# 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: November 2009** 

#### **Vegetation Cover Nov 2009**

#### 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

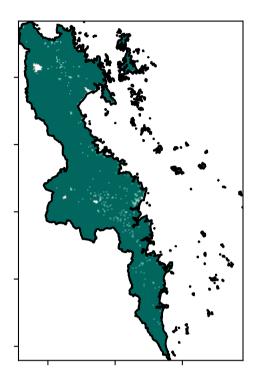
2019.

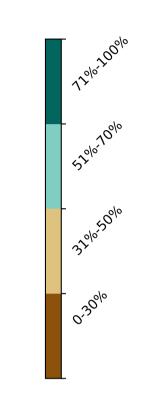
is, red pixels are about 20%

Catchment Scale

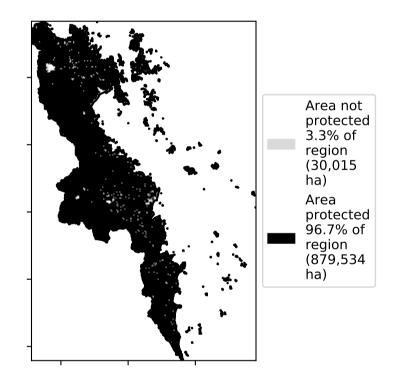
Land Use and Forests

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

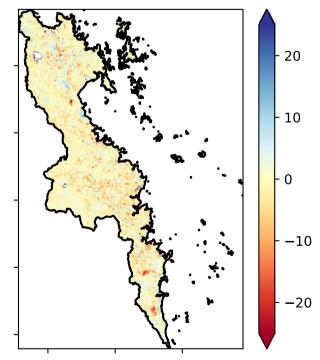




#### % Area protected from water erosion (>70%)

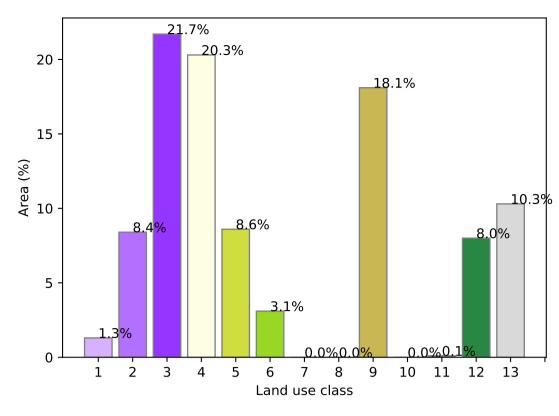


Total Vegetation Cover Anomaly [%]

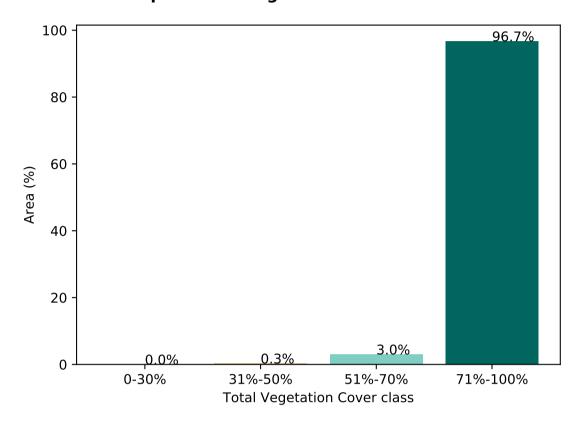


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

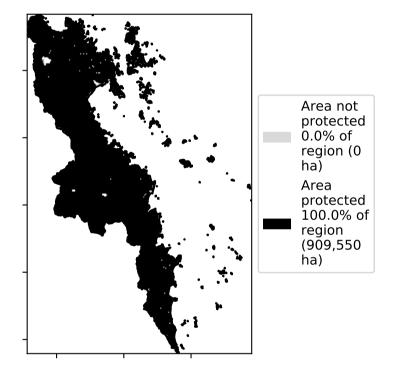
#### Proportion of each land class in area



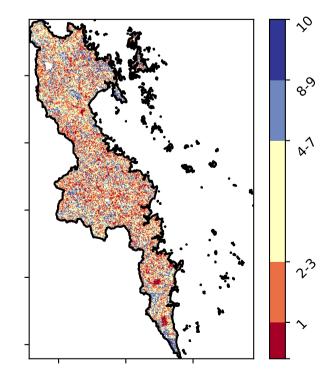
#### Proportion of vegetation cover class in area



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



#### Total Vegetation Cover Decile [%]





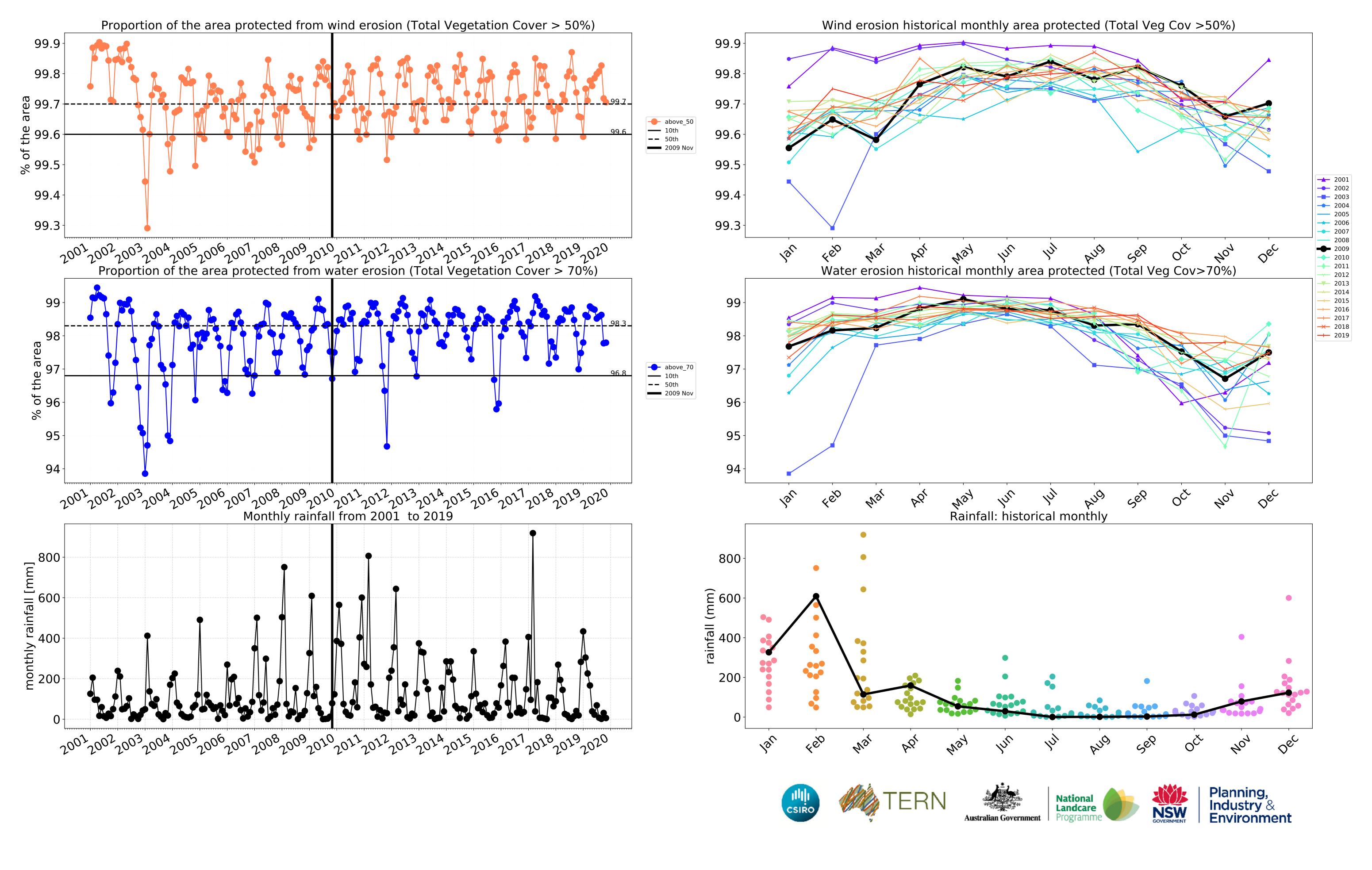




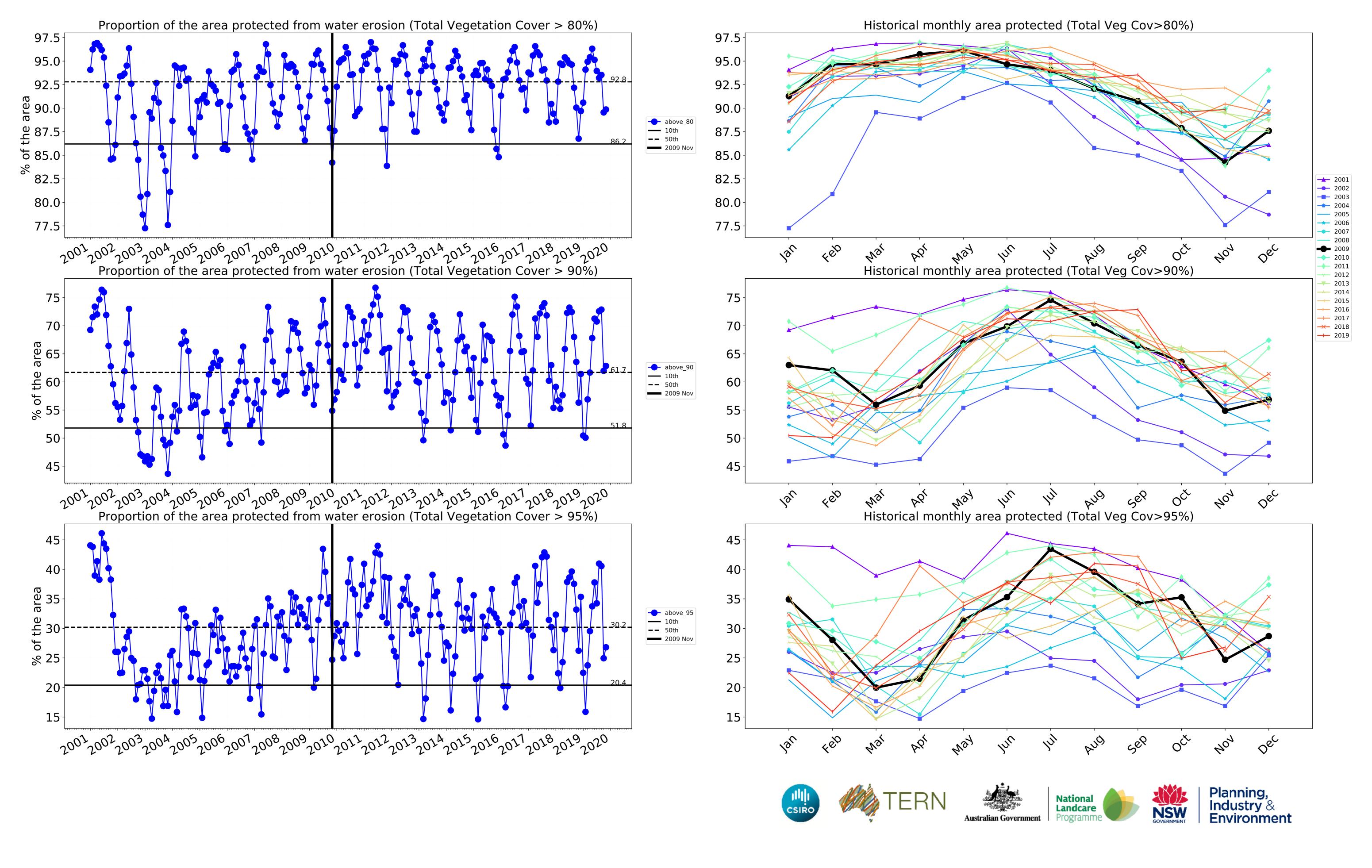








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#### **Conservation and natural environments**

#### **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

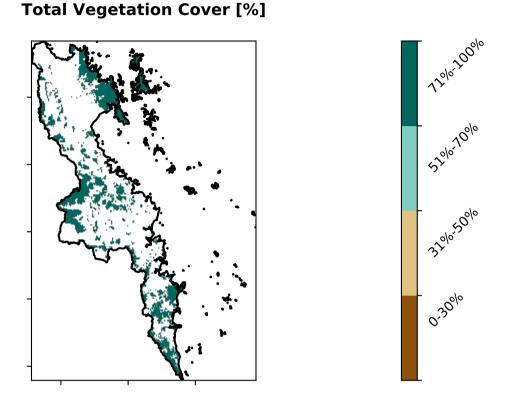
is, red pixels are about 20% lower than the mean of that

Catchment Scale Land

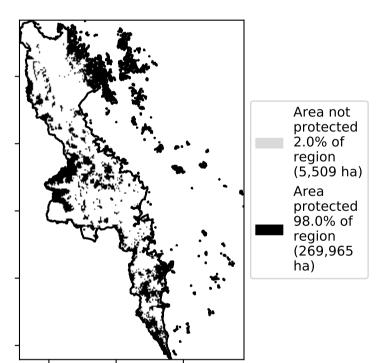
Derived from

Use of Australia

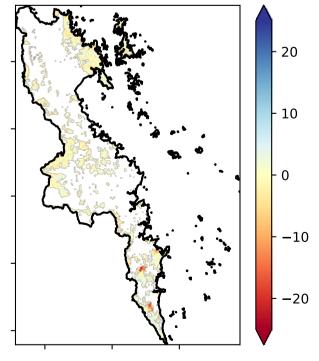
# 1 Conservation and natural environments - Non-2 Conservation and natural environments - Woodland 3 Conservation and natural environments - Non-woodland forest



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

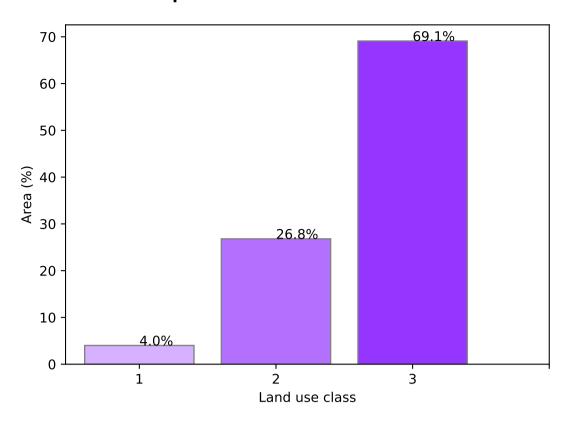


#### **Total Vegetation Cover Anomaly [%]**

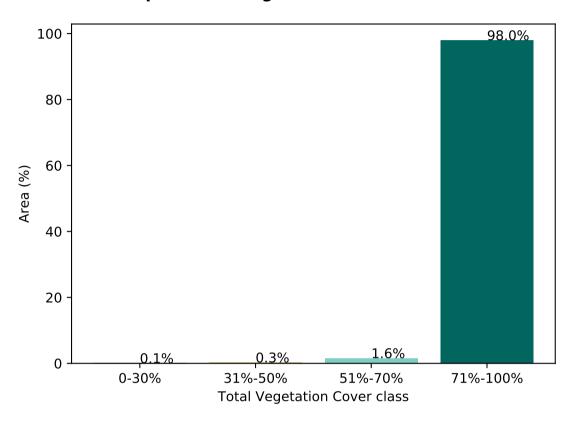


pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of

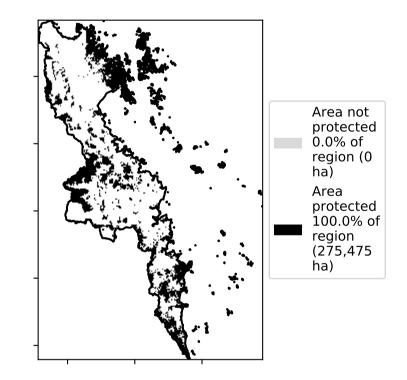
#### **Proportion of each land class in area**

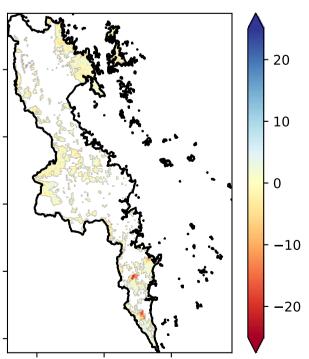


#### Proportion of vegetation cover class in area

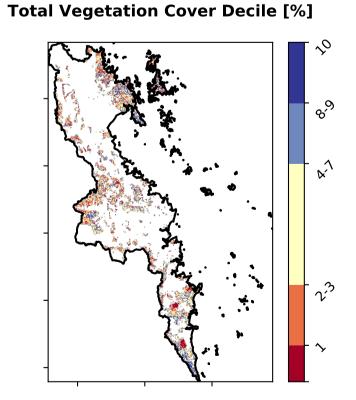


#### % Area protected from wind erosion (>50%)





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







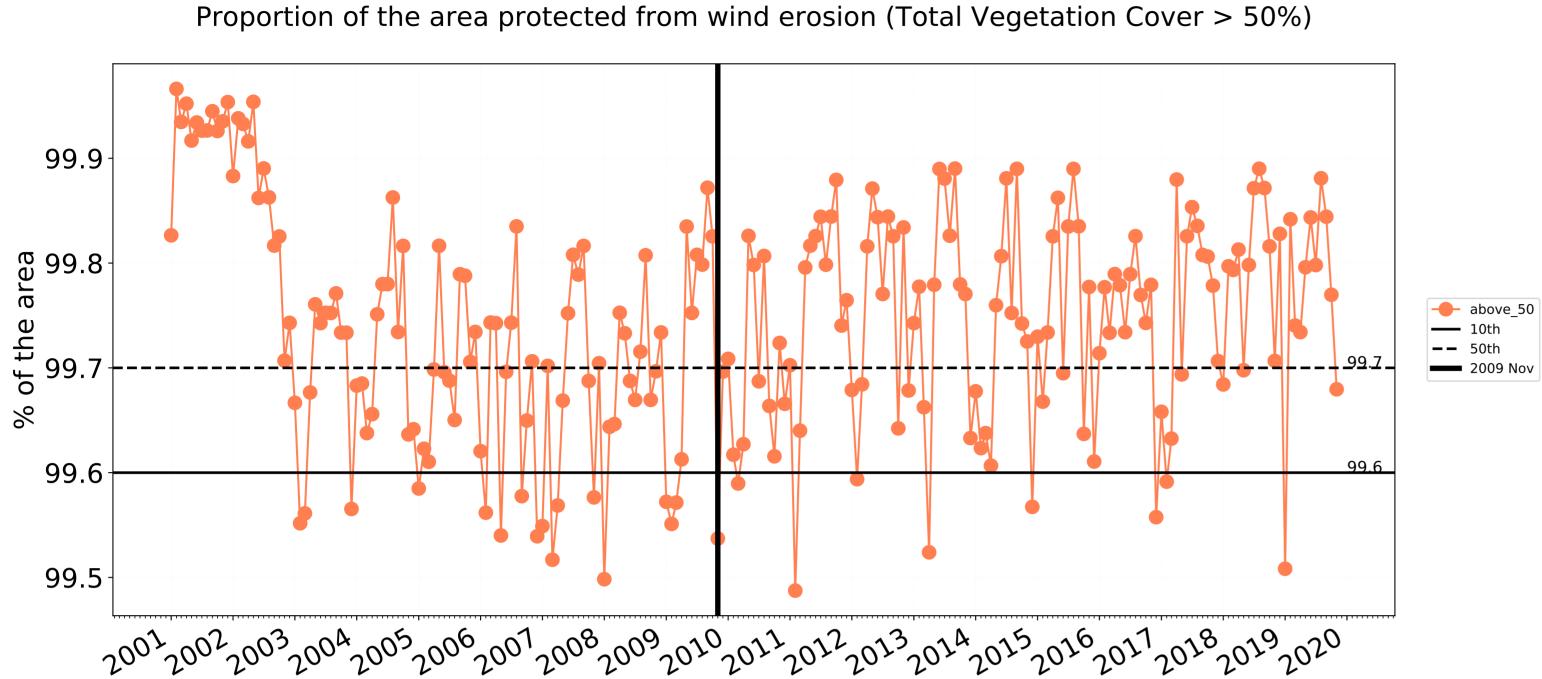




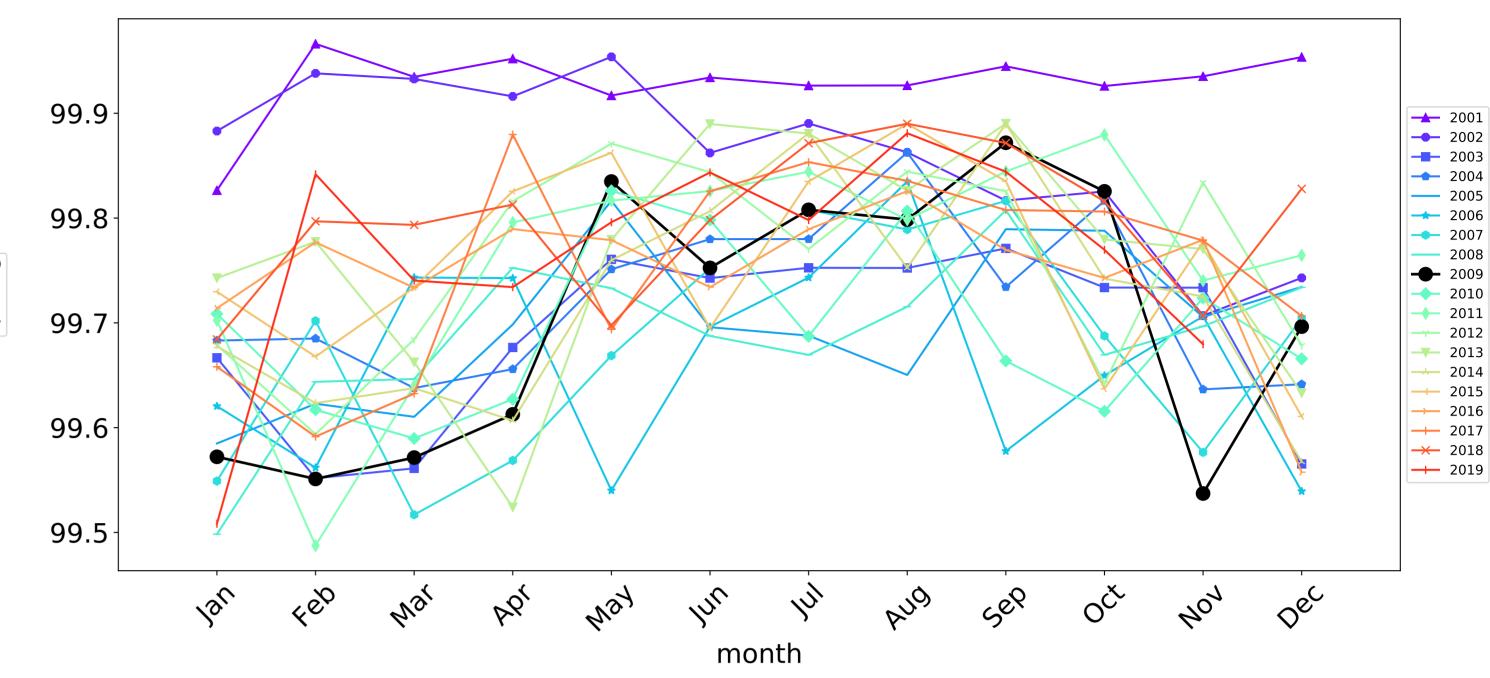


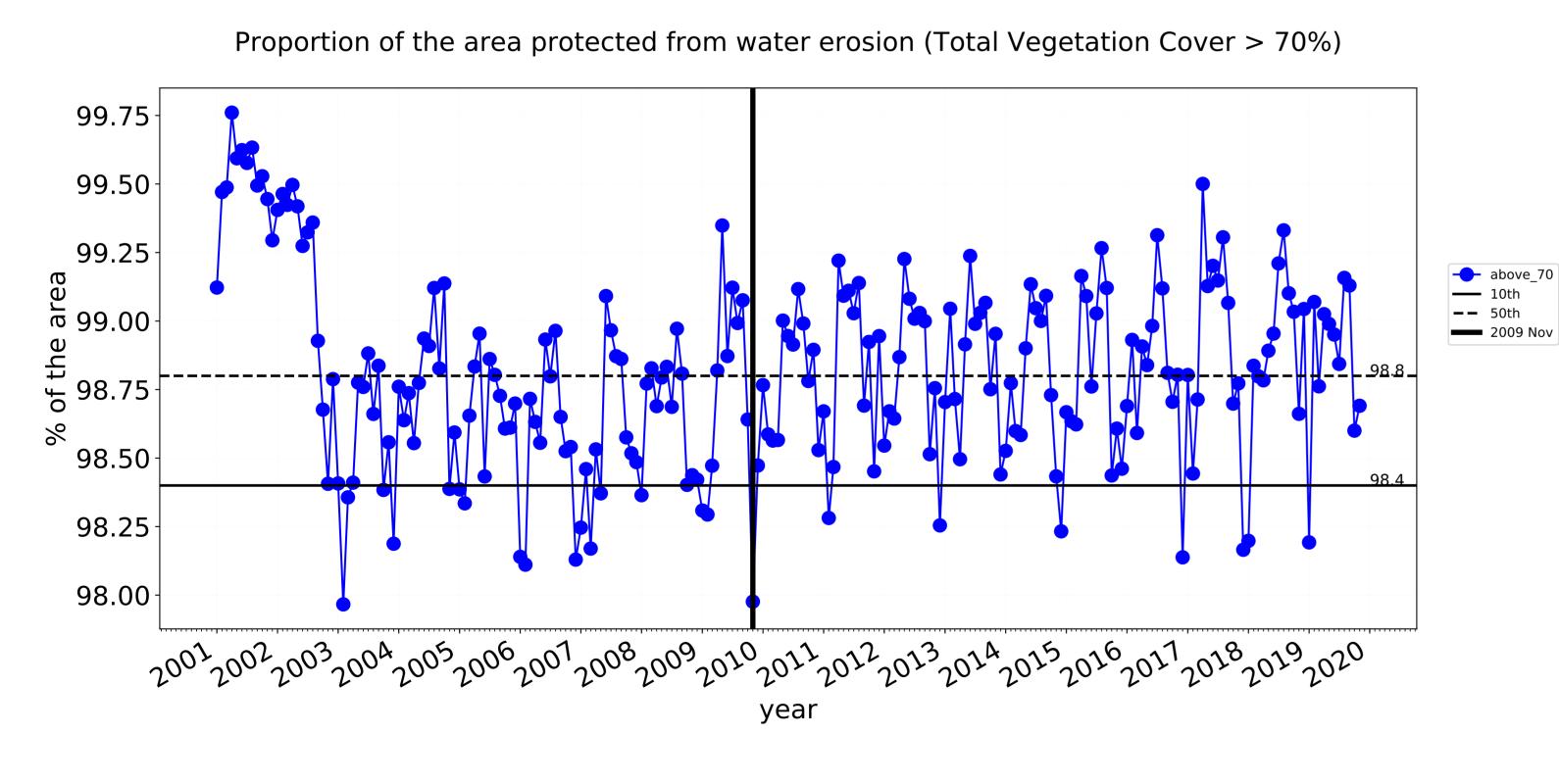


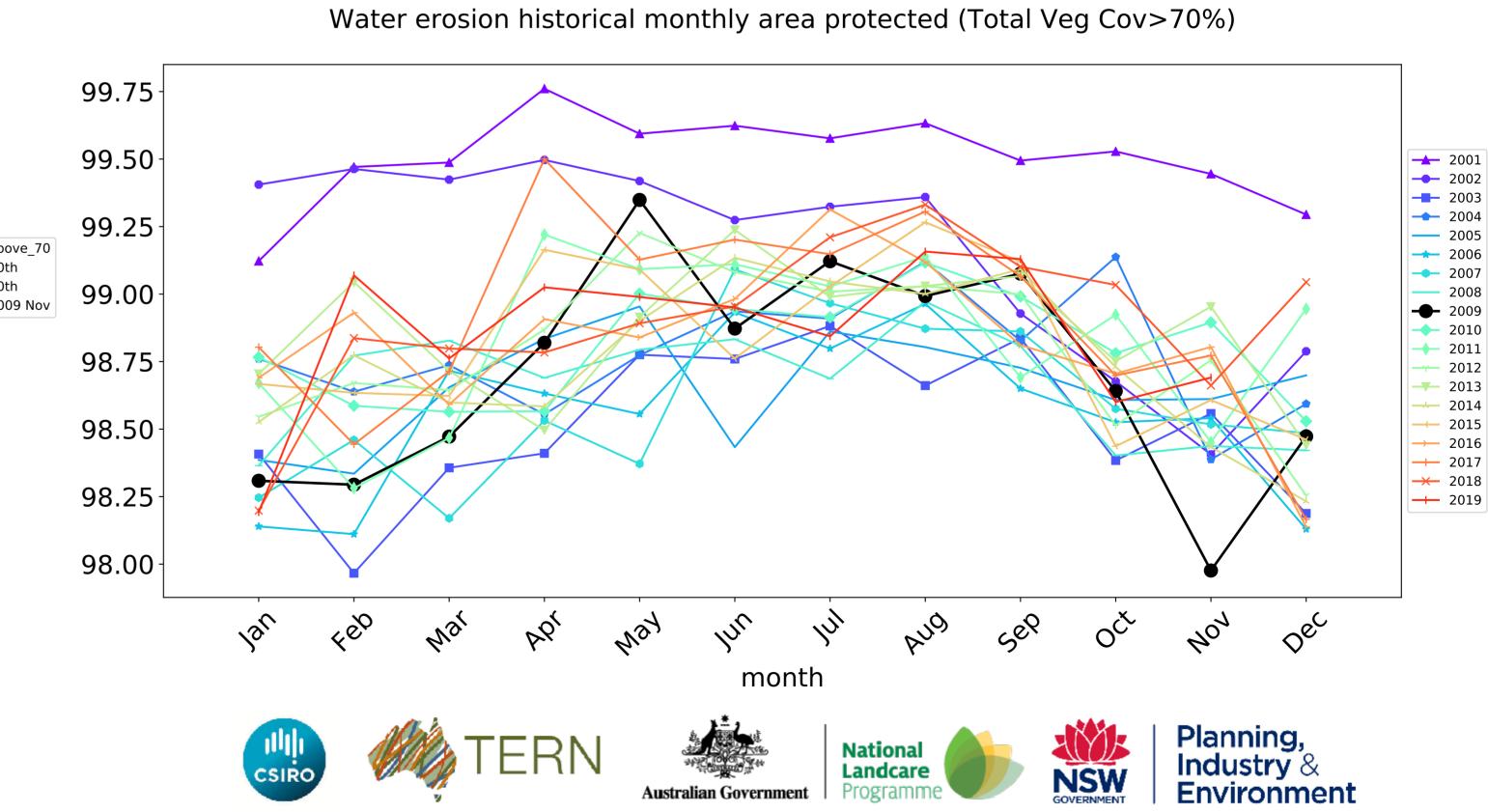
#### **Conservation and natural environments timeseries**

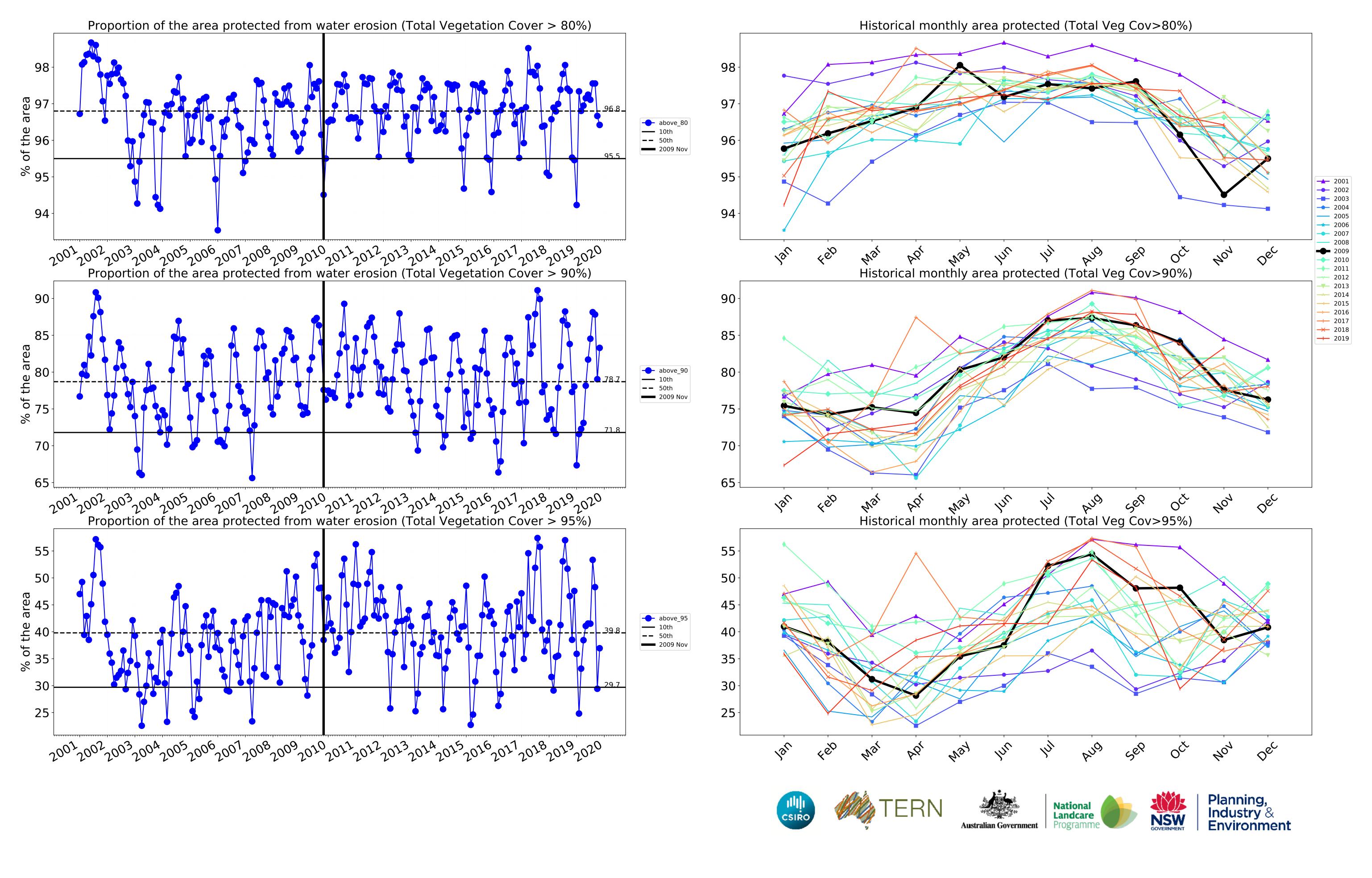


#### Wind erosion historical monthly area protected (Total Veg Cov >50%)









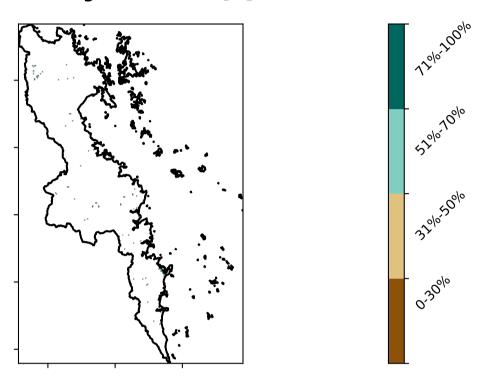
#### **Conservation and natural environments non forest**

#### **Land use and forest cover**

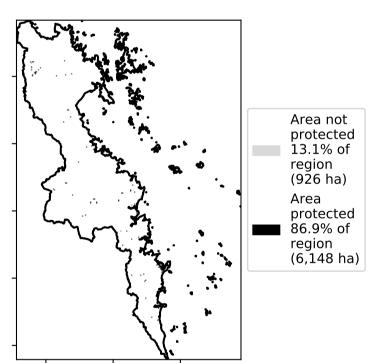
Catchment Scale 1 Conservation and natural environments - Non-

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

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

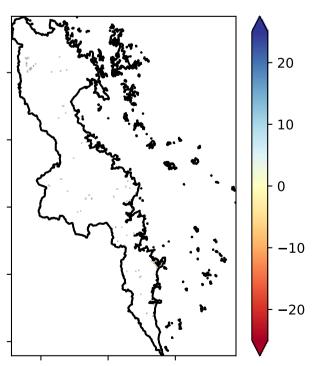


#### % Area protected from water erosion (>70%)



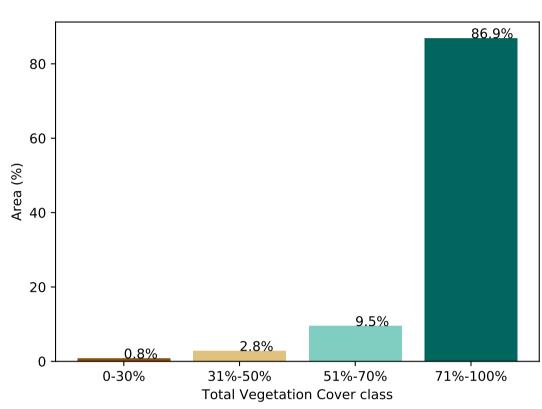
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

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

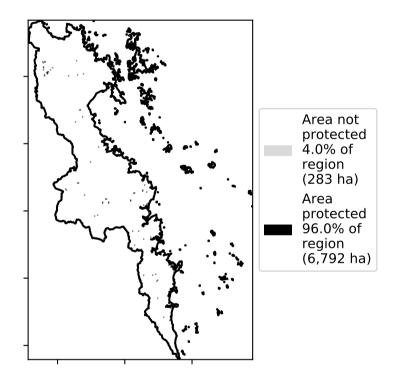


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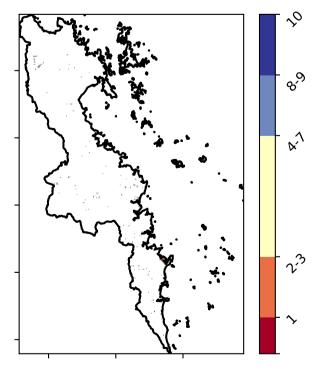
#### Proportion of vegetation cover class in area



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



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





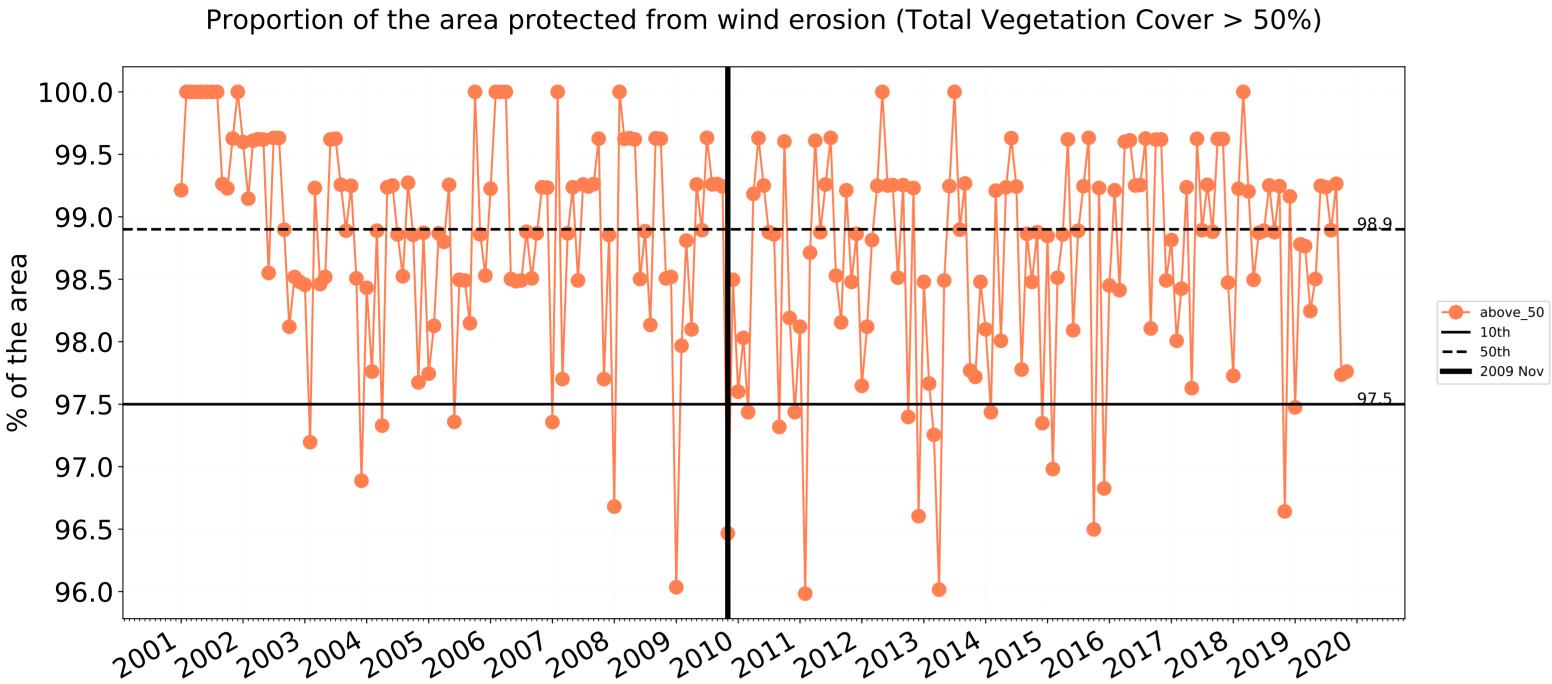




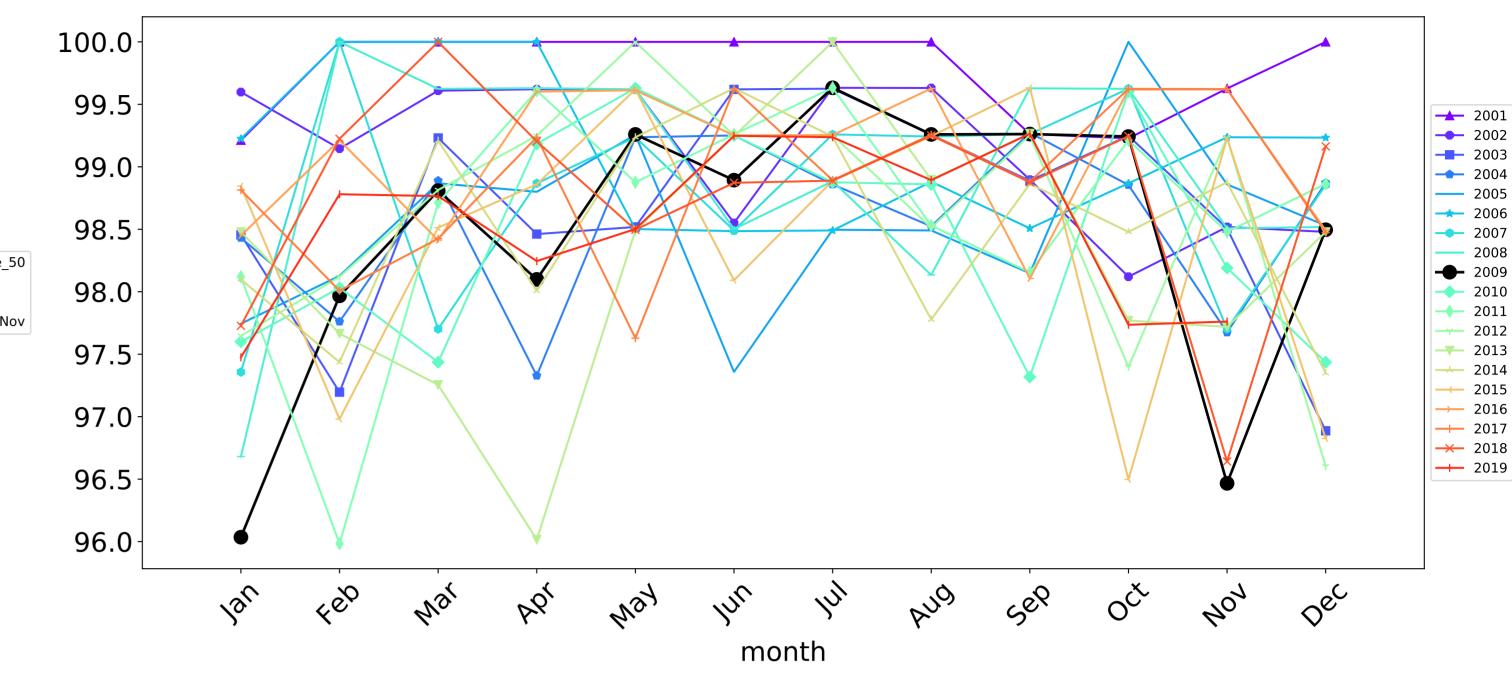


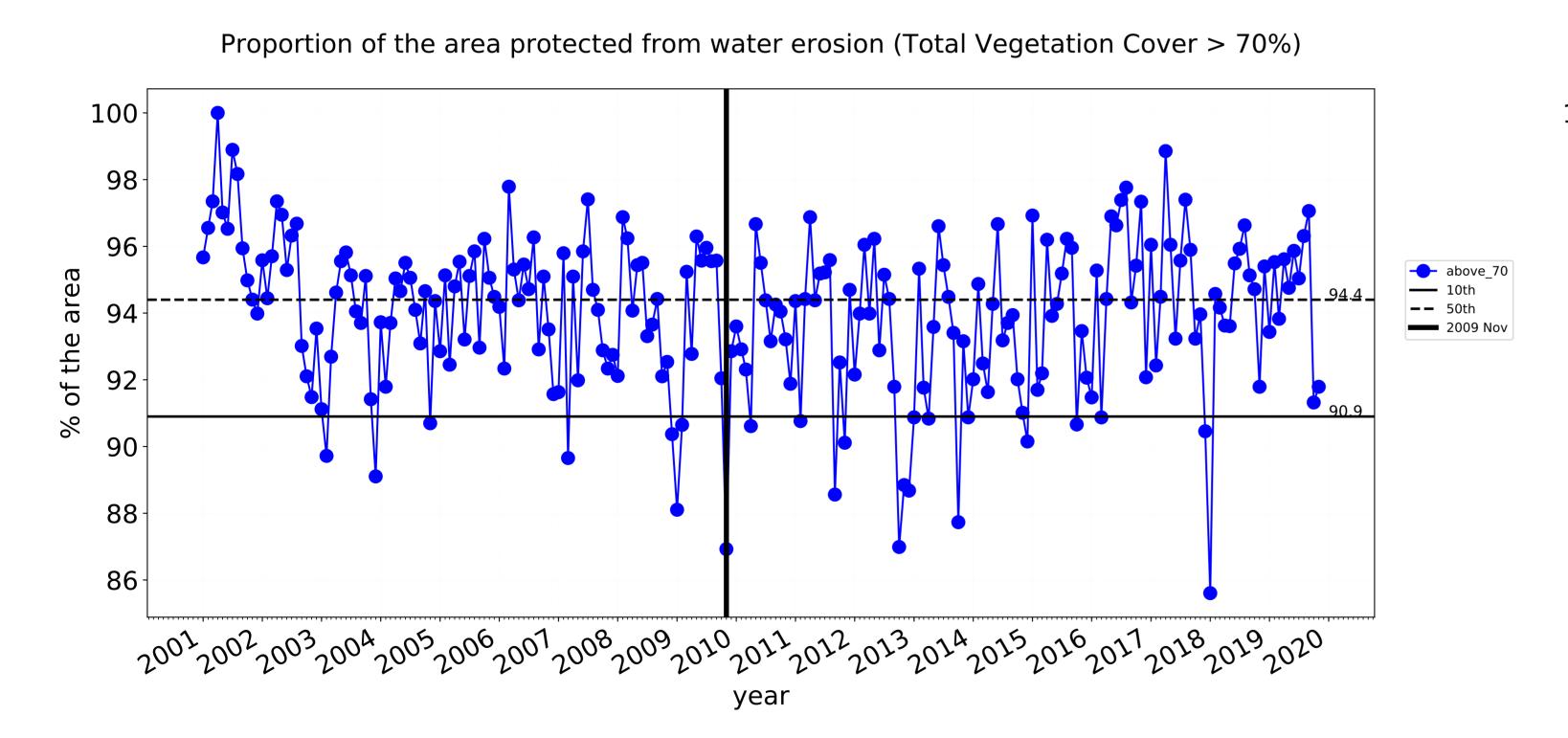


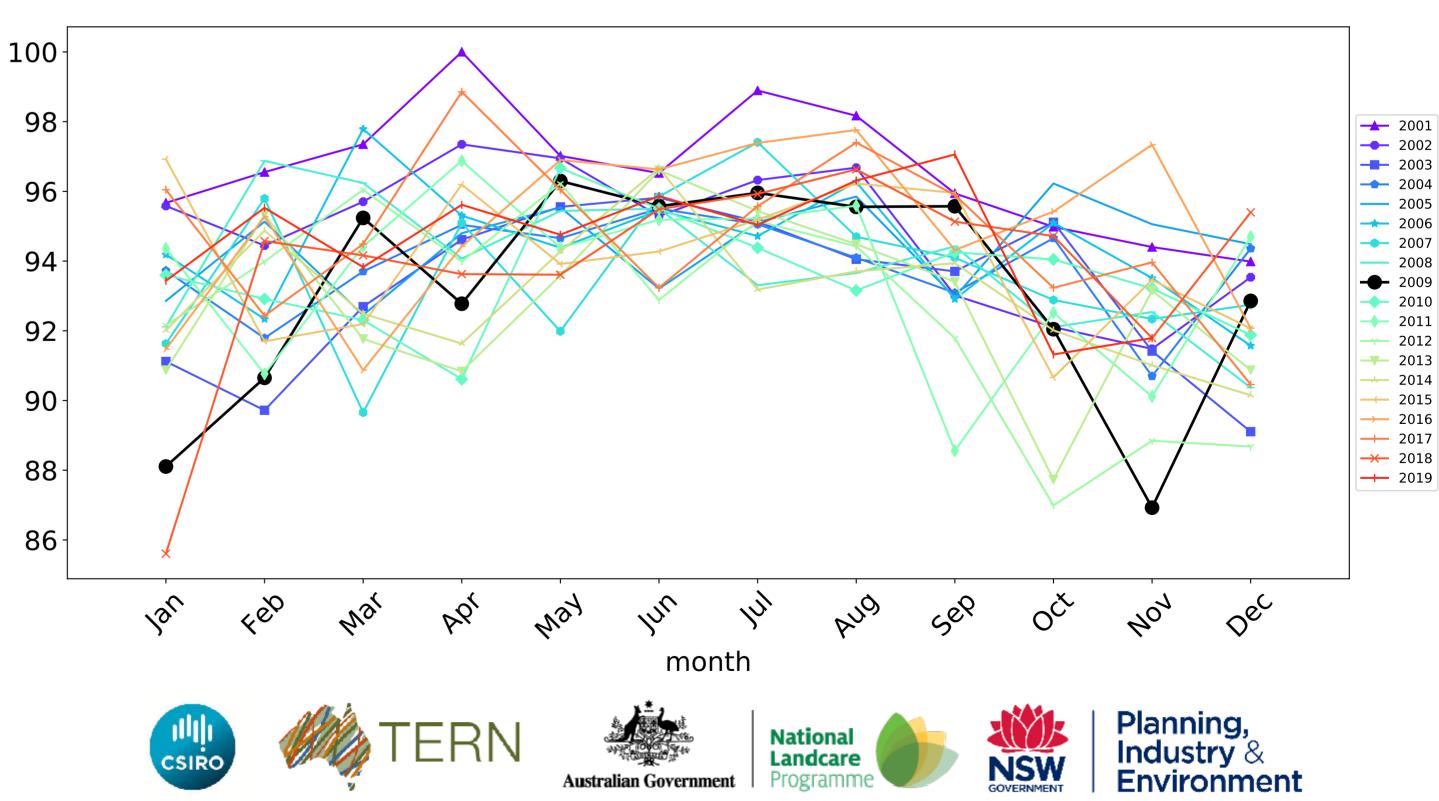




#### Wind erosion historical monthly area protected (Total Veg Cov >50%)

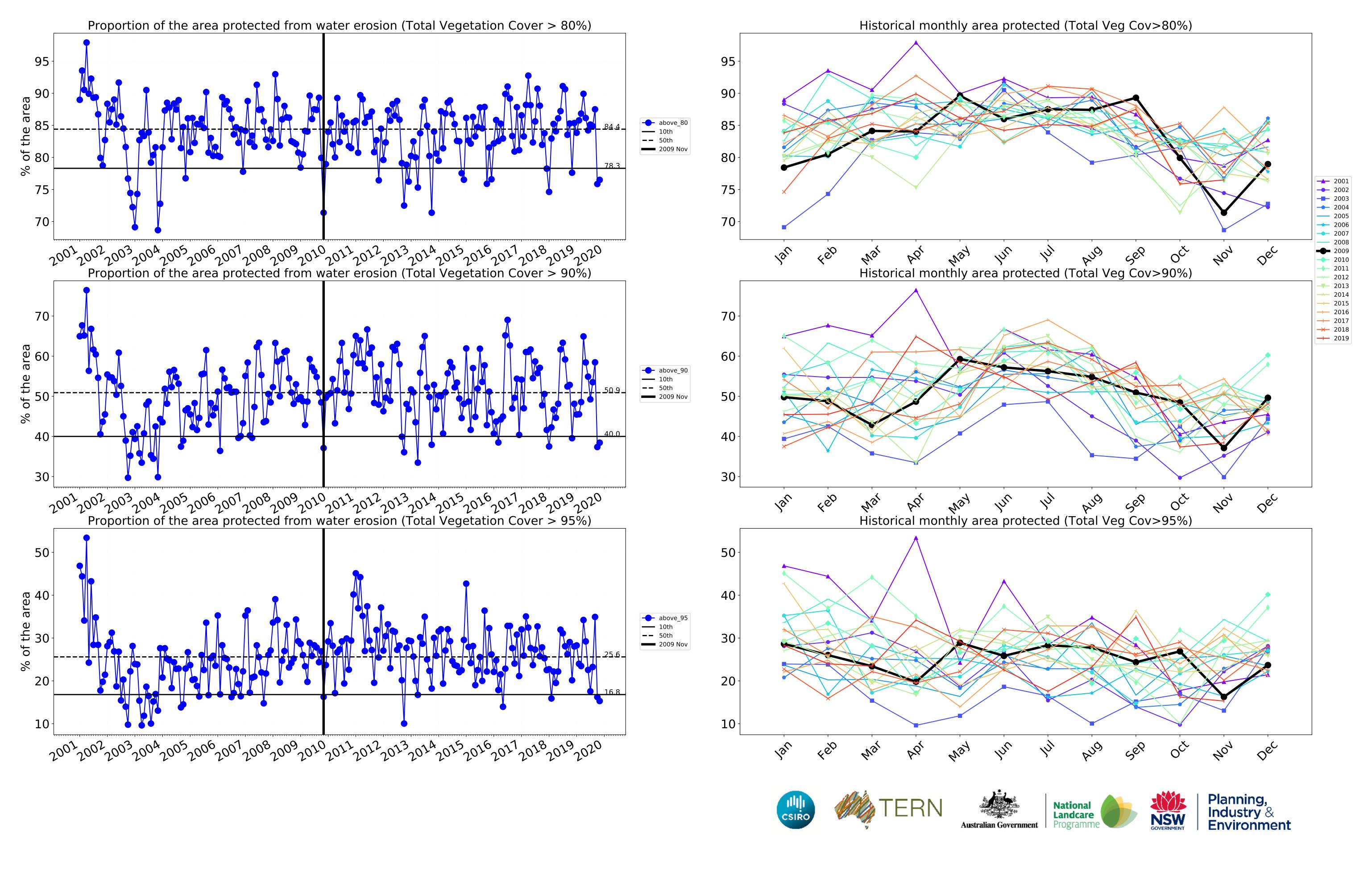






NSW GOVERNMENT

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



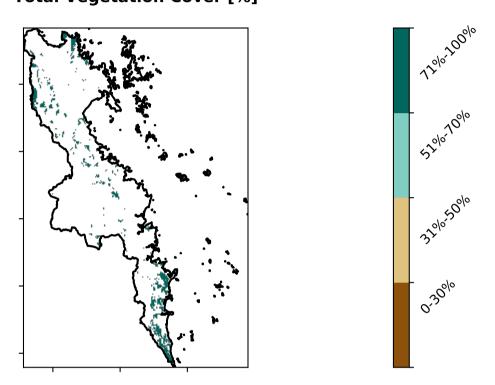
#### **Conservation and natural environments Woodland forest**

#### Land use and forest cover

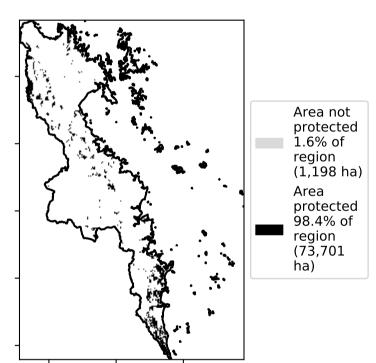
1 Conservation and natural environments - Woodland

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%)



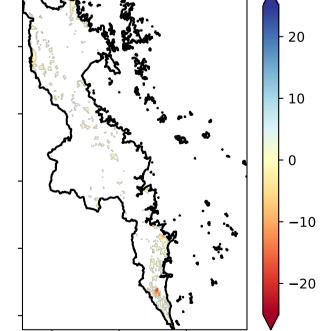
#### Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the

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pixel. The mean

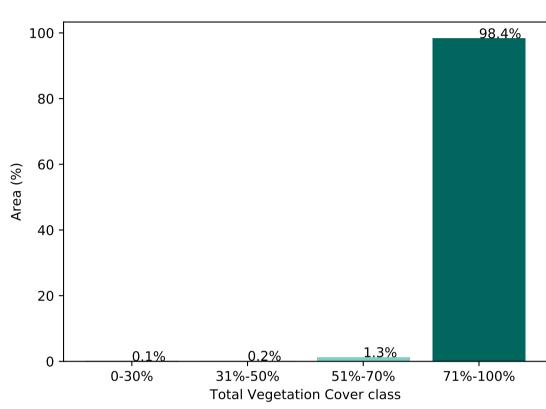
using baseline from 2001 to 2019.

is only for the month of the map

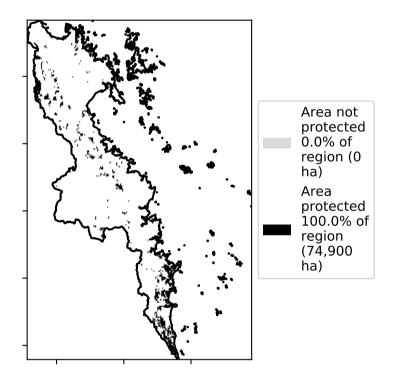


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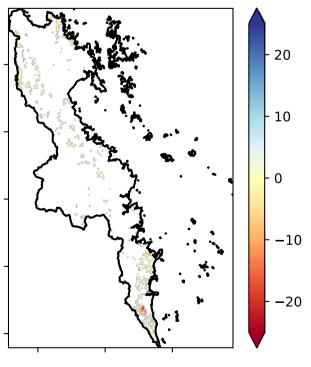
#### Proportion of vegetation cover class in area



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



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



**Total Vegetation Cover Decile [%]** 



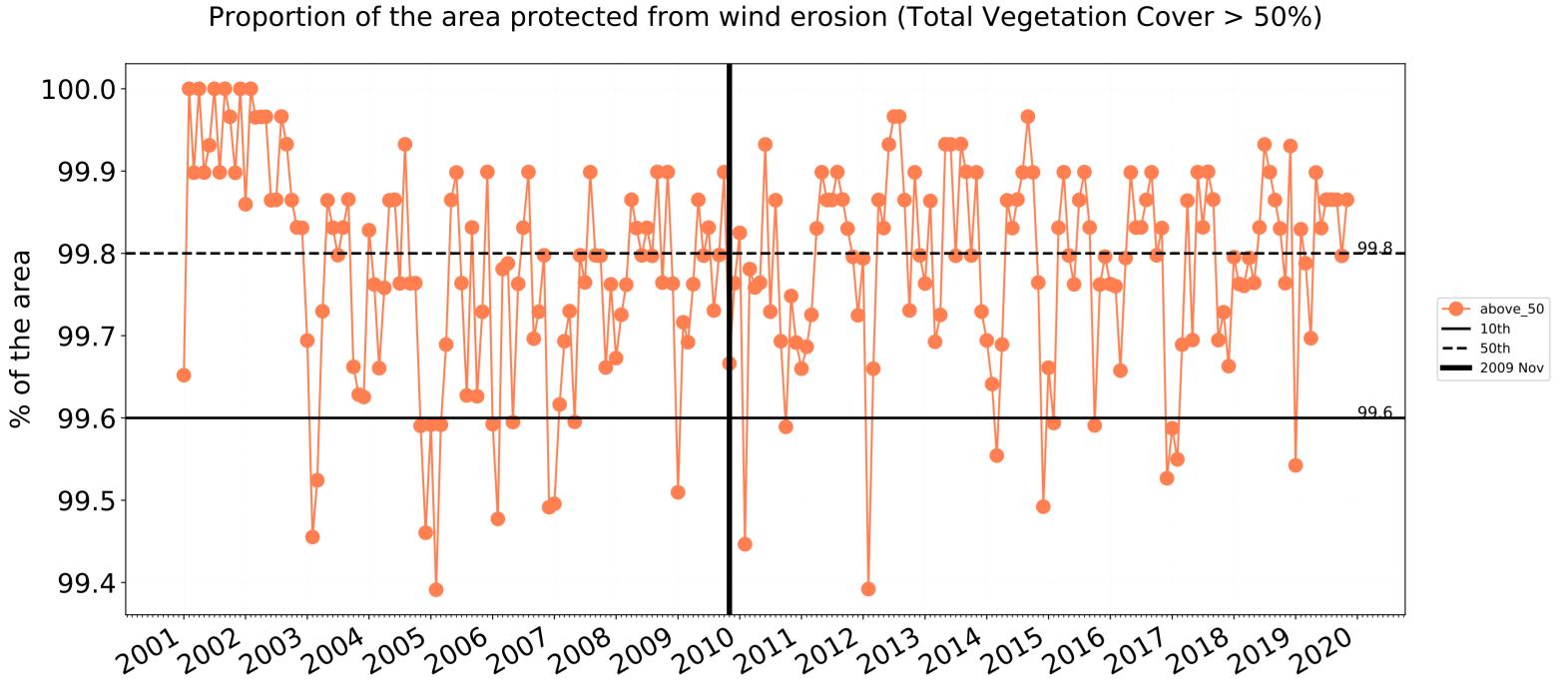


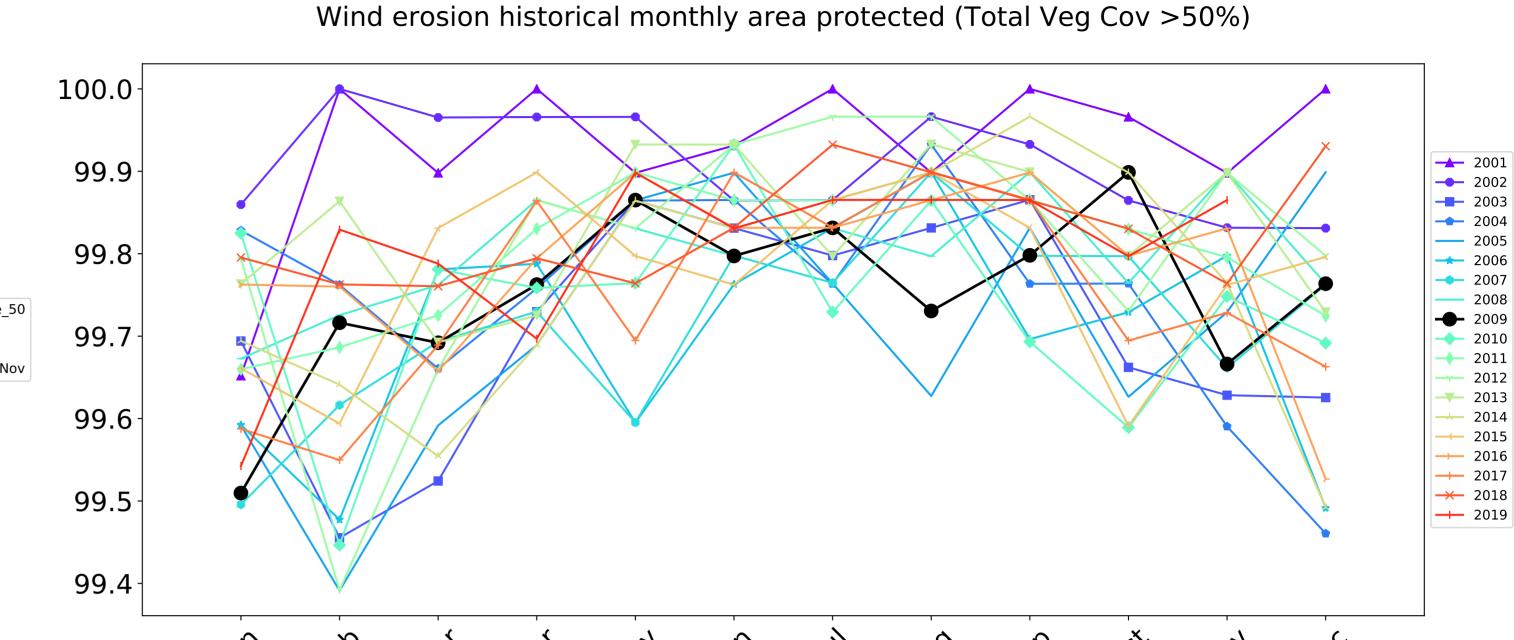




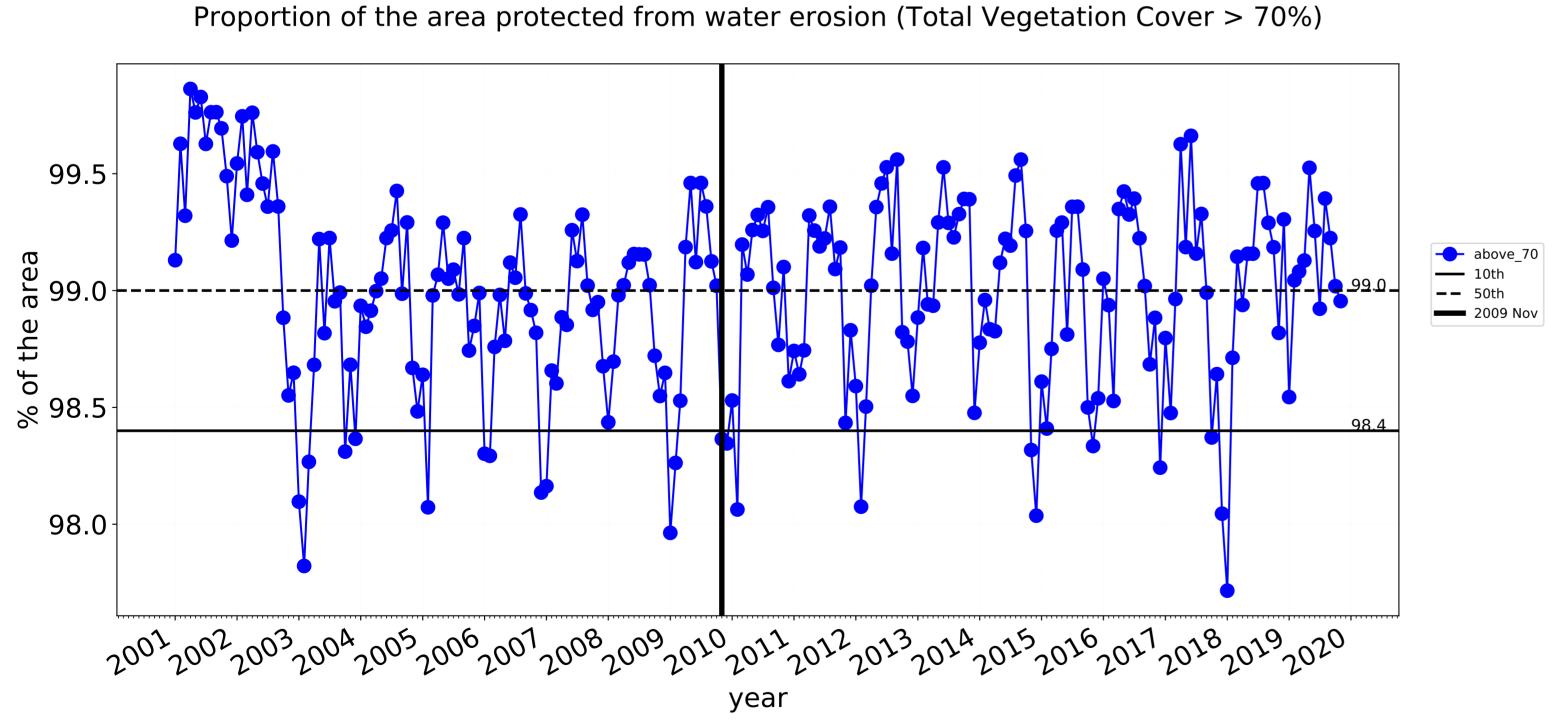


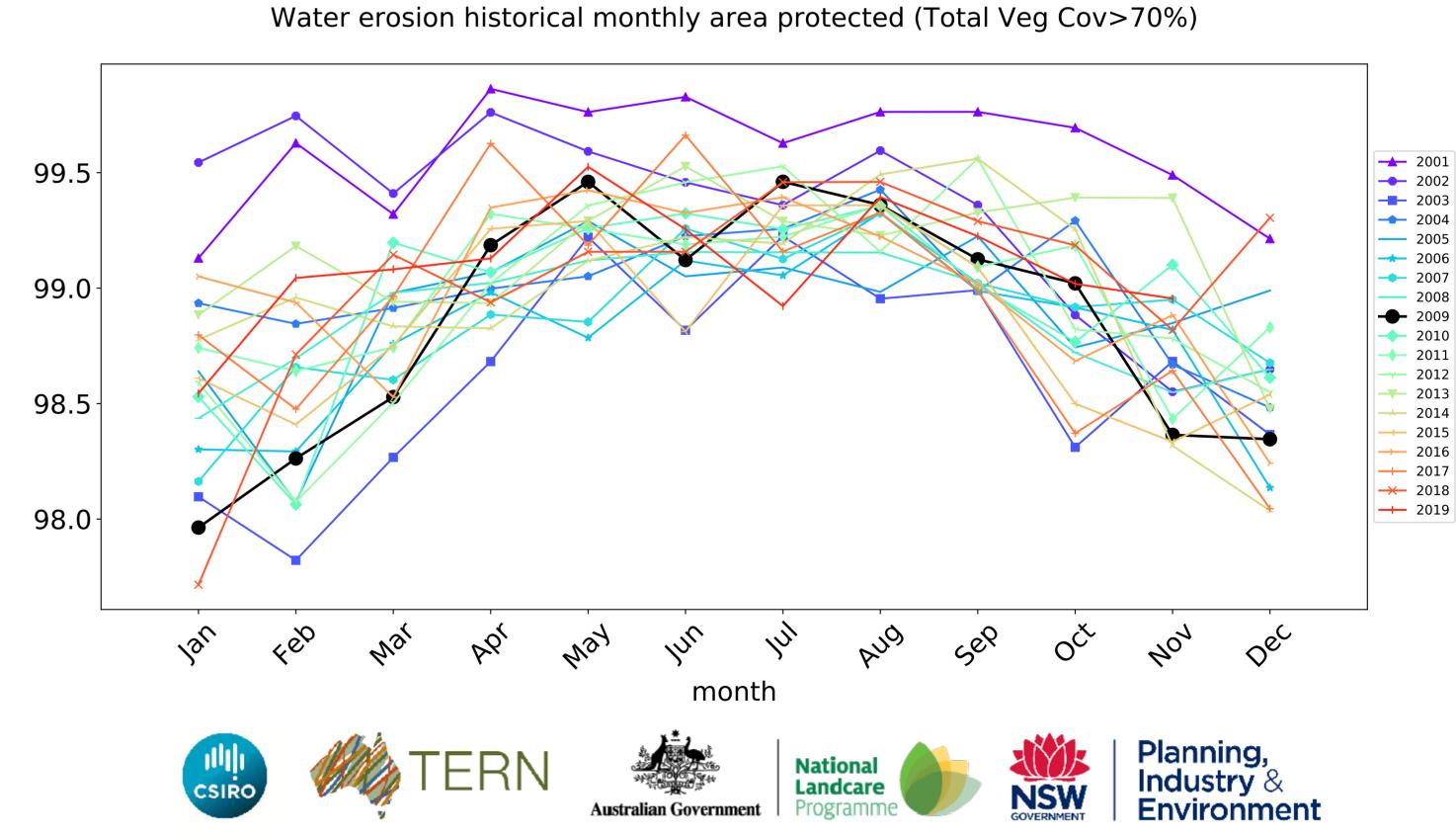


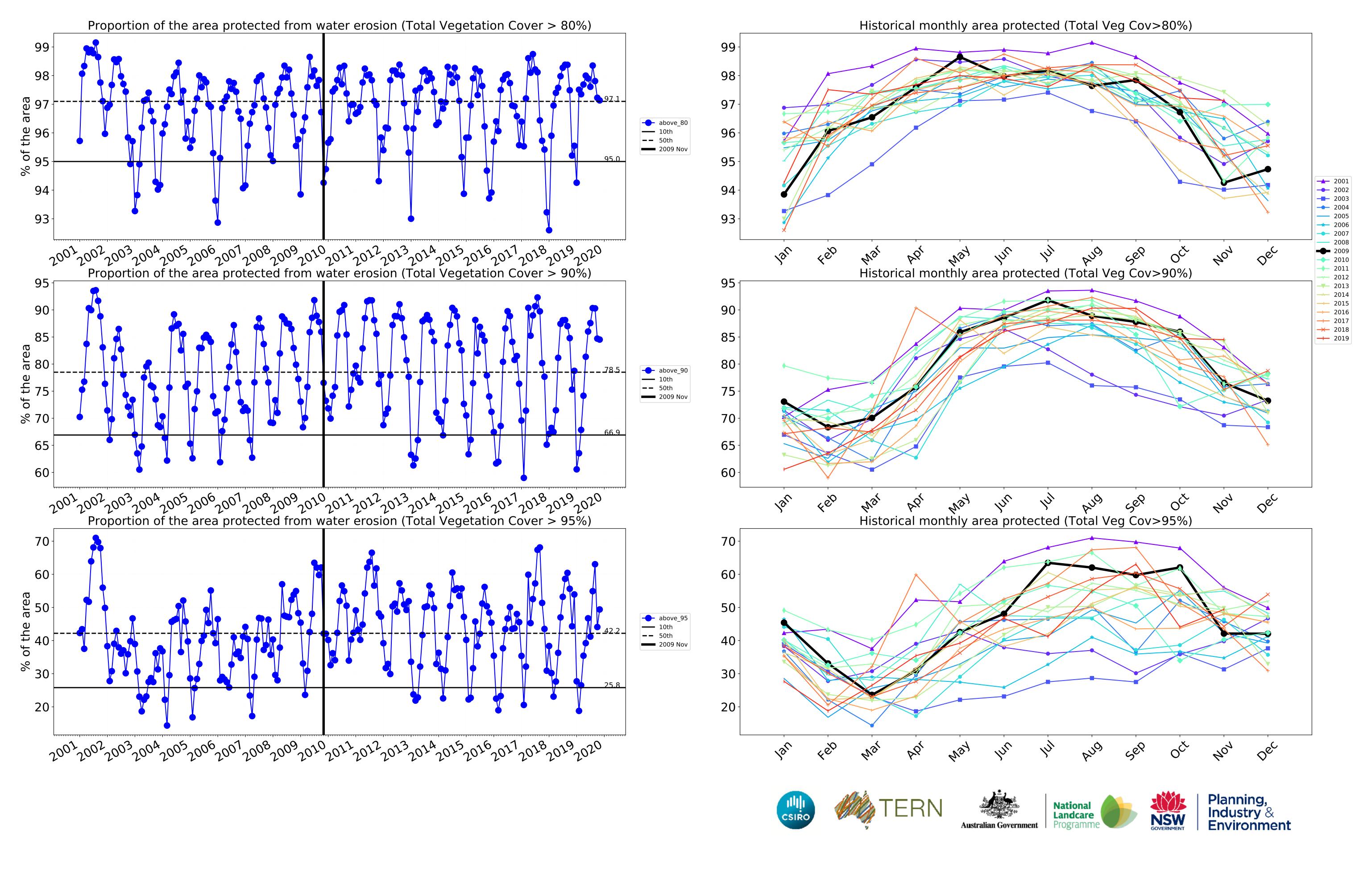




month







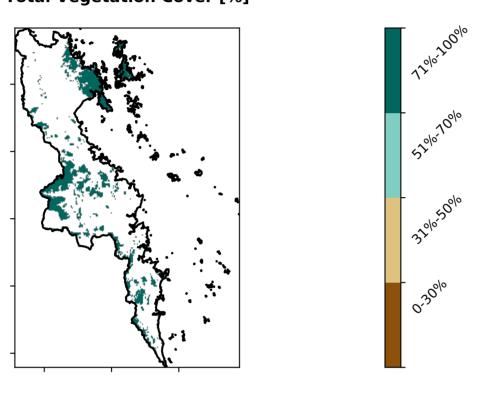
#### **Conservation and natural environments Forest (non woodland)**

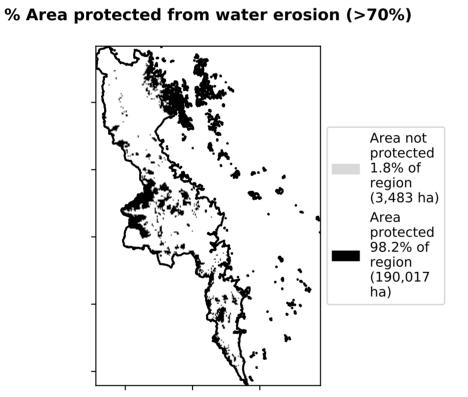
#### Land use and forest cover

1 Conservation and natural environments - Non-woodland forest

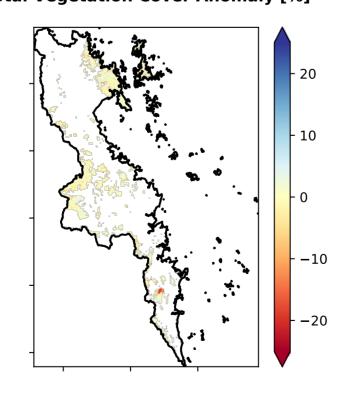
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

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



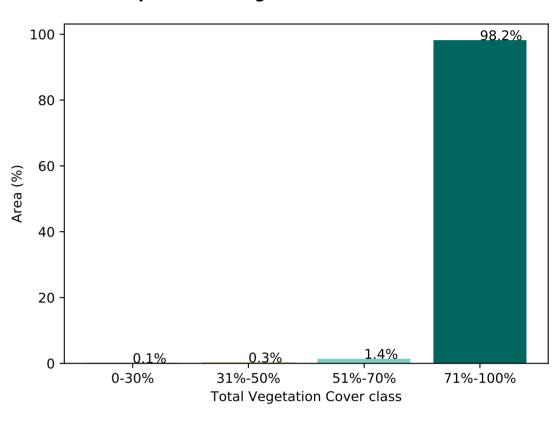


#### Total Vegetation Cover Anomaly [%]

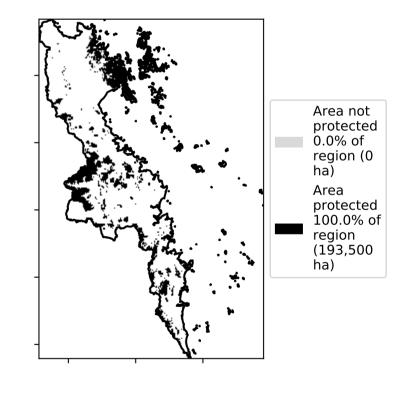


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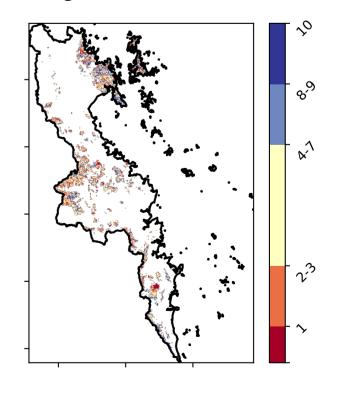
#### Proportion of vegetation cover class in area

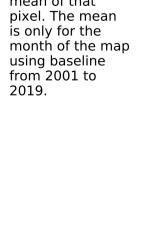


#### % Area protected from wind erosion (>50%)



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





Anomaly show how many percetage points each

pixel is from

is, red pixels are about 20% lower than the

mean of that

the mean. That

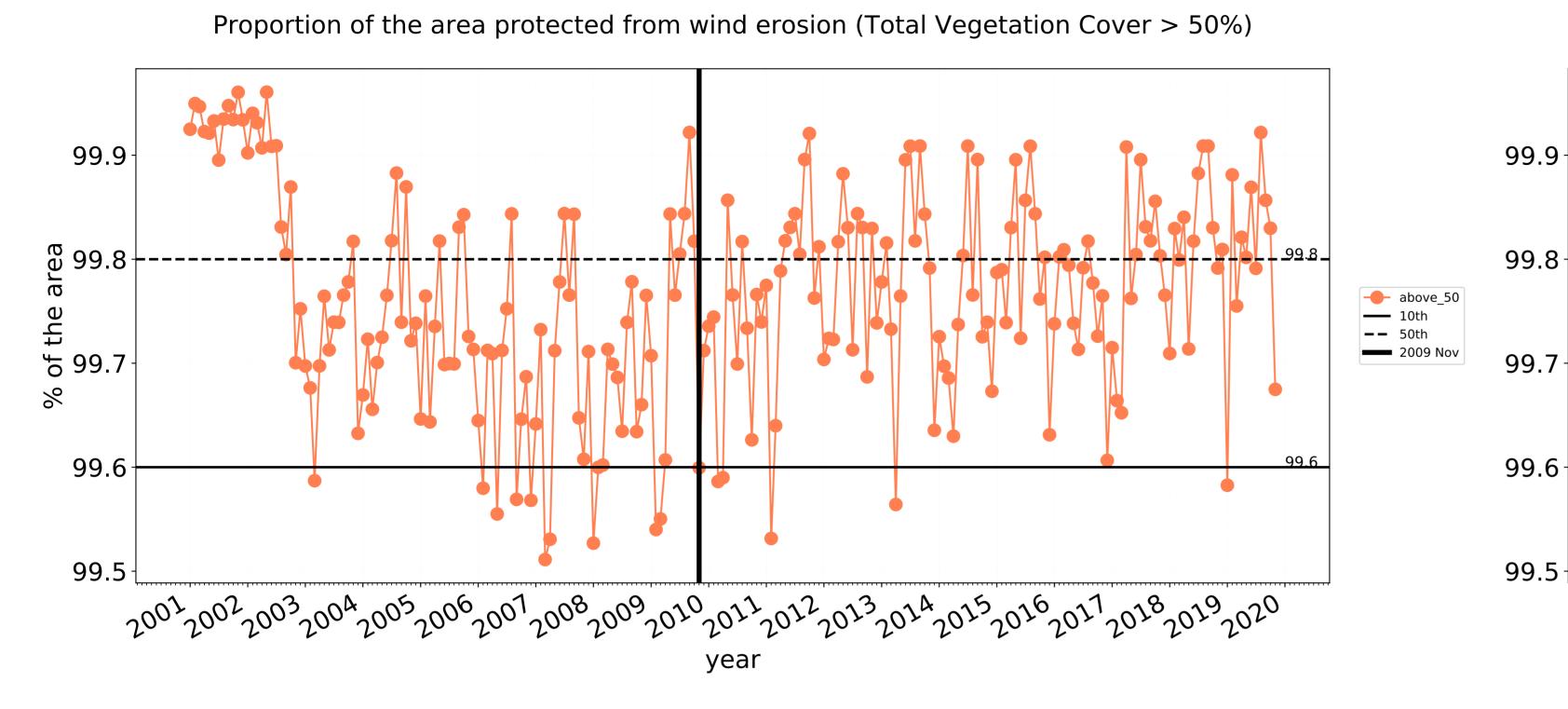








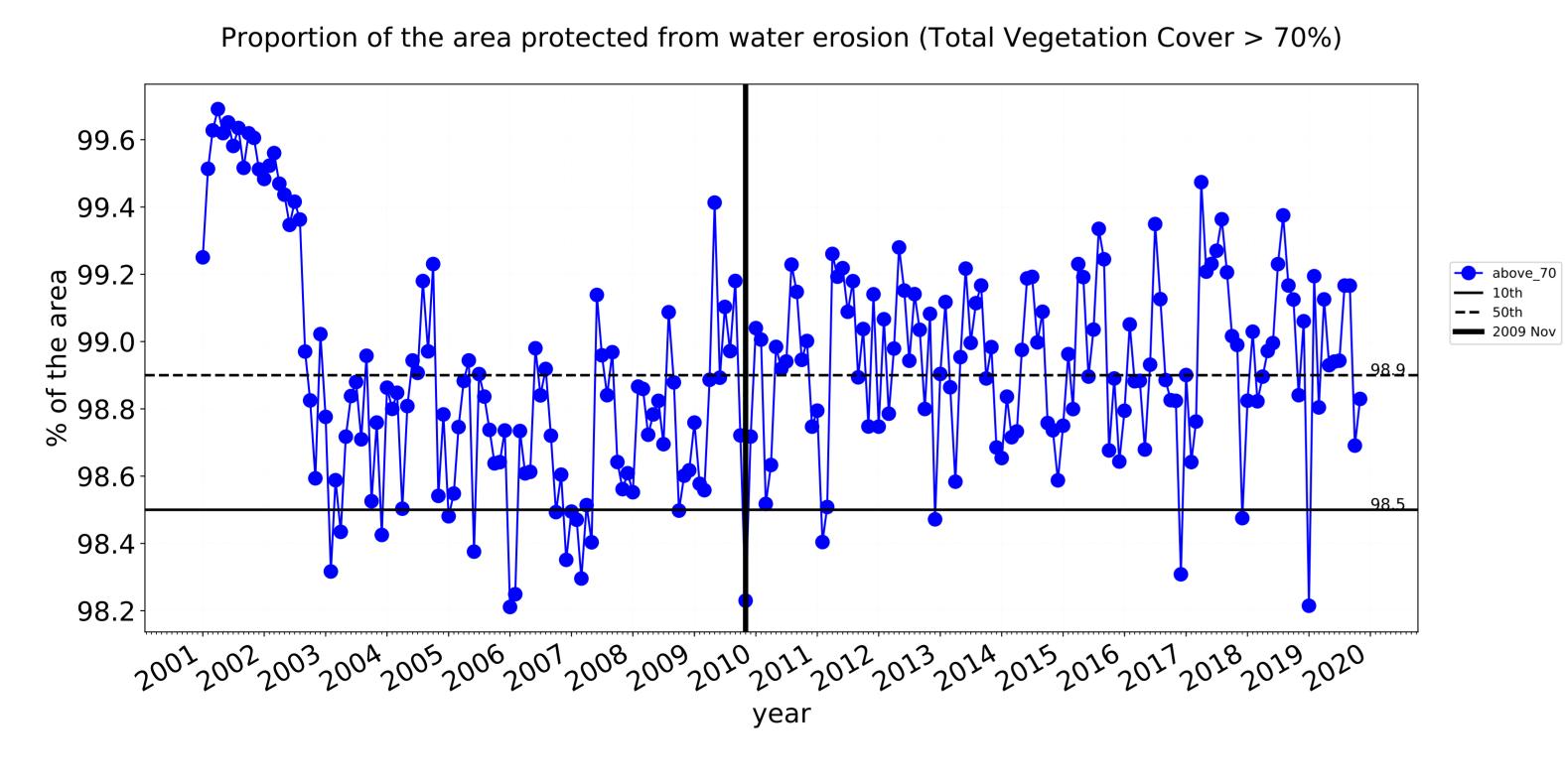


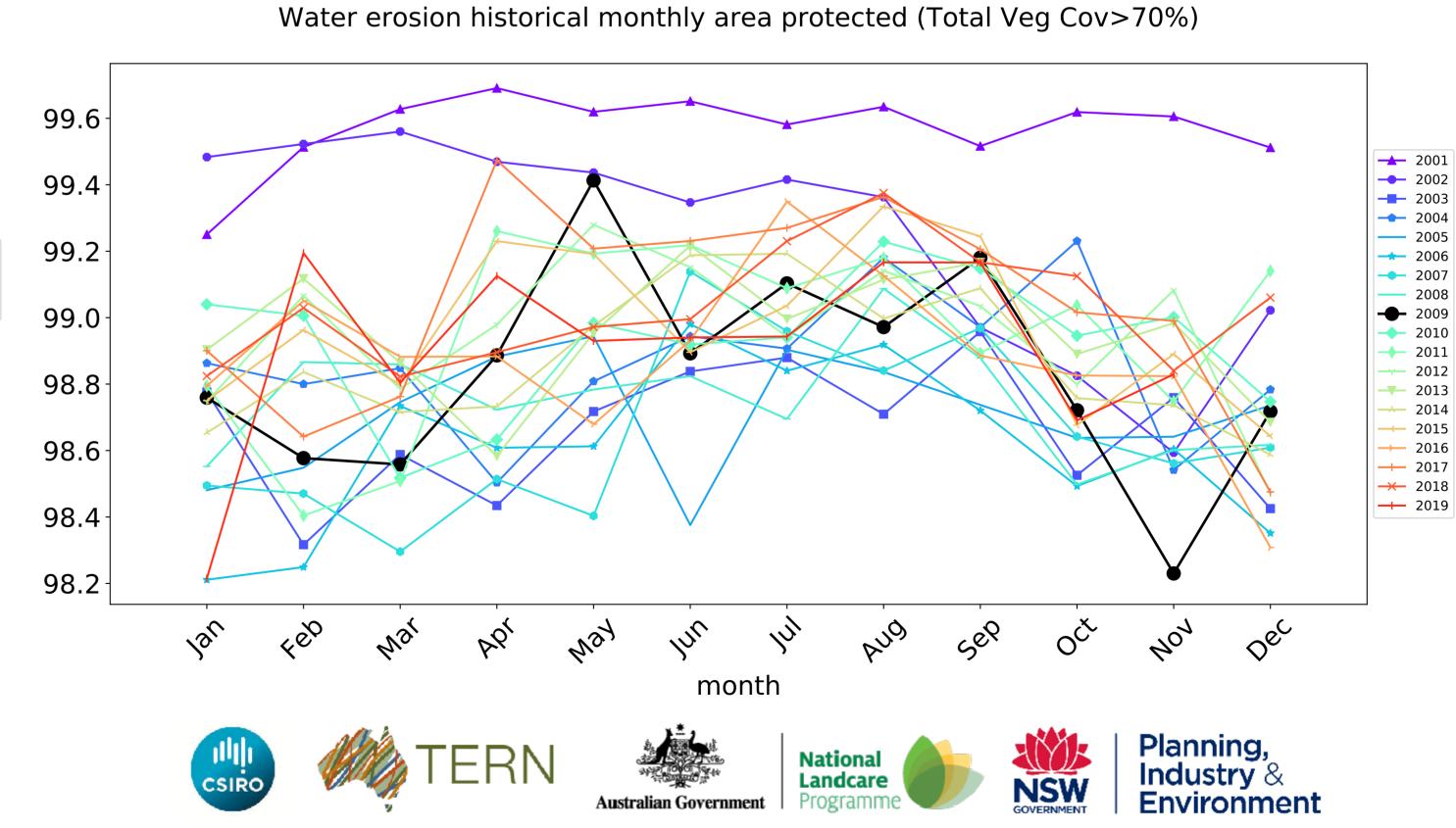


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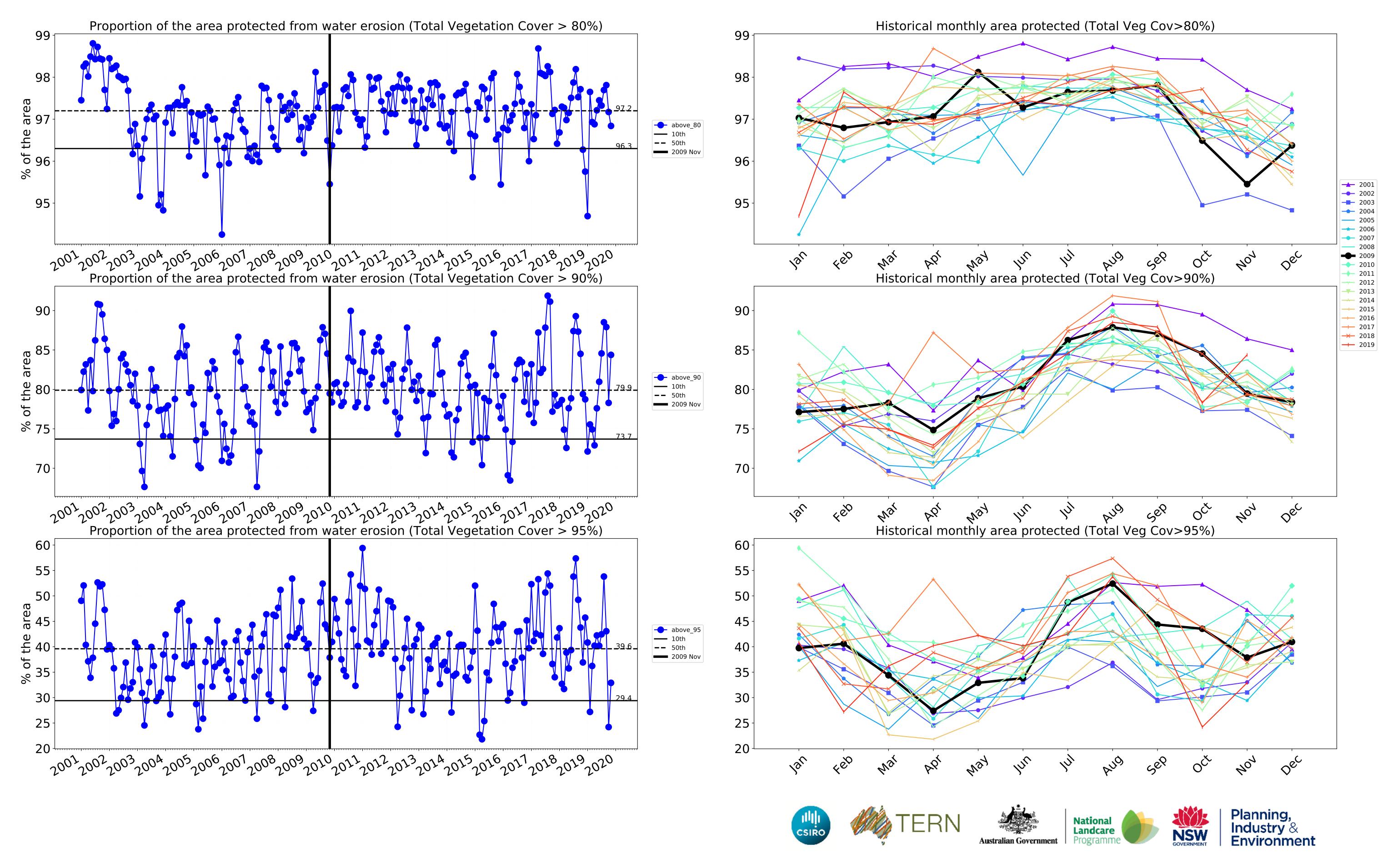
→ 2016 → 2017

→ 2018
→ 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

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Derived from

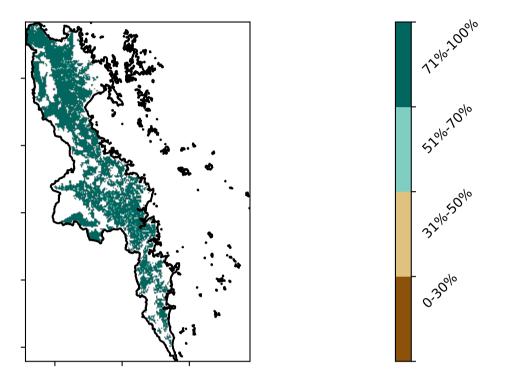
Use of Australia

Land Use and Forests

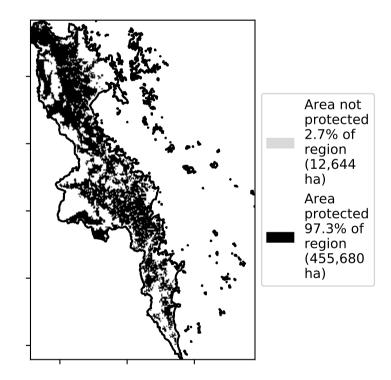
Catchment Scale Land

#### 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

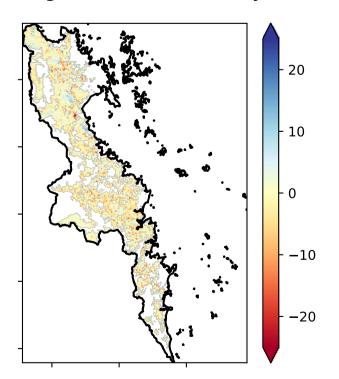
#### **Total Vegetation Cover [%]**



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

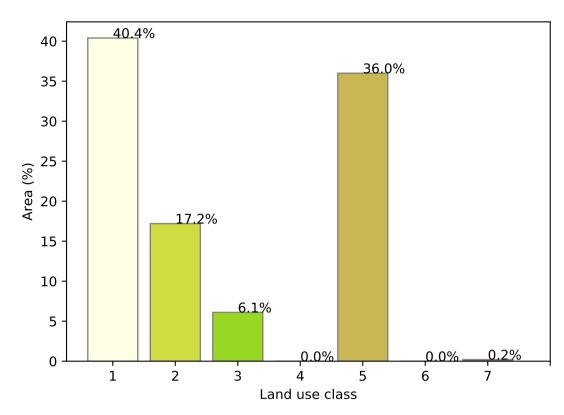


#### **Total Vegetation Cover Anomaly [%]**

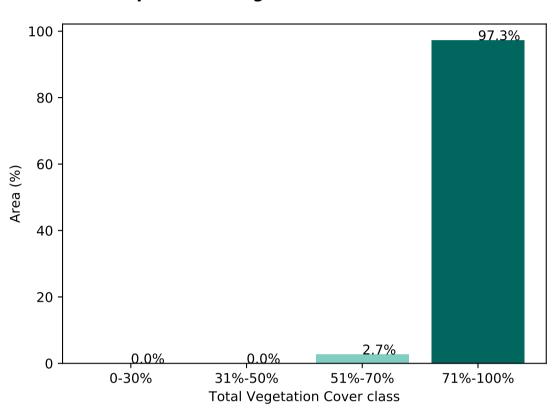


pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of the map using baseline from 2001 to 2019.

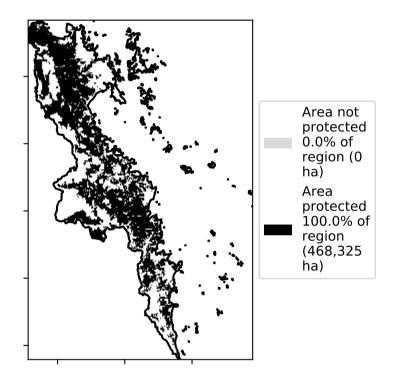
#### **Proportion of each land class in area**



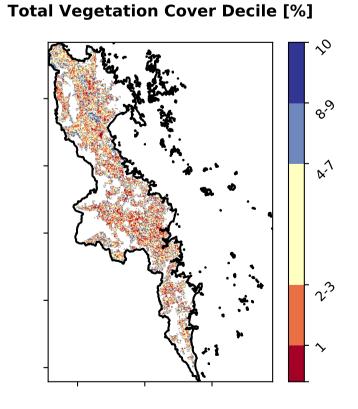
Proportion of vegetation cover class in area



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



Deciles show where the records for that month of







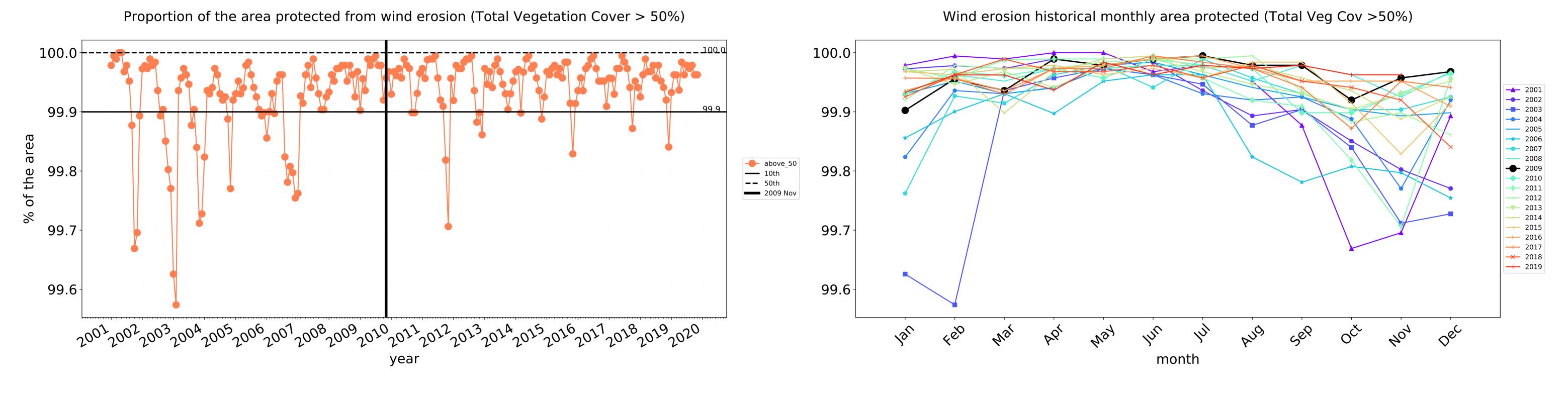


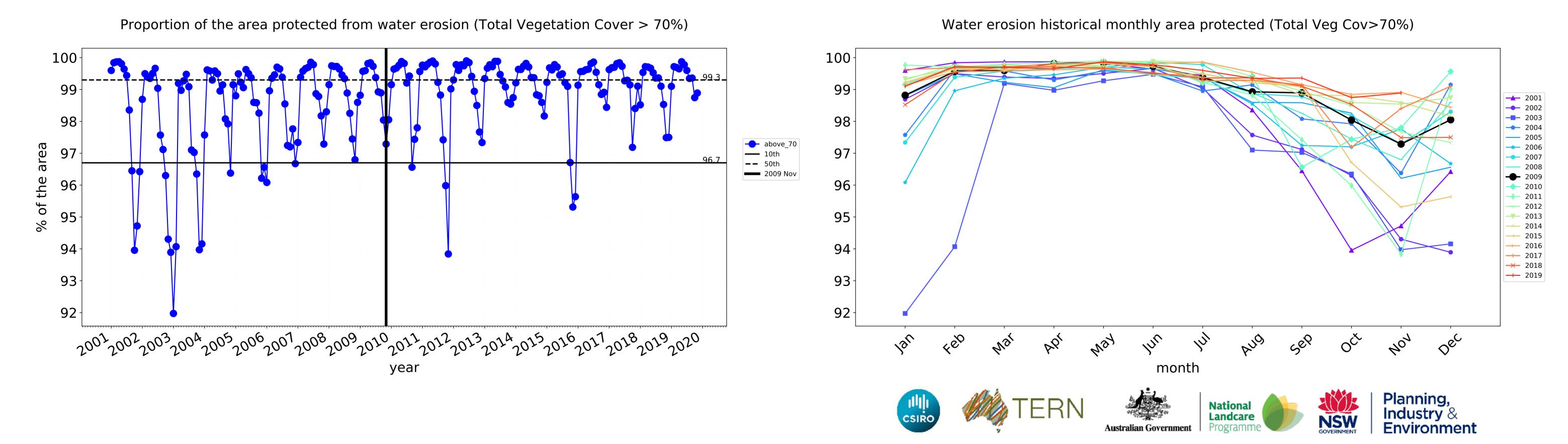


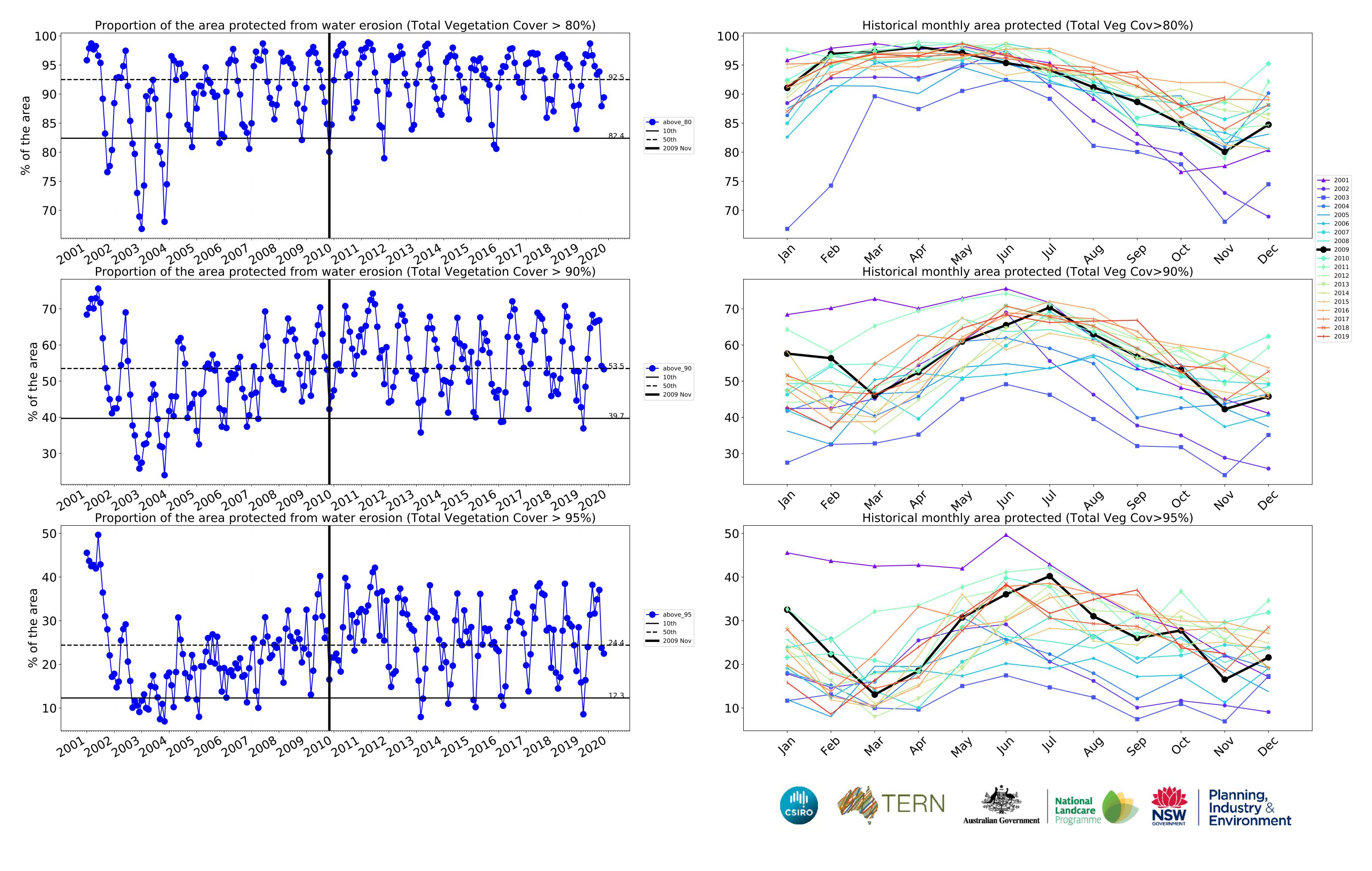




#### **Agriculture timeseries**







#### 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

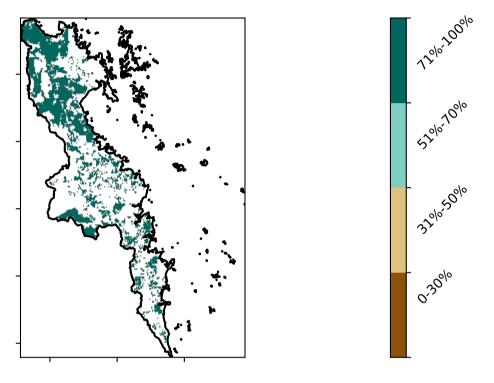
using baseline from 2001 to 2019.

is only for the month of the map

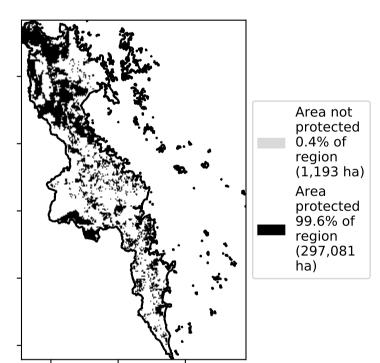
is, red pixels are about 20% lower than the mean of that

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

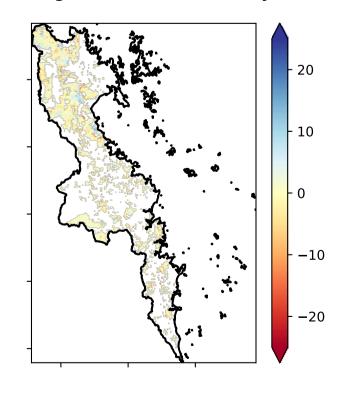
#### **Total Vegetation Cover [%]**



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

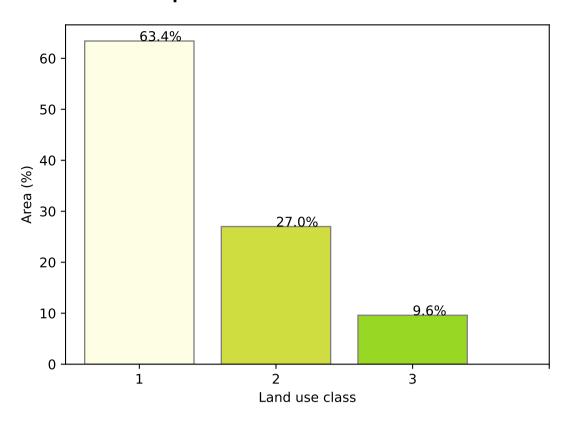


#### **Total Vegetation Cover Anomaly [%]**

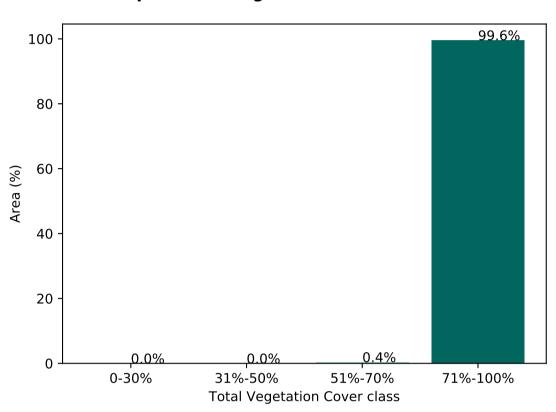


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

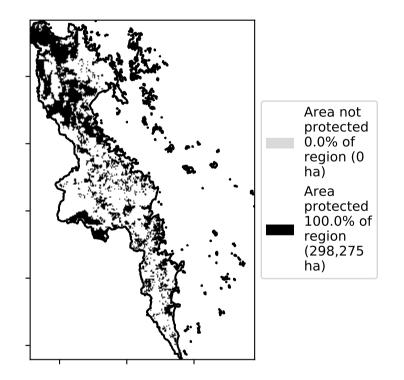
#### Proportion of each land class in area



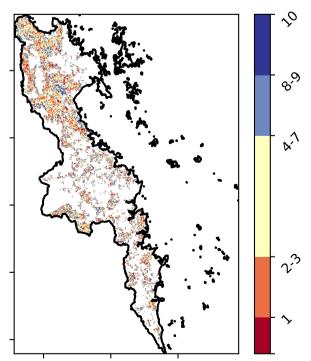
#### **Proportion of vegetation cover class in area**



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



#### Total Vegetation Cover Decile [%]







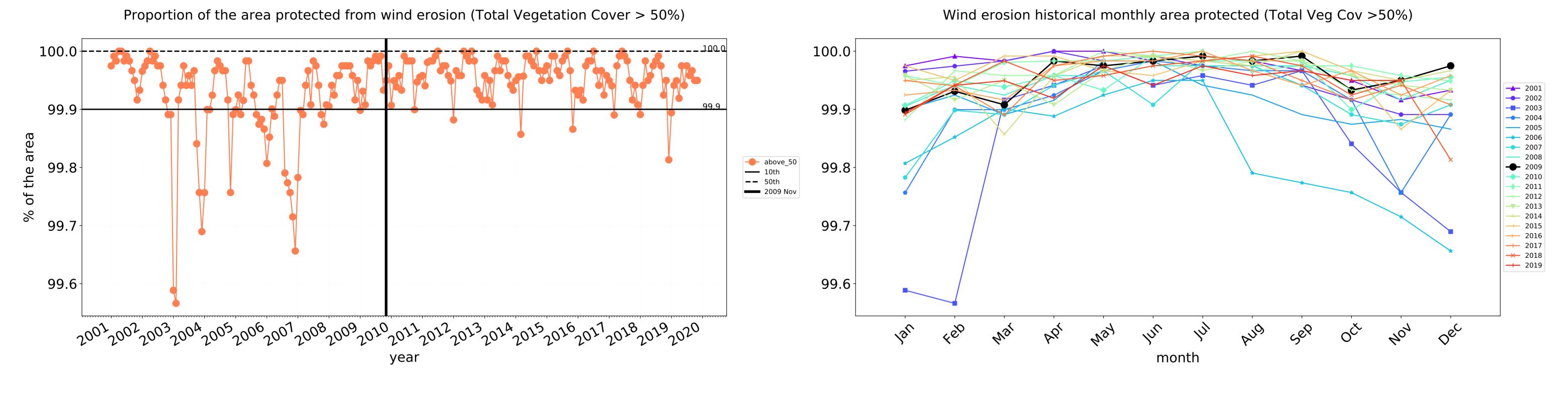


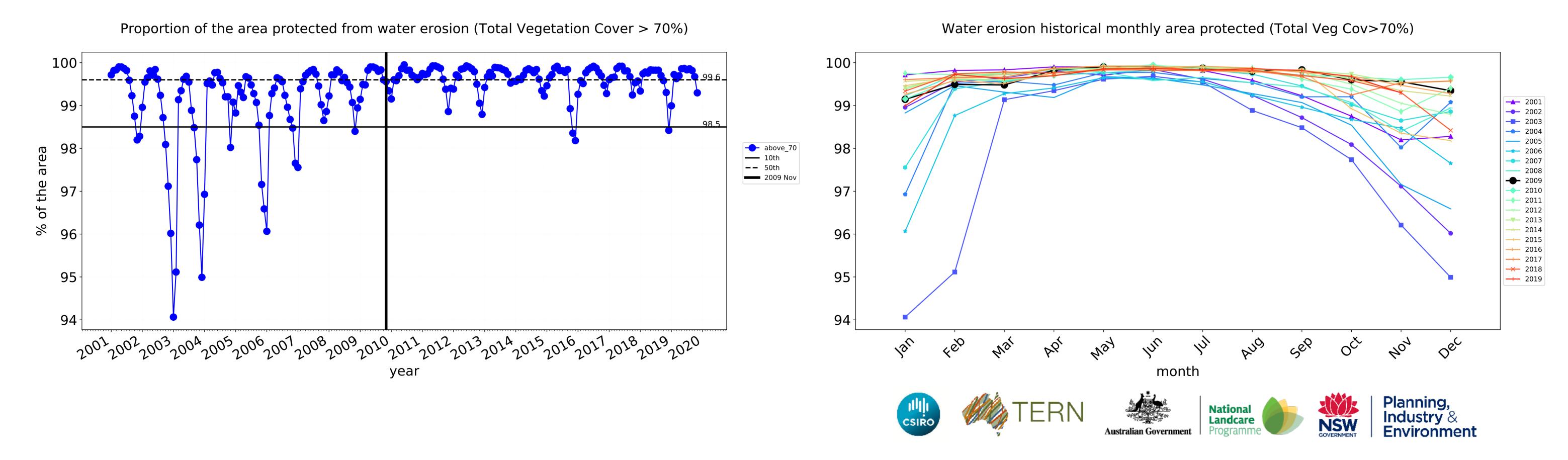


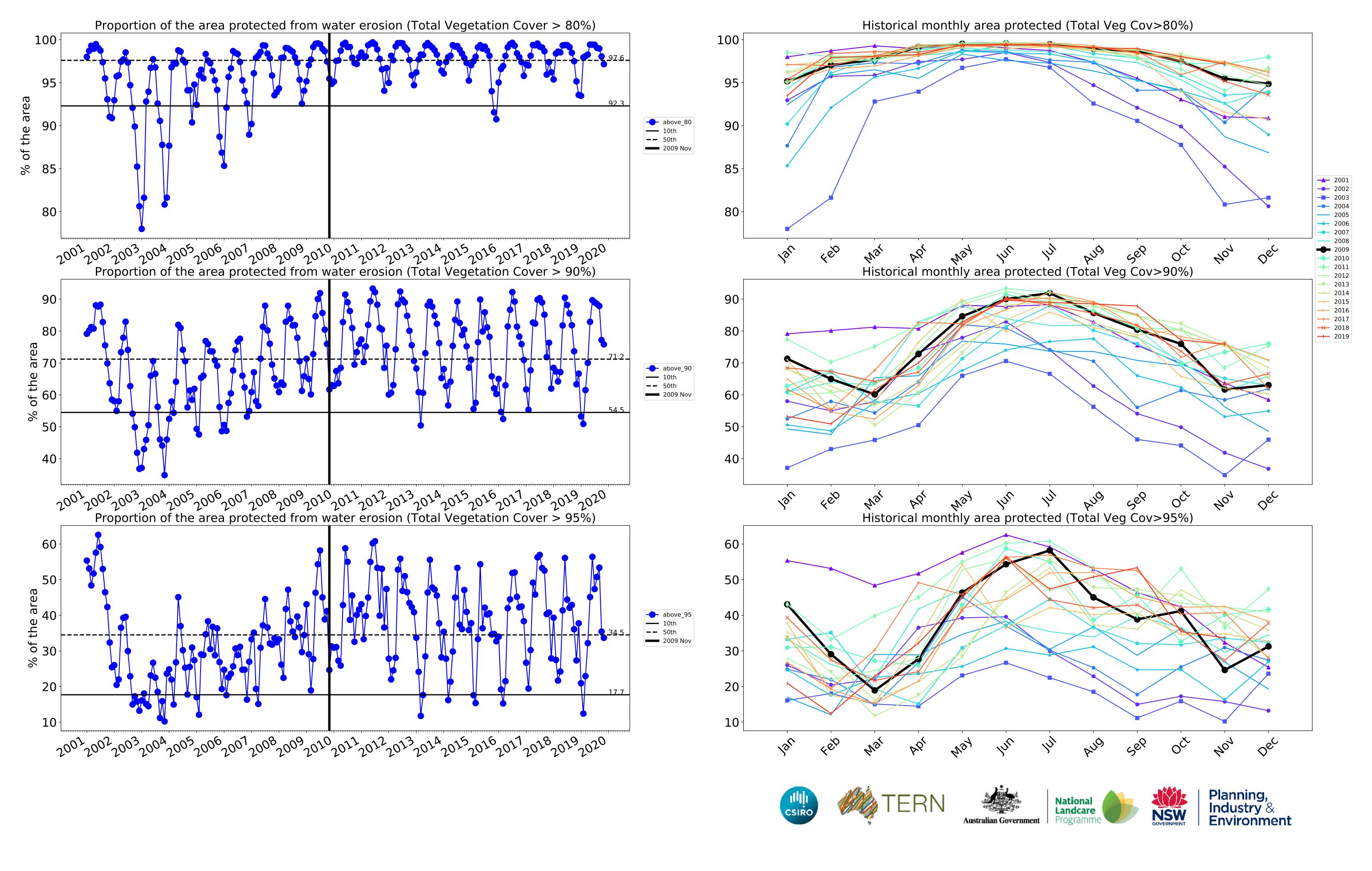




#### **Grazing timeseries**







#### **Grazing non forest**

#### **Land use and forest cover**

1 Agriculture - Grazing - Non forest

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

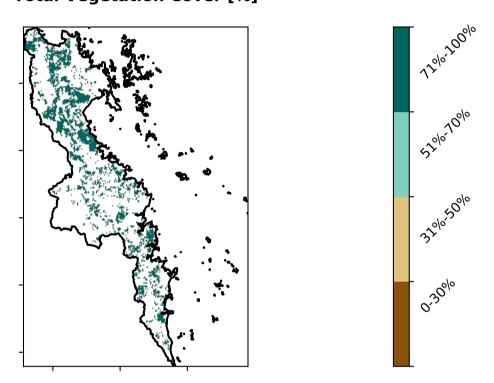
is, red pixels are about 20% lower than the mean of that

pixel. The mean

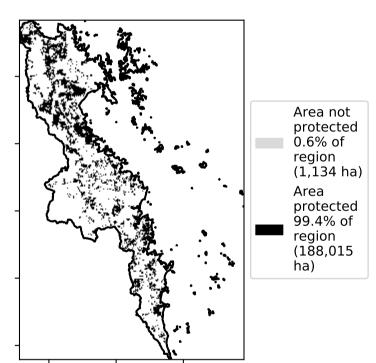
using baseline from 2001 to 2019.

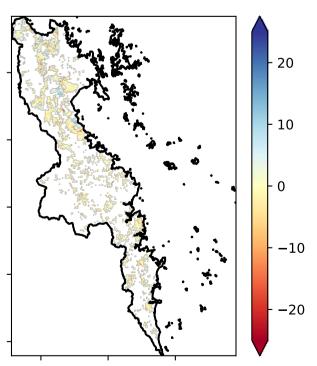
is only for the month of the map

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



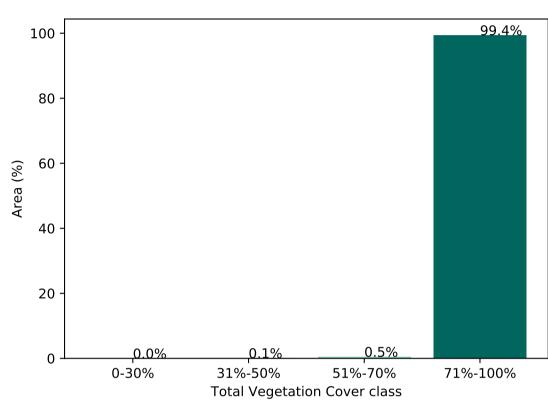
#### % Area protected from water erosion (>70%)



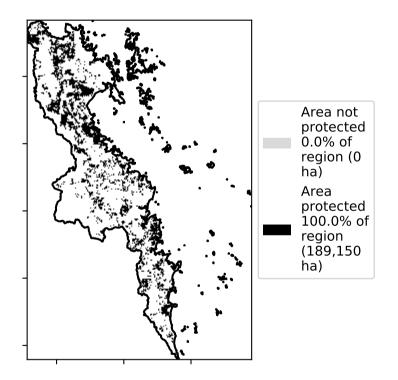


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of

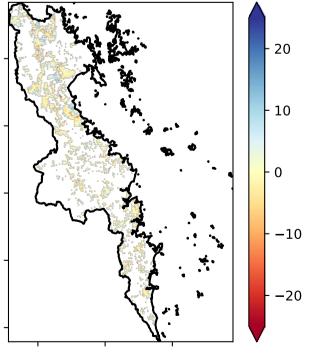
#### Proportion of vegetation cover class in area



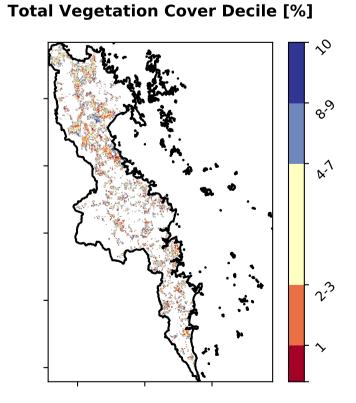
#### % Area protected from wind erosion (>50%)



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



the map using baseline from 2001 to 2019.







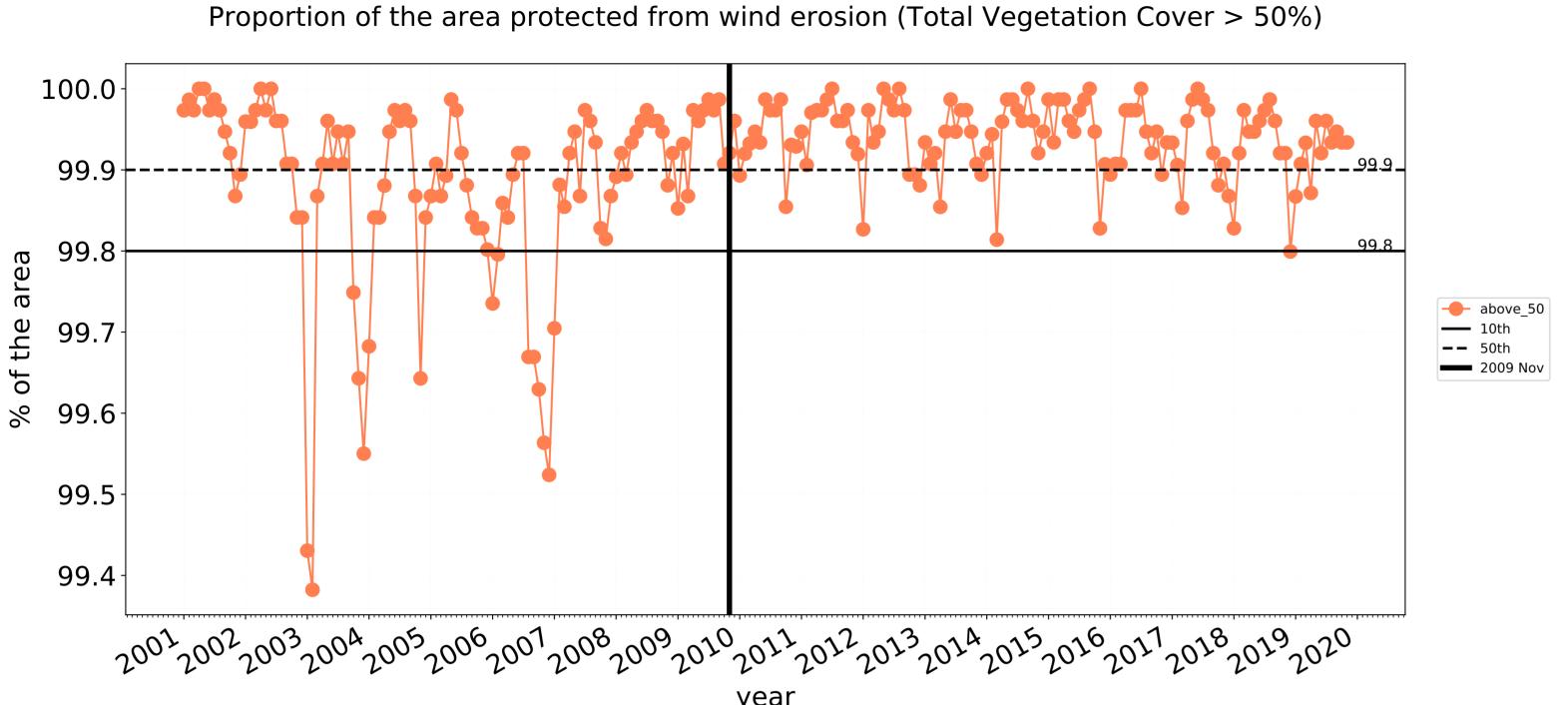


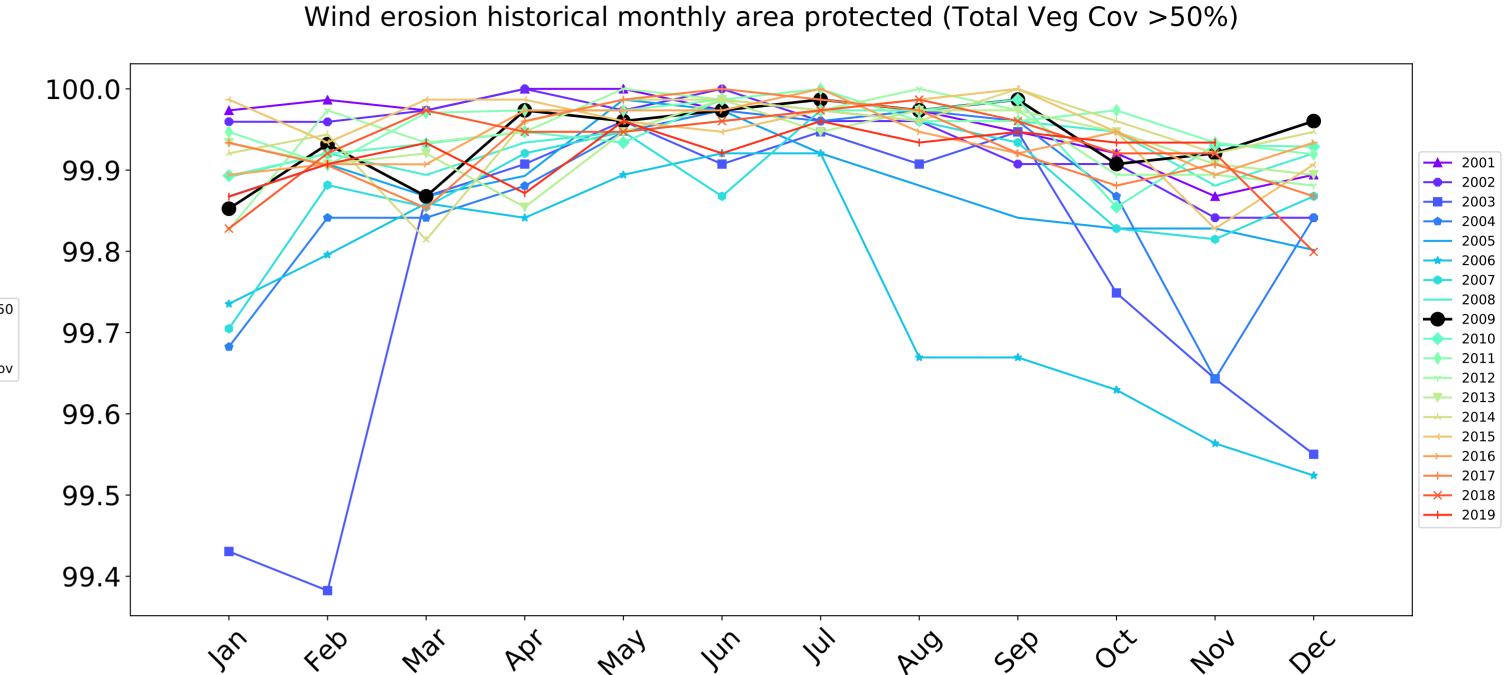




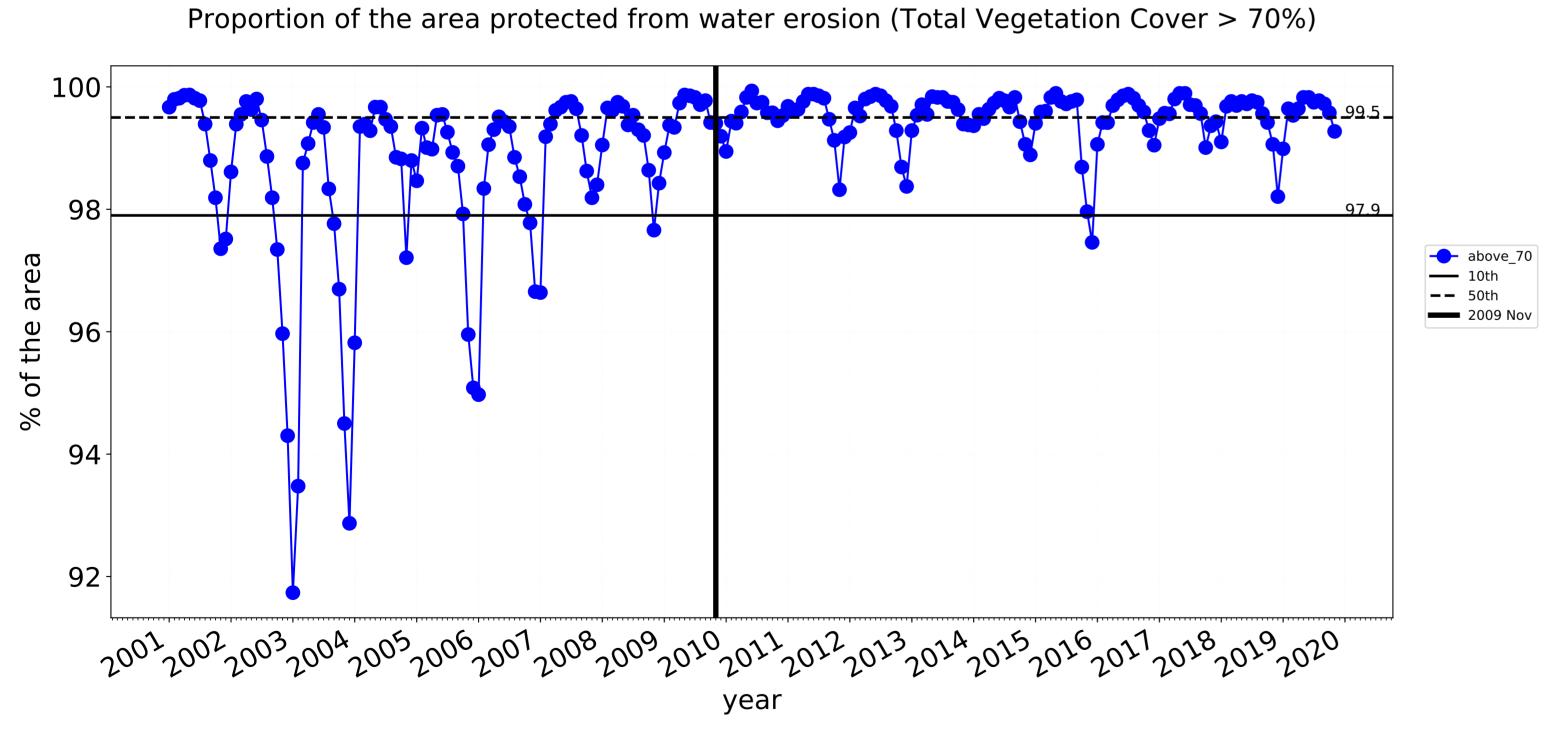


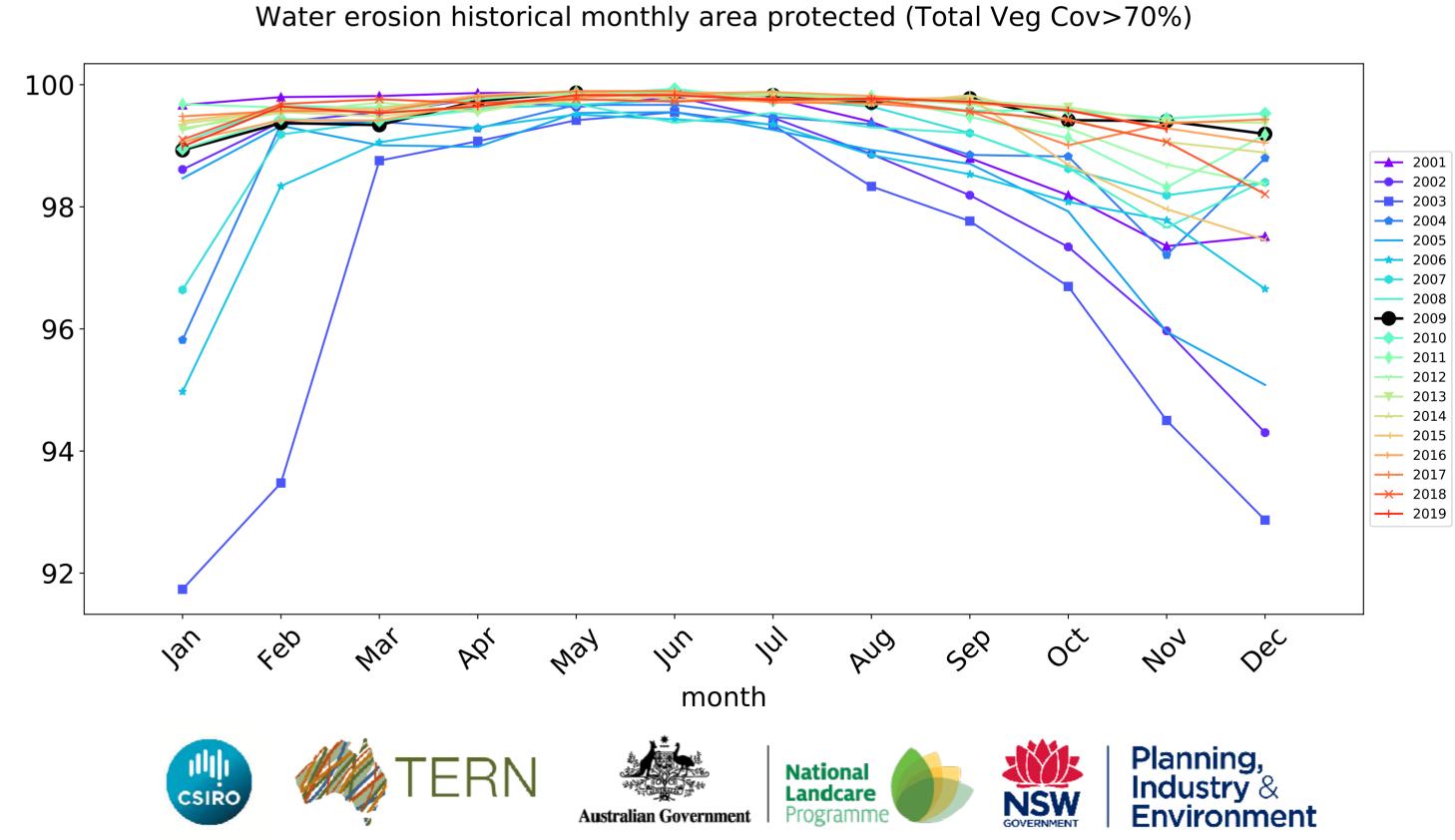
#### **Grazing non forest timeseries**

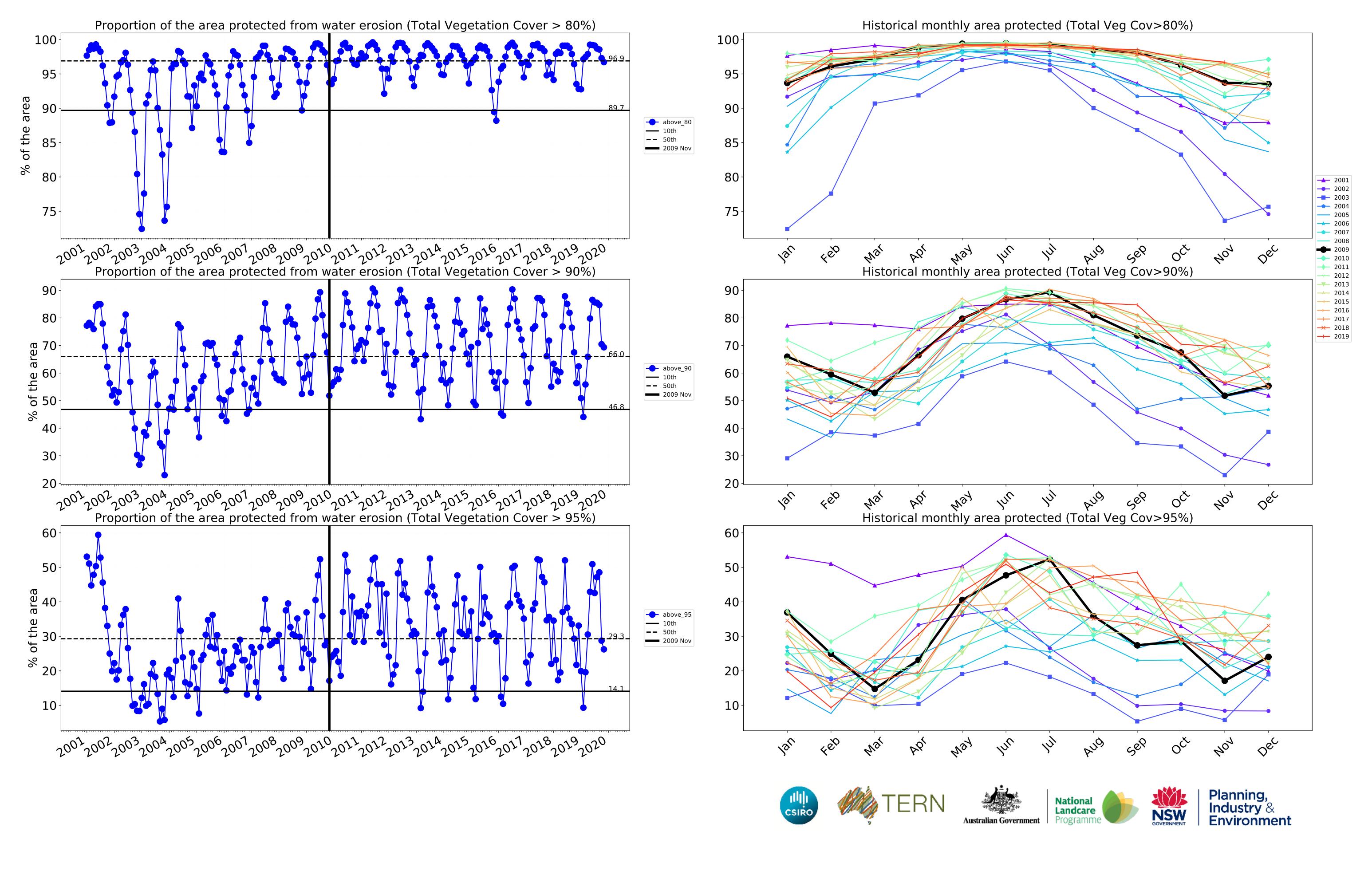




month



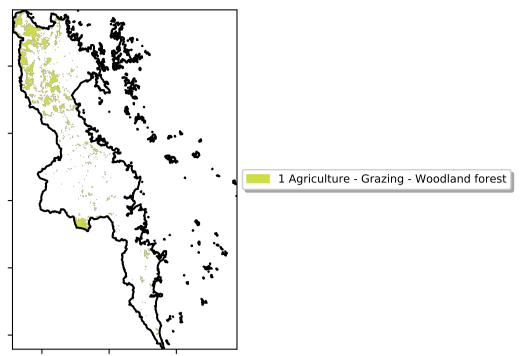




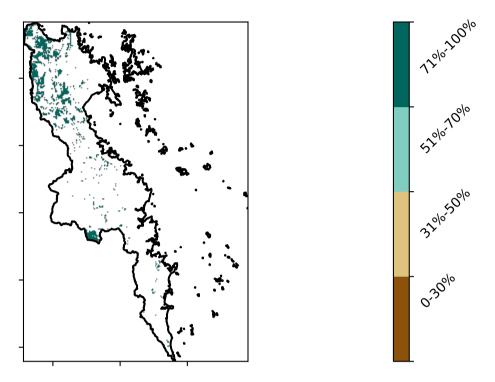
#### **Grazing Woodland forest**

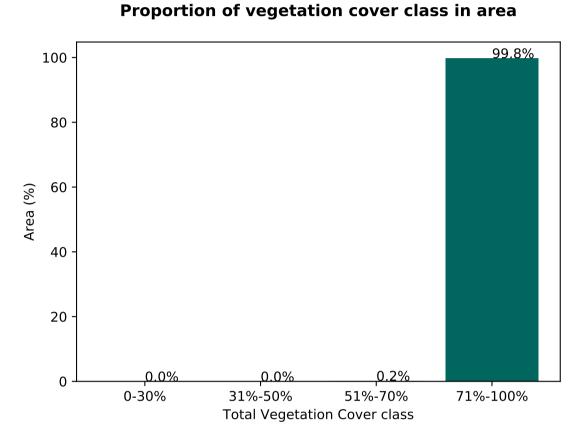
#### Land use and forest cover

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

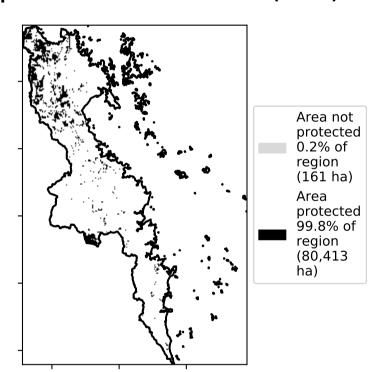


#### **Total Vegetation Cover [%]**

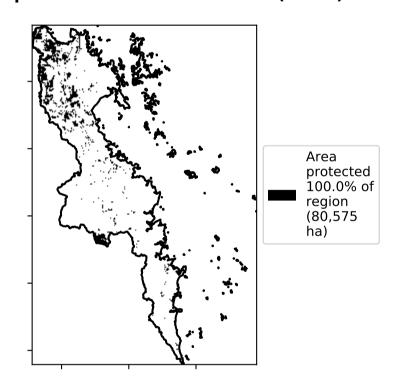




#### % Area protected from water erosion (>70%)



% Area protected from wind erosion (>50%)



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

Anomaly show how many percetage points each

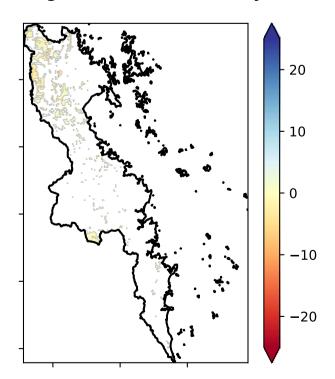
pixel is from the mean. That

pixel. The mean

using baseline from 2001 to 2019.

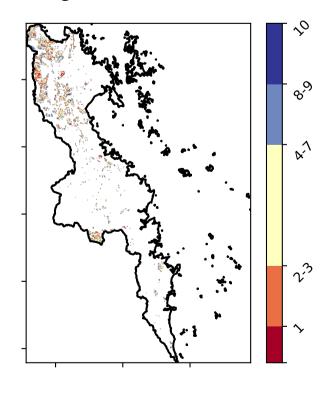
is only for the month of the map

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.

Total Vegetation Cover Decile [%]







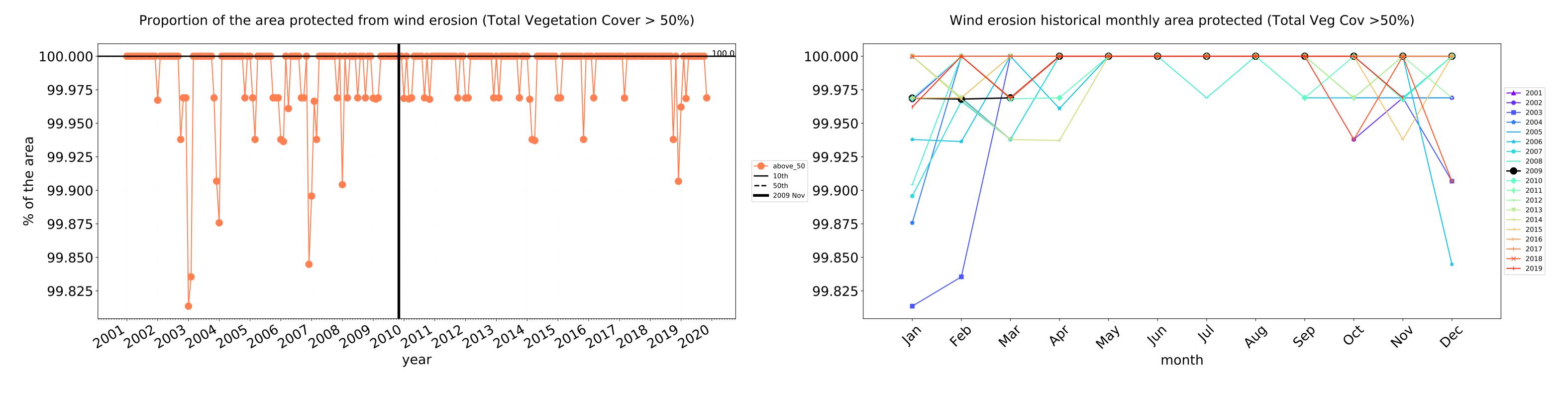


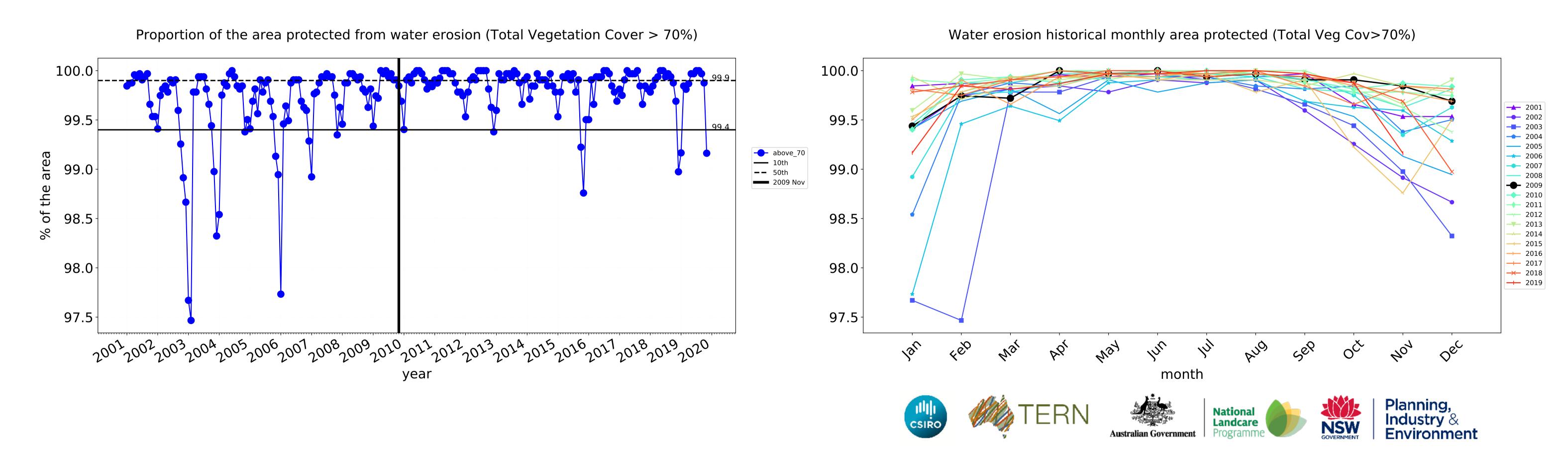


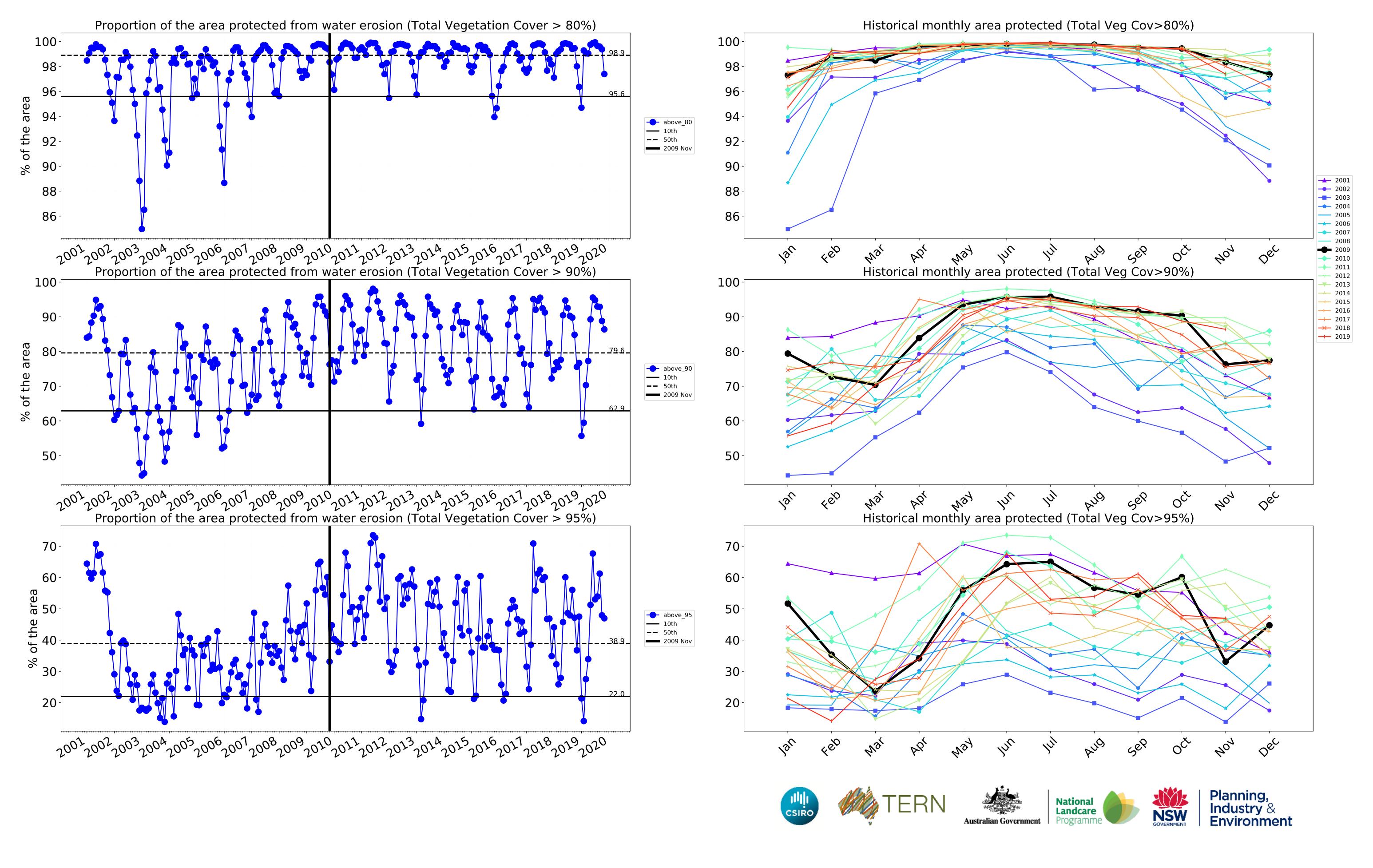




#### **Grazing Woodland forest timeseries**







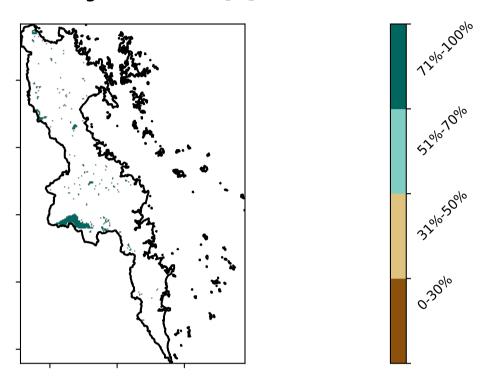
#### **Grazing - Forest (non woodland)**

#### Land use and forest cover

1 Agriculture - Grazing - Non-woodland forest

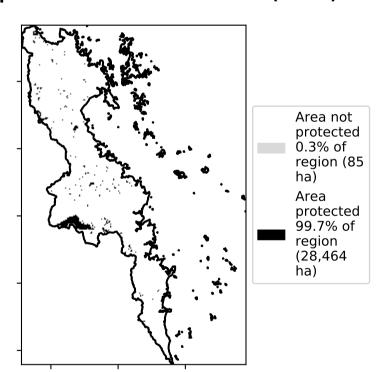
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

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



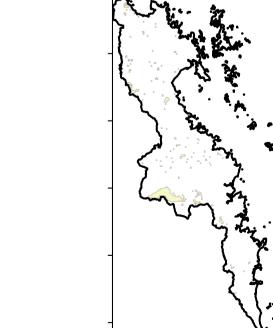
#### % Area protected from water erosion (>70%)

**Total Vegetation Cover Anomaly [%]** 



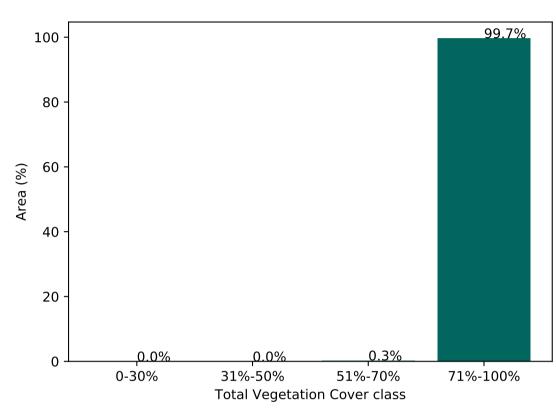
# Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map

using baseline from 2001 to 2019.

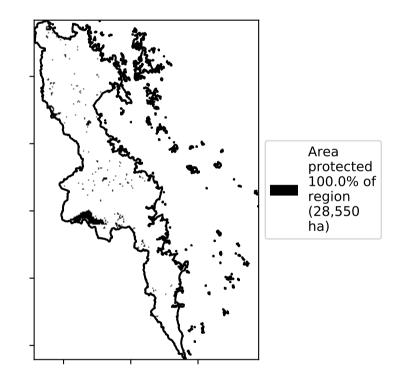


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

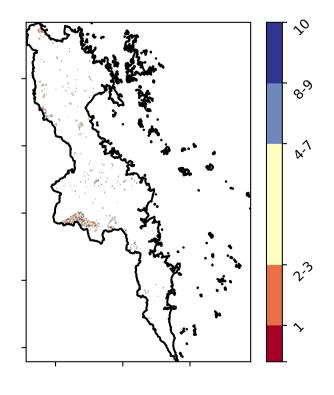
#### Proportion of vegetation cover class in area



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



#### Total Vegetation Cover Decile [%]







- 20

10

-10

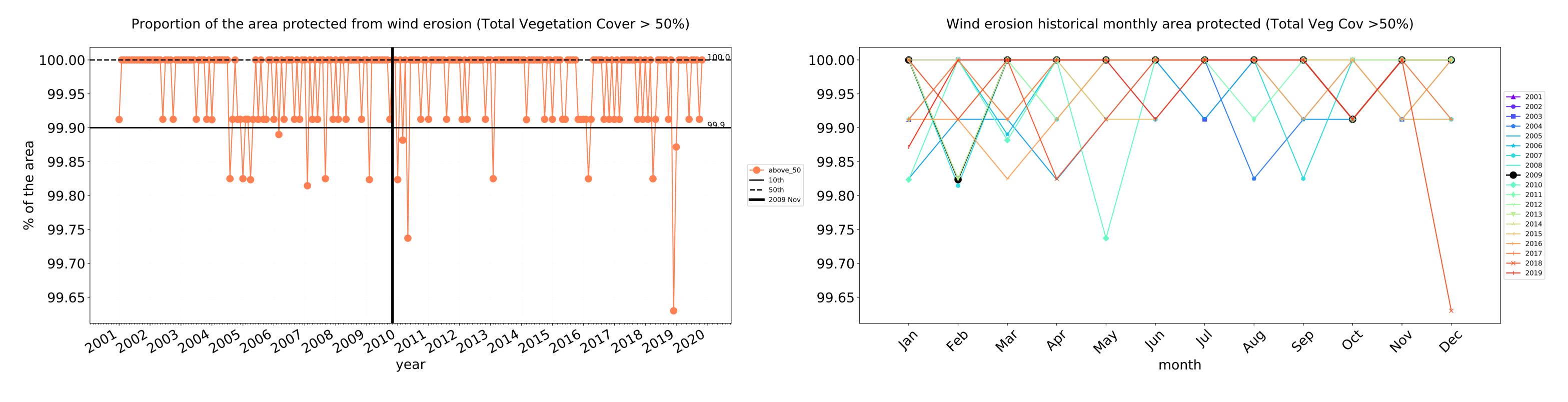
**-**20

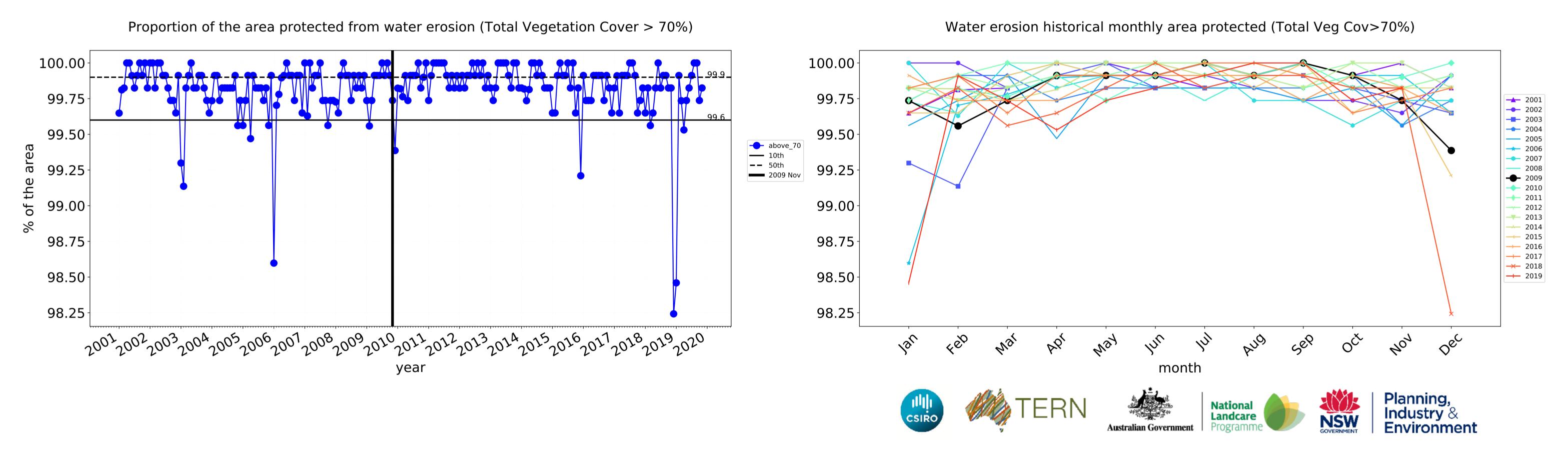


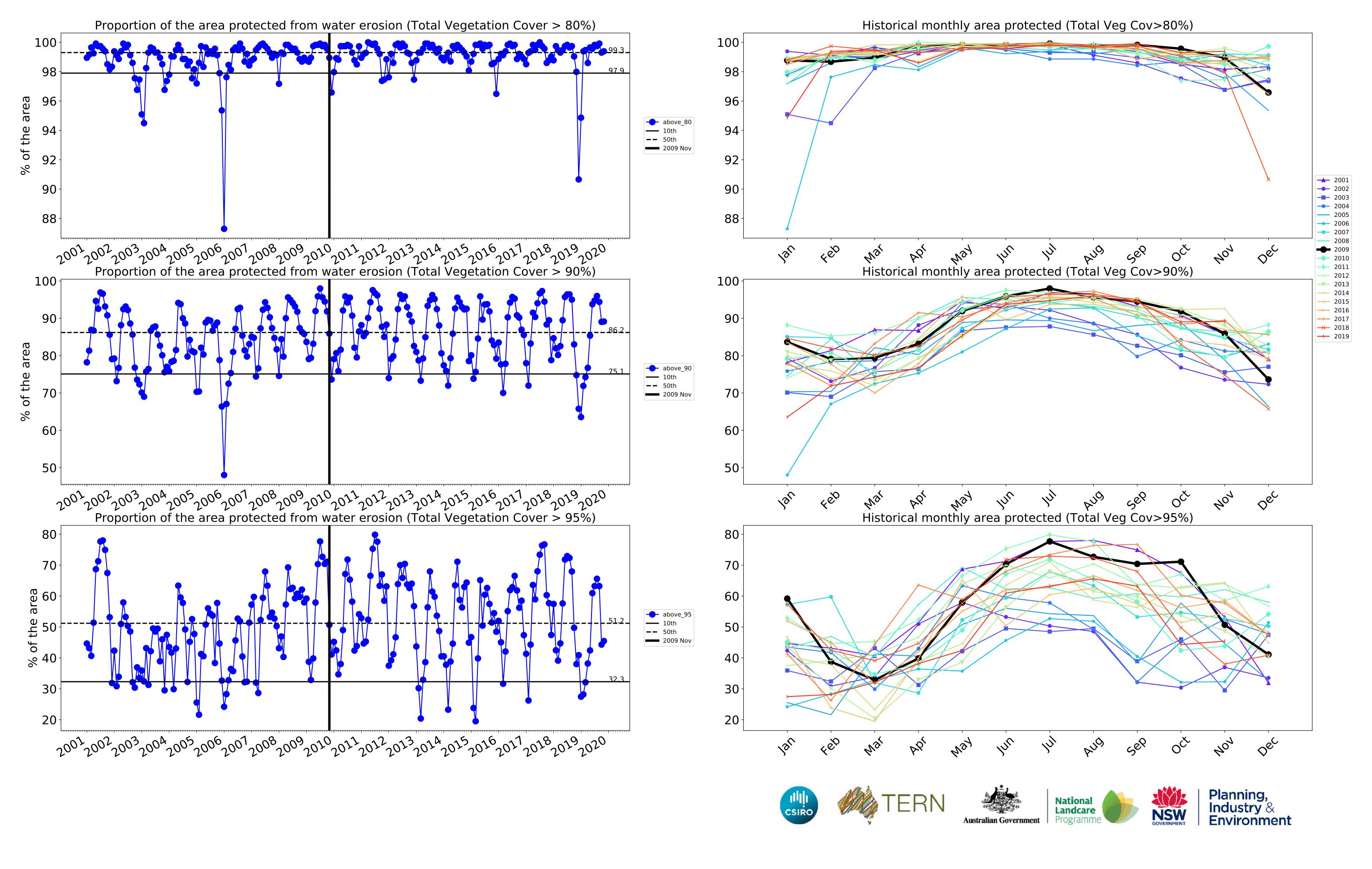












#### **Irrigation**

#### **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

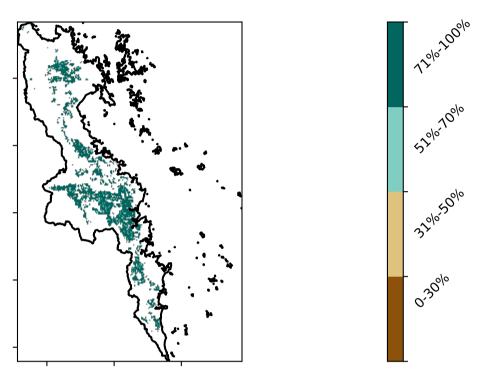
using baseline from 2001 to 2019.

is only for the month of the map

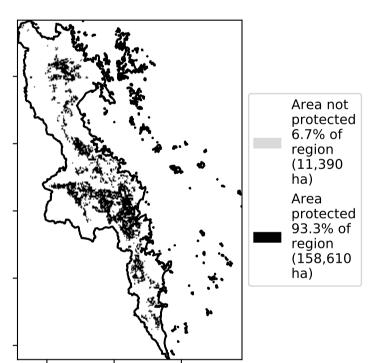
is, red pixels are about 20% lower than the mean of that

Catchment Scale Land Use and Forests

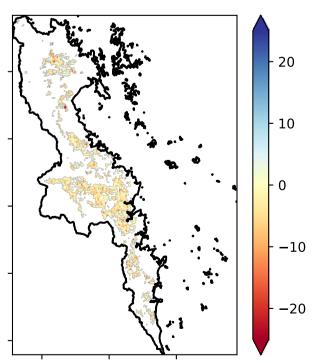
#### **Total Vegetation Cover [%]**



% Area protected from water erosion (>70%)

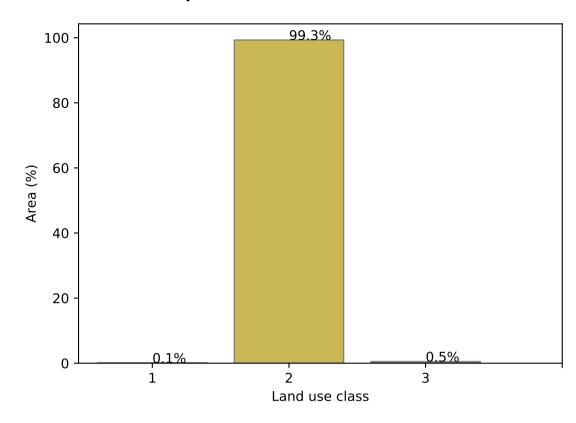


**Total Vegetation Cover Anomaly [%]** 

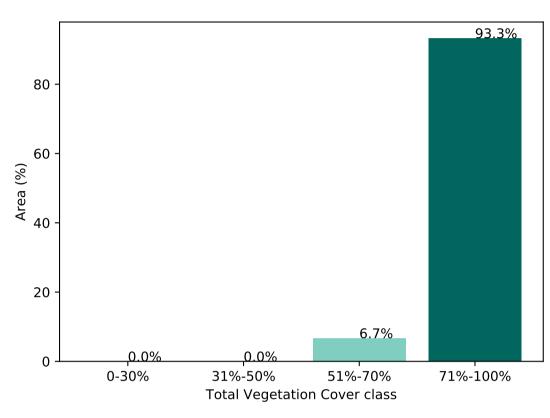


pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of the map using baseline from 2001 to 2019.

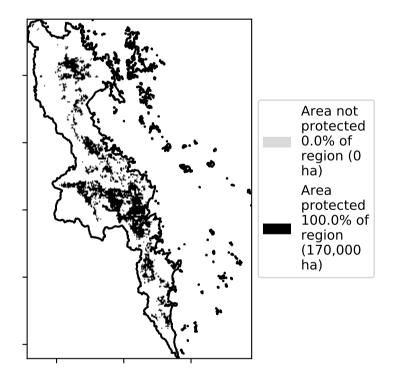
#### **Proportion of each land class in area**

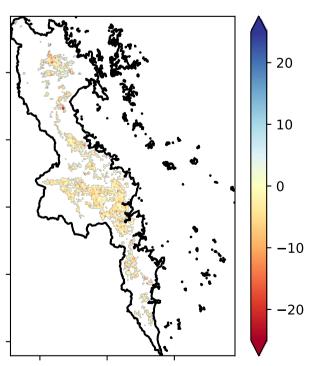


Proportion of vegetation cover class in area

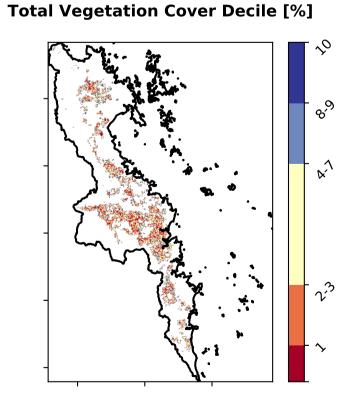


% Area protected from wind erosion (>50%)





Deciles show where the records for that month of







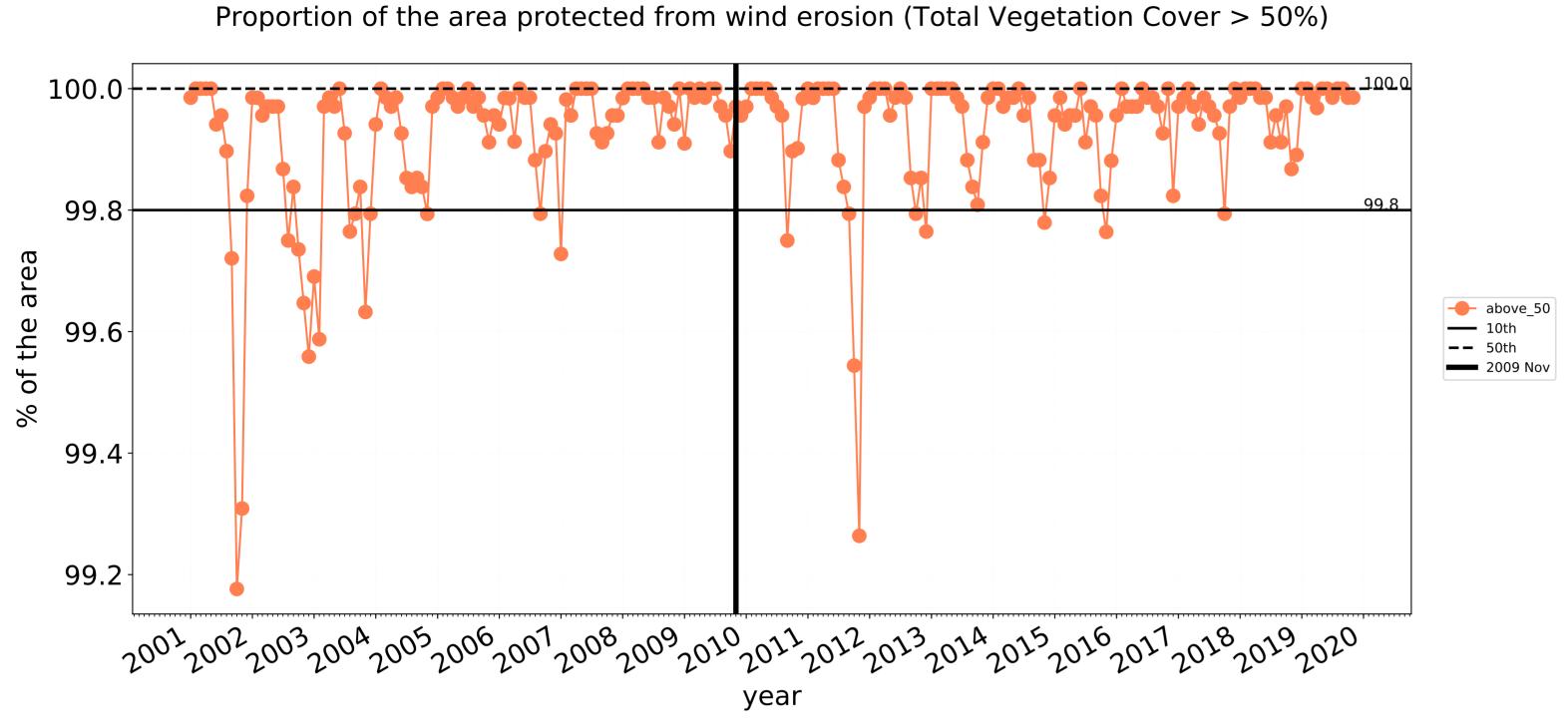


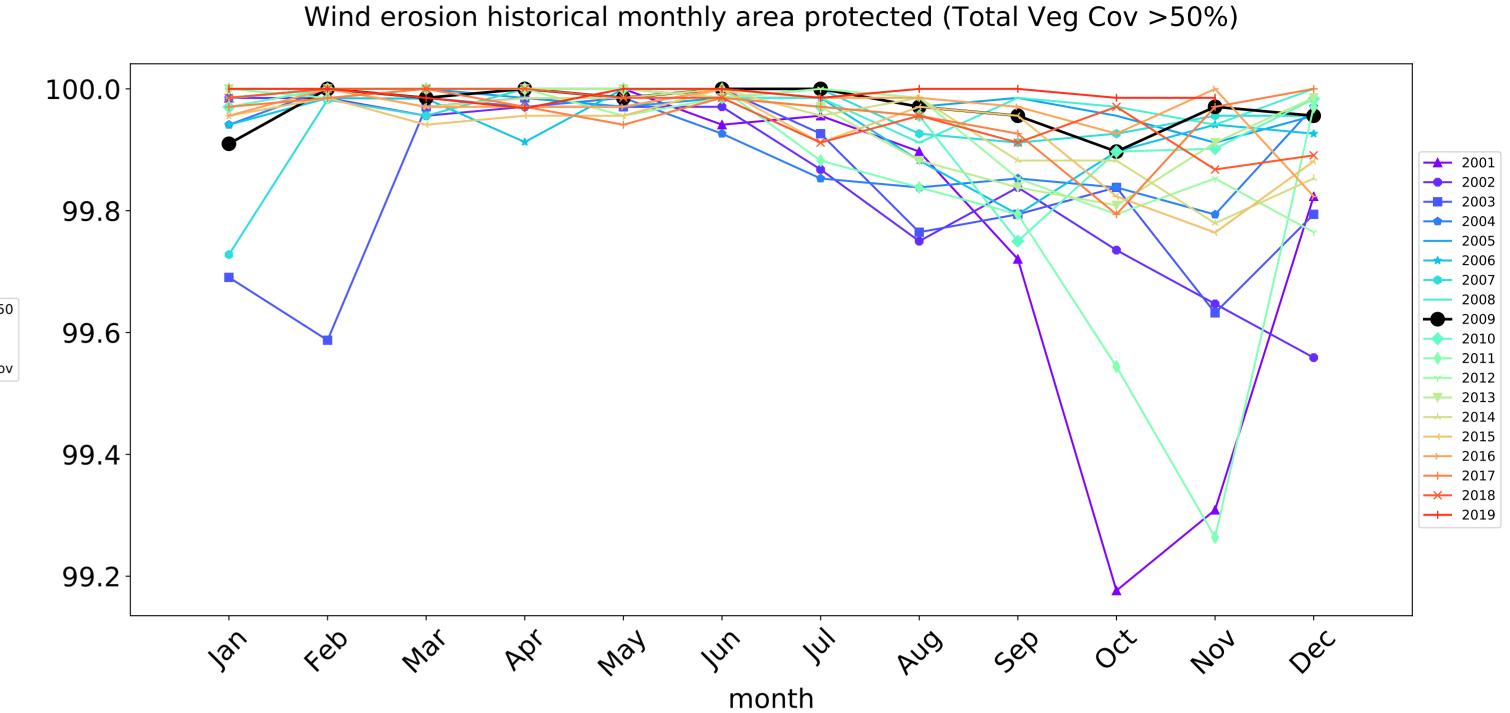


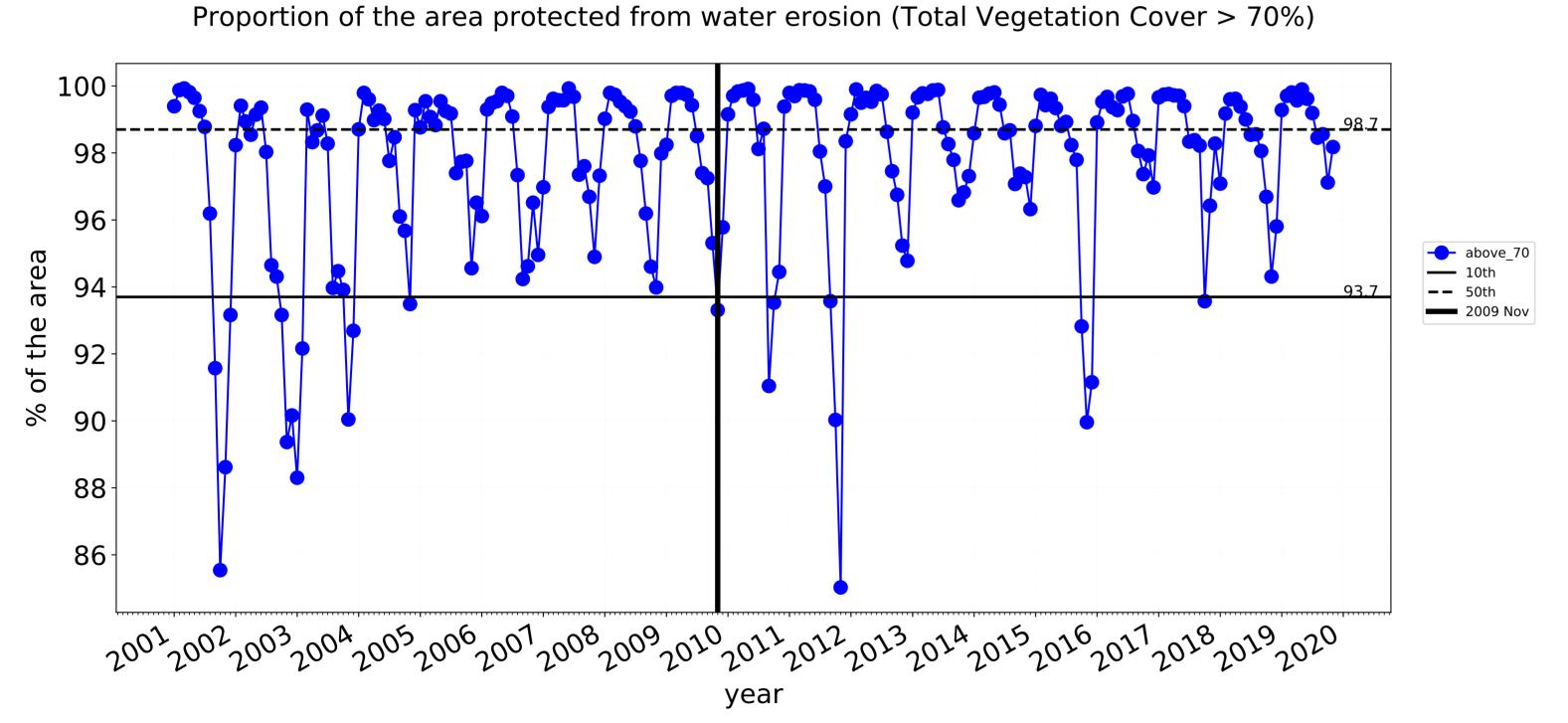


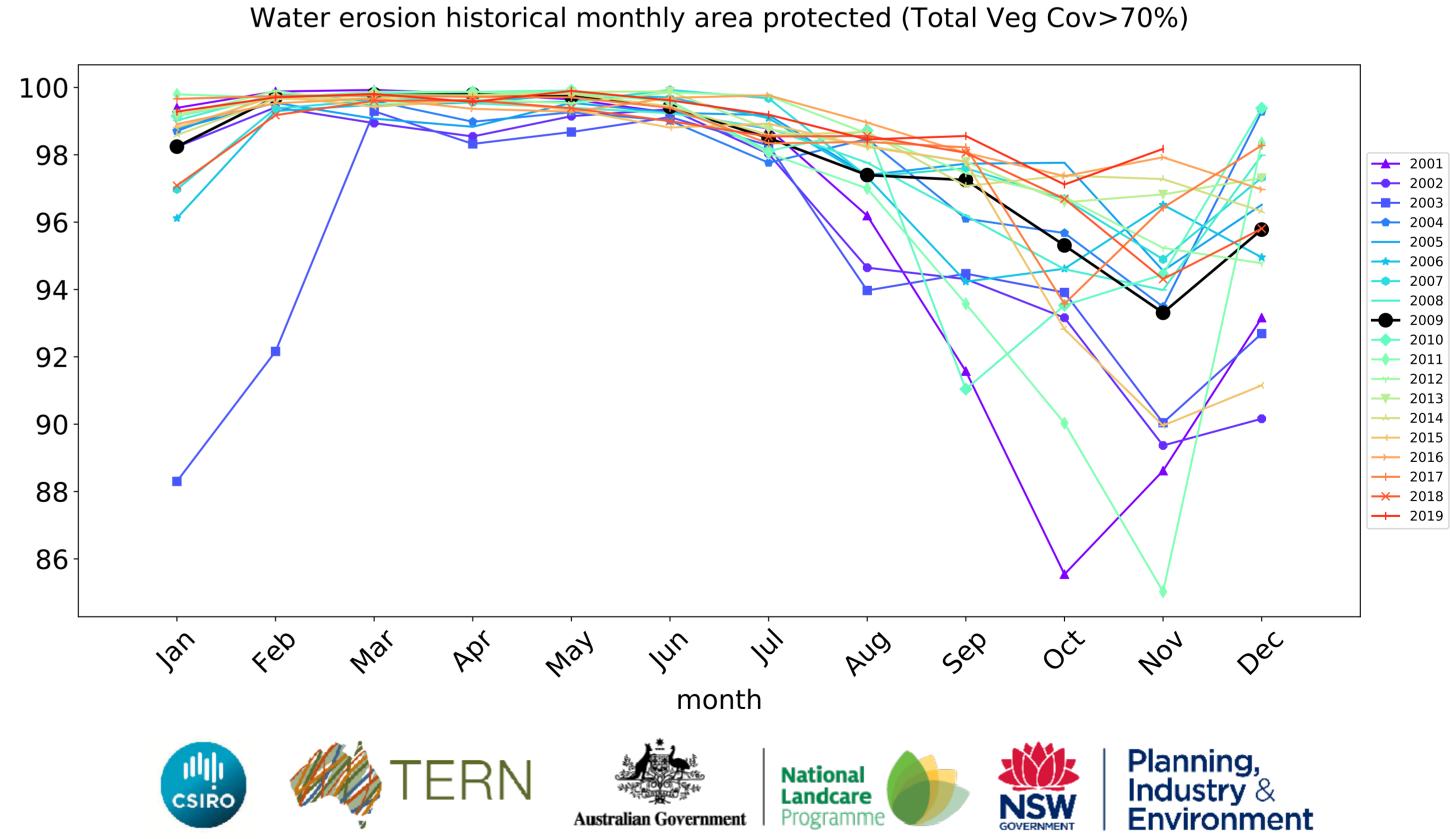


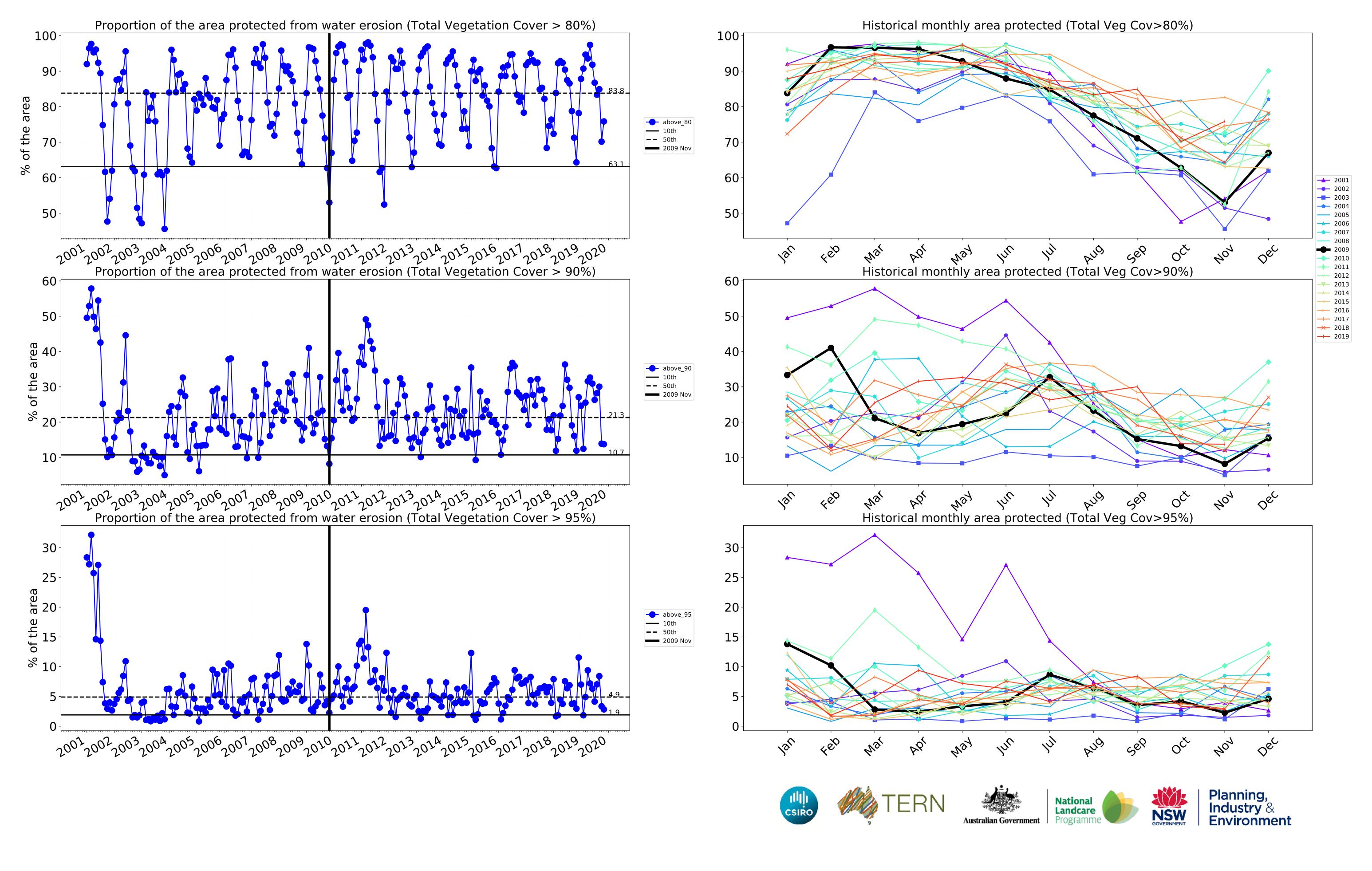
#### **Irrigation timeseries**











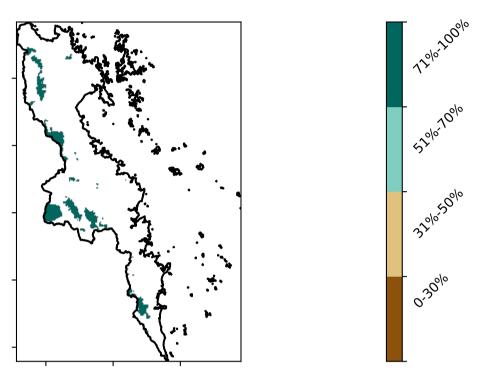
#### **Production native forests and plantation forests**

#### **Land use and forest cover**

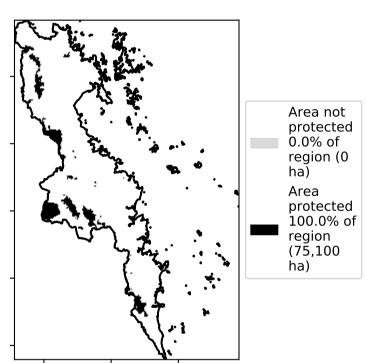
1 Production native forests and plantation forests

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

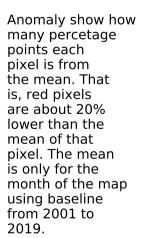
#### **Total Vegetation Cover [%]**

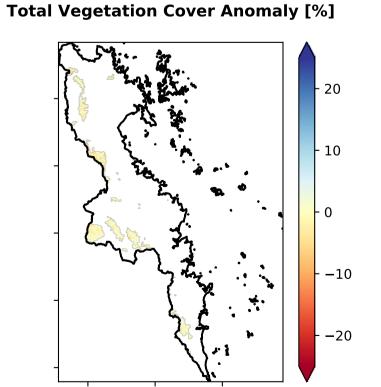


#### % Area protected from water erosion (>70%)



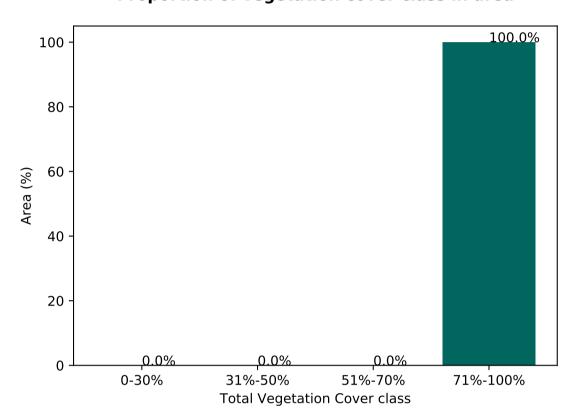
#### Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map



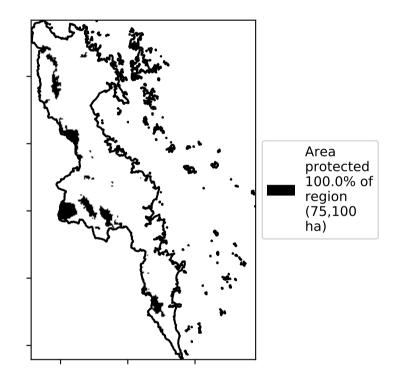


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

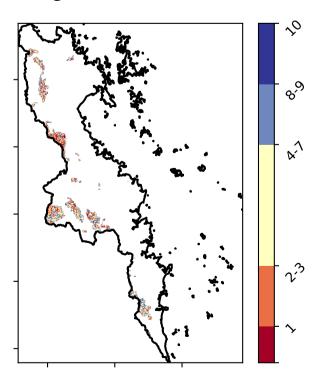
#### Proportion of vegetation cover class in area



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



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







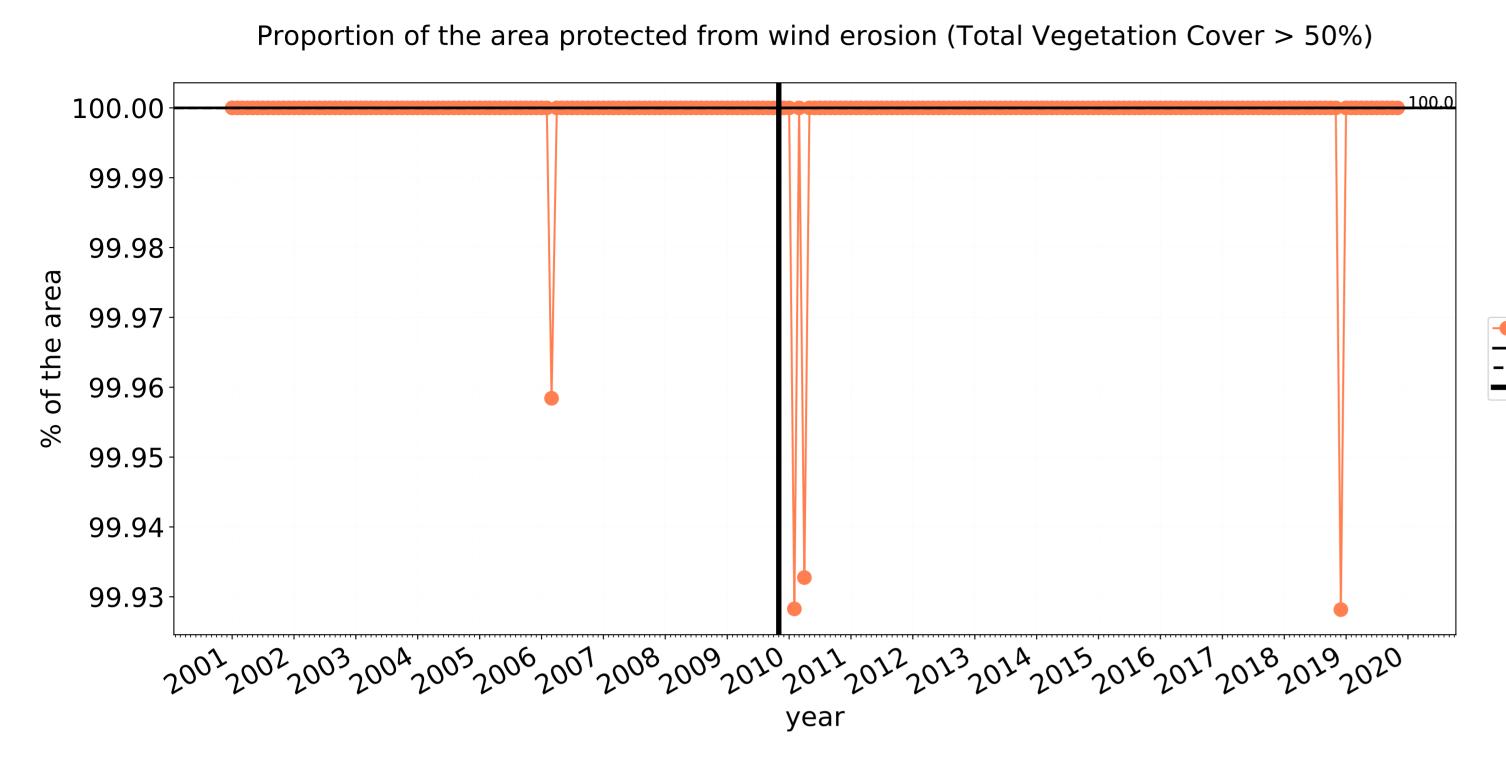


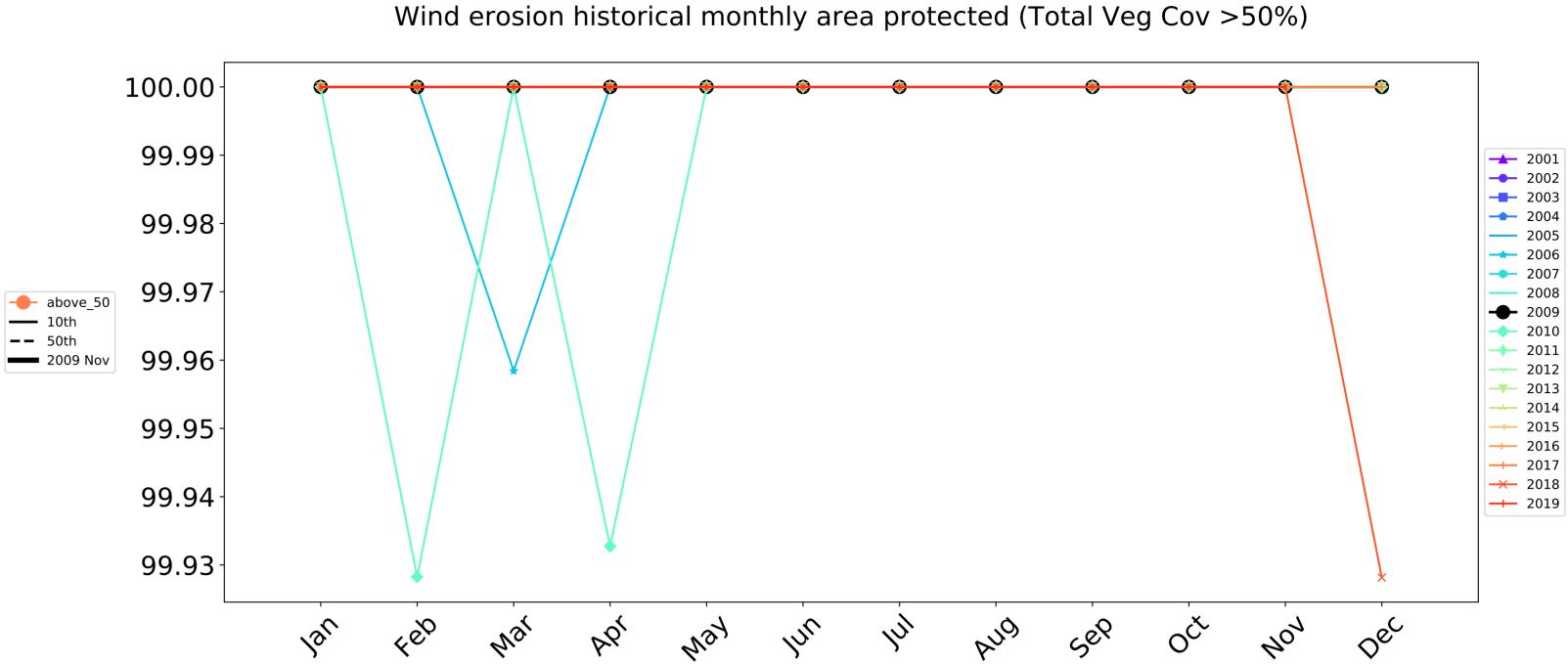




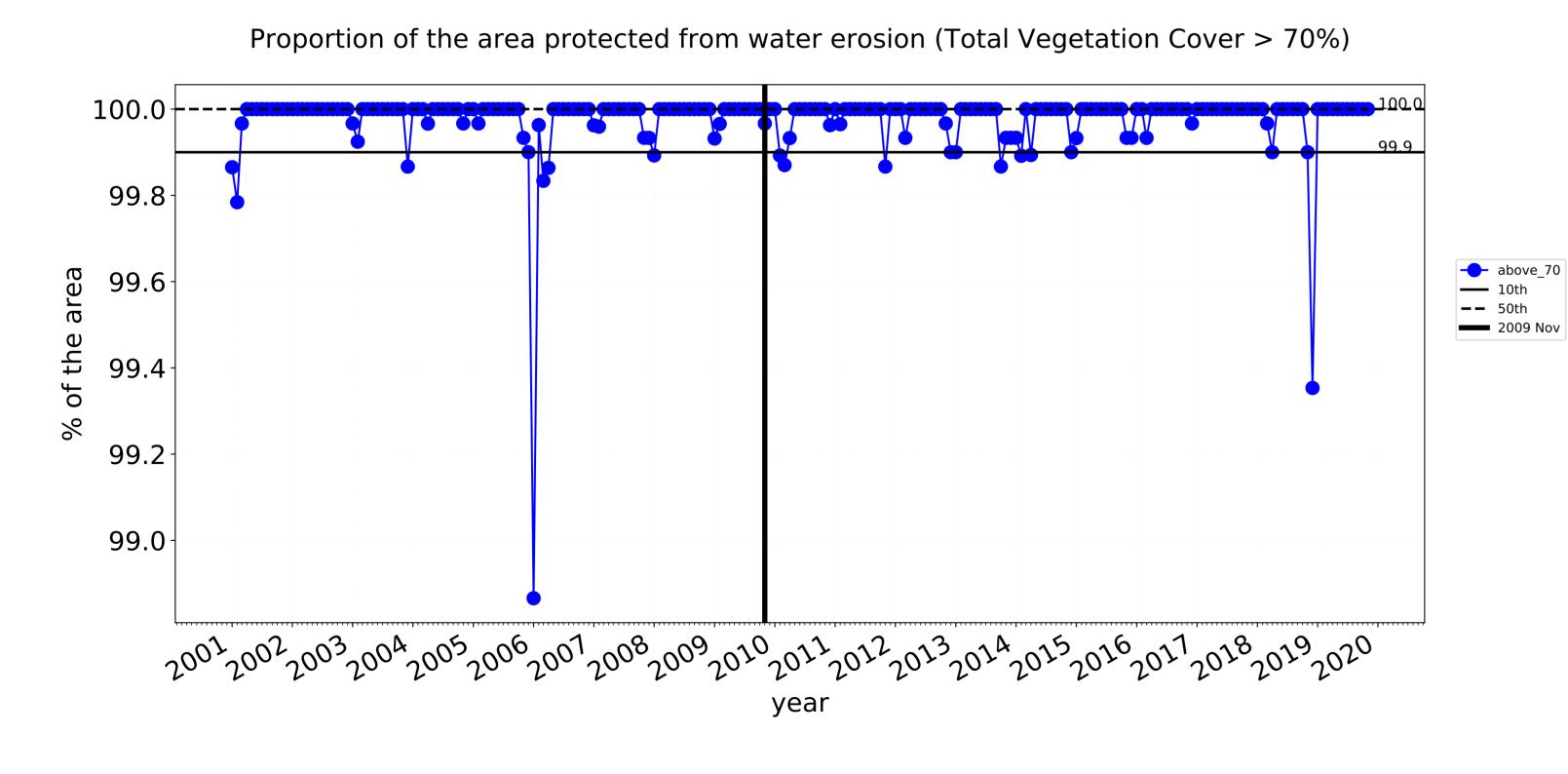


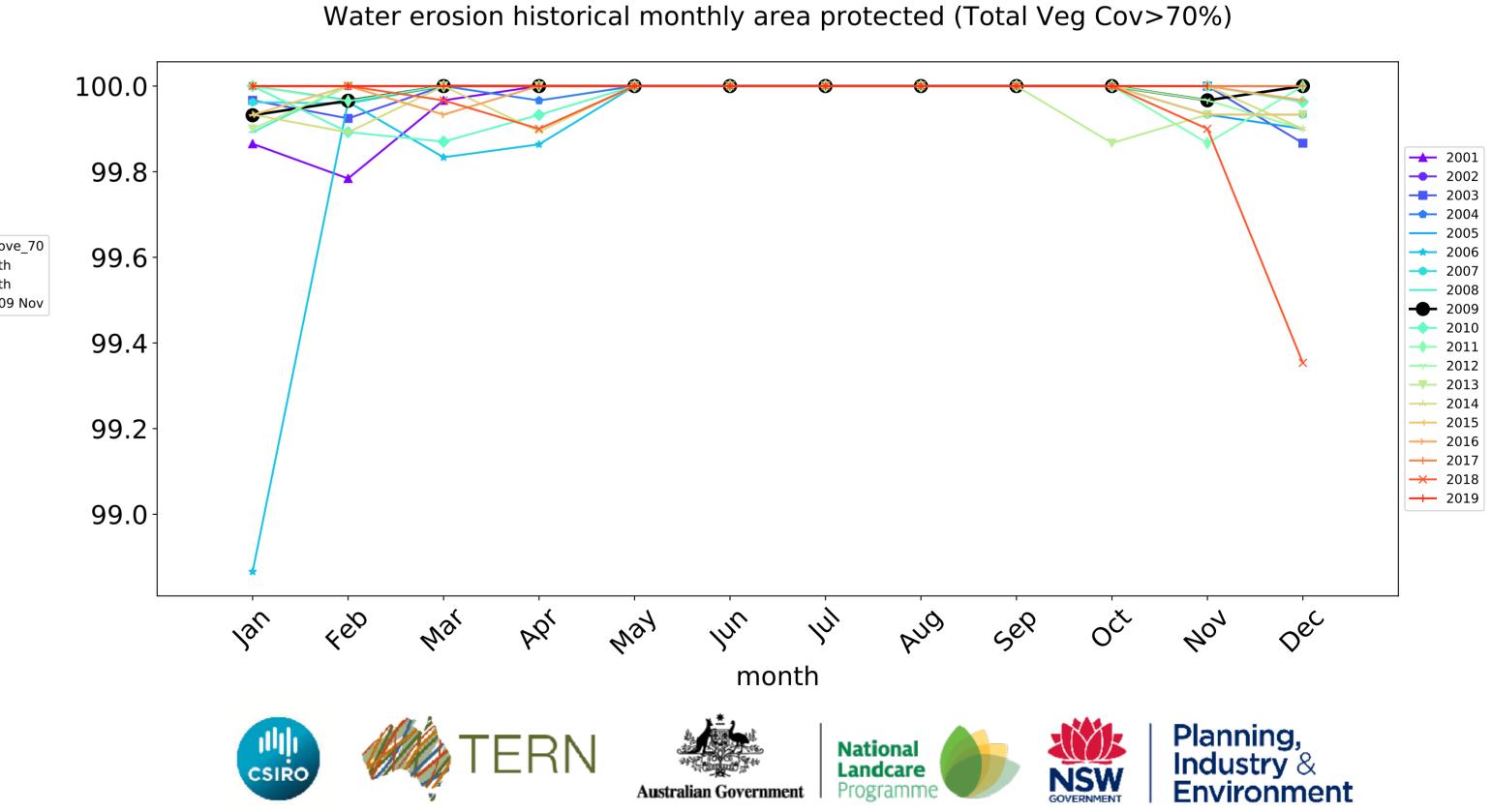
#### **Production native forests and plantation forests timeseries**

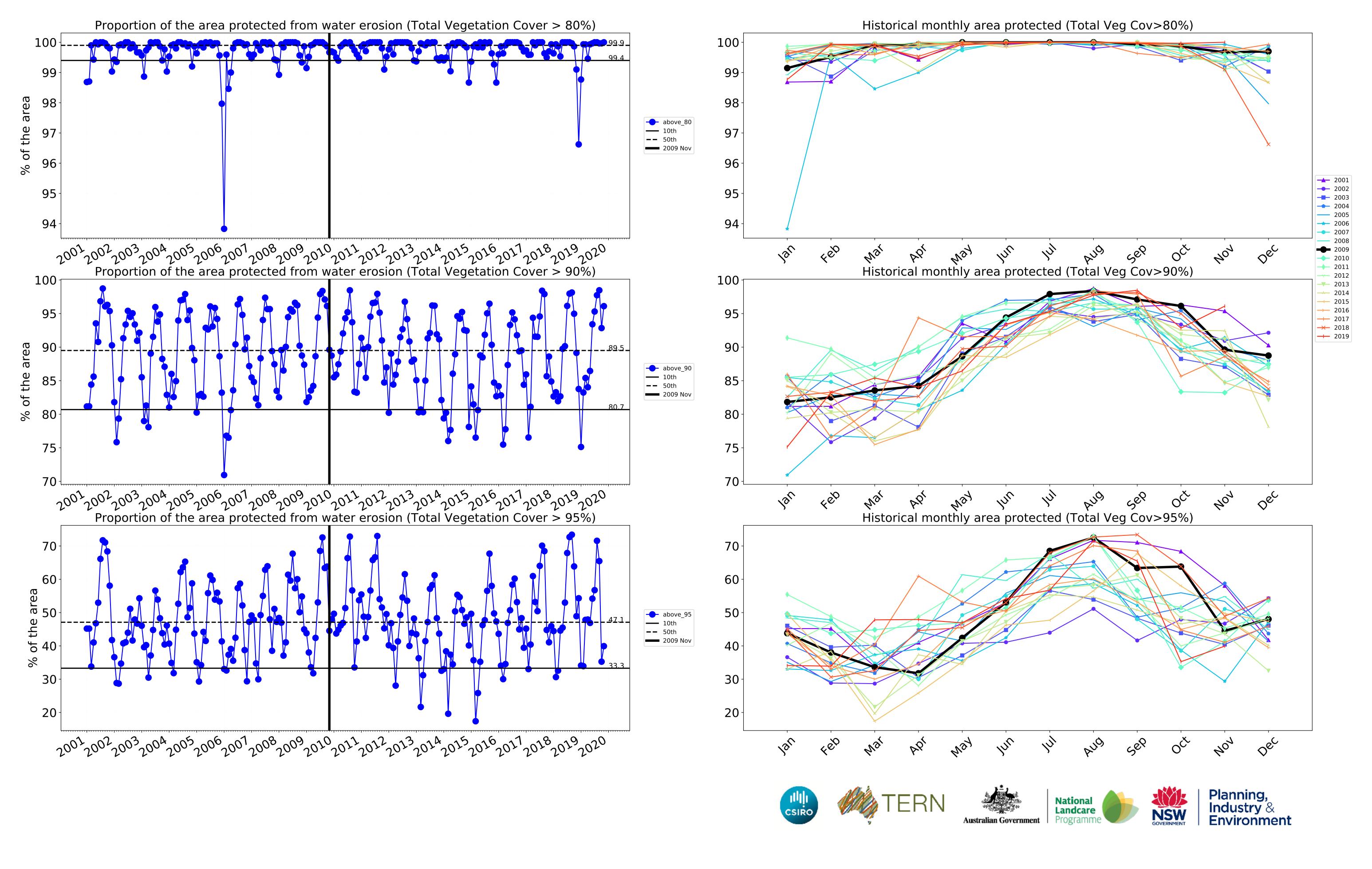




month







# 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	99.9% 908,874	99.7% 906,446	96.7% 879,612	84.2% 766,072	54.9% 499,117	24.7% 224,652
Conservation and natural environments	275,475	99.9% 275,100	99.5% 274,200	98.0% 269,900	94.5% 260,350	77.6% 213,725	38.5% 105,975
Conservation and natural environments non forest	7,075	99.3% 7,025	96.5% 6,825	86.9% 6,150	71.4% 5,050	37.1% 2,625	16.3% 1,150
Conservation and natural environments Woodland forest	74,900	99.9% 74,825	99.7% 74,650	98.4% 73,675	94.3% 70,600	76.5% 57,325	42.1% 31,550
Conservation and natural environments Forest (non woodland)	193,500	99.9% 193,250	99.6% 192,725	98.2% 190,075	95.5% 184,700	79.5% 153,775	37.9% 73,275
Agriculture	468,325	100.0% 468,275	100.0% 468,125	97.3% 455,625	80.1% 374,925	42.2% 197,825	16.5% 77,375
Grazing	298,275	100.0% 298,250	99.9% 298,125	99.6% 296,950	95.5% 284,775	61.7% 183,950	24.7% 73,525
Grazing non forest	189,150	100.0% 189,125	99.9% 189,000	99.4% 188,025	93.7% 177,275	51.8% 97,950	17.1% 32,375
Grazing Woodland forest	80,575	100.0% 80,575	100.0% 80,575	99.8% 80,450	98.4% 79,250	76.3% 61,475	33.1% 26,675
Grazing - Forest (non woodland)	28,550	100.0% 28,550	100.0% 28,550	99.7% 28,475	98.9% 28,250	85.9% 24,525	50.7% 14,475
Irrigation	170,000	100.0% 169,975	100.0% 169,950	93.3% 158,625	53.0% 90,100	8.2% 13,875	2.3% 3,850
Production native forests and plantation forests	75,100	100.0% 75,100	100.0% 75,100	100.0% 75,075	99.7% 74,850	89.6% 67,300	44.5% 33,450











