Total vegetation cover soil protection Region:NRM Hunter NSW

Date: August 2009

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:

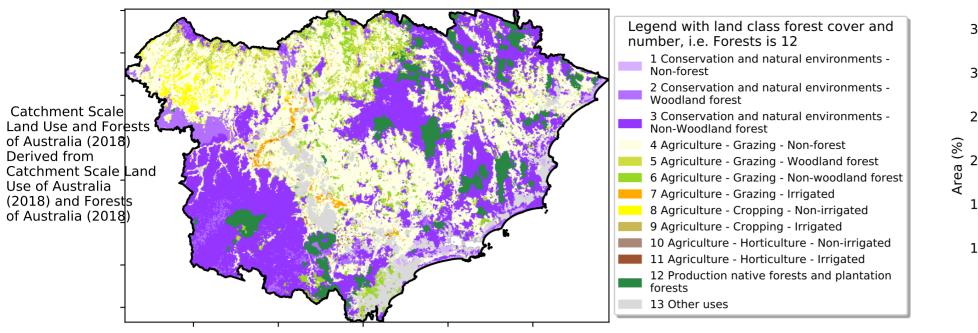
https://doi.org/10.4225/08/5848a3f19a7b3

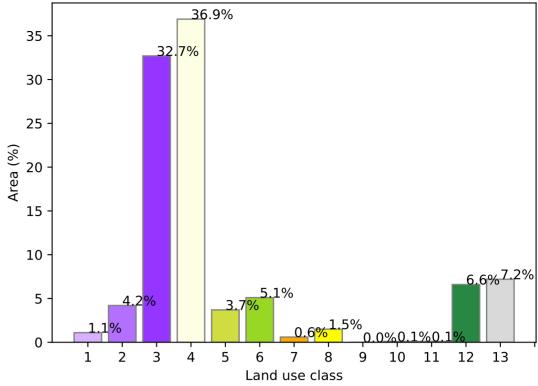


Vegetation Cover Aug 2009

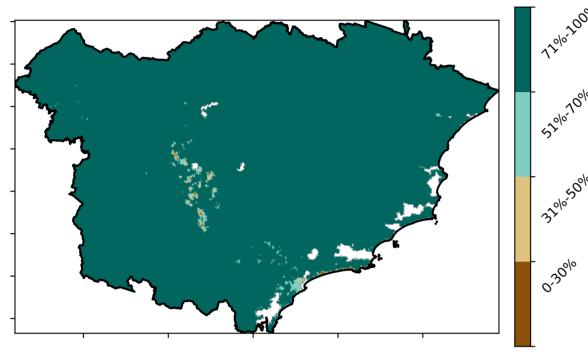
Land use and forest cover

Proportion of each land class in area

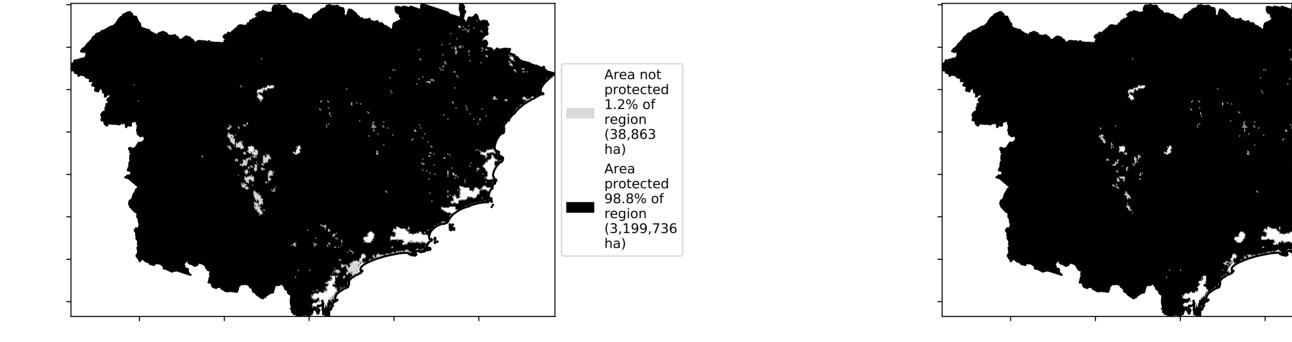




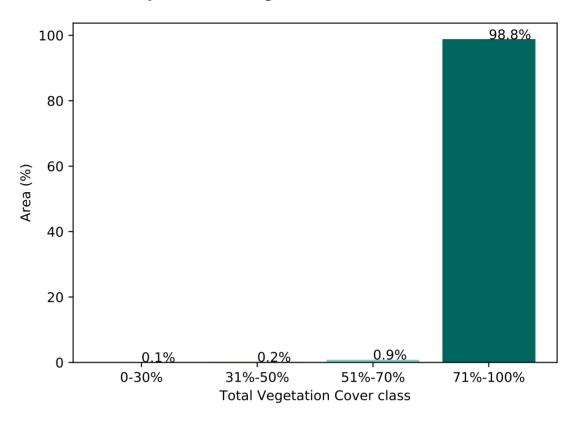
Total Vegetation Cover [%]



% Area protected from water erosion (>70%)



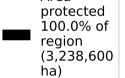
Proportion of vegetation cover class in area



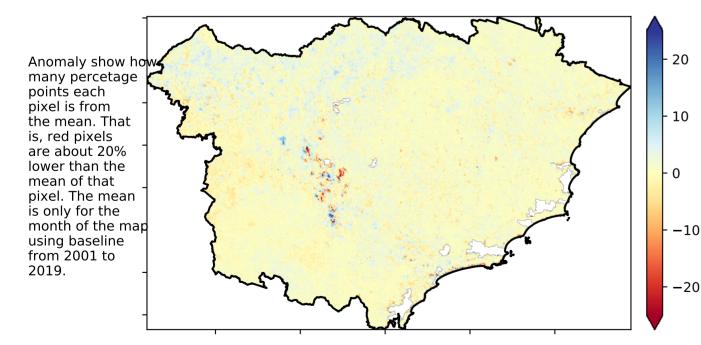
% Area protected from wind erosion (>50%)



Area not protected 0.0% of region (0 ha) Area

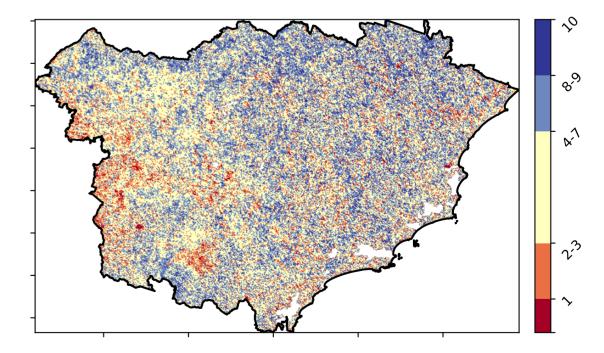


Total Vegetation Cover Anomaly [%]

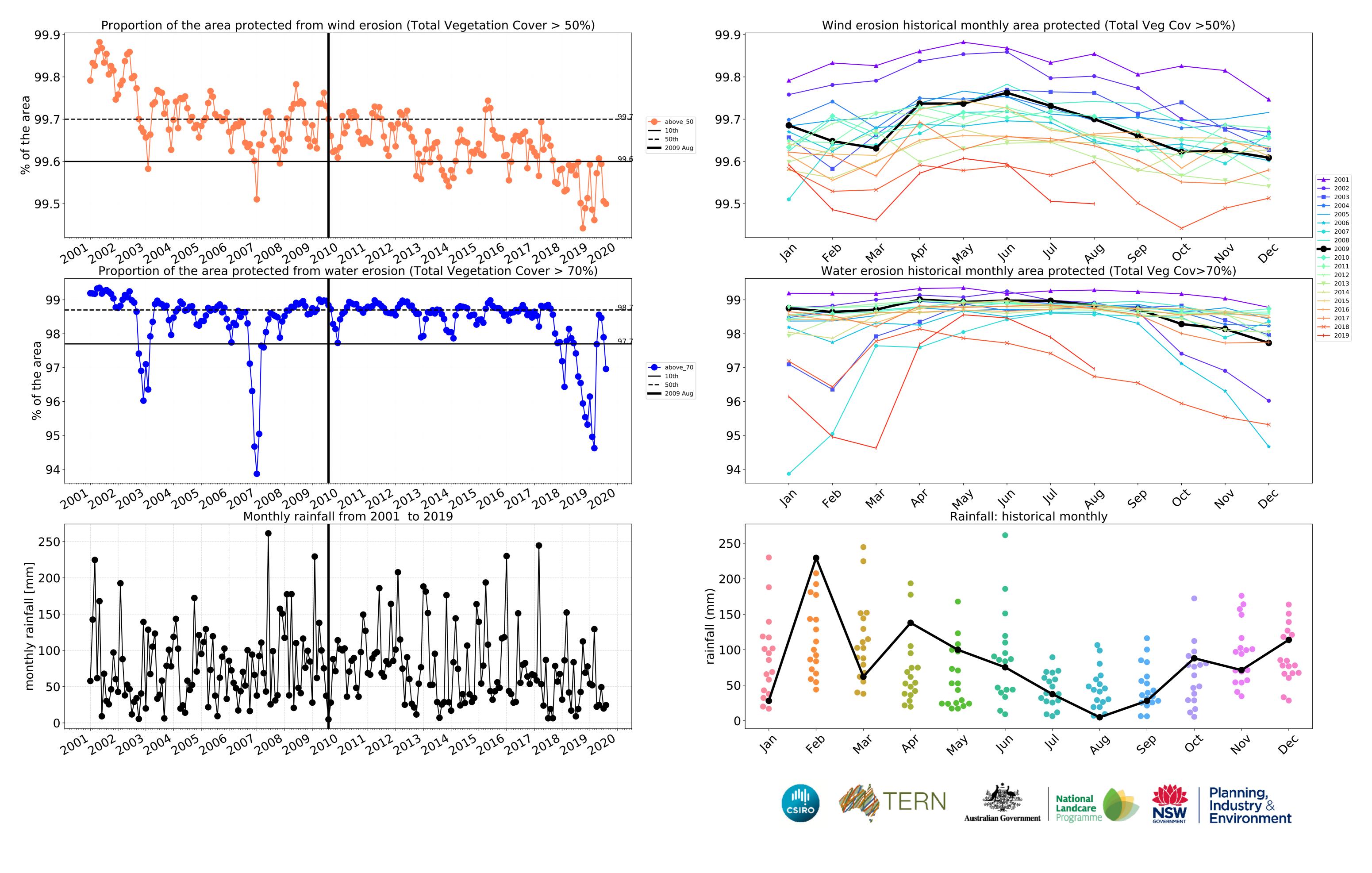


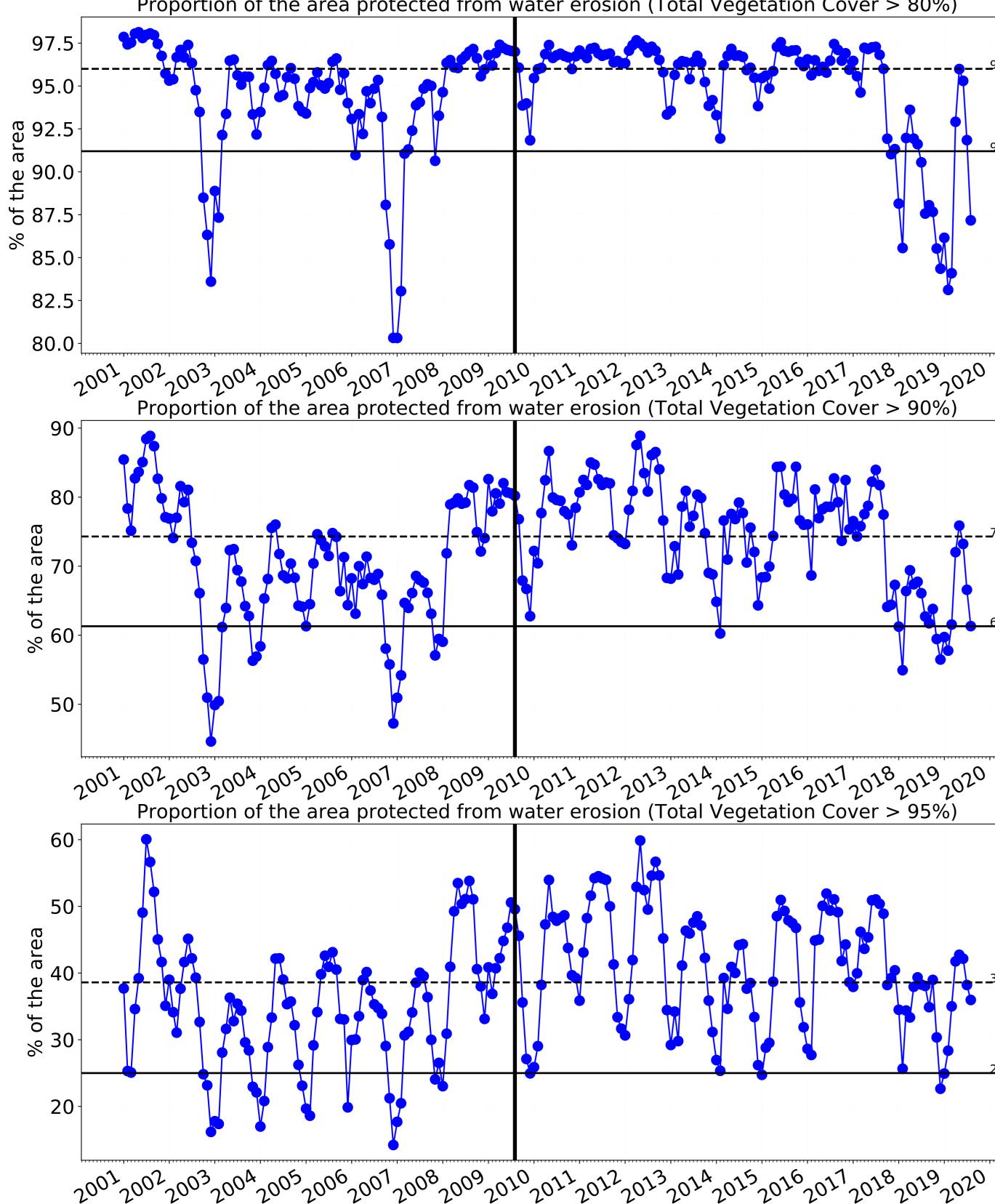
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

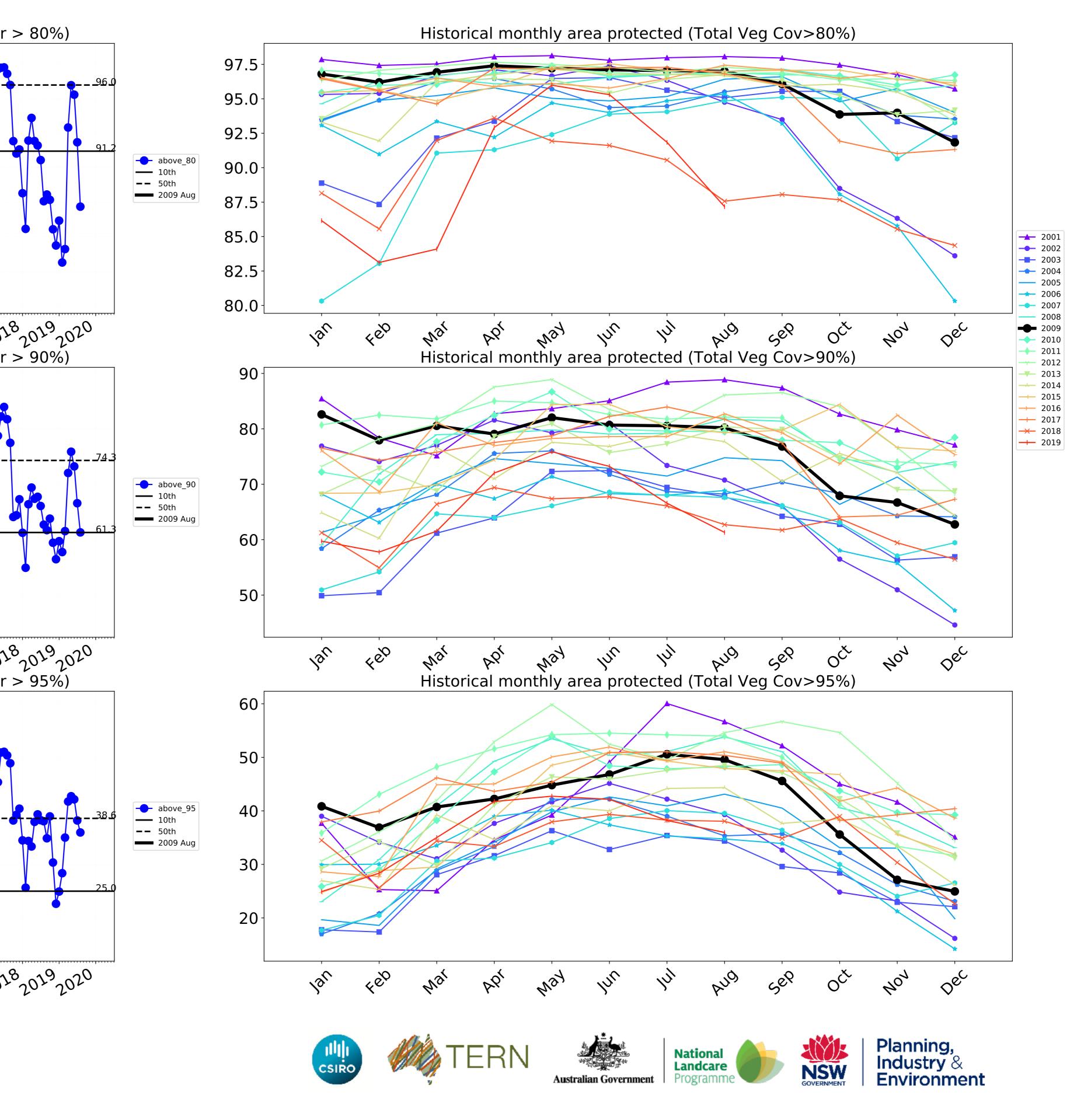






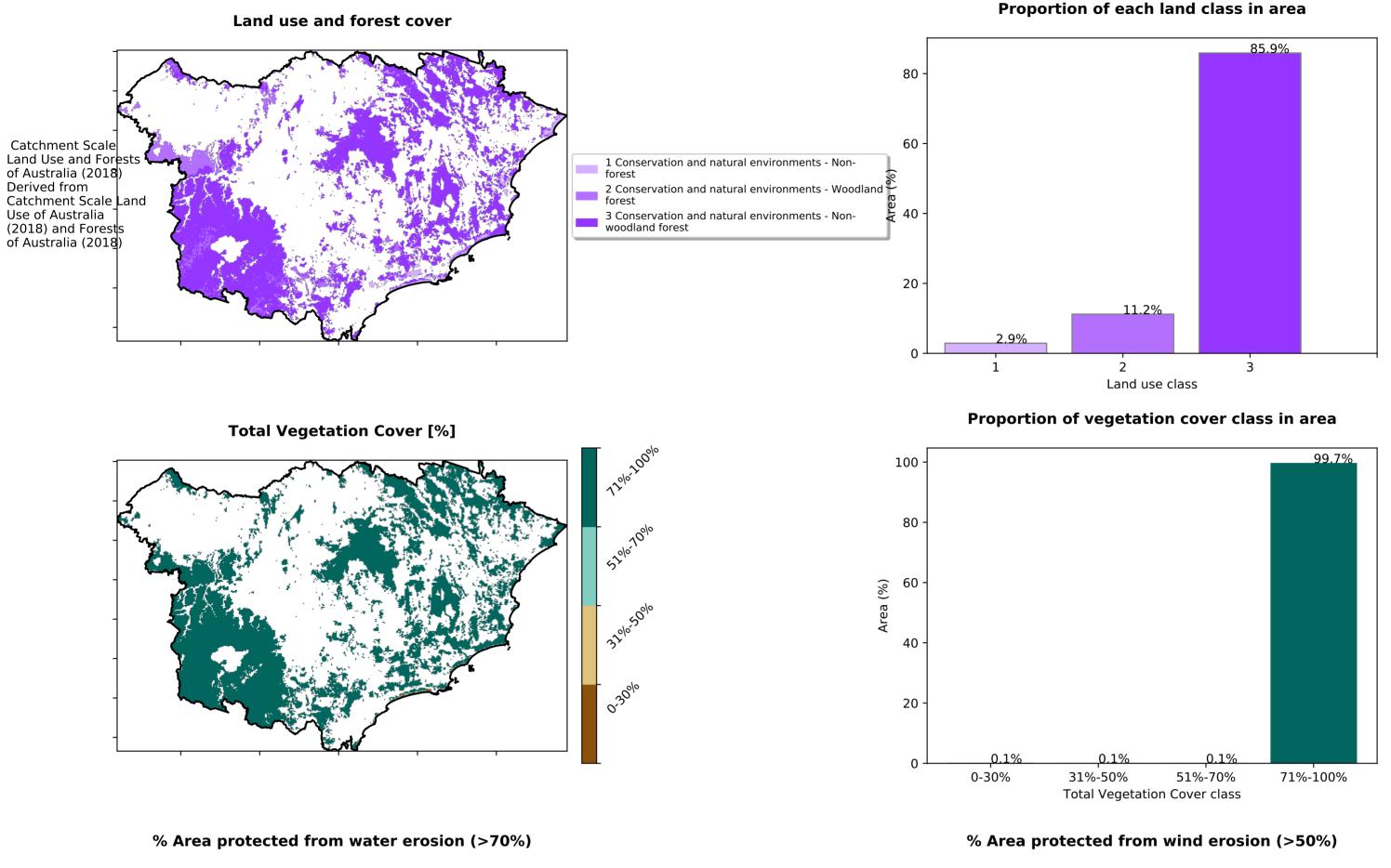


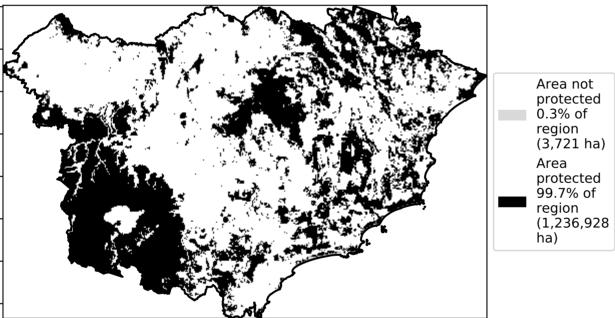
Proportion of the area protected from water erosion (Total Vegetation Cover > 80%)



4

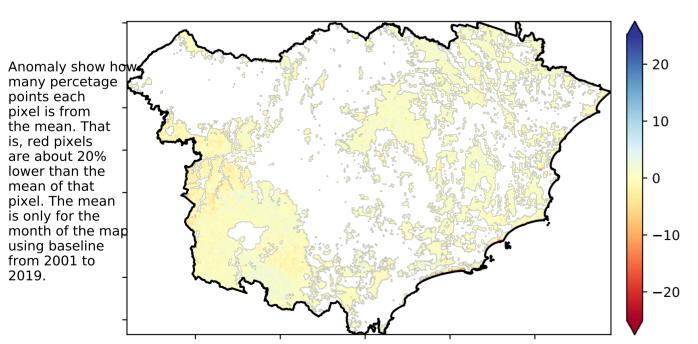
Conservation and natural environments





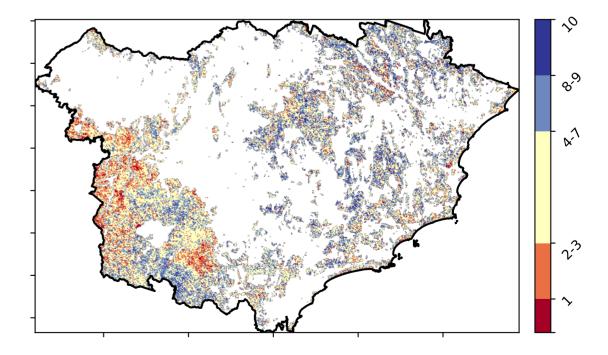
Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (1,240,650 ha)

Total Vegetation Cover Anomaly [%]



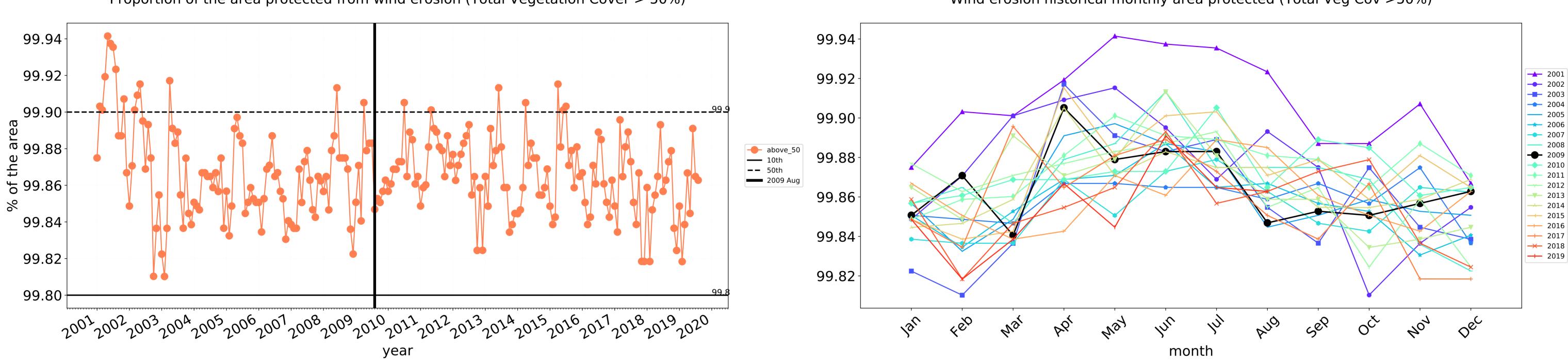
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]



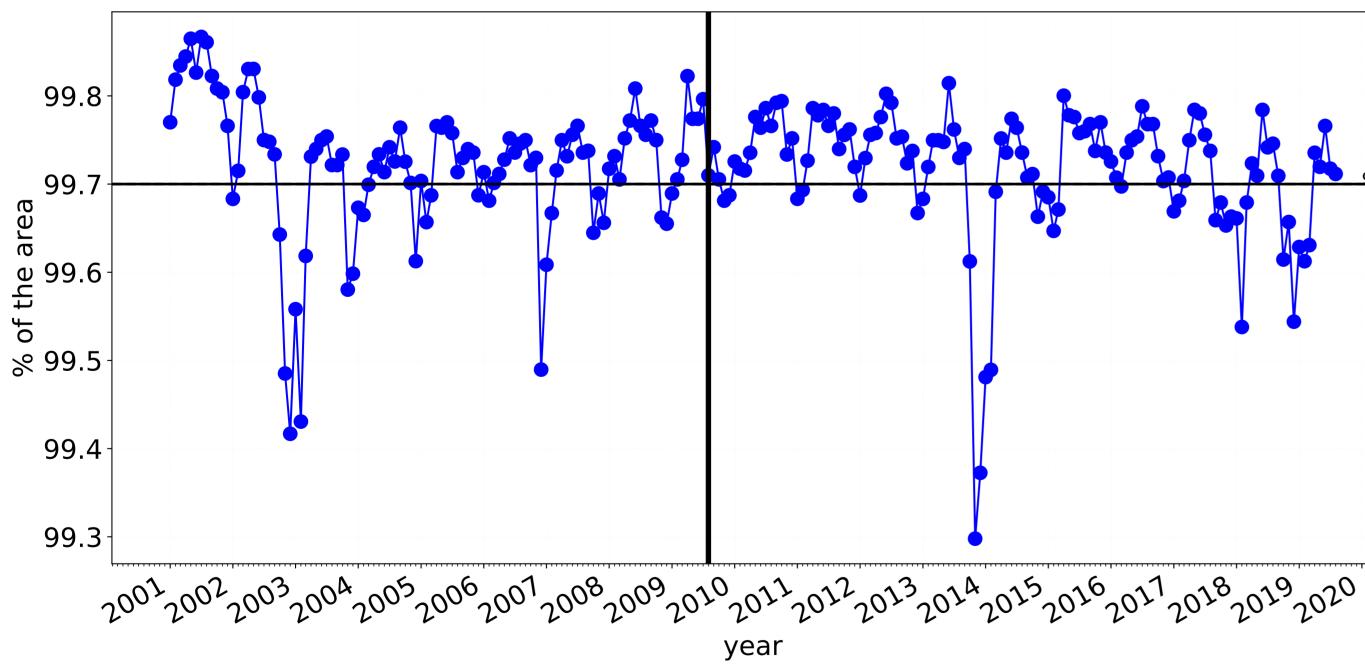


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Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

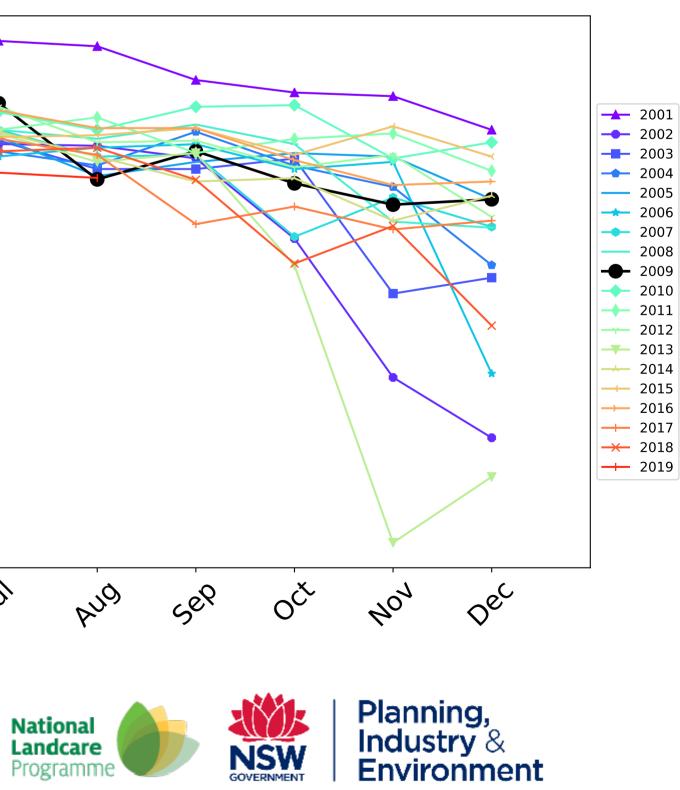


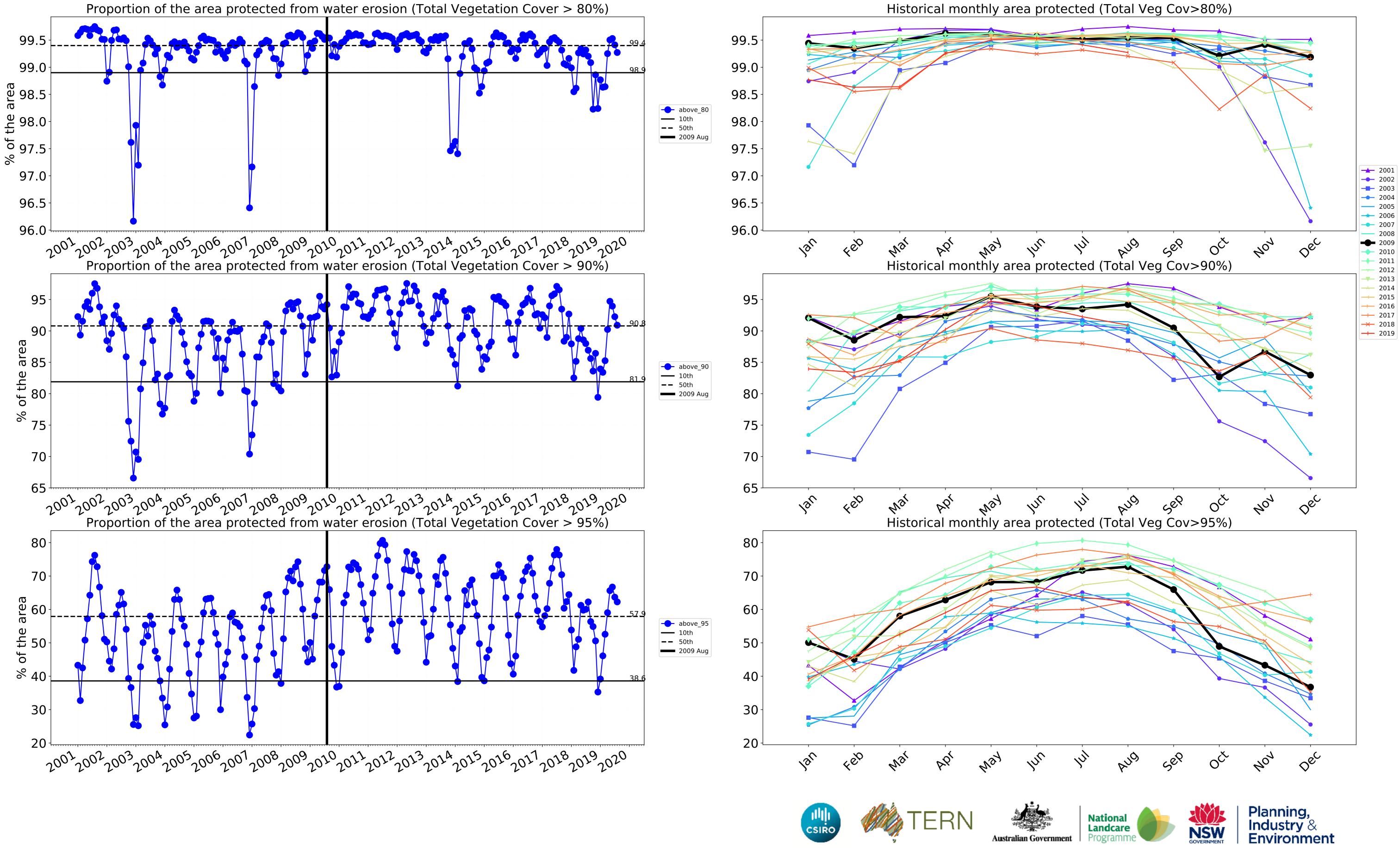
Conservation and natural environments timeseries

99.8-99.7 --- above_70 **——** 10th **——** 50th 99.6⁻ 99.5 99.4 99.3-Jan feb In May PQ1 Mal 1/2/ month FERN (SOR) CSIRC Australian Government

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

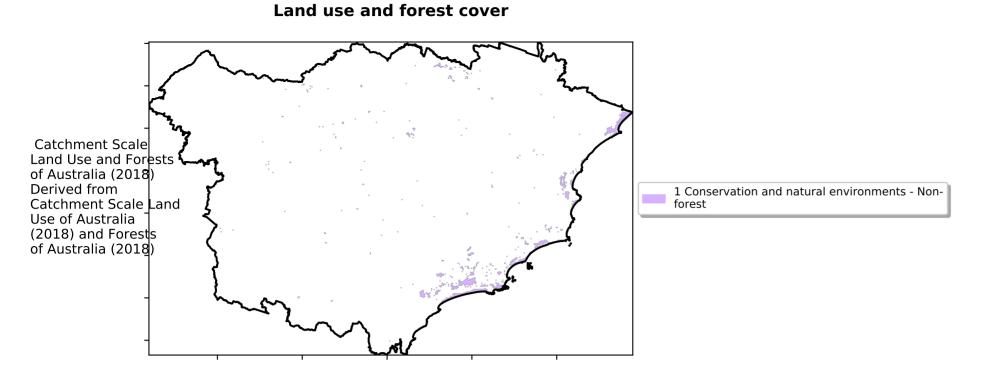
Water erosion historical monthly area protected (Total Veg Cov>70%)



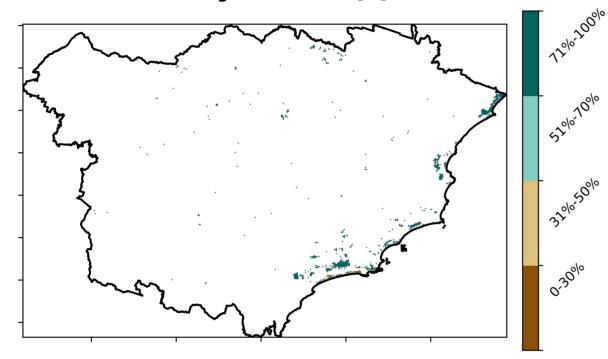




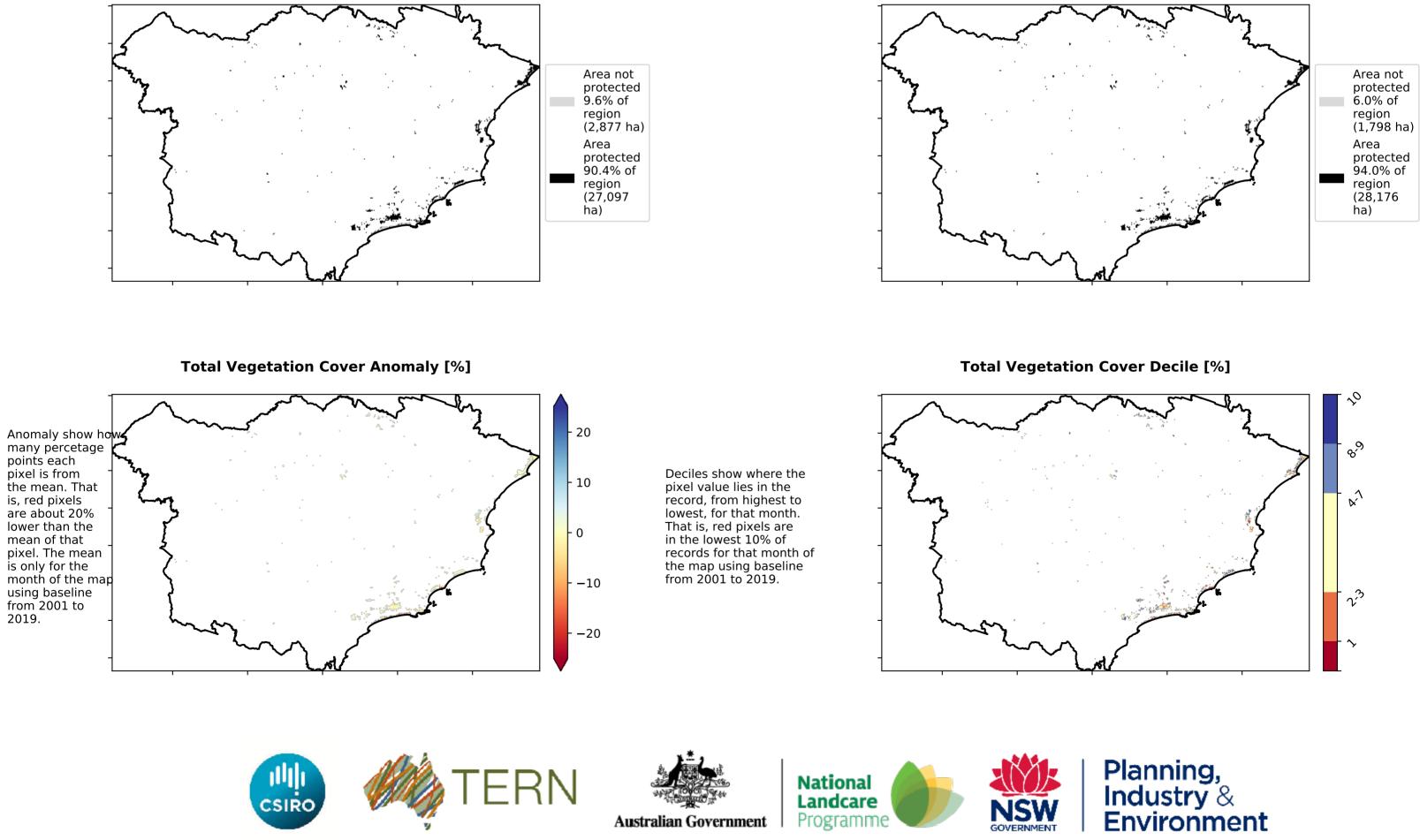
Conservation and natural environments non forest



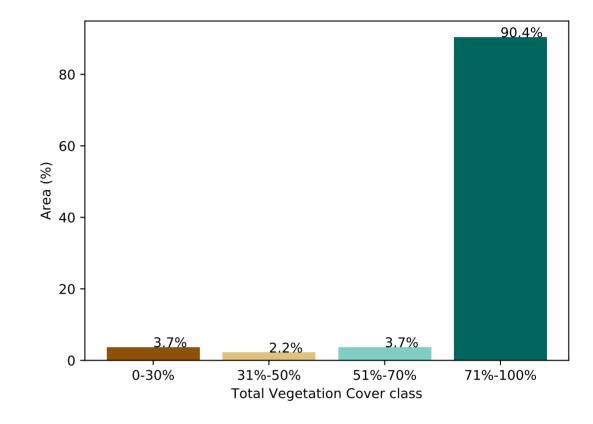
Total Vegetation Cover [%]



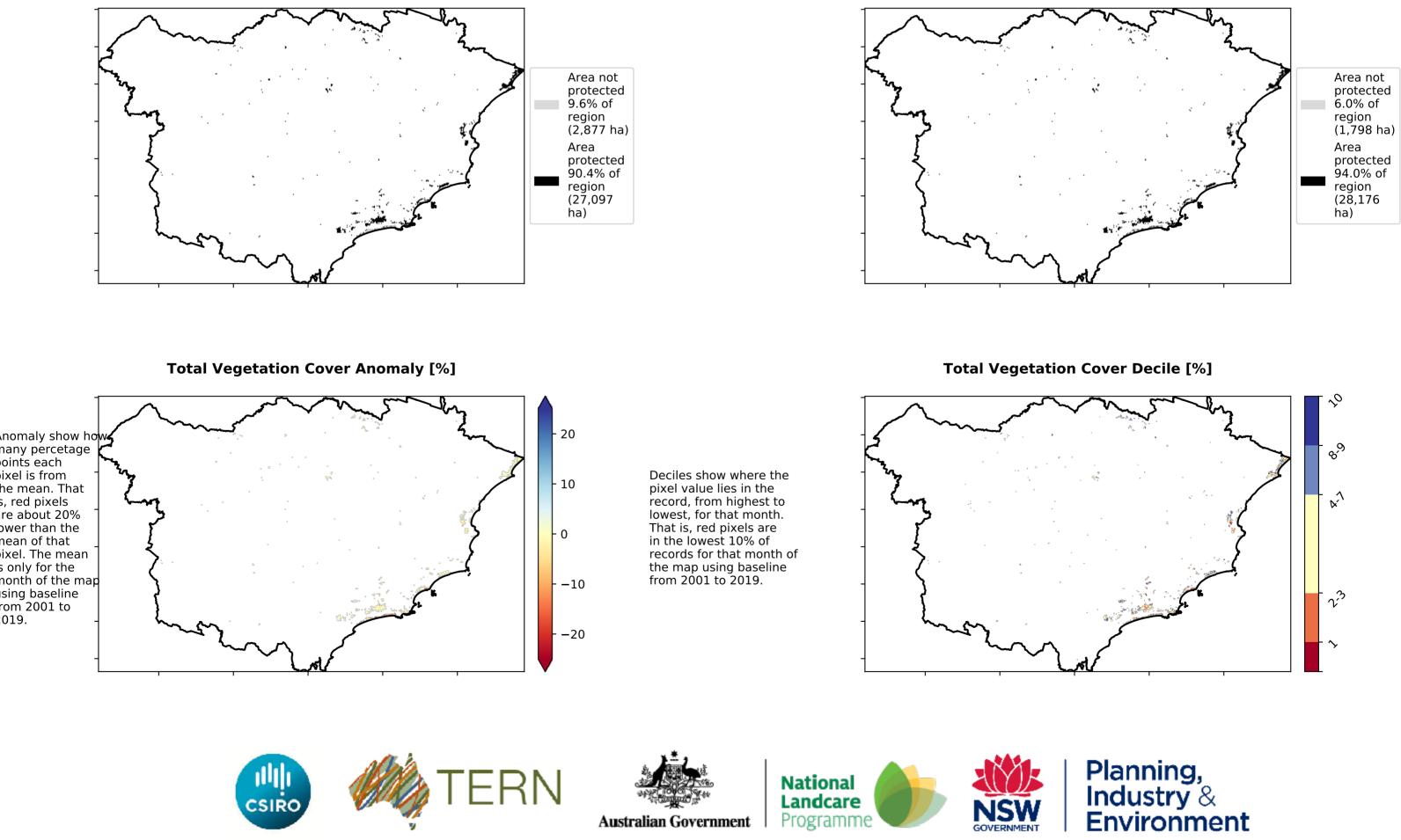
% Area protected from water erosion (>70%)

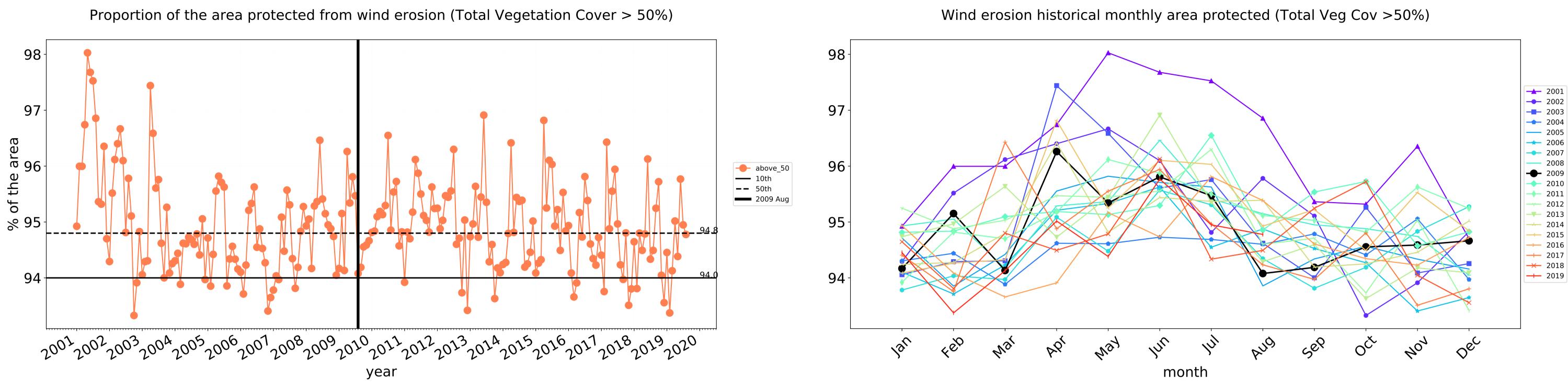


Proportion of vegetation cover class in area

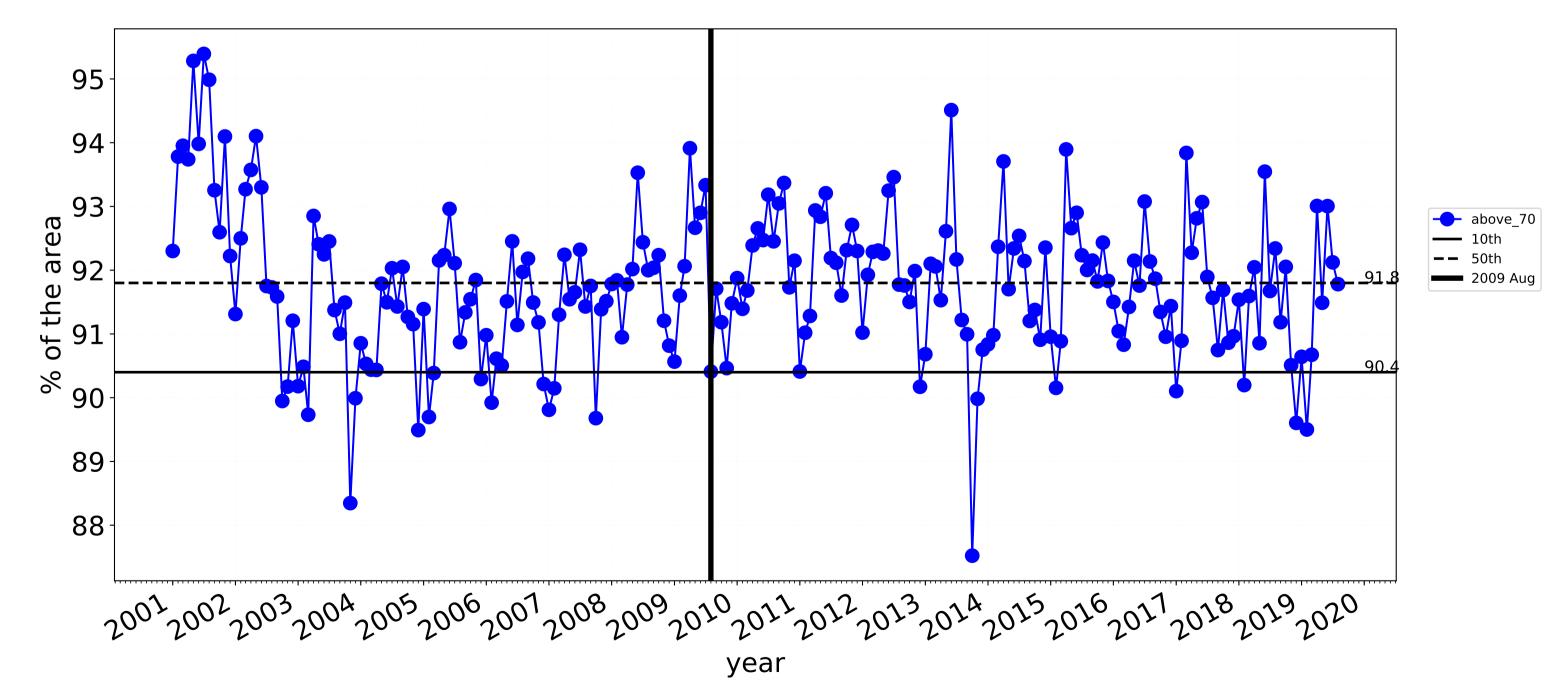


% Area protected from wind erosion (>50%)



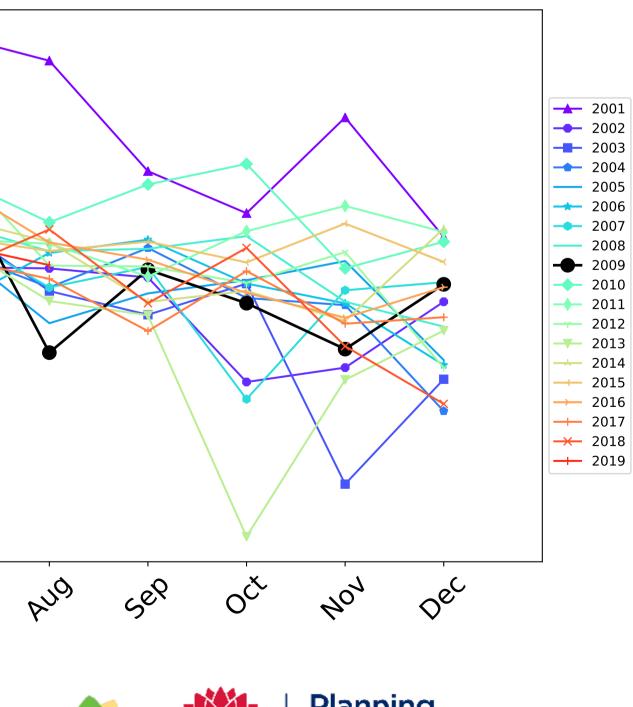


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



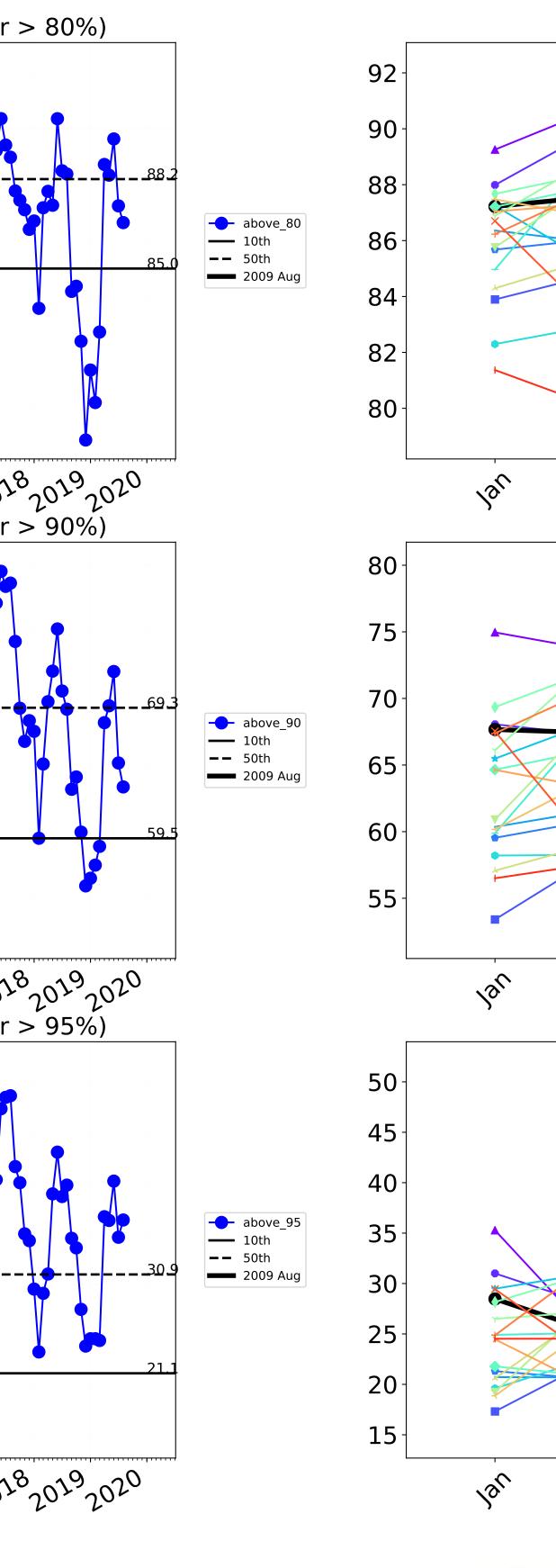
95 94 93 92 91 90 89 88 Jan feb May In 1/2/ Mai Pb, month ERN CSIRO Programm Australian Government

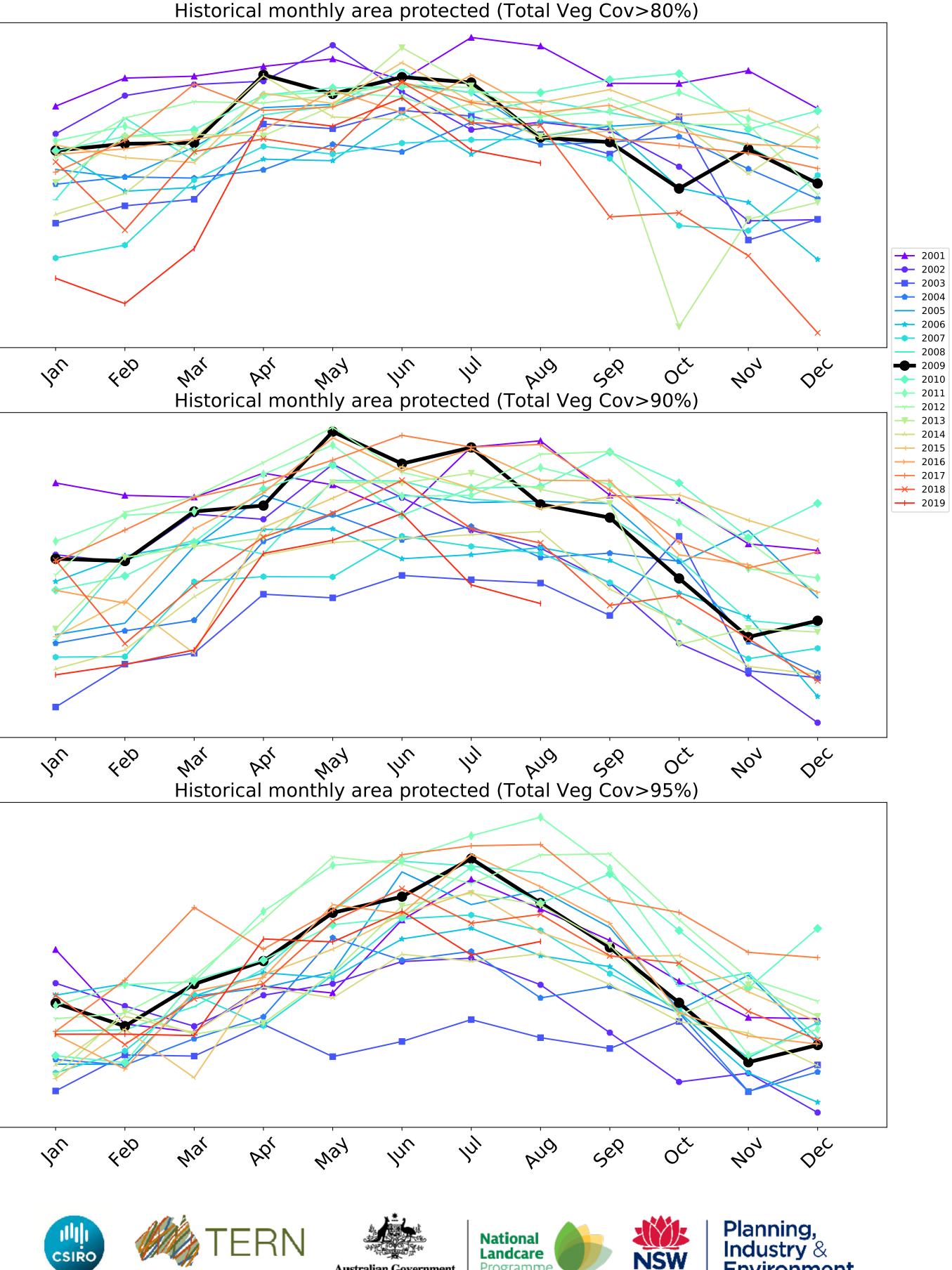
Water erosion historical monthly area protected (Total Veg Cov>70%)



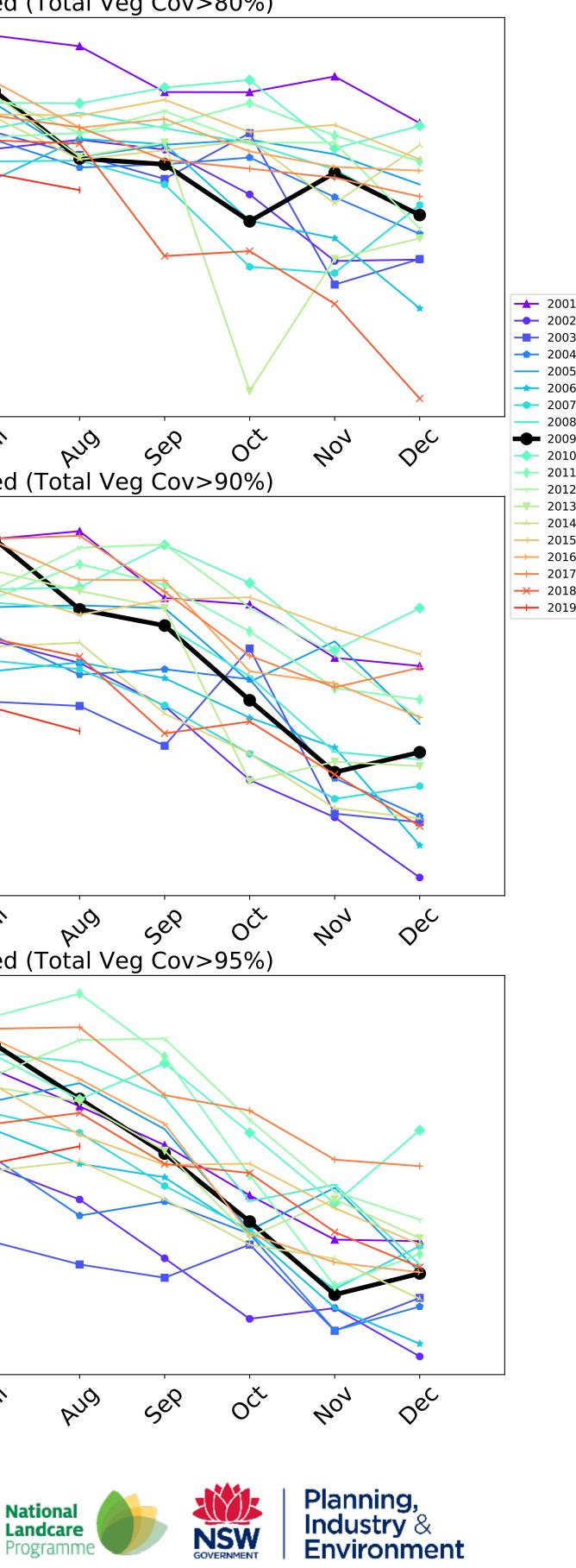


Proportion of the area protected from water erosion (Total Vegetation Cover > 80%) 92 90 area 88 of the 86 % 82 80 $\frac{20^{2} 20^{2} 20^{2} 20^{3} 20^{4} 20^{5} 20^{6} 20^{1} 20^{8} 20^{9} 20^{1$ 80 75 area 70 the 65 of [%] 60 55 $\frac{20^{2} 20^{2} 20^{2} 20^{3} 20^{4} 20^{5} 20^{6} 20^{1} 20^{8} 20^{9} 20^{1$ 50 45 40 vol the area 35 30 % 25 20 15 20012002200320042005200620012008200920102011201220132014201520162011201820192020





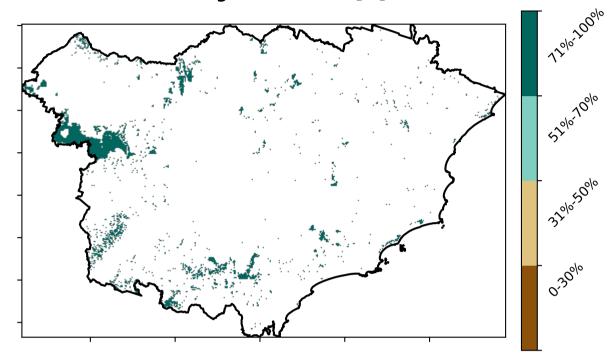
Australian Government



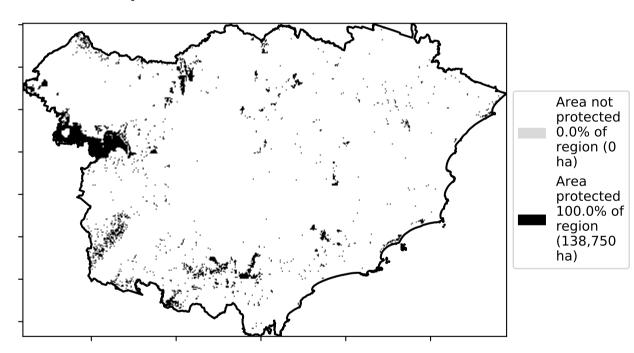
Conservation and natural environments Woodland forest



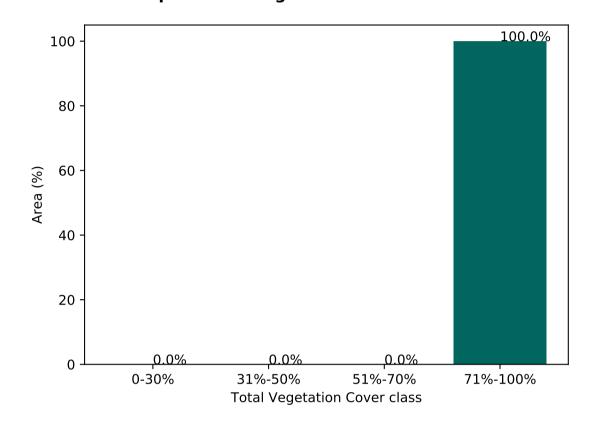
Total Vegetation Cover [%]



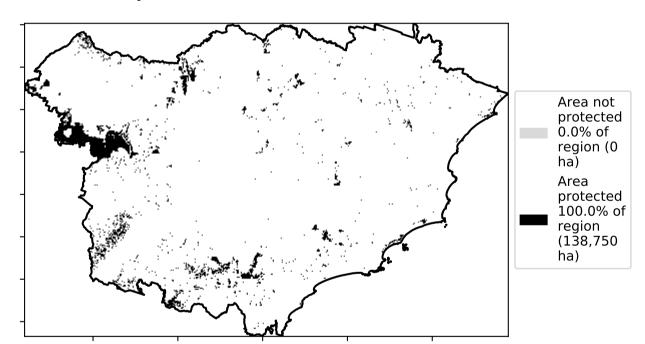
% Area protected from water erosion (>70%)



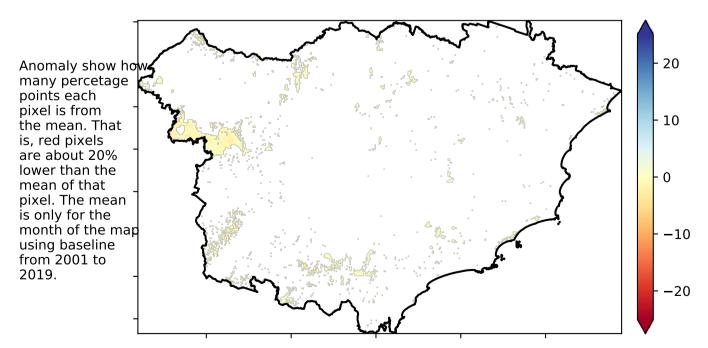
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

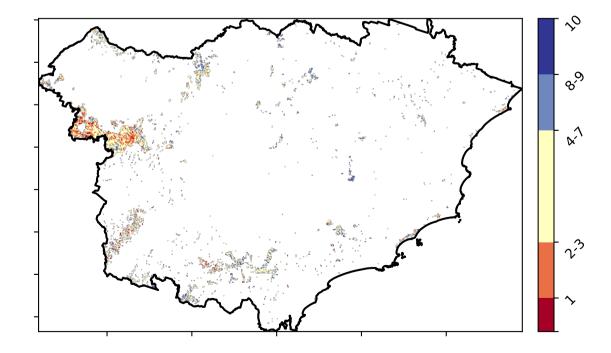


Total Vegetation Cover Anomaly [%]

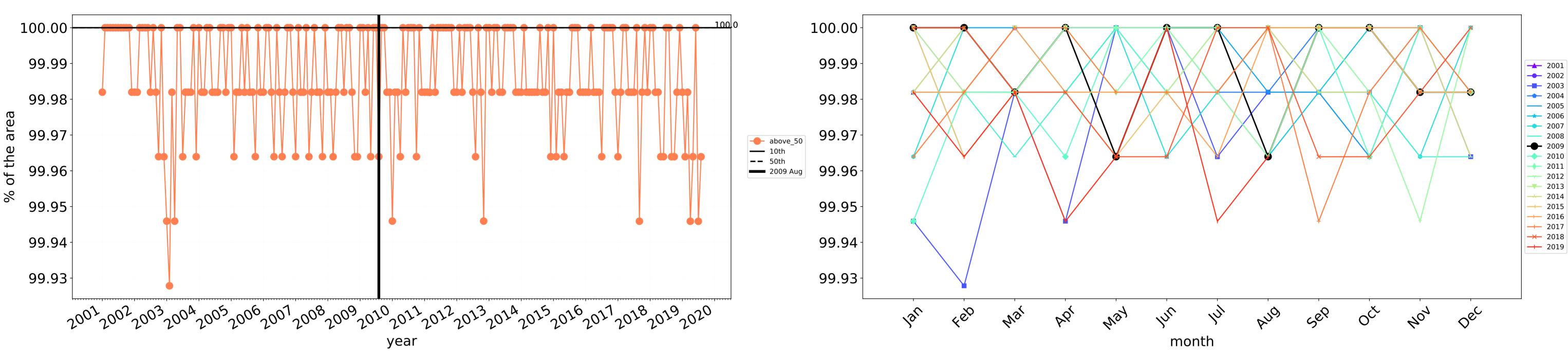


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Total Vegetation Cover Decile [%]

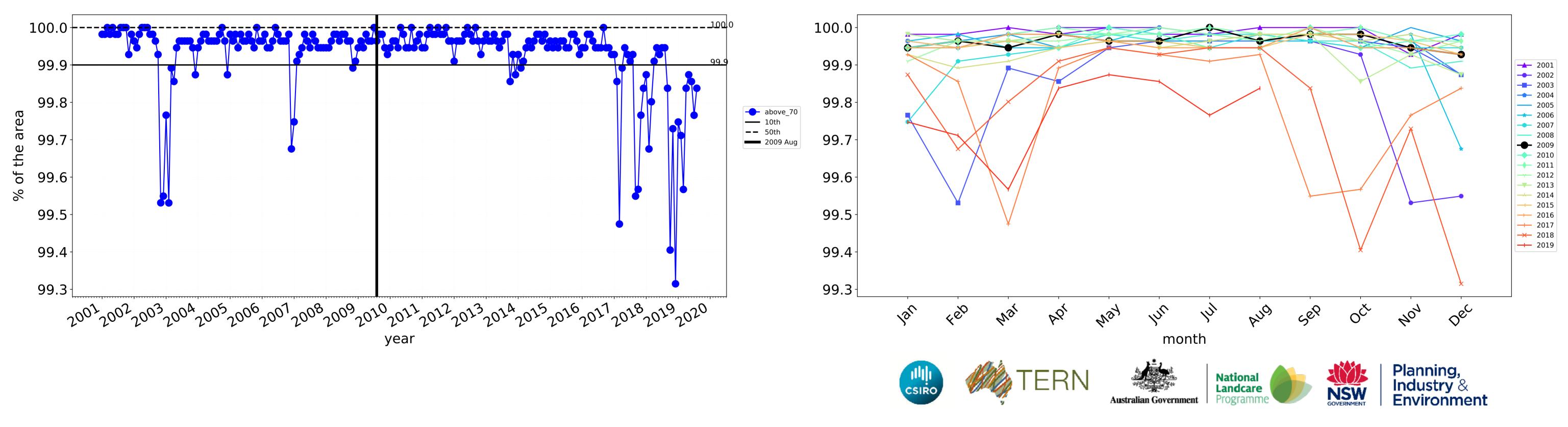


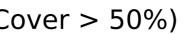




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

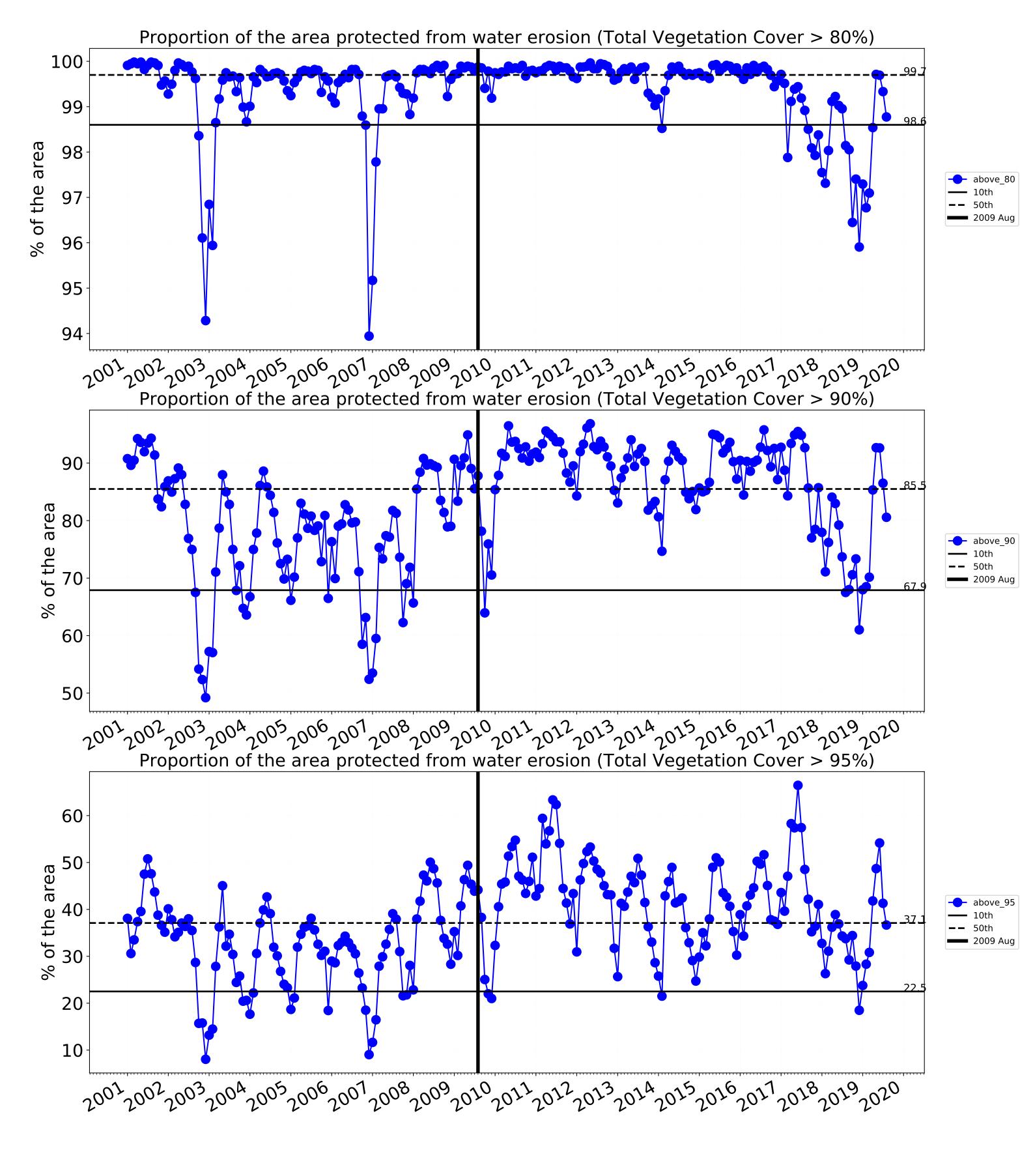


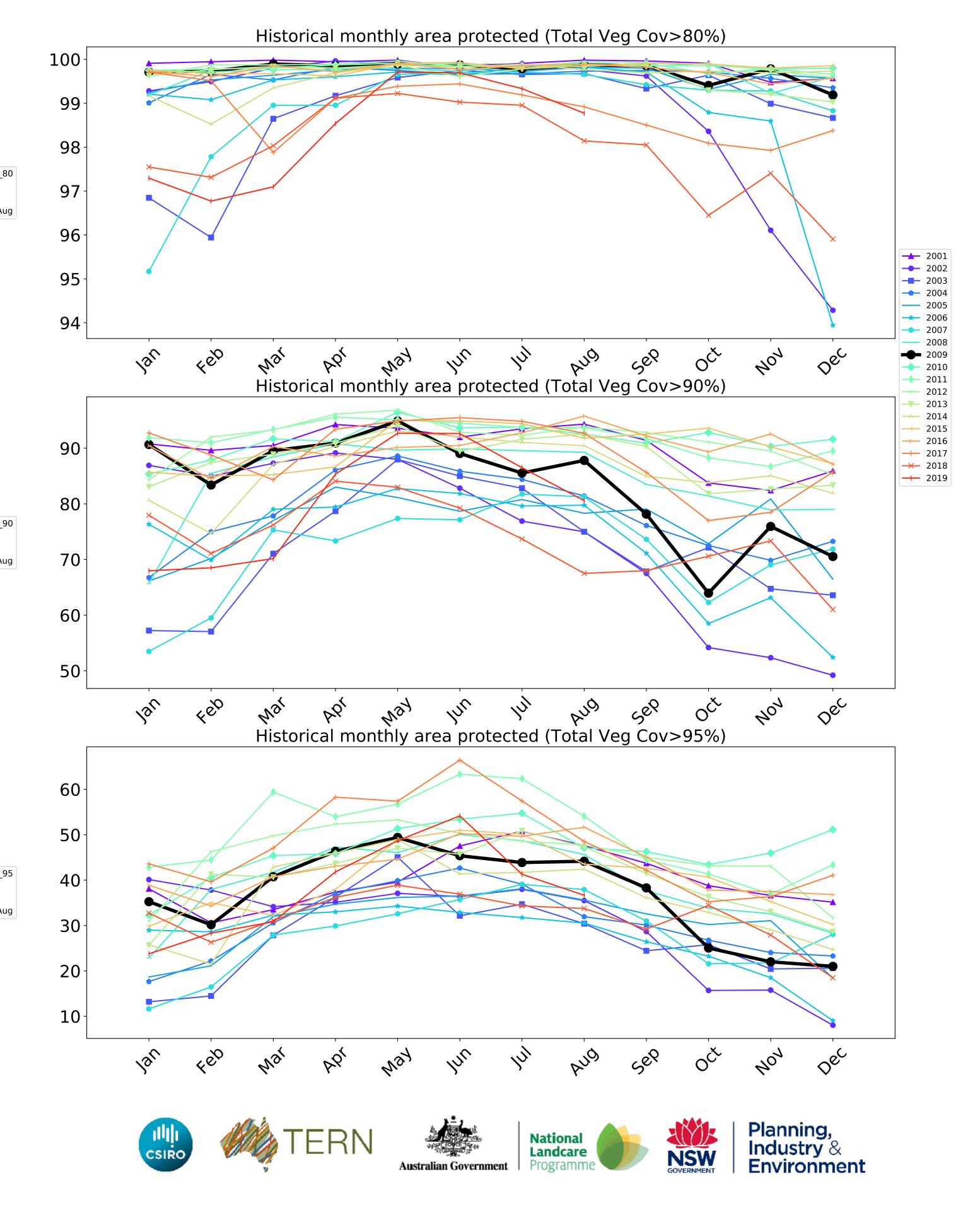


Wind erosion historical monthly area protected (Total Veg Cov >50%)



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

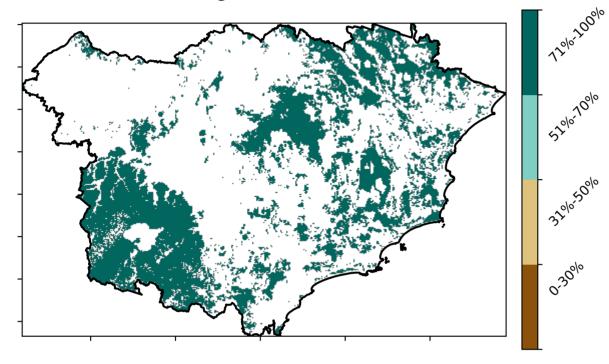




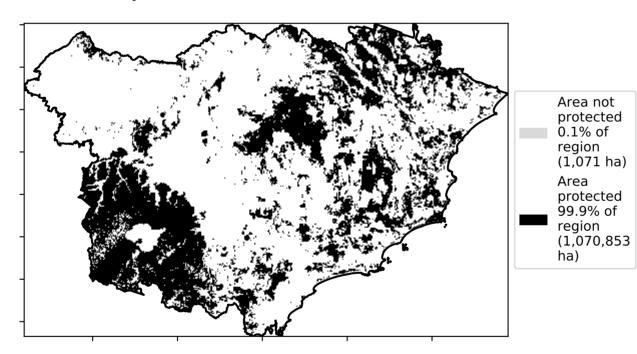
Conservation and natural environments Forest (non woodland)



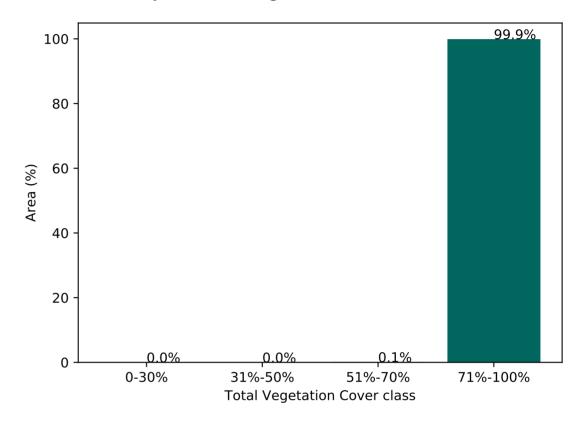
Total Vegetation Cover [%]



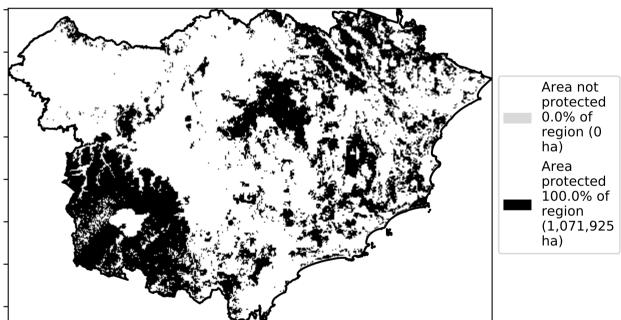
% Area protected from water erosion (>70%)



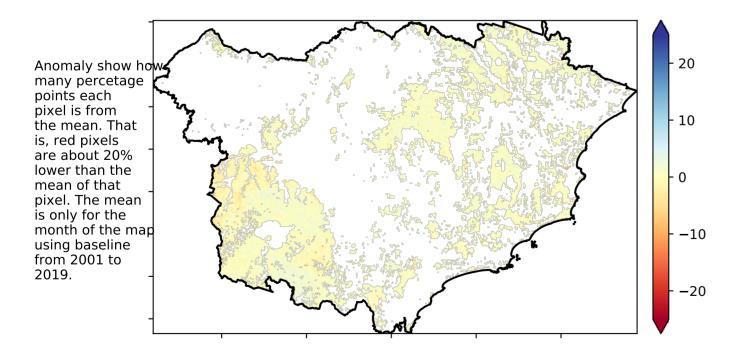
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

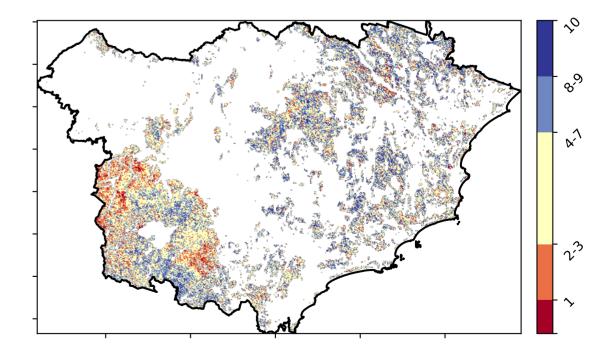


Total Vegetation Cover Anomaly [%]

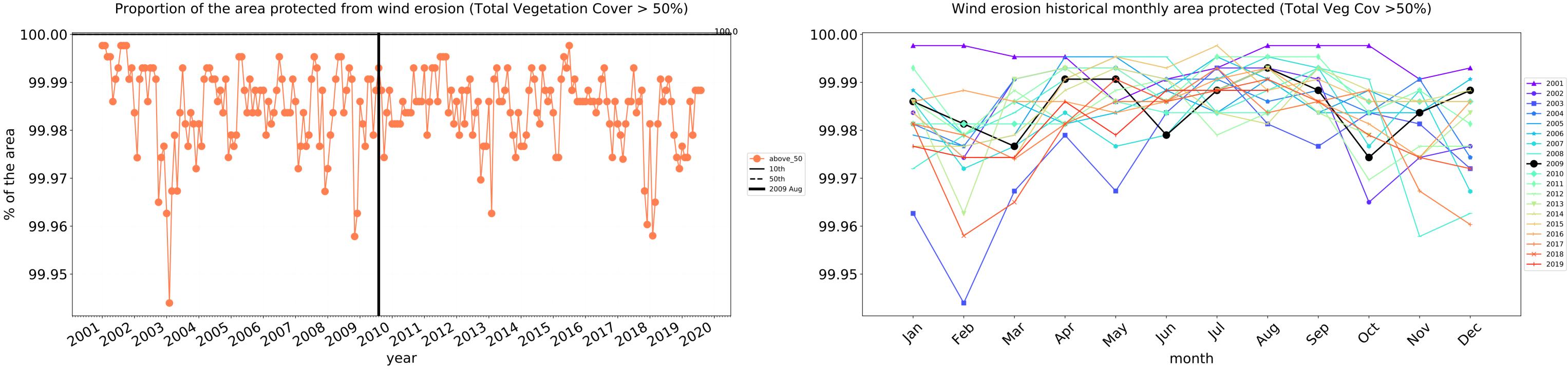


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

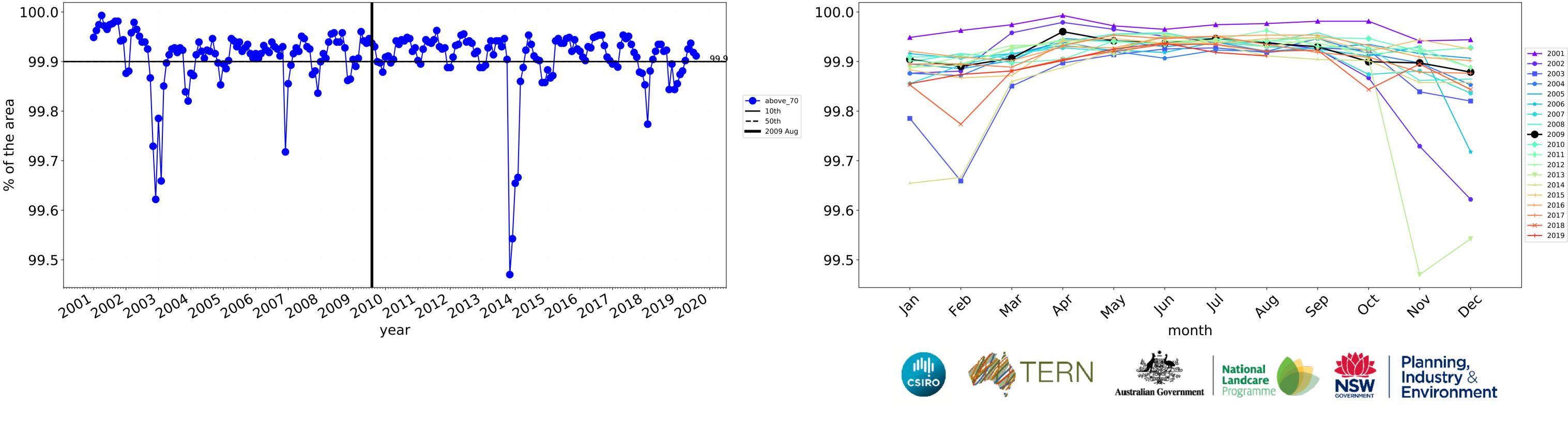
Total Vegetation Cover Decile [%]

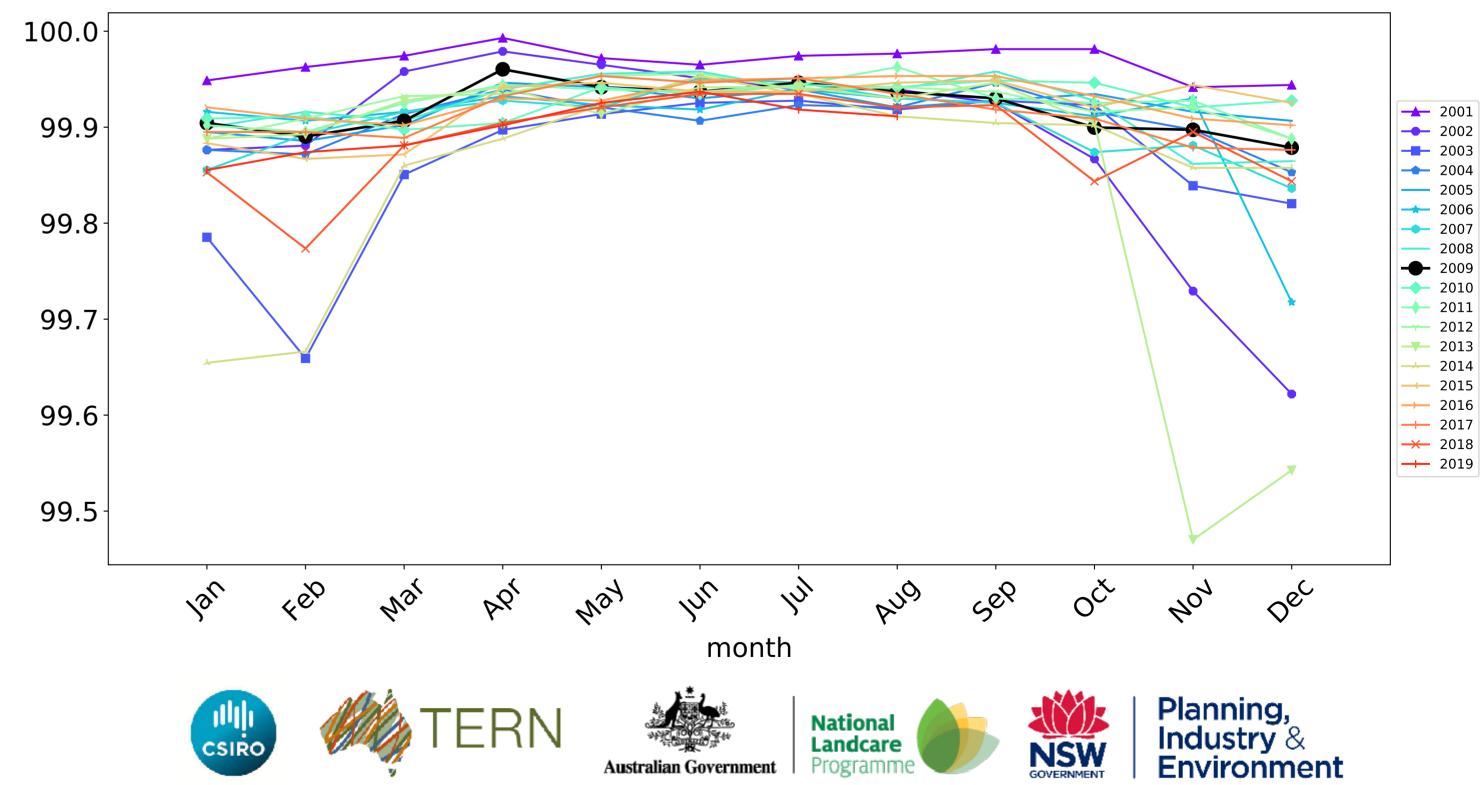




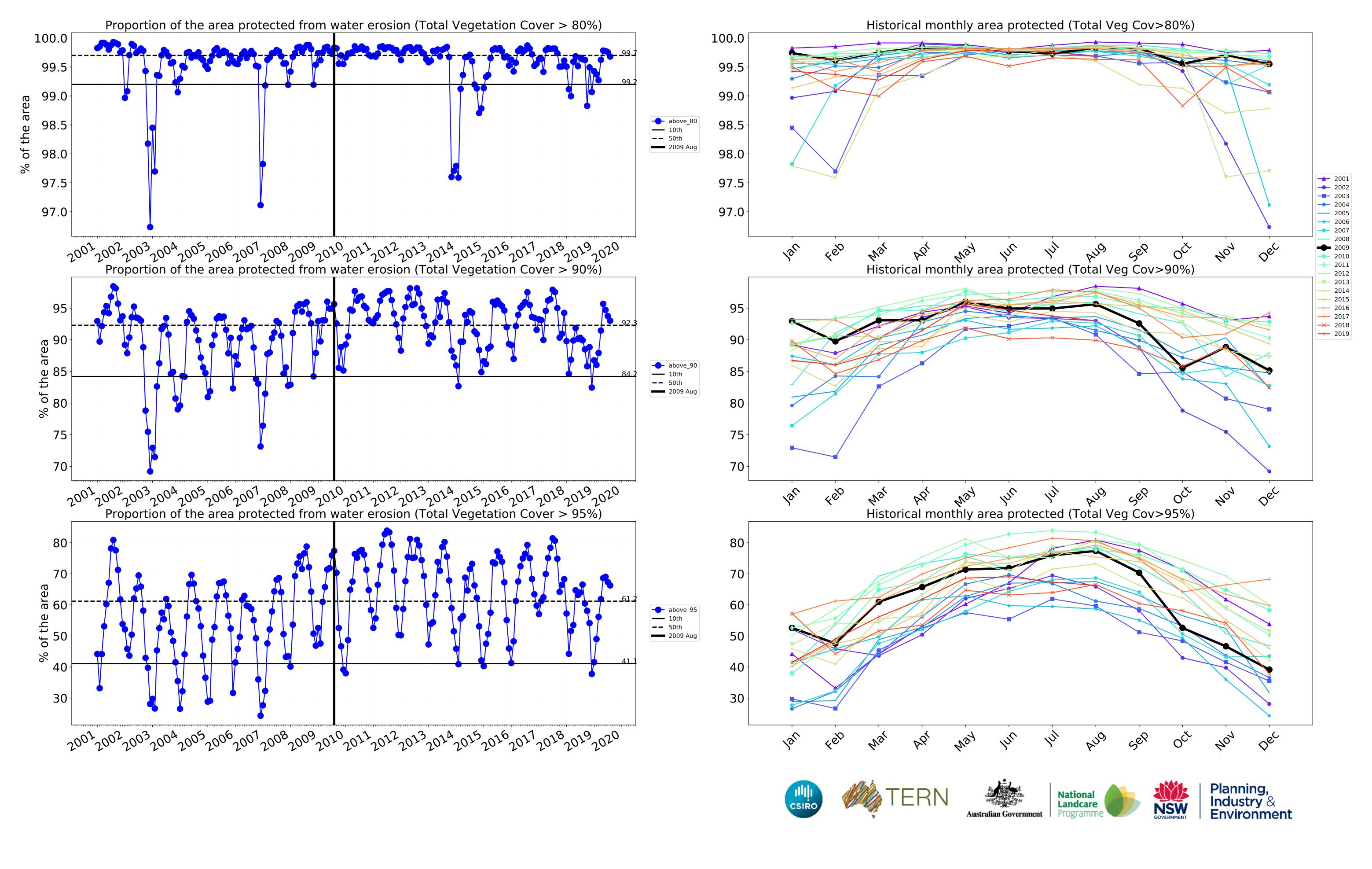


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)







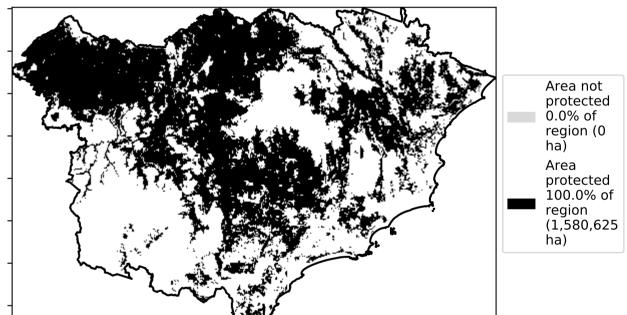


Agriculture

Land use and forest cover 80 -<u>76.</u>7% 70 · 60 Catchment Scale Land Use and Forests of Australia (2018) 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 50 Area (%) - 05 3 Agriculture - Grazing - Non-woodland forest Derived from 4 Agriculture - Grazing - Irrigated Catchment Scale Land 5 Agriculture - Cropping - Non-irrigated Use of Australia (2018) and Forests of Australia (2018) 6 Agriculture - Cropping - Irrigated 7 Agriculture - Horticulture - Non-irrigated 30 8 Agriculture - Horticulture - Irrigated 20 <u>10.</u>7% 10 <u>7.6</u>% 0 1 2 3 Land use class Proportion of vegetation cover class in area **Total Vegetation Cover [%]** 12%,100 100 80 52%70% 60 Area (%) 32010 40 0.30% 20 0.2% 0.0% 0.0% 0 0-30% 31%-50% 51%-70% Total Vegetation Cover class % Area protected from water erosion (>70%)

Proportion of each land class in area

% Area protected from wind erosion (>50%)

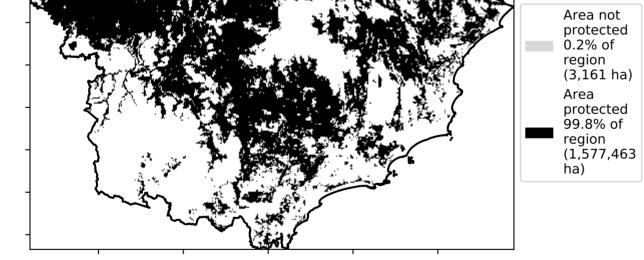


0.2%

8

99.8%

71%-100%



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

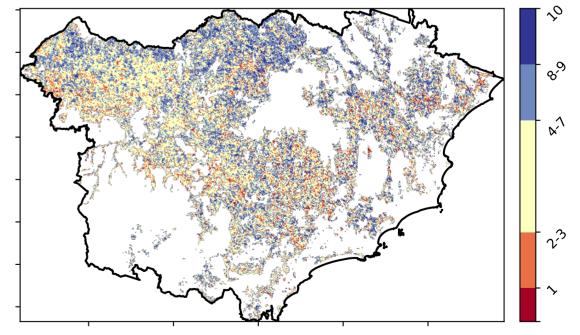
mean of that pixel. The mean

is only for the month of the map using baseline from 2001 to 2019.

· 20 - 10 0

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 the map using baseline from 2001 to 2019.

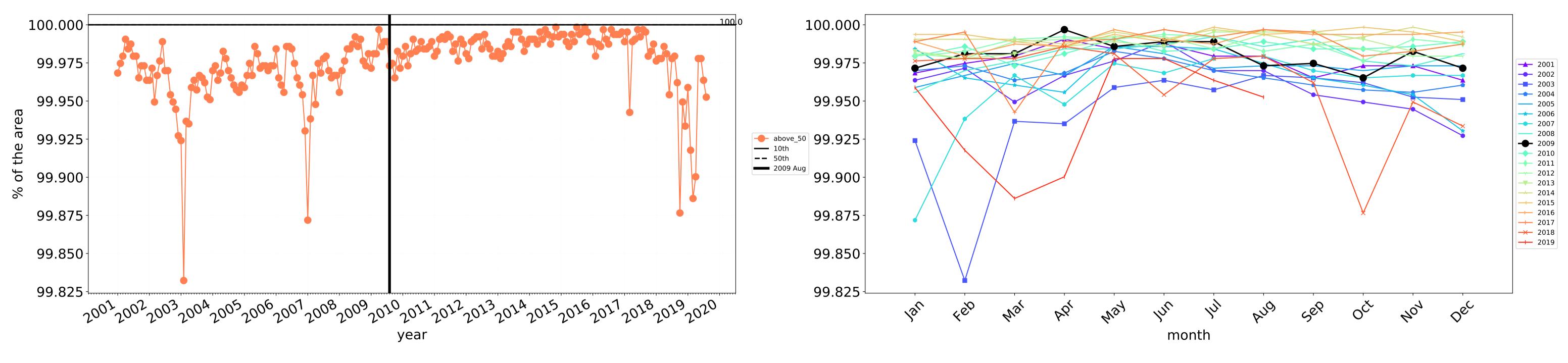
Total Vegetation Cover Decile [%]





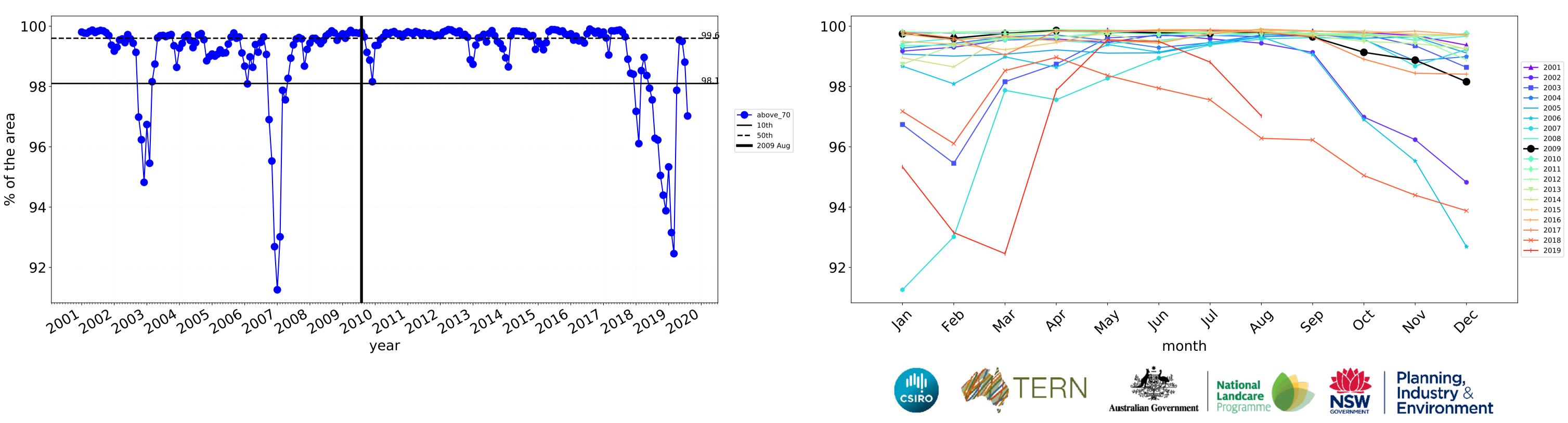
-10

-20



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

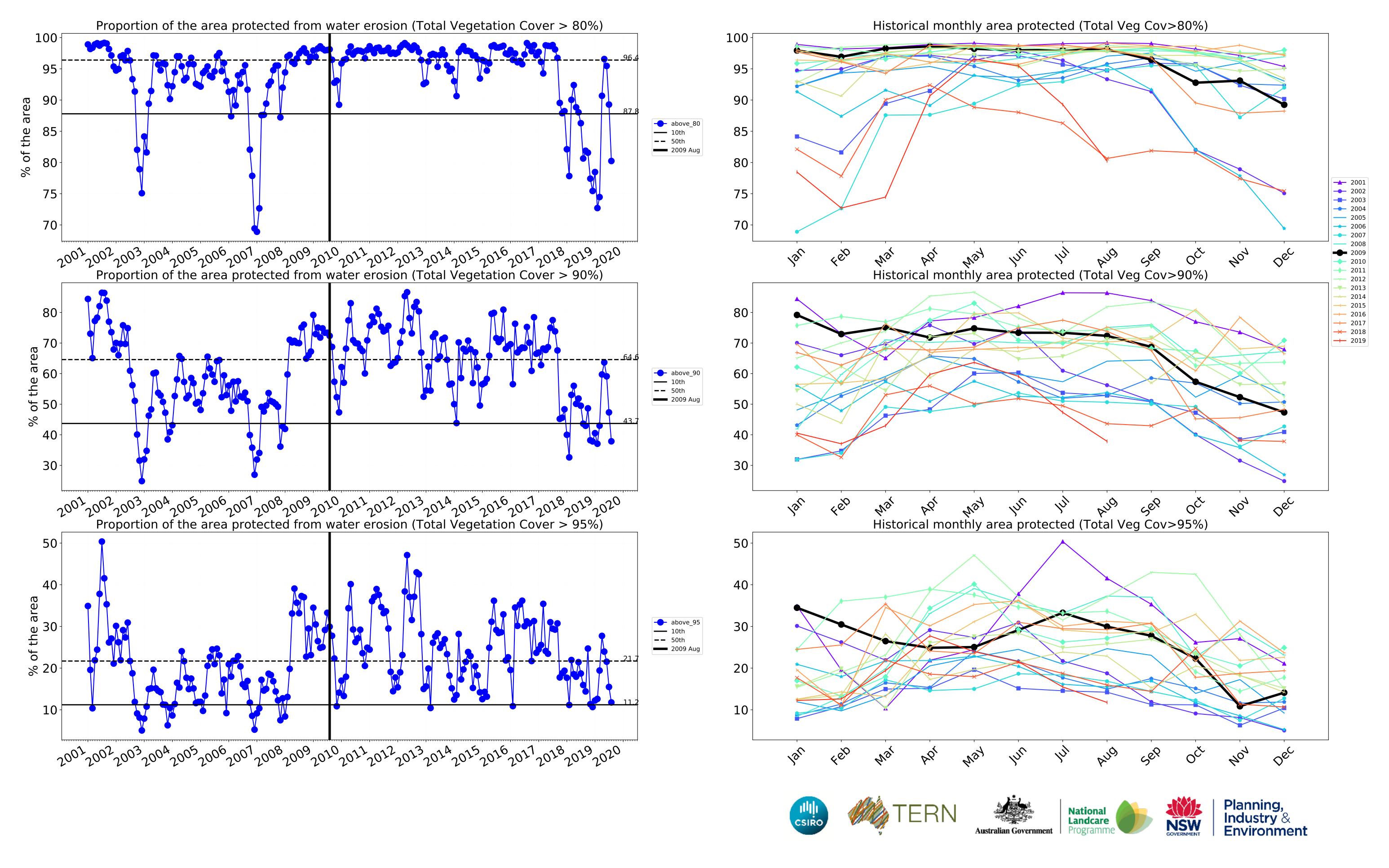
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



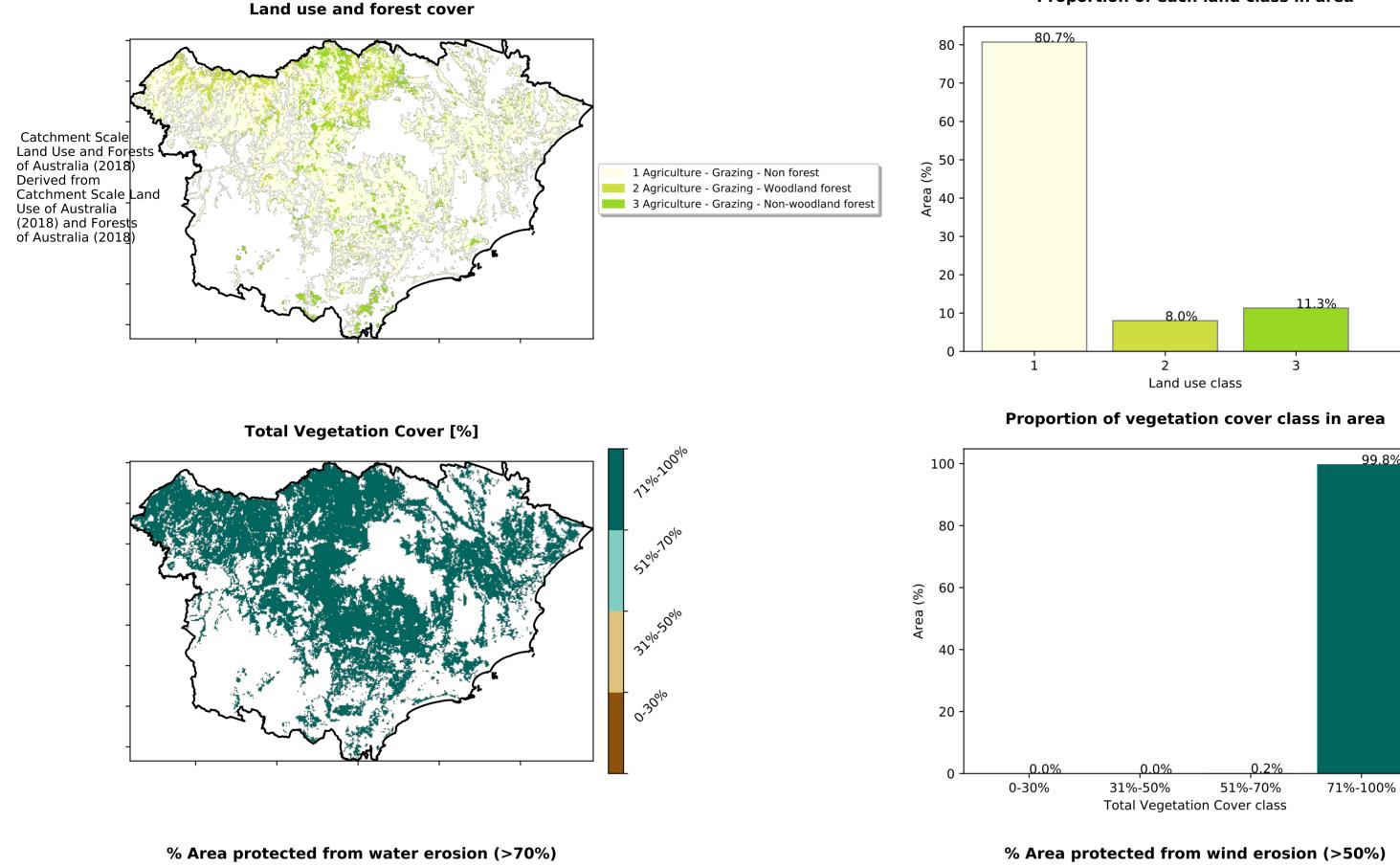


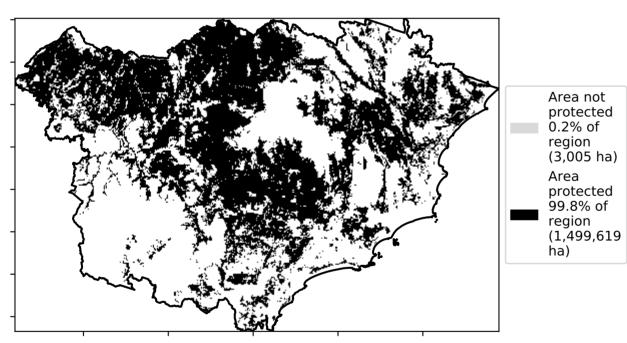
Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

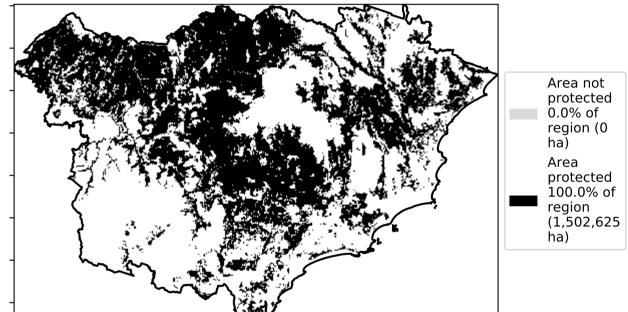


Grazing





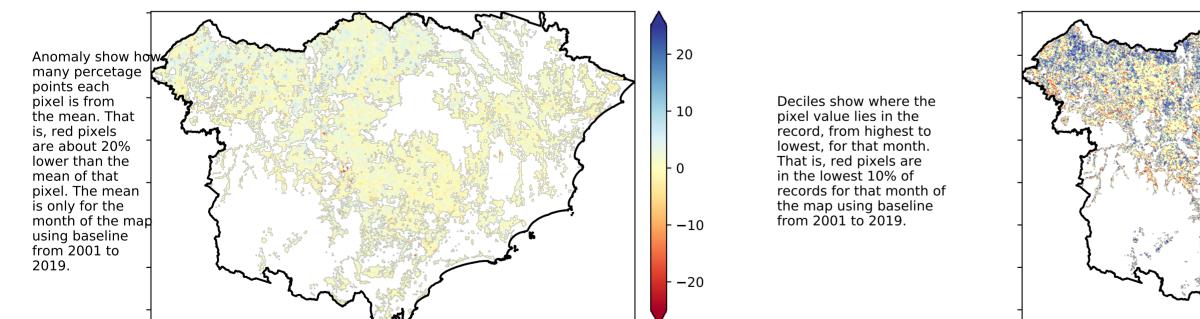
Proportion of each land class in area

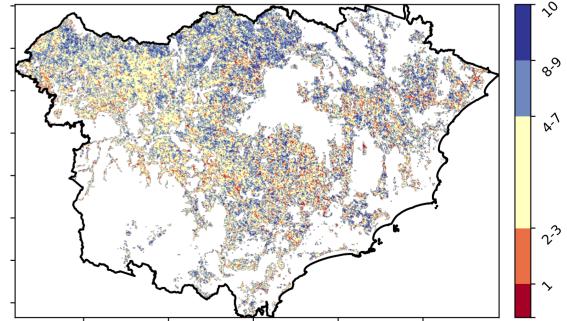


99.8%

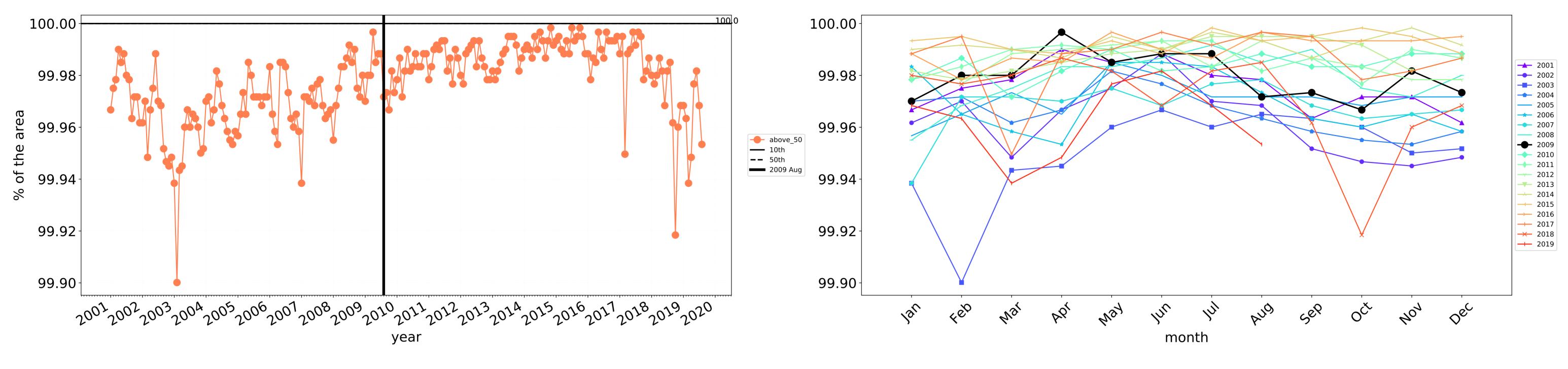
Total Vegetation Cover Anomaly [%]

Total Vegetation Cover Decile [%]



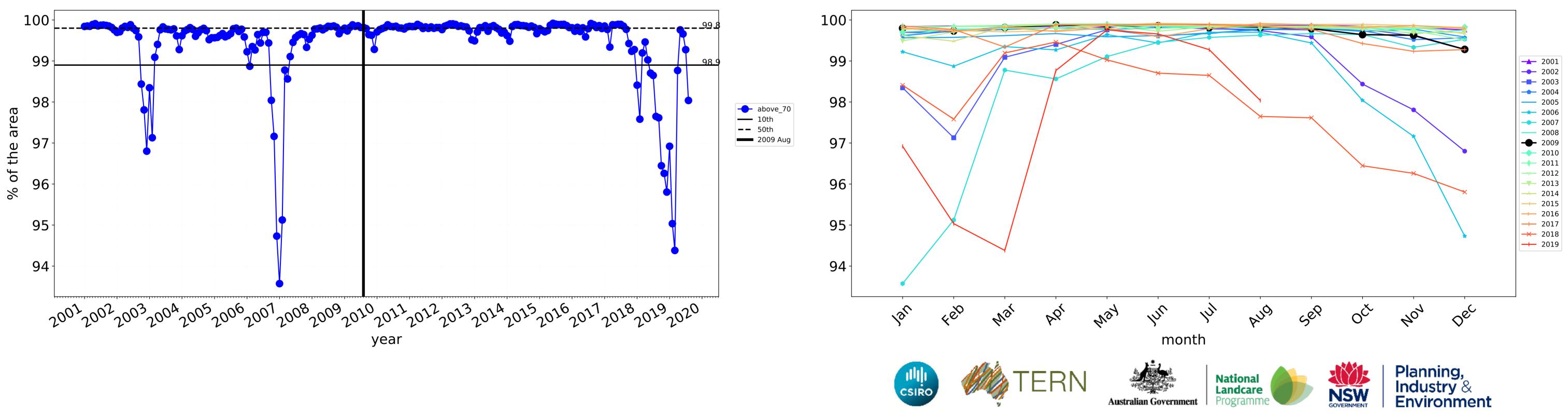






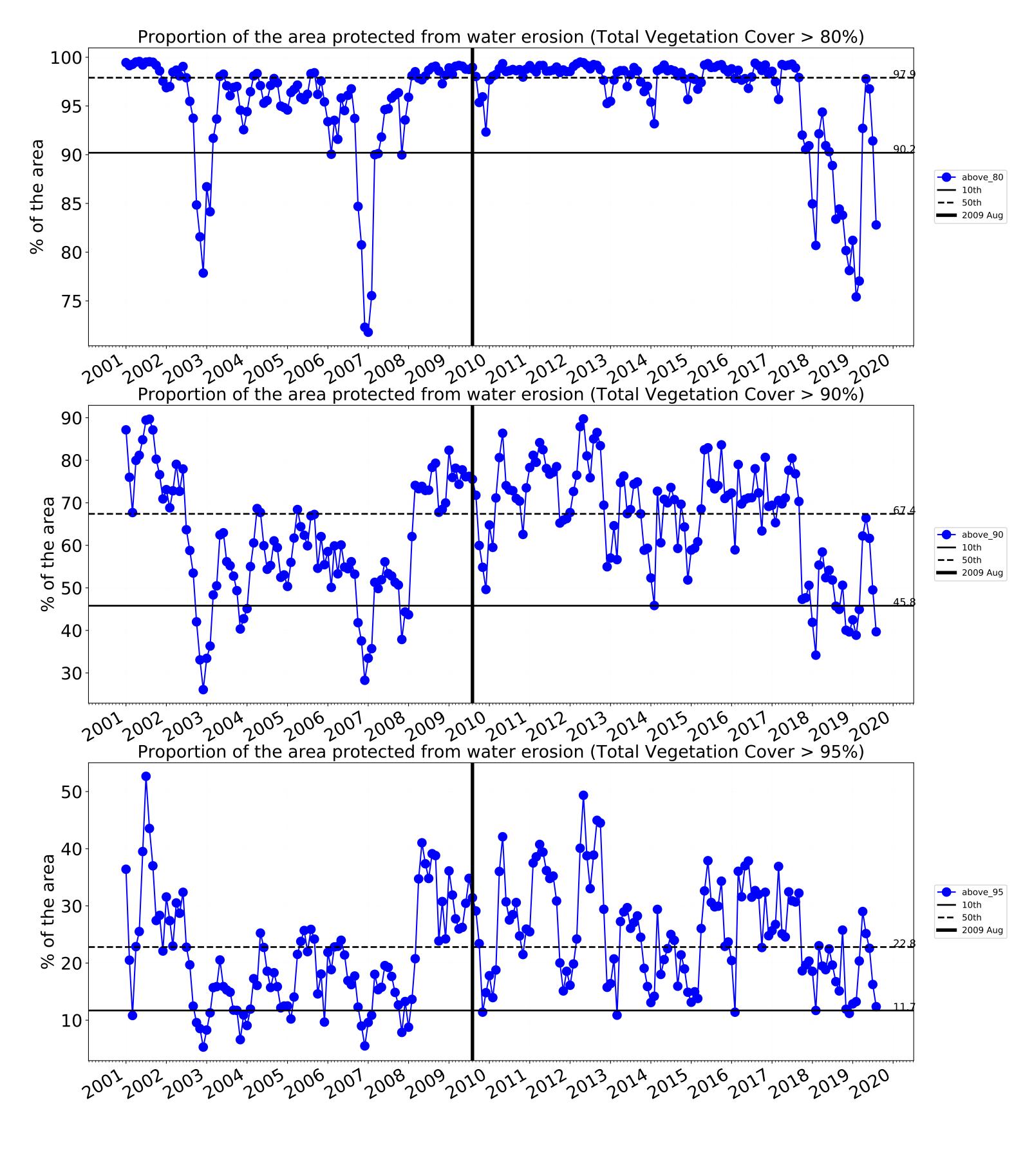
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

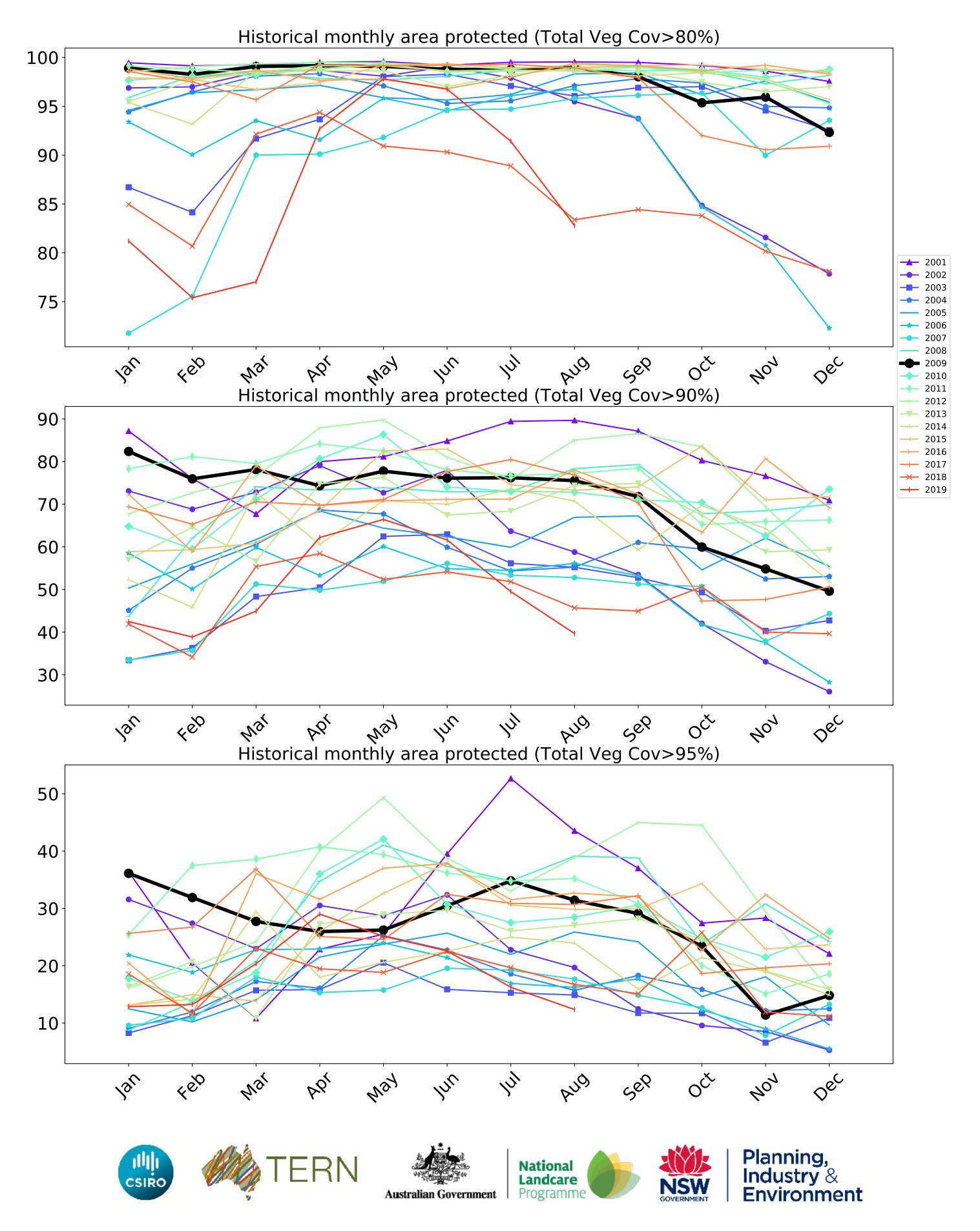
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

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

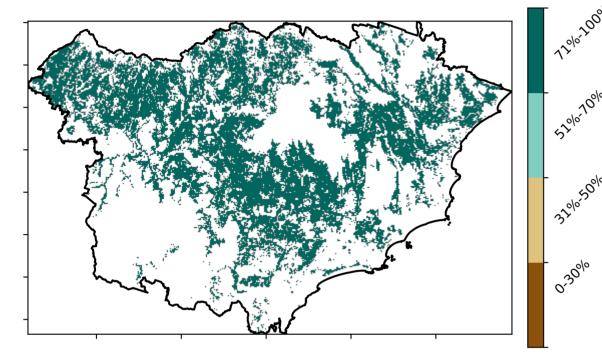




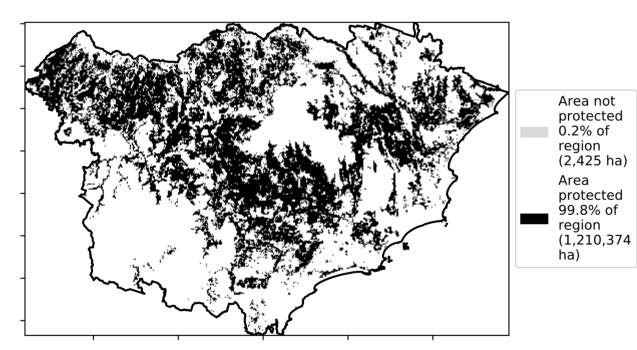
Grazing non forest

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

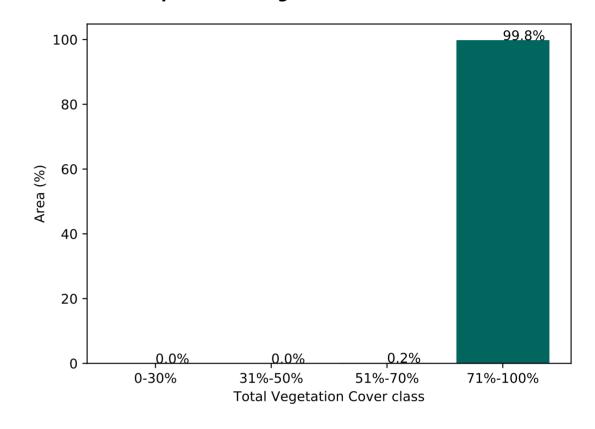
Total Vegetation Cover [%]



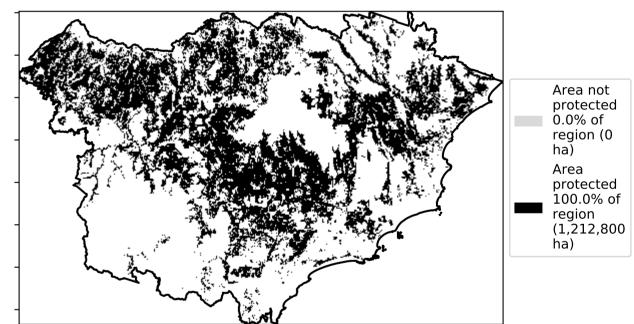
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

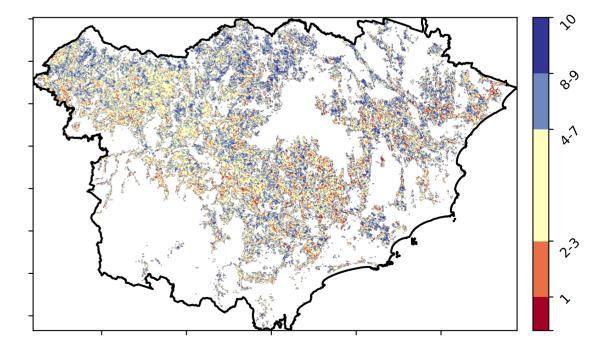


Total Vegetation Cover Anomaly [%]

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 the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]





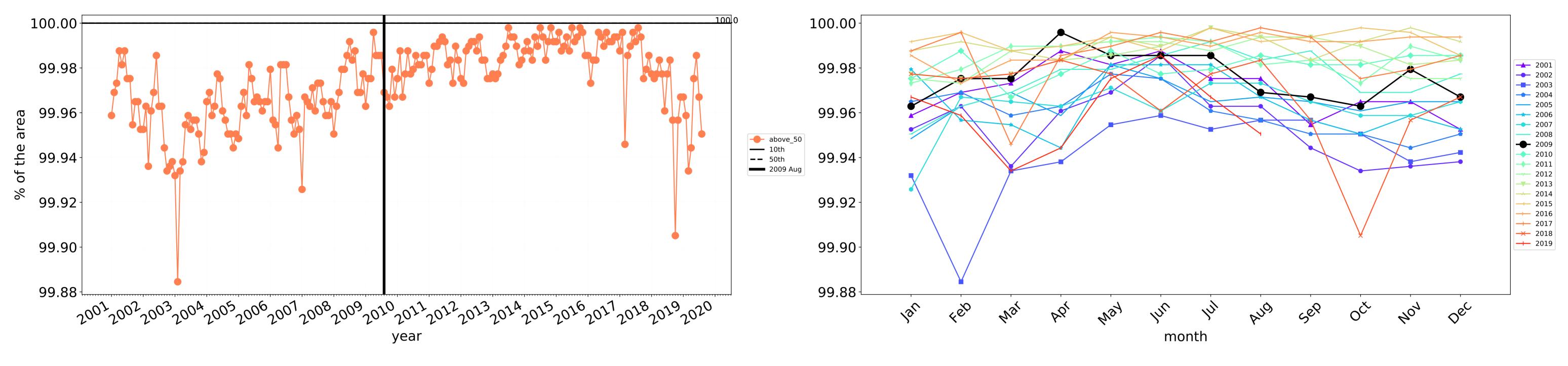
· 20

- 10

0

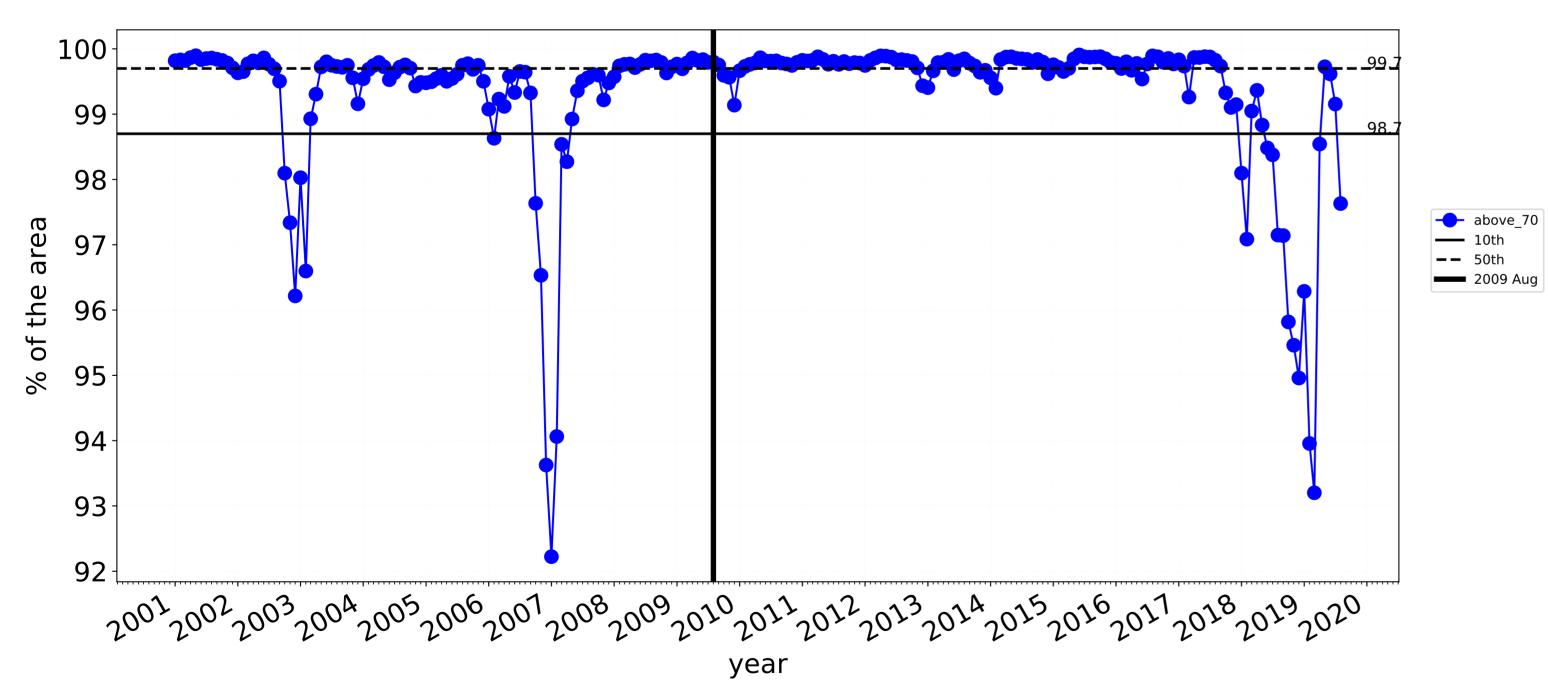
-10

-20

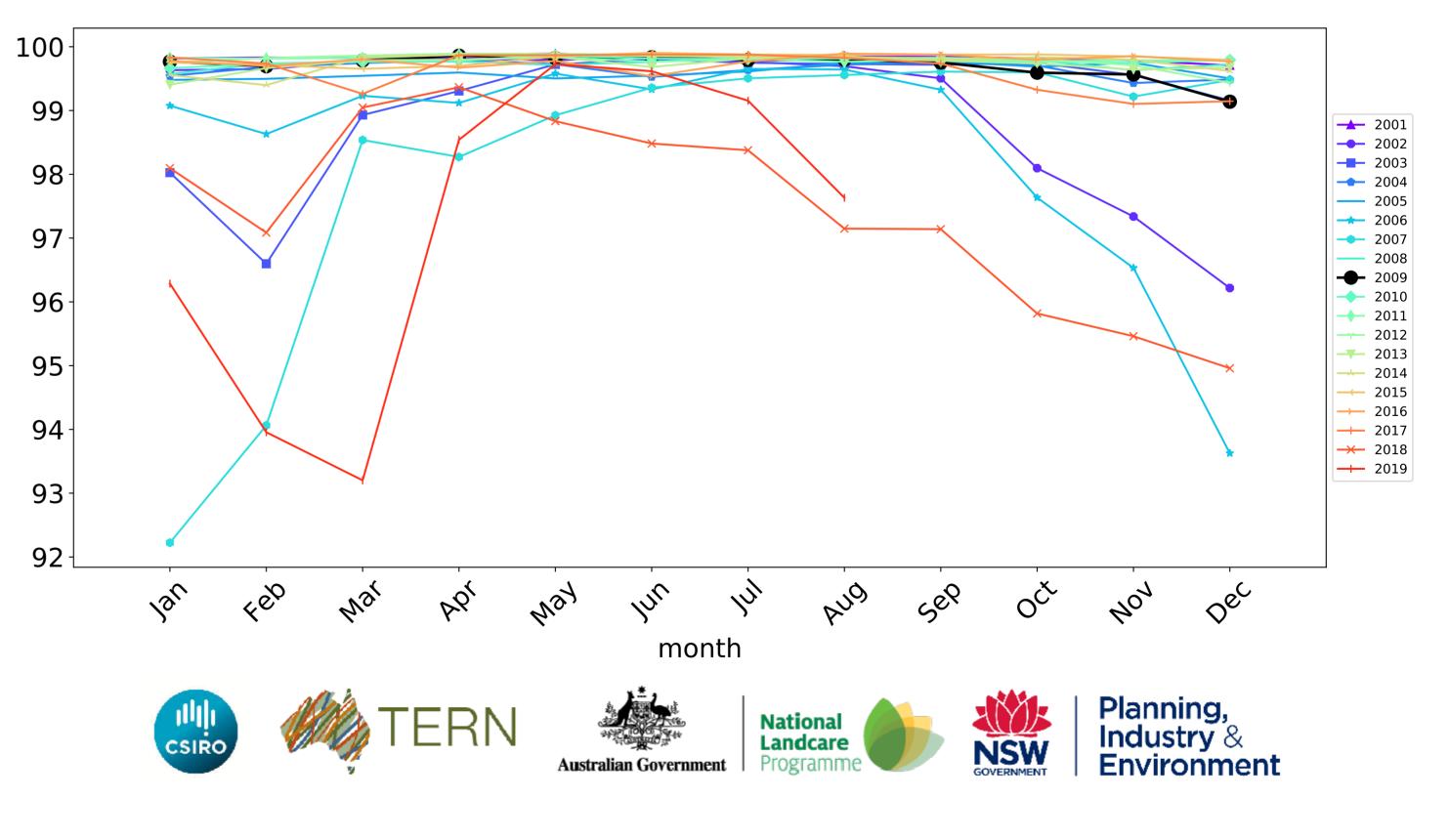


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

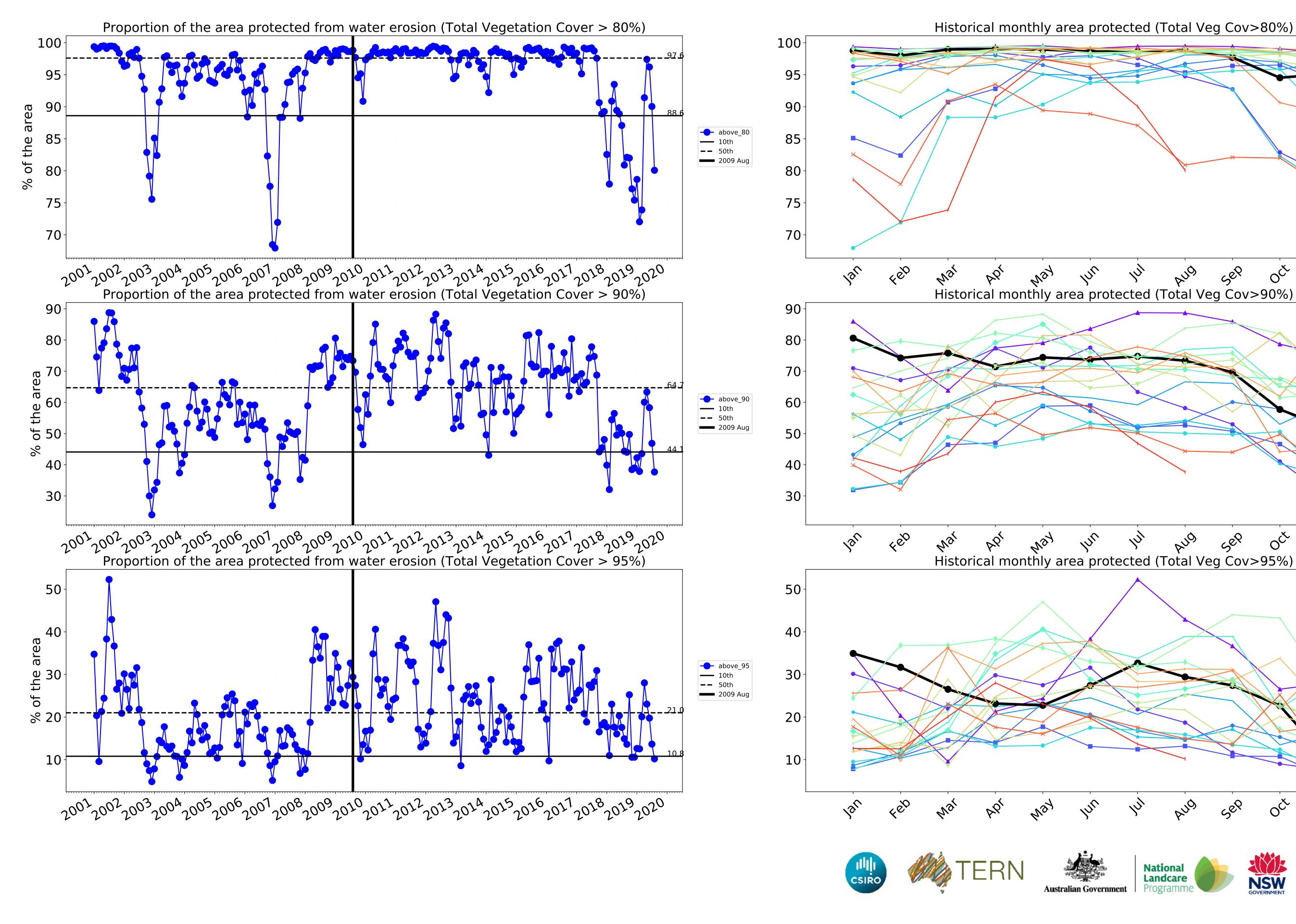
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

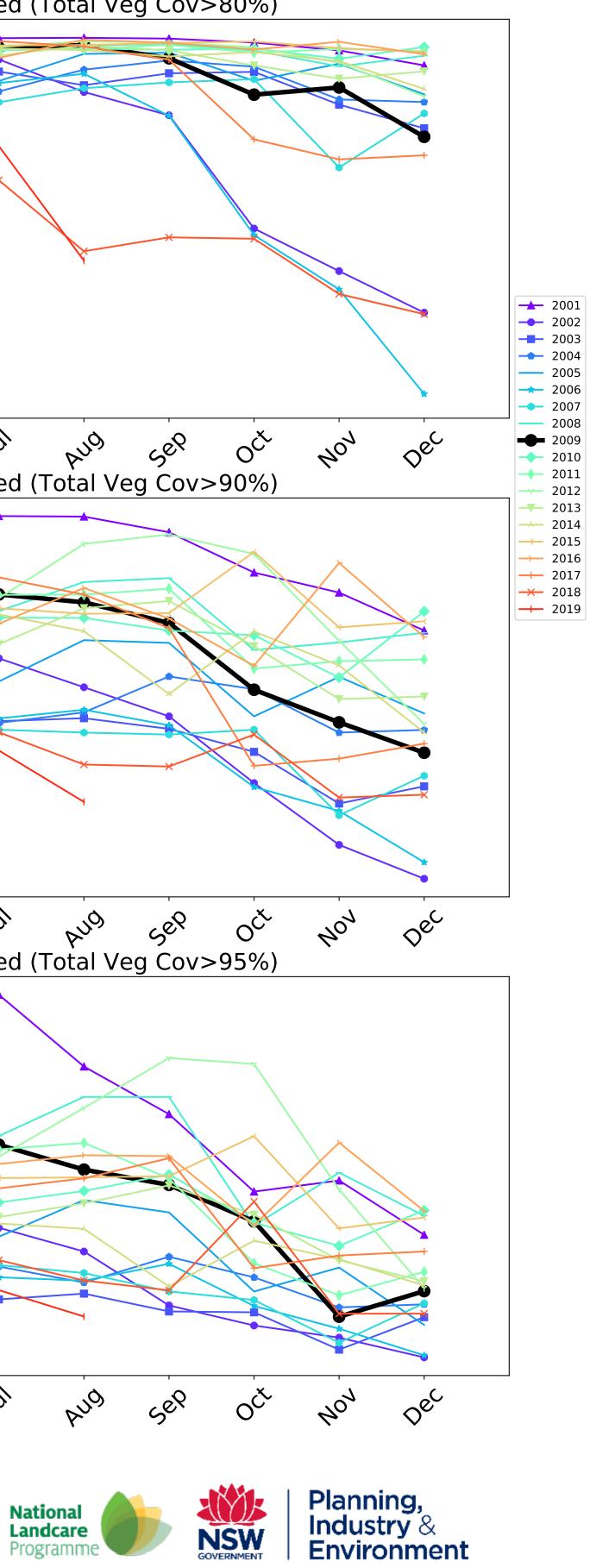


Wind erosion historical monthly area protected (Total Veg Cov >50%)

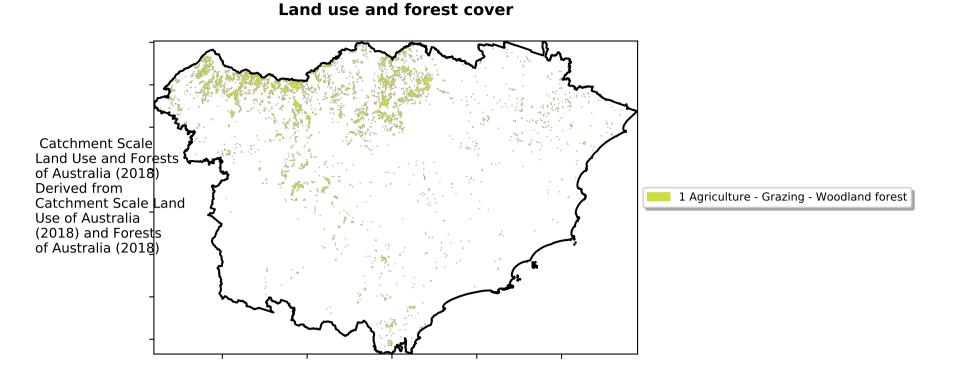


Water erosion historical monthly area protected (Total Veg Cov>70%)

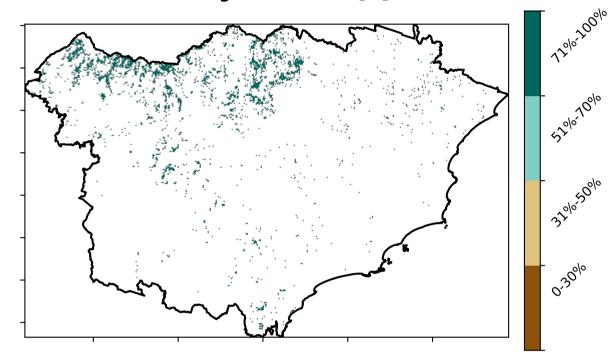




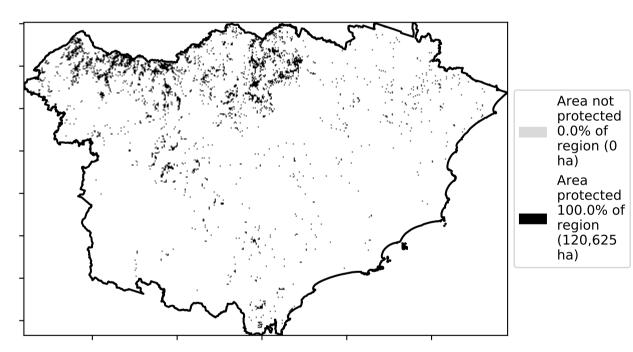
Grazing Woodland forest



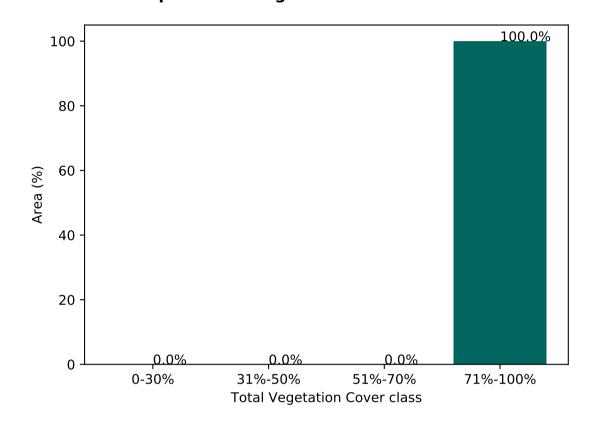
Total Vegetation Cover [%]



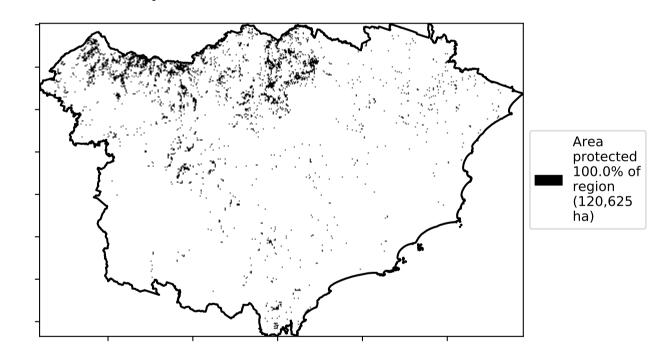
% Area protected from water erosion (>70%)



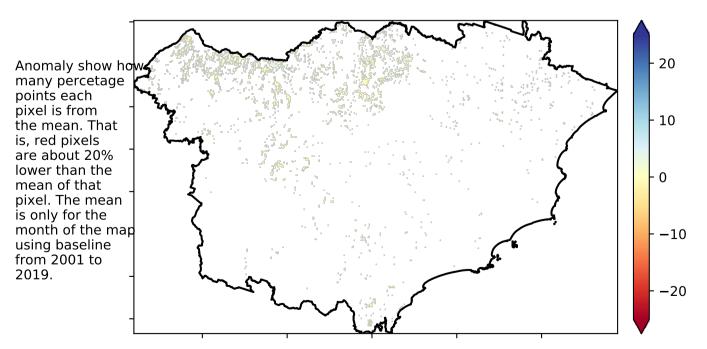
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

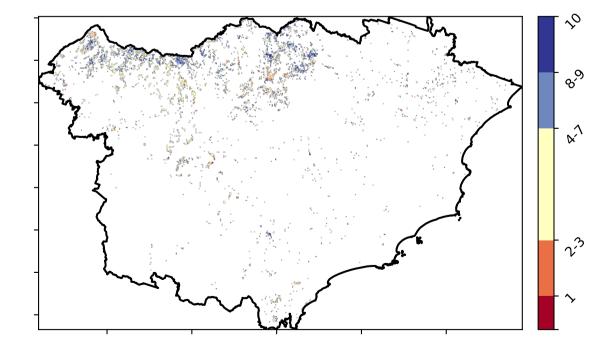


Total Vegetation Cover Anomaly [%]

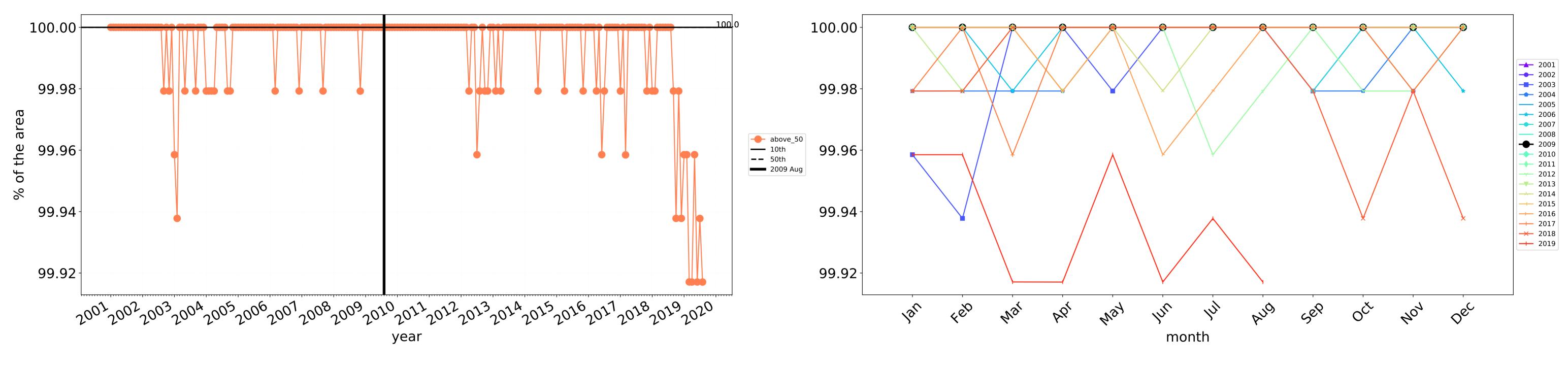


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

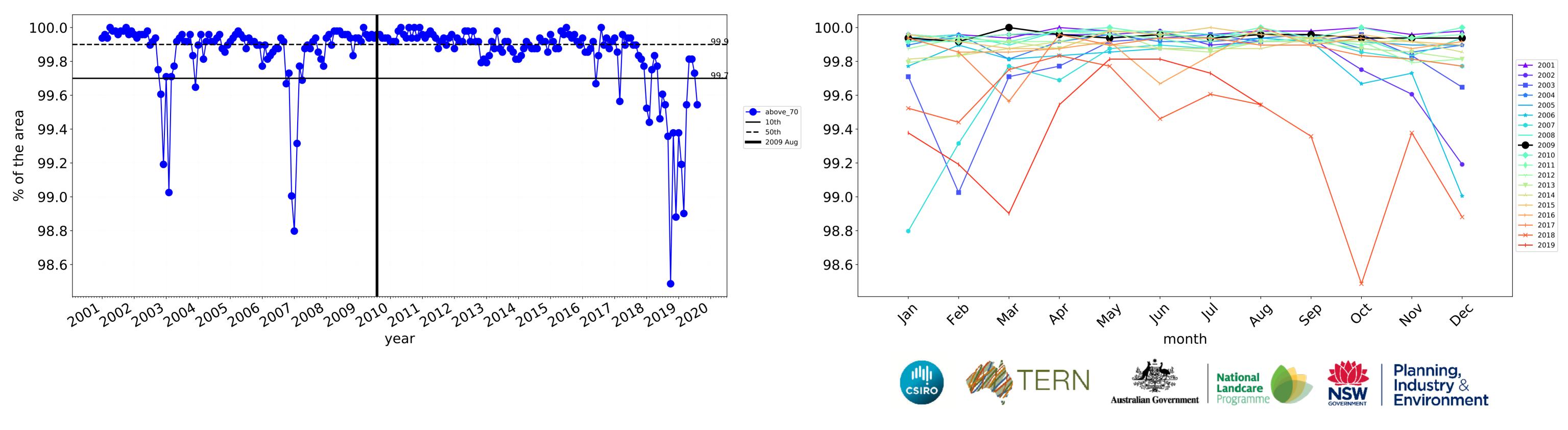






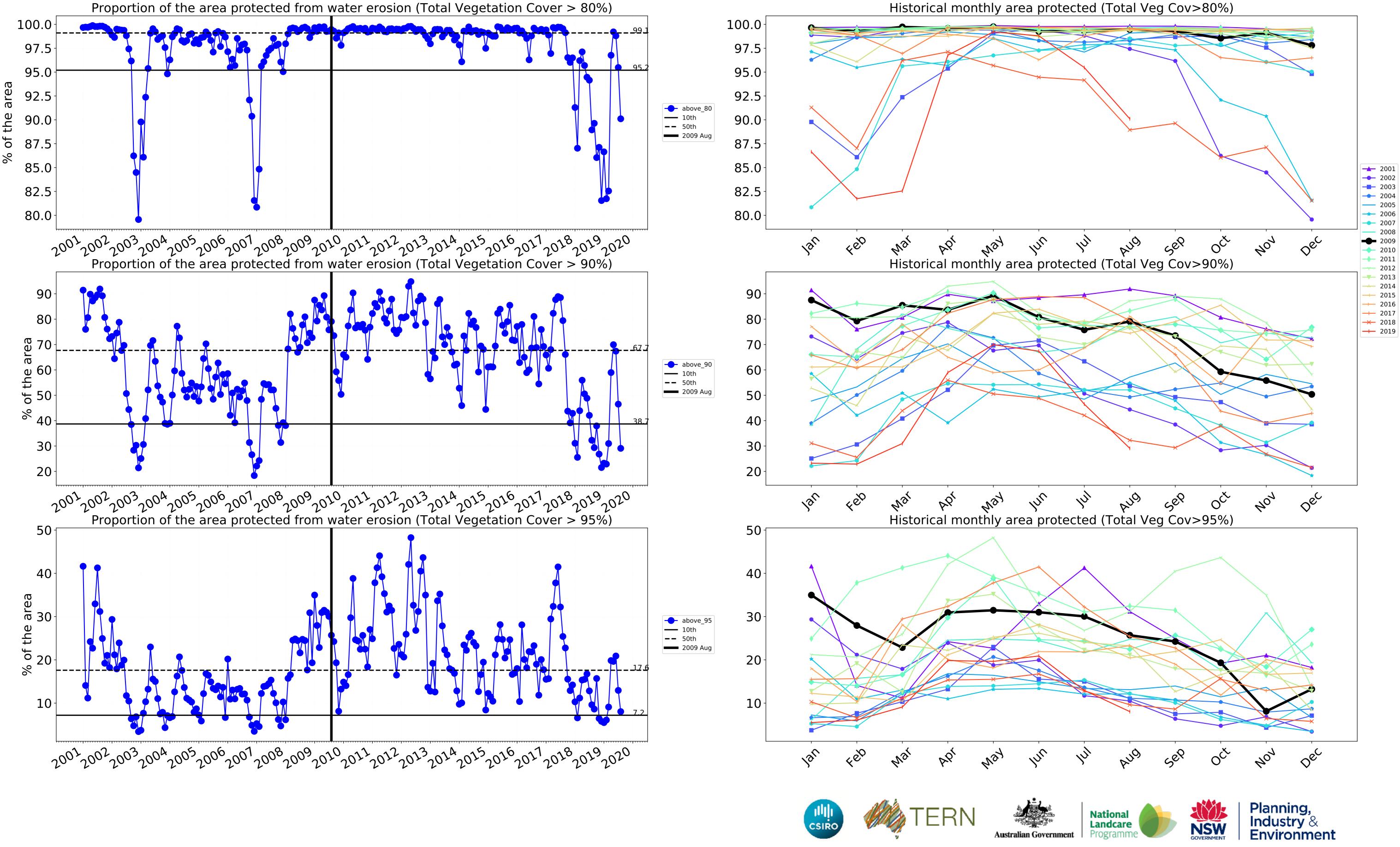
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

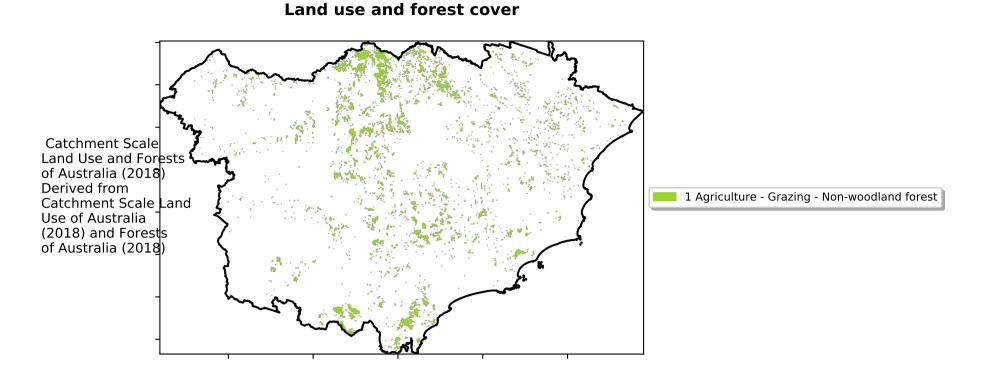


Wind erosion historical monthly area protected (Total Veg Cov >50%)

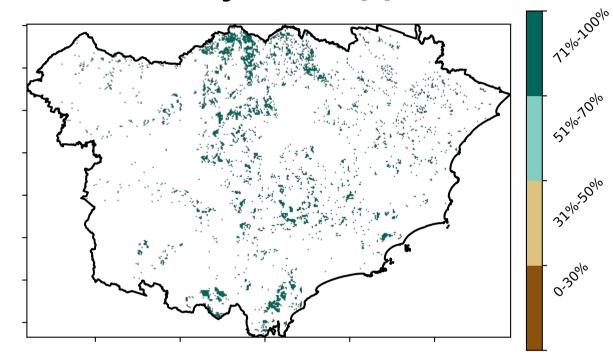
Water erosion historical monthly area protected (Total Veg Cov>70%)



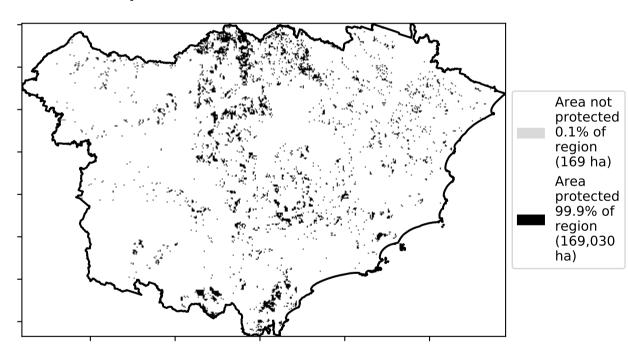
Grazing - Forest (non woodland)



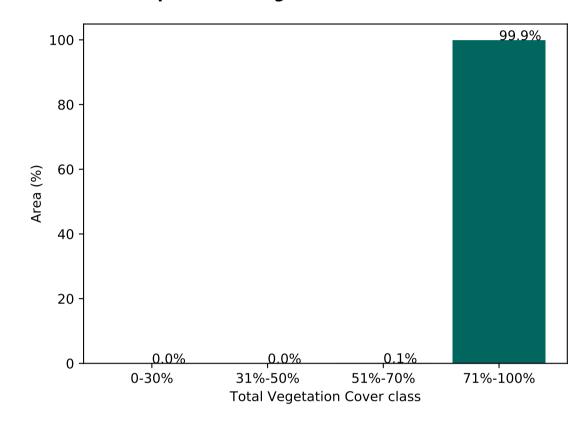
Total Vegetation Cover [%]



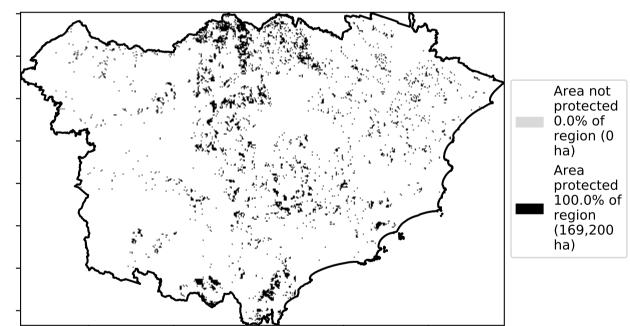
% Area protected from water erosion (>70%)



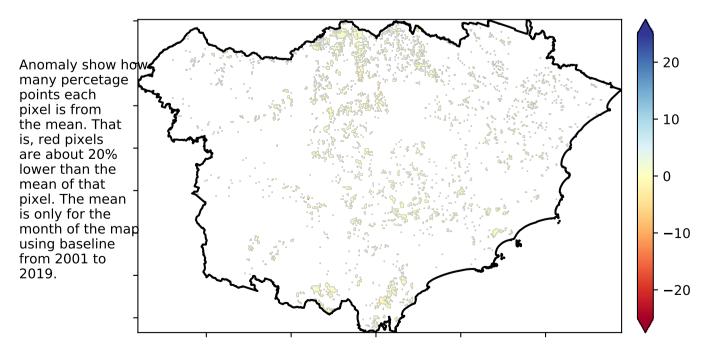
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

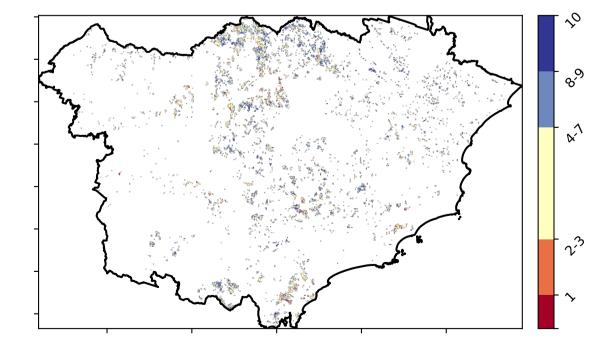


Total Vegetation Cover Anomaly [%]

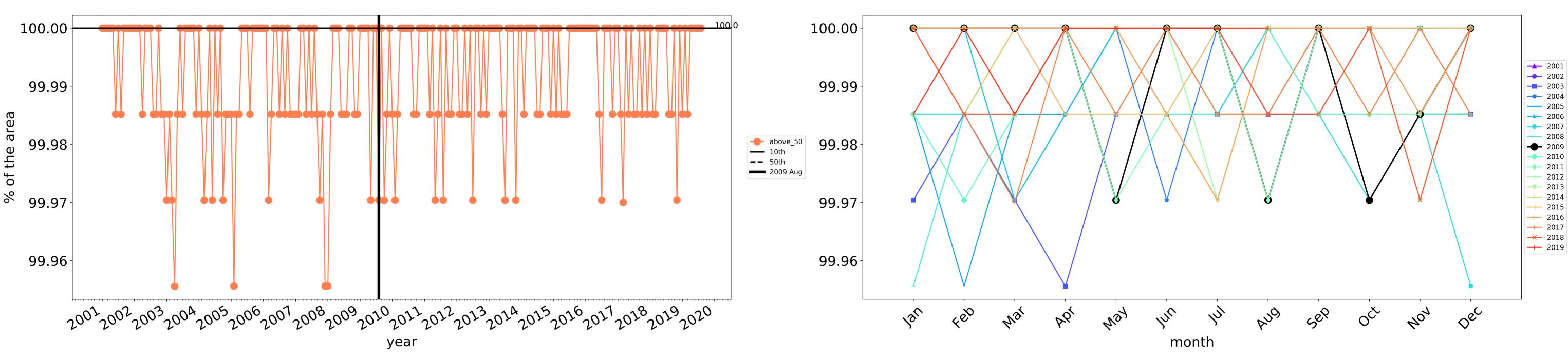


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

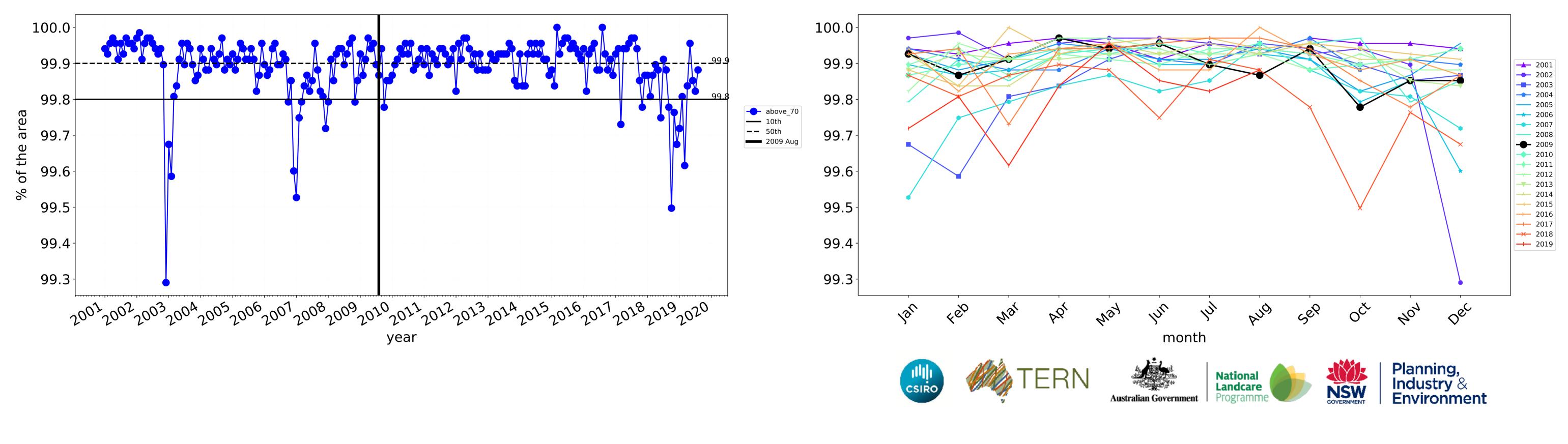






Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

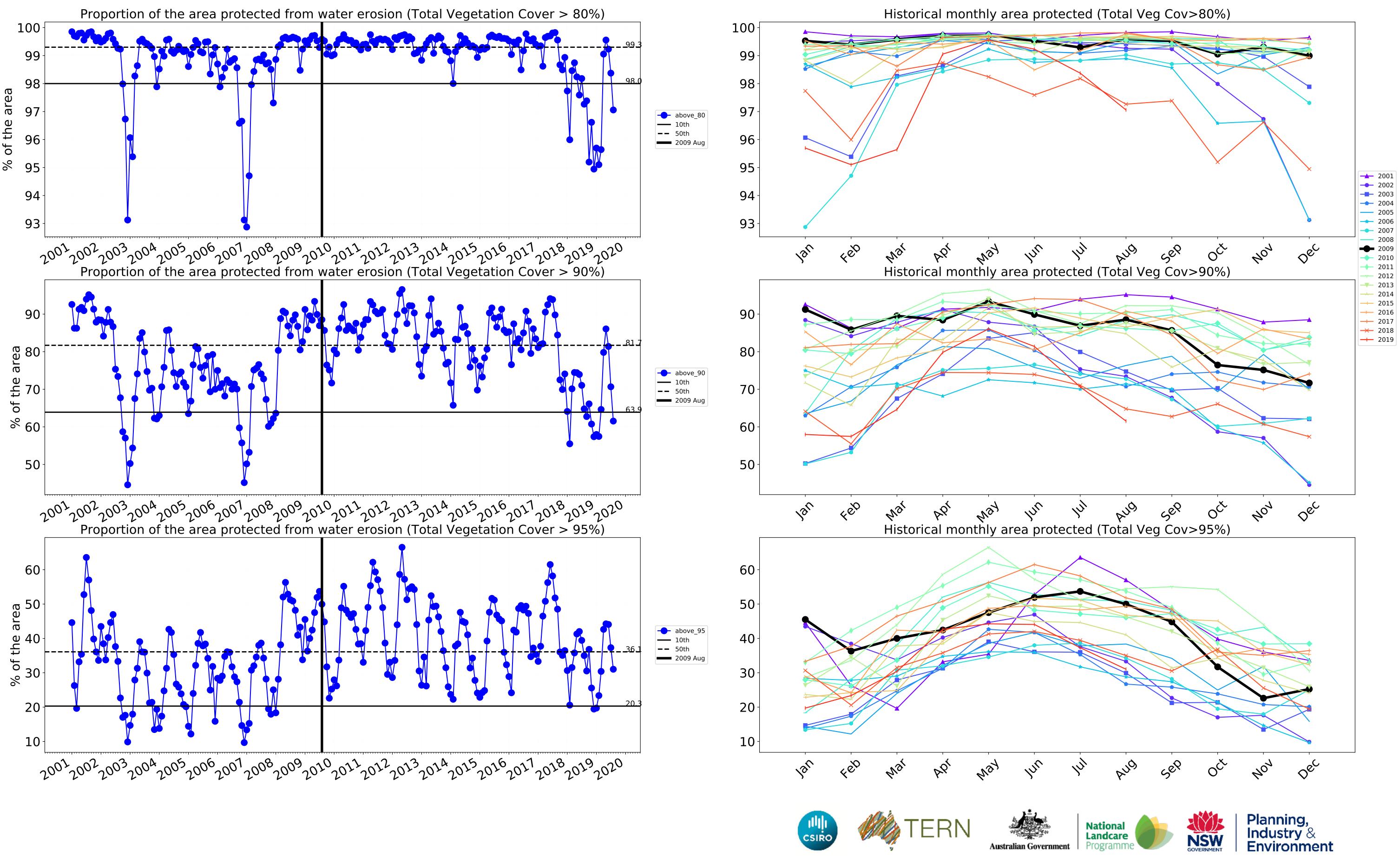
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)





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

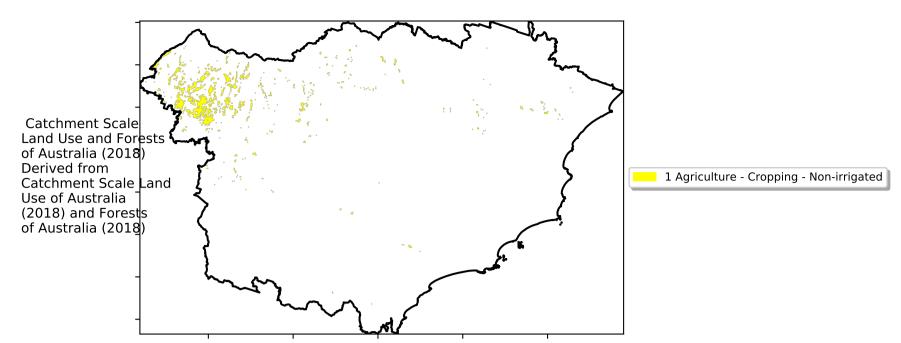
Water erosion historical monthly area protected (Total Veg Cov>70%)



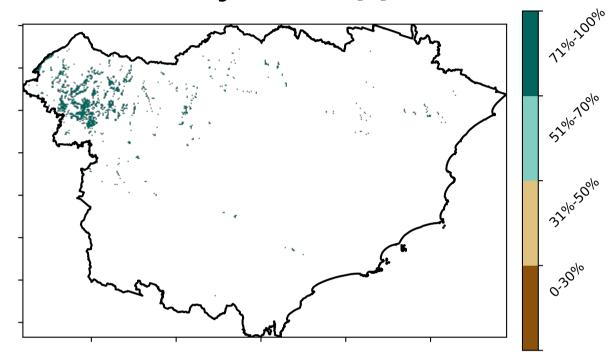
Australian Government

Cropping

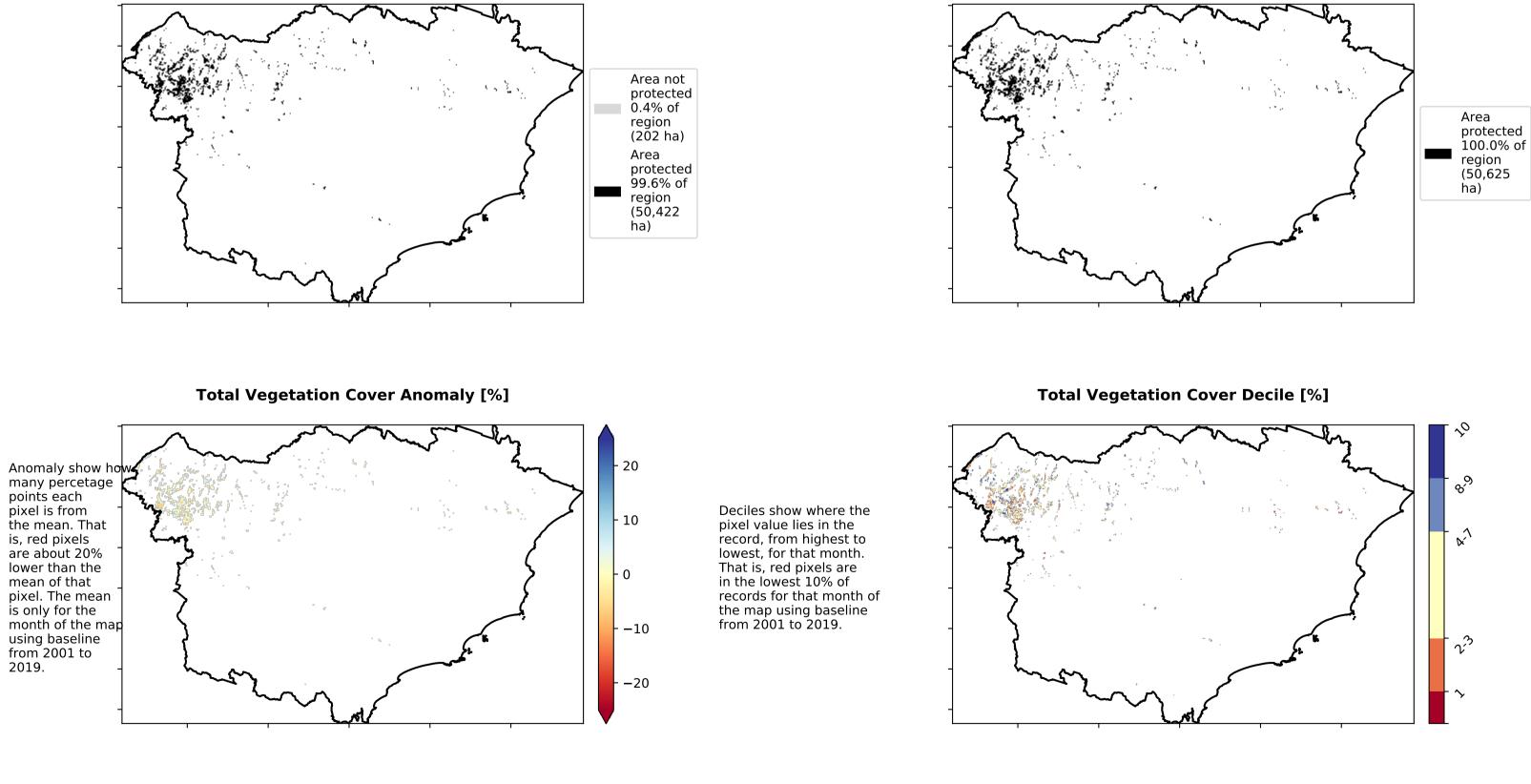
Land use and forest cover



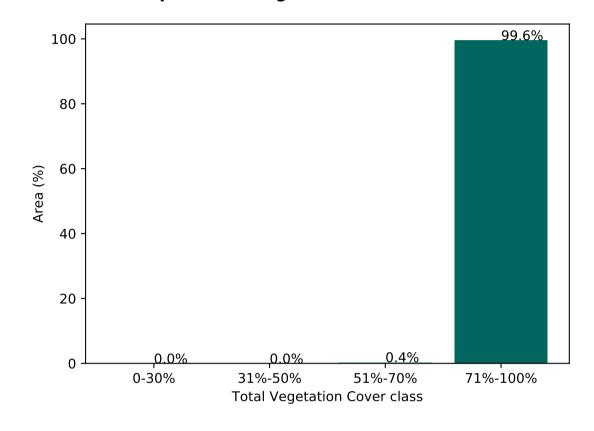
Total Vegetation Cover [%]



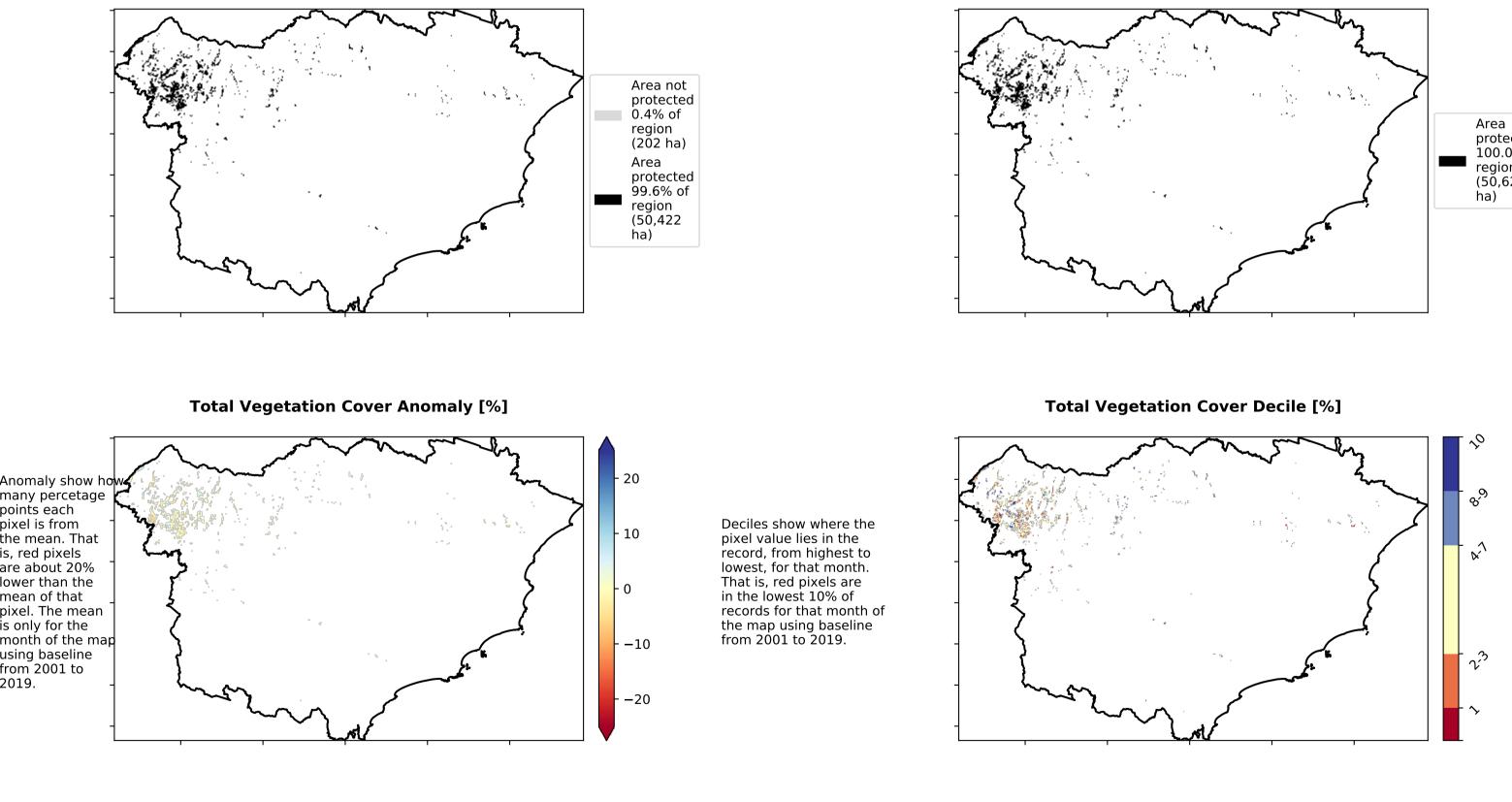
% Area protected from water erosion (>70%)



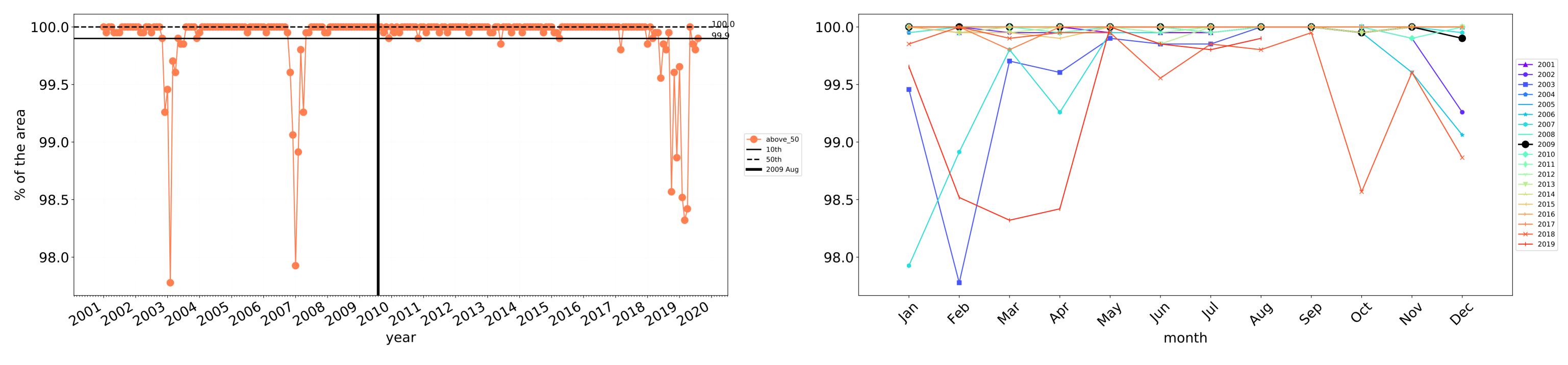
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

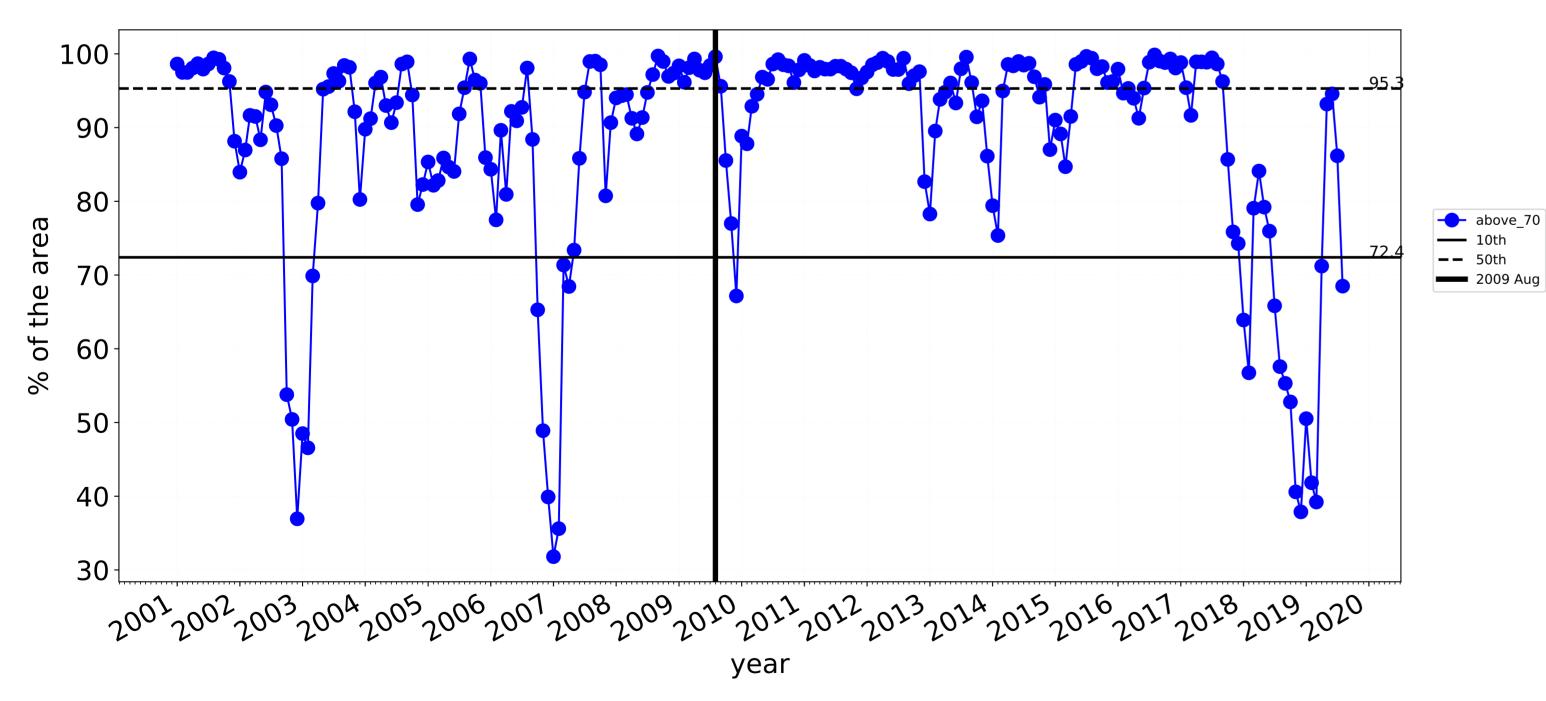


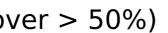




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

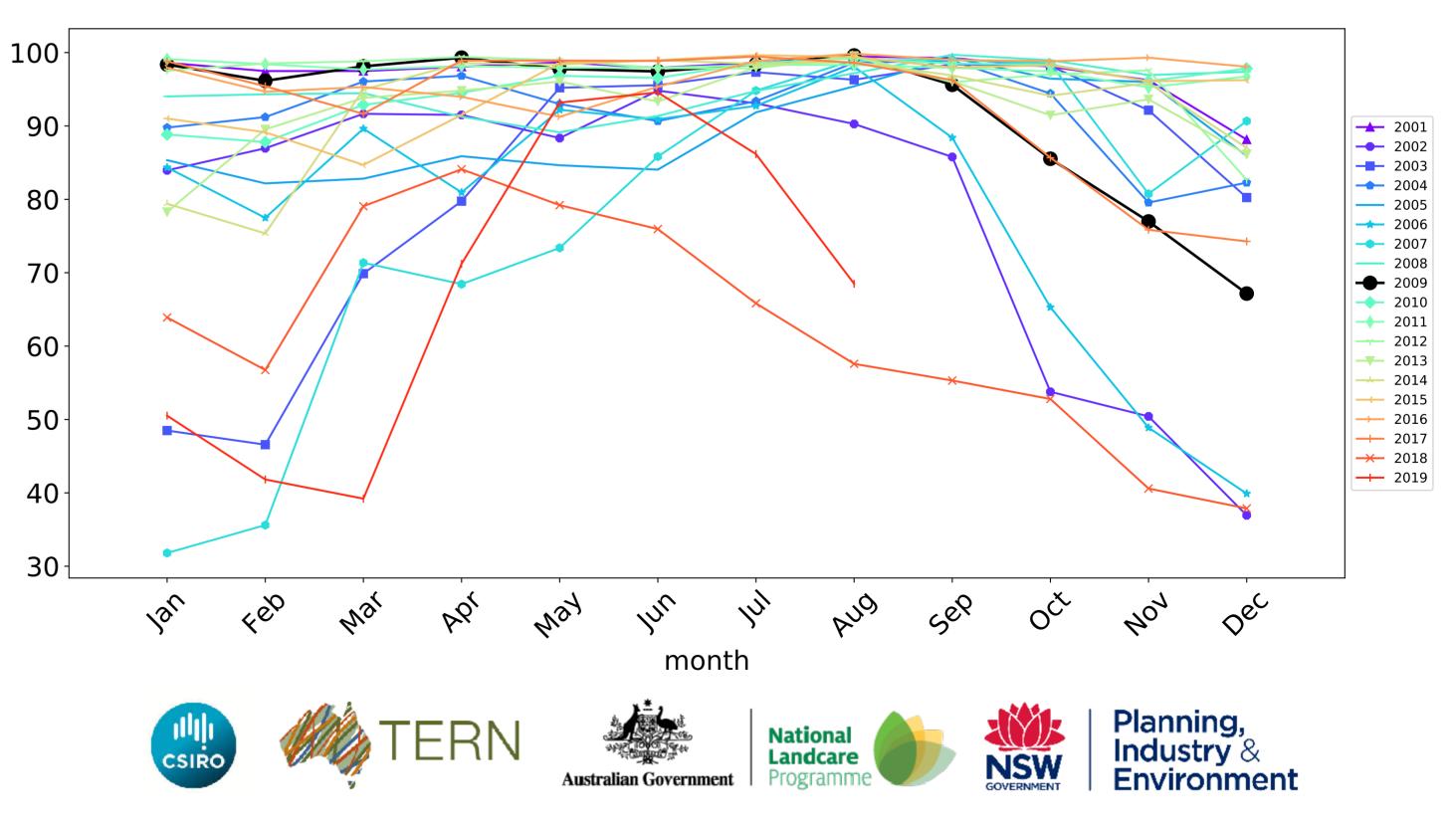
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

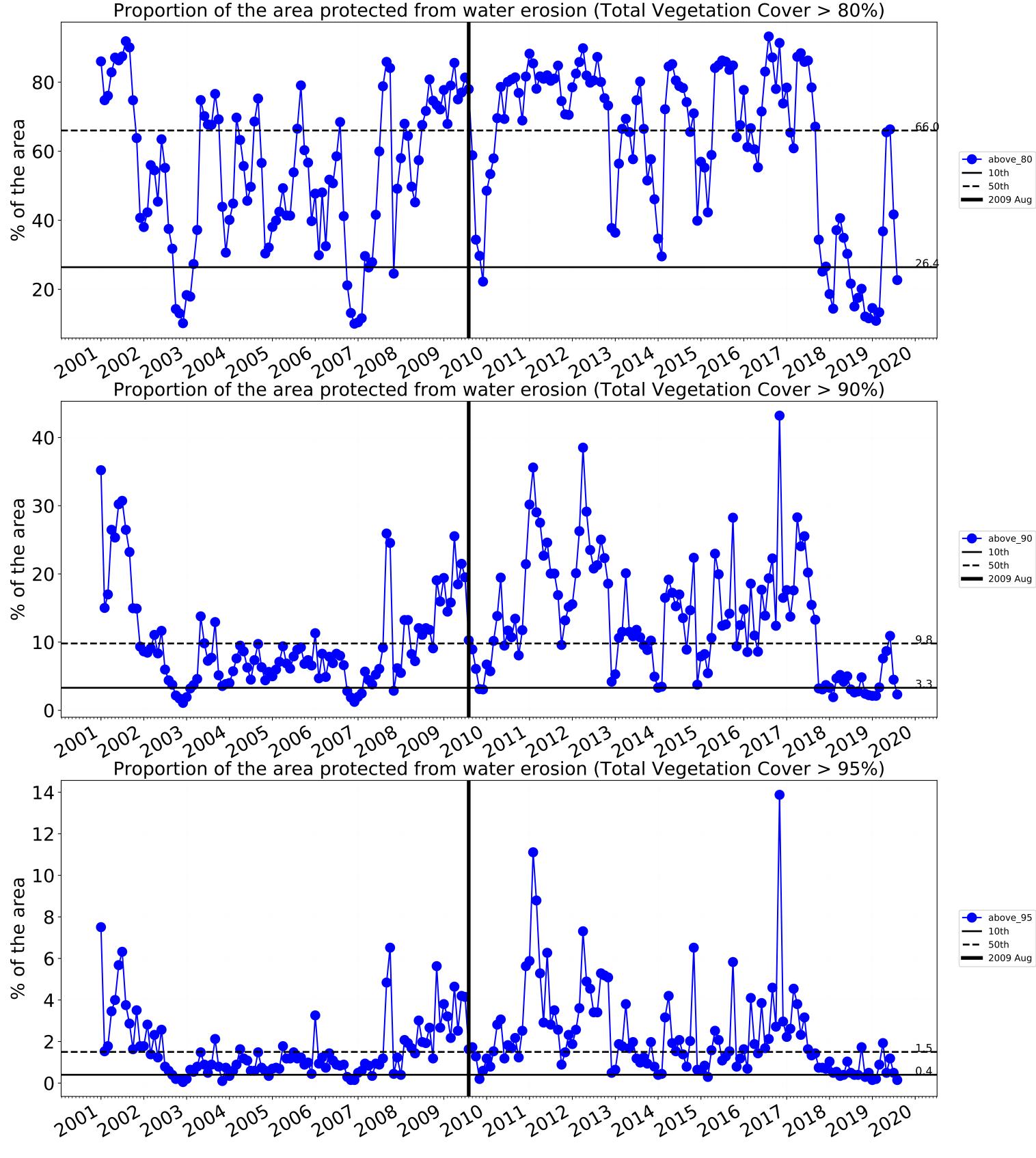




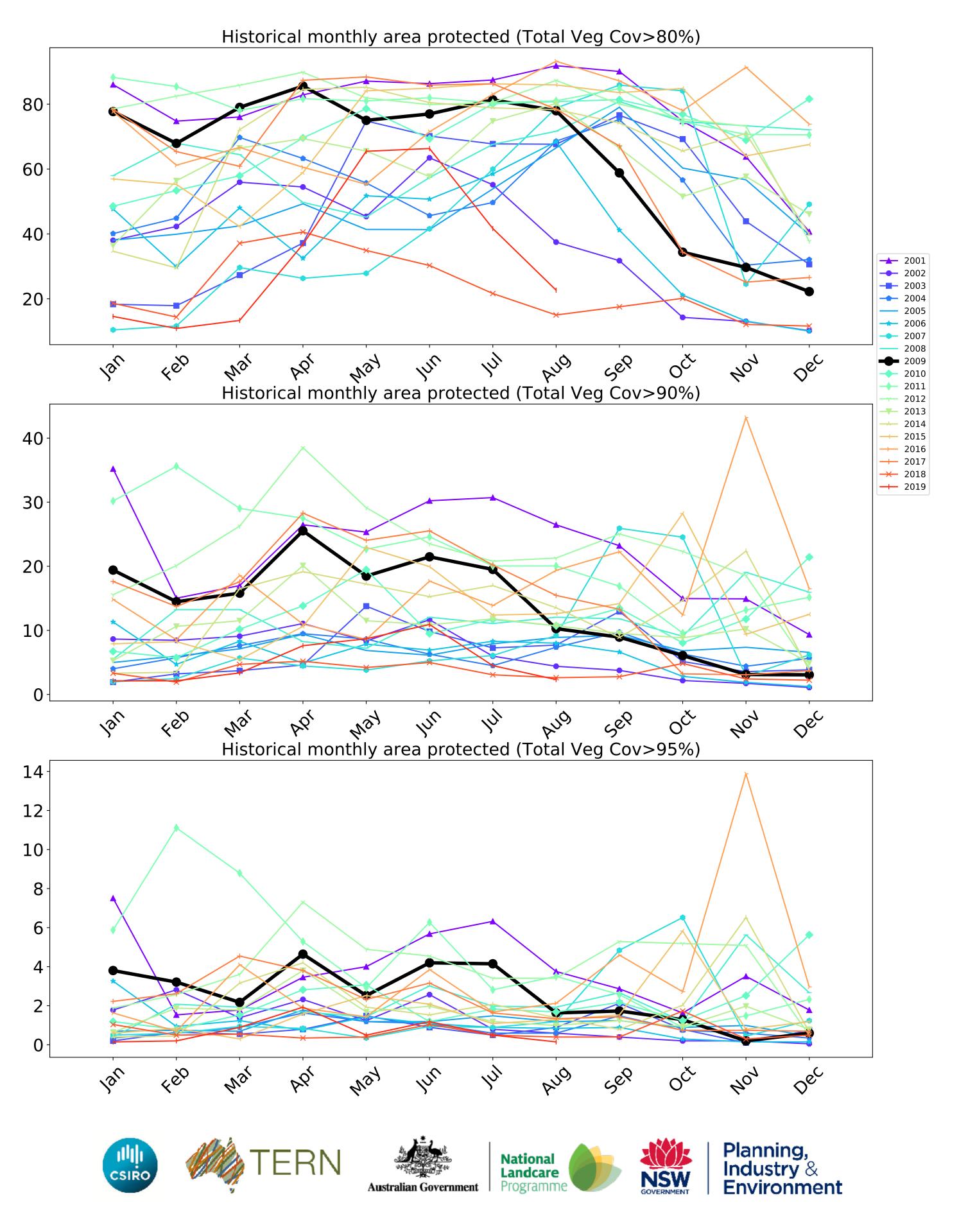
Wind erosion historical monthly area protected (Total Veg Cov >50%)

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





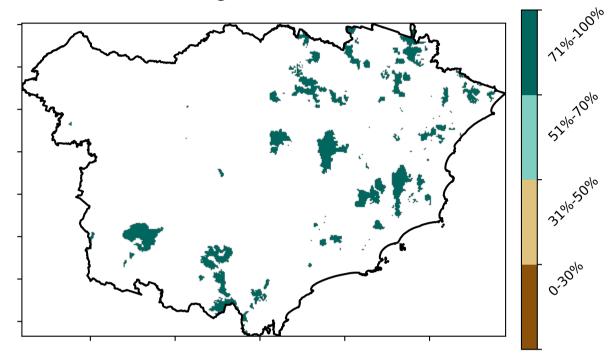




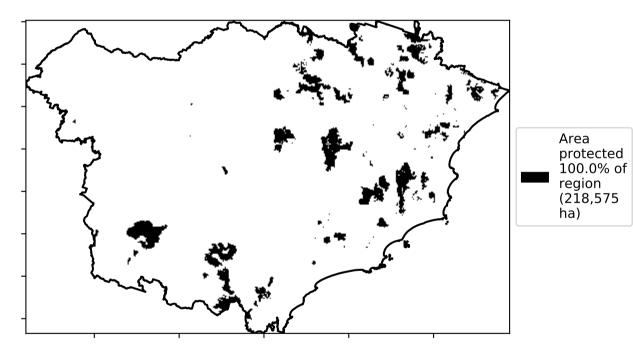
Production native forests and plantation forests



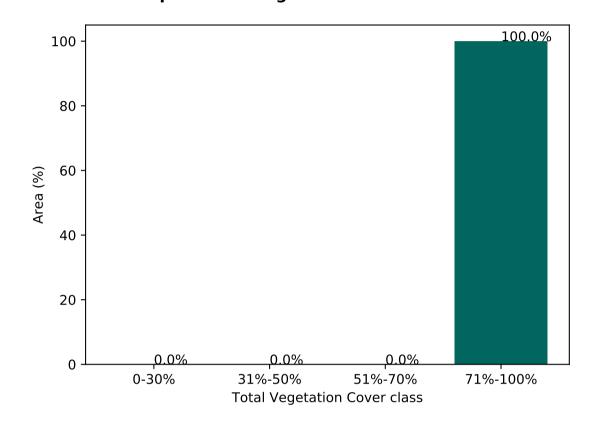
Total Vegetation Cover [%]



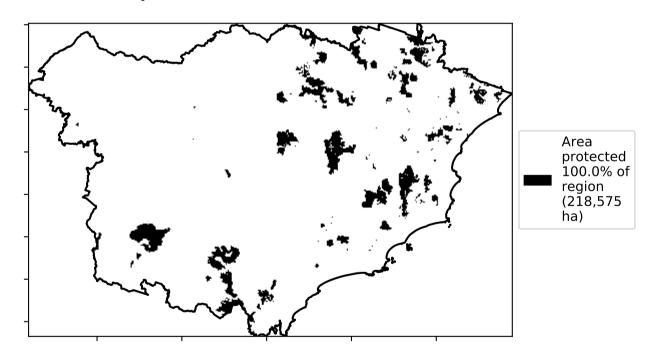
% Area protected from water erosion (>70%)



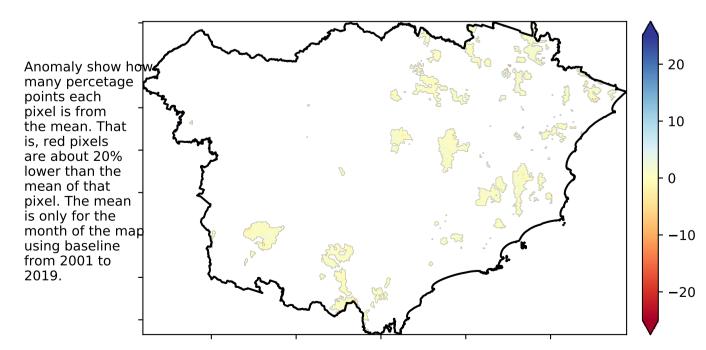
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

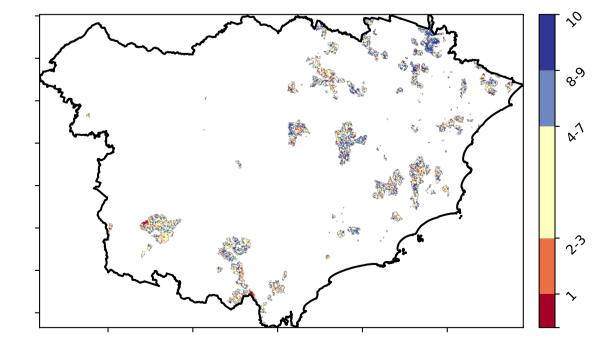


Total Vegetation Cover Anomaly [%]



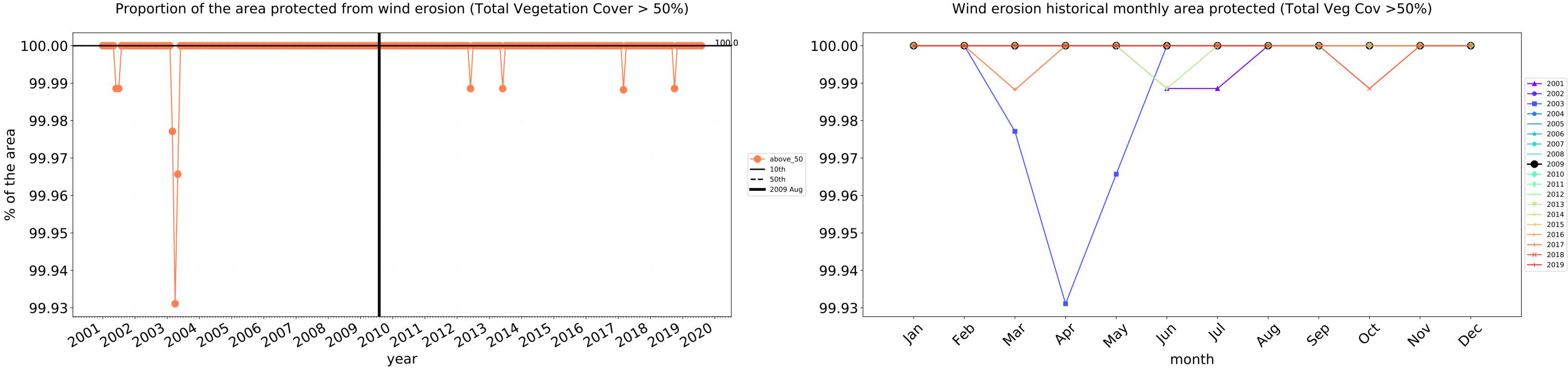
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]



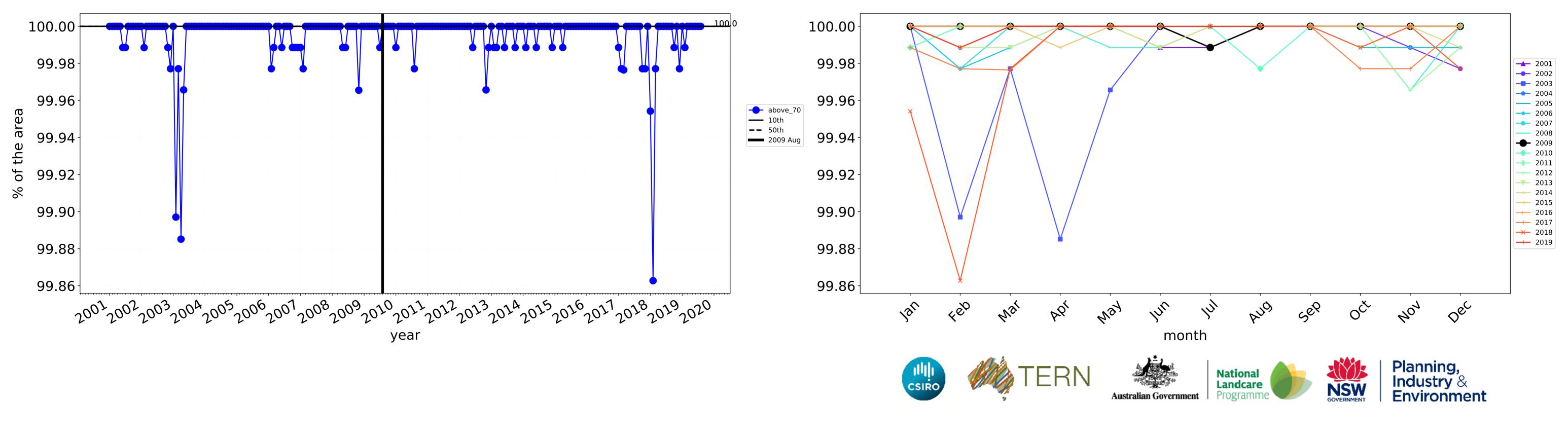


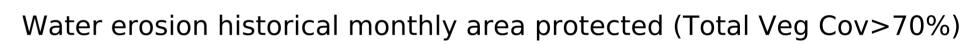
Production native forests and plantation forests timeseries

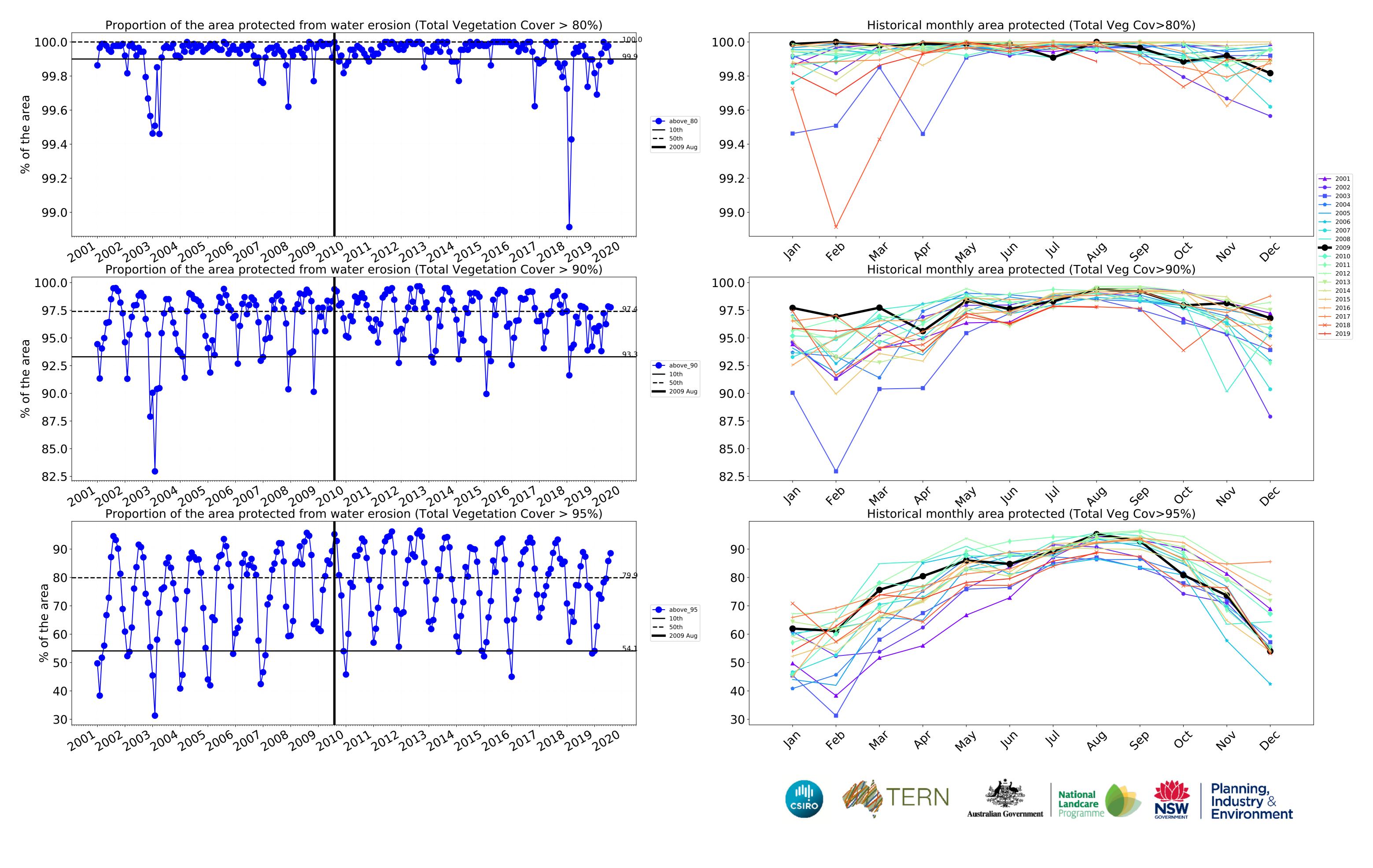


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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







Hunter (3,238,600 ha and no data 61,825 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	3,238,600	99.9% 3,236,024	99.7% 3,228,898	98.8% 3,201,068	97.0% 3,141,334	80.2% 2,597,321	49.6% 1,605,310
Conservation and natural environments	1,240,650	99.9% 1,239,500	99.8% 1,238,750	99.7% 1,237,050	99.5% 1,235,050	94.2% 1,168,750	72.8% 903,225
Conservation and natural environments non forest	29,975	96.2% 28,850	94.1% 28,200	90.4% 27,100	87.8% 26,325	72.9% 21,850	41.2% 12,350
Conservation and natural environments Woodland forest	138,750	100.0% 138,725	100.0% 138,700	100.0% 138,700	99.9% 138,575	87.8% 121,825	44.2% 61,275
Conservation and natural environments Forest (non woodland)	1,071,925	100.0% 1,071,925	100.0% 1,071,850	99.9% 1,071,250	99.8% 1,070,150	95.6% 1,025,075	77.4% 829,600
Agriculture	1,580,625	100.0% 1,580,625	100.0% 1,580,200	99.8% 1,577,575	98.1% 1,550,950	72.4% 1,143,600	29.9% 473,275
Grazing	1,502,625	100.0% 1,502,625	100.0% 1,502,200	99.8% 1,499,900	99.0% 1,487,075	75.5% 1,134,950	31.4% 472,200
Grazing non forest	1,212,800	100.0% 1,212,800	100.0% 1,212,425	99.8% 1,210,350	98.8% 1,198,600	73.4% 889,775	29.4% 356,650
Grazing Woodland forest	120,625	100.0% 120,625	100.0% 120,625	100.0% 120,575	99.5% 119,975	79.1% 95,400	25.7% 31,000
Grazing - Forest (non woodland)	169,200	100.0% 169,200	100.0% 169,150	99.9% 168,975	99.6% 168,500	88.5% 149,775	50.0% 84,550
Cropping	50,625	100.0% 50,625	100.0% 50,625	99.6% 50,425	78.0% 39,475	10.3% 5,200	1.6% 825
Production native forests and plantation forests	218,575	100.0% 218,575	100.0% 218,575	100.0% 218,575	100.0% 218,575	99.4% 217,275	95.3% 208,200

