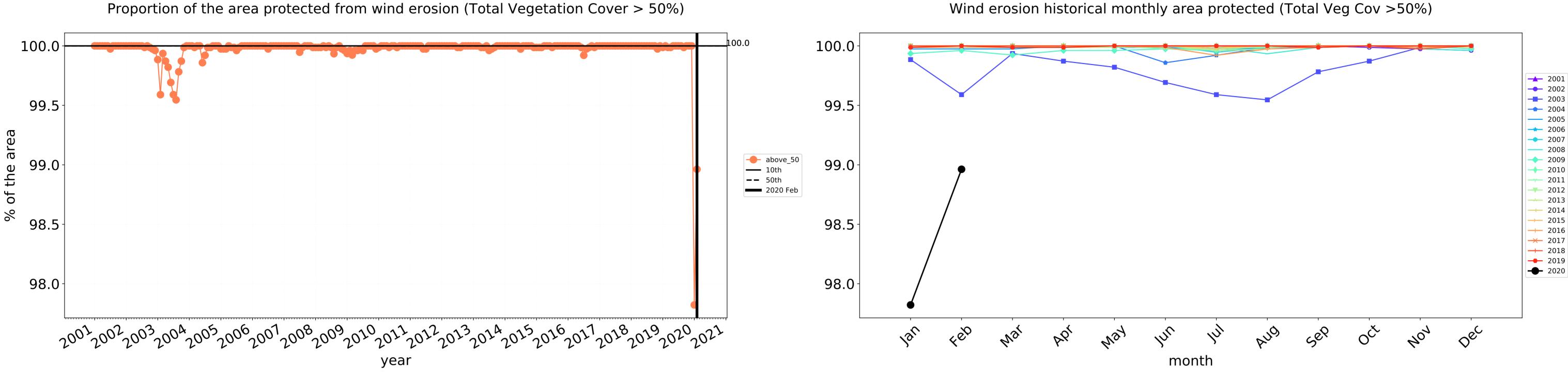


% Area protected from wind erosion (>50%)



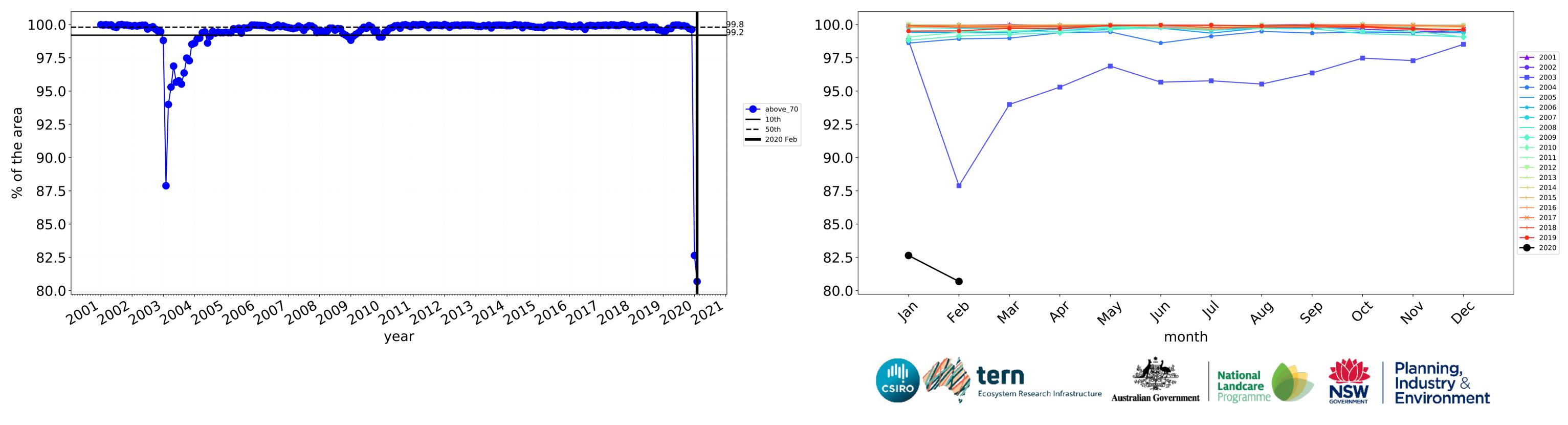


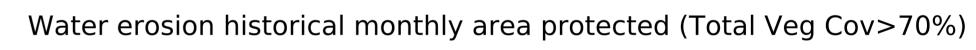
Conservation and natural environments Forest (non woodland) timeseries



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

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





Agriculture

Land use and forest cover

Proportion of each land class in area

<u>52.</u>5%

<u>7.9</u>%

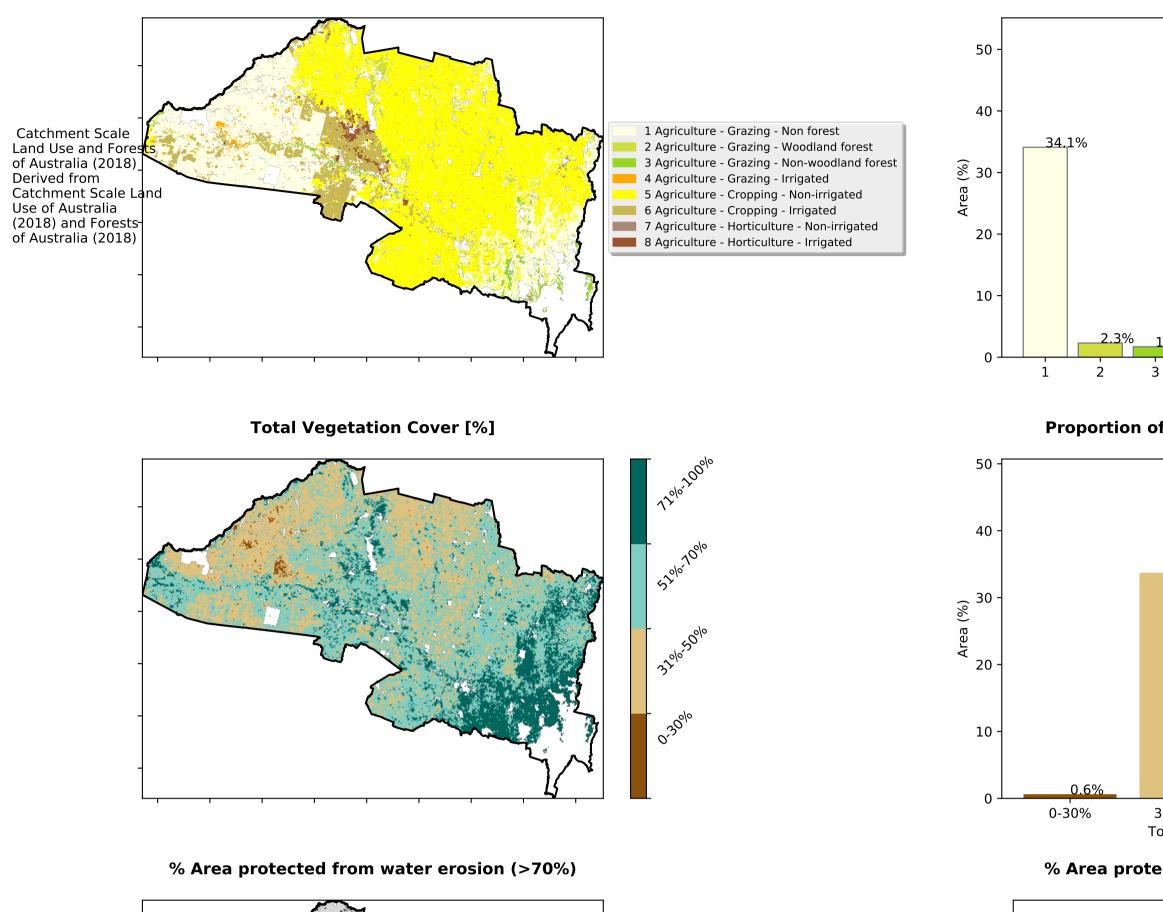
6

0.9%

8

0.0%

7



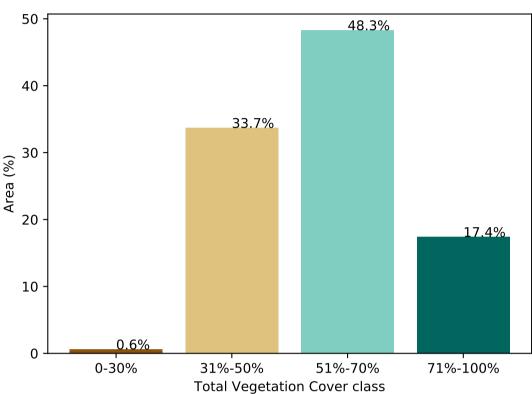
Proportion of vegetation cover class in area

Land use class

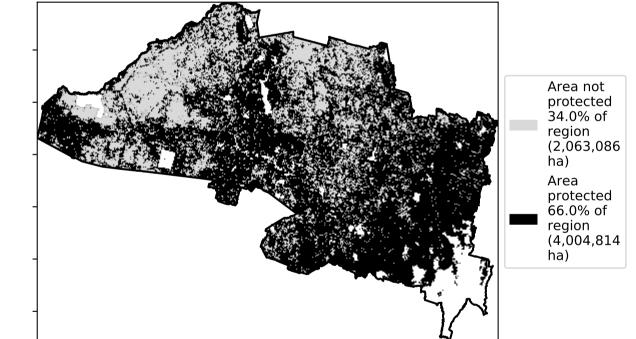
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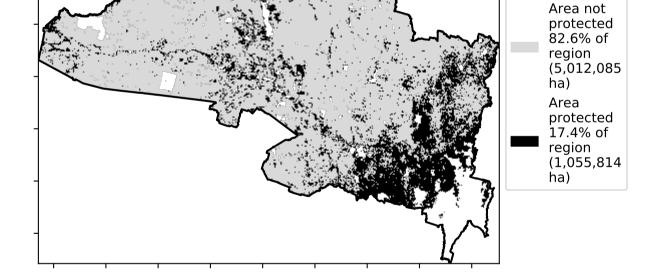
0.6%

4

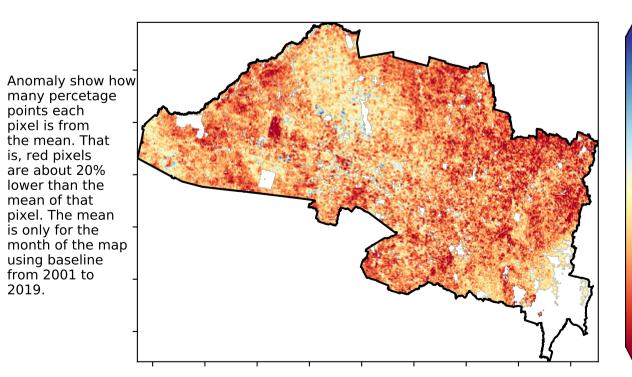


% Area protected from wind erosion (>50%)

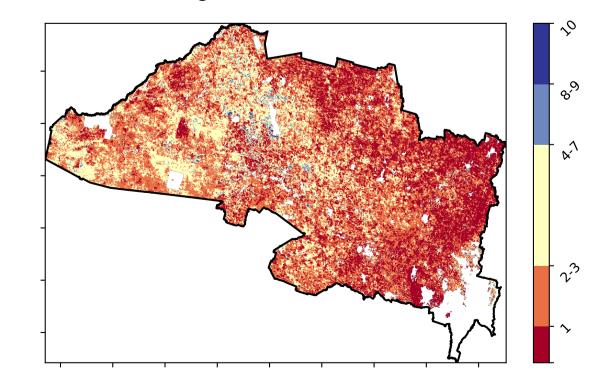




Total Vegetation Cover Anomaly [%]



Total Vegetation Cover Decile [%]





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

the map using baseline from 2001 to 2019.

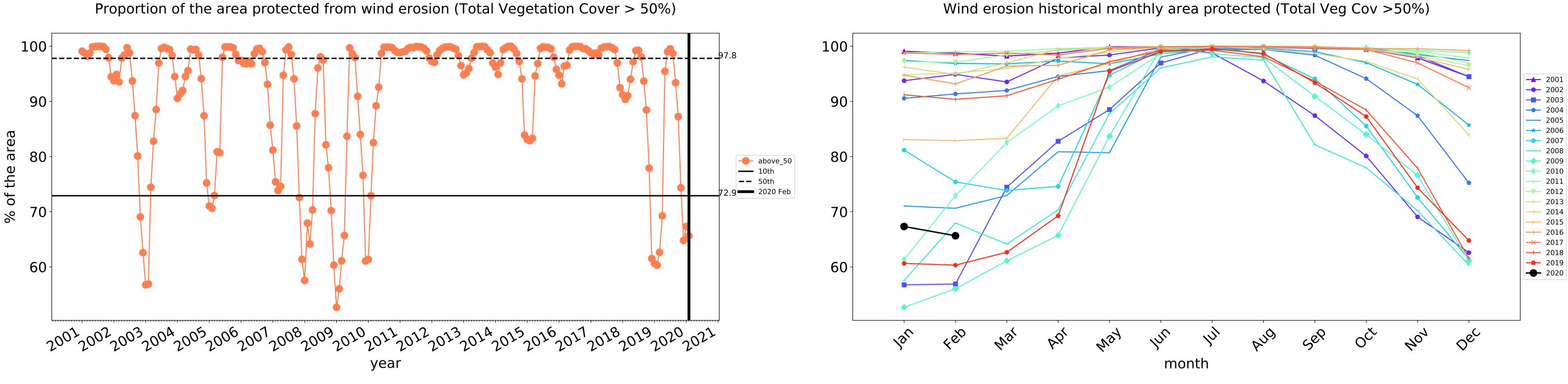
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10

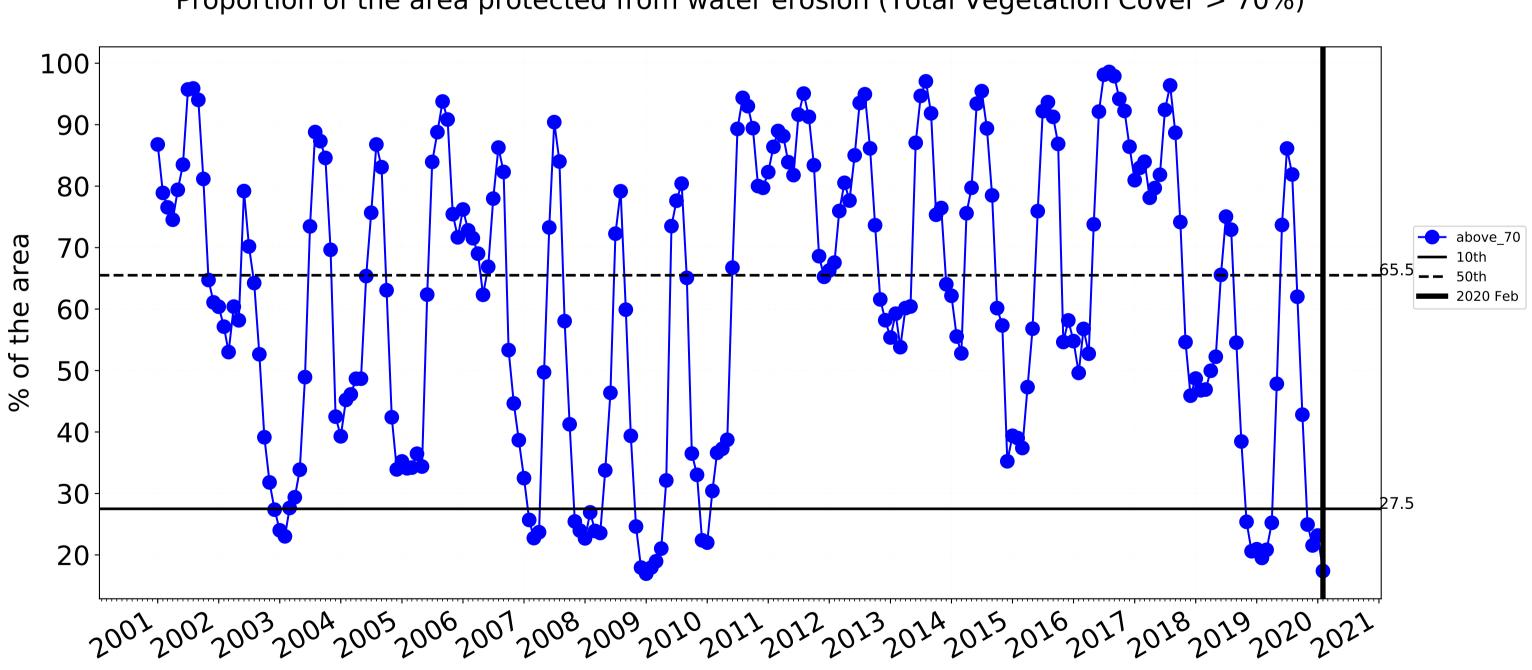
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-10

-20



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

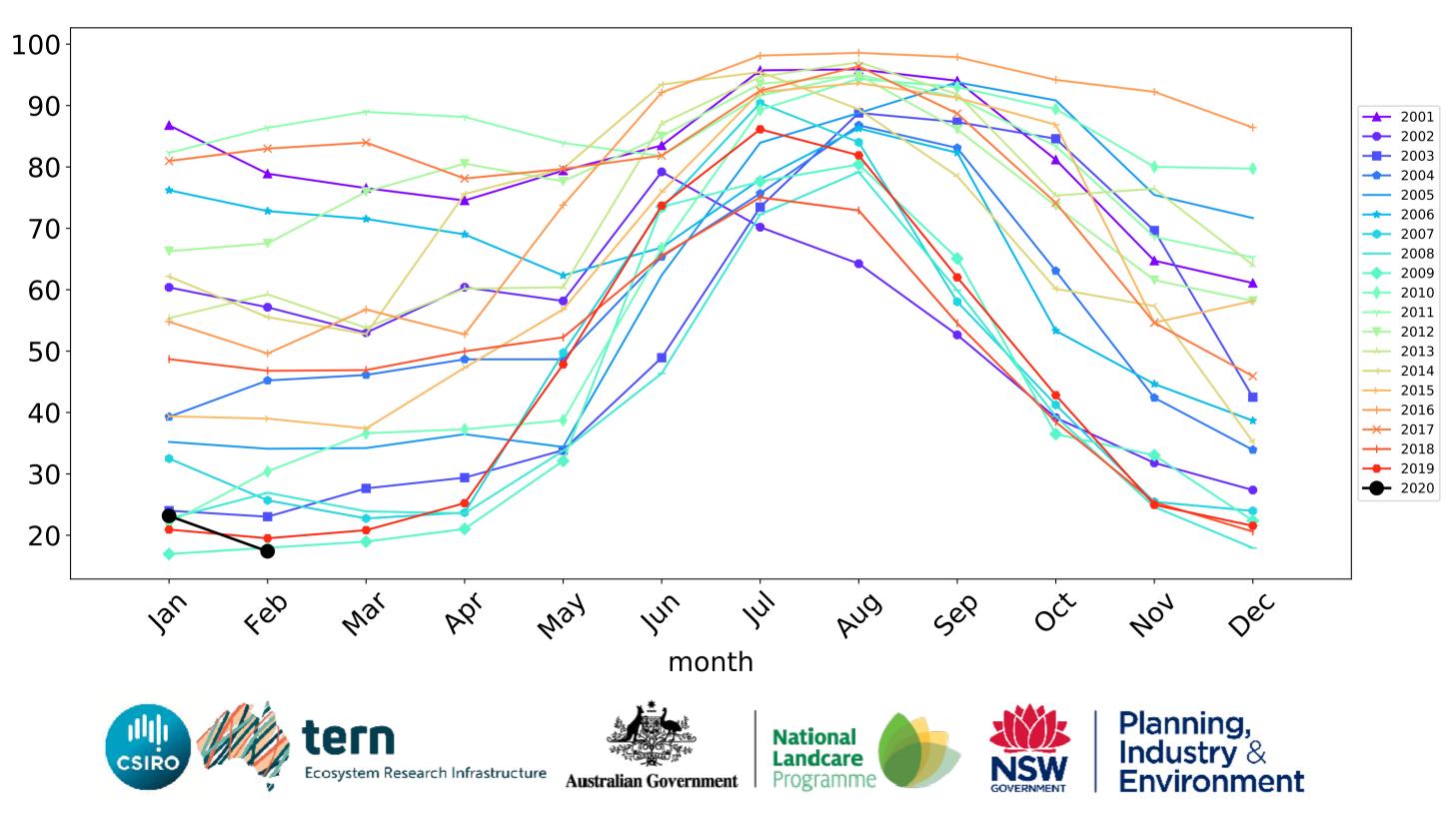


year

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

Agriculture timeseries

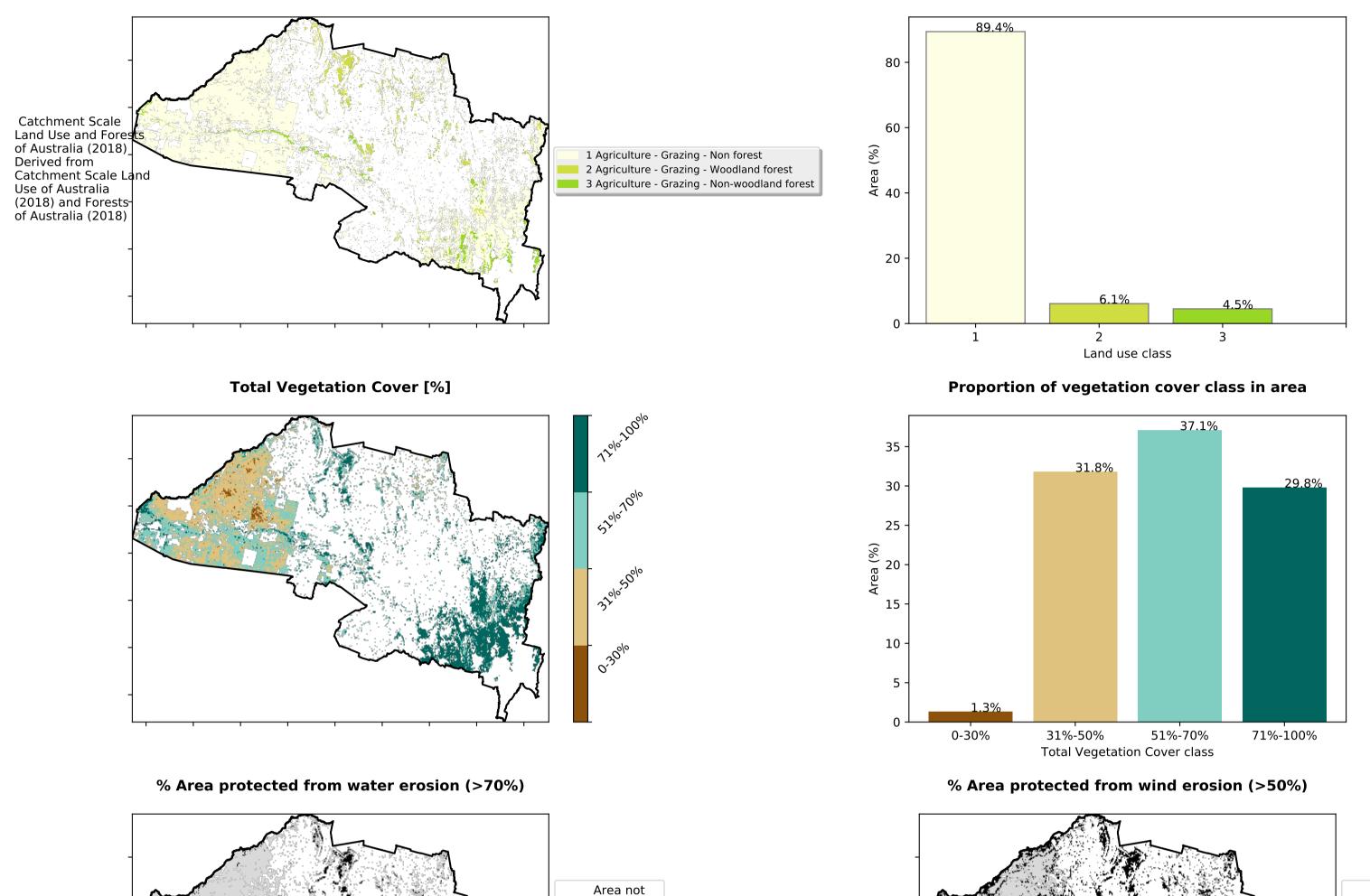
Water erosion historical monthly area protected (Total Veg Cov>70%)



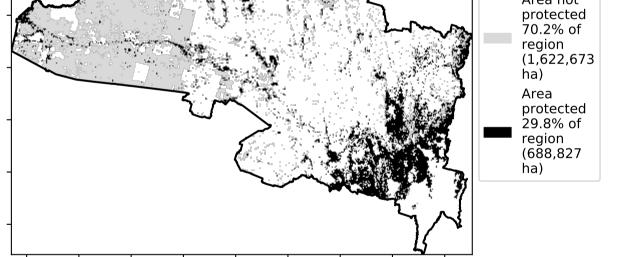
Grazing

Land use and forest cover

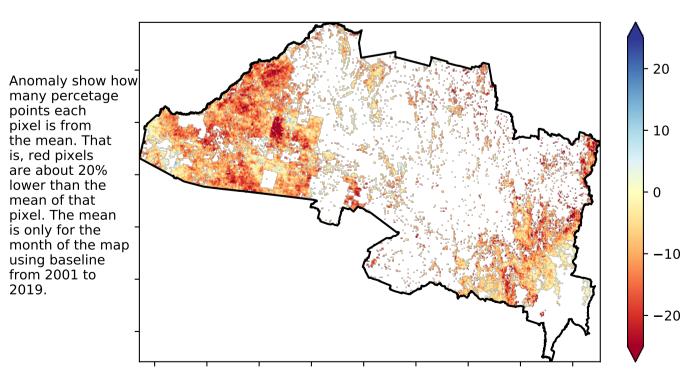
Proportion of each land class in area



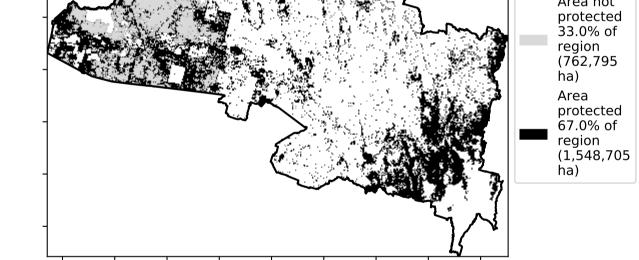
Area not



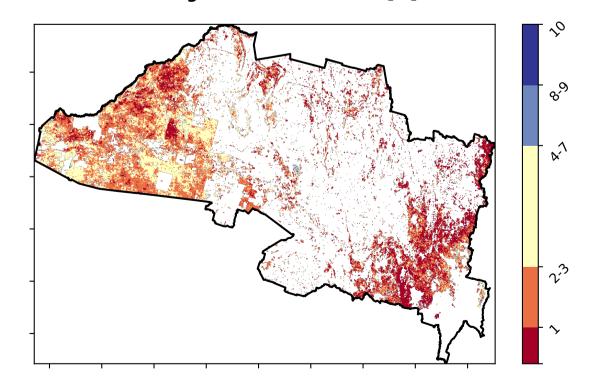
Total Vegetation Cover Anomaly [%]



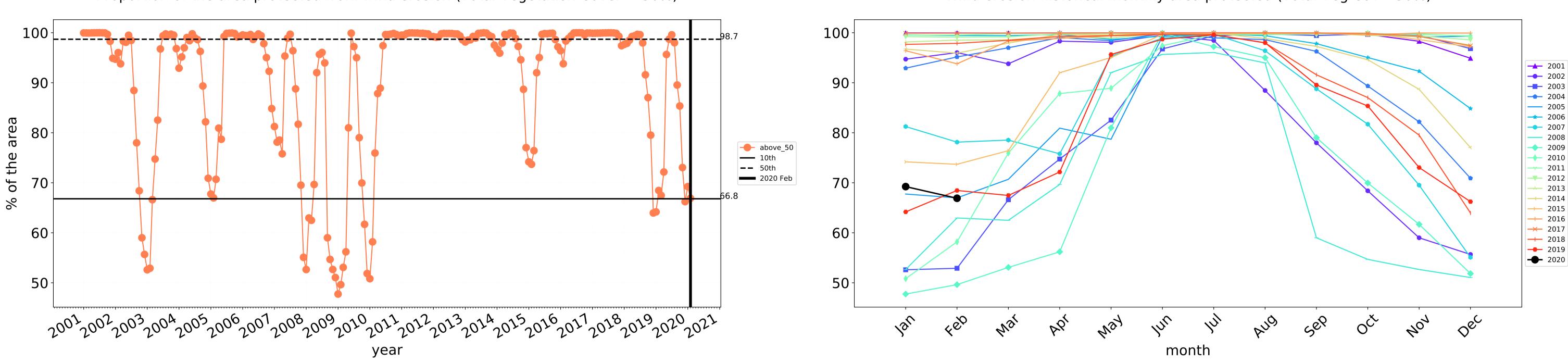
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



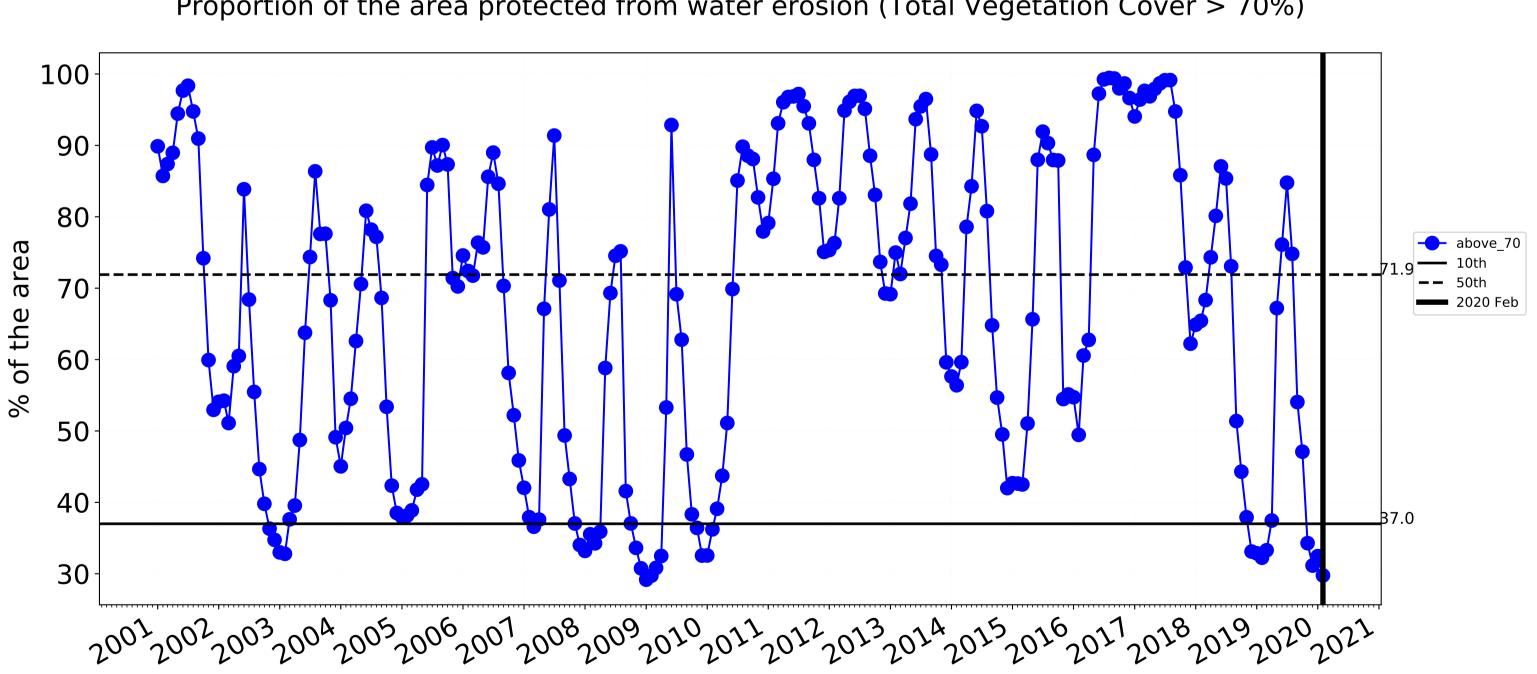
Total Vegetation Cover Decile [%]







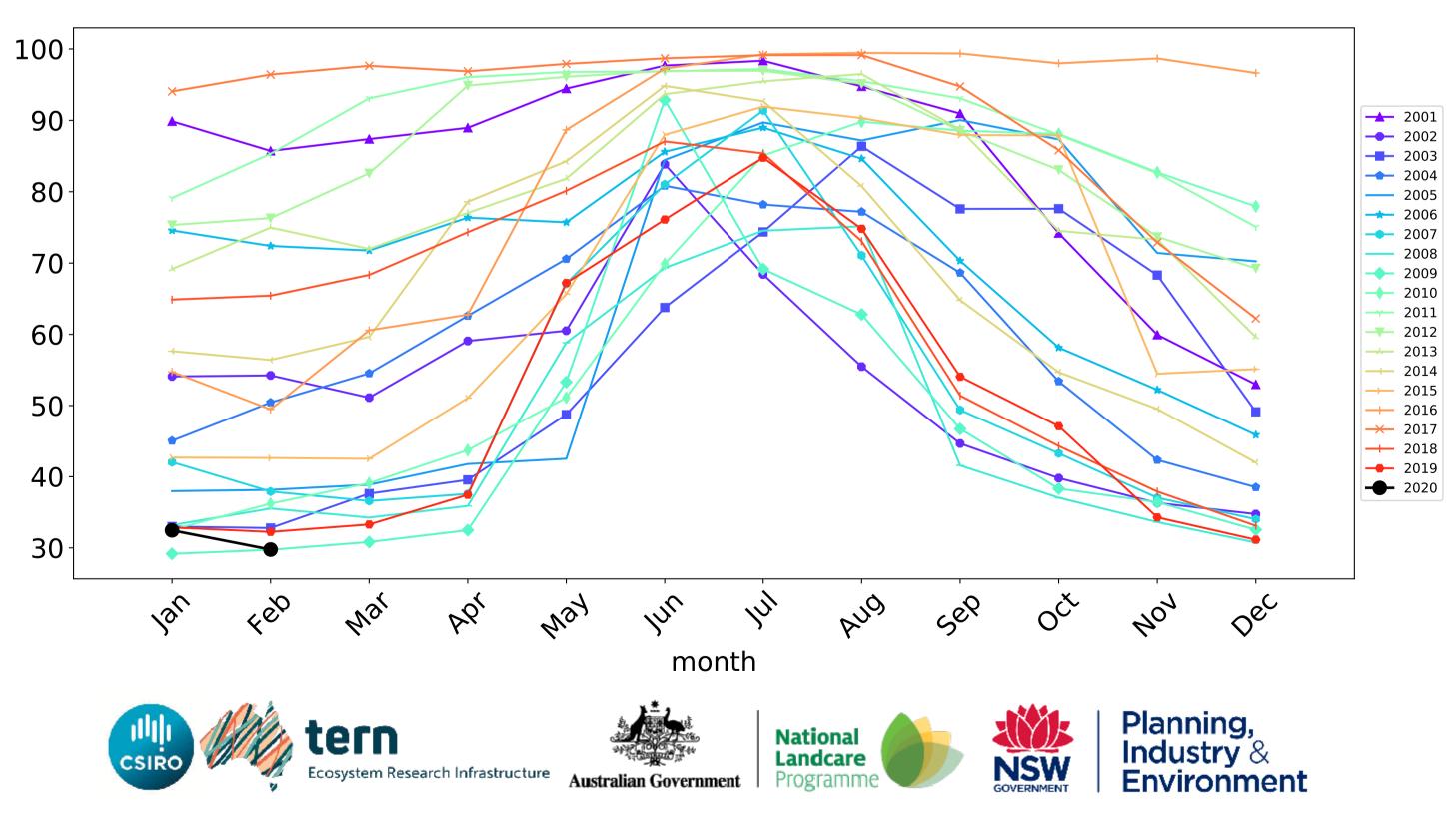
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



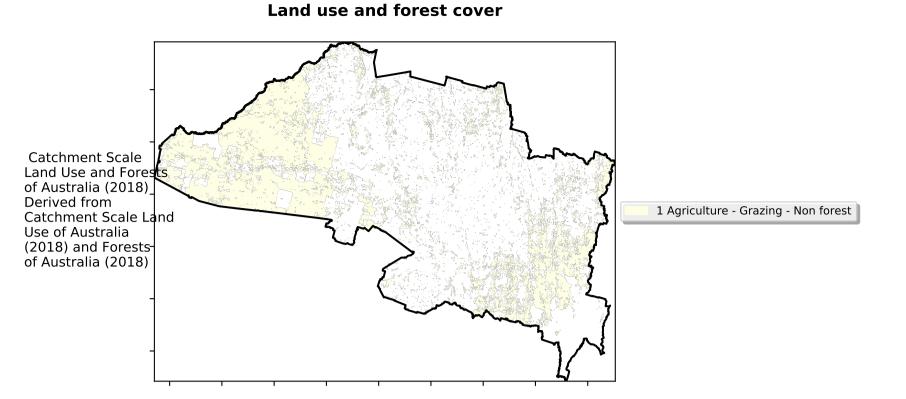
year

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

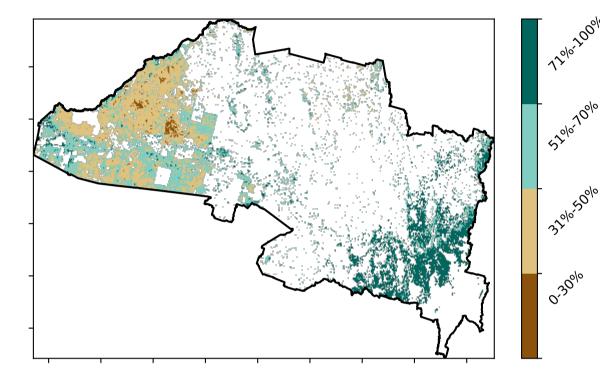
Water erosion historical monthly area protected (Total Veg Cov>70%)



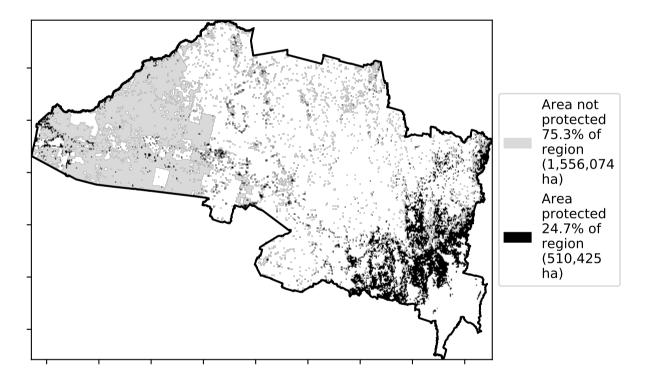
Grazing non forest

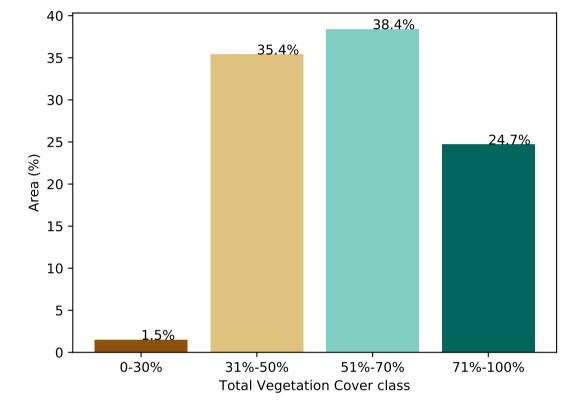


Total Vegetation Cover [%]

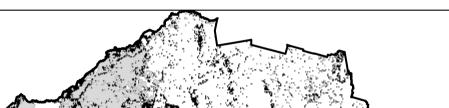


% Area protected from water erosion (>70%)



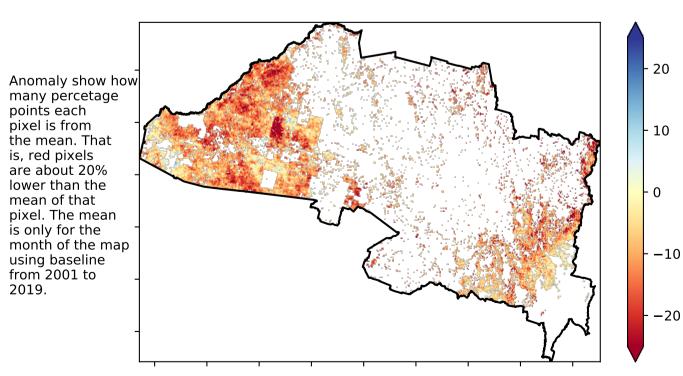


% Area protected from wind erosion (>50%)



Proportion of vegetation cover class in area

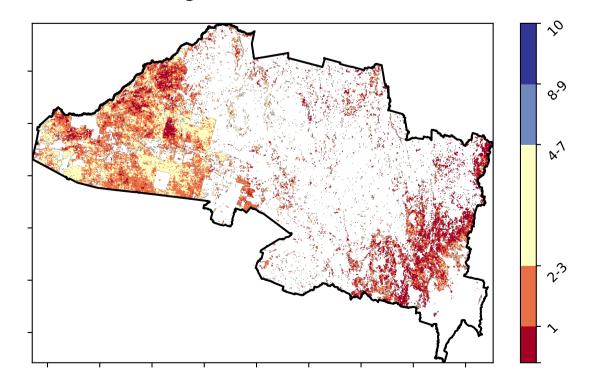
Total Vegetation Cover Anomaly [%]



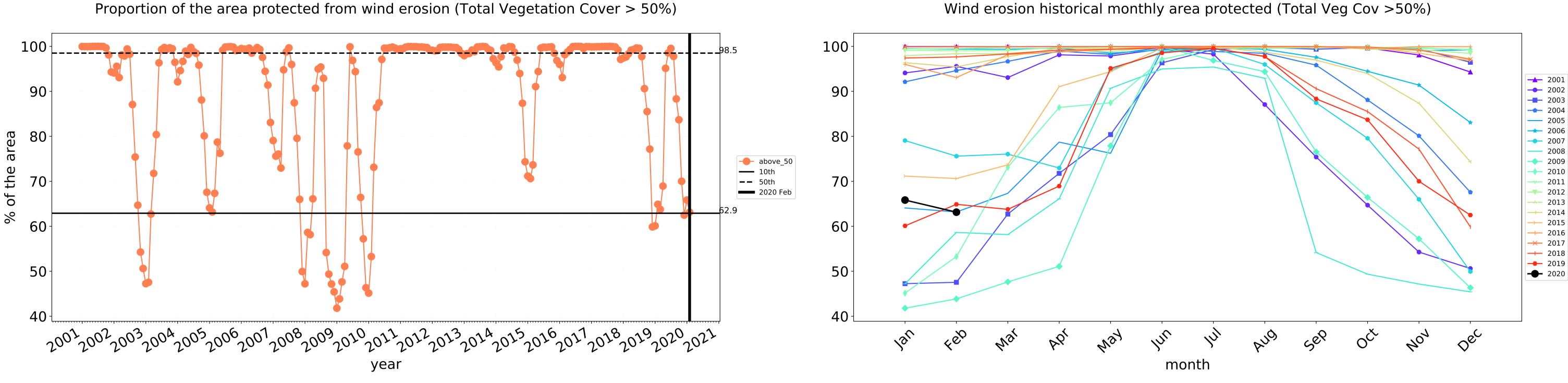
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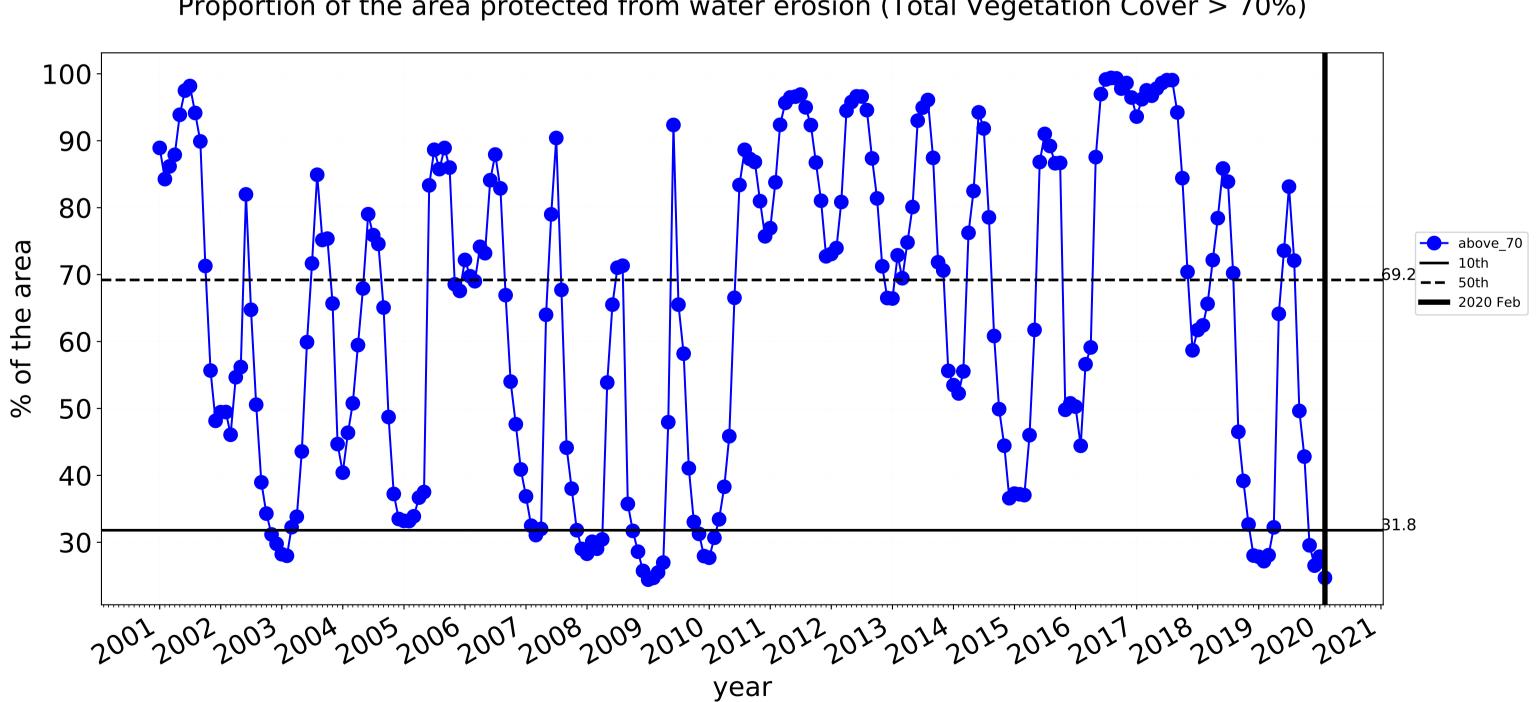
Total Vegetation Cover Decile [%]





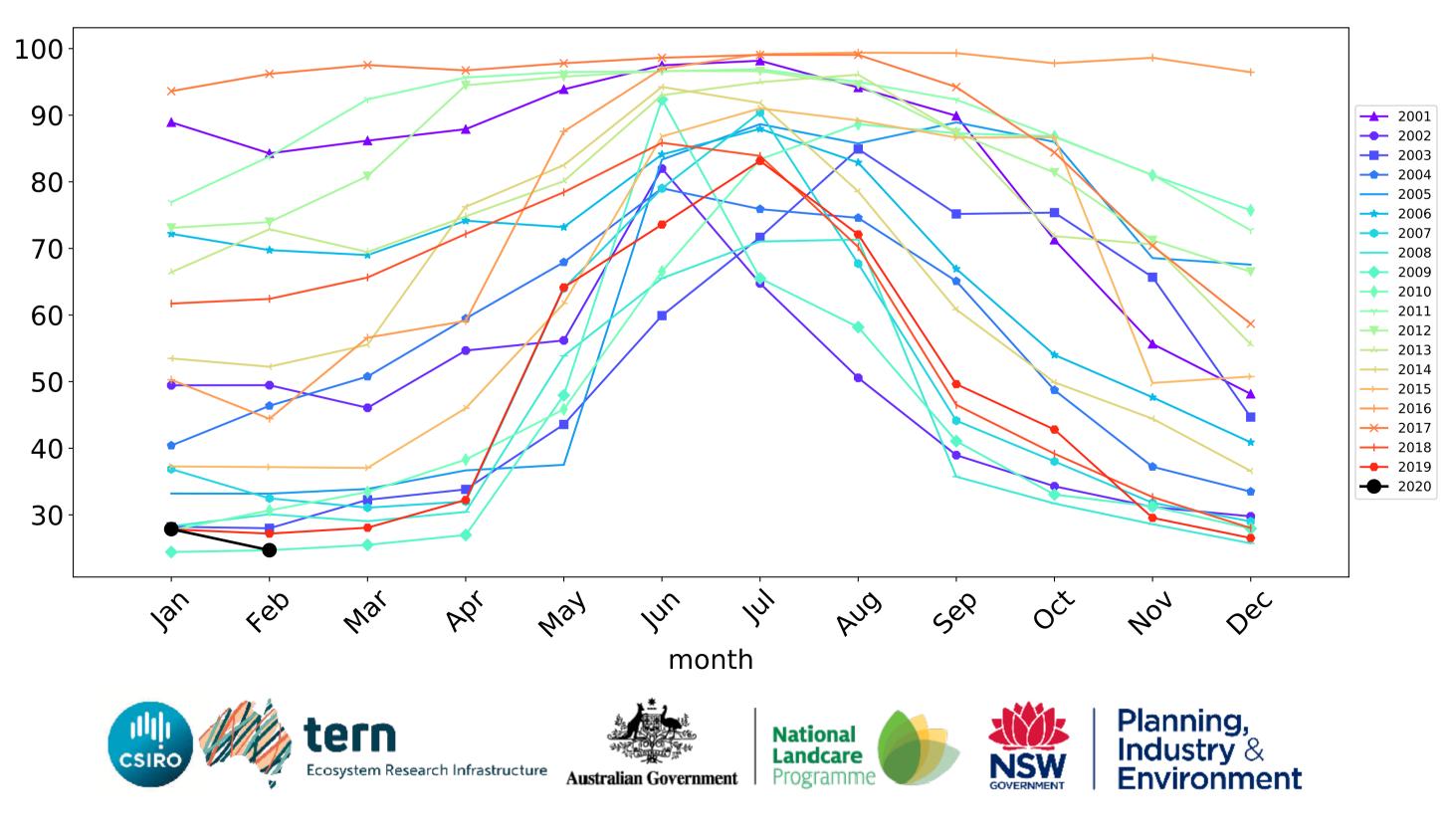


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

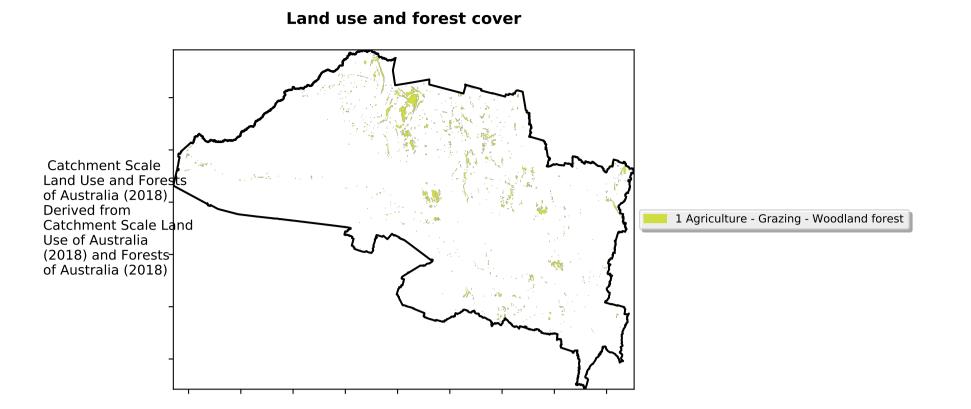


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

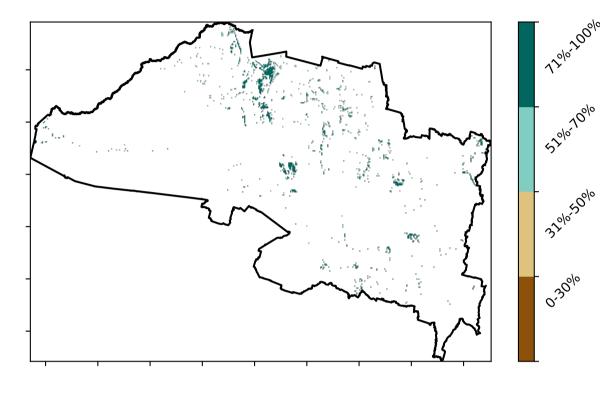
Grazing non forest timeseries



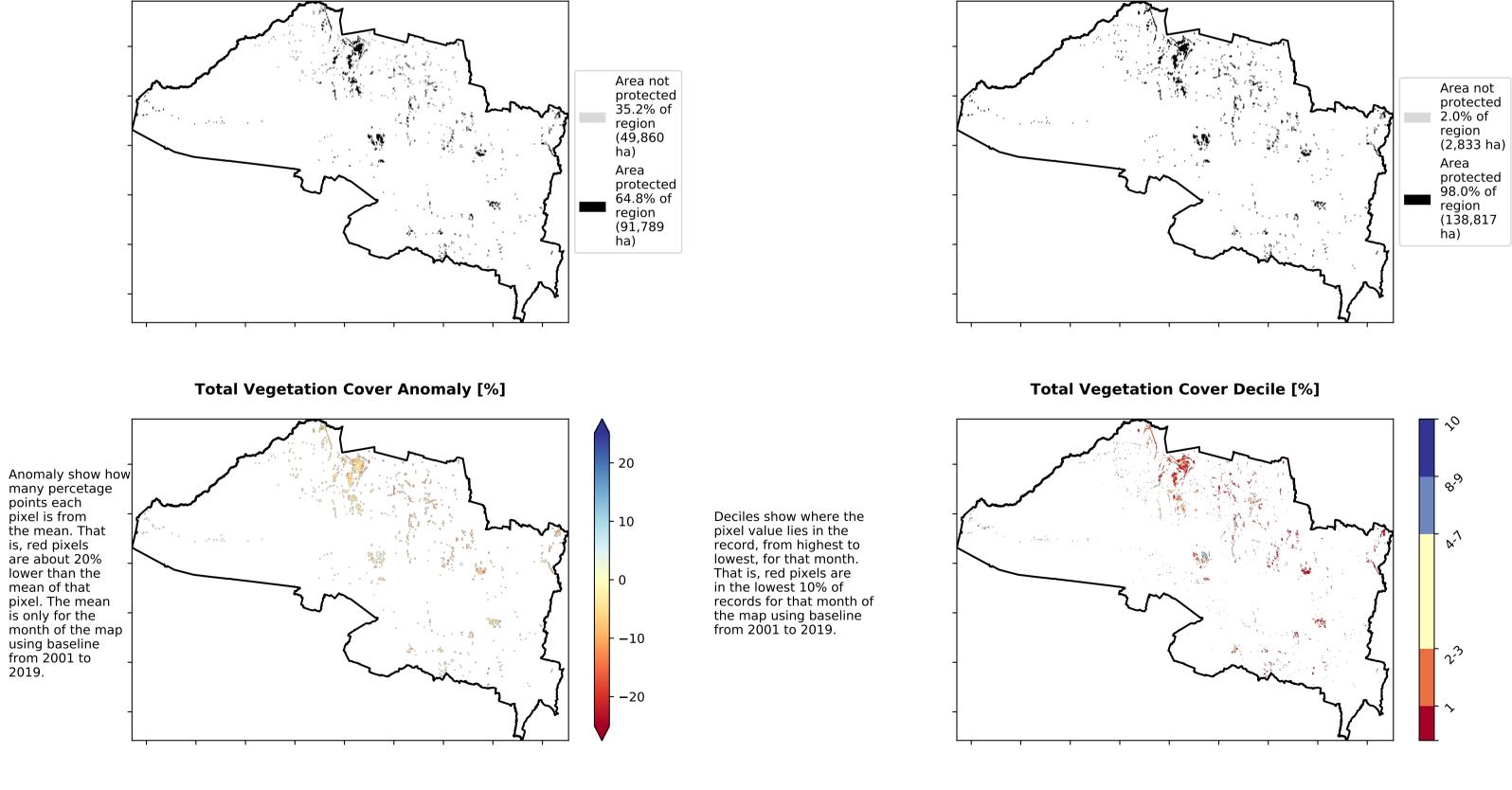
Grazing Woodland forest



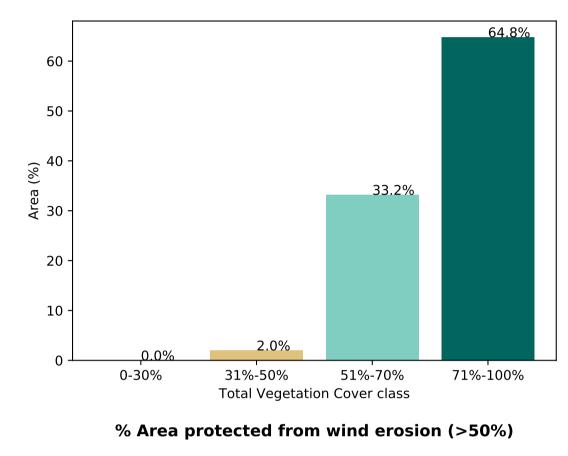
Total Vegetation Cover [%]

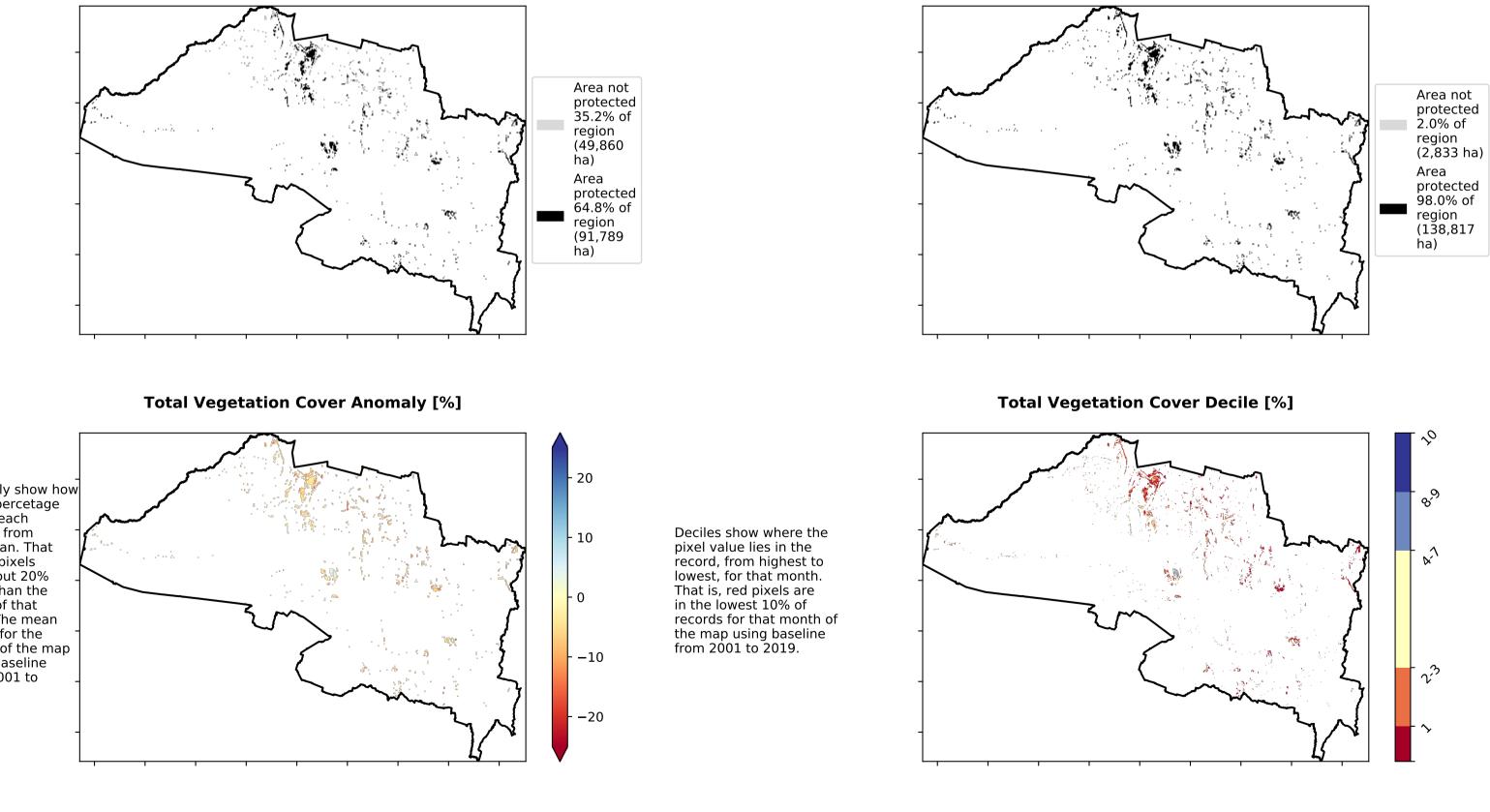


% Area protected from water erosion (>70%)

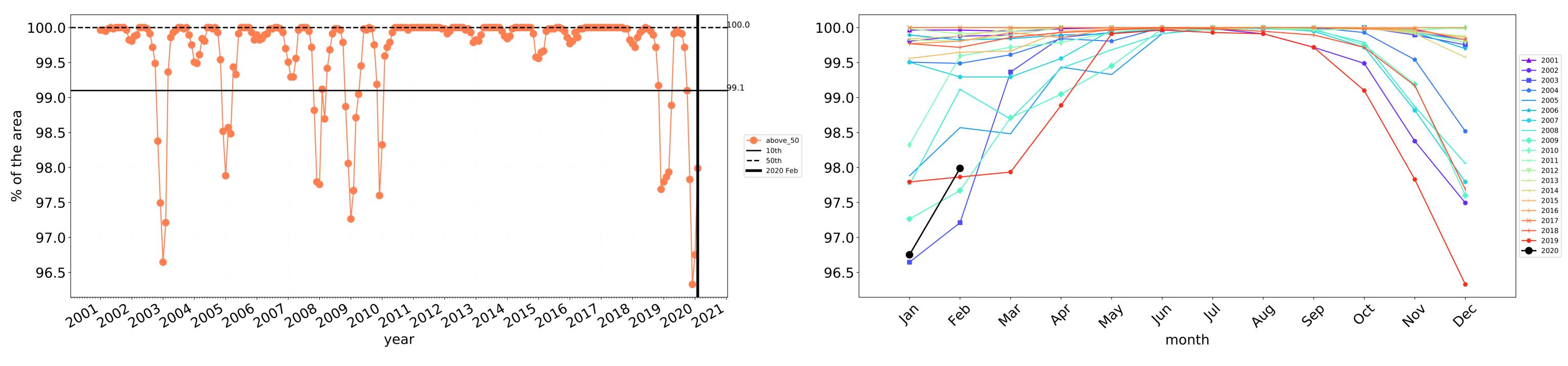






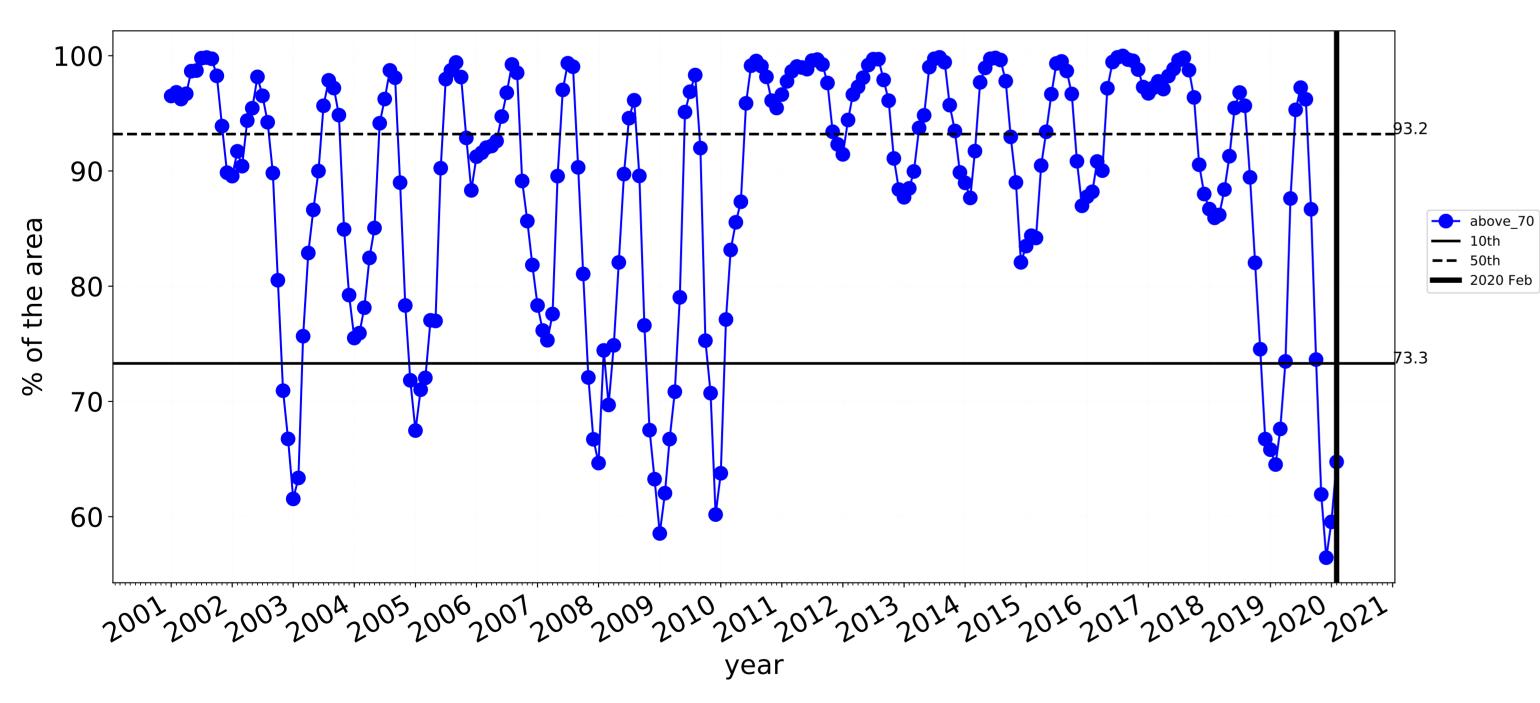


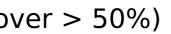




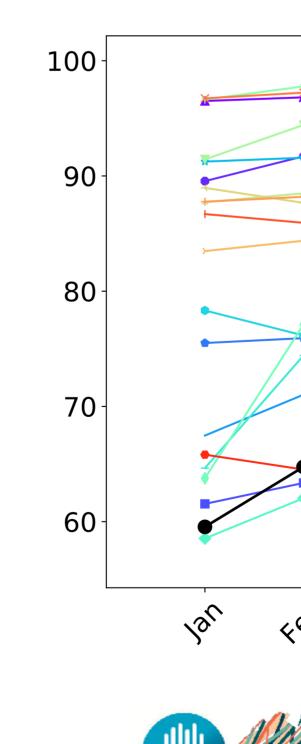
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

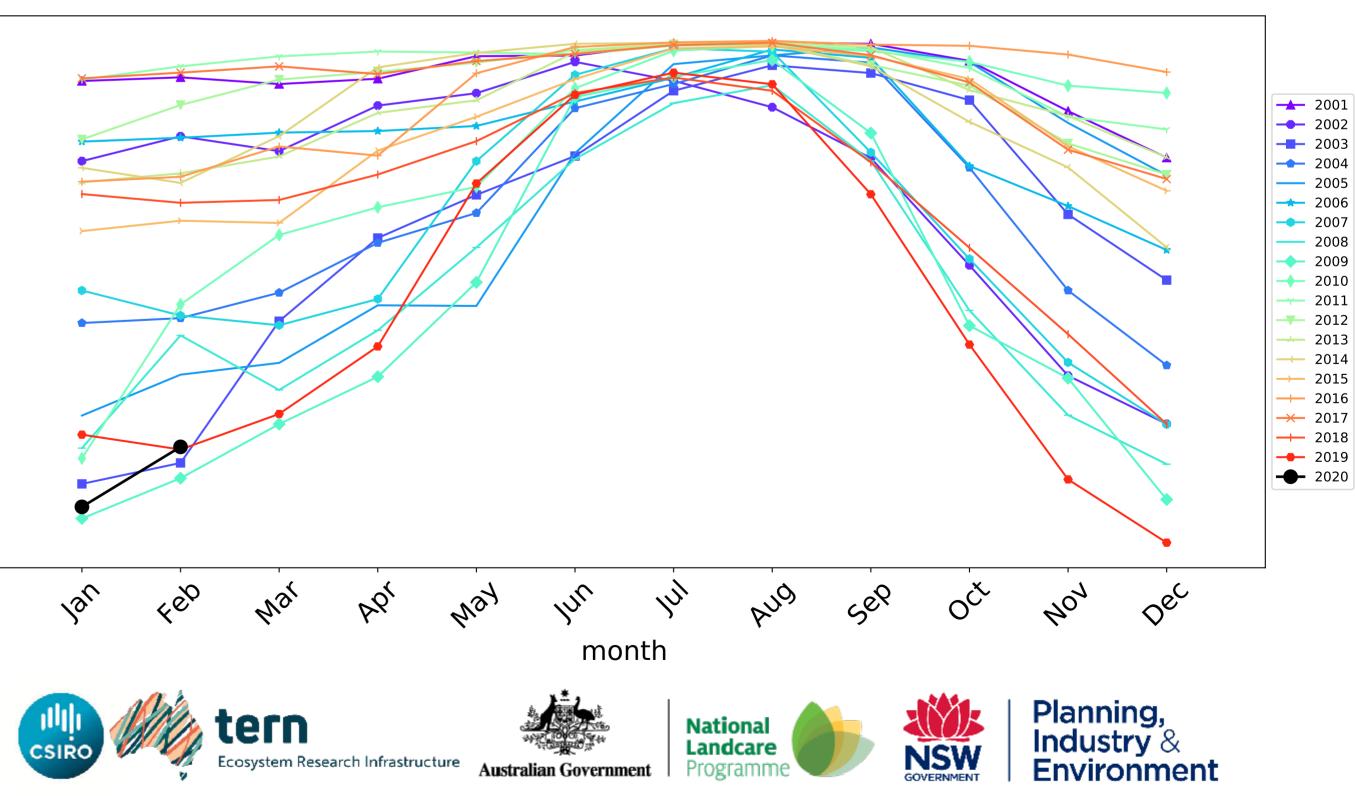




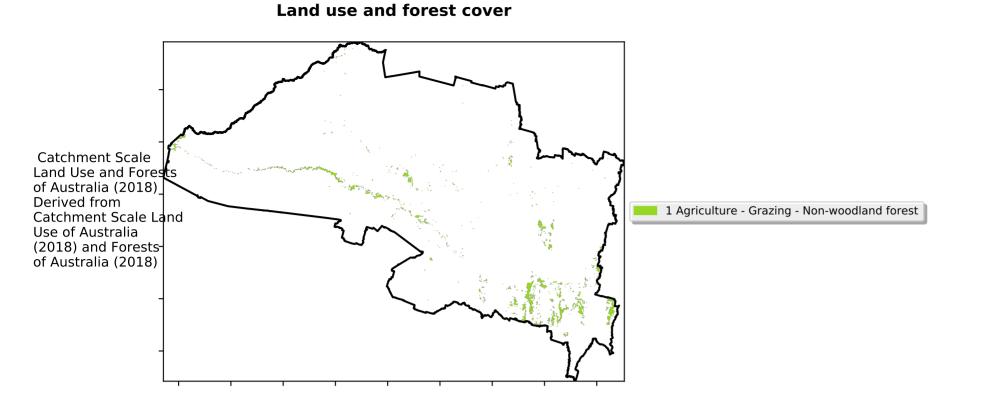


Wind erosion historical monthly area protected (Total Veg Cov >50%)

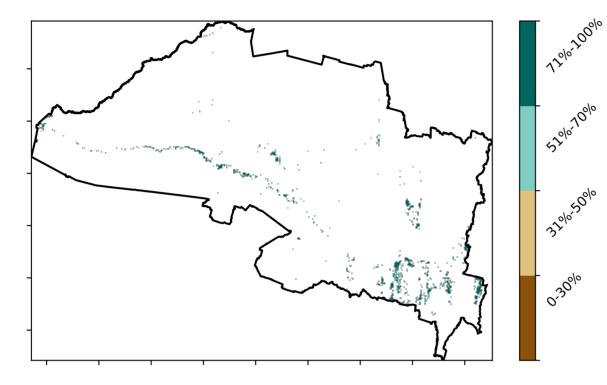




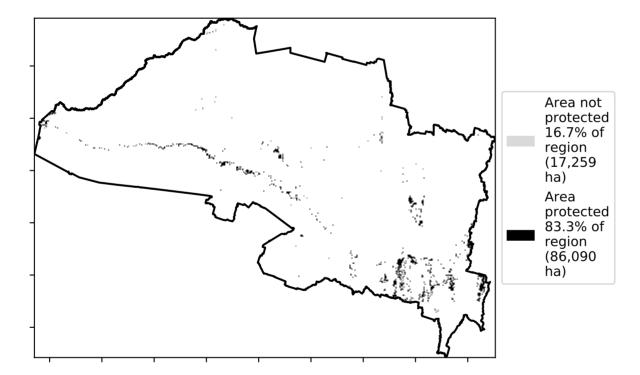
Grazing - Forest (non woodland)



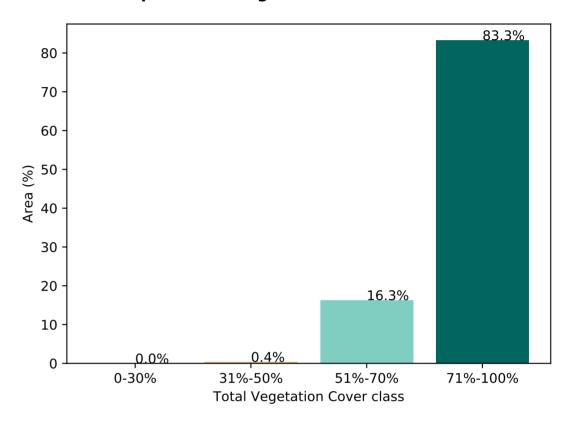
Total Vegetation Cover [%]



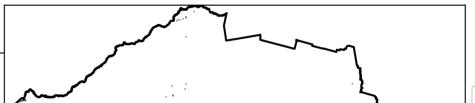
% Area protected from water erosion (>70%)



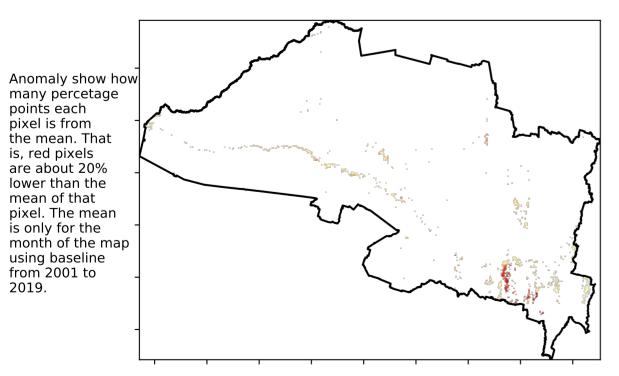




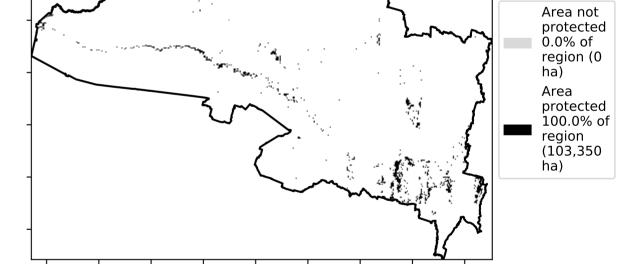
% Area protected from wind erosion (>50%)



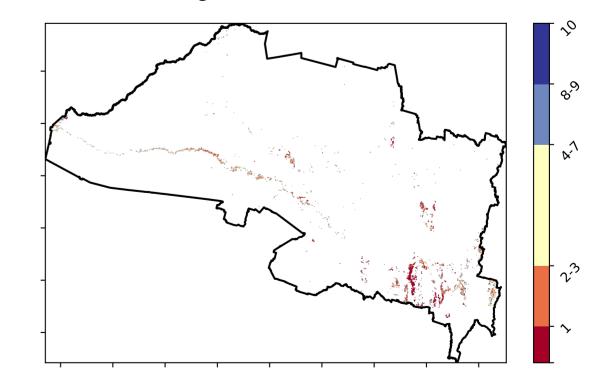
Total Vegetation Cover Anomaly [%]



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Total Vegetation Cover Decile [%]





records for tha the map using from 2001 to 2

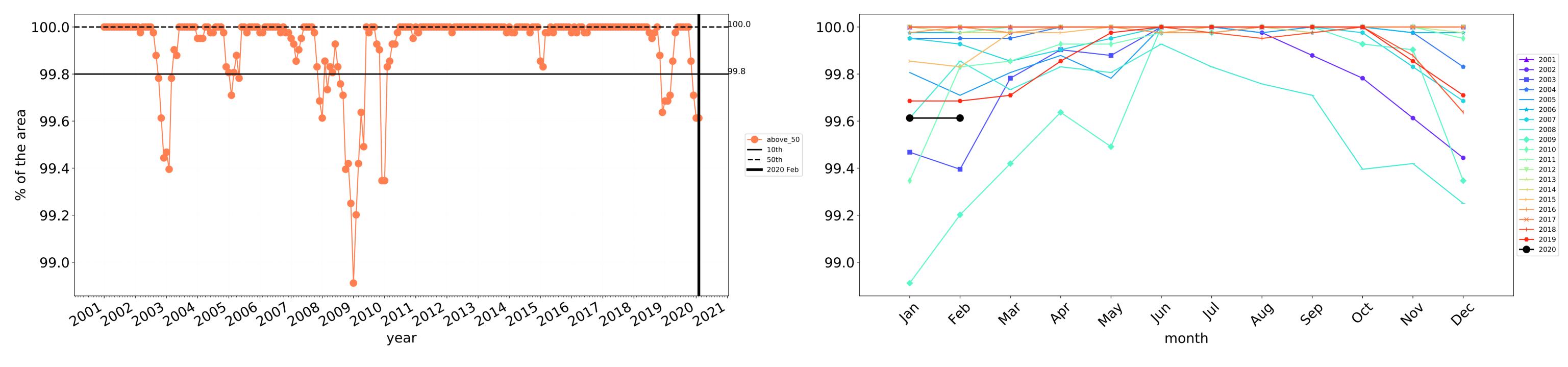
20

10

0

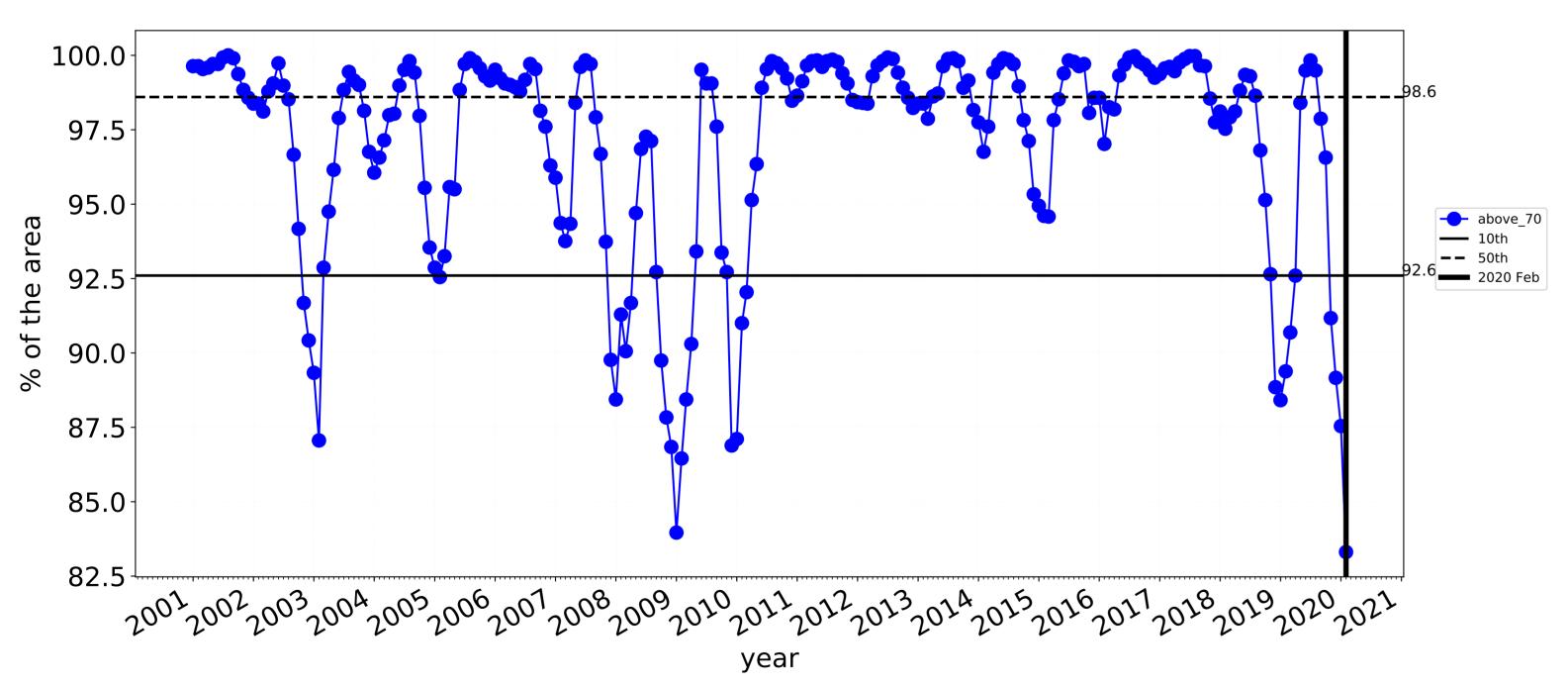
-10

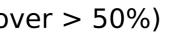
-20



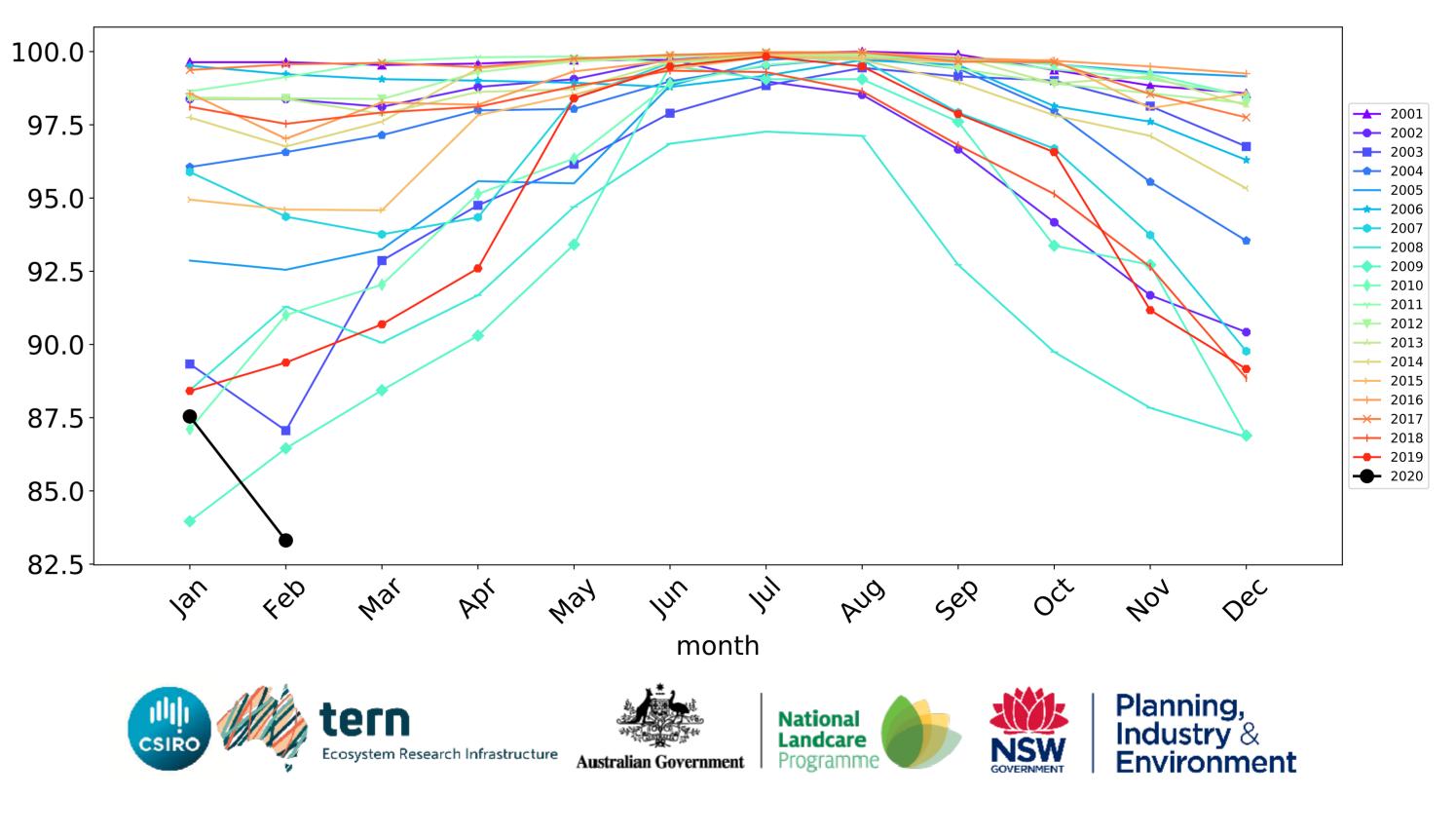
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

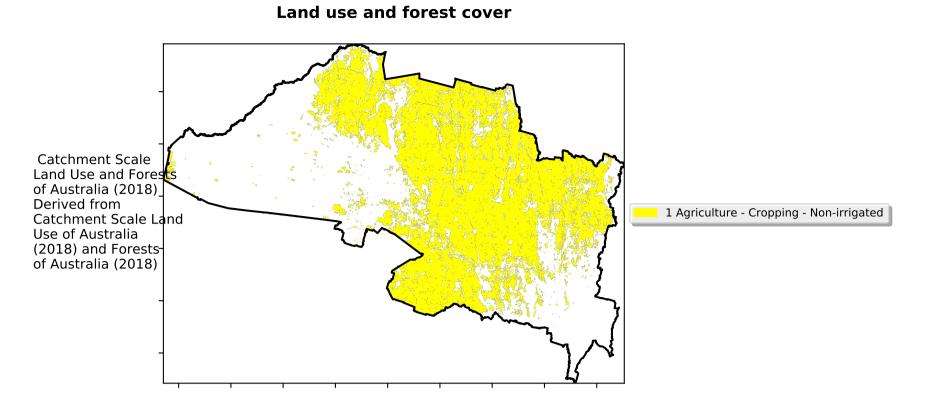




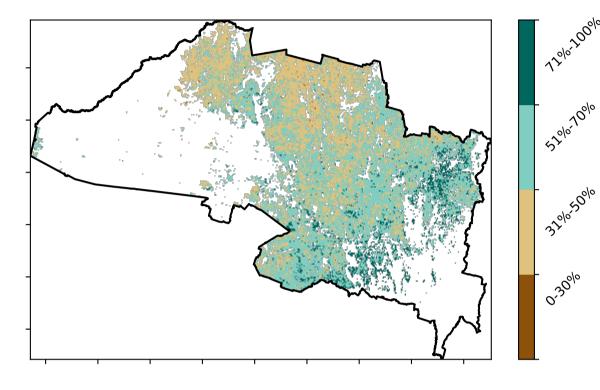
Wind erosion historical monthly area protected (Total Veg Cov >50%)



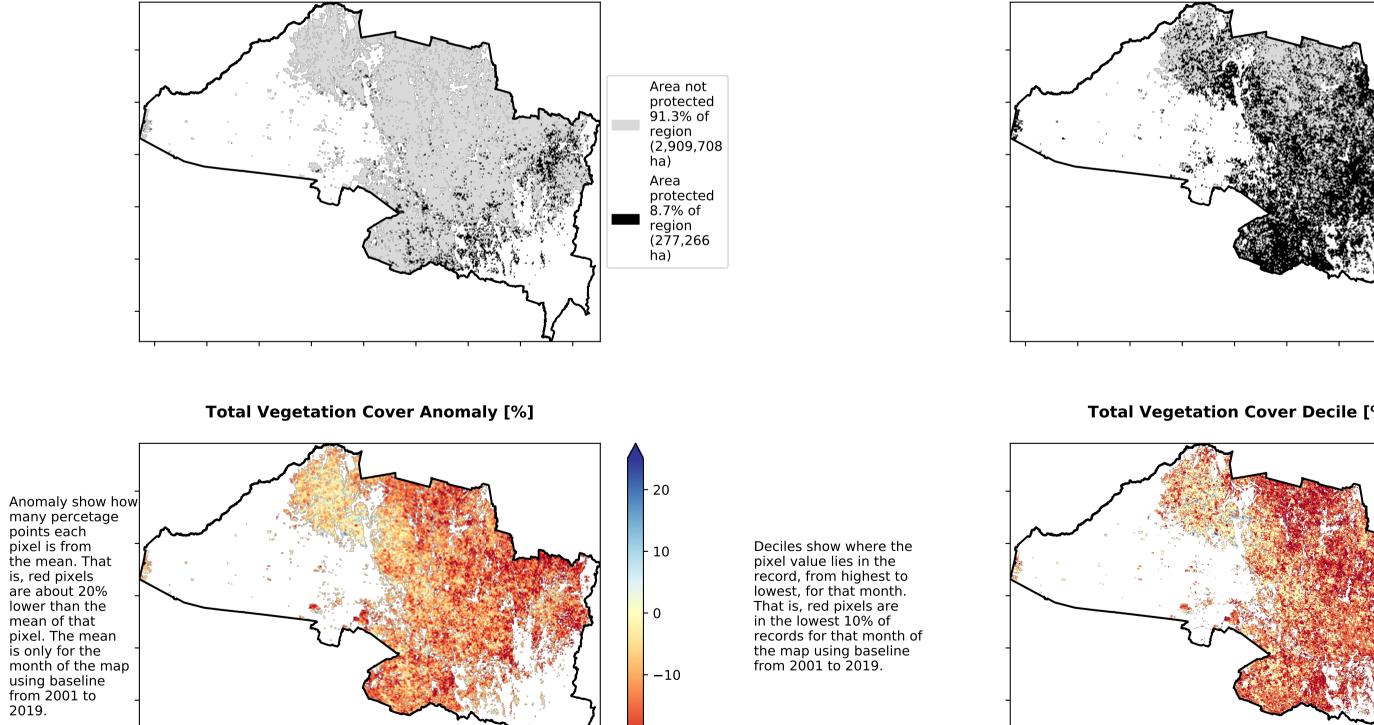
Cropping



Total Vegetation Cover [%]

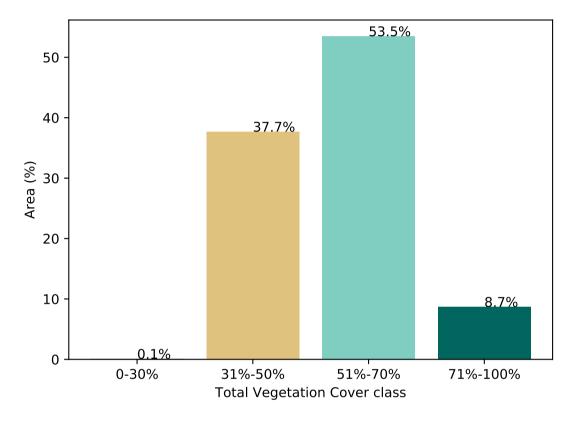


% Area protected from water erosion (>70%)

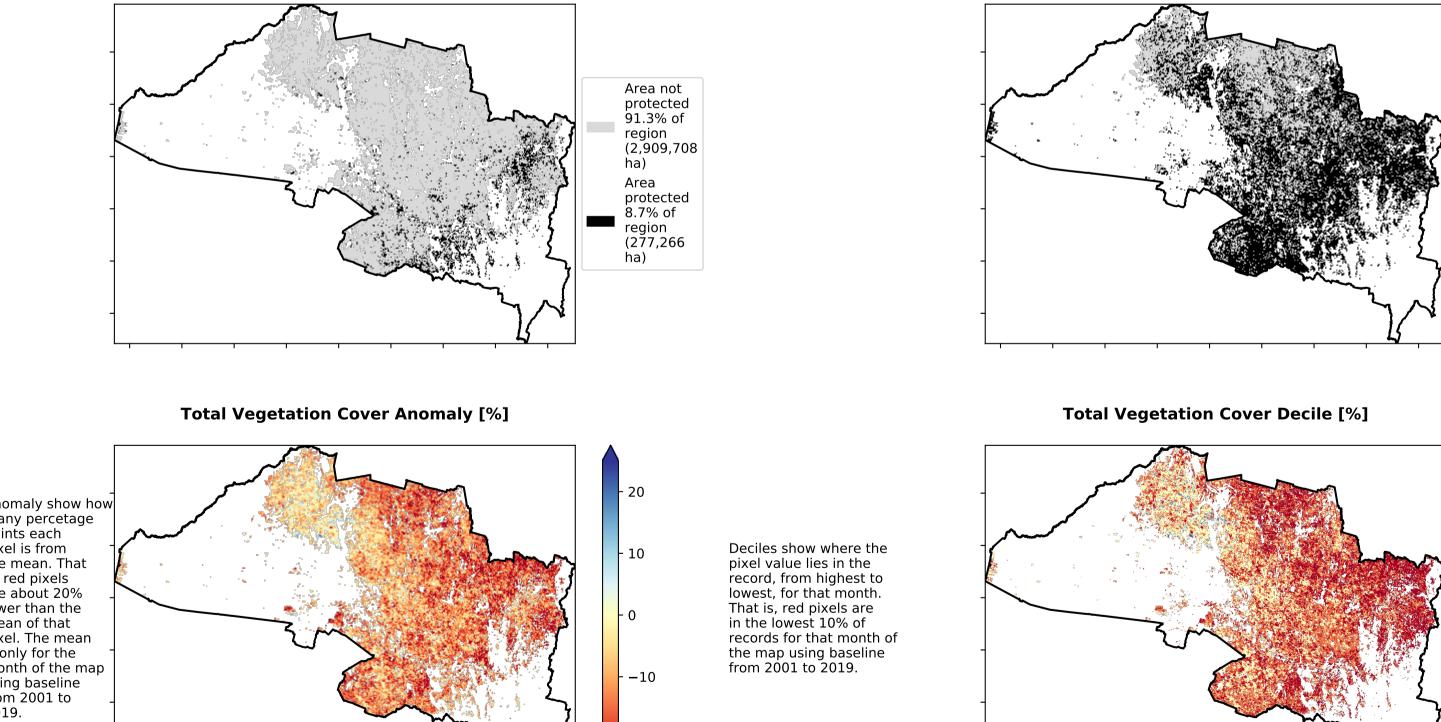


-20

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



ha)

ha)

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°,

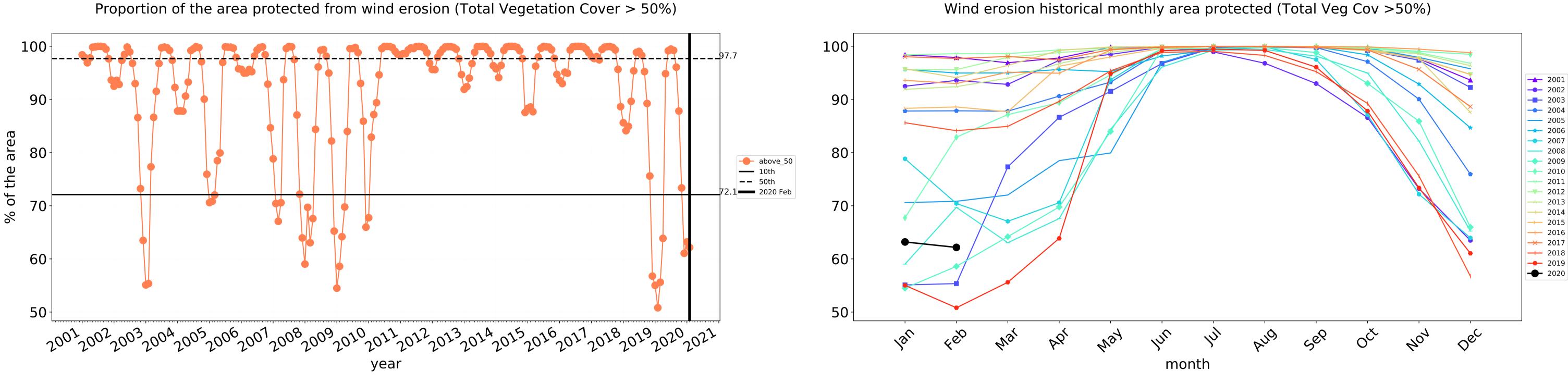
A.1

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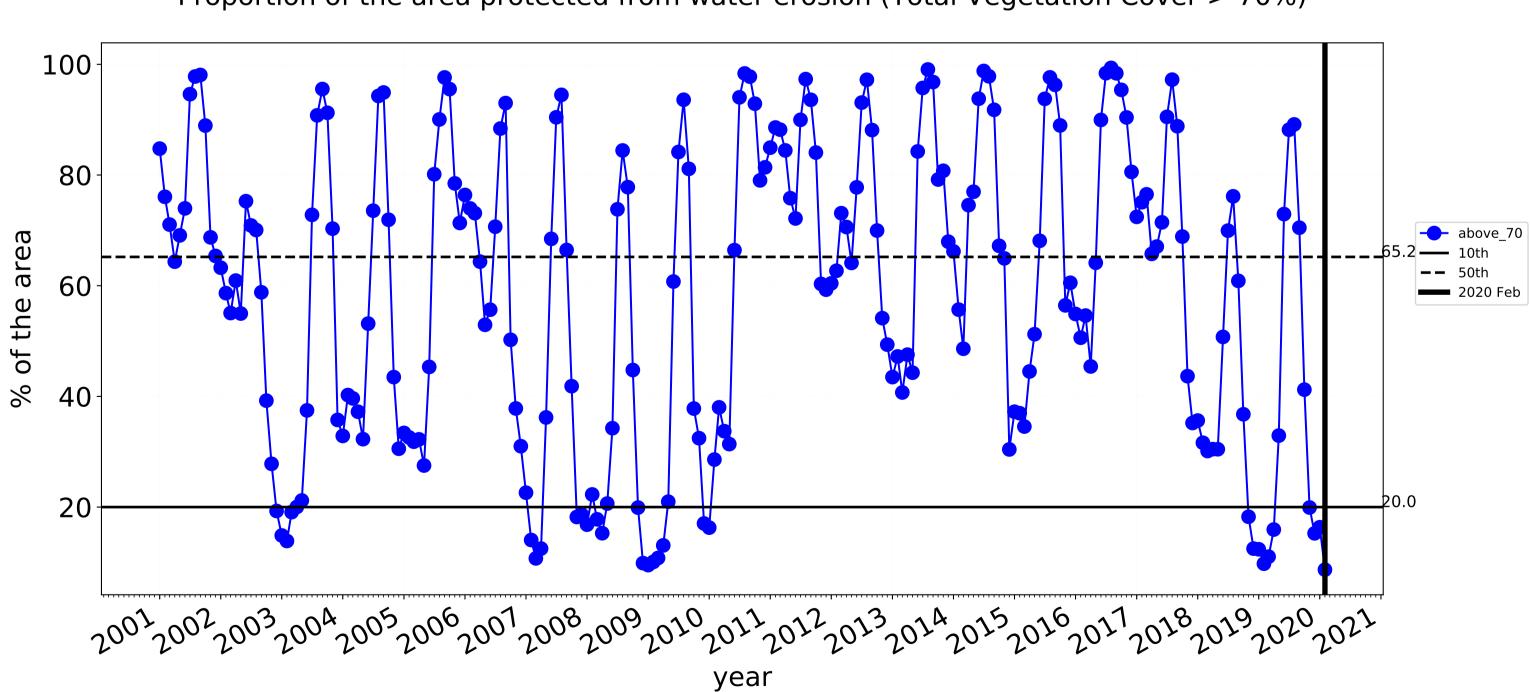
Area

protected 62.0% of region (1,975,924



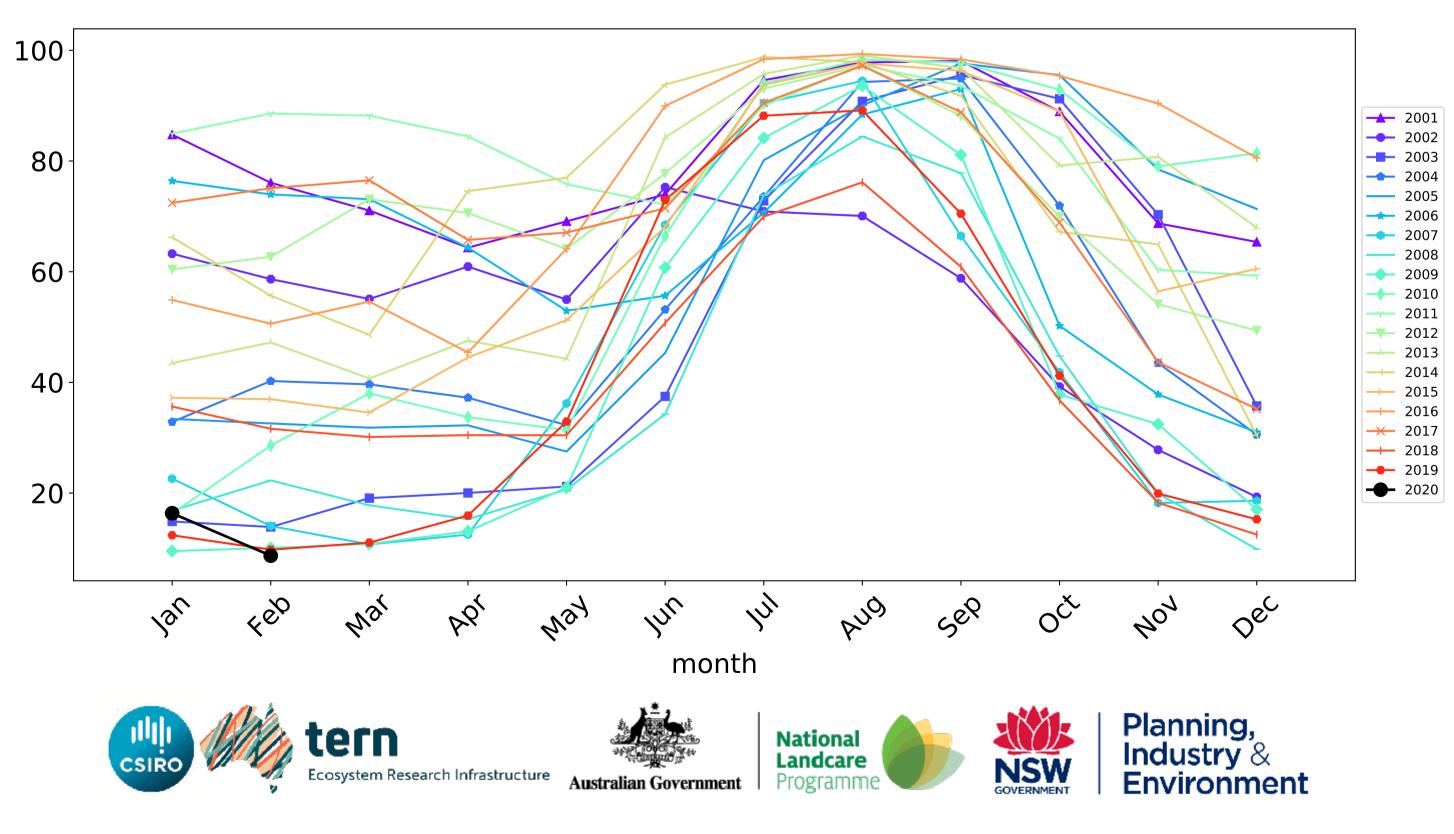


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



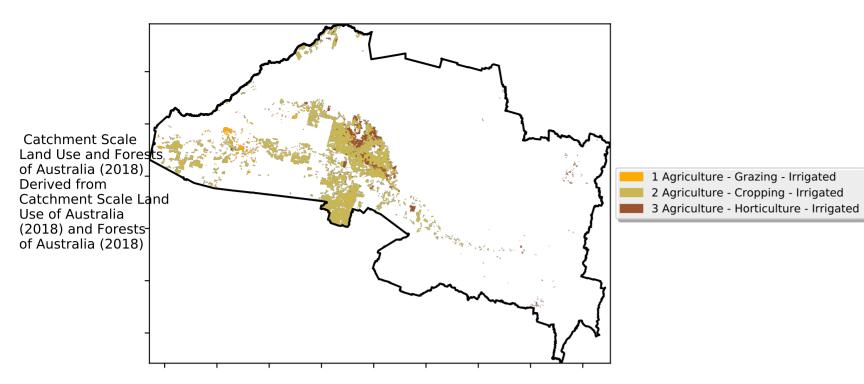
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

Cropping timeseries

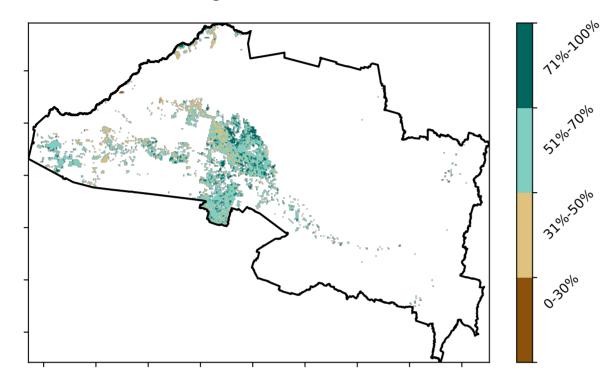


Irrigation

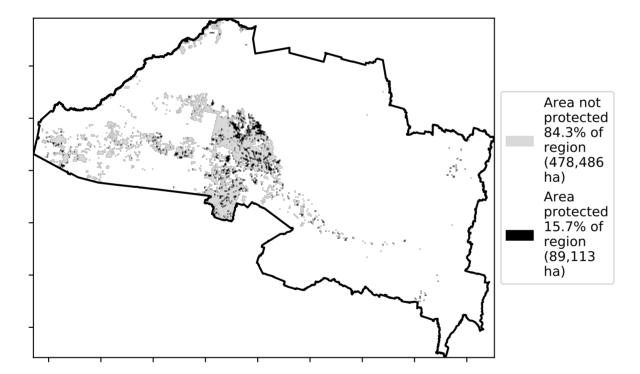
Land use and forest cover

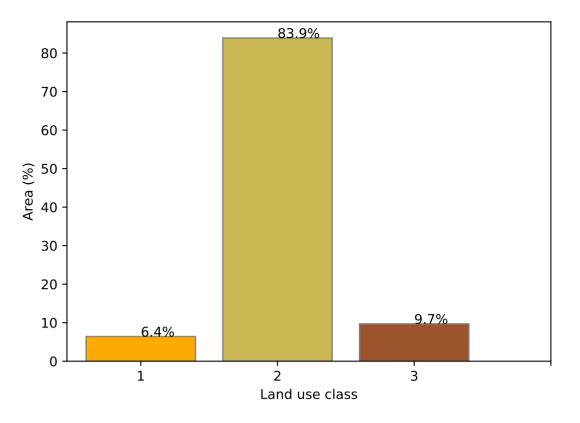


Total Vegetation Cover [%]



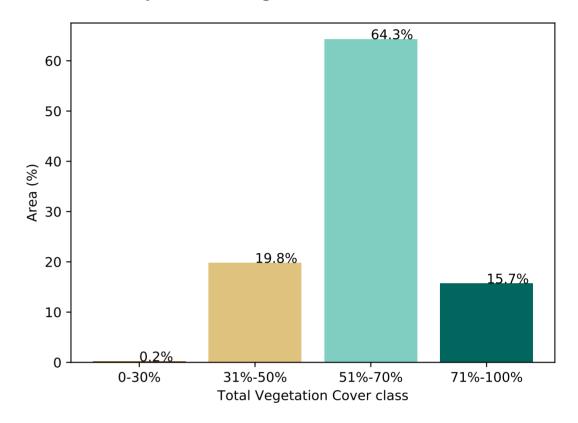
% Area protected from water erosion (>70%)



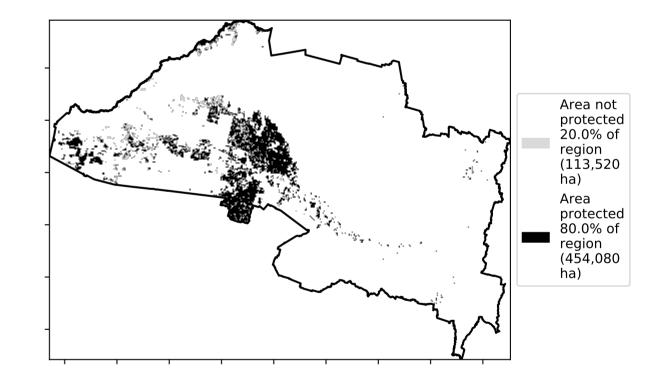


Proportion of each land class in area

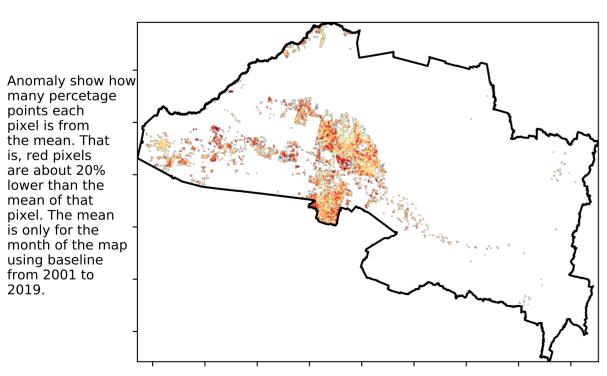
Proportion of vegetation cover class in area



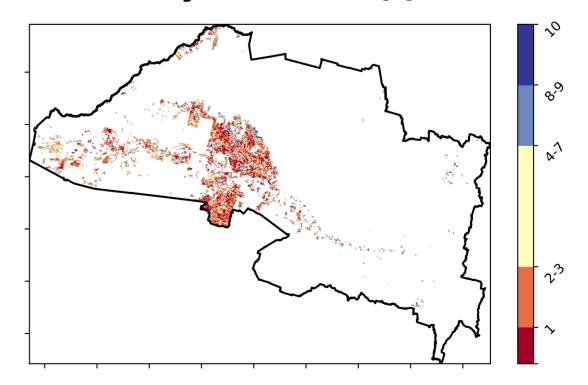
% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]



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 [%]





22

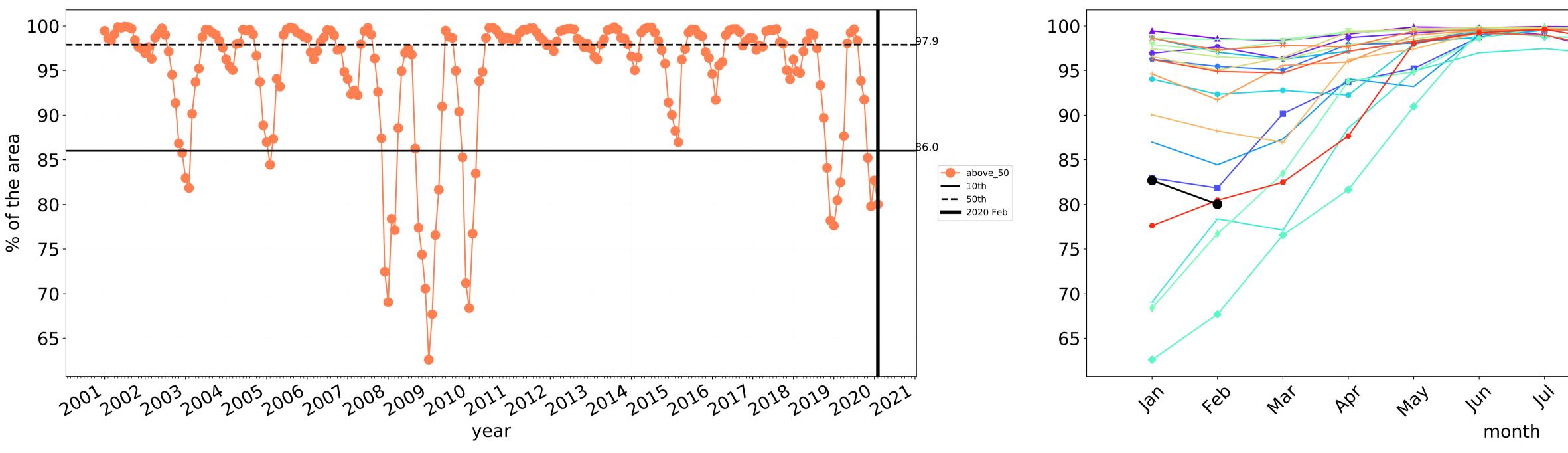
- 20

- 10

- 0

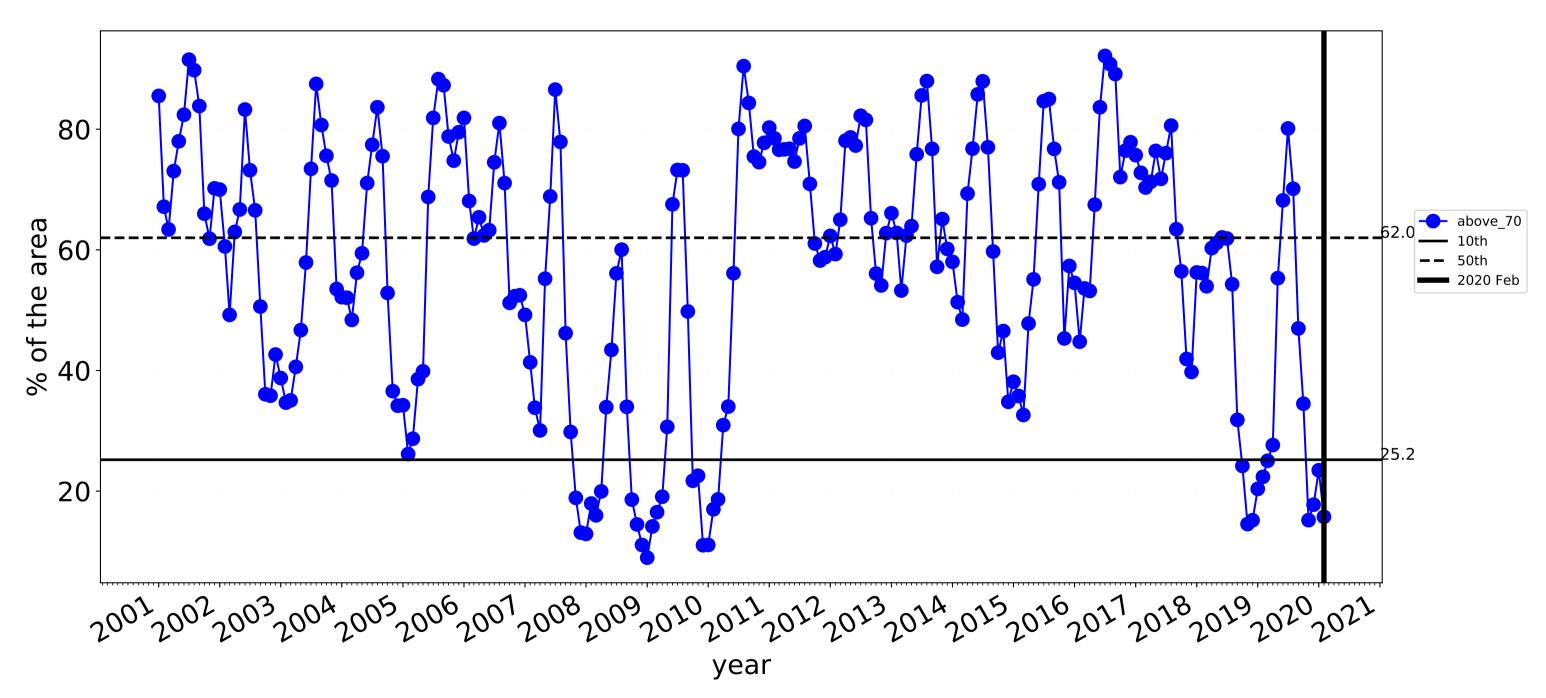
-10

-20



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

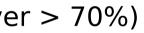
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



Irrigation timeseries

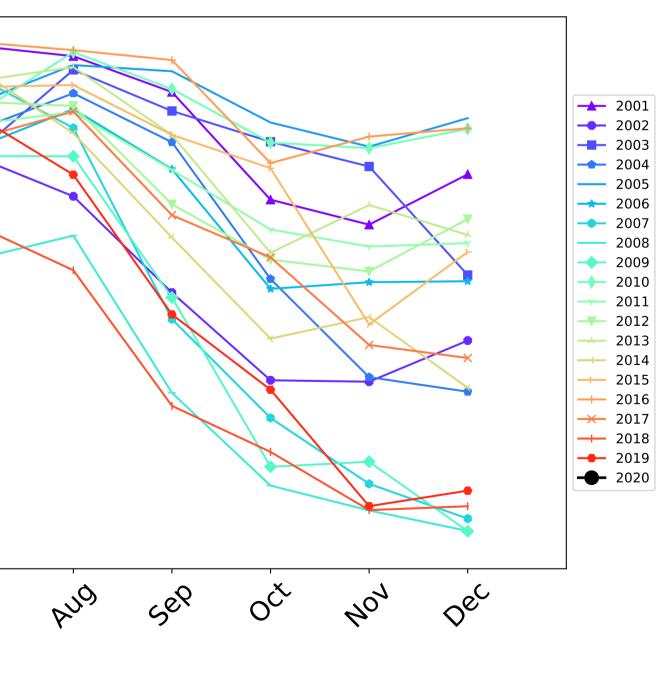


Wind erosion historical monthly area protected (Total Veg Cov >50%)



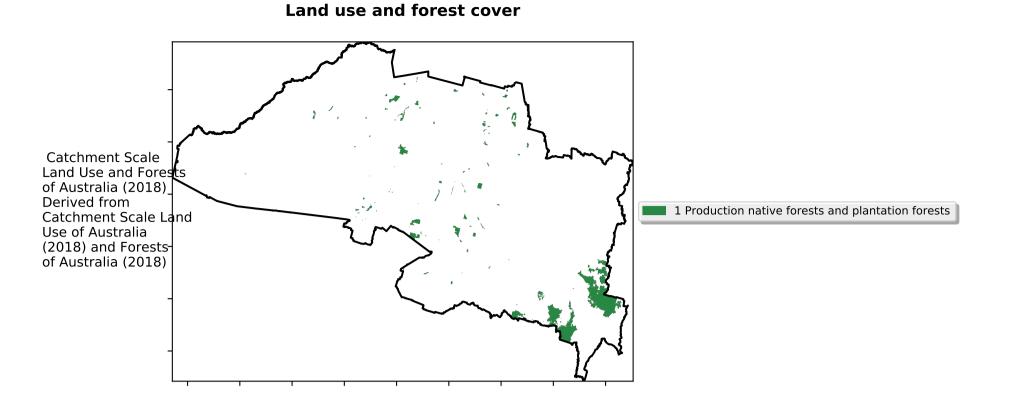
80-60-40-20 feb May In Par In In Wal P.Q1 month CSIRO CONTRACTOR CONTR Australian Government

___ 2001 --- 2002 ---- 2003 **---** 2004 **---** 2005 **----** 2006 **---** 2007 - 2008 **-** 2009 **—** 2010 2011 --- 2013 ← 2014 → 2015 ---- 2016 <u>→</u> 2017 --- 2018 --- 2019 ---- 2020 AUG Sel 404 Dec OČ

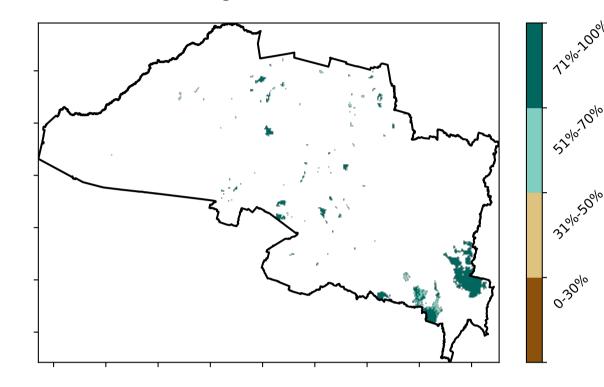




Production native forests and plantation forests



Total Vegetation Cover [%]

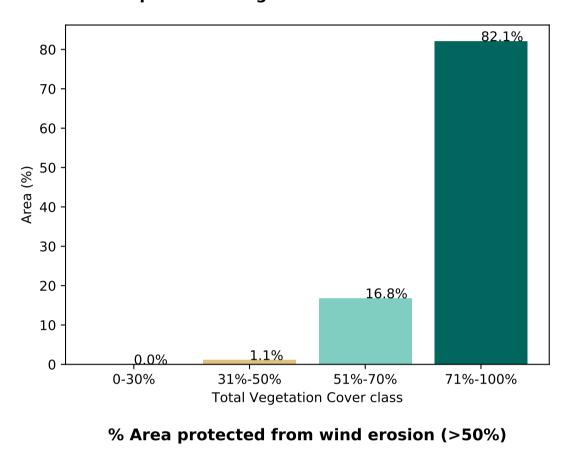


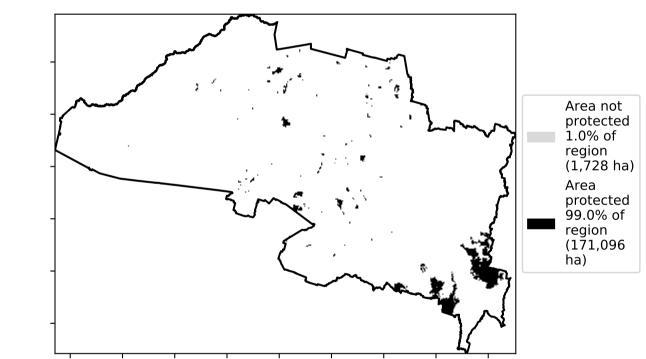
% Area protected from water erosion (>70%)



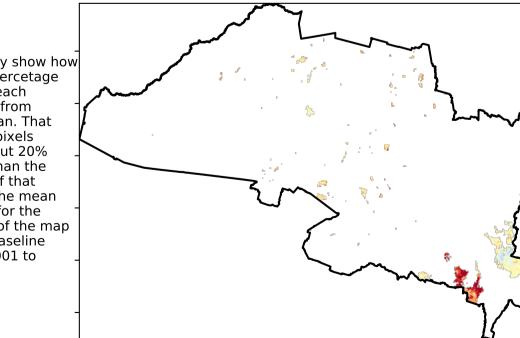


Proportion of vegetation cover class in area



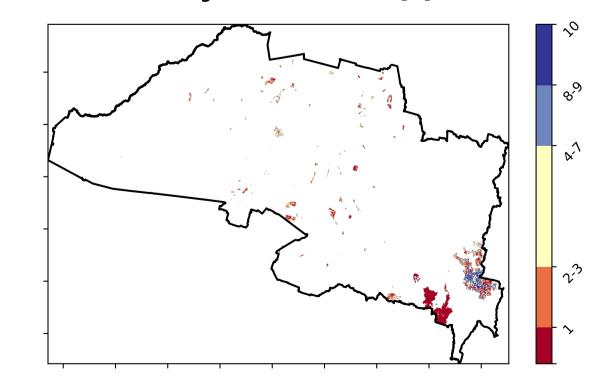


Total Vegetation Cover Anomaly [%]



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.

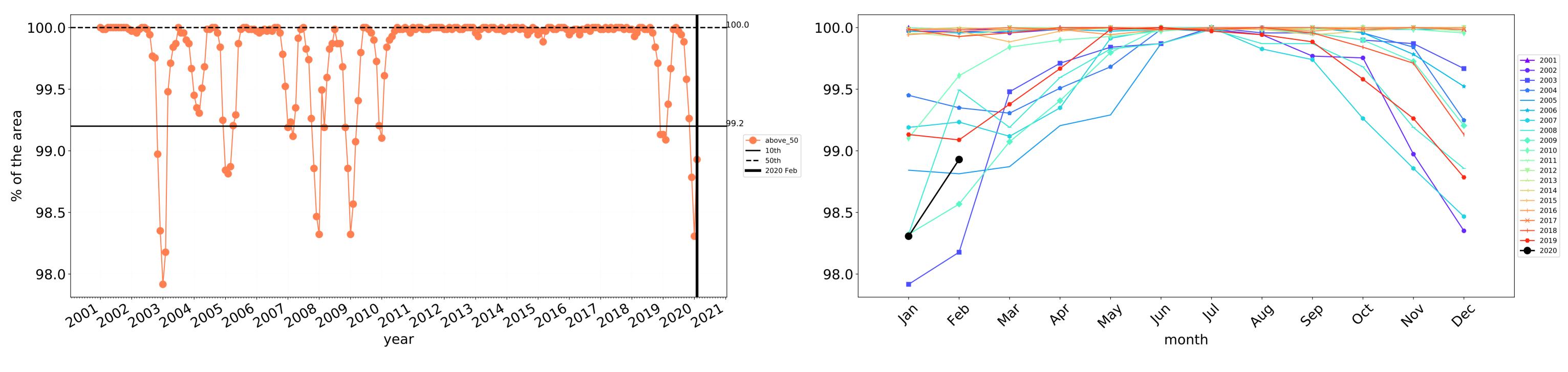
20

10

0

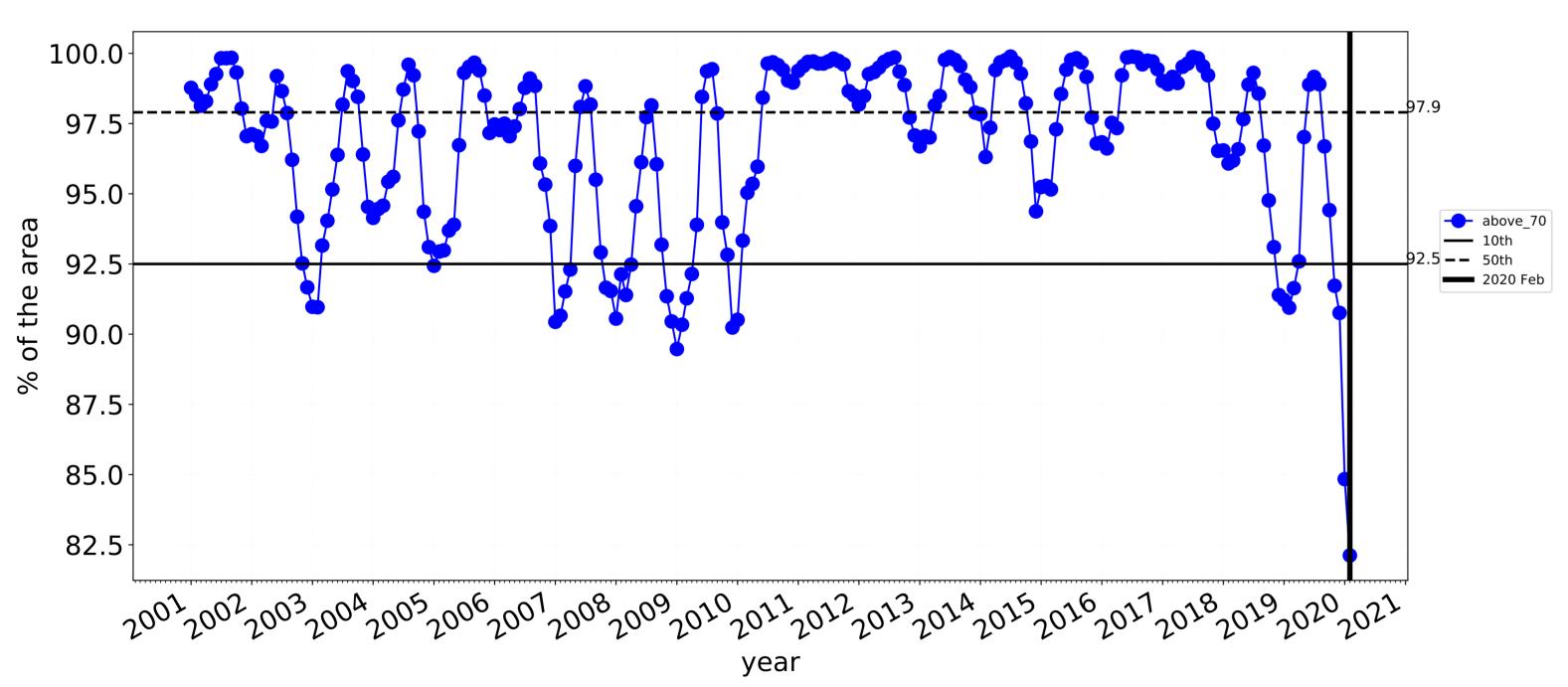
-10

-20

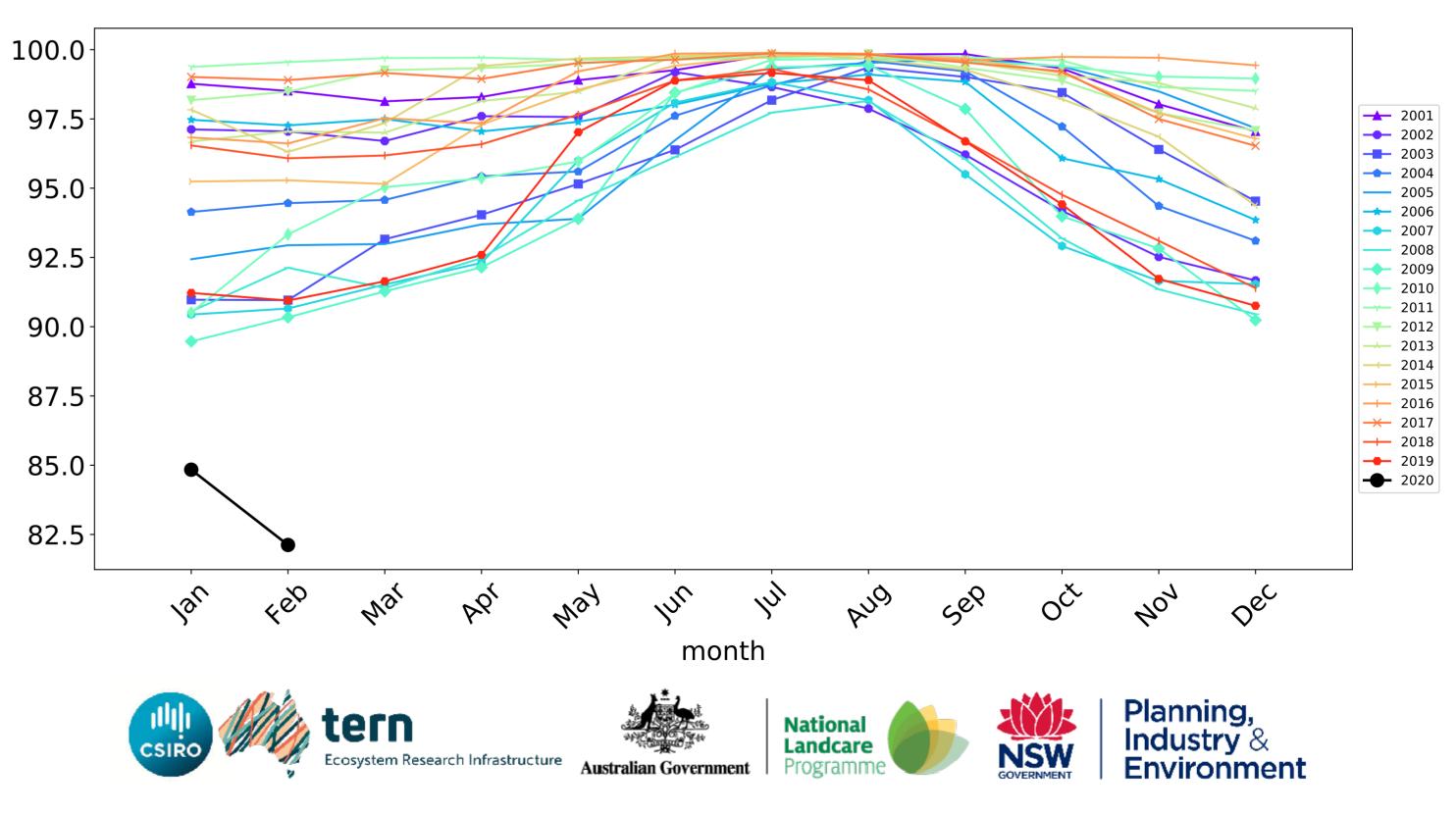


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)





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



Riverina (6,694,650 ha and no data 13,685 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 | 6,694,650 | 99.4% 6,656,275 | 67.9% 4,547,525 | 21.5% 1,441,100 | 9.6% 640,550 | 2.9% 194,275 | 1.1% 76,875 |
| Conservation and natural environments | 323,050 | 100.0% 322,925 | 90.3% 291,625 | 65.3% 210,950 | 50.9% 164,275 | 24.7% 79,700 | 8.9% 28,650 |
| Conservation and natural environments non forest | 83,350 | 99.9% 83,300 | 64.9% 54,075 | 17.3% 14,425 | 9.7% 8,050 | 6.3% 5,275 | 2.6% 2,200 |
| Conservation and natural environments Forest (non woodland) | 195,200 | 100.0% 195,125 | 99.0% 193,175 | 80.7% 157,500 | 65.3% 127,425 | 36.0% 70,325 | 13.4% 26,075 |
| Agriculture | 6,067,900 | 99.4% 6,030,925 | 65.6% 3,983,550 | 17.4% 1,055,000 | 5.9% 357,400 | 0.7% 43,700 | 0.1% 8,075 |
| Grazing | 2,311,500 | 98.7% 2,280,475 | 66.9% 1,546,450 | 29.8% 688,075 | 12.8% 295,875 | 1.7% 39,050 | 0.3% 6,750 |
| Grazing non forest | 2,066,500 | 98.5% 2,035,475 | 63.1% 1,304,700 | 24.7% 510,250 | 9.6% 197,650 | 1.0% 19,750 | 0.1% 3,000 |
| Grazing Woodland forest | 141,650 | 100.0% 141,650 | 98.0% 138,800 | 64.8% 91,725 | 27.6% 39,125 | 1.2% 1,675 | 0.1% 100 |
| Grazing - Forest (non woodland) | 103,350 | 100.0% 103,350 | 99.6% 102,950 | 83.3% 86,100 | 57.2% 59,100 | 17.1% 17,625 | 3.5% 3,650 |
| Cropping | 3,186,975 | 99.8% 3,182,050 | 62.2% 1,981,200 | 8.7% 276,975 | 1.3% 40,975 | 0.0% 1,125 | 0.0% 225 |
| Irrigation | 567,600 | 99.8% 566,575 | 80.0% 454,225 | 15.7% 89,350 | 3.6% 20,500 | 0.6% 3,525 | 0.2% 1,100 |
| Production native forests and plantation forests | 172,825 | 100.0% 172,825 | 98.9% 170,975 | 82.1% 141,925 | 64.8% 112,025 | 40.8% 70,575 | 23.2% 40,075 |

