## **Total vegetation cover soil protection Region:NRM Burdekin QLD**

## Date: July 2021

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 2021**

#### Land use and forest cover

#### Proportion of each land class in area



Legend with land class forest cover and number, i.e. Forests is 12 1 Conservation and natural environments - Non-forest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments - Non-Woodland forest 4 Agriculture - Grazing - Non-forest 5 Agriculture - Grazing - Non-woodland forest 6 Agriculture - Grazing - Irrigated 8 Agriculture - Cropping - Irrigated 9 Agriculture - Horticulture - Non-irrigated 10 Agriculture - Horticulture - Irrigated 11 Agriculture - Horticulture - Irrigated 12 Production native forests and plantation forests 13 Other uses		
<ul> <li>Non-forest</li> <li>Conservation and natural environments - Woodland forest</li> <li>Conservation and natural environments - Non-Woodland forest</li> <li>Conservation and natural environments - Non-Woodland forest</li> <li>Agriculture - Grazing - Non-forest</li> <li>S Agriculture - Grazing - Woodland forest</li> <li>G Agriculture - Grazing - Non-woodland forest</li> <li>Agriculture - Grazing - Irrigated</li> <li>S Agriculture - Cropping - Irrigated</li> <li>Magriculture - Horticulture - Non-irrigated</li> <li>Magriculture - Horticulture - Irrigated</li> <li>Magriculture - Horticulture - Irrigated</li> <li>Production native forests and plantation forests</li> </ul>		
<ul> <li>Woodland forest</li> <li>3 Conservation and natural environments - Non-Woodland forest</li> <li>4 Agriculture - Grazing - Non-forest</li> <li>5 Agriculture - Grazing - Woodland forest</li> <li>6 Agriculture - Grazing - Non-woodland forest</li> <li>7 Agriculture - Grazing - Irrigated</li> <li>8 Agriculture - Cropping - Irrigated</li> <li>9 Agriculture - Cropping - Irrigated</li> <li>10 Agriculture - Horticulture - Irrigated</li> <li>11 Agriculture - Horticulture - Irrigated</li> <li>12 Production native forests and plantation forests</li> </ul>	The second	
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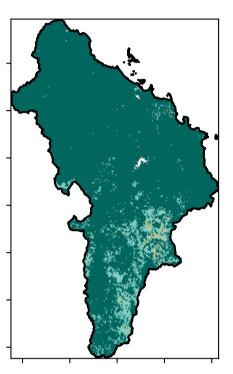
12%200%

1 52°10 TO010

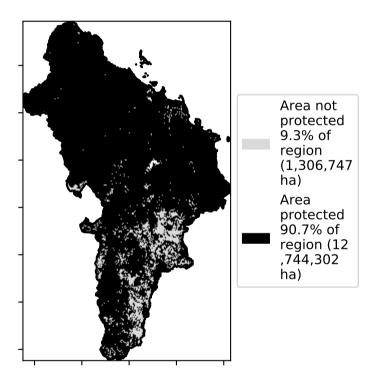
32°10'50°10

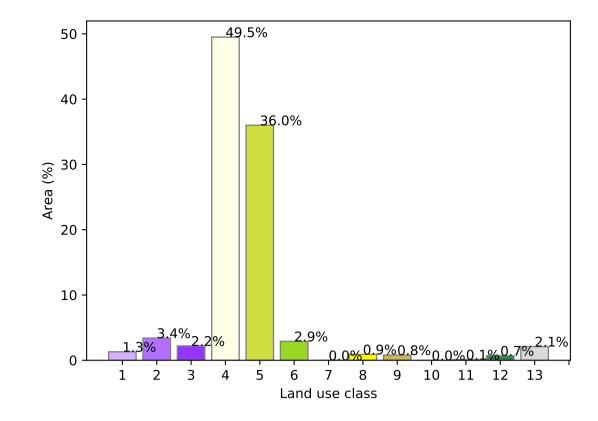
0.30%

#### Total Vegetation Cover [%]

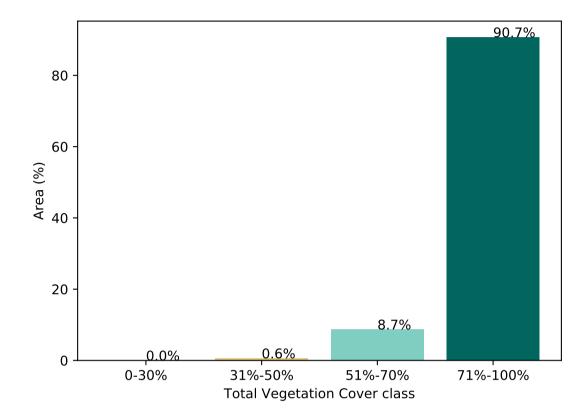


#### % Area protected from water erosion (>70%)

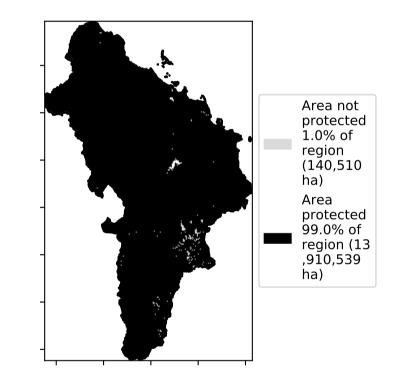




#### Proportion of vegetation cover class in area



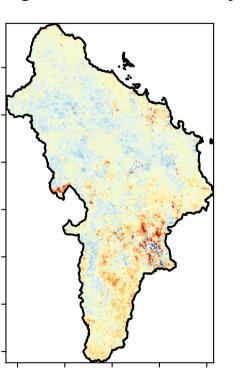
#### % Area protected from wind erosion (>50%)

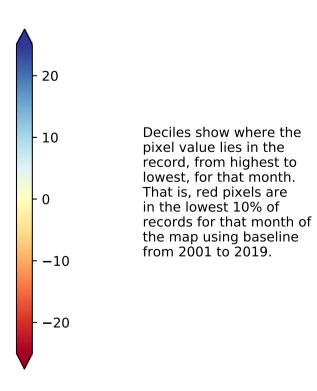


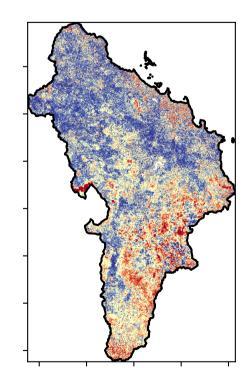
Total Vegetation Cover Anomaly [%]

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.

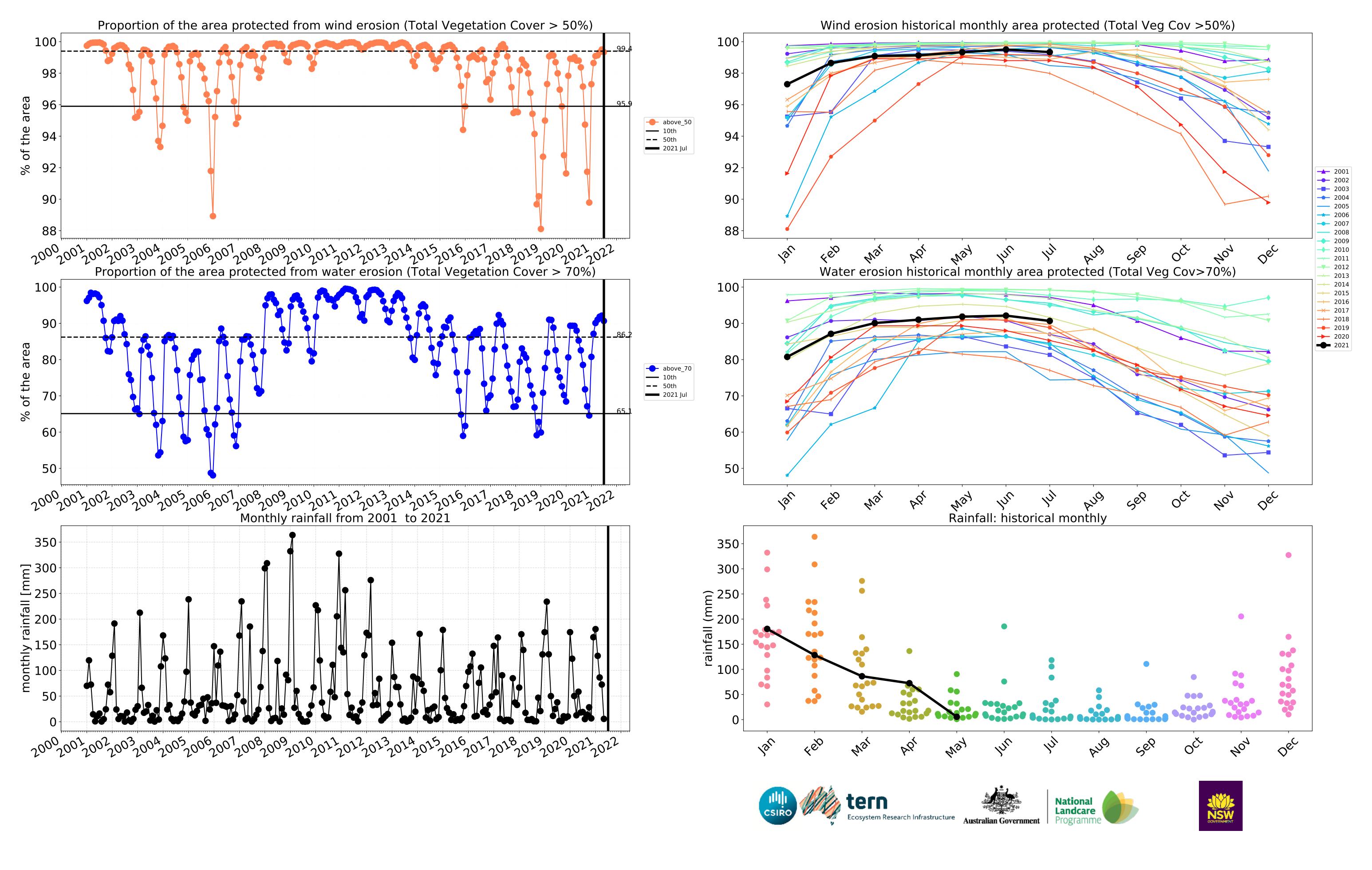






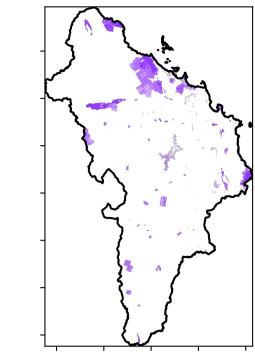






### **Conservation and natural environments**

#### Land use and forest cover



 Conservation and natural environments - Nonforest
 Conservation and natural environments - Woodland forest
 Conservation and natural environments - Nonwoodland forest

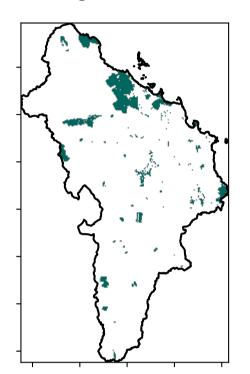
12%200%

52°10'10°10

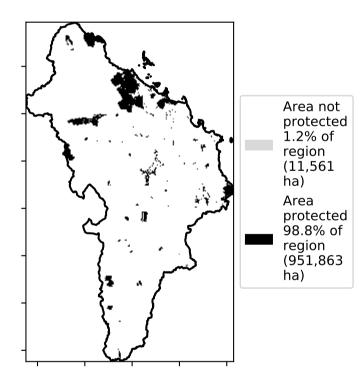
3201050010

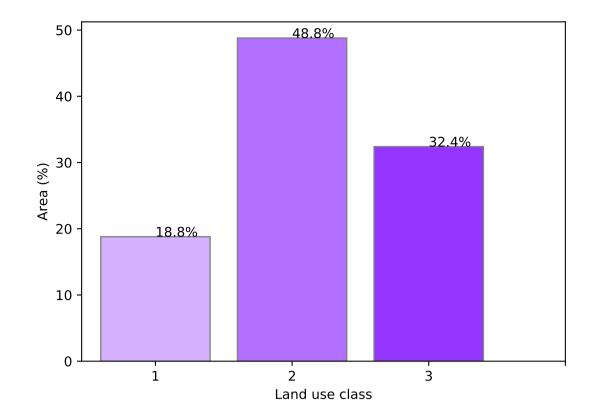
0.30%

#### **Total Vegetation Cover [%]**



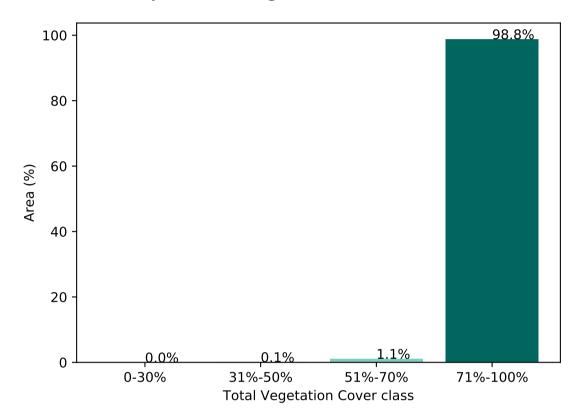




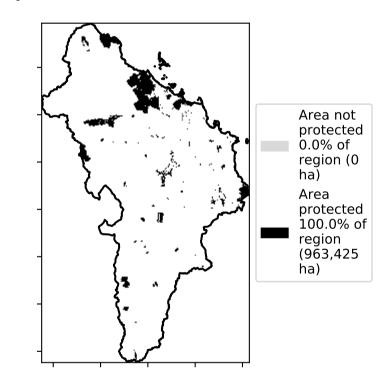


#### Proportion of each land class in area

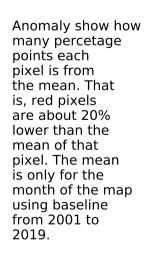
#### Proportion of vegetation cover class in area



#### % Area protected from wind erosion (>50%)



**Total Vegetation Cover Anomaly [%]** 



Catchment Scale

of Australia (2018) Derived from

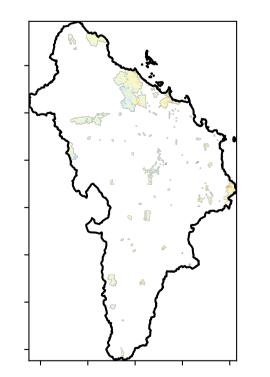
(2018) and Forests

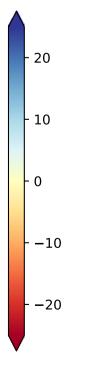
of Australia (2018)

Use of Australia

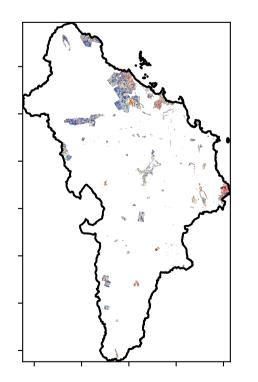
Land Use and Forests

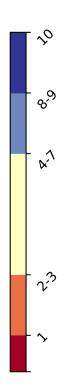
Catchment Scale Land





Total Vegetation Cover Decile [%]







Deciles show where the

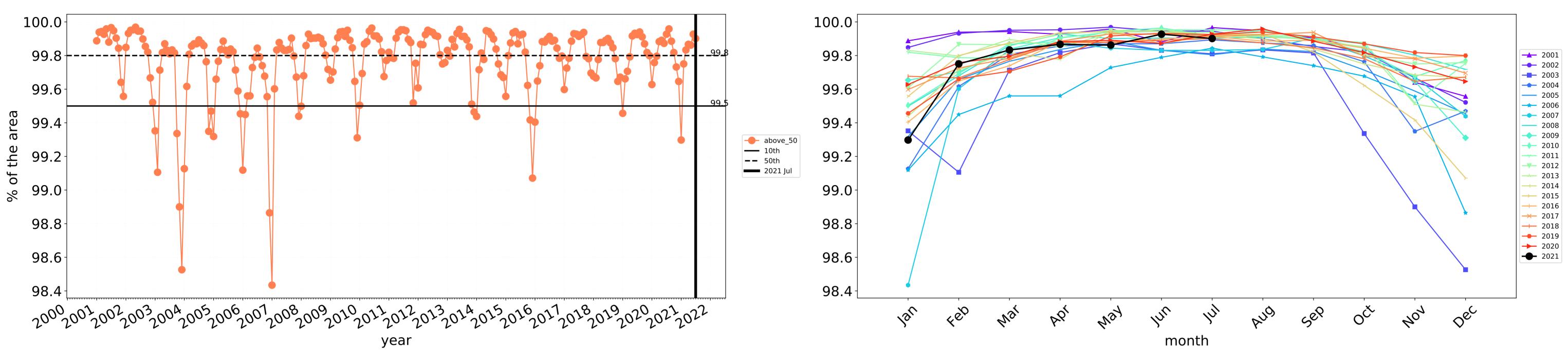
pixel value lies in the

in the lowest 10% of

records for that month of

the map using baseline from 2001 to 2019.

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

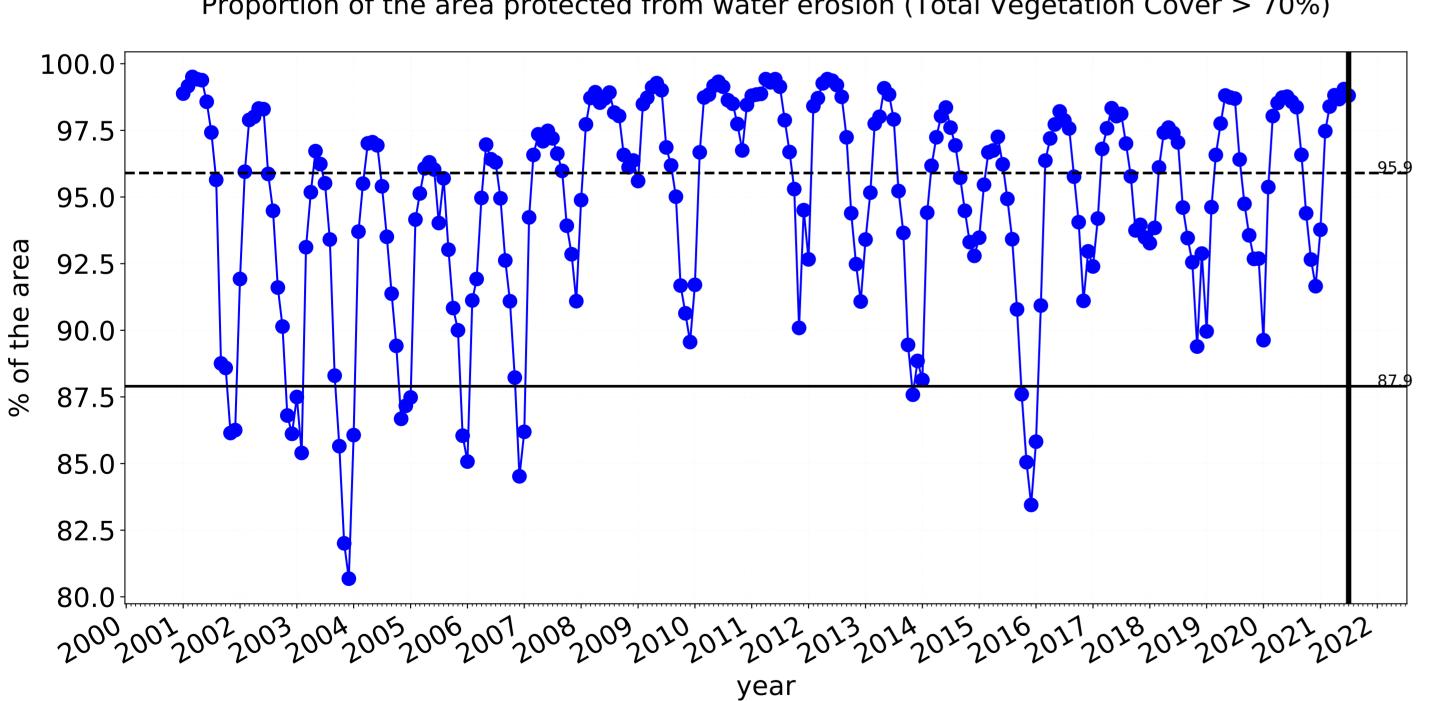


**——** 10th

**——** 50th

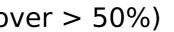
**——** 2021 Jul

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

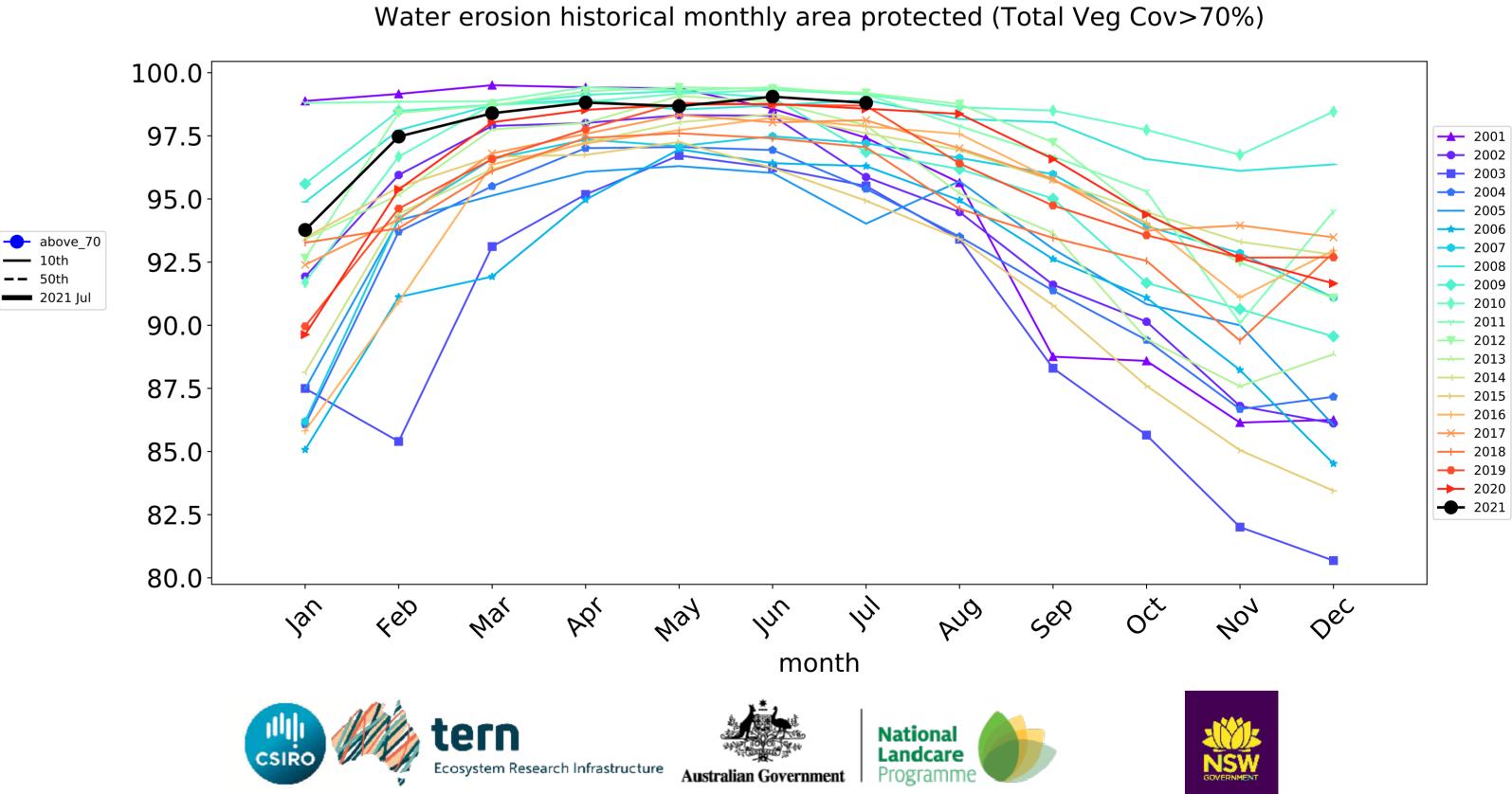


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

## **Conservation and natural environments timeseries**

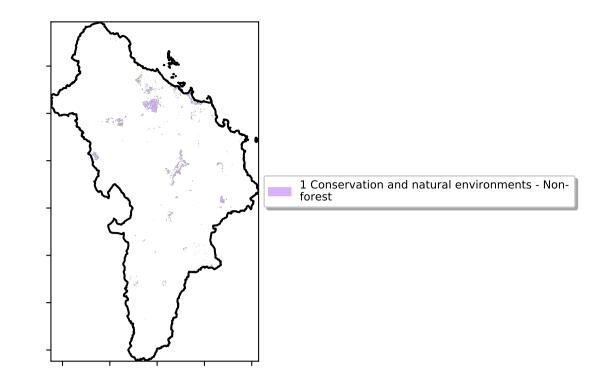


Wind erosion historical monthly area protected (Total Veg Cov >50%)

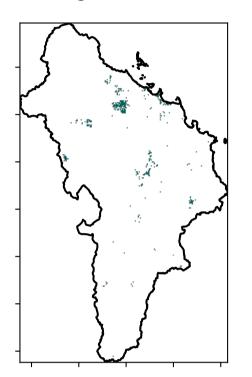


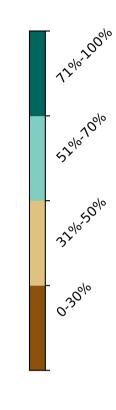
## **Conservation and natural environments non forest**

Land use and forest cover

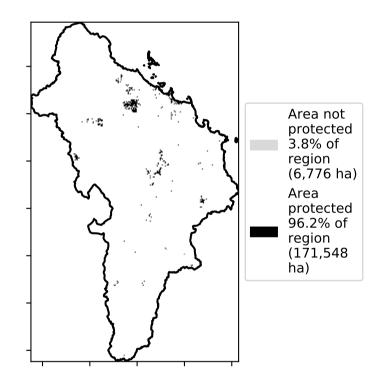


Total Vegetation Cover [%]

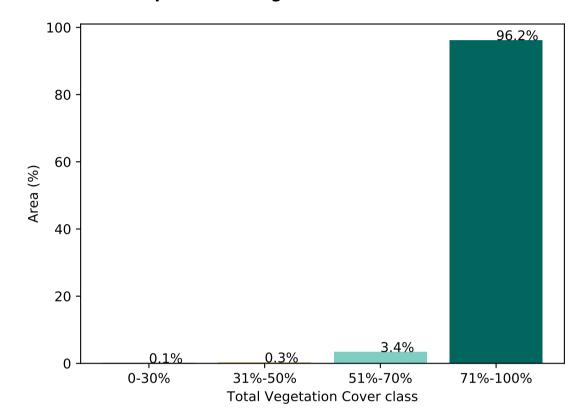




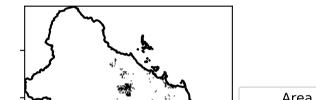
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



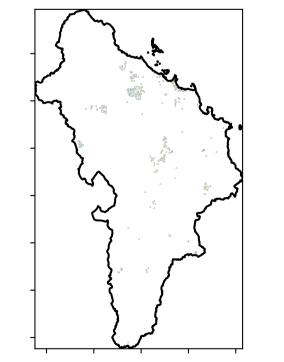
% Area protected from wind erosion (>50%)

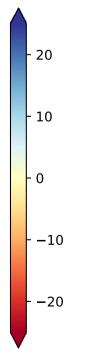


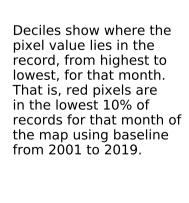
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover Anomaly [%]** 

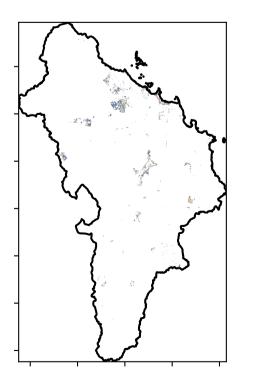
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.





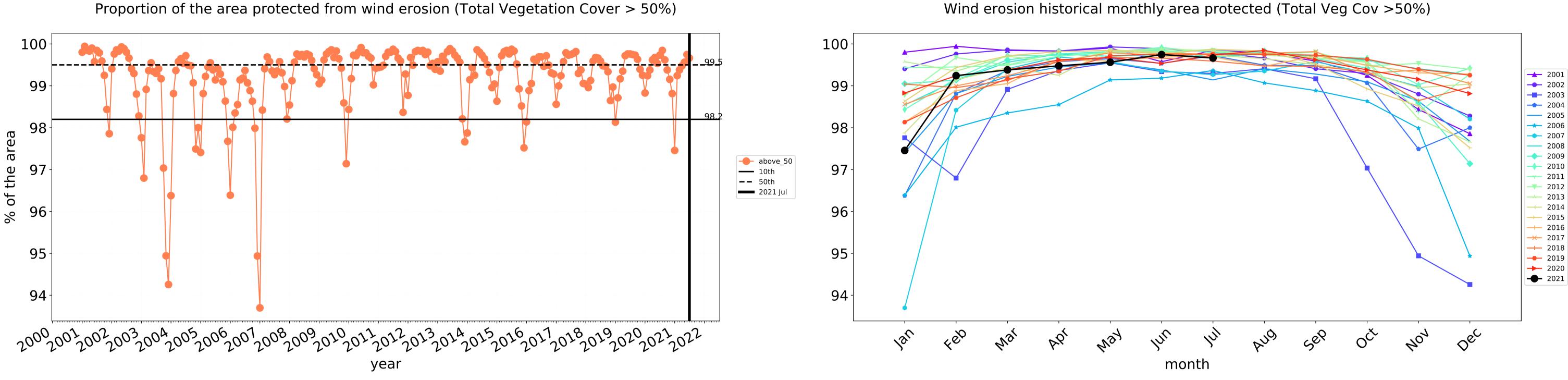


Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (178,325 ha)



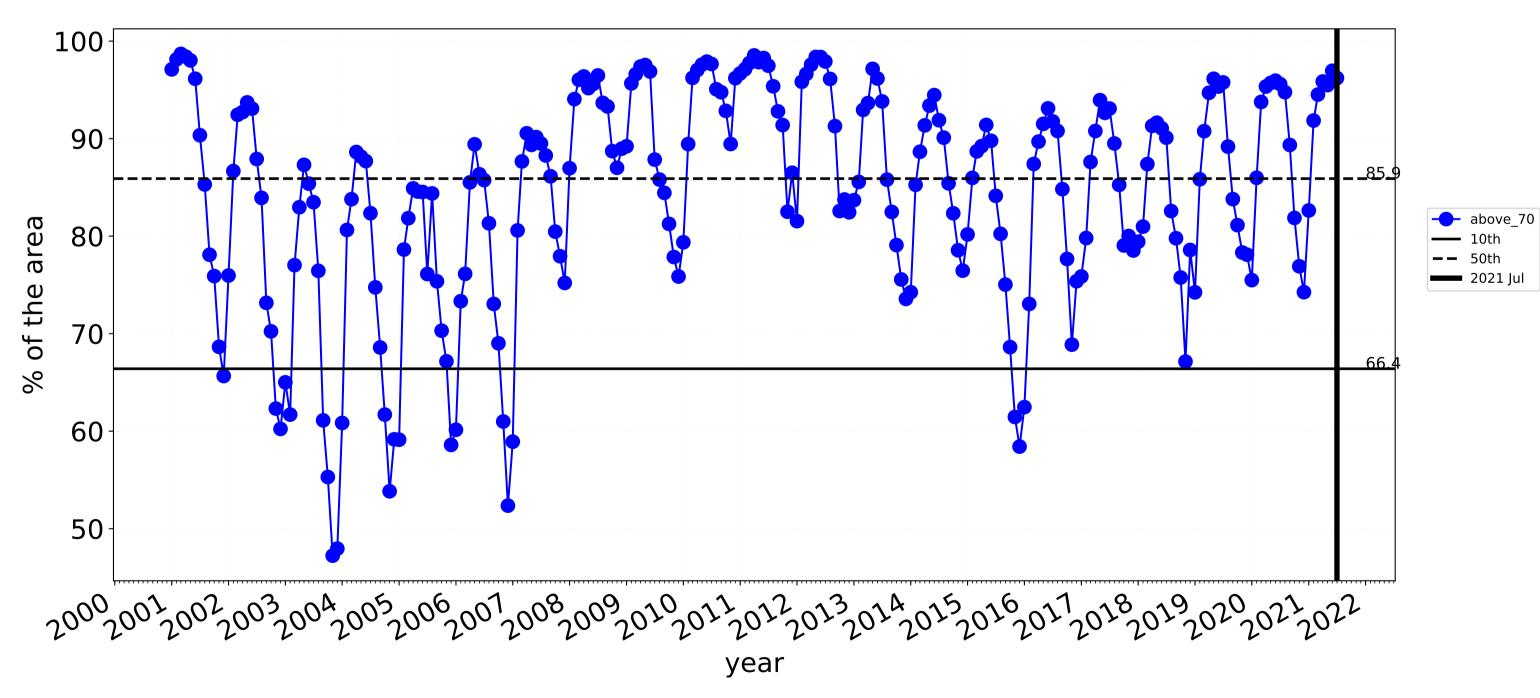


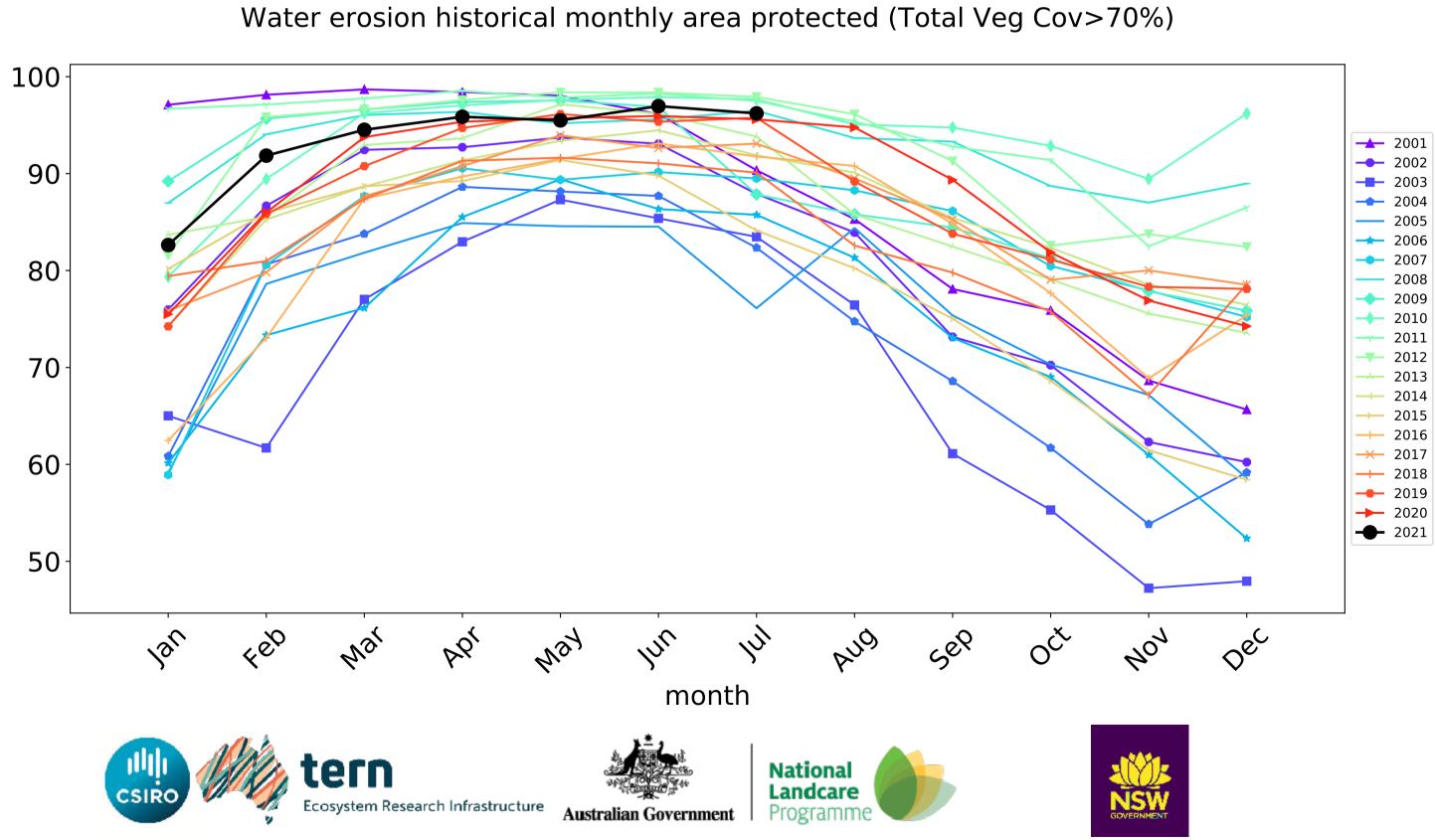




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

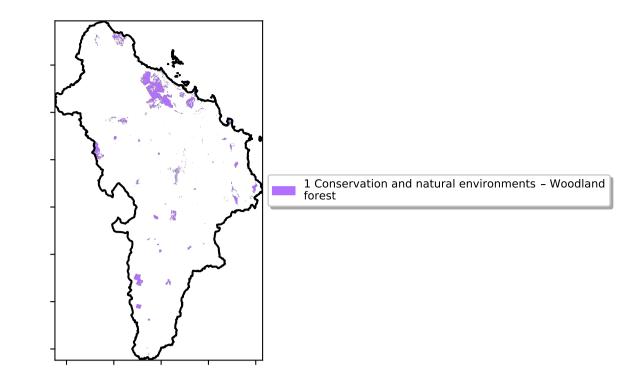




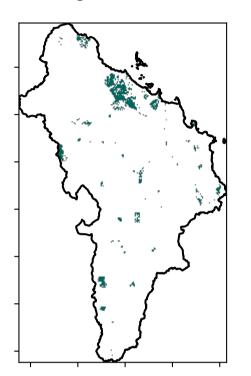


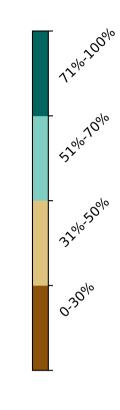
## **Conservation and natural environments Woodland forest**

Land use and forest cover

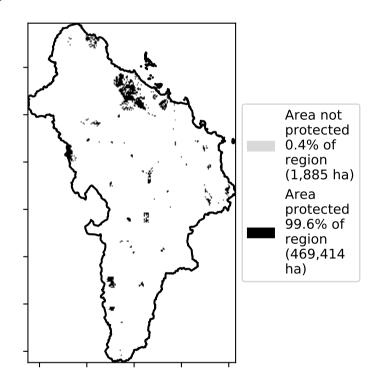


Total Vegetation Cover [%]

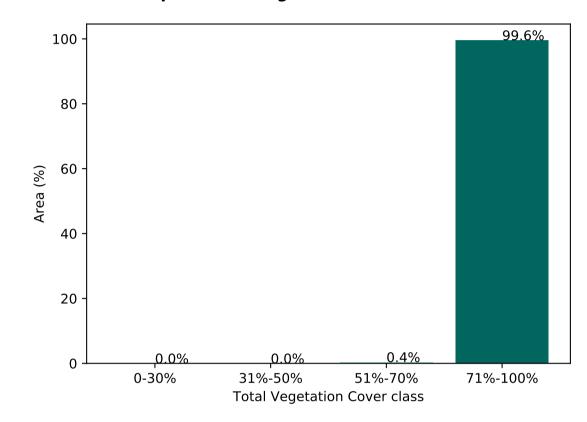




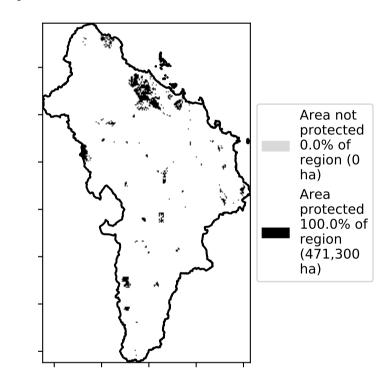
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



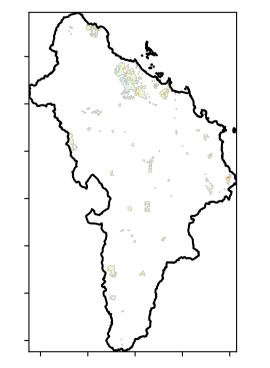
% Area protected from wind erosion (>50%)

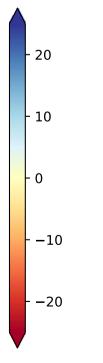


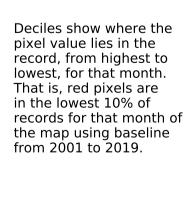
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

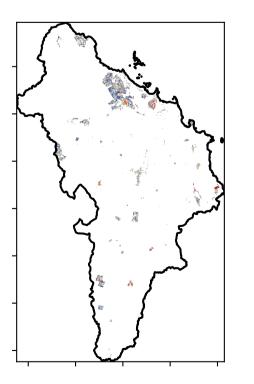
Total Vegetation Cover Anomaly [%]

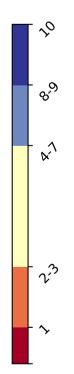
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



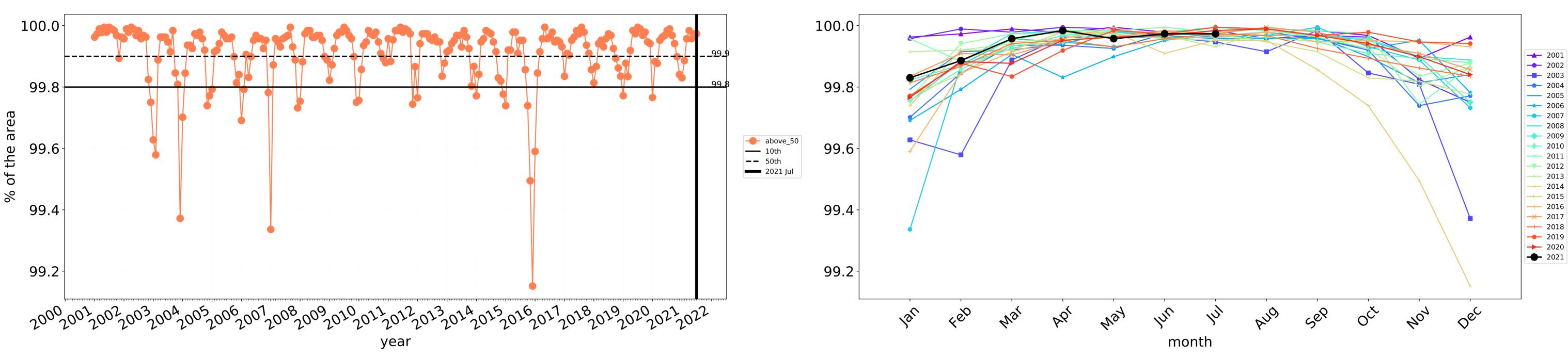




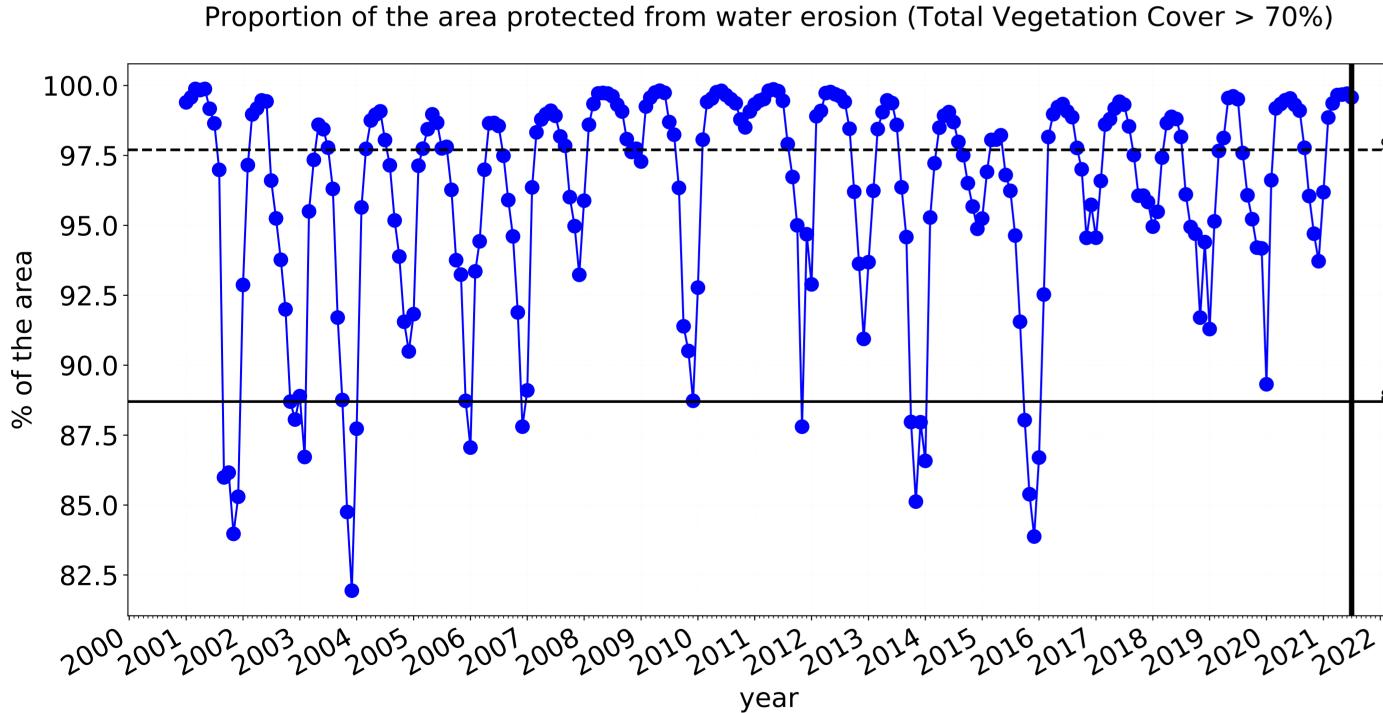






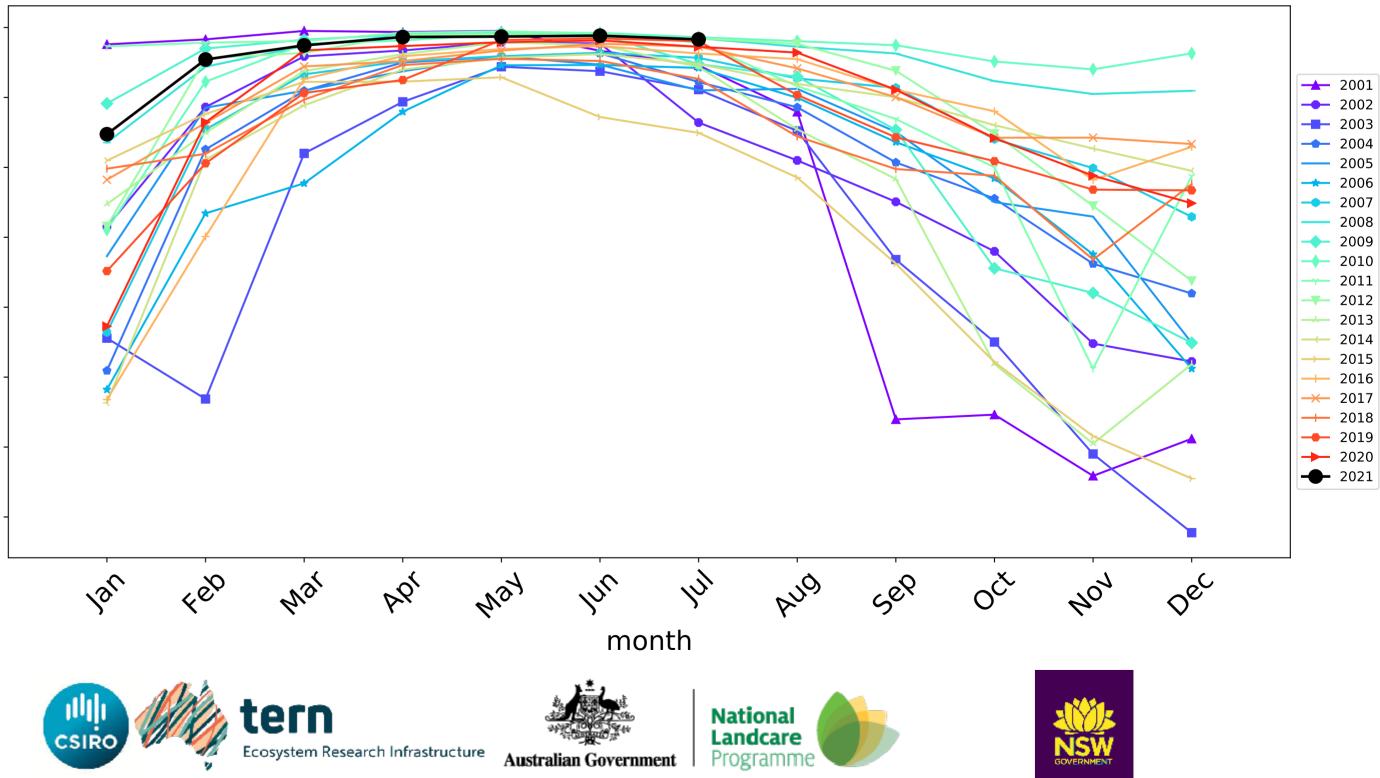


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)



100.0 97.5 95.0----- above\_70 **—** 10th 92.5<sup>-</sup> **——** 50th ----- 2021 Jul 90.0-87.5 85.0-82.5 Jan feb

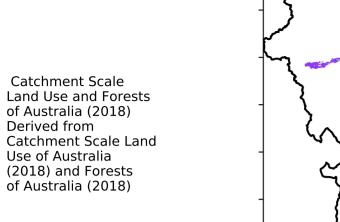
Water erosion historical monthly area protected (Total Veg Cov>70%)

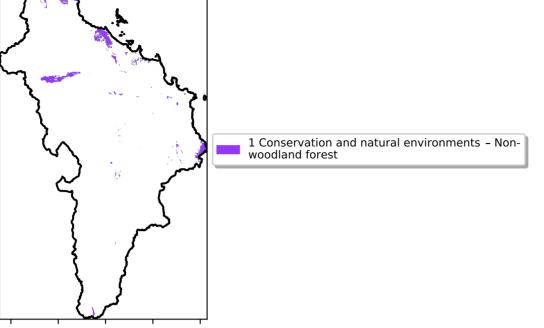


Wind erosion historical monthly area protected (Total Veg Cov >50%)

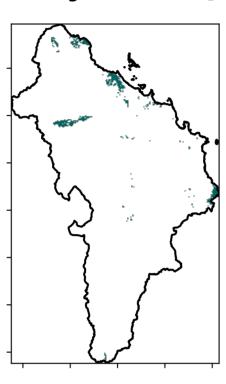
## **Conservation and natural environments Forest (non woodland)**

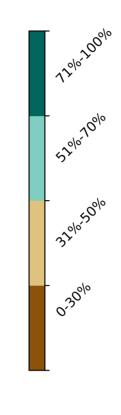
Land use and forest cover



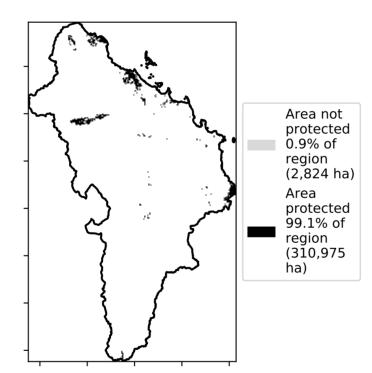


**Total Vegetation Cover [%]** 

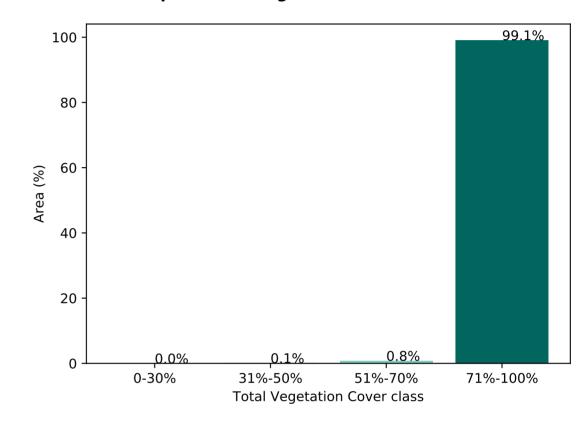




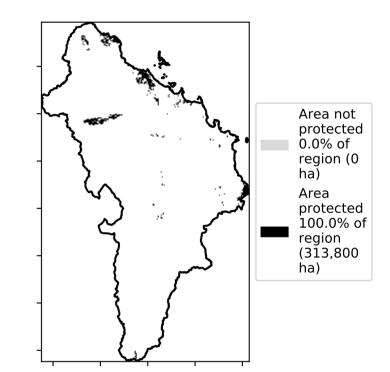
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

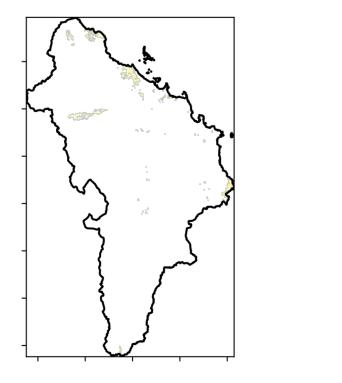


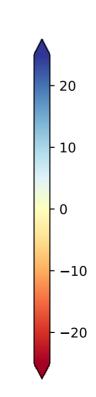
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Anomaly [%]** 

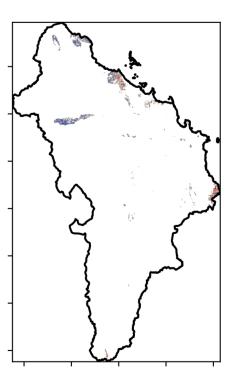
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.





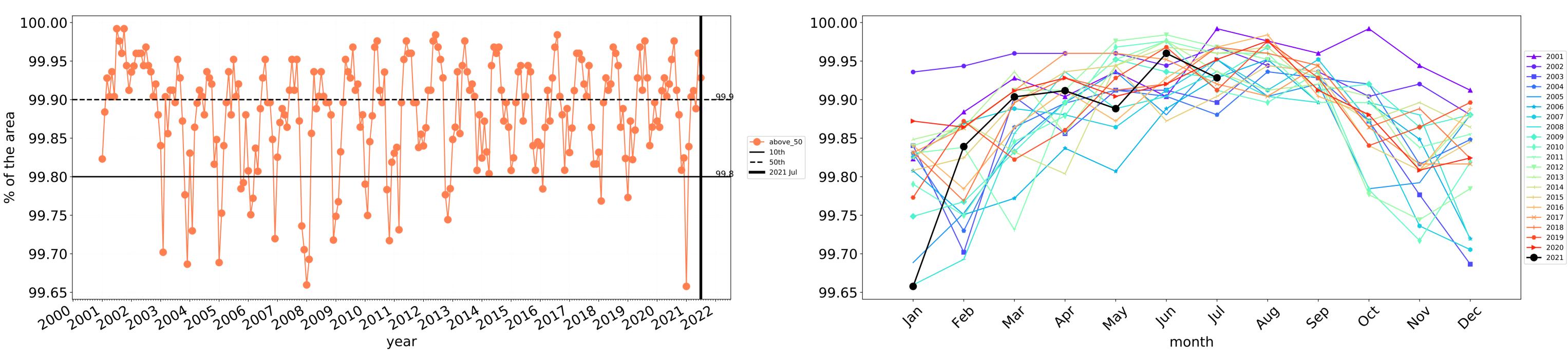
**Total Vegetation Cover Decile [%]** 

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.



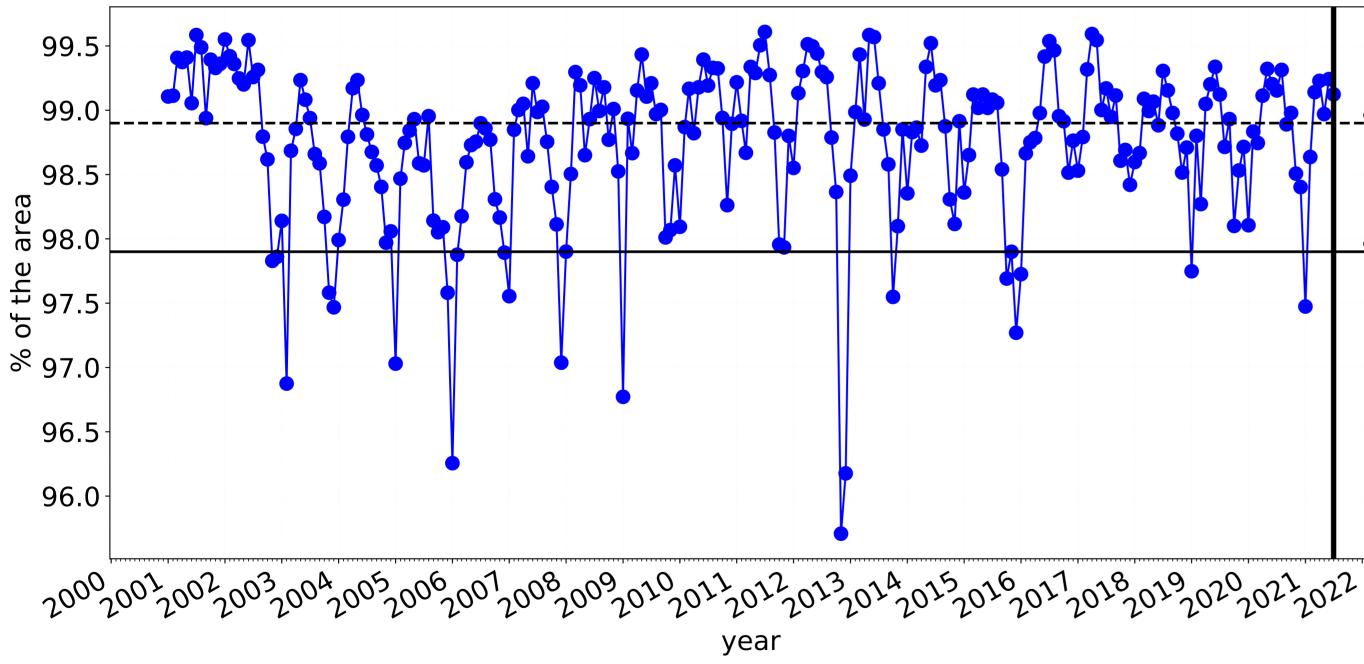






Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

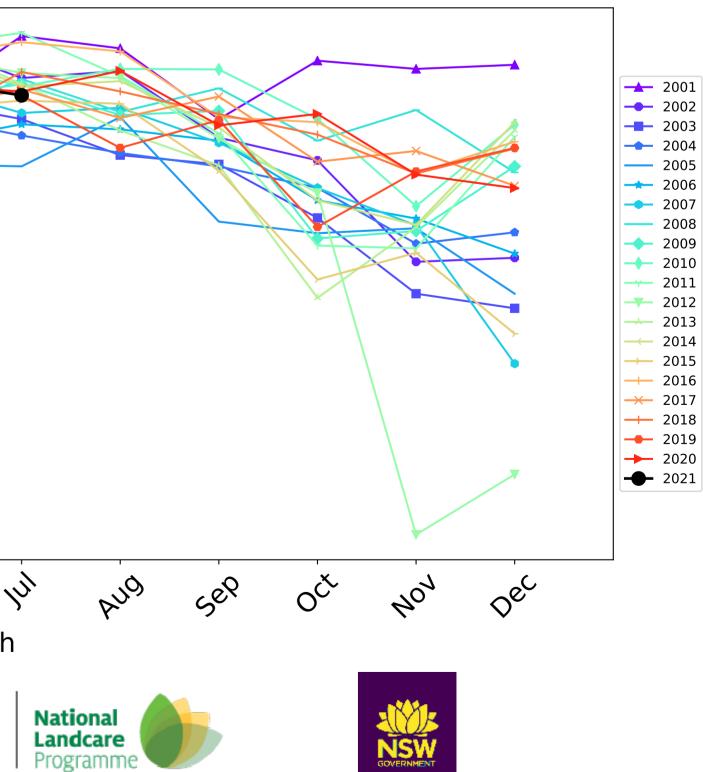
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



99.5 99.0 98.5 --- above\_70 **—** 10th **--** 50th 98.0 07 0 **——** 2021 Jul 97.5 97.0 96.5 96.0 feb Jan In May PQ Way month tern Ecosystem Research Infrastructure Australian Government

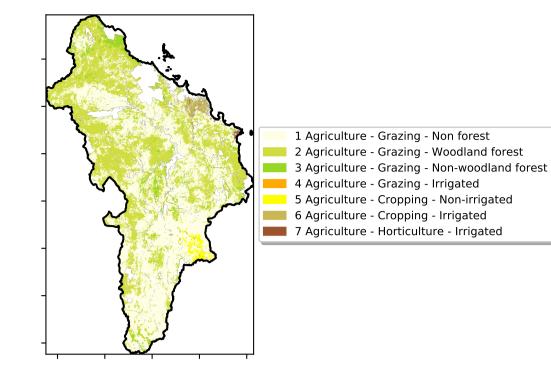
Wind erosion historical monthly area protected (Total Veg Cov >50%)

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



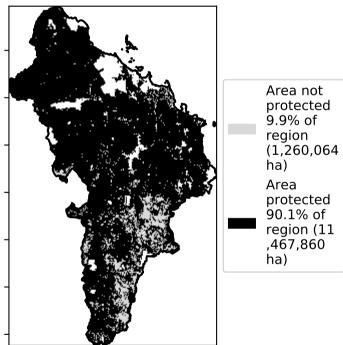
## Agriculture

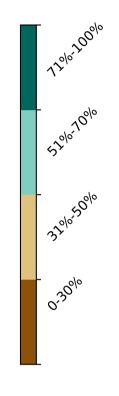
Land use and forest cover



**Total Vegetation Cover [%]** 



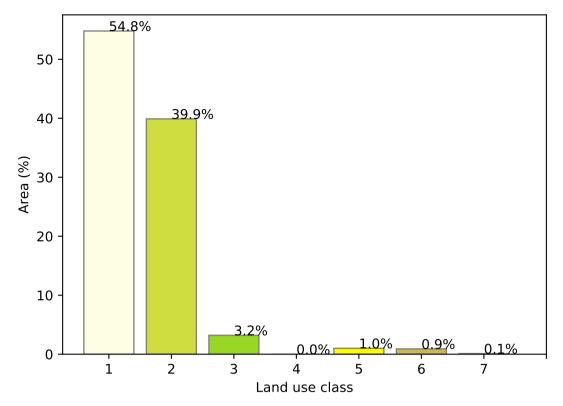




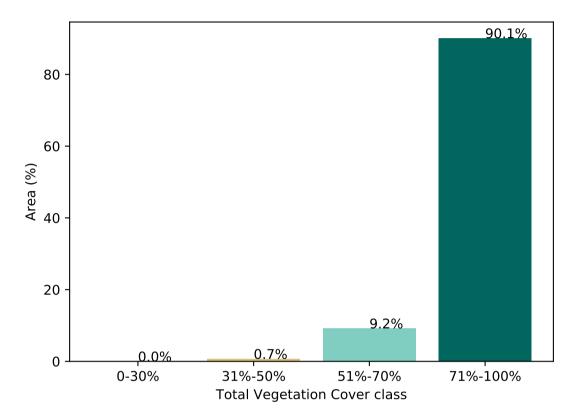
1 Agriculture - Grazing - Non forest



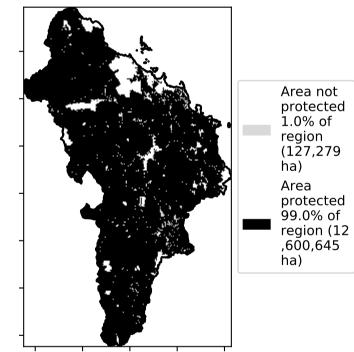




#### Proportion of vegetation cover class in area



#### % Area protected from wind erosion (>50%)



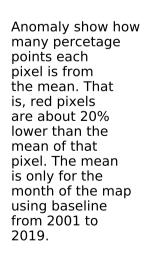
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**Total Vegetation Cover Anomaly [%]** 



Catchment Scale

of Australia (2018)

Derived from

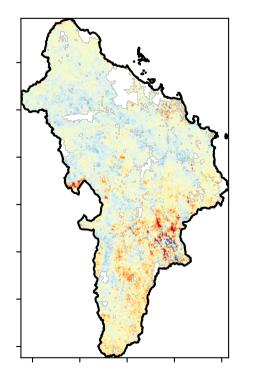
Use of Australia

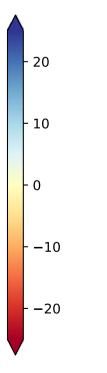
(2018) and Forests

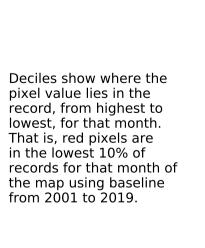
of Australia (2018)

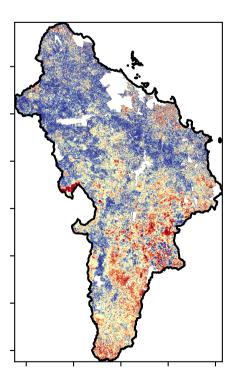
Land Use and Forests

Catchment Scale Land

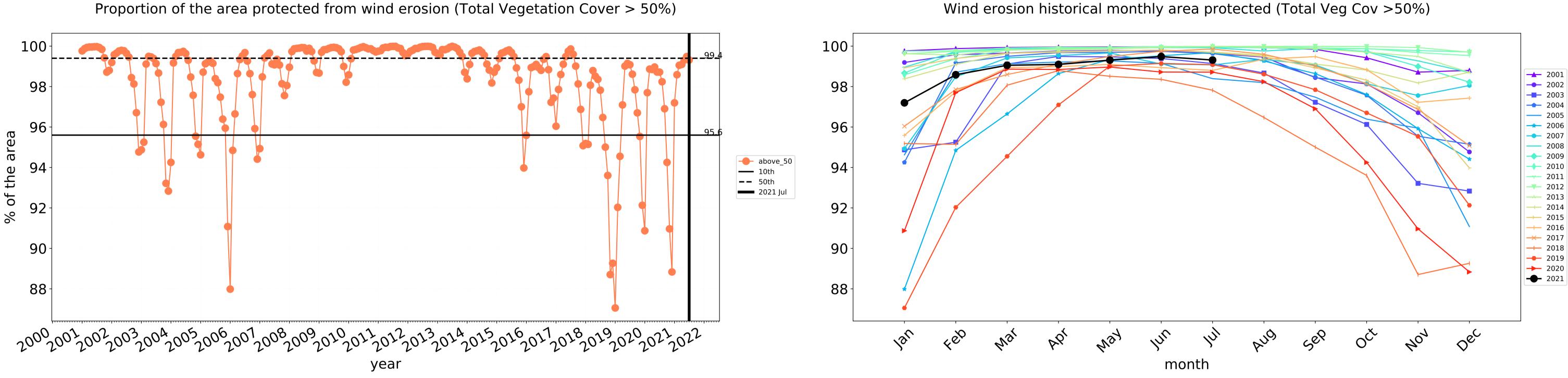




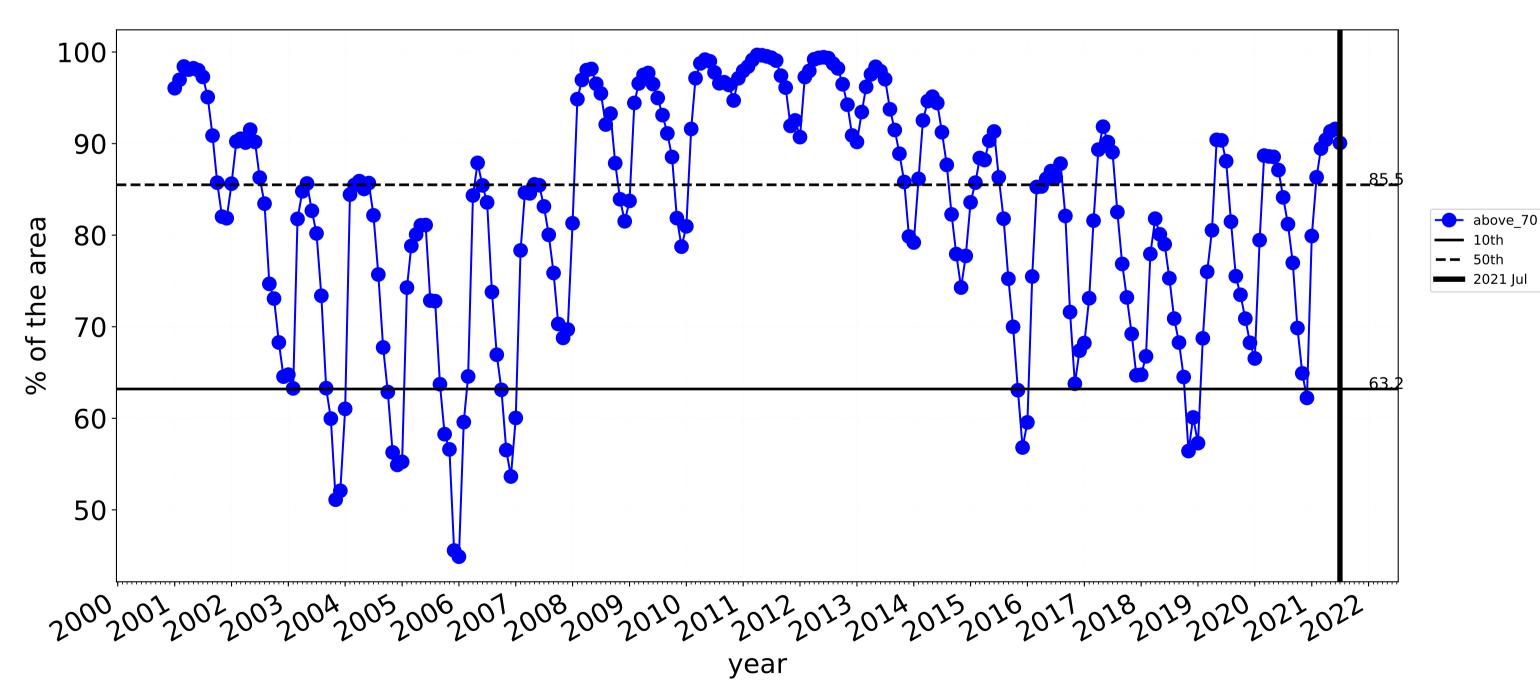








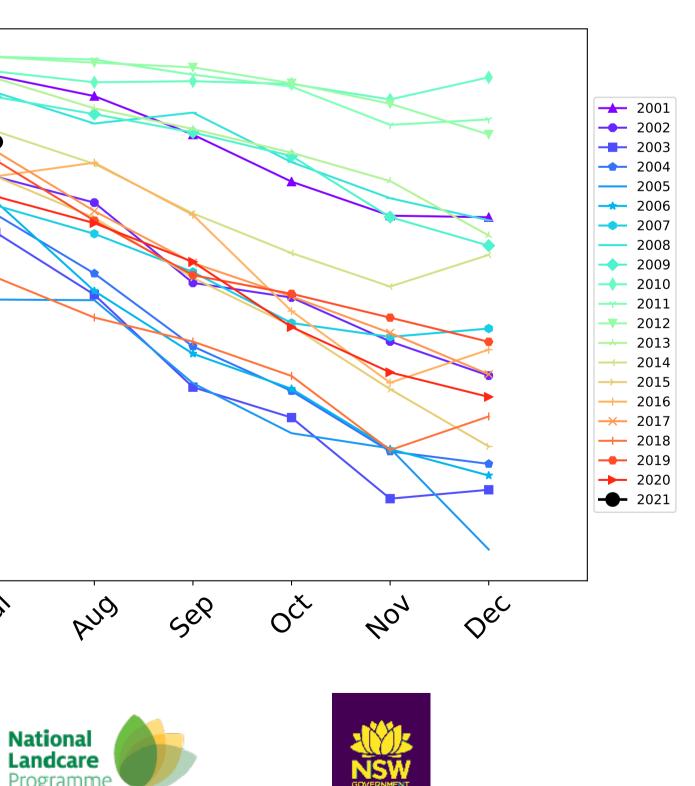




## **Agriculture timeseries**

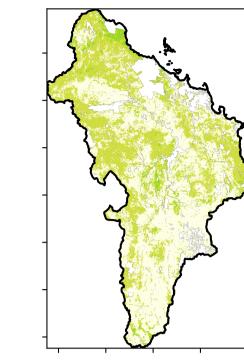
100-90-80 70-60 50 400 way In Jan Mar PQ1 1's month Ecosystem Research Infrastructure Australian Government Programm

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



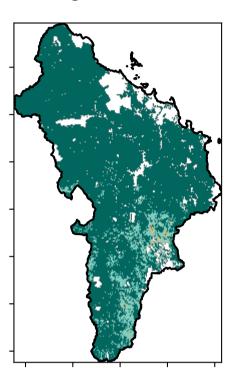
## Grazing

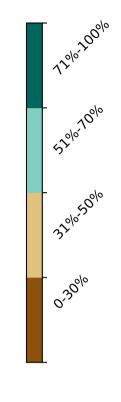
Land use and forest cover



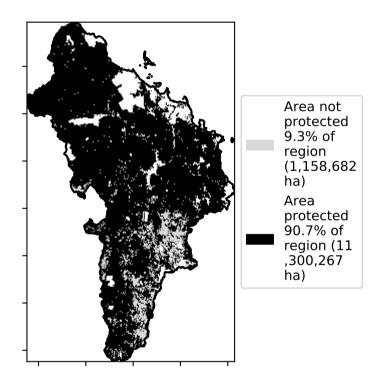
Agriculture - Grazing - Non forest
 Agriculture - Grazing - Woodland forest
 Agriculture - Grazing - Non-woodland forest

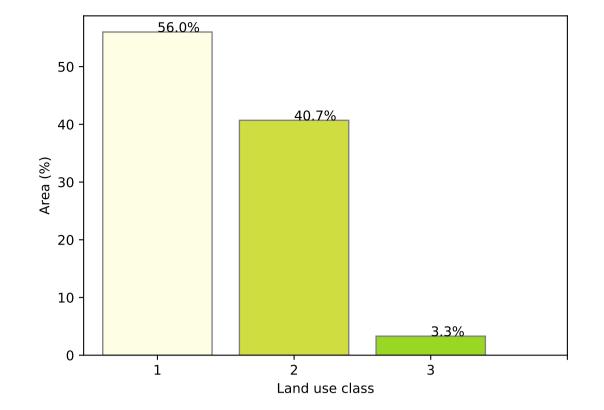
#### Total Vegetation Cover [%]





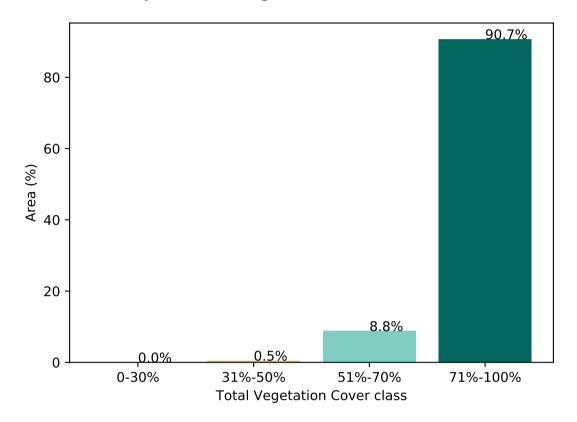
% Area protected from water erosion (>70%)



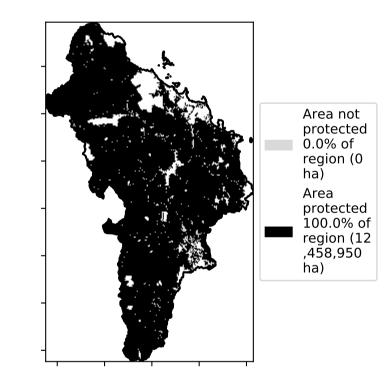


#### Proportion of each land class in area

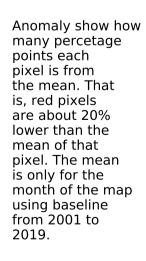
Proportion of vegetation cover class in area



#### % Area protected from wind erosion (>50%)



**Total Vegetation Cover Anomaly [%]** 

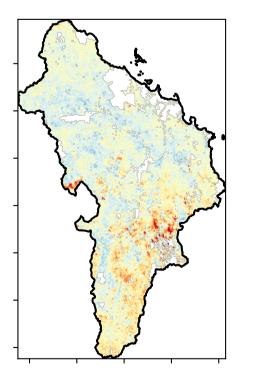


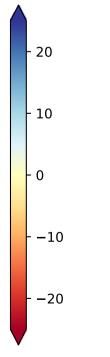
Catchment Scale Land Use and Forests of Australia (2018)

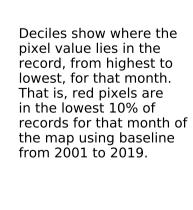
Catchment Scale Land

Derived from

Use of Australia (2018) and Forests of Australia (2018)







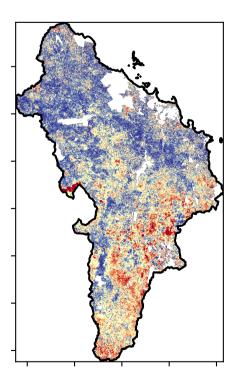
**Total Vegetation Cover Decile [%]** 

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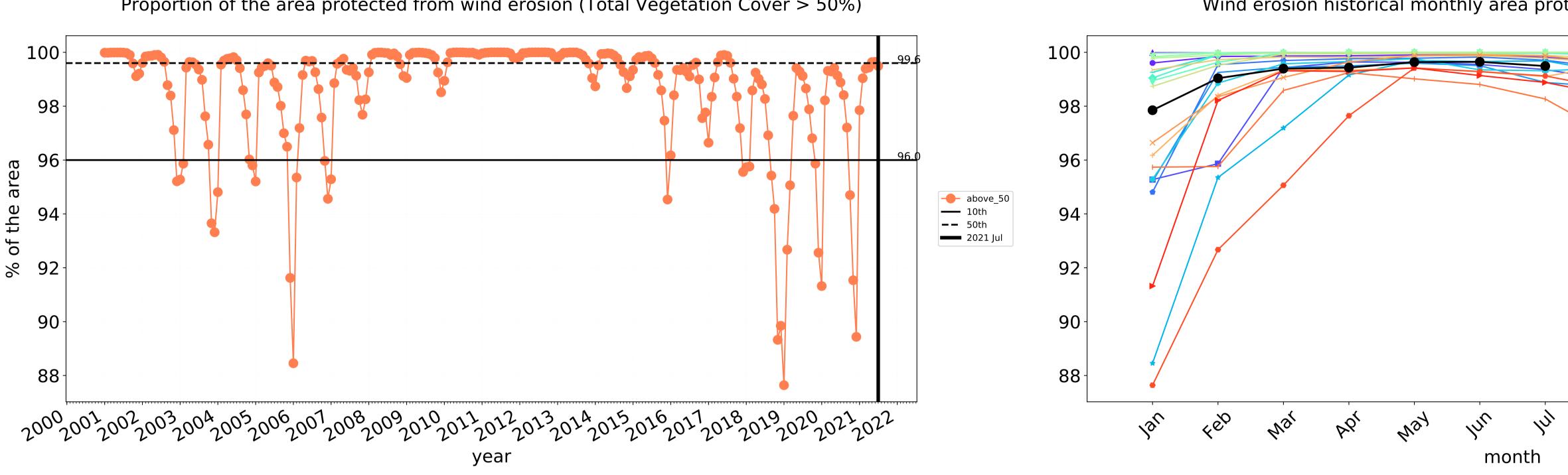
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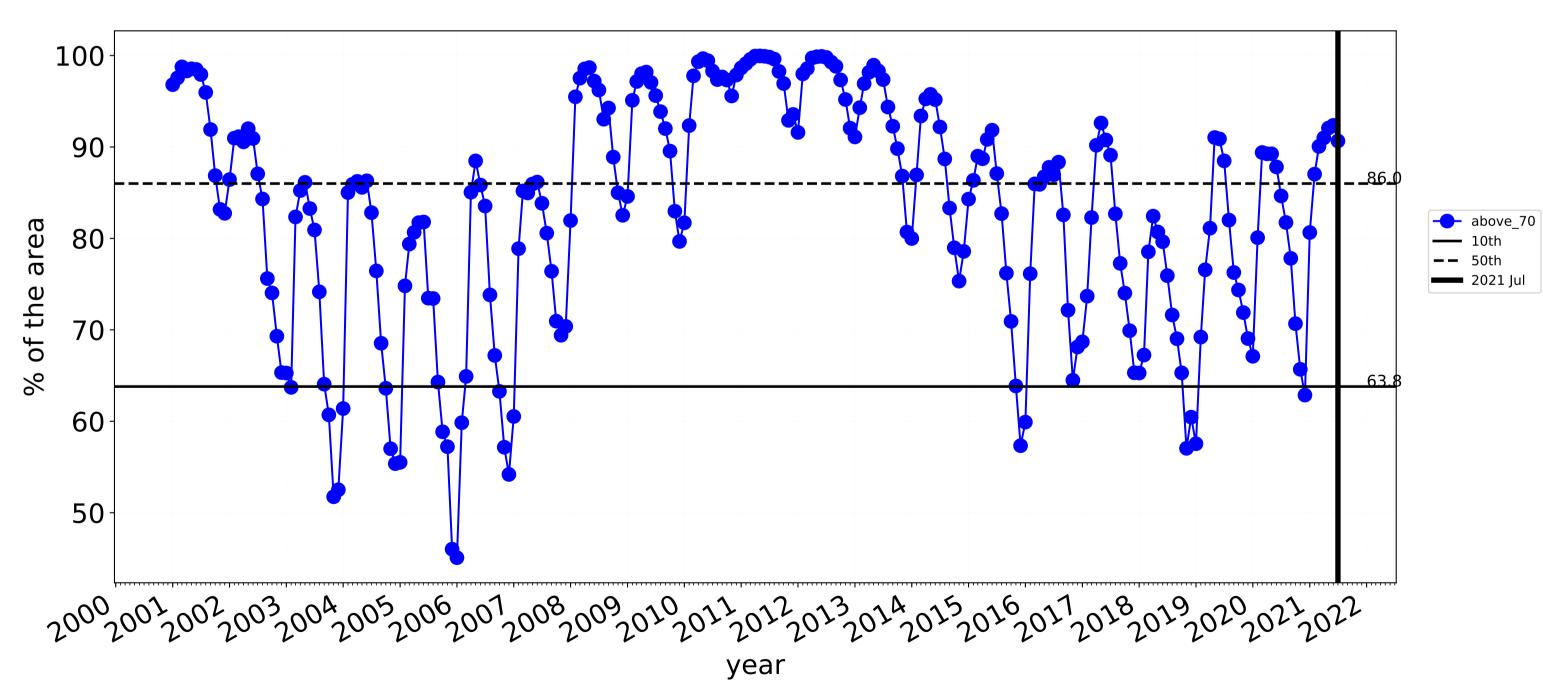


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Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)





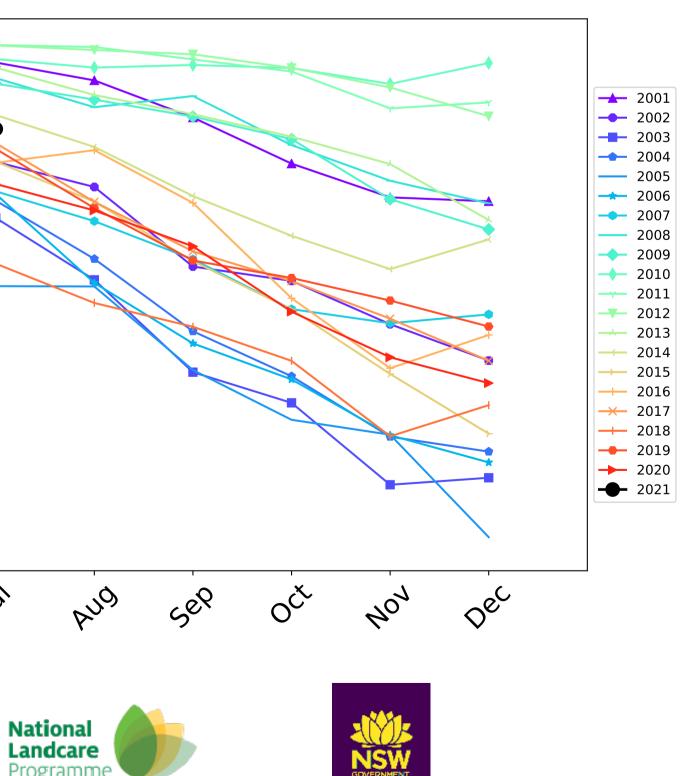
## Grazing timeseries

100 90 80 70-60 50-400 way In Jan Mar 1/1/ PQ1 month Ecosystem Research Infrastructure Australian Government Programm

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

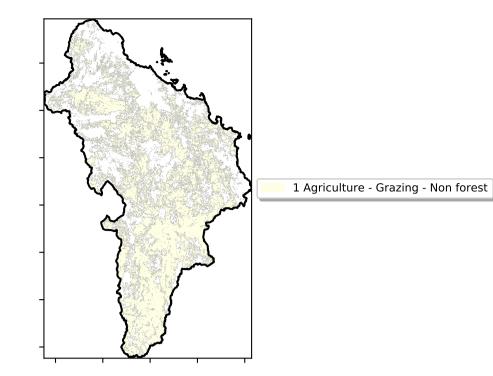
**\_\_\_** 2001 --- 2002 ---- 2003 **---** 2004 \_\_\_\_ 2005 **----** 2006 **---** 2007 2008 **---** 2010 --- 2011 --- 2013 --- 2014 2015 - 2016 <del>→</del> 2017 **→** 2018 **→** 2019**→** 2020 --- 2021 AUD Sel 404 Dec OČ

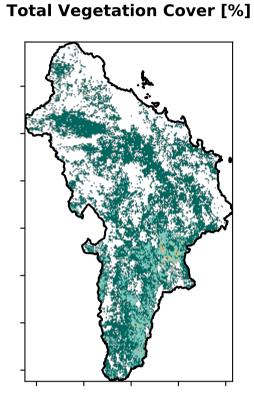
Water erosion historical monthly area protected (Total Veg Cov>70%)

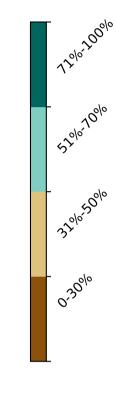


## **Grazing non forest**

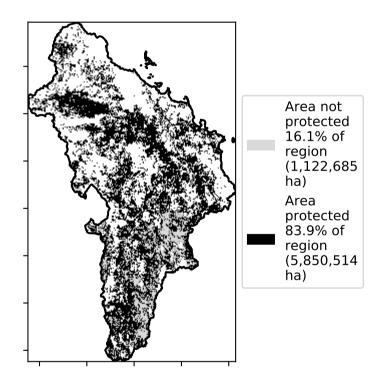
Land use and forest cover







% Area protected from water erosion (>70%)



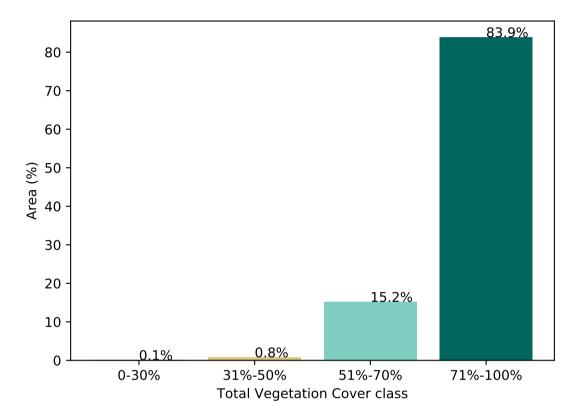


Deciles show where the pixel value lies in the

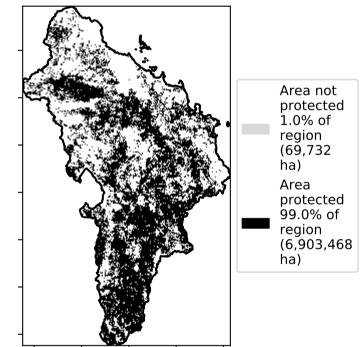
record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of

records for that month of the map using baseline from 2001 to 2019.

Proportion of vegetation cover class in area

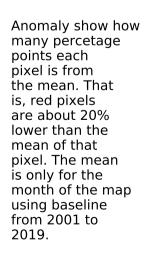


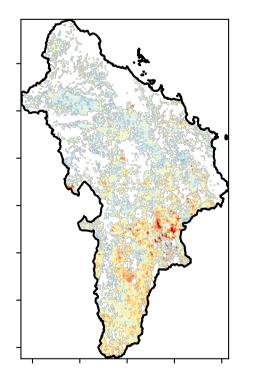
% Area protected from wind erosion (>50%)

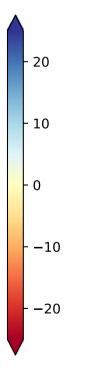


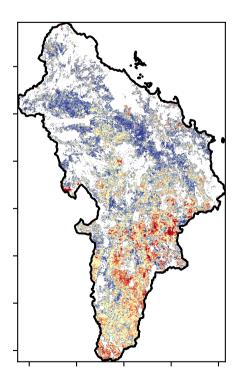
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

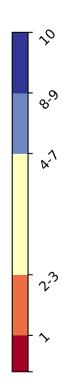
**Total Vegetation Cover Anomaly [%]** 



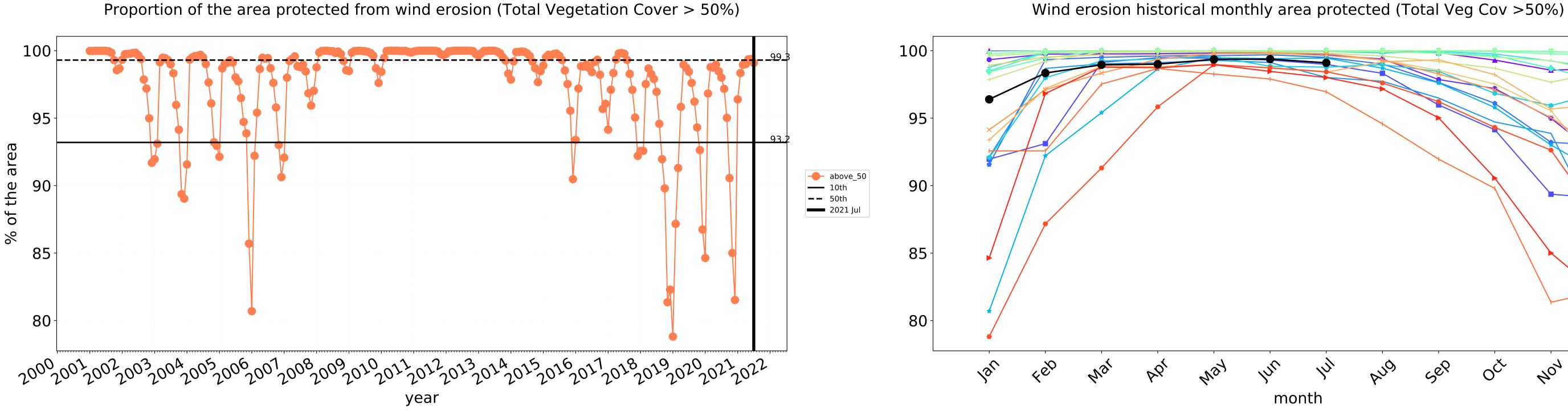




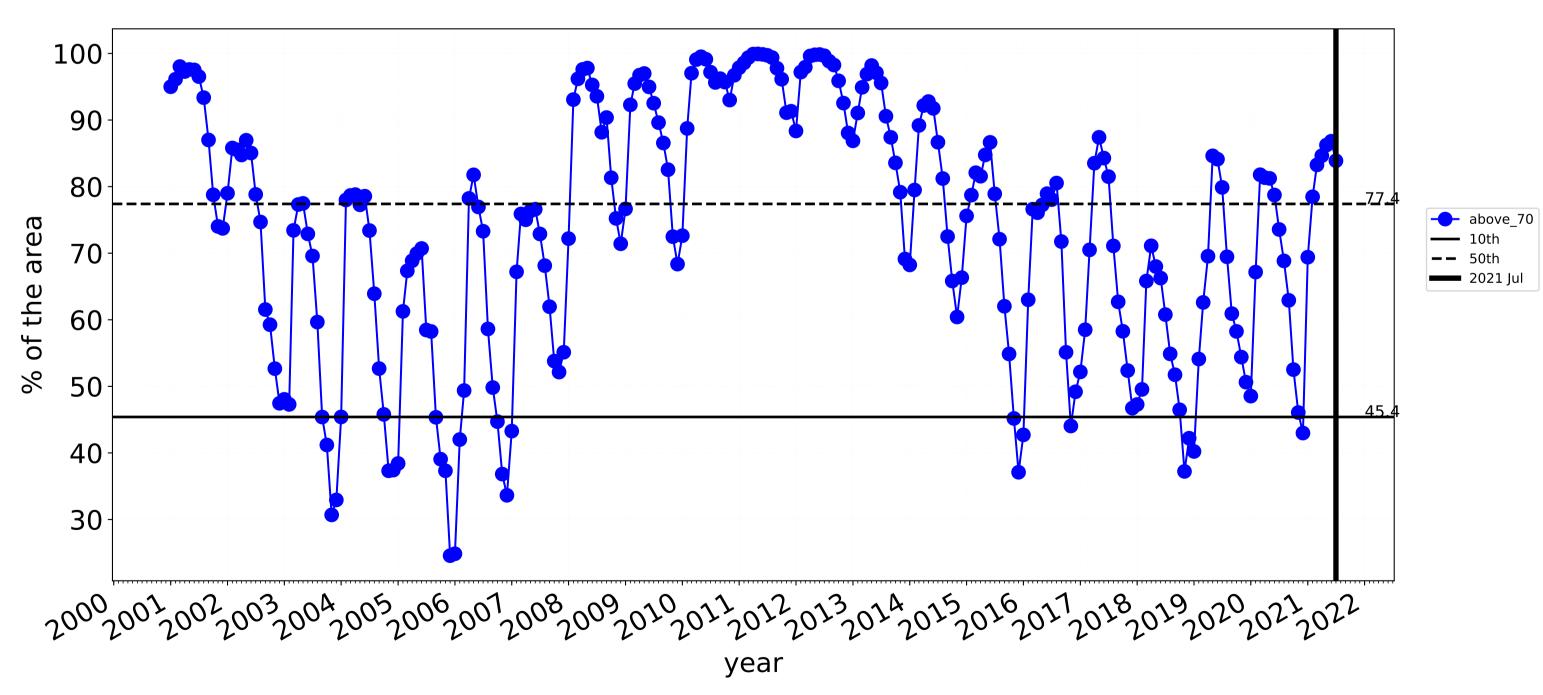








Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

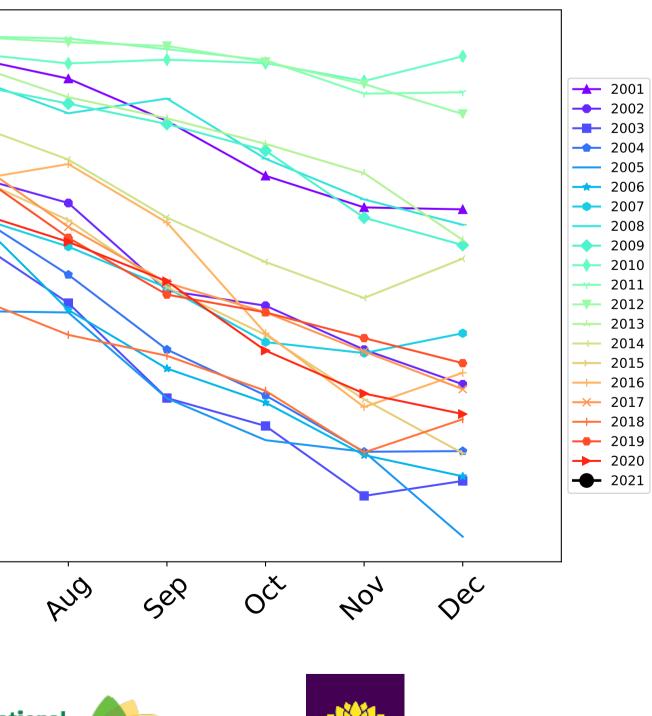


## Grazing non forest timeseries

100 90 80 70-60-50 40 30feb way In Jan Mar PQ 1's month Ecosystem Research Infrastructure Australian Government

**\_\_\_** 2001 --- 2002 ---- 2003 **---** 2004 \_\_\_\_ 2005 **----** 2006 **---** 2007 2008 **---** 2009 **—** 2010 --- 2011 --- 2013 **→** 2014 - 2015 <mark>→</mark> 2016 <del>→</del> 2017 --- 2018 → 2019
→ 2020
→ 2021 AUD Sel 404 Dec OČ

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

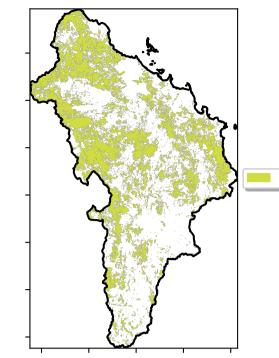






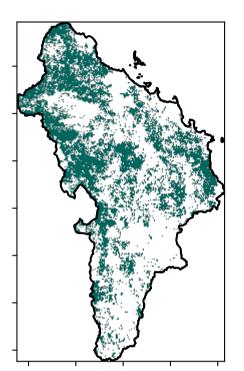
## **Grazing Woodland forest**

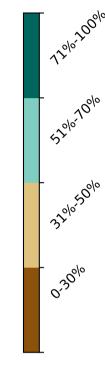
Land use and forest cover



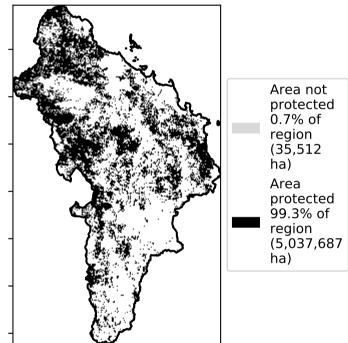
1 Agriculture - Grazing - Woodland forest

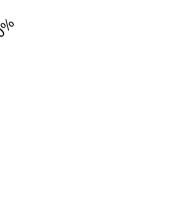
**Total Vegetation Cover [%]** 



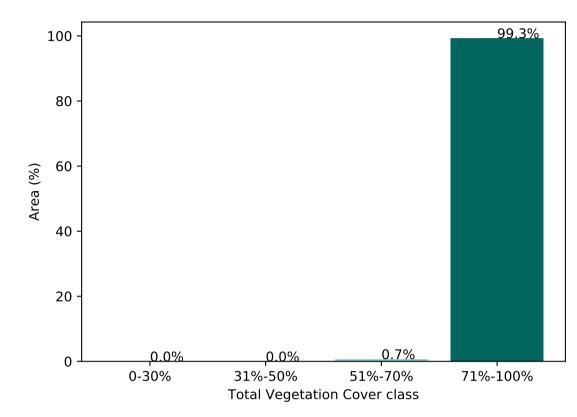


% Area protected from water erosion (>70%)

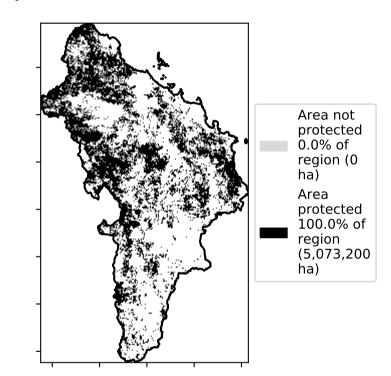




Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



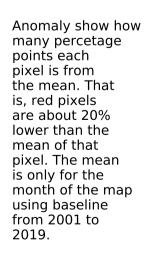
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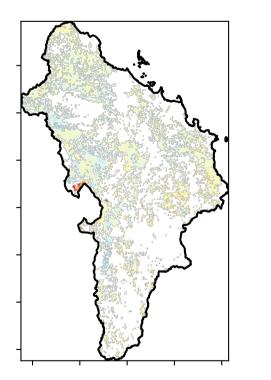
**Total Vegetation Cover Anomaly [%]** 

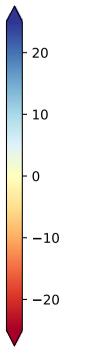


Catchment Scale Land Use and Forests of Australia (2018)

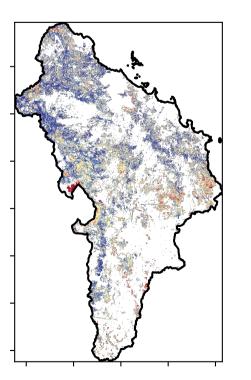
Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Derived from





**Total Vegetation Cover Decile [%]** 

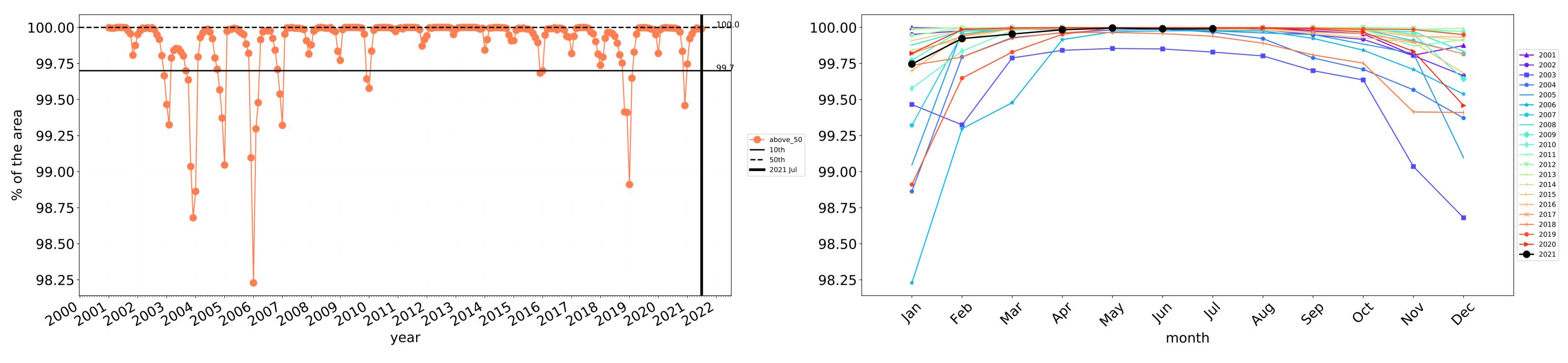




Deciles show where the pixel value lies in the

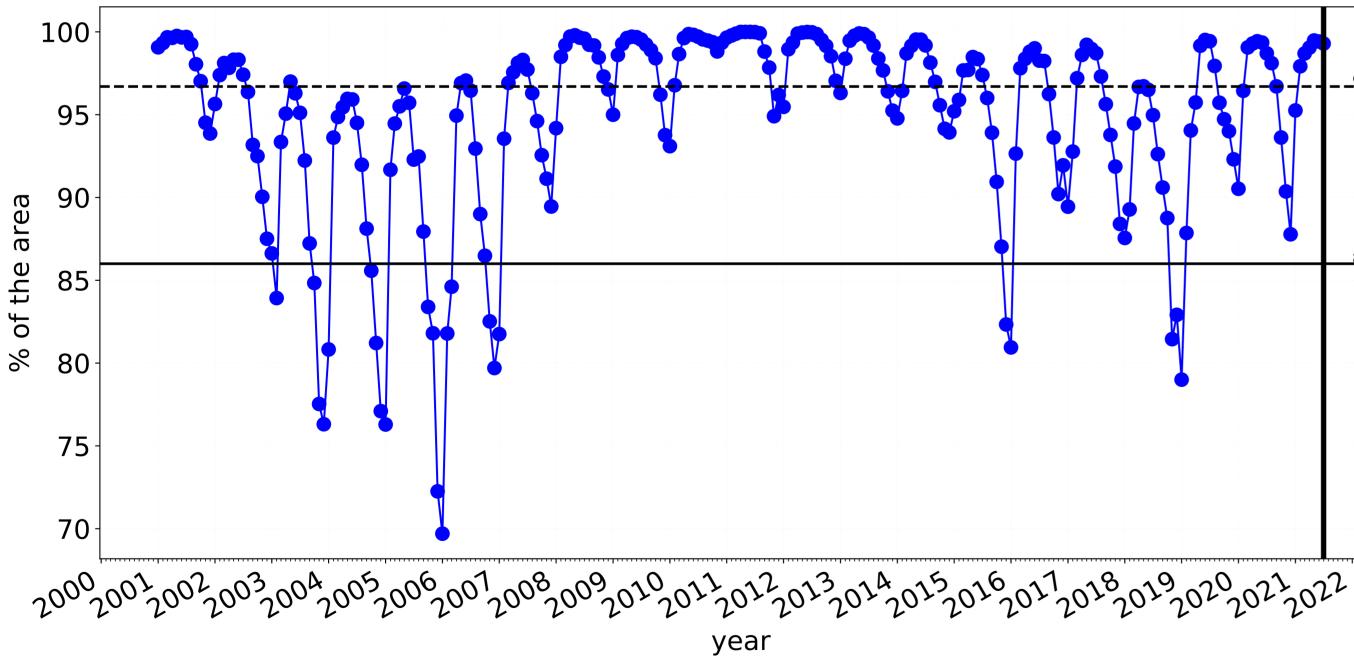
record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of

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%)

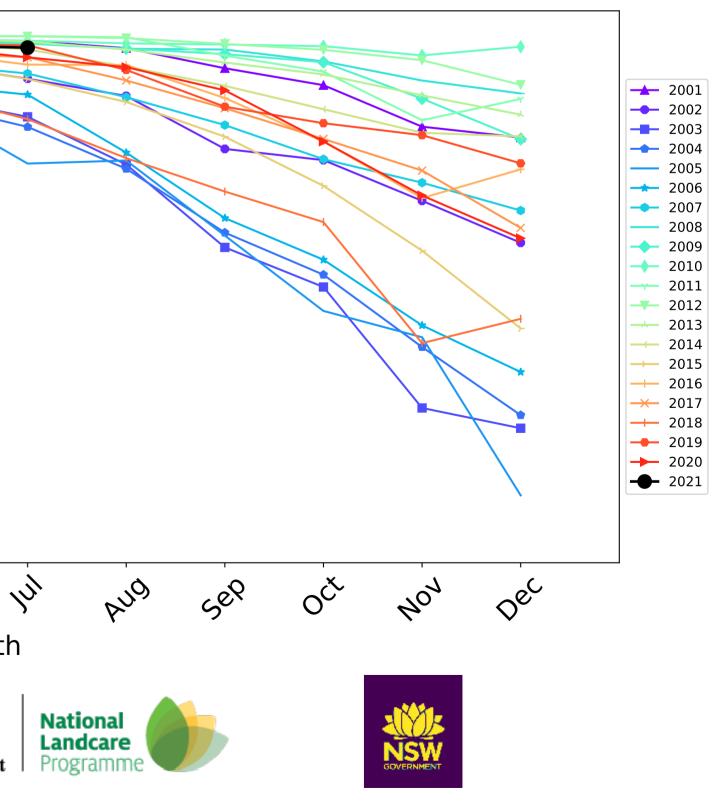
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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

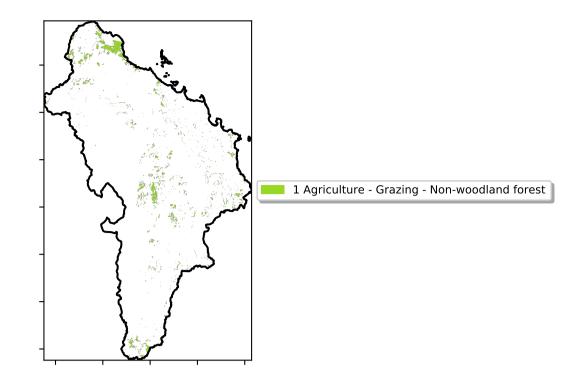
100 95 90 ---- above\_70 **—** 10th **--** 50th 85 80 75 70 Jan feb In May PQ' Way month tern Ecosystem Research Infrastructure Australian Government

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

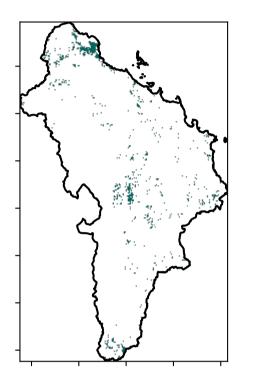


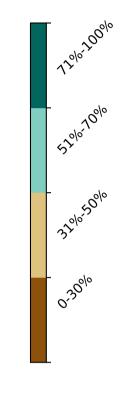
## **Grazing - Forest (non woodland)**

Land use and forest cover

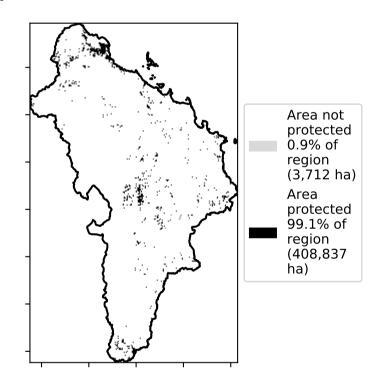


**Total Vegetation Cover [%]** 

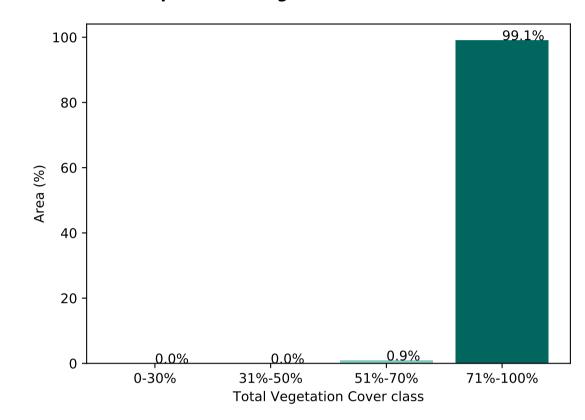




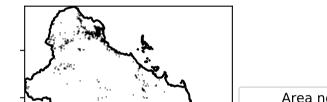
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



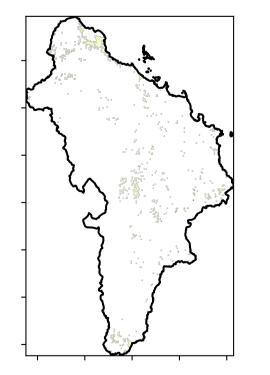
% Area protected from wind erosion (>50%)

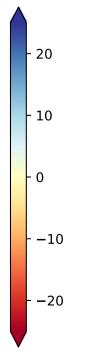


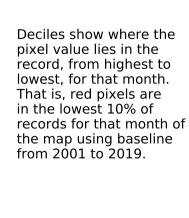
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

**Total Vegetation Cover Anomaly [%]** 

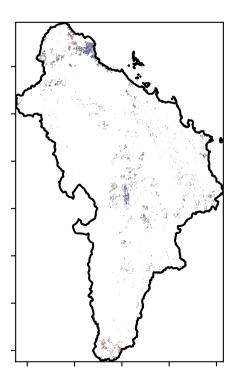
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

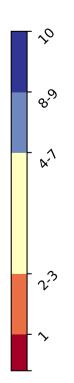




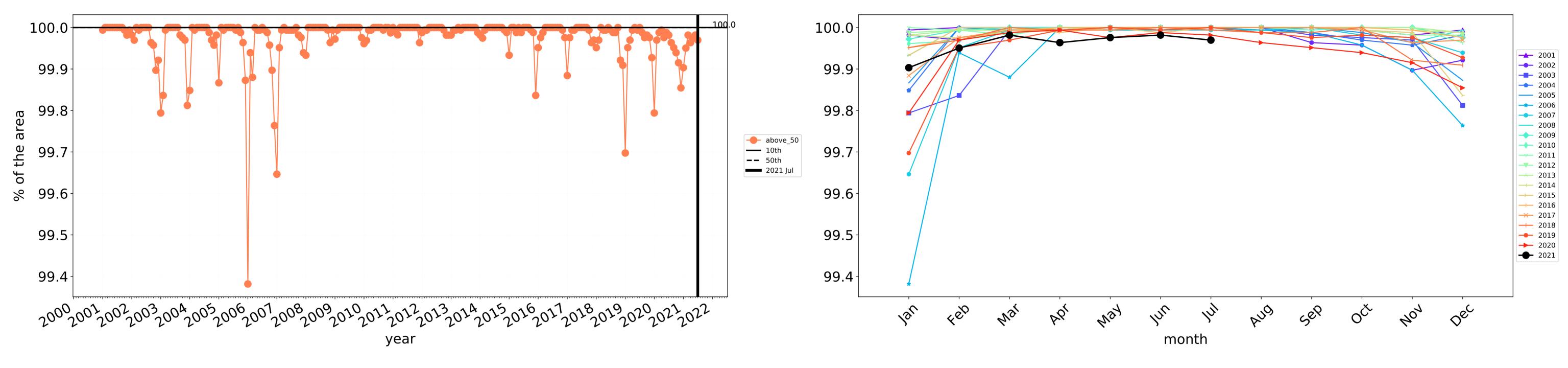


Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (412,550 ha)



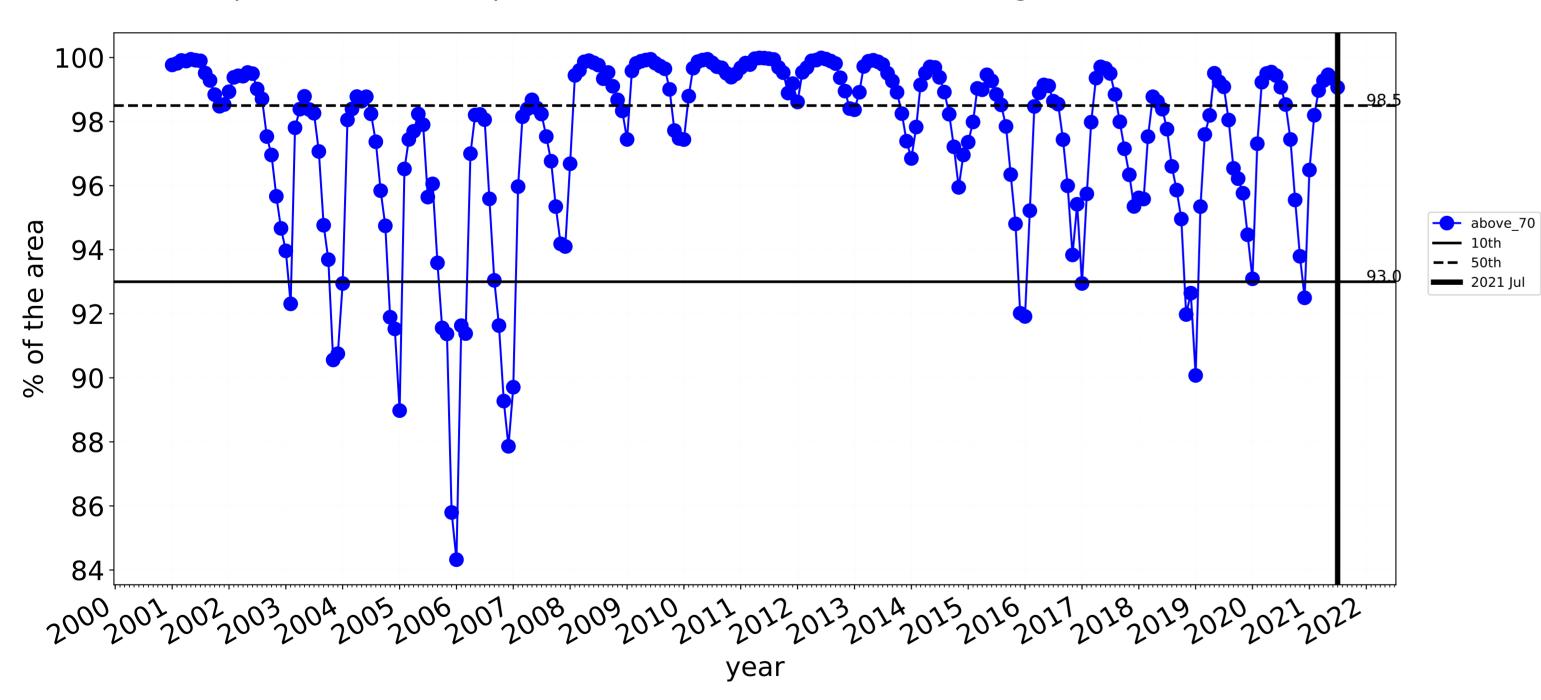


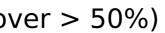




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

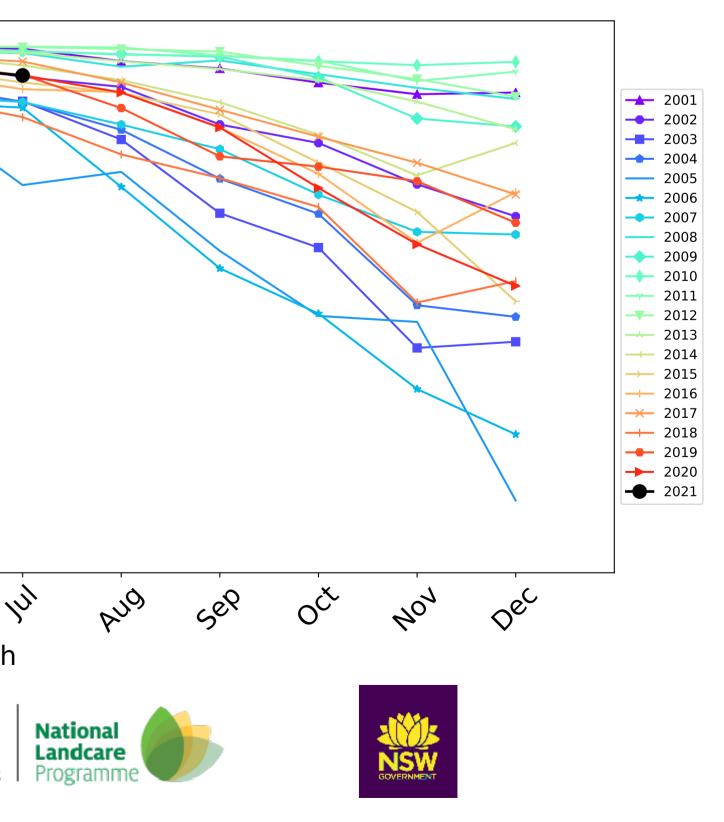




Wind erosion historical monthly area protected (Total Veg Cov >50%)

100 98 96 94 92 90 88 86 84 Jan 4eb way In Mai Þb, month tern Ecosystem Research Infrastructure Australian Government

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



# Burdekin (14,051,050 ha and no data 39,279 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	14,051,050	100.0% 14,045,725	99.3% 13,958,250	90.7% 12,738,925	74.1% 10,413,825	32.9% 4,617,900	6.2% 875,325
Conservation and natural environments	963,425	100.0% 963,200	99.9% 962,475	98.8% 951,925	93.6% 901,950	56.5% 544,050	21.8% 210,225
Conservation and natural environments non forest	178,325	99.9% 178,175	99.7% 177,725	96.2% 171,575	82.2% 146,650	23.9% 42,675	2.3% 4,100
Conservation and natural environments Woodland forest	471,300	100.0% 471,275	100.0% 471,175	99.6% 469,300	95.8% 451,600	52.8% 249,050	13.7% 64,800
Conservation and natural environments Forest (non woodland)	313,800	100.0% 313,750	99.9% 313,575	99.1% 311,050	96.8% 303,700	80.4% 252,325	45.0% 141,325
Agriculture	12,727,925	100.0% 12,723,425	99.3% 12,640,350	90.1% 11,463,325	72.7% 9,254,825	31.2% 3,968,825	5.0% 632,200
Grazing	12,458,950	100.0% 12,454,725	99.5% 12,395,425	90.7% 11,295,150	73.6% 9,172,750	31.7% 3,951,275	5.0% 628,200
Grazing non forest	6,973,200	99.9% 6,969,000	99.1% 6,910,275	83.9% 5,849,150	57.8% 4,027,150	19.9% 1,387,075	2.6% 181,475
Grazing Woodland forest	5,073,200	100.0% 5,073,175	100.0% 5,072,725	99.3% 5,037,300	93.8% 4,760,100	46.1% 2,336,450	6.8% 347,075
Grazing - Forest (non woodland)	412,550	100.0% 412,550	100.0% 412,425	99.1% 408,700	93.4% 385,500	55.2% 227,750	24.2% 99,650

