### **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: November 2003** 

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







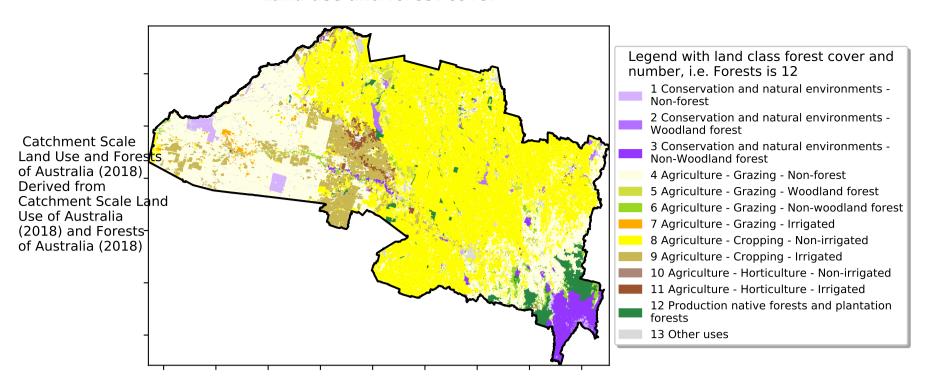




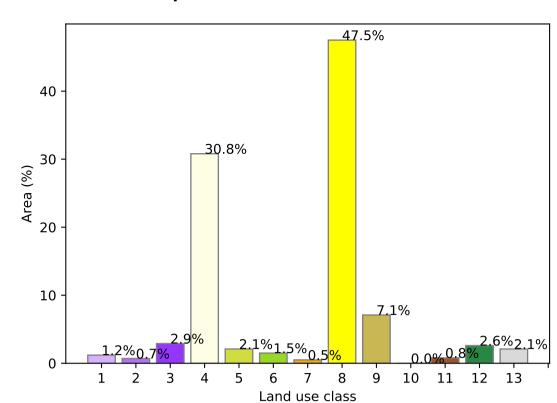


### **Vegetation Cover Nov 2003**

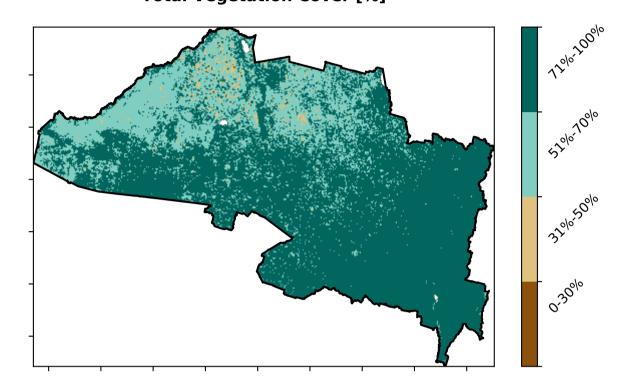
### Land use and forest cover



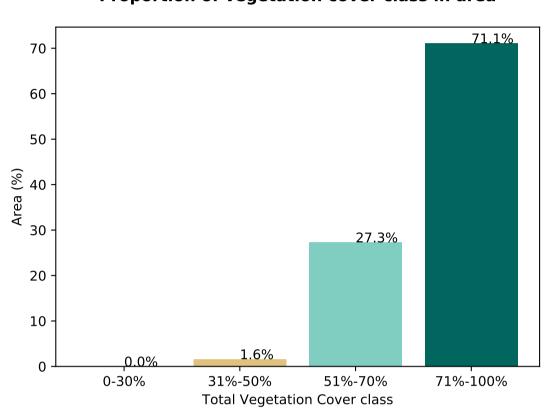
### **Proportion of each land class in area**



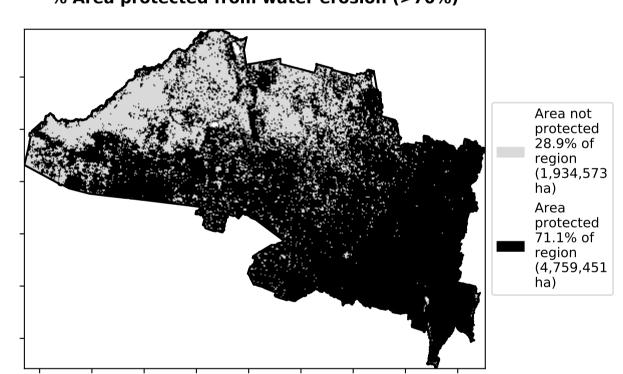
### **Total Vegetation Cover [%]**



**Proportion of vegetation cover class in area** 



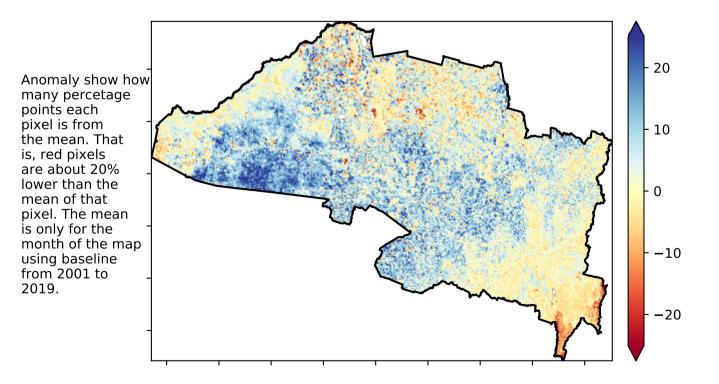
### % Area protected from water erosion (>70%)



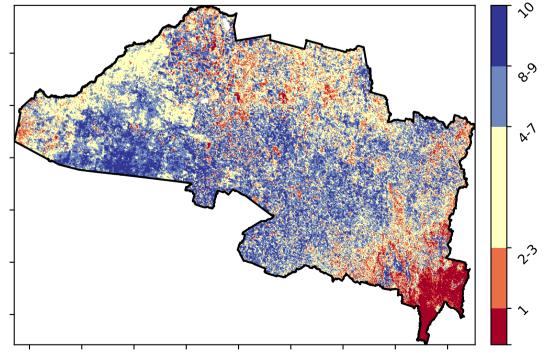
% Area protected from wind erosion (>50%)



### **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.





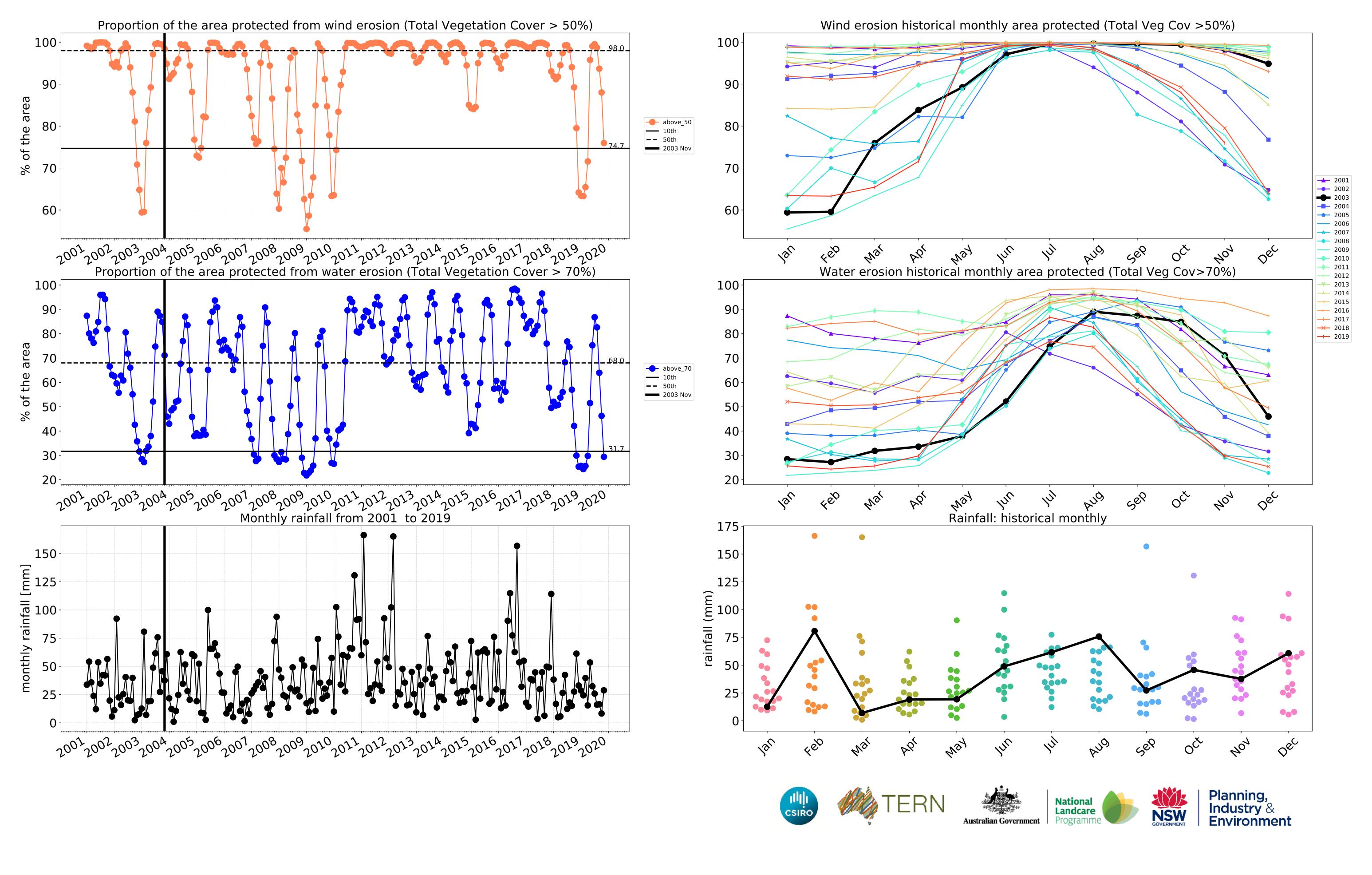




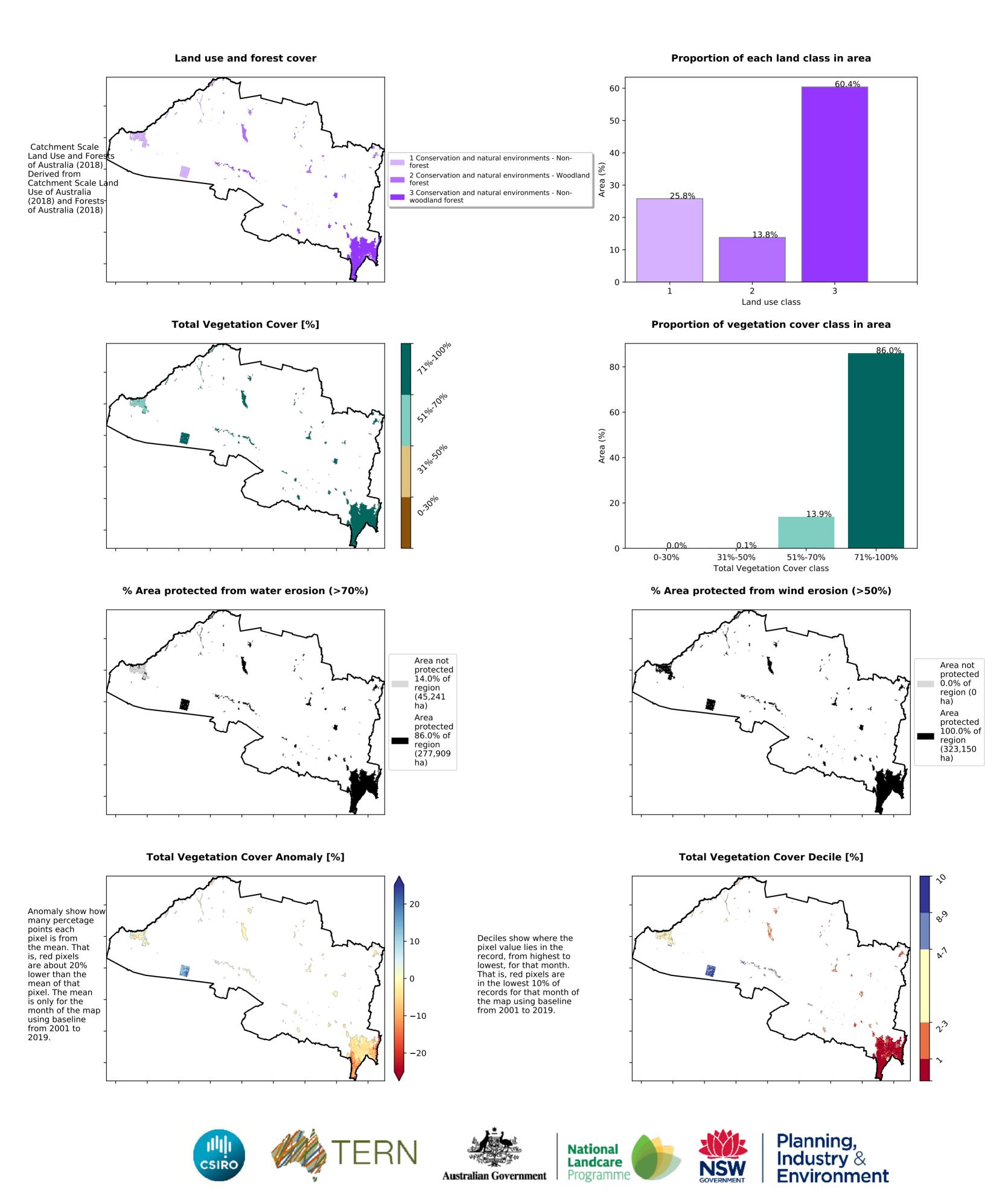




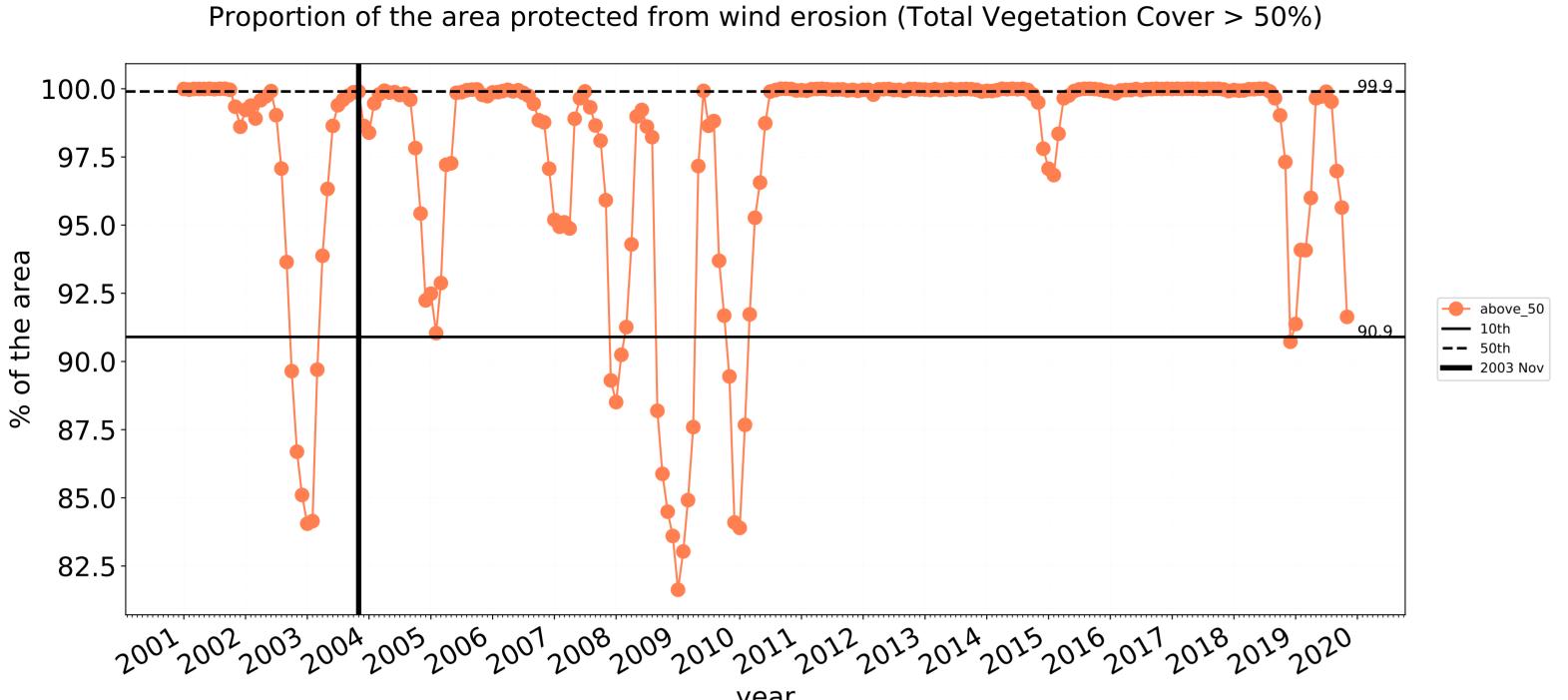


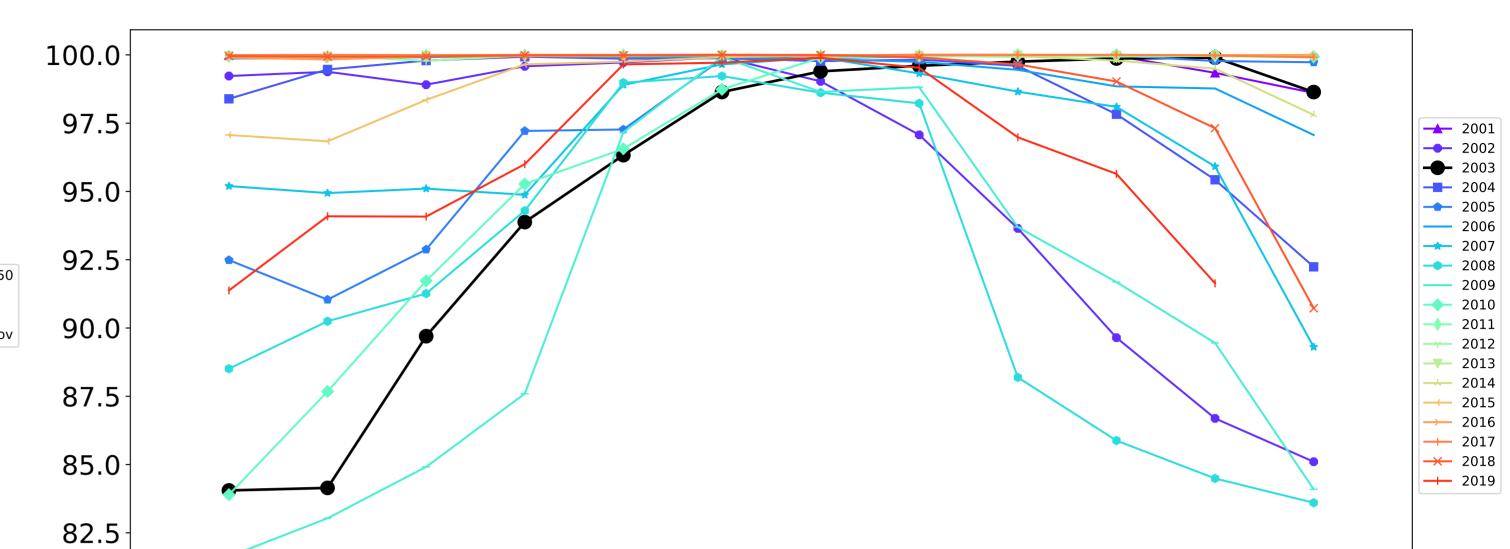


### **Conservation and natural environments**



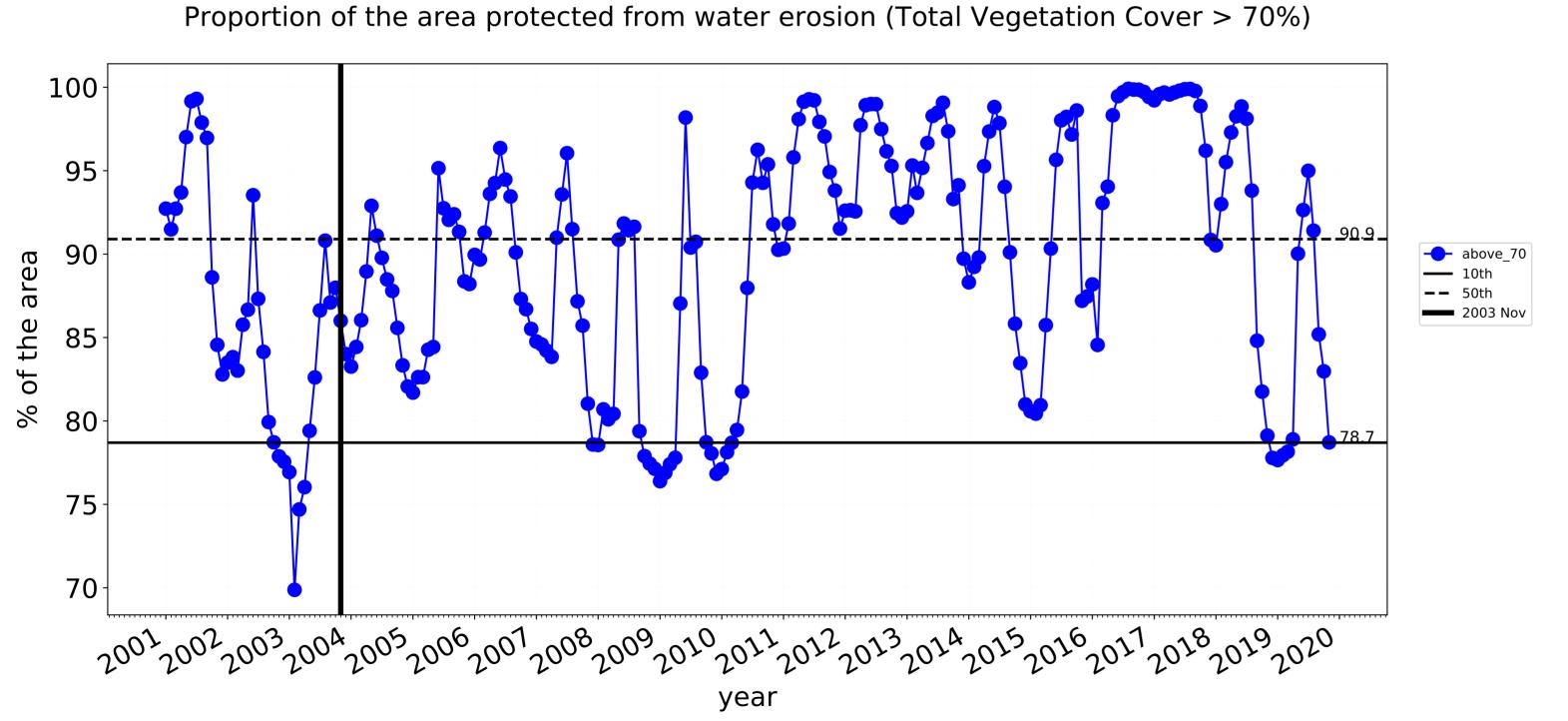
### **Conservation and natural environments timeseries**

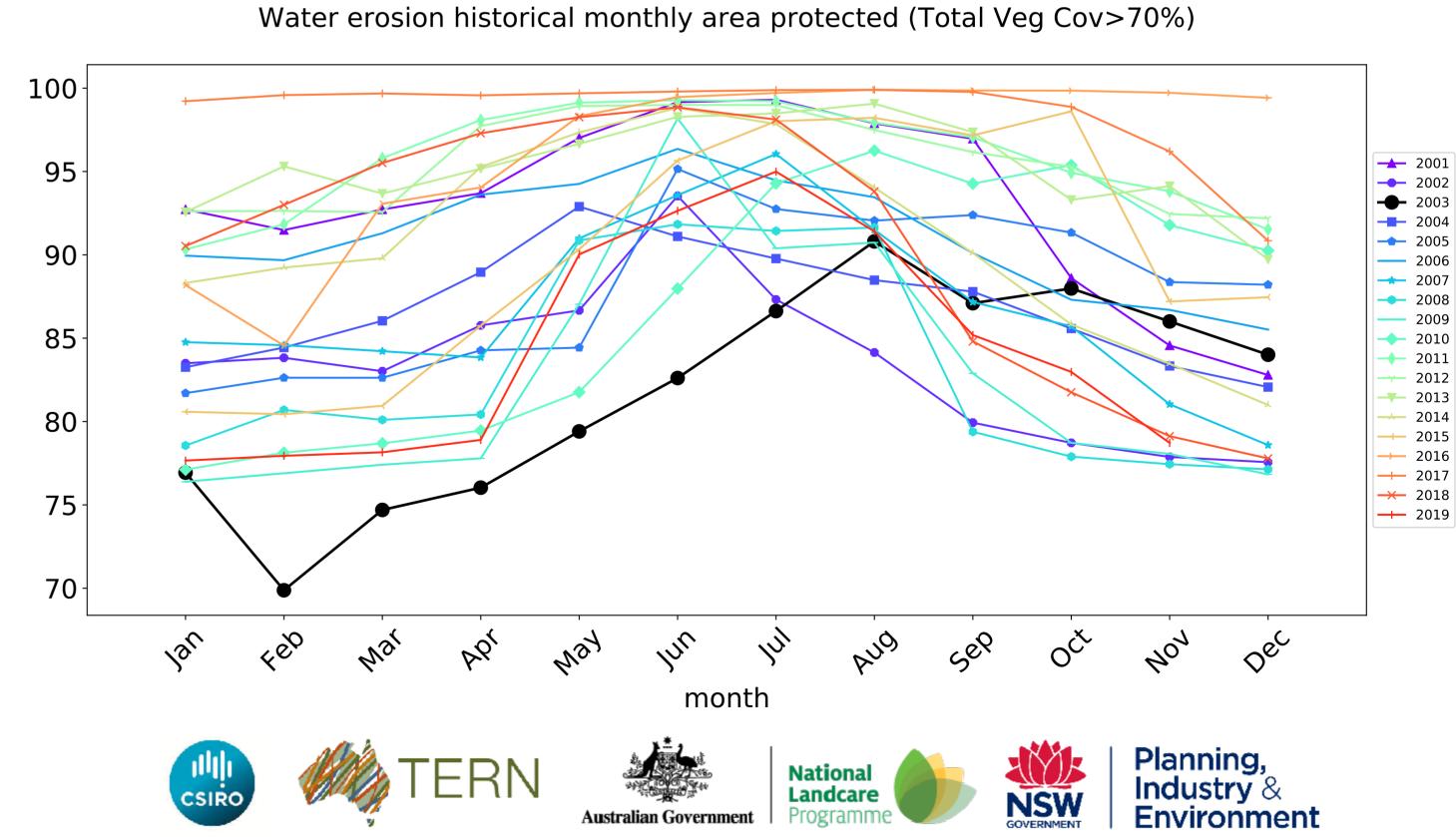




month

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



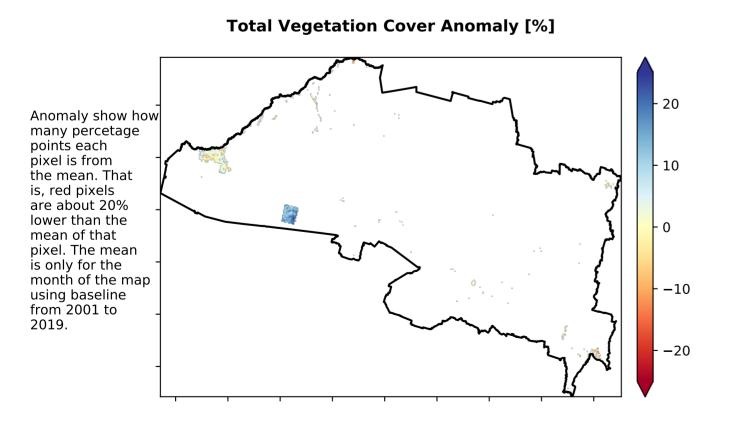


### **Conservation and natural environments non forest**

### Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) 1 Conservation and natural environments - Nonforest 1 Conservation and natural environments - Nonforest

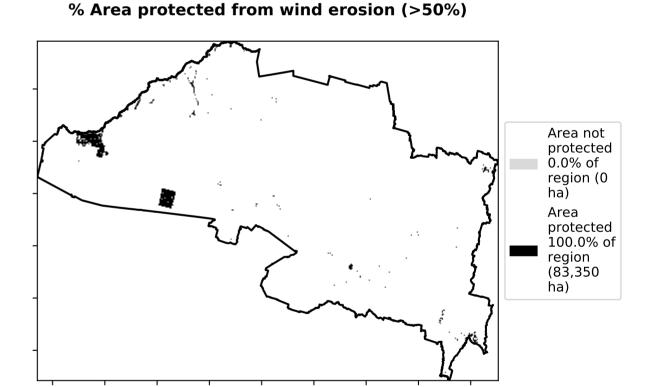
## Total Vegetation Cover [%]

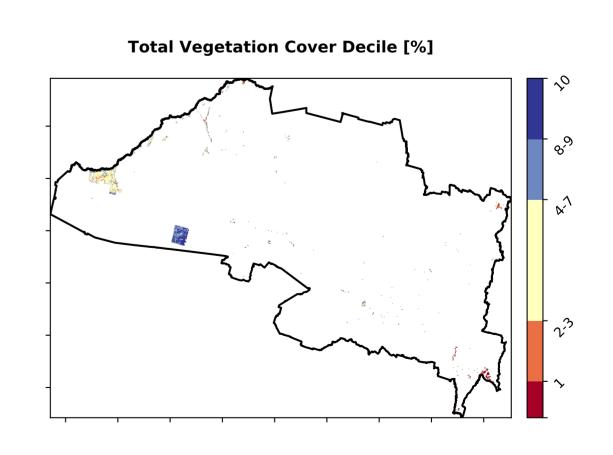
### Area not protected 45.1% of region (37,590 ha) Area protected 54.9% of region (45,759 ha)



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 54.9% 404020100-30% 31%-50% Total Vegetation Cover class









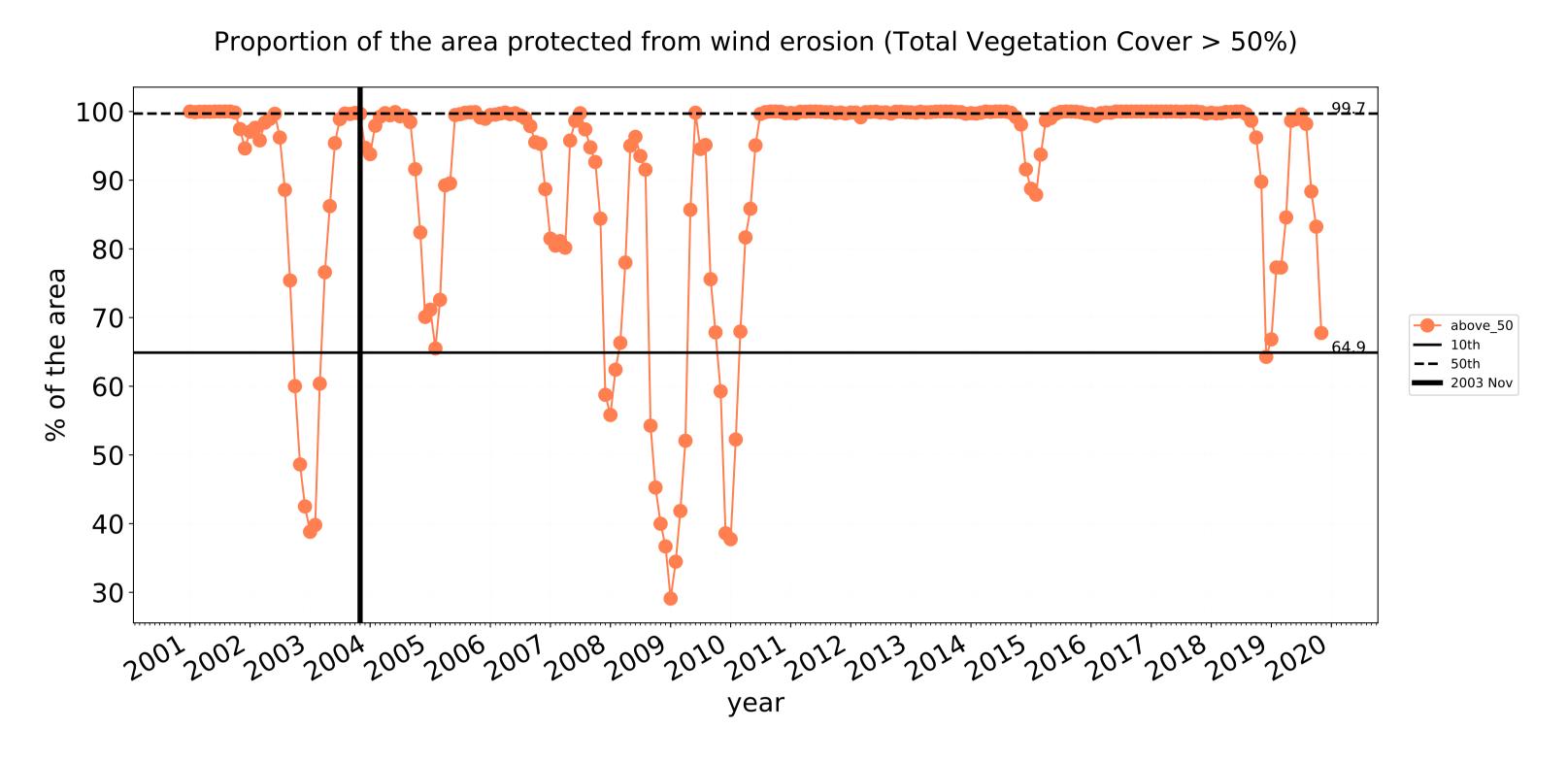


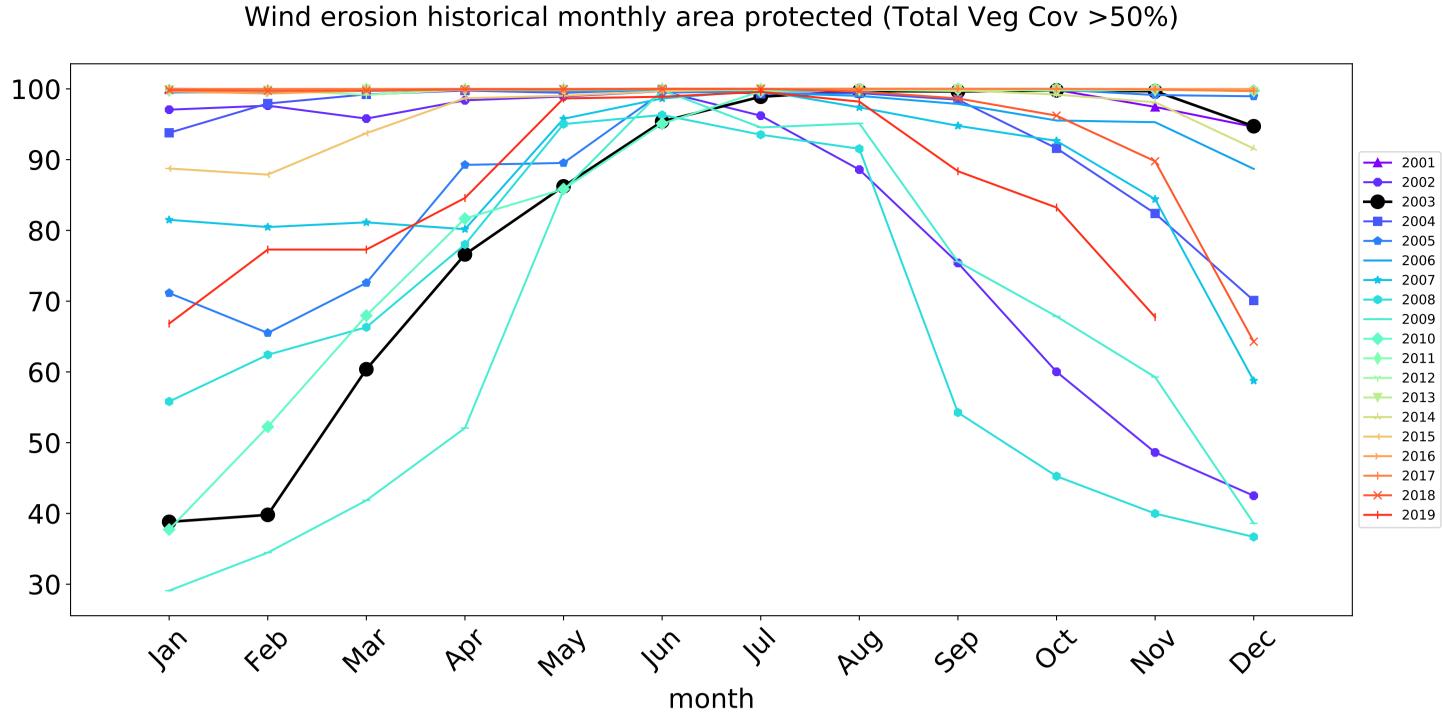


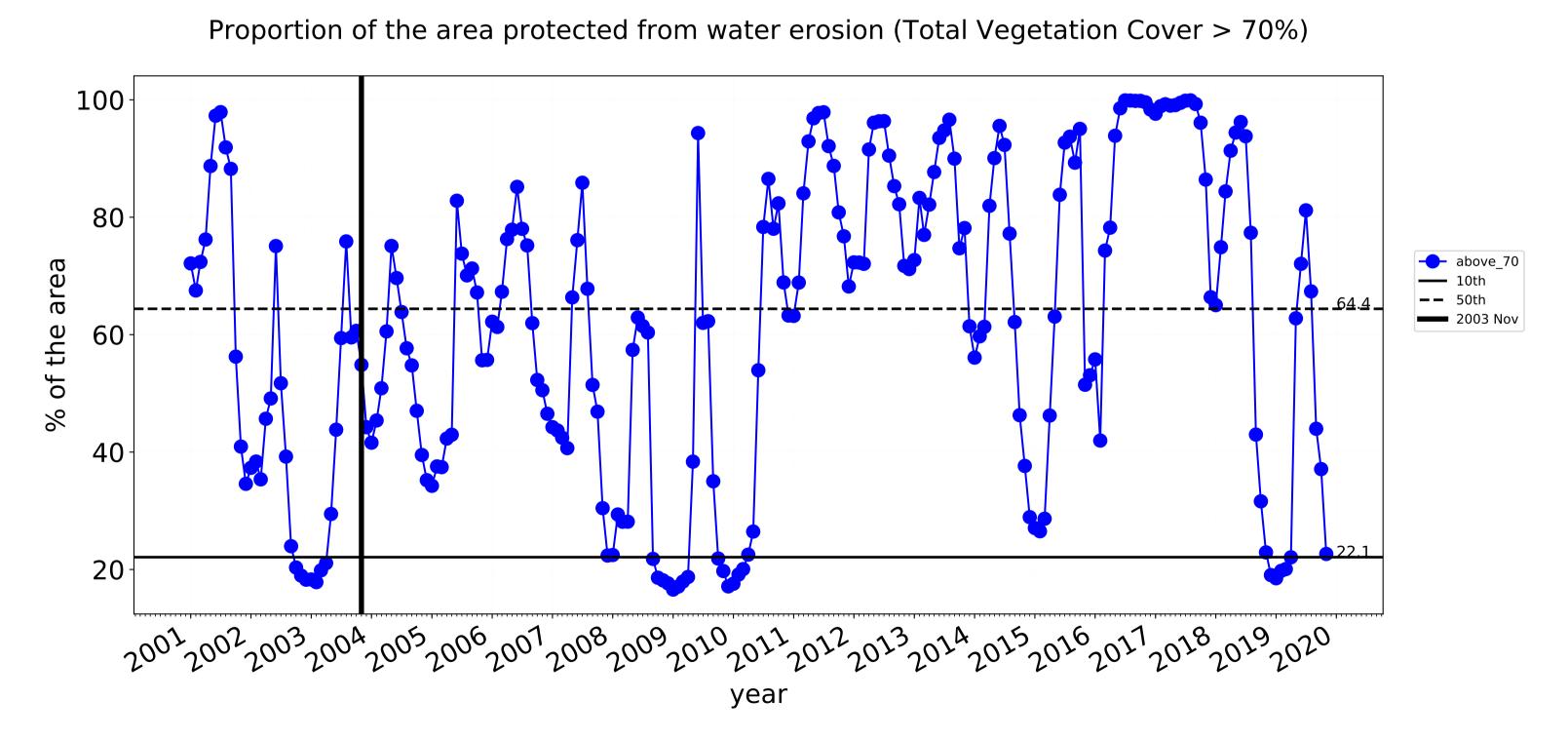


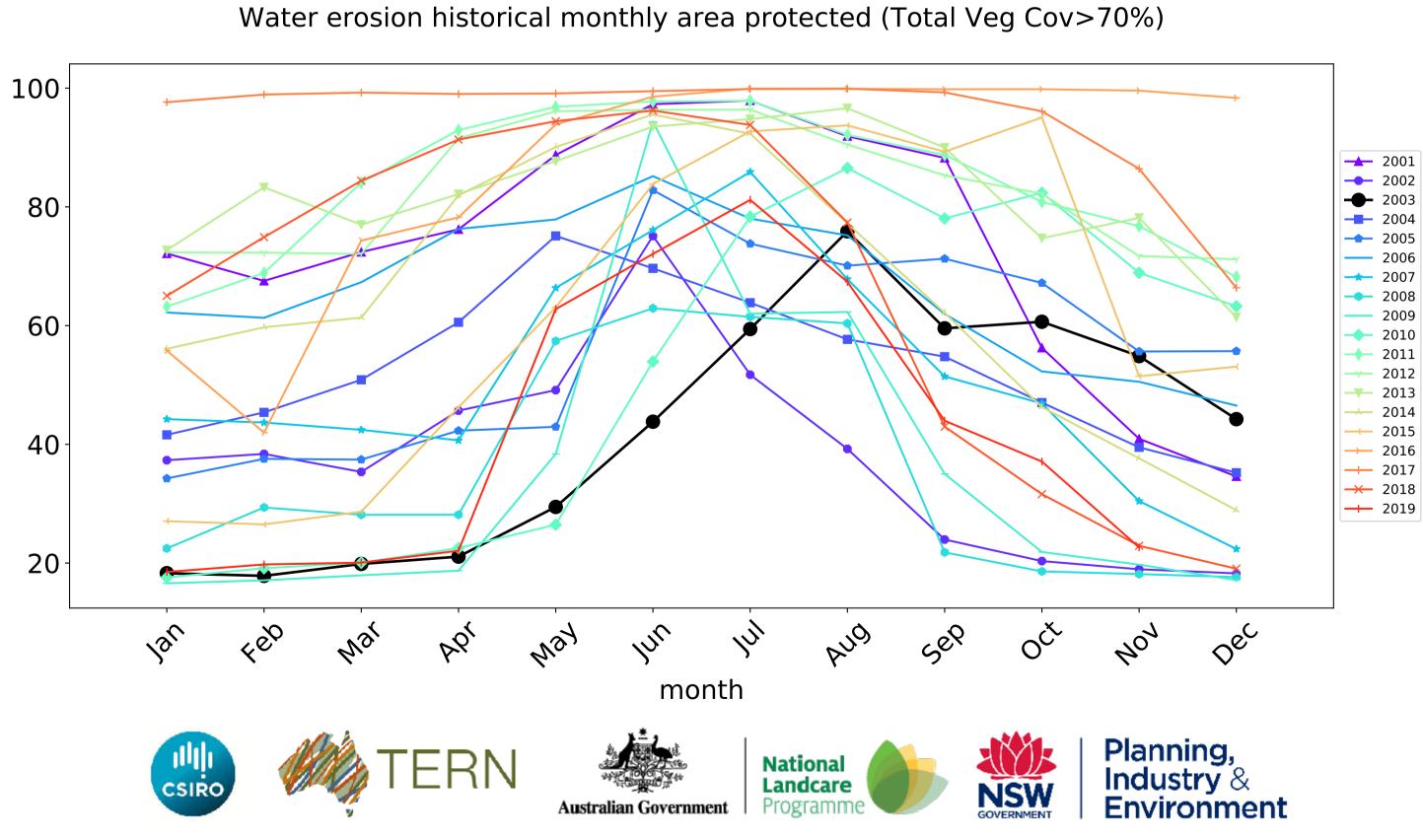


### **Conservation and natural environments non forest timeseries**

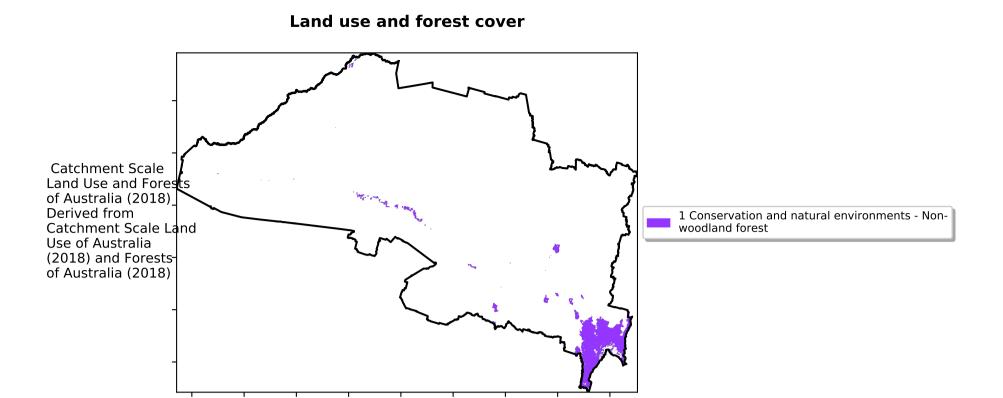




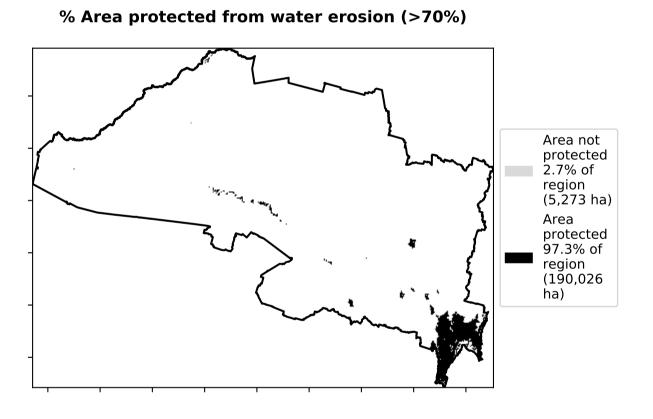


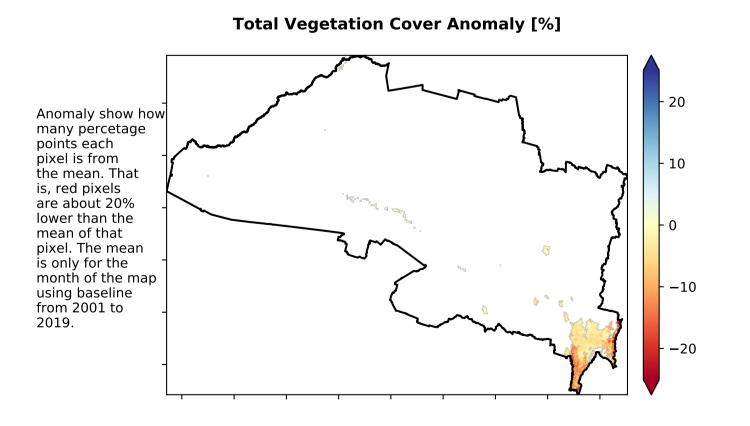


### **Conservation and natural environments Forest (non woodland)**

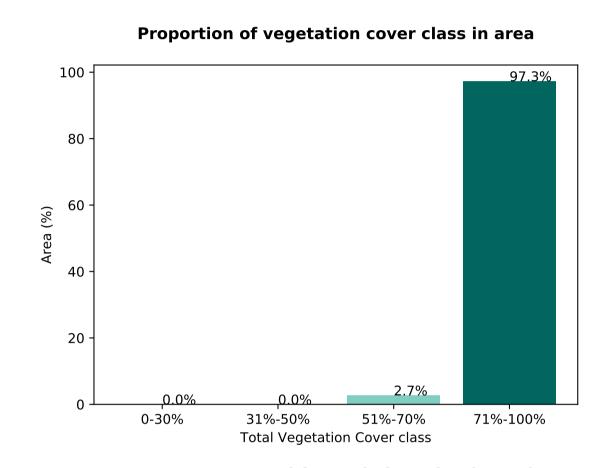


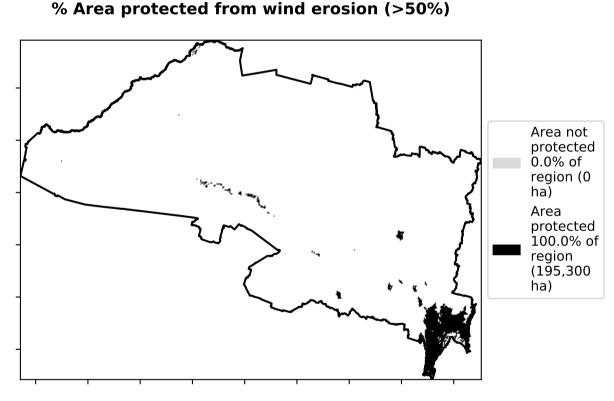
# Total Vegetation Cover [%]

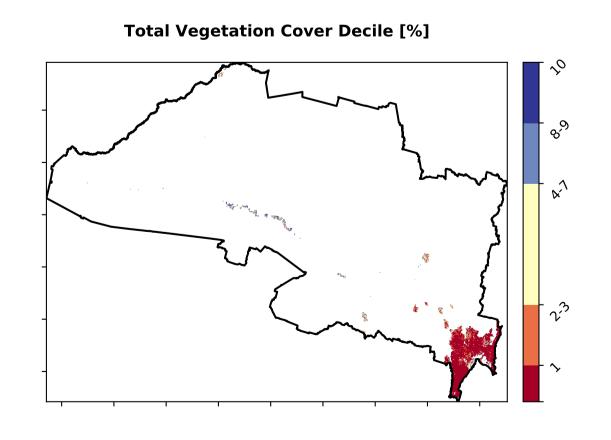




Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.









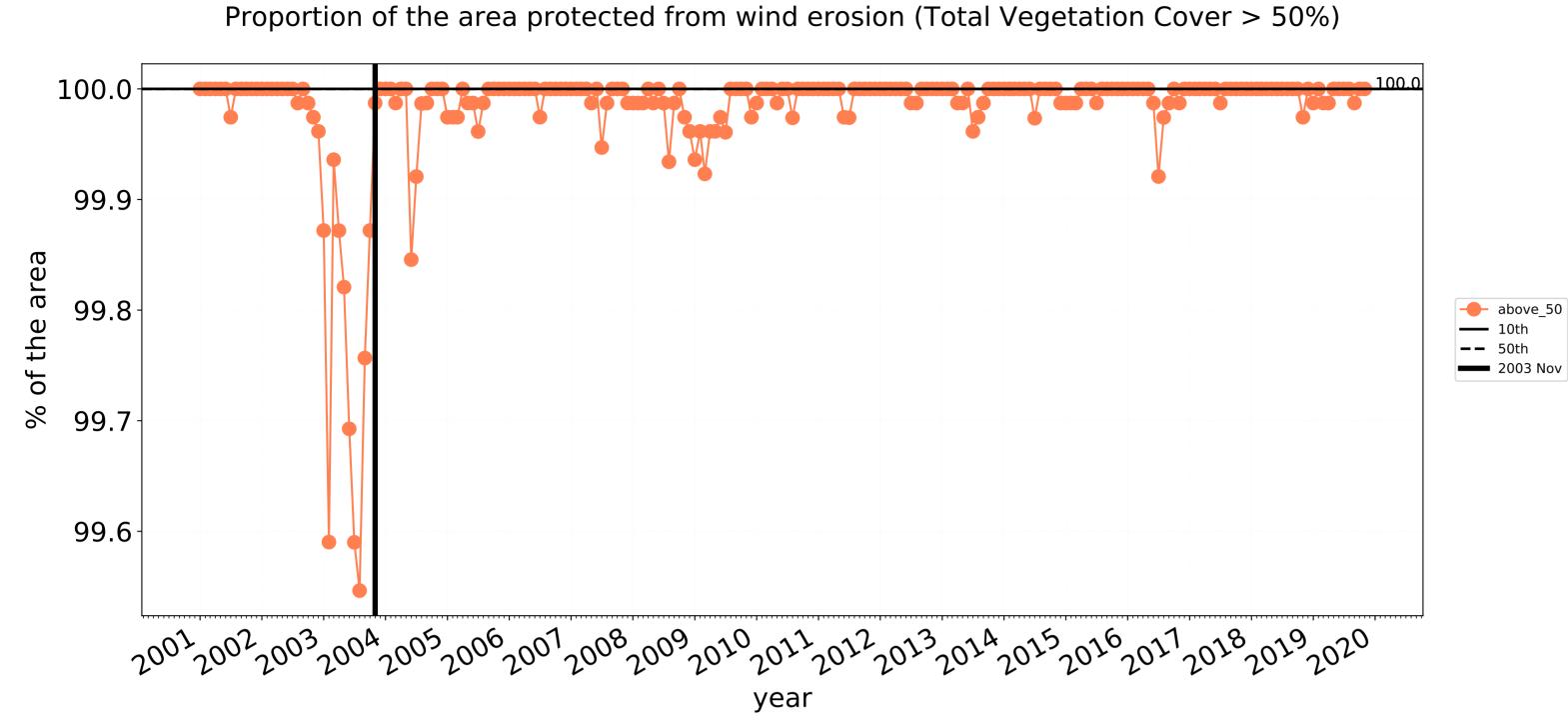


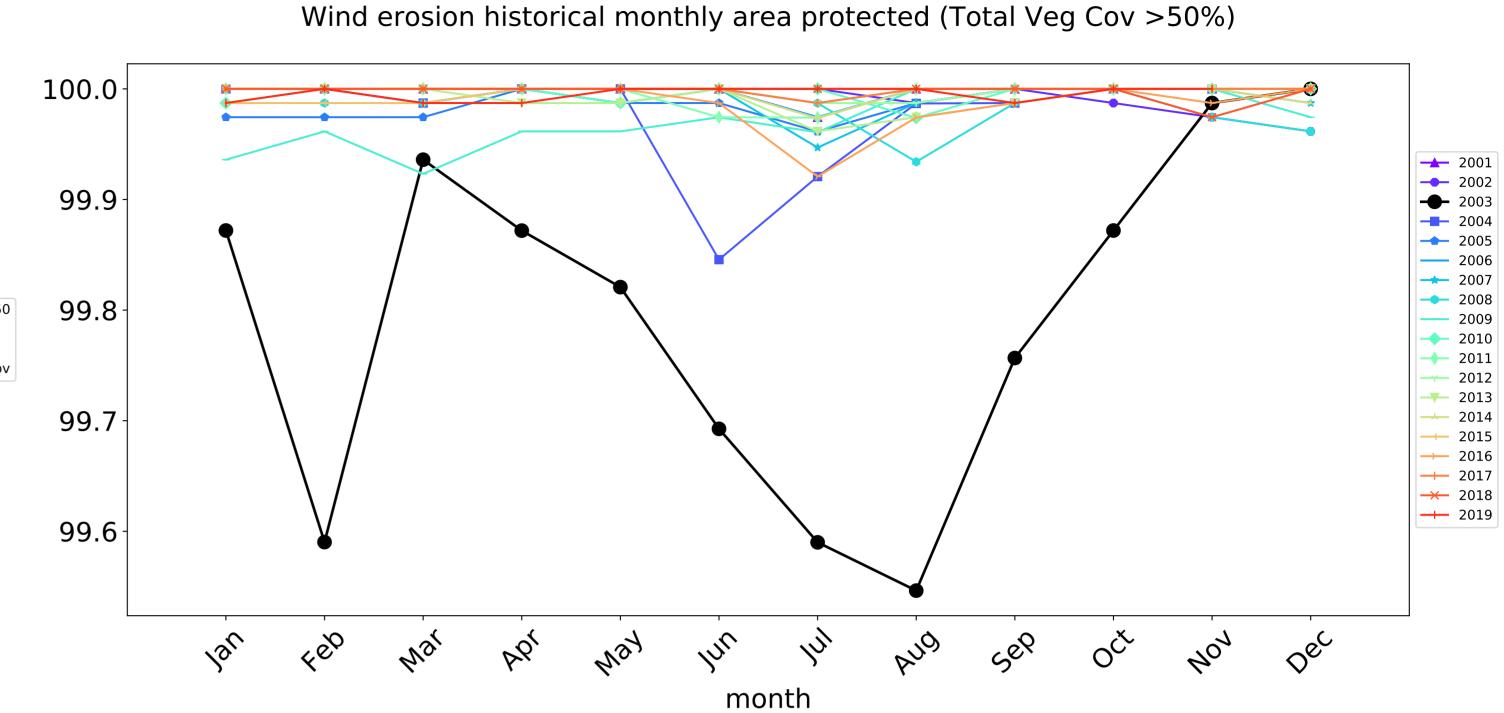


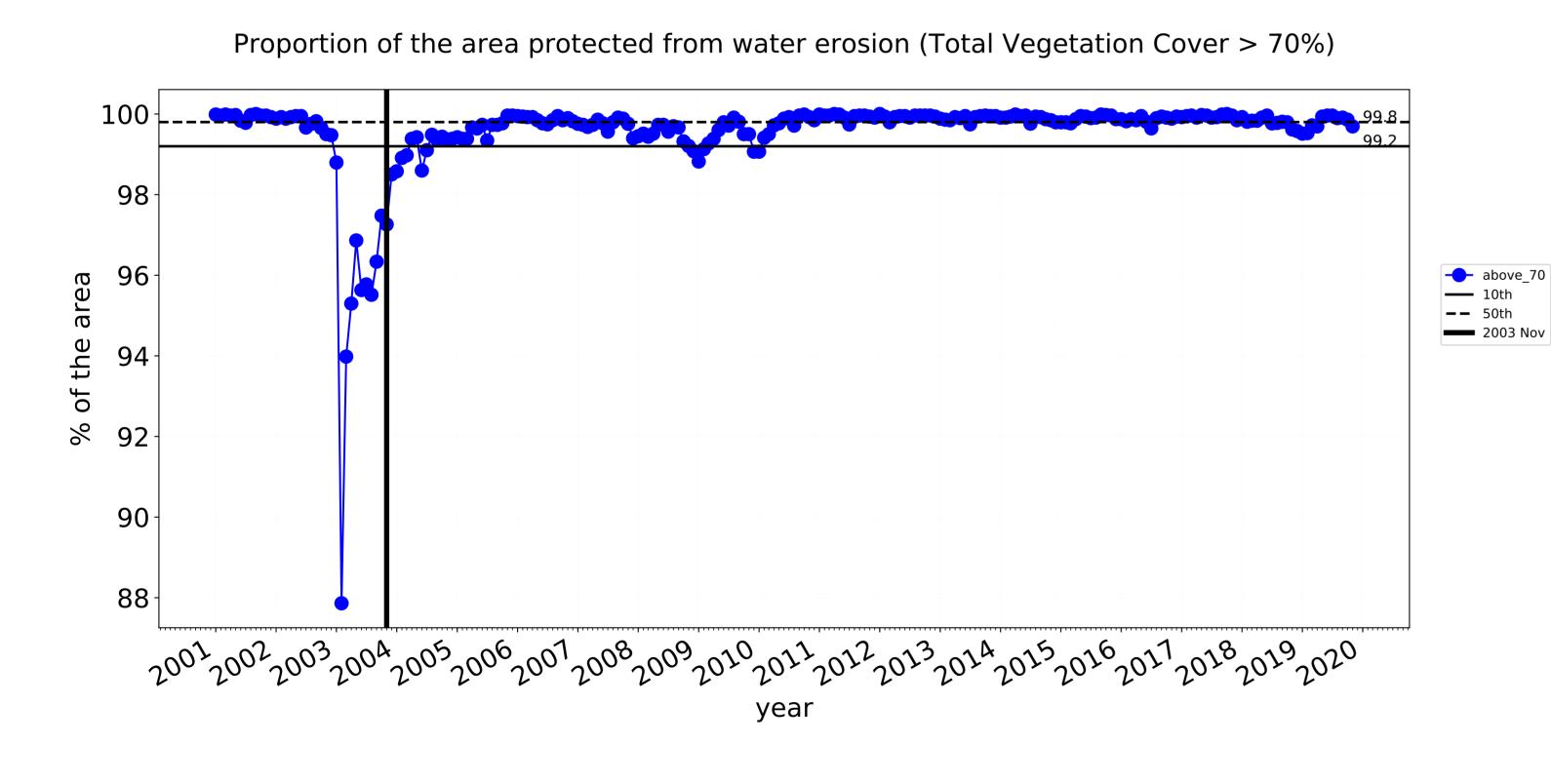


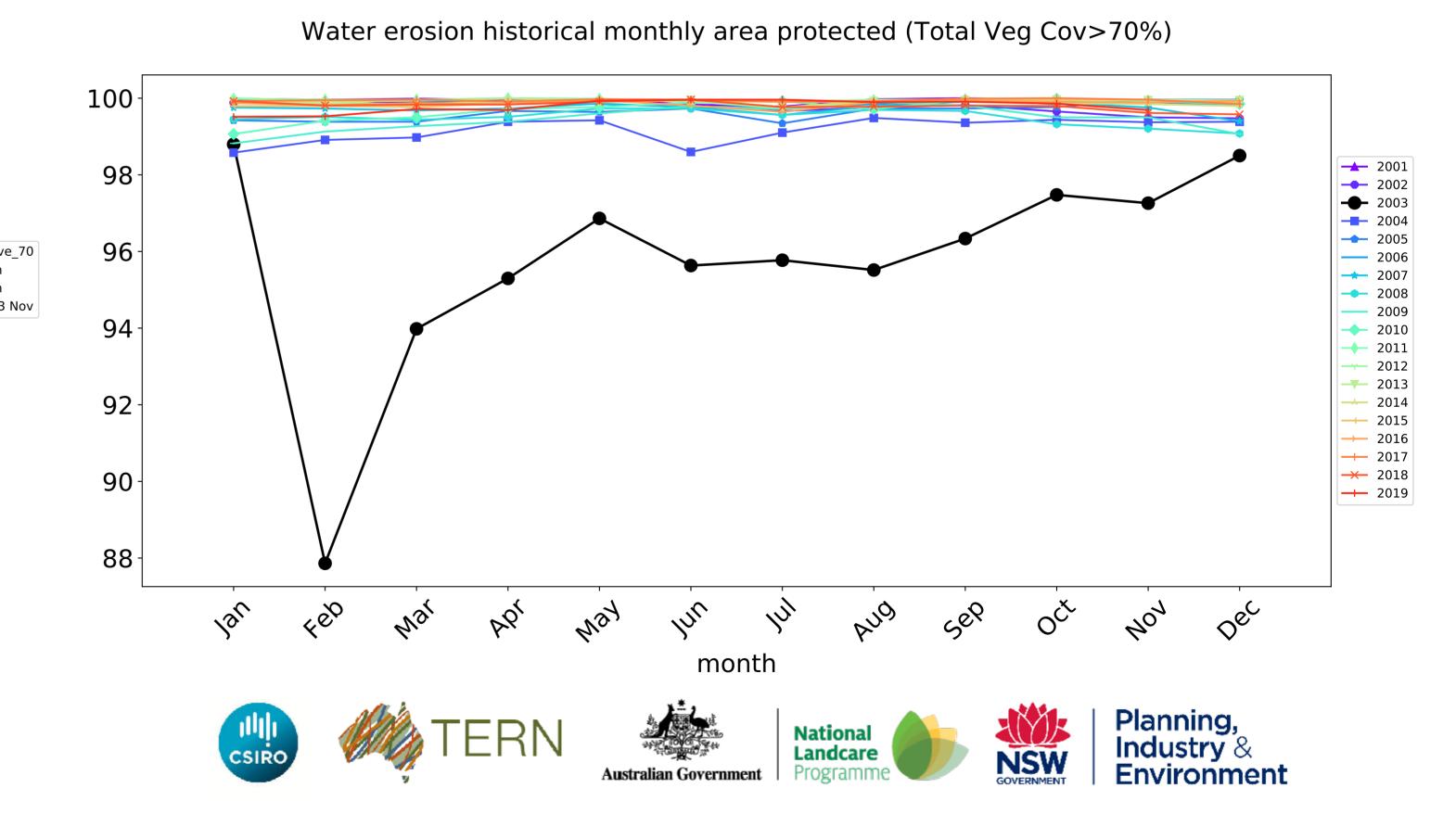








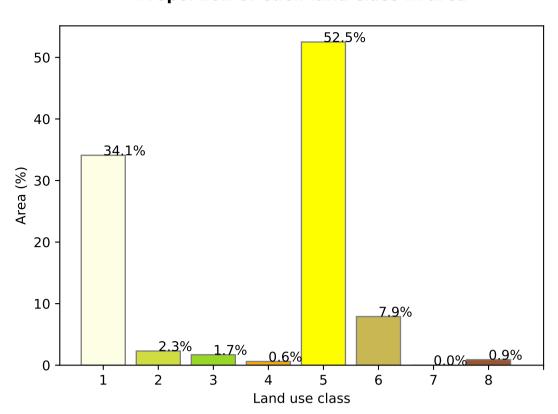




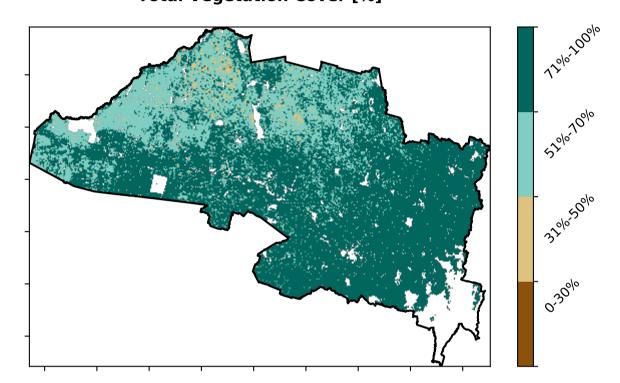
### **Agriculture**

### Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest Derived from 4 Agriculture - Grazing - Irrigated Catchment Scale Land Use of Australia 5 Agriculture - Cropping - Non-irrigated 6 Agriculture - Cropping - Irrigated (2018) and Forests-7 Agriculture - Horticulture - Non-irrigated of Australia (2018) 8 Agriculture - Horticulture - Irrigated

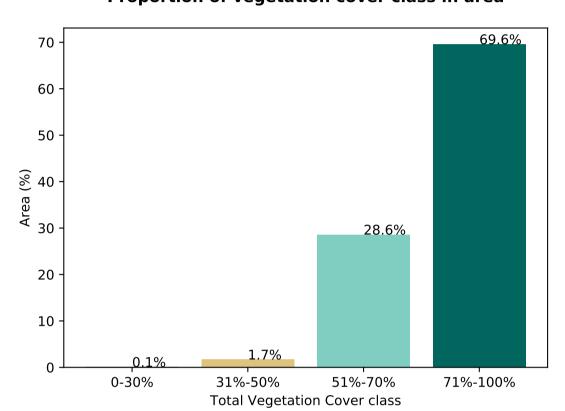
### Proportion of each land class in area



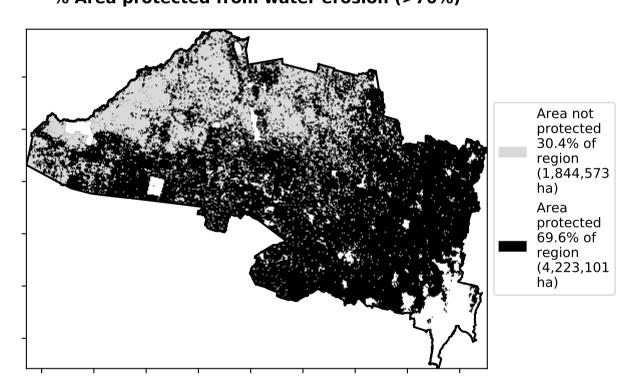




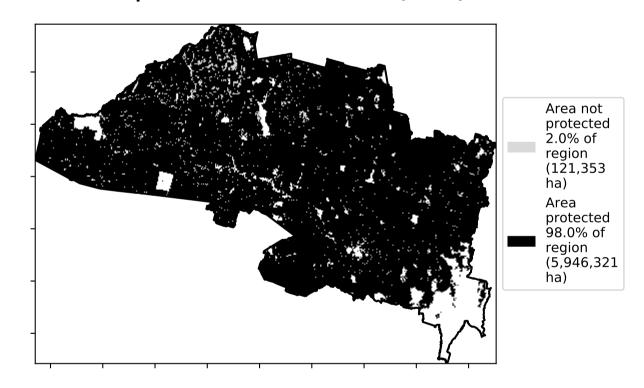
**Proportion of vegetation cover class in area** 



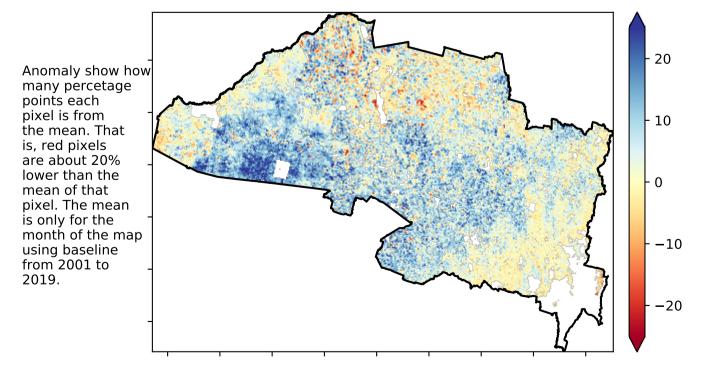
### % Area protected from water erosion (>70%)



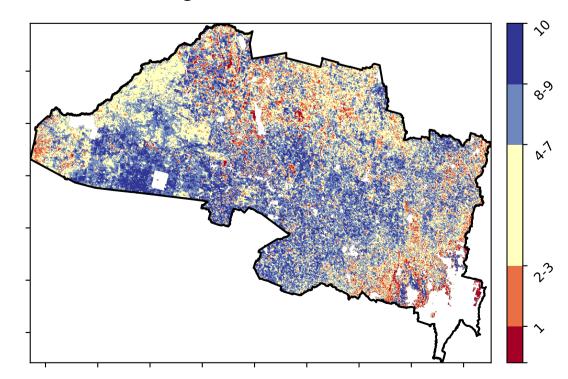
% Area protected from wind erosion (>50%)



### **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 man using baseline. the map using baseline from 2001 to 2019.







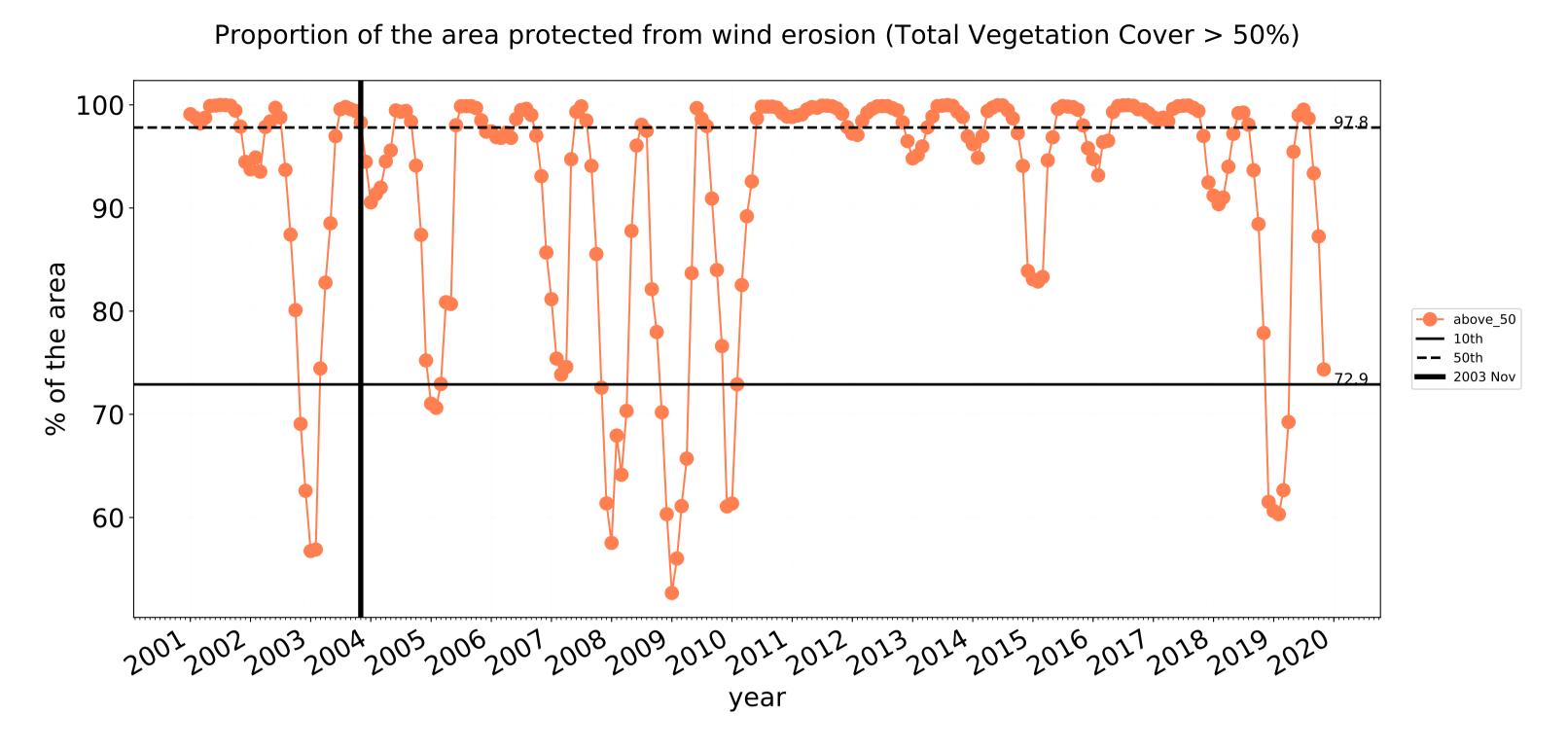






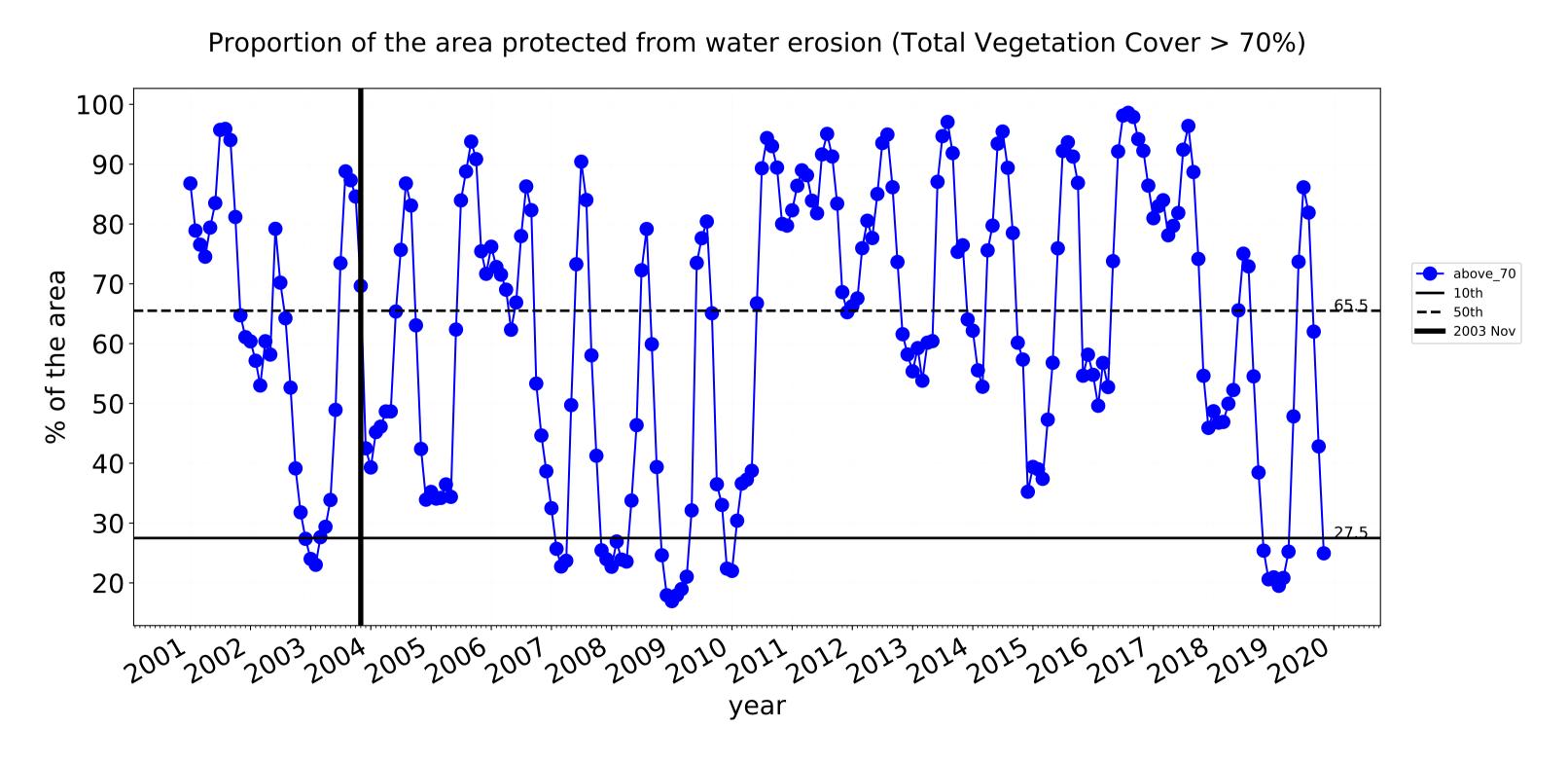


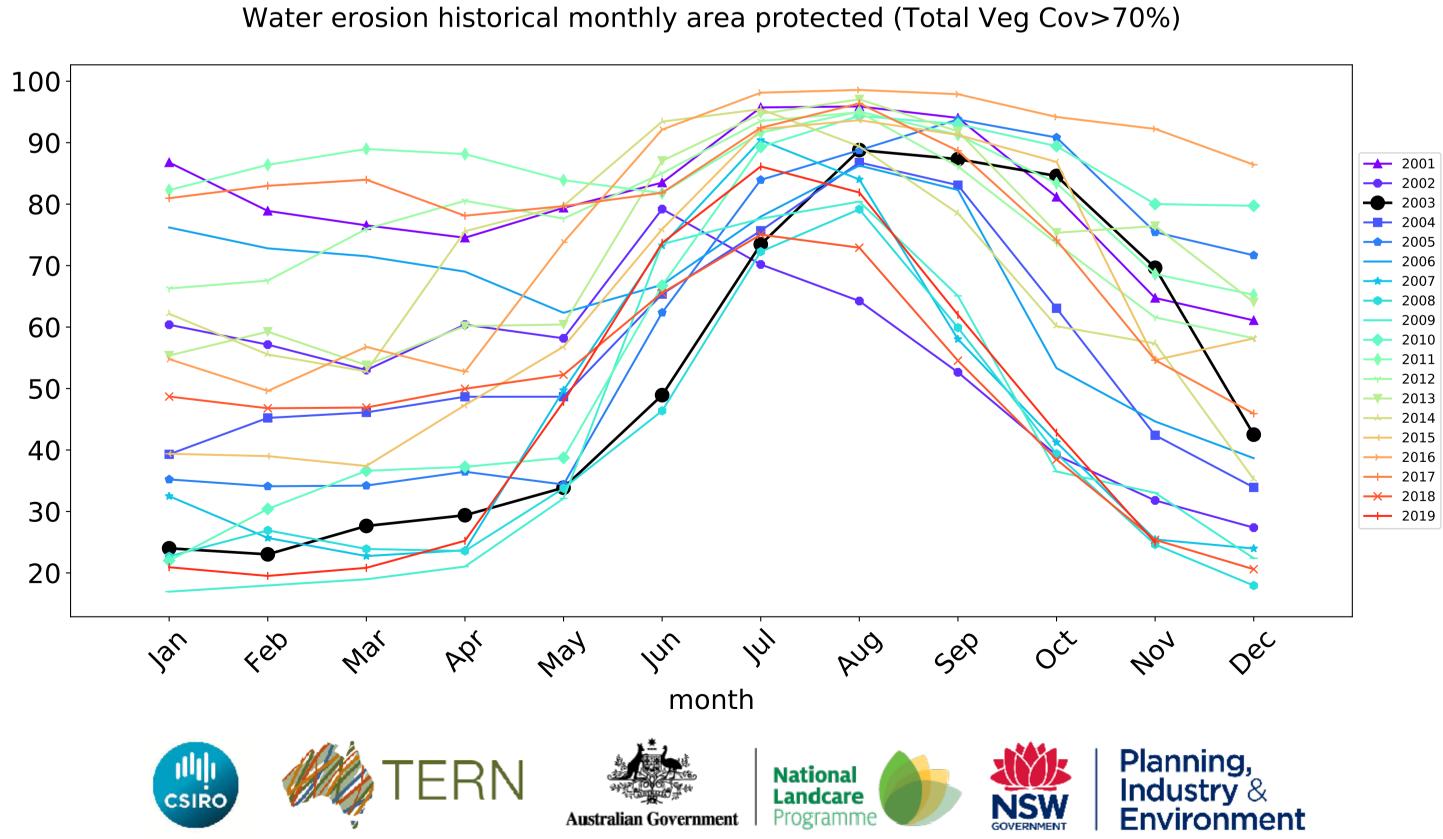
### **Agriculture timeseries**



### Wind erosion historical monthly area protected (Total Veg Cov >50%) 100 90 **---** 2003 80 2009 **~** 2010 2012 2013 70 \_ 2014 <del>←</del> 2015 **→** 2016 <del>----</del> 2017 <del>×</del> 2018 60 <del>----</del> 2019

month





### **Grazing**

20

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

### 89.4%

**Proportion of each land class in area** 

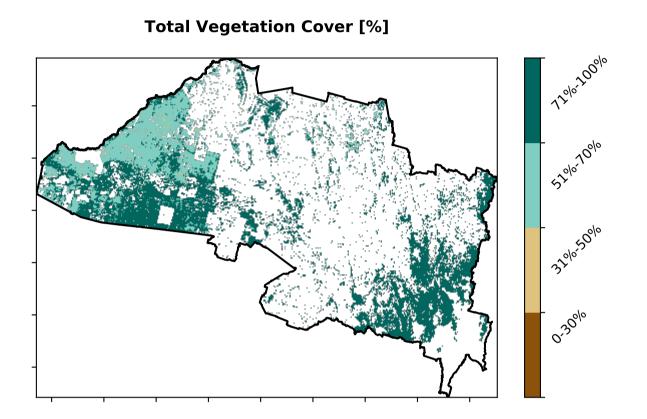
### Proportion of vegetation cover class in area

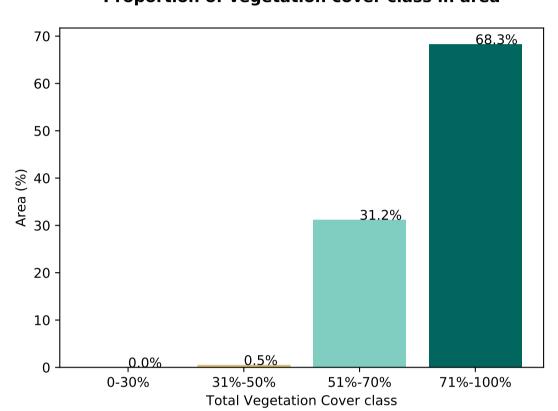
Land use class

6.1%

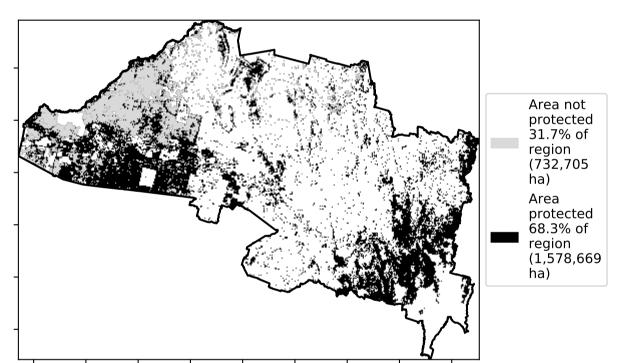
4.5%

3

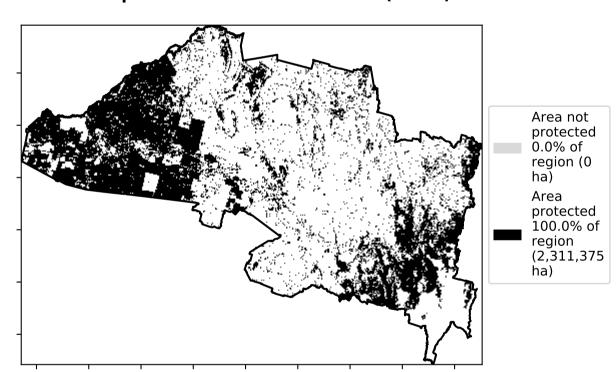




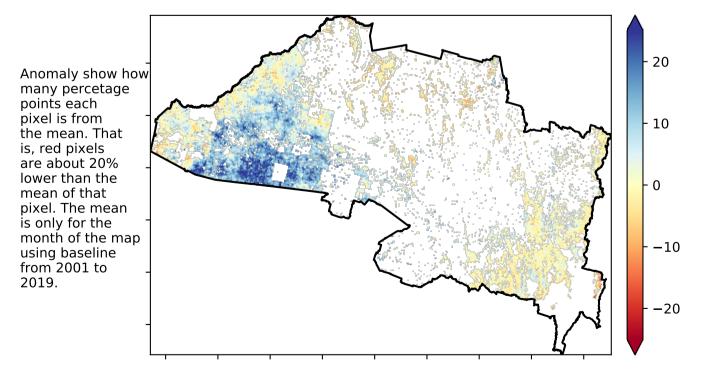
### % Area protected from water erosion (>70%)



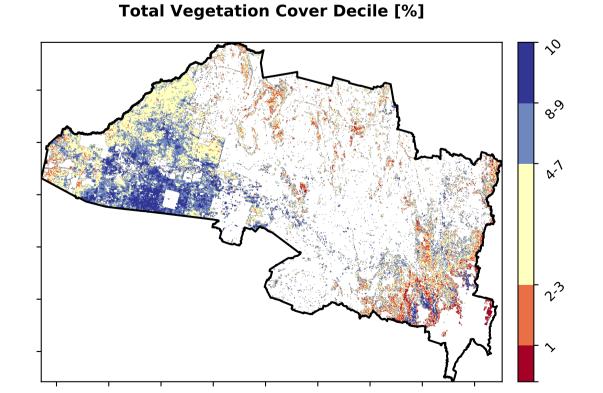
% Area protected from wind erosion (>50%)



### Total Vegetation Cover Anomaly [%]



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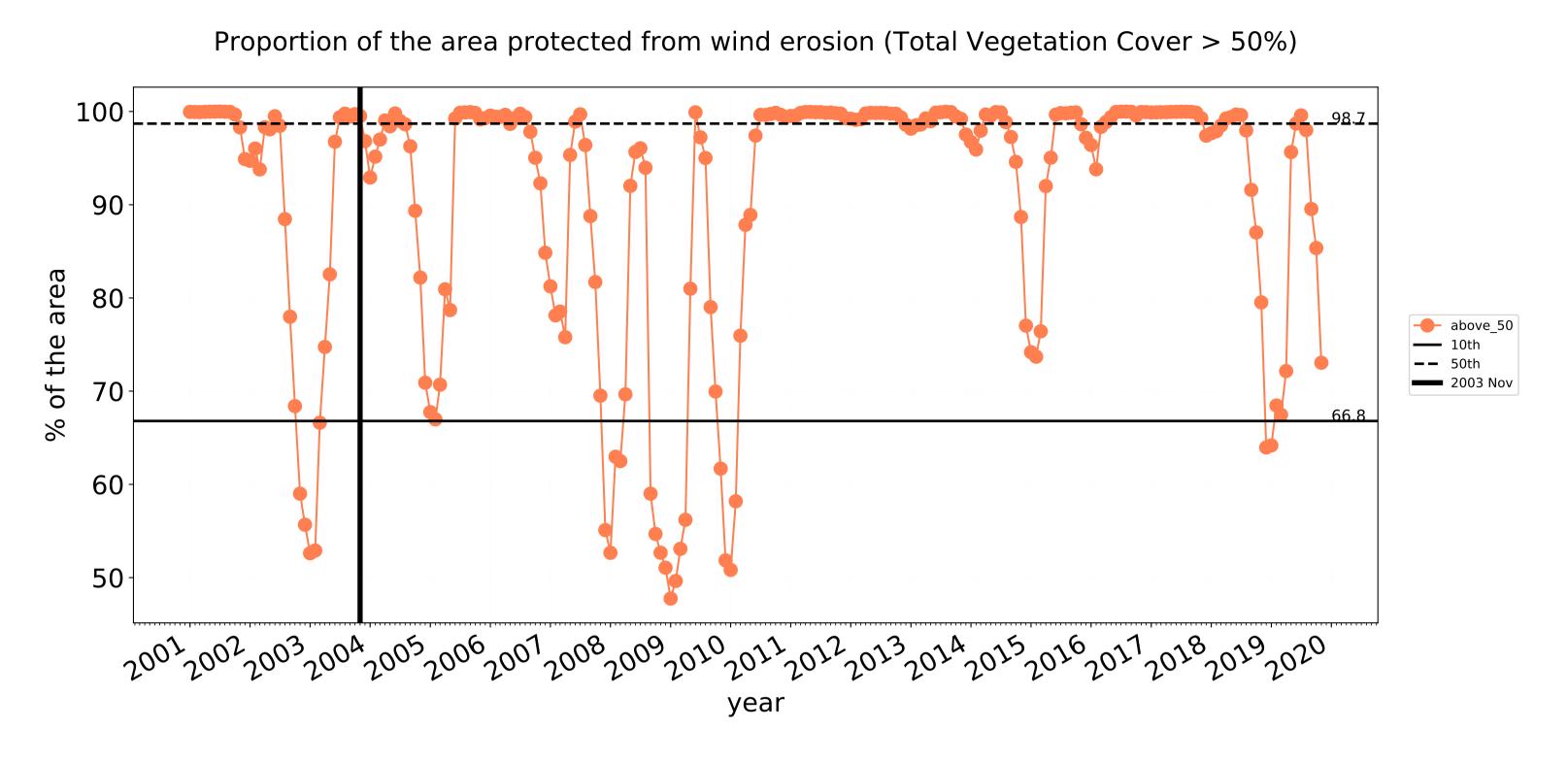


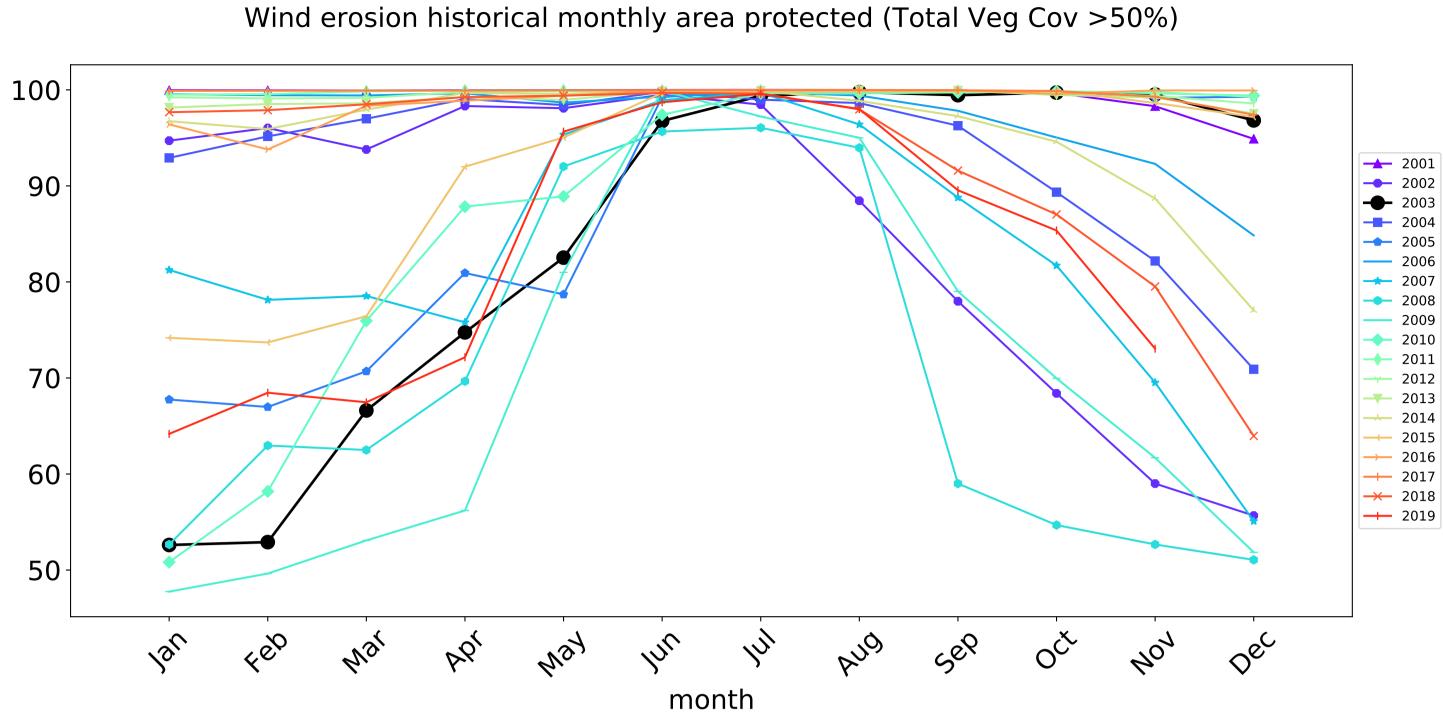


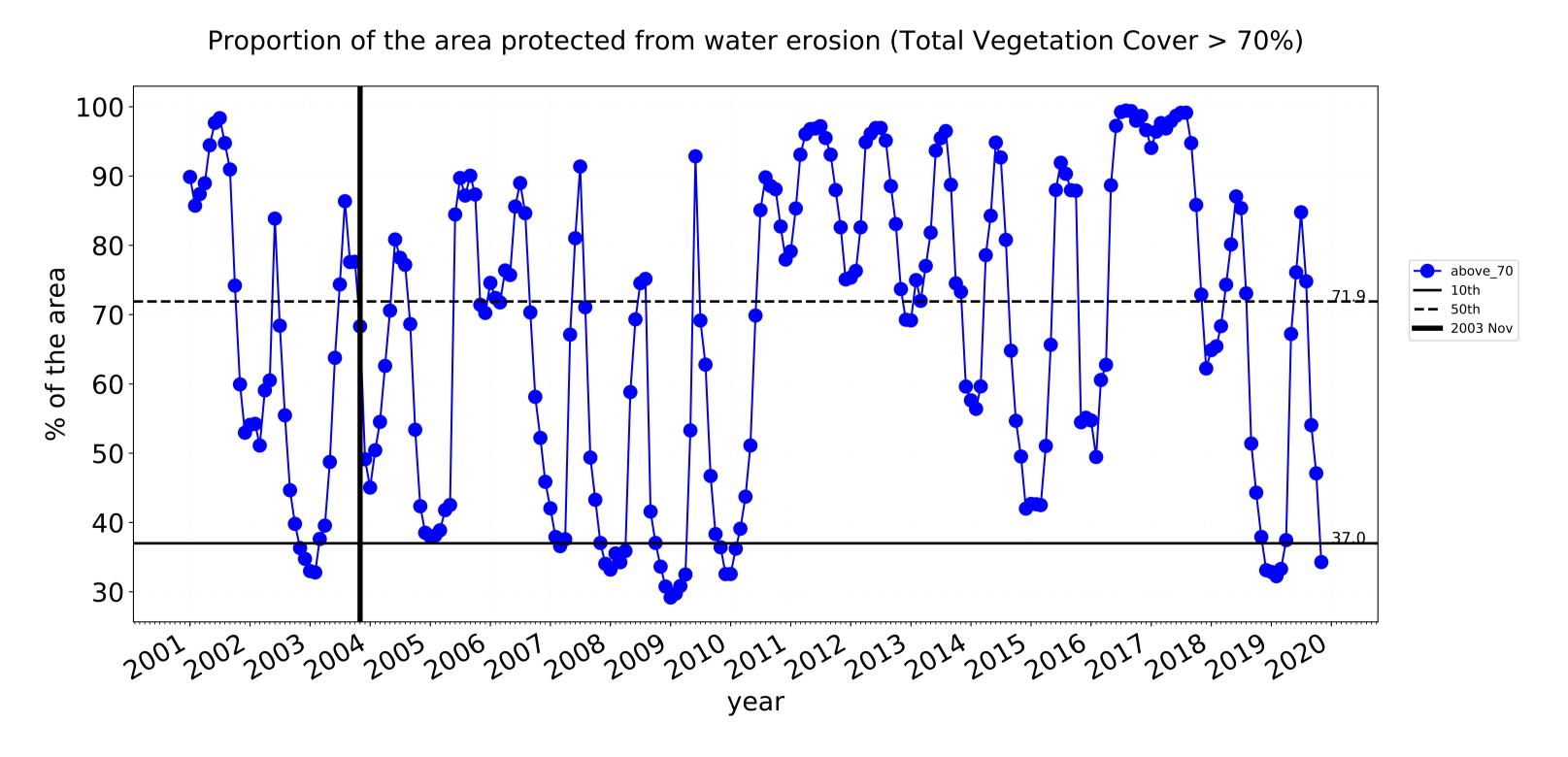


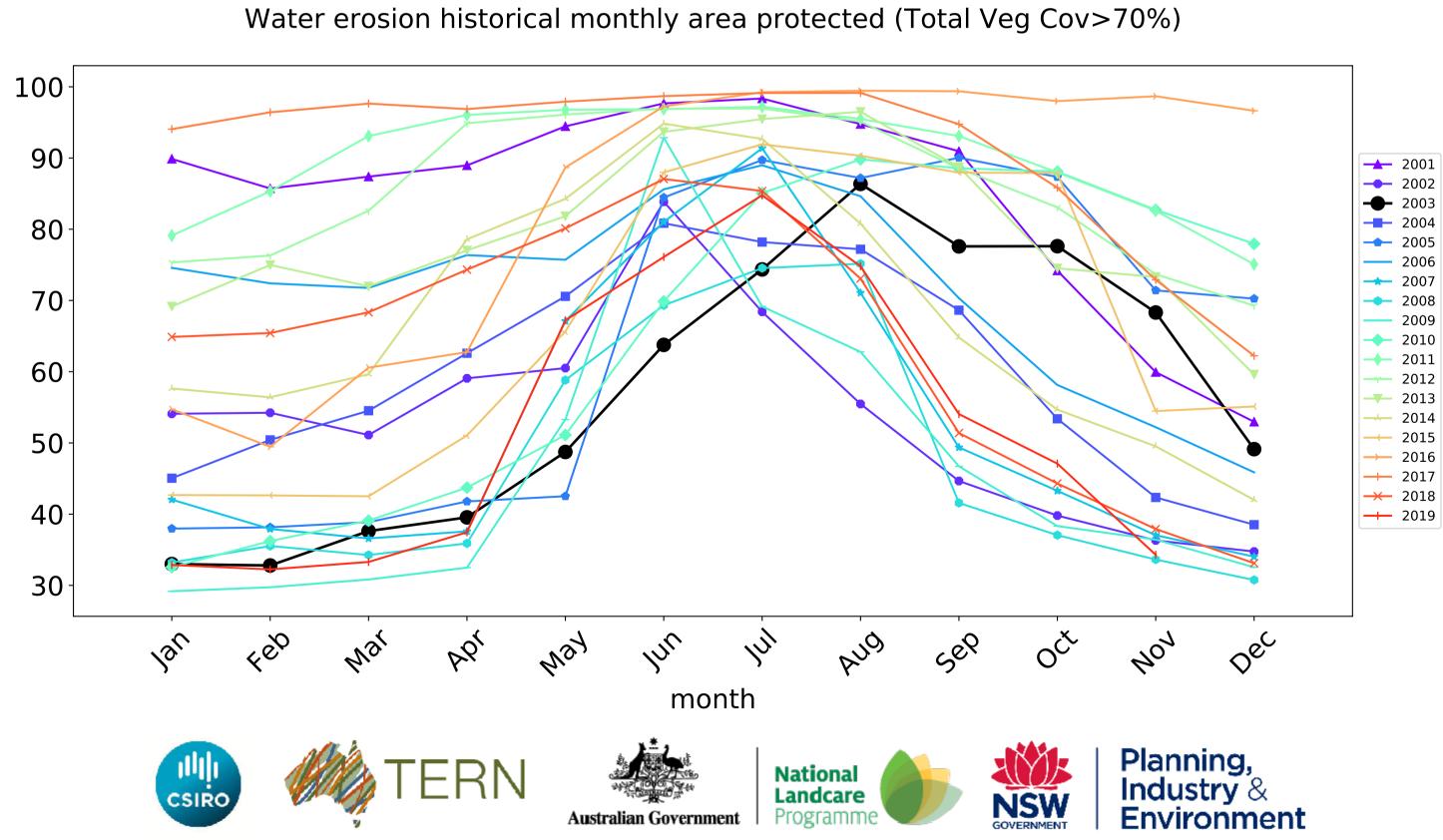


### **Grazing timeseries**



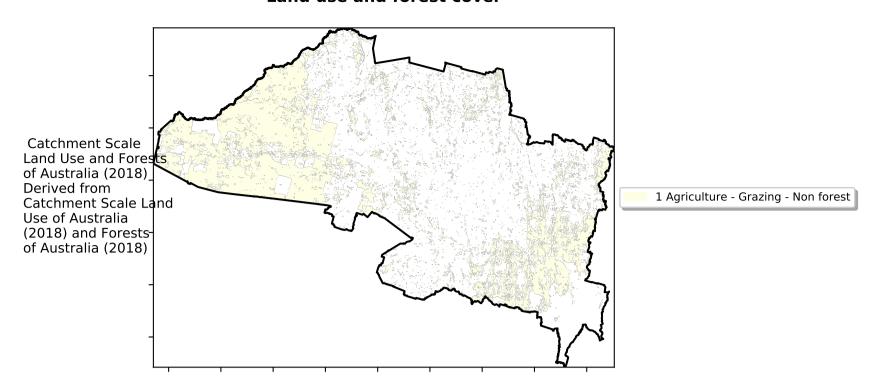




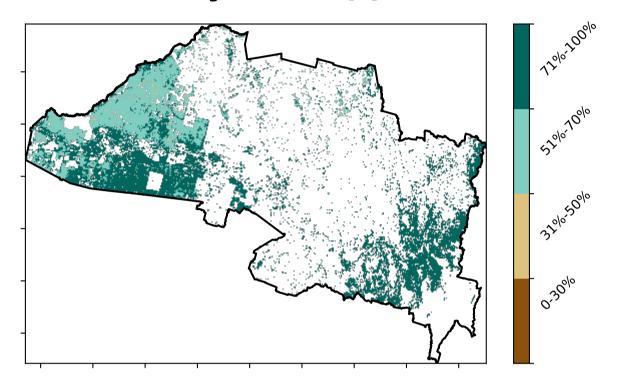


### **Grazing non forest**

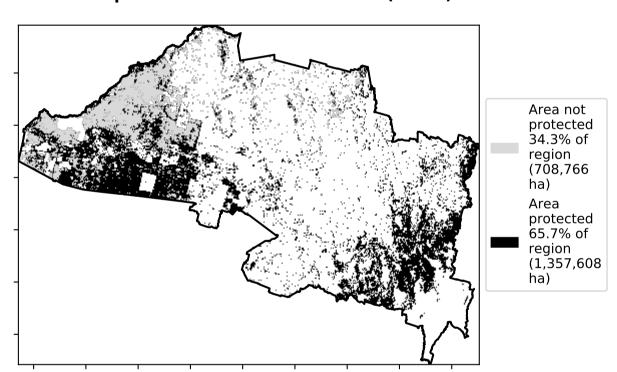
### Land use and forest cover



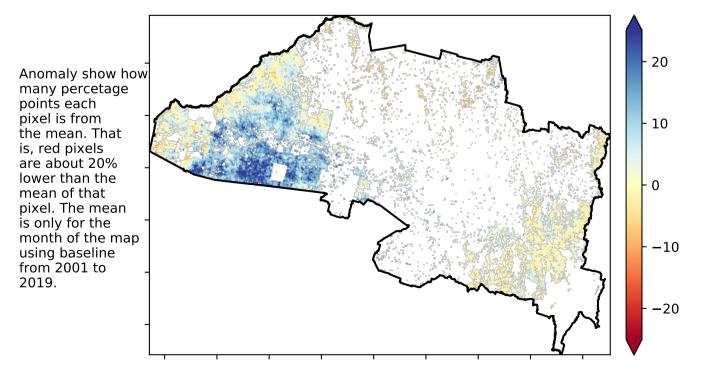
### **Total Vegetation Cover [%]**



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

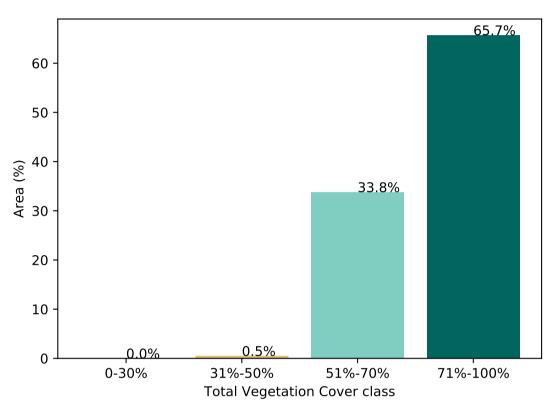


### Total Vegetation Cover Anomaly [%]

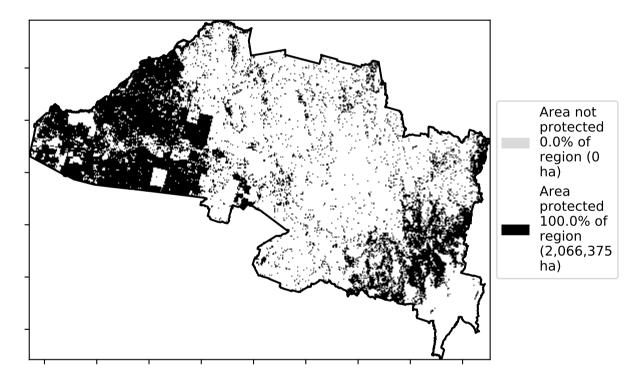


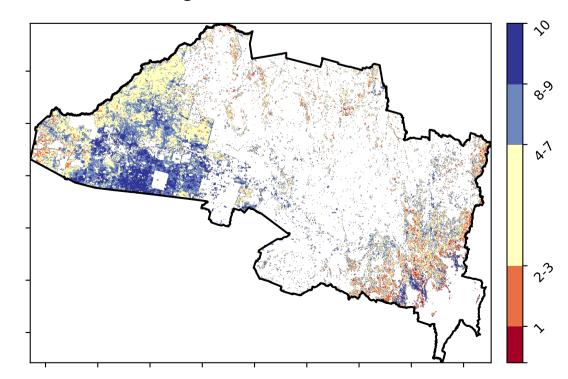
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### Proportion of vegetation cover class in area



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









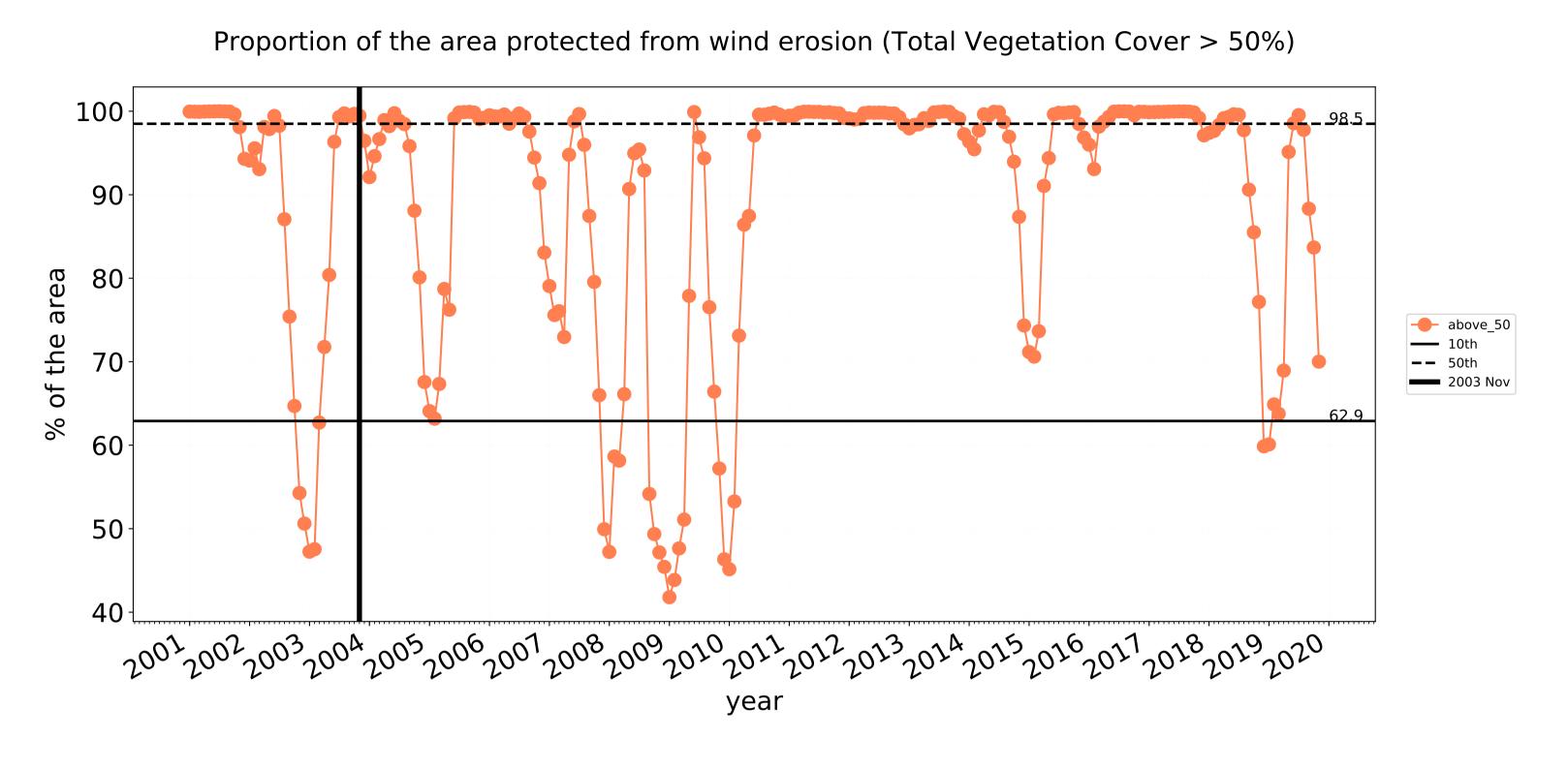


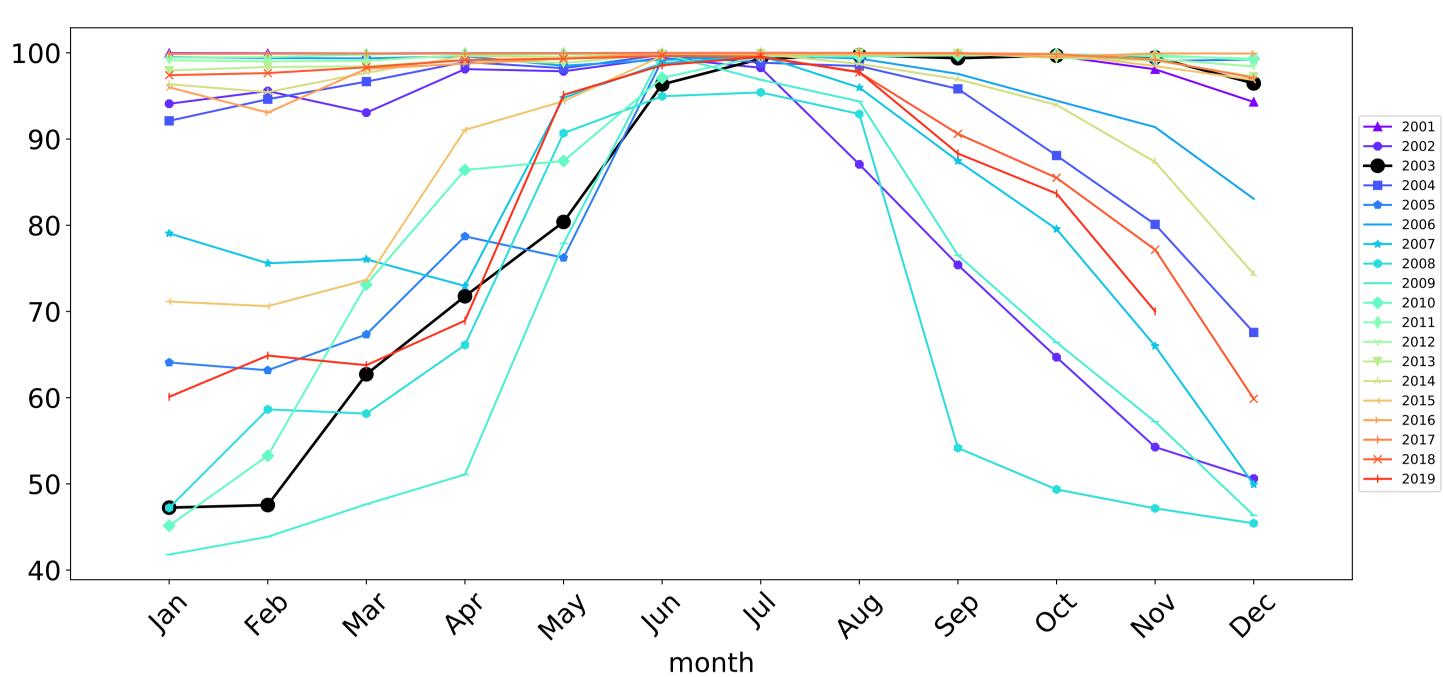




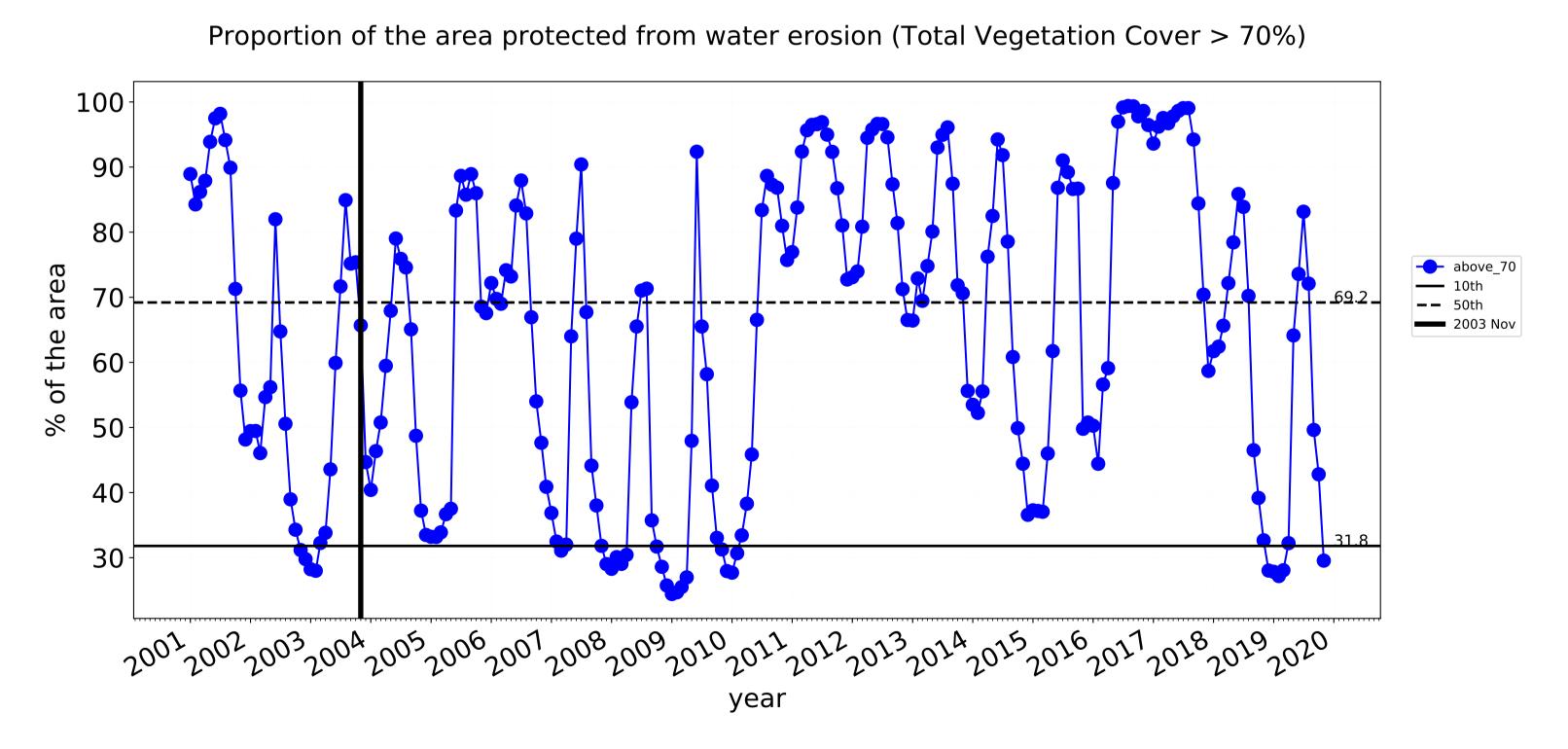


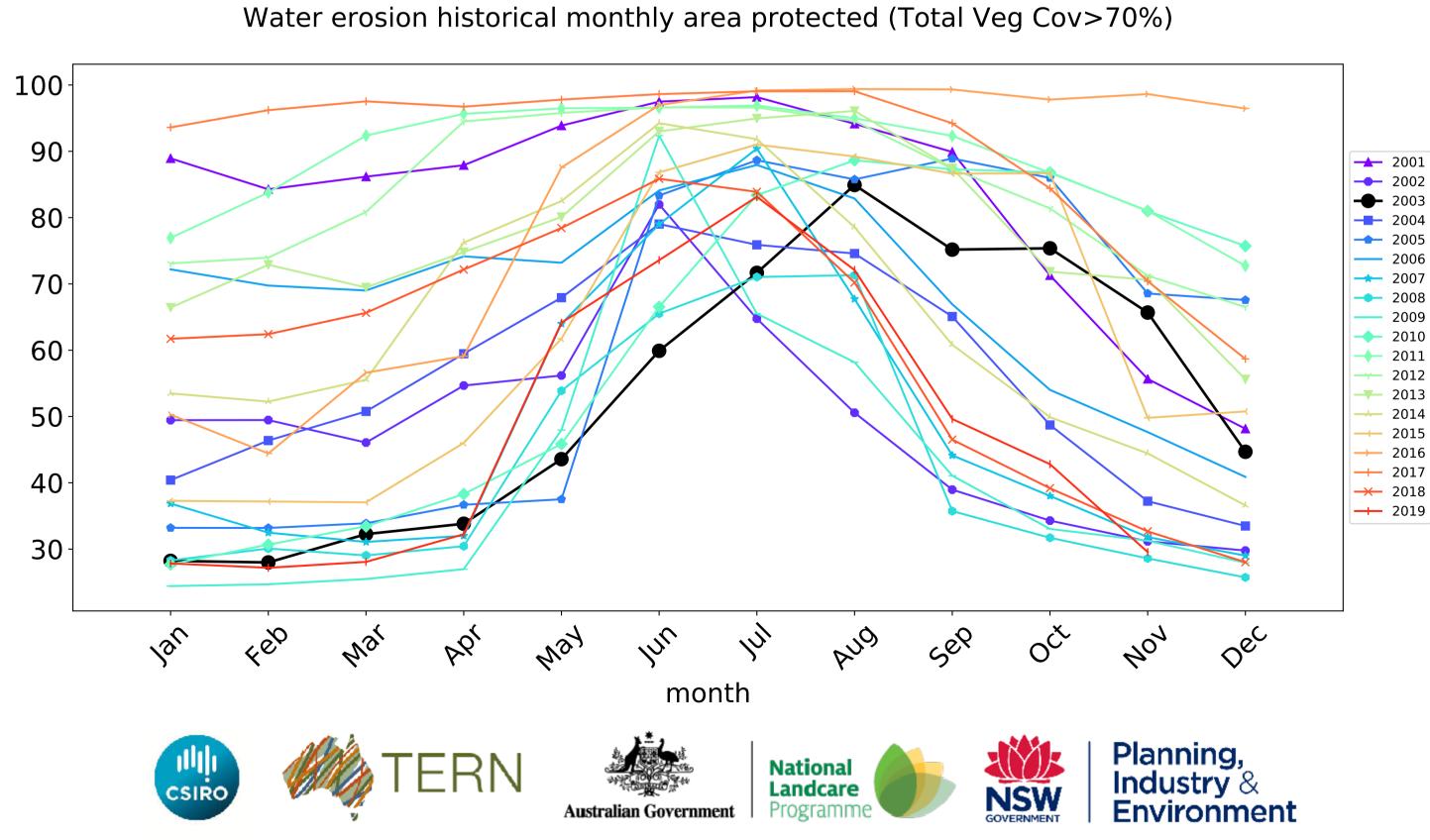
### **Grazing non forest timeseries**





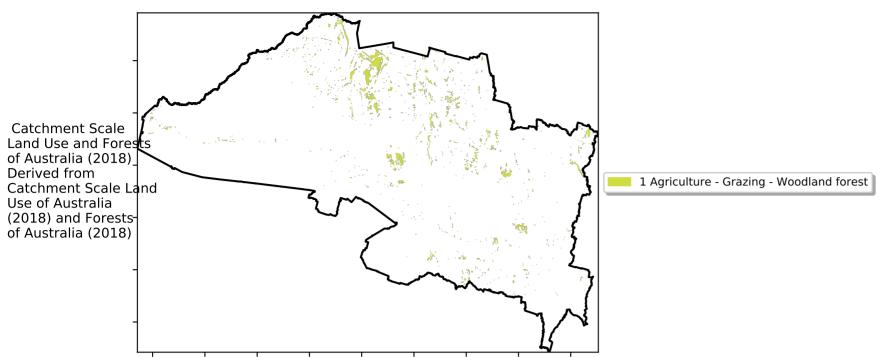
Wind erosion historical monthly area protected (Total Veg Cov >50%)



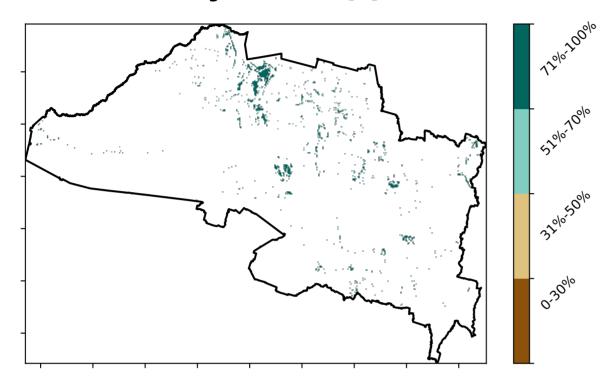


### **Grazing Woodland forest**

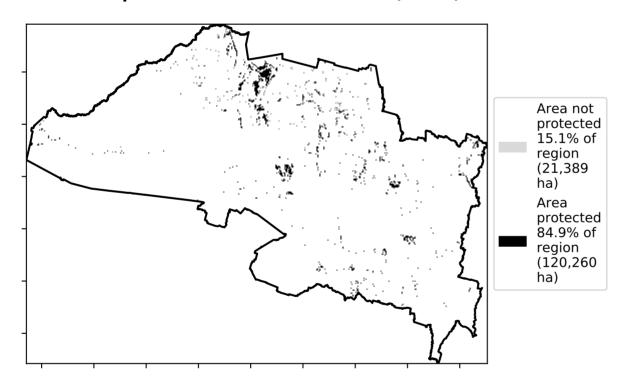
### Land use and forest cover



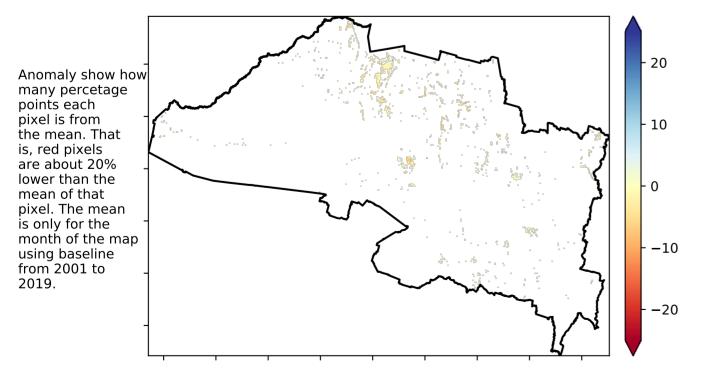
### **Total Vegetation Cover [%]**



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

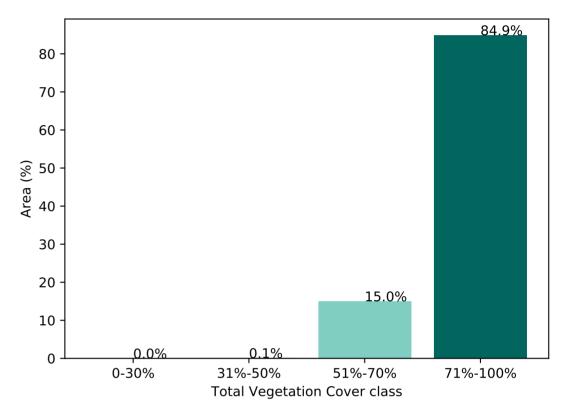


### Total Vegetation Cover Anomaly [%]

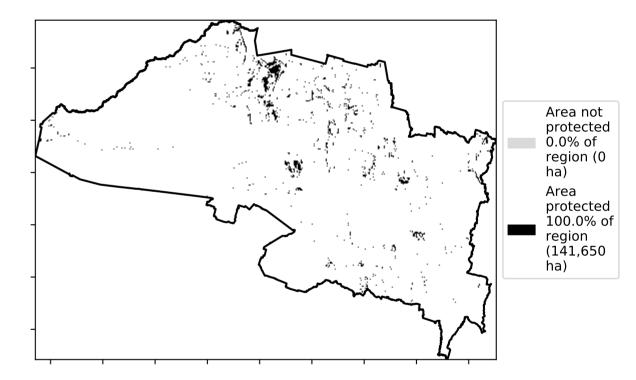


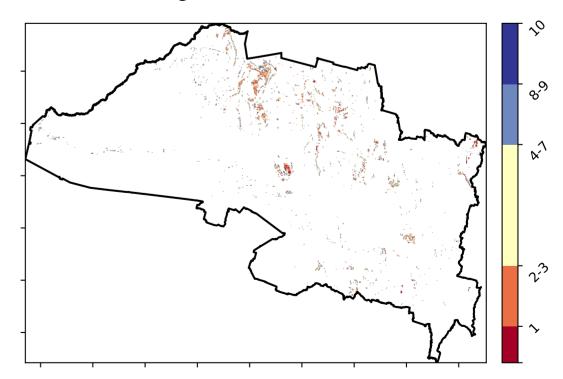
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### Proportion of vegetation cover class in area



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









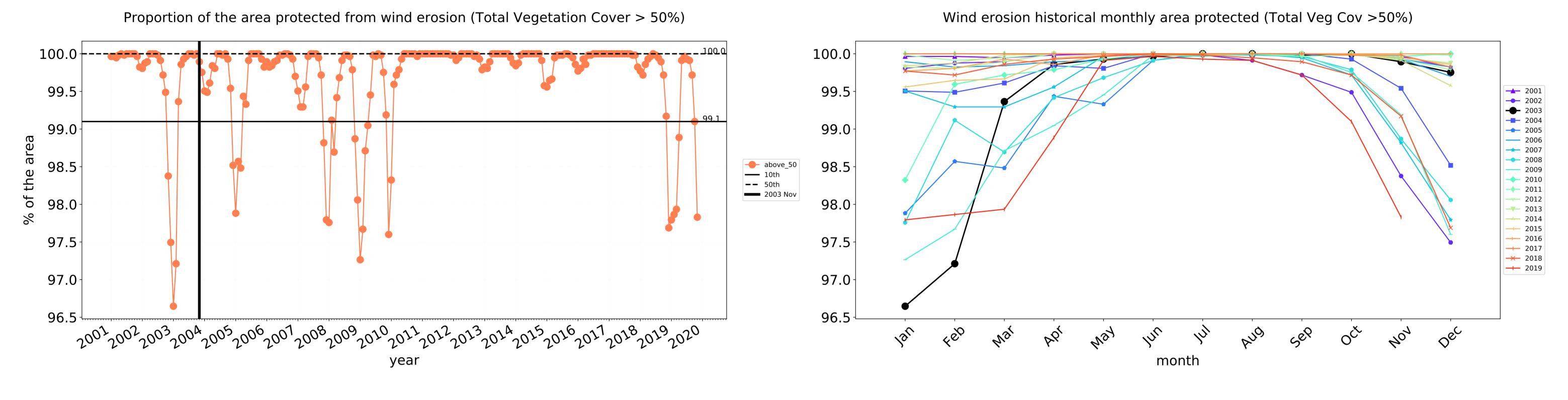


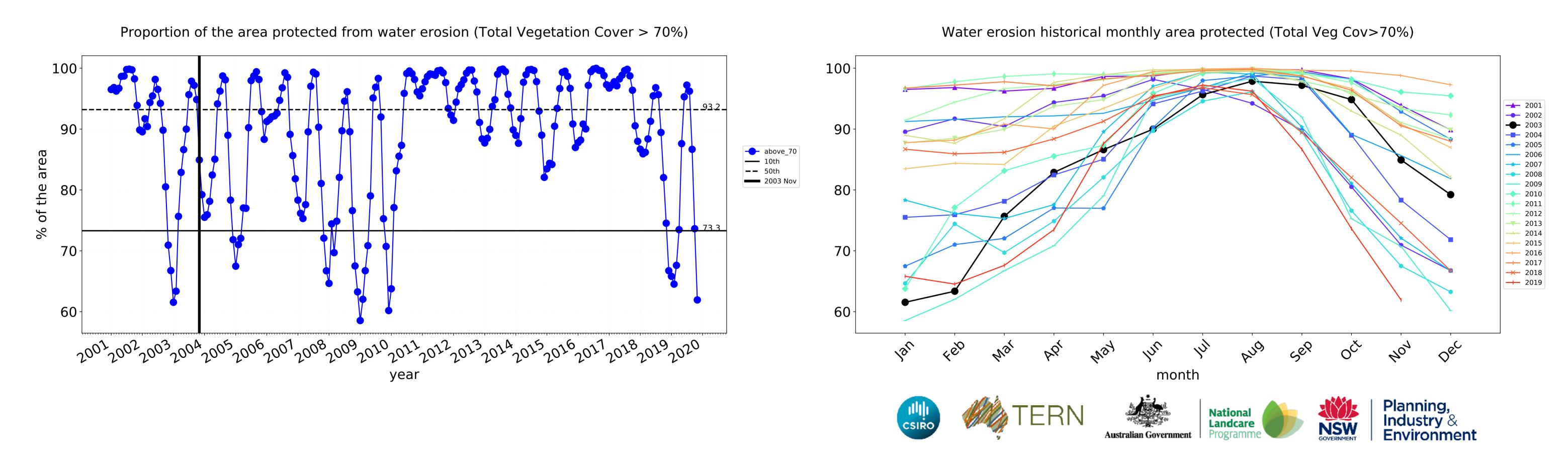






### **Grazing Woodland forest timeseries**



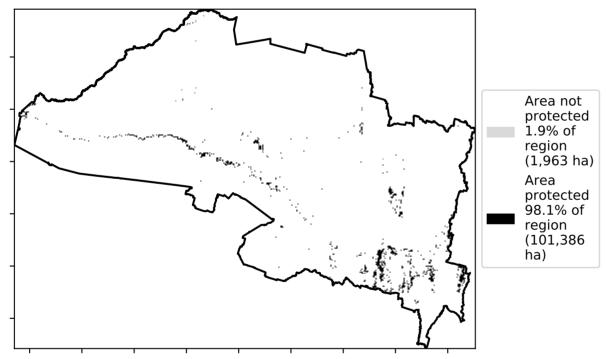


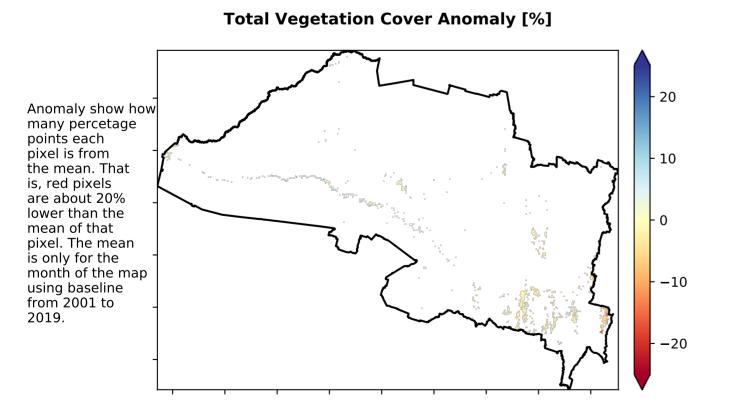
### **Grazing - Forest (non woodland)**

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

## Total Vegetation Cover [%]

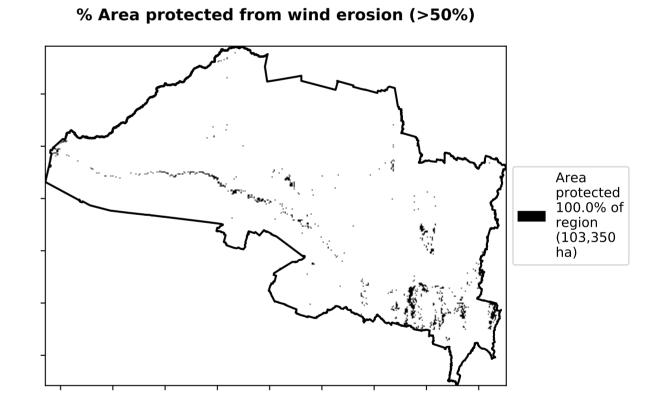
### % Area protected from water erosion (>70%) Area not protected 1.9% of region

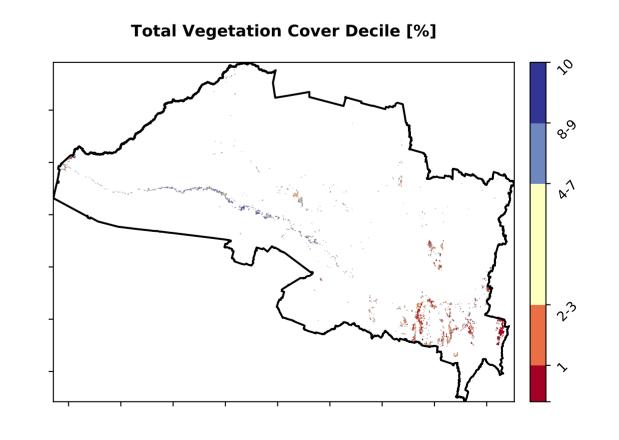




Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

# Proportion of vegetation cover class in area 100 - 98.1% 80 - 60 - 40 - 20 - 0.0% 0.0% 1.9% O-30% 31%-50% 51%-70% 71%-100% Total Vegetation Cover class







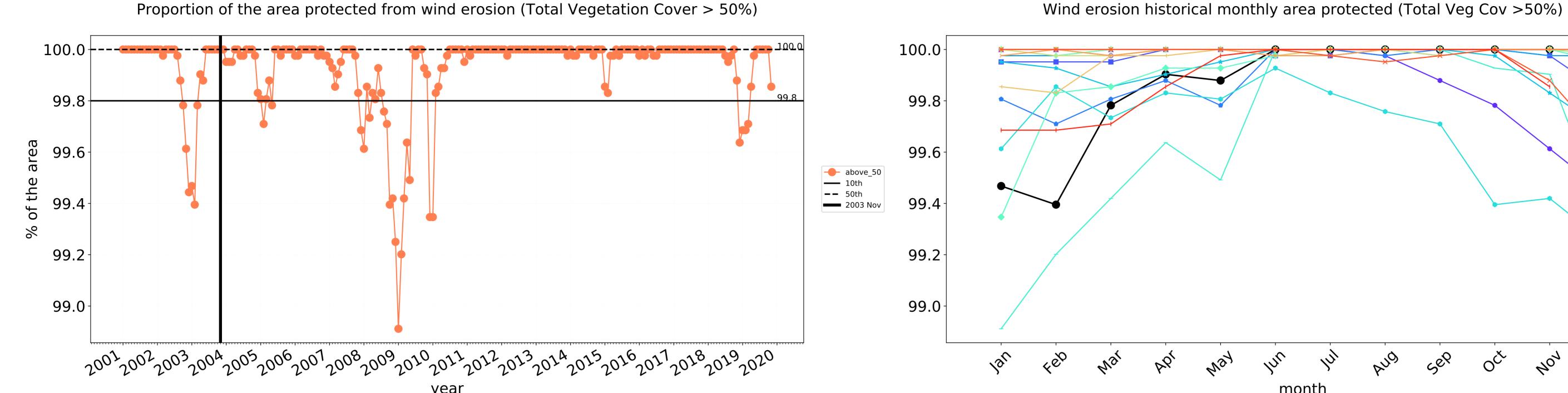


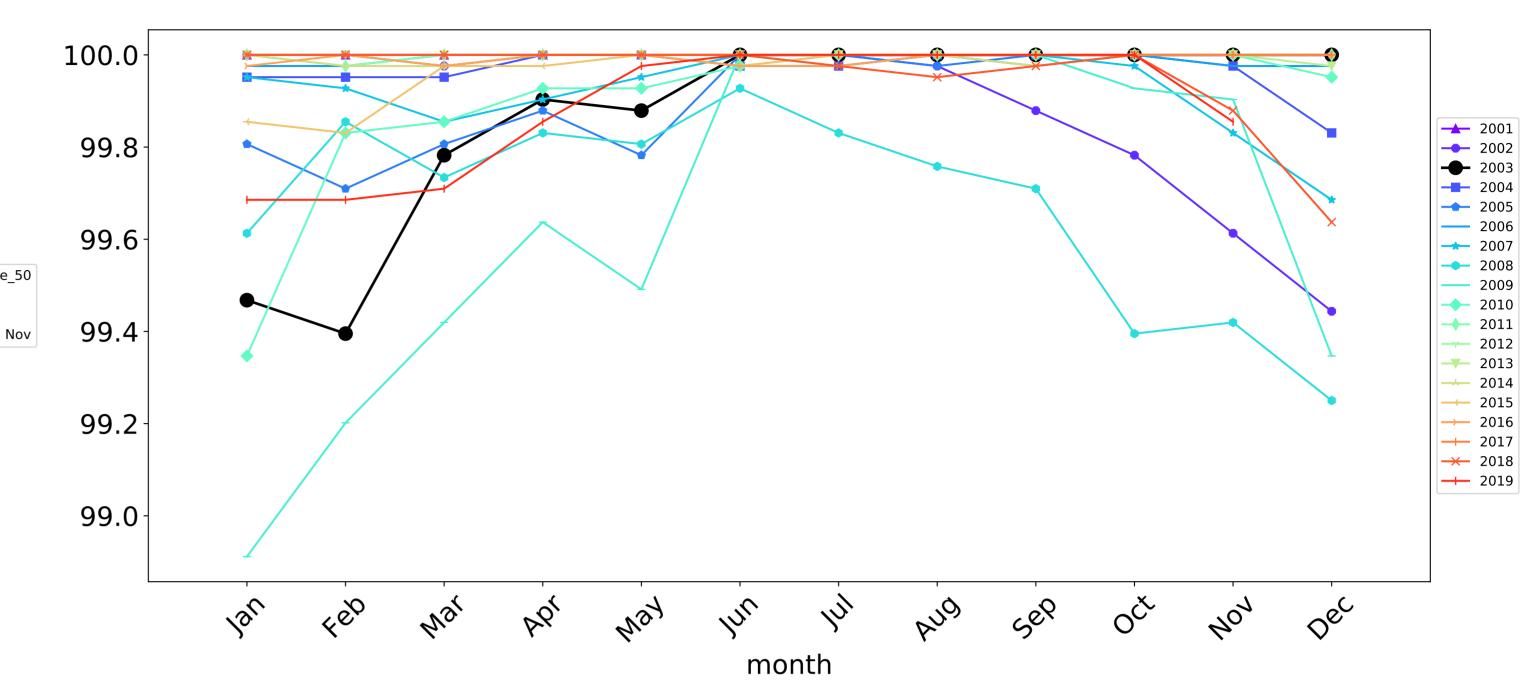


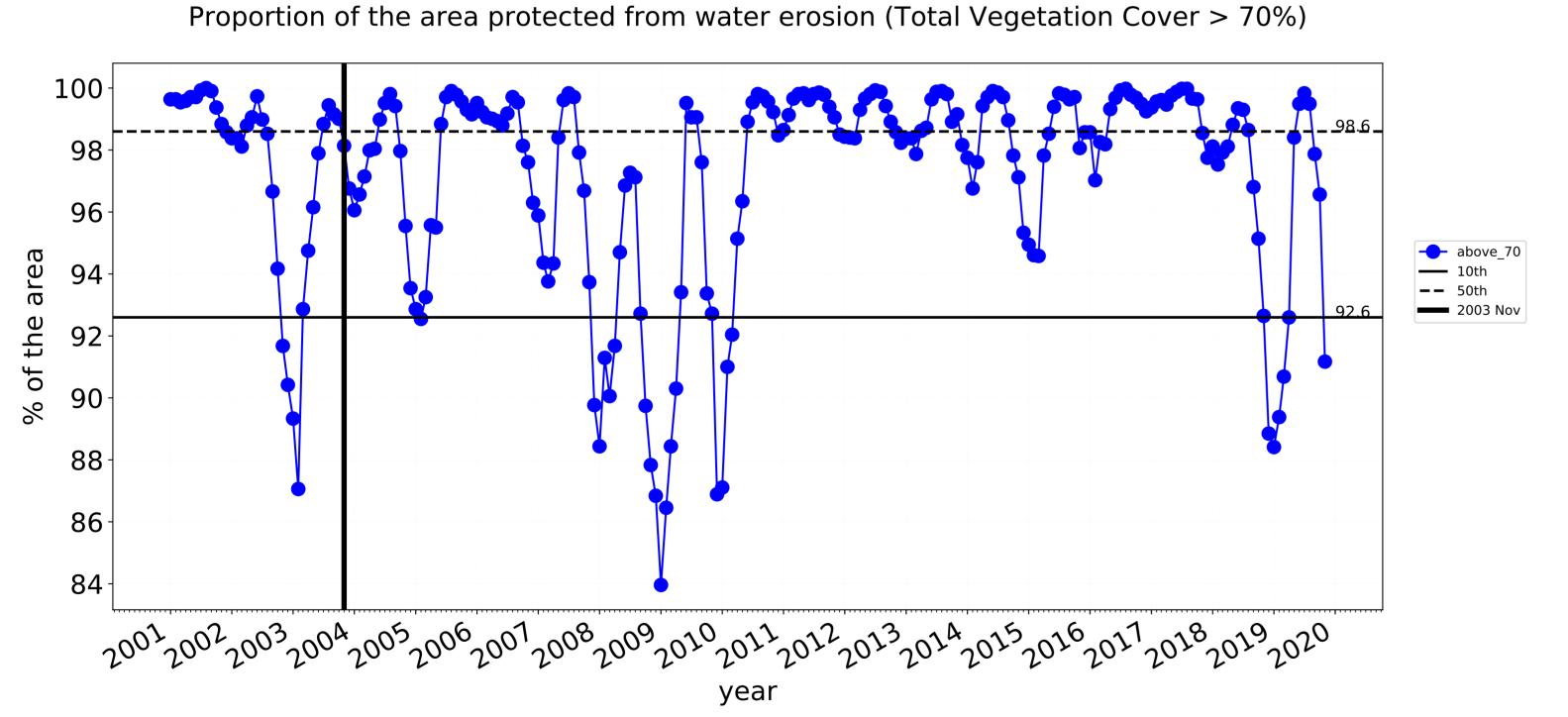


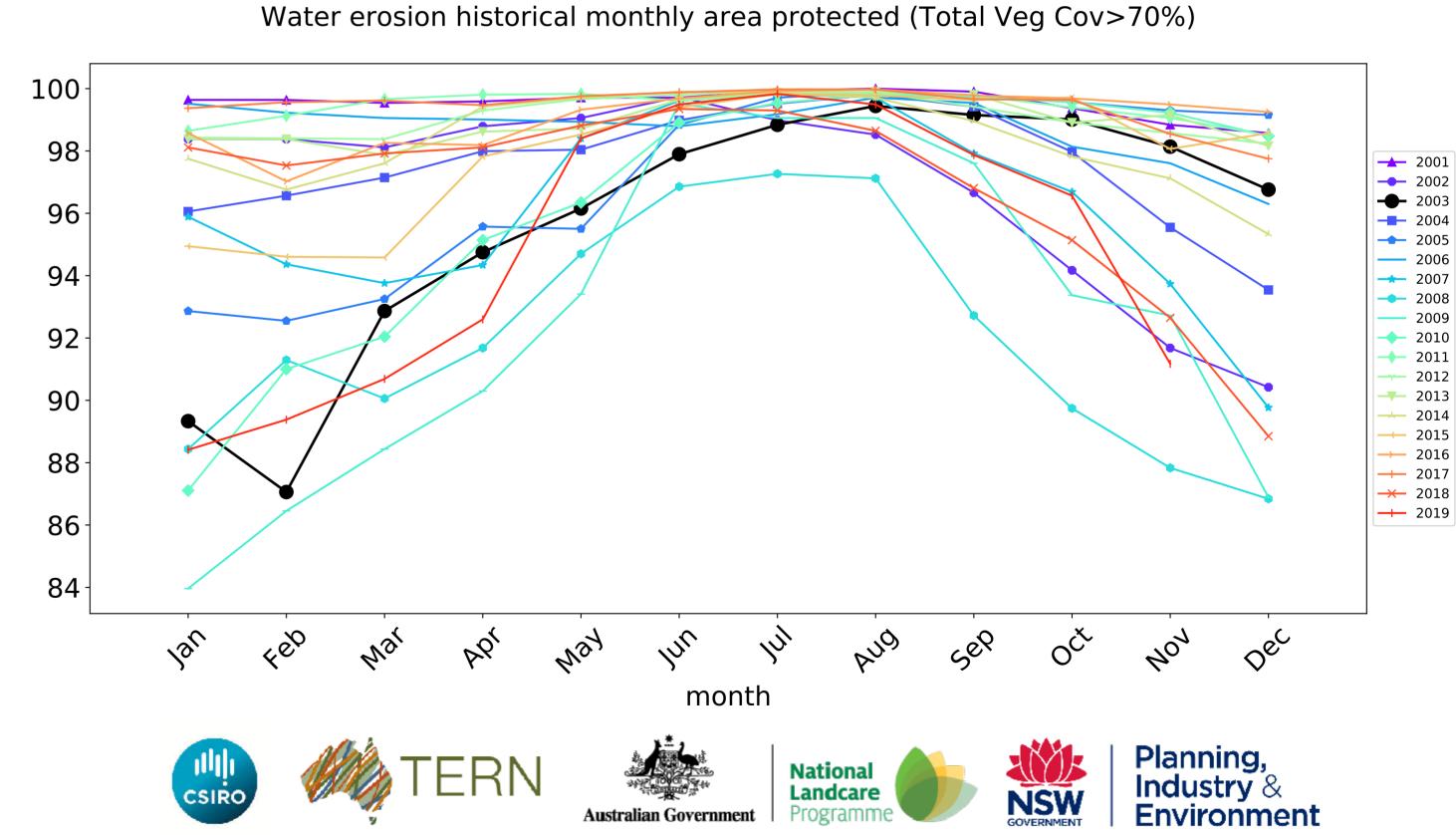






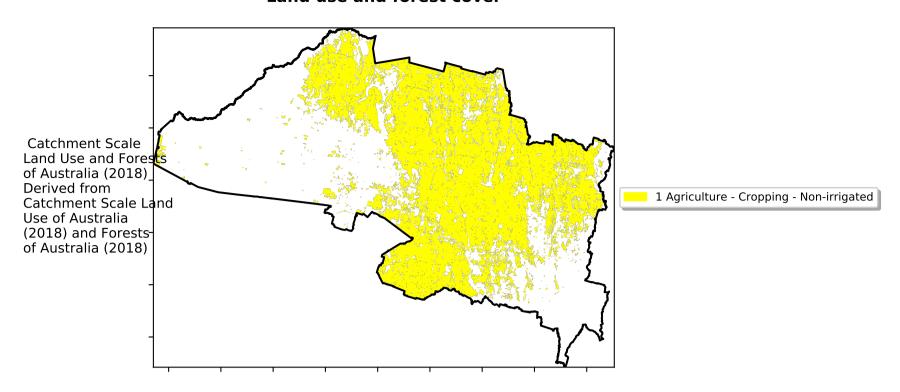




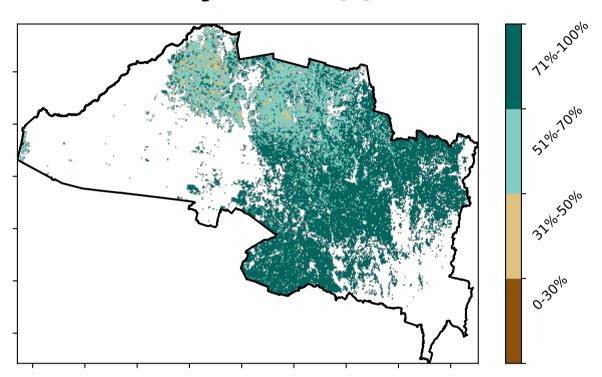


### **Cropping**

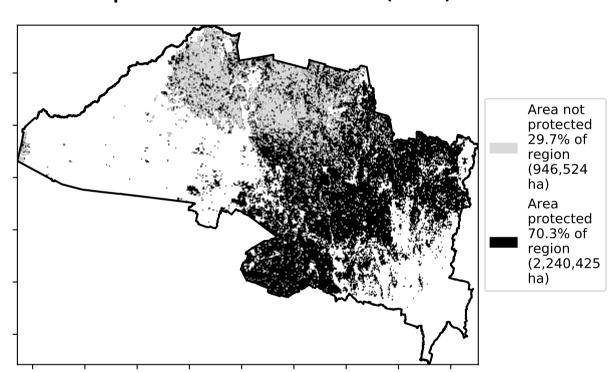
### Land use and forest cover



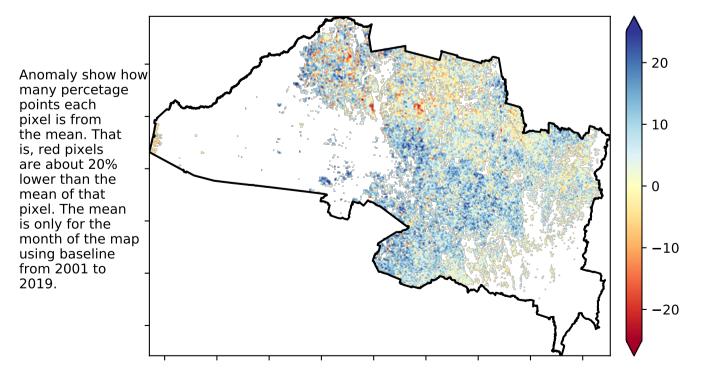
### **Total Vegetation Cover [%]**



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

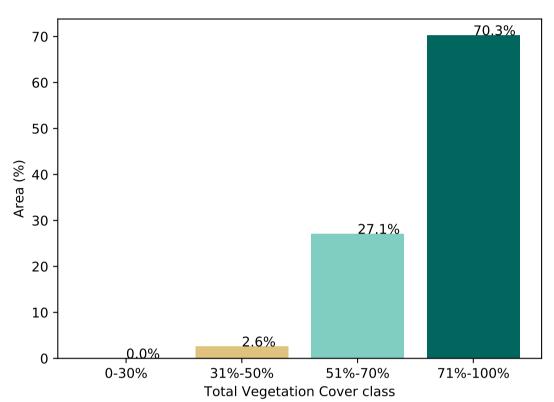


### **Total Vegetation Cover Anomaly [%]**

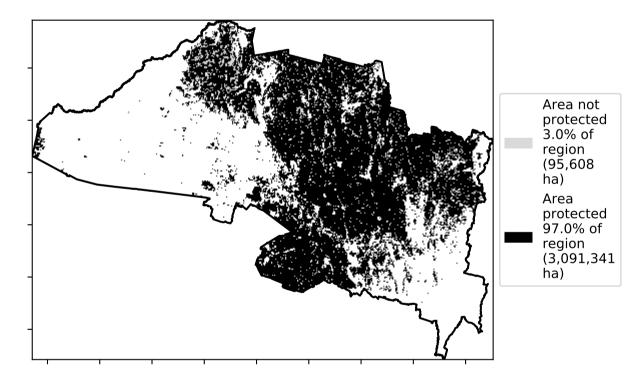


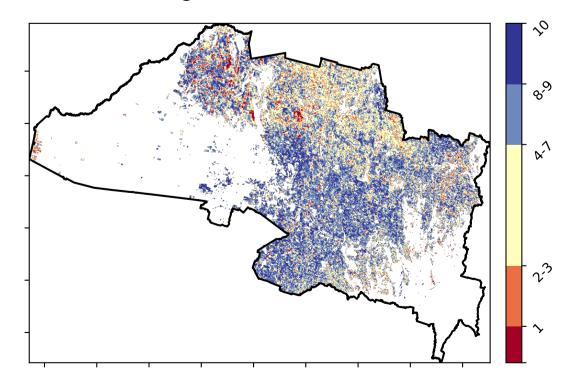
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

### Proportion of vegetation cover class in area



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









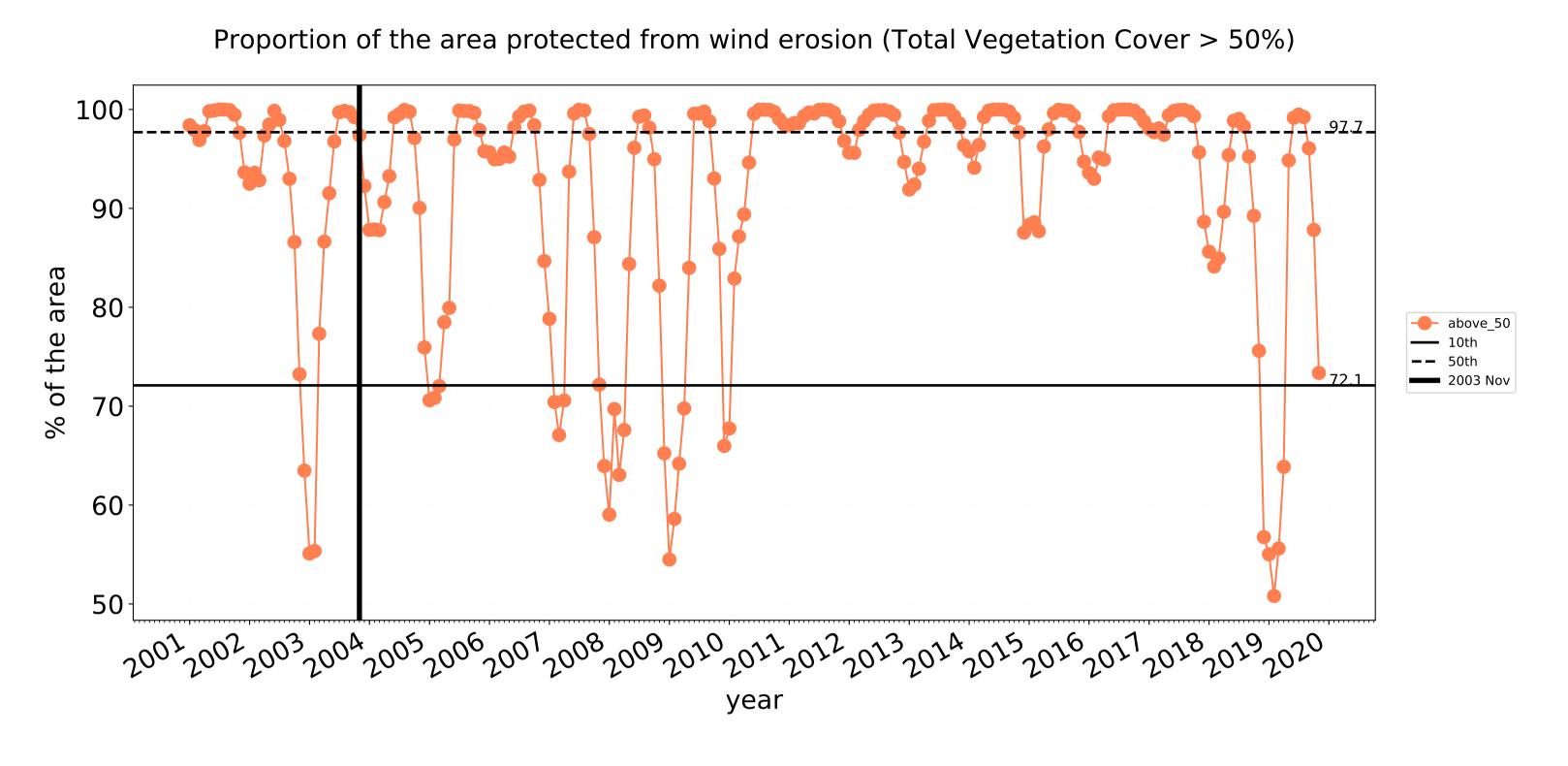


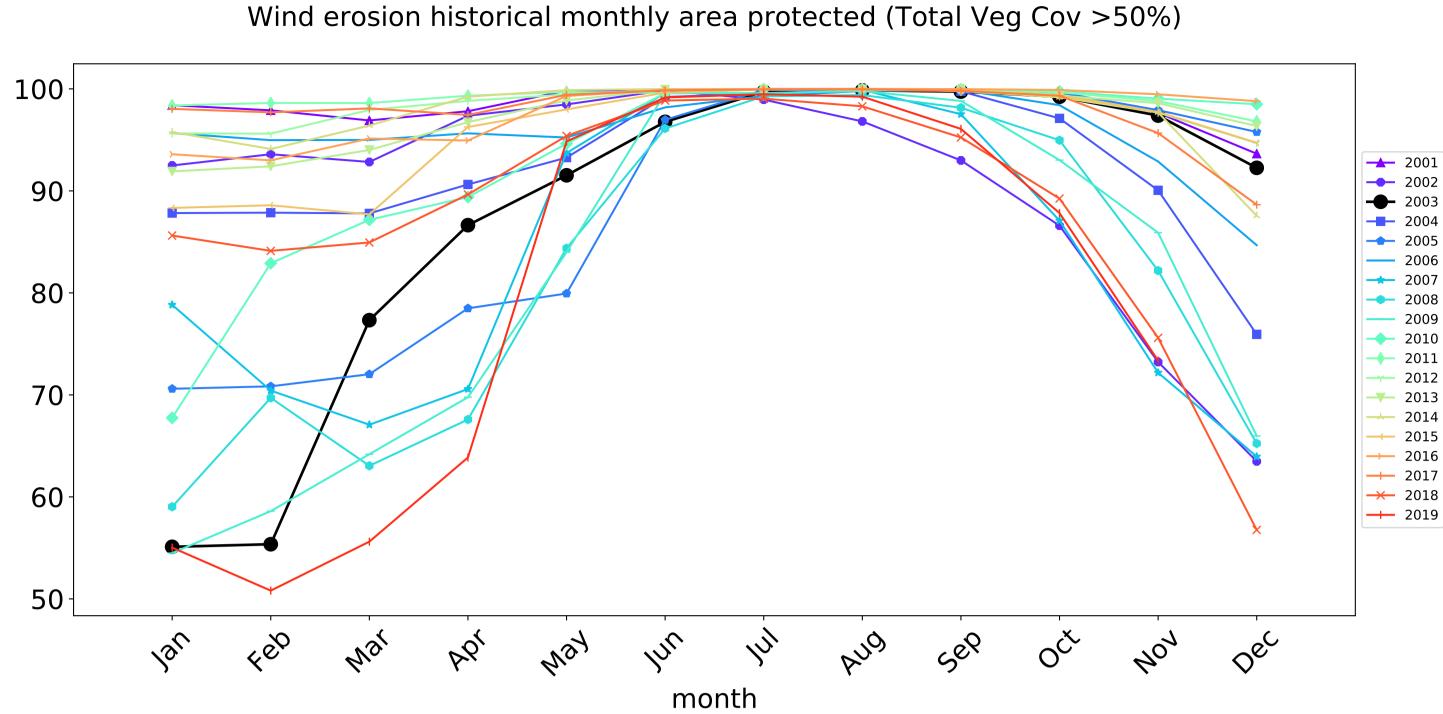


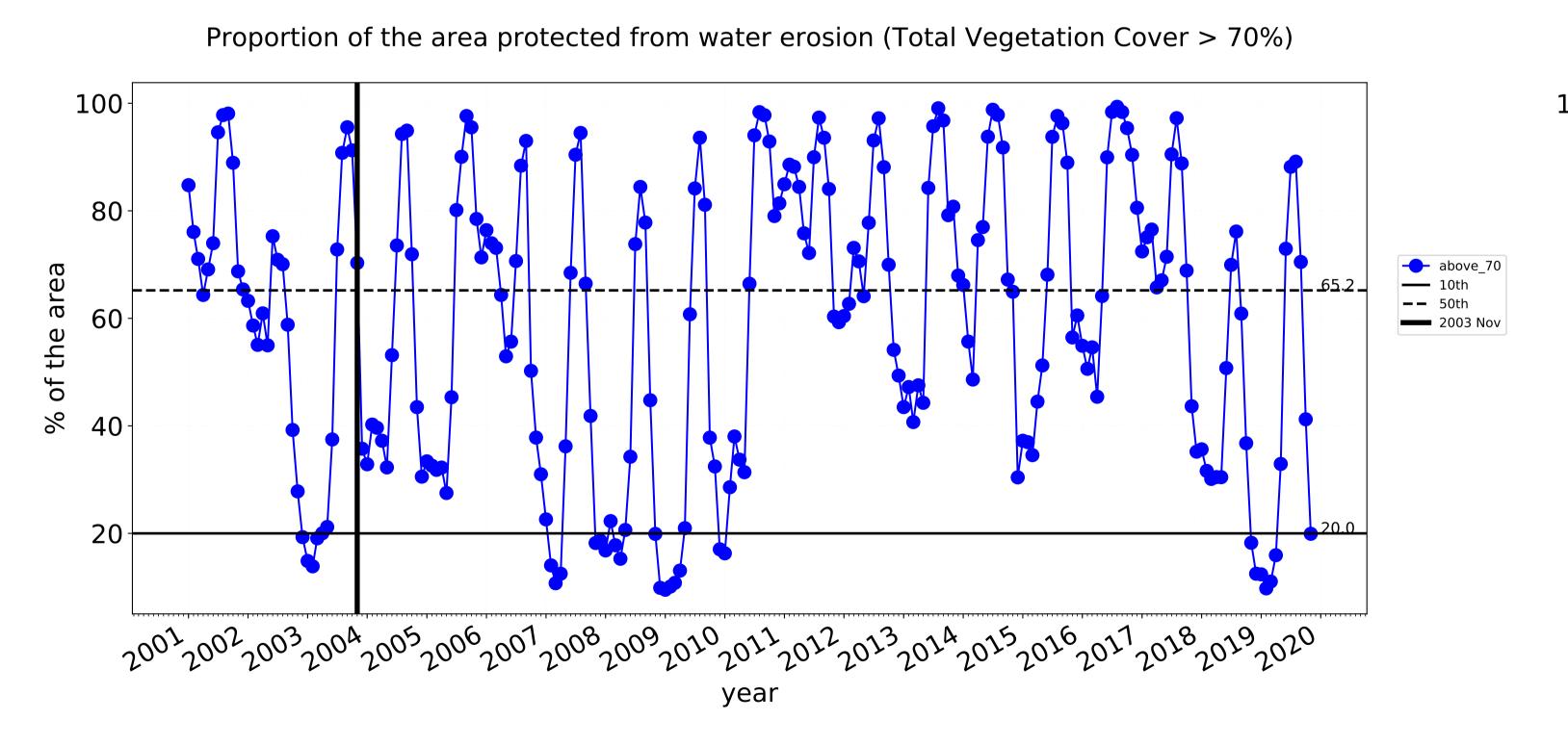


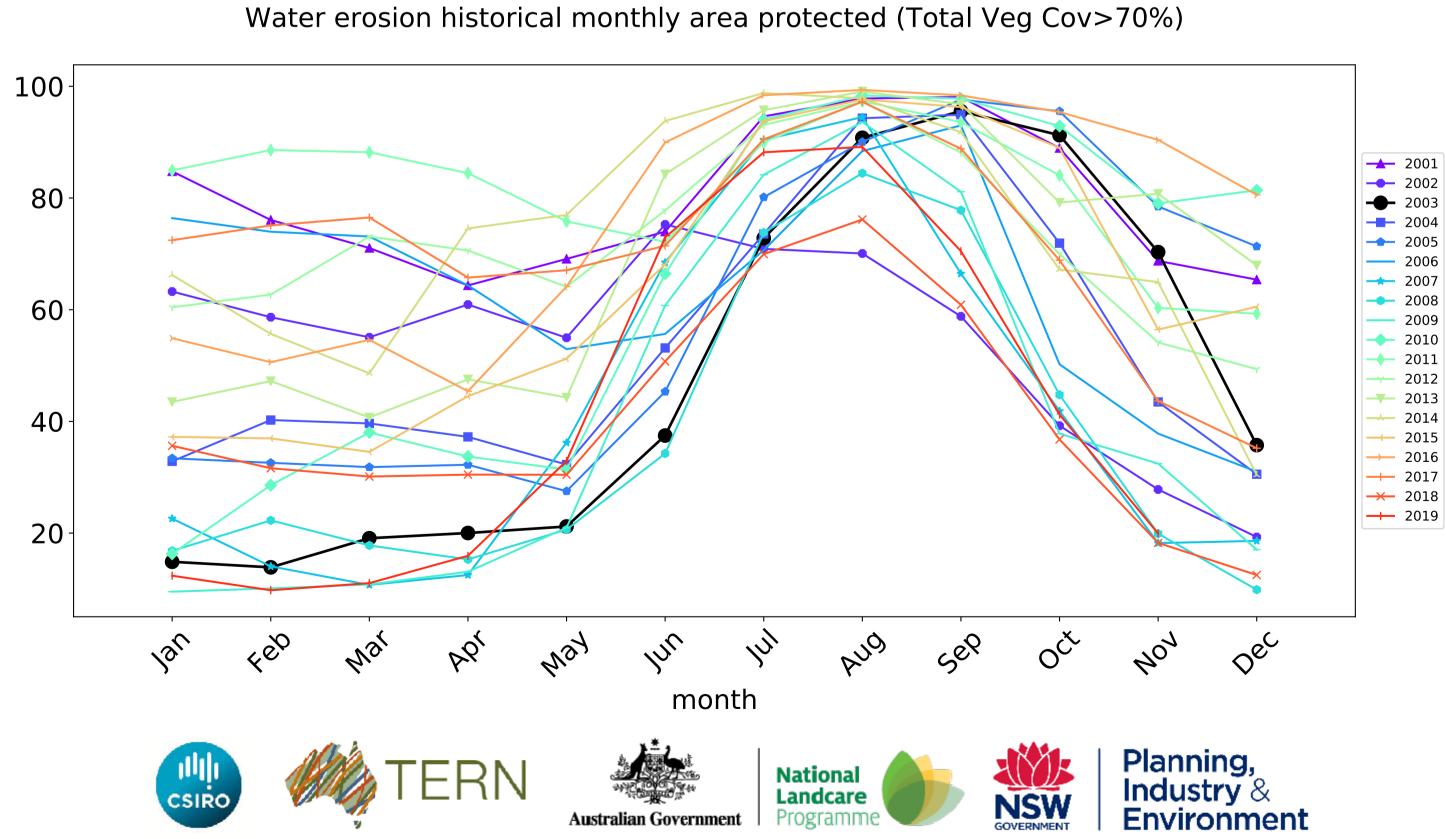


### **Cropping timeseries**







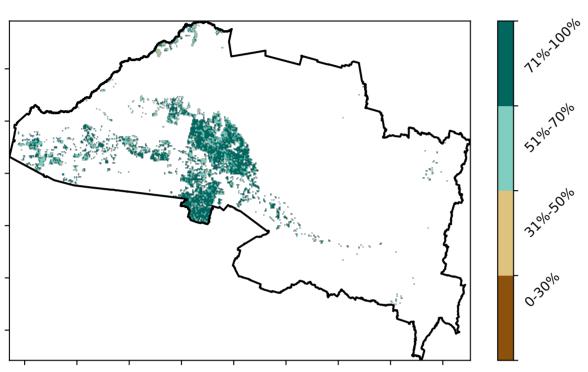


### Irrigation

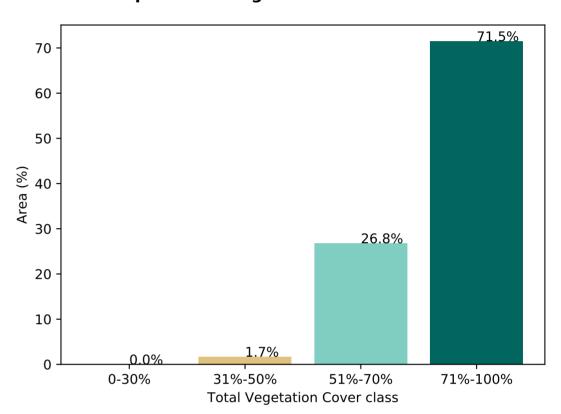
### Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018) 1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated 3 Agriculture - Horticulture - Irrigated

### **Proportion of each land class in area** 83.9% 80 70 60 Area (%) 30 -20 9.7% 10 6.4% 2 3 Land use class

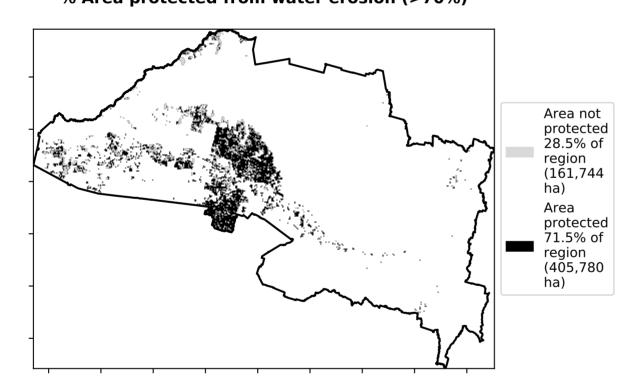




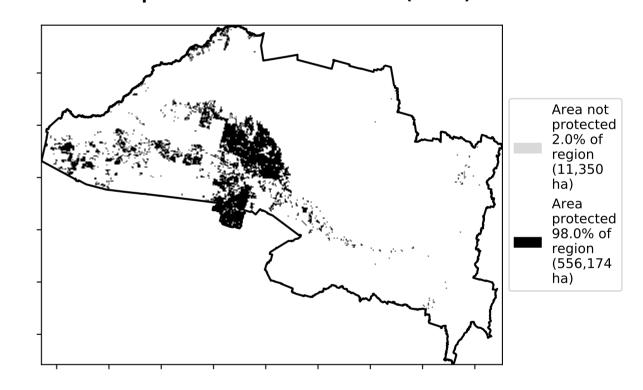
**Proportion of vegetation cover class in area** 



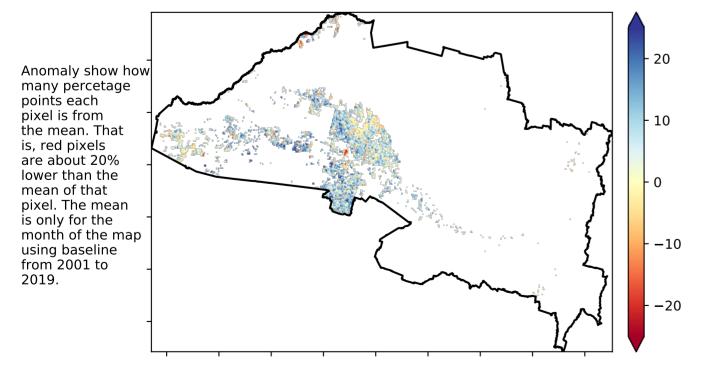
### % Area protected from water erosion (>70%)



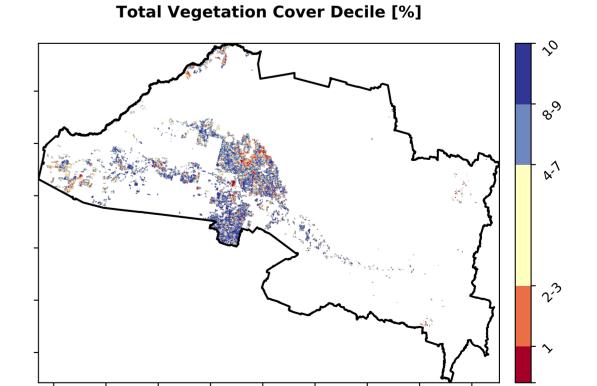
% Area protected from wind erosion (>50%)



### **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.





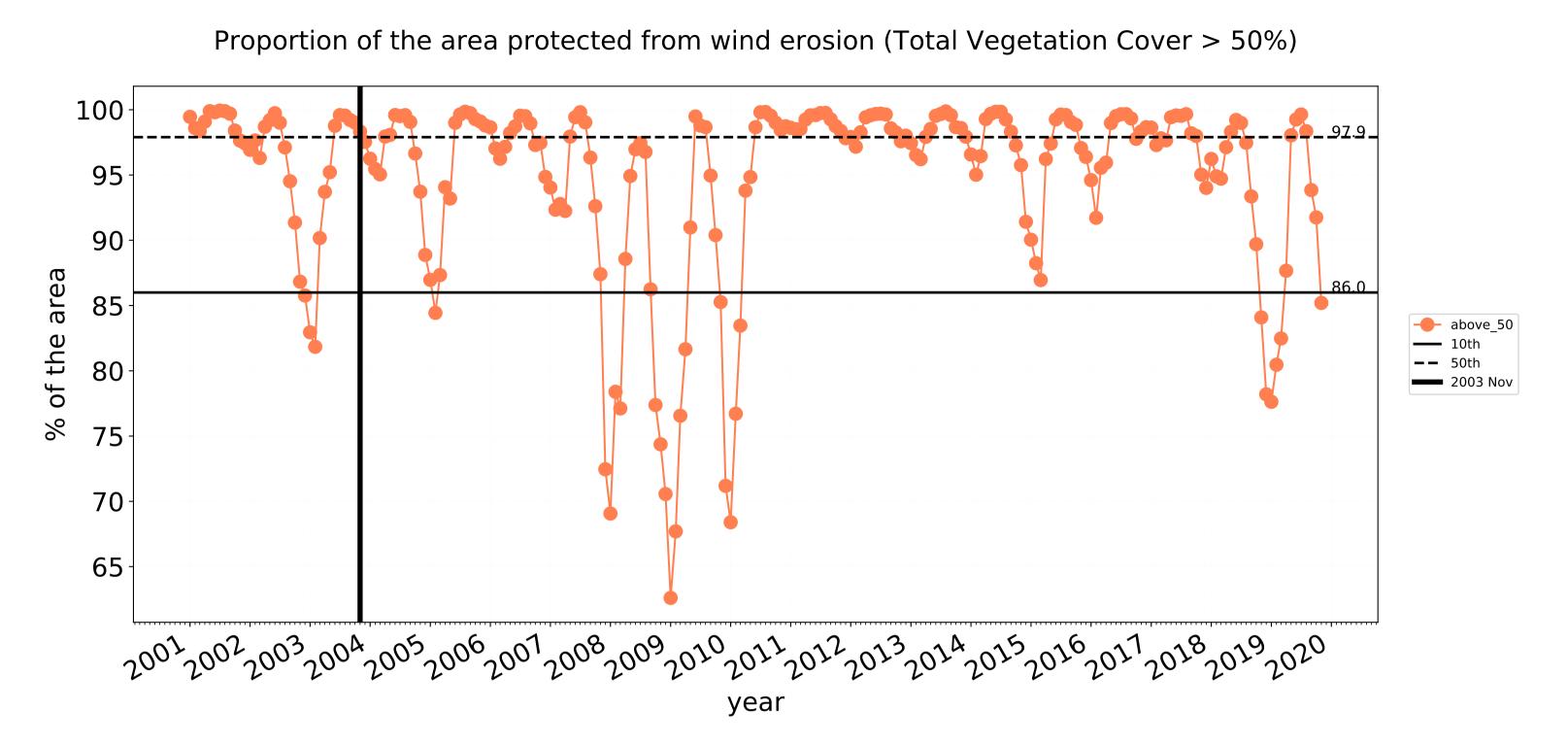


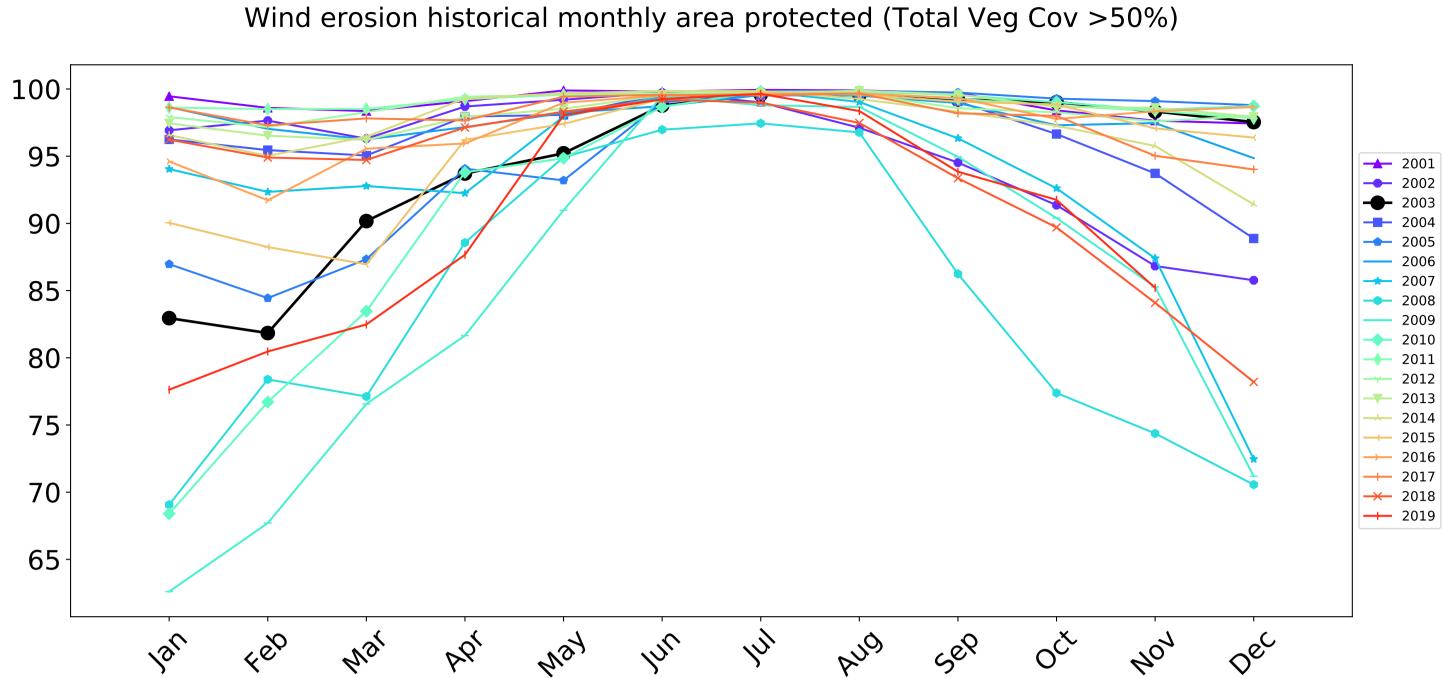




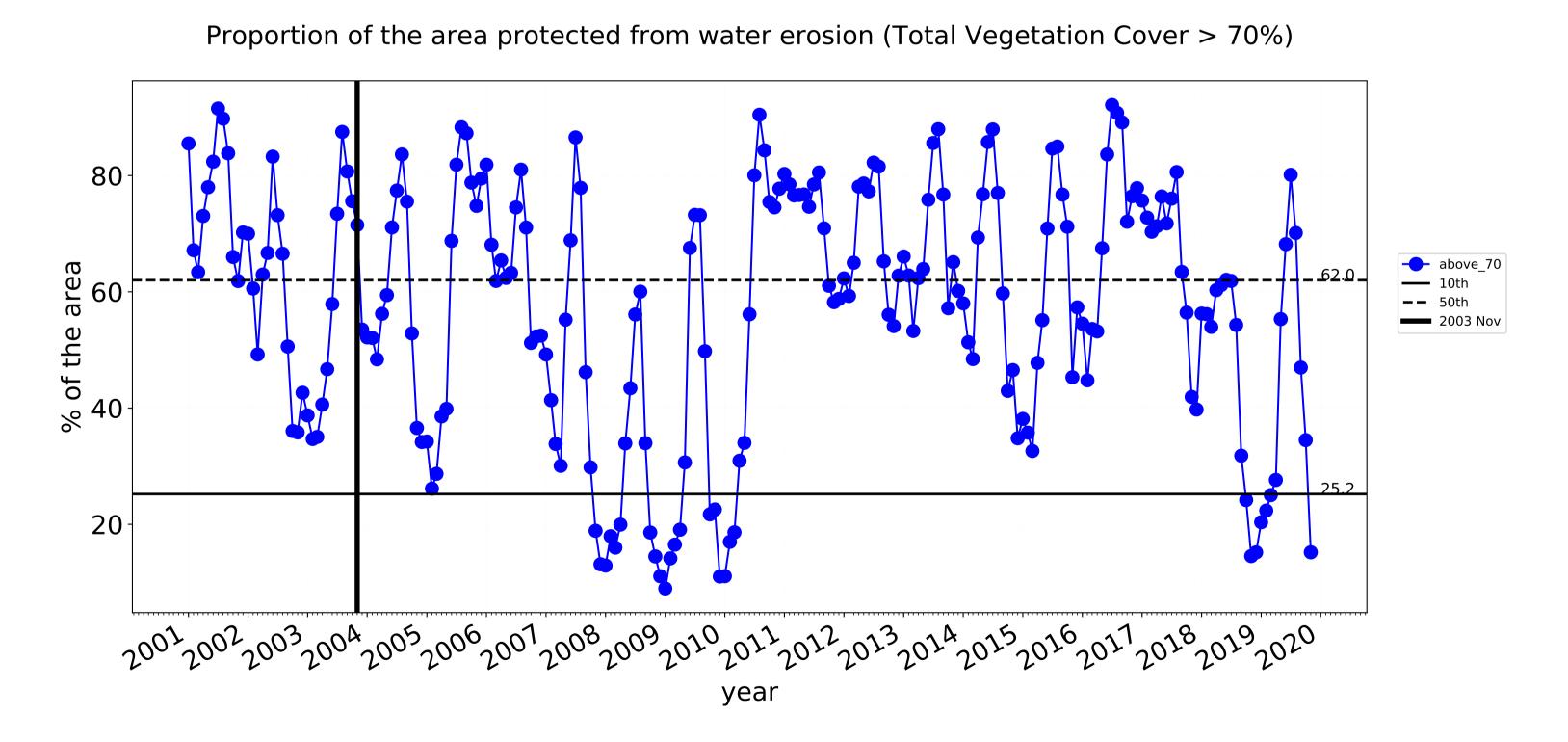


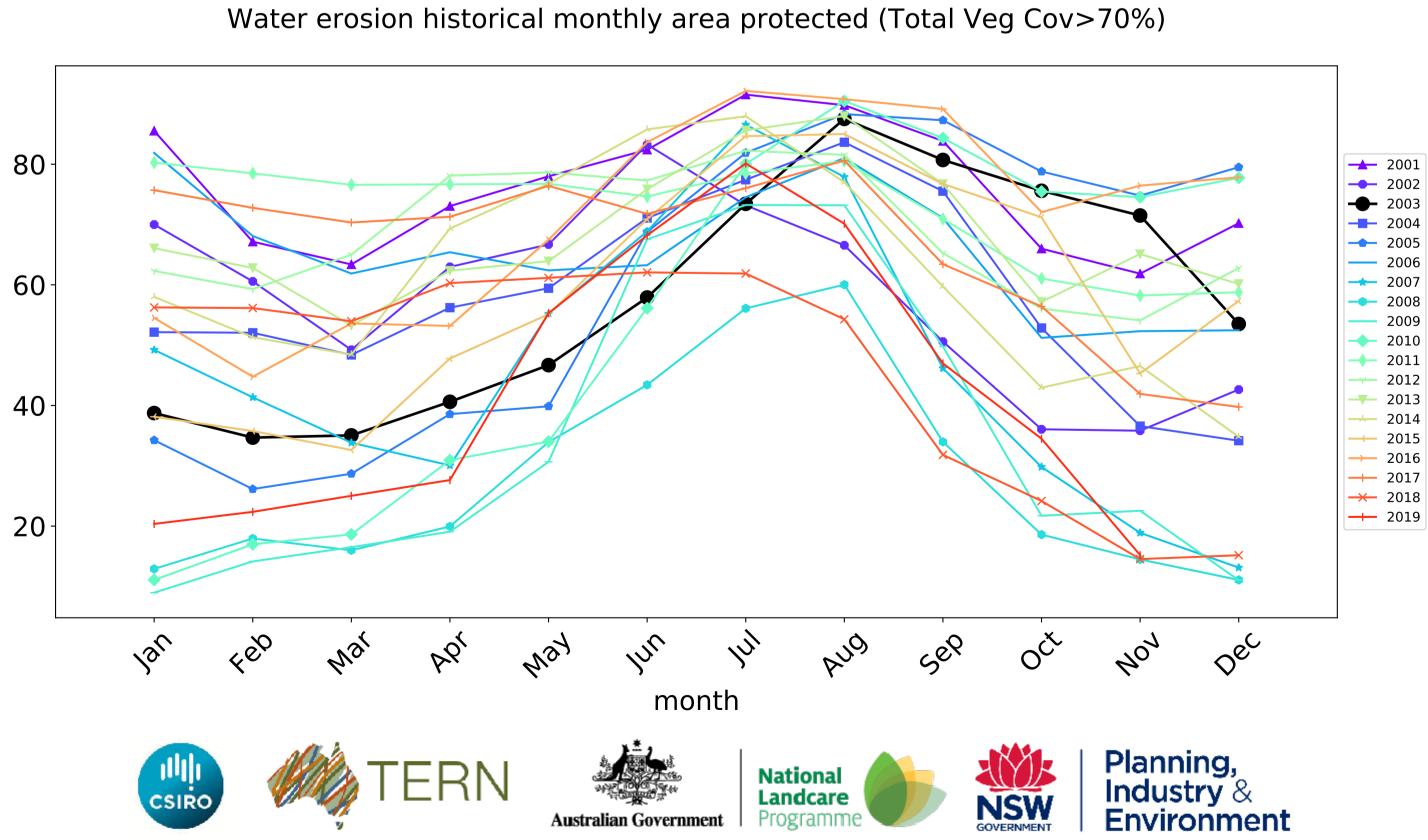






month



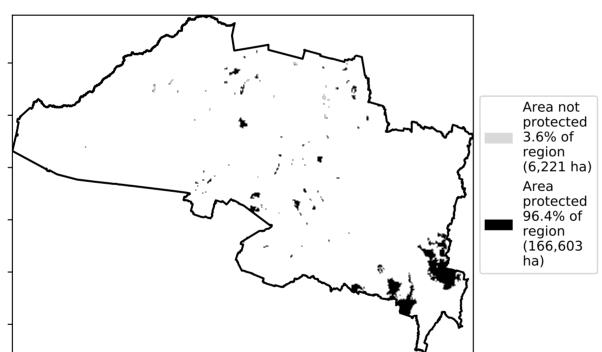


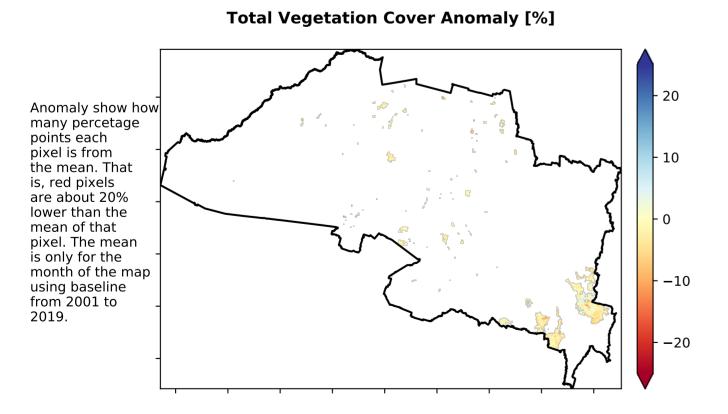
### **Production native forests and plantation forests**

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

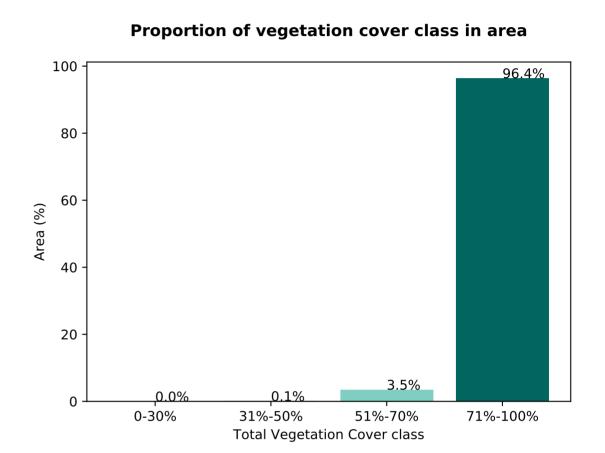
## **Total Vegetation Cover [%]**

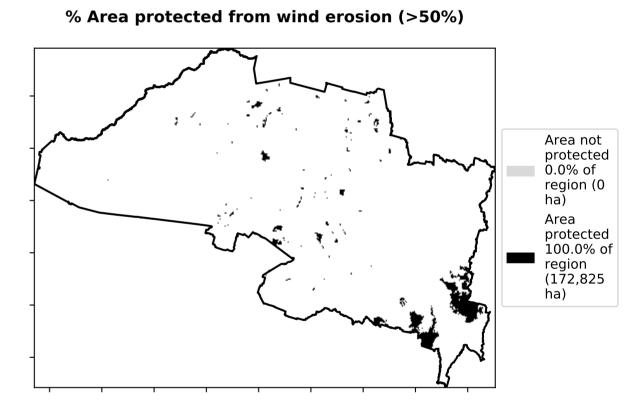
### % Area protected from water erosion (>70%)

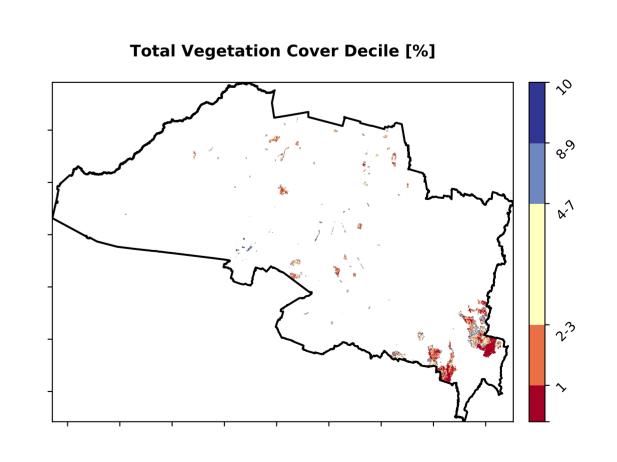




Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the man using baseling. the map using baseline from 2001 to 2019.











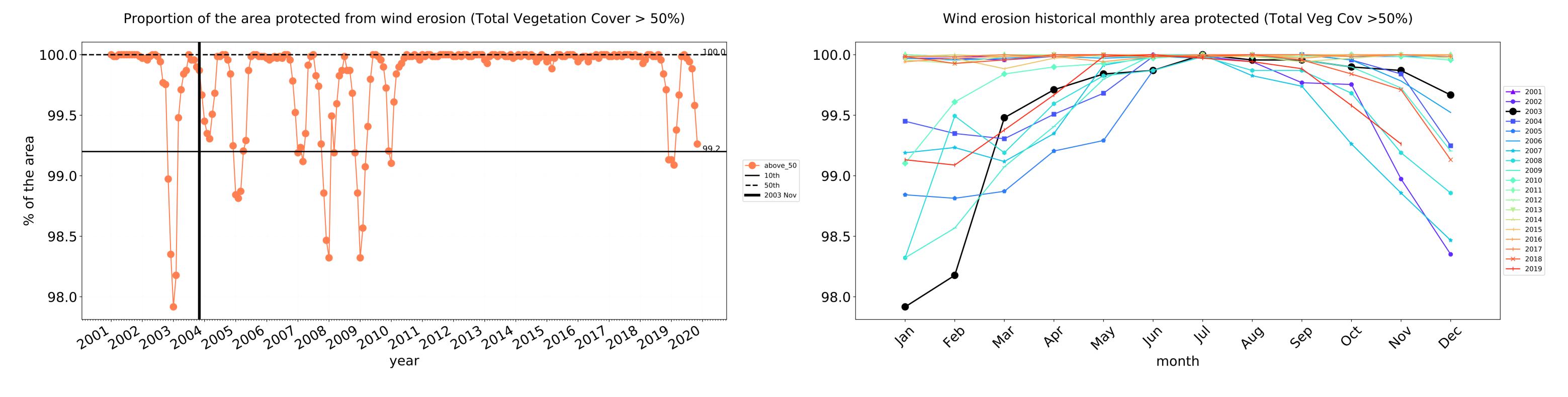


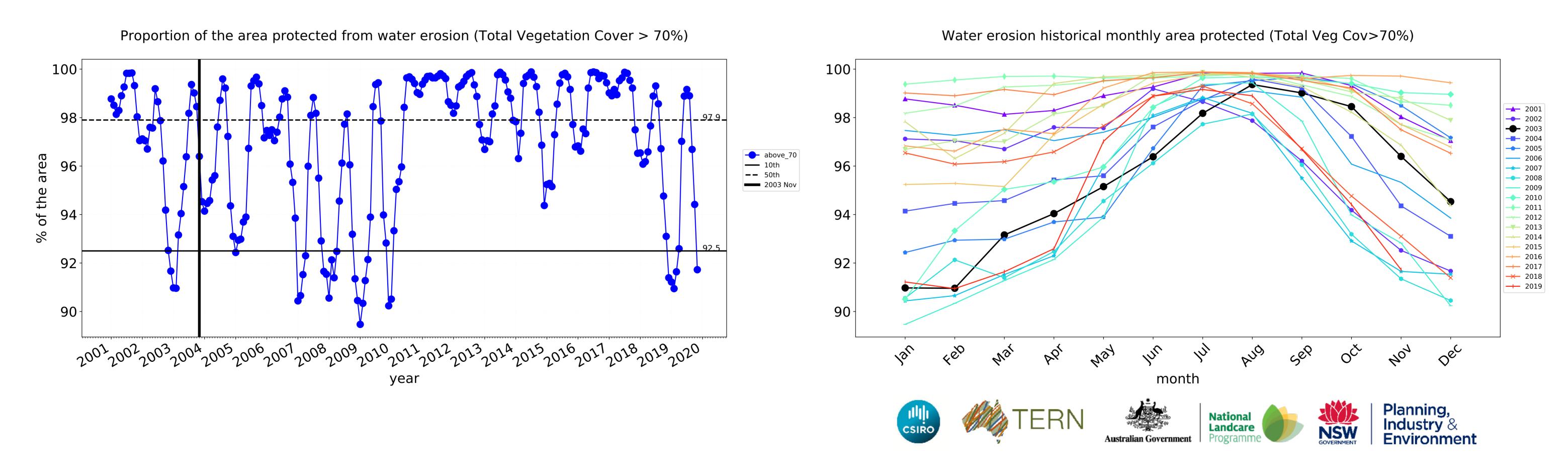






### **Production native forests and plantation forests timeseries**





### Riverina (6,694,025 ha and no data 14,310 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	6,694,025	100.0% 6,693,575	98.4% 6,588,132	71.1% 4,759,855	44.8% 2,997,098	15.2% 1,017,106	4.0% 267,107
Conservation and natural environments	323,150	100.0% 323,150	99.9% 322,825	86.0% 277,925	72.1% 233,050	30.6% 99,000	4.3% 13,775
Conservation and natural environments non forest	83,350	100.0% 83,350	99.7% 83,075	54.9% 45,725	41.9% 34,900	17.7% 14,775	5.7% 4,775
Conservation and natural environments Forest (non woodland)	195,300	100.0% 195,300	100.0% 195,275	97.3% 189,950	83.4% 162,900	39.5% 77,050	4.5% 8,850
Agriculture	6,067,675	100.0% 6,067,275	98.3% 5,963,675	69.6% 4,225,675	42.2% 2,558,575	13.4% 811,875	3.8% 228,275
Grazing	2,311,375	100.0% 2,311,375	99.5% 2,300,250	68.3% 1,578,900	45.2% 1,045,050	16.7% 385,325	4.2% 96,200
Grazing non forest	2,066,375	100.0% 2,066,375	99.5% 2,055,400	65.7% 1,357,175	42.8% 884,950	16.9% 348,925	4.5% 92,950
Grazing Woodland forest	141,650	100.0% 141,650	99.9% 141,500	84.9% 120,300	49.3% 69,850	6.6% 9,375	0.3% 400
Grazing - Forest (non woodland)	103,350	100.0% 103,350	100.0% 103,350	98.1% 101,425	87.3% 90,250	26.1% 27,025	2.8% 2,850
Cropping	3,186,950	100.0% 3,186,600	97.4% 3,103,575	70.3% 2,240,675	41.3% 1,317,225	12.1% 387,000	3.8% 120,325
Irrigation	567,525	100.0% 567,475	98.3% 558,025	71.5% 405,750	34.6% 196,150	7.0% 39,550	2.1% 11,750
Production native forests and plantation forests	172,825	100.0% 172,825	99.9% 172,600	96.4% 166,600	88.5% 153,000	55.7% 96,325	13.1% 22,650











