# Total vegetation cover soil protection Region:LGA Ararat\_(RC) VIC

# Date: February 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:

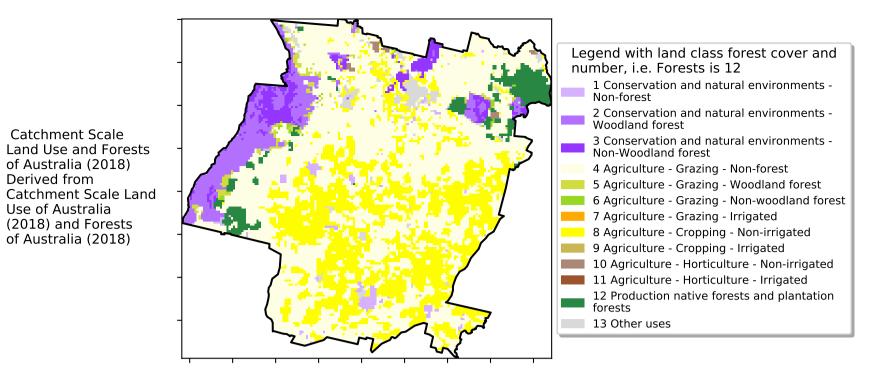
https://doi.org/10.4225/08/5848a3f19a7b3



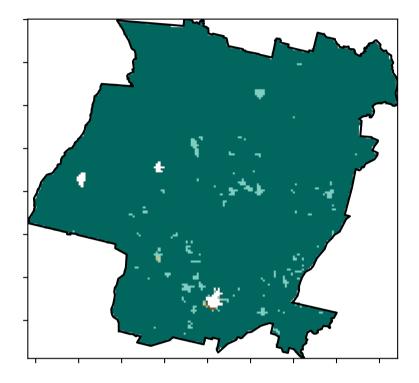
# **Vegetation Cover Feb 2021**

#### Land use and forest cover

#### Proportion of each land class in area

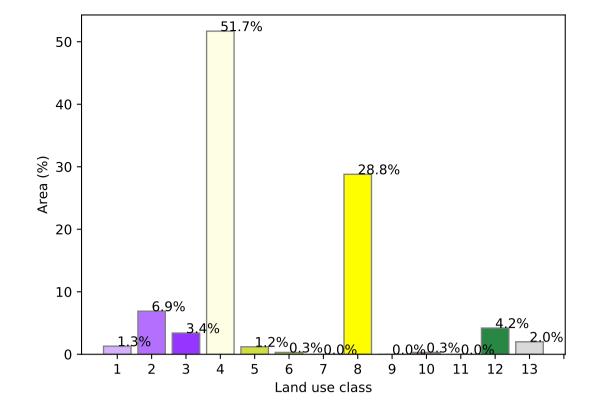


#### **Total Vegetation Cover [%]**

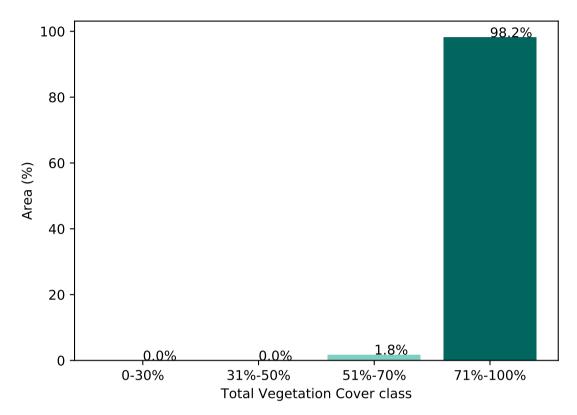


#### % Area protected from water erosion (>70%)

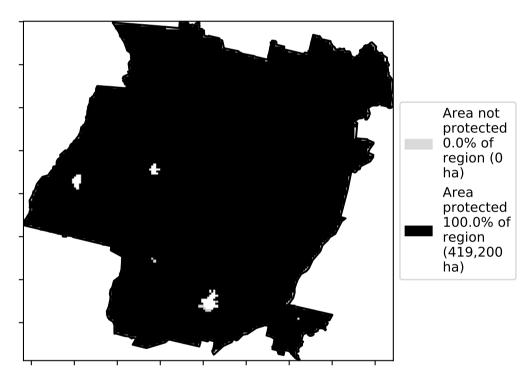




#### **Proportion of vegetation cover class in area**



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



 $\hat{\mathcal{S}}$ 

°,

A-1

2:5

protected 98.2% of region (411,654 ha)

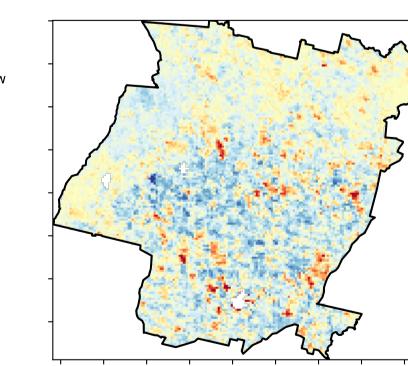
12010-200%

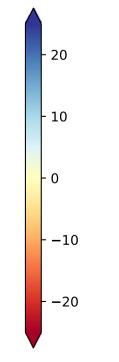
52°10°10°10

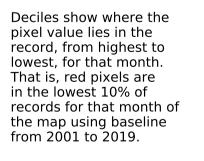
320050010

0.30%

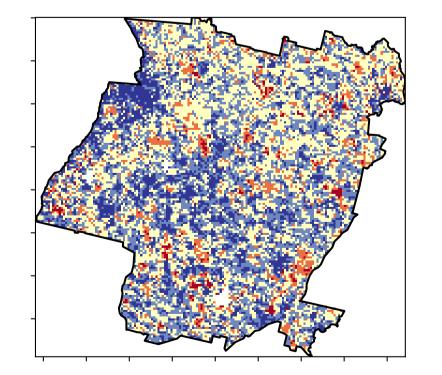
**Total Vegetation Cover Anomaly [%]** 







**Total Vegetation Cover Decile [%]** 

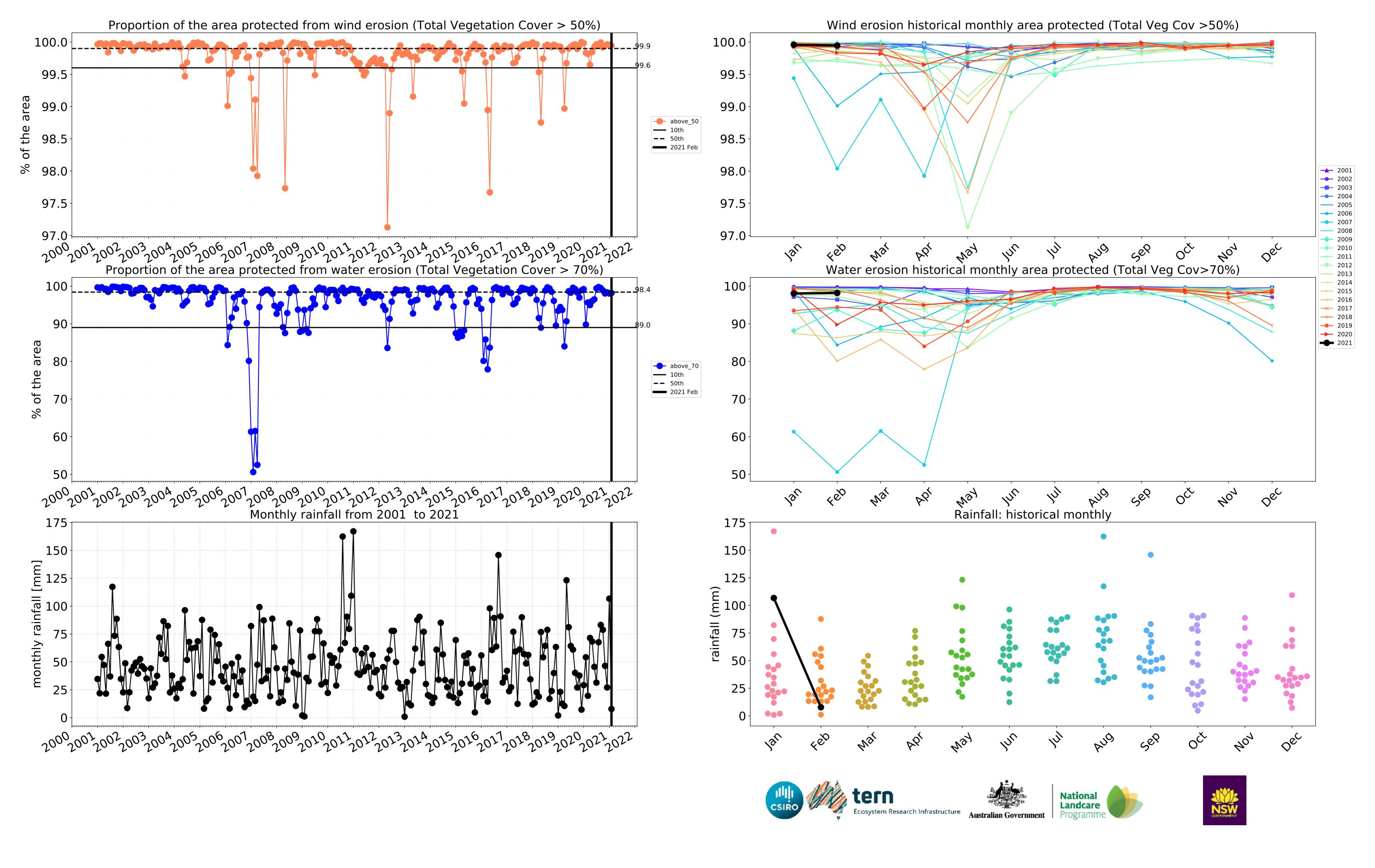


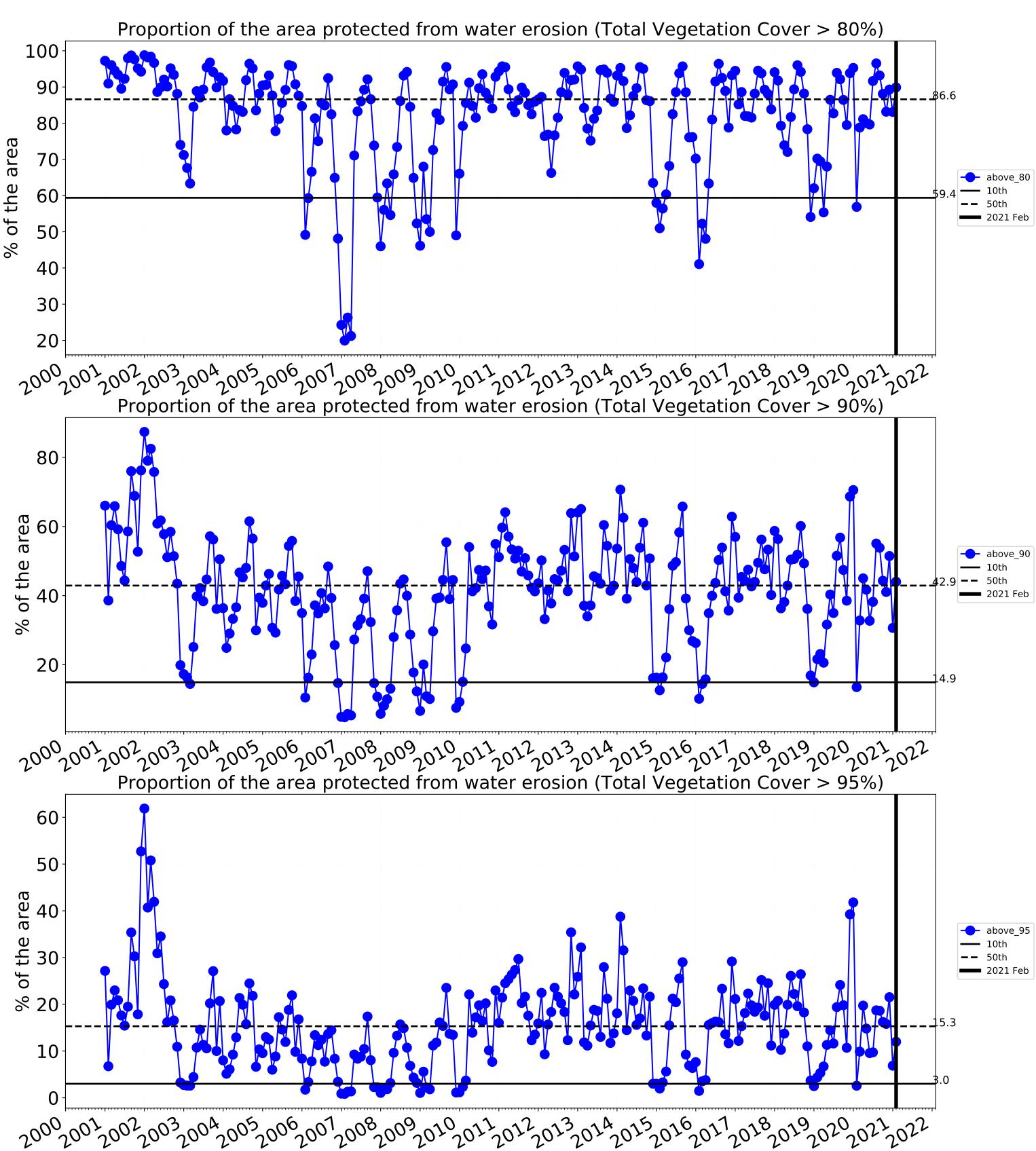


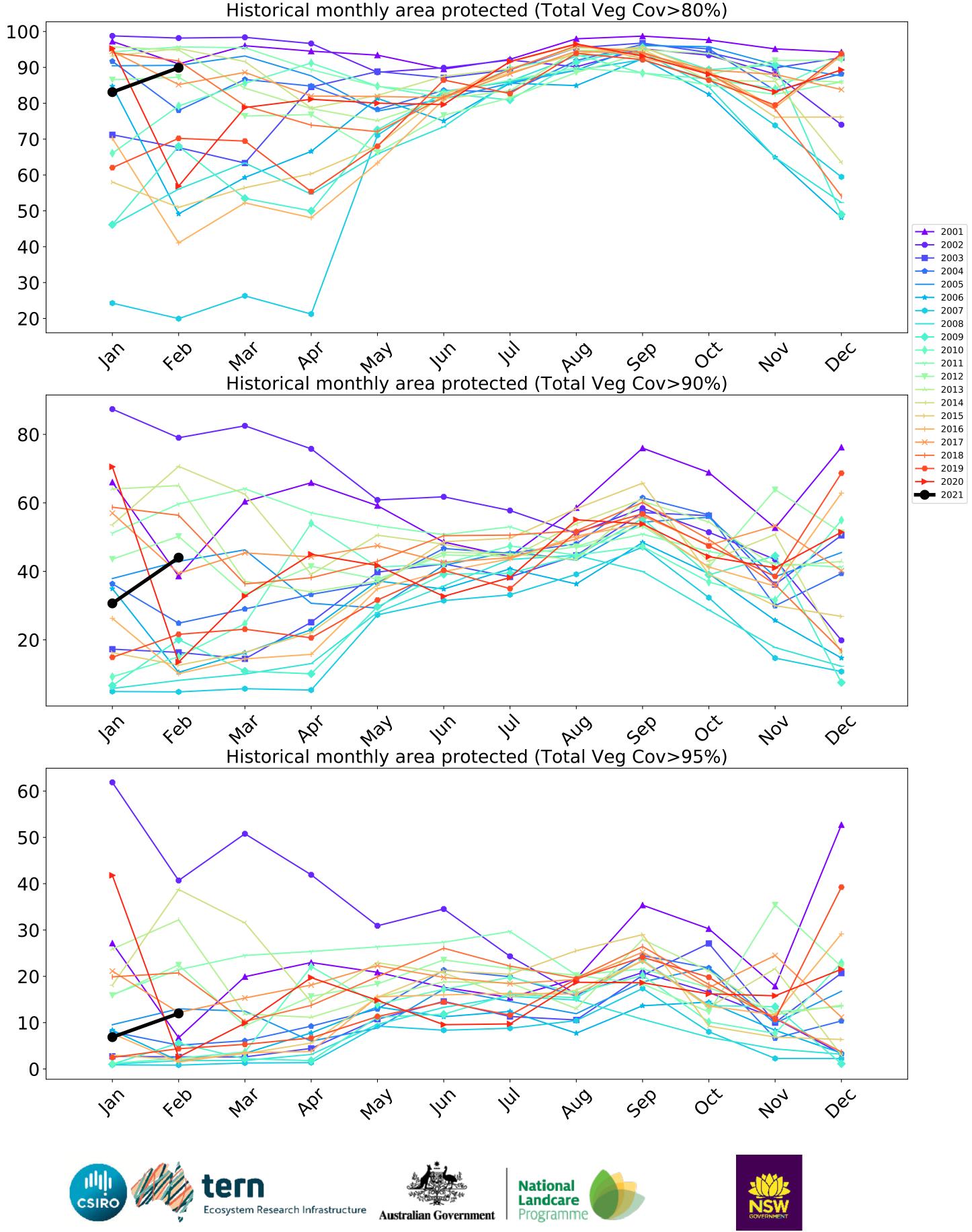
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

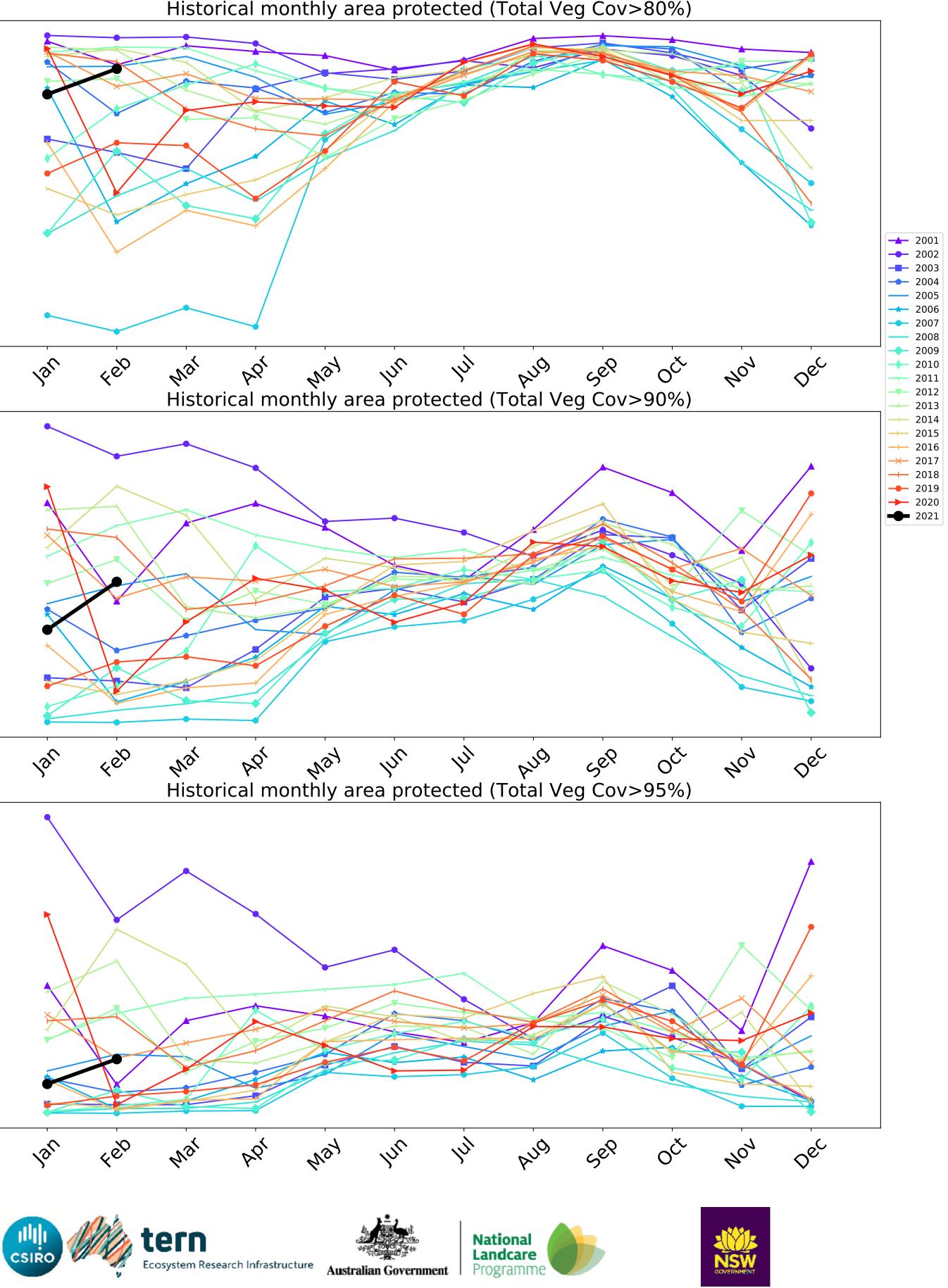
Derived from

Use of Australia









### **Conservation and natural environments**

forest

1 Conservation and natural environments - Non-forest

3 Conservation and natural environments - Non-woodland forest

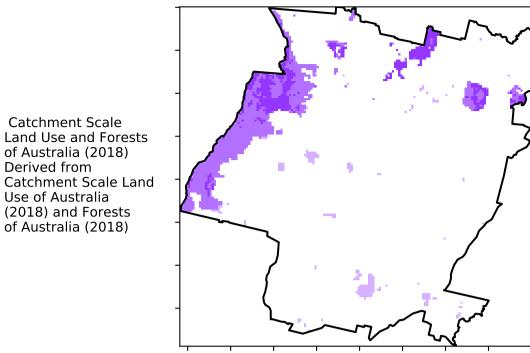
12%200%

· 52°10'10°10

32°1050°10

0.30%

2 Conservation and natural environments - Woodland



Land use and forest cover

Catchment Scale Land Use and Forests

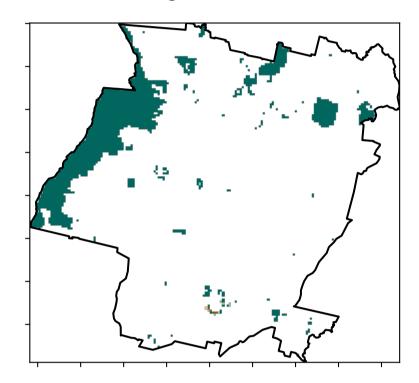
of Australia (2018)

(2018) and Forests of Australia (2018)

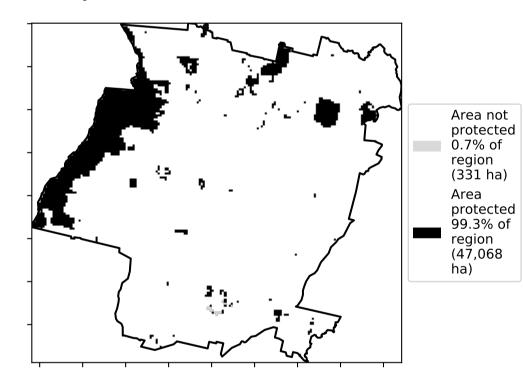
Derived from

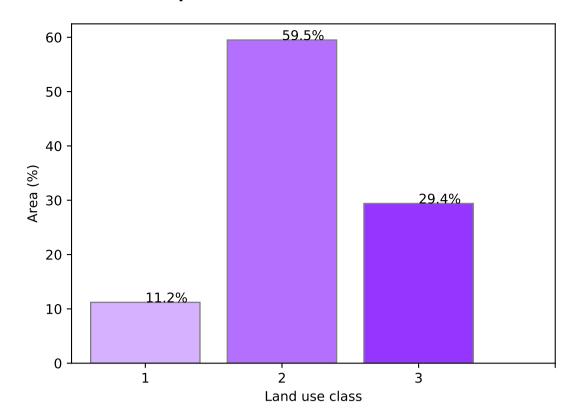
Use of Australia

**Total Vegetation Cover [%]** 



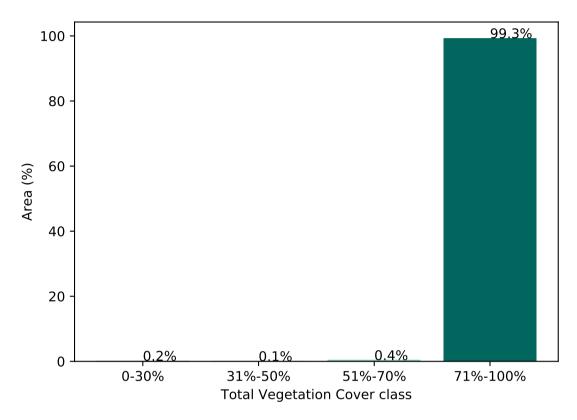
% Area protected from water erosion (>70%)



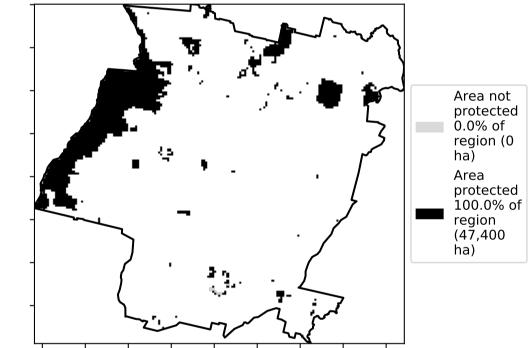


#### Proportion of each land class in area

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



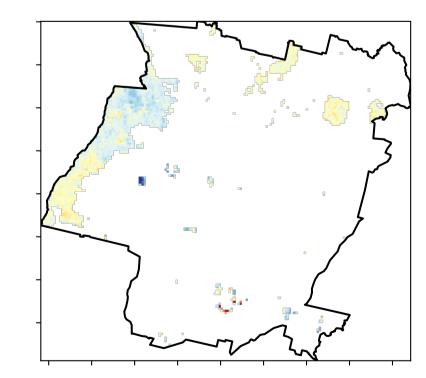
 $\hat{\mathcal{S}}$ 

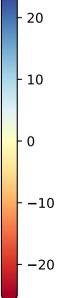
es,o

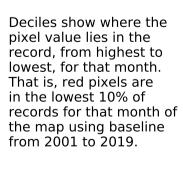
A-1

2?5

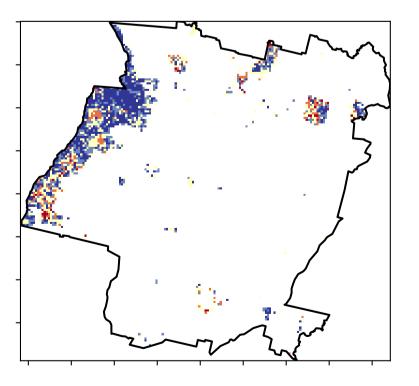
**Total Vegetation Cover Anomaly [%]** 





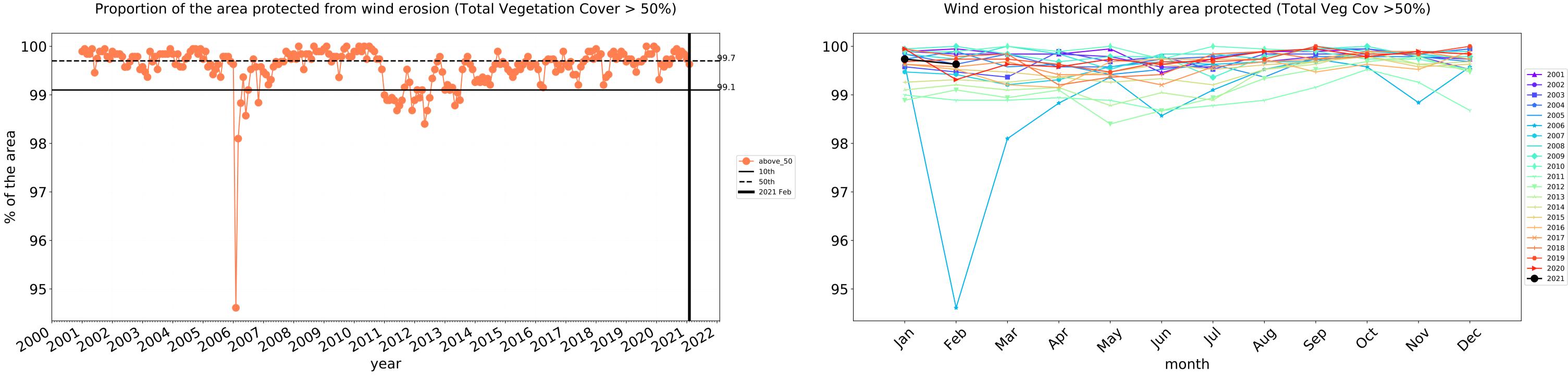


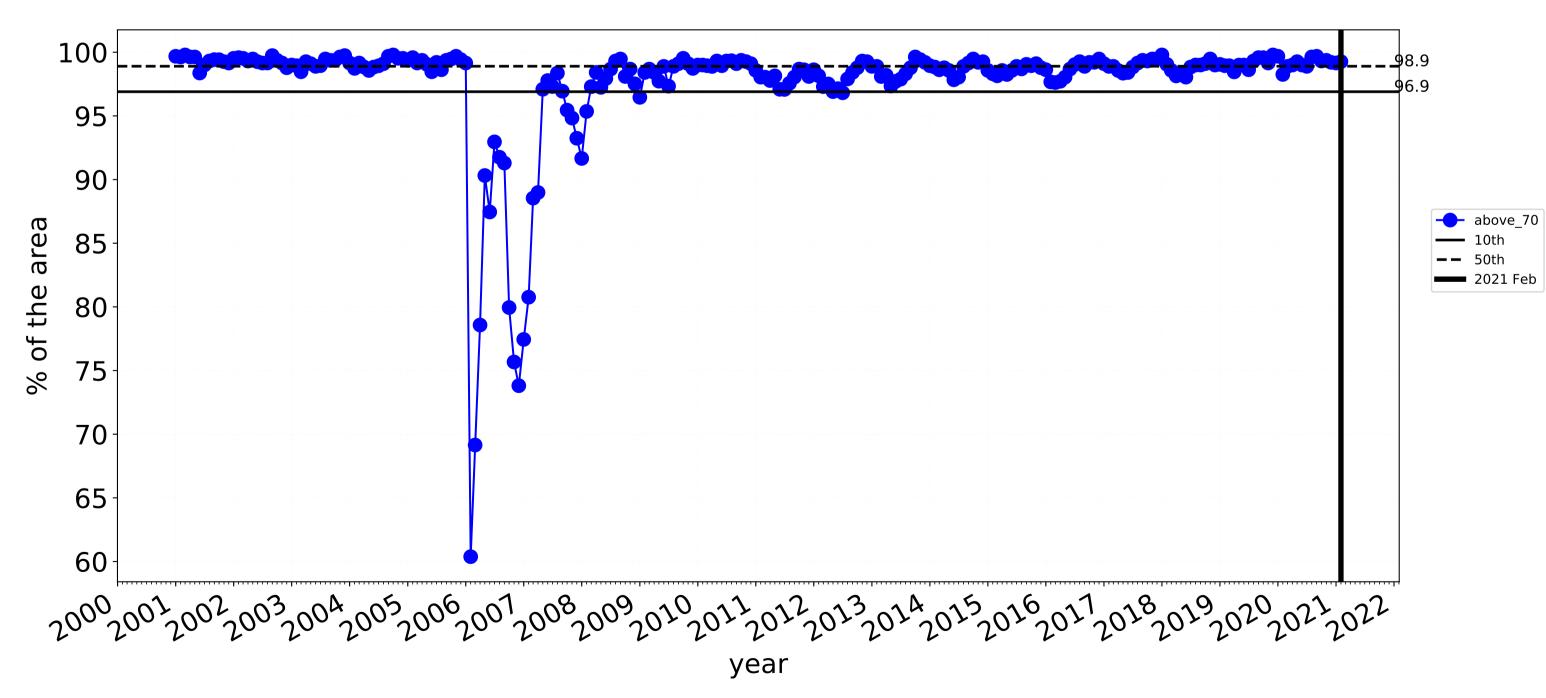
**Total Vegetation Cover Decile [%]** 

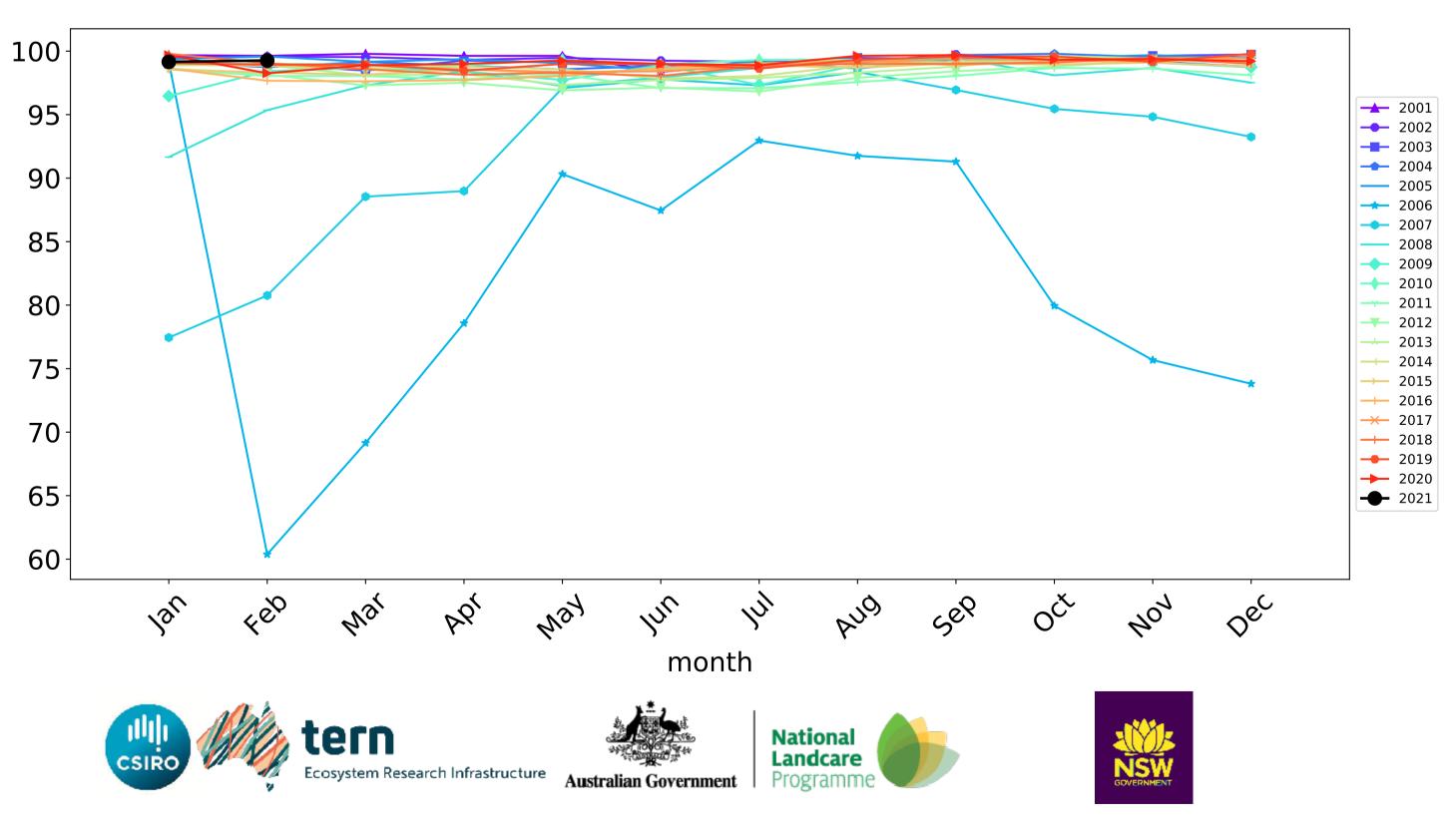


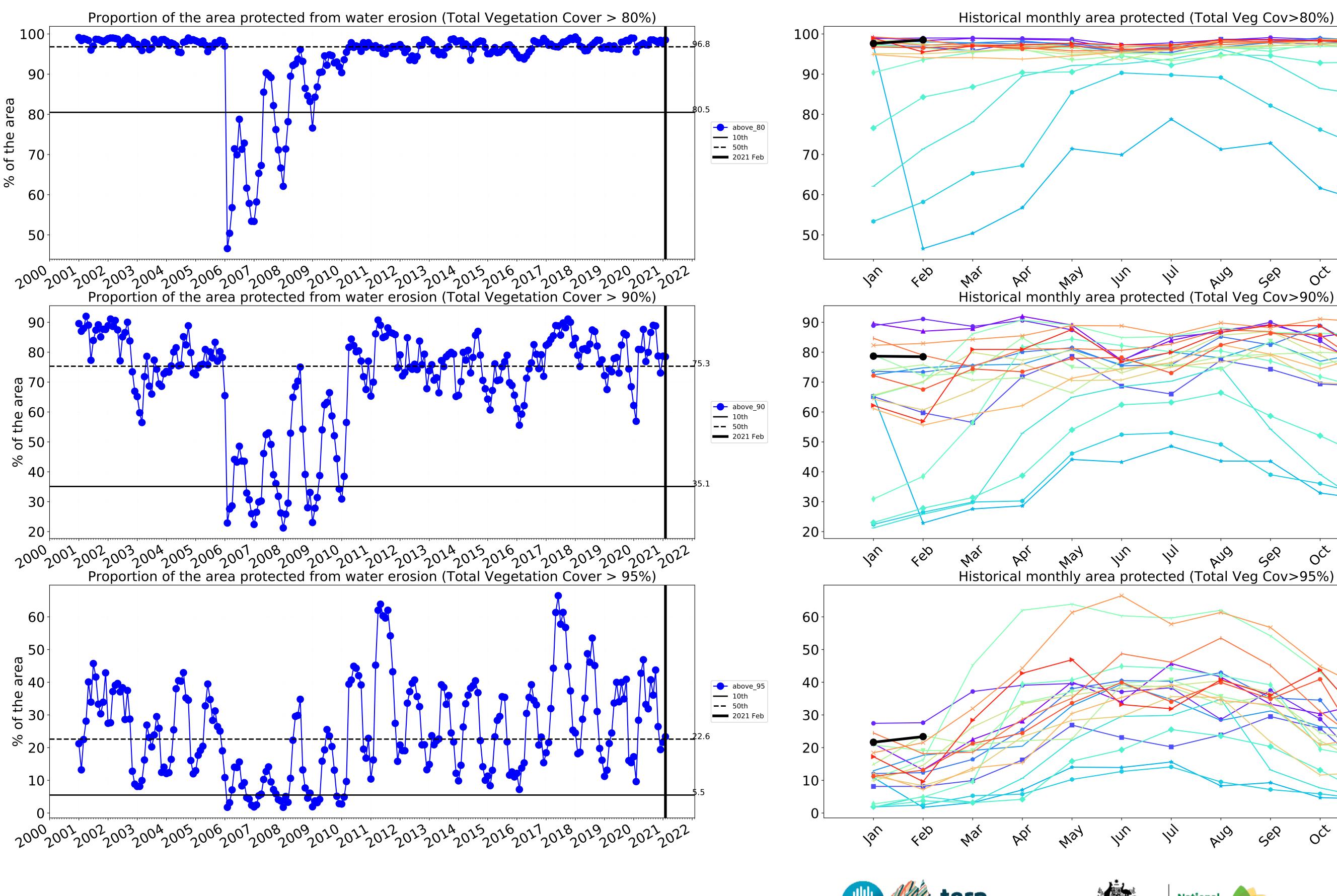


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

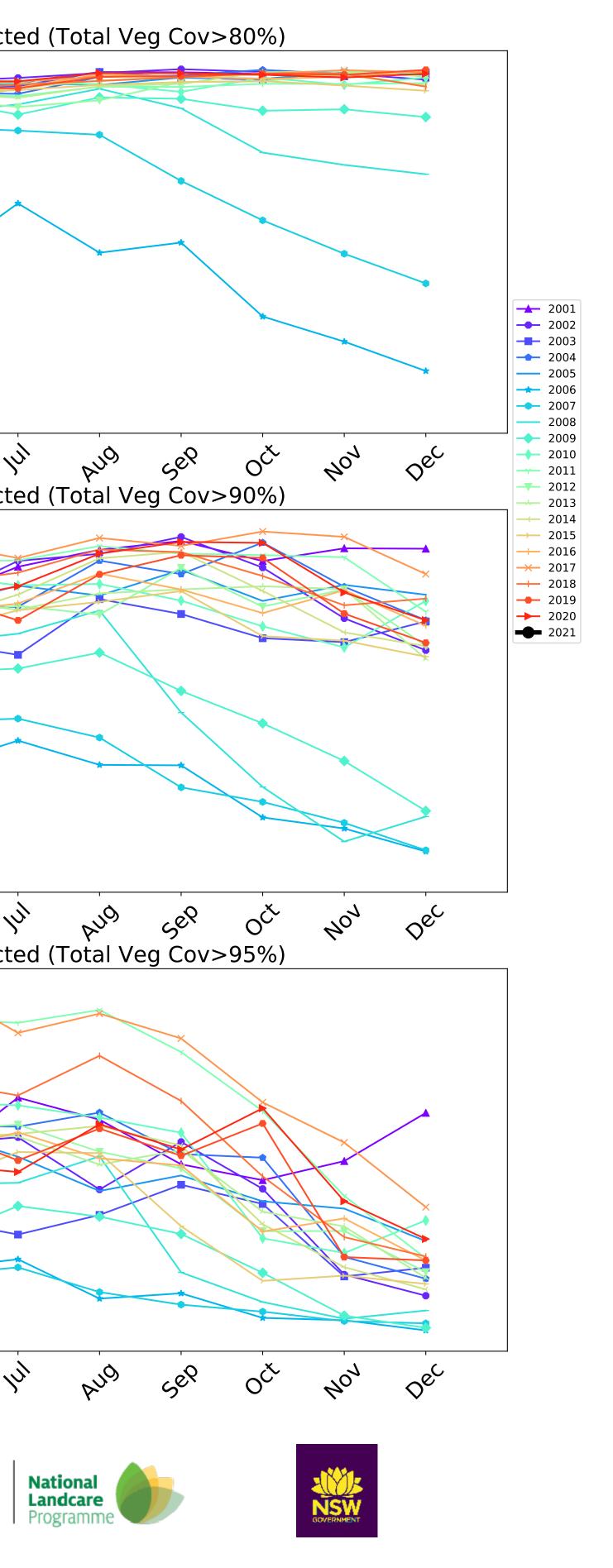






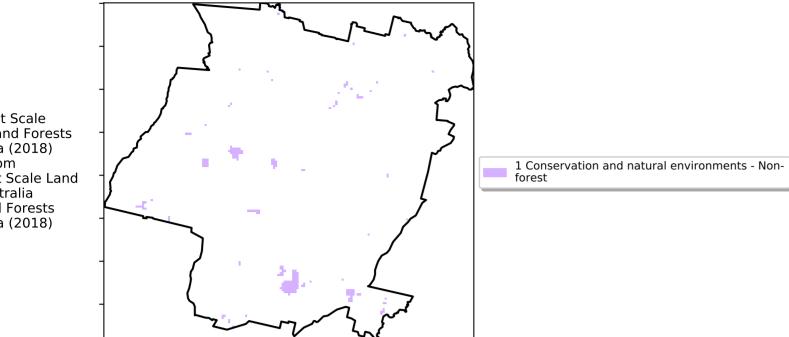


tern Ecosystem Research Infrastructure Australian Government

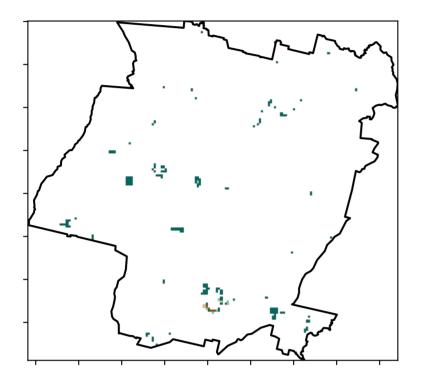


#### **Conservation and natural environments non forest**

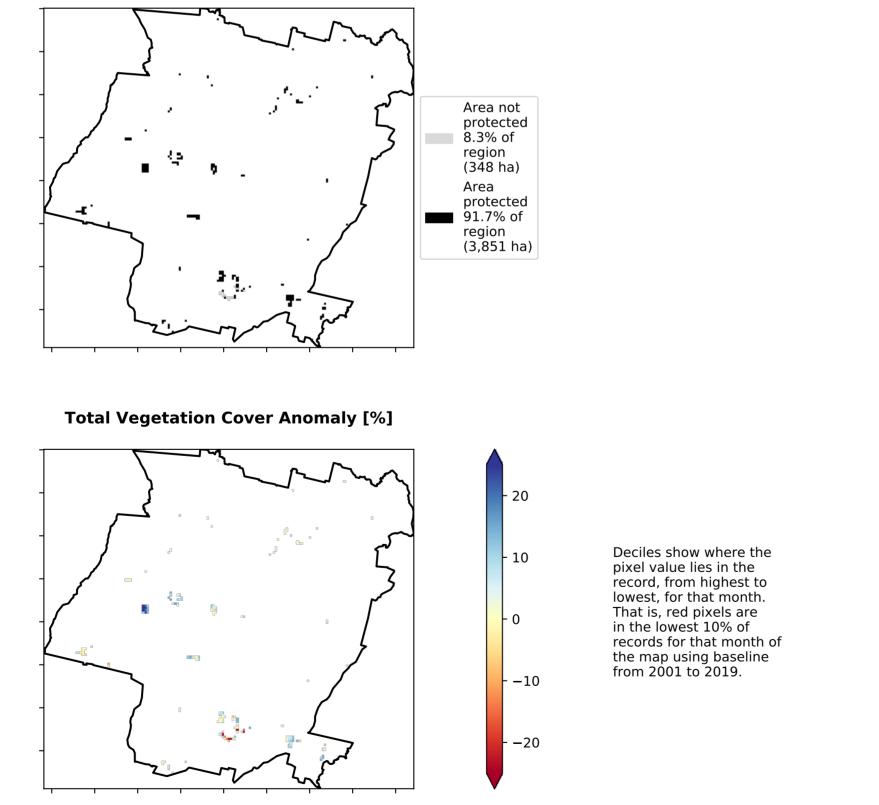
Land use and forest cover



**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)



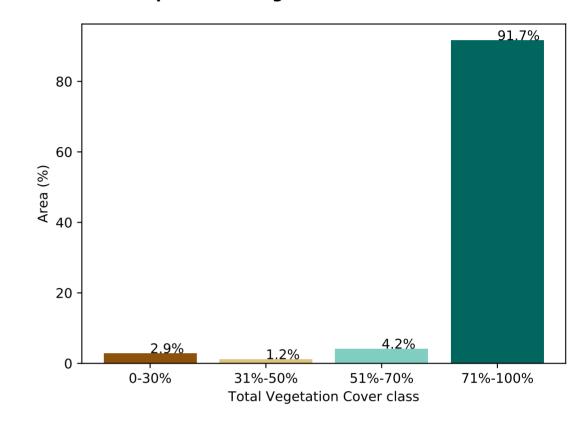
12%100%

· 52°10'10°10

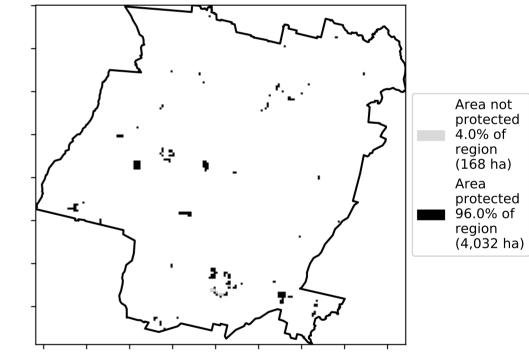
329050010

0.30%

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)

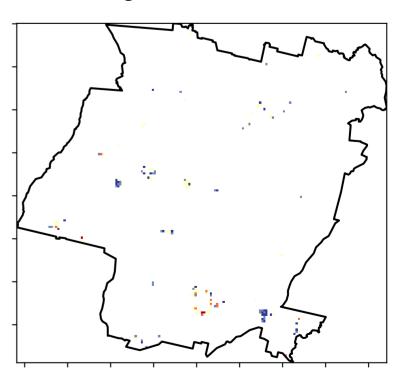
**Total Vegetation Cover Decile [%]** 

 $\hat{\mathbf{v}}$ 

୶ୖୄ

A.1

2:3

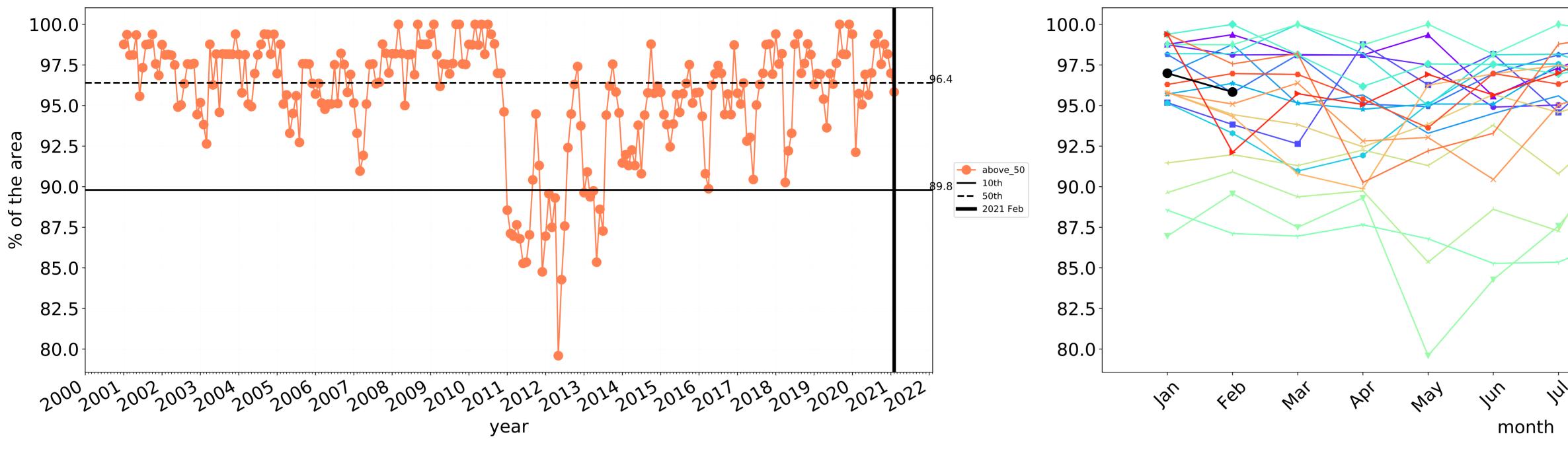




Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

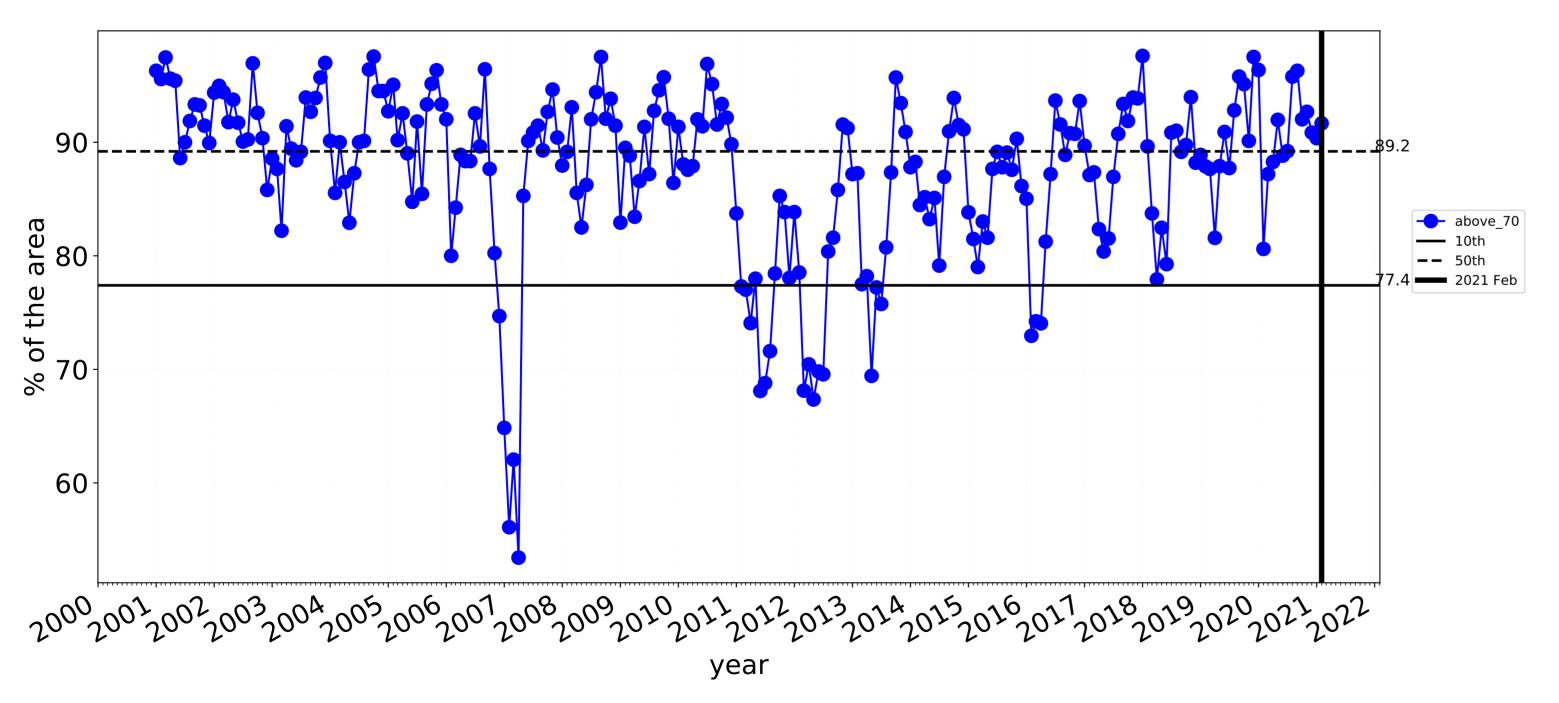


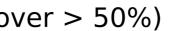
### **Conservation and natural environments non forest timeseries**



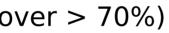
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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





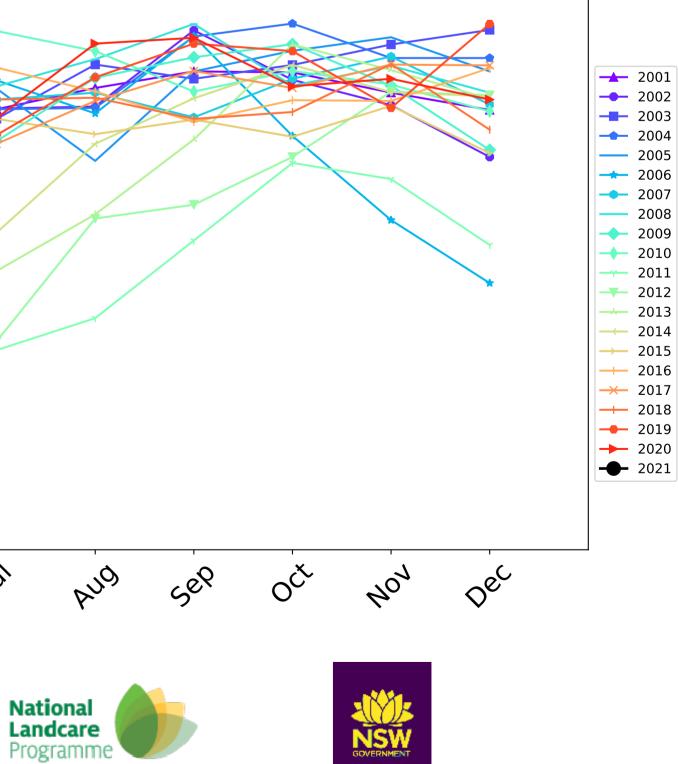
Wind erosion historical monthly area protected (Total Veg Cov >50%)

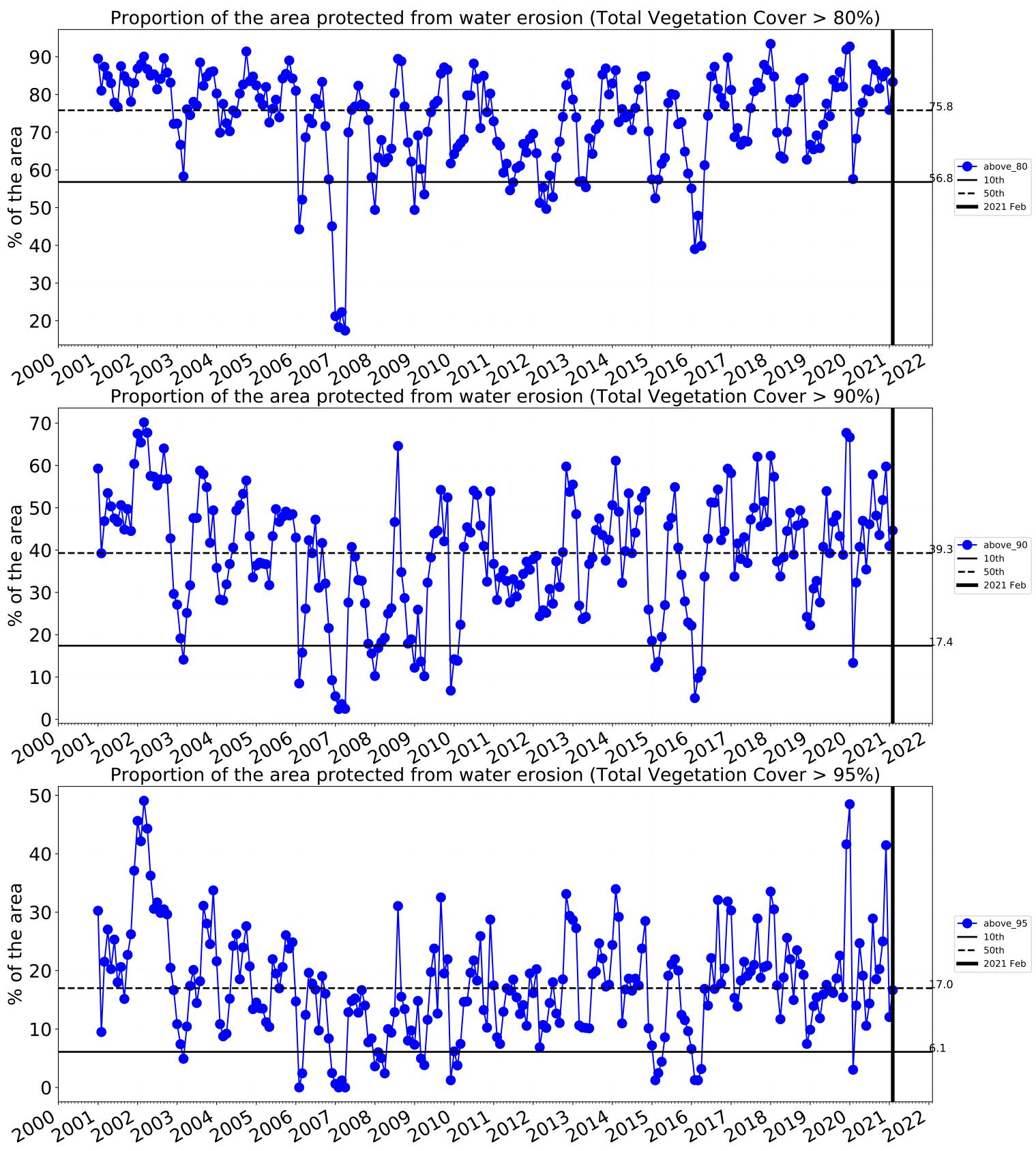


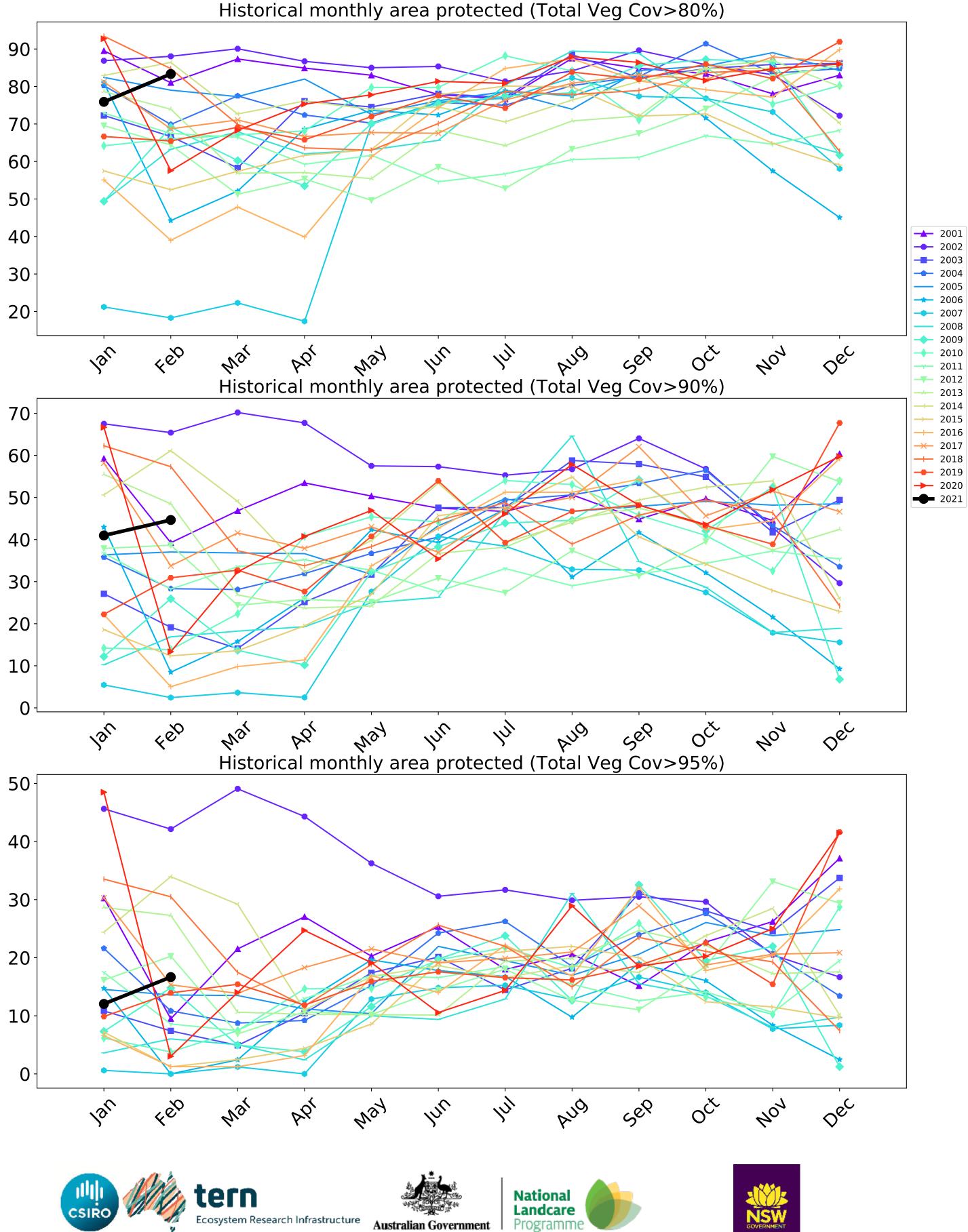
90 80 70 60 1ar 4eb In May Mai 1's 291 month tern Ecosystem Research Infrastructure Australian Government

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

**—** 2001 --- 2002 ---- 2004 **\_\_\_** 2006 --- 2007 2008 ---- 2009 --- 2011 --- 2013 <del>---</del> 2014 <mark>→</mark> 2015 --- 2016 <del>→</del> 2017 → 2018
→ 2019
→ 2020 ---- 2021 401 OČ Dec AUG Ser









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

Land Use and Forests of Australia (2018) 1 Conservation and natural environments - Woodland forest Catchment Scale Land

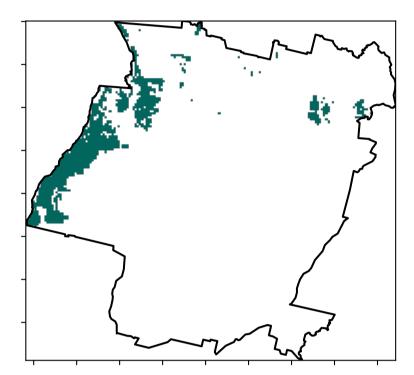
Catchment Scale

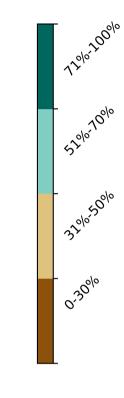
Derived from

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

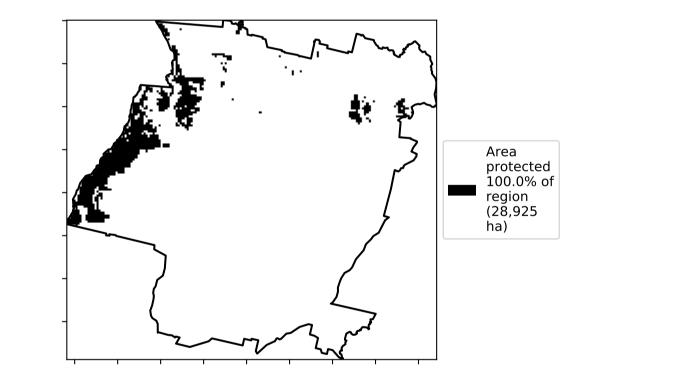
**Total Vegetation Cover [%]** 

Land use and forest cover

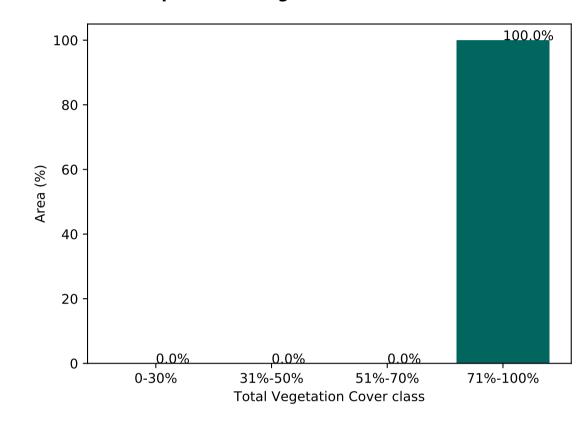




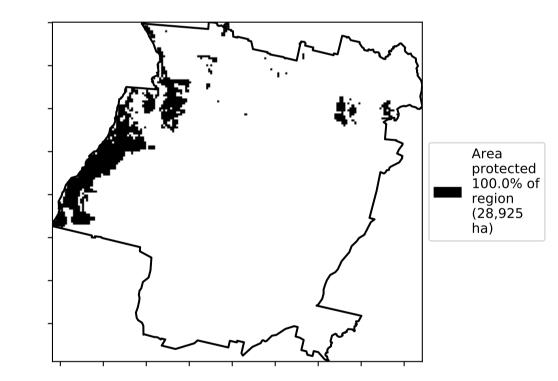
% Area protected from water erosion (>70%)



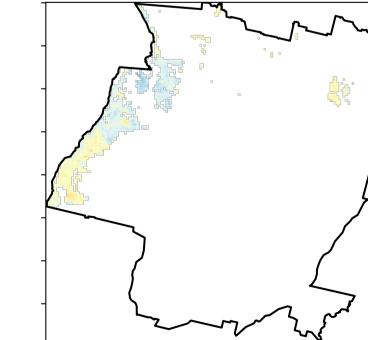
Proportion of vegetation cover class in area

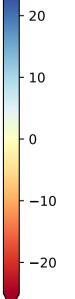


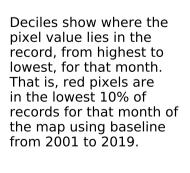
% Area protected from wind erosion (>50%)



**Total Vegetation Cover Anomaly [%]** 







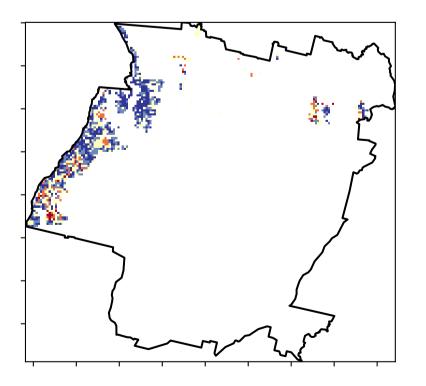
**Total Vegetation Cover Decile [%]** 

 $\hat{\mathcal{S}}$ 

<sub>ଚ</sub>ି

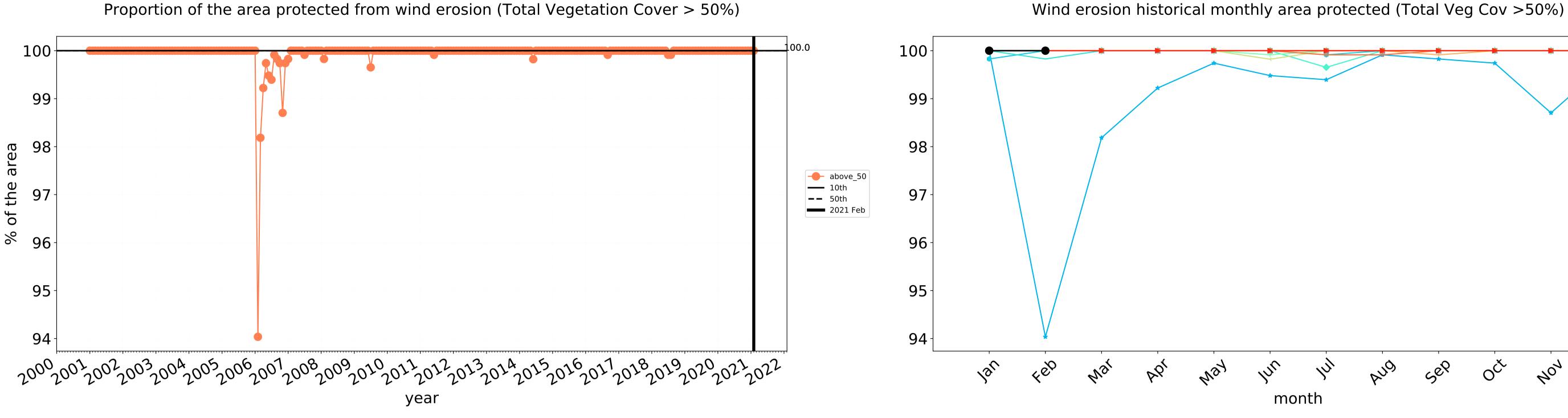
A.1

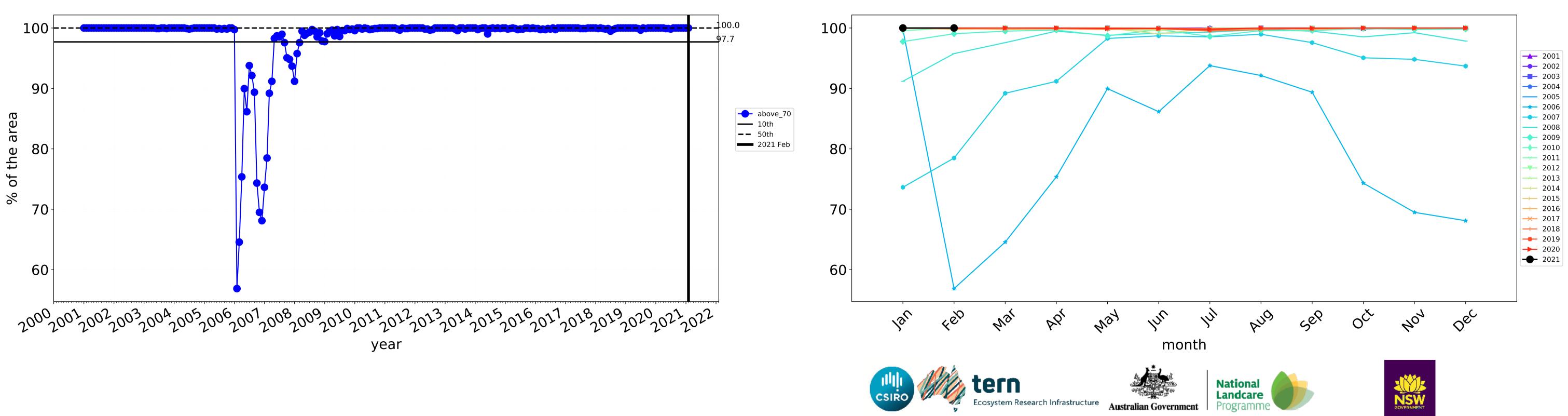
2?5





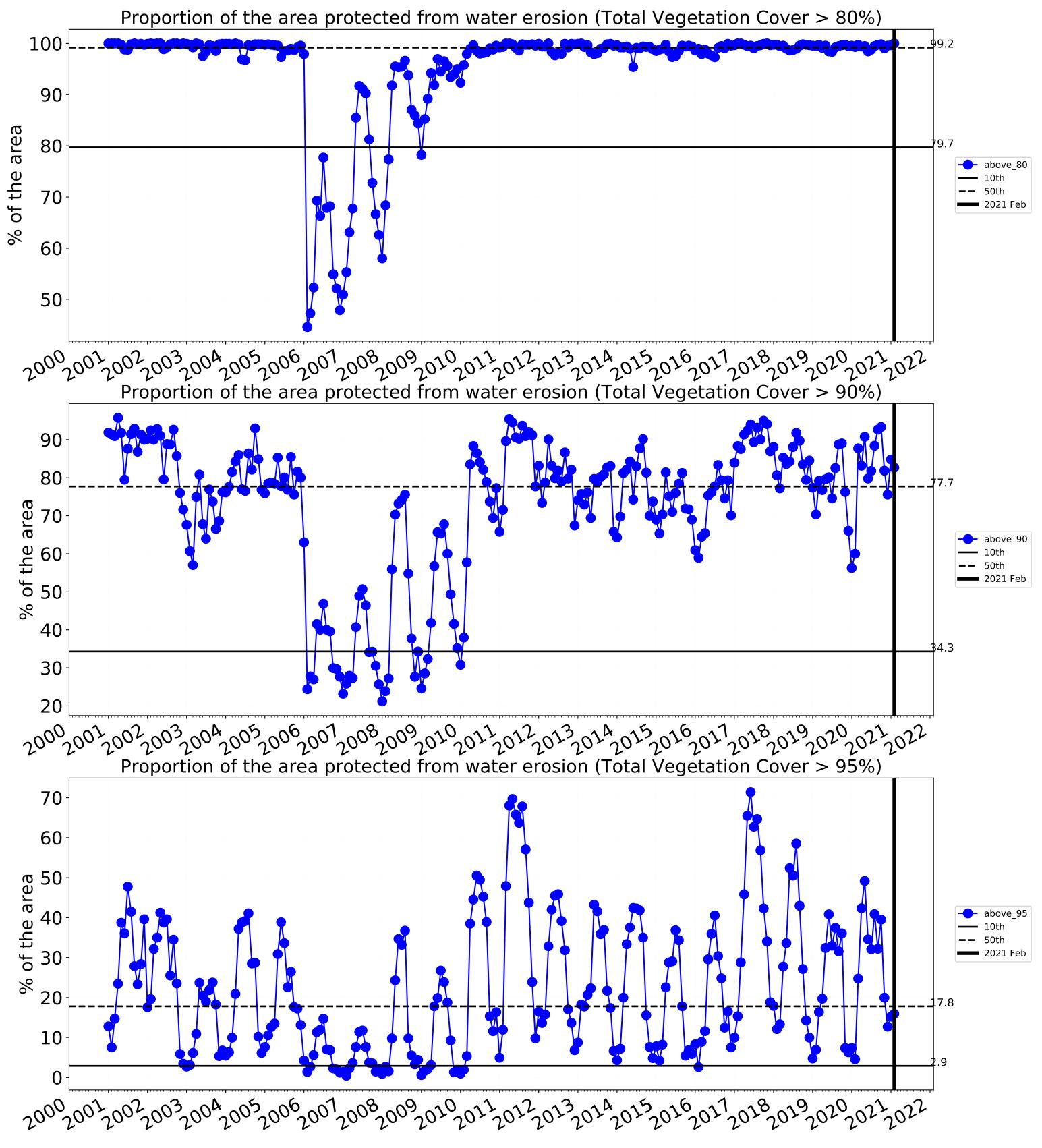
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

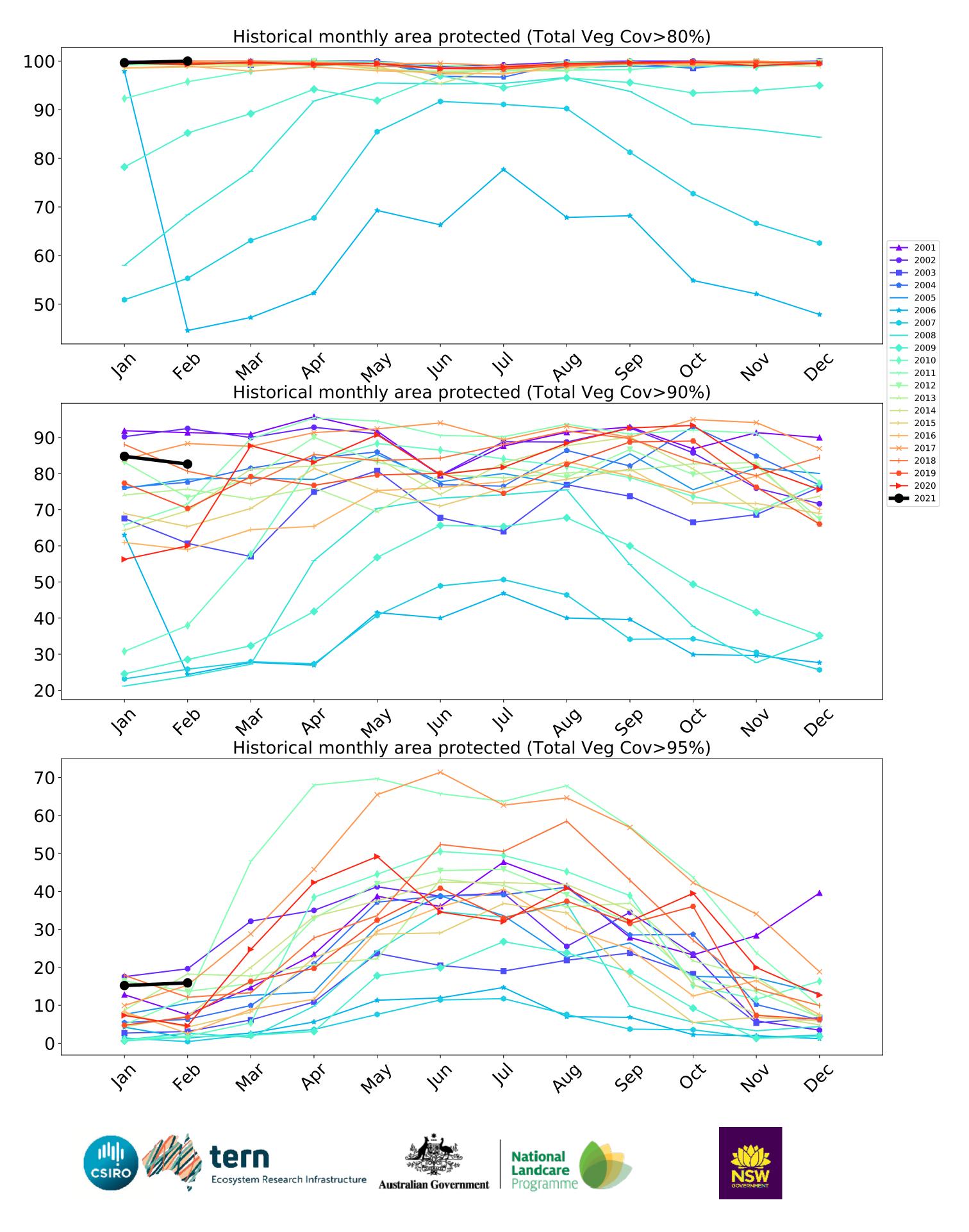




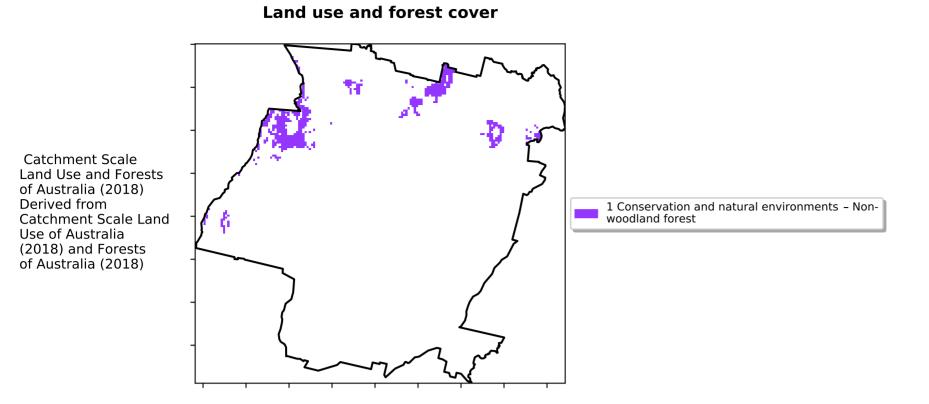
**\_\_\_** 2001 --- 2002 ---- 2003 **---** 2004 \_\_\_\_ 2005 **----** 2006 **---** 2007 2008 ---- 2011 --- 2013 **→** 2014 <mark>→</mark> 2015 --- 2016 <del>→</del> 2017 **→** 2018 ---- 2019 → 2020 ---- 2021 AUG Sel 404 Dec OC

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





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



12%200%

· 52°10'10°10

· 32°10'50°10

0.30%

- 20

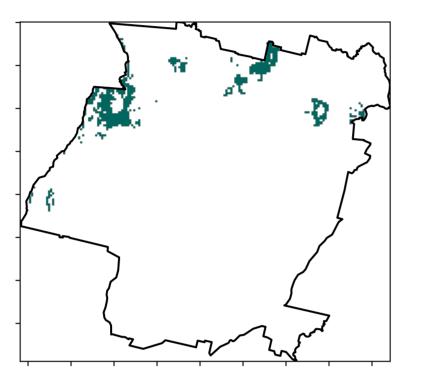
· 10

· 0

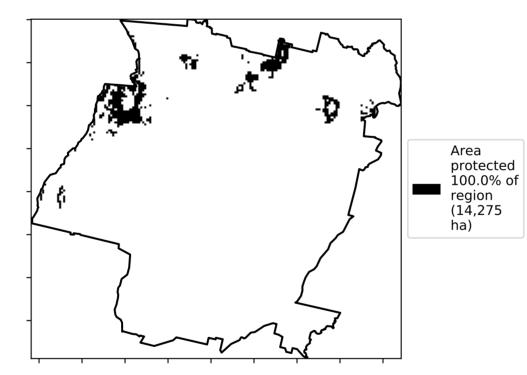
-10

-20

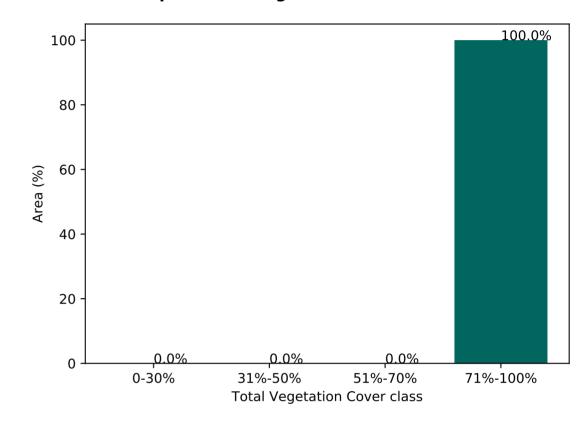
Total Vegetation Cover [%]



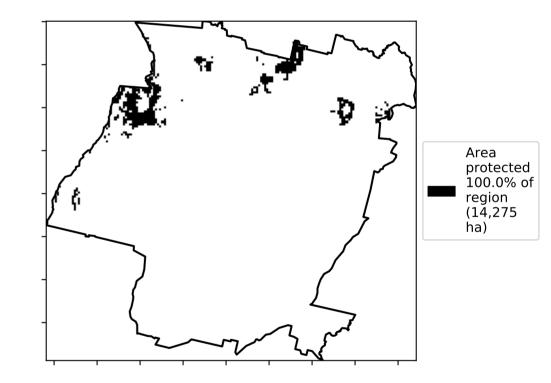
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

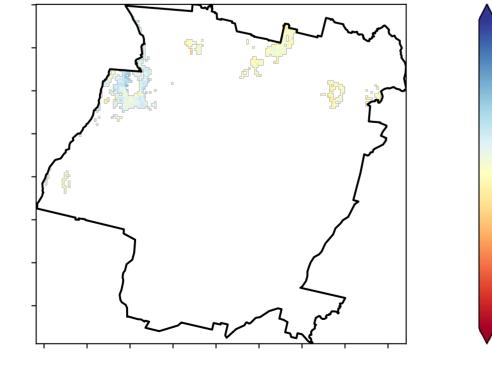


% Area protected from wind erosion (>50%)



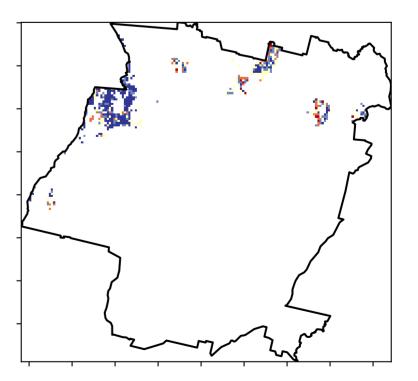
**Total Vegetation Cover Anomaly [%]** 

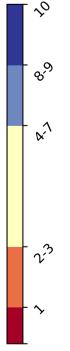
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



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

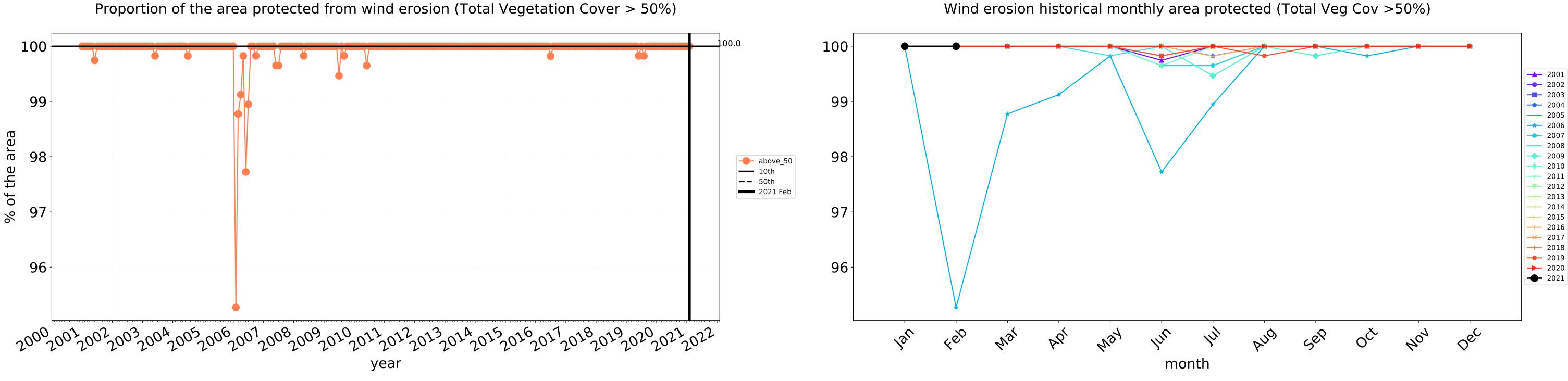
**Total Vegetation Cover Decile [%]** 



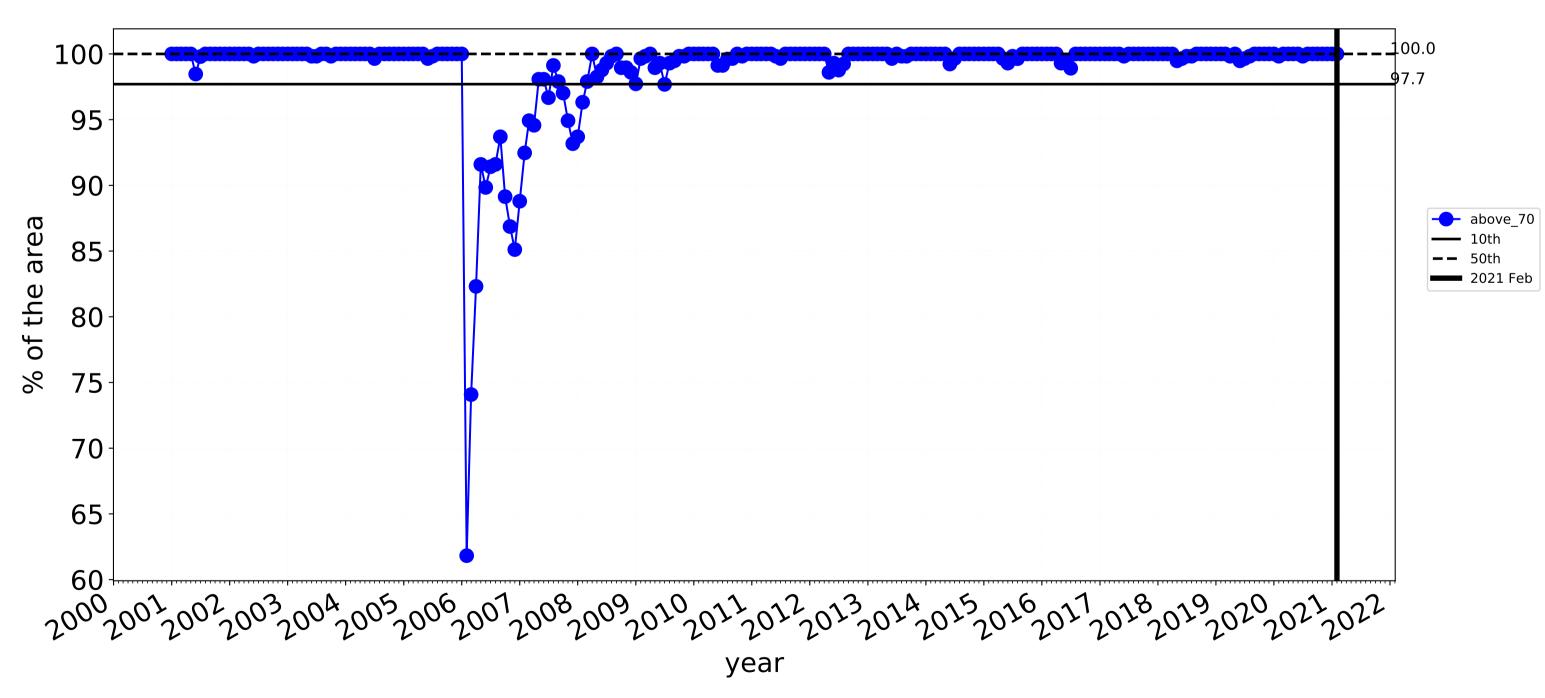


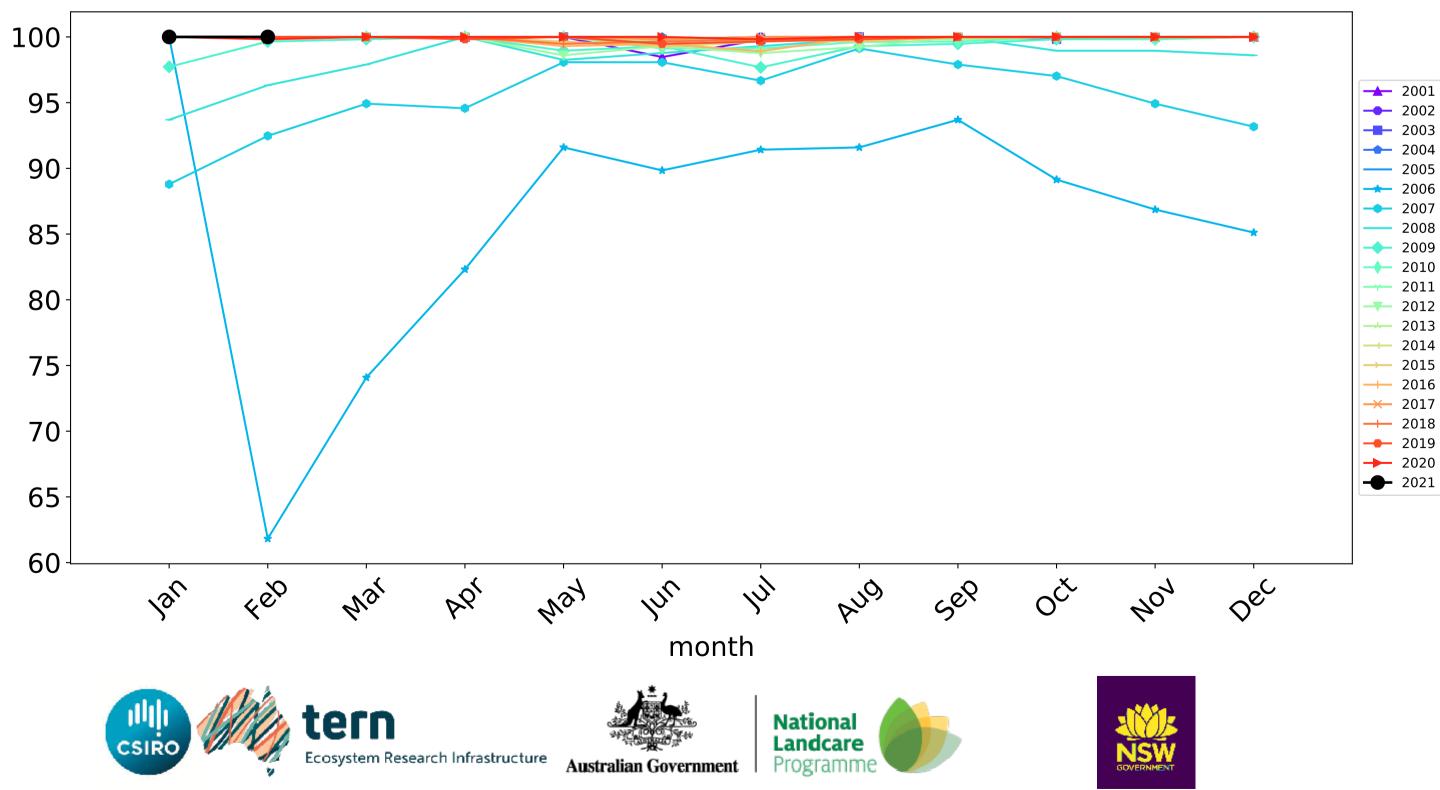


## **Conservation and natural environments Forest (non woodland) timeseries**

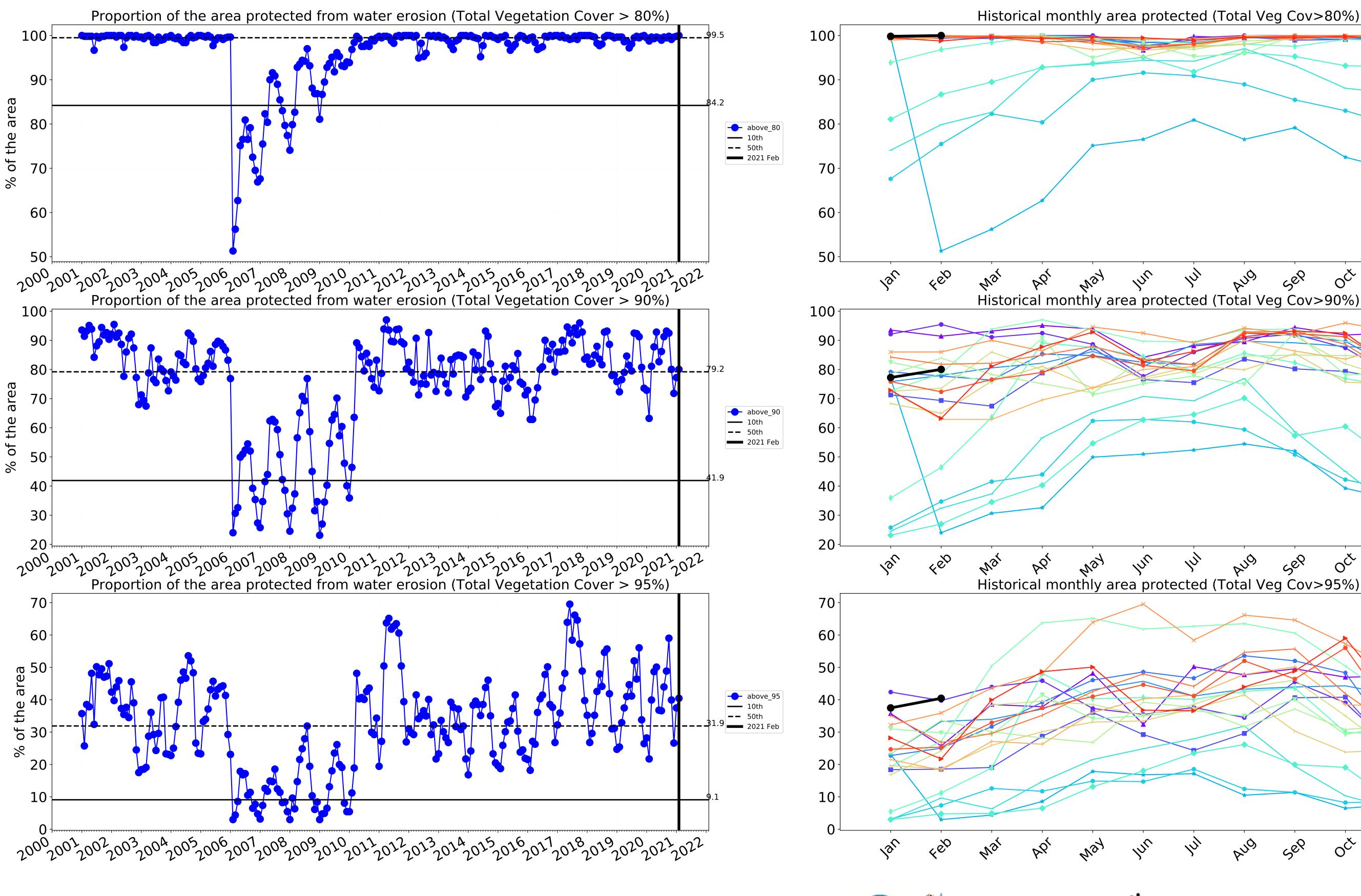


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

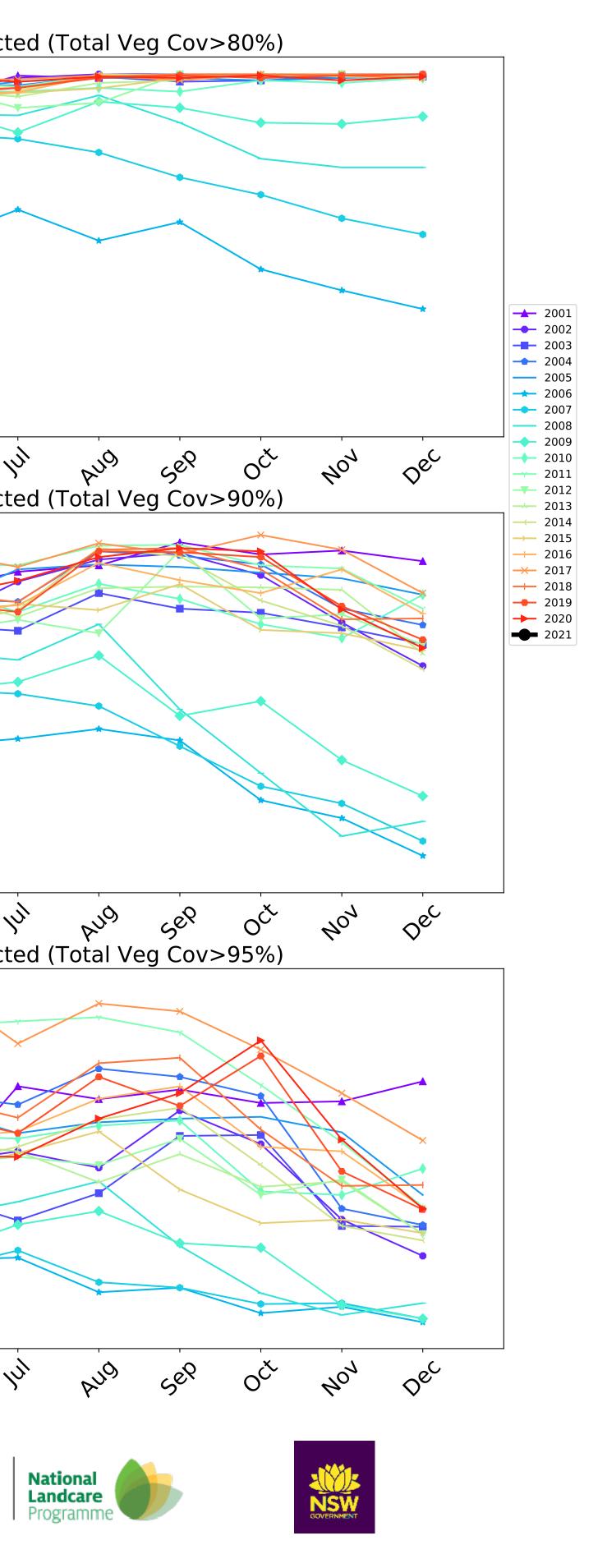




Water erosion historical monthly area protected (Total Veg Cov>70%)



tern Ecosystem Research Infrastructure Australian Government

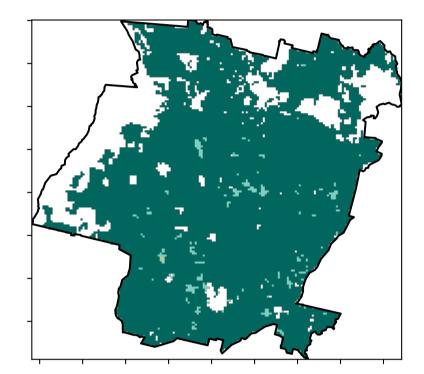


### Agriculture

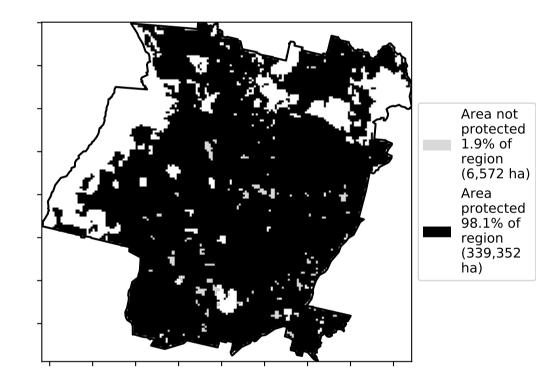
Catchment Scale Land Use and Forests of Australia (2018) Catchment Scale Land (2018) and Forests of Australia (2018)

Land use and forest cover

**Total Vegetation Cover [%]** 



% Area protected from water erosion (>70%)



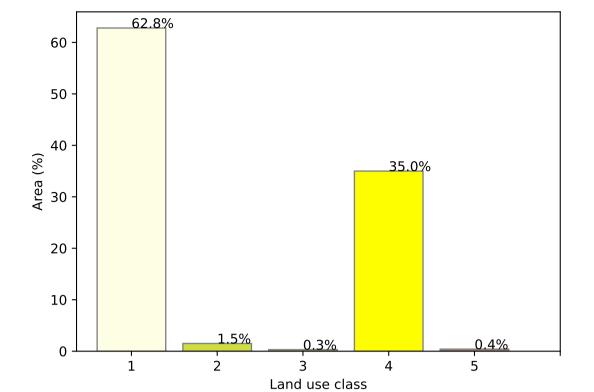
1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest 4 Agriculture - Cropping - Non-irrigated 5 Agriculture - Horticulture - Non-irrigated

12%200%

· 52°10'70°10

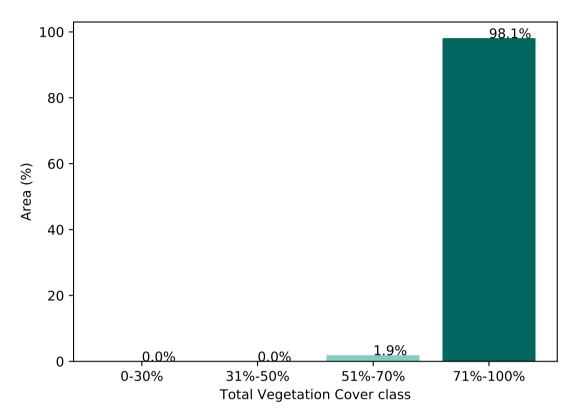
32°1050°10

0.30%



#### Proportion of each land class in area

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



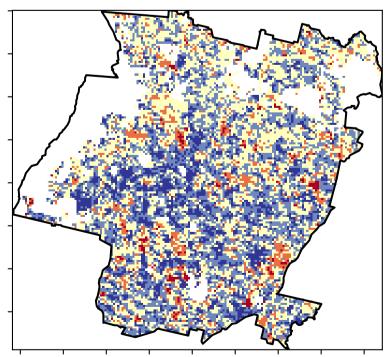
\$

es,o

A.1

2?

**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

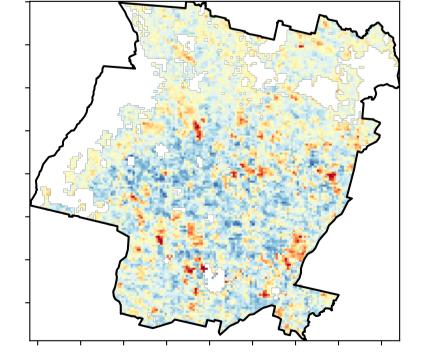
the map using baseline from 2001 to 2019.

**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 from 2001 to 2019.

Derived from

Use of Australia

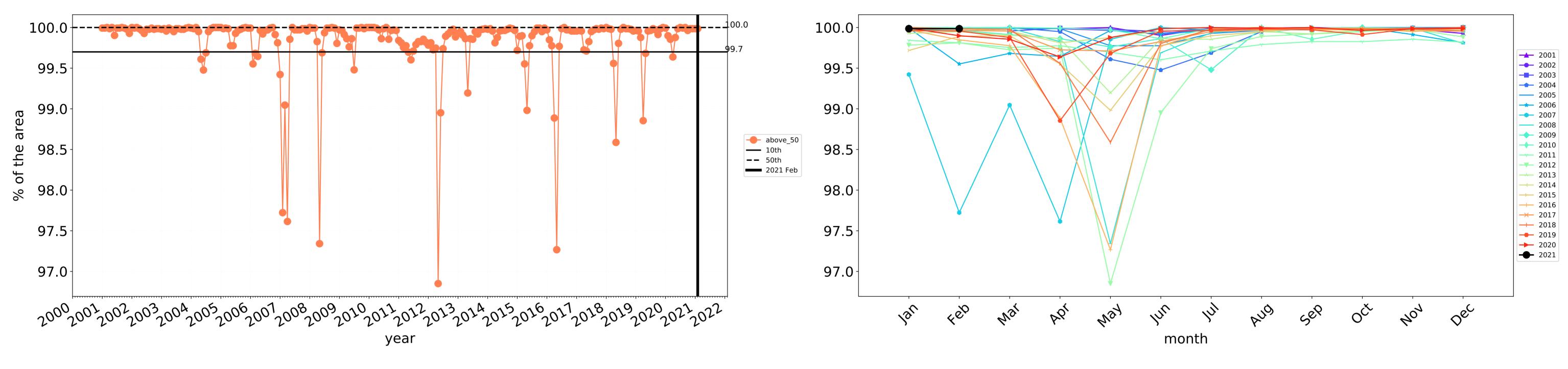


- 10 0 -10-20

- 20

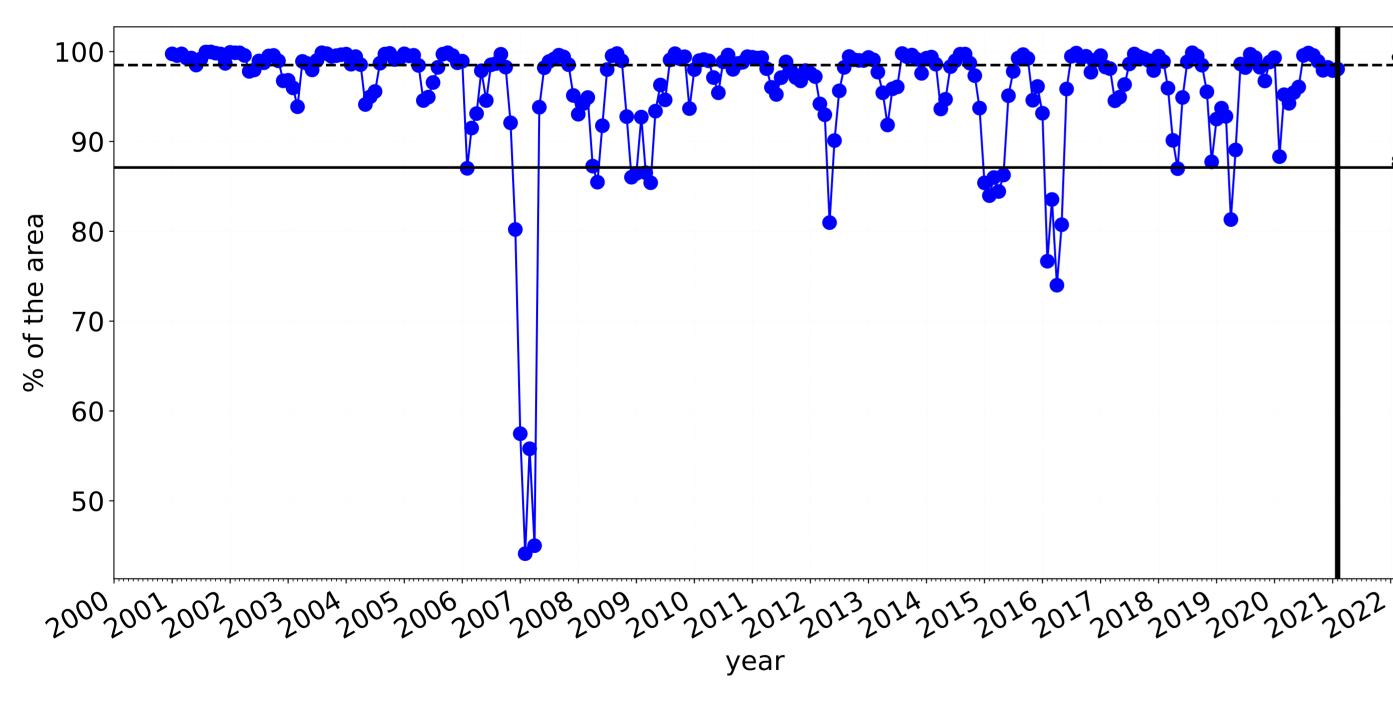


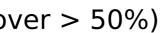




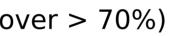
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



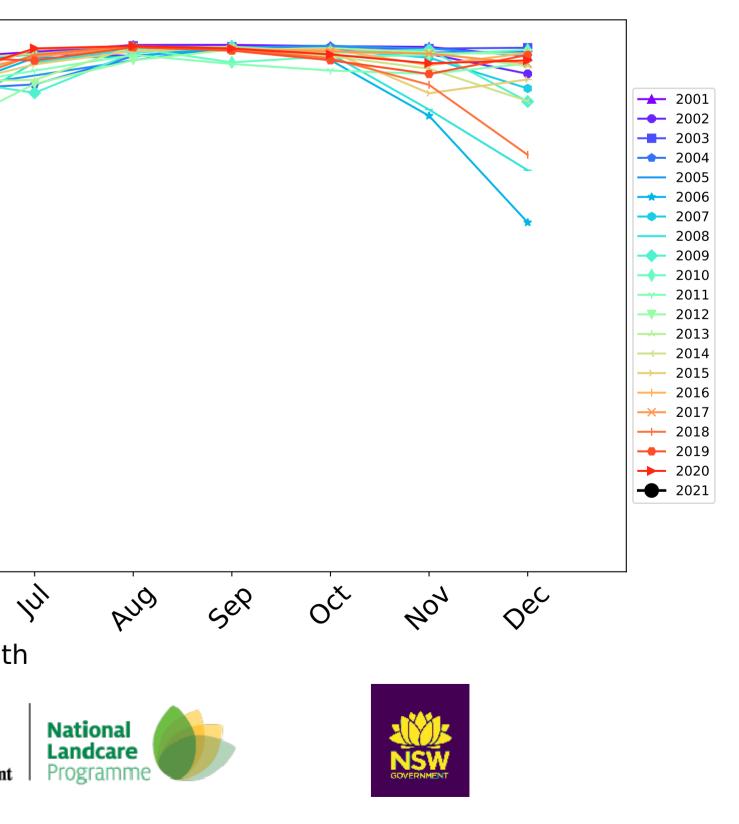


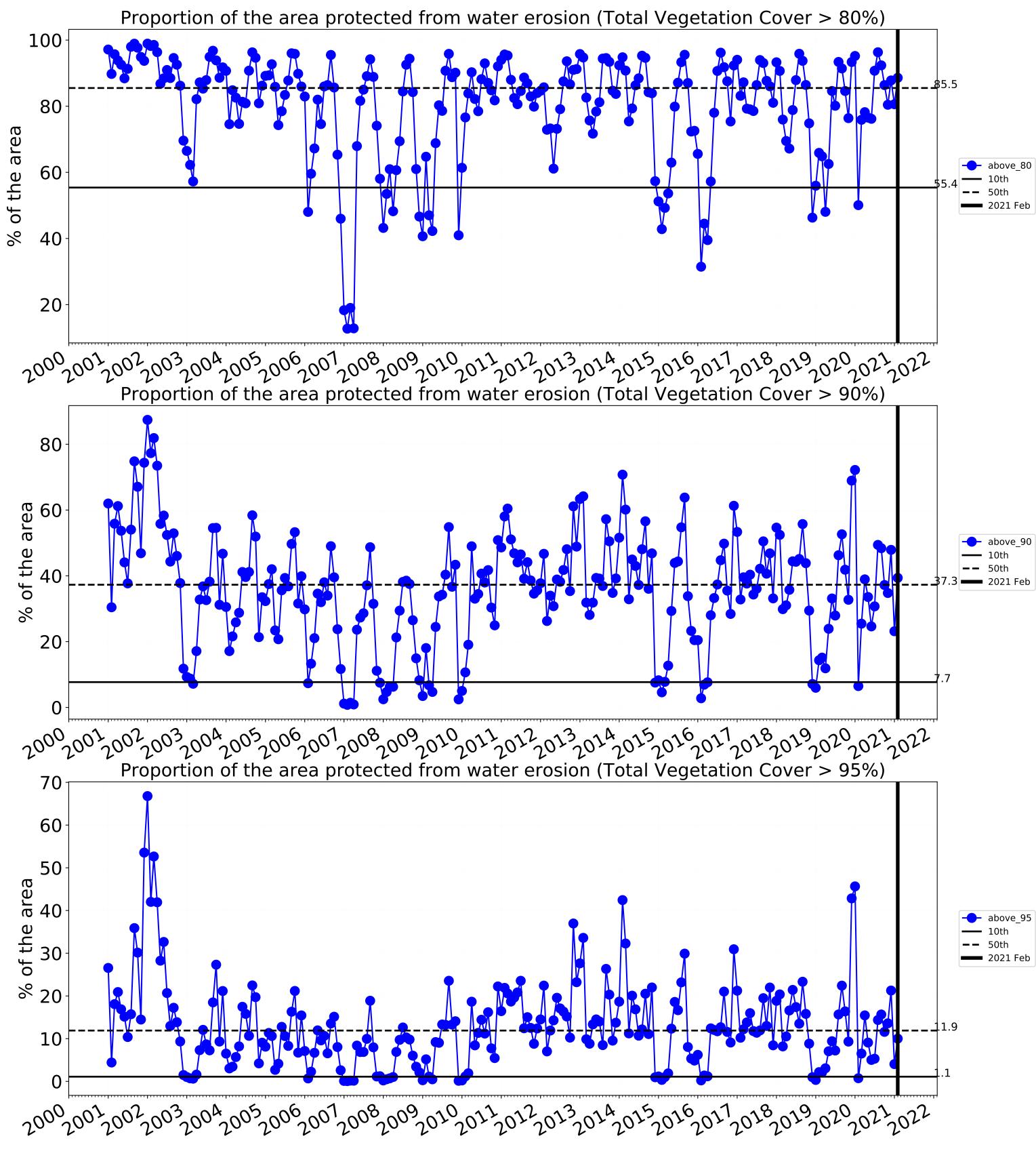
Wind erosion historical monthly area protected (Total Veg Cov >50%)

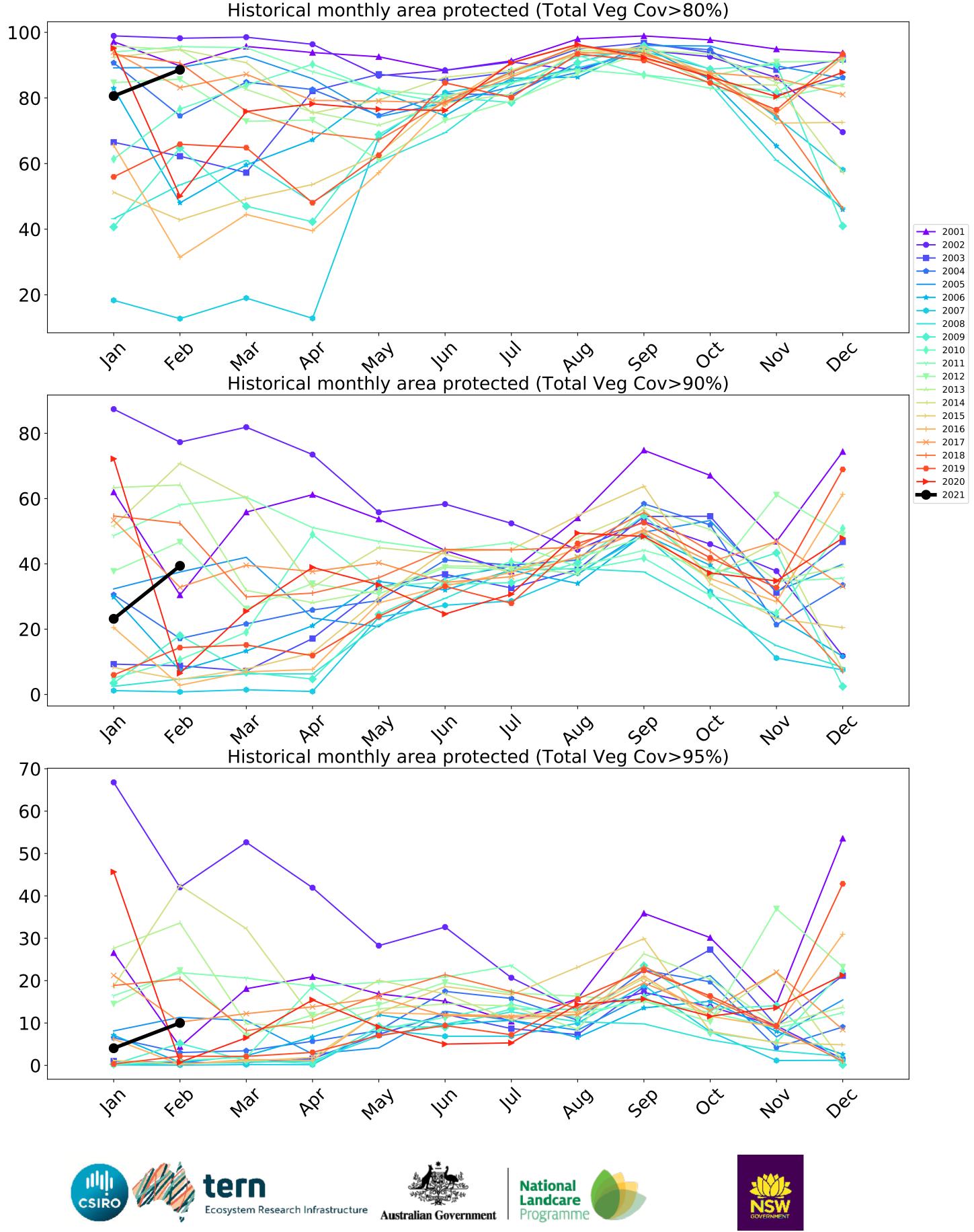


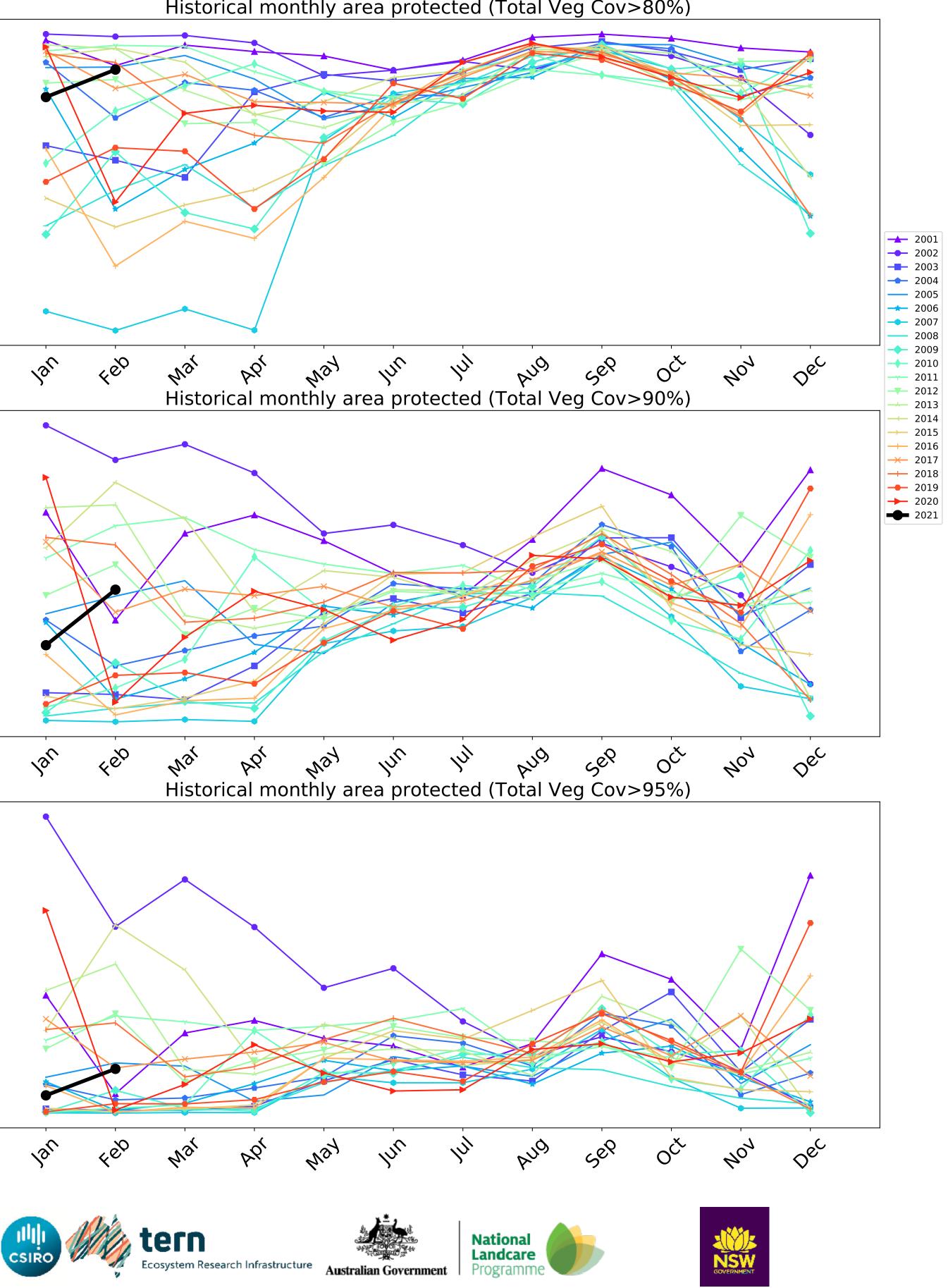
100 90 ---- above\_70 80 **——** 10th **——** 50th **——** 2021 Feb 70 60 50 4eb Jan way In PQ' Mai month tern Ecosystem Research Infrastructure Australian Government

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





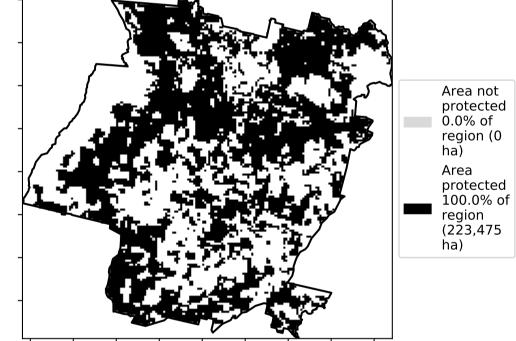




#### Grazing

Land use and forest cover 100 97.2% 80 Catchment Scale Land Use and Forests of Australia (2018) 60 Area (%) Of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018) 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest 40 20 2.3% 0.5% 0 2 1 3 Land use class Proportion of vegetation cover class in area **Total Vegetation Cover [%]** 12%100% 98.9% 100 80 52°1070010 60 Area (%) · 32°10'50°10 40 0.30% 20 1.1%0.0% 0.0% 0 0-30% 31%-50% 51%-70% 71%-100% Total Vegetation Cover class % Area protected from wind erosion (>50%) % Area protected from water erosion (>70%)





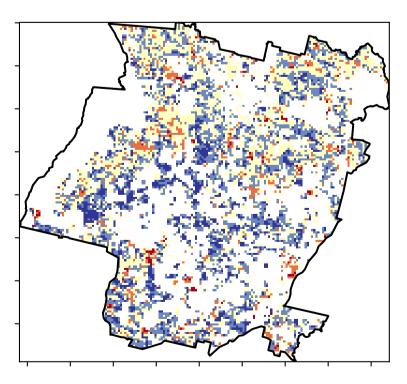
\$

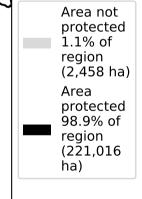
<sub>ଚ</sub>ି

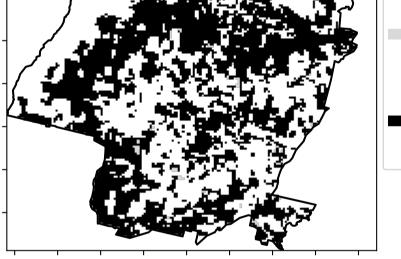
A-1

2?

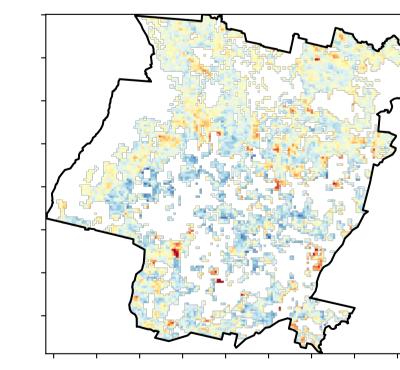
Total Vegetation Cover Decile [%]

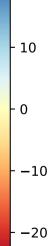






**Total Vegetation Cover Anomaly [%]** 





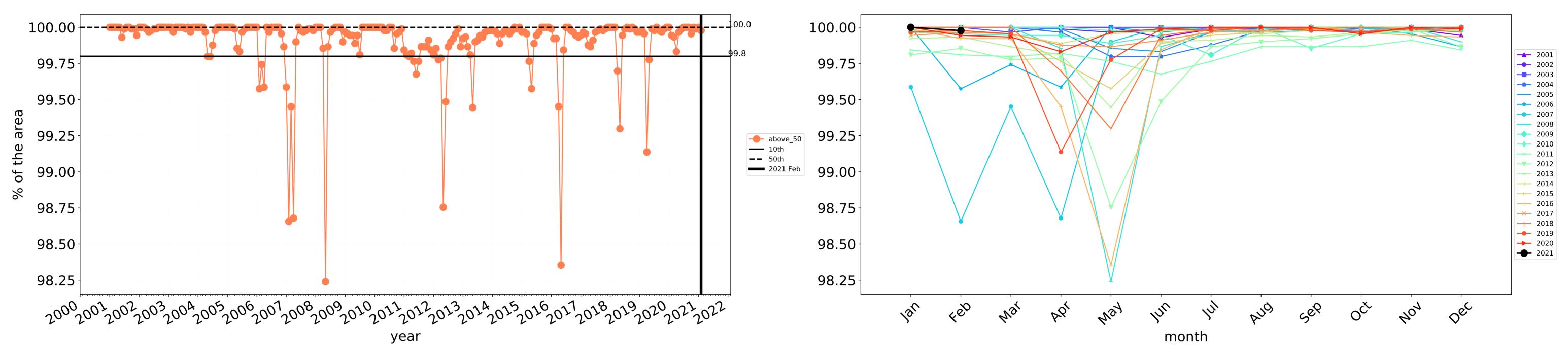
- 20

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

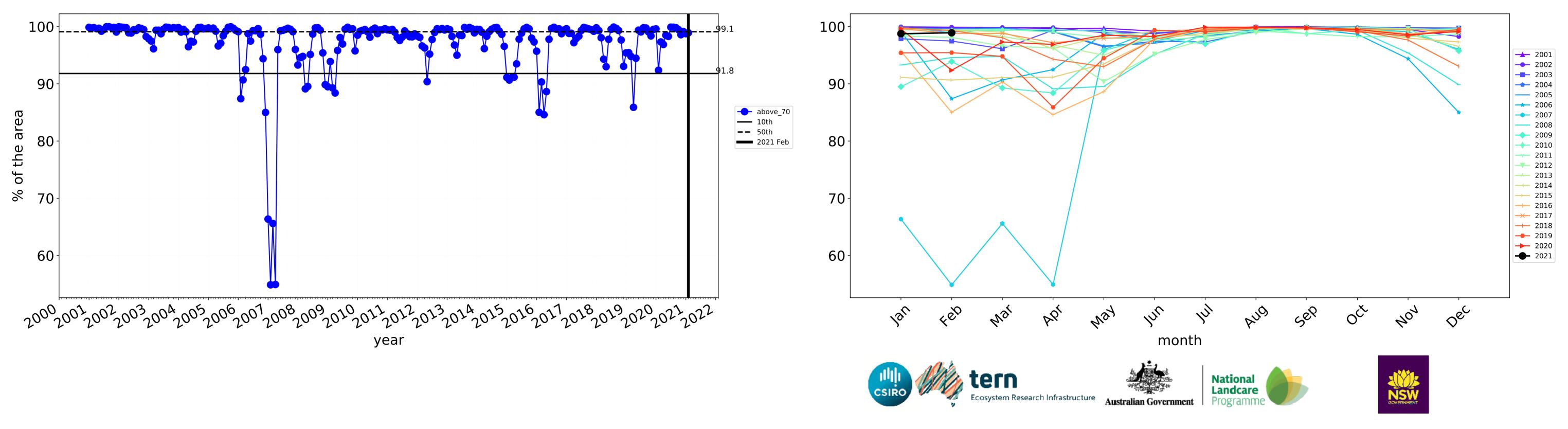


Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



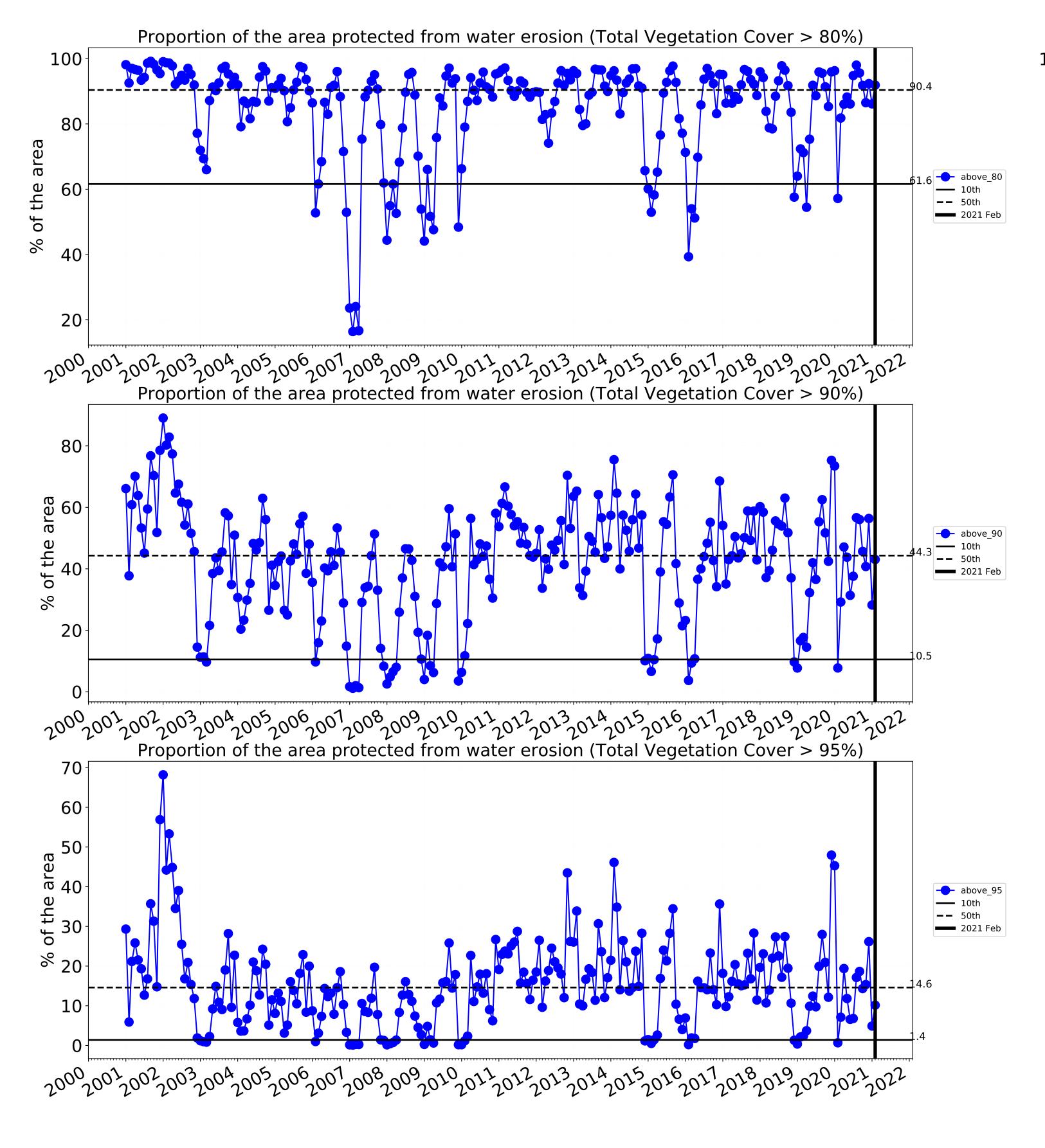


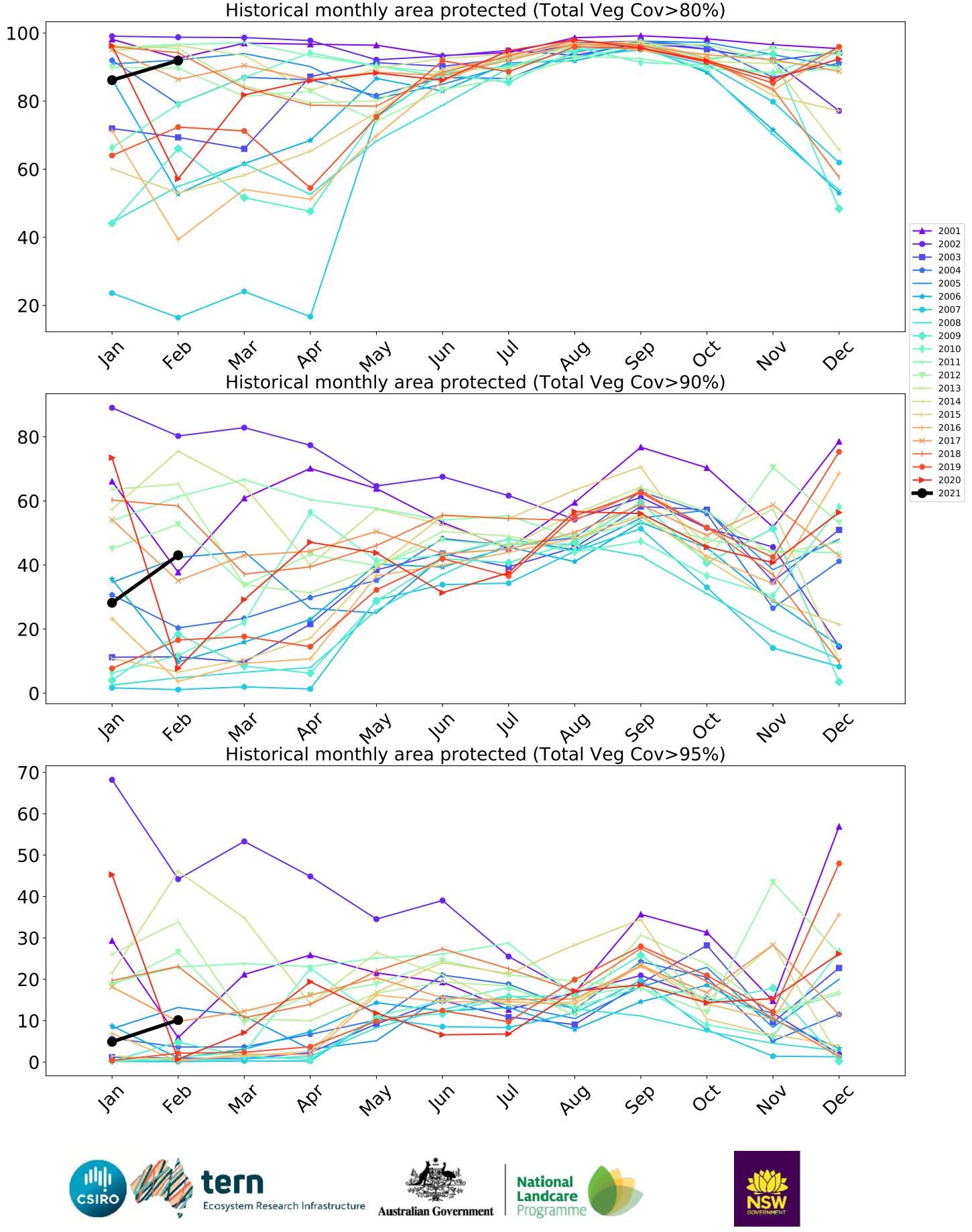
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

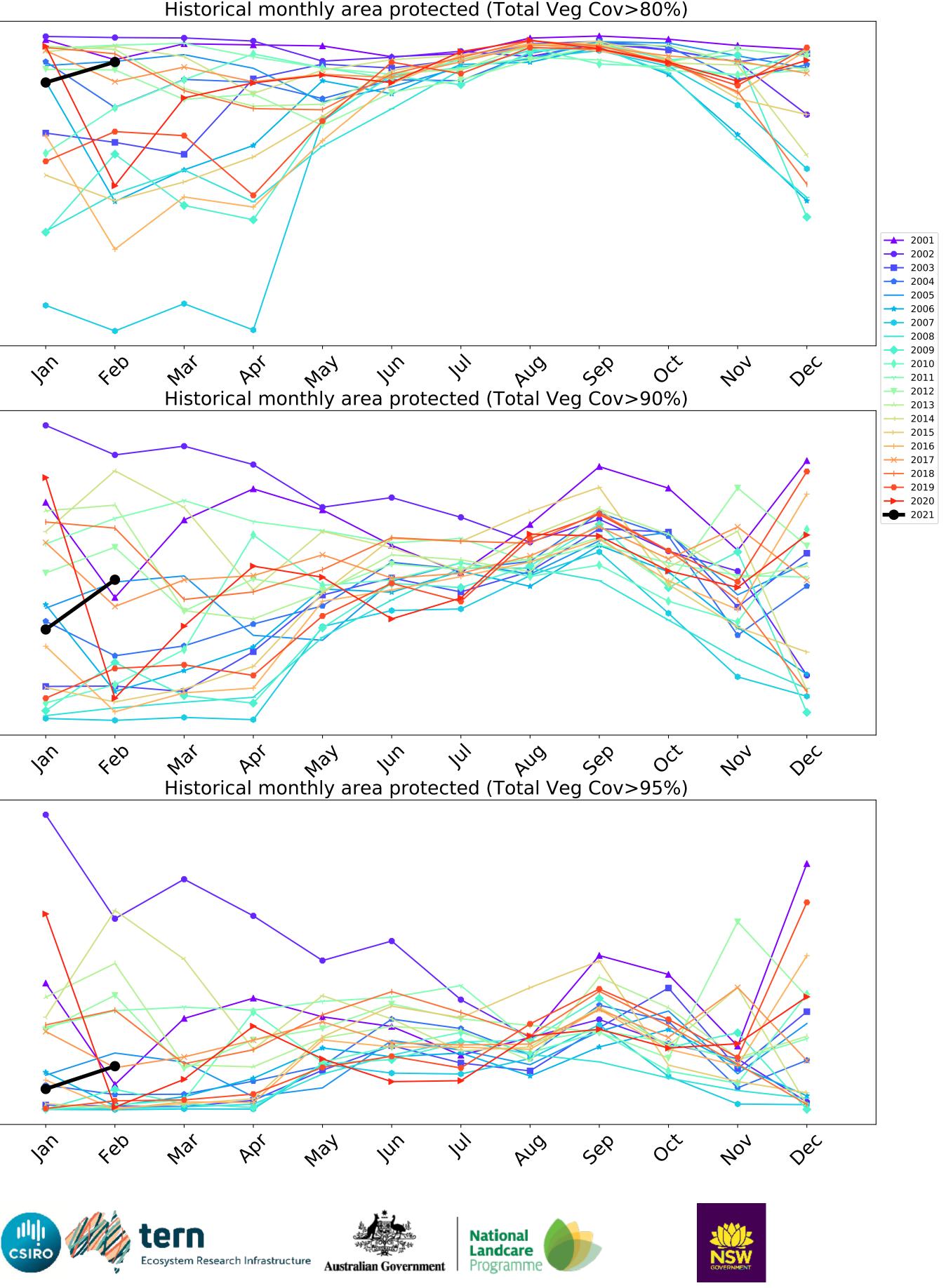




Wind erosion historical monthly area protected (Total Veg Cov >50%)







#### **Grazing non forest**

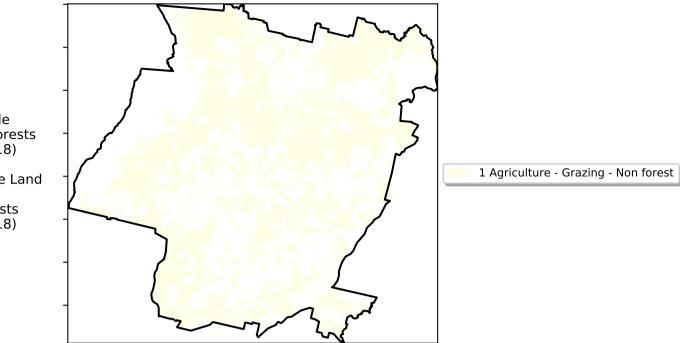
12%100%

52°10°10°10

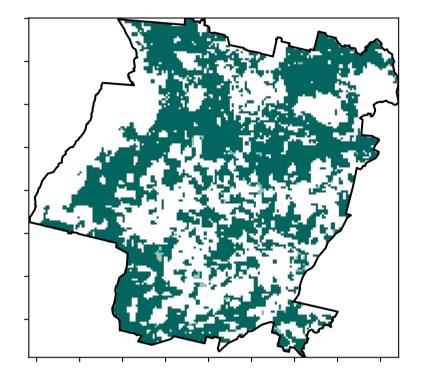
· 32°10'50°10

0.30%

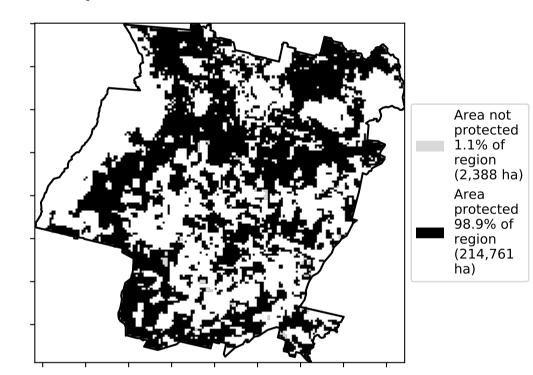
Land use and forest cover



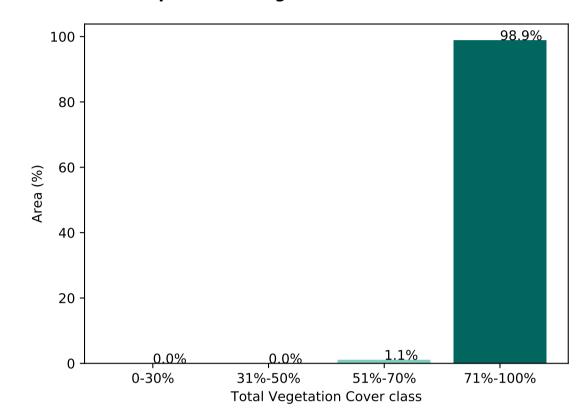
**Total Vegetation Cover [%]** 



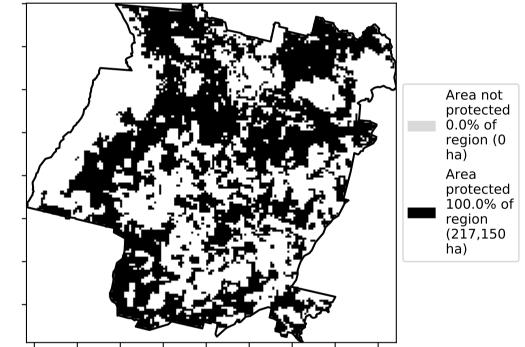
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



\$

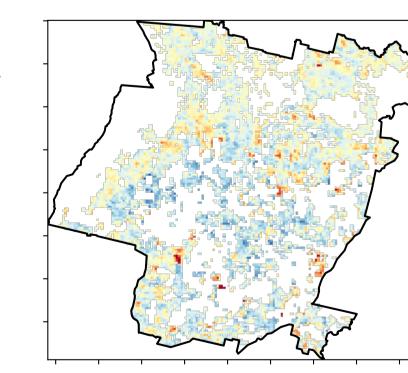
<sub>ଚ</sub>ି

A-1

2?5

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

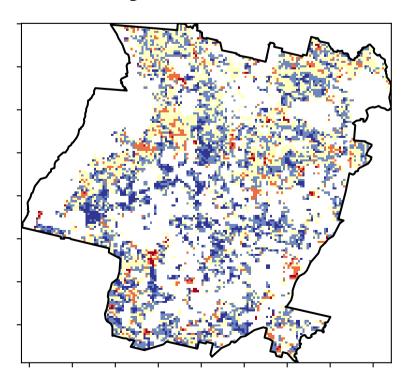
**Total Vegetation Cover Anomaly [%]** 



- 10 0 -10-20

- 20

Total Vegetation Cover Decile [%]





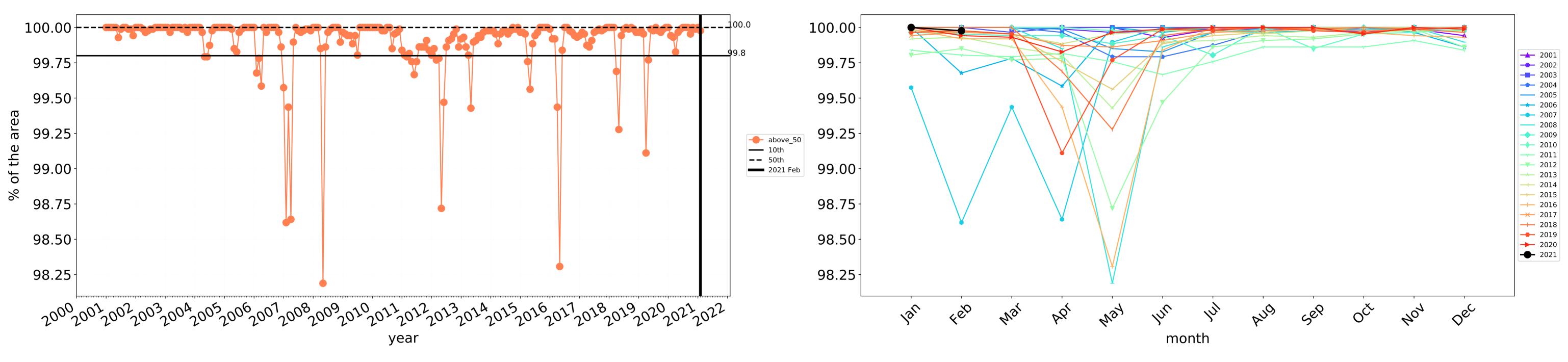
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline

the map using baseline from 2001 to 2019.

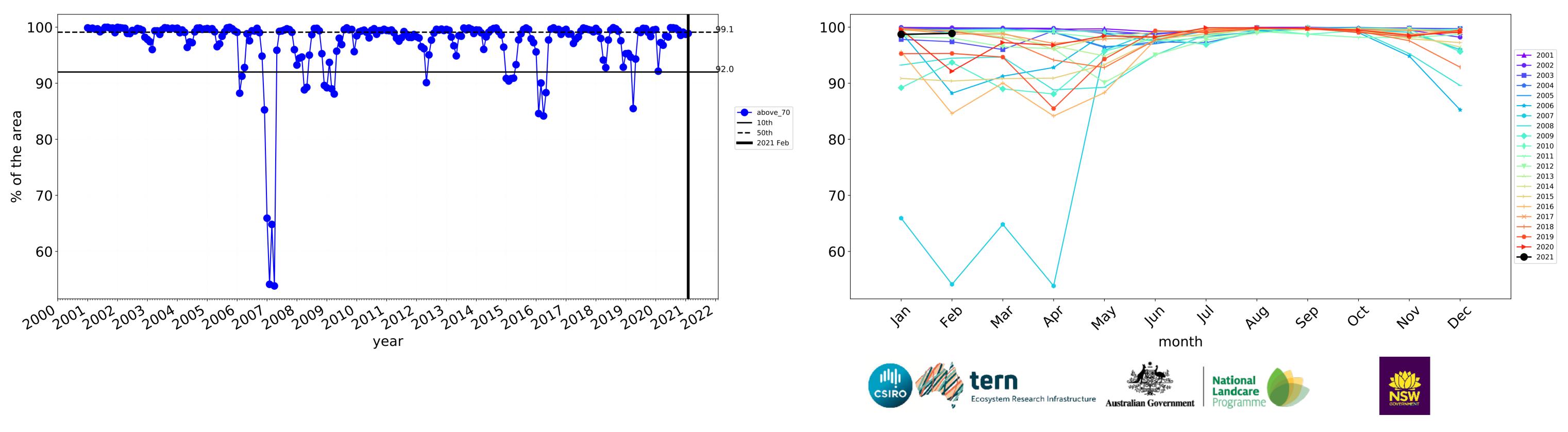
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



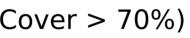


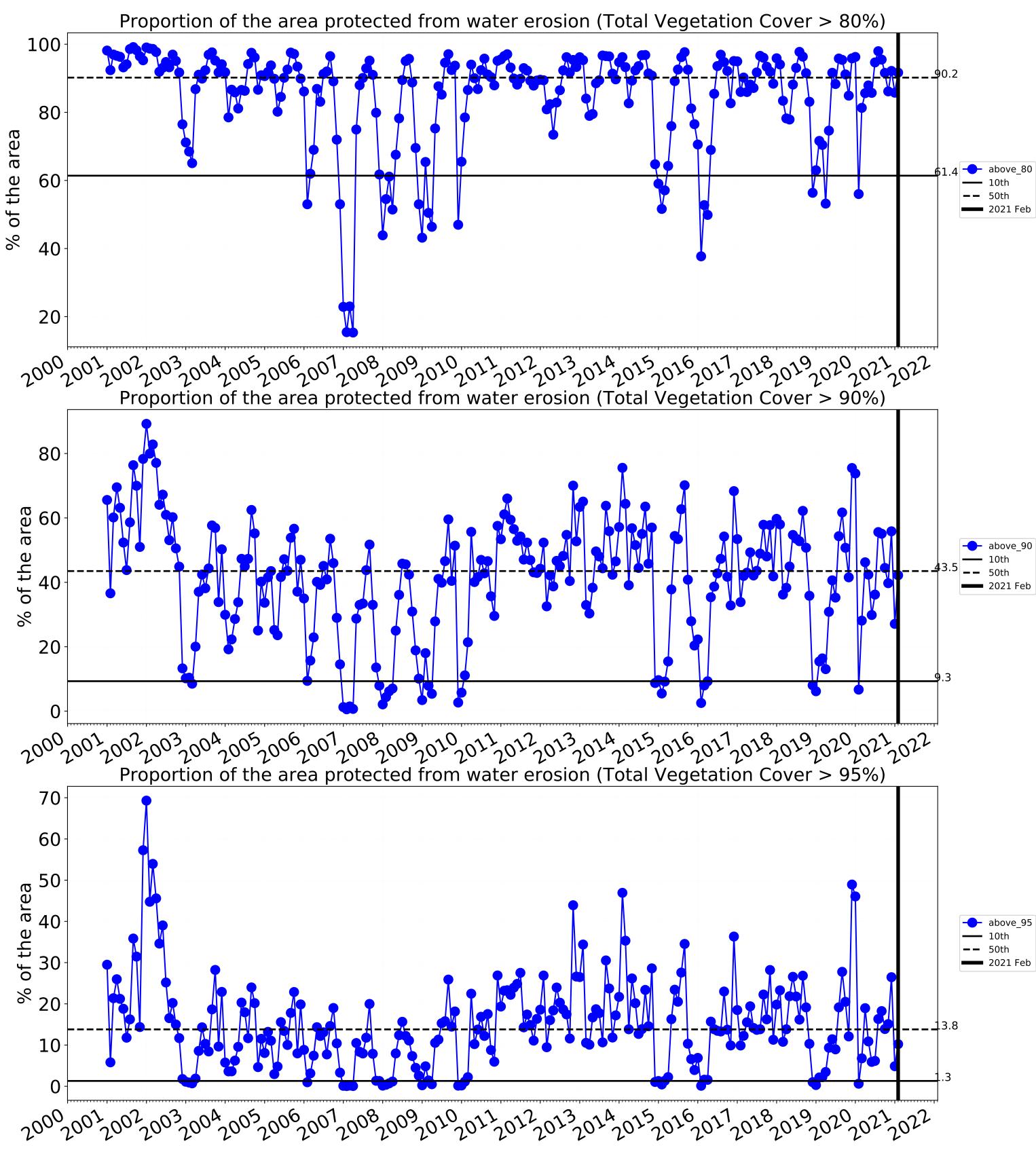


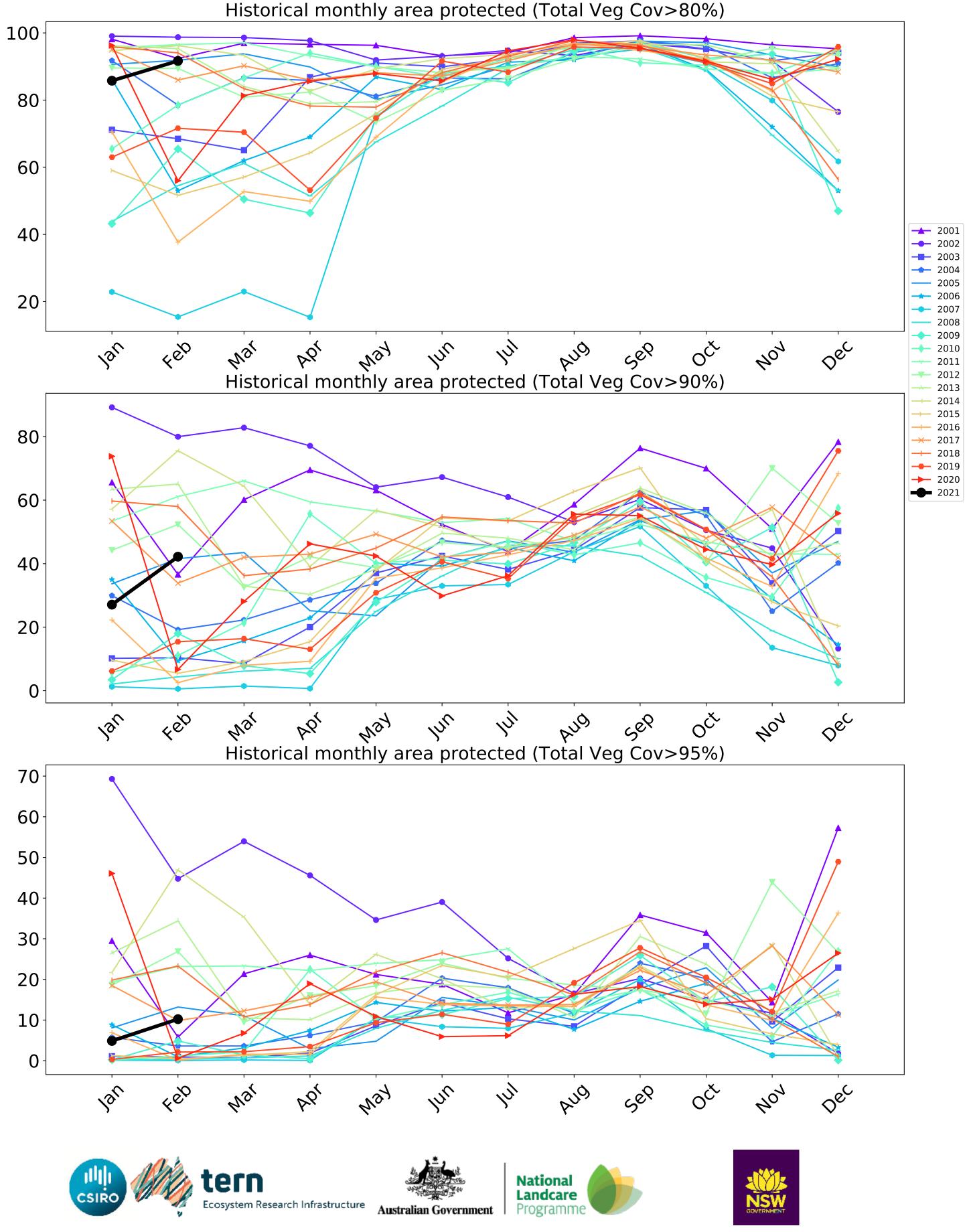
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

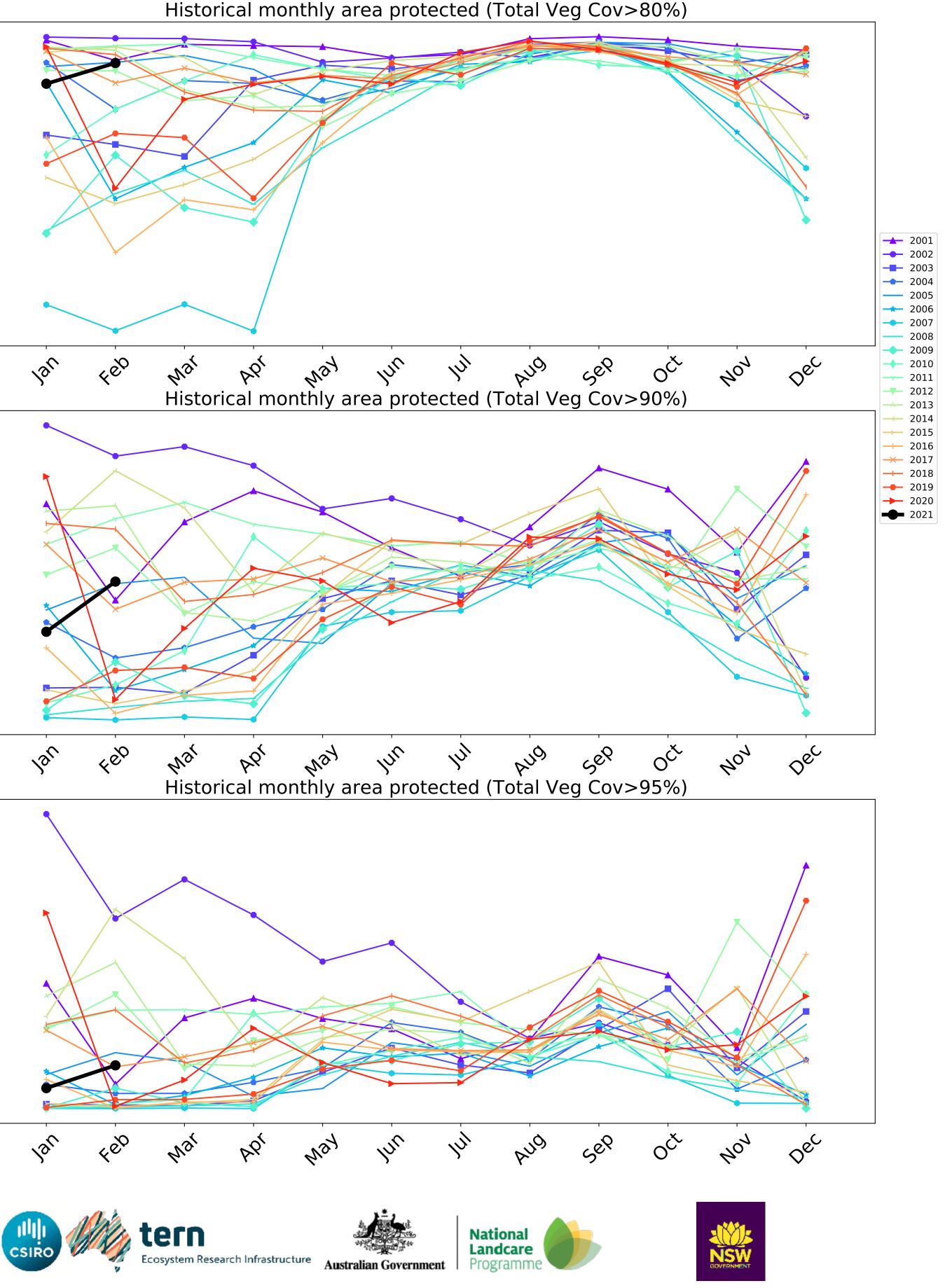


Wind erosion historical monthly area protected (Total Veg Cov >50%)

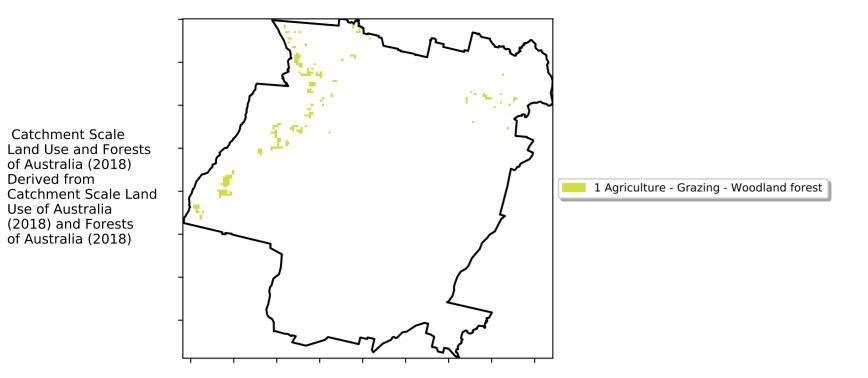








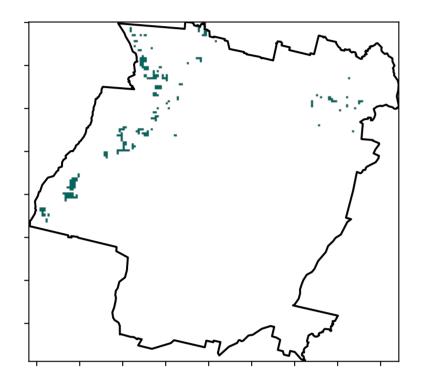
### **Grazing Woodland forest**

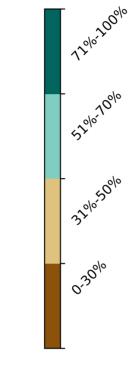


Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

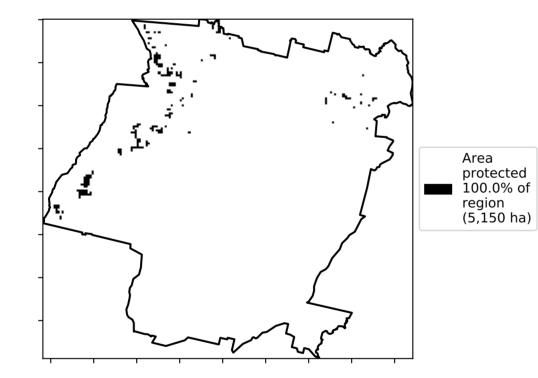
**Total Vegetation Cover [%]** 

Land use and forest cover

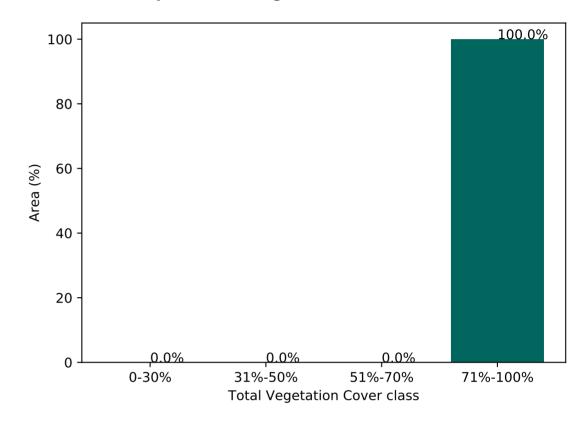




% Area protected from water erosion (>70%)



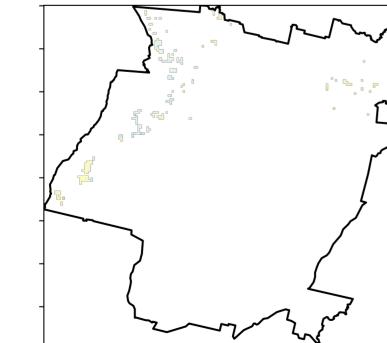
Proportion of vegetation cover class in area

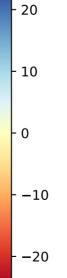


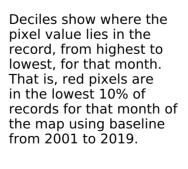
% Area protected from wind erosion (>50%)

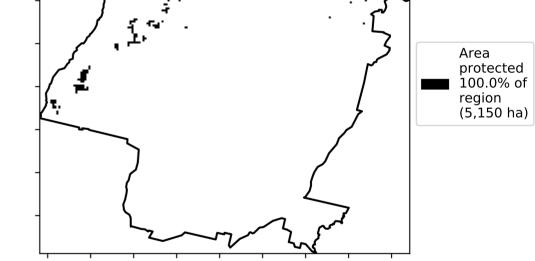


**Total Vegetation Cover Anomaly [%]** 









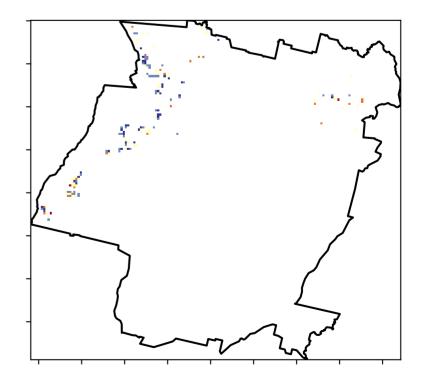
\$

୶ୖୄ

A.1

2:3

Total Vegetation Cover Decile [%]

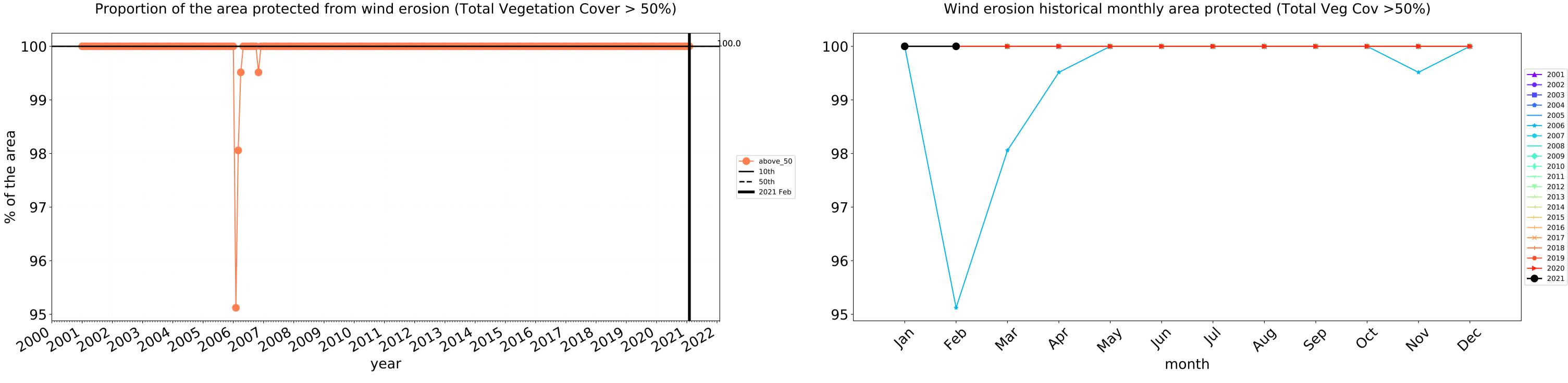




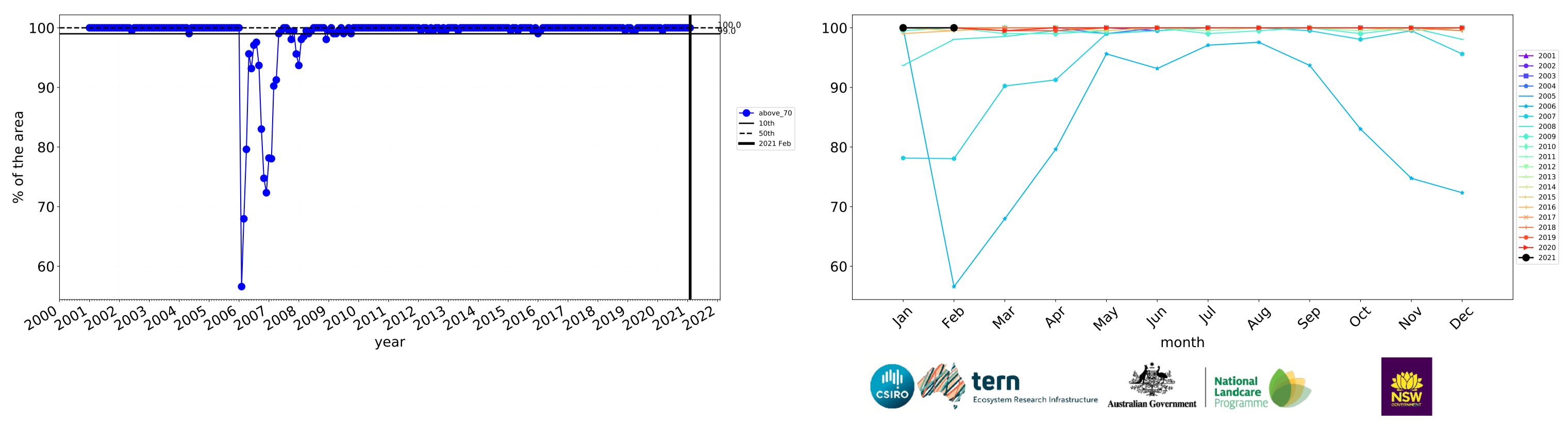
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

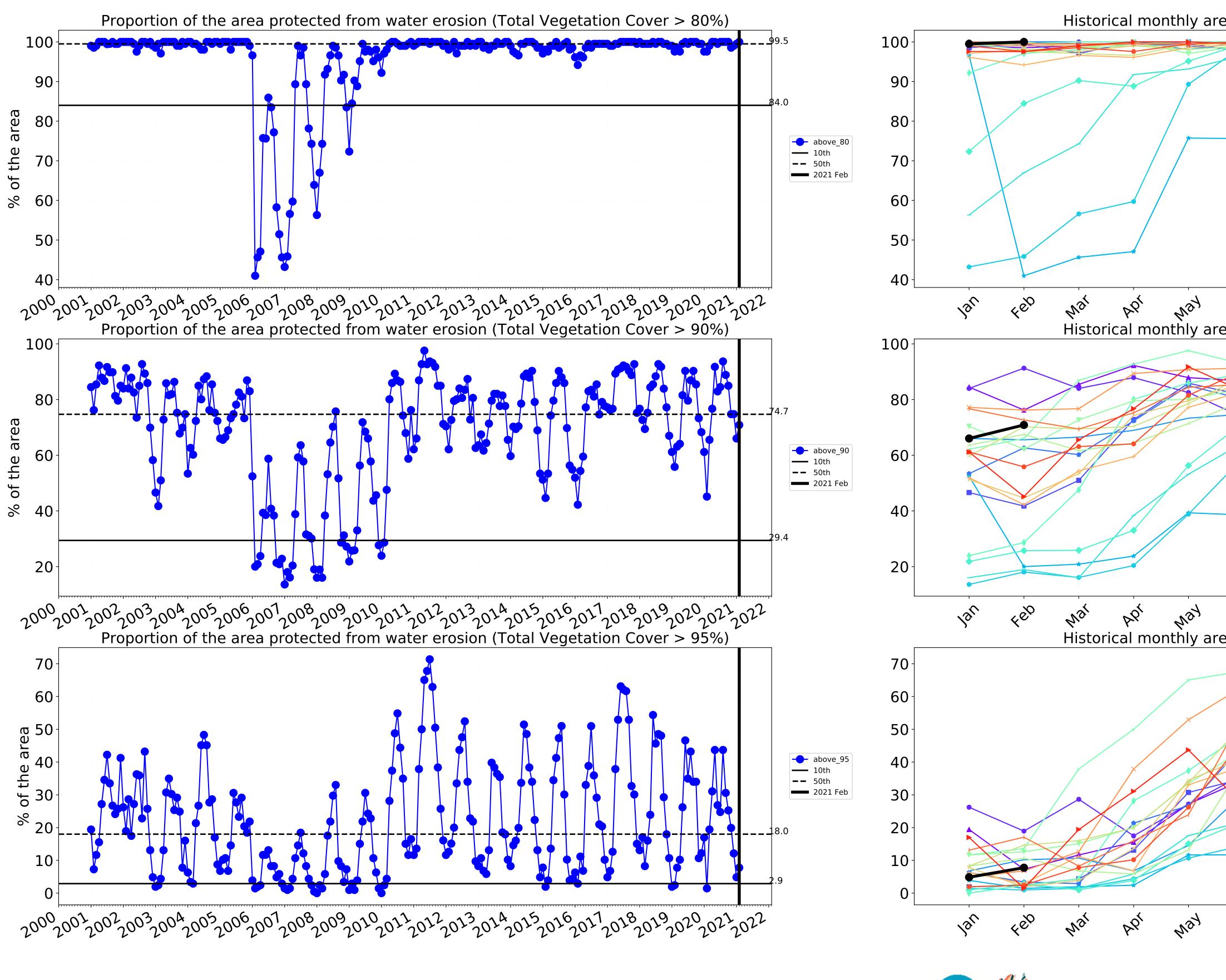


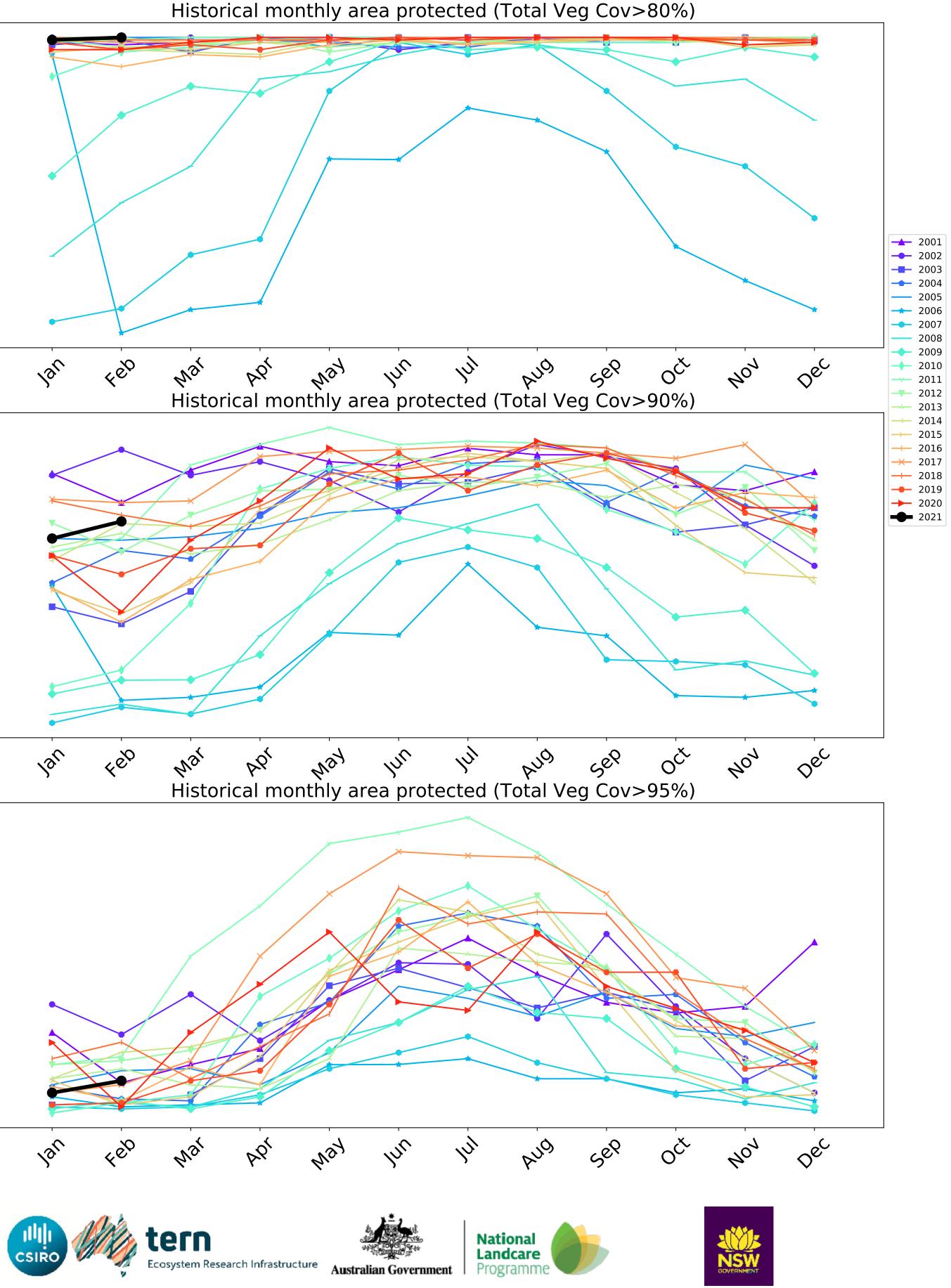
# **Grazing Woodland forest timeseries**



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

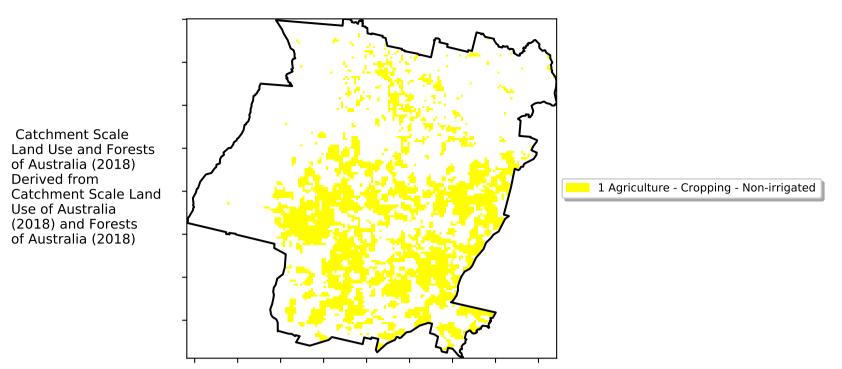




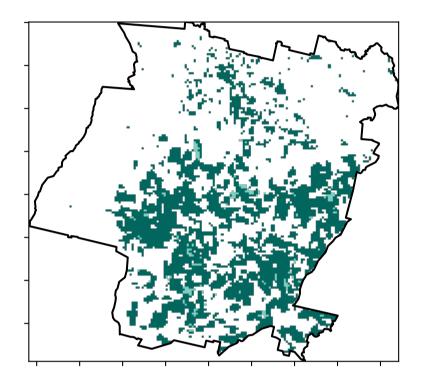


### Cropping

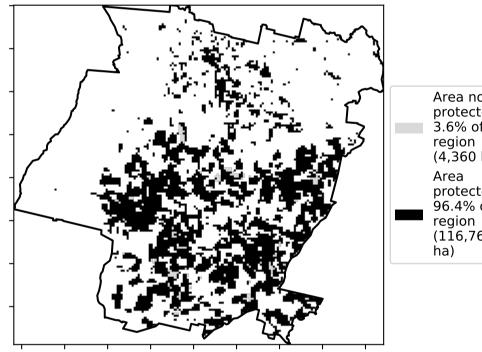
Land use and forest cover



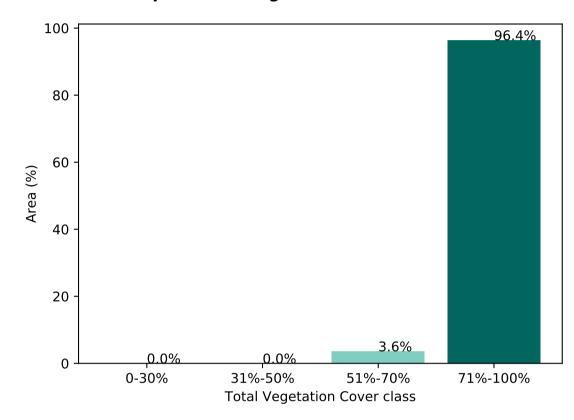
**Total Vegetation Cover [%]** 



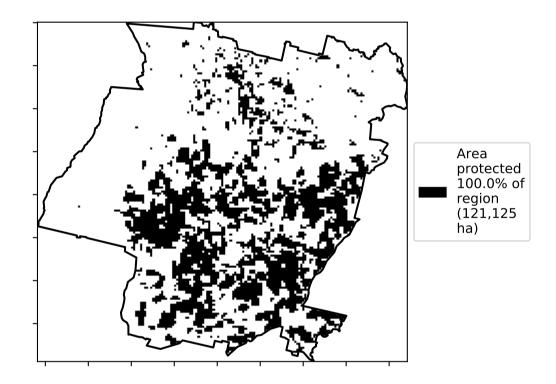
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



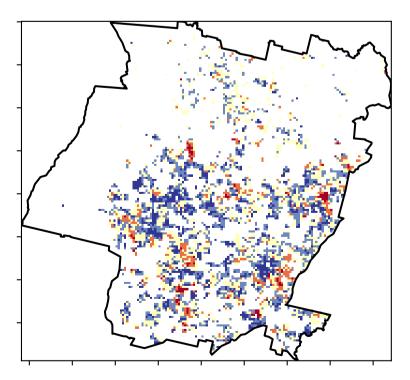
~

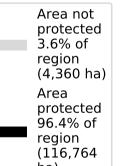
<sub>ଚ</sub>ି

A-1

2?5

**Total Vegetation Cover Decile [%]** 





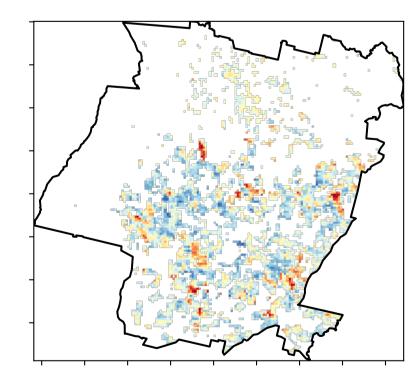
12%200%

· 52°10'70°10

32°1050°10

0.30%

**Total Vegetation Cover Anomaly [%]** 



- 10 0 -10

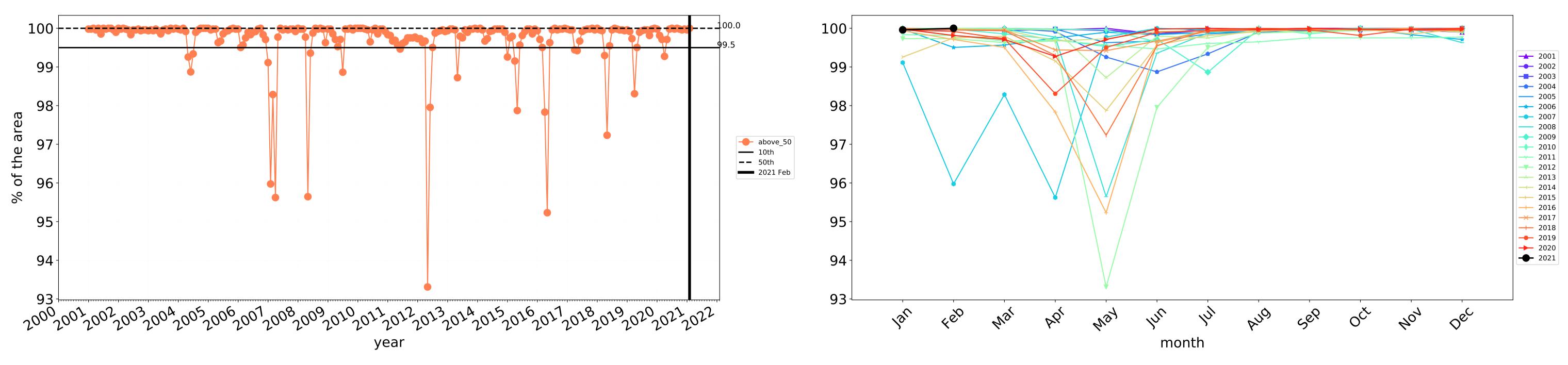
-20

- 20

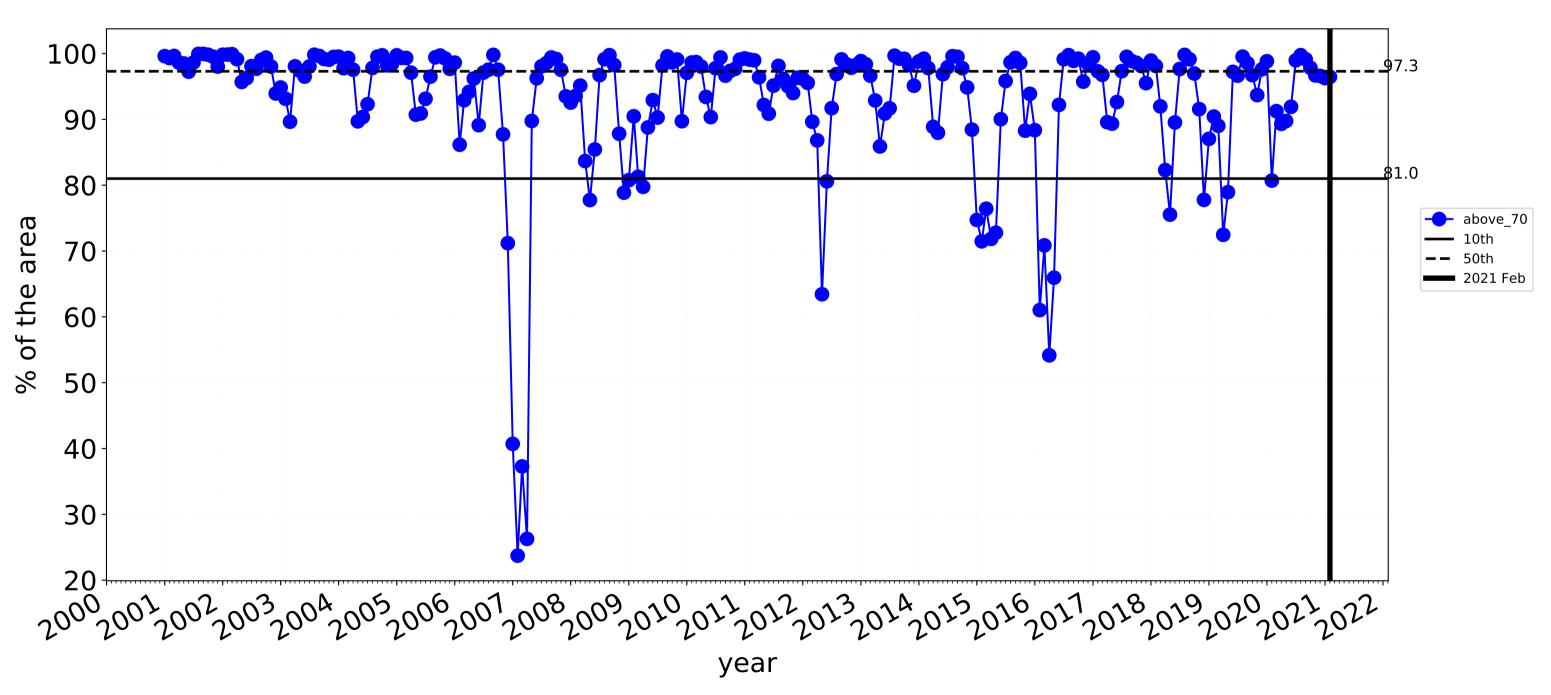
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline the map using baseline from 2001 to 2019.



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.



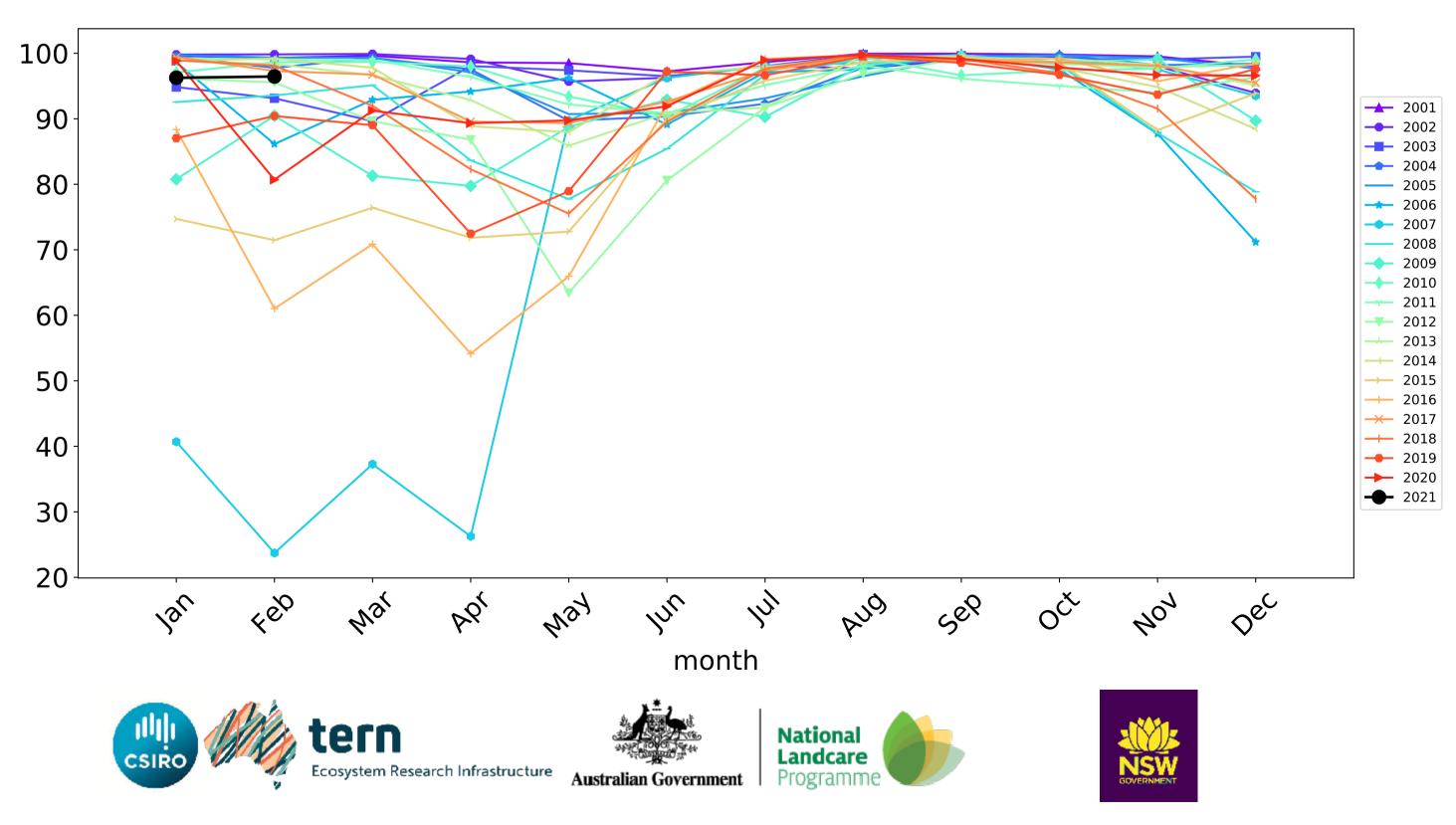
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

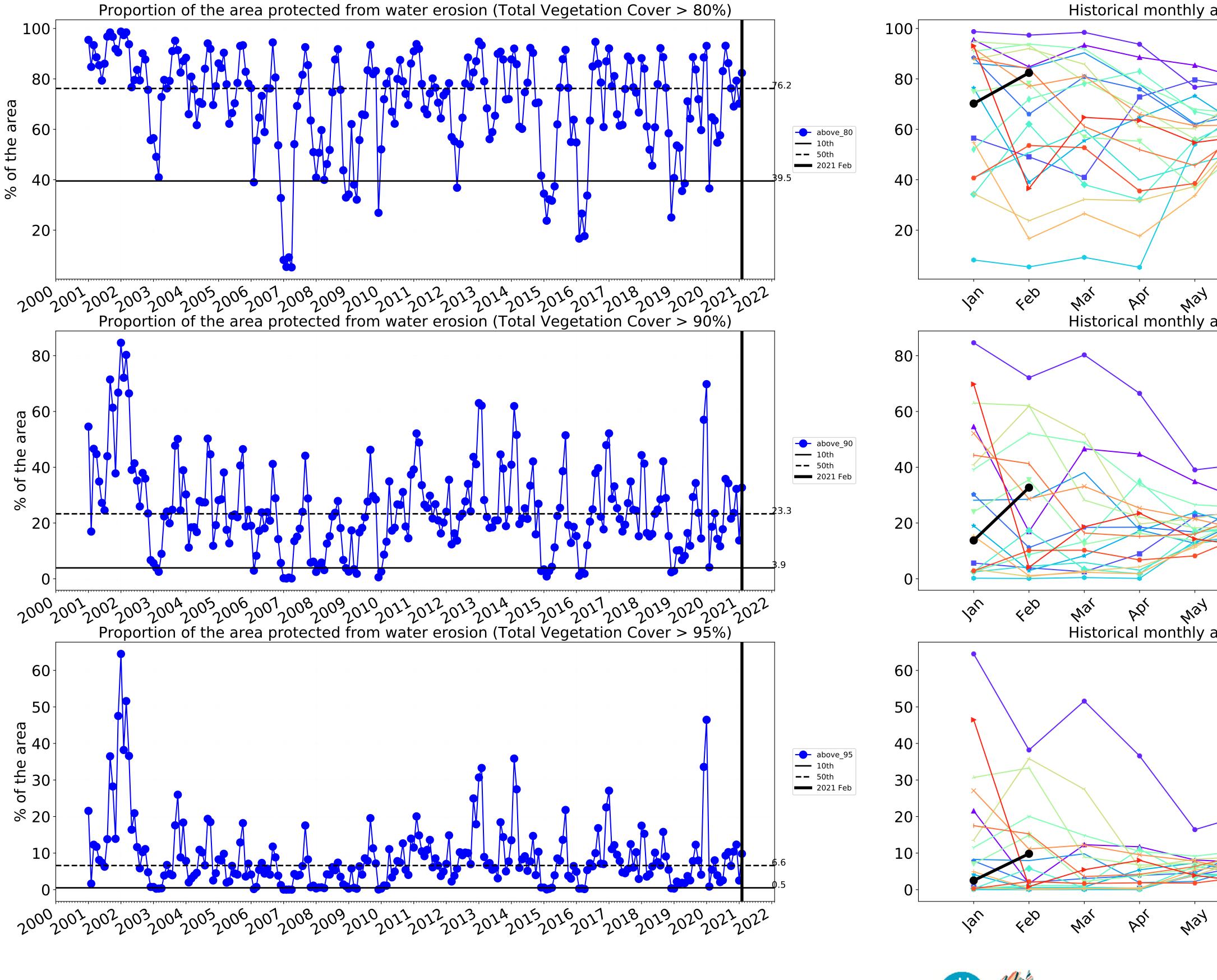


# **Cropping timeseries**



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

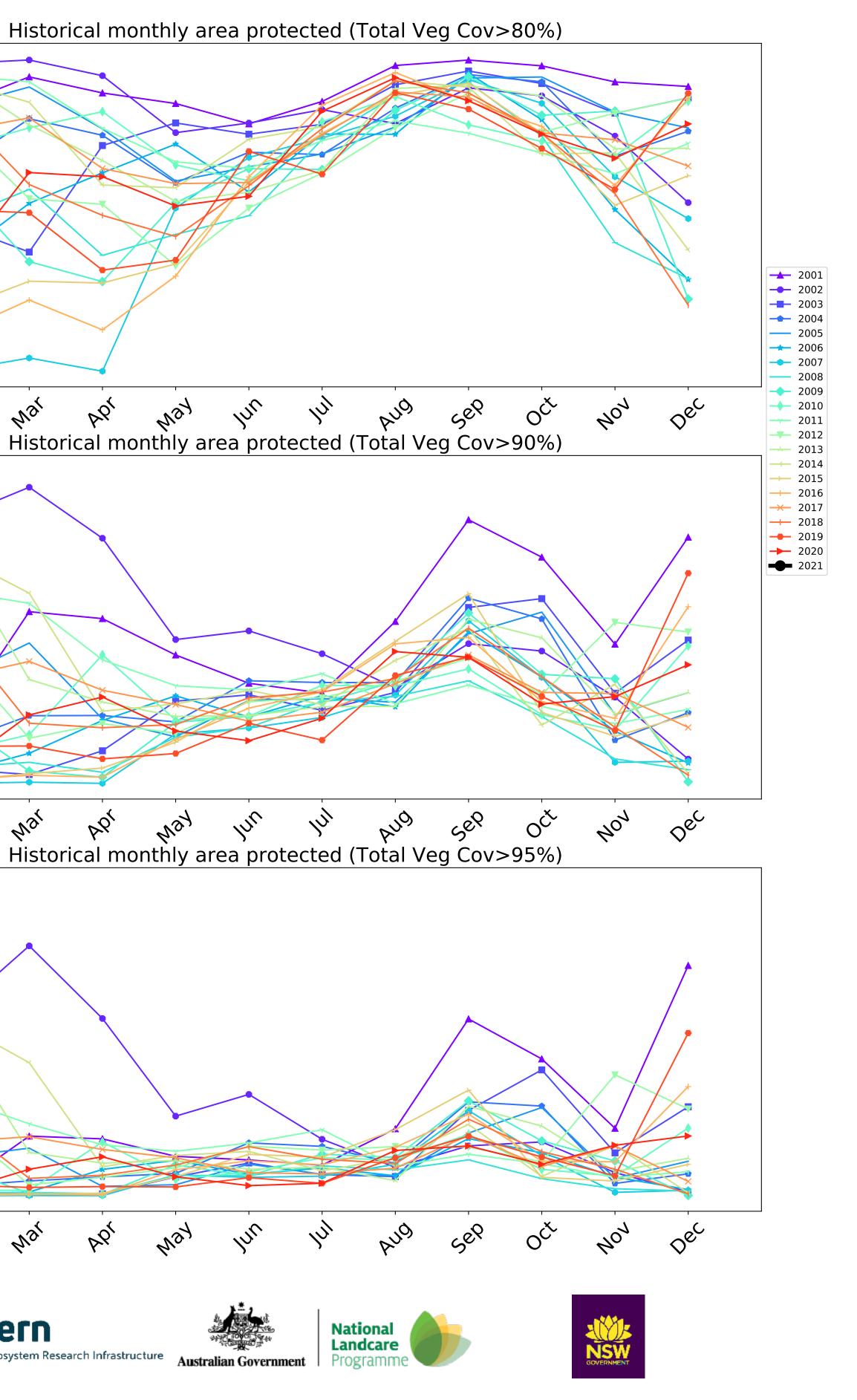






JUI

JUL

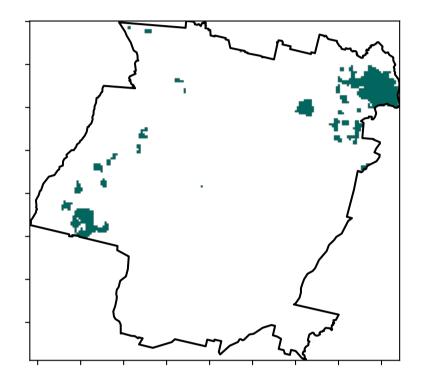


### **Production native forests and plantation forests**

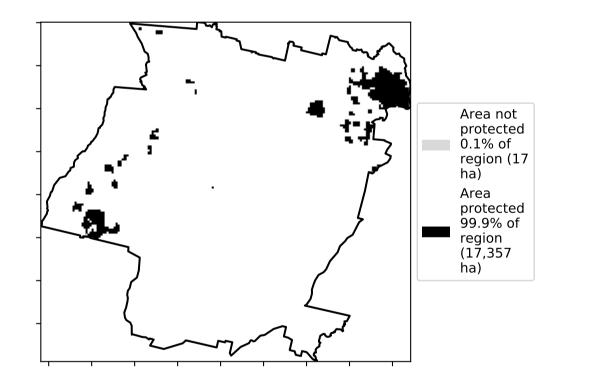
1 Production native forests and plantation forests

**Total Vegetation Cover [%]** 

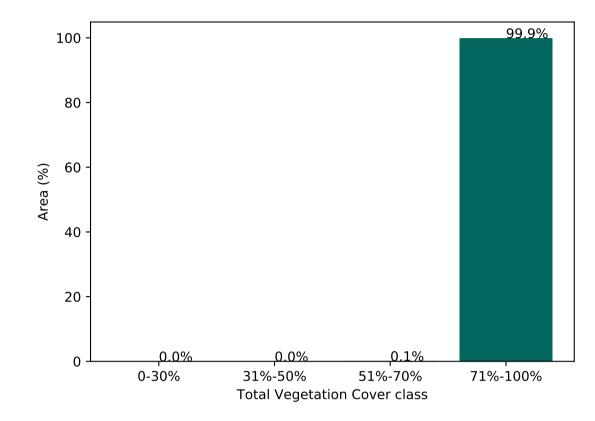
Land use and forest cover



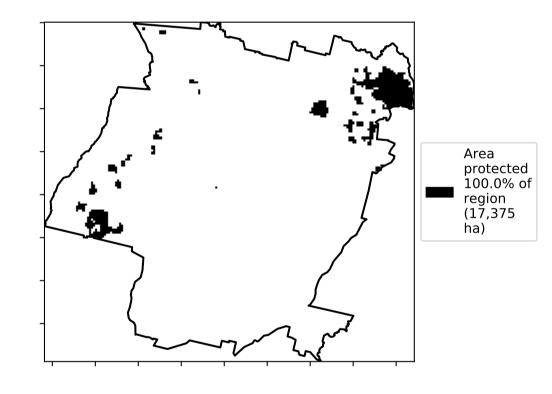
% Area protected from water erosion (>70%)



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)

pixel is from

is, red pixels are about 20%

the mean. That

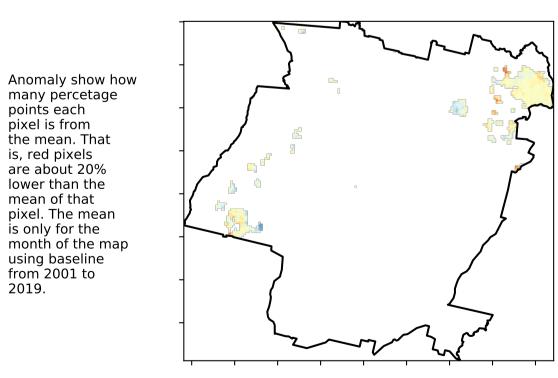
lower than the

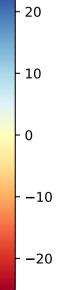
pixel. The mean

using baseline from 2001 to 2019.

mean of that

**Total Vegetation Cover Anomaly [%]** 





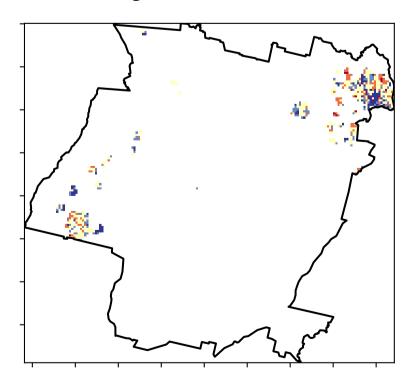
120000

· 52°10'70°10

3201050010

0.30%

**Total Vegetation Cover Decile [%]** 





Deciles show where the pixel value lies in the

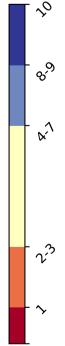
record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of

records for that month of

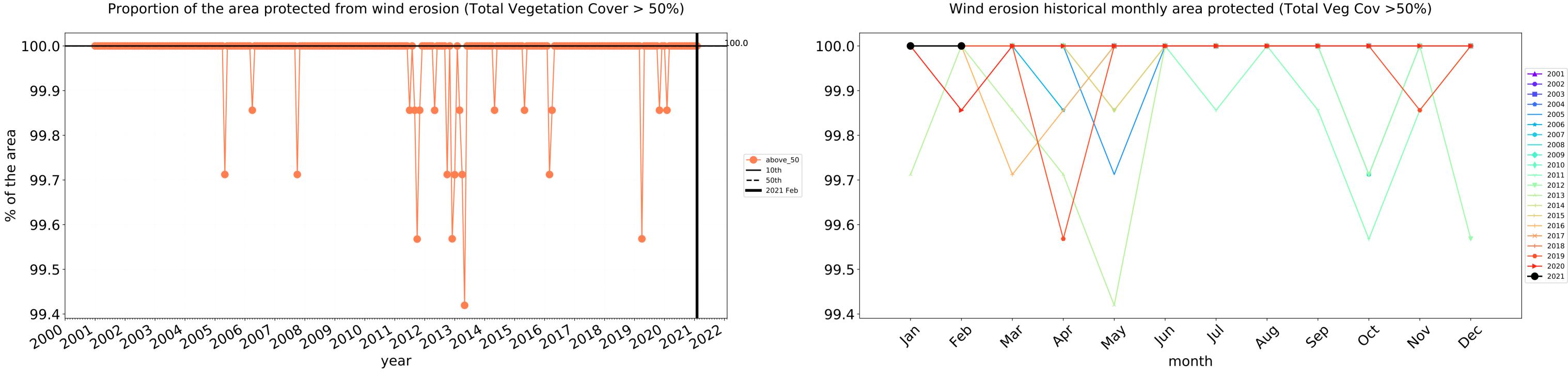
the map using baseline from 2001 to 2019.

32

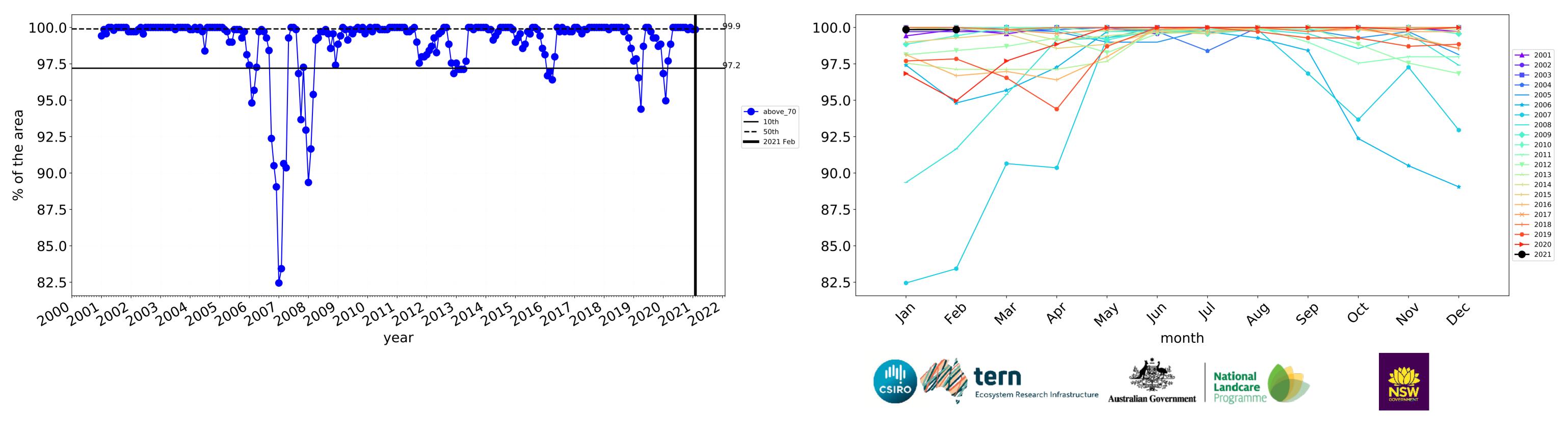




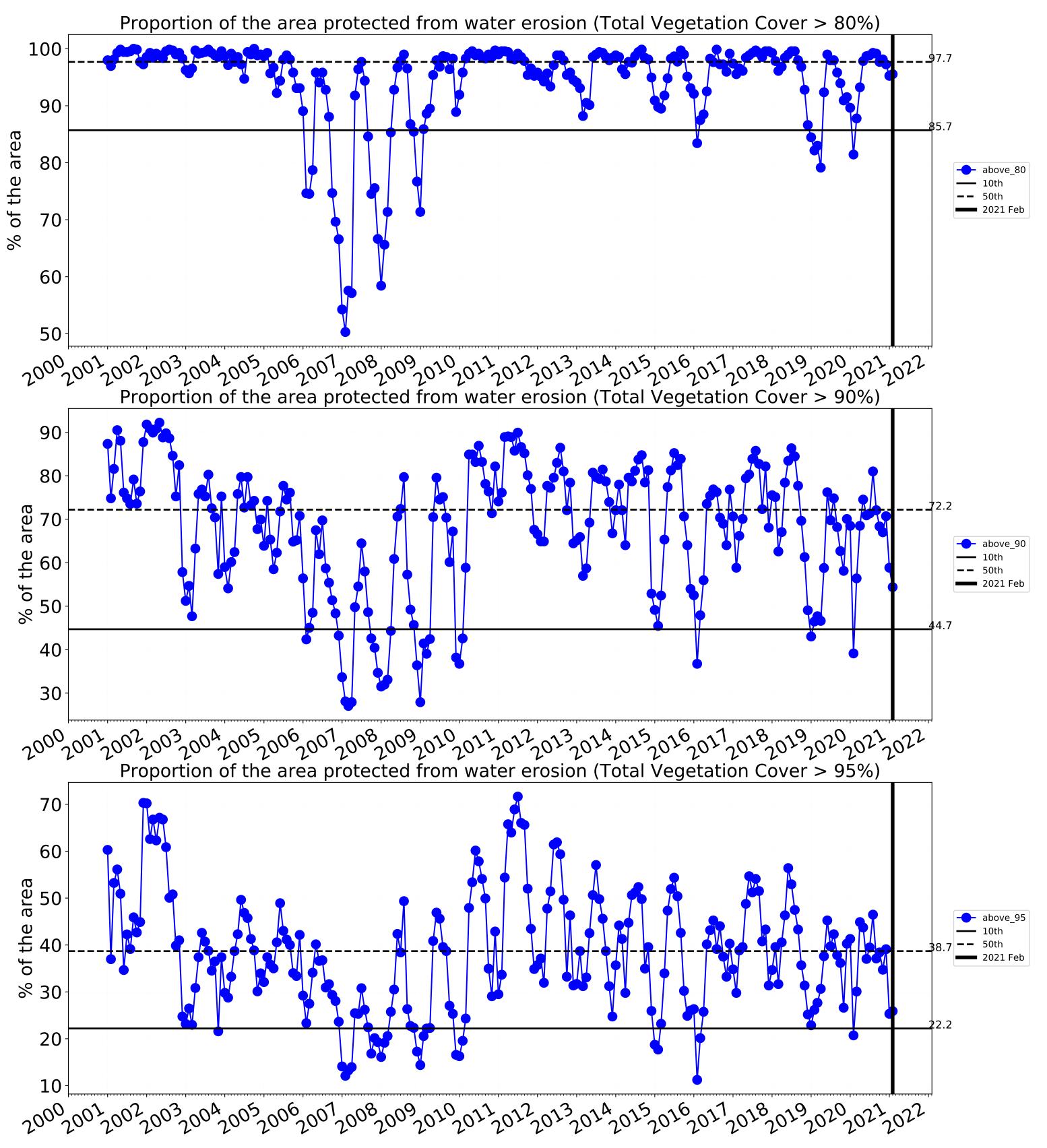
## Production native forests and plantation forests timeseries

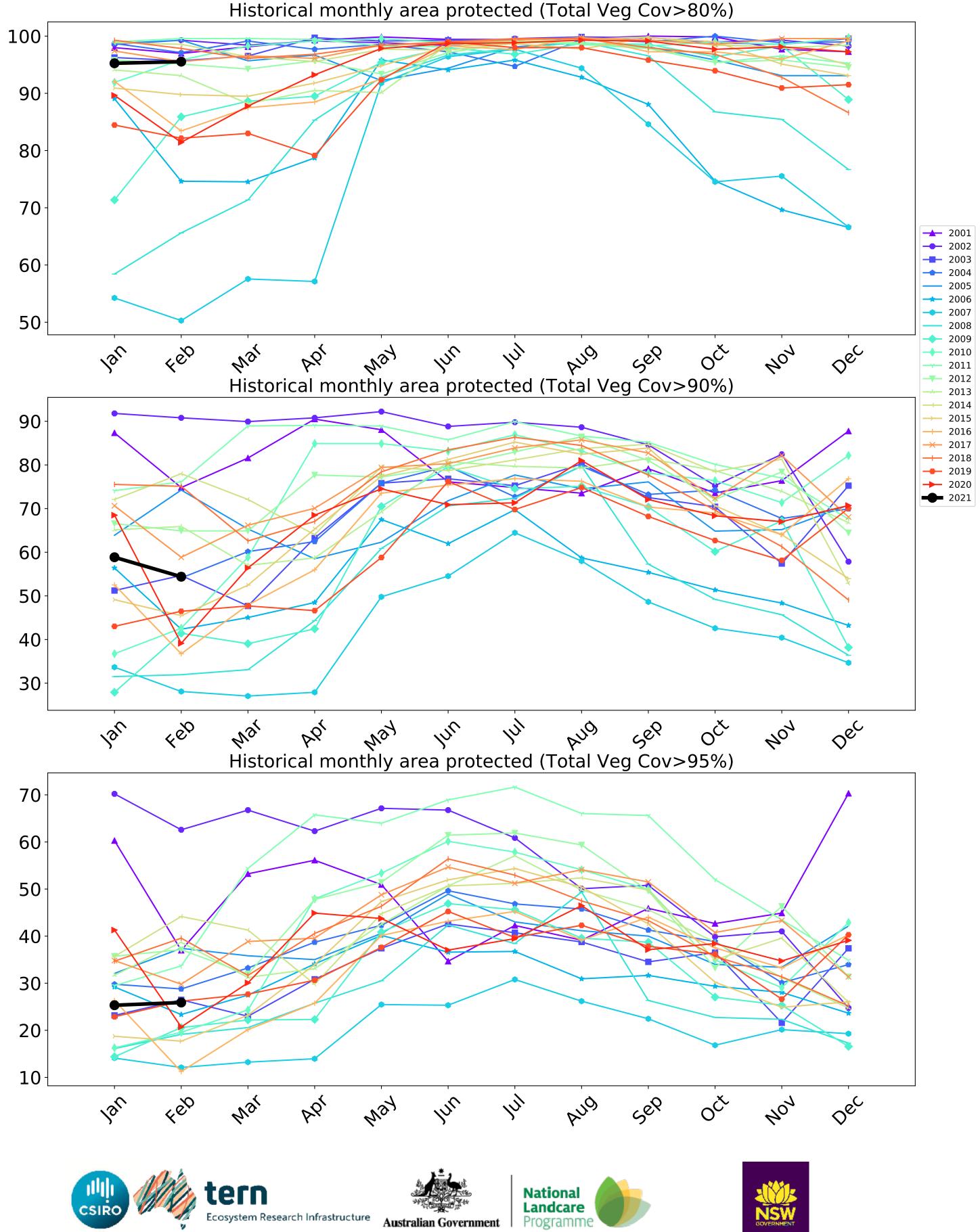


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



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







## Ararat\_(RC) (419,200 ha and no data 1,903 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	419,200	100.0% 419,075	99.9% 418,975	98.2% 411,550	89.9% 376,825	44.0% 184,500	12.0% 50,250
Conservation and natural environments	47,400	99.7% 47,275	99.6% 47,225	99.3% 47,050	98.5% 46,700	78.5% 37,200	23.4% 11,075
Conservation and natural environments non forest	4,200	97.0% 4,075	95.8% 4,025	91.7% 3,850	83.3% 3,500	44.6% 1,875	16.7% 700
Conservation and natural environments Woodland forest	28,925	100.0% 28,925	100.0% 28,925	100.0% 28,925	100.0% 28,925	82.6% 23,900	15.9% 4,600
Conservation and natural environments Forest (non woodland)	14,275	100.0% 14,275	100.0% 14,275	100.0% 14,275	100.0% 14,275	80.0% 11,425	40.5% 5,775
Agriculture	345,925	100.0% 345,925	100.0% 345,875	98.1% 339,200	88.6% 306,475	39.4% 136,250	10.0% 34,625
Grazing	223,475	100.0% 223,475	100.0% 223,425	98.9% 221,050	91.9% 205,375	43.0% 96,175	10.1% 22,675
Grazing non forest	217,150	100.0% 217,150	100.0% 217,100	98.9% 214,725	91.7% 199,050	42.2% 91,625	10.2% 22,200
Grazing Woodland forest	5,150	100.0% 5,150	100.0% 5,150	100.0% 5,150	100.0% 5,150	70.9% 3,650	7.8% 400
Cropping	121,125	100.0% 121,125	100.0% 121,125	96.4% 116,825	82.4% 99,800	32.7% 39,600	9.8% 11,900
Production native forests and plantation forests	17,375	100.0% 17,375	100.0% 17,375	99.9% 17,350	95.5% 16,600	54.4% 9,450	25.9% 4,500

