Total vegetation cover soil protection
Region:NRM Western NSW   Date: November 2019

This report describes vegetation protecting the soil surface from erosion during a chosen month compared to previous years. This report has been generated using MODIS fractional vegetation cover information available in Rangelands and Pasture Productivity (RAPP) map tool https://map.geo-rapp.org/#australia. The report is based on 500 metre pixel data on monthly time steps.
Land use forest cover:

Results can be shown for the whole region (polygon), and separated by land use and forest cover classes which are likely to show different cover patterns and targets. Land use is divided into four broad classes: Conservation and natural environments, Agriculture, production native forests and plantation forests (no report), and other (no report). Agriculture is divided into grazing, crops and horticulture which are sub-divided into non-irrigated and irrigated. If forest is present land use is further divided into: non-forest, woodland forest and non-woodland forest. The area of each land use and forest class are shown as a map and chart. The report content is repeated for each land use and forest cover class that covers at least 1% of the area of the chosen region.
Total vegetation Cover:

The total vegetation cover indicates where soil is likely to be protected from wind and or water hillslope erosion. Total vegetation cover for this month is shown on a map and chart classified into 4 classes.
   • 71-100% High cover – protected from wind and usually water erosion (high rainfall, steep
slopes, and erodible soils may need greater than 80, 90, 95 and up to 100% cover)
   • 51-70% Moderate cover – protected from wind erosion
   • 31-50% Low cover – not protected
   • 0-30% Very Low cover – not protected
Erosion protection: Wind erosion 50% total vegetation cover

The vegetation cover threshold required to prevent soil erosion is usually 50% to reduce wind erosion, 70% or 80% to reduce water (hillslope) erosion depending on the steepness and rainfall. Areas protected from erosion for the month:
   • Map: water erosion protection (>70% cover) percentage area and hectares.
   • Map: wind erosion protection (>50% cover) percentage area and hectares.
Comparison with previous years:

   • Map: anomaly comparing this month to the average cover from the same month in previous years.
   • Map: deciles rank of month against the same month in previous years.
Anomalies and deciles until September 2019 are calculated comparing to the same months 2001 to 2019. Extra monthly data will be used to calculate anomalies and deciles post September 2019 as they become available.
Time series monthly from January 2001 to current:

Erosion protection
   • Wind erosion protection time series: percentage of the area of the region with greater than 50% cover for
      each month (orange lines). Horizontal lines are 10th (cover target) and 50th percentiles.
   • Water erosion protection time series: percentage of the area of the region with greater than 70% cover for
      each month (blue line). Horizontal lines are 10th (cover target) and 50th percentiles.
Rainfall
   • Millimetres rainfall each month (black line).
Each time series is also stacked by year. The black line shows the current year of data.
Water erosion protection for higher rainfall and steeper slopes:

Water erosion protection on higher slopes. As slope increases, more cover is required to control water erosion. The thresholds reported are:
   • the percentage area with pixels greater than 80% total cover.
   • the percentage area with pixels greater than 90% total cover.
   • the percentage area with pixels greater than 95% total cover.

Acknowledgment of data:

1. http://www.agriculture.gov.au/abares/aclump/land-use/alum-classification

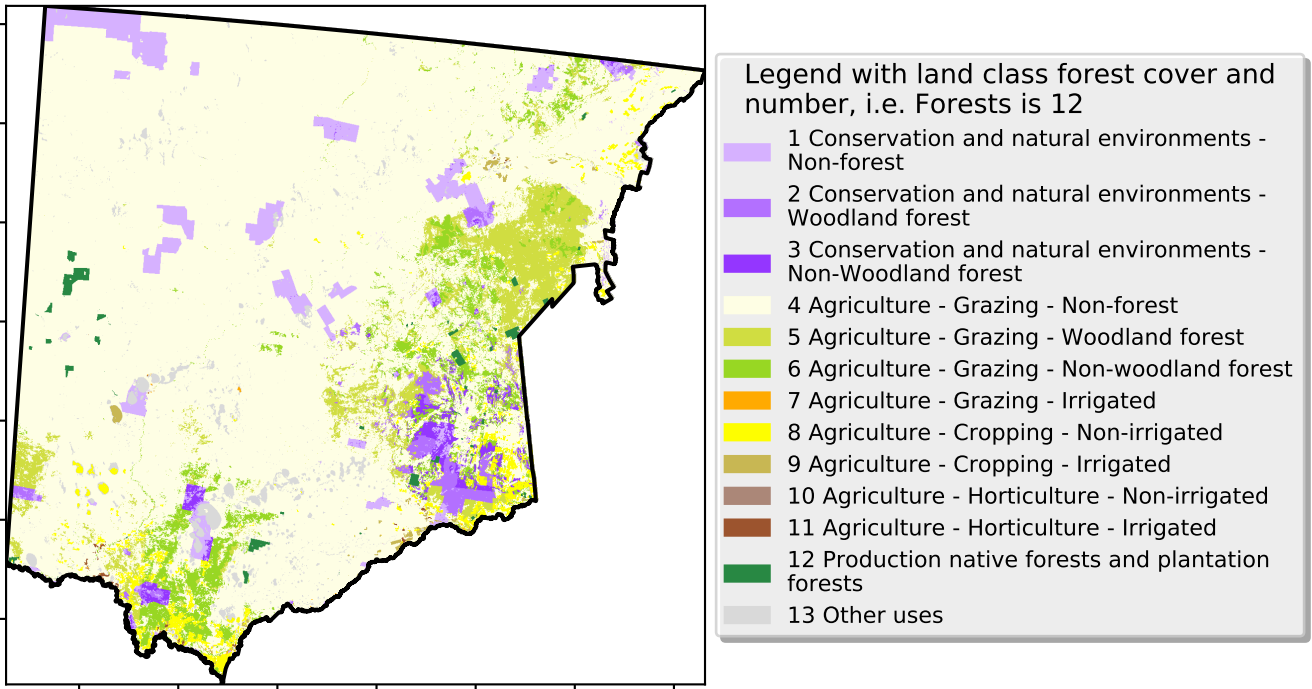2. http://www.agriculture.gov.au/abares/forestsaustralia/sofr/sofr-2018

3. https://www.dpi.nsw.gov.au/agriculture/pastures-and-rangelands/establishment-mgmt/production-management2/groundcover
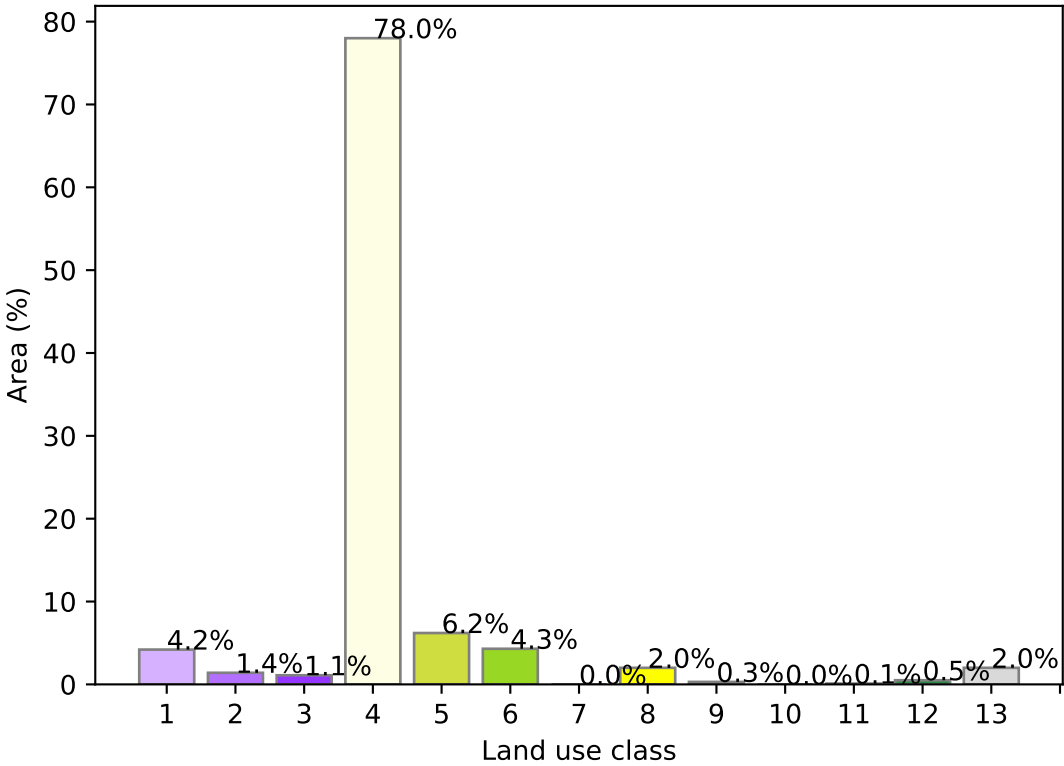
4. MODIS Fractional cover algorithm:

   https://doi.org/10.4225/08/5848a3f19a7b3
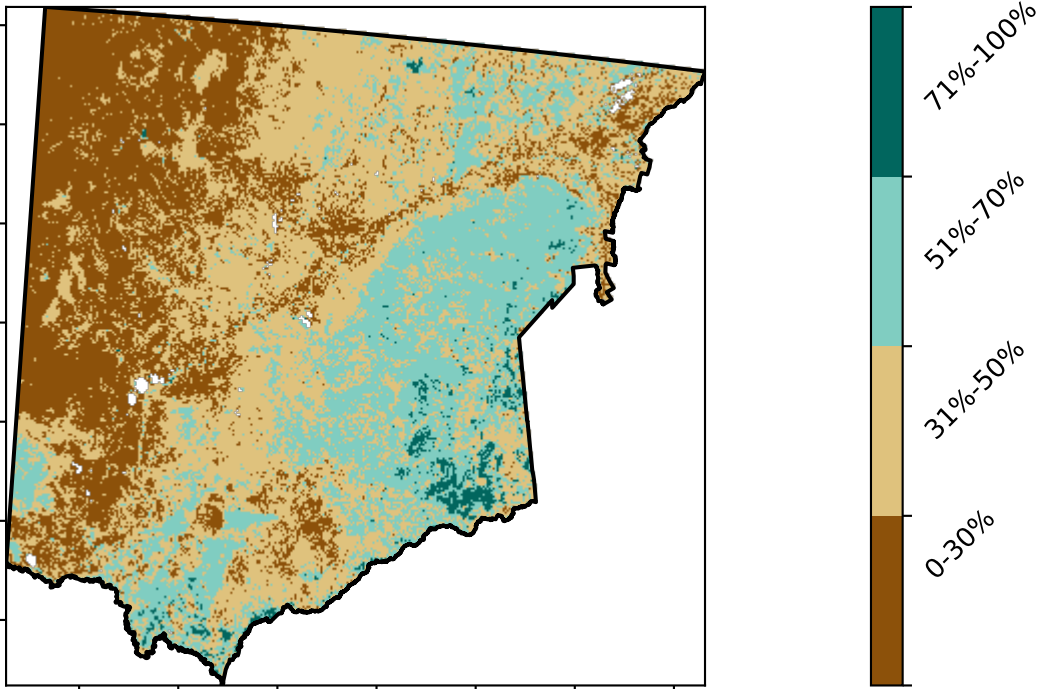
Vegetation Cover Nov 2019

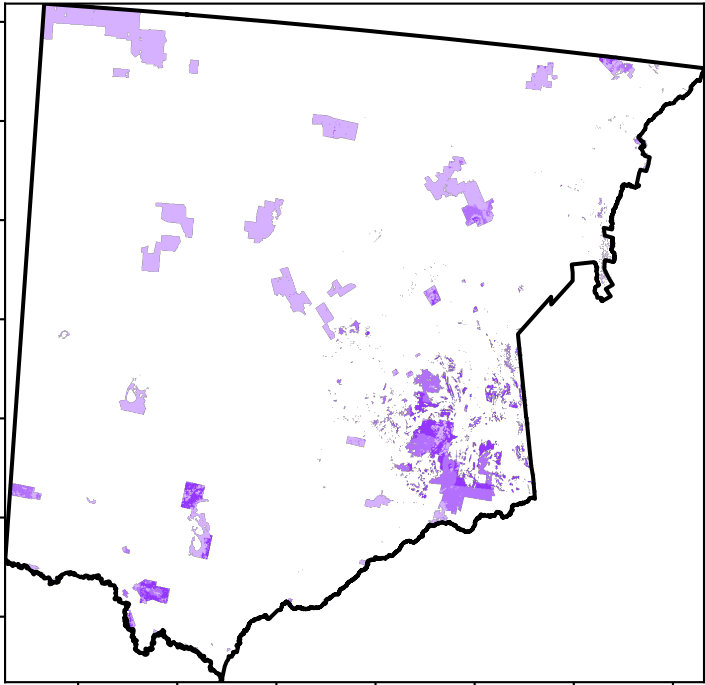## Land use and forest cover

Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)
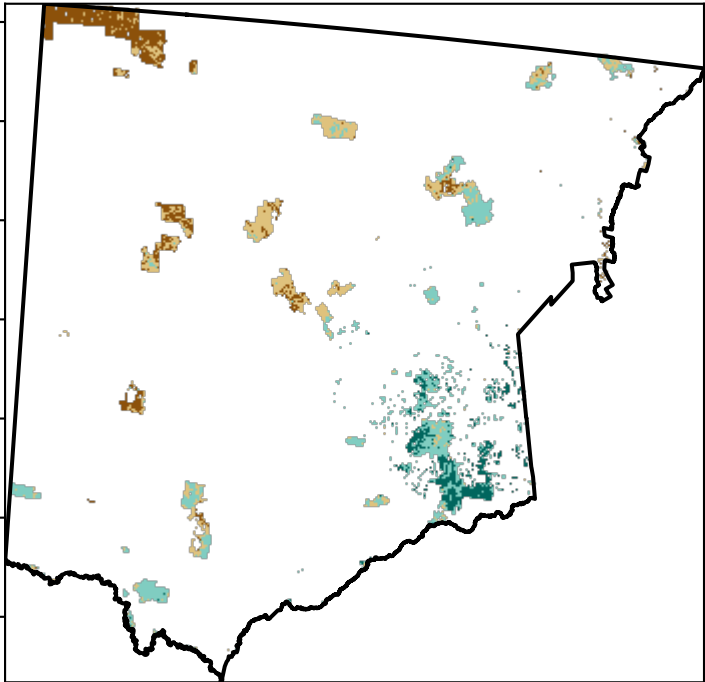
Legend with land class forest cover and number, i.e. Forests is 12

1 Conservation and natural environments - Non-forest
2 Conservation and natural environments - Woodland forest
3 Conservation and natural environments - Non-Woodland forest
4 Agriculture - Grazing - Non-forest
5 Agriculture - Grazing - Woodland forest
6 Agriculture - Grazing - Non-woodland forest
7 Agriculture - Grazing - Irrigated
8 Agriculture - Cropping - Non-irrigated
9 Agriculture - Cropping - Irrigated
10 Agriculture - Horticulture - Non-irrigated
11 Agriculture - Horticulture - Irrigated
12 Production native forests and plantation forests
13 Other uses

Proportion of each land class in area

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

## Proportion of vegetation cover class in area

% Area protected from water erosion (>70%)

Area not protected 98.2% of region (30,762,843 ha)
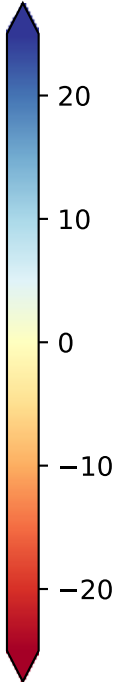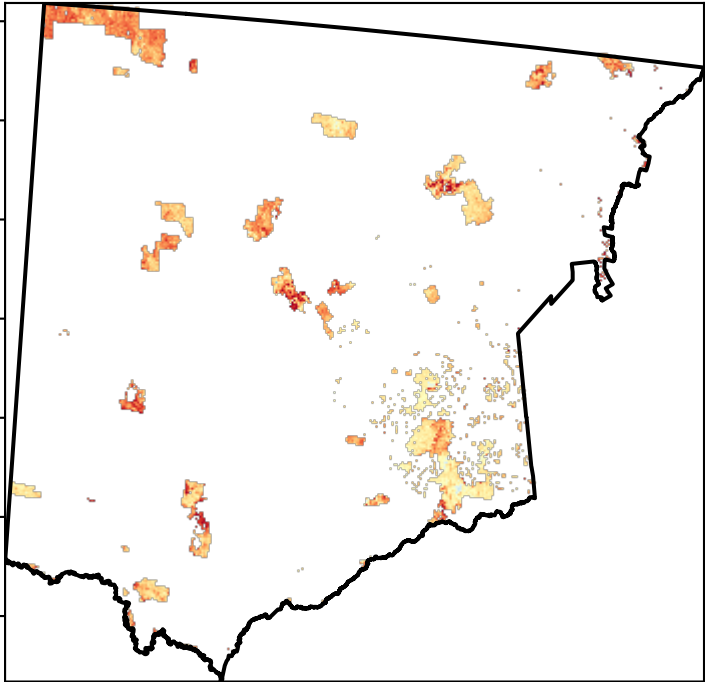
Area protected 1.8% of region (563,881 ha)

% Area protected from wind erosion (>50%)

Area not protected 74.0% of region (23,181,776 ha)
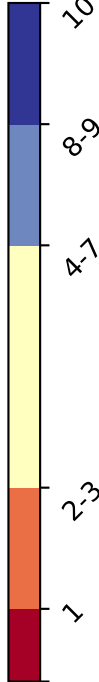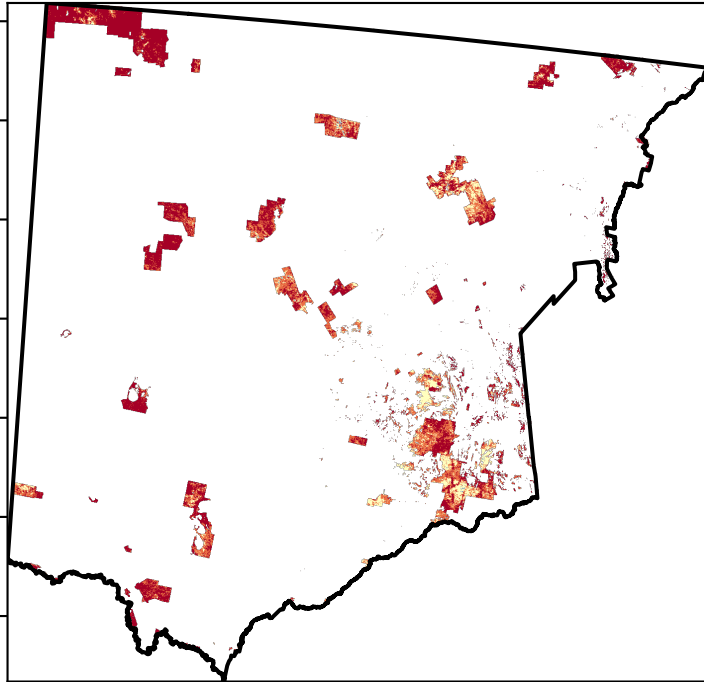
Area protected 26.0% of region (8,144,948 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.
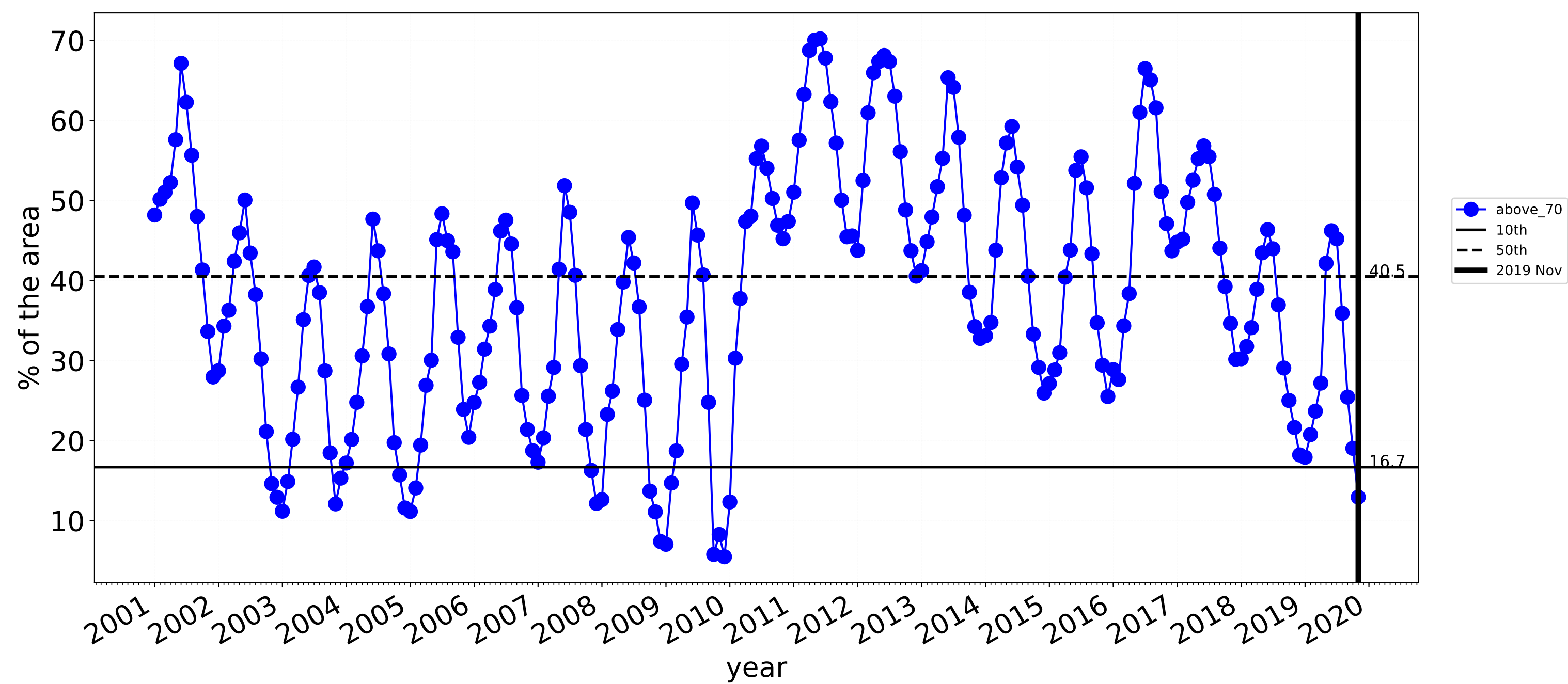
Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

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

Water erosion historical monthly area protected (Total Veg Cov>70%)
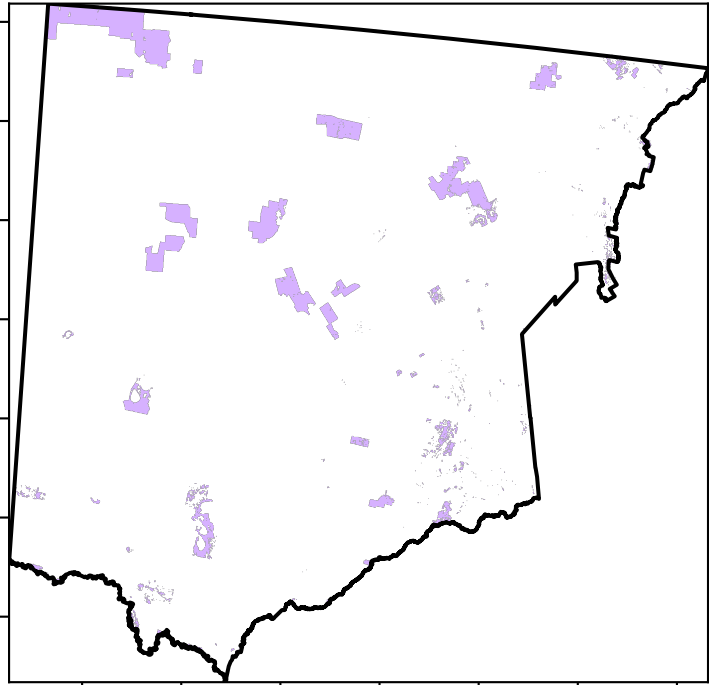
Monthly rainfall from 2001 to 2019

Rainfall: historical monthly
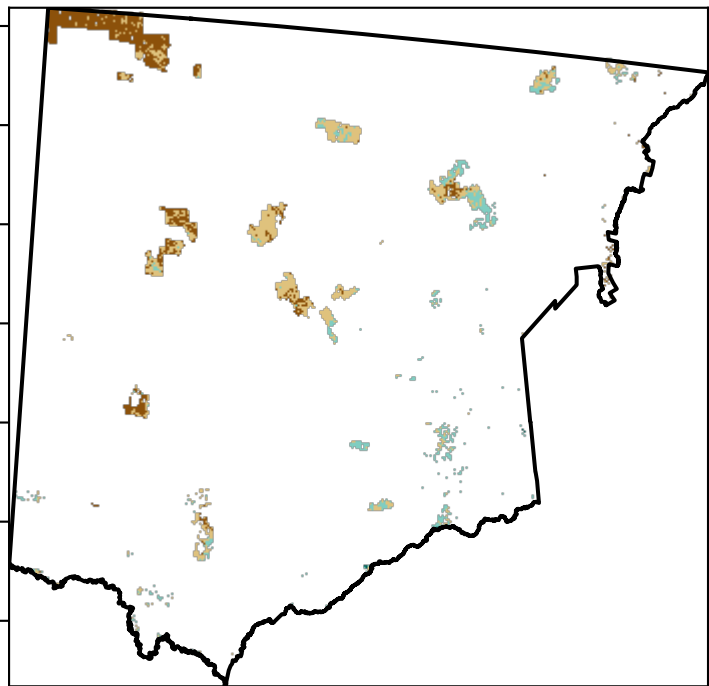
Conservation and natural environments

Land use and forest cover

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

Proportion of each land class in area

63.2%
20.6%
16.2%

Area (%)

Land use class

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

Proportion of vegetation cover class in area

22.8%
28.7%
35.6%
12.9%

Area (%)

Total Vegetation Cover class

0-30%   31%-50%   51%-70%   71%-100%
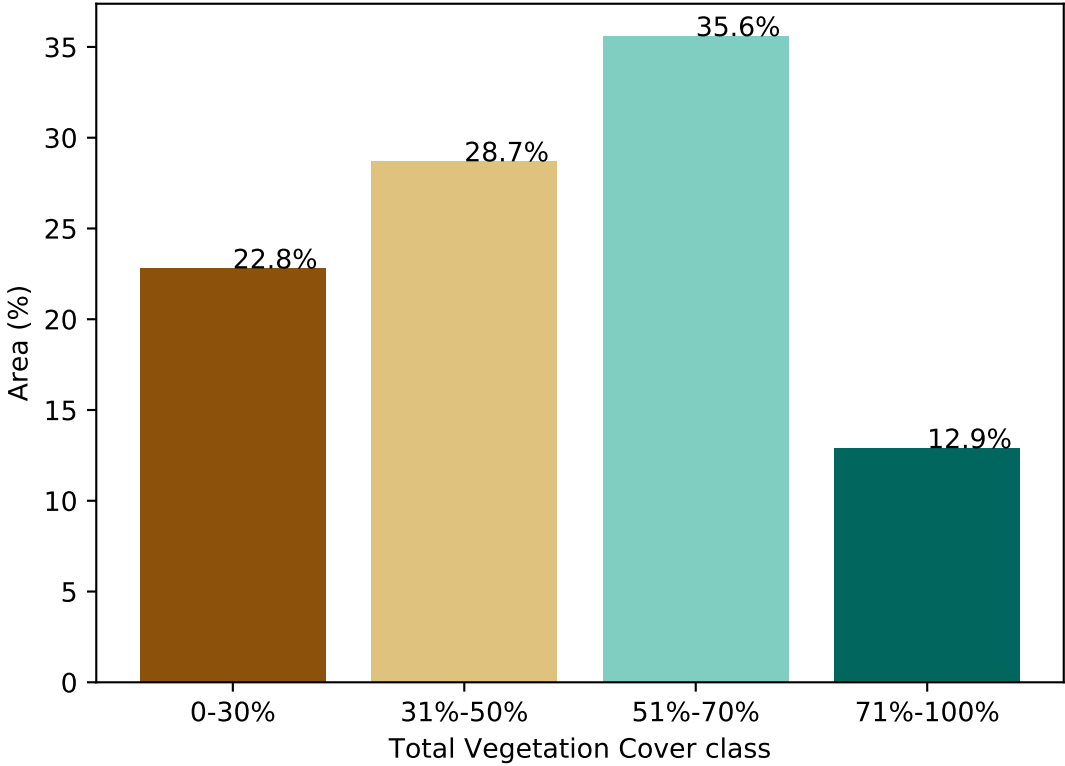
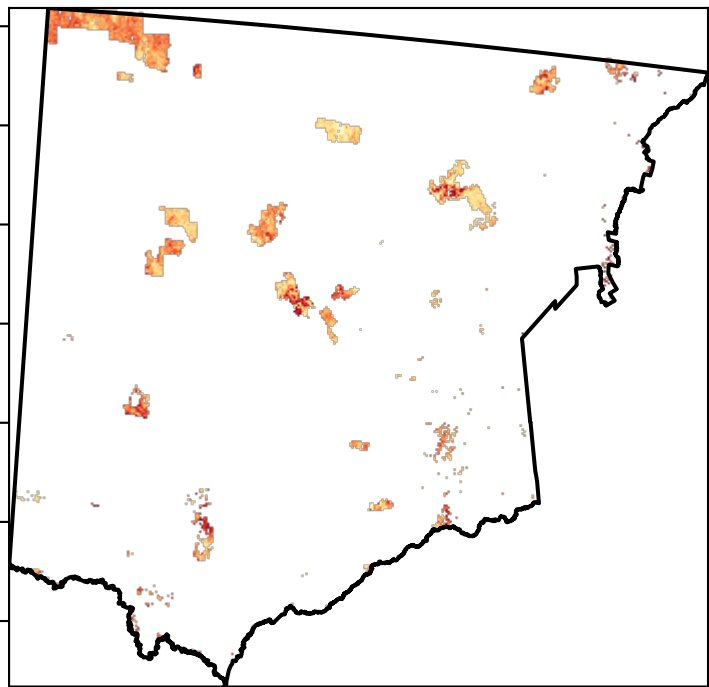## % Area protected from water erosion (>70%)
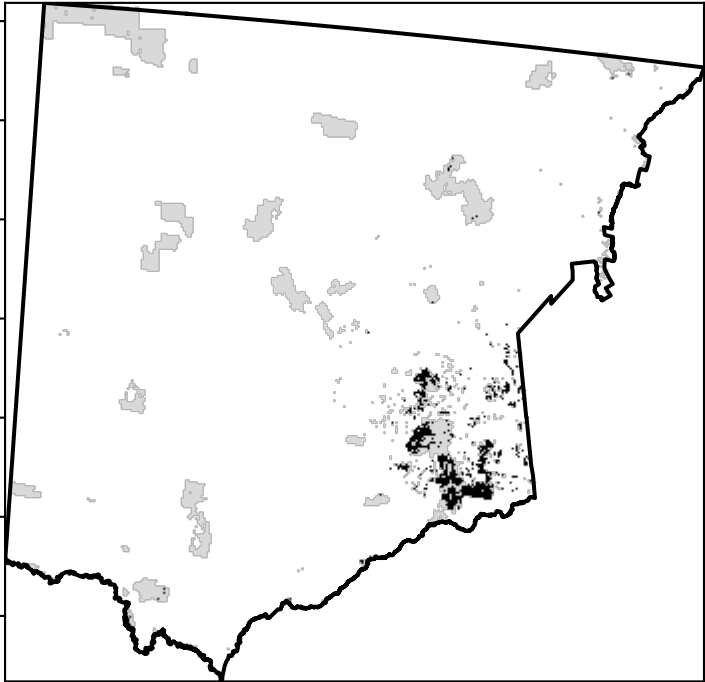
Area not protected
87.1% of region
(1,832,083 ha)

Area protected
12.9% of region
(271,341 ha)

% Area protected from wind erosion (>50%)
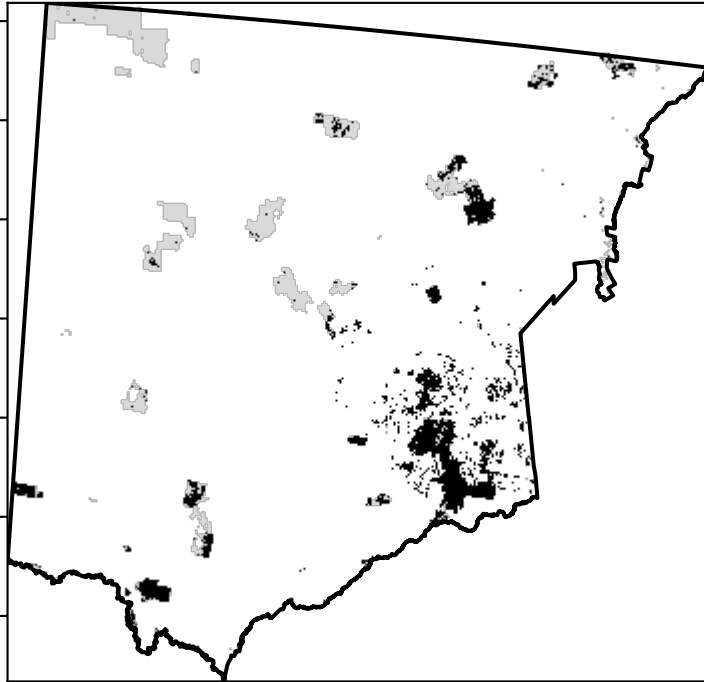
Area not protected
52.0% of region
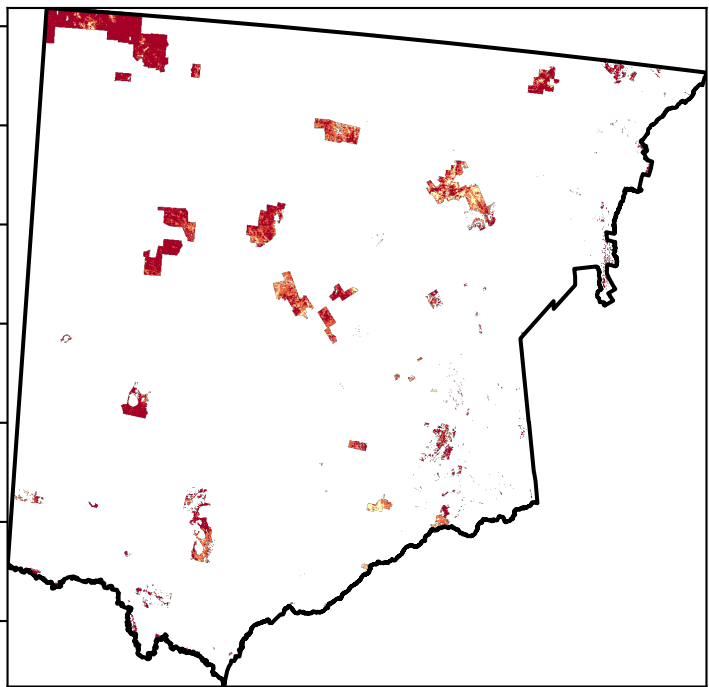(1,093,781 ha)

Area protected
48.0% of region
(1,009,644 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

10
8-9
4-7
2-3
1

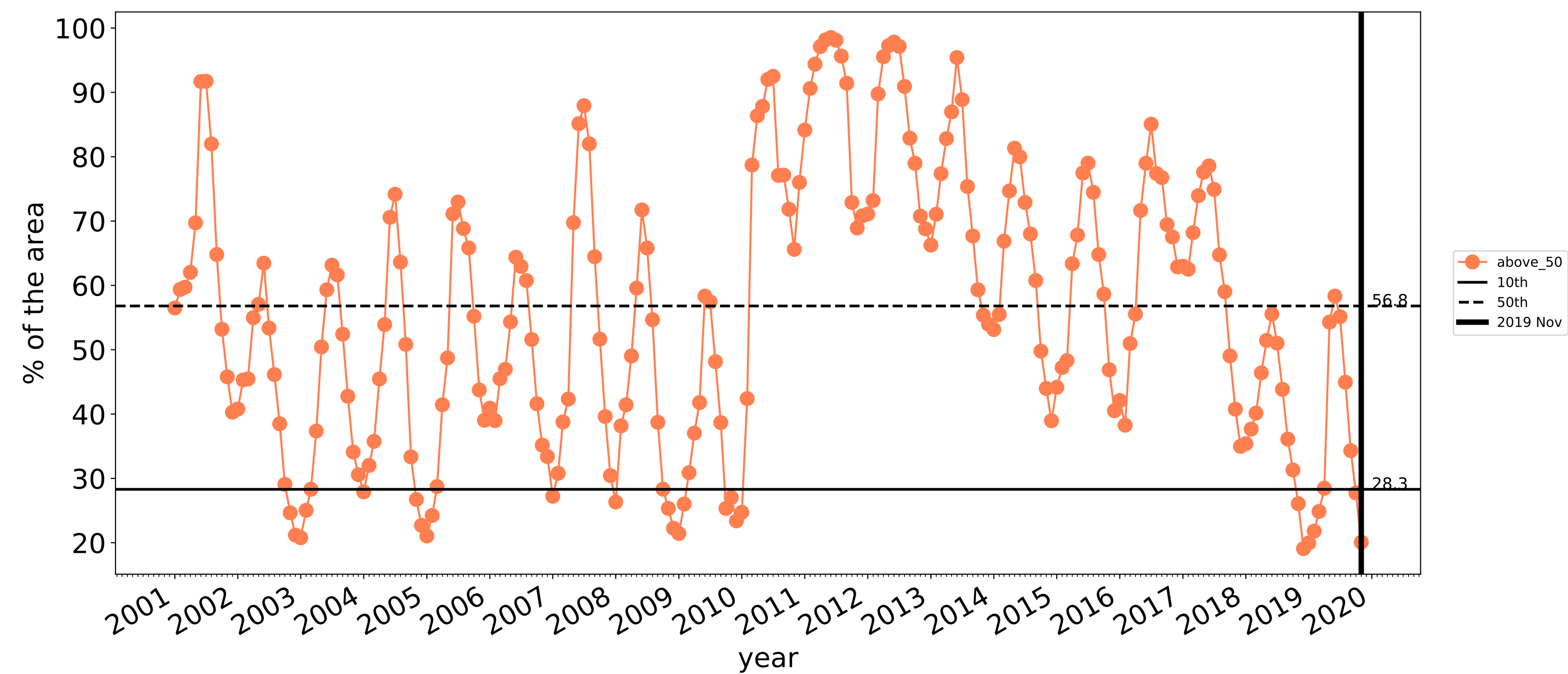CSIRO   TERN   Australian Government   National Landcare Programme   NSW GOVERNMENT   Planning, Industry & Environment
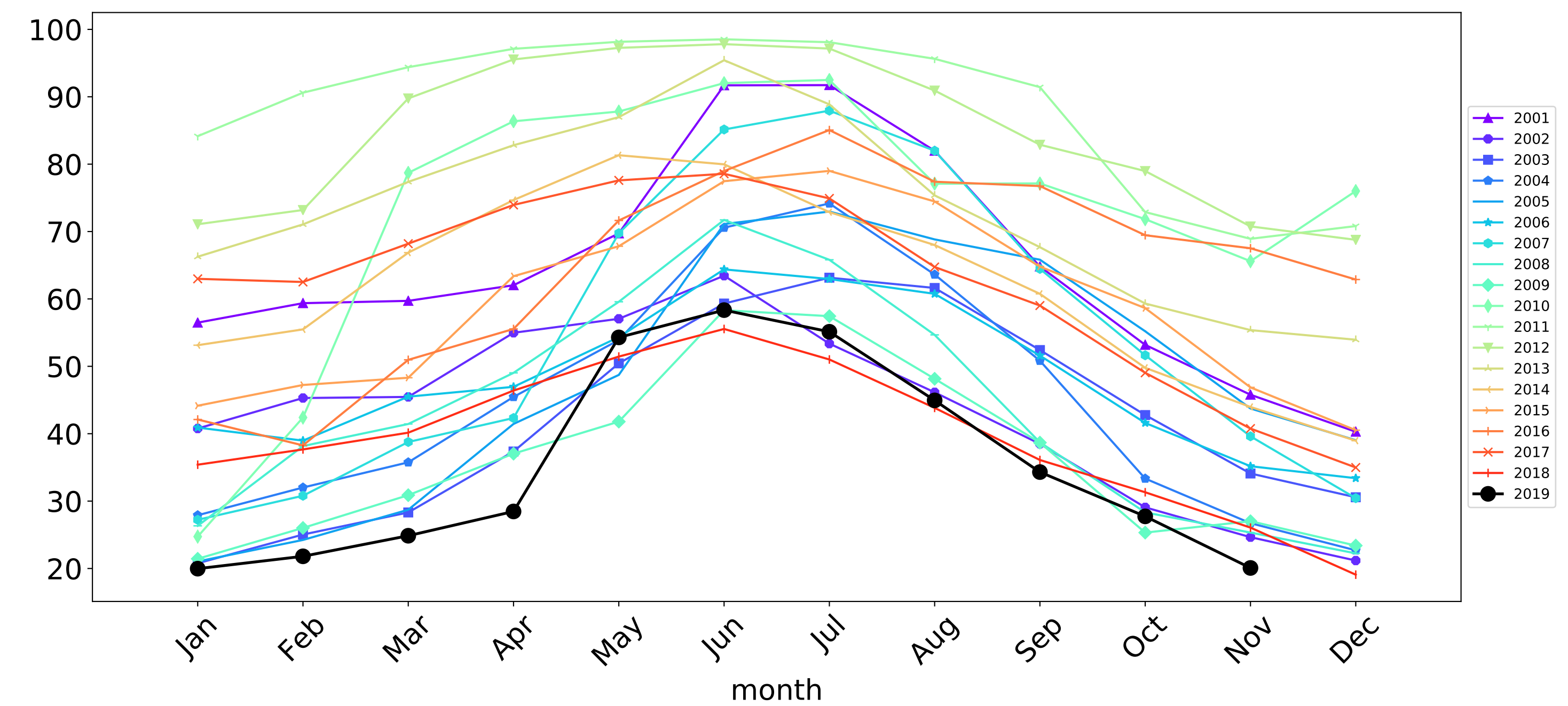
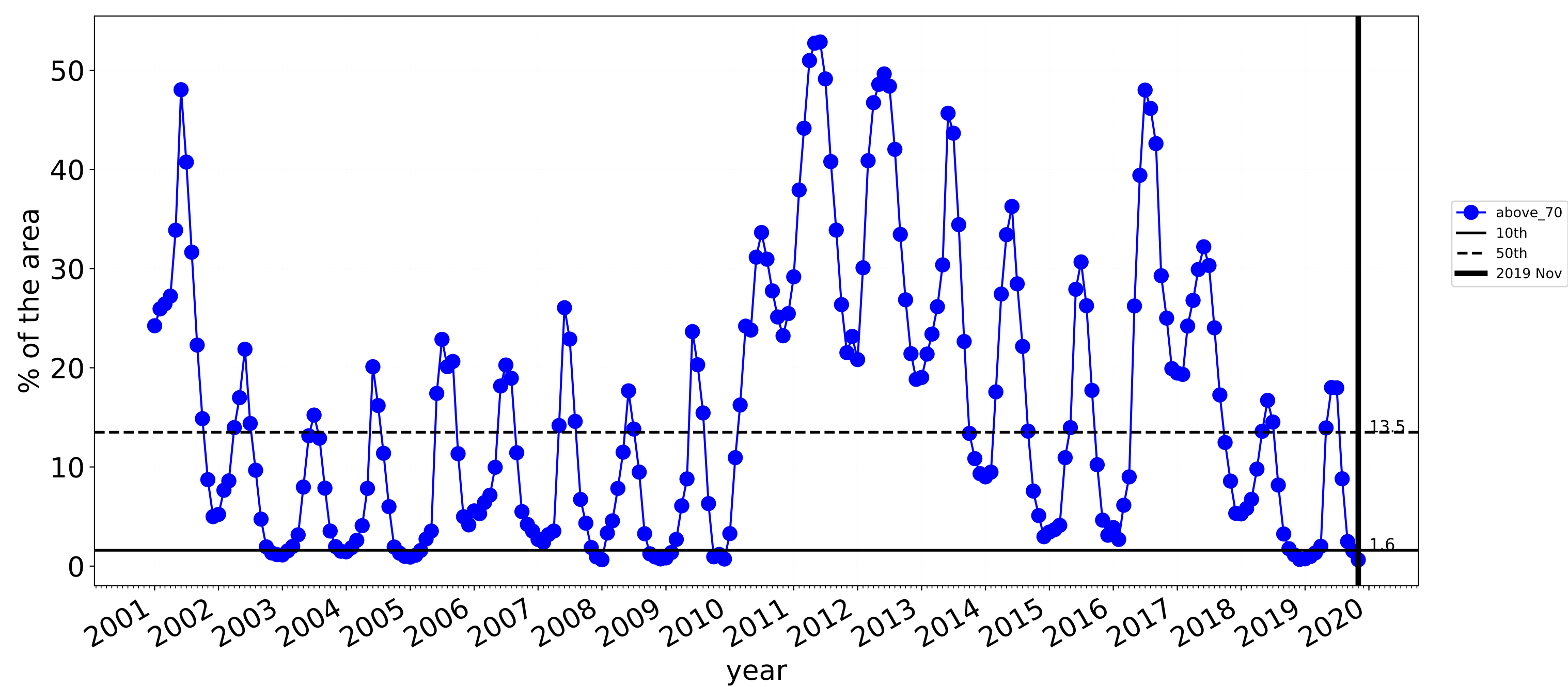# Conservation and natural environments timeseries

Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)
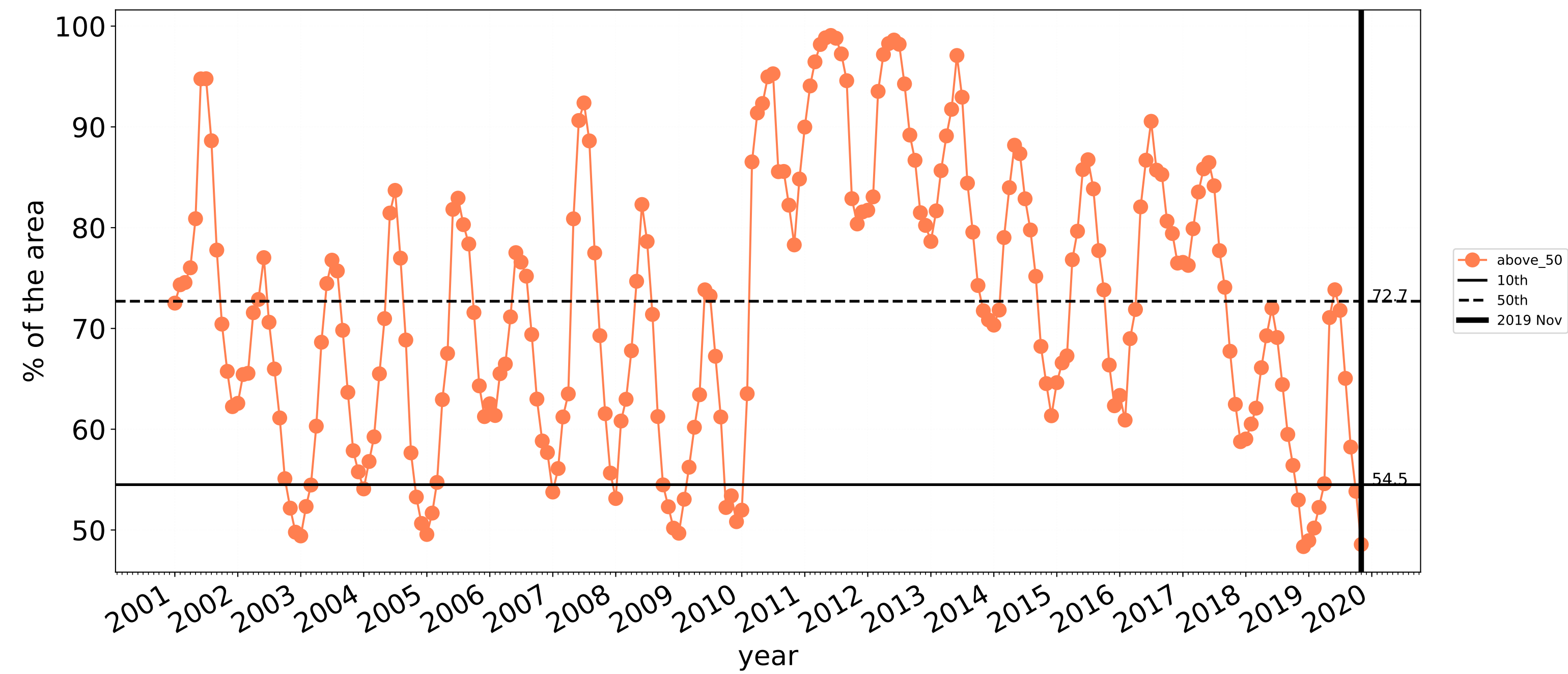
Wind erosion historical monthly area protected (Total Veg Cov >50%)
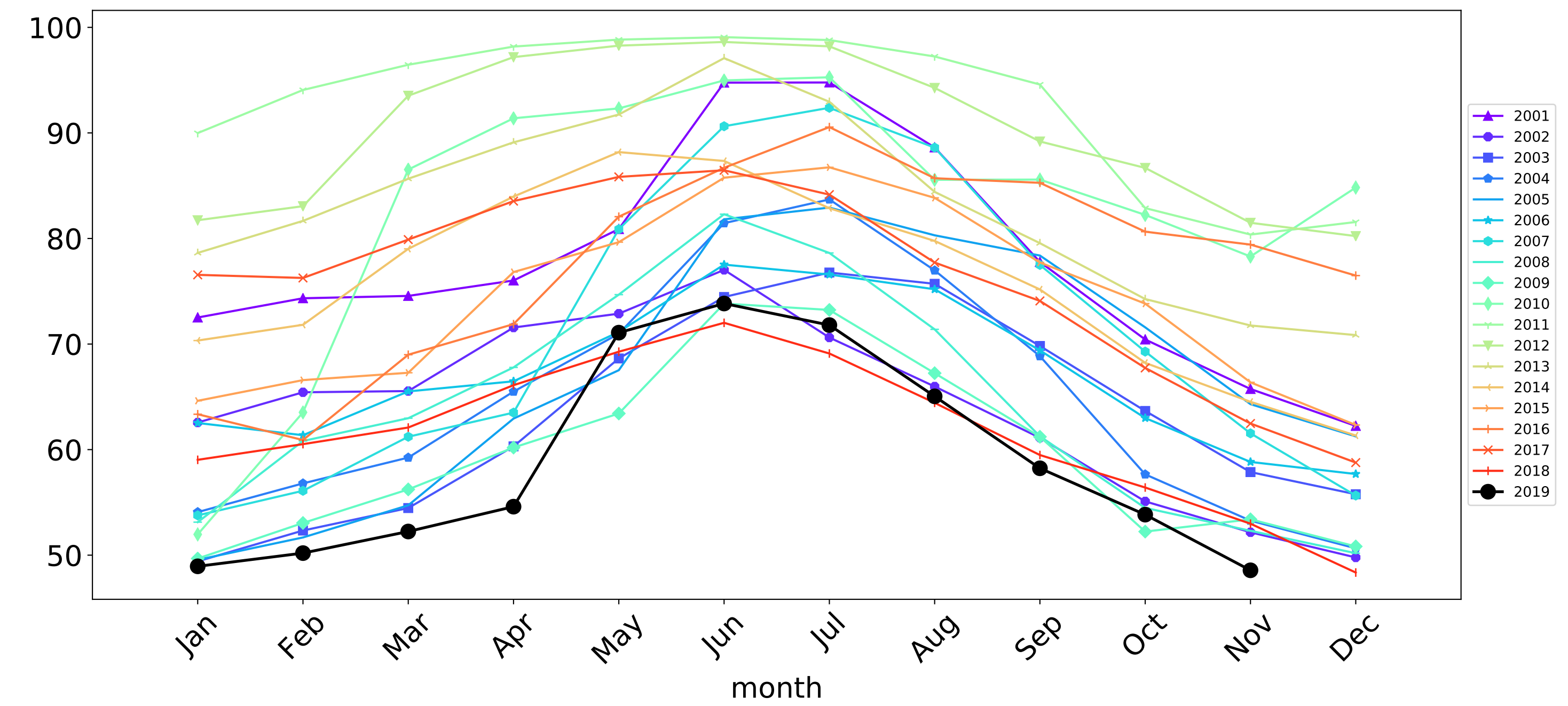
Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

Water erosion historical monthly area protected (Total Veg Cov>70%)
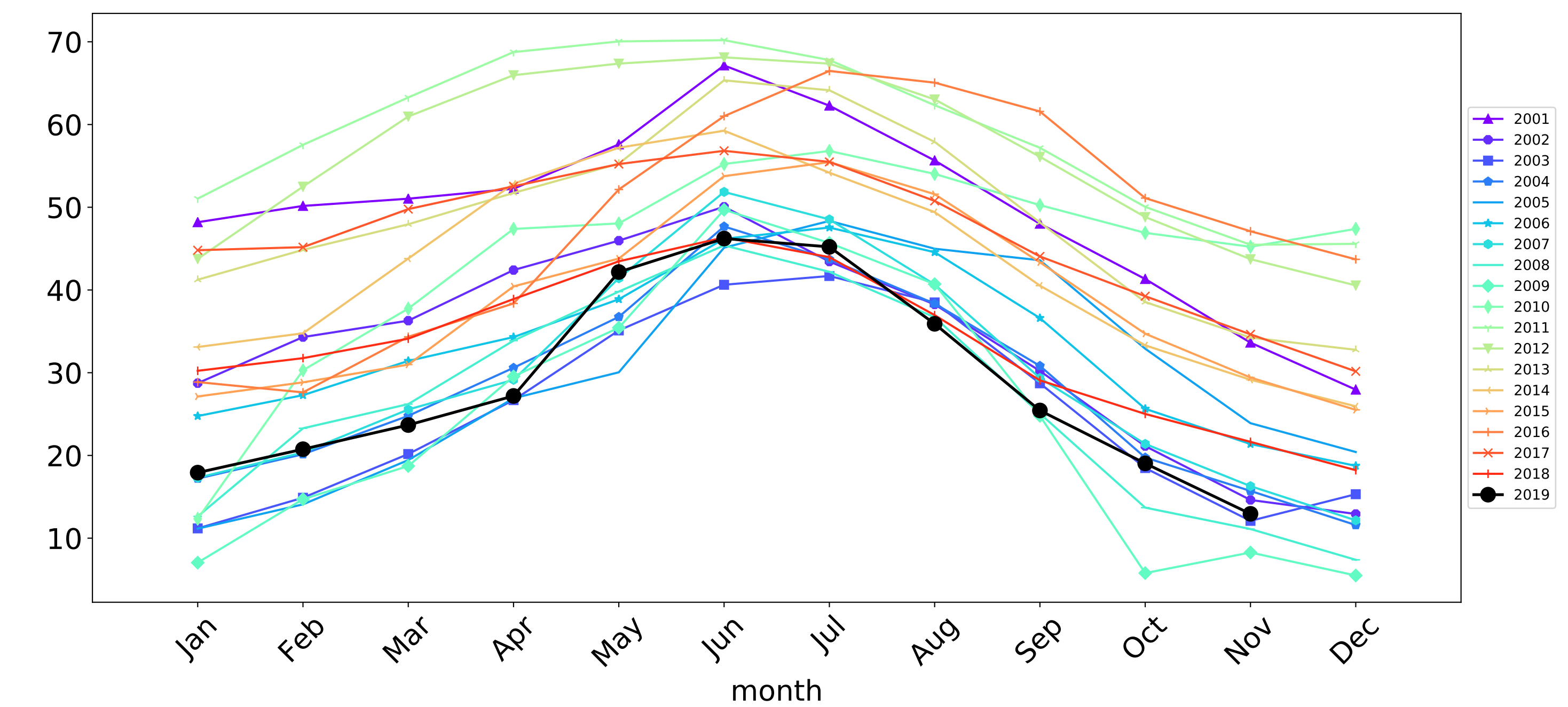
Conservation and natural environments non forest

Land use and forest cover

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

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

Proportion of vegetation cover class in area

36.1%
43.9%
19.4%
0.6%

Area (%)

Total Vegetation Cover class
0-30%   31%-50%   51%-70%   71%-100%
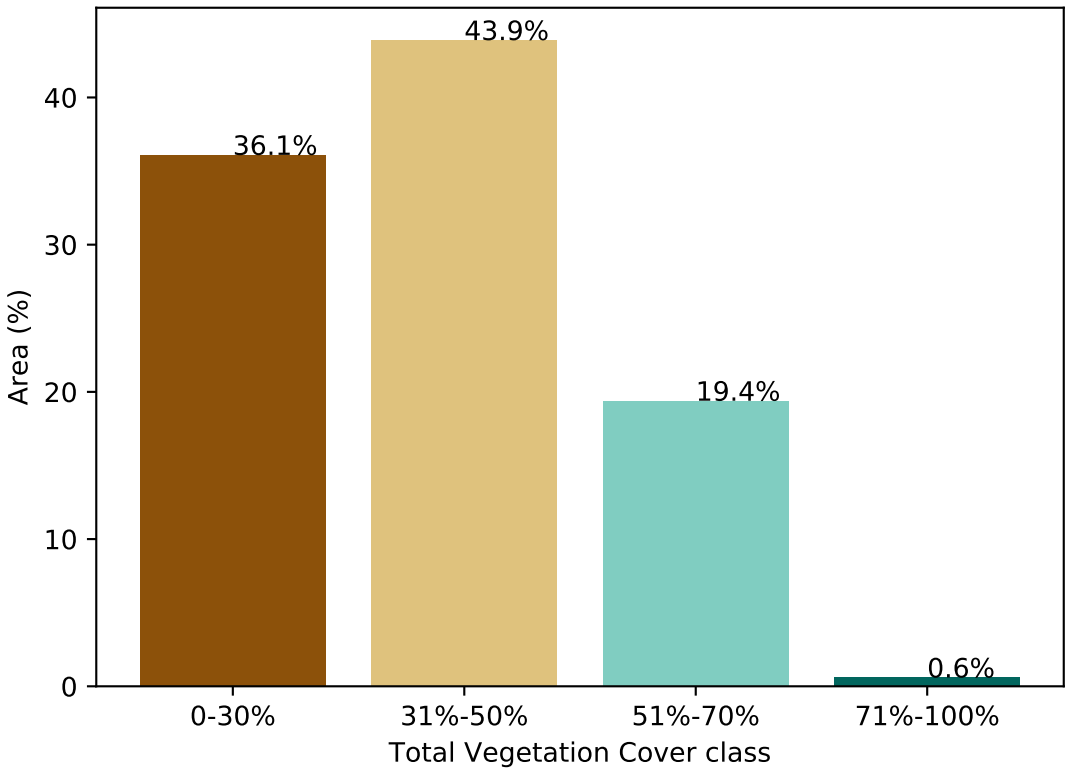
% Area protected from water erosion (>70%)
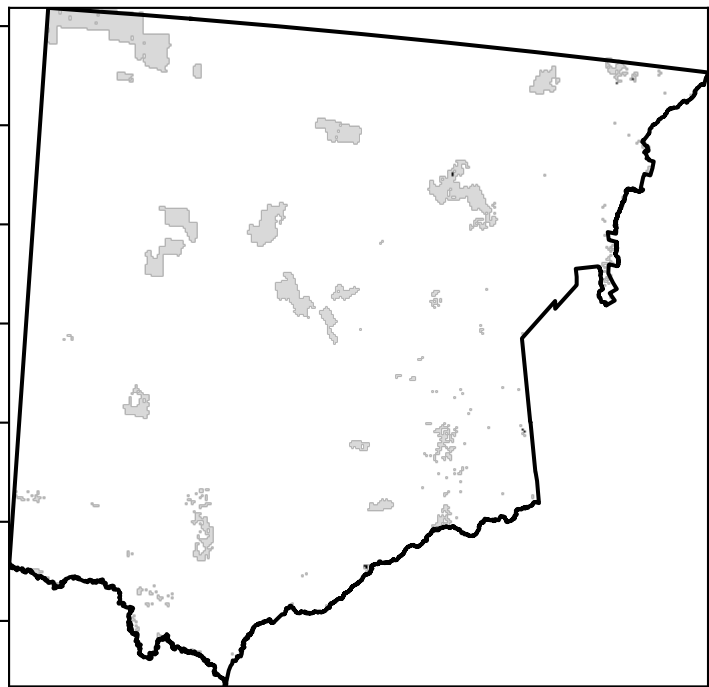
Area not protected
99.4% of region
(1,320,429 ha)

Area protected
0.6% of region
(7,970 ha)

% Area protected from wind erosion (>50%)
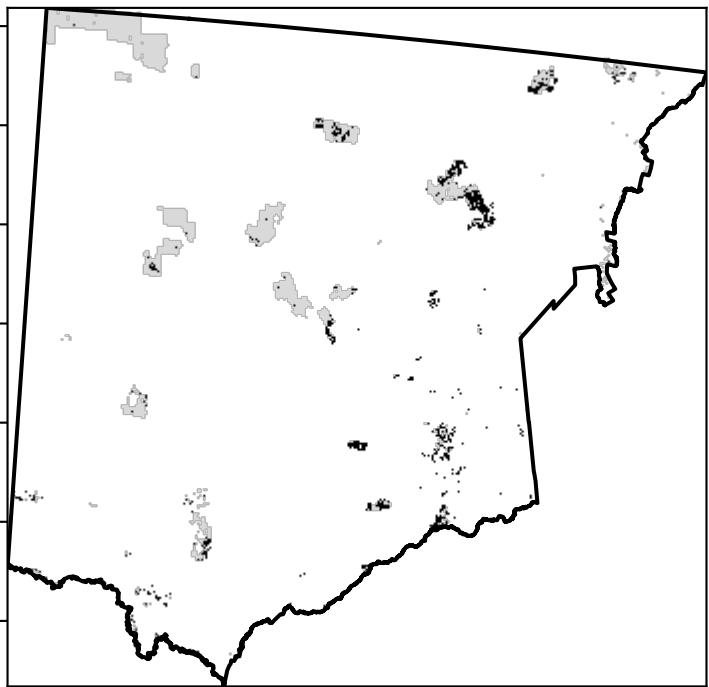
Area not protected
80.0% of region
(1,062,720 ha)

Area protected
20.0% of region
(265,680 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

10
8-9
4-7
2-3
1

CSIRO   TERN   Australian Government   National Landcare Programme   NSW GOVERNMENT   Planning, Industry & Environment

Conservation and natural environments non forest timeseries

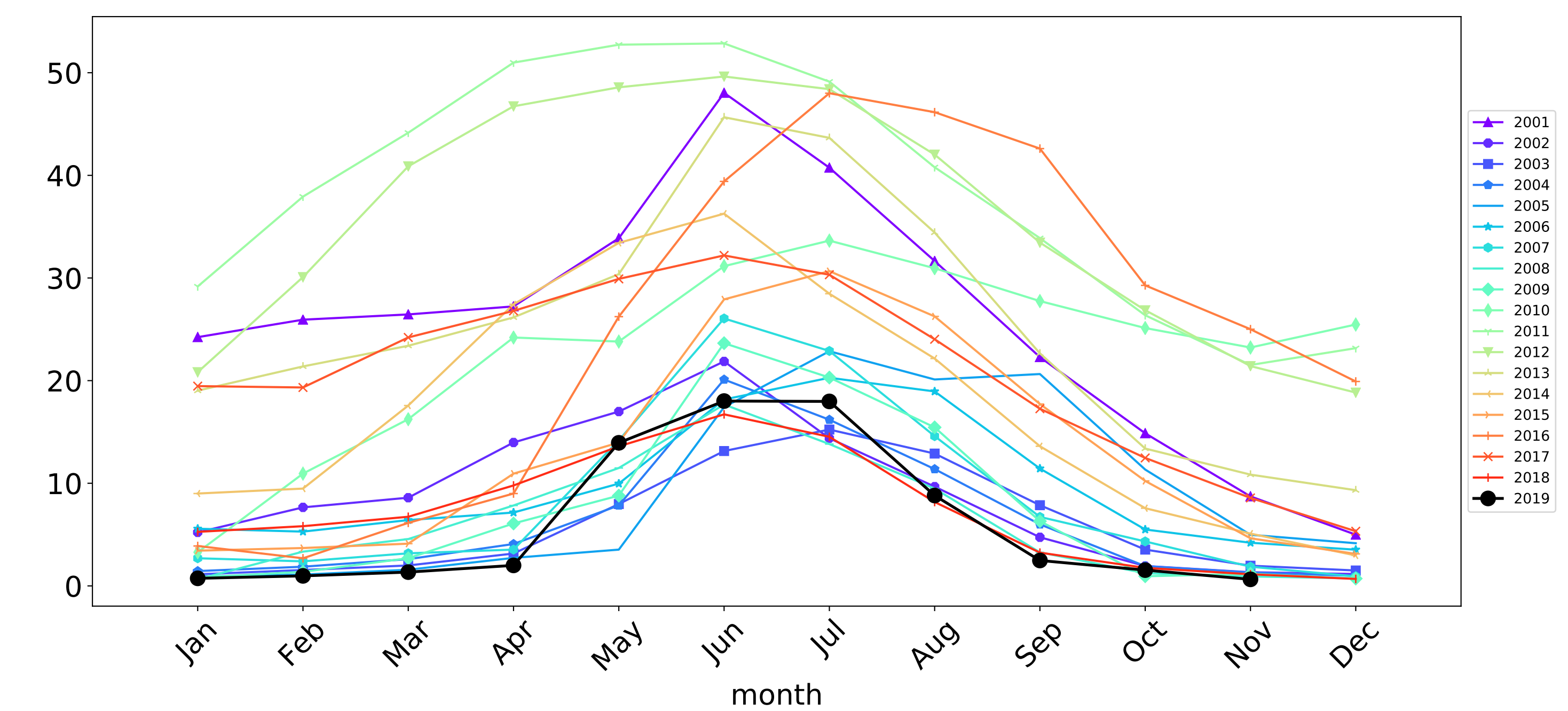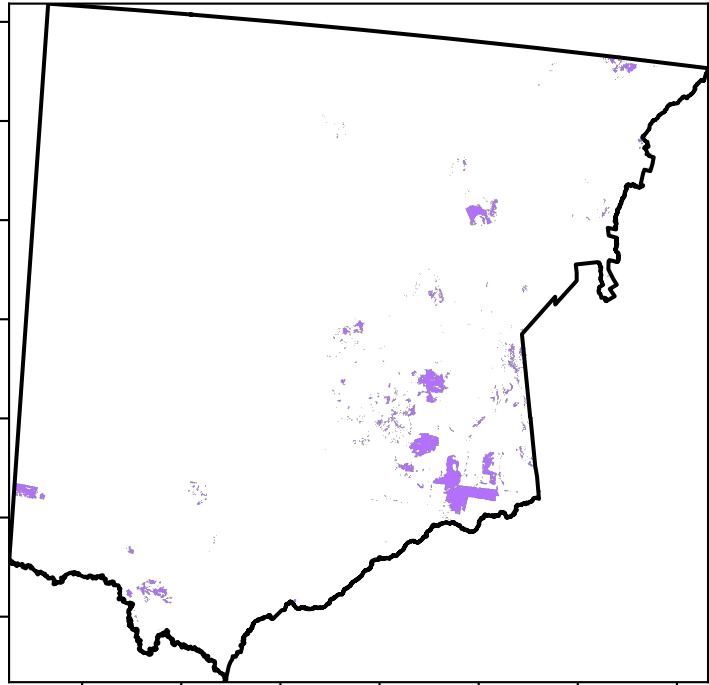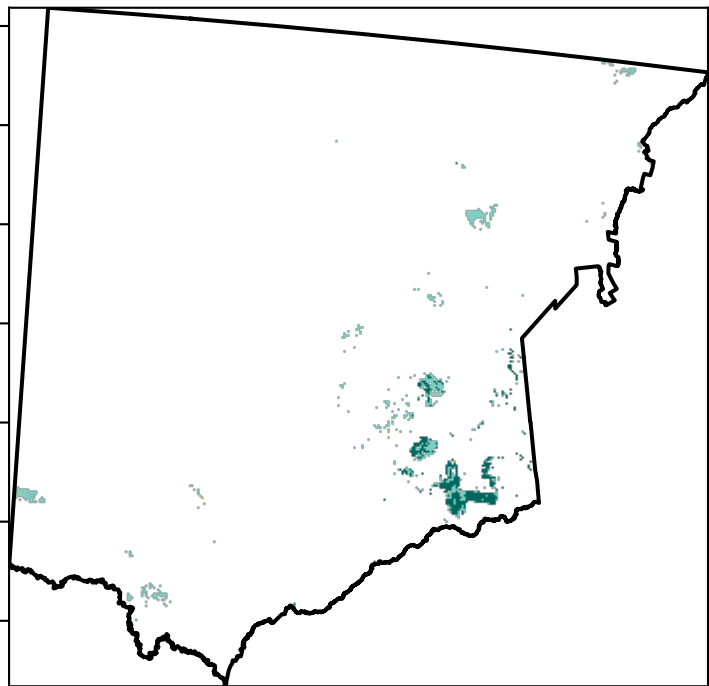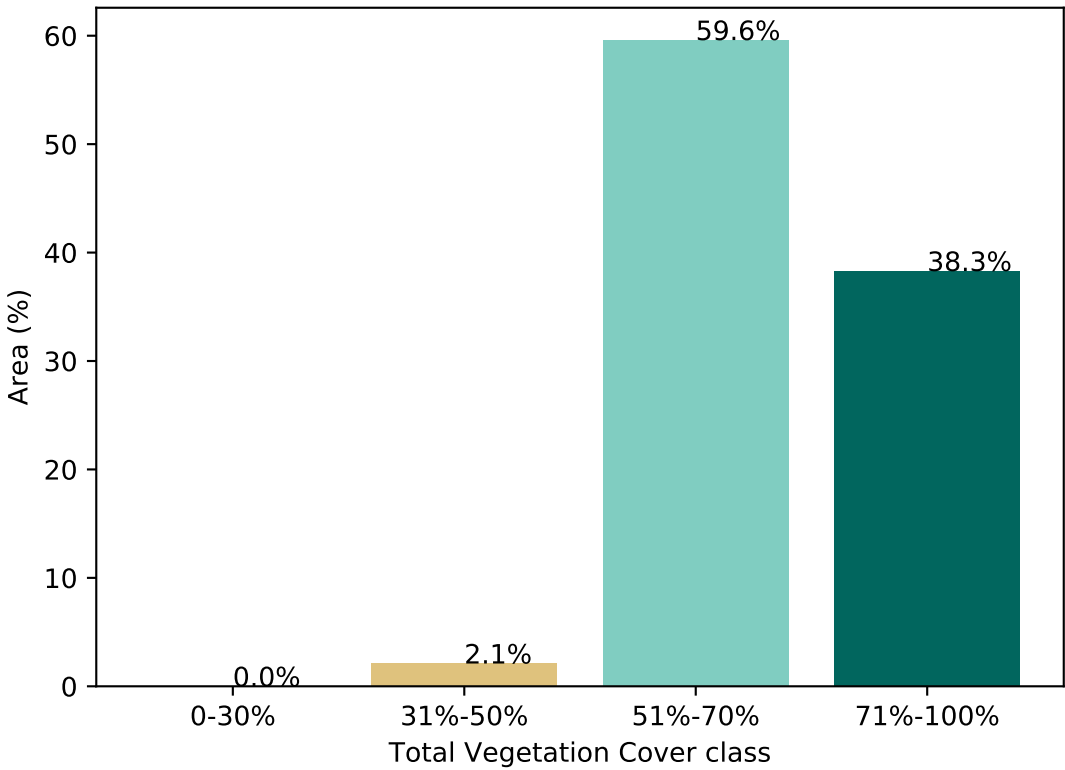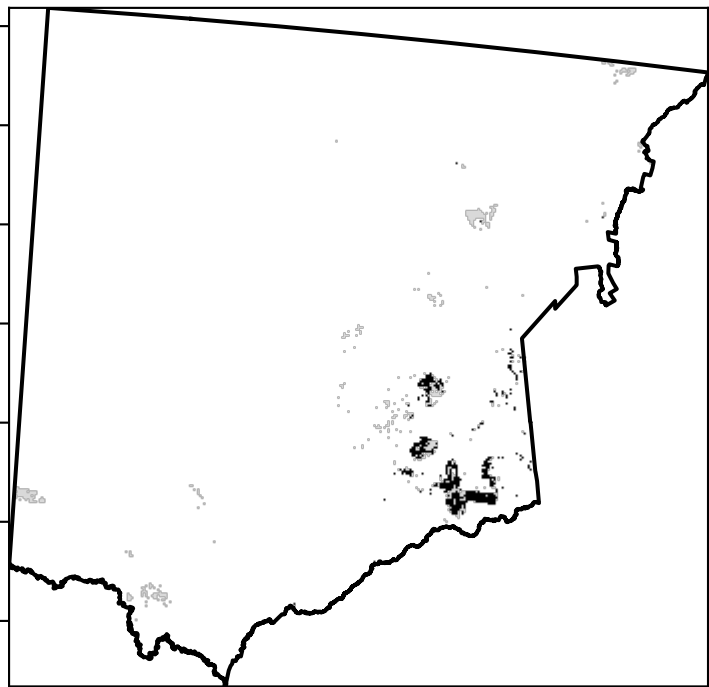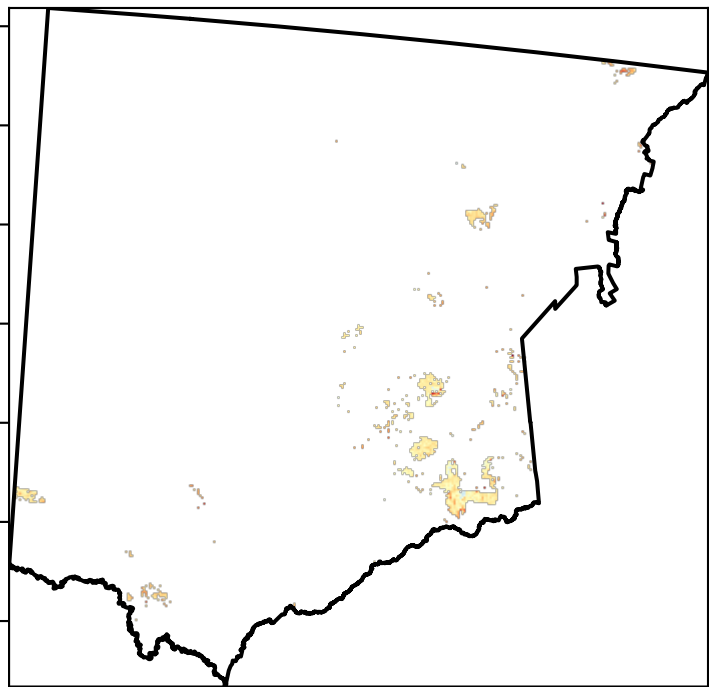Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

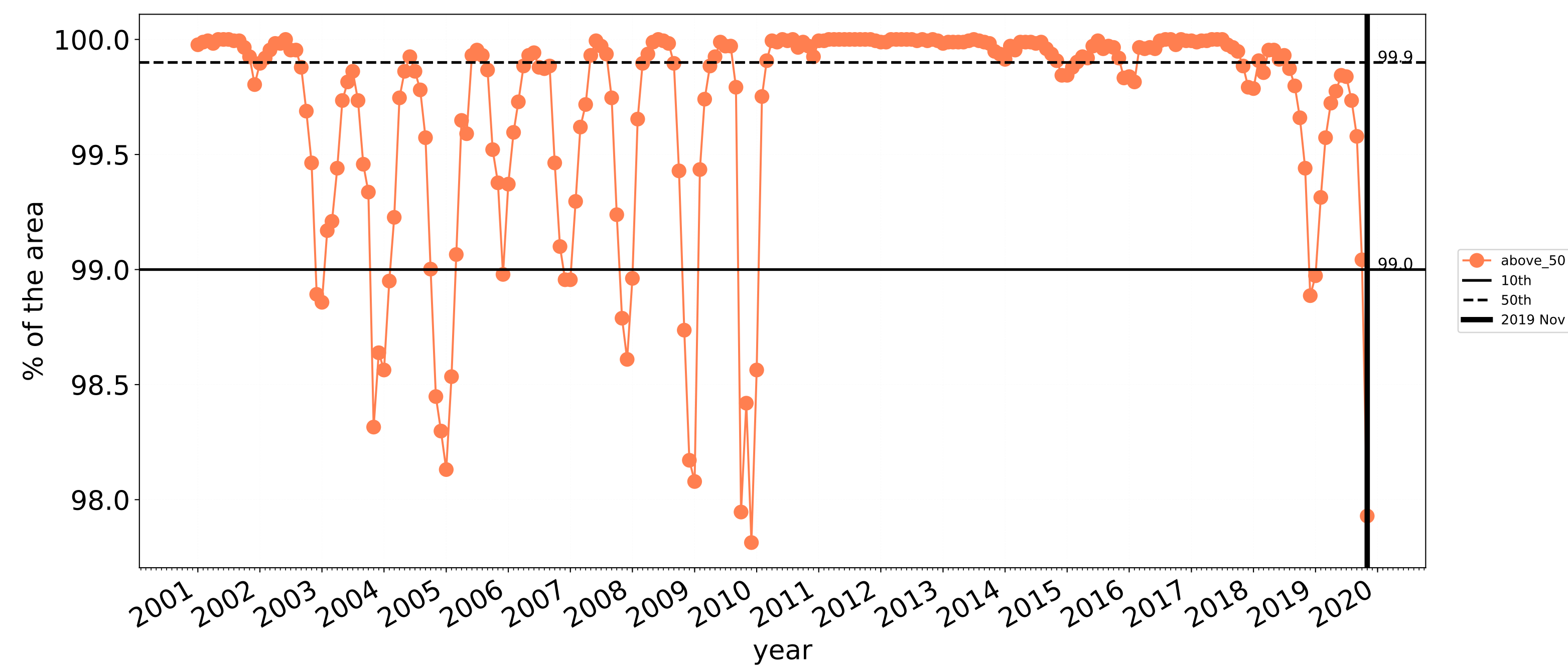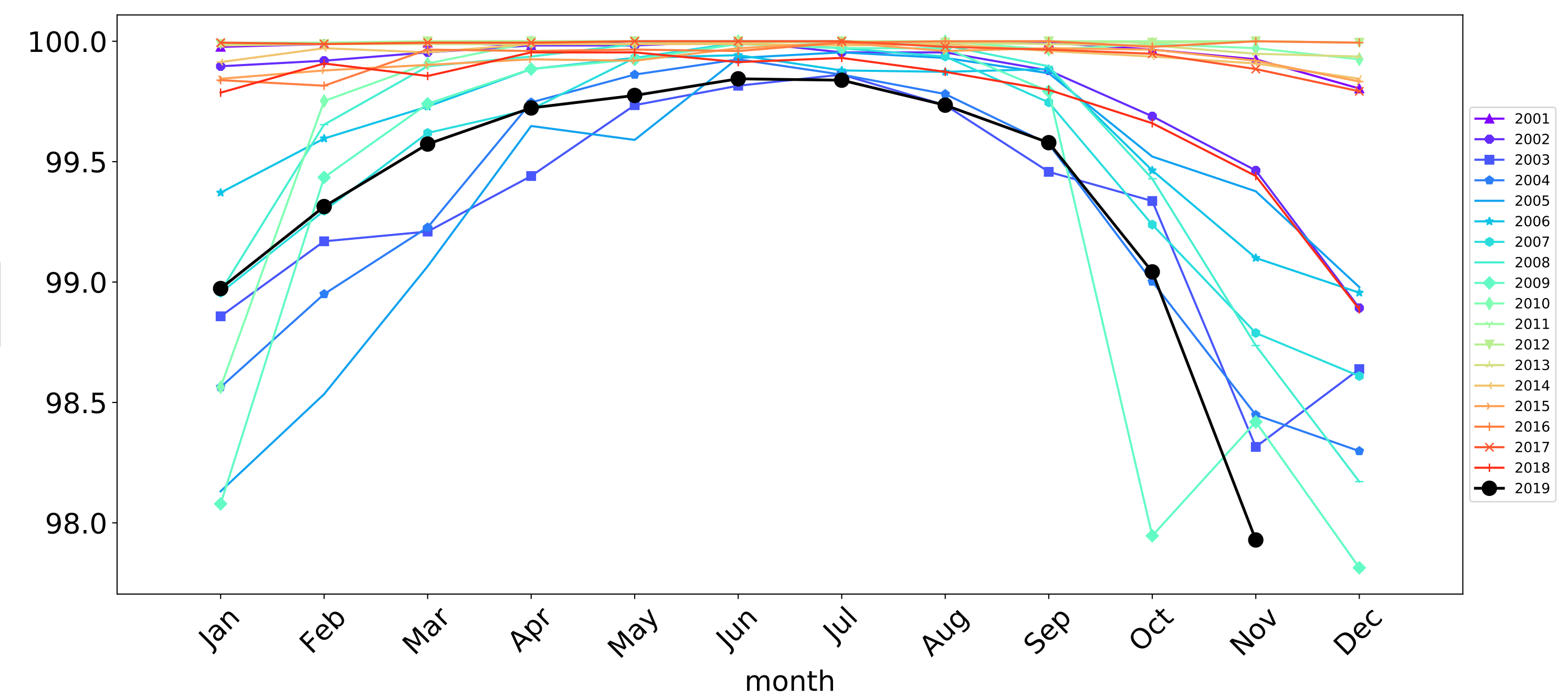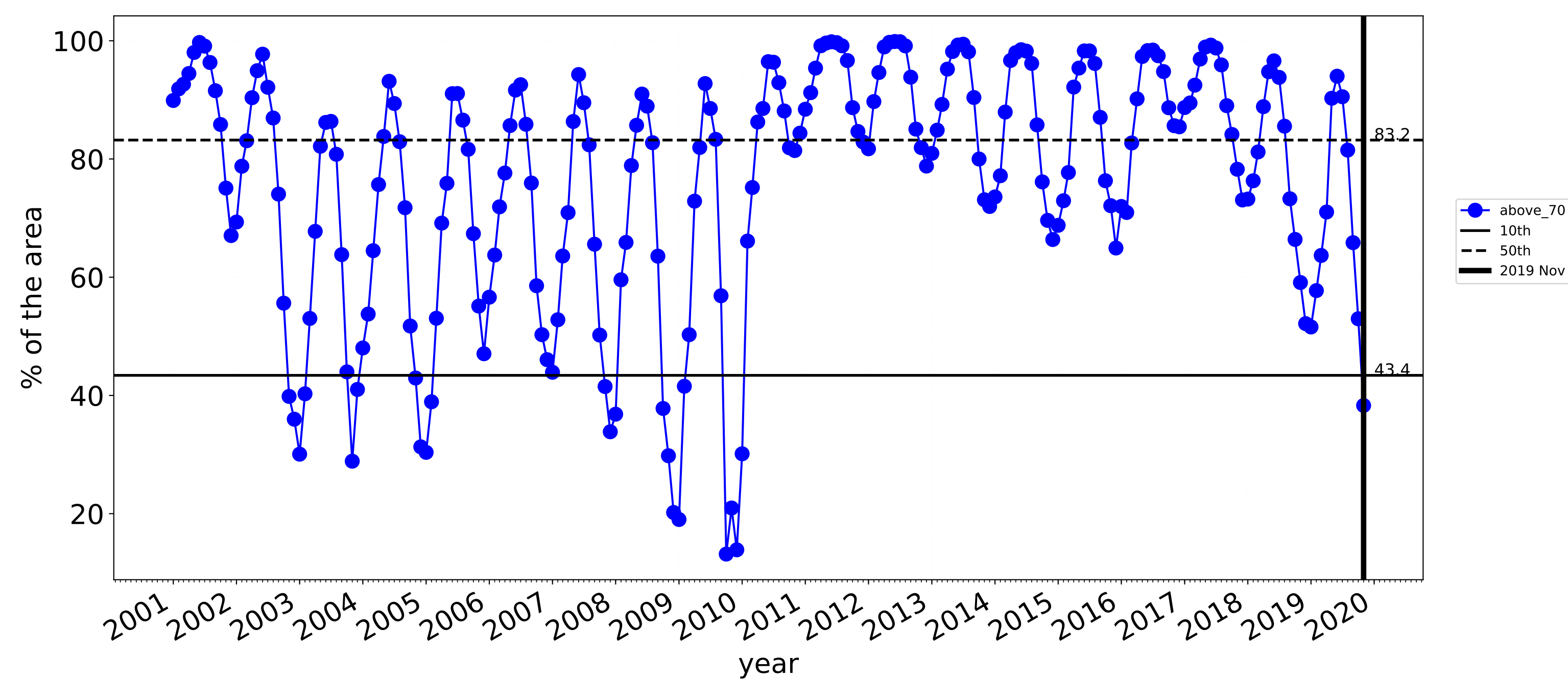Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

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

Conservation and natural environments Woodland forest

Land use and forest cover

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 – Woodland forest

Total Vegetation Cover [%]

71%-100%

51%-70%

31%-50%

0-30%

Proportion of vegetation cover class in area

Area (%)

0.0% 2.1% 59.6% 38.3%

0-30   31%-50%   51%-70%   71%-100%

Total Vegetation Cover class

% Area protected from water erosion (>70%)

Area not protected 61.7% of region (267,376 ha)

Area protected 38.3% of region (165,973 ha)

% Area protected from wind erosion (>50%)
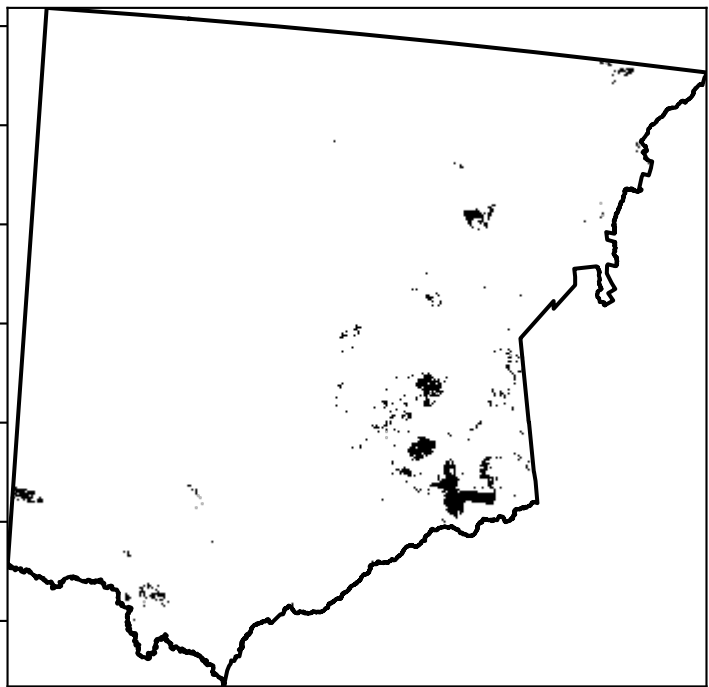
Area not protected 2.0% of region (8,667 ha)

Area protected 98.0% of region (424,683 ha)

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.

20

10

0

-10

-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 from 2001 to 2019.

10

8-9

4-7

2-3

1

CSIRO   TERN   Australian Government   National Landcare Programme   NSW GOVERNMENT   Planning, Industry & Environment

Conservation and natural environments Woodland forest timeseries

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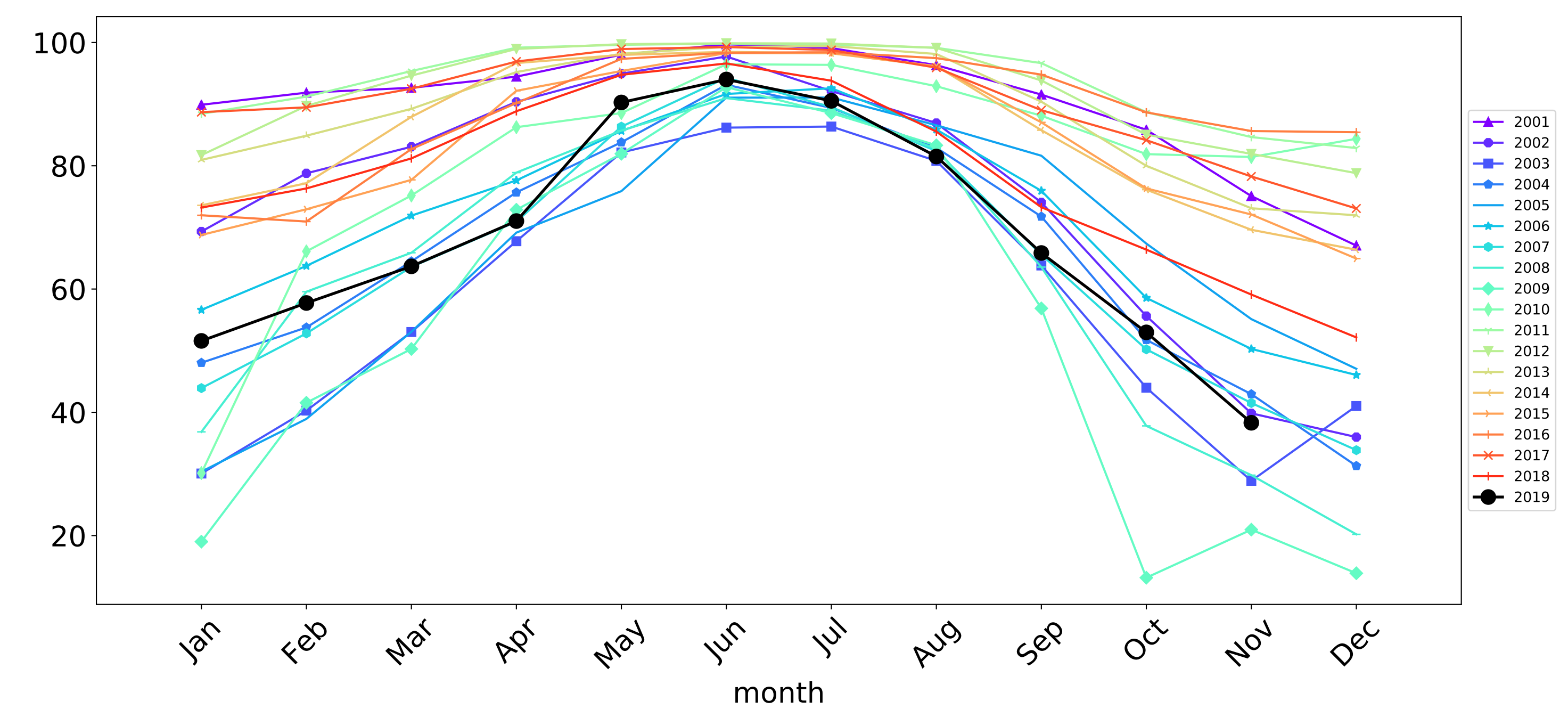

Wind erosion historical monthly area protected (Total Veg Cov >50%)

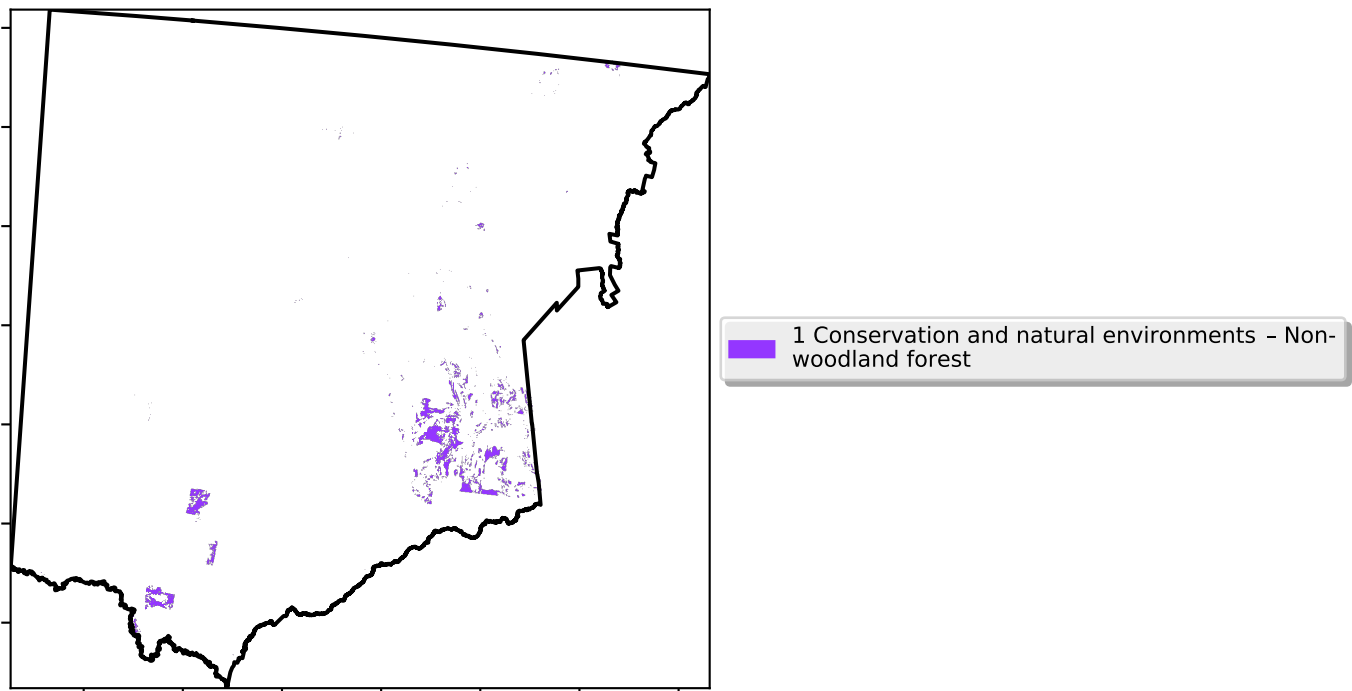### Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

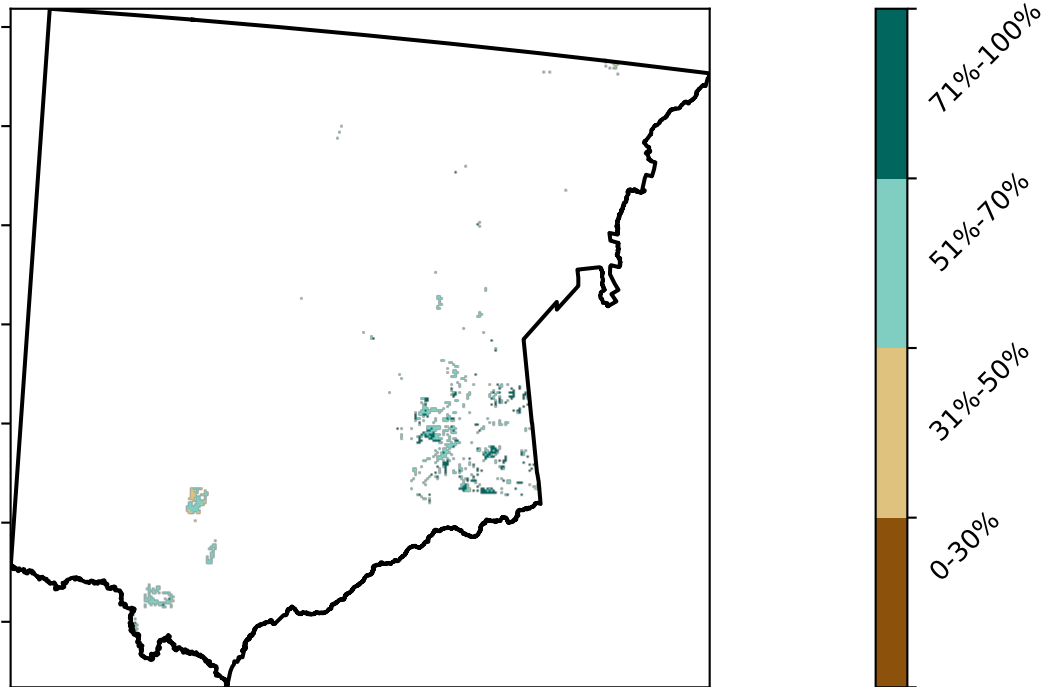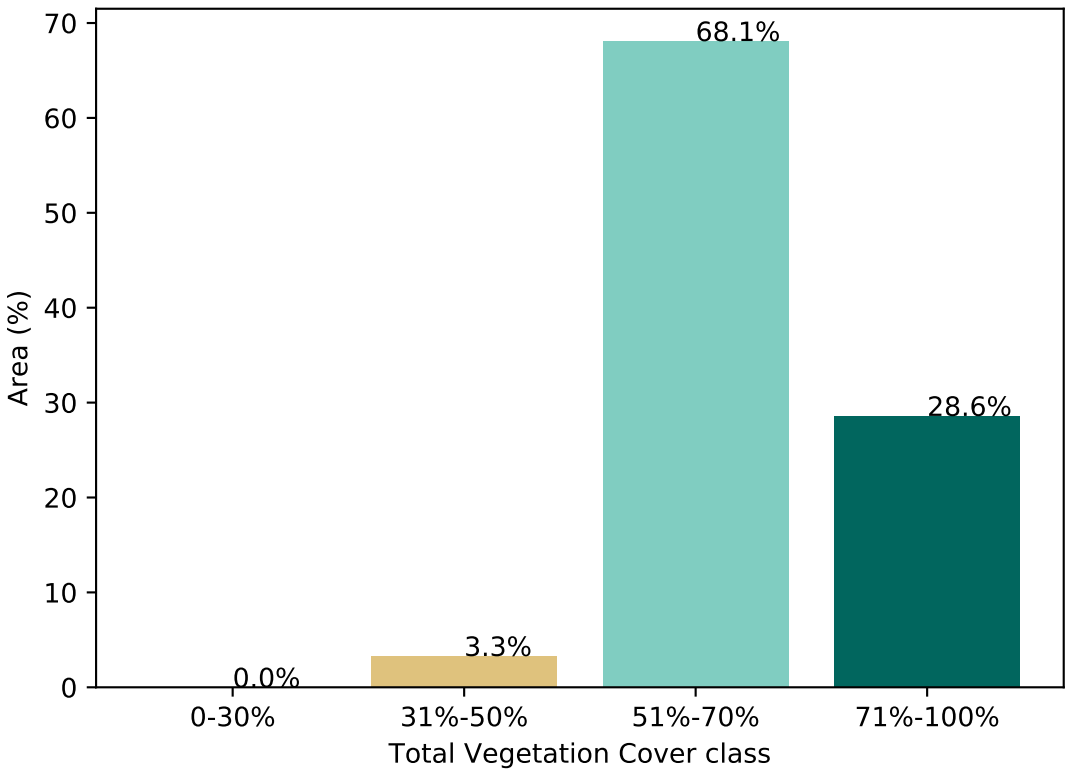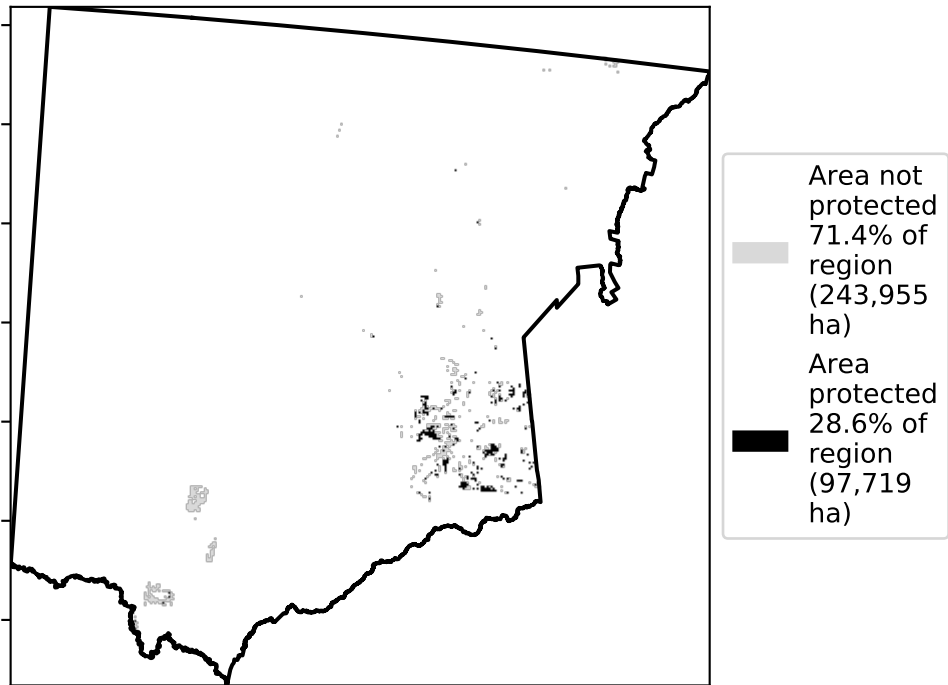### Water erosion historical monthly area protected (Total Veg Cov>70%)

Conservation and natural environments Forest (non woodland)

Land use and forest cover

Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)
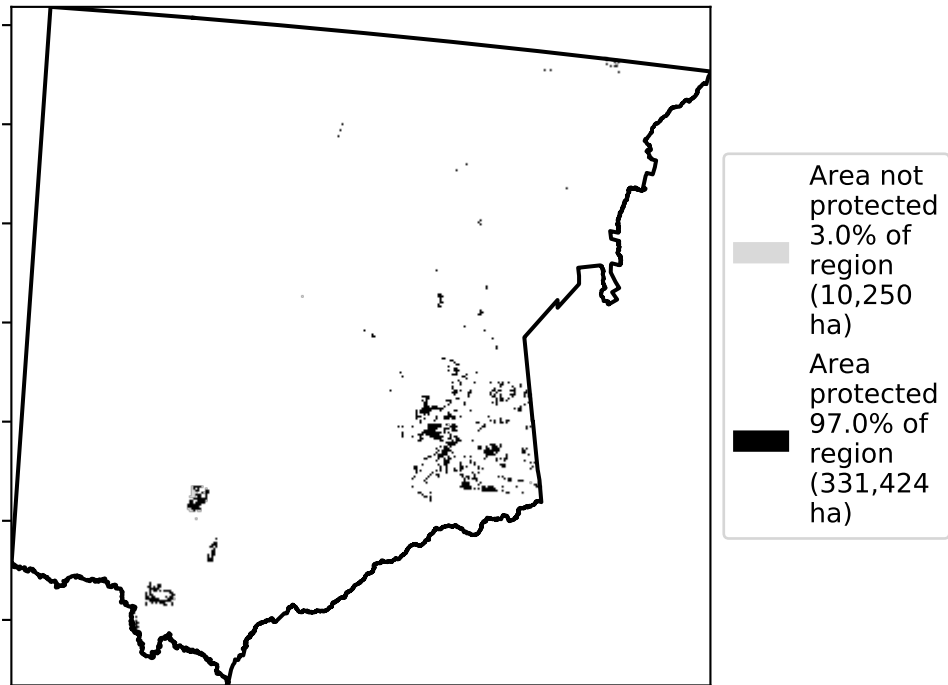
1 Conservation and natural environments – Non-woodland forest

Total Vegetation Cover [%]

71%-100%

51%-70%

31%-50%

0-30%

Proportion of vegetation cover class in area

68.1%

28.6%

0.0%   3.3%

0-30%   31%-50%   51%-70%   71%-100%

Total Vegetation Cover class

Area (%)

% Area protected from water erosion (>70%)

Area not protected 71.4% of region (243,955 ha)

Area protected 28.6% of region (97,719 ha)

% Area protected from wind erosion (>50%)

Area not protected 3.0% of region (10,250 ha)

Area protected 97.0% of region (331,424 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

10

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8-9

4-7

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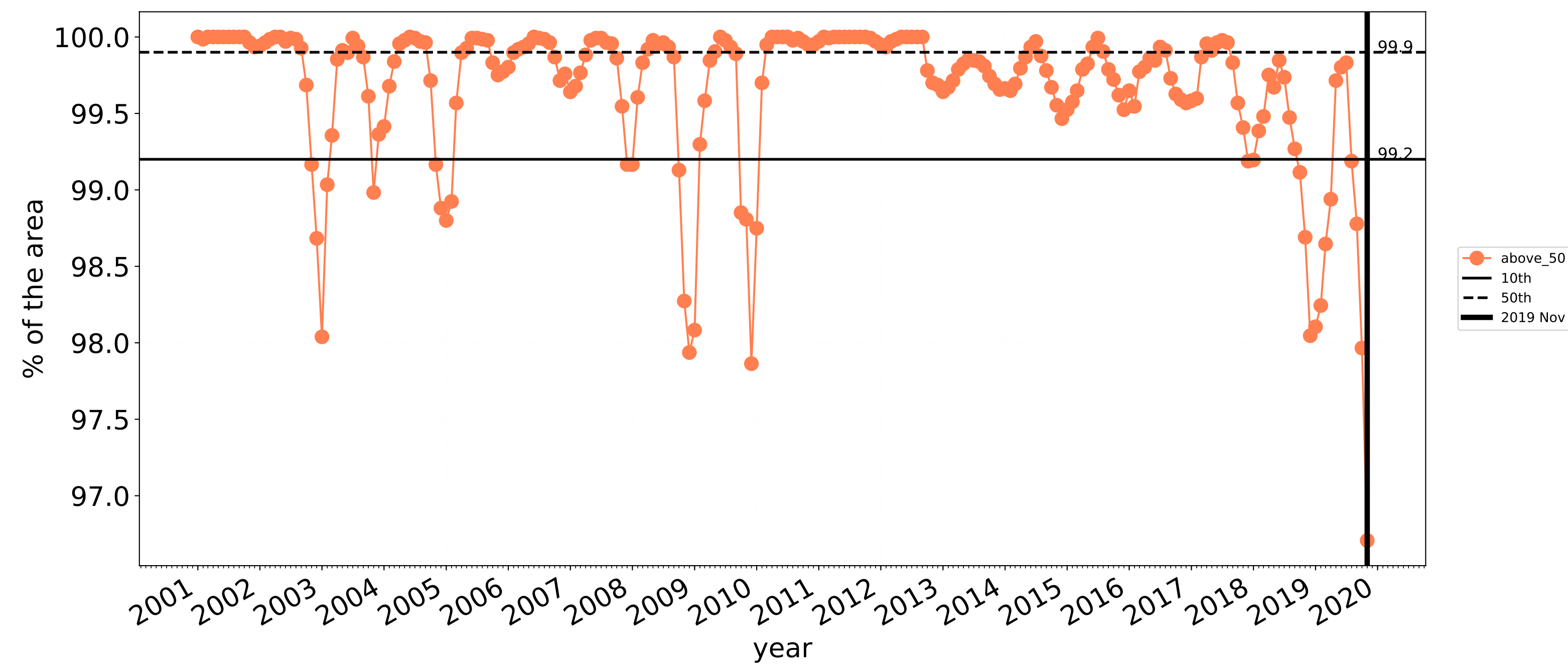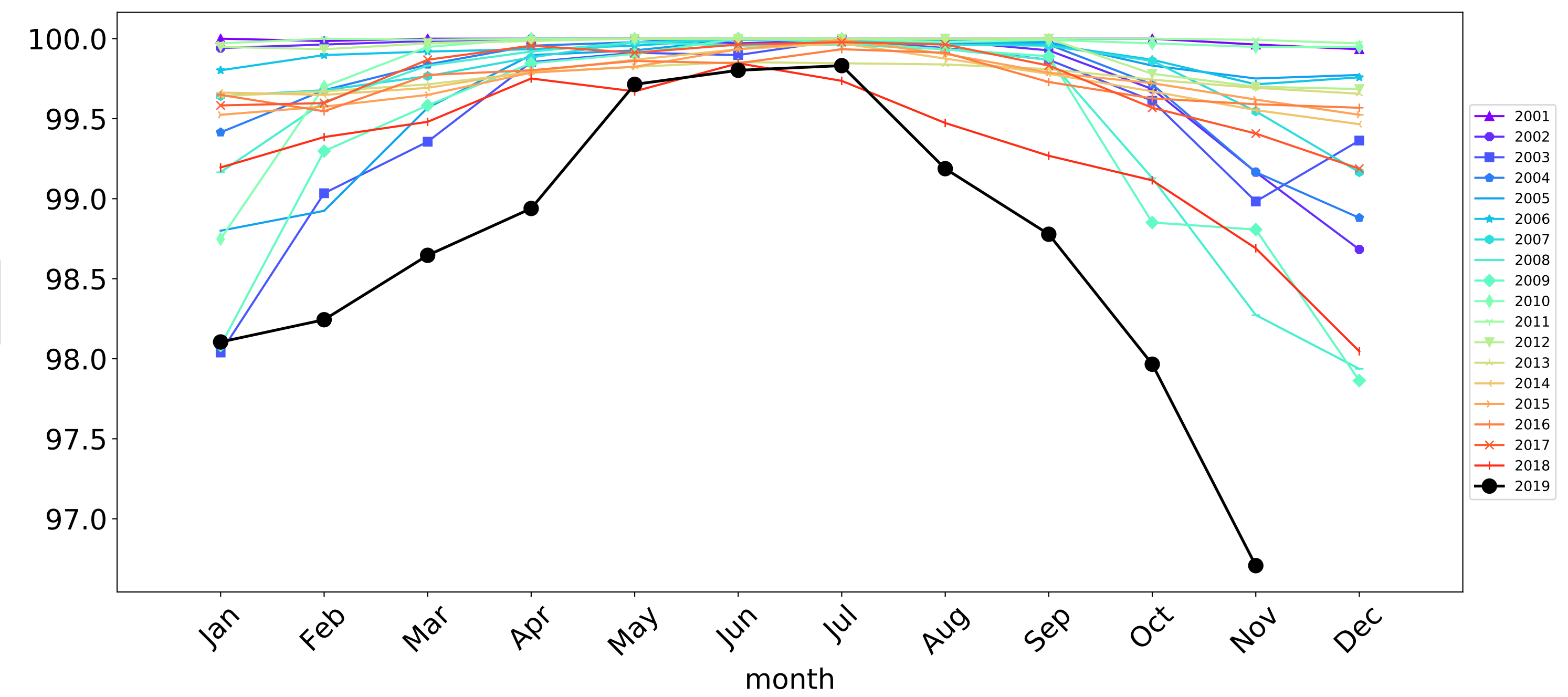
1

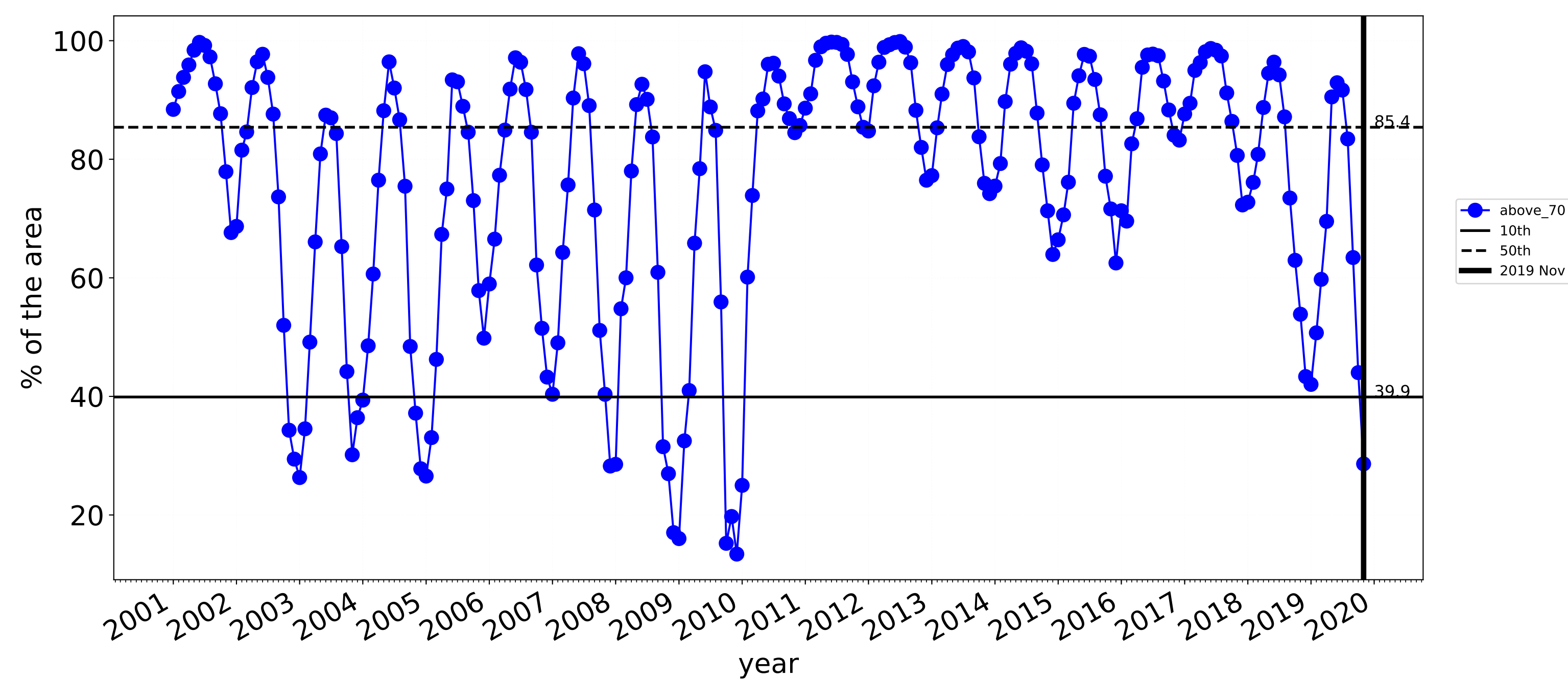# Conservation and natural environments Forest (non woodland) timeseries

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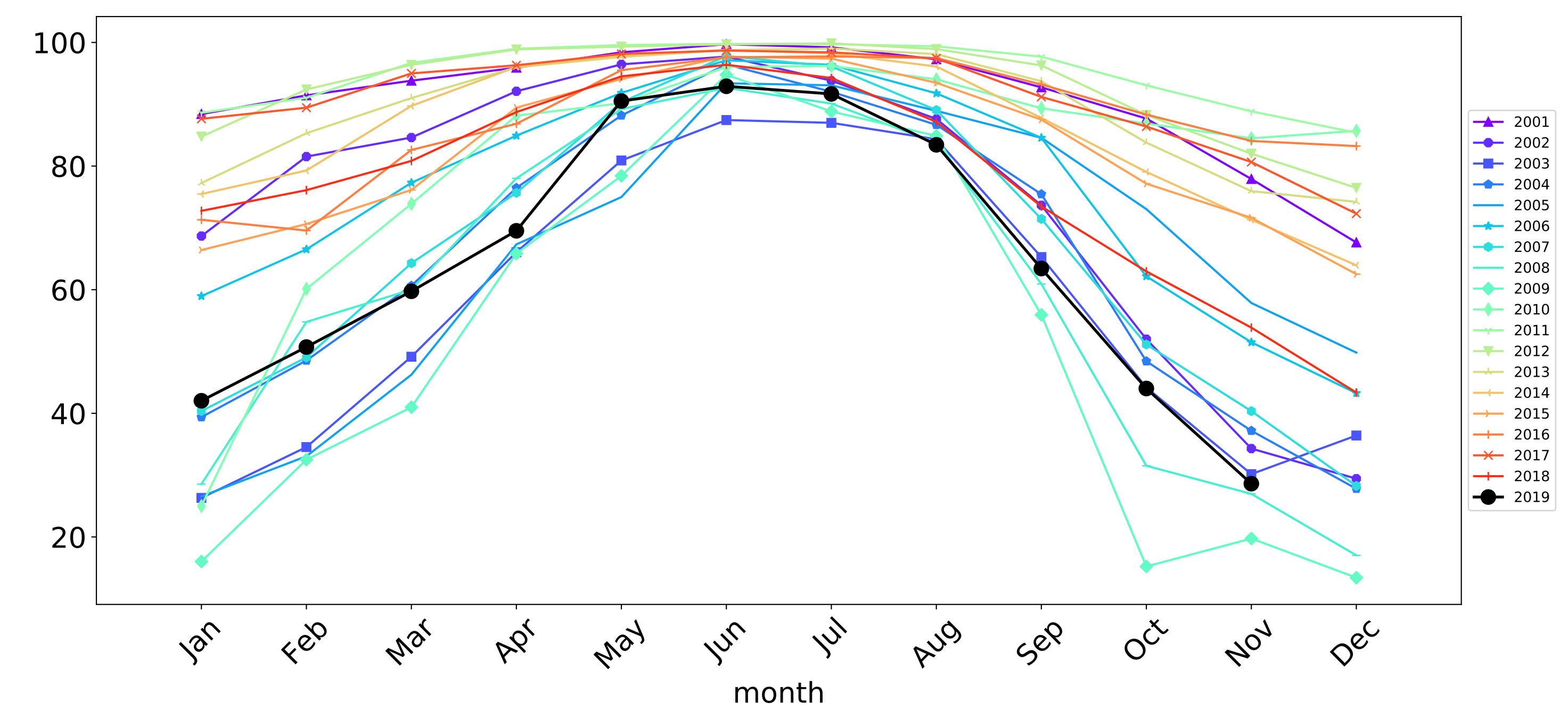

Wind erosion historical monthly area protected (Total Veg Cov >50%)

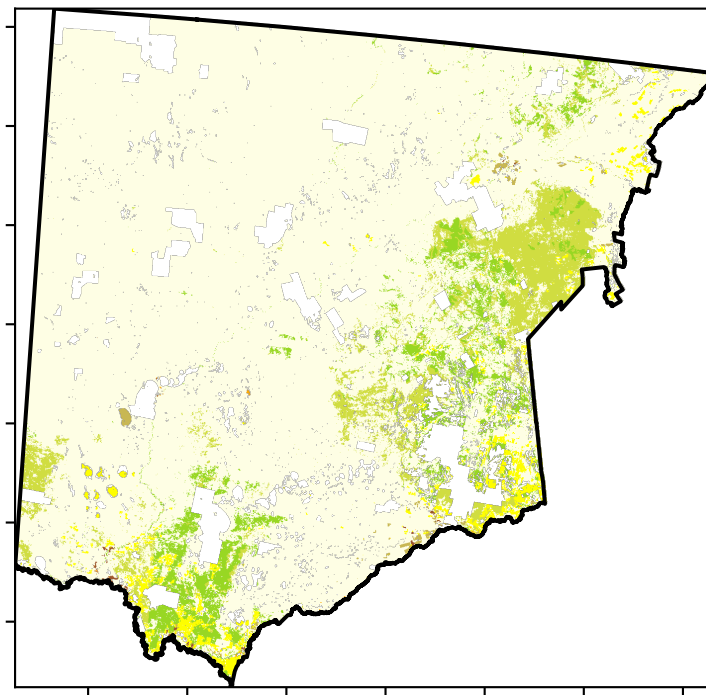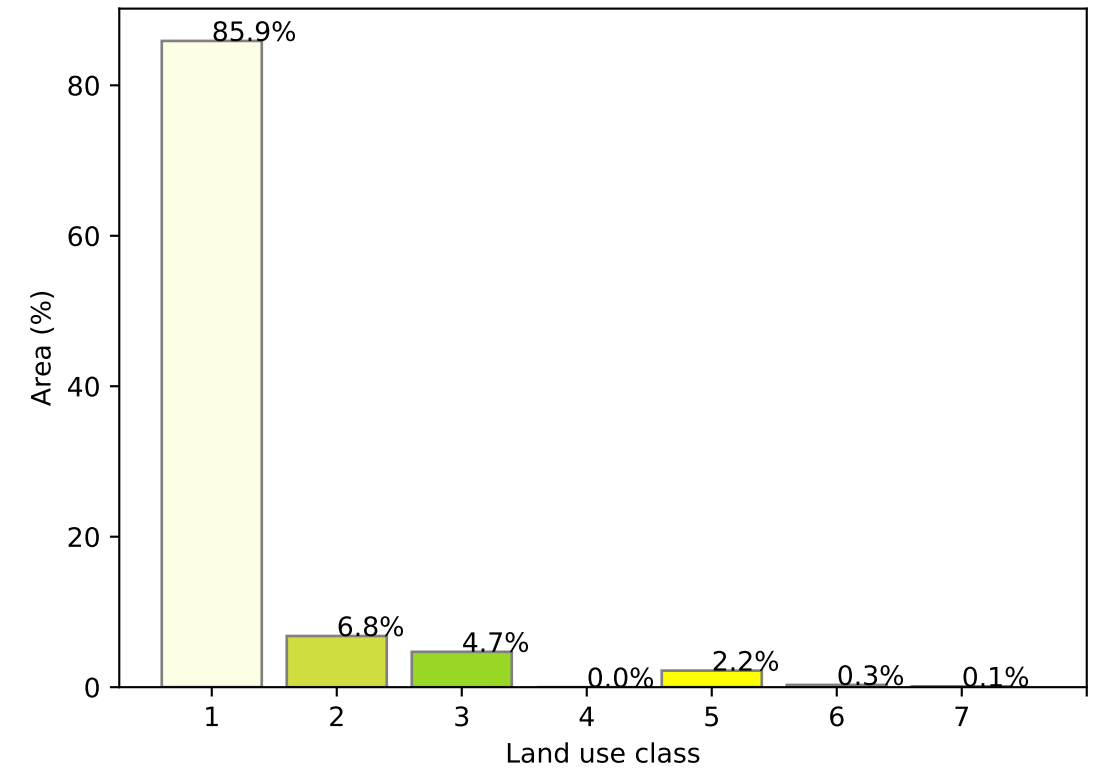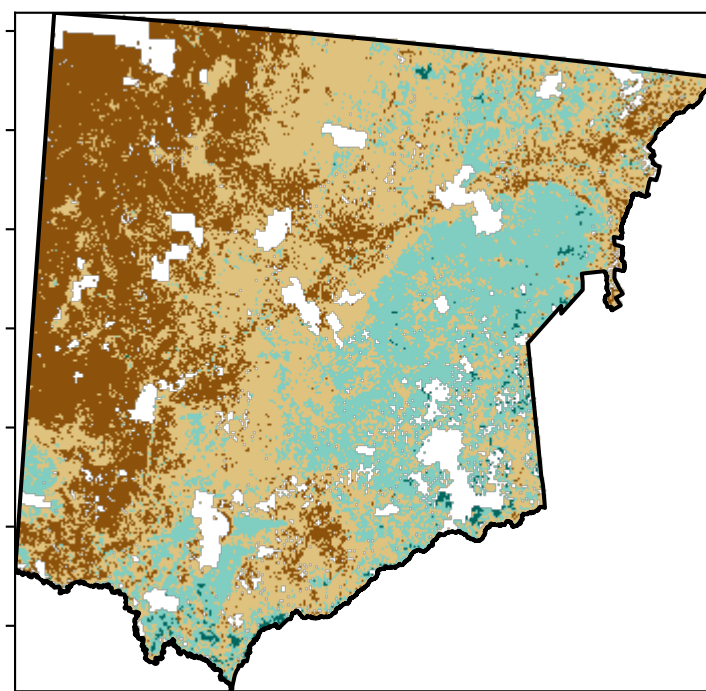Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

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

Agriculture

Land use and forest cover

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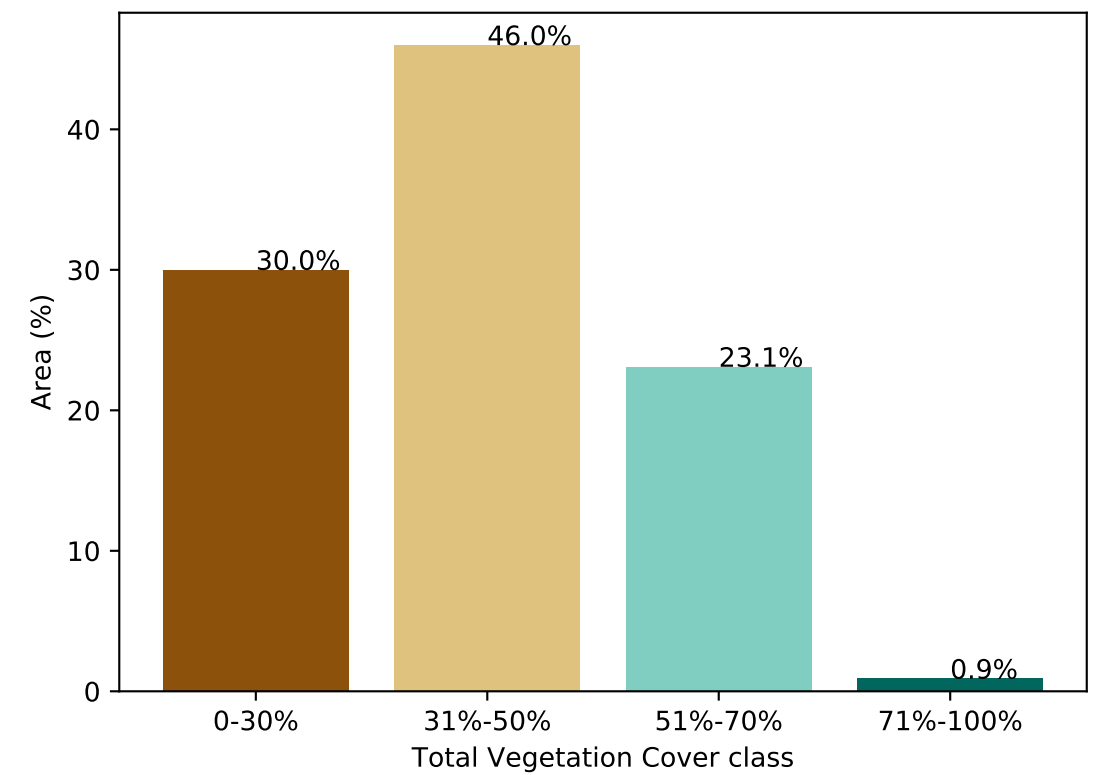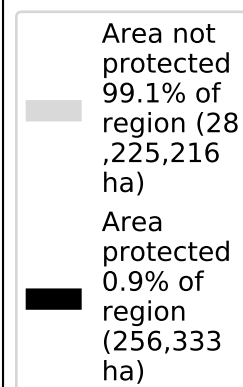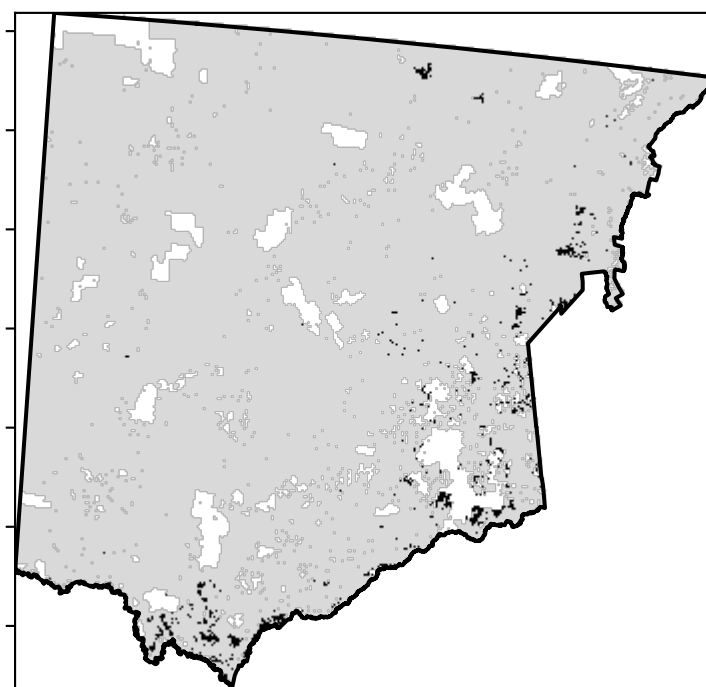(2018) and Forests
of Australia (2018)

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

Proportion of each land class in area

85.9%
6.8%
4.7%
0.0%
2.2%
0.3%
0.1%

Area (%)

Land use class

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

Proportion of vegetation cover class in area

46.0%
30.0%
23.1%
0.9%

Area (%)

0-30%   31%-50%   51%-70%   71%-100%
Total Vegetation Cover class

% Area protected from water erosion (>70%)

Area not
protected
99.1% of
region (28
,225,216
ha)

Area
protected
0.9% of
region
(256,333
ha)

% Area protected from wind erosion (>50%)

Area not
protected
76.0% of
region (21
,645,978
ha)

Area
protected
24.0% of
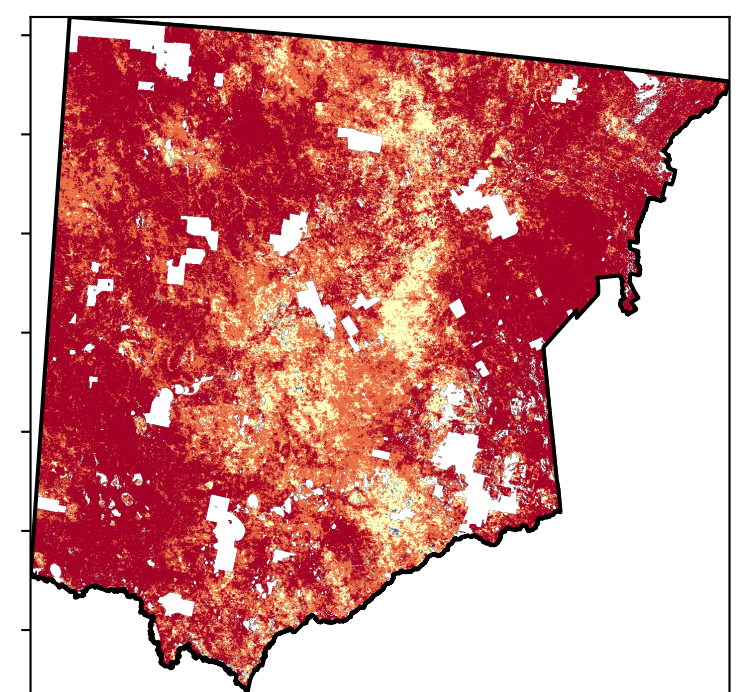region
(6,835,572
ha)

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.

20
10
0
-10
-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
from 2001 to 2019.

10
8-9
4-7
2-3
1

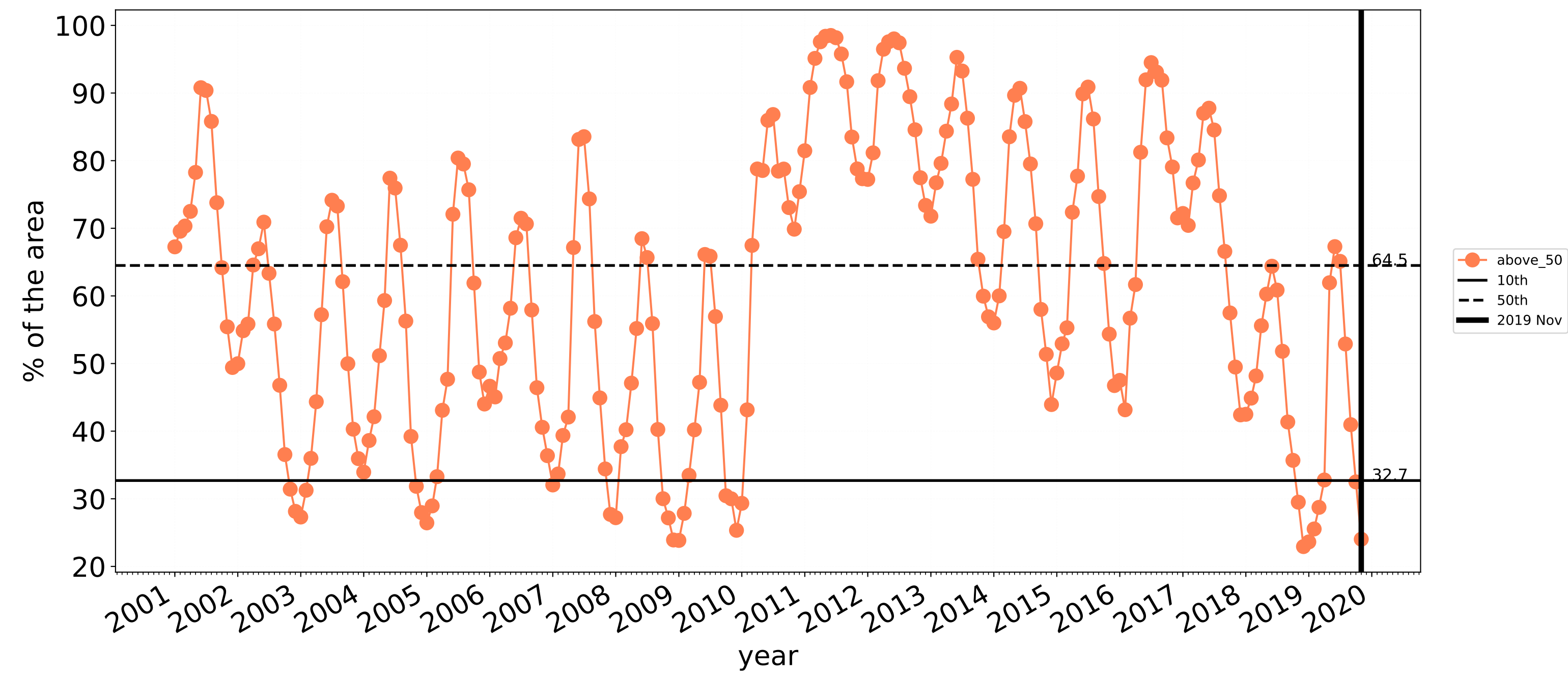CSIRO   TERN   Australian Government   National Landcare Programme   NSW GOVERNMENT   Planning, Industry & Environment
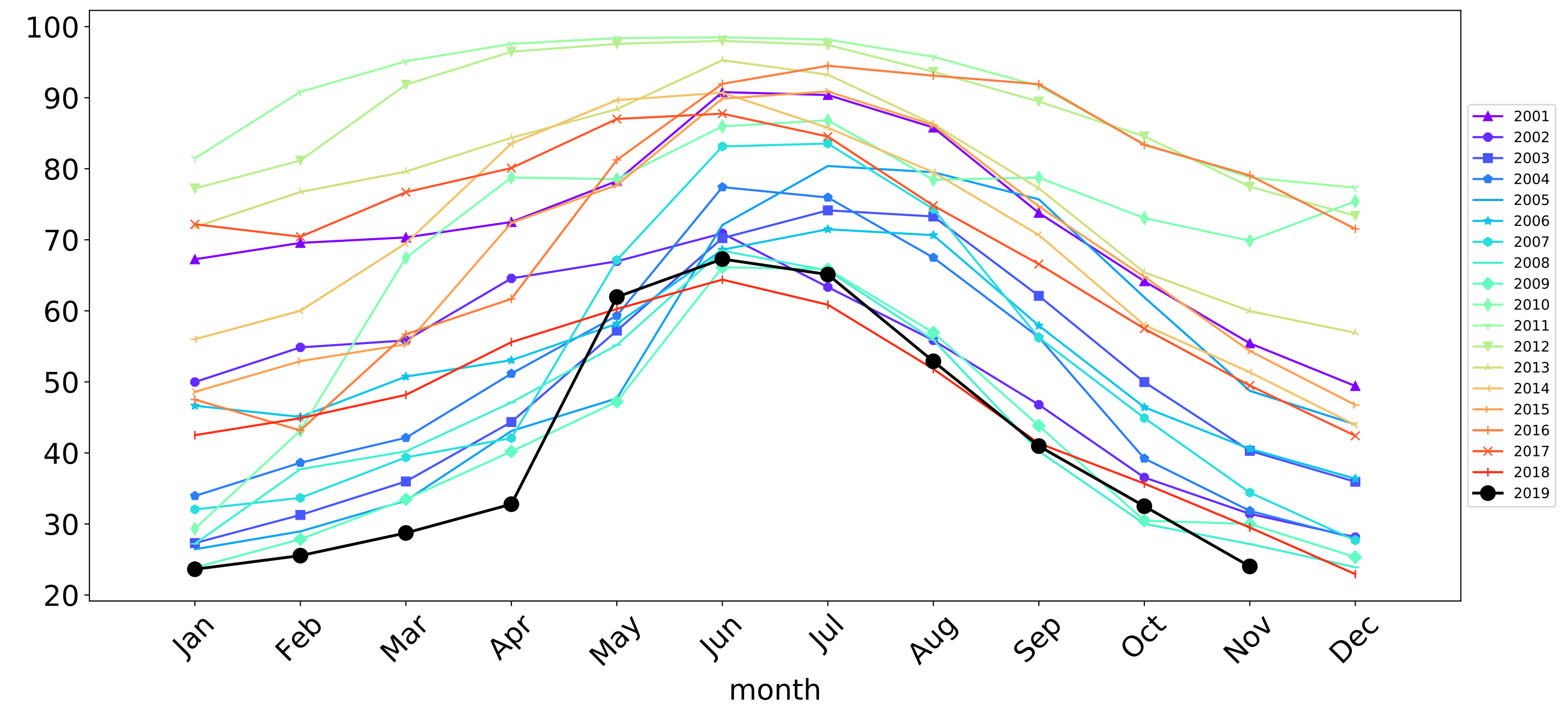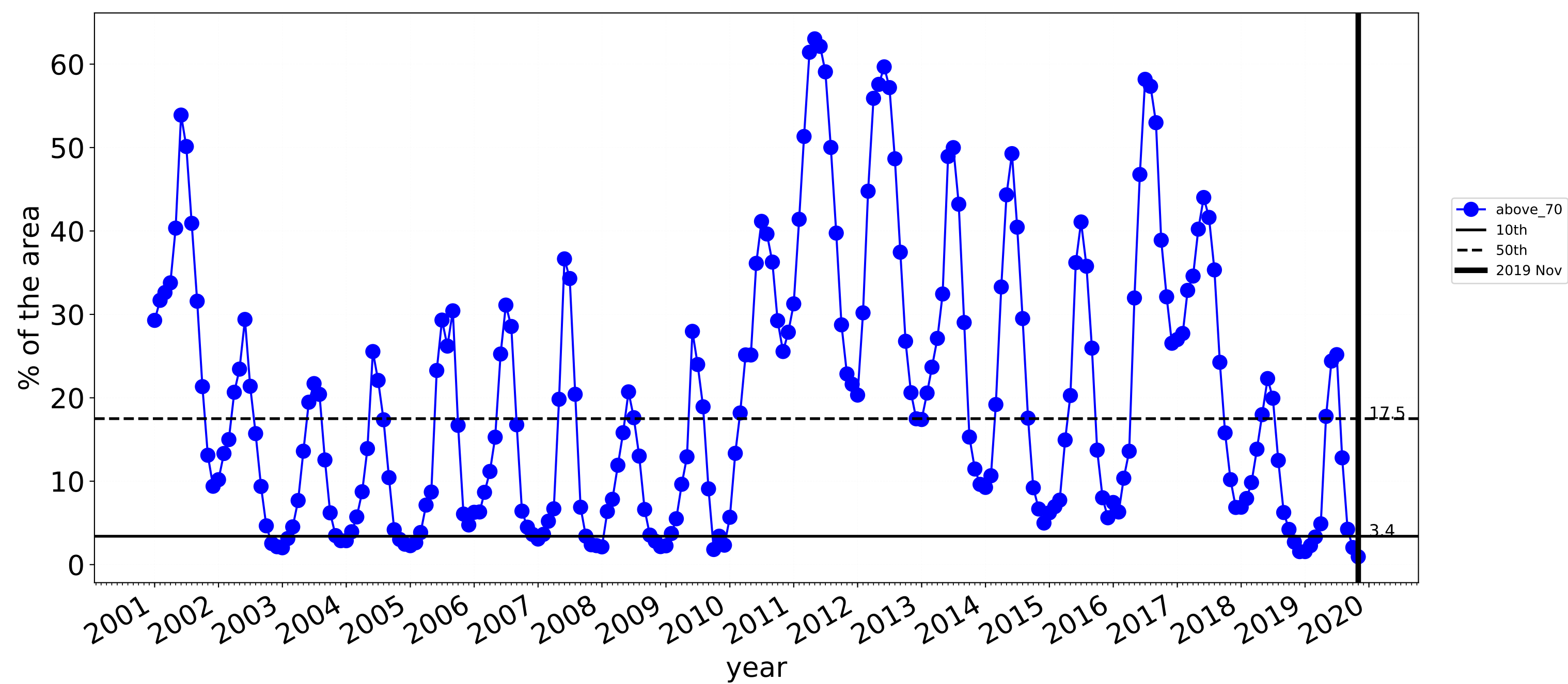
Agriculture timeseries

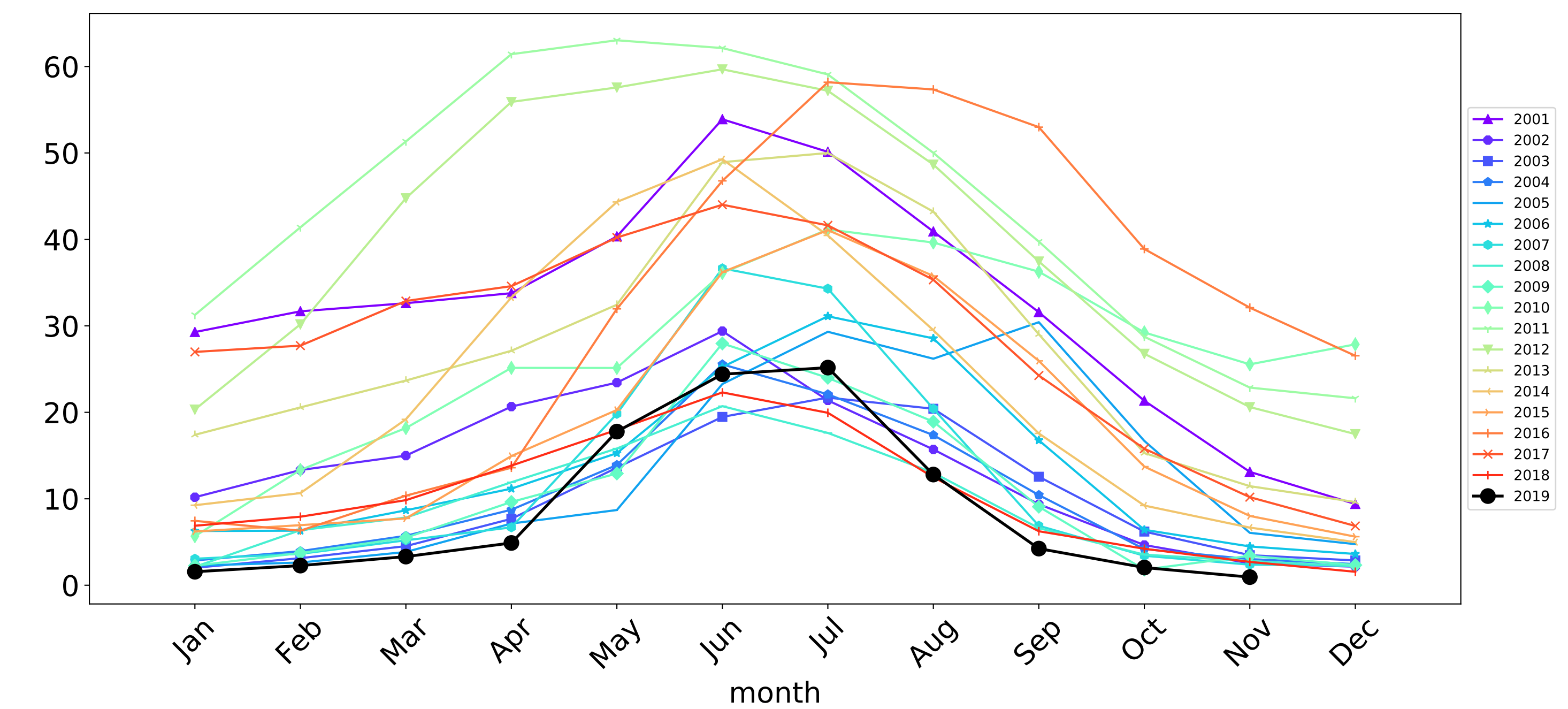Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

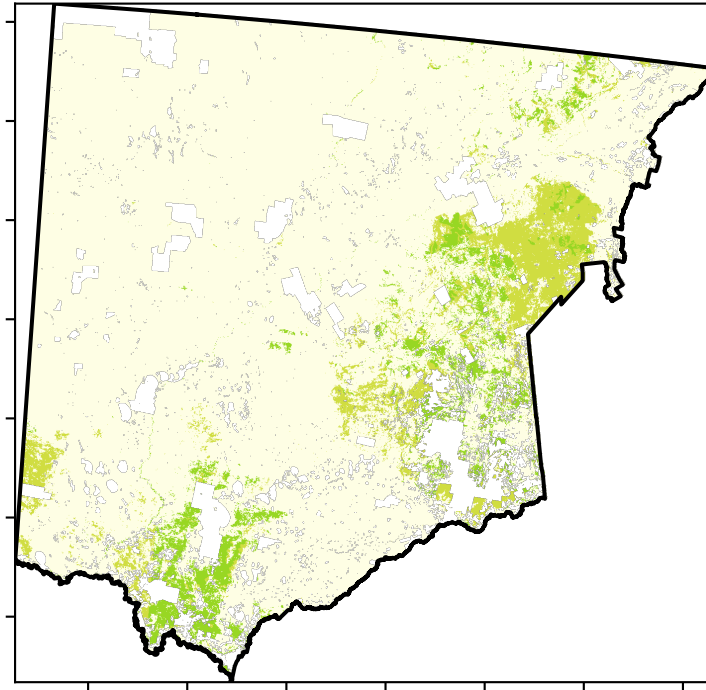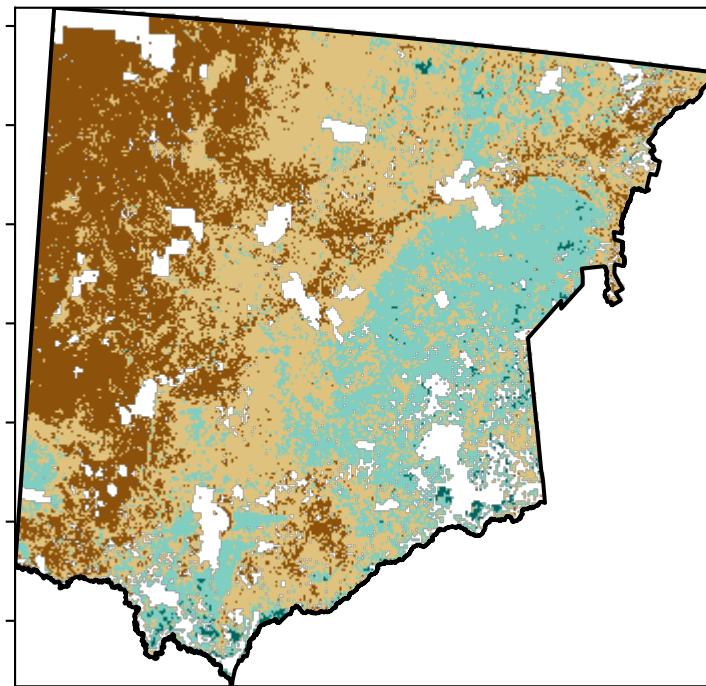Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

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

Grazing

Land use and forest cover

Catchment Scale
Land Use and Forests
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

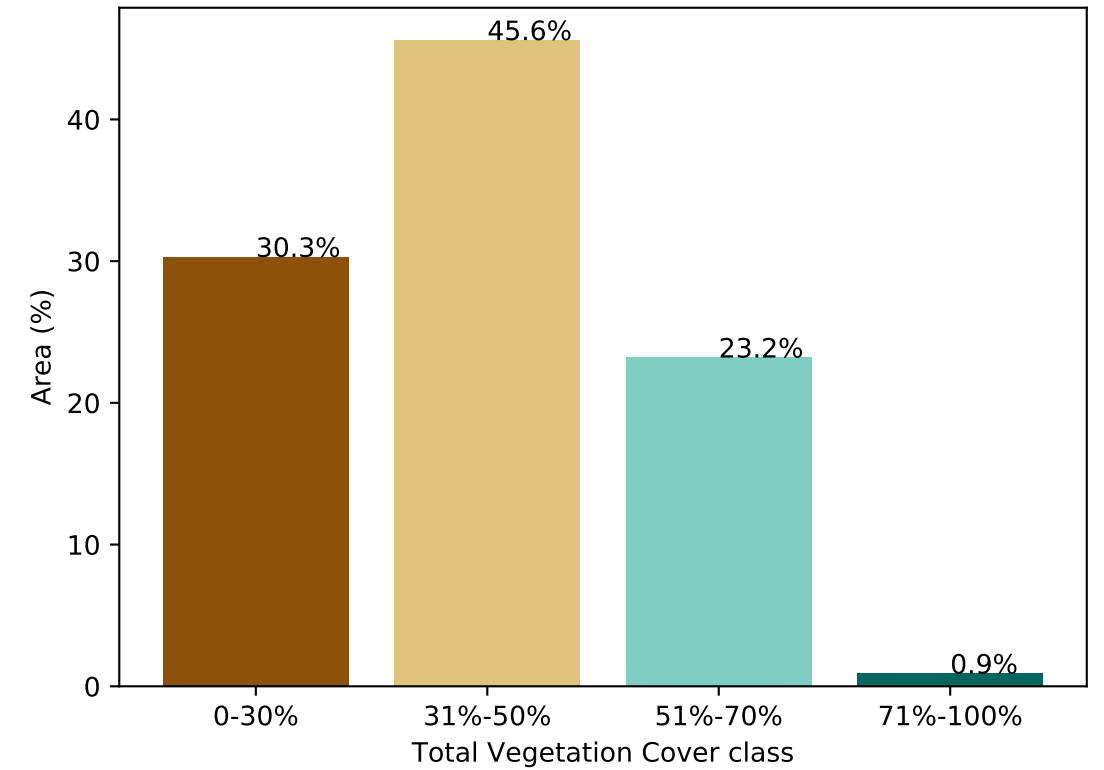## Proportion of each land class in area
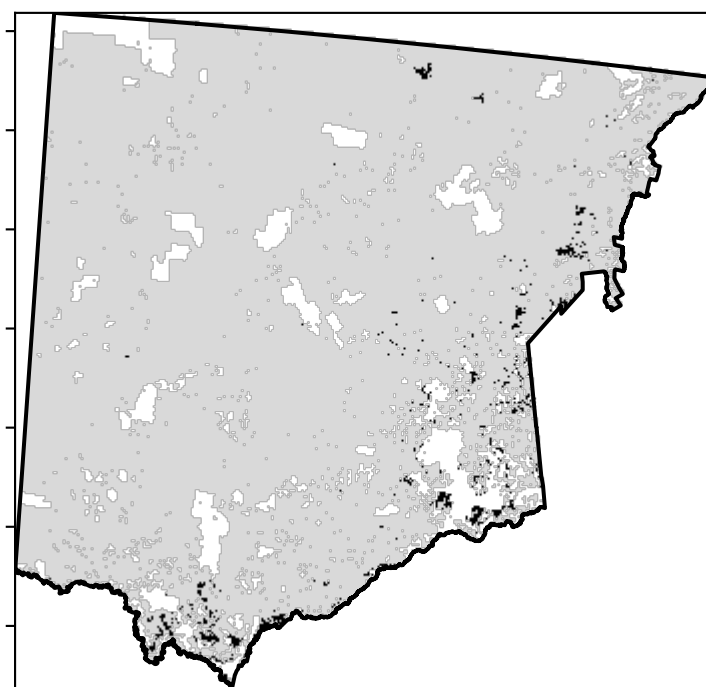

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

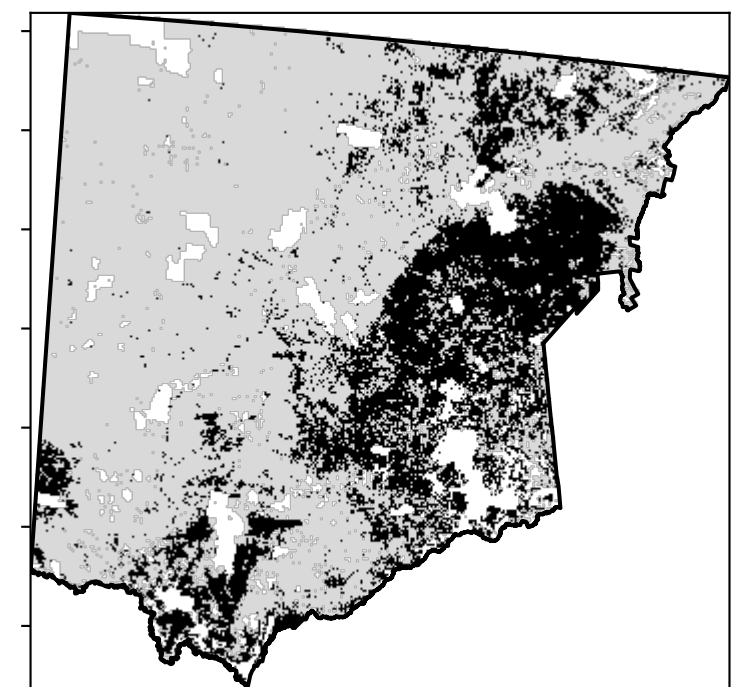## Proportion of vegetation cover class in area

% Area protected from water erosion (>70%)
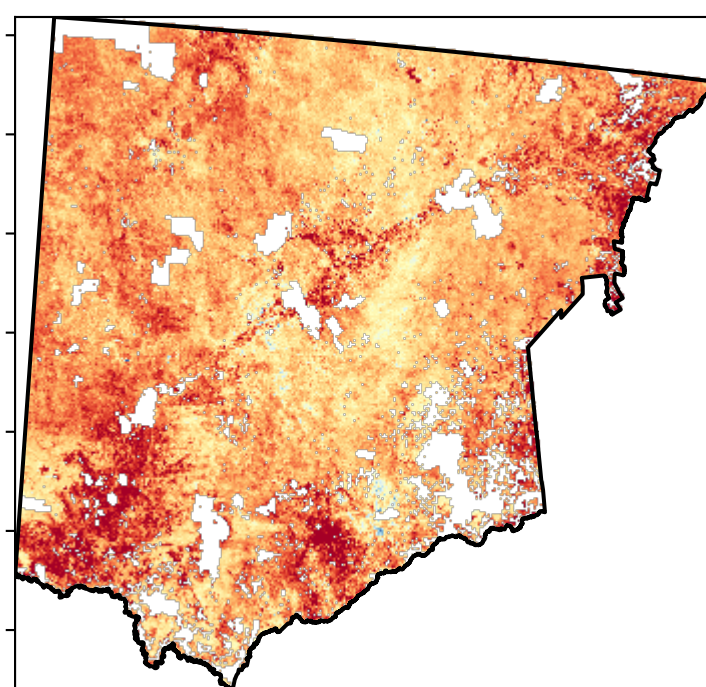

Area not
protected
99.1% of
region (27
,505,725
ha)

Area
protected
0.9% of
region
(249,799
ha)

% Area protected from wind erosion (>50%)

Area not
protected
76.0% of
region (21
,094,199
ha)

Area
protected
24.0% of
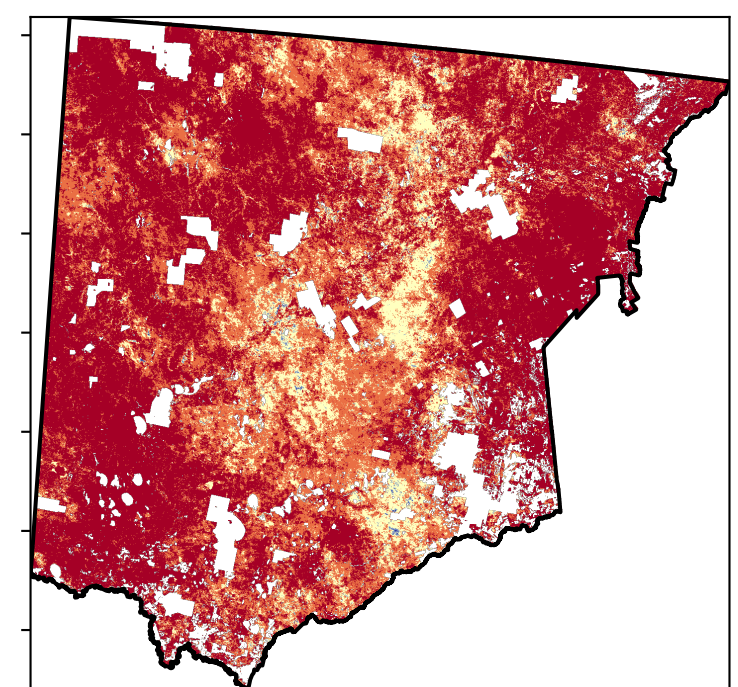region
(6,661,326
ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

Grazing timeseries

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

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

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

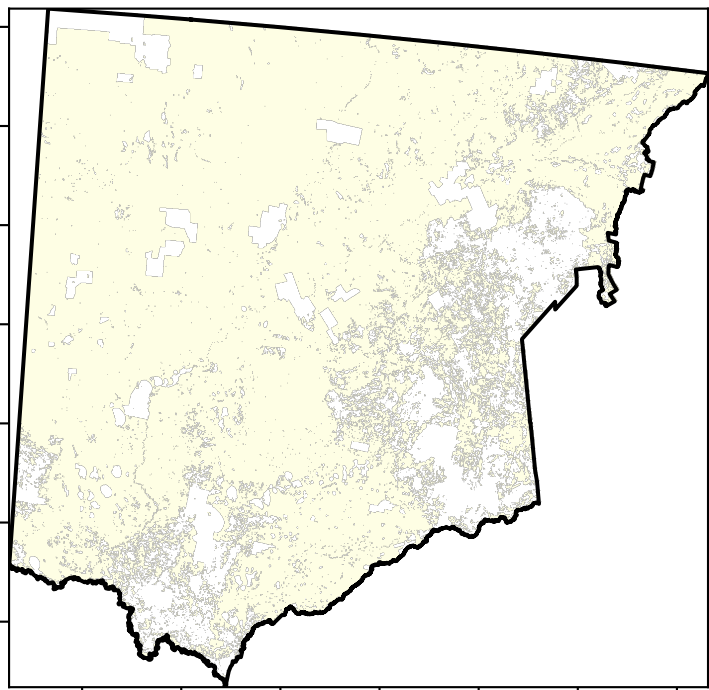Water erosion historical monthly area protected (Total Veg Cov>70%)
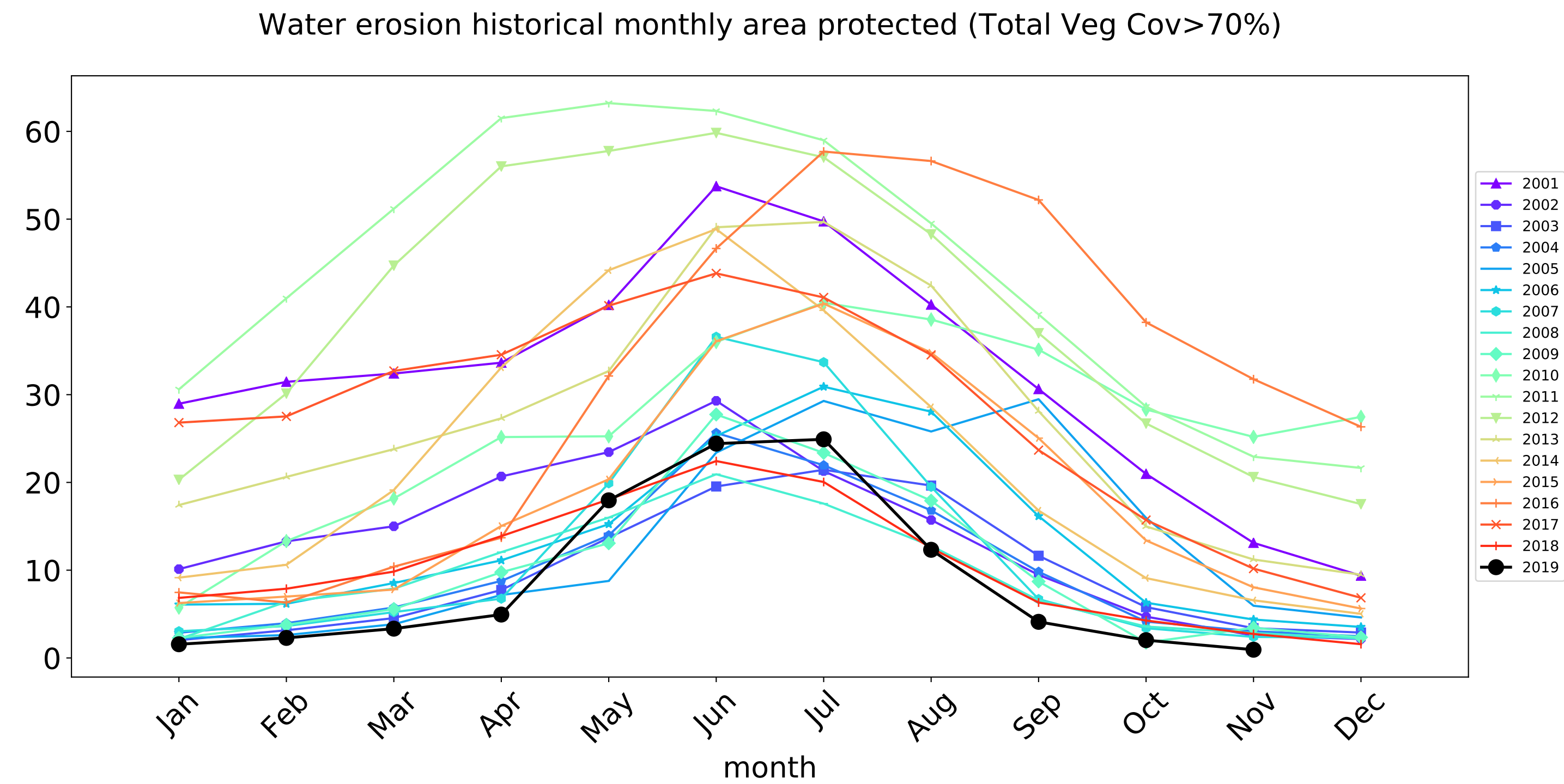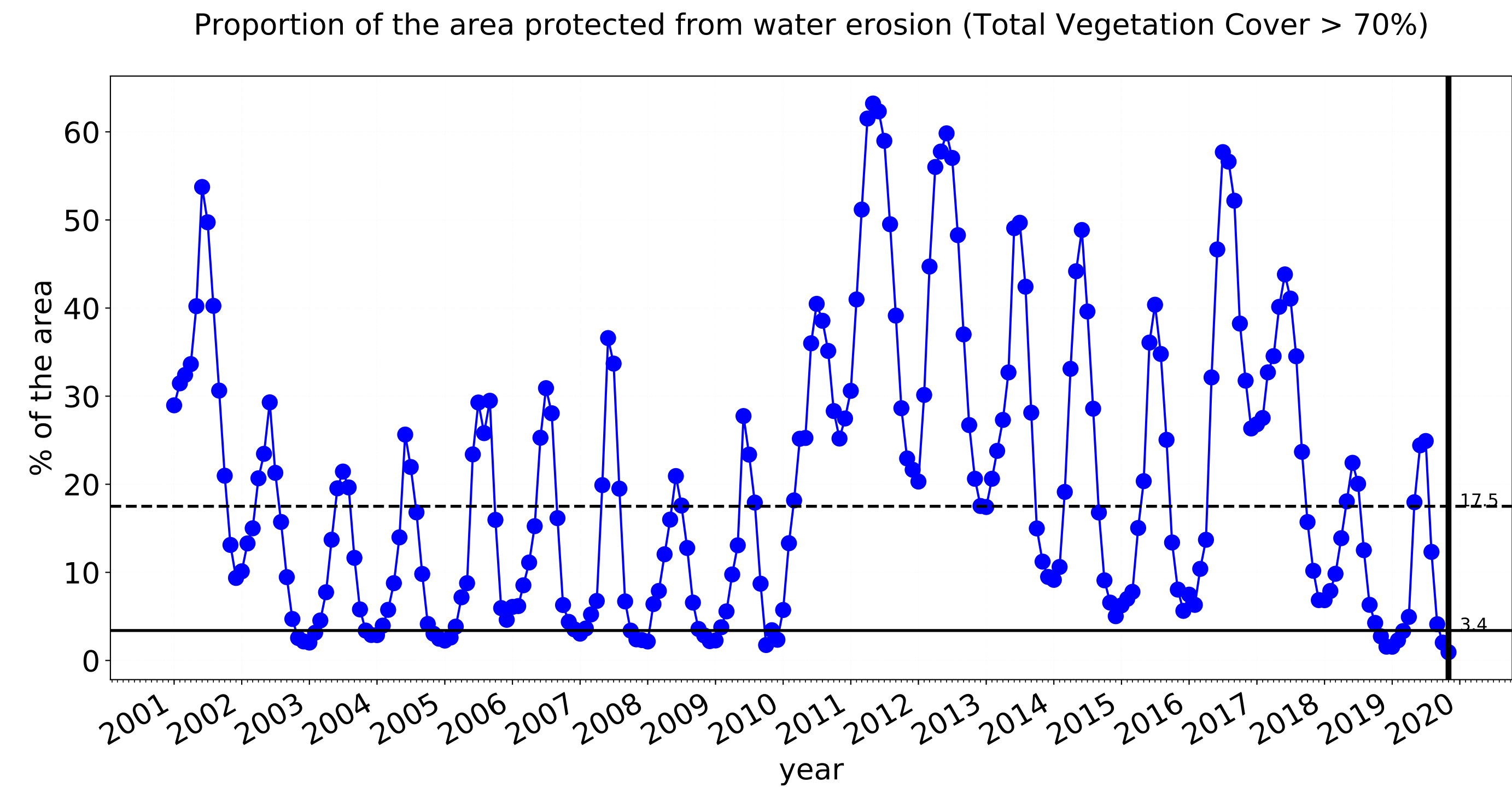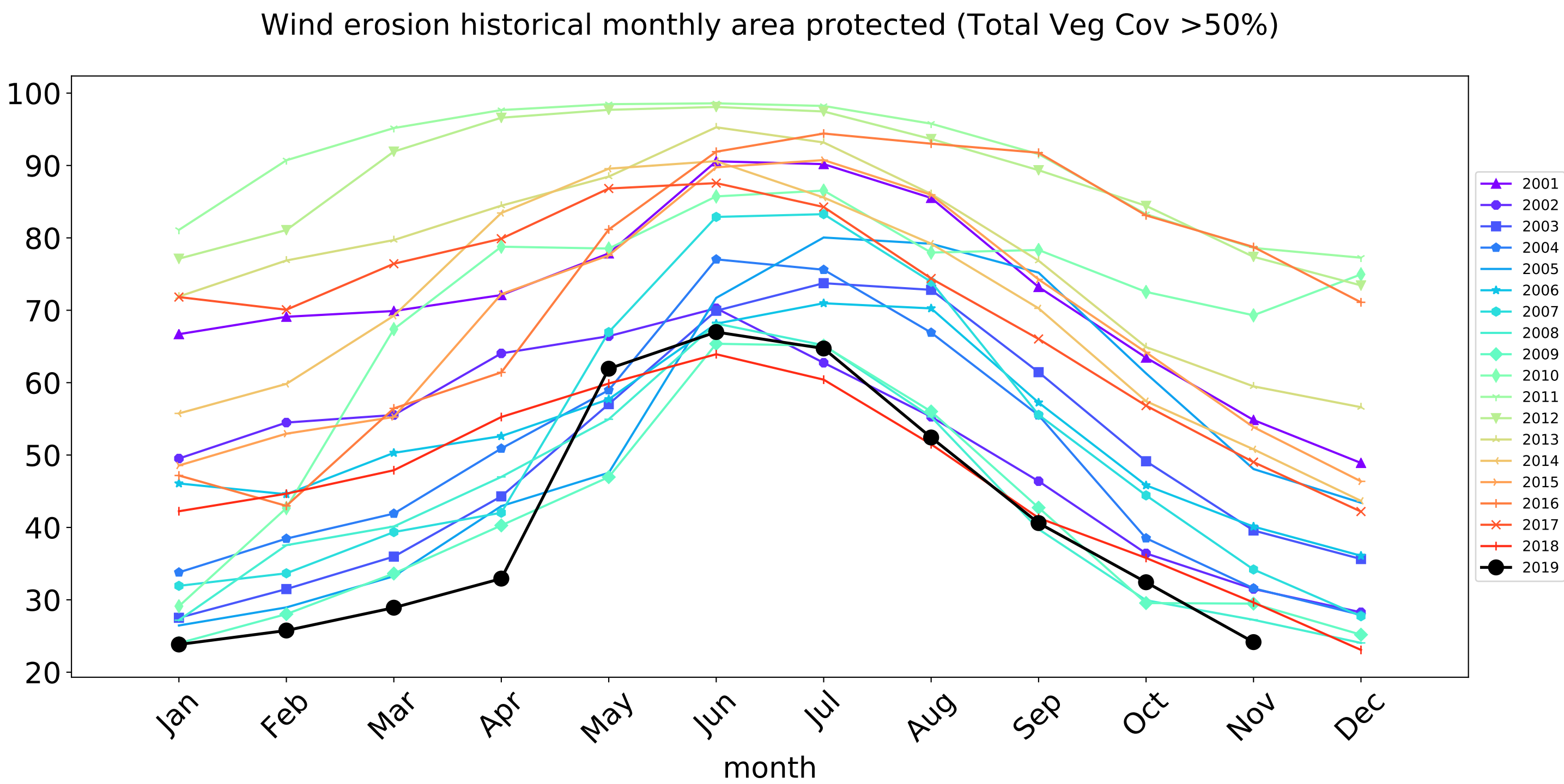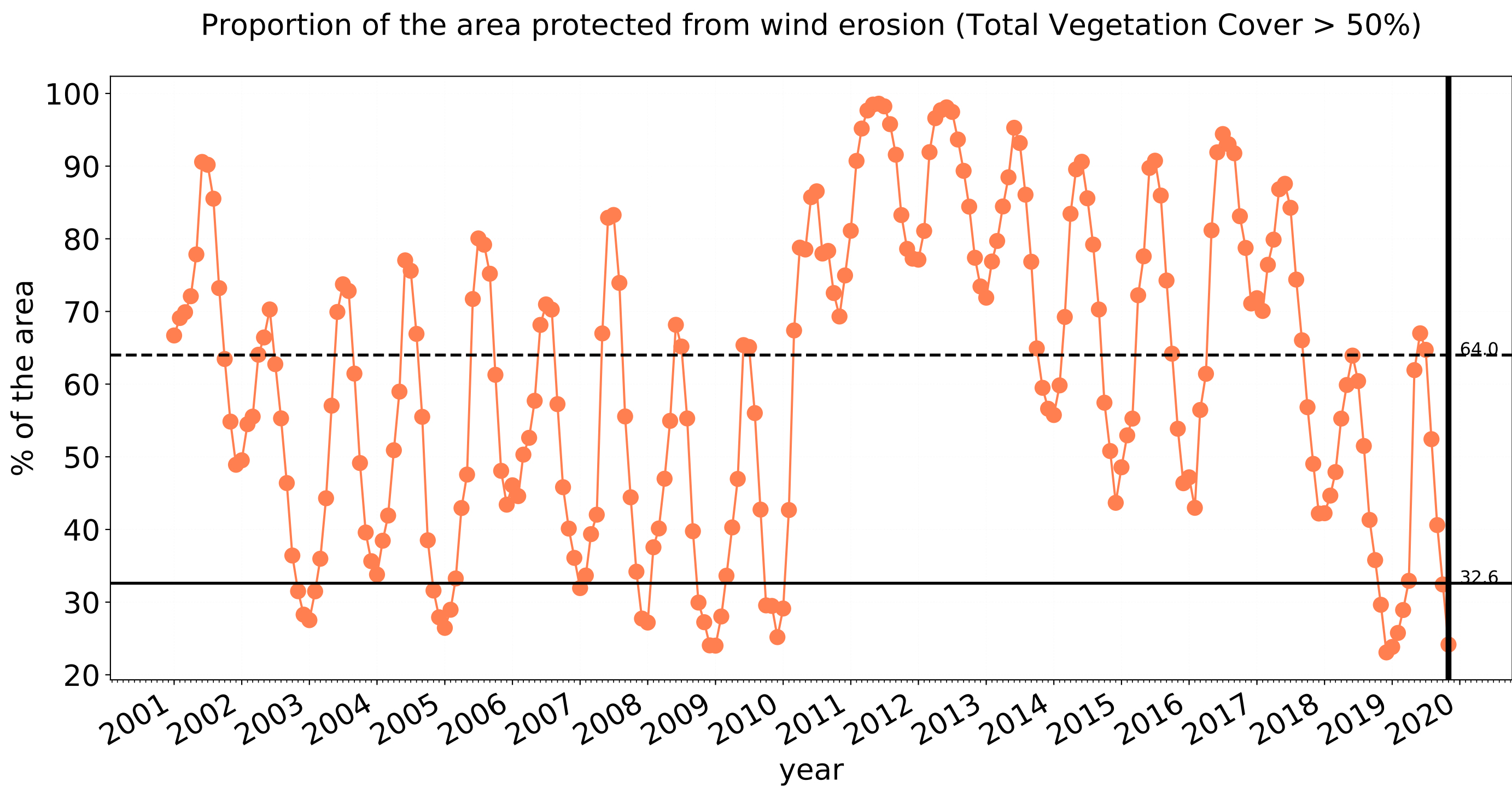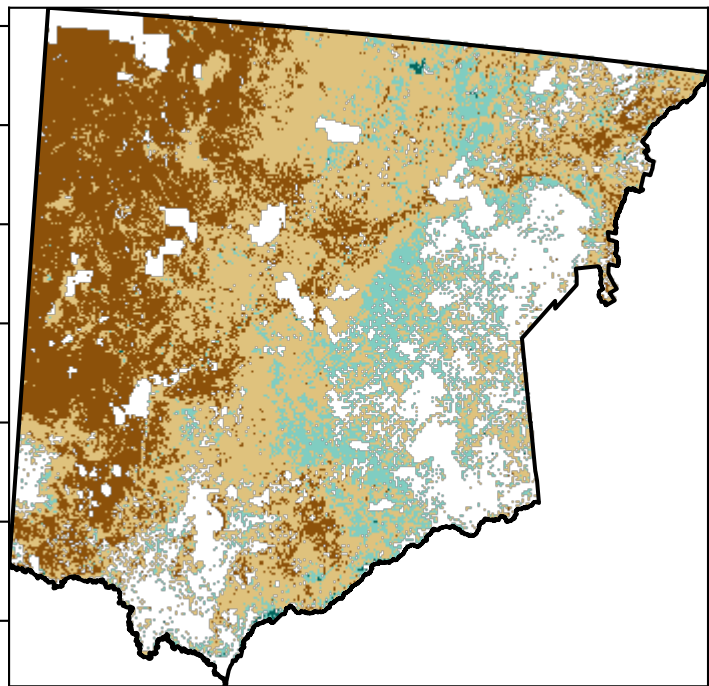
Grazing non forest

Land use and forest cover

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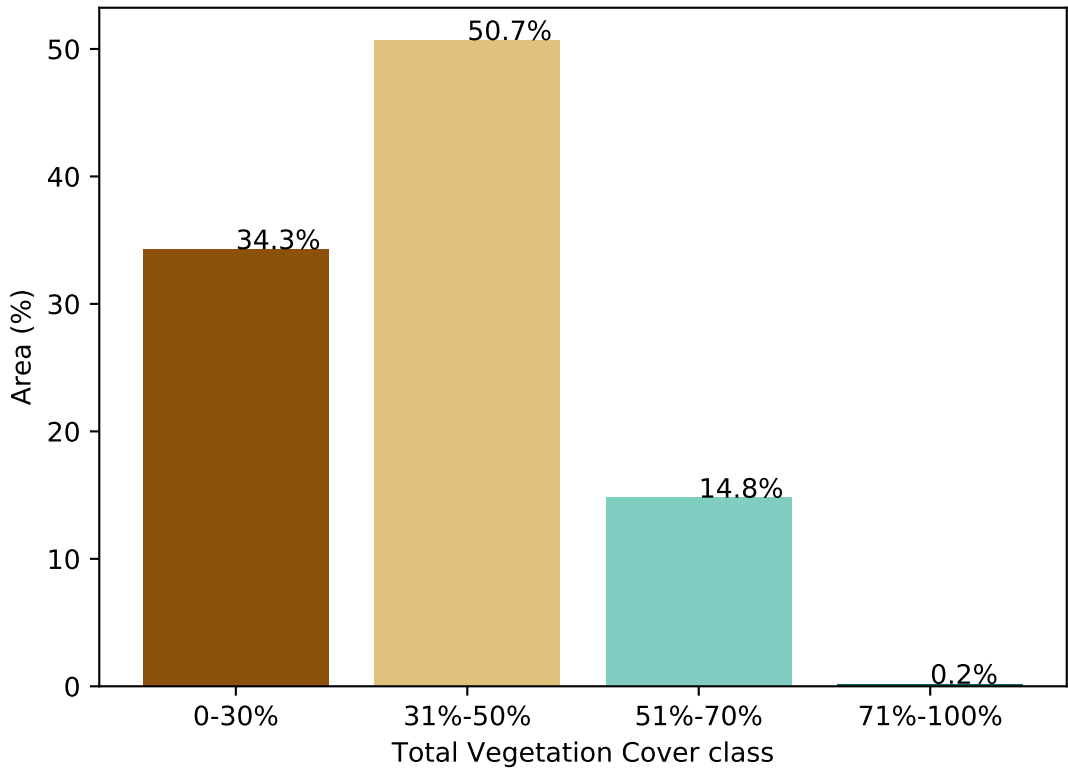
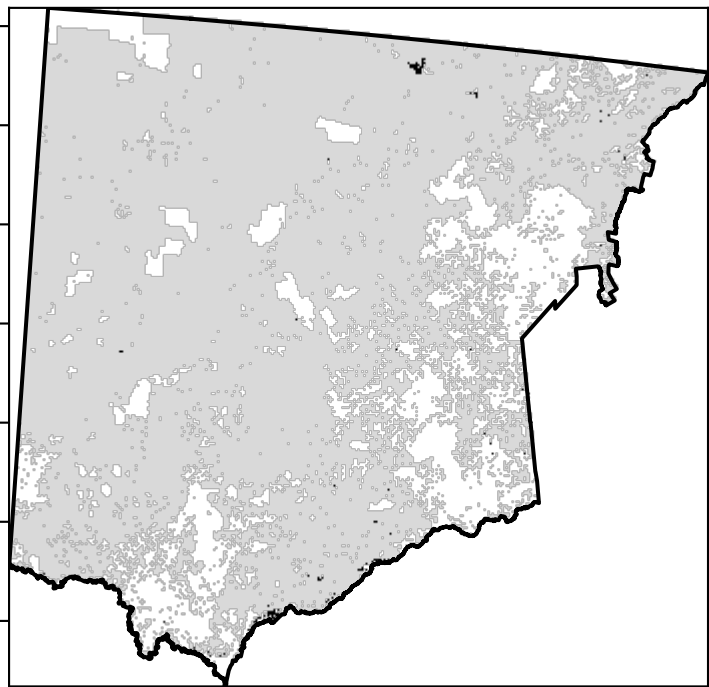1 Agriculture - Grazing - Non forest

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

Proportion of vegetation cover class in area

Area (%) — Total Vegetation Cover class

- 0-30%: 34.3%
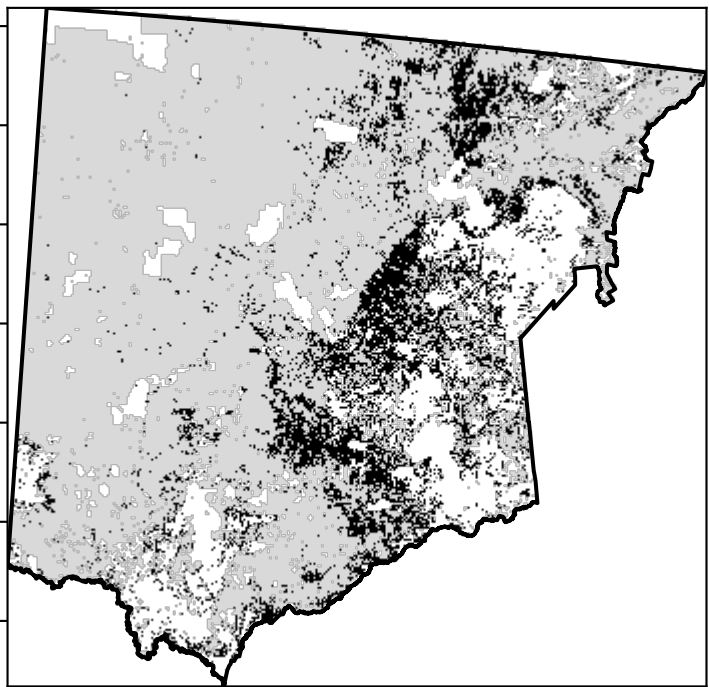- 31%-50%: 50.7%
- 51%-70%: 14.8%
- 71%-100%: 0.2%

% Area protected from water erosion (>70%)

Area not protected 99.8% of region (24,423,430 ha)

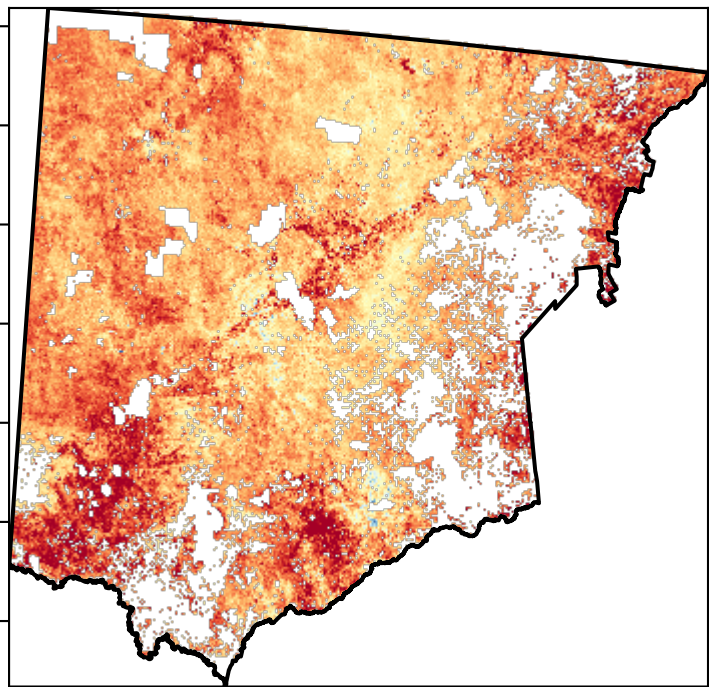Area protected 0.2% of region (48,944 ha)

% Area protected from wind erosion (>50%)

Area not protected 85.0% of region (20,801,518 ha)
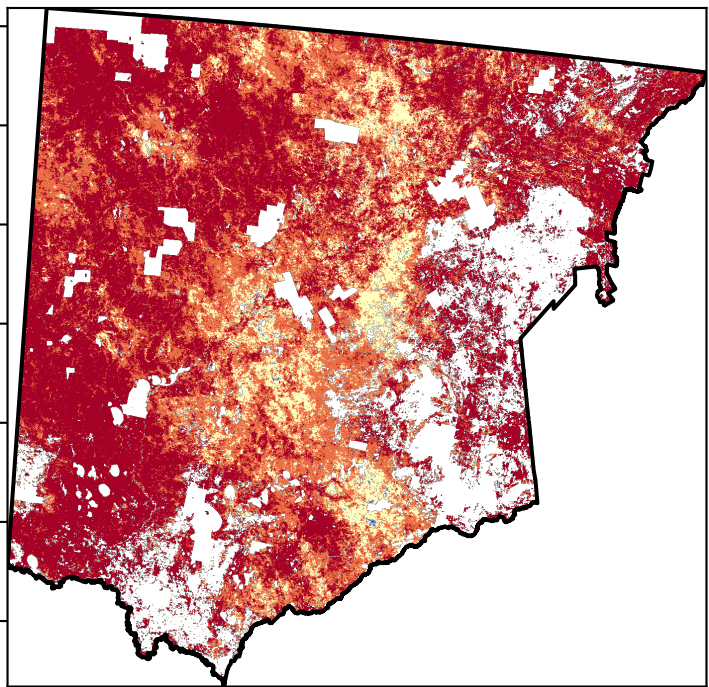
Area protected 15.0% of region (3,670,856 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

10
8-9
4-7
2-3
1

CSIRO   TERN   Australian Government   National Landcare Programme   NSW GOVERNMENT   Planning, Industry & Environment
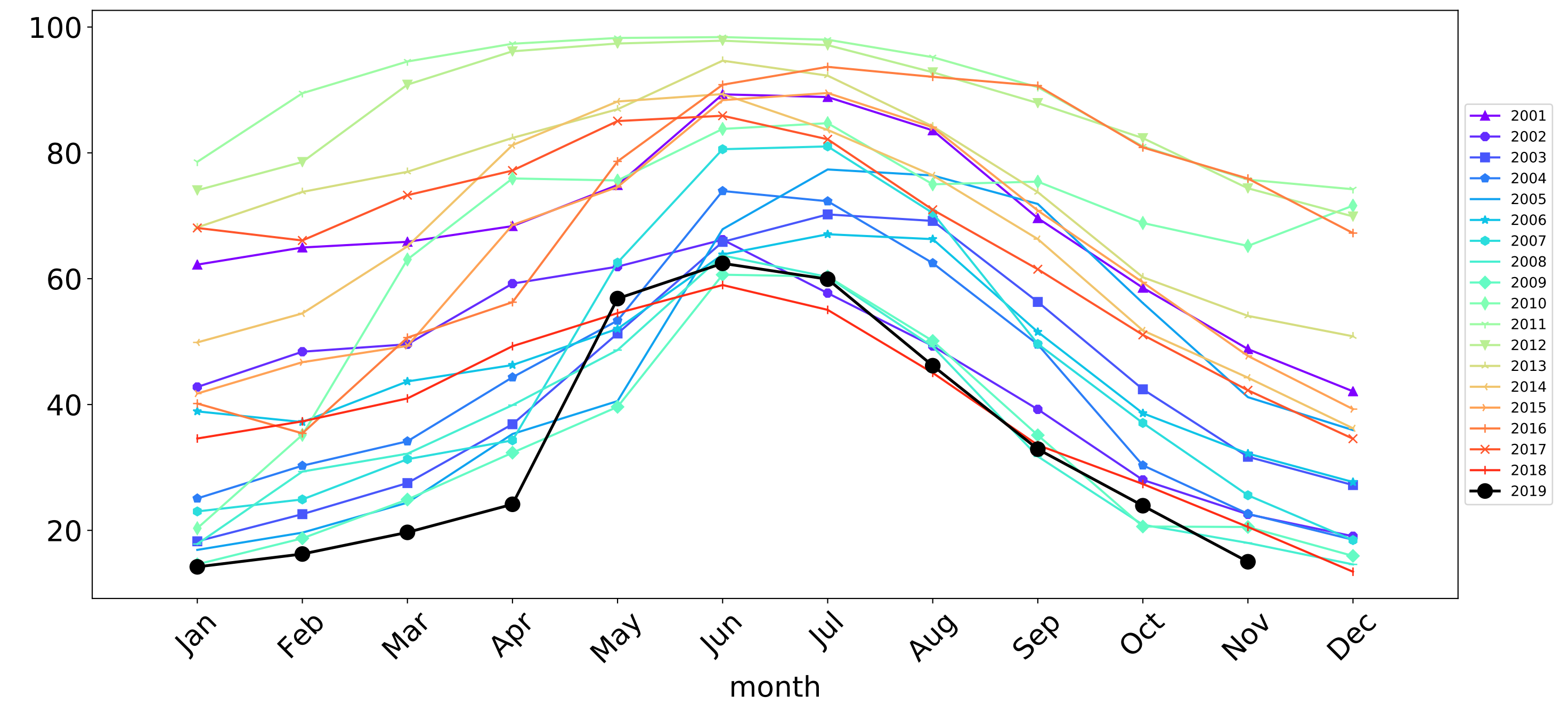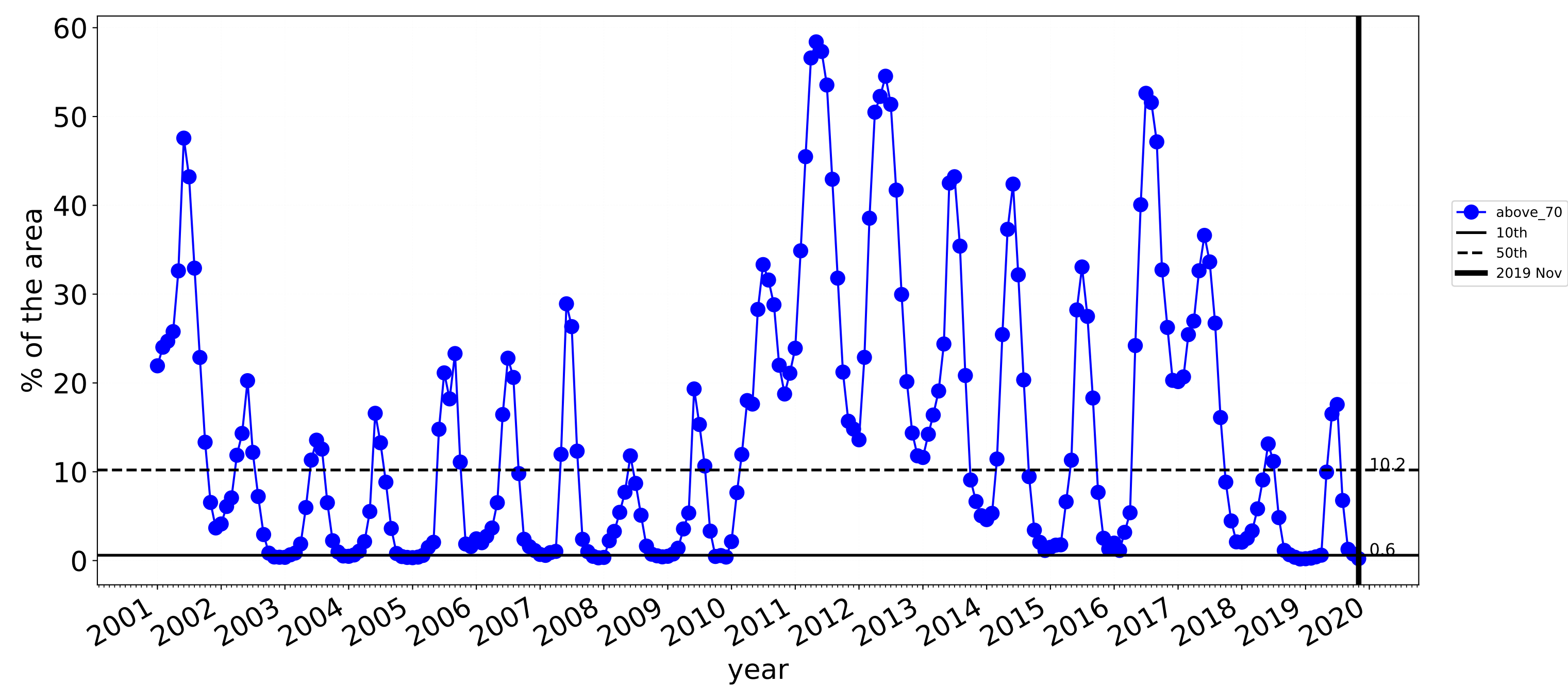
10

Grazing non forest timeseries

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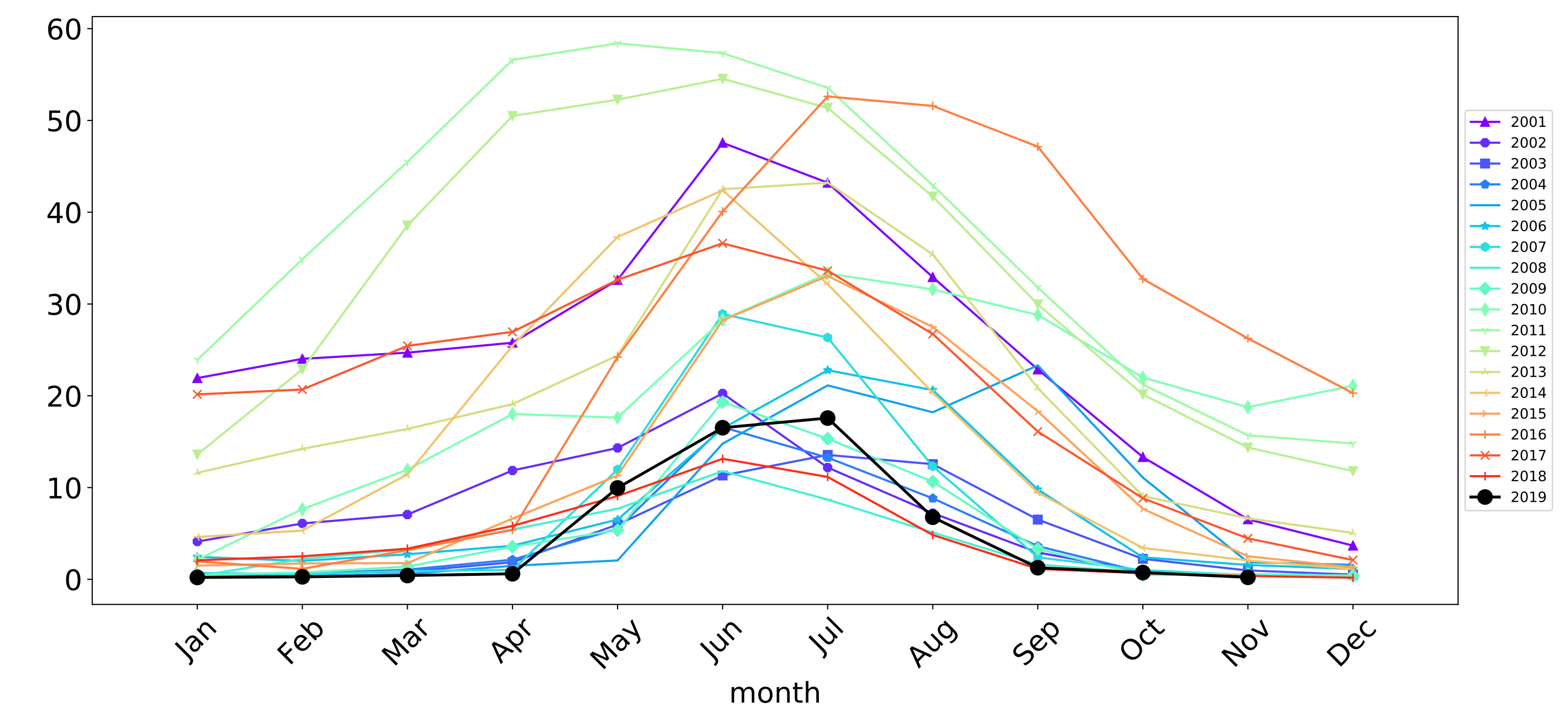

Wind erosion historical monthly area protected (Total Veg Cov >50%)

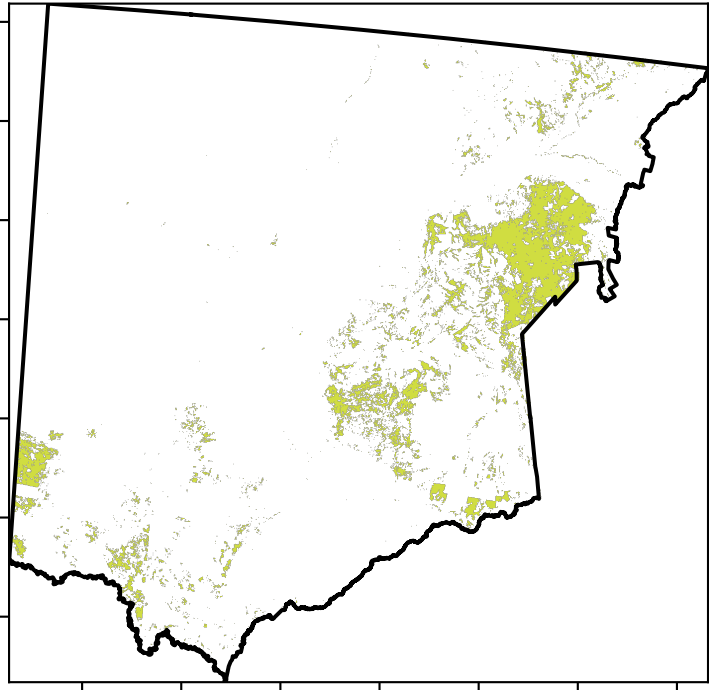Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

Water erosion historical monthly area protected (Total Veg Cov>70%)
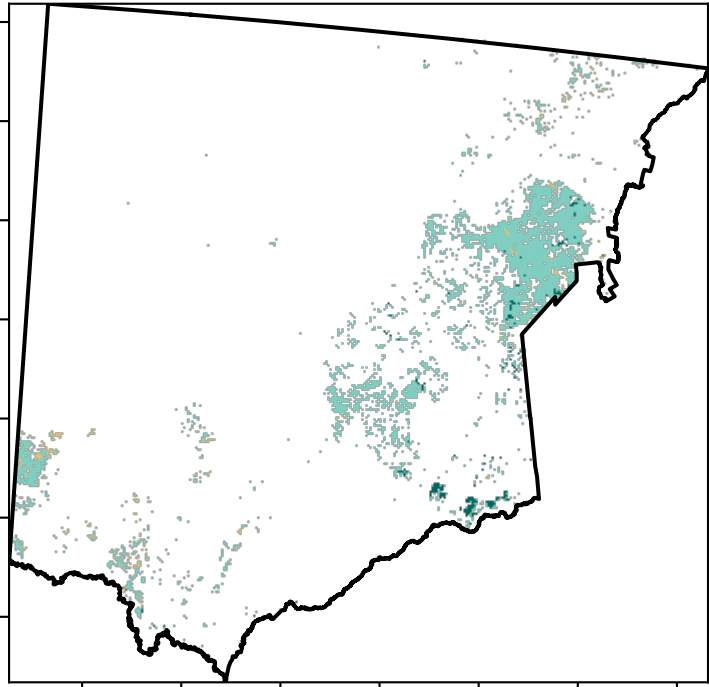
Grazing Woodland forest
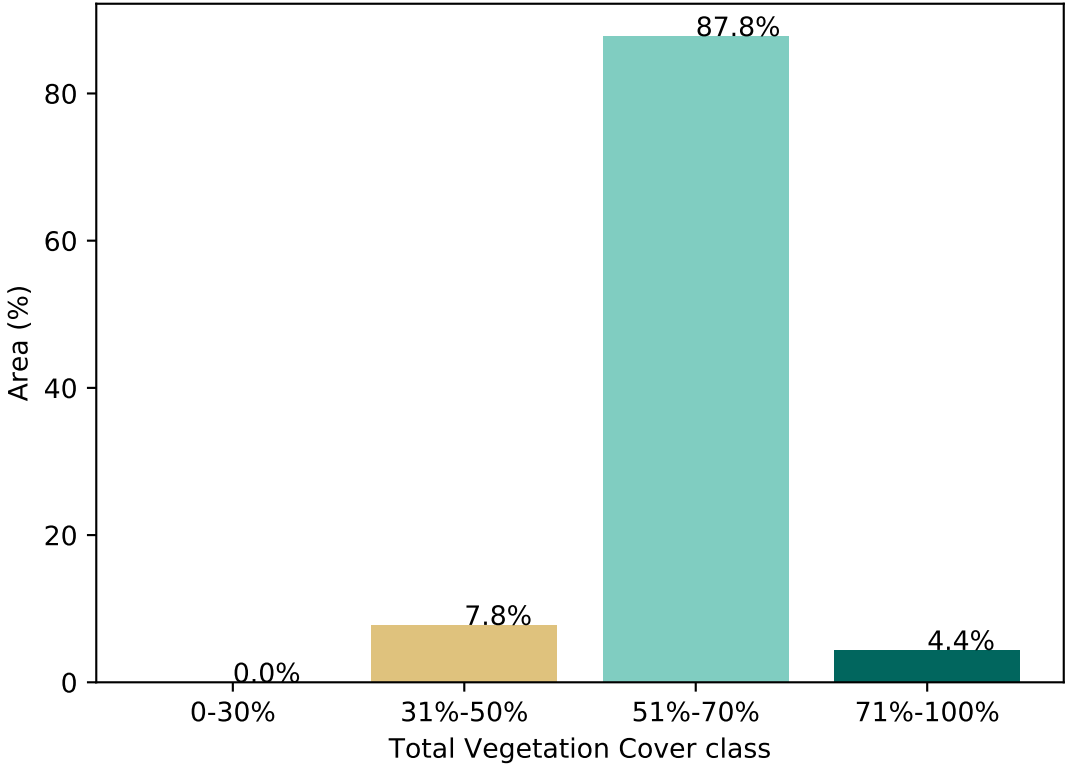
Land use and forest cover

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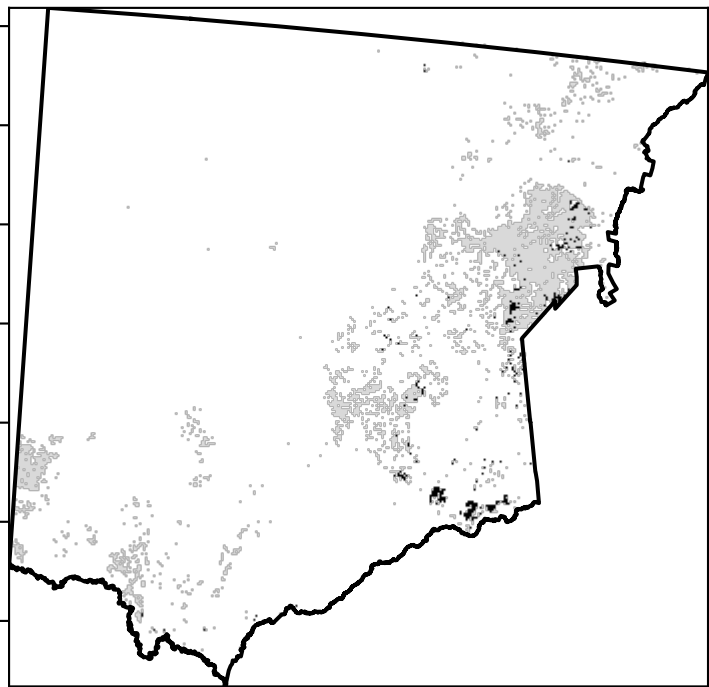
1 Agriculture - Grazing - Woodland forest

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

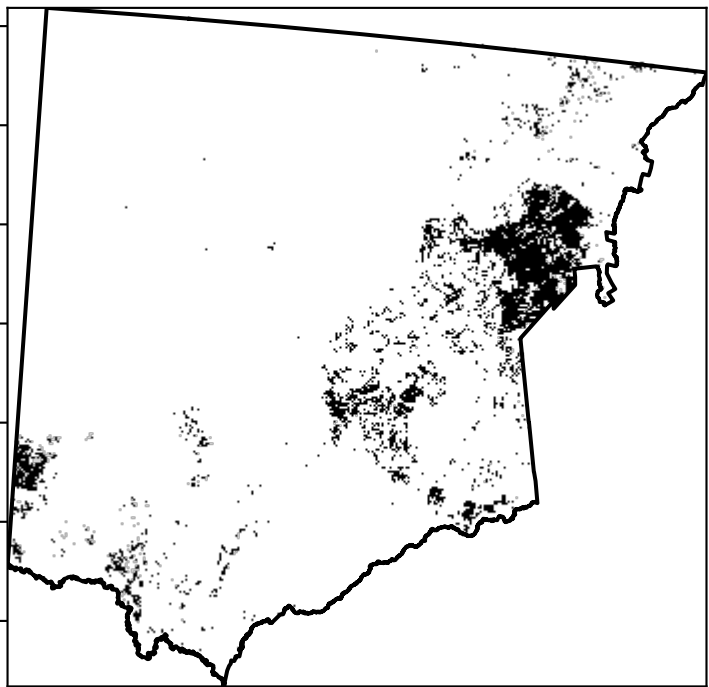### Proportion of vegetation cover class in area

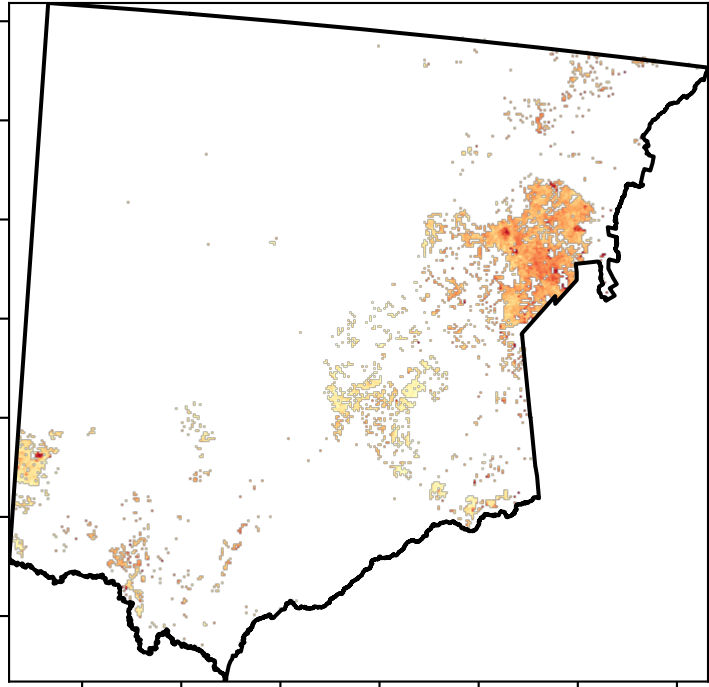### % Area protected from water erosion (>70%)

Area not protected 95.6% of region (1,850,577 ha)

Area protected 4.4% of region (85,173 ha)

% Area protected from wind erosion (>50%)

Area not protected 8.0% of region (154,860 ha)

Area protected 92.0% of region (1,780,890 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

Grazing Woodland forest timeseries

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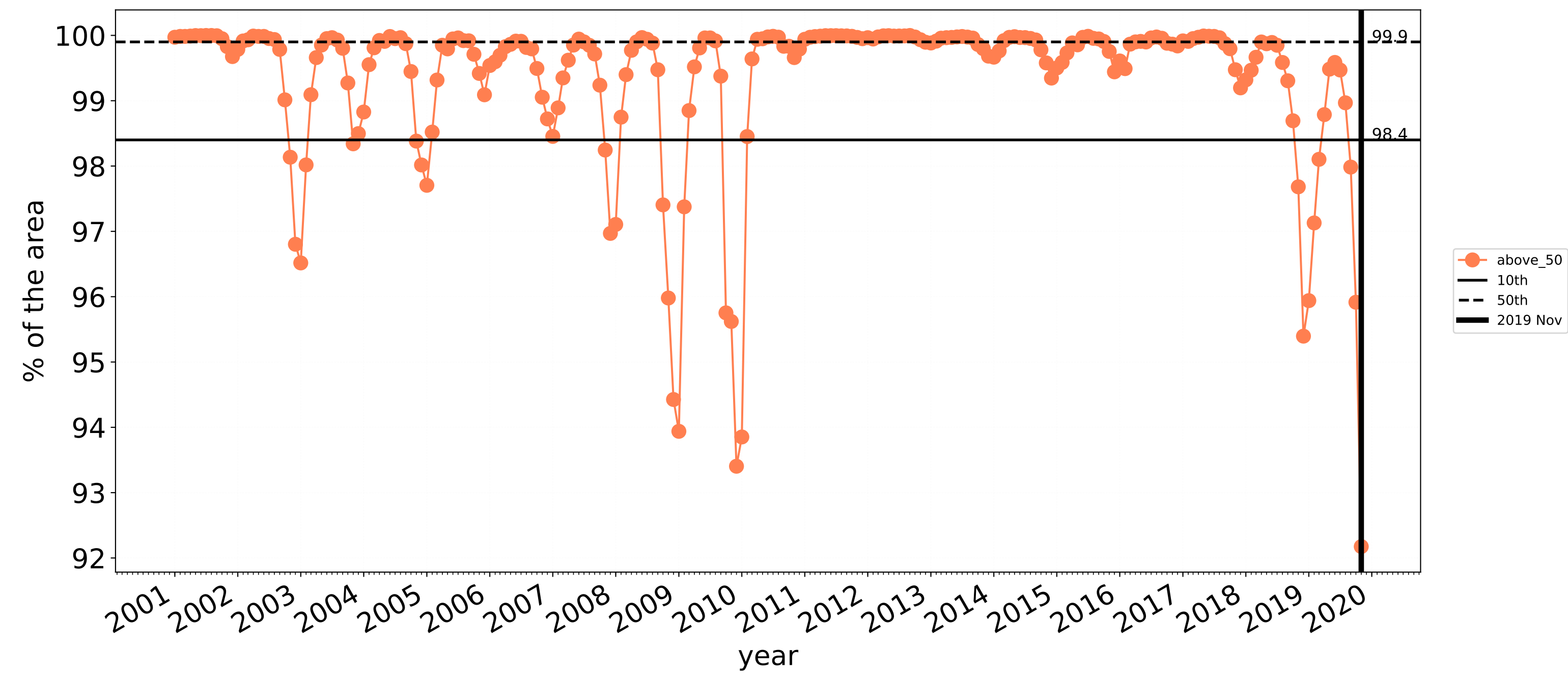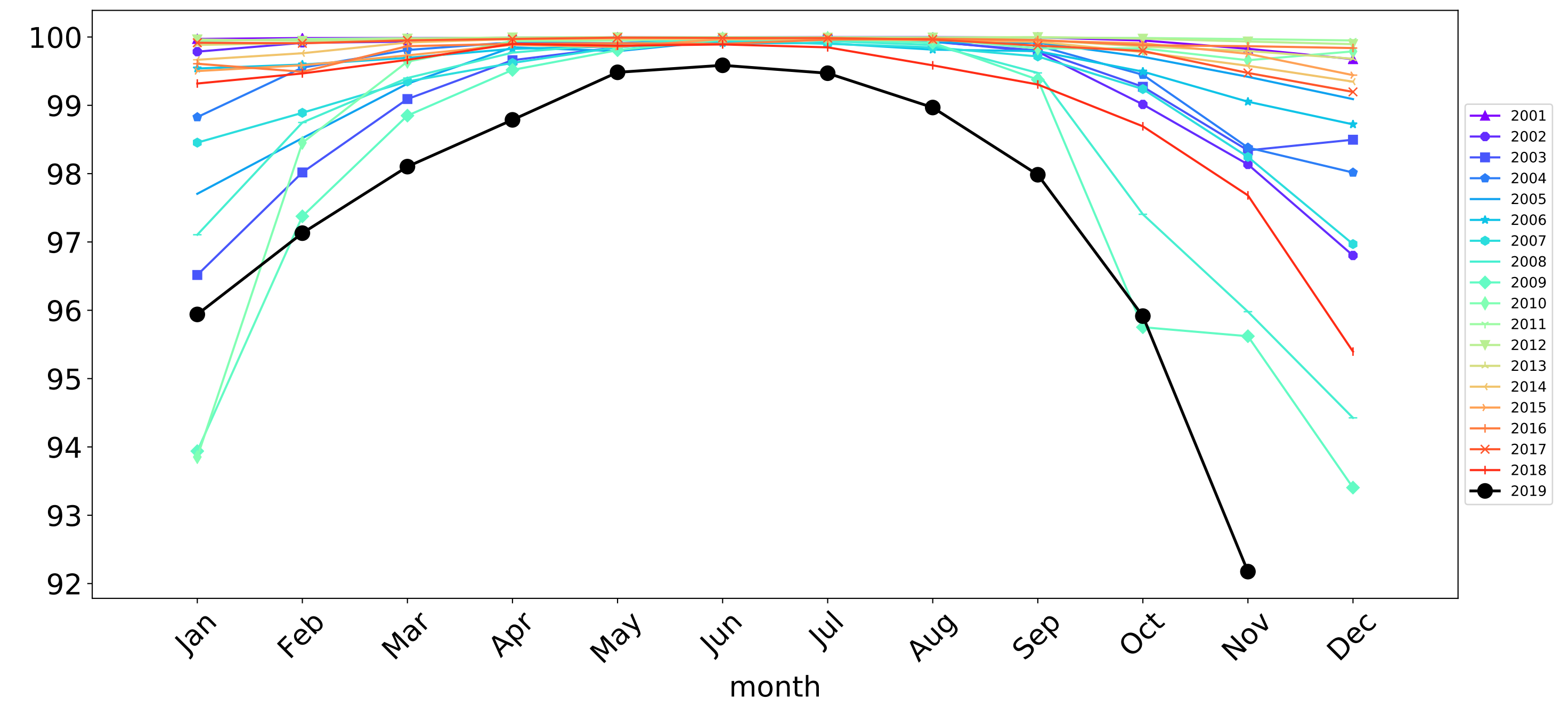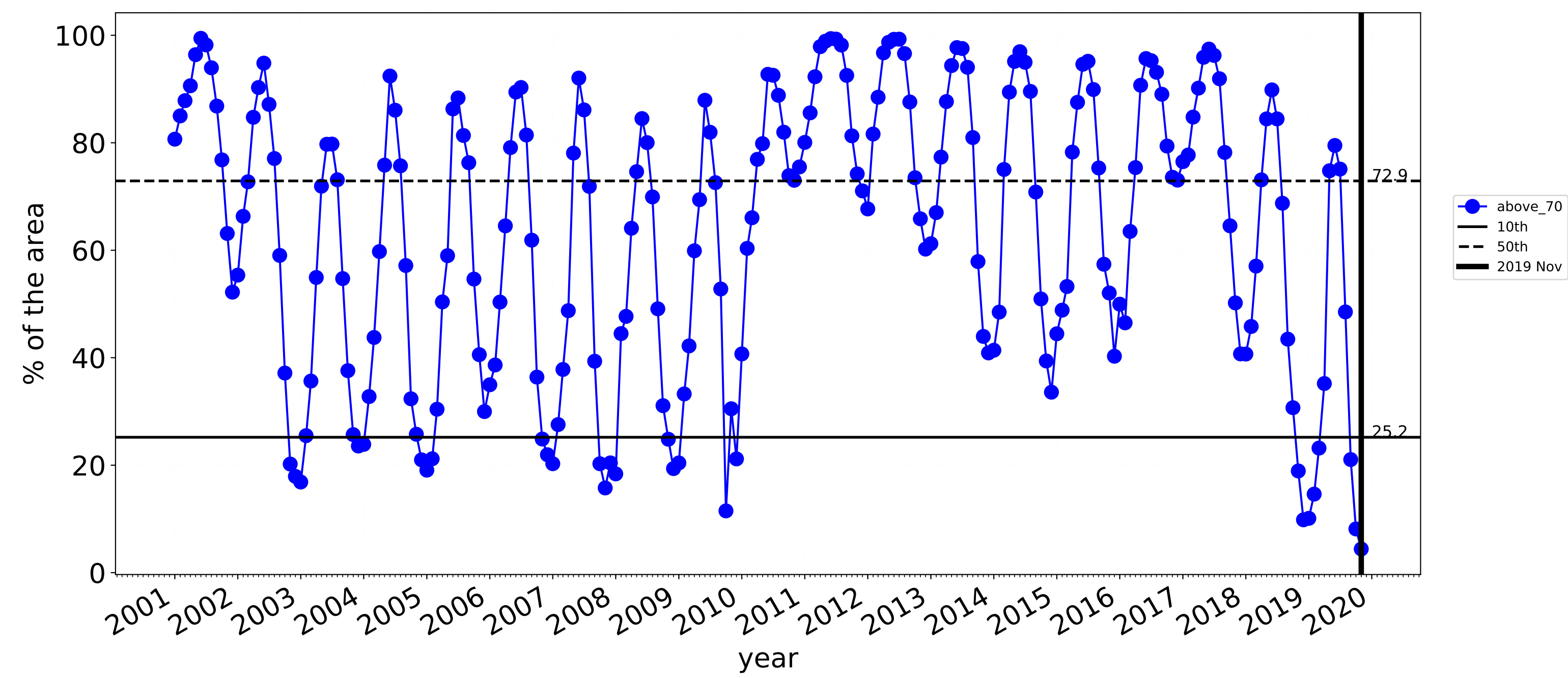

Wind erosion historical monthly area protected (Total Veg Cov >50%)

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

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

Grazing - Forest (non woodland)

Land use and forest cover

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

1 Agriculture - Grazing - Non-woodland forest

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

Proportion of vegetation cover class in area

% Area protected from water erosion (>70%)

Area not protected 91.1% of region (1,227,481 ha)

Area protected 8.9% of region (119,918 ha)

% Area protected from wind erosion (>50%)

Area not protected 7.0% of region (94,318 ha)

Area protected 93.0% of region (1,253,082 ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

CSIRO TERN Australian Government | National Landcare Programme NSW GOVERNMENT | Planning, Industry & Environment

Grazing - Forest (non woodland) timeseries

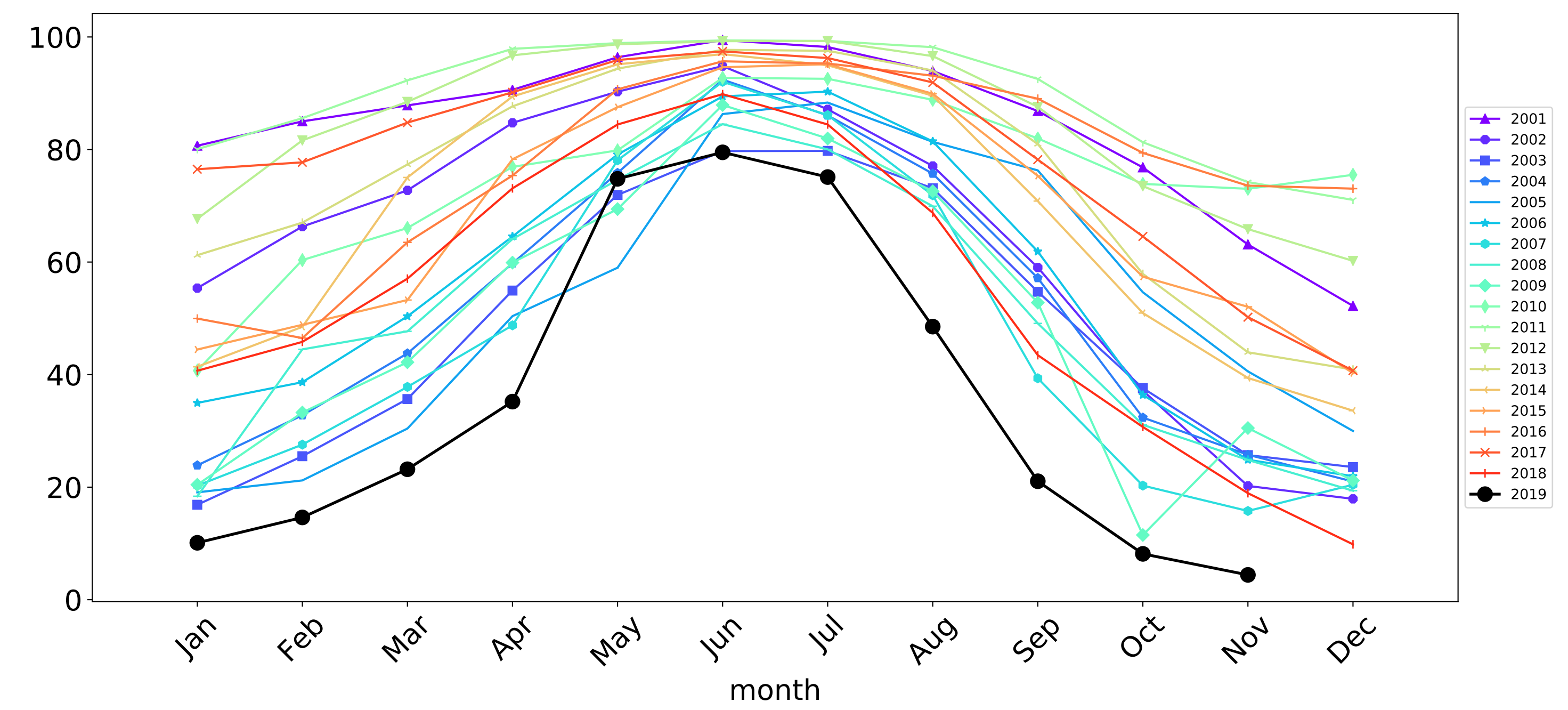Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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

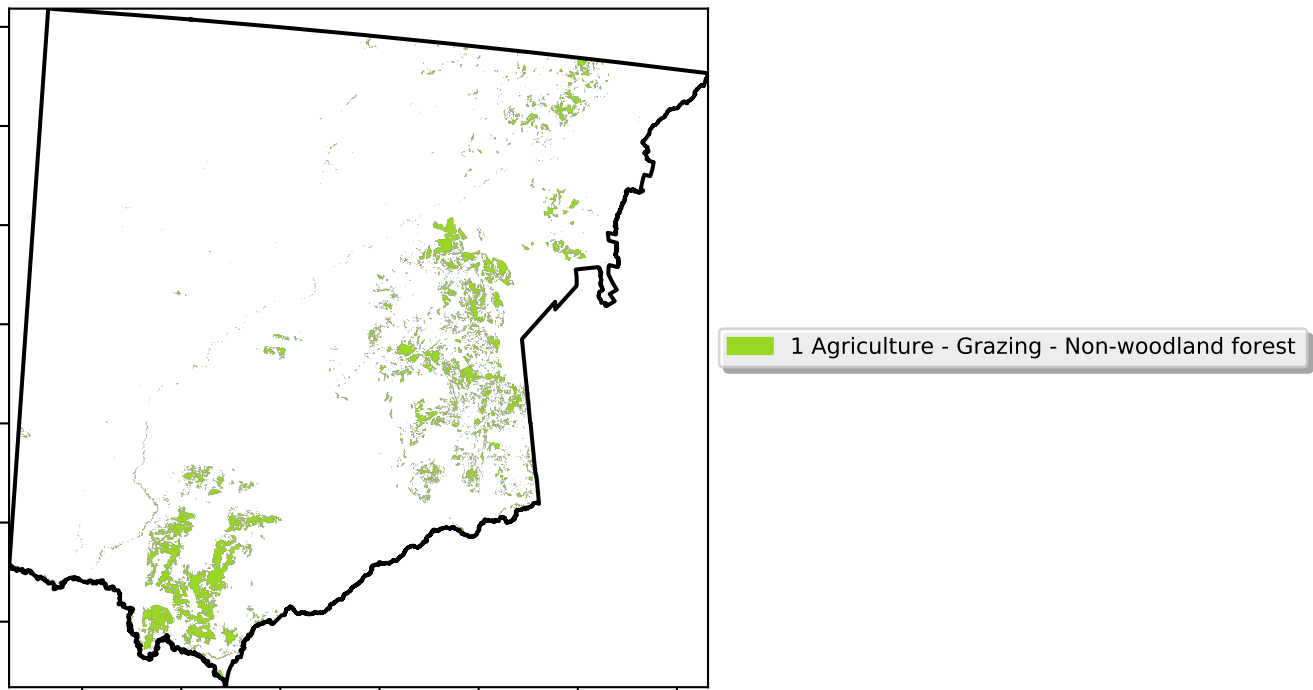Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

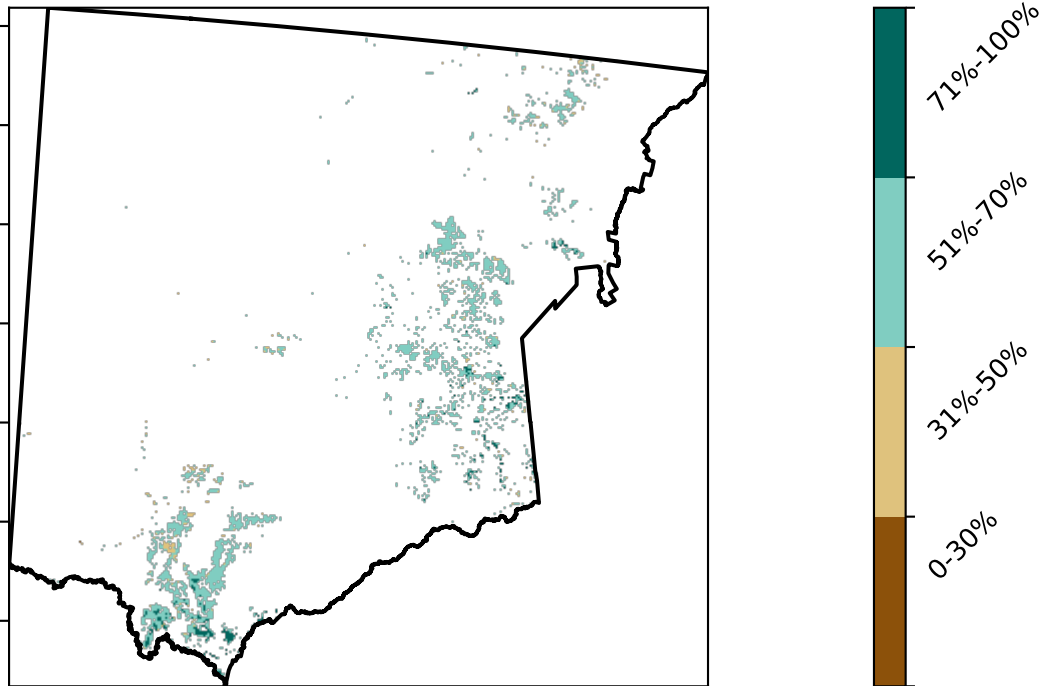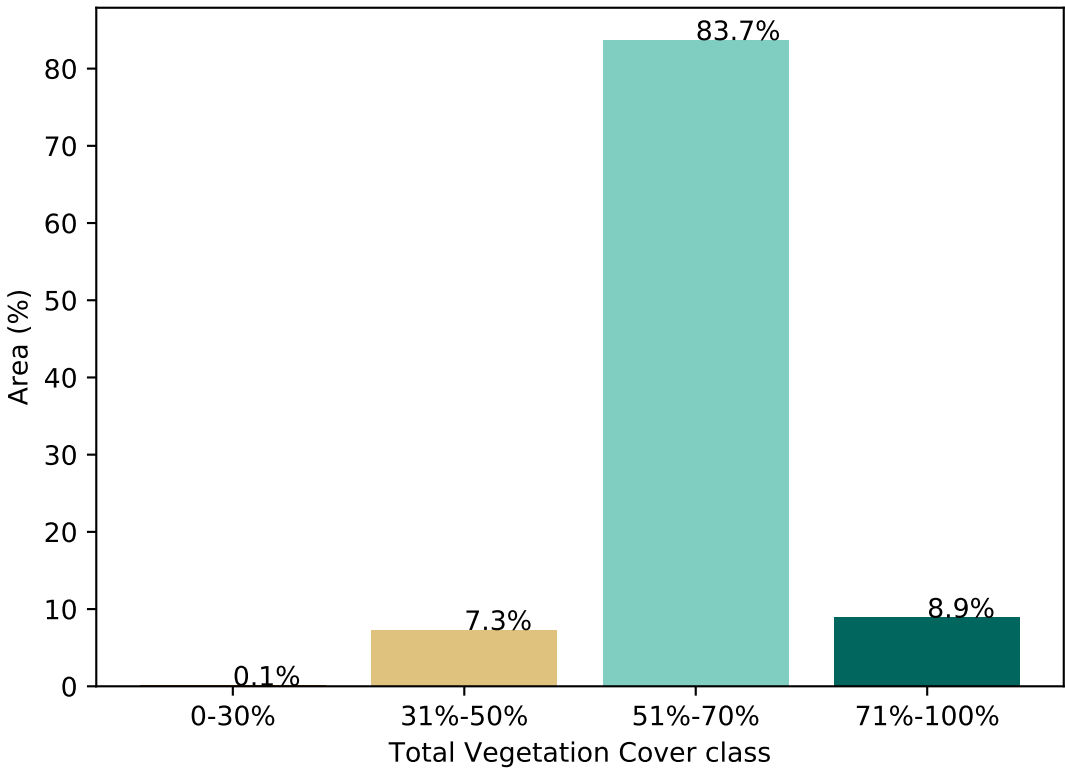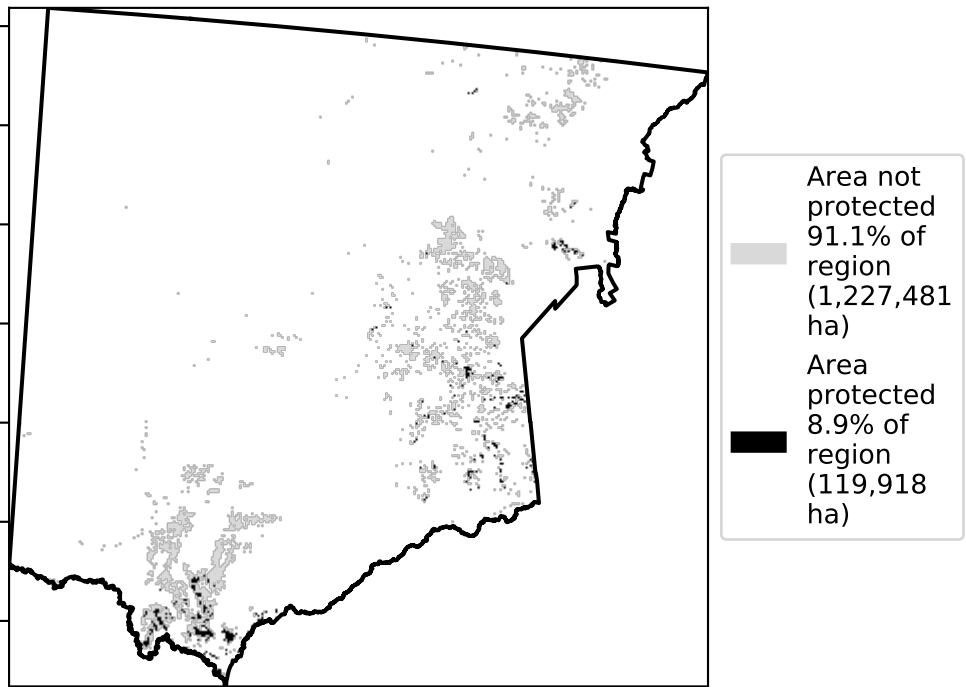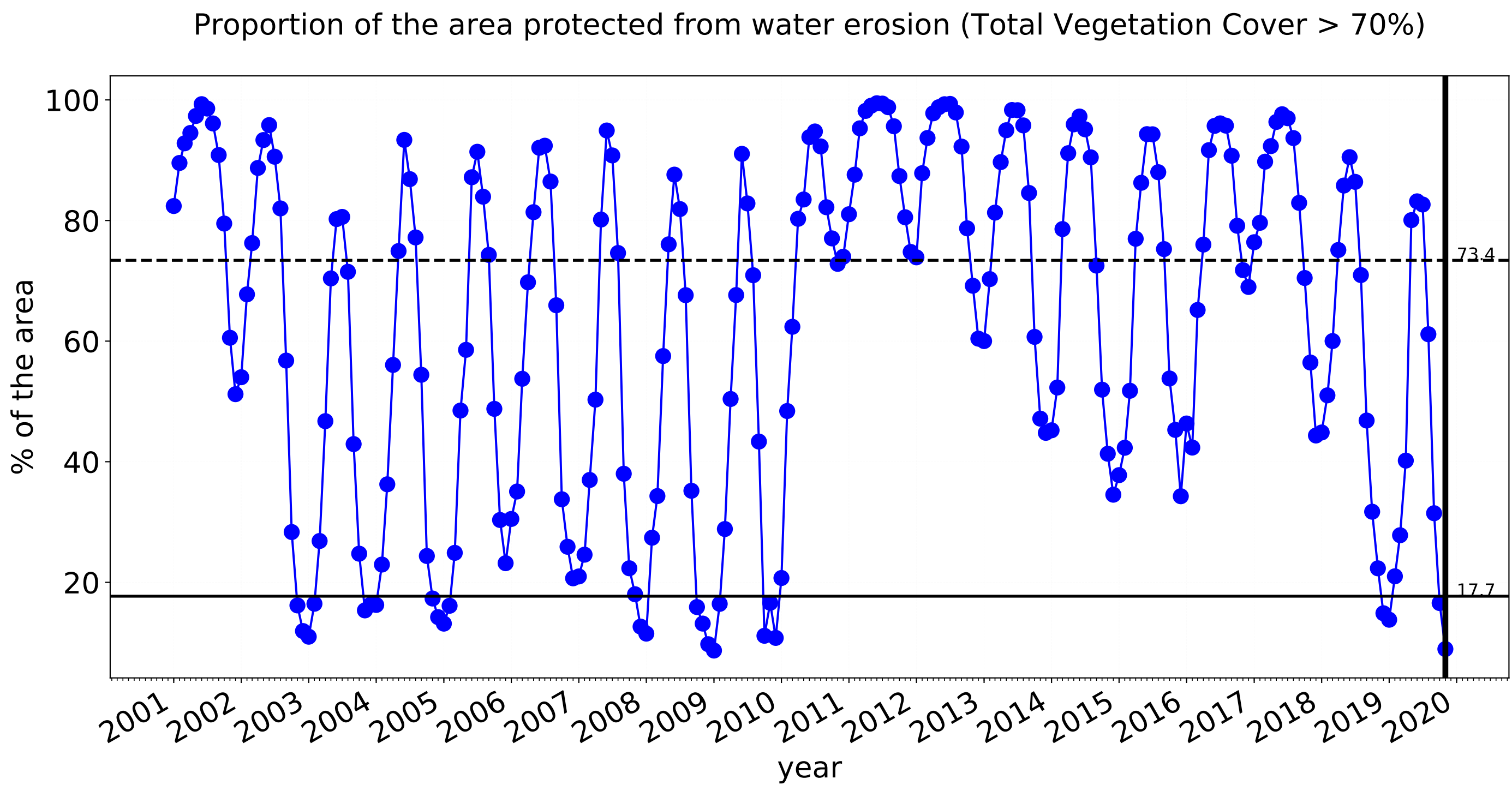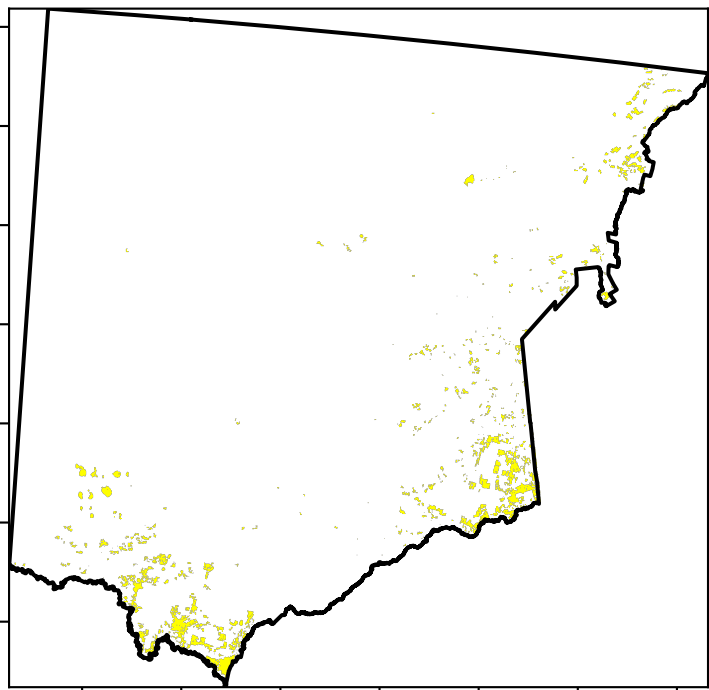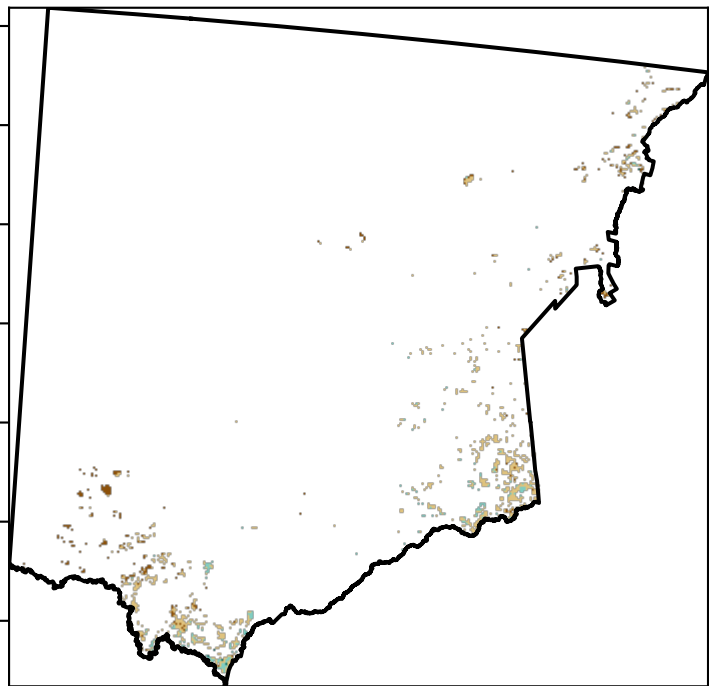Water erosion historical monthly area protected (Total Veg Cov>70%)
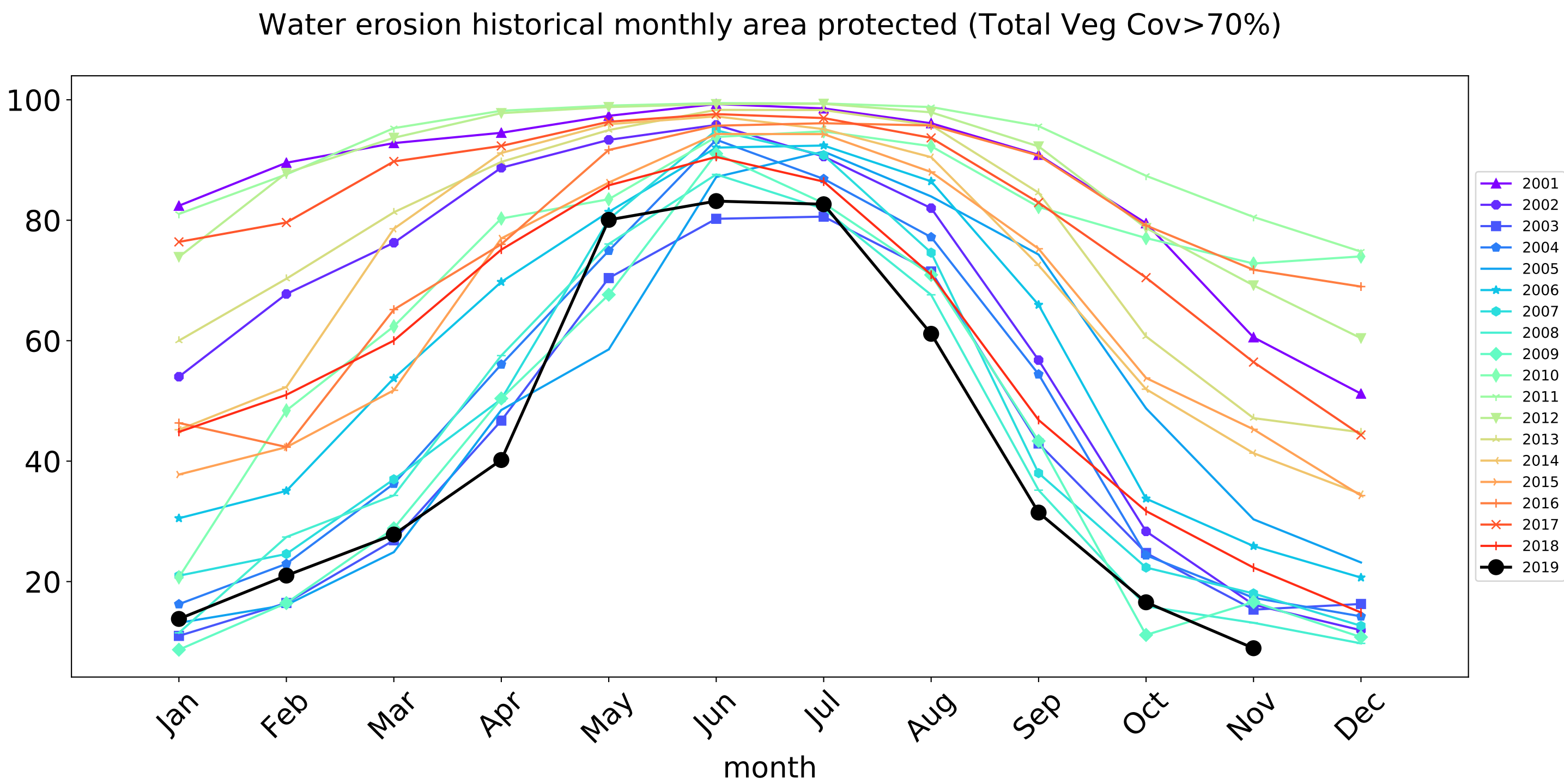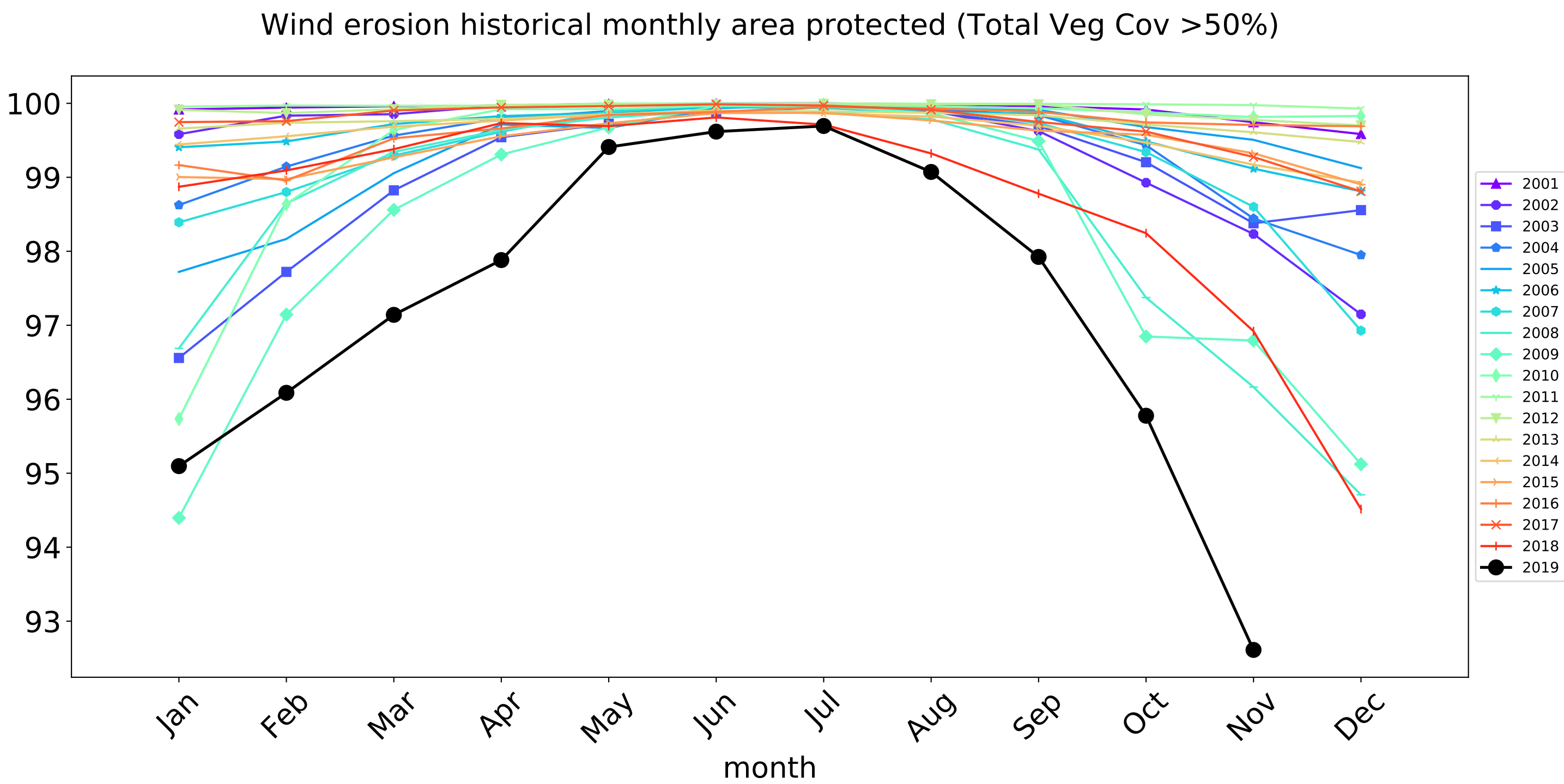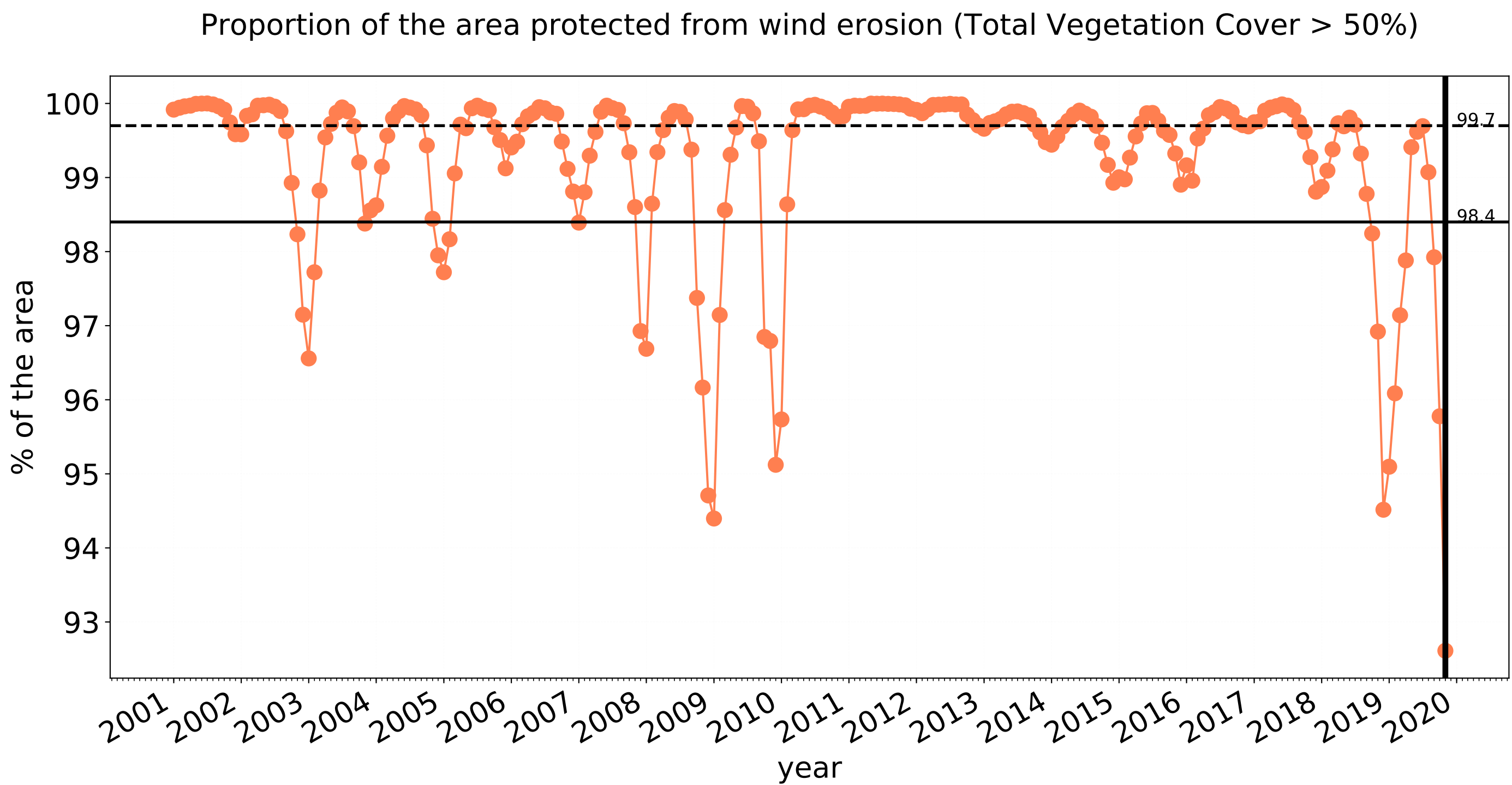
Cropping

Land use and forest cover

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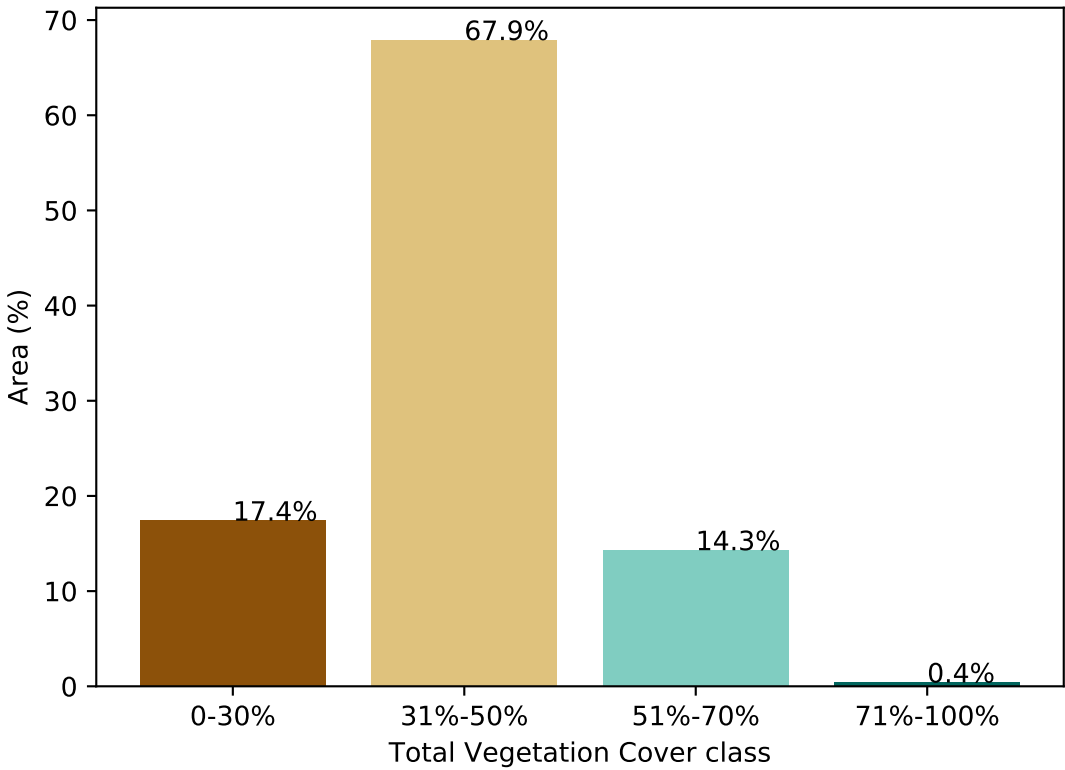Use of Australia
(2018) and Forests
of Australia (2018)

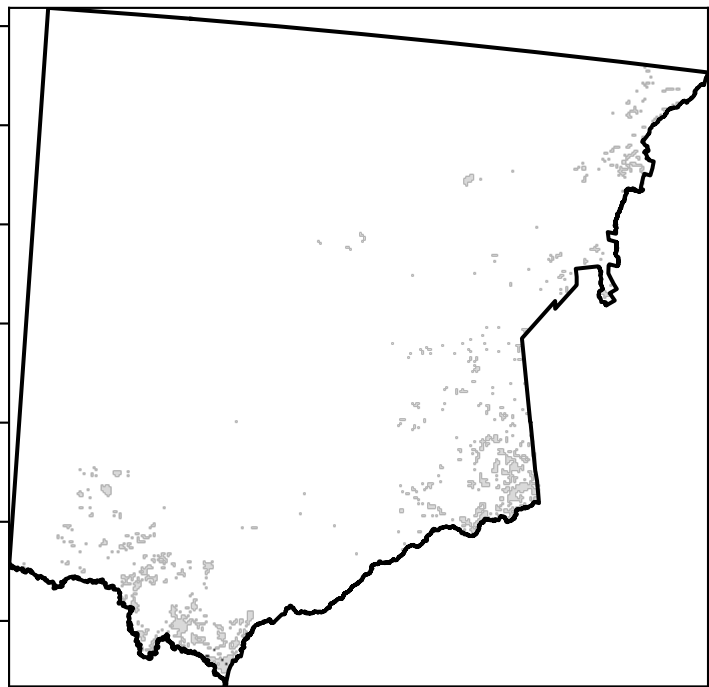1 Agriculture - Cropping - Non-irrigated

Total Vegetation Cover [%]

71%-100%
51%-70%
31%-50%
0-30%

Proportion of vegetation cover class in area

Area (%)

67.9%

17.4%

14.3%

0.4%

Total Vegetation Cover class
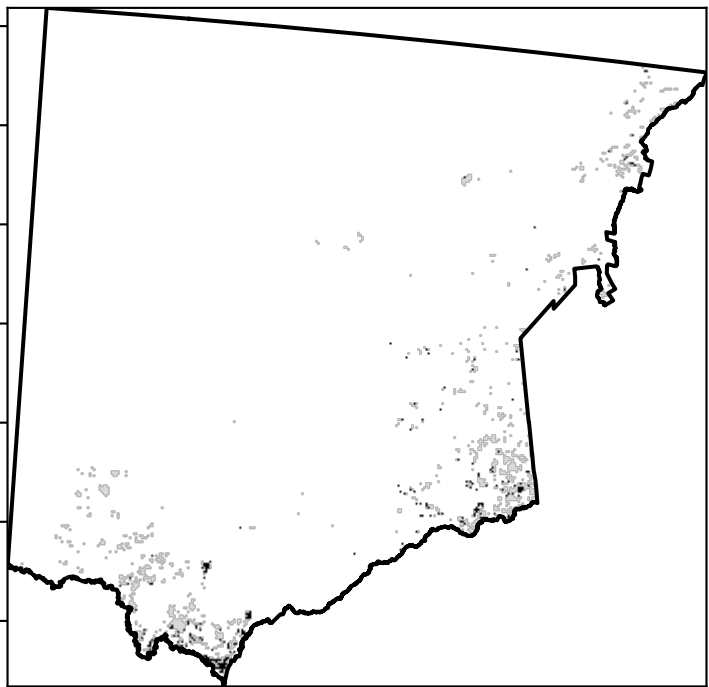
0-30% 31%-50% 51%-70% 71%-100%

% Area protected from water erosion (>70%)

Area not
protected
99.6% of
region
(604,323
ha)

Area
protected
0.4% of
region
(2,427 ha)

% Area protected from wind erosion (>50%)

Area not
protected
85.0% of
region
(515,737
ha)

Area
protected
15.0% of
region
(91,012
ha)

Total Vegetation Cover Anomaly [%]

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

Total Vegetation Cover Decile [%]

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

10
8-9
4-7
2-3
1

Cropping timeseries

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

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

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

Water erosion historical monthly area protected (Total Veg Cov>70%)
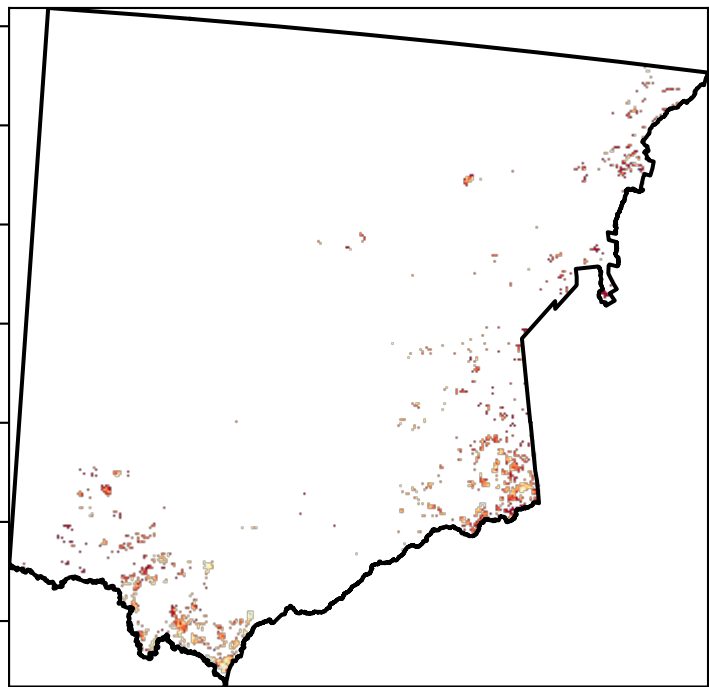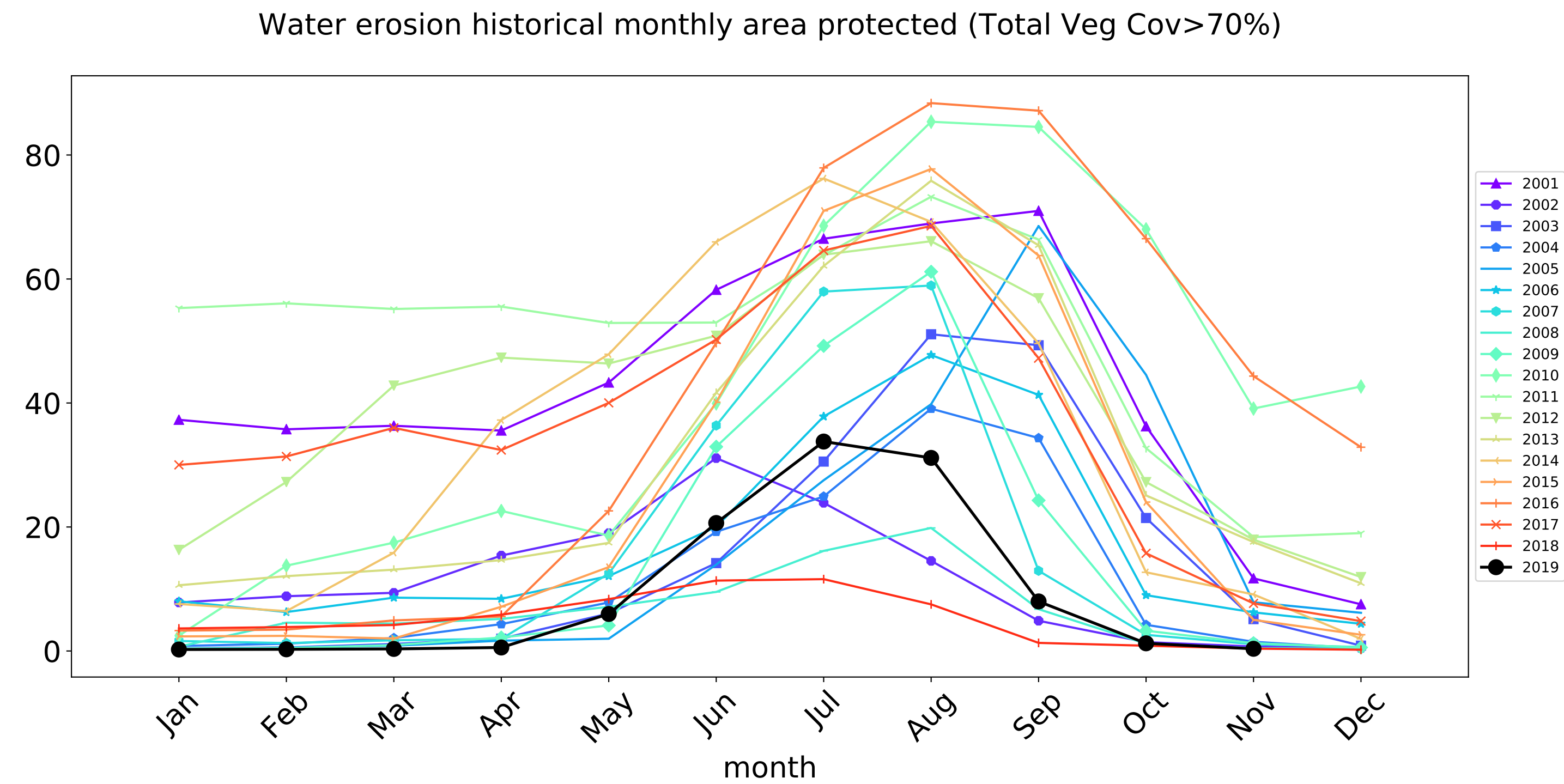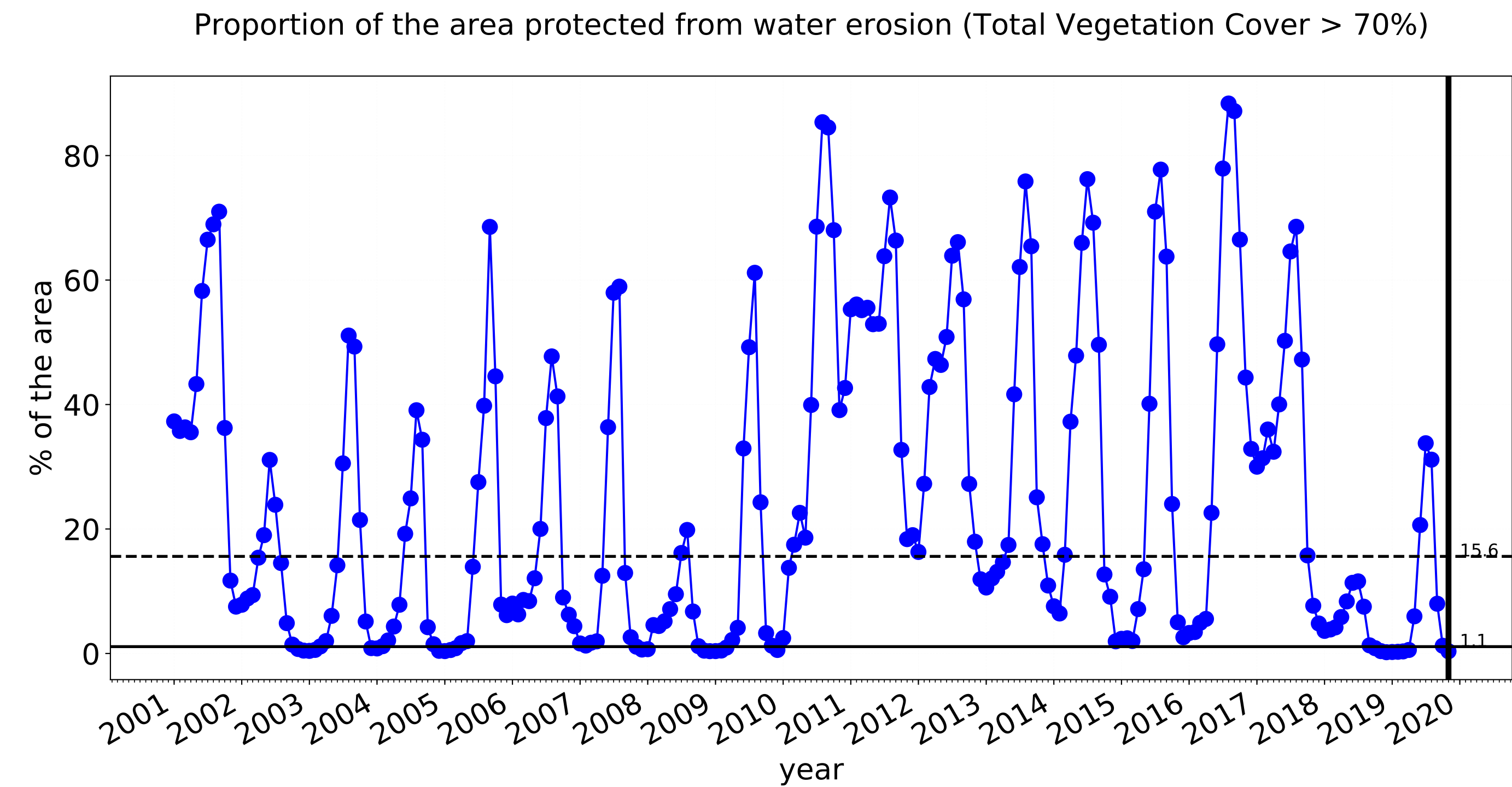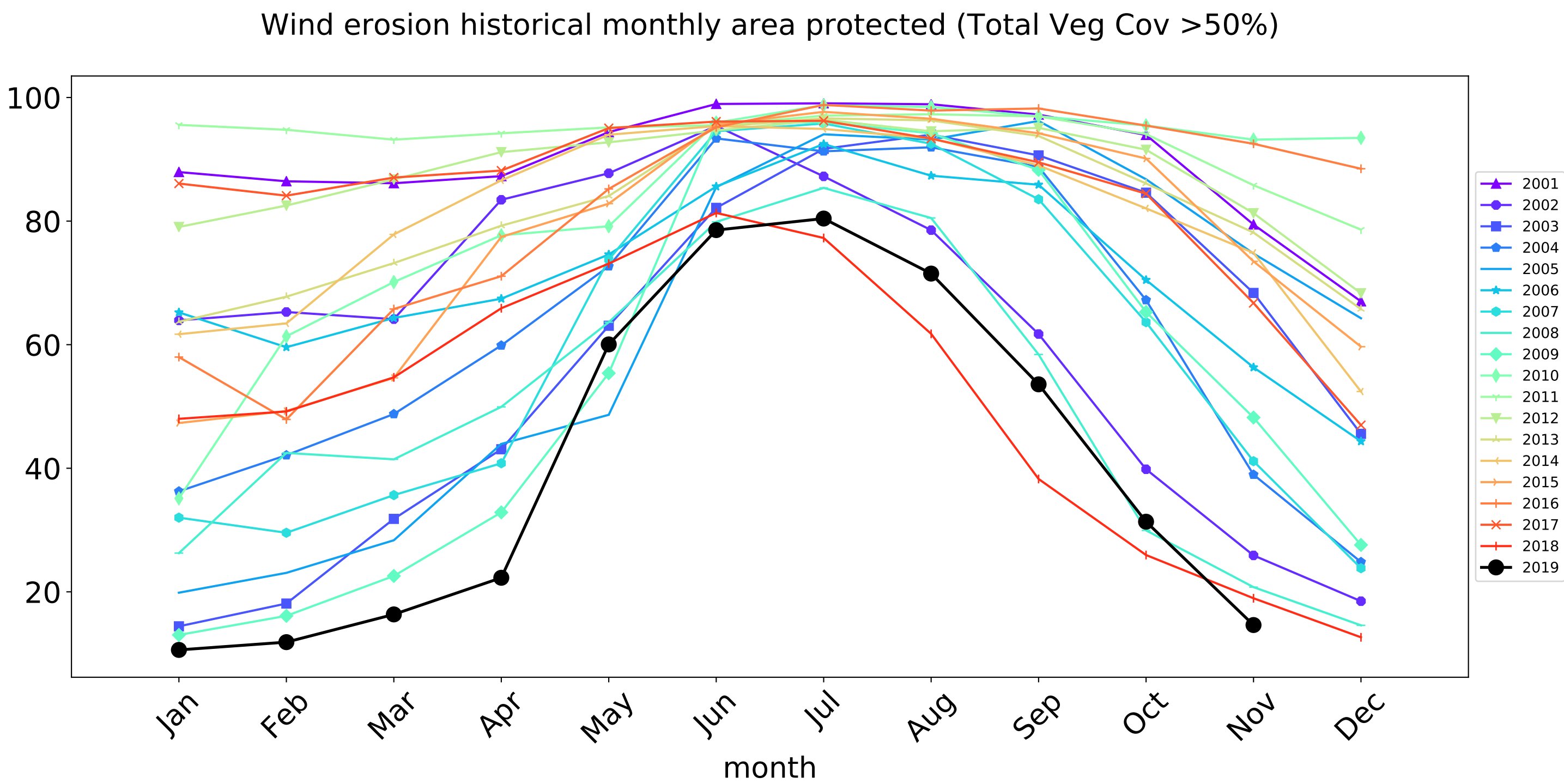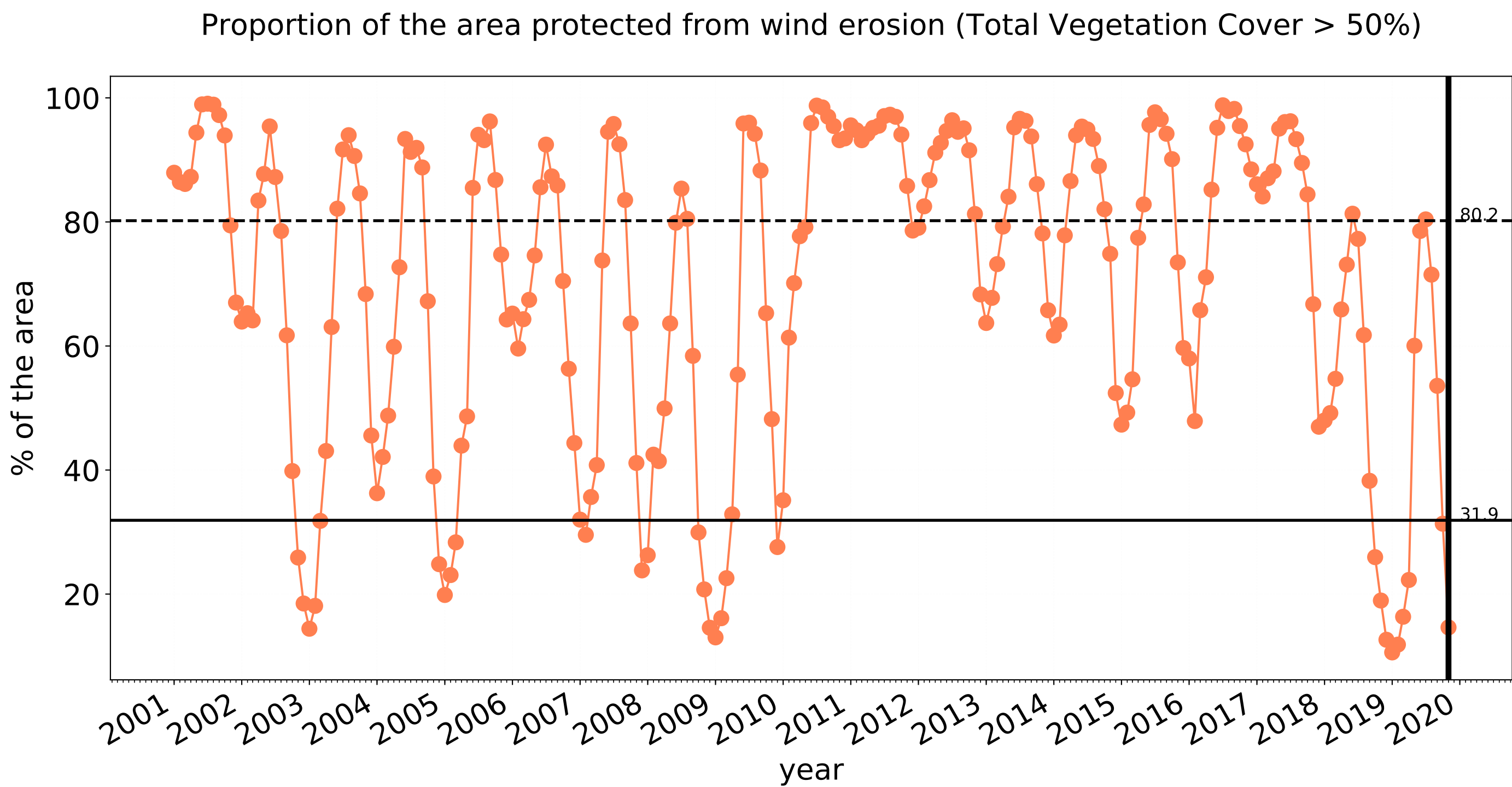
Western (31,326,725 ha and no data 126,180 ha) Percentage area and hectares protected with TVC threshold 30,50,70,80,90 and 95%

Land use and forest cover Class	area(ha)	above_30	above_50	above_70	above_80	above_90	above_95
Entire region	31,326,725	70.5% 22,085,950	25.6% 8,018,425	1.8% 562,500	0.1% 30,800	0.0% 3,375	0.0% 1,125
Conservation and natural environments	2,103,425	77.2% 1,624,675	48.6% 1,021,550	12.9% 272,250	0.3% 6,125	0.0% 50	0.0% 0
Conservation and natural environments non forest	1,328,400	64.0% 849,850	20.1% 266,750	0.6% 8,500	0.1% 1,275	0.0% 0	0.0% 0
Conservation and natural environments Woodland forest	433,350	100.0% 433,275	97.9% 424,375	38.3% 165,975	0.5% 2,050	0.0% 50	0.0% 0
Conservation and natural environments Forest (non woodland)	341,675	100.0% 341,550	96.7% 330,425	28.6% 97,775	0.8% 2,800	0.0% 0	0.0% 0
Agriculture	28,481,550	70.1% 19,952,525	24.0% 6,841,650	0.9% 268,100	0.1% 22,200	0.0% 2,025	0.0% 450
Grazing	27,755,525	69.7% 19,356,375	24.2% 6,705,125	0.9% 260,275	0.1% 21,275	0.0% 1,775	0.0% 325
Grazing non forest	24,472,375	65.7% 16,074,975	15.0% 3,673,000	0.2% 54,475	0.0% 8,700	0.0% 750	0.0% 275
Grazing Woodland forest	1,935,750	99.9% 1,934,625	92.2% 1,784,275	4.4% 85,375	0.1% 1,225	0.0% 125	0.0% 0
Grazing - Forest (non woodland)	1,347,400	100.0% 1,346,775	92.6% 1,247,850	8.9% 120,425	0.8% 11,350	0.1% 900	0.0% 50
Cropping	606,750	82.5% 500,475	14.6% 88,750	0.4% 2,150	0.1% 500	0.0% 250	0.0% 125