Total vegetation cover soil protection Region:LGA Whitsunday_(R) QLD

Date: November 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

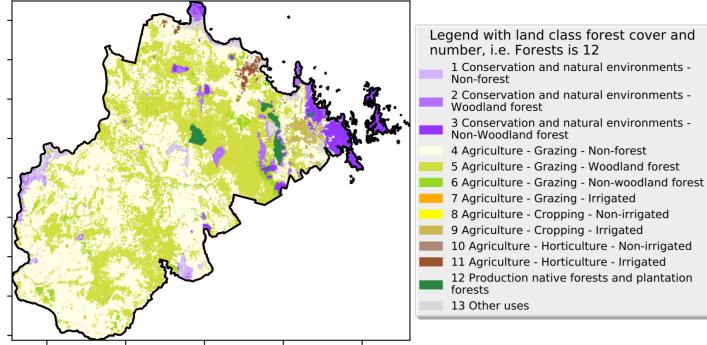


Vegetation Cover Nov 2019

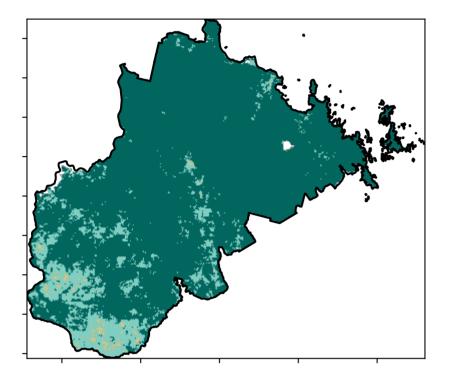
Land use and forest cover

Proportion of each land class in area

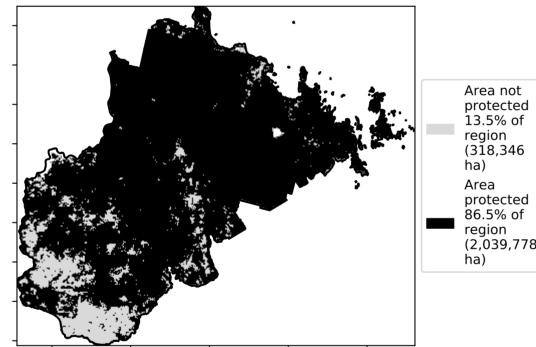


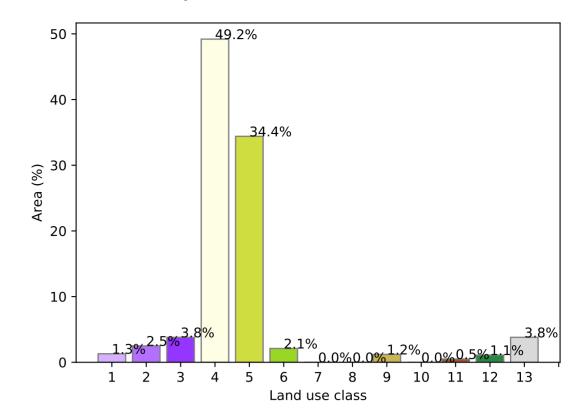


Total Vegetation Cover [%]

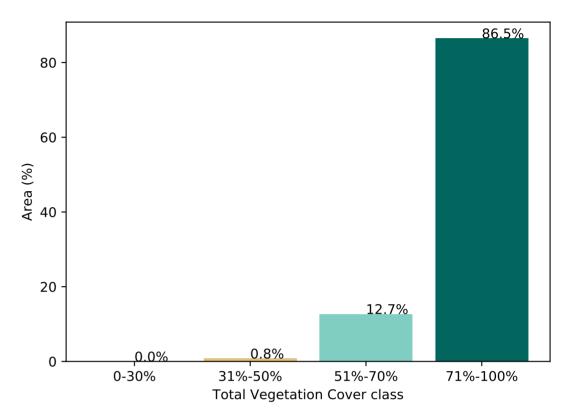


% Area protected from water erosion (>70%)

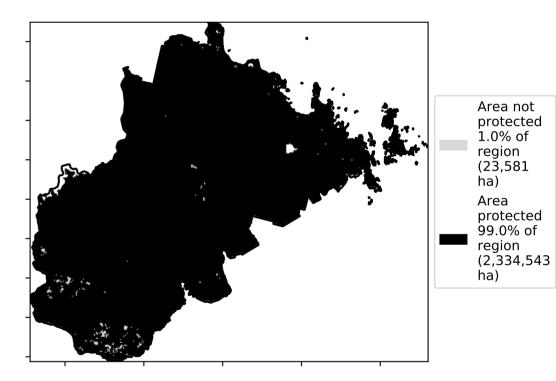




Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



(2,039,778

12%200%

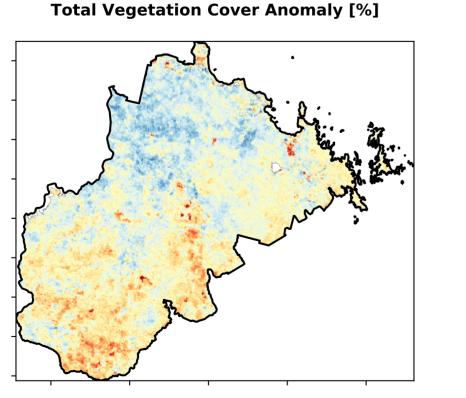
52% 70%

32%50%

0.30%

Total Vegetation Cover Decile [%]

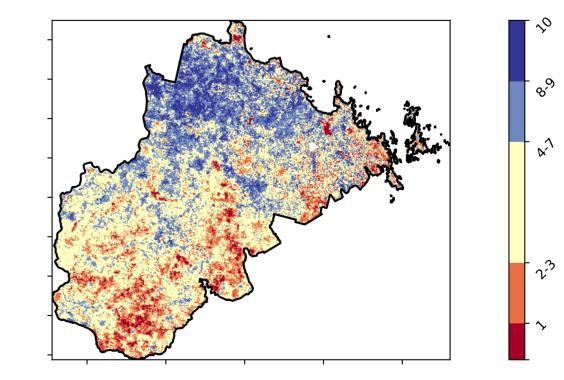
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



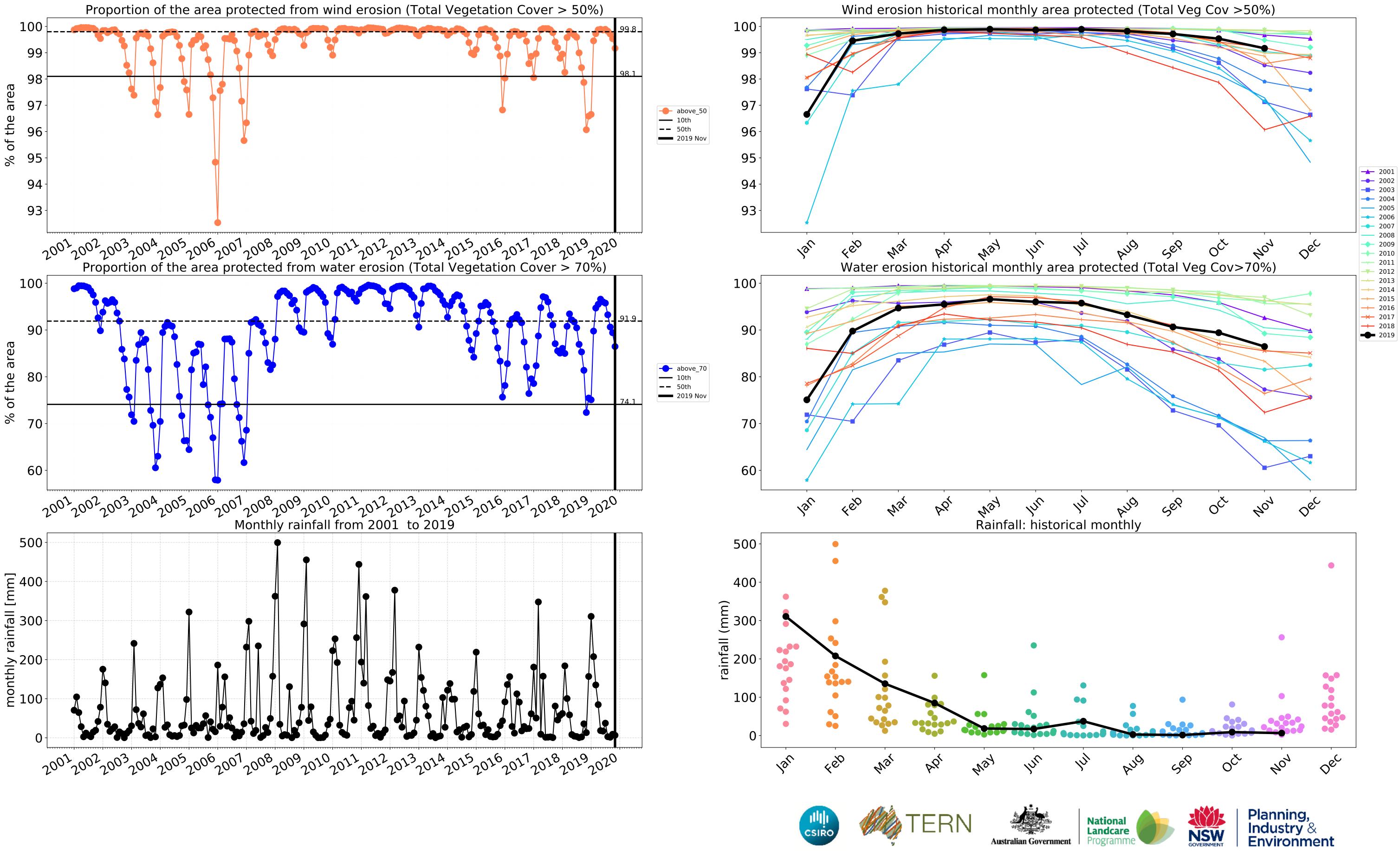


-20

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 from 2001 to 2019.







Conservation and natural environments

forest

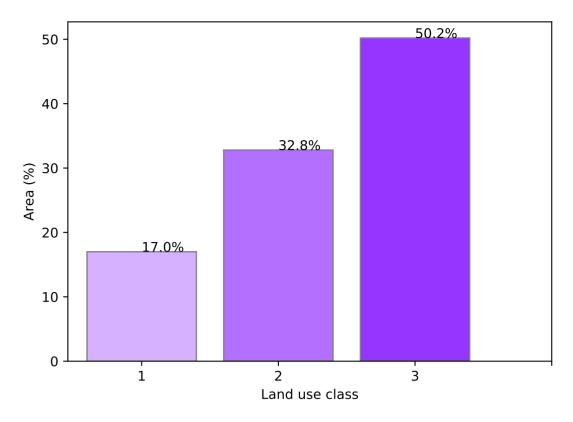
forest

woodland forest

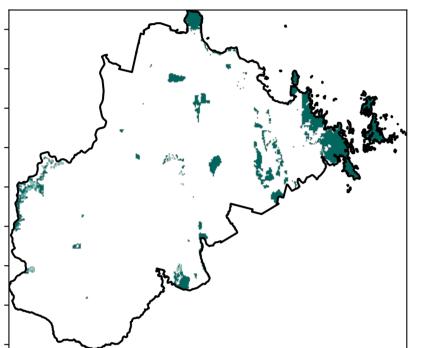
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

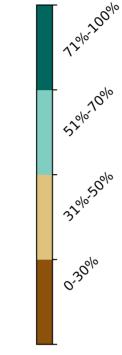
Land use and forest cover

Proportion of each land class in area



Total Vegetation Cover [%]



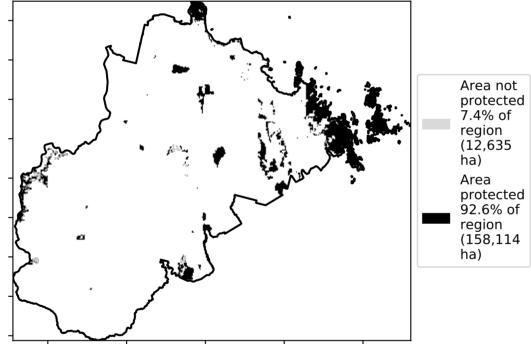


1 Conservation and natural environments - Non-

3 Conservation and natural environments - Non-

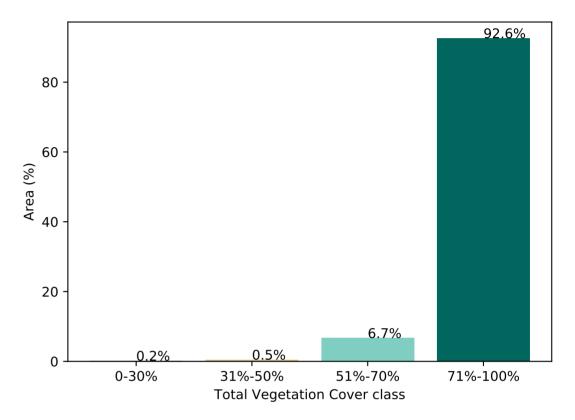
2 Conservation and natural environments – Woodland

% Area protected from water erosion (>70%)

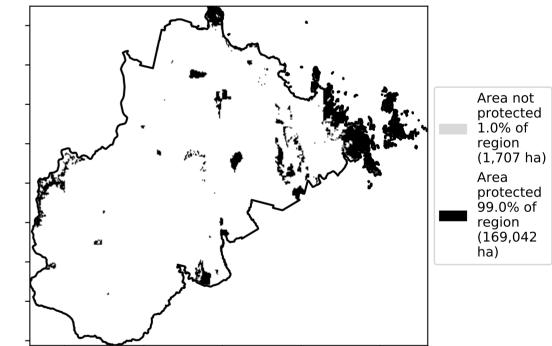


Area not

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



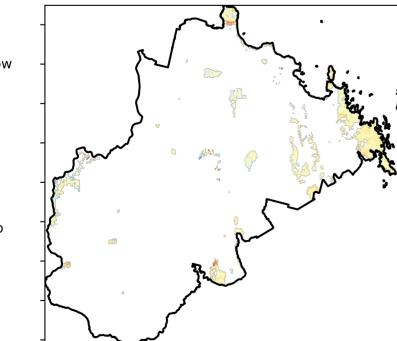
 $\hat{\mathbf{v}}$

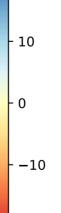
୍ଚ୍ଚ

A.1

2.3

Total Vegetation Cover Anomaly [%]



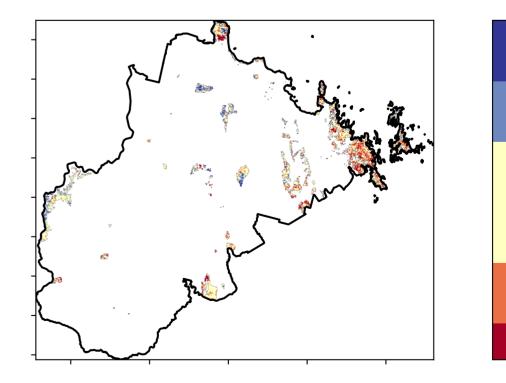


-20

- 20

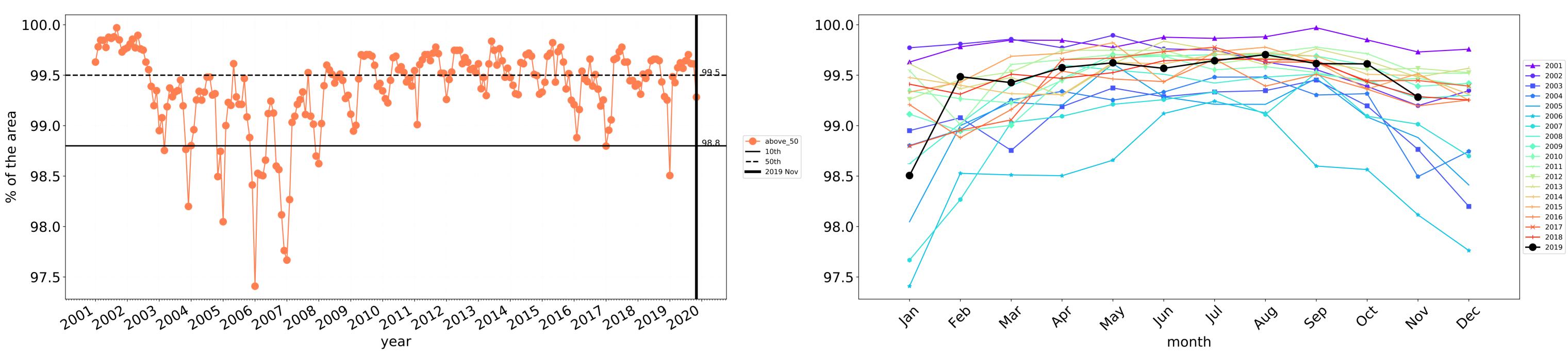
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Total Vegetation Cover Decile [%]





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

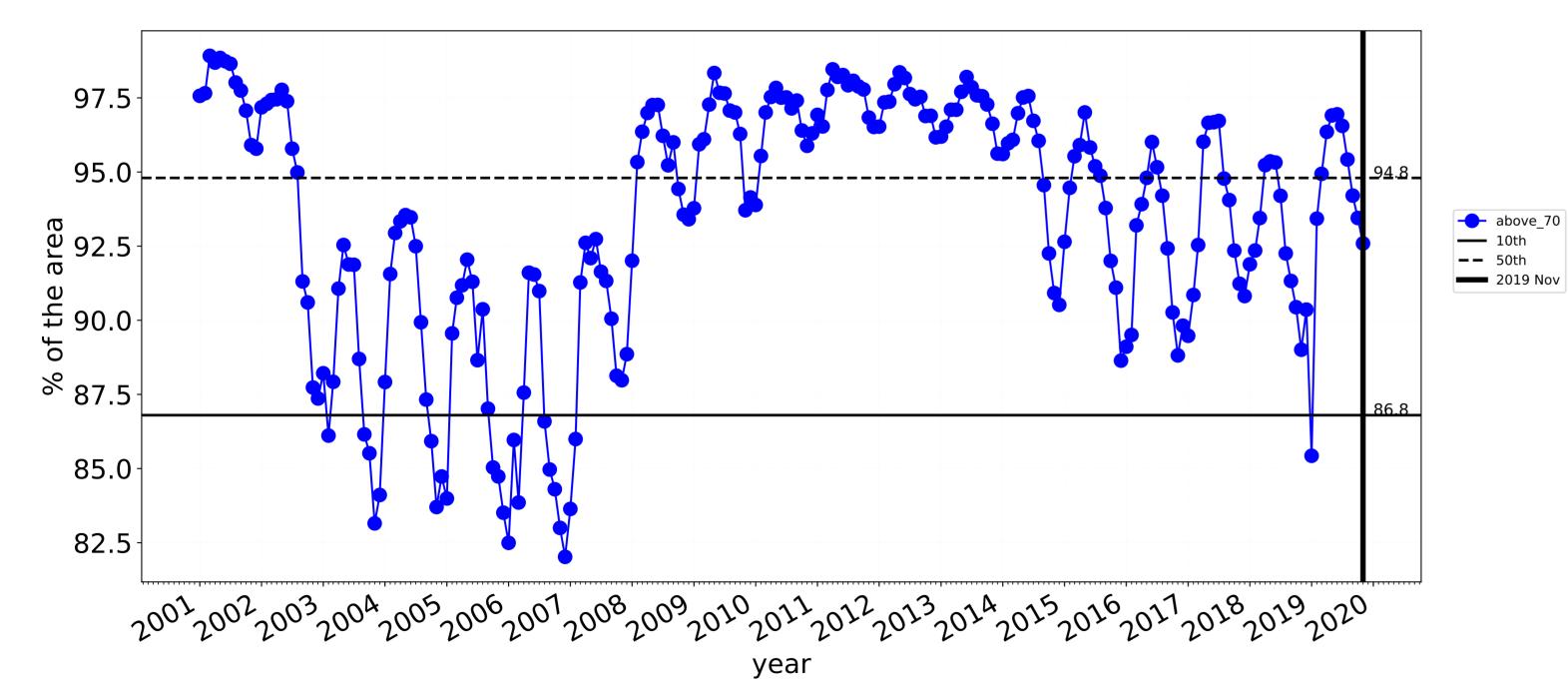


---- above_70

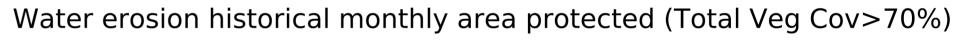
— 10th

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

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

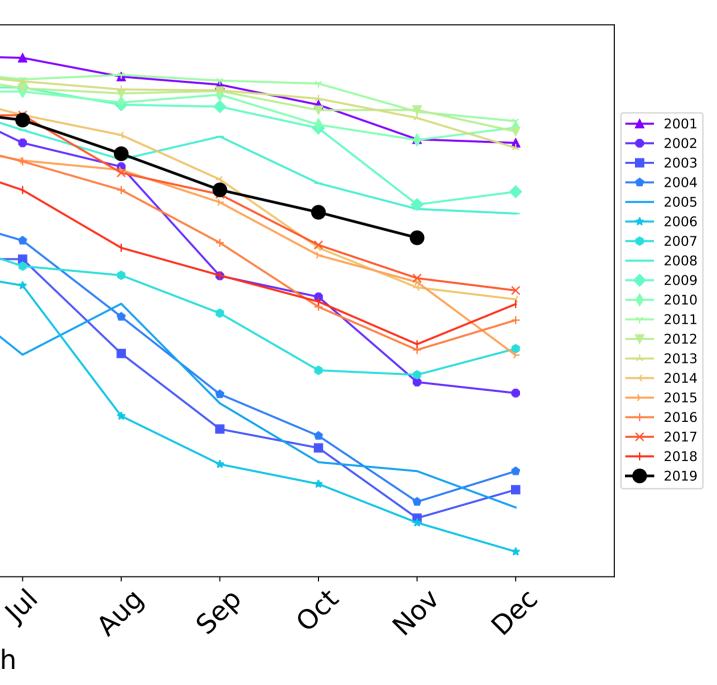


97.5 95.0 92.5 90.0 87.5 85.0 82.5 Jan fed In Mai PQ Way month FERN **HARD** CSIRO Australian Government



5

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

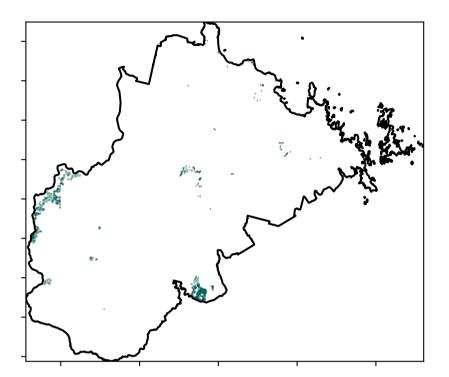




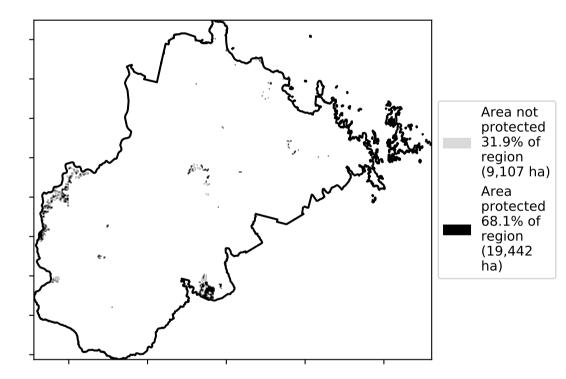
Conservation and natural environments non forest

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

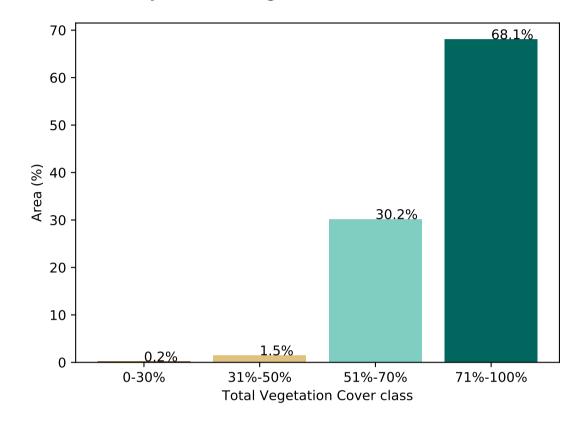
Total Vegetation Cover [%]



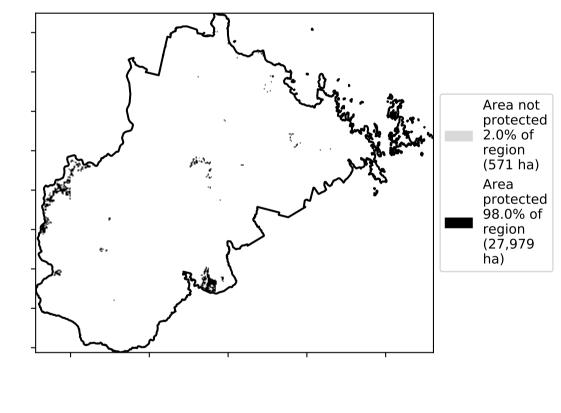
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



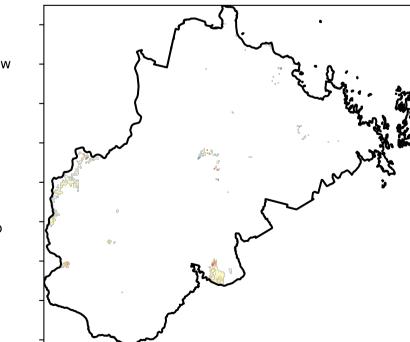
\$

_ଚି)

A-1

2.3

Total Vegetation Cover Anomaly [%]



- 10 - 0 - -10

-20

- 20

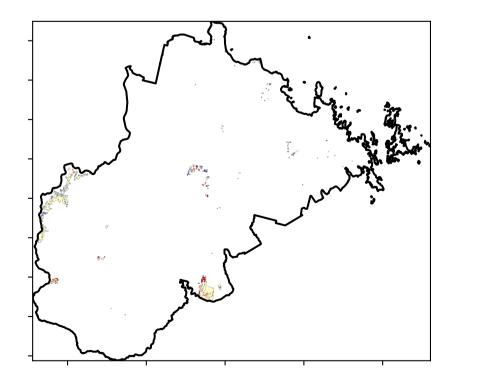
12%-100"

52°1070°10

32005001

0.30%

Total Vegetation Cover Decile [%]





Deciles show where the pixel value lies in the

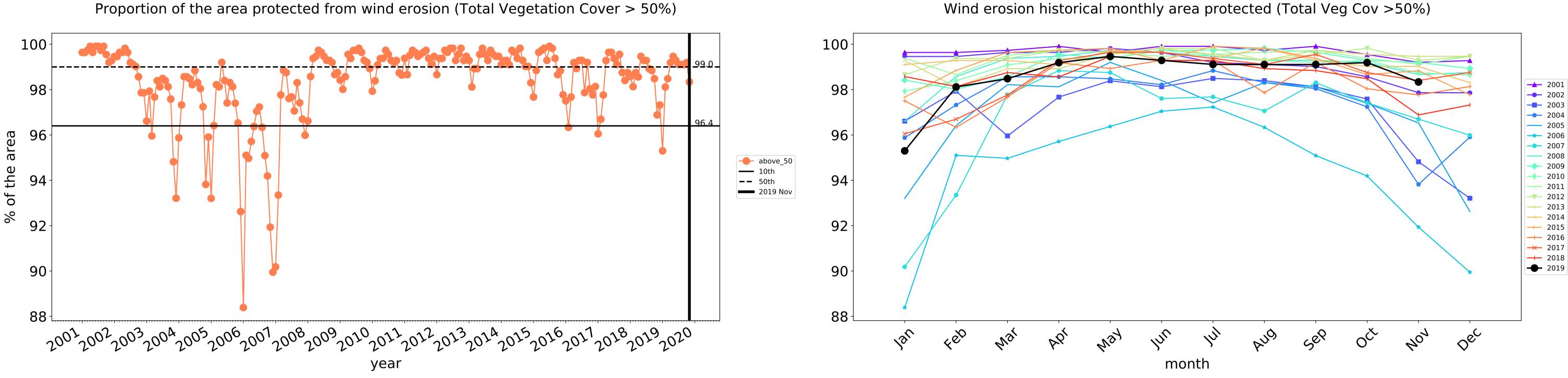
record, from highest to

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.

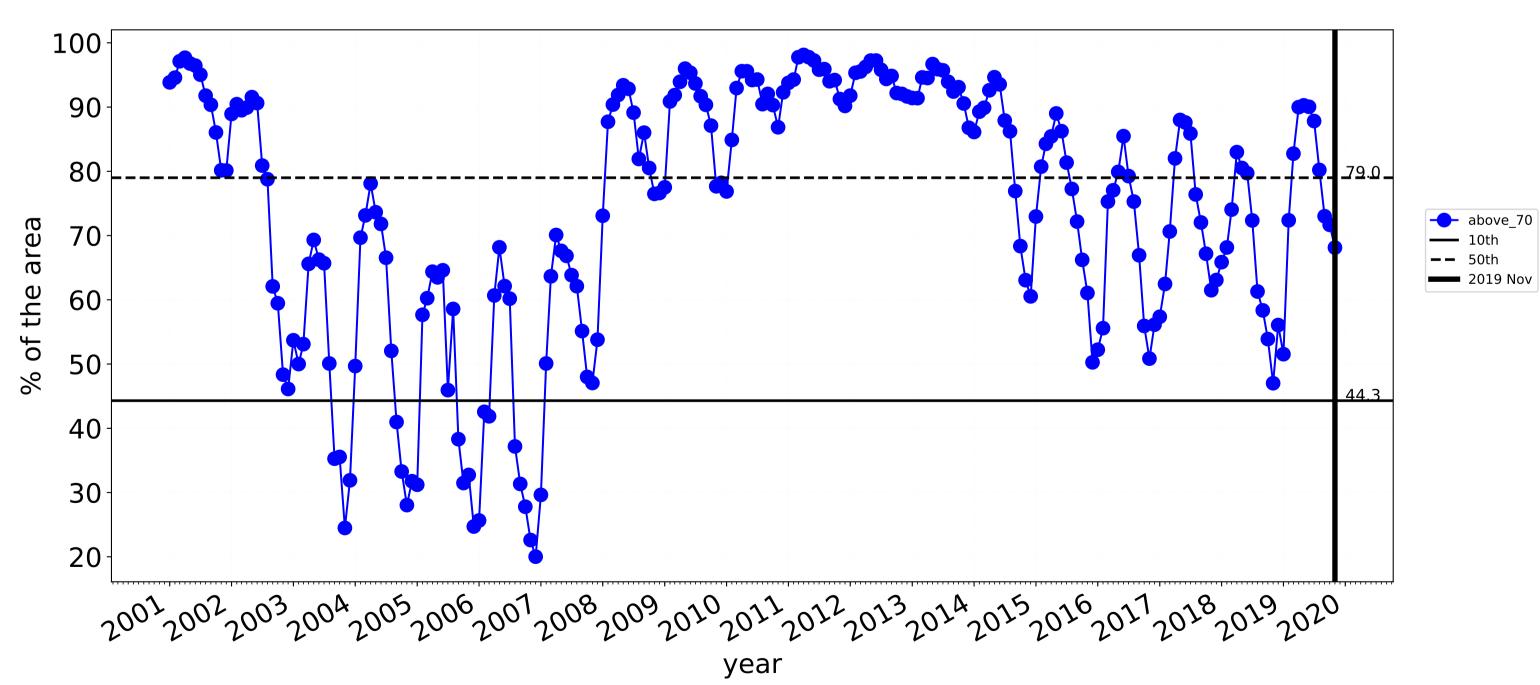
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.





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

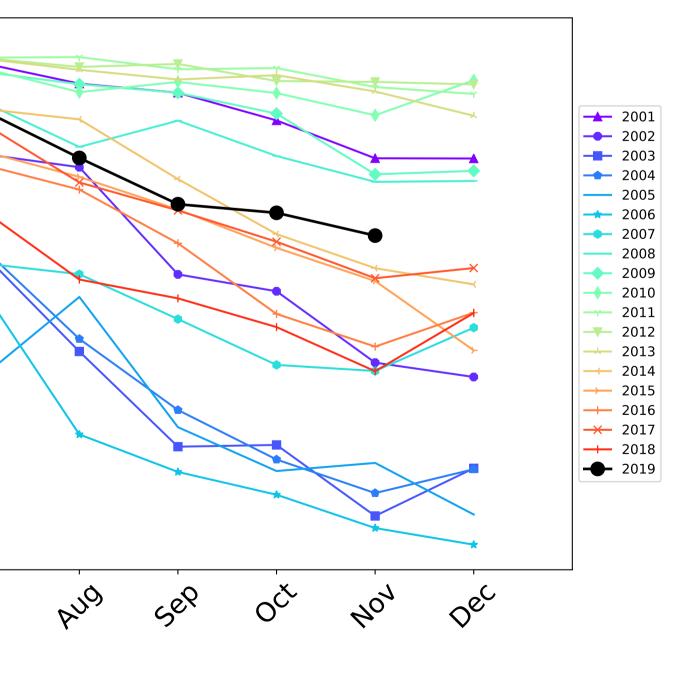
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



100-90-80 70-60 50 40 30-20lar fed May In Mai PQ1 1/2/ month TERN CSIRO Australian Government

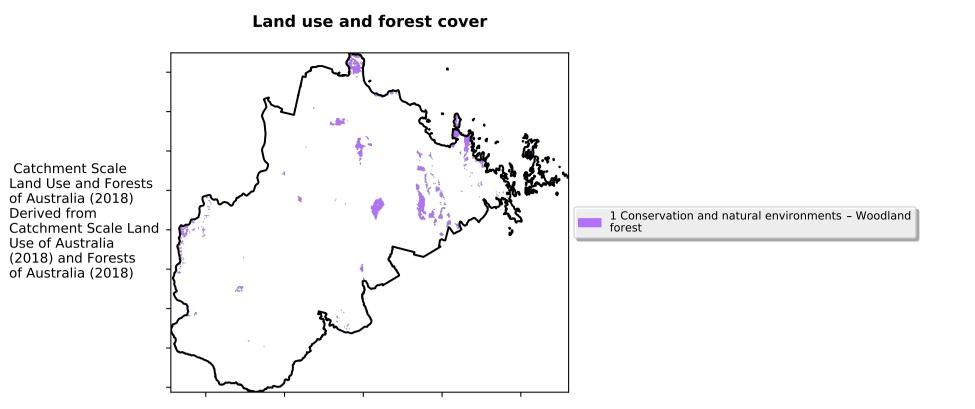
3

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

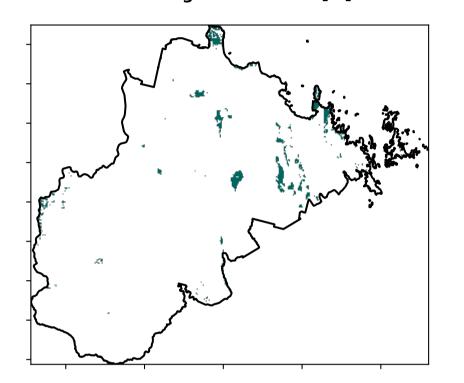




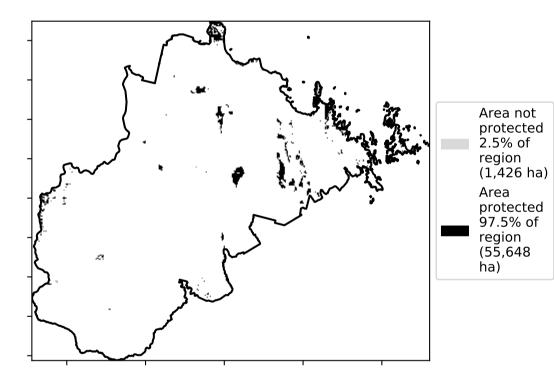
Conservation and natural environments Woodland forest



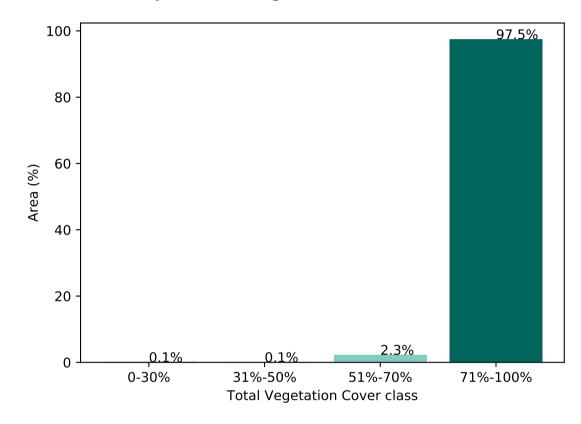
Total Vegetation Cover [%]



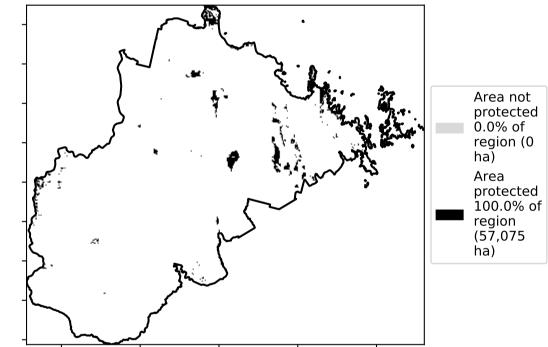
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



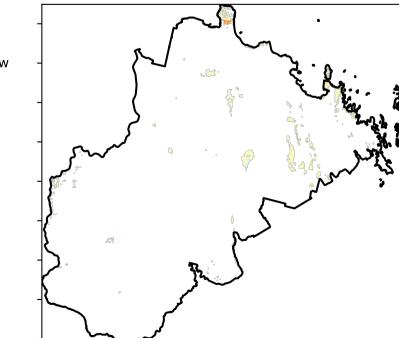
\$

ଚ୍ଚ

A.1

· 2^{?3}

Total Vegetation Cover Anomaly [%]



- 10 0 -10

-20

- 20

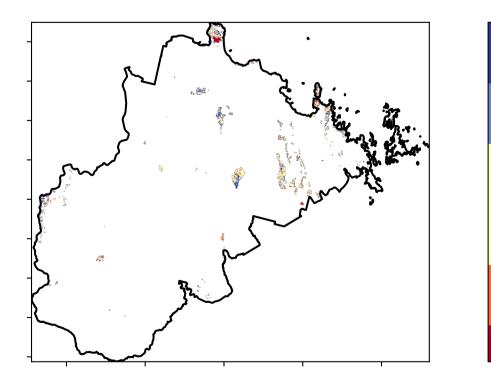
12001000

52°1070010

3201050010

0.30%

Total Vegetation Cover Decile [%]





Deciles show where the pixel value lies in the

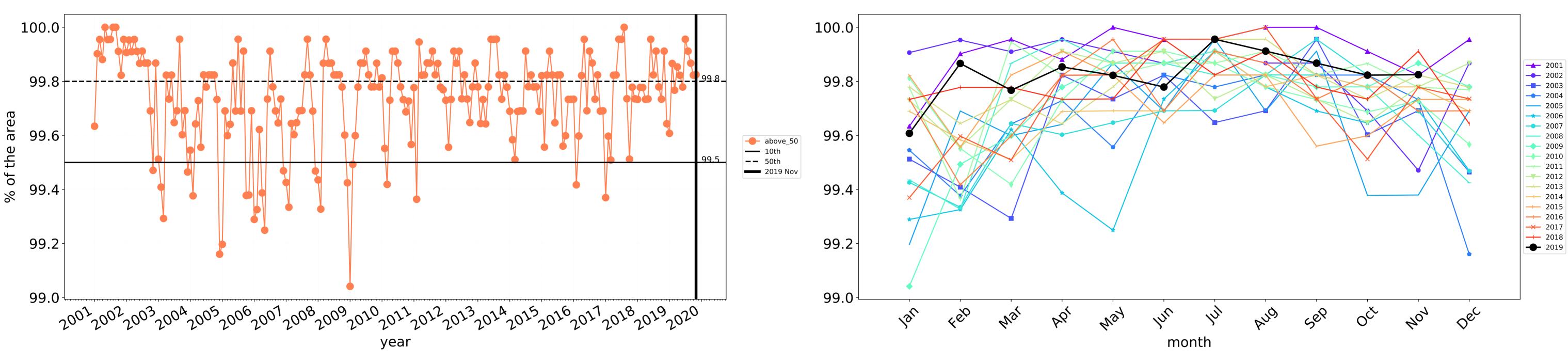
record, from highest to lowest, for that month. That is, red pixels are

in the lowest 10% of

records for that month of

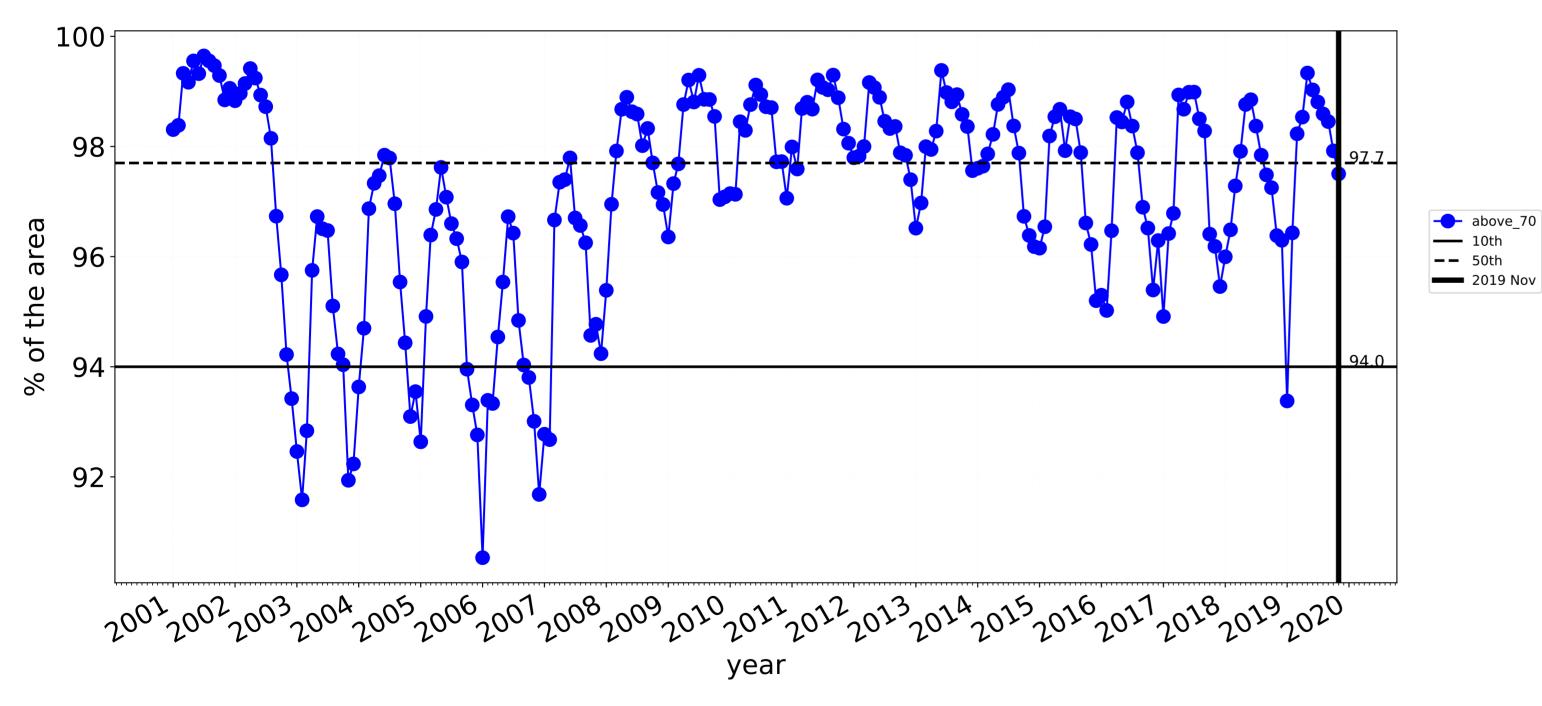
the map using baseline from 2001 to 2019.

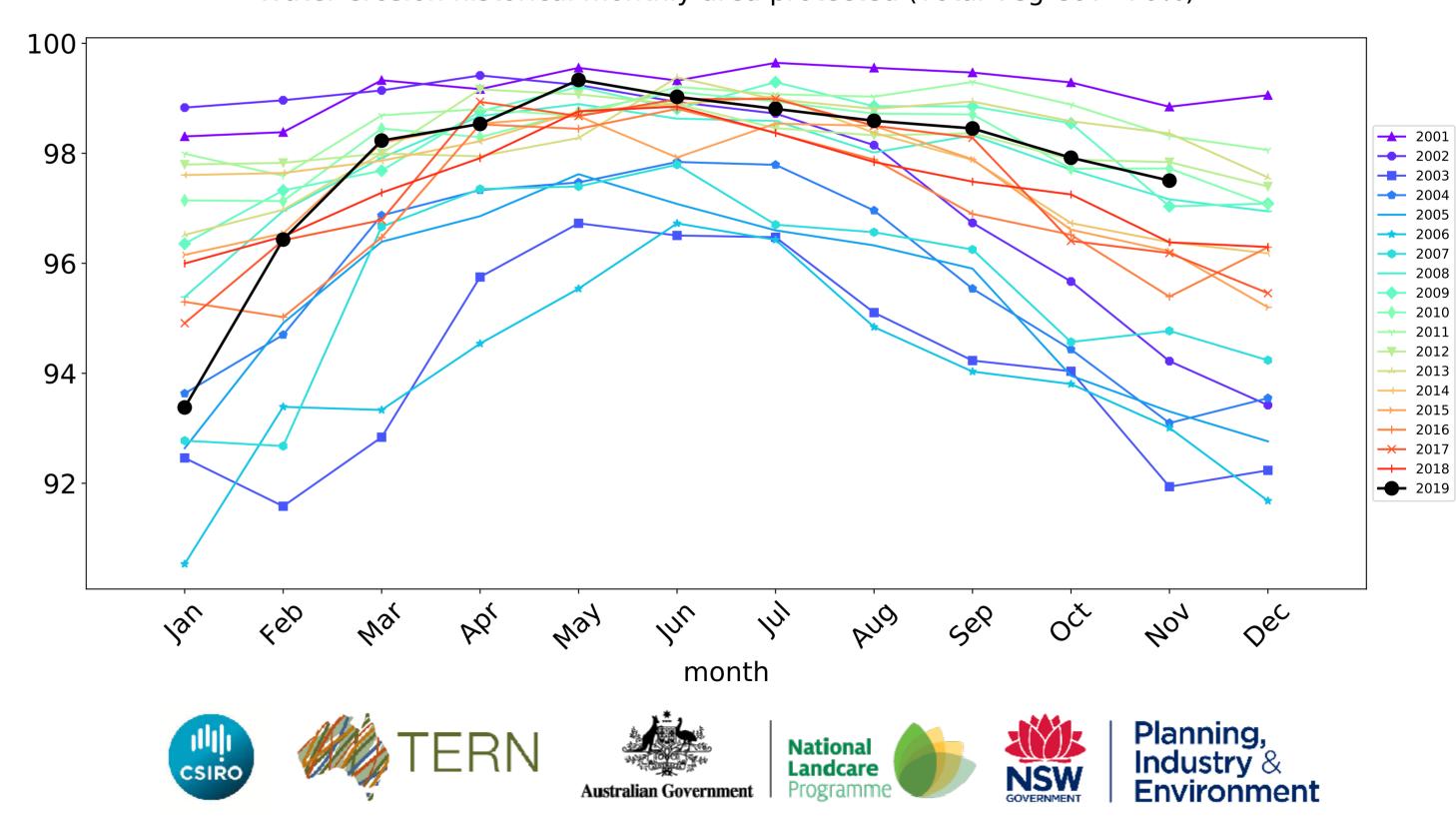
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

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

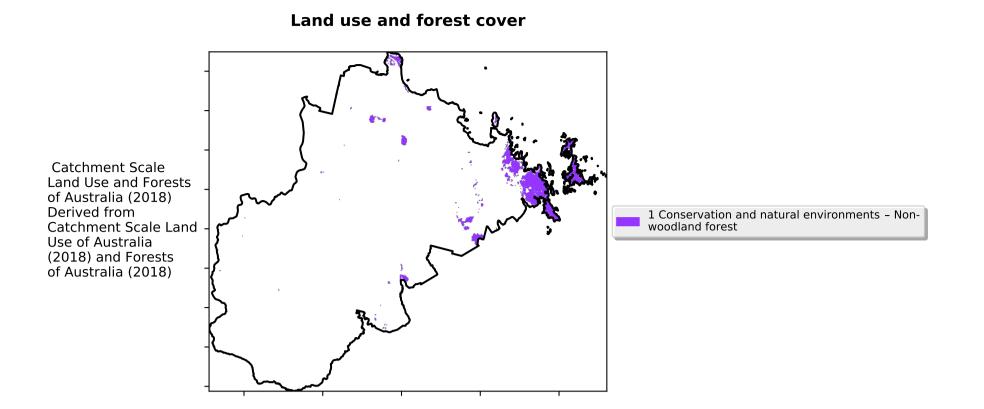




Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

Conservation and natural environments Forest (non woodland)



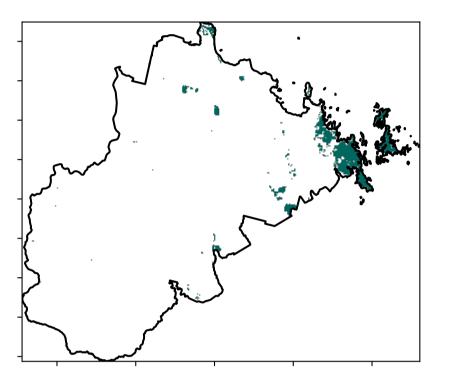
12%200%

52°10°10°10

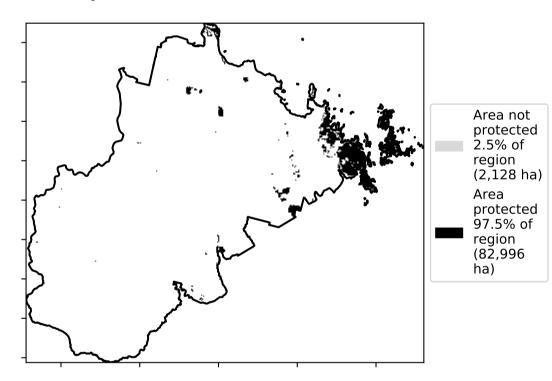
32005000

0.30%

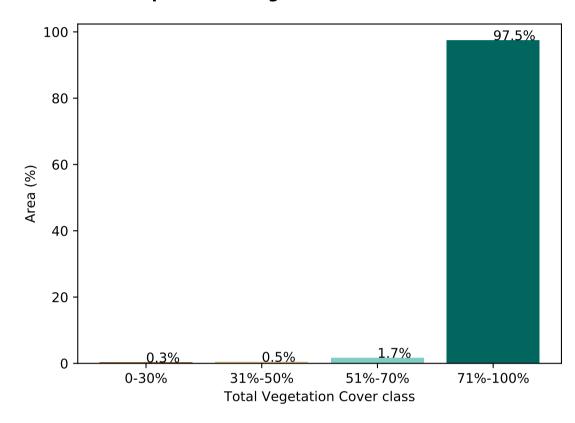
Total Vegetation Cover [%]



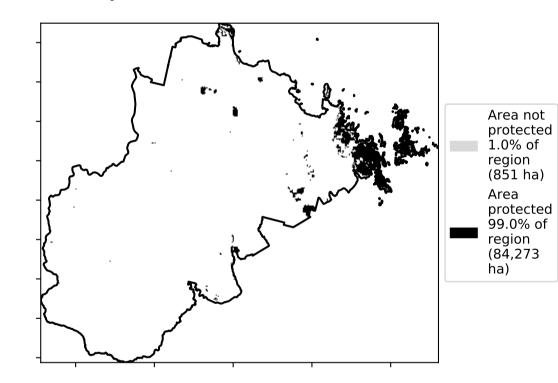
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

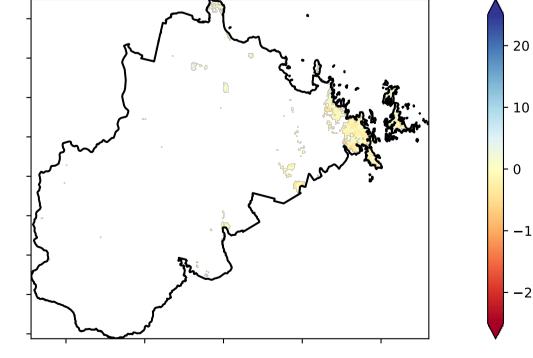


% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]

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 man using baseline the map using baseline from 2001 to 2019.

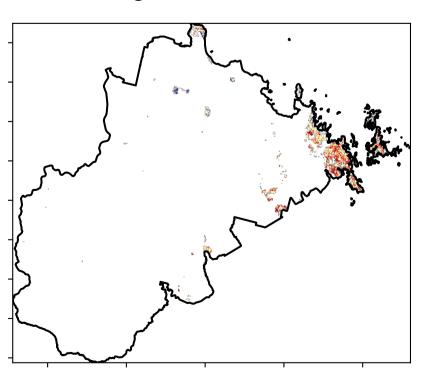
Total Vegetation Cover Decile [%]

\$

ۍ ک

A.1

• 2^{?3}









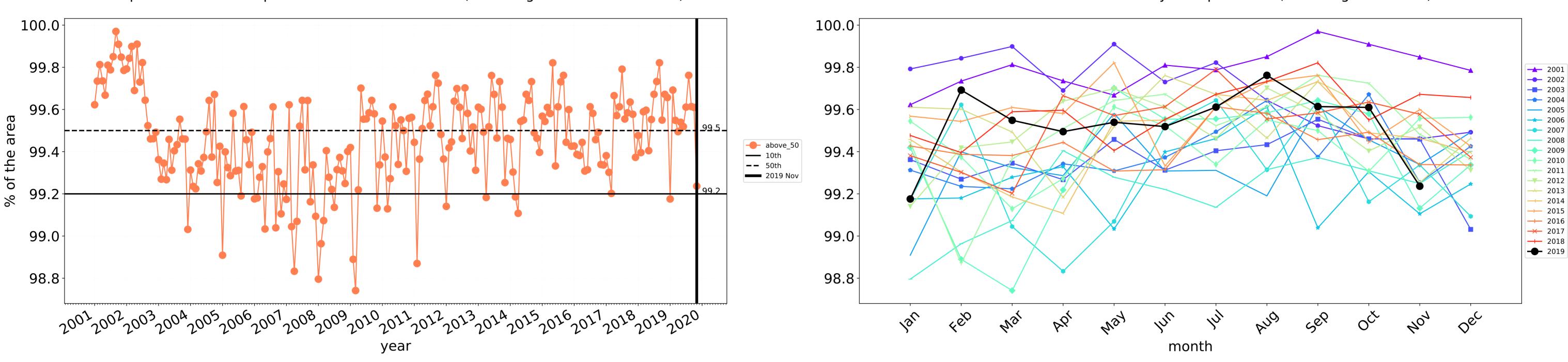
0

-10

-20

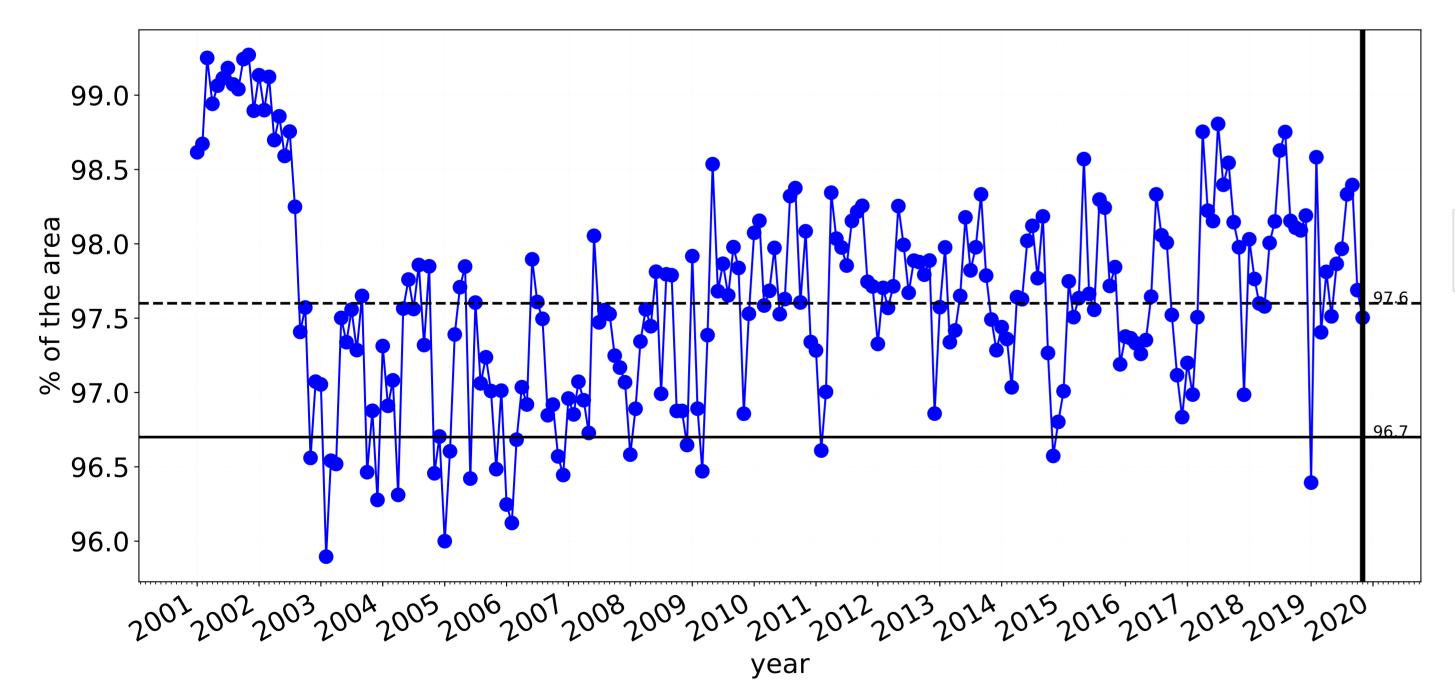




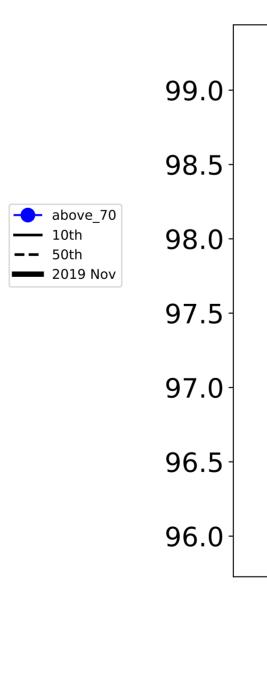


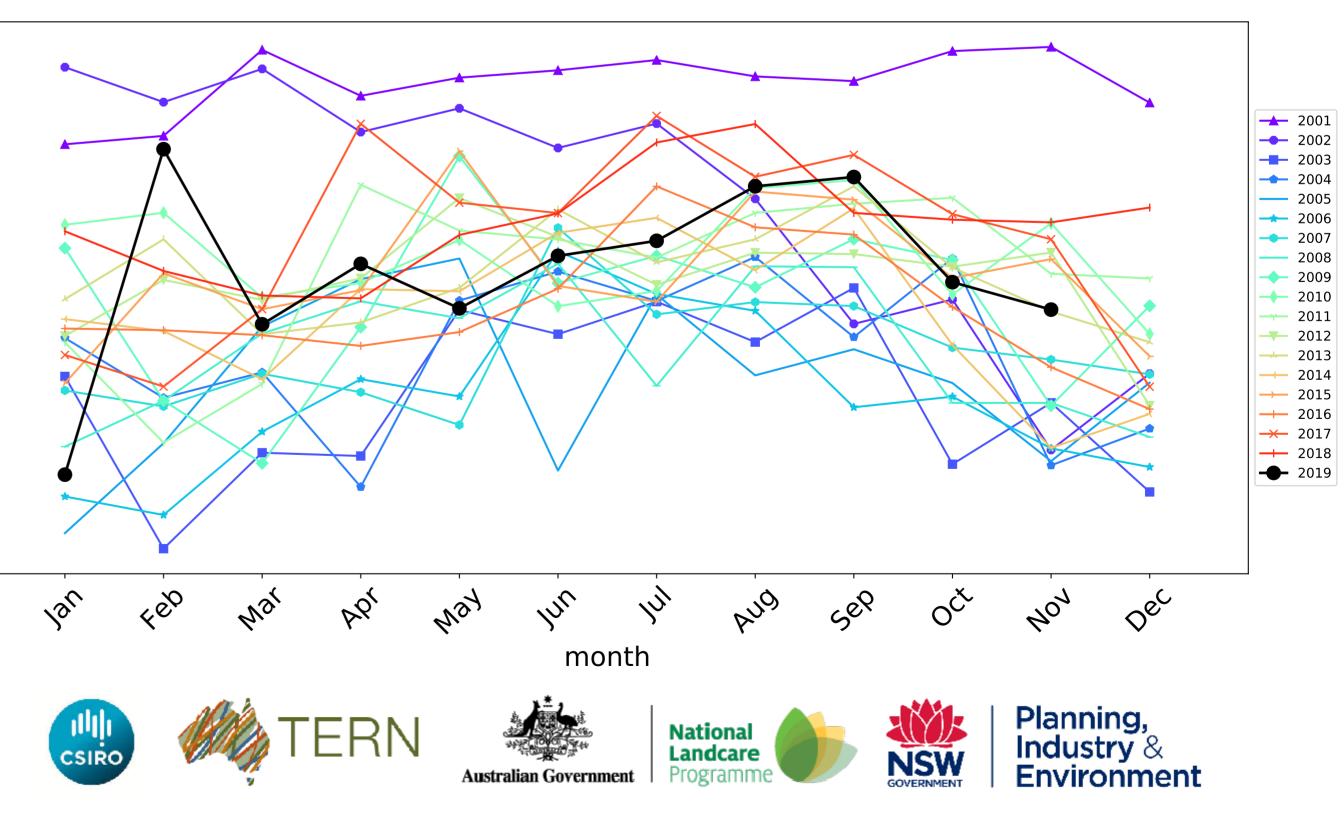
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



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





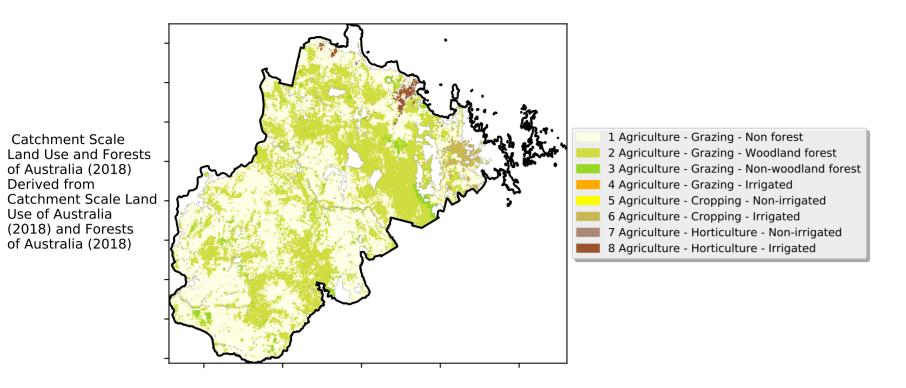
Water erosion historical monthly area protected (Total Veg Cov>70%)



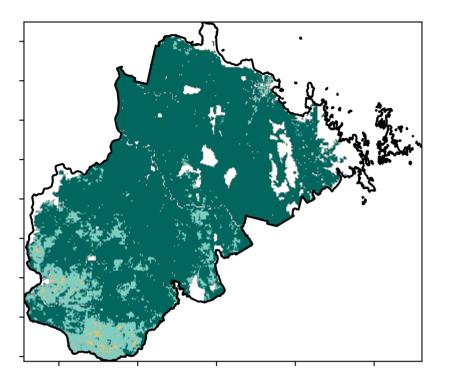
Agriculture

Land use and forest cover

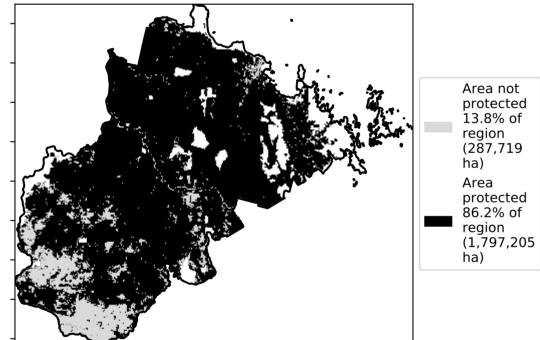
Proportion of each land class in area

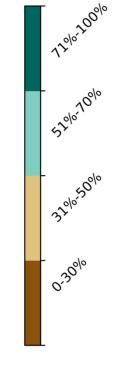


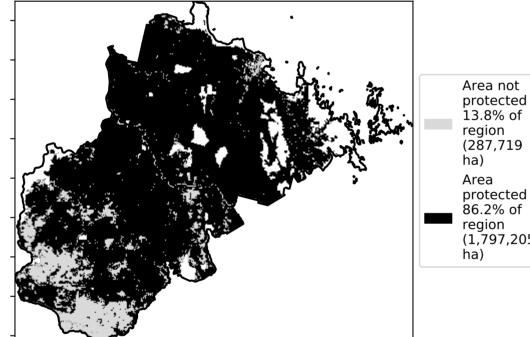
Total Vegetation Cover [%]

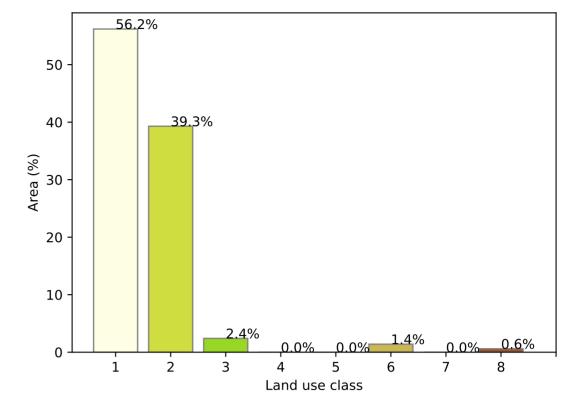


% Area protected from water erosion (>70%)

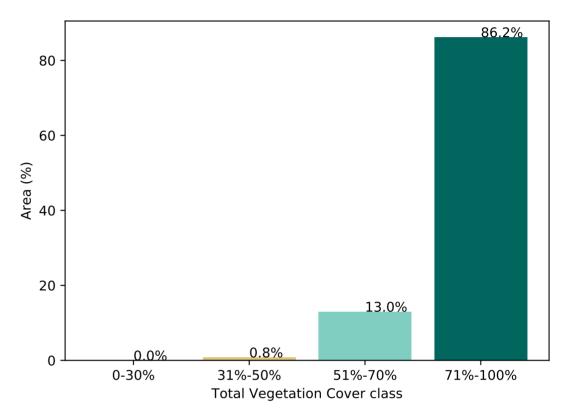




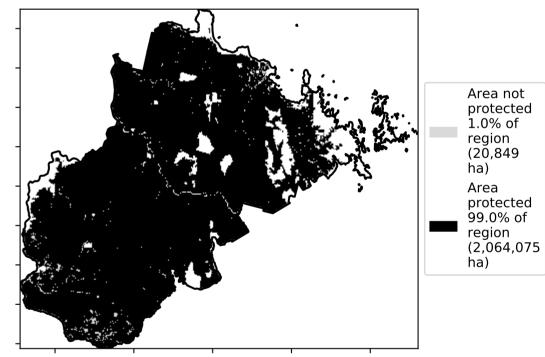




Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



\$

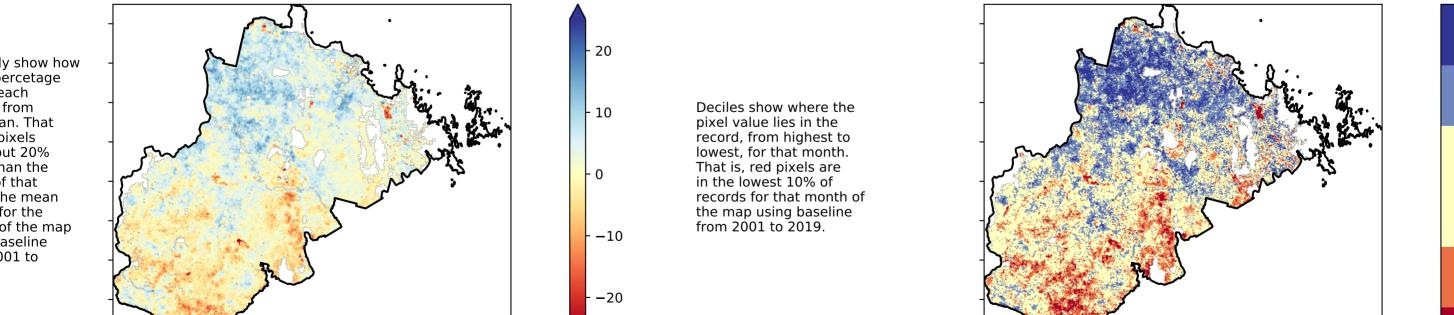
°,

A.1

2??

Total Vegetation Cover Anomaly [%]

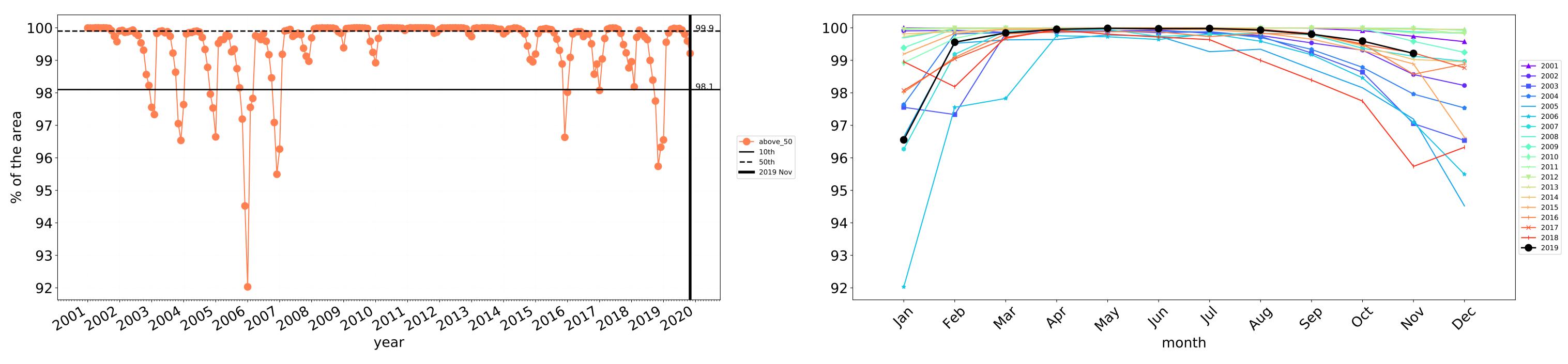
Total Vegetation Cover Decile [%]





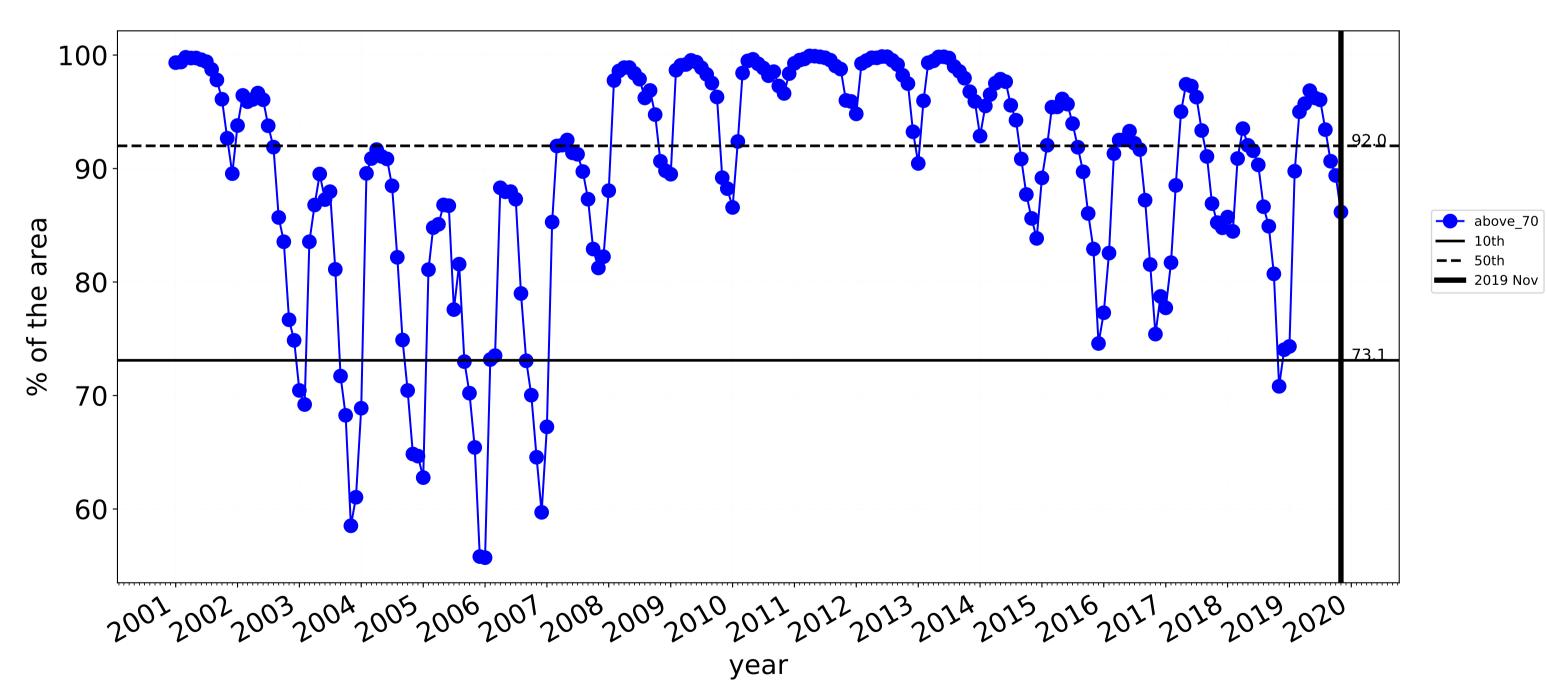
Anomaly show how many percetage points each pixel is from the mean That the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.





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

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



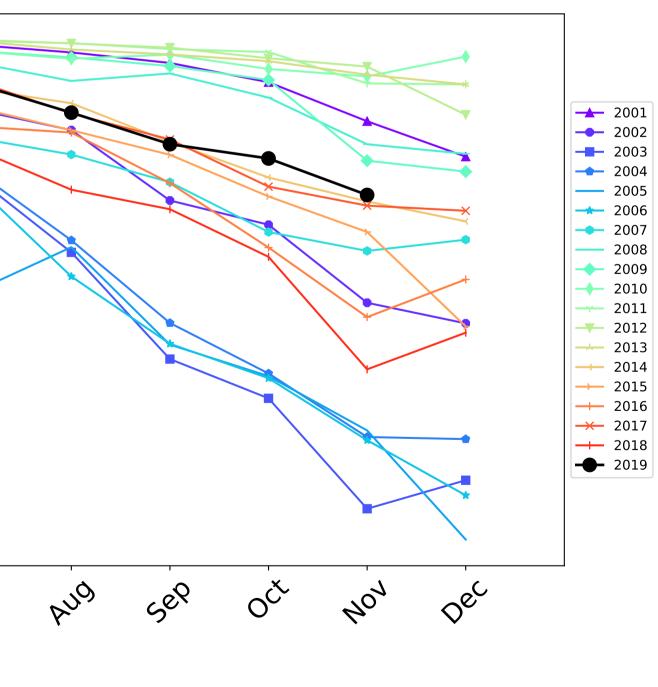
Agriculture timeseries



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

100-90 80 70-60 1ar feb way In War, PQ 1/2/ month TERN (1912) CSIRO Australian Government

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



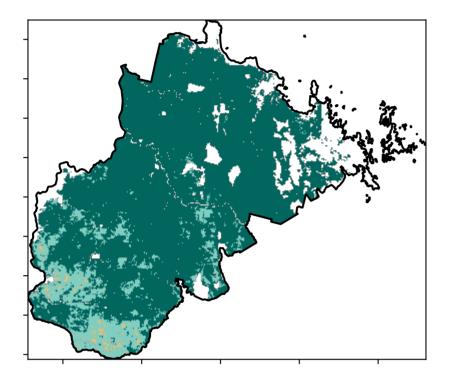


Grazing

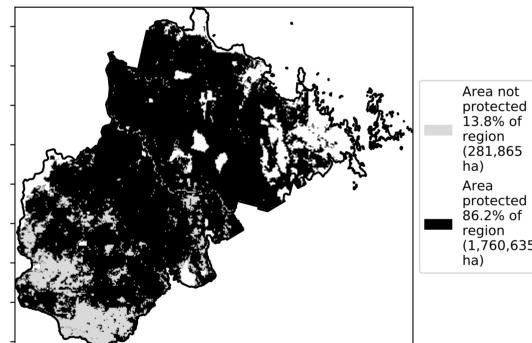
Catchment Scale Land Use and Forests of Australia (2018) Derived from 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest Catchment Scale Land 3 Agriculture - Grazing - Non-woodland forest Use of Australia (2018) and Forests of Australia (2018)

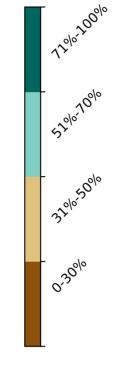
Land use and forest cover

Total Vegetation Cover [%]

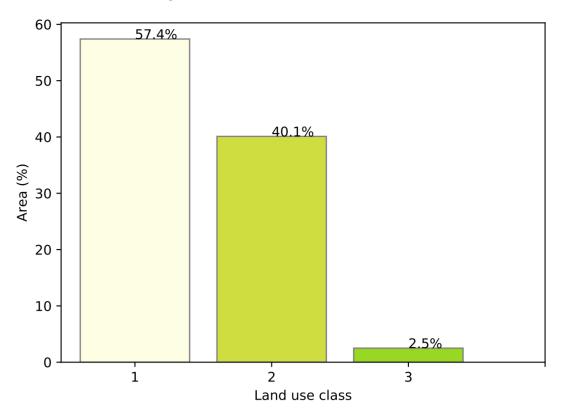


% Area protected from water erosion (>70%)



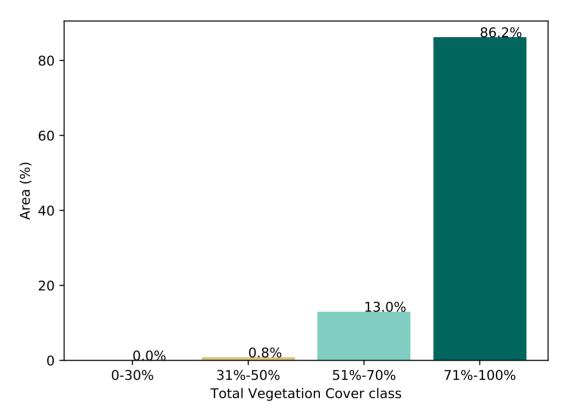




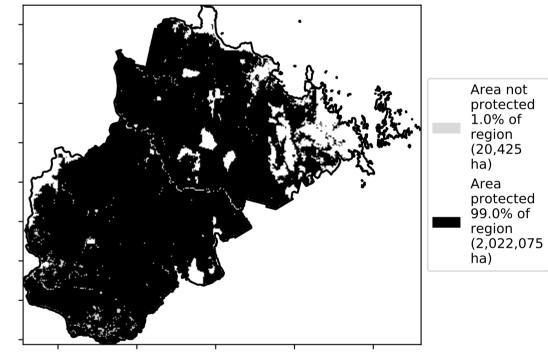


Proportion of each land class in area

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



\$

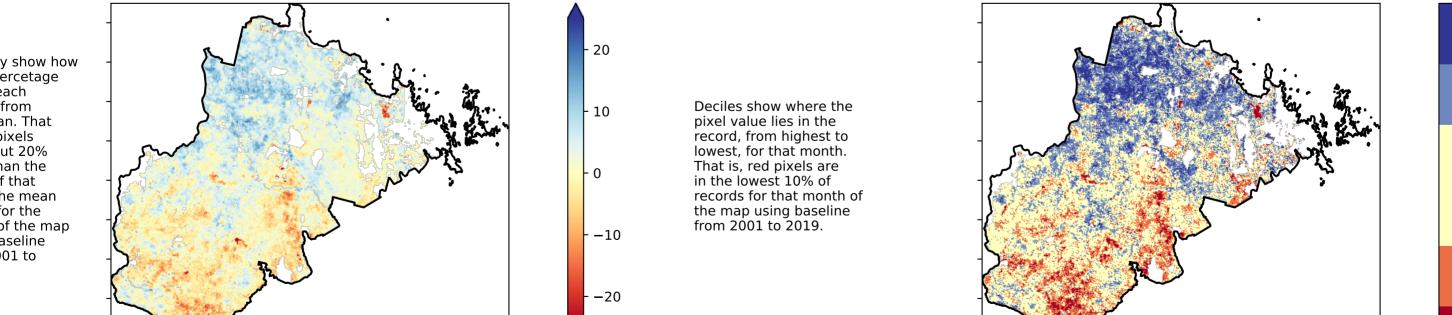
°,

A.1

· 2³

Total Vegetation Cover Anomaly [%]

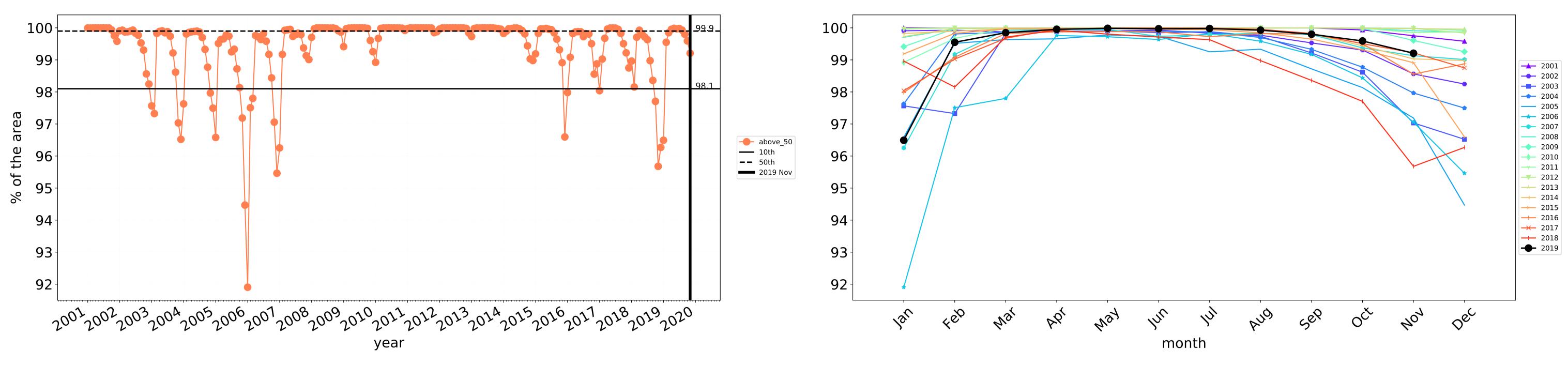
Total Vegetation Cover Decile [%]





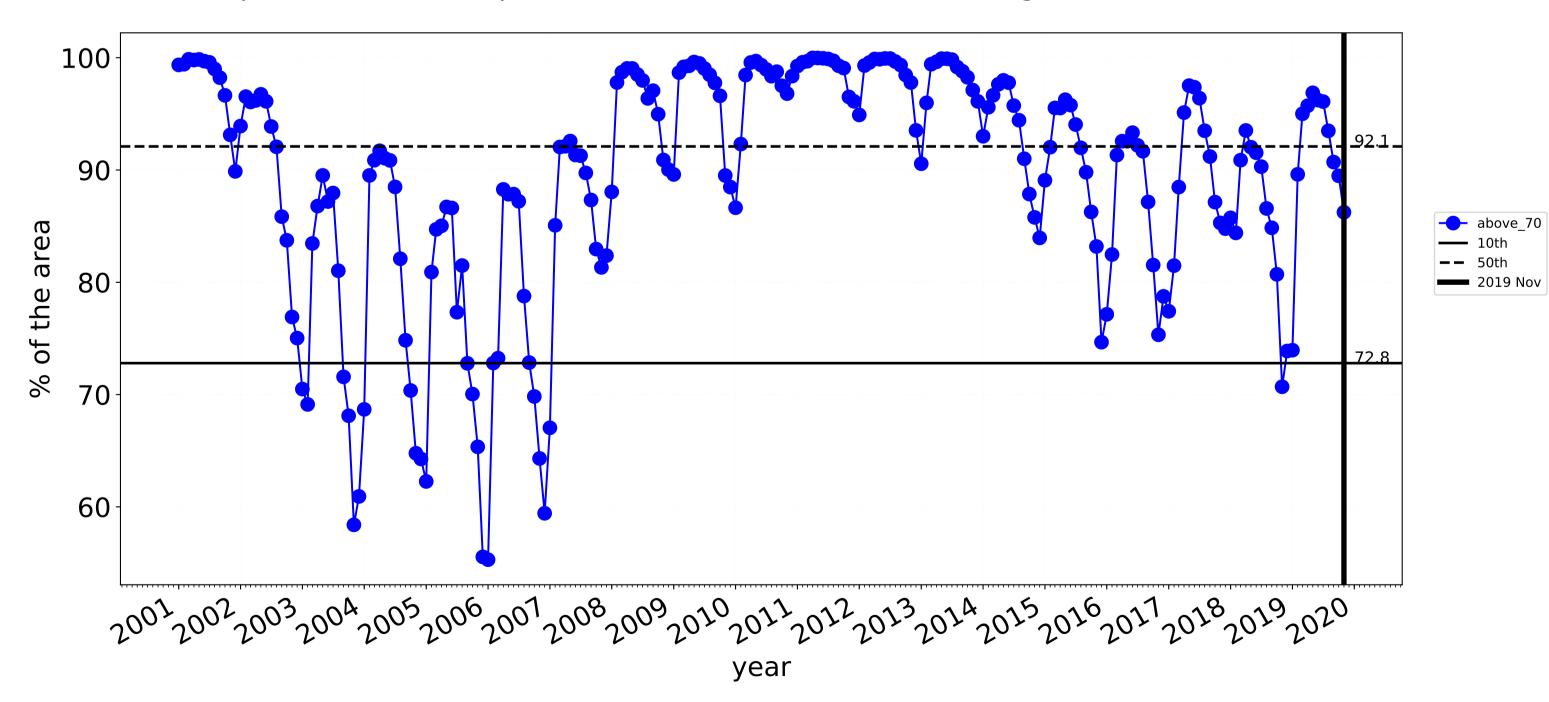
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.





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

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

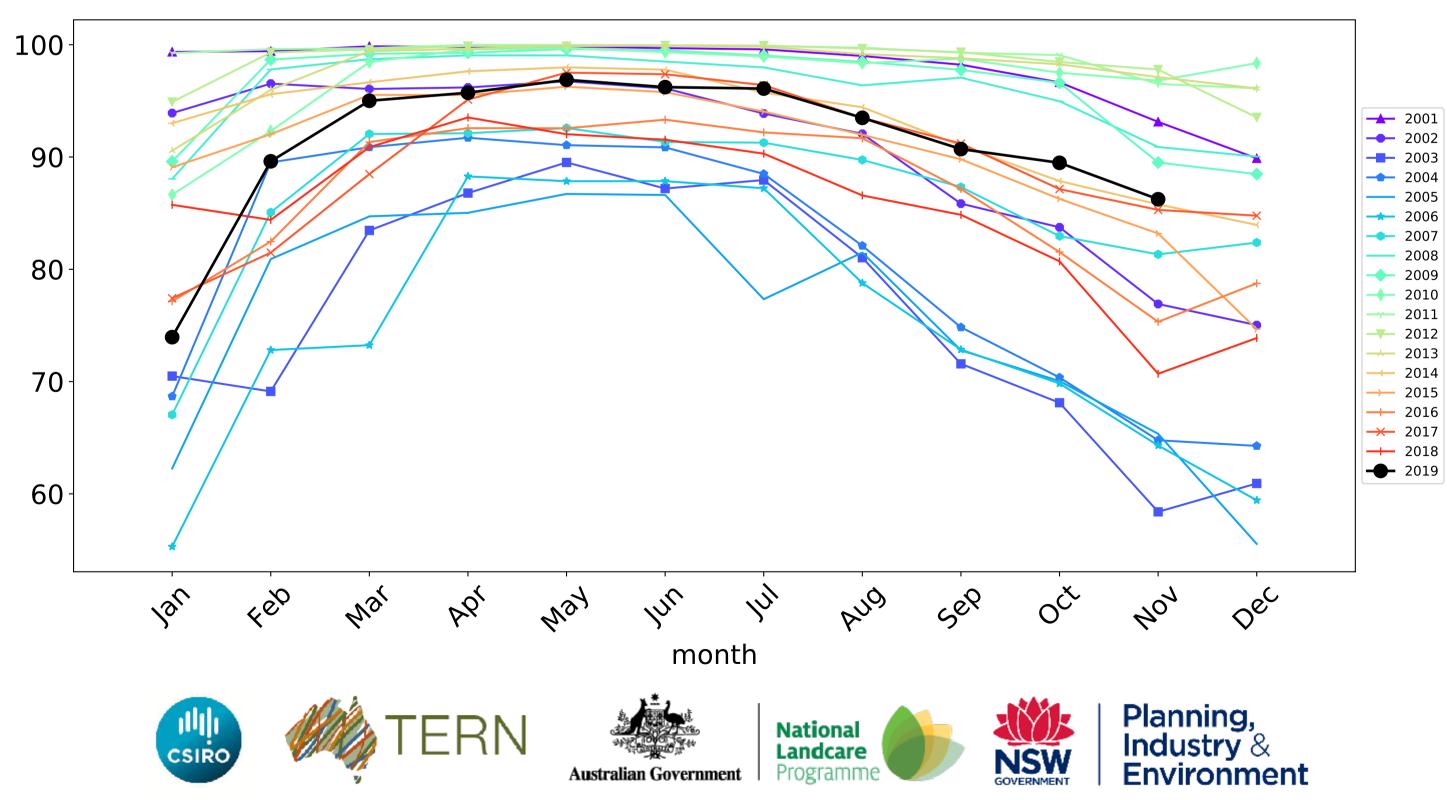


Grazing timeseries

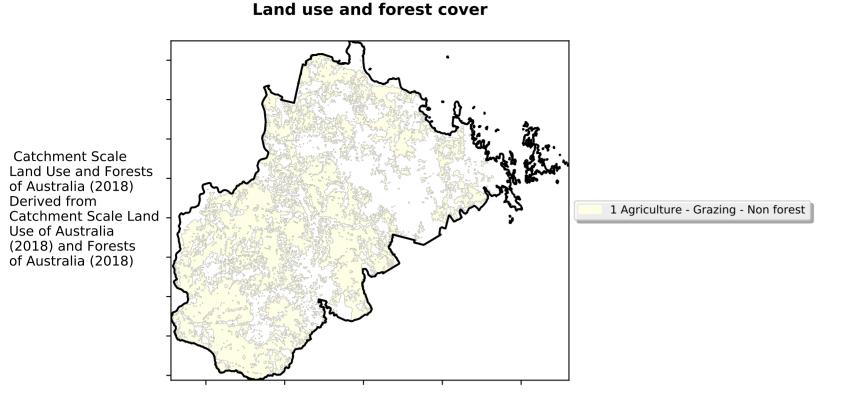


Wind erosion historical monthly area protected (Total Veg Cov >50%)

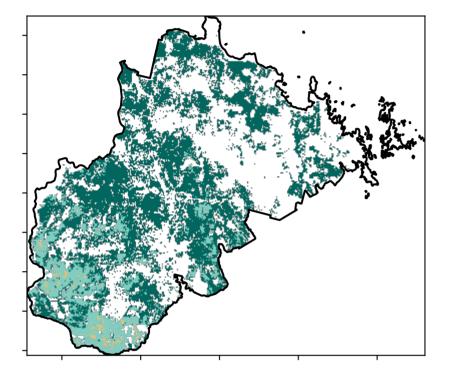
Water erosion historical monthly area protected (Total Veg Cov>70%)



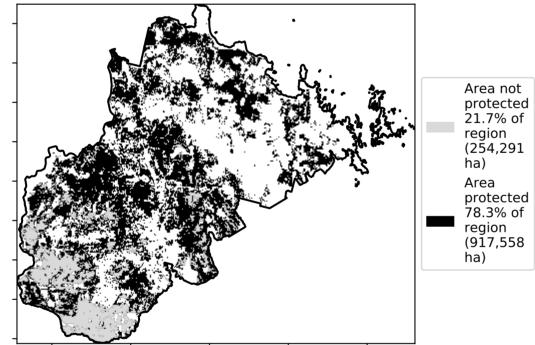
Grazing non forest

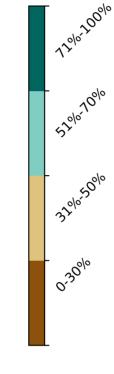


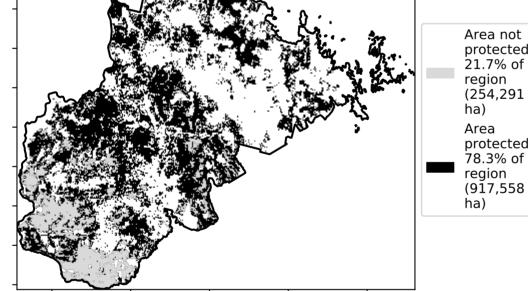
Total Vegetation Cover [%]



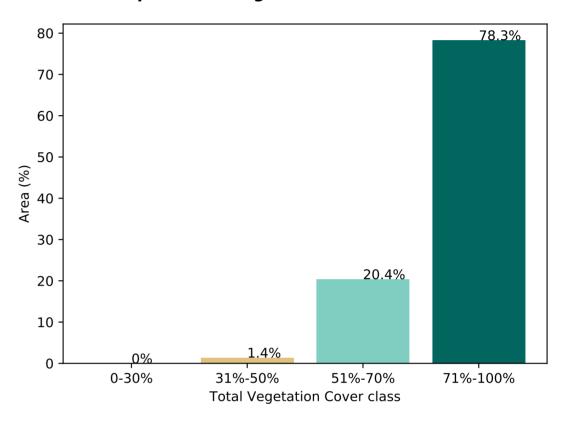
% Area protected from water erosion (>70%)



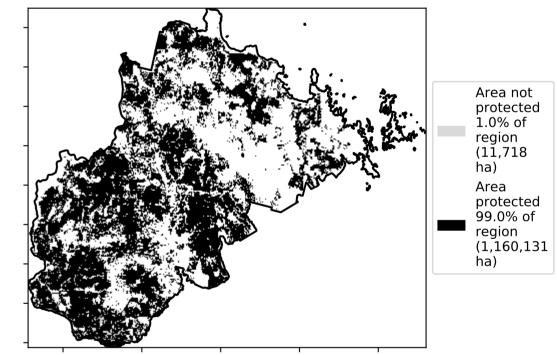




Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



\$

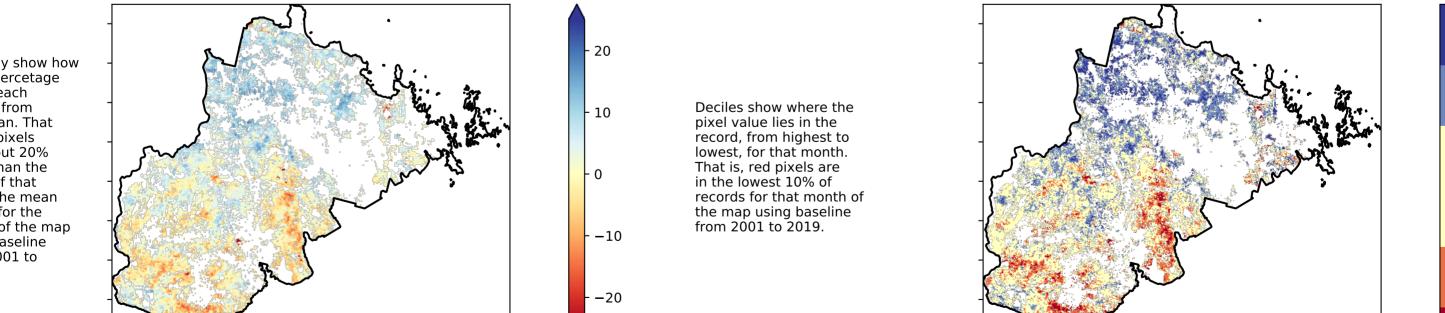
°,

x.1

2??

Total Vegetation Cover Anomaly [%]

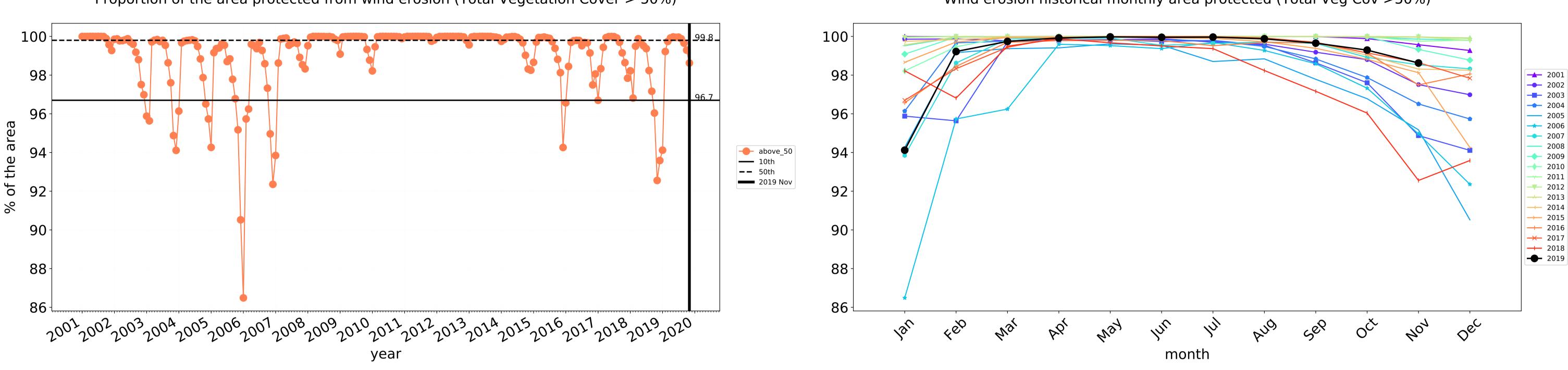
Total Vegetation Cover Decile [%]





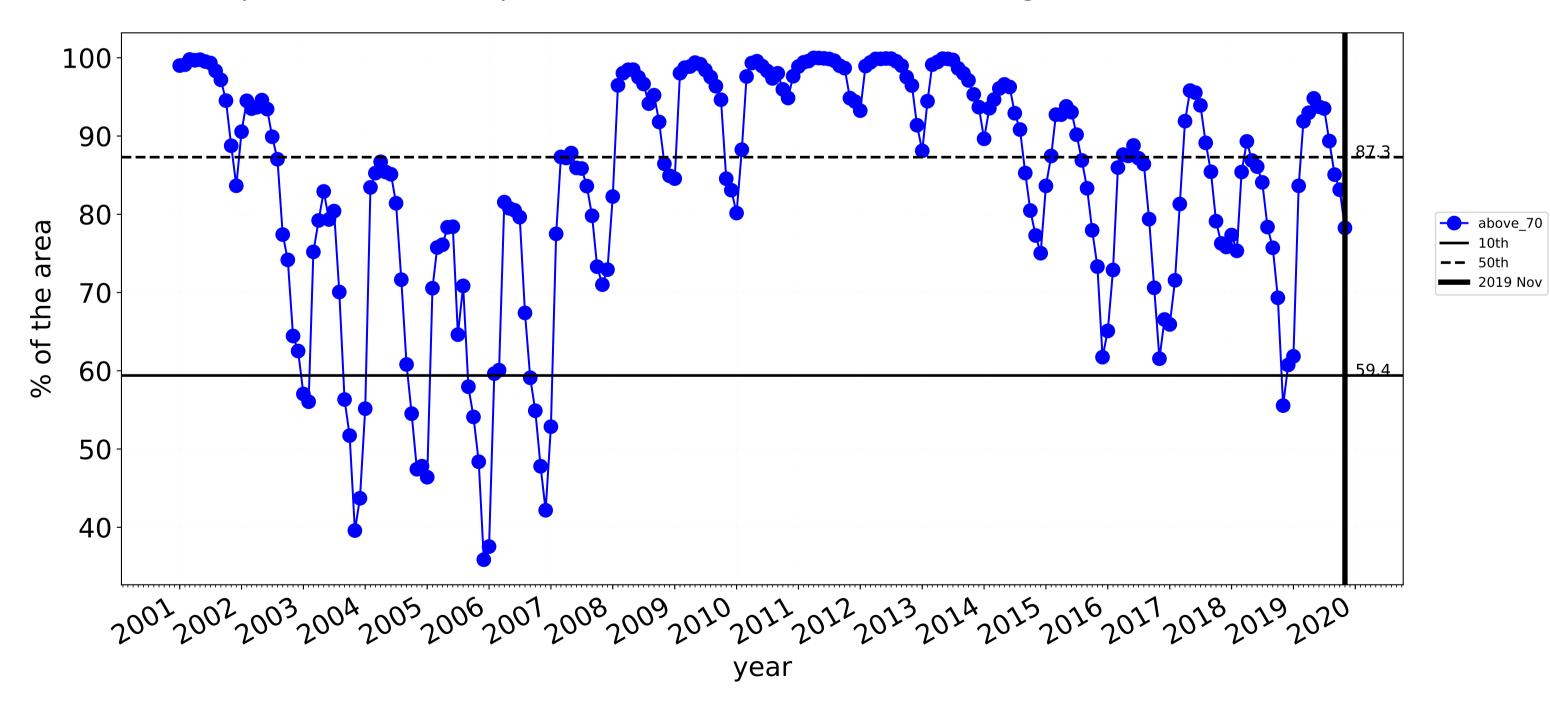
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map from 2001 to 2019.



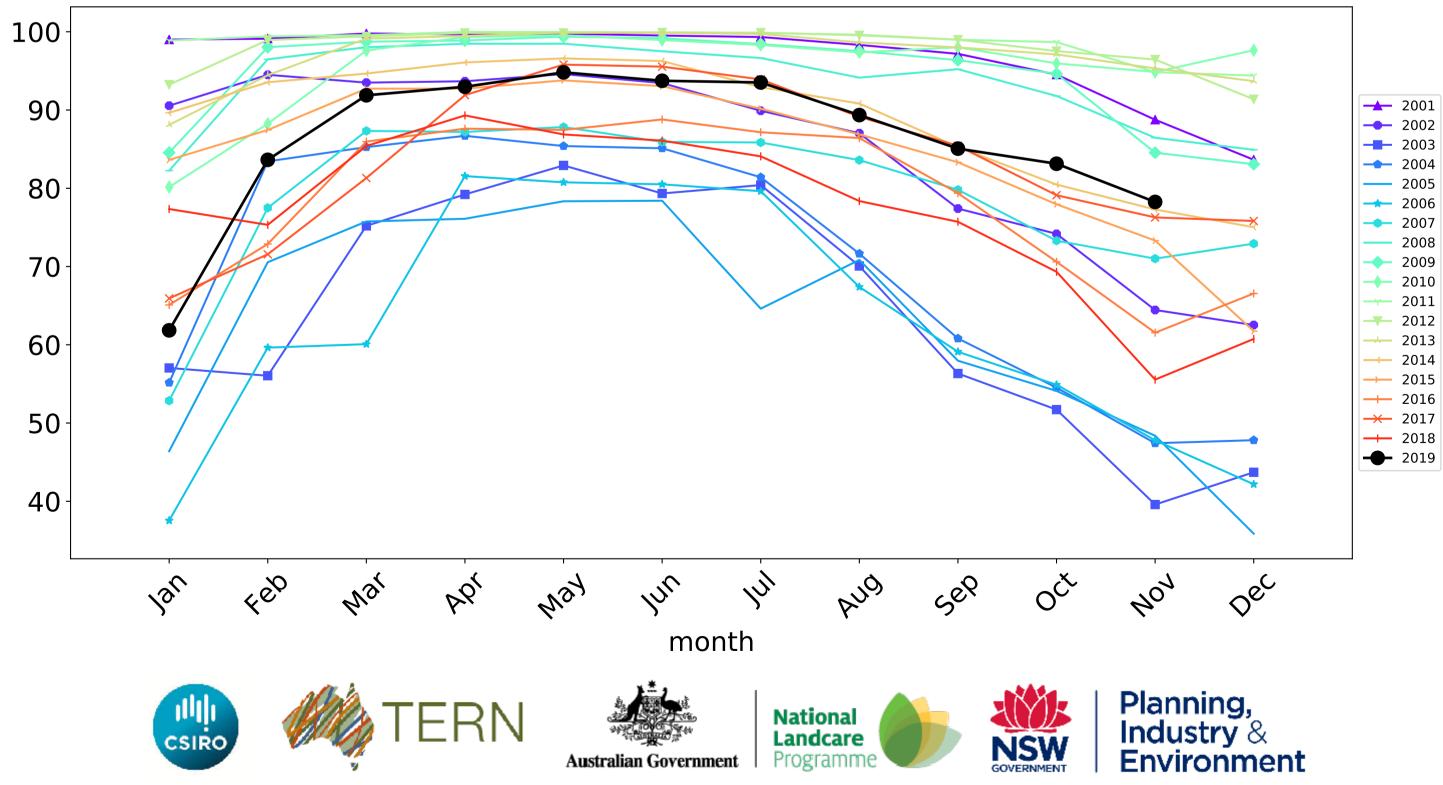


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



Grazing non forest timeseries



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

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

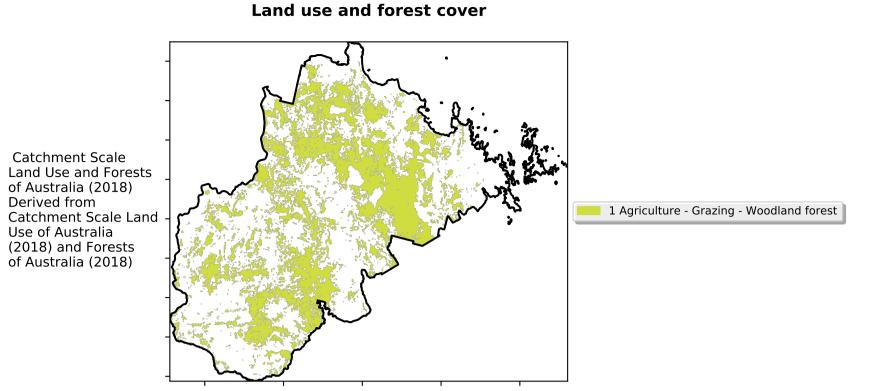
Grazing Woodland forest

12000

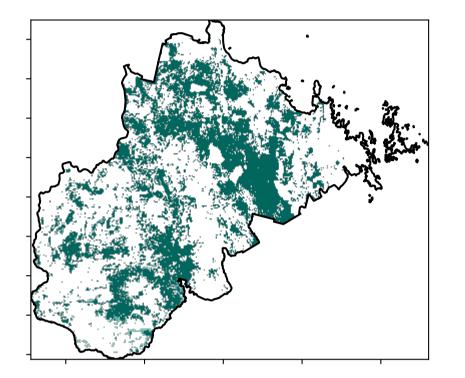
52% TON

320050010

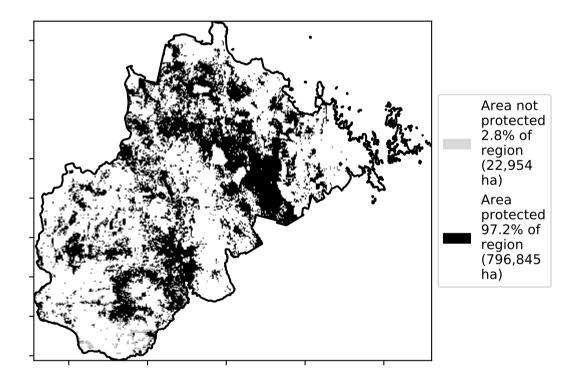
0.30%



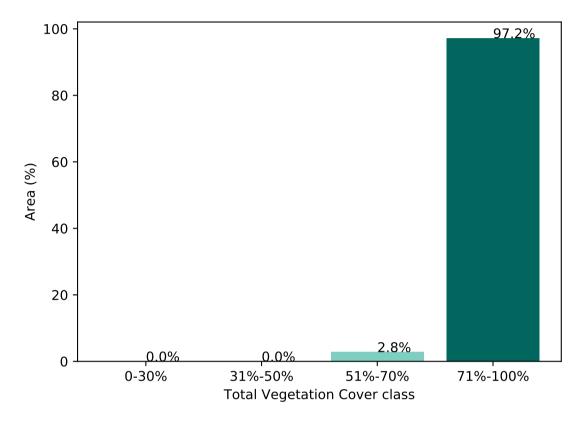
Total Vegetation Cover [%]



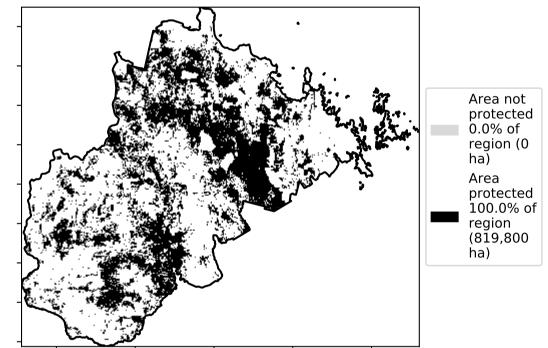
% Area protected from water erosion (>70%)



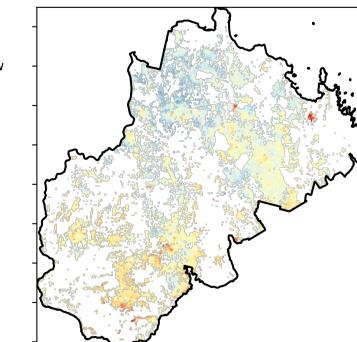
Proportion of vegetation cover class in area



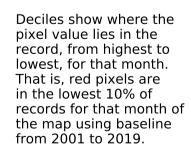
% Area protected from wind erosion (>50%)



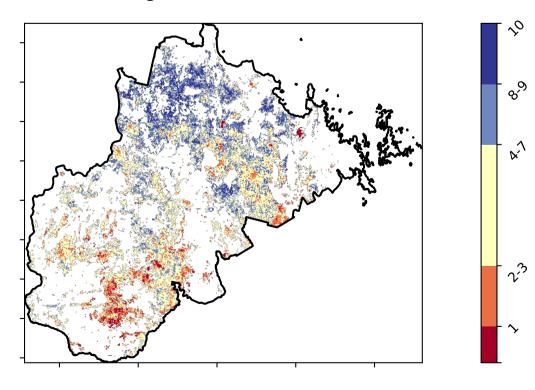
Total Vegetation Cover Anomaly [%]







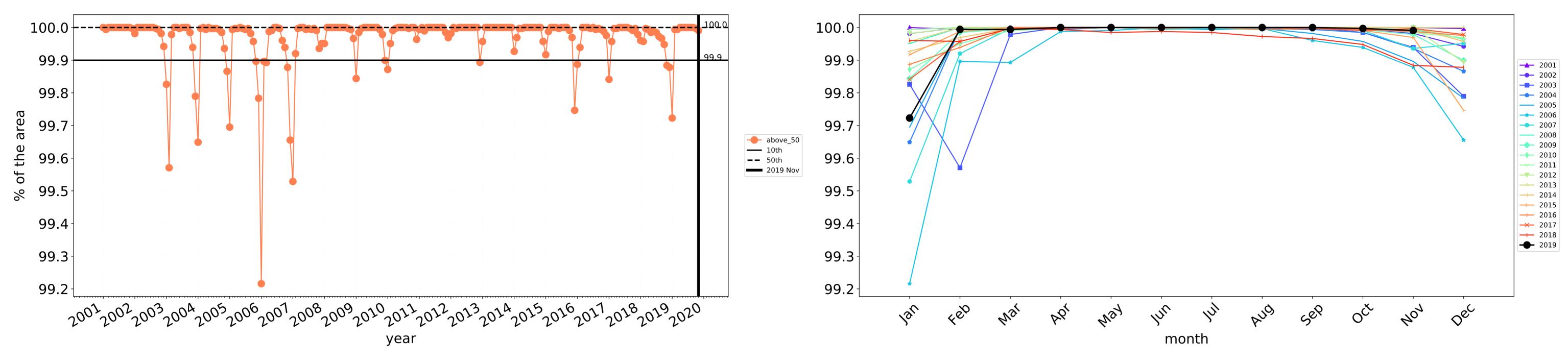
Total Vegetation Cover Decile [%]





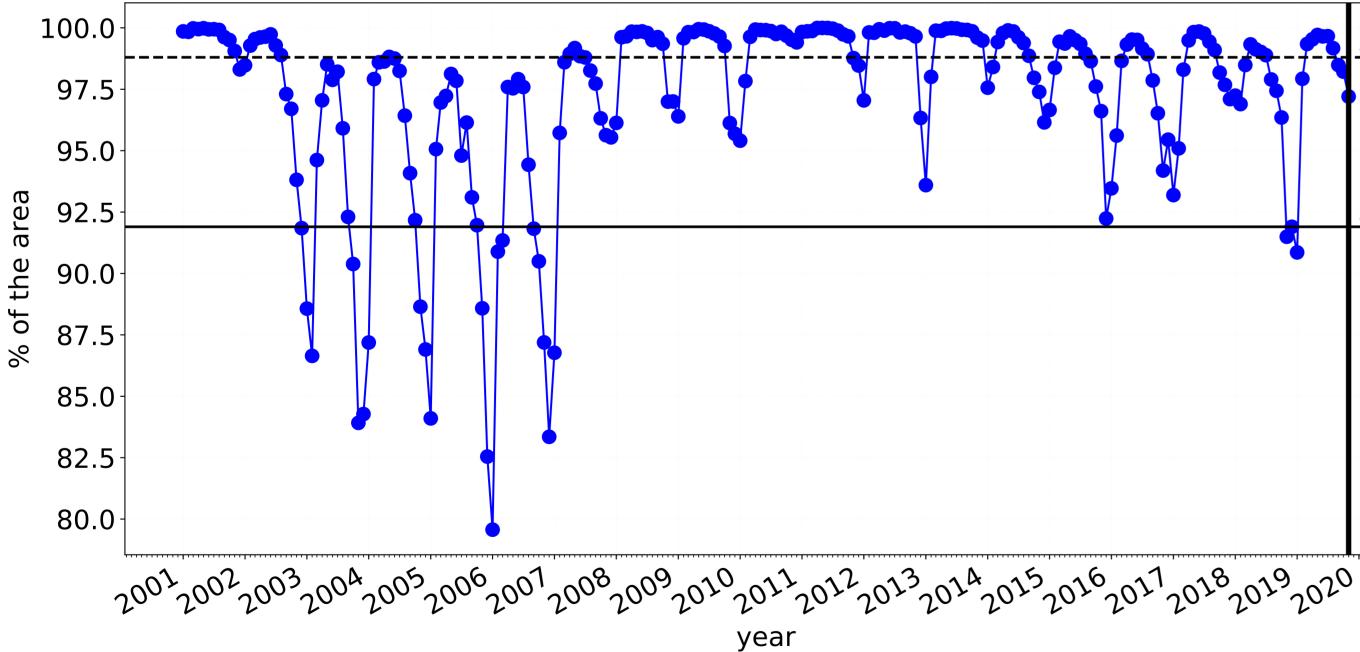
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

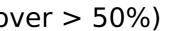
Grazing Woodland forest timeseries



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



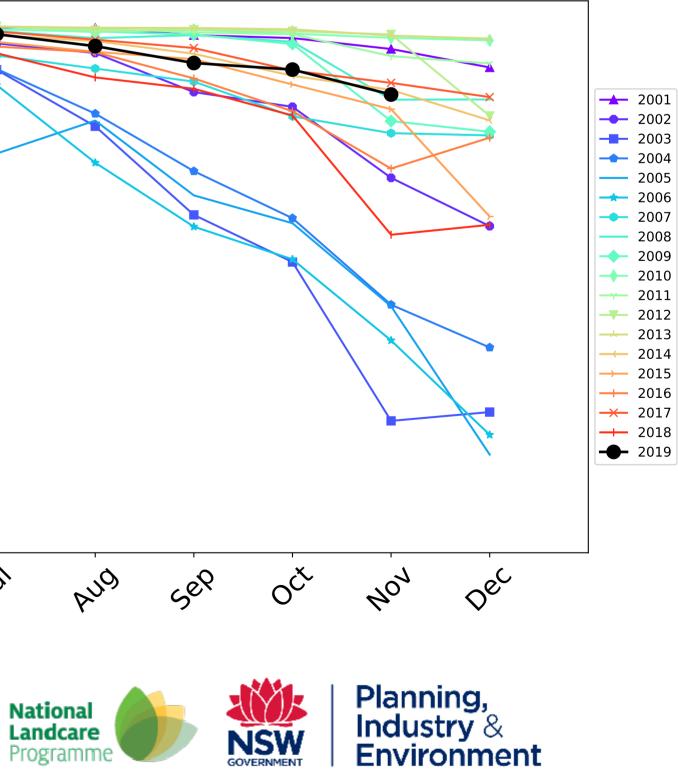




Wind erosion historical monthly area protected (Total Veg Cov >50%)

100.0 97.5 95.0 ---- above_70 92.5 **——** 10th **——** 50th 90.0 87.5 85.0-82.5 80.0-Jan feb May In 1st Mai PQ month ERN **HORA** CSIRO Programme Australian Government

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



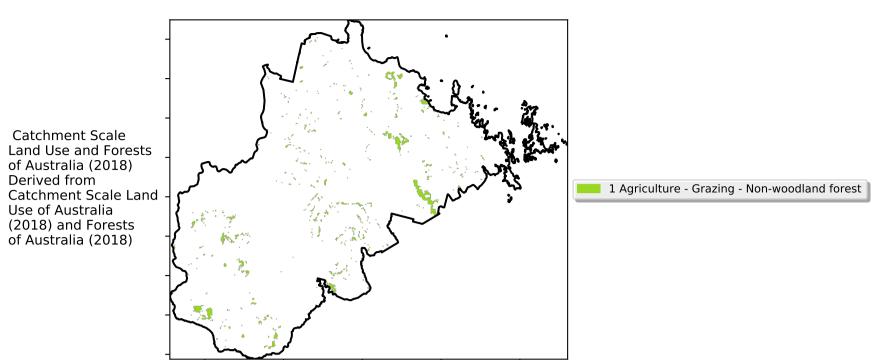
Grazing - Forest (non woodland)

12001000

52°1070010

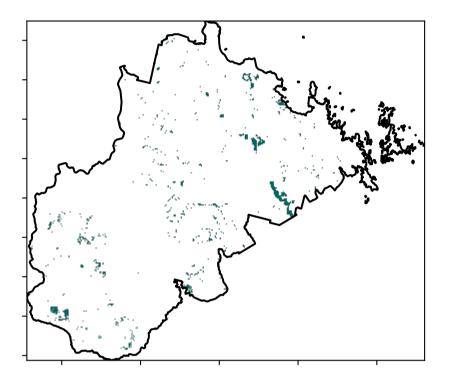
3201050010

0.30%

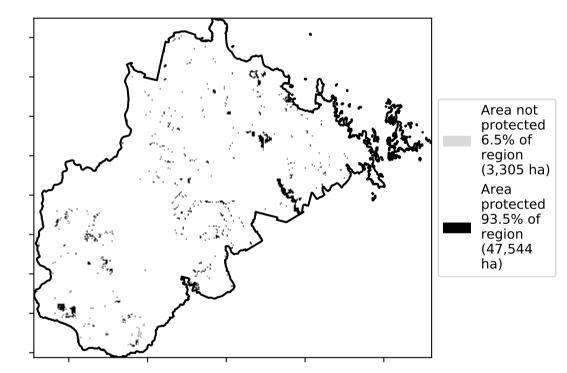


Land use and forest cover

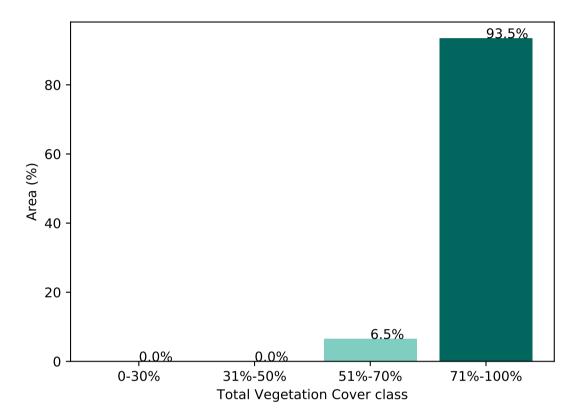
Total Vegetation Cover [%]



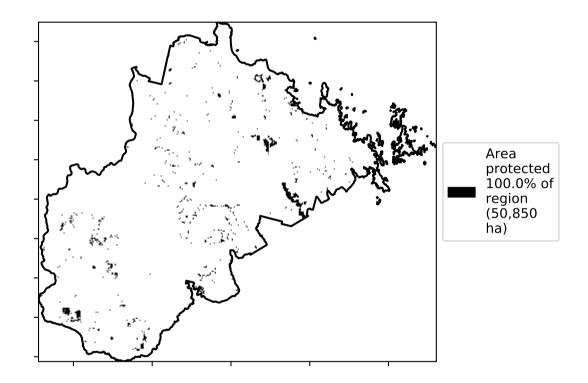
% Area protected from water erosion (>70%)







% Area protected from wind erosion (>50%)



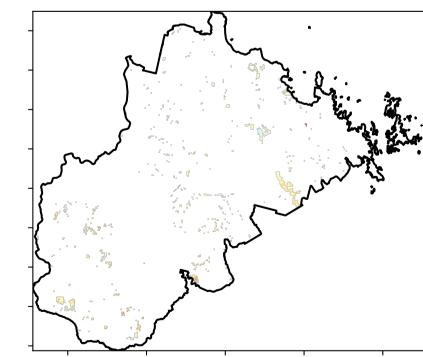
 $\hat{\mathbf{v}}$

ଚ୍ଚ

A.1

· 2^{?3}

Total Vegetation Cover Anomaly [%]

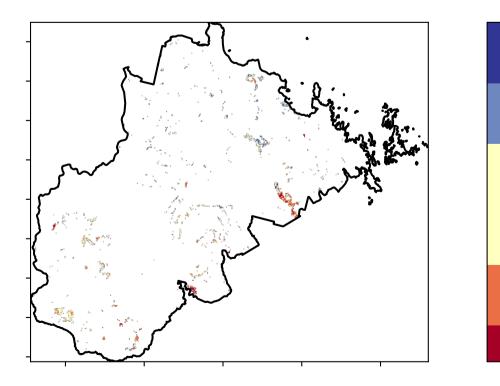


- 10 - 0 - -10

-20

- 20

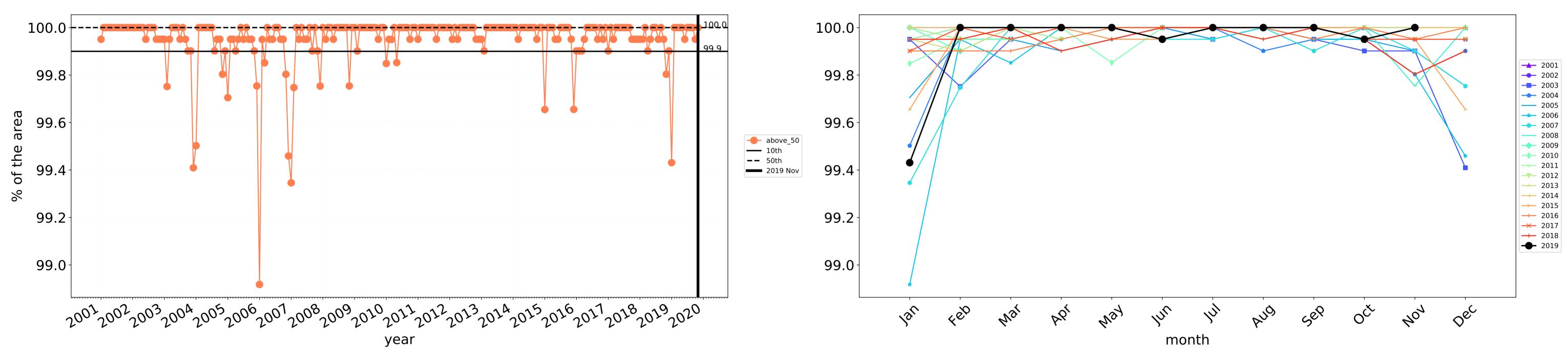
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019. **Total Vegetation Cover Decile [%]**





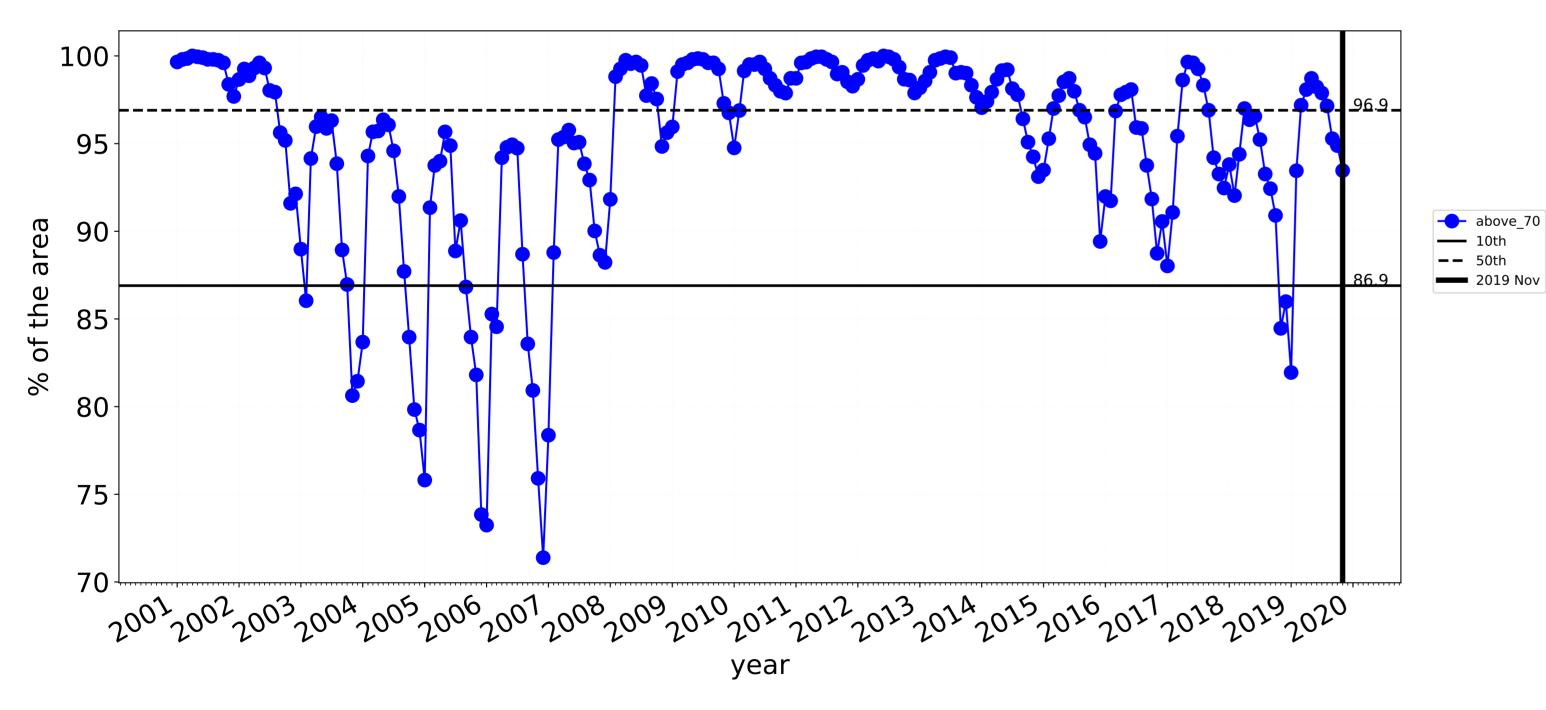
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

Grazing - Forest (non woodland) timeseries



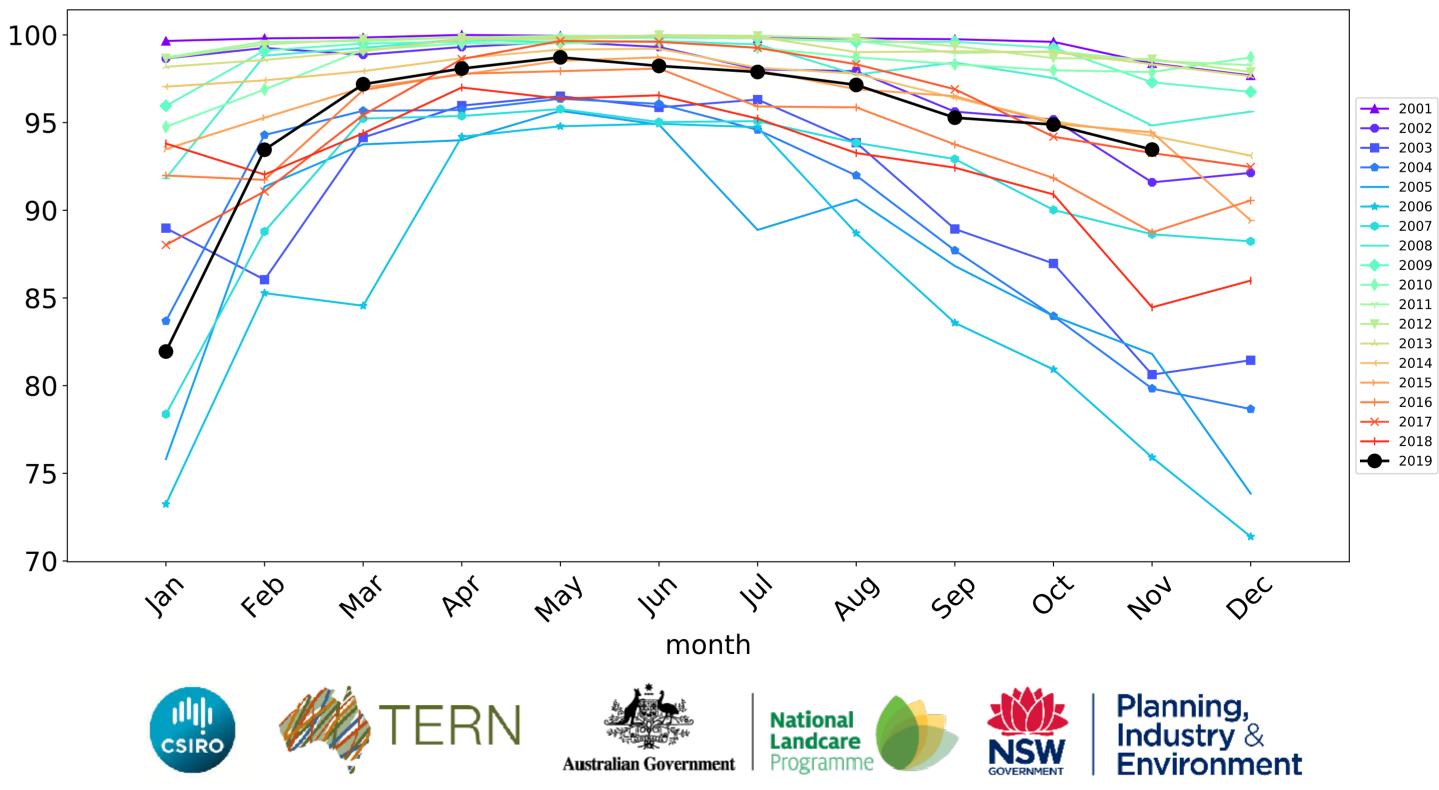
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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





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



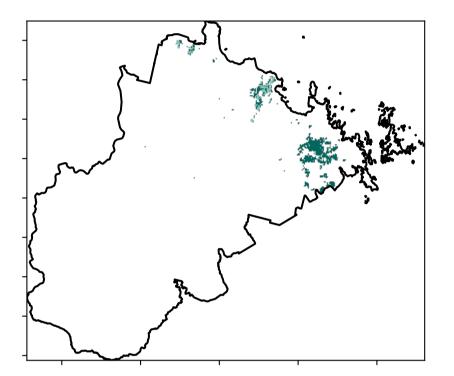
Water erosion historical monthly area protected (Total Veg Cov>70%)

Irrigation

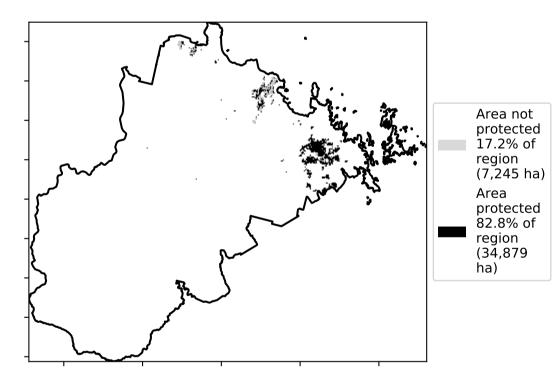
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

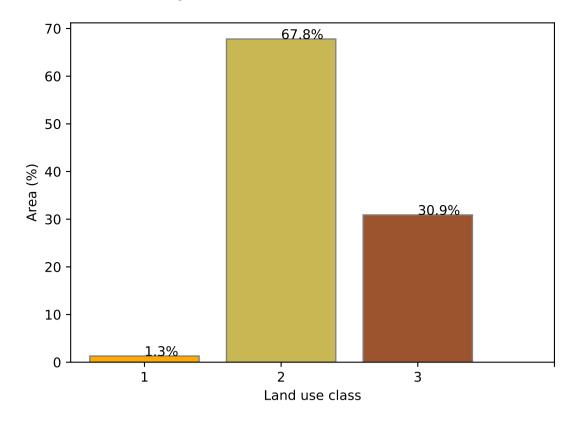
Total Vegetation Cover [%]

Land use and forest cover



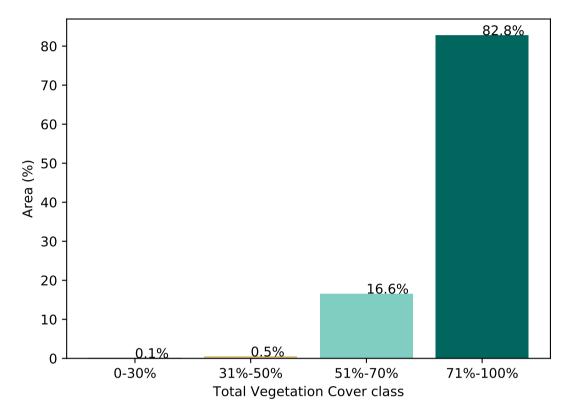
% Area protected from water erosion (>70%)



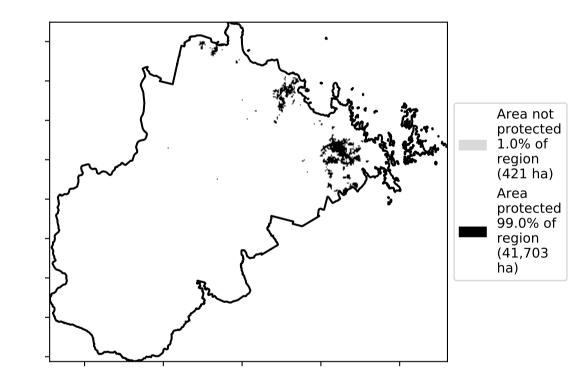


Proportion of each land class in area

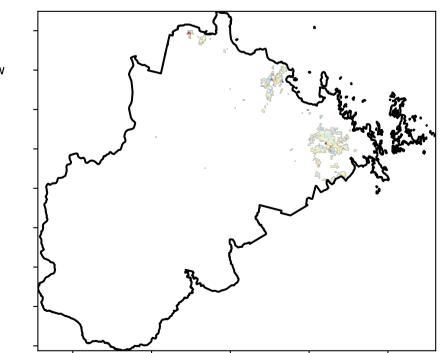
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]



- 10 - 0 - -10

-20

- 20

12%-100"

52°1070°10

32%50%

0.30%

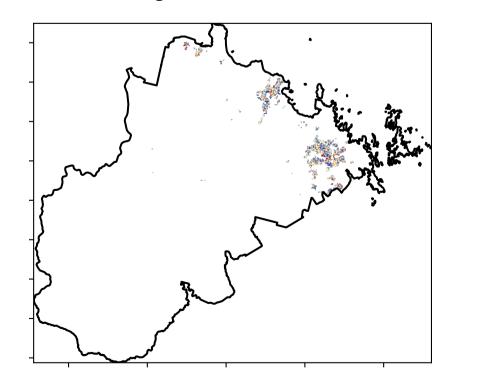
Total Vegetation Cover Decile [%]

\$

_ଚି

A-1

23





Deciles show where the pixel value lies in the

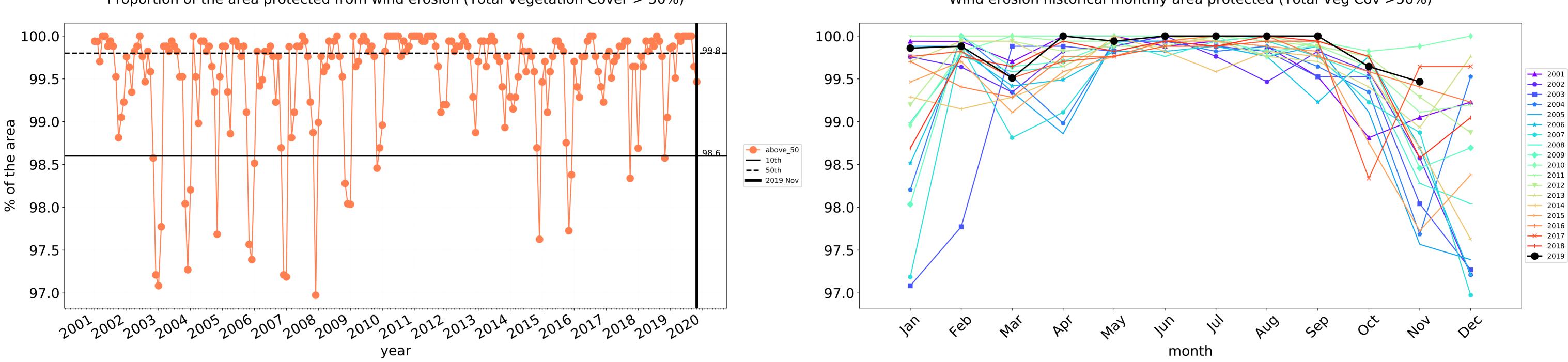
record, from highest to

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.

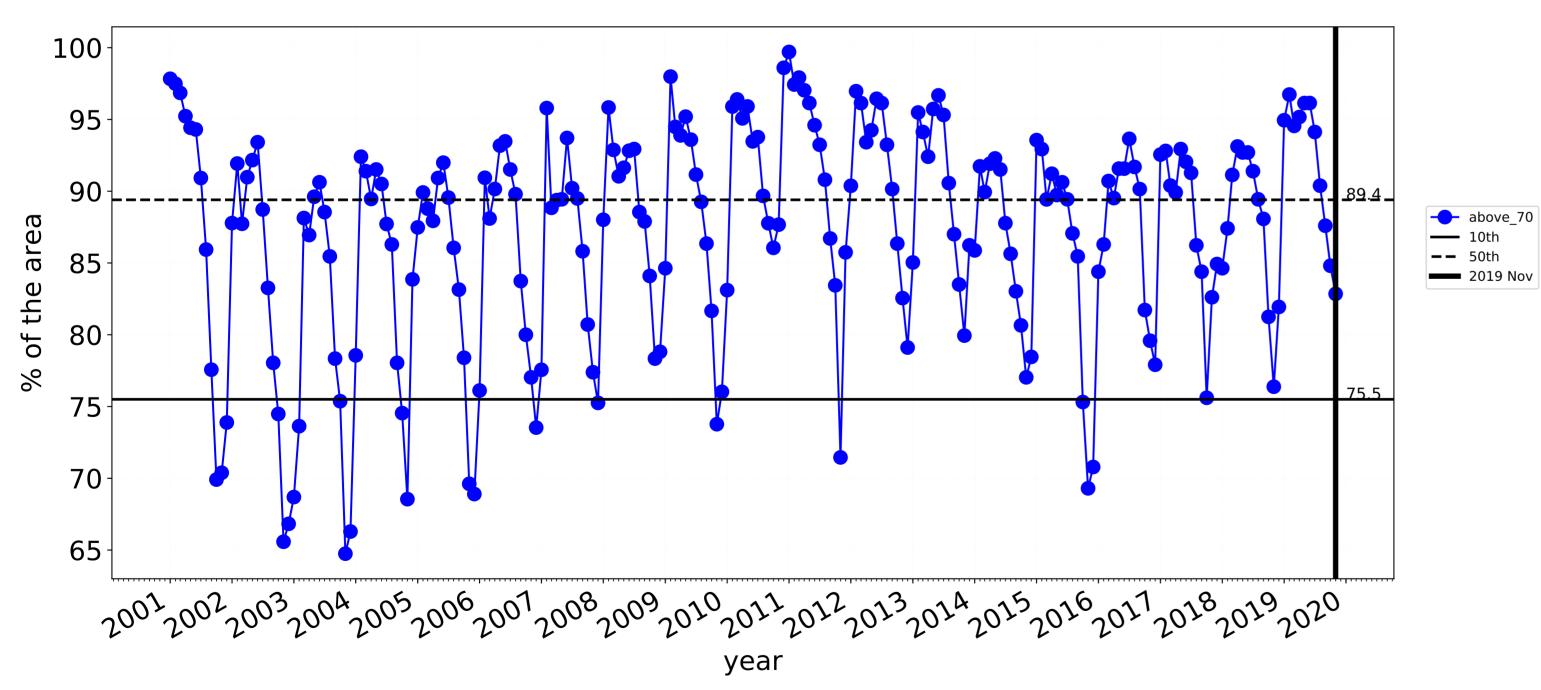
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.





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

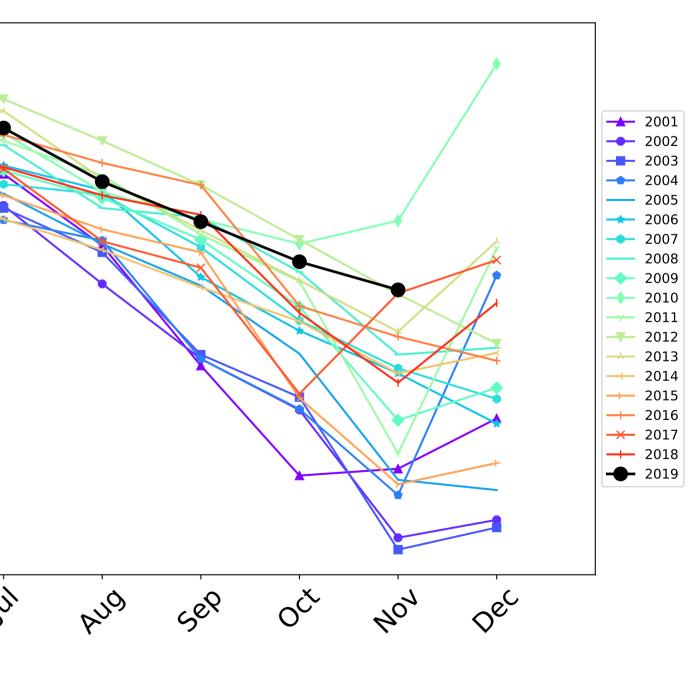




100-95 90 85 80 75 70 65 Jan fed way In 1¹₁ Mal P.Q month ERN Australian Government

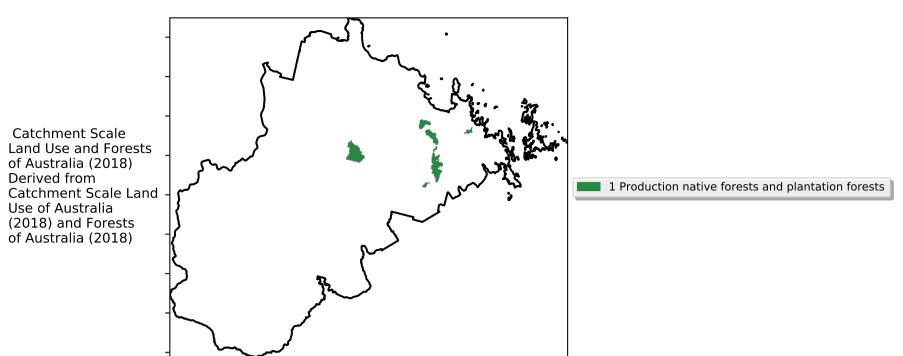
Wind erosion historical monthly area protected (Total Veg Cov >50%)

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



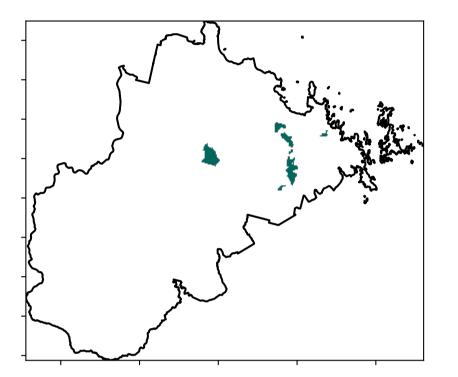


Production native forests and plantation forests

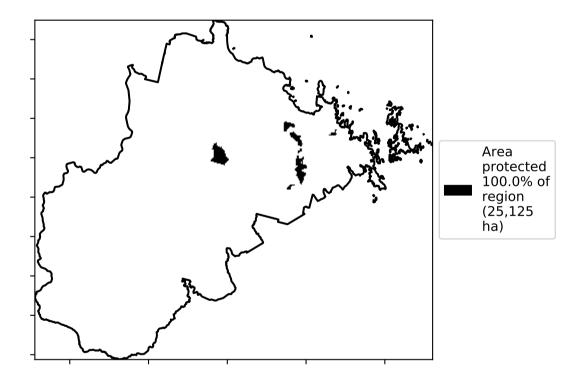


Land use and forest cover

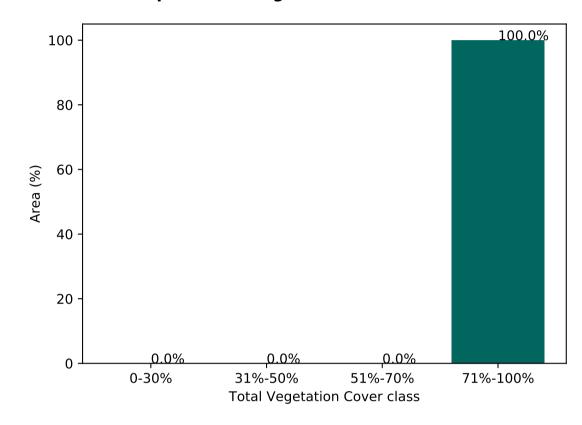
Total Vegetation Cover [%]



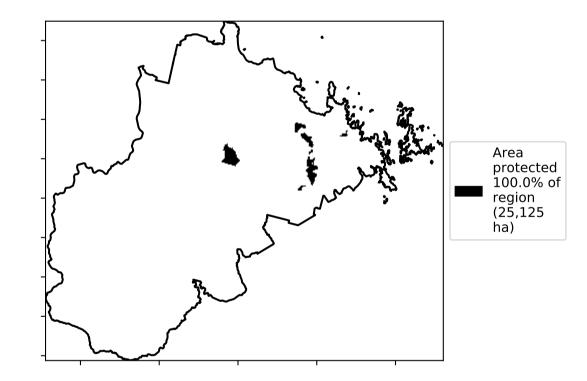
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



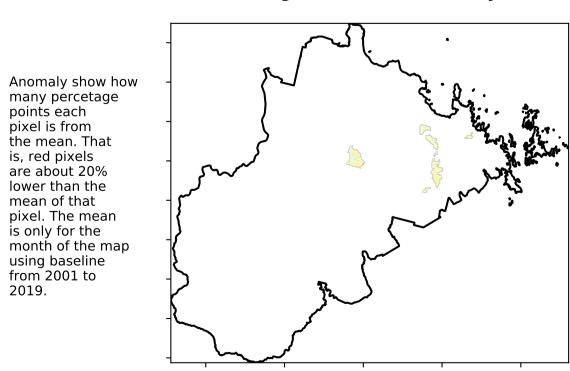
% Area protected from wind erosion (>50%)



 $\sqrt{2}$

A.1

Total Vegetation Cover Anomaly [%]



is, red pixels

mean of that

- 10 0 -10

- 20

-20

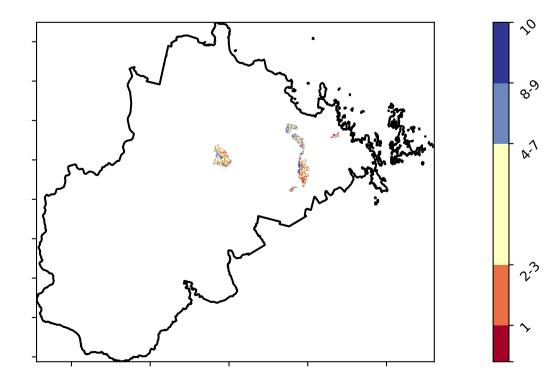
12% 200%

52°1070°10

320050010

0.30%

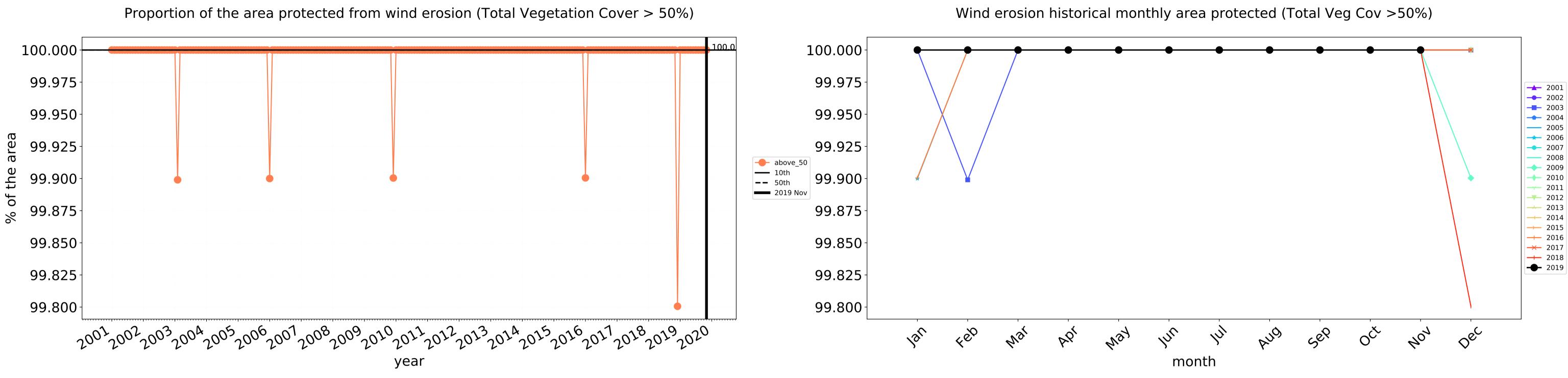
Total Vegetation Cover Decile [%]



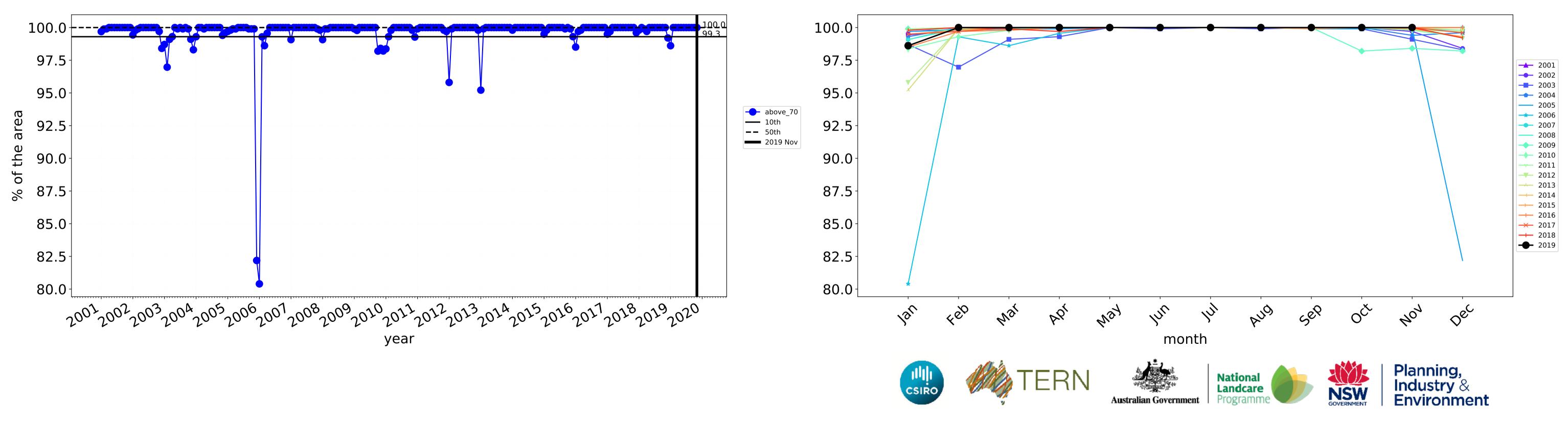


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

Production native forests and plantation forests timeseries



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



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

Whitsunday_(R) (2,358,125 ha and no data 23,751 ha) Percentage area and hectares protected with TVC threshold 30,50,70,80,90 and 95%

Land use and forest cover Class	area(ha)	above_30	above_50	above_70	above_80	above_90	above_95
Entire region	2,358,125	100.0% 2,357,550	99.2% 2,338,525	86.5% 2,038,900	64.9% 1,530,150	31.8% 748,900	10.1% 238,725
Conservation and natural environments	170,750	99.8% 170,450	99.3% 169,525	92.6% 158,100	78.9% 134,675	56.0% 95,675	20.0% 34,225
Conservation and natural environments non forest	28,550	99.8% 28,500	98.3% 28,075	68.1% 19,450	19.3% 5,500	3.9% 1,125	1.6% 450
Conservation and natural environments Woodland forest	57,075	100.0% 57,050	99.8% 56,975	97.5% 55,650	87.6% 49,975	61.1% 34,900	23.4% 13,350
Conservation and natural environments Forest (non woodland)	85,125	99.7% 84,900	99.2% 84,475	97.5% 83,000	93.0% 79,200	70.1% 59,650	24.0% 20,425
Agriculture	2,084,925	100.0% 2,084,875	99.2% 2,068,525	86.2% 1,796,625	64.0% 1,333,425	29.9% 623,025	9.4% 195,700
Grazing	2,042,500	100.0% 2,042,450	99.2% 2,026,325	86.2% 1,761,425	64.1% 1,309,675	30.3% 618,975	9.5% 194,625
Grazing non forest	1,171,850	100.0% 1,171,800	98.6% 1,155,750	78.3% 917,025	49.3% 578,000	18.7% 219,275	4.4% 51,725
Grazing Woodland forest	819,800	100.0% 819,800	100.0% 819,725	97.2% 796,875	84.9% 695,725	46.6% 382,325	16.8% 138,100
Grazing - Forest (non woodland)	50,850	100.0% 50,850	100.0% 50,850	93.5% 47,525	70.7% 35,950	34.2% 17,375	9.4% 4,800
Irrigation	42,125	100.0% 42,125	99.5% 41,900	82.8% 34,900	55.8% 23,525	9.5% 4,000	2.6% 1,075
Production native forests and plantation forests	25,125	100.0% 25,125	100.0% 25,125	100.0% 25,125	100.0% 25,125	78.1% 19,625	18.2% 4,575

