Total vegetation cover soil protection Region:NRM Hunter NSW

Date: April 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:

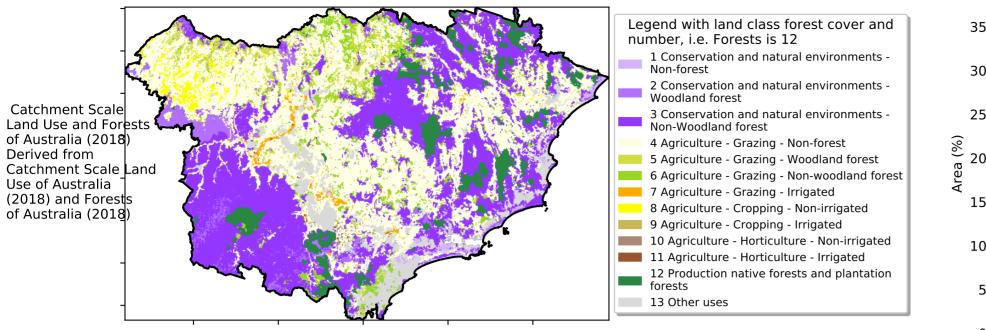
https://doi.org/10.4225/08/5848a3f19a7b3



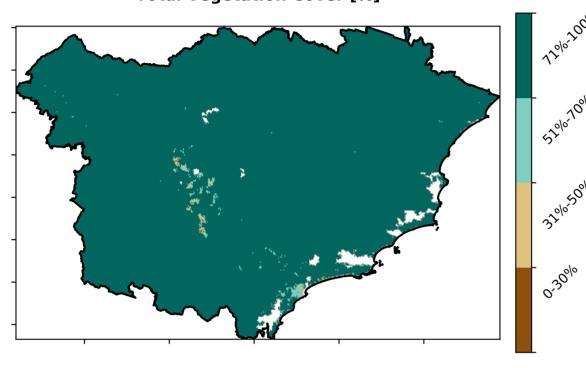
Vegetation Cover Apr 2009

Land use and forest cover

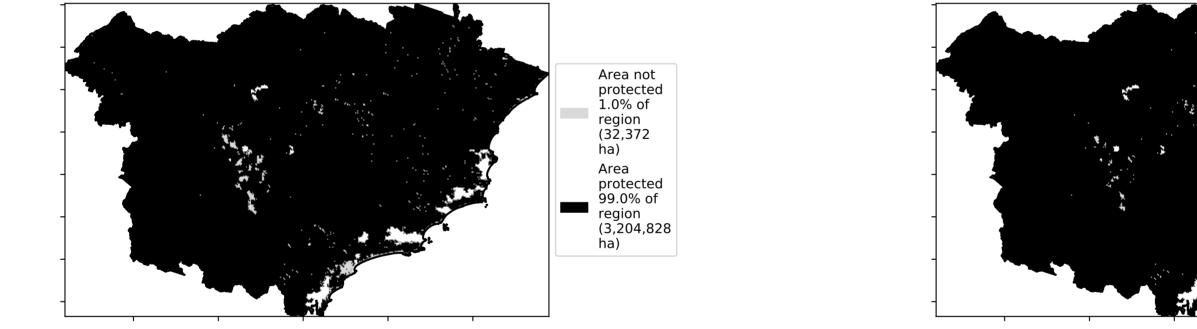
Proportion of each land class in area

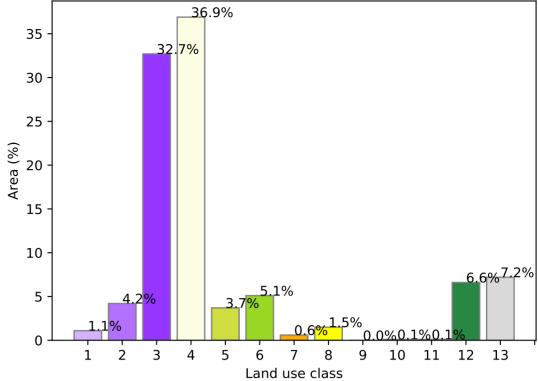




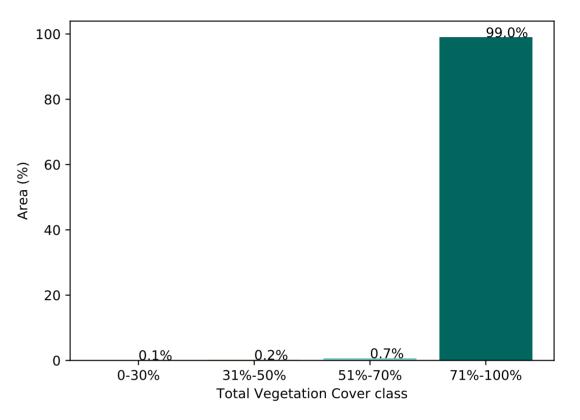


% Area protected from water erosion (>70%)

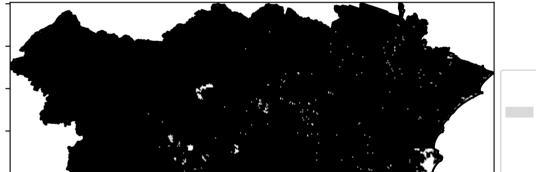




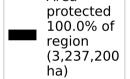
Proportion of vegetation cover class in area



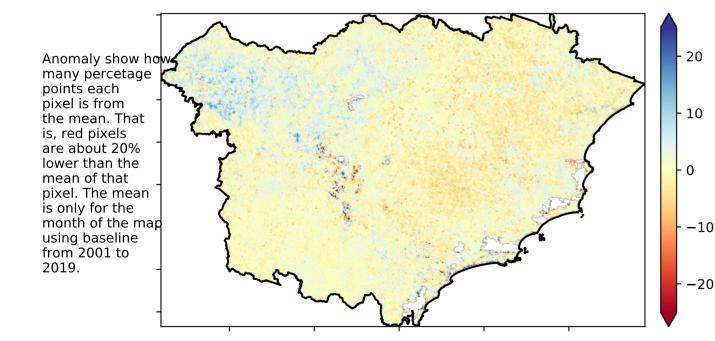
% Area protected from wind erosion (>50%)



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

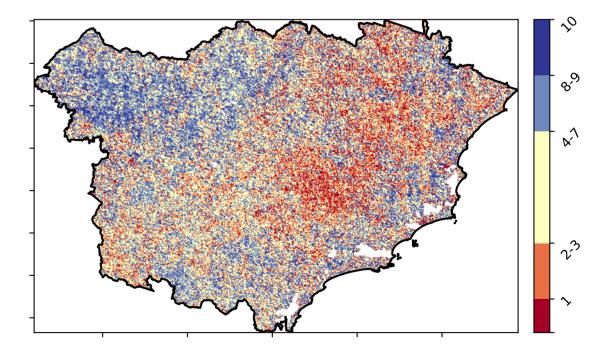


Total Vegetation Cover Anomaly [%]



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.

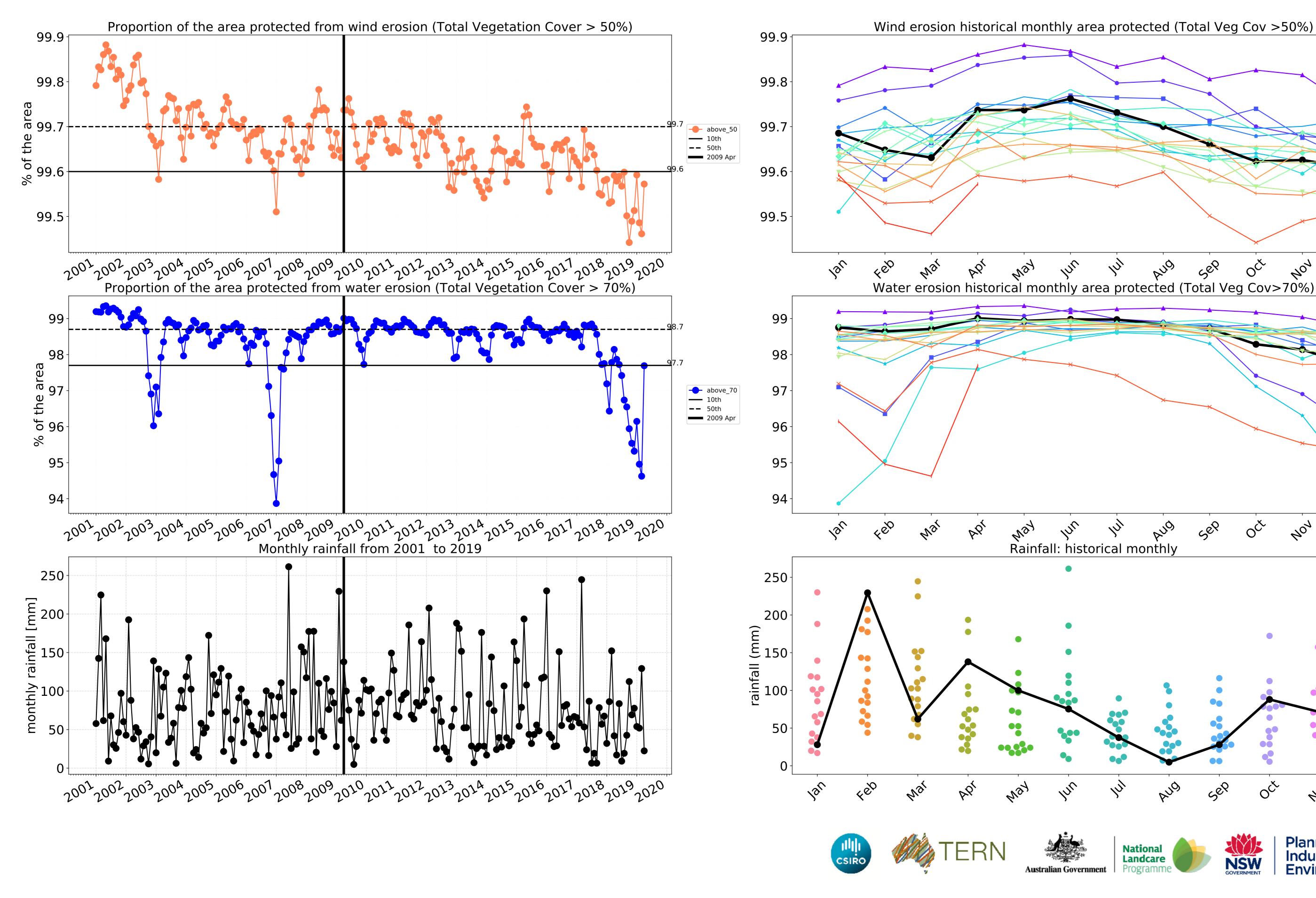
Total Vegetation Cover Decile [%]

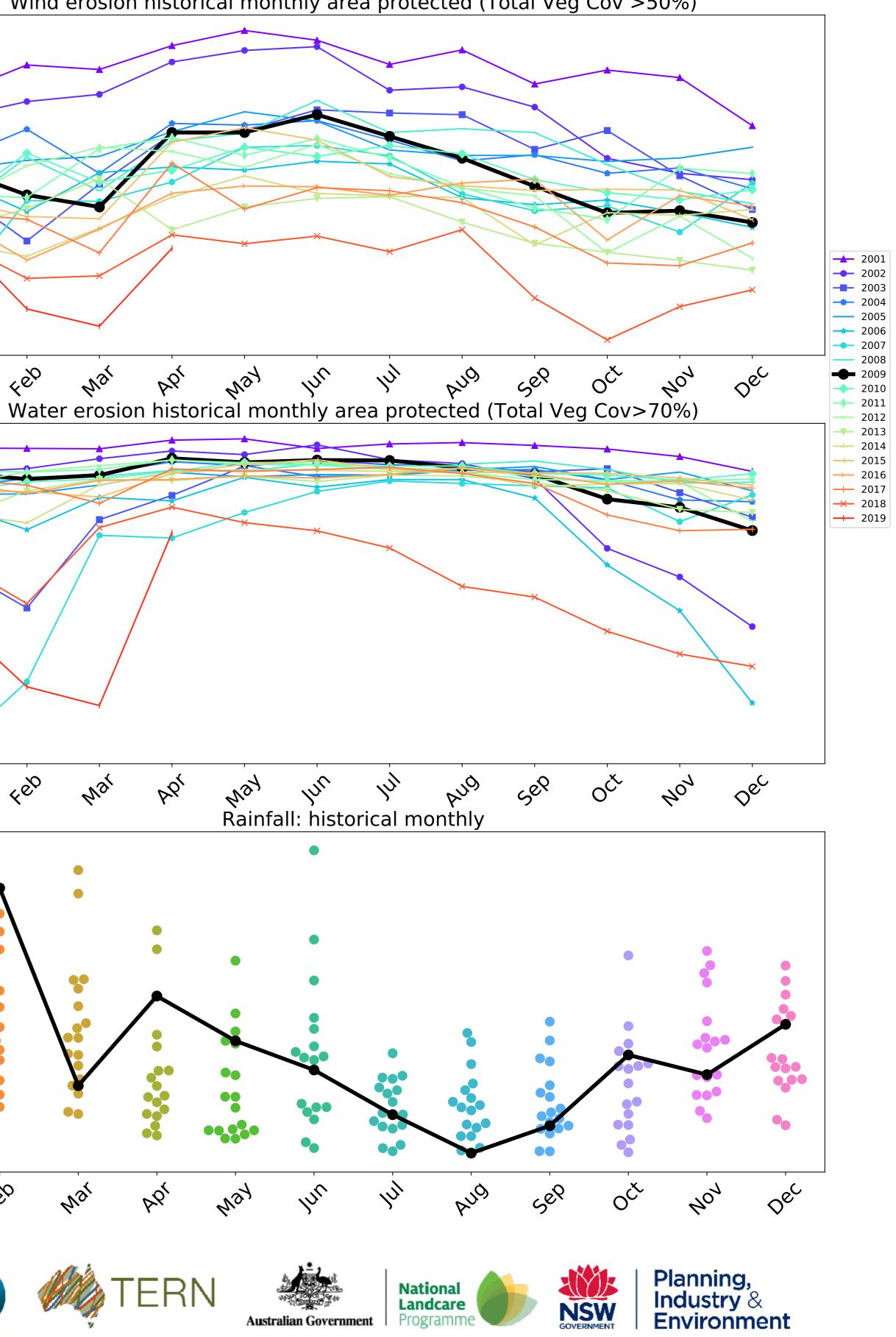


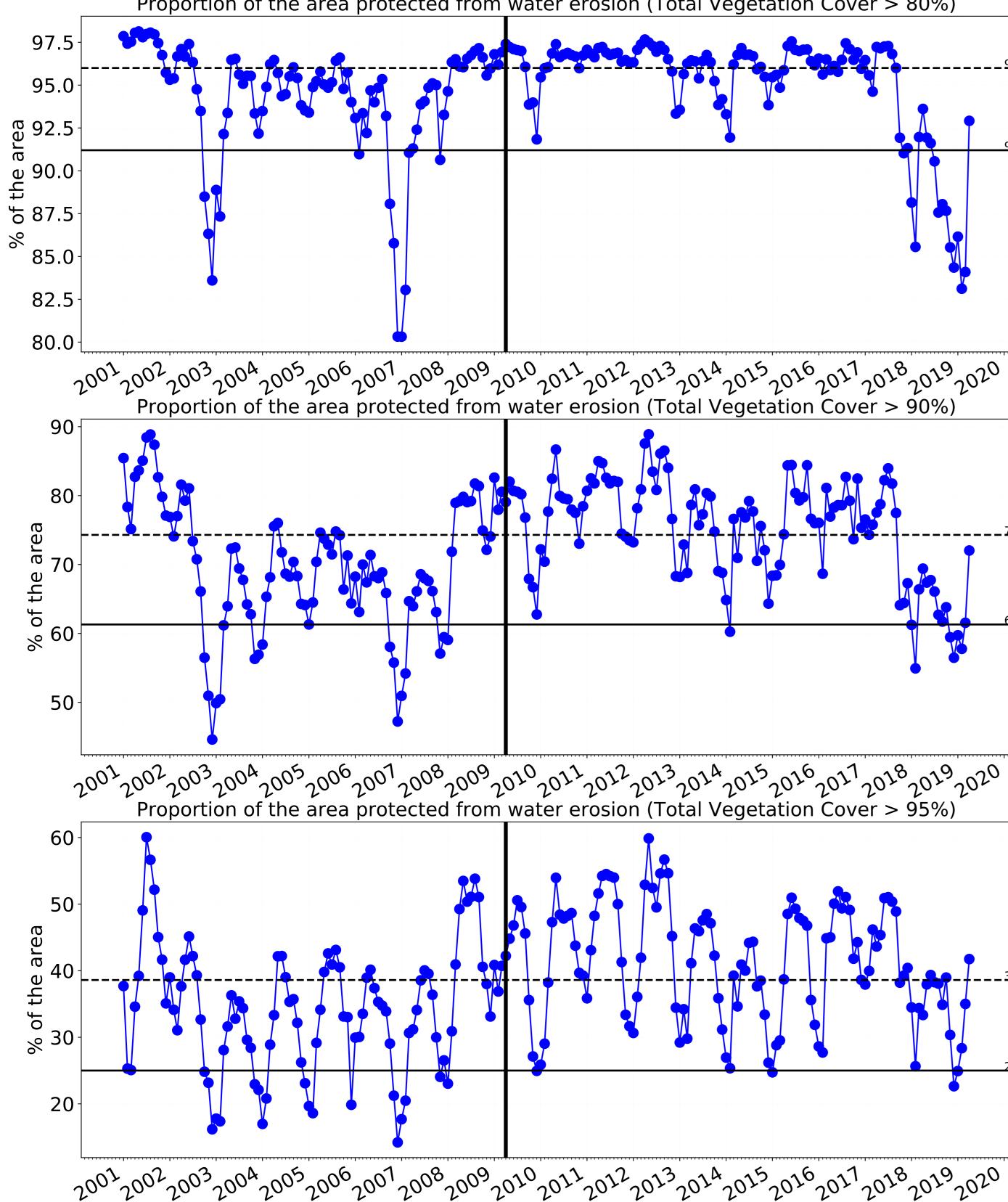


2

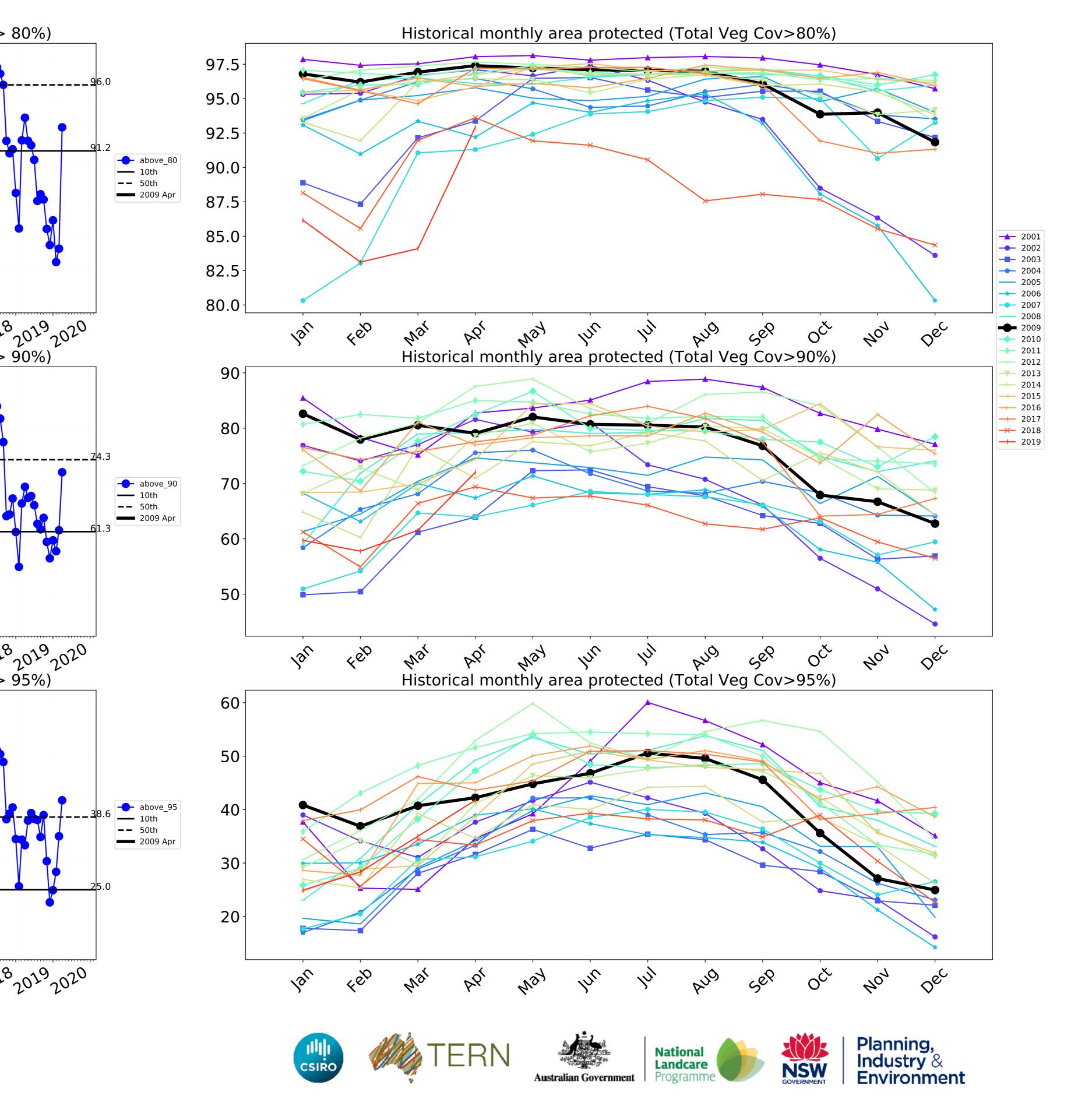
-20





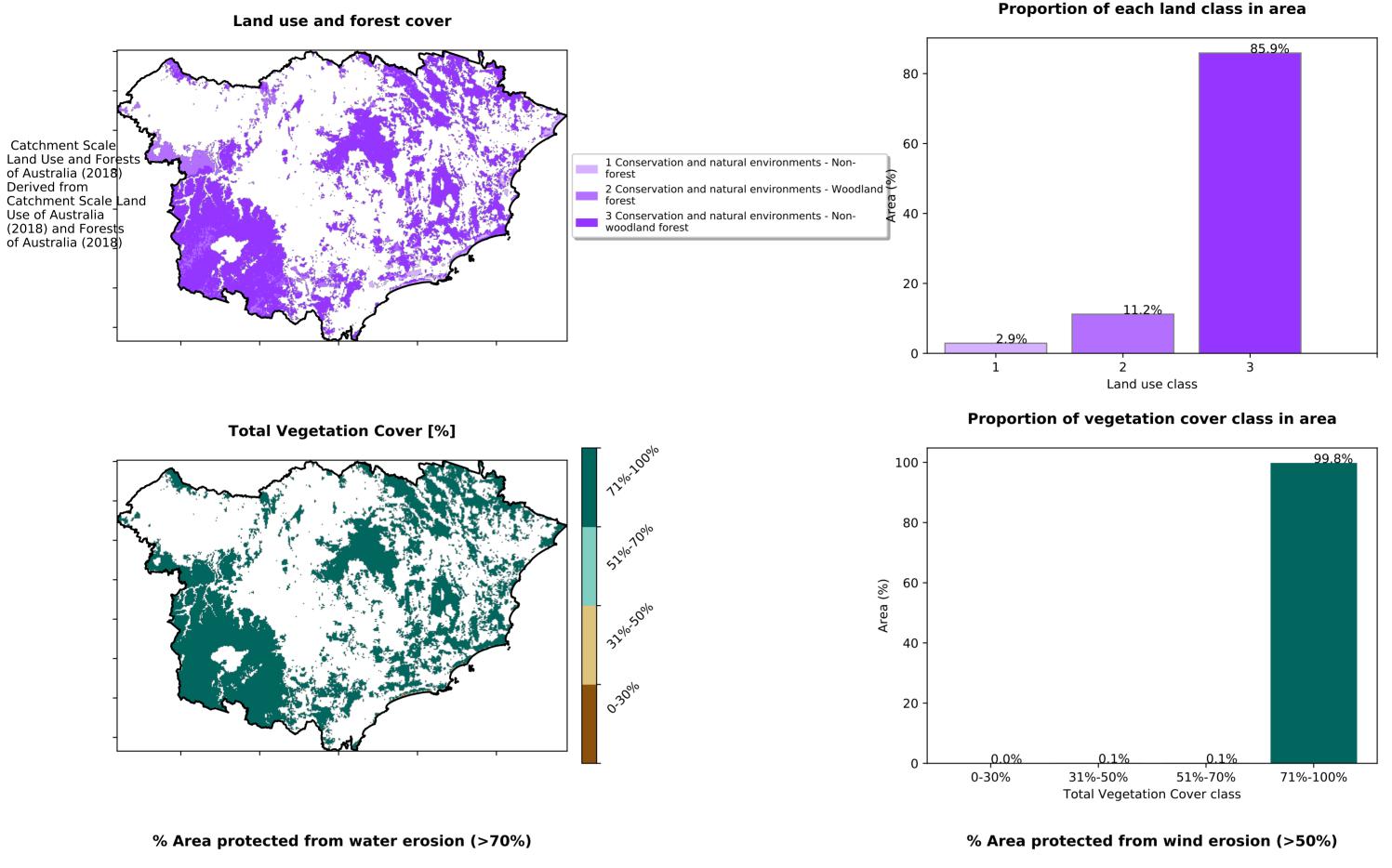


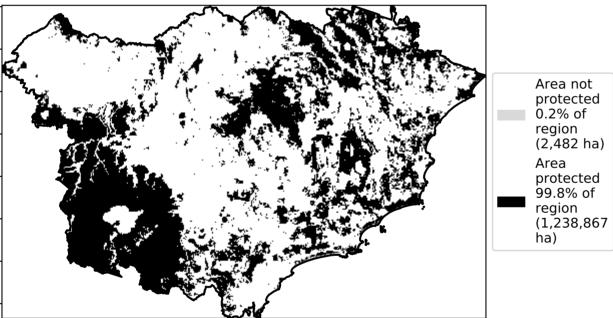
Proportion of the area protected from water erosion (Total Vegetation Cover > 80%)



4

Conservation and natural environments





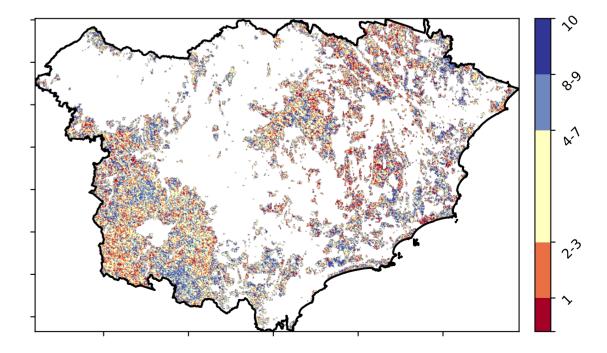
Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (1,241,350 ha)

Total Vegetation Cover Anomaly [%]

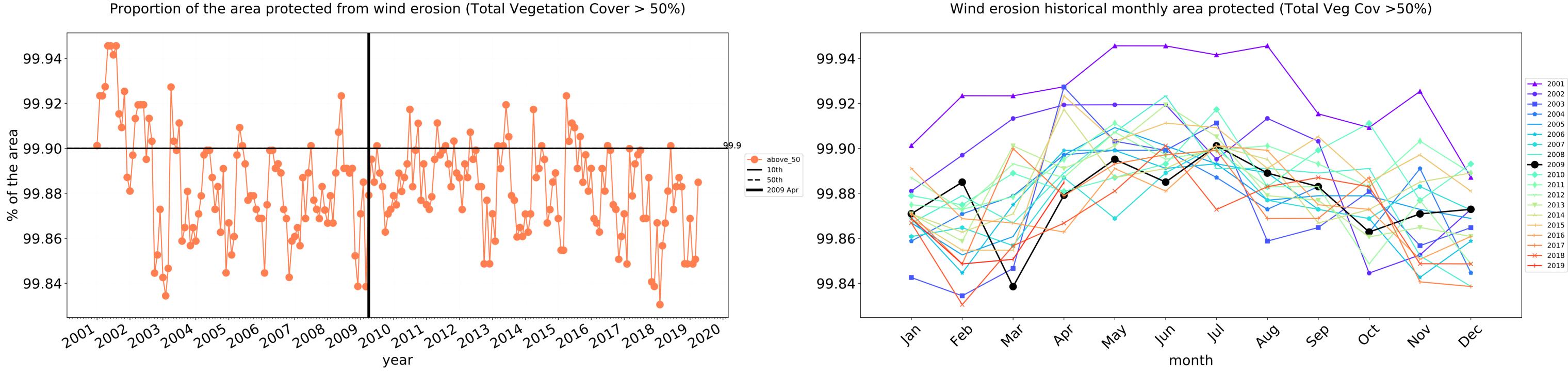
Anomaly show how many percetage points each pixel is from the mean. That · 20 - 10 is, red pixels are about 20% lower than the mean of that 0 pixel. The mean is only for the month of the map using baseline from 2001 to 2019. -10 -20

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.

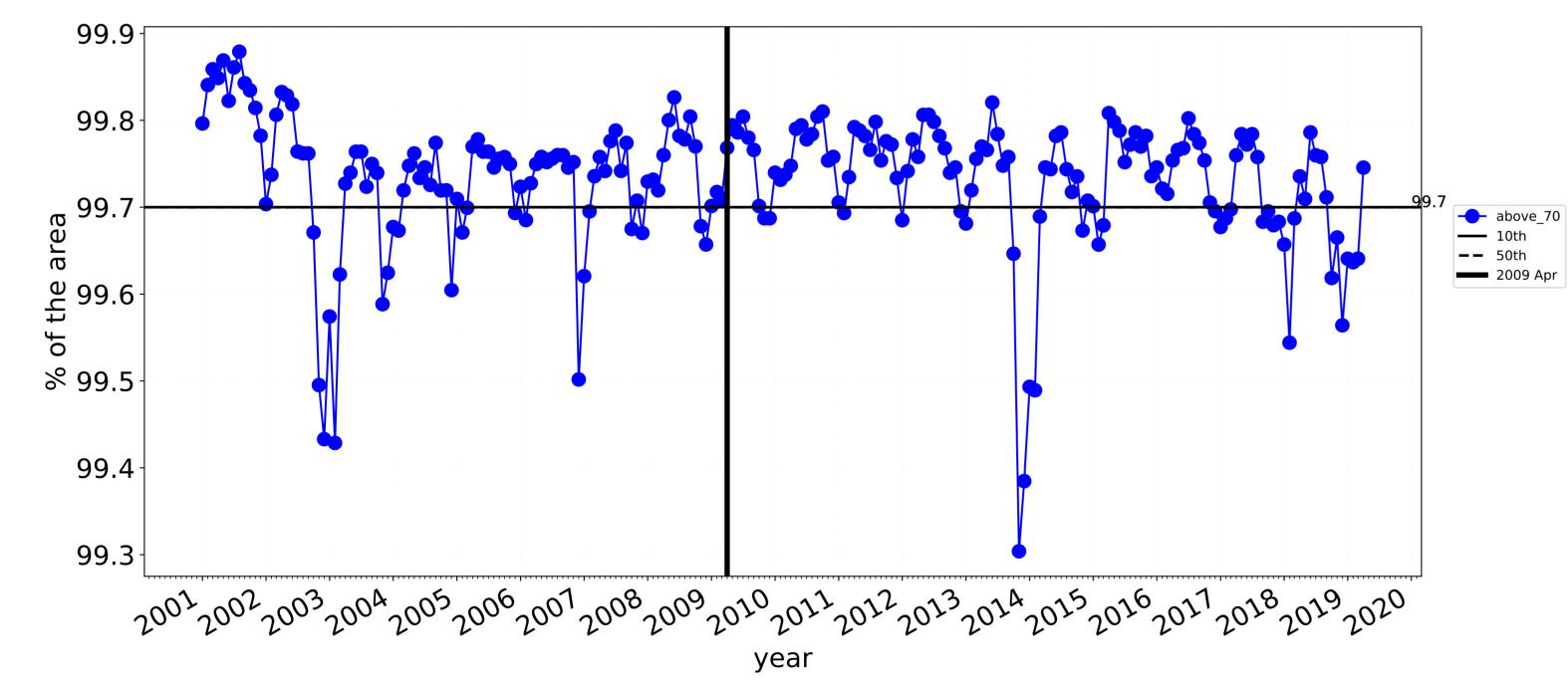
Total Vegetation Cover Decile [%]



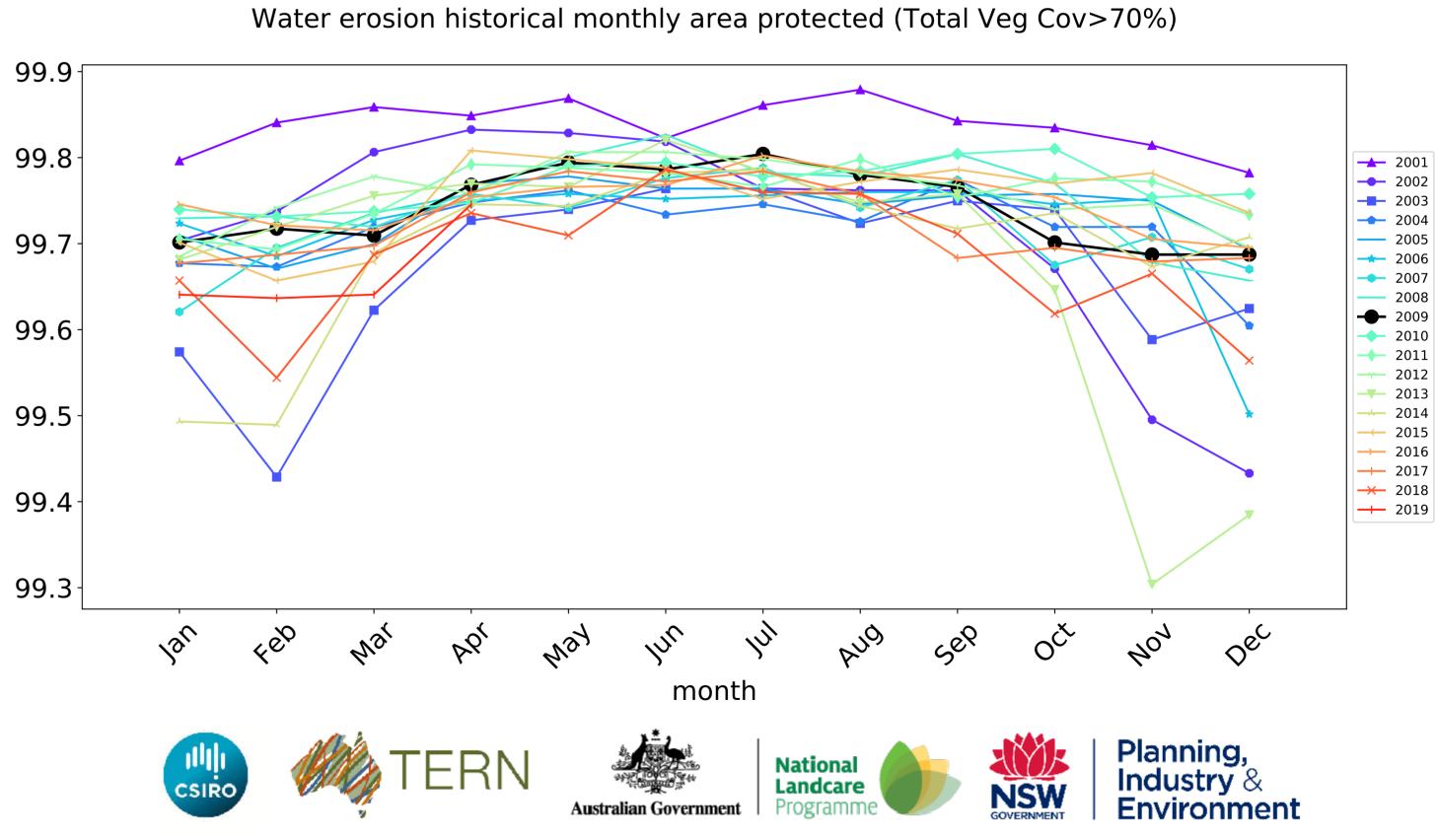


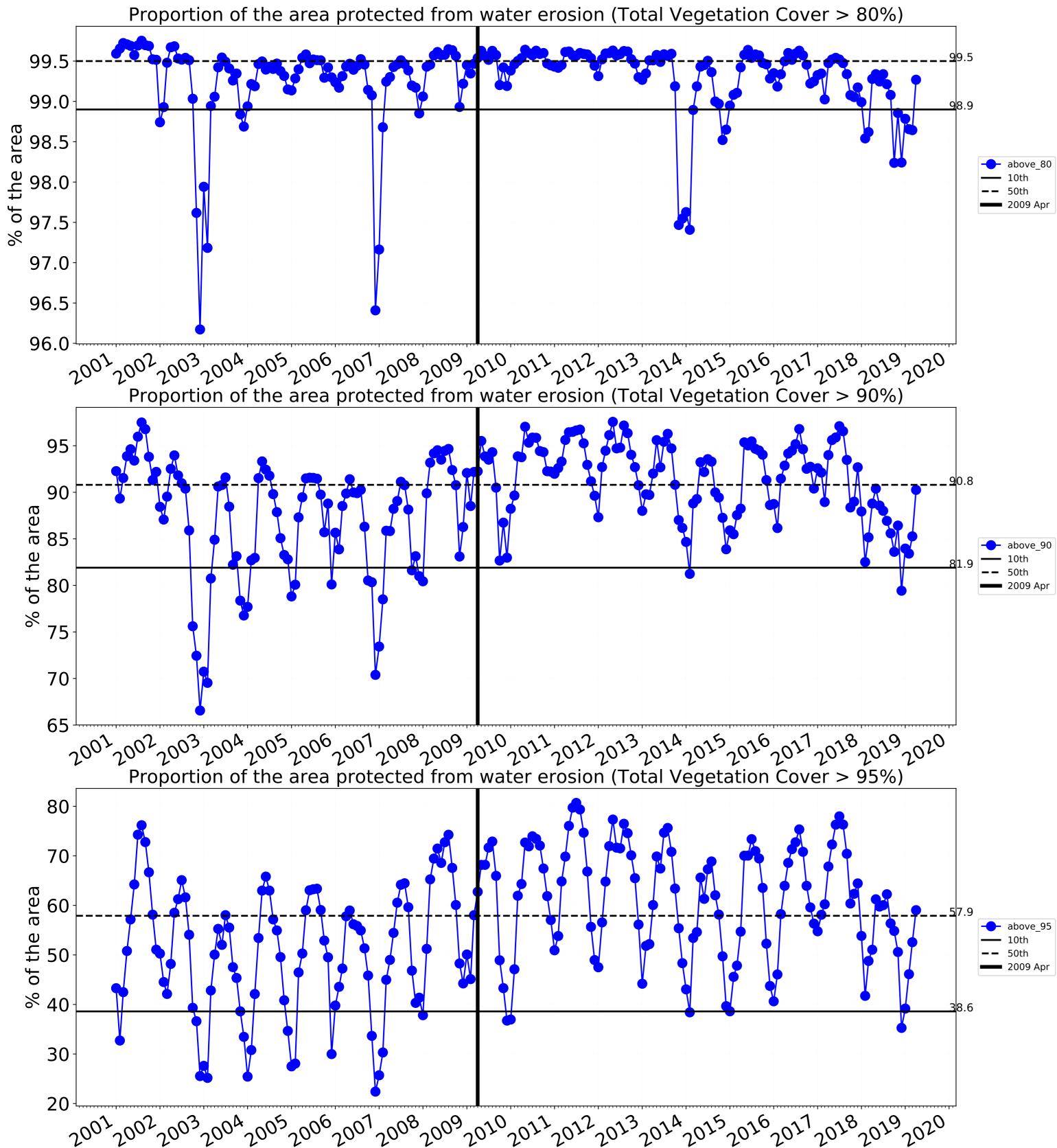


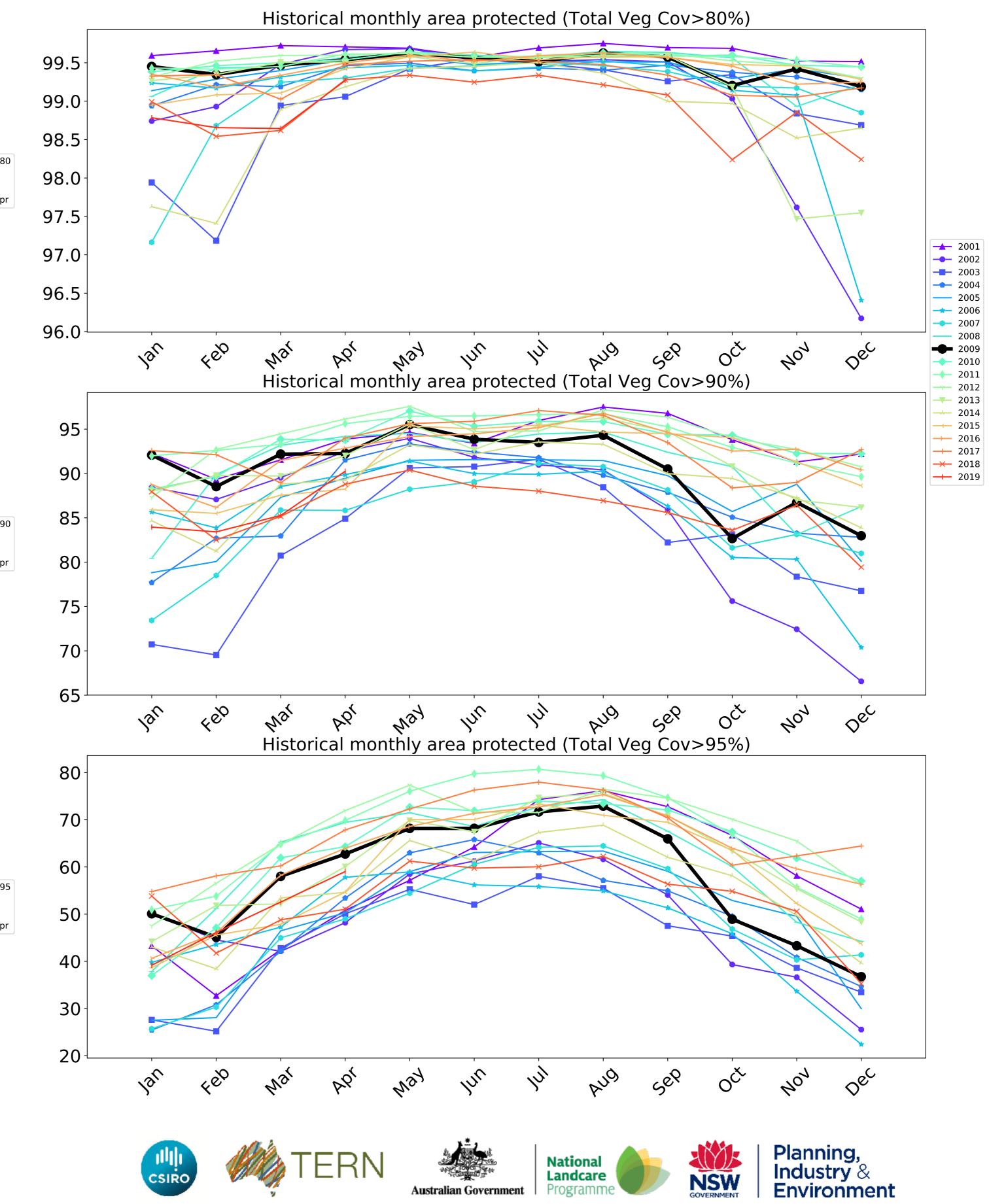




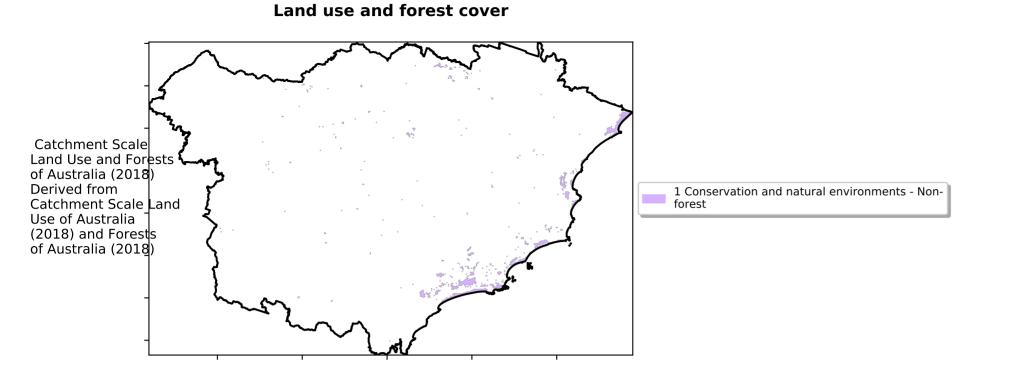
Conservation and natural environments timeseries



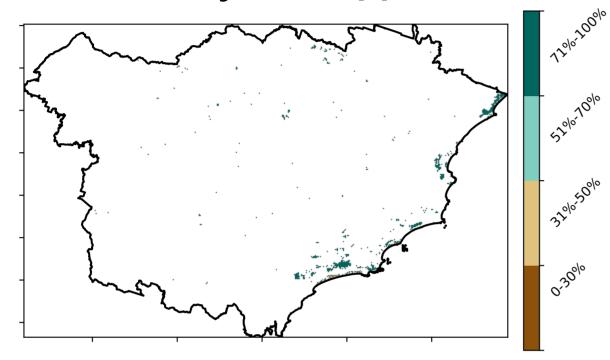




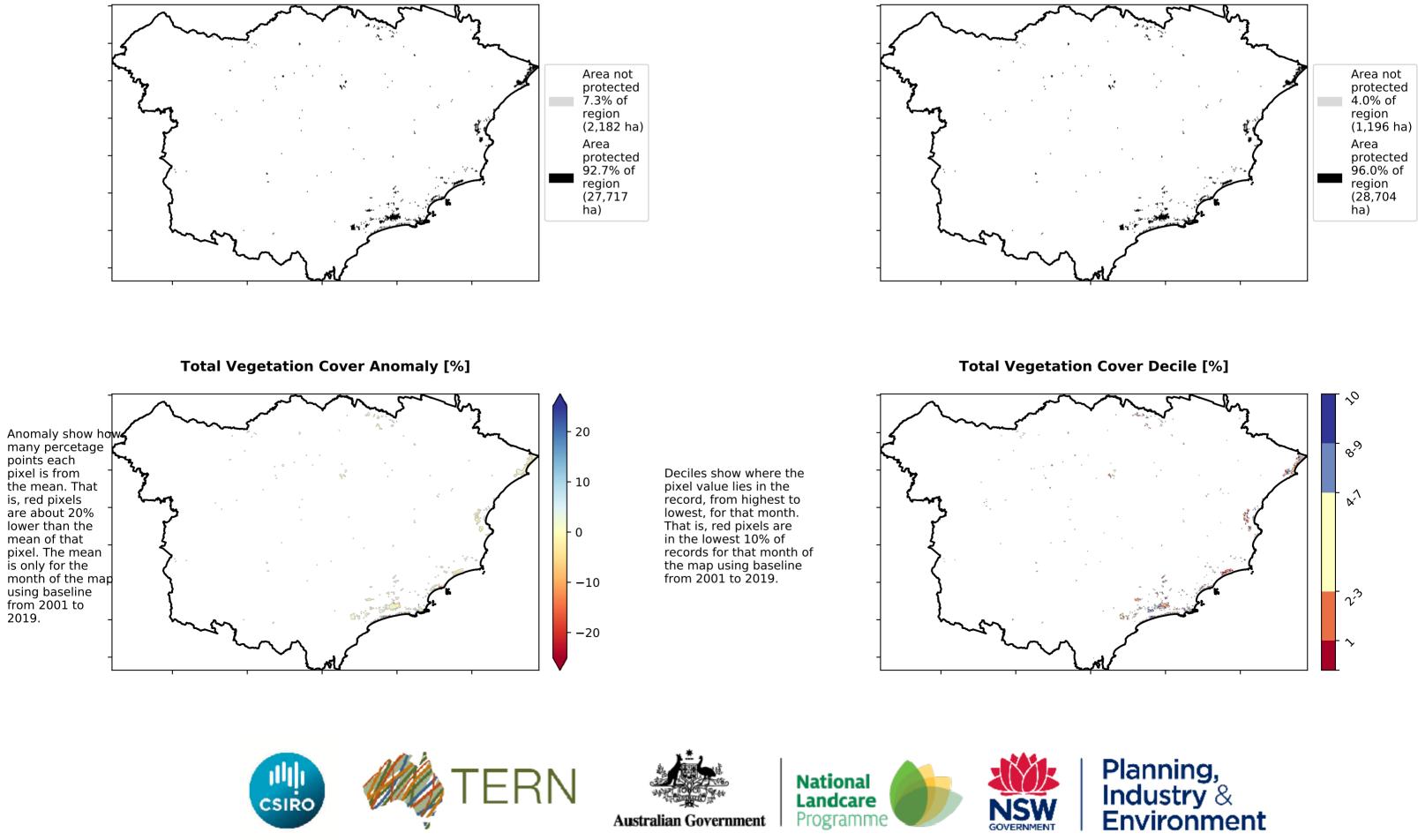
Conservation and natural environments non forest



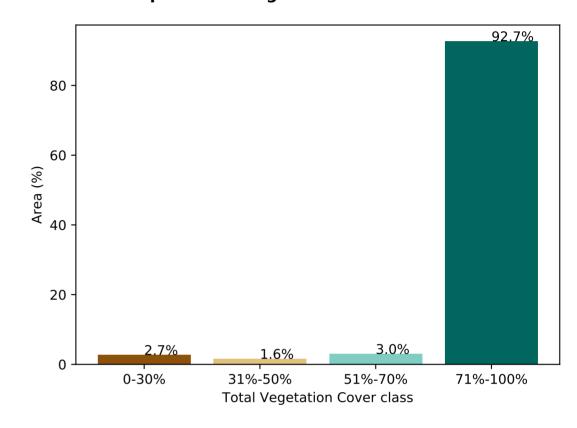
Total Vegetation Cover [%]



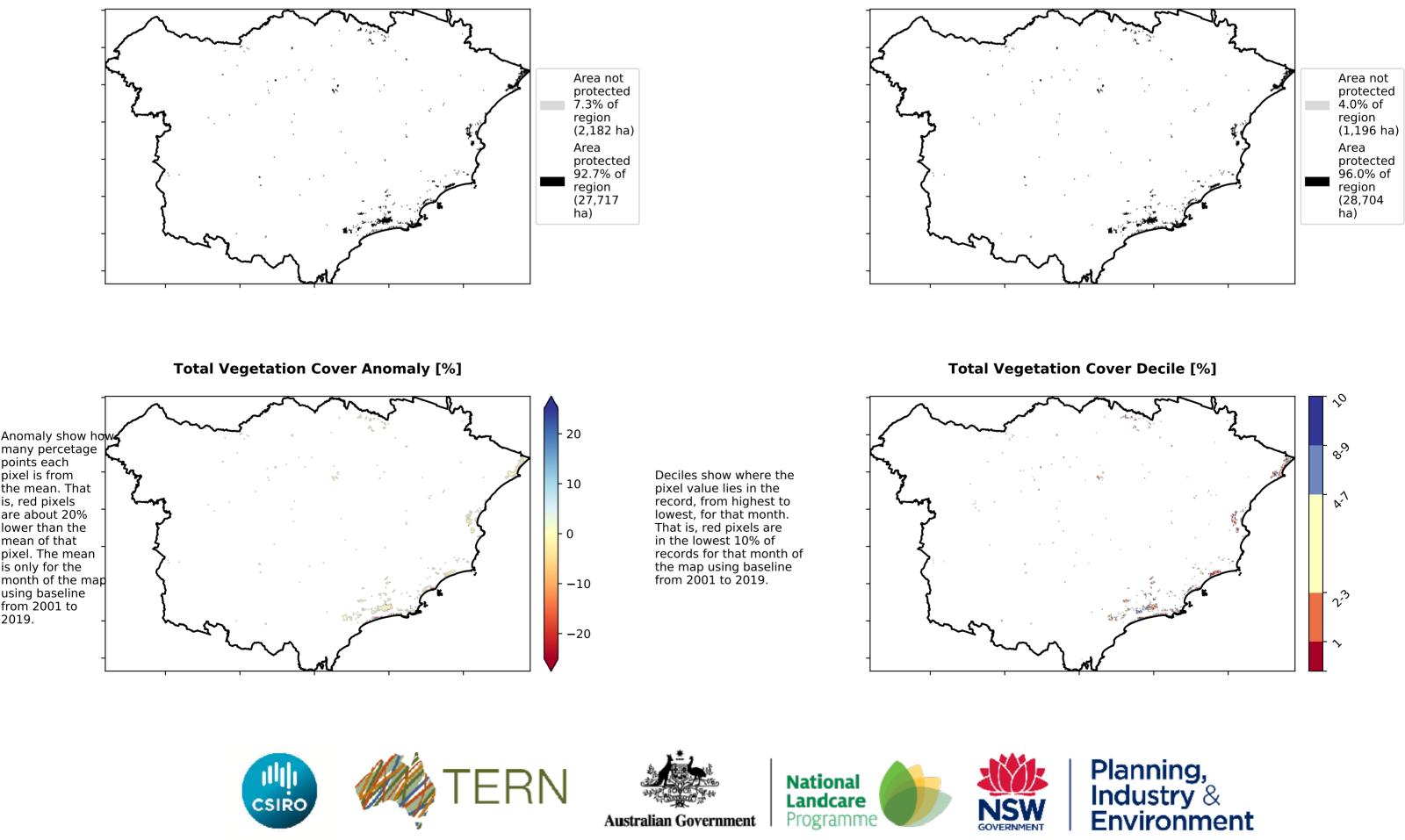
% Area protected from water erosion (>70%)

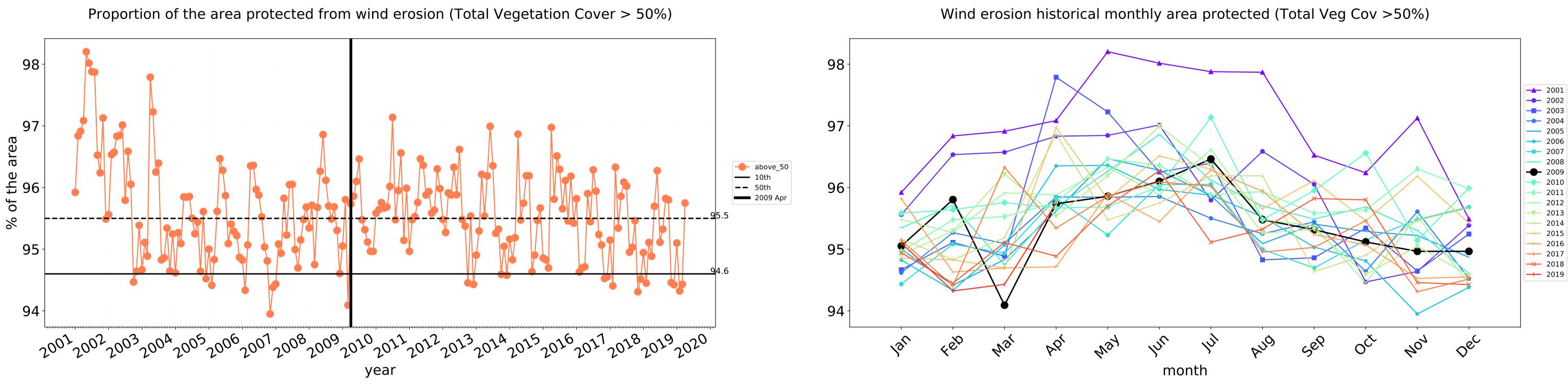


Proportion of vegetation cover class in area

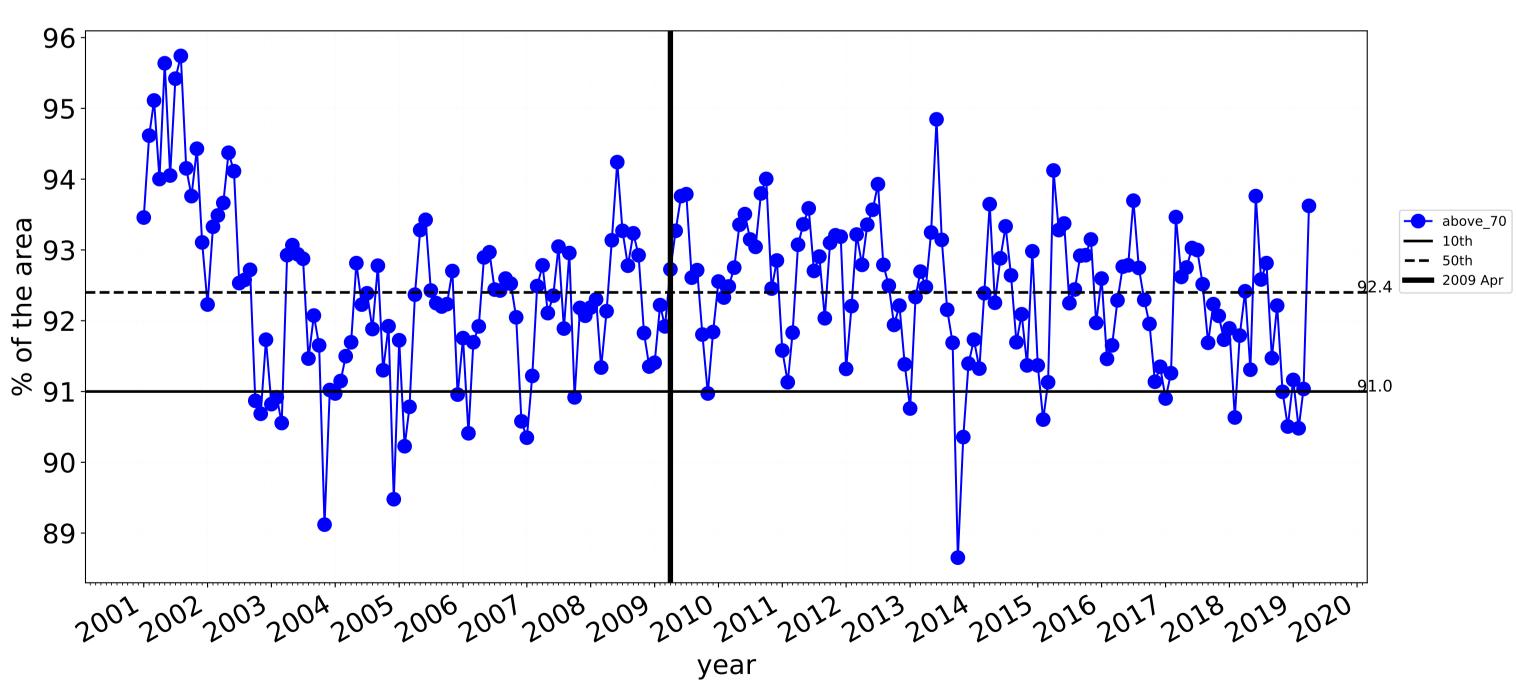


% Area protected from wind erosion (>50%)



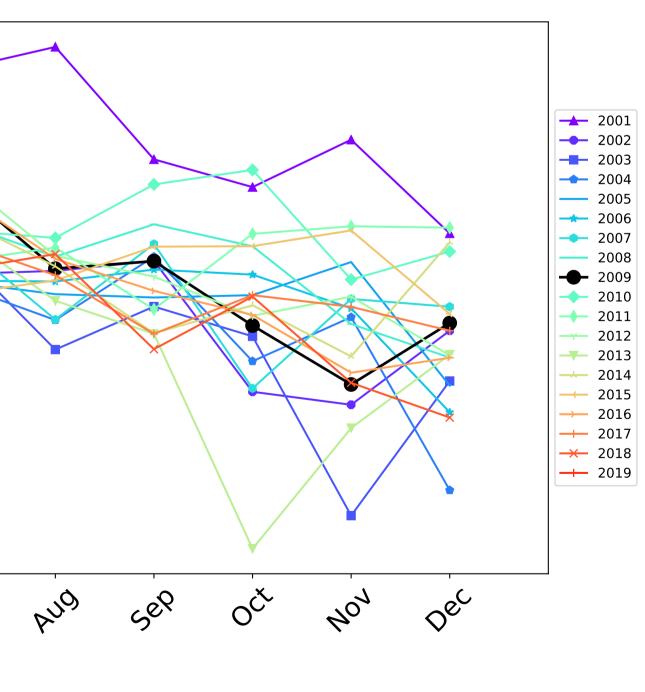


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

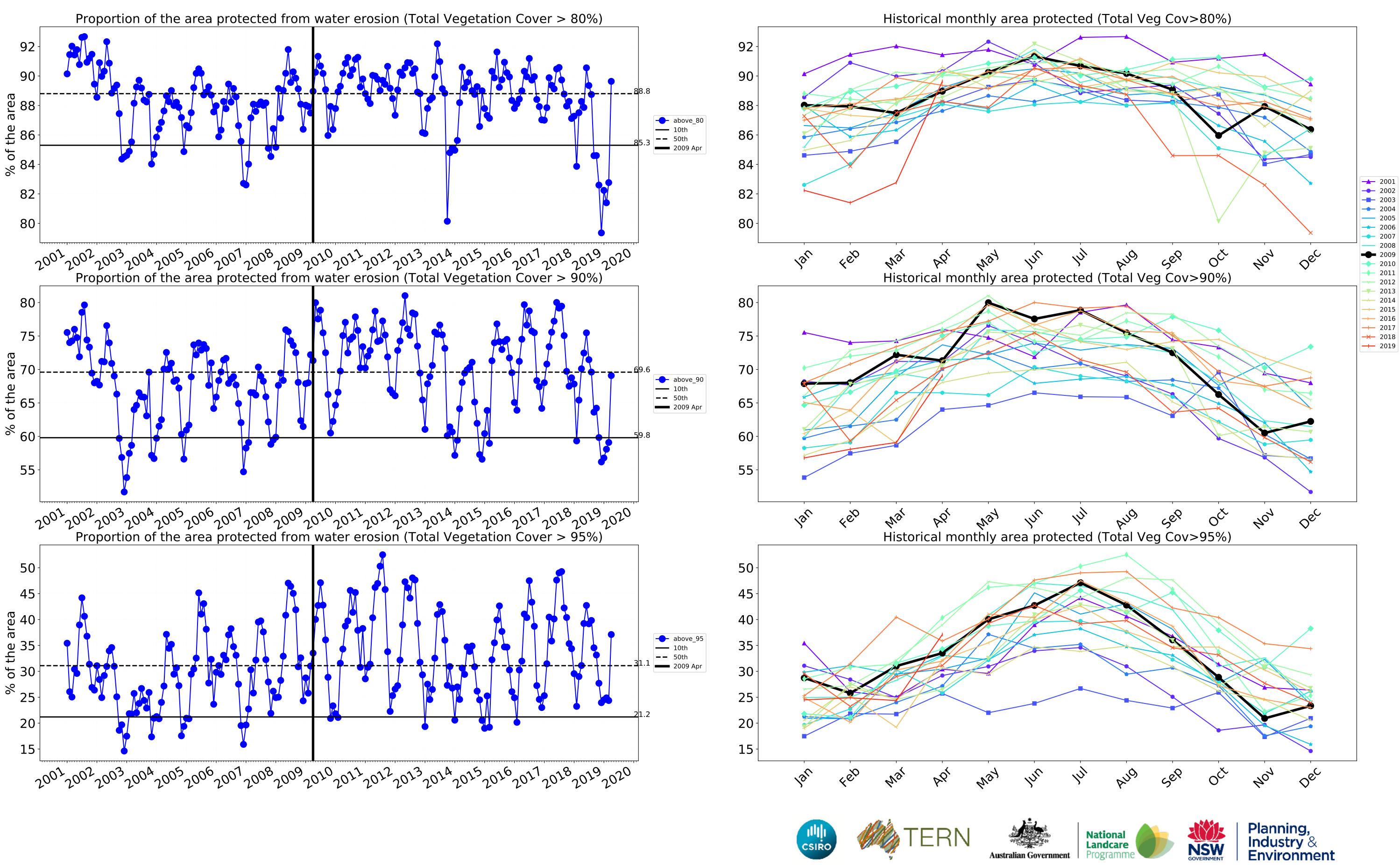


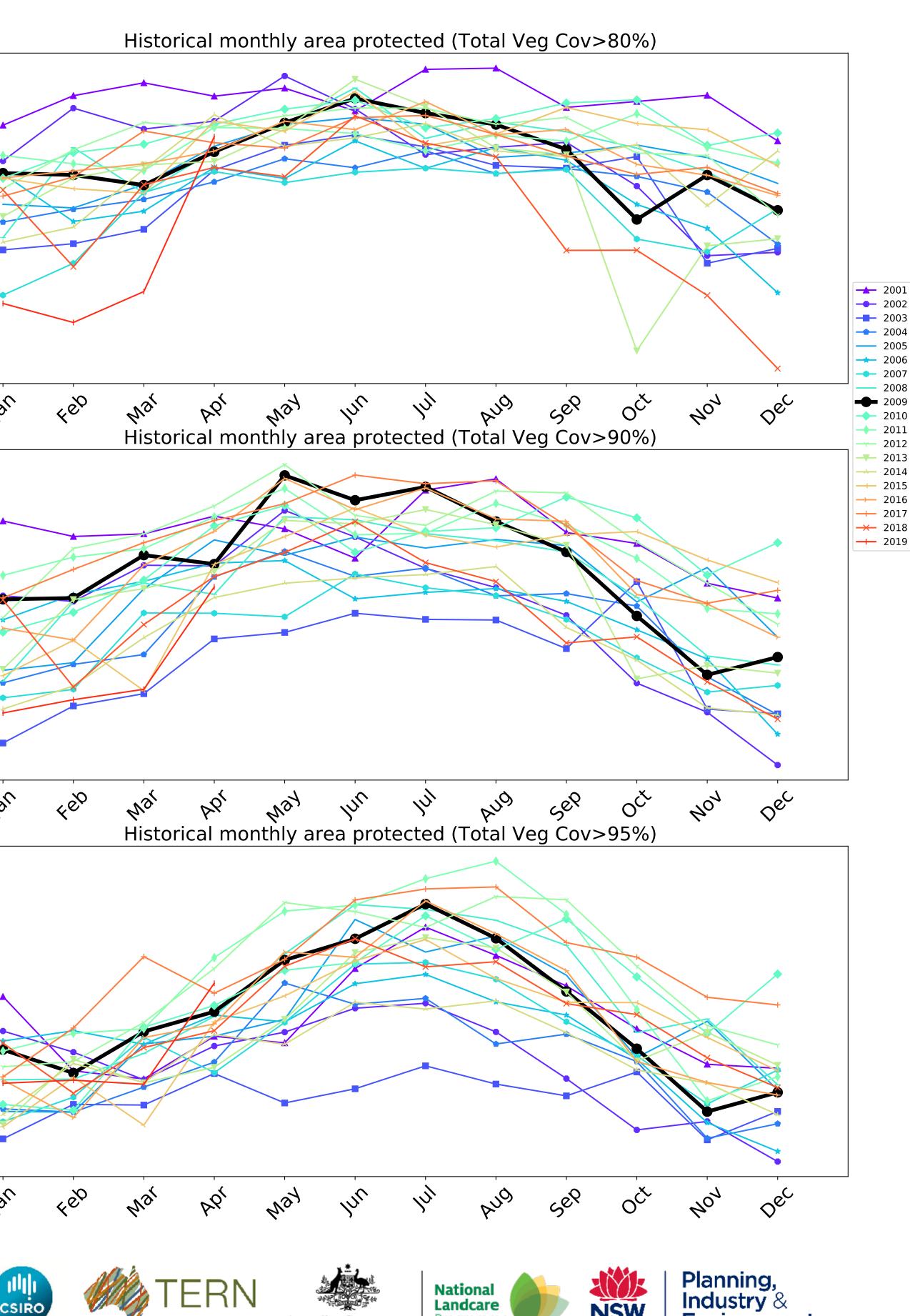
96-95 94 93 **9**2 91 90 89 Par feb May In Mai IN IN Pb, month 1000 ERN CSIRO Australian Government

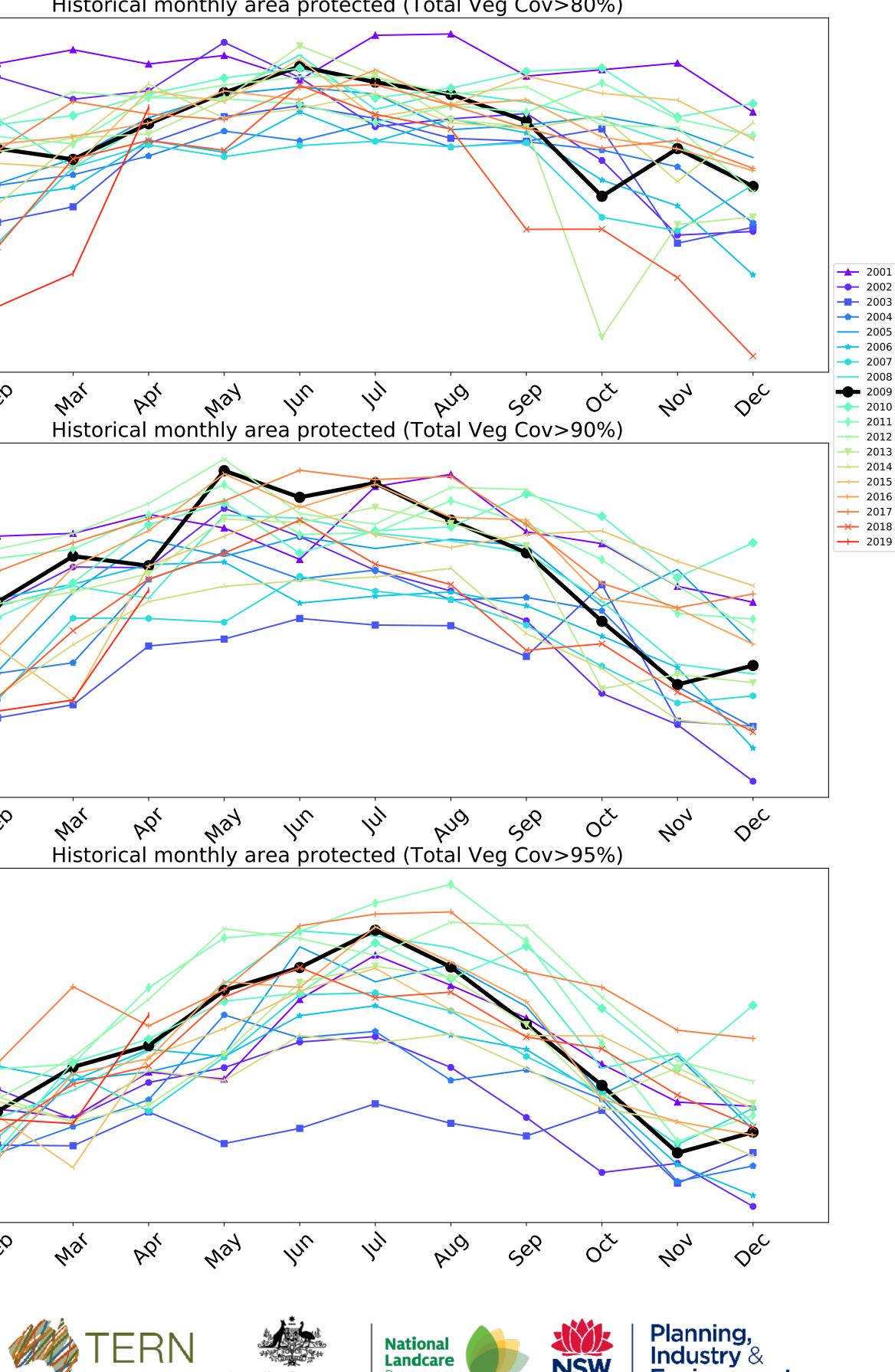
Water erosion historical monthly area protected (Total Veg Cov>70%)





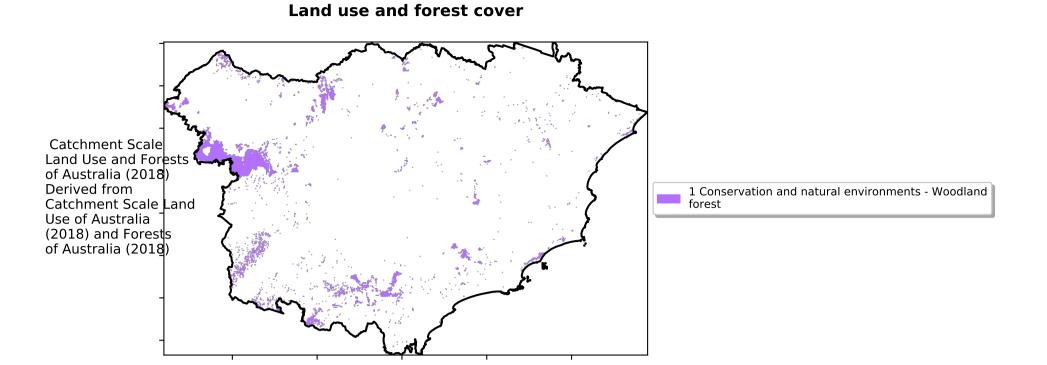




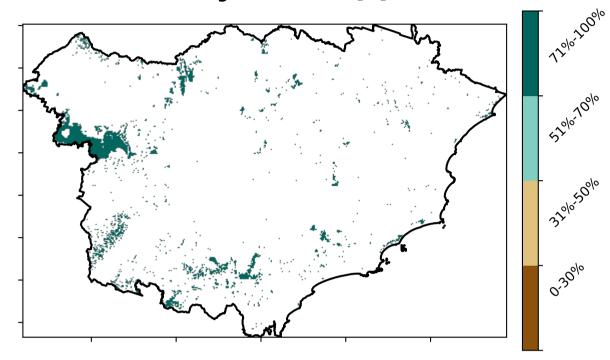




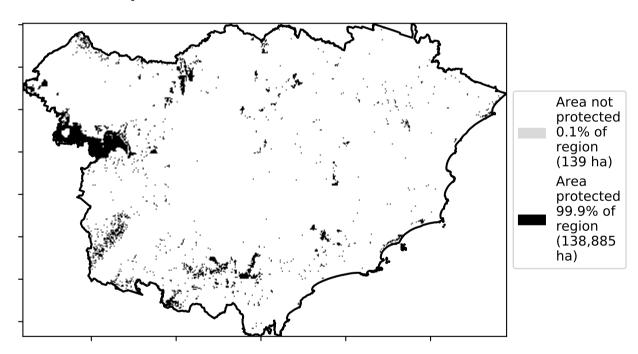
Conservation and natural environments Woodland forest



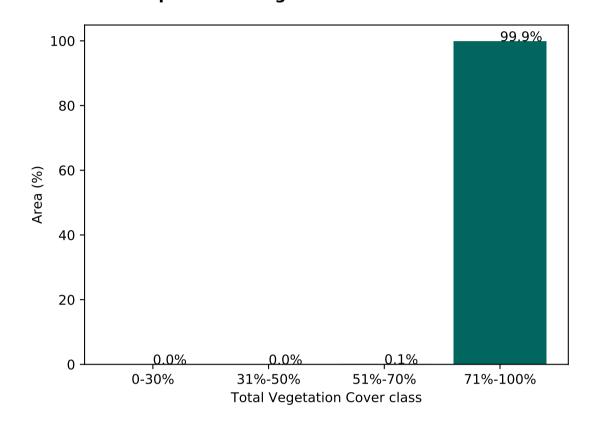
Total Vegetation Cover [%]



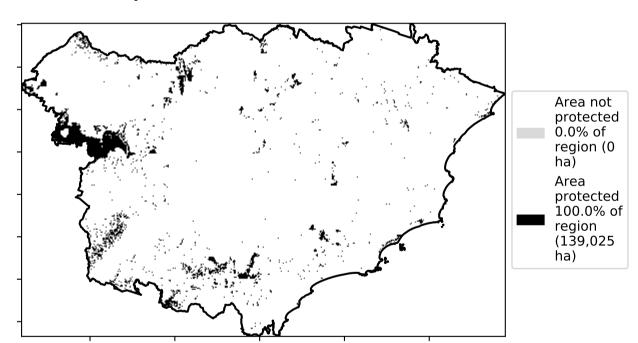
% Area protected from water erosion (>70%)



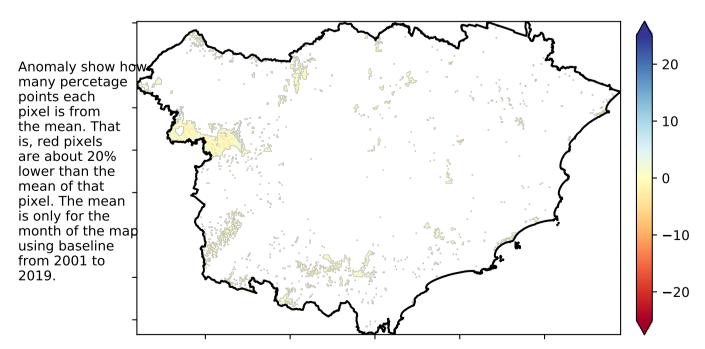
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

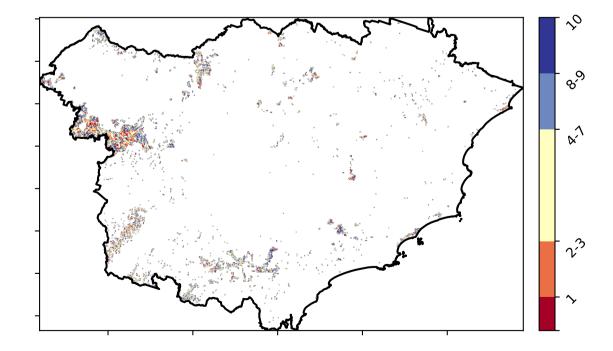


Total Vegetation Cover Anomaly [%]

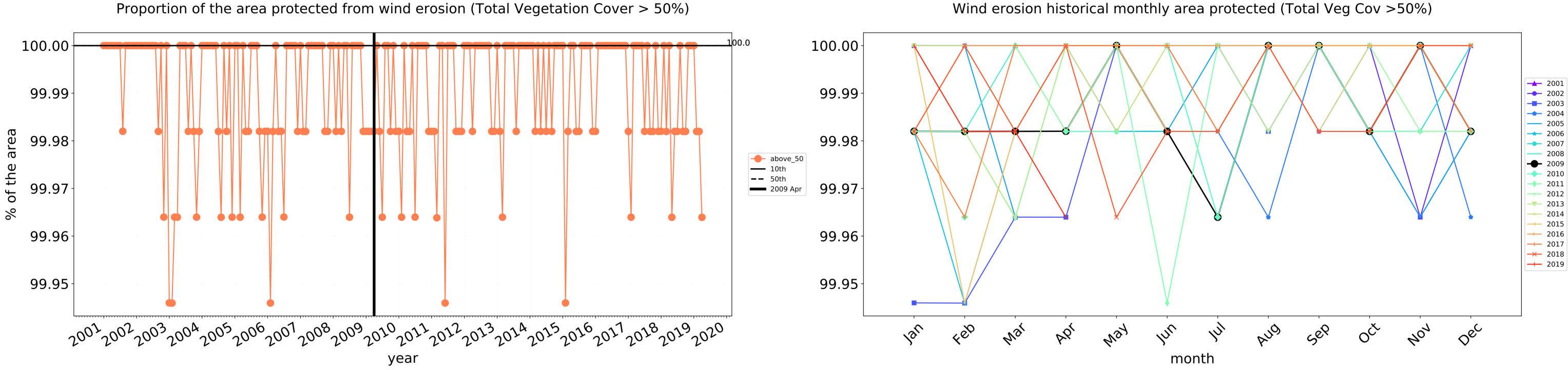


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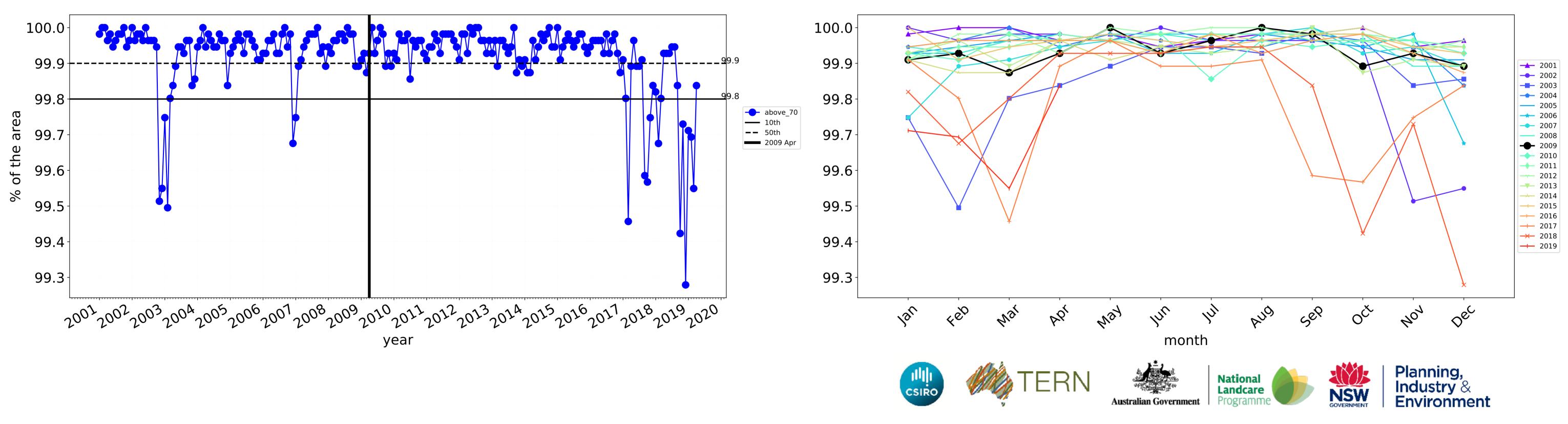
Total Vegetation Cover Decile [%]



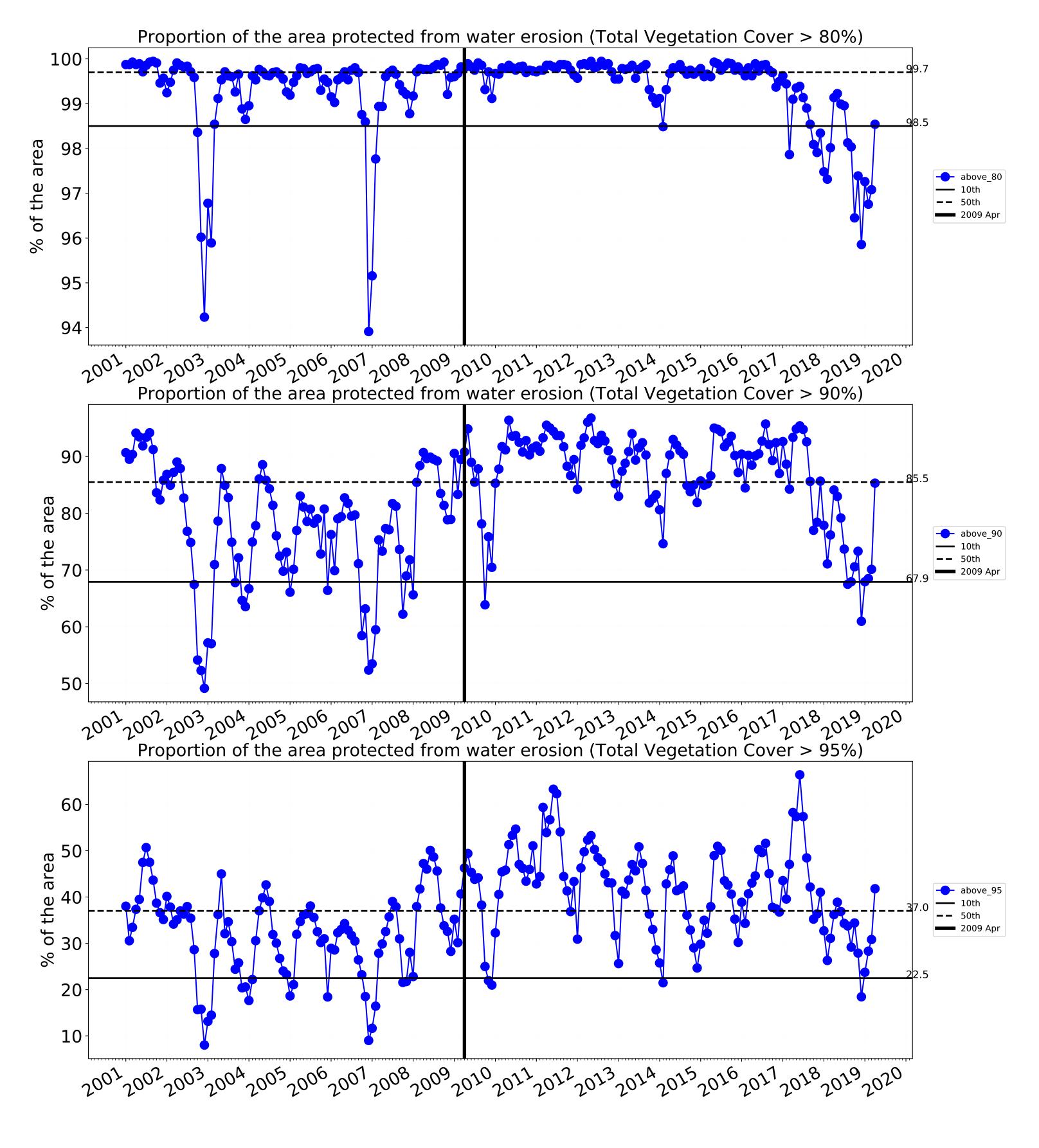


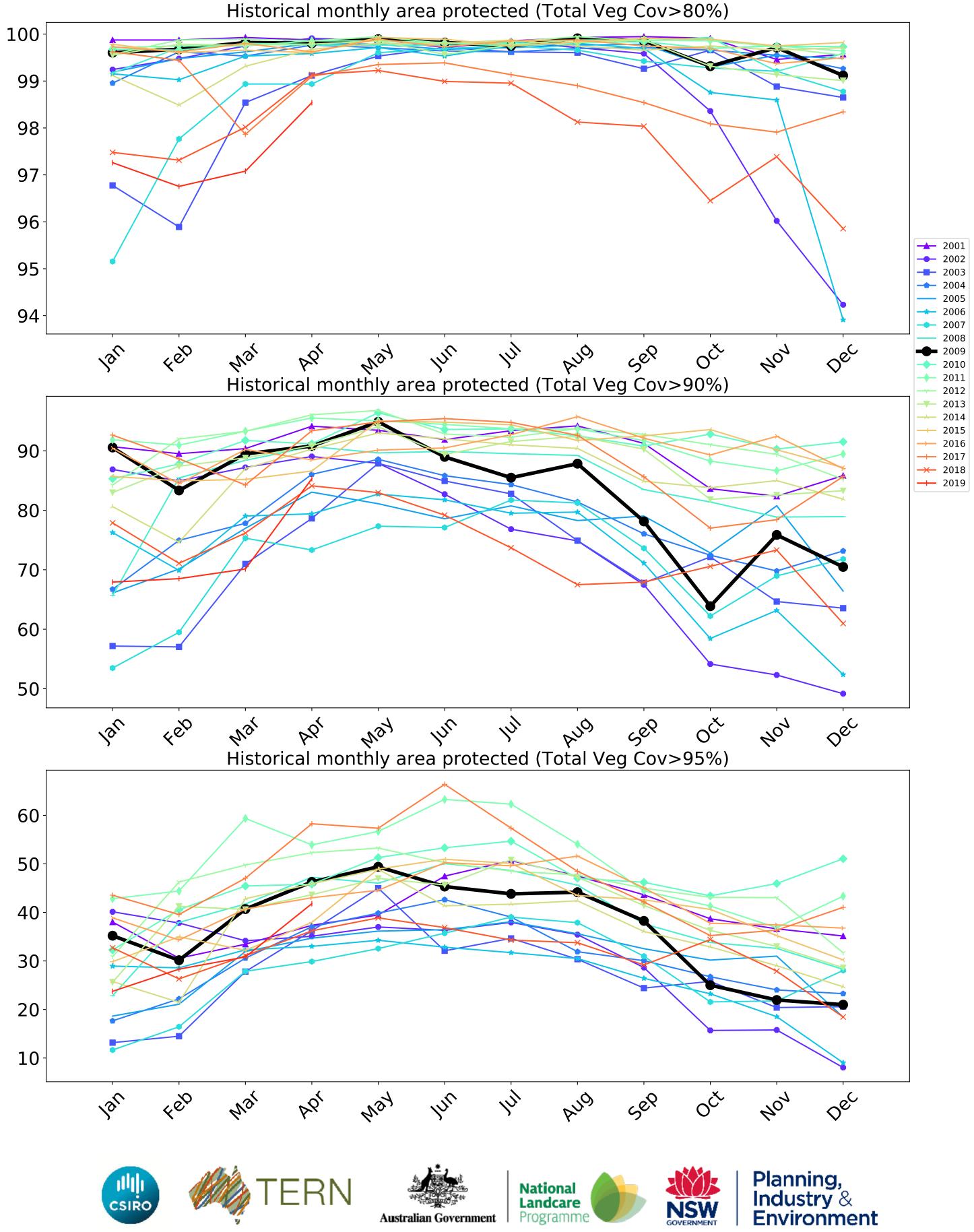


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



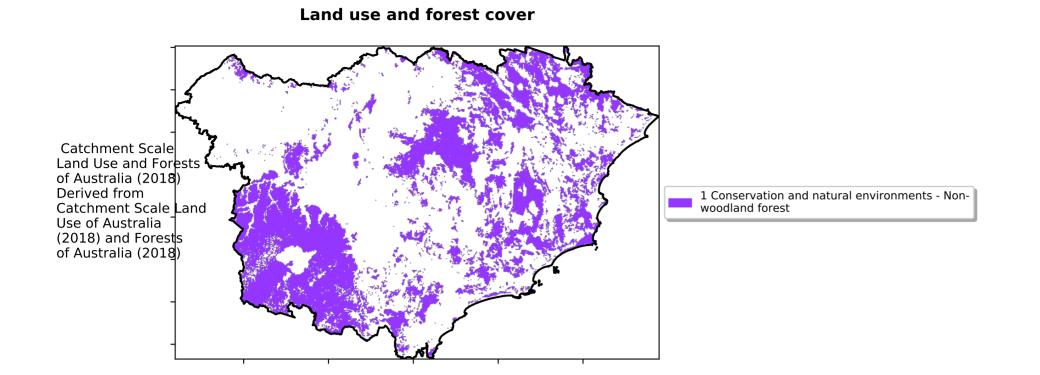
Water erosion historical monthly area protected (Total Veg Cov>70%)



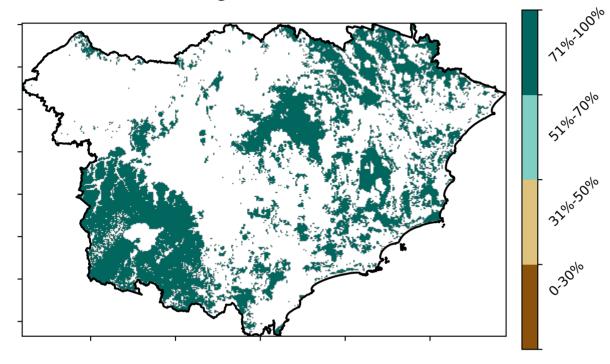


Australian Government

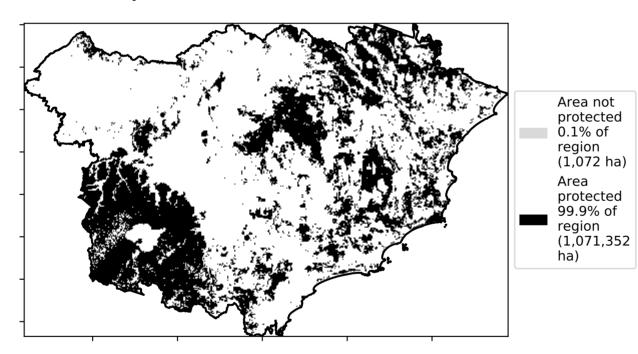
Conservation and natural environments Forest (non woodland)



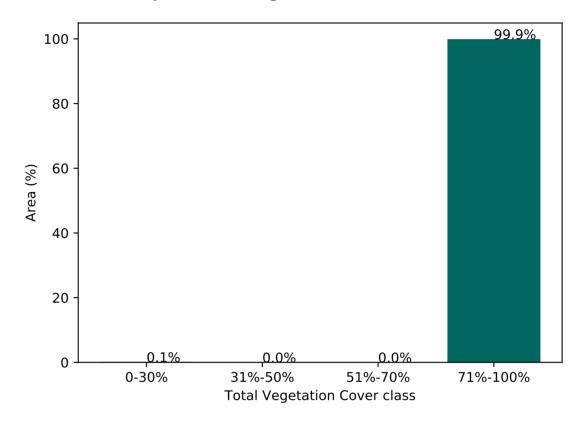
Total Vegetation Cover [%]



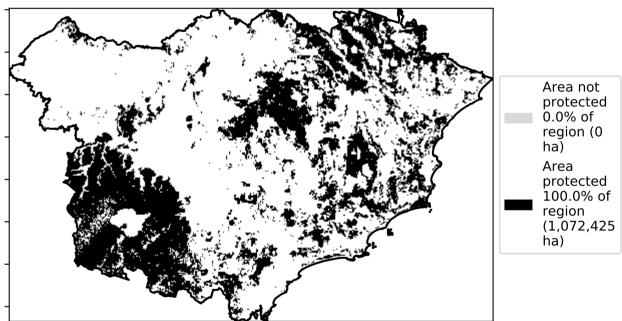
% Area protected from water erosion (>70%)



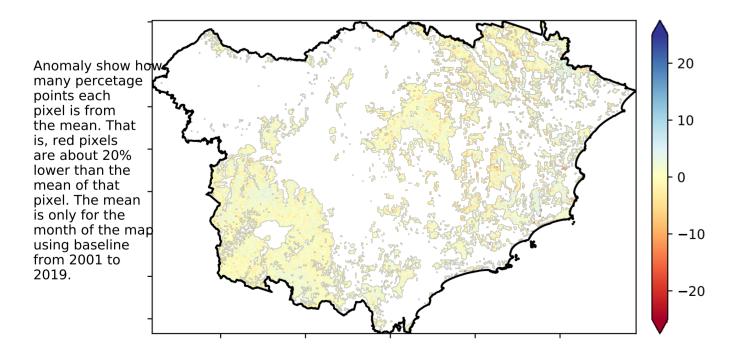
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

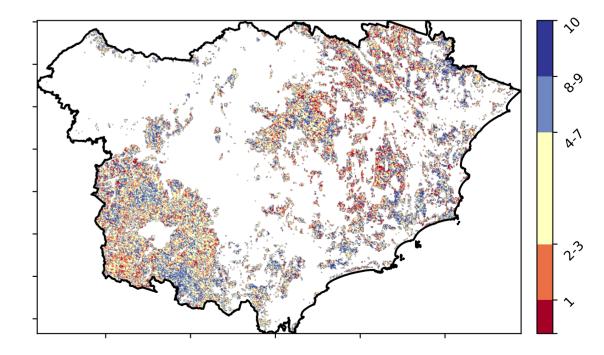


Total Vegetation Cover Anomaly [%]

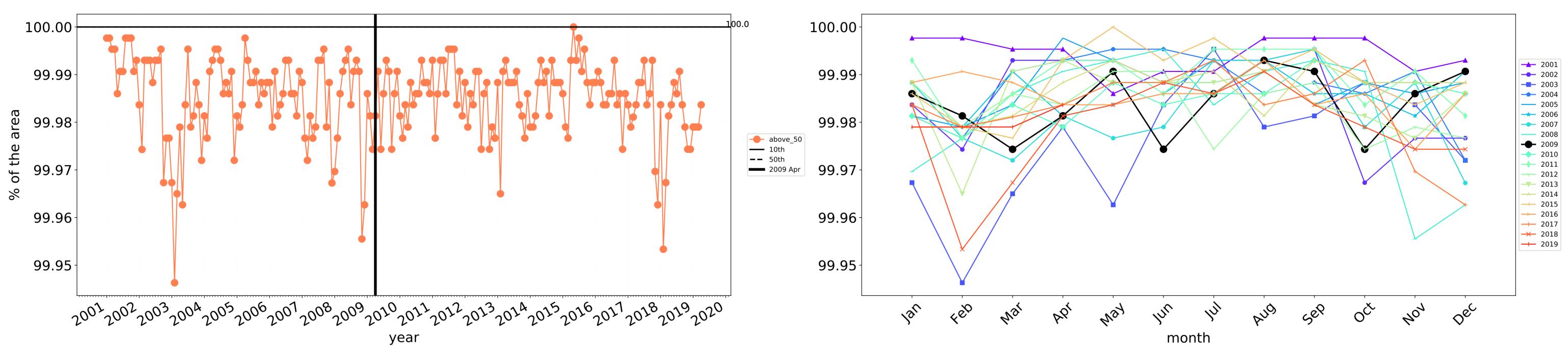


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Total Vegetation Cover Decile [%]

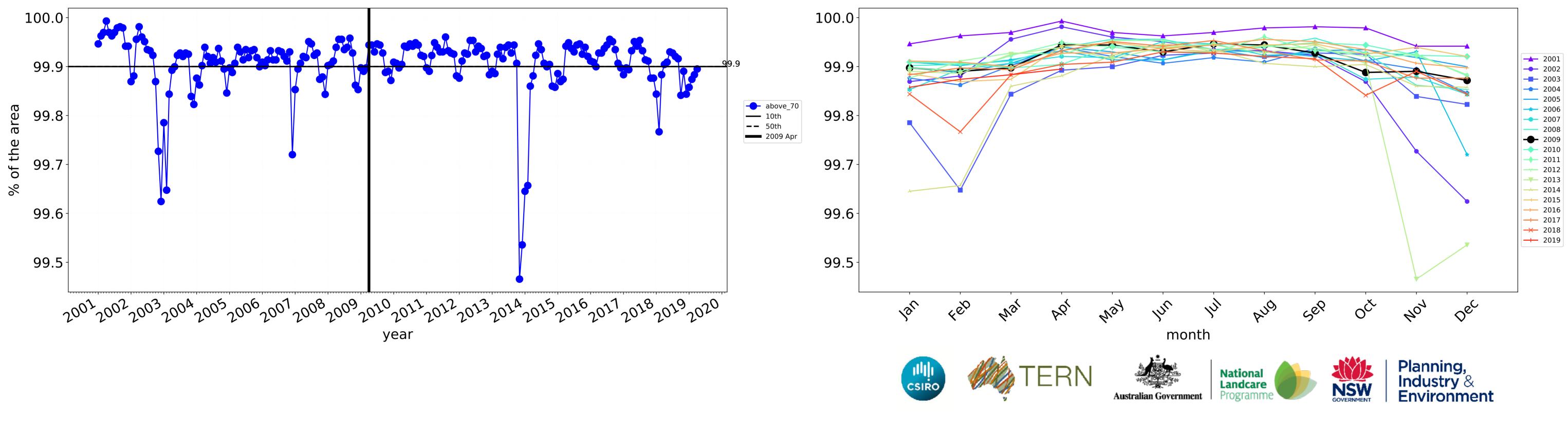






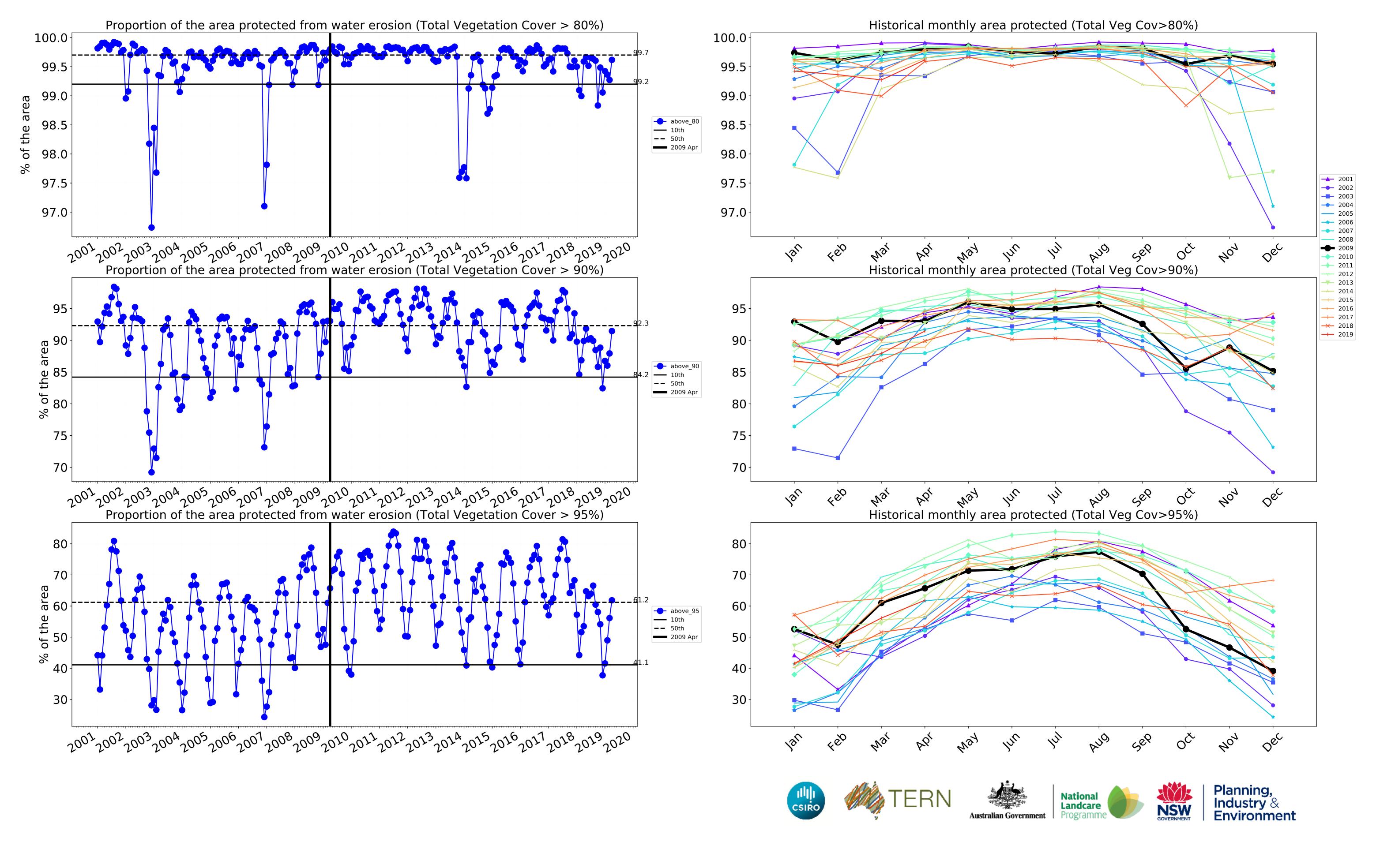
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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%)



Agriculture

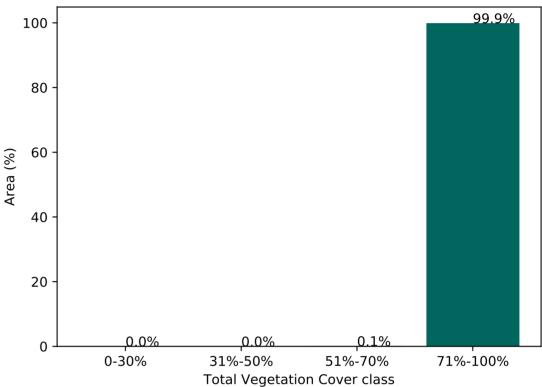
Land use and forest cover 80 -<u>76.</u>7% 70 · 60 Catchment Scale Land Use and Forests of Australia (2018) 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 50 Area (%) - 05 3 Agriculture - Grazing - Non-woodland forest Derived from 4 Agriculture - Grazing - Irrigated Catchment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

Proportion of each land class in area

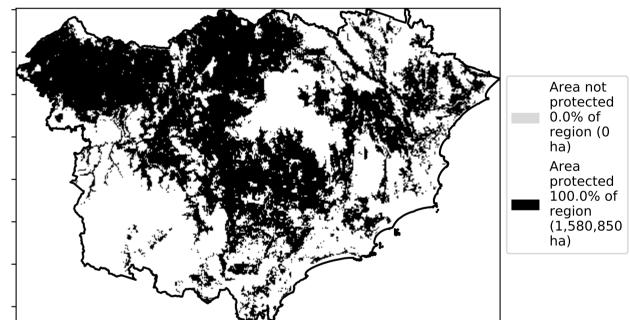
Proportion of vegetation cover class in area

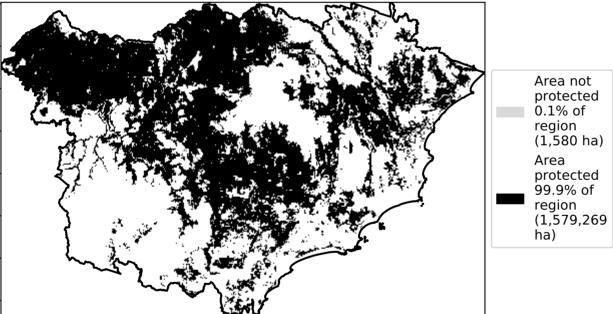
0.2%

8



% Area protected from wind erosion (>50%)





Total Vegetation Cover Anomaly [%]

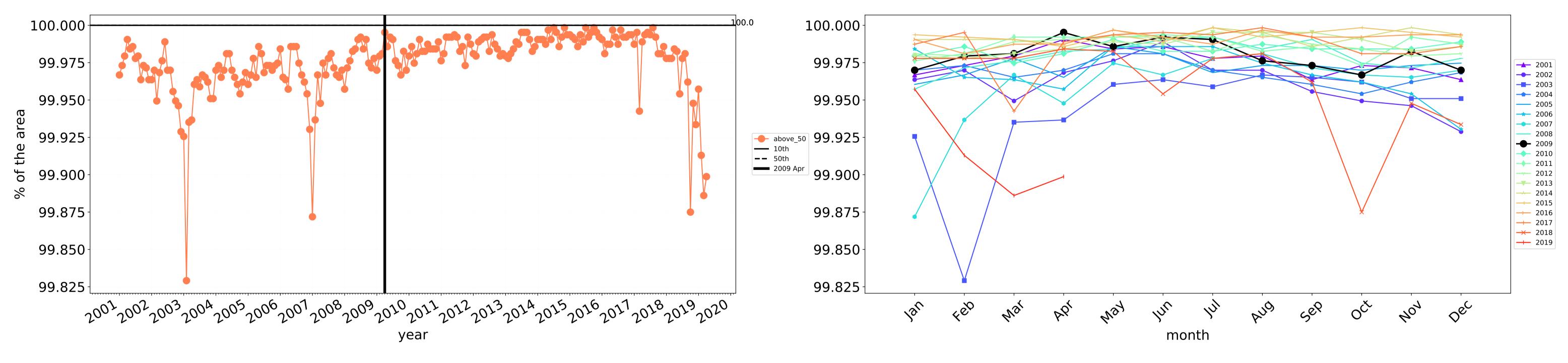
Anomaly show how many percetage points each pixel is from the mean That · 20 - 10 the mean. That is, red pixels are about 20% lower than the 0 mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019. -10-20

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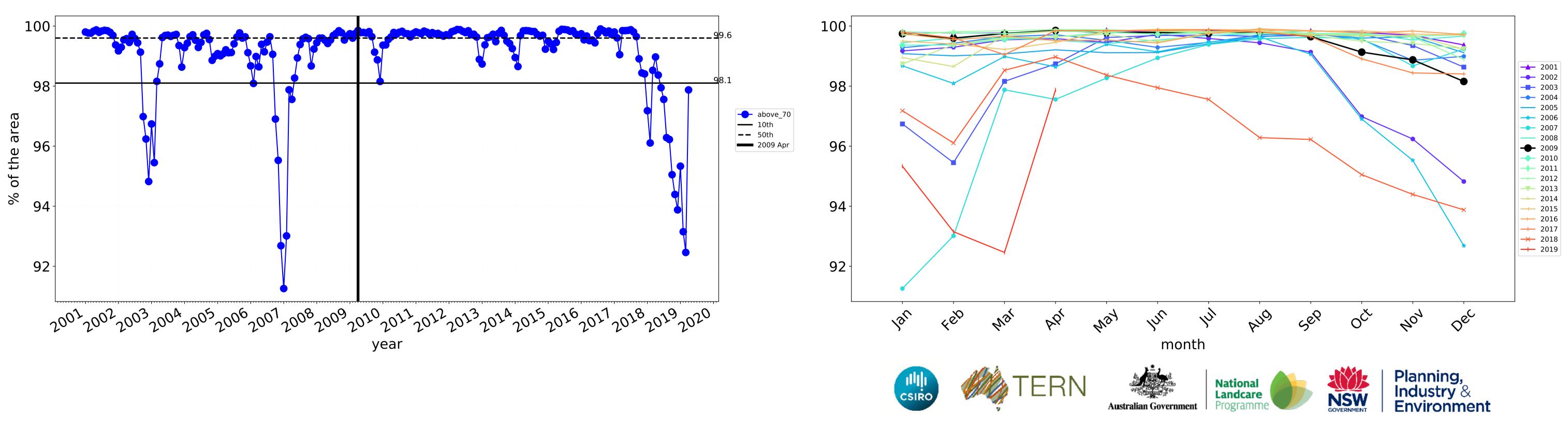
Total Vegetation Cover Decile [%]





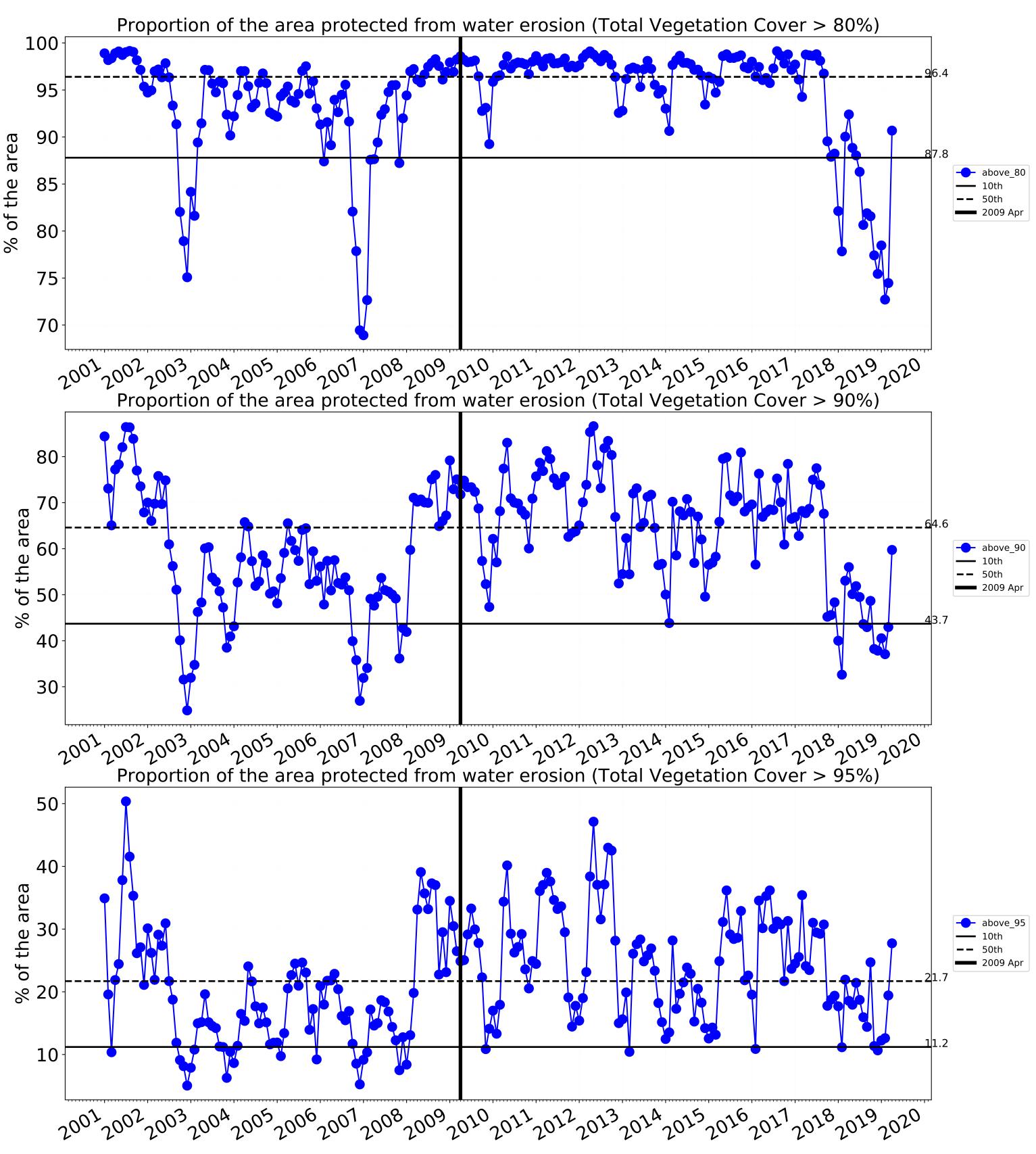
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

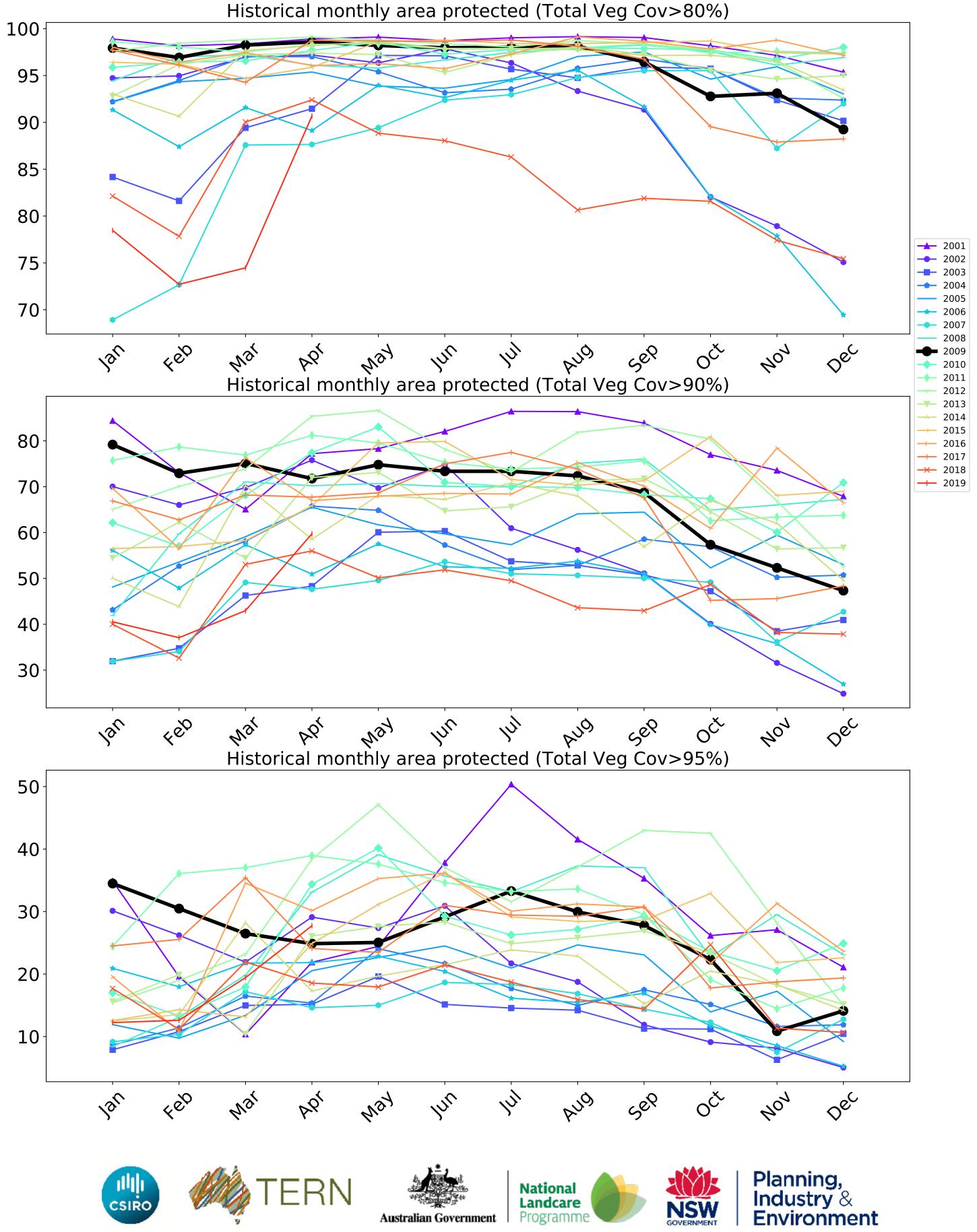
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

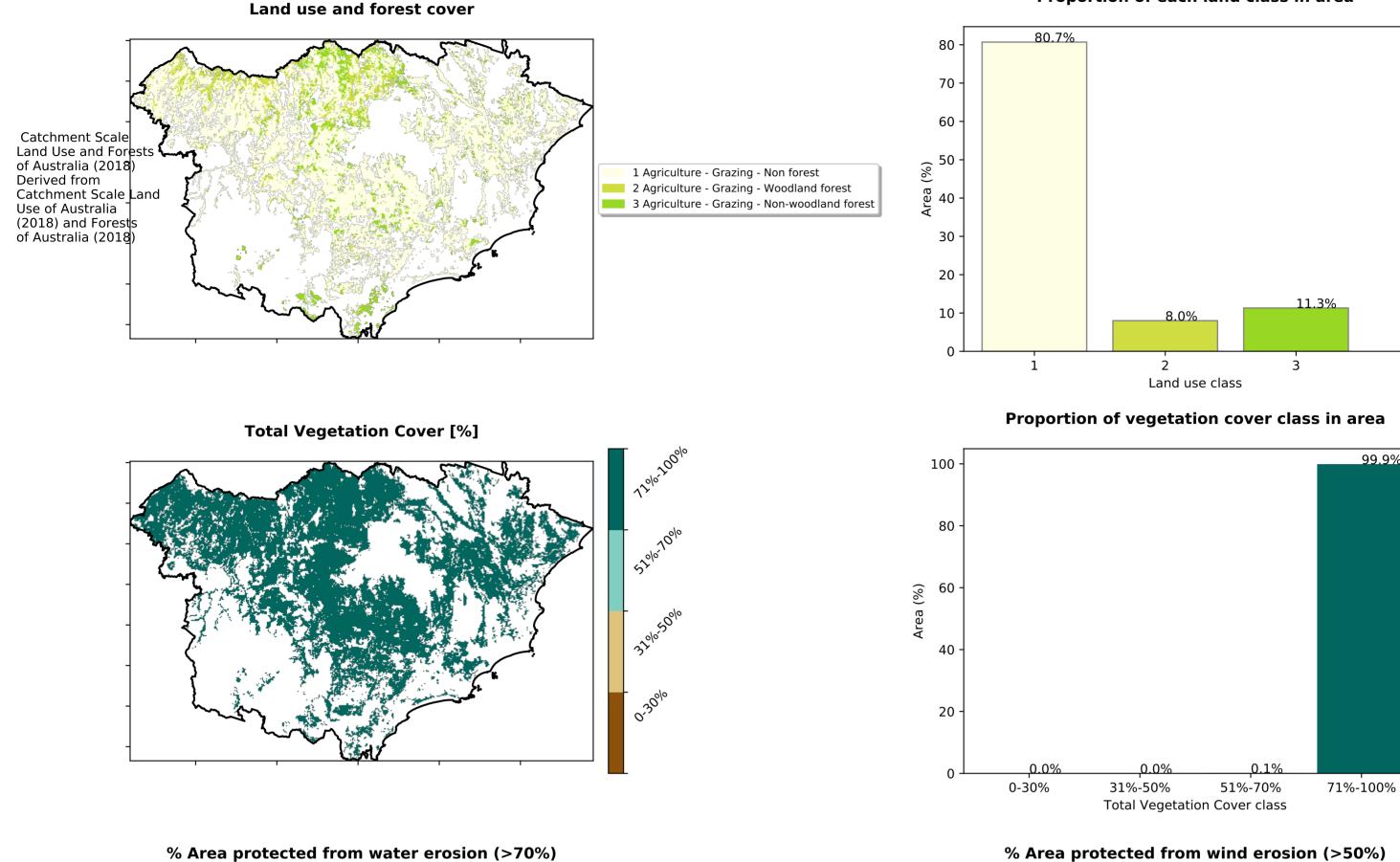


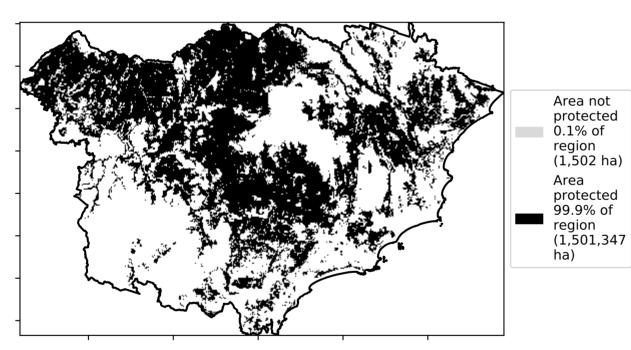




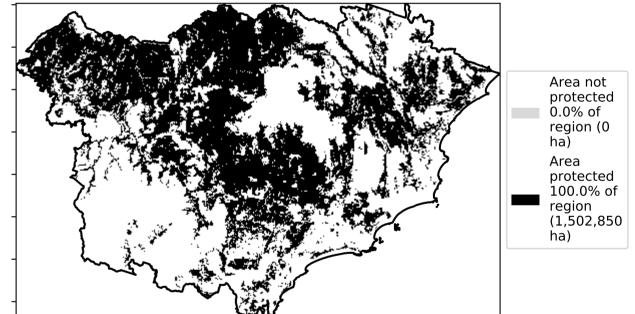
Australian Government

Grazing





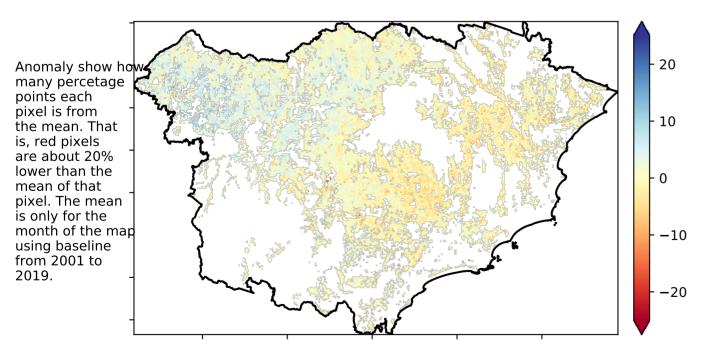
Proportion of each land class in area



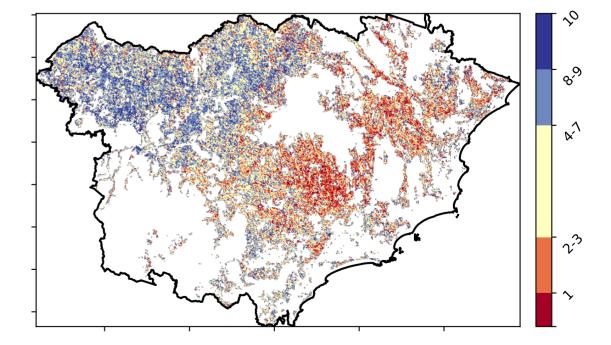
99.9%

Total Vegetation Cover Anomaly [%]

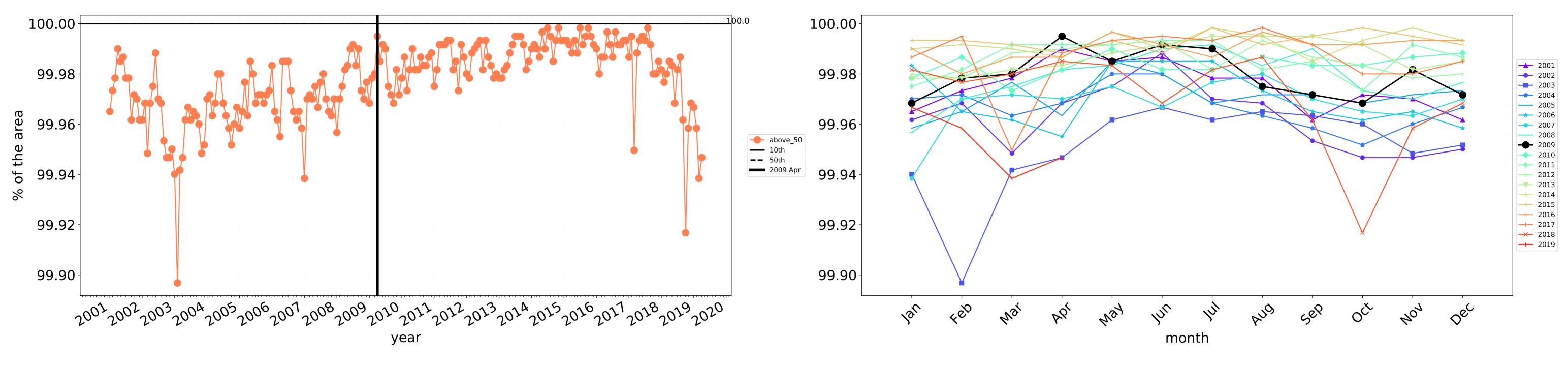
Total Vegetation Cover Decile [%]



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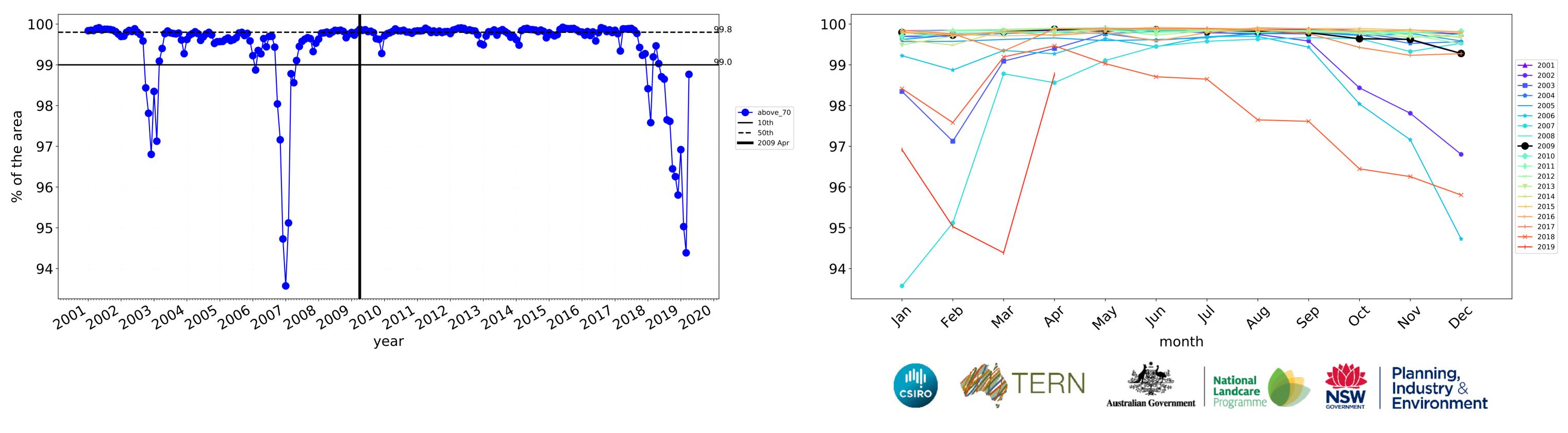




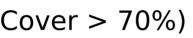


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

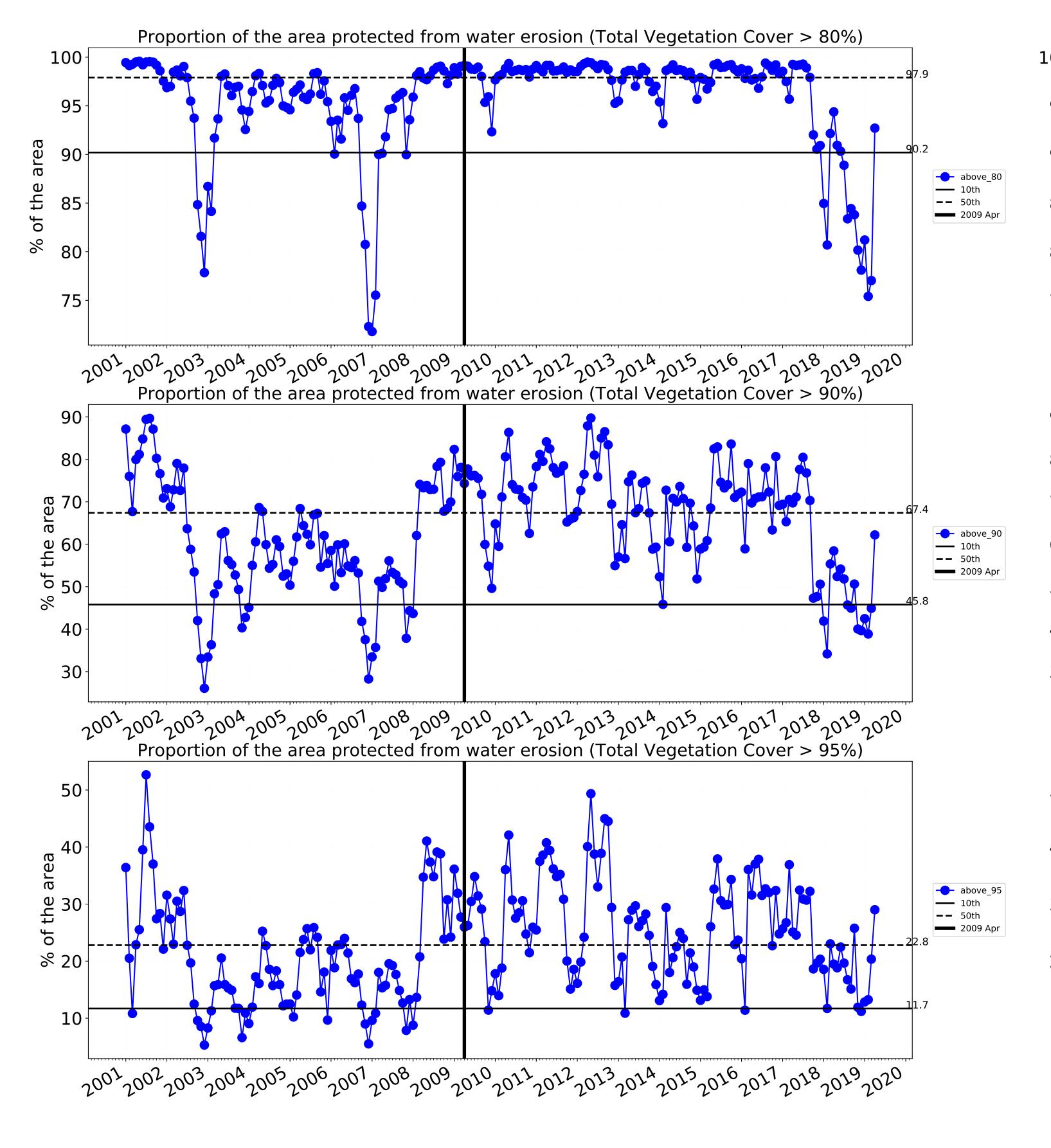
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

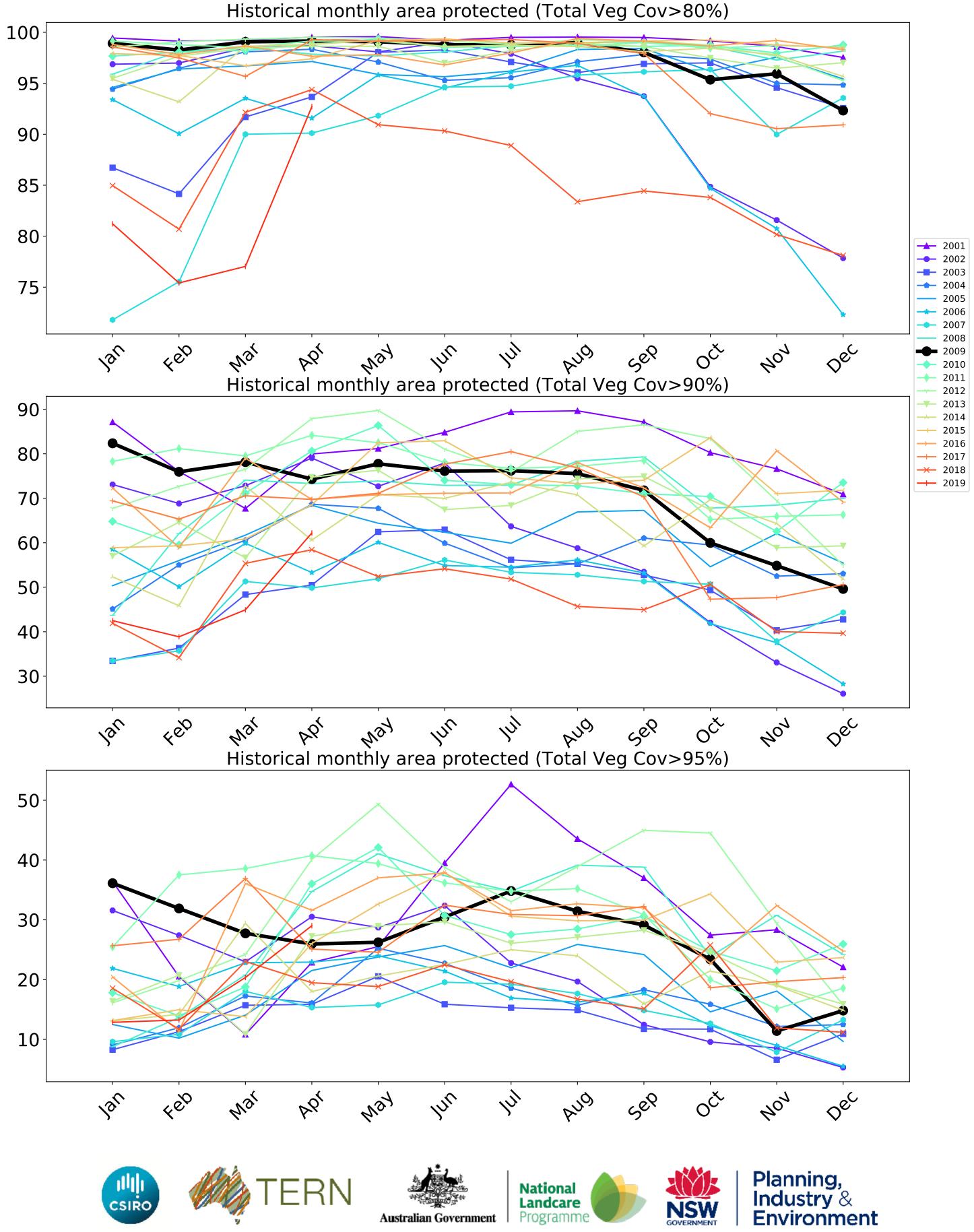


Wind erosion historical monthly area protected (Total Veg Cov >50%)



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

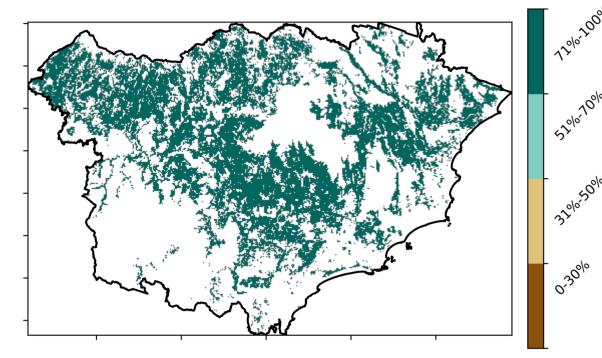




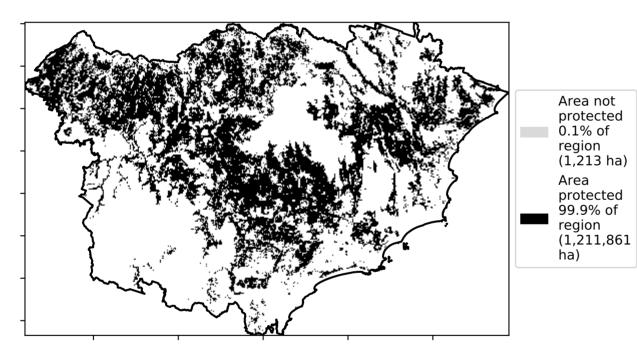
Grazing non forest

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)

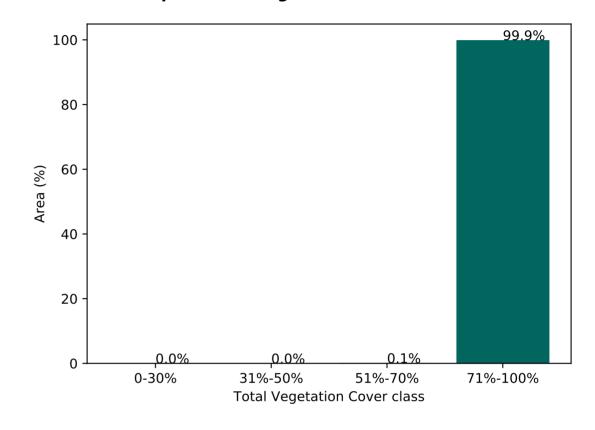
Total Vegetation Cover [%]



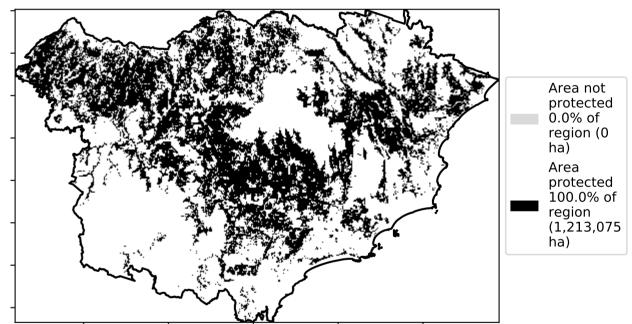
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

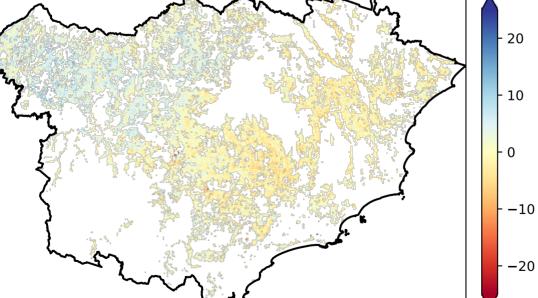


% Area protected from wind erosion (>50%)



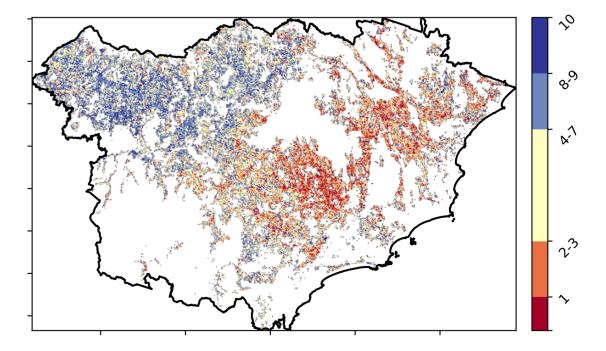
Total Vegetation Cover Anomaly [%]

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.

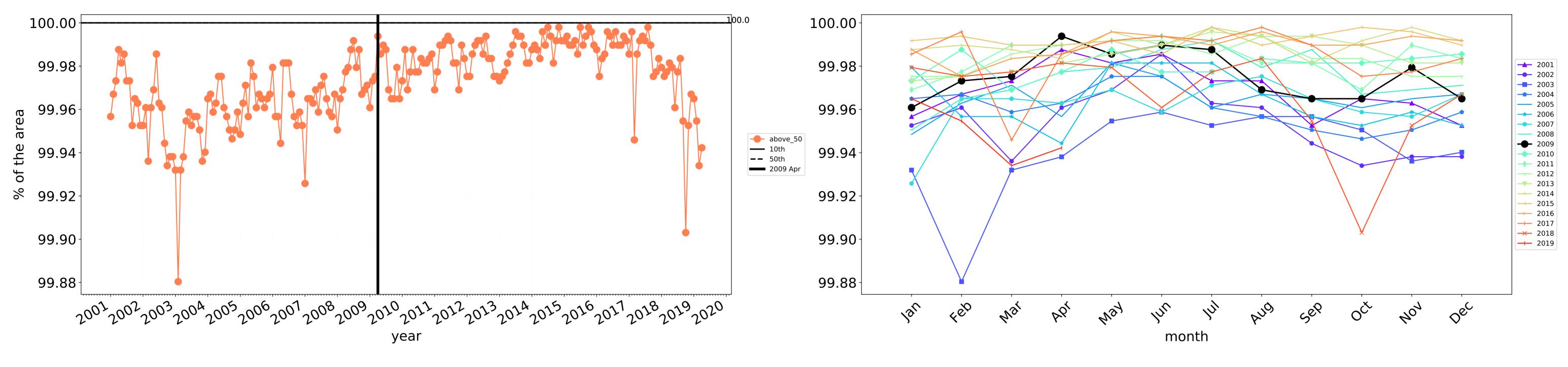


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

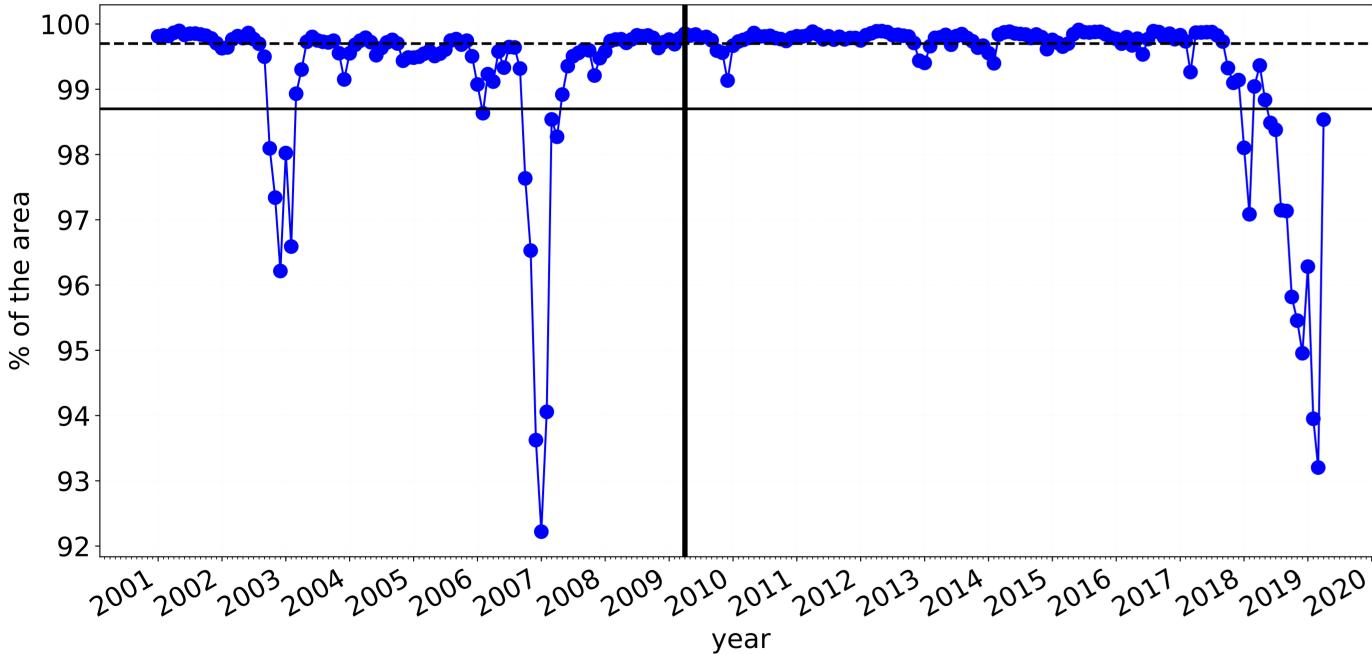




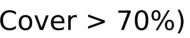


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

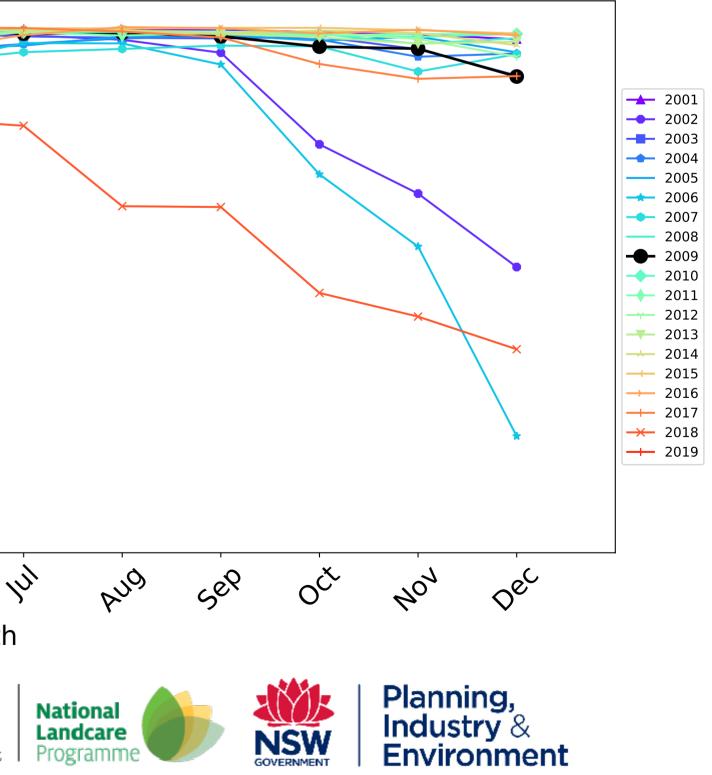


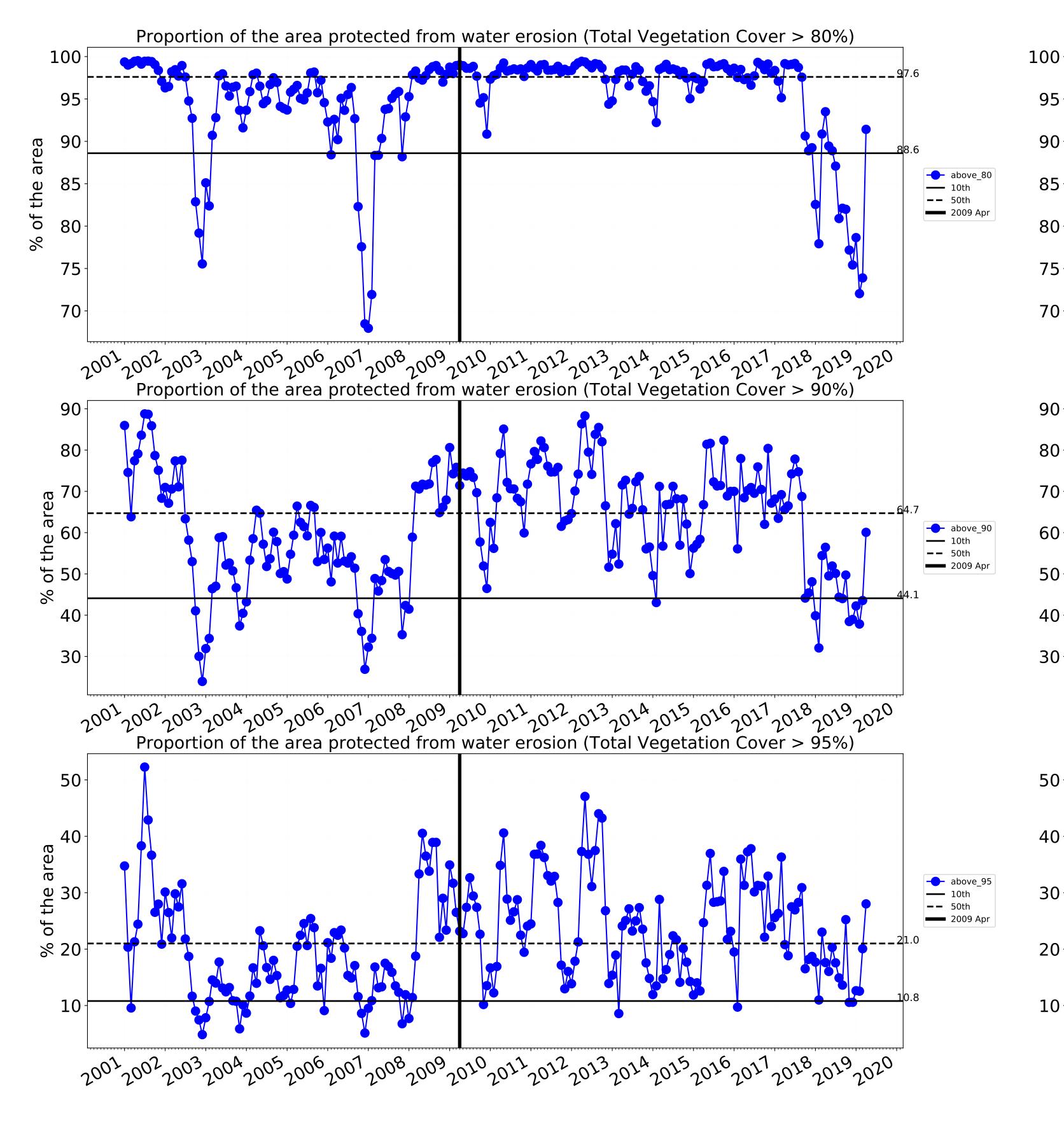
Wind erosion historical monthly area protected (Total Veg Cov >50%)

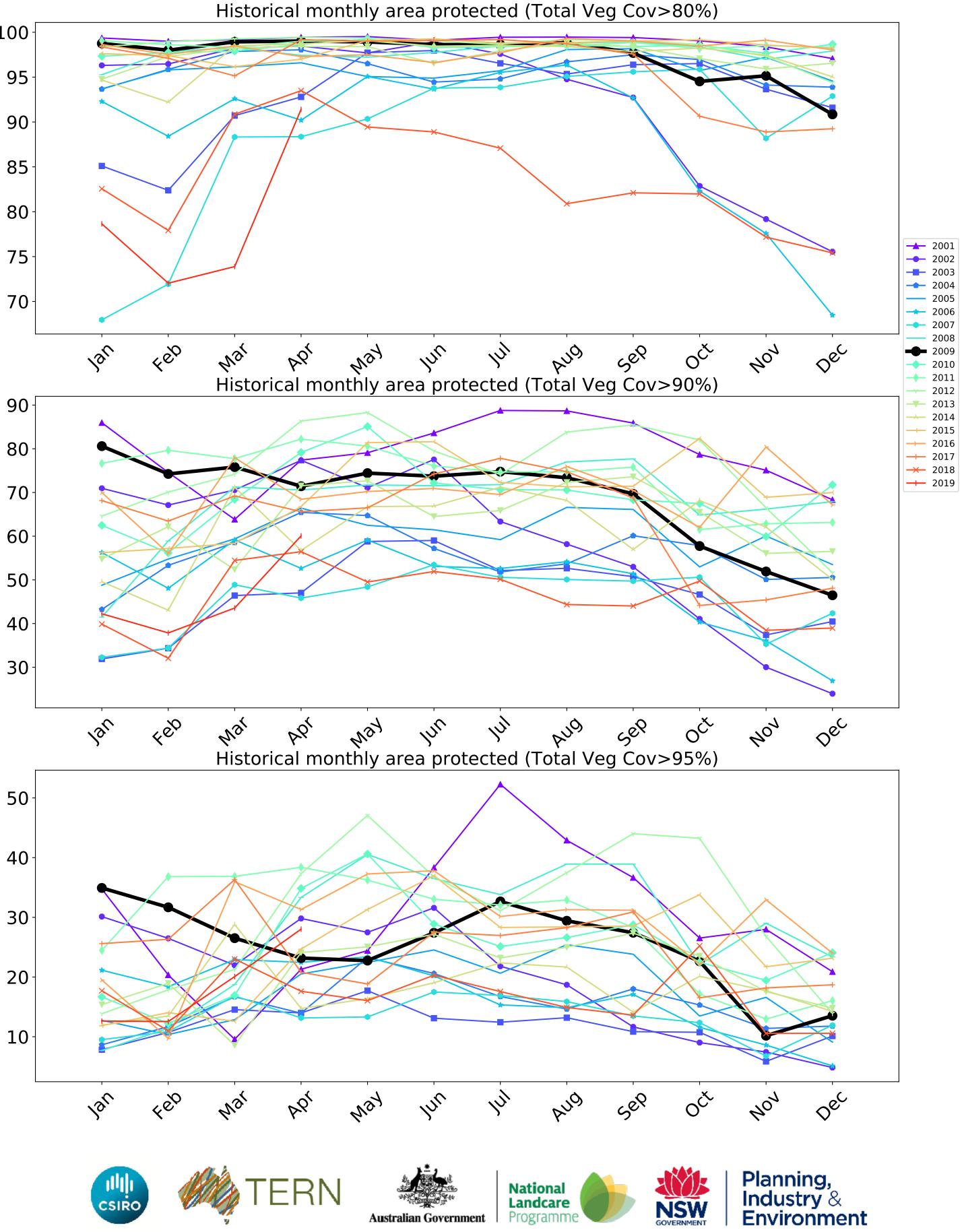


100 ____<u>9</u>9.7 99 98 ---- above_70 97 **—** 10th **——** 50th **—** 2009 Apr 96 95 94 93 92 feb lar May Inu PQ Mai month ERN CSIRO Australian Government

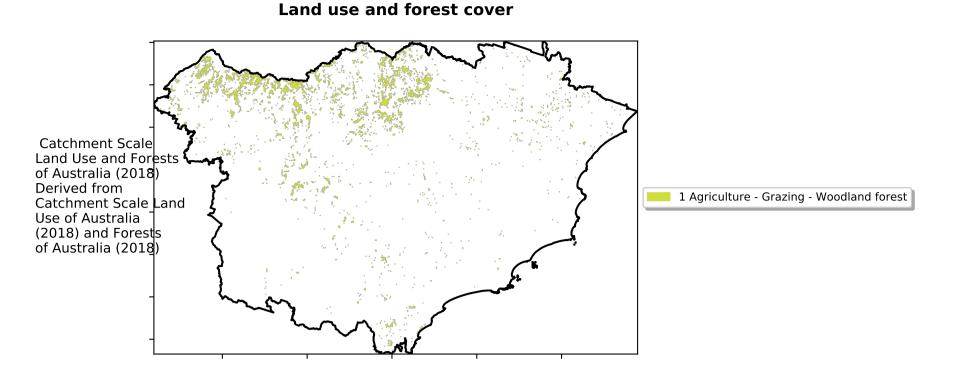
Water erosion historical monthly area protected (Total Veg Cov>70%)



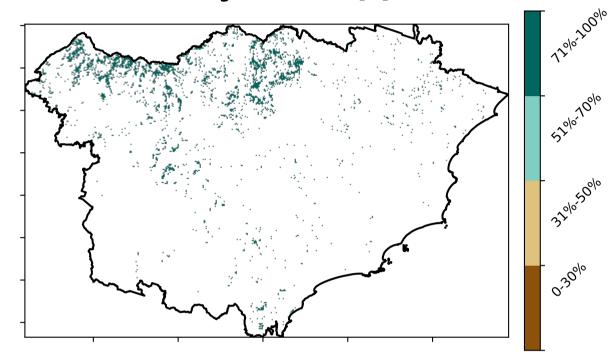




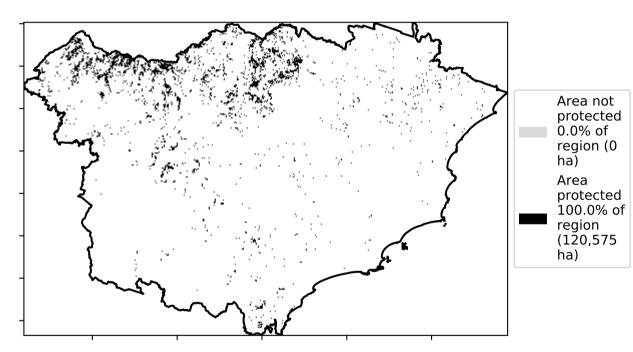
Grazing Woodland forest



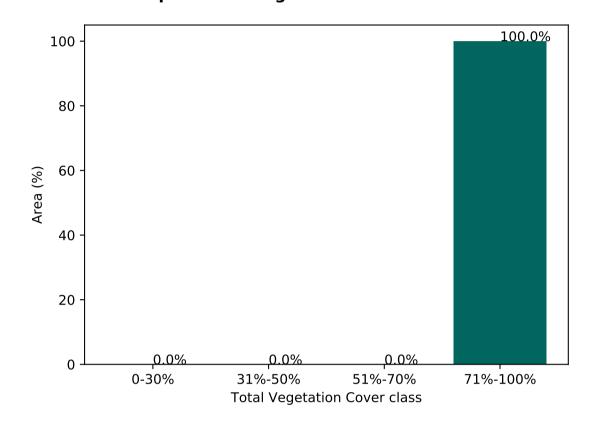
Total Vegetation Cover [%]



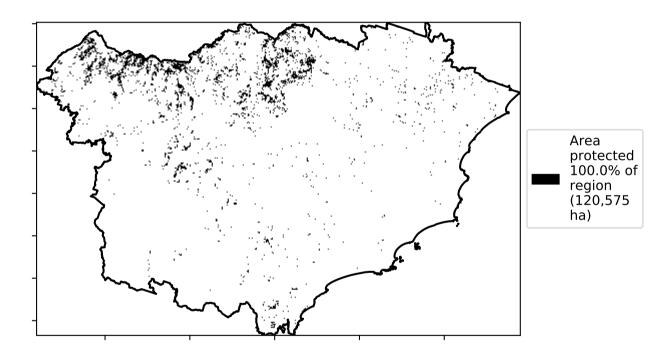
% Area protected from water erosion (>70%)



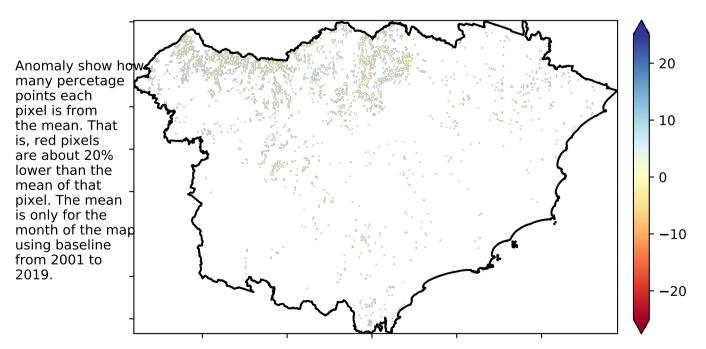
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

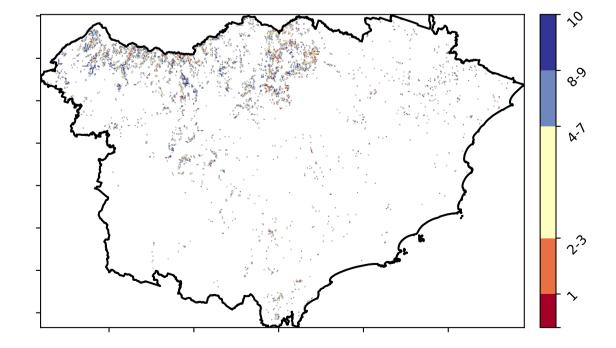


Total Vegetation Cover Anomaly [%]

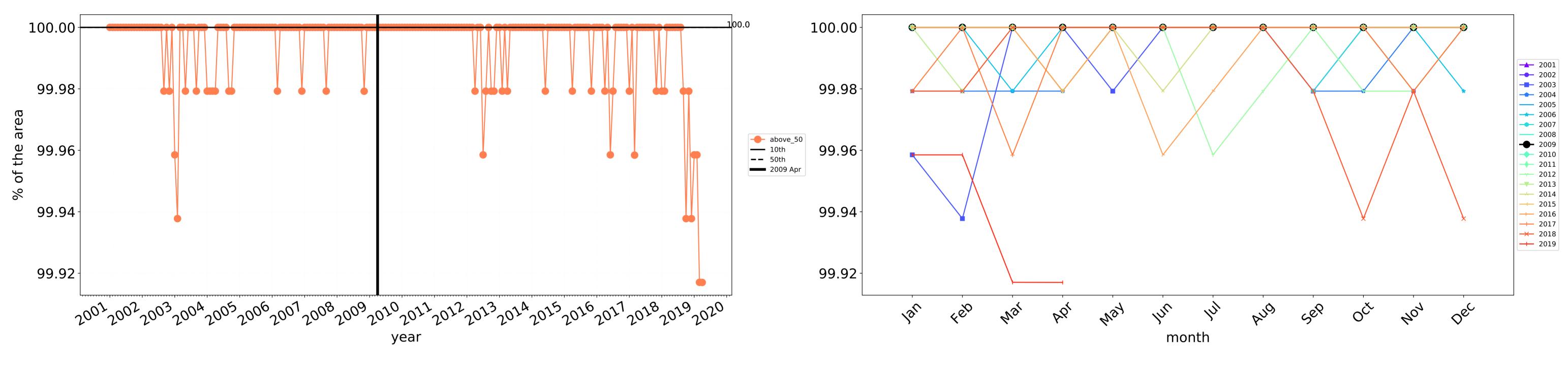


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

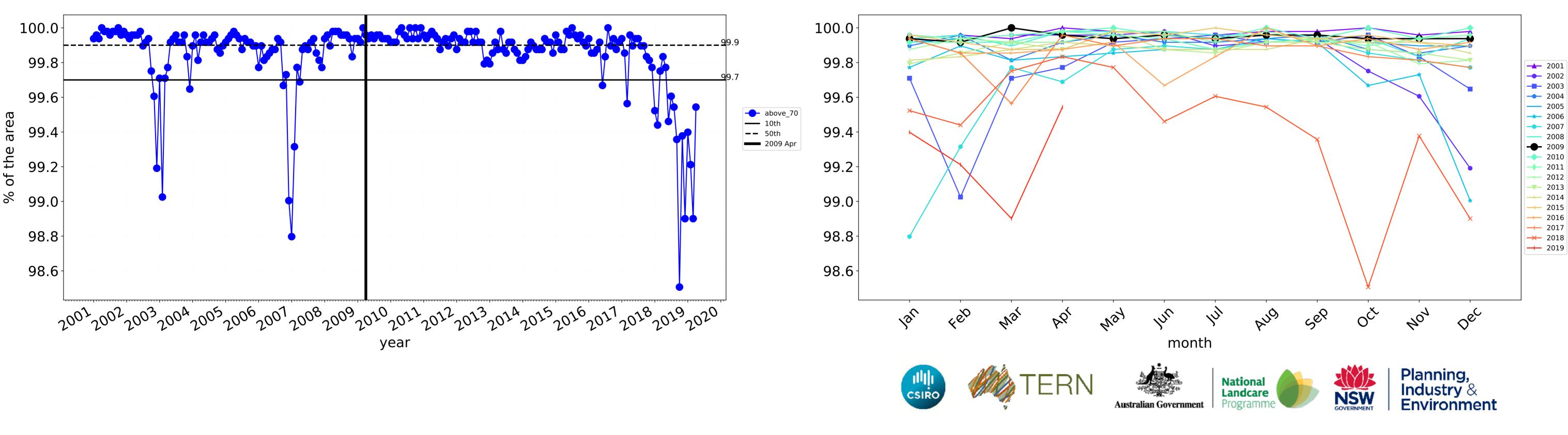




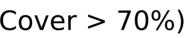


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

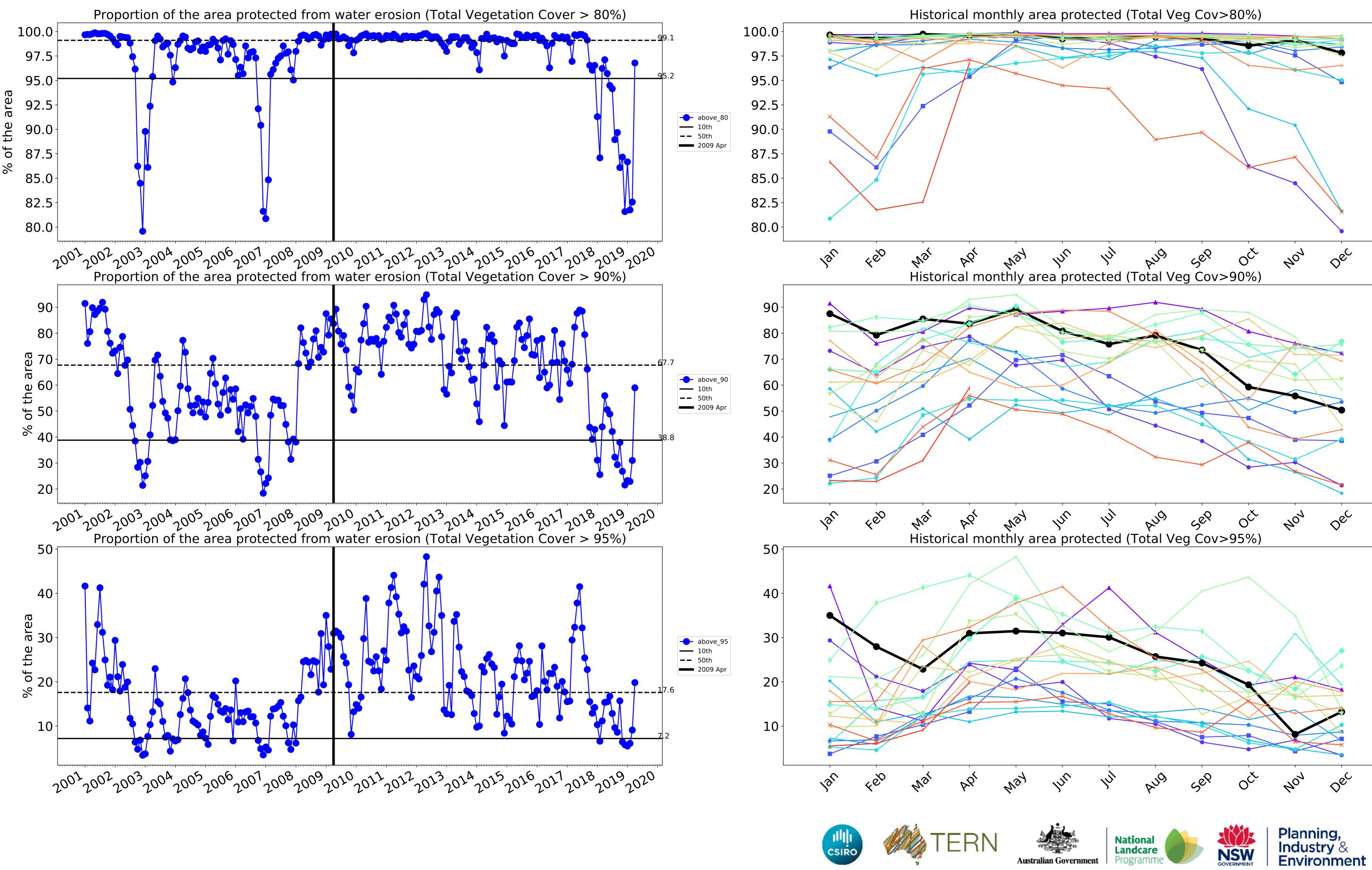


Wind erosion historical monthly area protected (Total Veg Cov >50%)



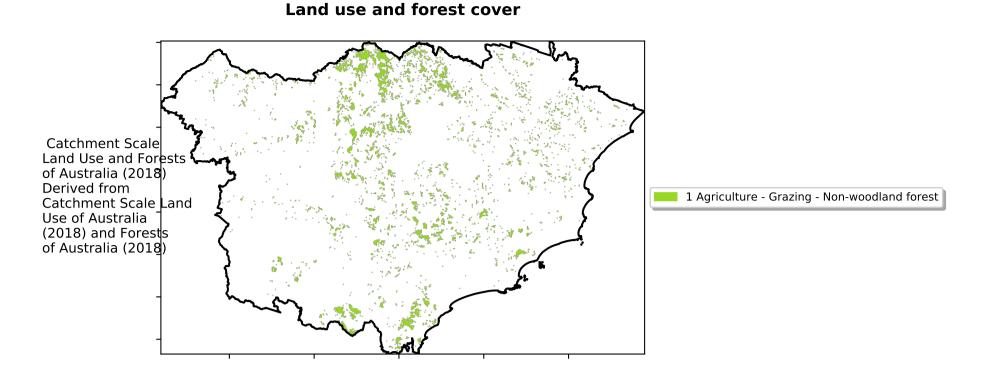


Water erosion historical monthly area protected (Total Veg Cov>70%)

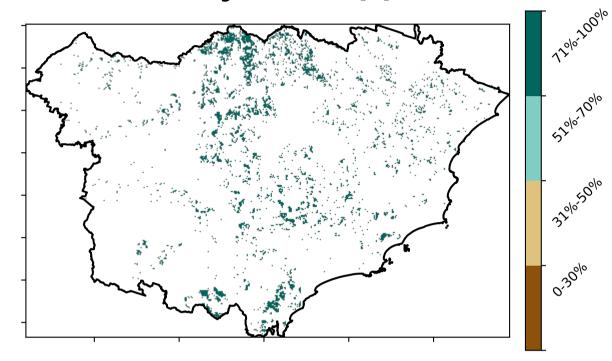


— 2001 --- 2002 **—** 2003 --- 2004 ____ 2005 **----** 2006 **---** 2007 2008 **—** 2009 **-** 2010 ↓ 2011↓ 2012 - 2013 - 2014 <mark>←</mark> 2015 <mark>→</mark> 2016 --- 2017 → 2018 → 2019

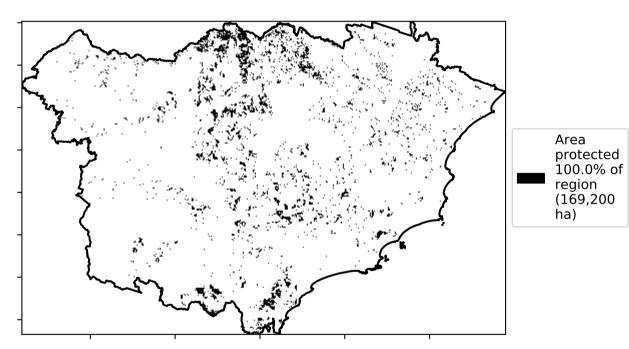
Grazing - Forest (non woodland)



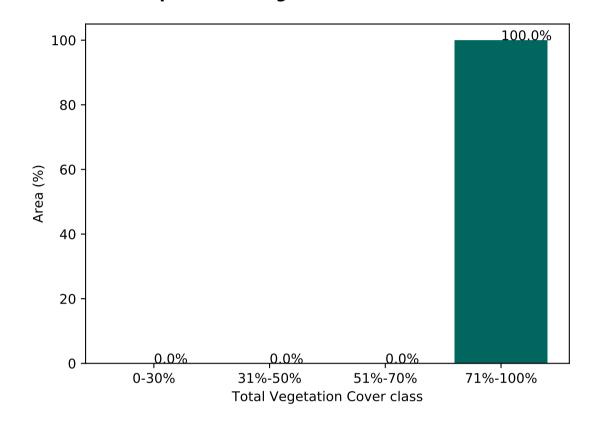
Total Vegetation Cover [%]



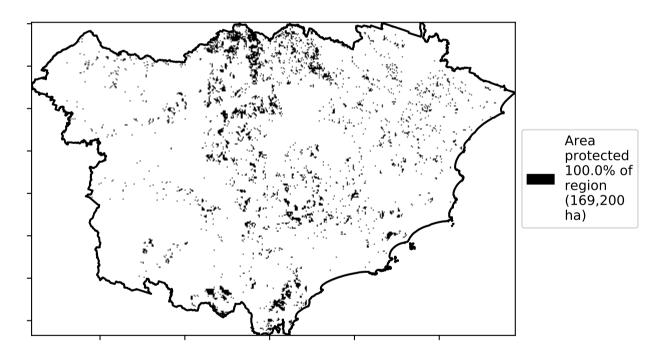
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



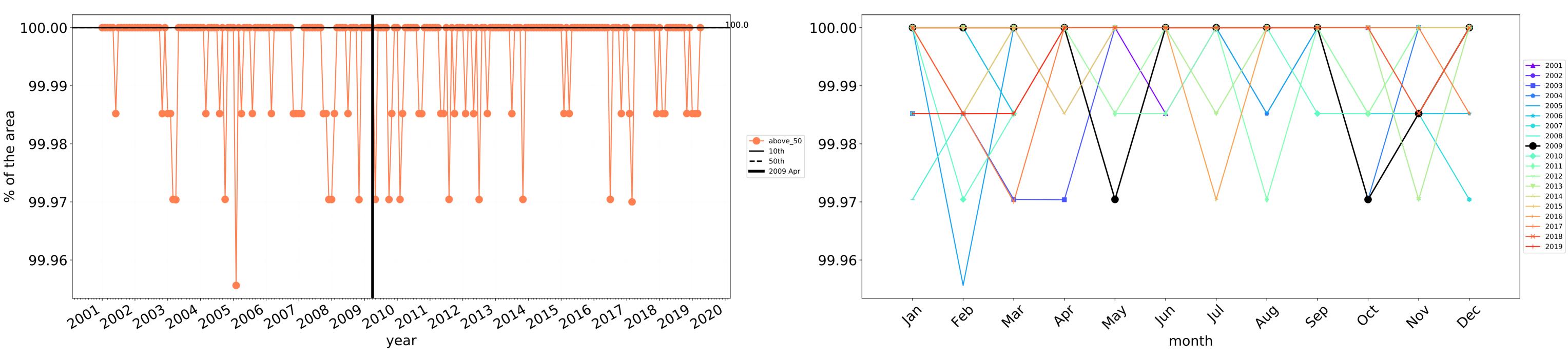
Total Vegetation Cover Anomaly [%]

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.

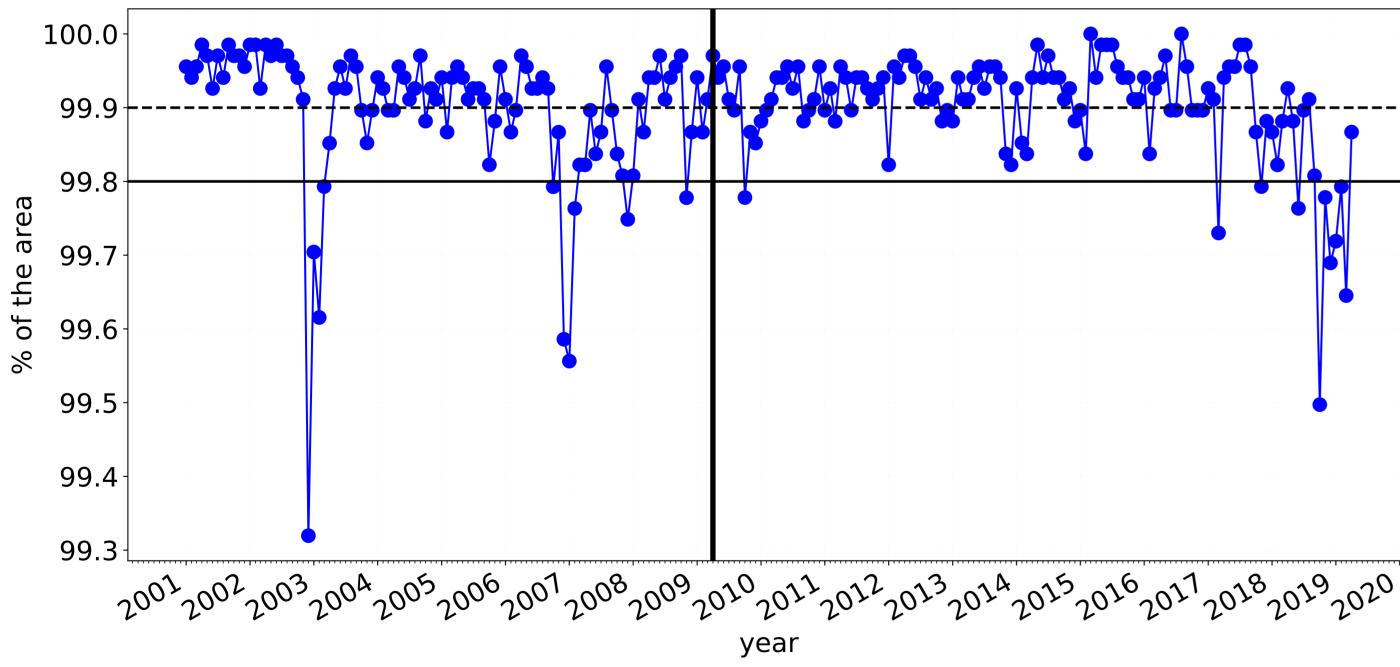
Total Vegetation Cover Decile [%]



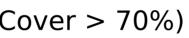


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

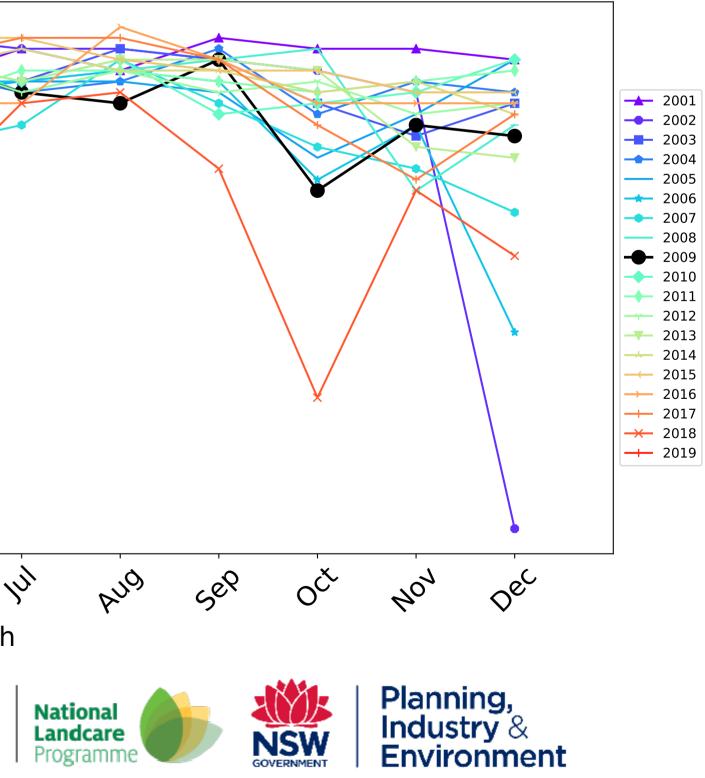


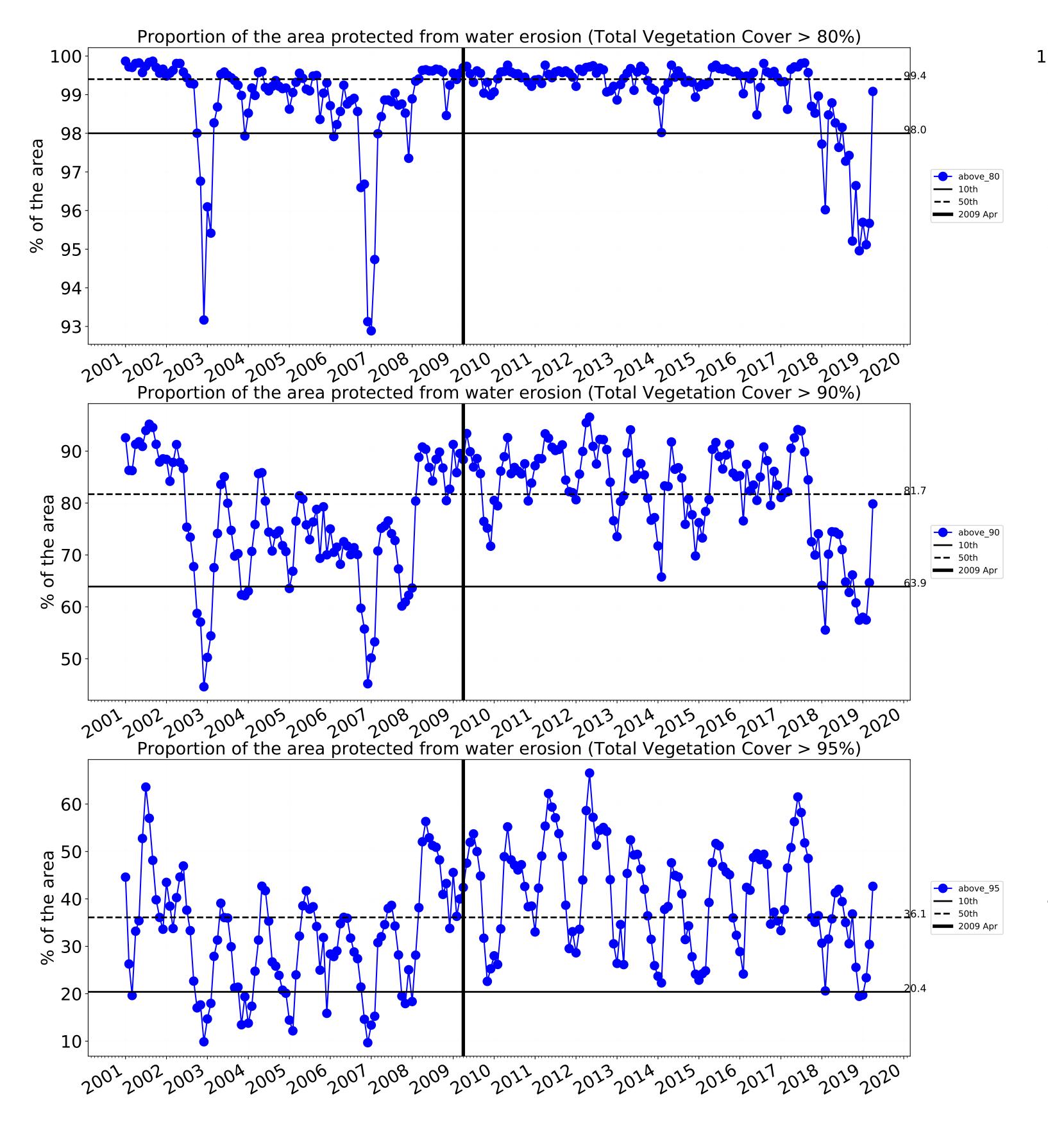
Wind erosion historical monthly area protected (Total Veg Cov >50%)

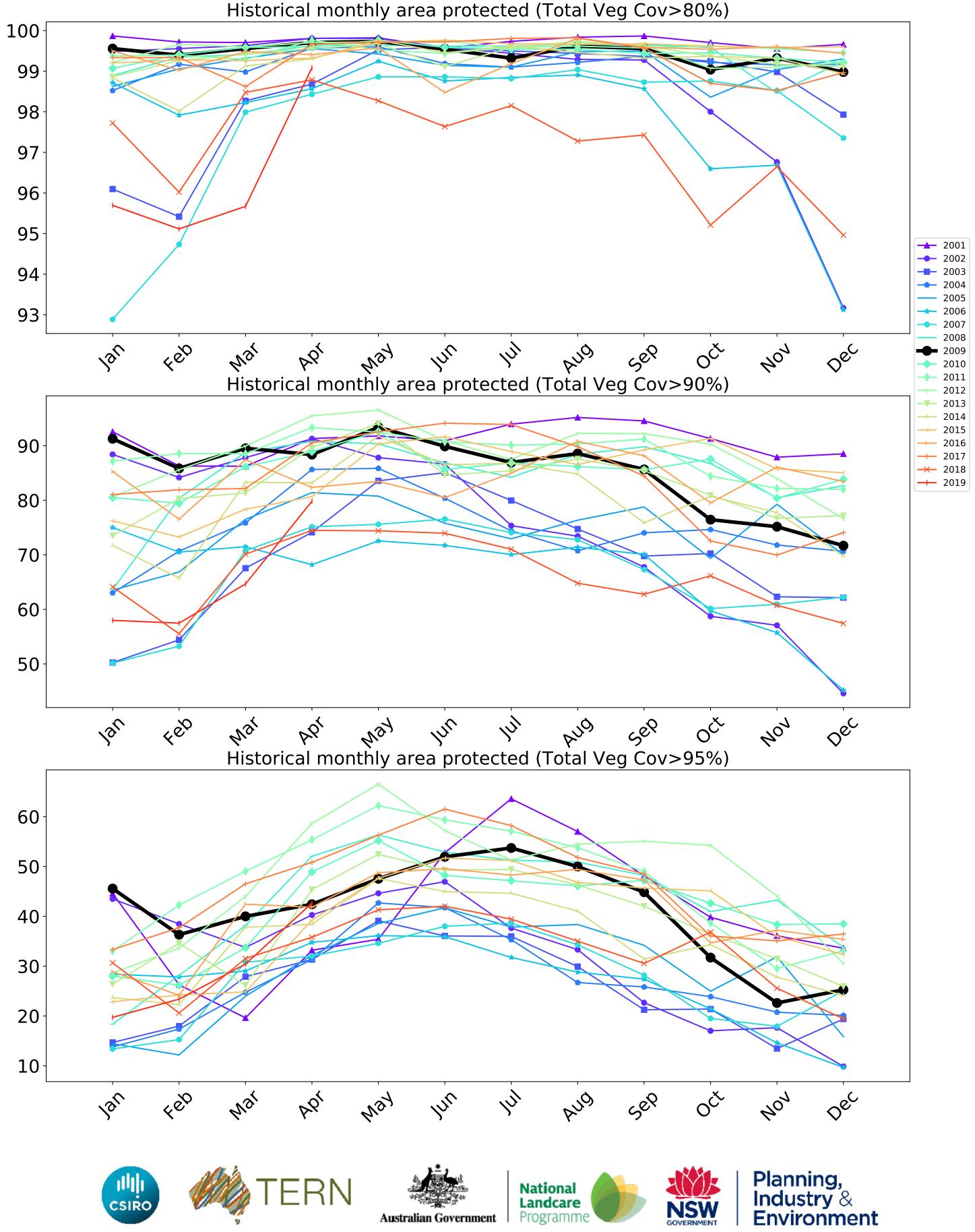


100.0-99.9 99.8 --- above_70 **—** 10th **--** 50th 99.7 **—** 2009 Apr 99.6 99.5 99.4 99.3 feb lar May In PQ' Mai month ERN CSIRO Australian Government

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

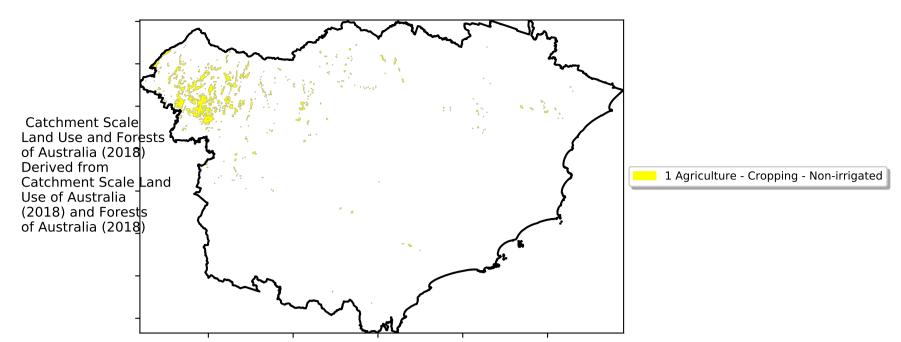




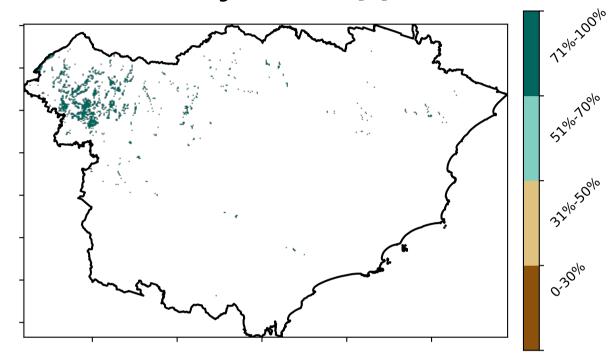


Cropping

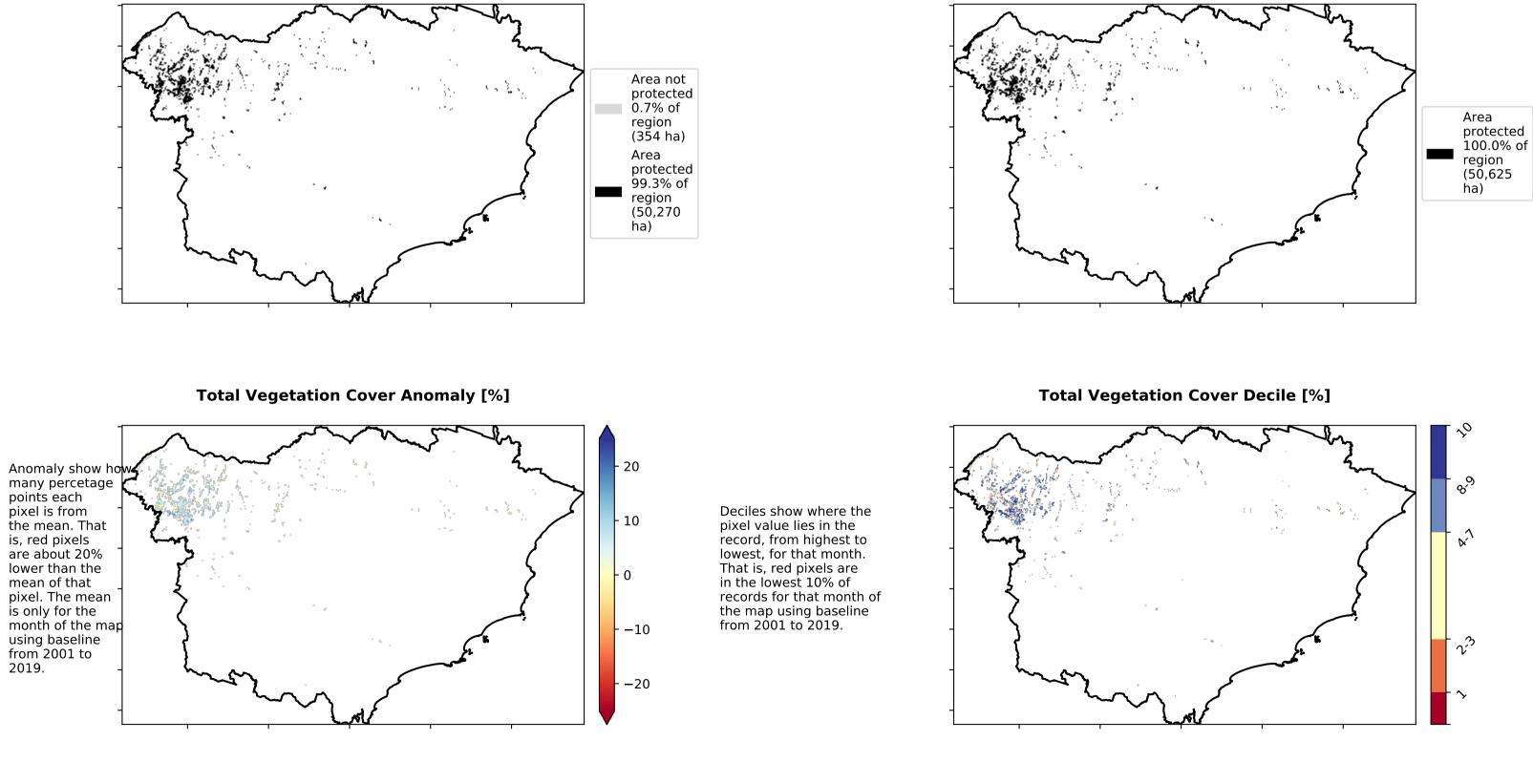
Land use and forest cover



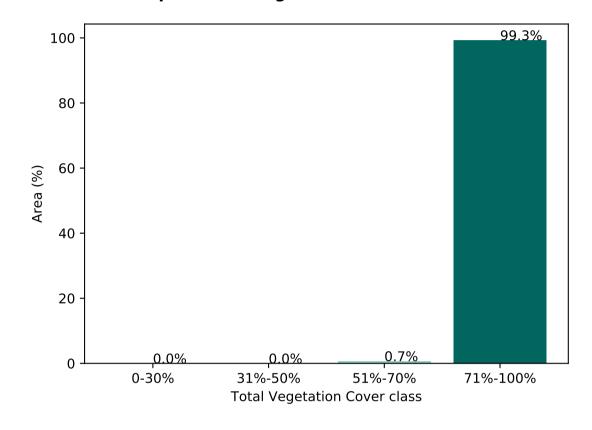
Total Vegetation Cover [%]



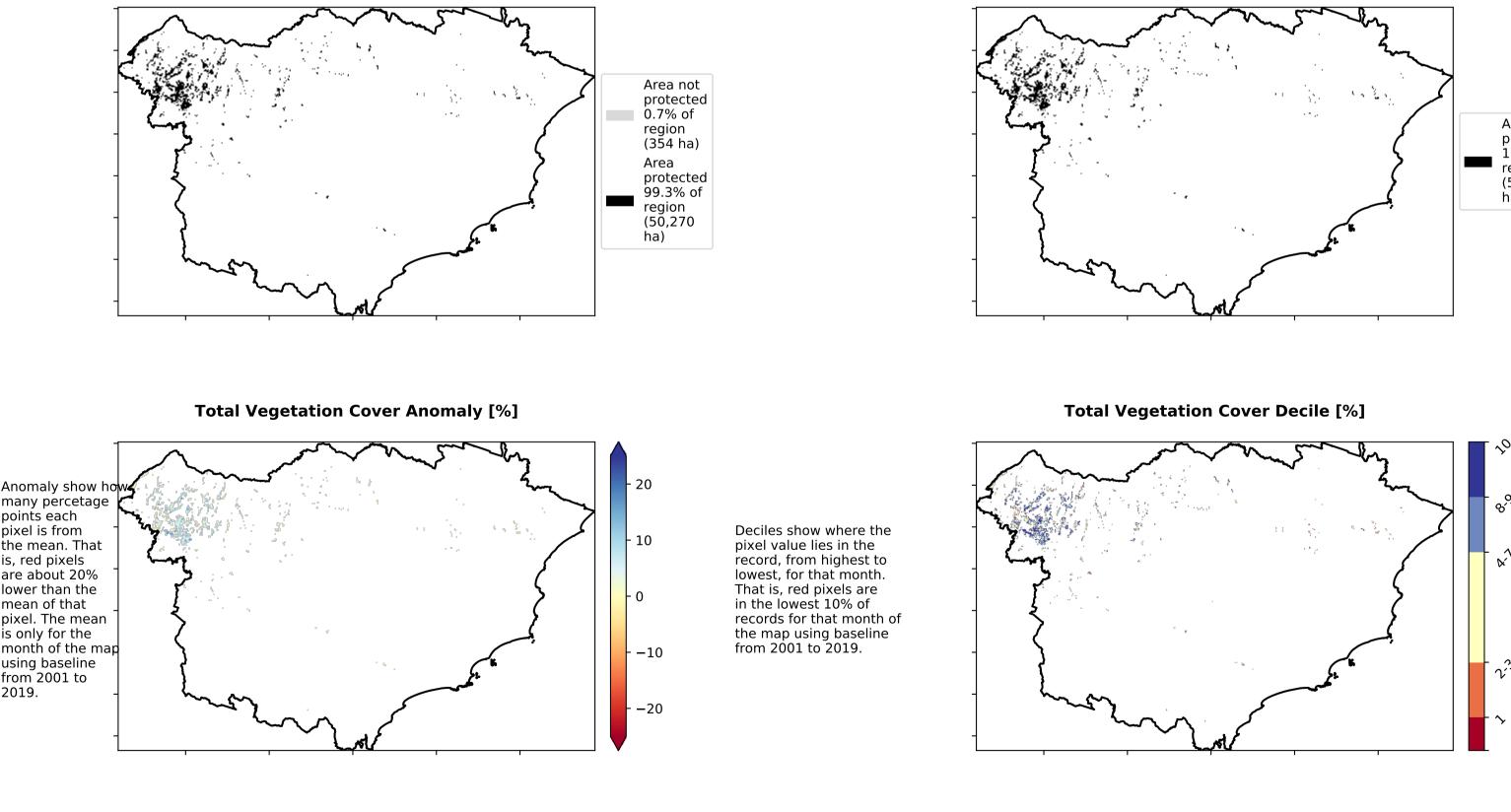
% Area protected from water erosion (>70%)



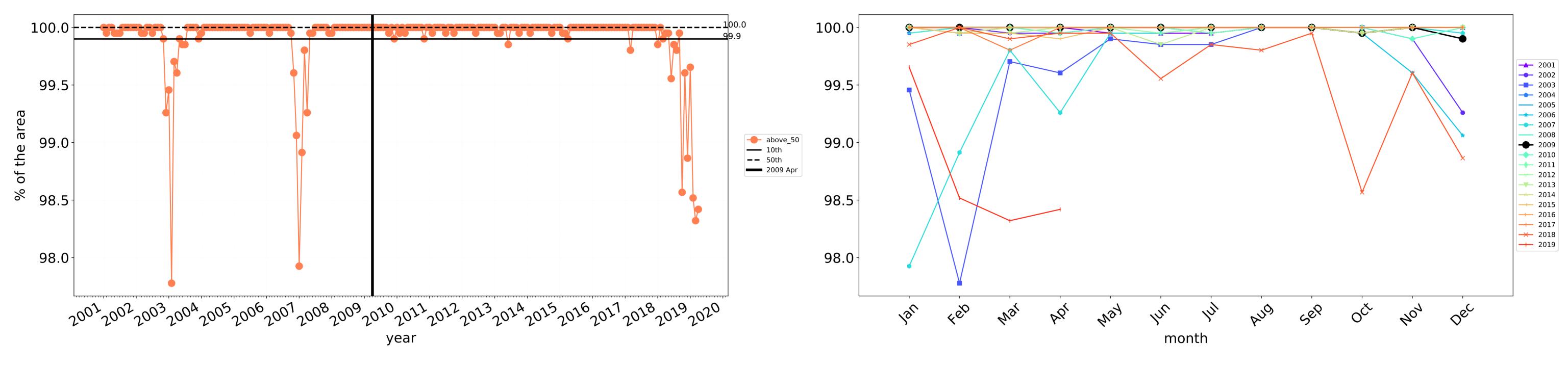
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

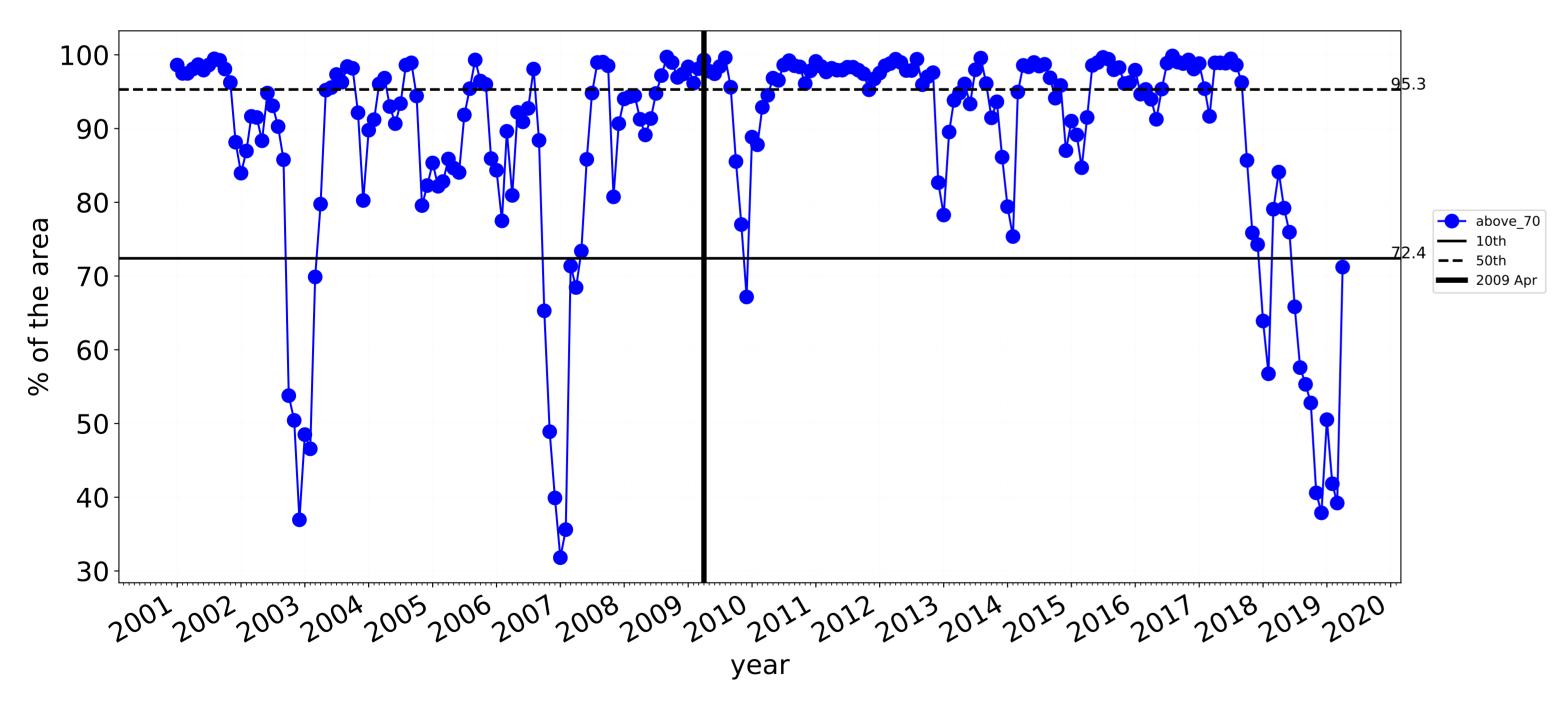






Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

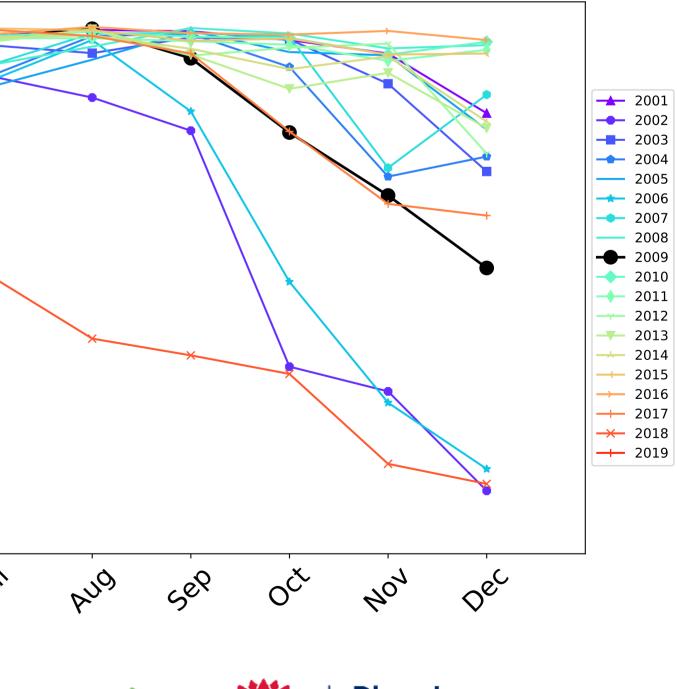
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



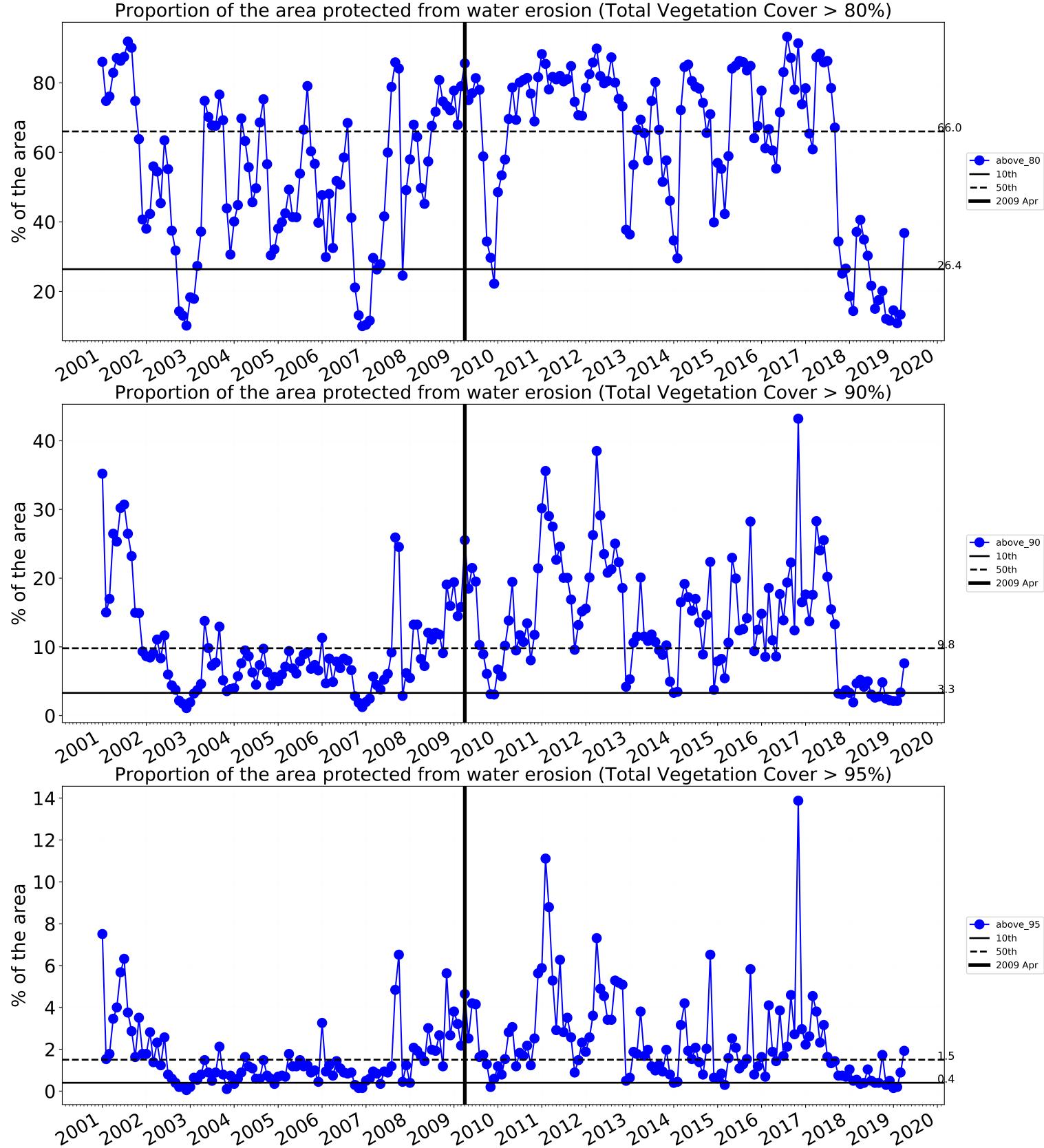
Wind erosion historical monthly area protected (Total Veg Cov >50%)

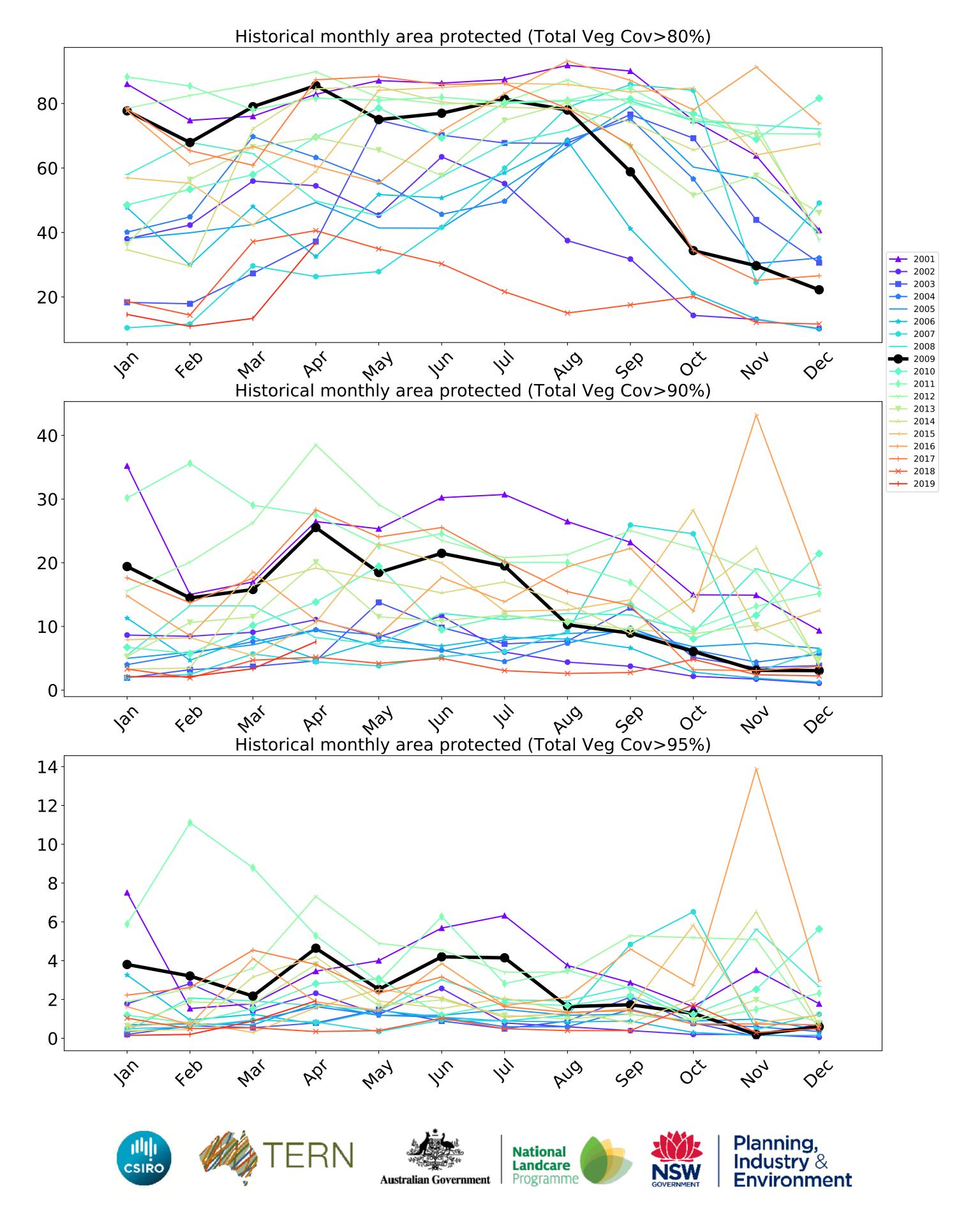
 100^{-1} 90 80 70 60 50 40-30 lar 4eb way PP In 1st Mai month FERN **HARD** CSIRO Australian Government

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





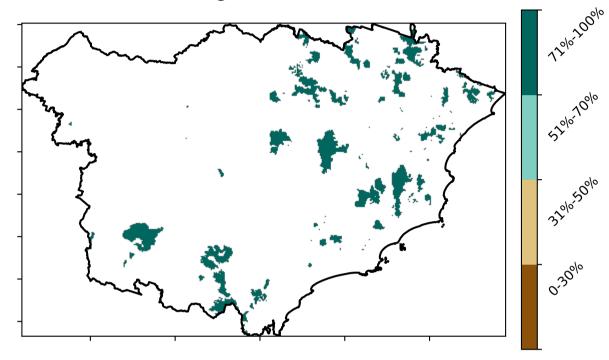




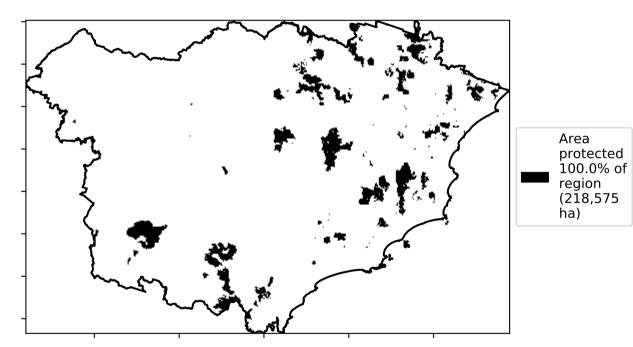
Production native forests and plantation forests



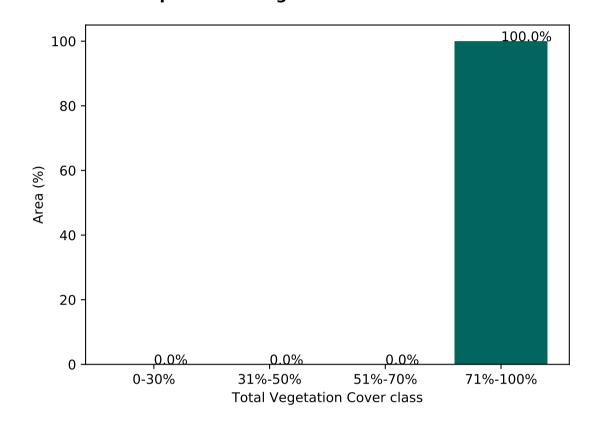
Total Vegetation Cover [%]



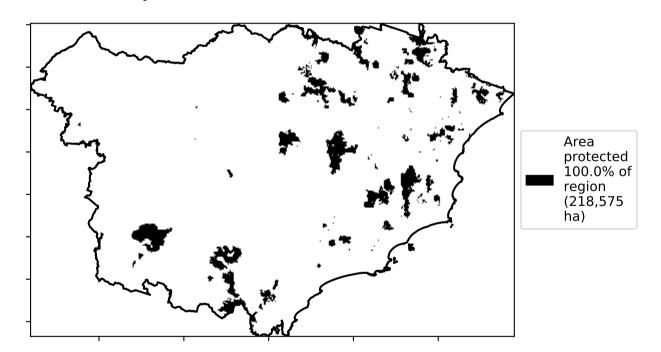
% Area protected from water erosion (>70%)



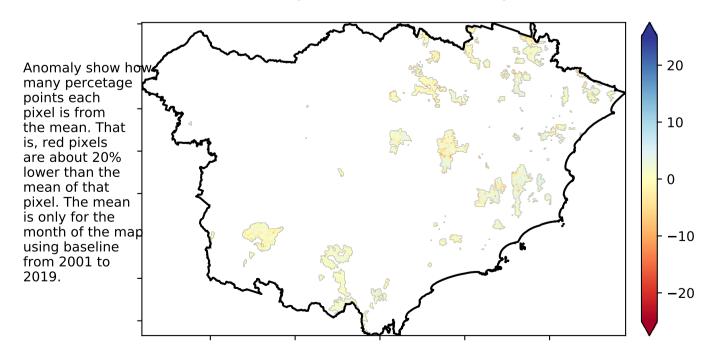
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

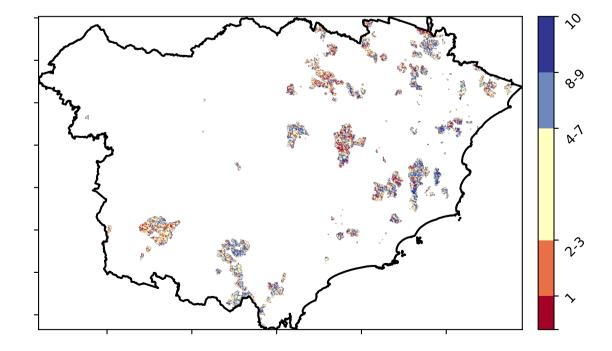


Total Vegetation Cover Anomaly [%]



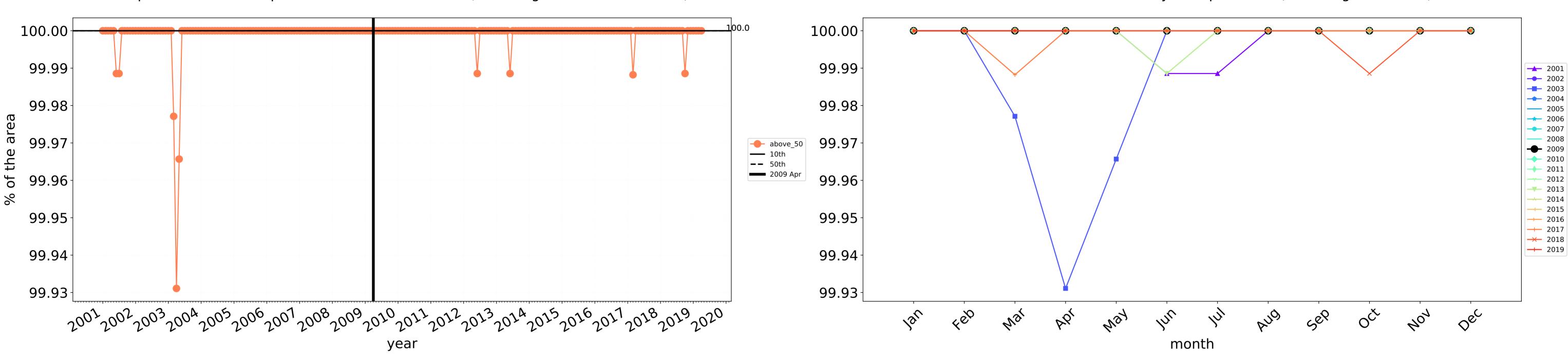
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]



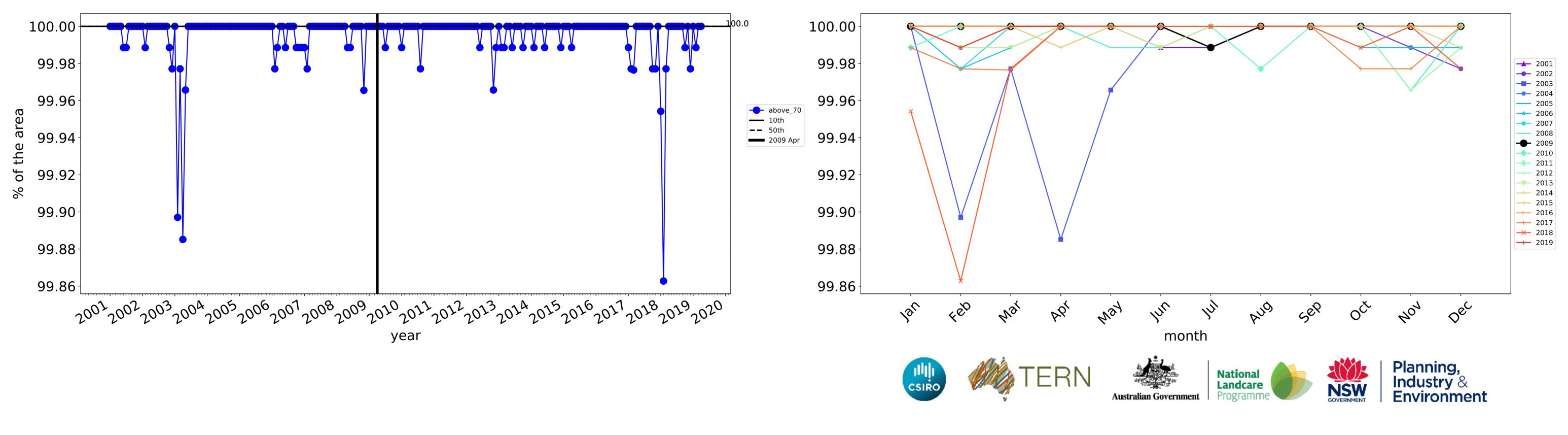


Production native forests and plantation forests timeseries

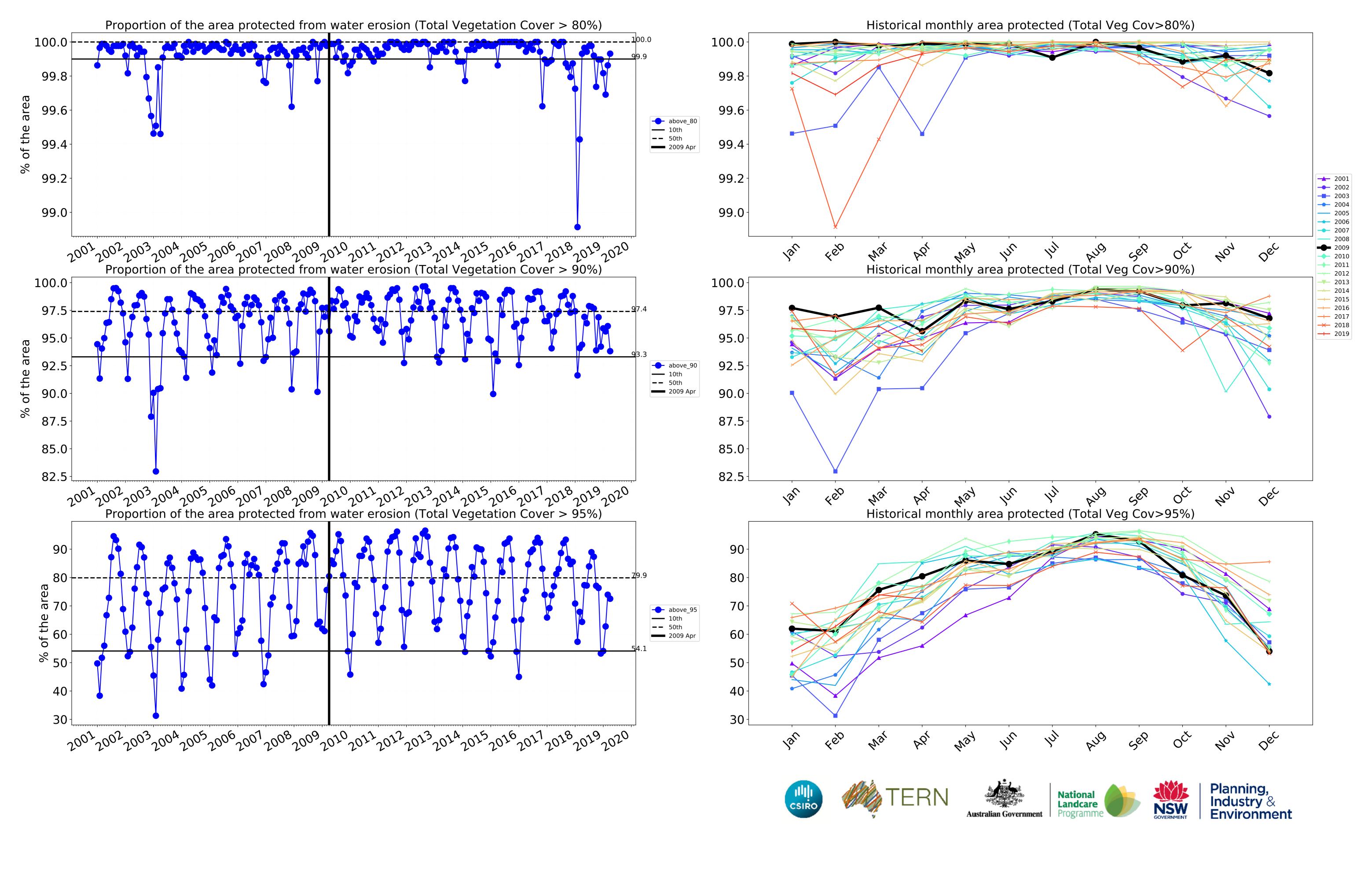


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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







Hunter (3,237,200 ha and no data 63,225 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	3,237,200	99.9% 3,235,077	99.7% 3,228,684	99.0% 3,205,110	97.4% 3,153,019	79.1% 2,559,483	42.2% 1,366,869
Conservation and natural environments	1,241,350	99.9% 1,240,525	99.9% 1,239,850	99.8% 1,238,475	99.5% 1,235,625	92.3% 1,145,175	62.7% 778,875
Conservation and natural environments non forest	29,900	97.3% 29,100	95.7% 28,625	92.7% 27,725	89.0% 26,600	71.3% 21,325	33.5% 10,025
Conservation and natural environments Woodland forest	139,025	100.0% 139,025	100.0% 139,000	99.9% 138,925	99.8% 138,750	90.8% 126,225	46.3% 64,325
Conservation and natural environments Forest (non woodland)	1,072,425	100.0% 1,072,400	100.0% 1,072,225	99.9% 1,071,825	99.8% 1,070,275	93.0% 997,625	65.7% 704,525
Agriculture	1,580,850	100.0% 1,580,850	100.0% 1,580,775	99.9% 1,578,525	98.6% 1,558,500	71.8% 1,134,650	24.9% 393,175
Grazing	1,502,850	100.0% 1,502,850	100.0% 1,502,775	99.9% 1,500,950	99.1% 1,490,025	74.3% 1,116,850	26.0% 390,225
Grazing non forest	1,213,075	100.0% 1,213,075	100.0% 1,213,000	99.9% 1,211,275	99.0% 1,201,250	71.4% 866,450	23.2% 281,125
Grazing Woodland forest	120,575	100.0% 120,575	100.0% 120,575	100.0% 120,525	99.6% 120,075	83.7% 100,875	31.0% 37,325
Grazing - Forest (non woodland)	169,200	100.0% 169,200	100.0% 169,200	100.0% 169,150	99.7% 168,700	88.4% 149,525	42.4% 71,775
Cropping	50,625	100.0% 50,625	100.0% 50,625	99.3% 50,275	85.6% 43,325	25.5% 12,925	4.6% 2,350
Production native forests and plantation forests	218,575	100.0% 218,575	100.0% 218,575	100.0% 218,575	100.0% 218,550	95.6% 209,000	80.5% 175,850

