# Total vegetation cover soil protection Region:NRM Mackay Whitsunday QLD

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

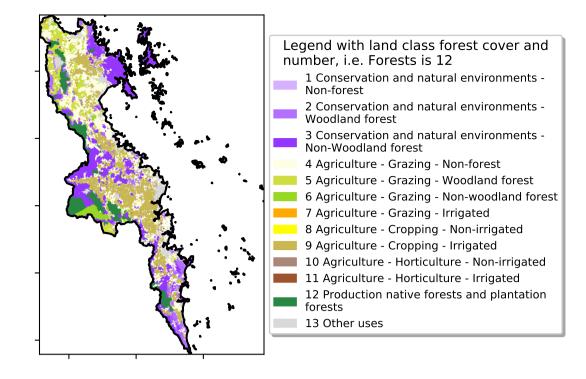


# **Vegetation Cover Sep 2010**

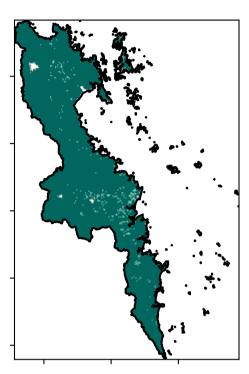
#### Land use and forest cover

#### Proportion of each land class in area

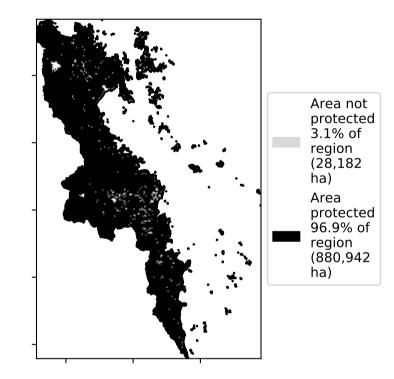
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

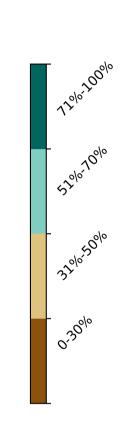


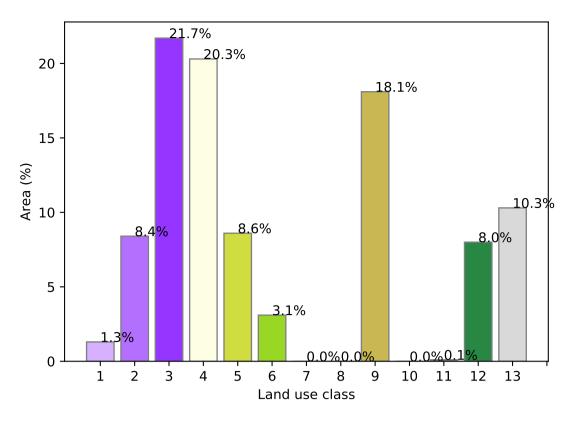
#### **Total Vegetation Cover [%]**



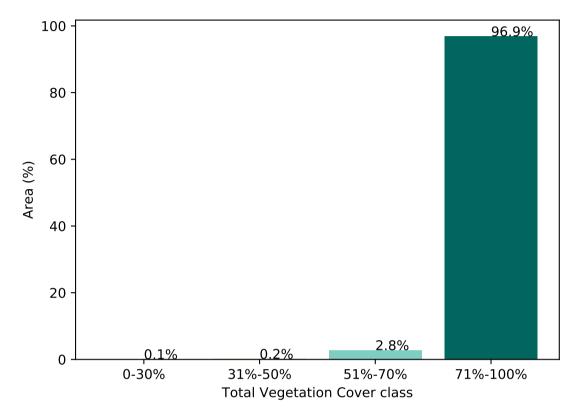
% Area protected from water erosion (>70%)



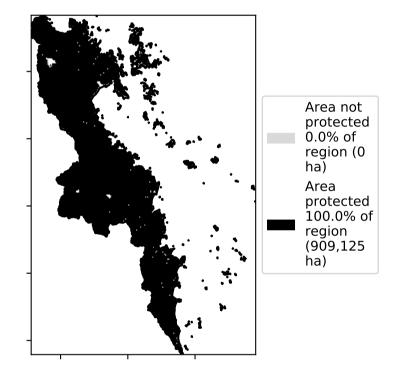




#### Proportion of vegetation cover class in area

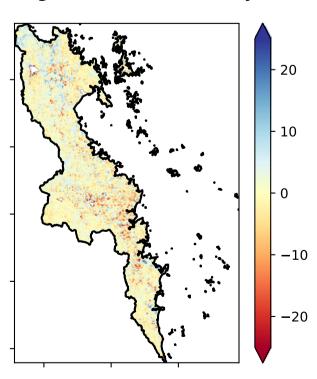


#### % Area protected from wind erosion (>50%)



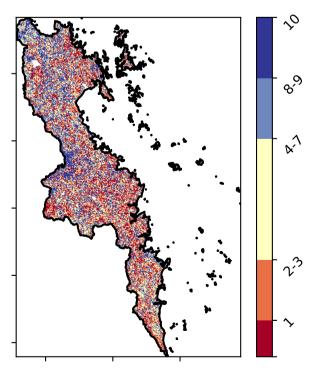
**Total Vegetation Cover Anomaly [%]** 

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

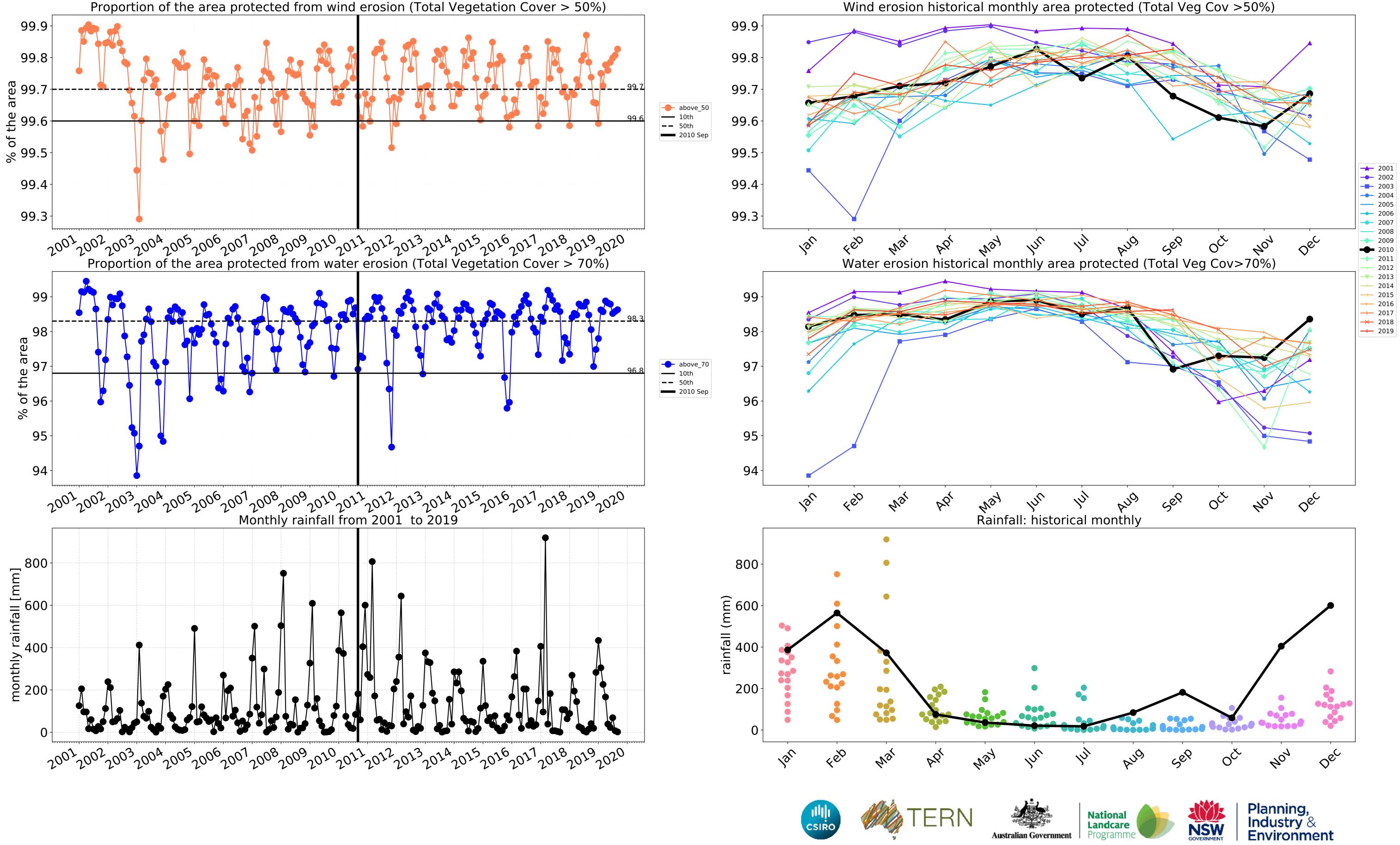


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

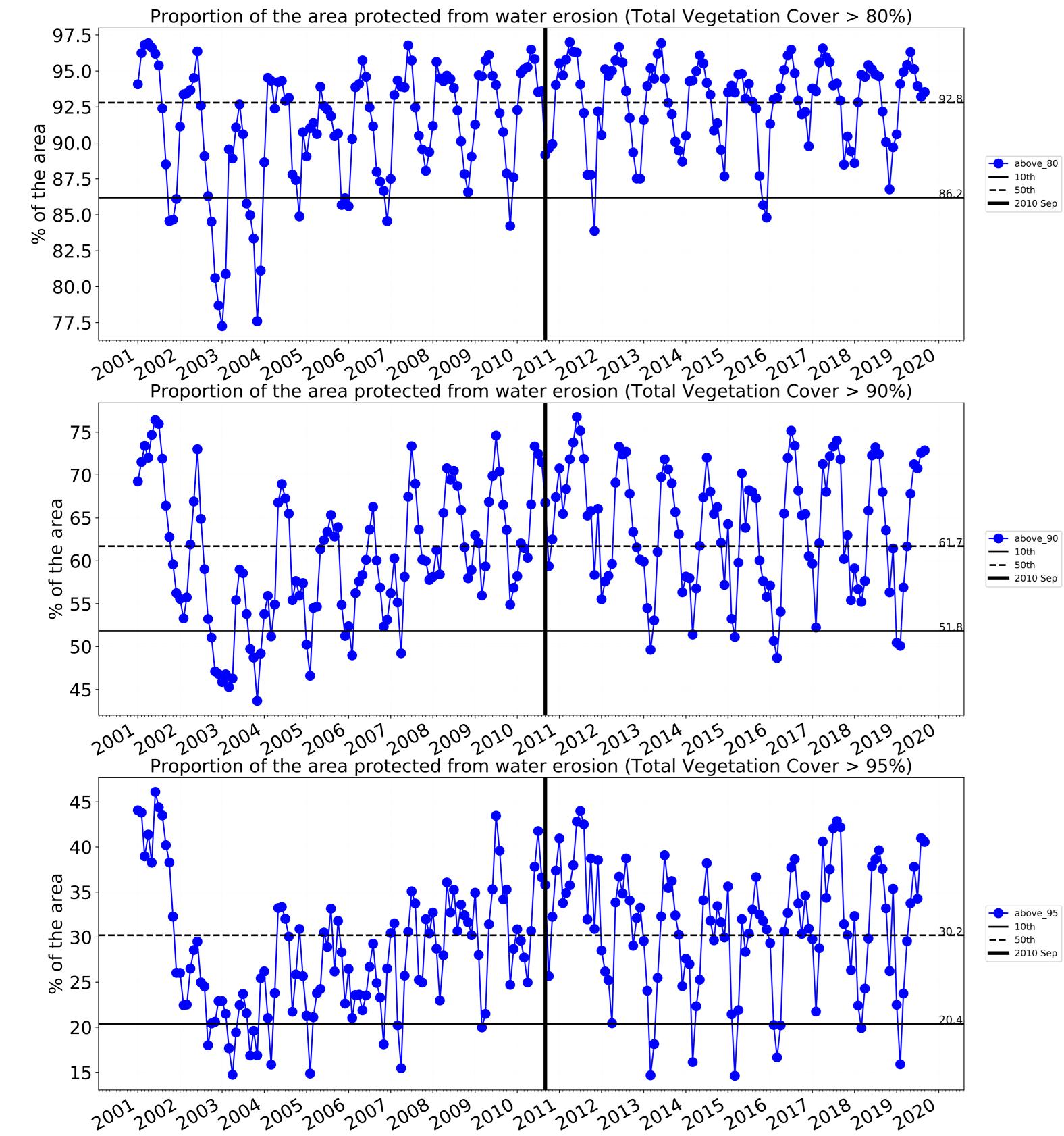
**Total Vegetation Cover Decile [%]** 

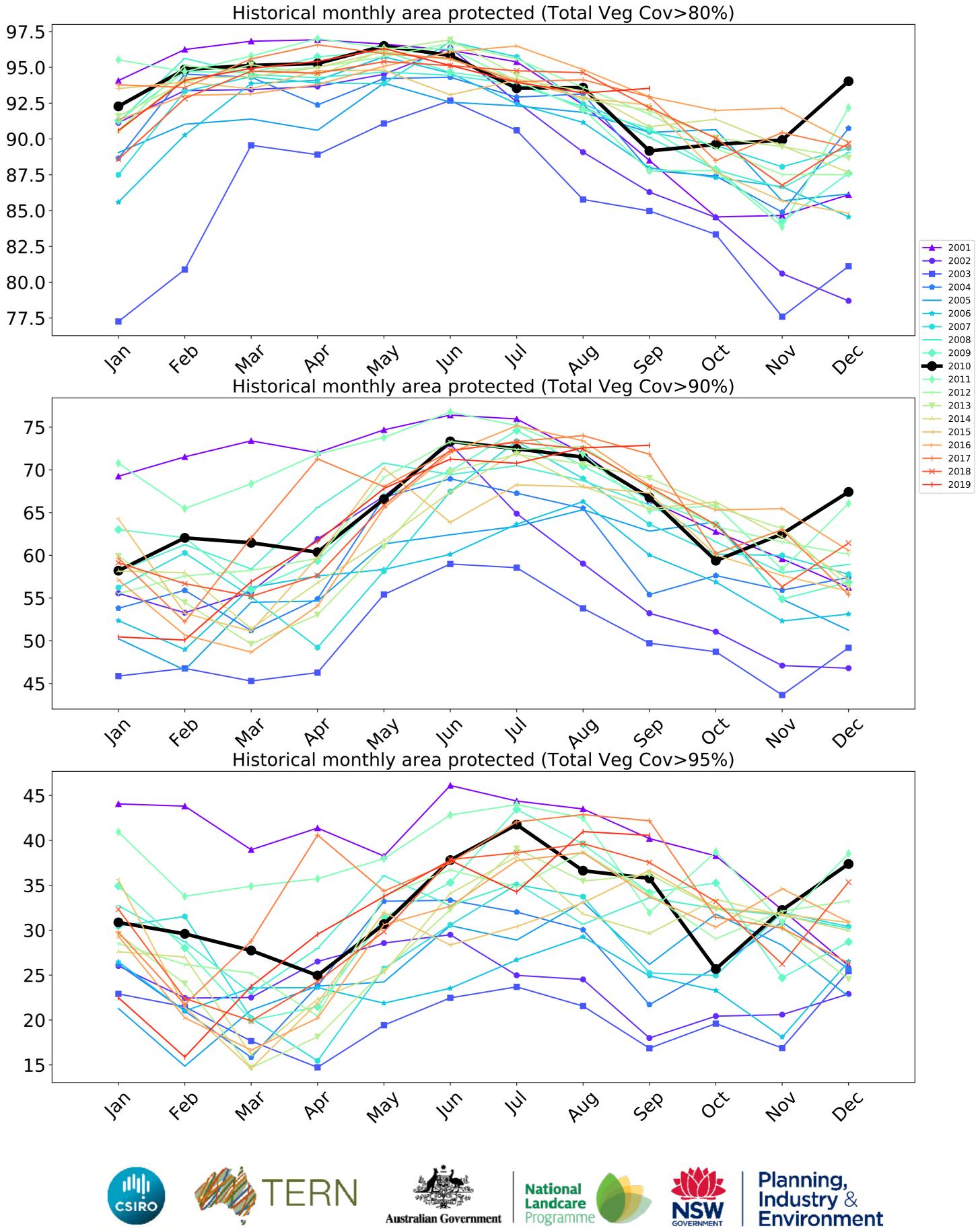










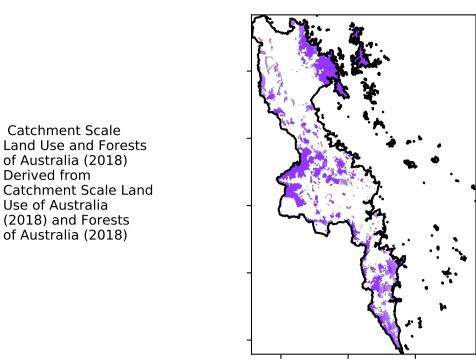




## **Conservation and natural environments**

#### Land use and forest cover

Proportion of each land class in area

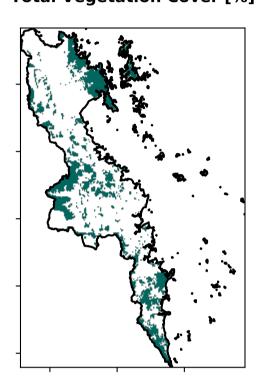


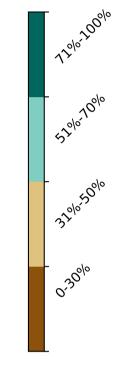
Derived from

Use of Australia

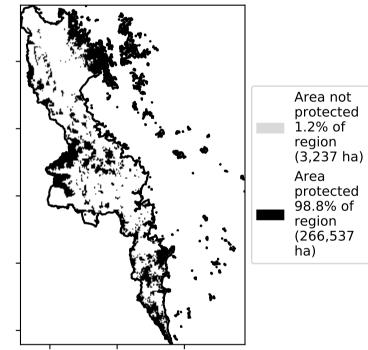
1 Conservation and natural environments - Nonforest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments - Non-woodland forest

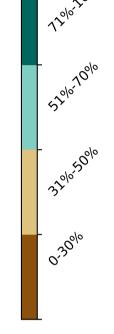
**Total Vegetation Cover [%]** 



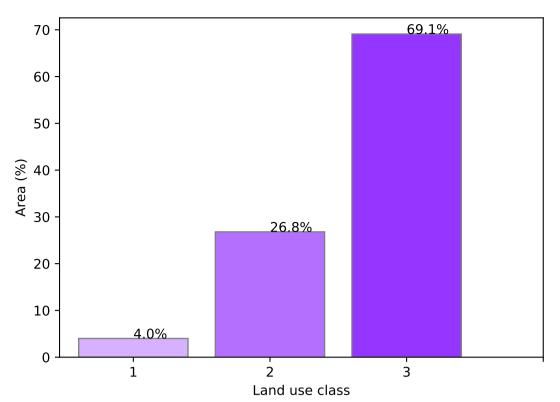


% Area protected from water erosion (>70%)

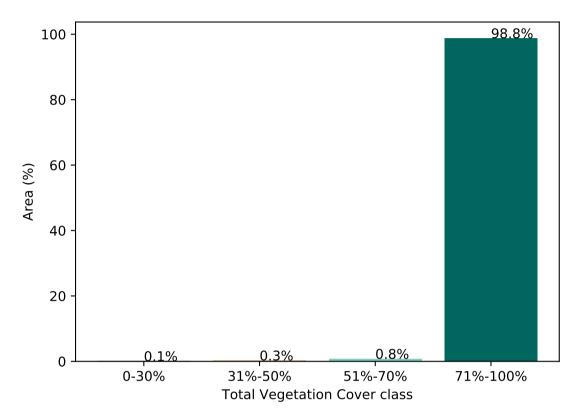




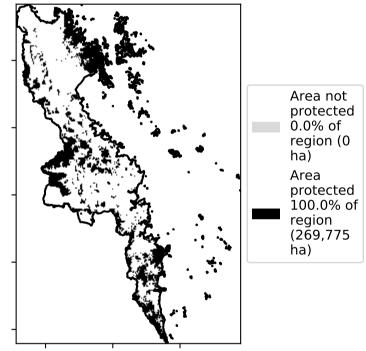




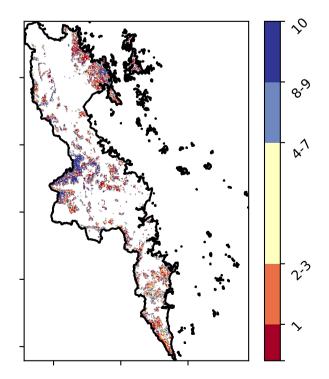
#### Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

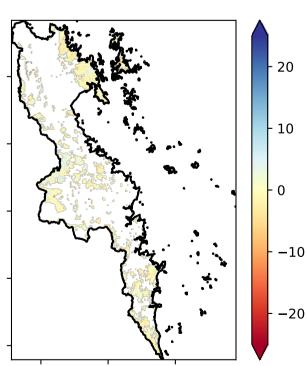


**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

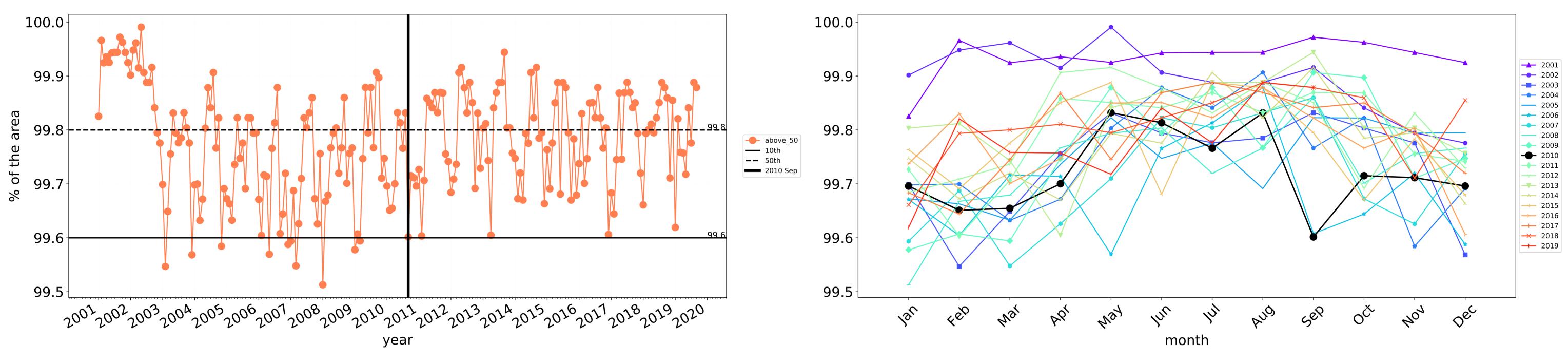
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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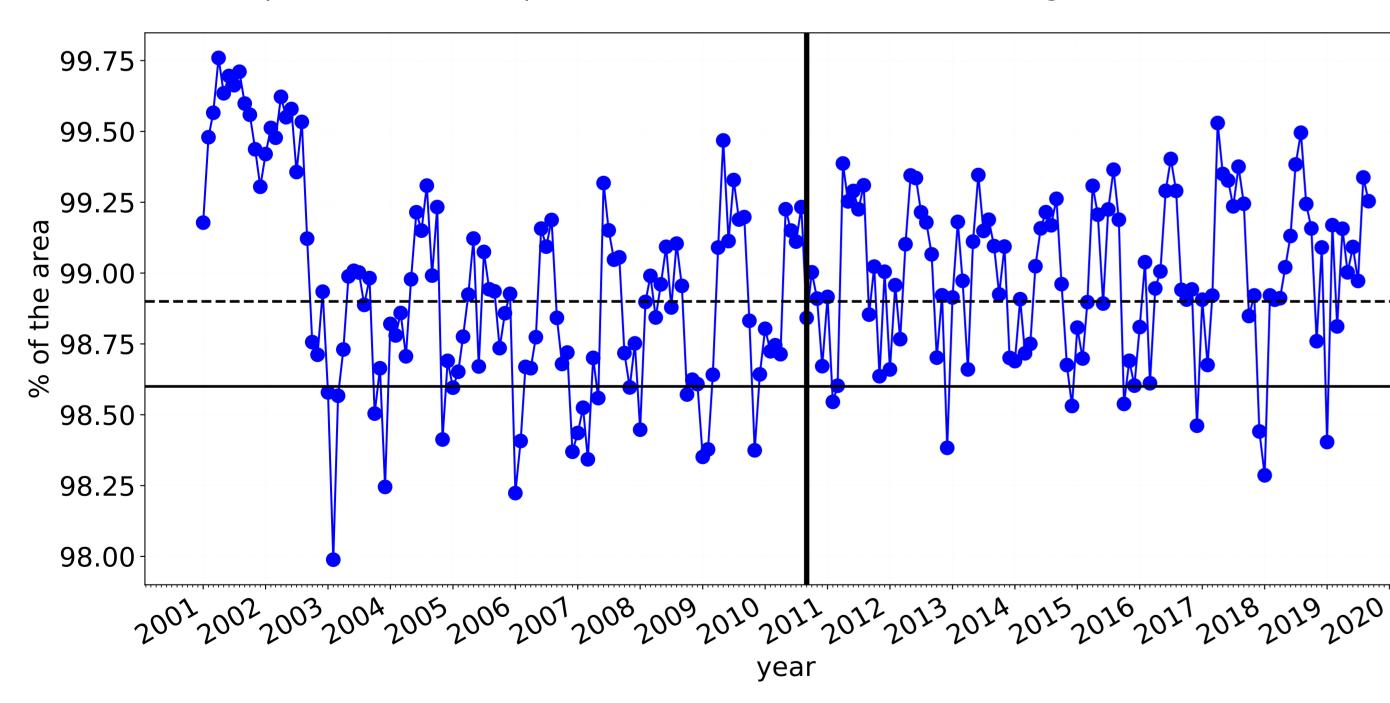


3



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

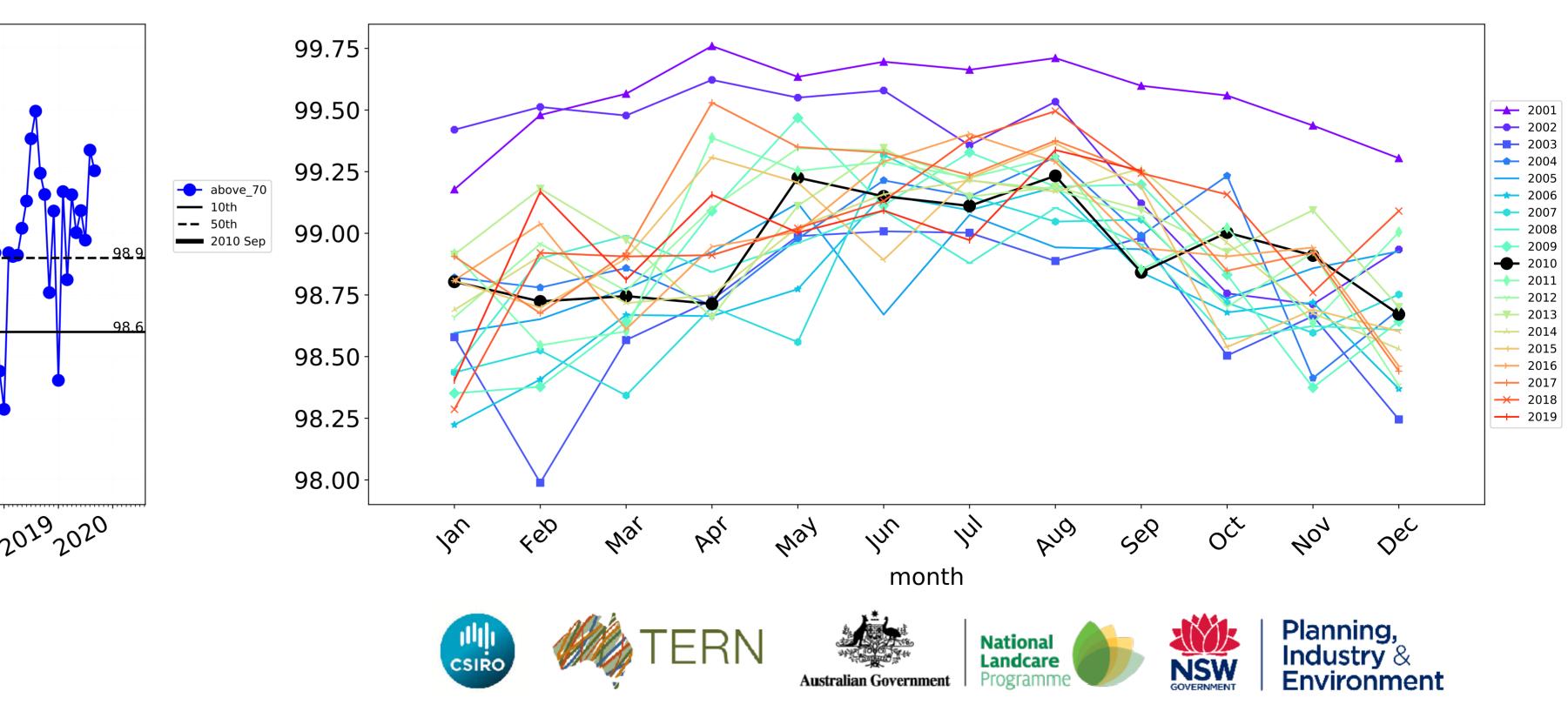
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



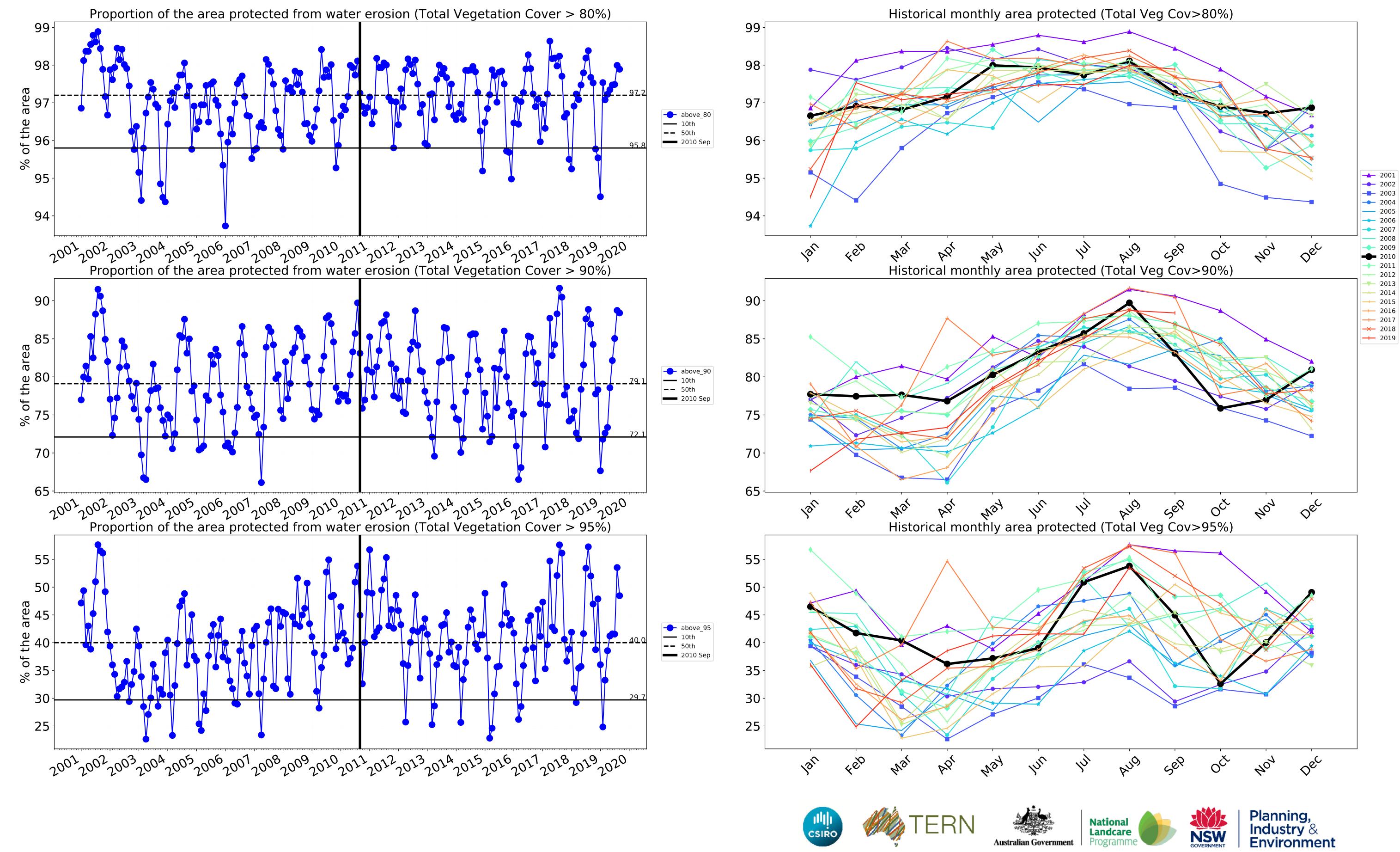
## **Conservation and natural environments timeseries**



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

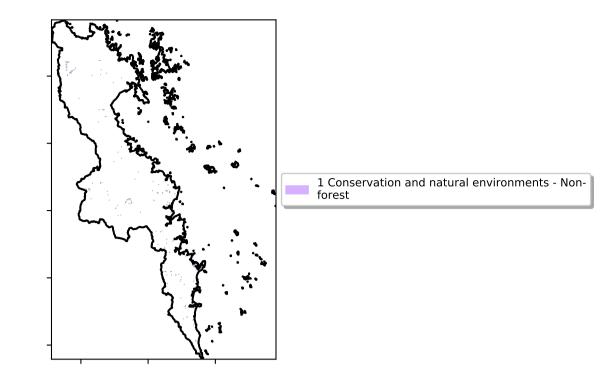


Water erosion historical monthly area protected (Total Veg Cov>70%)

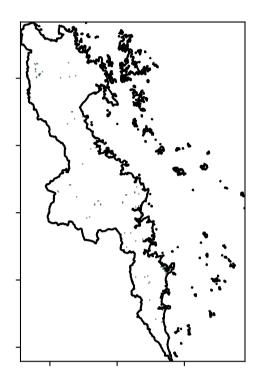


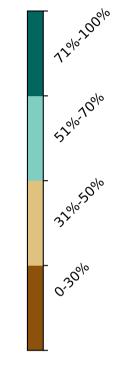
## **Conservation and natural environments non forest**

Land use and forest cover

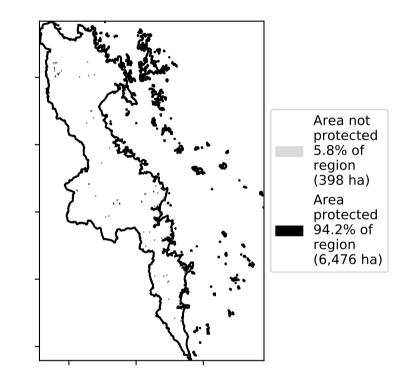


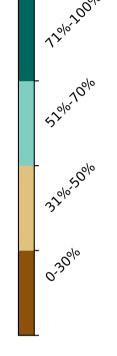
**Total Vegetation Cover [%]** 



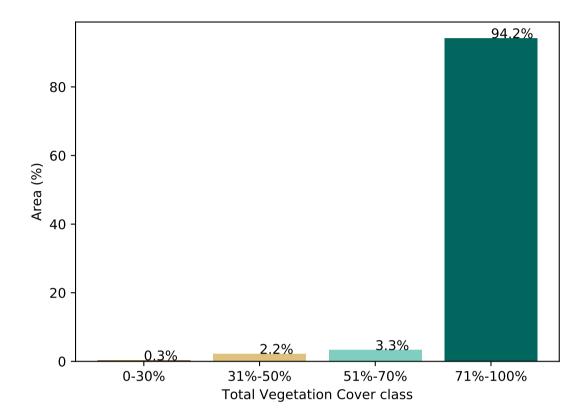


% Area protected from water erosion (>70%)

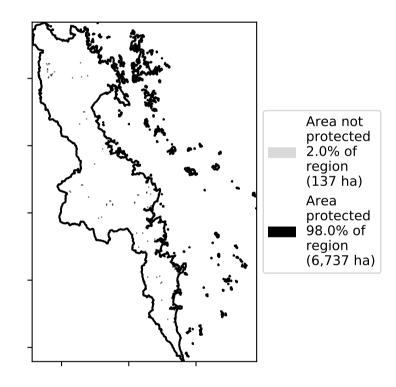




Proportion of vegetation cover class in area

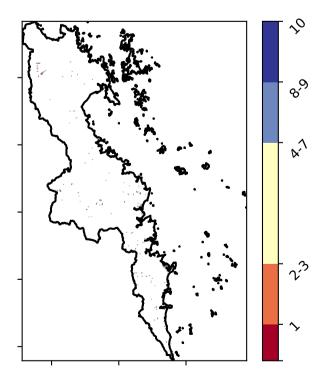


% Area protected from wind erosion (>50%)

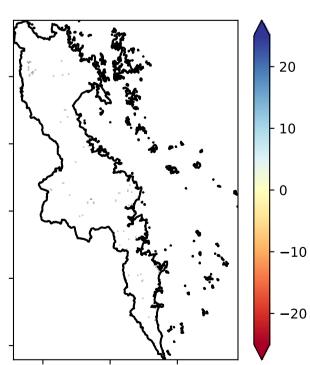


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover Decile [%]** 

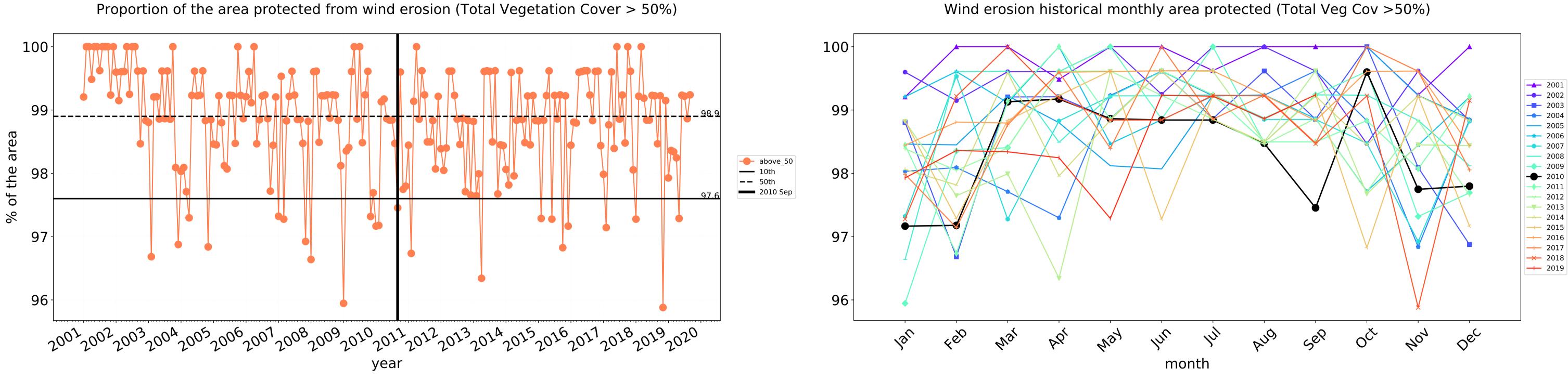


**Total Vegetation Cover Anomaly [%]** 

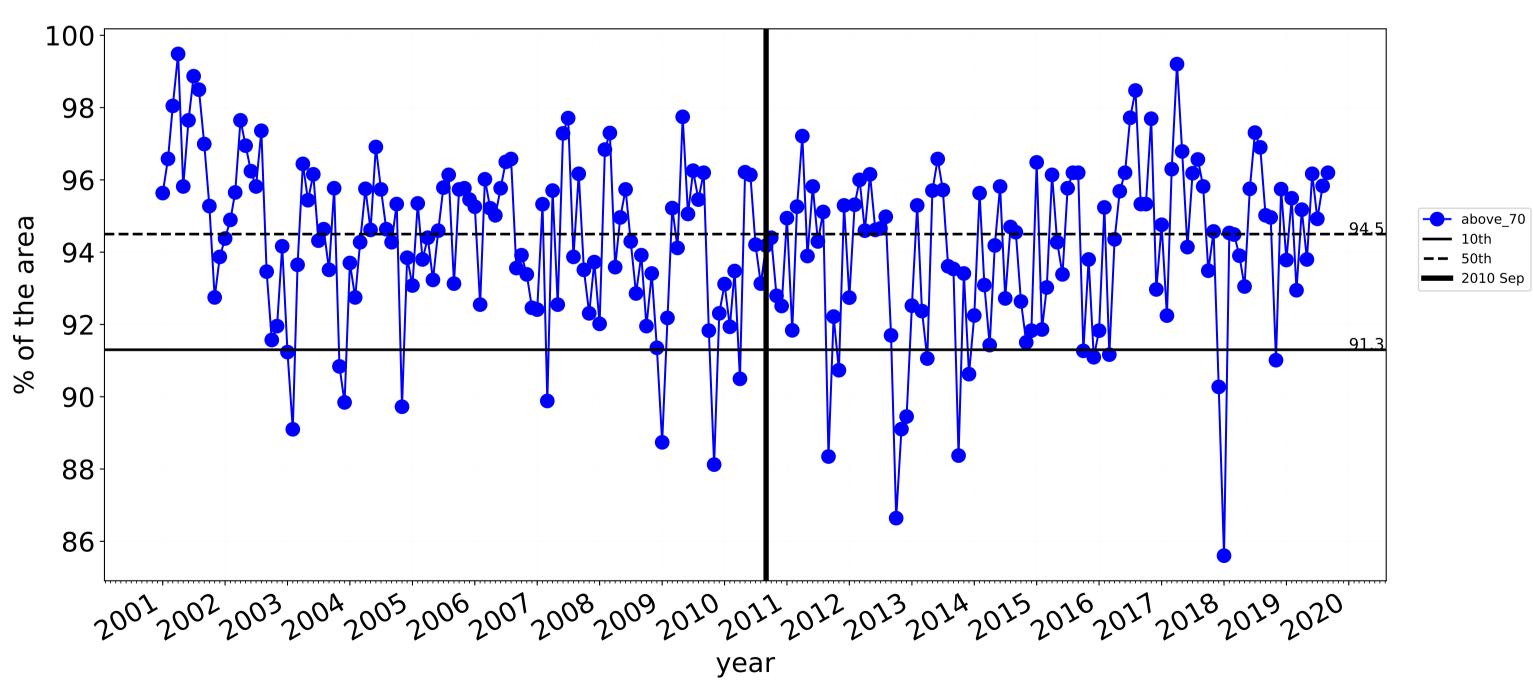


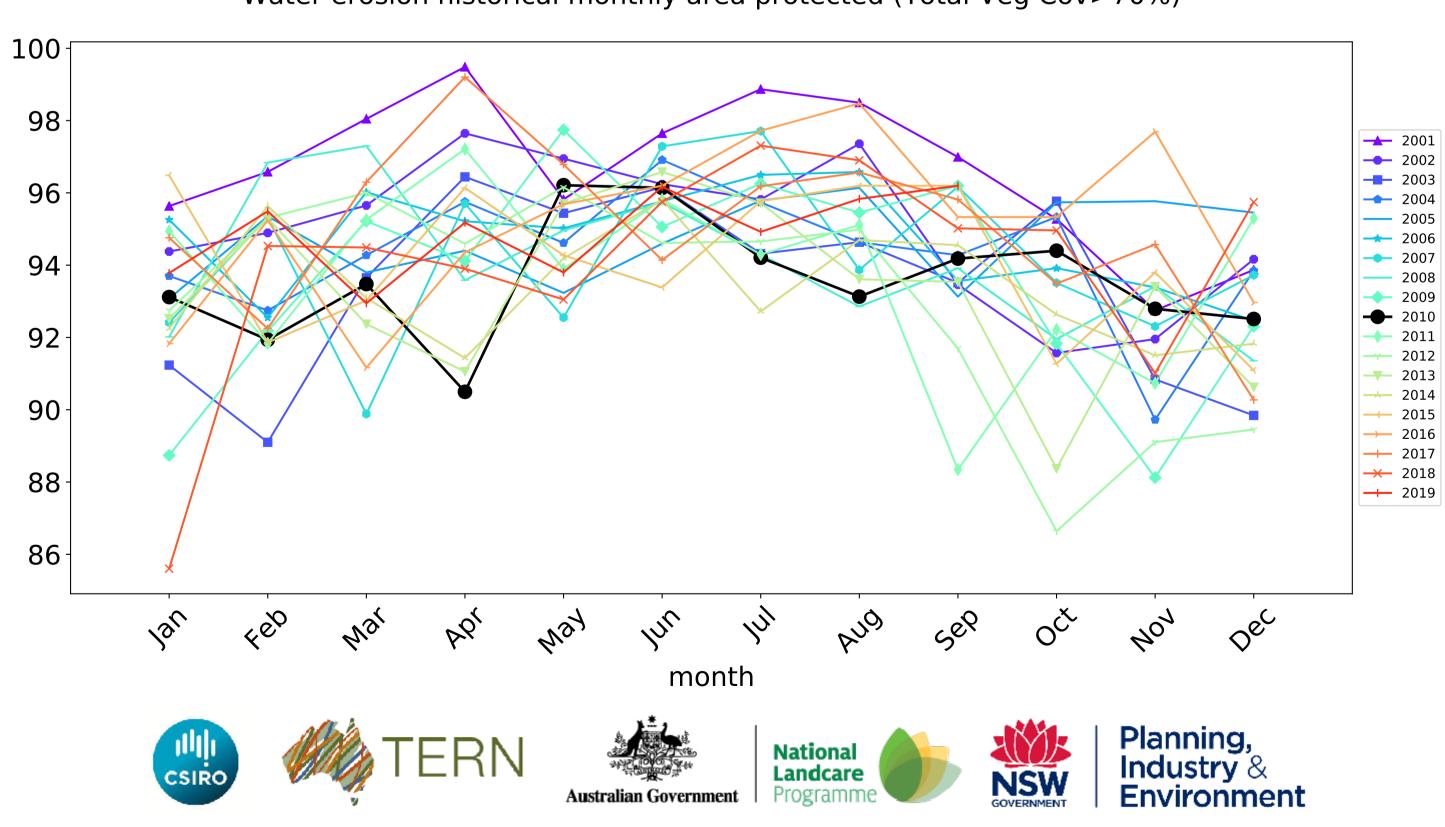
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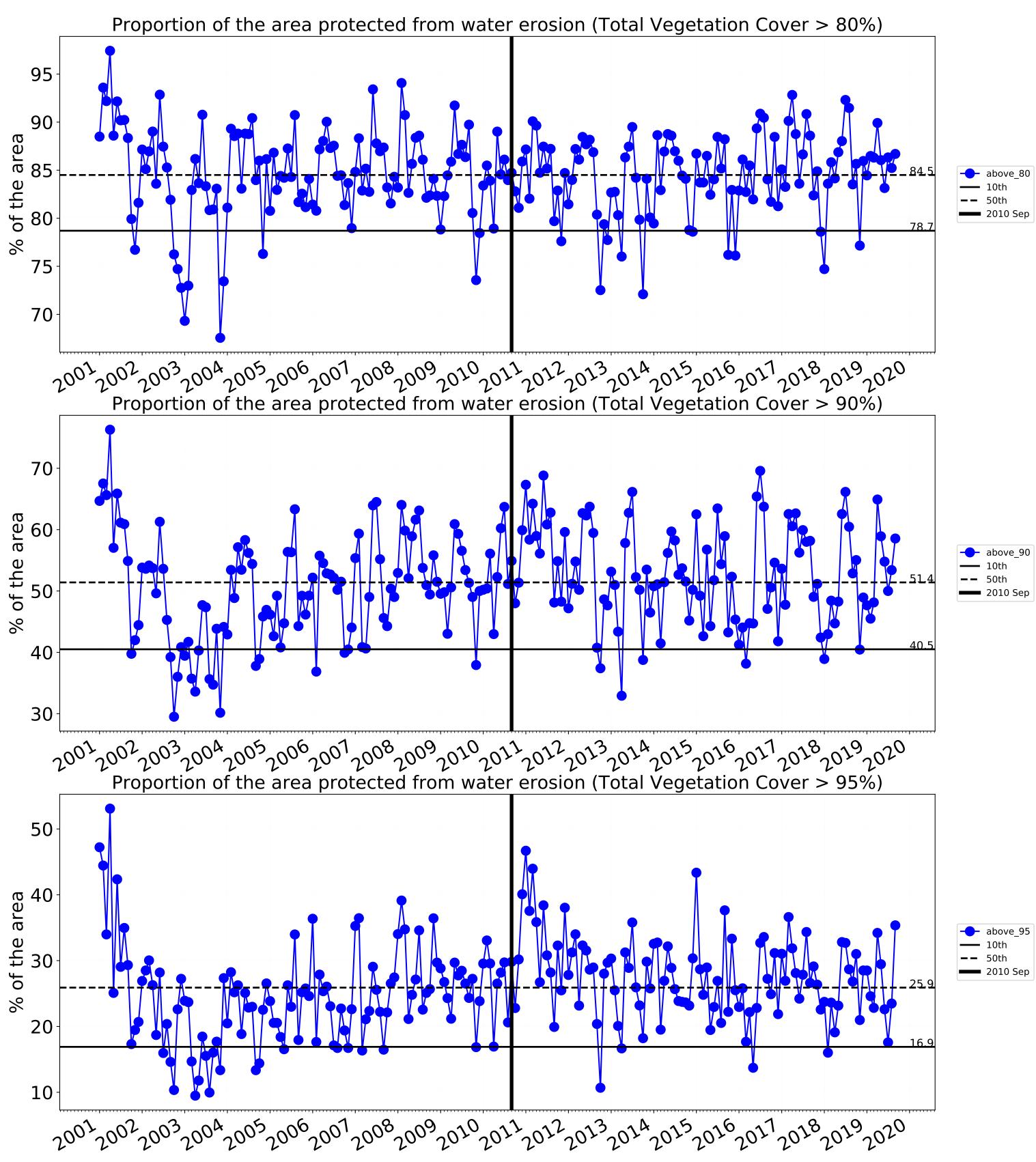


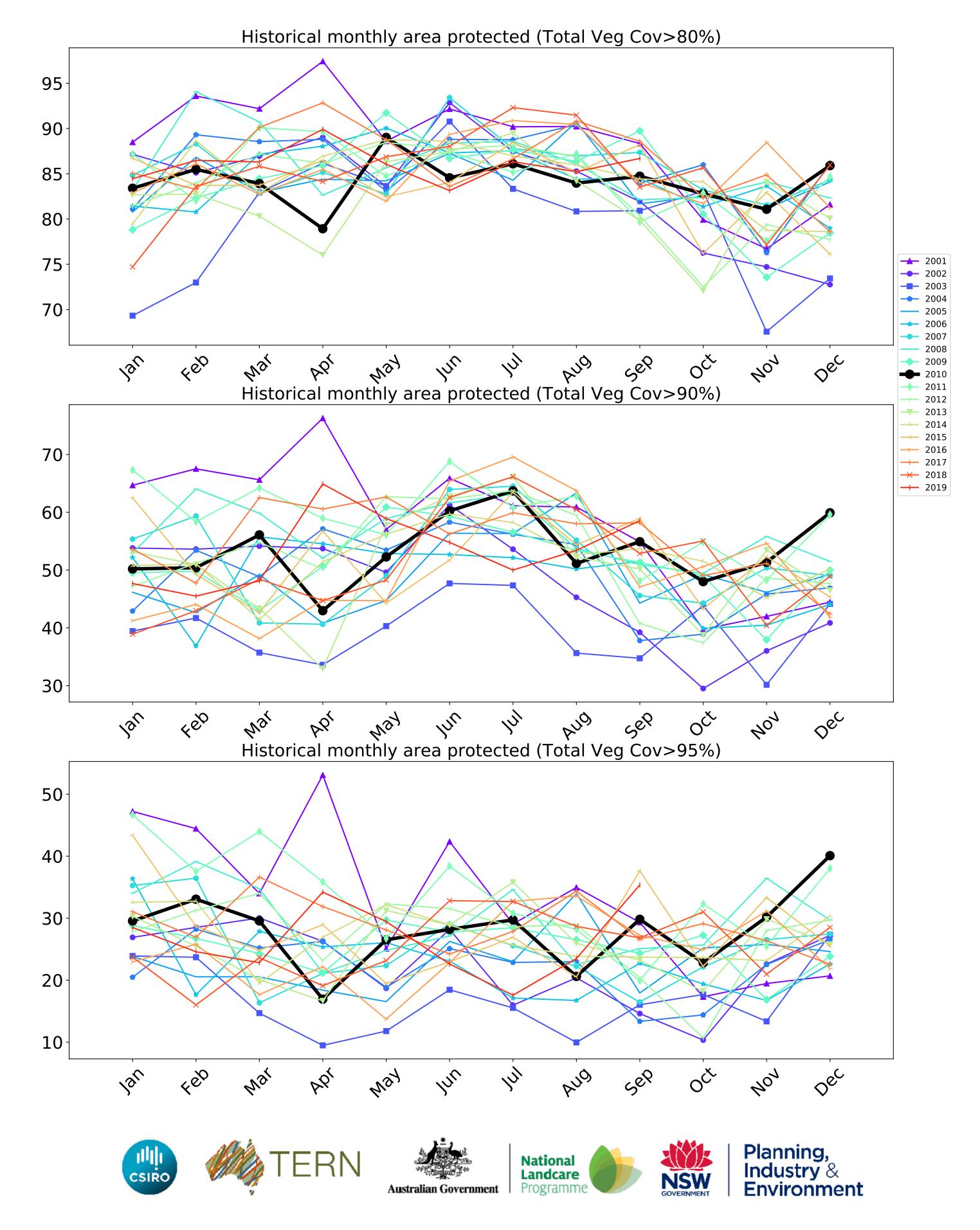
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)





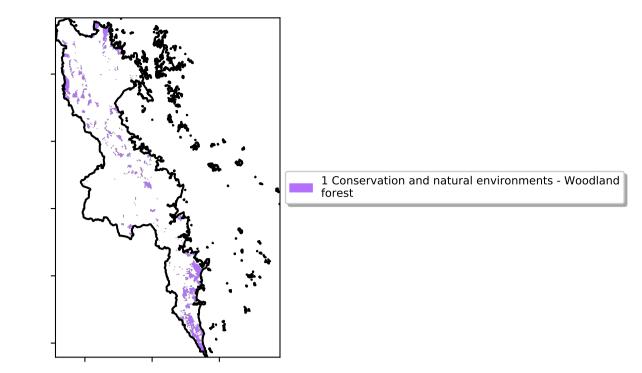
Water erosion historical monthly area protected (Total Veg Cov>70%)



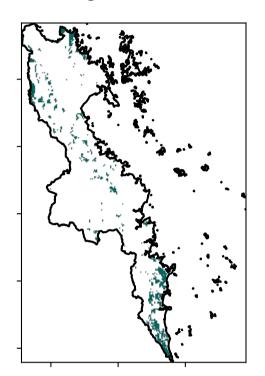


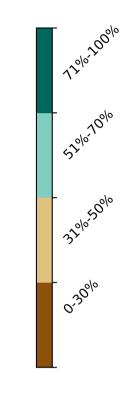
## **Conservation and natural environments Woodland forest**

Land use and forest cover

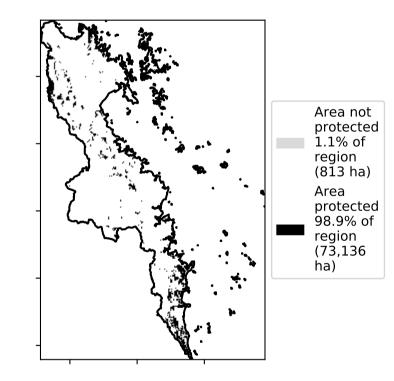


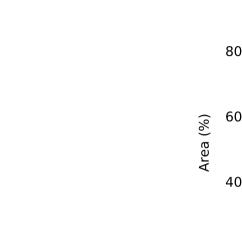
**Total Vegetation Cover [%]** 



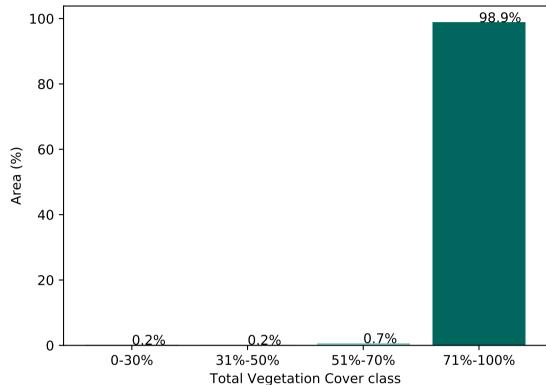


% Area protected from water erosion (>70%)

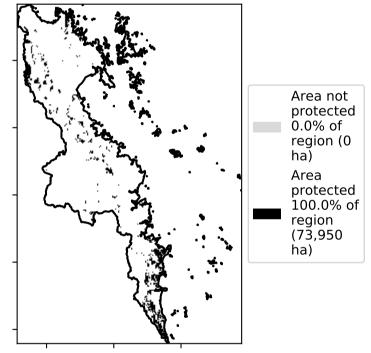




Proportion of vegetation cover class in area

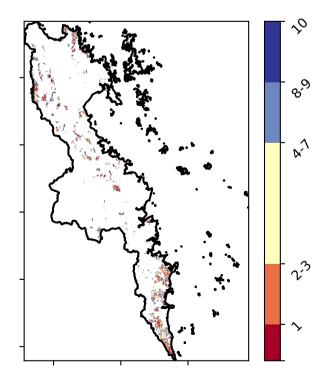


% Area protected from wind erosion (>50%)

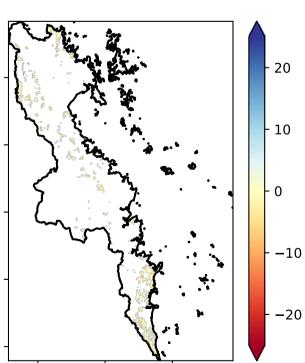


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover Decile [%]** 

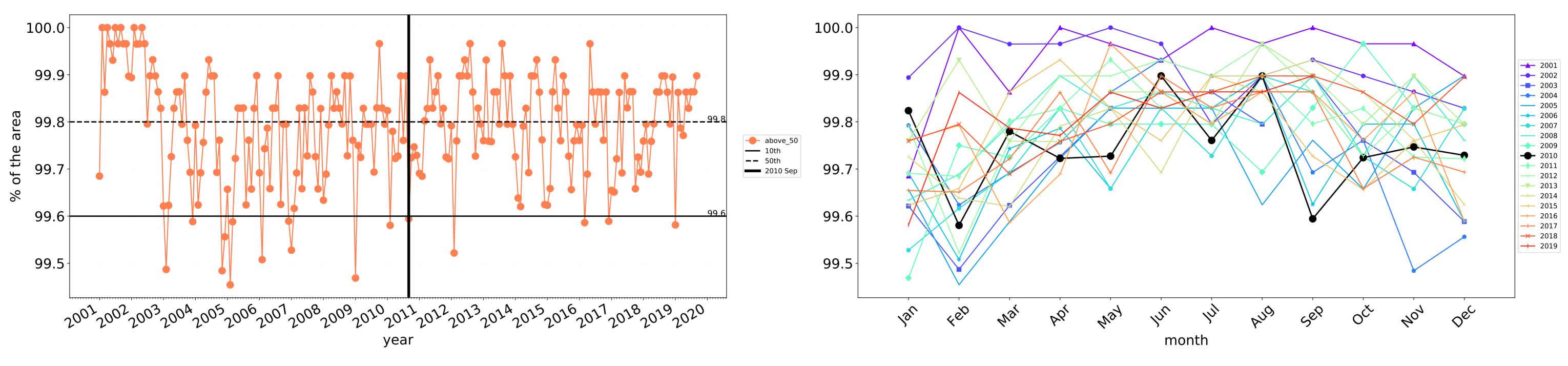


**Total Vegetation Cover Anomaly [%]** 



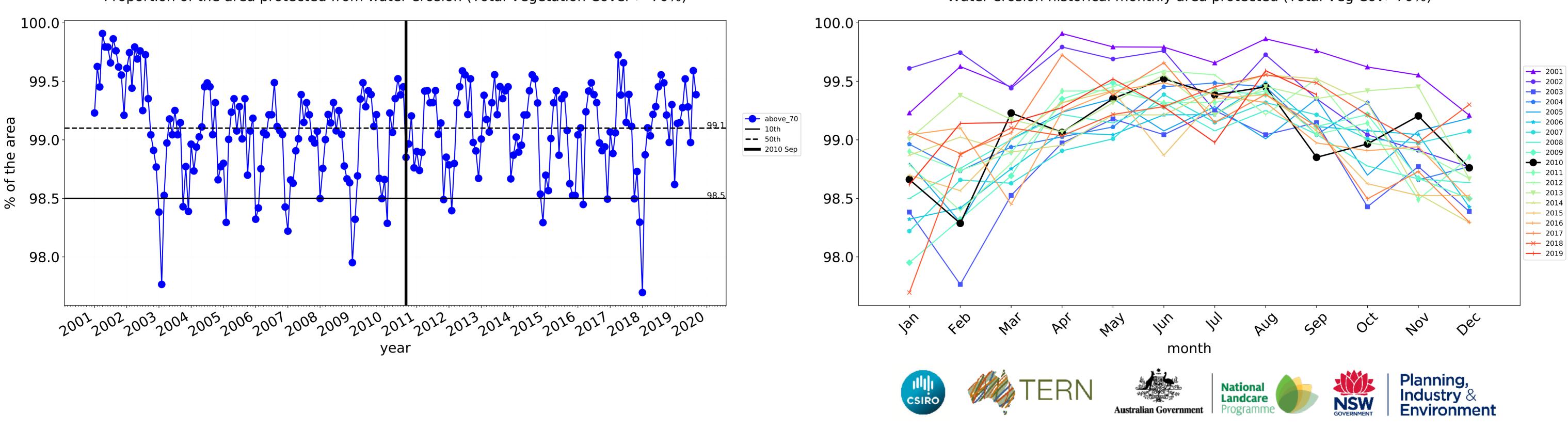
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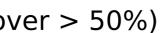




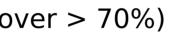
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

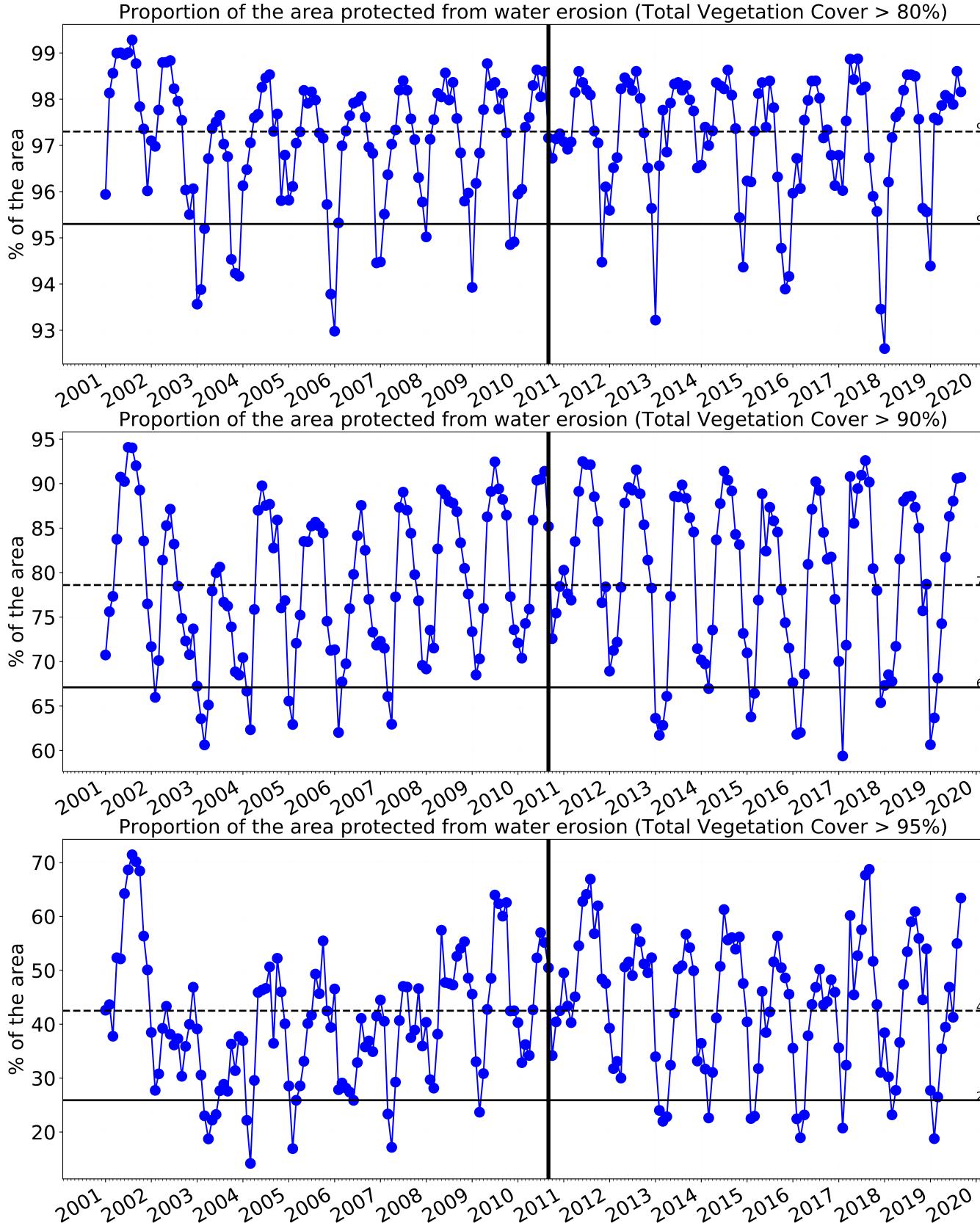


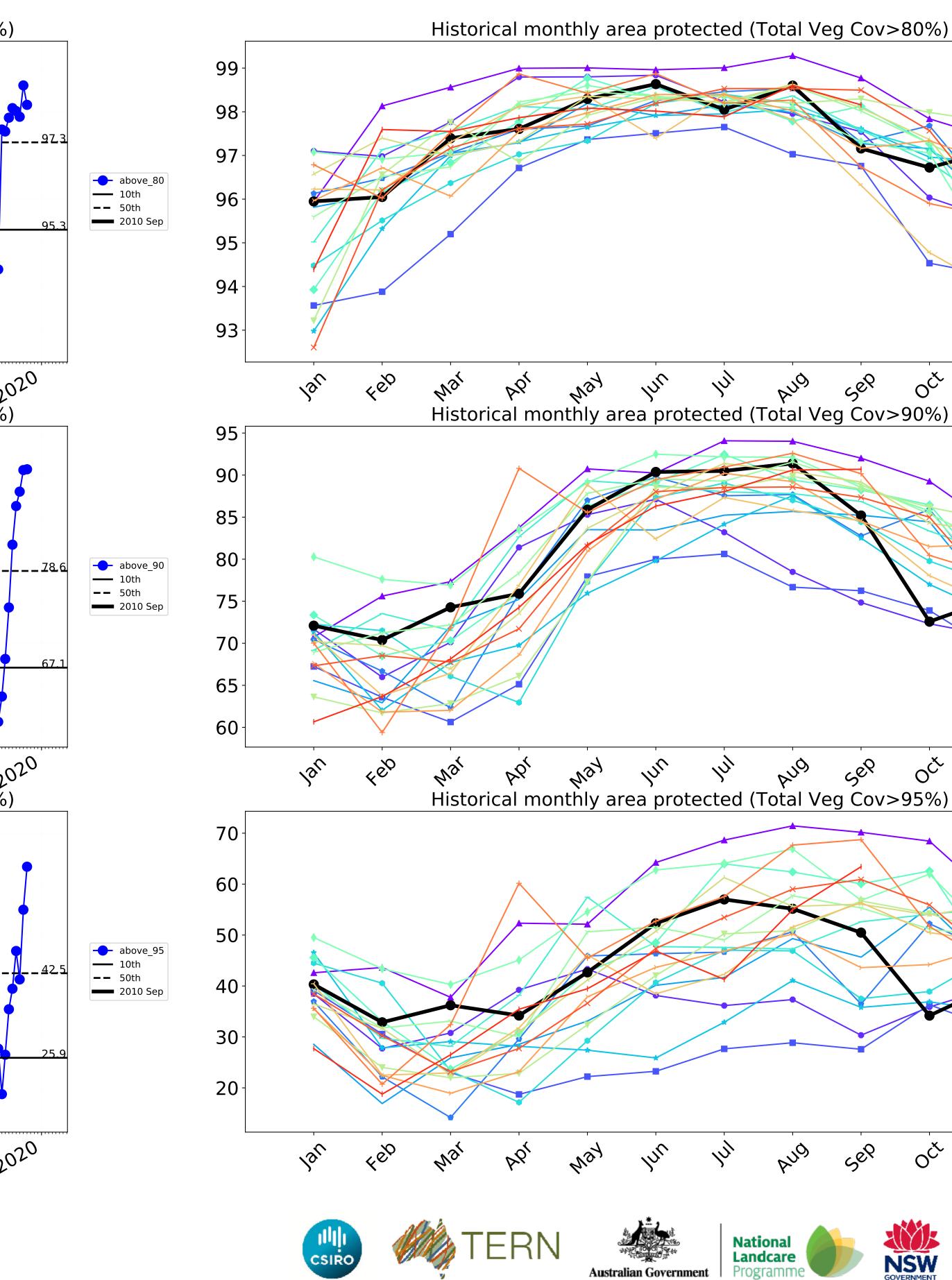


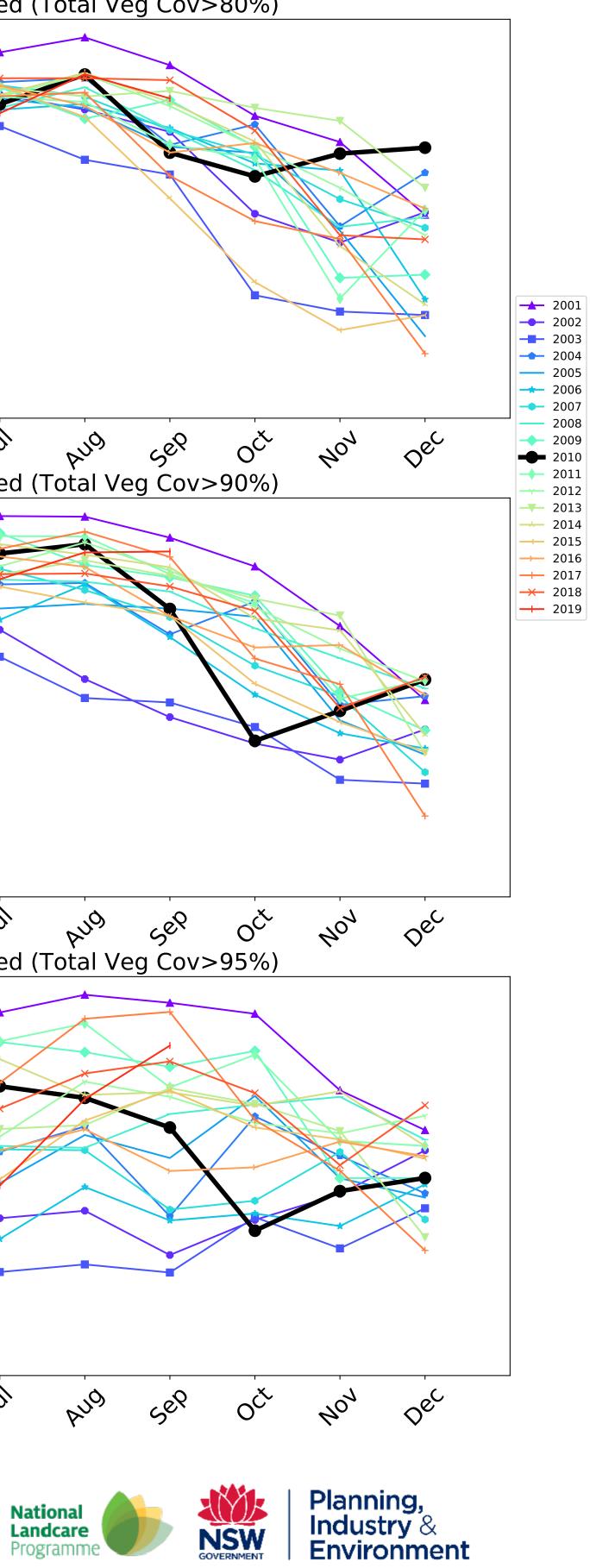
Wind erosion historical monthly area protected (Total Veg Cov >50%)



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

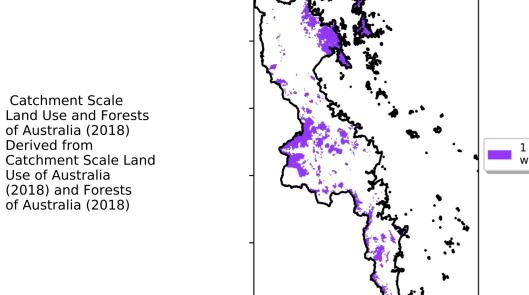






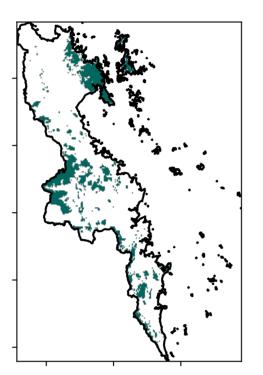
## **Conservation and natural environments Forest (non woodland)**

Land use and forest cover

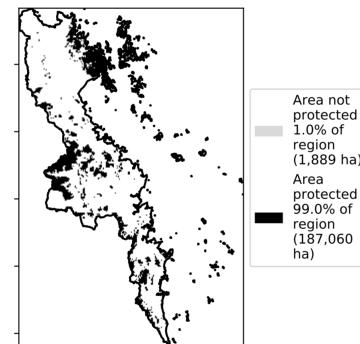


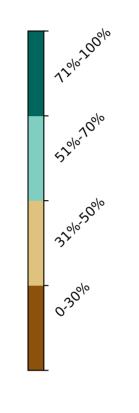
1 Conservation and natural environments - Nonwoodland forest

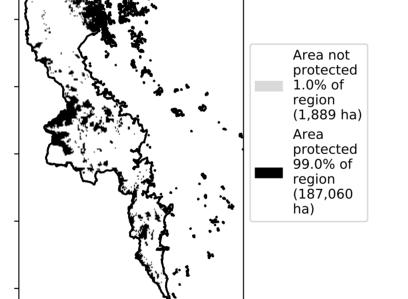
**Total Vegetation Cover [%]** 



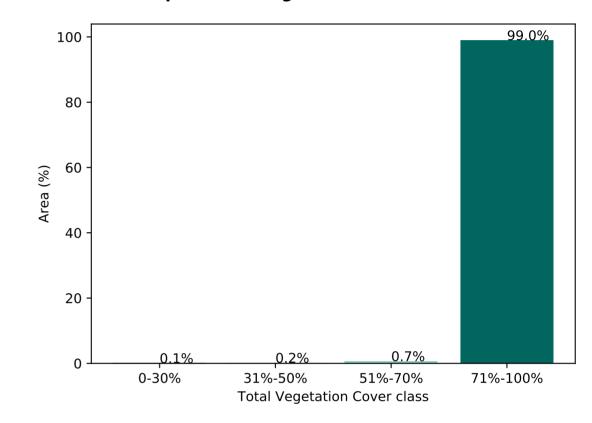
% Area protected from water erosion (>70%)



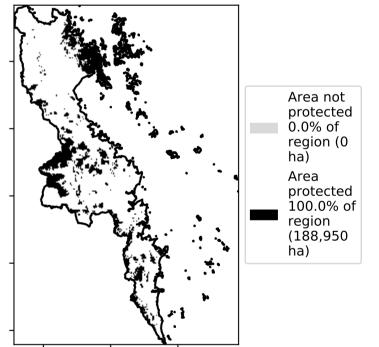




Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



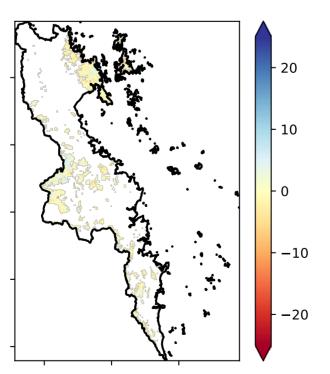
**Total Vegetation Cover Anomaly [%]** 

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.

Catchment Scale

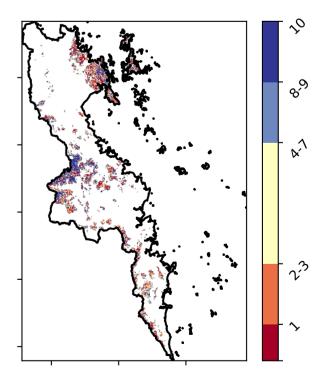
of Australia (2018) Derived from

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

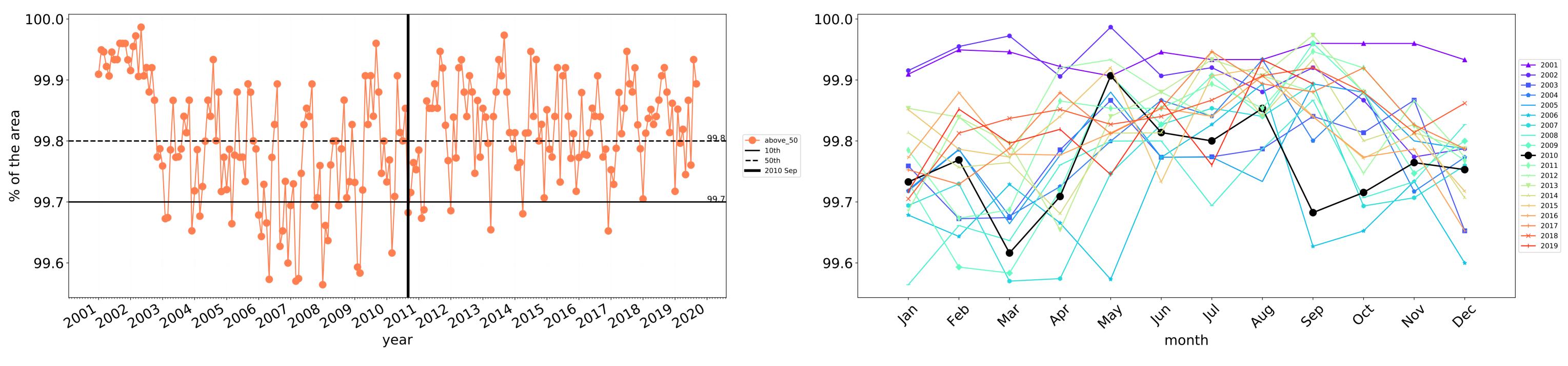


Total Vegetation Cover Decile [%]

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 from 2001 to 2019.



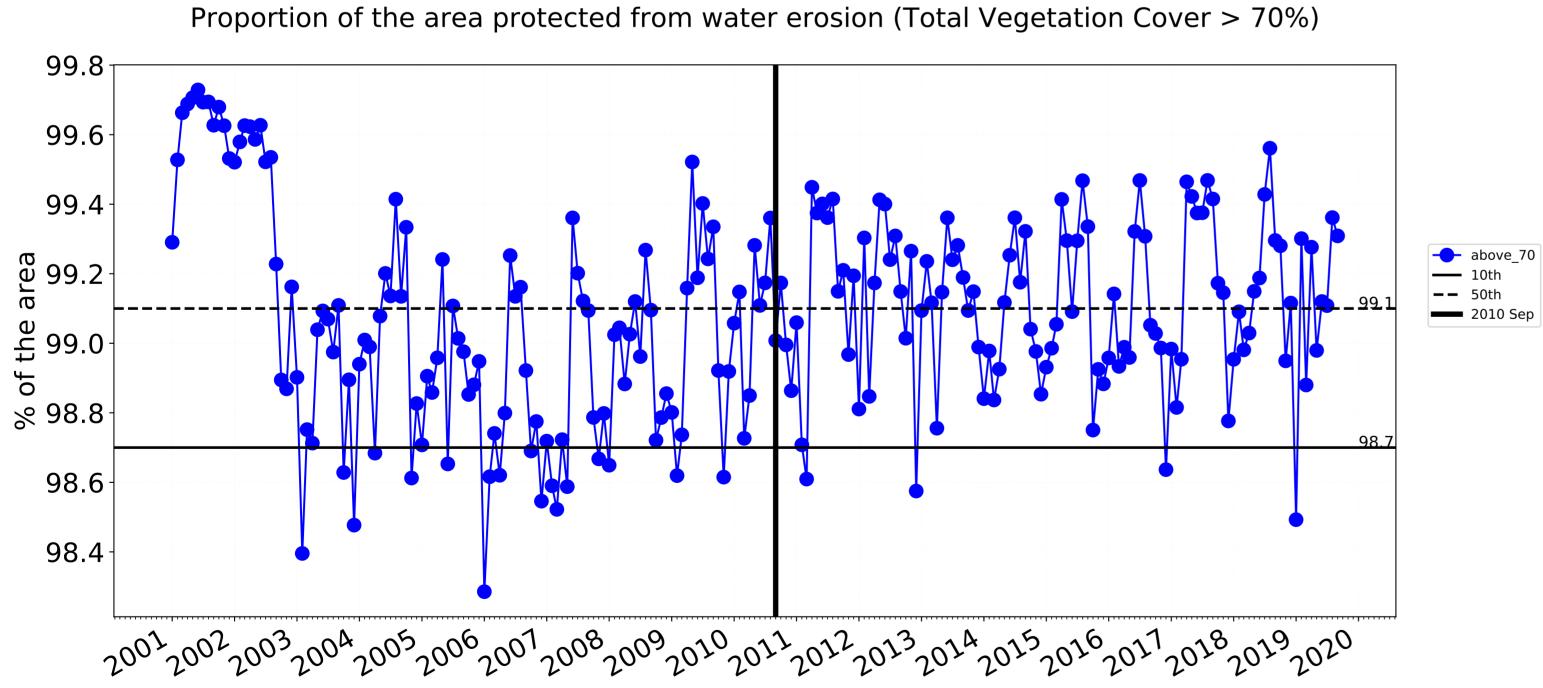




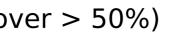
---- above\_70

**——** 10th

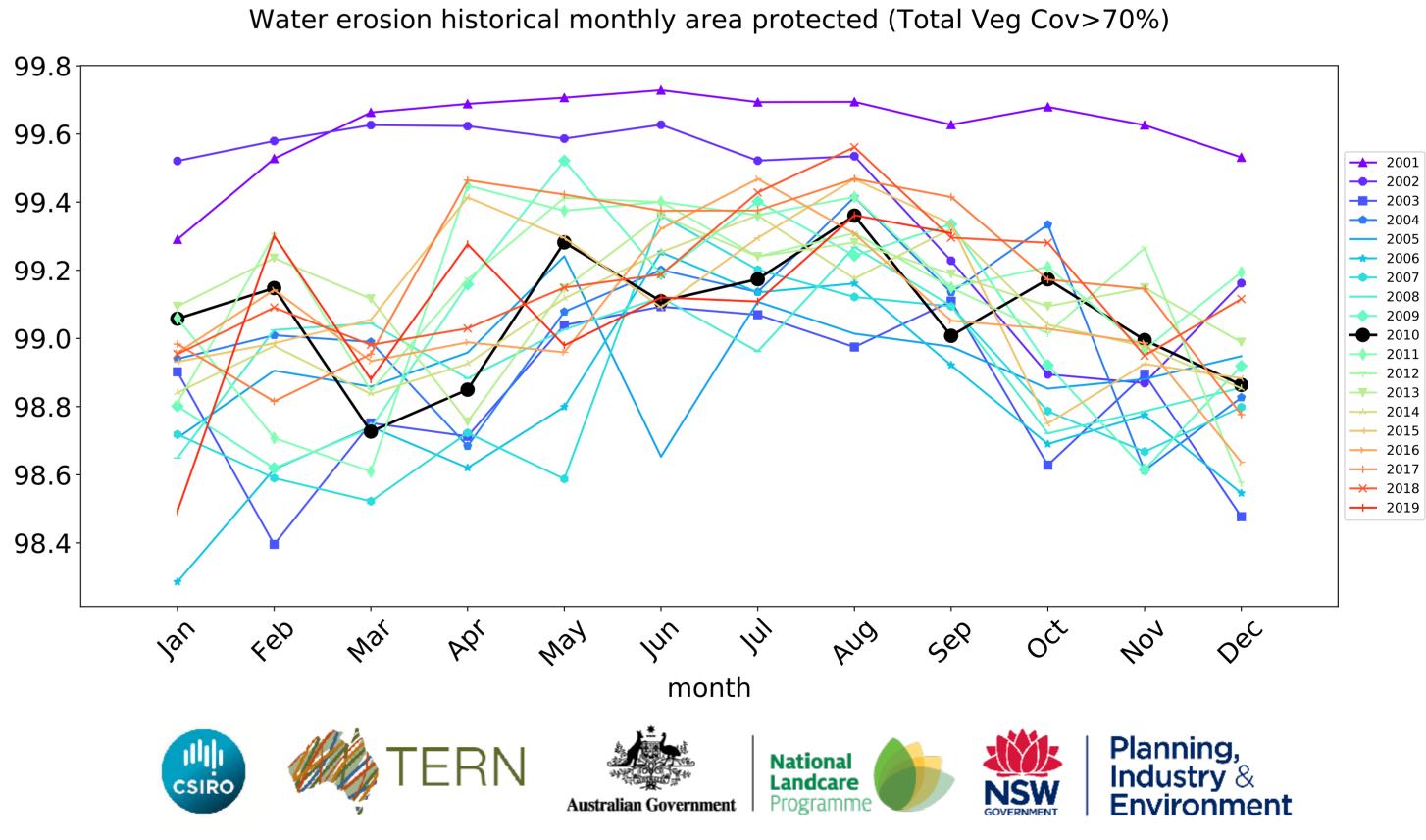
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

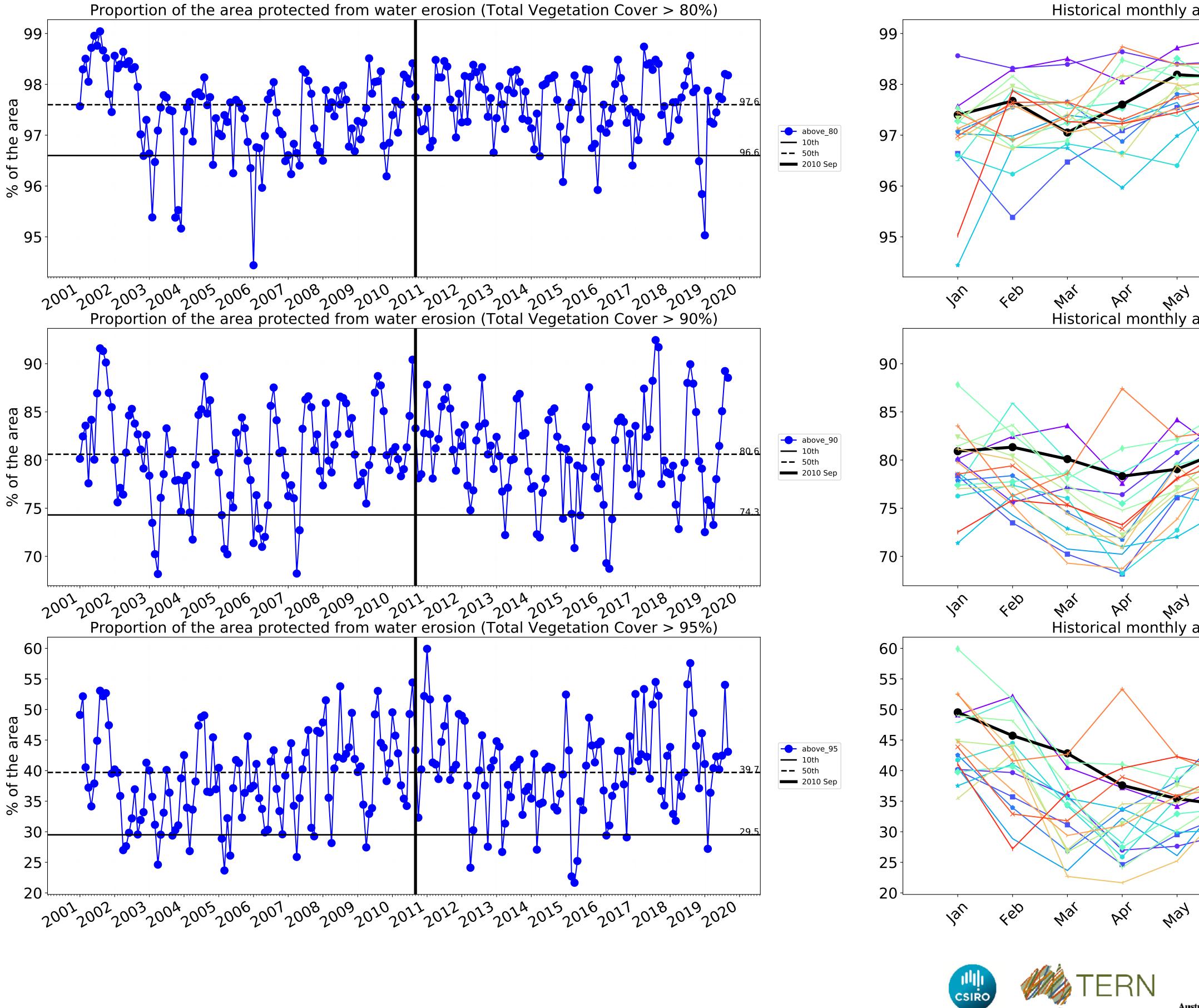


year



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



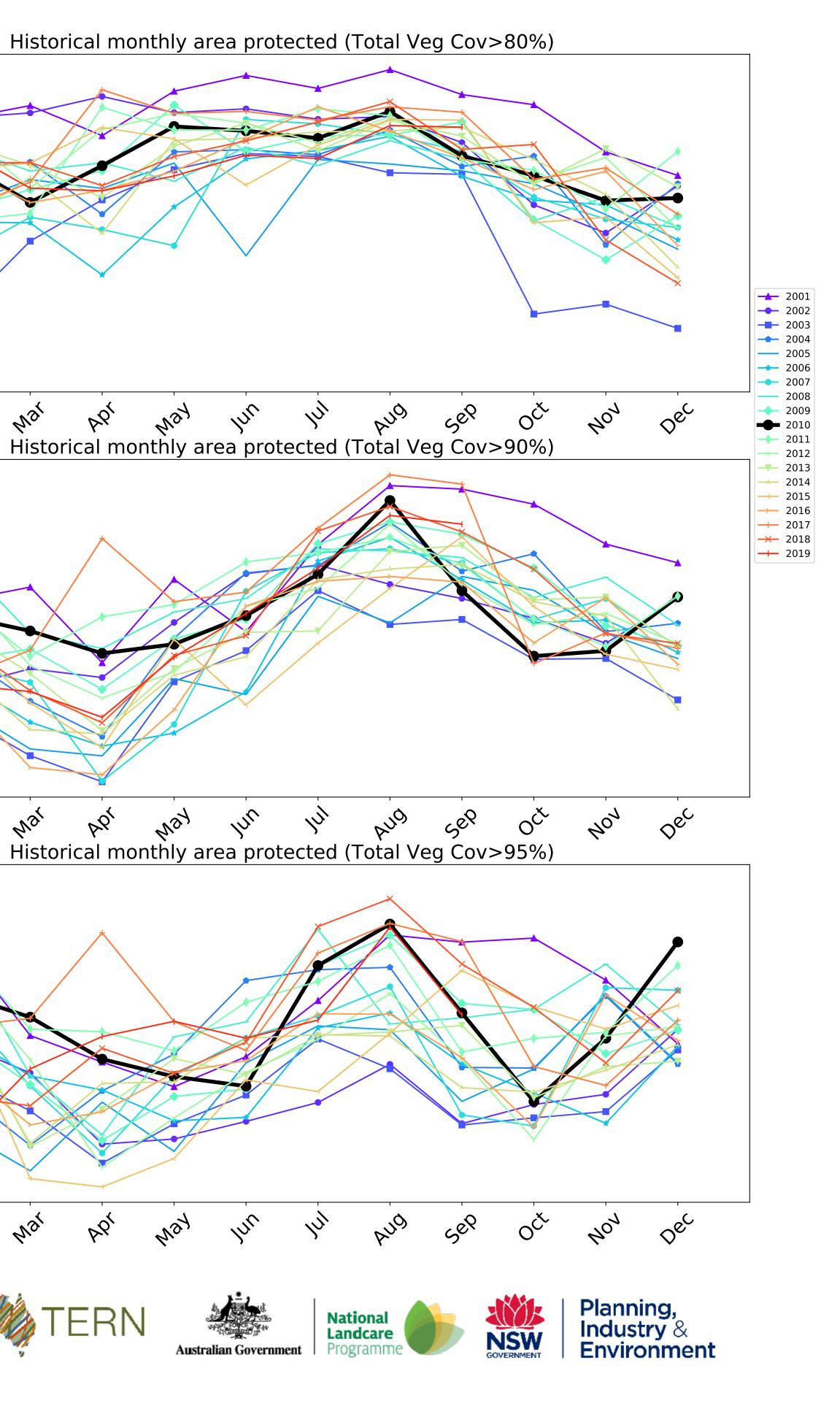


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Jul

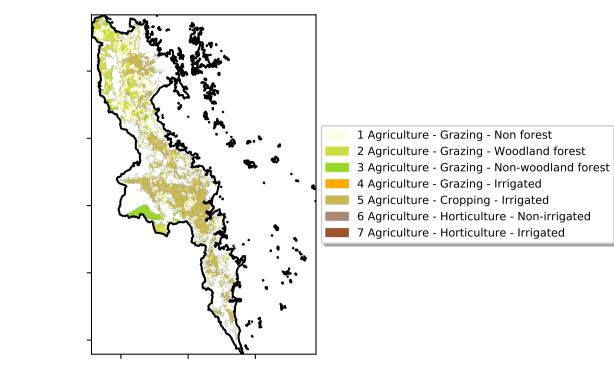
Australian Government

JU,

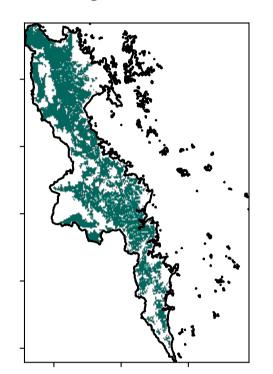


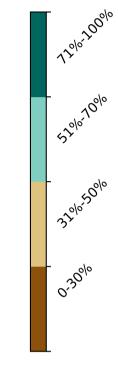
## **Agriculture**

Land use and forest cover

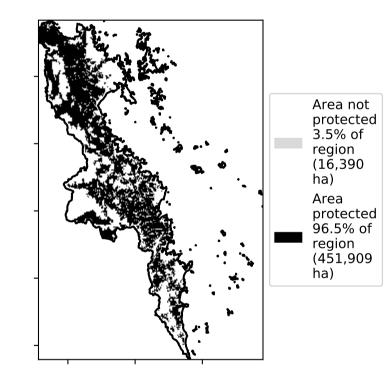


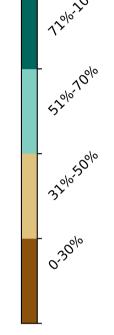
**Total Vegetation Cover [%]** 

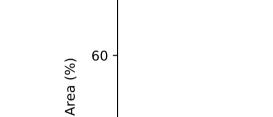




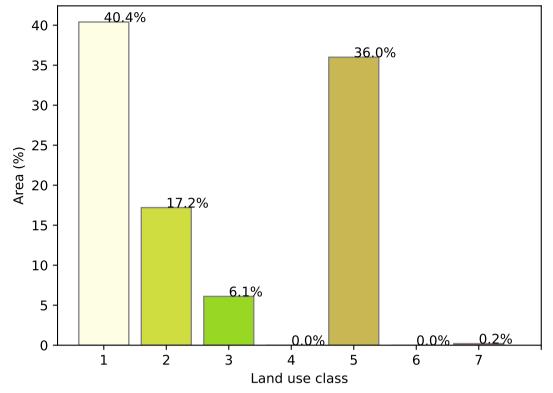
% Area protected from water erosion (>70%)



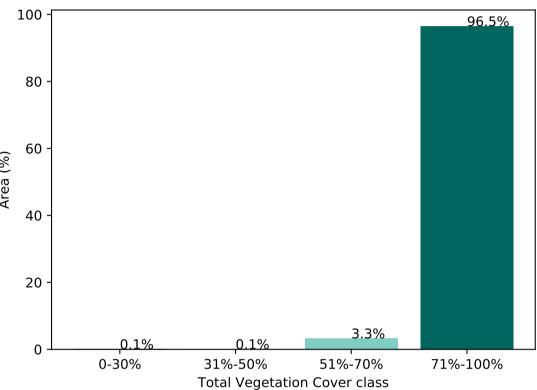




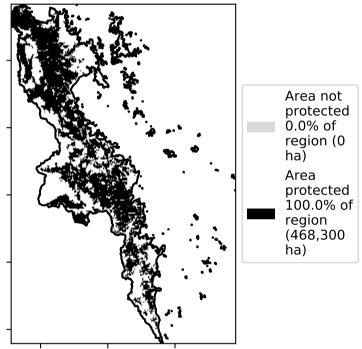
# Proportion of each land class in area



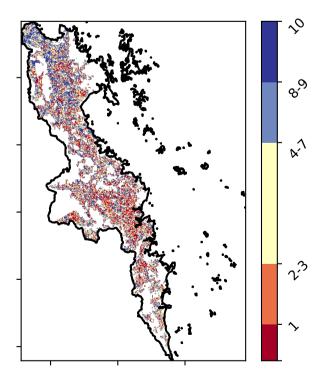
#### Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 



**Total Vegetation Cover Anomaly [%]** 

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.

Catchment Scale

of Australia (2018)

(2018) and Forests

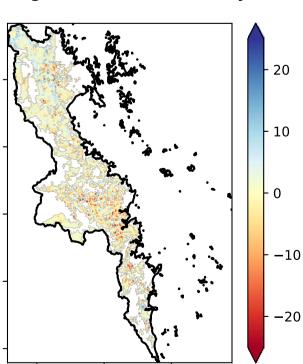
of Australia (2018)

Derived from

Use of Australia

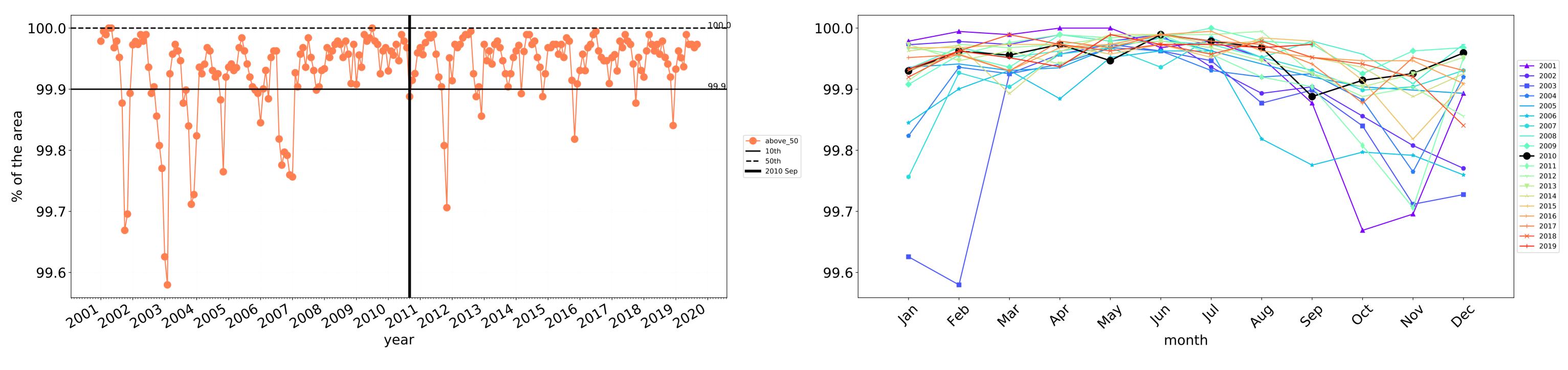
Land Use and Forests

Catchment Scale Land



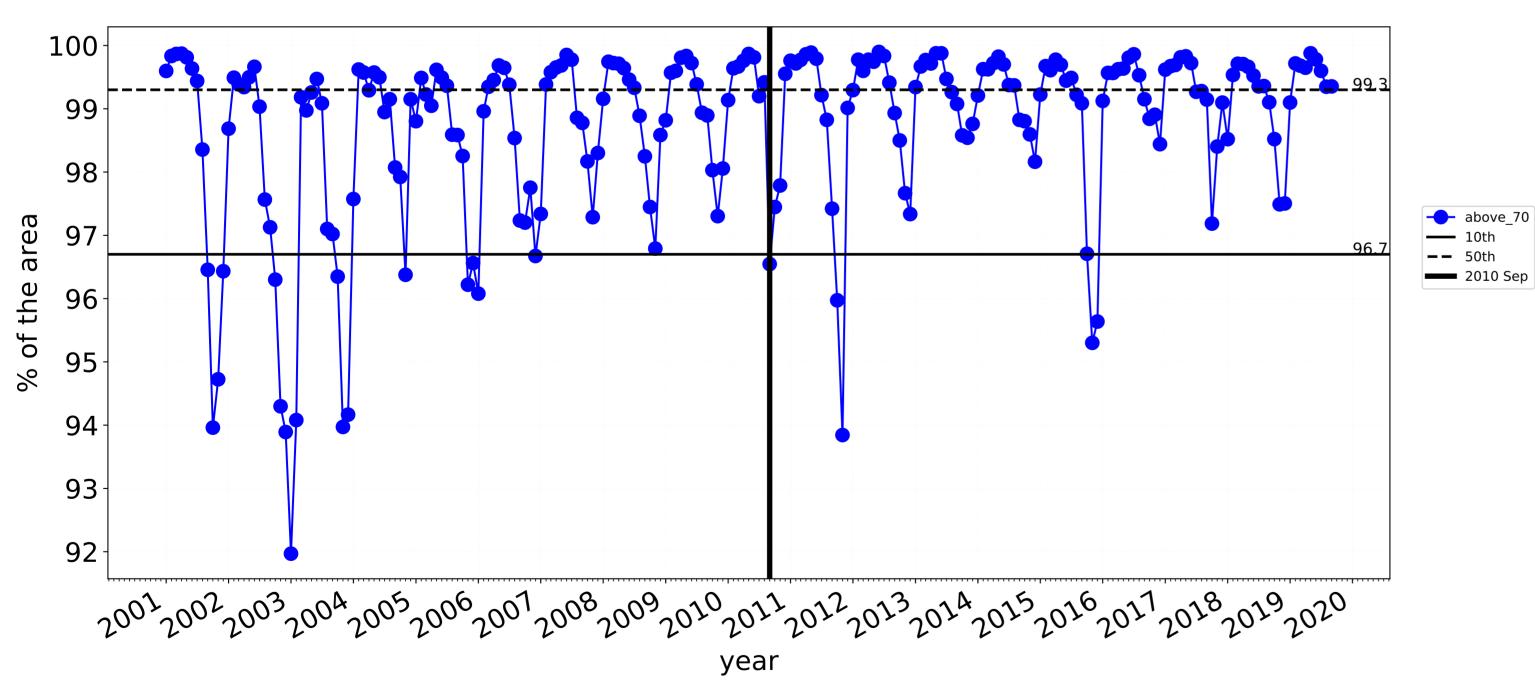
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





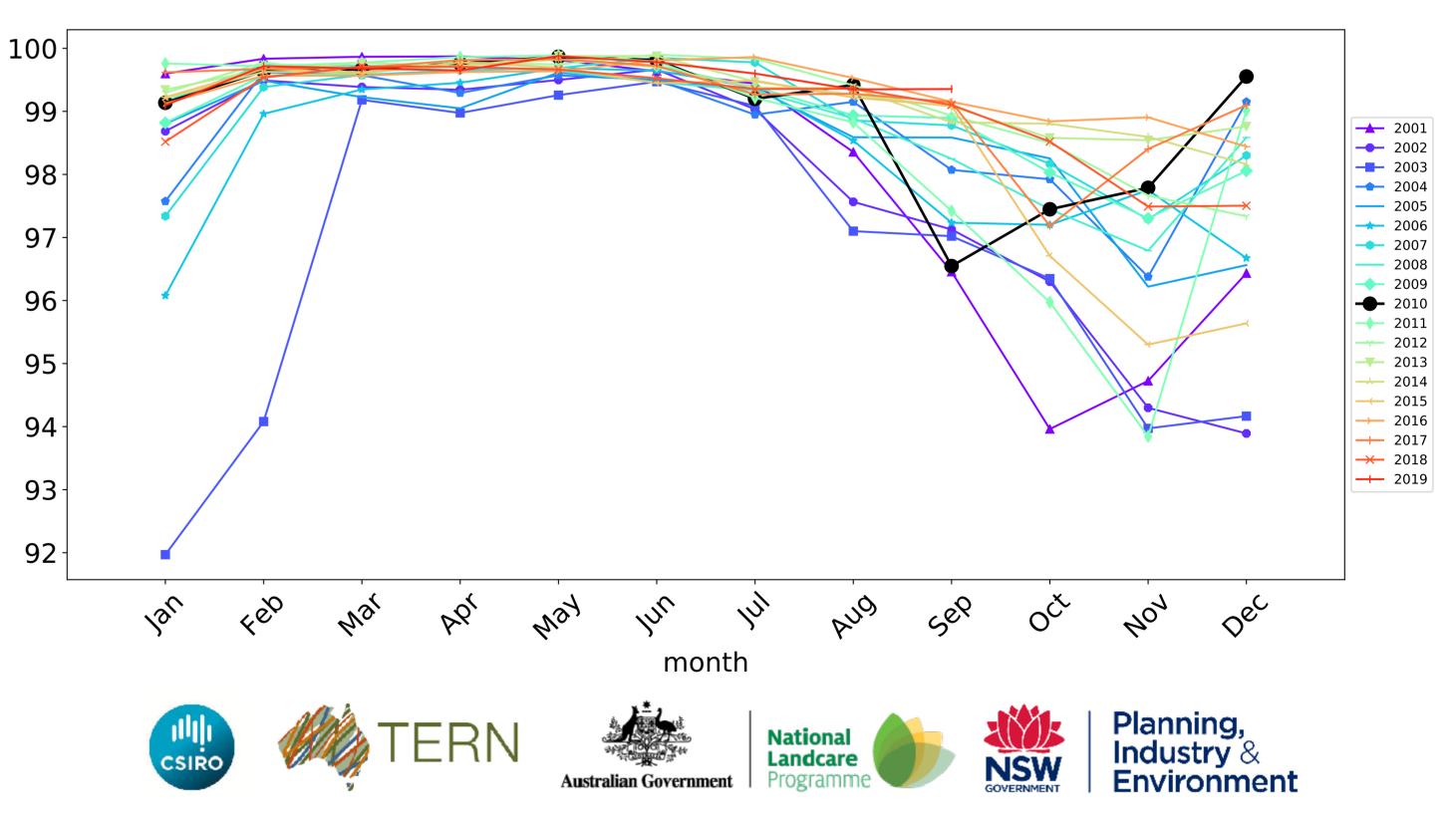
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

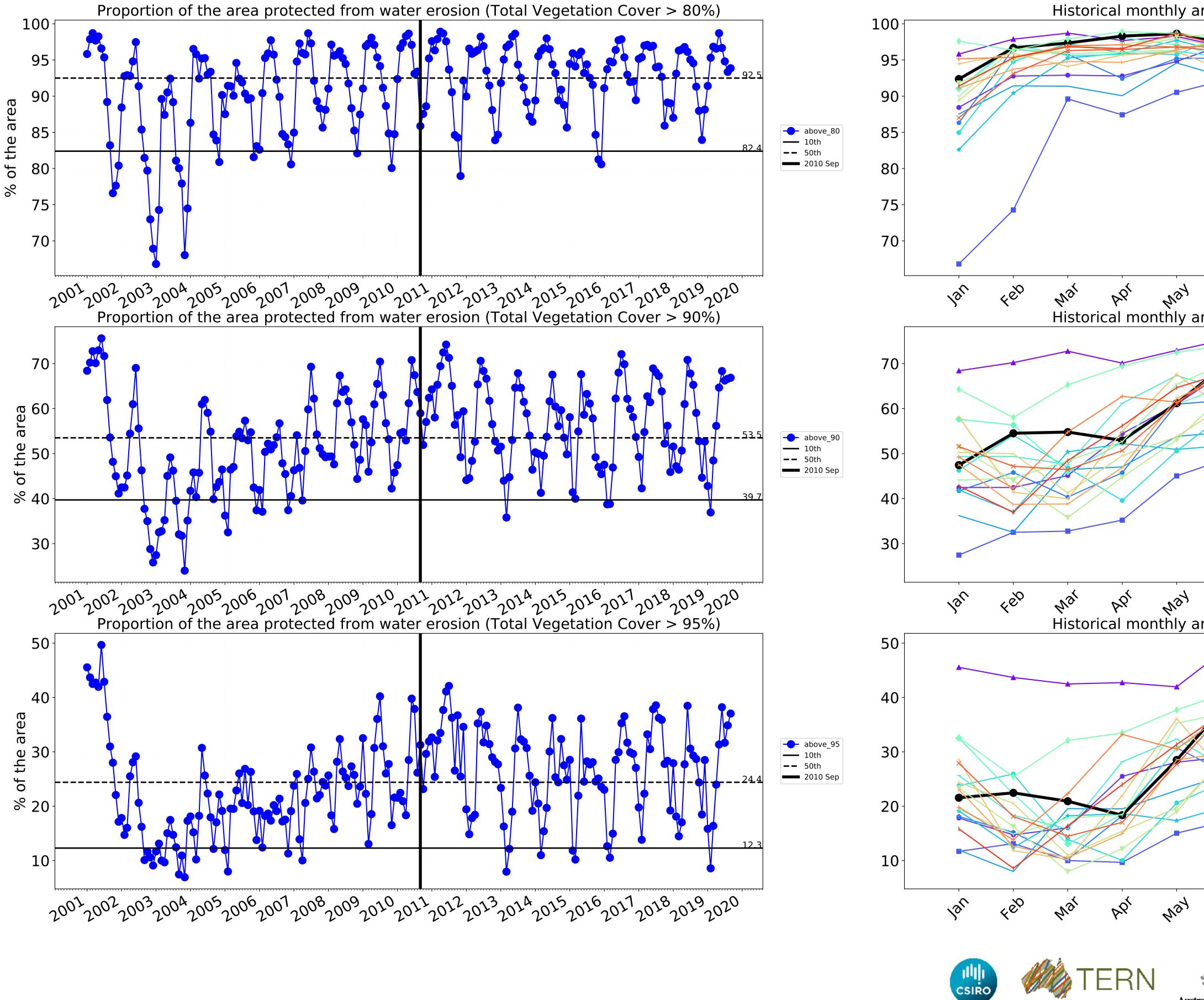




Wind erosion historical monthly area protected (Total Veg Cov >50%)

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





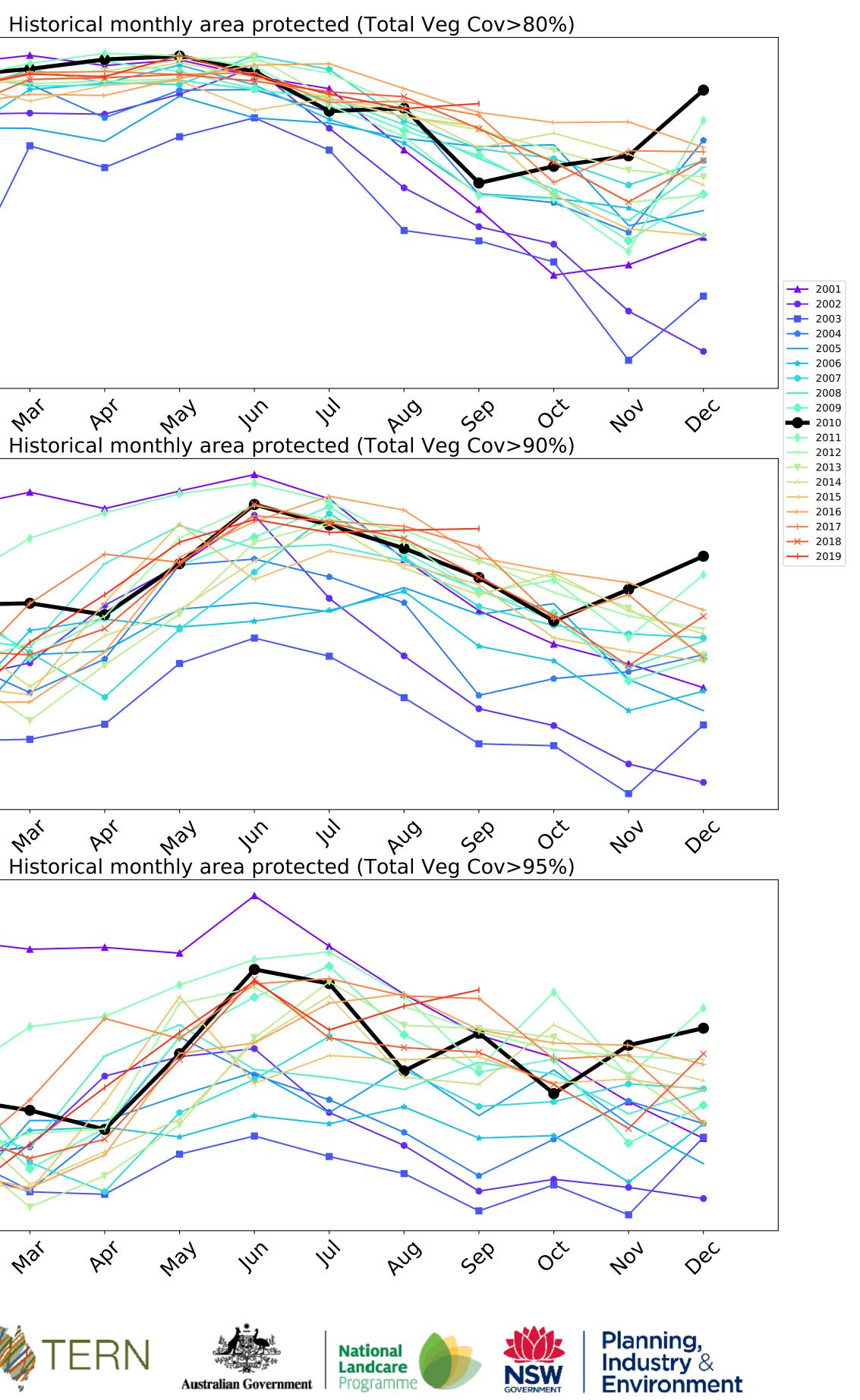


Jul

JUL

Jul

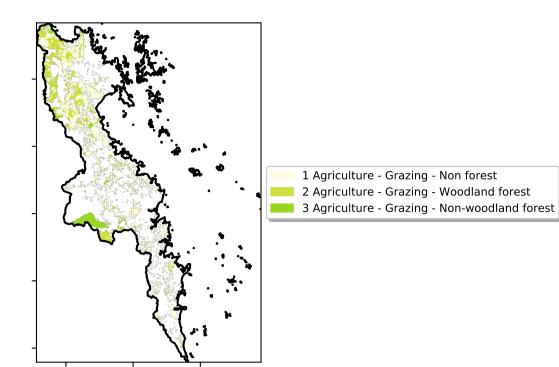
1)



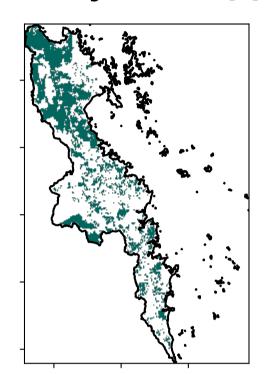
## Grazing

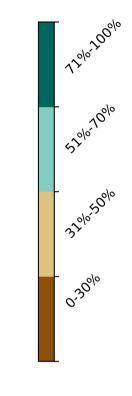
Land use and forest cover

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

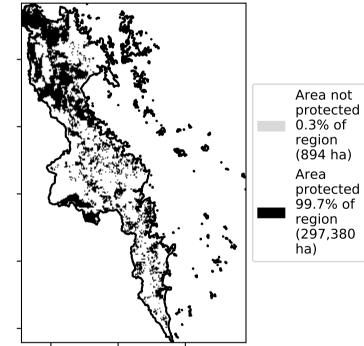


**Total Vegetation Cover [%]** 

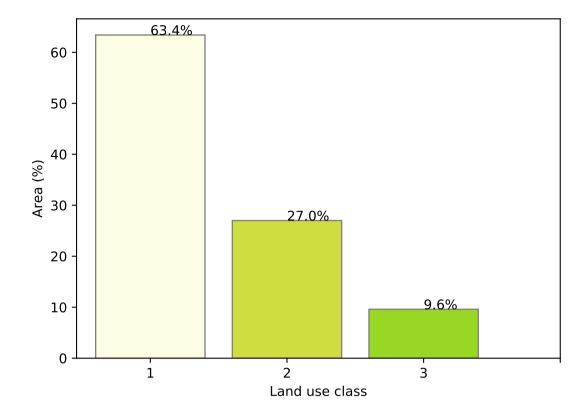




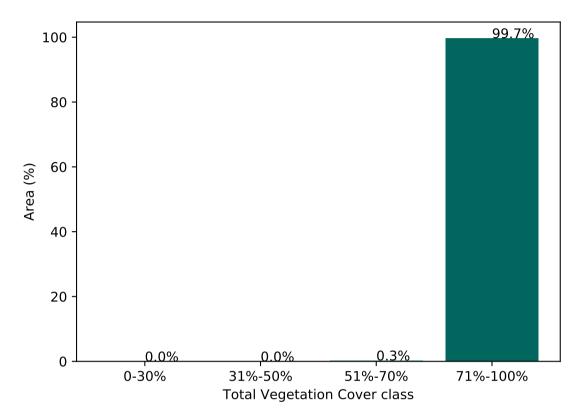
% Area protected from water erosion (>70%)



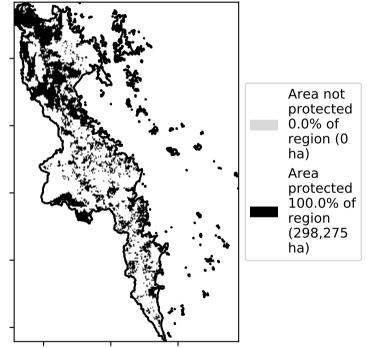
#### Proportion of each land class in area



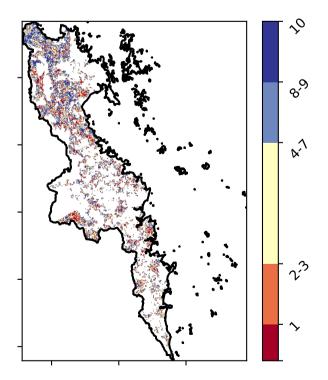
#### Proportion of vegetation cover class in area



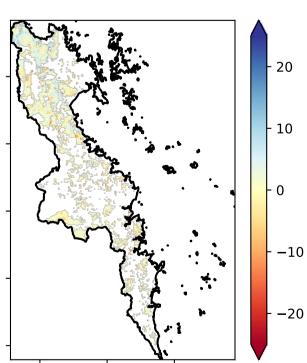
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 

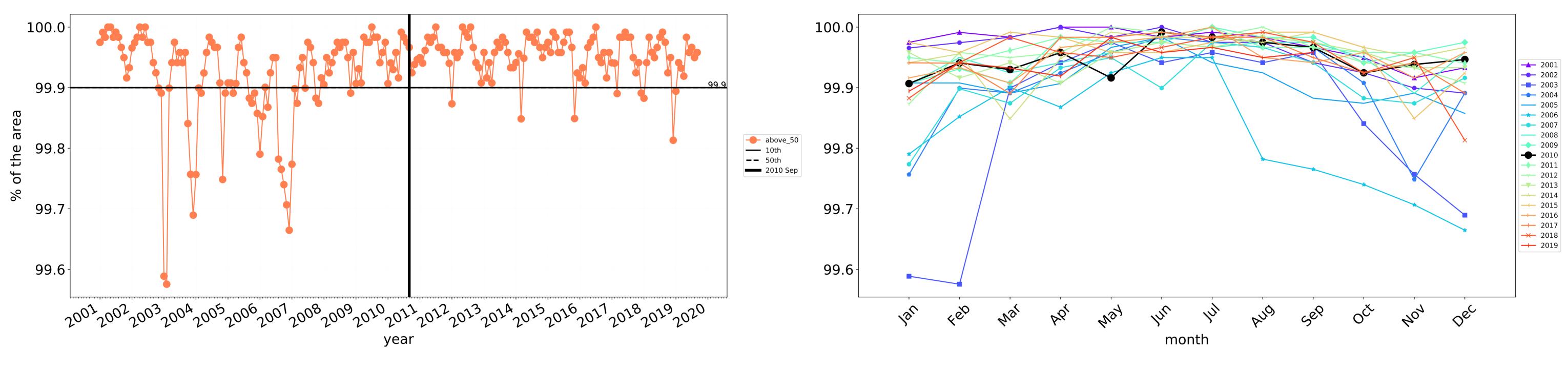


**Total Vegetation Cover Anomaly [%]** 



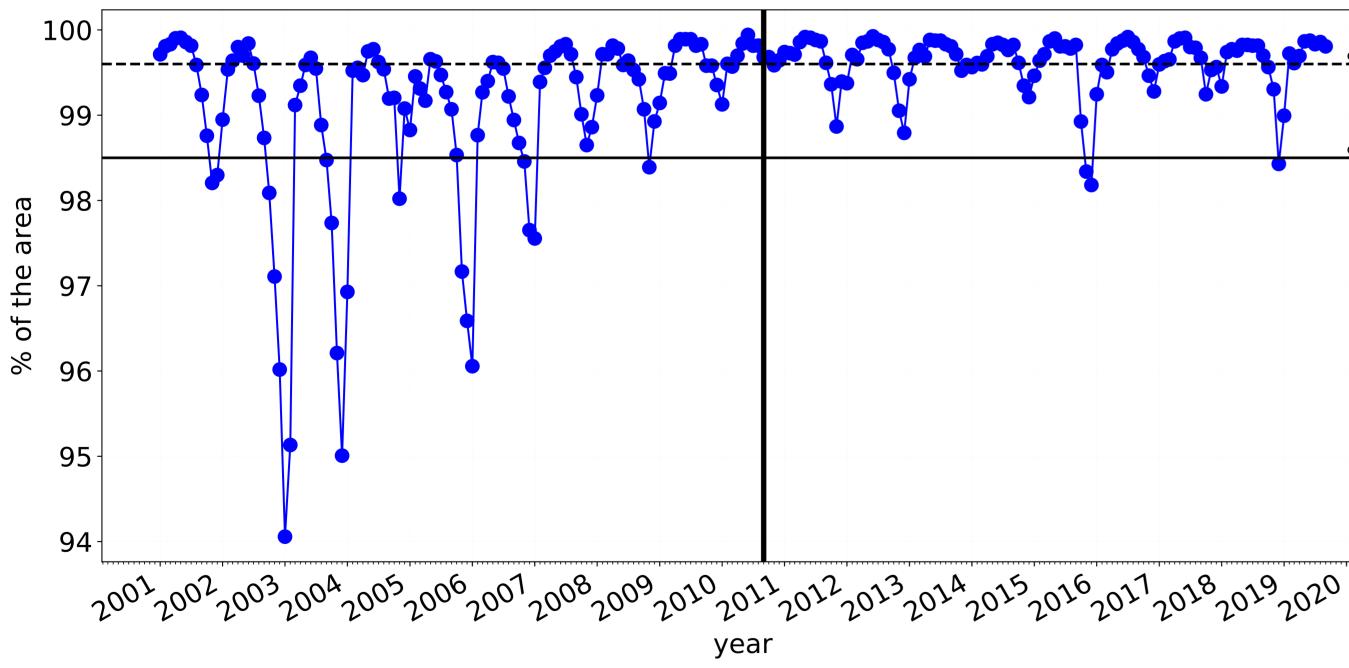
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

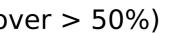




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



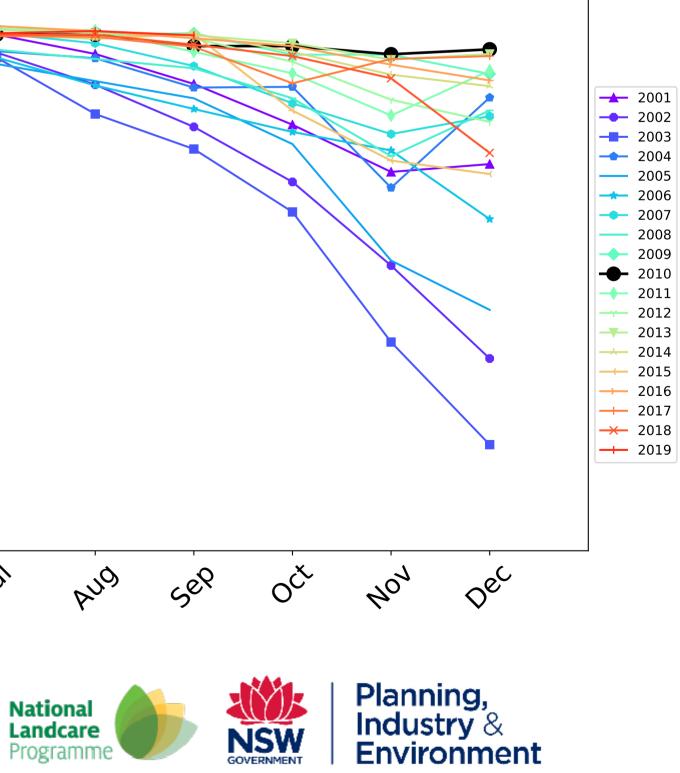


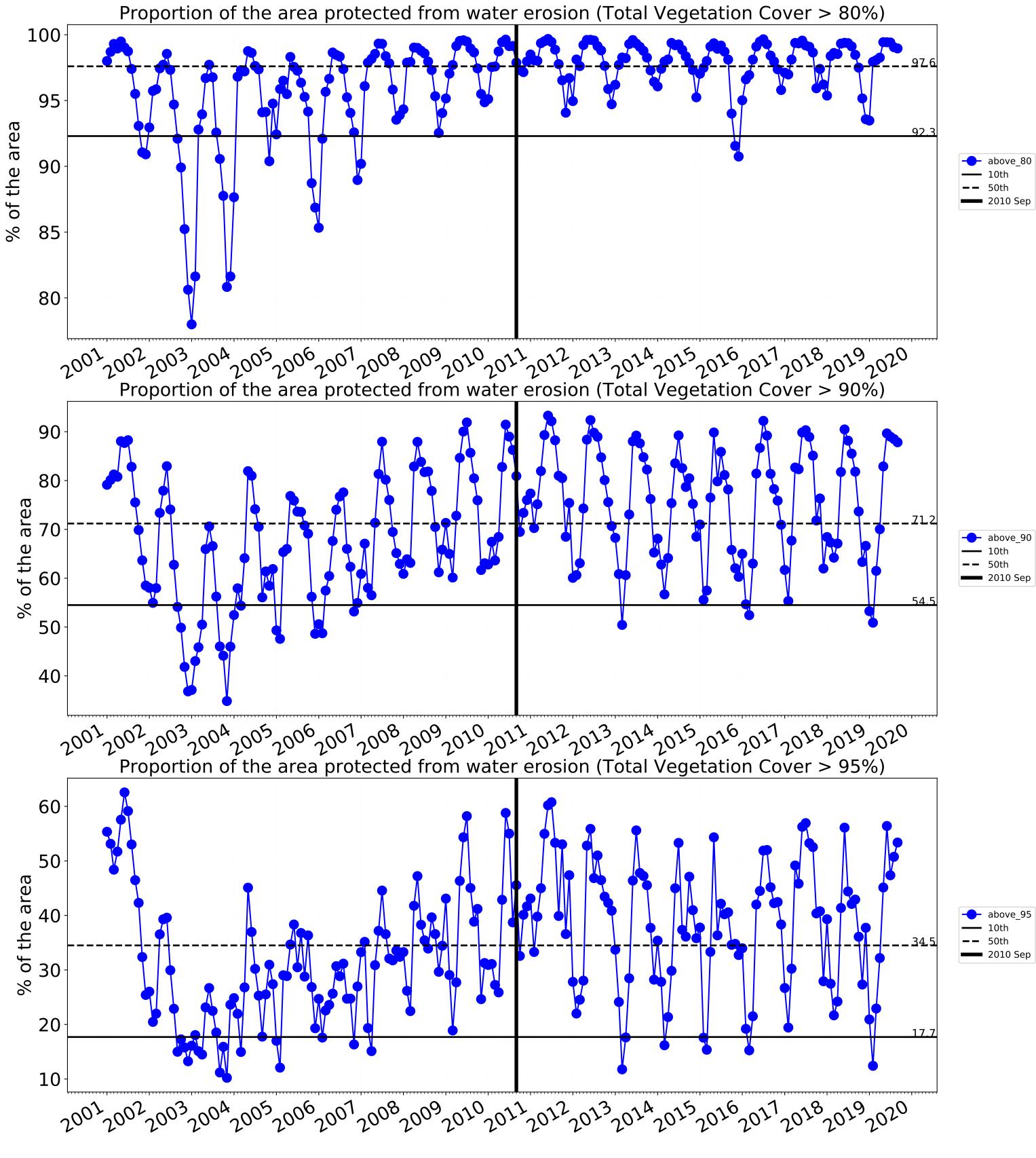


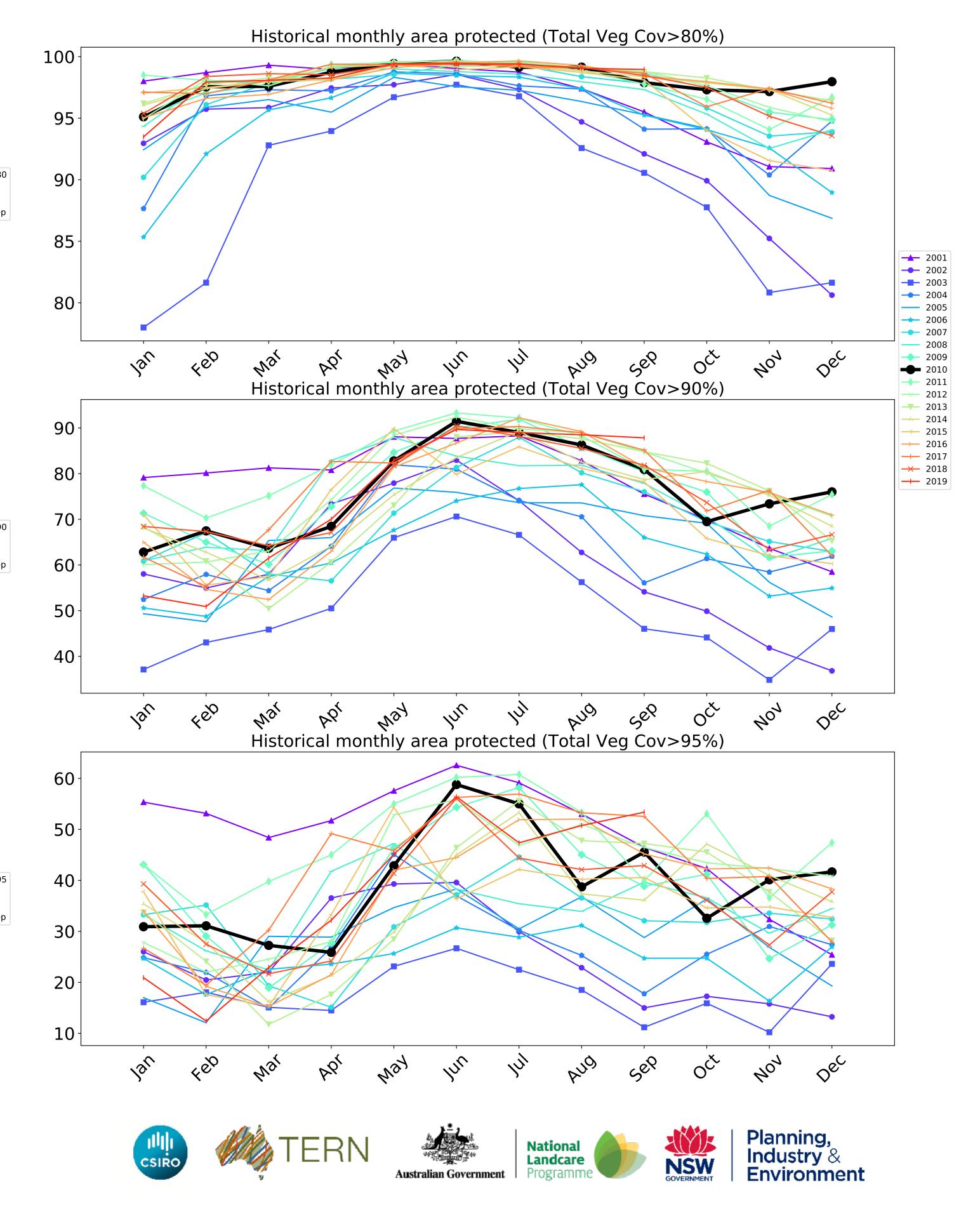
Wind erosion historical monthly area protected (Total Veg Cov >50%)

100-99 98 98 ---- above\_70 **—** 10th **——** 50th **——** 2010 Sep 97 96 95<sup>-</sup> 94 Jan 4eb way PP Mai In 1y month ERN **HAR** CSIRC Australian Government

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

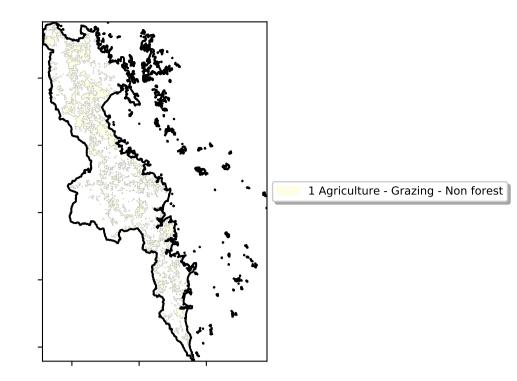




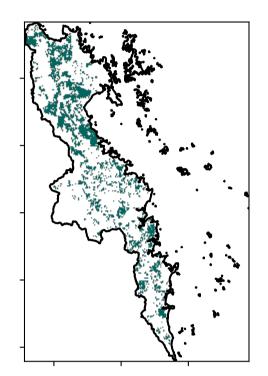


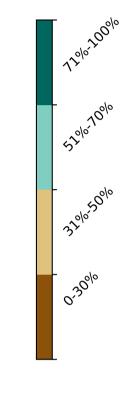
## **Grazing non forest**

Land use and forest cover

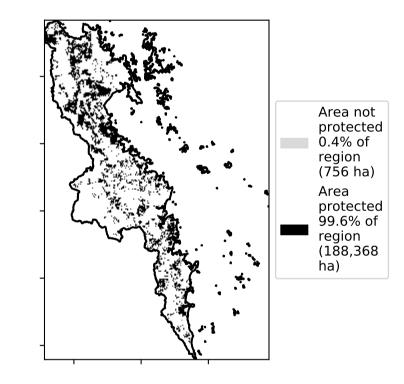


**Total Vegetation Cover [%]** 

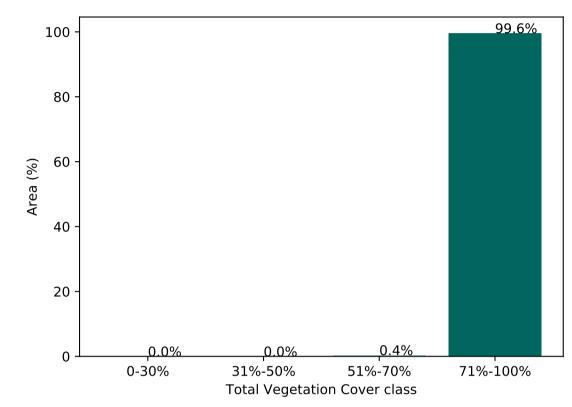




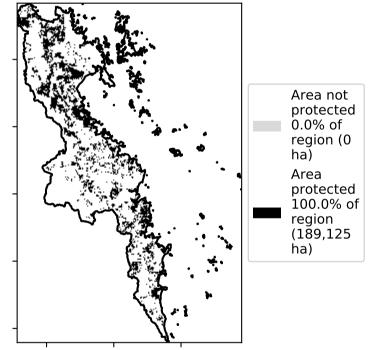
% Area protected from water erosion (>70%)



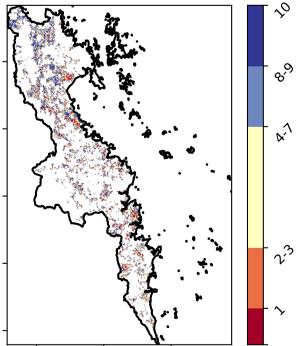


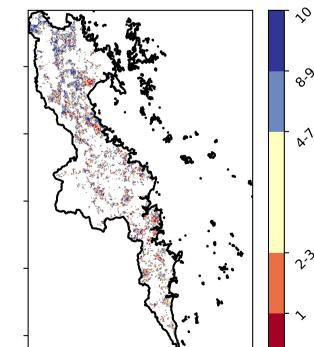


% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 





**Total Vegetation Cover Anomaly [%]** 

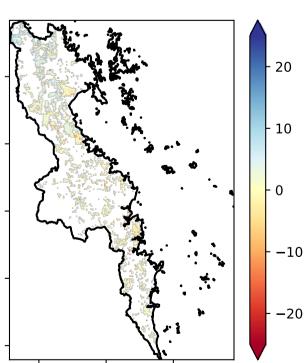
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

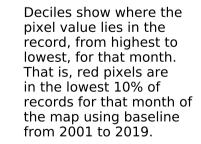
Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land

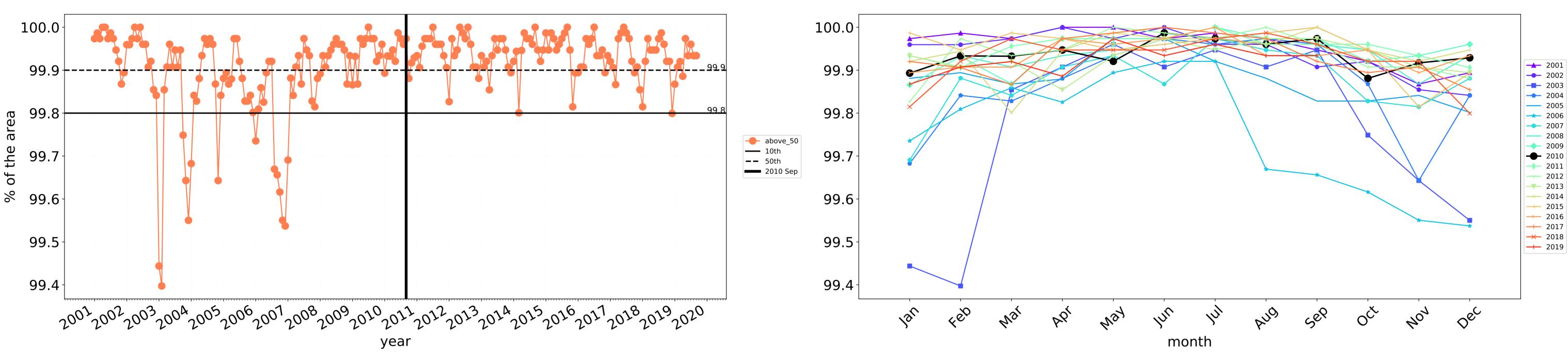
Derived from

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



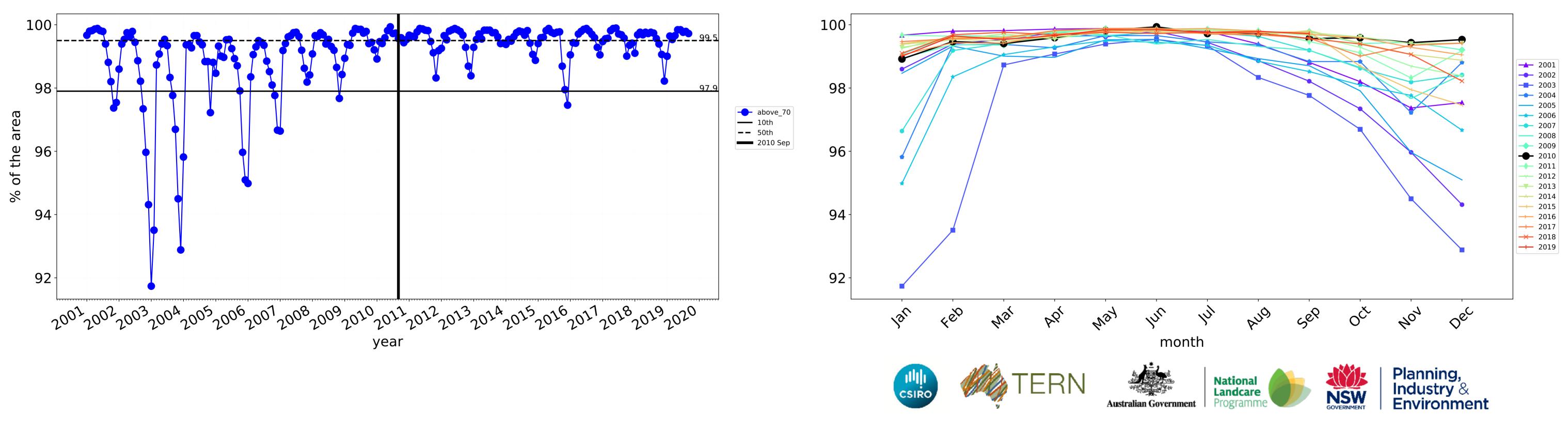






Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

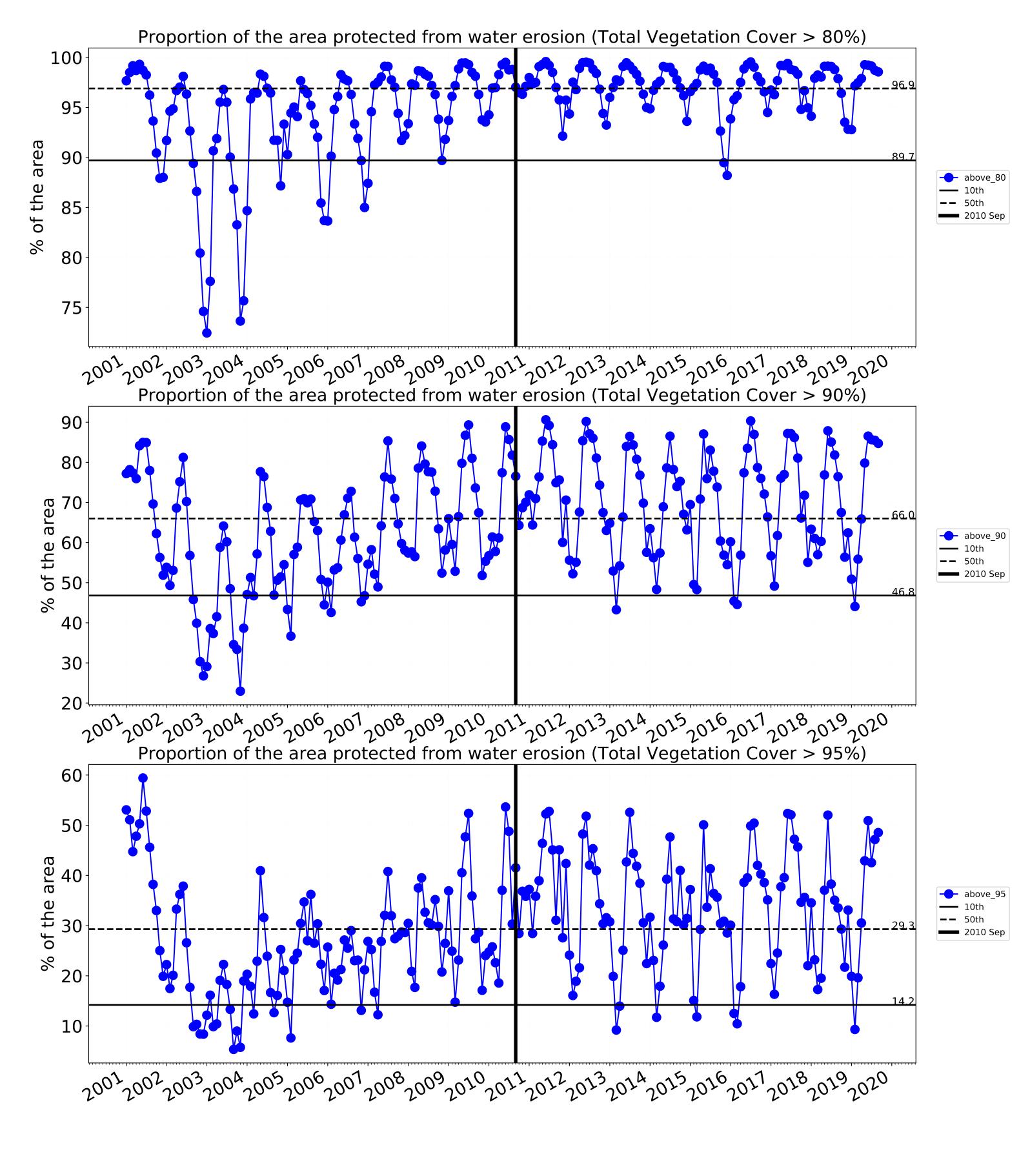
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

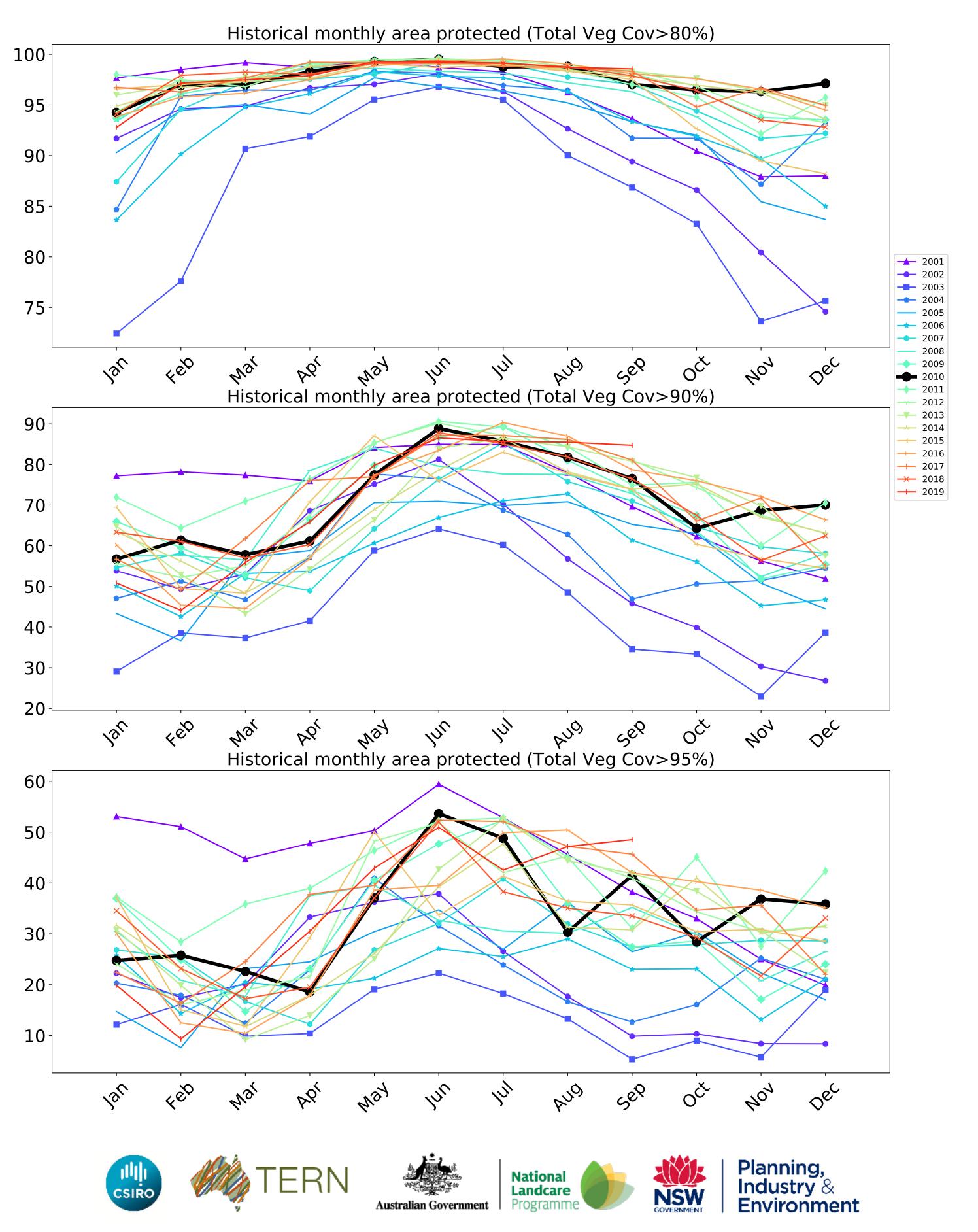


# Grazing non forest timeseries



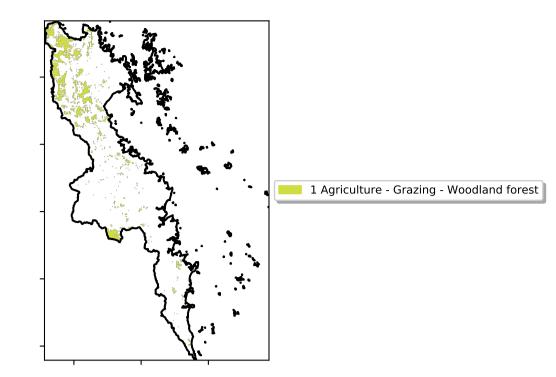
# Wind erosion historical monthly area protected (Total Veg Cov >50%)



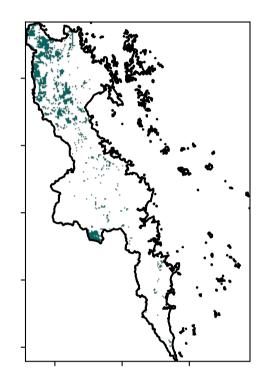


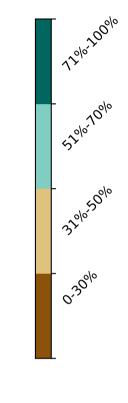
## **Grazing Woodland forest**

Land use and forest cover

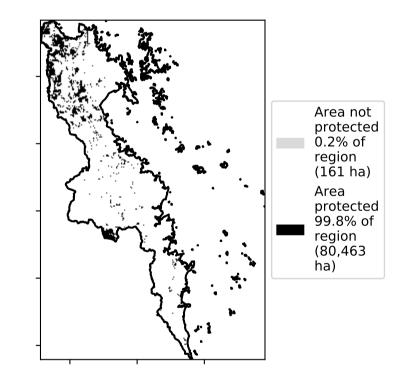


**Total Vegetation Cover [%]** 

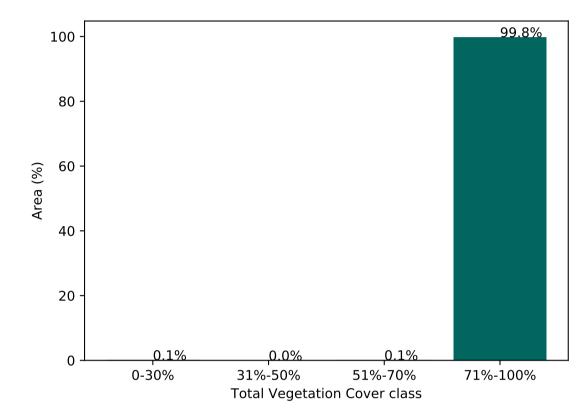




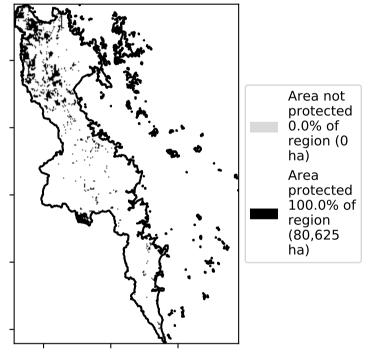
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

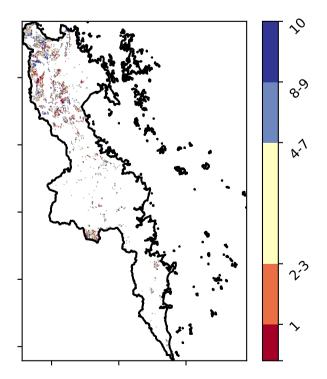


% Area protected from wind erosion (>50%)

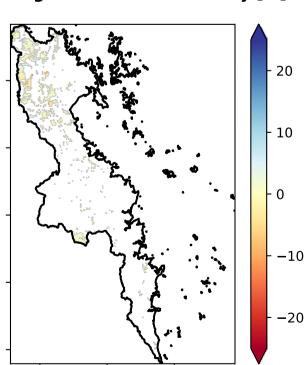


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Total Vegetation Cover Decile [%]

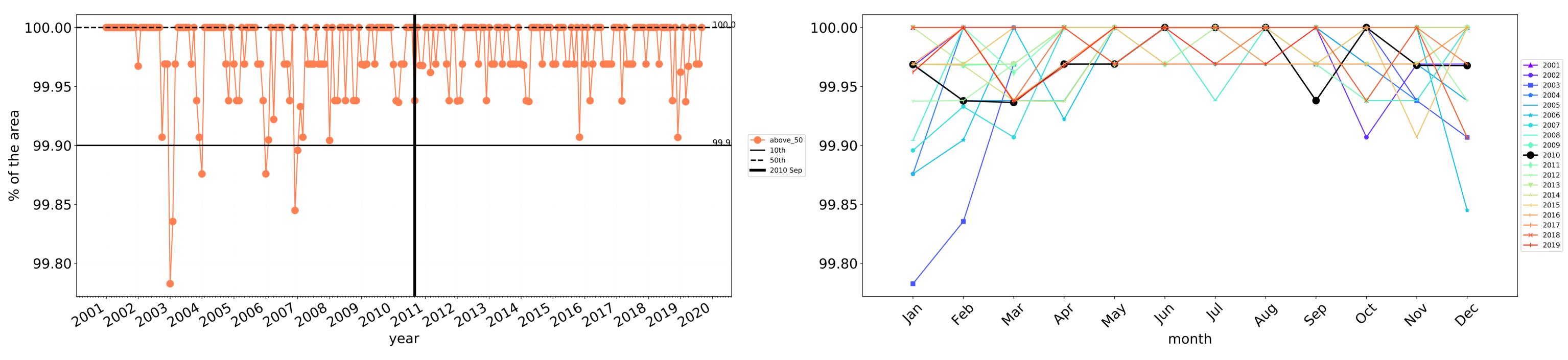


**Total Vegetation Cover Anomaly [%]** 



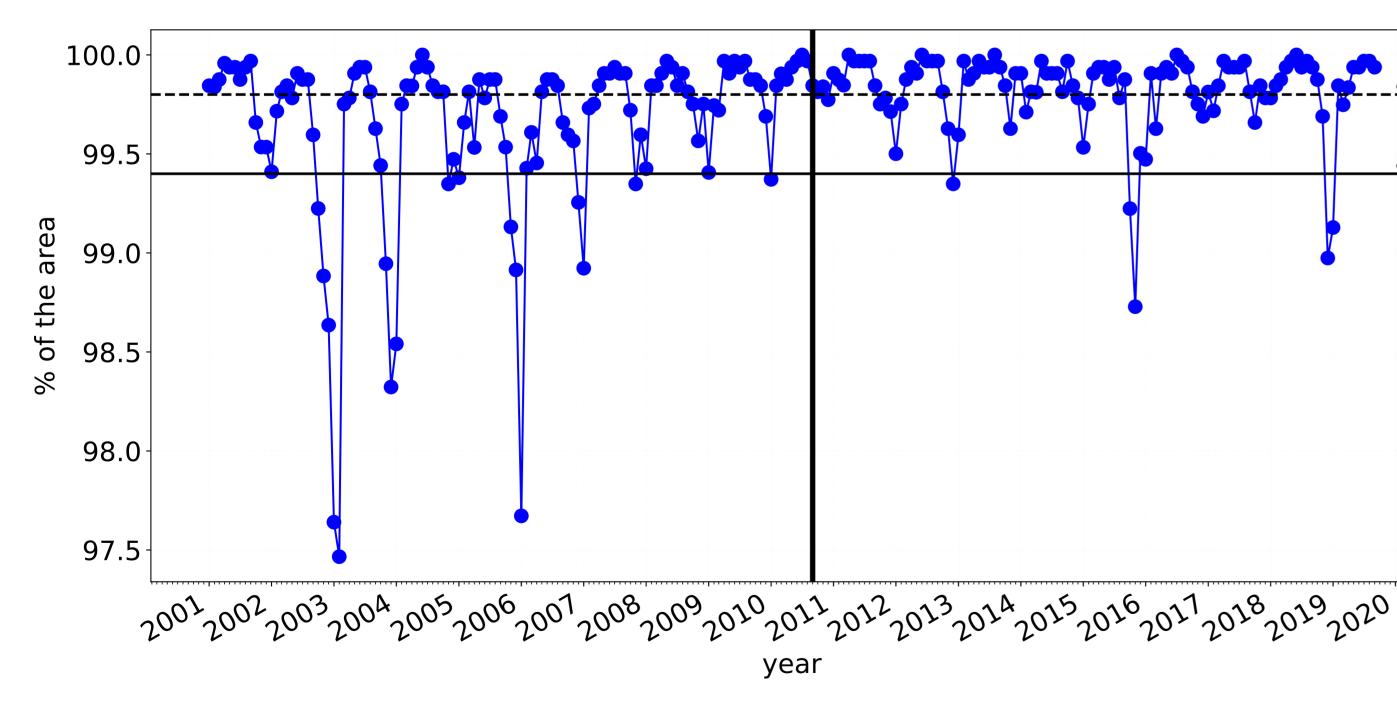
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





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%)

100.0-99.5 ---- above\_70 **—** 10th 99.0 **--** 50th **——** 2010 Sep 98.5 98.0 97.5

feb

lan



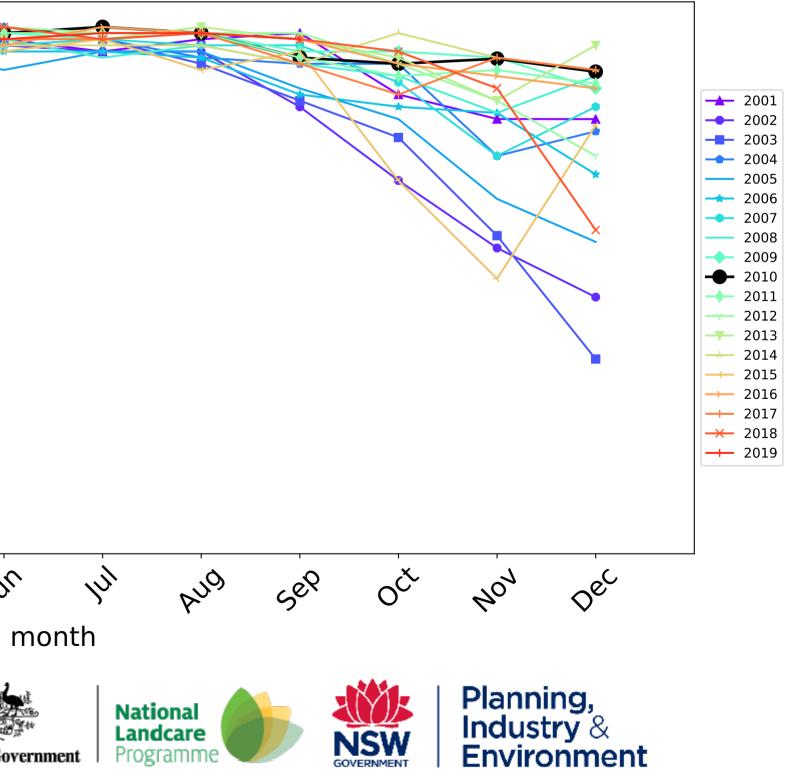
Wal

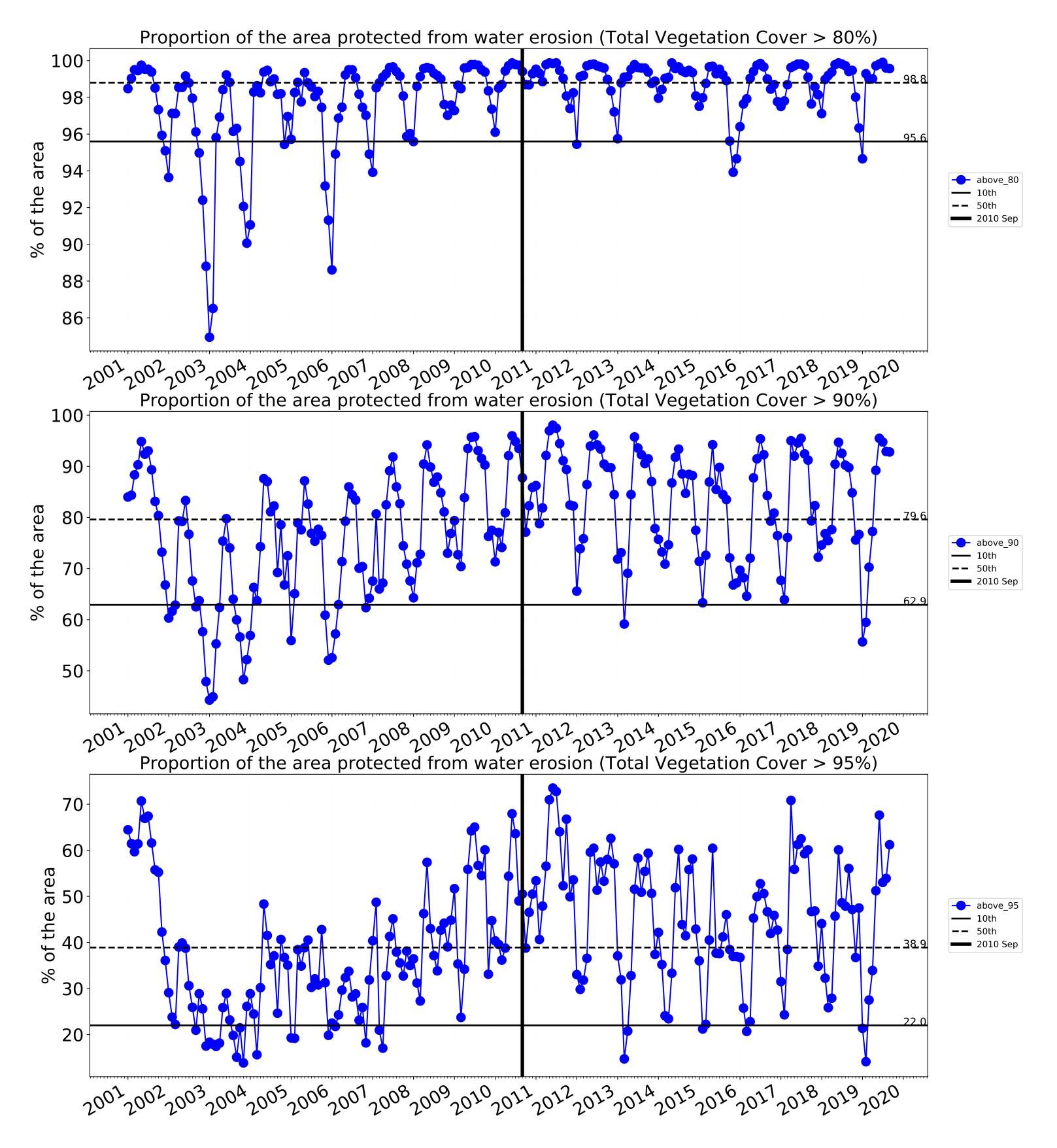
PQ

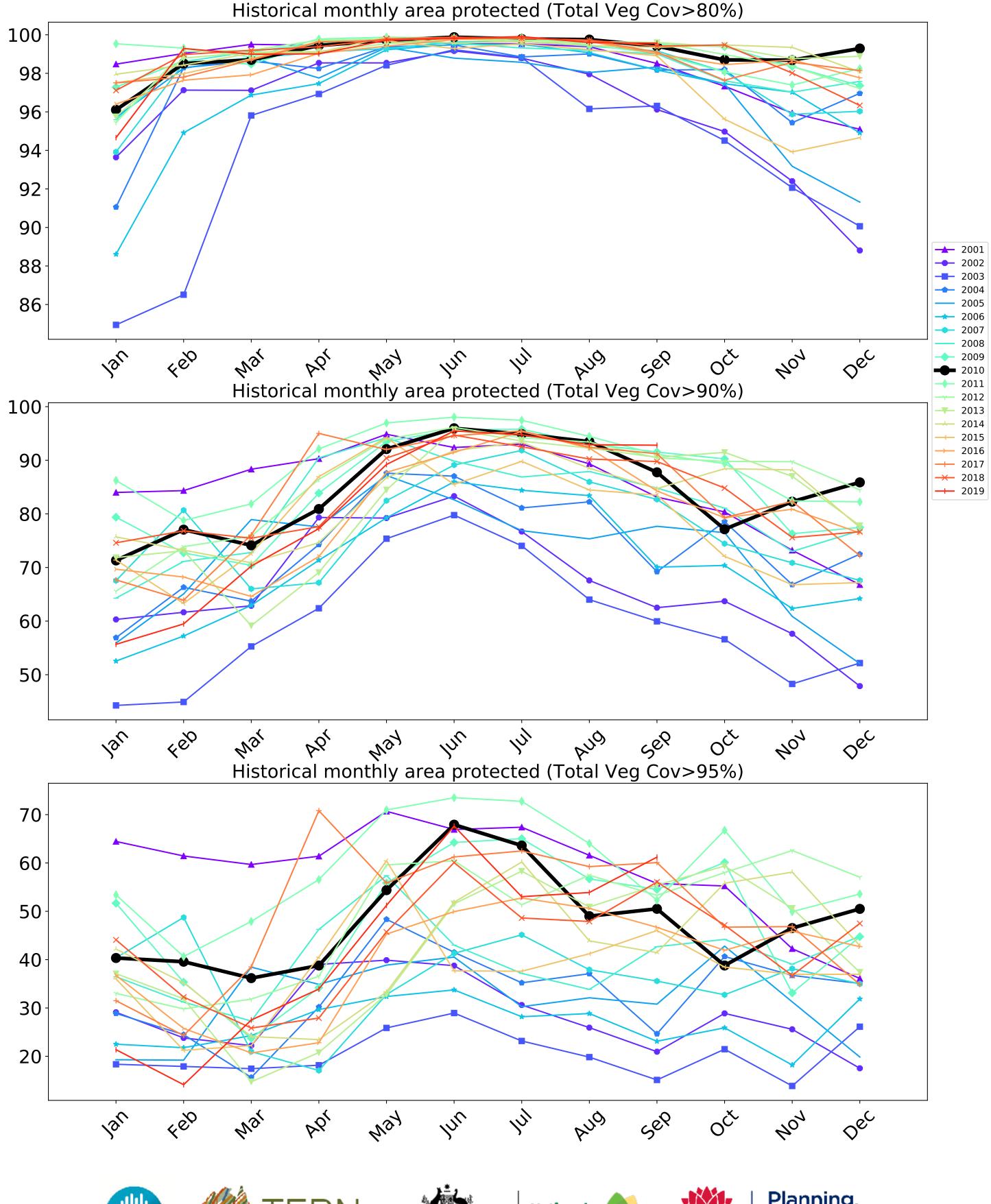
way

In

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





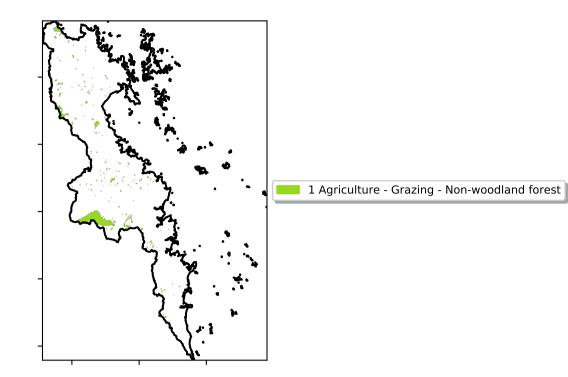




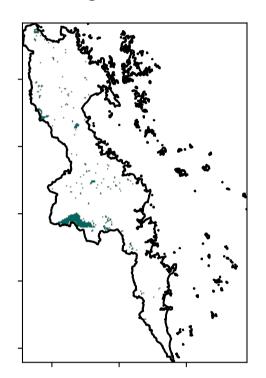


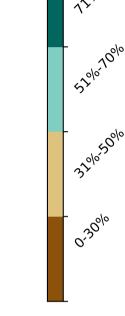
## Grazing - Forest (non woodland)

Land use and forest cover

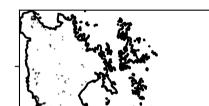


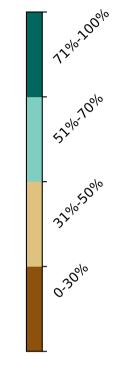
**Total Vegetation Cover [%]** 

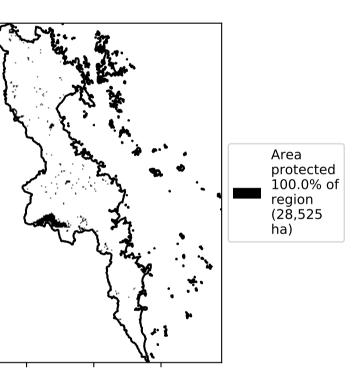




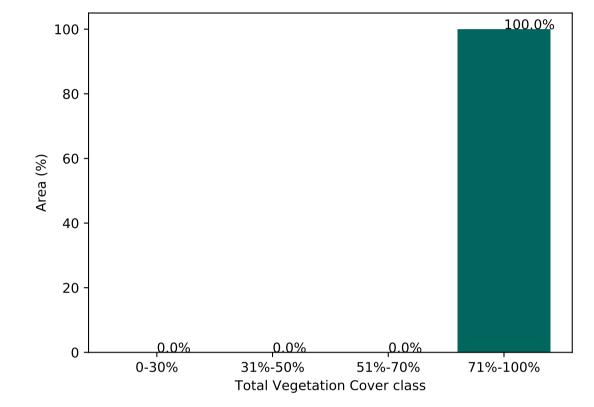
% Area protected from water erosion (>70%)







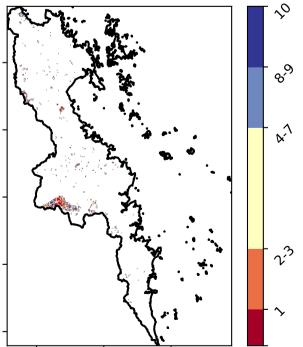
Proportion of vegetation cover class in area

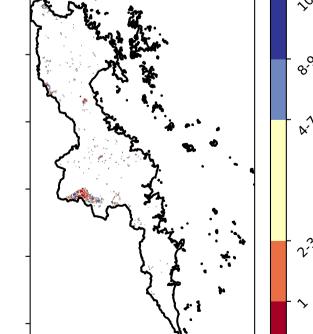


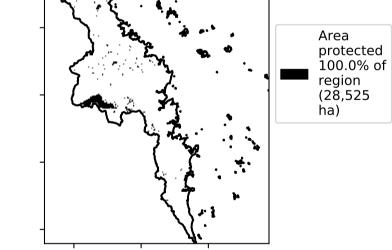
% Area protected from wind erosion (>50%)



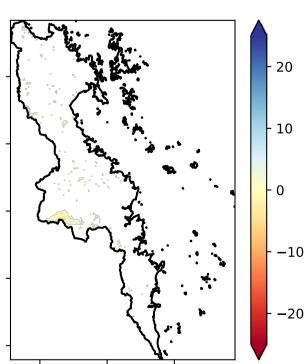
**Total Vegetation Cover Decile [%]** 





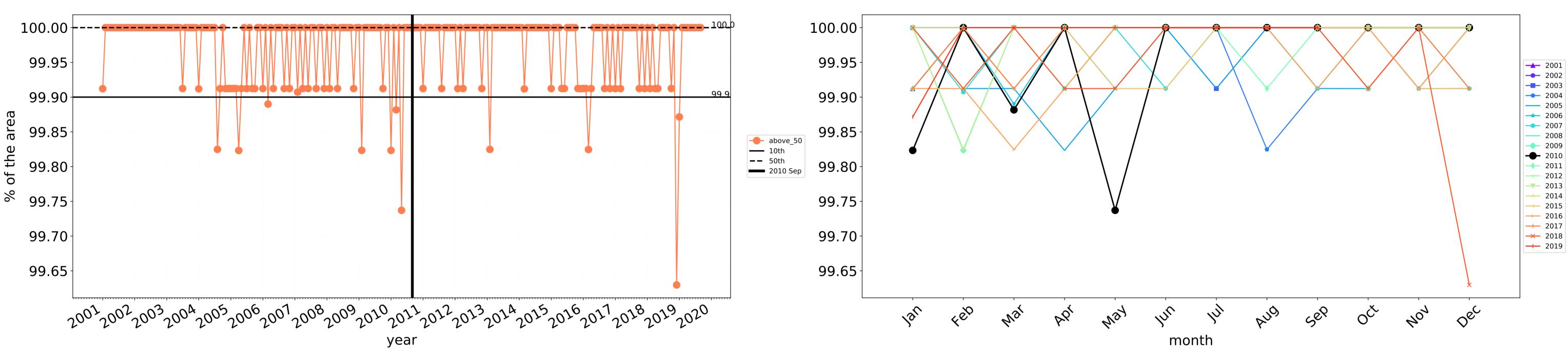


**Total Vegetation Cover Anomaly [%]** 



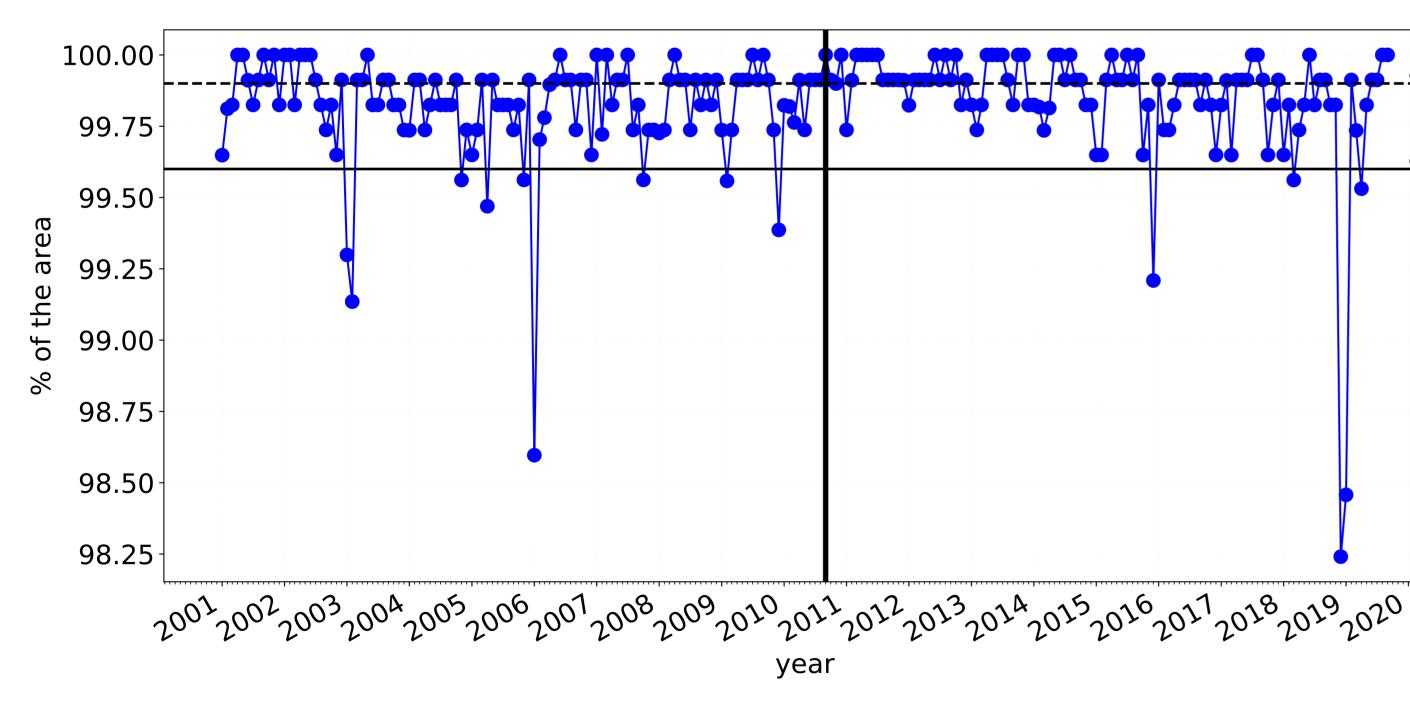
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

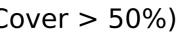




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

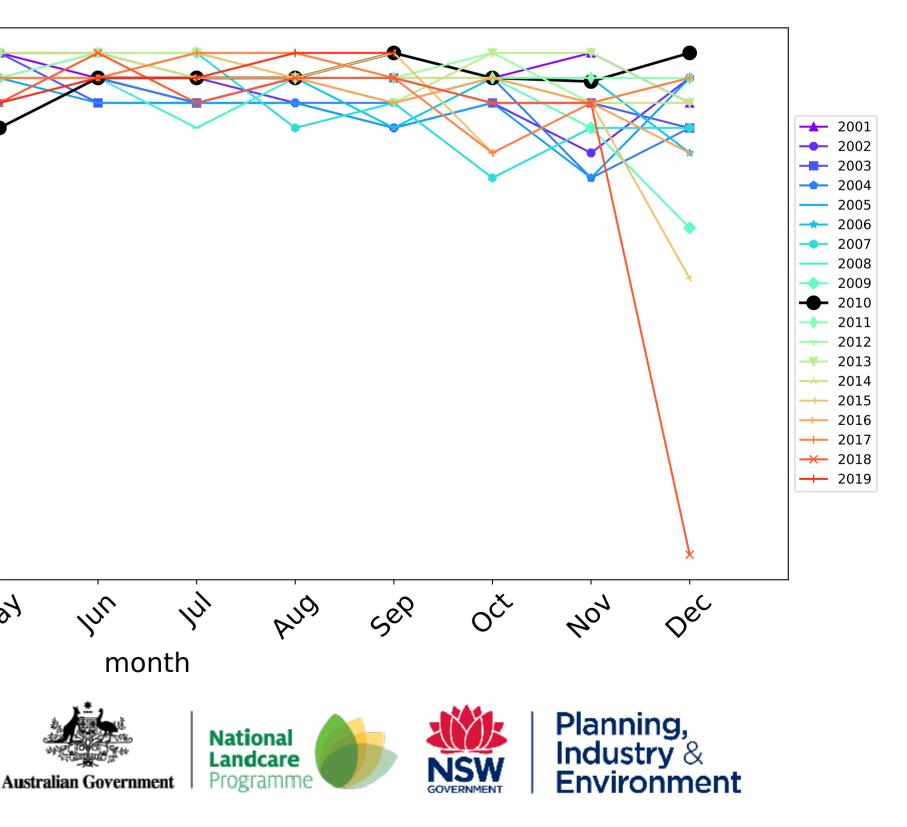


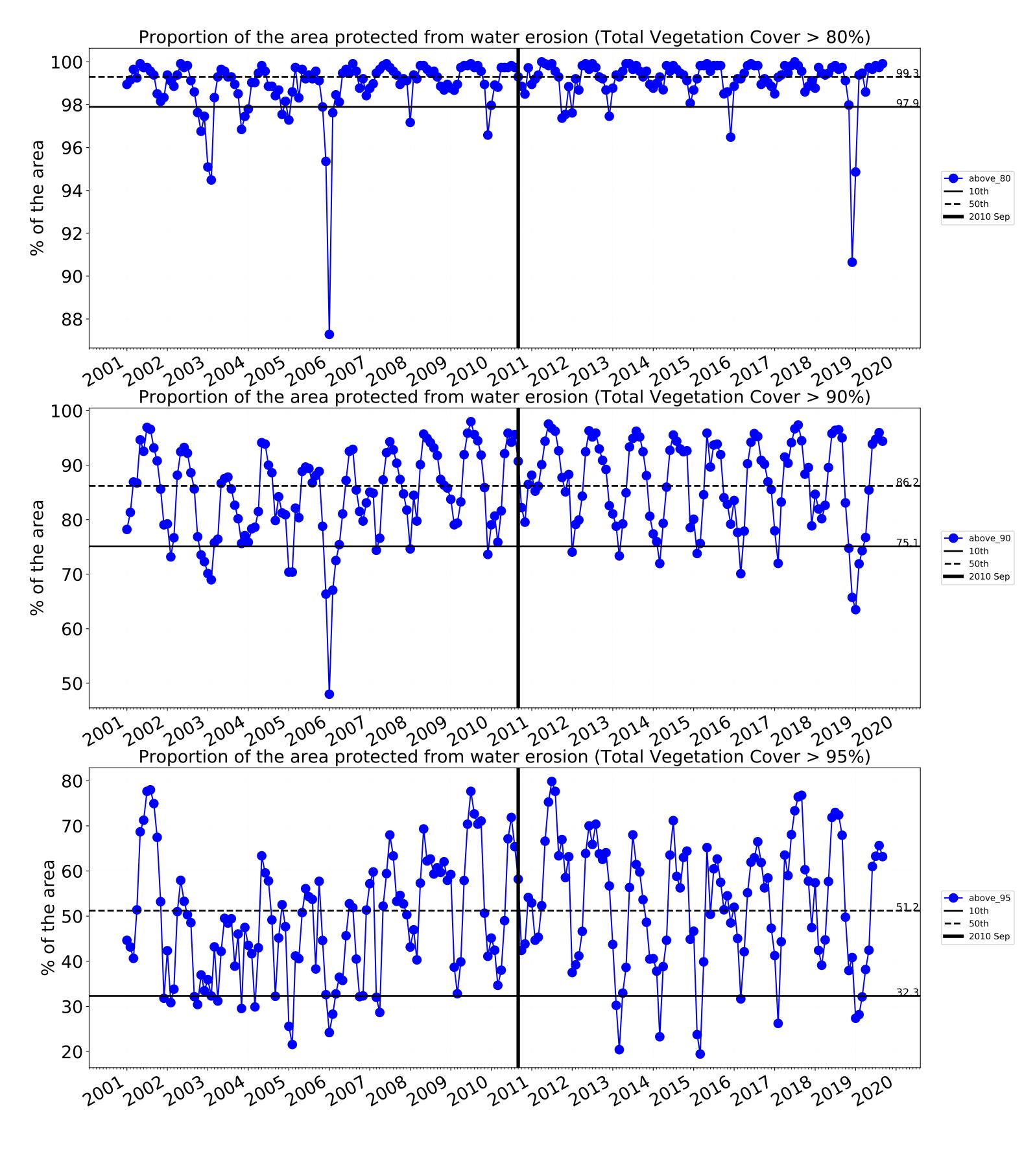


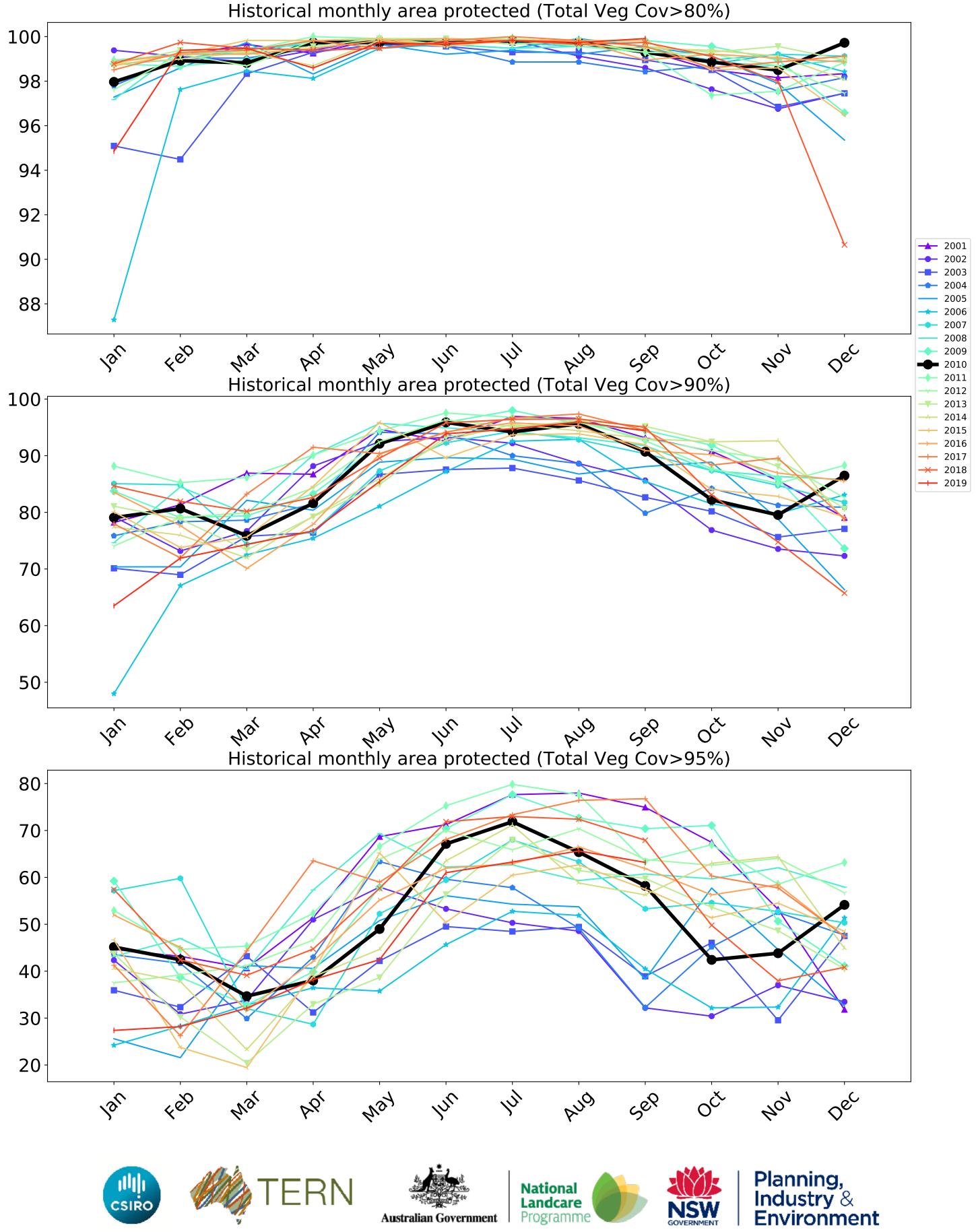
Wind erosion historical monthly area protected (Total Veg Cov >50%)

100.00-99.75 99.50 --- above\_70 **—** 10th **--** 50th 99.25 **——** 2010 Sep 99.00 98.75 98.50 98.25 Jan feb In May PQ Wal month ERN CSIRO

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





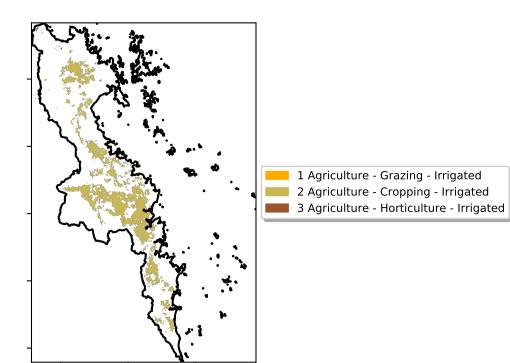




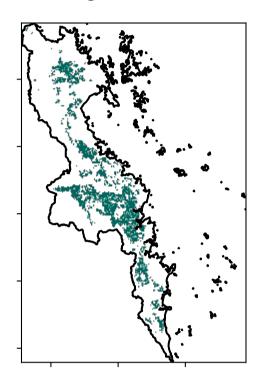
## Irrigation

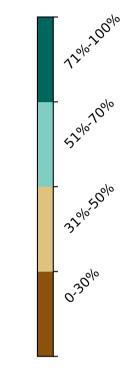
Land use and forest cover

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

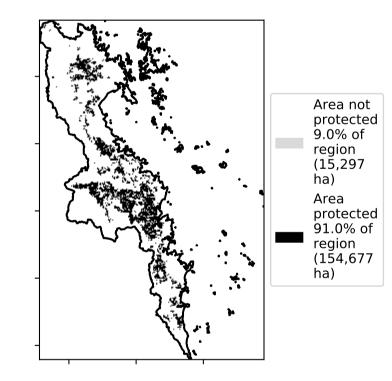


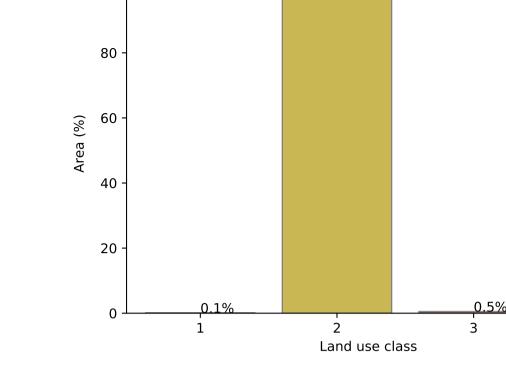
**Total Vegetation Cover [%]** 





% Area protected from water erosion (>70%)



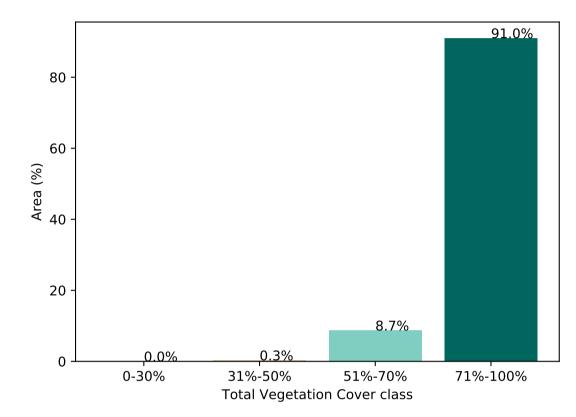


100

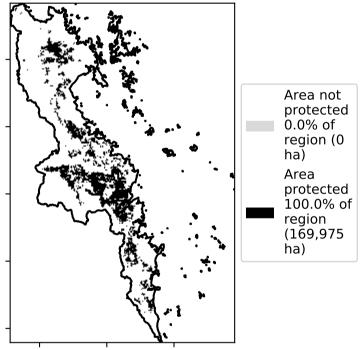
#### Proportion of each land class in area

99.3%

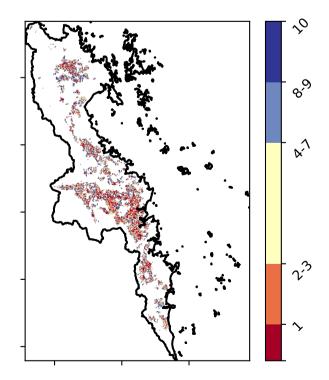
Proportion of vegetation cover class in area



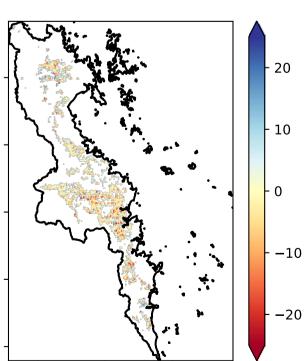
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Decile [%]** 

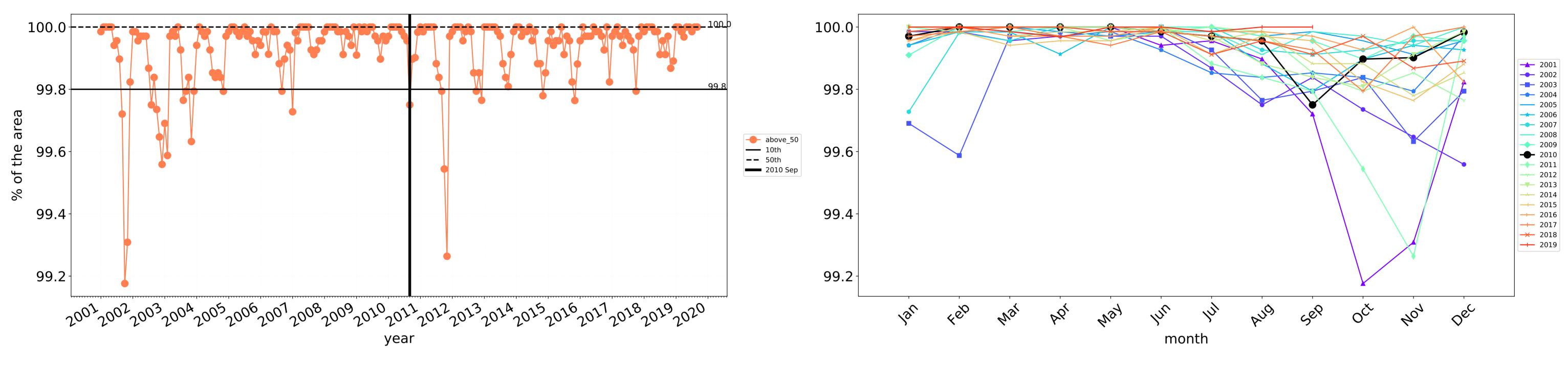


**Total Vegetation Cover Anomaly [%]** 



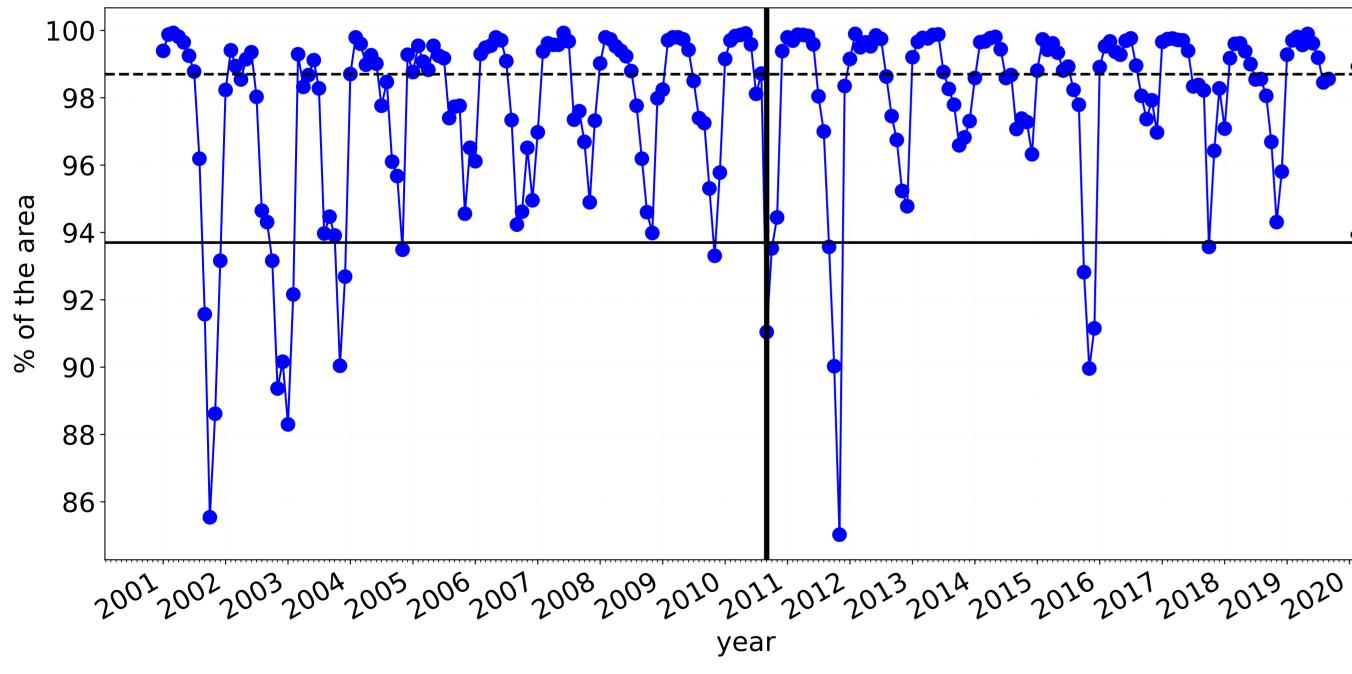
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

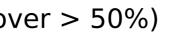




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

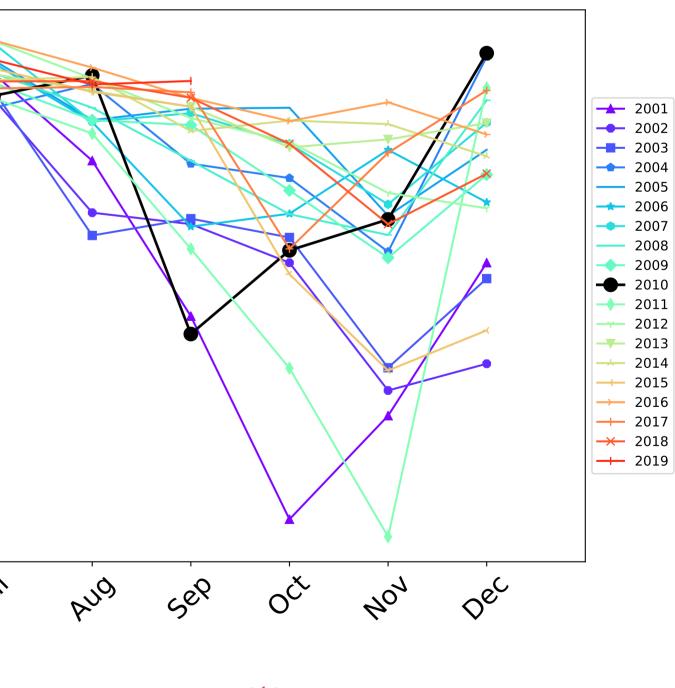




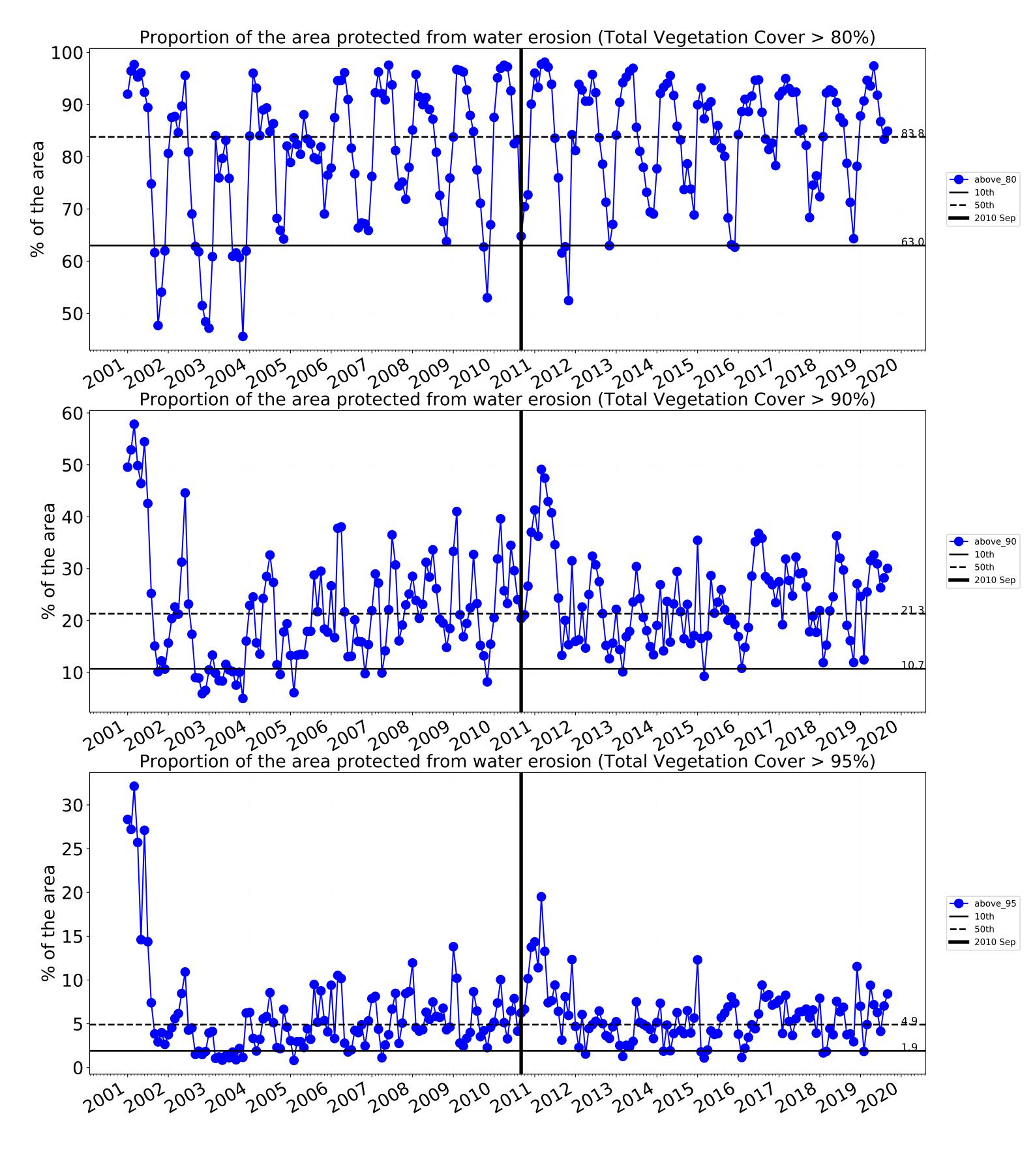
Wind erosion historical monthly area protected (Total Veg Cov >50%)

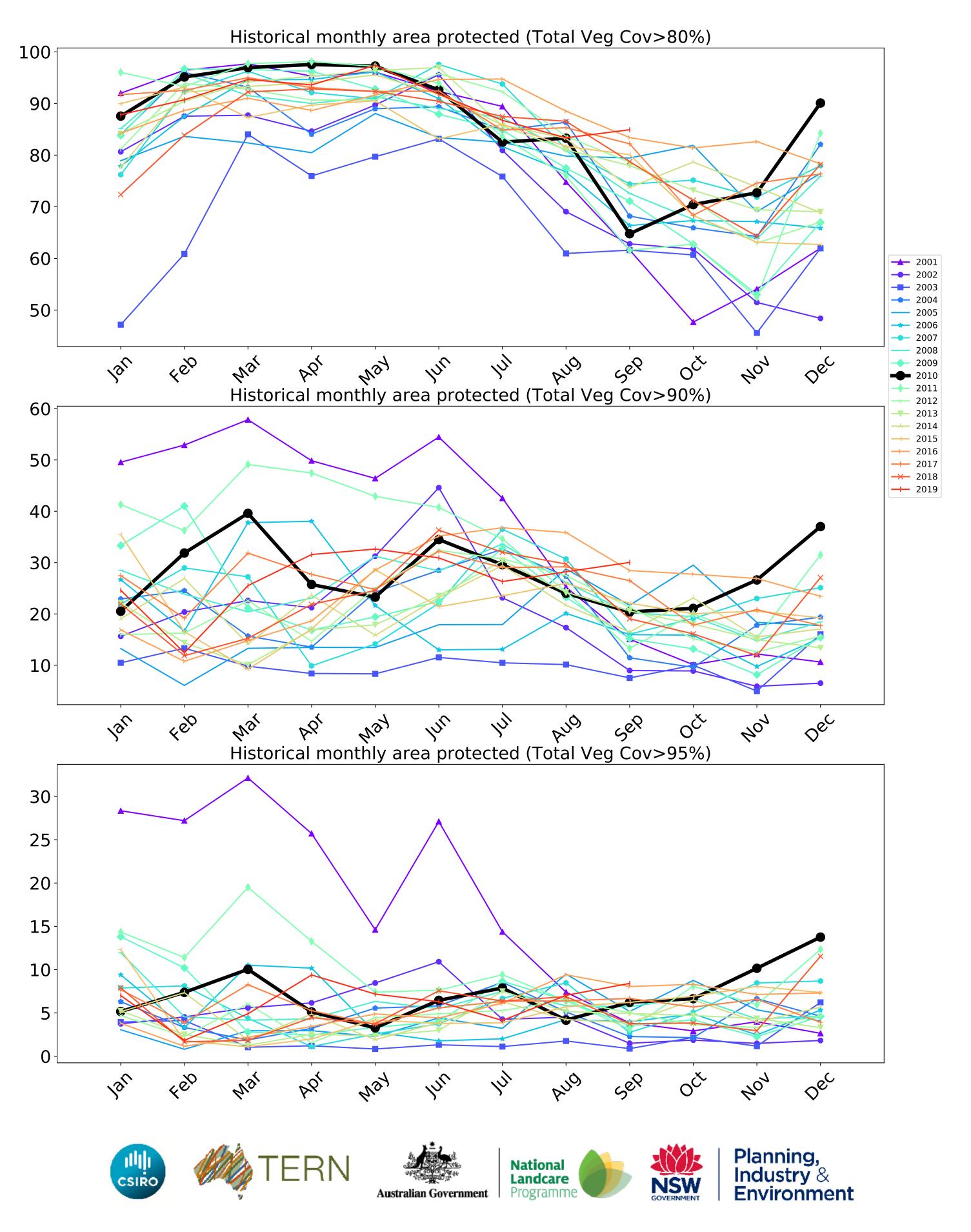
100 98 96 ---- above\_70 **—** 10th 94 03 **——** 50th **——** 2010 Sep 92 90 88 86 Jan feb May PQ Mar In In In month ERN **HORA** CSIRC Australian Government

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



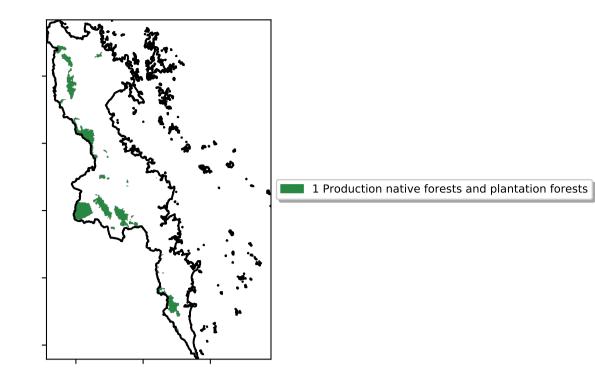




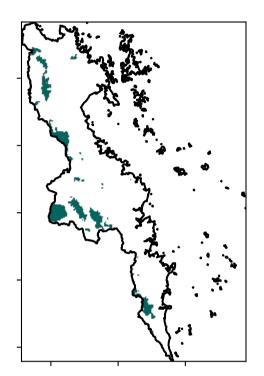


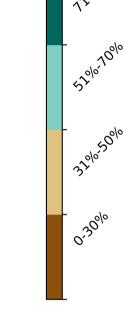
## **Production native forests and plantation forests**

Land use and forest cover

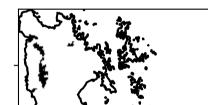


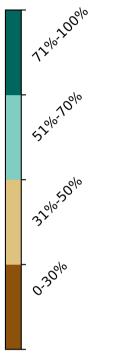
**Total Vegetation Cover [%]** 



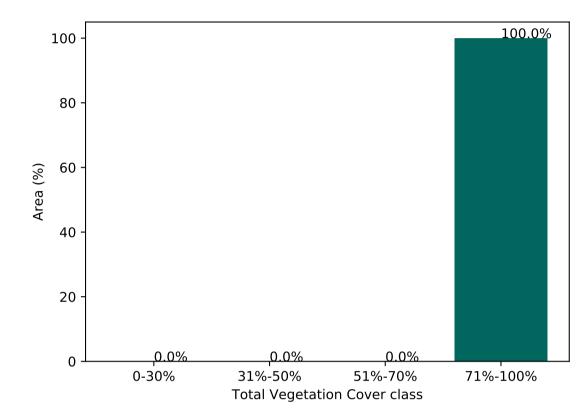


% Area protected from water erosion (>70%)

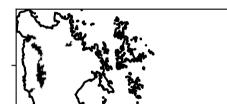




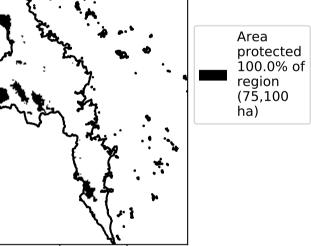
Proportion of vegetation cover class in area



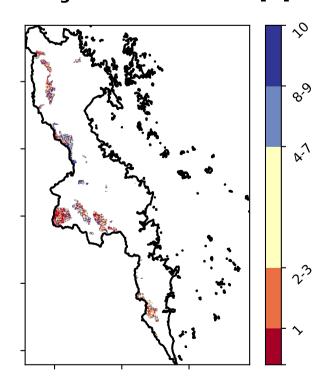
% Area protected from wind erosion (>50%)

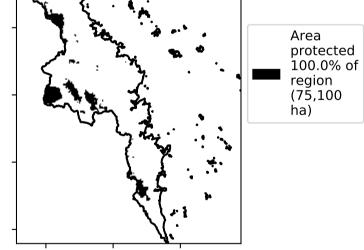


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

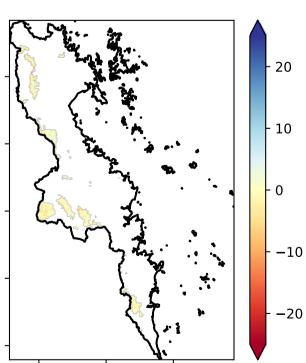


**Total Vegetation Cover Decile [%]** 



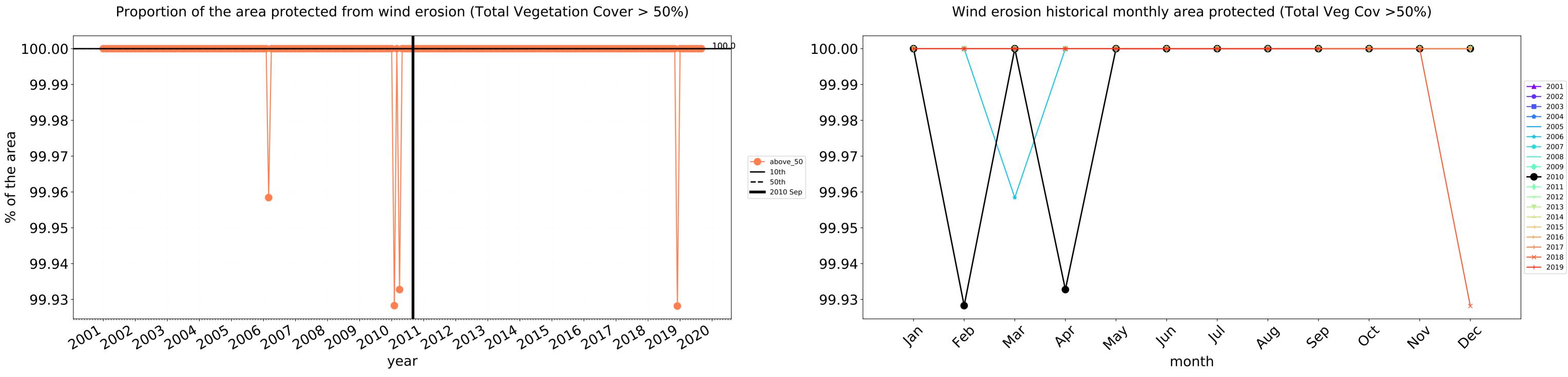


**Total Vegetation Cover Anomaly [%]** 

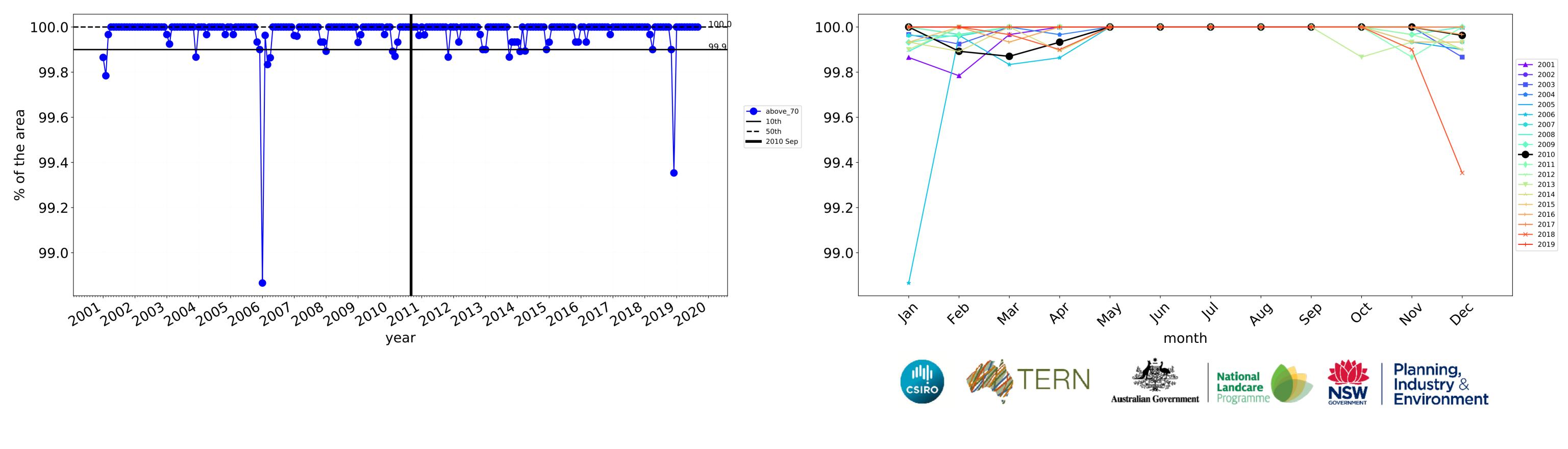


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

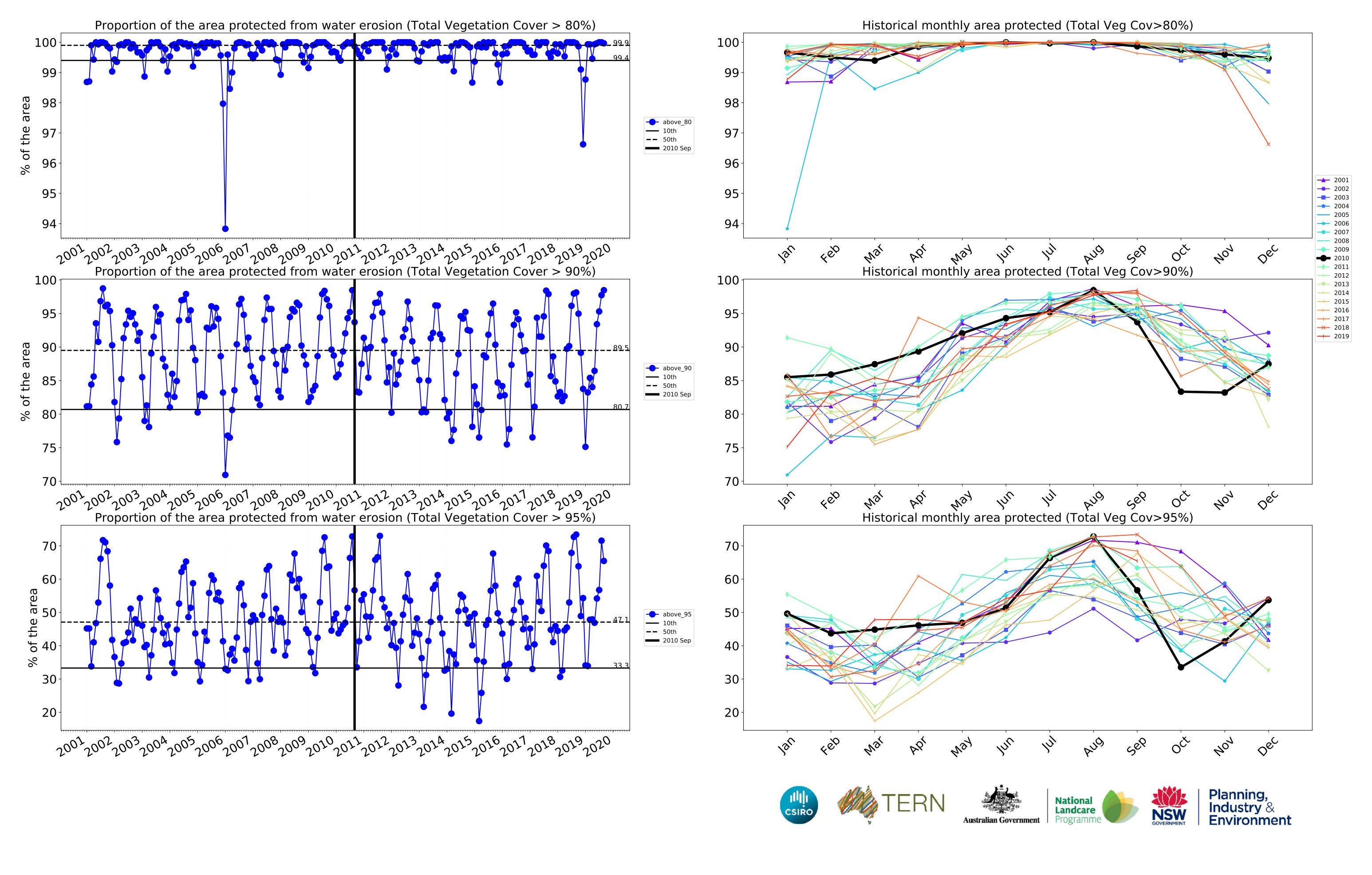




Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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



# Mackay Whitsunday (909,125 ha and no data 23,935 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	909,125	99.9% 908,041	99.7% 906,201	96.9% 881,073	89.2% 810,631	66.8% 607,015	35.8% 325,195
Conservation and natural environments	269,775	99.9% 269,375	99.6% 268,700	98.8% 266,650	97.3% 262,375	83.1% 224,150	45.0% 121,275
Conservation and natural environments non forest	6,875	99.6% 6,850	97.5% 6,700	94.2% 6,475	84.7% 5,825	54.9% 3,775	29.8% 2,050
Conservation and natural environments Woodland forest	73,950	99.8% 73,825	99.6% 73,650	98.9% 73,100	97.2% 71,850	85.2% 63,000	50.5% 37,325
Conservation and natural environments Forest (non woodland)	188,950	99.9% 188,700	99.7% 188,350	99.0% 187,075	97.8% 184,700	83.3% 157,375	43.3% 81,900
Agriculture	468,300	100.0% 468,275	99.9% 467,775	96.5% 452,125	85.9% 402,125	58.9% 276,025	31.3% 146,450
Grazing	298,275	100.0% 298,250	100.0% 298,175	99.7% 297,325	97.9% 291,975	80.9% 241,350	45.5% 135,850
Grazing non forest	189,125	100.0% 189,125	100.0% 189,075	99.6% 188,300	97.0% 183,500	76.5% 144,725	41.5% 78,525
Grazing Woodland forest	80,625	100.0% 80,600	99.9% 80,575	99.8% 80,500	99.4% 80,150	87.8% 70,750	50.5% 40,725
Grazing - Forest (non woodland)	28,525	100.0% 28,525	100.0% 28,525	100.0% 28,525	99.3% 28,325	90.7% 25,875	58.2% 16,600
Irrigation	169,975	100.0% 169,975	99.7% 169,550	91.0% 154,750	64.8% 110,100	20.4% 34,650	6.2% 10,600
Production native forests and plantation forests	75,100	100.0% 75,100	100.0% 75,100	100.0% 75,100	99.9% 75,000	93.7% 70,375	56.7% 42,550

