Total vegetation cover soil protection Region:NRM Riverina NSW

Date: December 2012

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:

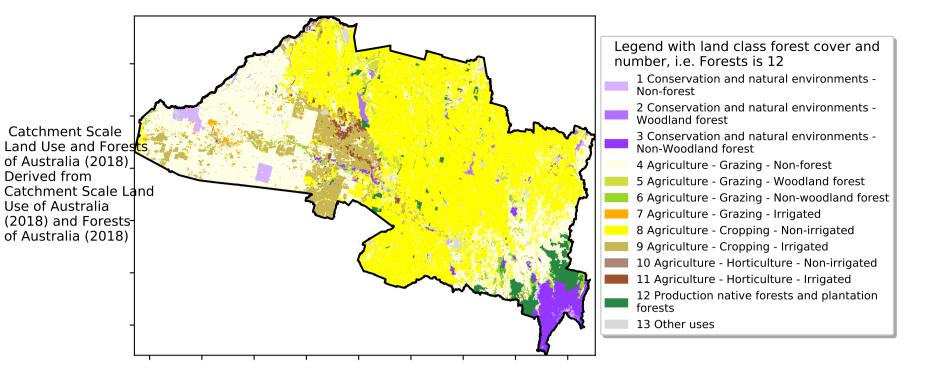
https://doi.org/10.4225/08/5848a3f19a7b3



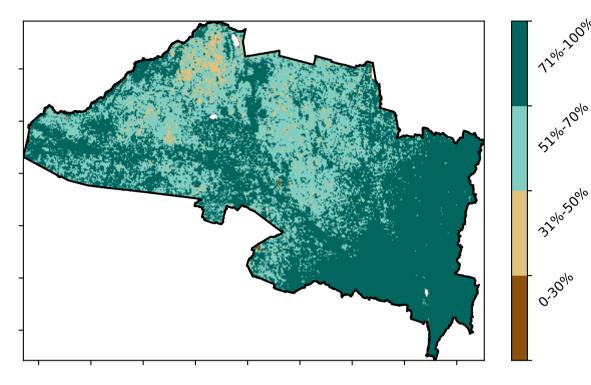
Vegetation Cover Dec 2012

Land use and forest cover

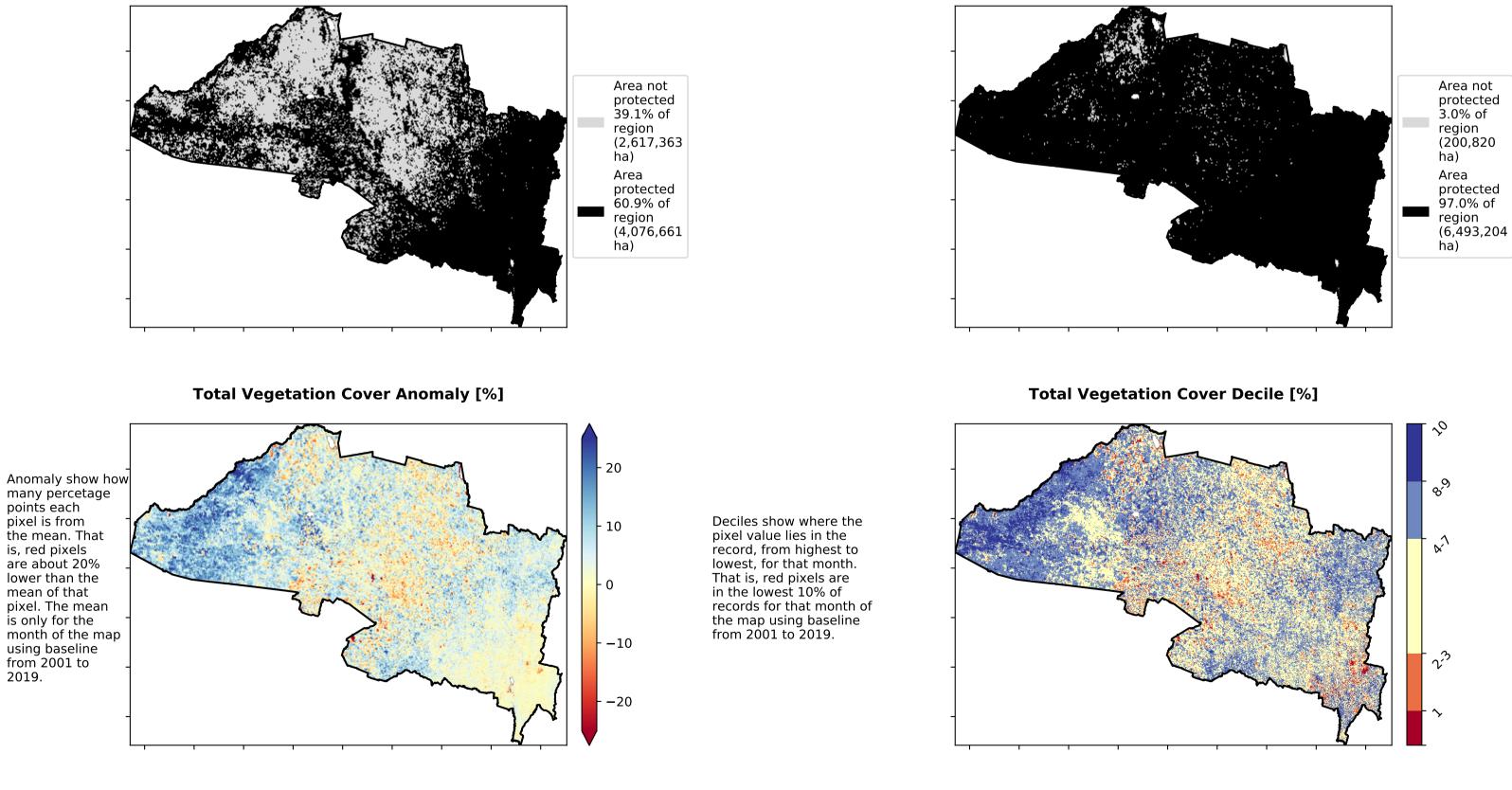
Proportion of each land class in area

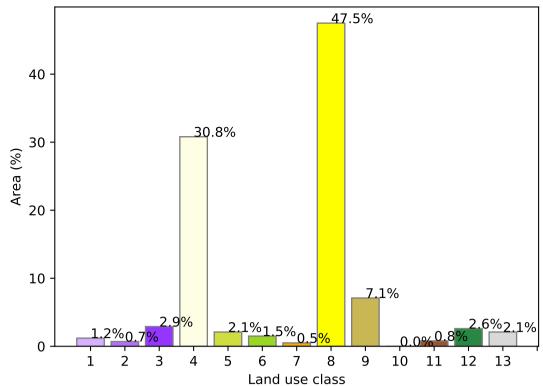


Total Vegetation Cover [%]

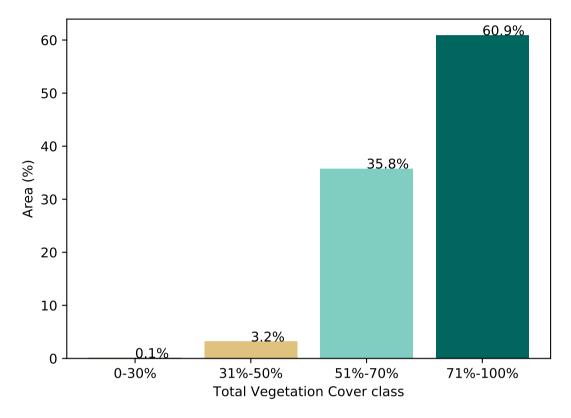


% Area protected from water erosion (>70%)

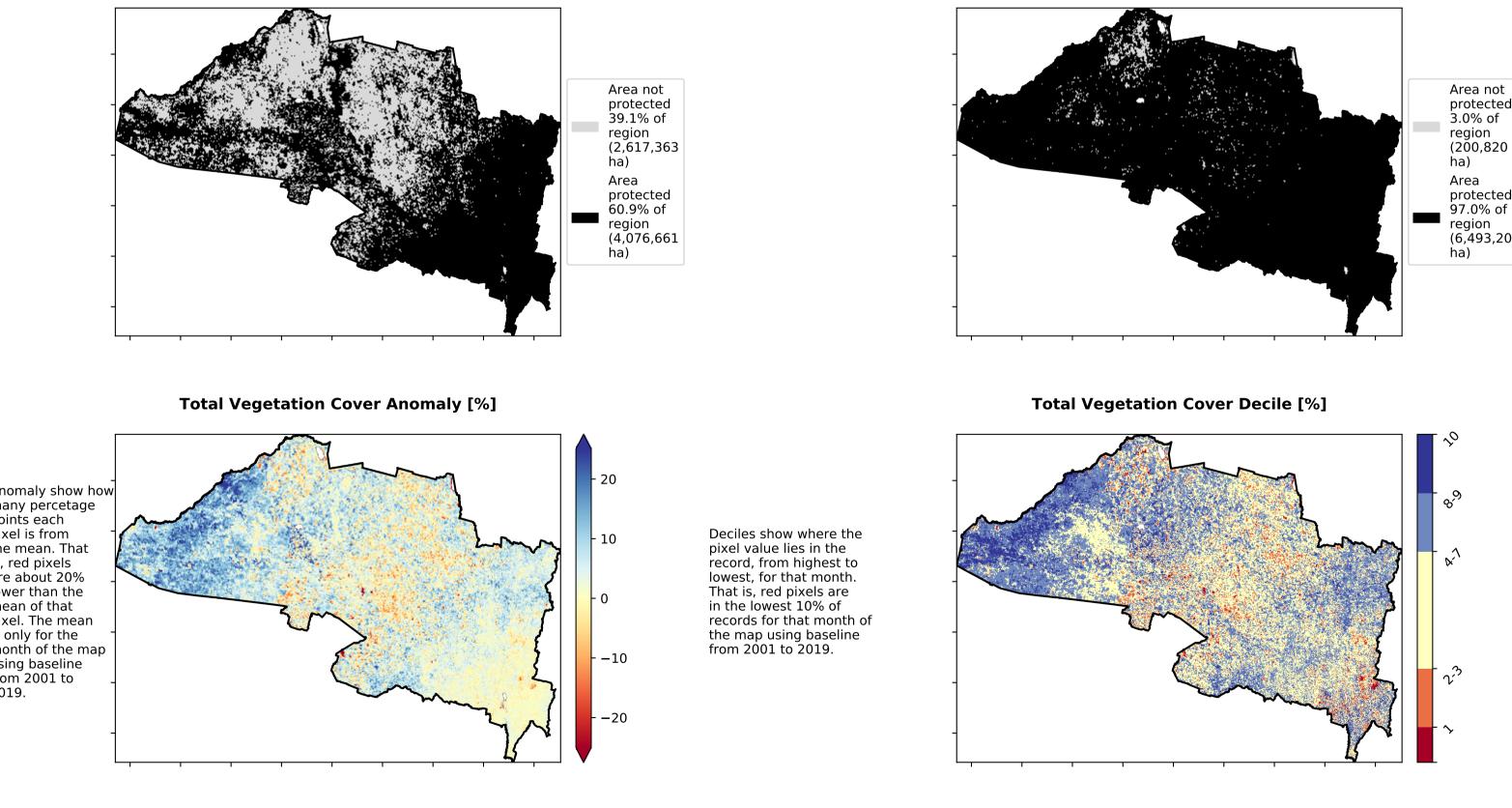




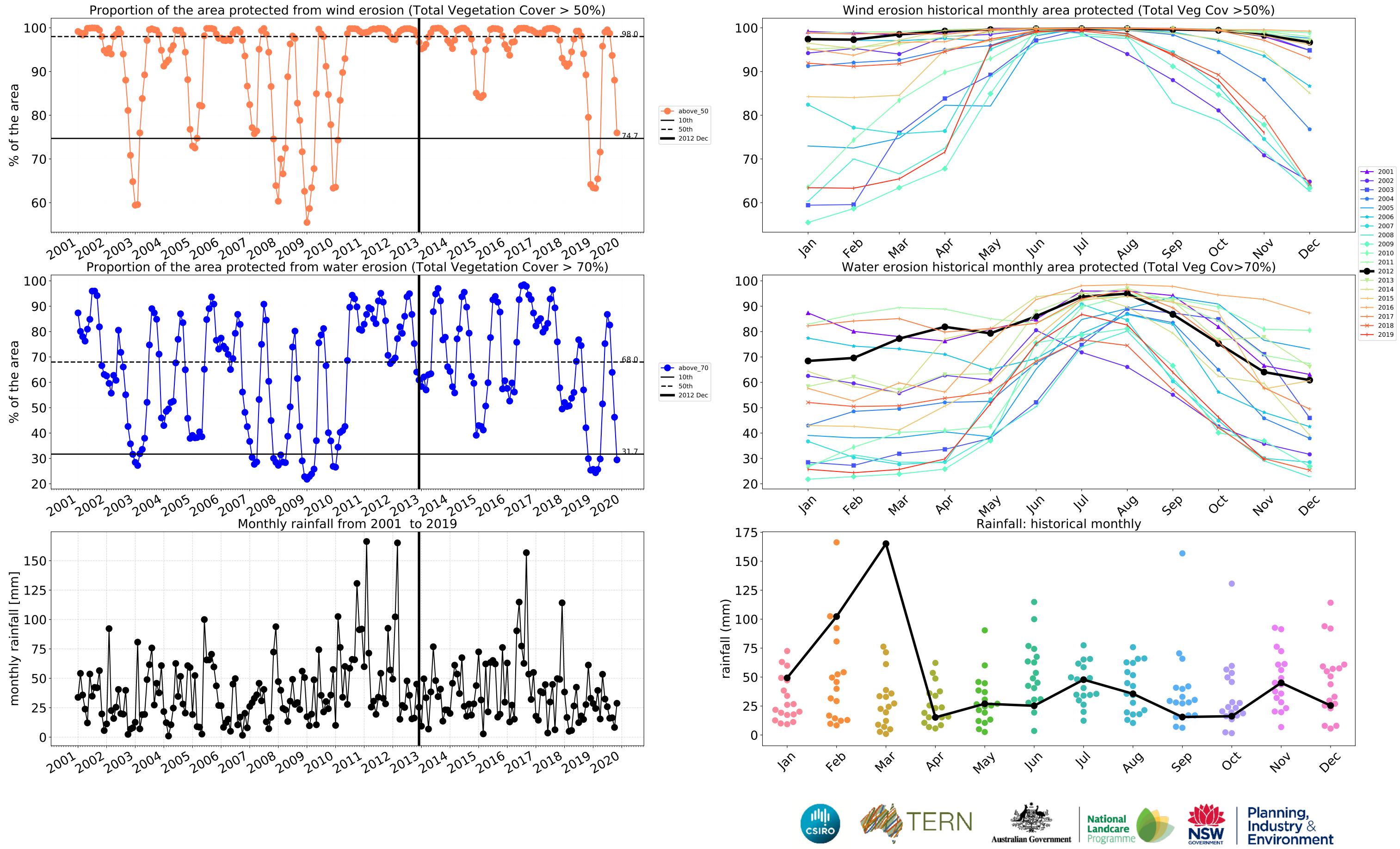
Proportion of vegetation cover class in area



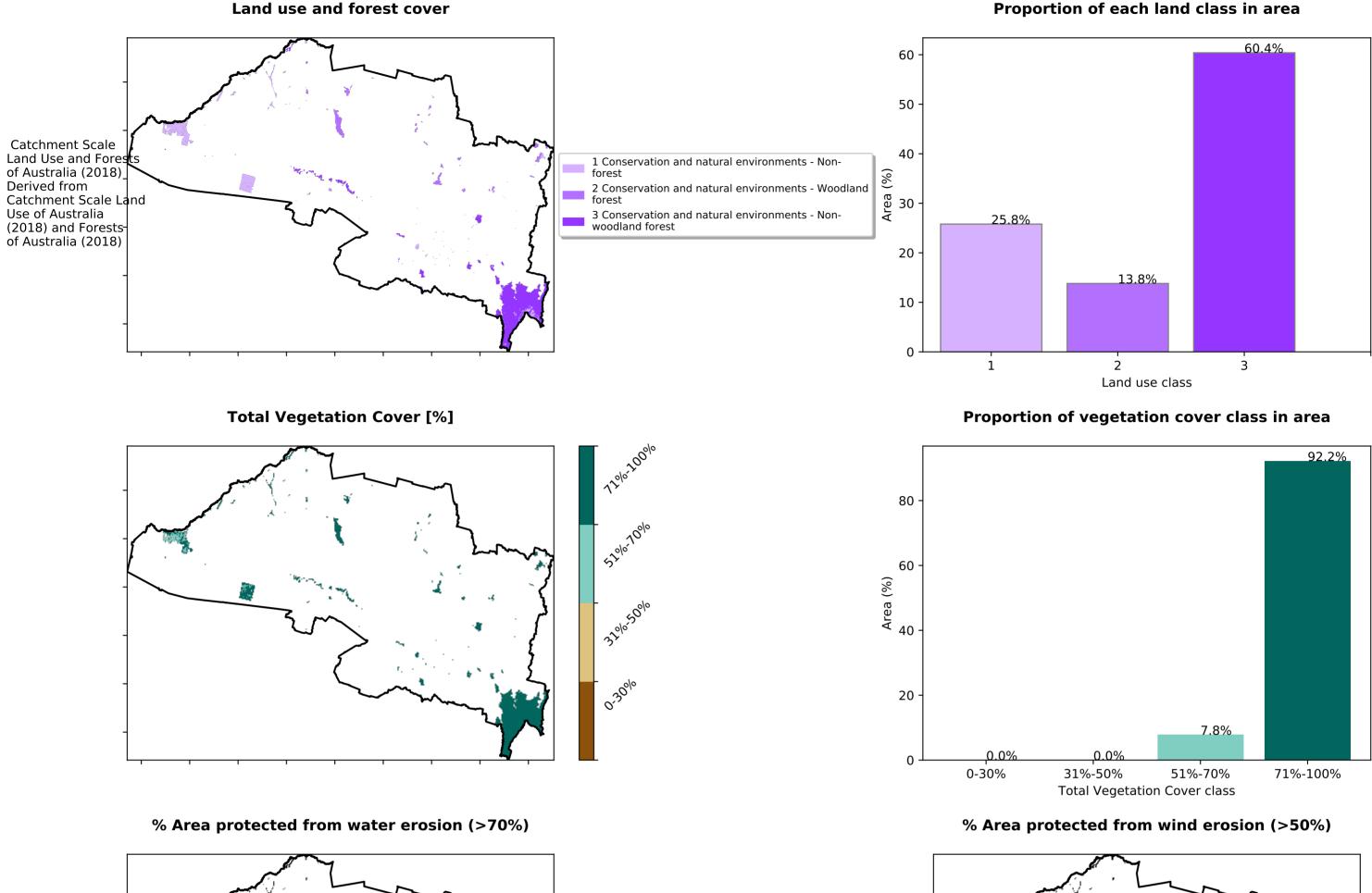
% Area protected from wind erosion (>50%)



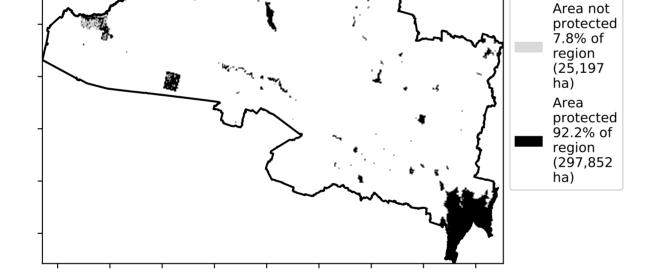




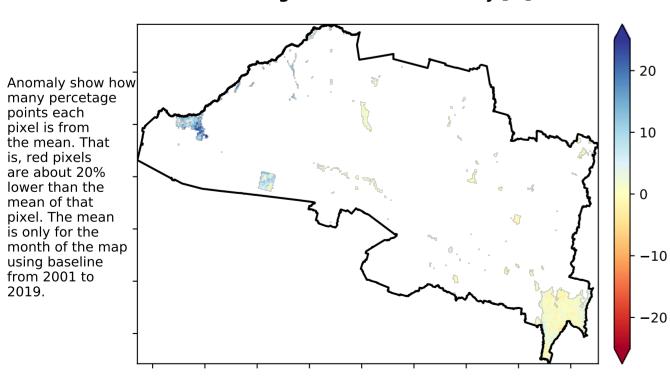
Conservation and natural environments



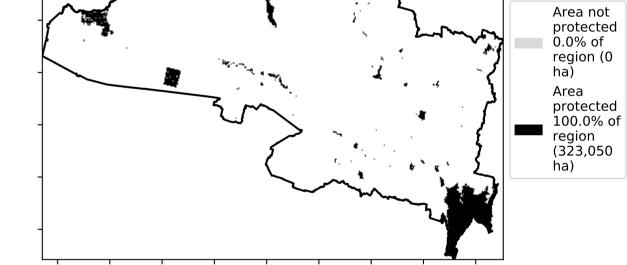
Proportion of each land class in area

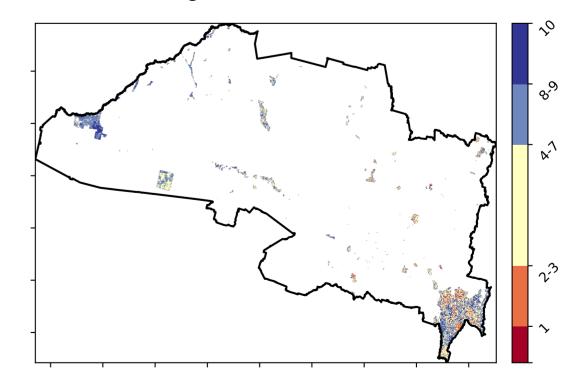


Total Vegetation Cover Anomaly [%]



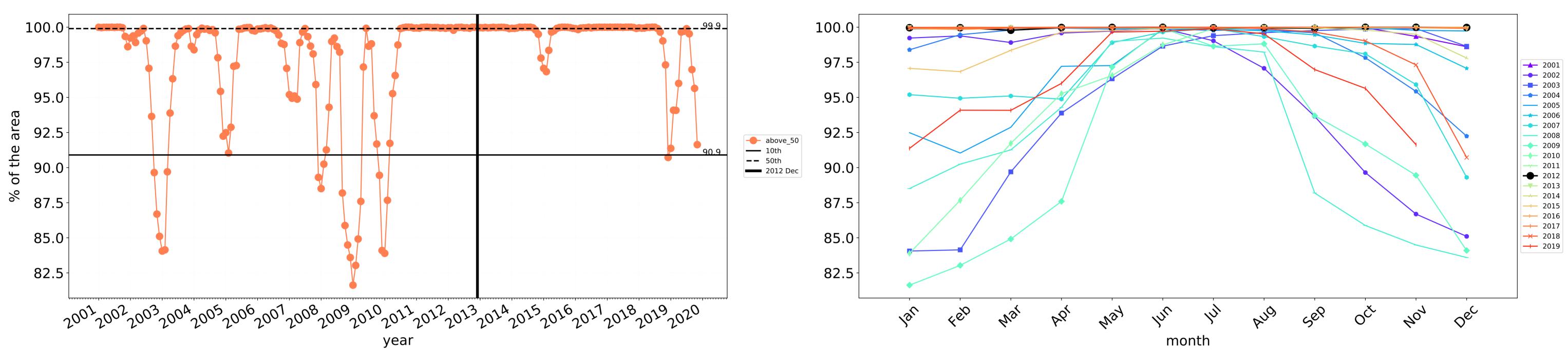
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





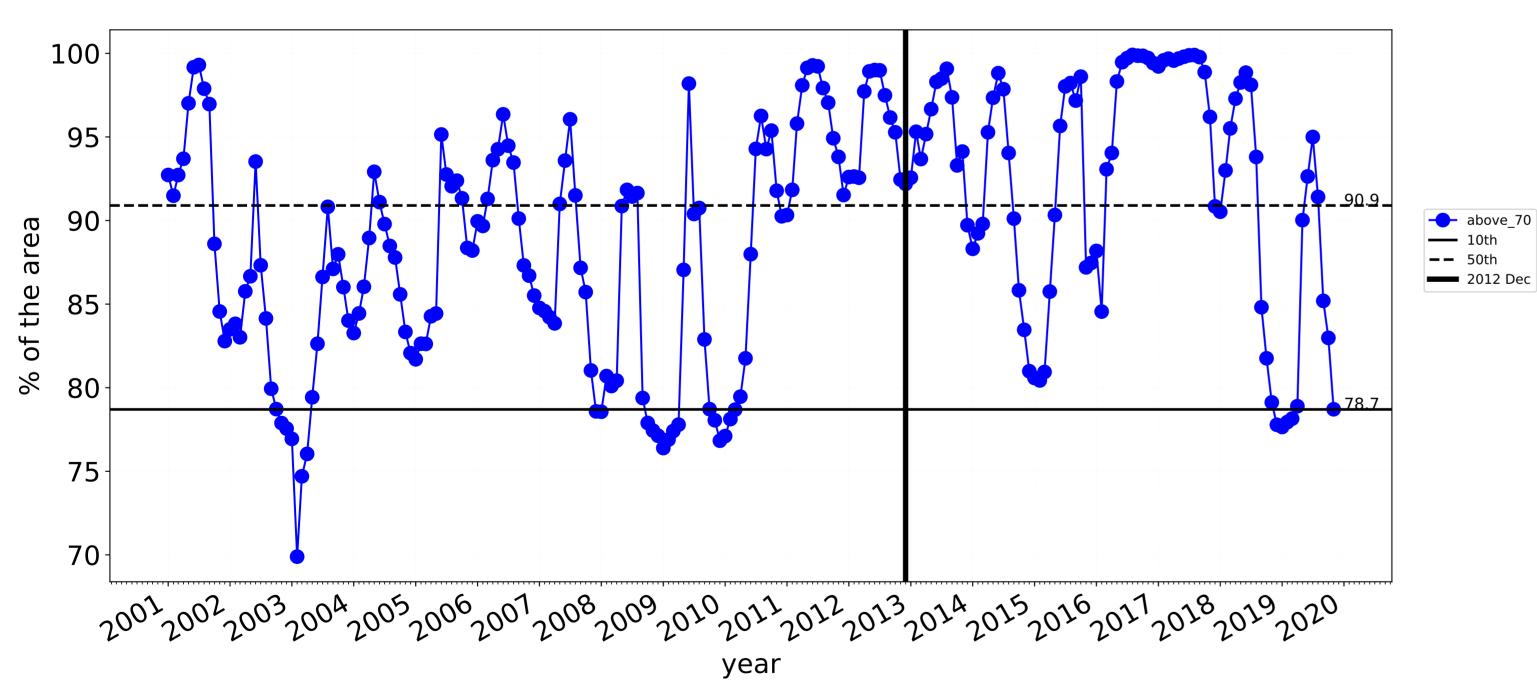


Conservation and natural environments timeseries



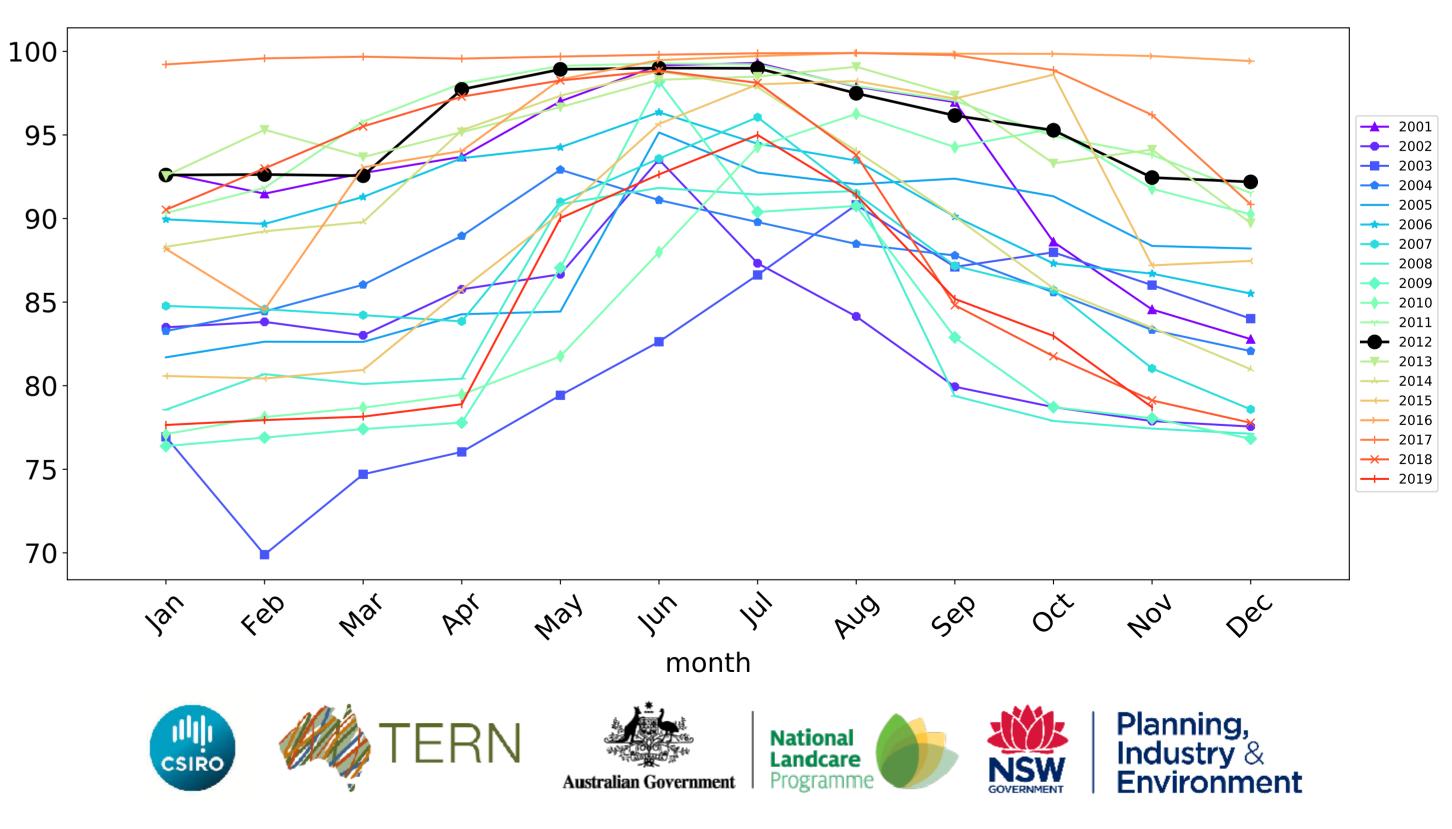
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

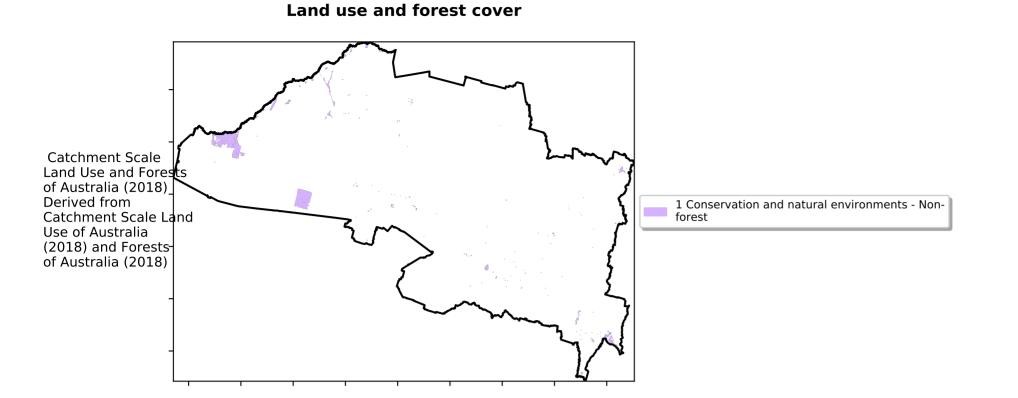




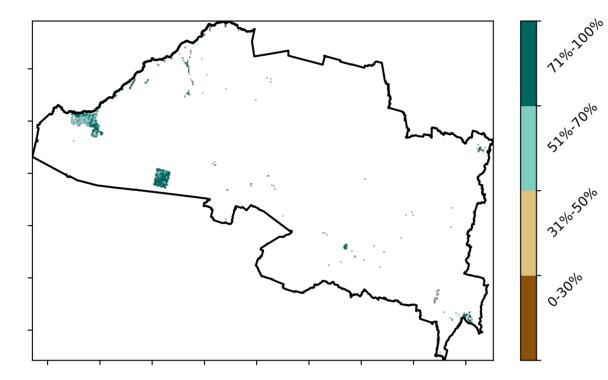
Wind erosion historical monthly area protected (Total Veg Cov >50%)



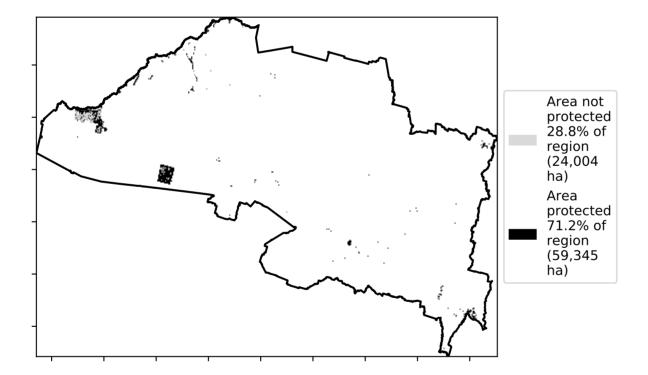
Conservation and natural environments non forest



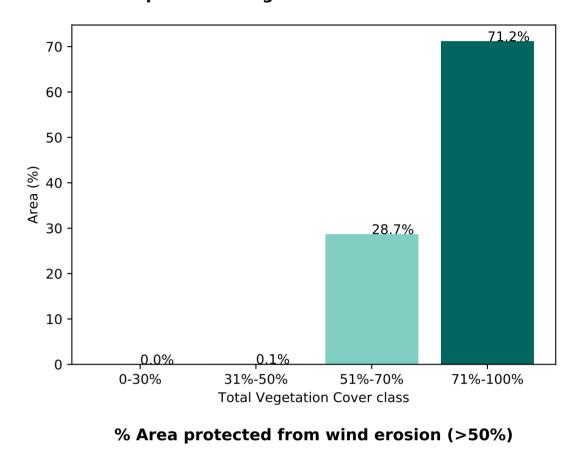
Total Vegetation Cover [%]



% Area protected from water erosion (>70%)

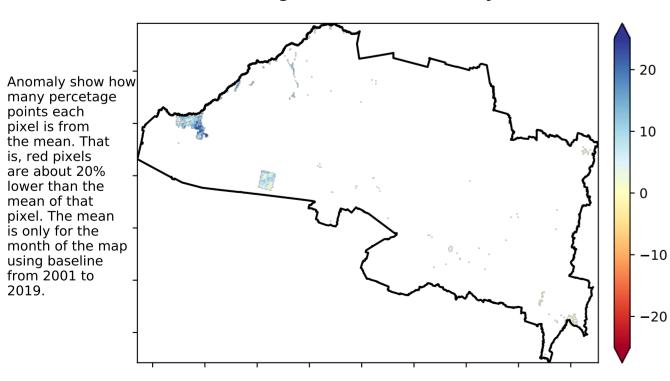


Proportion of vegetation cover class in area

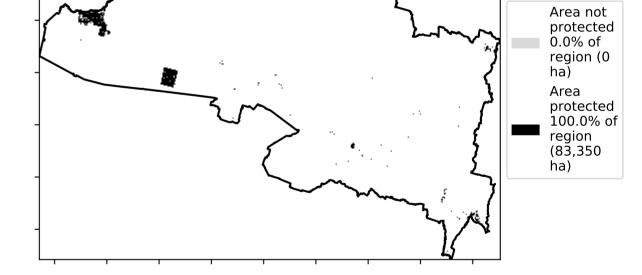




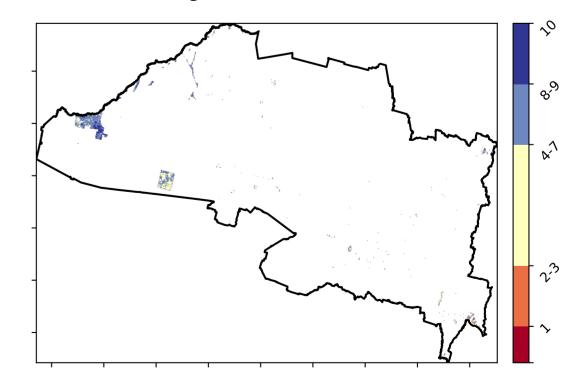
Total Vegetation Cover Anomaly [%]



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.

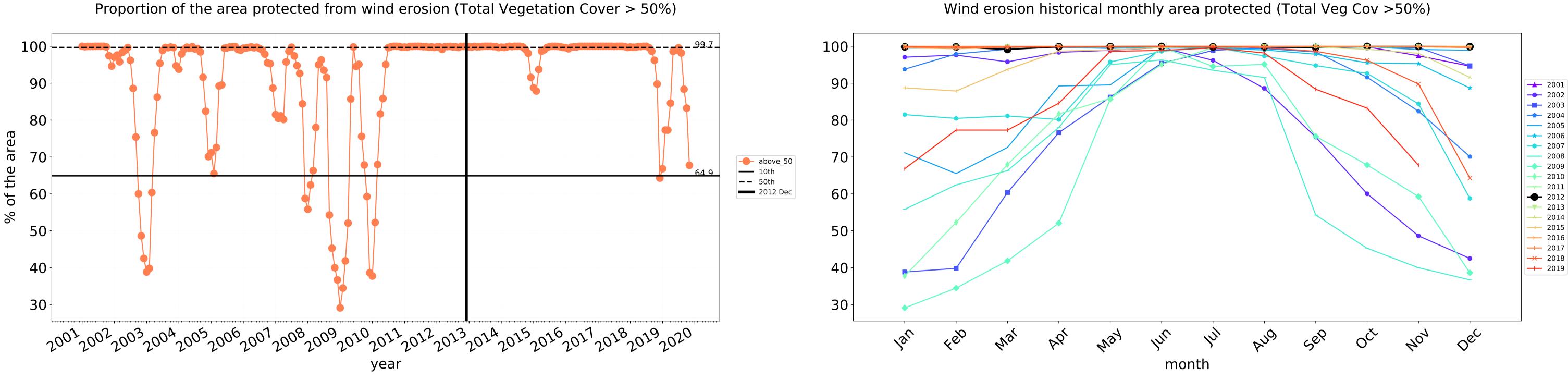


Total Vegetation Cover Decile [%]



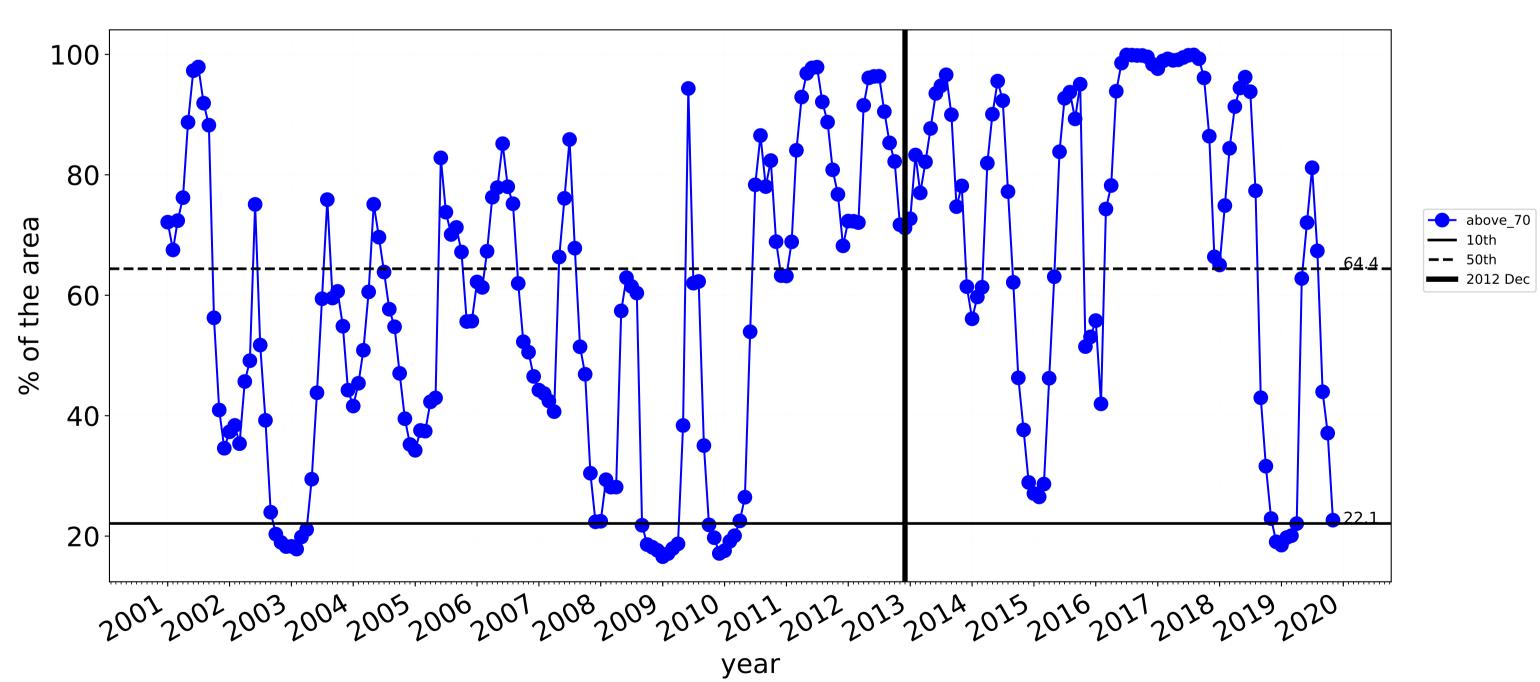


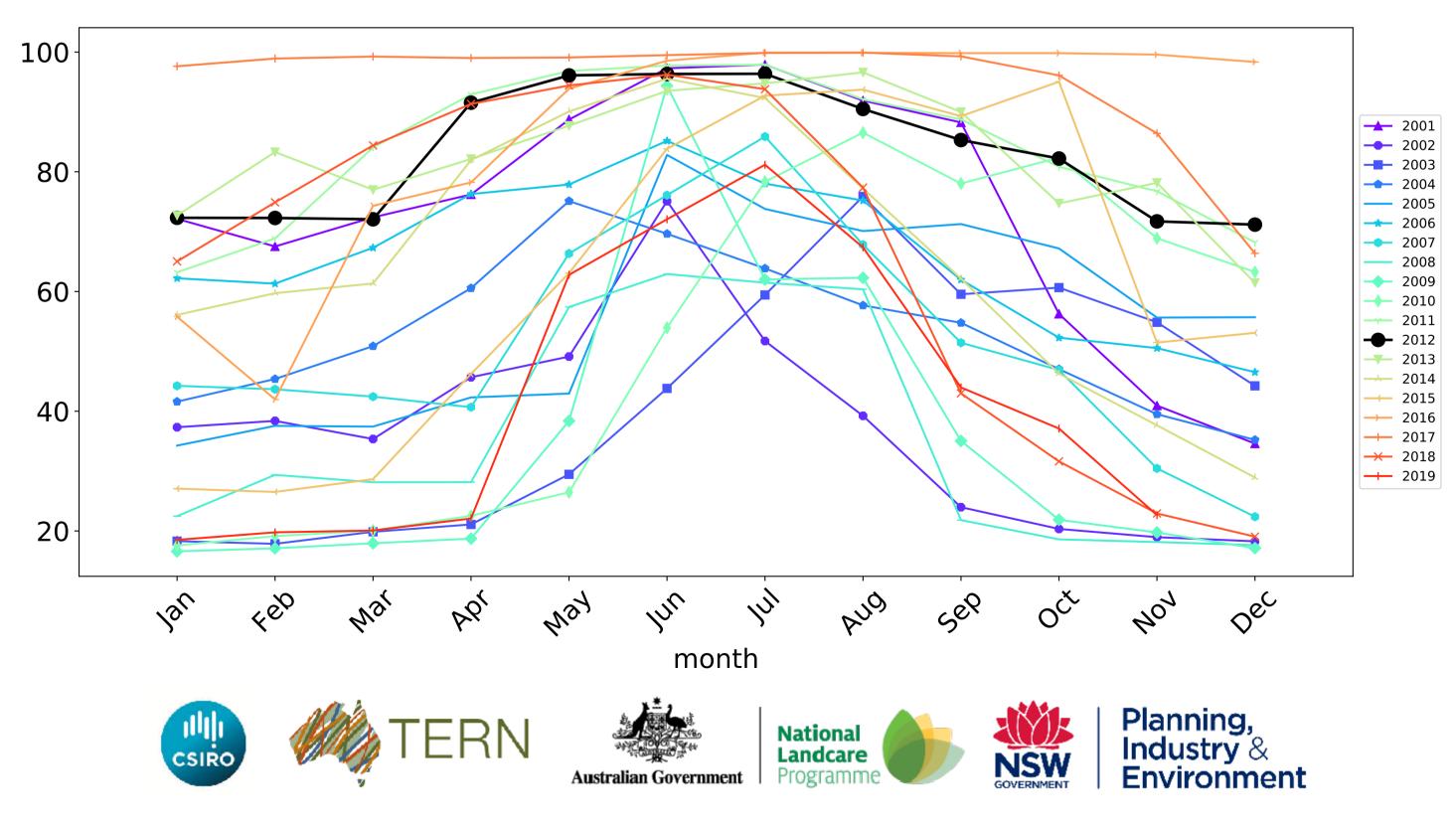
Ø



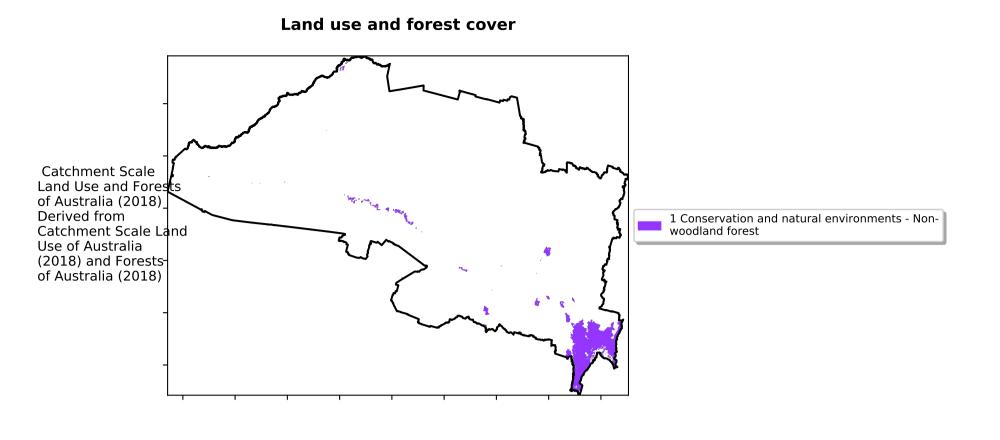
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



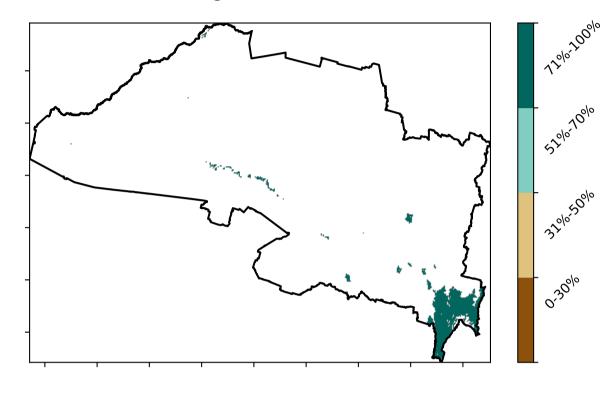




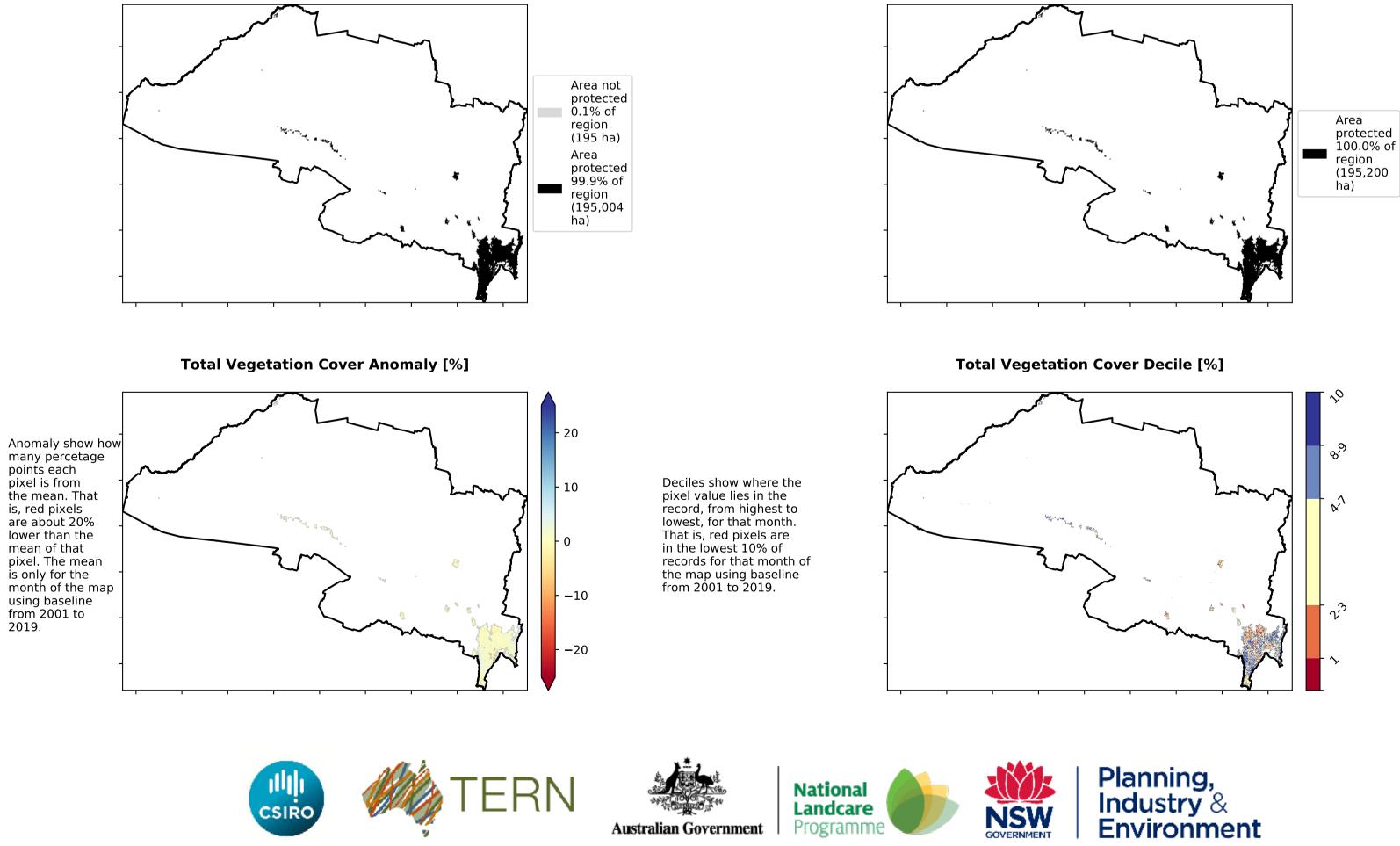
Conservation and natural environments Forest (non woodland)



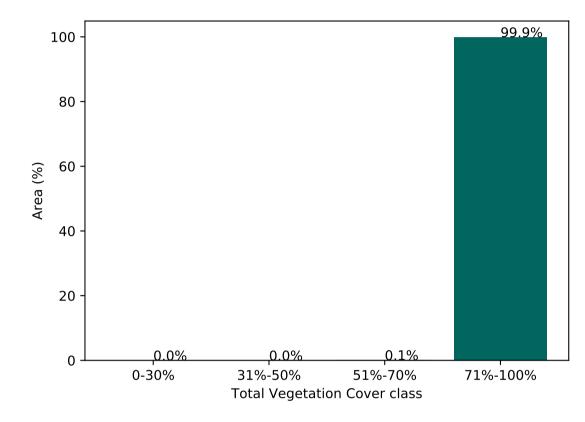
Total Vegetation Cover [%]



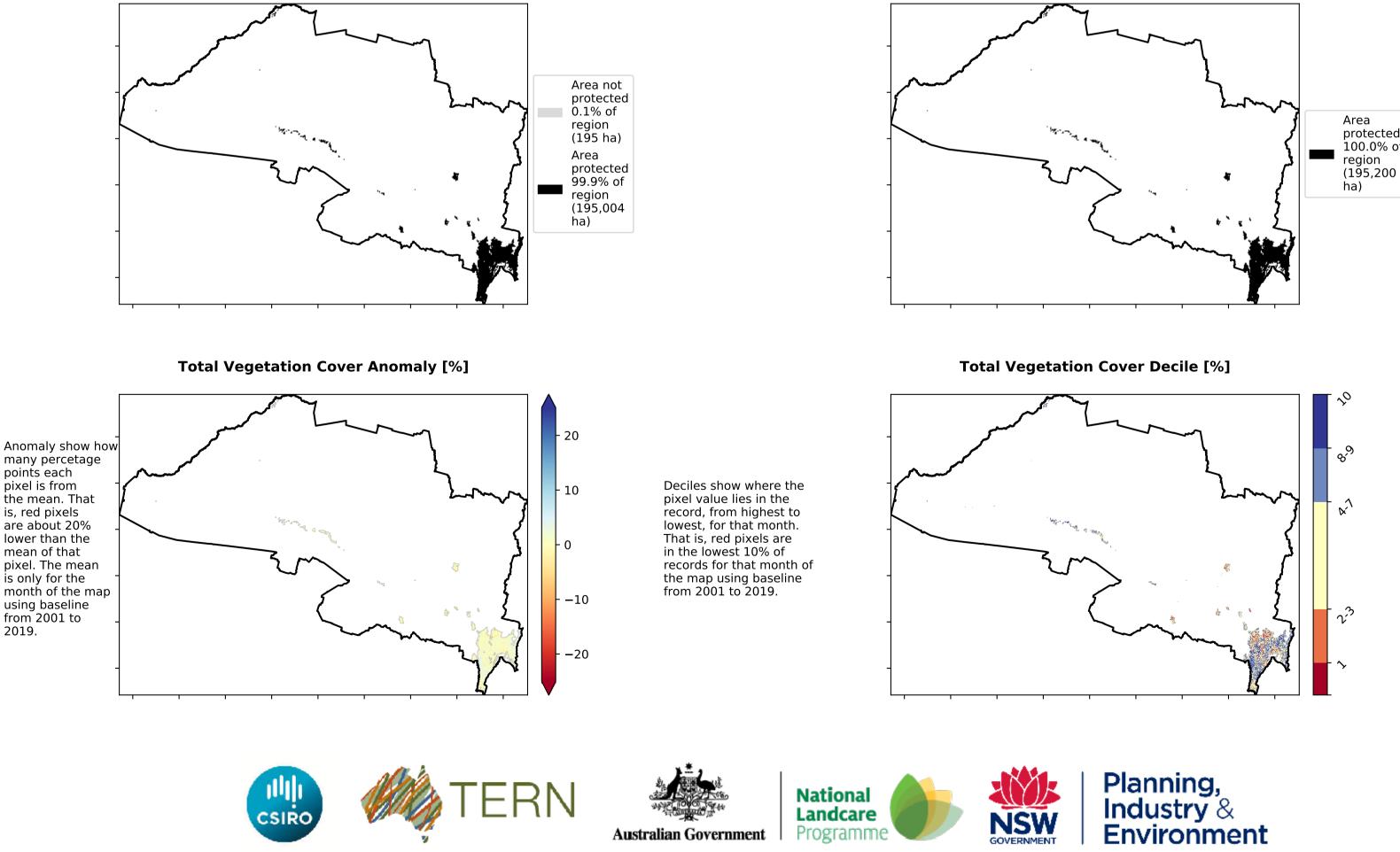
% Area protected from water erosion (>70%)



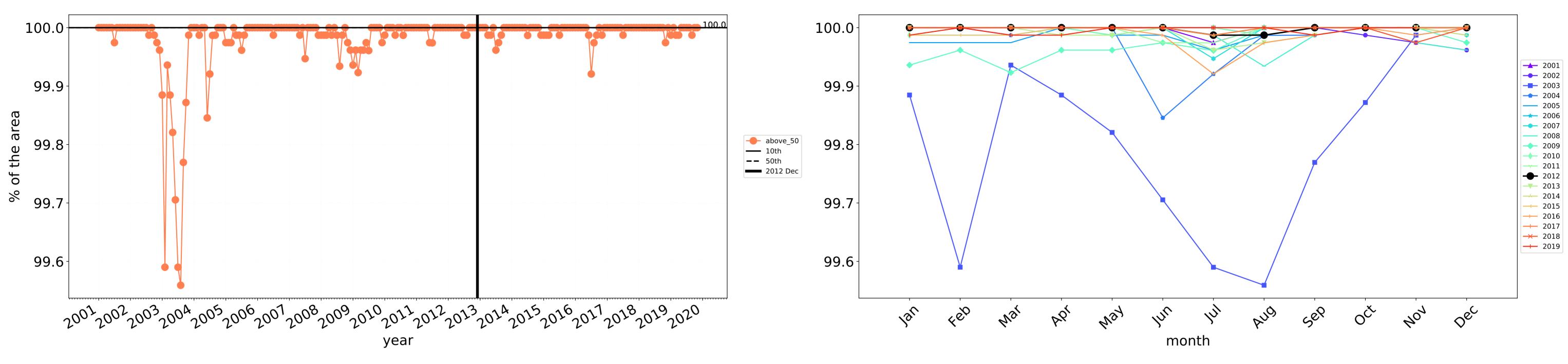
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

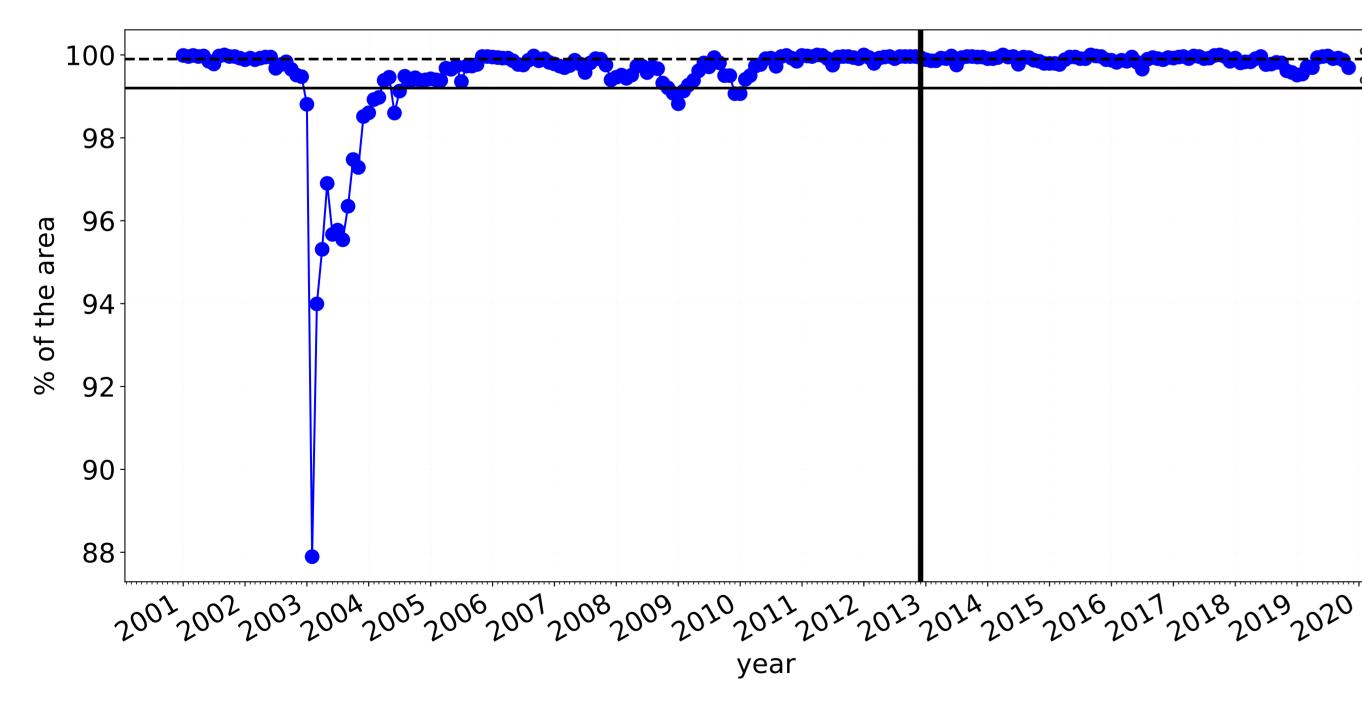


Conservation and natural environments Forest (non woodland) timeseries



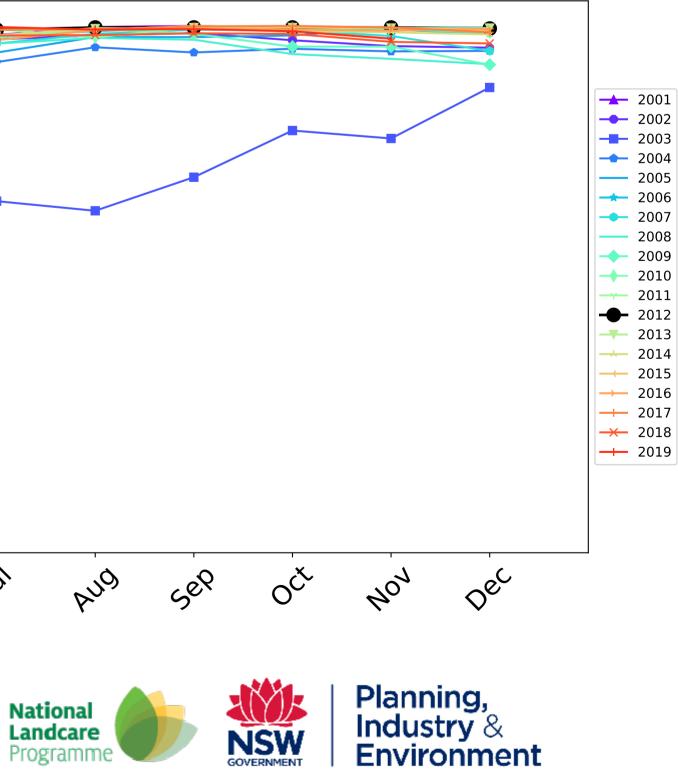
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



100 99.9 98 96 ---- above_70 **—** 10th **——** 50th **—** 2012 Dec 94 92 90 88 lar 4eb way In PQ 1/2/ Mar month TERN 1900g CSIRO Australian Government

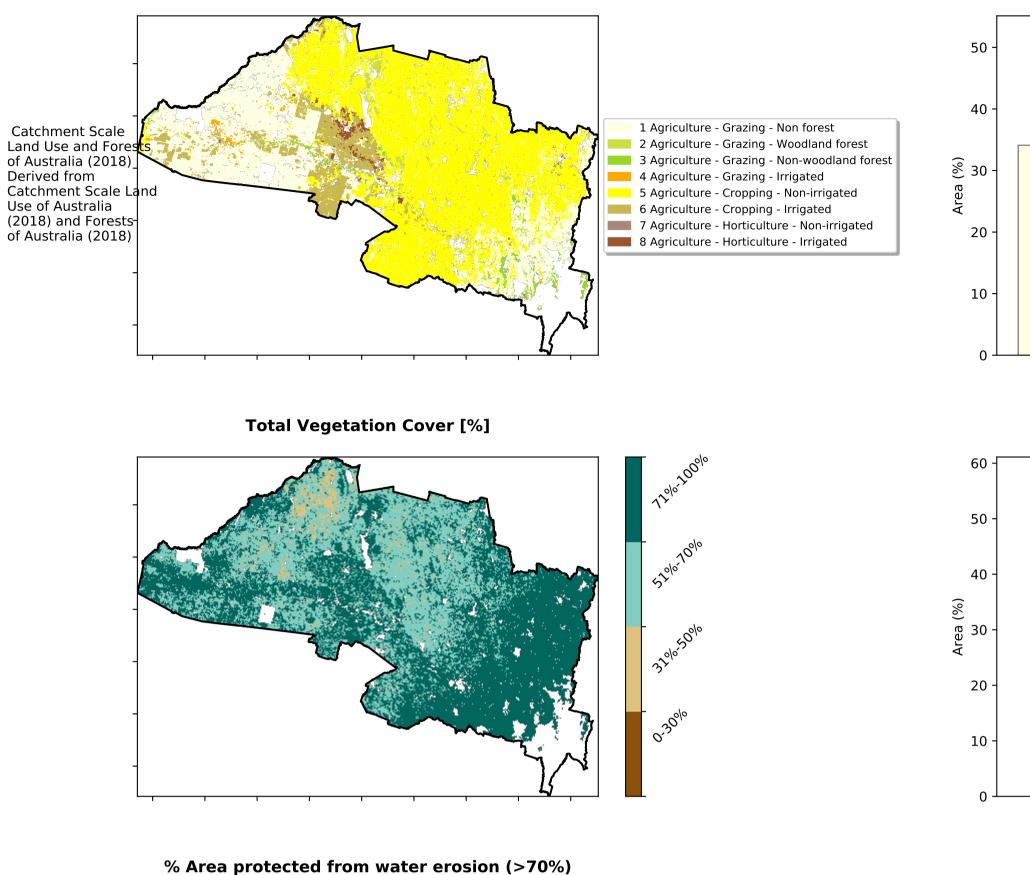
Water erosion historical monthly area protected (Total Veg Cov>70%)

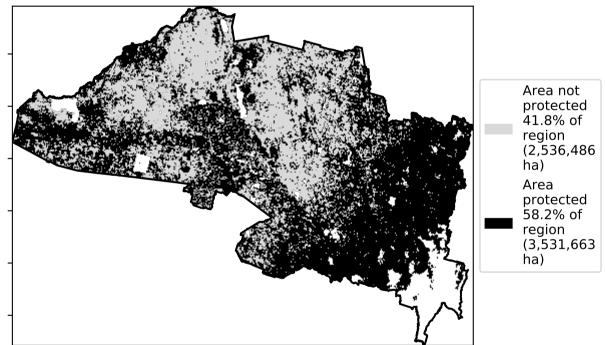


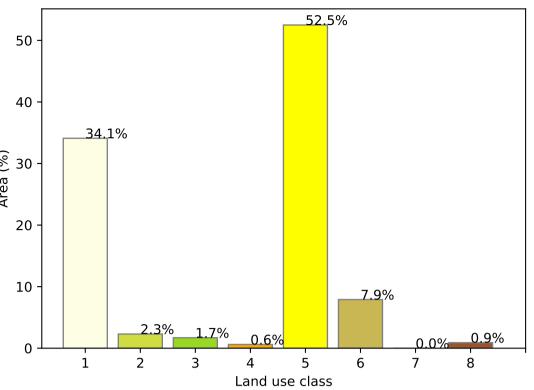
Agriculture

Land use and forest cover

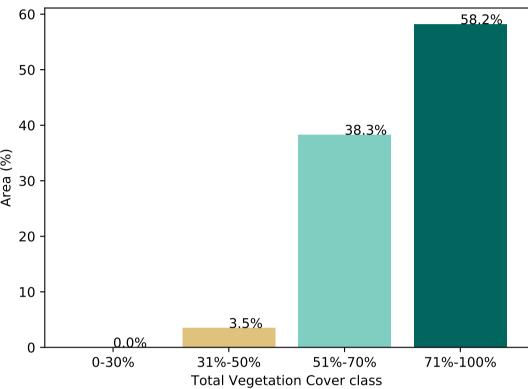
Proportion of each land class in area







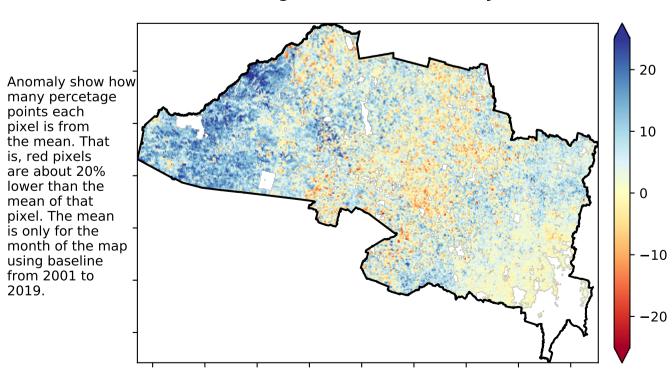
Proportion of vegetation cover class in area



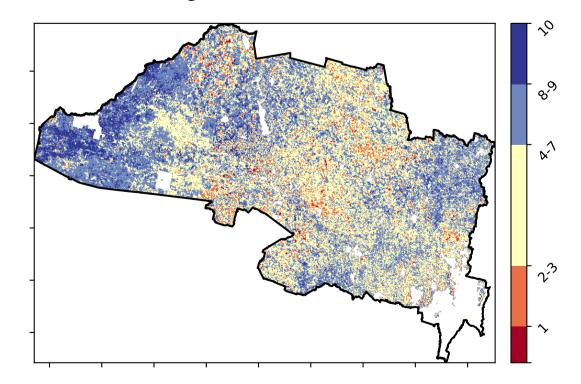
% Area protected from wind erosion (>50%)



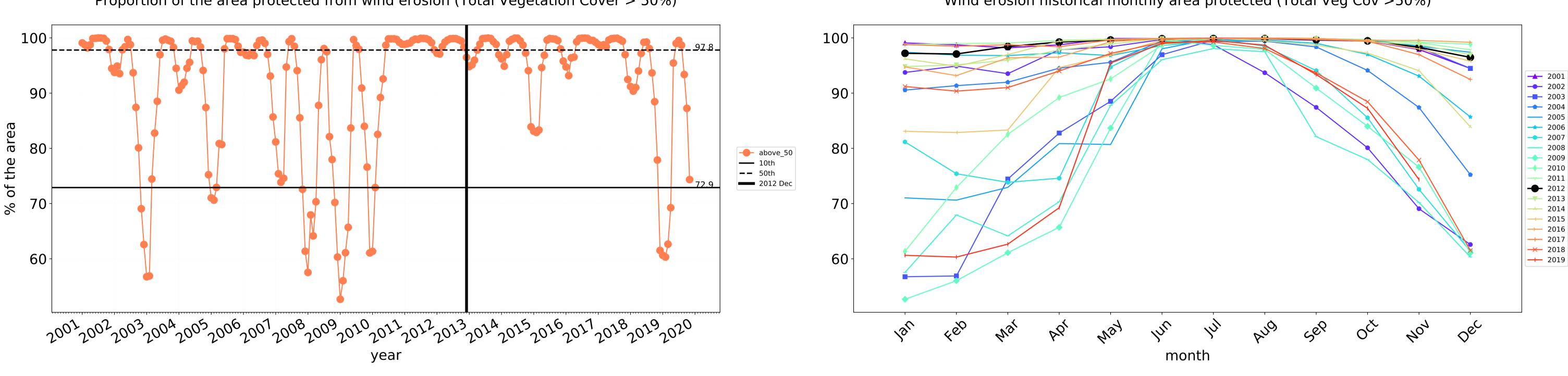
Total Vegetation Cover Anomaly [%]



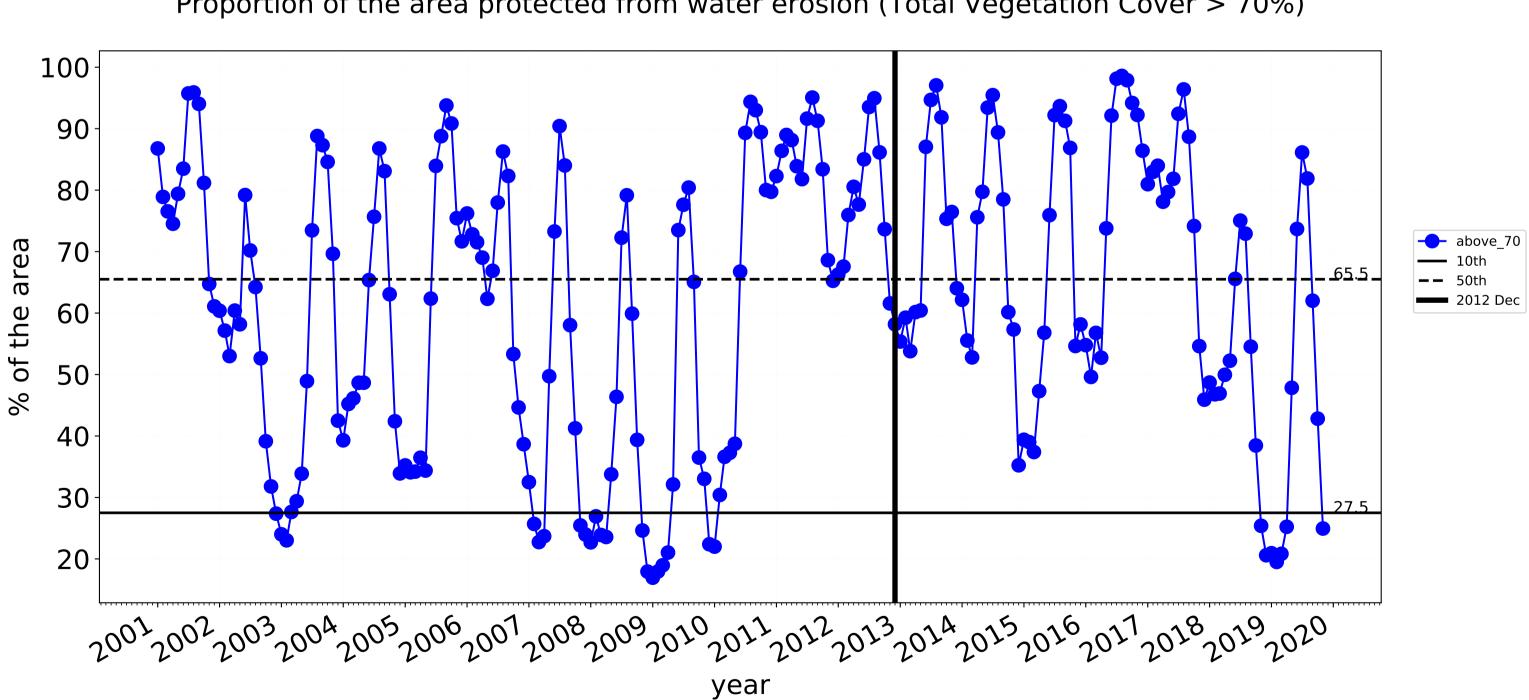
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.





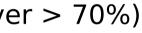


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

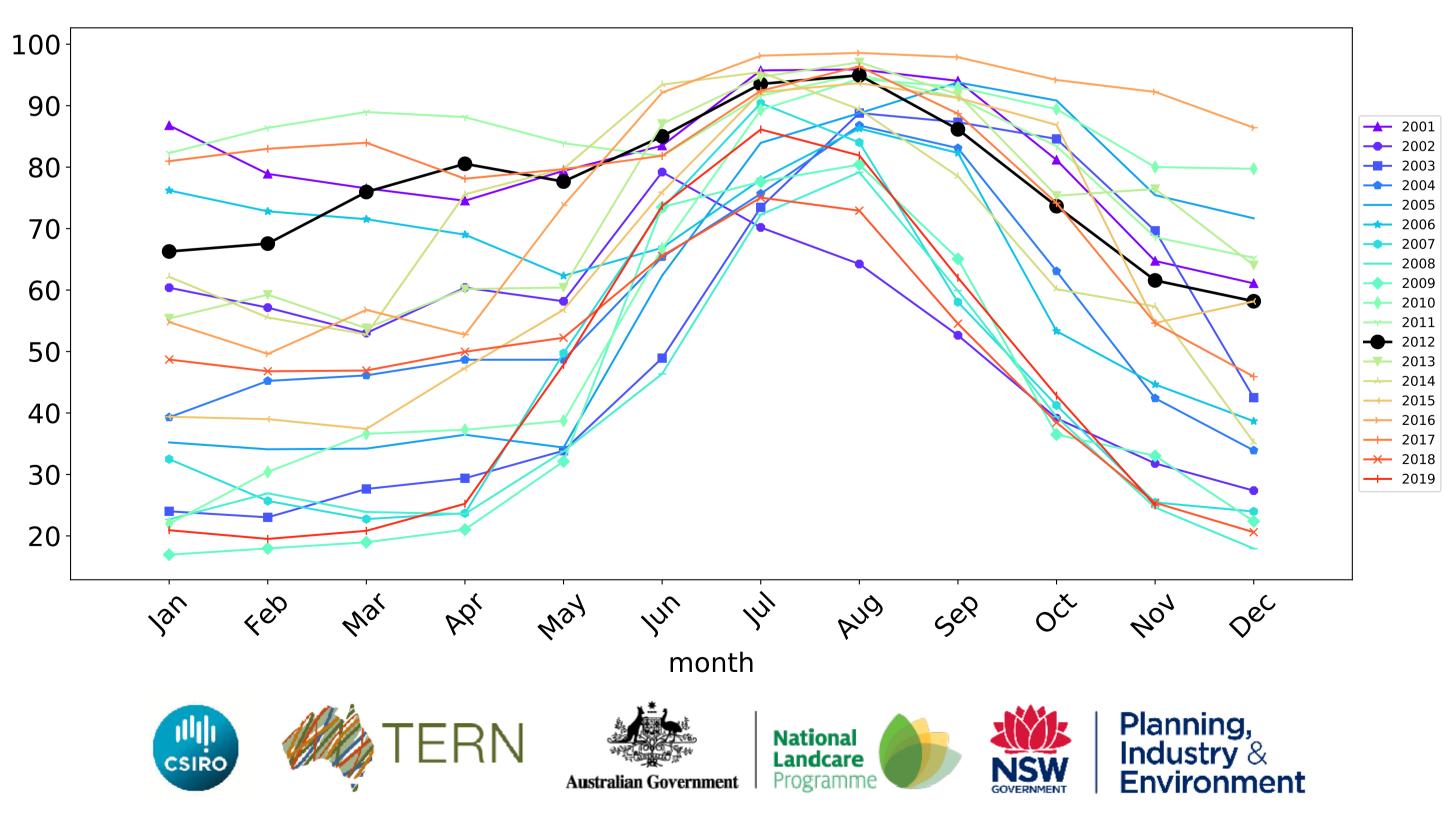


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

Agriculture timeseries



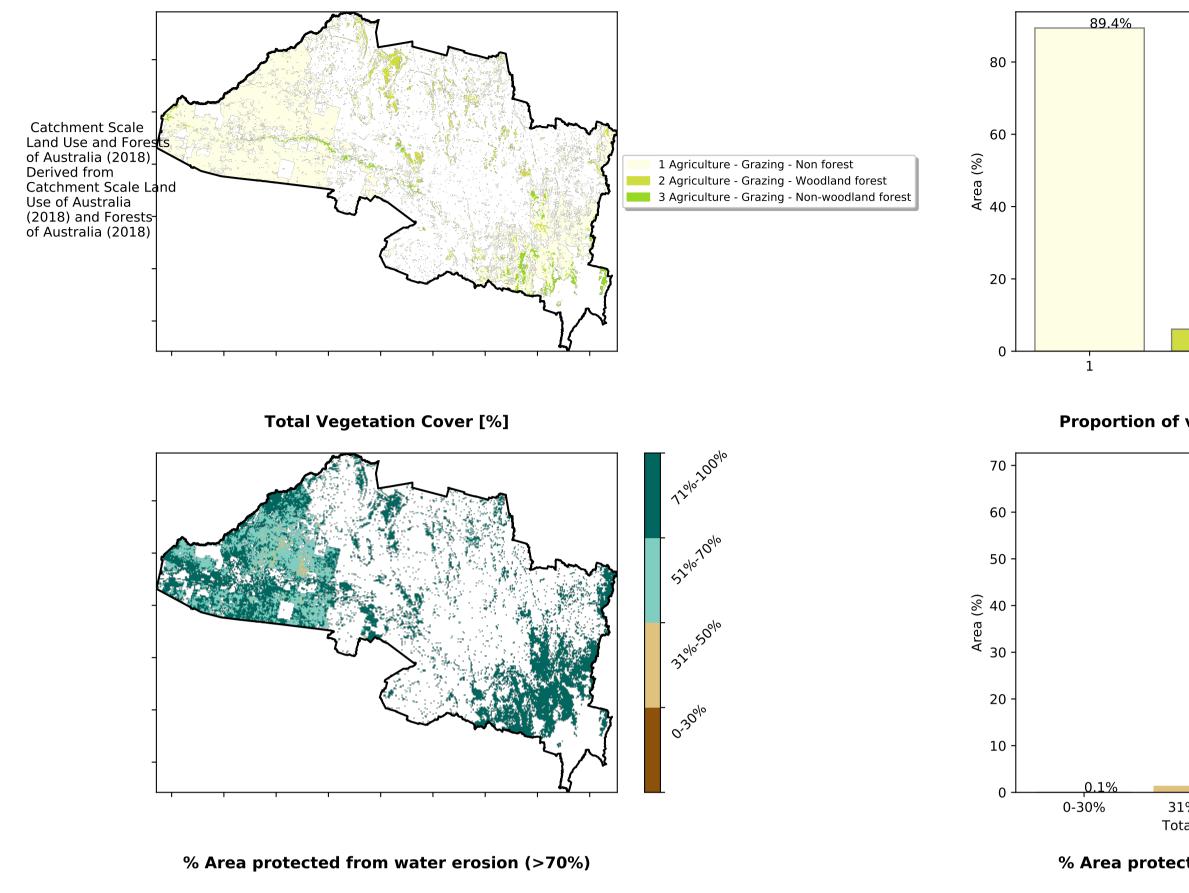
Water erosion historical monthly area protected (Total Veg Cov>70%)

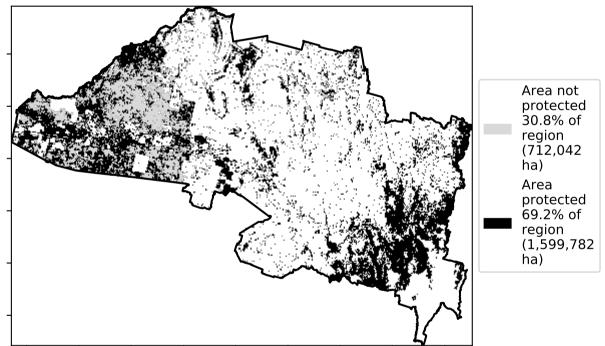


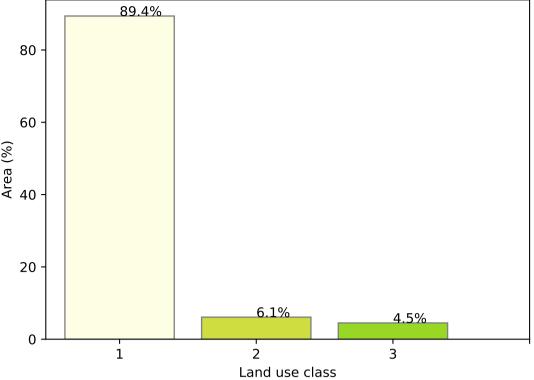
Grazing

Land use and forest cover

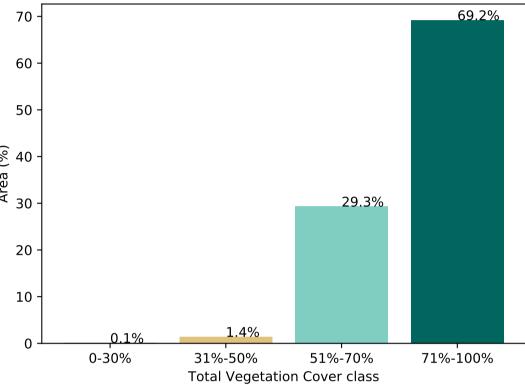
Proportion of each land class in area



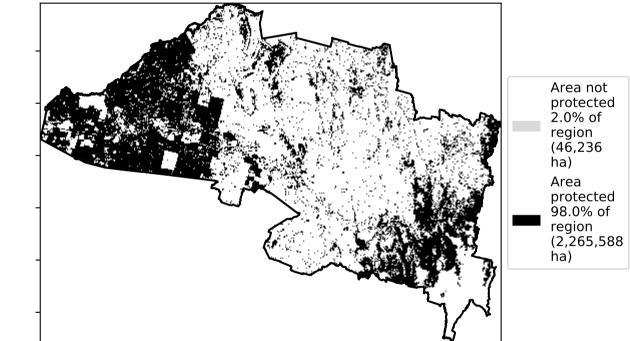




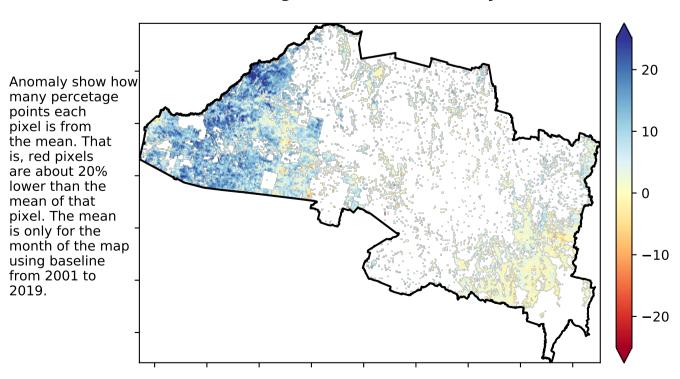
Proportion of vegetation cover class in area



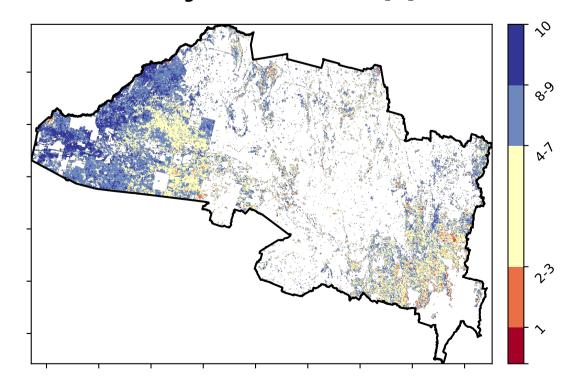
% Area protected from wind erosion (>50%)



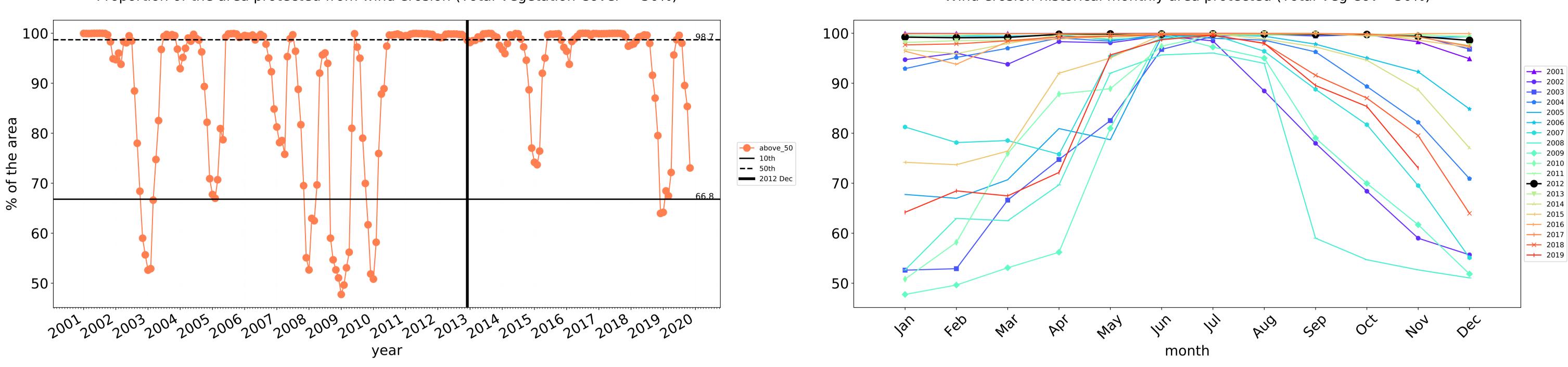
Total Vegetation Cover Anomaly [%]



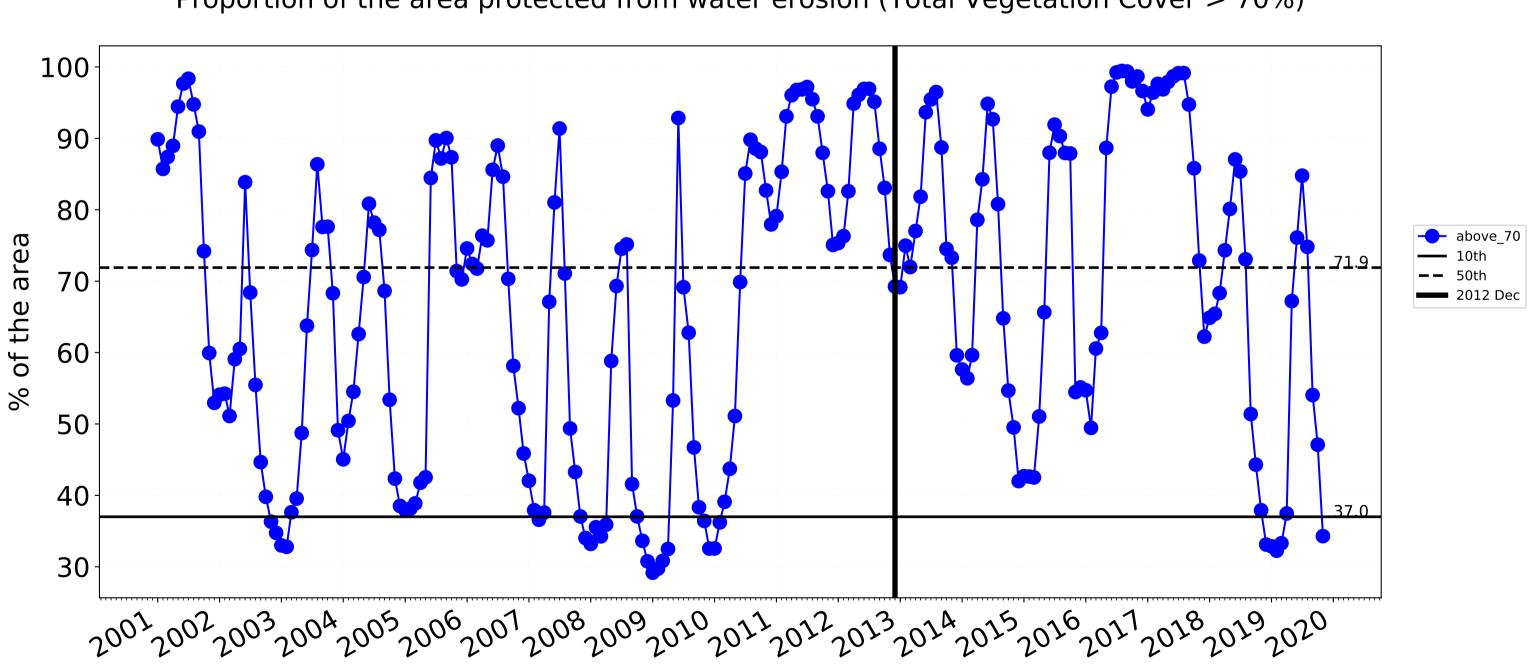
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.







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

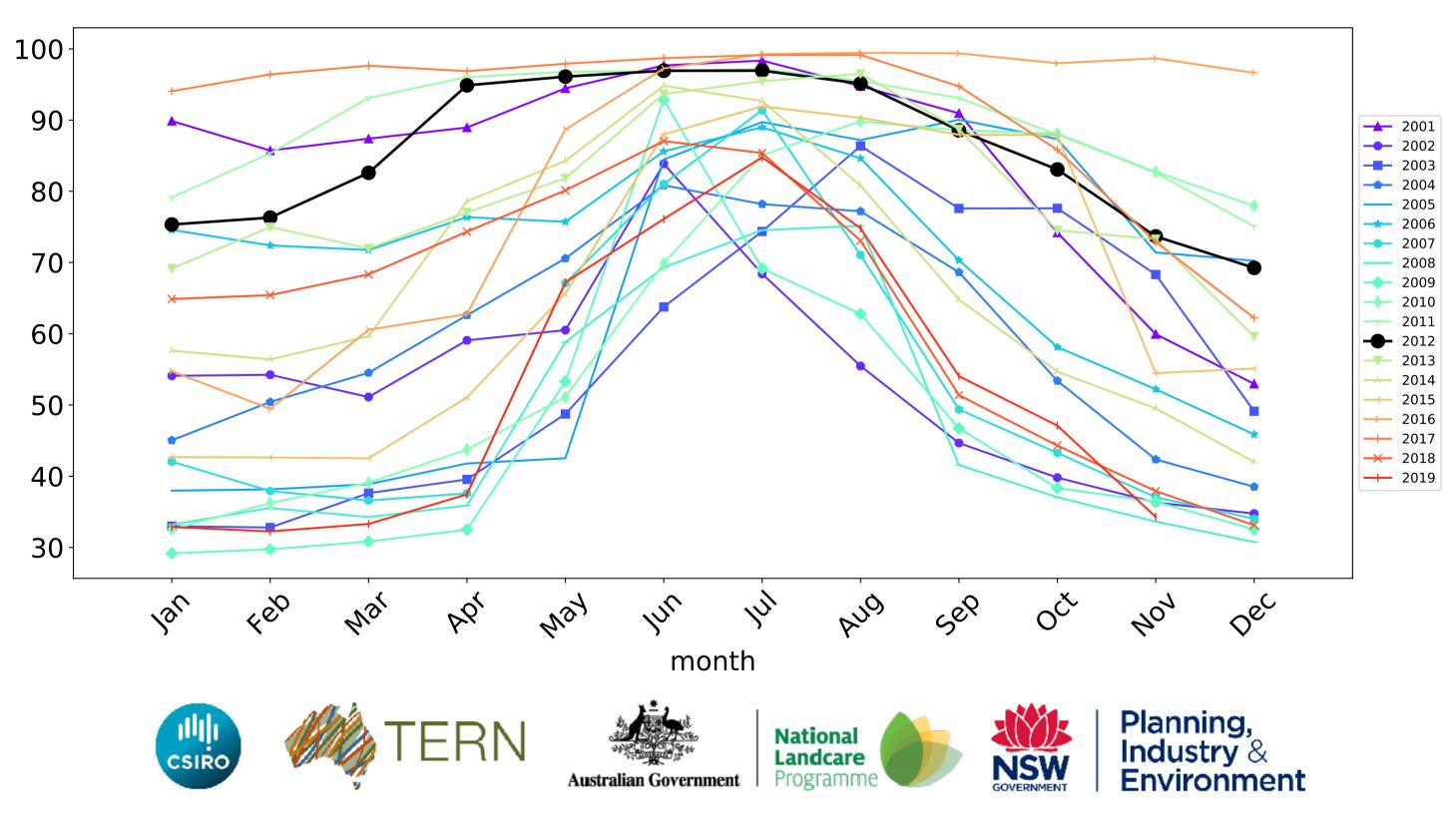


year

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

Grazing timeseries

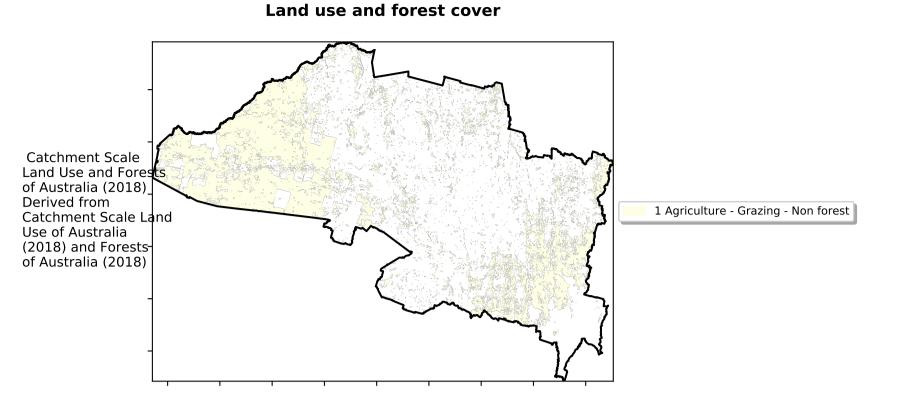
Water erosion historical monthly area protected (Total Veg Cov>70%)



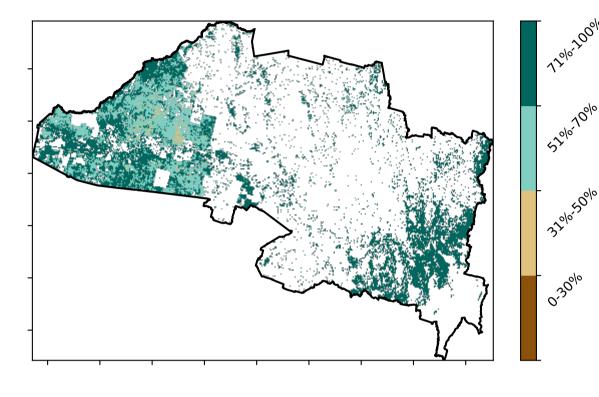
13

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

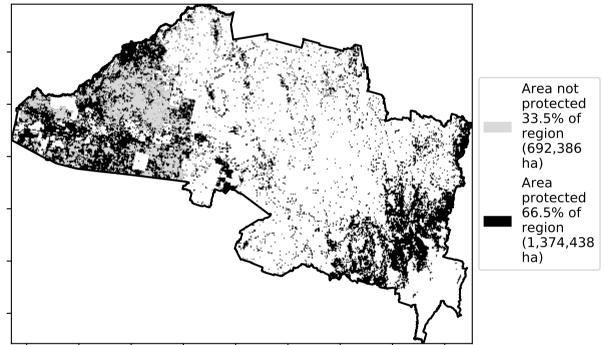
Grazing non forest



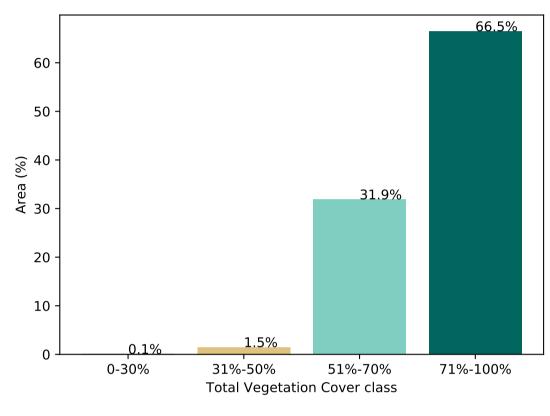
Total Vegetation Cover [%]



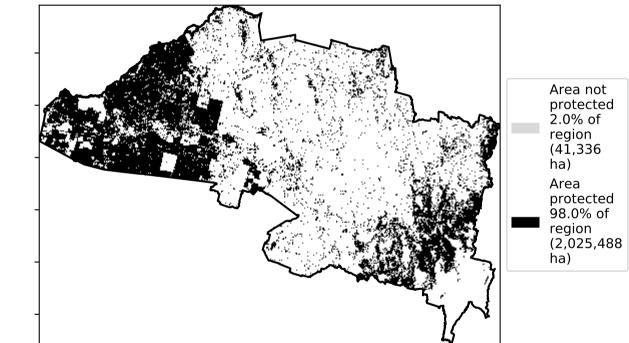
% Area protected from water erosion (>70%)



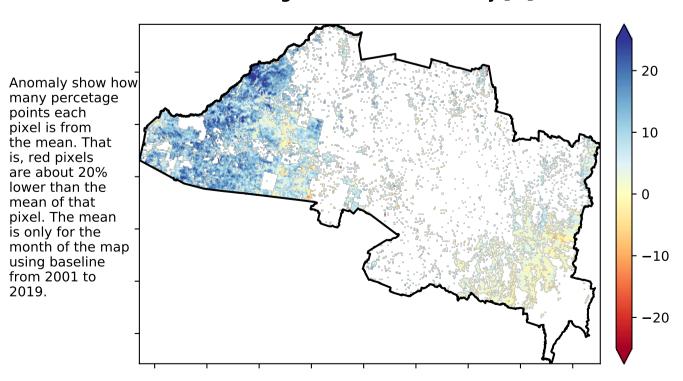
Proportion of vegetation cover class in area



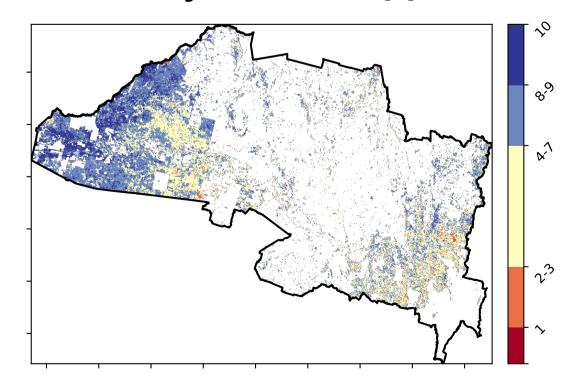
% Area protected from wind erosion (>50%)



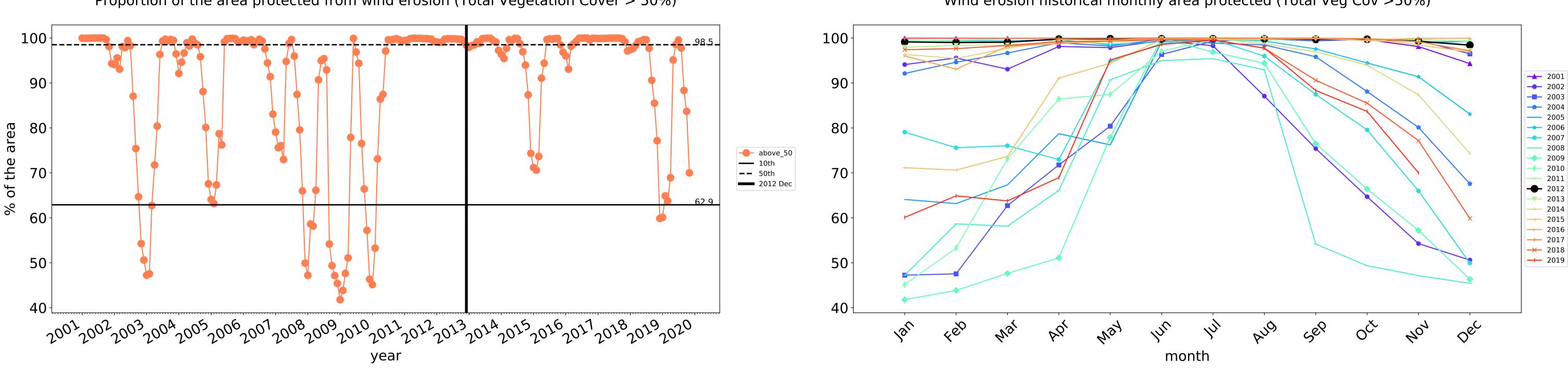
Total Vegetation Cover Anomaly [%]



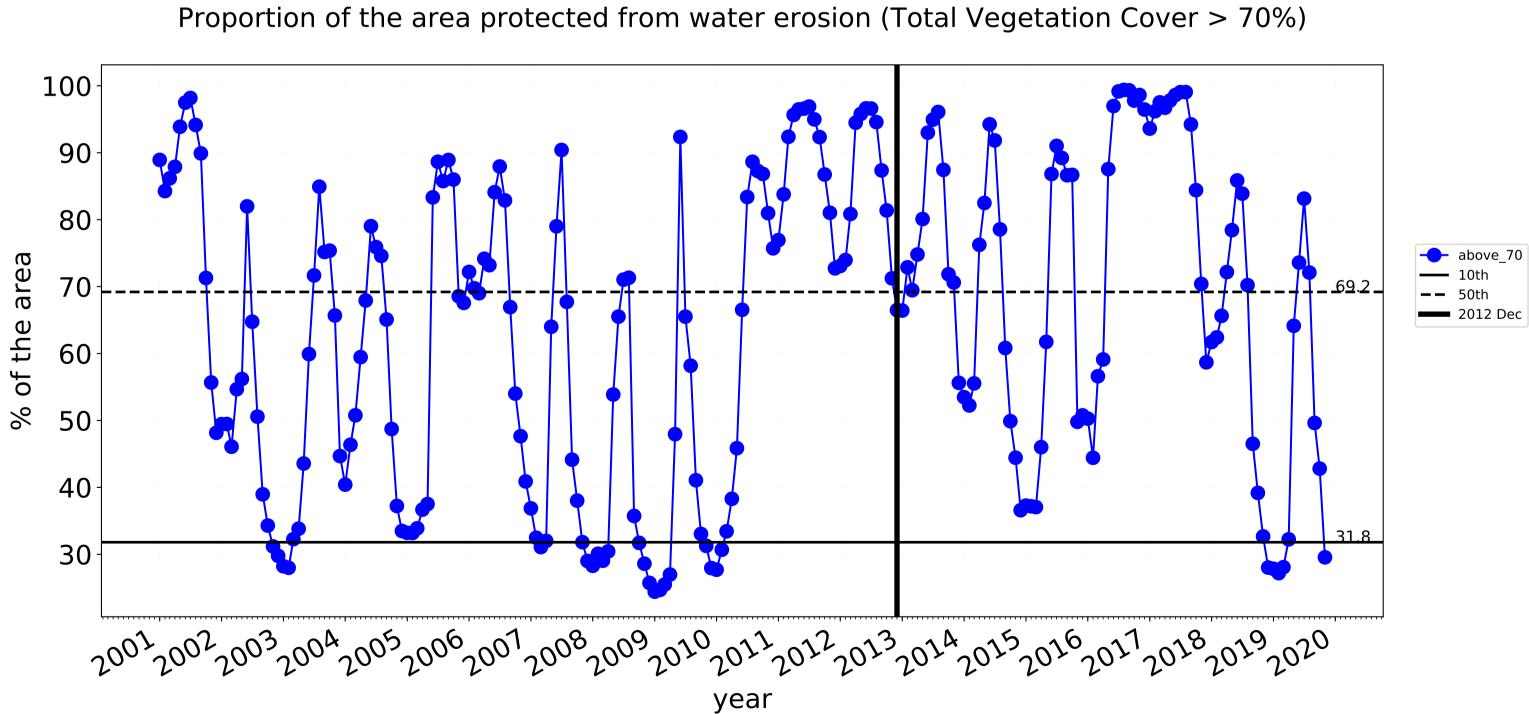
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.





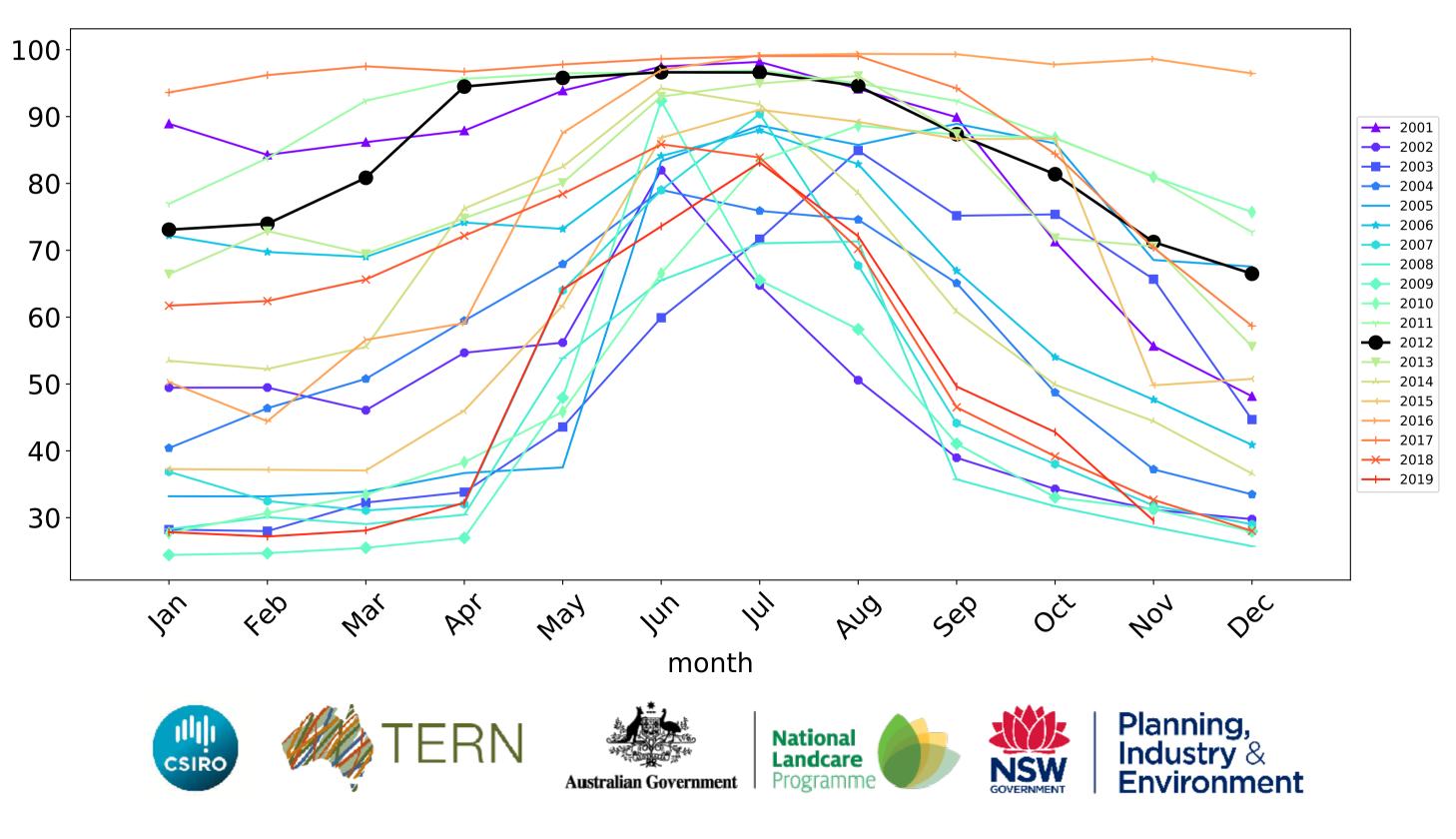


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

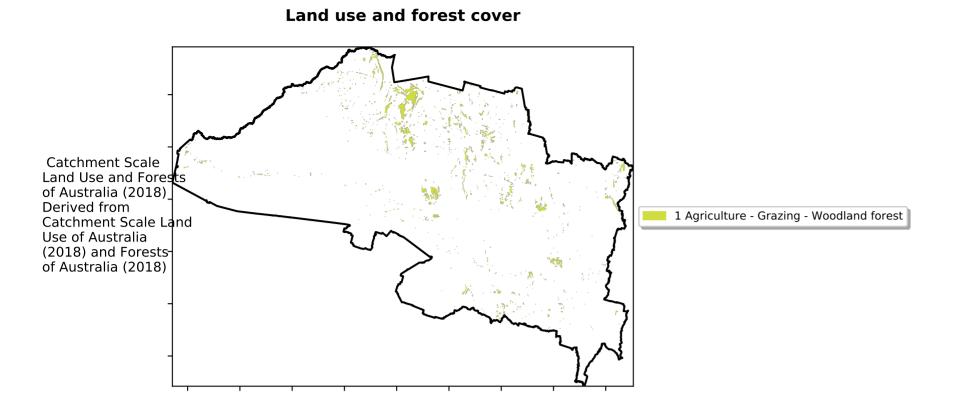


Grazing non forest timeseries

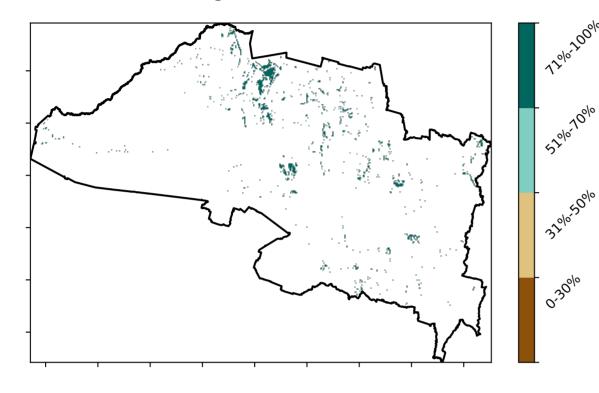
Wind erosion historical monthly area protected (Total Veg Cov >50%)



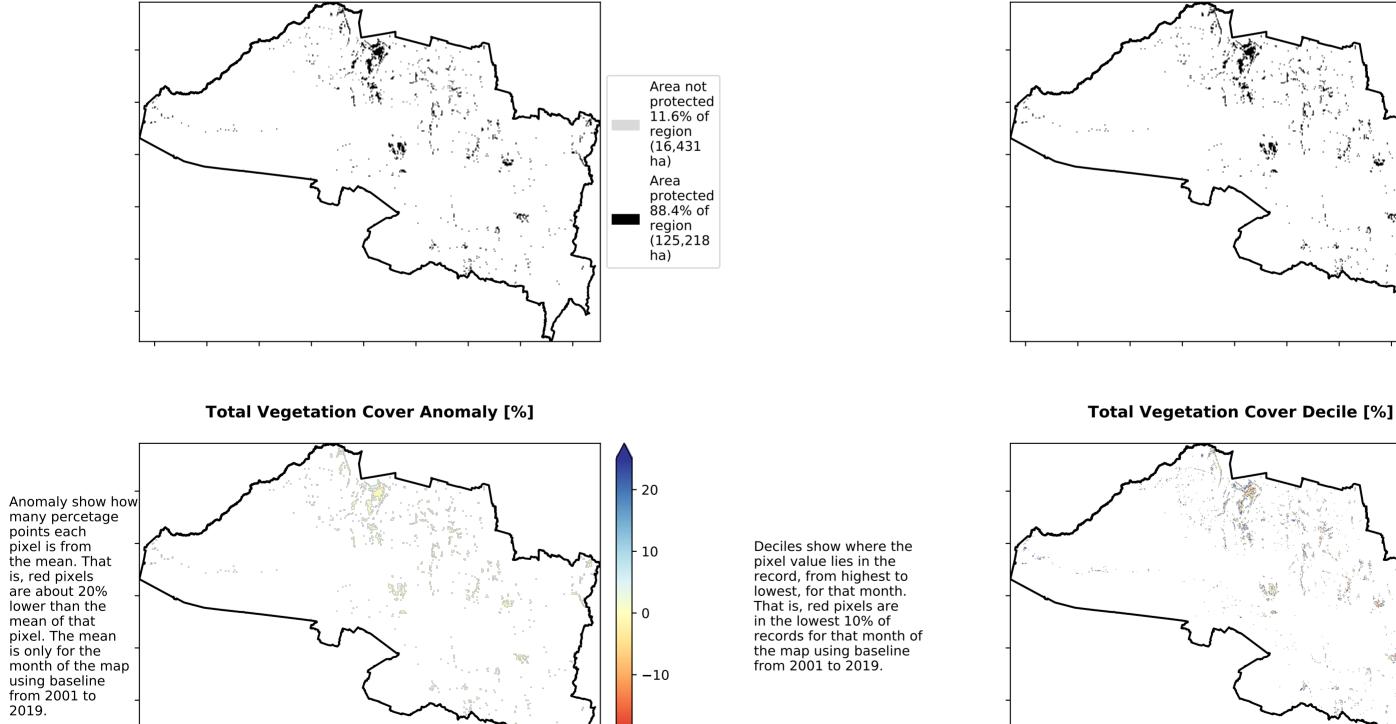
Grazing Woodland forest



Total Vegetation Cover [%]



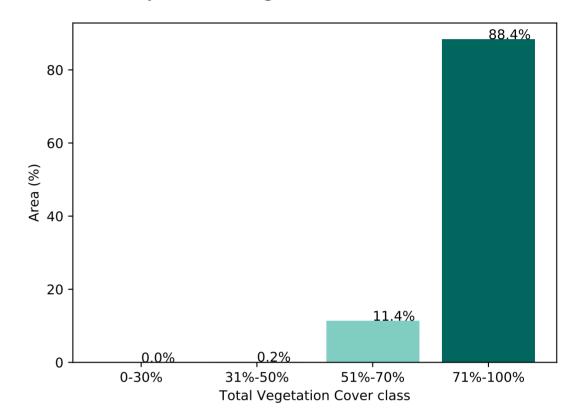
% Area protected from water erosion (>70%)



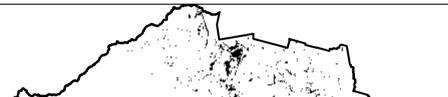
-10

-20





% Area protected from wind erosion (>50%)



region (0 ha)

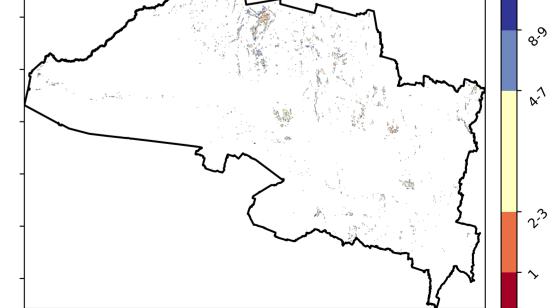
protected 100.0% of

region (141,650

Area

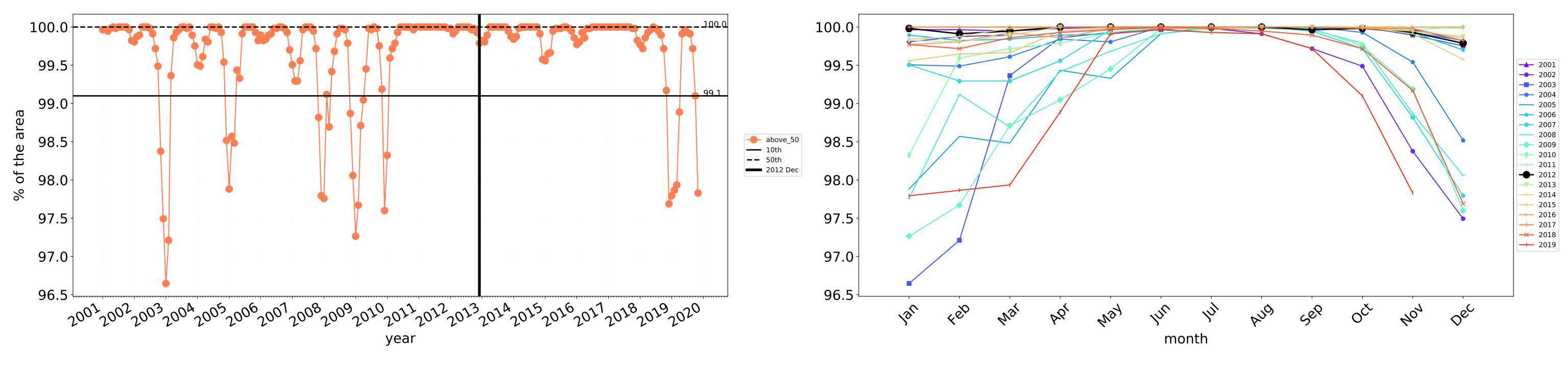
ha)

\$



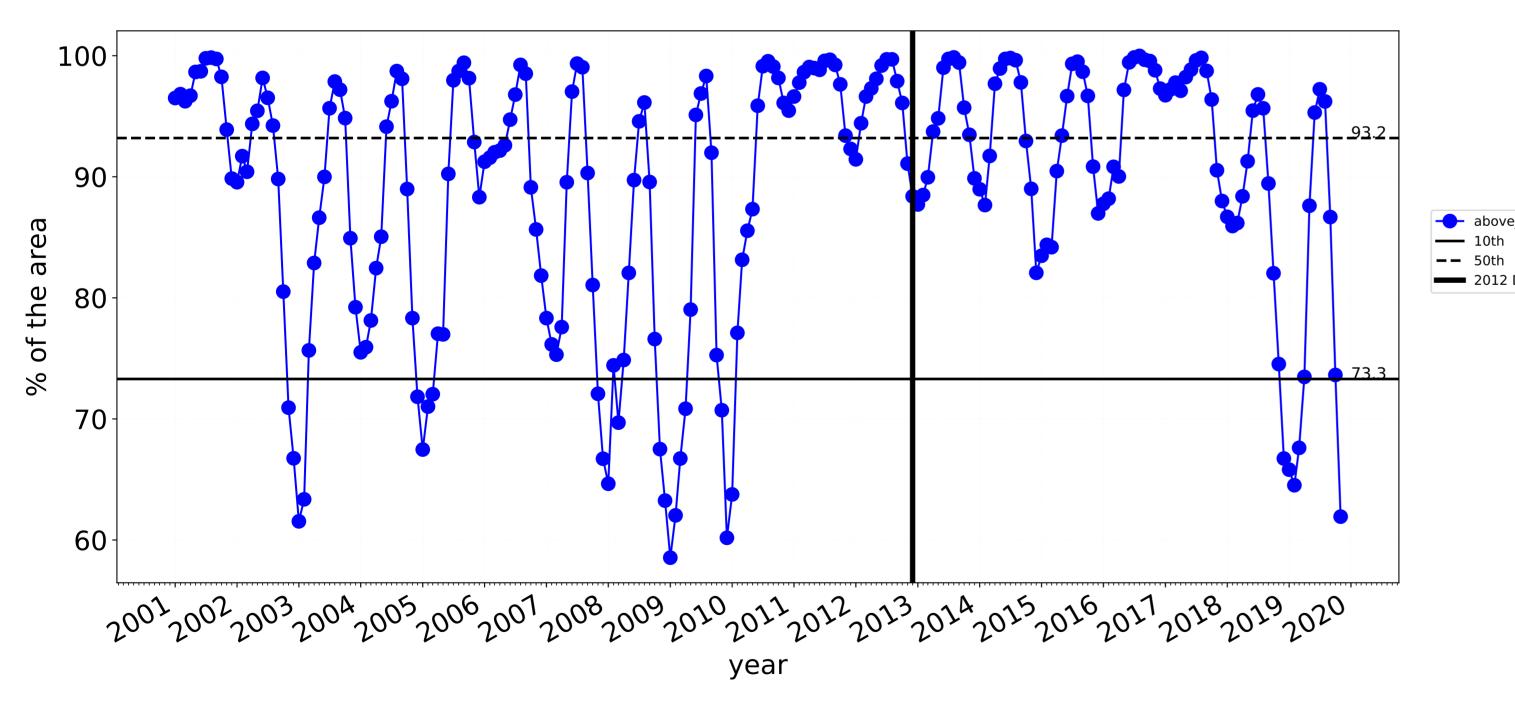


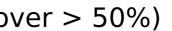
Grazing Woodland forest timeseries



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

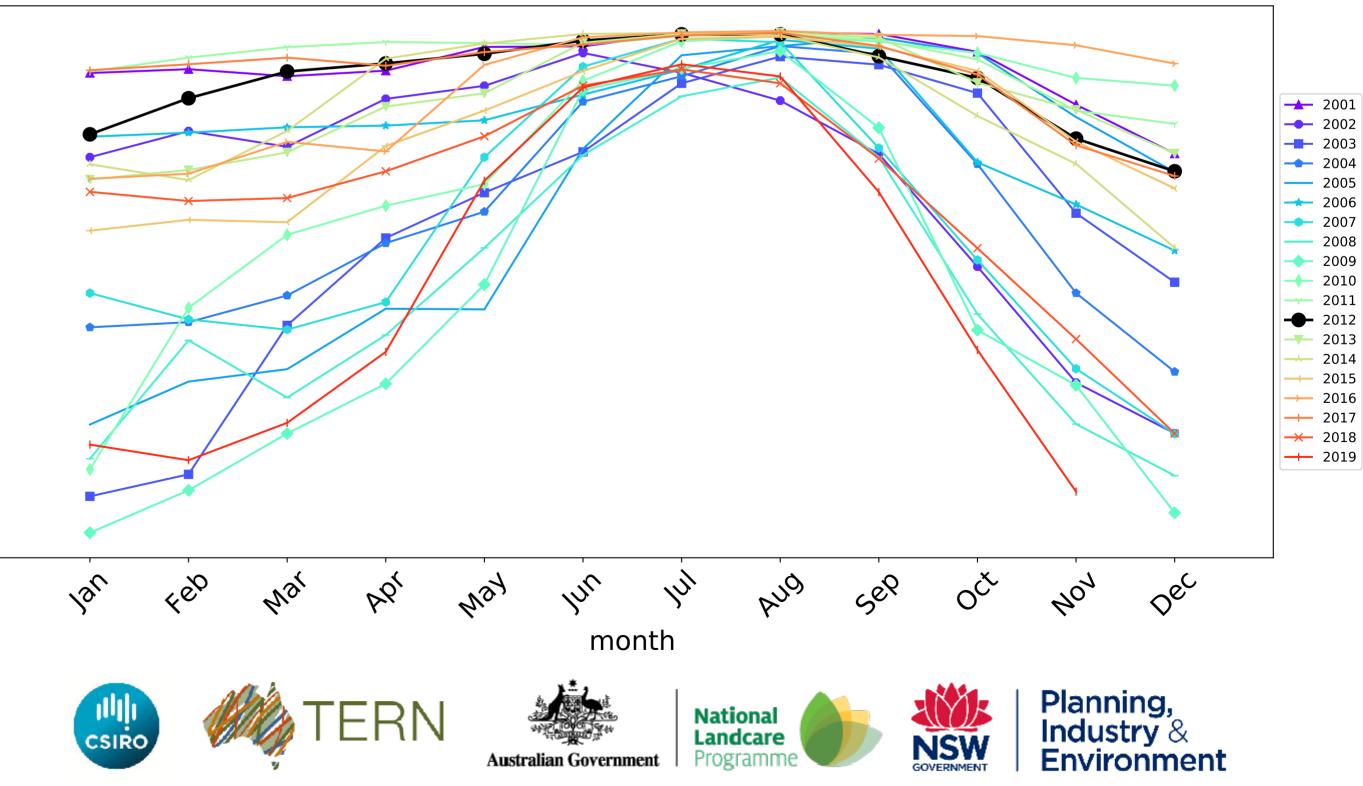
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



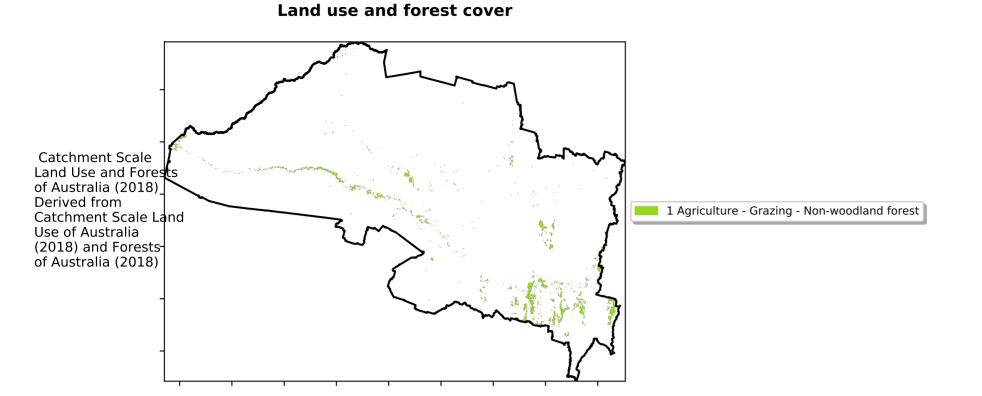


Wind erosion historical monthly area protected (Total Veg Cov >50%)

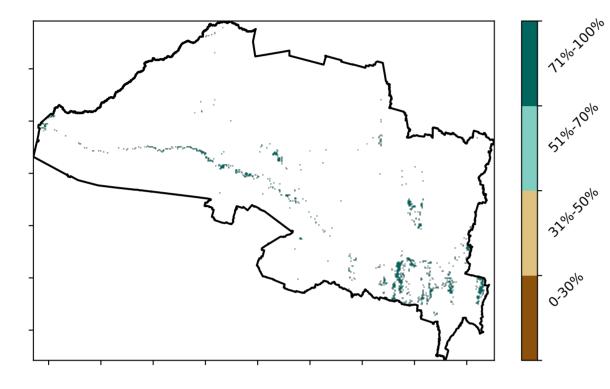
100-90 --- above_70 **——** 2012 Dec 80 70-60 Jan feb



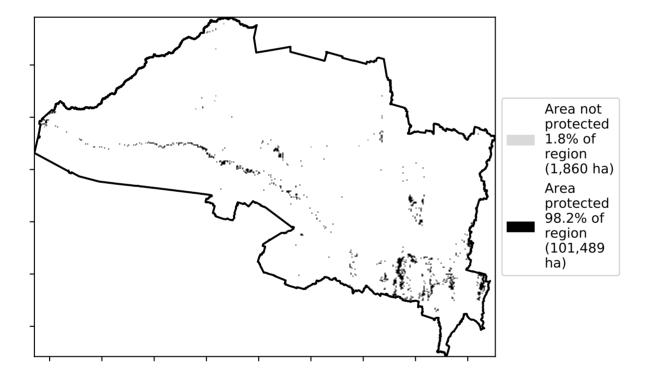
Grazing - Forest (non woodland)



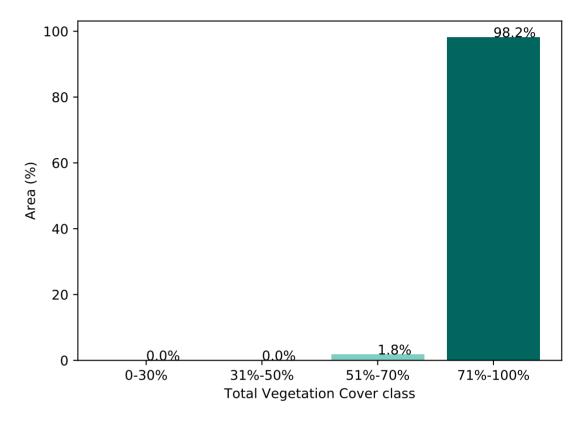
Total Vegetation Cover [%]



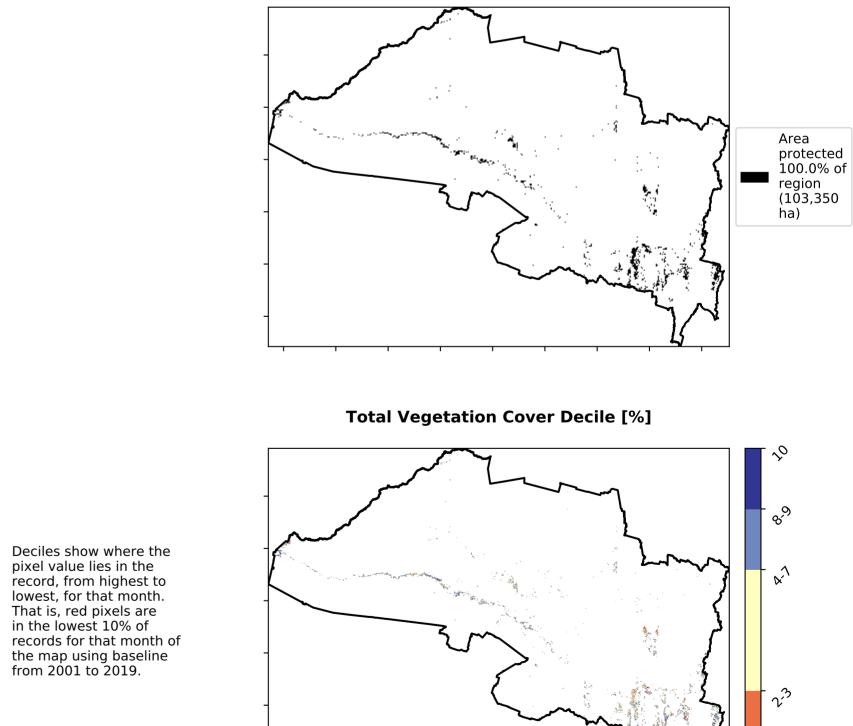
% Area protected from water erosion (>70%)



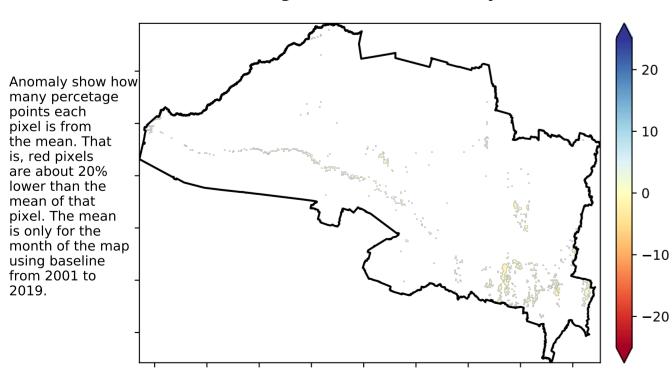
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

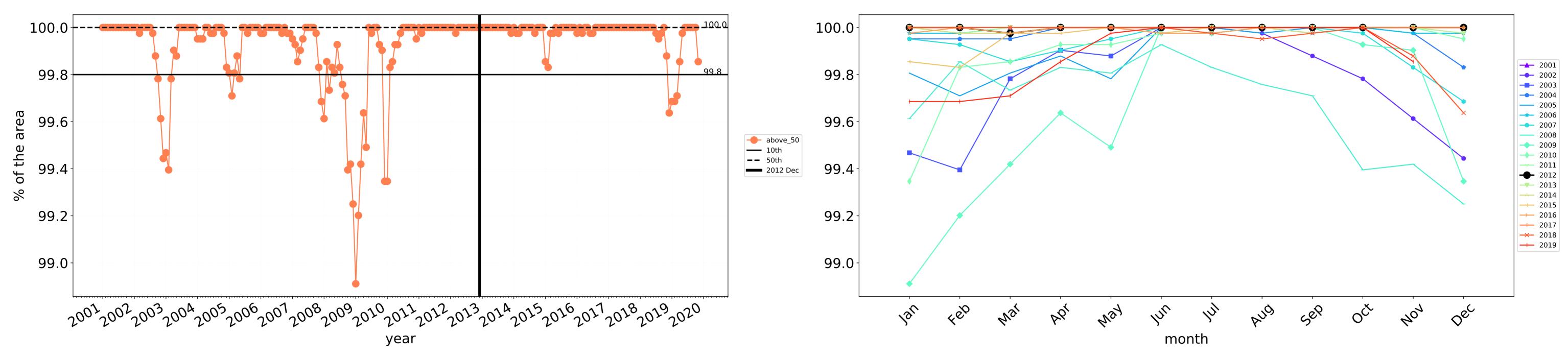


Total Vegetation Cover Anomaly [%]



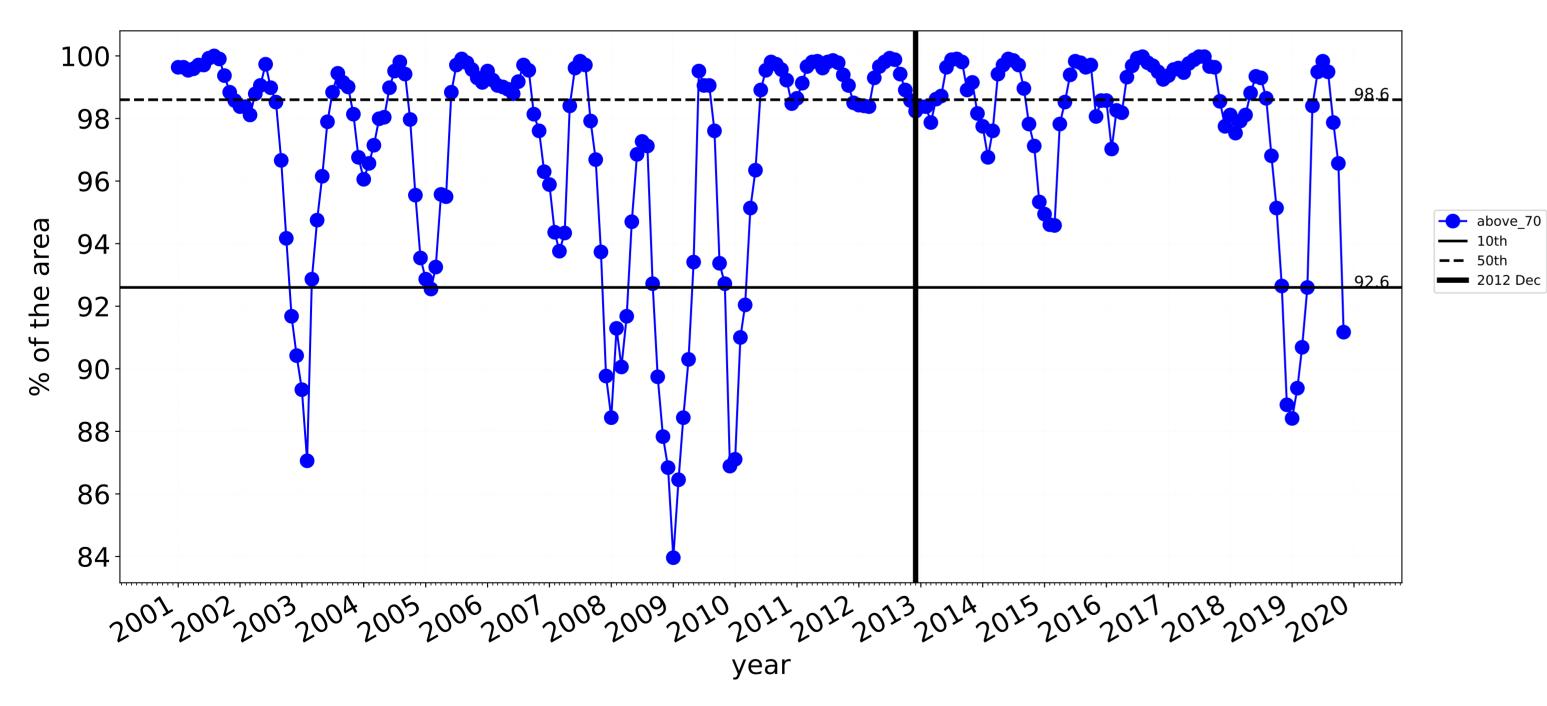


Grazing - Forest (non woodland) timeseries

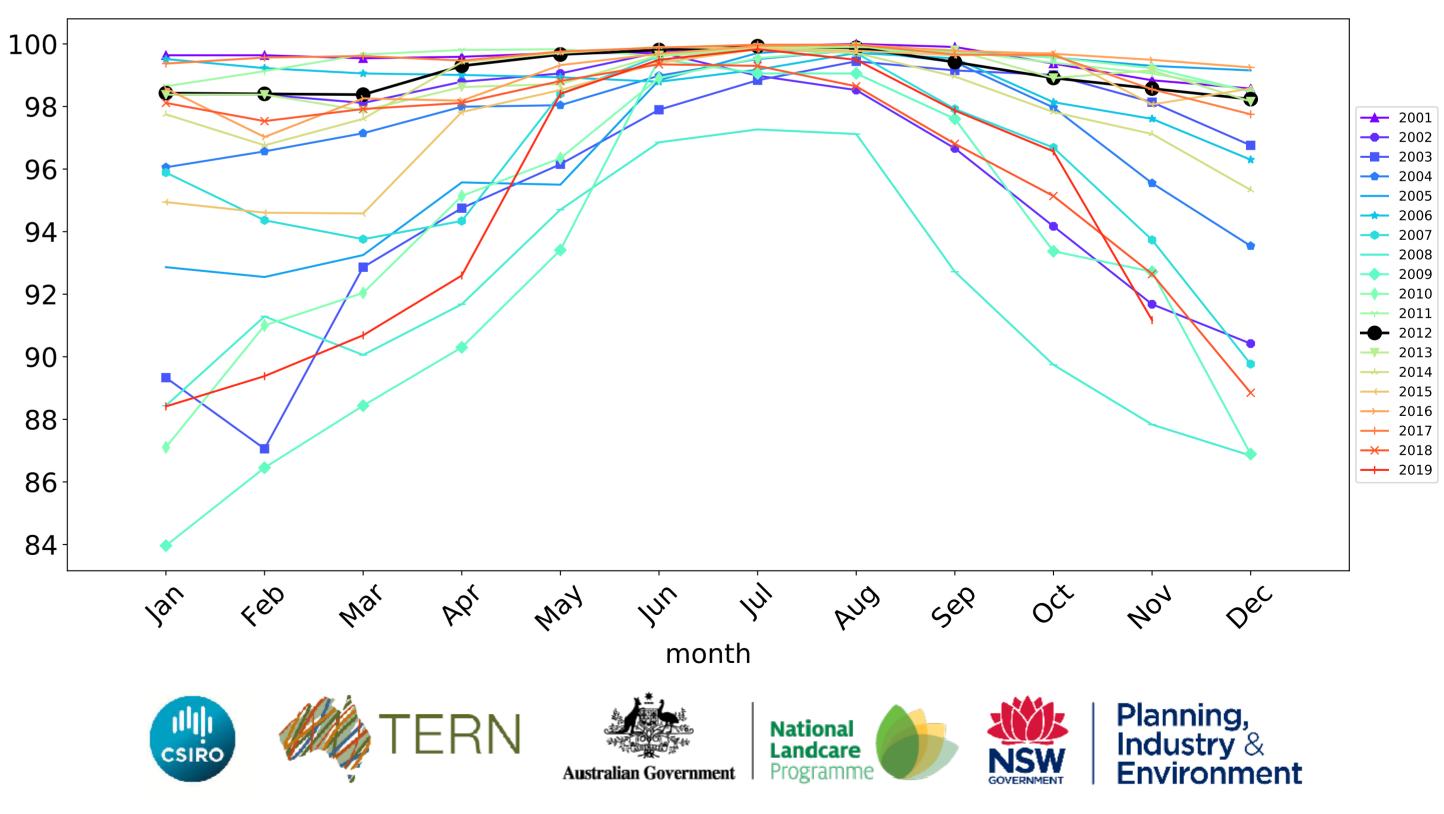


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

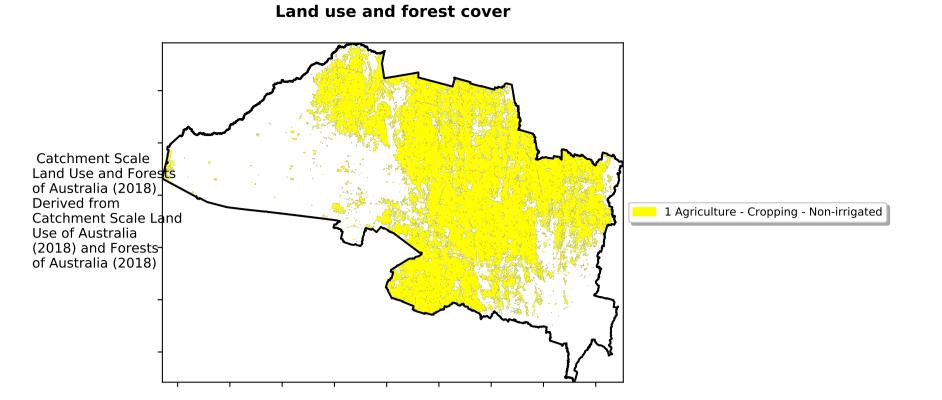
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



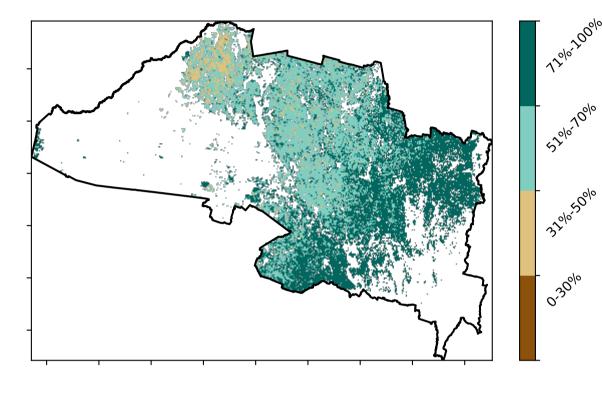
Wind erosion historical monthly area protected (Total Veg Cov >50%)



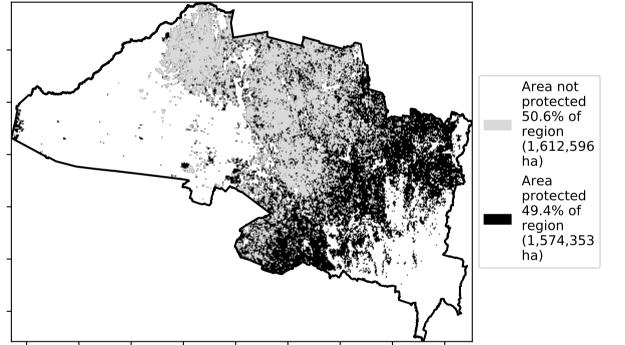
Cropping



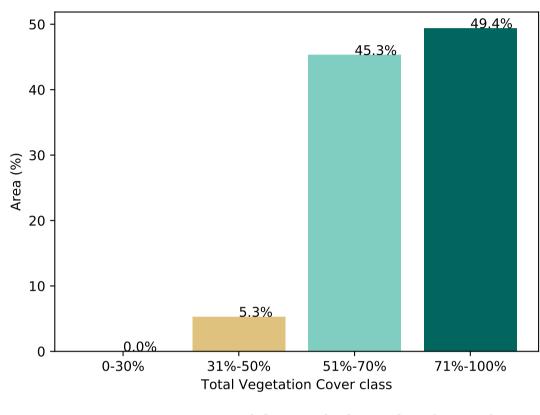
Total Vegetation Cover [%]



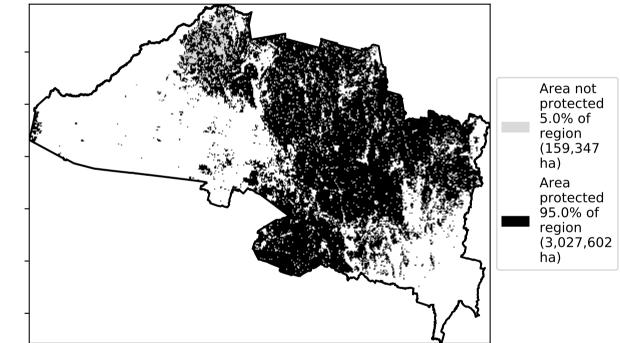
% Area protected from water erosion (>70%)



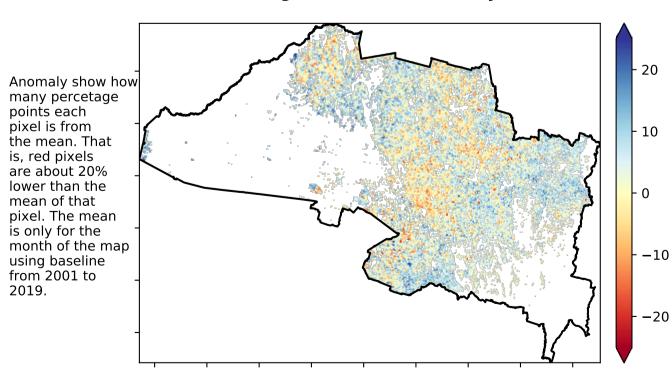




% Area protected from wind erosion (>50%)

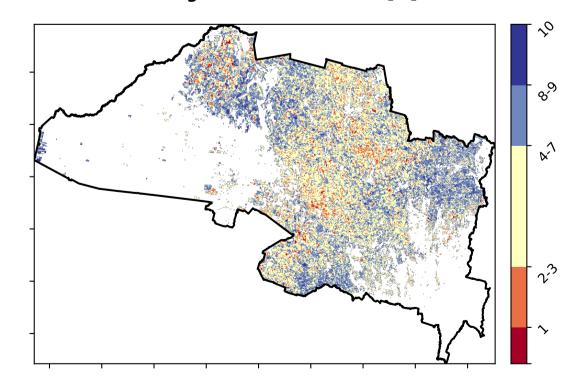


Total Vegetation Cover Anomaly [%]



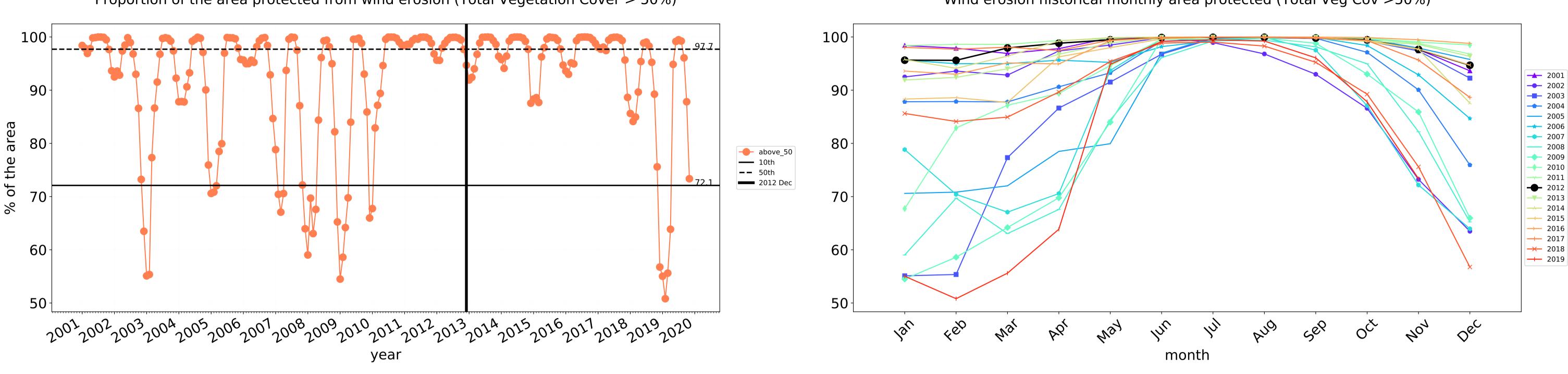
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]





20

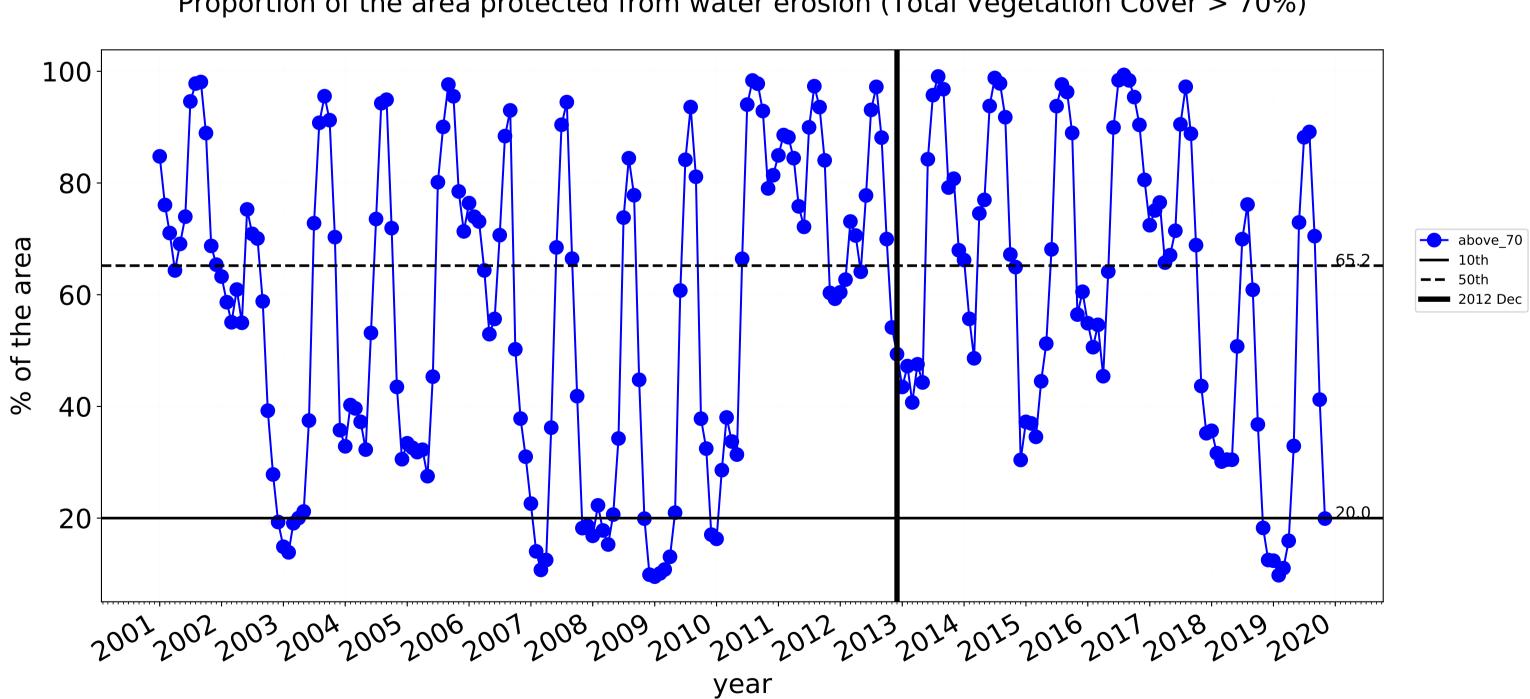


—— 10th

—— 50th

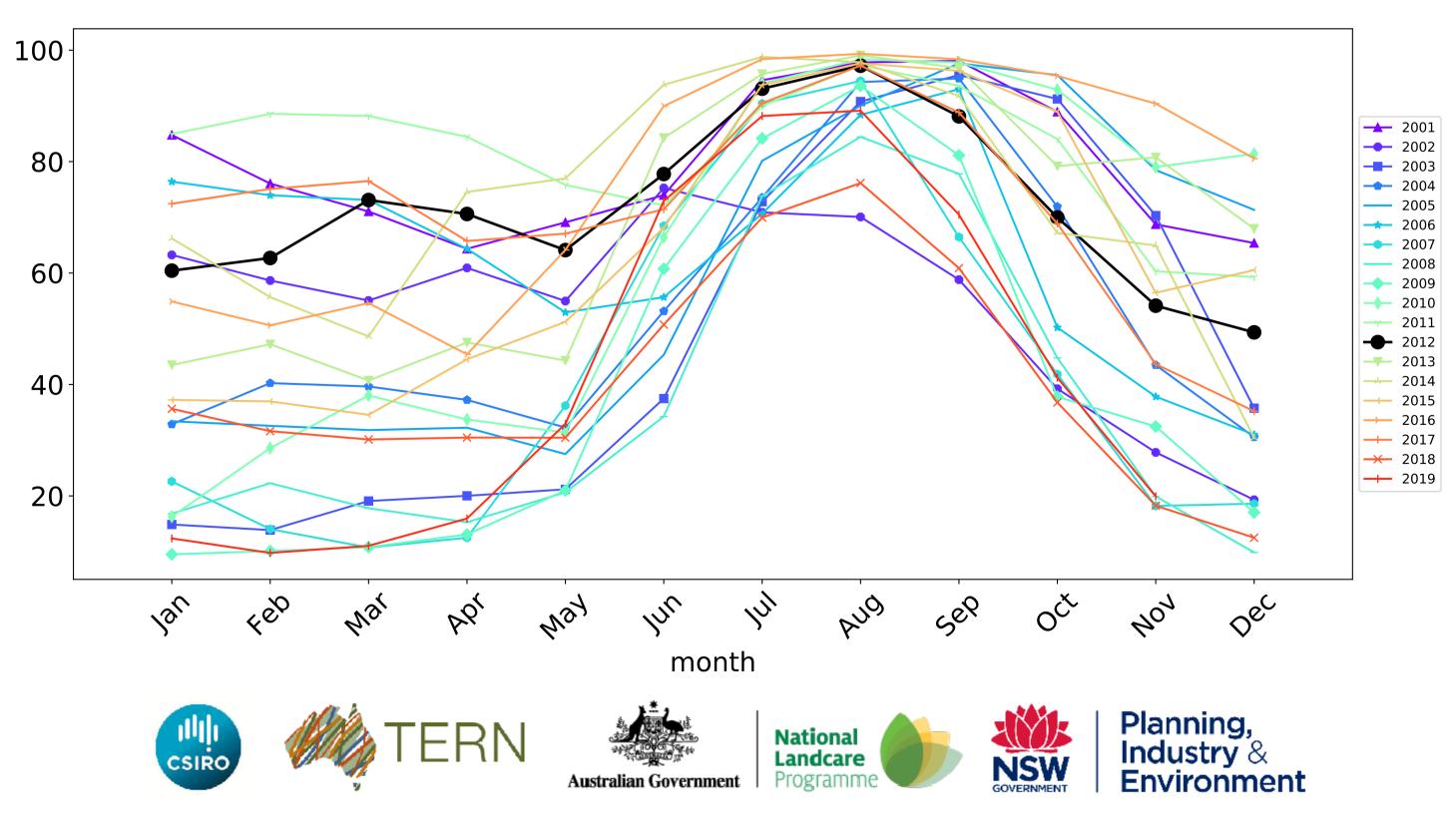
—— 2012 Dec

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



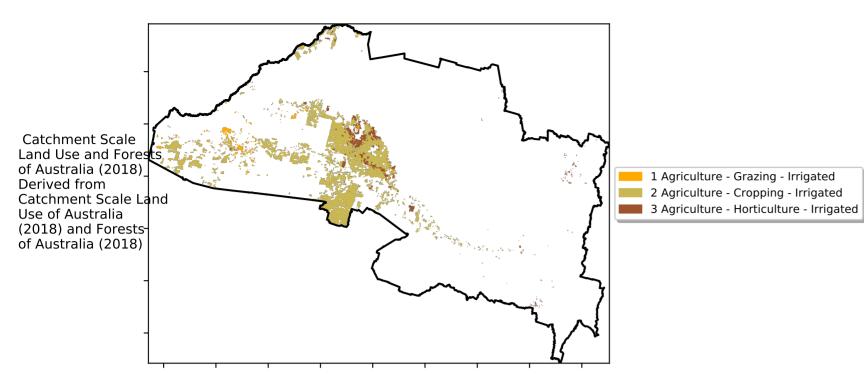
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

Cropping timeseries

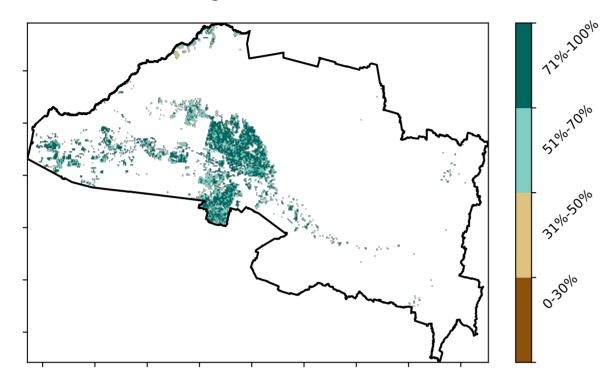


Irrigation

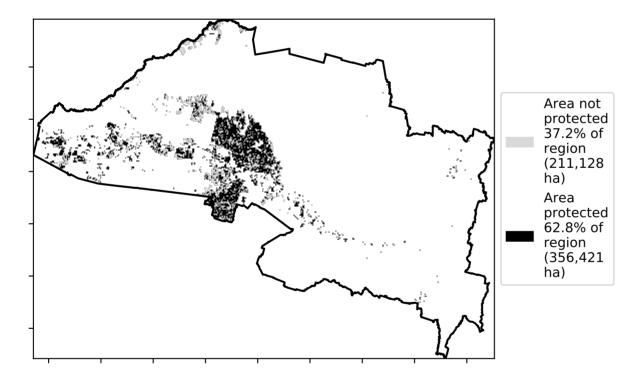
Land use and forest cover

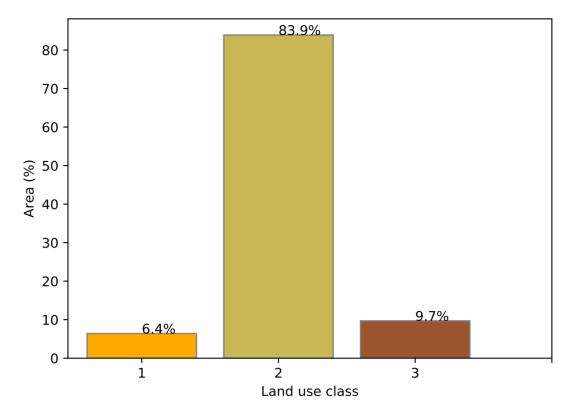


Total Vegetation Cover [%]



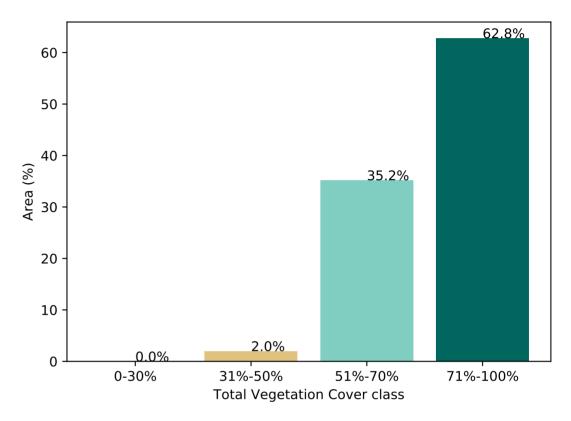
% Area protected from water erosion (>70%)



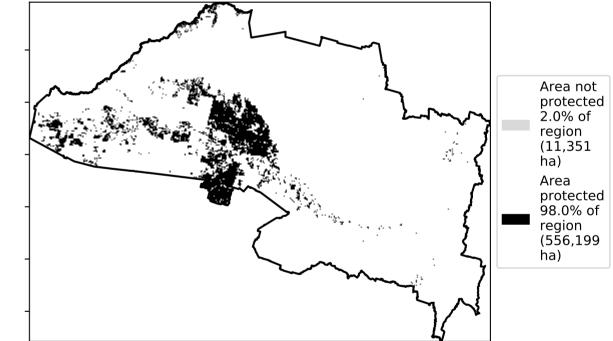


Proportion of each land class in area

Proportion of vegetation cover class in area

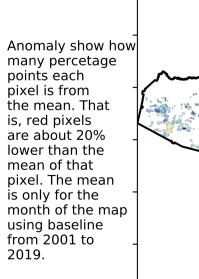


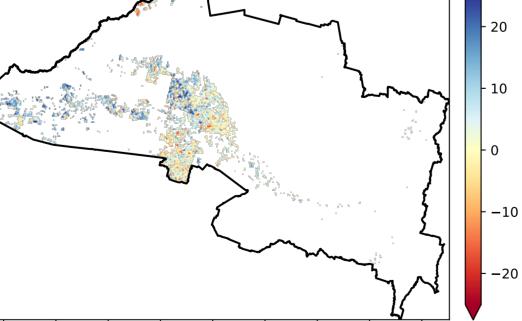
% Area protected from wind erosion (>50%)



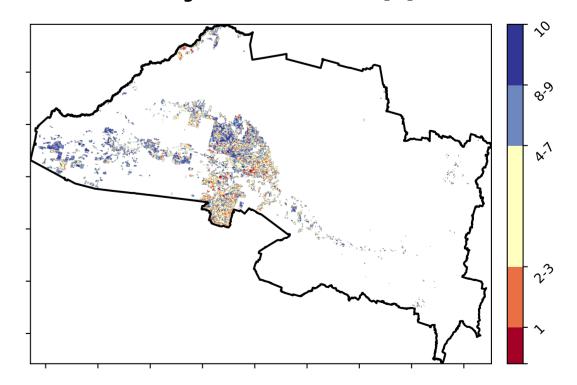


Total Vegetation Cover Anomaly [%]

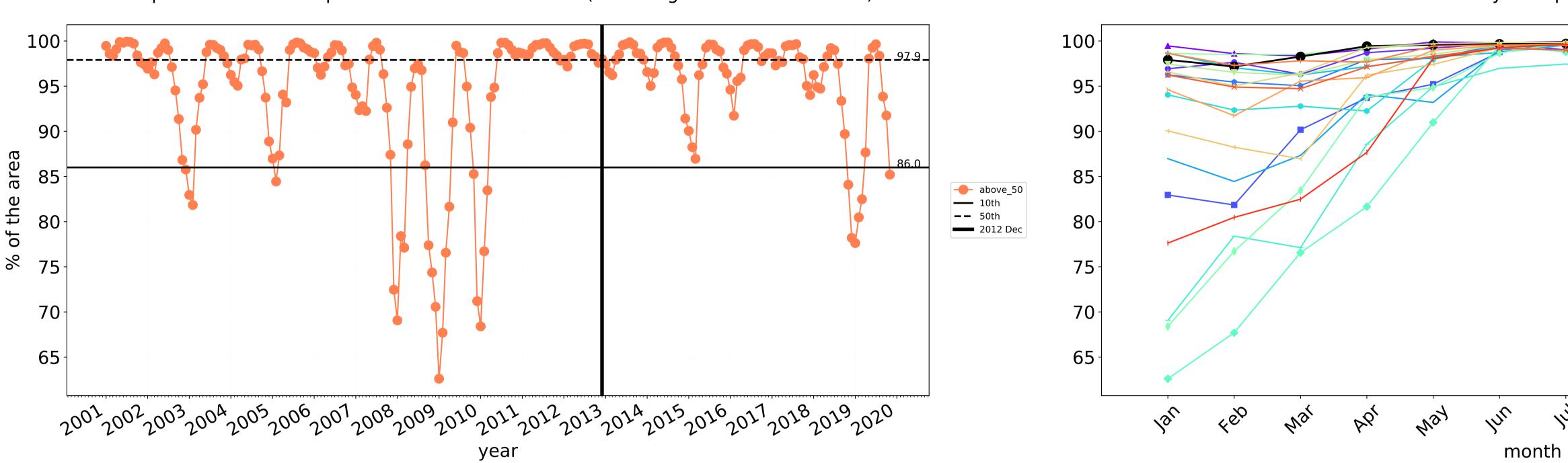




Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

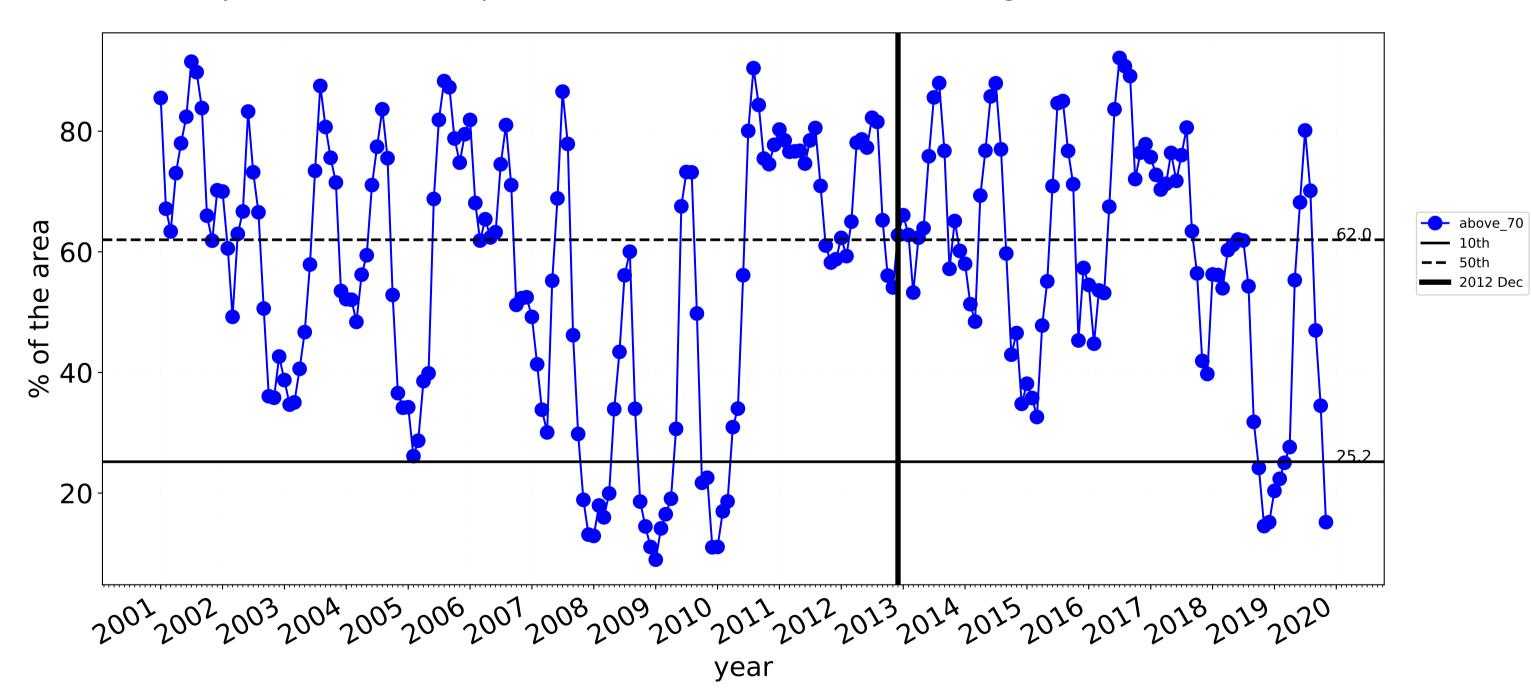






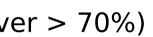
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

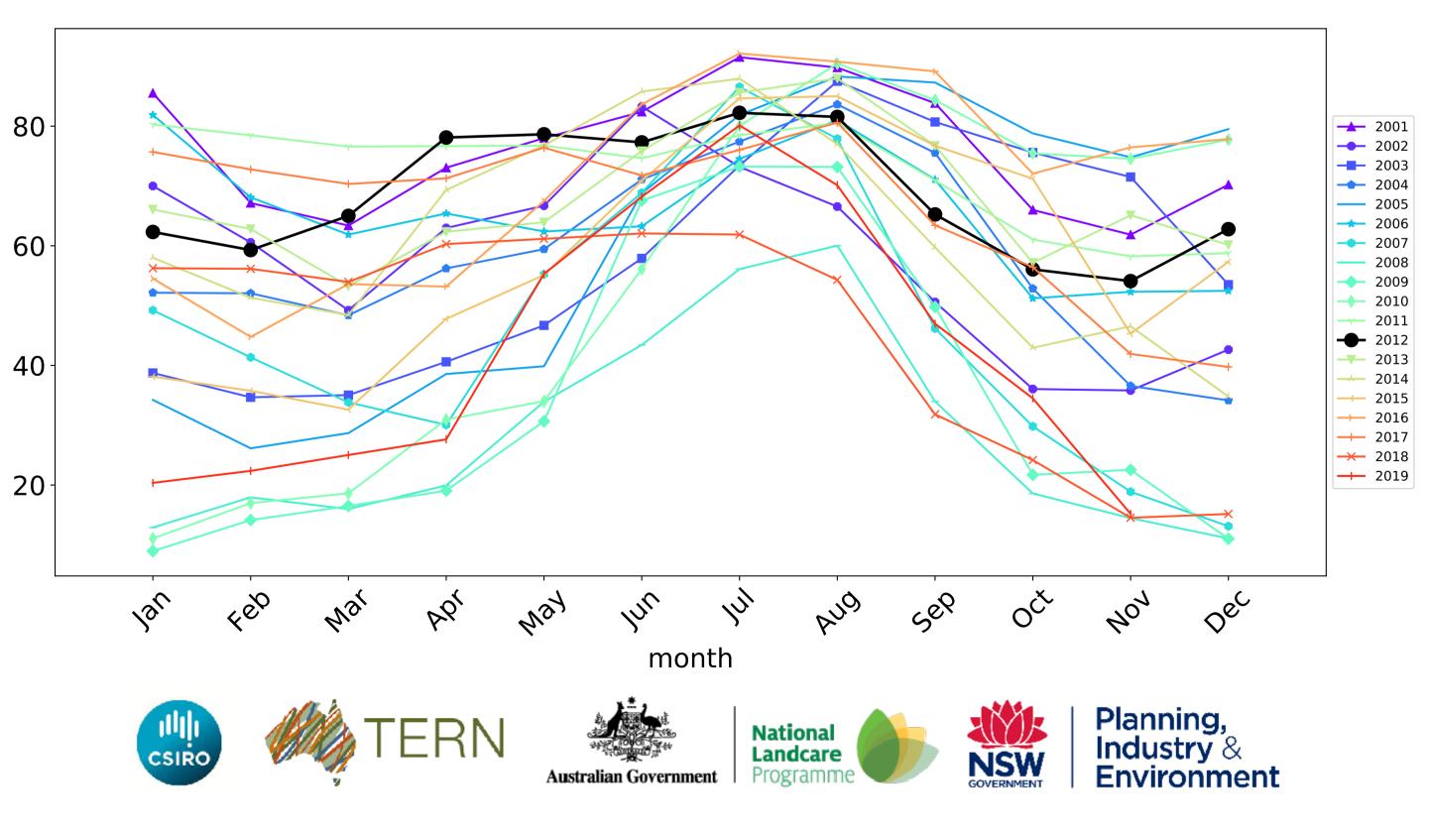
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



Irrigation timeseries

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



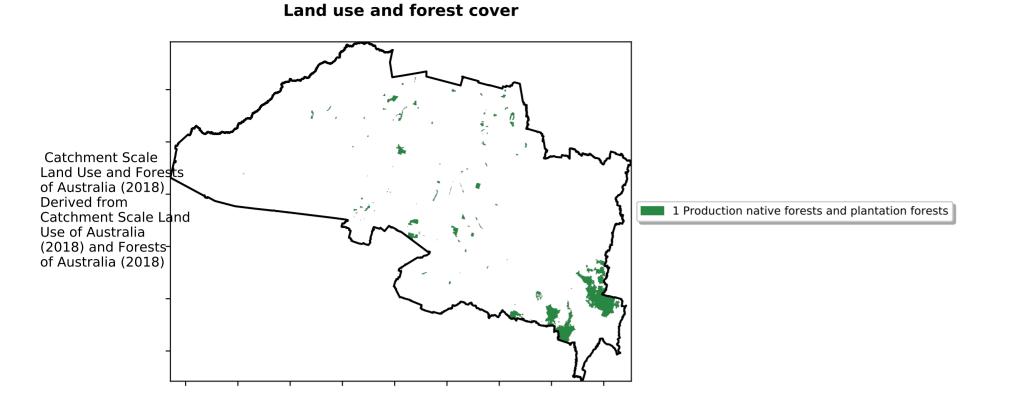


1^j

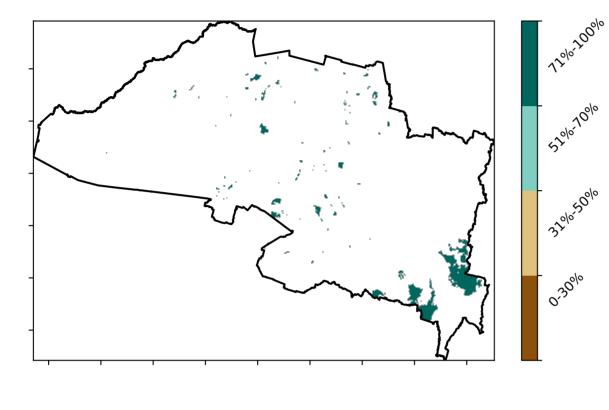
___ 2001 --- 2002 ---- 2003 **---** 2004 2005 **----** 2006 --- 2007 2008 **---** 2009 **—** 2010 2011 --- 2012 ---- 2013 ____ 2014 <mark>→</mark> 2015 **→** 2016 --- 2017 → 2018 **→** 2019 AUG Sel 404 Dec OČ

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

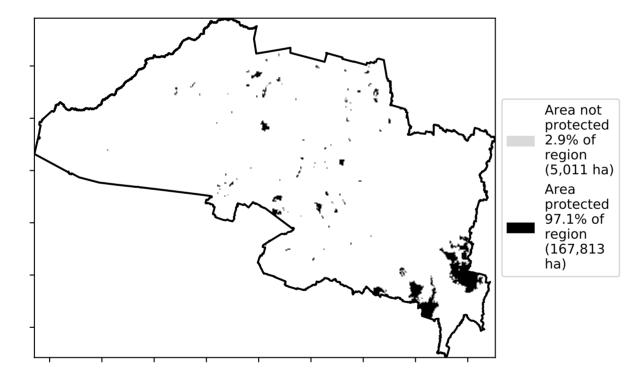
Production native forests and plantation forests



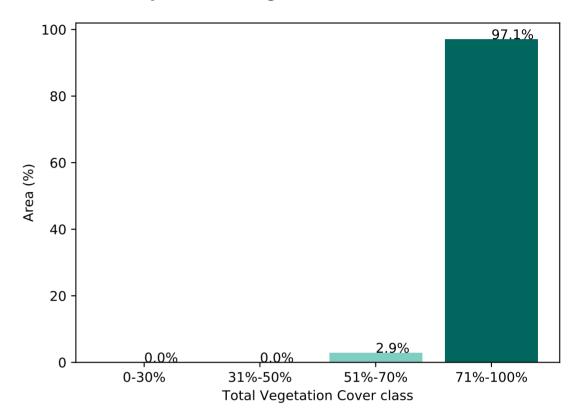
Total Vegetation Cover [%]



% Area protected from water erosion (>70%)



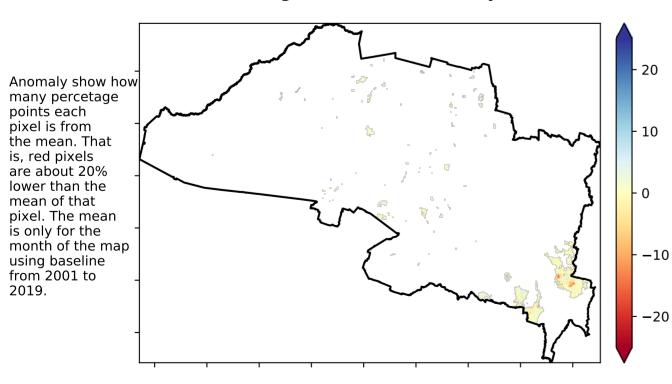




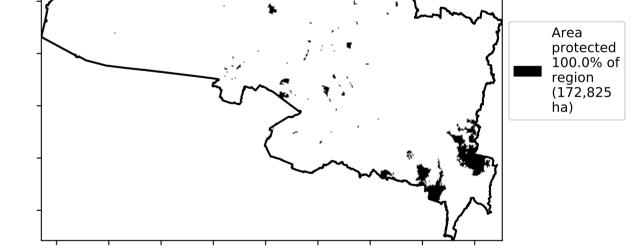
% Area protected from wind erosion (>50%)

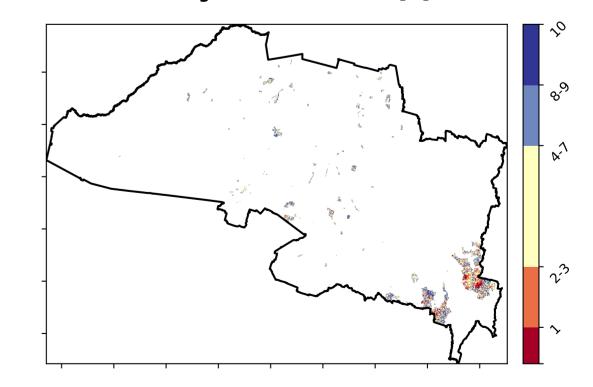


Total Vegetation Cover Anomaly [%]

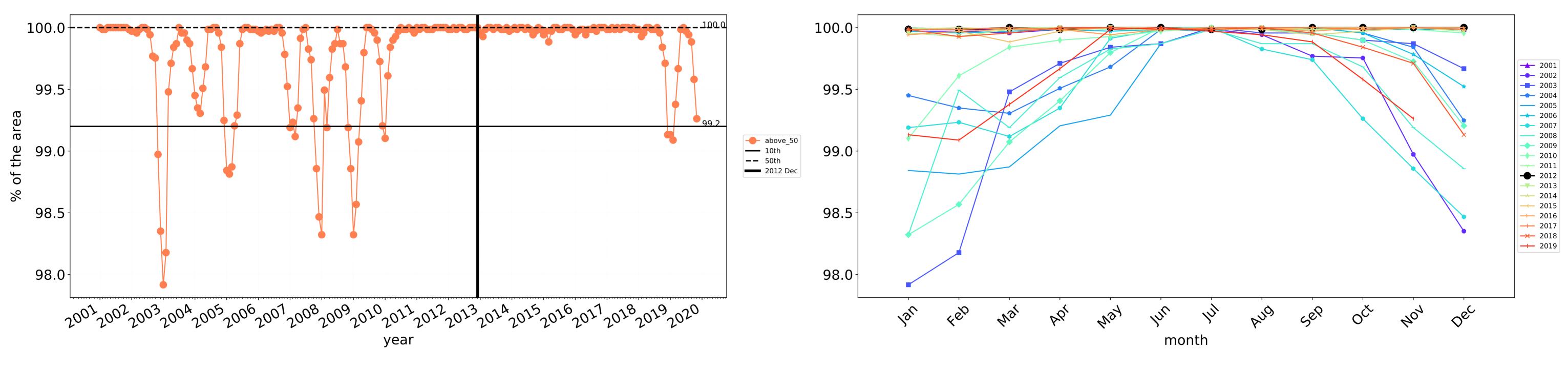


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.









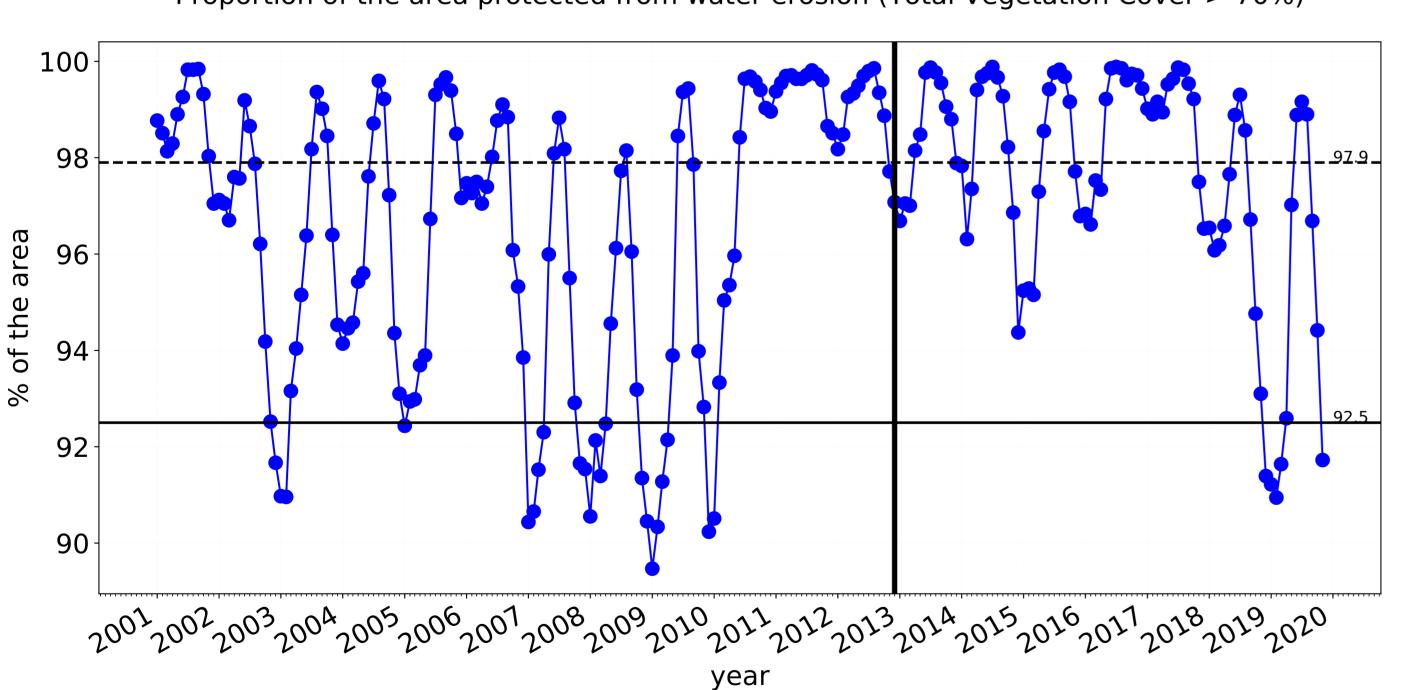
---- above_70

— 2012 Dec

— 10th

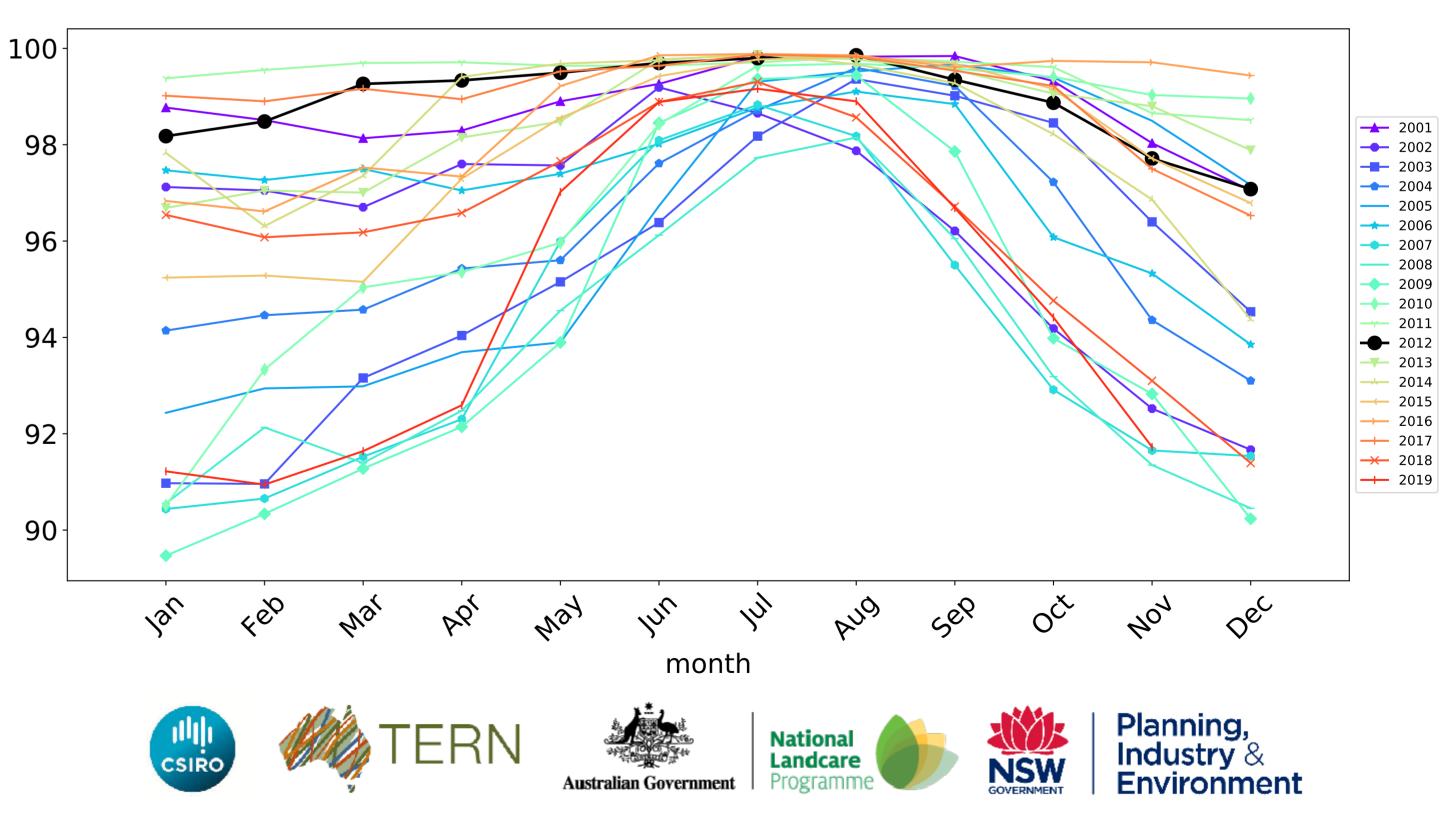
—— 50th

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



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

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



Riverina (6,694,025 ha and no data 14,310 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	6,694,025	99.9% 6,687,026	96.7% 6,472,442	60.9% 4,075,448	34.4% 2,299,711	13.0% 868,834	3.7% 247,377
Conservation and natural environments	323,050	100.0% 323,050	100.0% 322,975	92.2% 297,825	79.5% 256,775	60.3% 194,725	29.8% 96,225
Conservation and natural environments non forest	83,350	100.0% 83,350	99.9% 83,275	71.2% 59,325	29.0% 24,175	13.1% 10,900	5.5% 4,575
Conservation and natural environments Forest (non woodland)	195,200	100.0% 195,200	100.0% 195,200	99.9% 195,075	99.1% 193,450	87.9% 171,550	45.9% 89,625
Agriculture	6,068,150	99.9% 6,065,075	96.5% 5,854,350	58.2% 3,530,600	30.5% 1,851,475	9.4% 568,375	1.7% 100,575
Grazing	2,311,825	99.9% 2,310,325	98.6% 2,278,700	69.2% 1,600,925	40.8% 943,900	16.3% 377,200	2.7% 62,050
Grazing non forest	2,066,825	99.9% 2,065,325	98.4% 2,034,000	66.5% 1,374,200	37.3% 771,600	15.3% 316,250	2.5% 51,800
Grazing Woodland forest	141,650	100.0% 141,650	99.8% 141,350	88.4% 125,200	58.3% 82,550	10.6% 14,975	1.1% 1,625
Grazing - Forest (non woodland)	103,350	100.0% 103,350	100.0% 103,350	98.2% 101,525	86.8% 89,750	44.5% 45,975	8.3% 8,625
Cropping	3,186,950	100.0% 3,185,525	94.7% 3,017,575	49.4% 1,572,875	24.5% 780,725	5.2% 164,950	0.8% 26,625
Irrigation	567,550	100.0% 567,400	98.0% 556,250	62.8% 356,300	22.3% 126,625	4.6% 26,200	2.1% 11,900
Production native forests and plantation forests	172,825	100.0% 172,825	100.0% 172,825	97.1% 167,775	88.9% 153,700	57.1% 98,750	28.6% 49,375

