Total vegetation cover soil protection Region:NRM Murray NSW

Date: July 2019

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:

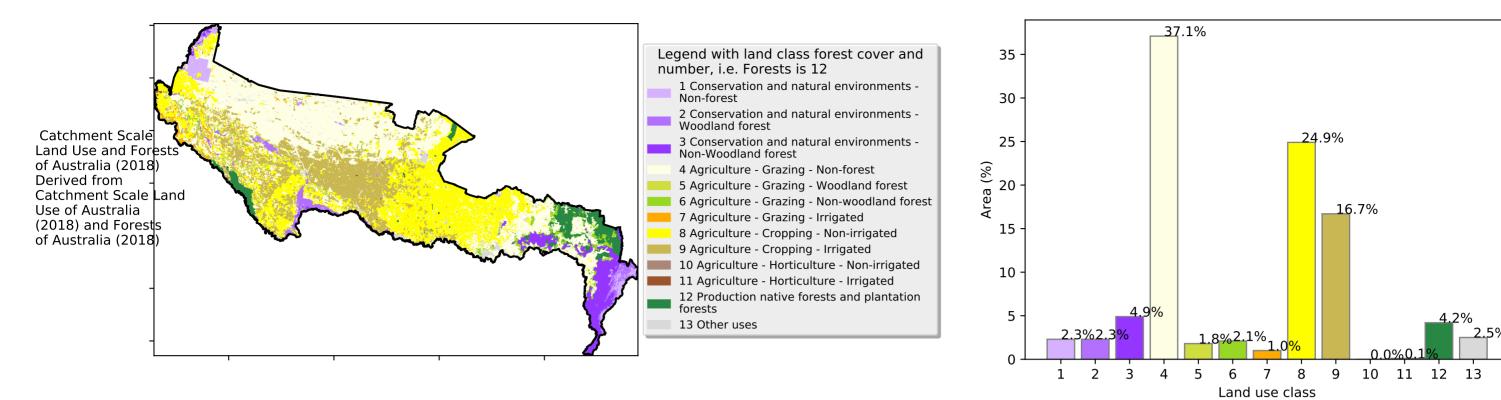
https://doi.org/10.4225/08/5848a3f19a7b3



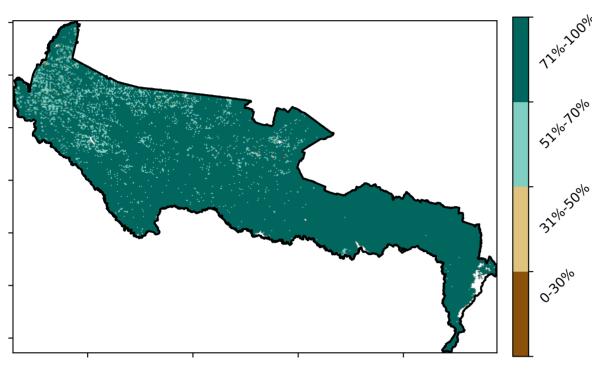
Vegetation Cover Jul 2019

Land use and forest cover

Proportion of each land class in area

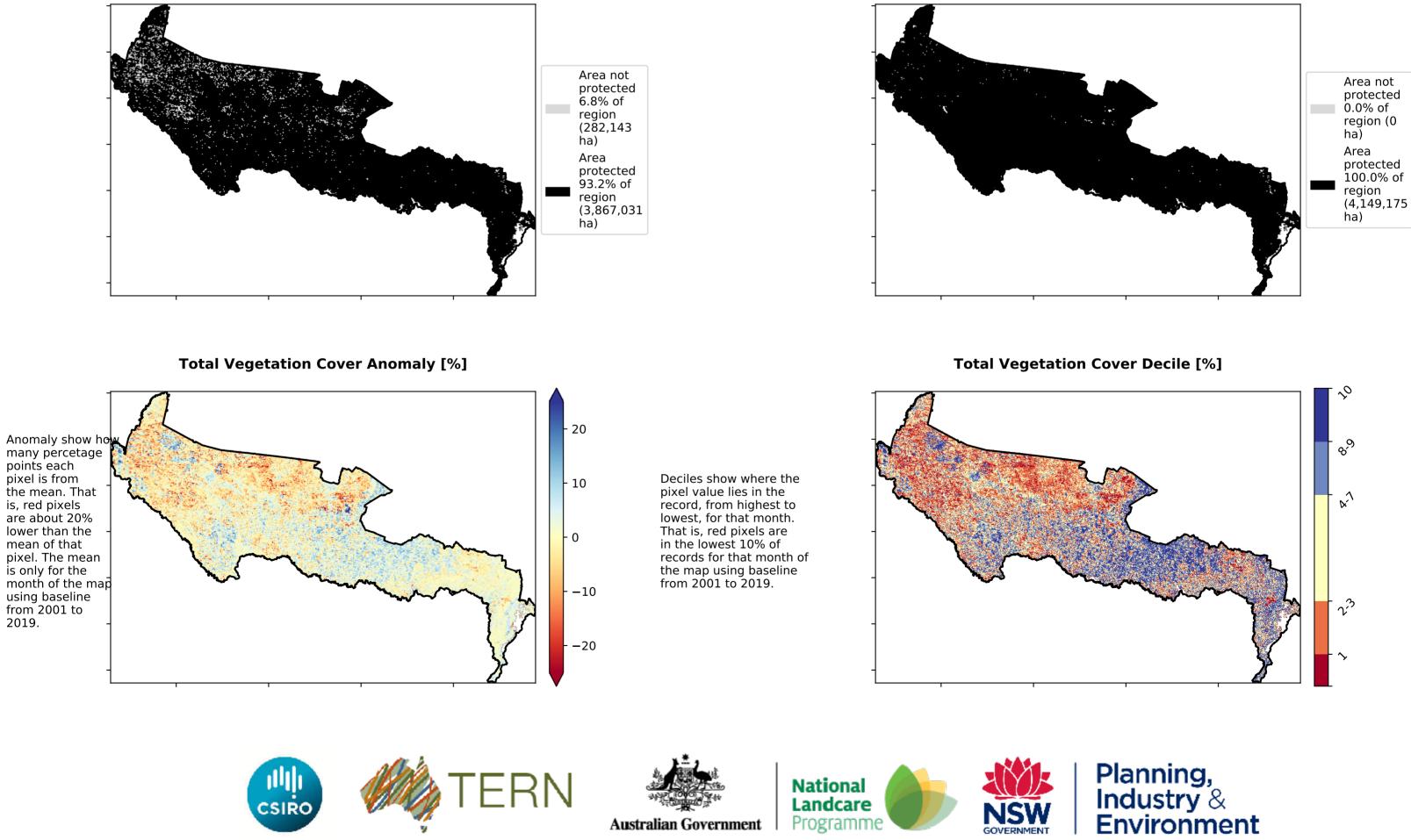


Total Vegetation Cover [%]

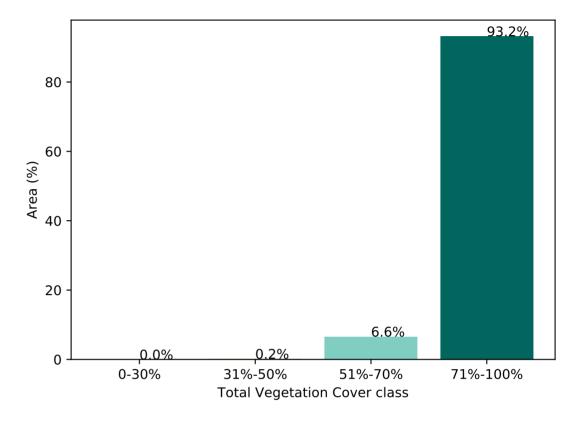


% Area protected from water erosion (>70%)

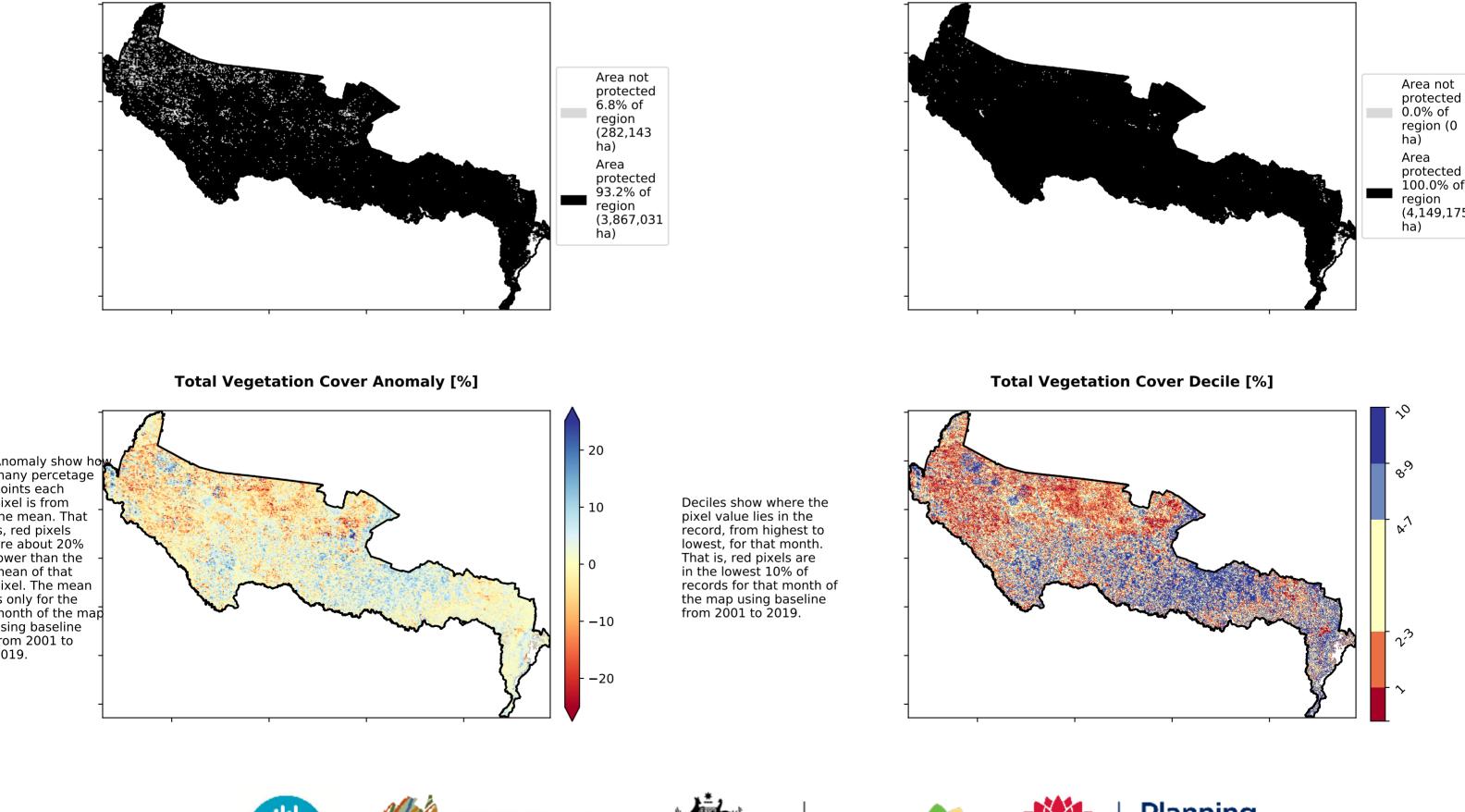
csiro



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

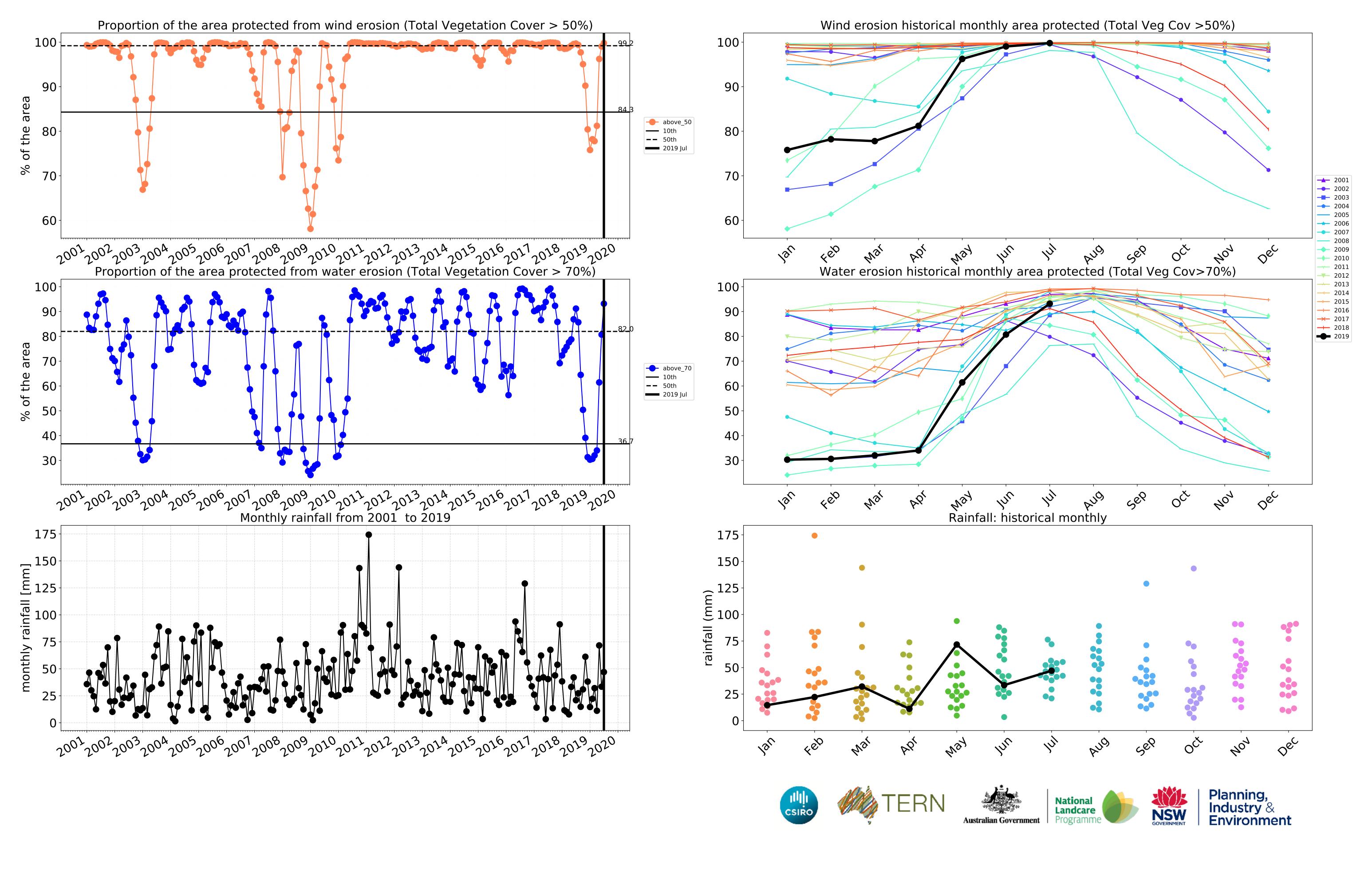


National

Landcare Programme



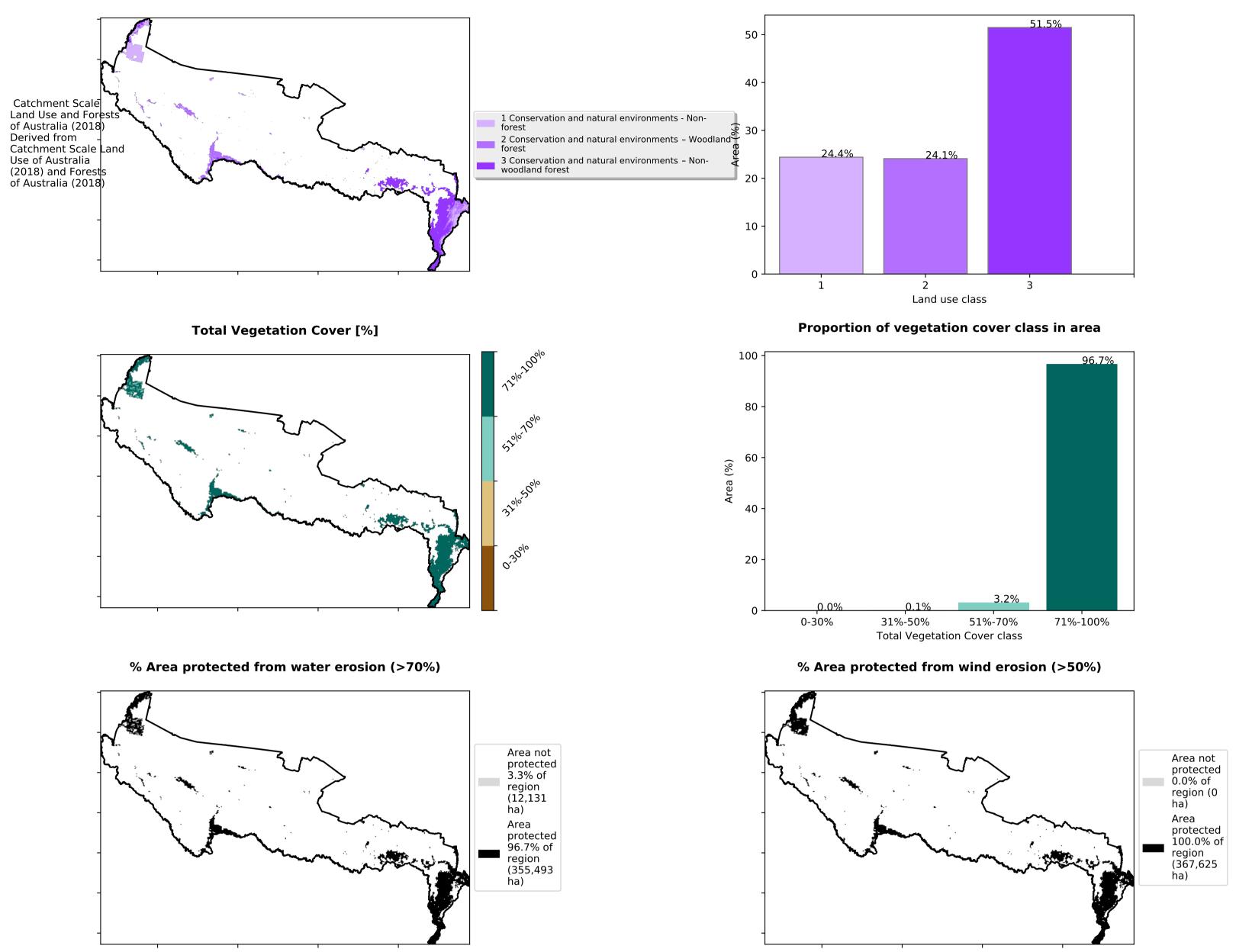
Australian Government



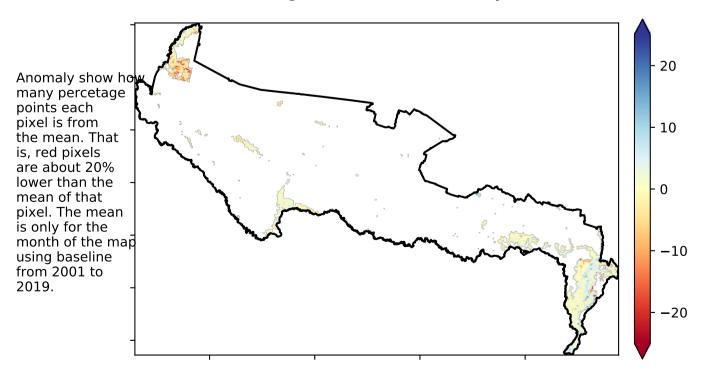
Conservation and natural environments

Land use and forest cover

Proportion of each land class in area

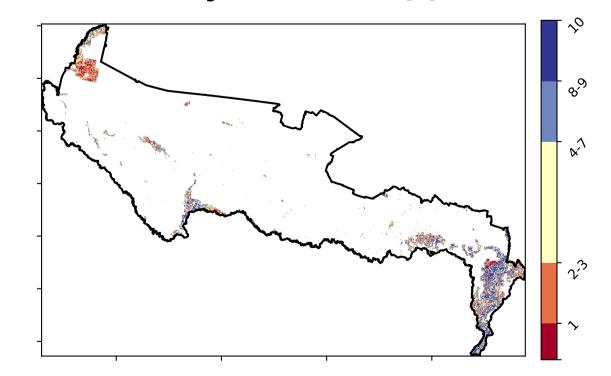


Total Vegetation Cover Anomaly [%]

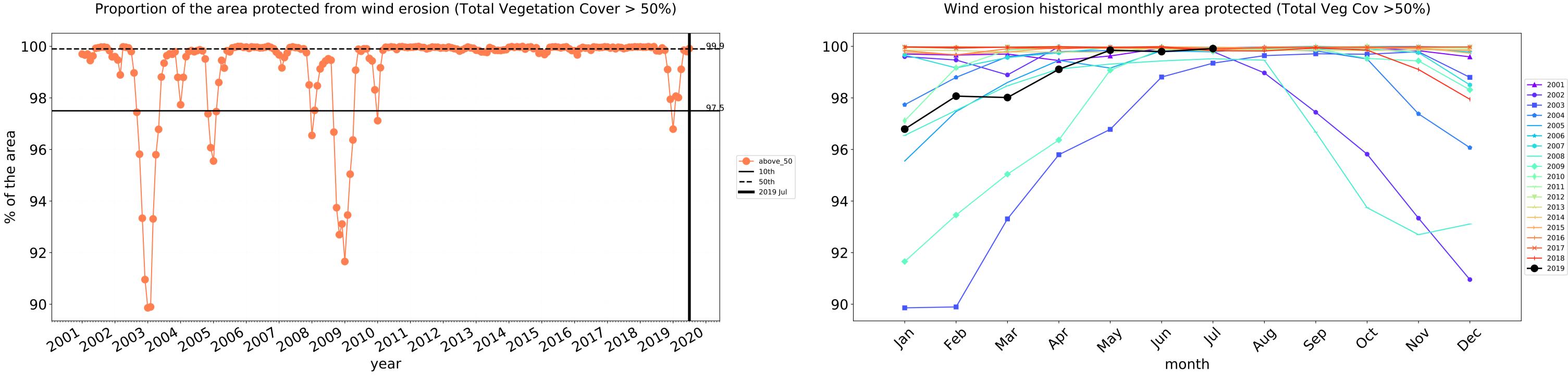


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

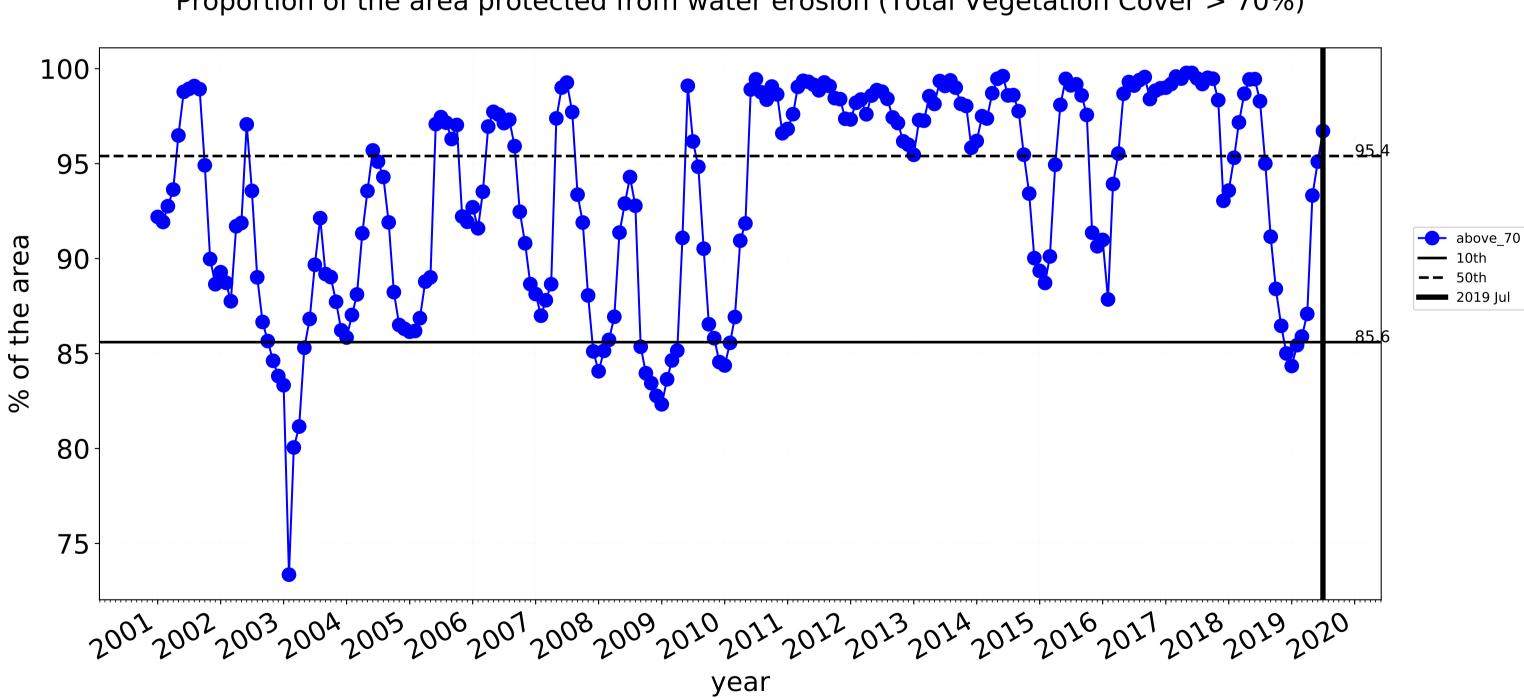
Total Vegetation Cover Decile [%]



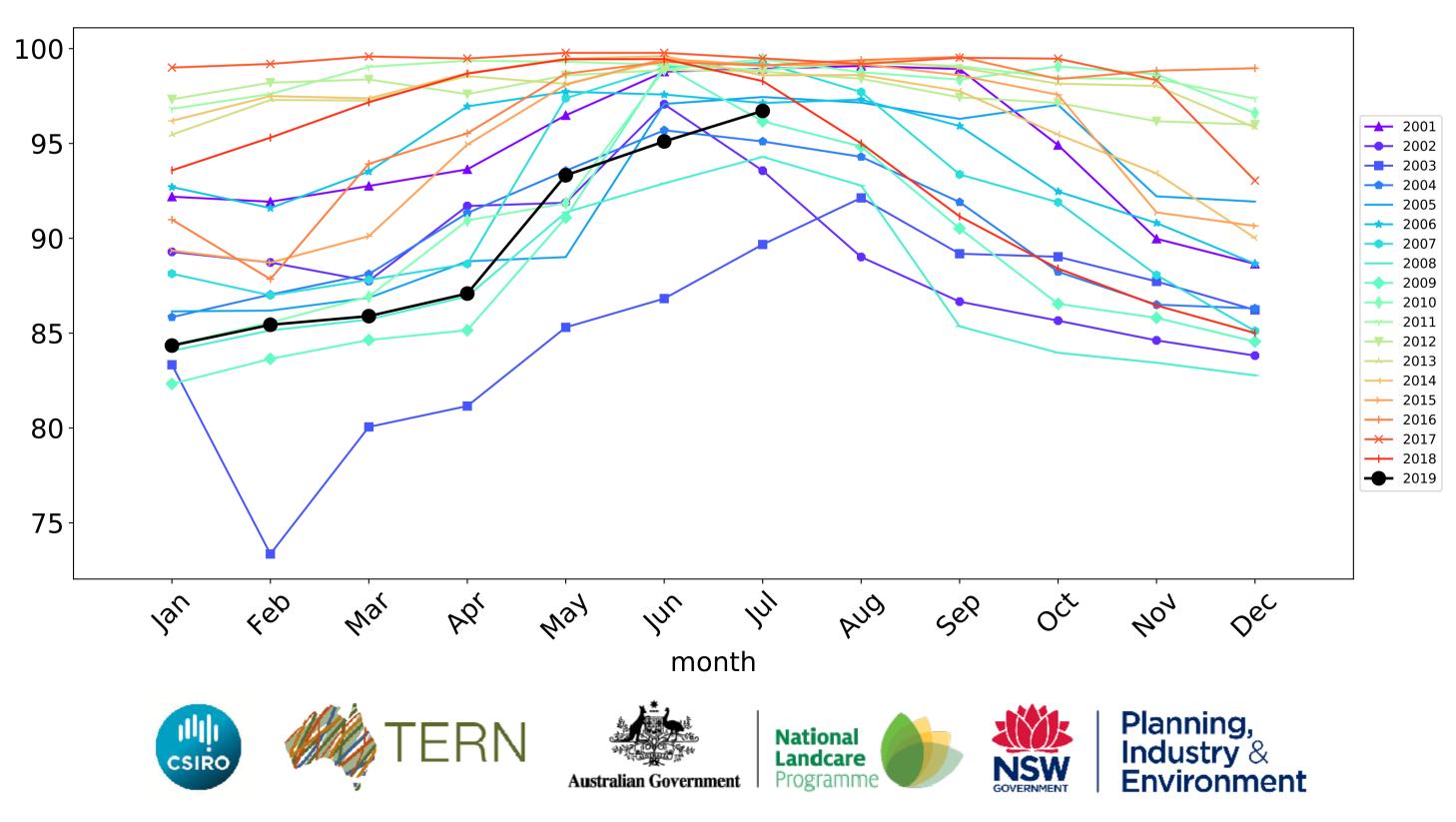




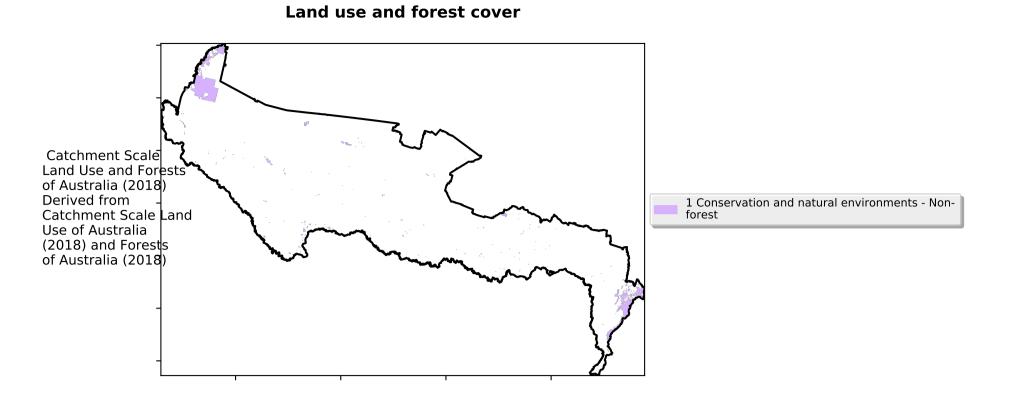
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



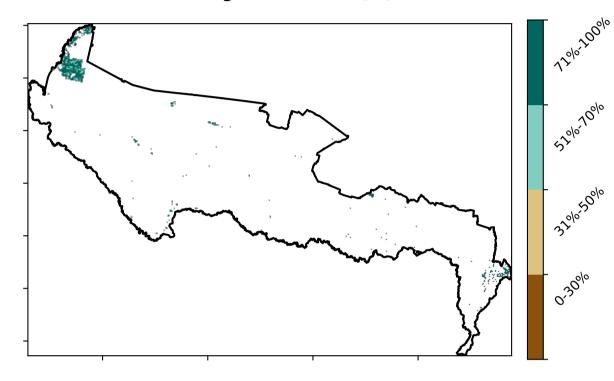
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



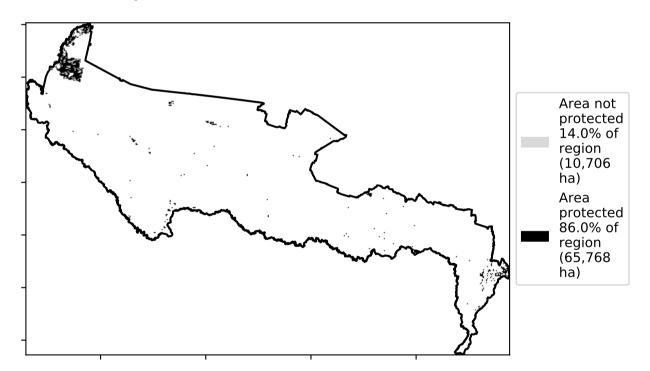
Conservation and natural environments non forest



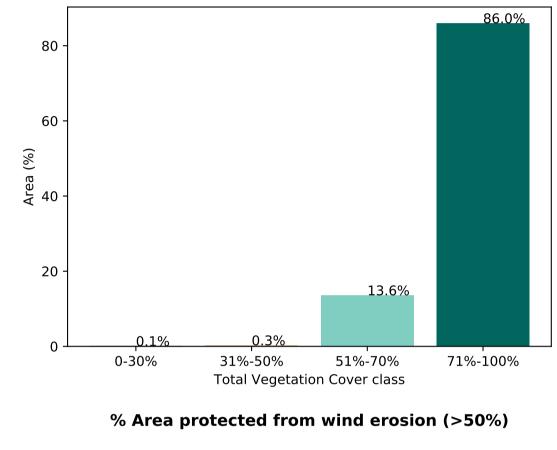
Total Vegetation Cover [%]

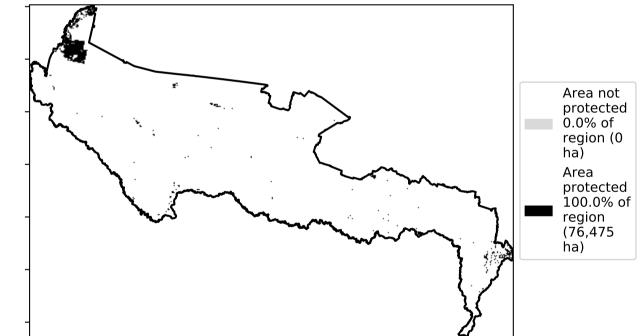


% Area protected from water erosion (>70%)

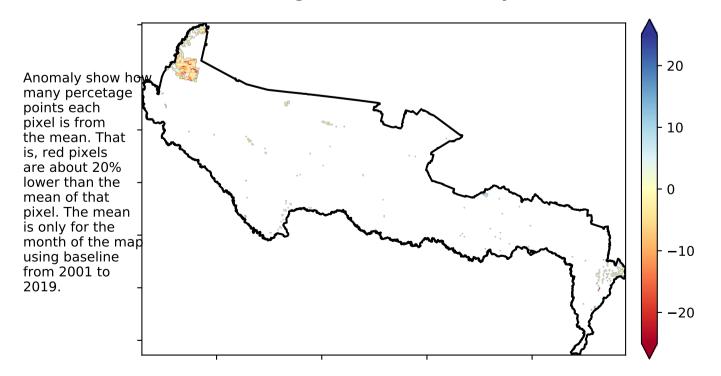


Proportion of vegetation cover class in area

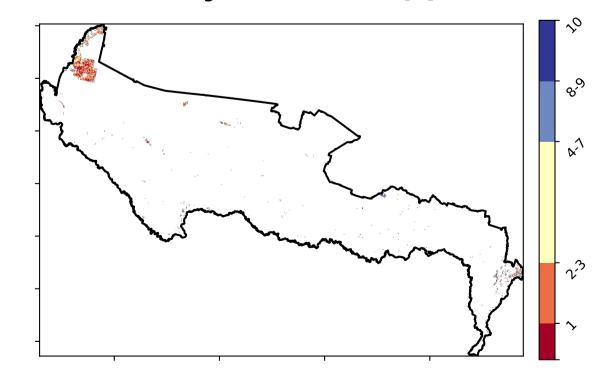




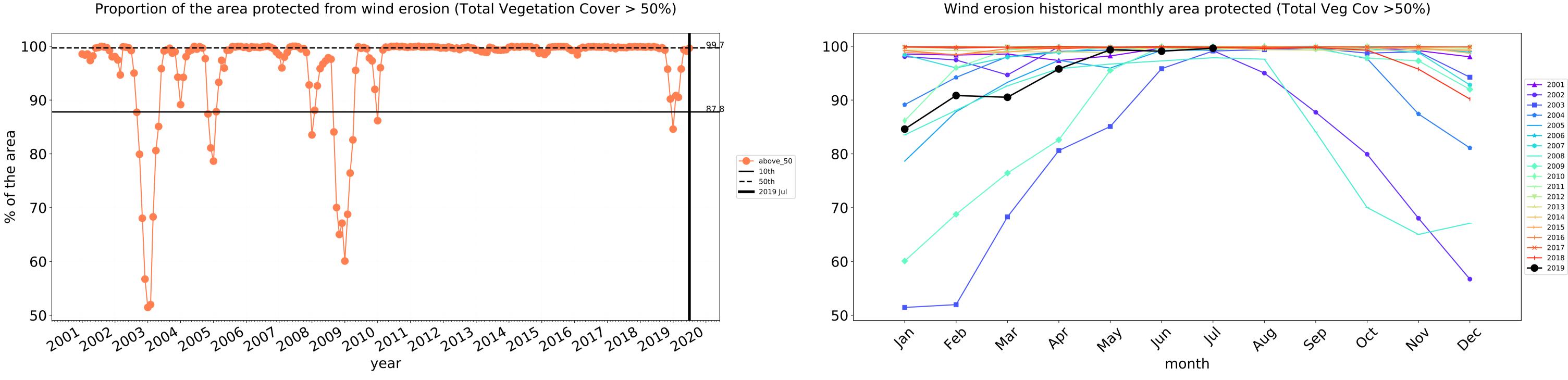
Total Vegetation Cover Anomaly [%]



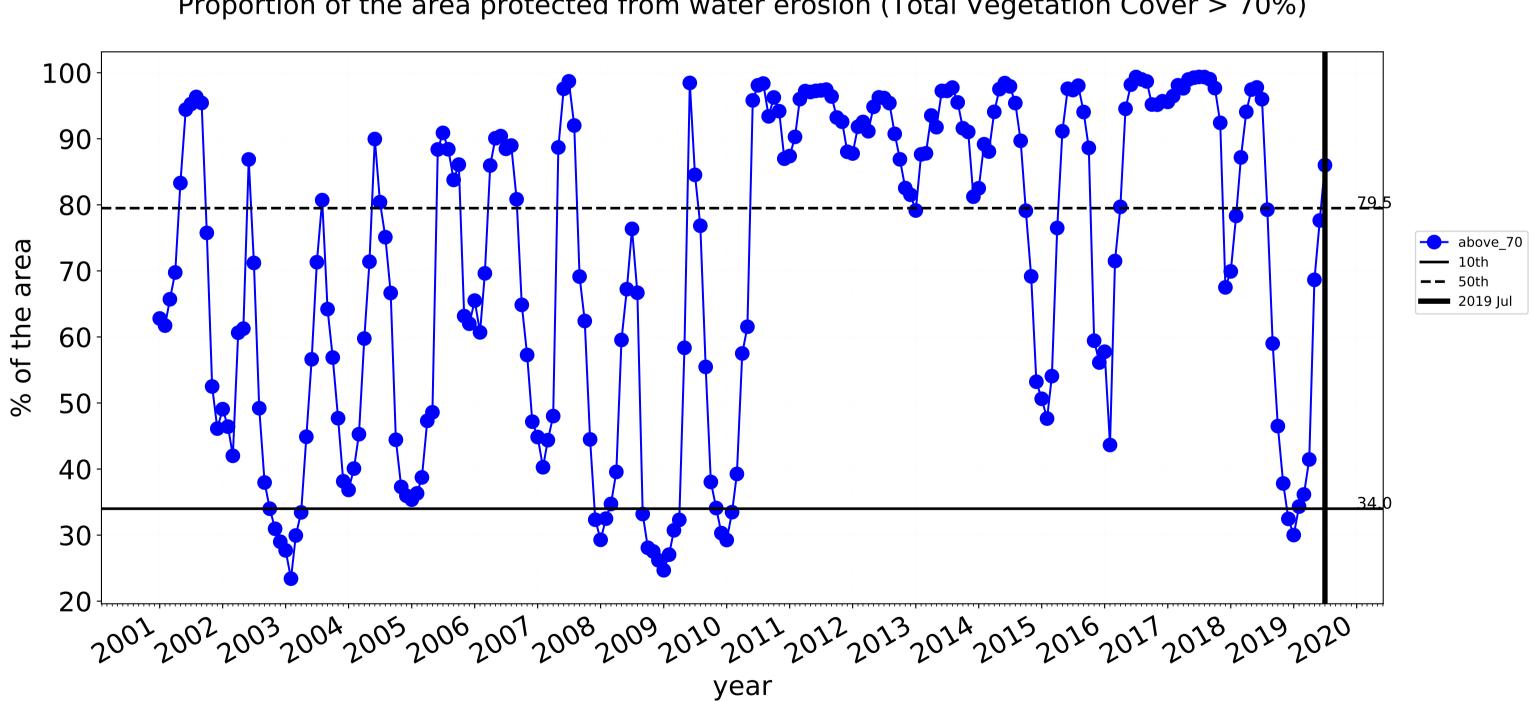
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019. **Total Vegetation Cover Decile [%]**



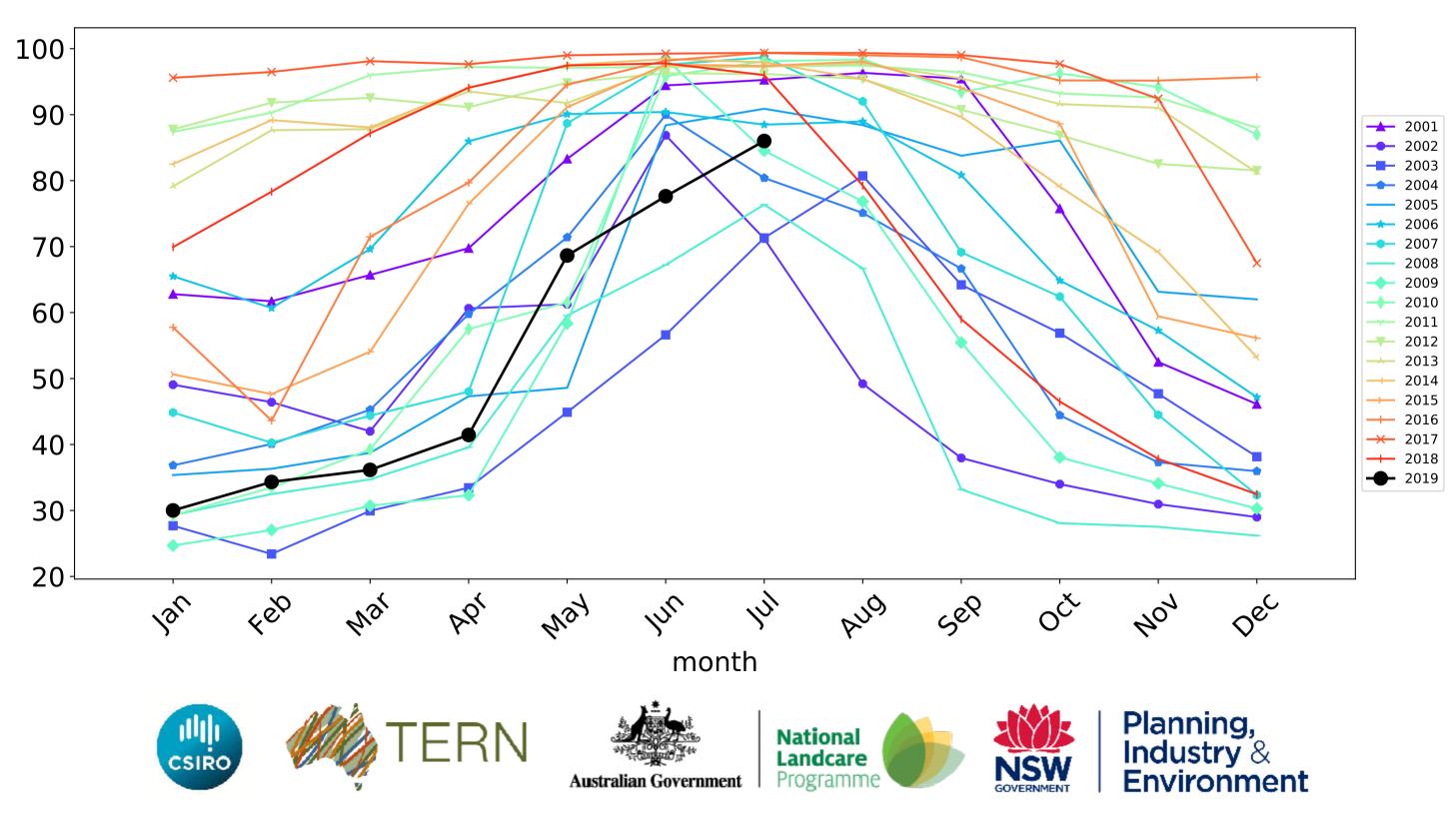




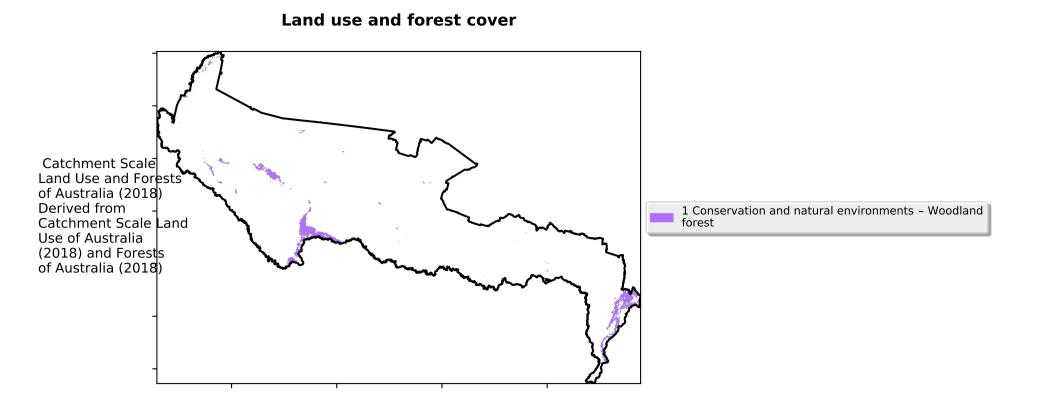
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



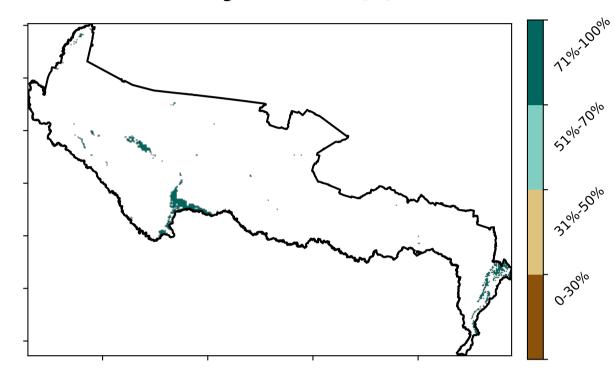
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



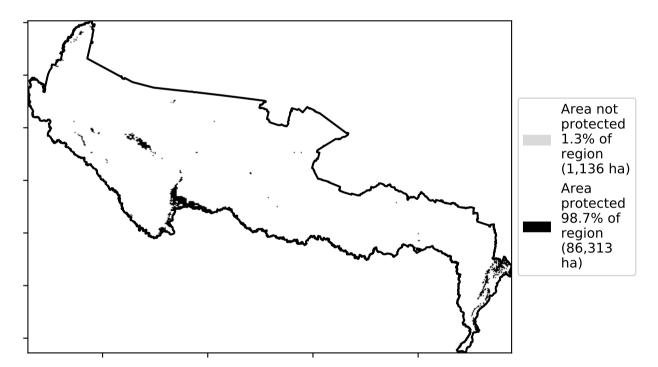
Conservation and natural environments Woodland forest



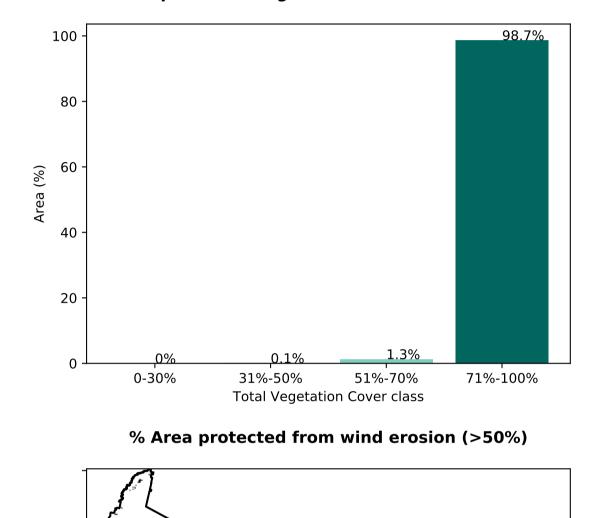
Total Vegetation Cover [%]



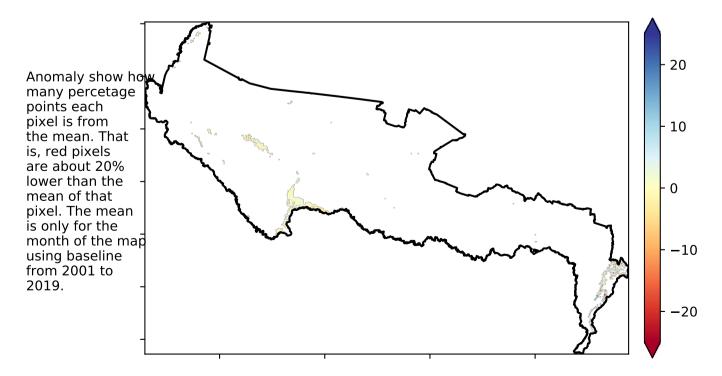
% Area protected from water erosion (>70%)



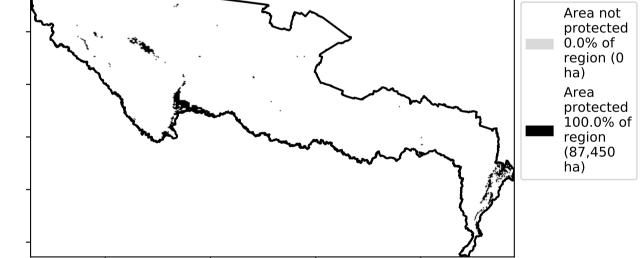
Proportion of vegetation cover class in area



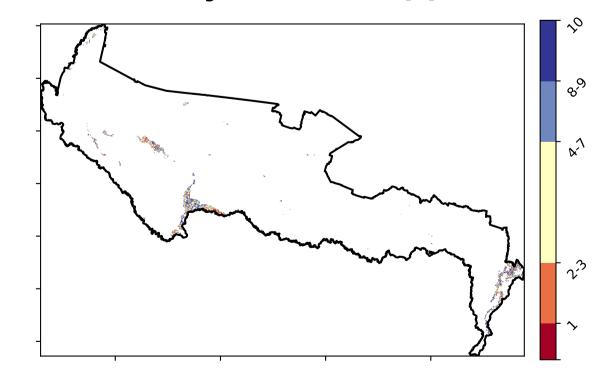
Total Vegetation Cover Anomaly [%]



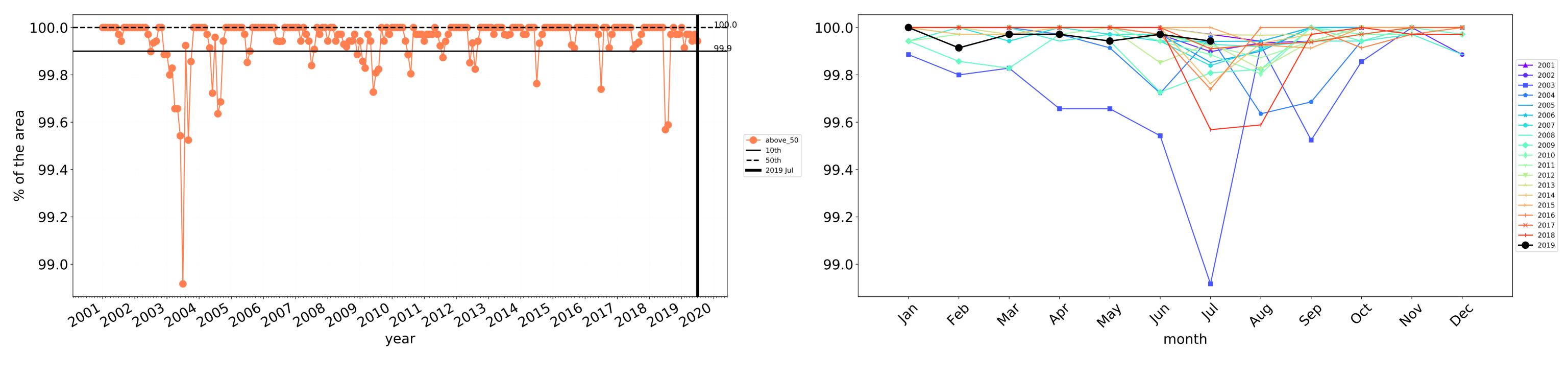
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.



Total Vegetation Cover Decile [%]

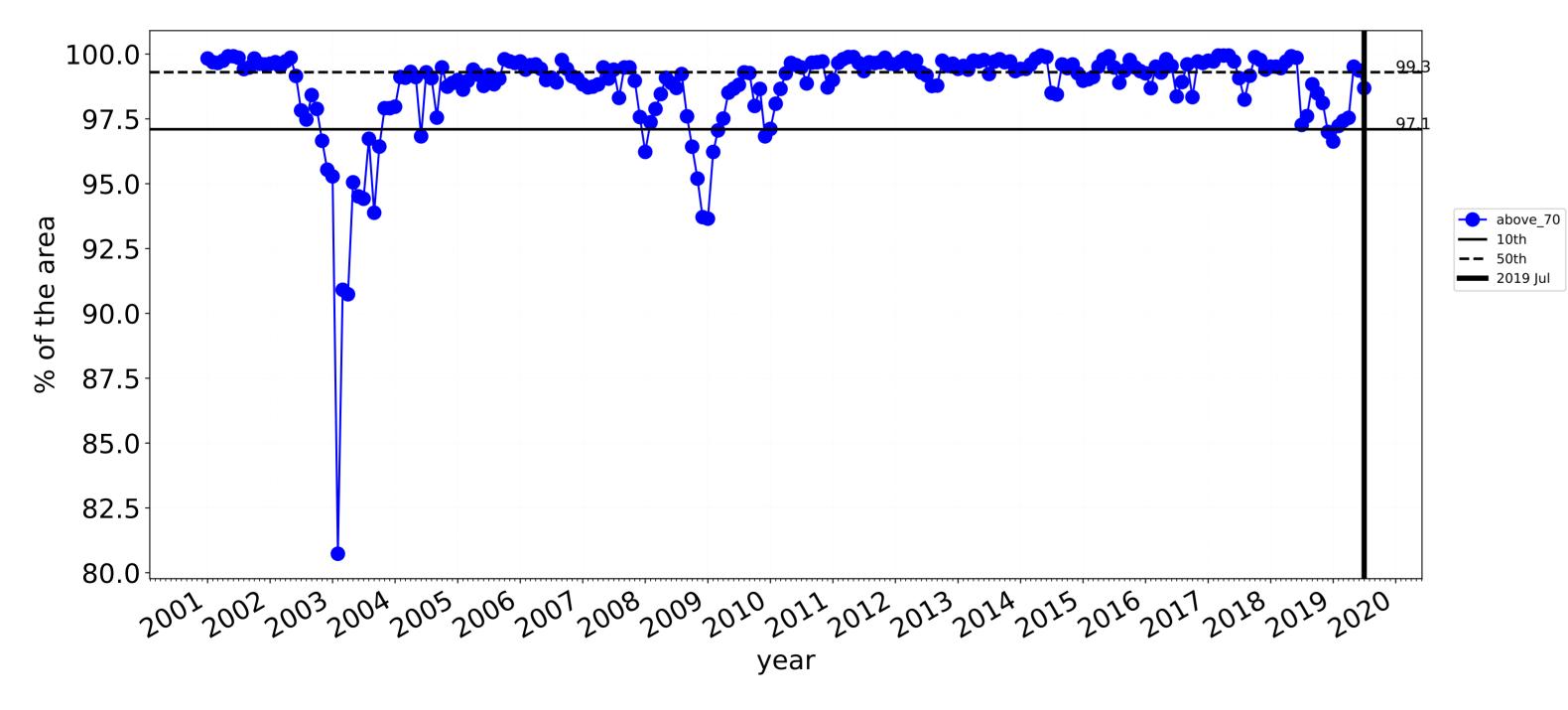


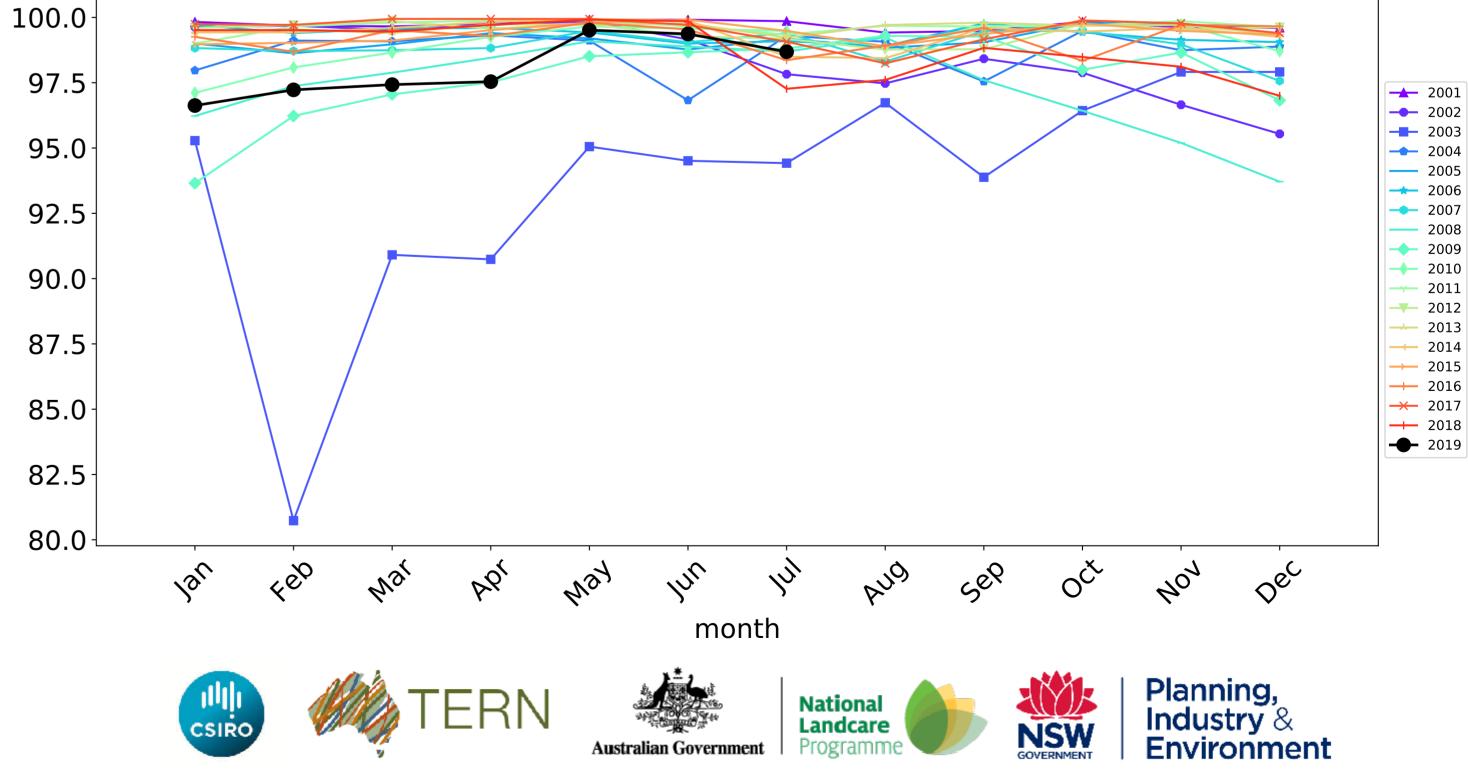




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

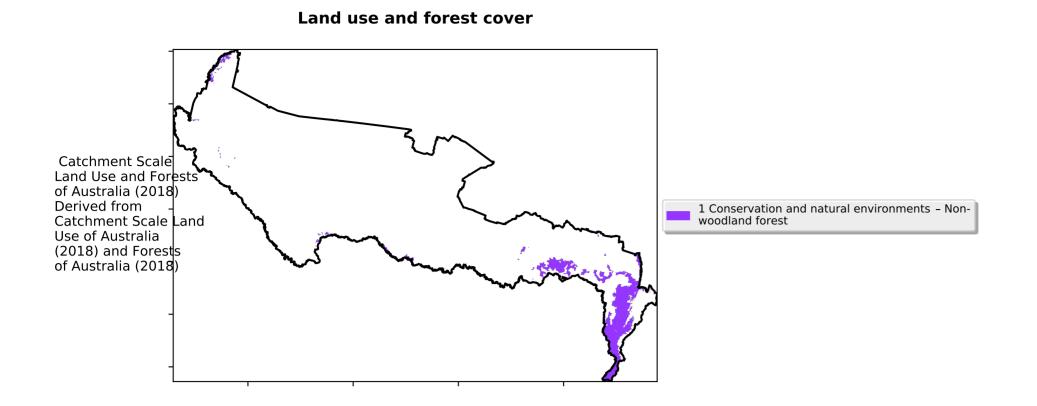
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



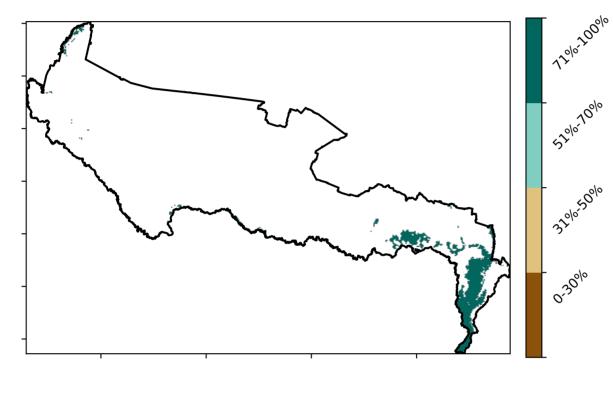


Water erosion historical monthly area protected (Total Veg Cov>70%)

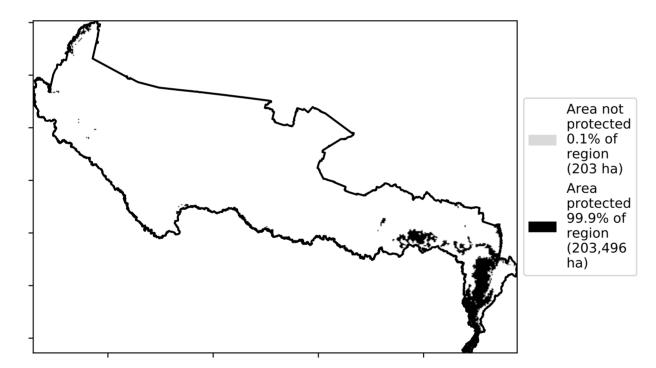
Conservation and natural environments Forest (non woodland)



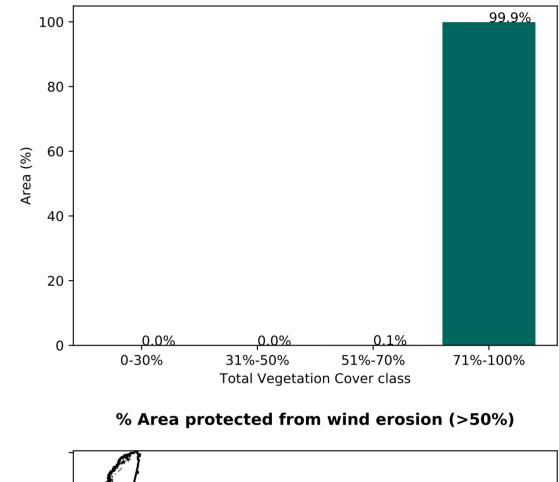
Total Vegetation Cover [%]

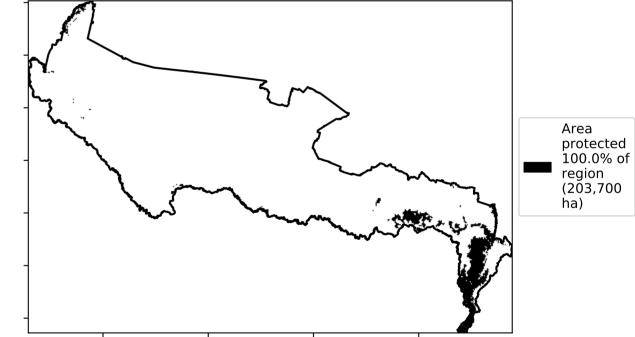


% Area protected from water erosion (>70%)

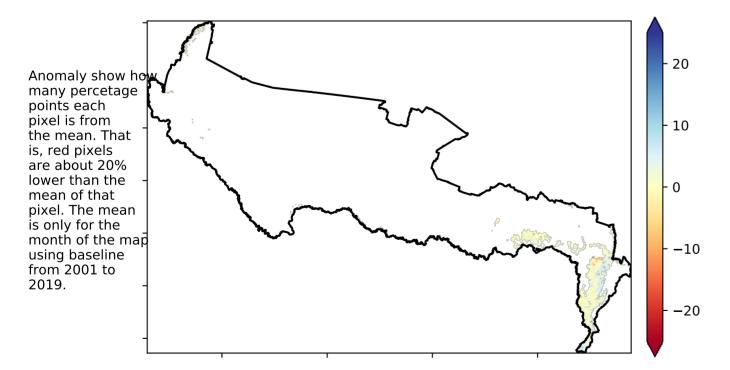


Proportion of vegetation cover class in area



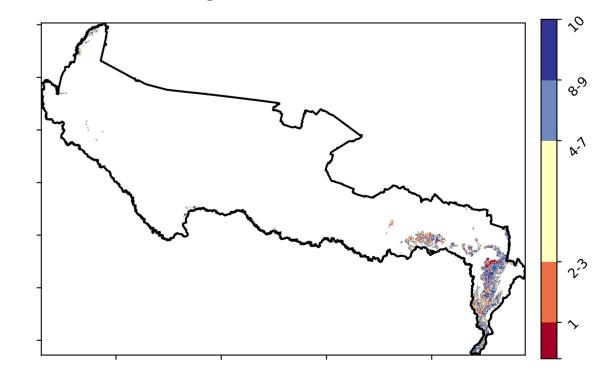


Total Vegetation Cover Anomaly [%]

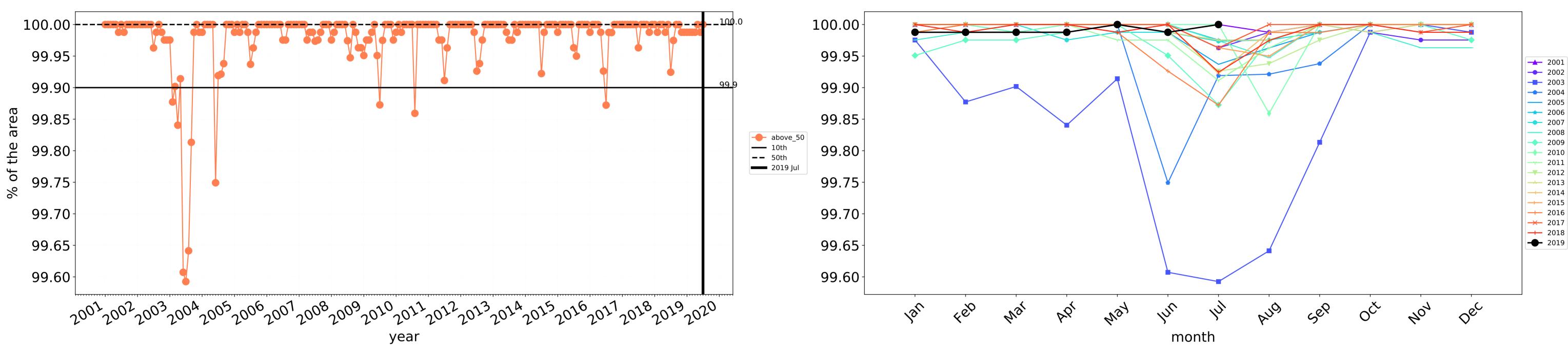


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Total Vegetation Cover Decile [%]

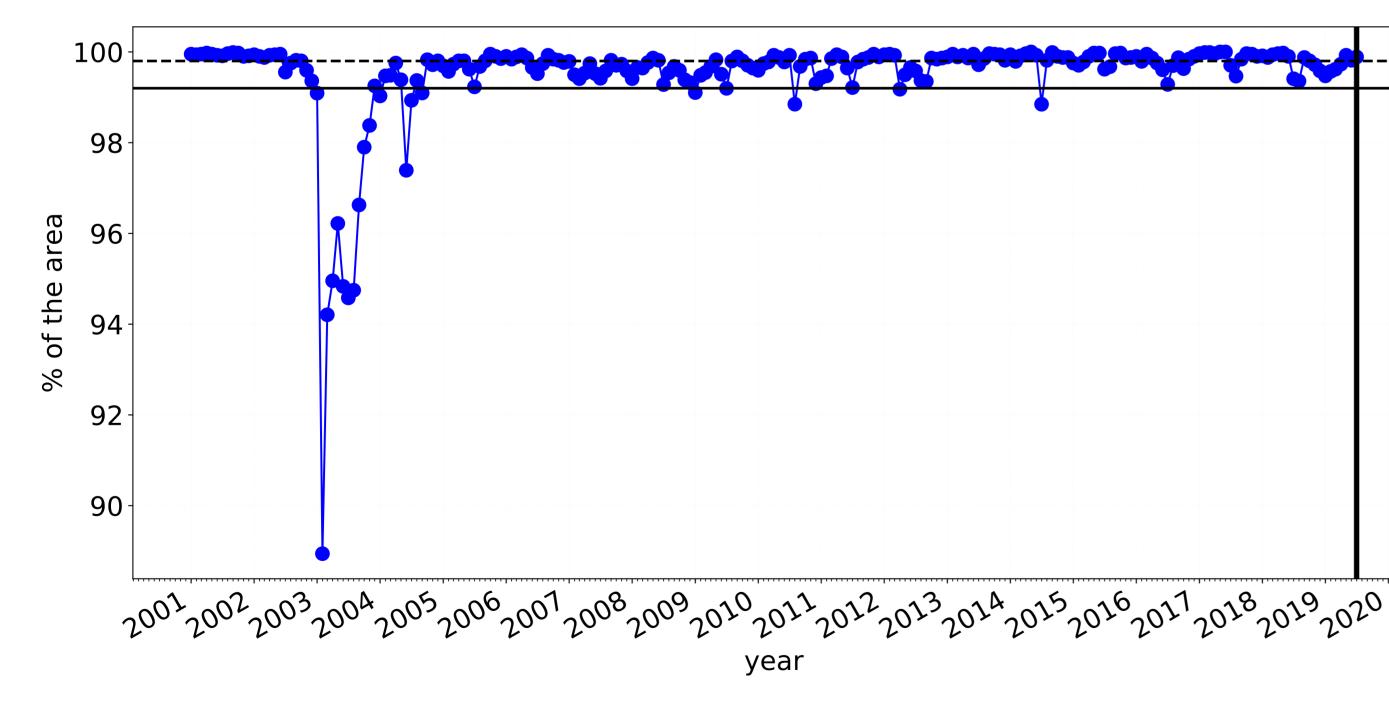






Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

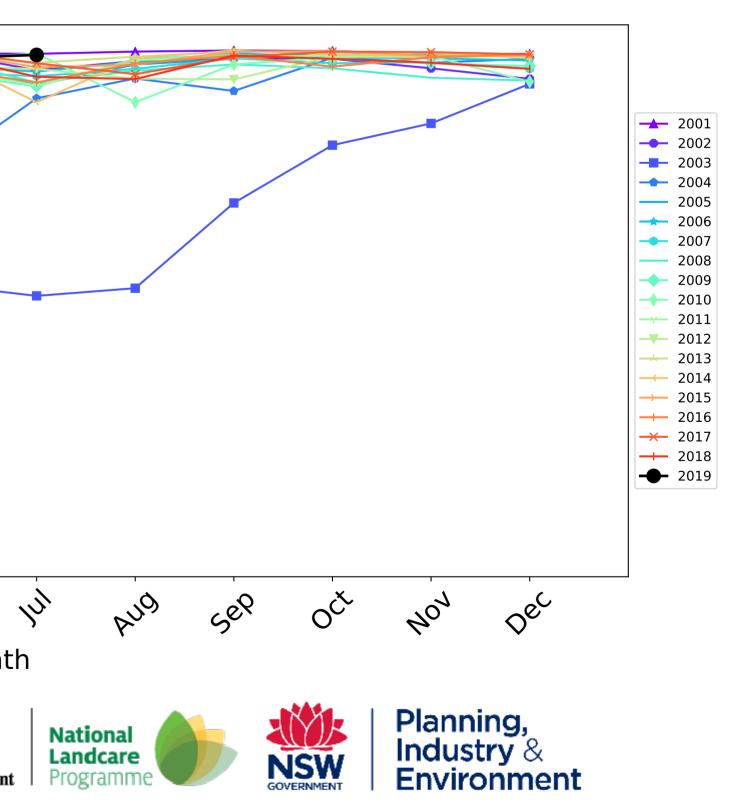


2000 > 30%

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

100 99 98 ---- above_70 96 **—** 10th **--** 50th **——** 2019 Jul 94 92 90 fer May Inu Jar Mar PQ month ΓERN (SOO) CSIRO Australian Government

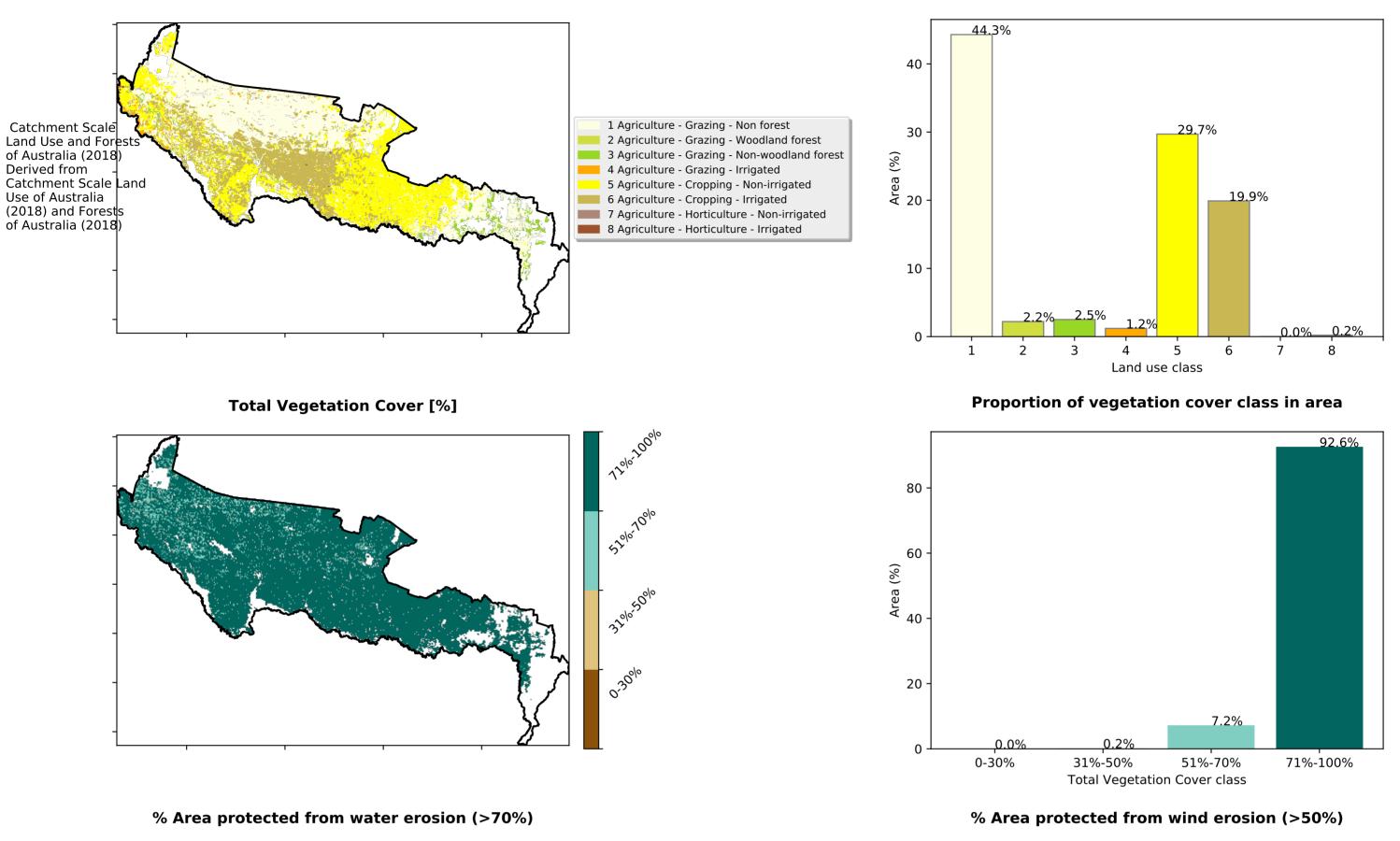
Water erosion historical monthly area protected (Total Veg Cov>70%)

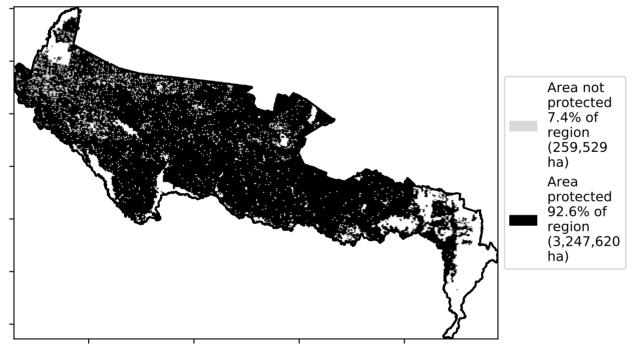


Agriculture

Land use and forest cover

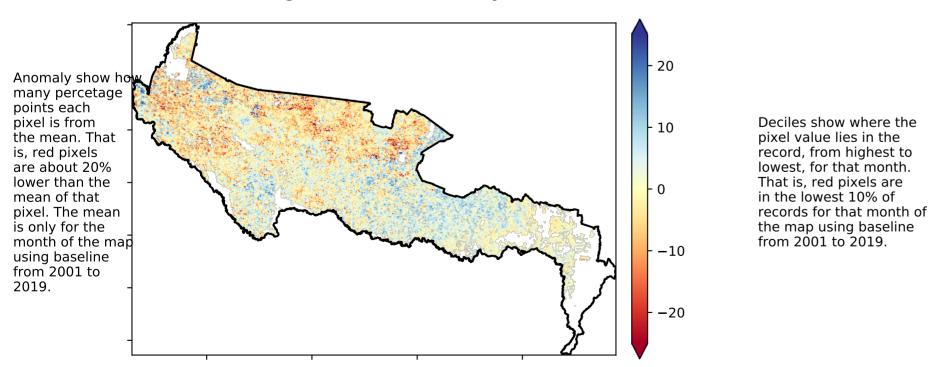
Proportion of each land class in area



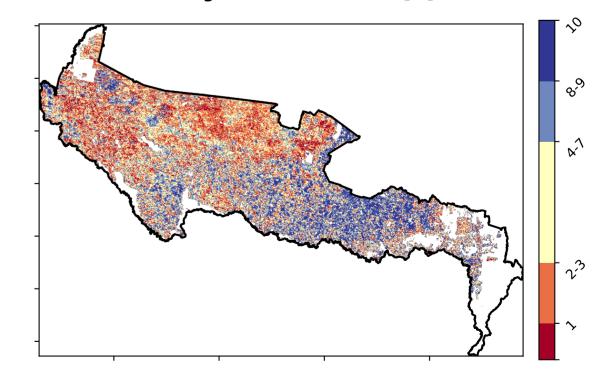




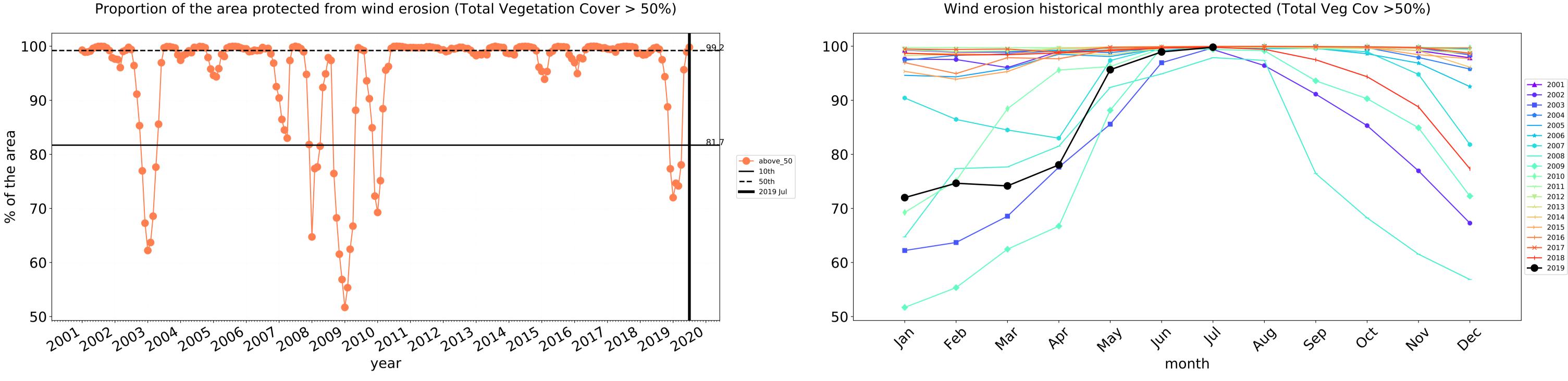
Total Vegetation Cover Anomaly [%]



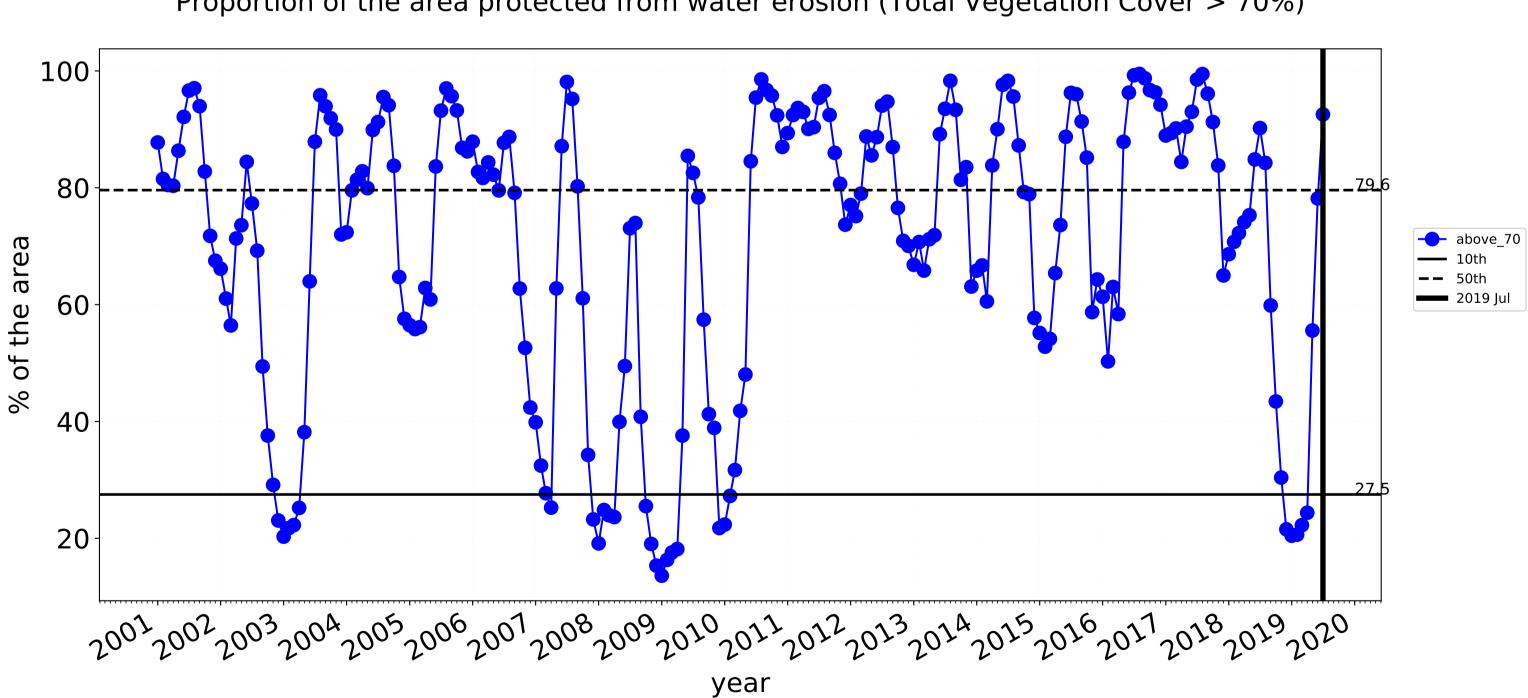
Total Vegetation Cover Decile [%]





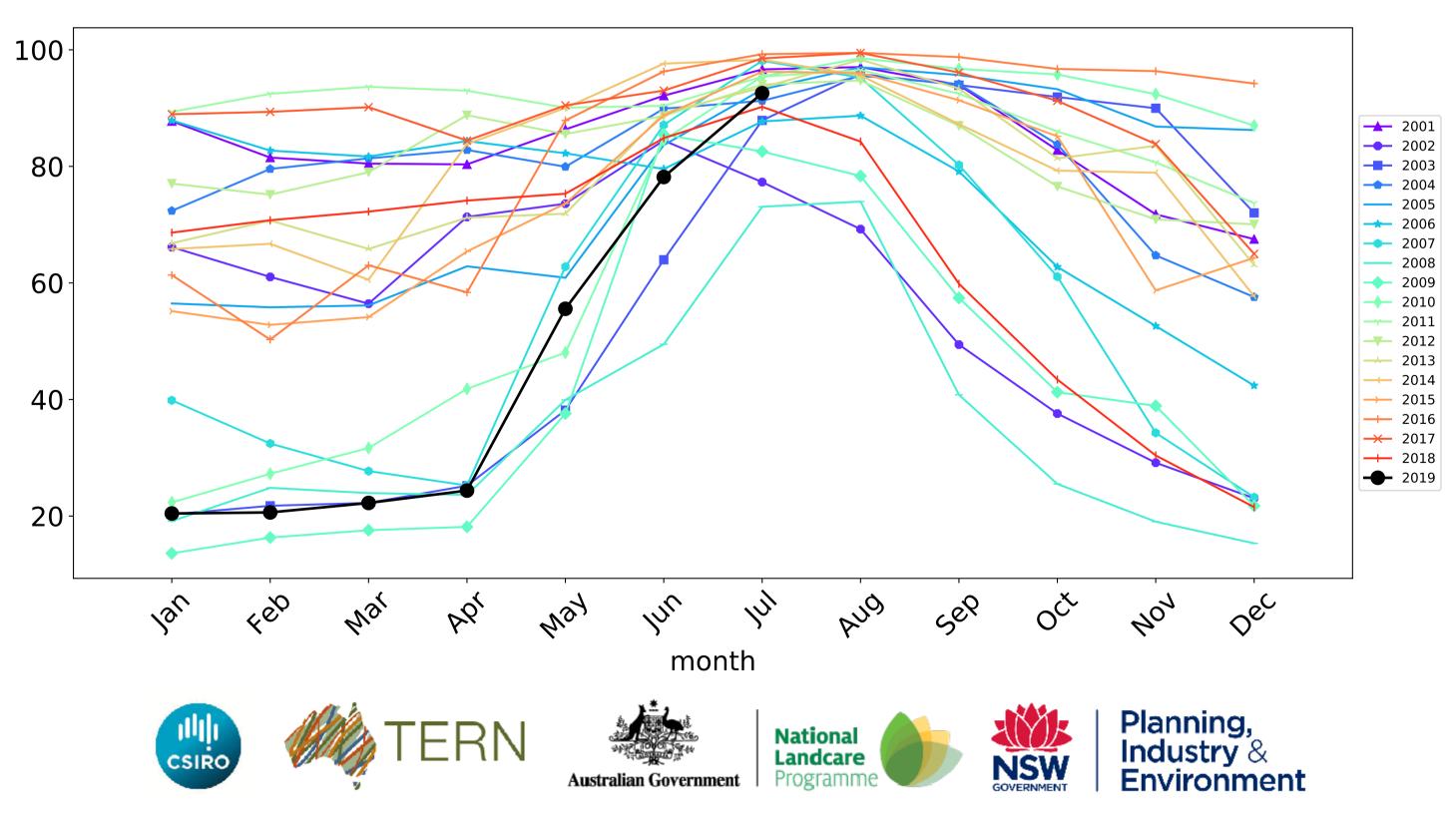


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



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

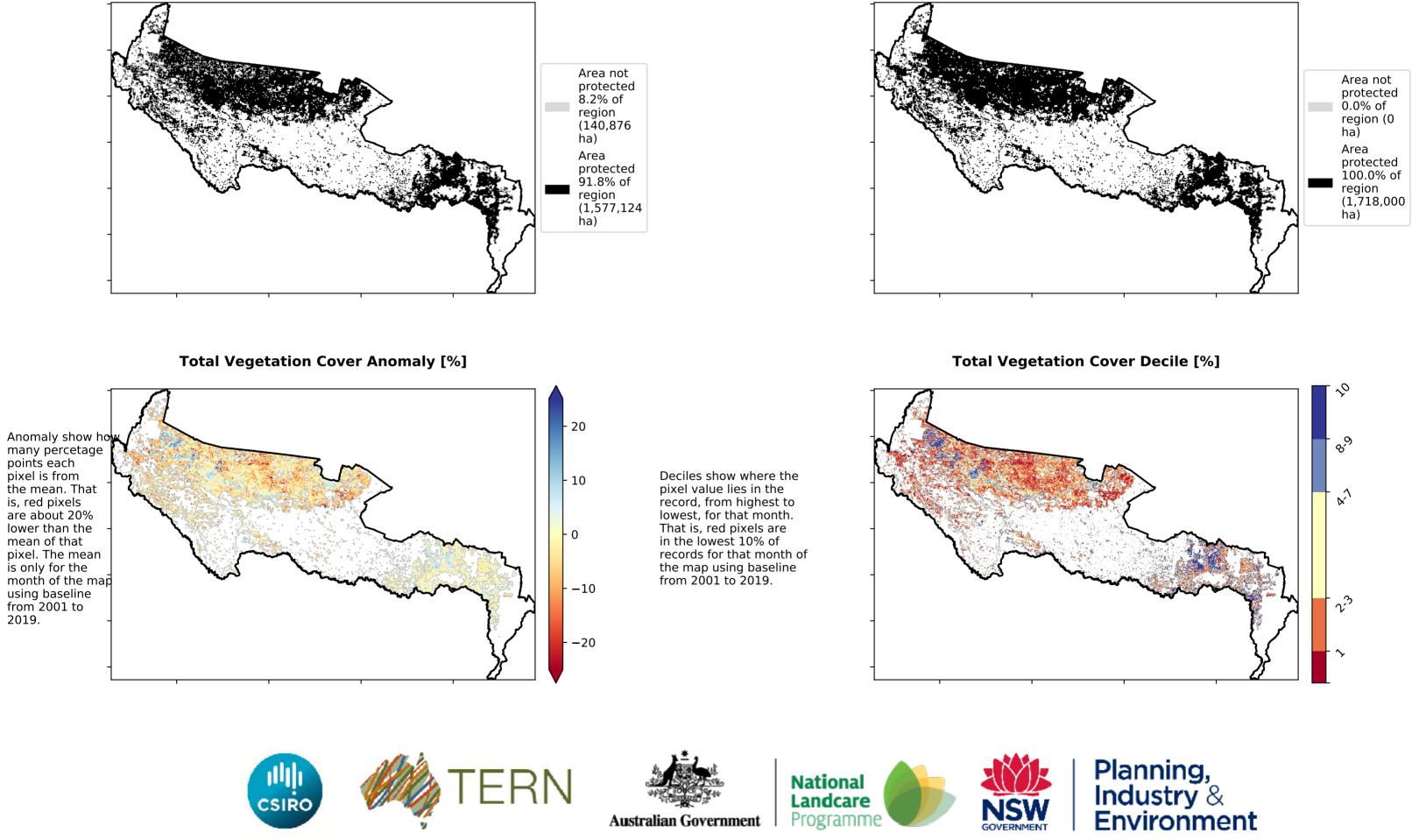
Agriculture timeseries



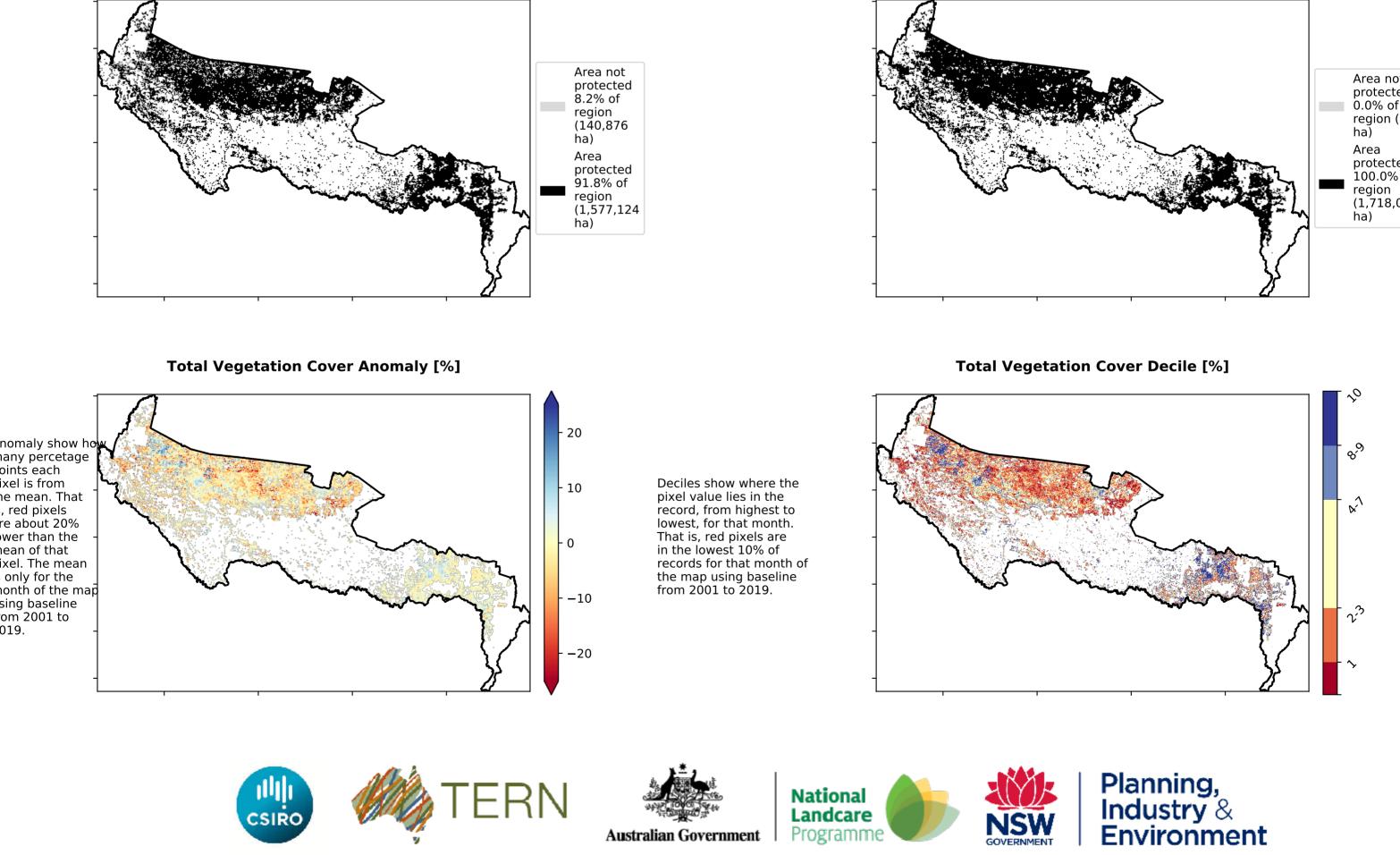
Grazing

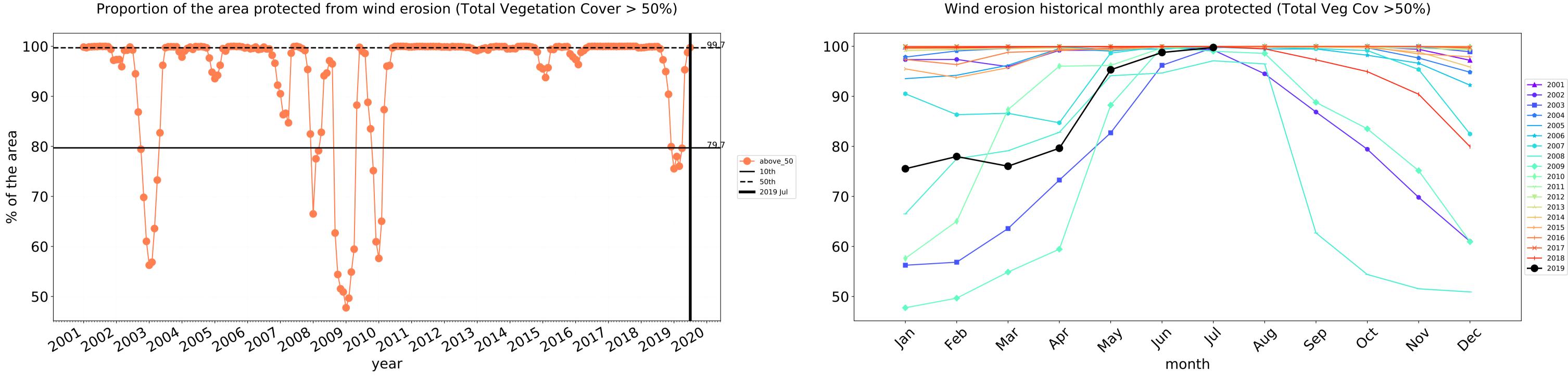
Proportion of each land class in area Land use and forest cover 90.4% 80 Catchment Scale Land Use and Forests of Australia (2018) Derived from 60 Area (%) 0 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest Catchment Scale Land 3 Agriculture - Grazing - Non-woodland forest Use of Australia (2018) and Forests of Australia (2018) 20 5.2% 4.4% 0 1 2 3 Land use class Proportion of vegetation cover class in area **Total Vegetation Cover [%]** 12%100 91.8% 80 52010-705 60 Area (%) 0 32005001 0.30% 20 7.9% 0.2% 0.1% 0 0-30% 31%-50% 51%-70% 71%-100% Total Vegetation Cover class

% Area protected from water erosion (>70%)

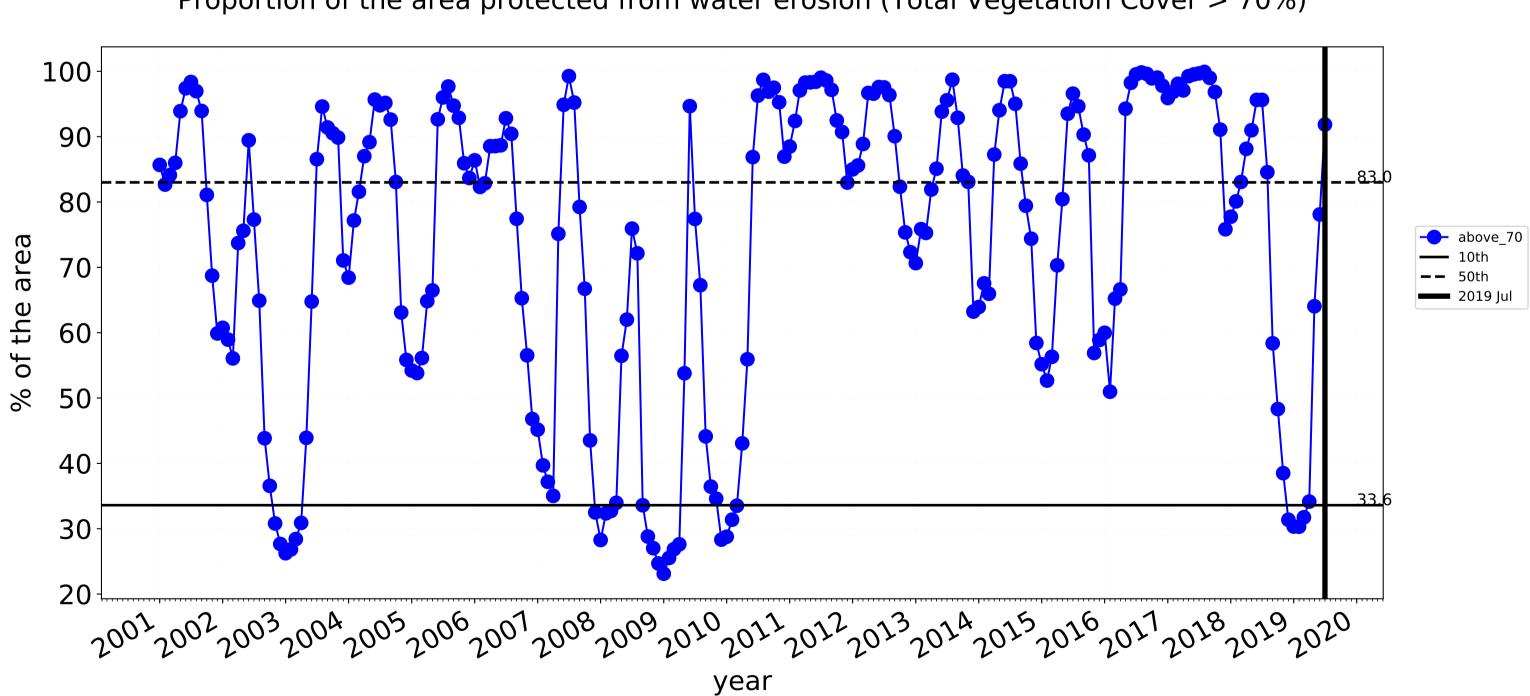






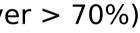


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

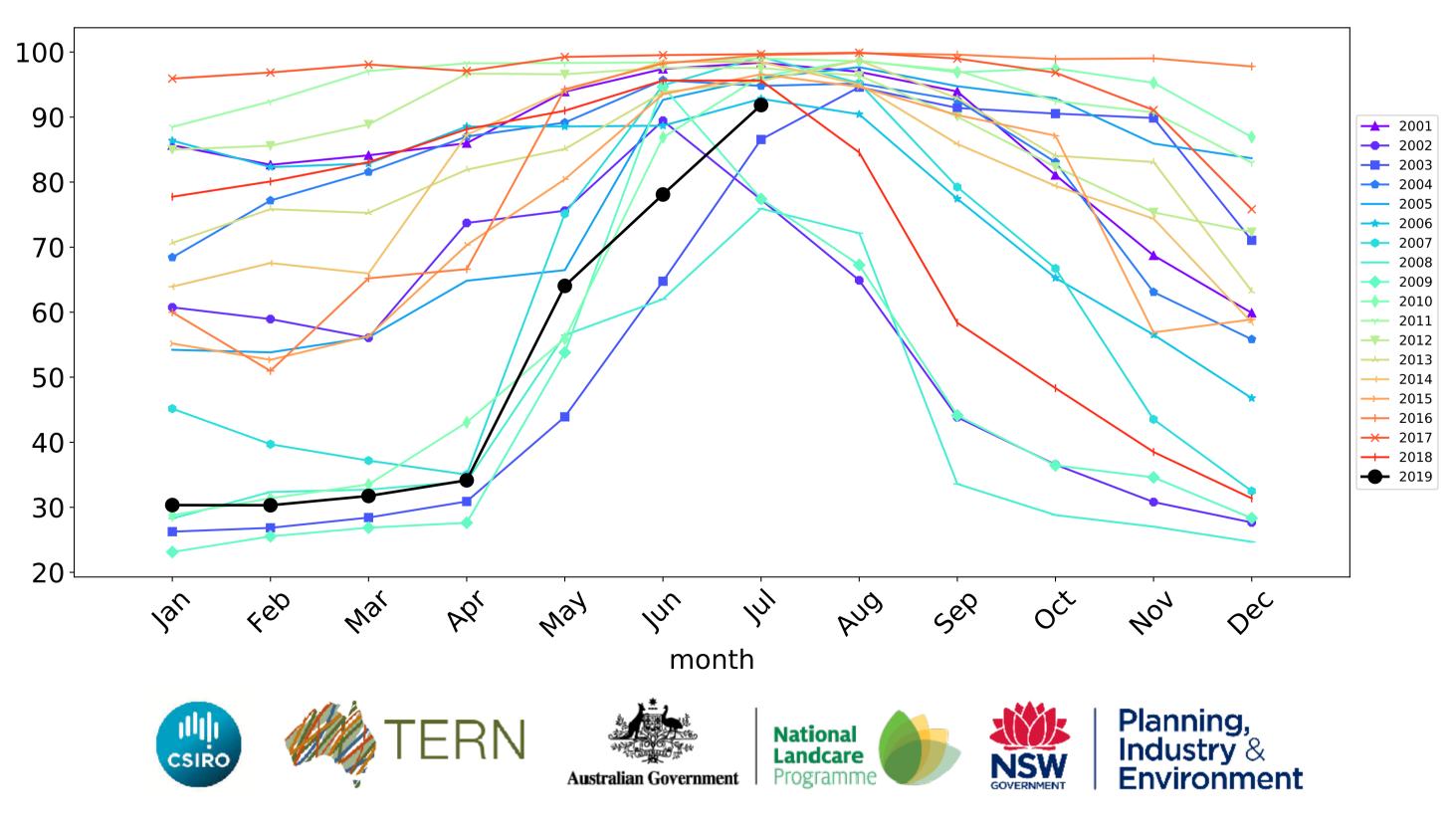


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

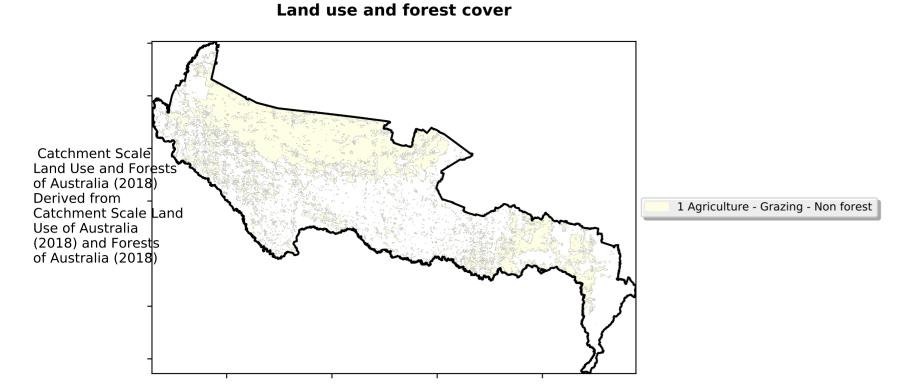
Grazing timeseries



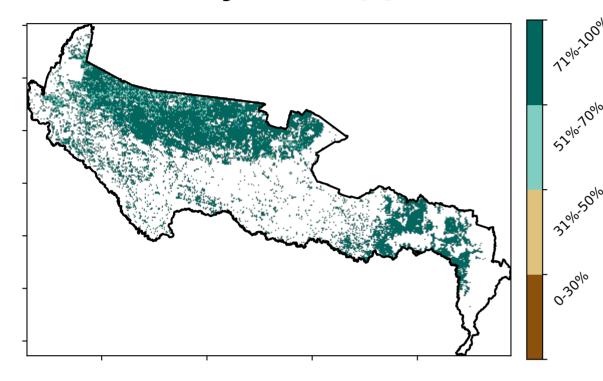
Water erosion historical monthly area protected (Total Veg Cov>70%)



Grazing non forest

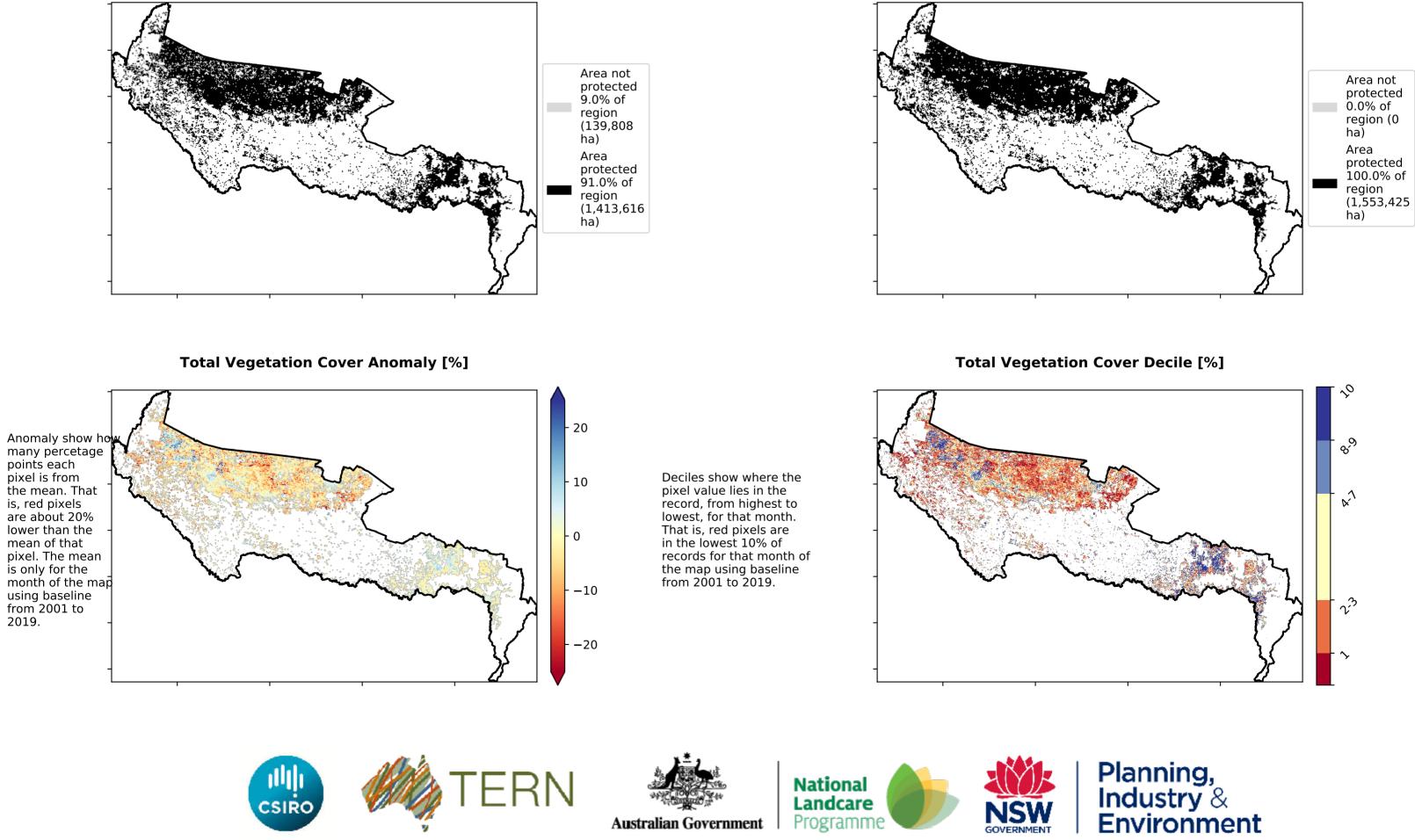


Total Vegetation Cover [%]



% Area protected from water erosion (>70%)

CSIRO

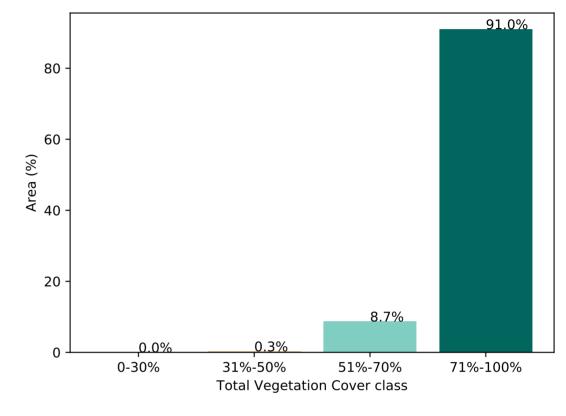


Landcare

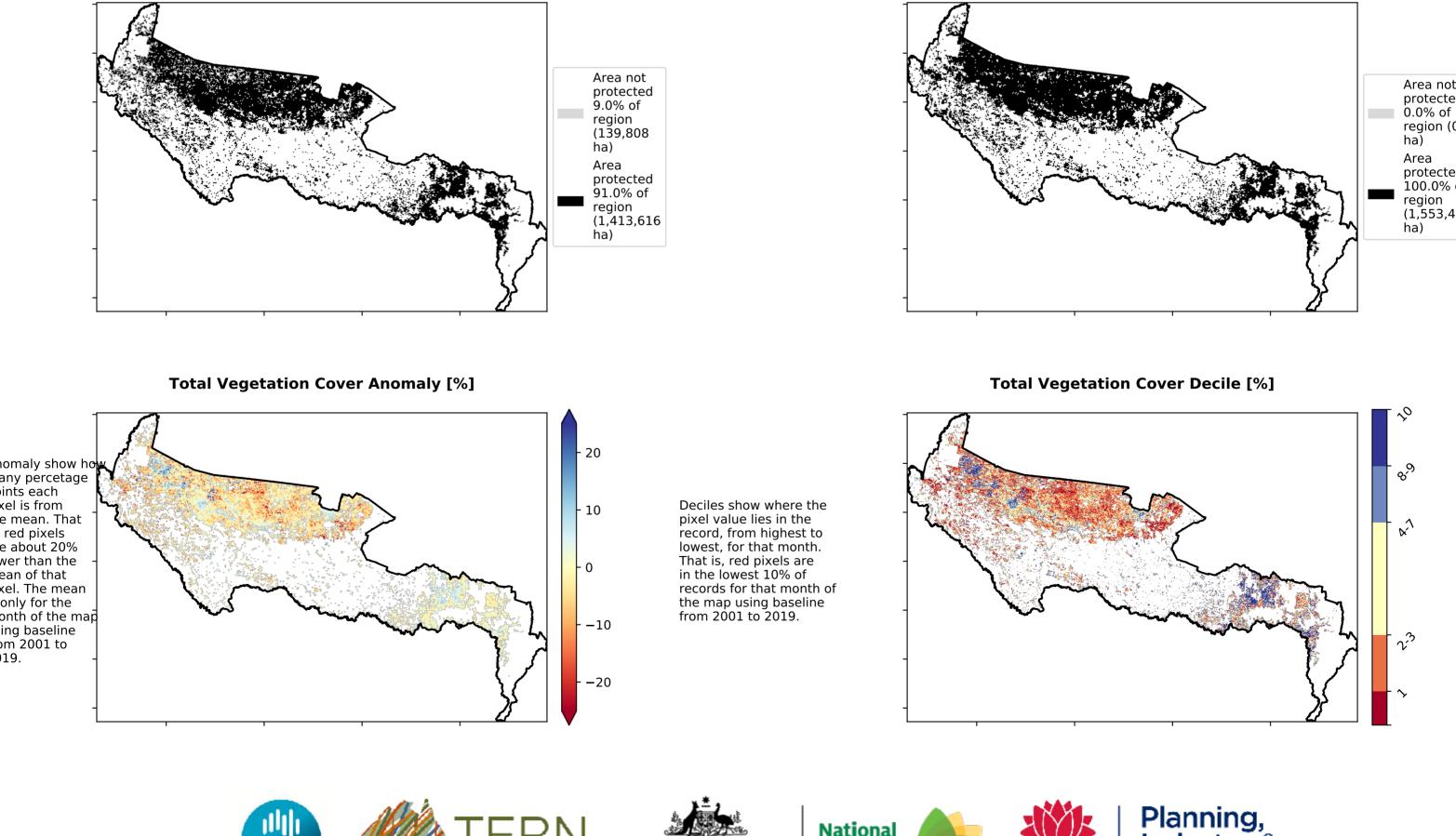
Programme

NSW GOVERNMENT



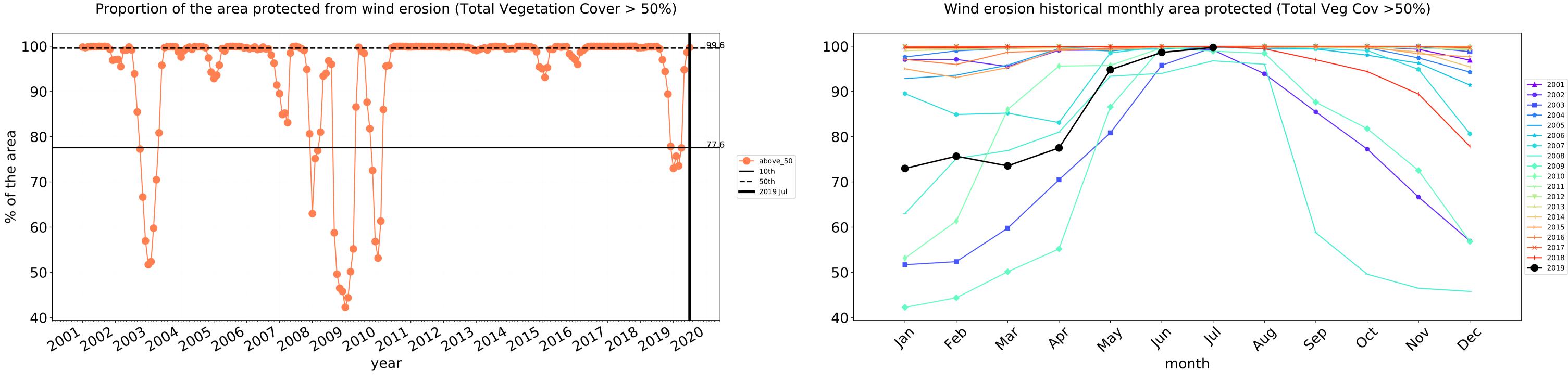


% Area protected from wind erosion (>50%)

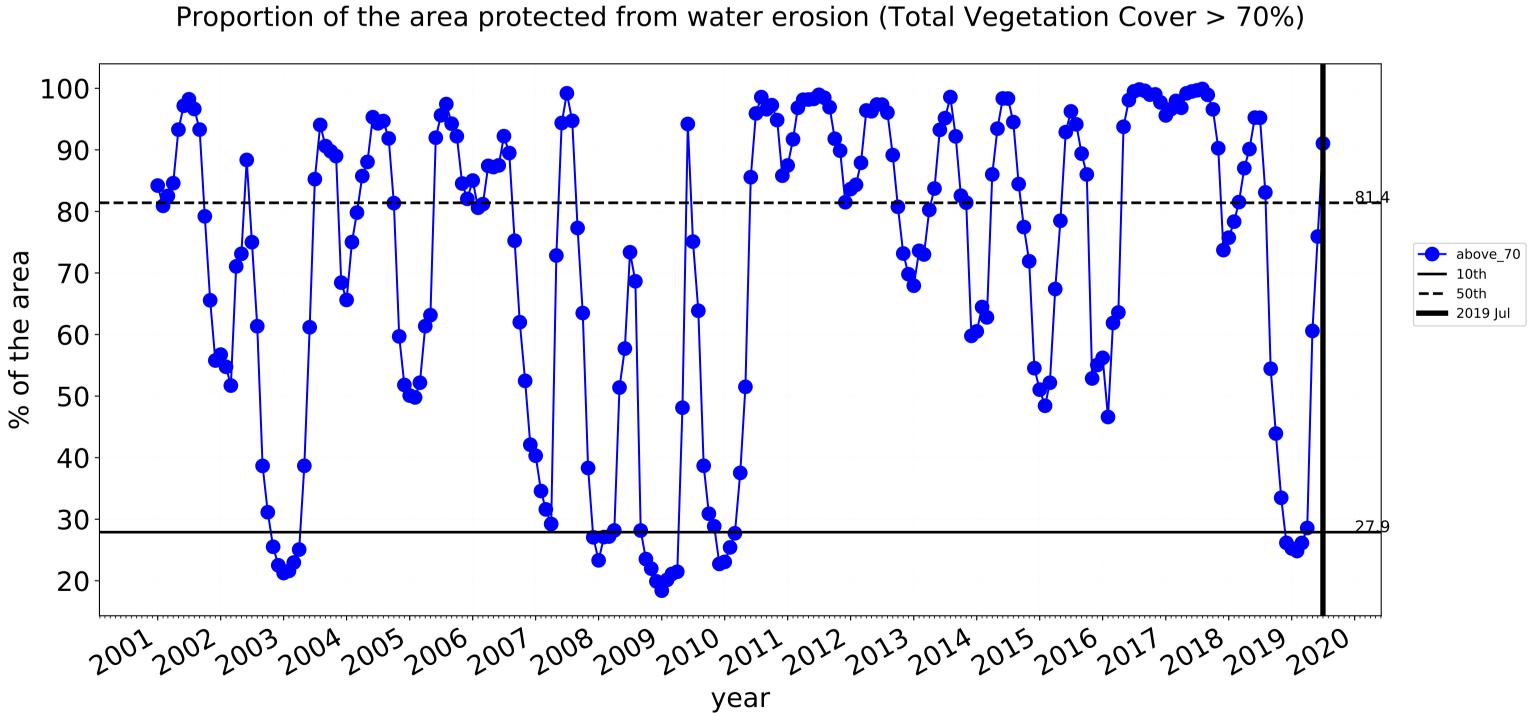




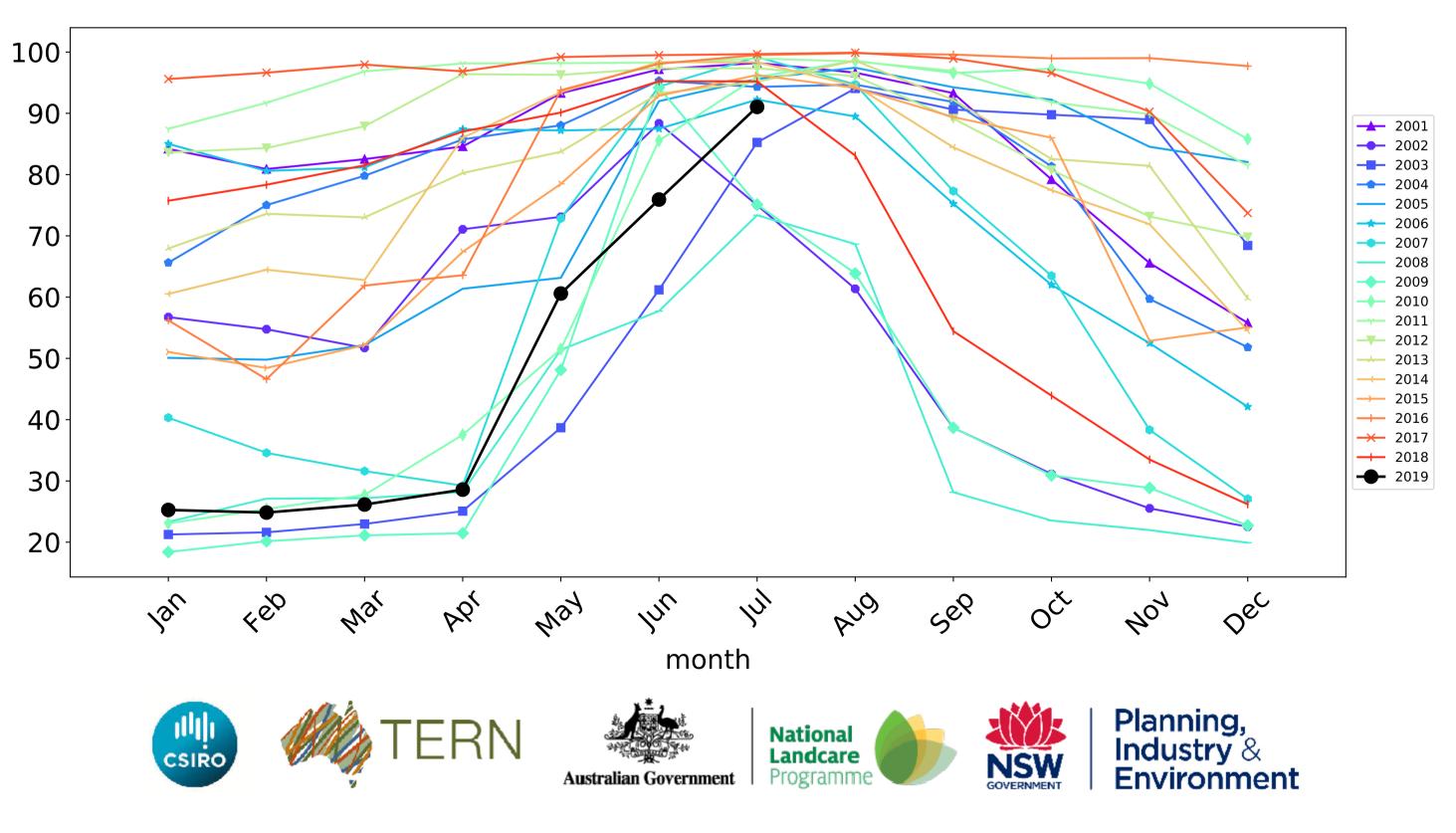
Australian Government



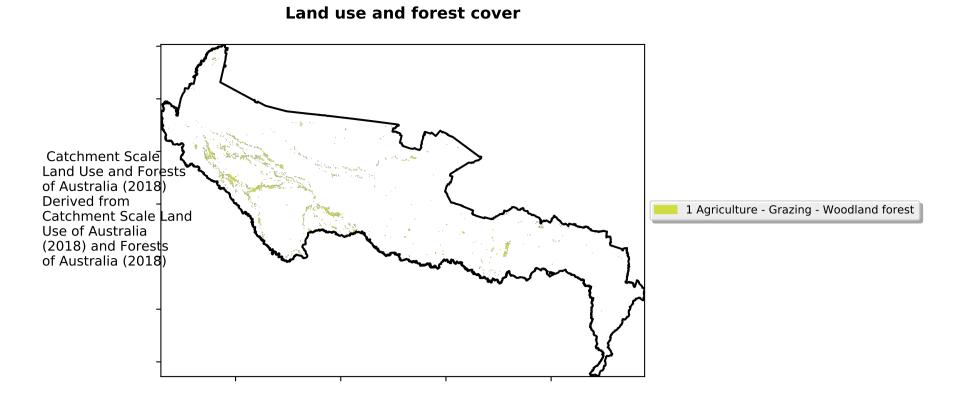
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



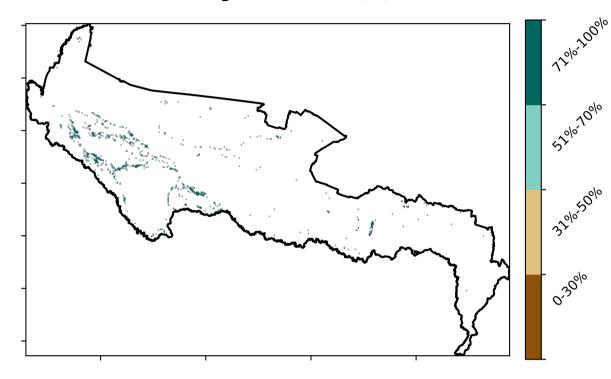
Grazing non forest timeseries



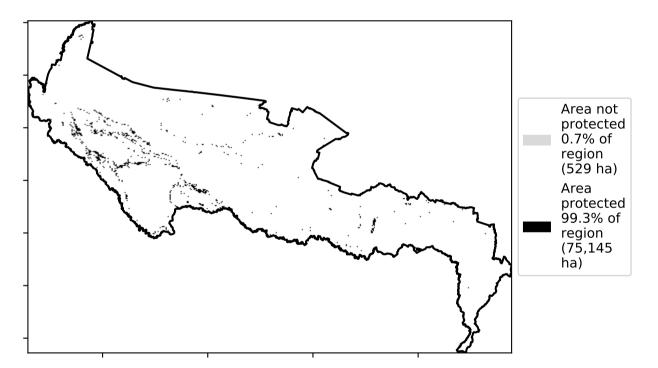
Grazing Woodland forest



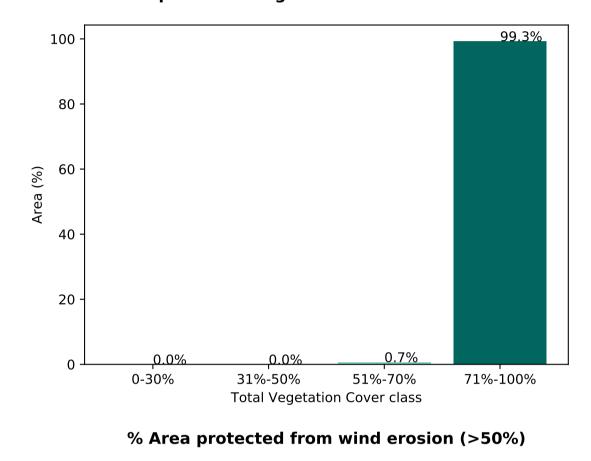
Total Vegetation Cover [%]

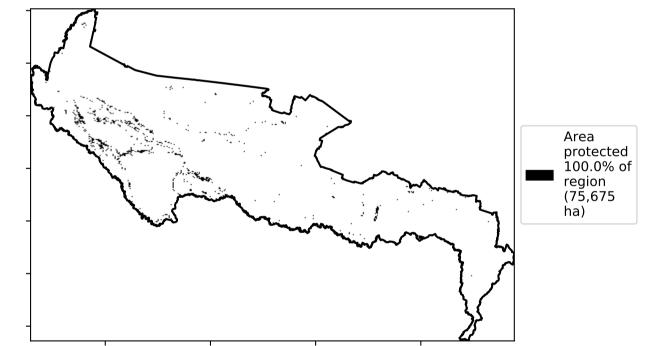


% Area protected from water erosion (>70%)

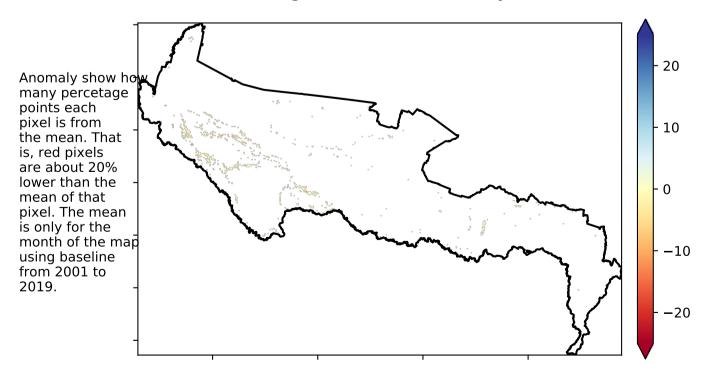


Proportion of vegetation cover class in area



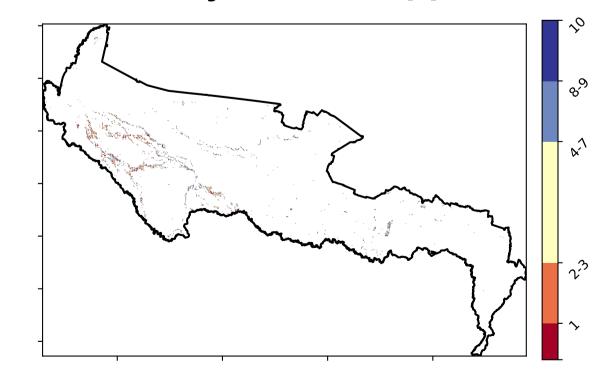


Total Vegetation Cover Anomaly [%]

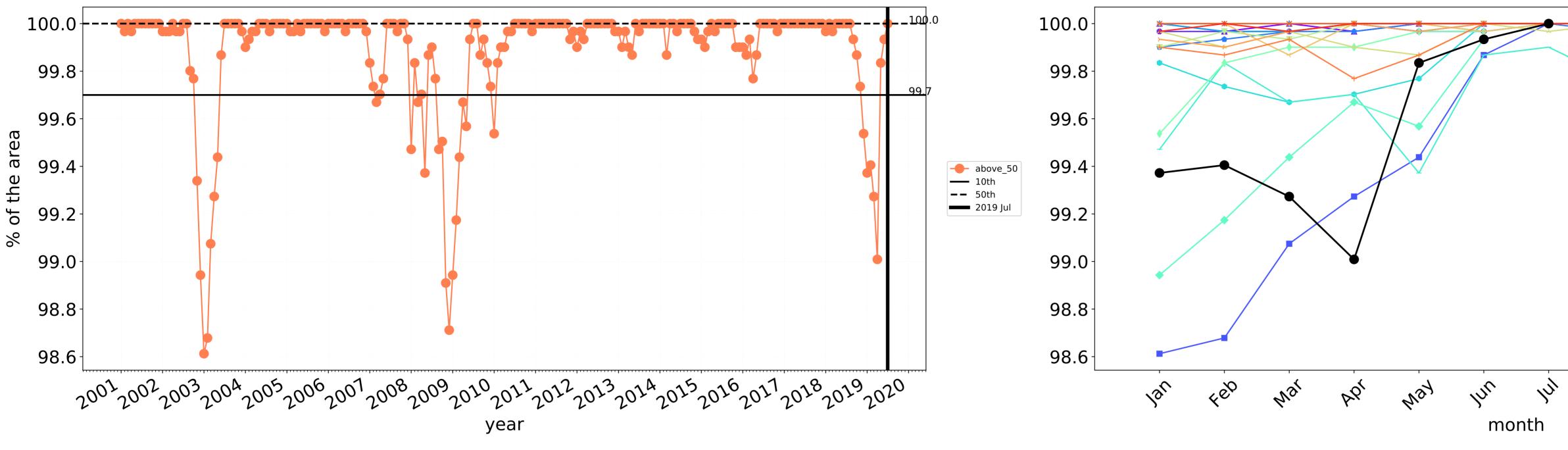


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]

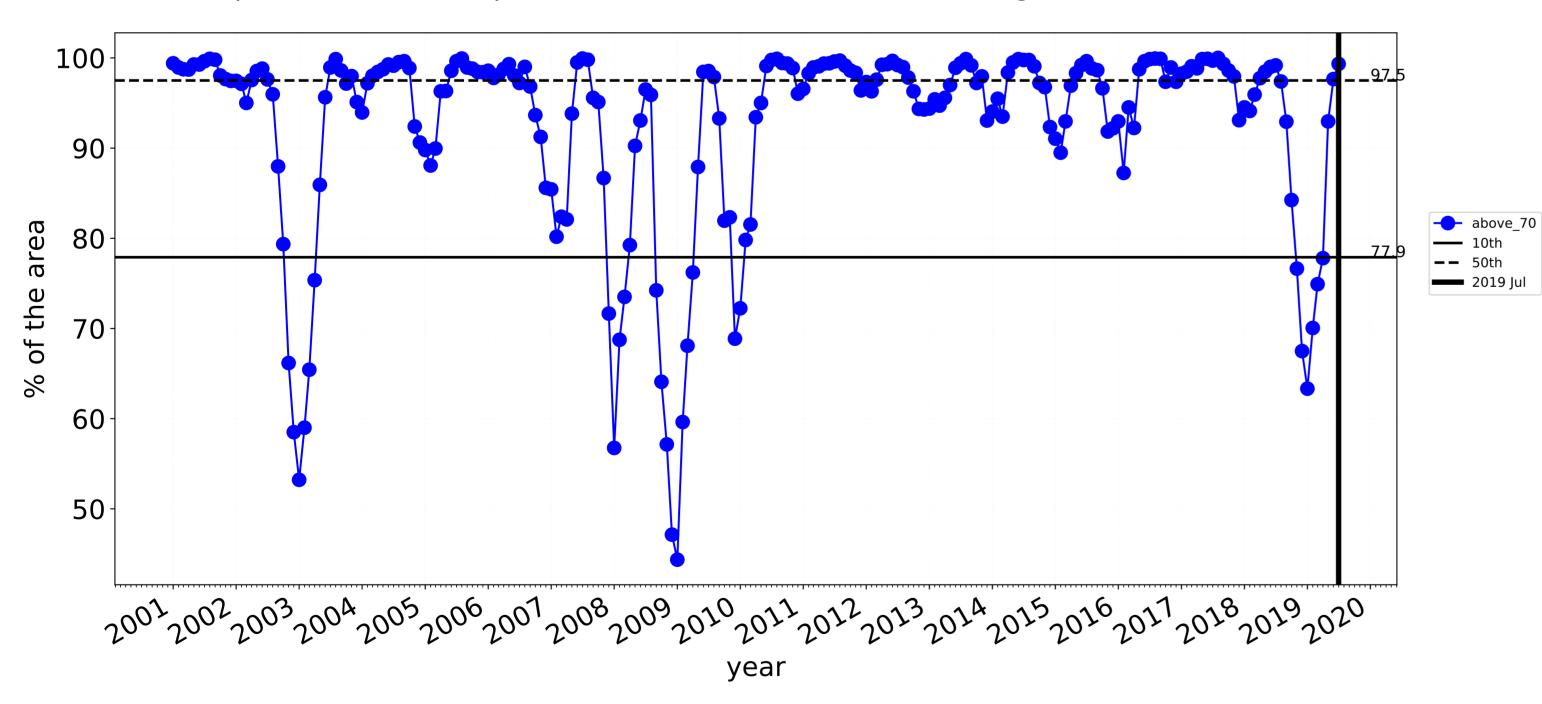






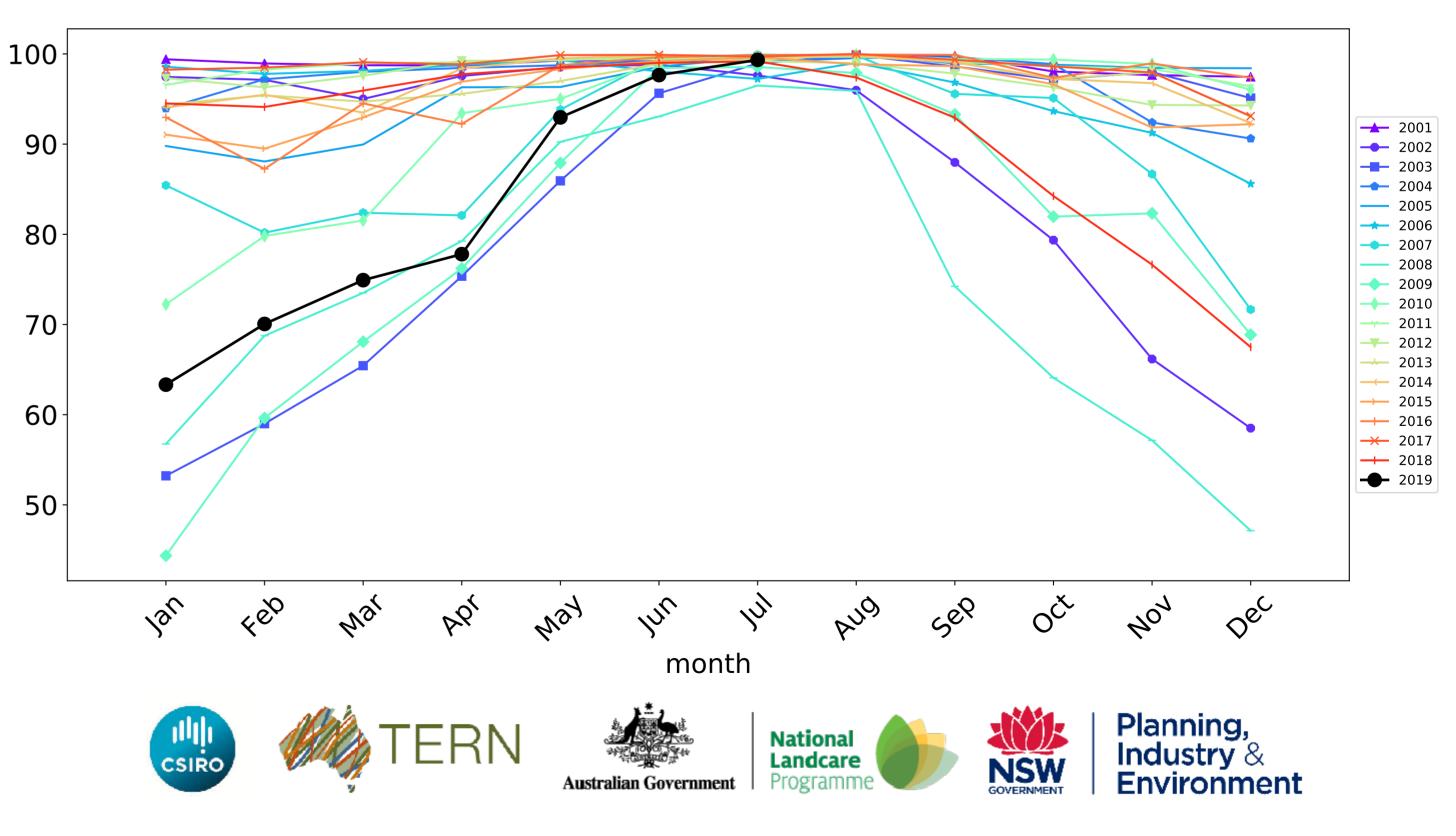
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



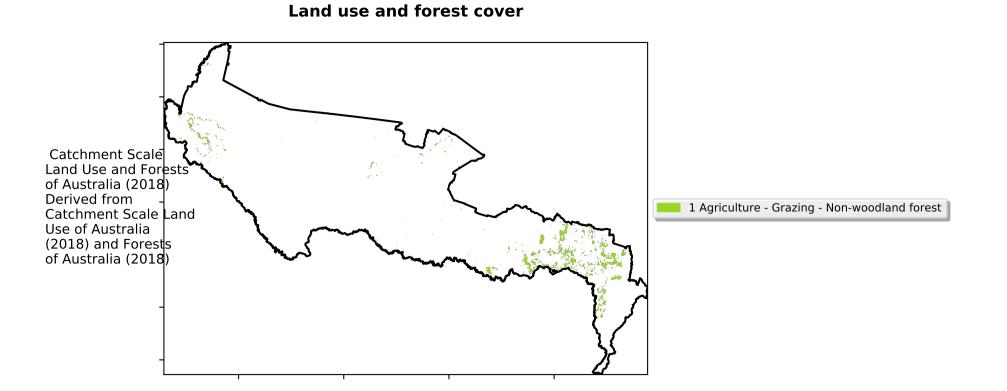


Wind erosion historical monthly area protected (Total Veg Cov >50%)

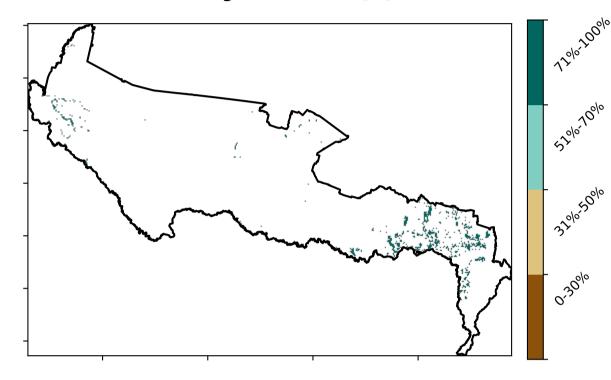


— 2001 --- 2002 ---- 2003 **---** 2004 ____ 2005 **___** 2006 --- 2007 2008 ---- 2009 **----** 2010 2011 --- 2013 **→** 2014 **→** 2015 --- 2016 <u>→</u> 2017 **→** 2018 ---- 2019 Sel OČ 401 AUD Dec

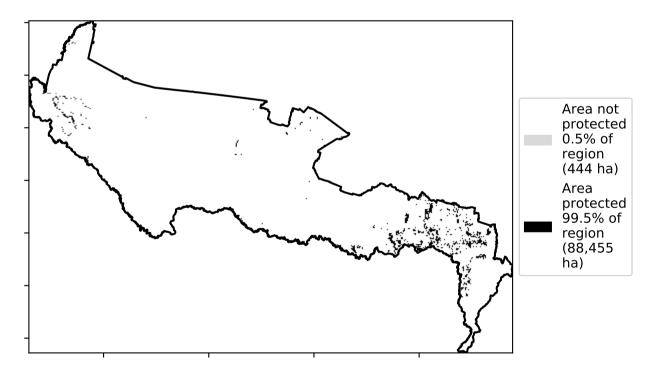
Grazing - Forest (non woodland)



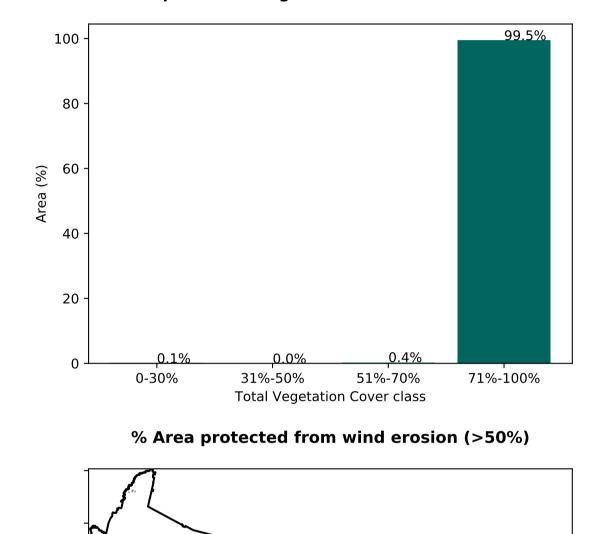
Total Vegetation Cover [%]



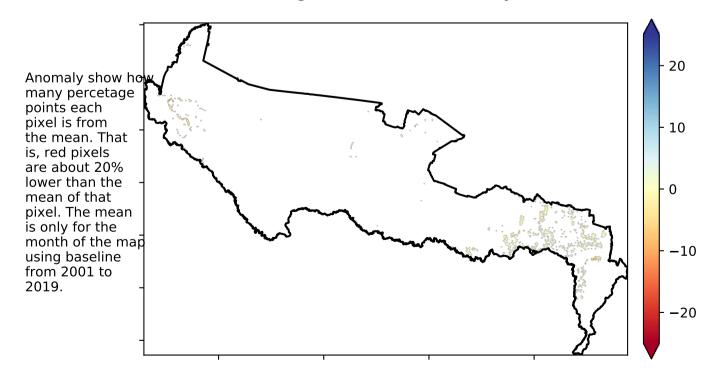
% Area protected from water erosion (>70%)

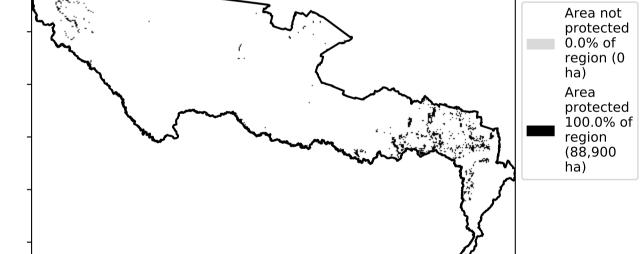


Proportion of vegetation cover class in area

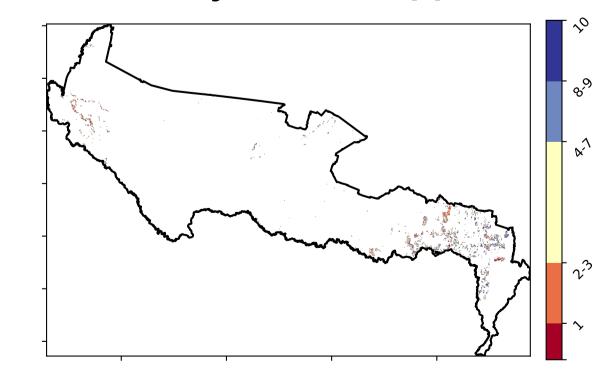


Total Vegetation Cover Anomaly [%]





Total Vegetation Cover Decile [%]



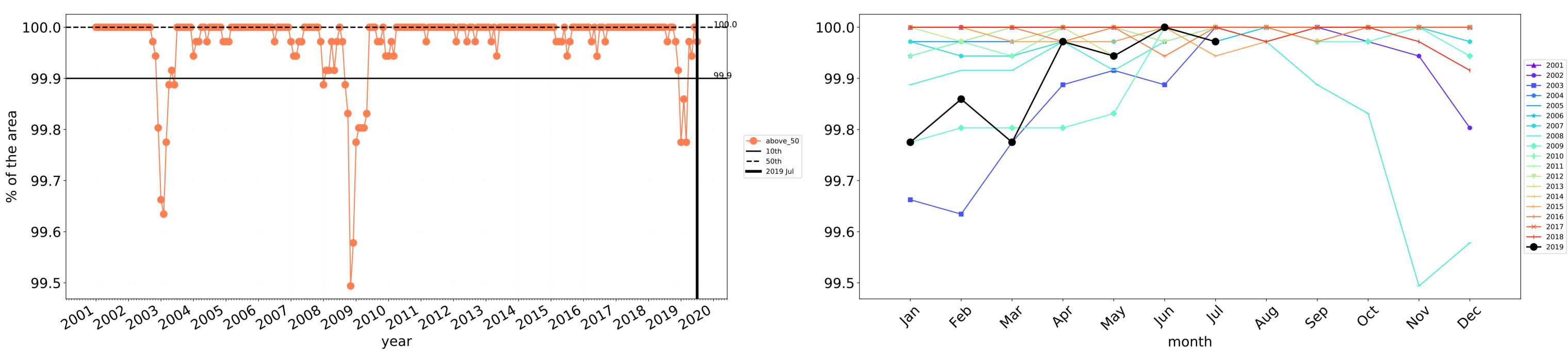


Deciles show where the pixel value lies in the

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

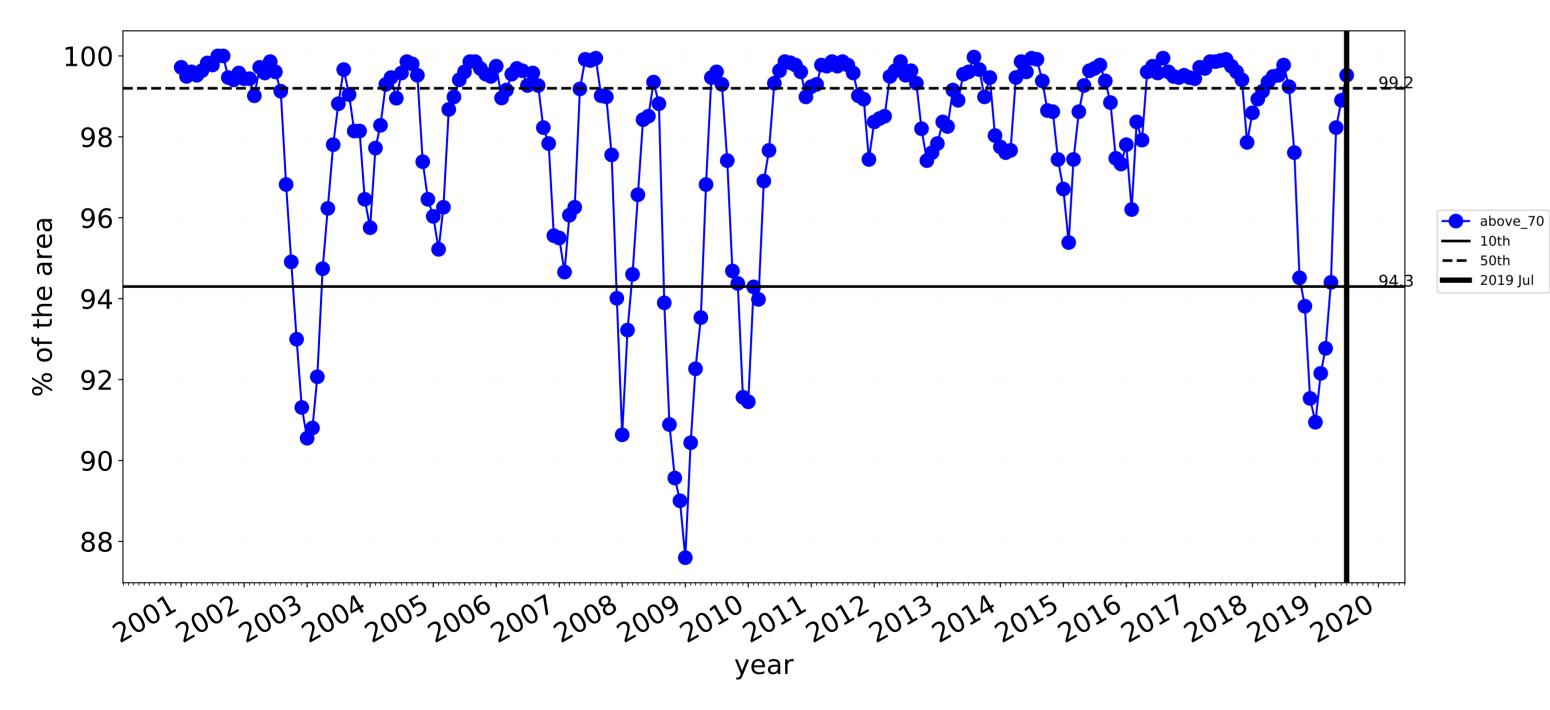
records for that month of

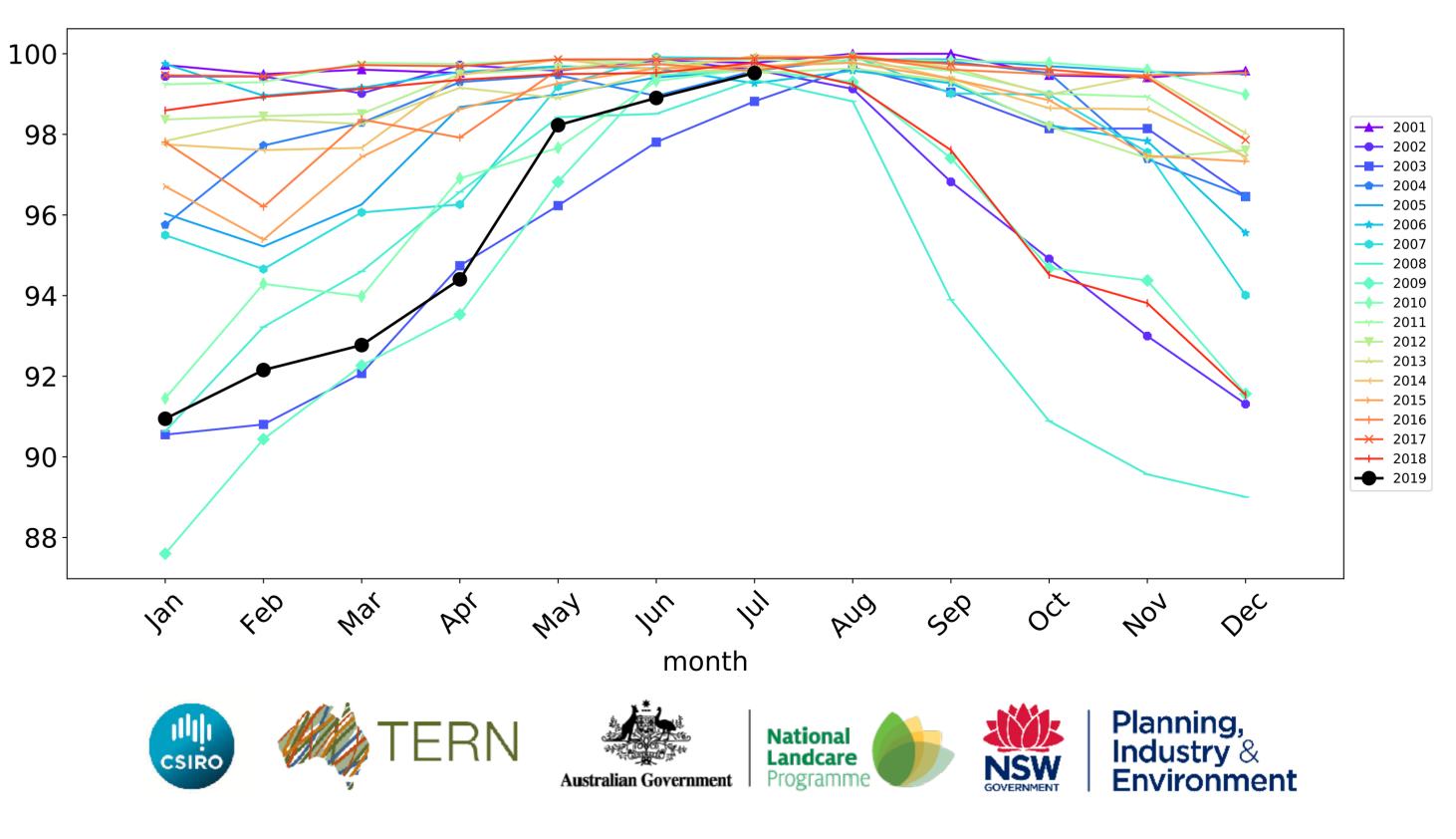
the map using baseline from 2001 to 2019.



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

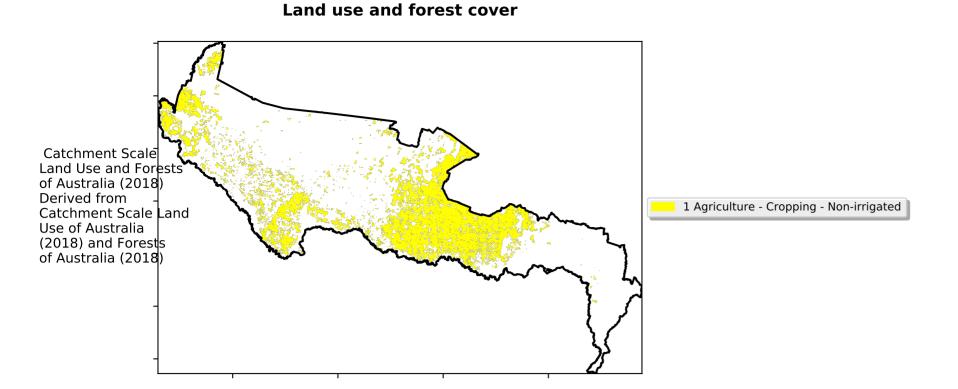
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



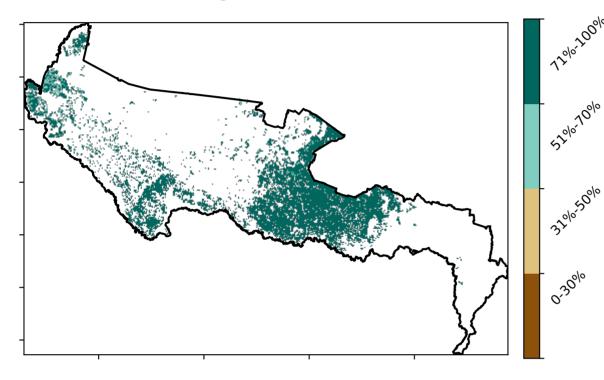


Wind erosion historical monthly area protected (Total Veg Cov >50%)

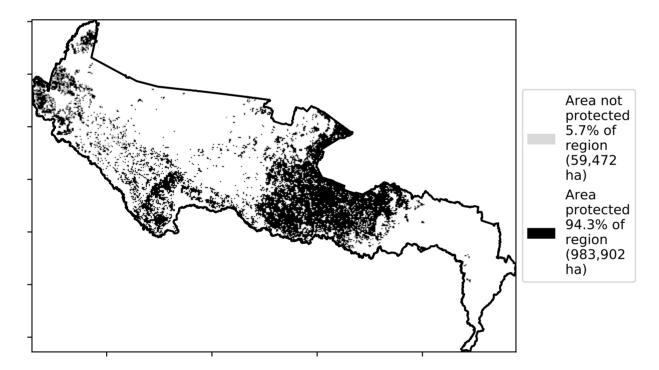
Cropping



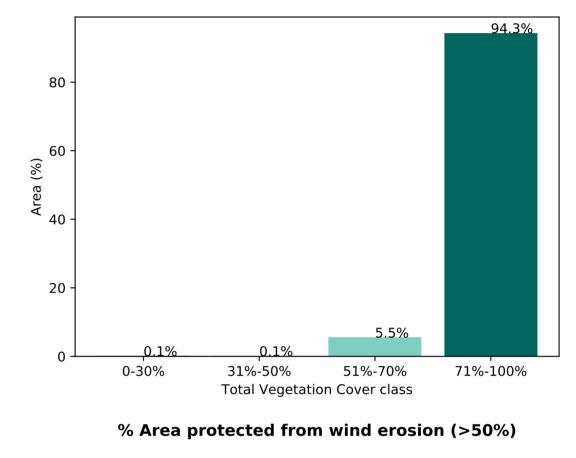
Total Vegetation Cover [%]

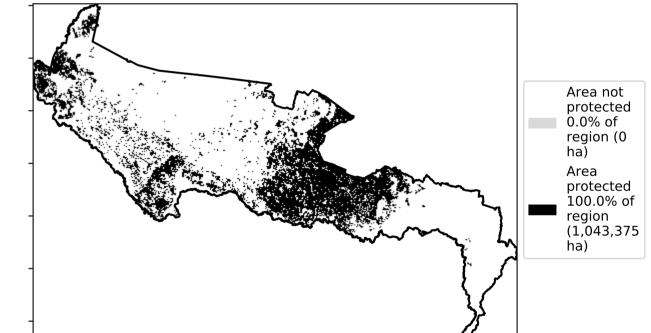


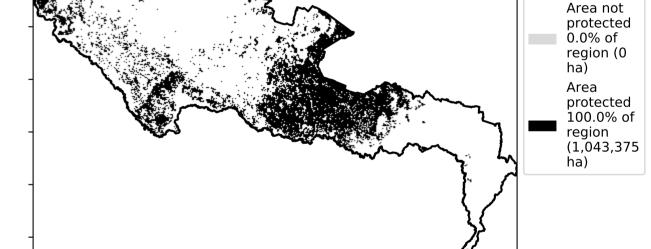
% Area protected from water erosion (>70%)



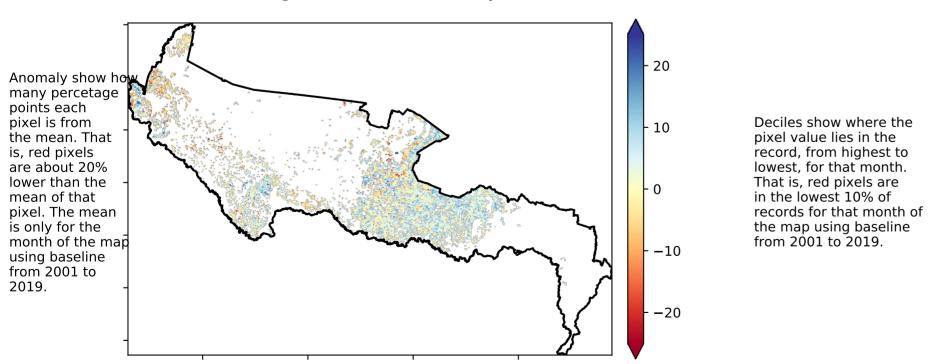
Proportion of vegetation cover class in area



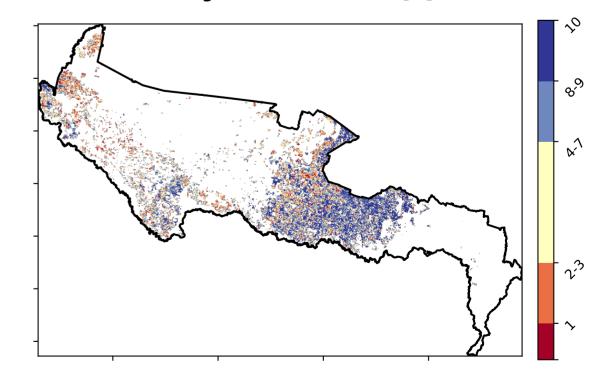




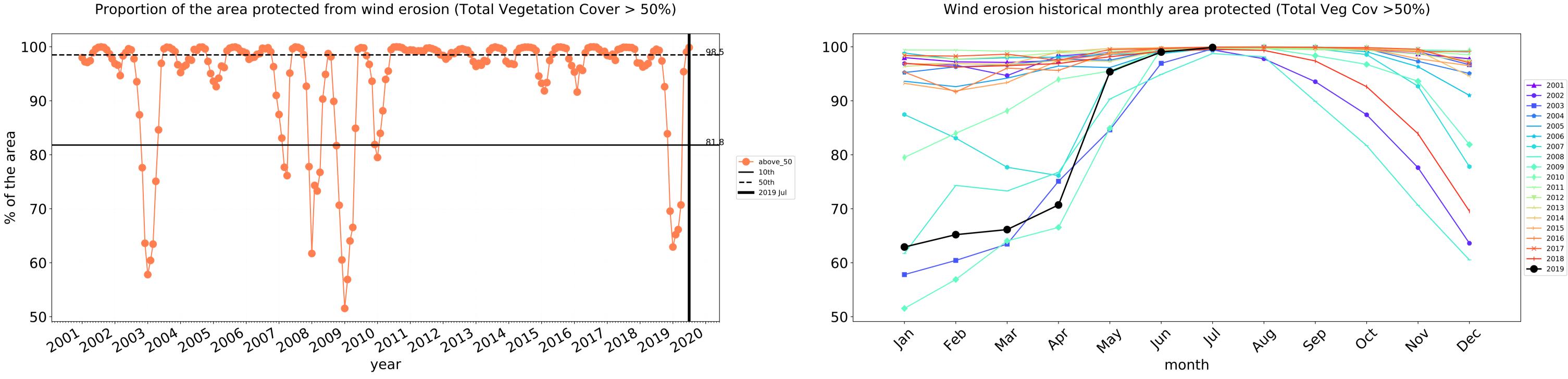
Total Vegetation Cover Anomaly [%]



Total Vegetation Cover Decile [%]

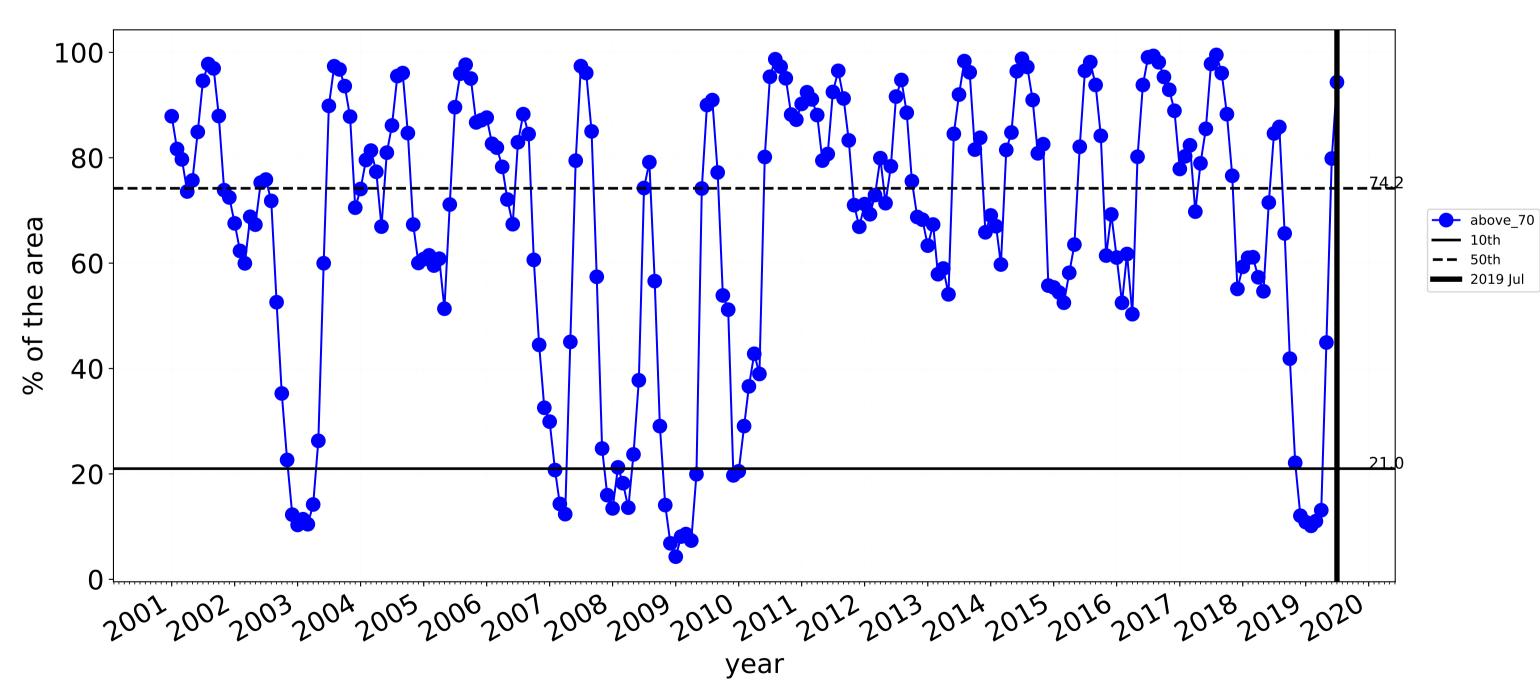




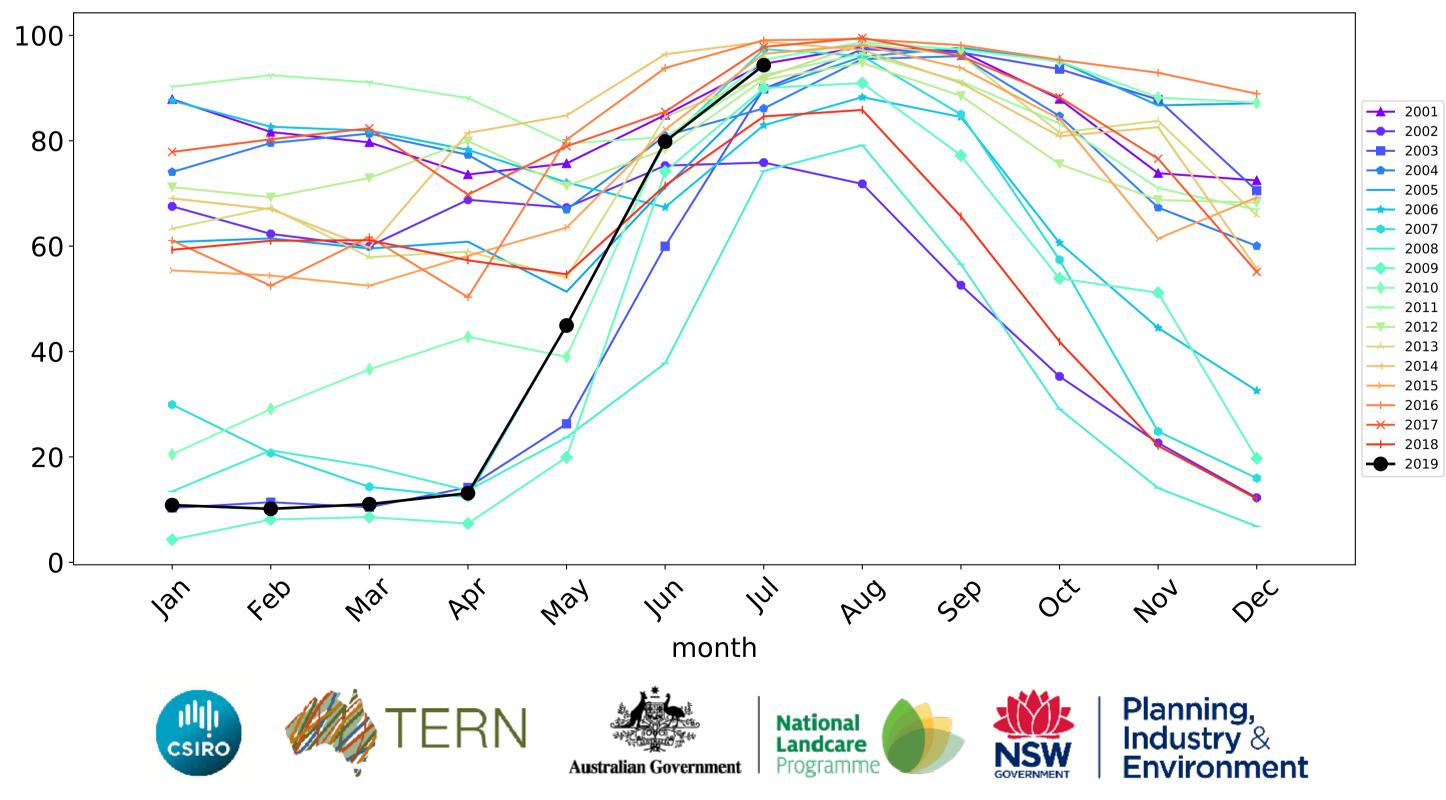


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



Cropping timeseries

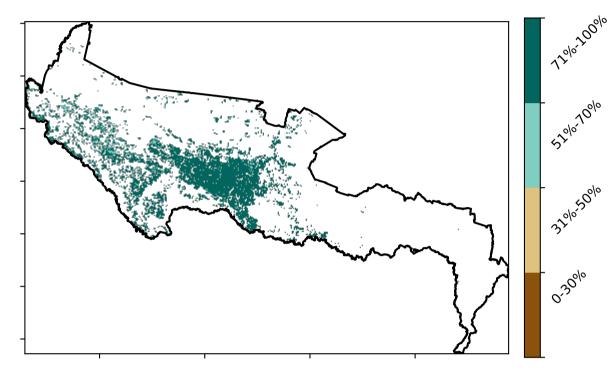


Water erosion historical monthly area protected (Total Veg Cov>70%)

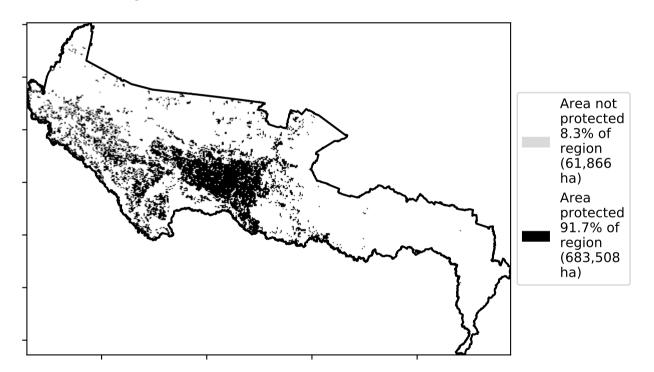
Irrigation

Land use and forest cover Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated Catchment Scale Land 3 Agriculture - Horticulture - Irrigated Use of Australia (2018) and Forests of Australia (2018)

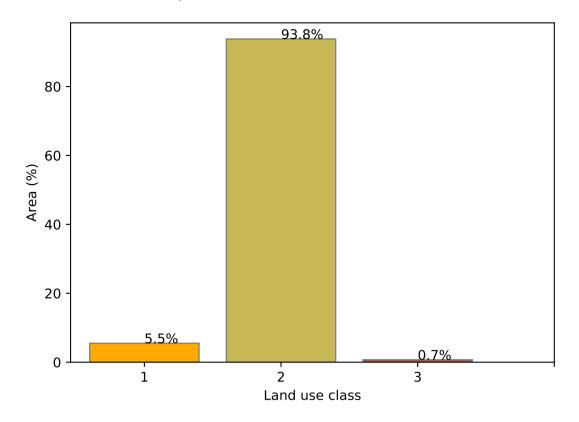
Total Vegetation Cover [%]



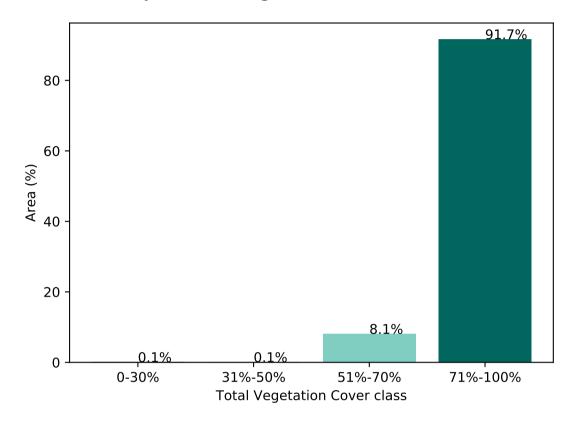
% Area protected from water erosion (>70%)



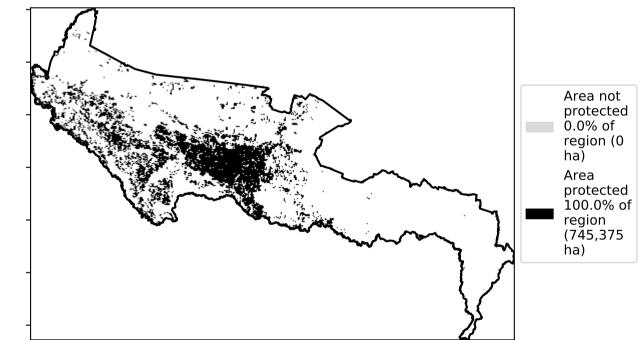
Proportion of each land class in area



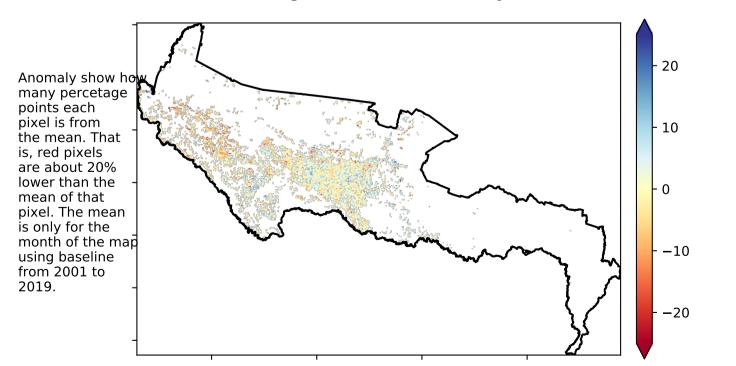
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

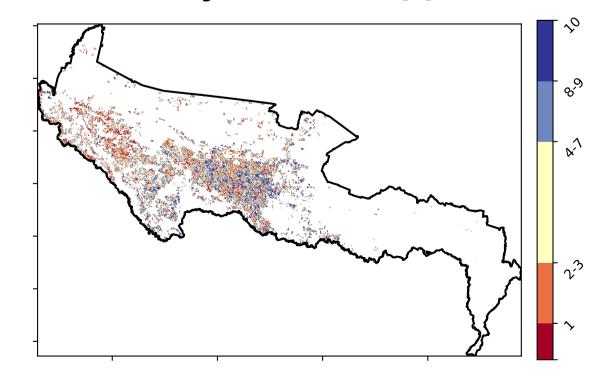


Total Vegetation Cover Anomaly [%]

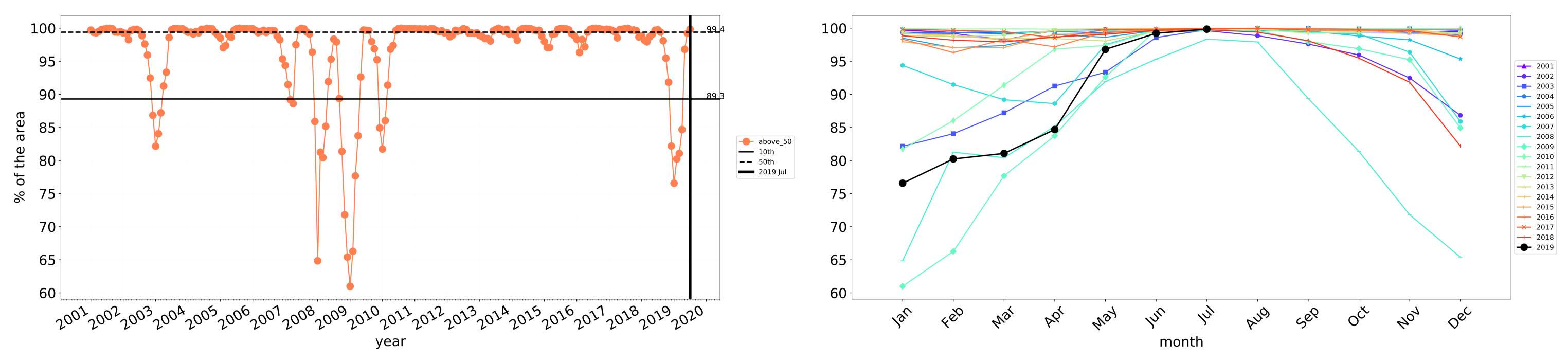


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

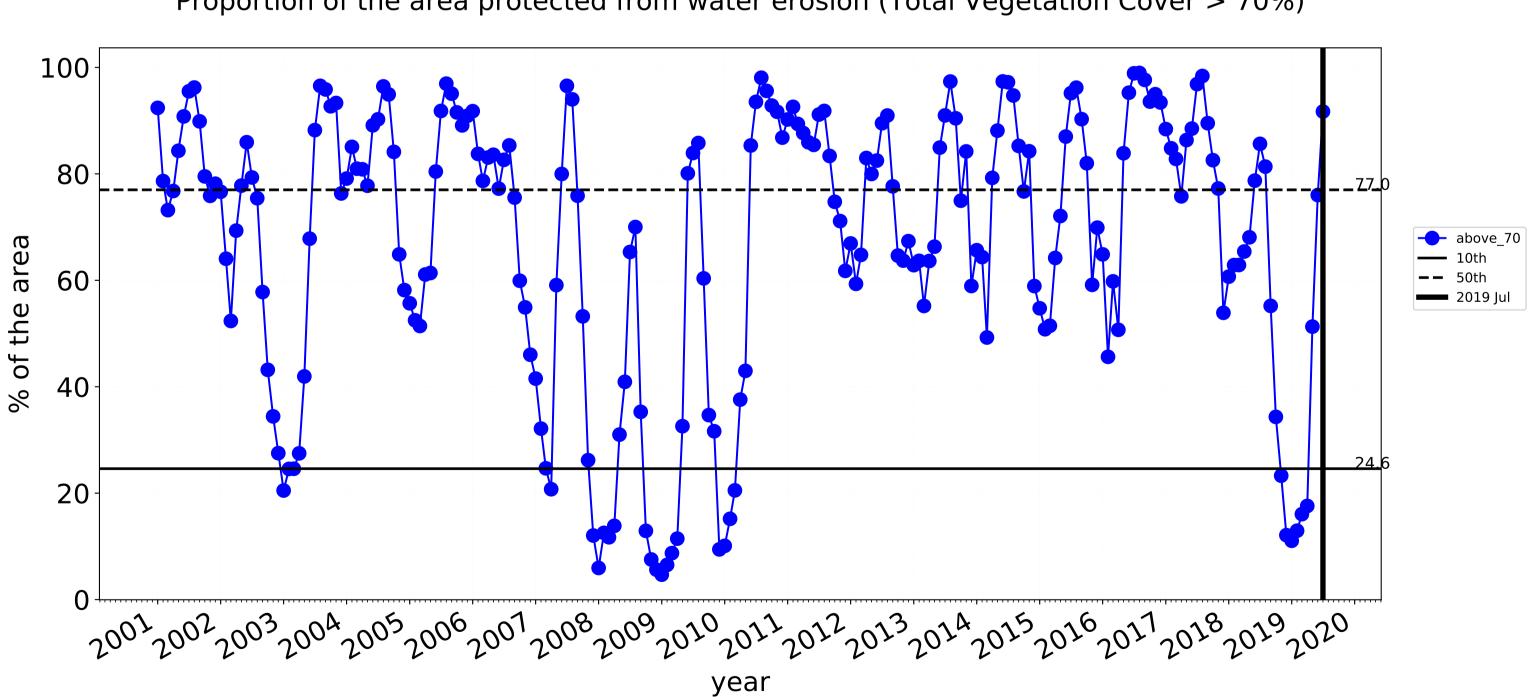
Total Vegetation Cover Decile [%]







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



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

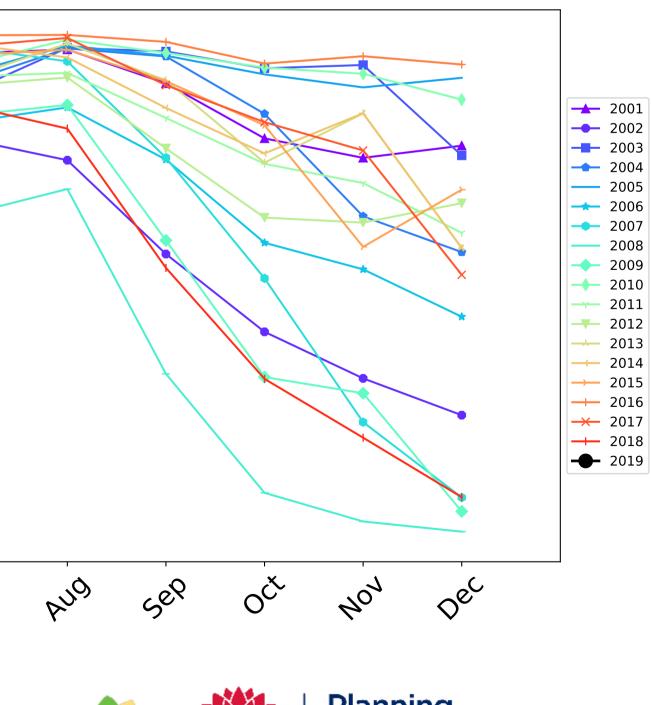
Irrigation timeseries



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

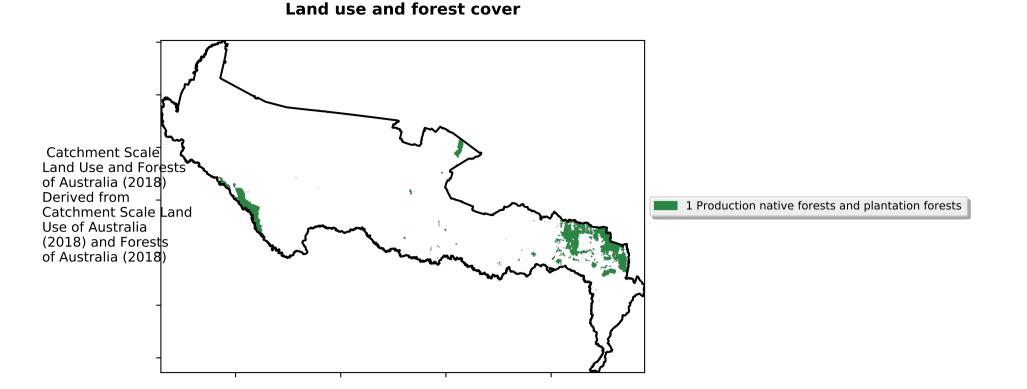
100-80 60 40 20-0 way In Jan 4eb hy, 291 Na, month TERN CSIRO Australian Government

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

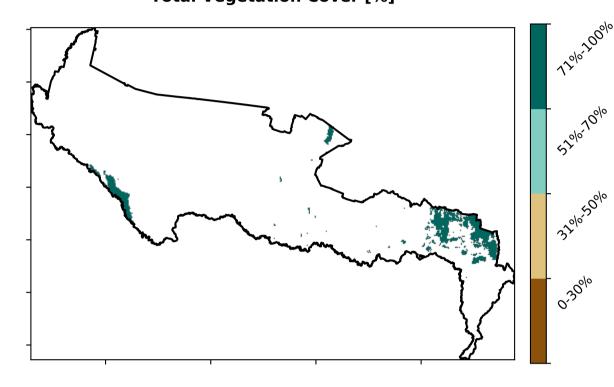




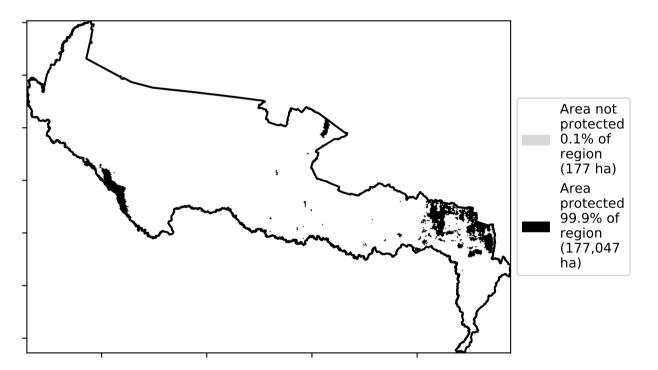
Production native forests and plantation forests



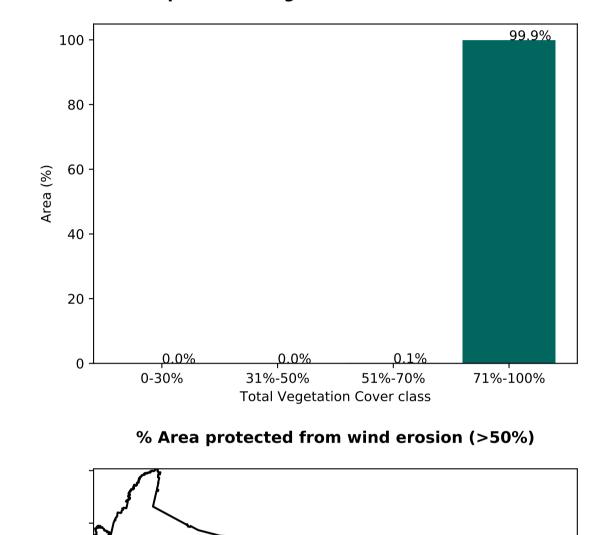
Total Vegetation Cover [%]



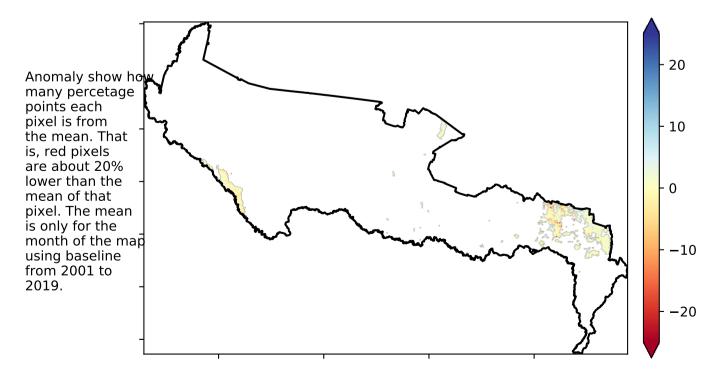
% Area protected from water erosion (>70%)

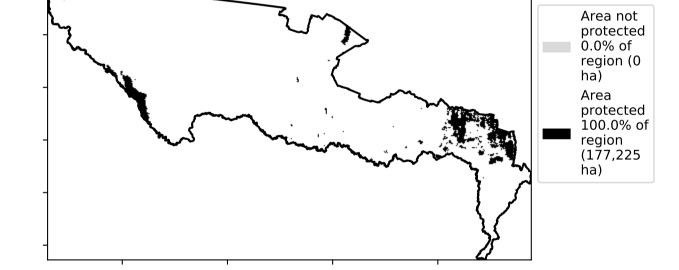


Proportion of vegetation cover class in area

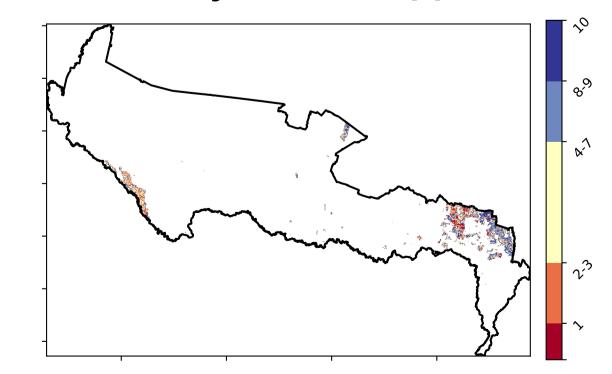


Total Vegetation Cover Anomaly [%]





Total Vegetation Cover Decile [%]



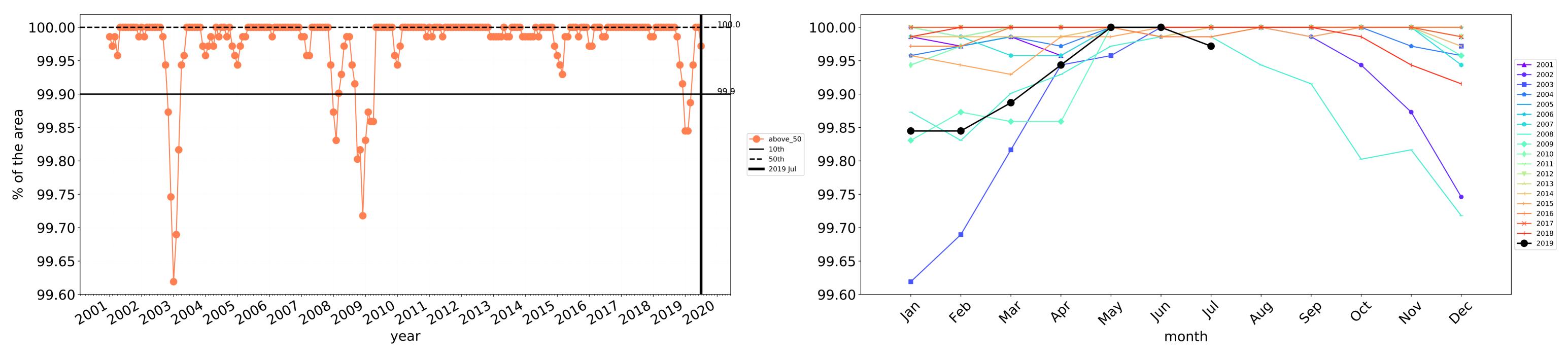


Deciles show where the pixel value lies in the

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

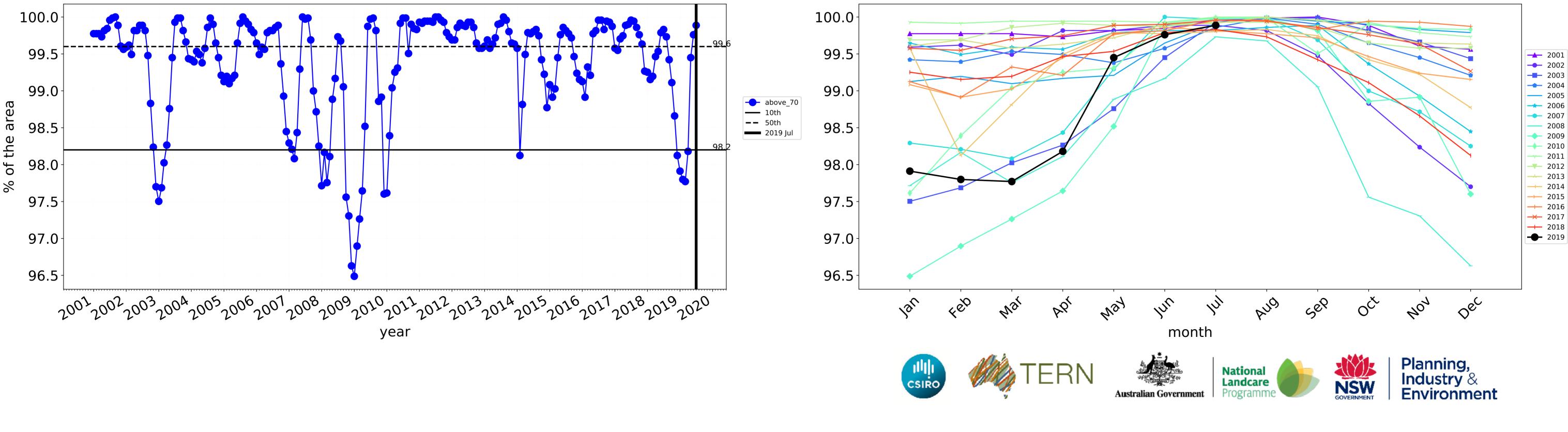
records for that month of

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%)



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

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

Murray (4,149,175 ha and no data 40,508 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	4,149,175	100.0% 4,147,675	99.8% 4,140,625	93.2% 3,866,350	67.4% 2,797,450	26.1% 1,083,325	10.4% 432,400
Conservation and natural environments	367,625	100.0% 367,575	99.9% 367,300	96.7% 355,550	87.6% 321,875	68.0% 250,025	35.9% 132,075
Conservation and natural environments non forest	76,475	99.9% 76,425	99.6% 76,200	86.0% 65,775	48.4% 37,000	19.3% 14,750	8.4% 6,400
Conservation and natural environments Woodland forest	87,450	100.0% 87,450	99.9% 87,400	98.7% 86,300	95.1% 83,200	67.2% 58,775	25.0% 21,900
Conservation and natural environments Forest (non woodland)	203,700	100.0% 203,700	100.0% 203,700	99.9% 203,475	99.0% 201,675	86.6% 176,500	50.9% 103,775
Agriculture	3,507,150	100.0% 3,506,625	99.8% 3,500,475	92.6% 3,246,375	63.8% 2,237,300	19.3% 676,900	6.2% 216,075
Grazing	1,718,000	100.0% 1,717,750	99.8% 1,713,750	91.8% 1,577,950	61.4% 1,055,625	21.3% 365,925	7.1% 122,450
Grazing non forest	1,553,425	100.0% 1,553,175	99.7% 1,549,200	91.0% 1,414,300	58.4% 907,575	18.4% 285,850	5.7% 88,675
Grazing Woodland forest	75,675	100.0% 75,675	100.0% 75,675	99.3% 75,175	85.3% 64,550	23.0% 17,375	3.7% 2,825
Grazing - Forest (non woodland)	88,900	100.0% 88,900	100.0% 88,875	99.5% 88,475	93.9% 83,500	70.5% 62,700	34.8% 30,950
Cropping	1,043,375	100.0% 1,043,200	99.9% 1,042,025	94.3% 984,400	73.3% 764,725	24.8% 258,650	7.9% 82,725
Irrigation	745,375	100.0% 745,275	99.9% 744,300	91.7% 683,625	55.9% 416,600	7.0% 52,300	1.5% 10,900
Production native forests and plantation forests	177,225	100.0% 177,200	100.0% 177,175	99.9% 177,025	98.8% 175,075	78.5% 139,075	44.8% 79,325

