Total vegetation cover soil protection Region:NRM Goulburn Broken VIC

Date: November 2001

This report describes vegetation protecting the soil surface from erosion during a chosen month compared to previous years. This report has been generated using MODIS fractional vegetation cover information available in Rangelands and Pasture Productivity (RAPP) map tool https://map.geo-rapp.org/#australia. The report is based on 500 metre pixel data on monthly time steps. Land use forest cover:

Results can be shown for the whole region (polygon), and separated by land use and forest cover classes which are likely to show different cover patterns and targets. Land use is divided into four broad classes: Conservation and natural environments, Agriculture, production native forests and plantation forests (no report), and other (no report). Agriculture is divided into grazing, crops and horticulture which are sub-divided into non-irrigated and irrigated. If forest is present land use is further divided into: non-forest, woodland forest and non-woodland forest. The area of each land use and forest class are shown as a map and chart. The report content is repeated for each land use and forest covers at least 1% of the area of the chosen region. Total vegetation Cover:

The total vegetation cover indicates where soil is likely to be protected from wind and or water hillslope erosion. Total vegetation cover for this month is shown on a map and chart classified into 4 classes.

• 71-100% High cover – protected from wind and usually water erosion (high rainfall, steep slopes, and erodible soils may need greater than 80, 90, 95 and up to 100% cover)

- 51-70% Moderate cover protected from wind erosion
- 31-50% Low cover not protected
- 0-30% Very Low cover not protected

Erosion protection: Wind erosion 50% total vegetation cover

The vegetation cover threshold required to prevent soil erosion is usually 50% to reduce wind erosion, 70% or 80% to reduce water (hillslope) erosion depending on the steepness and rainfall. Areas protected from erosion for the month:

- Map: water erosion protection (>70% cover) percentage area and hectares.
- Map: wind erosion protection (>50% cover) percentage area and hectares. Comparison with previous years:
 - Map: anomaly comparing this month to the average cover from the same month in previous years.
 - Map: deciles rank of month against the same month in previous years.

Anomalies and deciles until September 2019 are calculated comparing to the same months 2001 to 2019. Extra monthly data will be used to calculate anomalies and deciles post September 2019 as they become available. Time series monthly from January 2001 to current:

Erosion protection

- Wind erosion protection time series: percentage of the area of the region with greater than 50% cover for each month (orange lines). Horizontal lines are 10th (cover target) and 50th percentiles.
- Water erosion protection time series: percentage of the area of the region with greater than 70% cover for each month (blue line). Horizontal lines are 10th (cover target) and 50th percentiles.

Rainfall

• Millimetres rainfall each month (black line).

Each time series is also stacked by year. The black line shows the current year of data. Water erosion protection for higher rainfall and steeper slopes:

Water erosion protection on higher slopes. As slope increases, more cover is required to control water erosion. The thresholds reported are:

- the percentage area with pixels greater than 80% total cover.
- the percentage area with pixels greater than 90% total cover.
- the percentage area with pixels greater than 95% total cover.

Acknowledgment of data:

- 1. http://www.agriculture.gov.au/abares/aclump/land-use/alum-classification
- 2. http://www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018
- 3. https://www.dpi.nsw.gov.au/agriculture/pastures-and-rangelands/establishment-mgmt/production-management2/groundcover
- 4. MODIS Fractional cover algorithm:

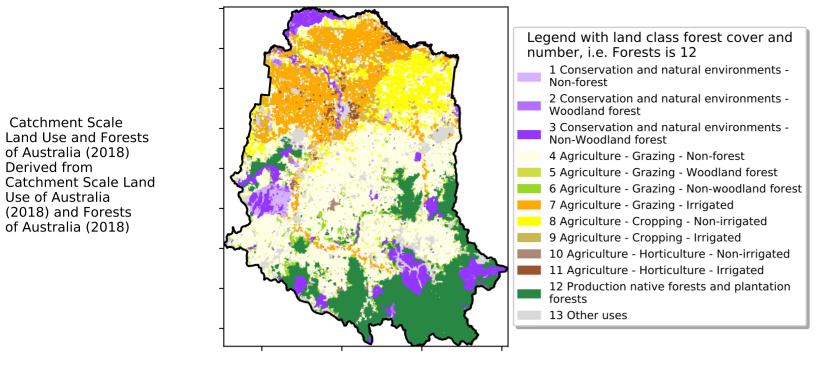
https://doi.org/10.4225/08/5848a3f19a7b3



Vegetation Cover Nov 2001

Land use and forest cover

Proportion of each land class in area



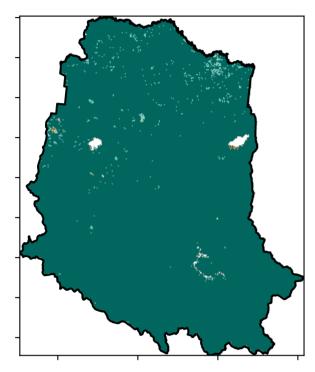
12%-100

52%70

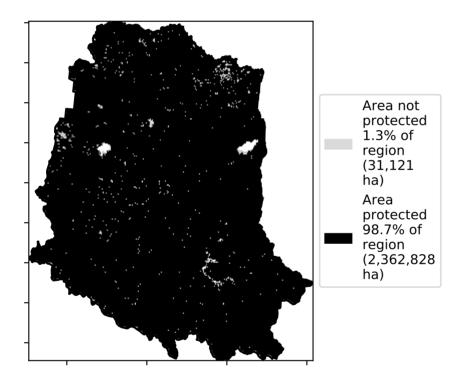
32%50%

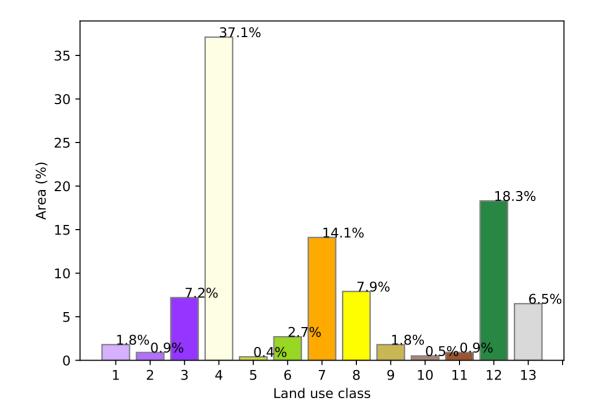
0-30%

Total Vegetation Cover [%]

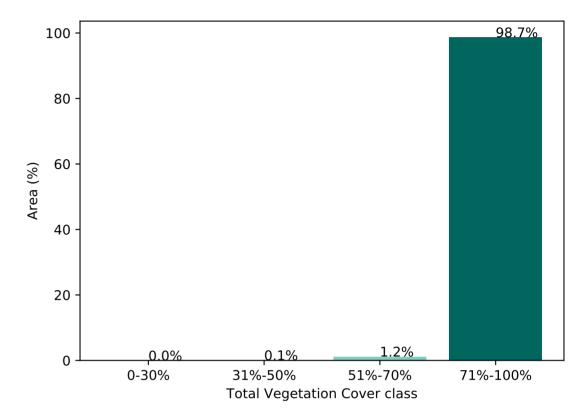


% Area protected from water erosion (>70%)

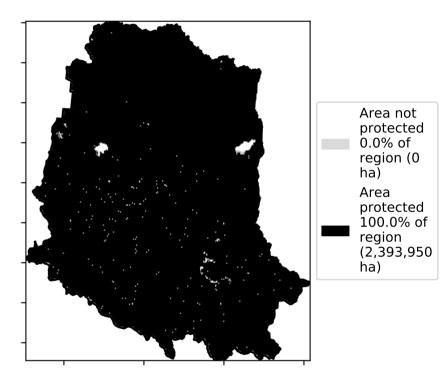




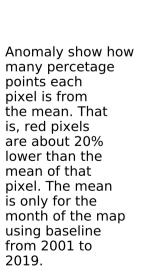
Proportion of vegetation cover class in area

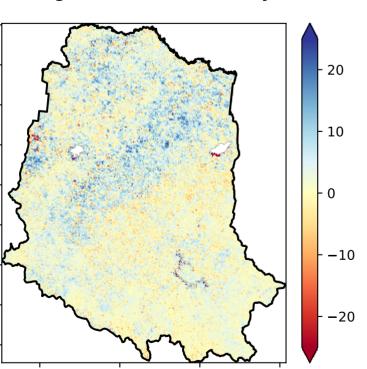


% Area protected from wind erosion (>50%)



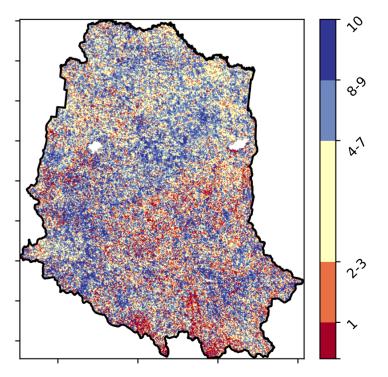
Total Vegetation Cover Anomaly [%]





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 [%]



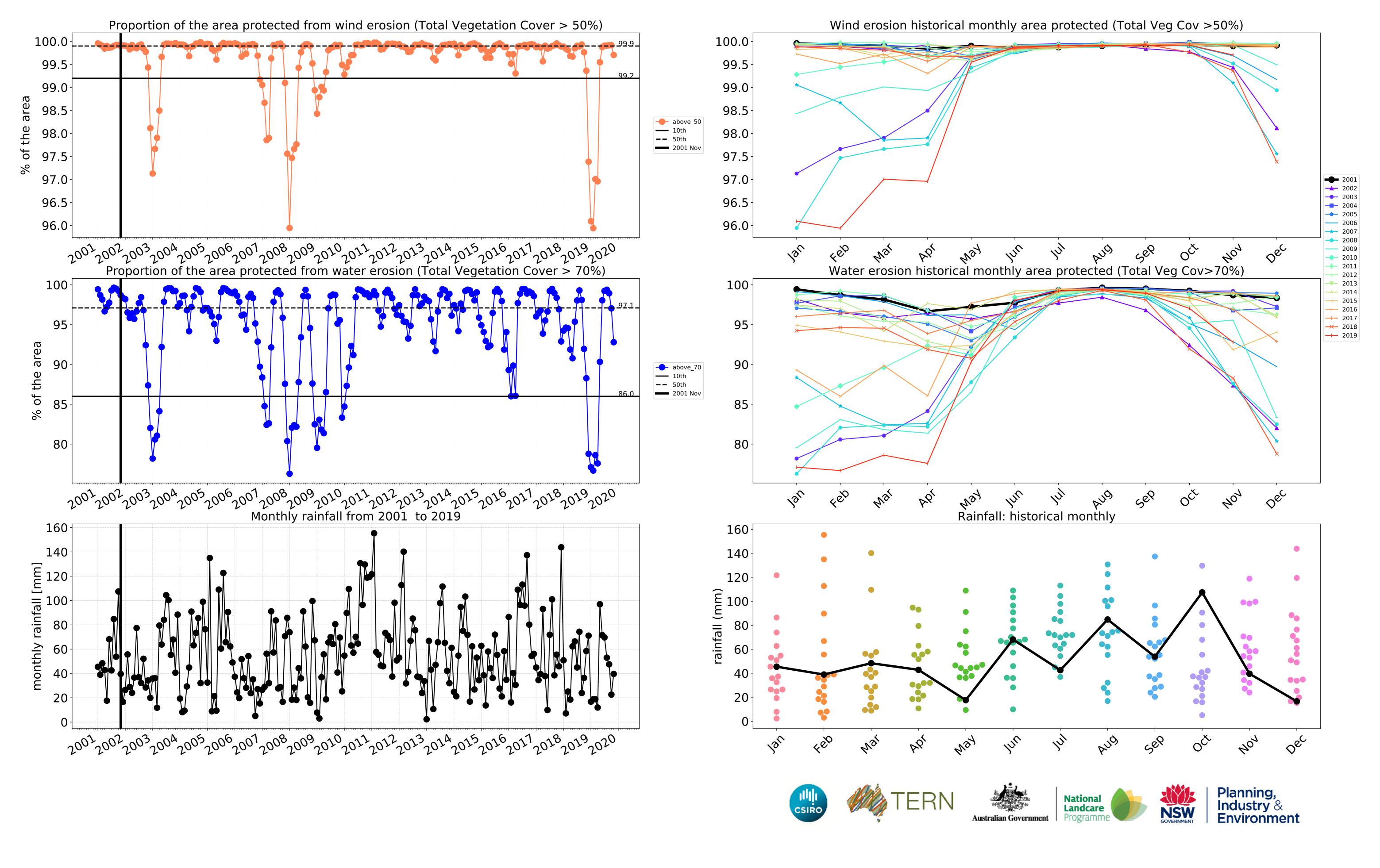


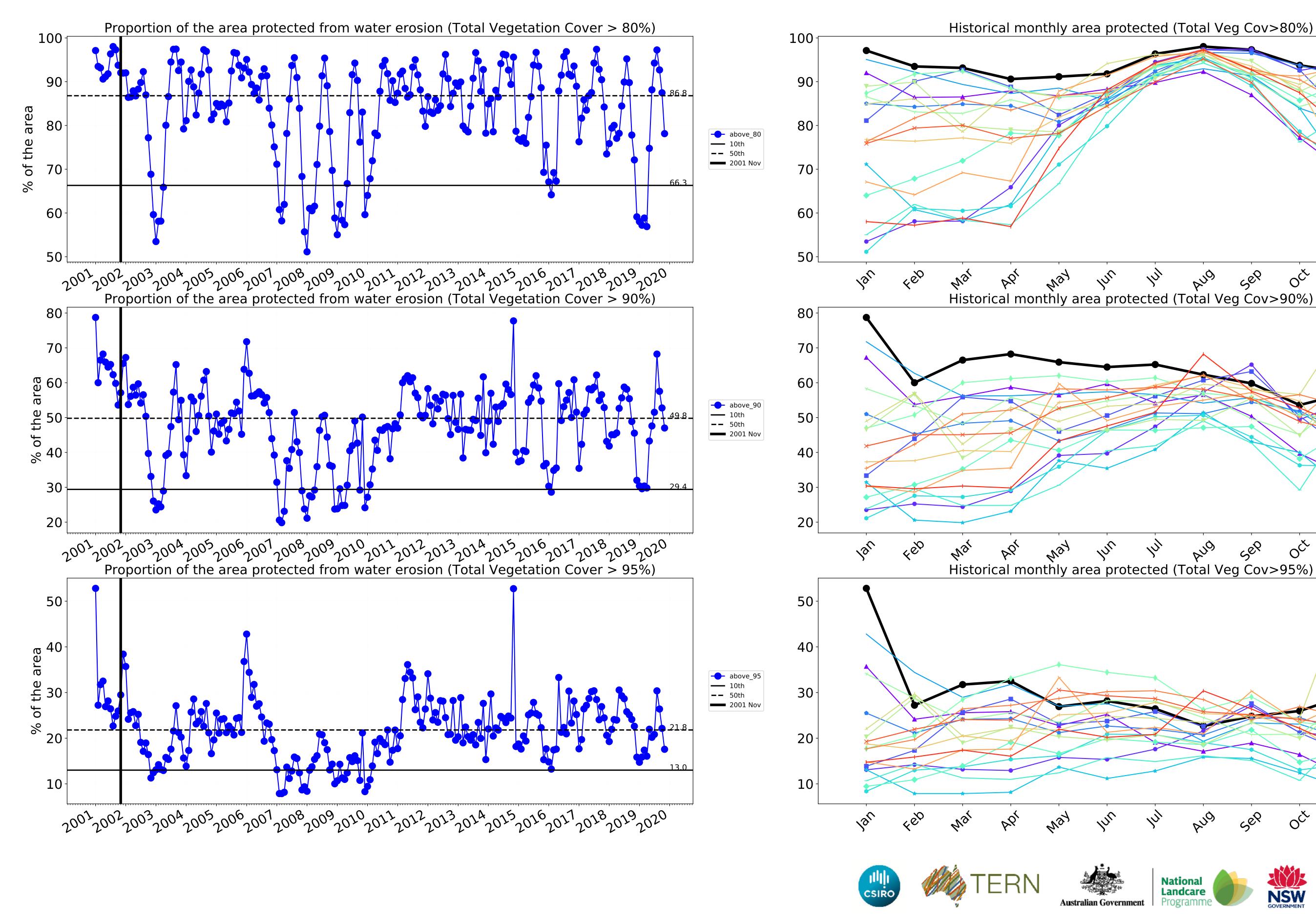
points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to

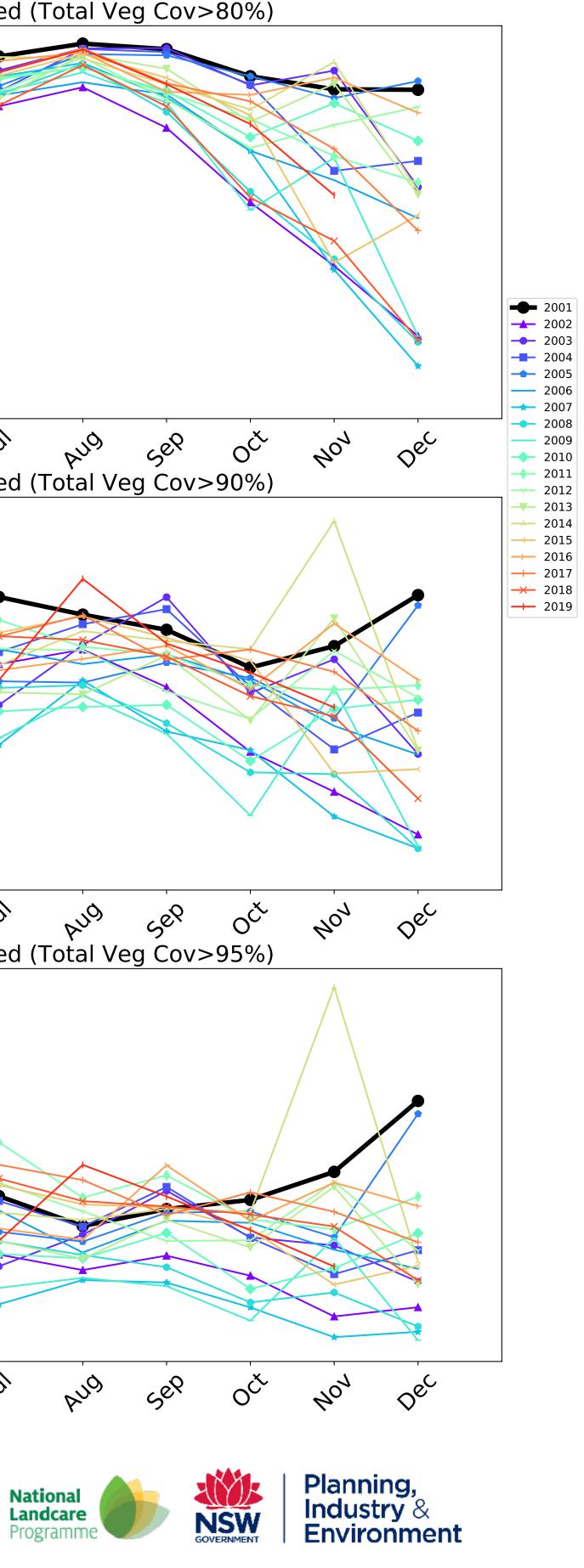
Derived from

Use of Australia

2

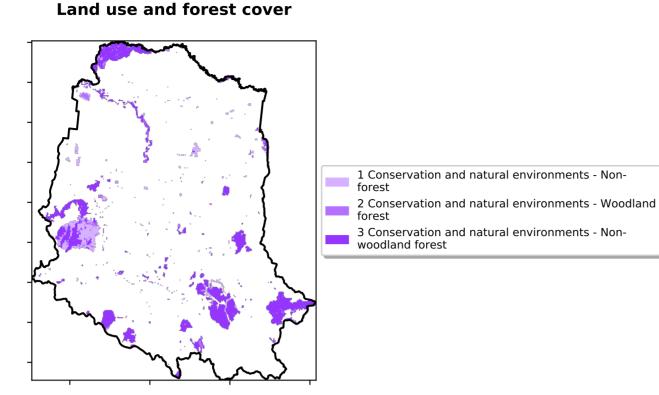




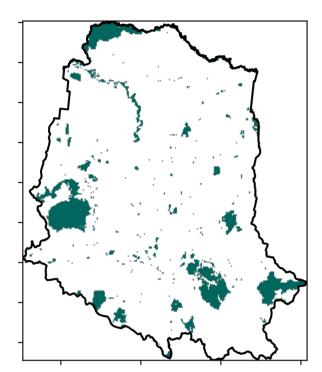


Conservation and natural environments

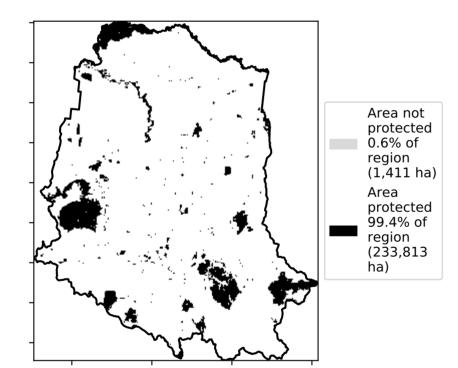
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

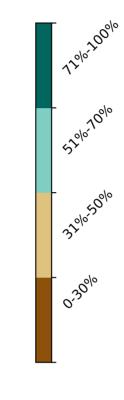


Total Vegetation Cover [%]

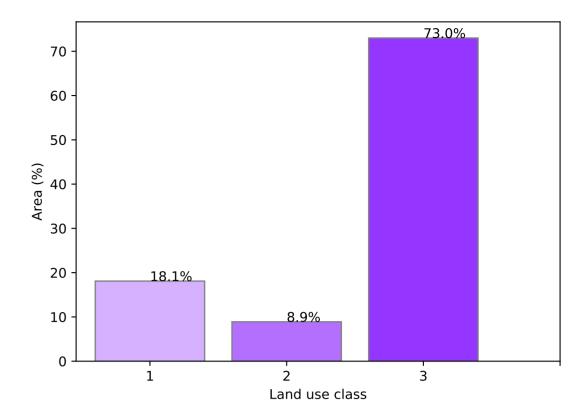


% Area protected from water erosion (>70%)

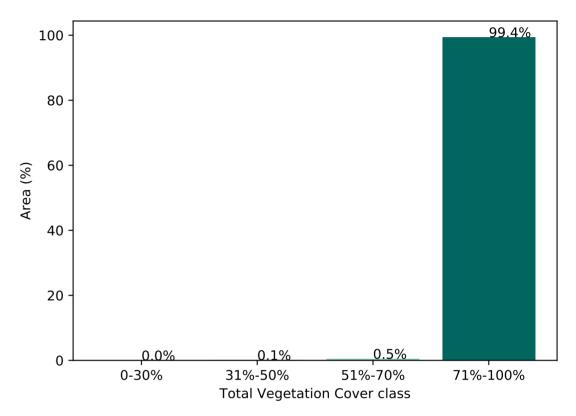




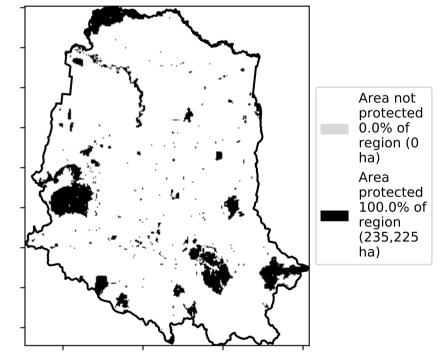
Proportion of each land class in area



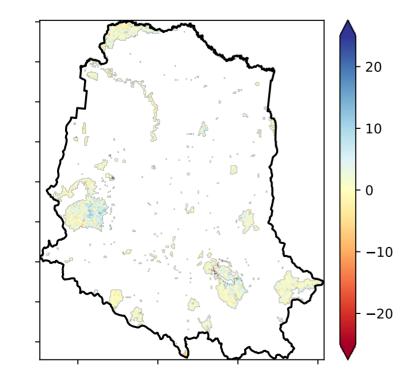
Proportion of vegetation cover class in area



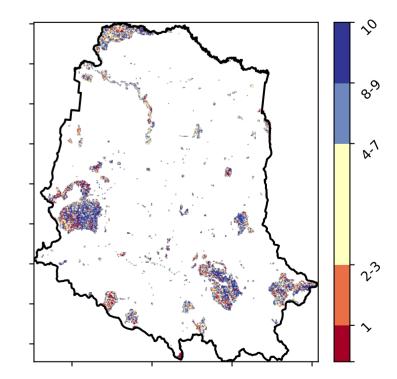
% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]



Total Vegetation Cover Decile [%]





Deciles show where the

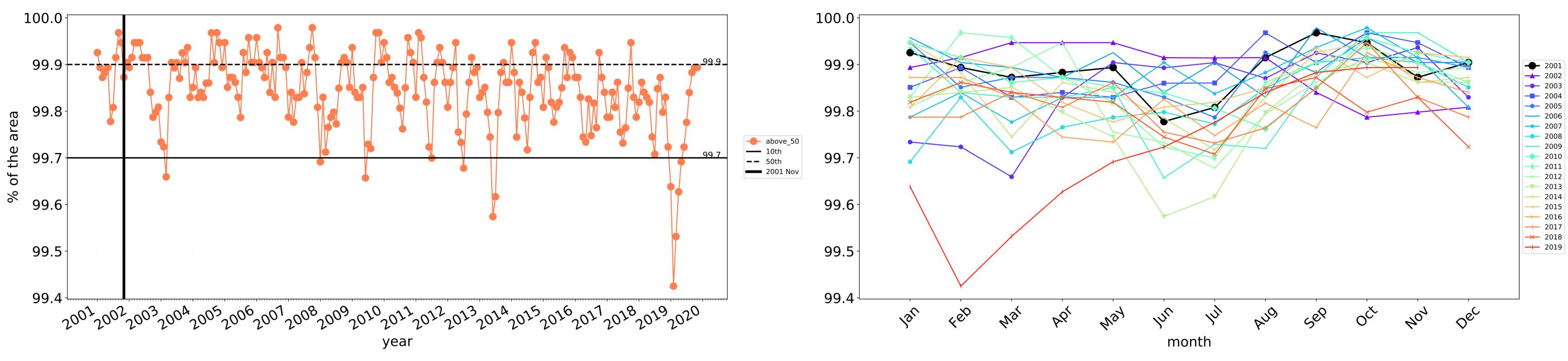
record, from highest to lowest, for that month. That is, red pixels are

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

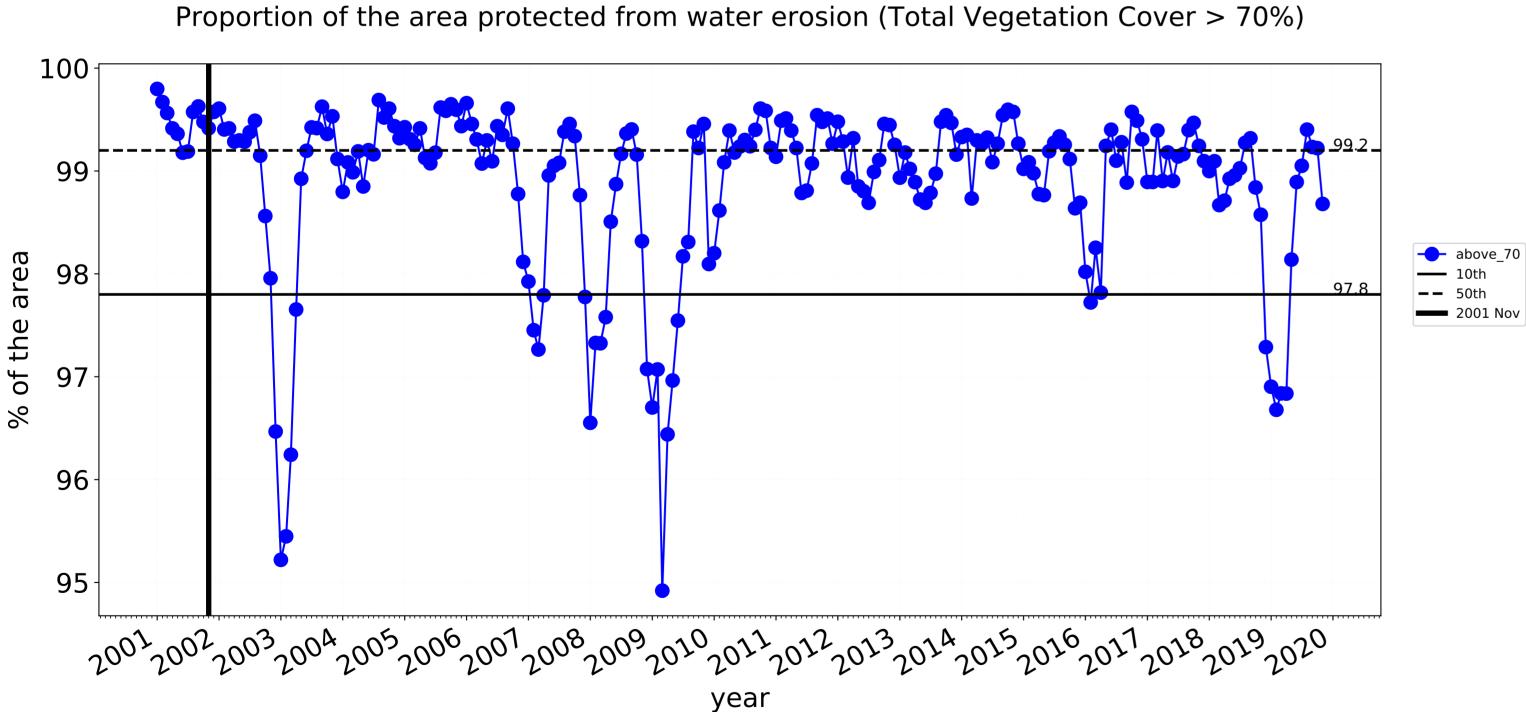
in the lowest 10% of

pixel value lies in the

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.

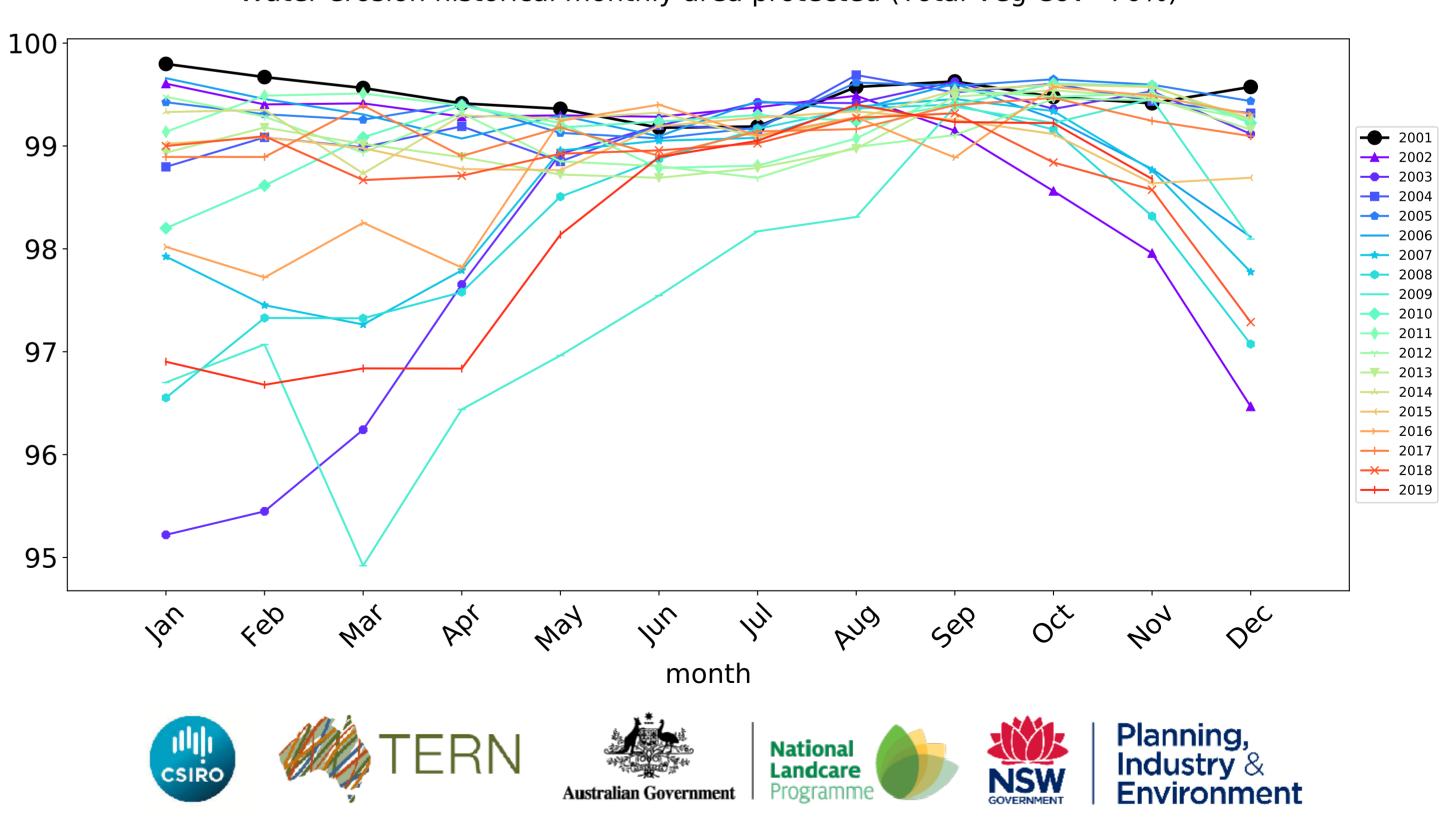


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

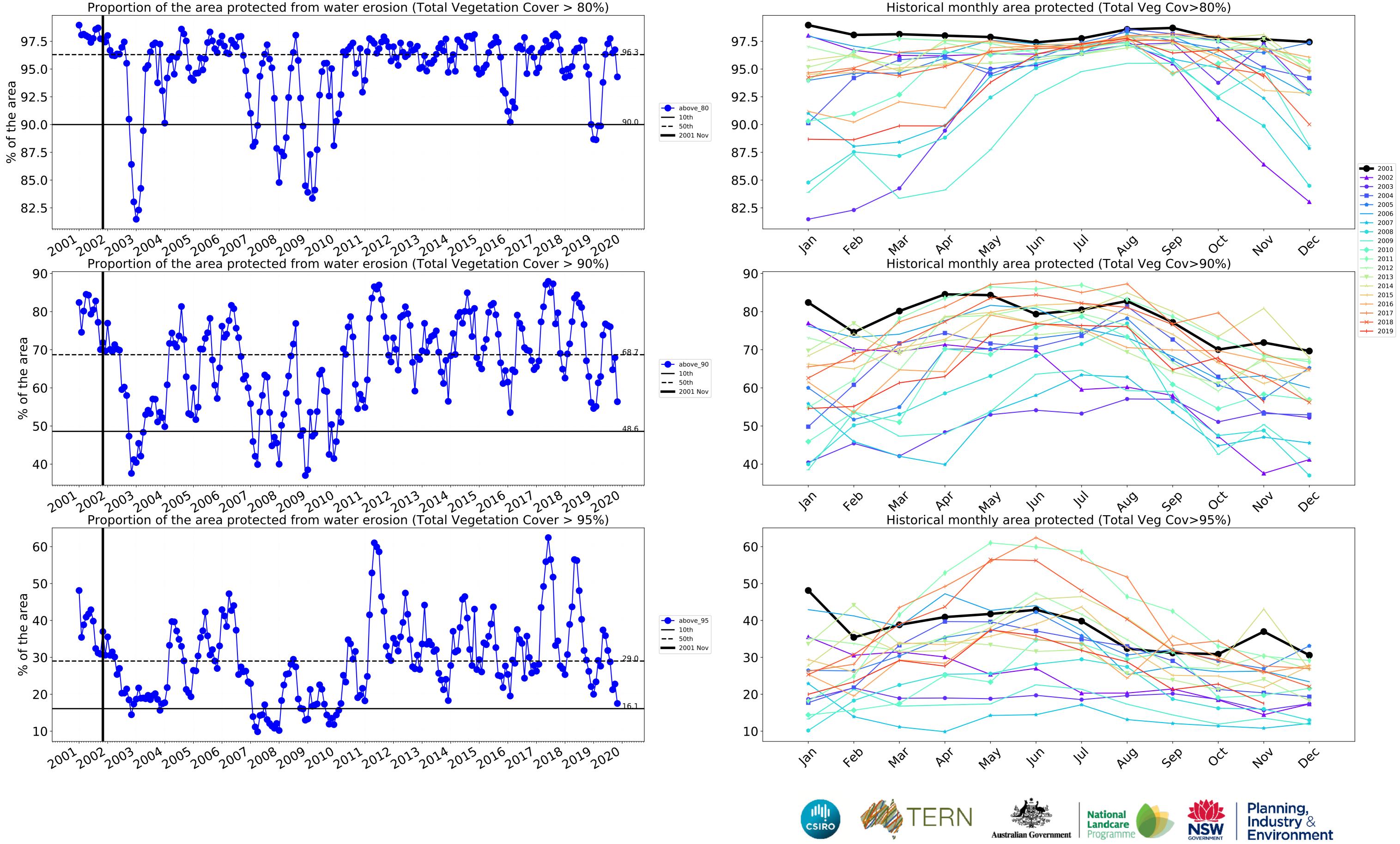


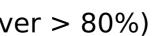
Conservation and natural environments timeseries

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



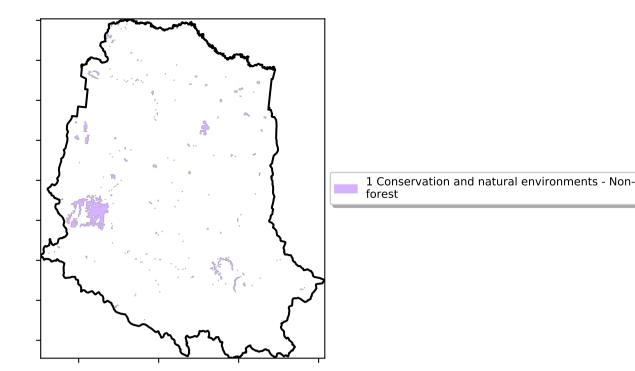
Water erosion historical monthly area protected (Total Veg Cov>70%)





Conservation and natural environments non forest

Land use and forest cover



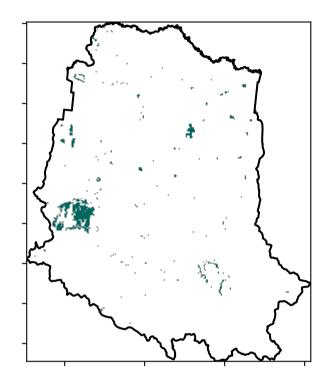
12º0010000

· 52°10'10°1

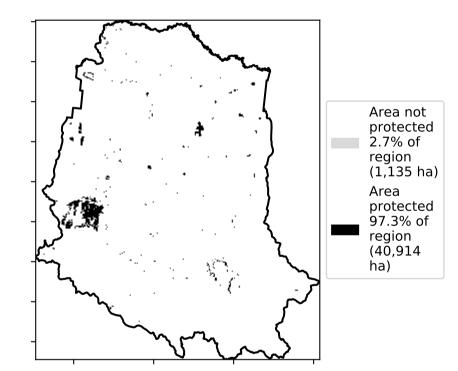
32°1050°10

0.30%

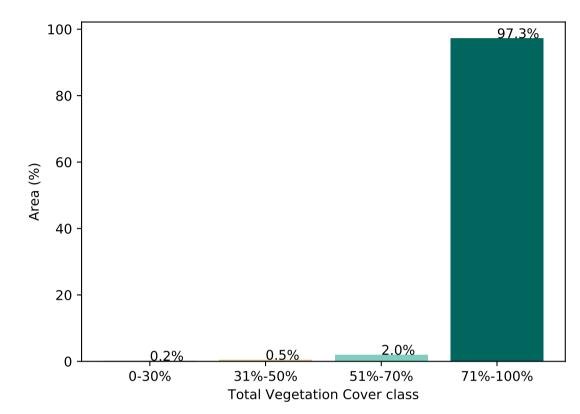
Total Vegetation Cover [%]



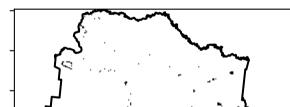








% Area protected from wind erosion (>50%)



region (420 ha)

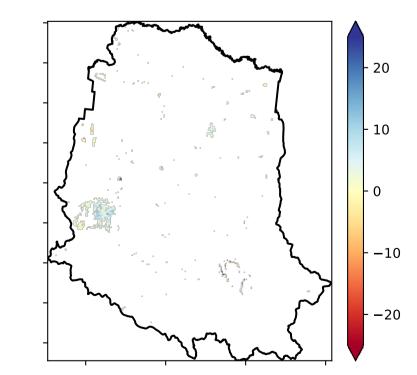
protected 99.0% of

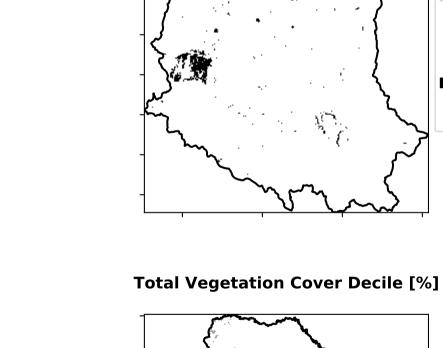
region (41,629

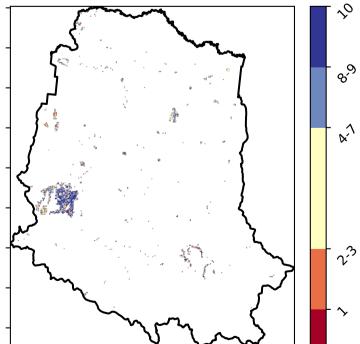
ha)

Area

Total Vegetation Cover Anomaly [%]









Deciles show where the

pixel value lies in the

in the lowest 10% of

records for that month of

the map using baseline from 2001 to 2019.

record, from highest to lowest, for that month. That is, red pixels are

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

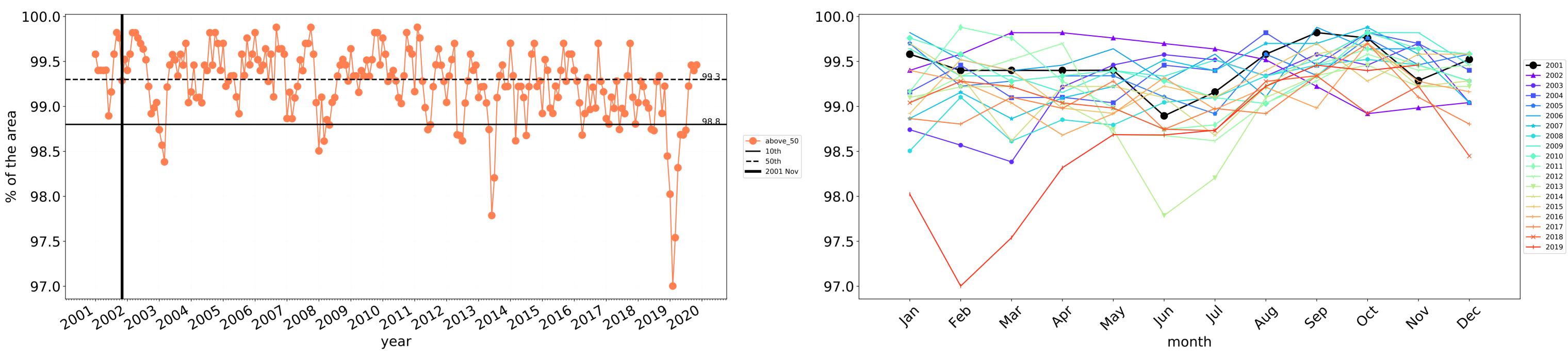
Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land

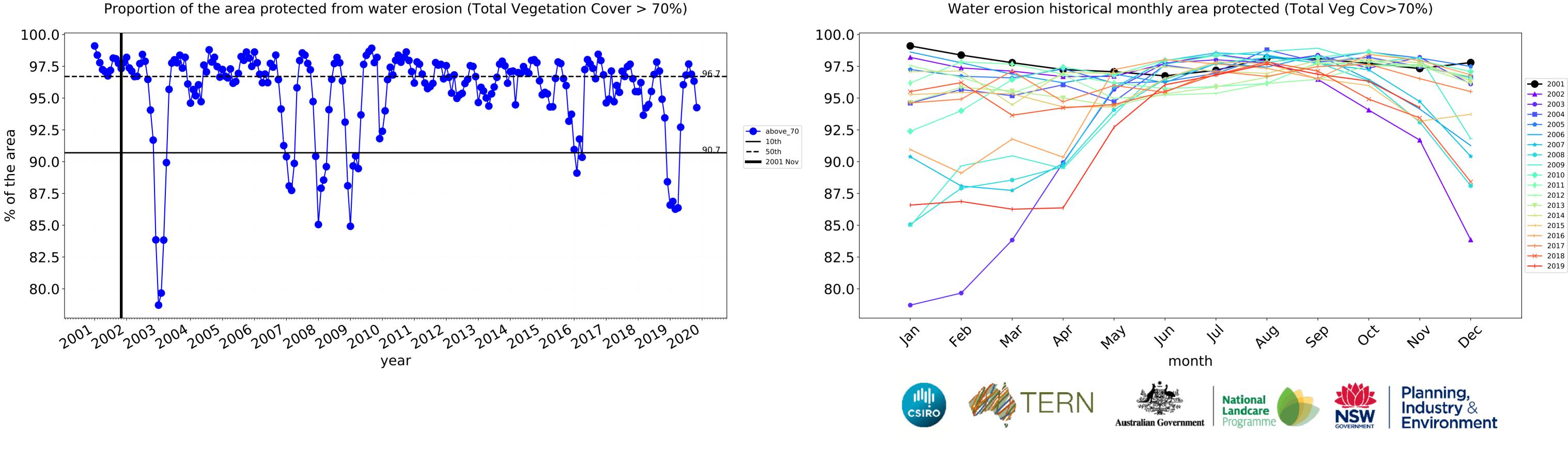
Derived from

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

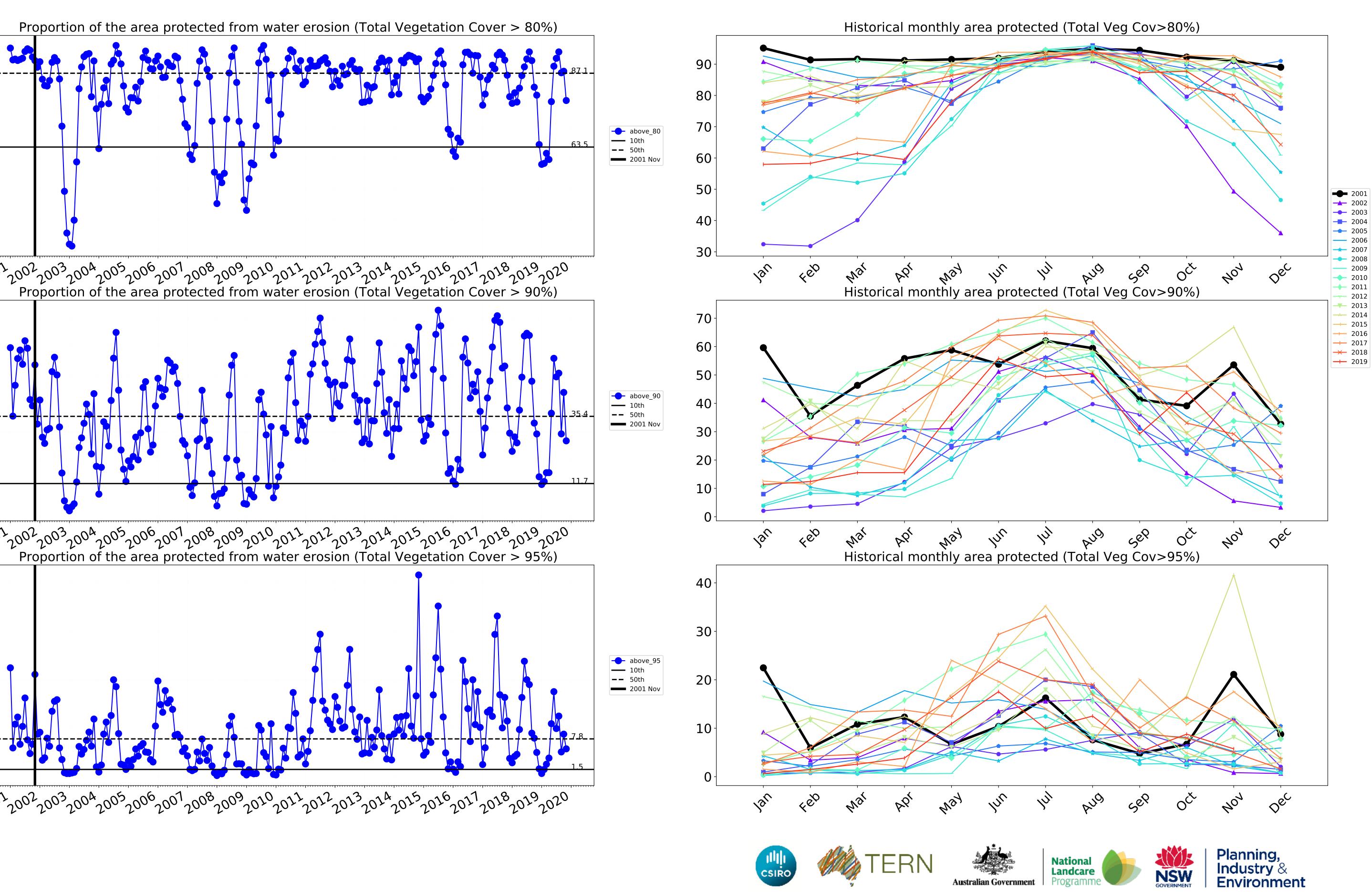
8

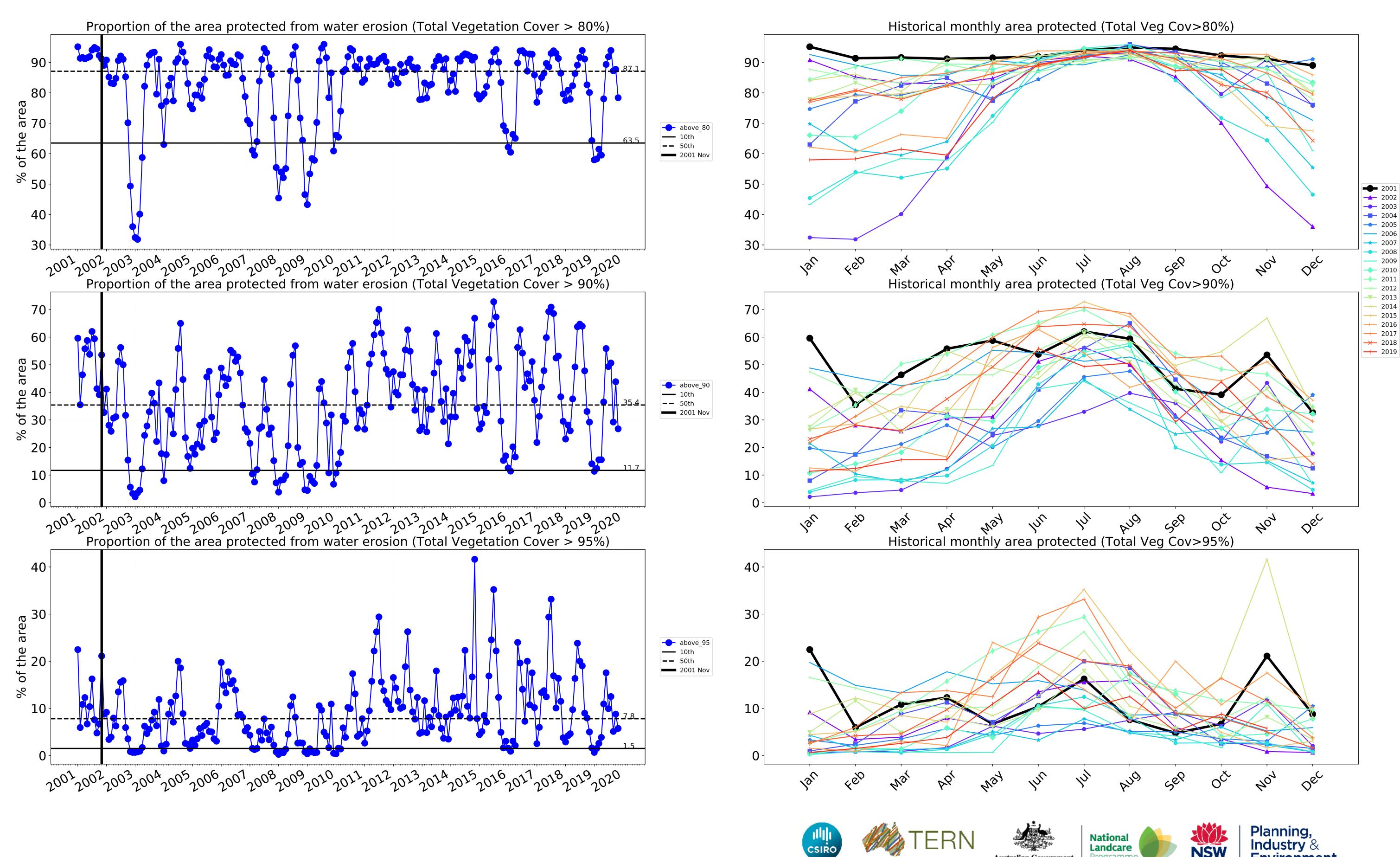


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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





Conservation and natural environments Forest (non woodland)

Land use and forest cover

Conservation and natural environments - Non-woodland forest

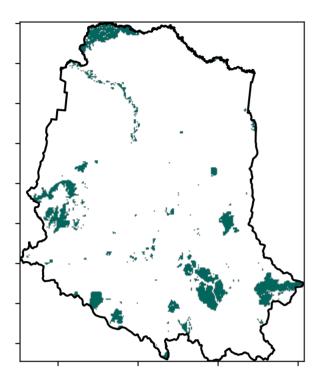
12%200

52%70%

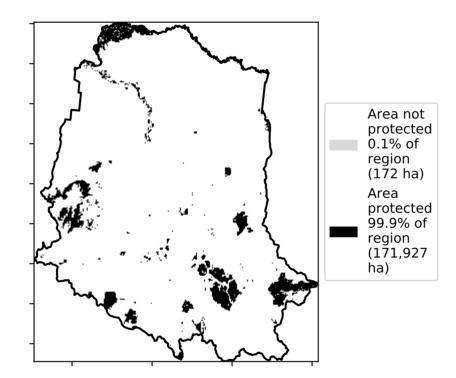
32%50%

0.30%

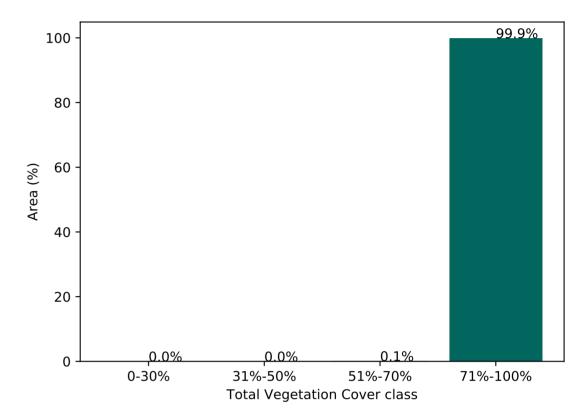
Total Vegetation Cover [%]



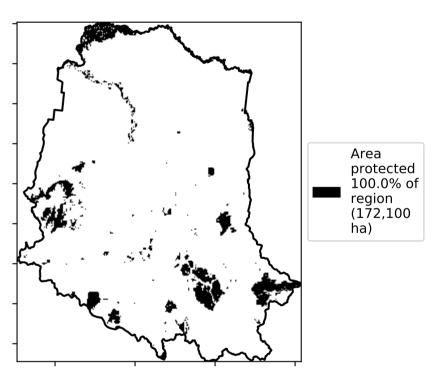
% Area protected from water erosion (>70%)



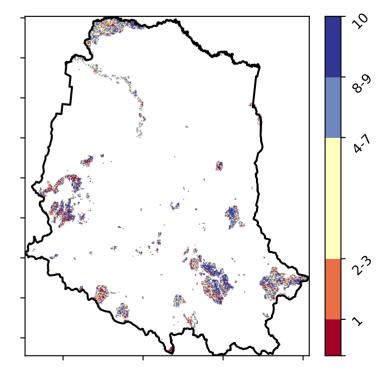
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]



Total Vegetation Cover Anomaly [%]

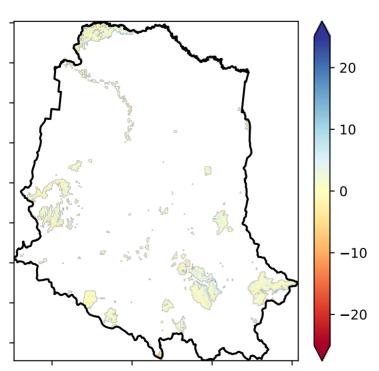
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land

Derived from

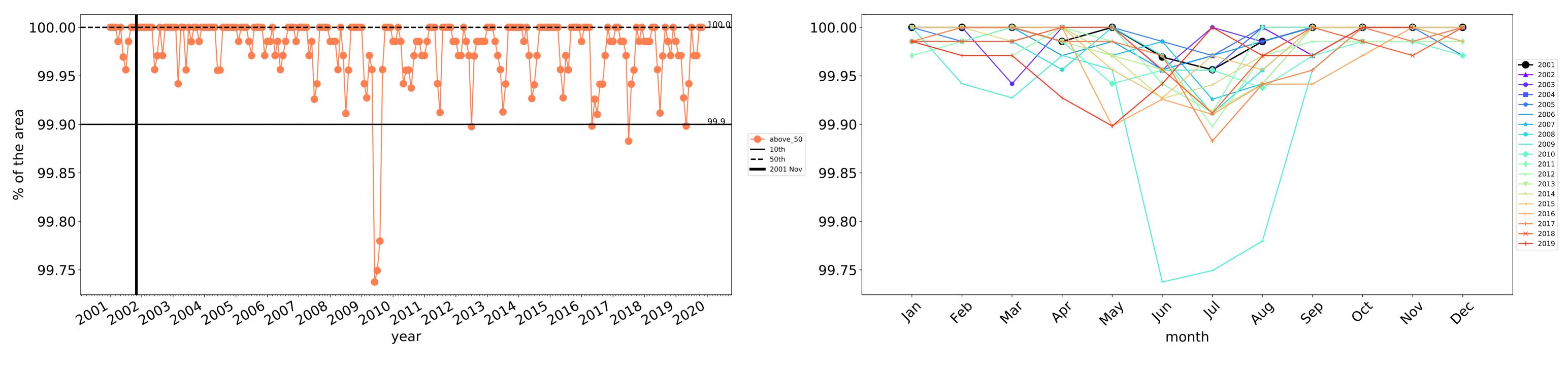
Use of Australia (2018) and Forests of Australia (2018)



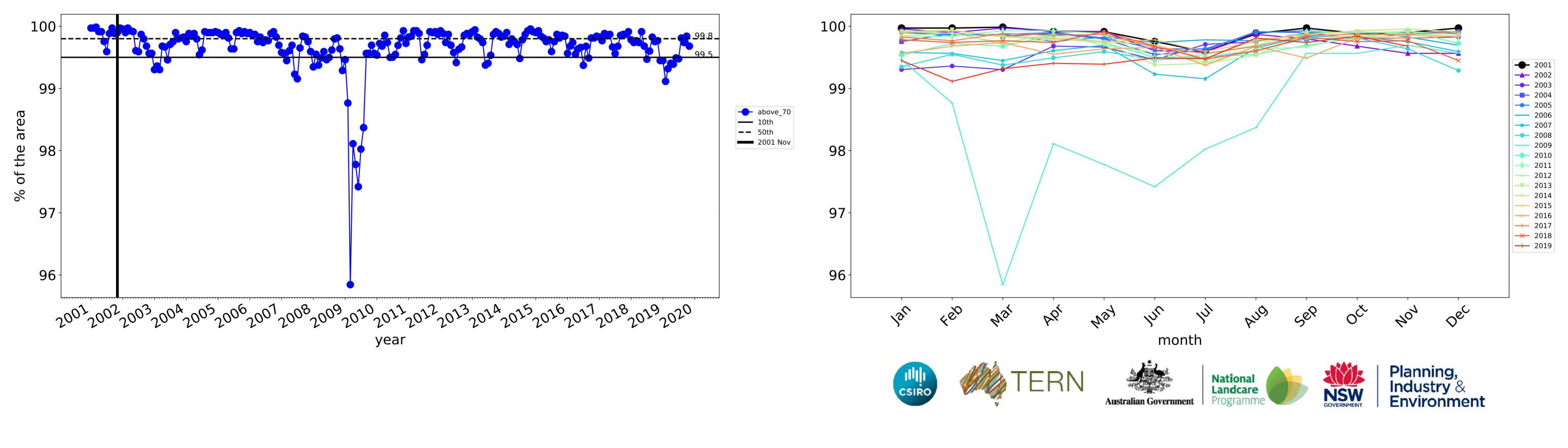
CSIRO



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

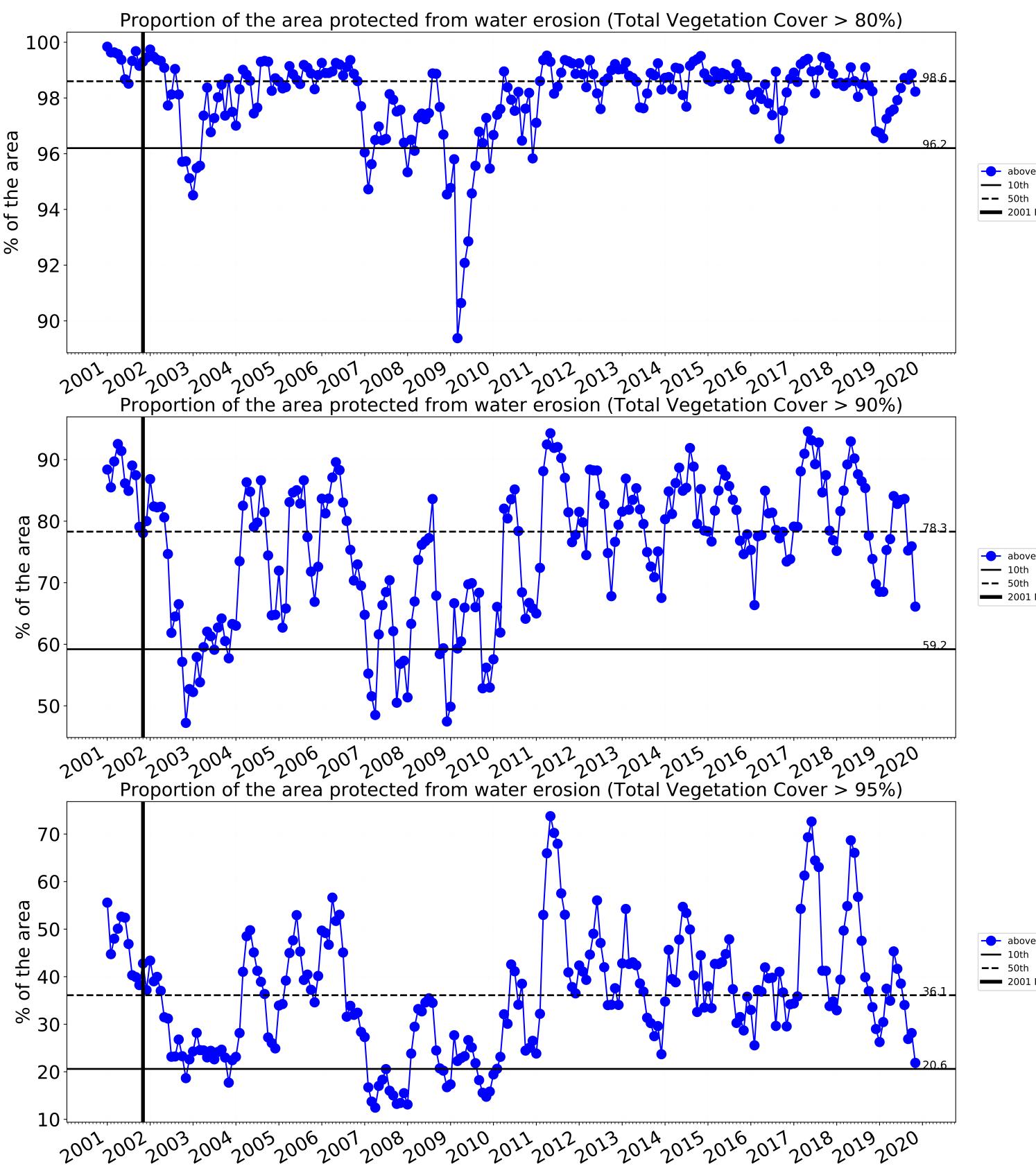


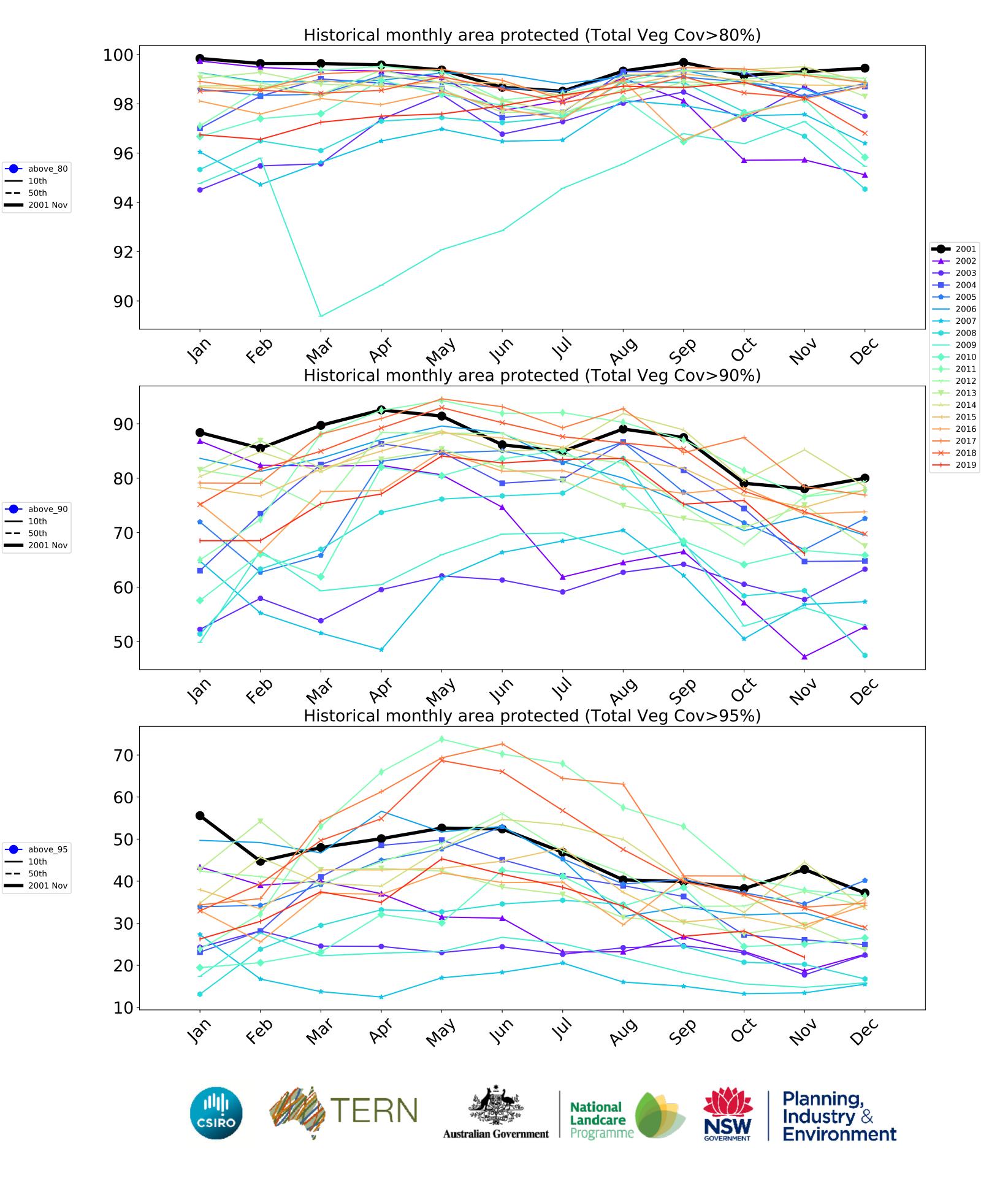
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)





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







Agriculture

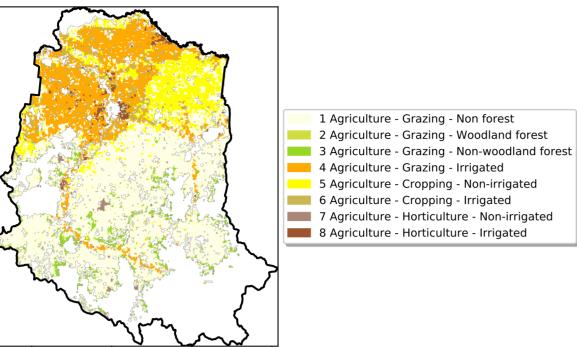
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Land use and forest cover

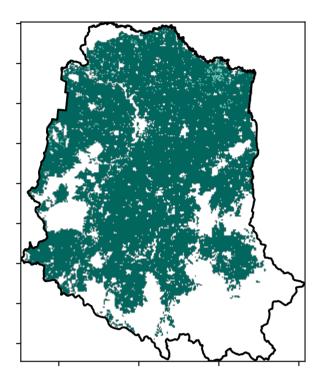
Proportion of each land class in area

<u>56.</u>7%

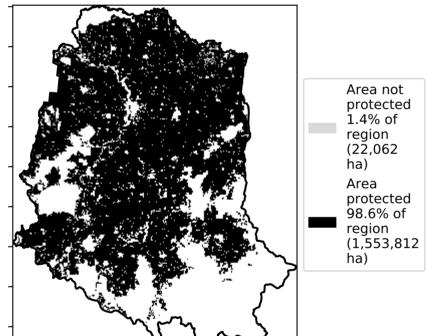
50

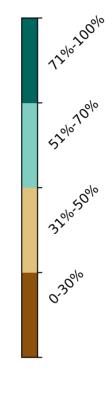


Total Vegetation Cover [%]

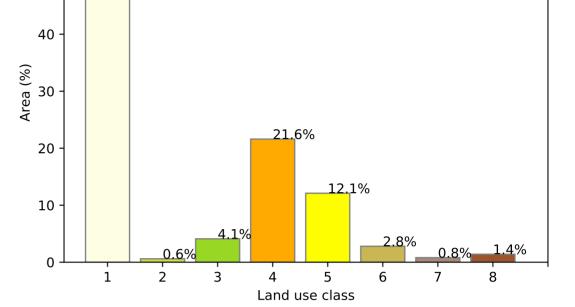




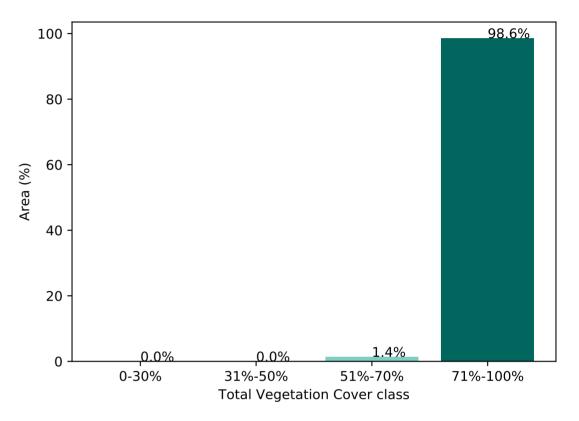




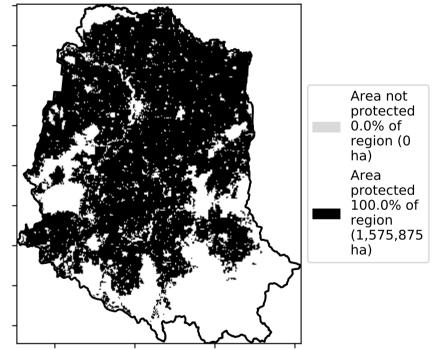




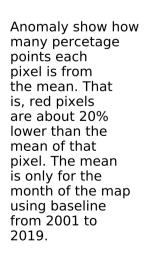
Proportion of vegetation cover class in area

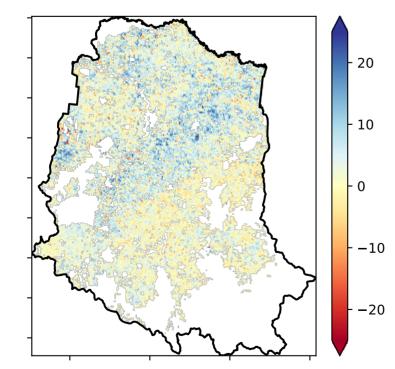


% Area protected from wind erosion (>50%)



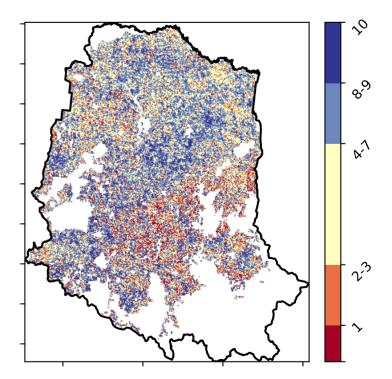
Total Vegetation Cover Anomaly [%]



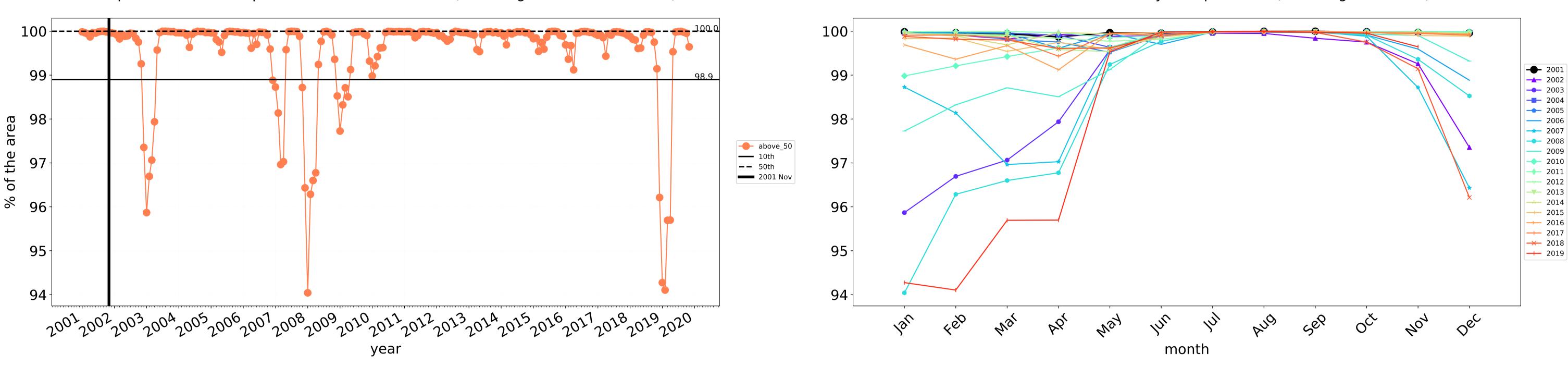


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

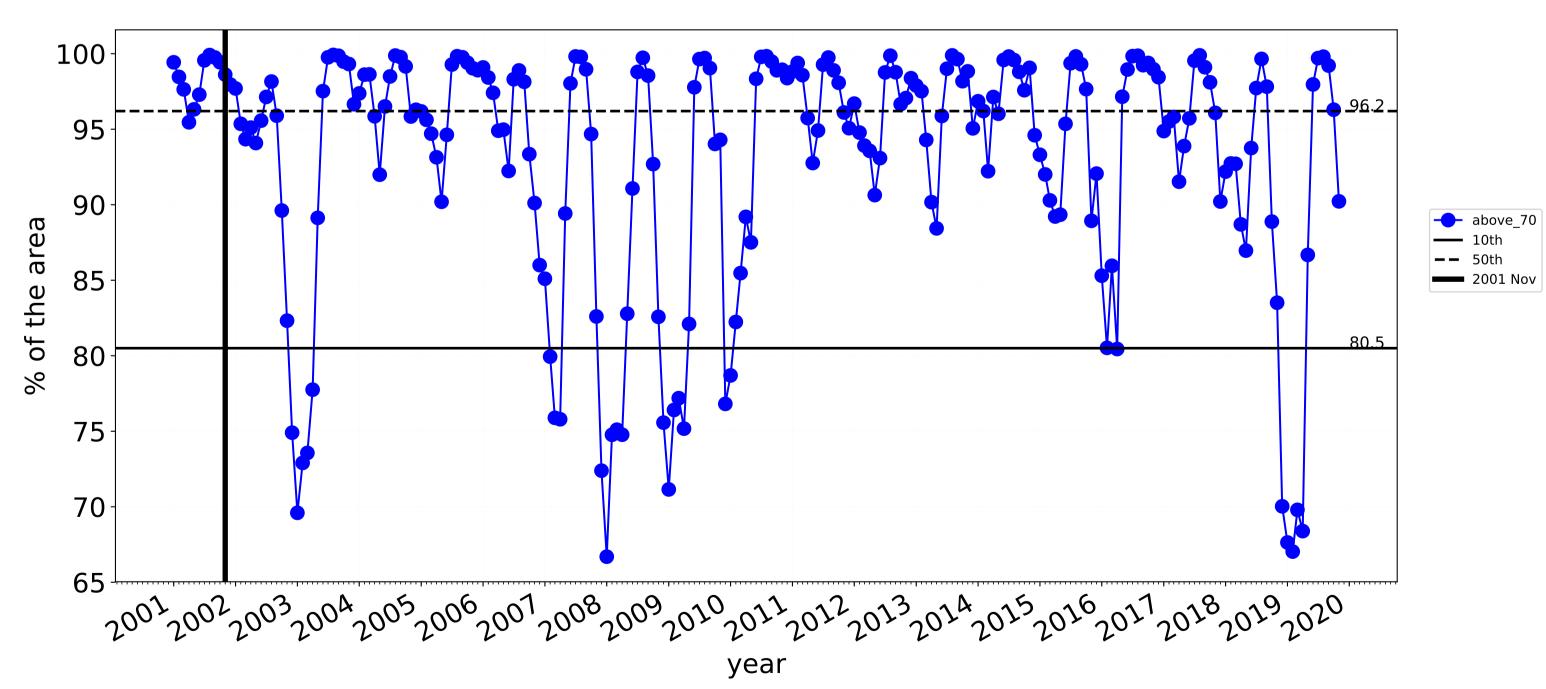






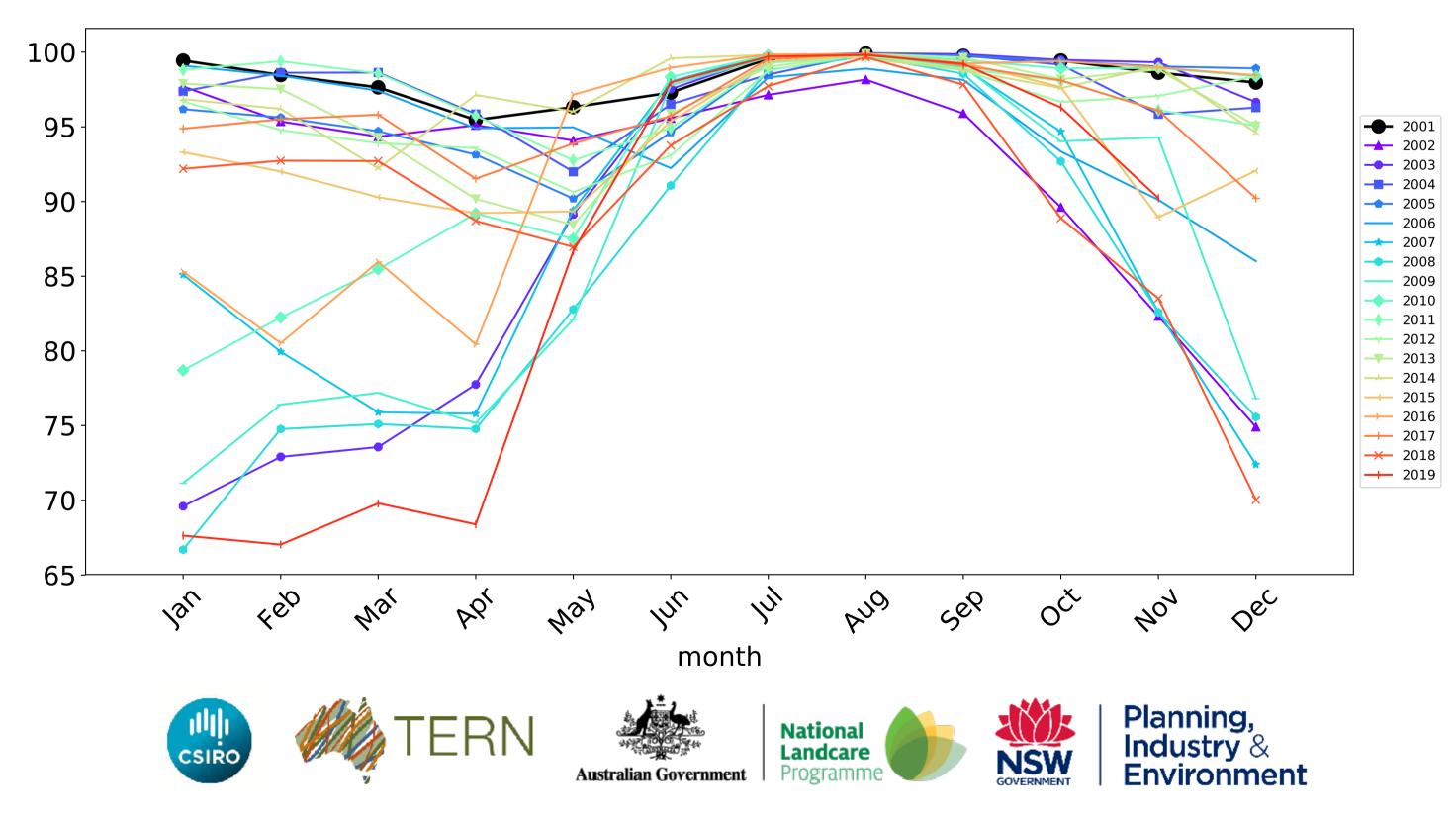
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



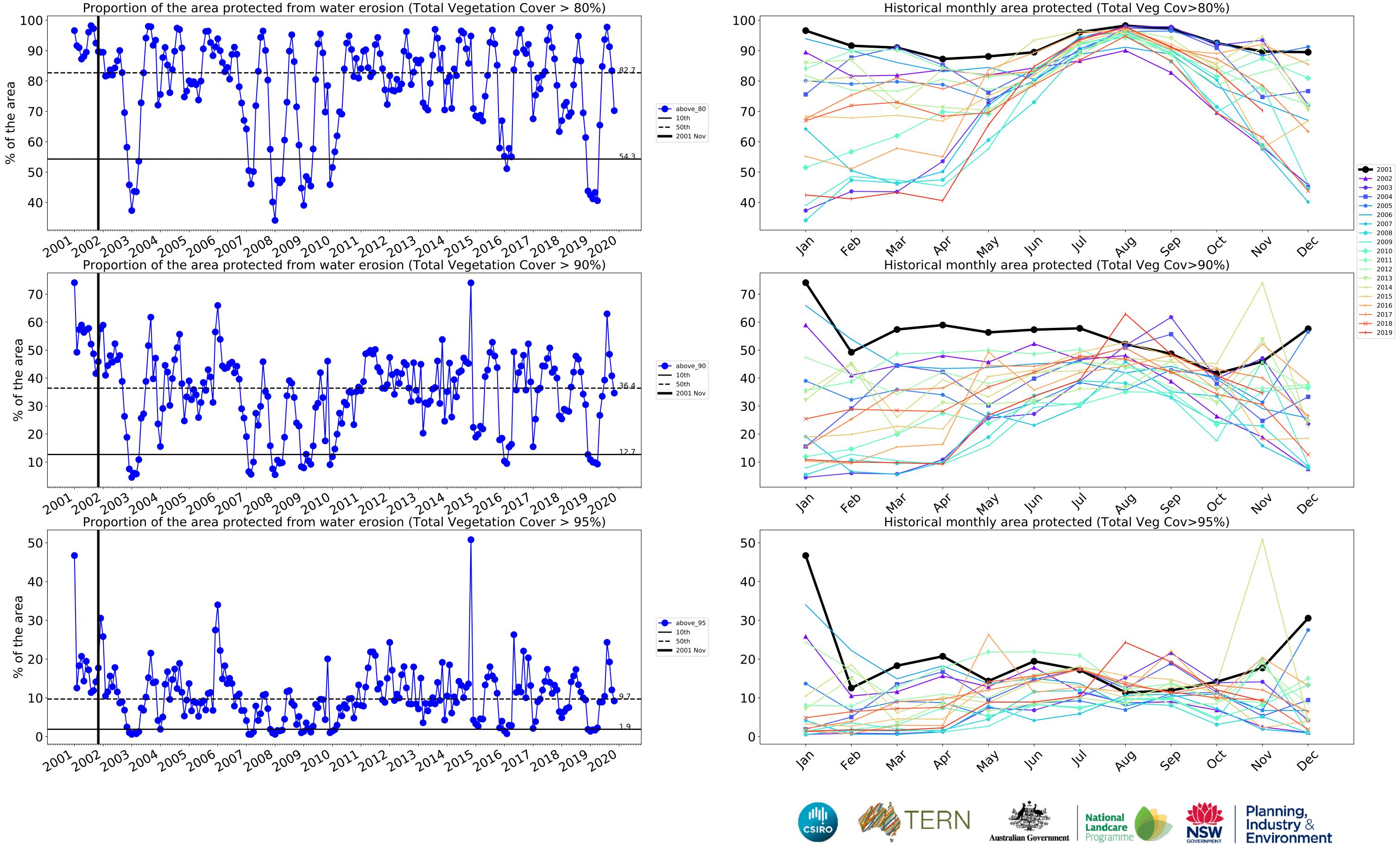


Agriculture timeseries

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

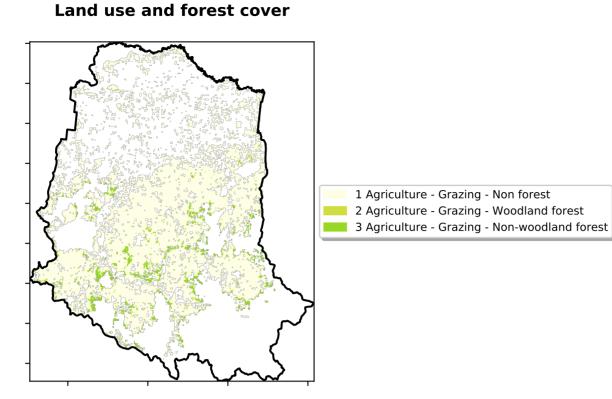


Wind erosion historical monthly area protected (Total Veg Cov >50%)

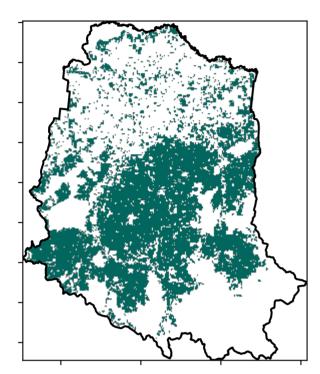


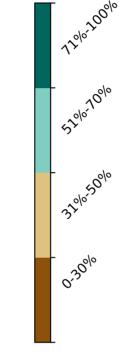
Grazing

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

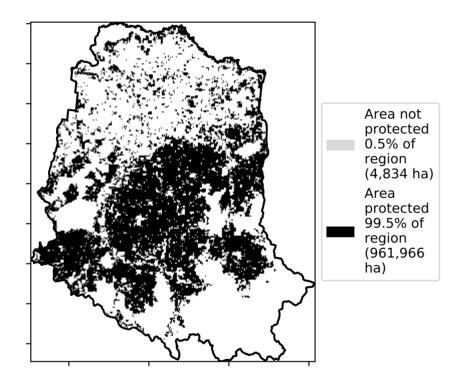


Total Vegetation Cover [%]





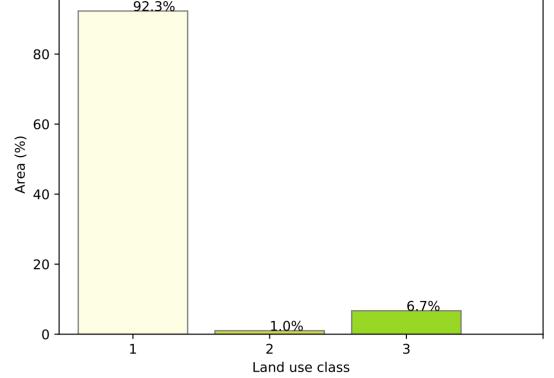
% Area protected from water erosion (>70%)



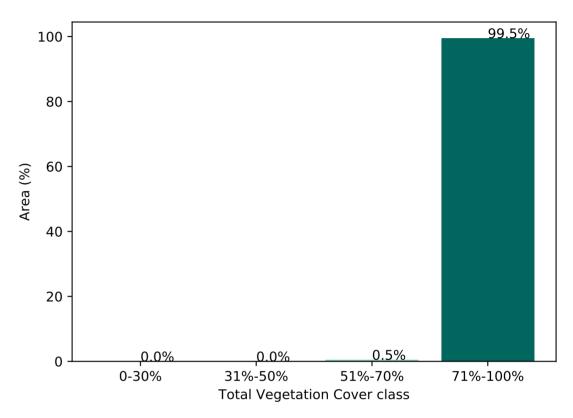
1 Agriculture - Grazing - Non forest

2 Agriculture - Grazing - Woodland forest

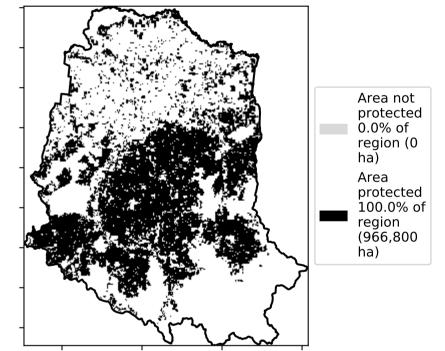
Proportion of each land class in area 92.3%



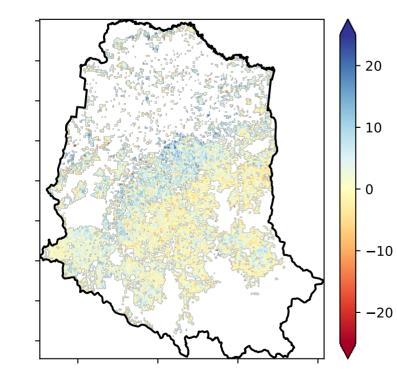
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

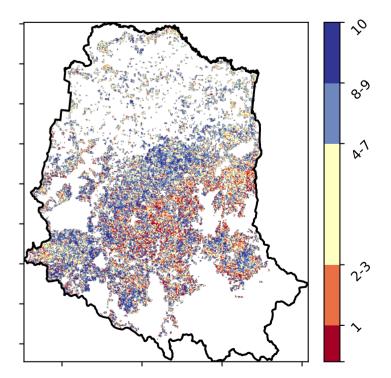


Total Vegetation Cover Anomaly [%]



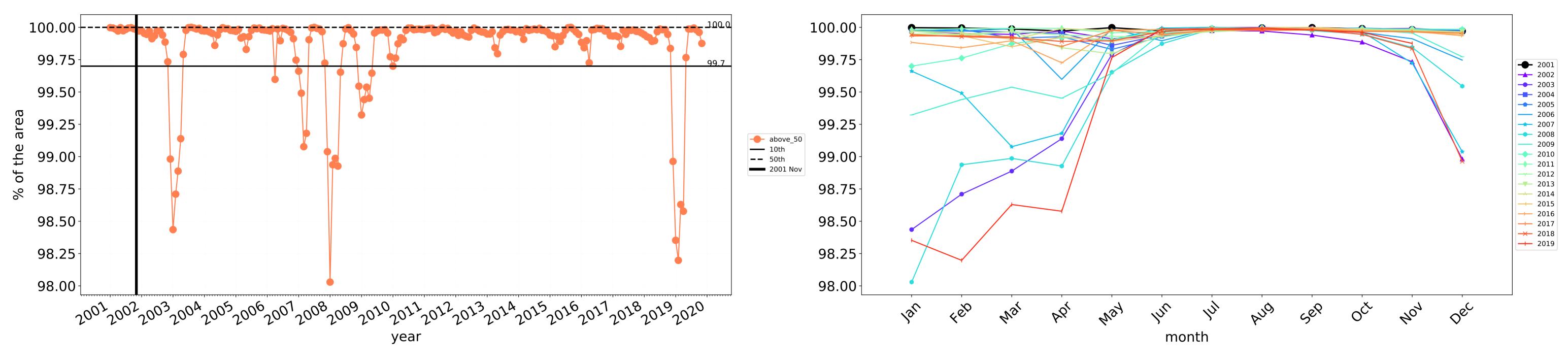
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

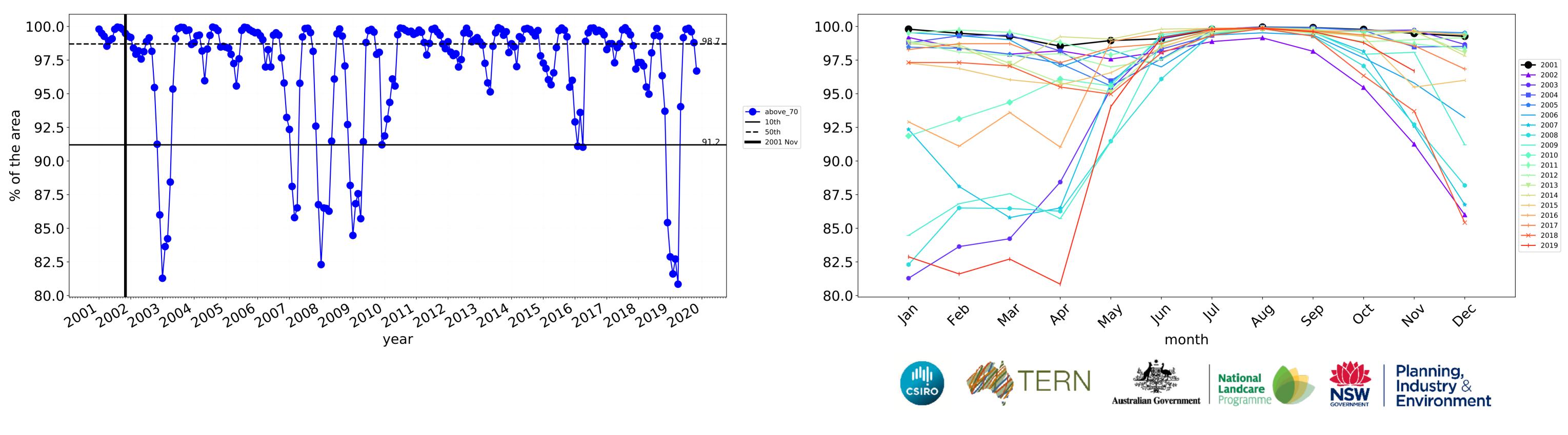




Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

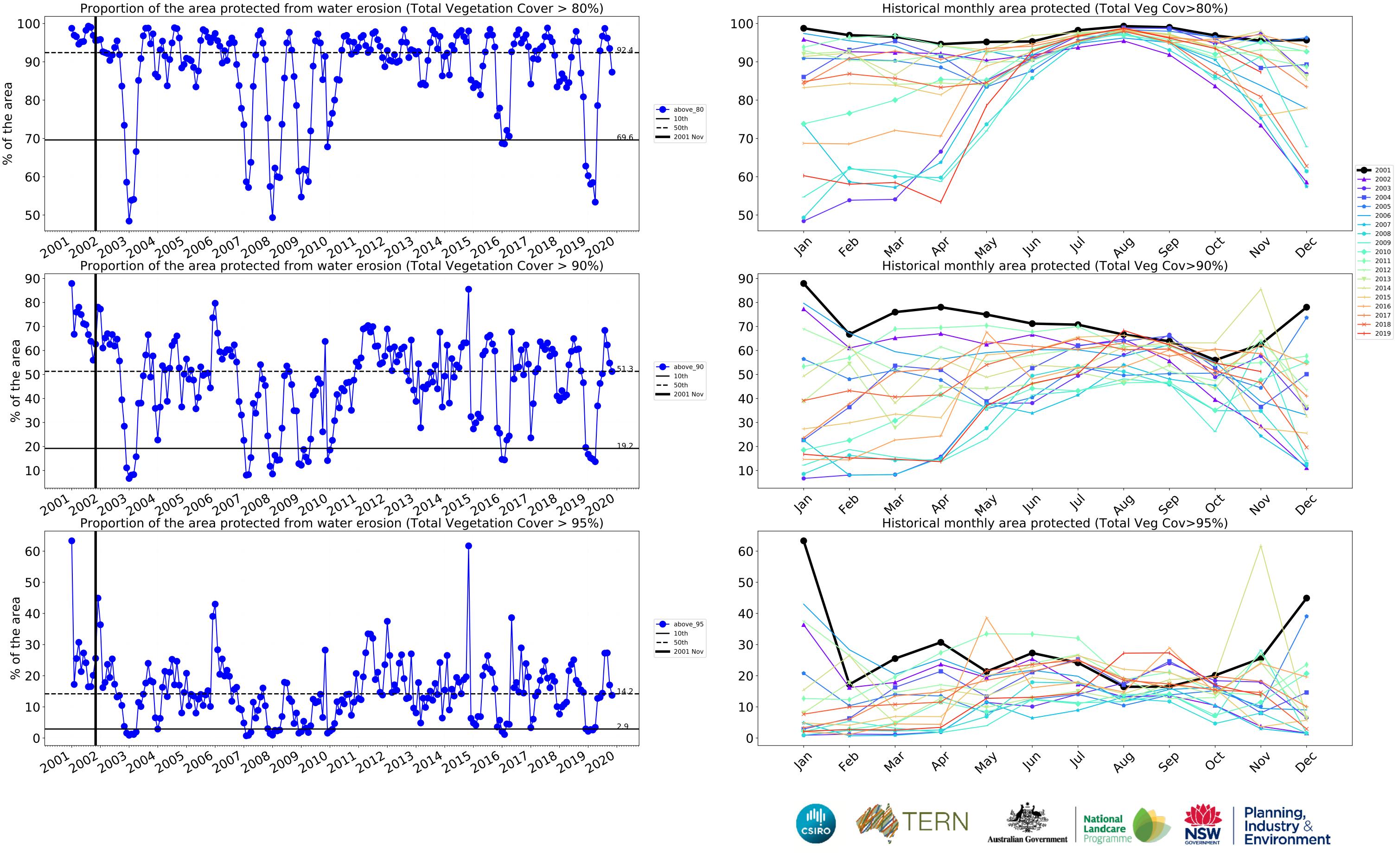


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

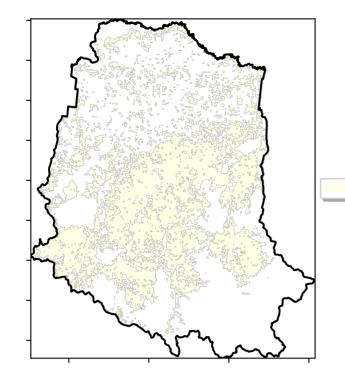
Water erosion historical monthly area protected (Total Veg Cov>70%)





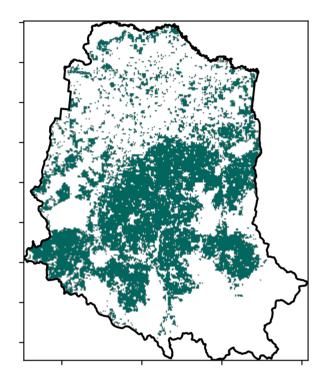
Grazing non forest

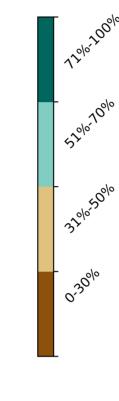
Land use and forest cover



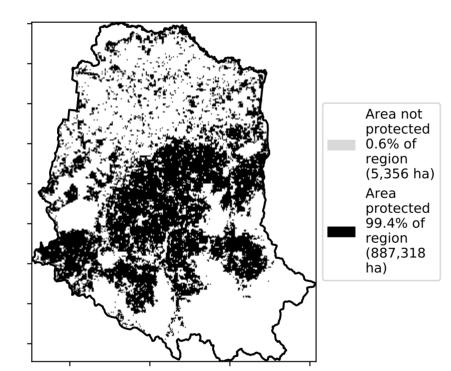
1 Agriculture - Grazing - Non forest

Total Vegetation Cover [%]

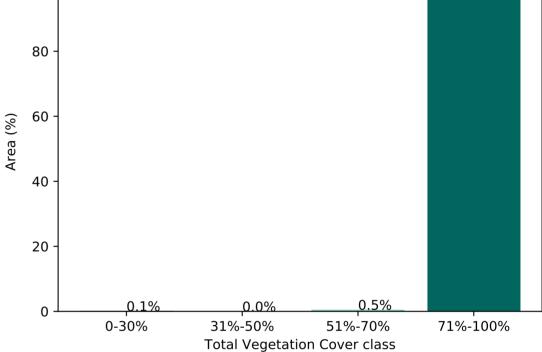




% Area protected from water erosion (>70%)

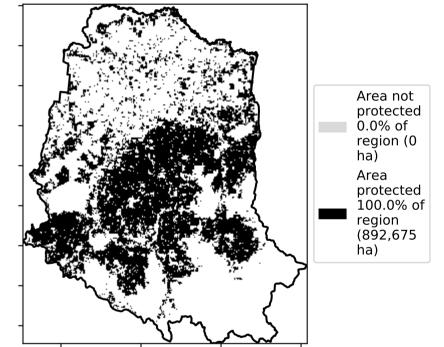






Proportion of vegetation cover class in area

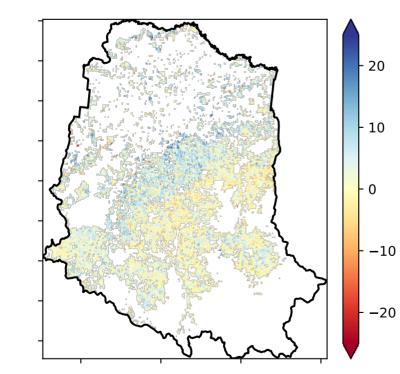
% Area protected from wind erosion (>50%)



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

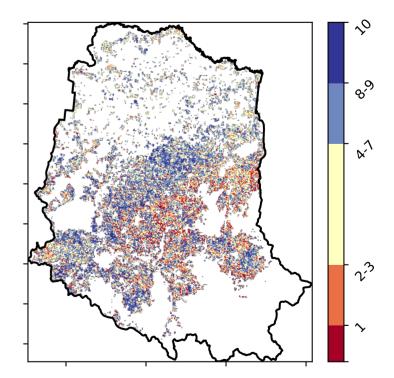
99.4%

Total Vegetation Cover Anomaly [%]



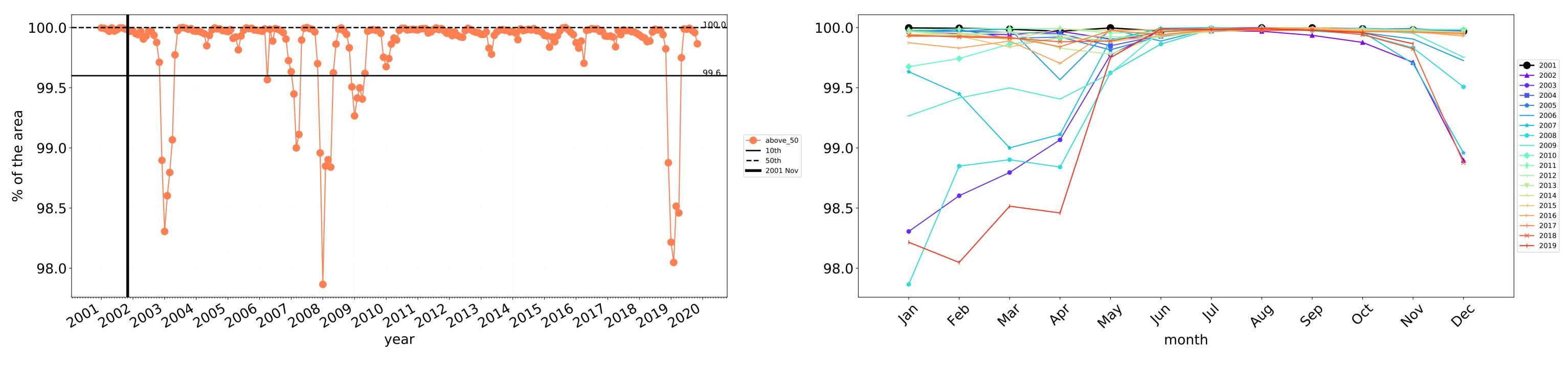
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]



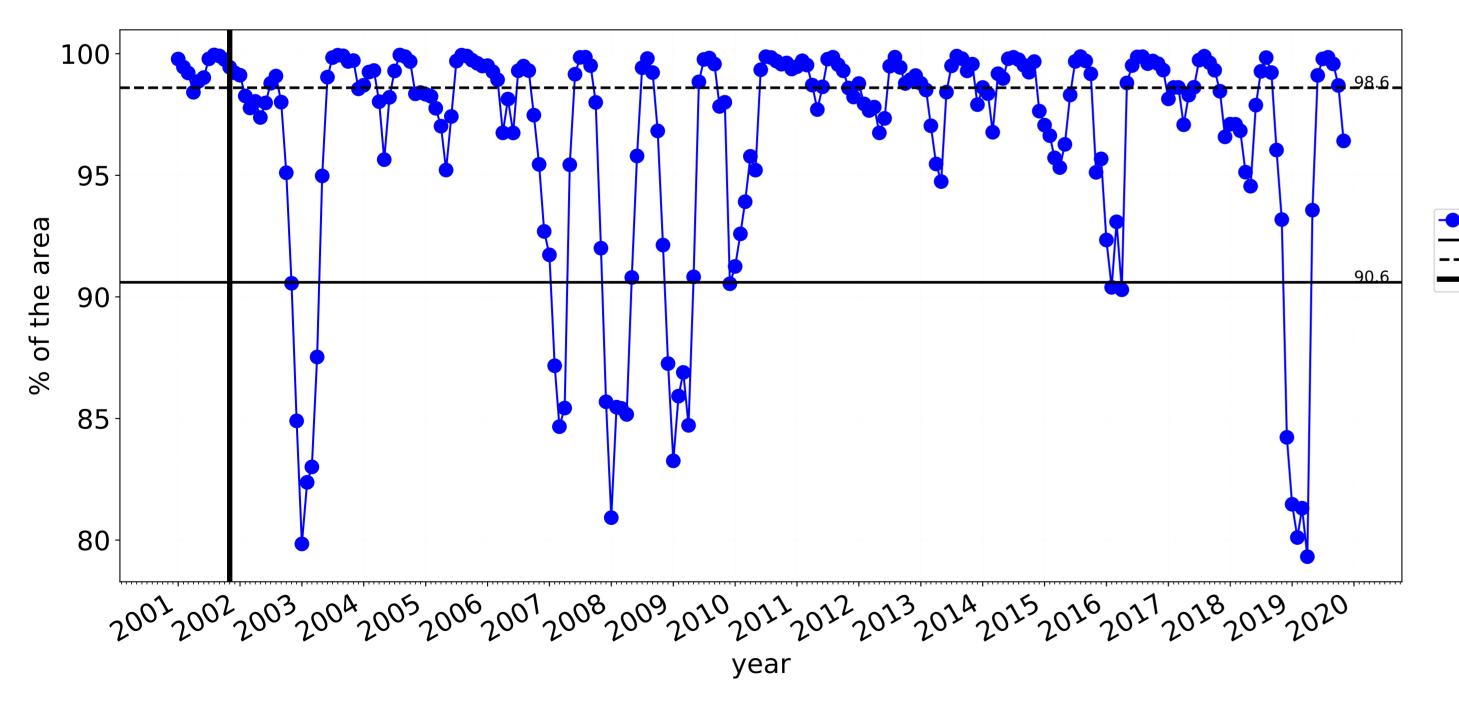


Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

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

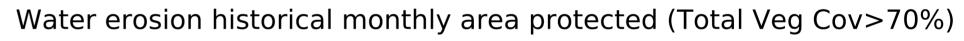


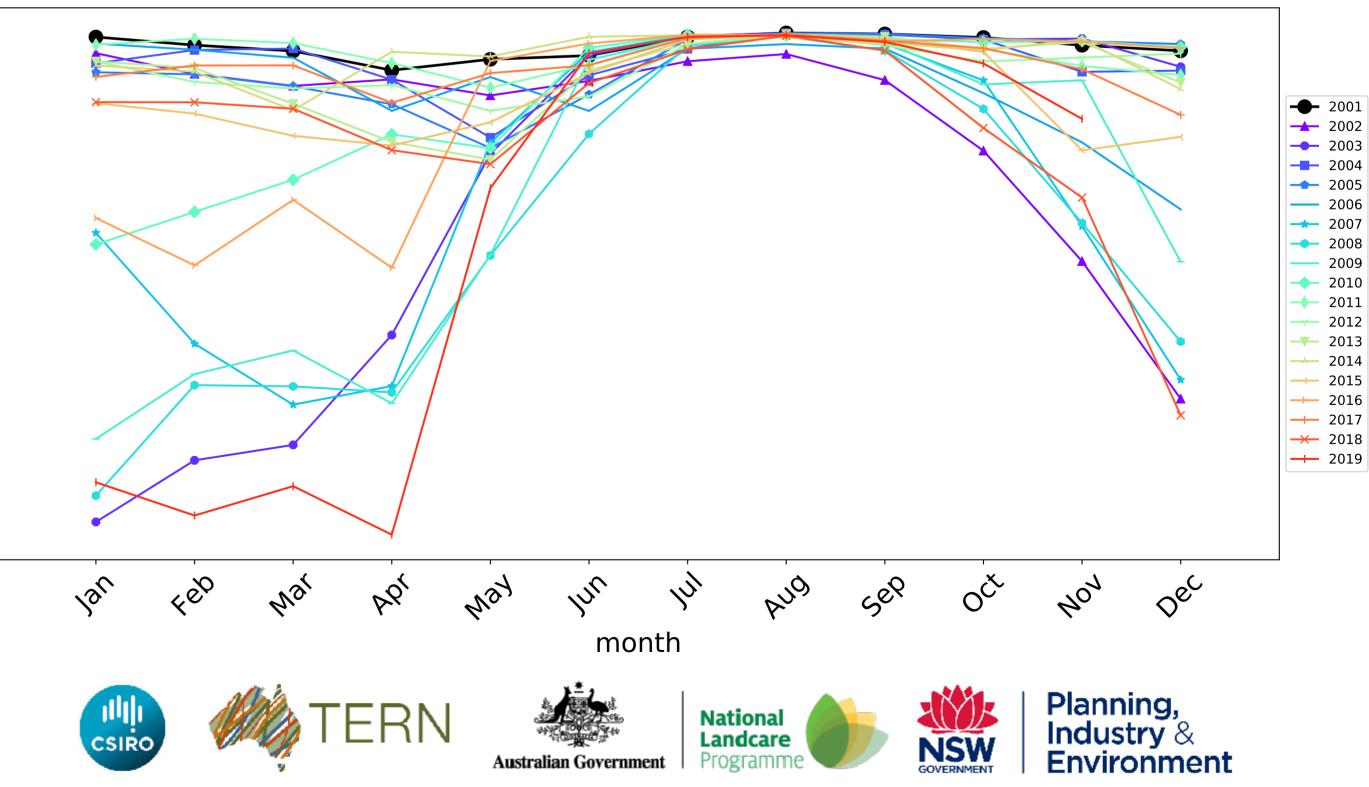
Grazing non forest timeseries

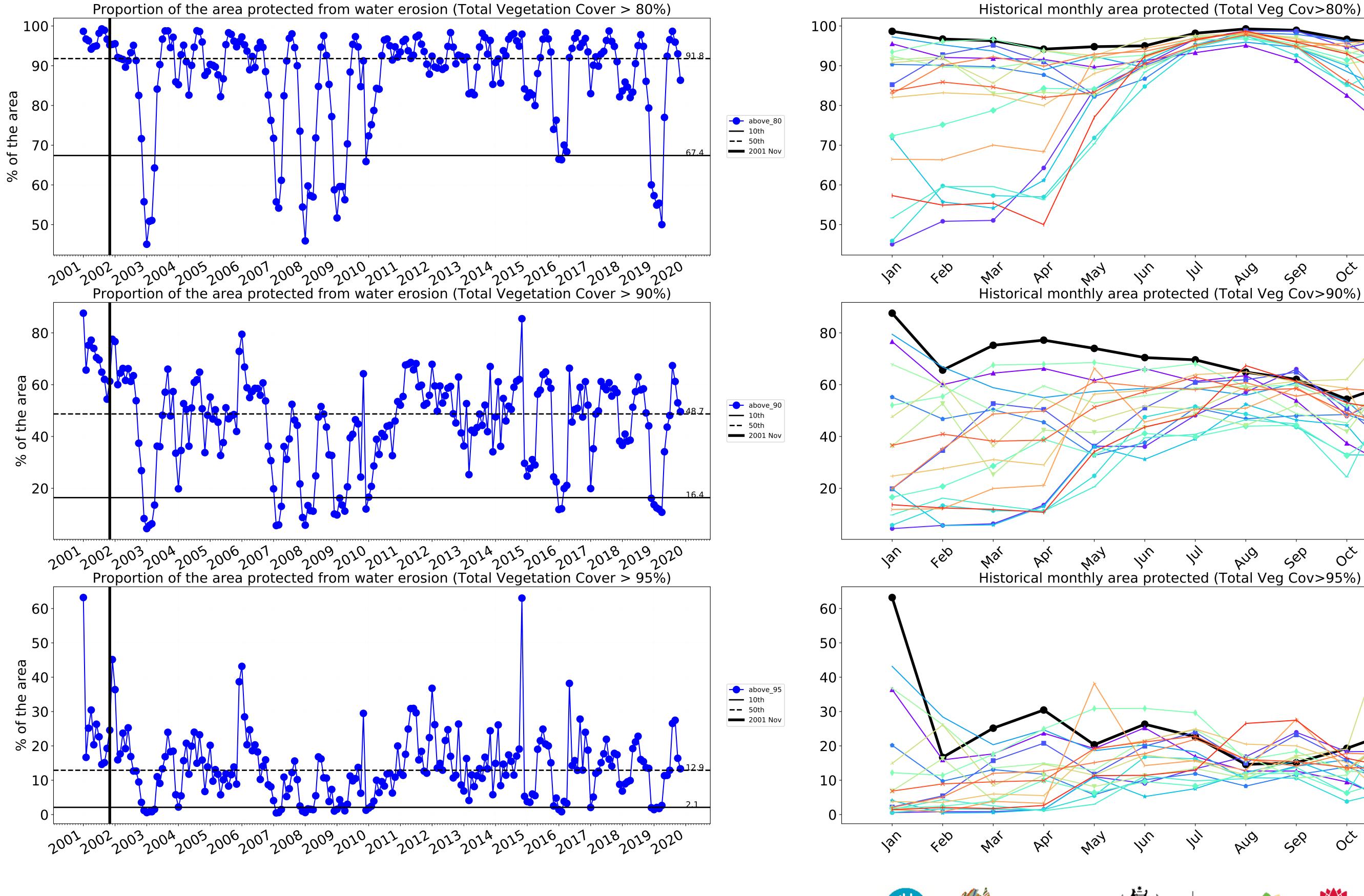


Wind erosion historical monthly area protected (Total Veg Cov >50%)

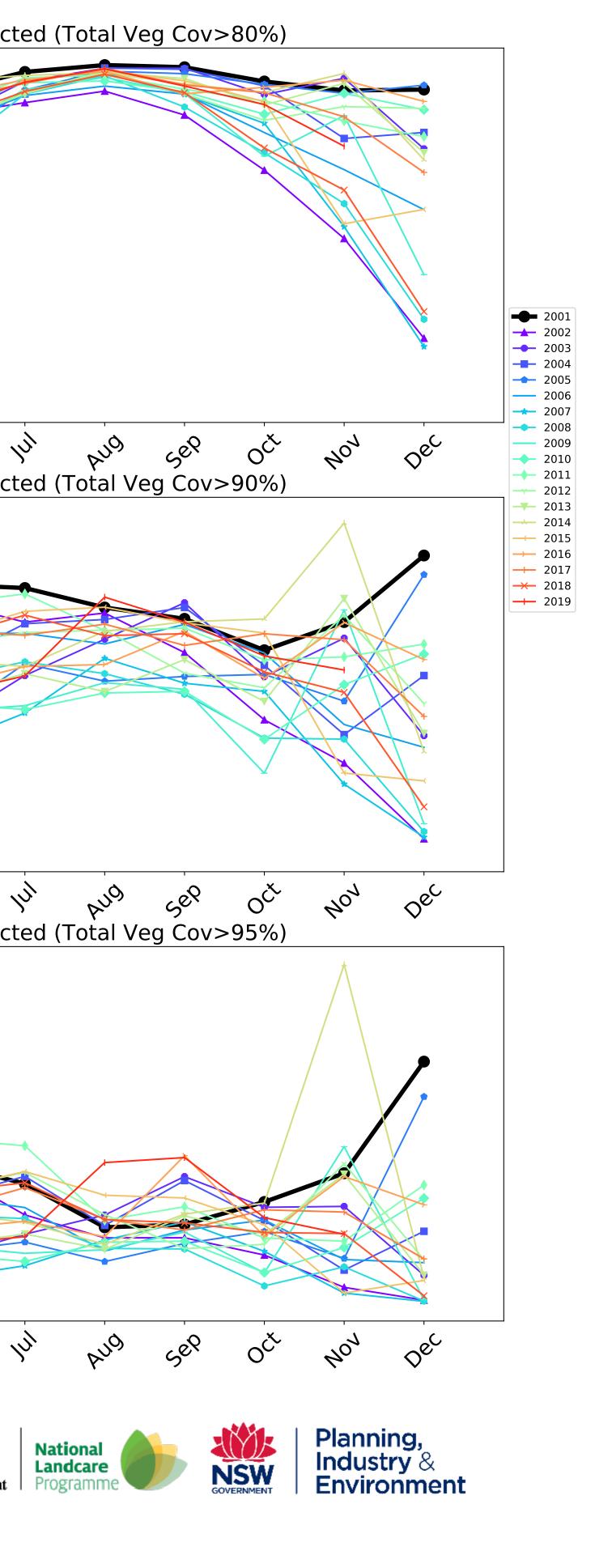
100 95 --- above_70 **—** 10th **——** 50th **—** 2001 Nov 90 85 80











Grazing - Forest (non woodland)

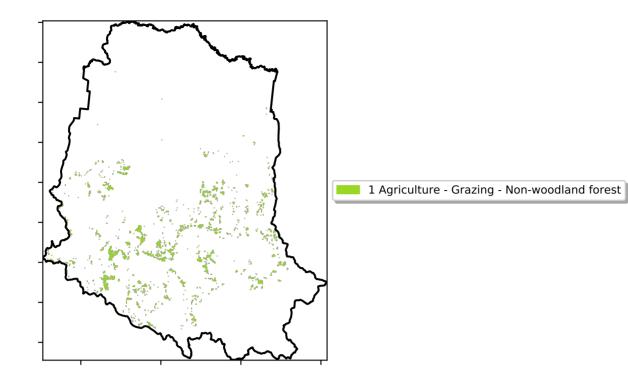
12%100%

52% 70%

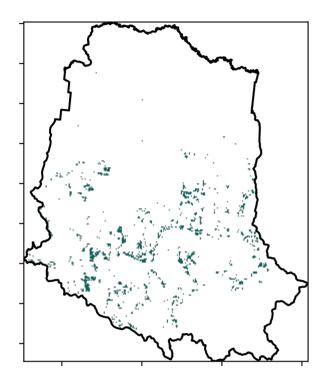
320/05/001

0.30%

Land use and forest cover



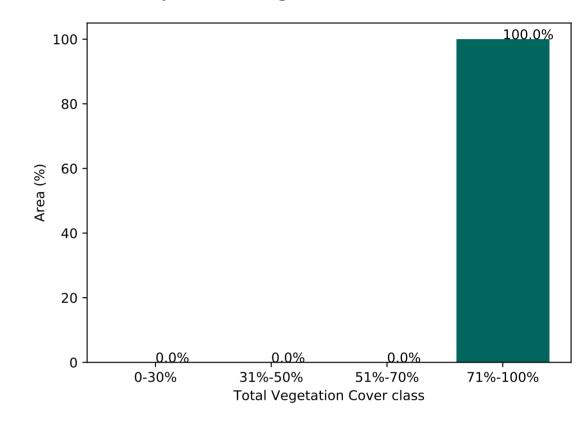
Total Vegetation Cover [%]







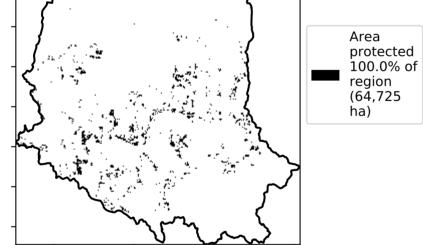
Proportion of vegetation cover class in area



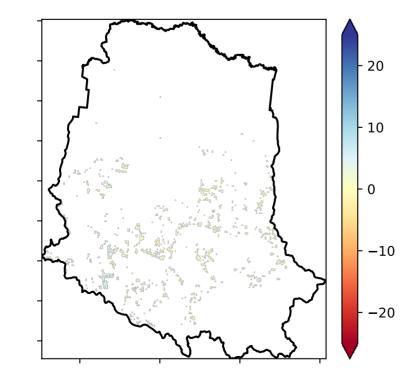
% Area protected from wind erosion (>50%)



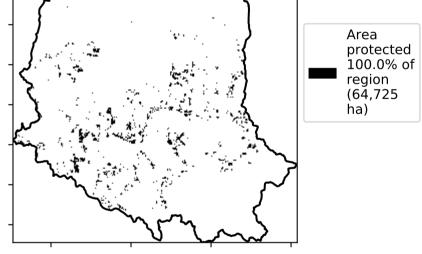
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)



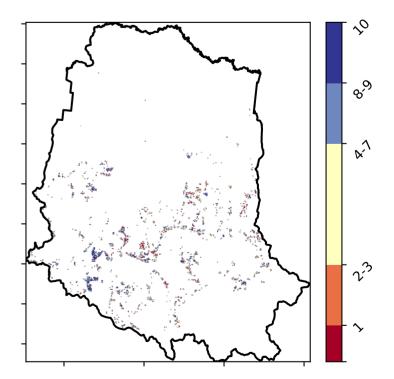
Total Vegetation Cover Anomaly [%]



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.

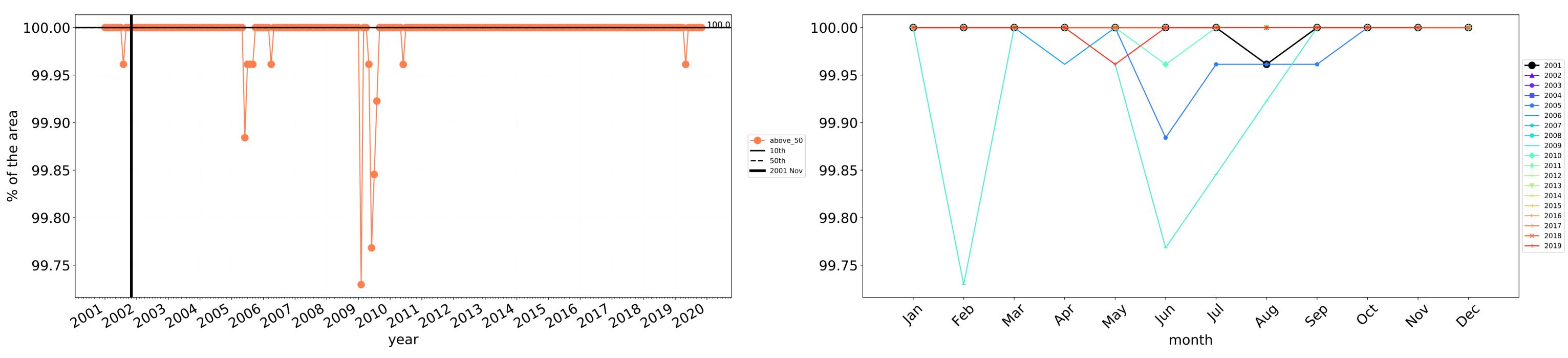


Total Vegetation Cover Decile [%]

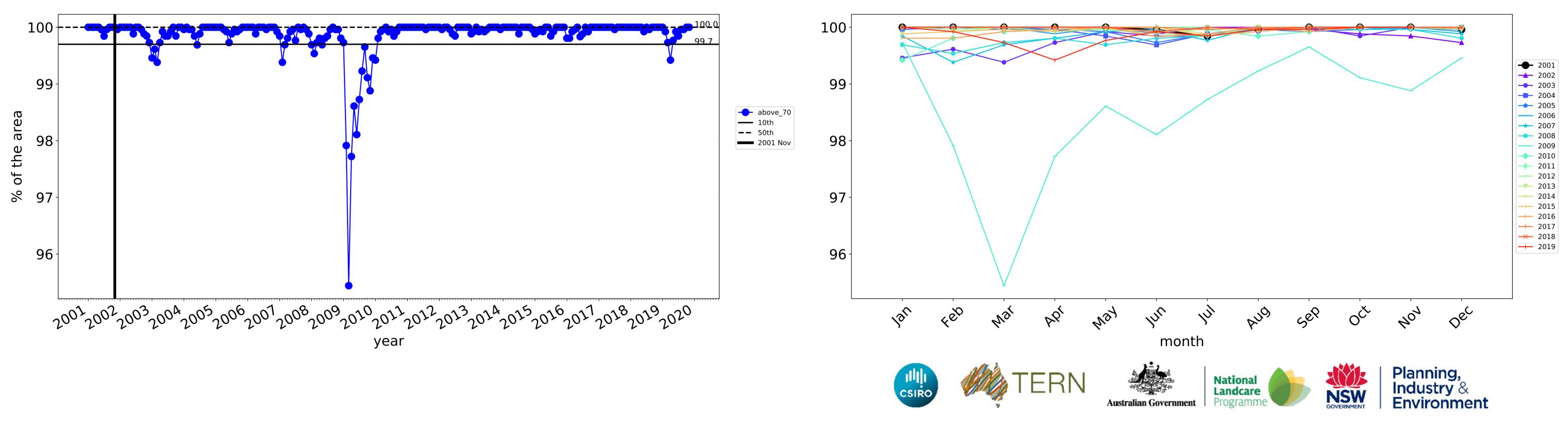




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

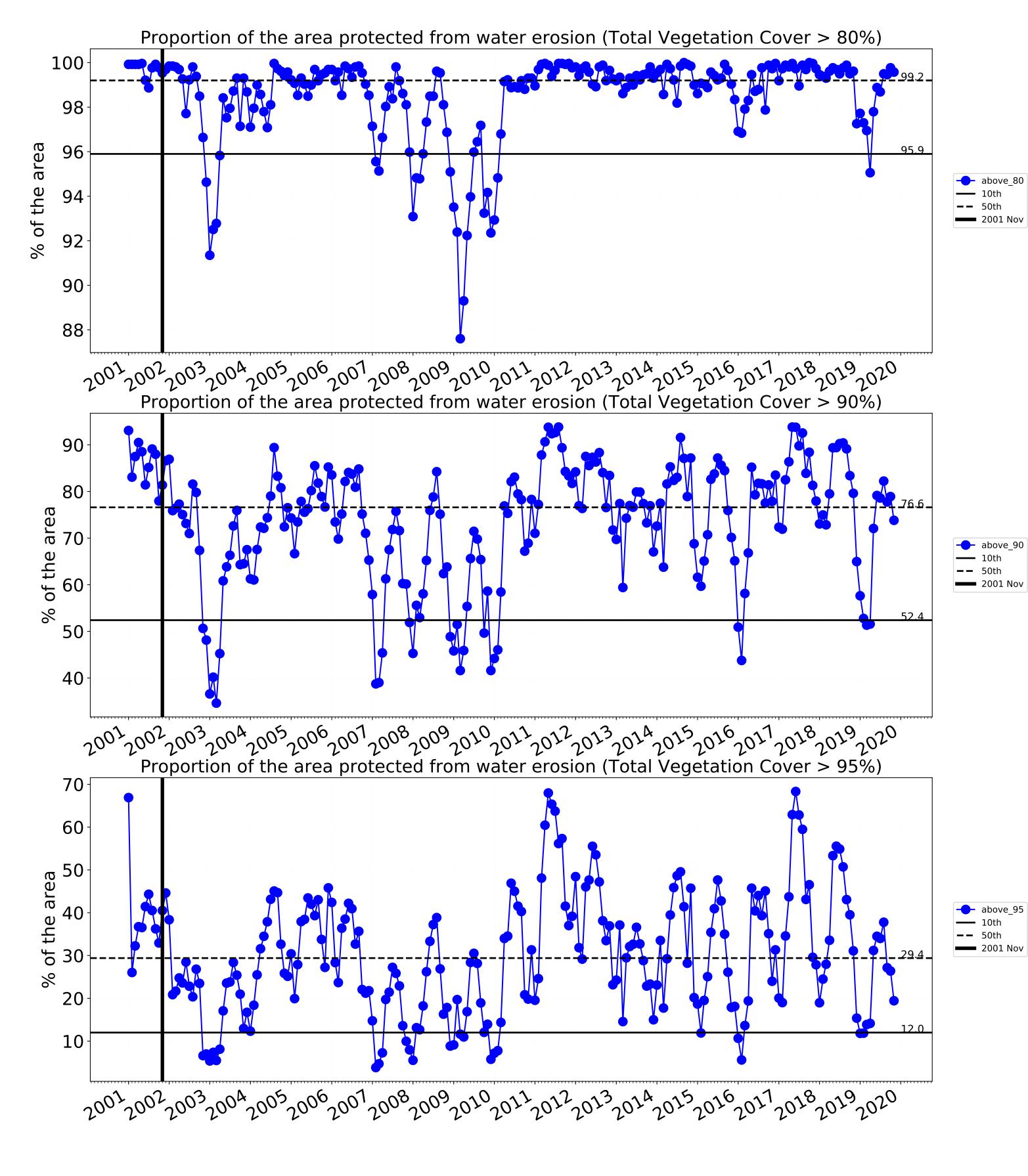


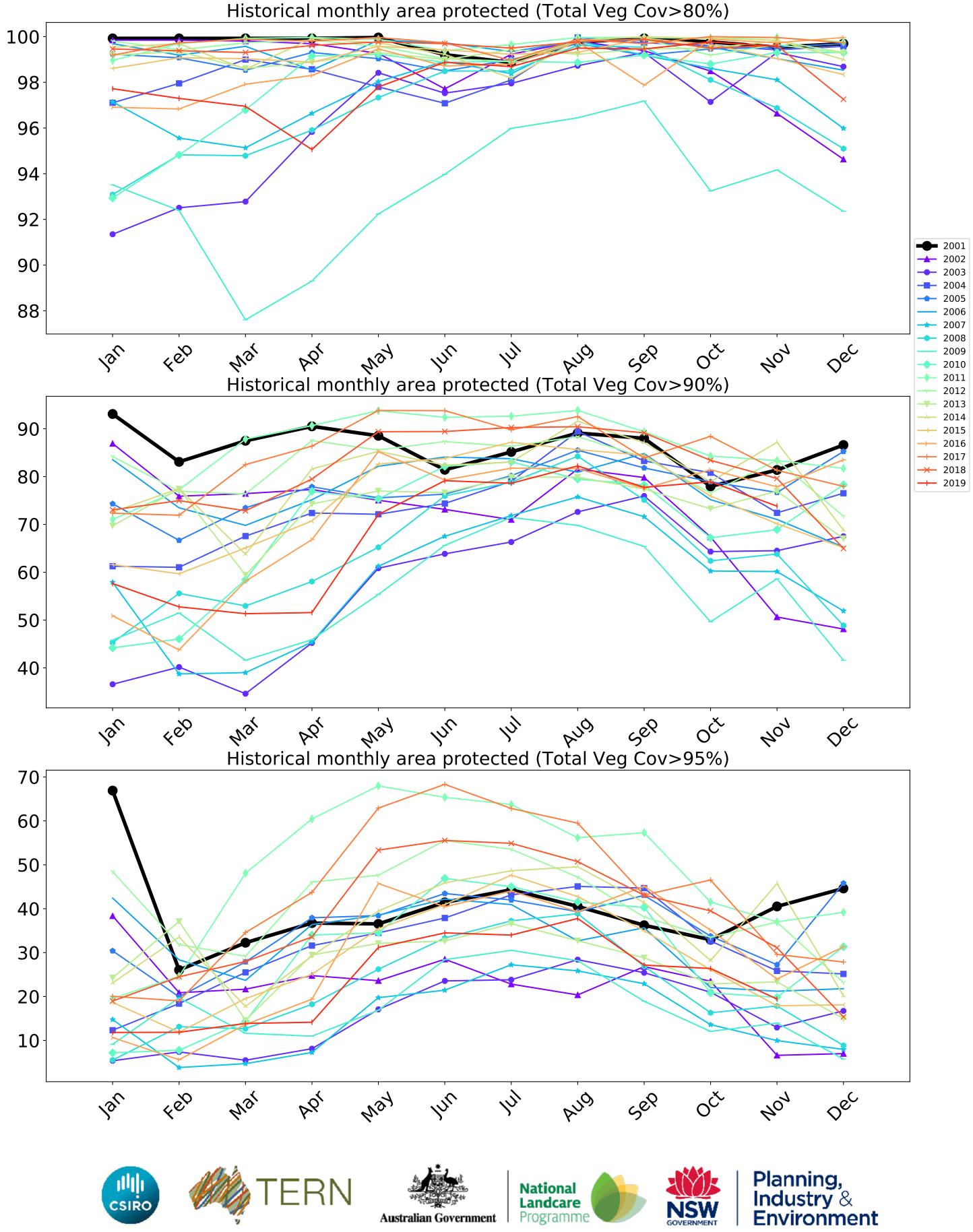


Wind erosion historical monthly area protected (Total Veg Cov >50%)

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



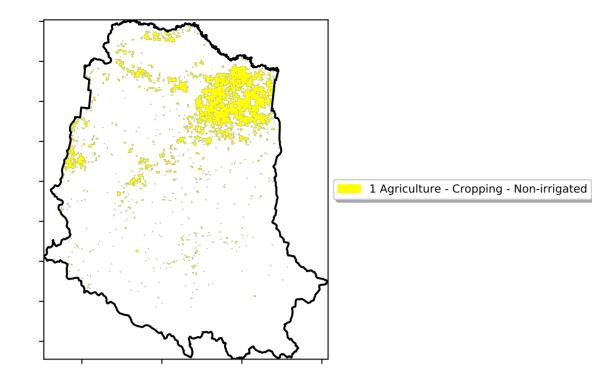




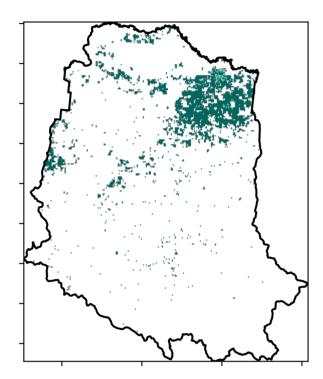


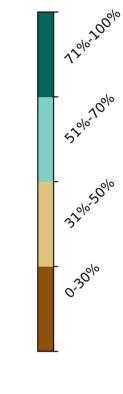
Cropping

Land use and forest cover

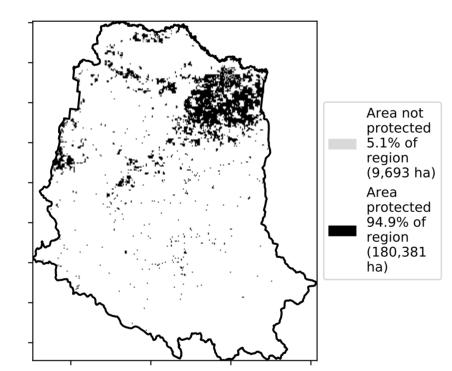


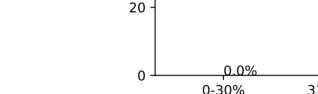
Total Vegetation Cover [%]



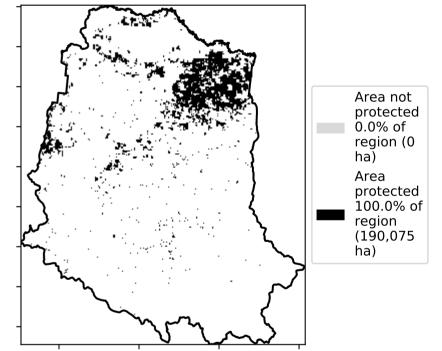


% Area protected from water erosion (>70%)

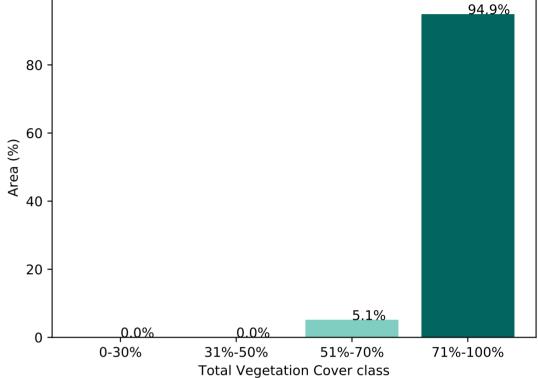


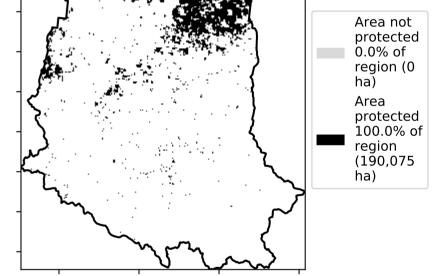


% Area protected from wind erosion (>50%)

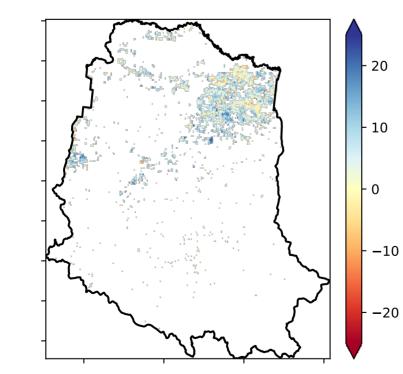


Proportion of vegetation cover class in area



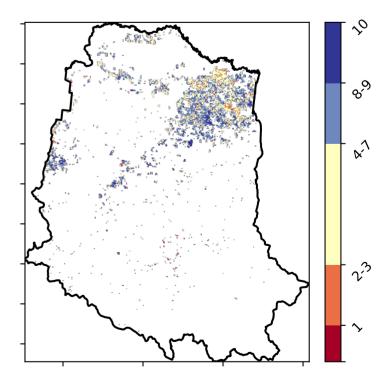


Total Vegetation Cover Anomaly [%]



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.

Total Vegetation Cover Decile [%]





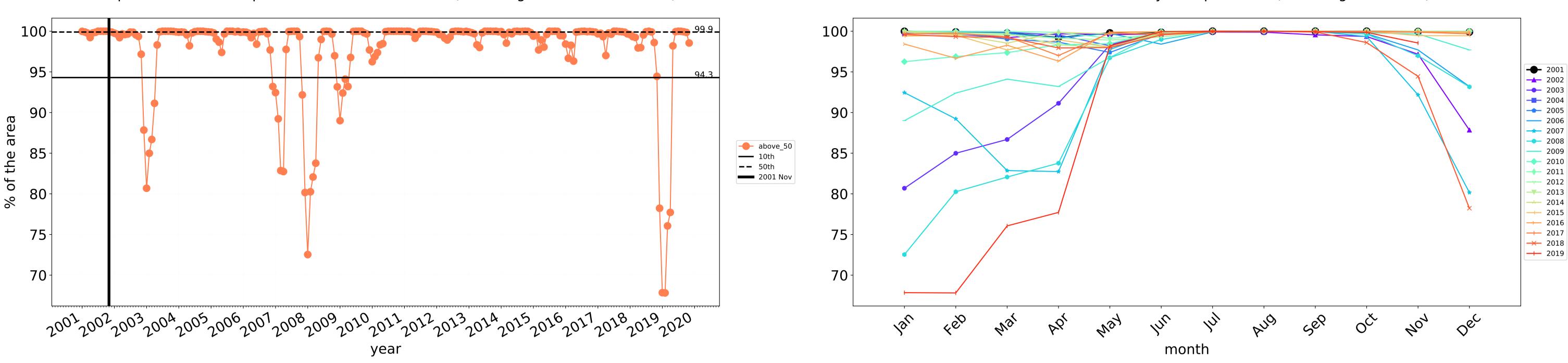
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land Use of Australia (2018) and Forests

of Australia (2018)

Derived from



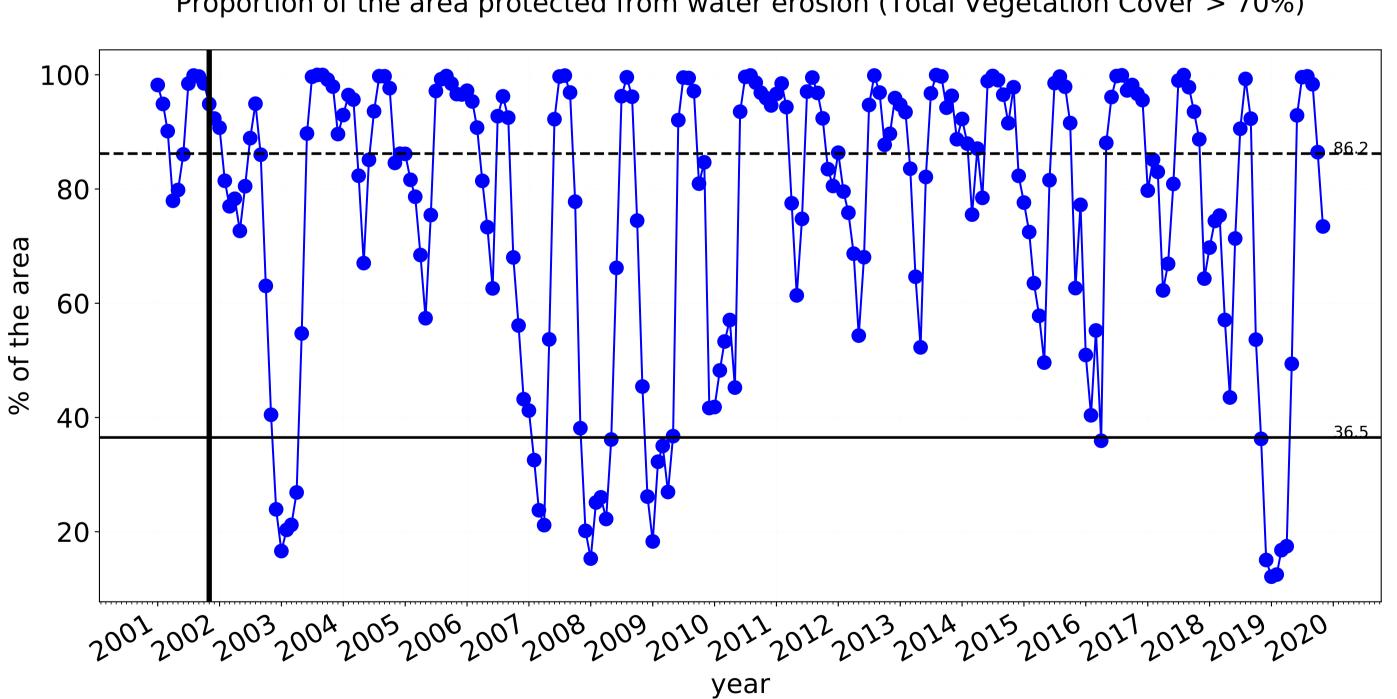
---- above_70

— 2001 Nov

—— 10th

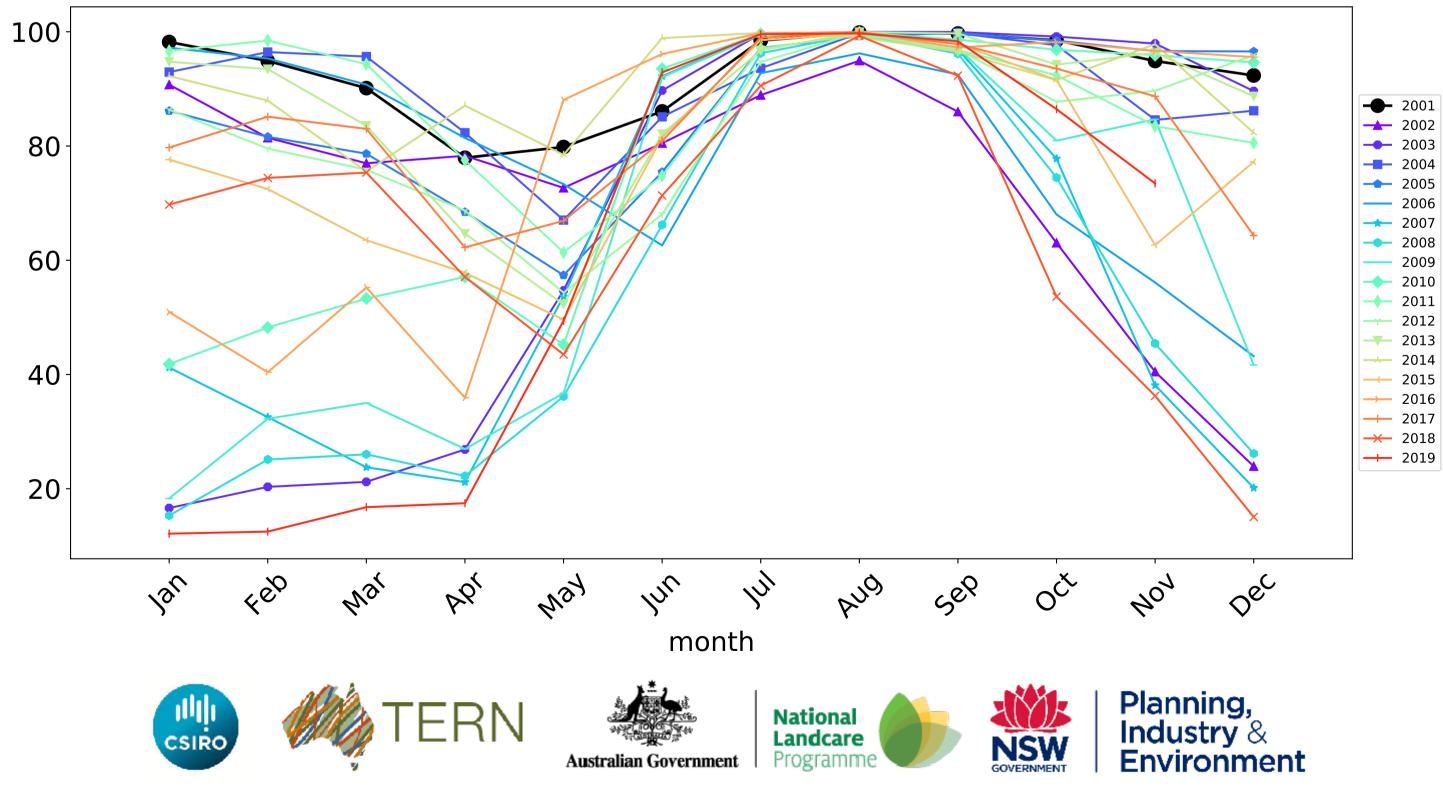
—— 50th

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



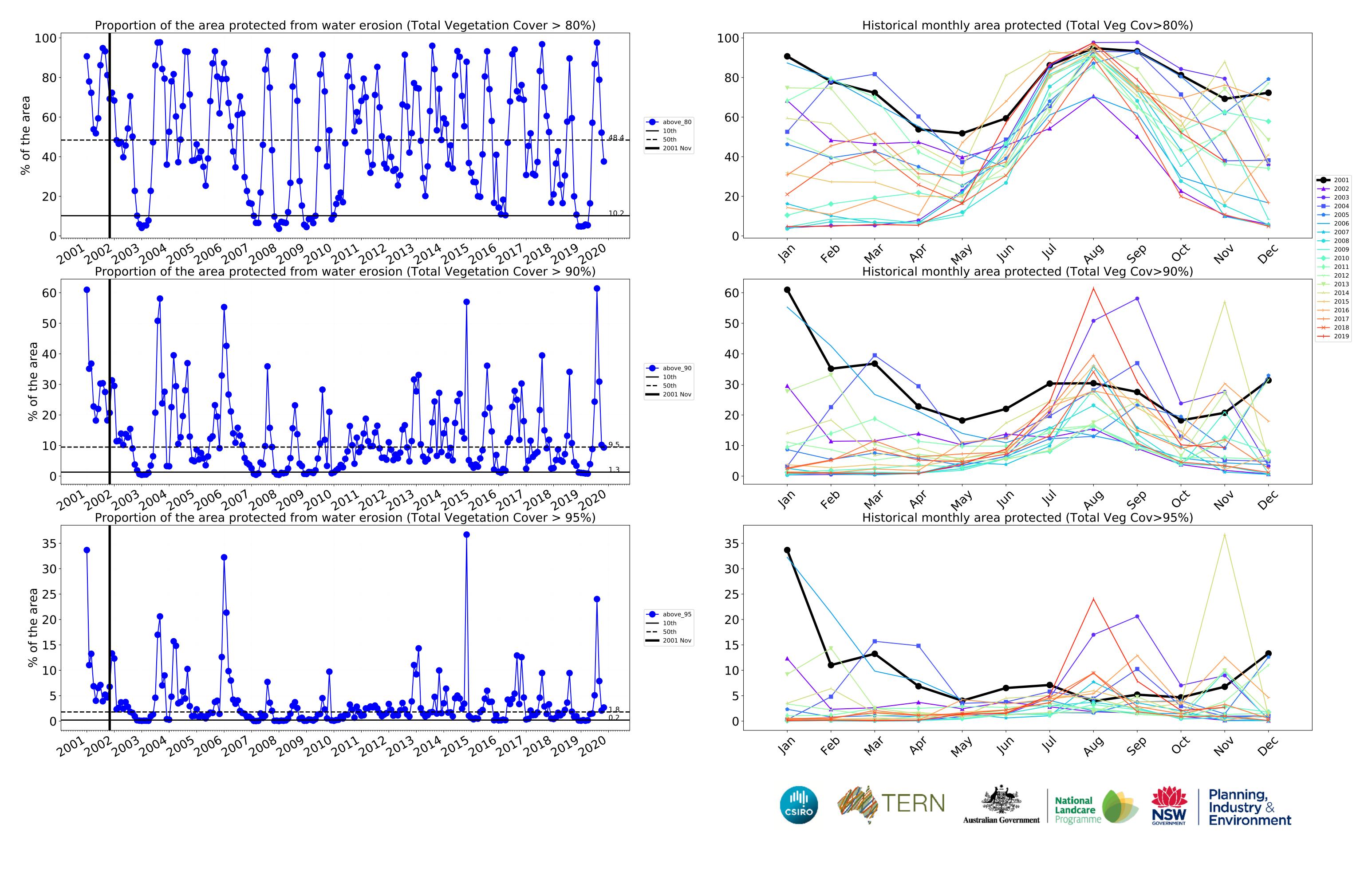
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

Cropping timeseries



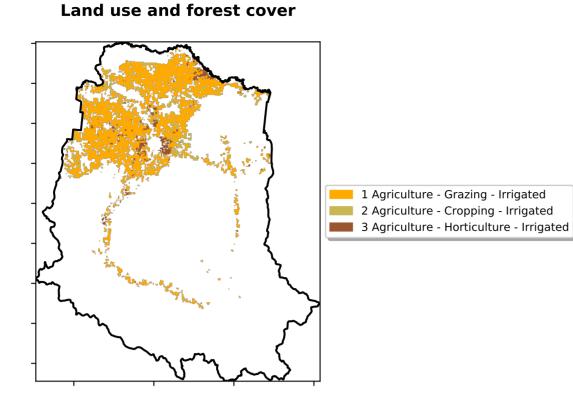
Wind erosion historical monthly area protected (Total Veg Cov >50%)

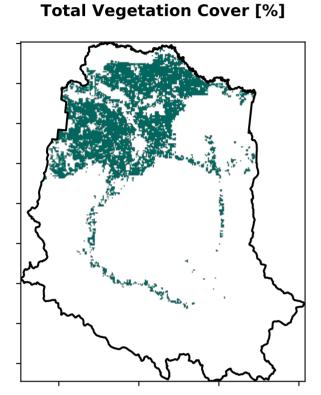
Water erosion historical monthly area protected (Total Veg Cov>70%)

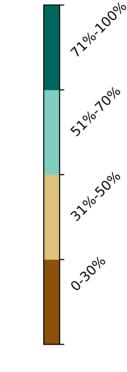


Irrigation

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

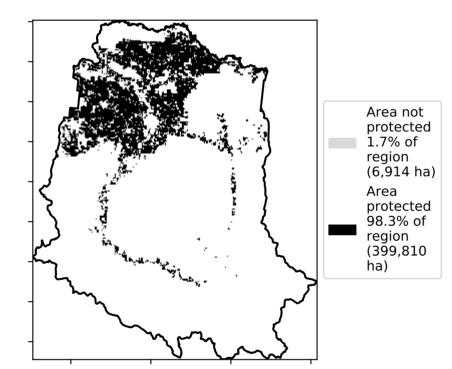


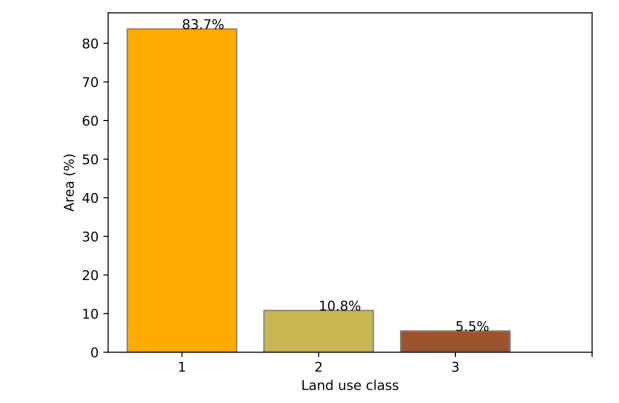




1 Agriculture - Grazing - Irrigated

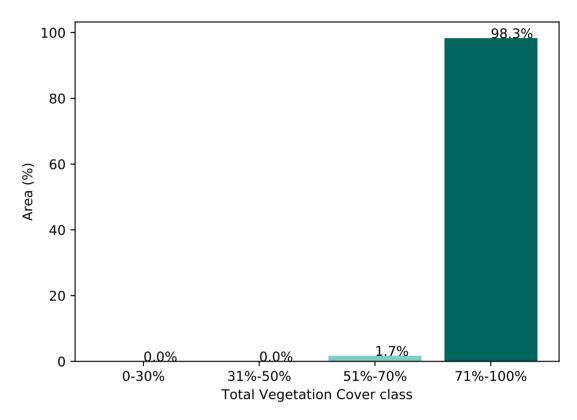
% Area protected from water erosion (>70%)



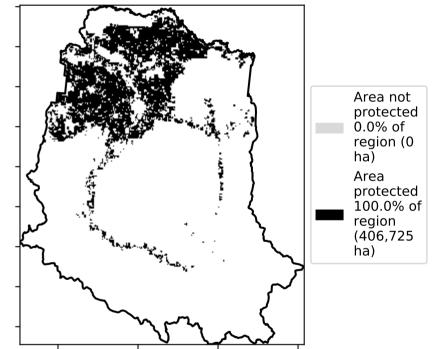


Proportion of each land class in area

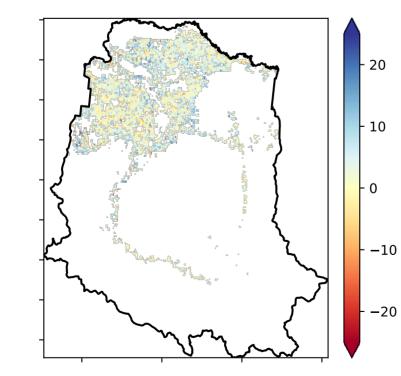
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

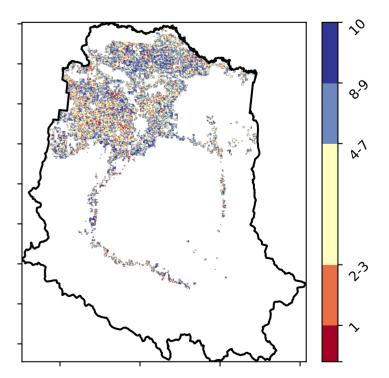


Total Vegetation Cover Anomaly [%]



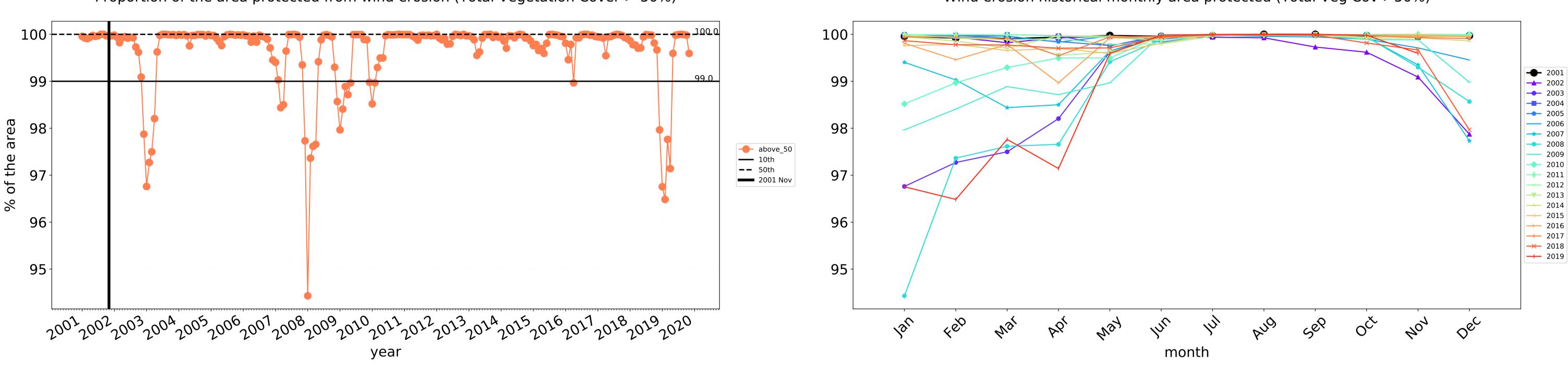
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

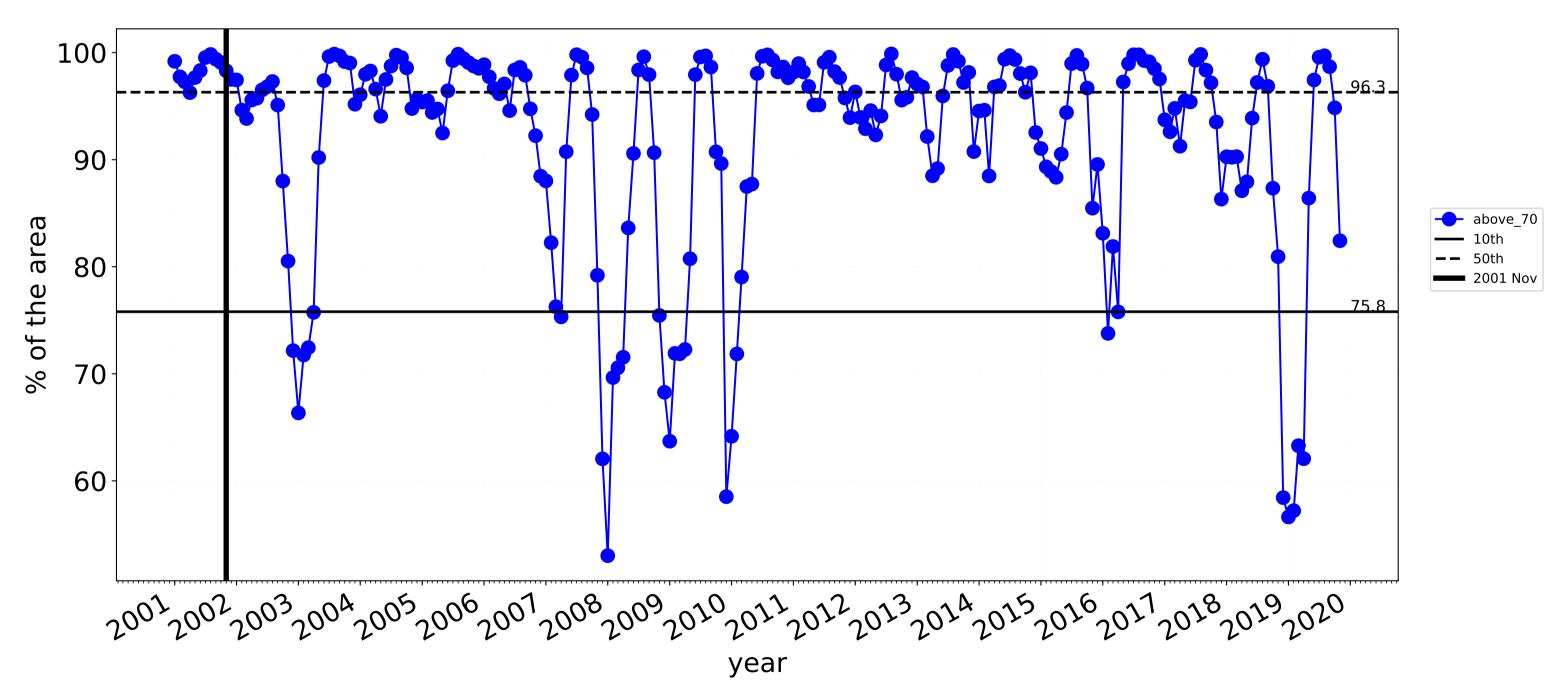




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

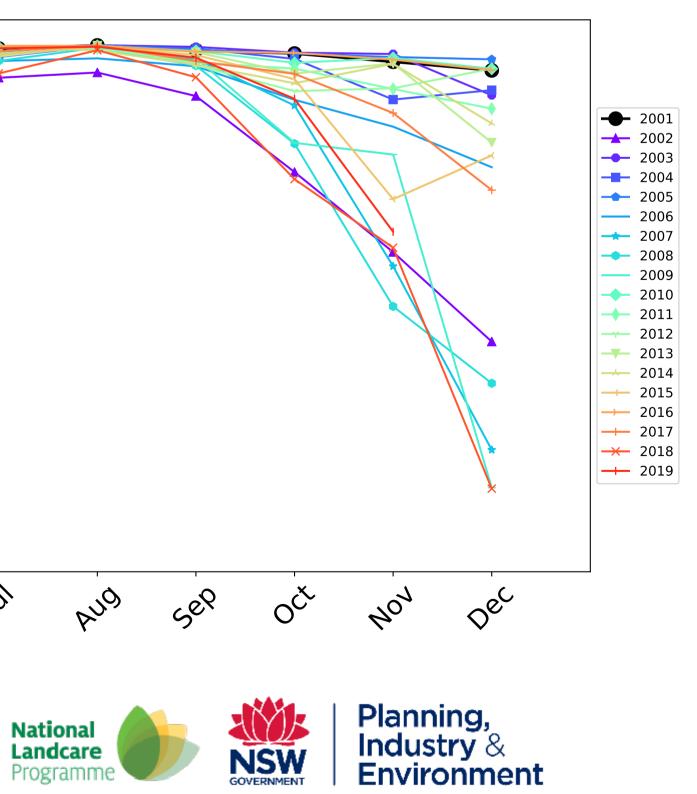


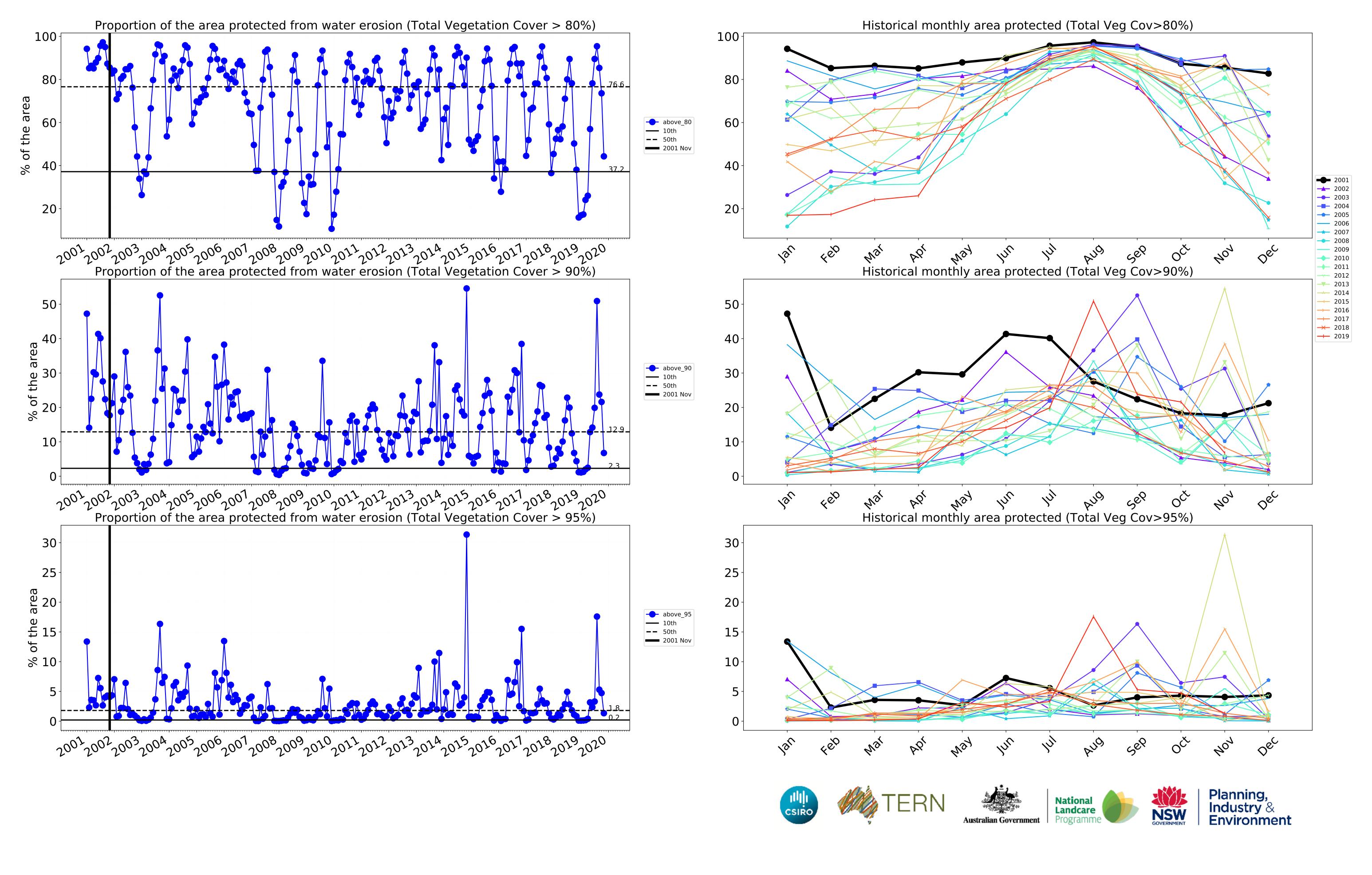
Irrigation timeseries

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

100-90-80 70-60feb May In Jan PQ1 1¹1 Mai month TERN (1912) CSIRO Australian Government

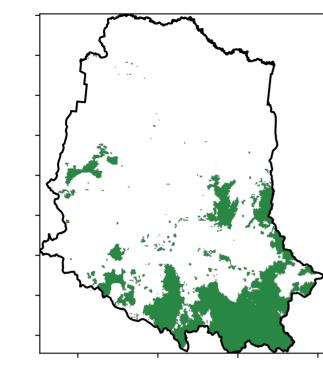
Water erosion historical monthly area protected (Total Veg Cov>70%)





Production native forests and plantation forests

Land use and forest cover



1 Production native forests and plantation forests

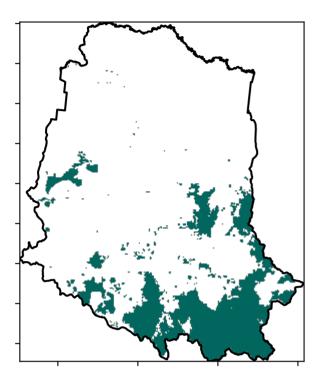
12%200%

52%70%

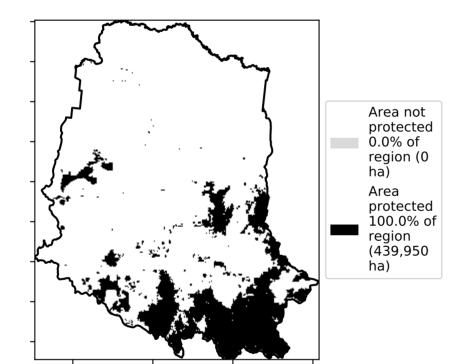
32%50

0.30%

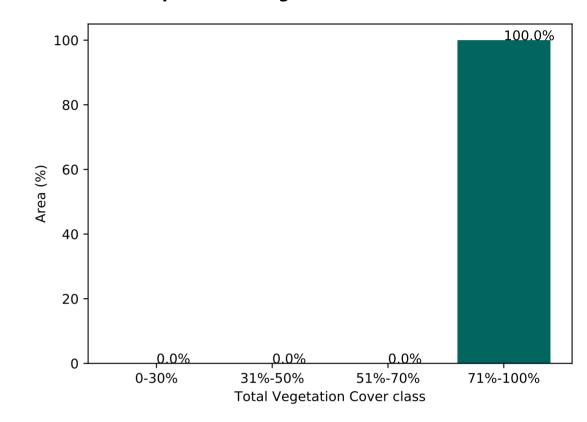
Total Vegetation Cover [%]







Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Area

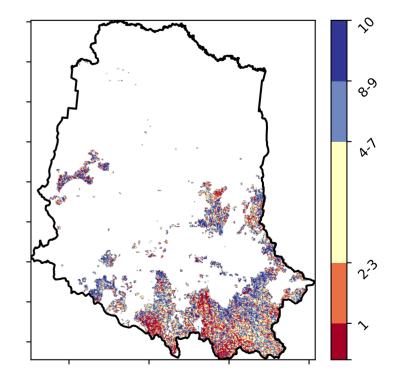
ĥa)

protected 100.0% of

region (439,950

Total Vegetation Cover Anomaly [%]

Total Vegetation Cover Decile [%]





Deciles show where the

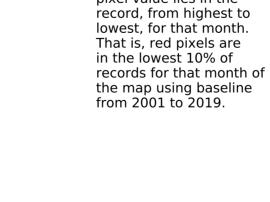
pixel value lies in the

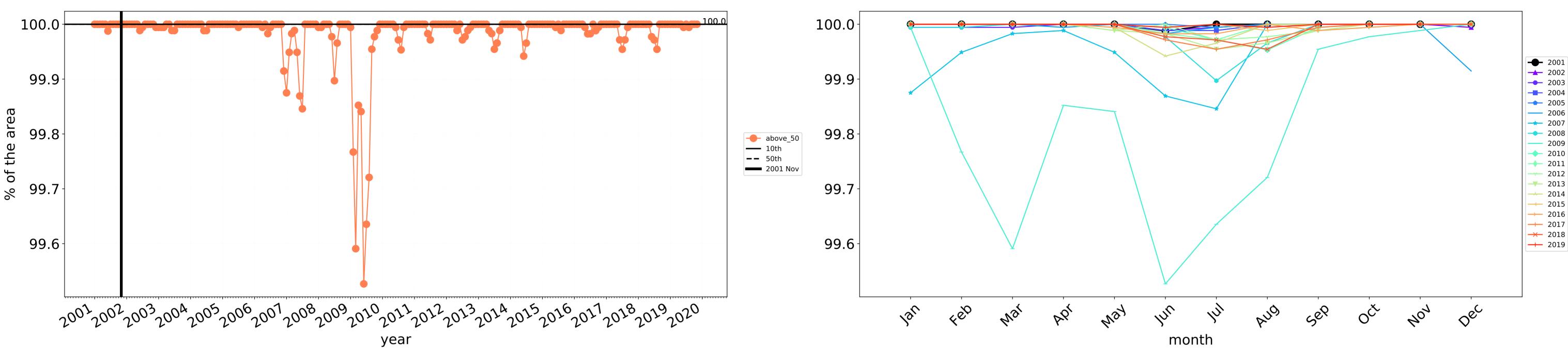
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Catchment Scale Land Use and Forests of Australia (2018)

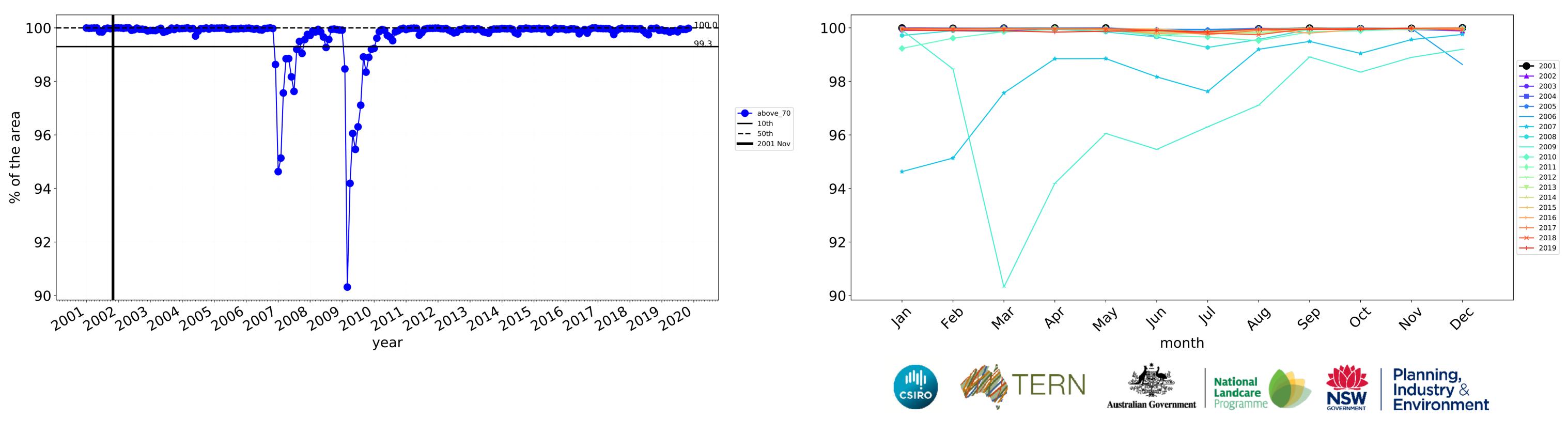
Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

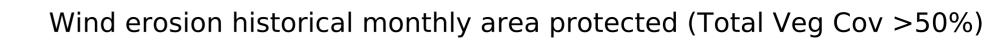
Derived from



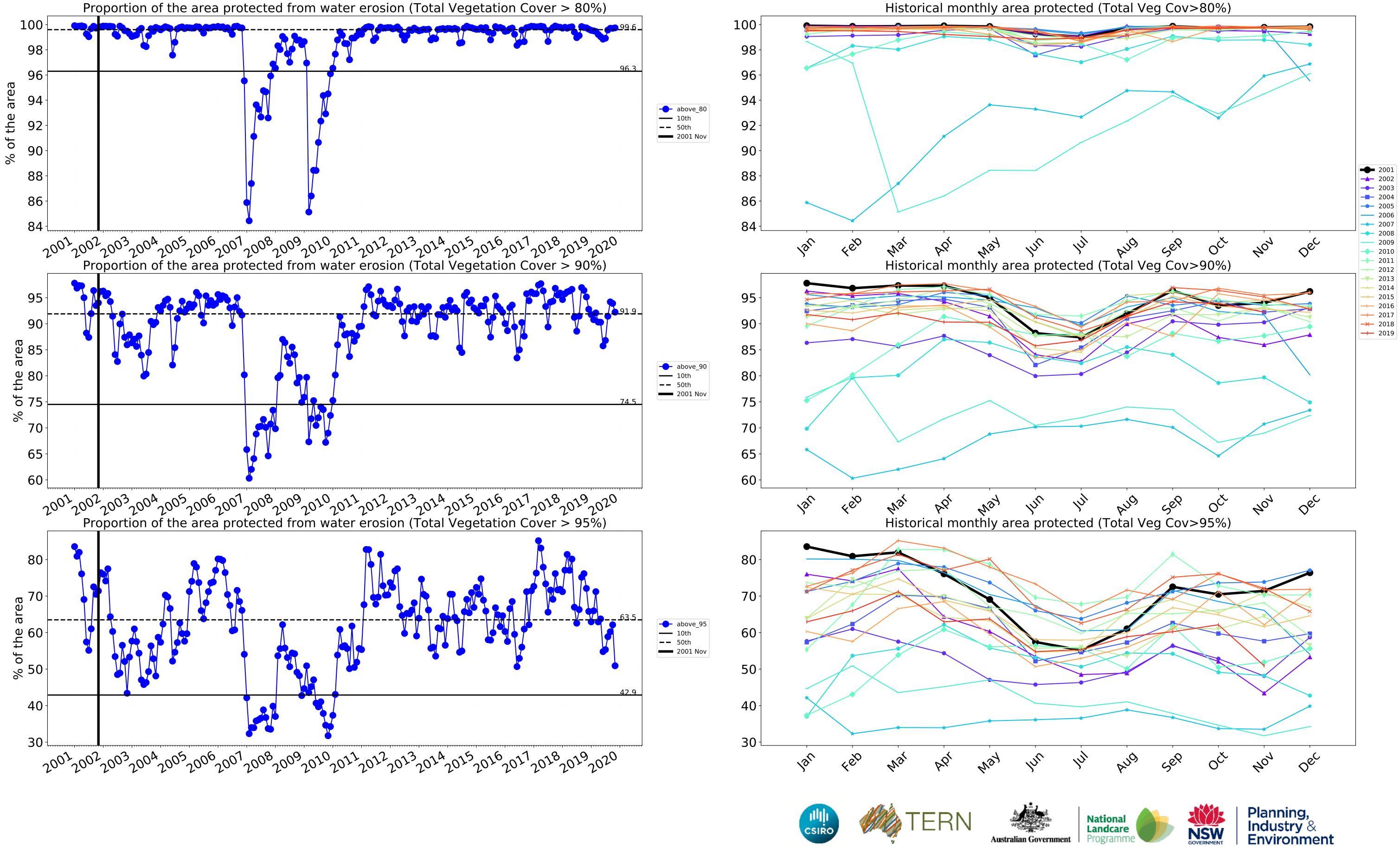


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)





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



Australian Government

Goulburn Broken (2,393,950 ha and no data 13,513 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	2,393,950	100.0% 2,392,900	99.9% 2,391,551	98.7% 2,362,870	92.0% 2,203,423	57.1% 1,367,389	29.5% 705,917
Conservation and natural environments	235,225	100.0% 235,125	99.9% 234,925	99.4% 233,850	97.7% 229,750	71.9% 169,075	37.0% 87,000
Conservation and natural environments non forest	42,050	99.8% 41,950	99.3% 41,750	97.3% 40,925	91.1% 38,325	53.6% 22,525	21.1% 8,875
Conservation and natural environments Forest (non woodland)	172,100	100.0% 172,100	100.0% 172,100	99.9% 171,925	99.3% 170,900	78.1% 134,350	42.8% 73,625
Agriculture	1,575,875	100.0% 1,575,875	100.0% 1,575,450	98.6% 1,554,075	89.7% 1,413,950	45.9% 723,500	17.7% 279,200
Grazing	966,800	100.0% 966,800	100.0% 966,625	99.5% 961,800	95.5% 923,425	62.6% 605,450	25.6% 247,375
Grazing non forest	892,675	100.0% 892,675	100.0% 892,500	99.4% 887,700	95.2% 850,000	61.3% 546,975	24.6% 219,300
Grazing - Forest (non woodland)	64,725	100.0% 64,725	100.0% 64,725	100.0% 64,725	99.5% 64,425	81.4% 52,675	40.5% 26,225
Cropping	190,075	100.0% 190,075	100.0% 190,000	94.9% 180,350	69.2% 131,600	20.7% 39,350	6.8% 12,850
Irrigation	406,725	100.0% 406,725	100.0% 406,550	98.3% 399,825	85.5% 347,850	17.7% 72,000	4.1% 16,550
Production native forests and plantation forests	439,950	100.0% 439,950	100.0% 439,950	100.0% 439,875	99.8% 439,000	94.0% 413,625	71.4% 314,200

