Total vegetation cover soil protection Region:LGA Townsville_(C) QLD

Date: April 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 Apr 2021

25

20

Area (%) 51

10

5

0

1

2

Land use and forest cover

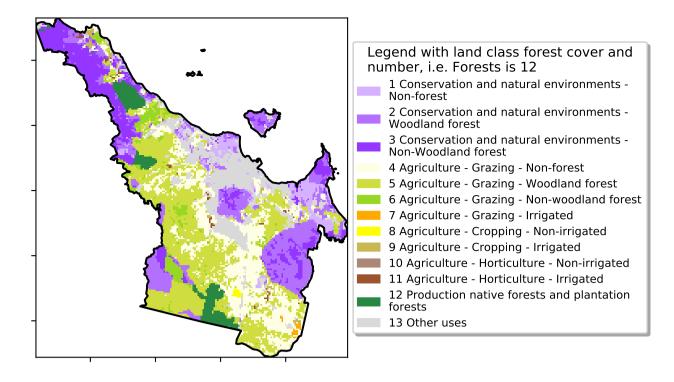
Proportion of each land class in area

26.5%

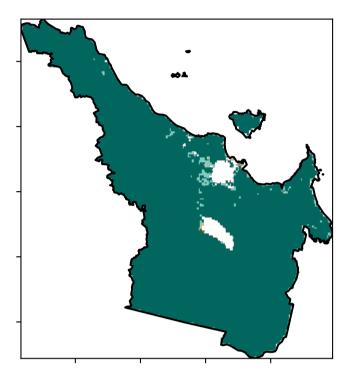
<u>18.<mark>4%</mark></u>

3

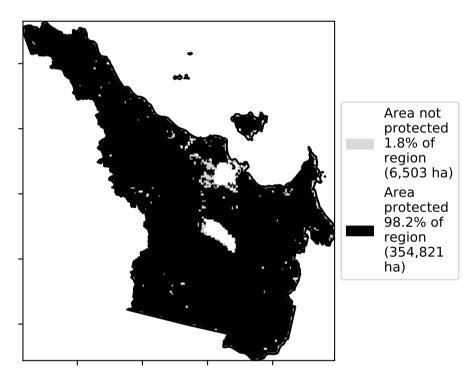
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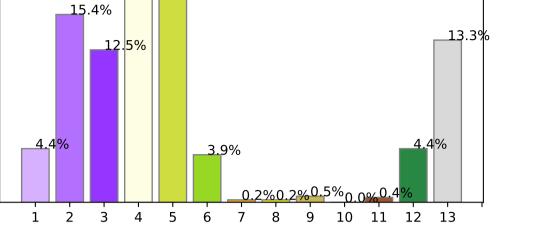


Total Vegetation Cover [%]



% Area protected from water erosion (>70%)





8

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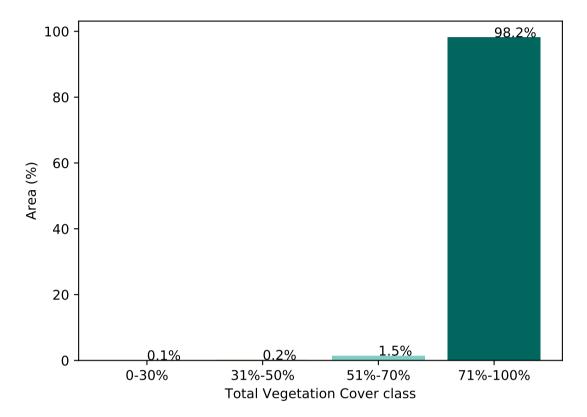
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Proportion of vegetation cover class in area

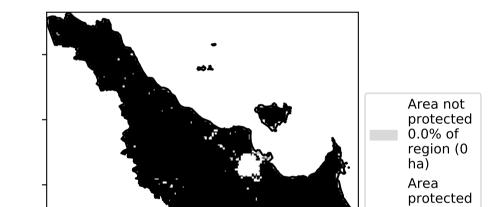
Land use class

6

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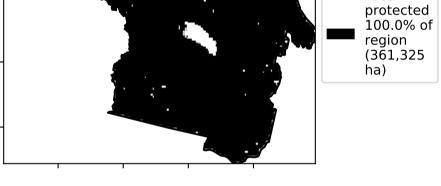


% Area protected from wind erosion (>50%)

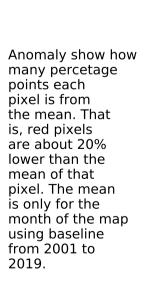


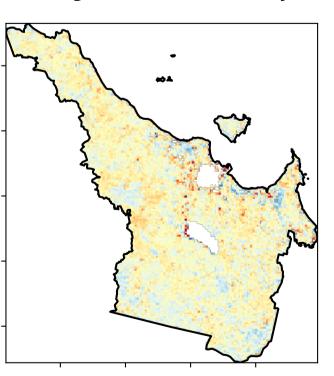
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

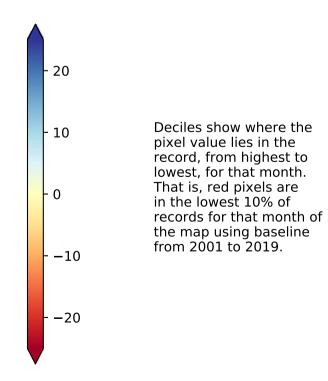
Total Vegetation Cover Anomaly [%]



Total Vegetation Cover Decile [%]





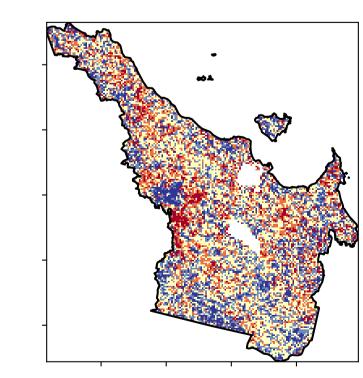


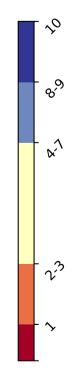
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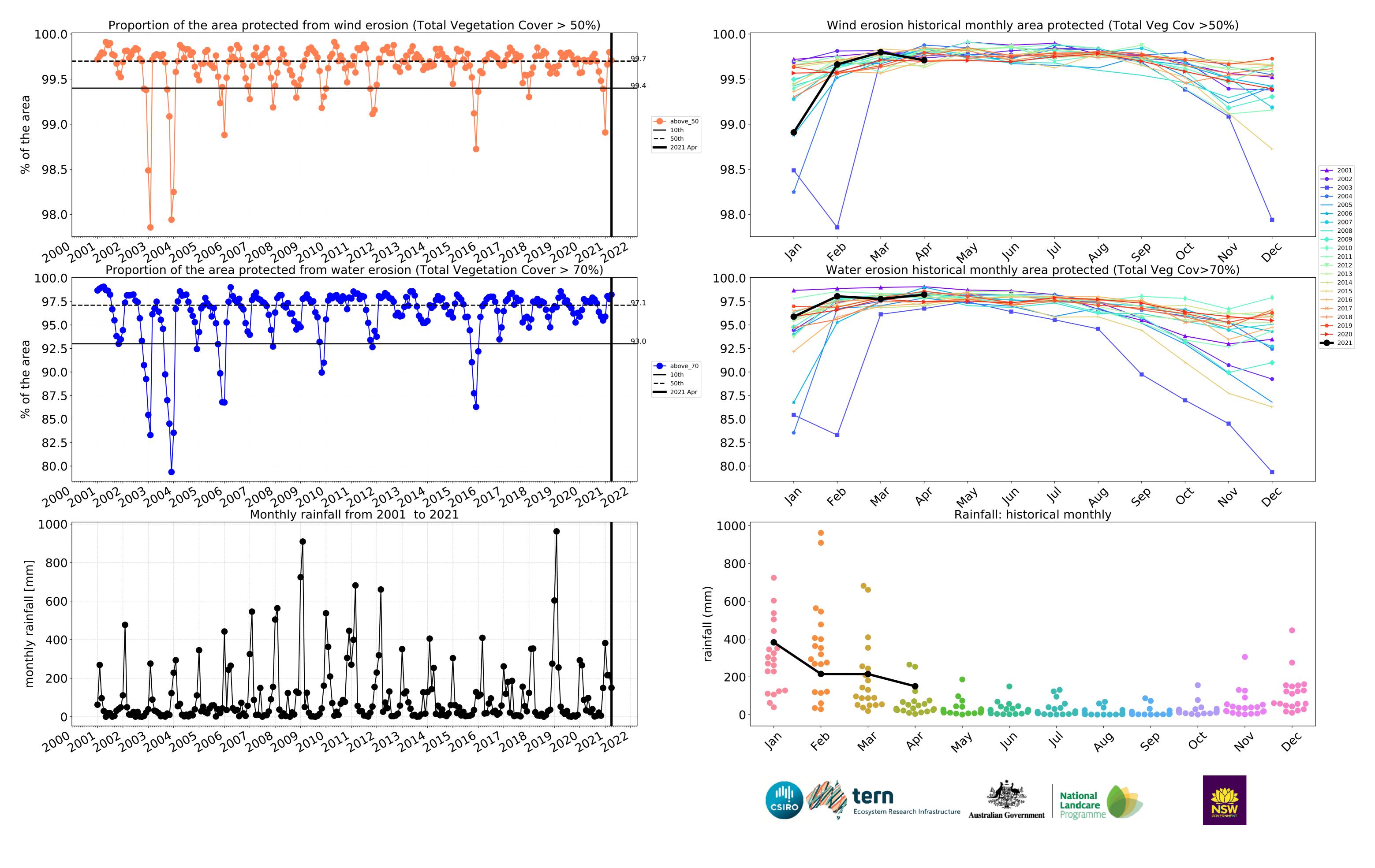
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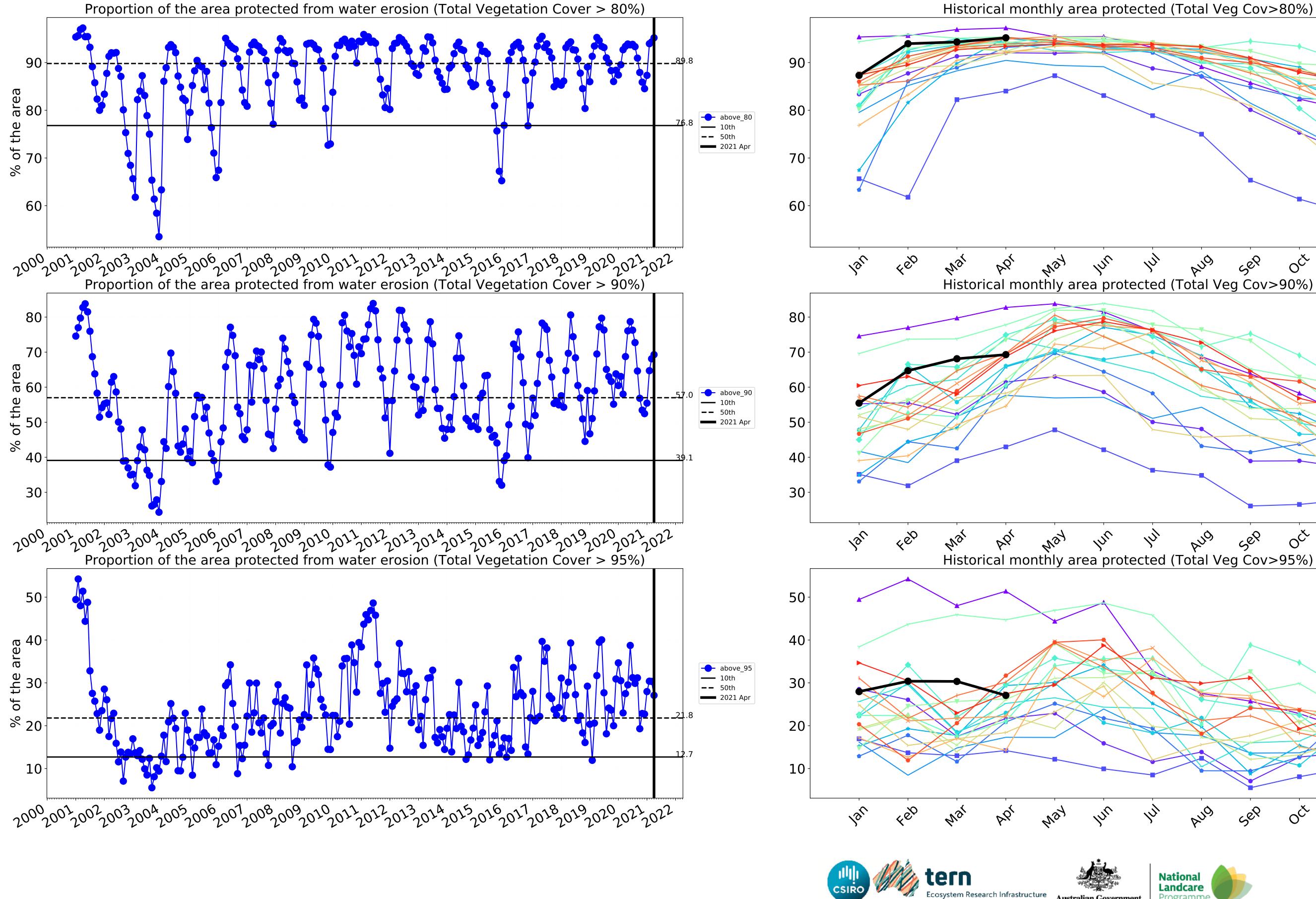
0-30%











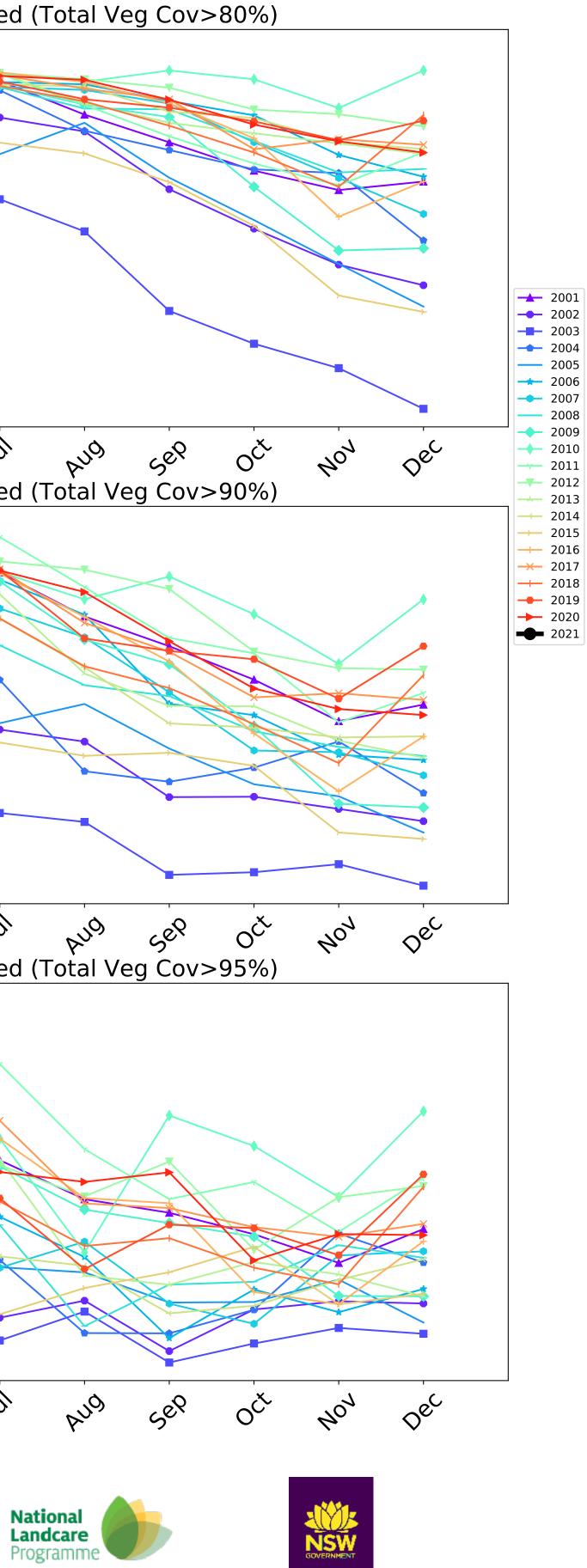
Australian Government

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Ecosystem Research Infrastructure



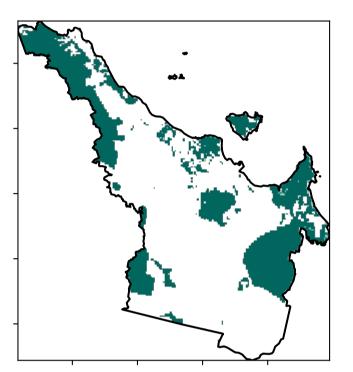
Conservation and natural environments

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

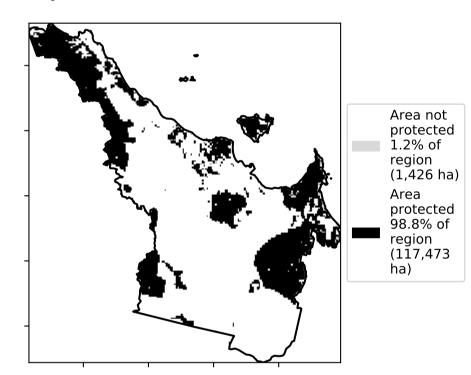
1 Conservation and natural environments - Non-forest 2 Conservation and natural environments – Woodland forest 3 Conservation and natural environments - Non-woodland forest

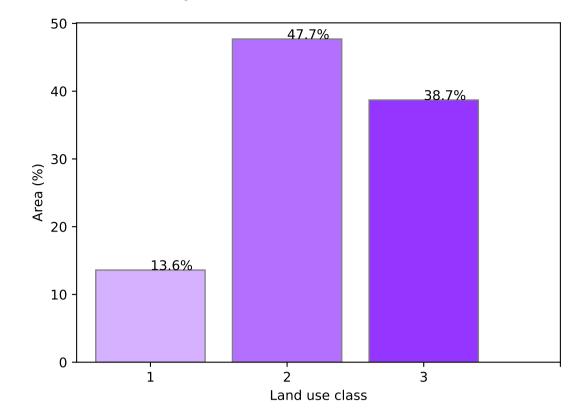
Total Vegetation Cover [%]

Land use and forest cover



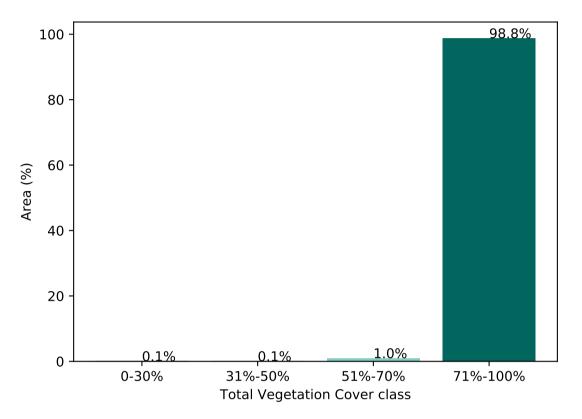
% Area protected from water erosion (>70%)



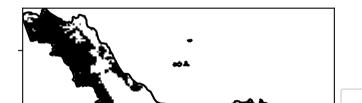


Proportion of each land class in area

Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)





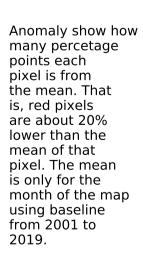
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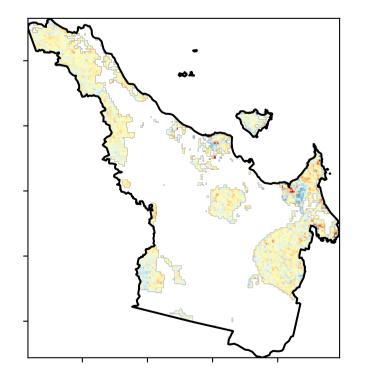
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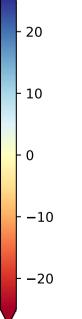
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2?

Total Vegetation Cover Anomaly [%]





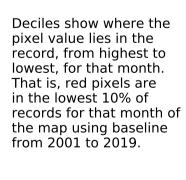


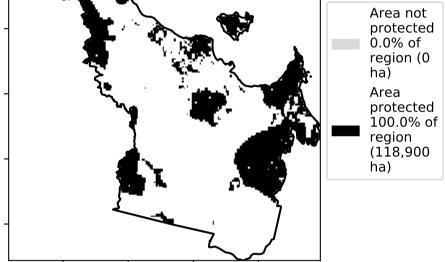
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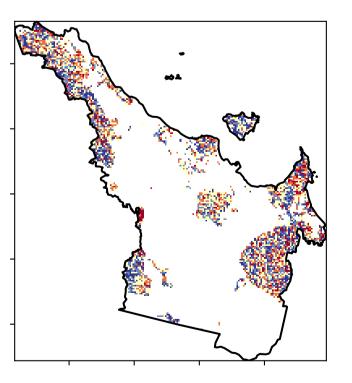
· 3201050010

0.30%

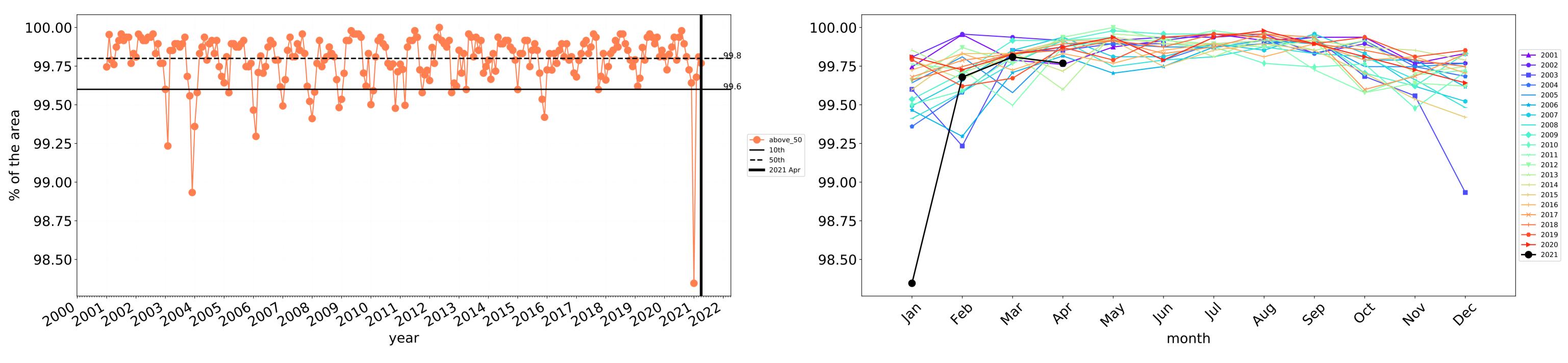


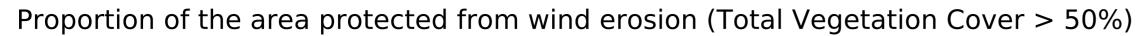


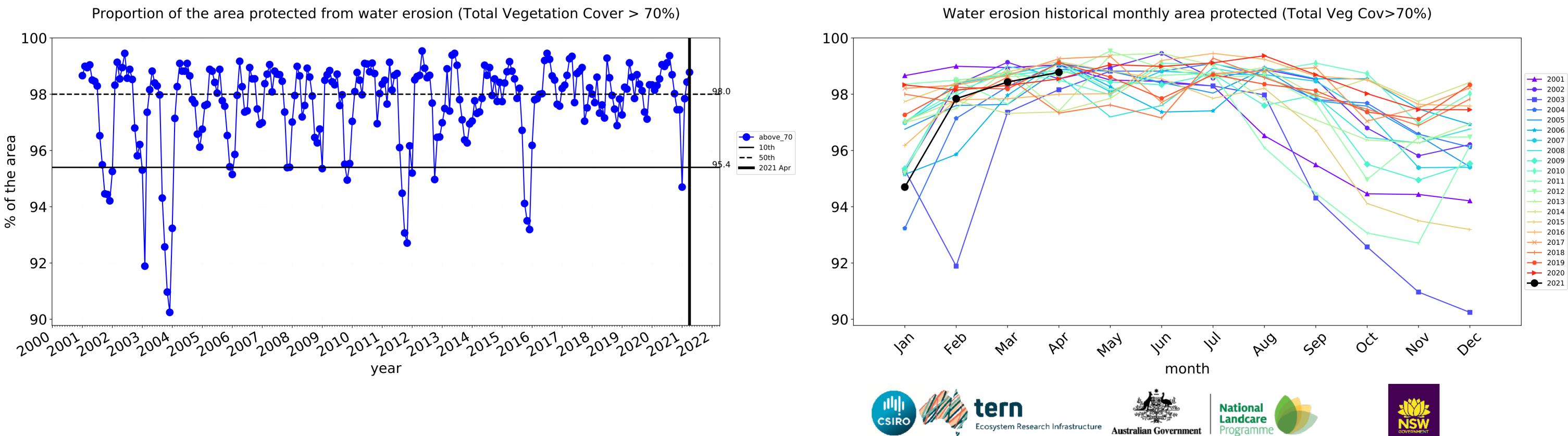
Total Vegetation Cover Decile [%]



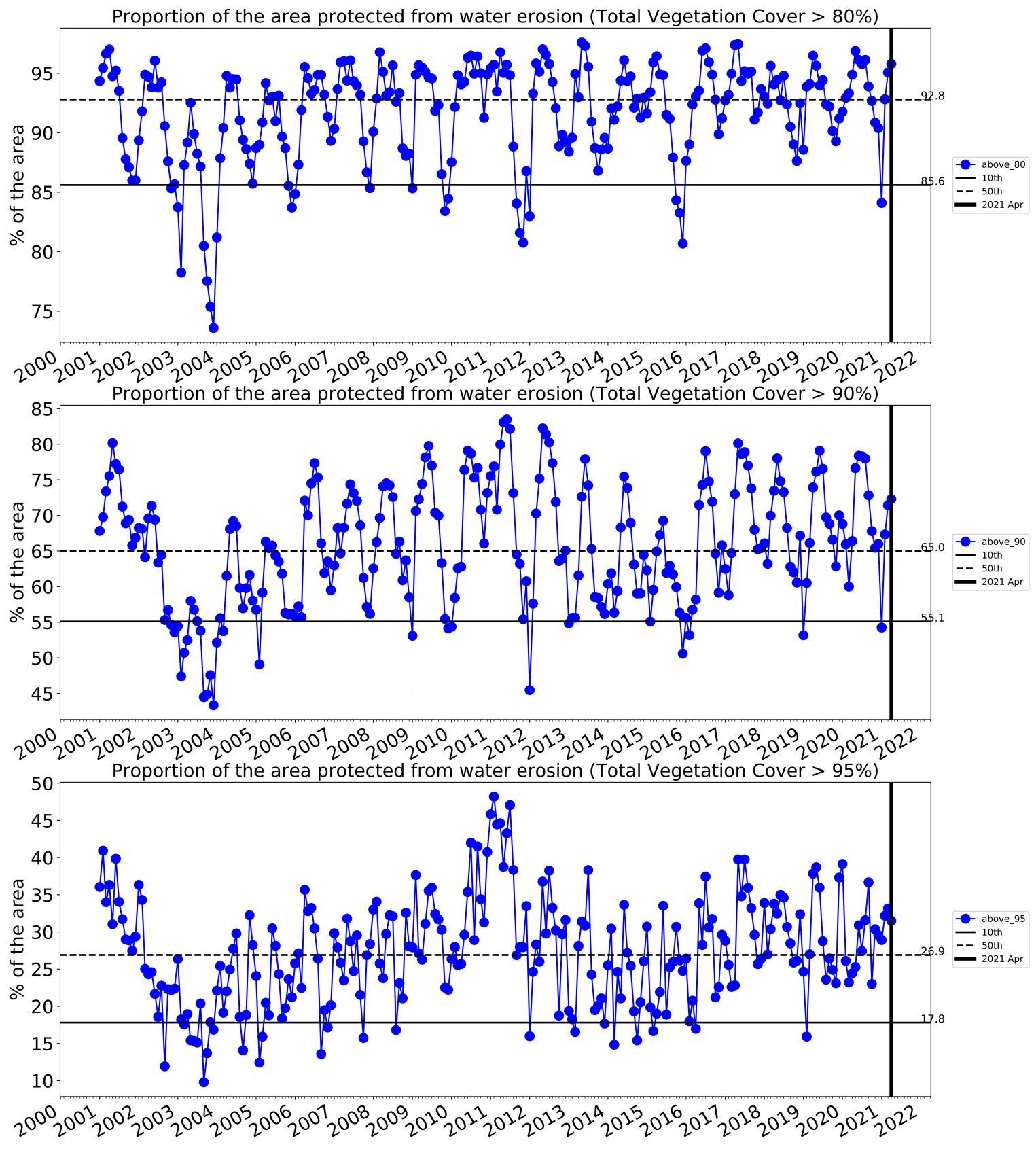


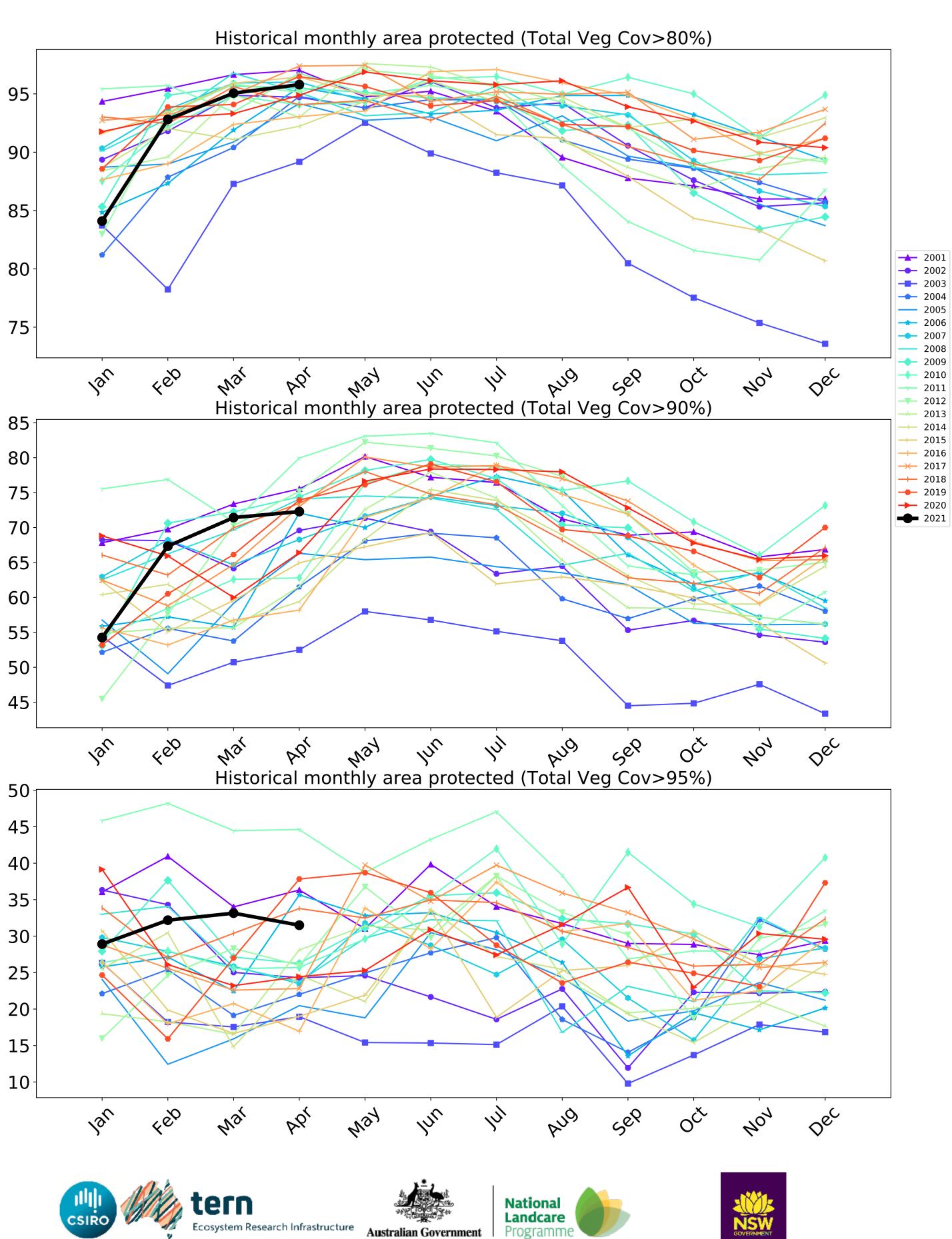






Wind erosion historical monthly area protected (Total Veg Cov >50%)

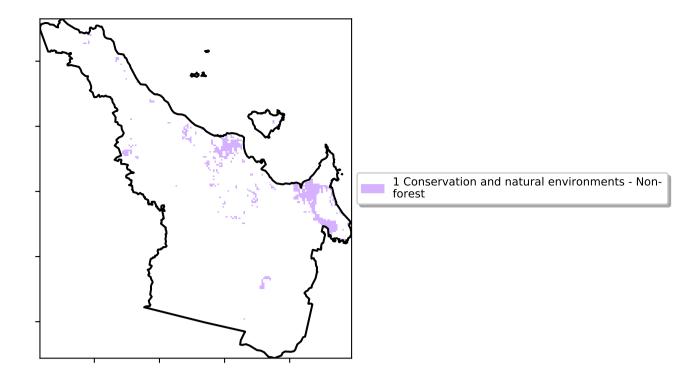




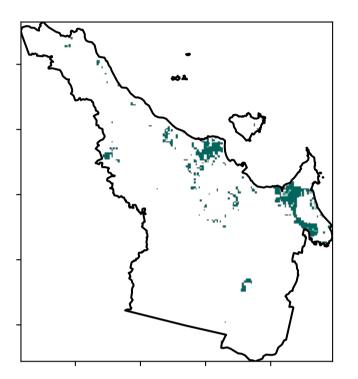


Conservation and natural environments non forest

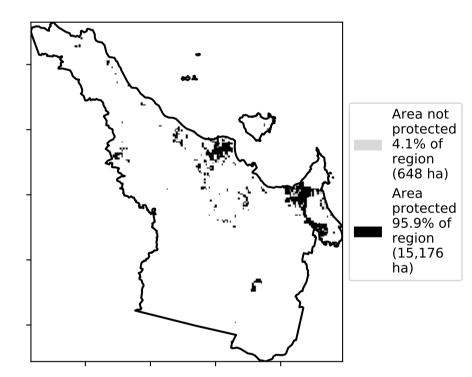
Land use and forest cover



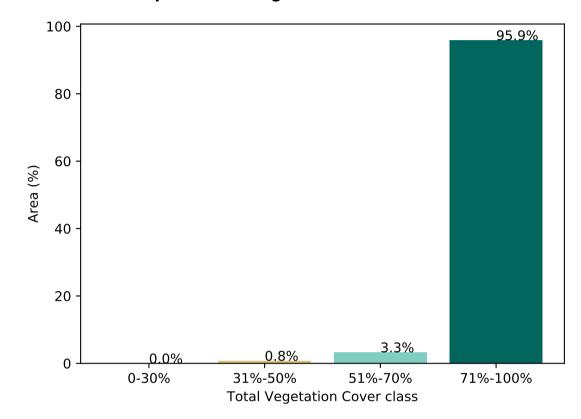
Total Vegetation Cover [%]



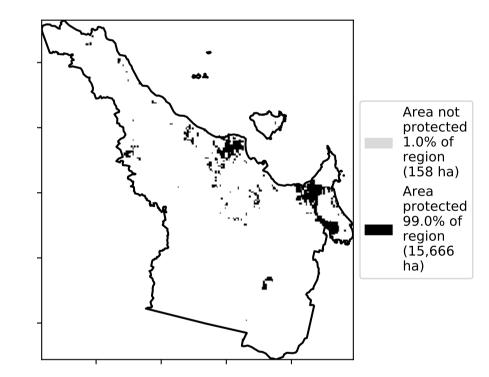


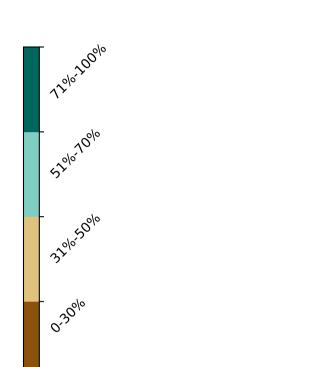


Proportion of vegetation cover class in area

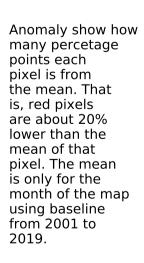


% Area protected from wind erosion (>50%)





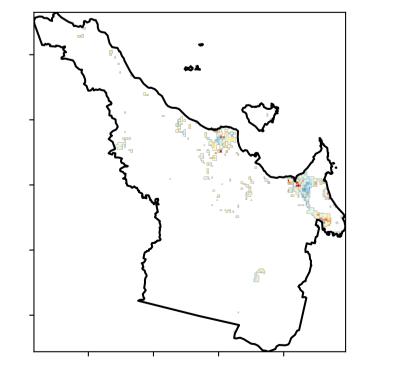
Total Vegetation Cover Anomaly [%]

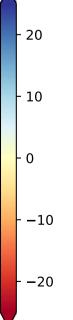


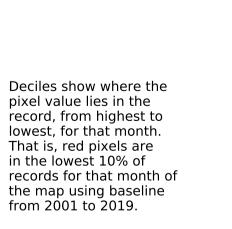
Catchment Scale Land Use and Forests of Australia (2018) Derived from

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

Catchment Scale Land







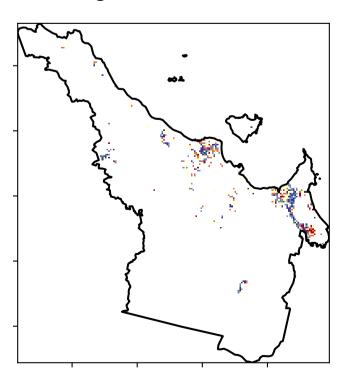
Total Vegetation Cover Decile [%]

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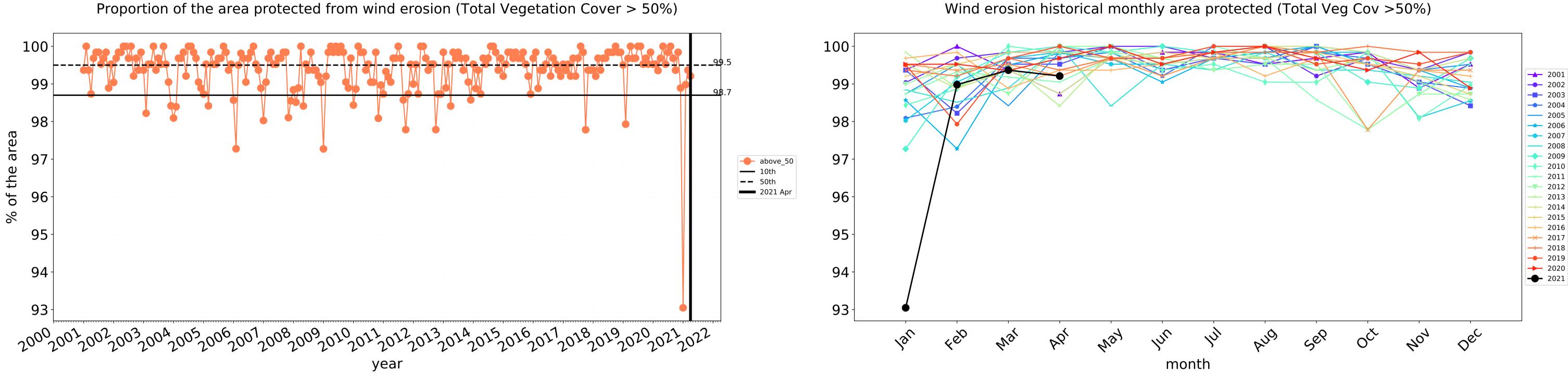
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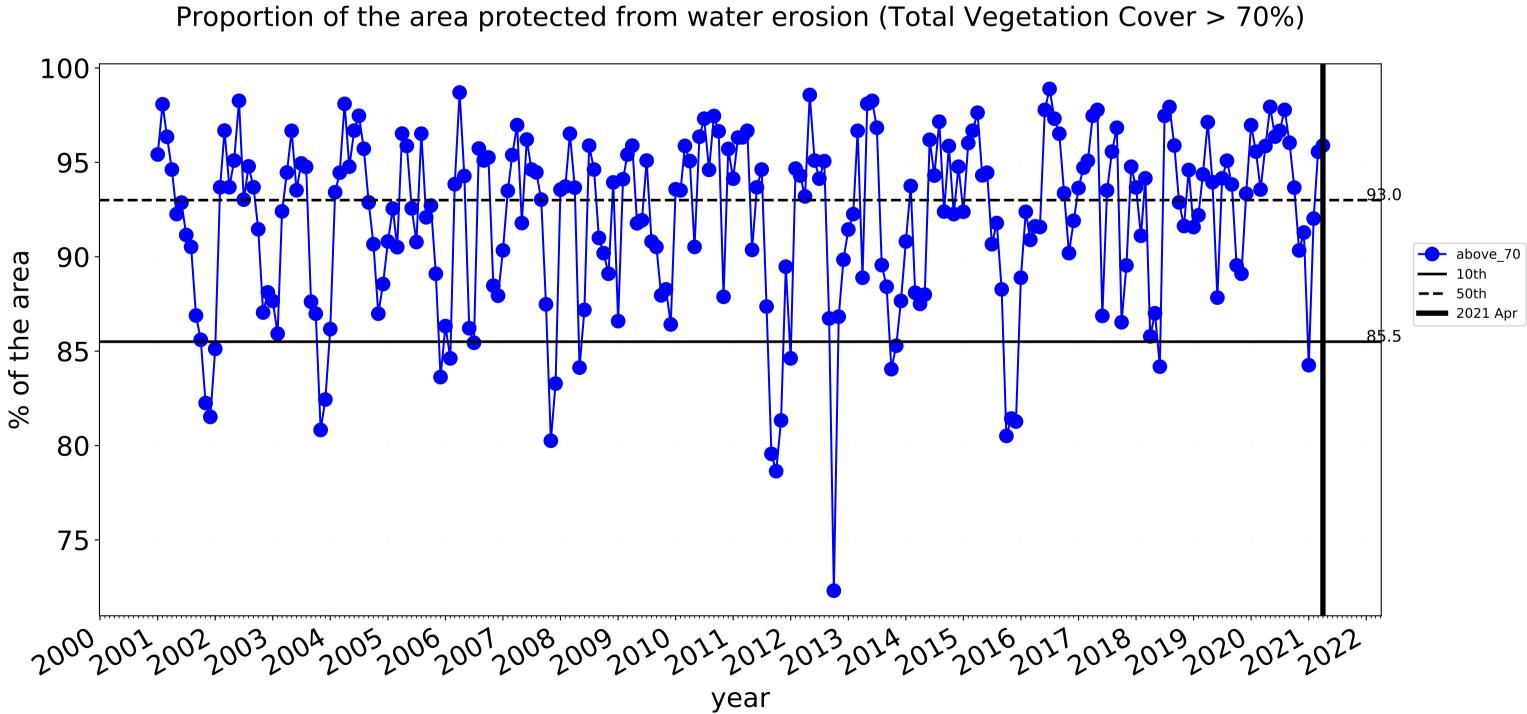
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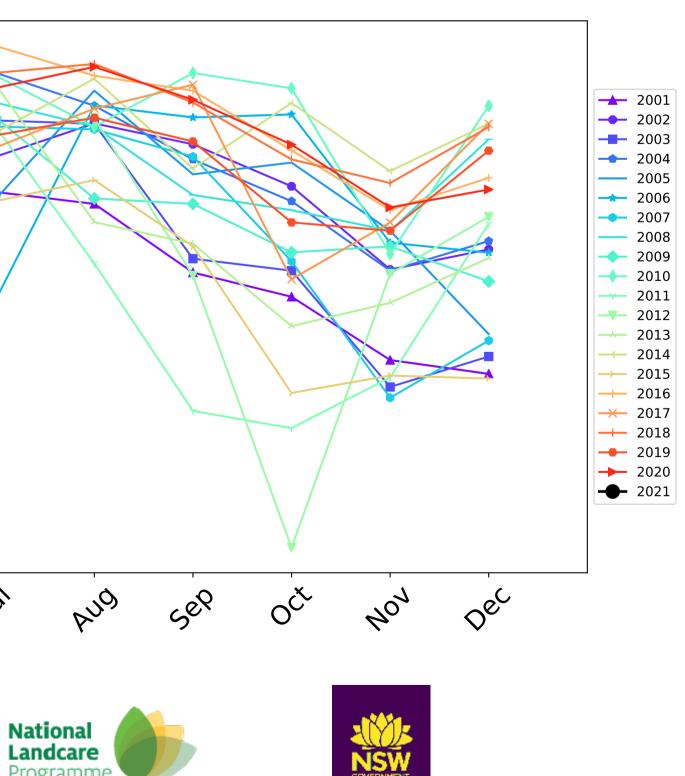


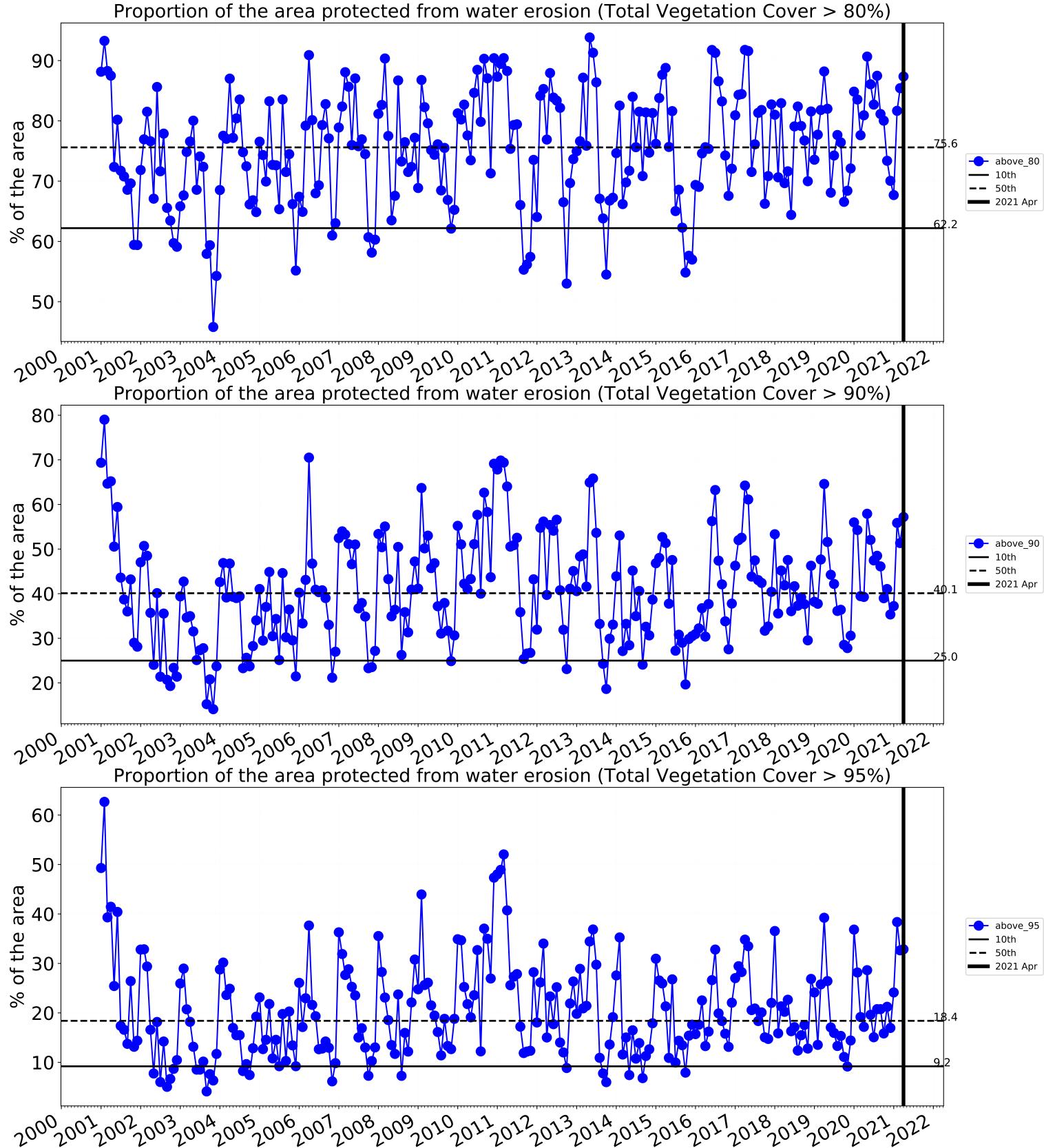
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

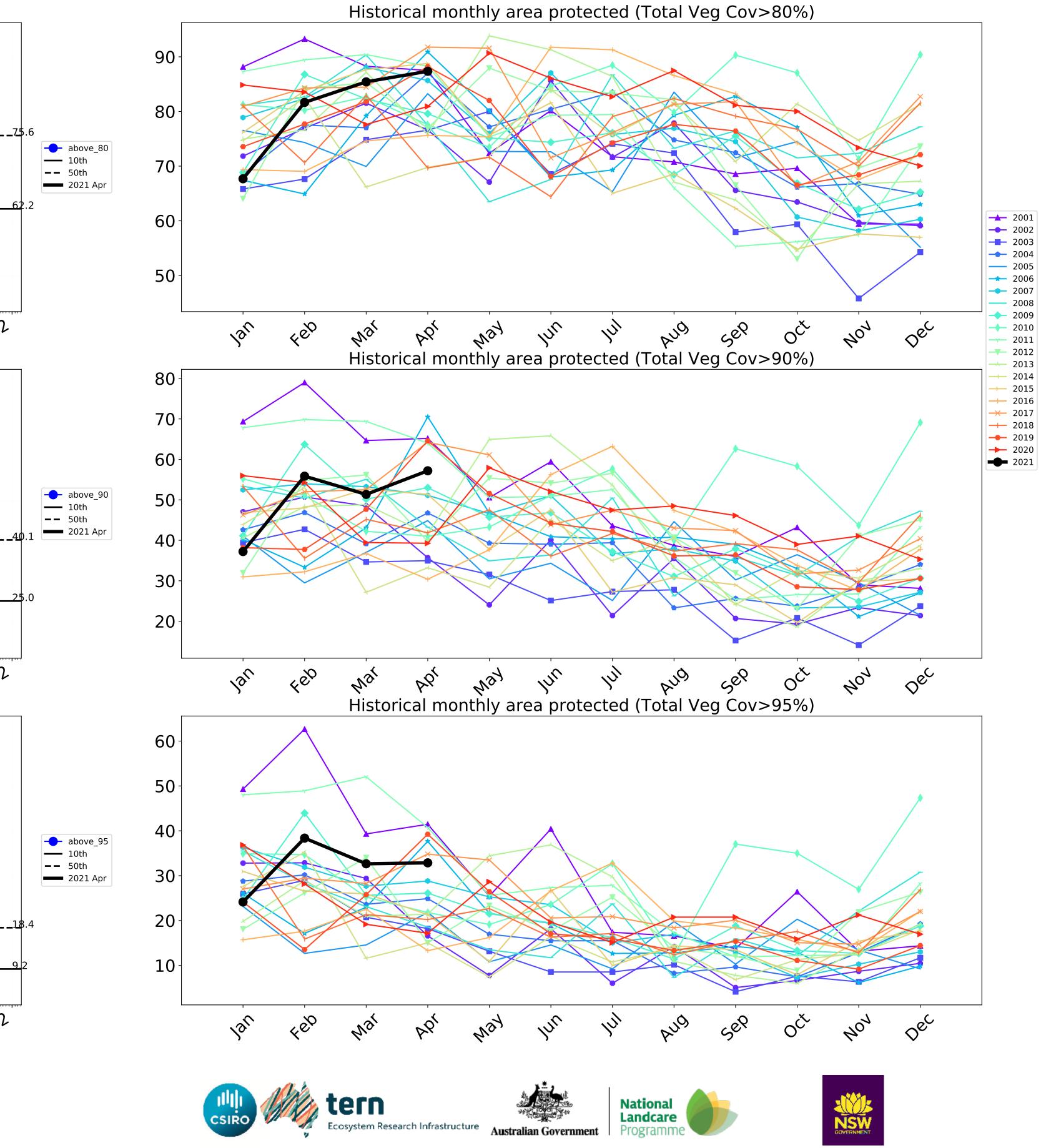


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Water erosion historical monthly area protected (Total Veg Cov>70%)



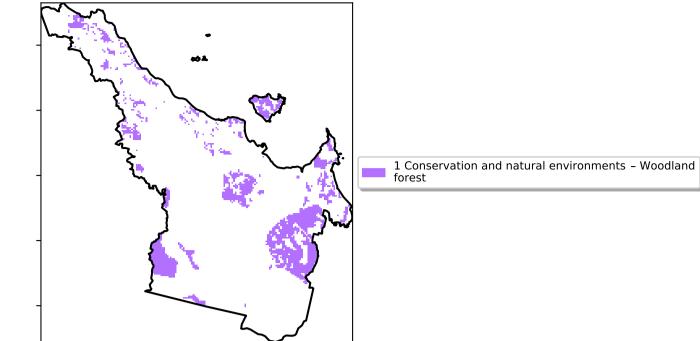






Conservation and natural environments Woodland forest

Land use and forest cover



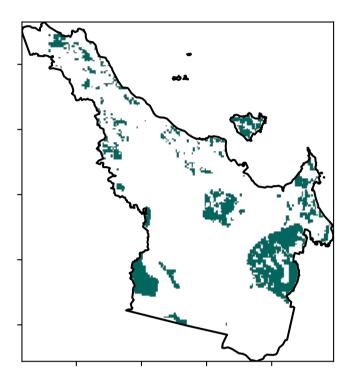
12%200%

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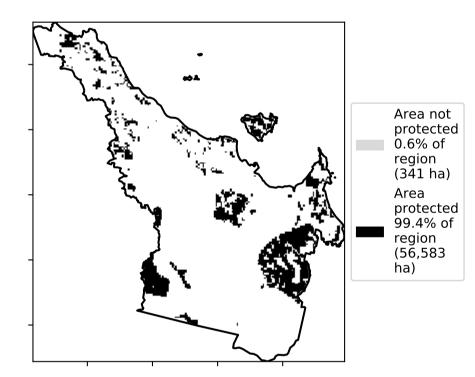
3201050010

0.30%

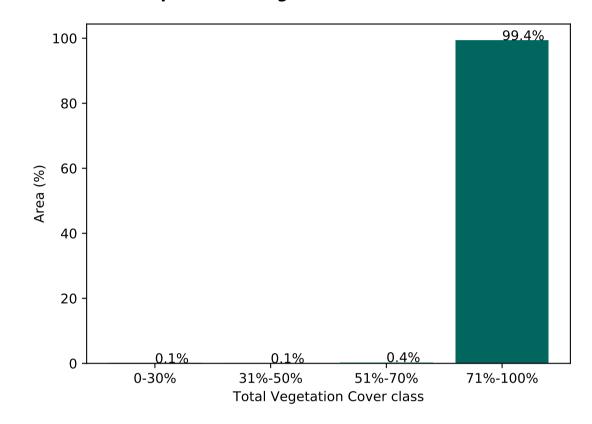
Total Vegetation Cover [%]



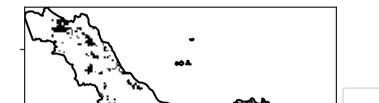




Proportion of vegetation cover class in area



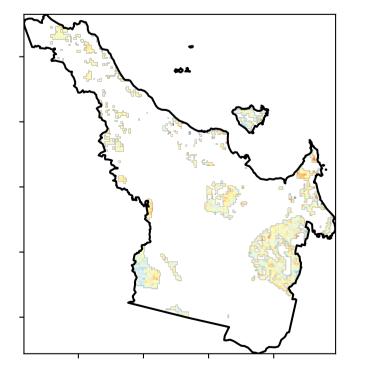
% Area protected from wind erosion (>50%)

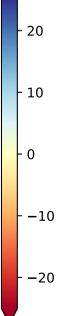


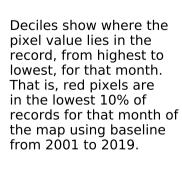
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Total Vegetation Cover Anomaly [%]

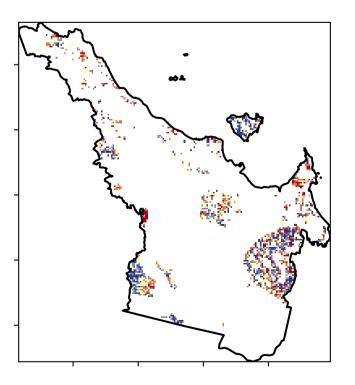
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.

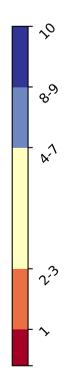




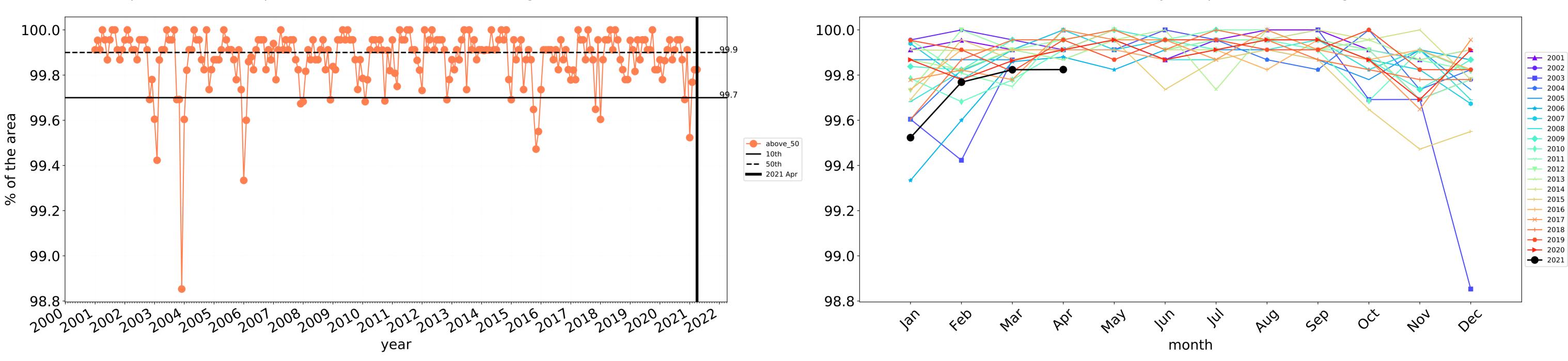


Area not protected 0.0% of region (0 ha) Area protected 100.0% of region (56,925 ha)



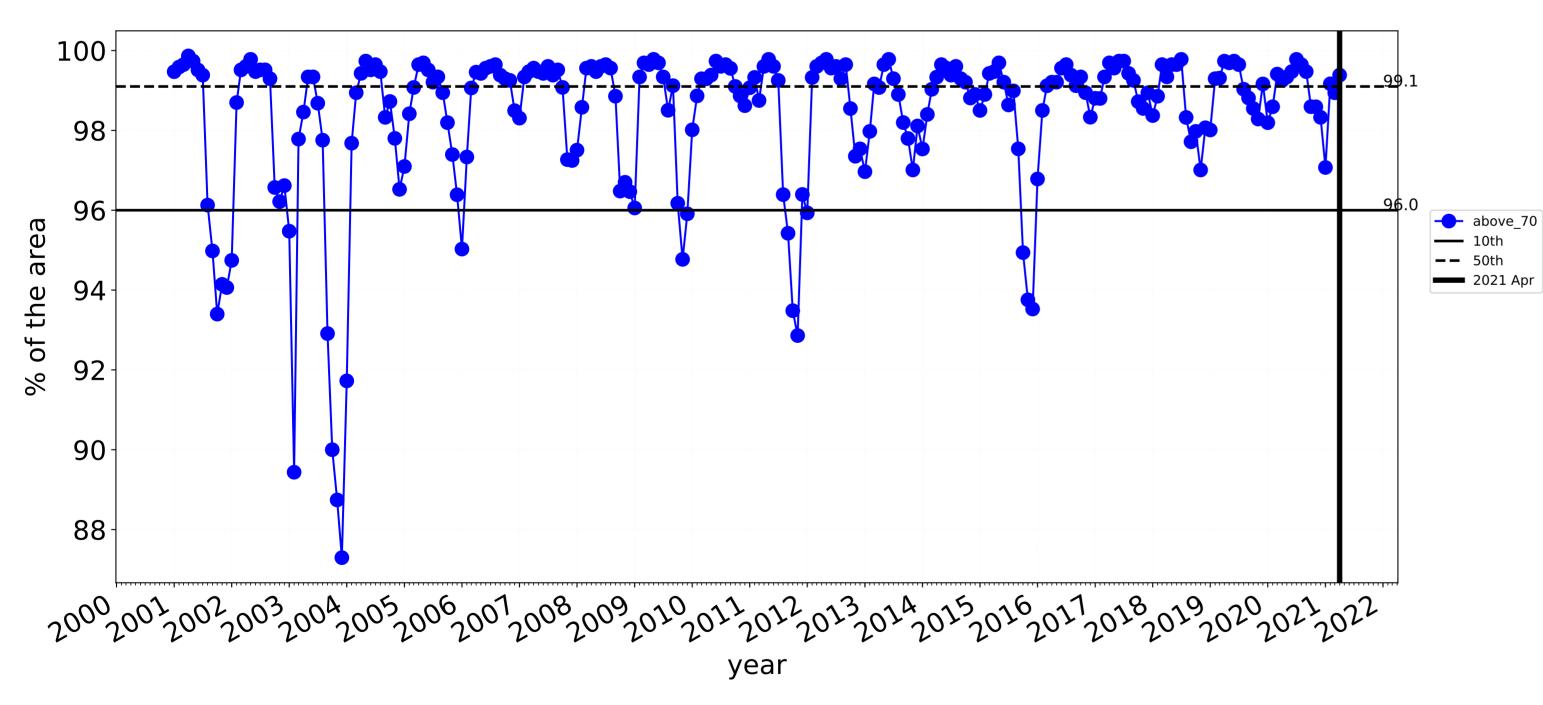




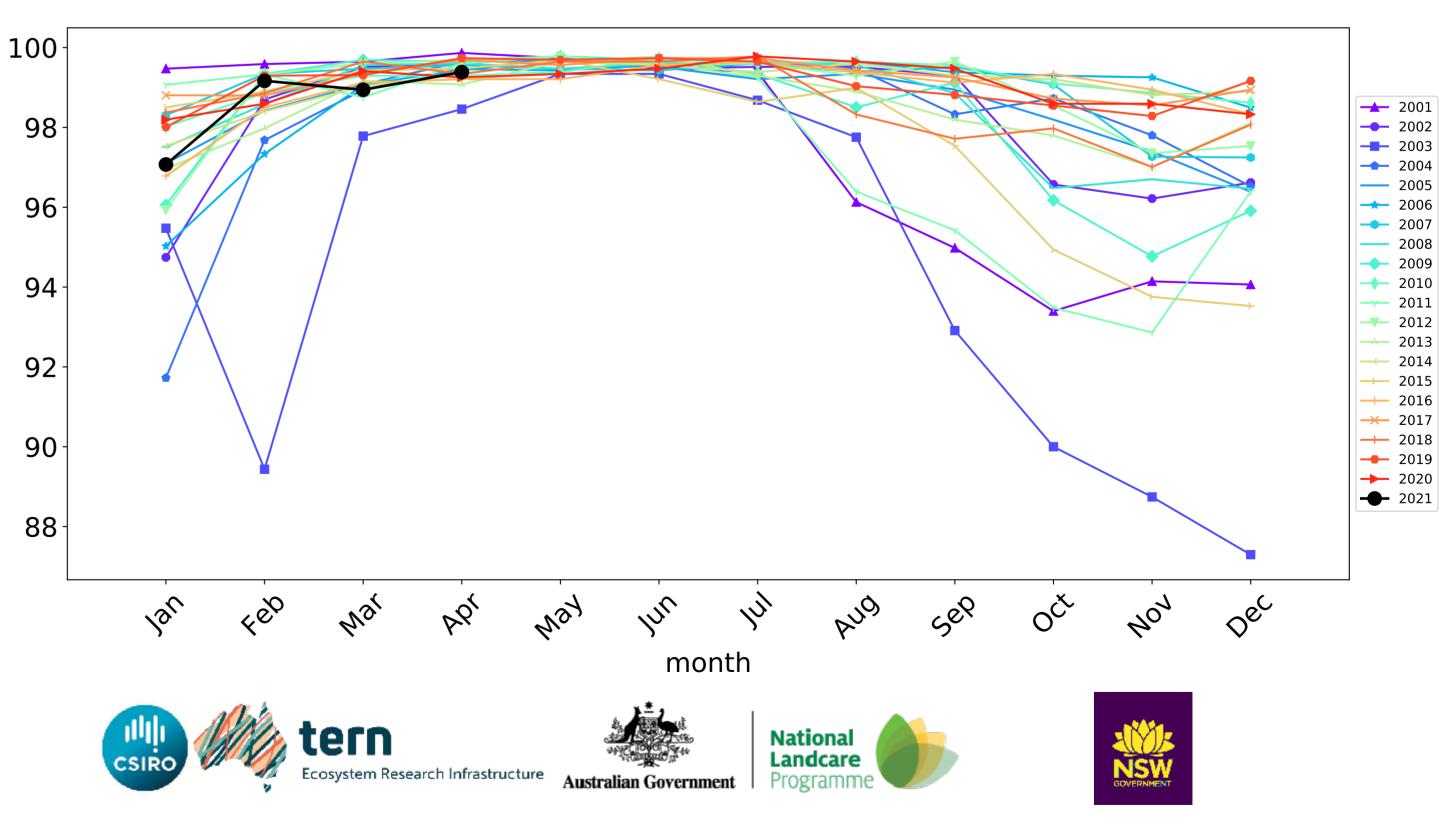


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

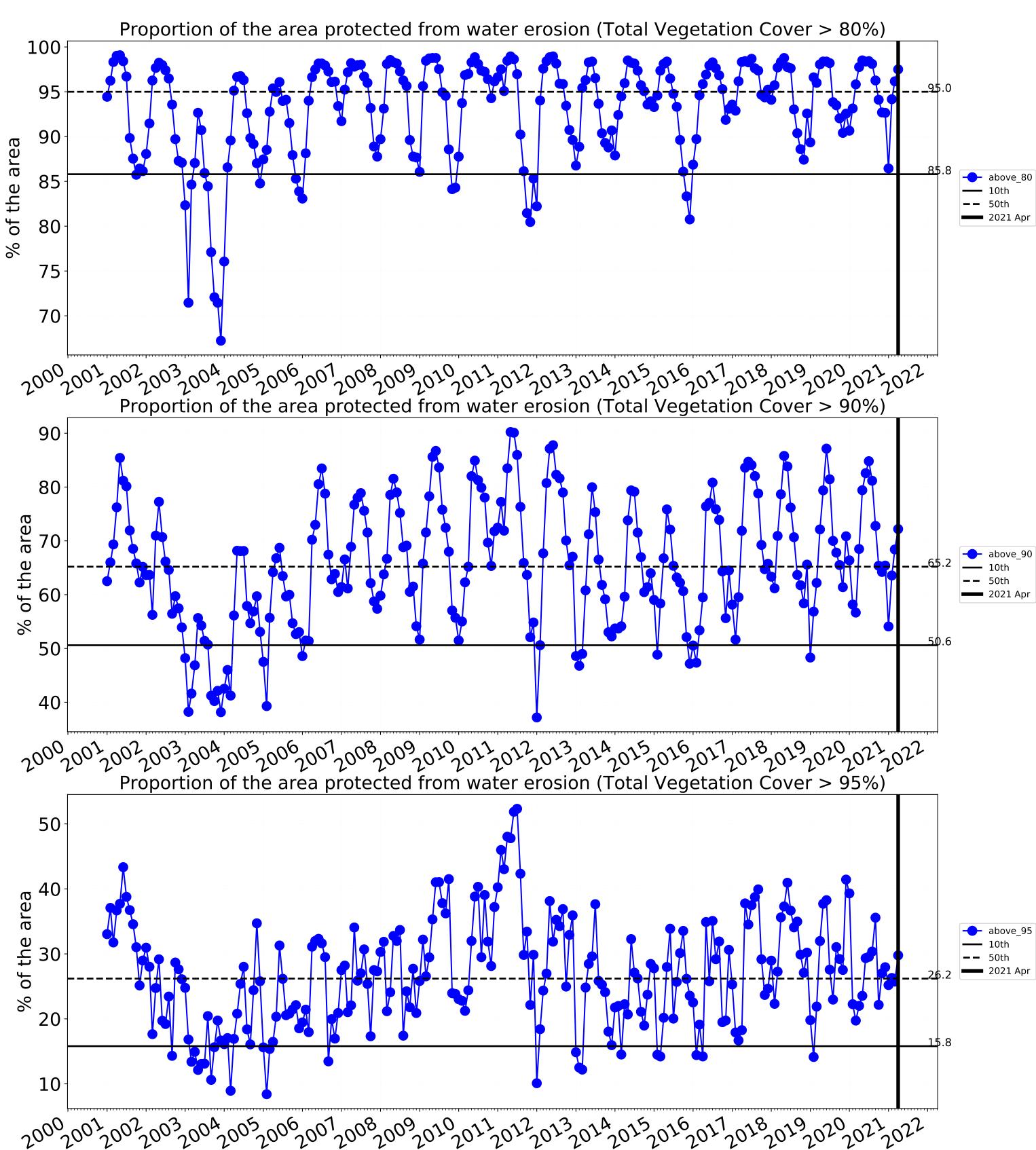
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

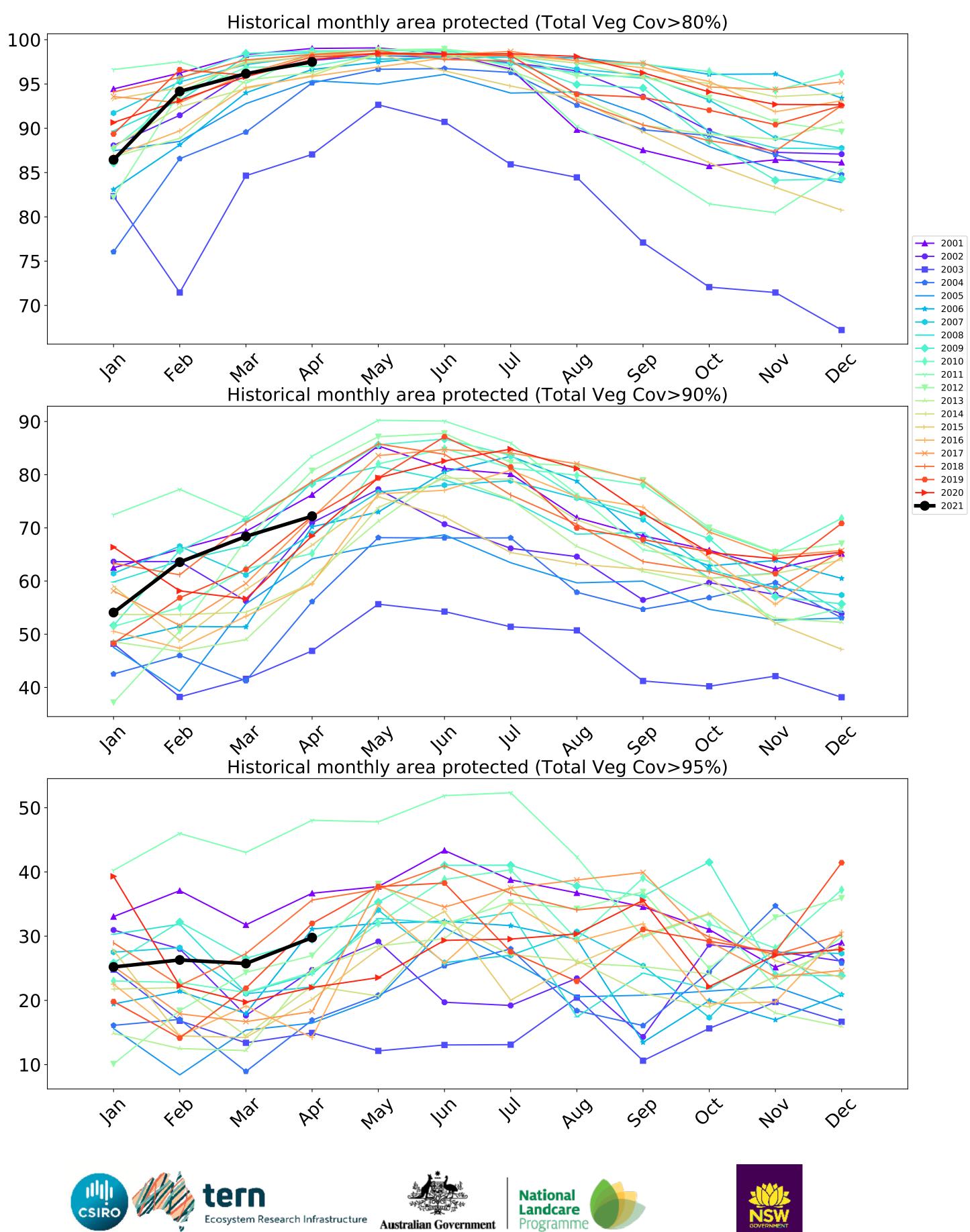


Water erosion historical monthly area protected (Total Veg Cov>70%)



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

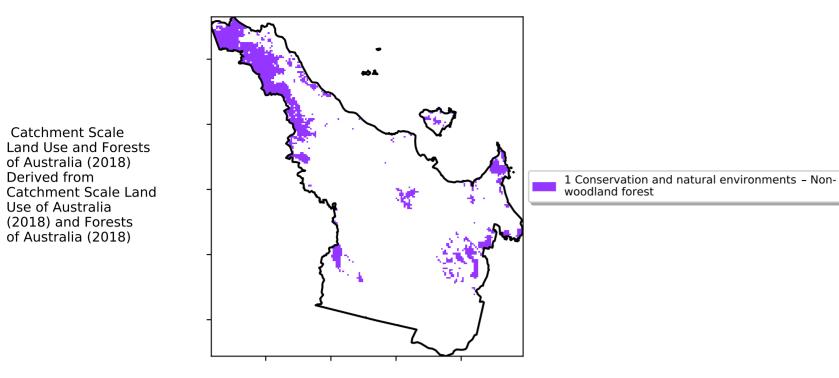




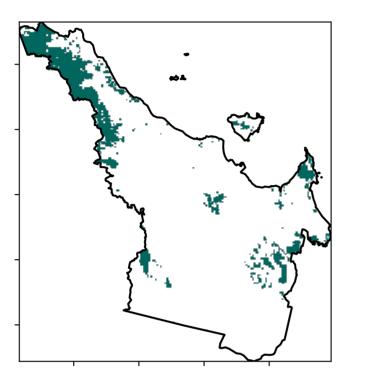


Conservation and natural environments Forest (non woodland)

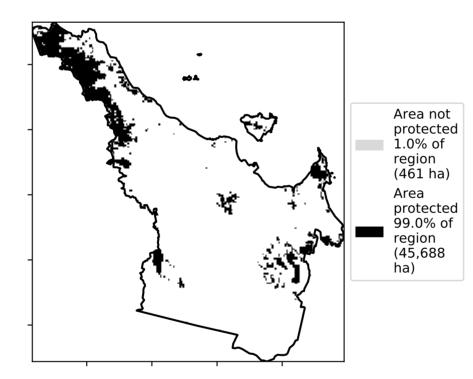
Land use and forest cover



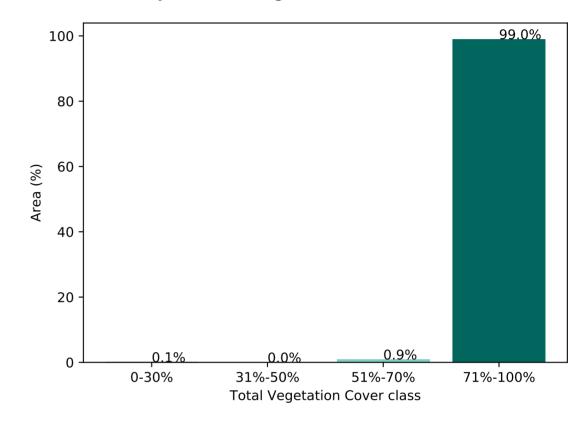
Total Vegetation Cover [%]



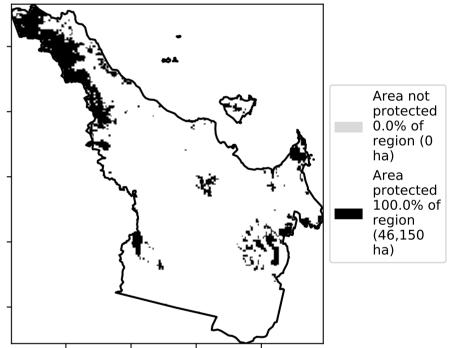
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area



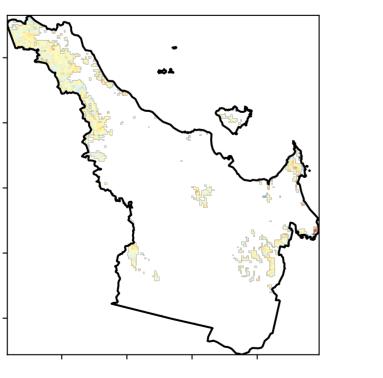
% Area protected from wind erosion (>50%)

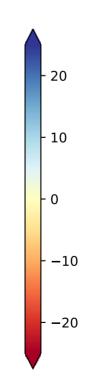


Total Vegetation Cover Anomaly [%]

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.

Derived from





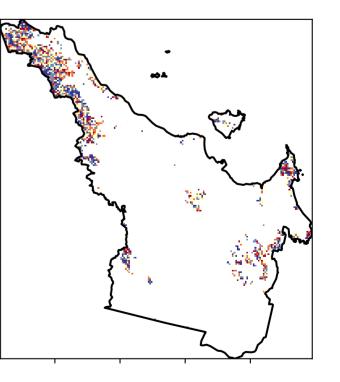
12%200%

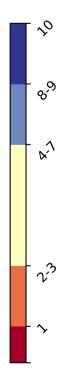
· 52% 70%

320050010

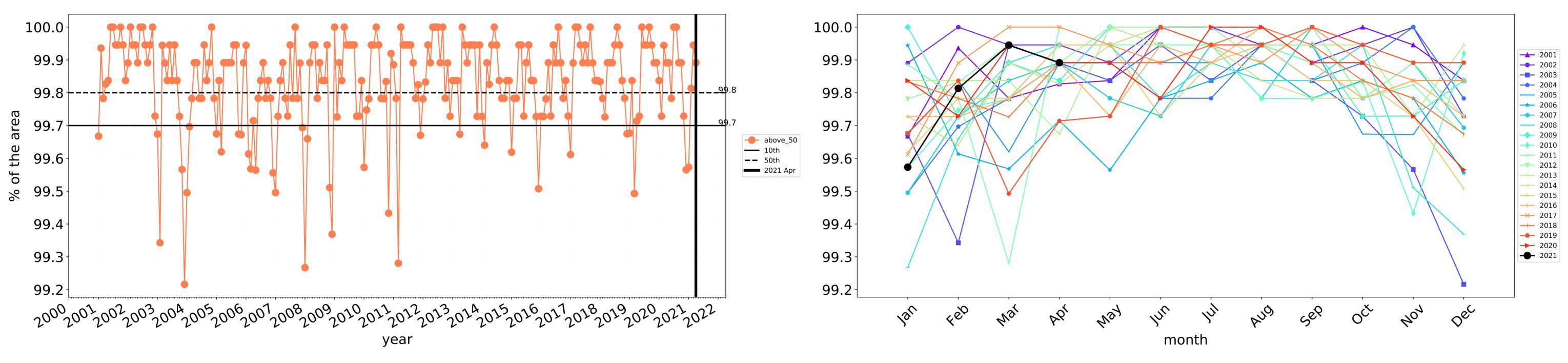
0.30%

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



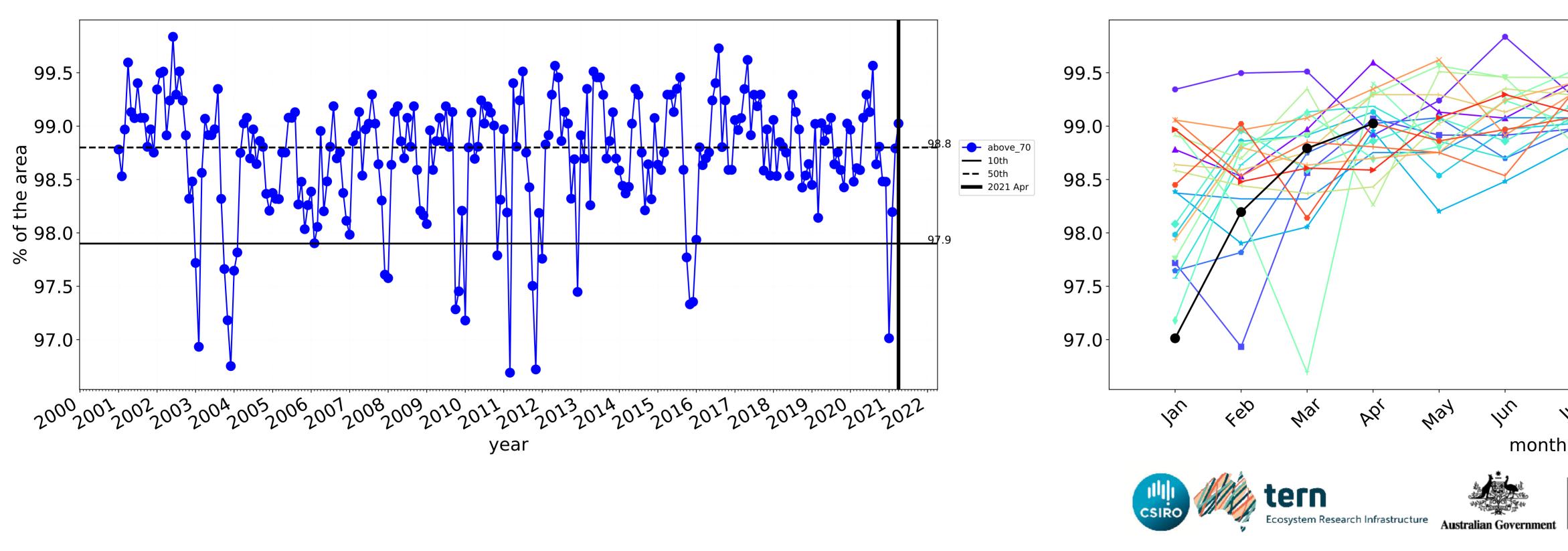


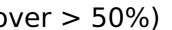




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

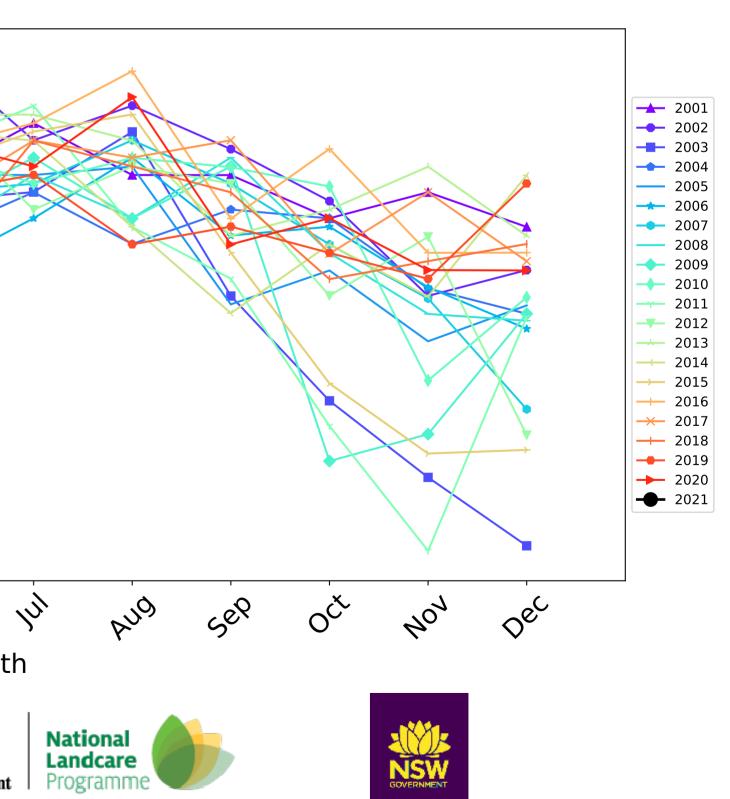
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

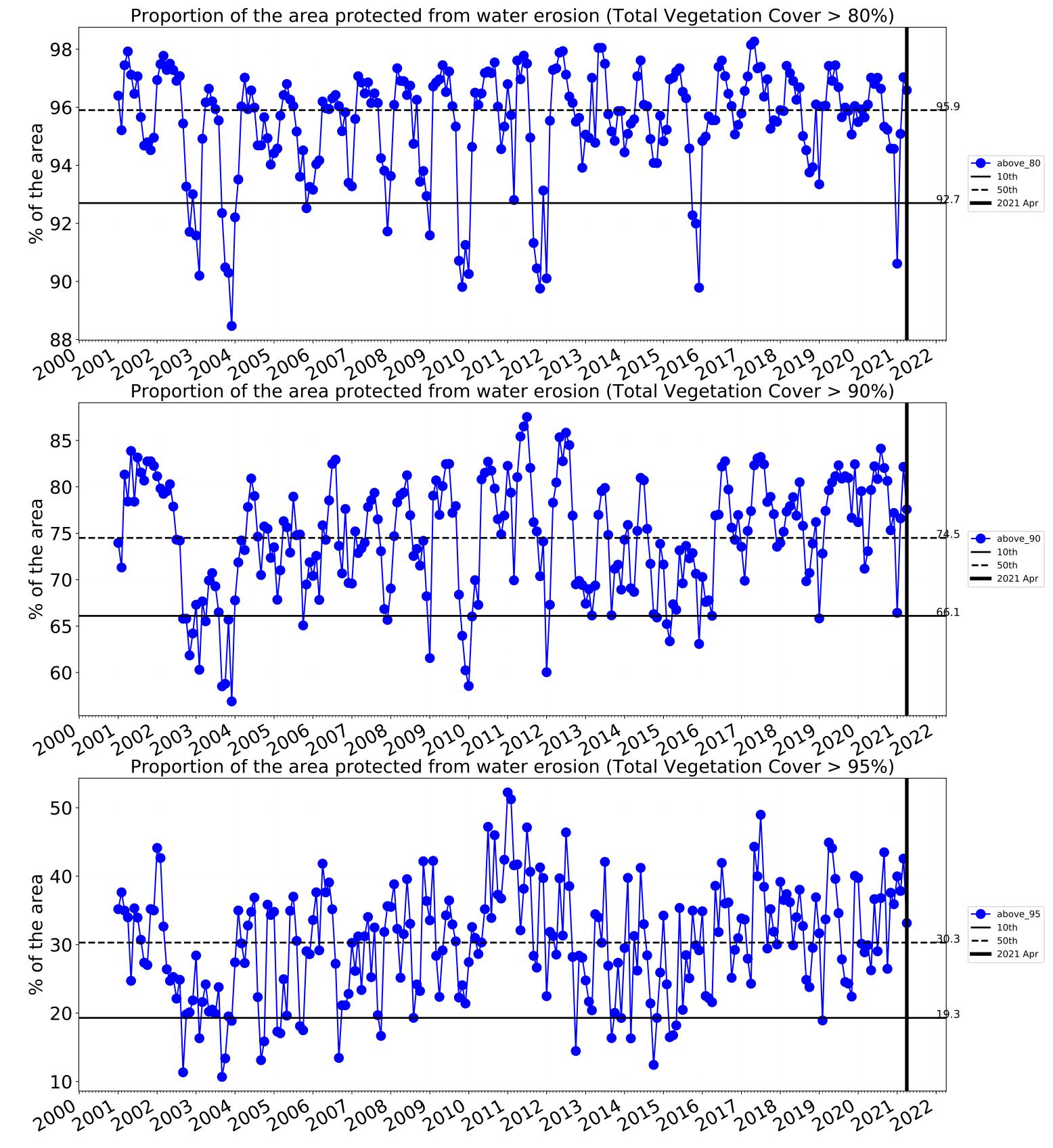


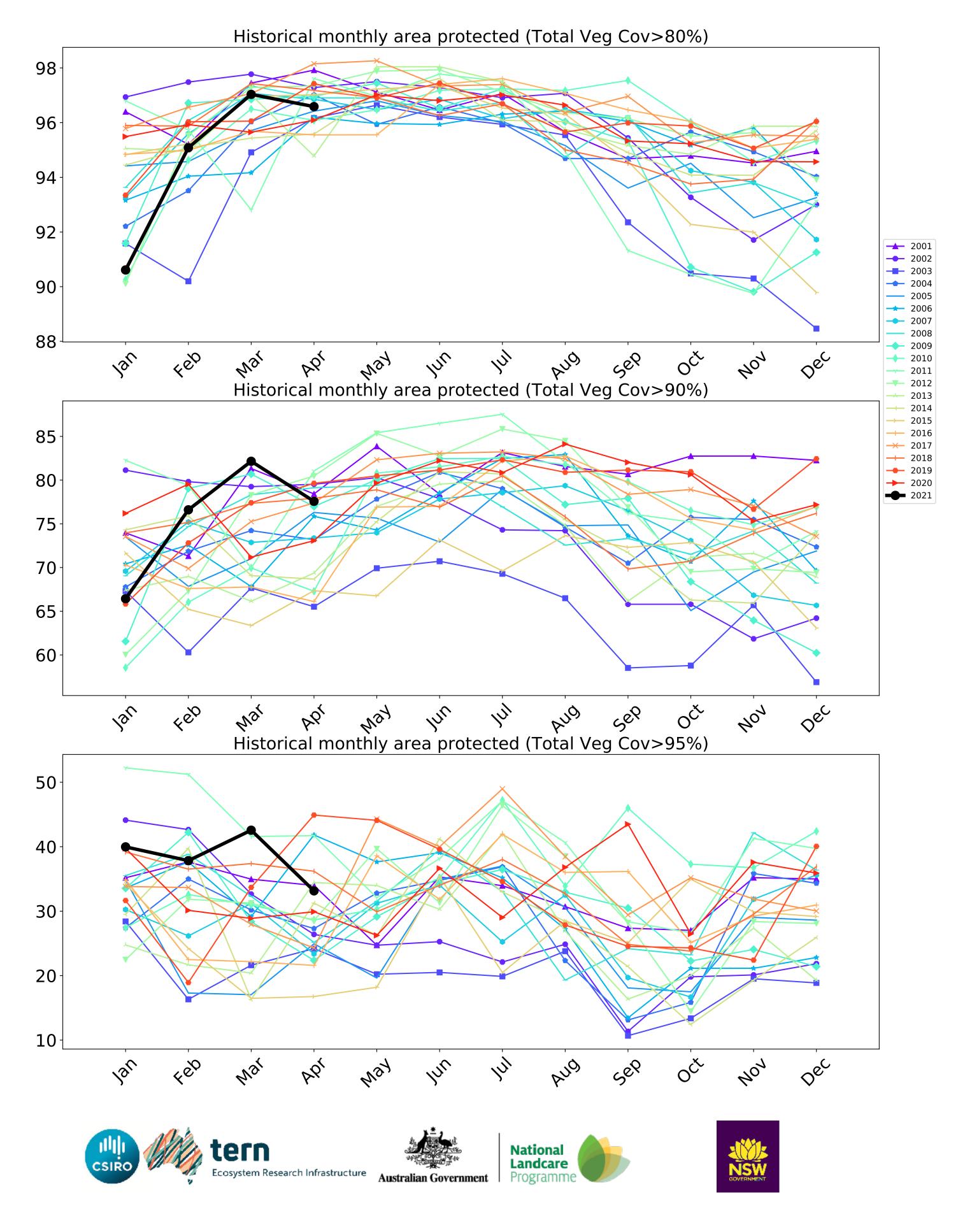


Wind erosion historical monthly area protected (Total Veg Cov >50%)

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



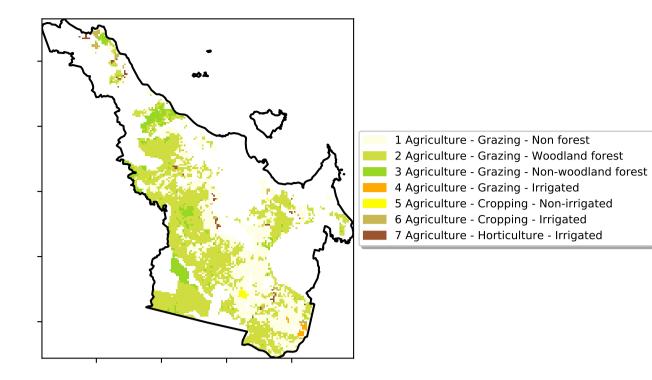




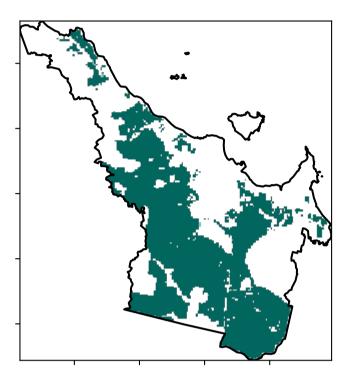
Agriculture

Land use and forest cover

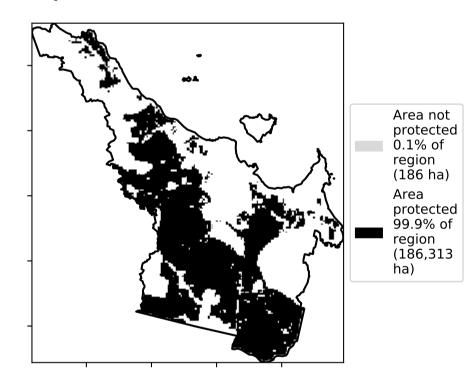


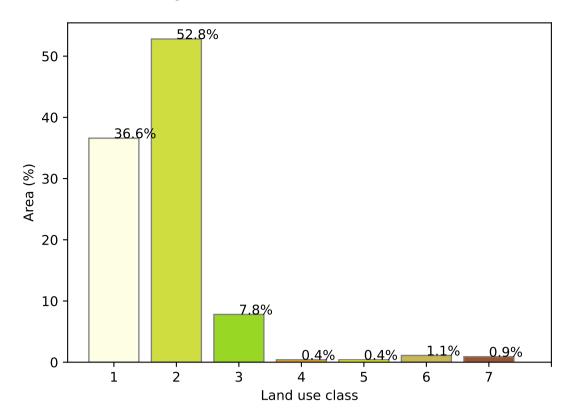


Total Vegetation Cover [%]

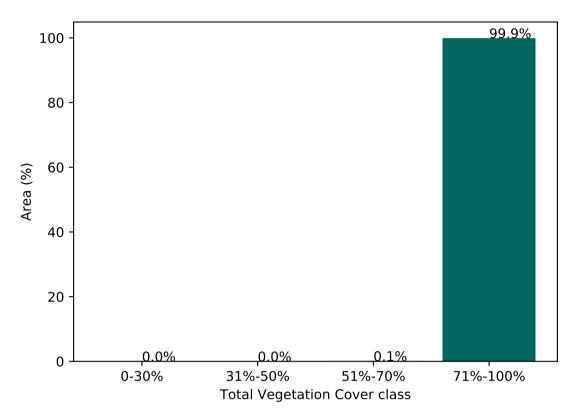


% Area protected from water erosion (>70%)

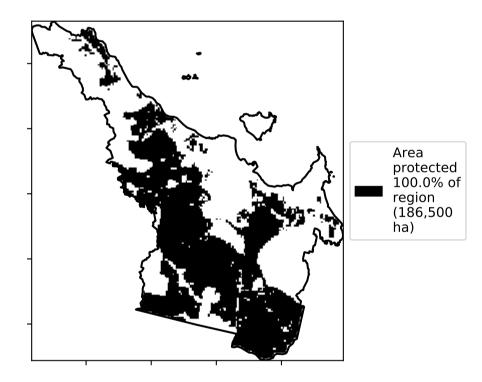




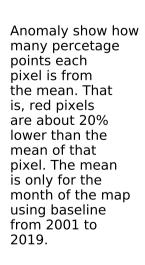
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]



Catchment Scale

of Australia (2018)

Derived from

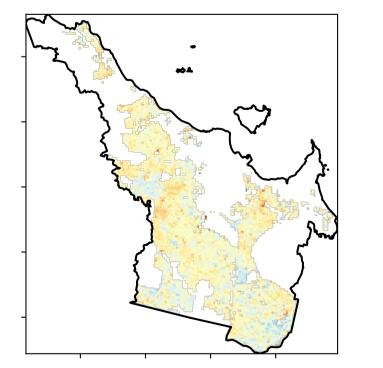
Use of Australia

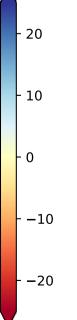
(2018) and Forests

of Australia (2018)

Land Use and Forests

Catchment Scale Land





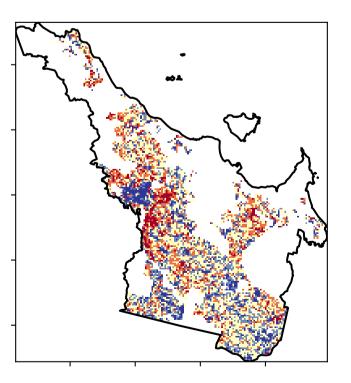
12º10-20010

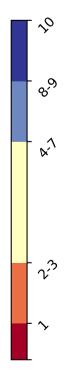
· 52% 70%

320050010

0.30%

Total Vegetation Cover Decile [%]







Deciles show where the

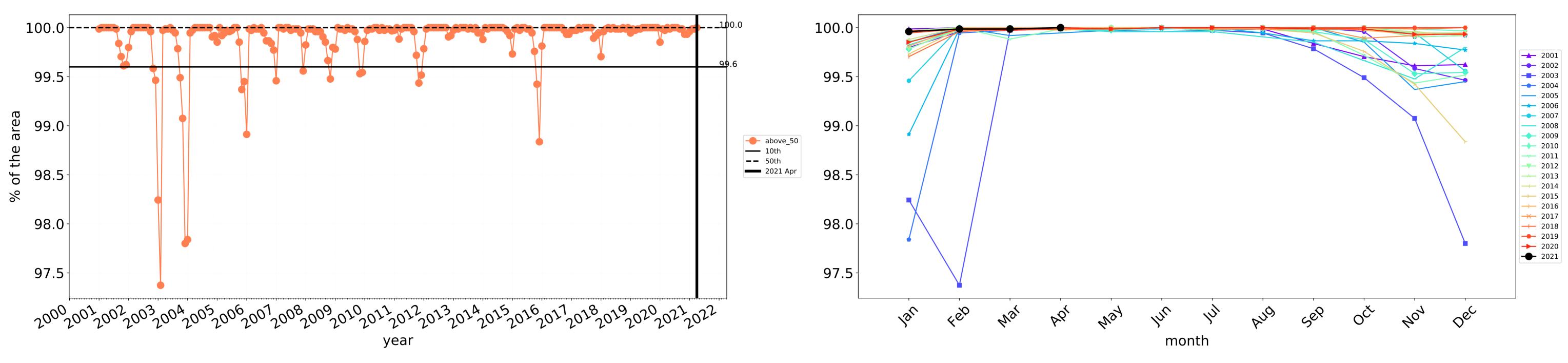
pixel value lies in the

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

records for that month of

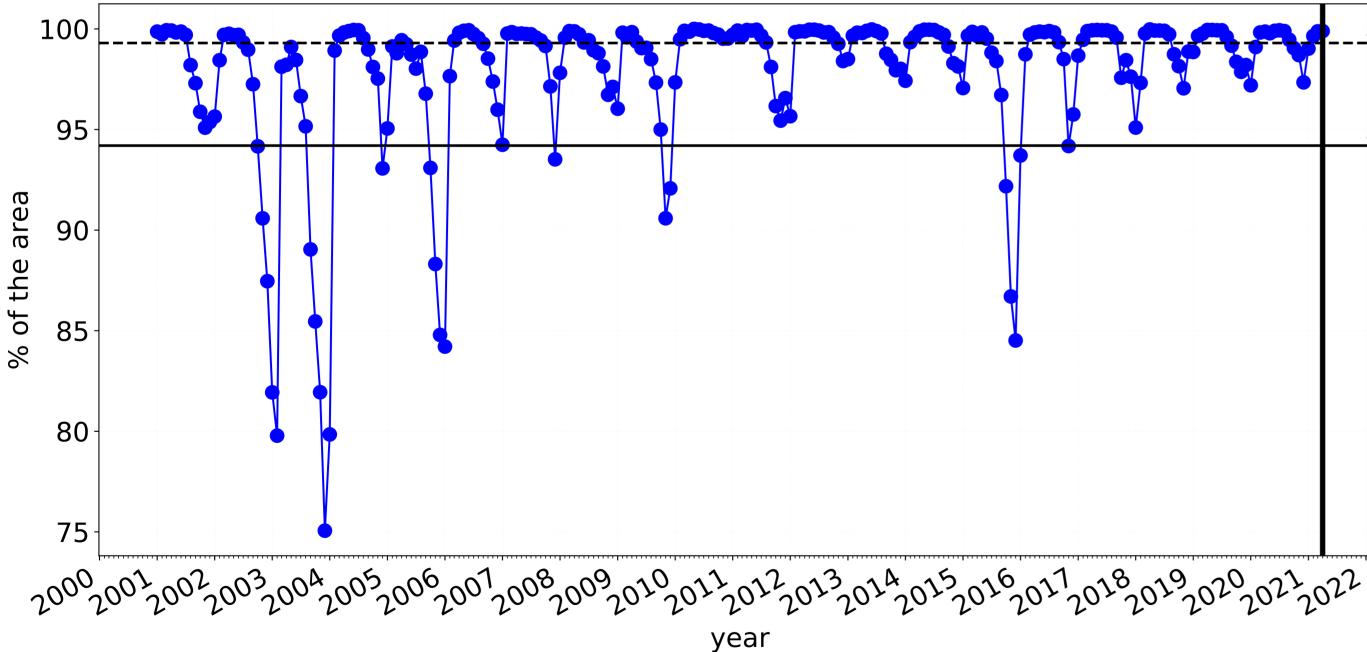
the map using baseline from 2001 to 2019.

in the lowest 10% of

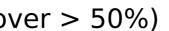


Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



Agriculture timeseries



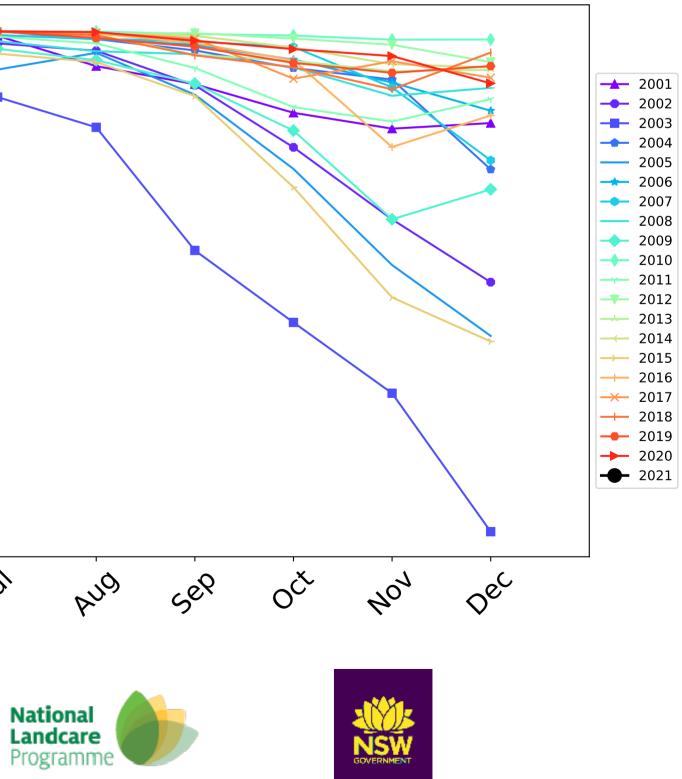
Wind erosion historical monthly area protected (Total Veg Cov >50%)

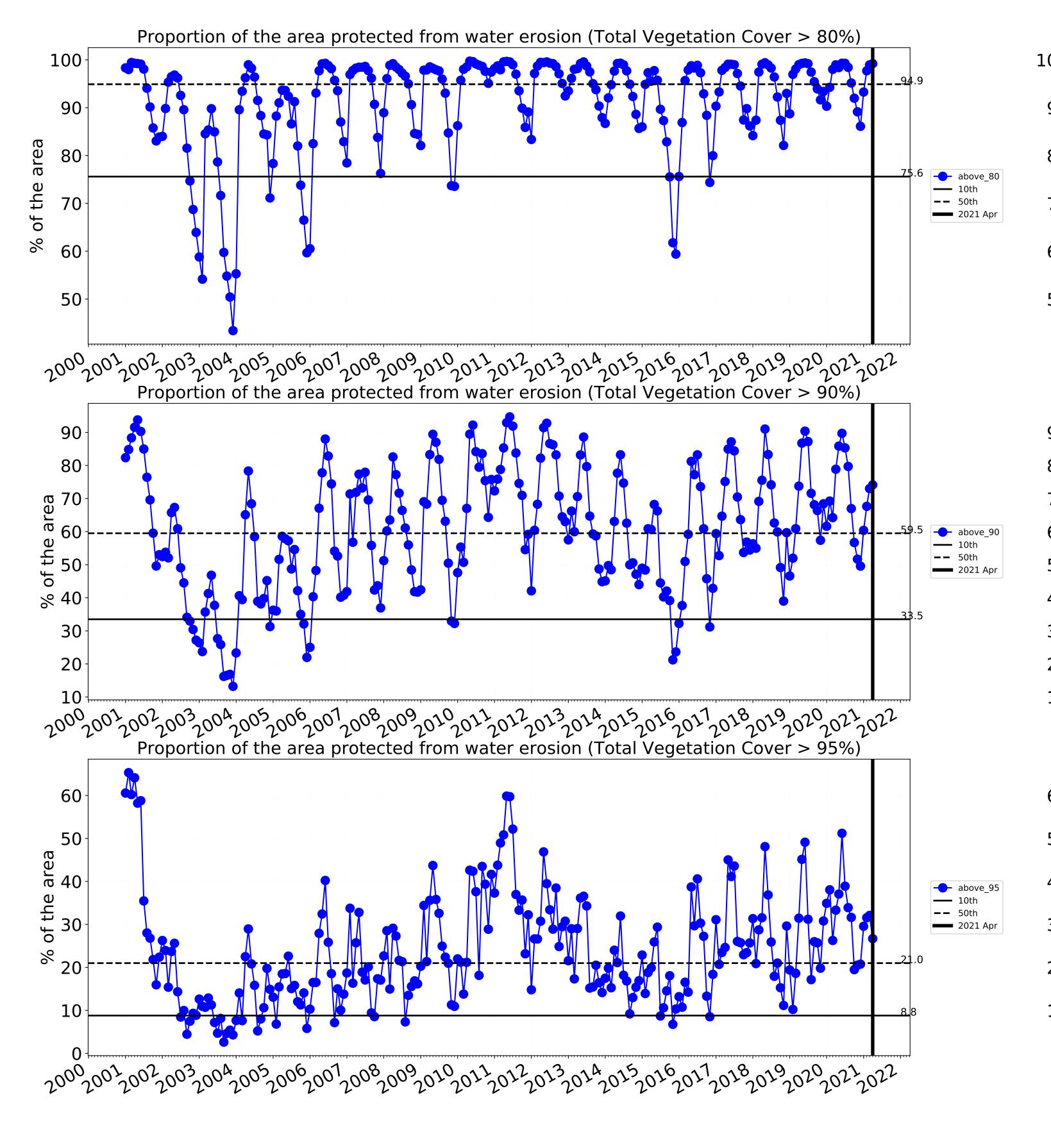
100 95 ---- above_70 **—** 10th 90 **——** 50th **—** 2021 Apr 85 80 75 Jan 4eb hul way PP War 1st month tern

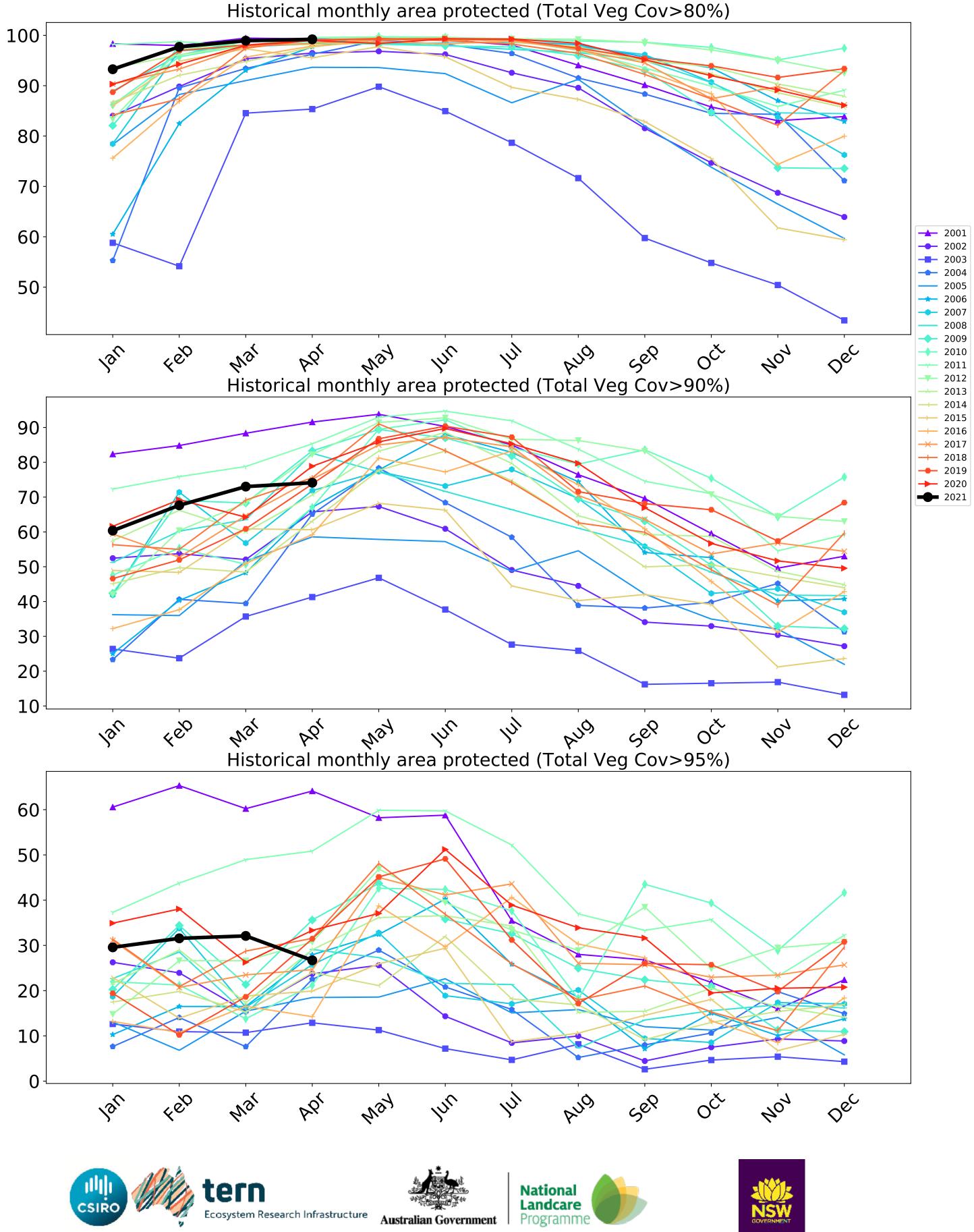
Australian Government

Ecosystem Research Infrastructure

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

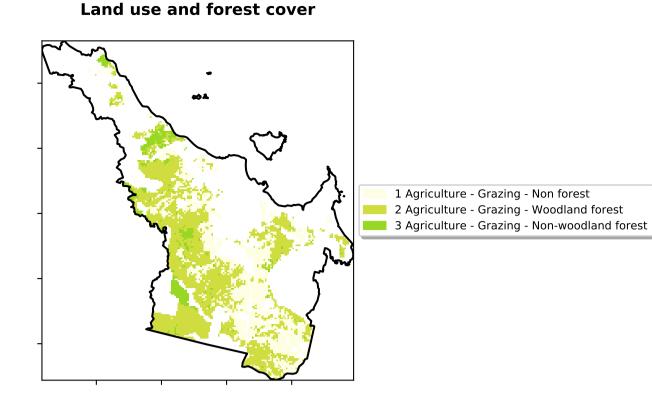




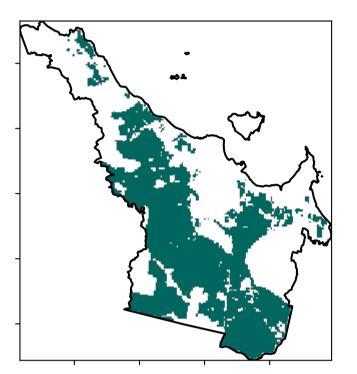


Grazing

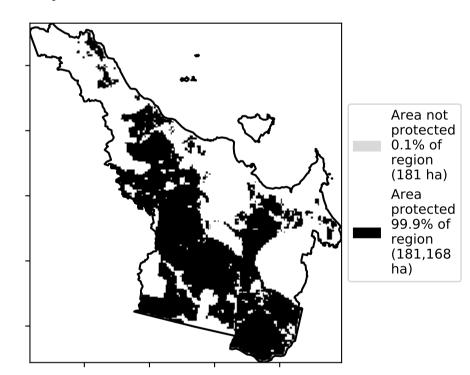
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

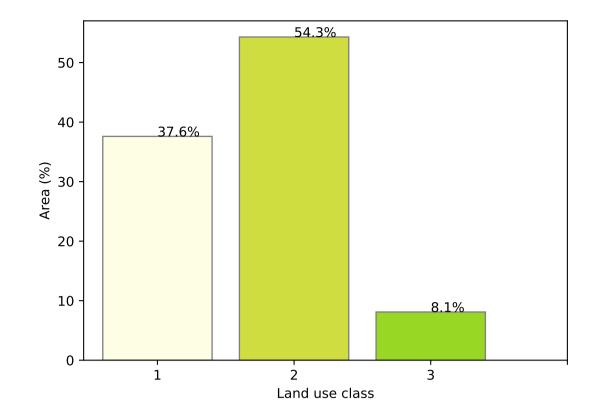


Total Vegetation Cover [%]



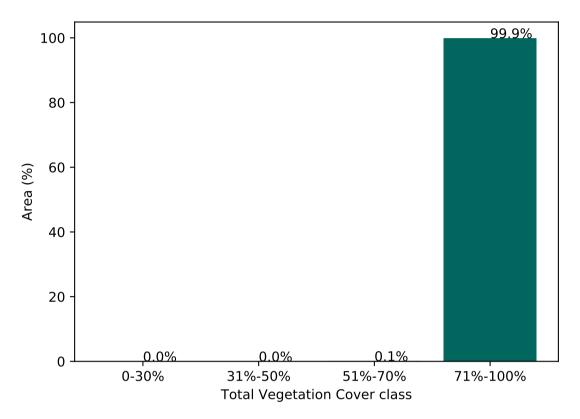
% Area protected from water erosion (>70%)





Proportion of each land class in area

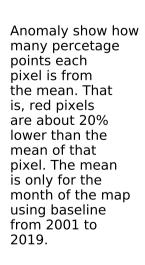
Proportion of vegetation cover class in area

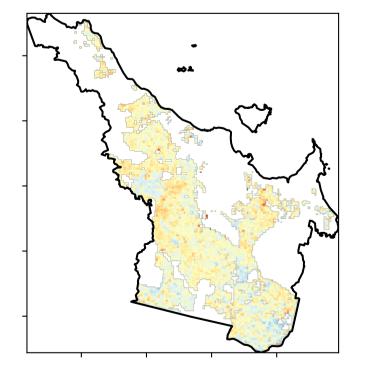


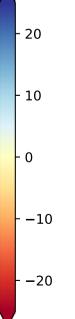
% Area protected from wind erosion (>50%)



Total Vegetation Cover Anomaly [%]





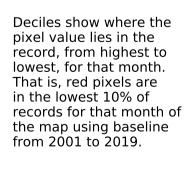


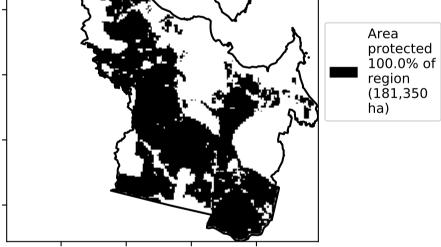
12%200%

52°10°10°10

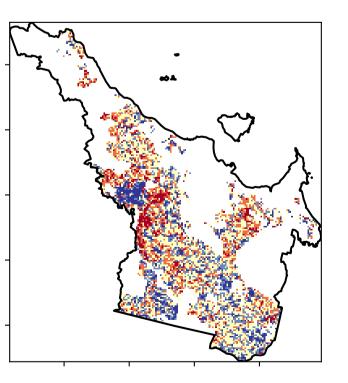
32005000

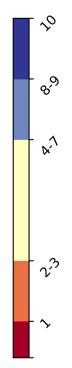
0.30%



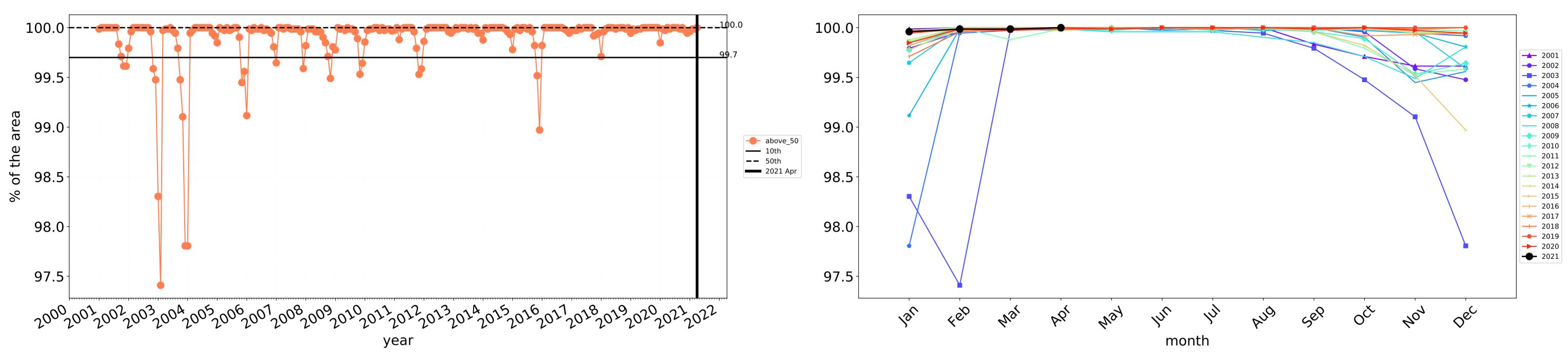


Total Vegetation Cover Decile [%]



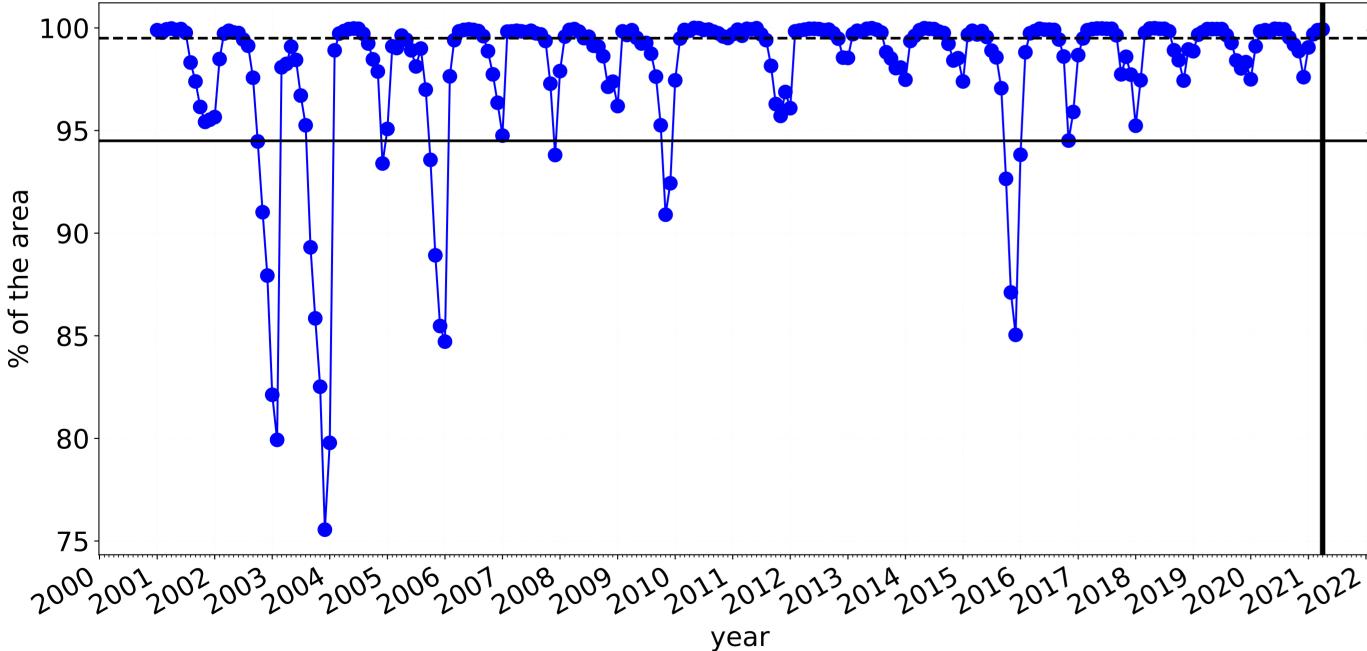


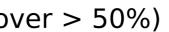




Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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



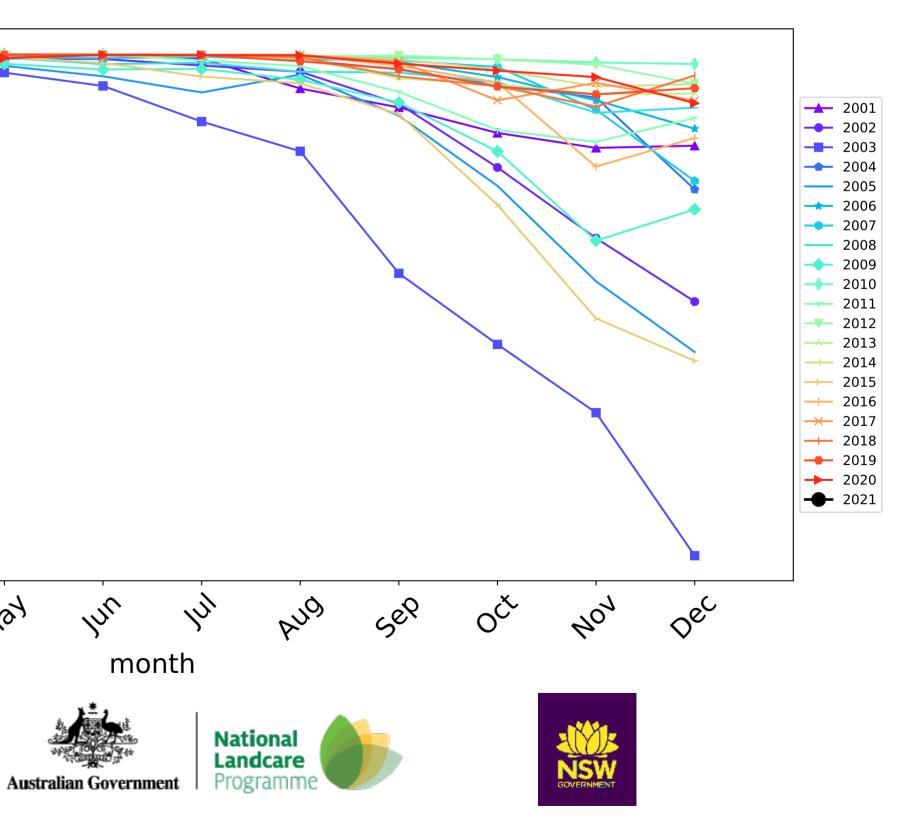


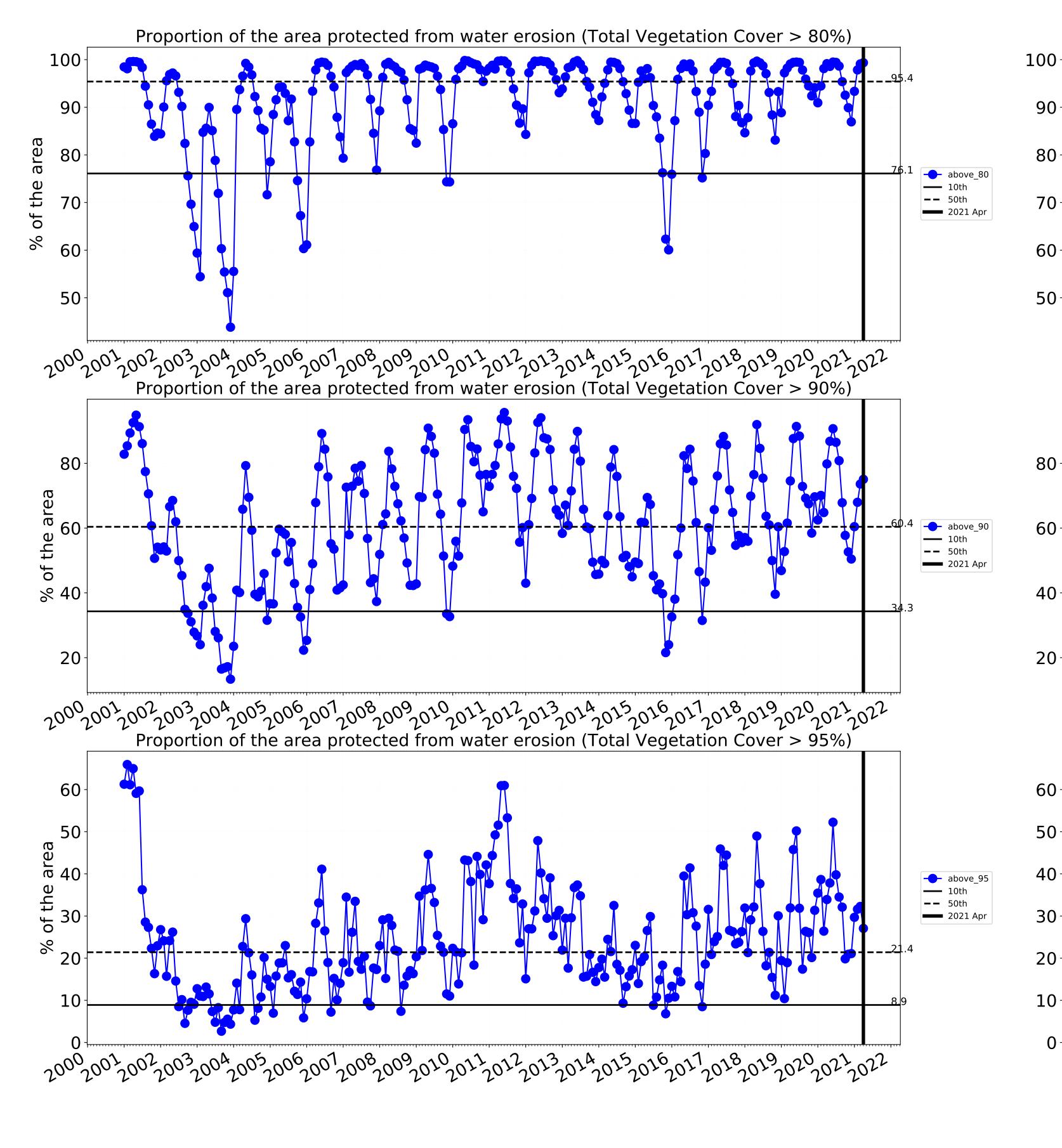
Wind erosion historical monthly area protected (Total Veg Cov >50%)

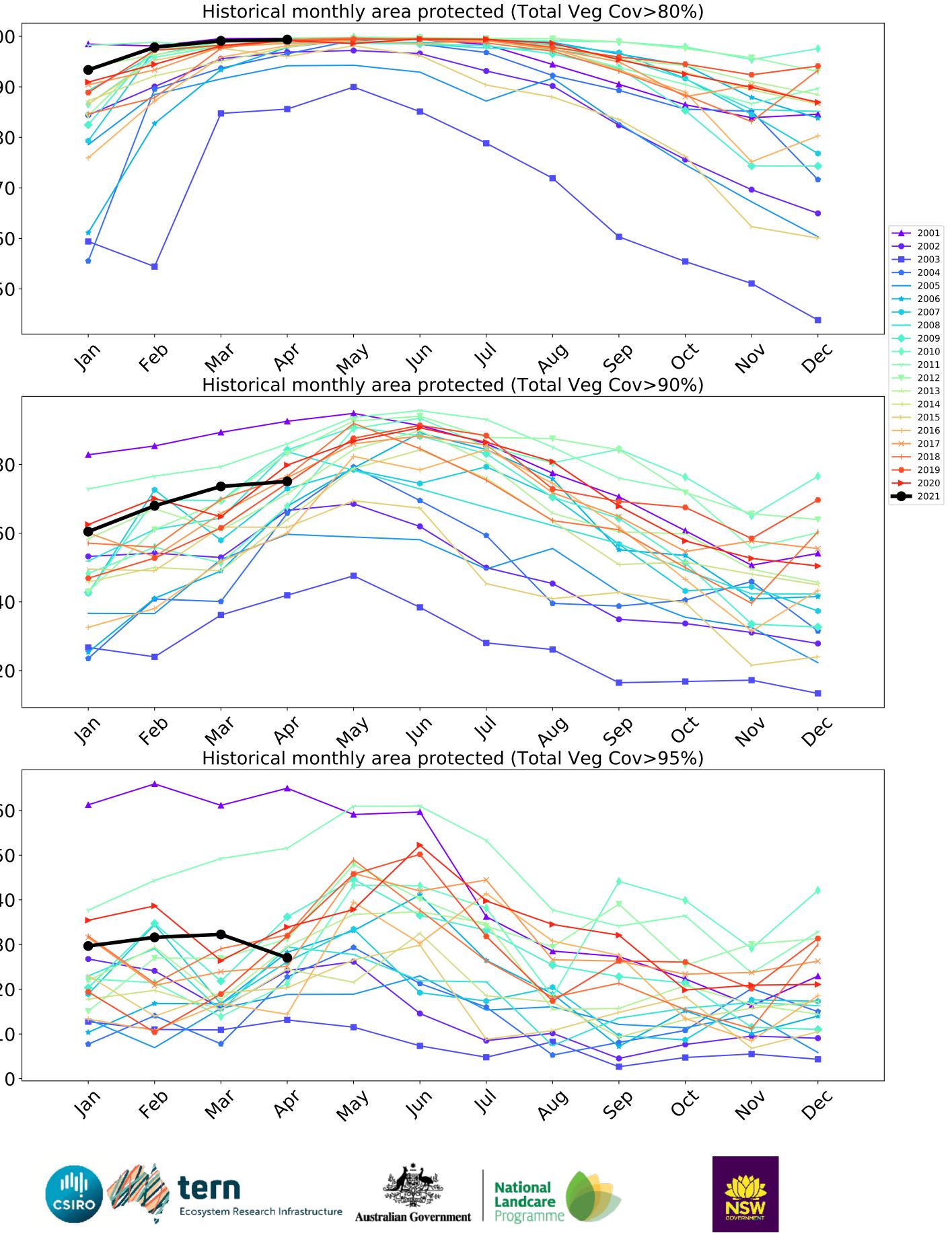
100 95 ---- above_70 **—** 10th 90 **——** 50th **—** 2021 Apr 85 80 75 Jan 4eb hul way PQ War tern

Ecosystem Research Infrastructure

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

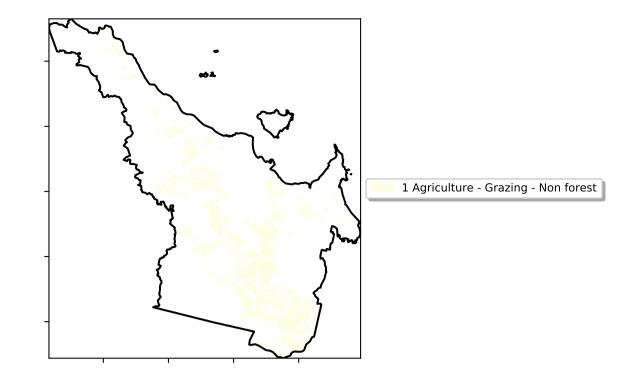




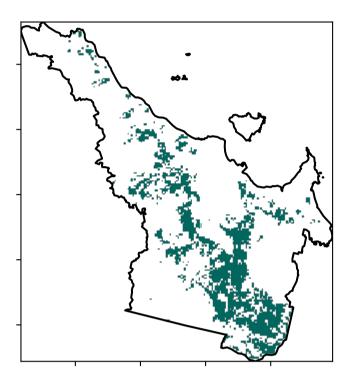


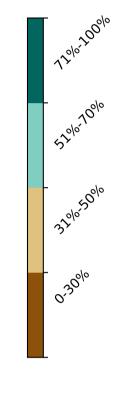
Grazing non forest

Land use and forest cover

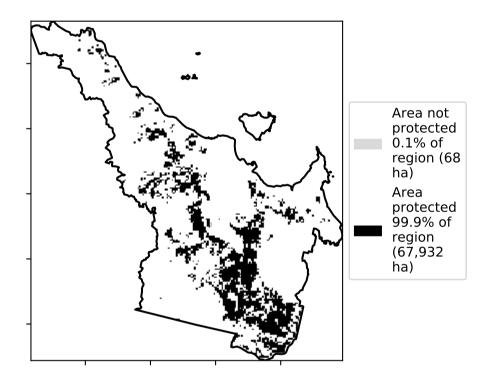


Total Vegetation Cover [%]

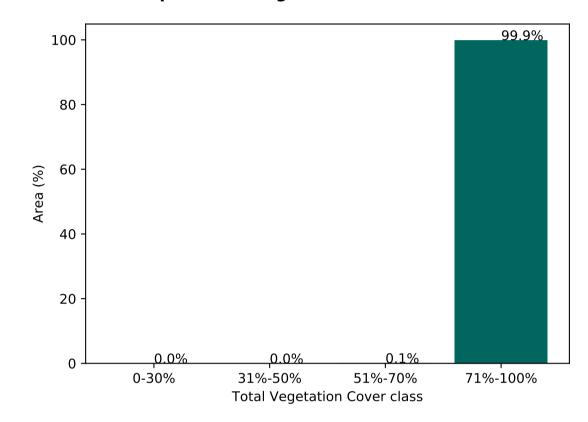




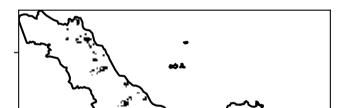
% Area protected from water erosion (>70%)



Proportion of vegetation cover class in area

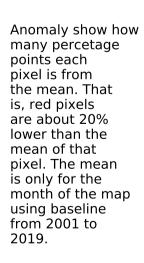


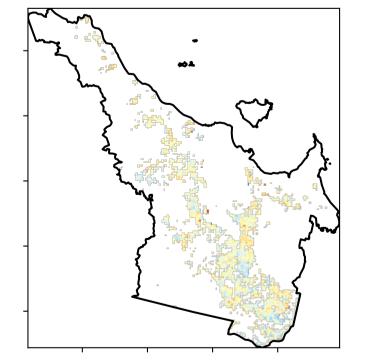
% Area protected from wind erosion (>50%)

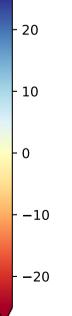


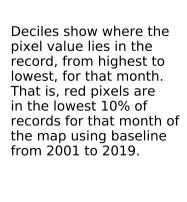
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

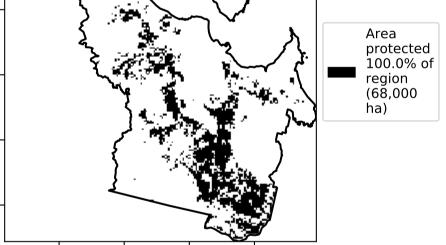
Total Vegetation Cover Anomaly [%]









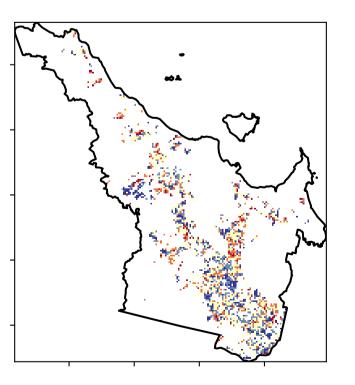


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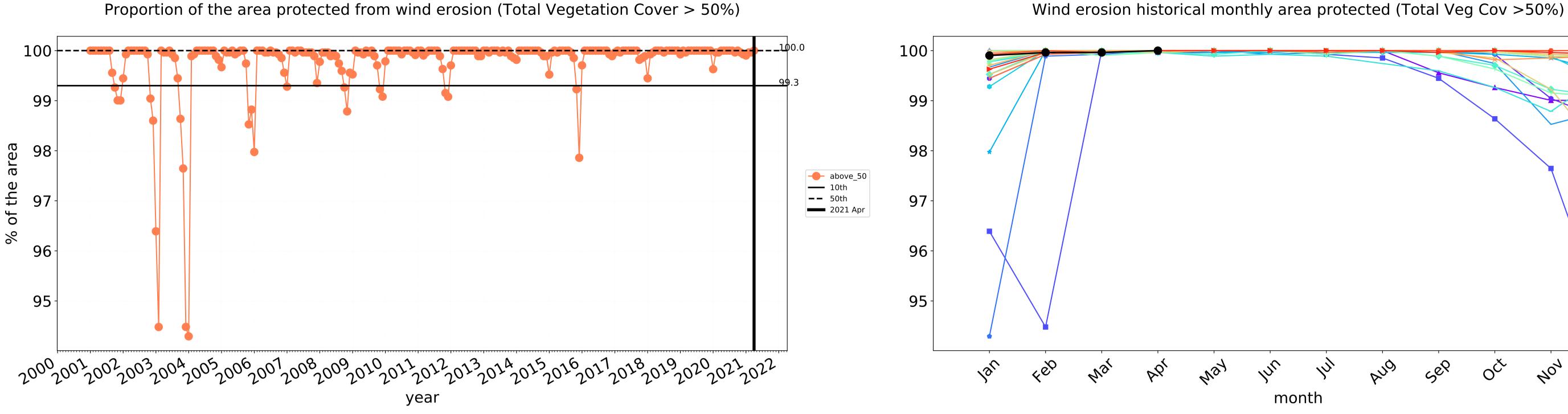
ଚ୍ଚ

A:1

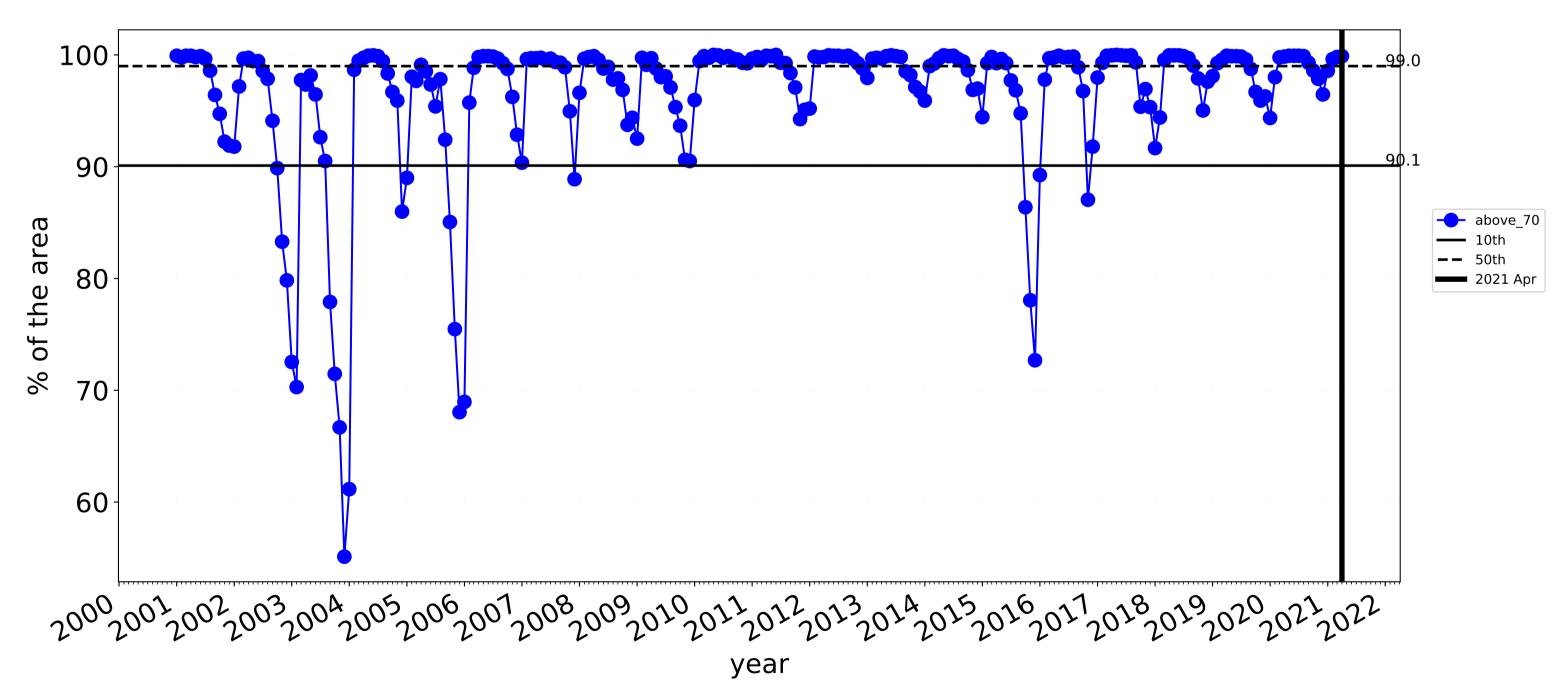
2?3





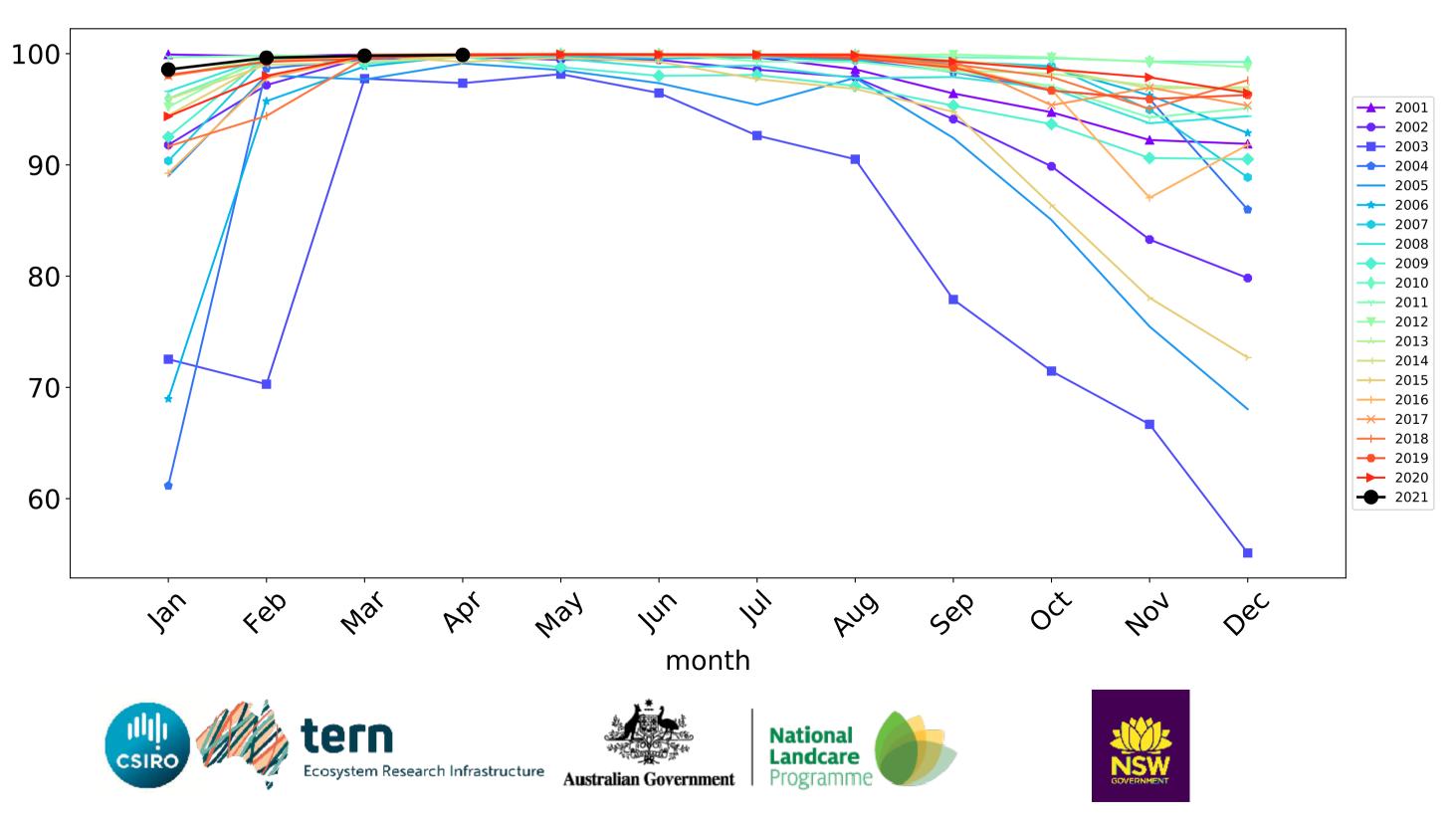


Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

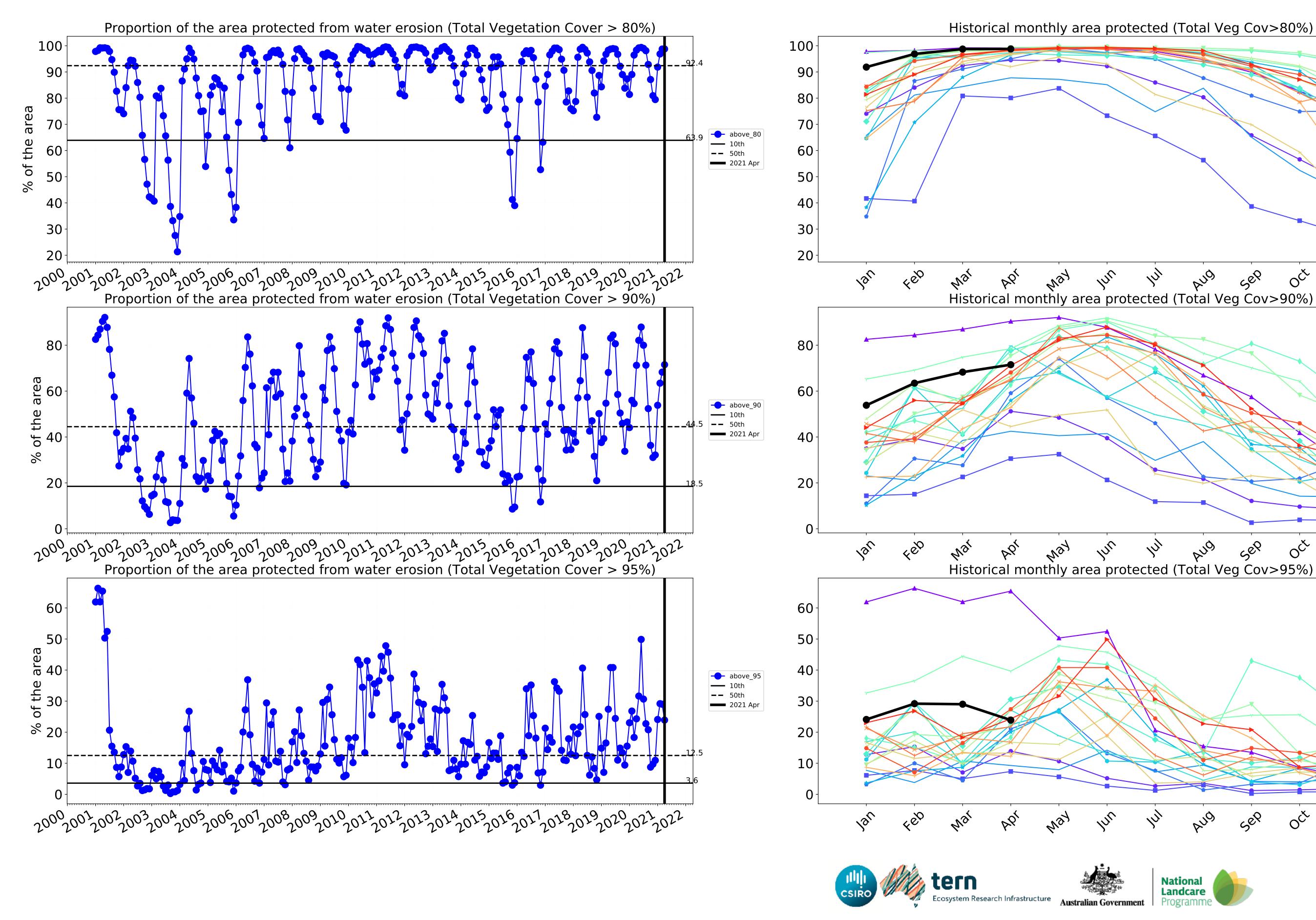


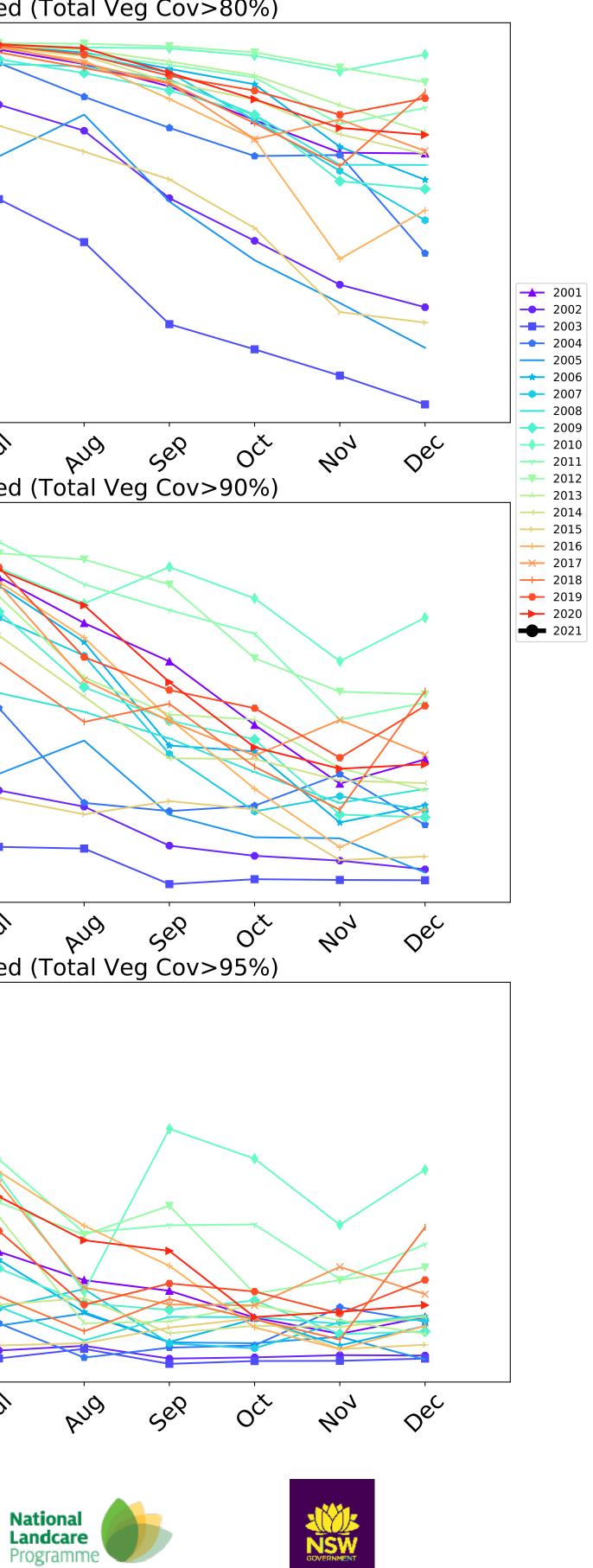
Grazing non forest timeseries

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



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





Grazing Woodland forest

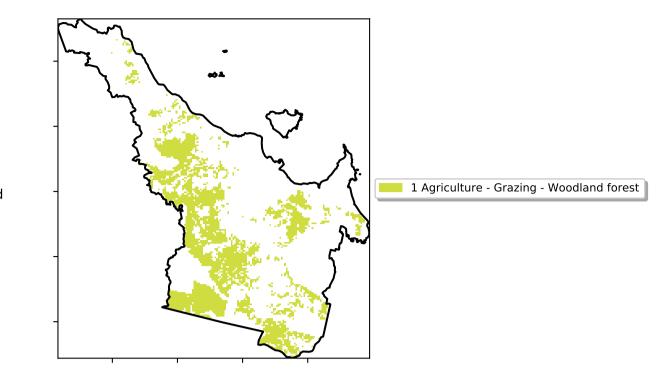
120/07/00%

· 52% 70%

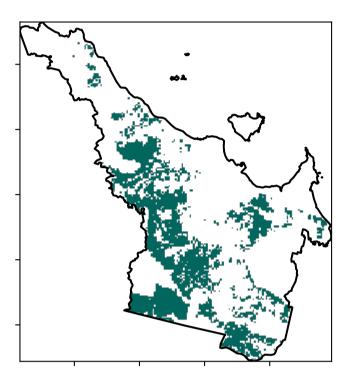
32005000

0.30%

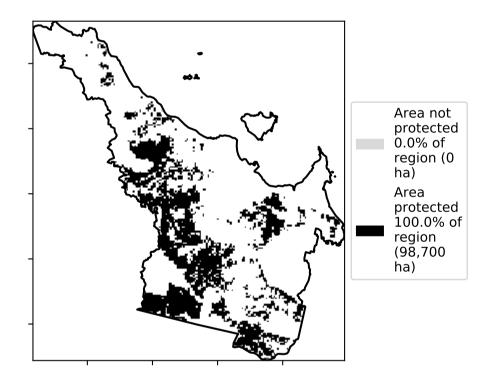
Land use and forest cover



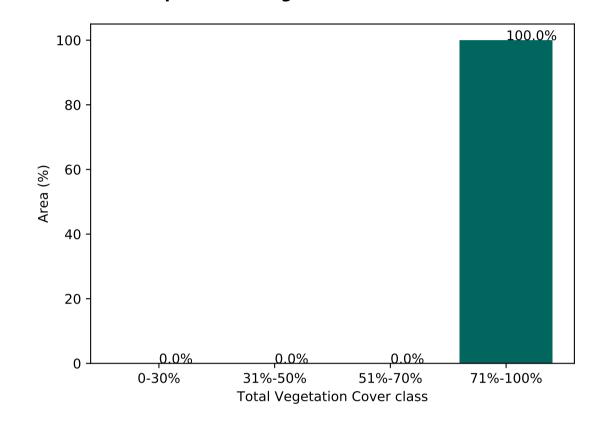
Total Vegetation Cover [%]



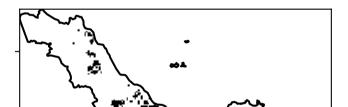




Proportion of vegetation cover class in area

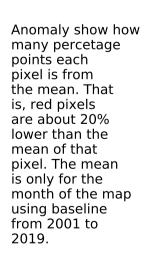


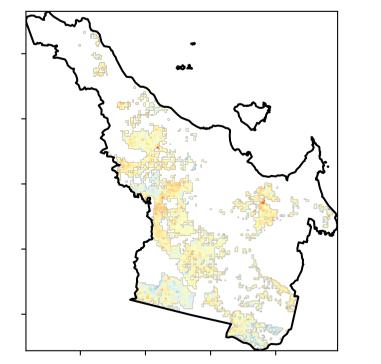
% Area protected from wind erosion (>50%)

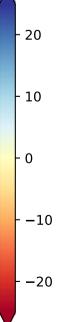


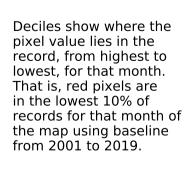
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

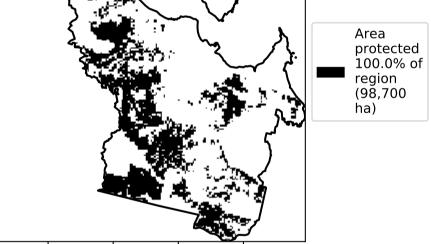
Total Vegetation Cover Anomaly [%]

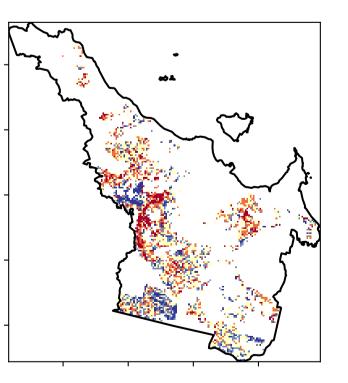


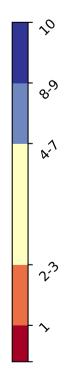






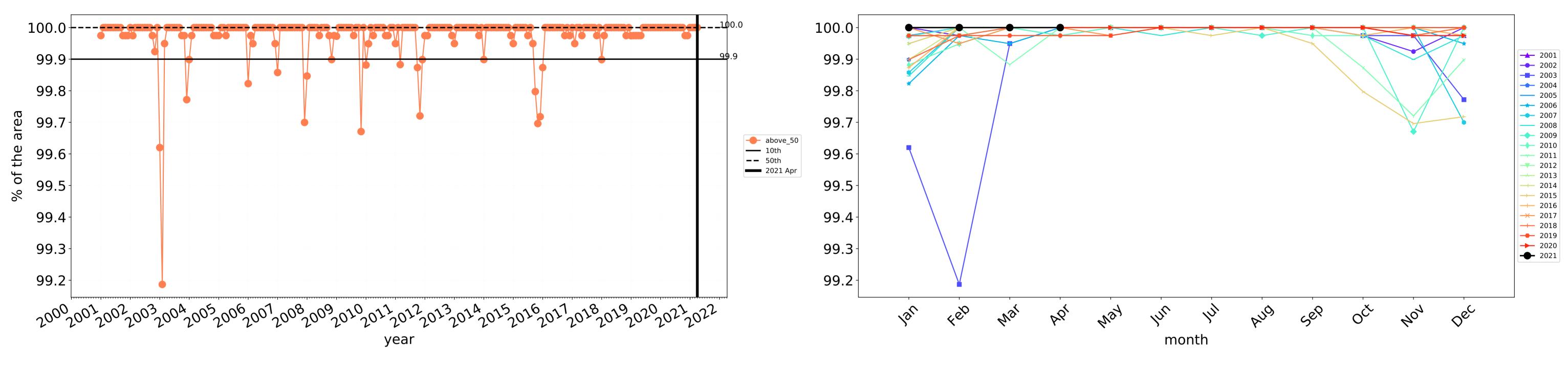






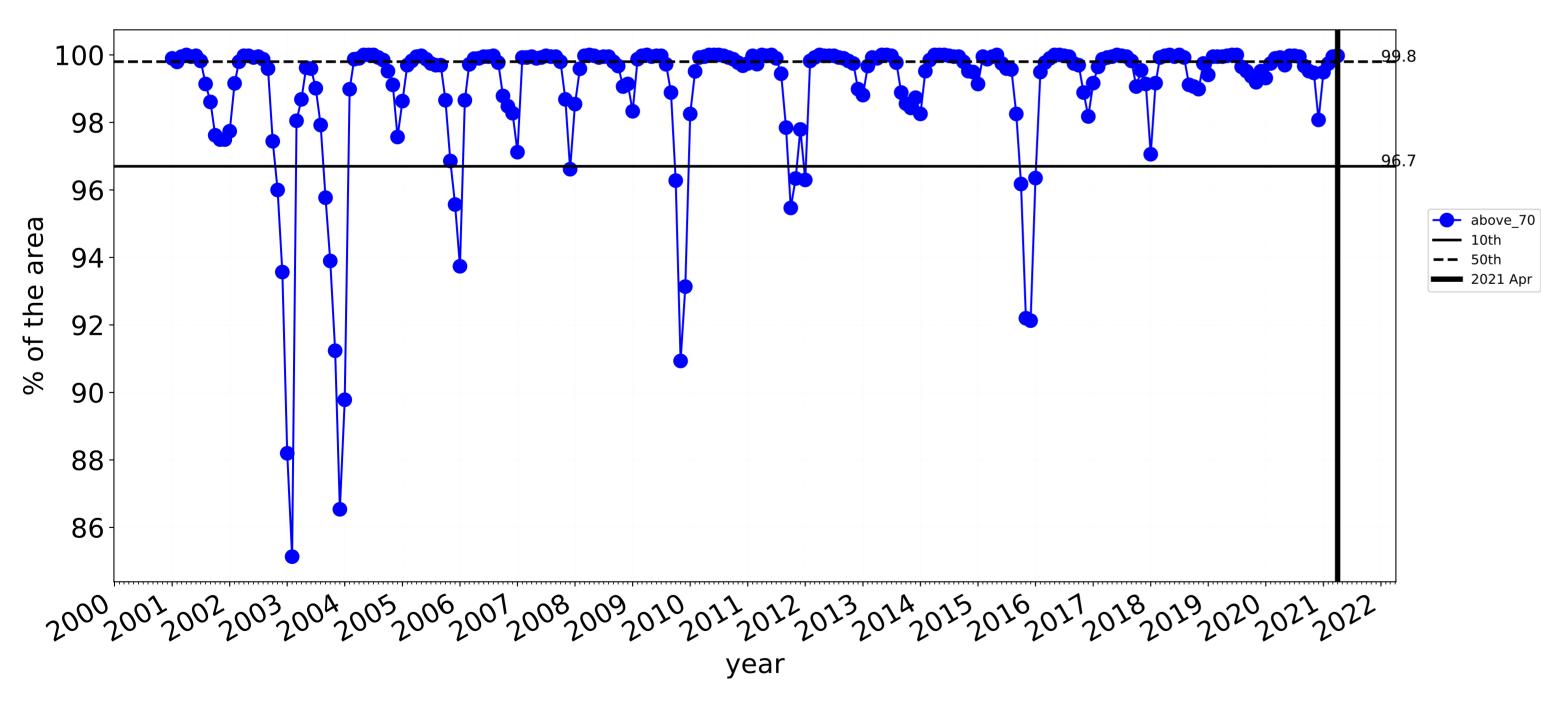


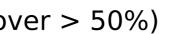
Grazing Woodland forest timeseries



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

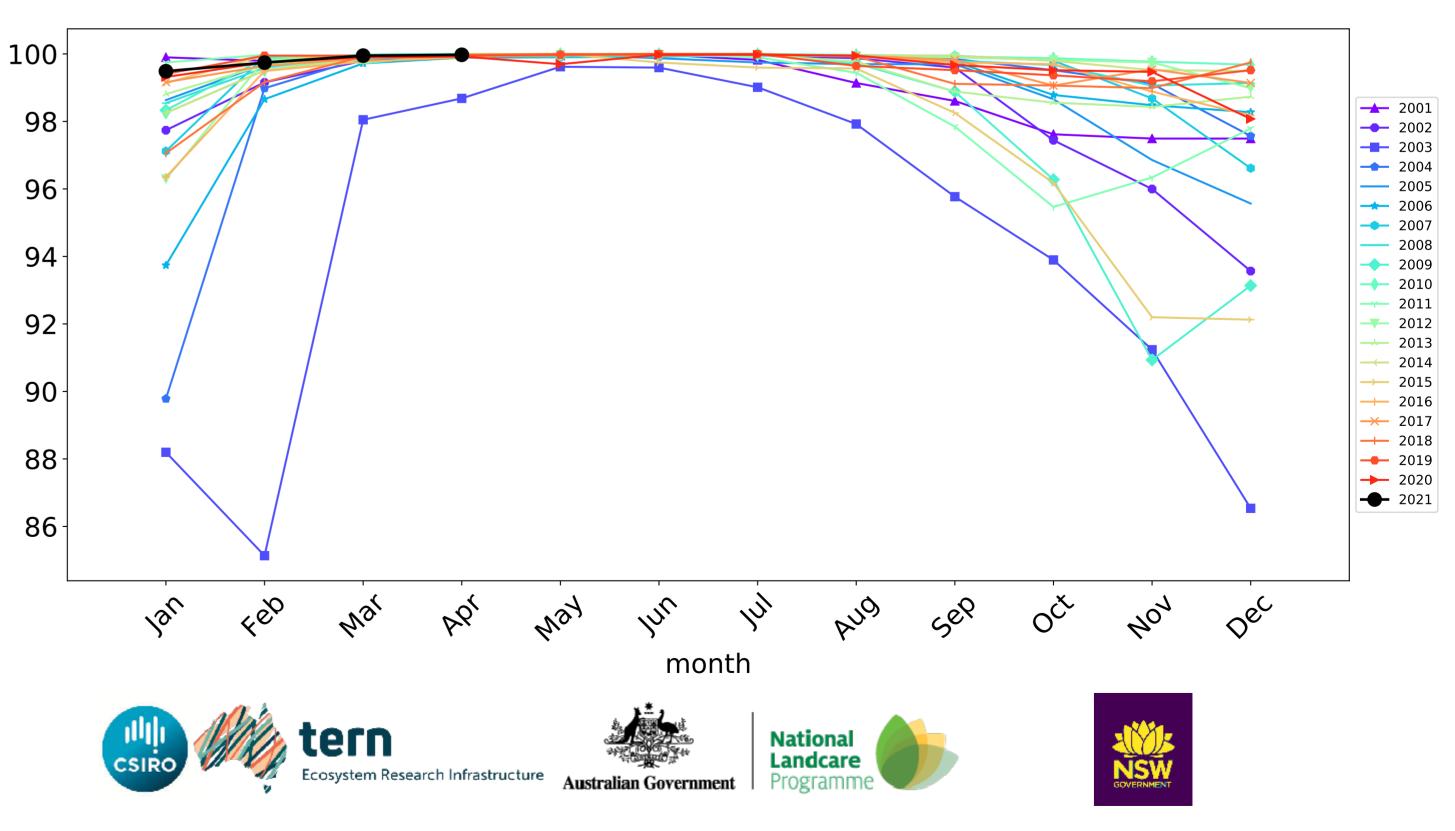
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

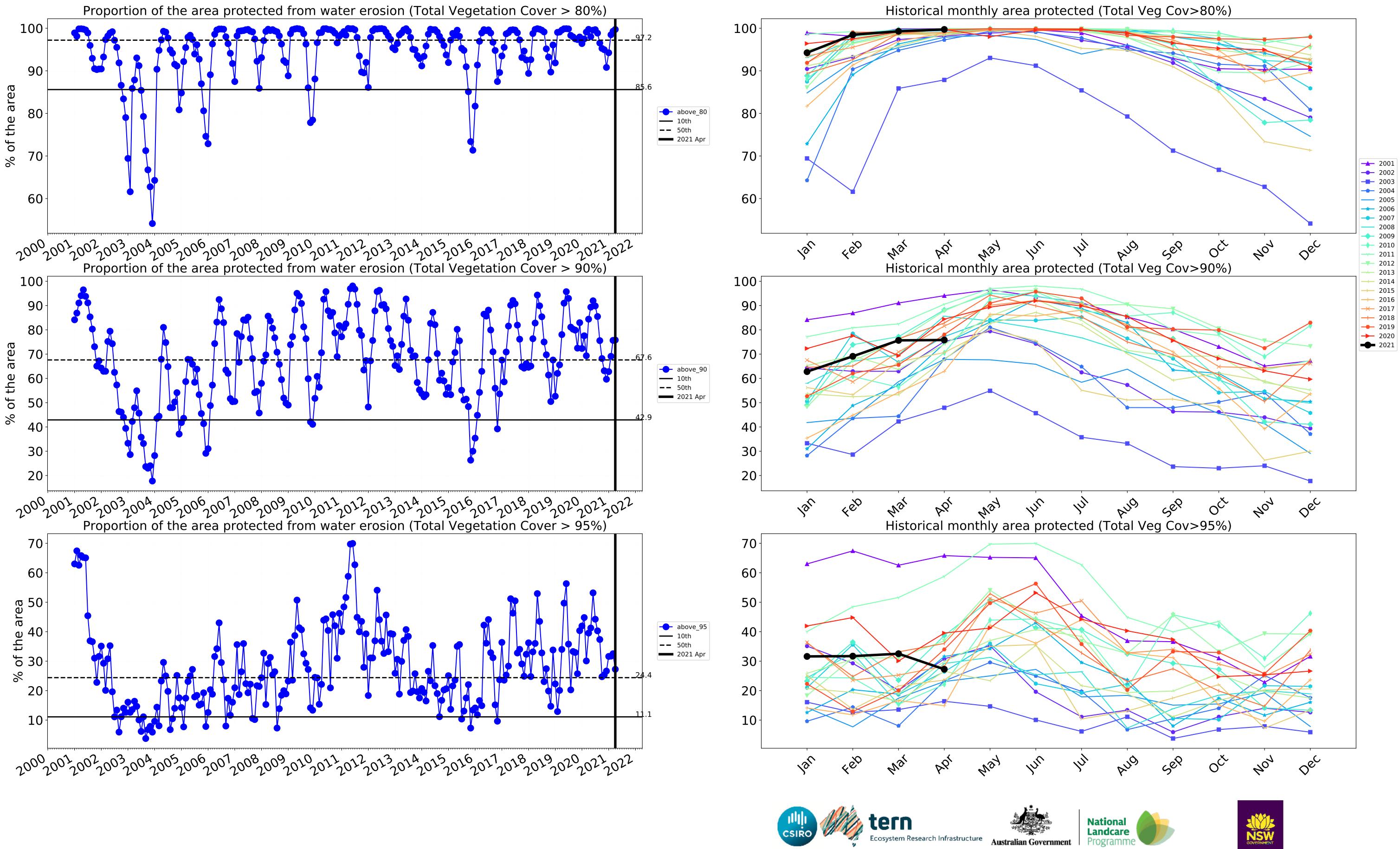


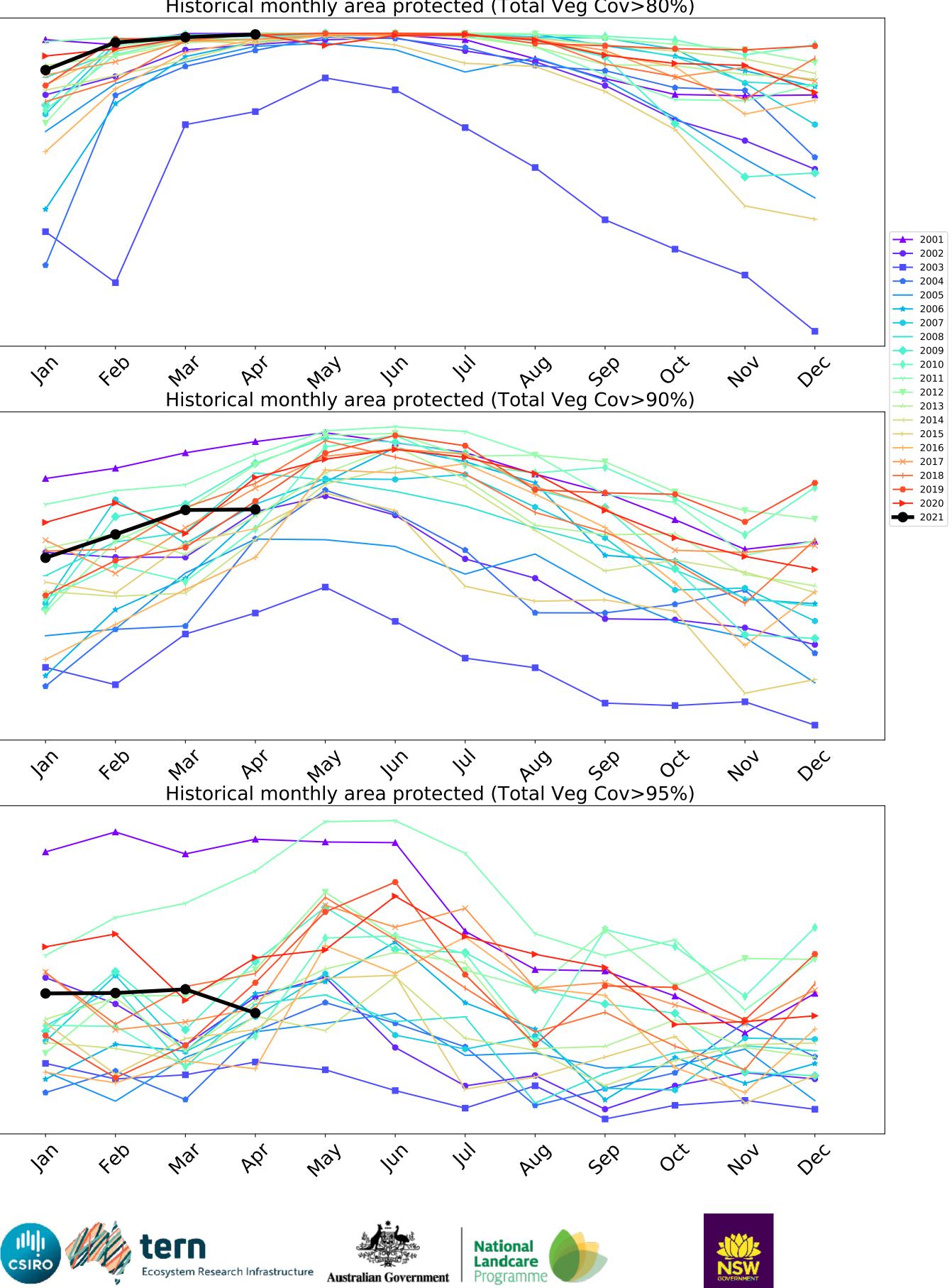


Wind erosion historical monthly area protected (Total Veg Cov >50%)

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







Grazing - Forest (non woodland)

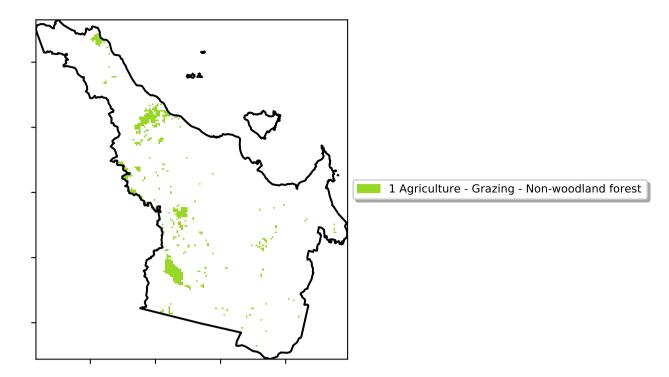
12º10-200010

52°10'70°10

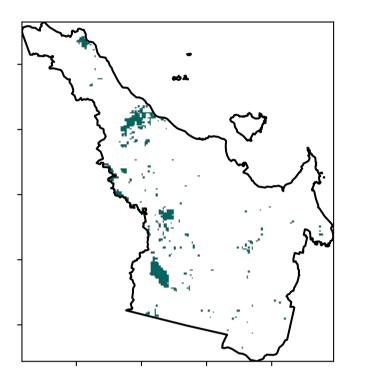
3201050010

0.30%

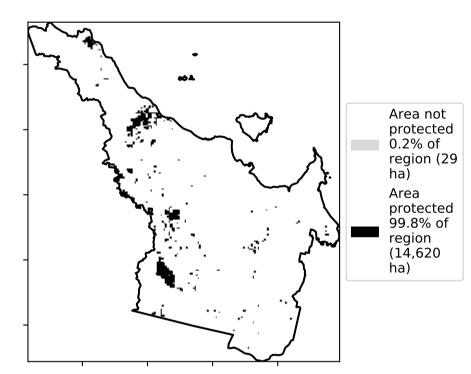
Land use and forest cover



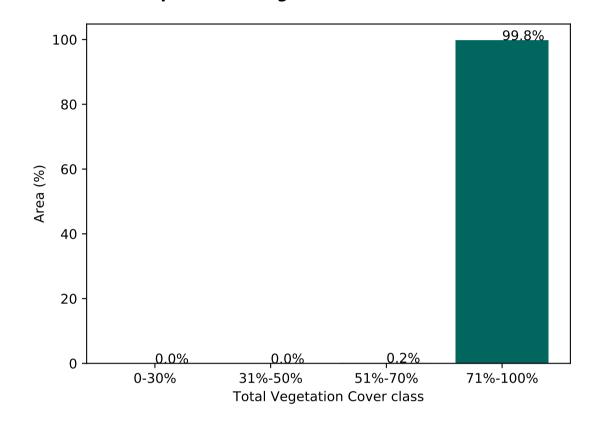
Total Vegetation Cover [%]



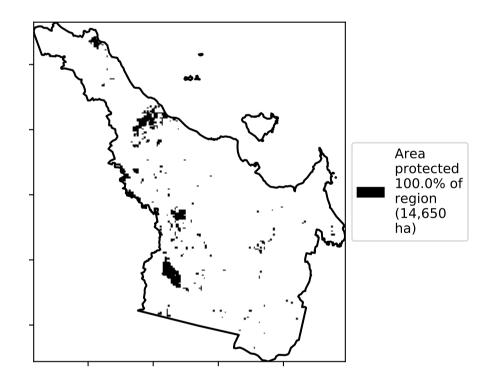




Proportion of vegetation cover class in area

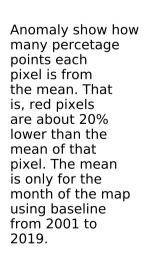


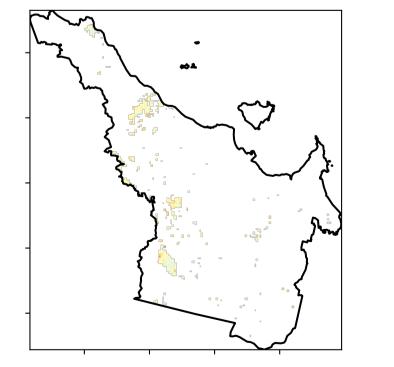
% Area protected from wind erosion (>50%)

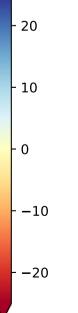


Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

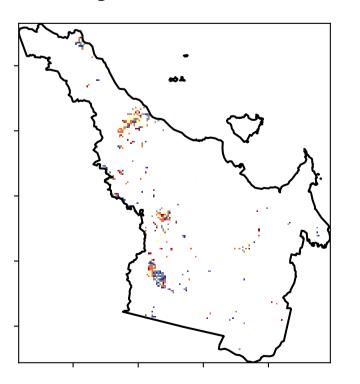
Total Vegetation Cover Anomaly [%]

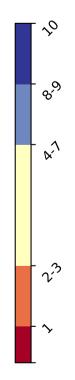






Total Vegetation Cover Decile [%]





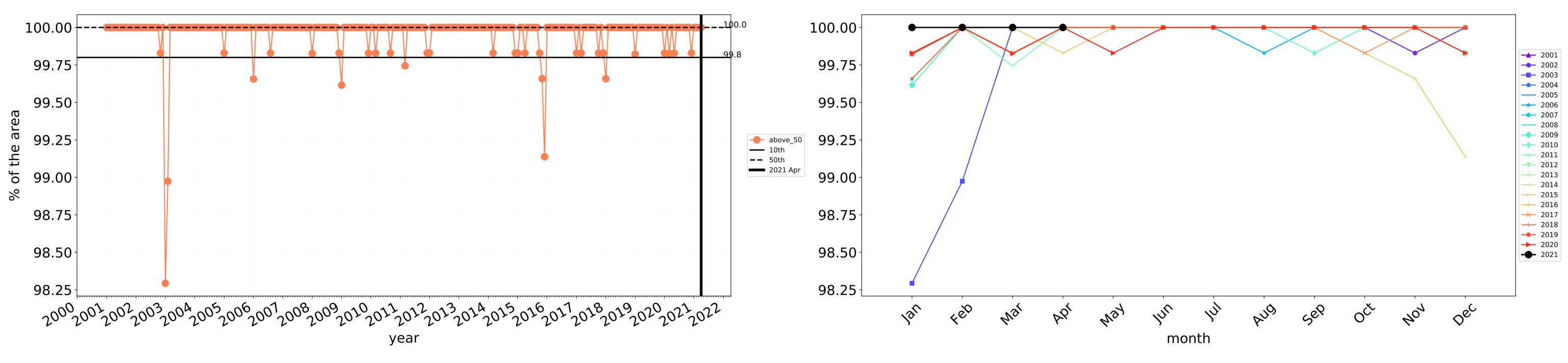


Deciles show where the pixel value lies in the

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

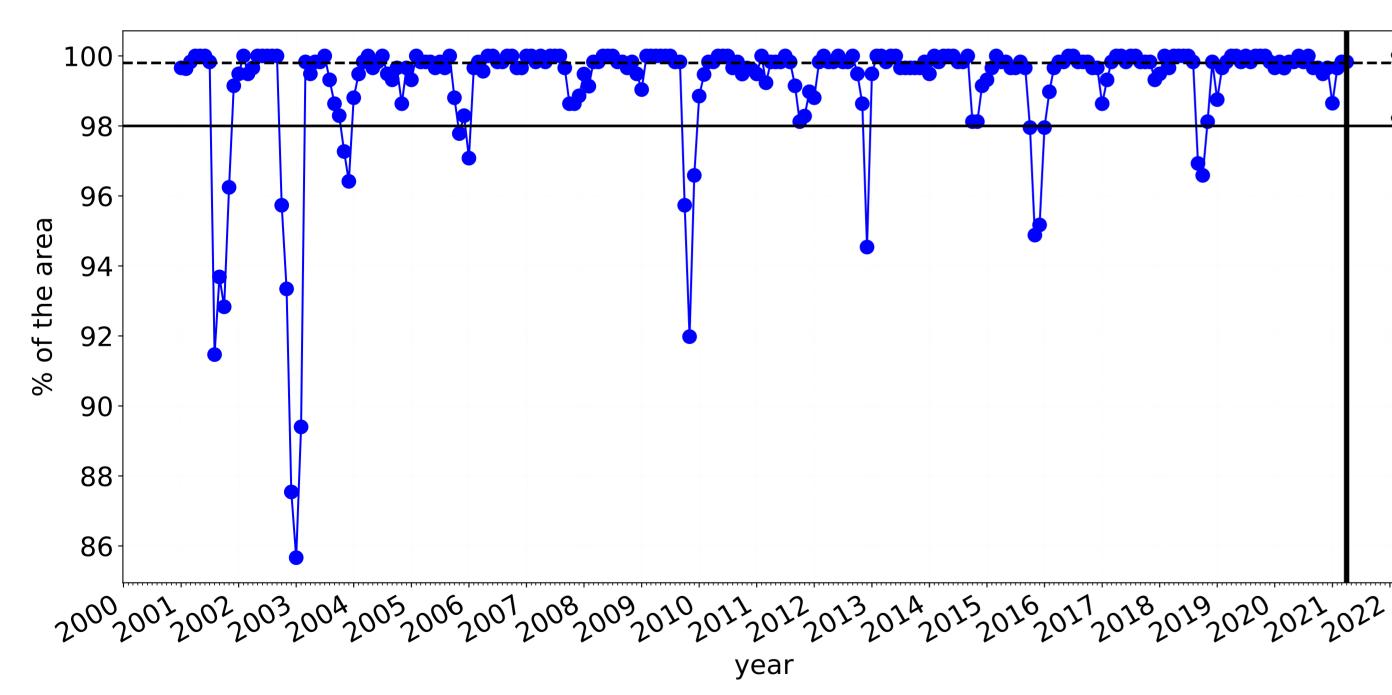
records for that month of

the map using baseline from 2001 to 2019.



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

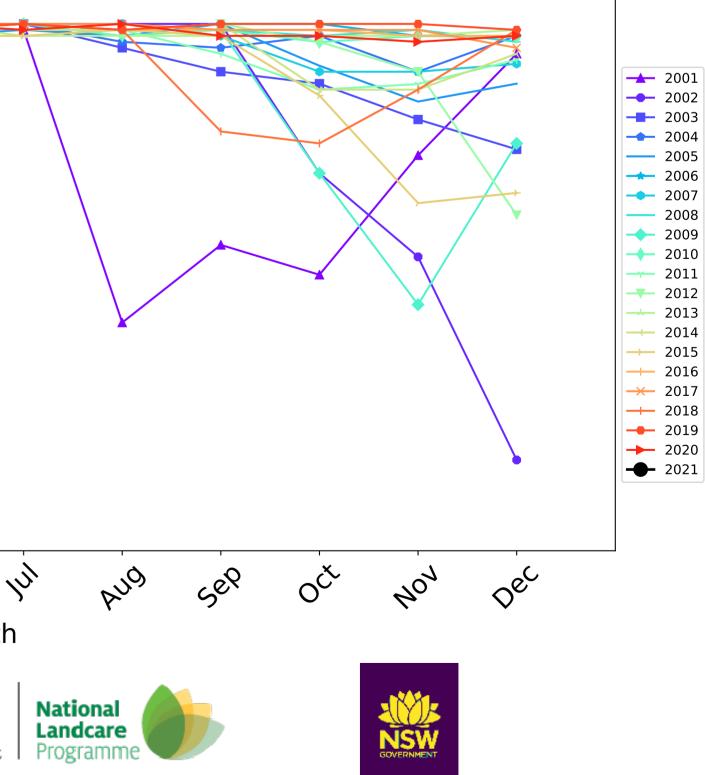
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

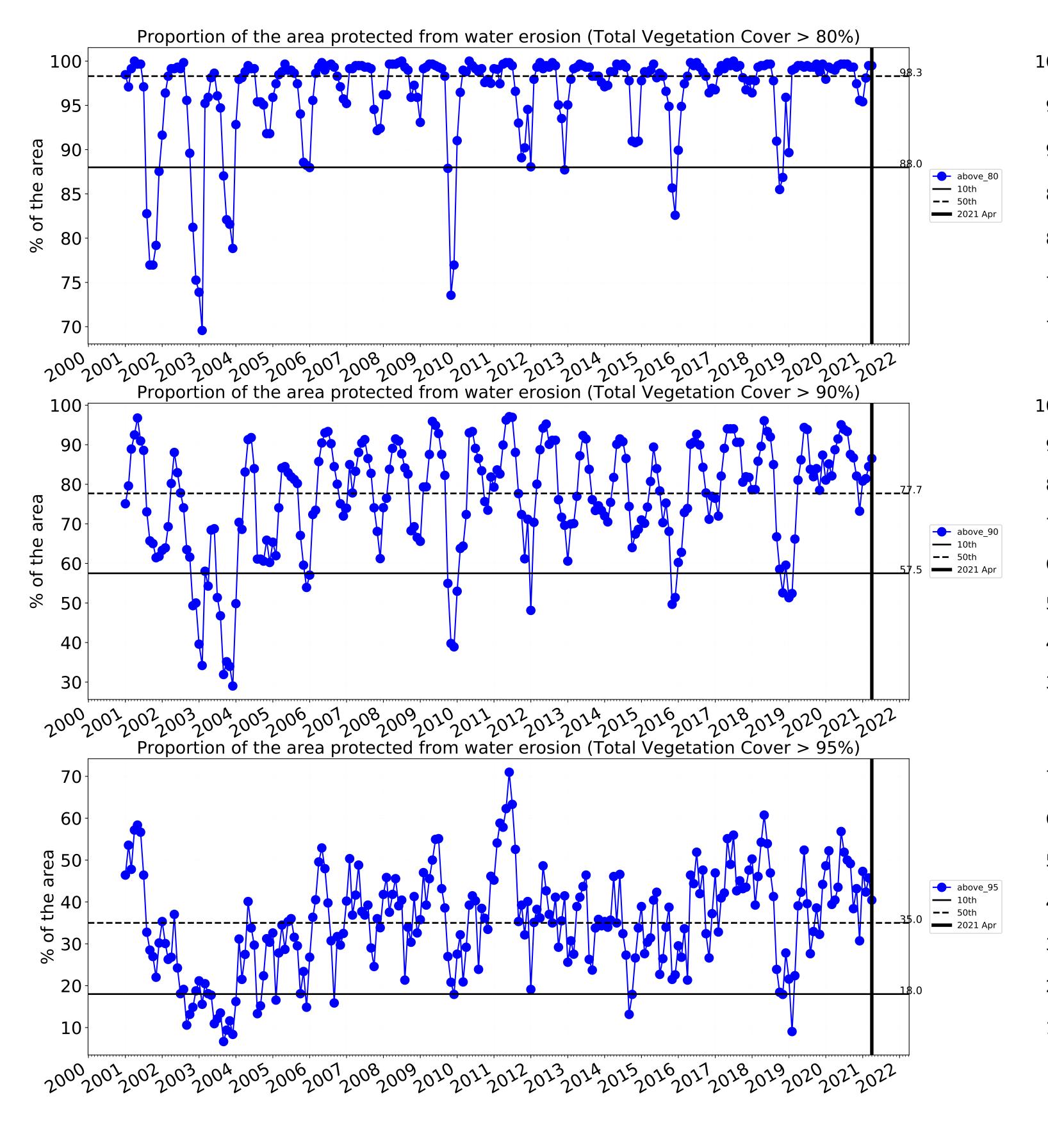


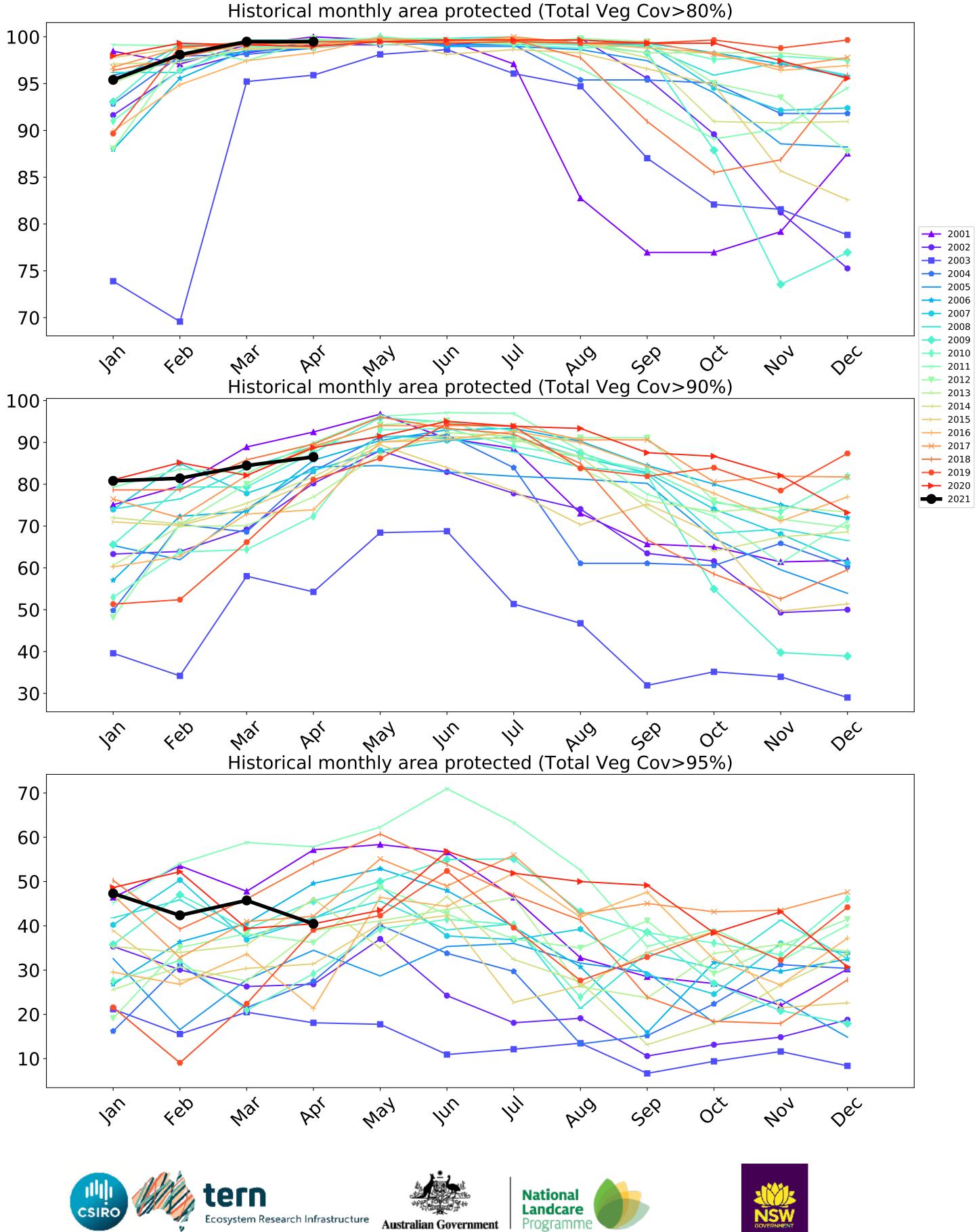
Wind erosion historical monthly area protected (Total Veg Cov >50%)

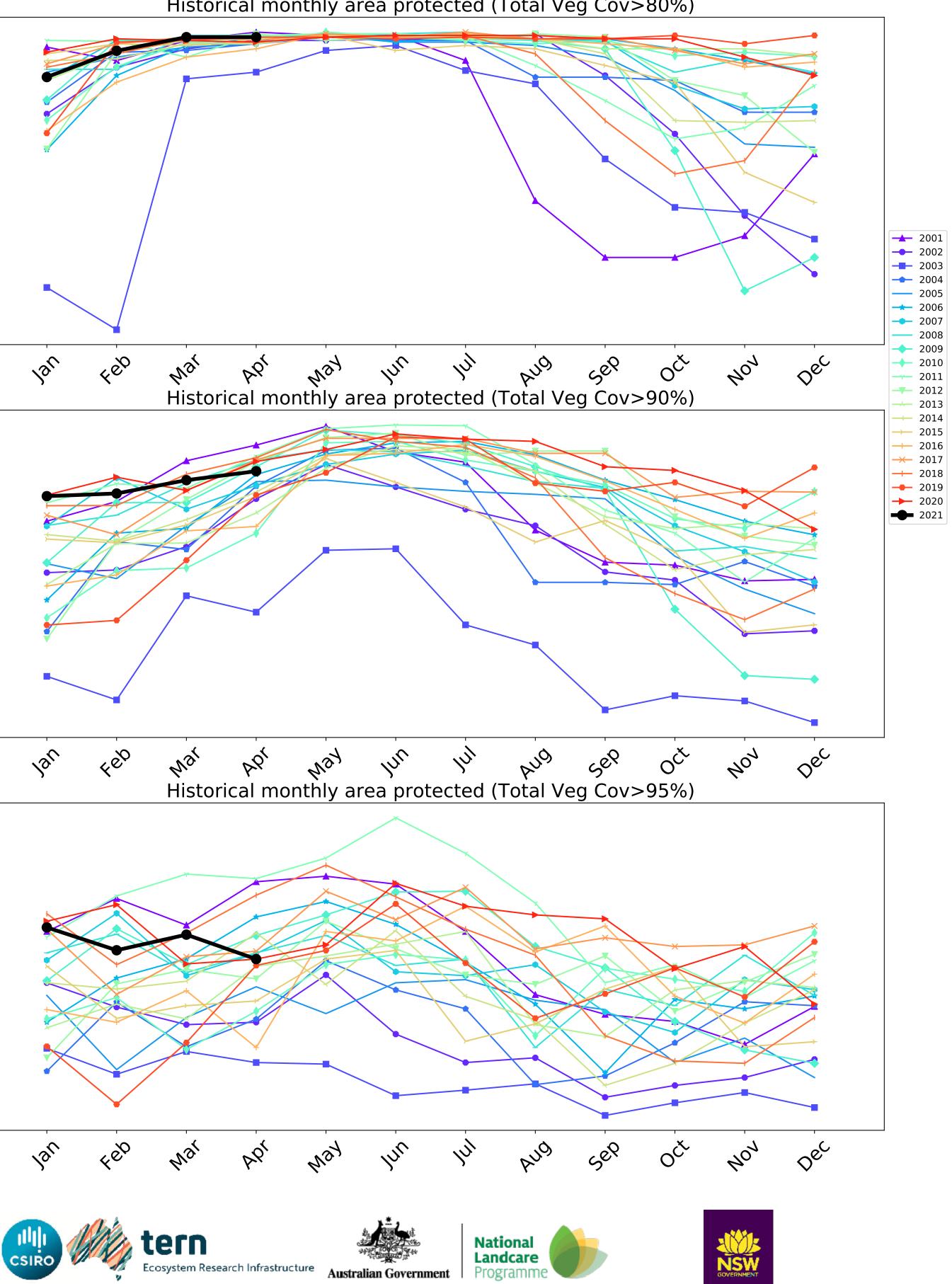
100 98 96 ---- above_70 **—** 10th **--** 50th 94 **—** 2021 Apr 92 90 88 86 4eb lan Inu way War PQ month min tern Ecosystem Research Infrastructure Australian Government

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







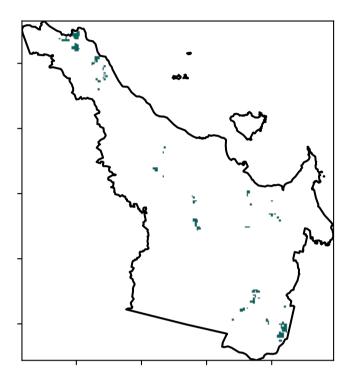


Irrigation

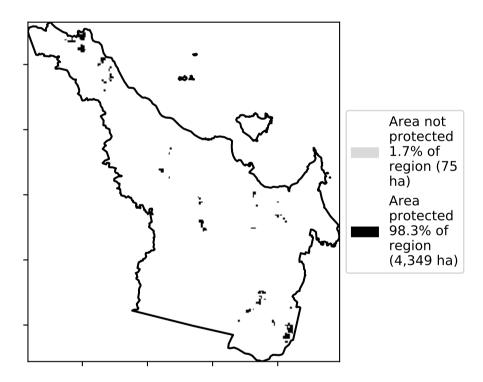
40 A Catchment Scale Land Use and Forests of Australia (2018) 1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated Catchment Scale Land 3 Agriculture - Horticulture - Irrigated

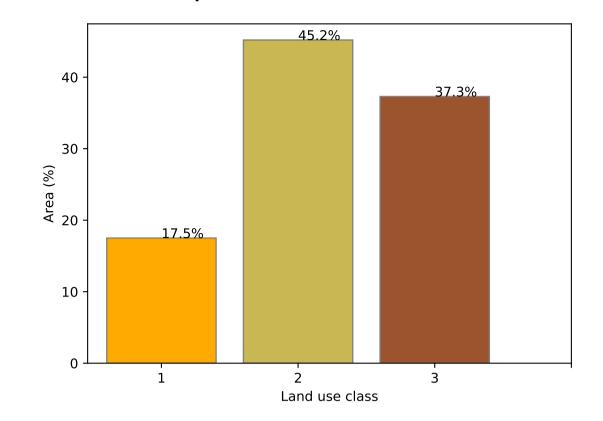
Total Vegetation Cover [%]

Land use and forest cover



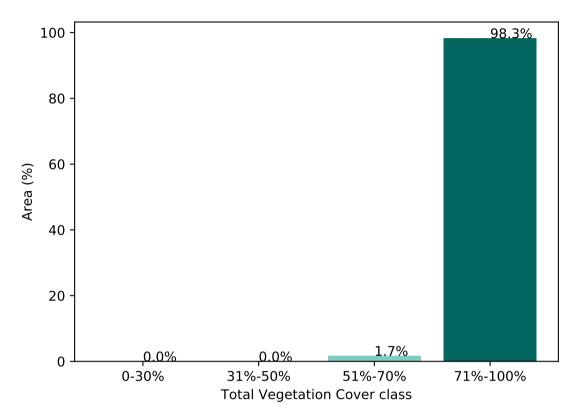




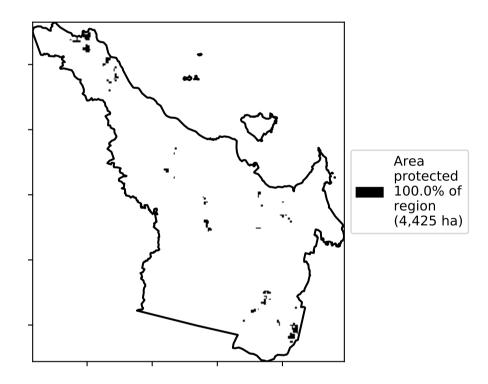


Proportion of each land class in area

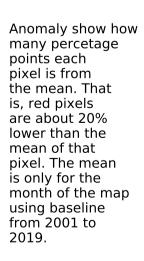
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)

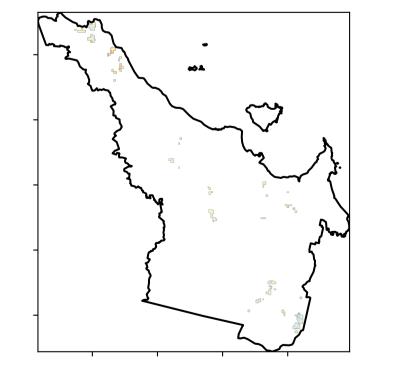


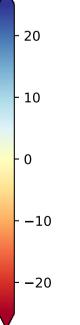
Total Vegetation Cover Anomaly [%]



Derived from

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





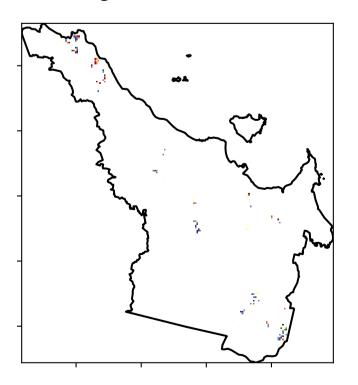
12%200%

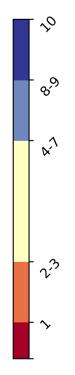
· 52°10°10°10

32°10'50010

0.30%

Total Vegetation Cover Decile [%]







Deciles show where the

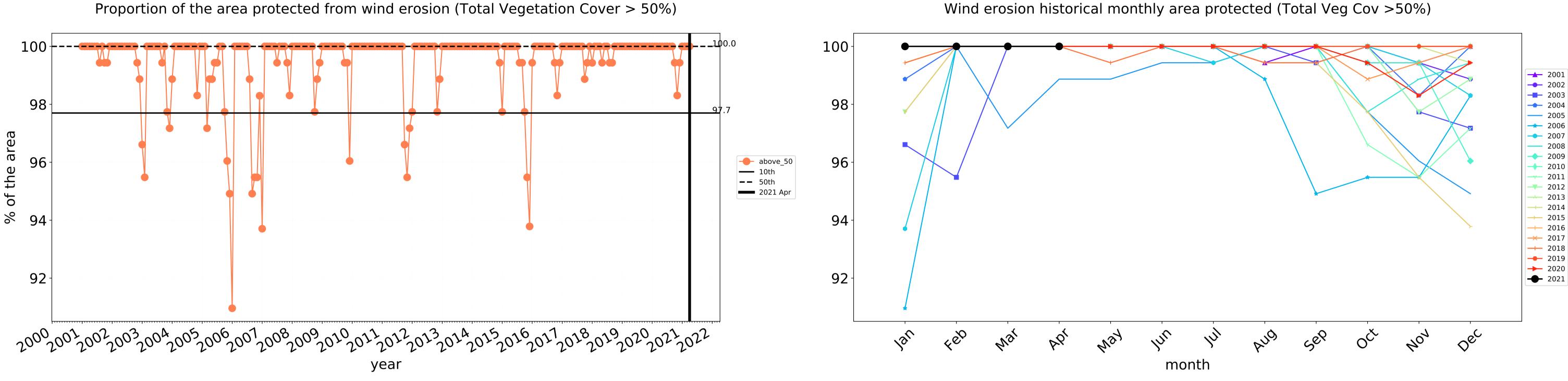
pixel value lies in the

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

records for that month of

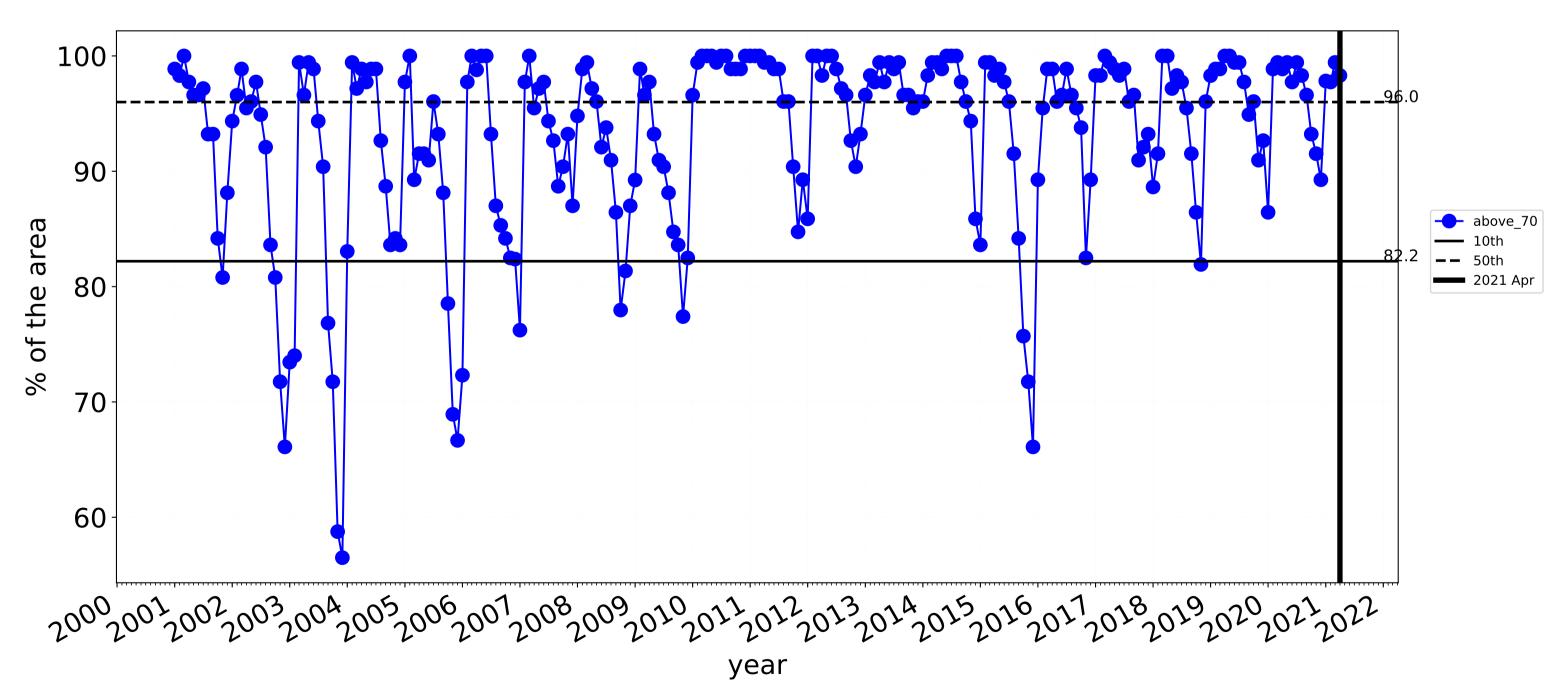
the map using baseline from 2001 to 2019.

in the lowest 10% of



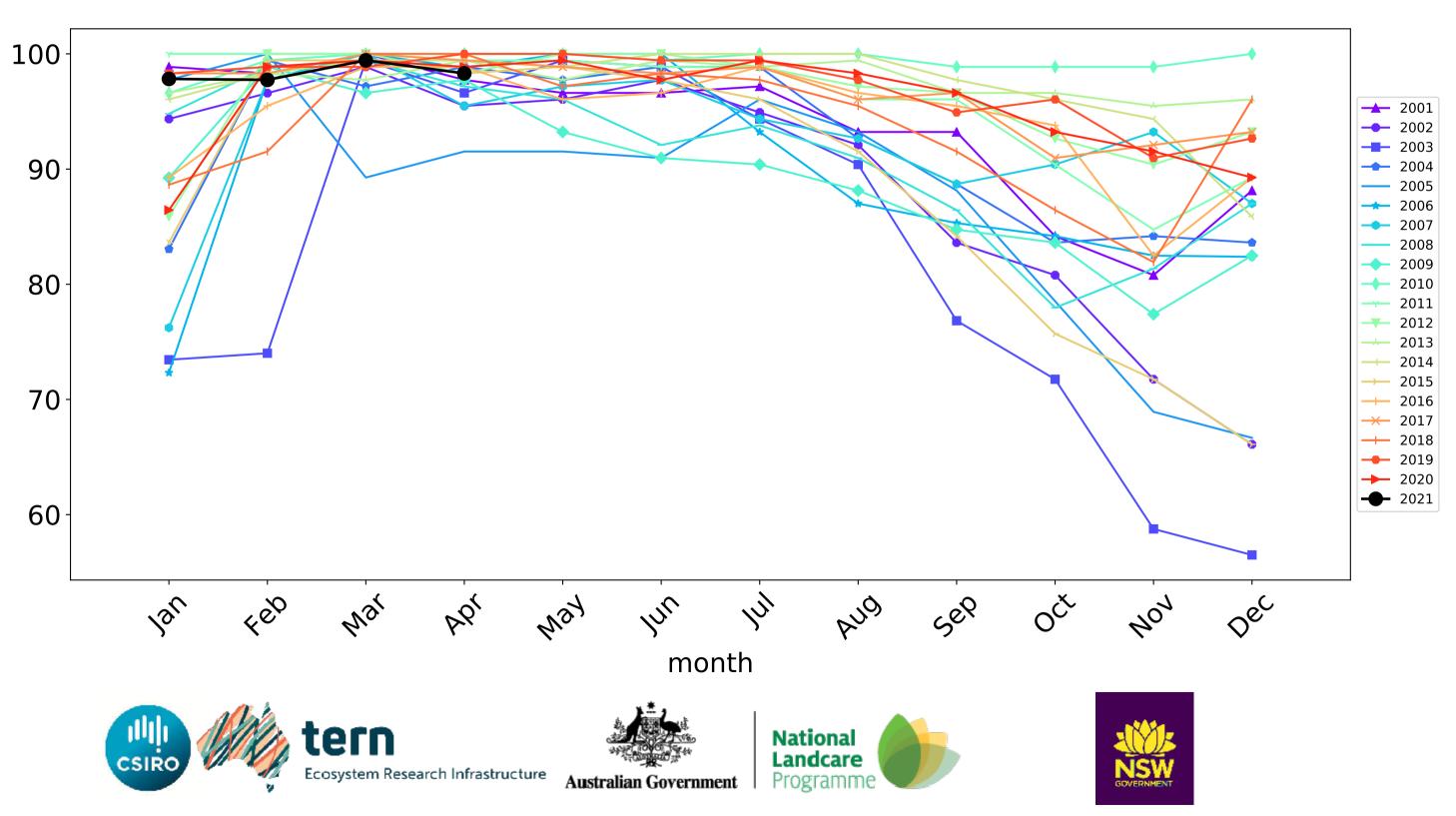
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

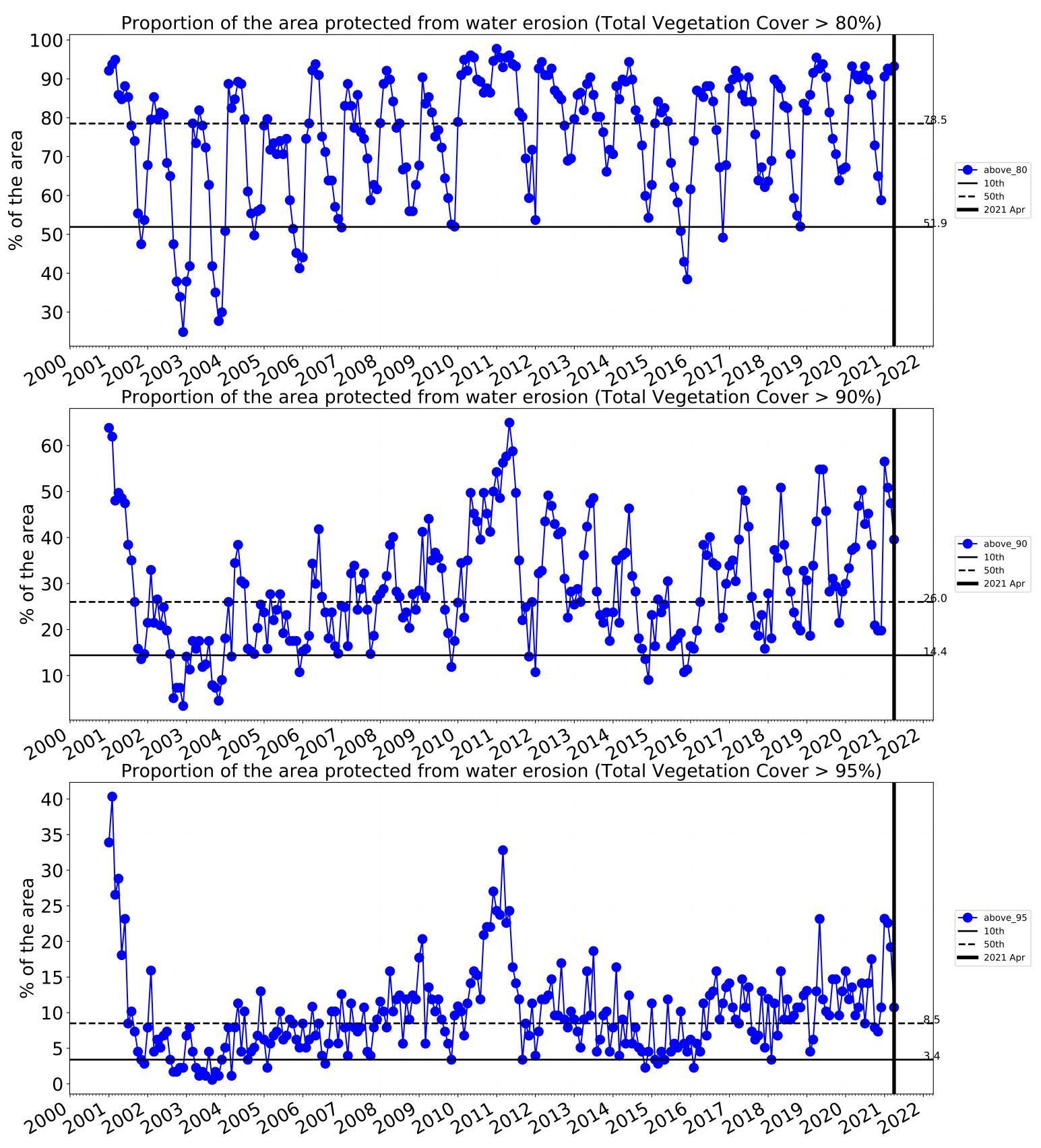
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

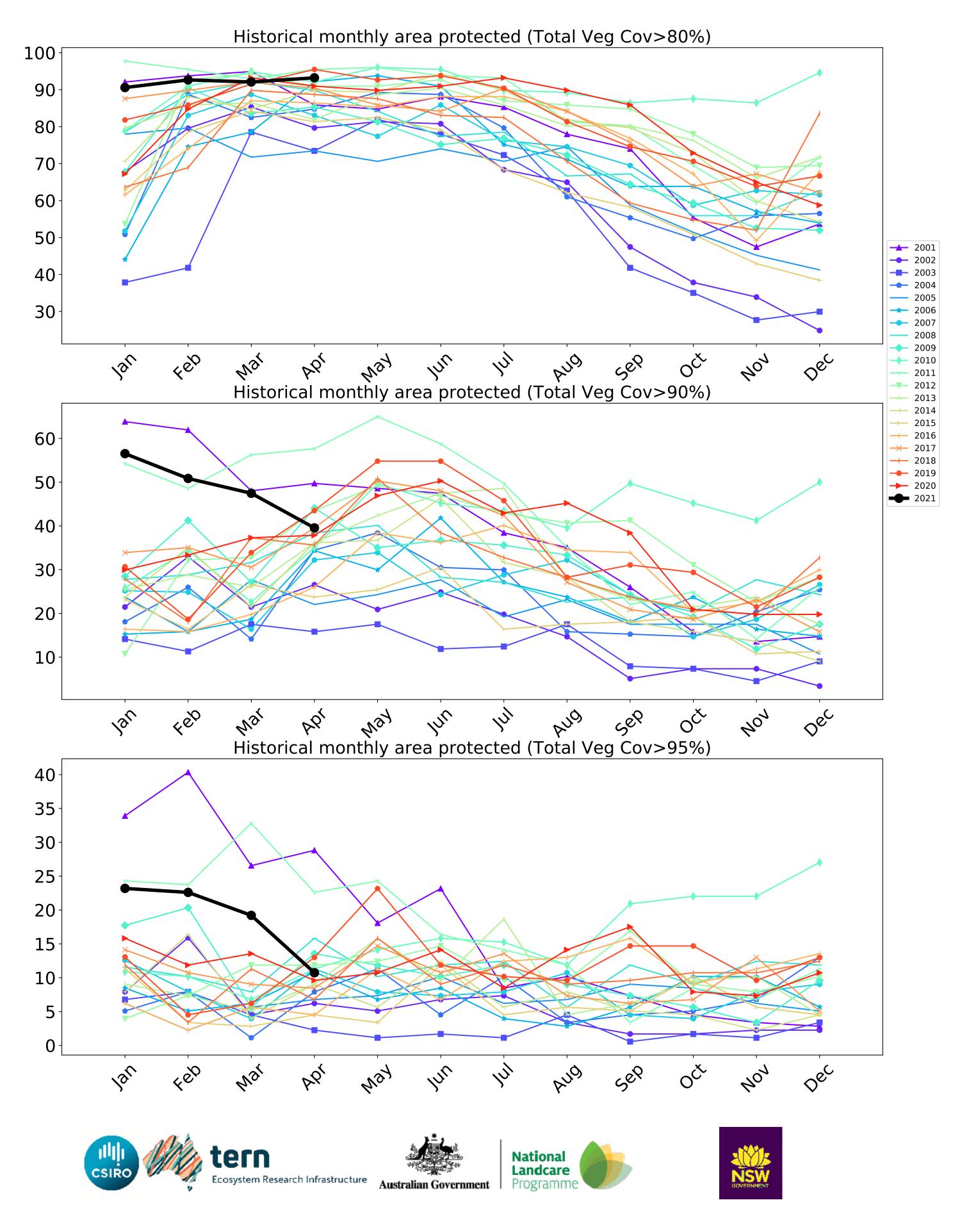


Irrigation timeseries

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

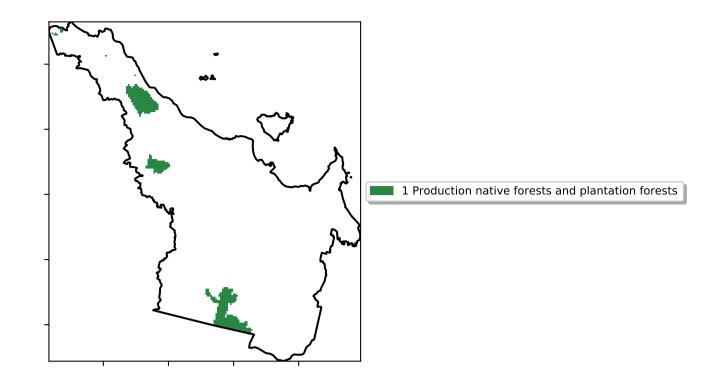




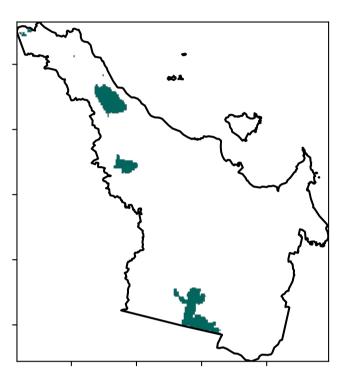


Production native forests and plantation forests

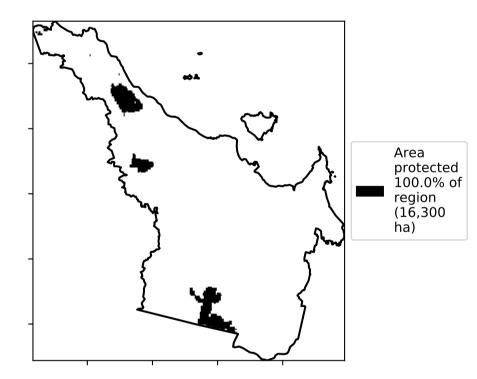
Land use and forest cover



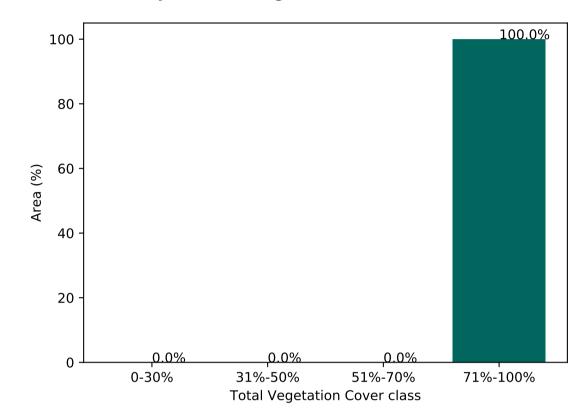
Total Vegetation Cover [%]



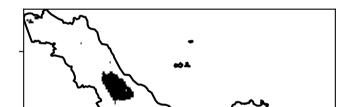




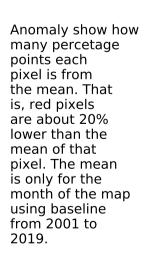




% Area protected from wind erosion (>50%)

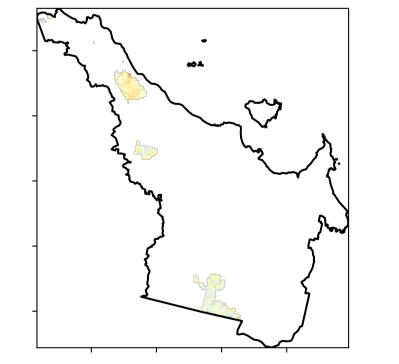


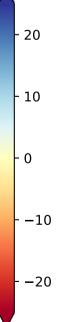
Total Vegetation Cover Anomaly [%]



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

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



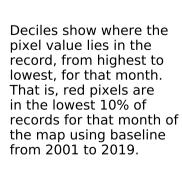


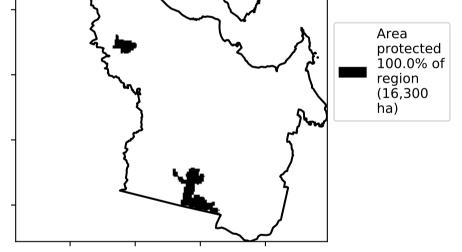
12º100010

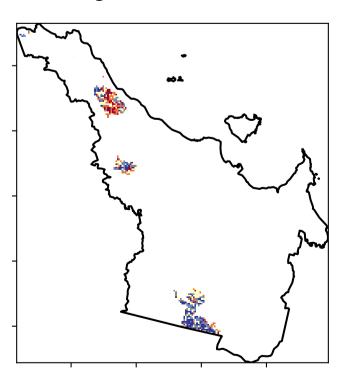
· 52% 70%

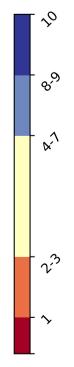
3201050010

0.30%

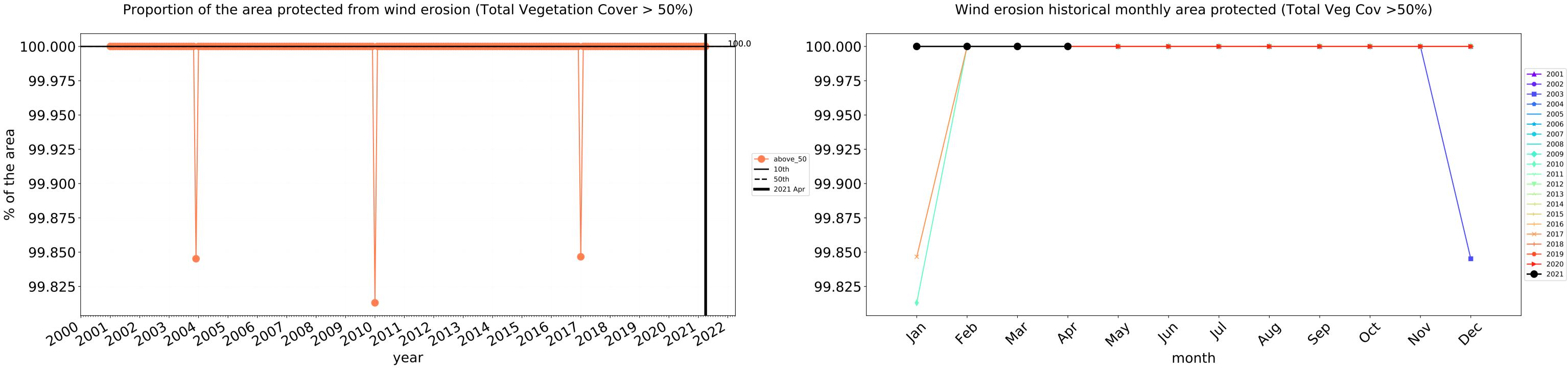




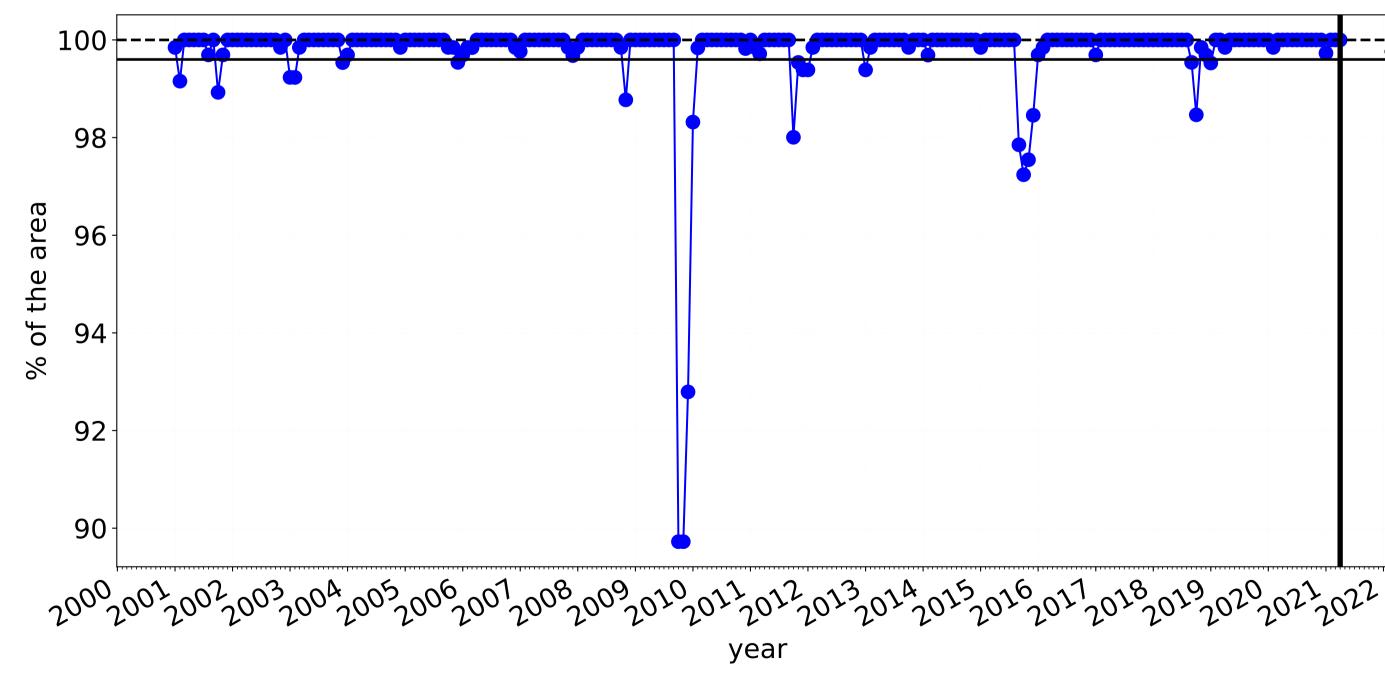






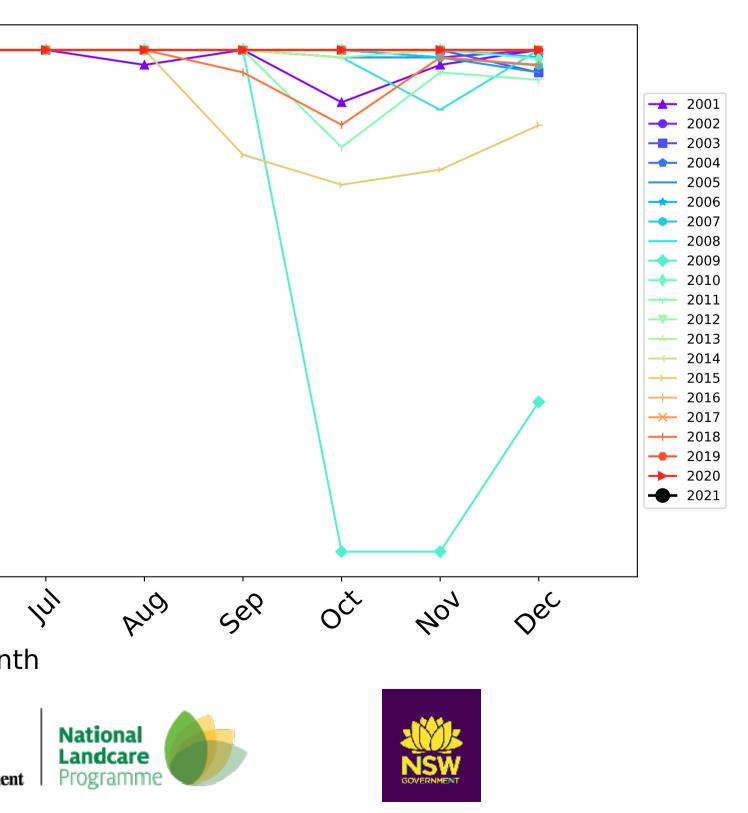


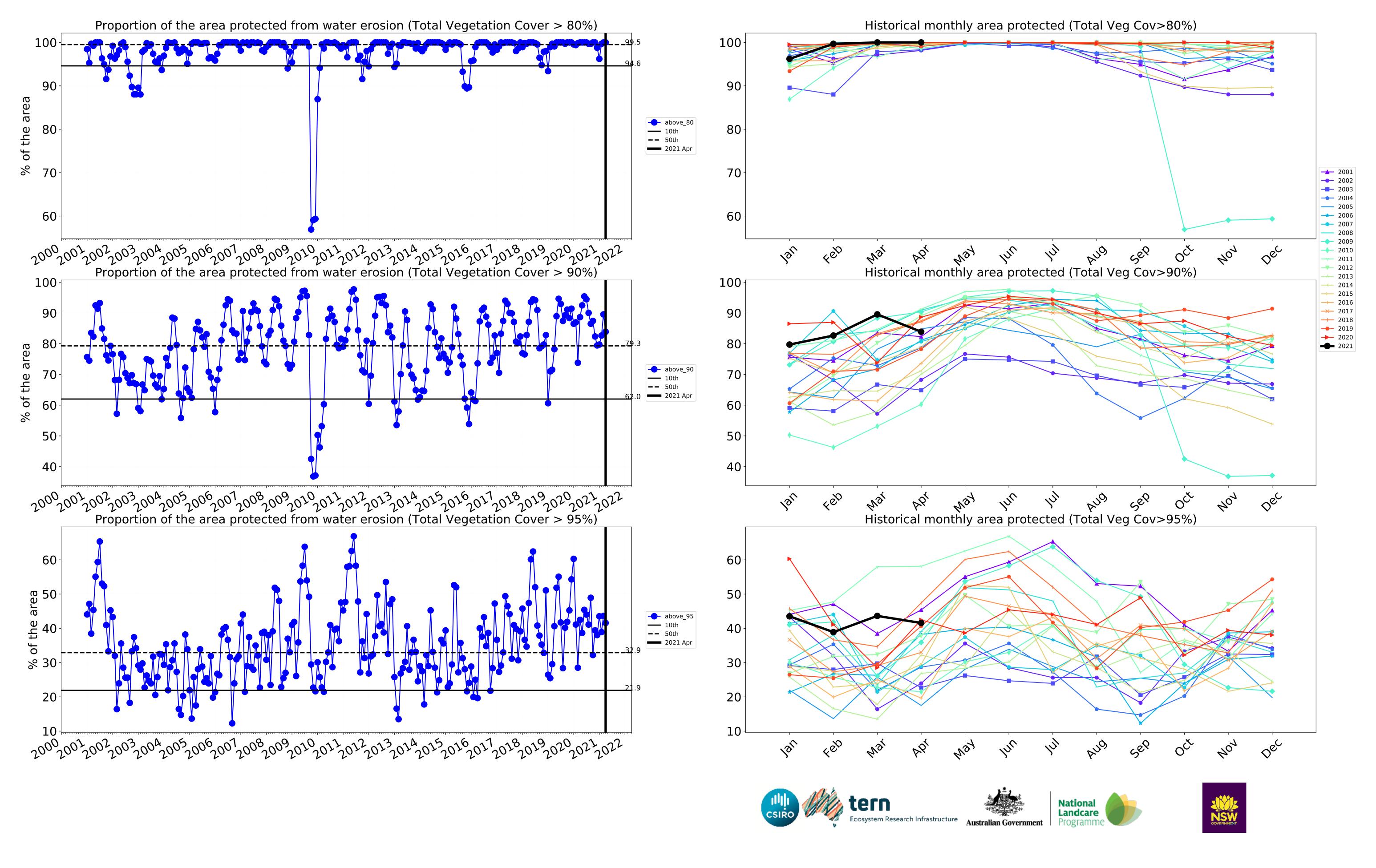
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)



100.0 100 _99.6 98 ---- above_70 **——** 10th 96 **——** 50th **—** 2021 Apr 94 92 90 4eb In Way Mar PQ Jan month tern Ecosystem F Ecosystem Research Infrastructure Australian Government

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





Townsville_(C) (361,325 ha and no data 11,860 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	361,325	99.9% 360,975	99.7% 360,275	98.2% 354,900	95.2% 343,950	69.3% 250,350	27.1% 97,850
Conservation and natural environments	118,900	99.9% 118,800	99.8% 118,625	98.8% 117,450	95.8% 113,900	72.3% 85,950	31.5% 37,450
Conservation and natural environments non forest	15,825	100.0% 15,825	99.2% 15,700	95.9% 15,175	87.4% 13,825	57.2% 9,050	32.9% 5,200
Conservation and natural environments Woodland forest	56,925	99.9% 56,875	99.8% 56,825	99.4% 56,575	97.5% 55,500	72.2% 41,100	29.8% 16,950
Conservation and natural environments Forest (non woodland)	46,150	99.9% 46,100	99.9% 46,100	99.0% 45,700	96.6% 44,575	77.6% 35,800	33.2% 15,300
Agriculture	186,500	100.0% 186,500	100.0% 186,500	99.9% 186,300	99.2% 185,025	74.1% 138,250	26.7% 49,800
Grazing	181,350	100.0% 181,350	100.0% 181,350	99.9% 181,225	99.4% 180,175	75.1% 136,125	27.1% 49,075
Grazing non forest	68,000	100.0% 68,000	100.0% 68,000	99.9% 67,925	98.8% 67,175	71.5% 48,625	23.9% 16,250
Grazing Woodland forest	98,700	100.0% 98,700	100.0% 98,700	100.0% 98,675	99.7% 98,425	75.8% 74,825	27.3% 26,900
Grazing - Forest (non woodland)	14,650	100.0% 14,650	100.0% 14,650	99.8% 14,625	99.5% 14,575	86.5% 12,675	40.4% 5,925
Irrigation	4,425	100.0% 4,425	100.0% 4,425	98.3% 4,350	93.2% 4,125	39.5% 1,750	$\begin{array}{c} 10.7\% \\ 475 \end{array}$
Production native forests and plantation forests	16,300	100.0% 16,300	100.0% 16,300	100.0% 16,300	100.0% 16,300	83.9% 13,675	41.6% 6,775

