## **Total vegetation cover soil protection Region:NRM Hunter NSW**

## Date: January 2009

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

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

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

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

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

Erosion protection: Wind erosion 50% total vegetation cover

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

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

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

#### **Erosion protection**

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

#### Rainfall

• Millimetres rainfall each month (black line).

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

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

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

## Acknowledgment of data:

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

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

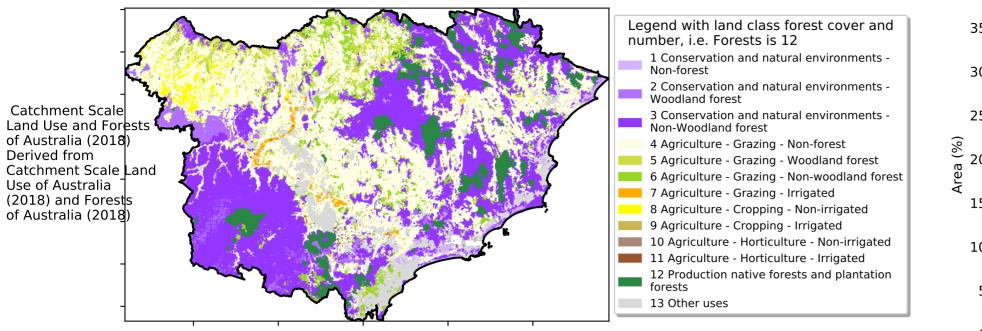


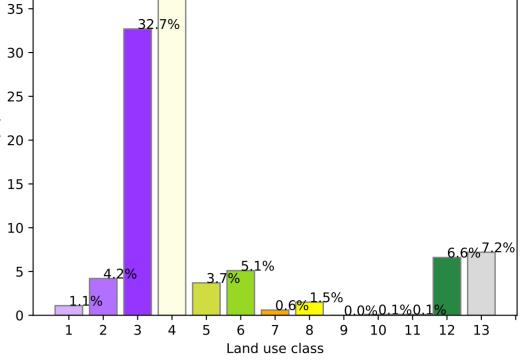
## **Vegetation Cover Jan 2009**

#### Land use and forest cover

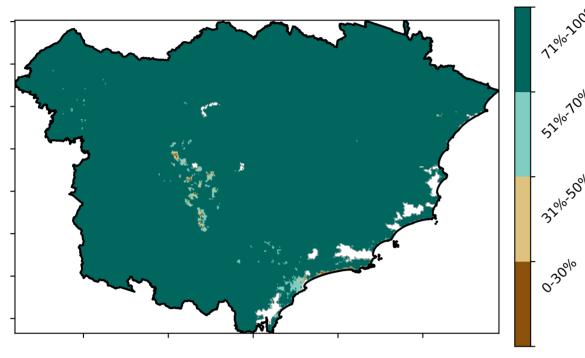
Proportion of each land class in area

36.9%

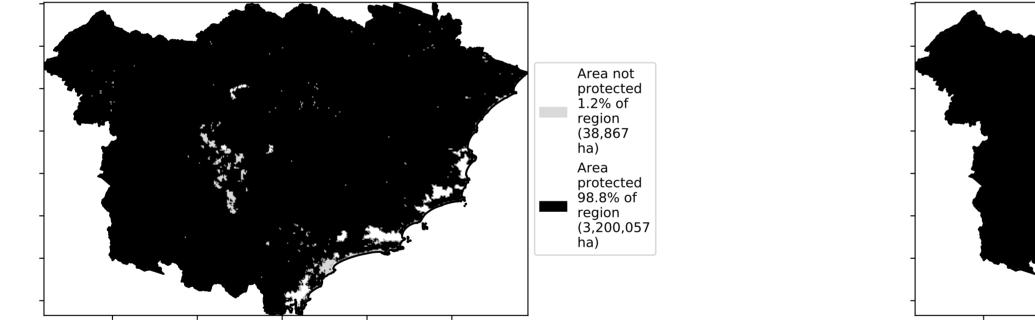




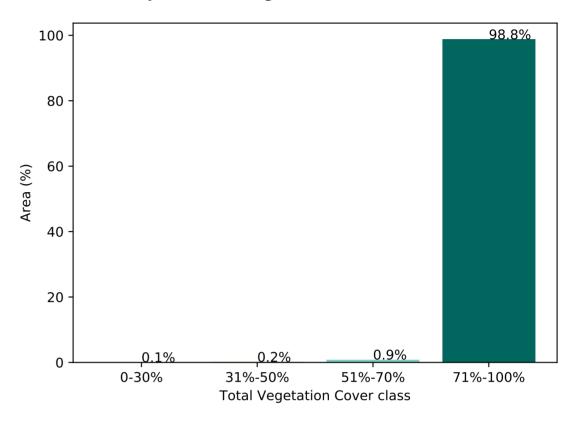
**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)



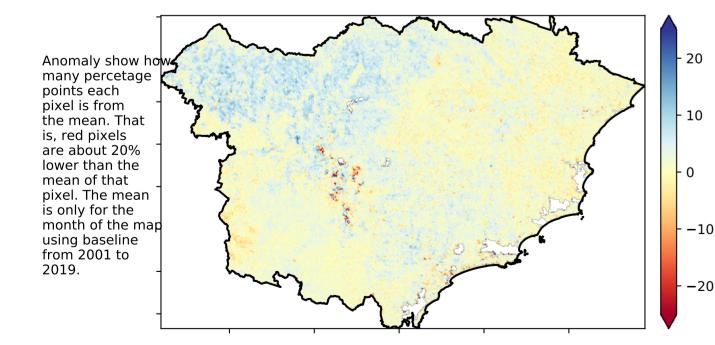
Proportion of vegetation cover class in area



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

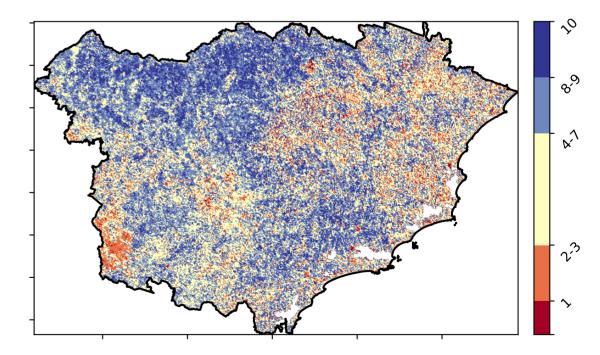


**Total Vegetation Cover Anomaly [%]** 

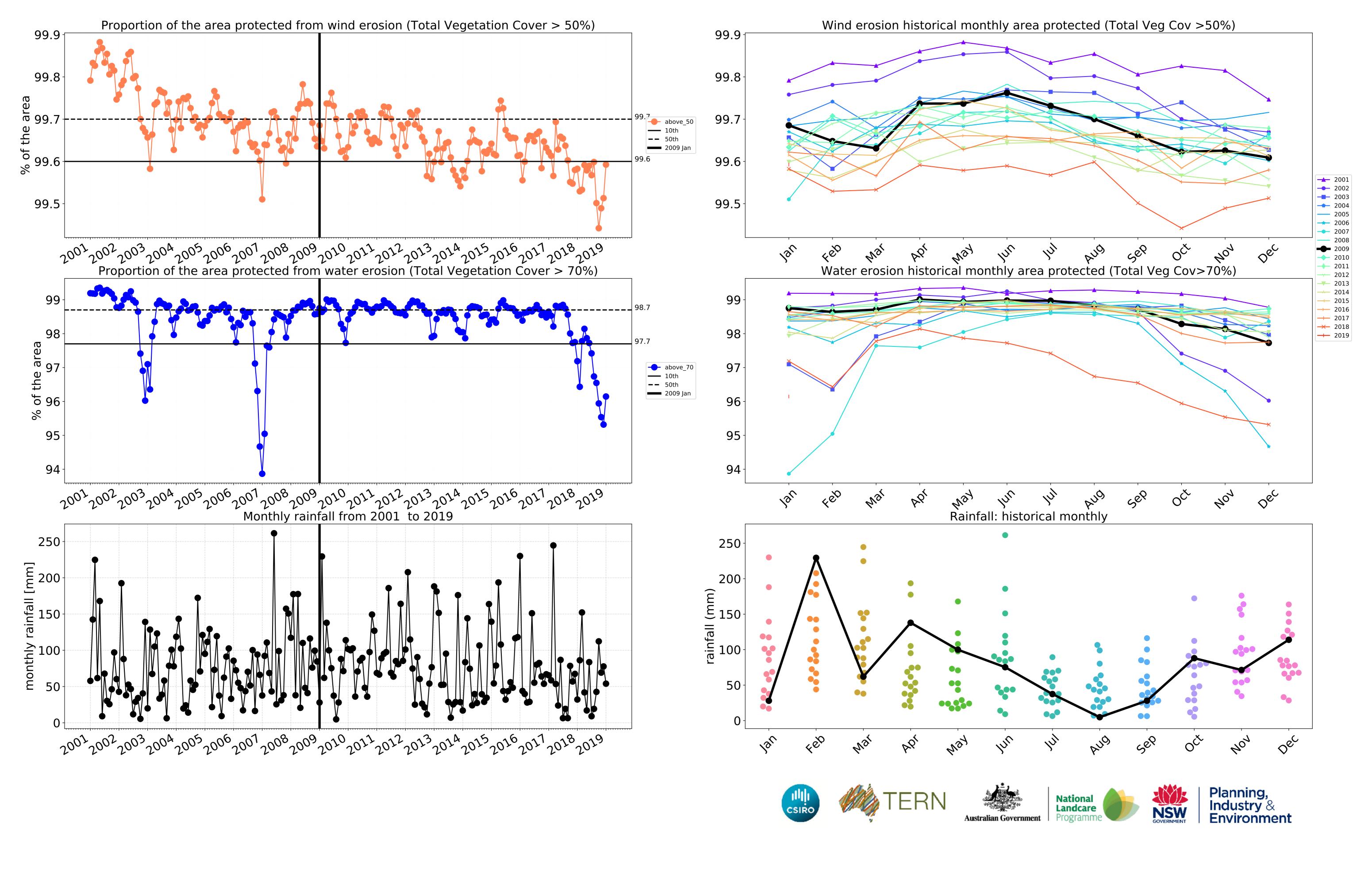


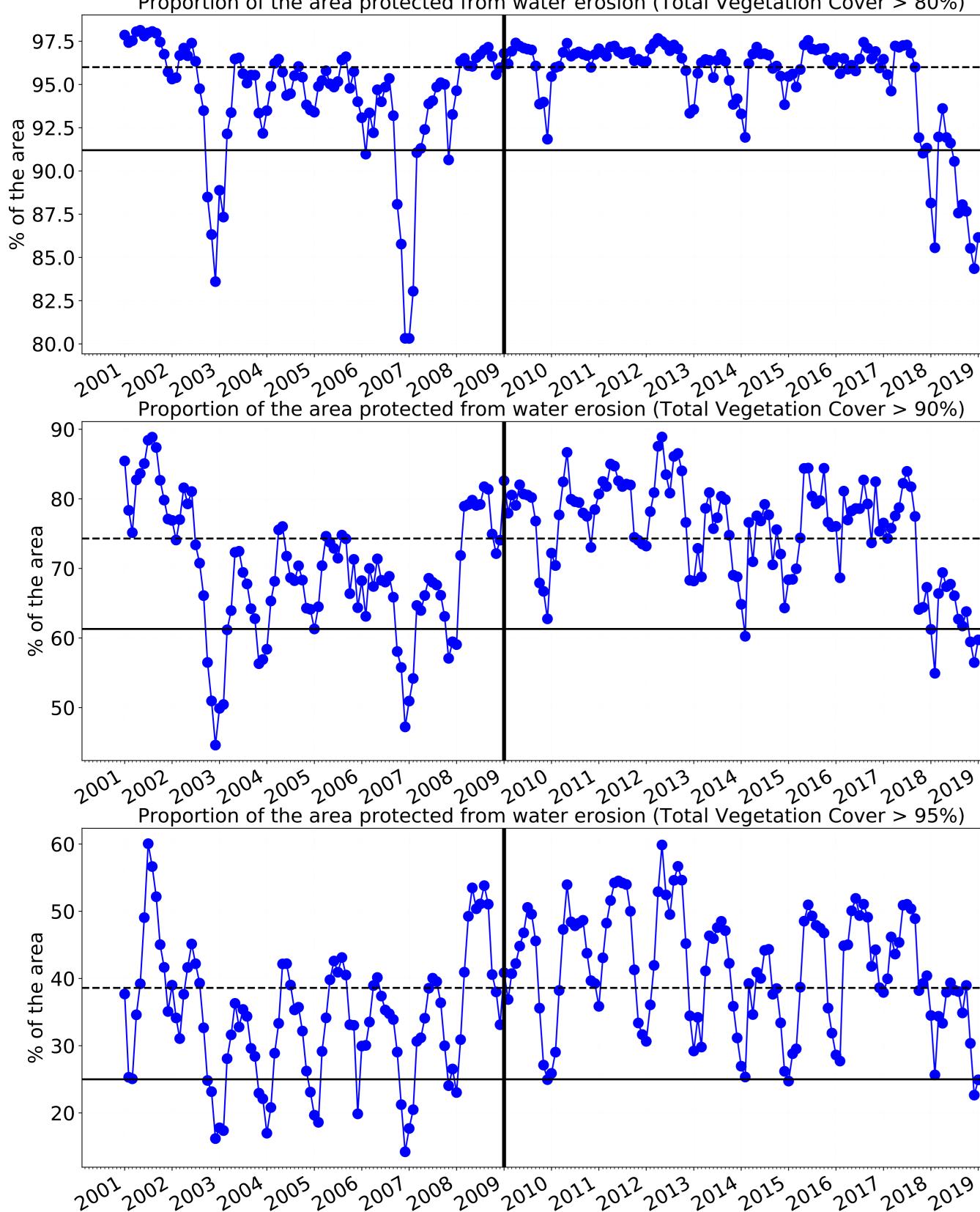
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

**Total Vegetation Cover Decile [%]** 

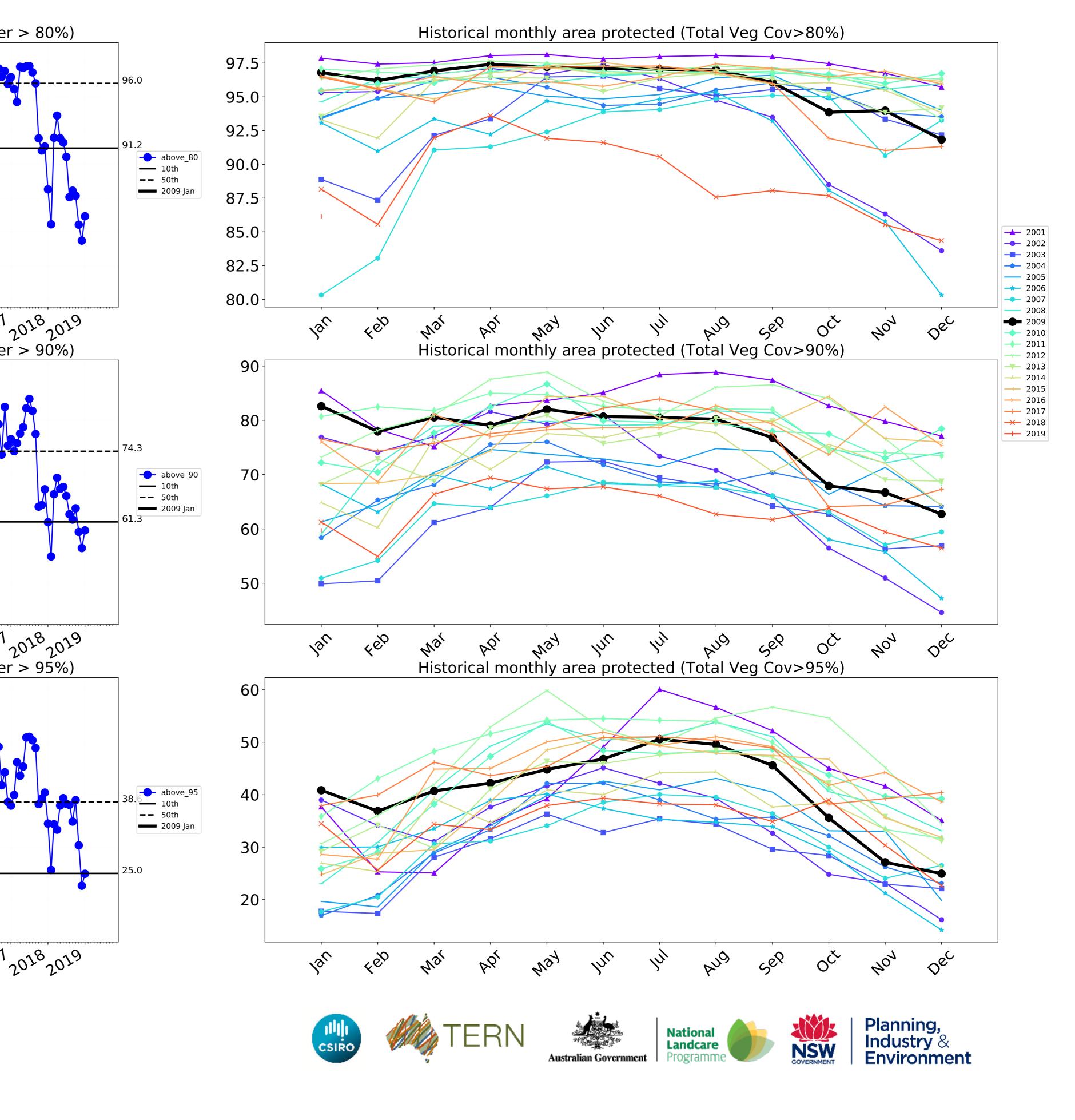






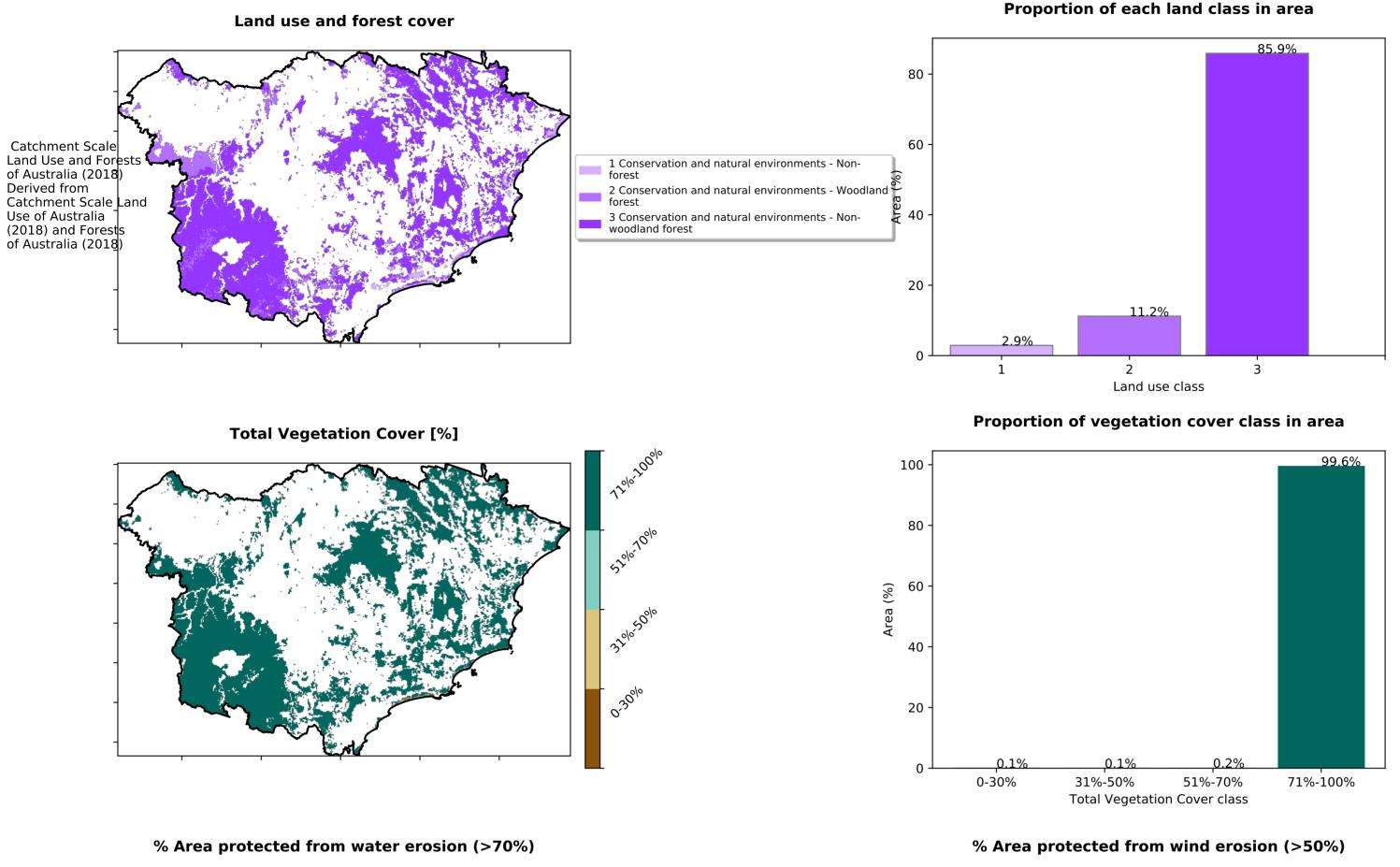


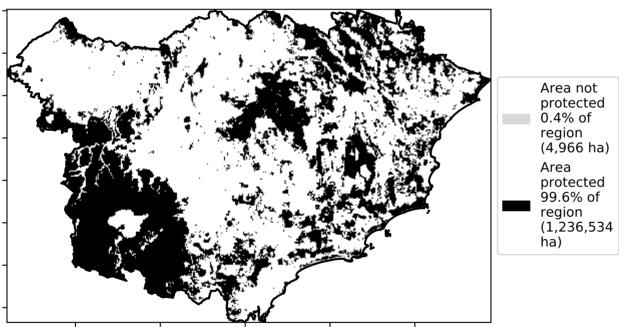
Proportion of the area protected from water erosion (Total Vegetation Cover > 80%)

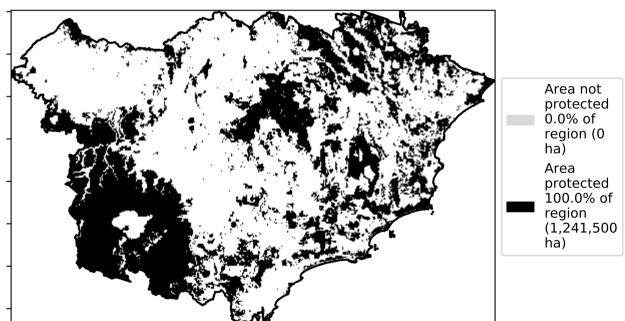


4

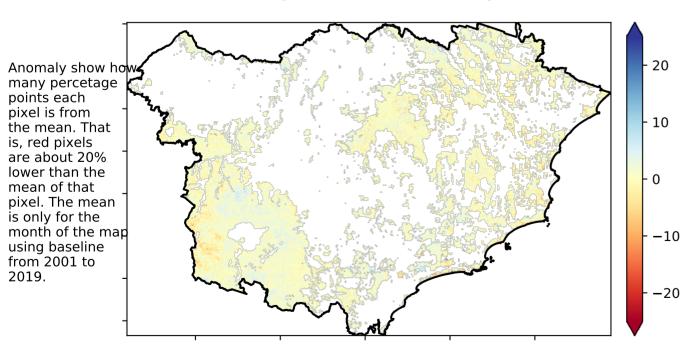
#### **Conservation and natural environments**





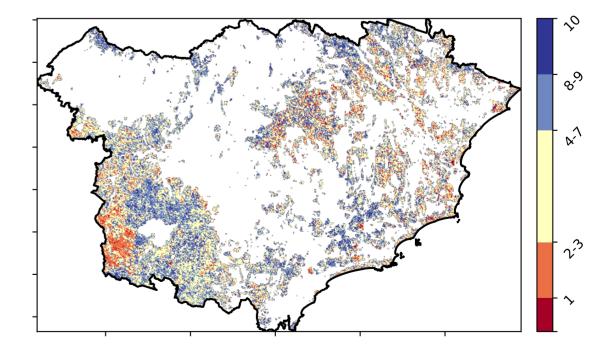


**Total Vegetation Cover Anomaly [%]** 

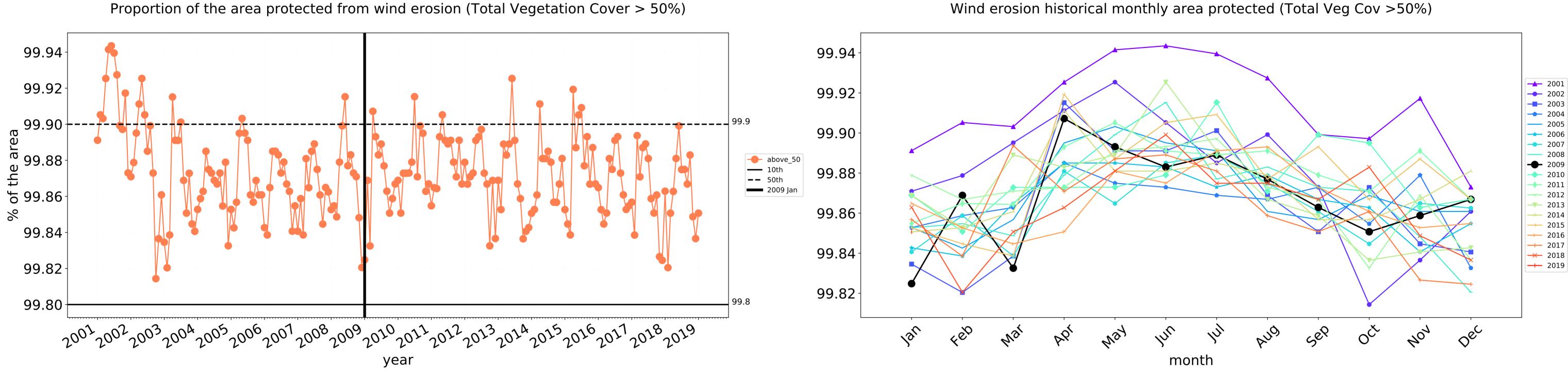


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

**Total Vegetation Cover Decile [%]** 

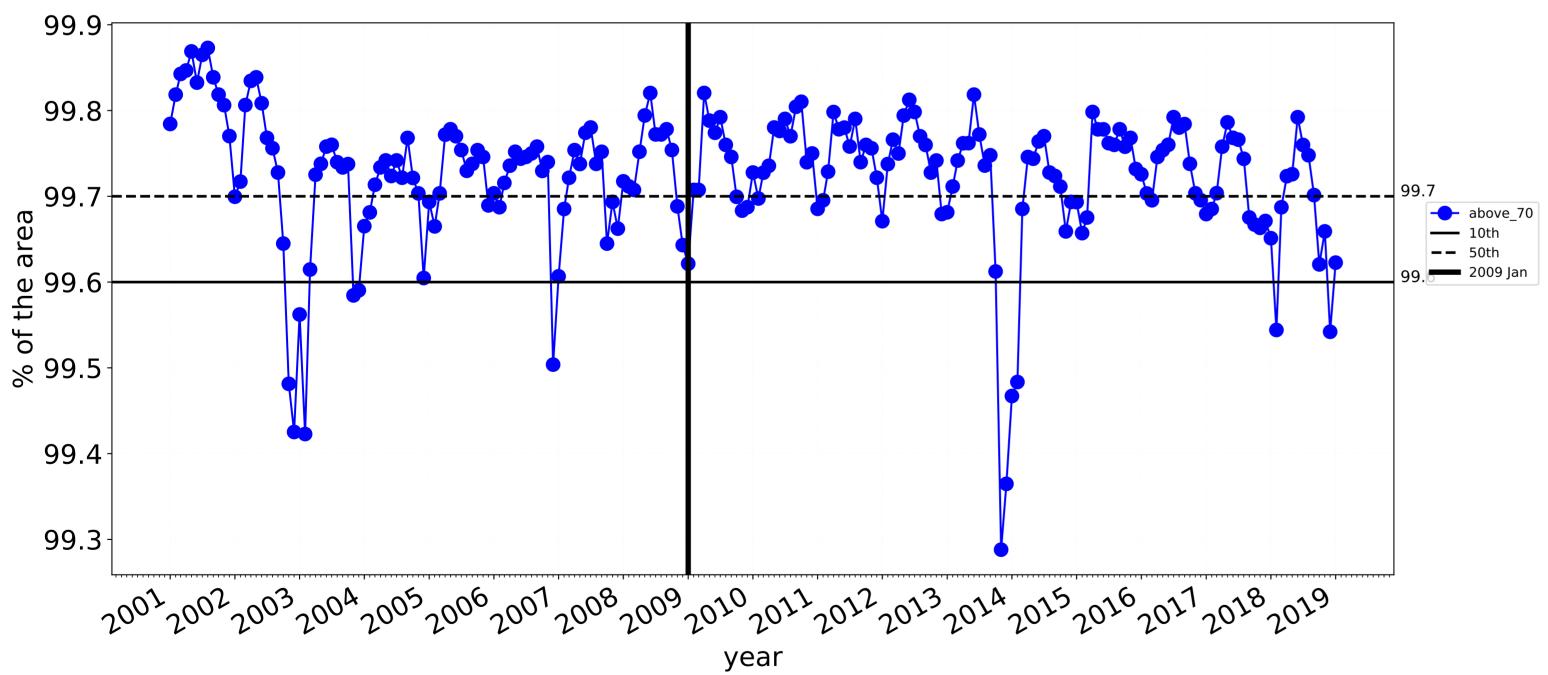


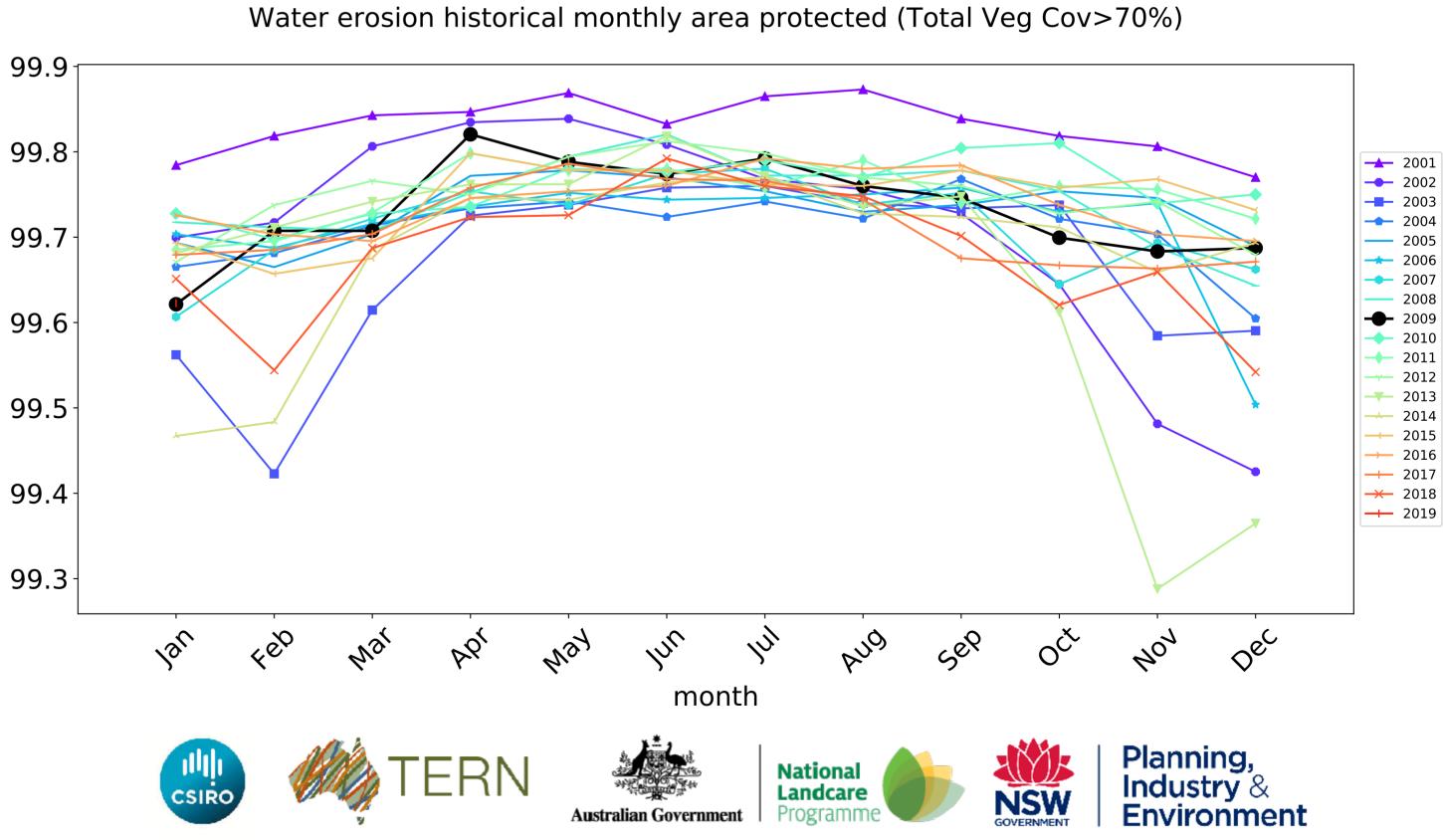


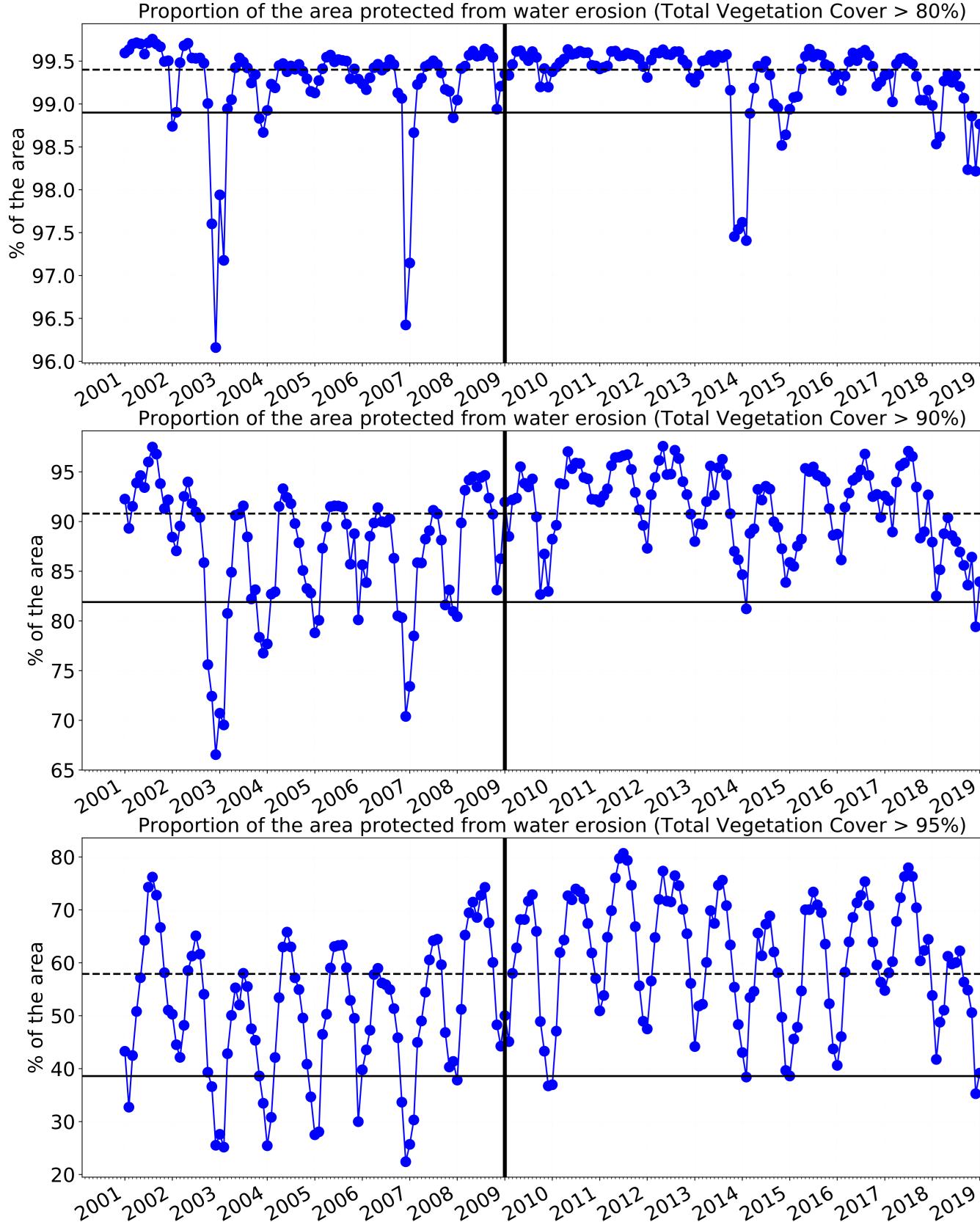


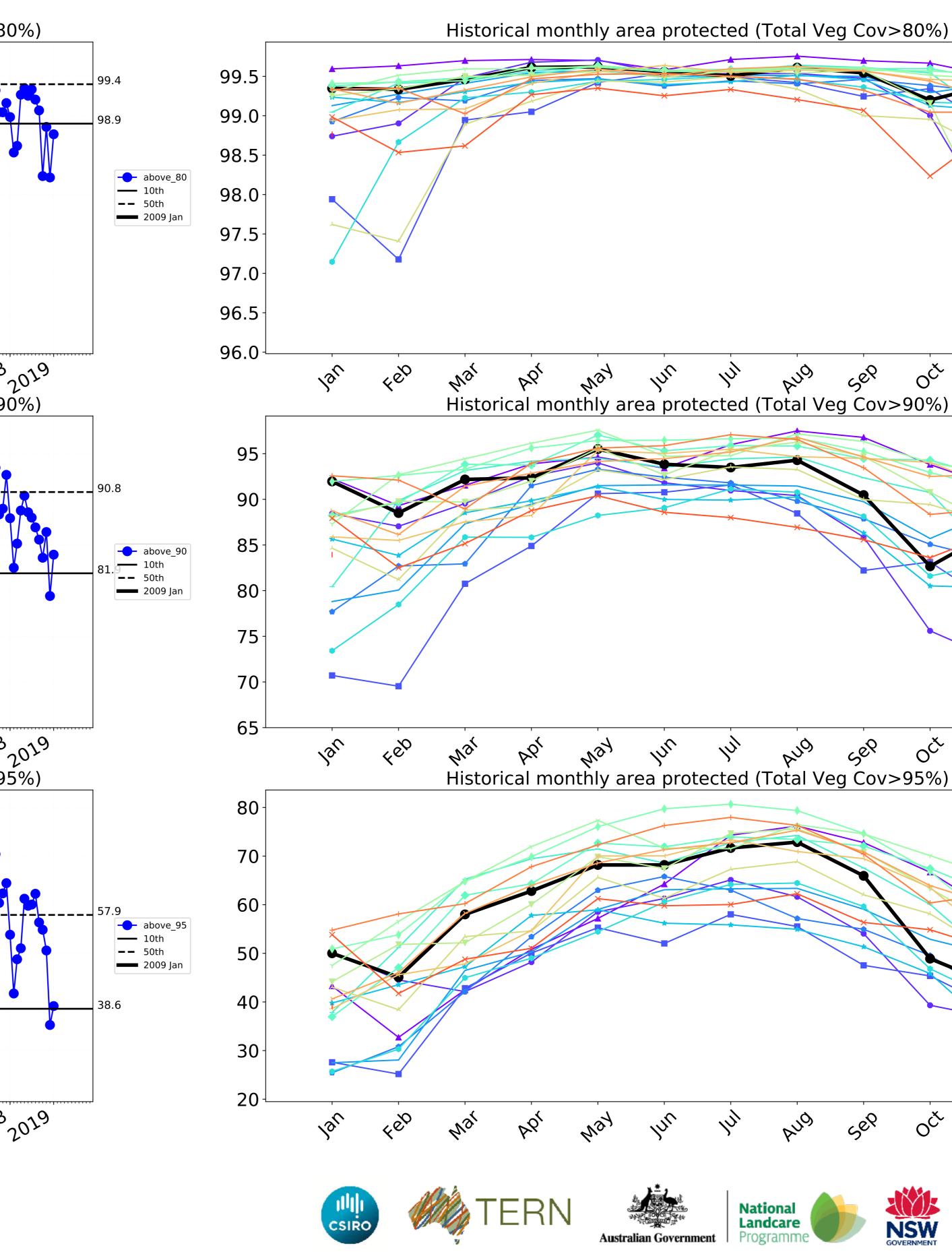
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

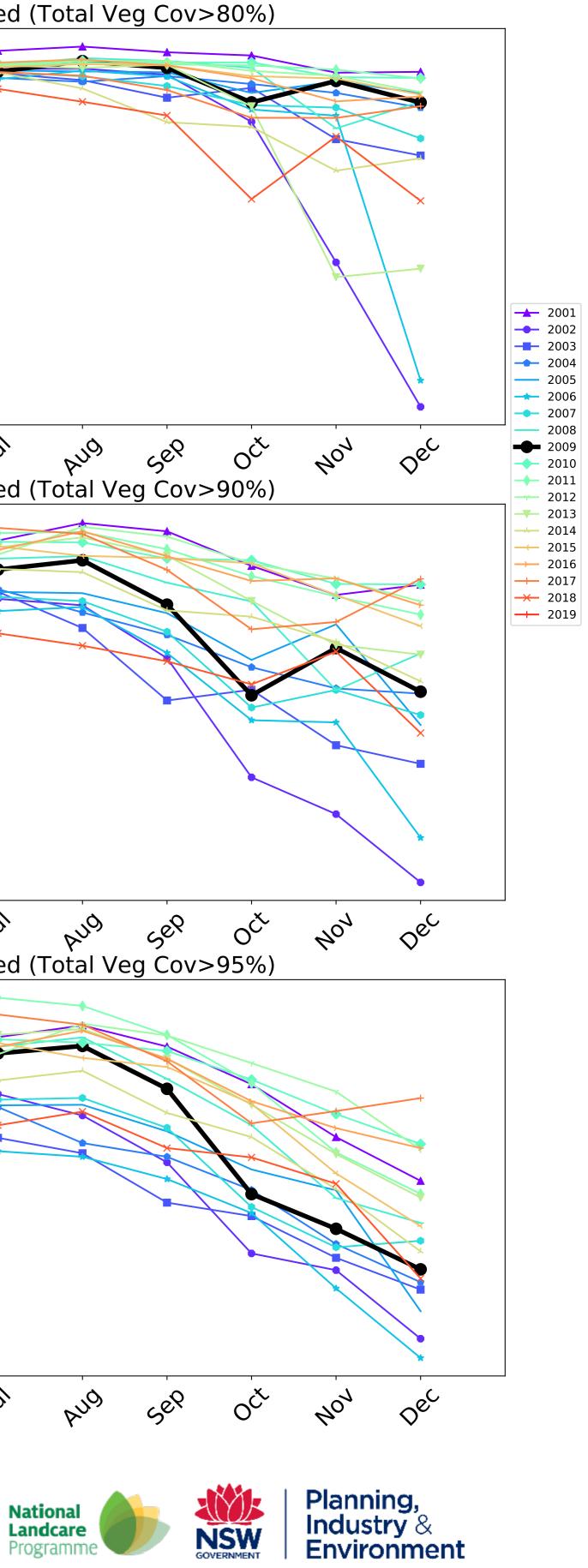




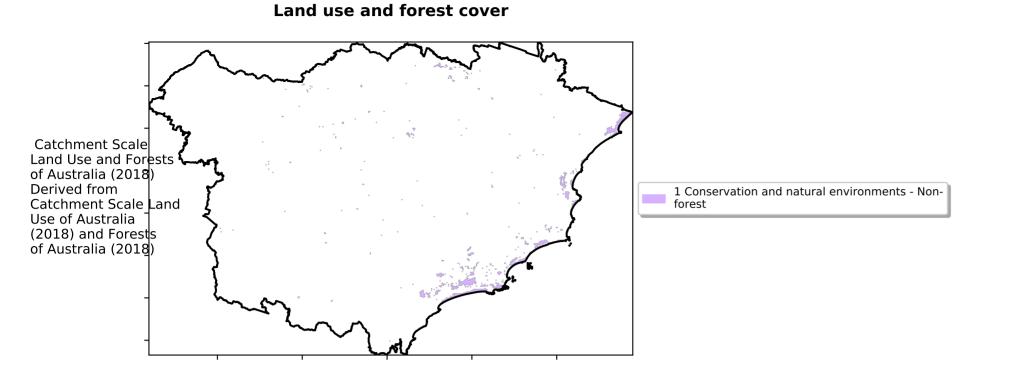




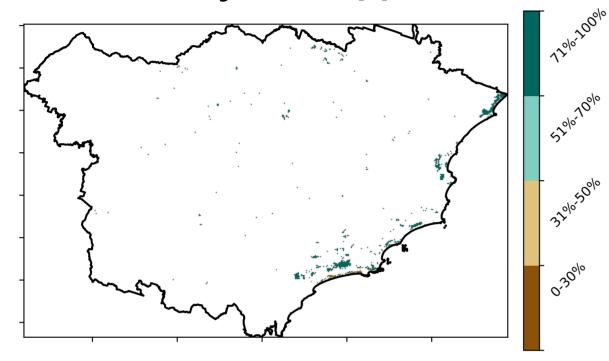




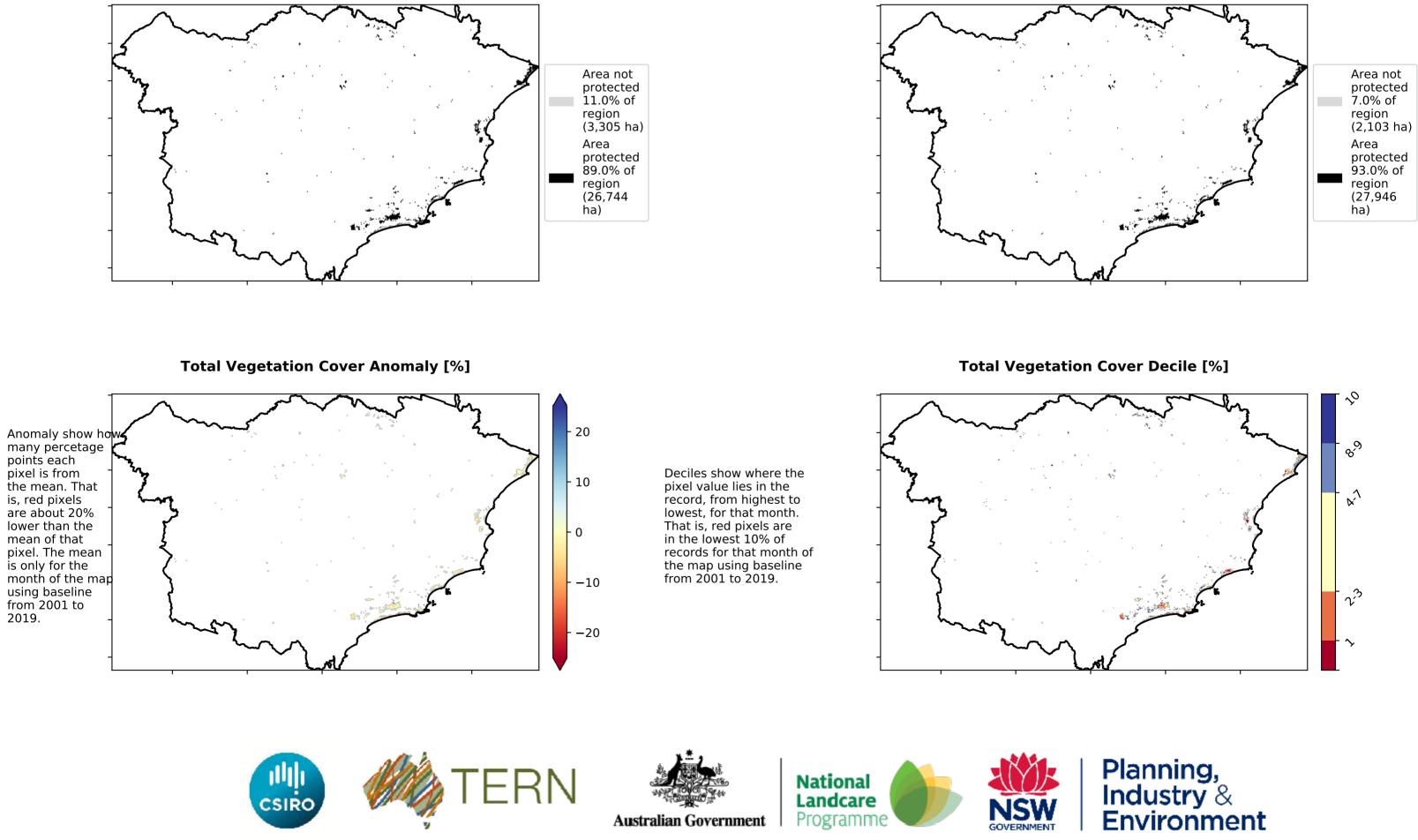
#### **Conservation and natural environments non forest**



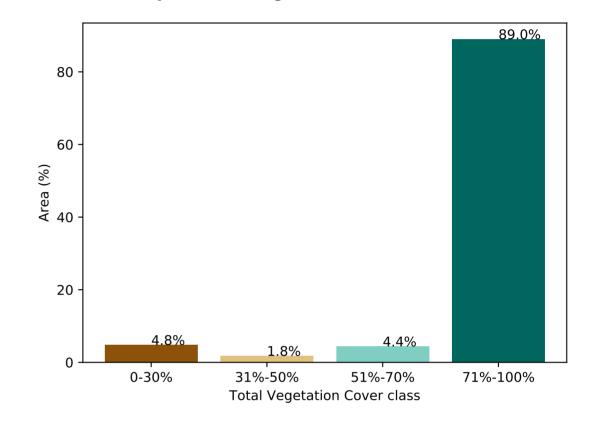
**Total Vegetation Cover [%]** 



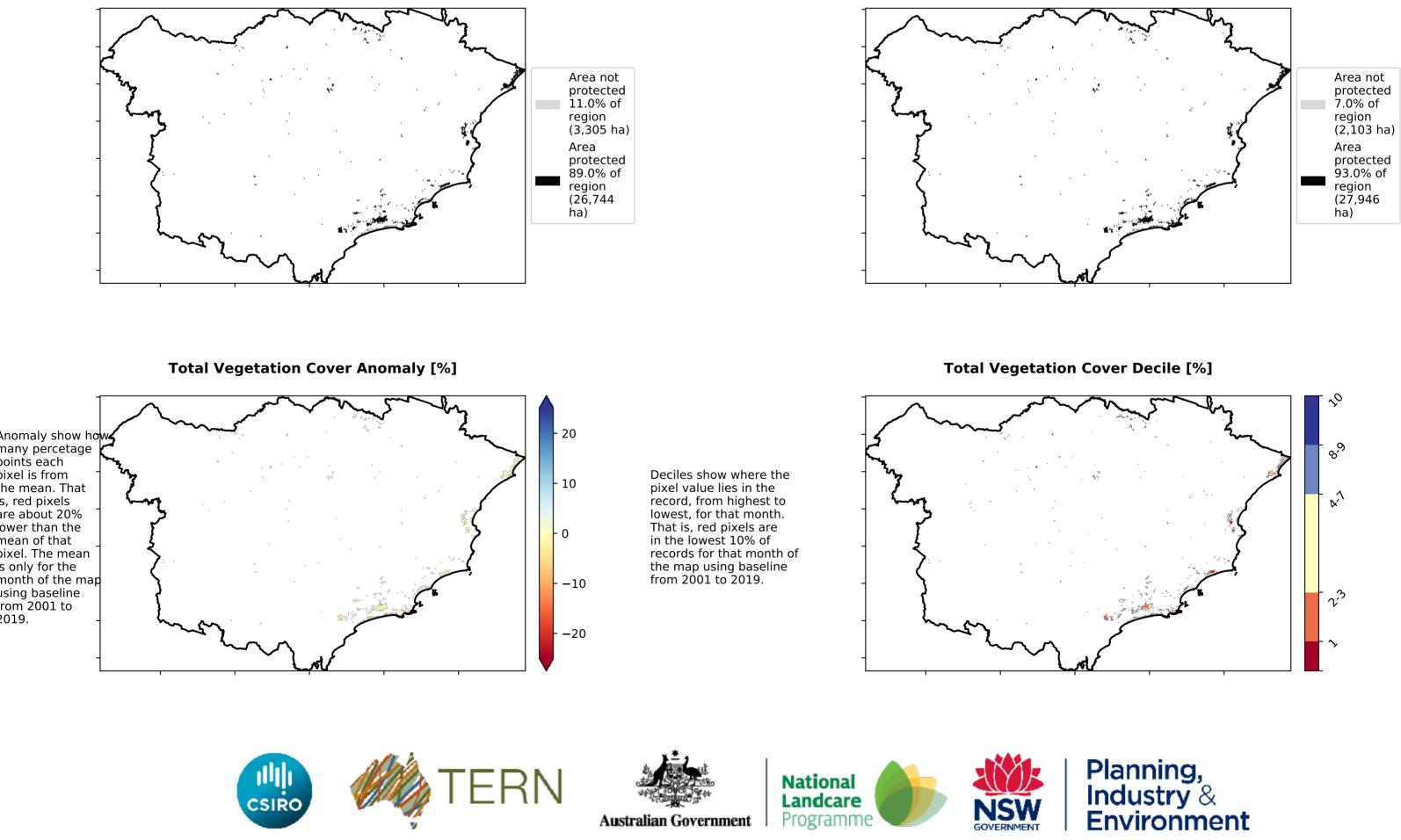
% Area protected from water erosion (>70%)

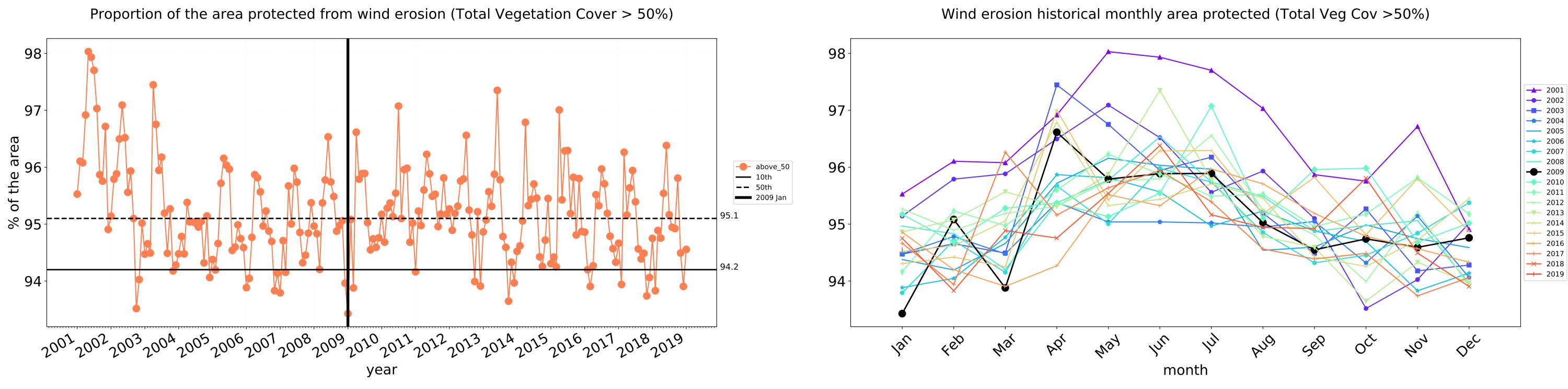


Proportion of vegetation cover class in area

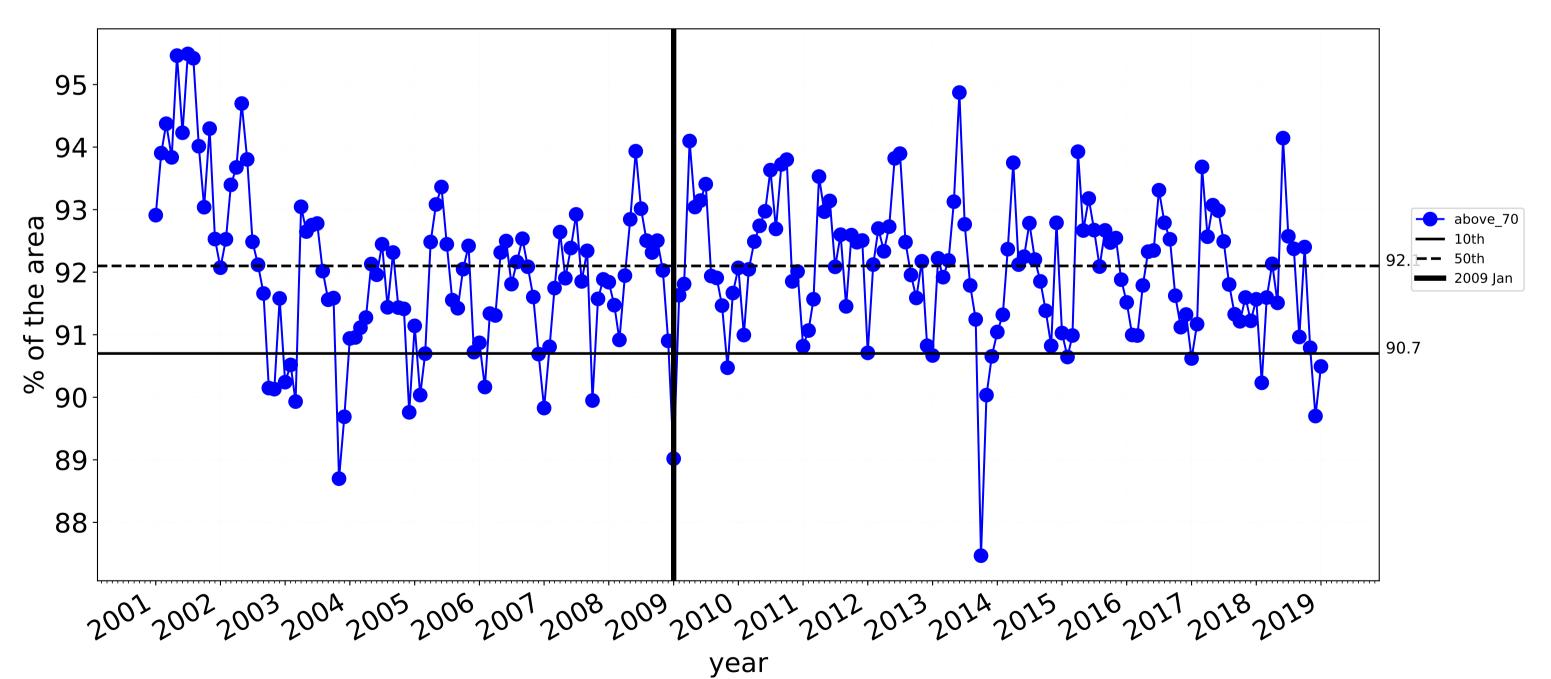


% Area protected from wind erosion (>50%)

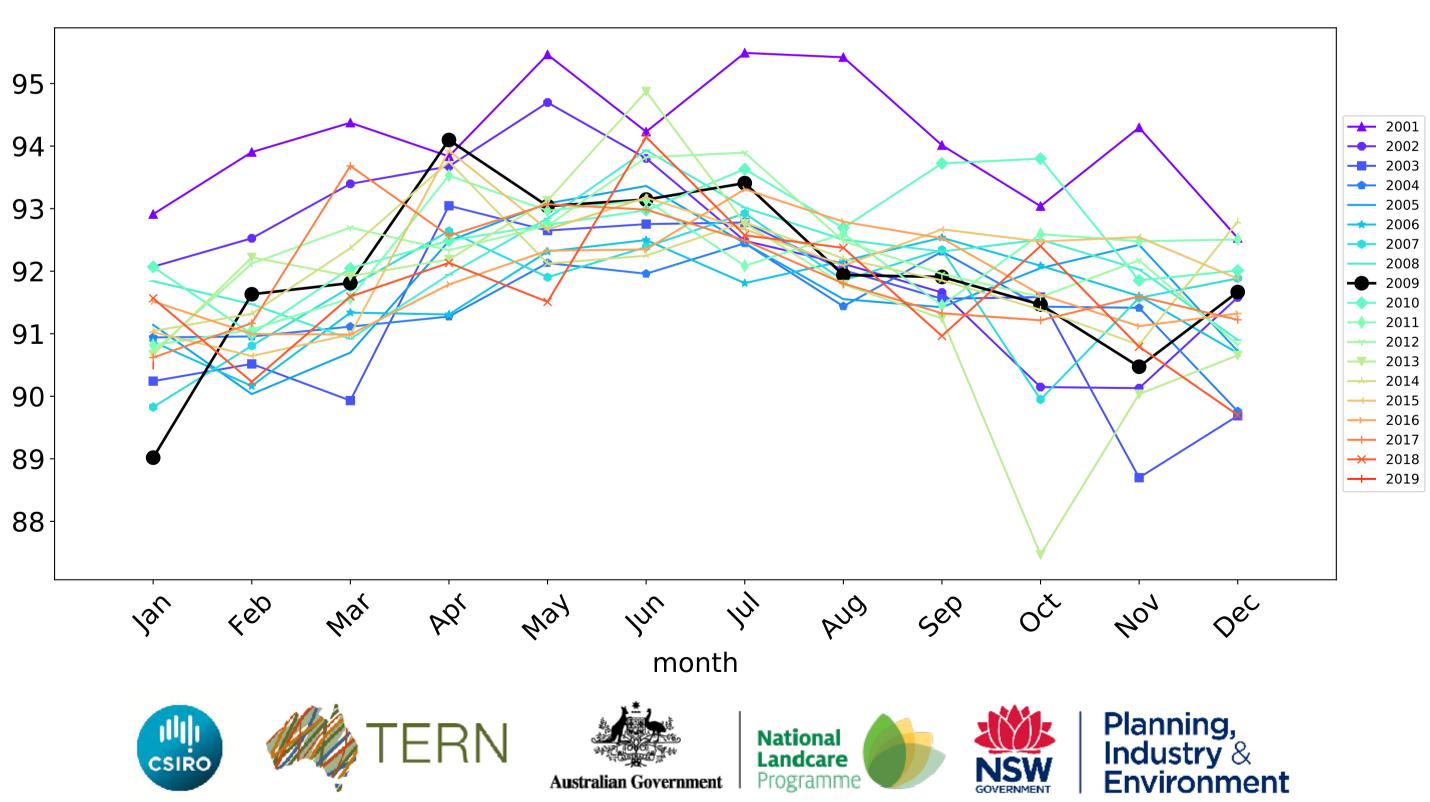


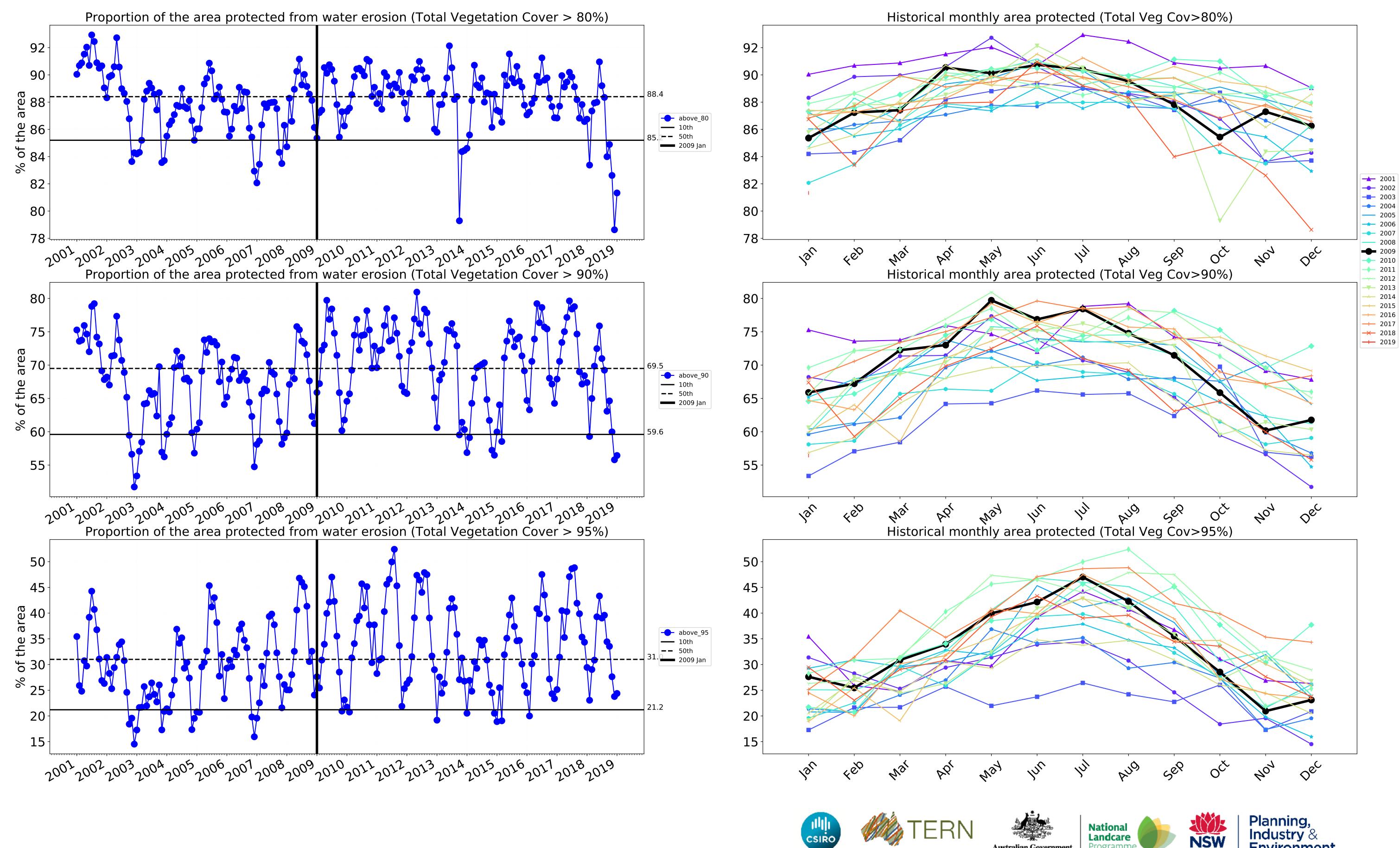


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

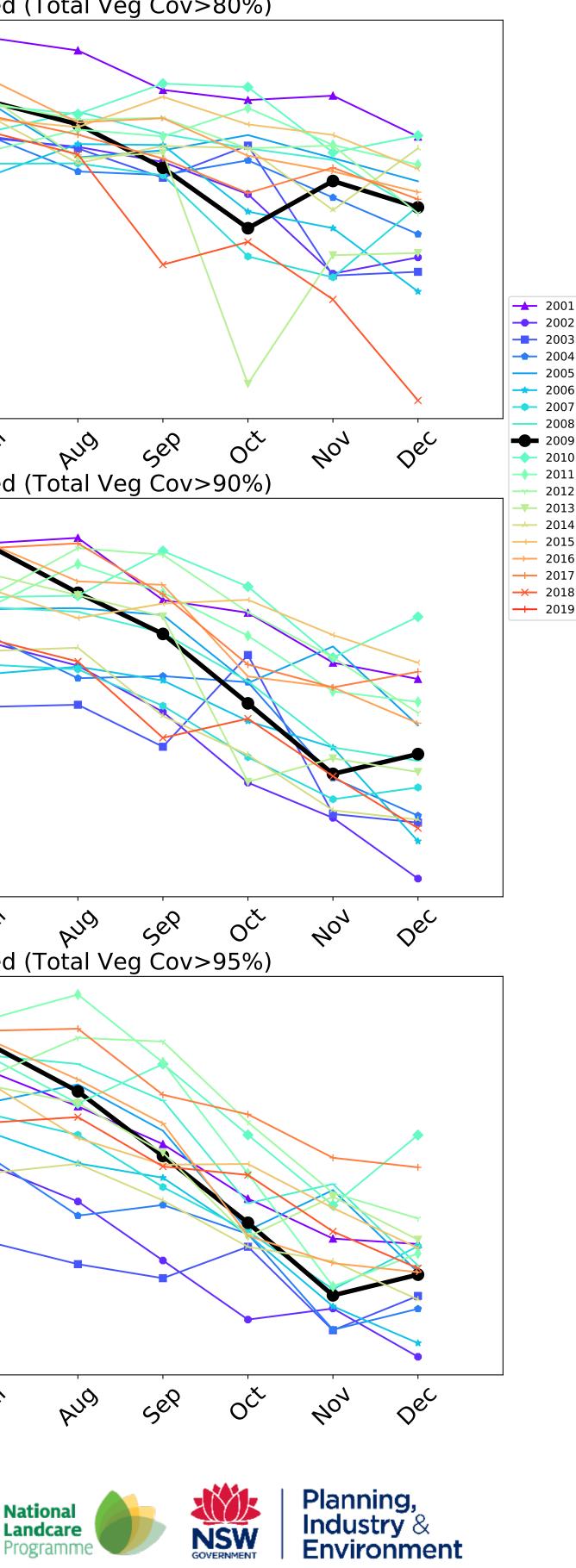


Water erosion historical monthly area protected (Total Veg Cov>70%)





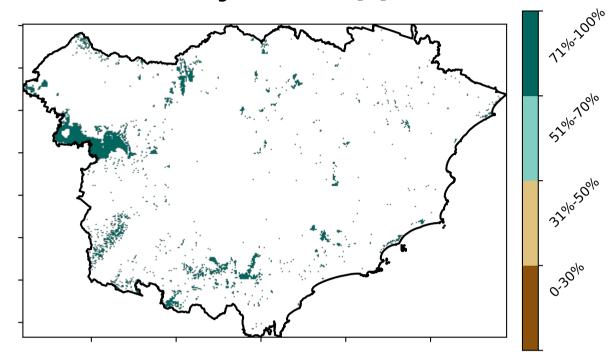
Australian Government



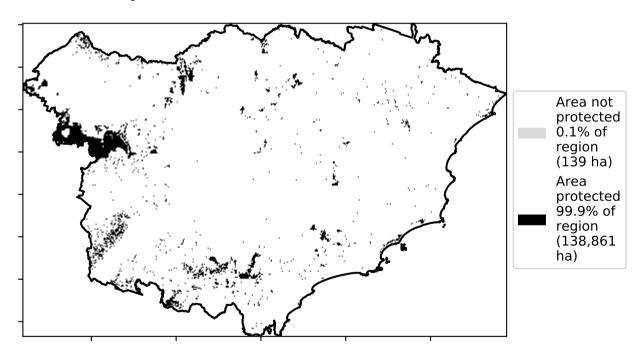
#### **Conservation and natural environments Woodland forest**



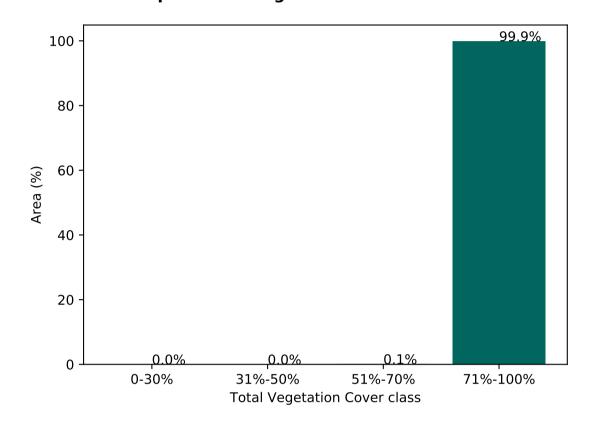
**Total Vegetation Cover [%]** 



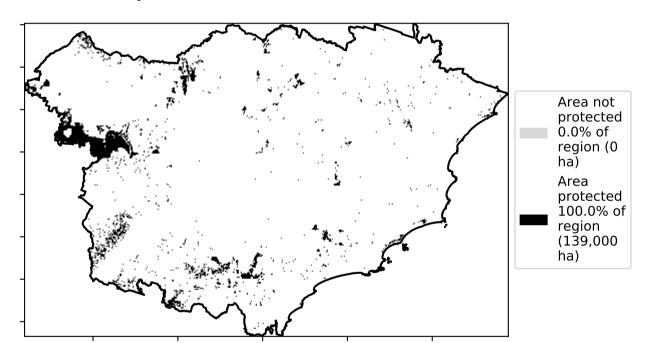
% Area protected from water erosion (>70%)



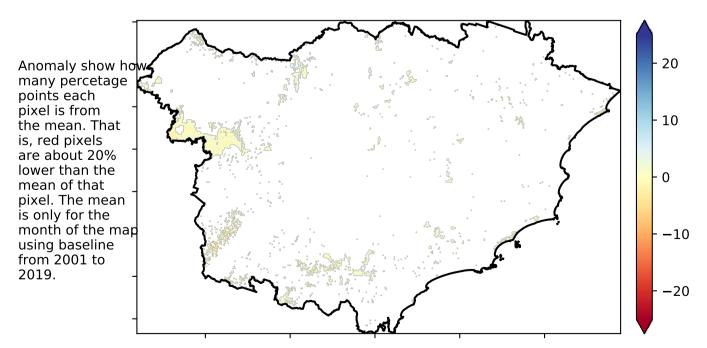
Proportion of vegetation cover class in area



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

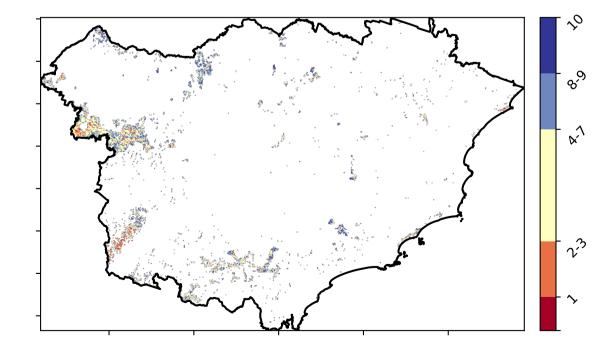


Total Vegetation Cover Anomaly [%]

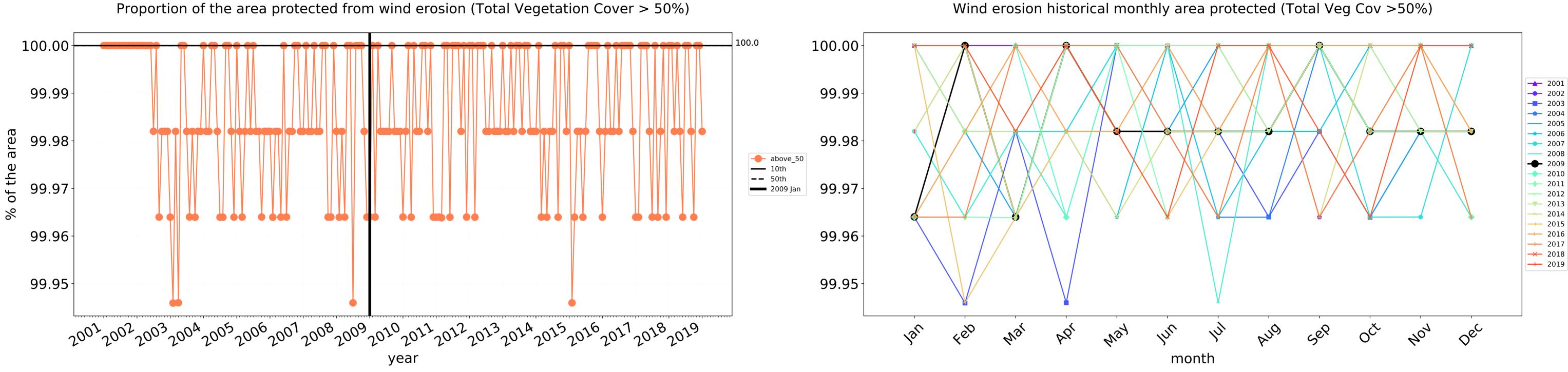


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Total Vegetation Cover Decile [%]

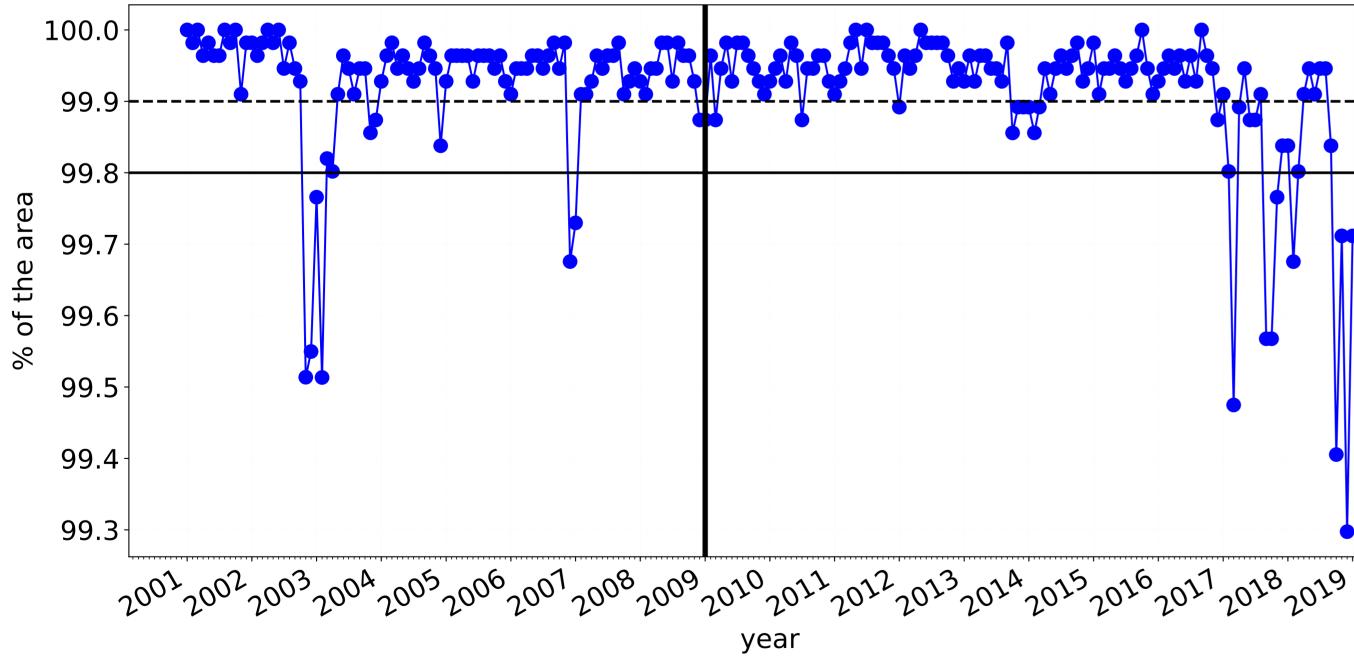






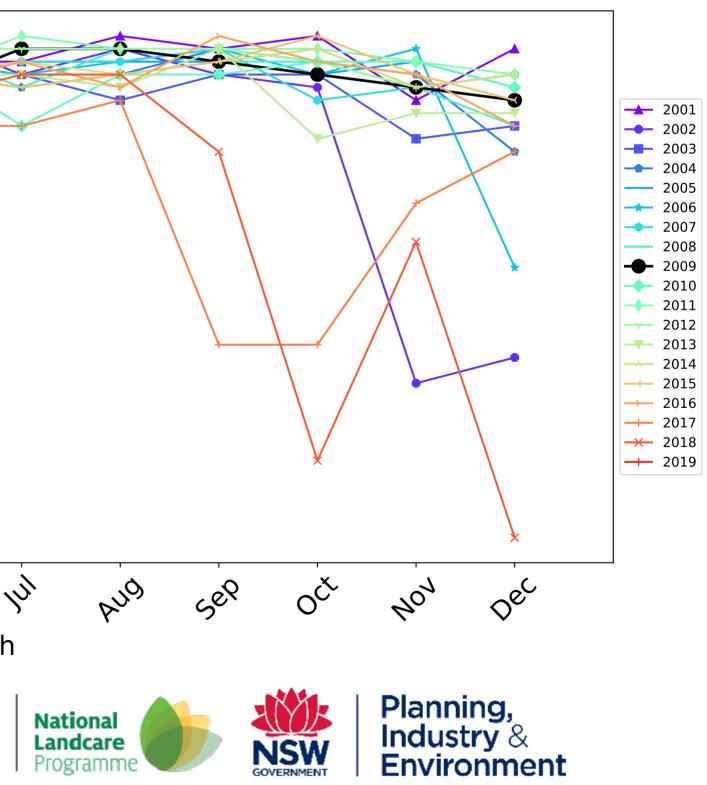
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



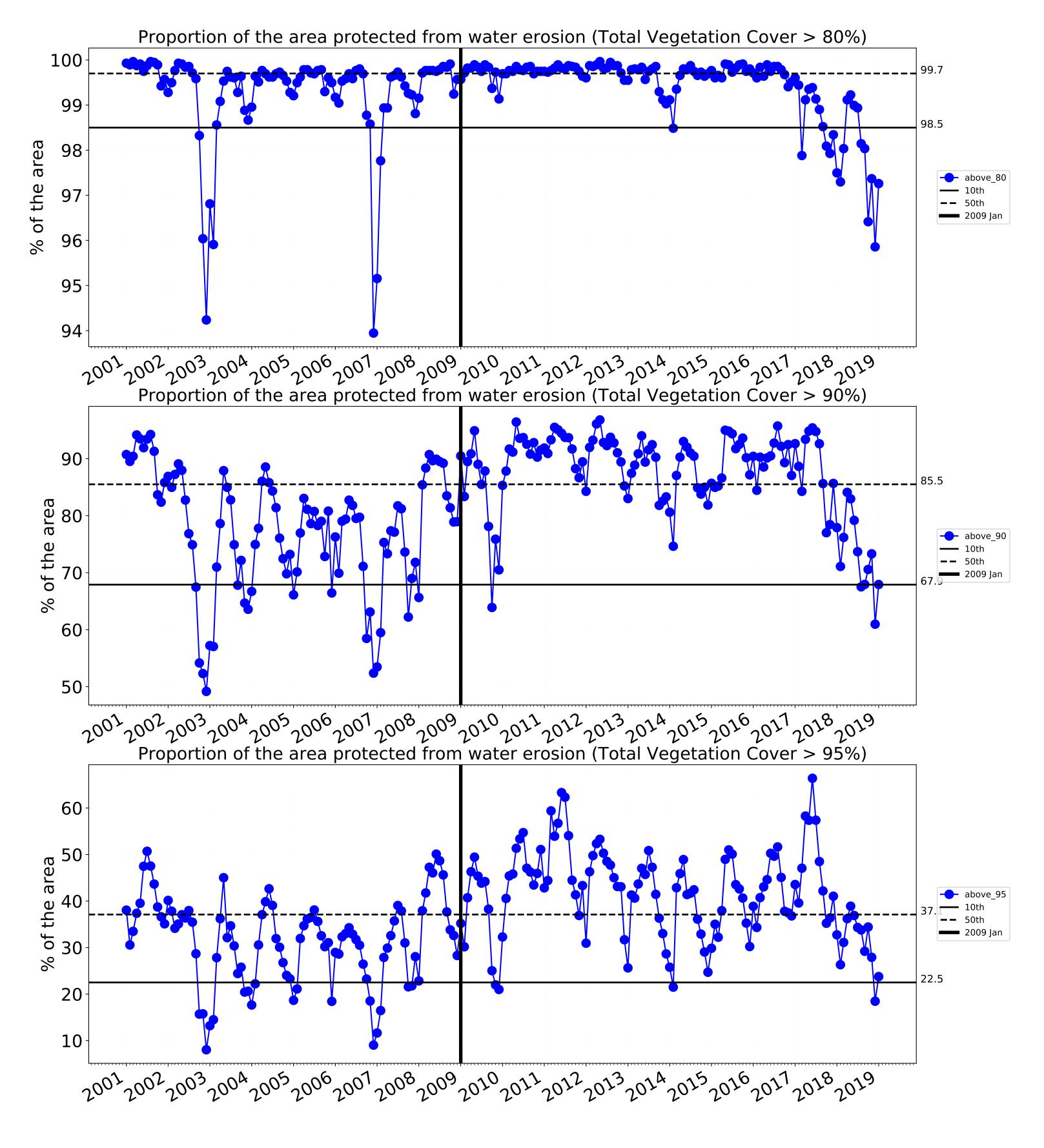
100.0 99.9 99.8 --- above\_70 **—** 10th **--** 50th 99.7 **——** 2009 Jan 99.6 99.5 99.4 99.3 Jan feb In May PQ Mai month ERN CSIRO Australian Government

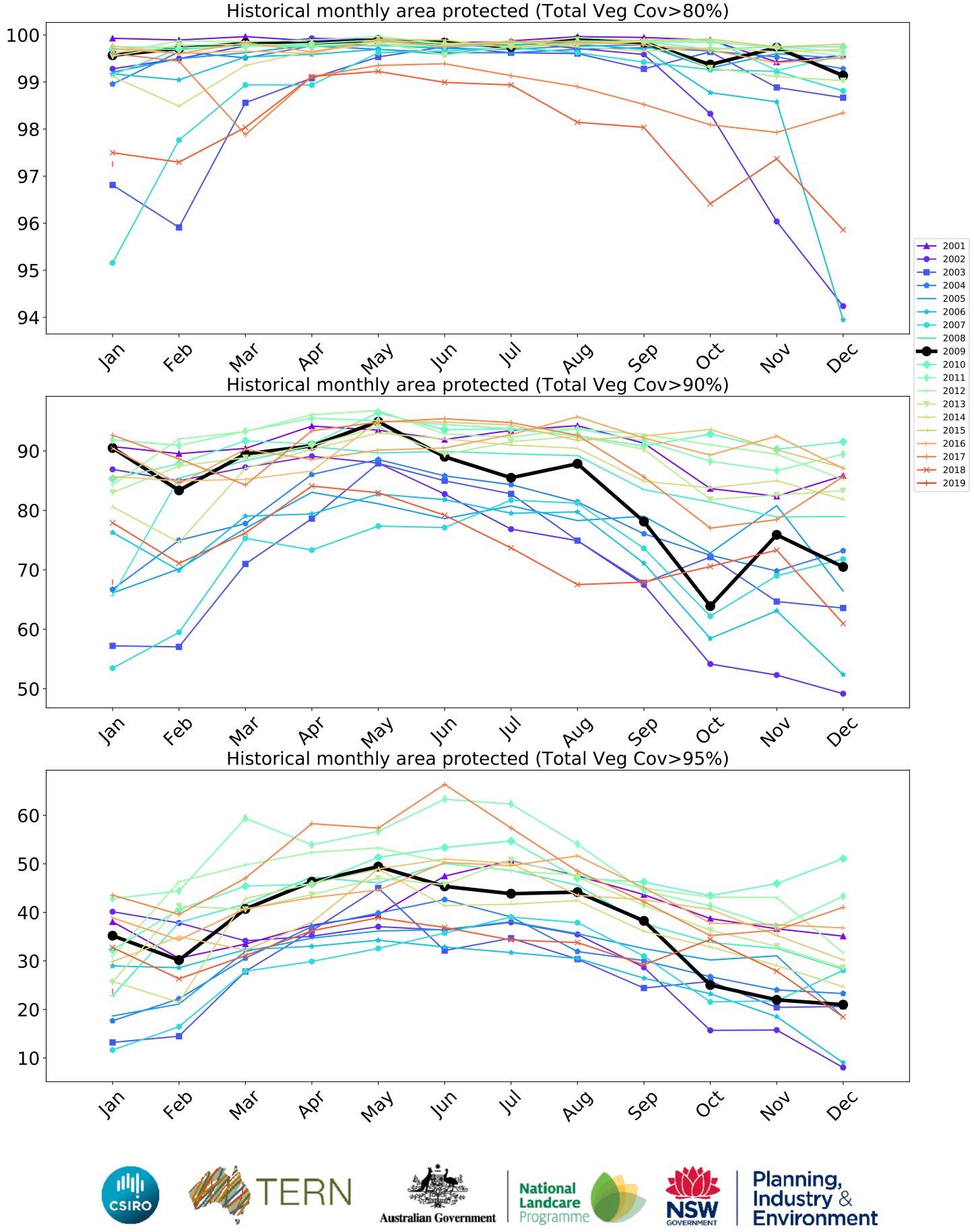
Water erosion historical monthly area protected (Total Veg Cov>70%)



**NSW** GOVERNMENT

Program

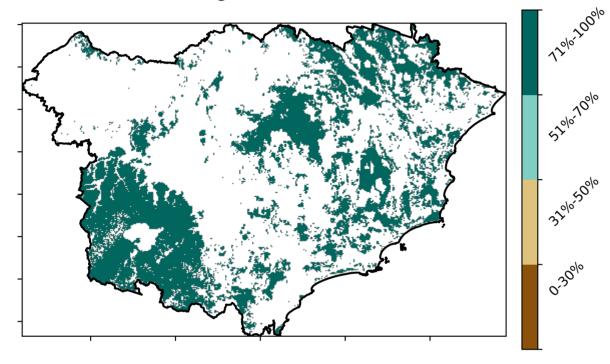




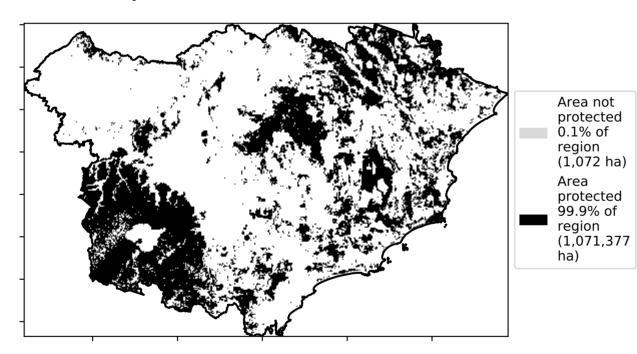
#### **Conservation and natural environments Forest (non woodland)**



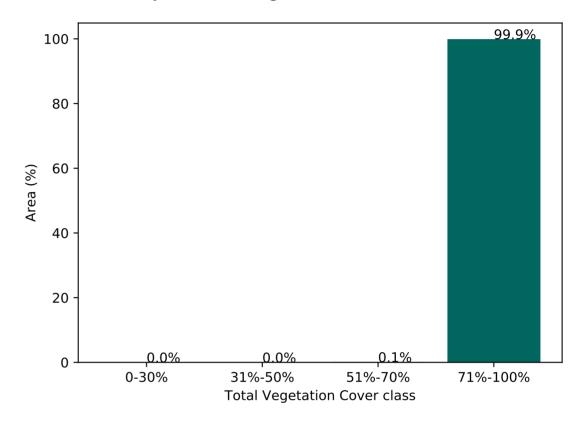
Total Vegetation Cover [%]



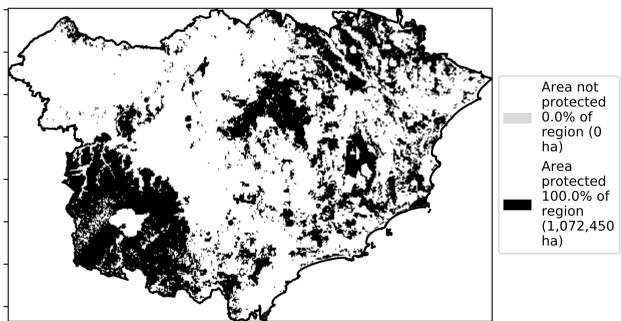
% Area protected from water erosion (>70%)



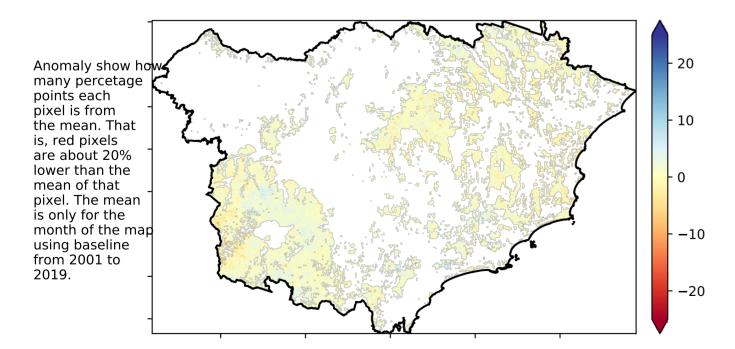
Proportion of vegetation cover class in area



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

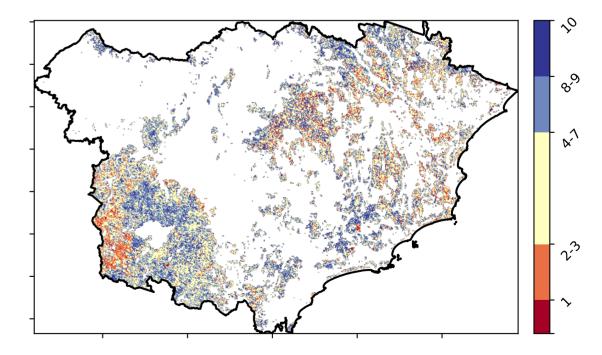


**Total Vegetation Cover Anomaly [%]** 

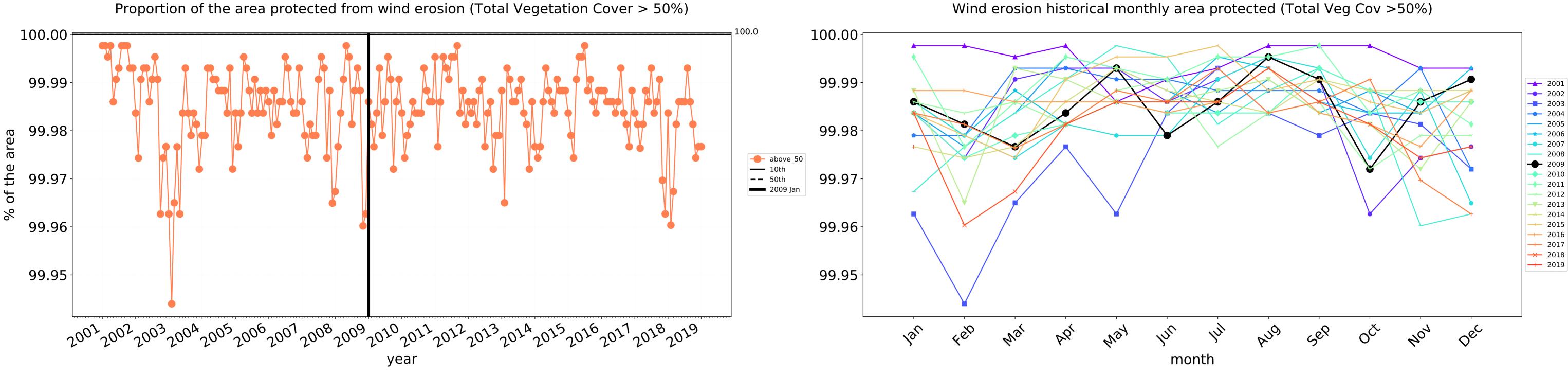


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Total Vegetation Cover Decile [%]

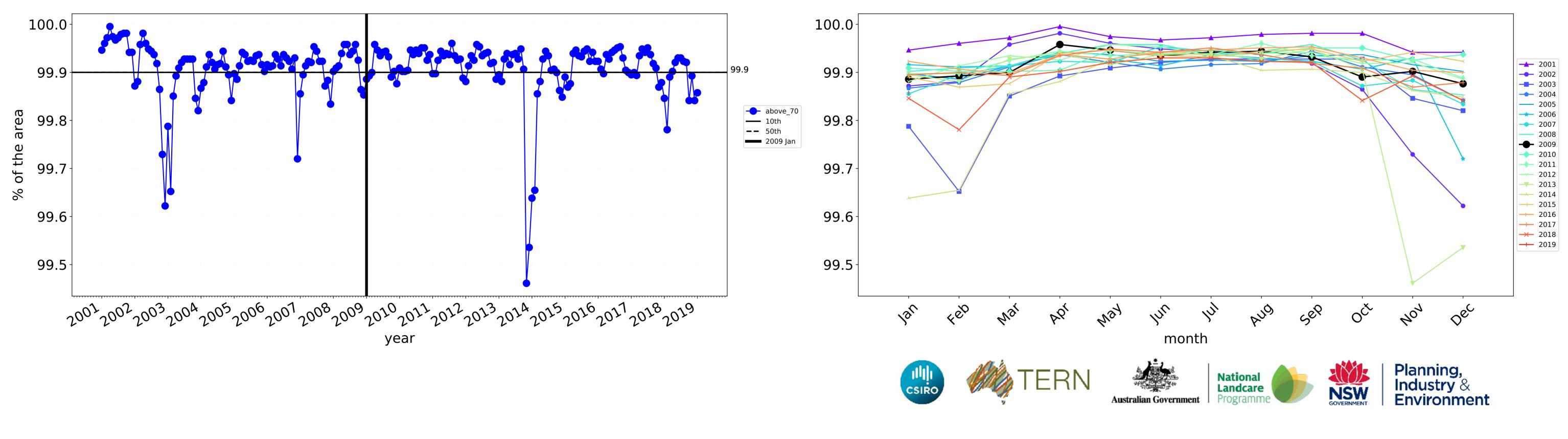




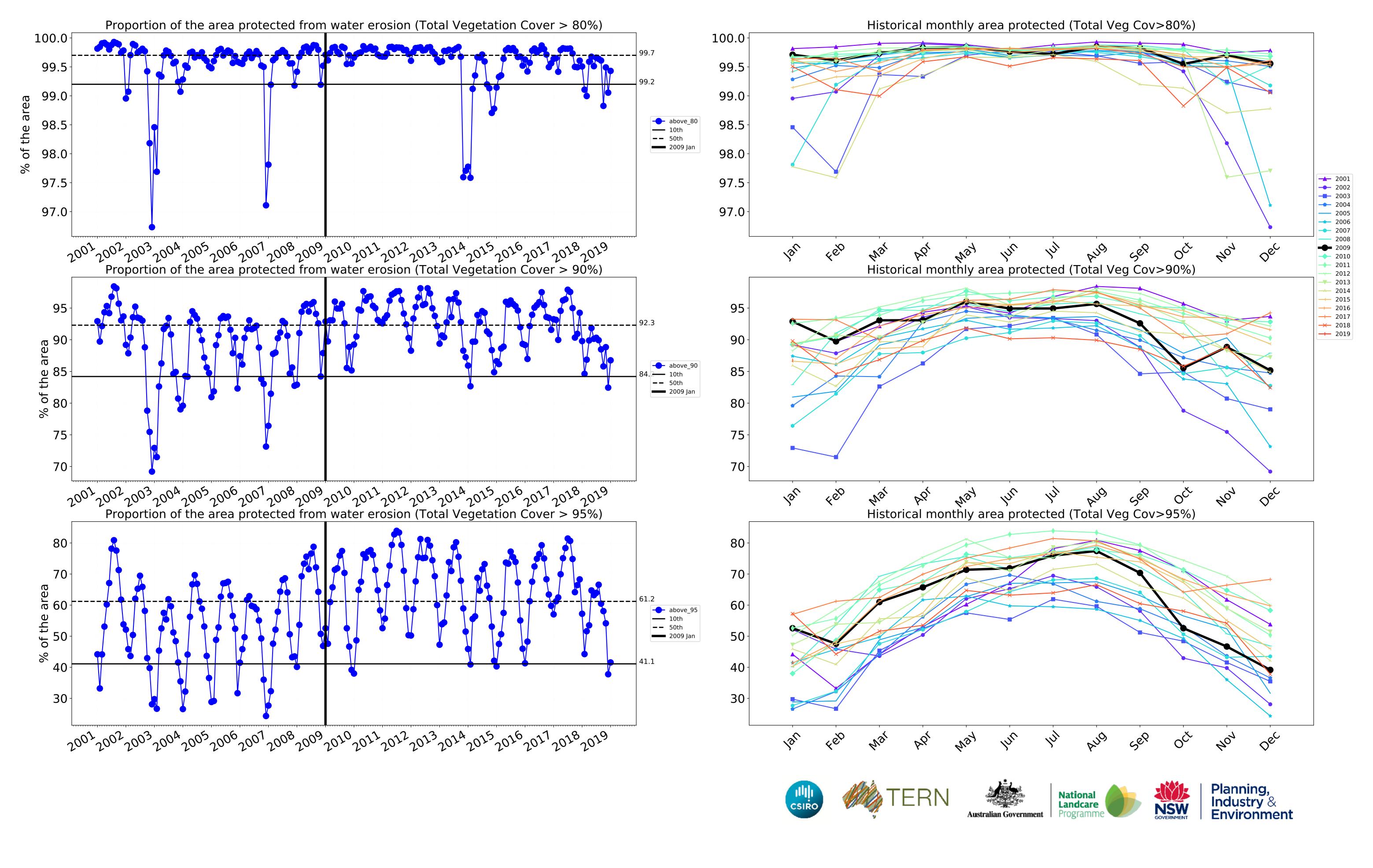


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



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



## Agriculture

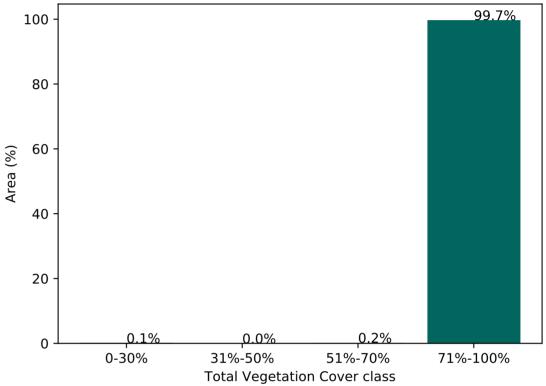
Land use and forest cover 80 -<u>76.</u>7% 70 · 60 Catchment Scale Land Use and Forests of Australia (2018) 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 50 Area (%) - 05 3 Agriculture - Grazing - Non-woodland forest Derived from 4 Agriculture - Grazing - Irrigated Catchment Scale Land 5 Agriculture - Cropping - Non-irrigated Use of Australia (2018) and Forests of Australia (2018) 6 Agriculture - Cropping - Irrigated 7 Agriculture - Horticulture - Non-irrigated 30 8 Agriculture - Horticulture - Irrigated 20 <u>10.</u>7% 10 <u>7.6</u>% 0 1 2 3 Land use class **Total Vegetation Cover [%]** 12%,100 100 80 52%70% 60 Area (%) 32010 40 0.30% 20 0.1% 0.0% 0 0-30% 31%-50%

Proportion of each land class in area

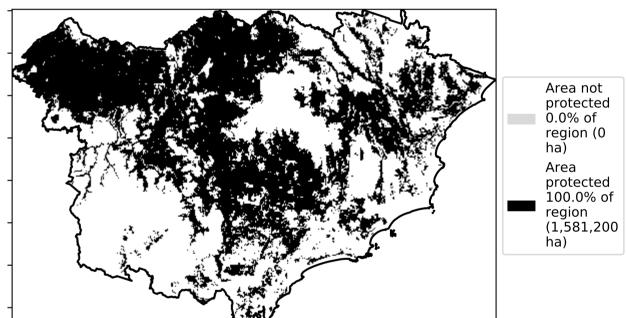
Proportion of vegetation cover class in area

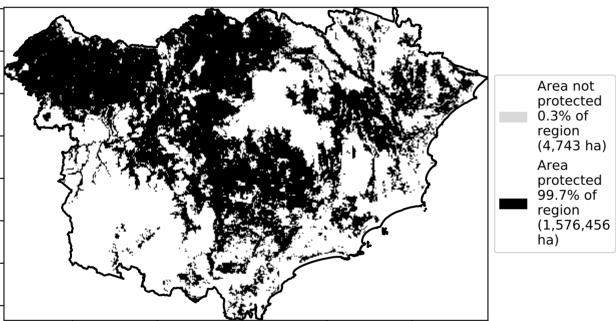
0.2%

8



% Area protected from wind erosion (>50%)





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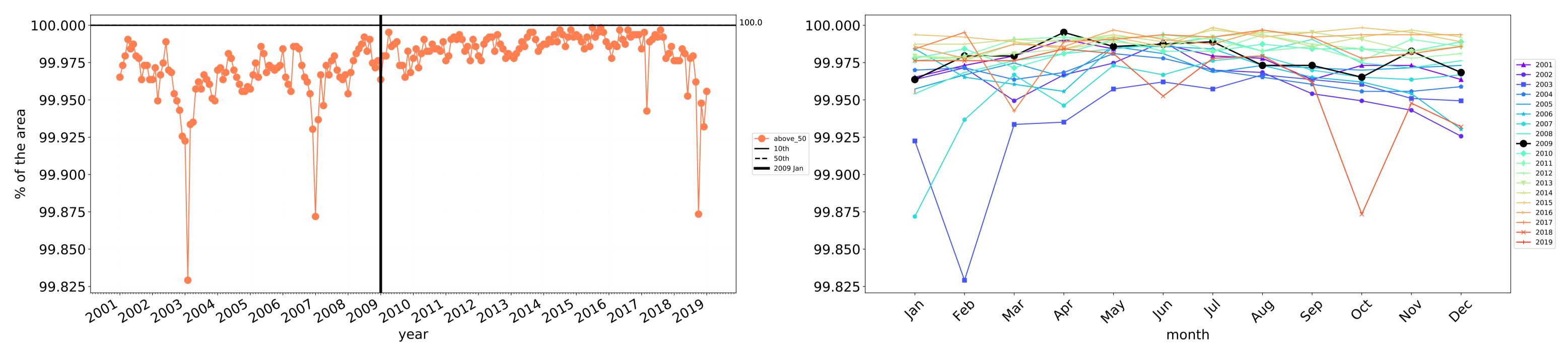
Total Vegetation Cover Anomaly [%]

Anomaly show how many percetage points each pixel is from the mean. That · 20 - 10 is, red pixels are about 20% lower than the 0 mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019. -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 the map using baseline from 2001 to 2019.

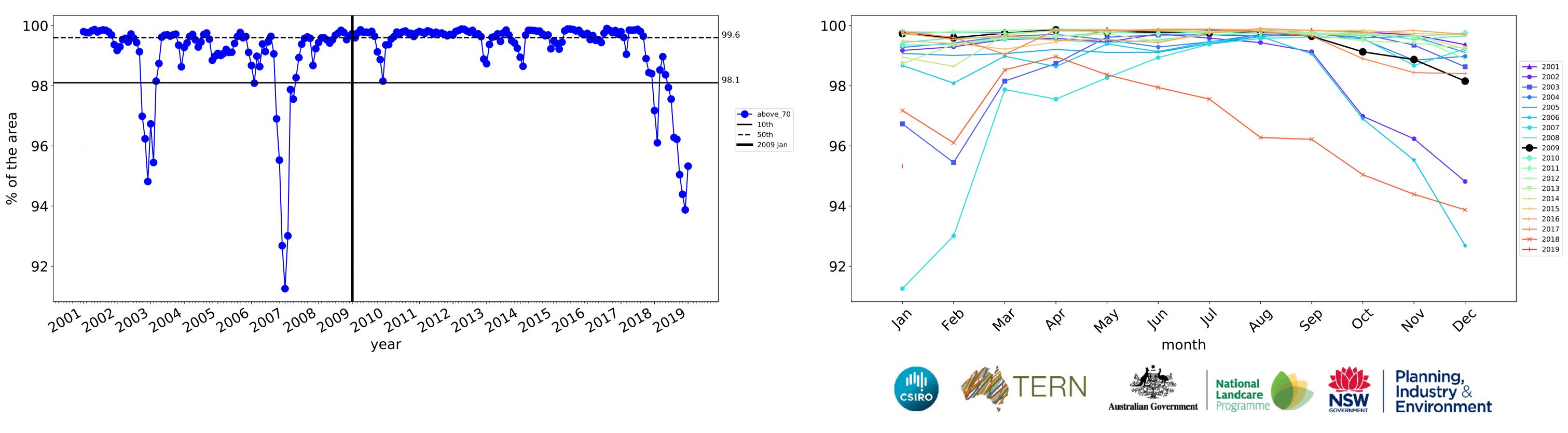
Total Vegetation Cover Decile [%]





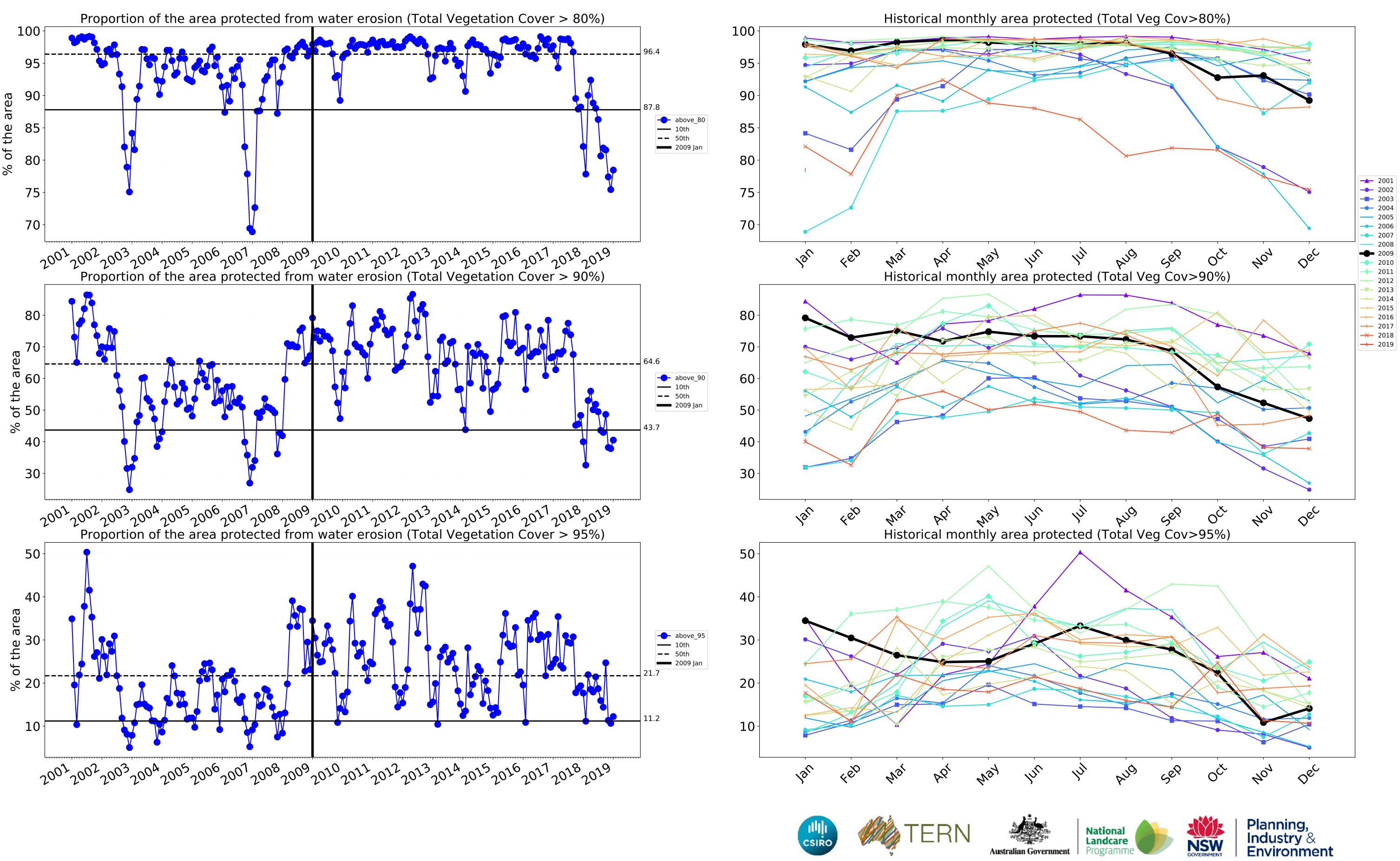
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

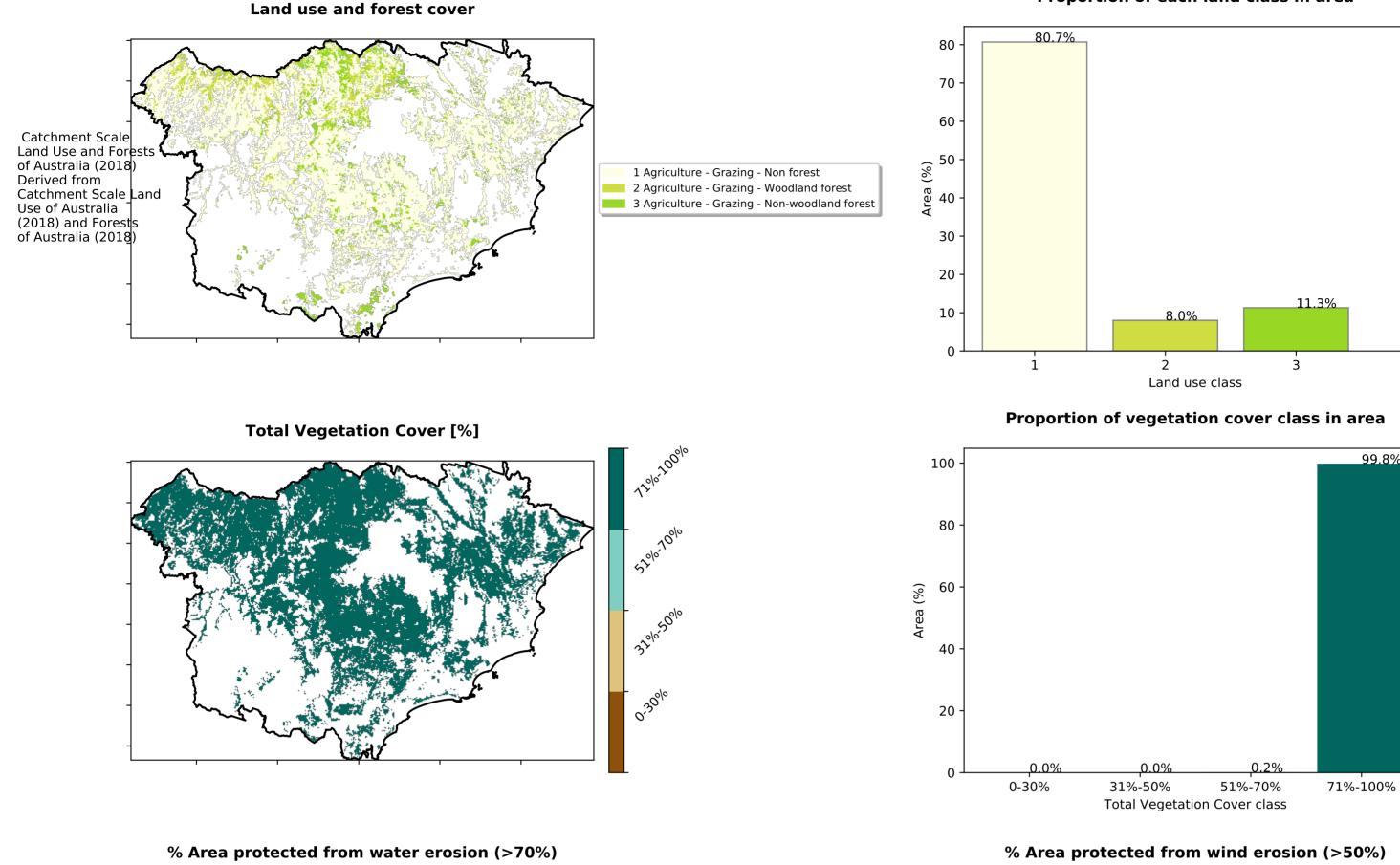


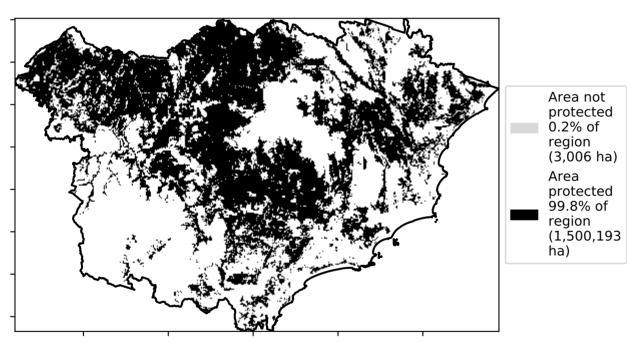
Wind erosion historical monthly area protected (Total Veg Cov >50%)



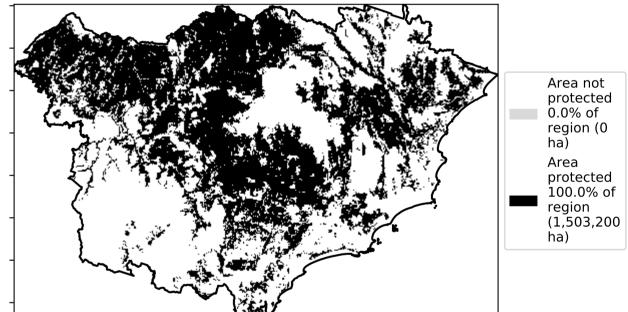


## Grazing





Proportion of each land class in area



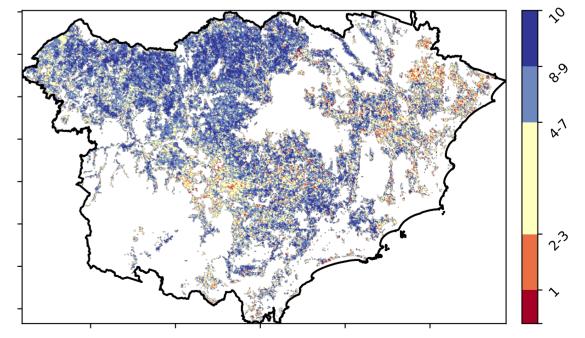
99.8%

**Total Vegetation Cover Anomaly [%]** 

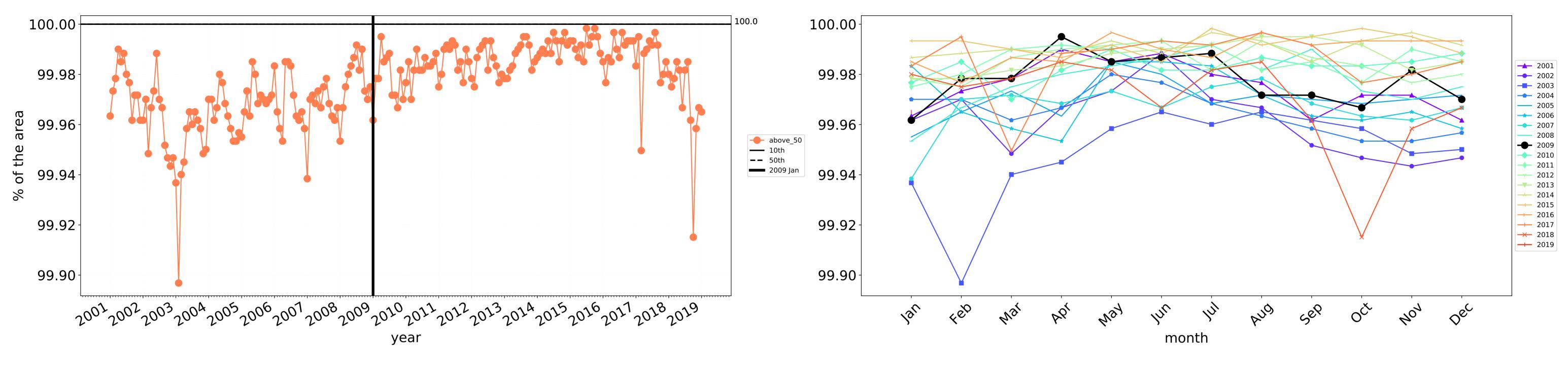
Anomaly show how many percetage points each pixel is from the mean. That · 20 - 10 is, red pixels are about 20% lower than the mean of that 0 pixel. The mean is only for the month of the map using baseline from 2001 to 2019. -10 -20

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**Total Vegetation Cover Decile [%]** 

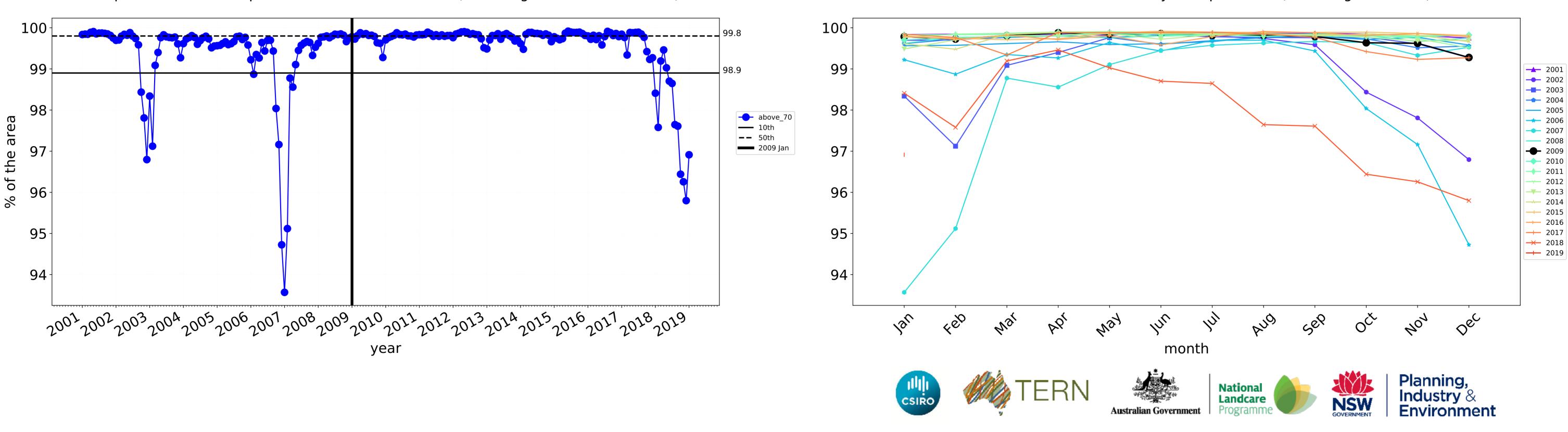






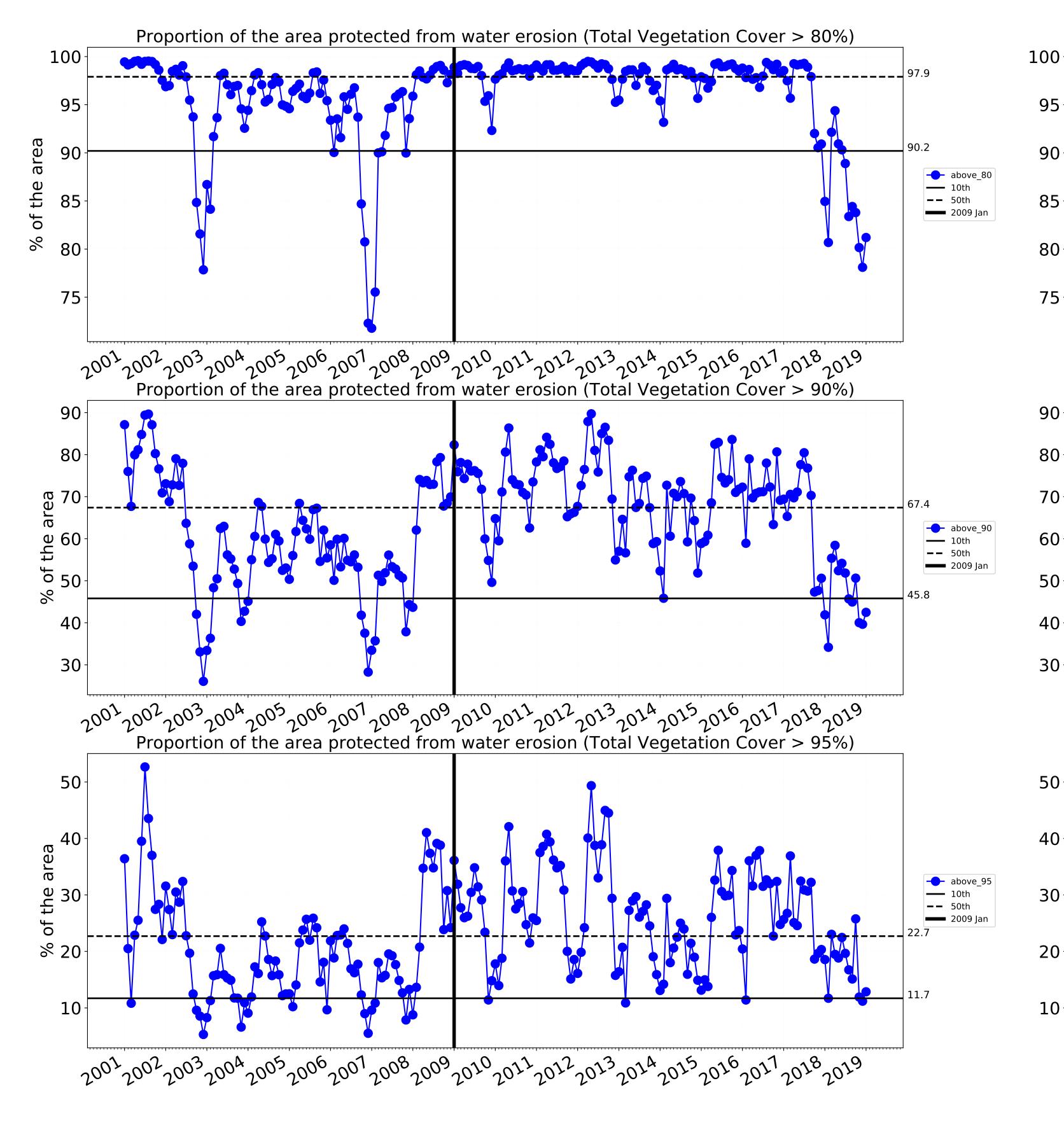
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

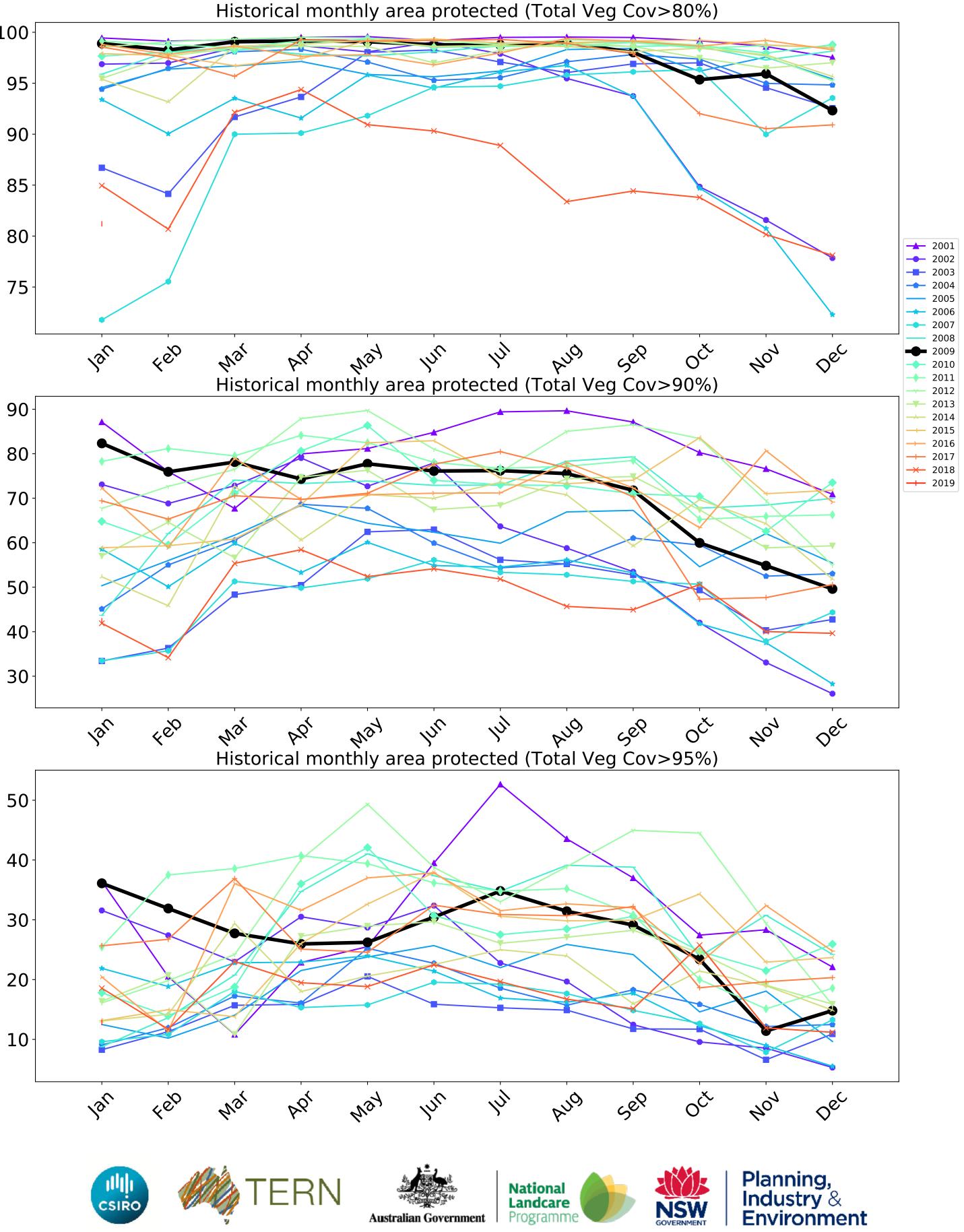
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

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

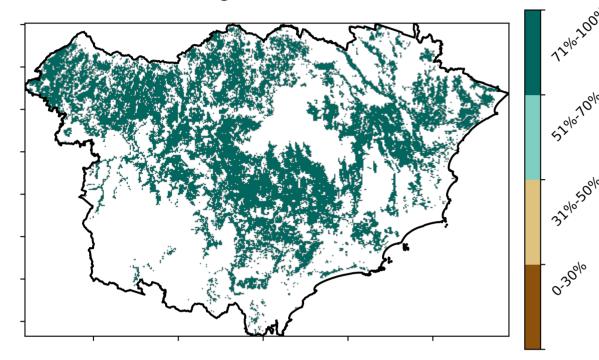




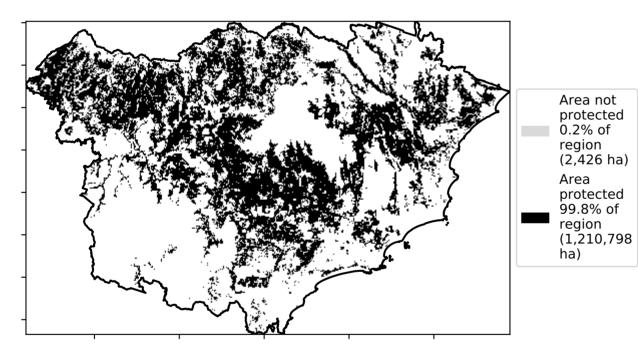
## **Grazing non forest**

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

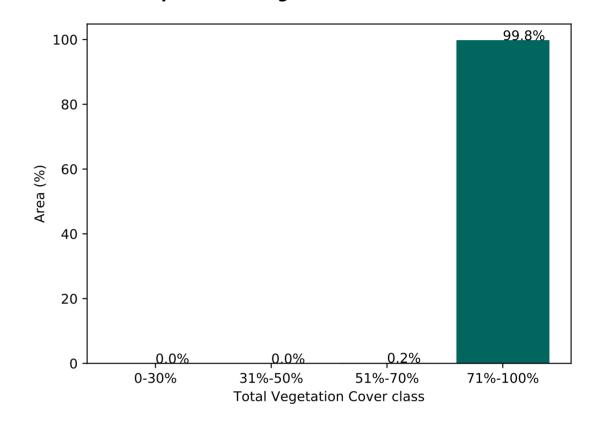
**Total Vegetation Cover [%]** 



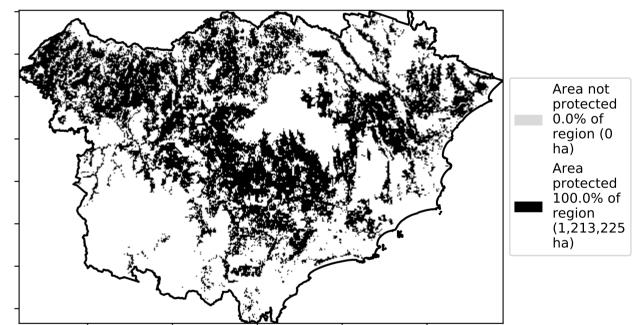
% Area protected from water erosion (>70%)



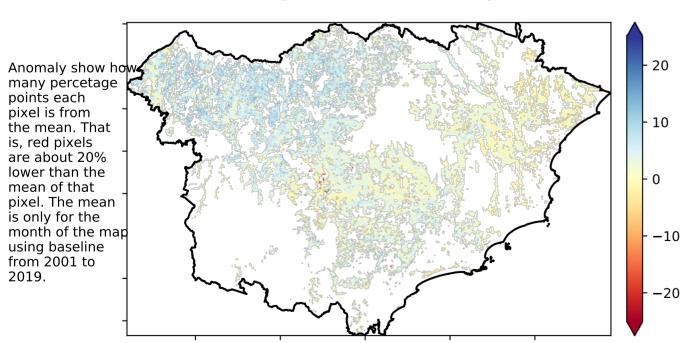
Proportion of vegetation cover class in area



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

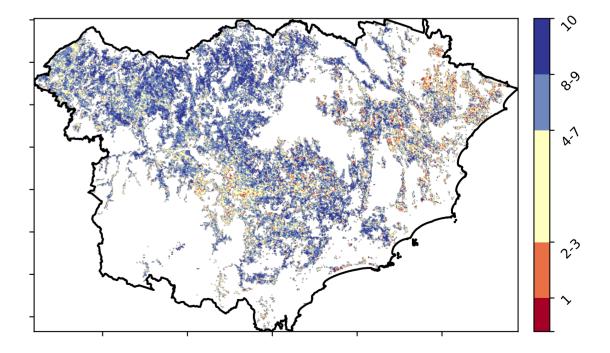


**Total Vegetation Cover Anomaly [%]** 

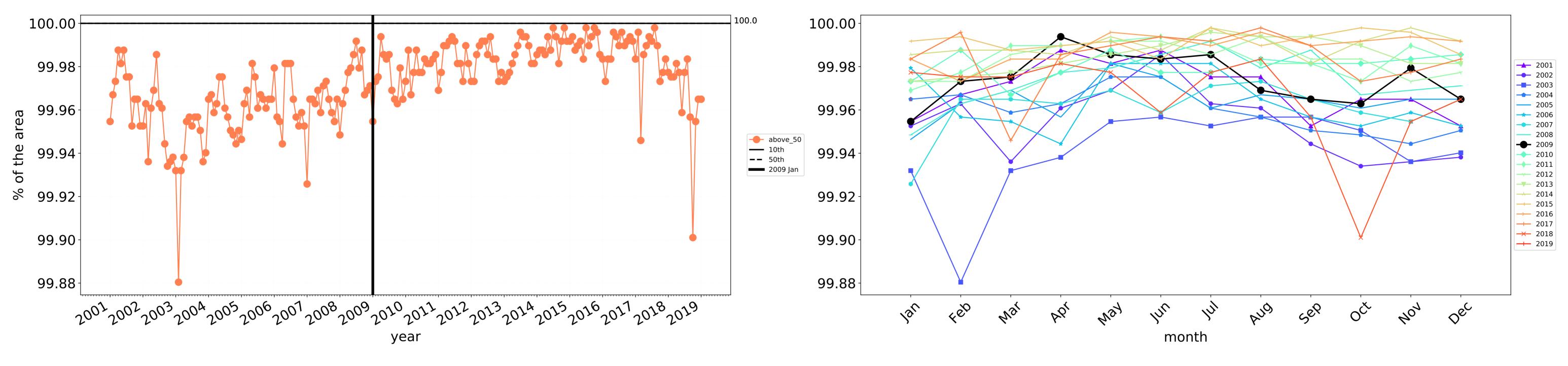


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**Total Vegetation Cover Decile [%]** 

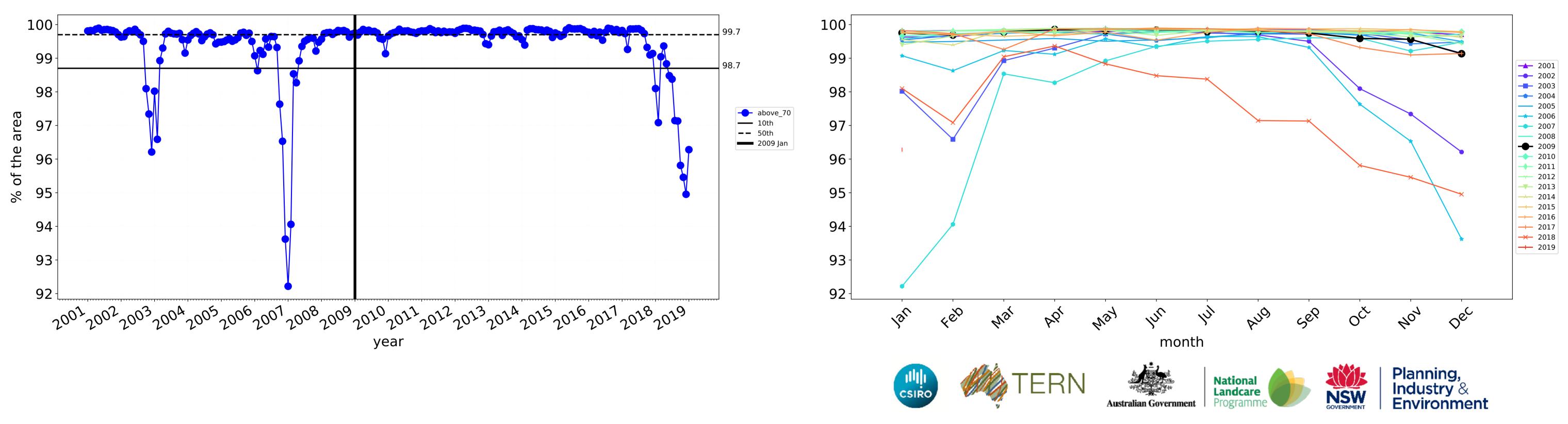






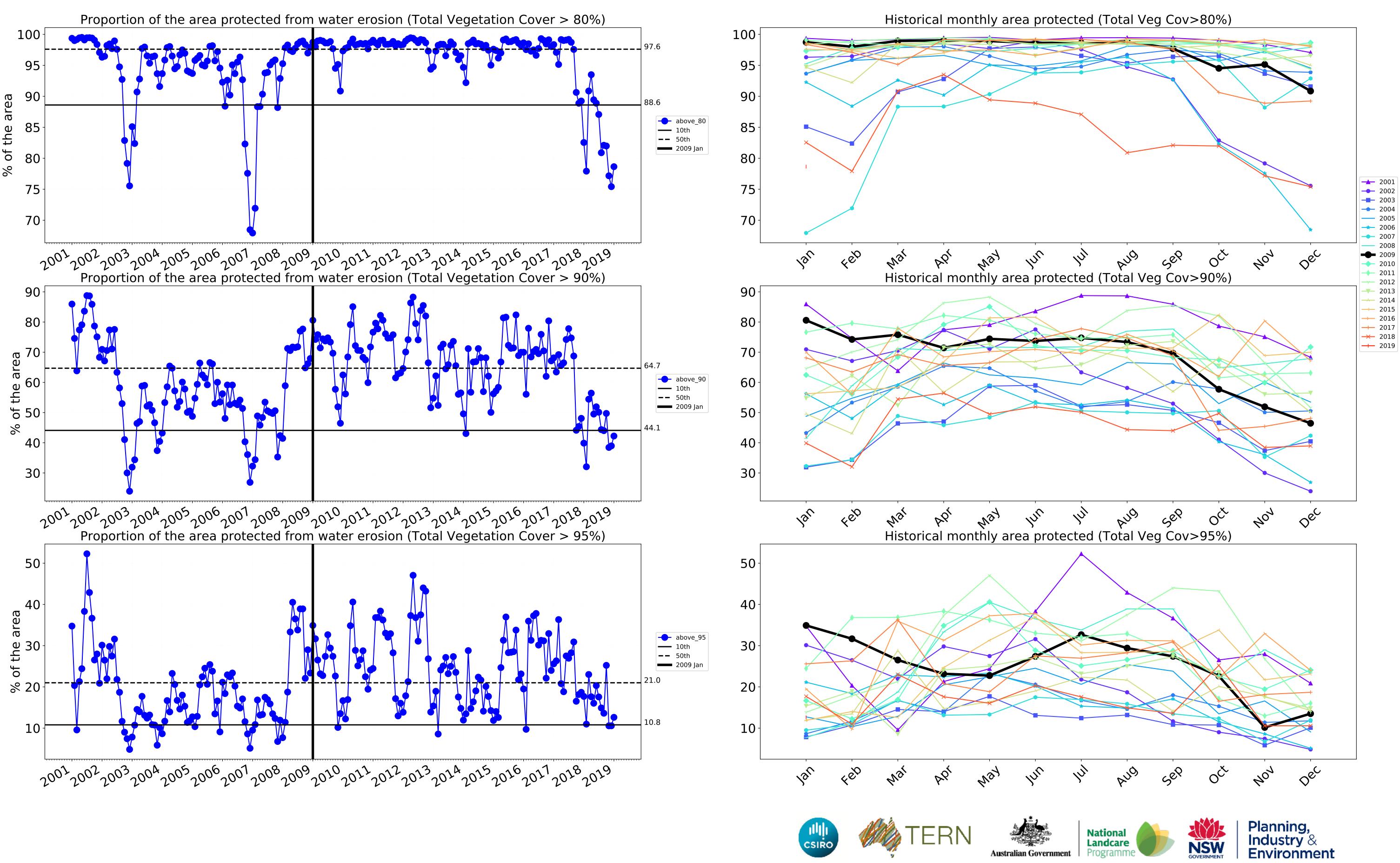
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



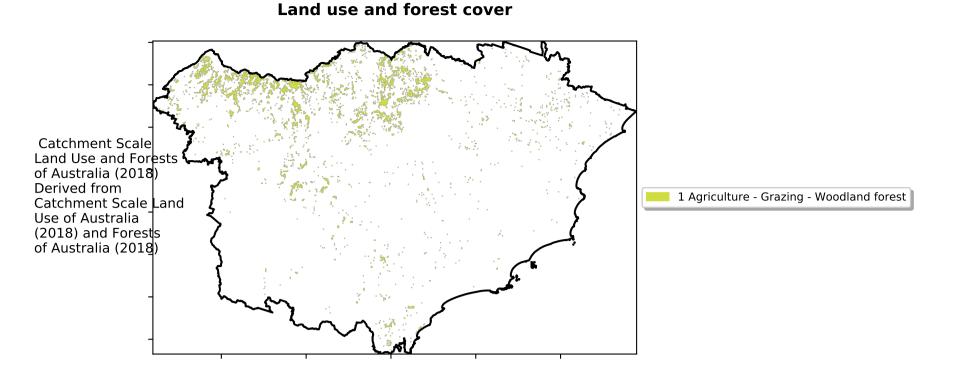
Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

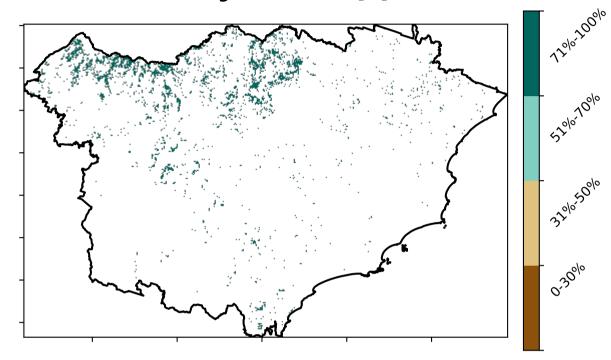


Australian Government

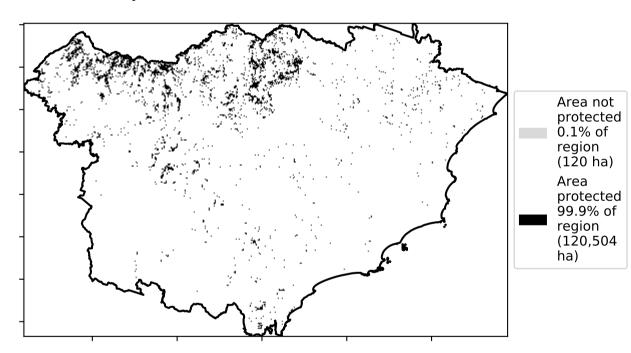
## **Grazing Woodland forest**



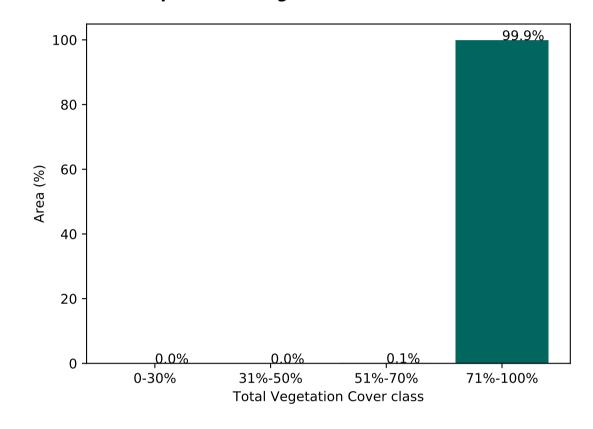
**Total Vegetation Cover [%]** 



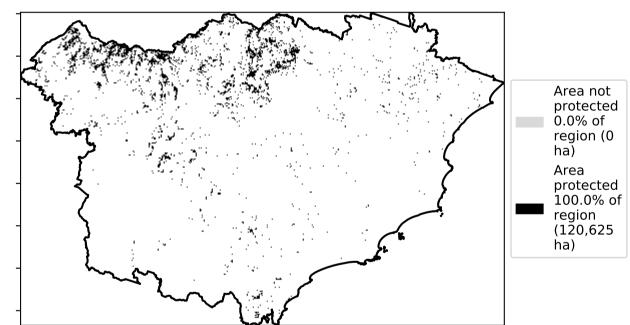
% Area protected from water erosion (>70%)



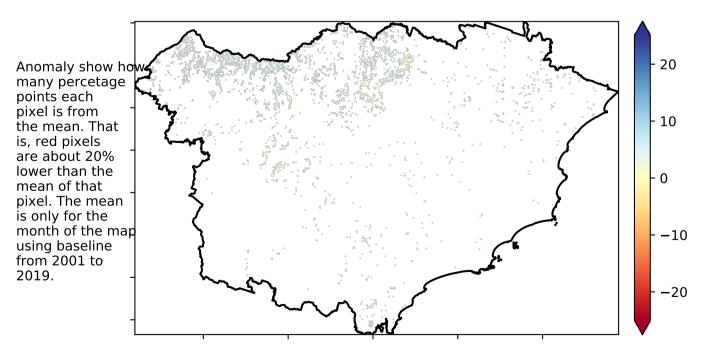
Proportion of vegetation cover class in area



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

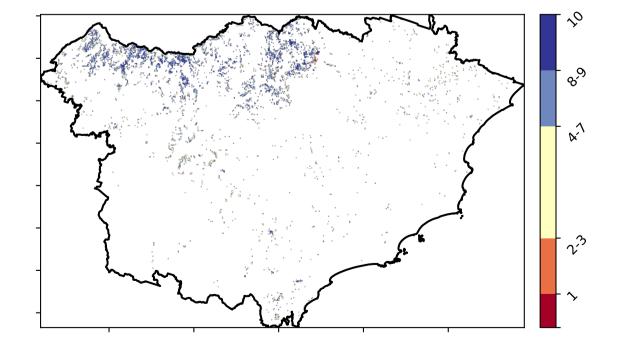


**Total Vegetation Cover Anomaly [%]** 

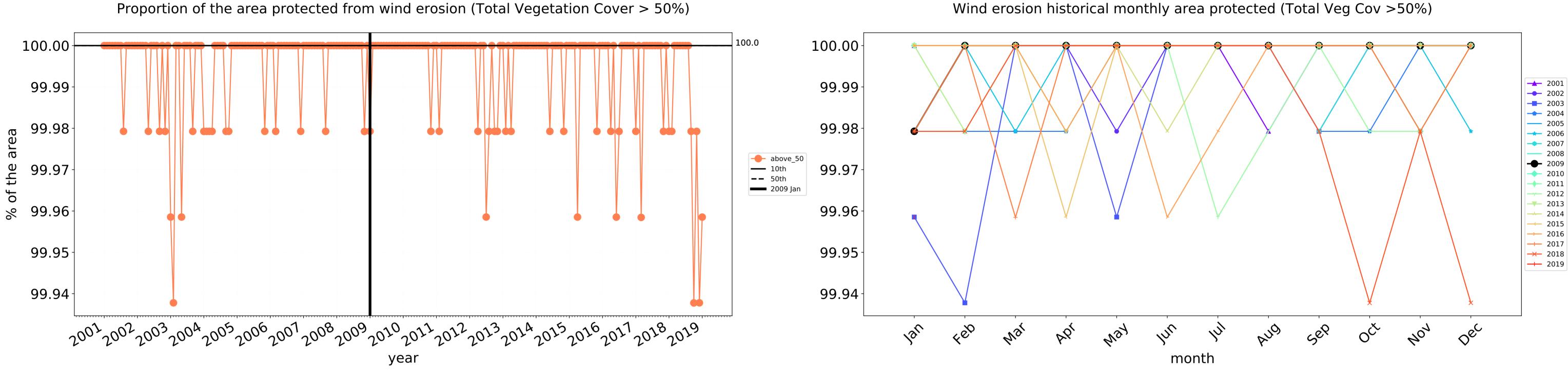


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

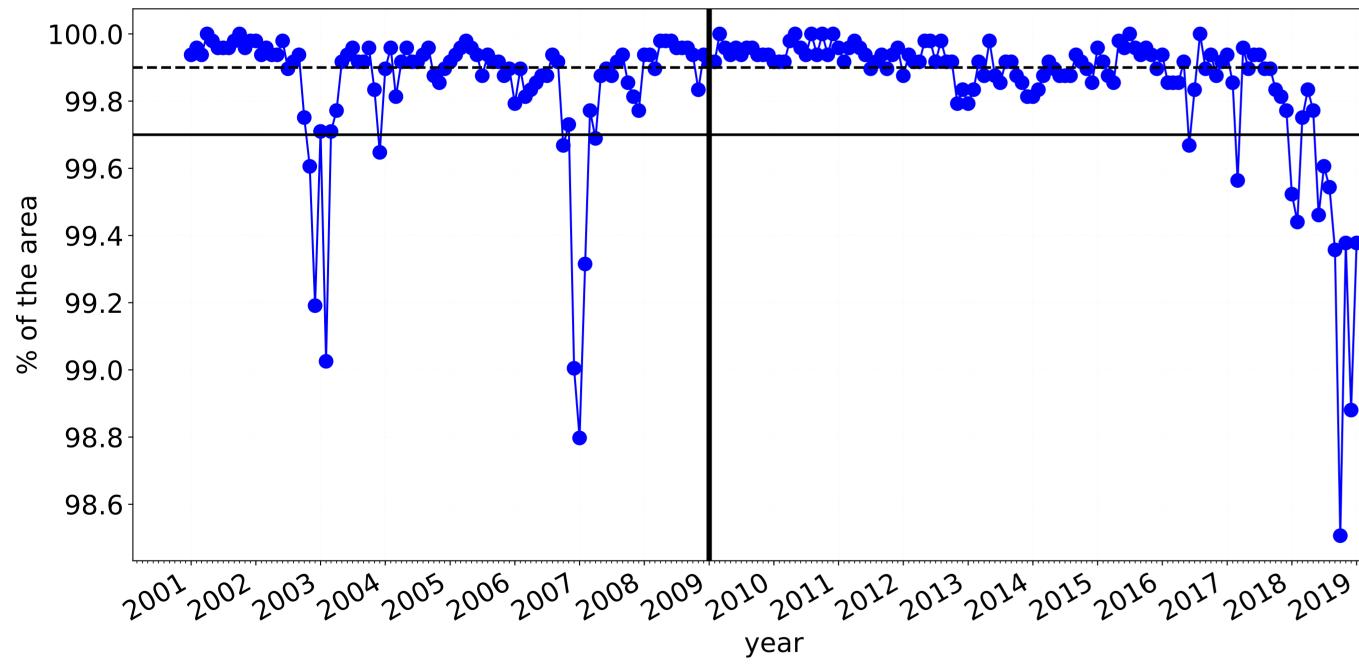






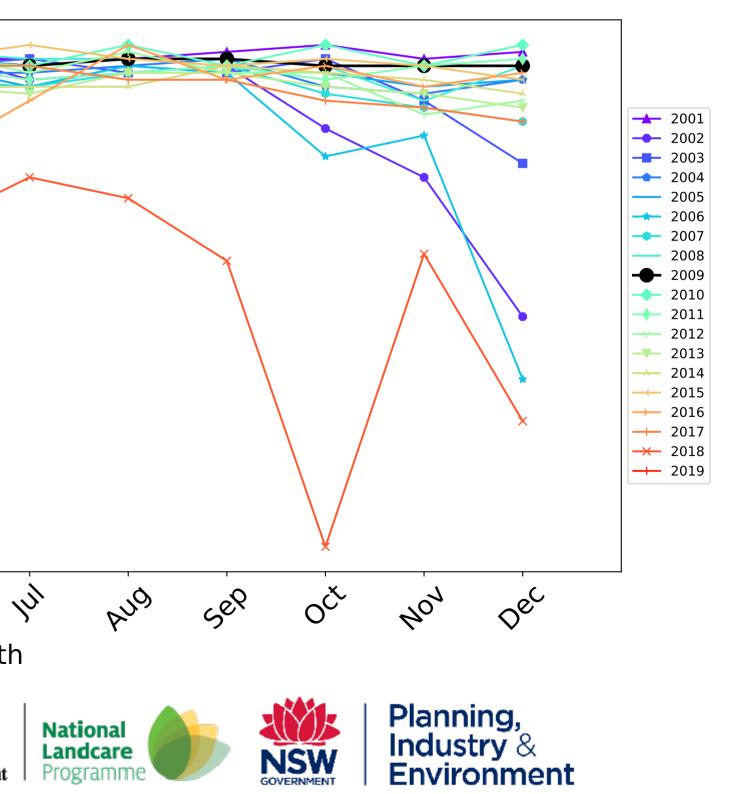
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

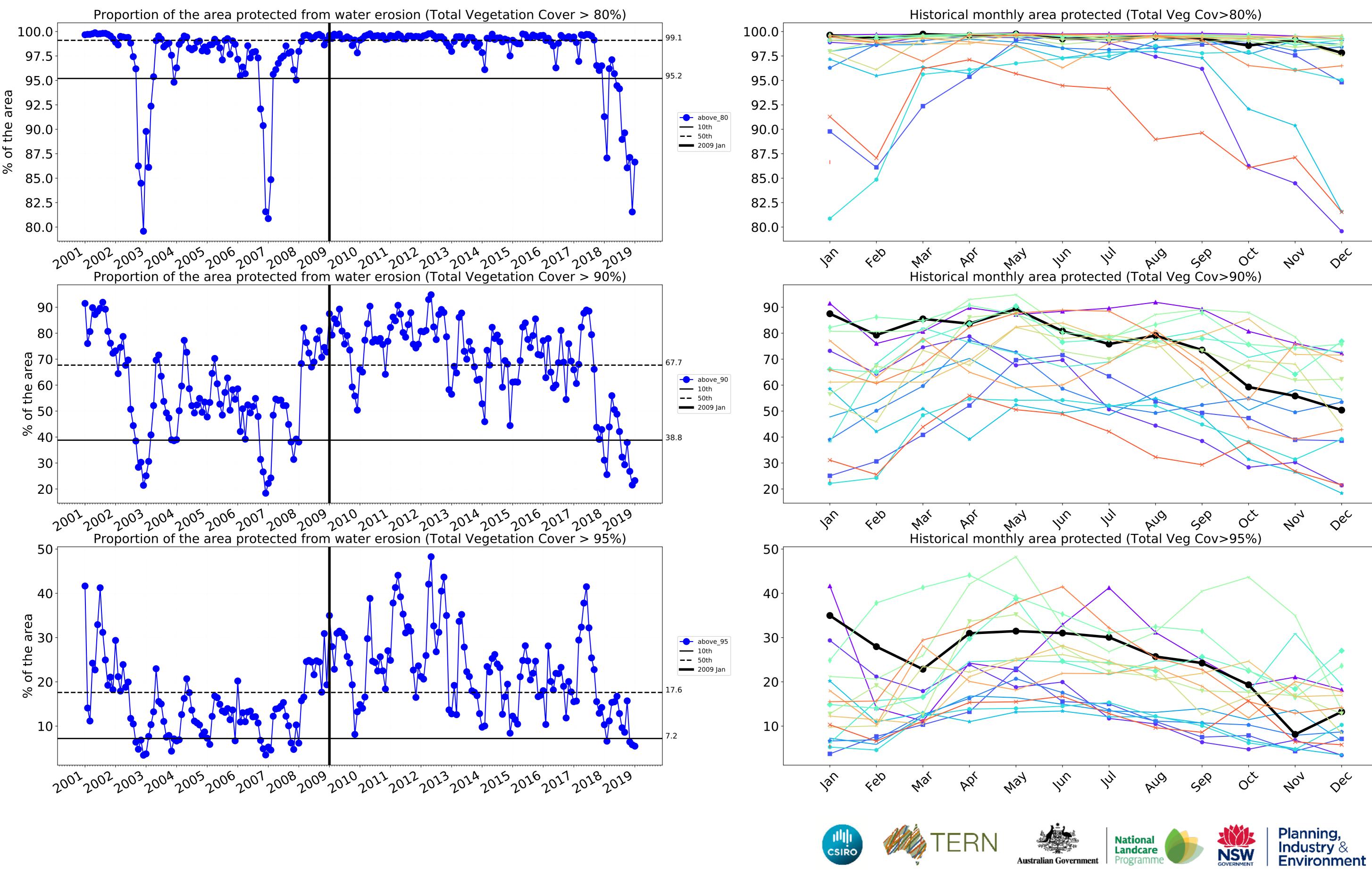
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



100.0-99.9 99.8-99.7 99.6 ---- above\_70 **—** 10th 99.4 **——** 50th **——** 2009 Jan 99.2 99.0 98.8 98.6 feb lar May In Wal PQ month ERN CSIRO Australian Government

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

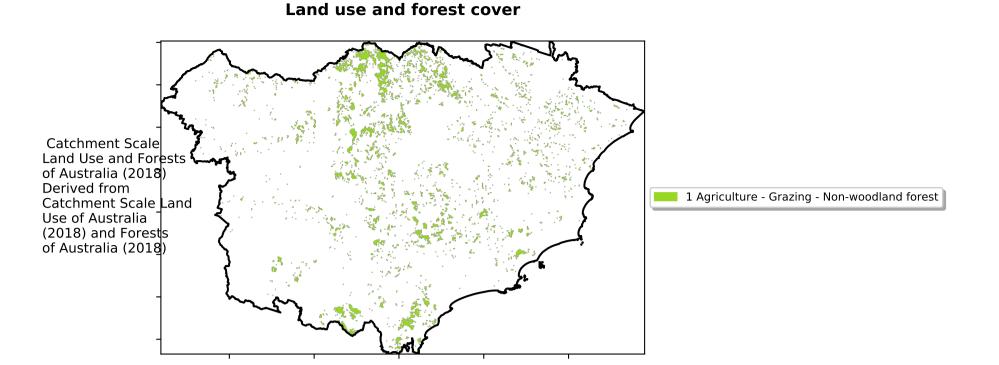




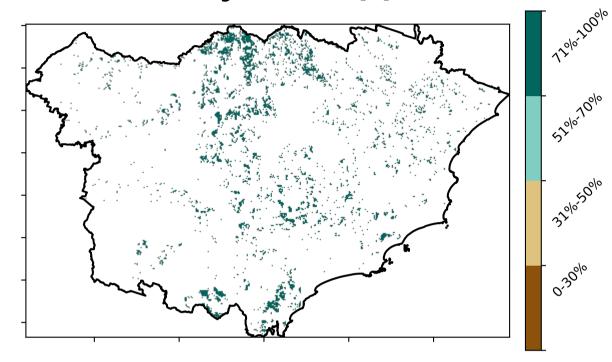
**—** 2001 --- 2002 ---- 2003 --- 2004 \_\_\_\_ 2005 **----** 2006 **---** 2007 **---** 2009 **-** 2010 ↓ 2011↓ 2012 - 2013 - 2014 <mark>←</mark> 2015 <mark>→</mark> 2016 --- 2017 → 2018 → 2019

2008

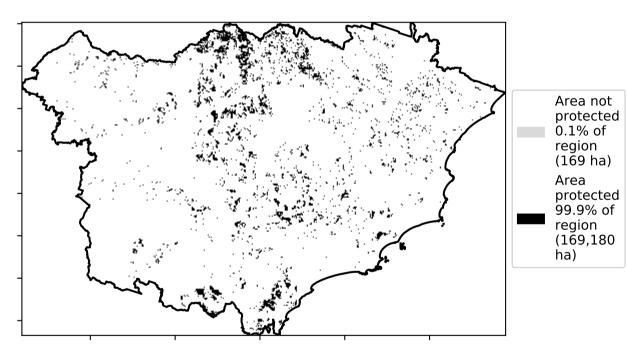
#### Grazing - Forest (non woodland)



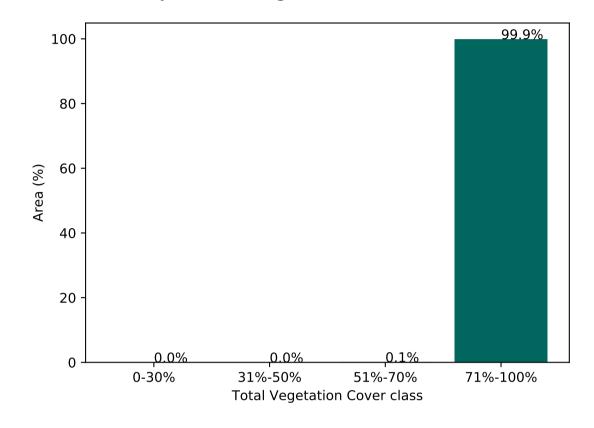
Total Vegetation Cover [%]



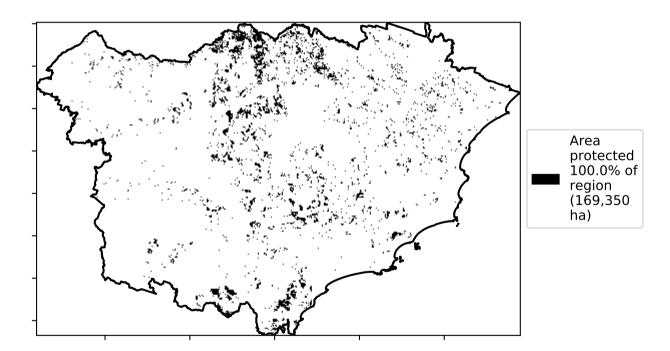
% Area protected from water erosion (>70%)



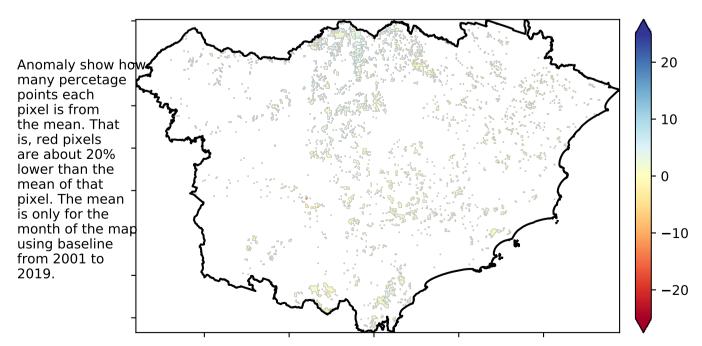
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

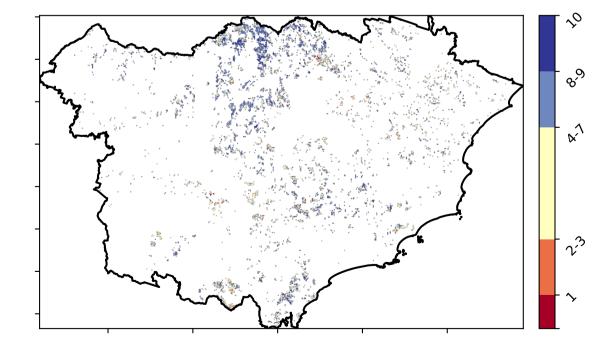


Total Vegetation Cover Anomaly [%]

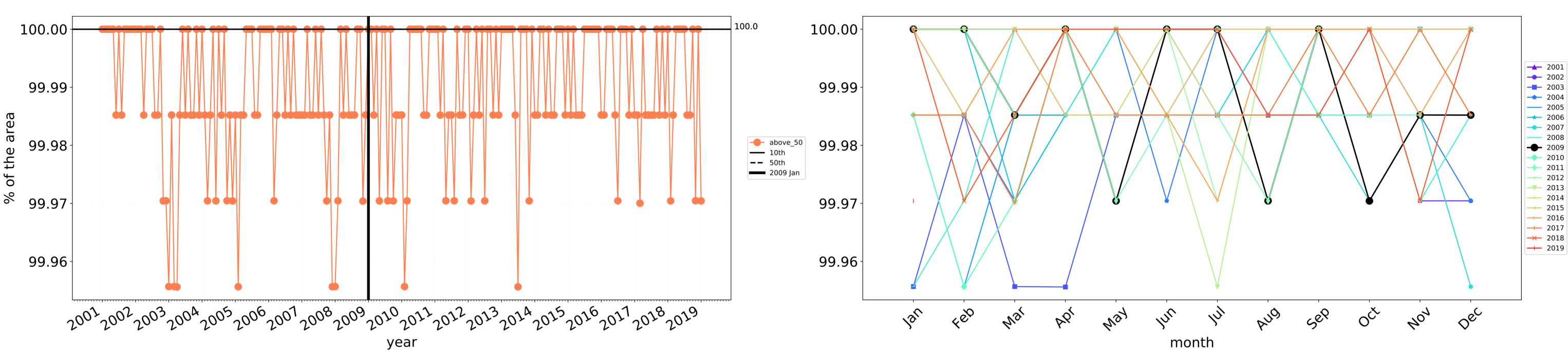


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

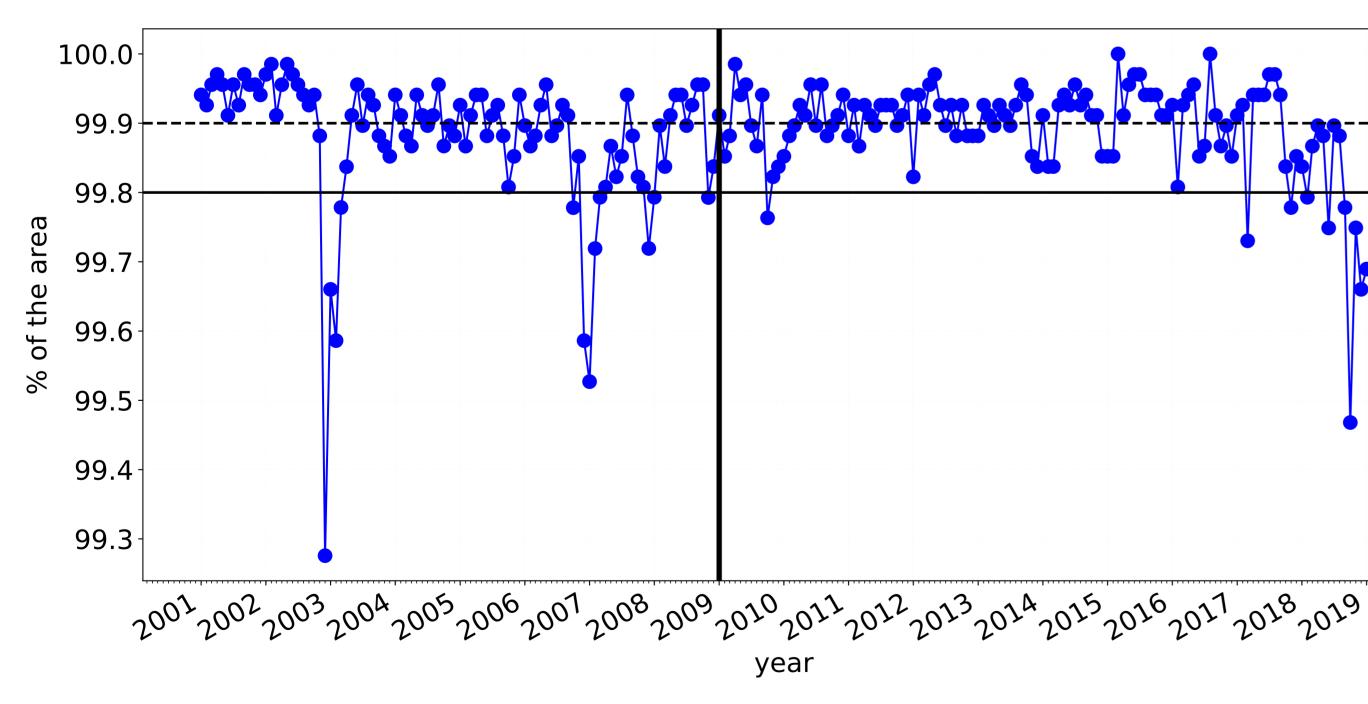


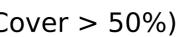




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

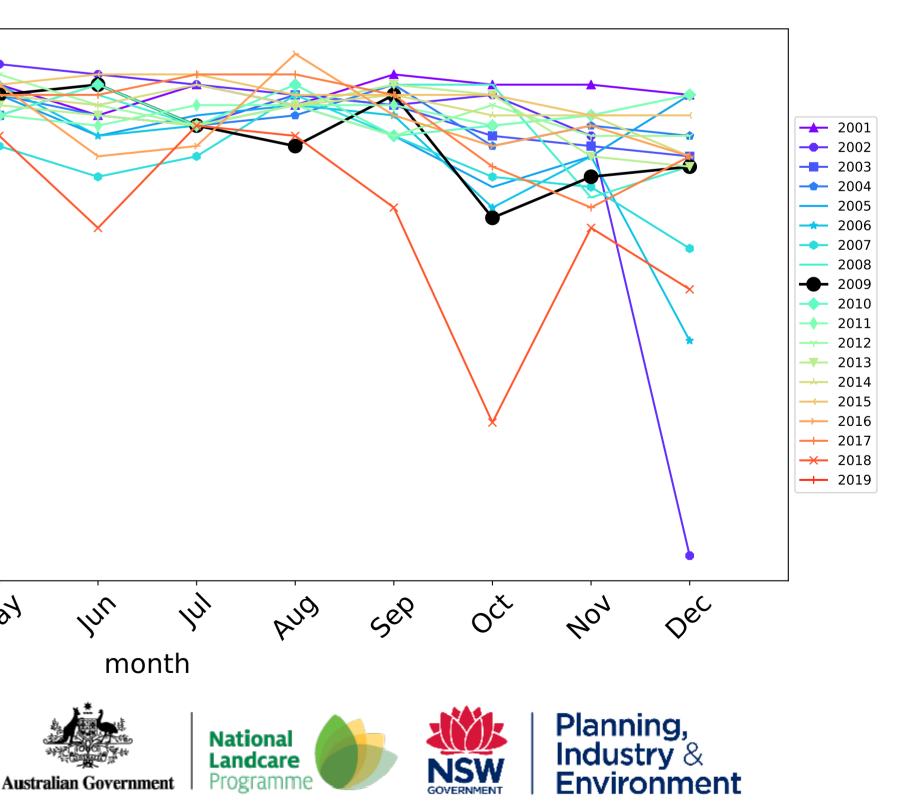


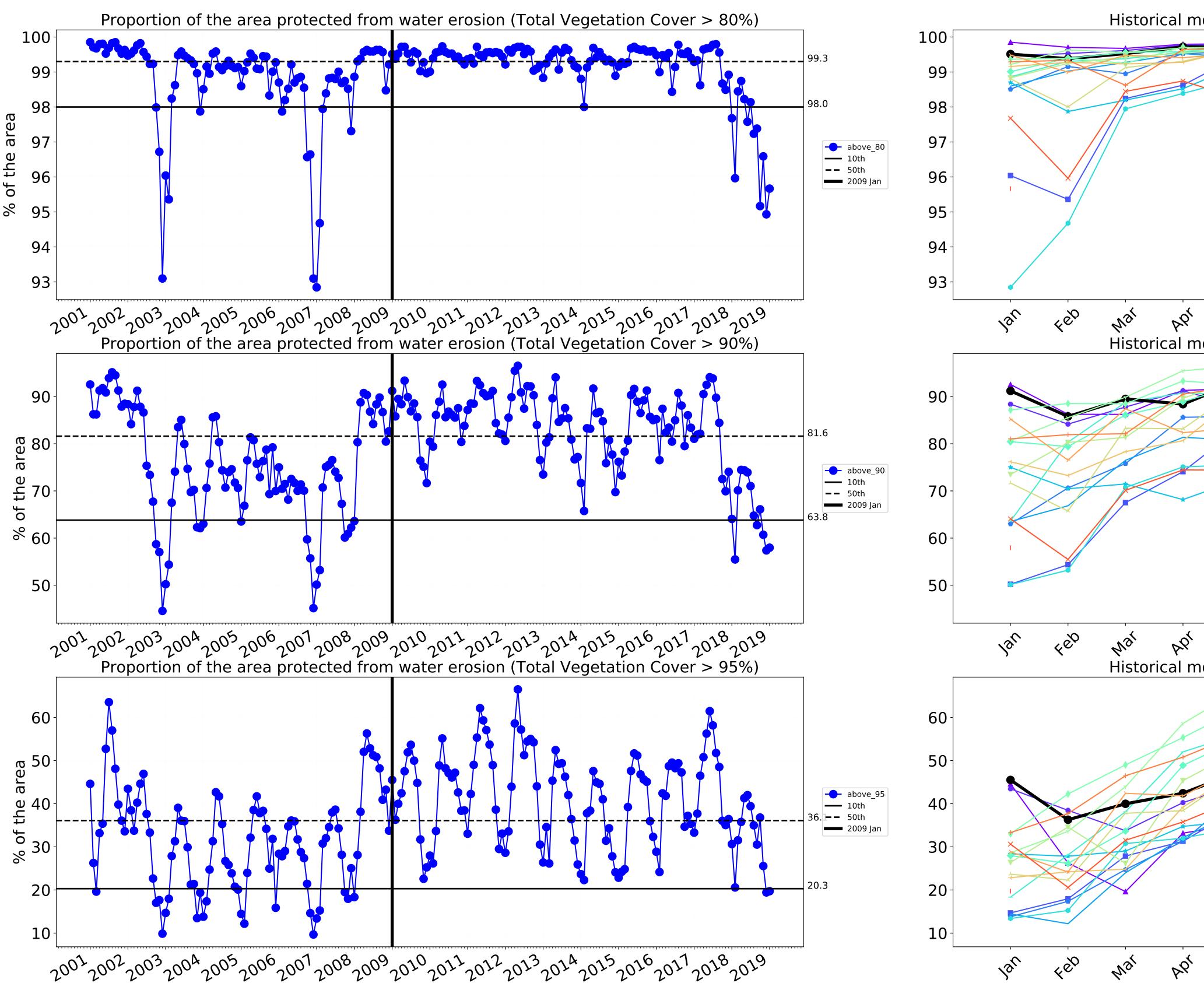


Wind erosion historical monthly area protected (Total Veg Cov >50%)

100.0-99.9 99.9 99.8 99.8 --- above\_70 **—** 10th 99.7 **--** 50th **——** 2009 Jan 99.6 99.5 99.4 99.3 lar feb In May PQ Mai month ΓERN CSIRO

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





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

JUJ

<u>0</u>

way

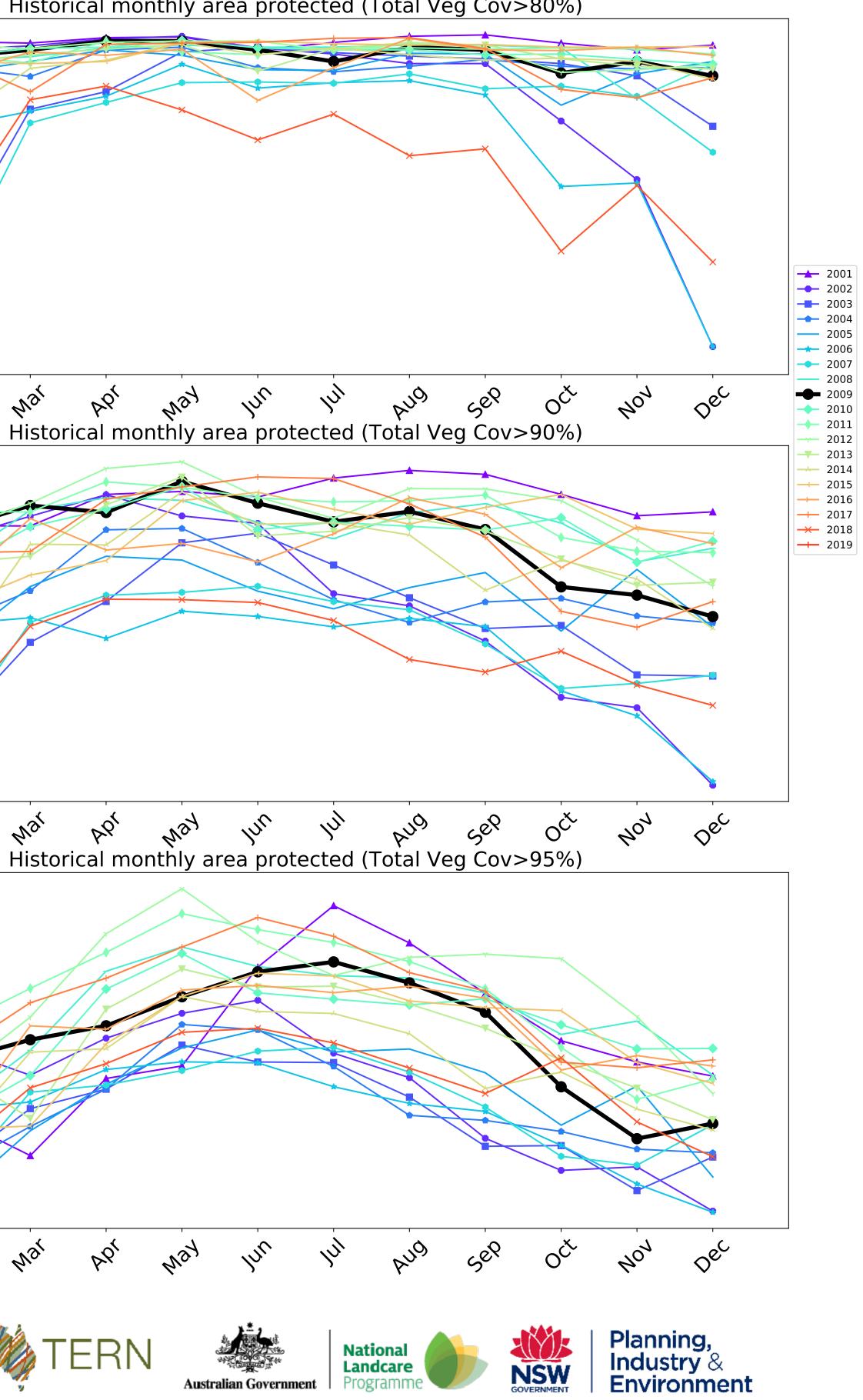
(1900)

TERN

Jul

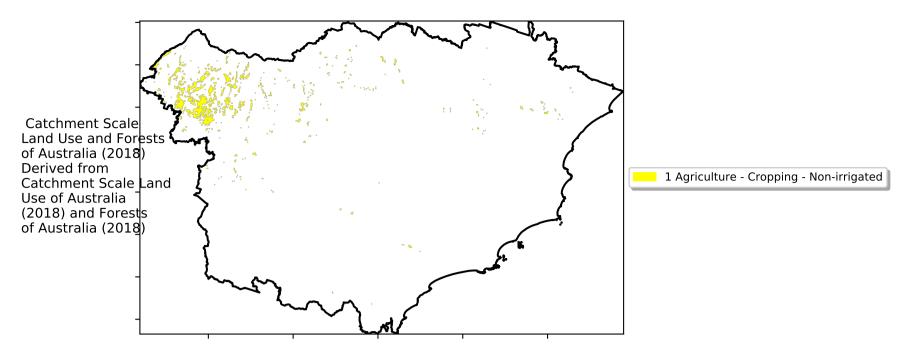
Australian Government

1/2/

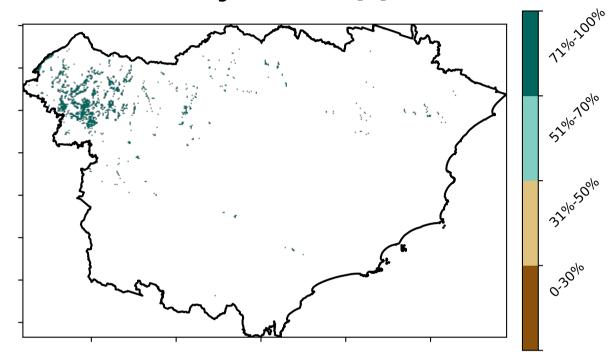


## Cropping

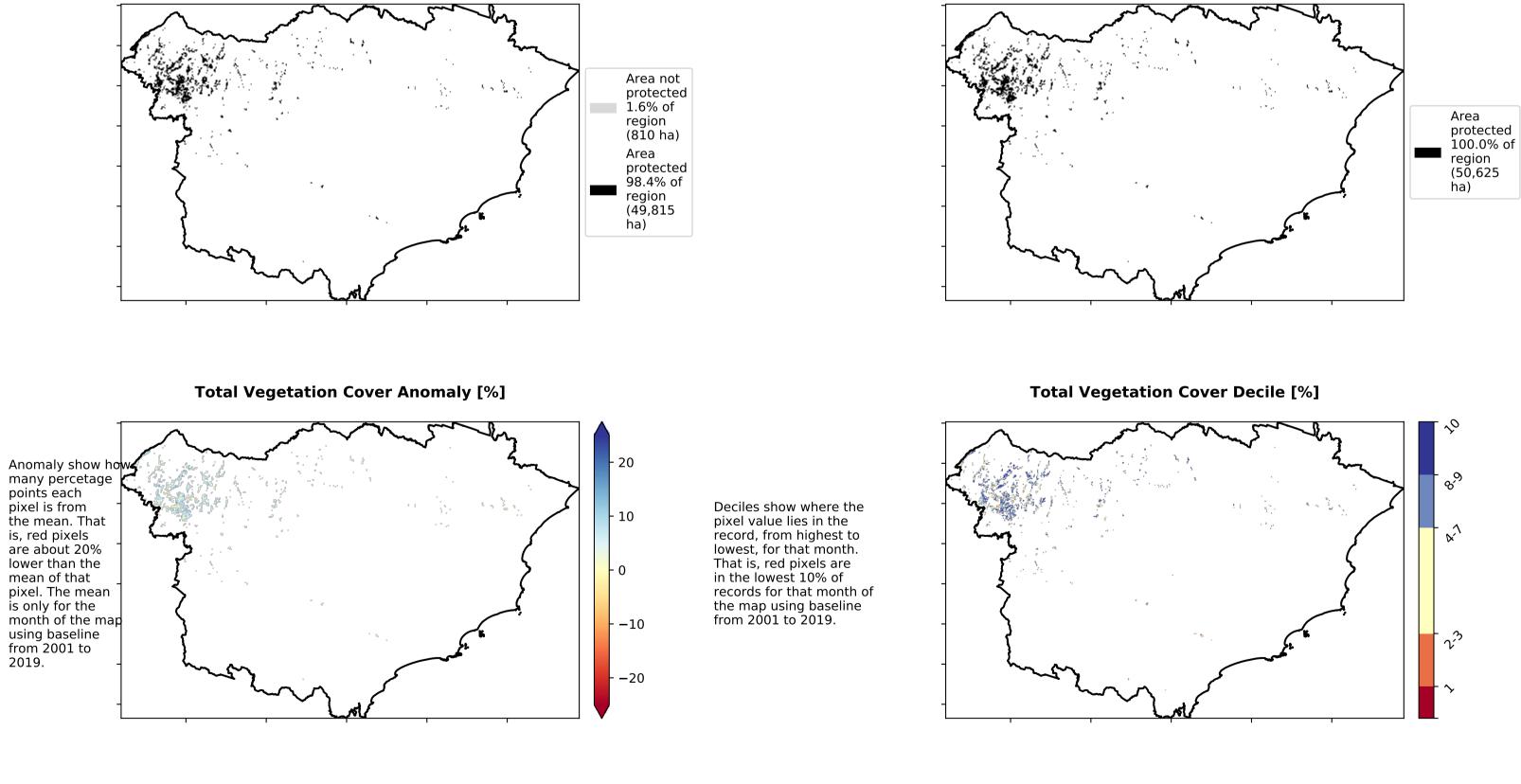
Land use and forest cover



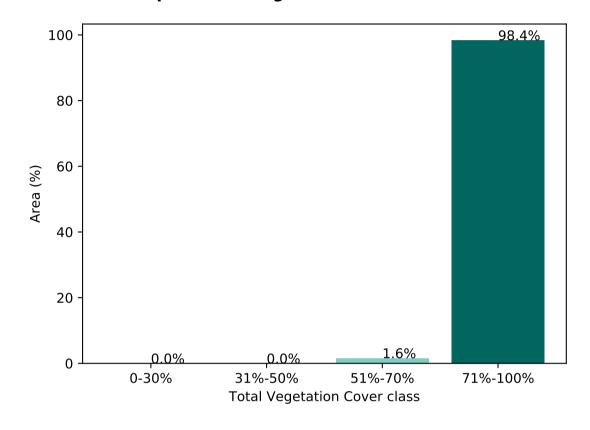
**Total Vegetation Cover [%]** 



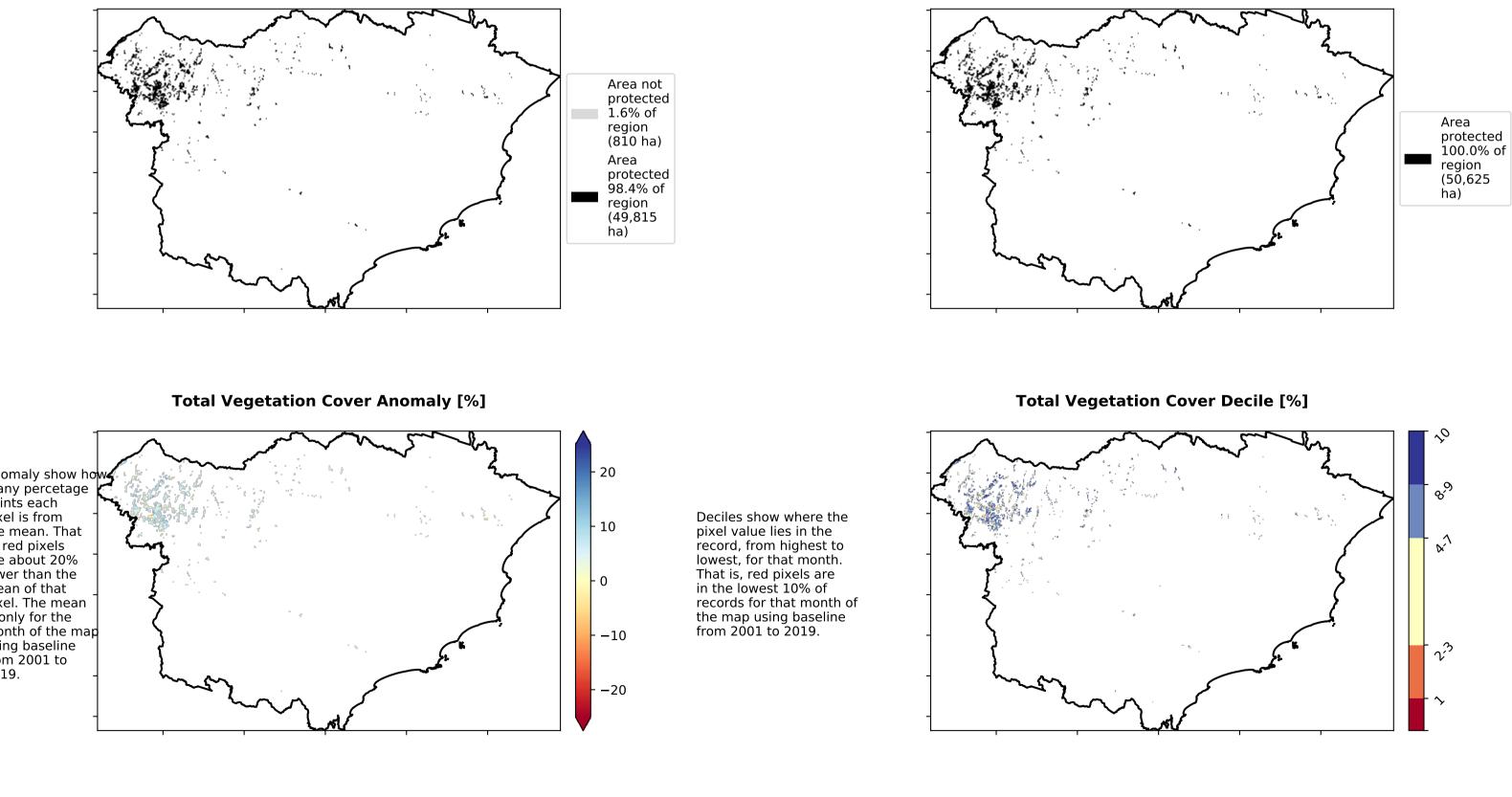
% Area protected from water erosion (>70%)



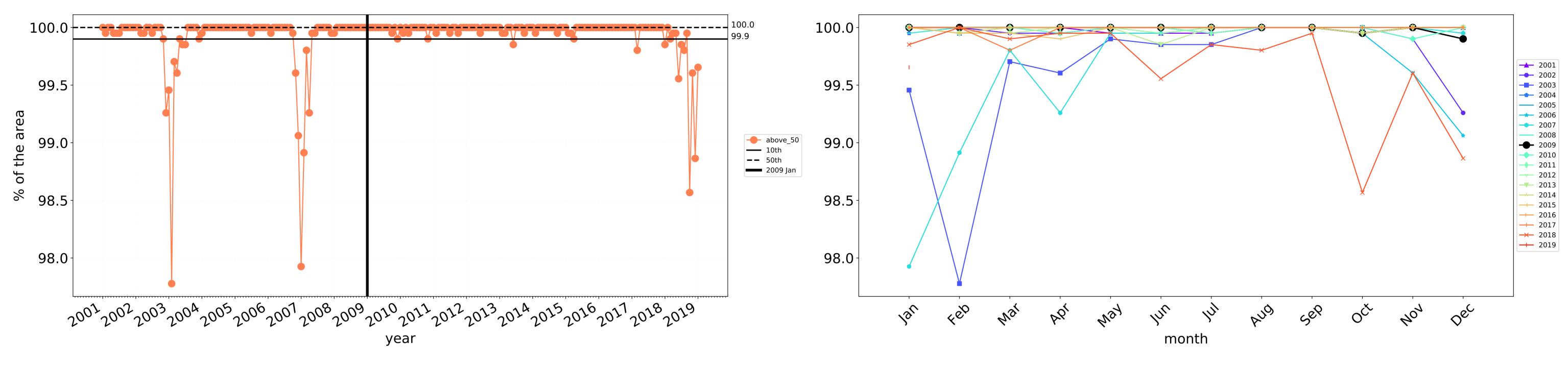
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

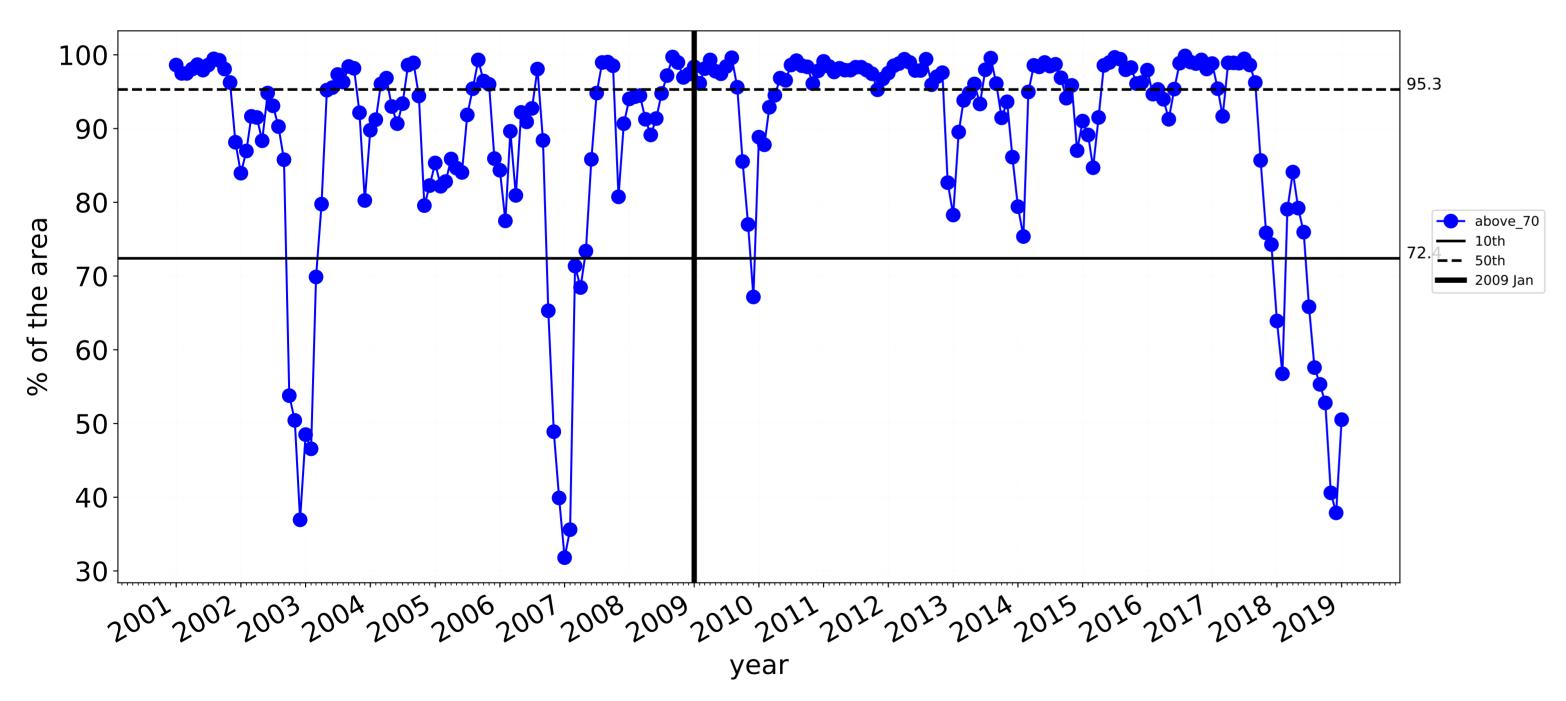




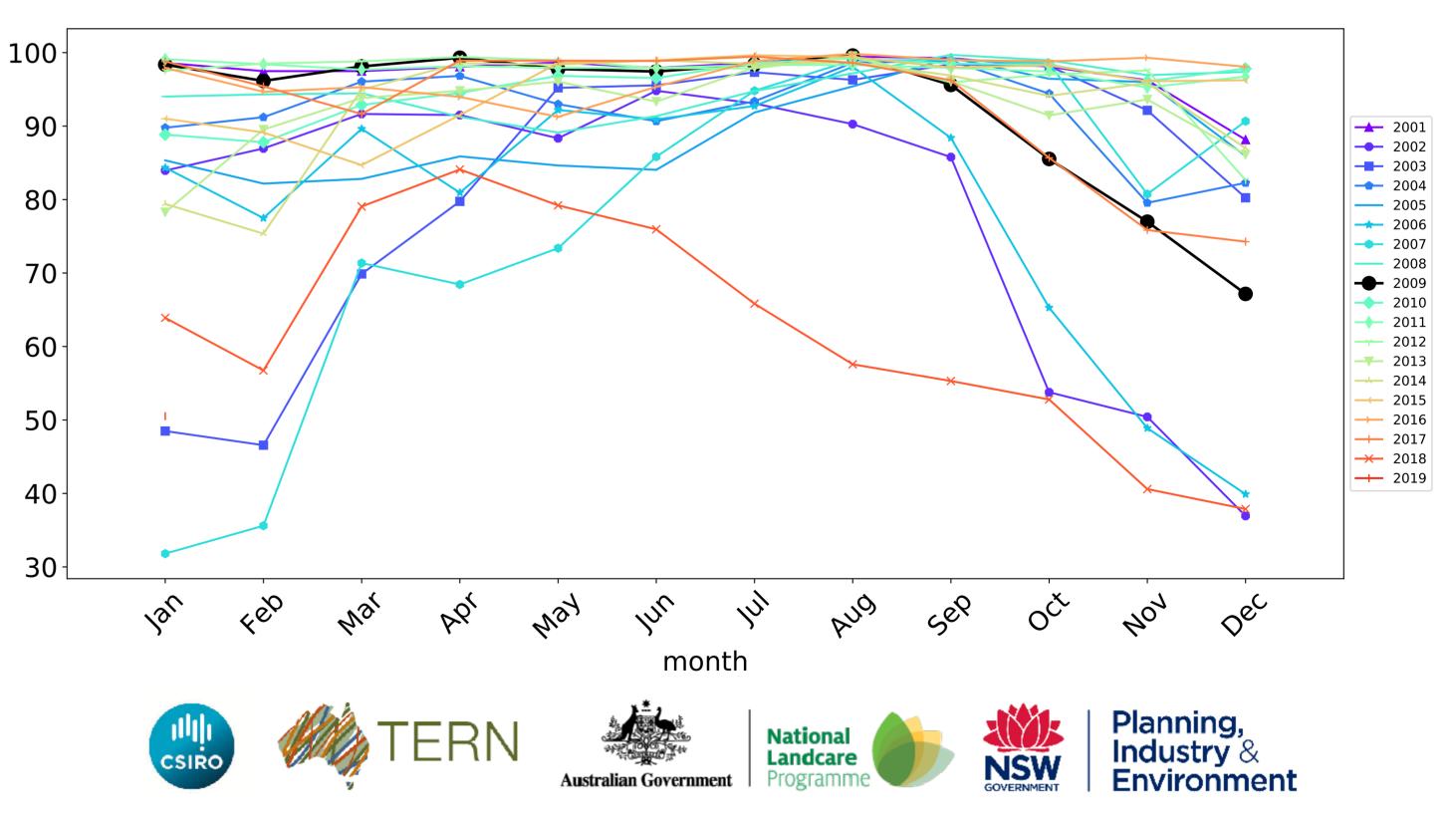


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

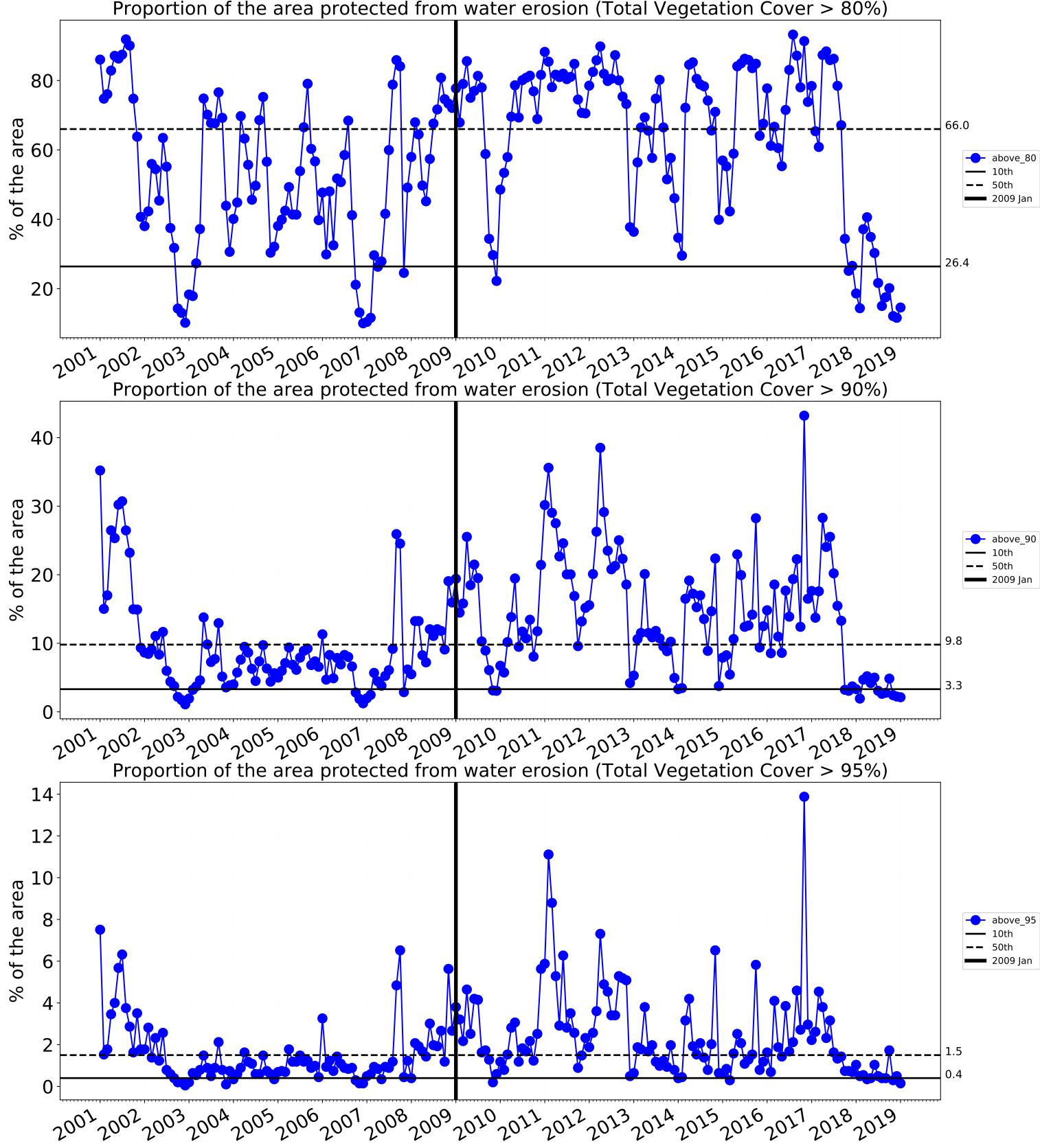
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

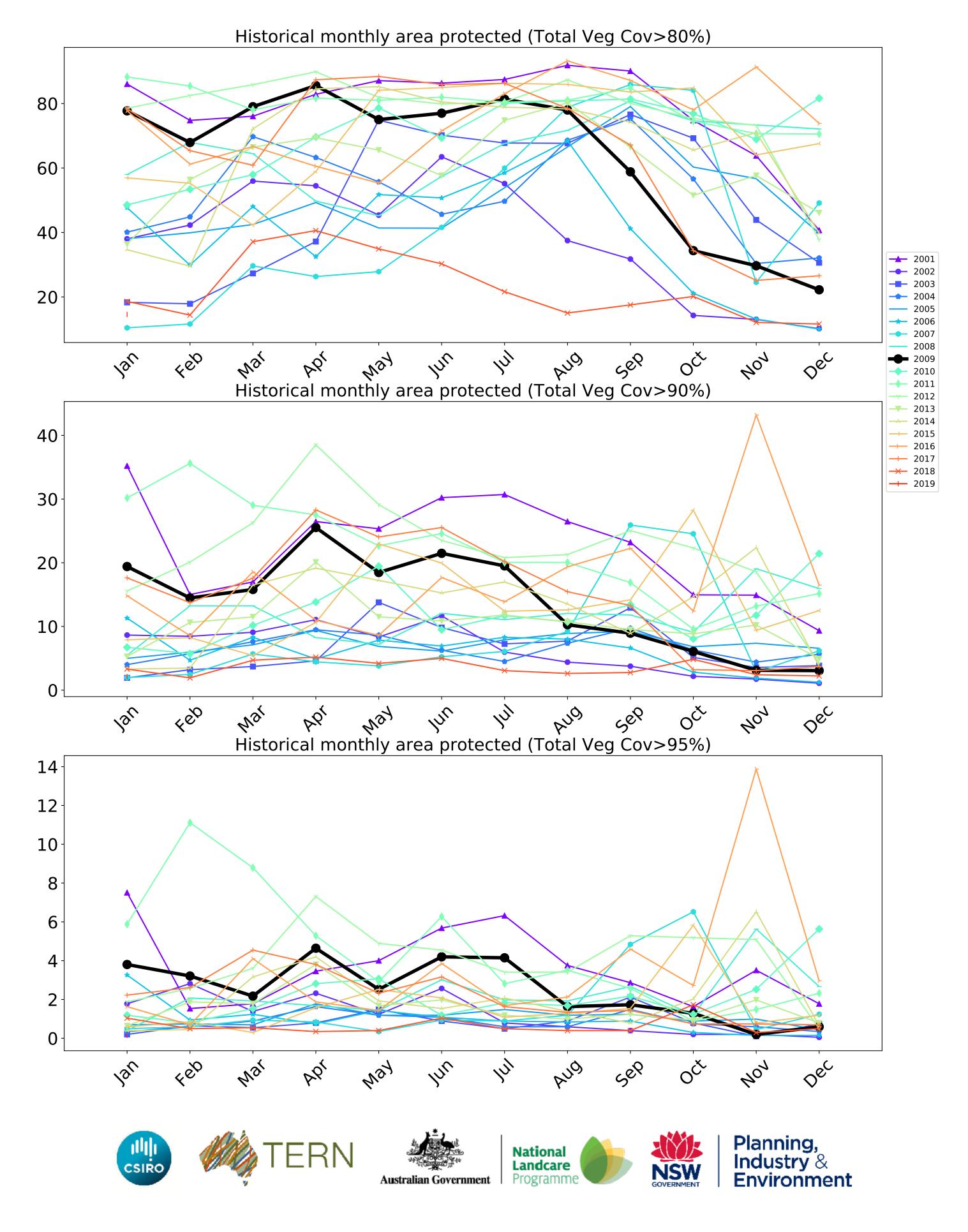


Water erosion historical monthly area protected (Total Veg Cov>70%)



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

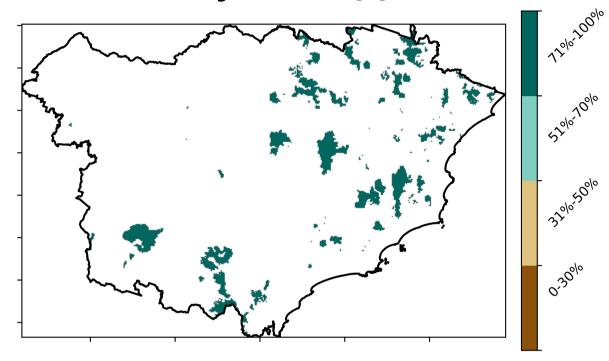




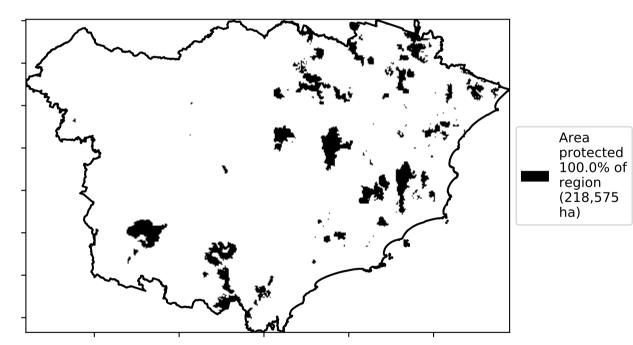
## **Production native forests and plantation forests**



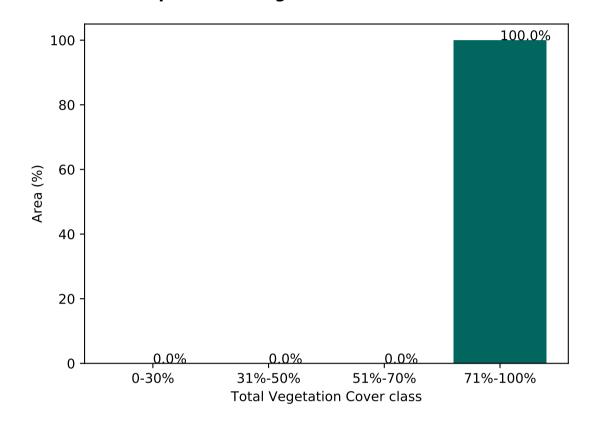
**Total Vegetation Cover [%]** 



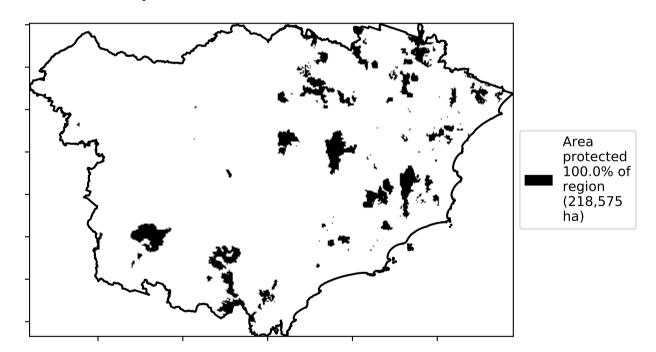
% Area protected from water erosion (>70%)



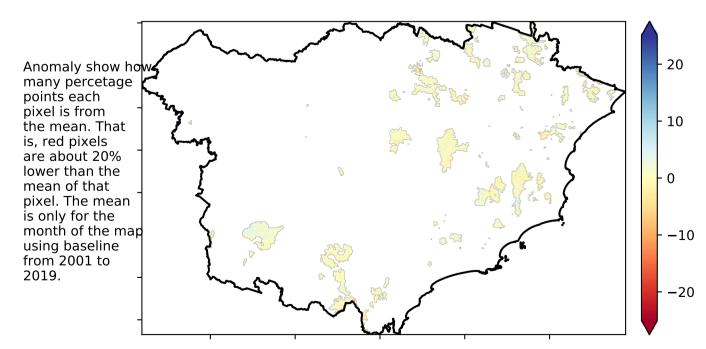
Proportion of vegetation cover class in area



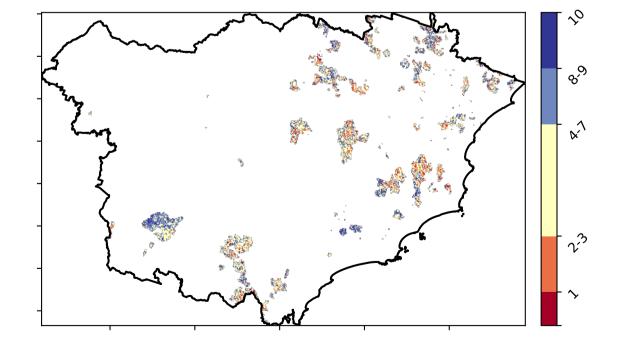
% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]

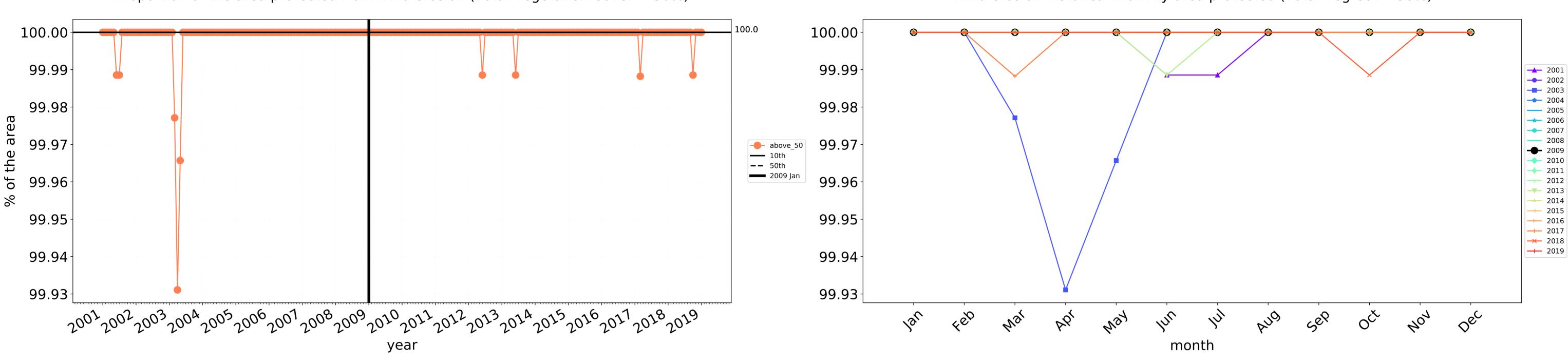


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019. Total Vegetation Cover Decile [%]



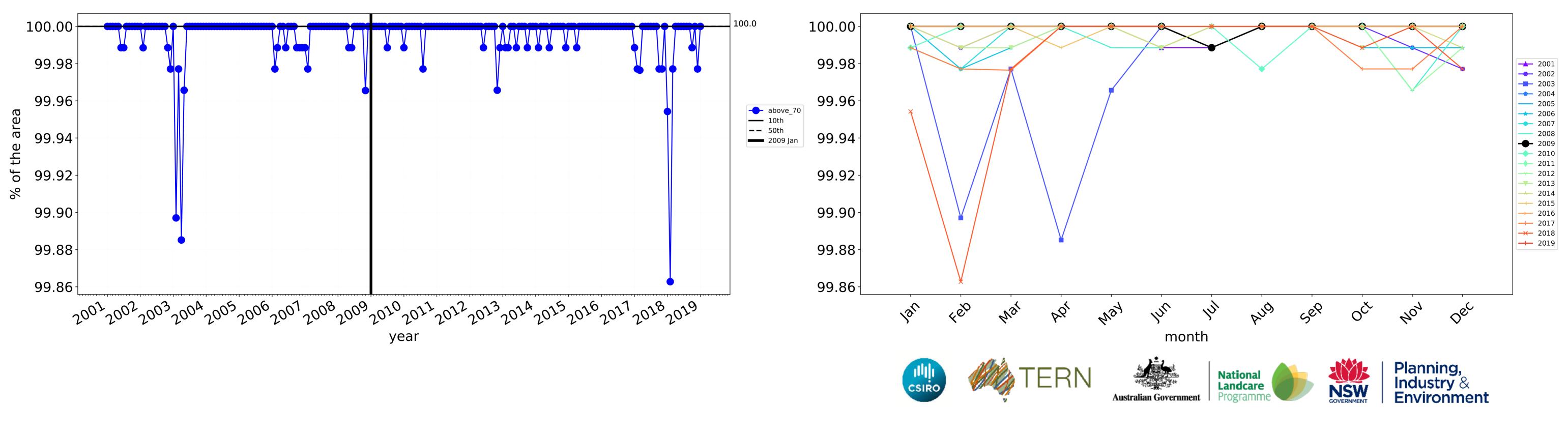


## Production native forests and plantation forests timeseries



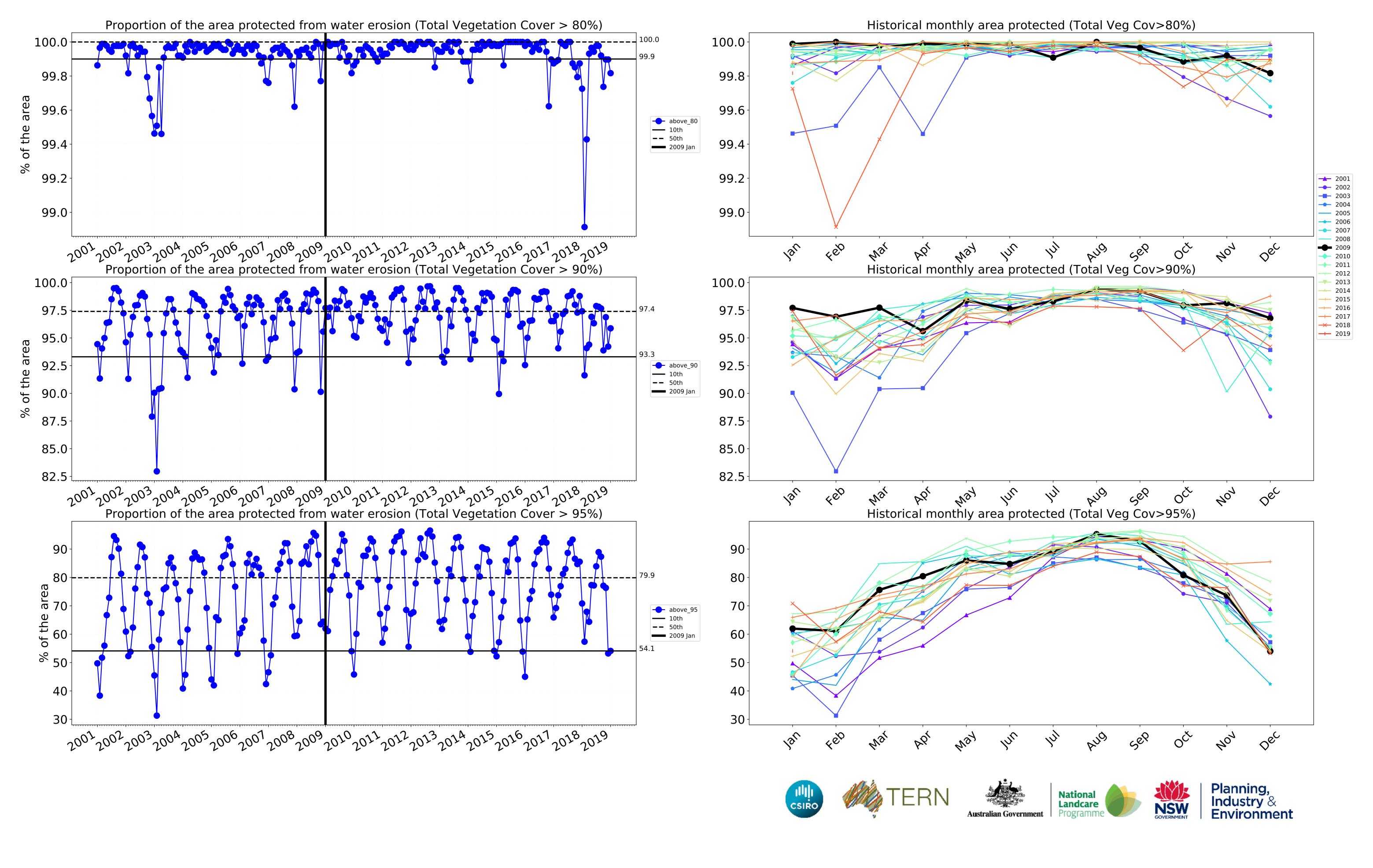
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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





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



# Hunter (3,238,925 ha and no data 61,500 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	3,238,925	99.9% 3,235,803	99.7% 3,228,735	98.8% 3,198,515	96.8% 3,135,253	82.6% 2,675,510	40.9% 1,323,157
Conservation and natural environments	1,241,500	99.9% 1,240,075	99.8% 1,239,325	99.6% 1,236,800	99.3% 1,233,400	92.0% 1,141,725	50.0% 620,950
Conservation and natural environments non forest	30,050	95.3% 28,625	93.4% 28,075	89.0% 26,750	85.4% 25,650	65.9% 19,800	27.6% 8,300
Conservation and natural environments Woodland forest	139,000	100.0% 139,000	100.0% 138,950	99.9% 138,825	99.6% 138,400	90.5% 125,775	35.2% 48,925
Conservation and natural environments Forest (non woodland)	1,072,450	100.0% 1,072,450	100.0% 1,072,300	99.9% 1,071,225	99.7% 1,069,350	92.9% 996,150	52.6% 563,725
Agriculture	1,581,200	100.0% 1,581,150	100.0% 1,580,625	99.7% 1,576,975	97.9% 1,548,250	79.2% 1,251,650	34.5% 545,150
Grazing	1,503,200	100.0% 1,503,150	100.0% 1,502,625	99.8% 1,499,950	98.9% 1,486,575	82.3% 1,237,675	36.1% 542,775
Grazing non forest	1,213,225	100.0% 1,213,175	100.0% 1,212,675	99.8% 1,210,225	98.7% 1,197,875	80.6% 977,675	34.9% 423,500
Grazing Woodland forest	120,625	100.0% 120,625	100.0% 120,600	99.9% 120,525	99.6% 120,175	87.5% 105,550	35.0% 42,200
Grazing - Forest (non woodland)	169,350	100.0% 169,350	100.0% 169,350	99.9% 169,200	99.5% 168,525	91.2% 154,450	45.5% 77,075
Cropping	50,625	100.0% 50,625	100.0% 50,625	98.4% 49,800	77.7% 39,350	19.4% 9,825	3.8% 1,925
Production native forests and plantation forests	218,575	100.0% 218,575	100.0% 218,575	100.0% 218,575	100.0% 218,550	97.7% 213,575	62.0% 135,450

