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

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:

**Date: September 2001** 

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 cover class that 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







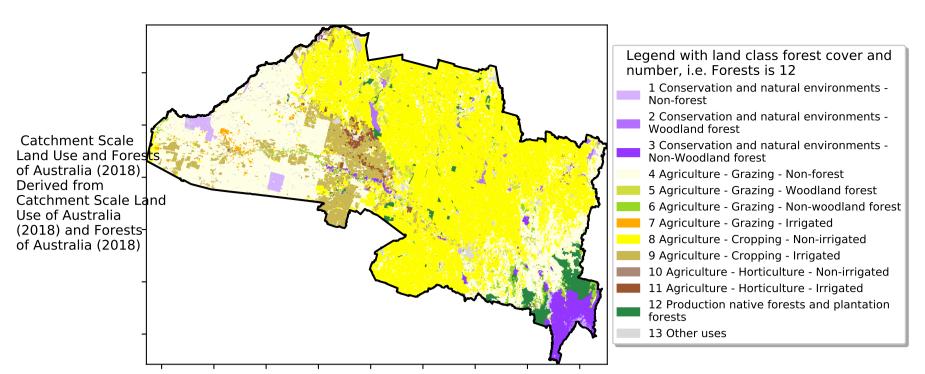




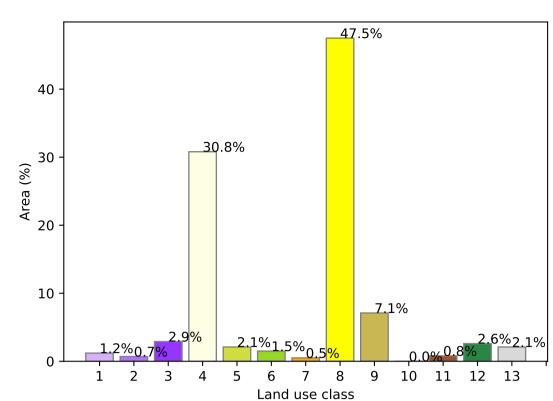


### **Vegetation Cover Sep 2001**

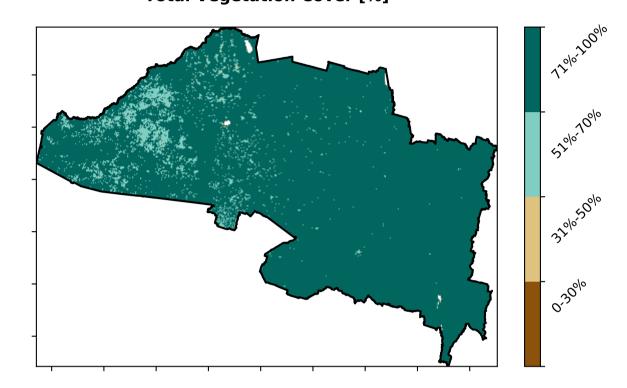
### Land use and forest cover



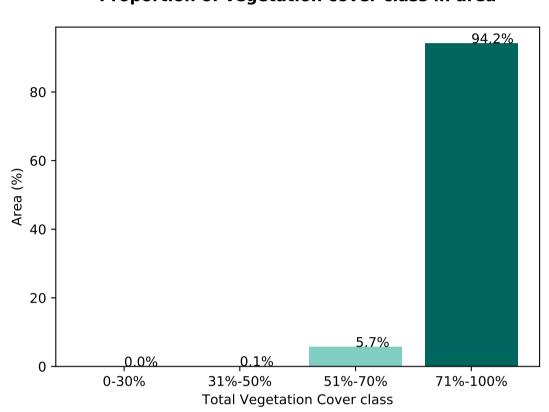
### Proportion of each land class in area



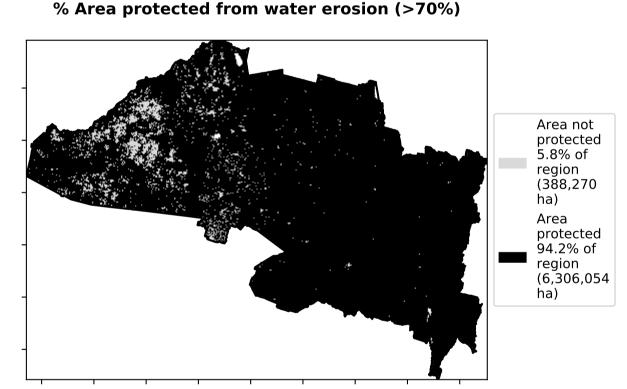
### **Total Vegetation Cover [%]**



Proportion of vegetation cover class in area



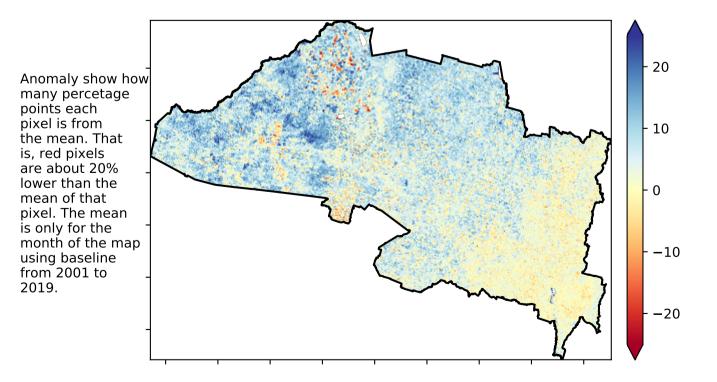
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% Area protected from wind erosion (>50%)



### 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.



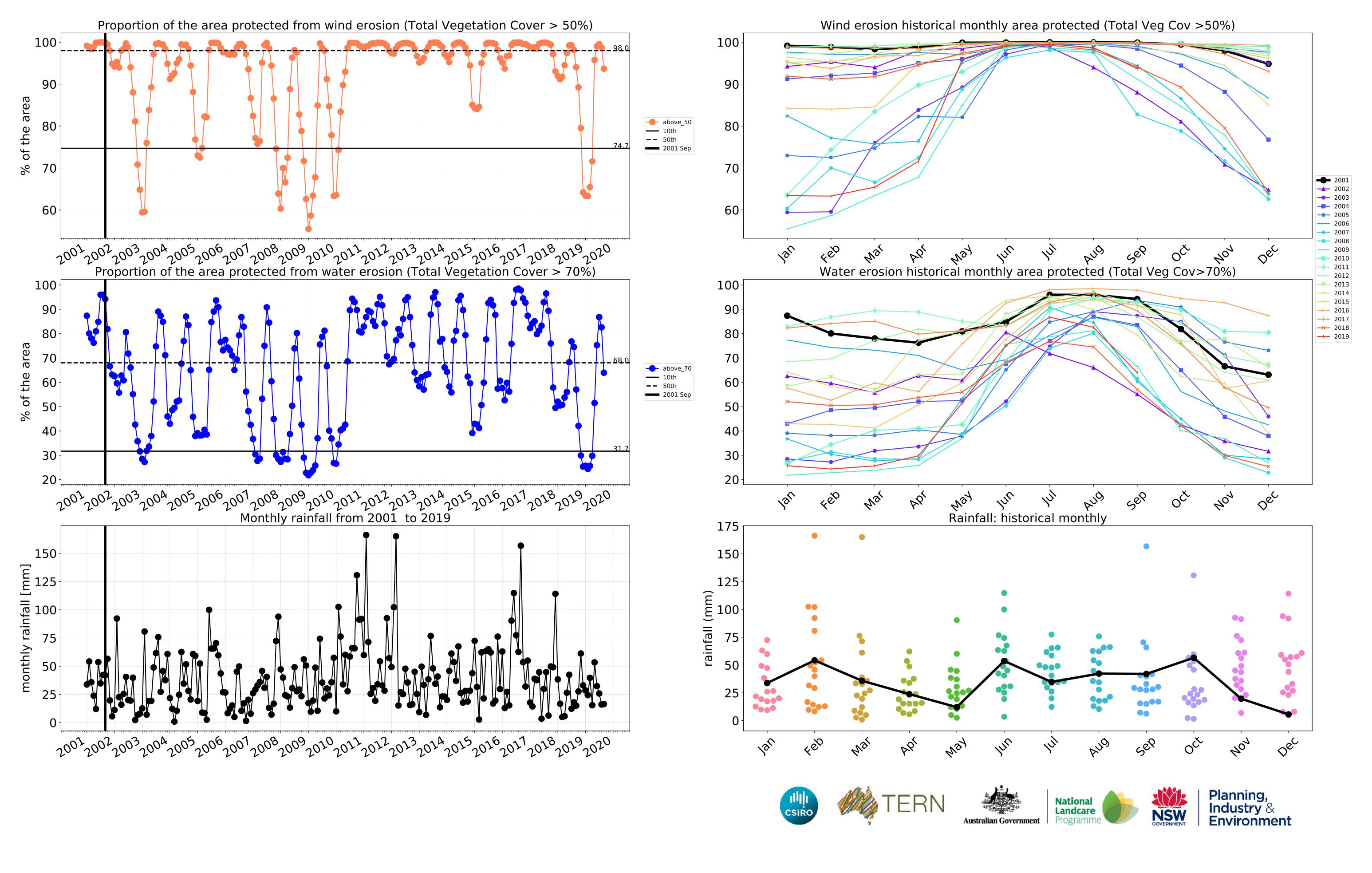




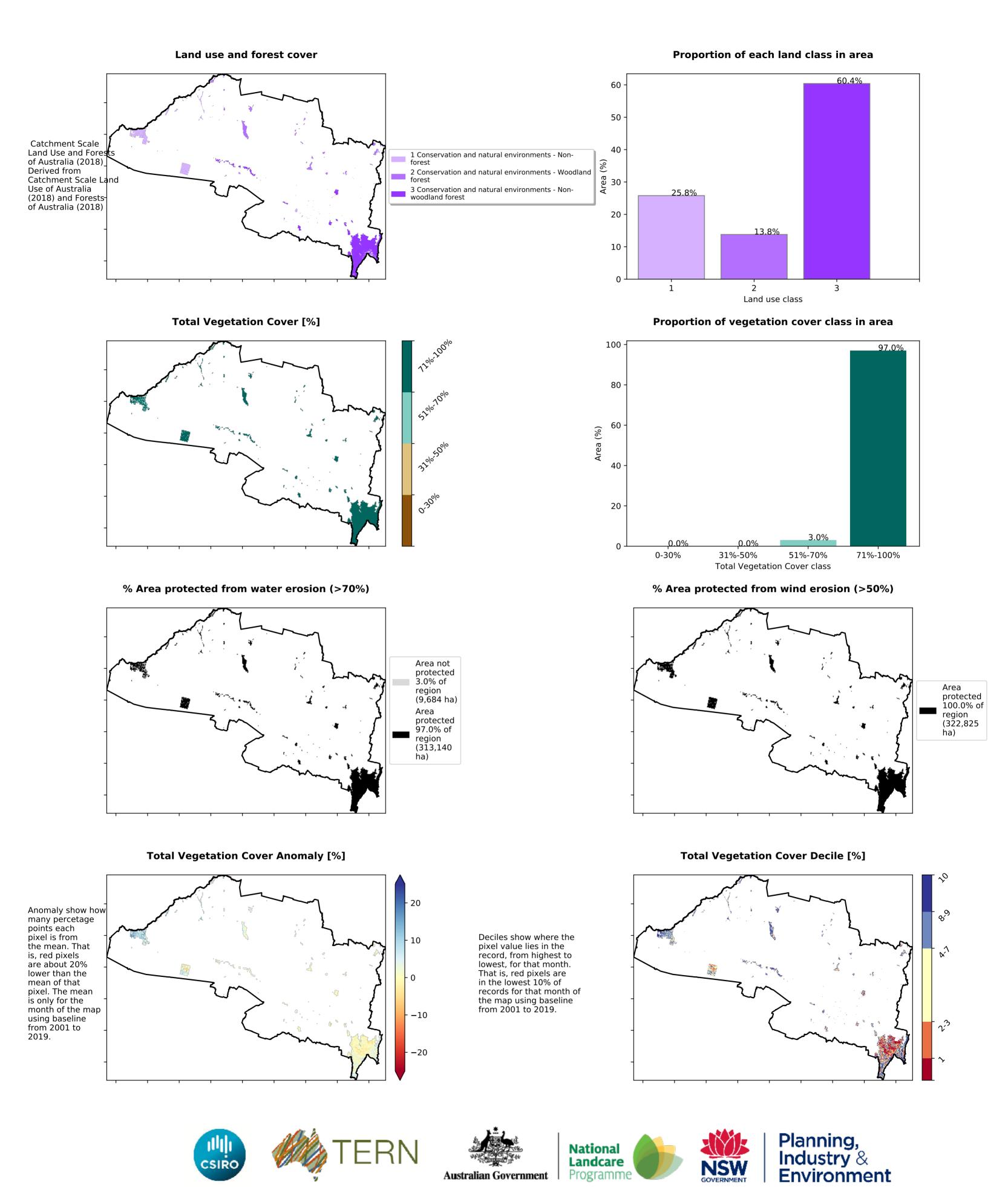






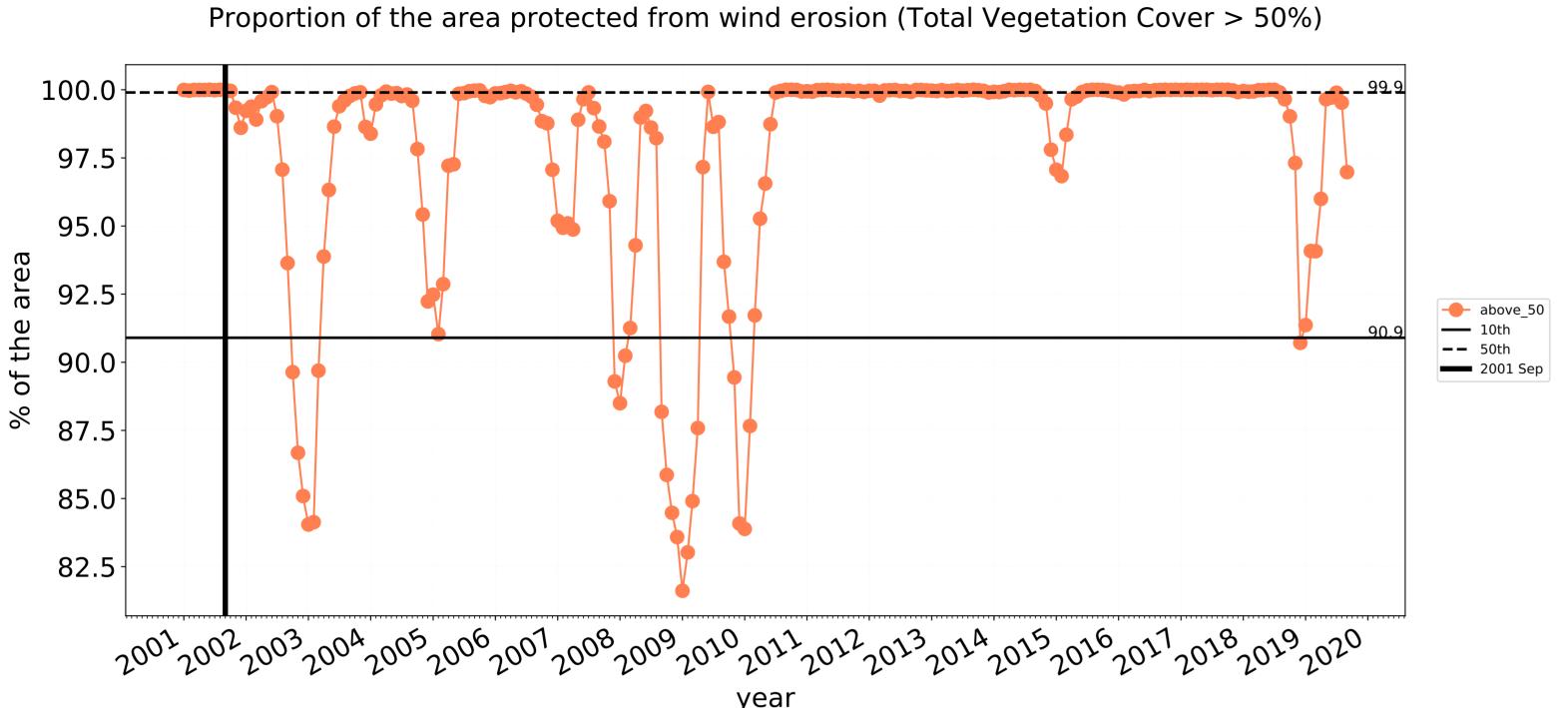


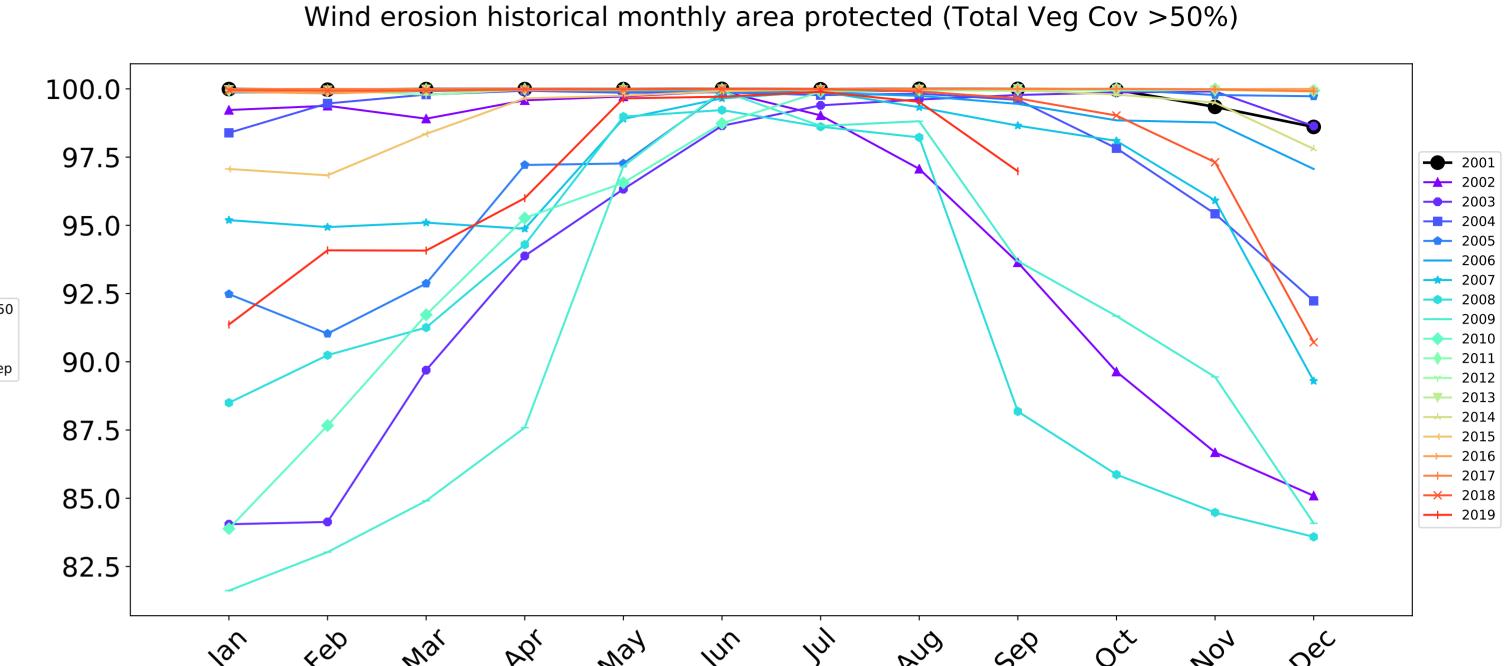
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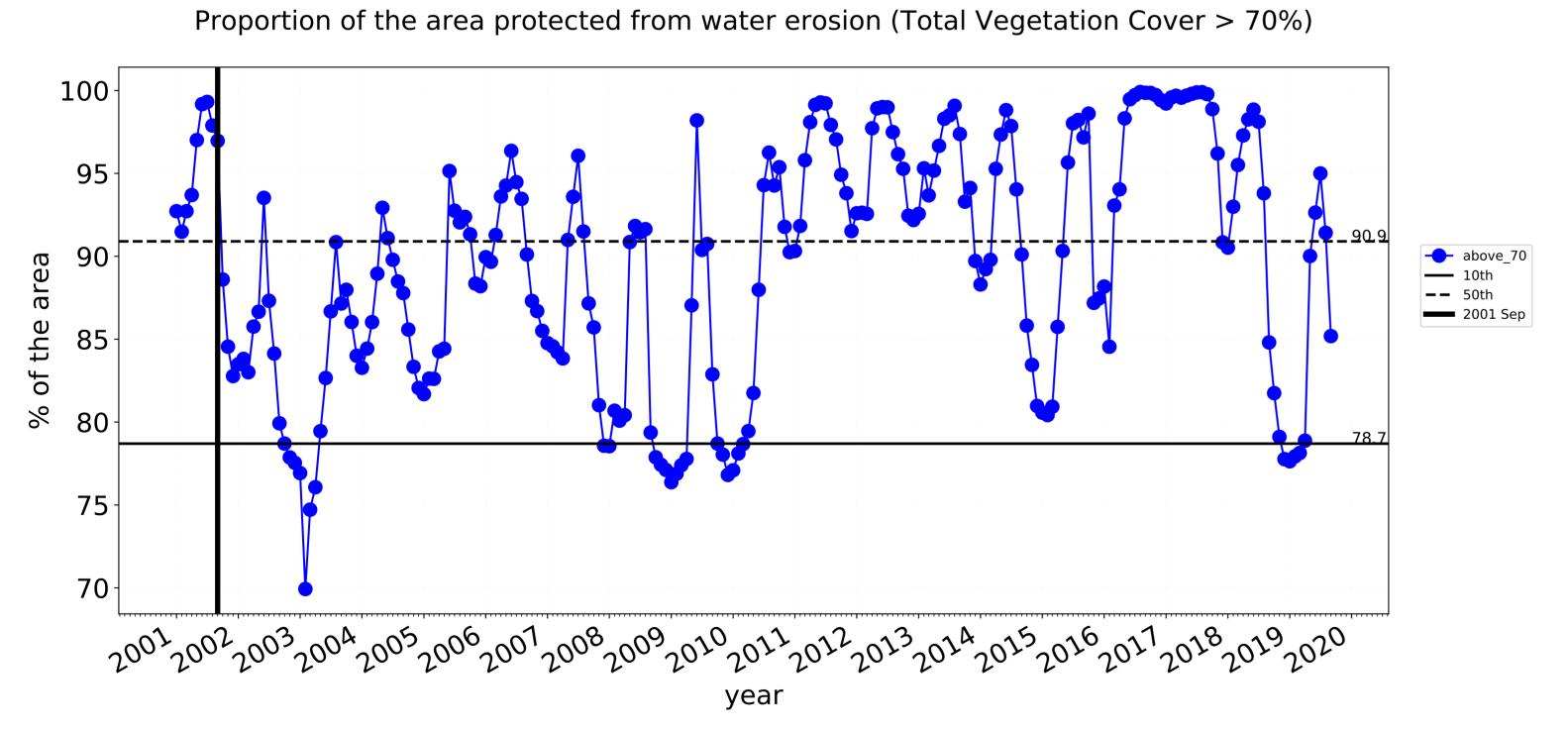


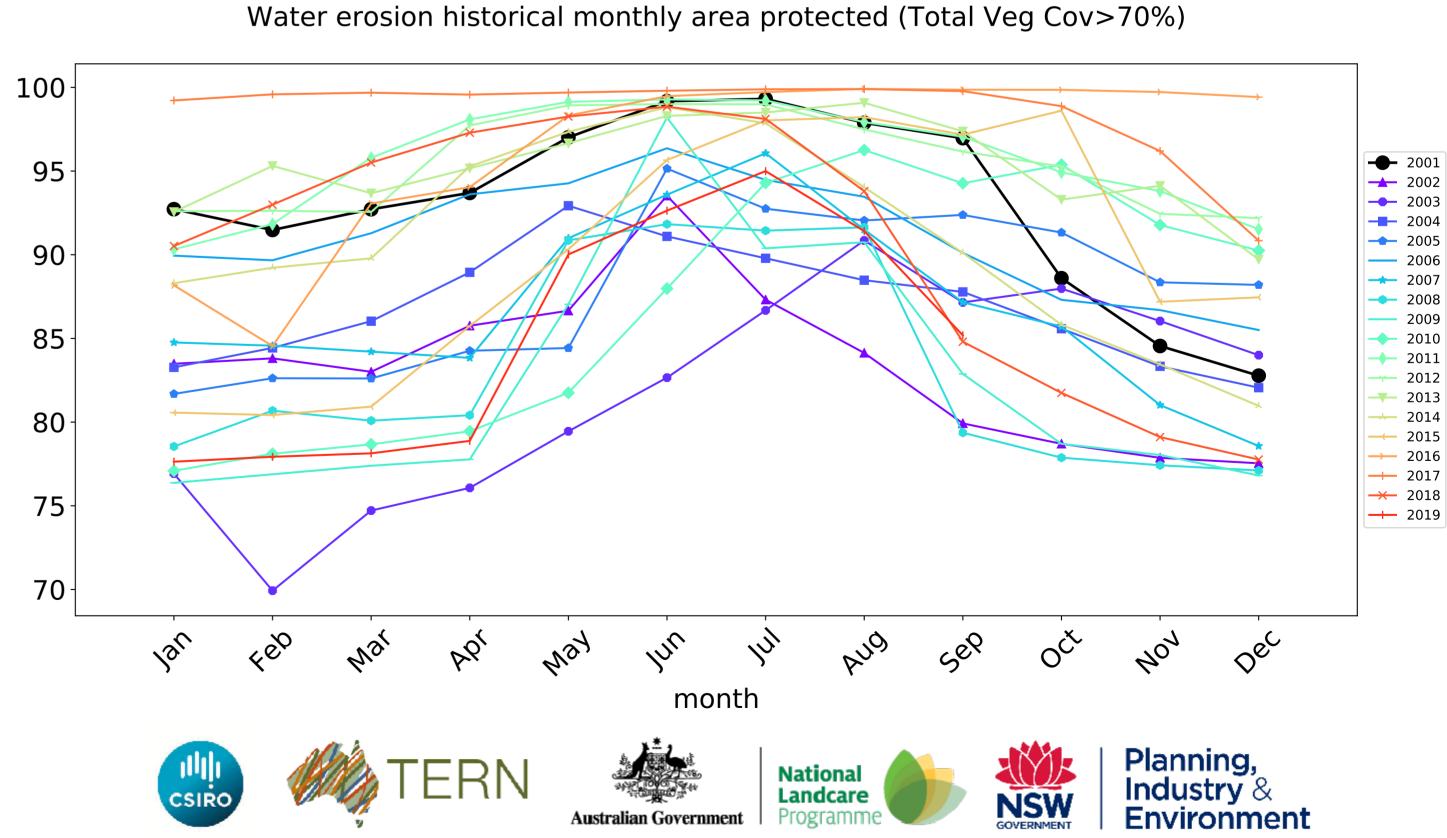
### **Conservation and natural environments timeseries**





month





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

### Land use and forest cover 1 Conservation and natural environments - Nonforest

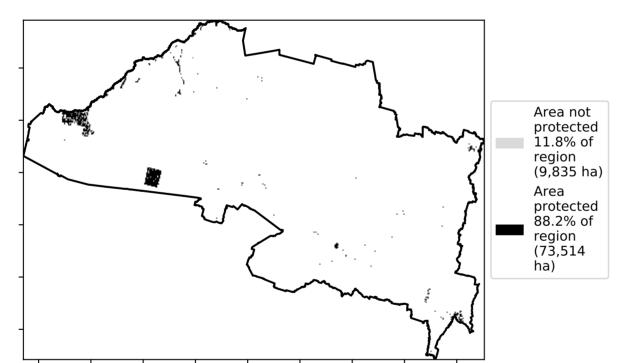
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**Total Vegetation Cover [%]** 

### % Area protected from water erosion (>70%)

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

Catchment Scale Land Use of Australia (2018) and Forestsof Australia (2018)

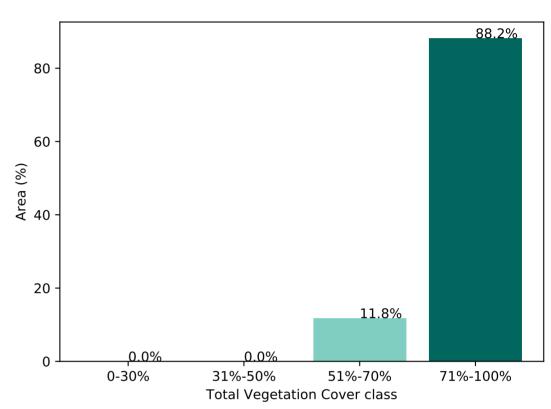


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

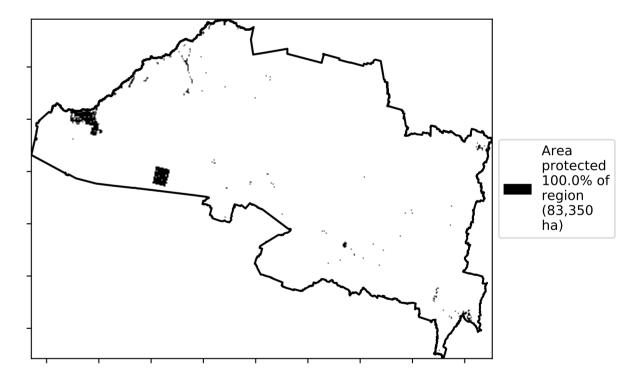
**Total Vegetation Cover Anomaly [%]** 

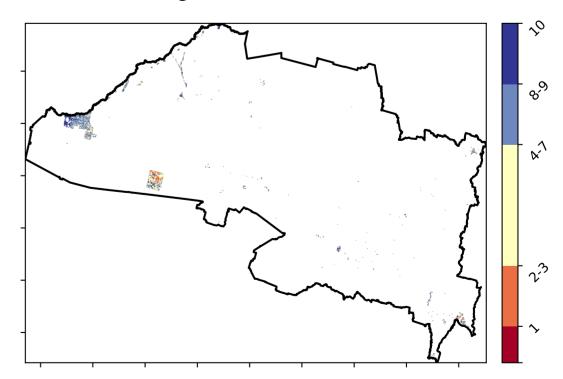
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

### **Proportion of vegetation cover class in area**



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









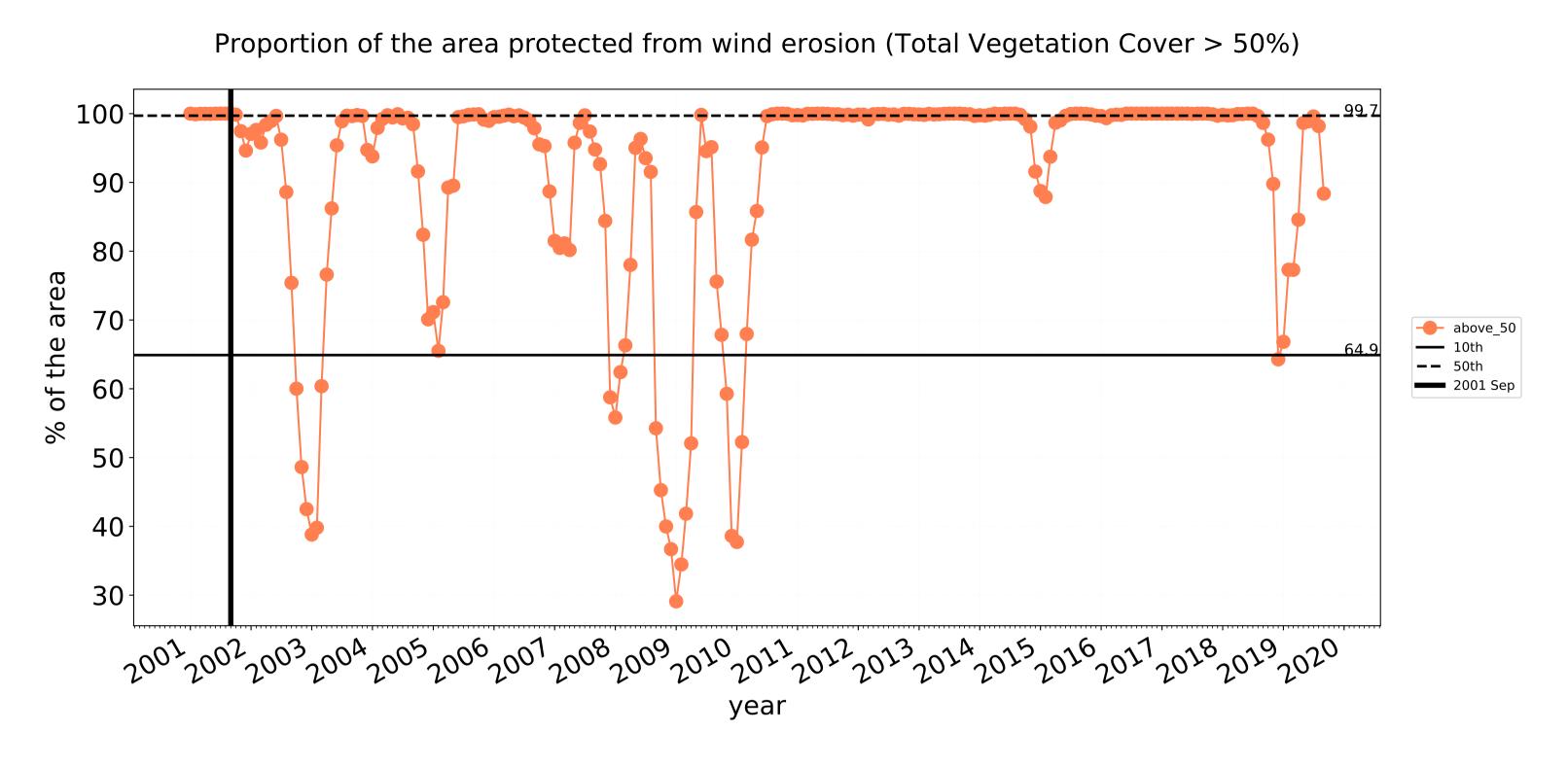


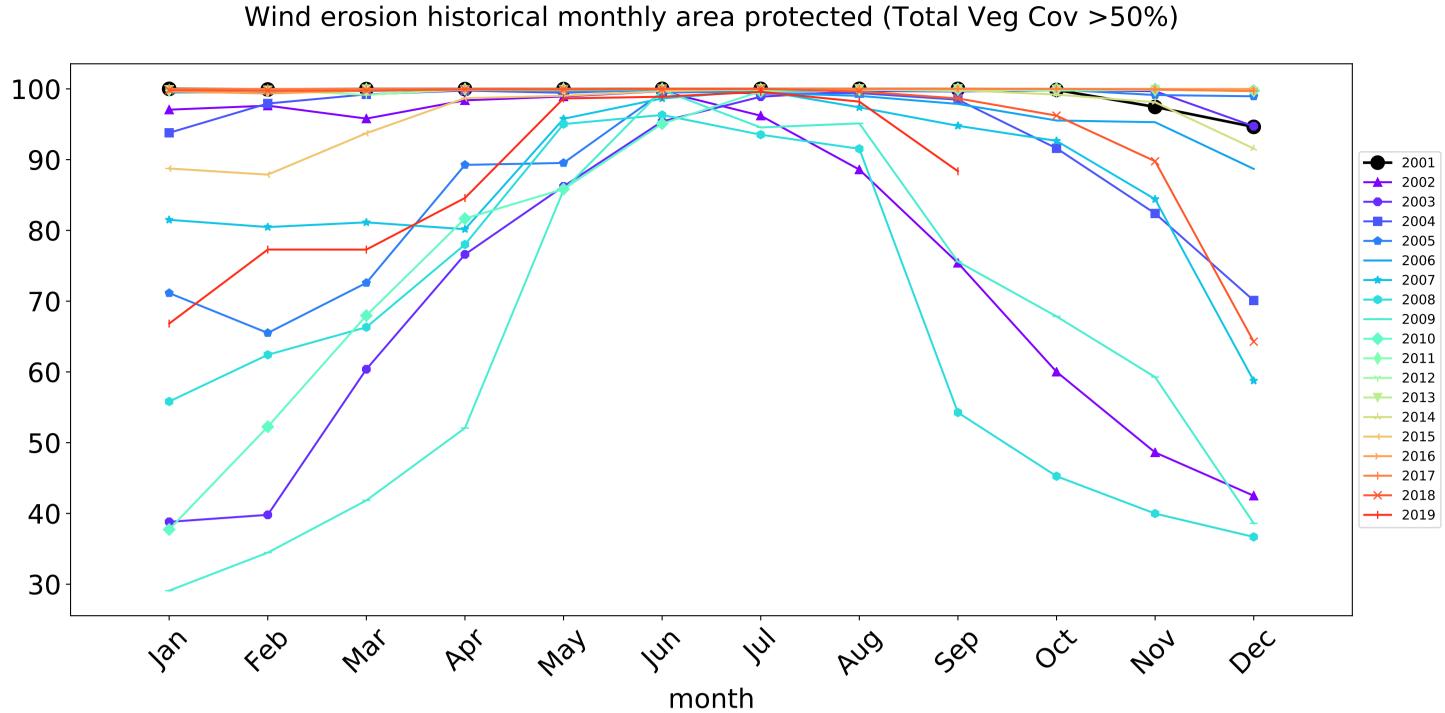


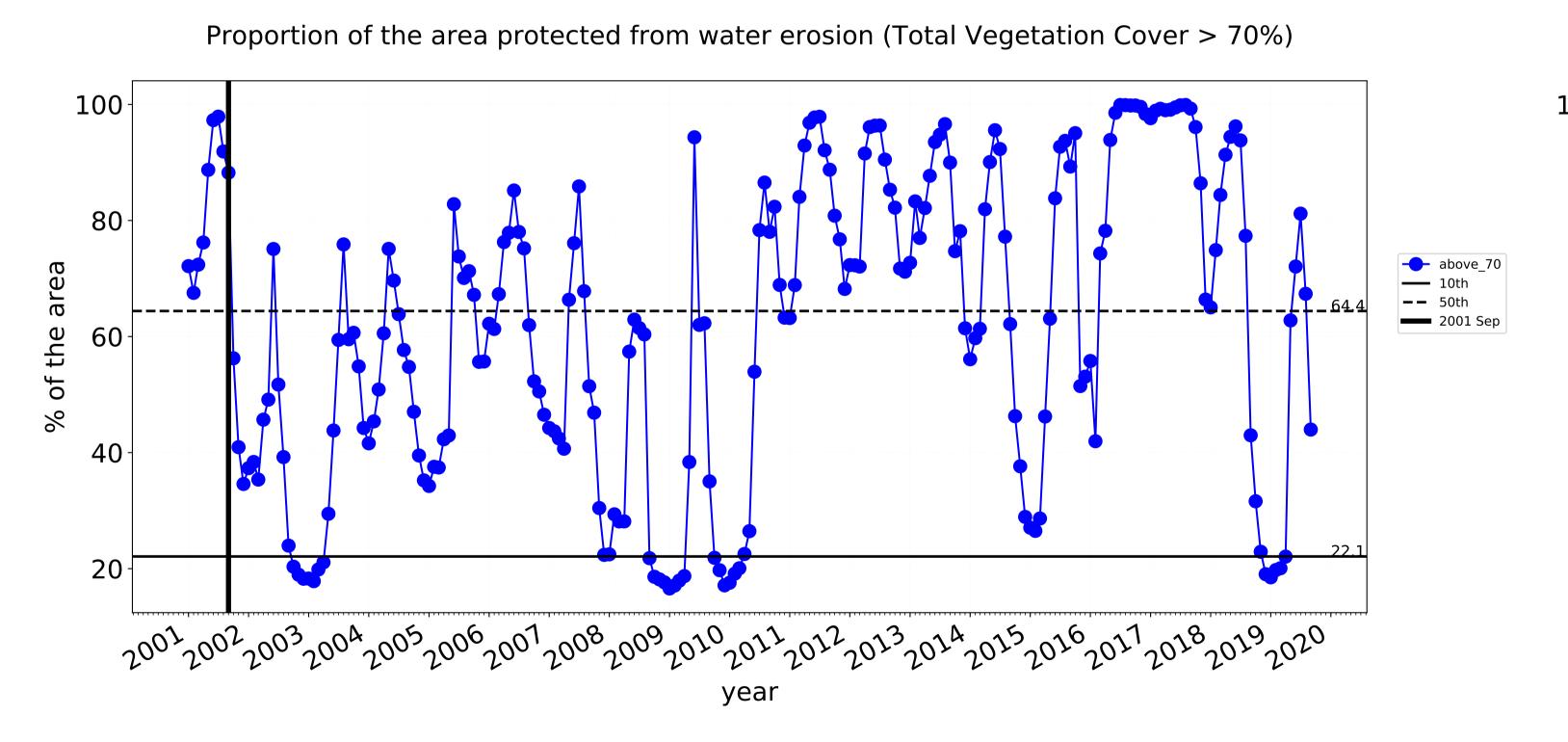


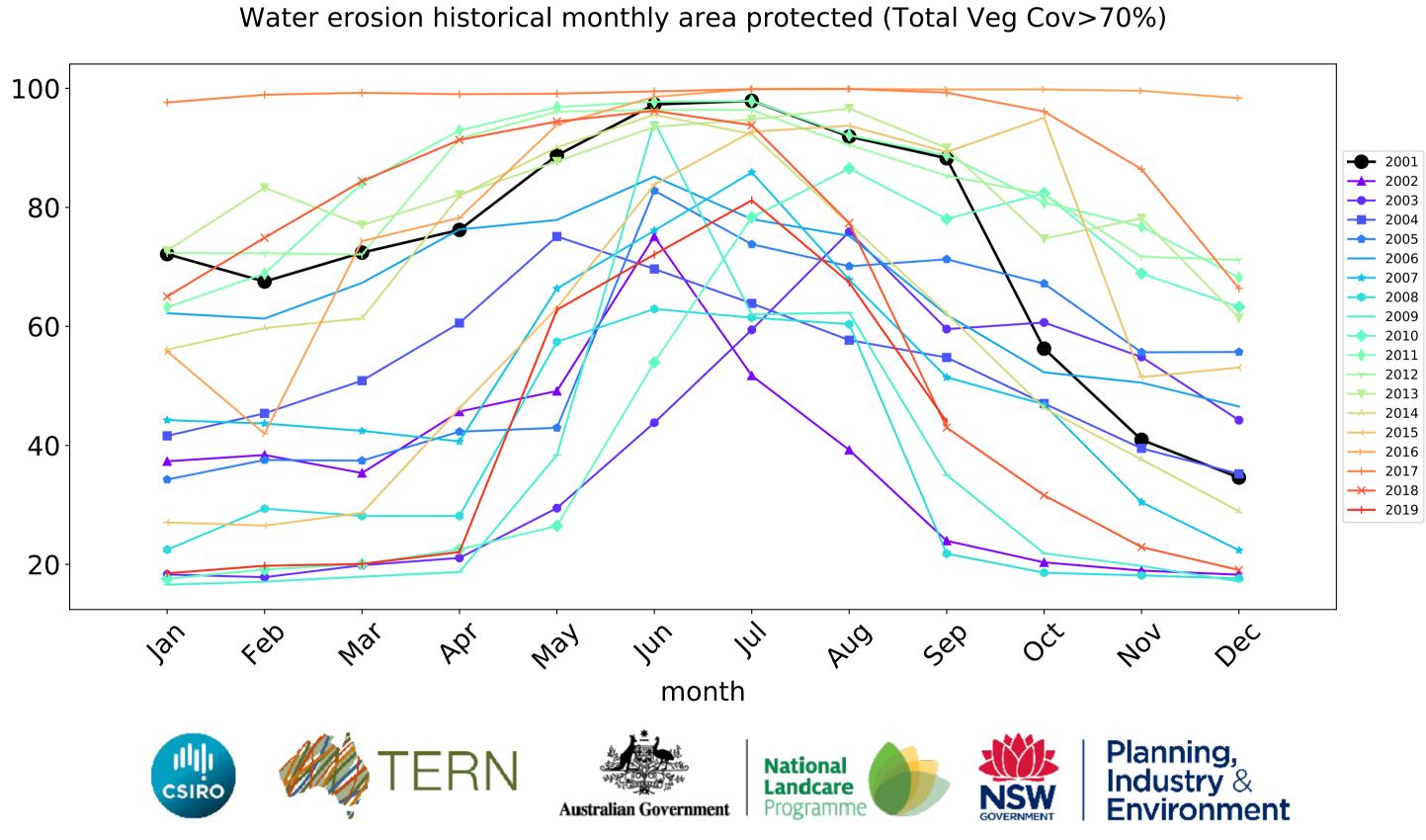


### **Conservation and natural environments non forest timeseries**

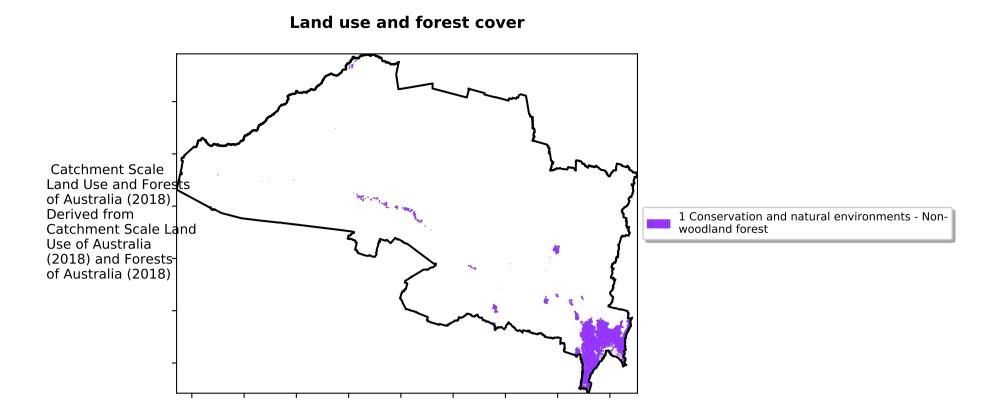




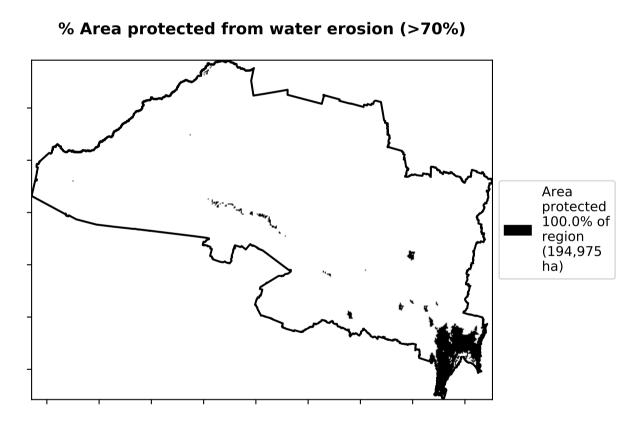


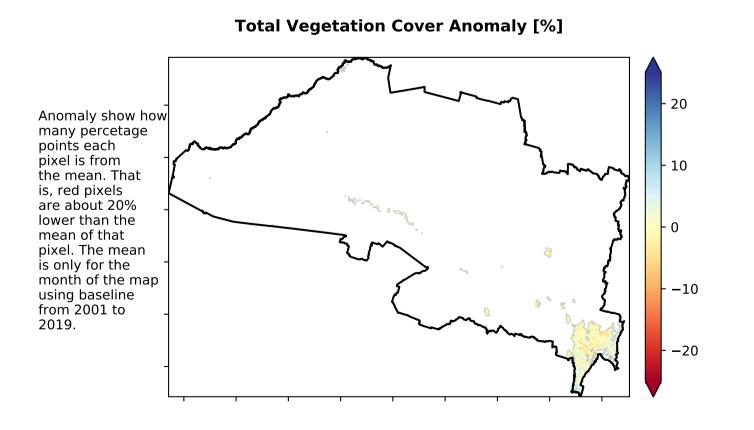


### **Conservation and natural environments Forest (non woodland)**

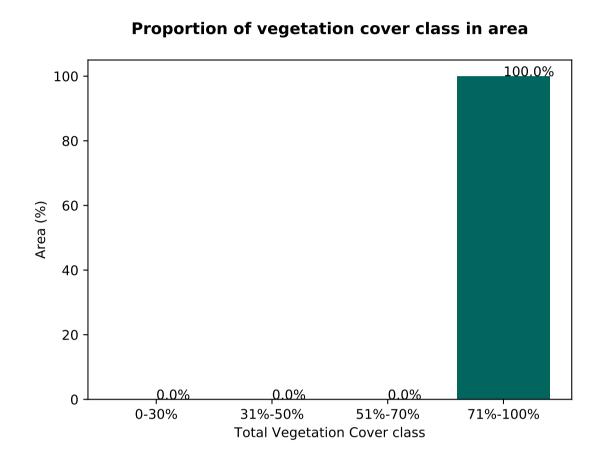


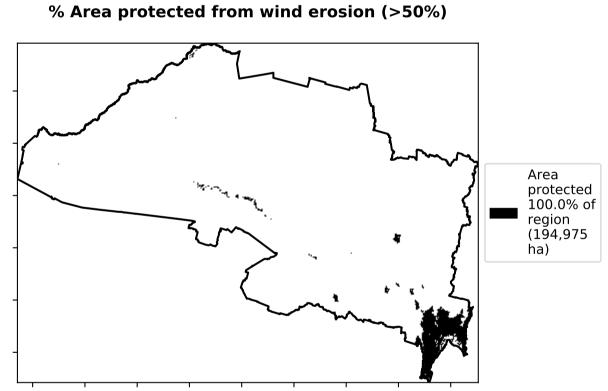
## Total Vegetation Cover [%] Tuelor Indeled Tu

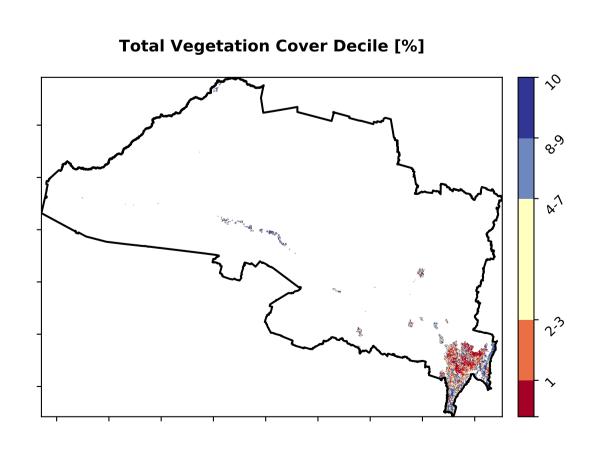




### Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.









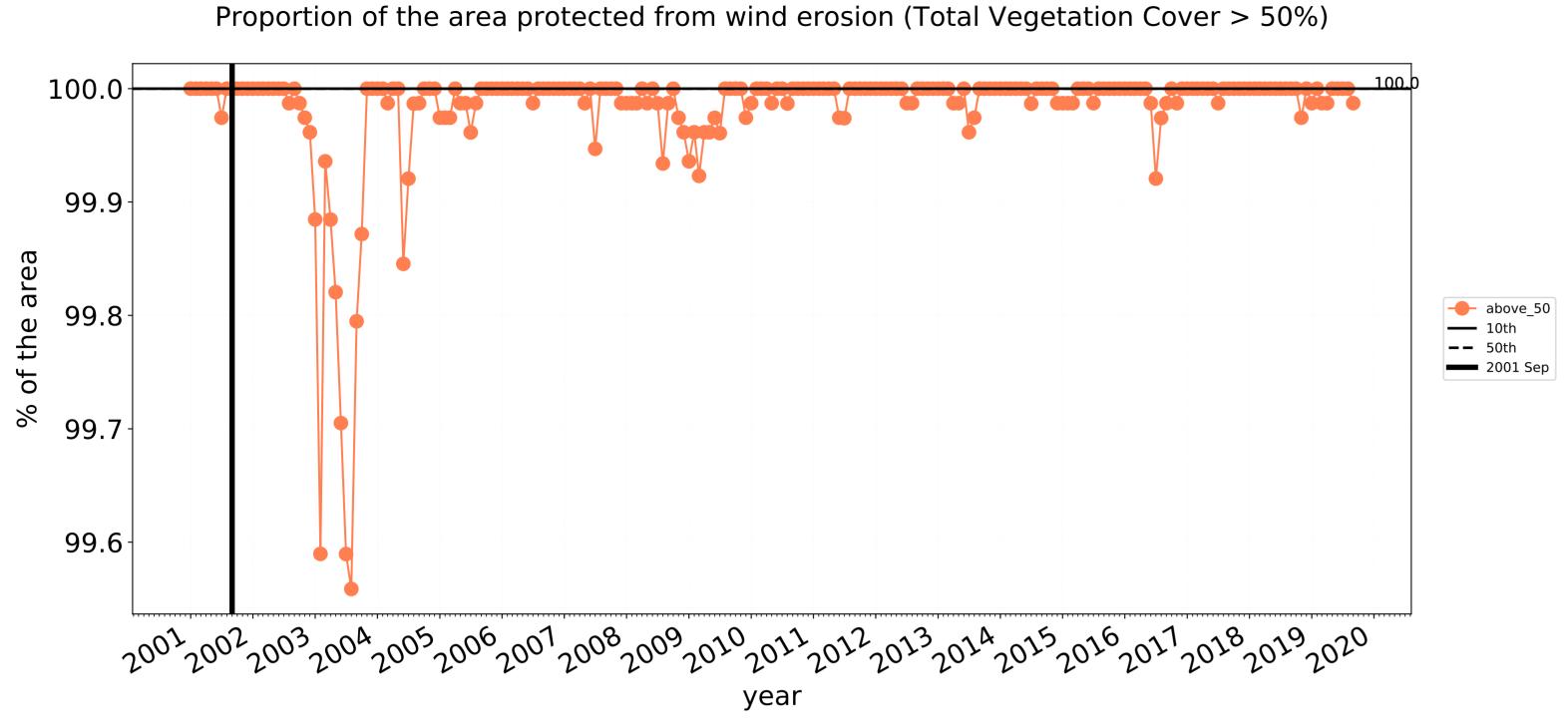


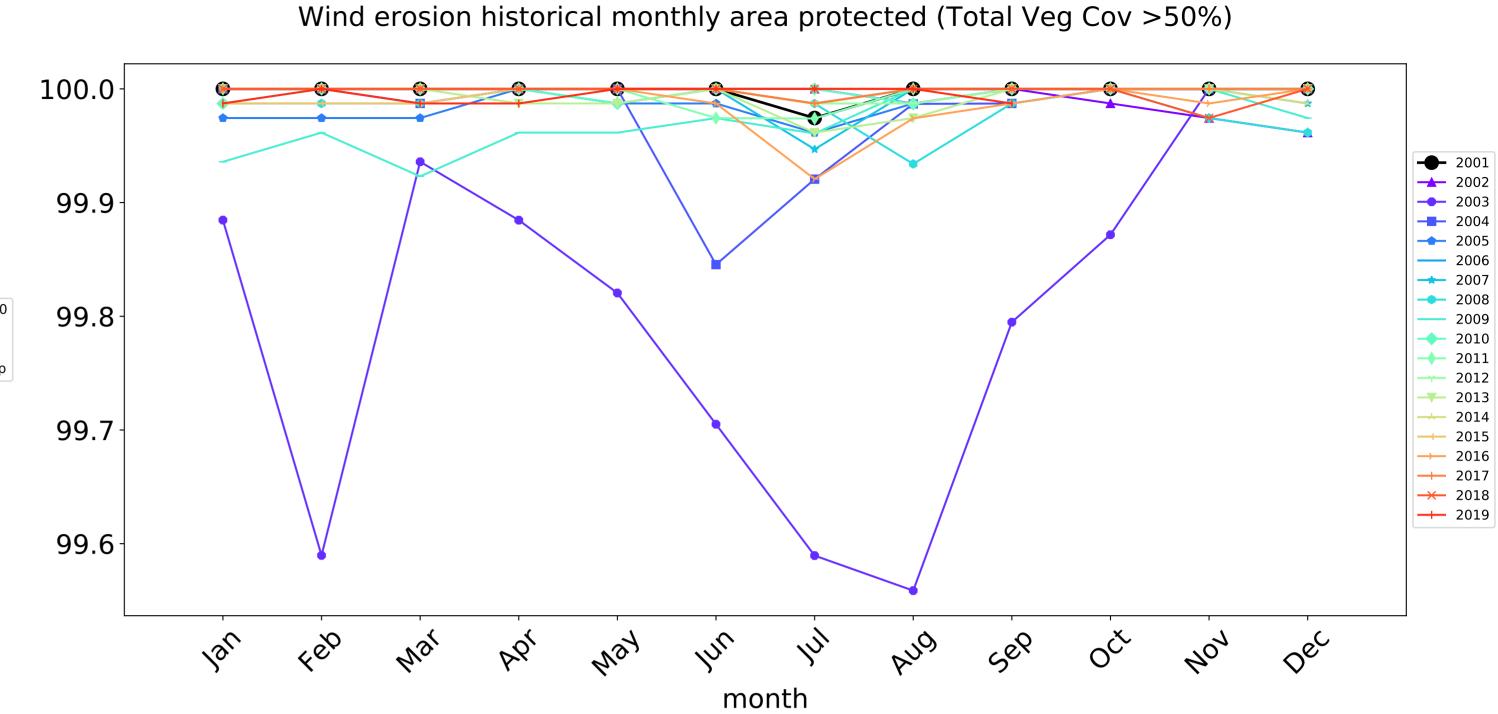


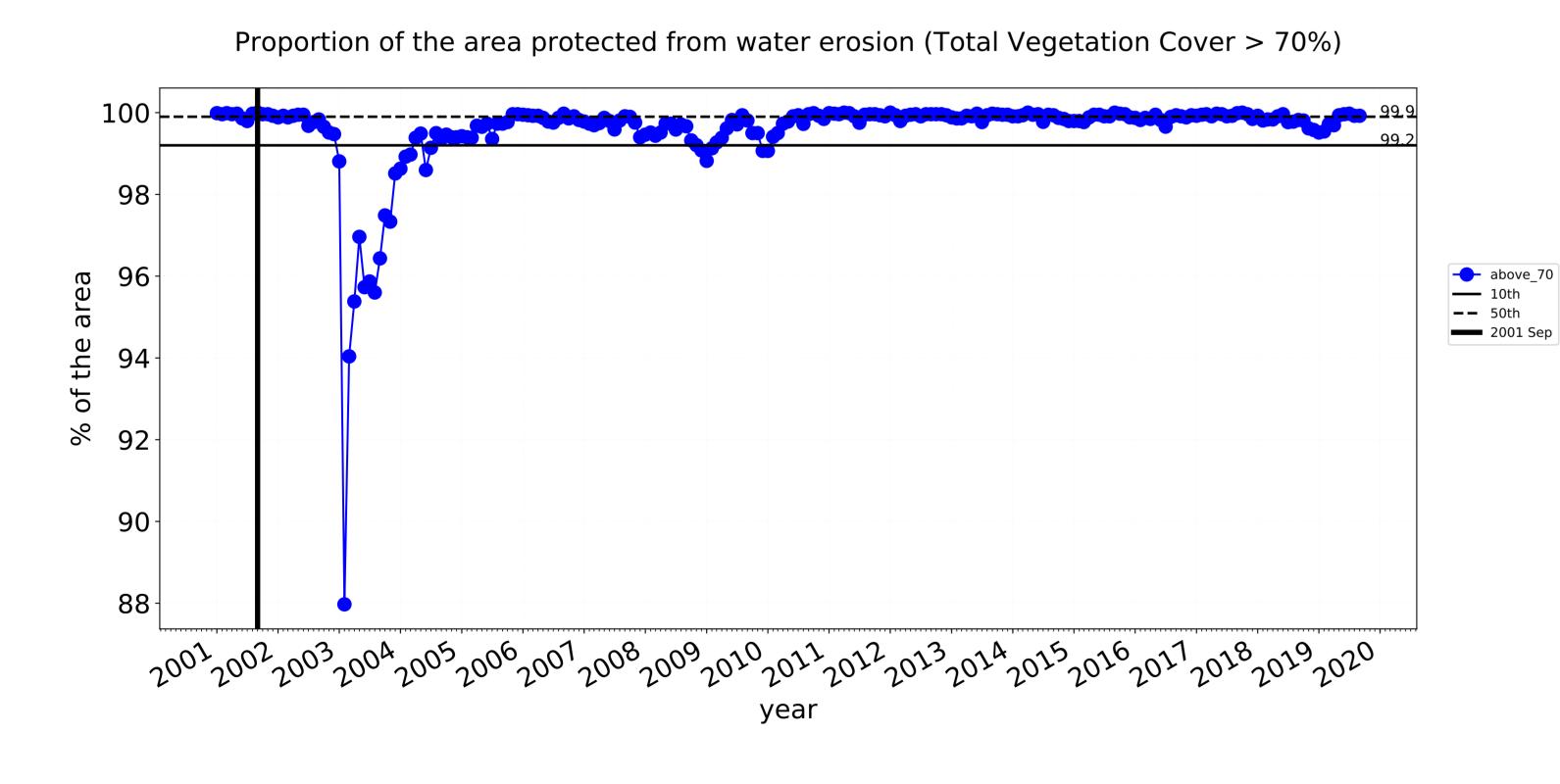


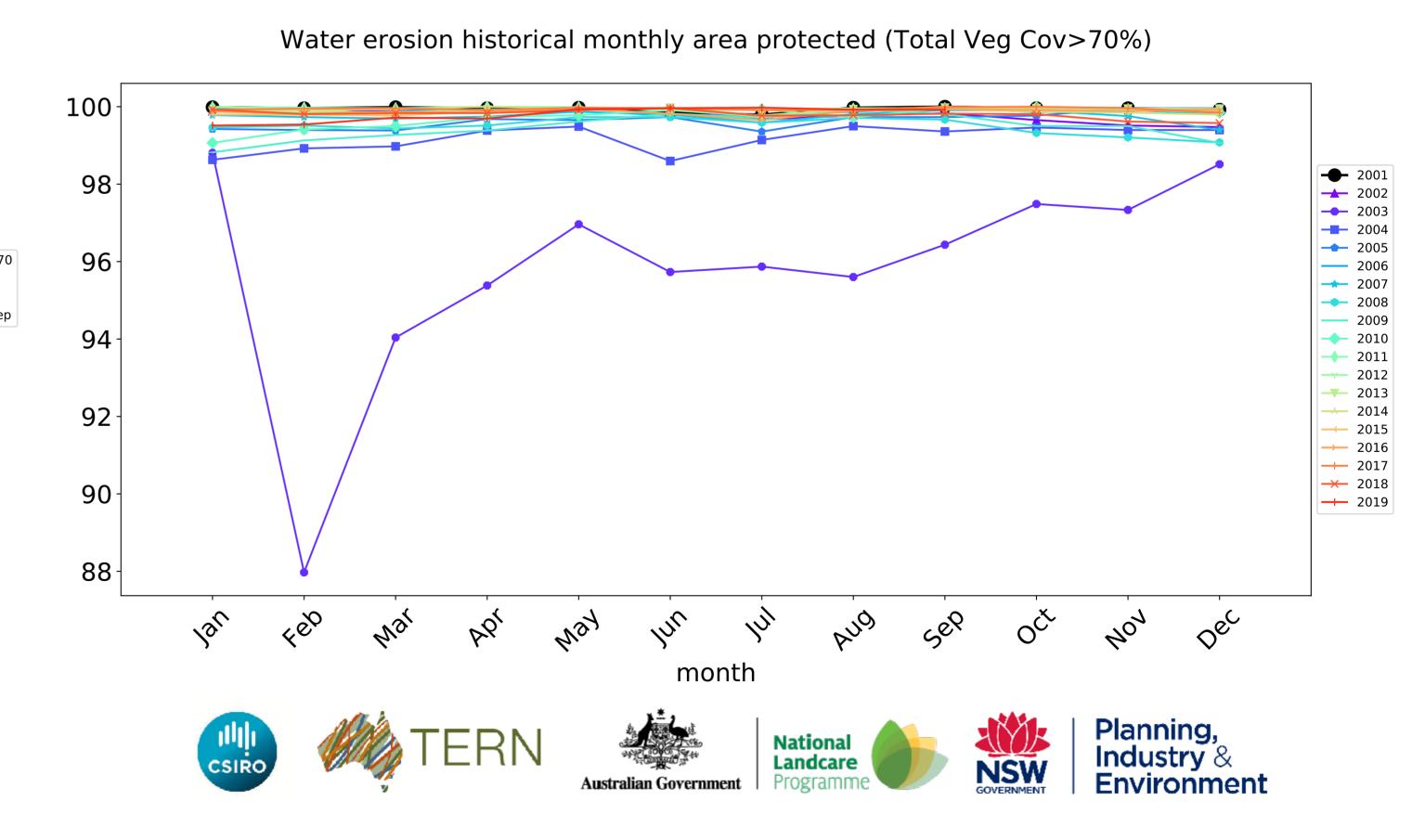








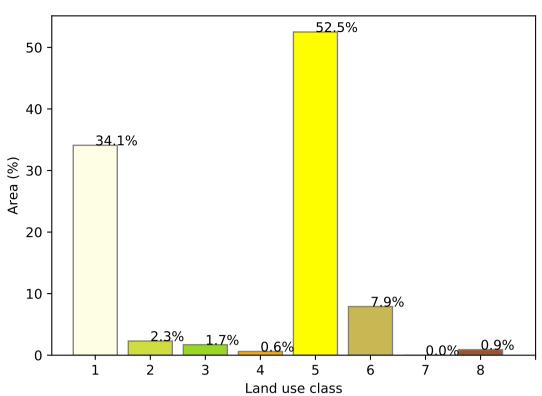




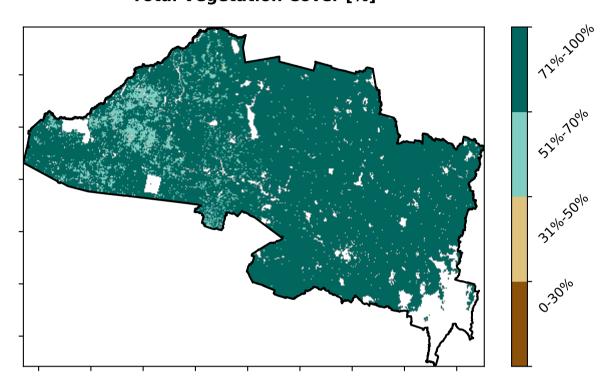
### **Agriculture**

### Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) a Agriculture - Grazing - Non-woodland forest b Agriculture - Grazing - Non-woodland forest catchment Scale Land Use of Australia (2018) a Agriculture - Grazing - Non-woodland forest b Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest b Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest b Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest b Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest b Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Grazing - Non-woodland forest catchment Scale a Agriculture - Gr

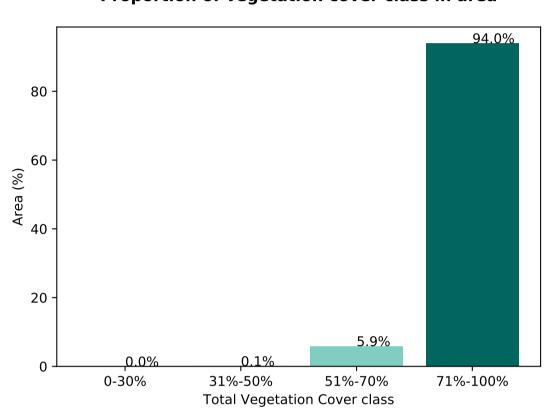
### Proportion of each land class in area



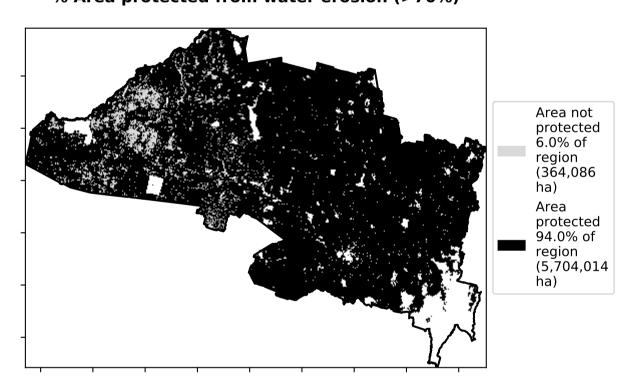
### **Total Vegetation Cover [%]**



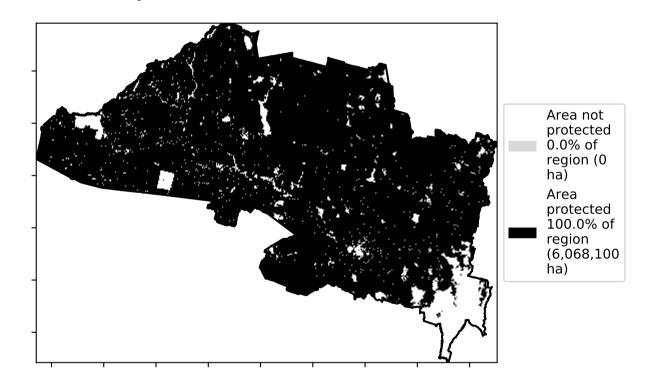
Proportion of vegetation cover class in area



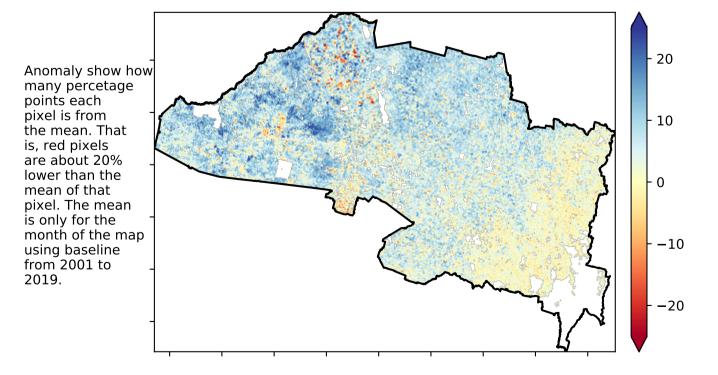
### % Area protected from water erosion (>70%)



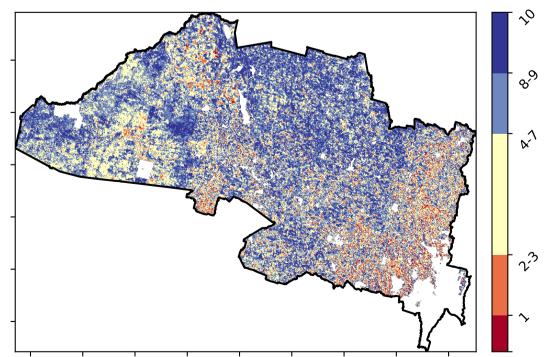
% Area protected from wind erosion (>50%)



### **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.







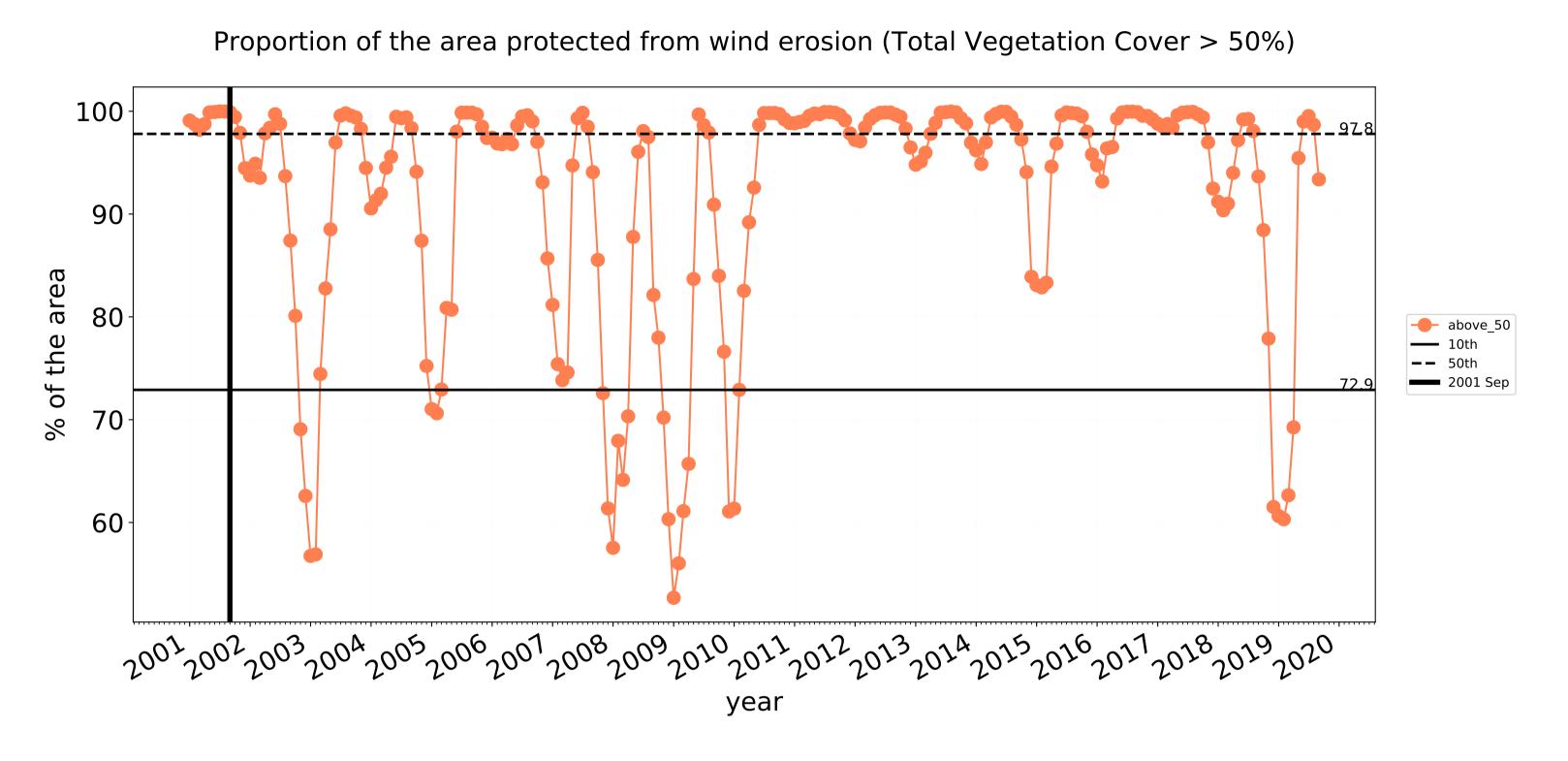


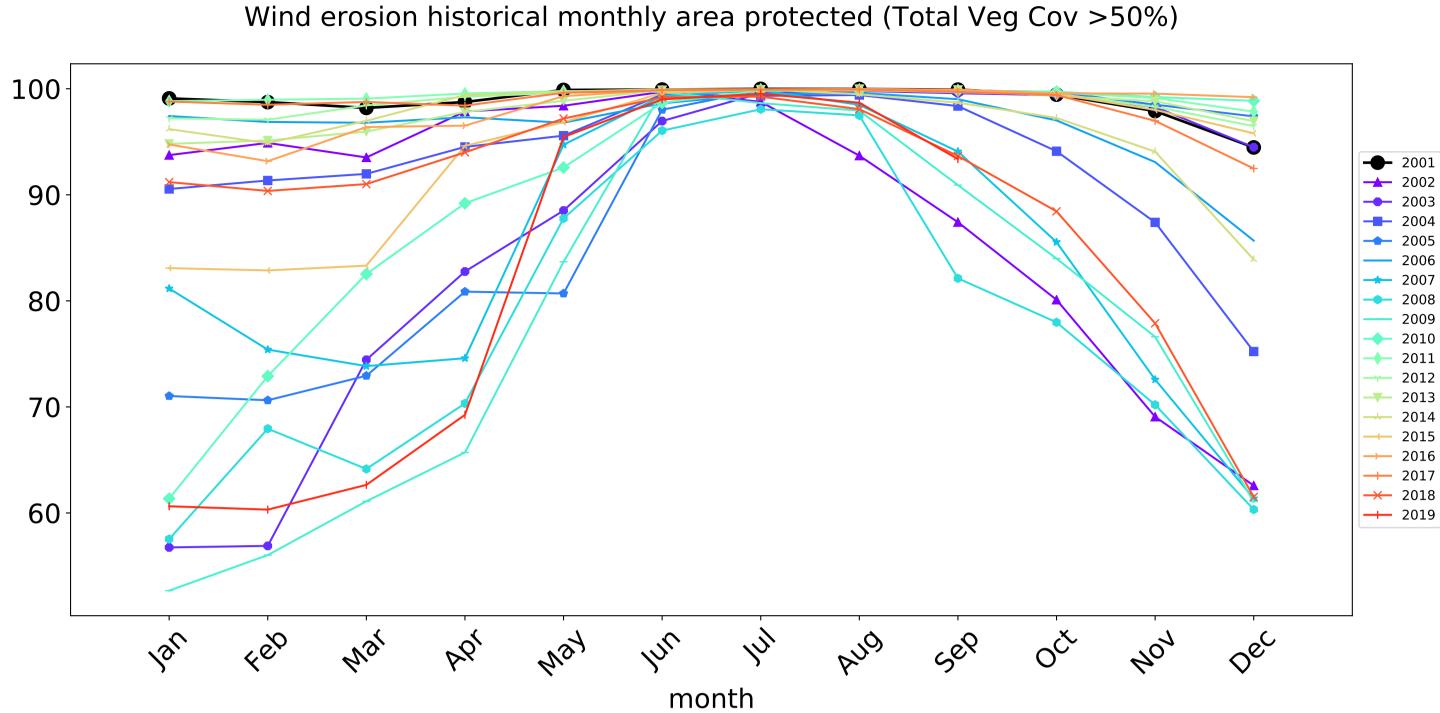


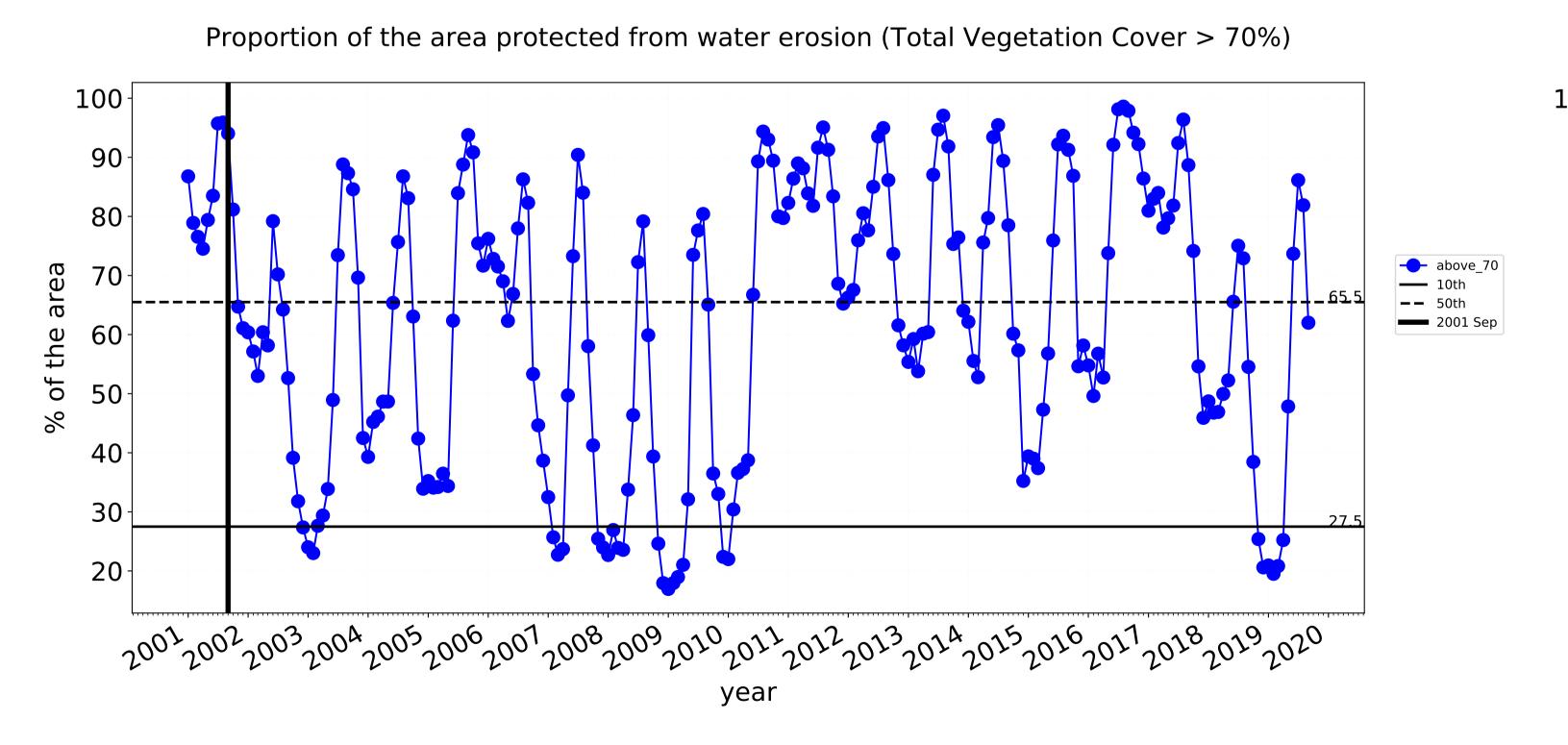


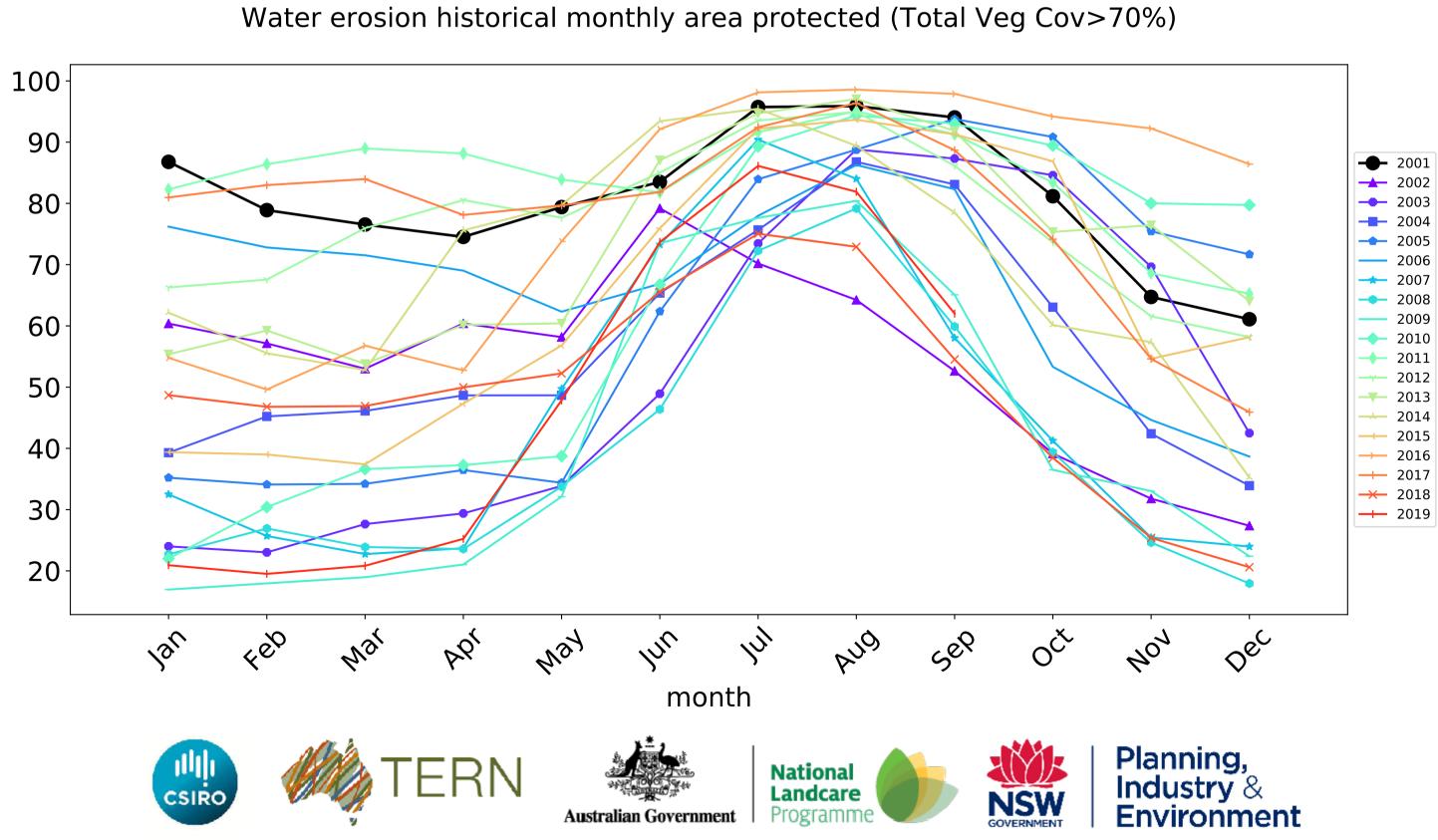


### **Agriculture timeseries**





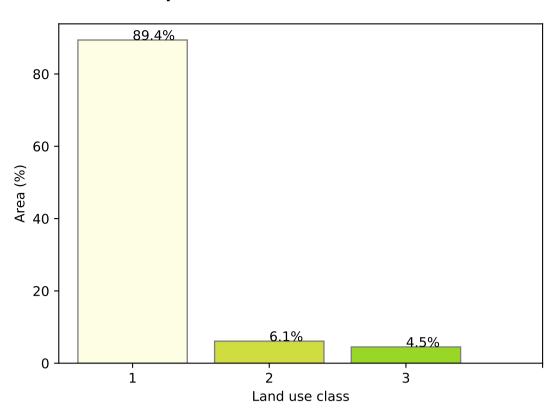




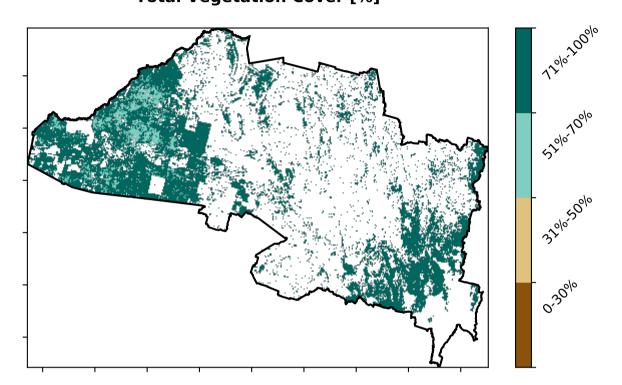
### **Grazing**

### Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest Catchment Scale Land Use of Australia (2018) and Forests-of Australia (2018) 3 Agriculture - Grazing - Non-woodland forest

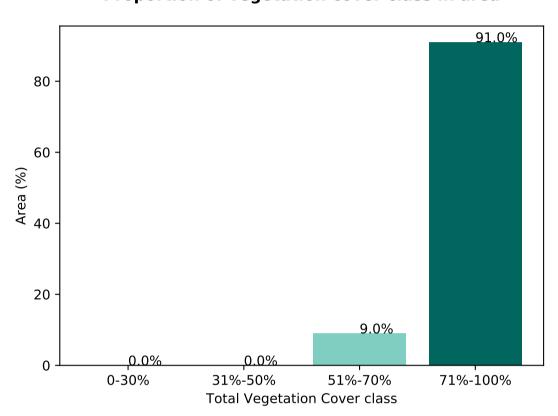
### Proportion of each land class in area



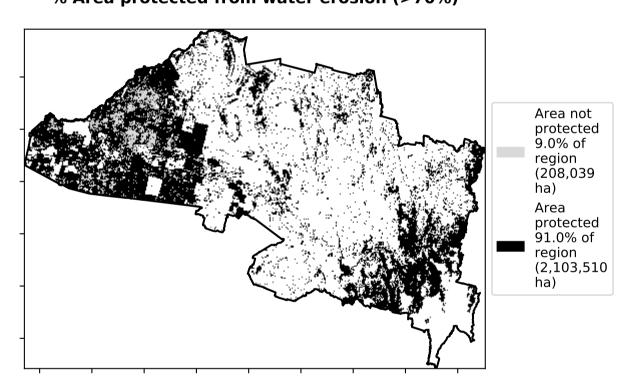
**Total Vegetation Cover [%]** 



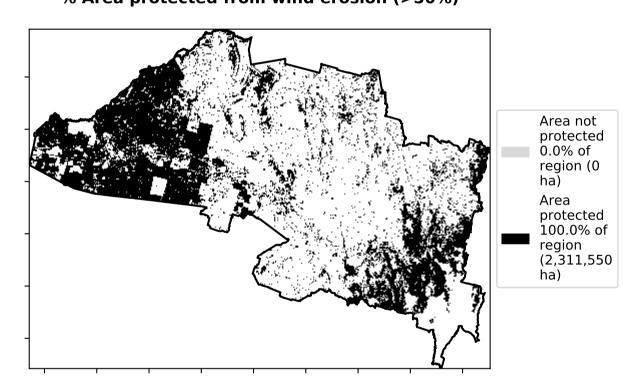
**Proportion of vegetation cover class in area** 



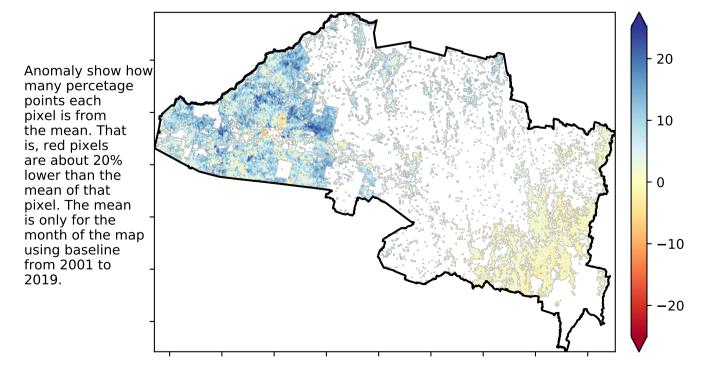
### % Area protected from water erosion (>70%)



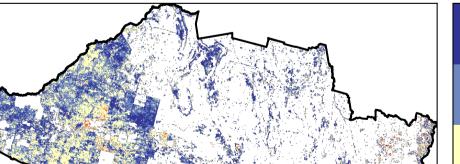
% Area protected from wind erosion (>50%)

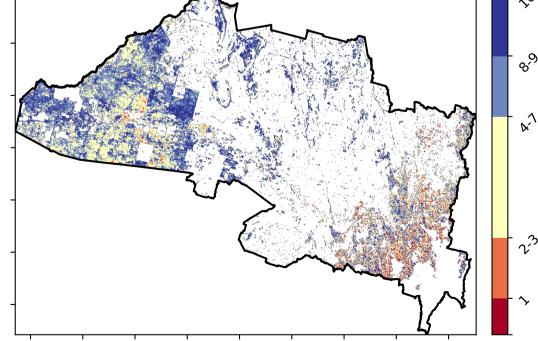


### **Total Vegetation Cover Anomaly [%]**



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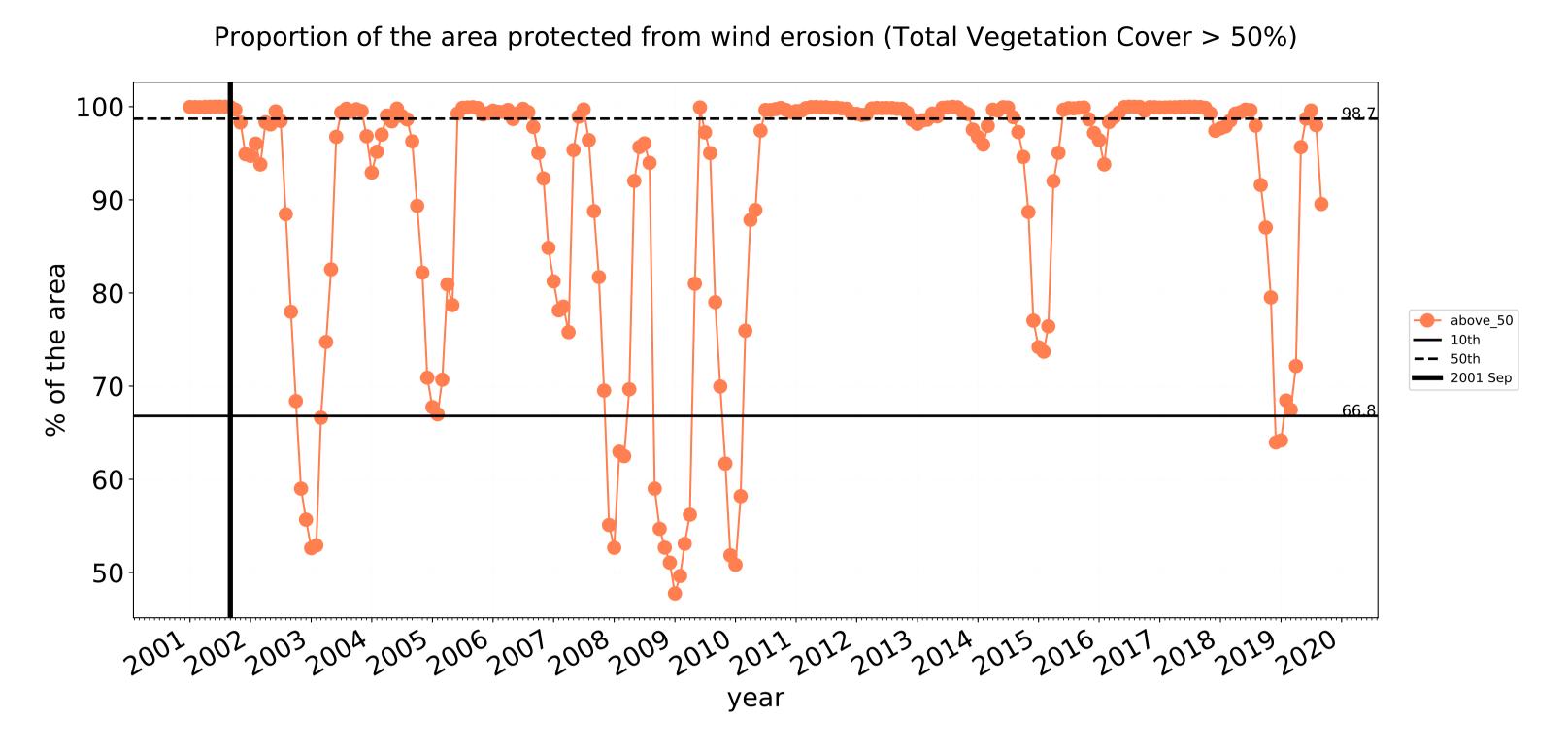


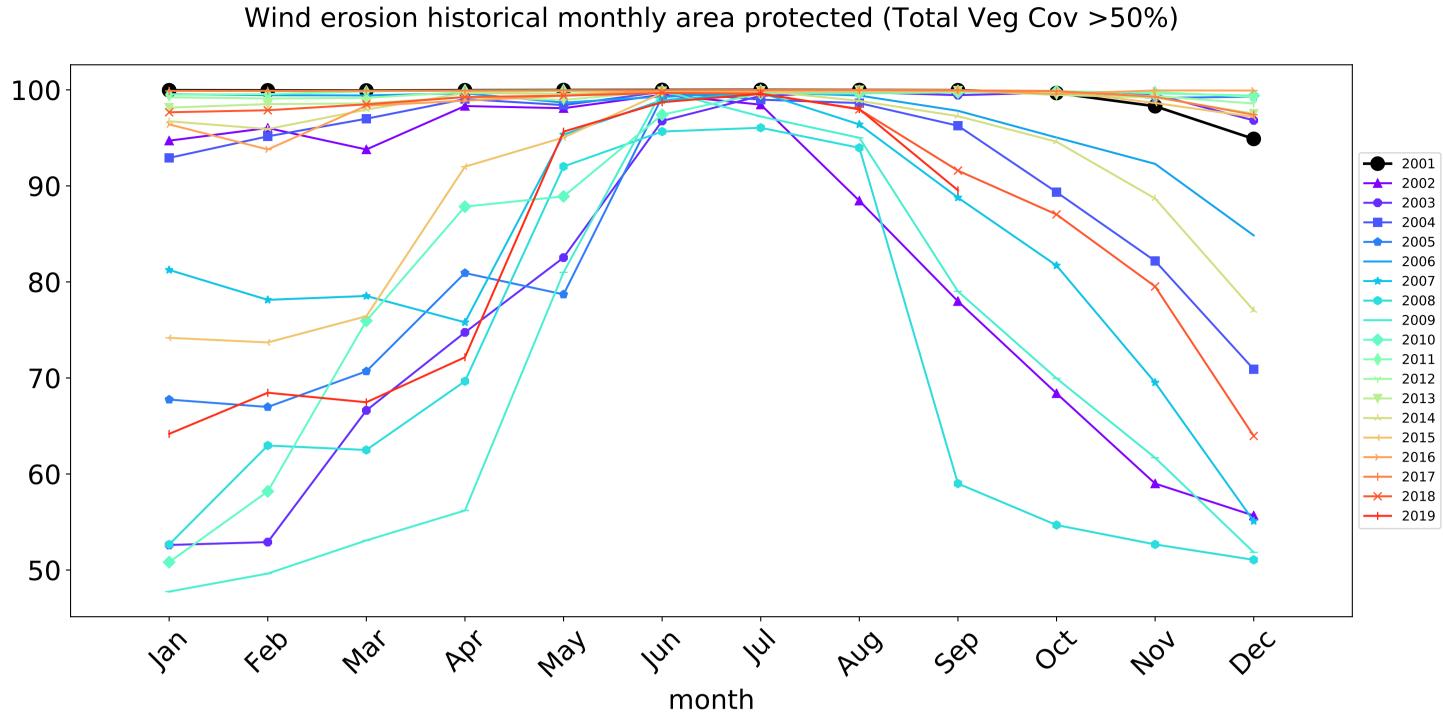


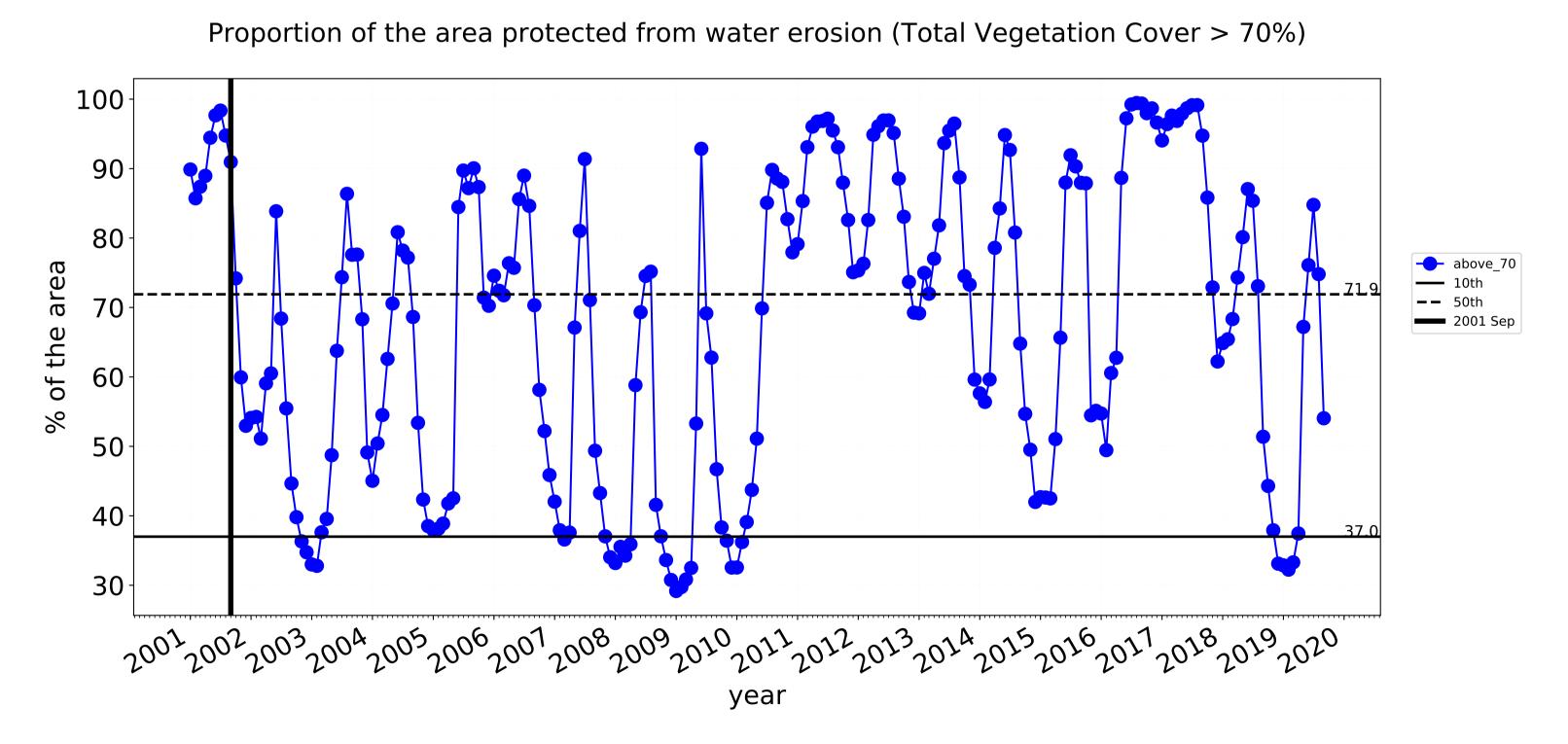


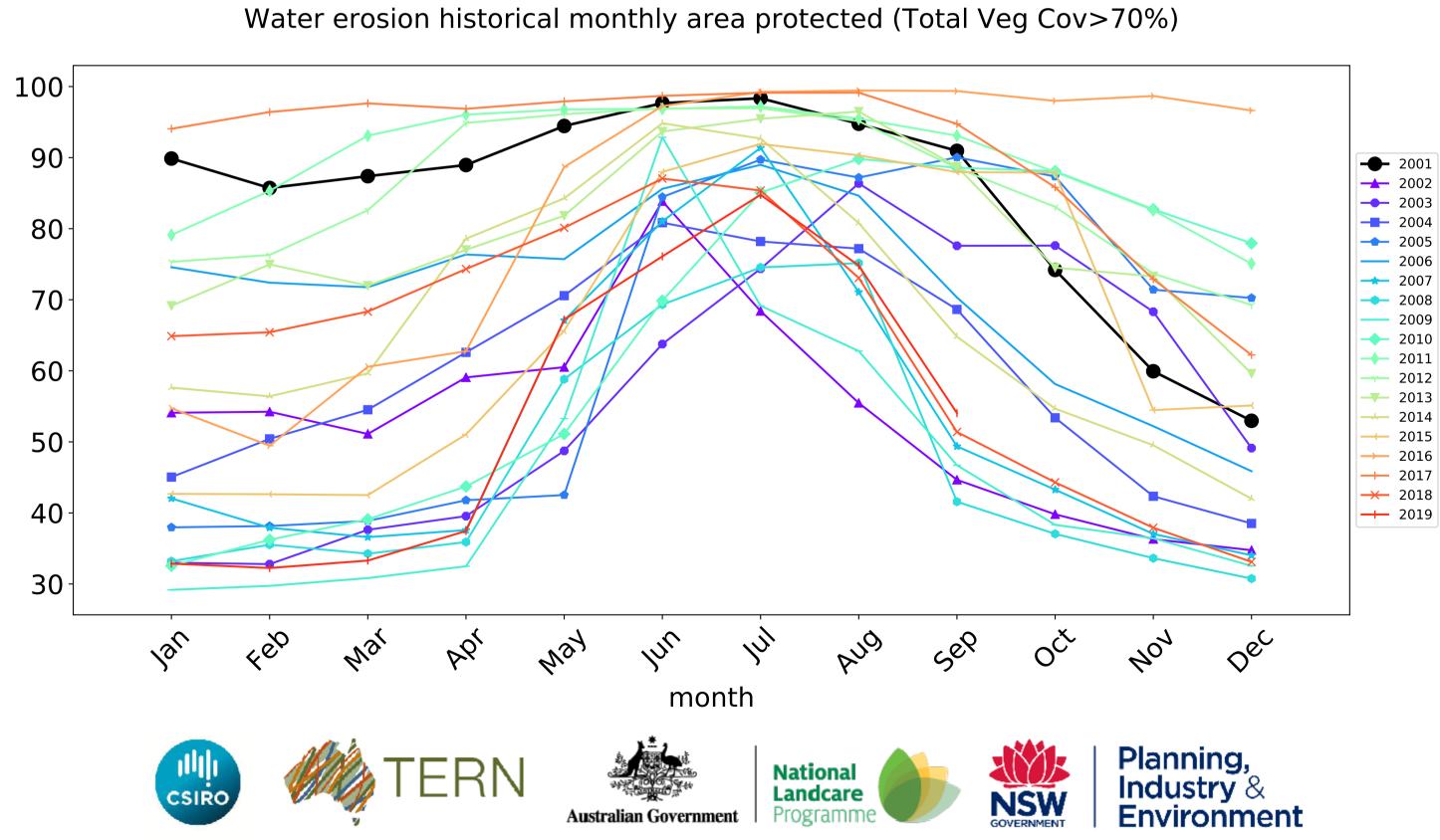


### **Grazing timeseries**



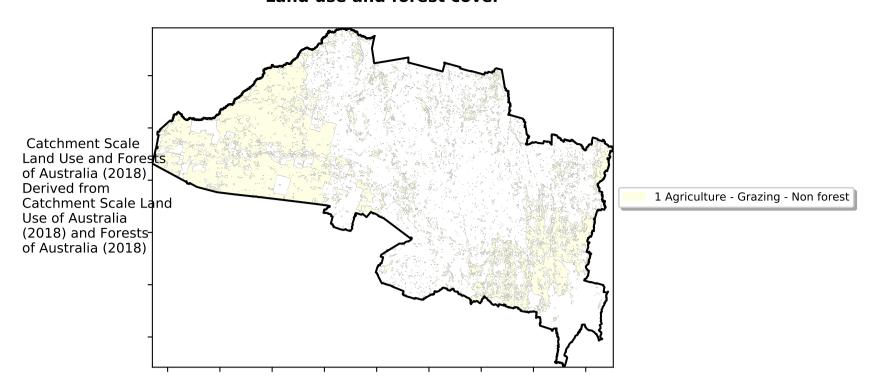




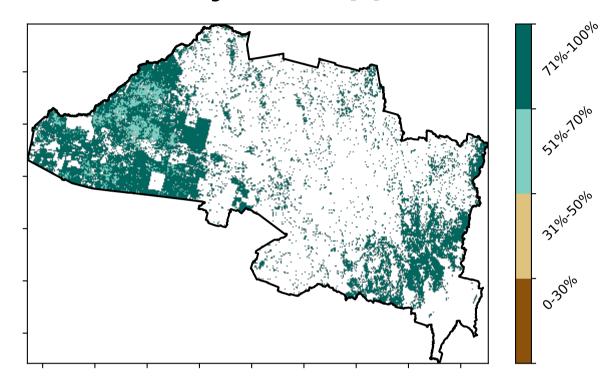


### **Grazing non forest**

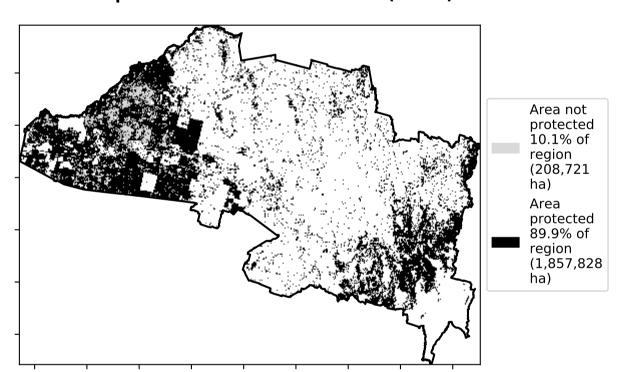
### Land use and forest cover



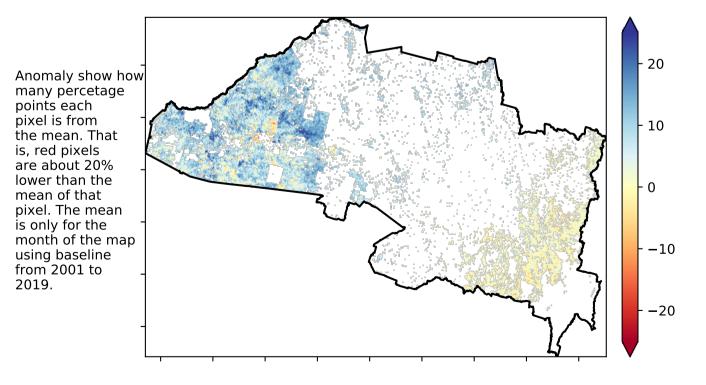
### **Total Vegetation Cover [%]**



### % Area protected from water erosion (>70%)

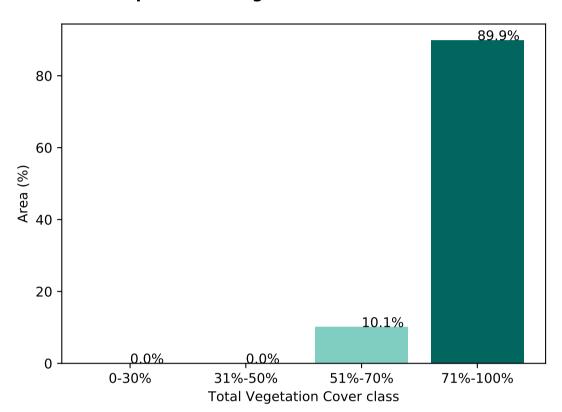


### Total Vegetation Cover Anomaly [%]

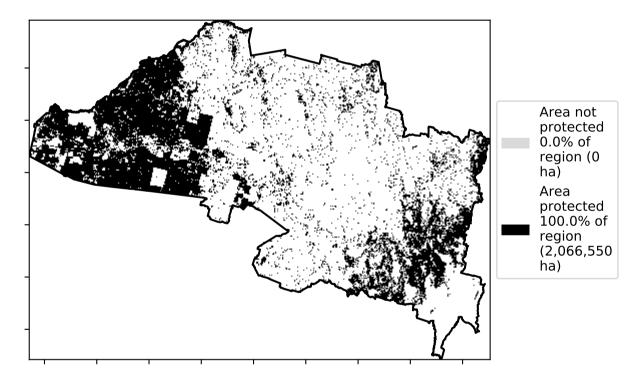


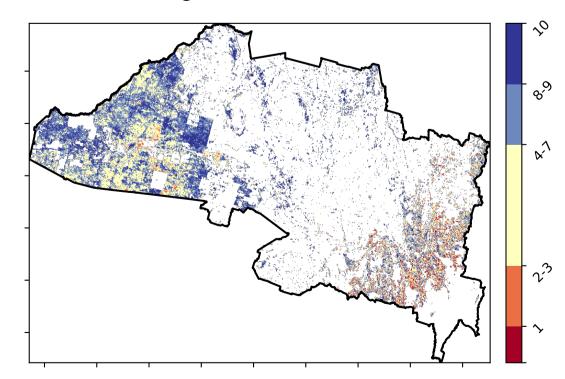
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### Proportion of vegetation cover class in area



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









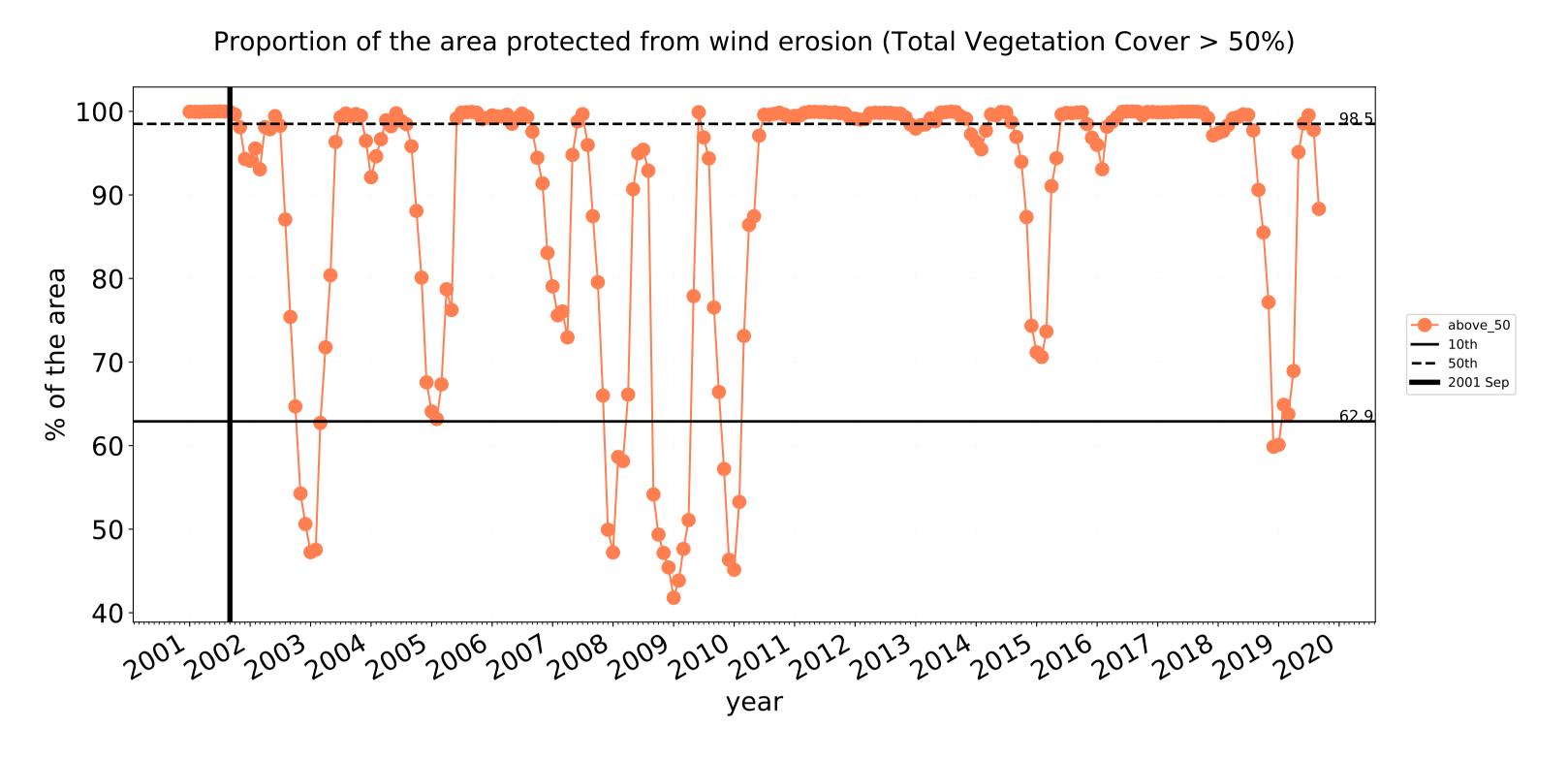


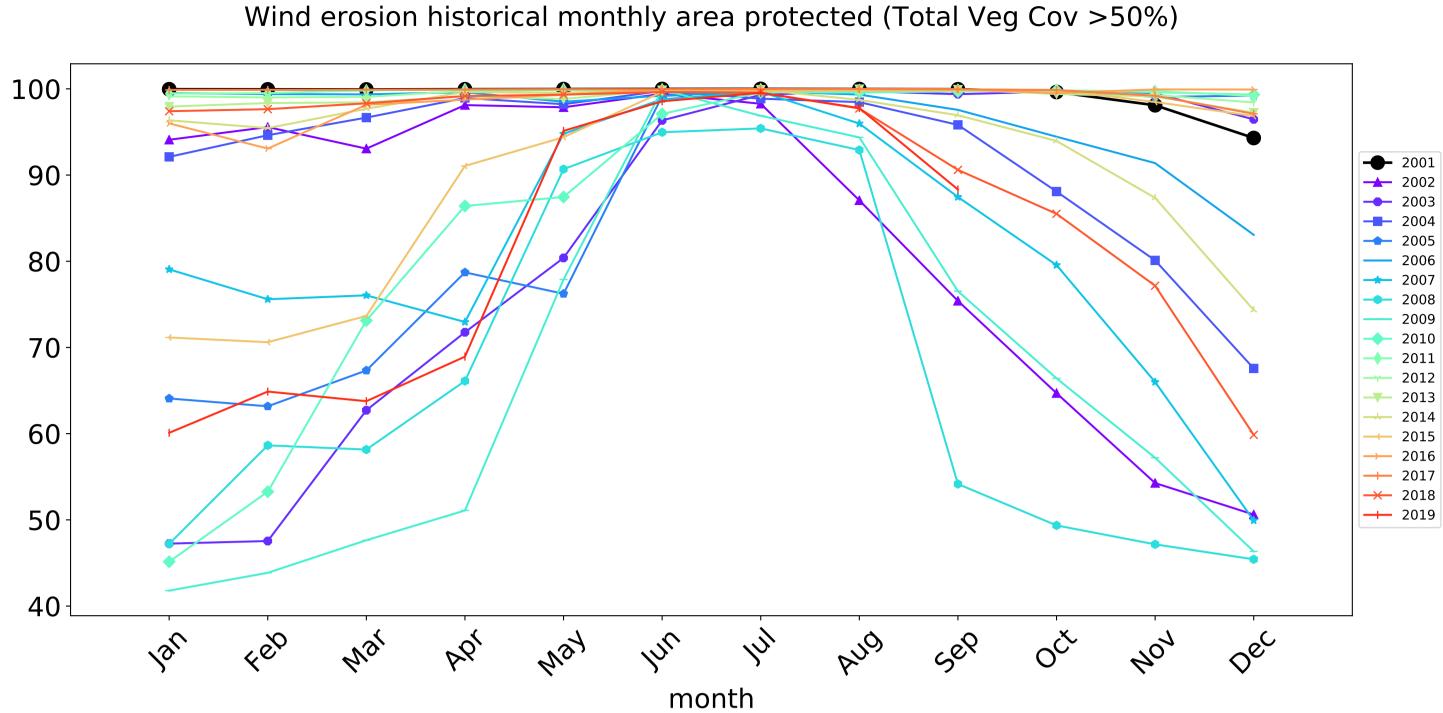


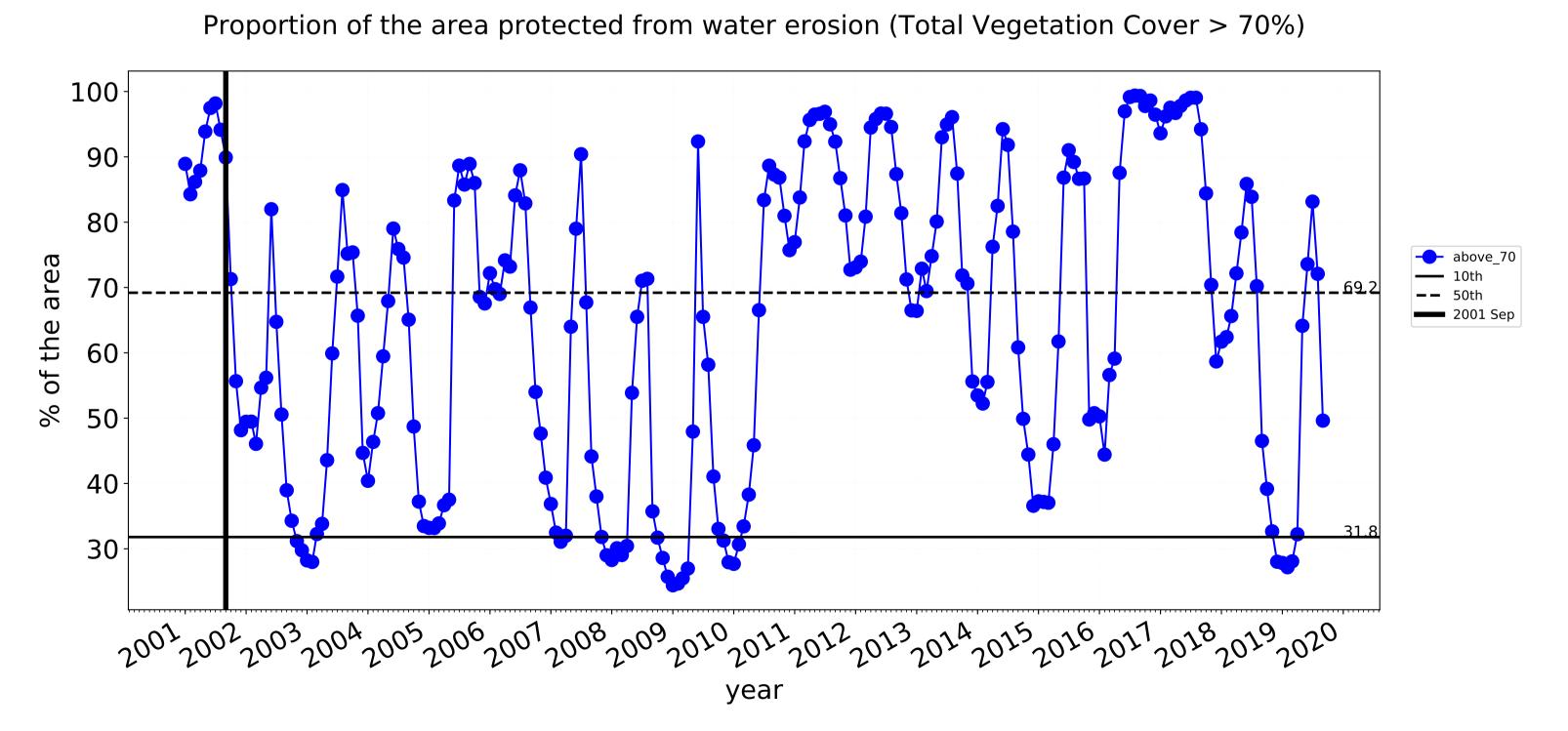


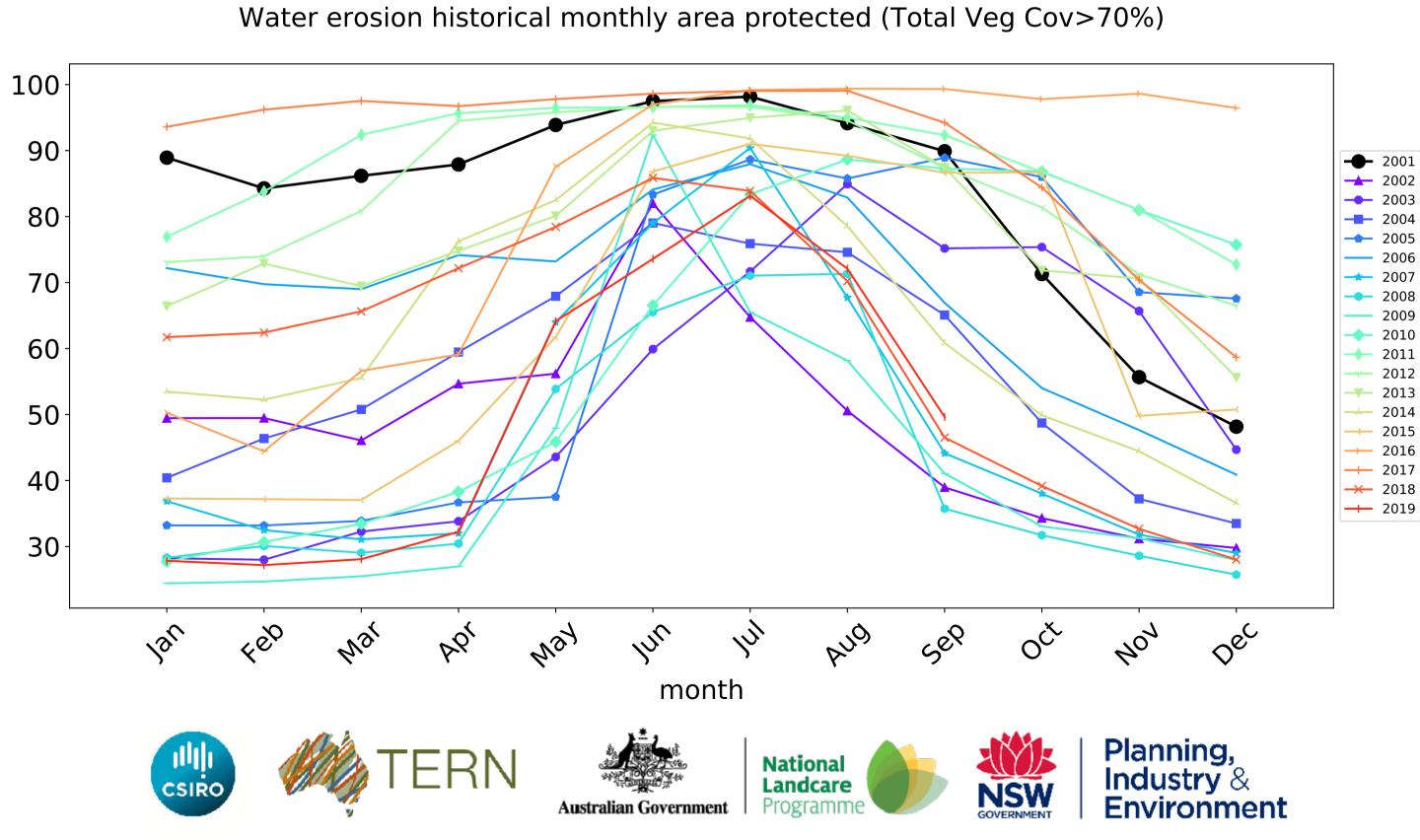


### **Grazing non forest timeseries**



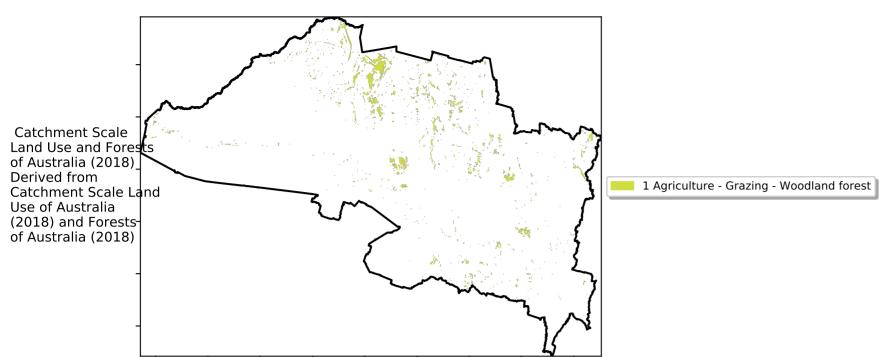




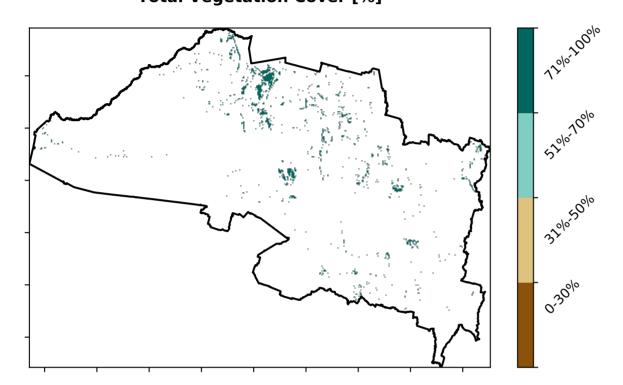


### **Grazing Woodland forest**

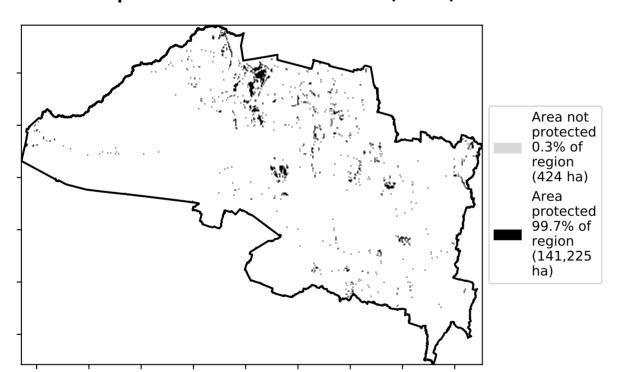
### Land use and forest cover



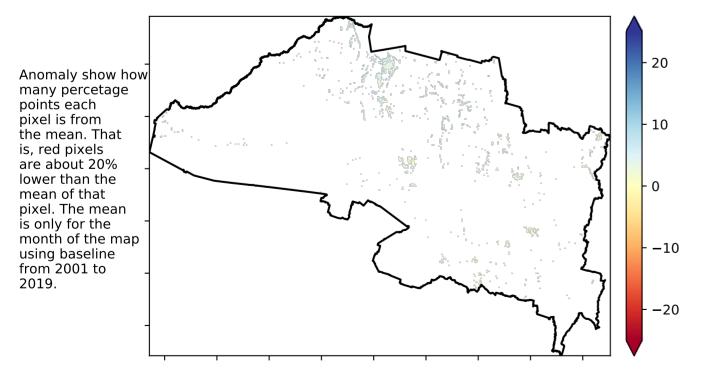
### Total Vegetation Cover [%]



### % Area protected from water erosion (>70%)

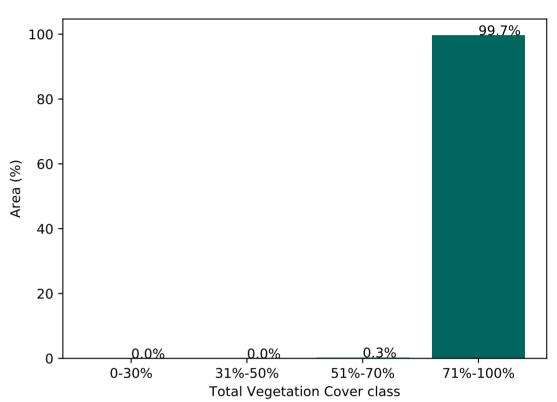


### Total Vegetation Cover Anomaly [%]

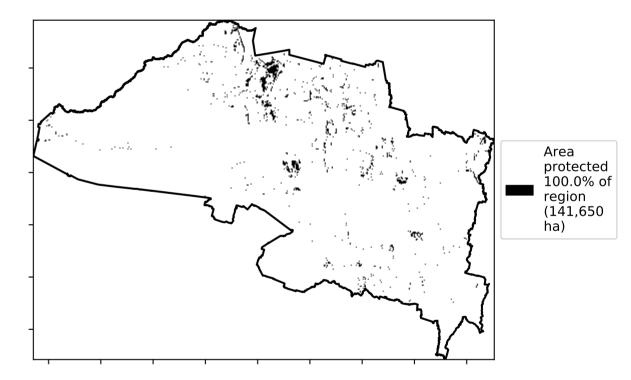


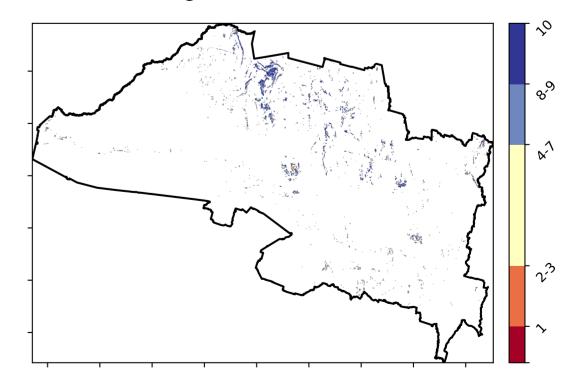
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

### **Proportion of vegetation cover class in area**



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









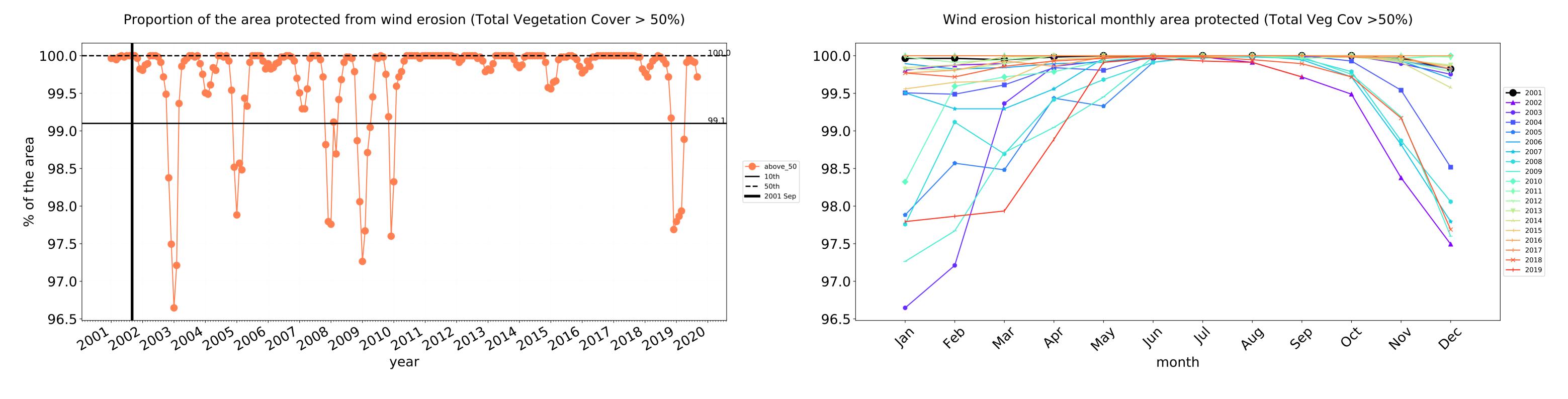


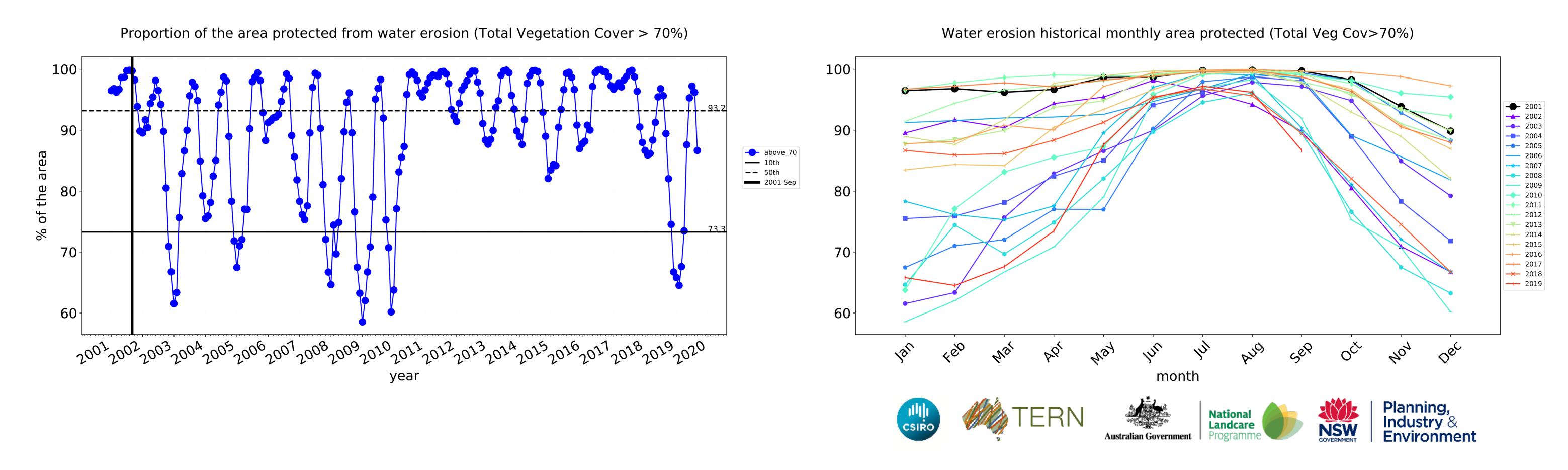






### **Grazing Woodland forest timeseries**



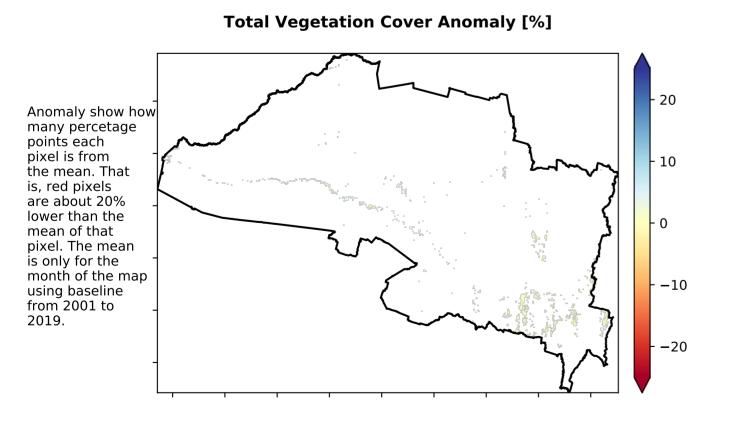


### **Grazing - Forest (non woodland)**

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

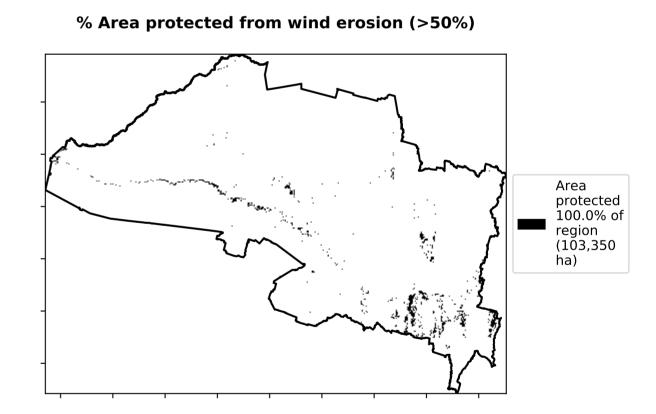
### Total Vegetation Cover [%]

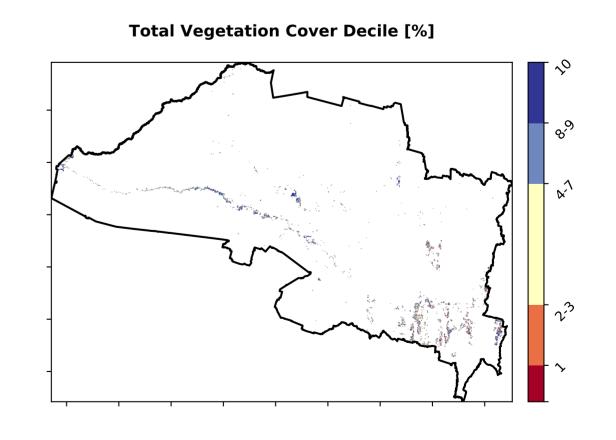
### % Area protected from water erosion (>70%) Area not protected 0.1% of region (103 ha) Area protected 99.9% of region (103,246 ha)



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 vegetation cover class in area 100 - 99.9% 80 - 99.9% 40 - 20 - 0.0% 0.1% 0-30% 31%-50% 51%-70% 71%-100% Total Vegetation Cover class







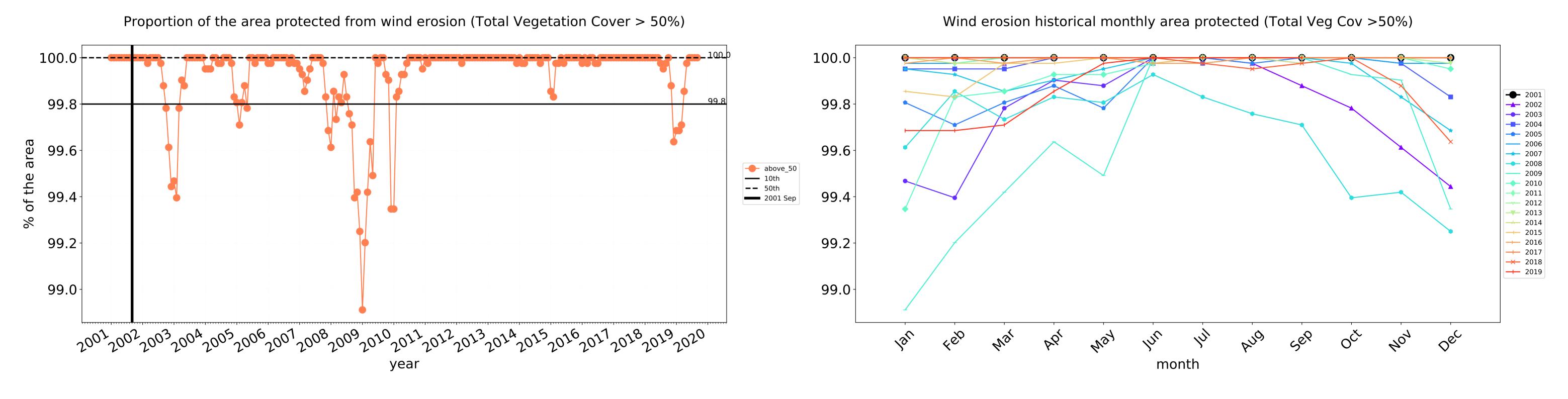


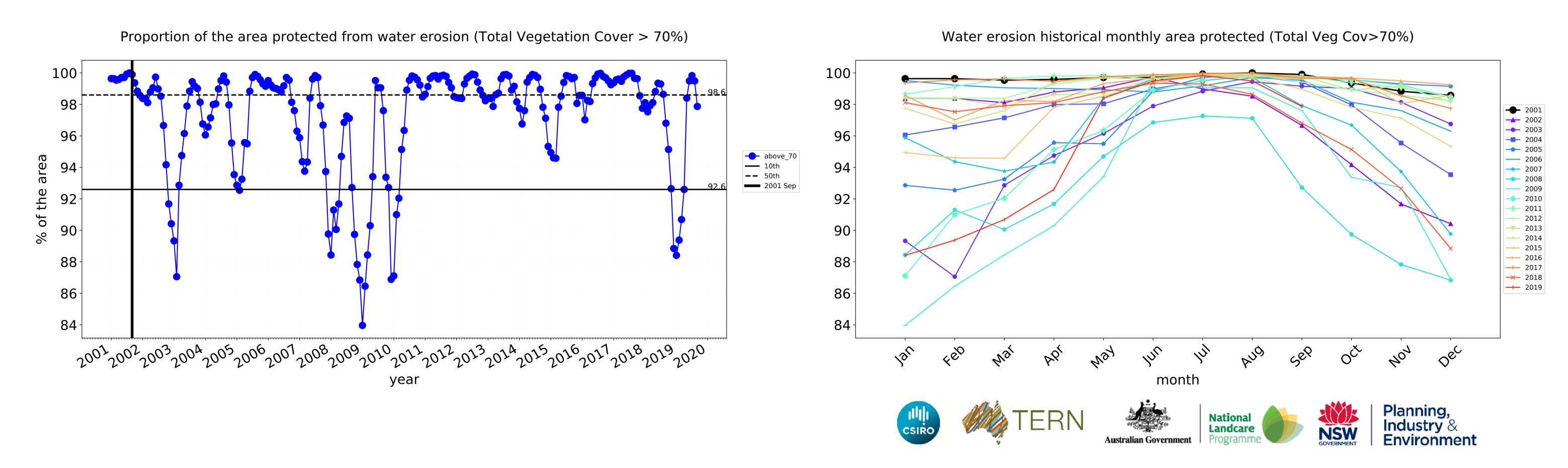






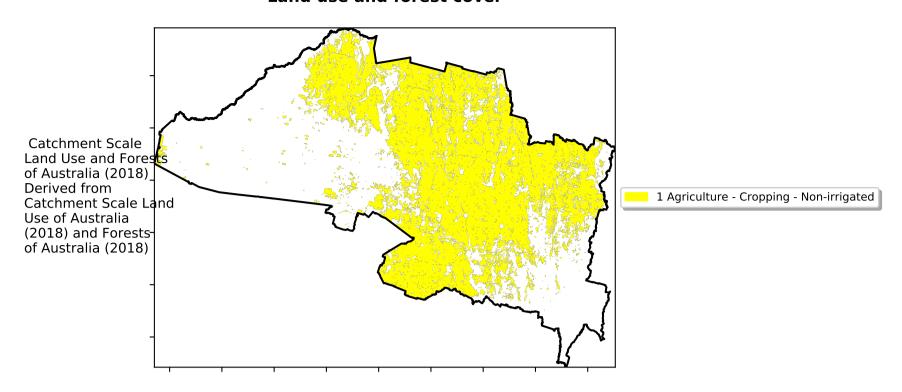




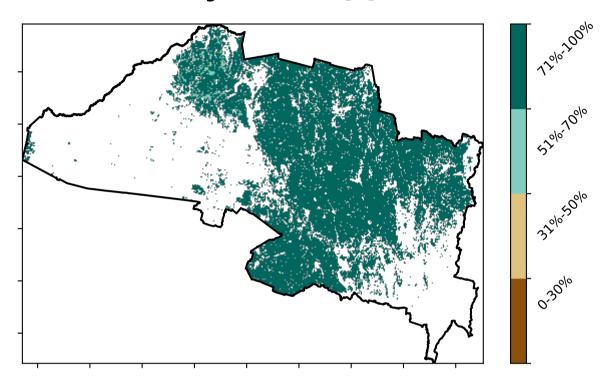


### **Cropping**

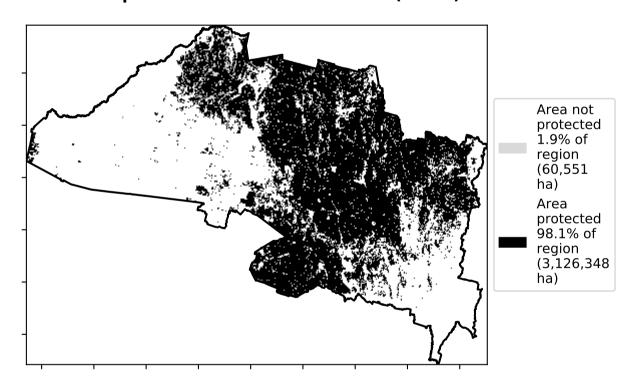
### Land use and forest cover



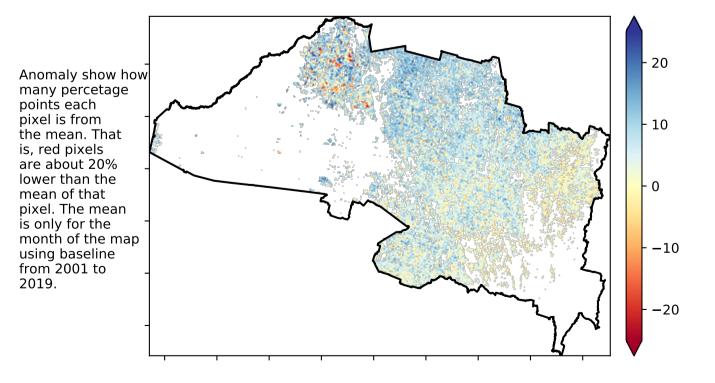
### **Total Vegetation Cover [%]**



### % Area protected from water erosion (>70%)

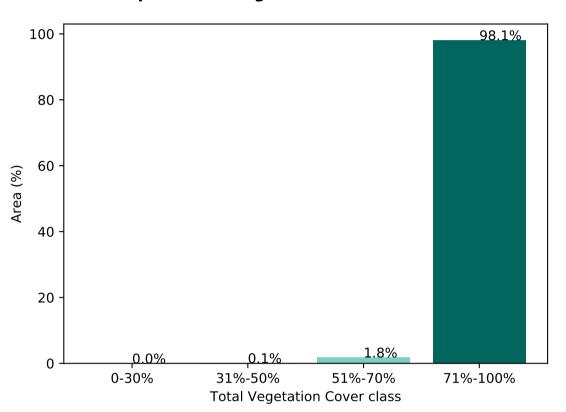


### **Total Vegetation Cover Anomaly [%]**

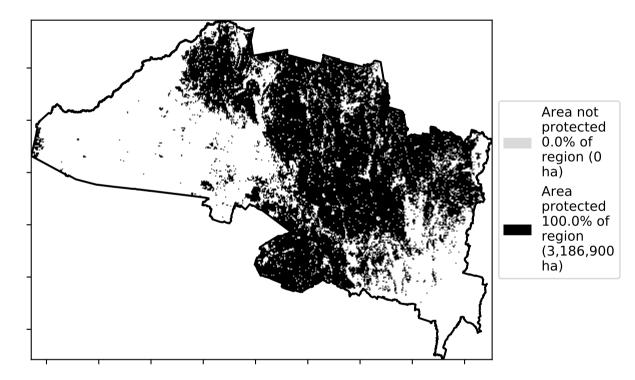


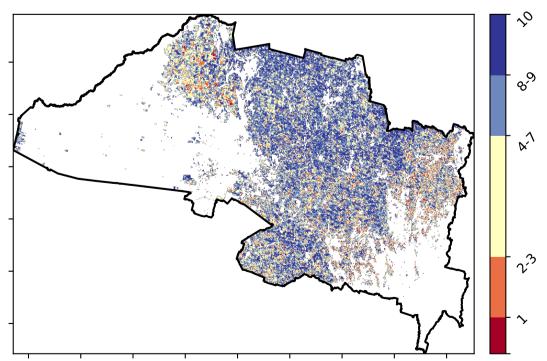
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

### **Proportion of vegetation cover class in area**



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









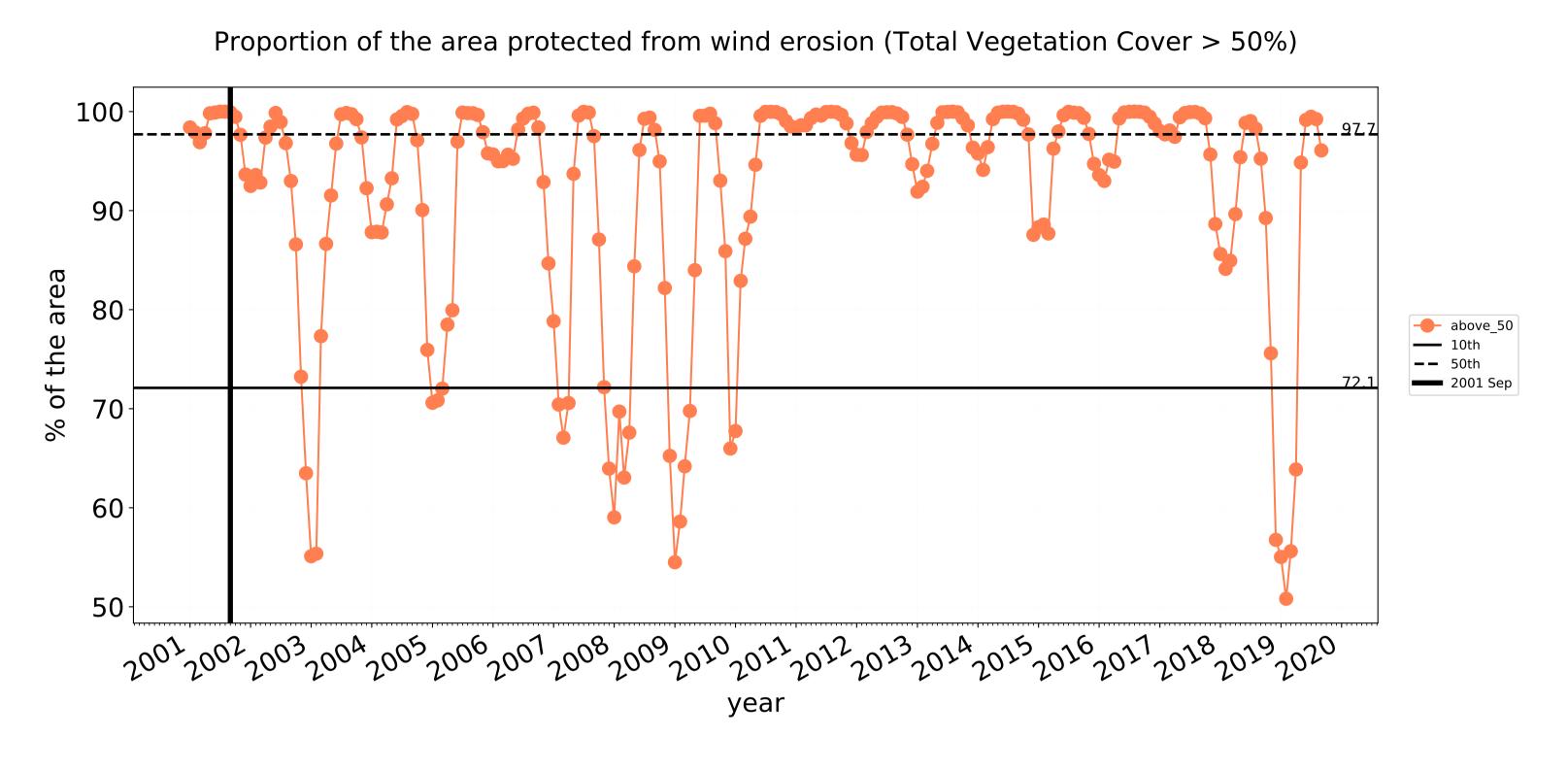


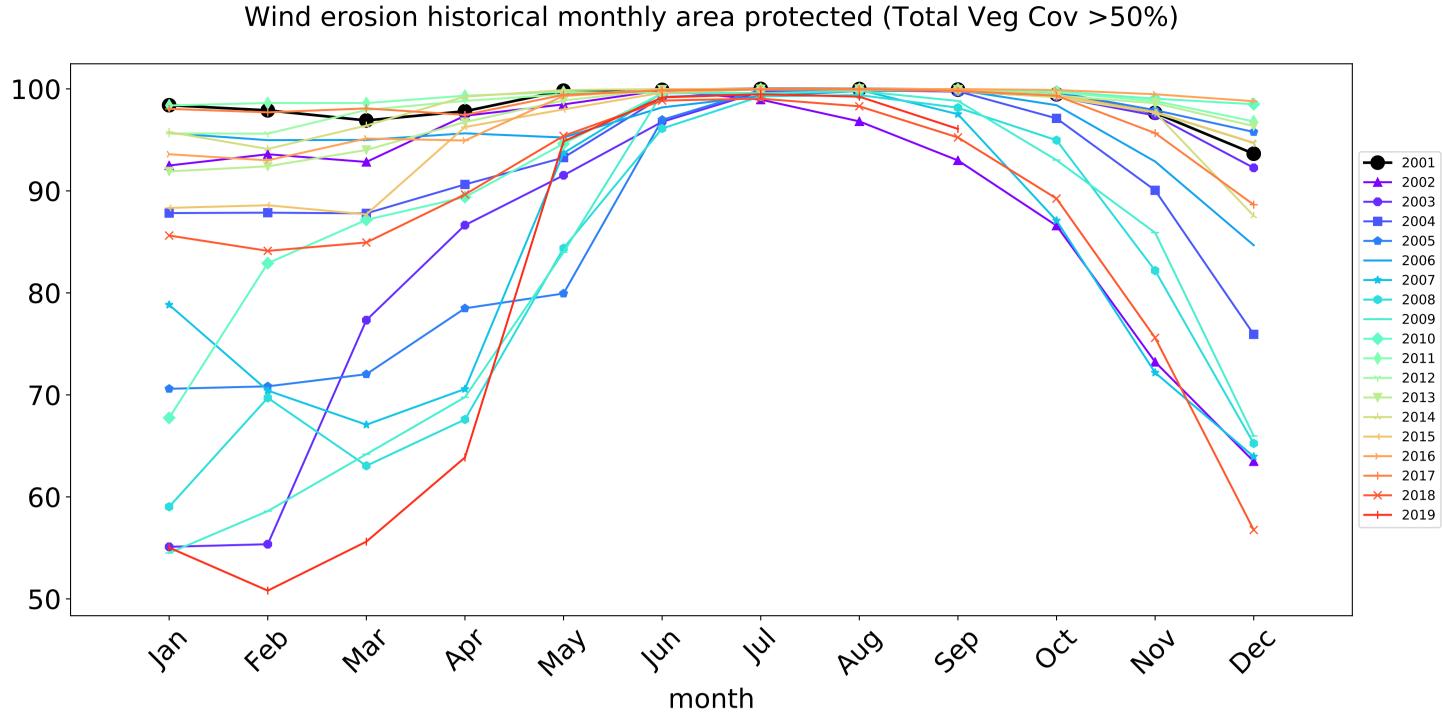


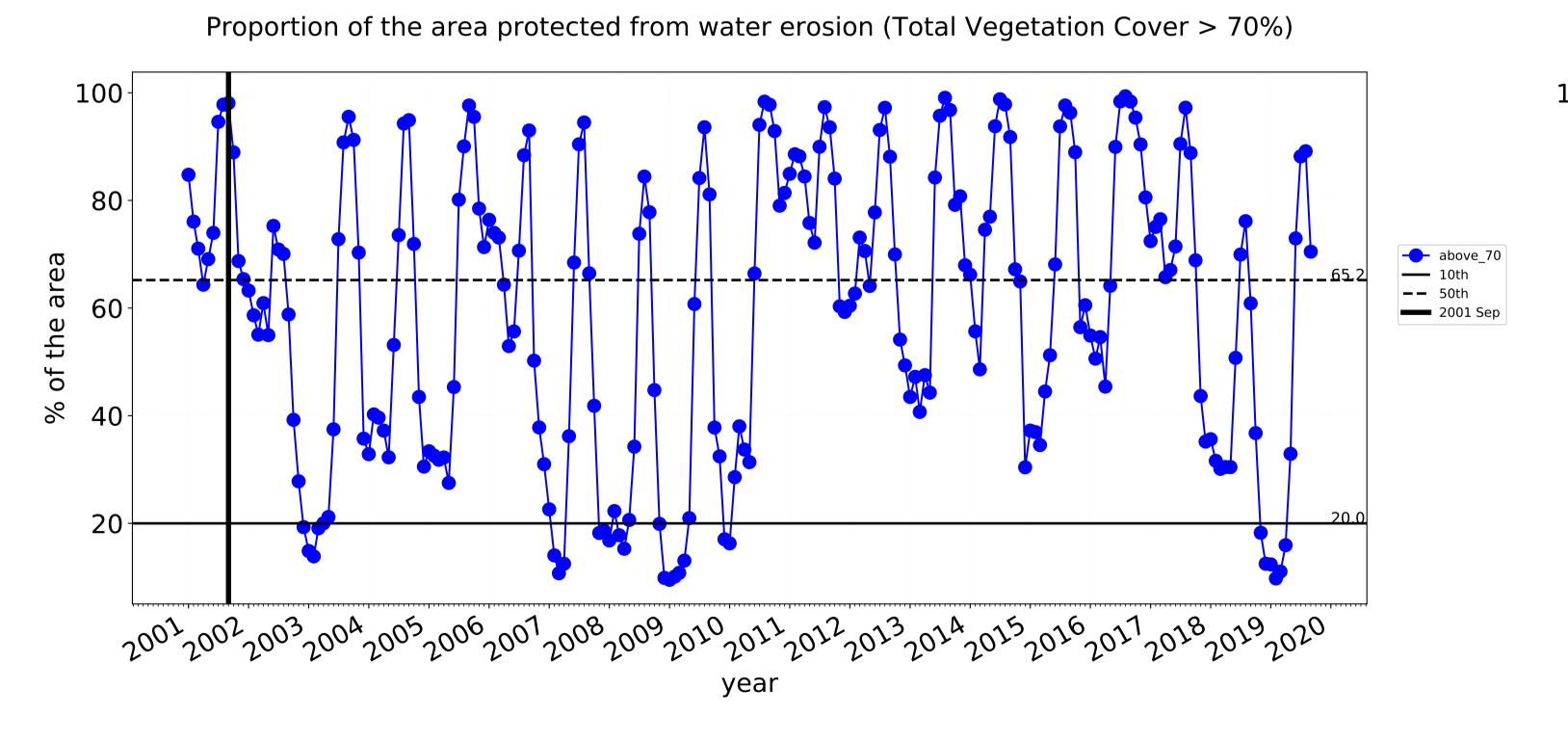


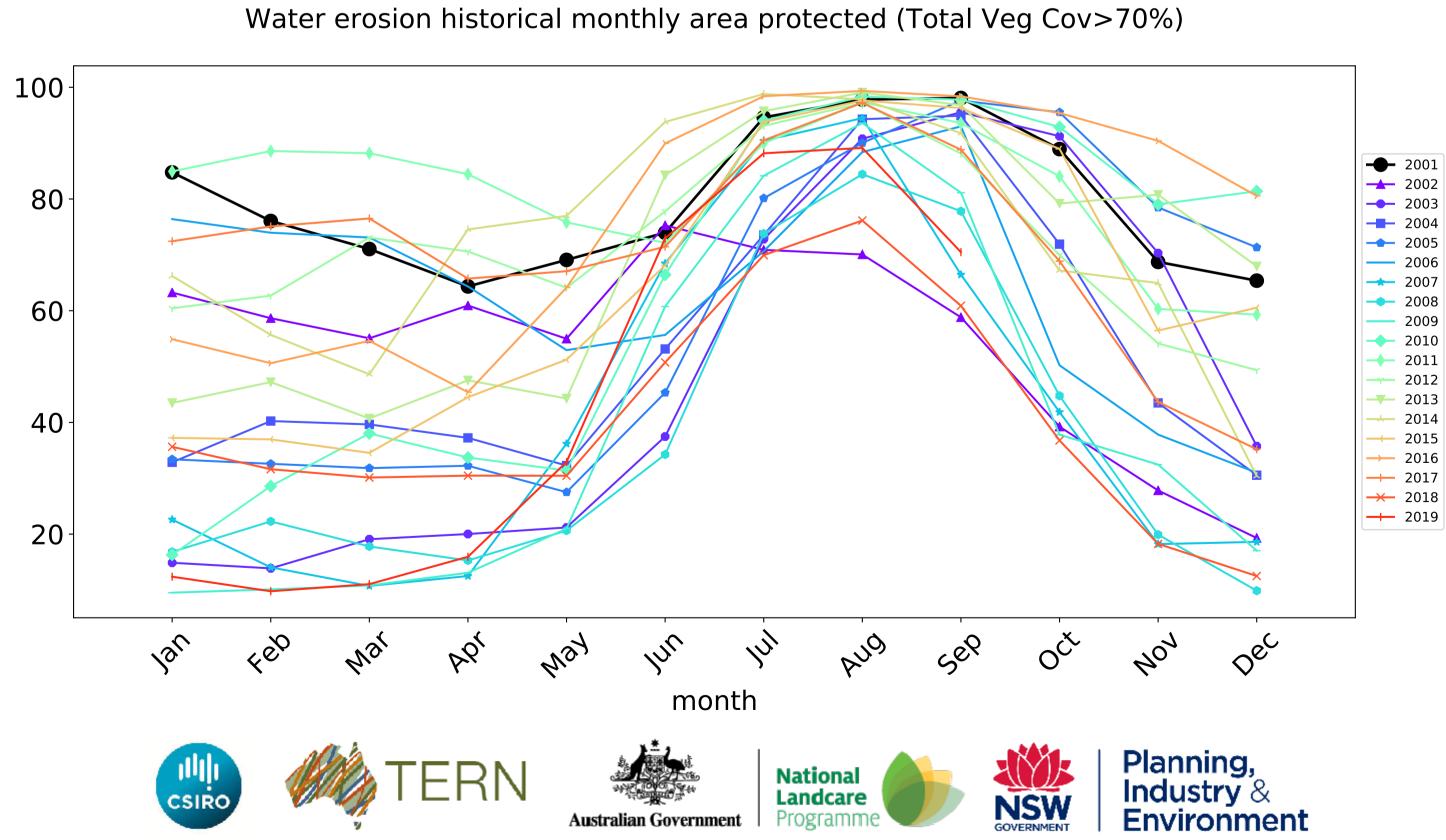


### **Cropping timeseries**

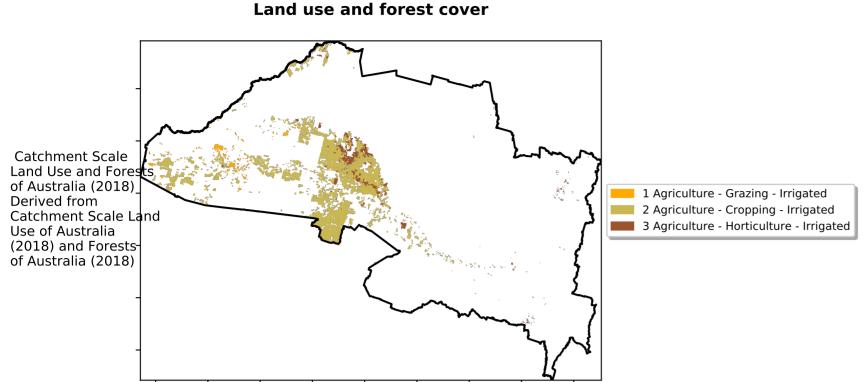


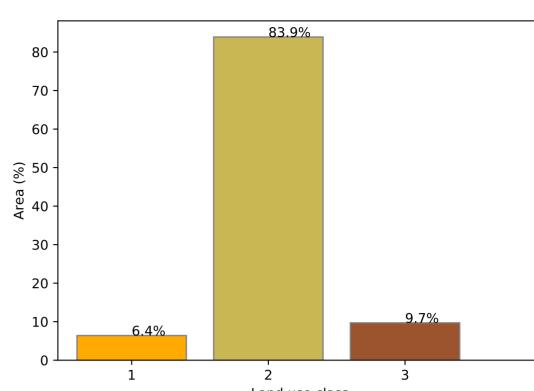


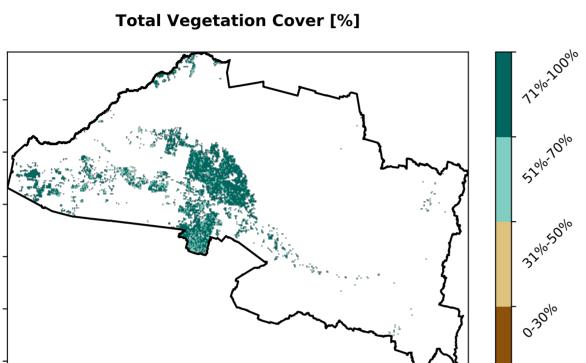


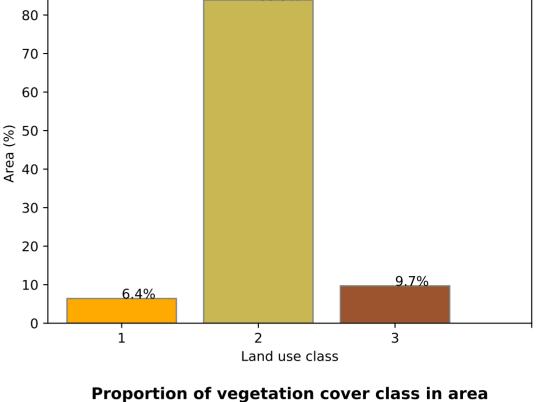


### **Irrigation**



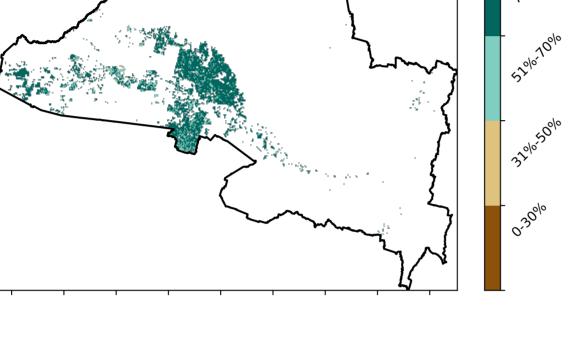




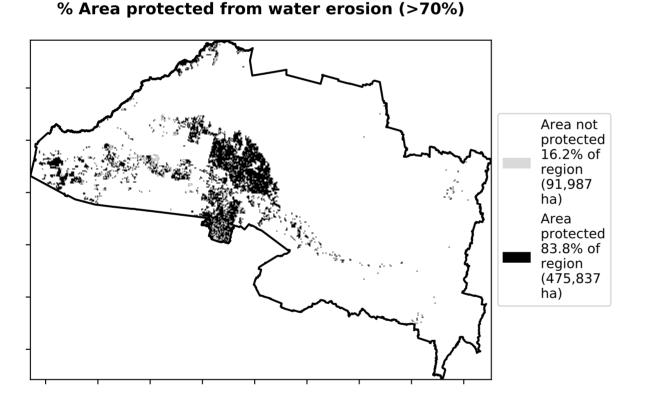


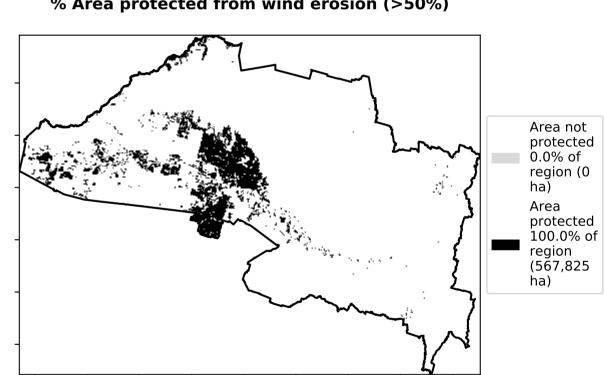
Proportion of each land class in area

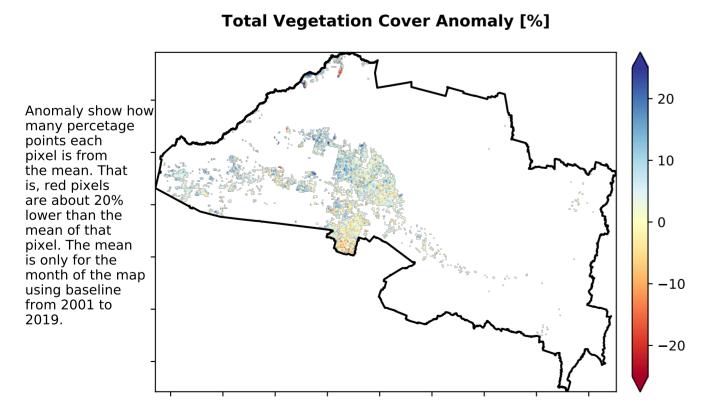
### 83.8% 80 70 60 Area (%) 30 20 15.9% 10 51%-70% 0-30% 31%-50% 71%-100% **Total Vegetation Cover class**



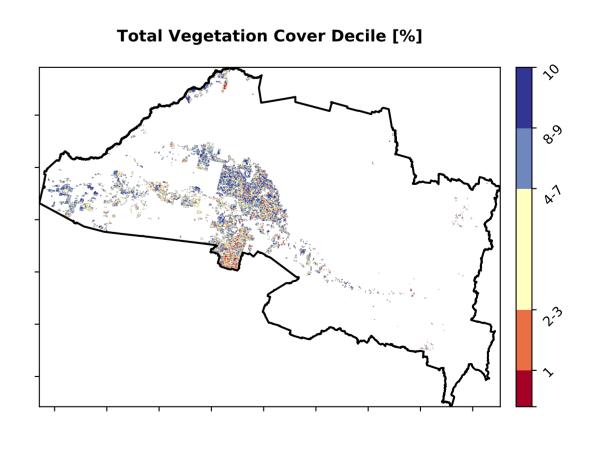
% Area protected from wind erosion (>50%)







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



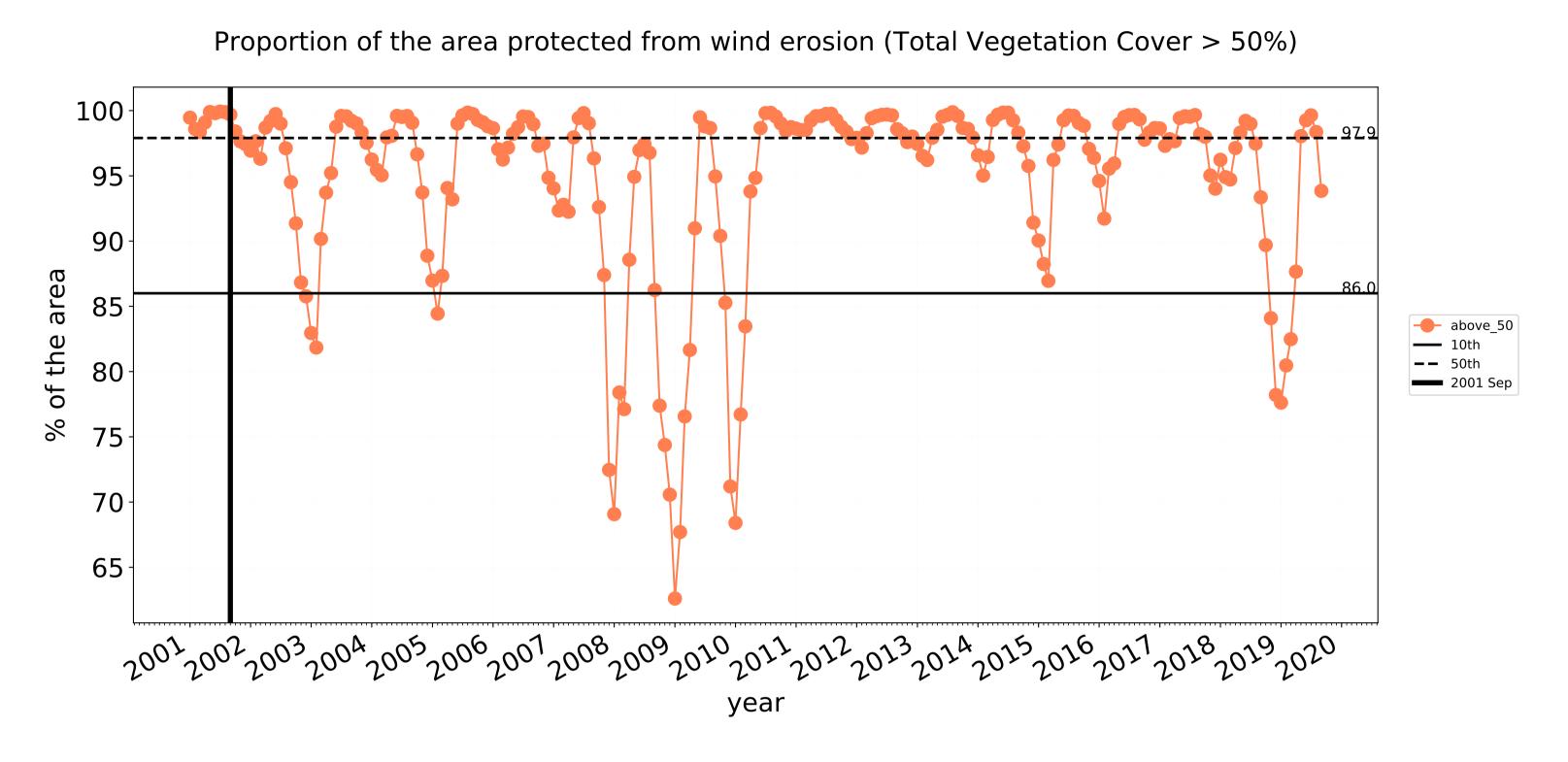


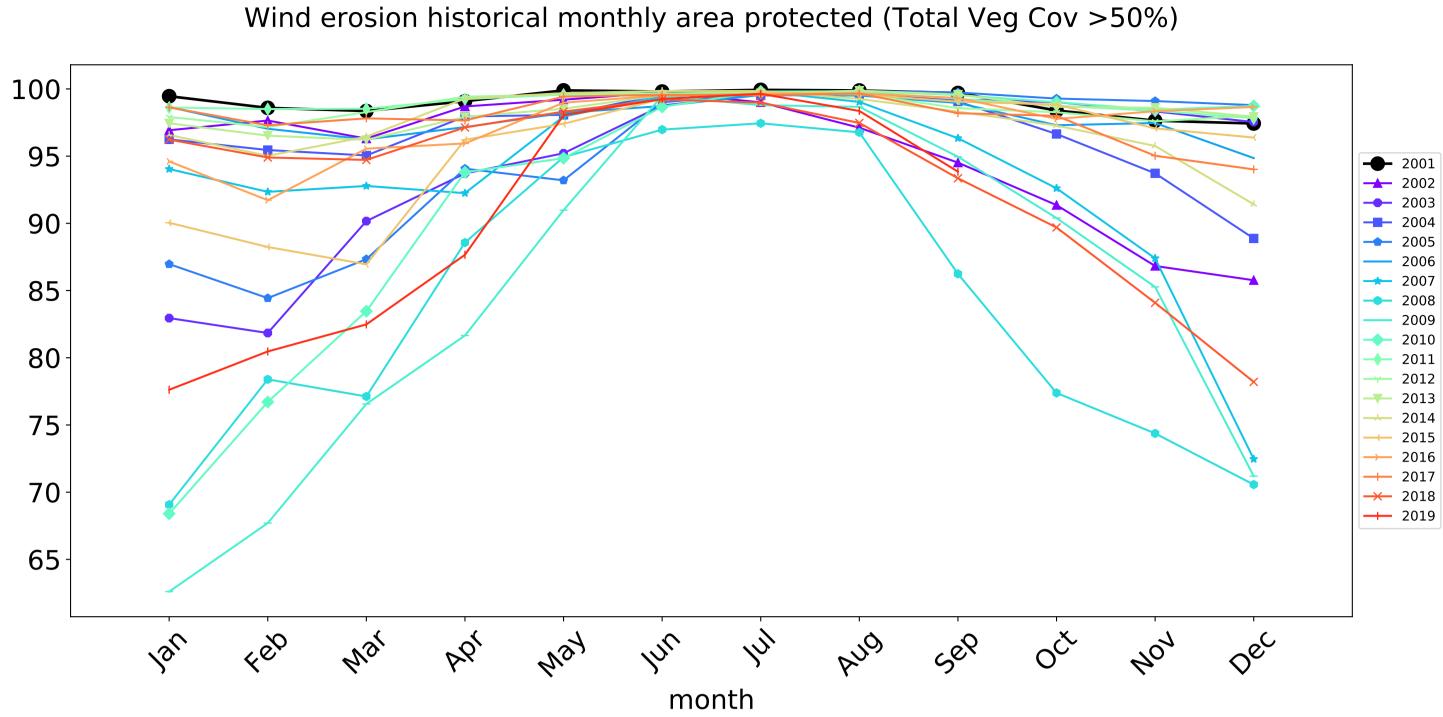


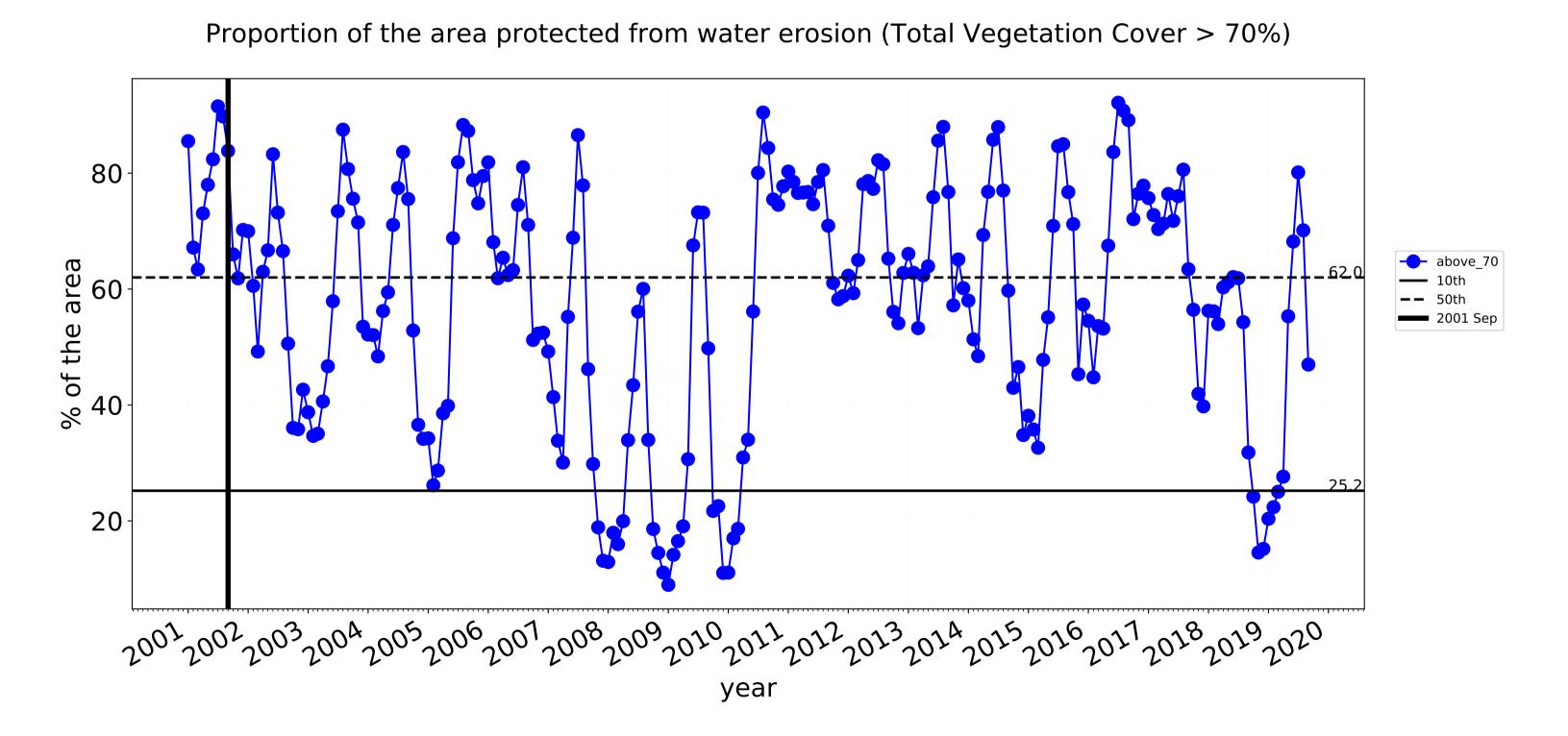


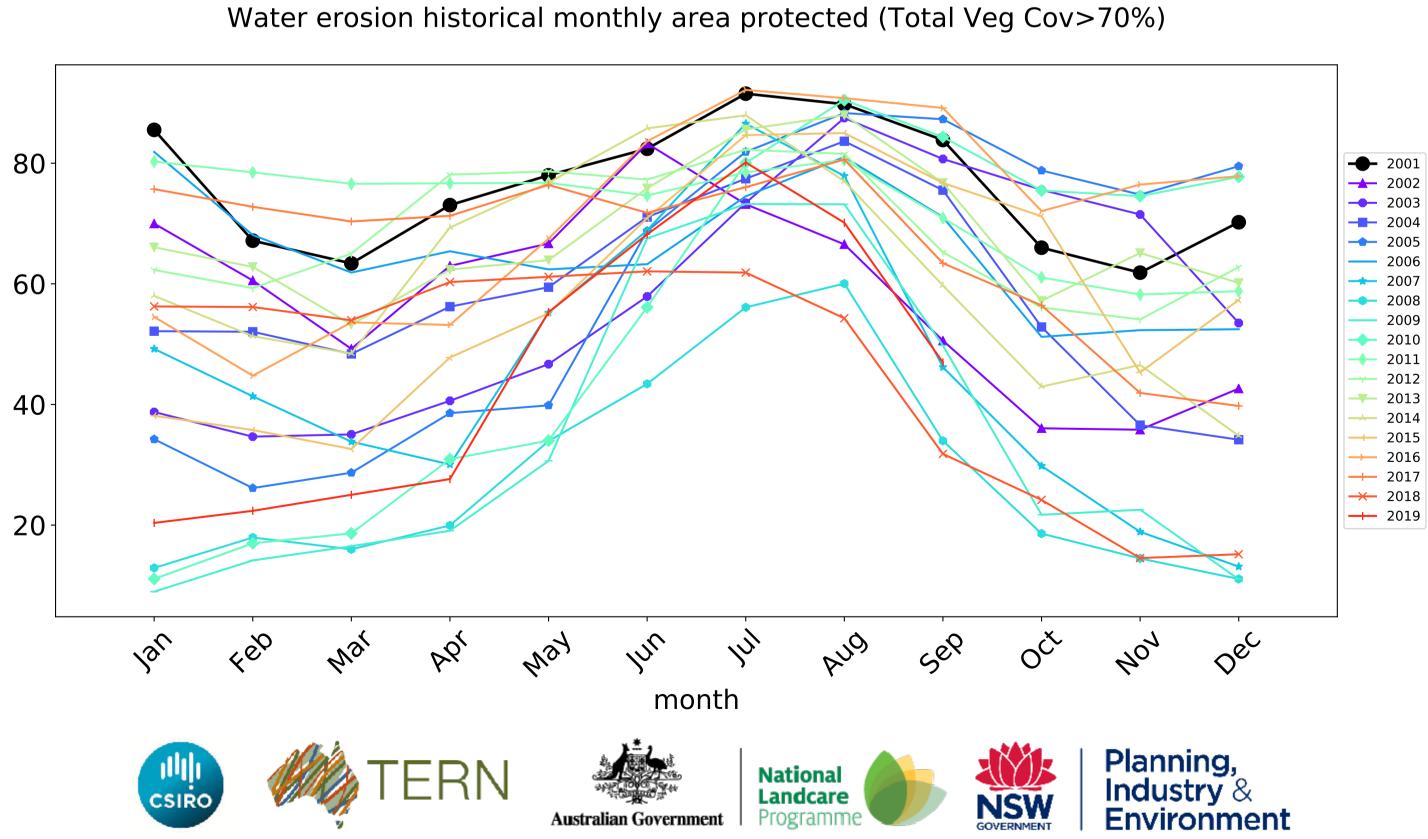










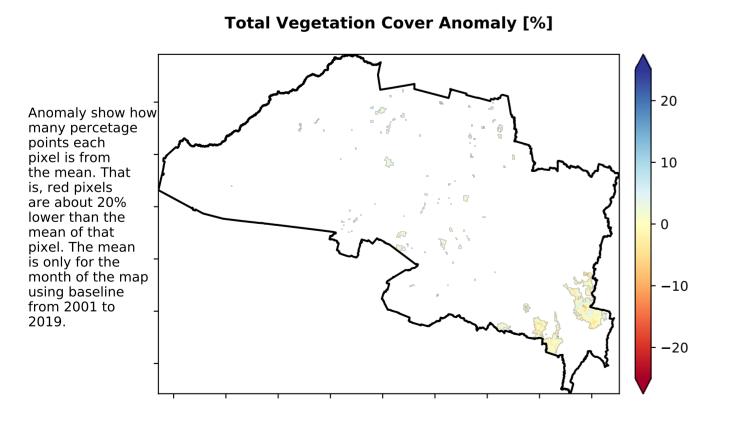


### **Production native forests and plantation forests**

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

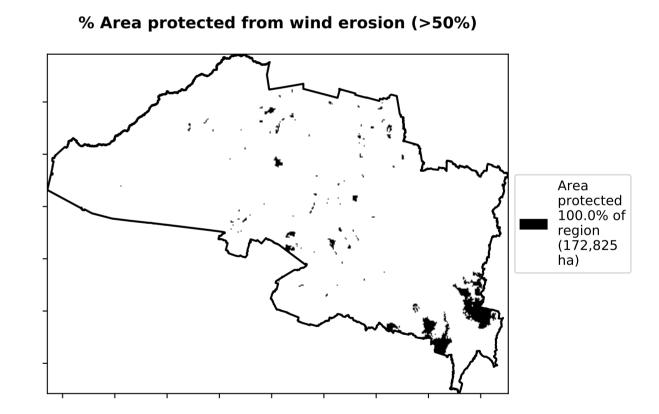
### Total Vegetation Cover [%]

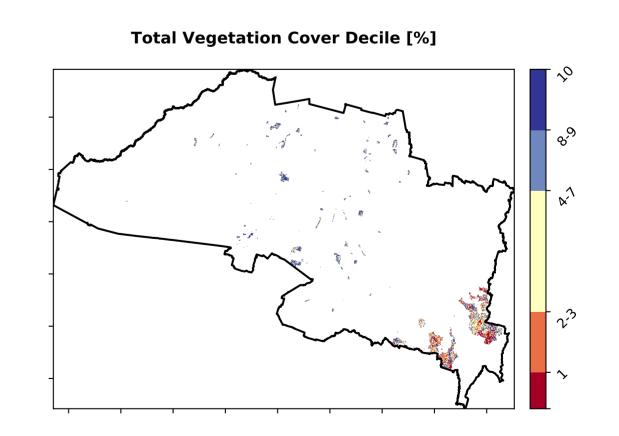
### % Area protected from water erosion (>70%) Area not protected 0.2% of region (345 ha) Area protected 99.8% of region (172,479 ha)



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 vegetation cover class in area 100 - 99.8% 80 - 99.8% 40 - 20 - 0.0% 0.0% 0.2% 0-30% 31%-50% 51%-70% 71%-100% Total Vegetation Cover class









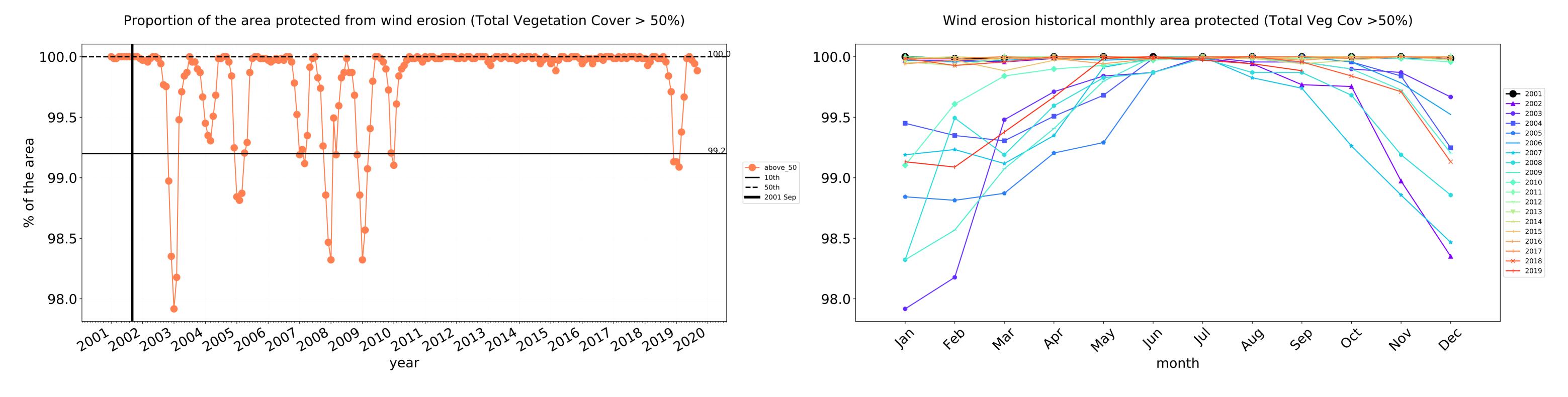


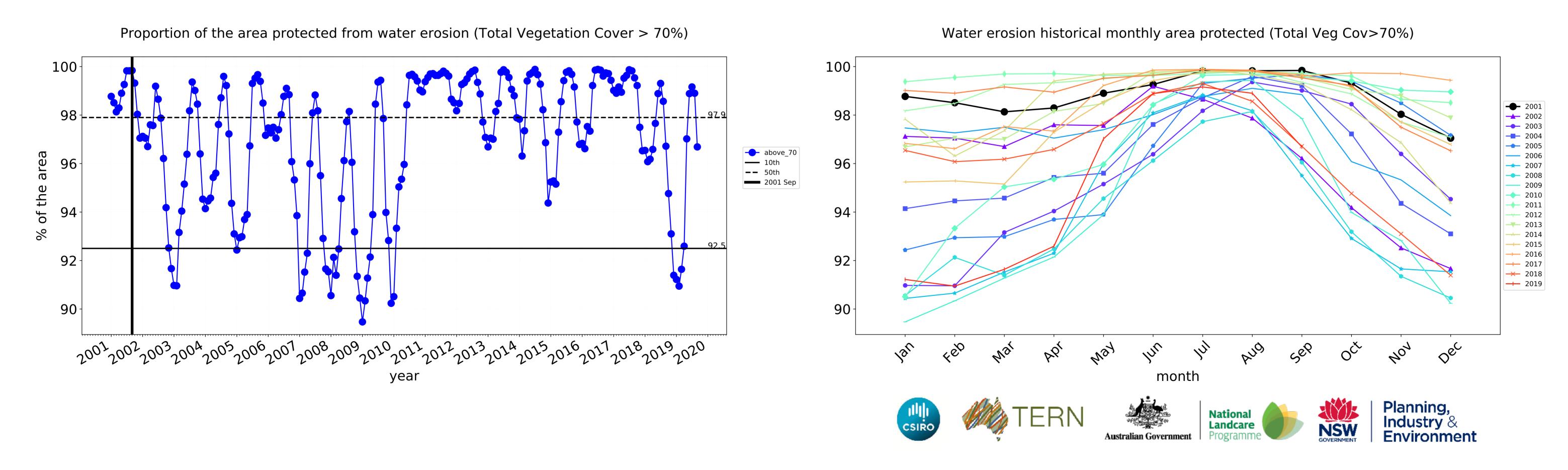






### **Production native forests and plantation forests timeseries**





### Riverina (6,694,325 ha and no data 14,010 ha) Percentage area and hectares protected with TVC threshold 30,50,70,80,90 and 95%

Land use and forest cover Class	area(ha)	above_30	above_50	above_70	above_80	above_90	above_95
Entire region	6,694,325	100.0% 6,693,900	99.9% 6,688,250	94.2% 6,305,856	76.9% 5,146,225	28.5% 1,908,697	7.6% 508,525
Conservation and natural environments	322,825	100.0% 322,825	100.0% 322,825	97.0% 313,025	87.8% 283,325	67.8% 219,000	30.4% 98,250
Conservation and natural environments non forest	83,350	100.0% 83,350	100.0% 83,350	88.2% 73,550	53.8% 44,850	15.9% 13,225	6.4% 5,325
Conservation and natural environments Forest (non woodland)	194,975	100.0% 194,975	100.0% 194,975	100.0% 194,975	99.8% 194,625	90.6% 176,725	44.7% 87,150
Agriculture	6,068,100	100.0% 6,068,050	99.9% 6,063,200	94.0% 5,706,050	76.0% 4,614,625	25.5% 1,546,150	5.8% 353,950
Grazing	2,311,550	100.0% 2,311,550	100.0% 2,310,625	91.0% 2,102,400	67.6% 1,561,600	25.2% 582,650	4.4% 100,800
Grazing non forest	2,066,550	100.0% 2,066,550	100.0% 2,065,625	89.9% 1,857,875	64.1% 1,325,525	21.7% 448,000	3.9% 79,600
Grazing Woodland forest	141,650	100.0% 141,650	100.0% 141,650	99.7% 141,275	95.5% 135,250	46.8% 66,325	5.2% 7,350
Grazing - Forest (non woodland)	103,350	100.0% 103,350	100.0% 103,350	99.9% 103,250	97.6% 100,825	66.1% 68,325	13.4% 13,850
Cropping	3,186,900	100.0% 3,186,900	99.9% 3,184,650	98.1% 3,125,775	87.7% 2,795,200	29.2% 931,750	7.7% 244,975
Irrigation	567,825	100.0% 567,775	99.7% 566,100	83.8% 476,075	45.1% 256,325	5.5% 31,100	1.4% 8,075
Production native forests and plantation forests	172,825	100.0% 172,825	100.0% 172,825	99.8% 172,550	98.2% 169,650	76.0% 131,275	31.8% 55,025











