## 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 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













**Date: December 2001** 

## **Vegetation Cover Dec 2001**

## Land use and forest cover

## Legend with land class forest cover and number, i.e. Forests is 12 1 Conservation and natural environments -Non-forest 2 Conservation and natural environments -3 Conservation and natural environments -Non-Woodland forest 4 Agriculture - Grazing - Non-forest 5 Agriculture - Grazing - Woodland forest 6 Agriculture - Grazing - Non-woodland forest 7 Agriculture - Grazing - Irrigated 8 Agriculture - Cropping - Non-irrigated 9 Agriculture - Cropping - Irrigated 10 Agriculture - Horticulture - Non-irrigated 11 Agriculture - Horticulture - Irrigated 12 Production native forests and plantation 13 Other uses

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

Anomaly show how many percetage points each pixel is from

the mean. That

lower than the

pixel. The mean

month of the map

mean of that

is only for the

using baseline from 2001 to

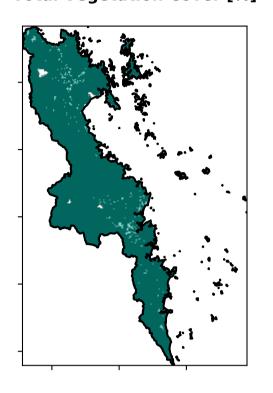
2019.

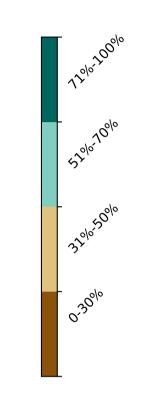
is, red pixels are about 20%

Catchment Scale

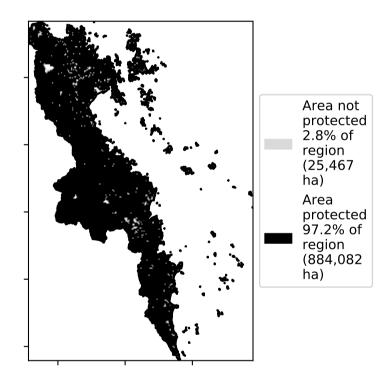
Land Use and Forests

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

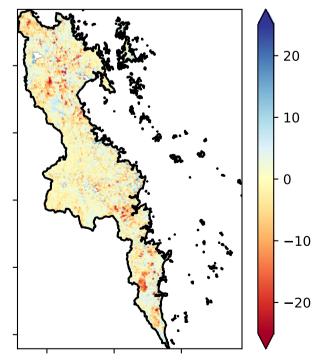




## % Area protected from water erosion (>70%)

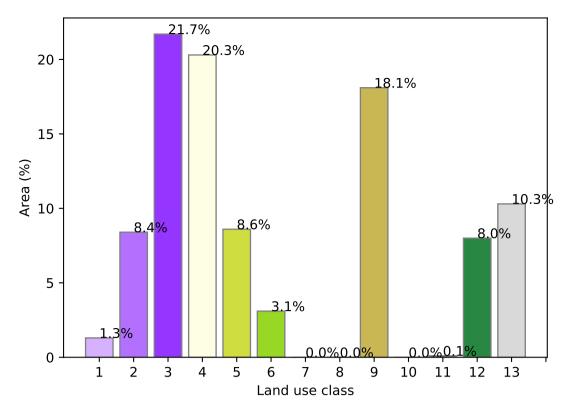


**Total Vegetation Cover Anomaly [%]** 

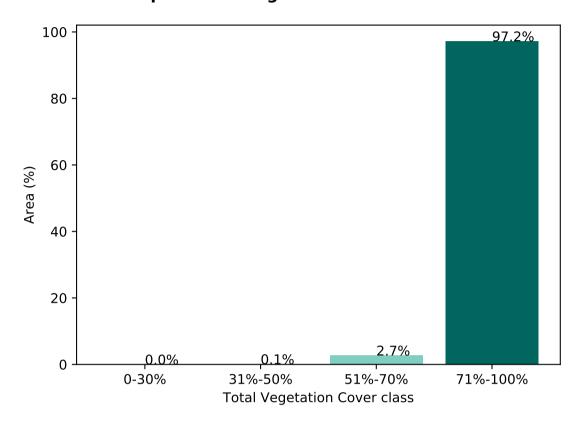


pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

## Proportion of each land class in area

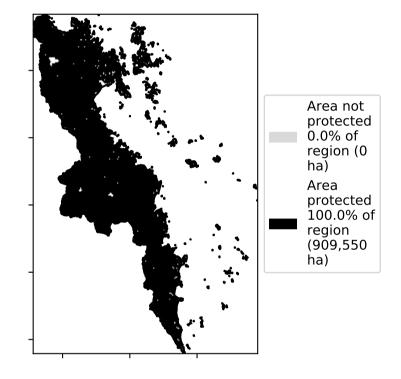


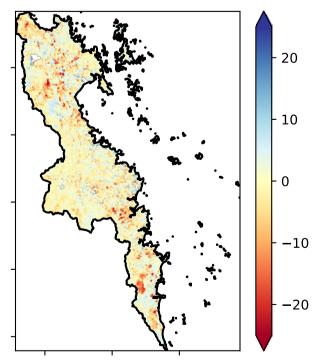
## Proportion of vegetation cover class in area



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

**Total Vegetation Cover Decile [%]** 





Deciles show where the



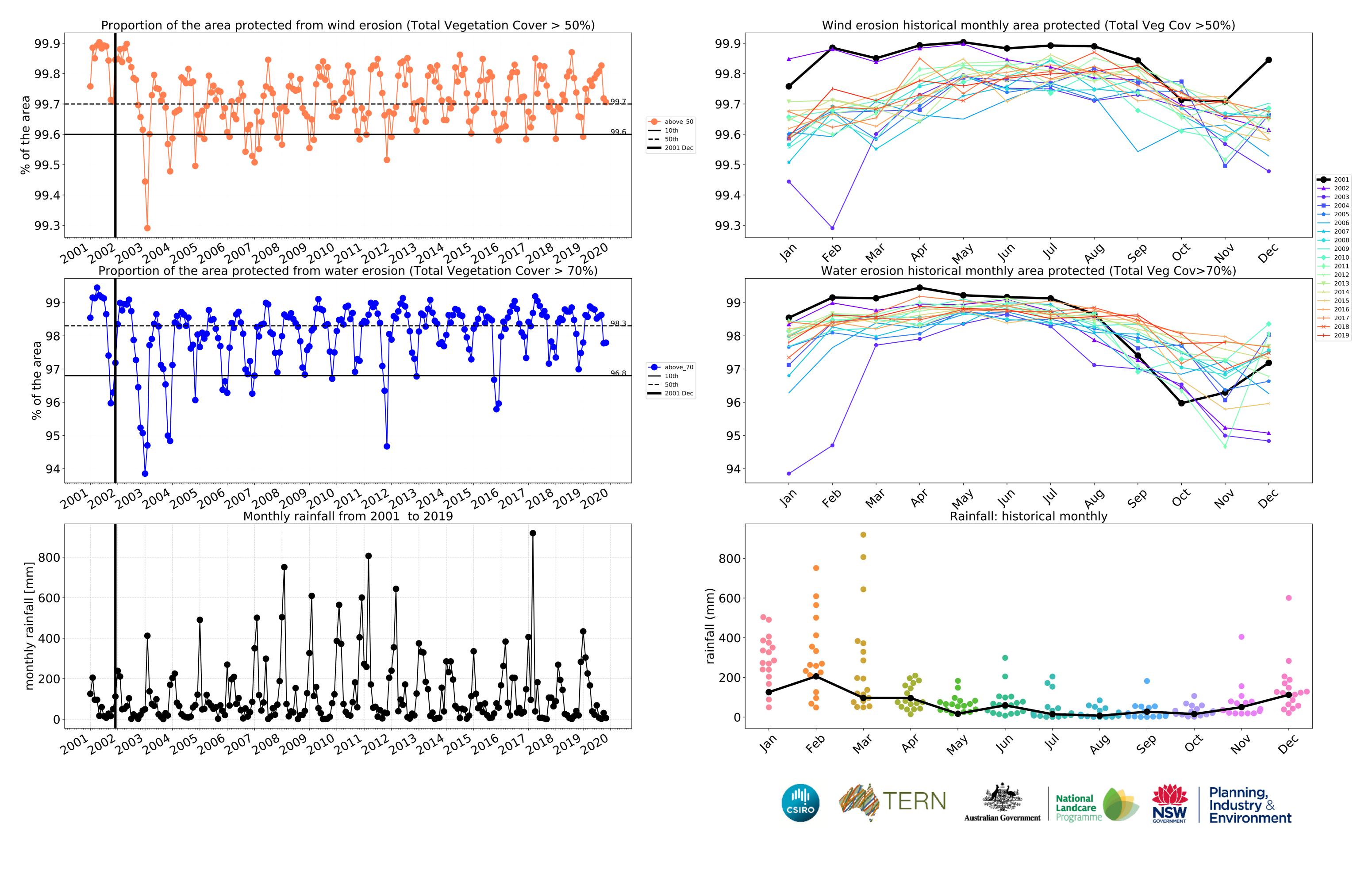




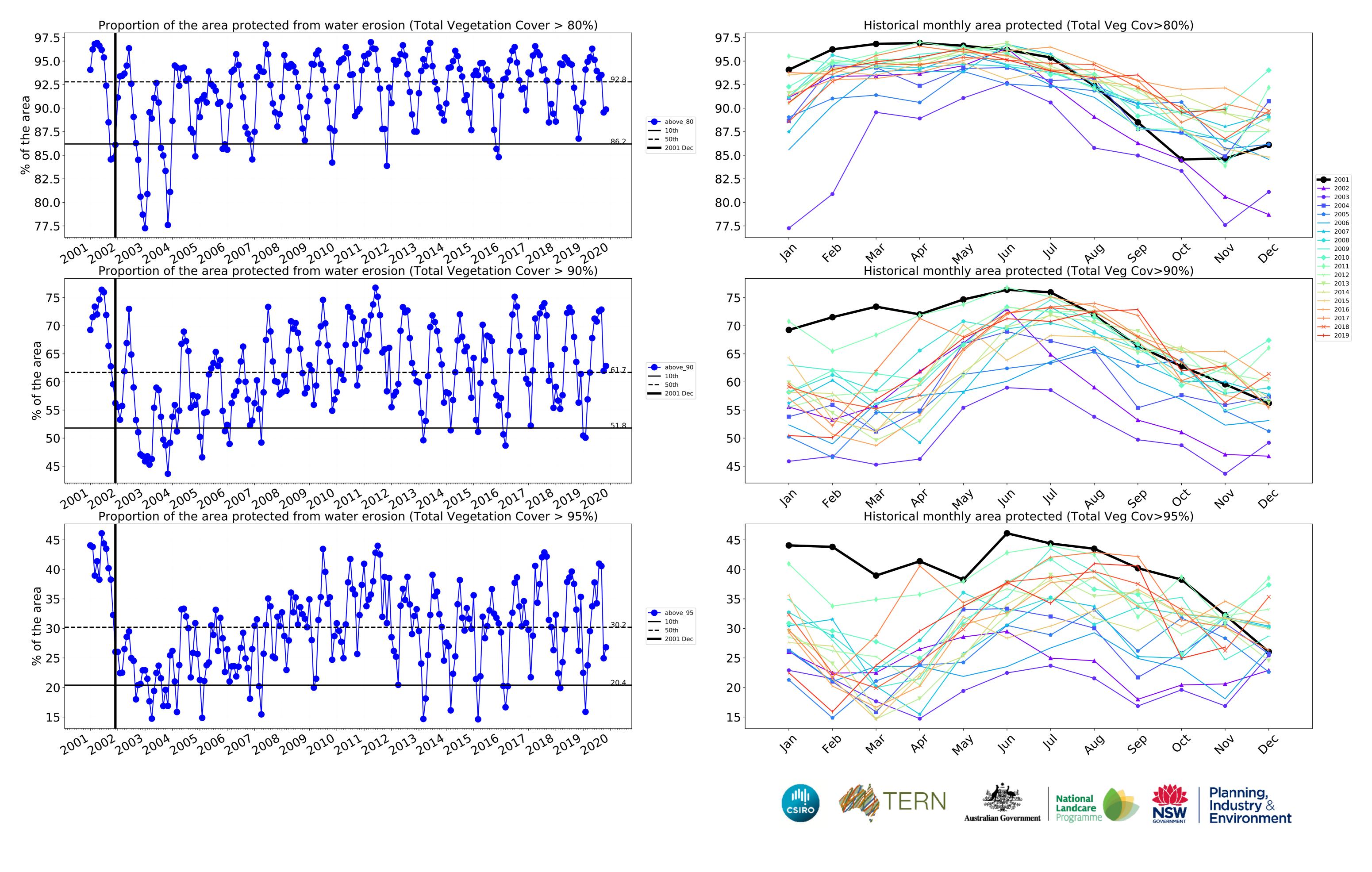








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## **Conservation and natural environments**

## **Land use and forest cover**

Catchment Scale Land Use and Forests

of Australia (2018)

(2018) and Forests

of Australia (2018)

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

using baseline from 2001 to 2019.

is only for the month of the map

is, red pixels are about 20% lower than the mean of that

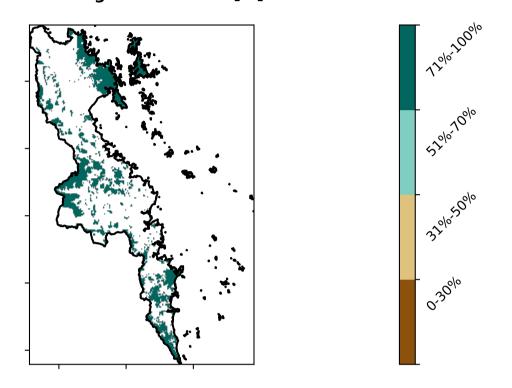
Catchment Scale Land

Derived from

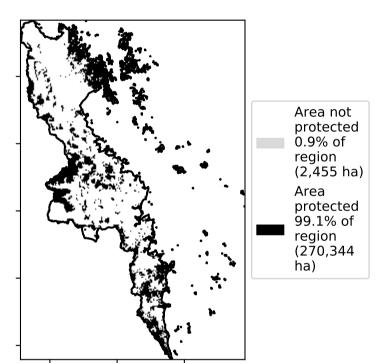
Use of Australia

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

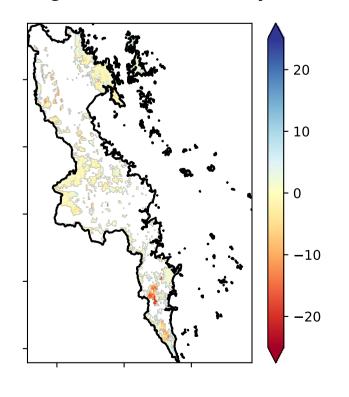
## **Total Vegetation Cover [%]**



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

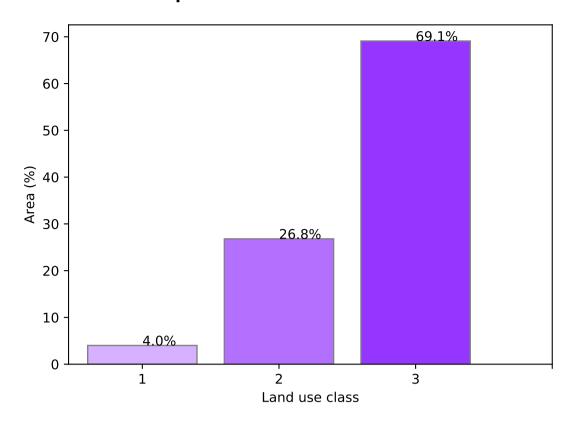


## **Total Vegetation Cover Anomaly [%]**

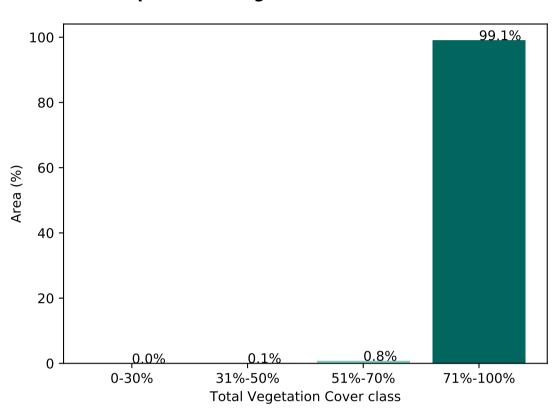


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

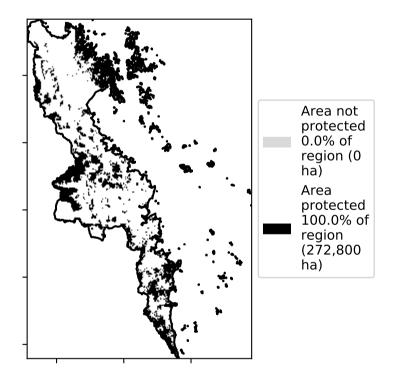
## Proportion of each land class in area

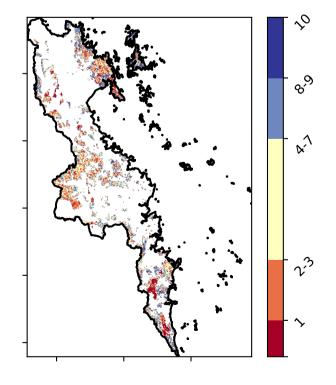


## Proportion of vegetation cover class in area



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









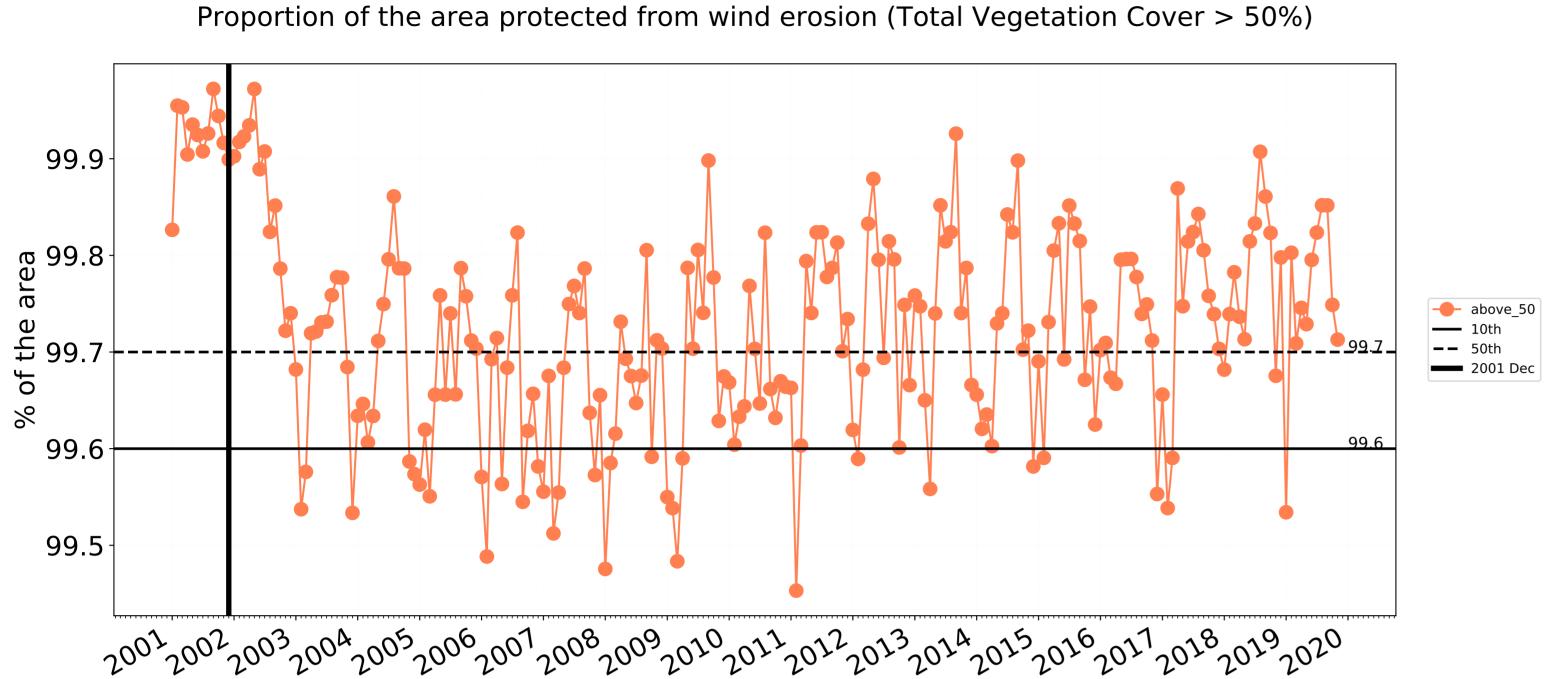


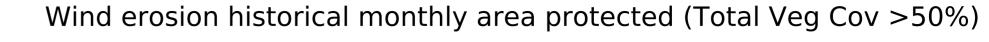


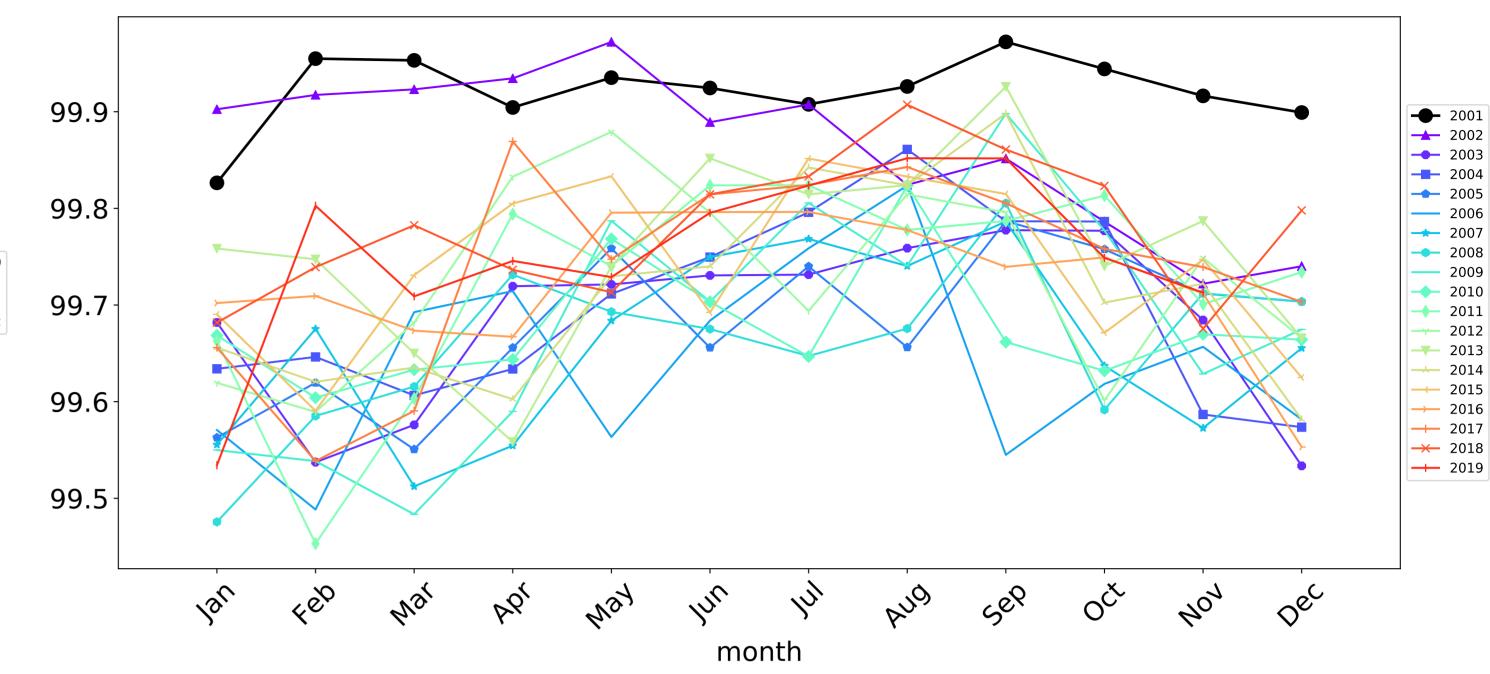


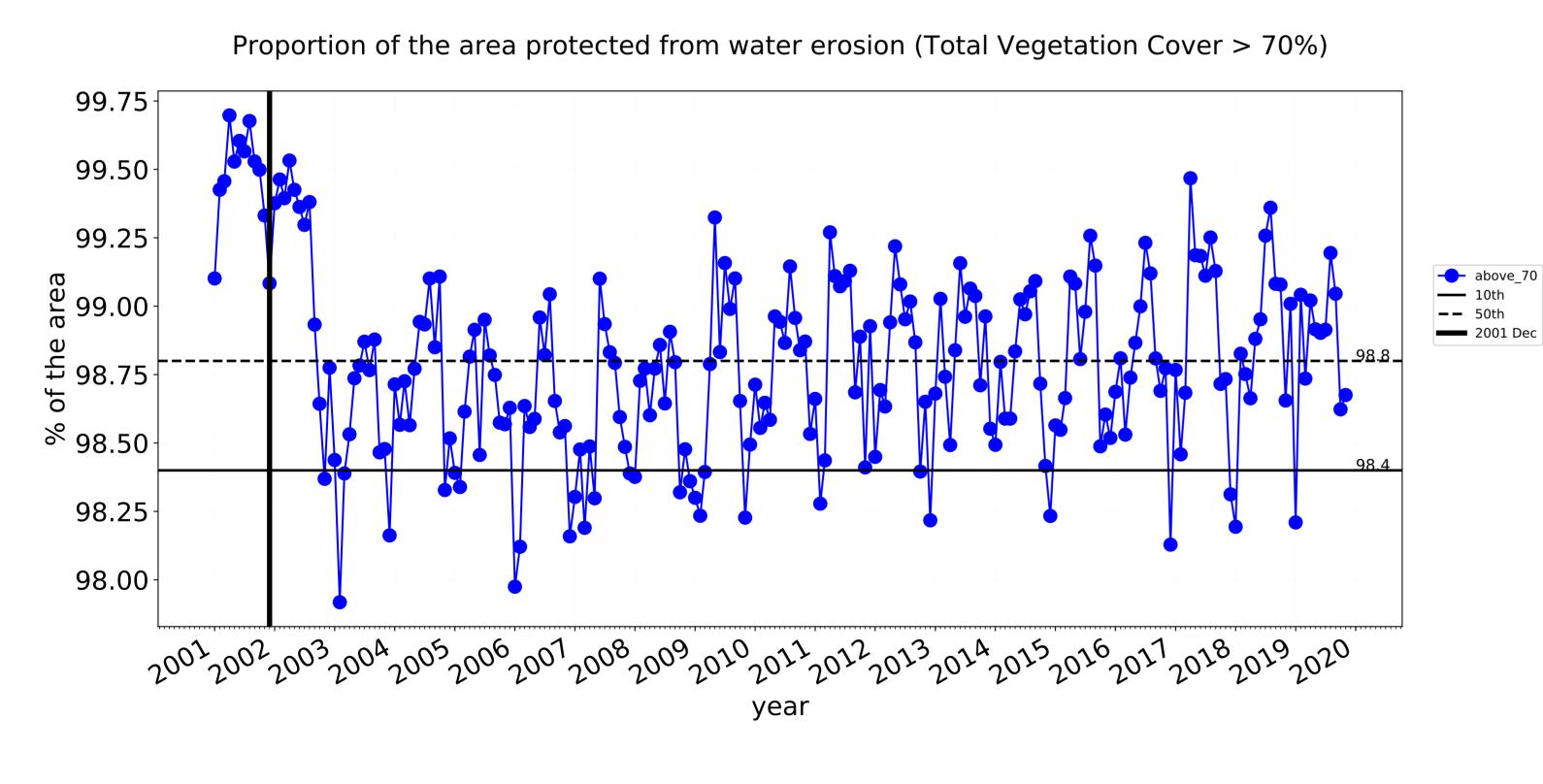


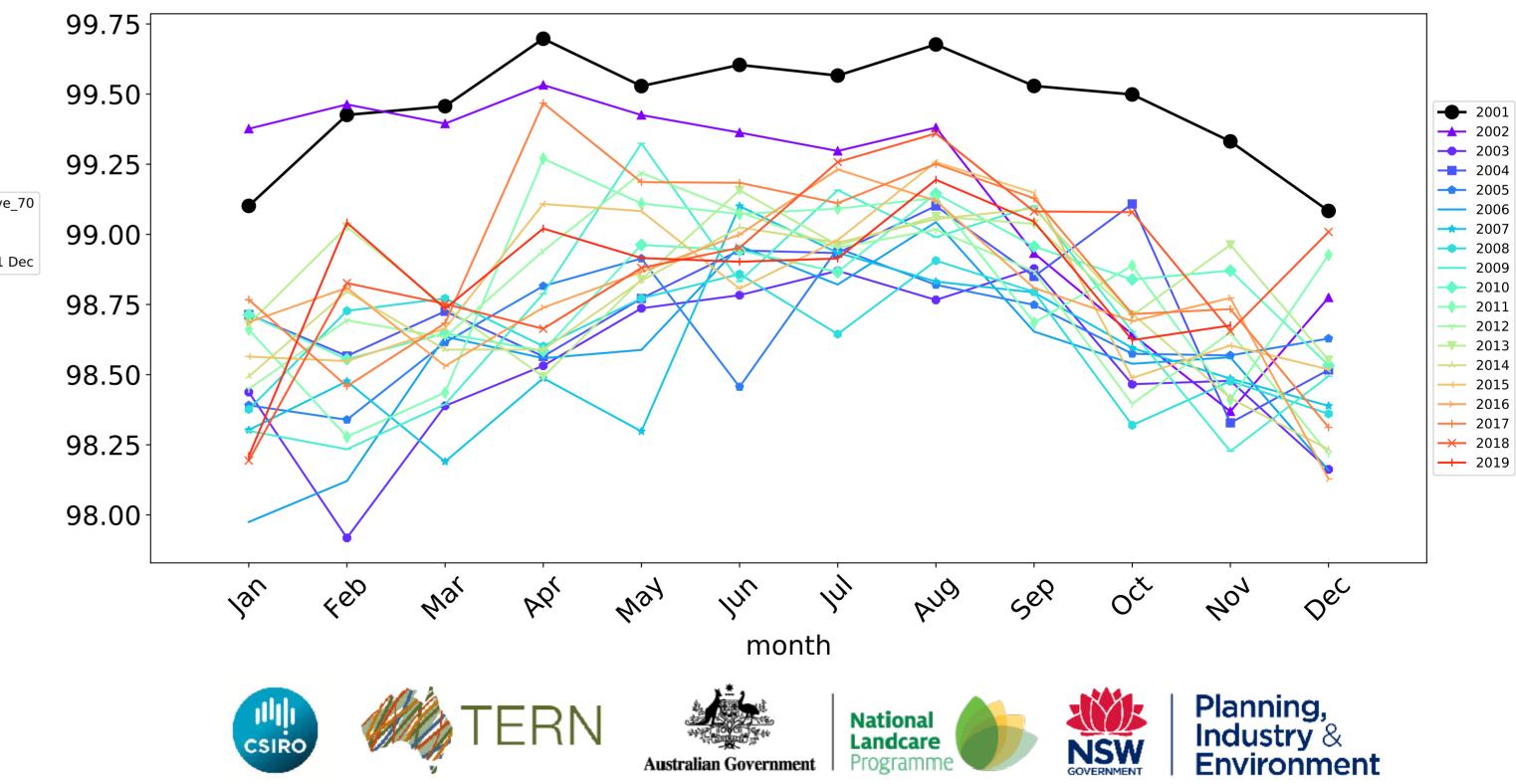
## **Conservation and natural environments timeseries**



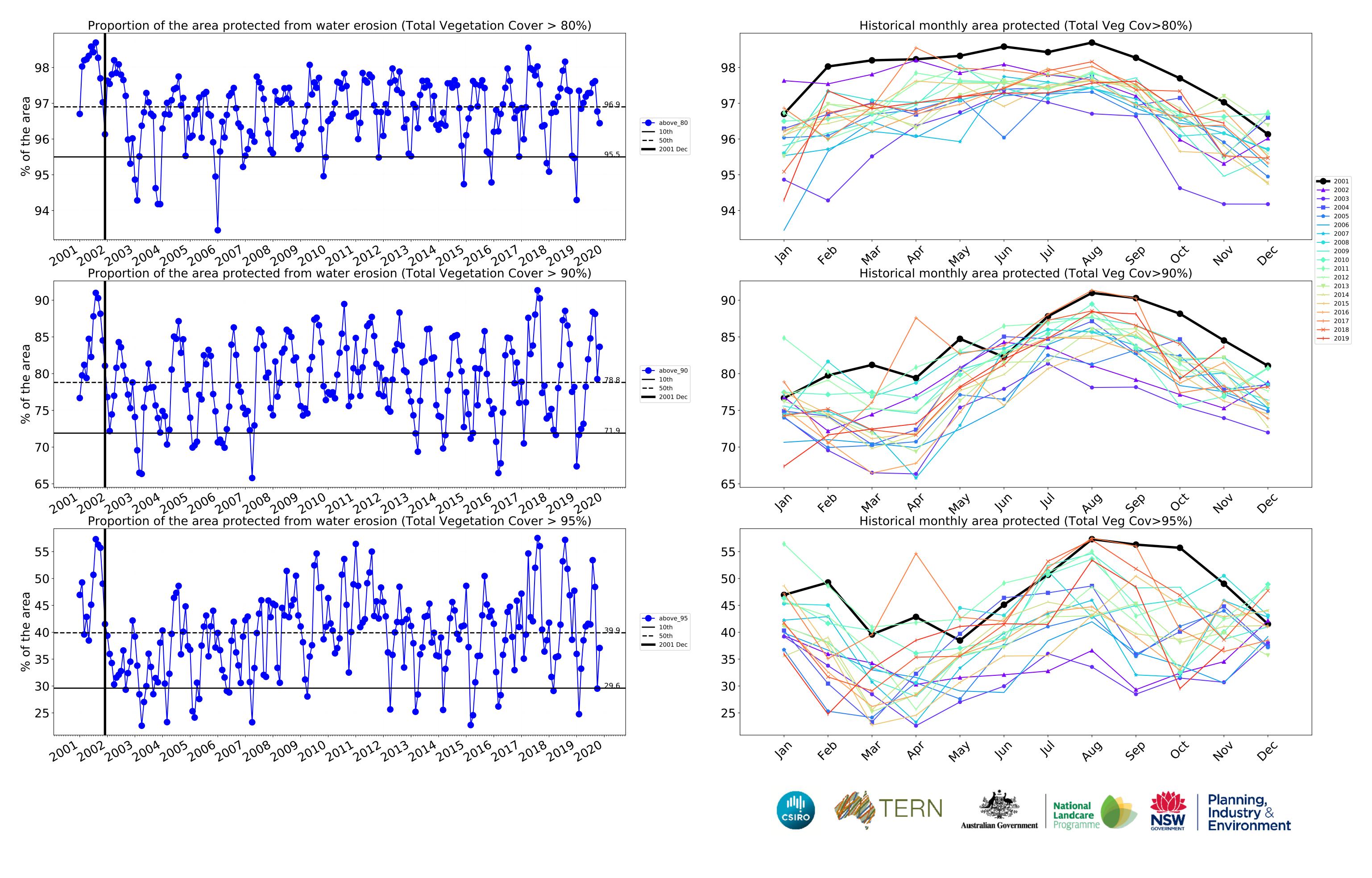








Water erosion historical monthly area protected (Total Veg Cov>70%)



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

## 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)

Anomaly show how many percetage points each

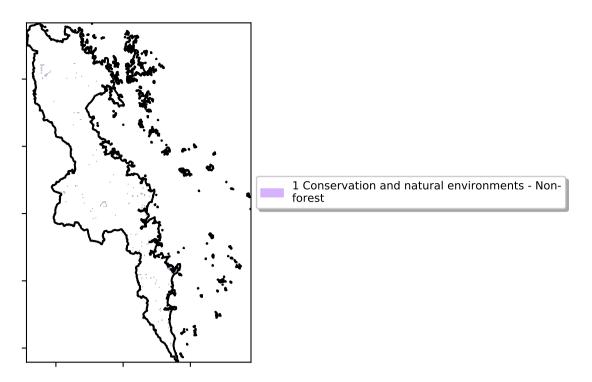
pixel is from the mean. That

pixel. The mean

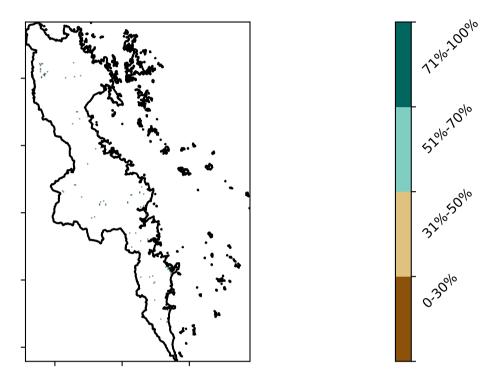
using baseline from 2001 to 2019.

is only for the month of the map

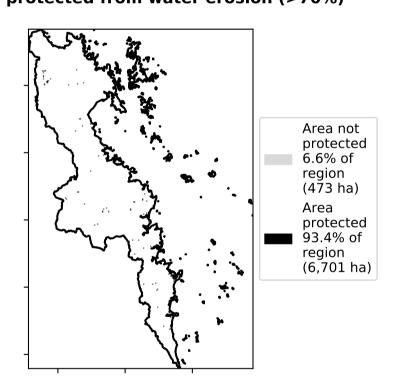
is, red pixels are about 20% lower than the mean of that



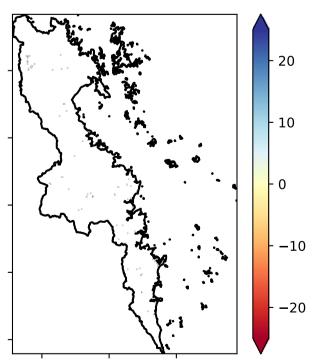
## **Total Vegetation Cover [%]**



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

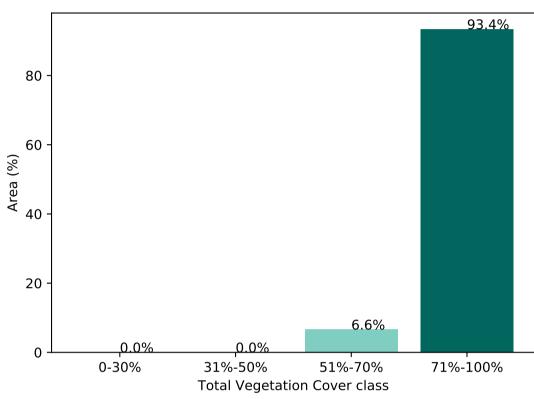


## Total Vegetation Cover Anomaly [%]

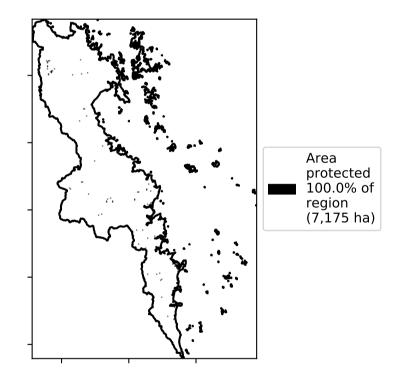


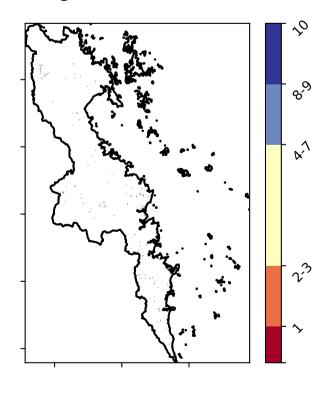
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

## Proportion of vegetation cover class in area



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









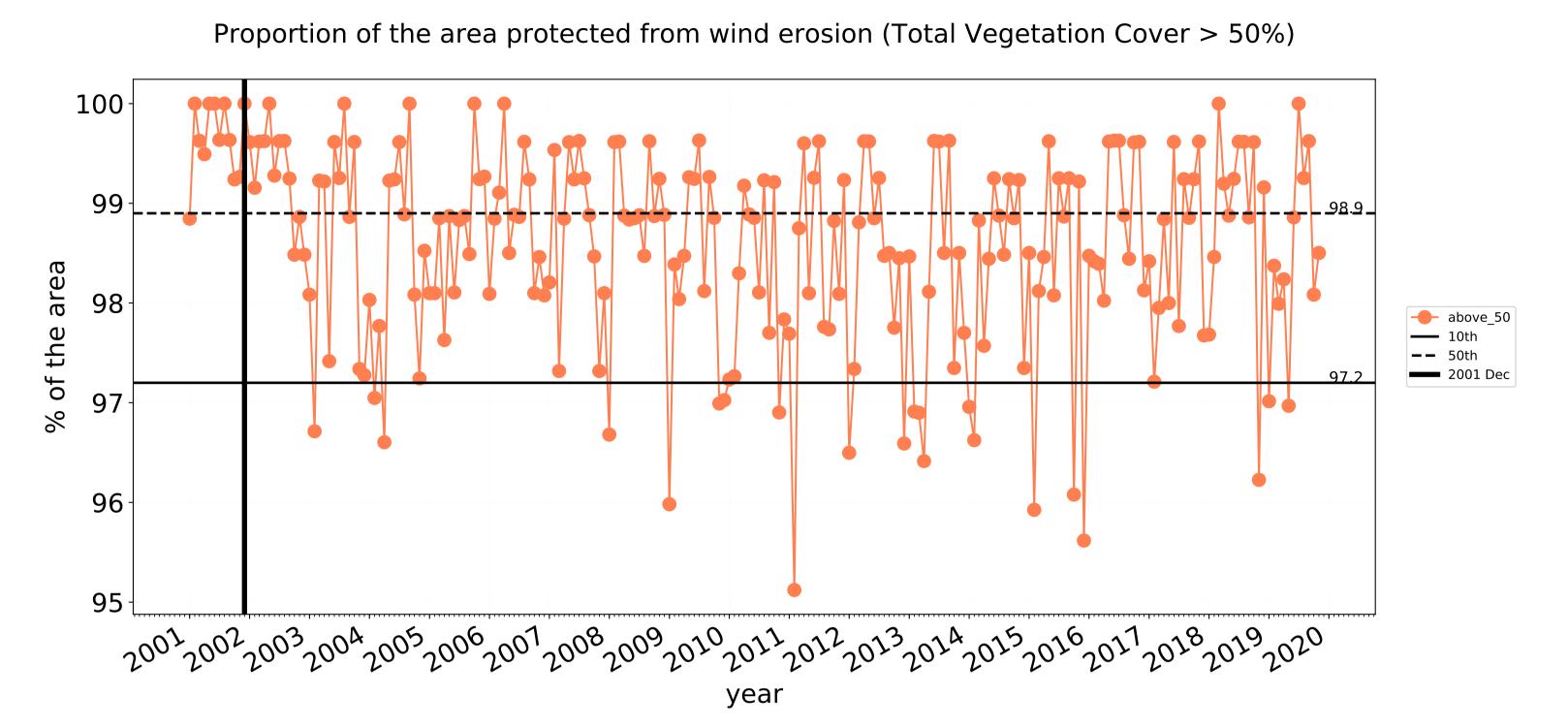


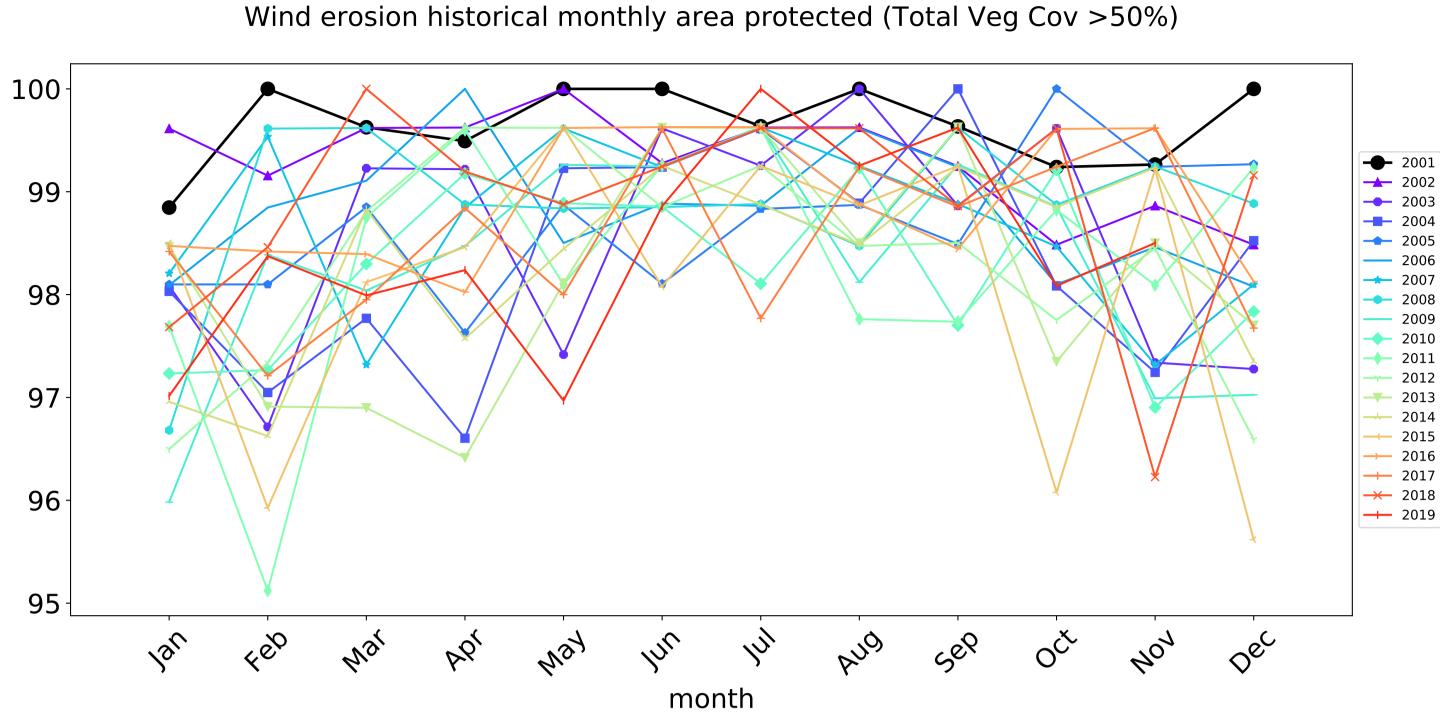


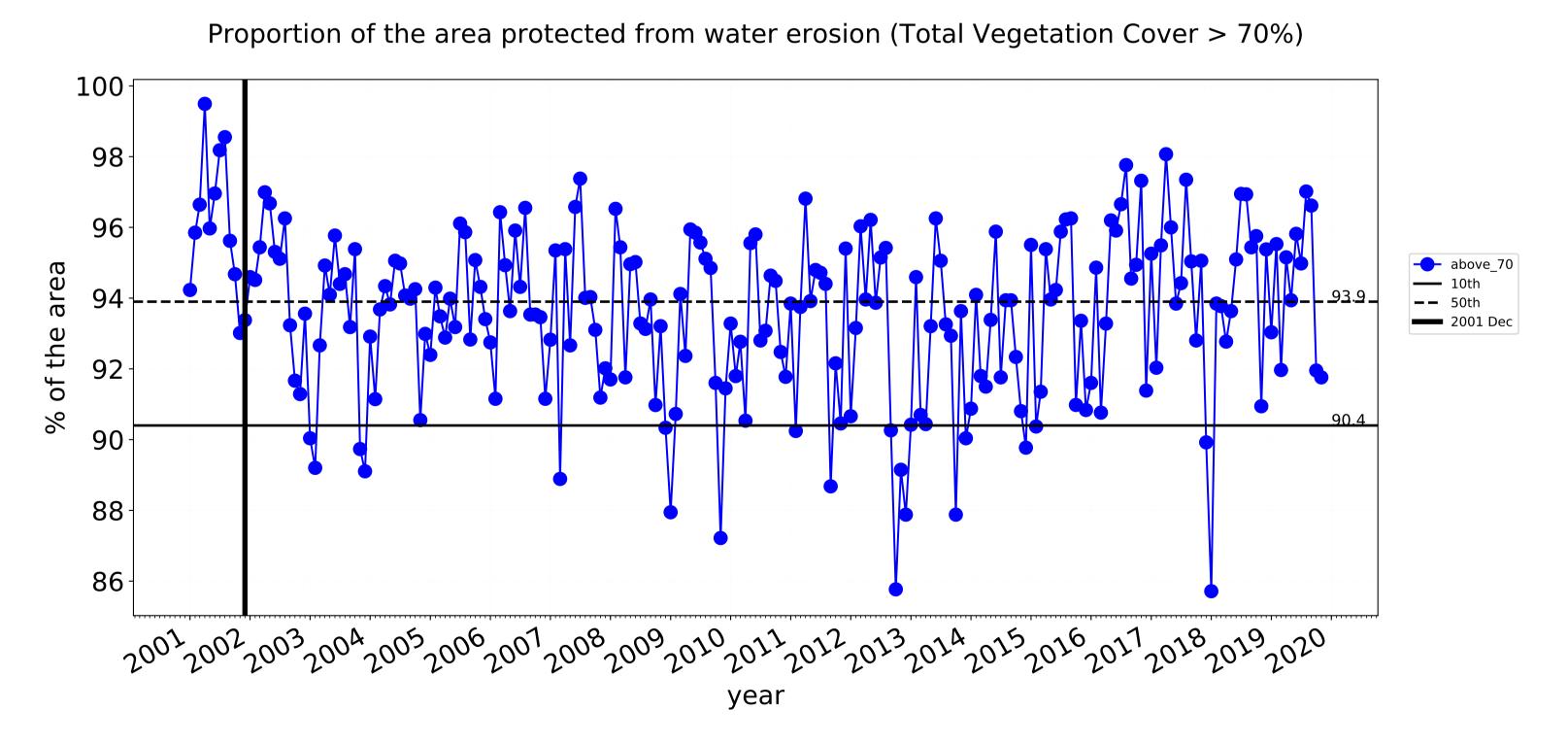


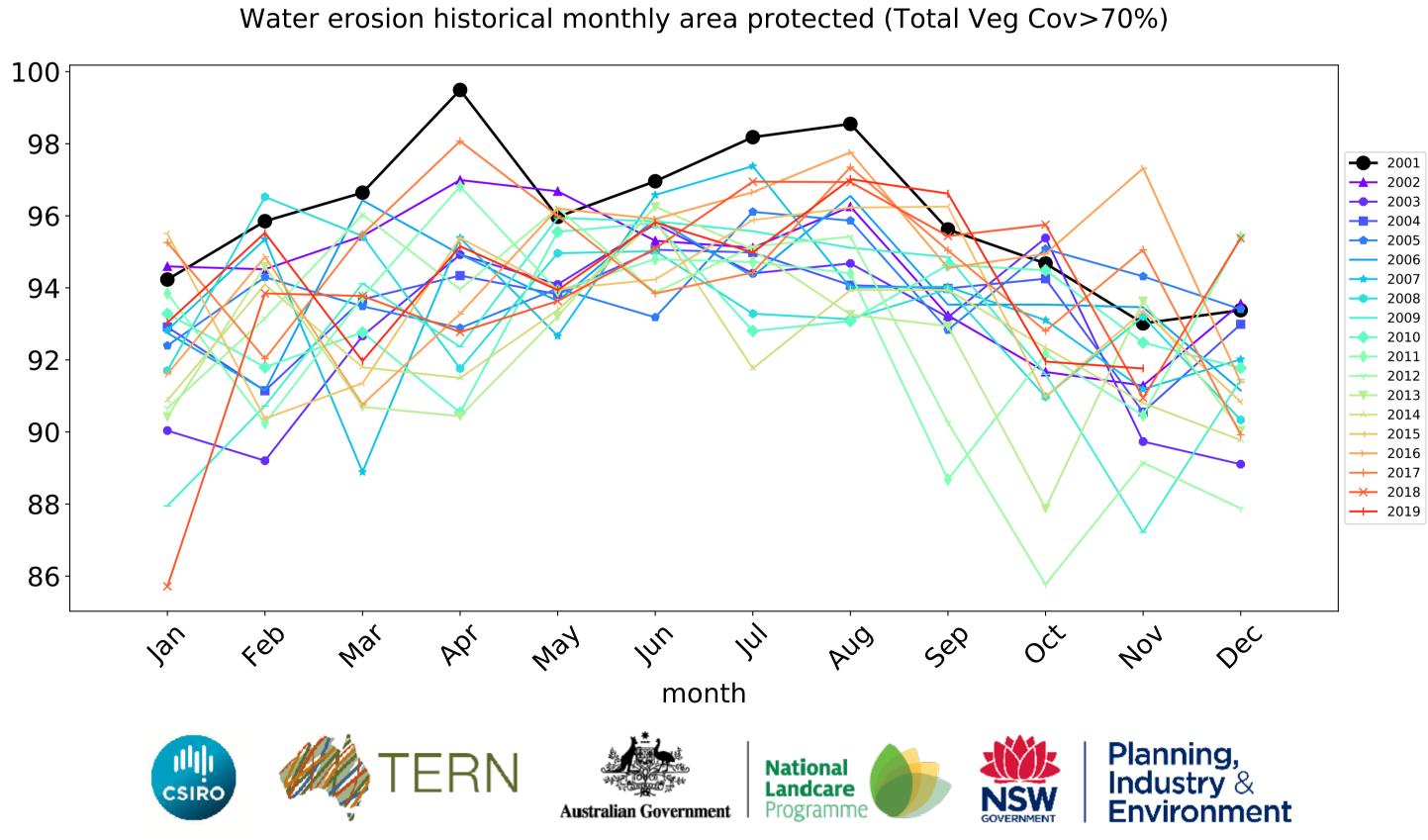


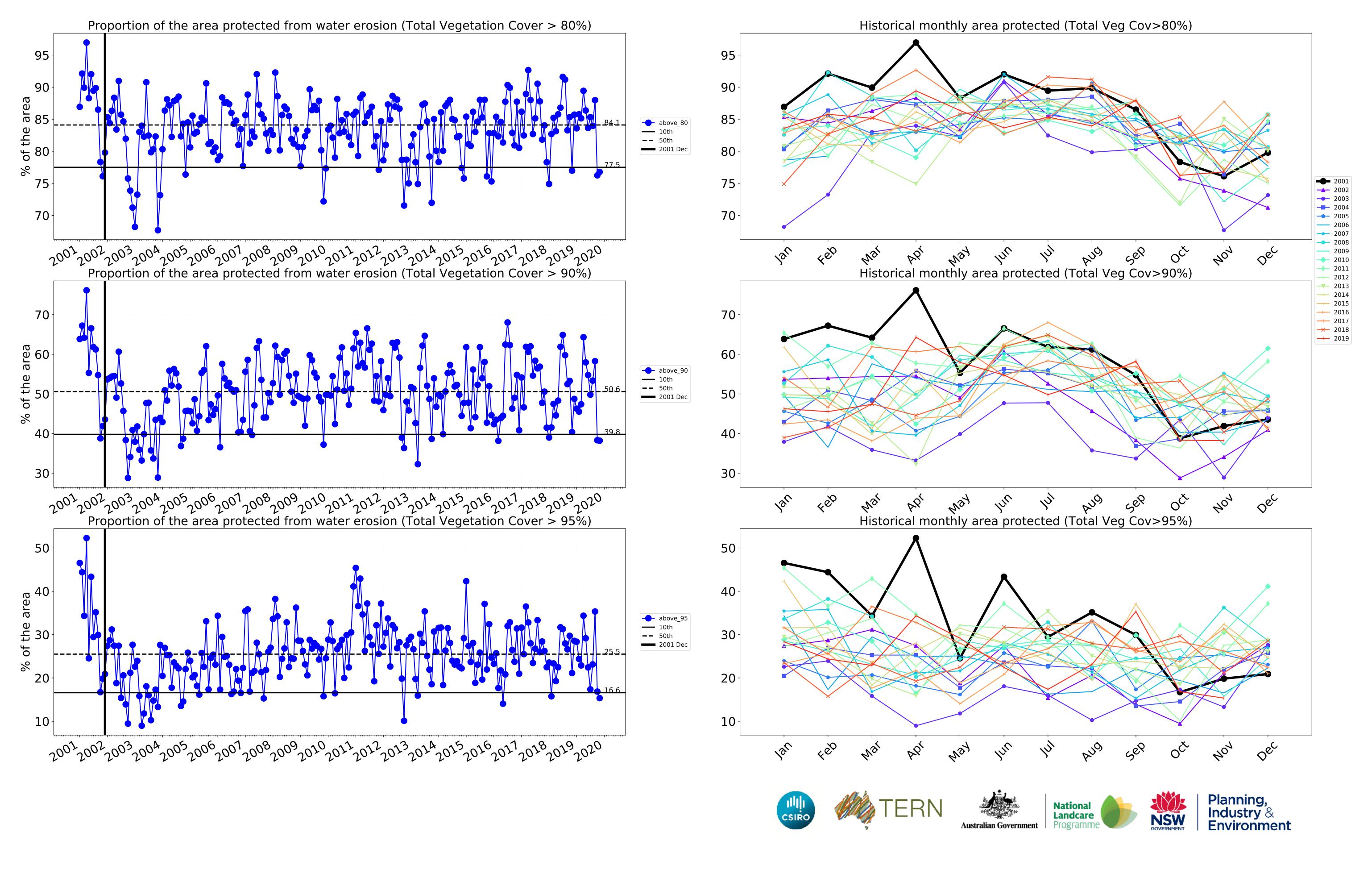
## **Conservation and natural environments non forest timeseries**







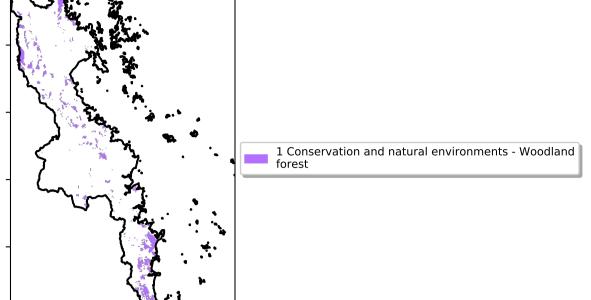




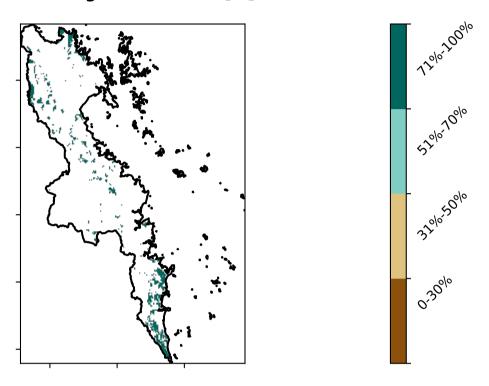
## **Conservation and natural environments Woodland forest**

## Land use and forest cover

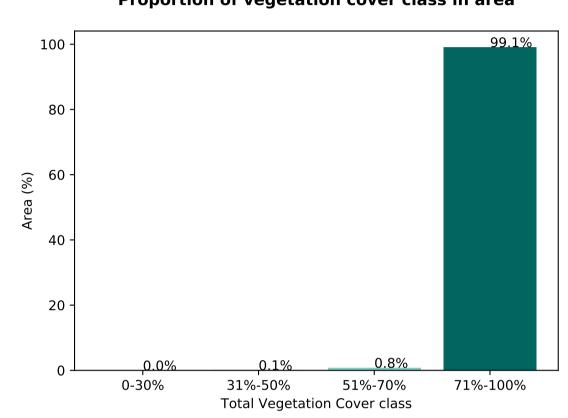
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)



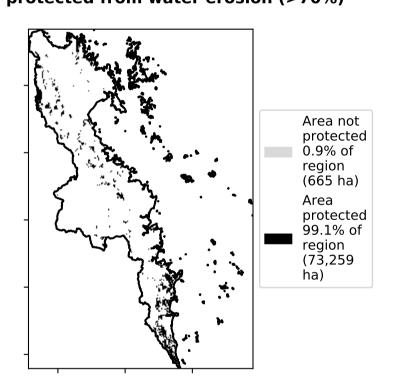
## **Total Vegetation Cover [%]**



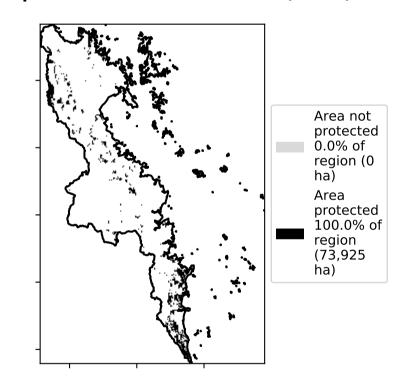
## Proportion of vegetation cover class in area



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



% Area protected from wind erosion (>50%)



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

Anomaly show how many percetage points each

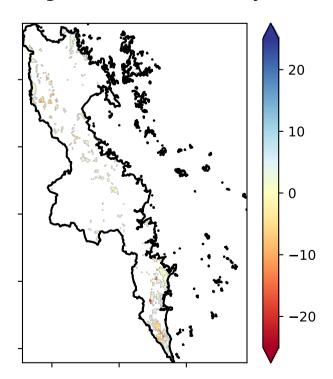
pixel is from the mean. That

pixel. The mean

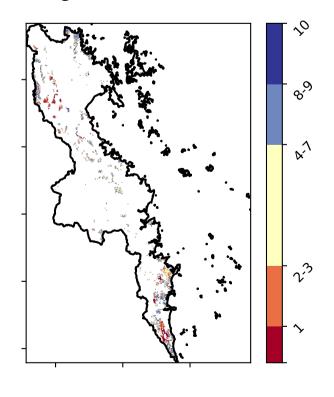
using baseline from 2001 to 2019.

is only for the month of the map

is, red pixels are about 20% lower than the mean of that



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.





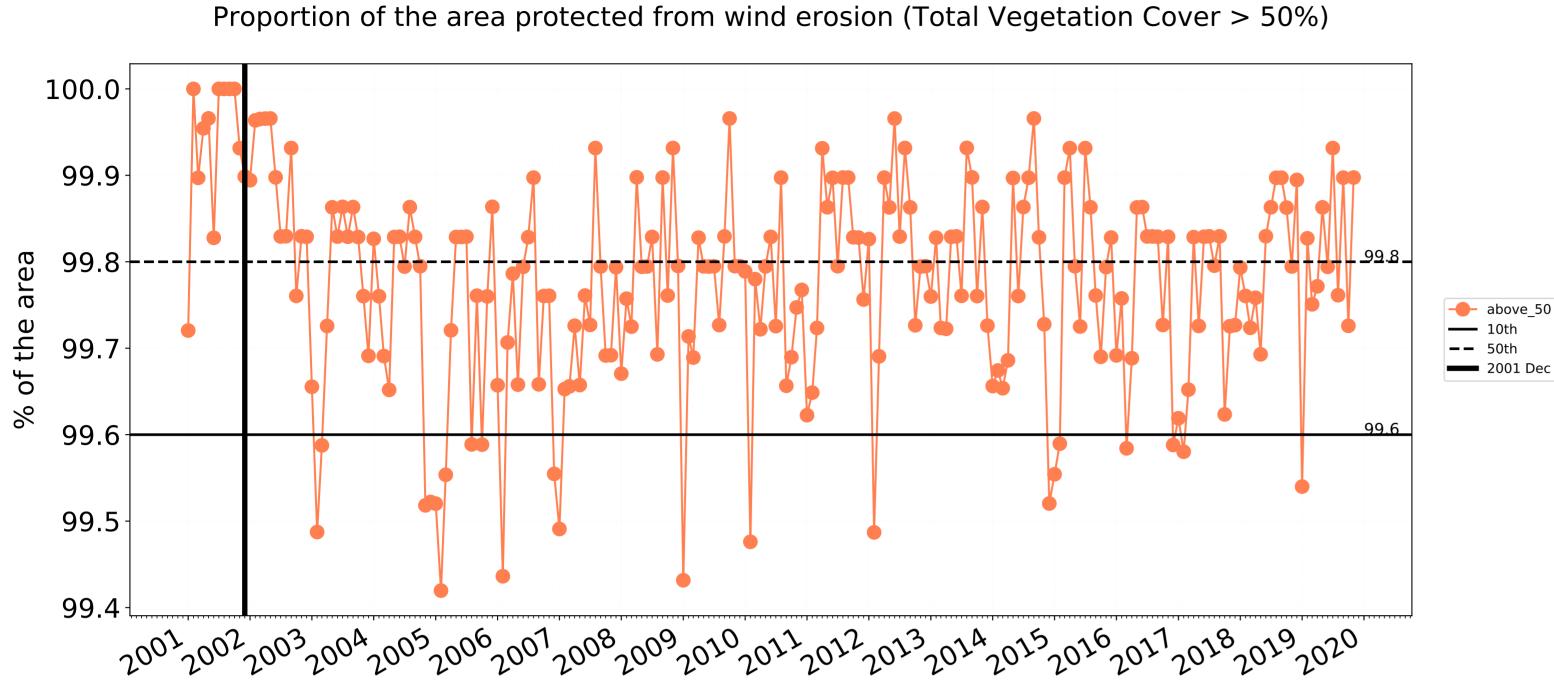


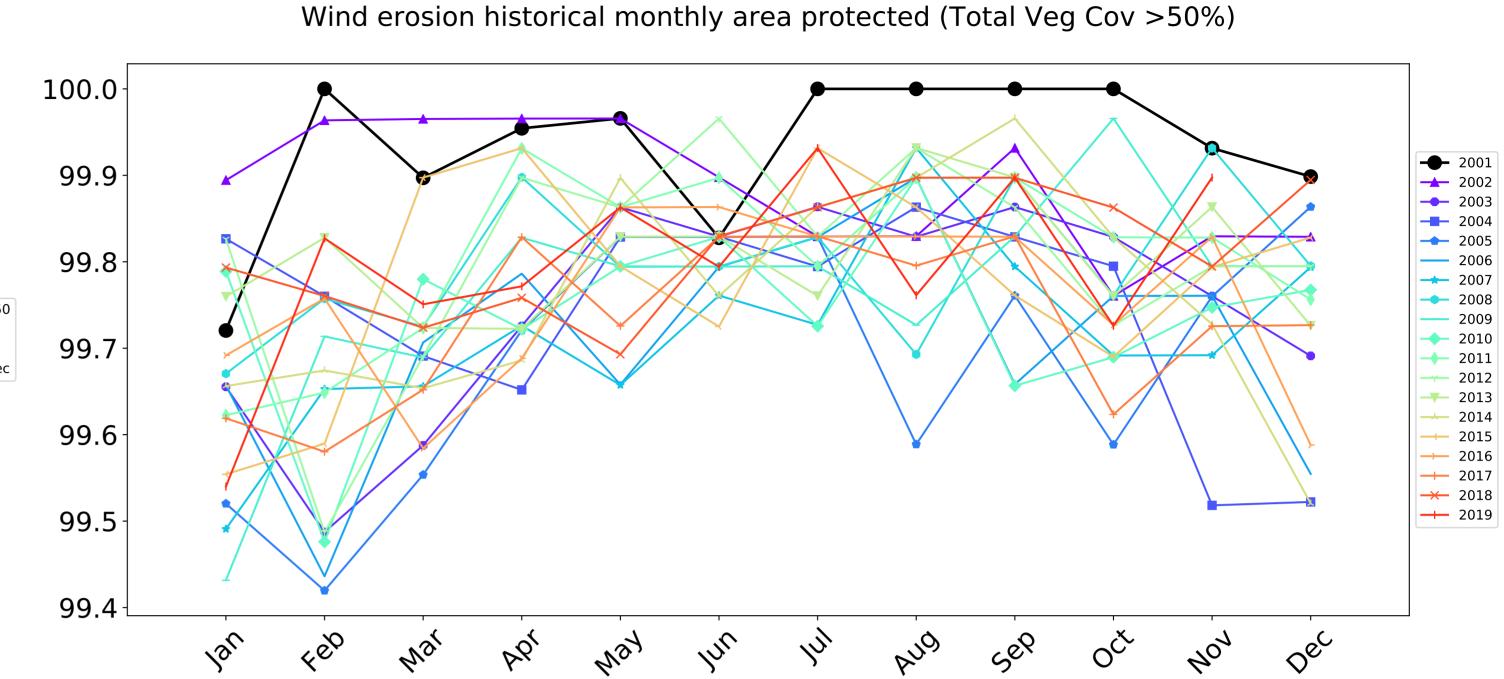




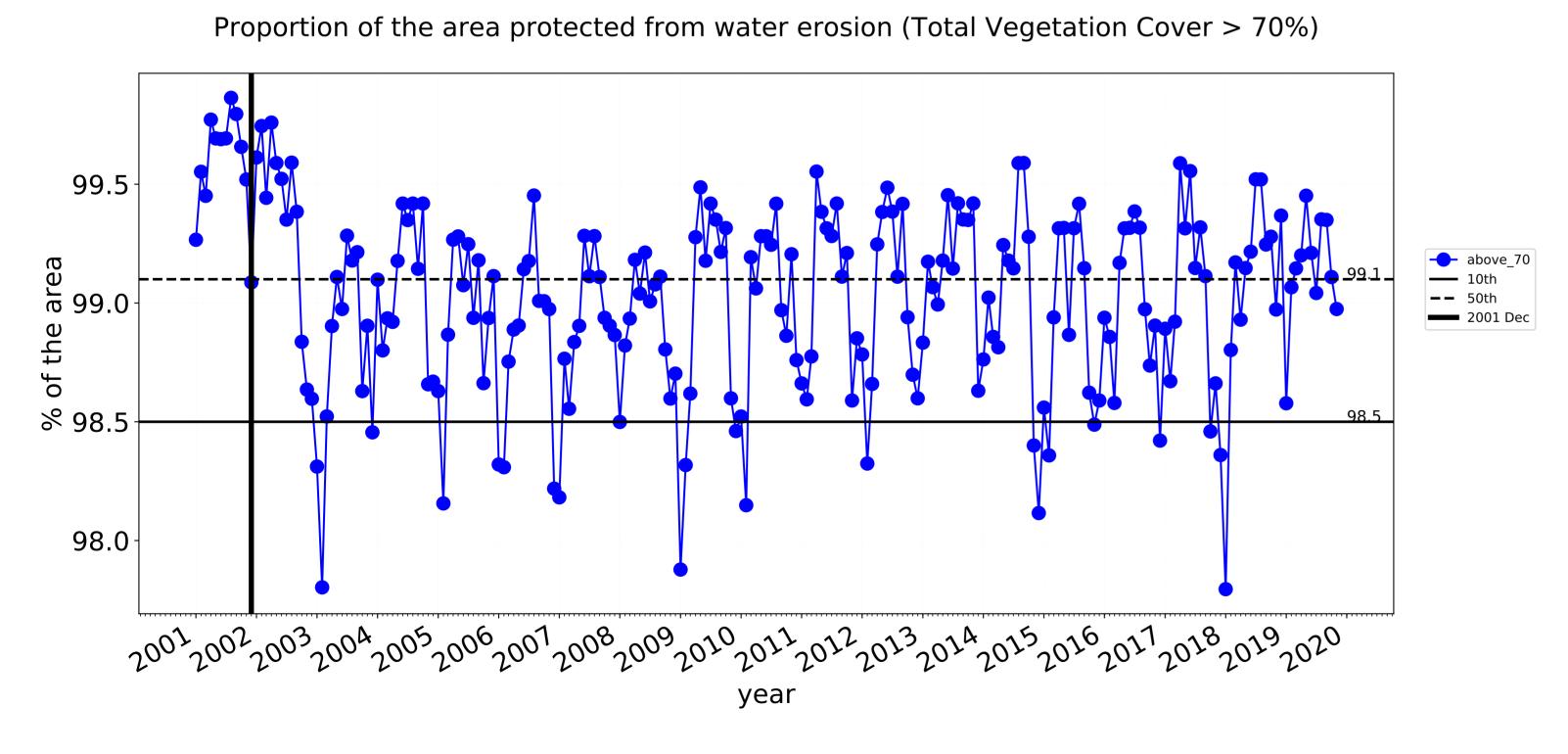


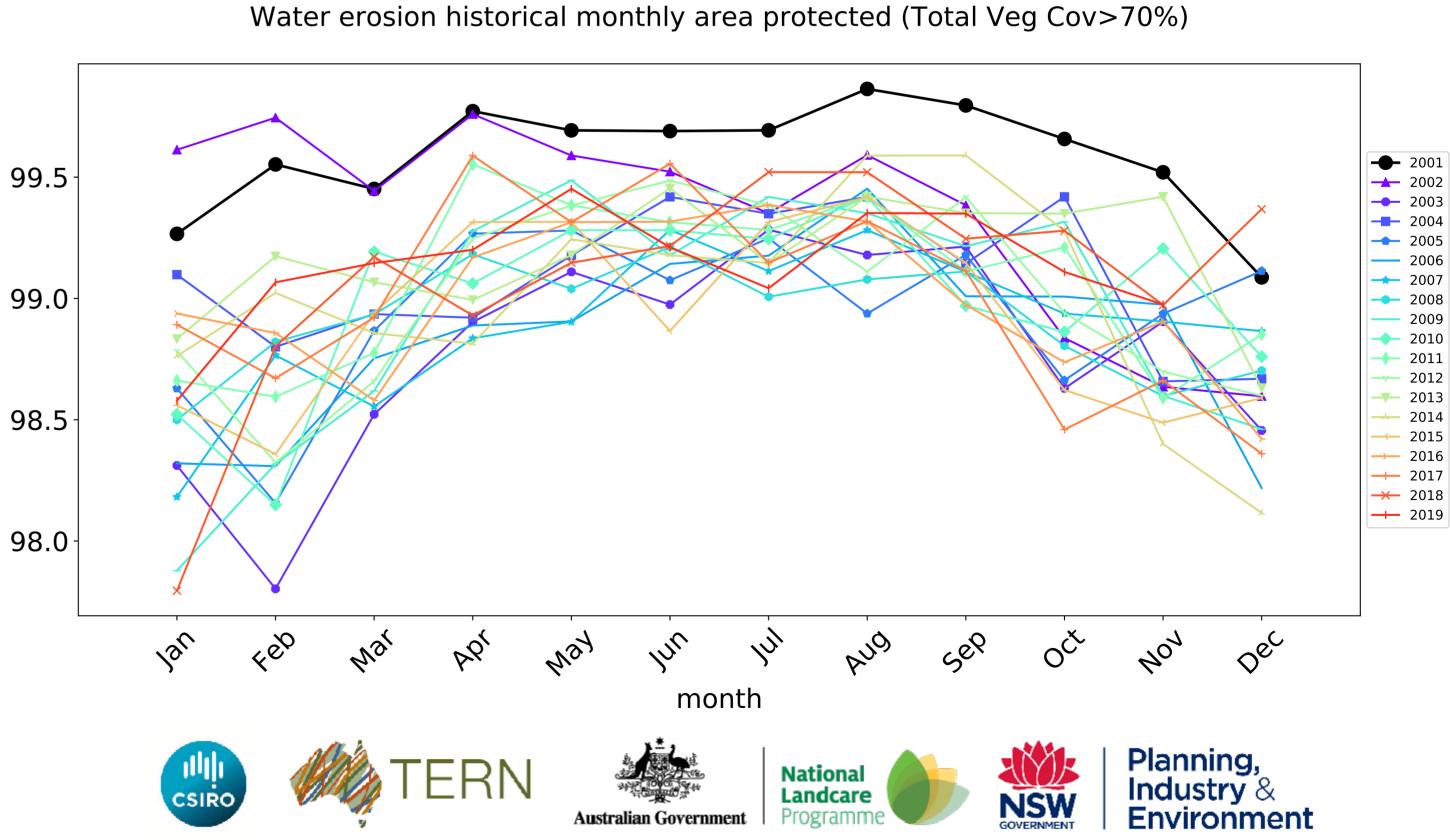


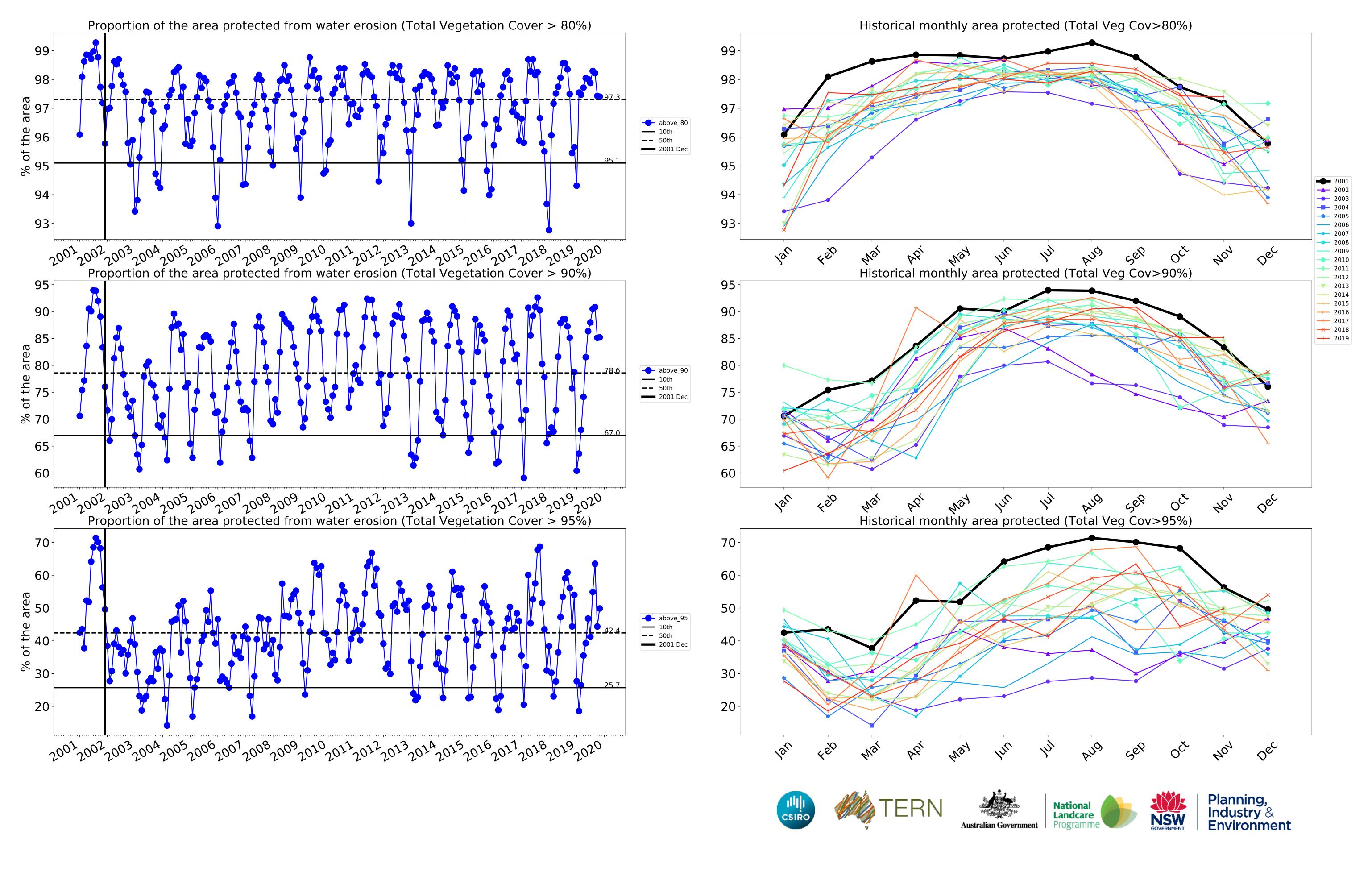




month



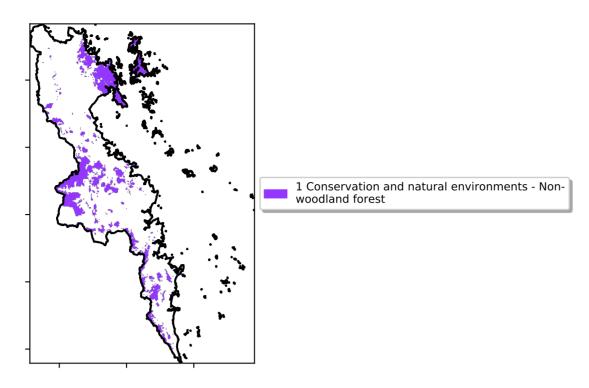




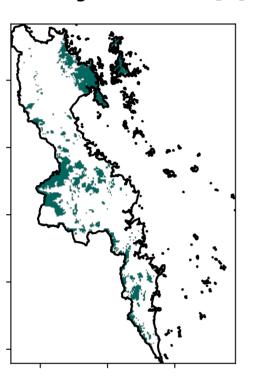
## **Conservation and natural environments Forest (non woodland)**

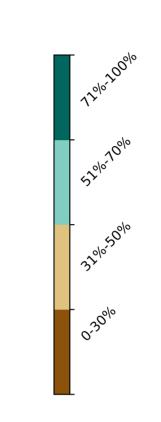
## Land use and forest cover

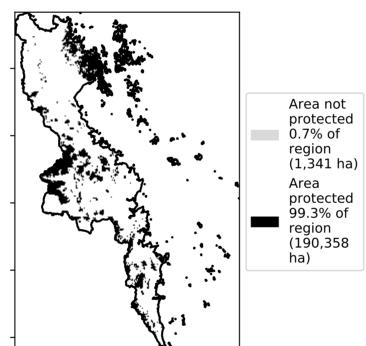
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

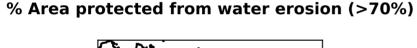


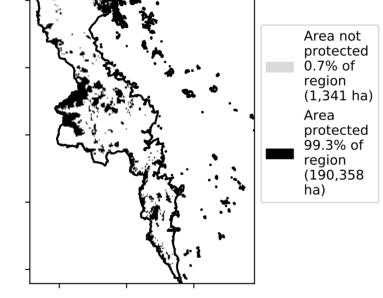
## **Total Vegetation Cover [%]**



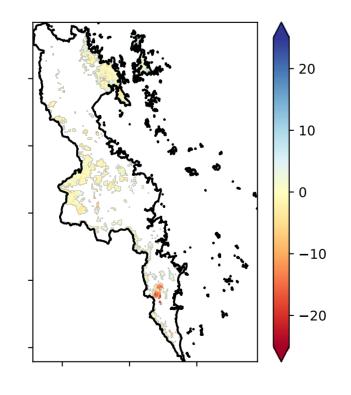






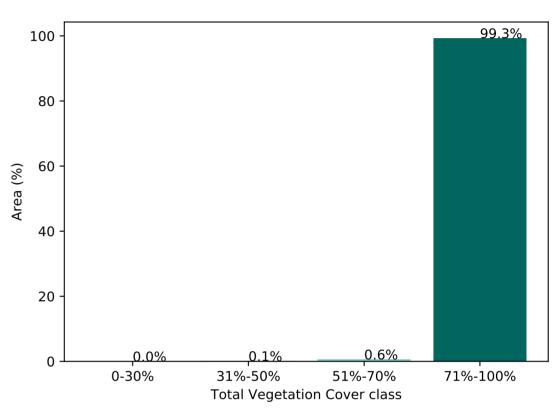


## **Total Vegetation Cover Anomaly [%]**

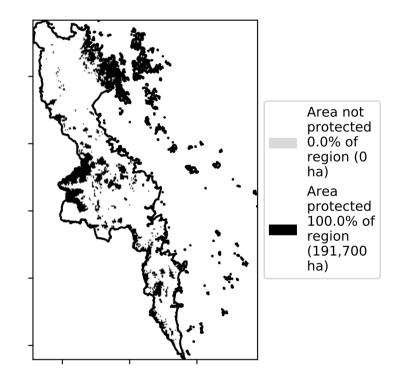


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

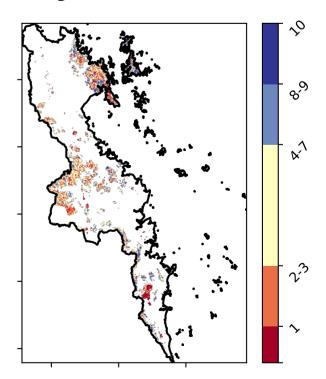
## Proportion of vegetation cover class in area



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



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



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



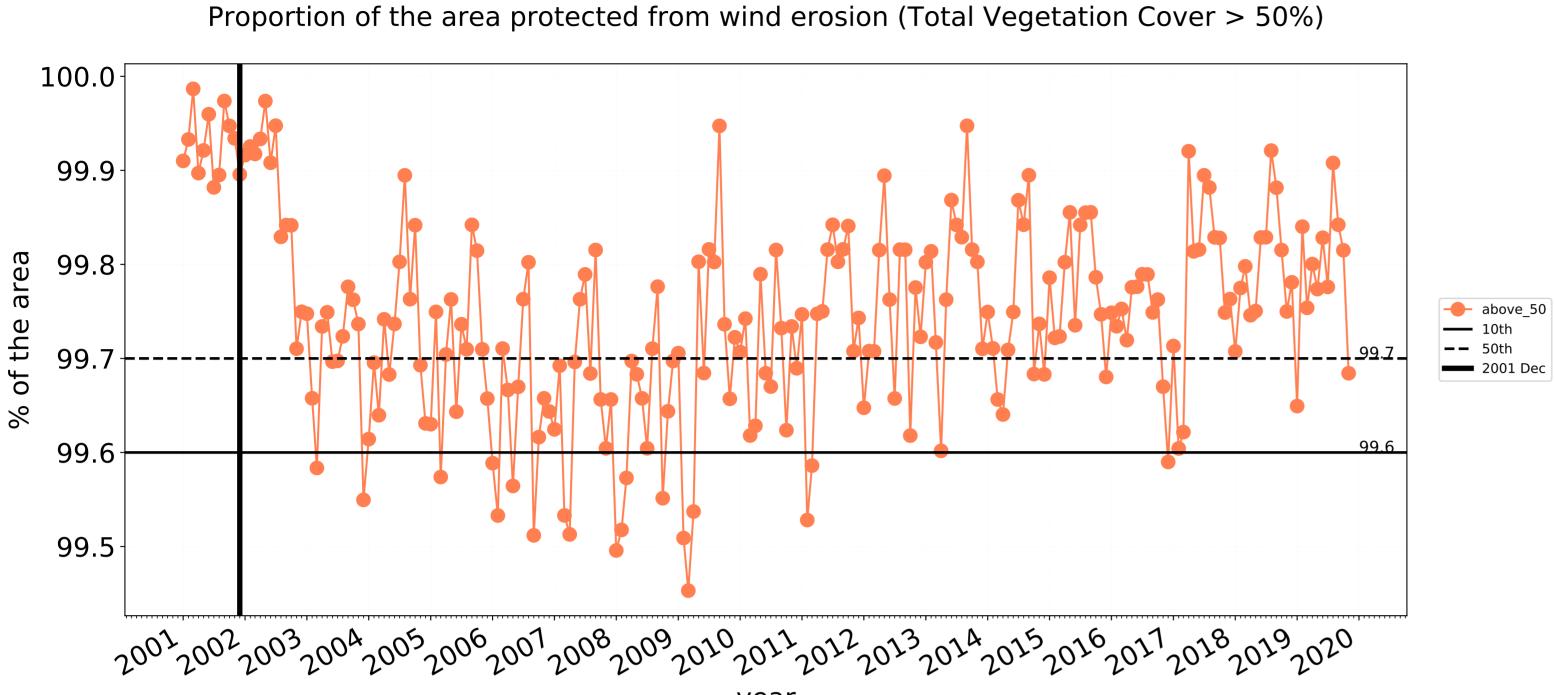


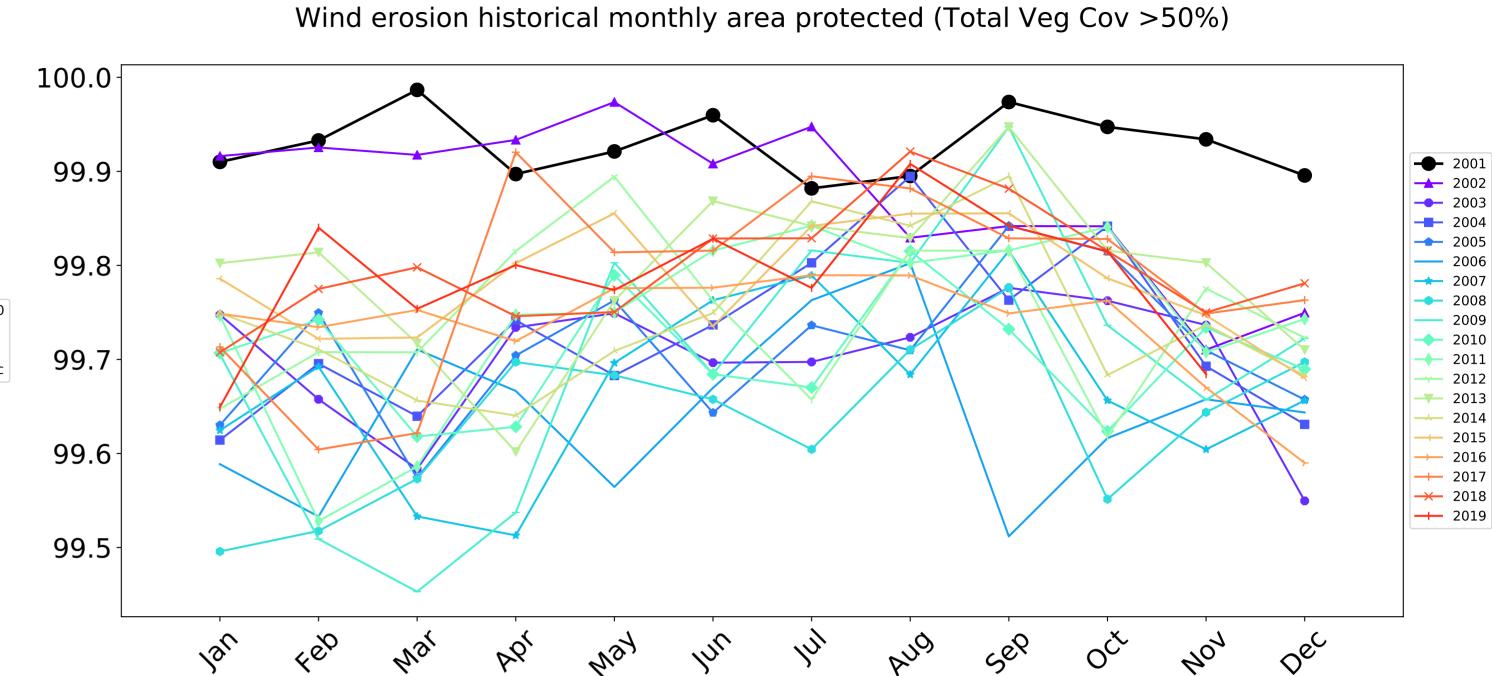




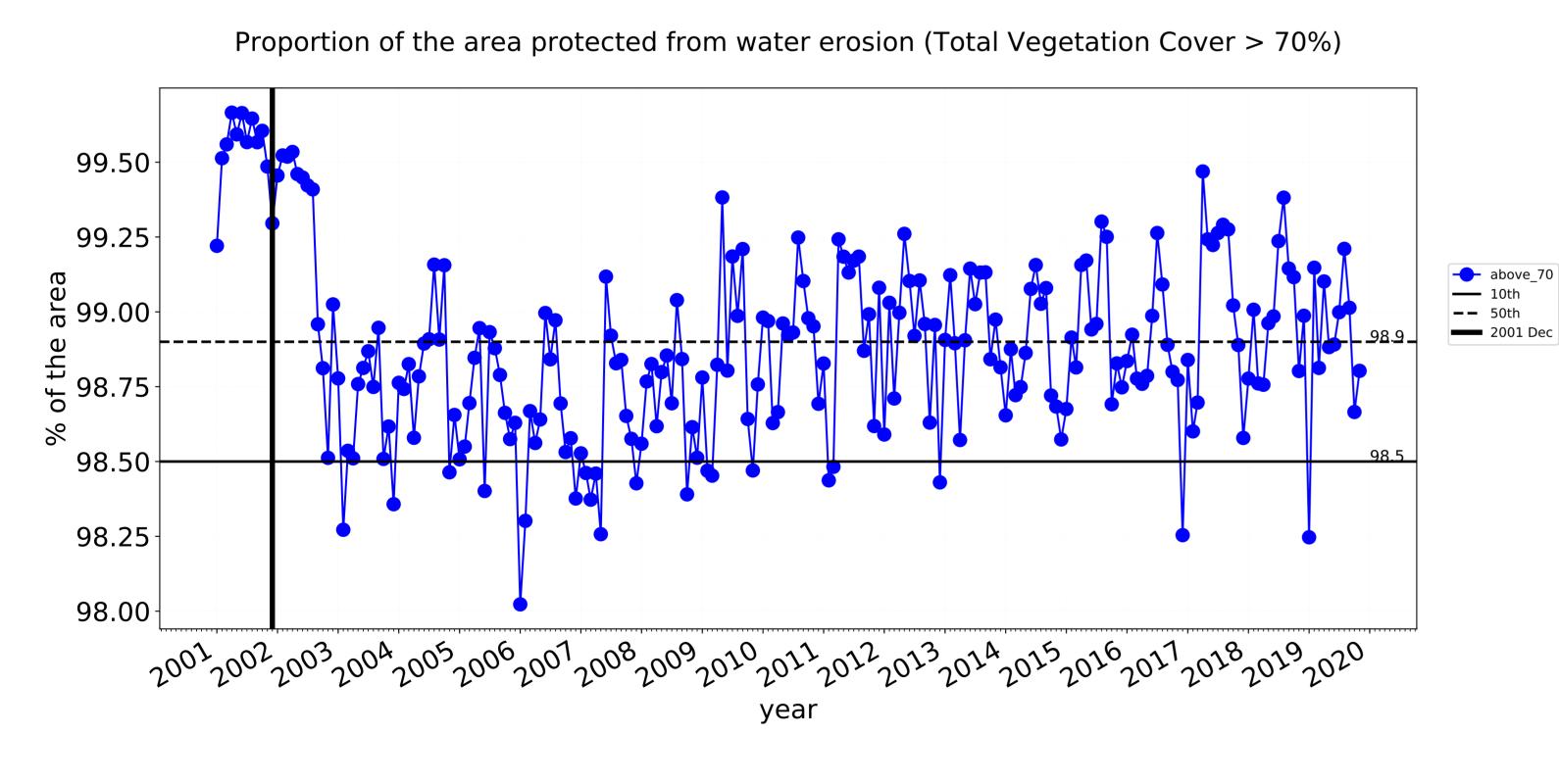


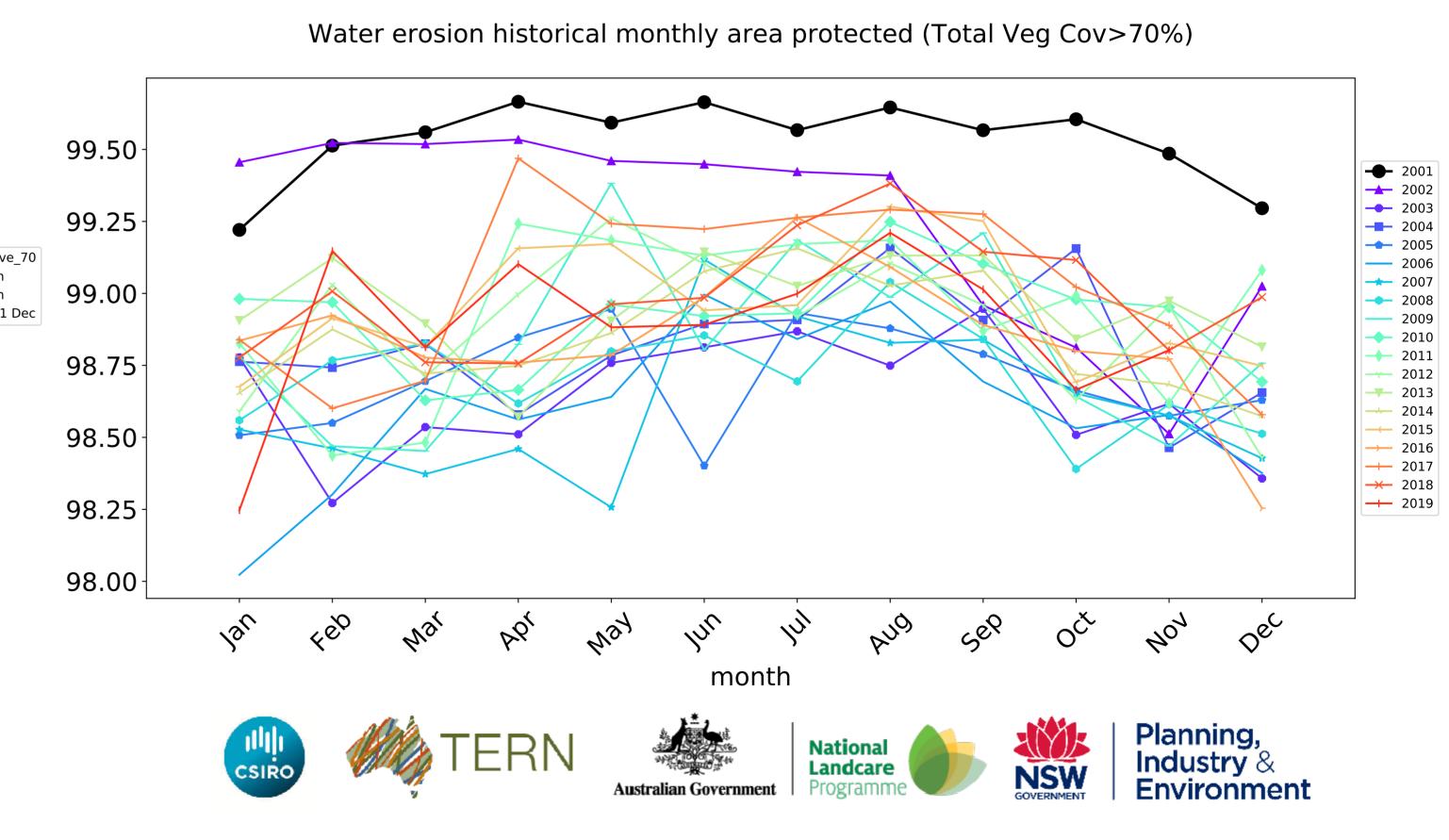


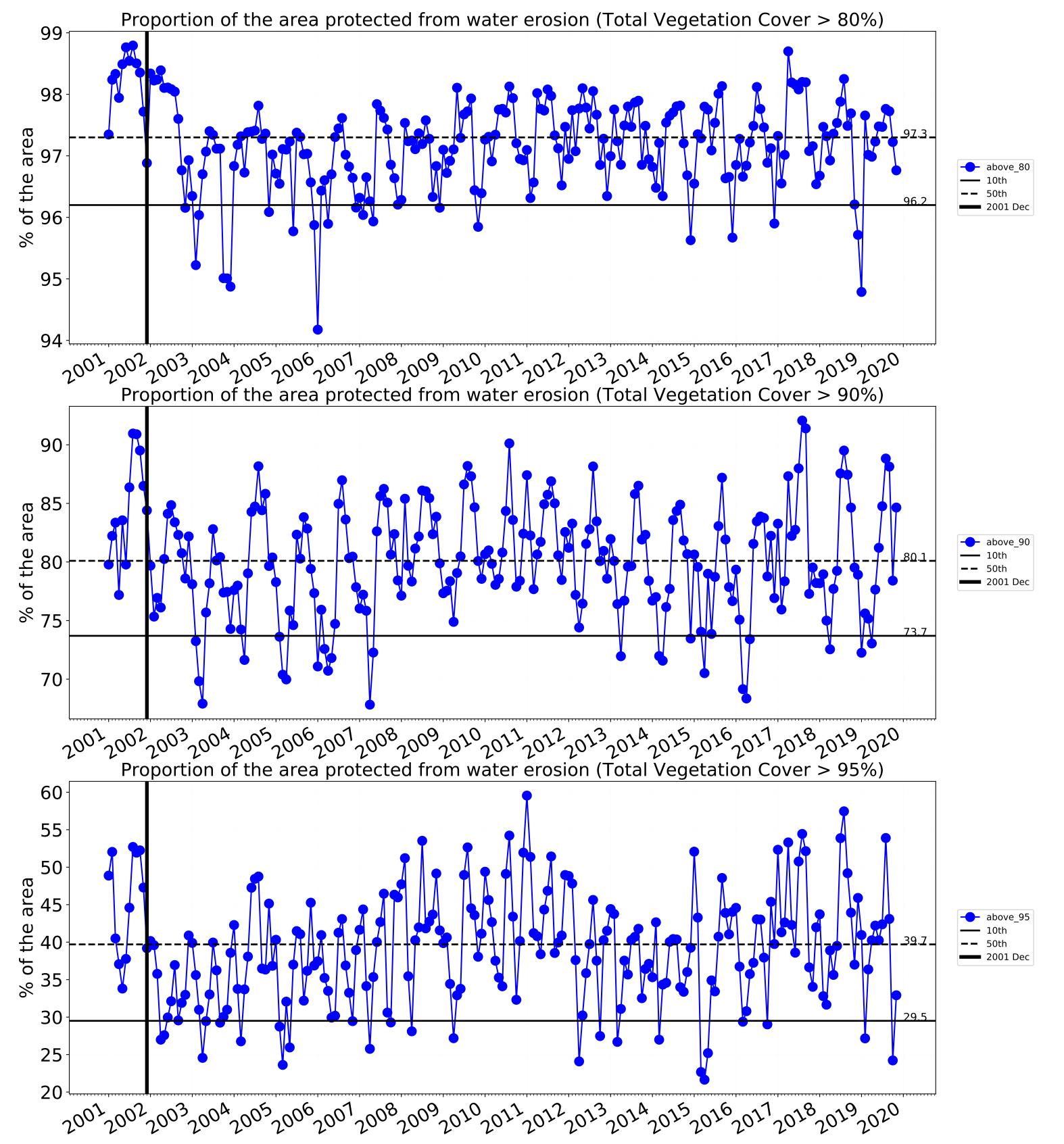


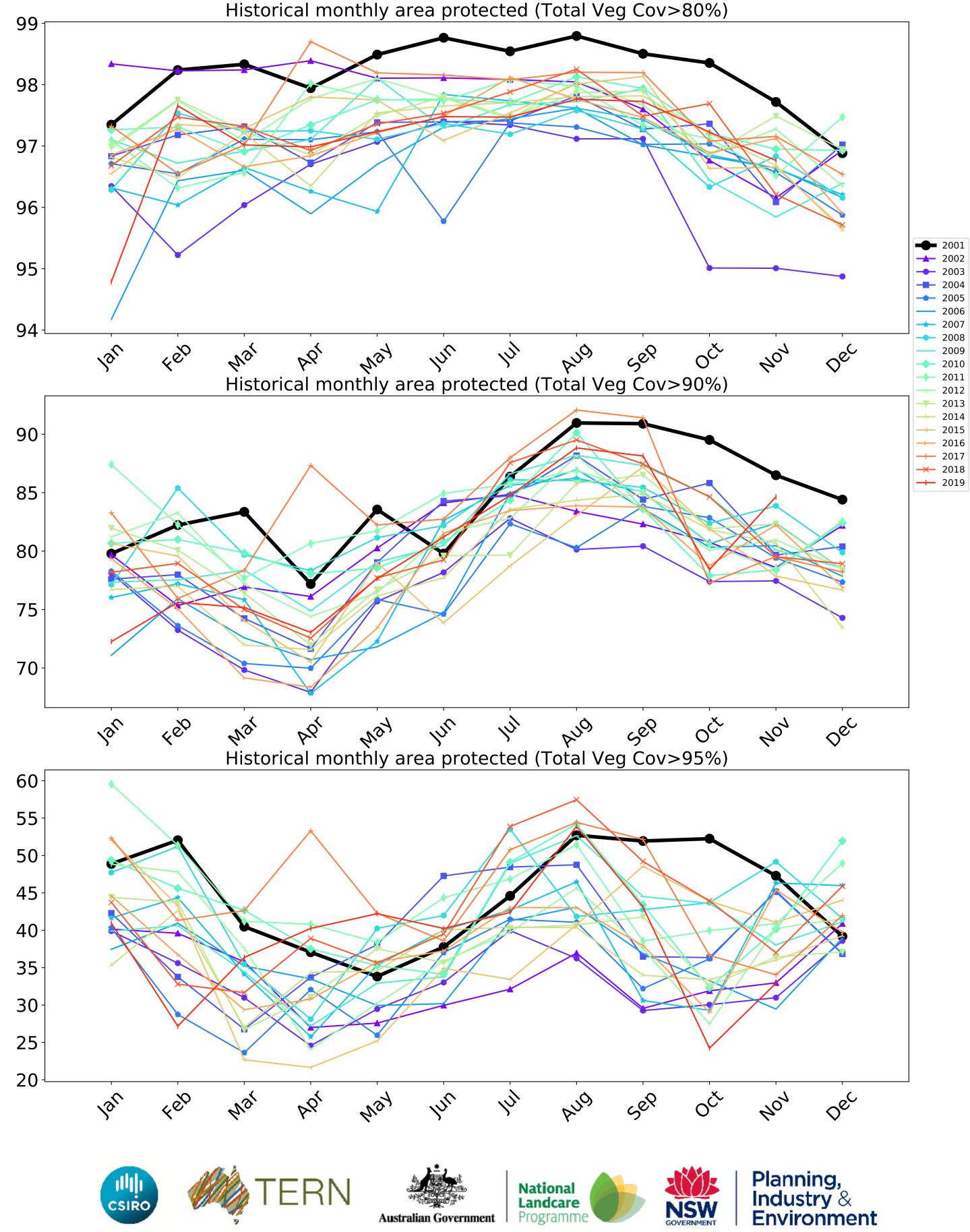


month









## **Agriculture**

## Land use and forest cover

Catchment Scale

of Australia (2018)

(2018) and Forests

of Australia (2018)

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

using baseline from 2001 to 2019.

is only for the month of the map

is, red pixels are about 20% lower than the mean of that

Derived from

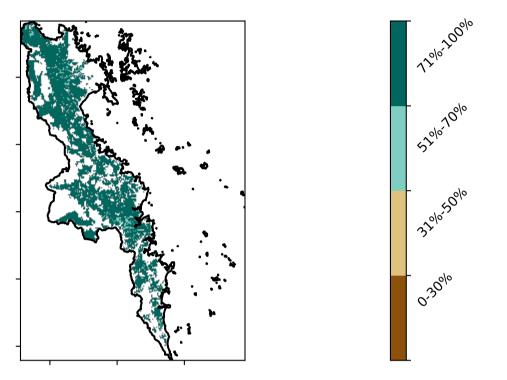
Use of Australia

Land Use and Forests

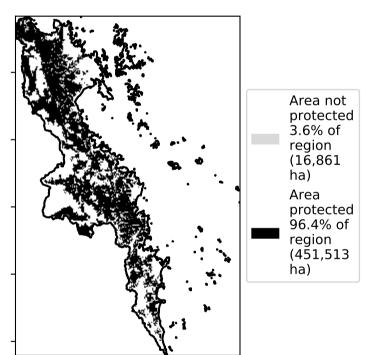
Catchment Scale Land

# 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest 4 Agriculture - Grazing - Irrigated 5 Agriculture - Cropping - Irrigated 6 Agriculture - Horticulture - Non-irrigated 7 Agriculture - Horticulture - Irrigated

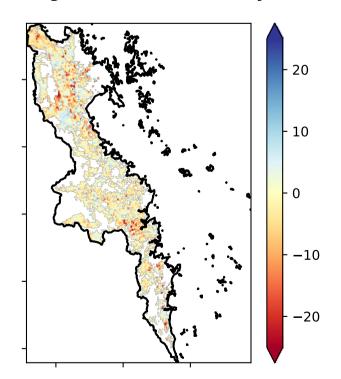
## **Total Vegetation Cover [%]**



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

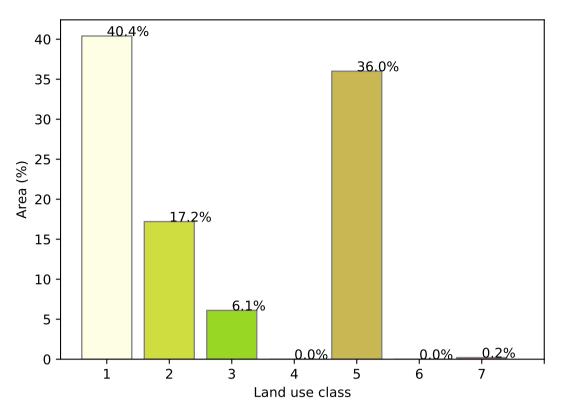


## **Total Vegetation Cover Anomaly [%]**

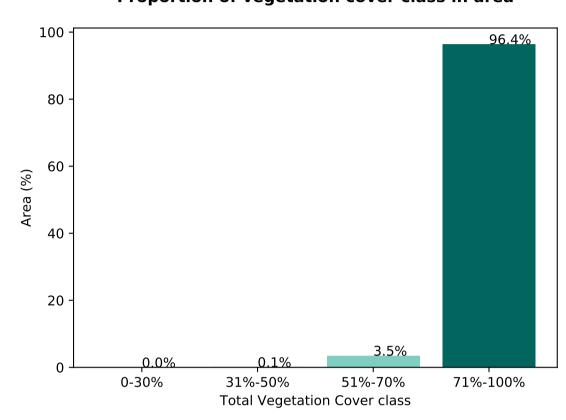


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

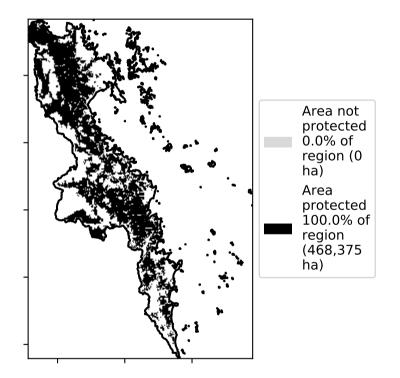
## Proportion of each land class in area



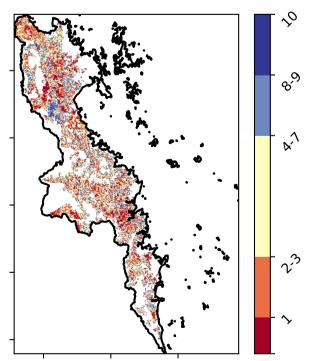
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]







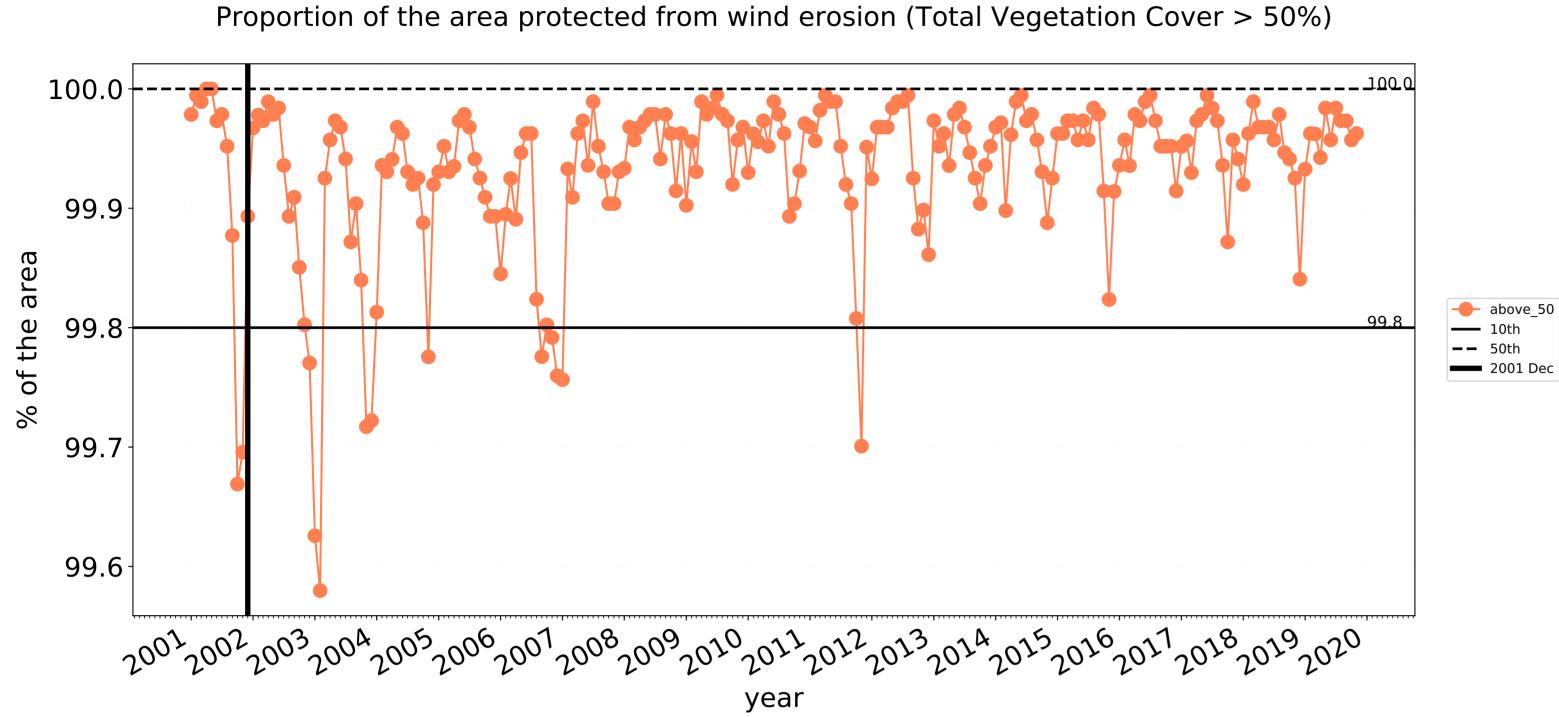


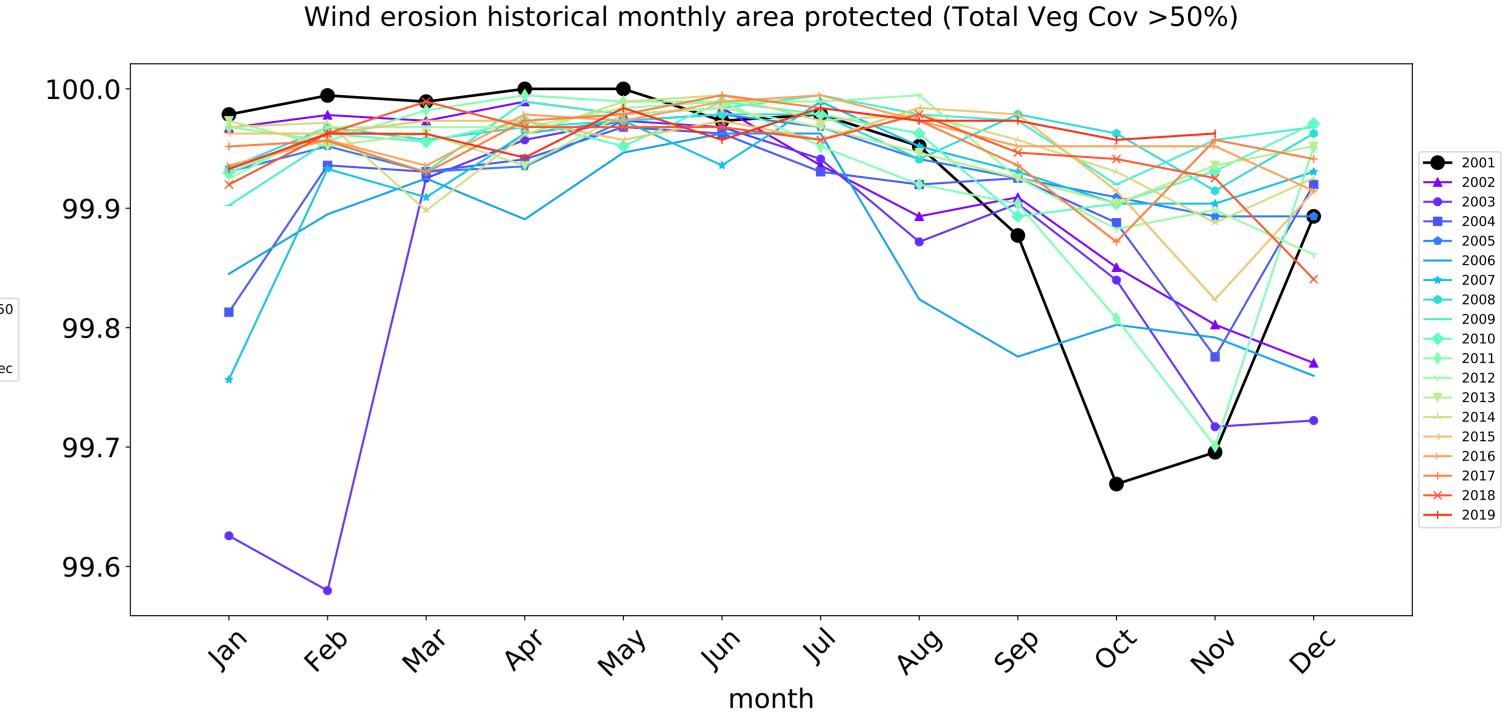


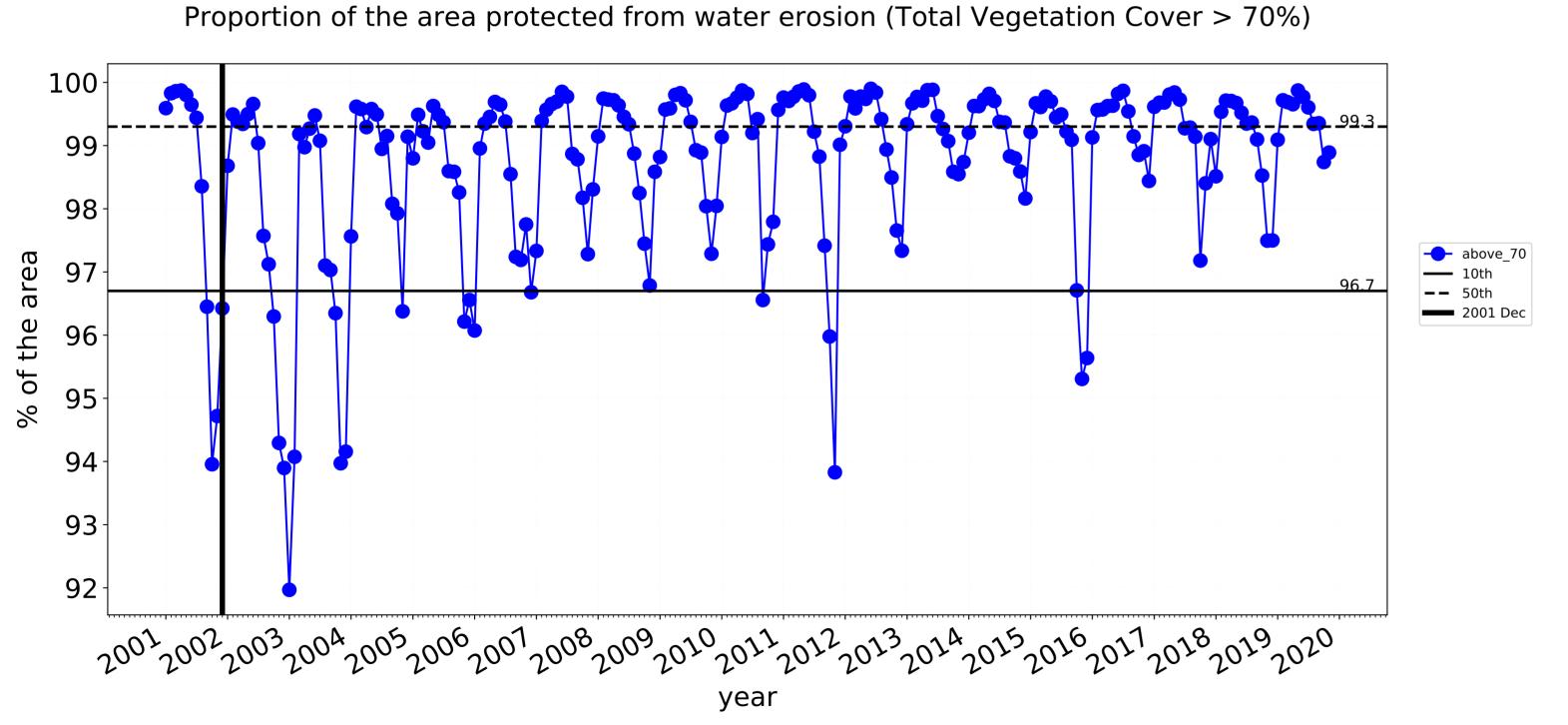


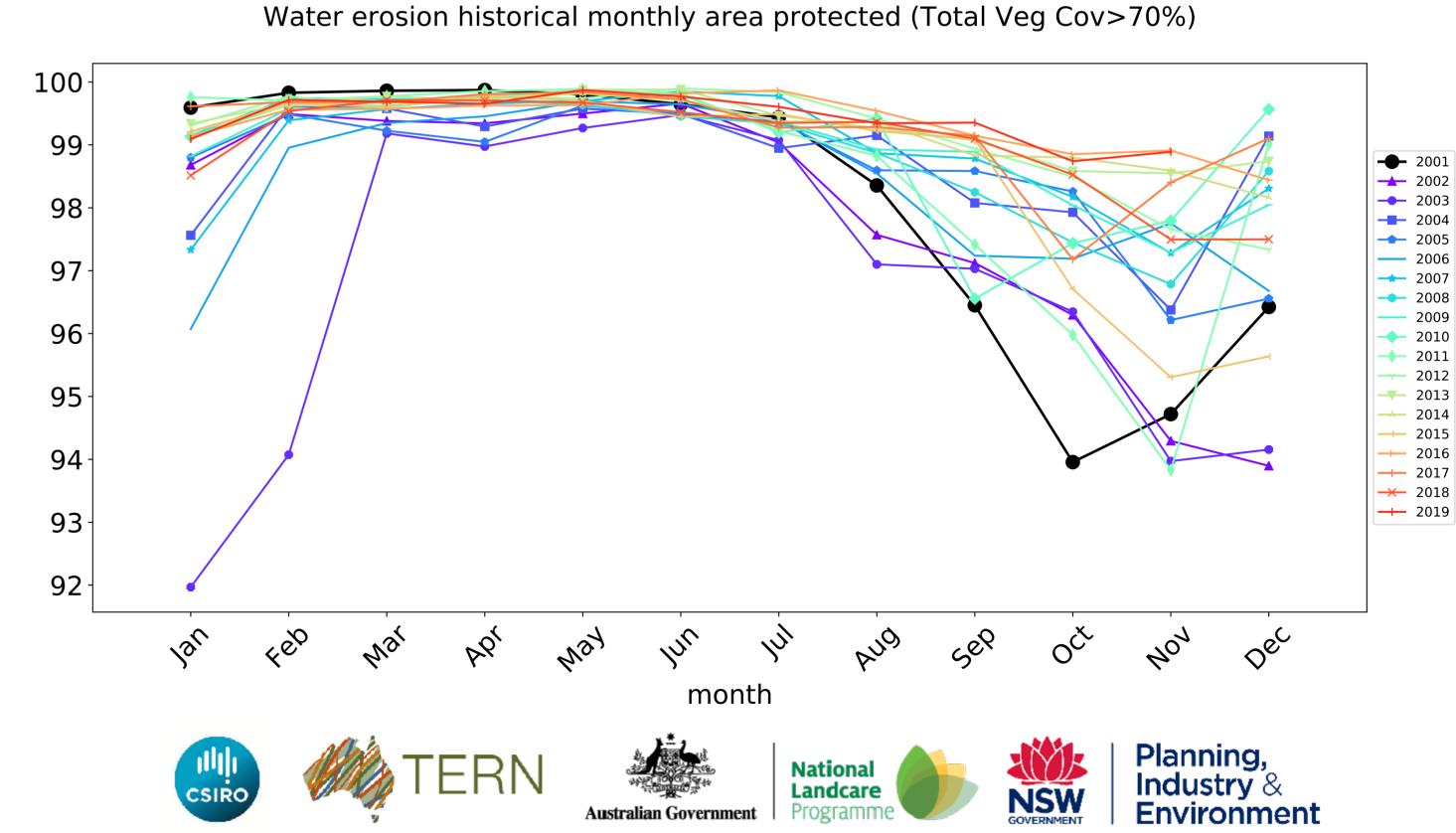


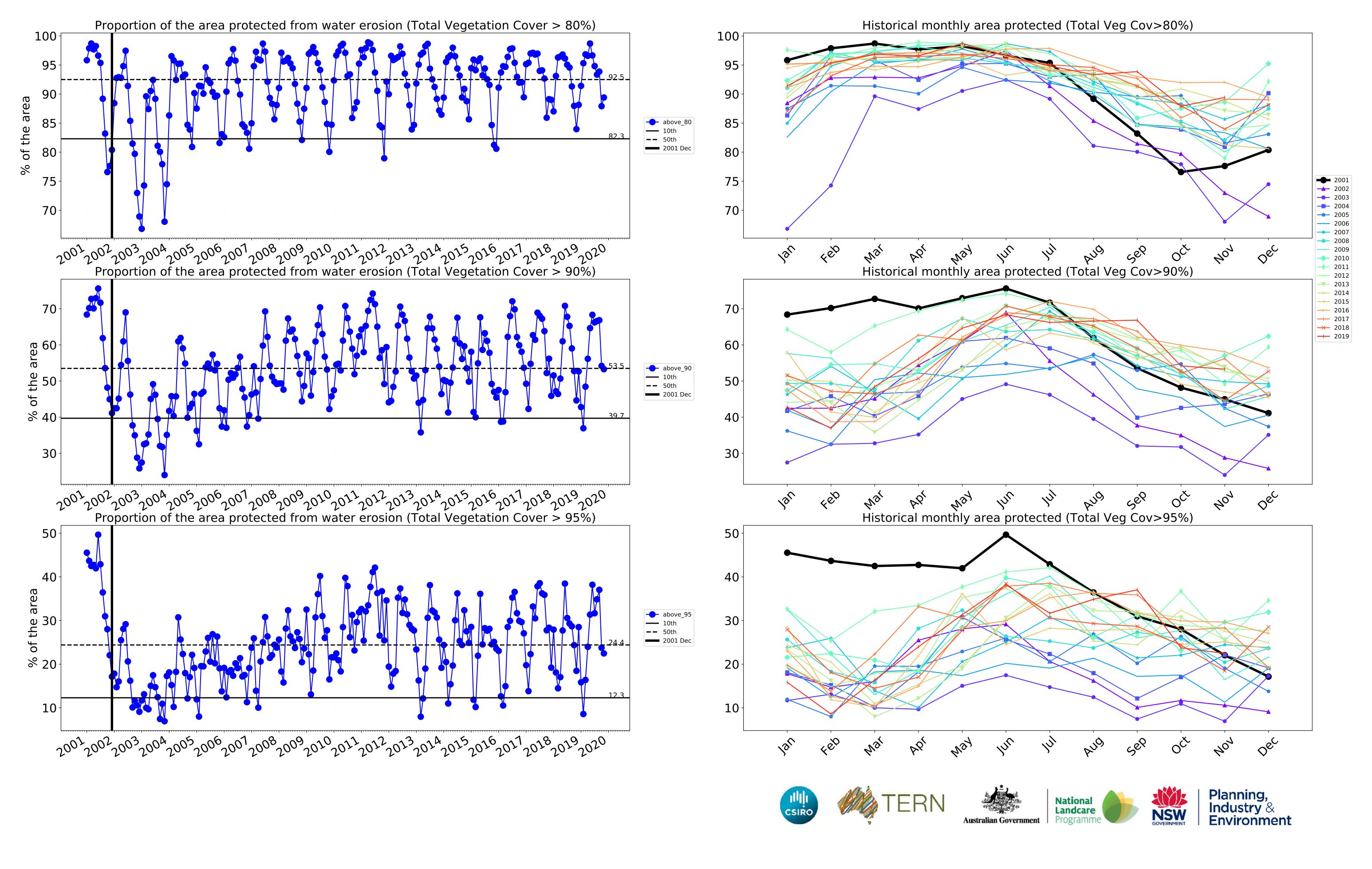
## **Agriculture timeseries**











## Grazing

## Land use and forest cover

Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land

Derived from

Use of Australia

(2018) and Forests of Australia (2018)

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

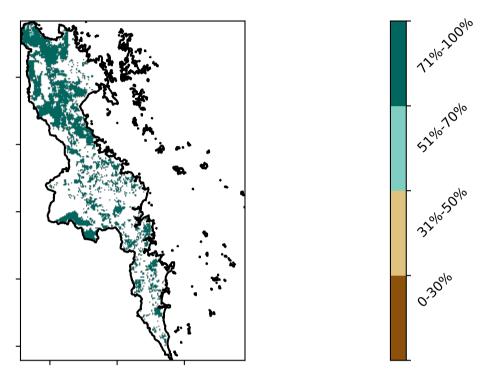
using baseline from 2001 to 2019.

is only for the month of the map

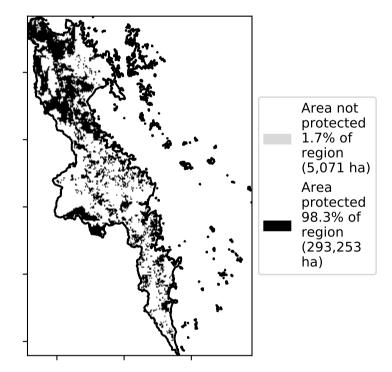
is, red pixels are about 20% lower than the mean of that

# 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest

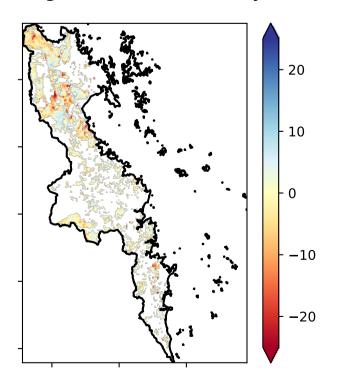
## **Total Vegetation Cover [%]**



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

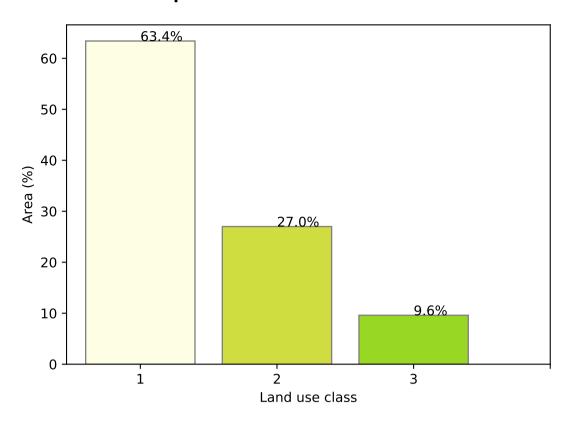


## **Total Vegetation Cover Anomaly [%]**

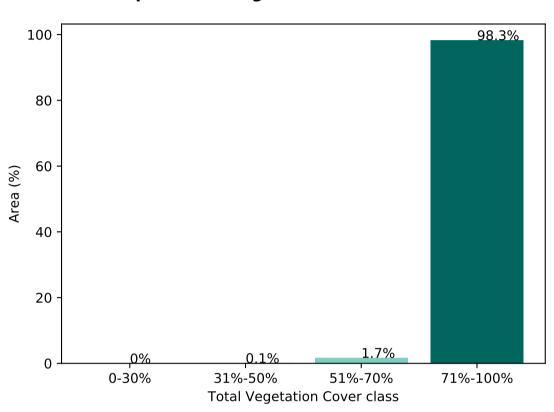


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

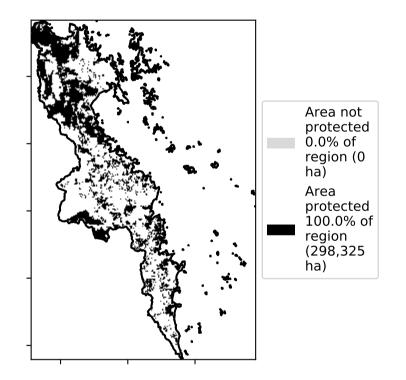
## Proportion of each land class in area

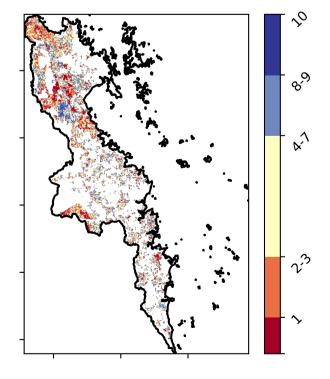


**Proportion of vegetation cover class in area** 



% Area protected from wind erosion (>50%)









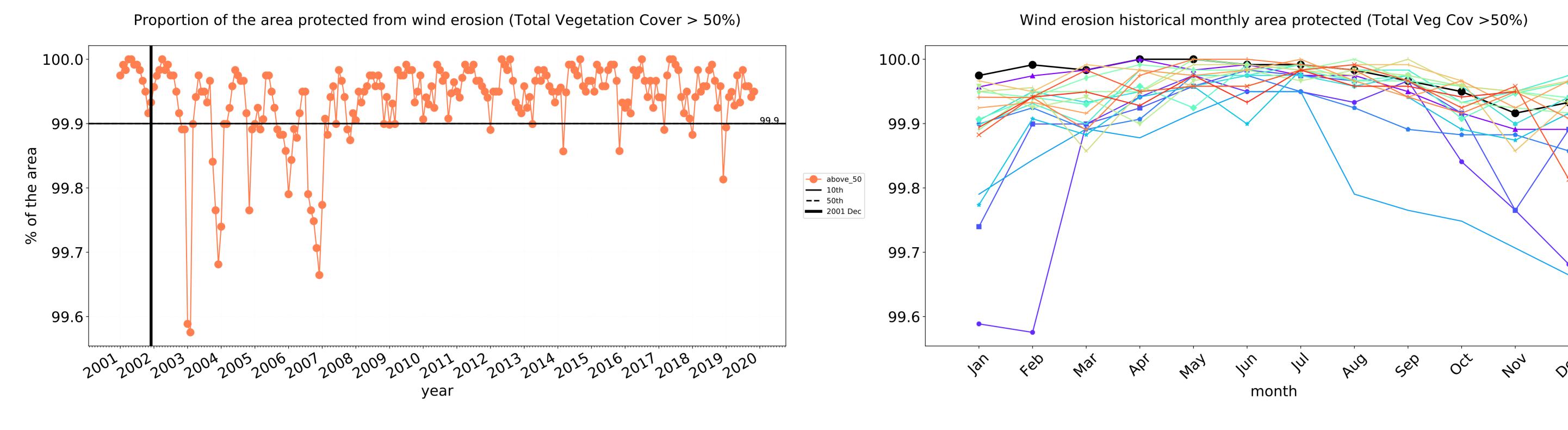


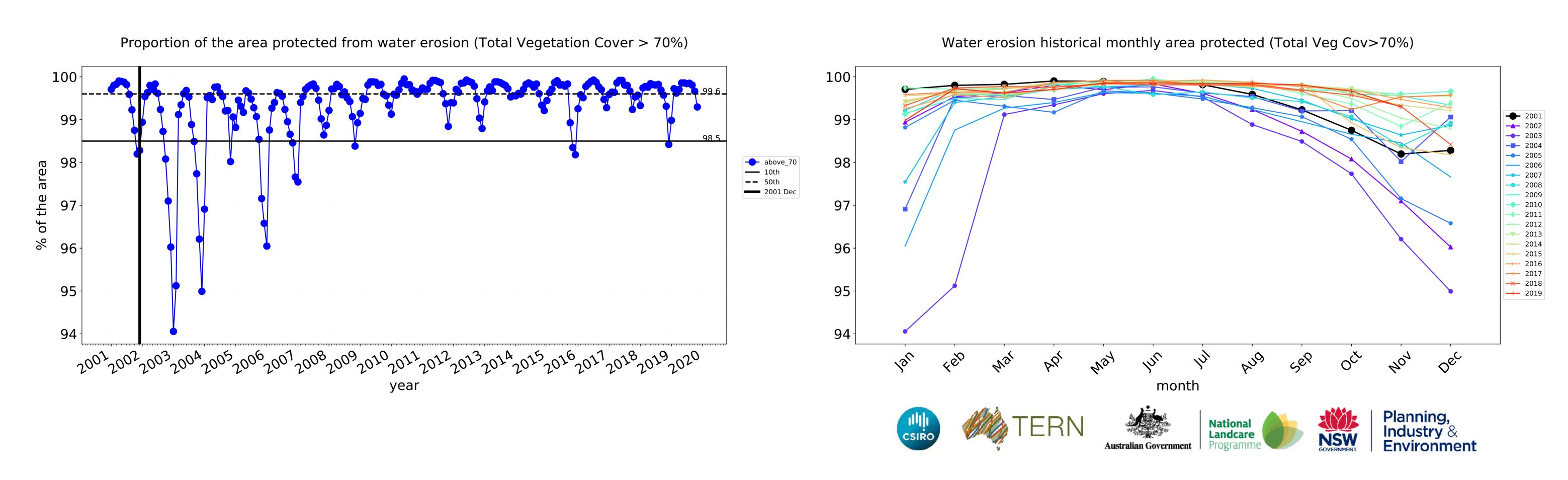






## **Grazing timeseries**

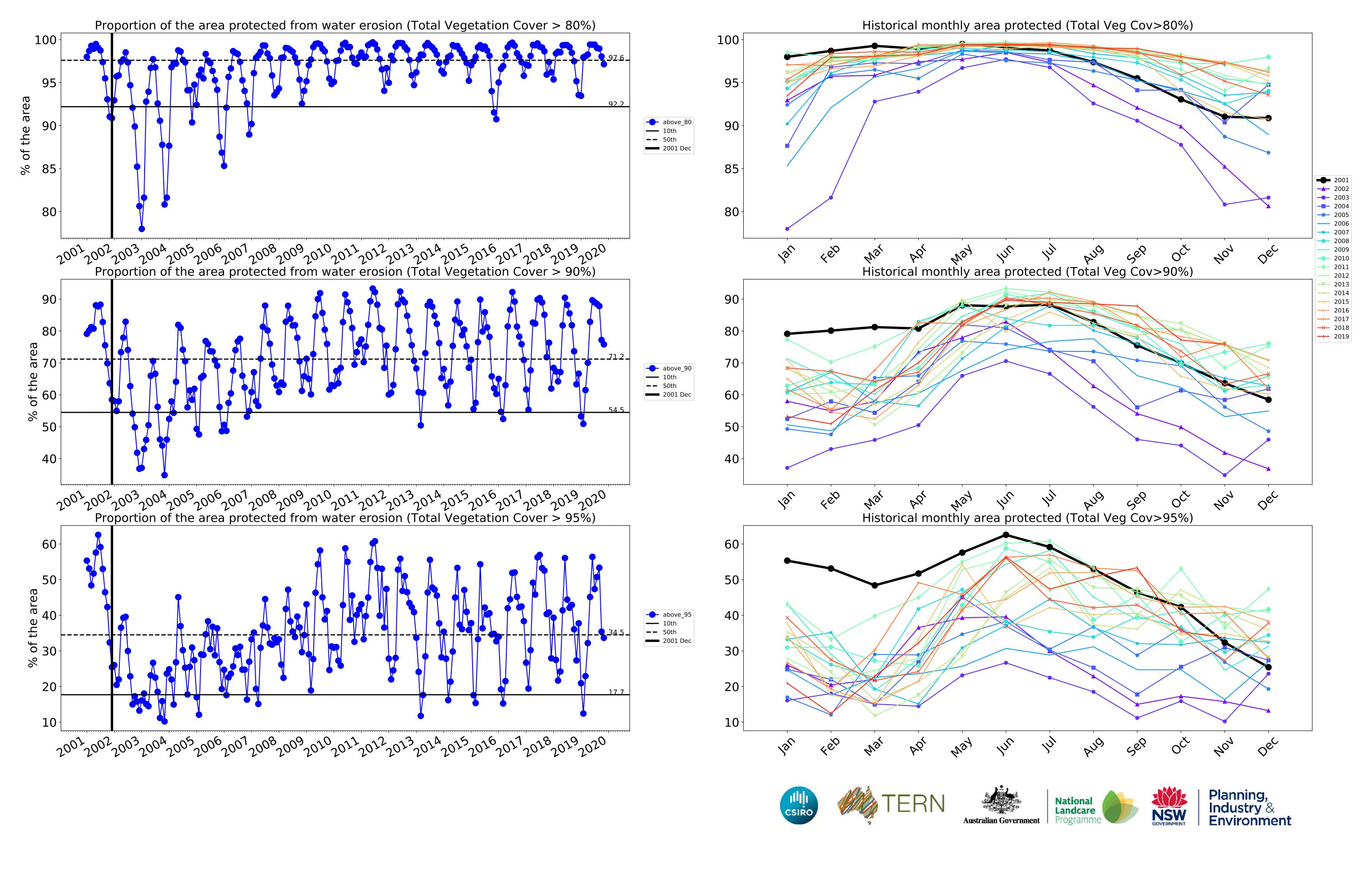




<del>→</del> 2007

**→** 2016

→ 2017 → 2018 → 2019



## **Grazing non forest**

## 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)

Anomaly show how many percetage points each

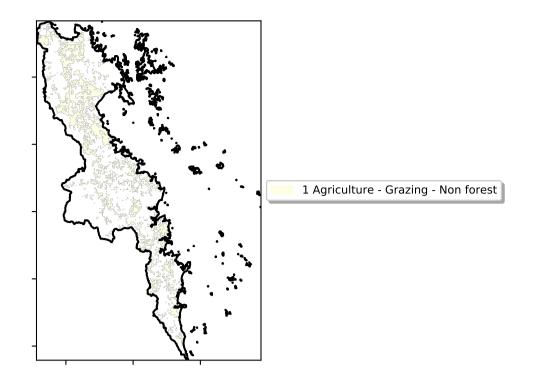
pixel is from the mean. That

is, red pixels are about 20% lower than the mean of that

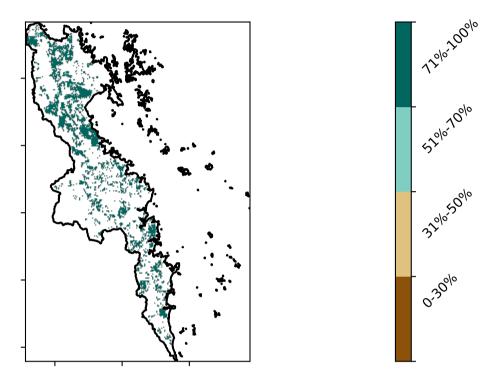
pixel. The mean

using baseline from 2001 to 2019.

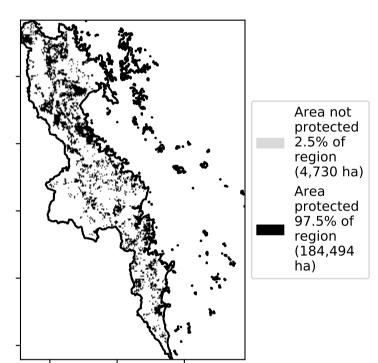
is only for the month of the map



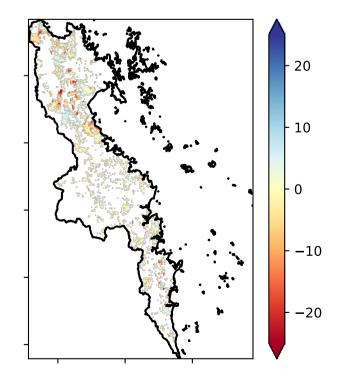
## **Total Vegetation Cover [%]**



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

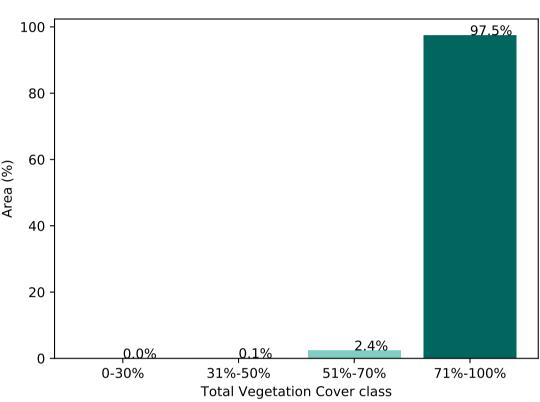


## **Total Vegetation Cover Anomaly [%]**

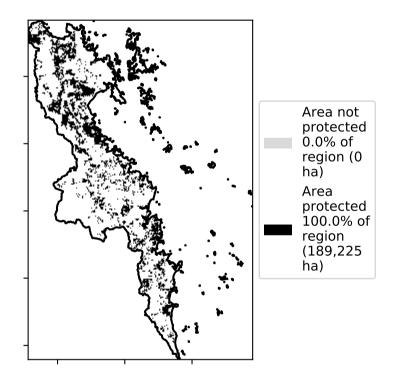


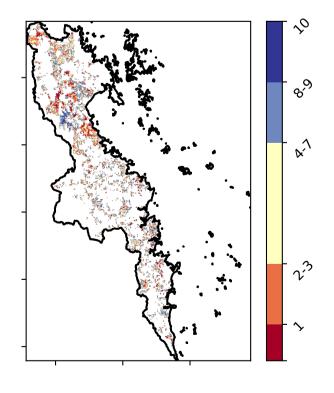
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

## Proportion of vegetation cover class in area



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









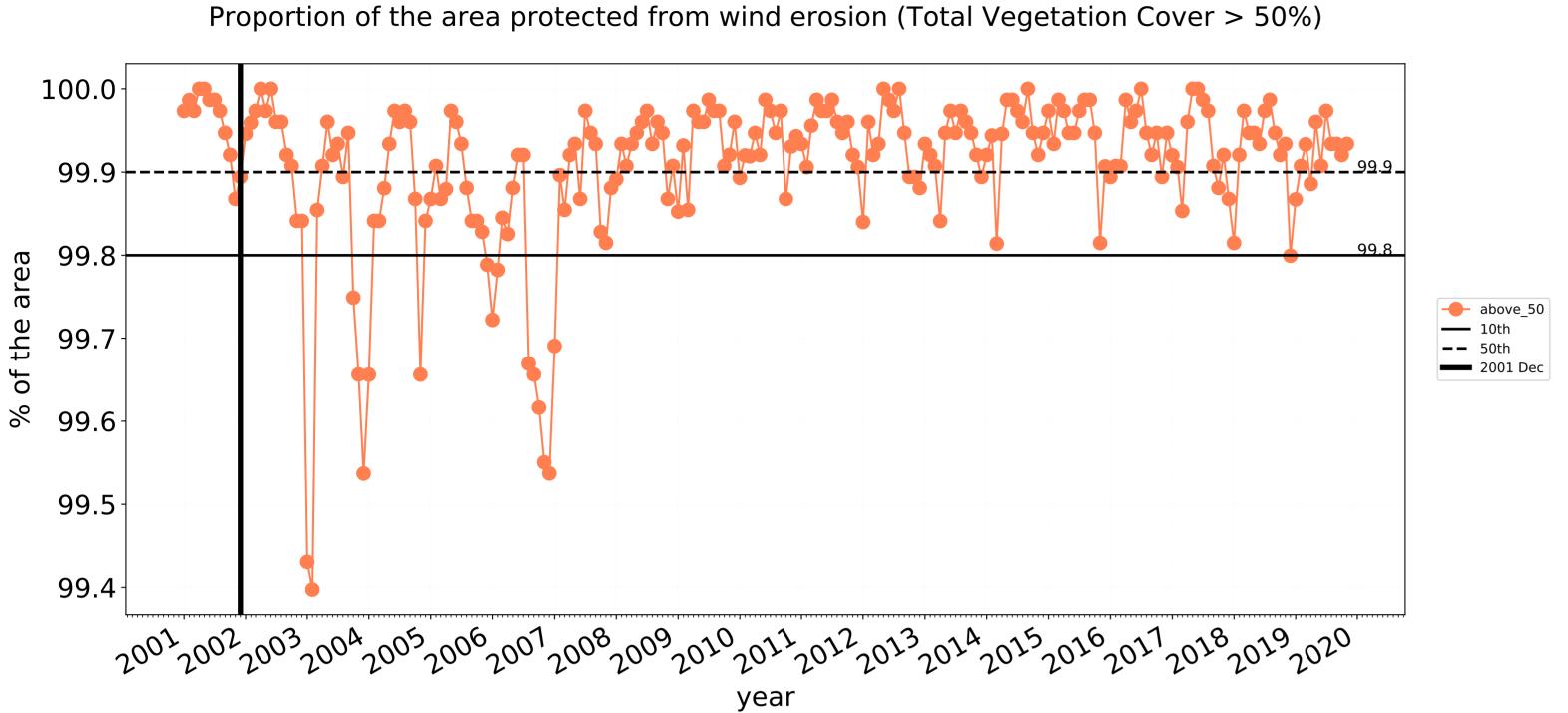


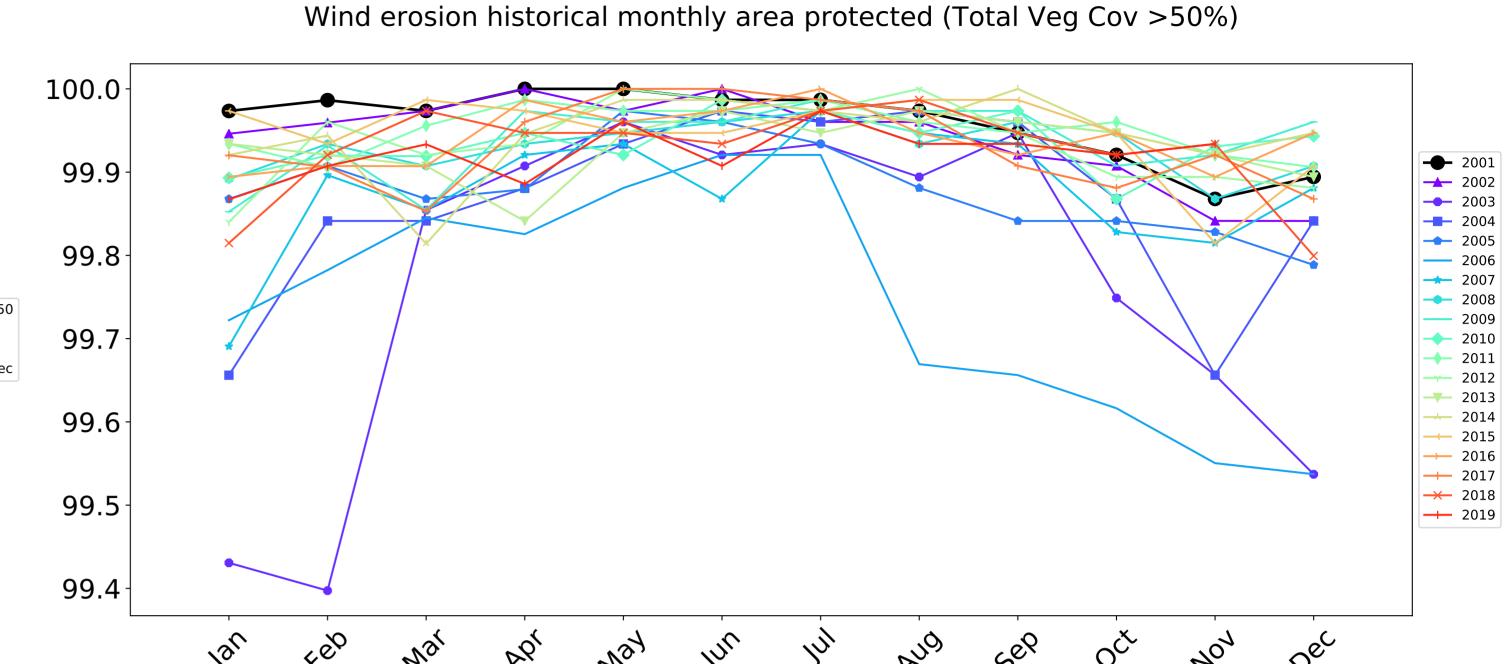




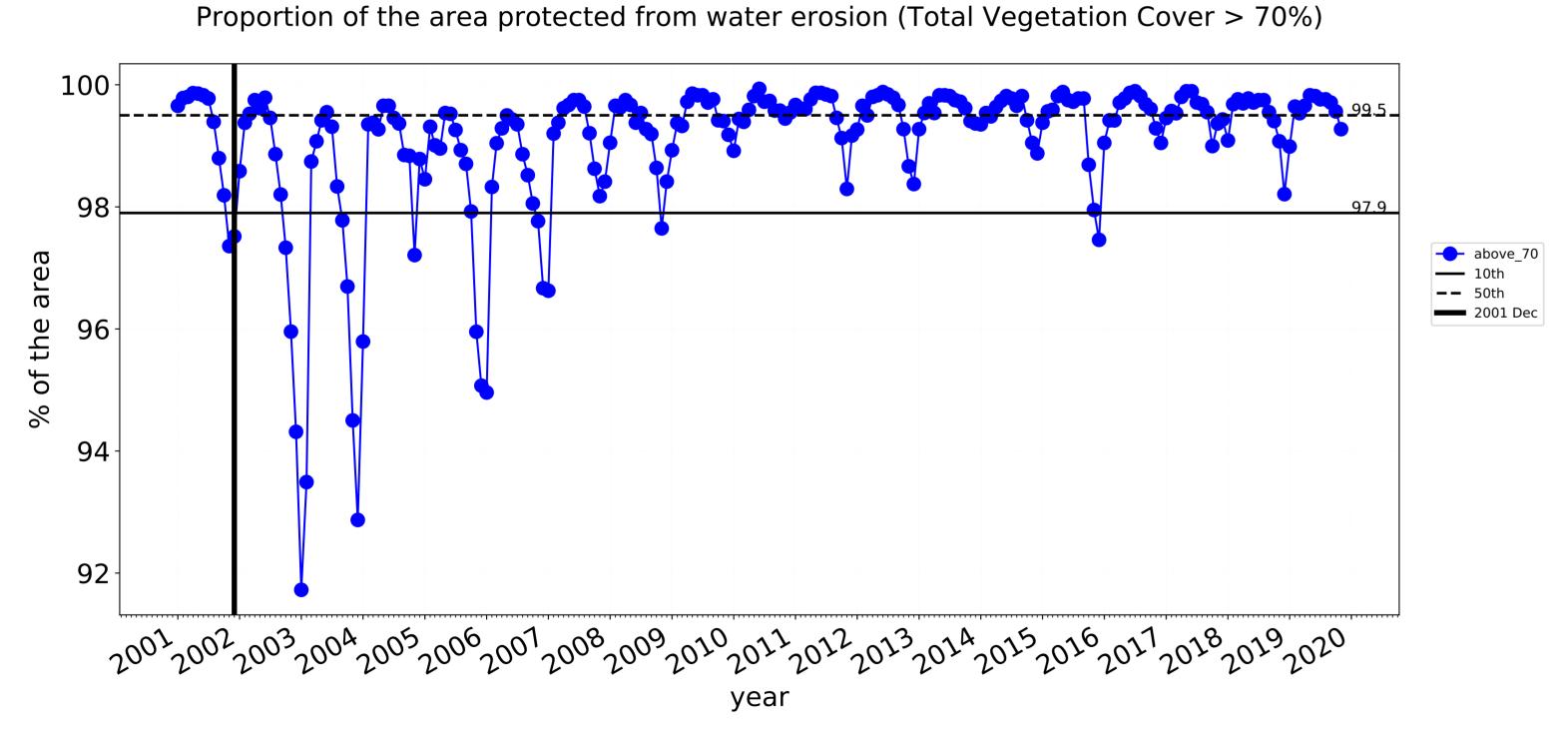


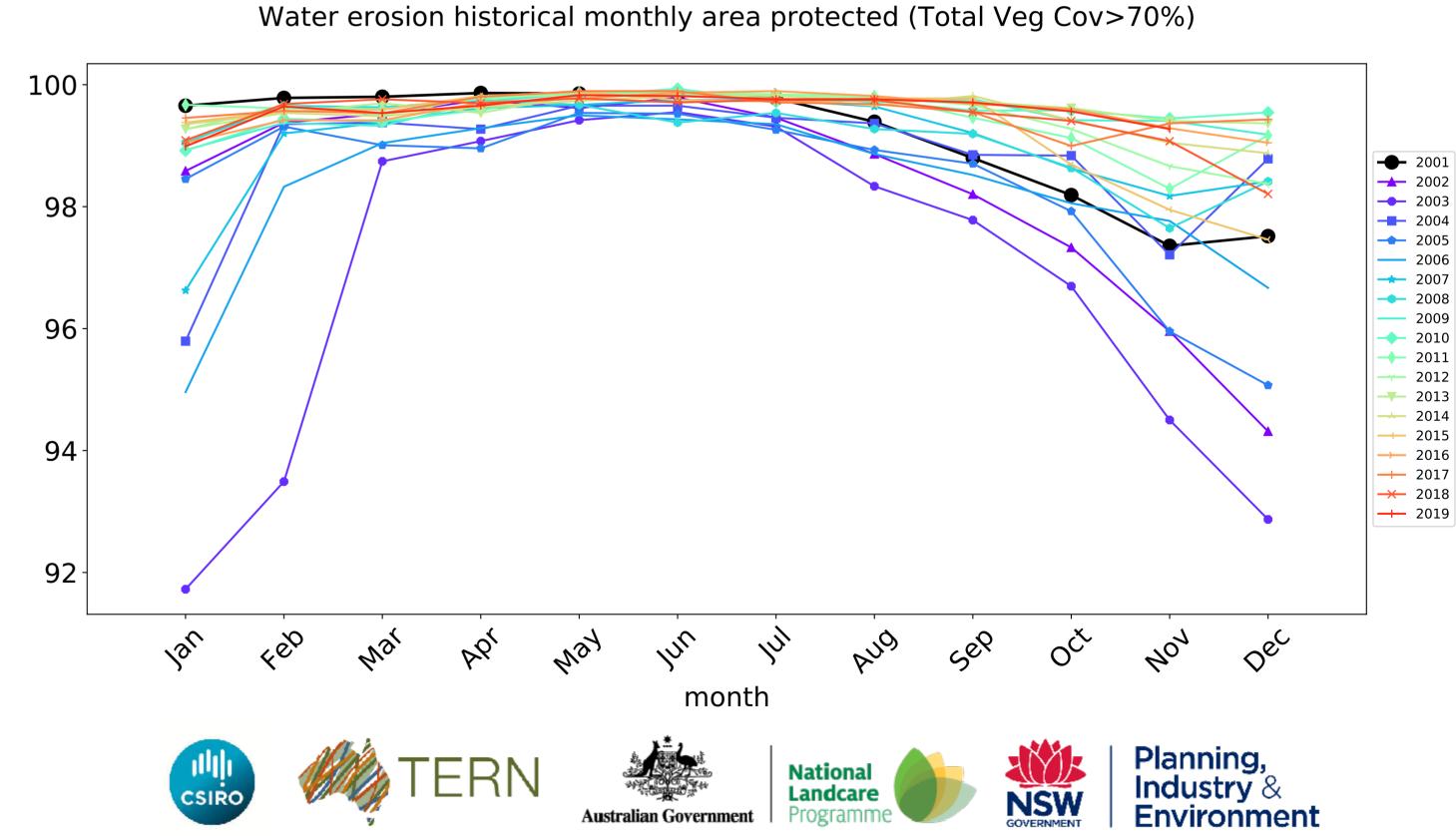
## **Grazing non forest timeseries**

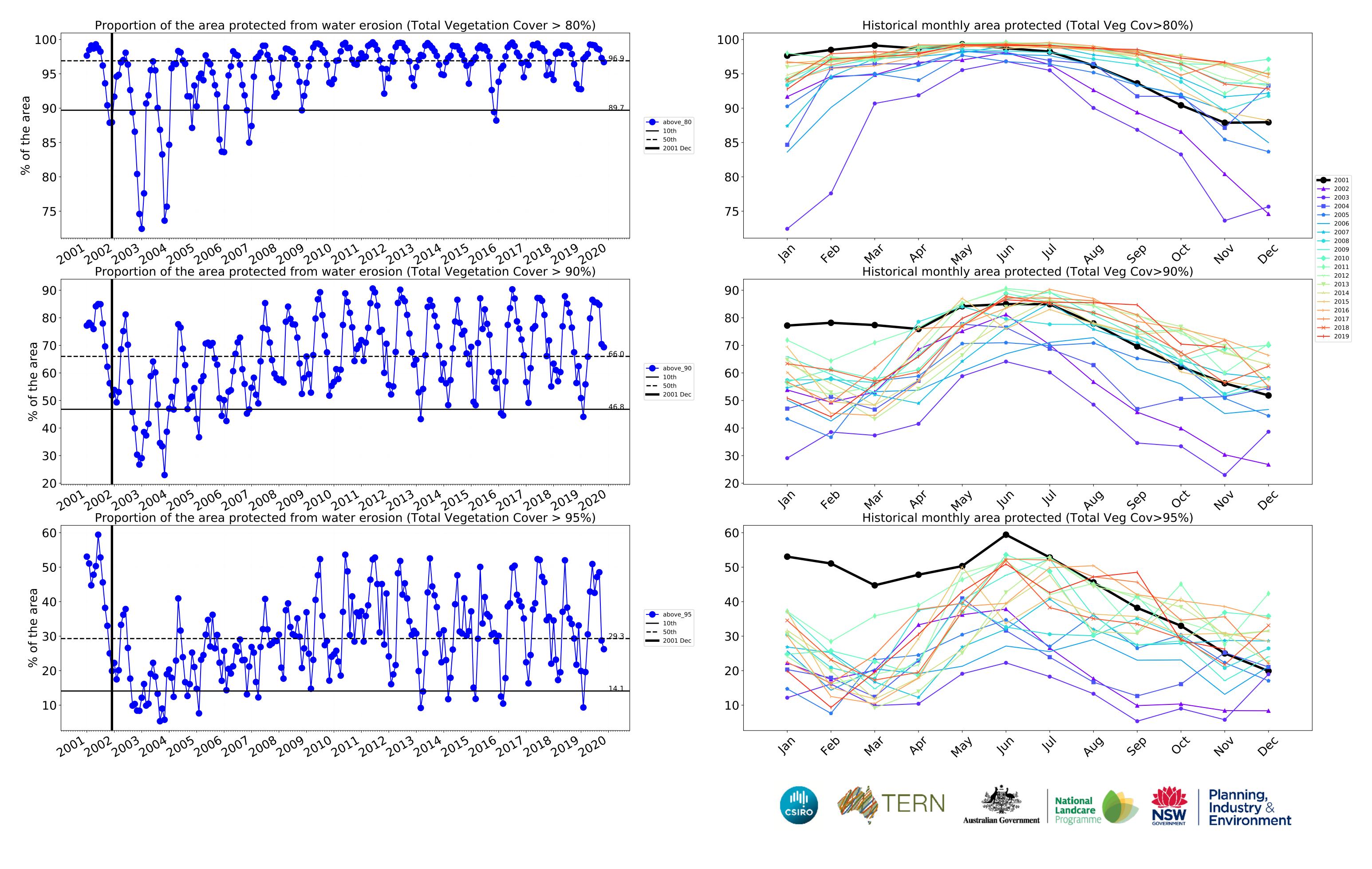




month



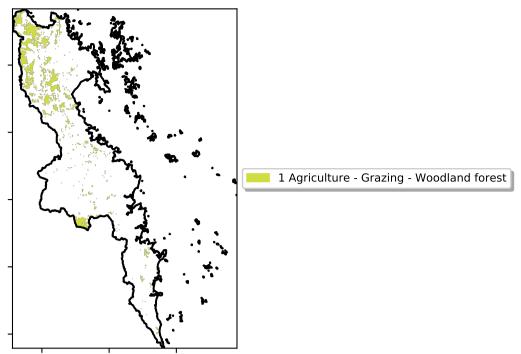




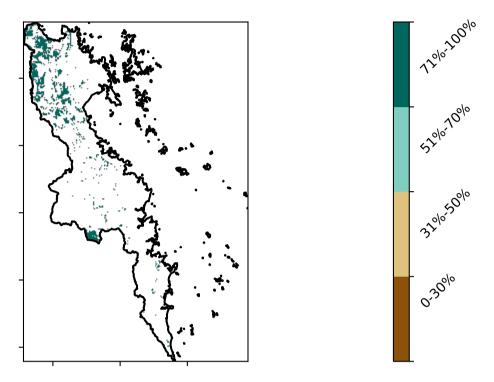
## **Grazing Woodland forest**

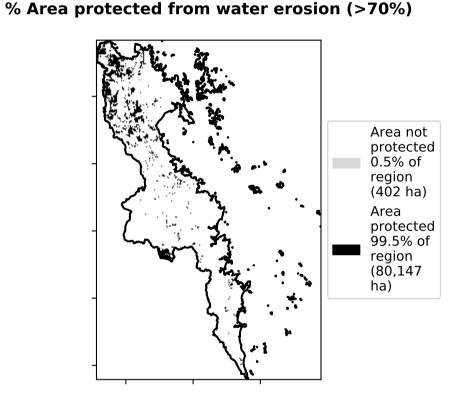
## **Land use and forest cover**

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 [%]**





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

Anomaly show how many percetage points each

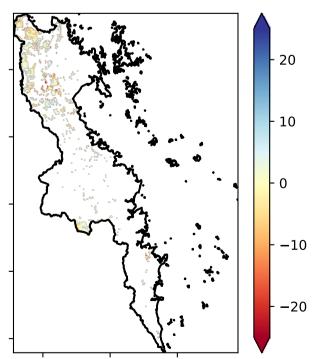
pixel is from the mean. That

pixel. The mean

using baseline from 2001 to 2019.

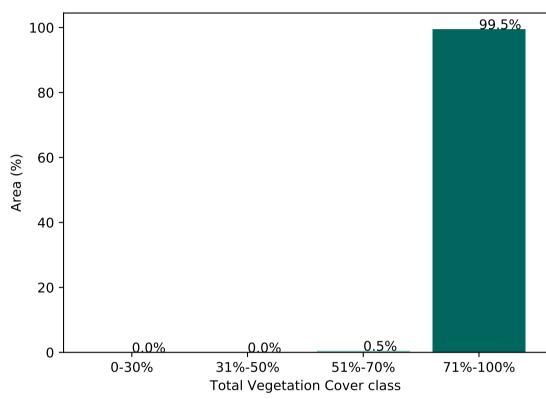
is only for the month of the map

is, red pixels are about 20% lower than the mean of that

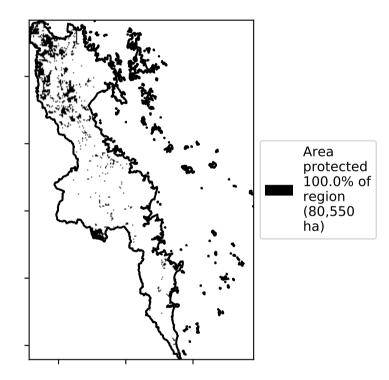


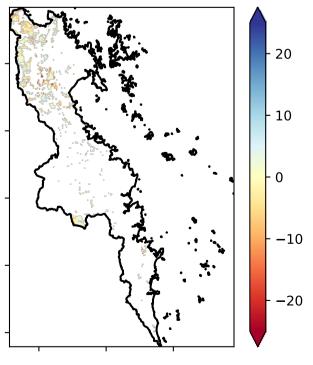
pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of

## Proportion of vegetation cover class in area

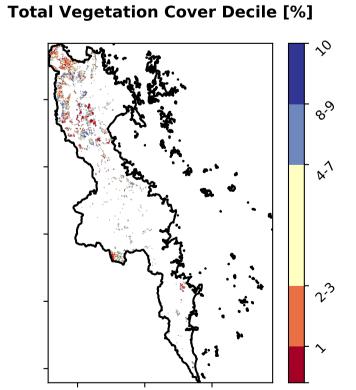


## % Area protected from wind erosion (>50%)





Deciles show where the records for that month of the map using baseline from 2001 to 2019.







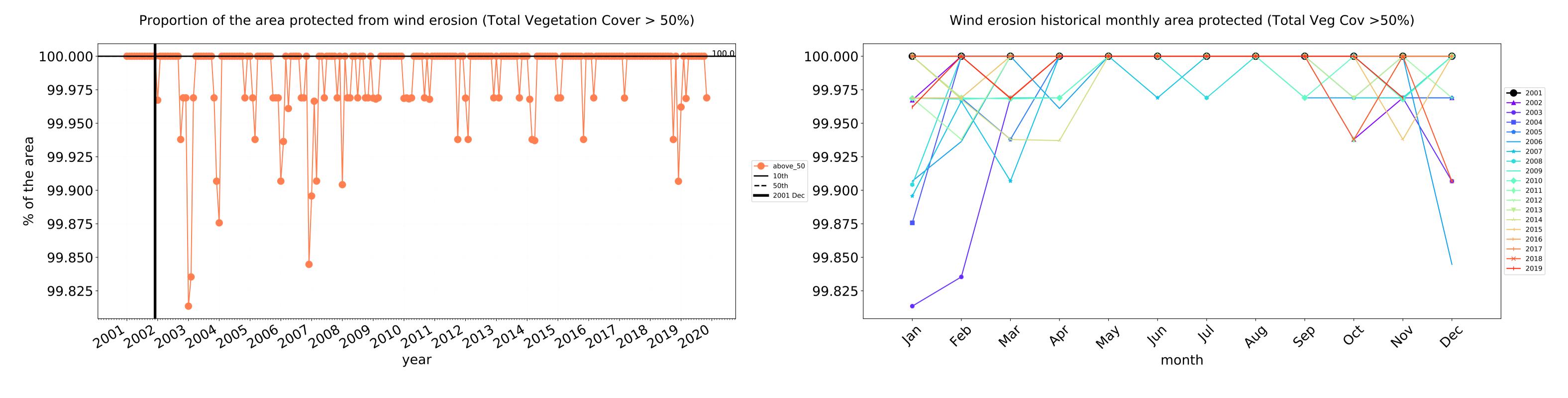


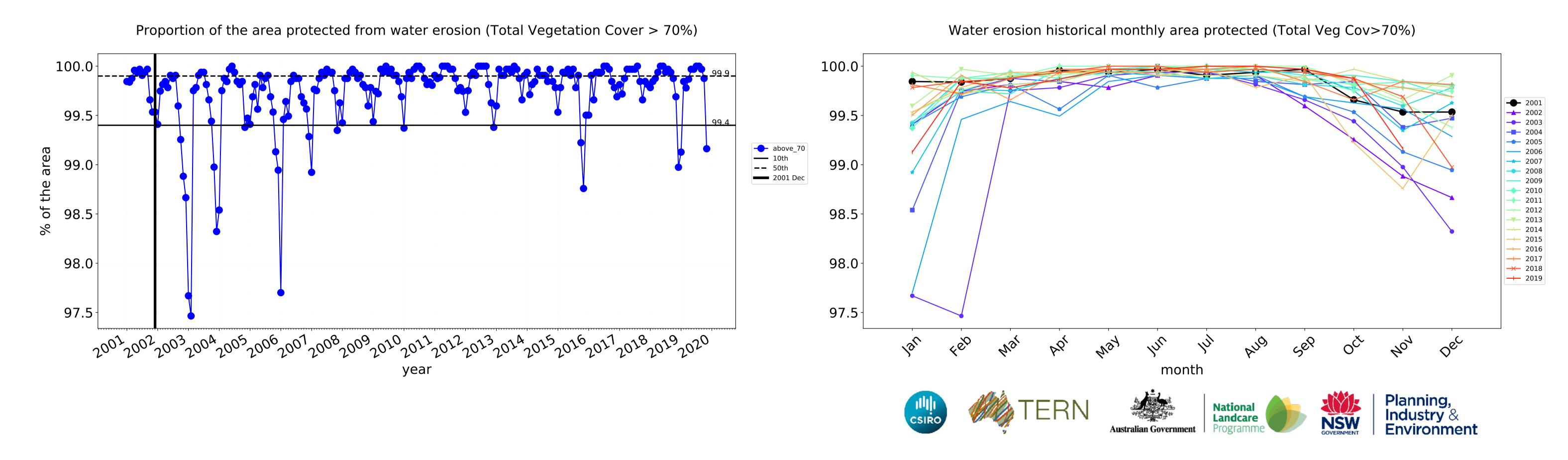


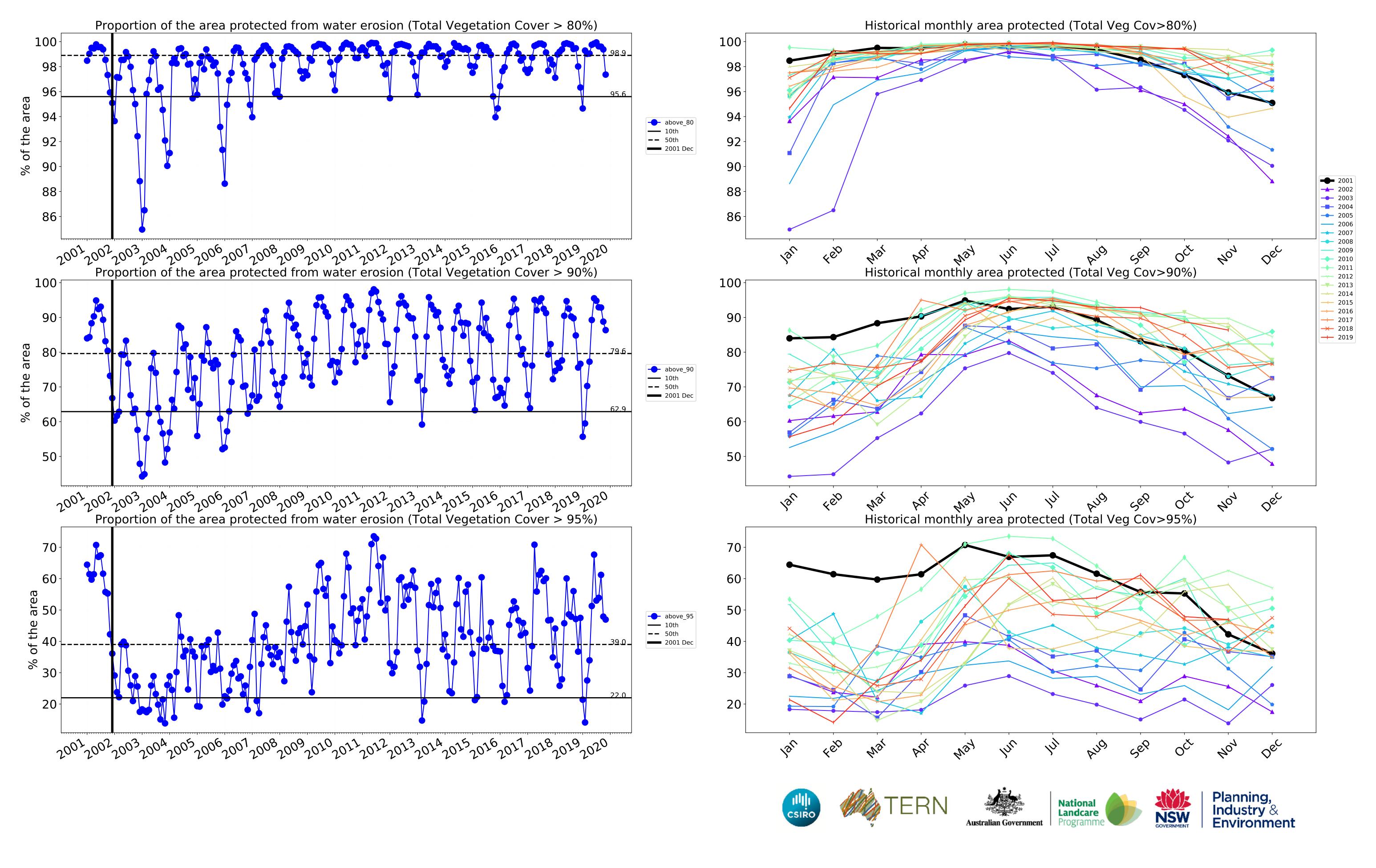




## **Grazing Woodland forest timeseries**







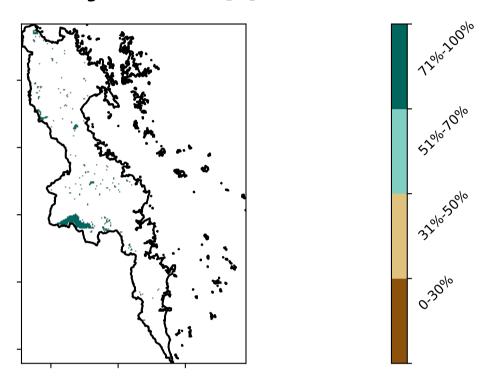
## **Grazing - Forest (non woodland)**

## Land use and forest cover

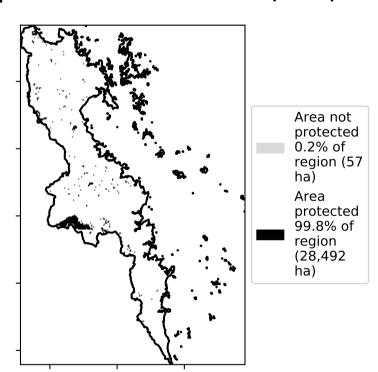
1 Agriculture - Grazing - Non-woodland forest

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 [%]**



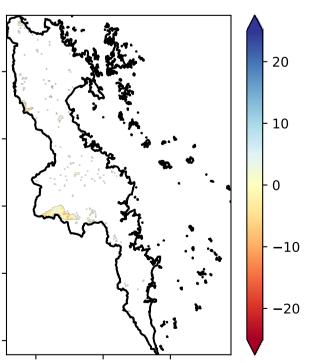
## % Area protected from water erosion (>70%)



## show how cetage

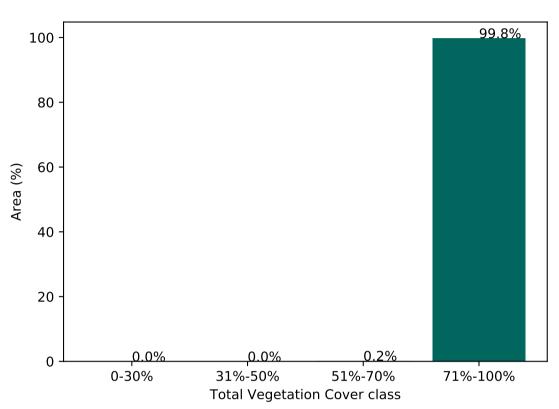
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

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

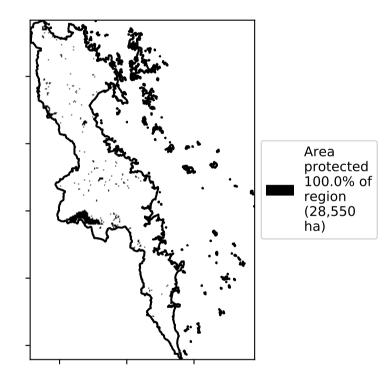


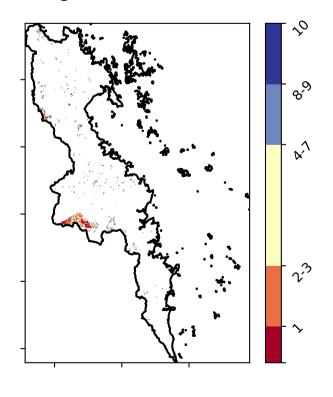
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

## Proportion of vegetation cover class in area



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







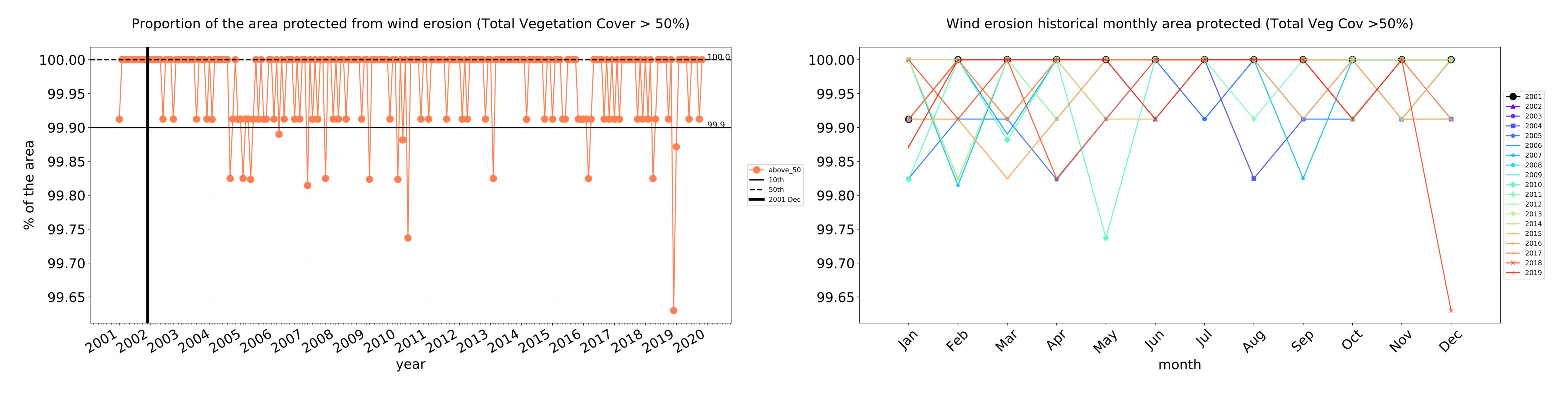


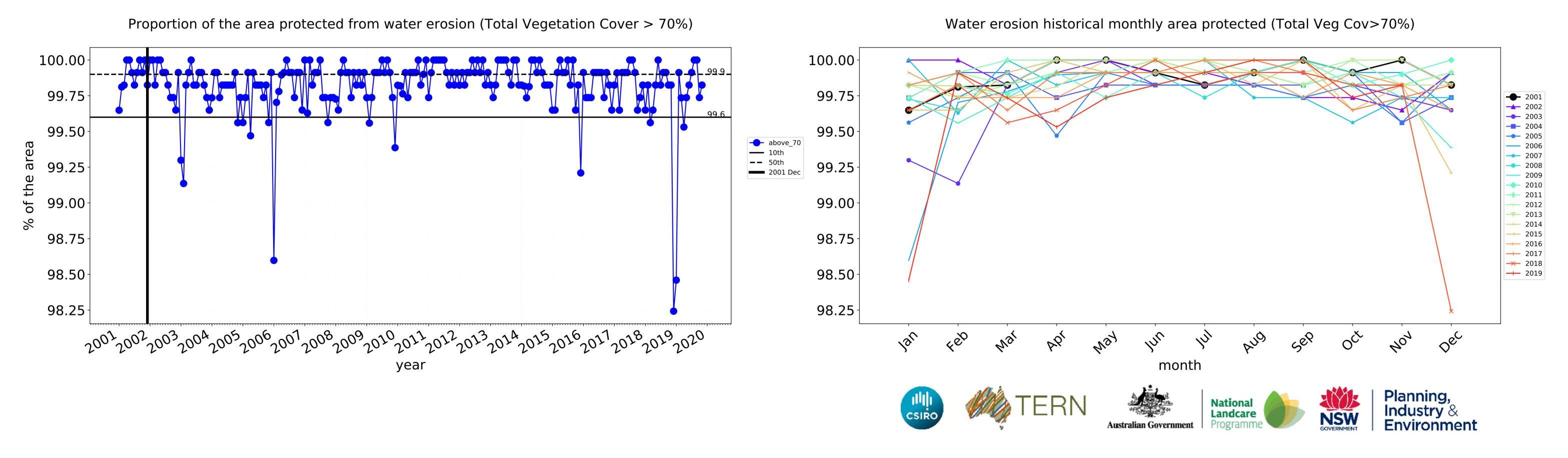


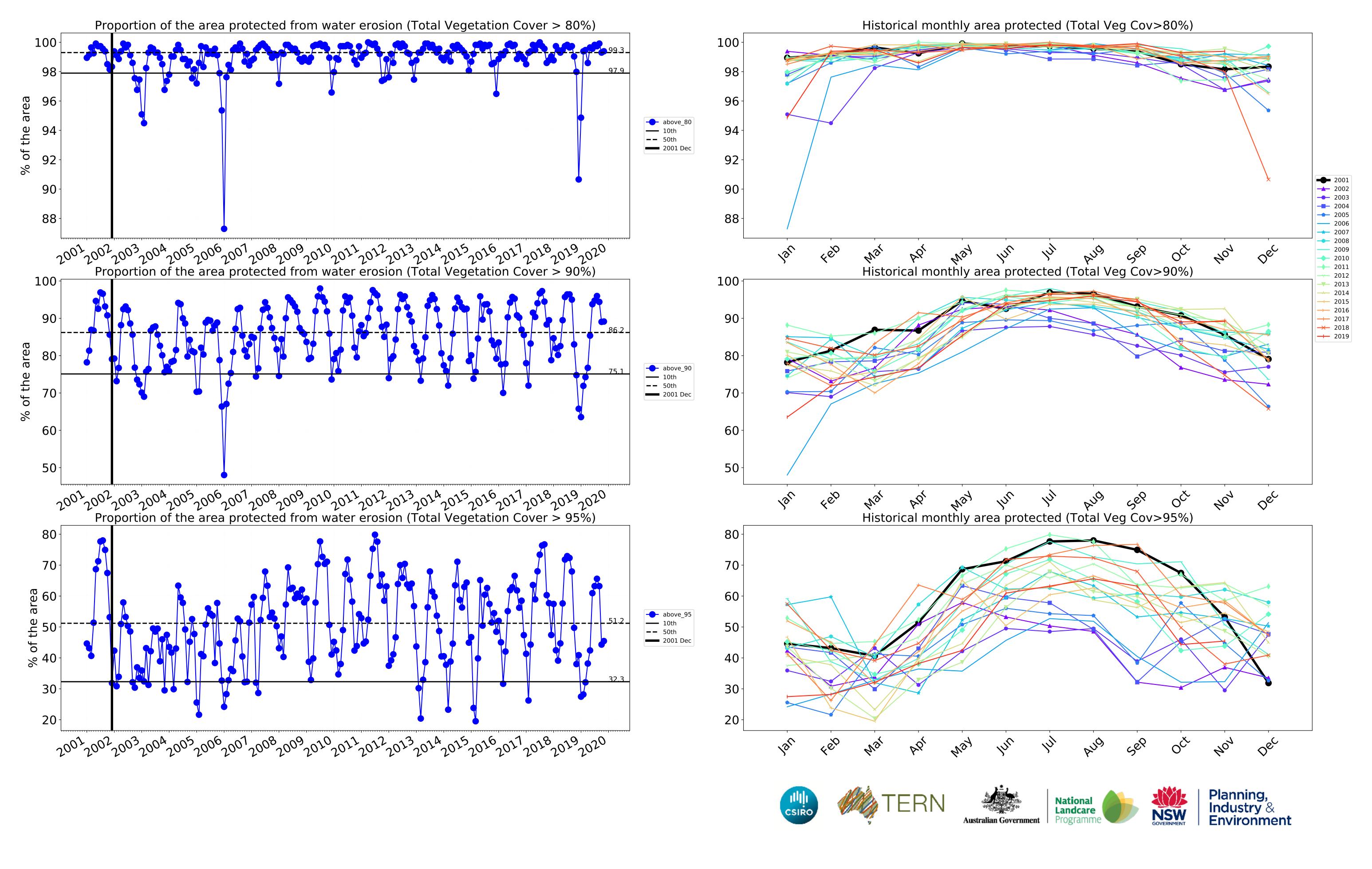












## **Irrigation**

## Land use and forest cover

# 1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated 3 Agriculture - Horticulture - Irrigated

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

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

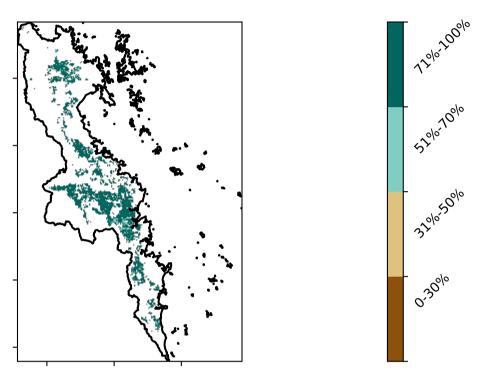
using baseline from 2001 to 2019.

is only for the month of the map

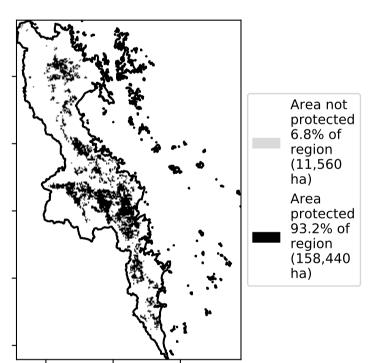
is, red pixels are about 20% lower than the mean of that

Catchment Scale Land Use and Forests

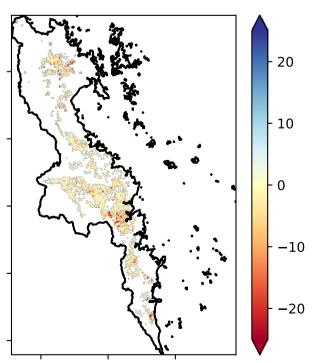
## **Total Vegetation Cover [%]**



% Area protected from water erosion (>70%)

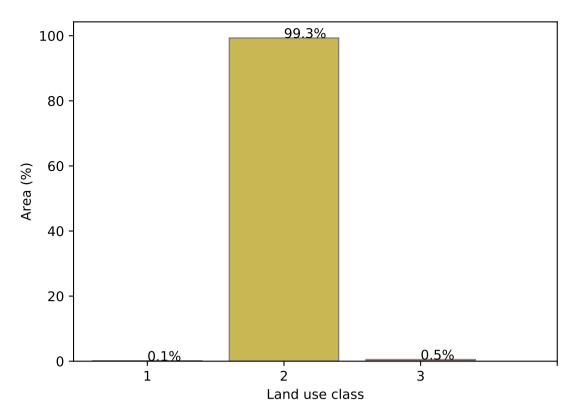


Total Vegetation Cover Anomaly [%]

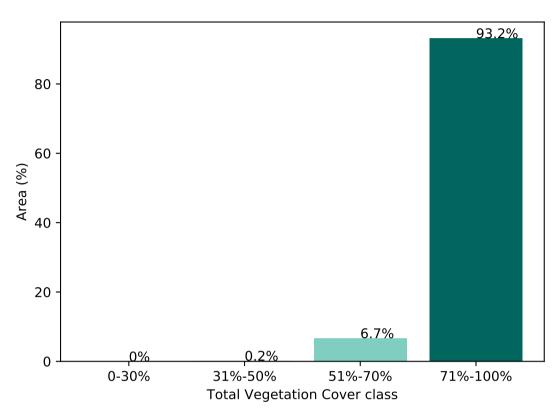


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

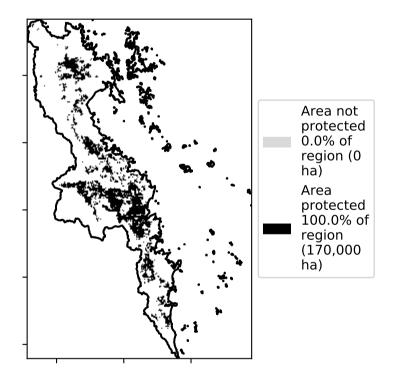
## **Proportion of each land class in area**



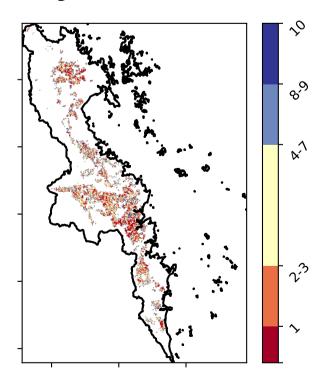
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]







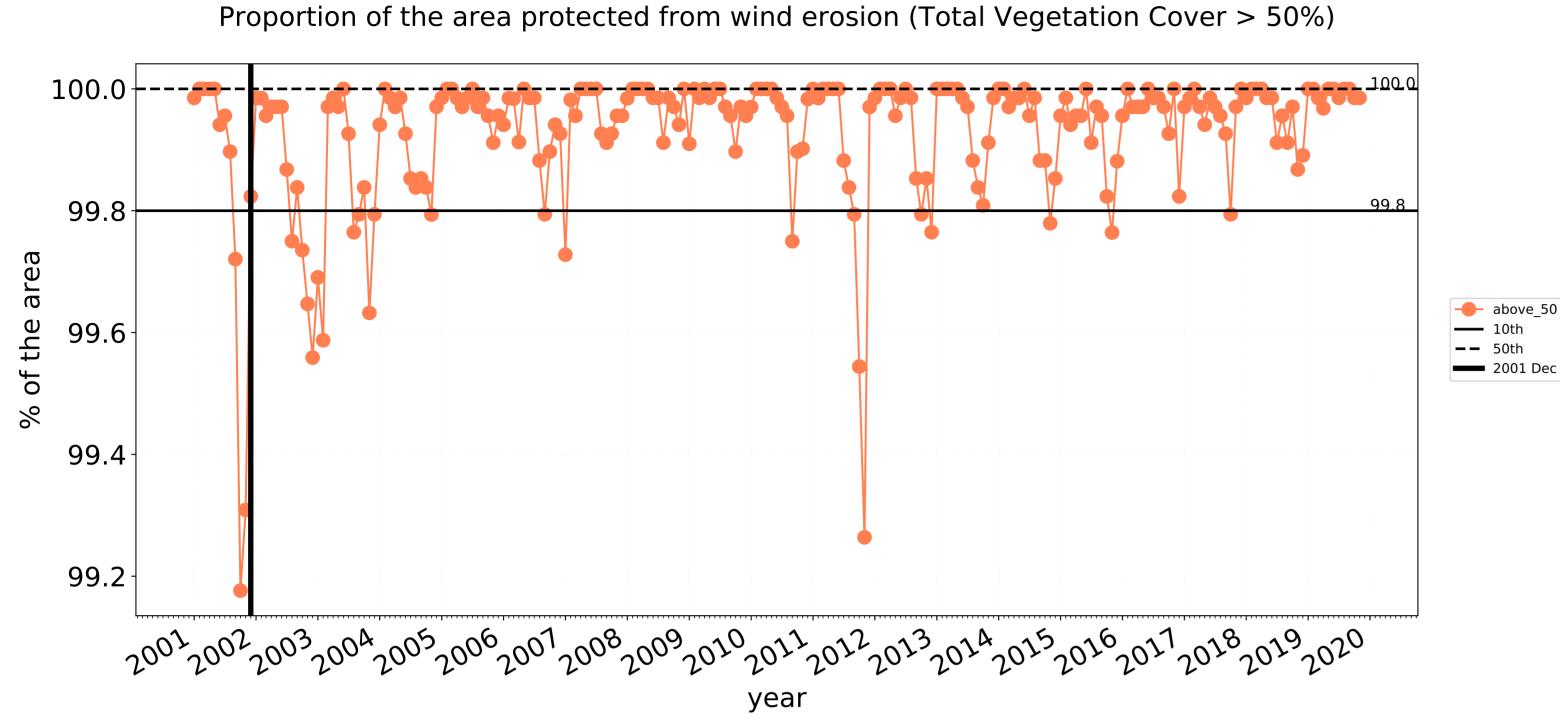


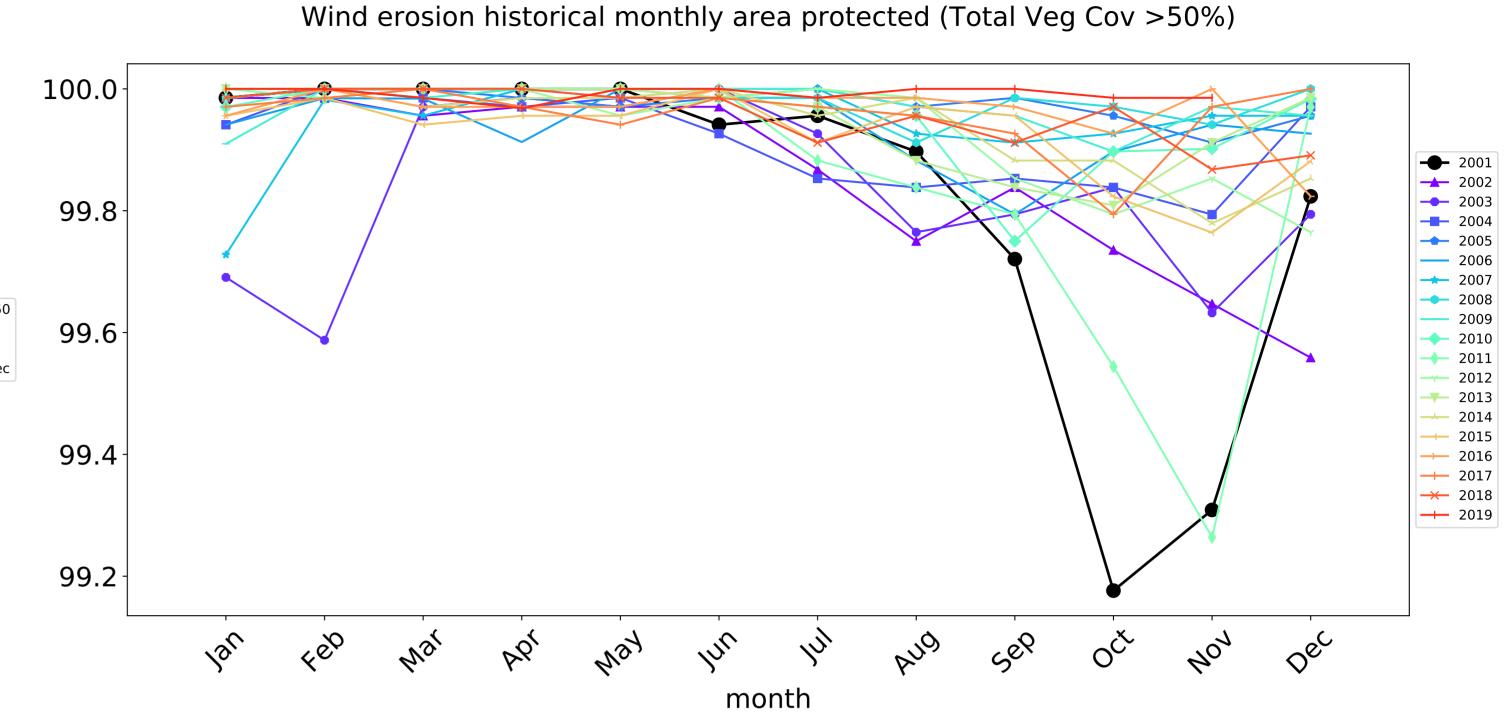


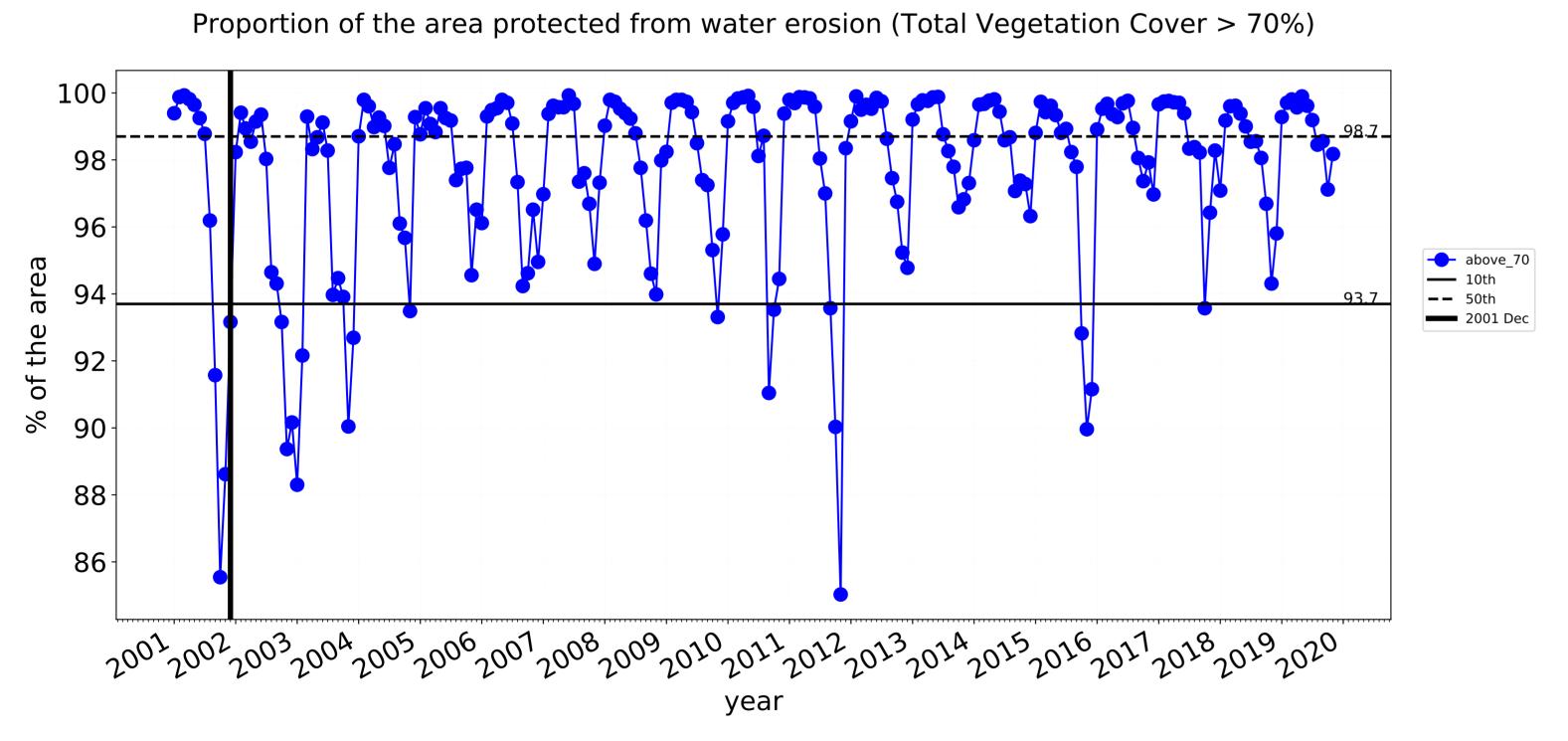


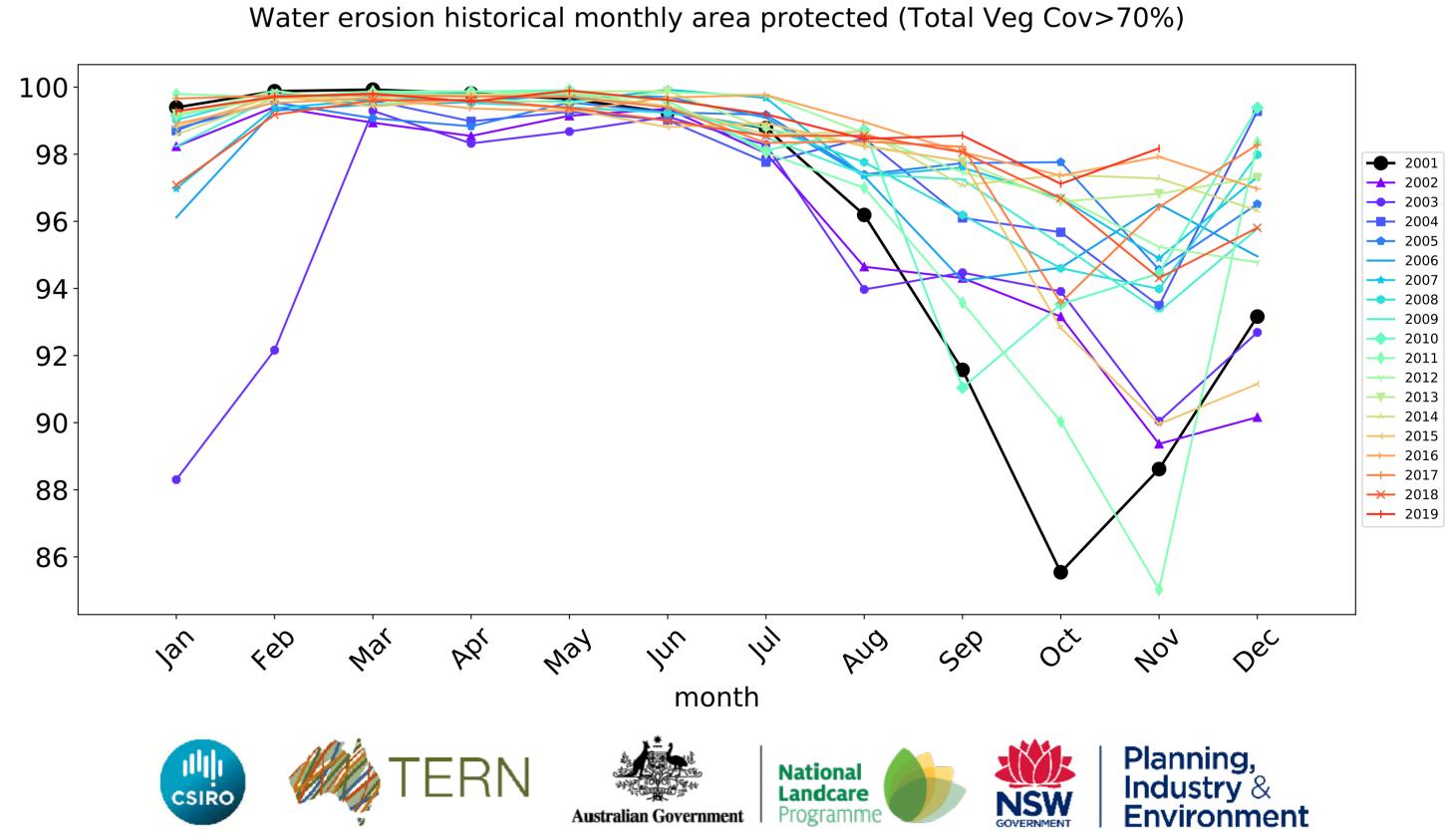


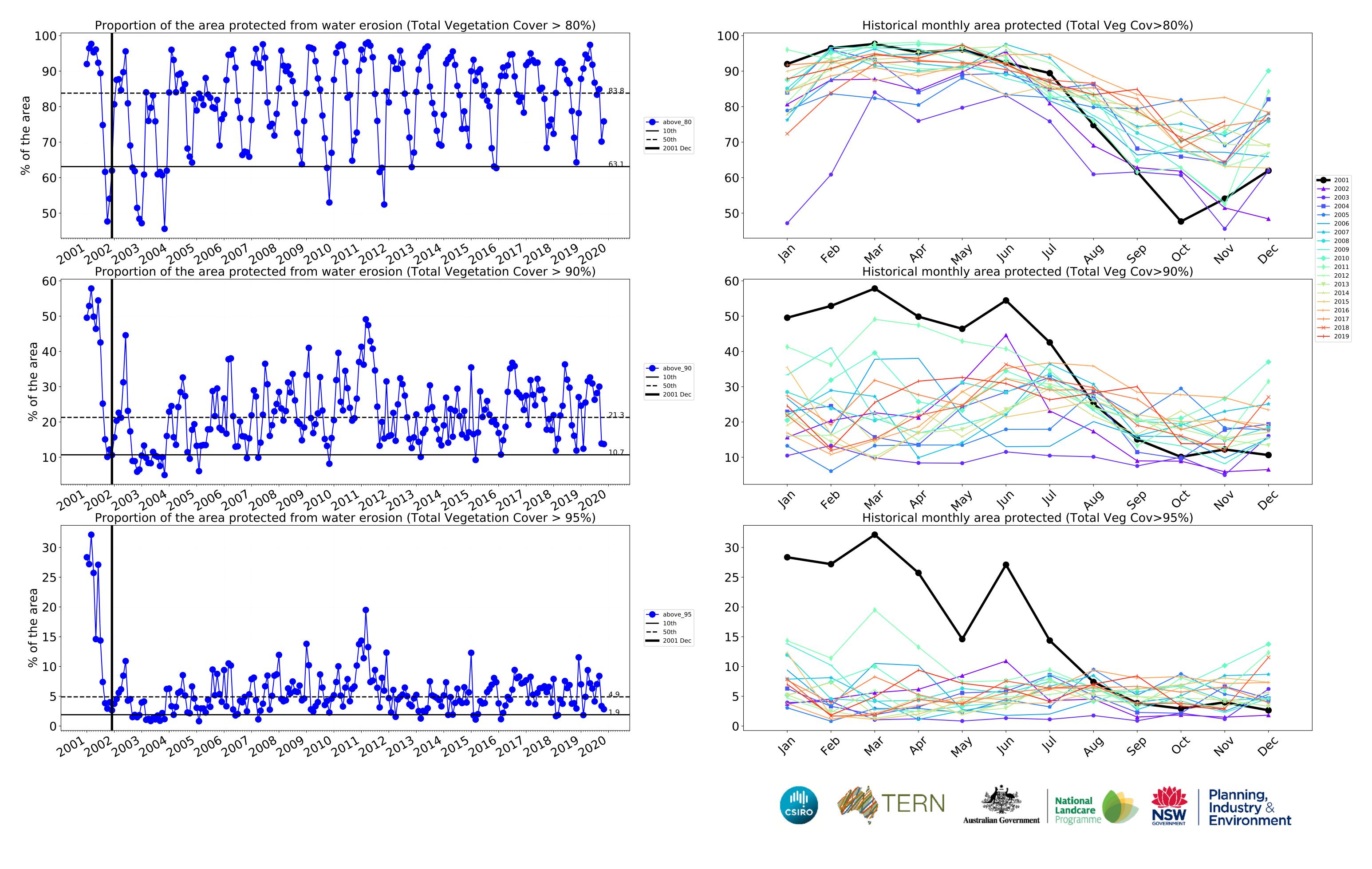
## Irrigation timeseries











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

## 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)

Anomaly show how many percetage points each

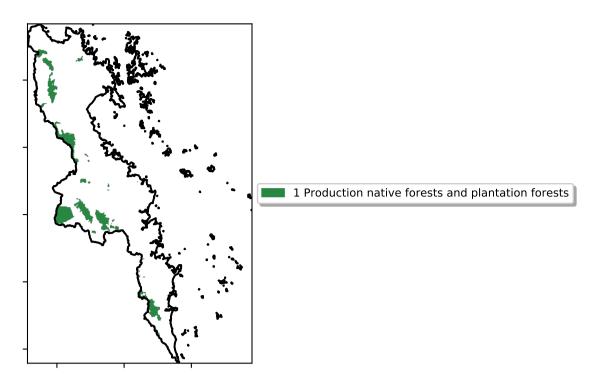
pixel is from the mean. That

pixel. The mean

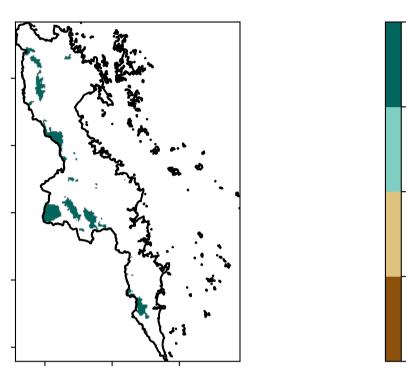
using baseline from 2001 to 2019.

is only for the month of the map

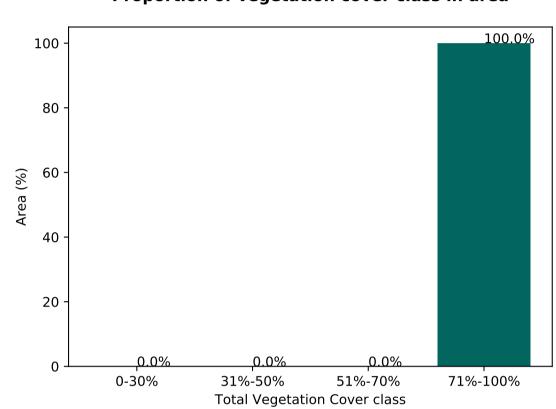
is, red pixels are about 20% lower than the mean of that



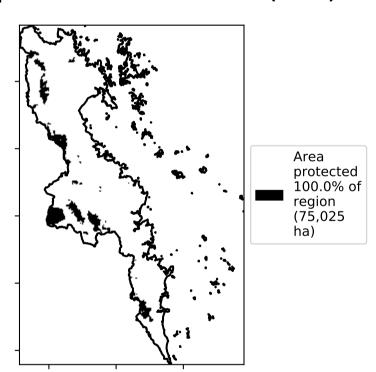
## **Total Vegetation Cover [%]**



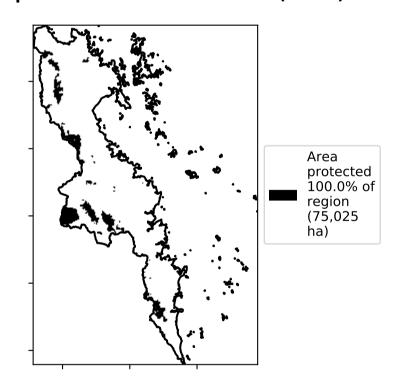
## Proportion of vegetation cover class in area



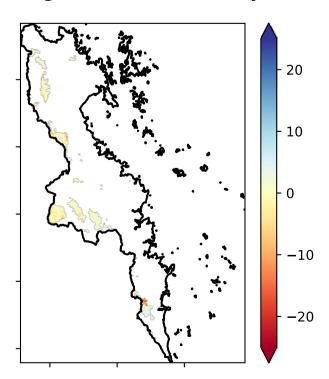
## % Area protected from water erosion (>70%)



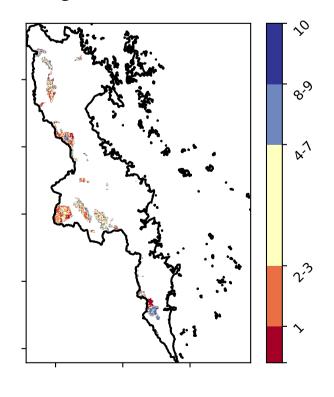
% Area protected from wind erosion (>50%)



## **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.







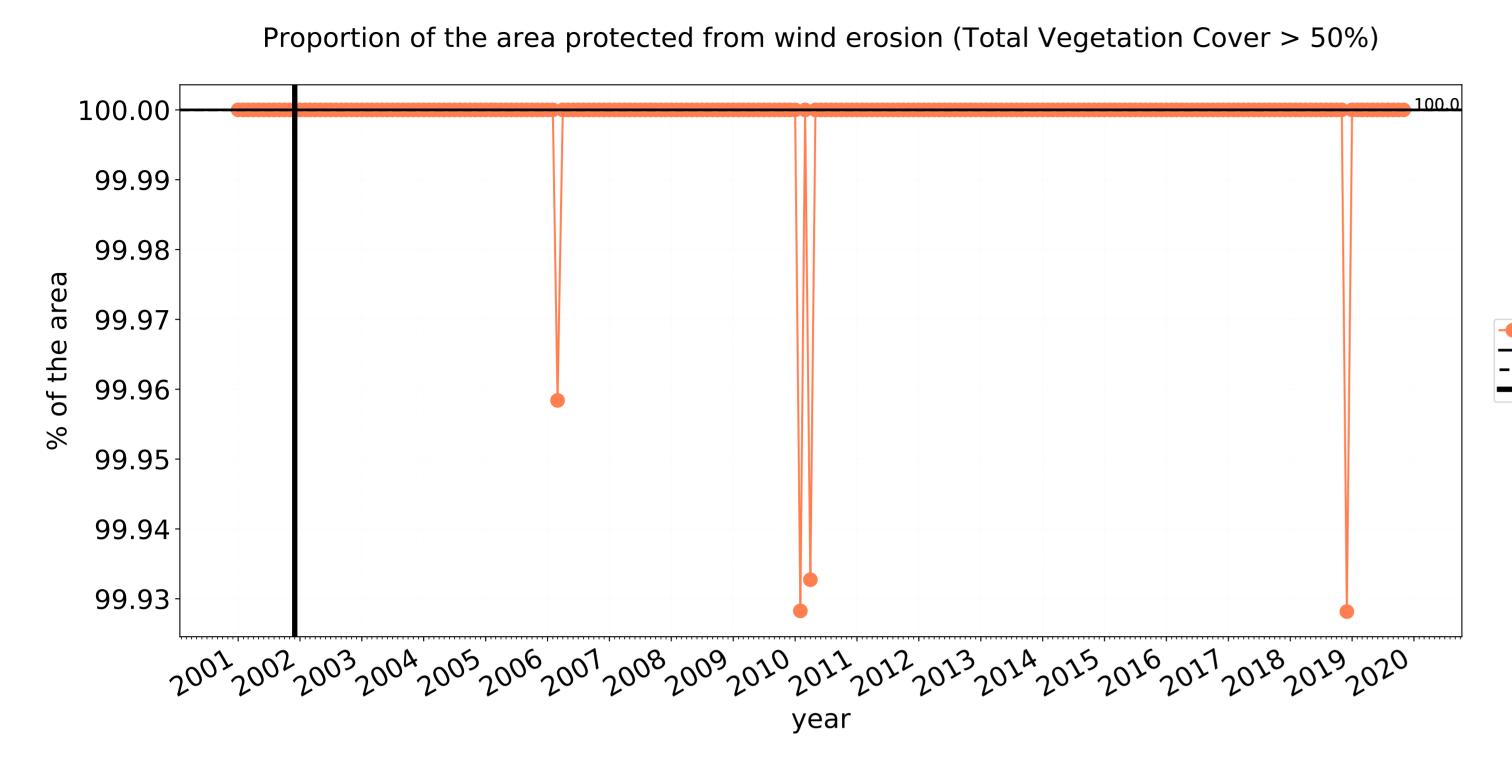


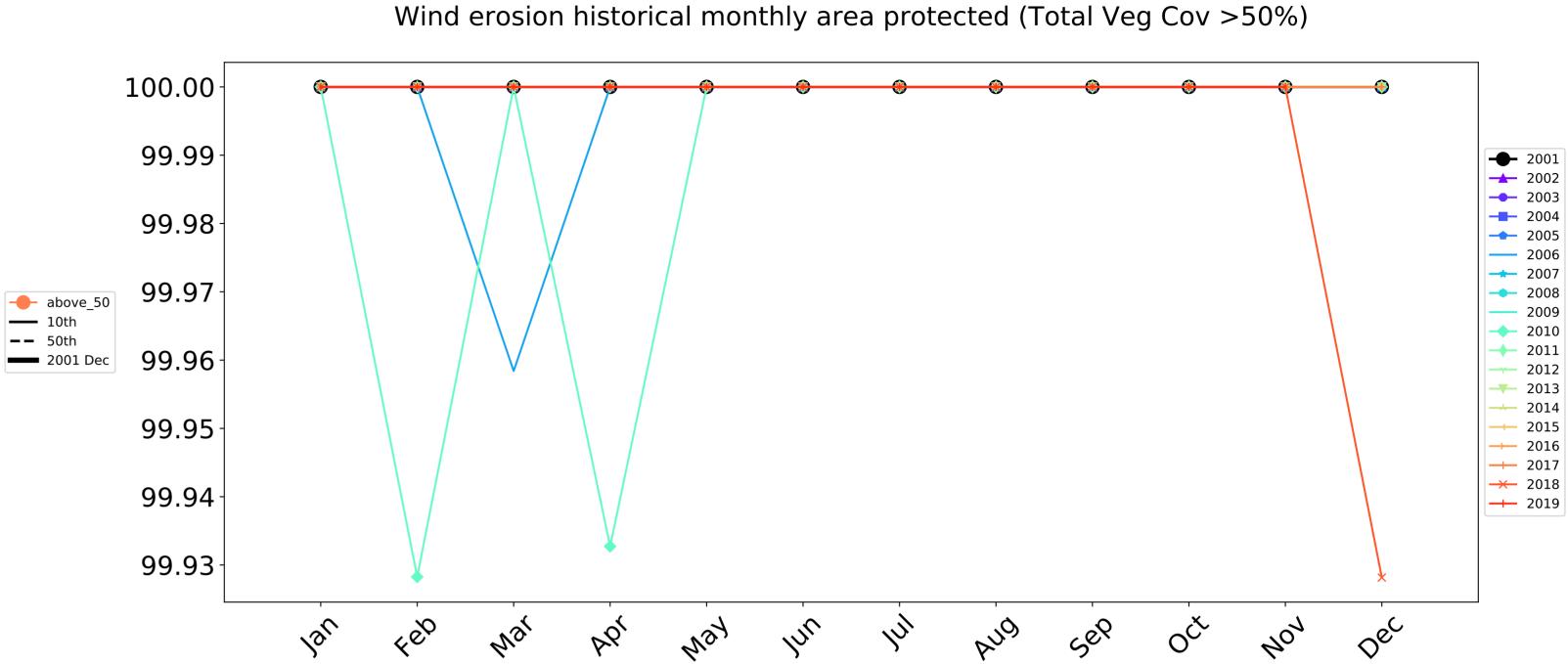




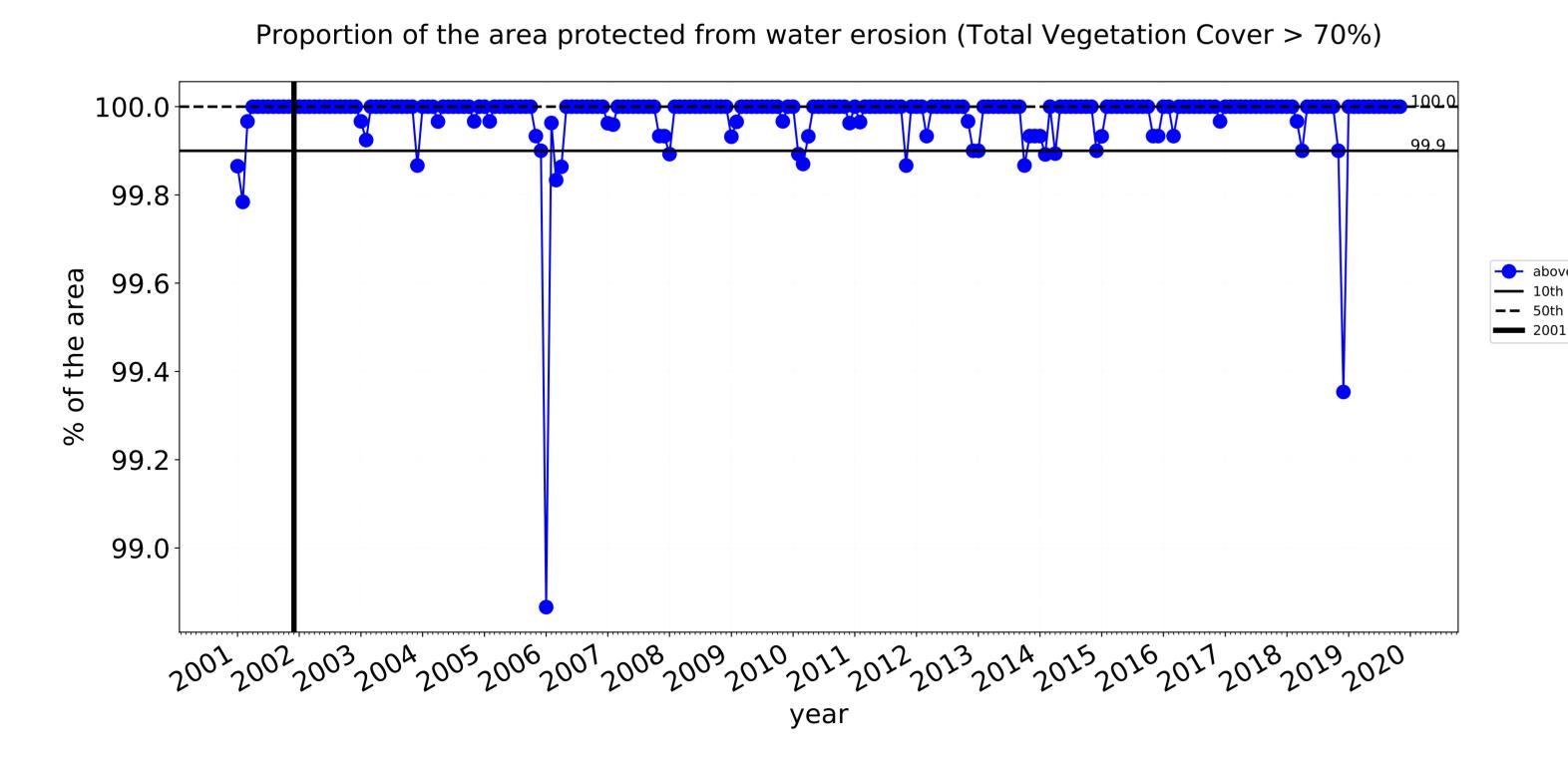


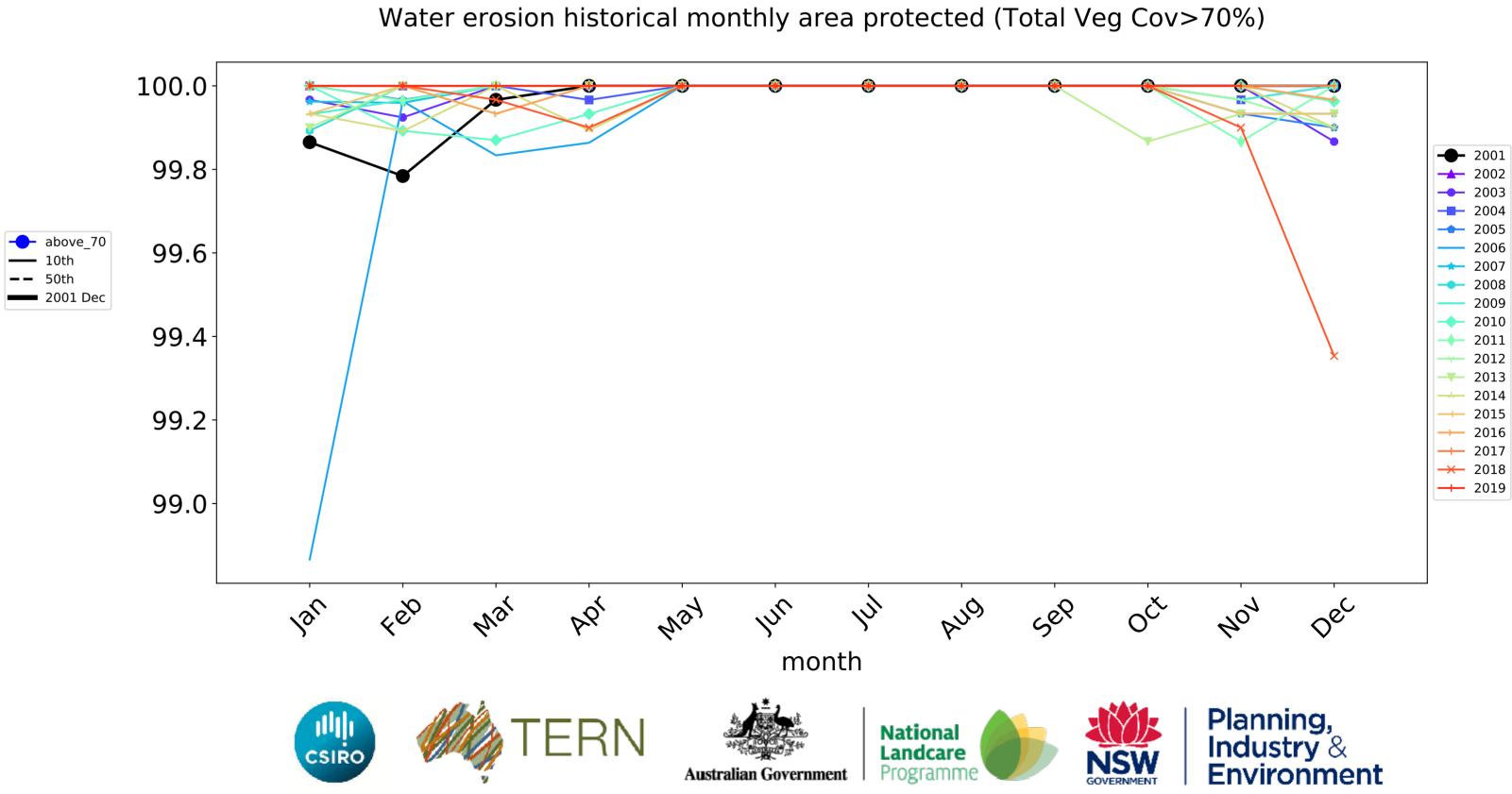
## **Production native forests and plantation forests timeseries**

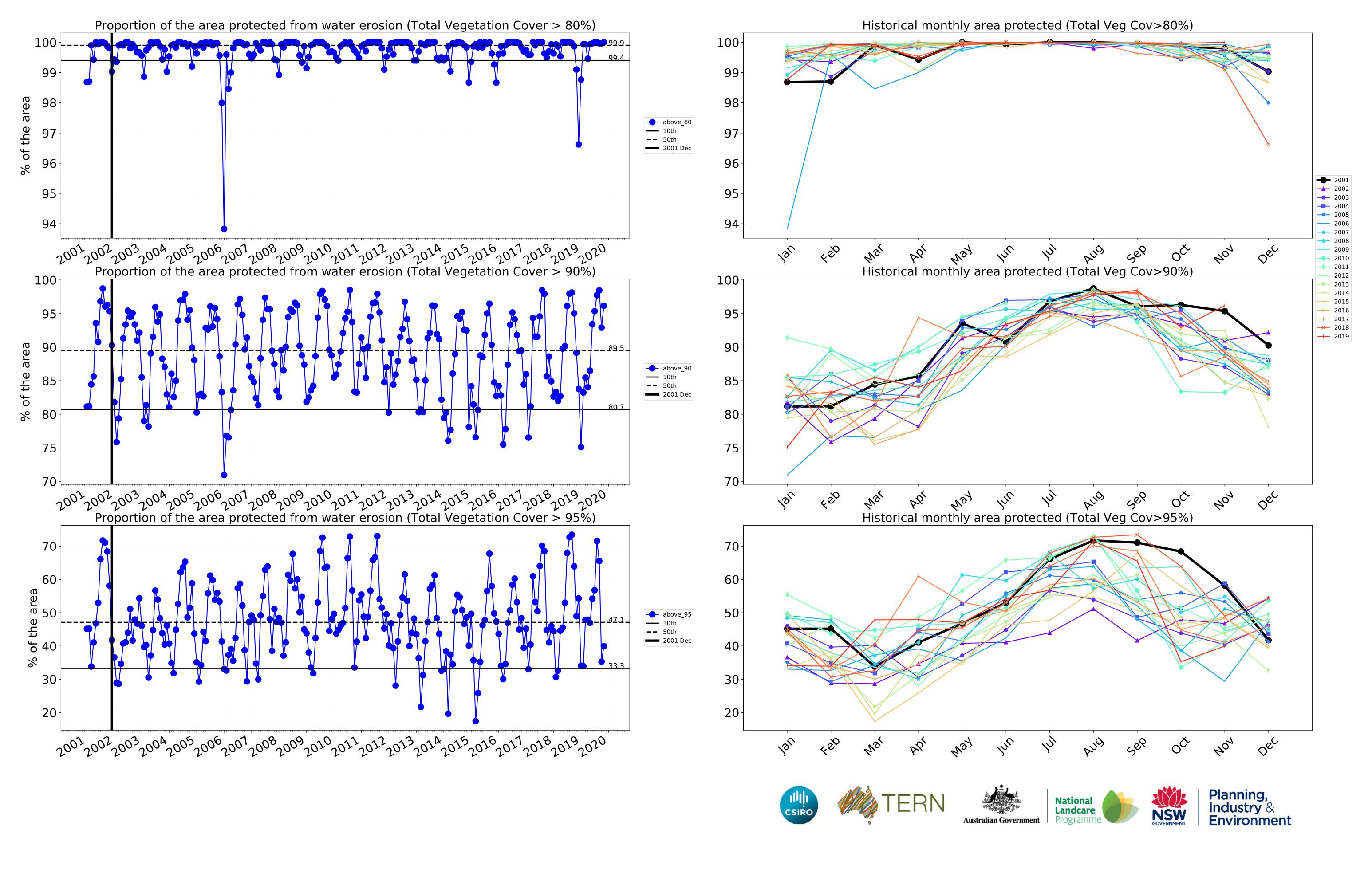




month







## Mackay Whitsunday (909,550 ha and no data 23,510 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	909,550	100.0% 909,274	99.8% 908,145	97.2% 883,967	86.1% 783,168	56.2% 511,419	26.0% 236,836
Conservation and natural environments	272,800	100.0% 272,725	99.9% 272,525	99.1% 270,300	96.1% 262,250	81.1% 221,150	41.5% 113,275
Conservation and natural environments non forest	7,175	100.0% 7,175	100.0% 7,175	93.4% 6,700	79.8% 5,725	43.6% 3,125	20.9% 1,500
Conservation and natural environments Woodland forest	73,925	100.0% 73,925	99.9% 73,850	99.1% 73,250	95.8% 70,800	76.1% 56,225	49.6% 36,650
natural environments Forest (non woodland)	191,700	100.0% 191,625	99.9% 191,500	99.3% 190,350	96.9% 185,725	84.4% 161,800	39.2% 75,125
Agriculture	468,375	100.0% 468,350	99.9% 467,875	96.4% 451,625	80.4% 376,500	41.1% 192,575	17.1% 80,325
Grazing	298,325	100.0% 298,300	99.9% 298,125	98.3% 293,200	90.9% 271,100	58.5% 174,450	25.4% 75,825
Grazing non forest	189,225	100.0% 189,200	99.9% 189,025	97.5% 184,525	88.0% 166,425	51.8% 98,075	19.9% 37,650
Grazing Woodland forest	80,550	100.0% 80,550	100.0% 80,550	99.5% 80,175	95.1% 76,600	66.8% 53,800	36.1% 29,075
Grazing - Forest (non woodland)	28,550	100.0% 28,550	100.0% 28,550	99.8% 28,500	98.3% 28,075	79.1% 22,575	31.9% 9,100
Irrigation	170,000	100.0% 170,000	99.8% 169,700	93.2% 158,375	62.0% 105,350	10.6% 18,075	2.6% 4,500
Production native forests and plantation forests	75,025	100.0% 75,025	100.0% 75,025	100.0% 75,025	99.0% 74,300	90.3% 67,725	41.8% 31,325











