Total vegetation cover soil protection
Region:LGA Esperance_(S) WA   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.
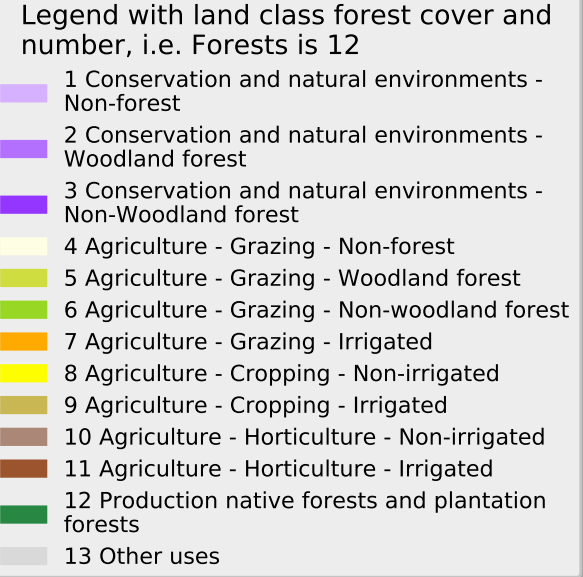
Acknowledgment of data:

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
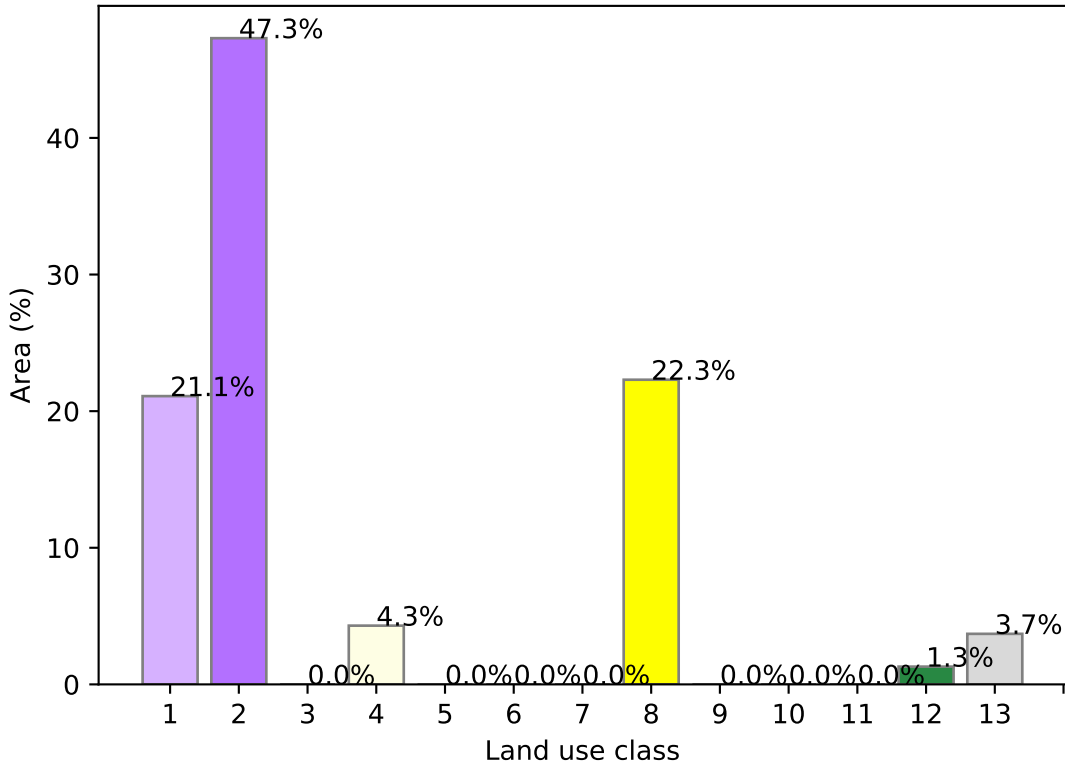
4. MODIS Fractional cover algorithm:

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

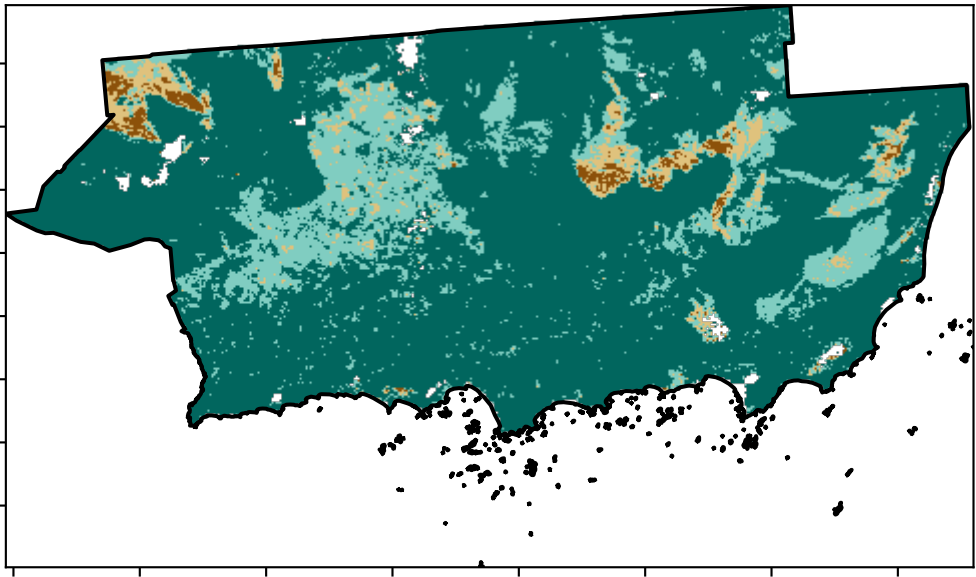# Vegetation Cover Nov 2019

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)
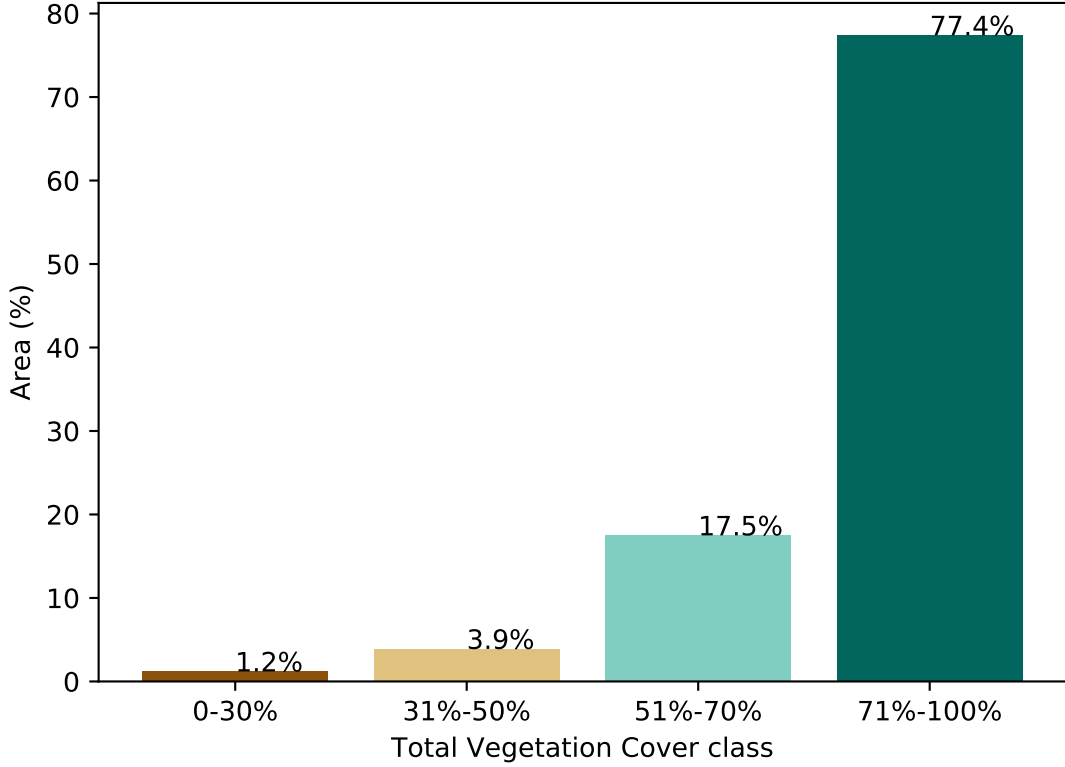
Legend with land class forest cover and number, i.e. Forests is 12
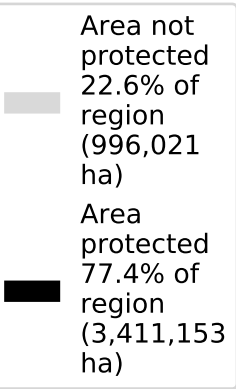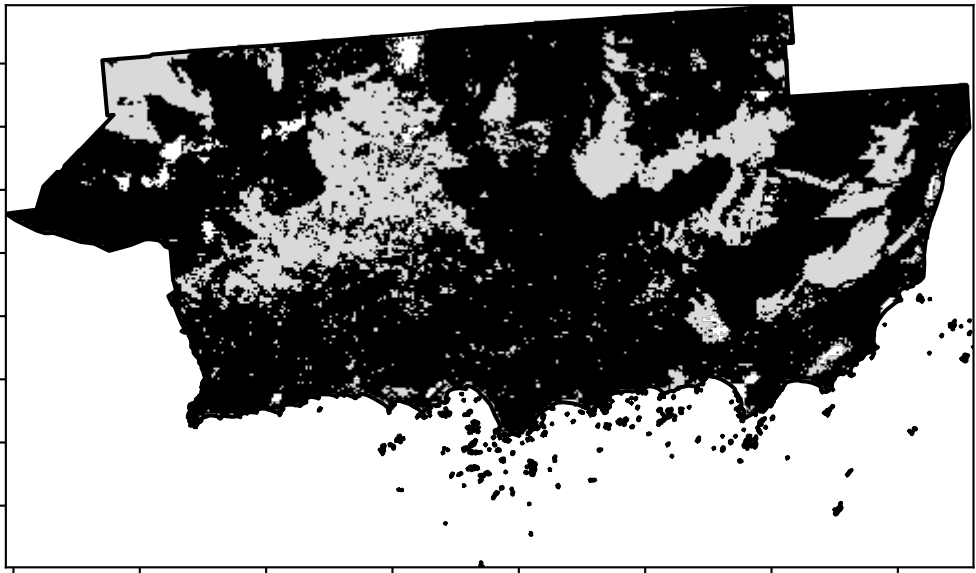
1 Conservation and natural environments - Non-forest
2 Conservation and natural environments - Woodland forest
3 Conservation and natural environments - Non-Woodland forest
4 Agriculture - Grazing - Non-forest
5 Agriculture - Grazing - Woodland forest
6 Agriculture - Grazing - Non-woodland forest
7 Agriculture - 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 [%]

Proportion of vegetation cover class in area

% Area protected from water erosion (>70%)

Area not protected 22.6% of region (996,021 ha)

Area protected 77.4% of region (3,411,153 ha)

% Area protected from wind erosion (>50%)

Area not protected 5.0% of region (220,358 ha)

Area protected 95.0% of region (4,186,816 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.

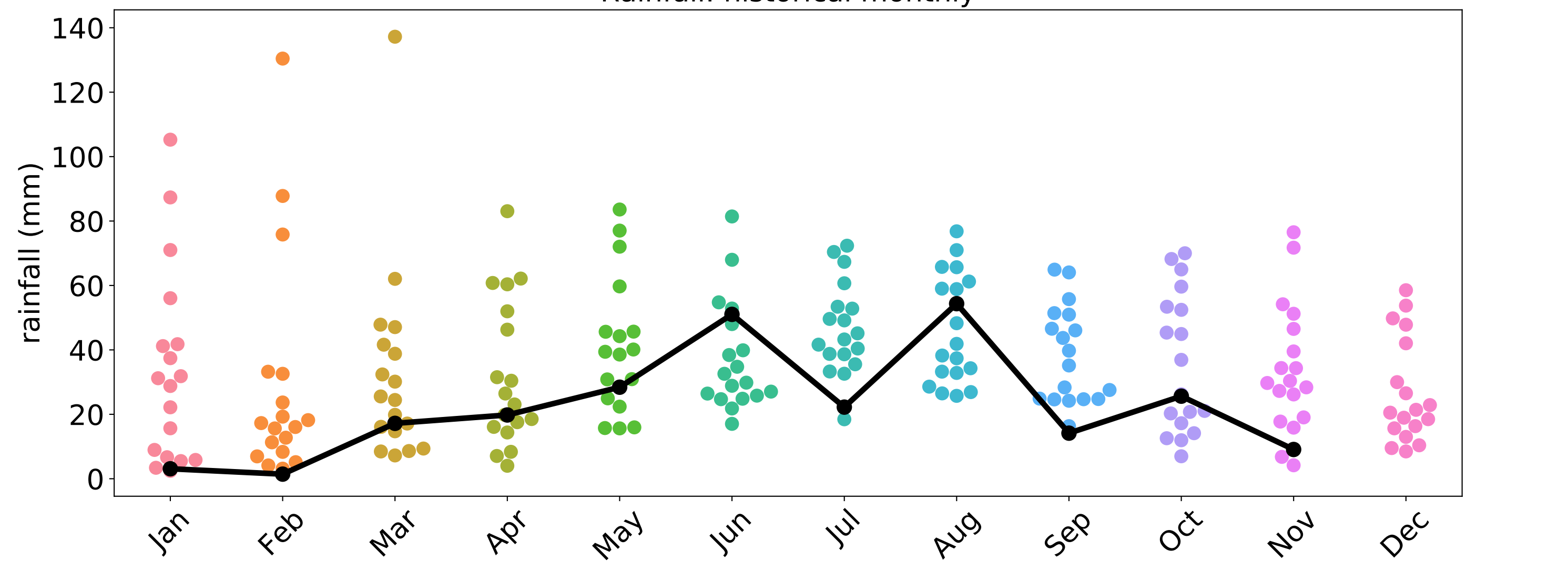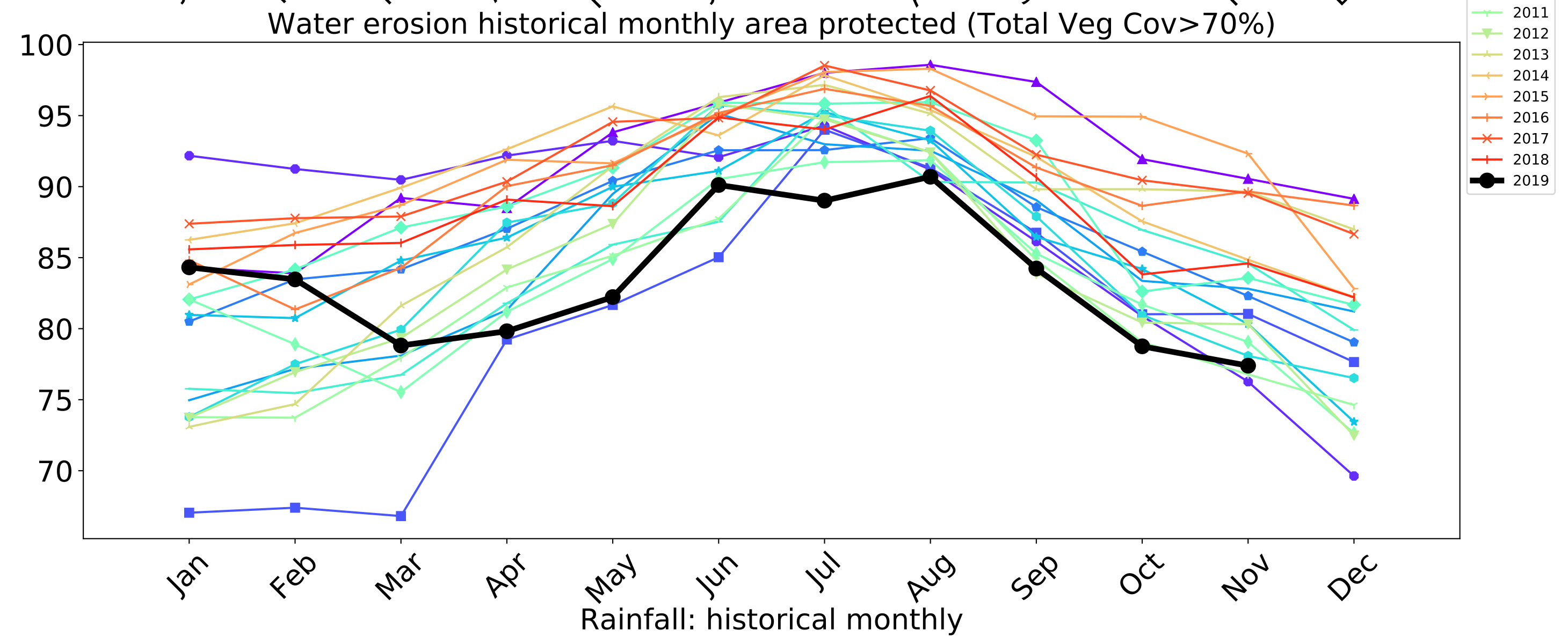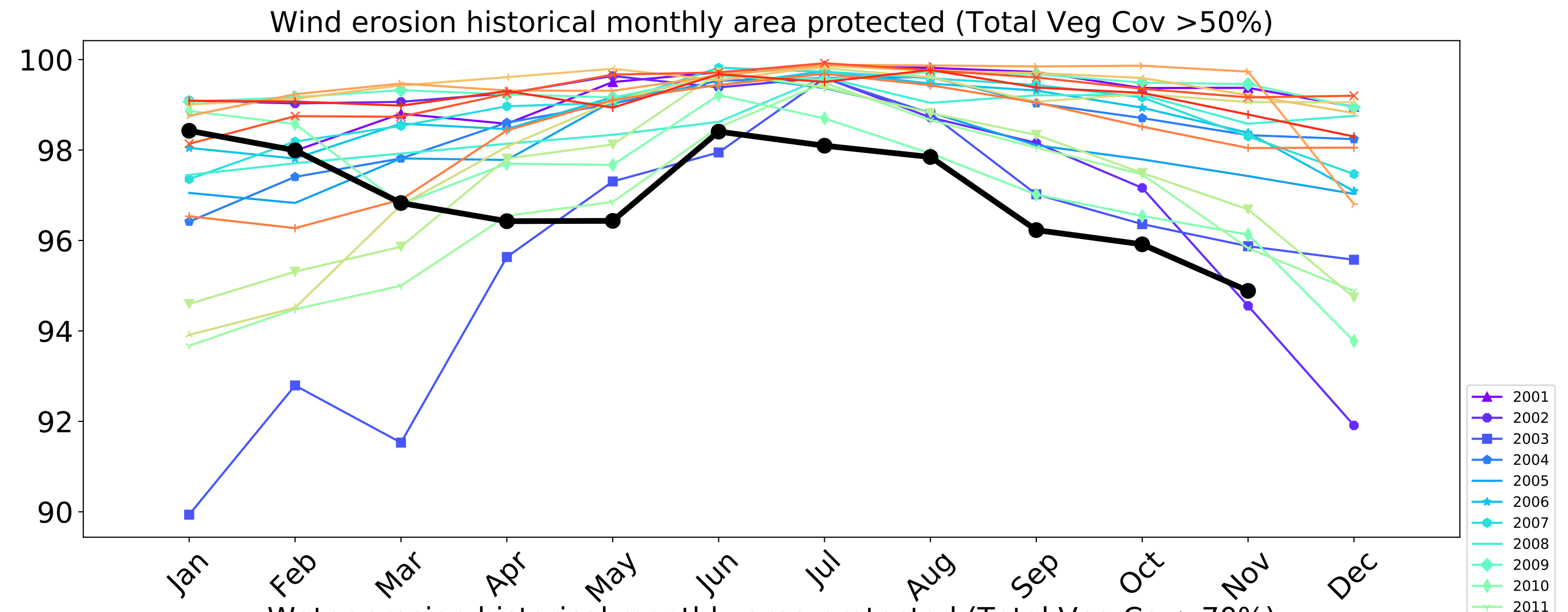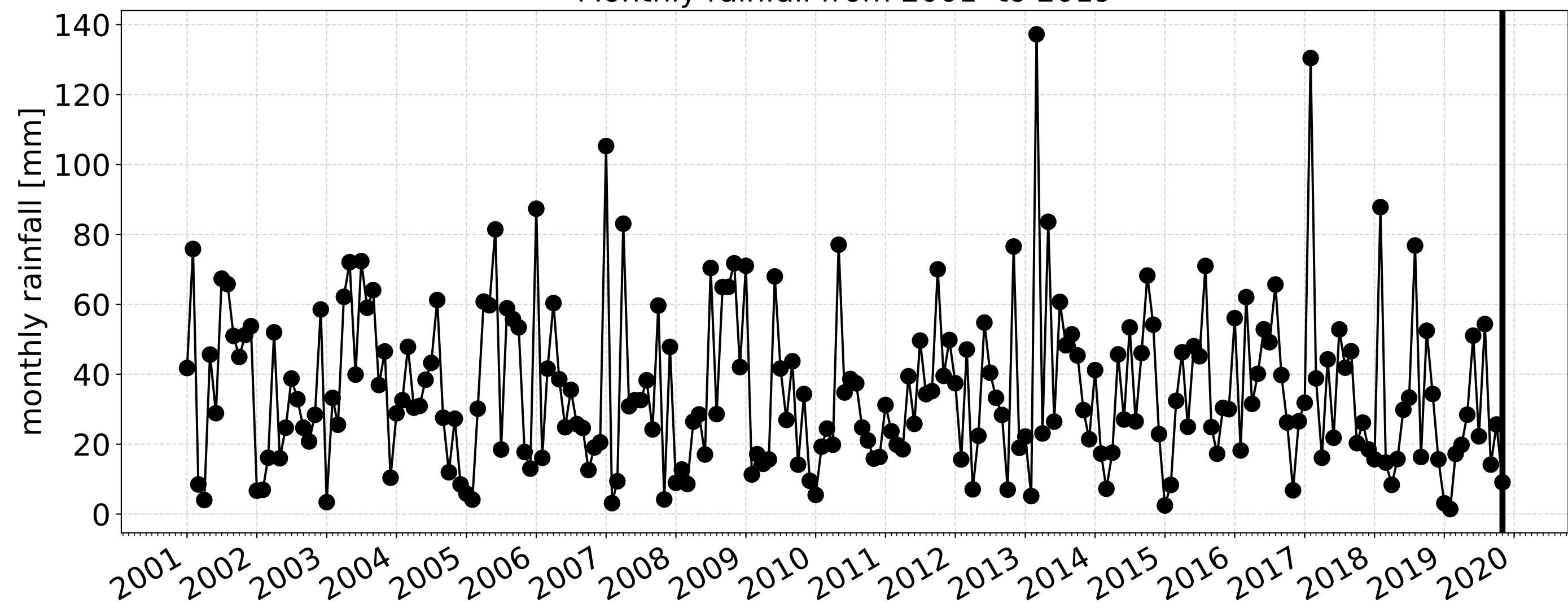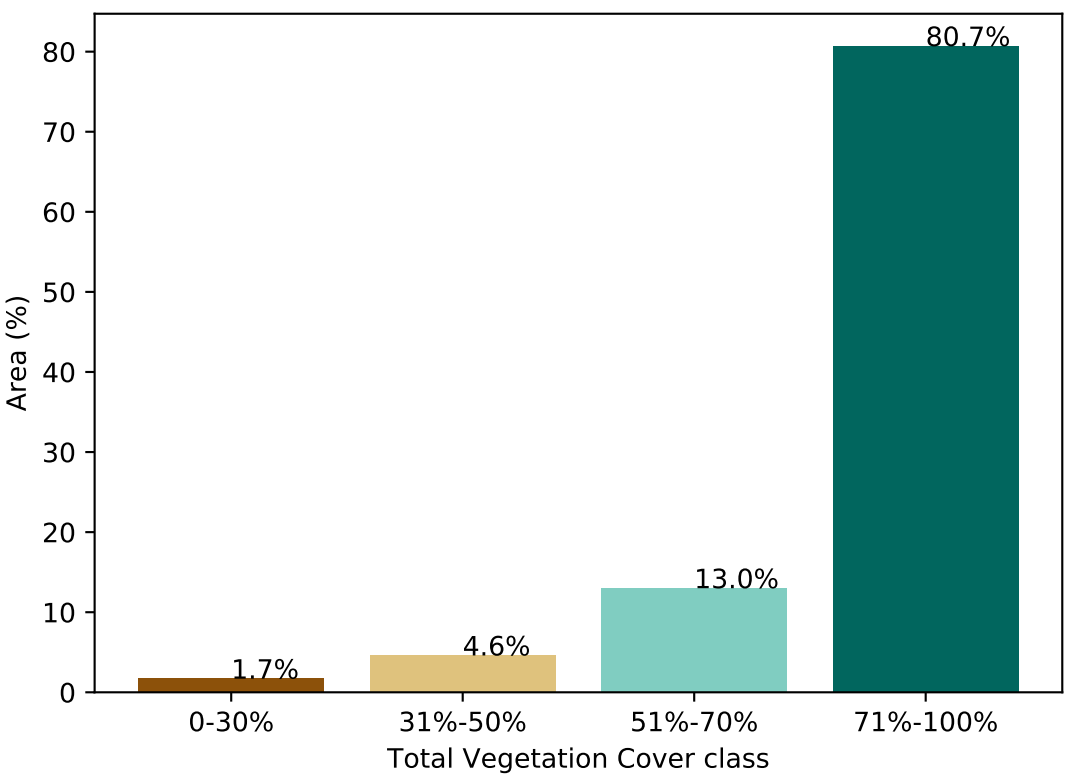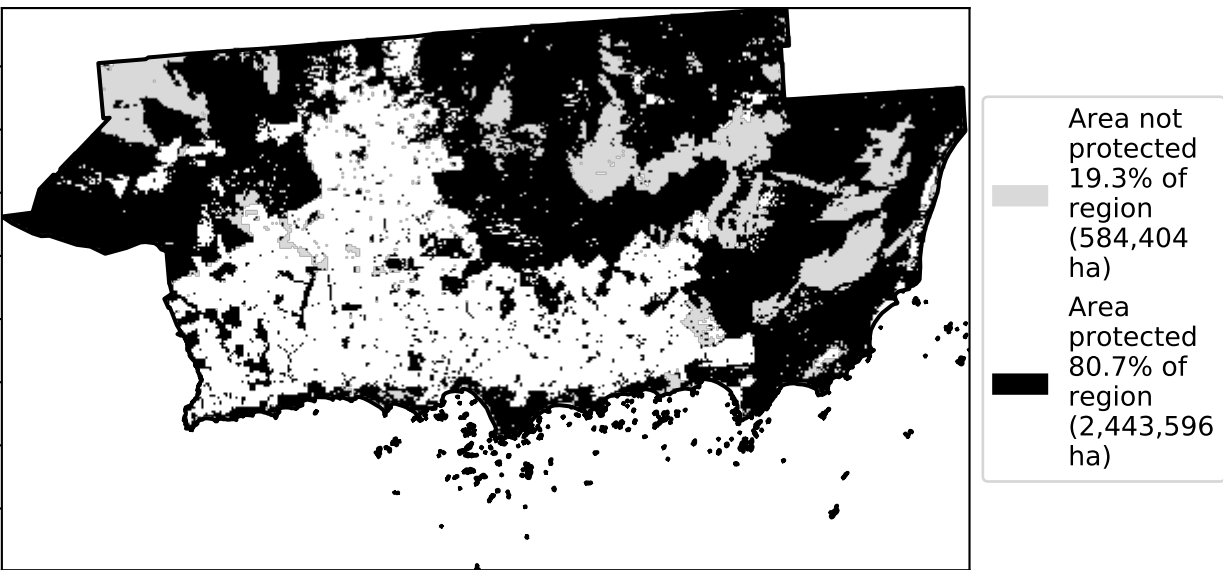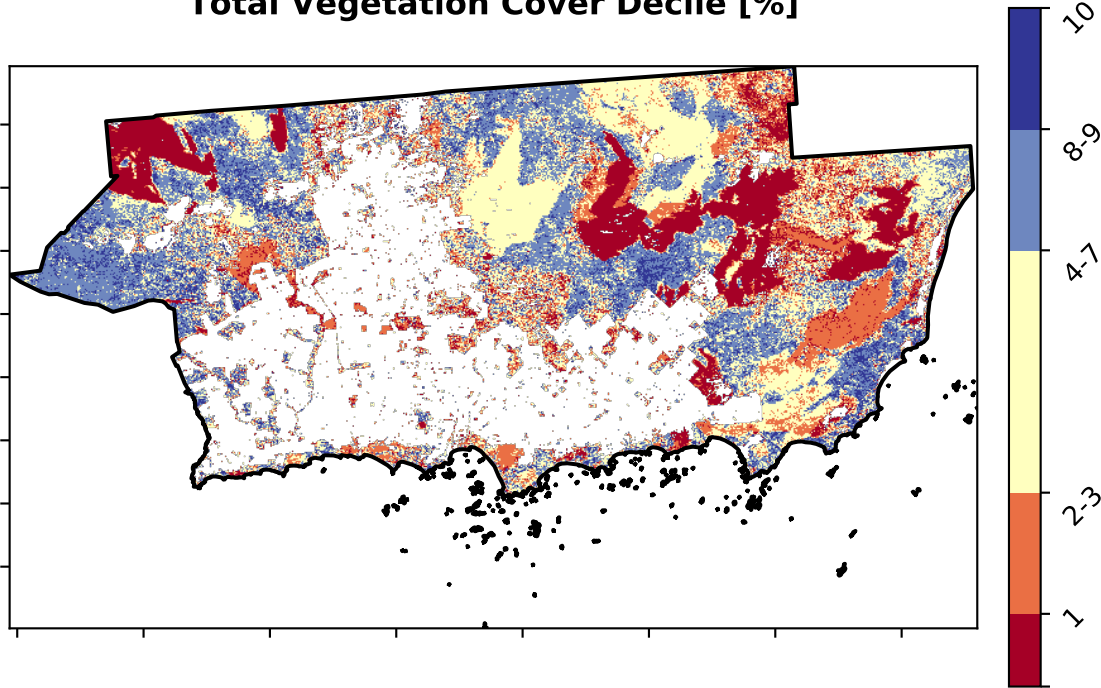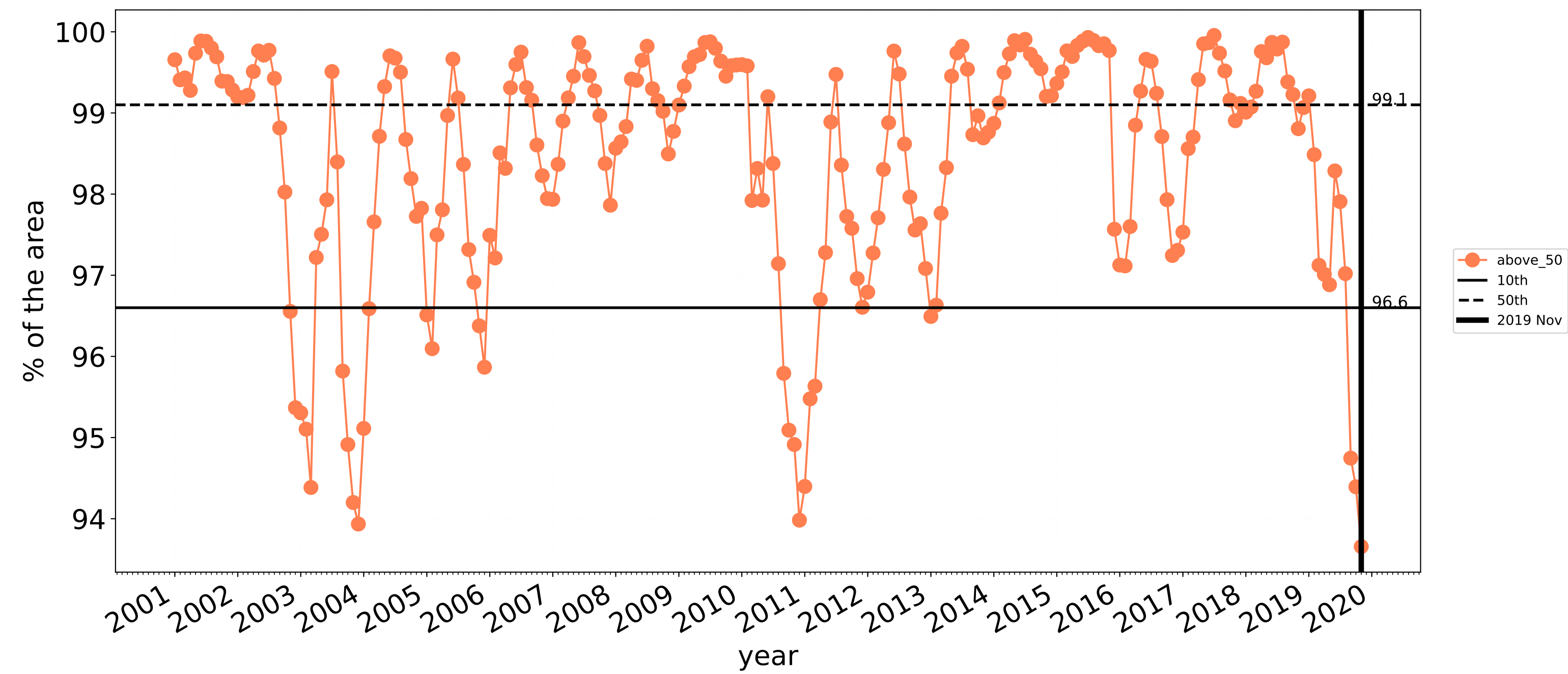Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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
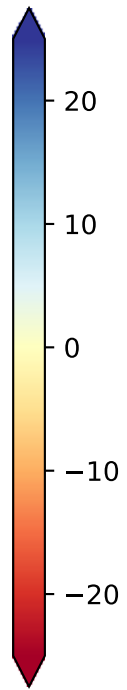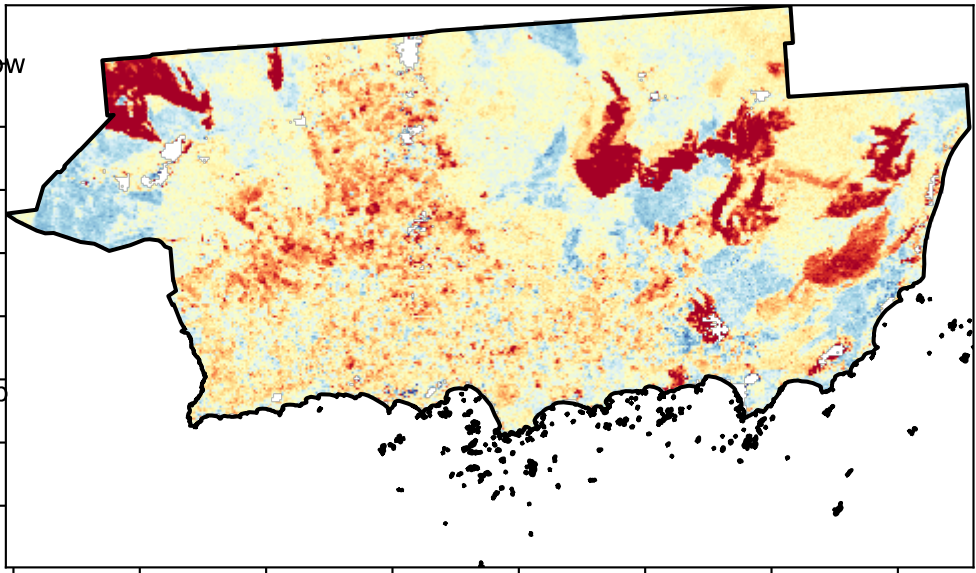
Conservation and natural environments

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

30.8% 69.1% 0.0%

Area (%)

Land use class

Total Vegetation Cover [%]

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

Proportion of vegetation cover class in area

1.7% 4.6% 13.0% 80.7%

Area (%)

Total Vegetation Cover class

% Area protected from water erosion (>70%)

Area not protected 19.3% of region (584,404 ha)

Area protected 80.7% of region (2,443,596 ha)

% Area protected from wind erosion (>50%)

Area not protected 6.0% of region (181,680 ha)

Area protected 94.0% of region (2,846,320 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.
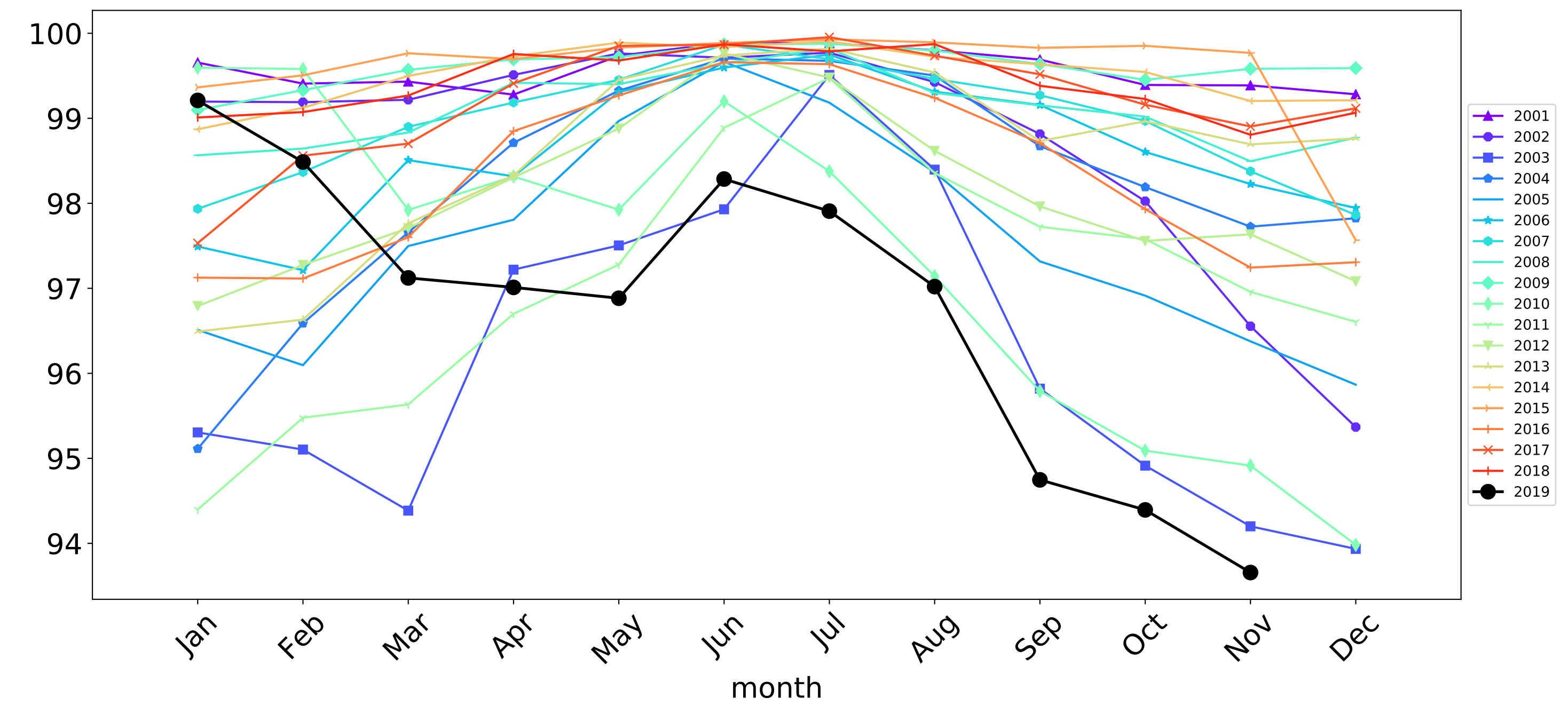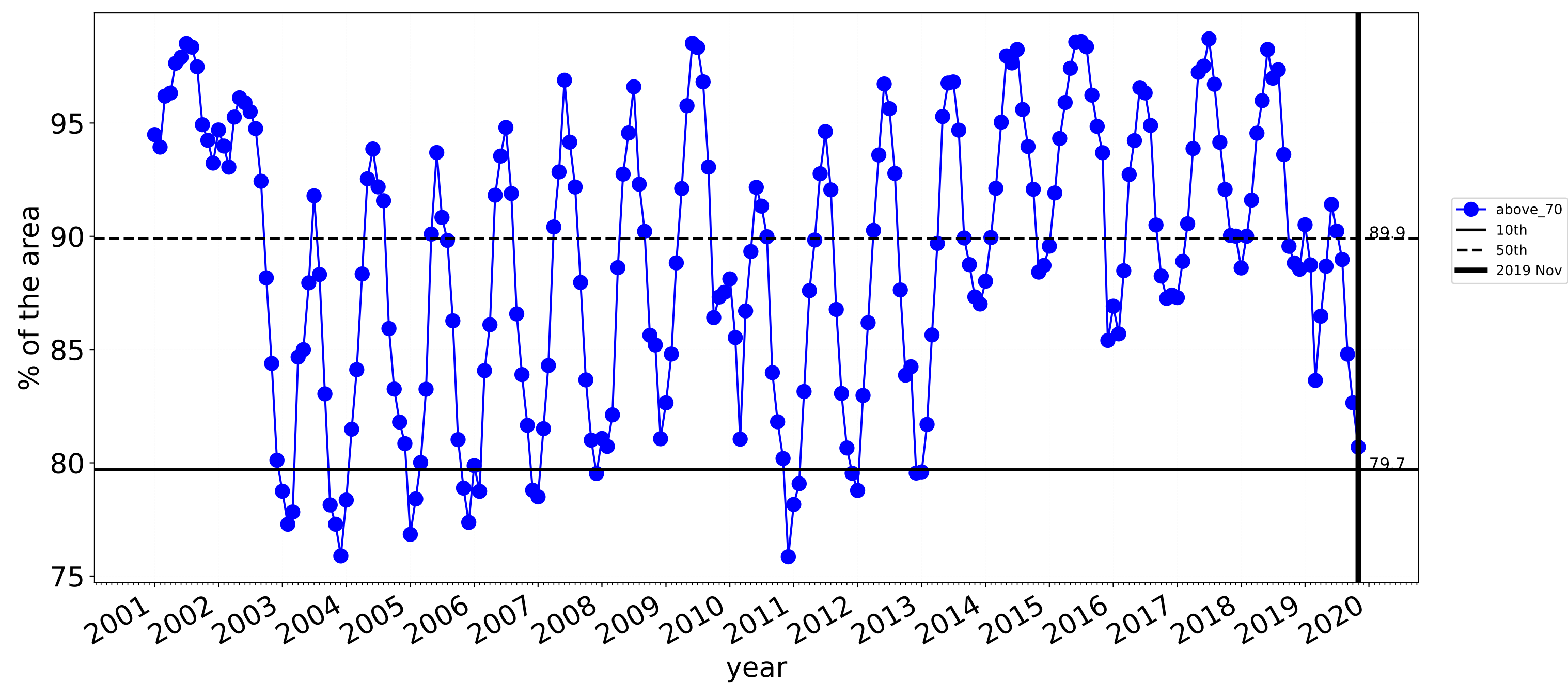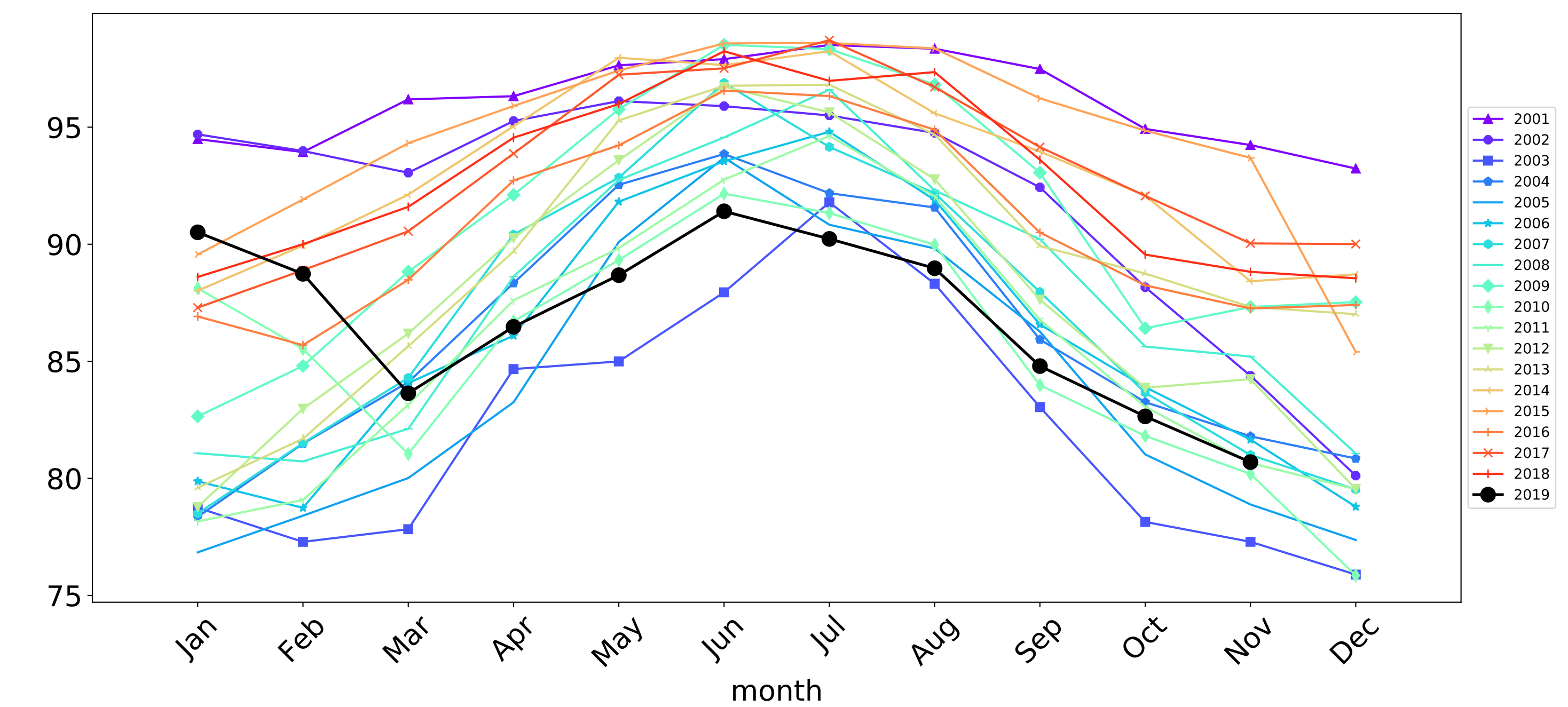

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Conservation and natural environments timeseries

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

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

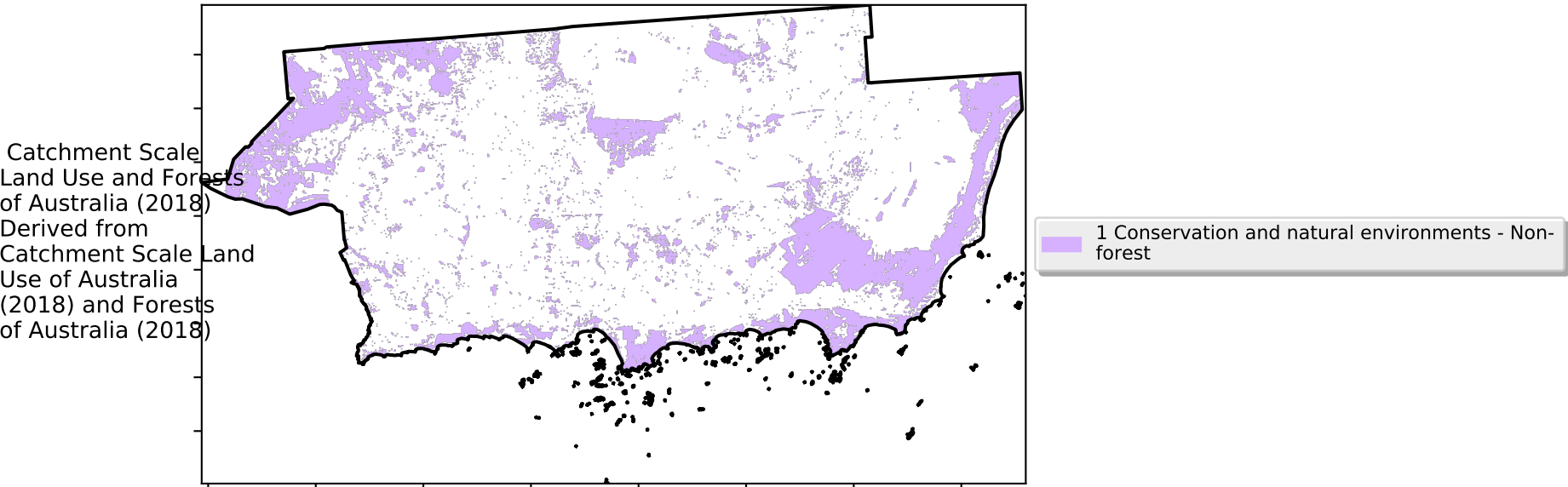Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

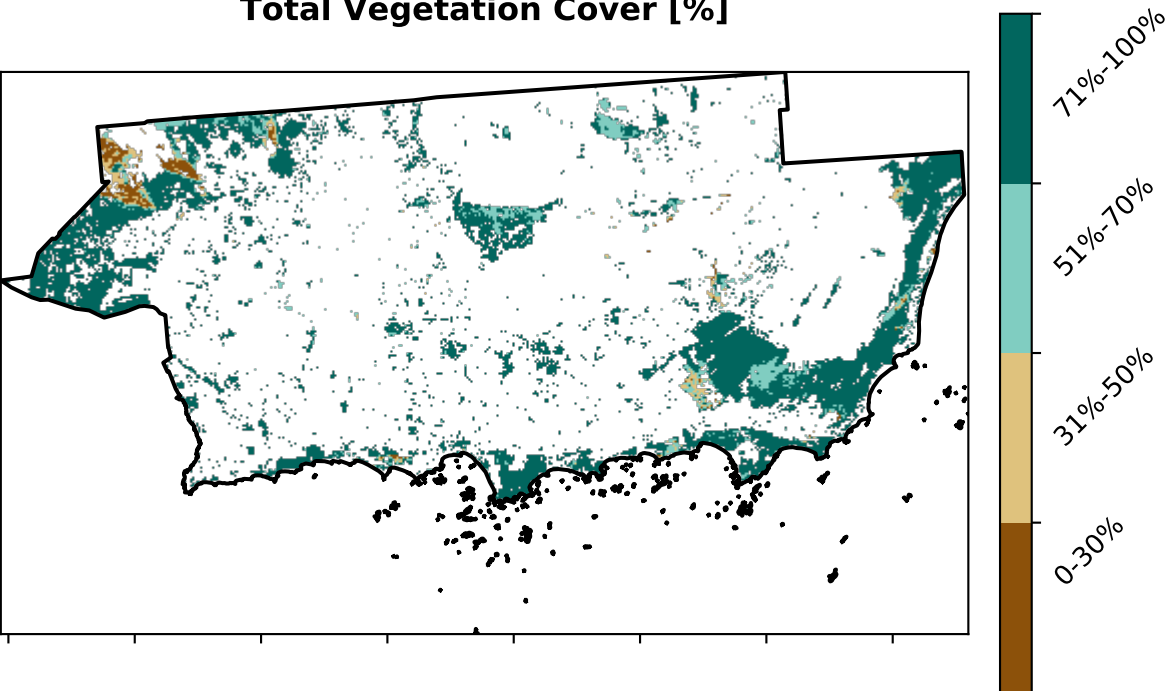Water erosion historical monthly area protected (Total Veg Cov>70%)

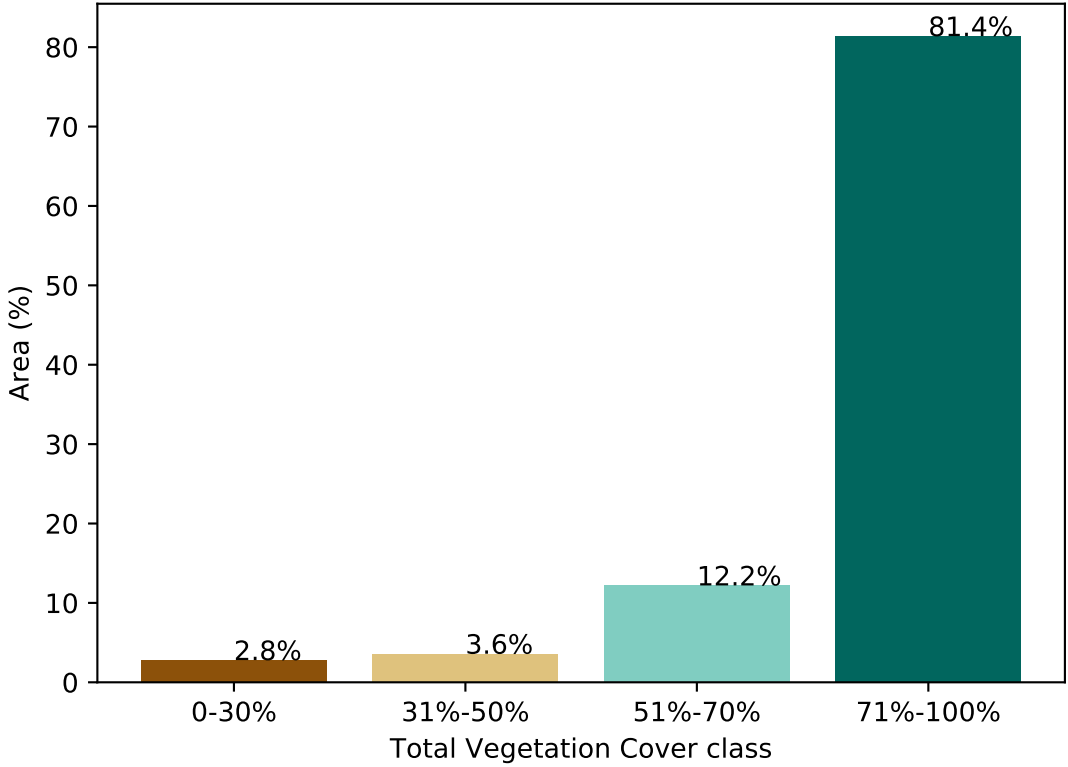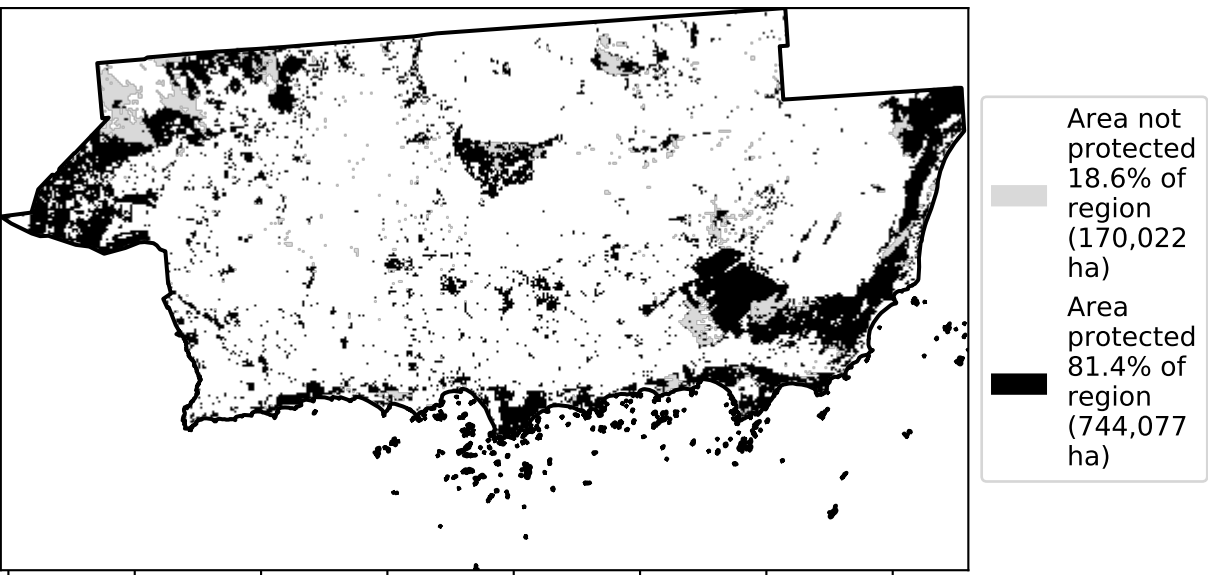# Conservation and natural environments non forest
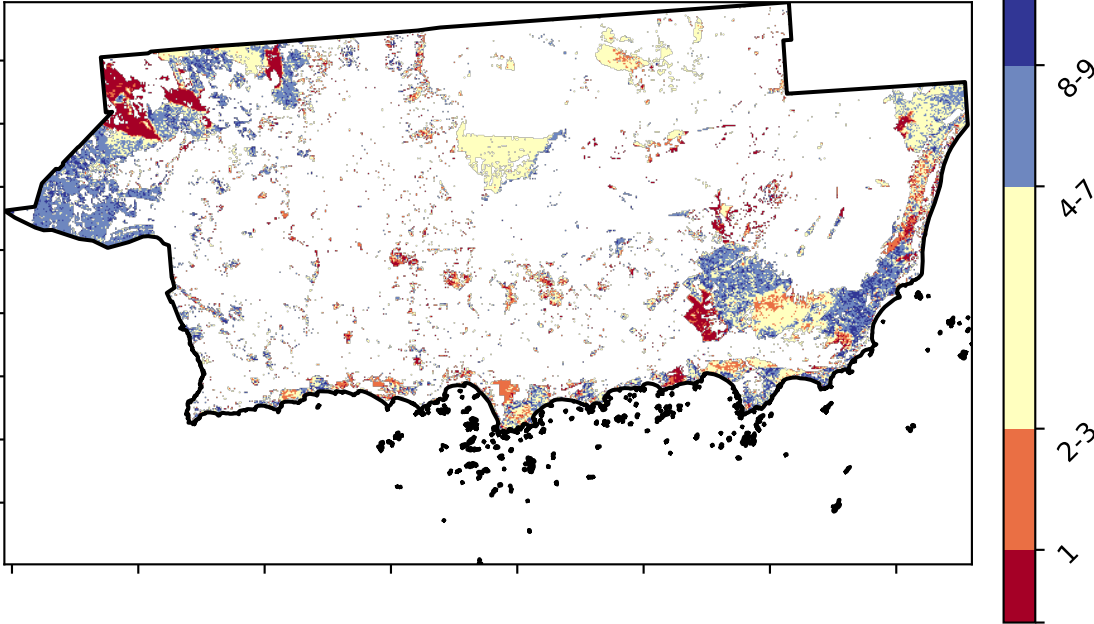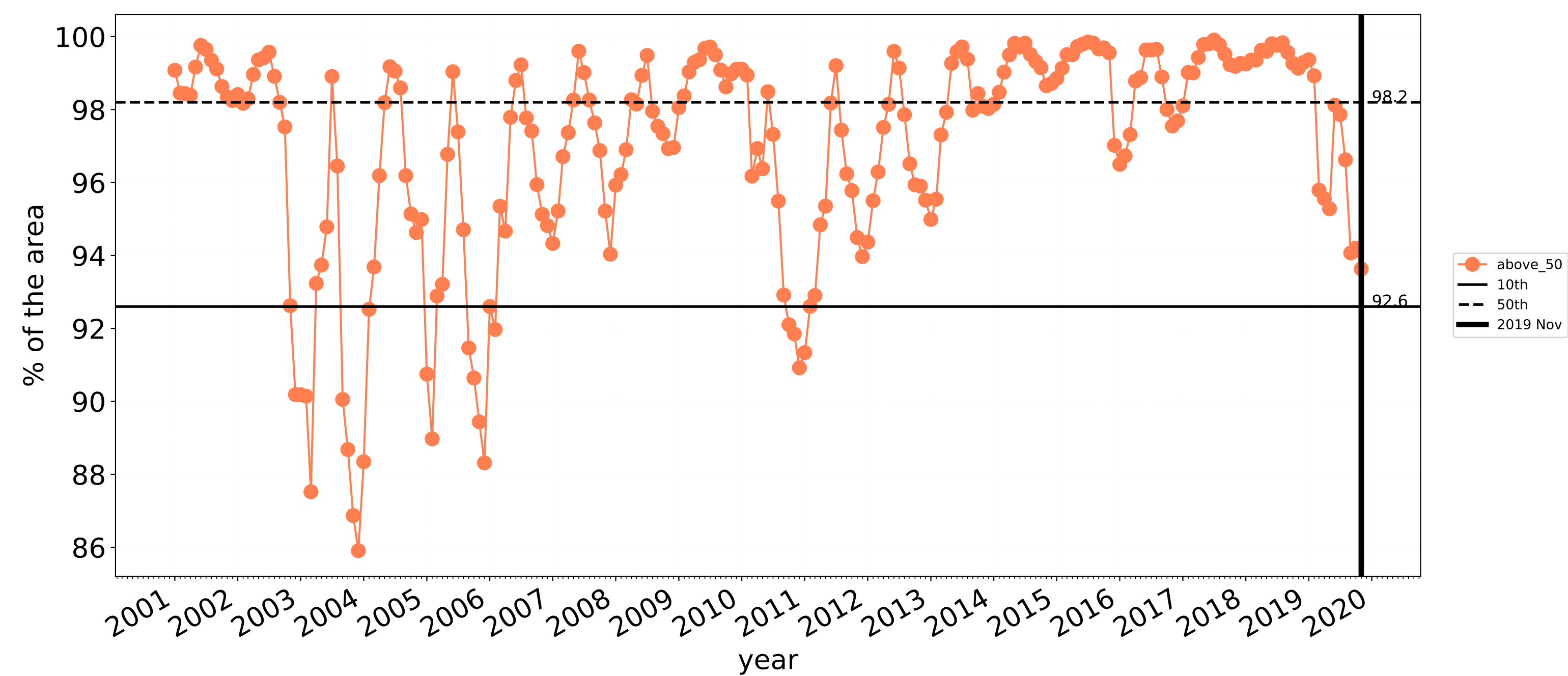
Land use and forest cover

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

Area (%) vs Total Vegetation Cover class

- 0-30%: 2.8%
- 31%-50%: 3.6%
- 51%-70%: 12.2%
- 71%-100%: 81.4%

% Area protected from water erosion (>70%)

Area not
protected
18.6% of
region
(170,022
ha)

Area
protected
81.4% of
region
(744,077
ha)

% Area protected from wind erosion (>50%)

Area not
protected
6.0% of
region
(54,846
ha)

Area
protected
94.0% of
region
(859,254
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 [%]

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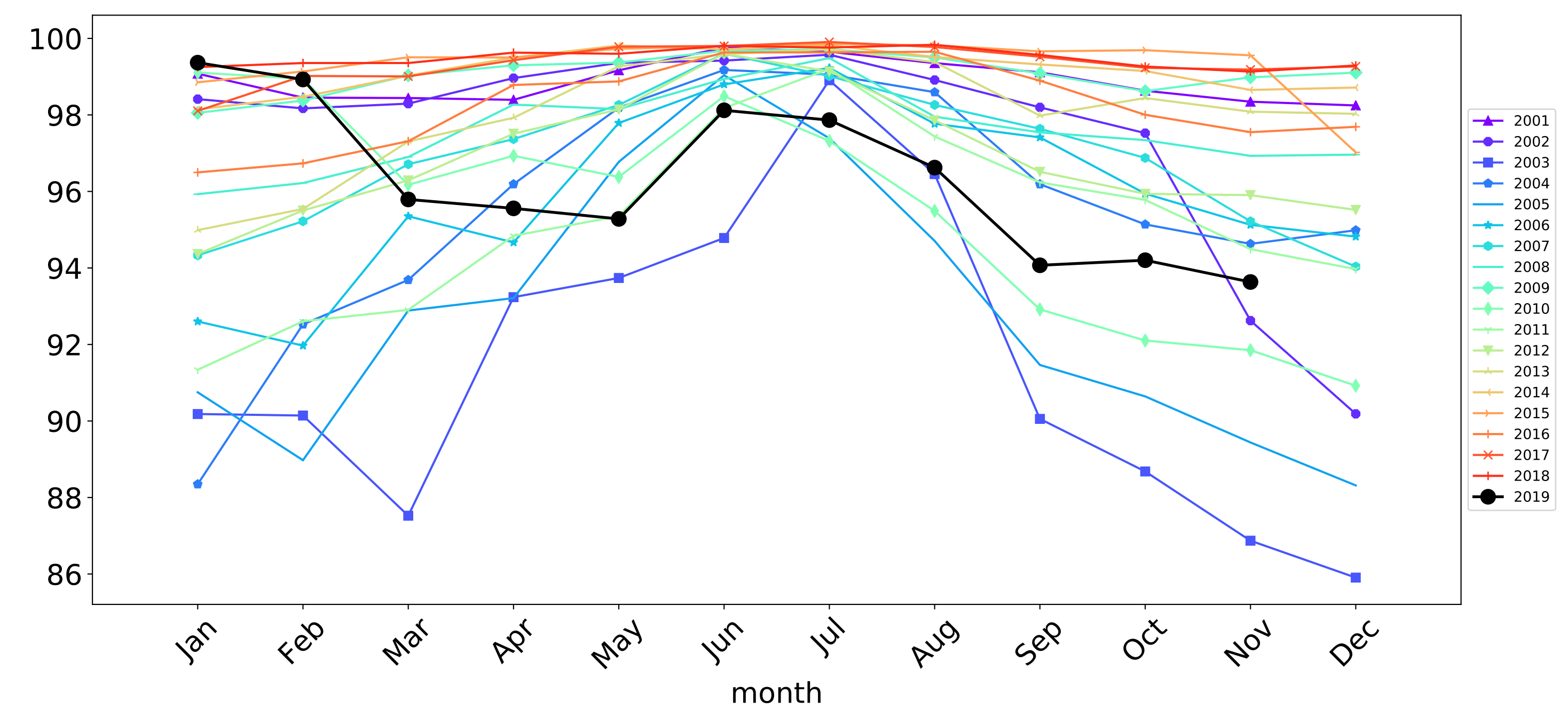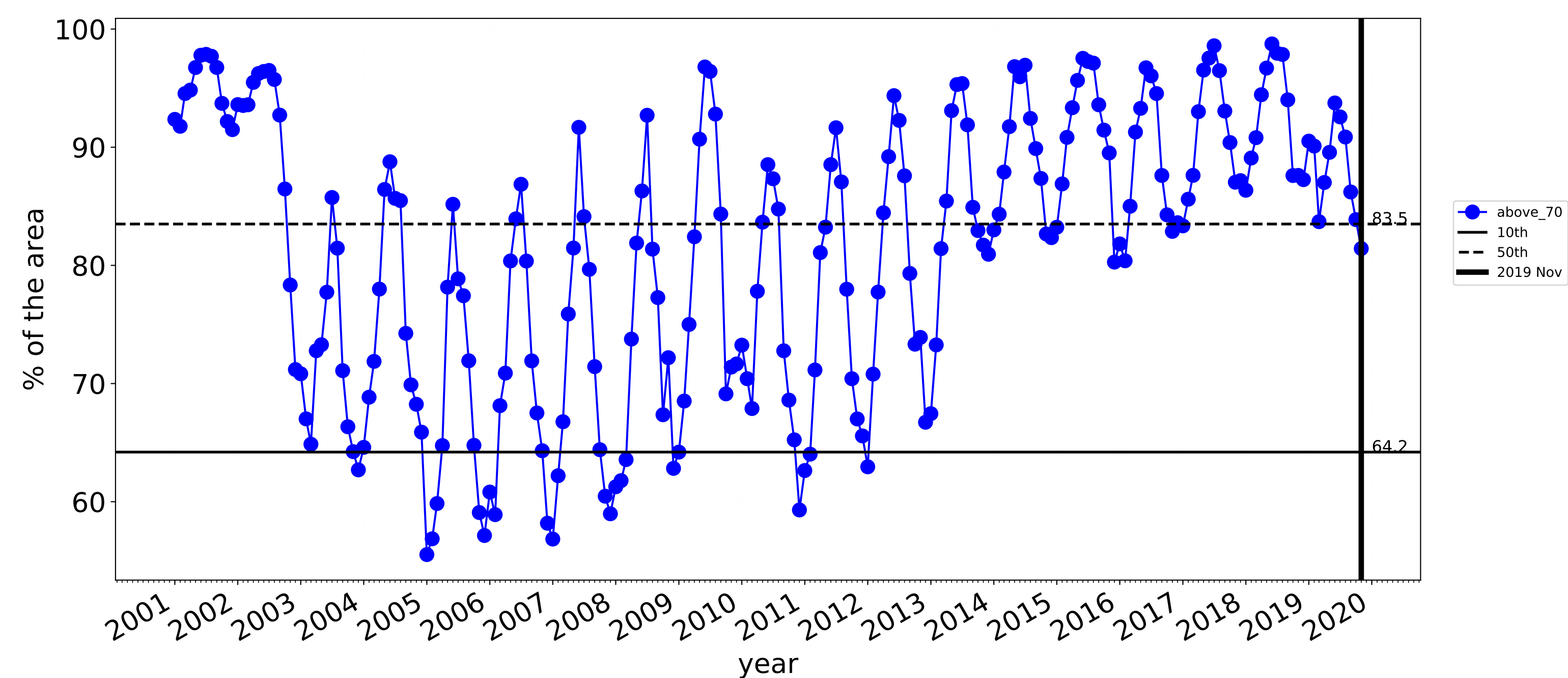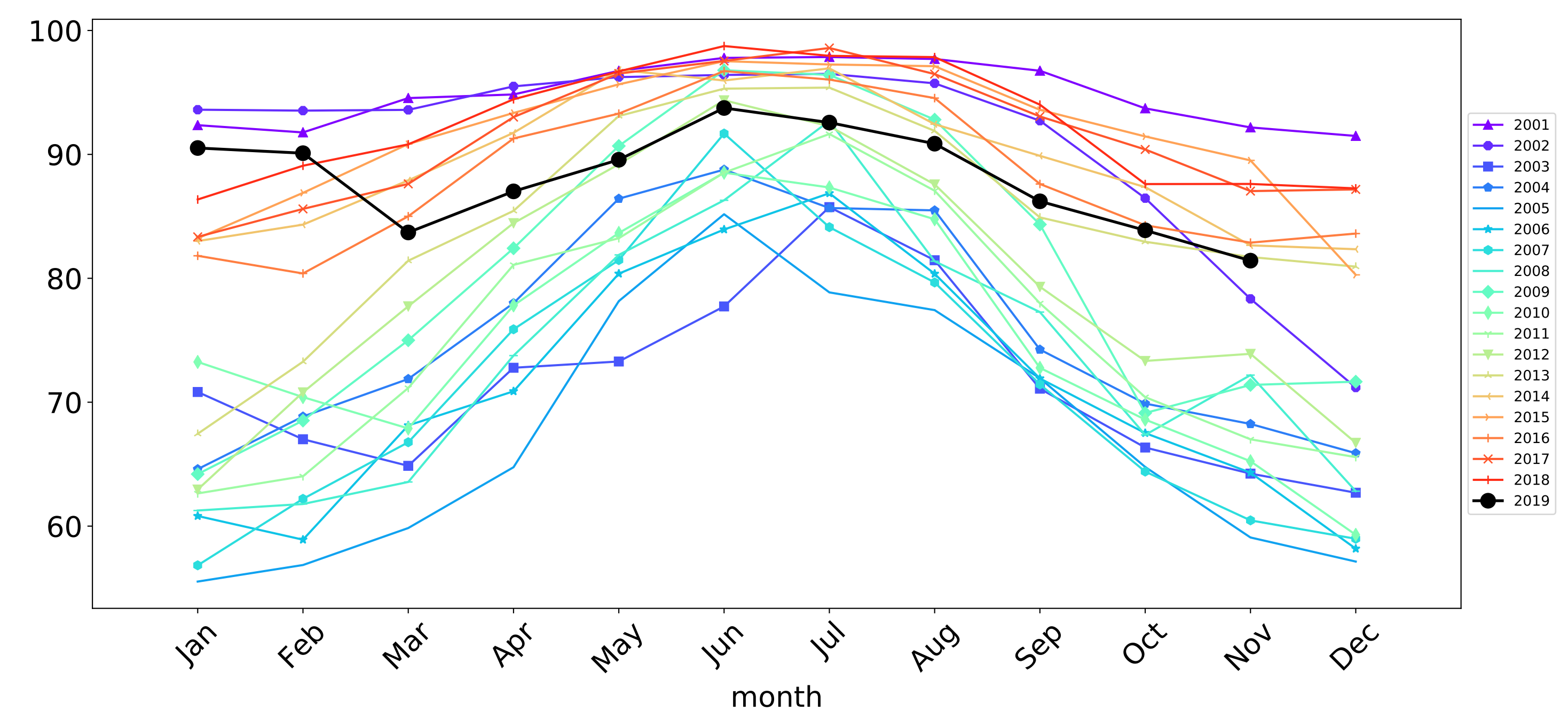records for that month
of the map using baseline
from 2001 to 2019.

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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%)

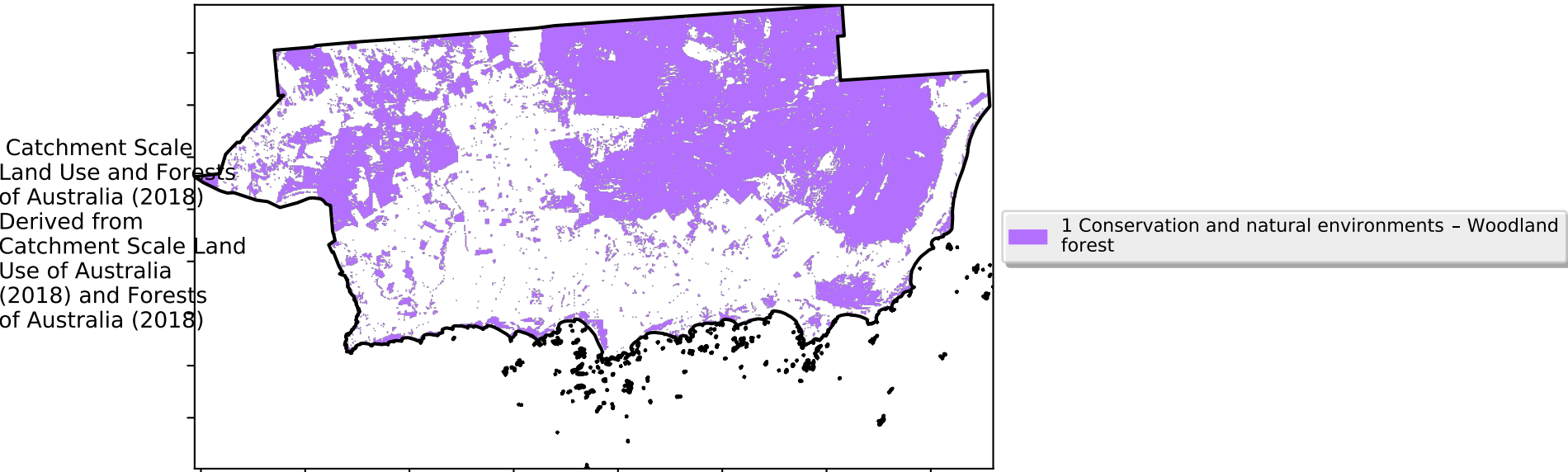Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

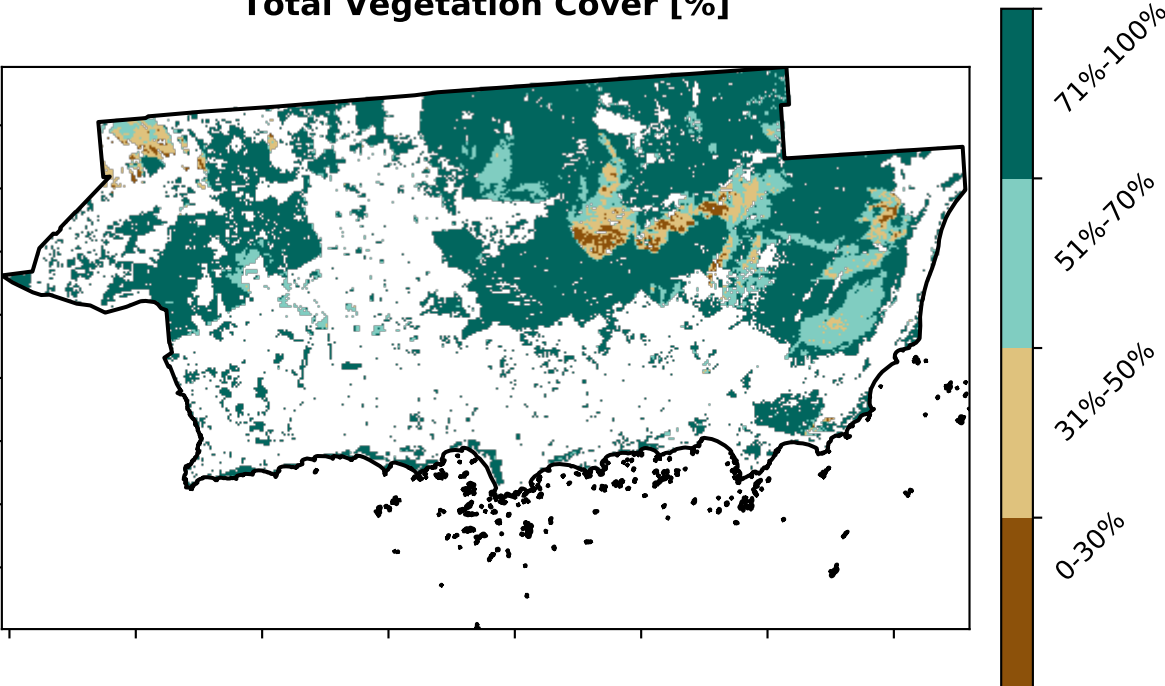Water erosion historical monthly area protected (Total Veg Cov>70%)

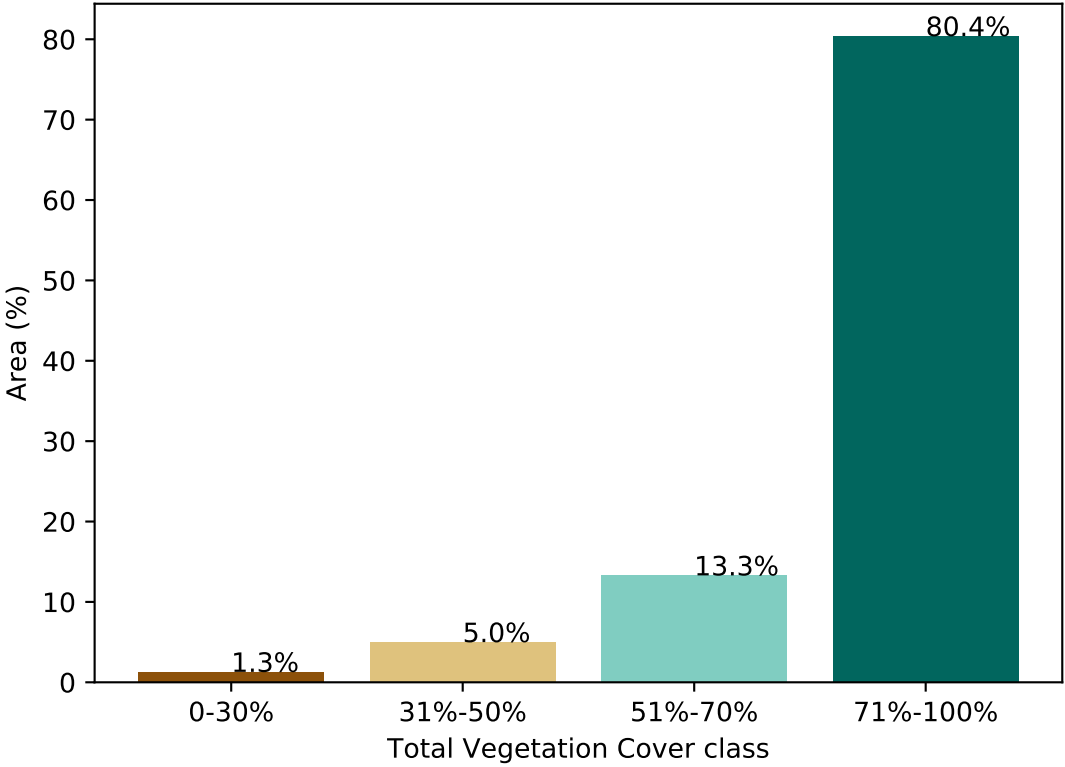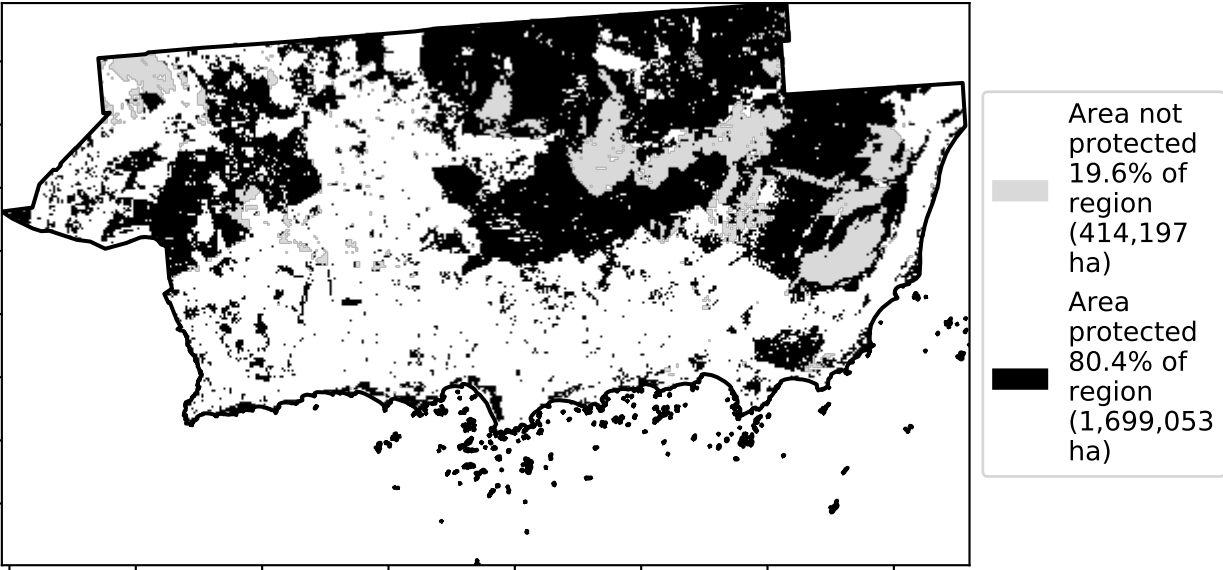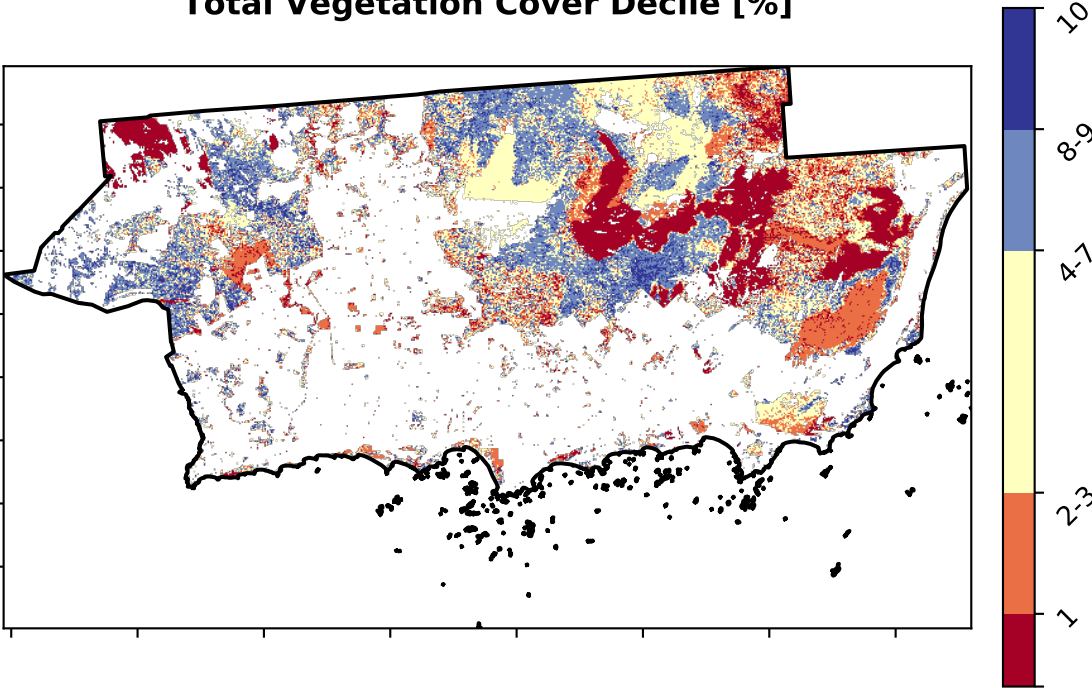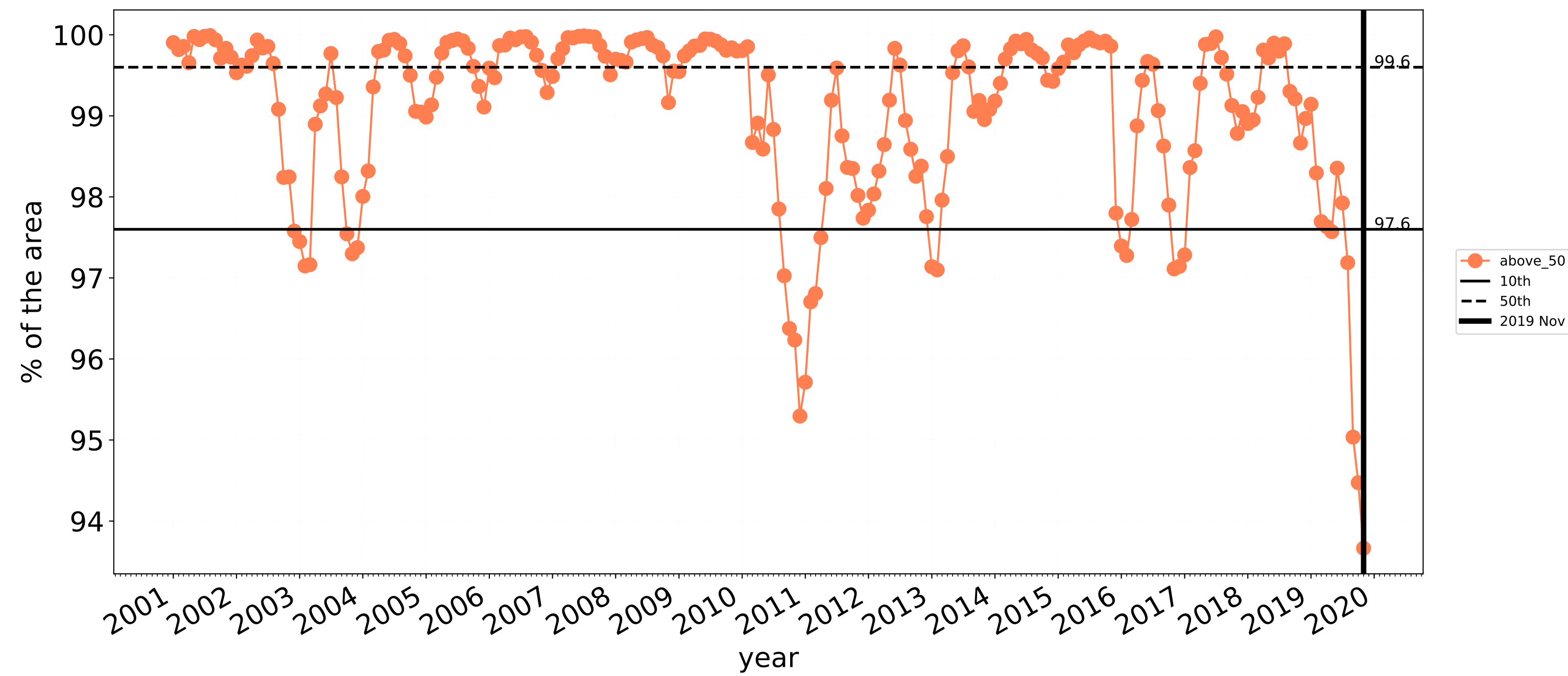# Conservation and natural environments Woodland forest

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

80.4%

13.3%

5.0%

1.3%

Area (%)

Total Vegetation Cover class

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

% Area protected from water erosion (>70%)

Area not
protected
19.6% of
region
(414,197
ha)

Area
protected
80.4% of
region
(1,699,053
ha)

% Area protected from wind erosion (>50%)

Area not
protected
6.0% of
region
(126,795
ha)

Area
protected
94.0% of
region
(1,986,455
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
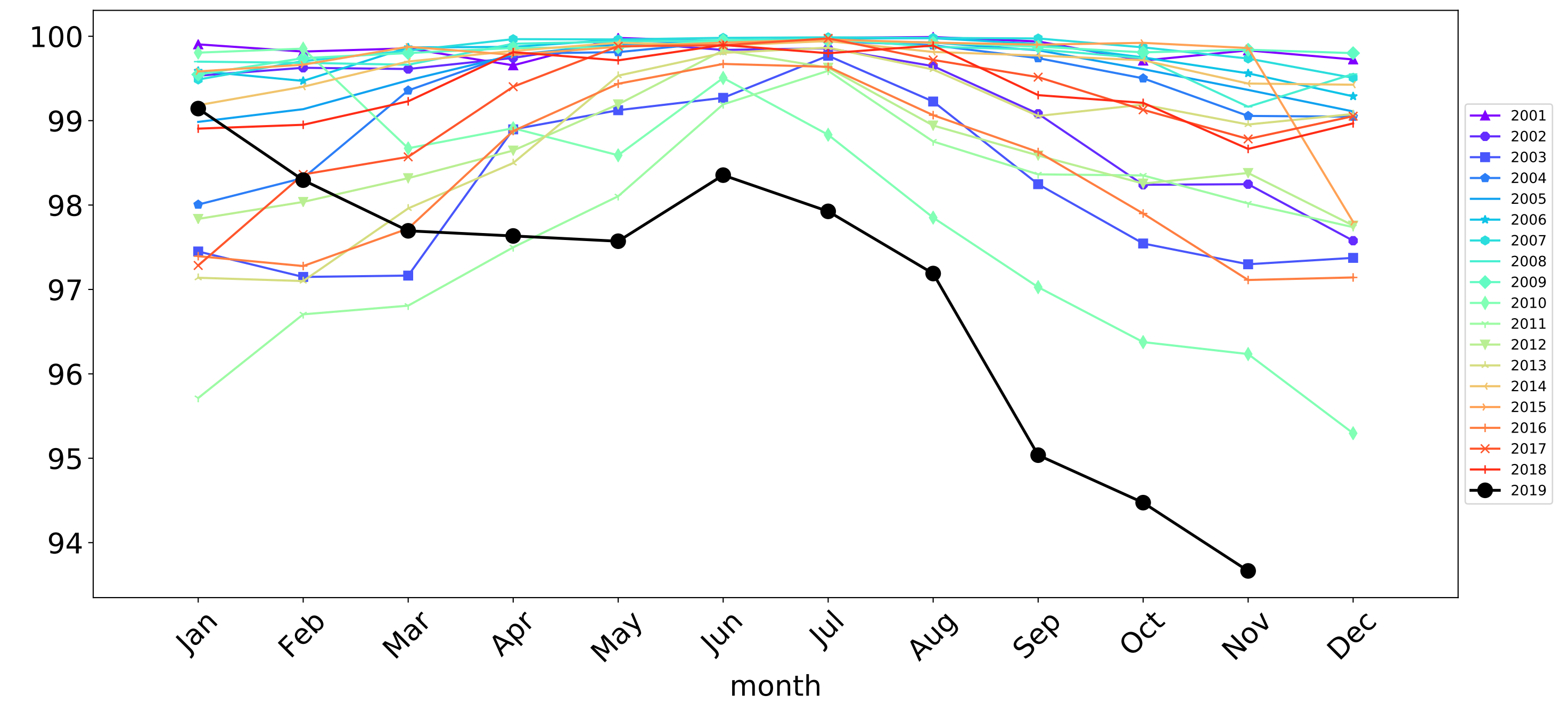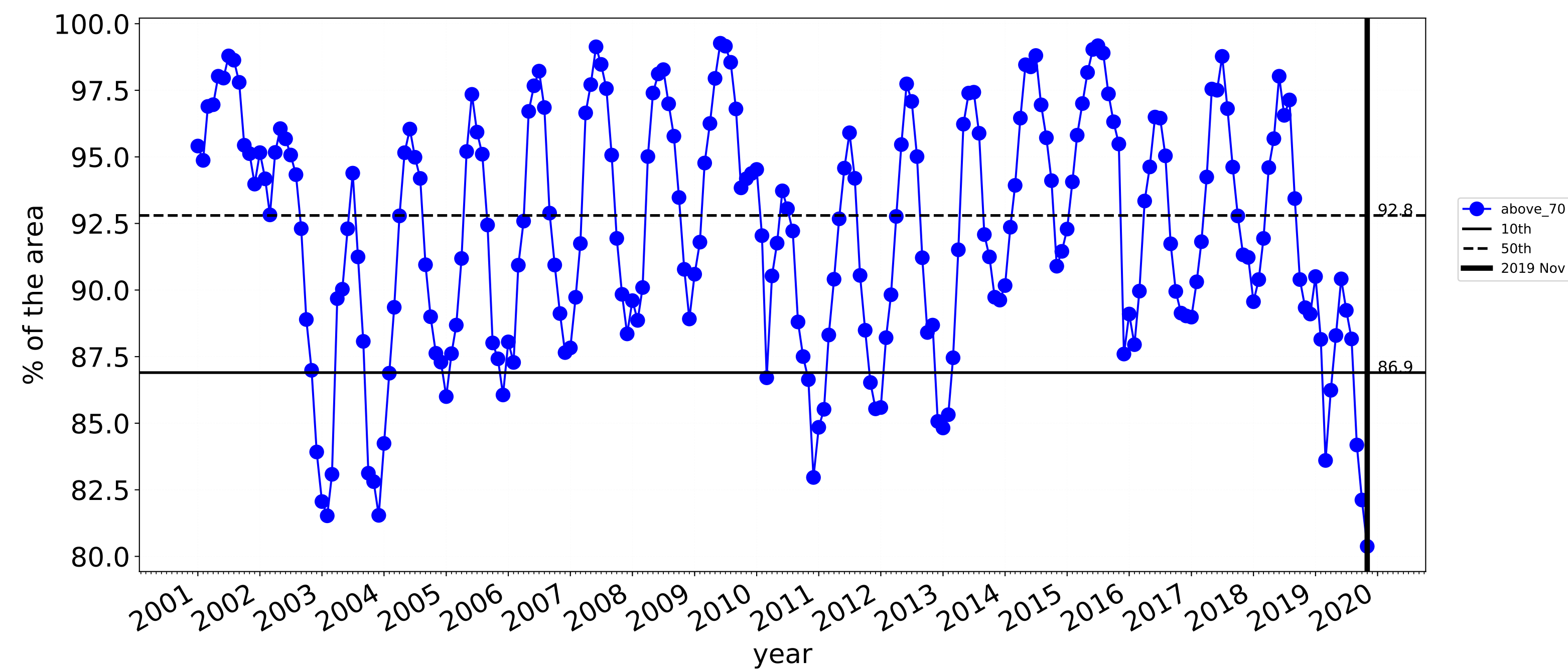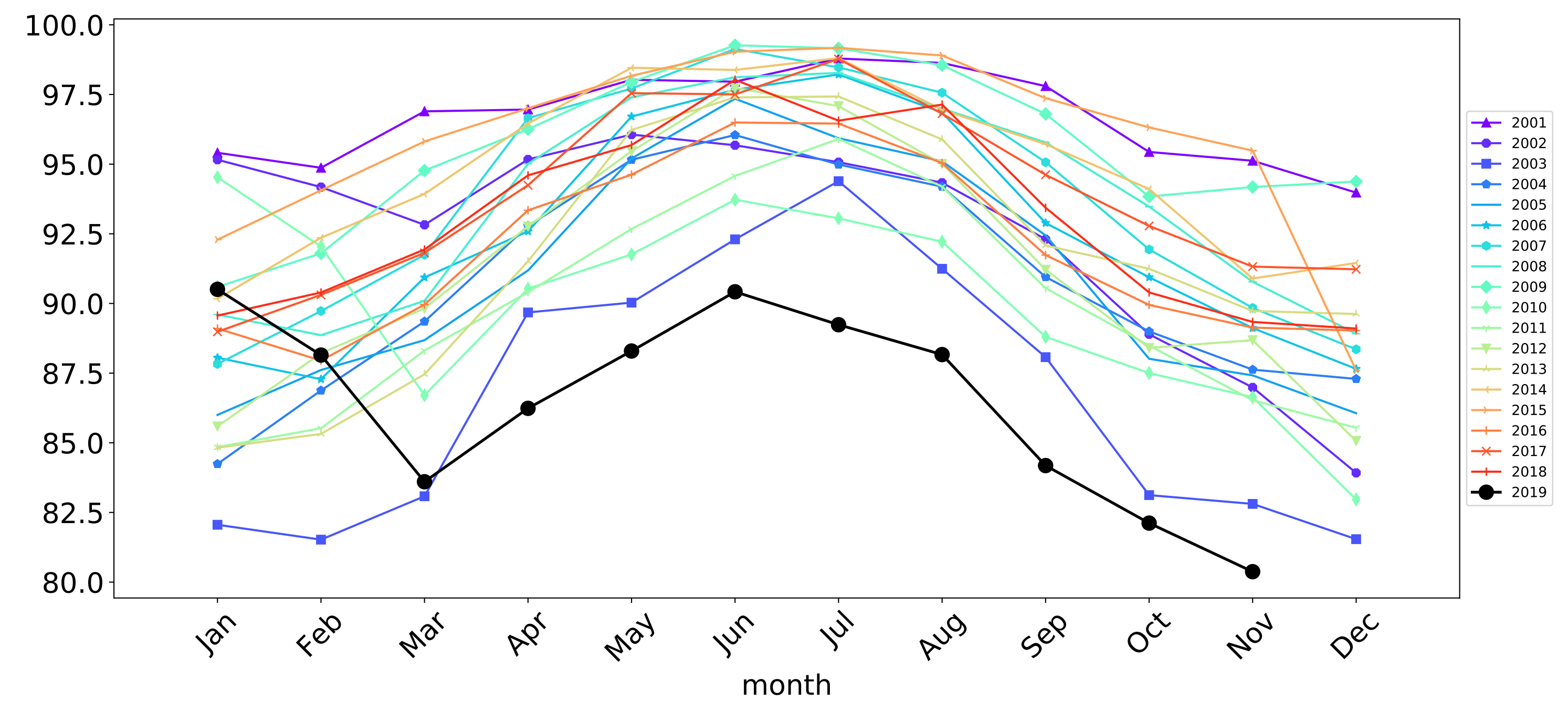the map using baseline
from 2001 to 2019.

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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%)

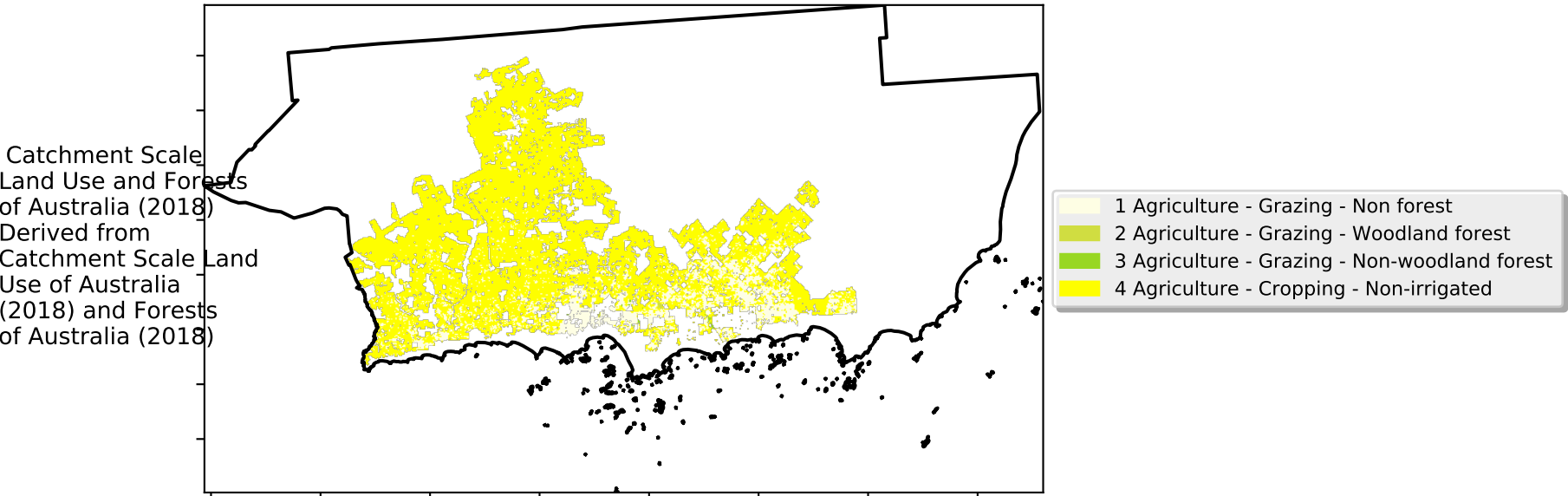### Proportion of the area protected from water erosion (Total Vegetation Cover > 70%)

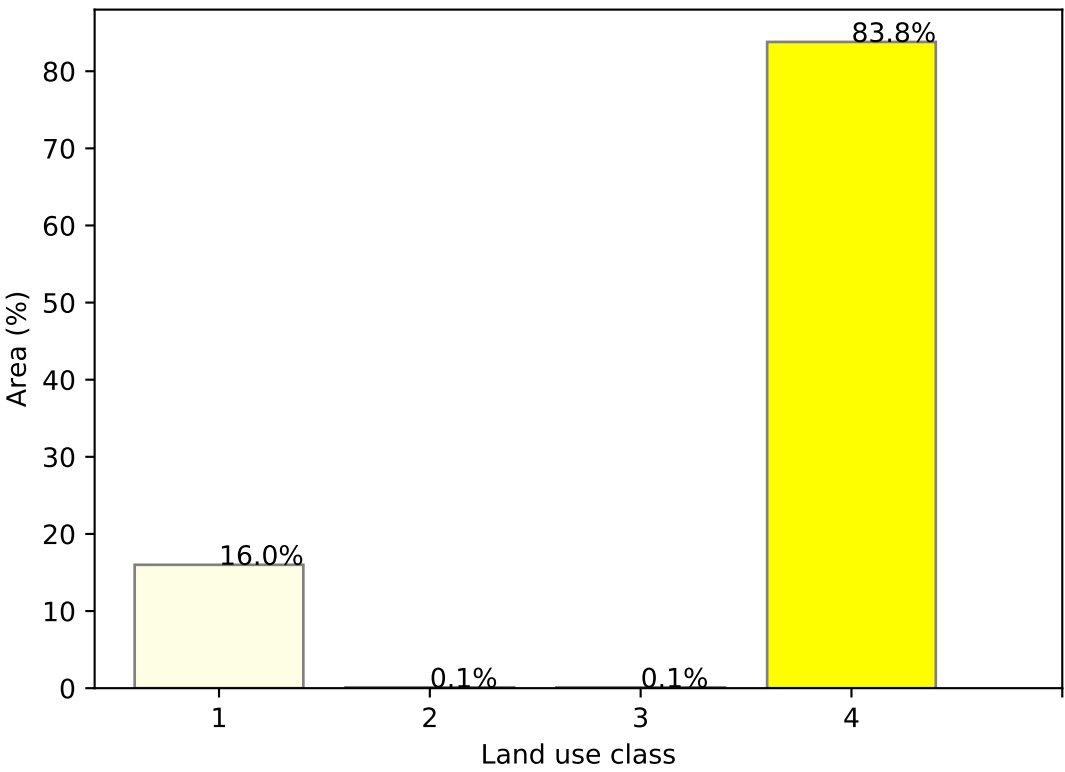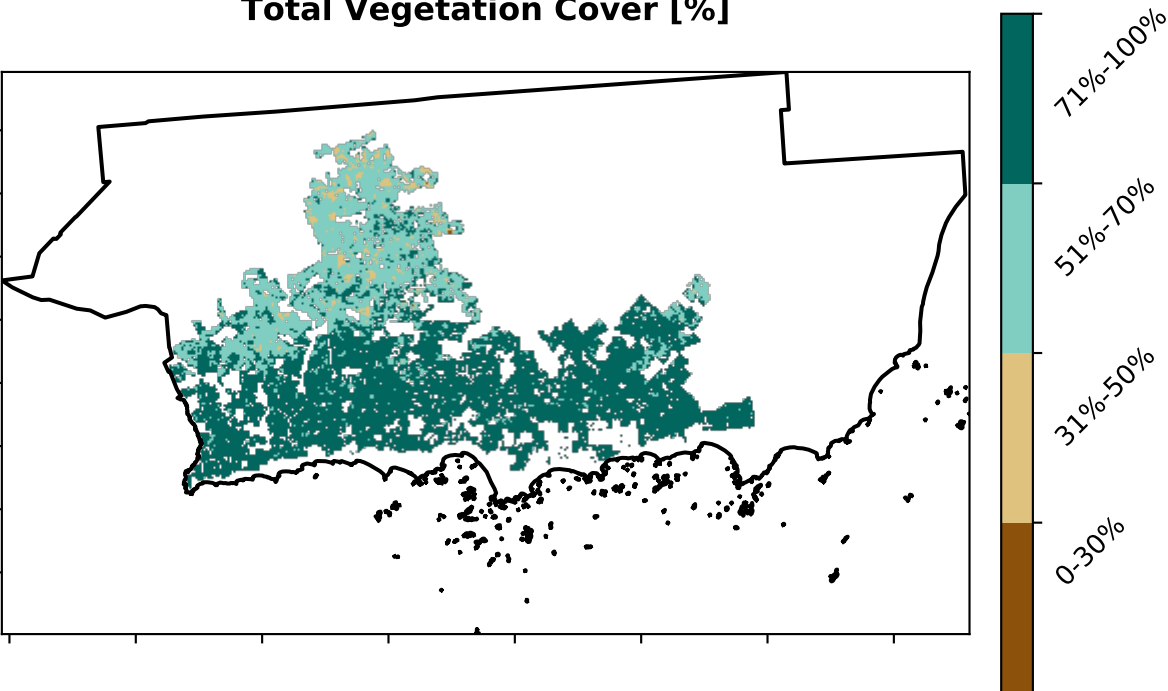### Water erosion historical monthly area protected (Total Veg Cov>70%)
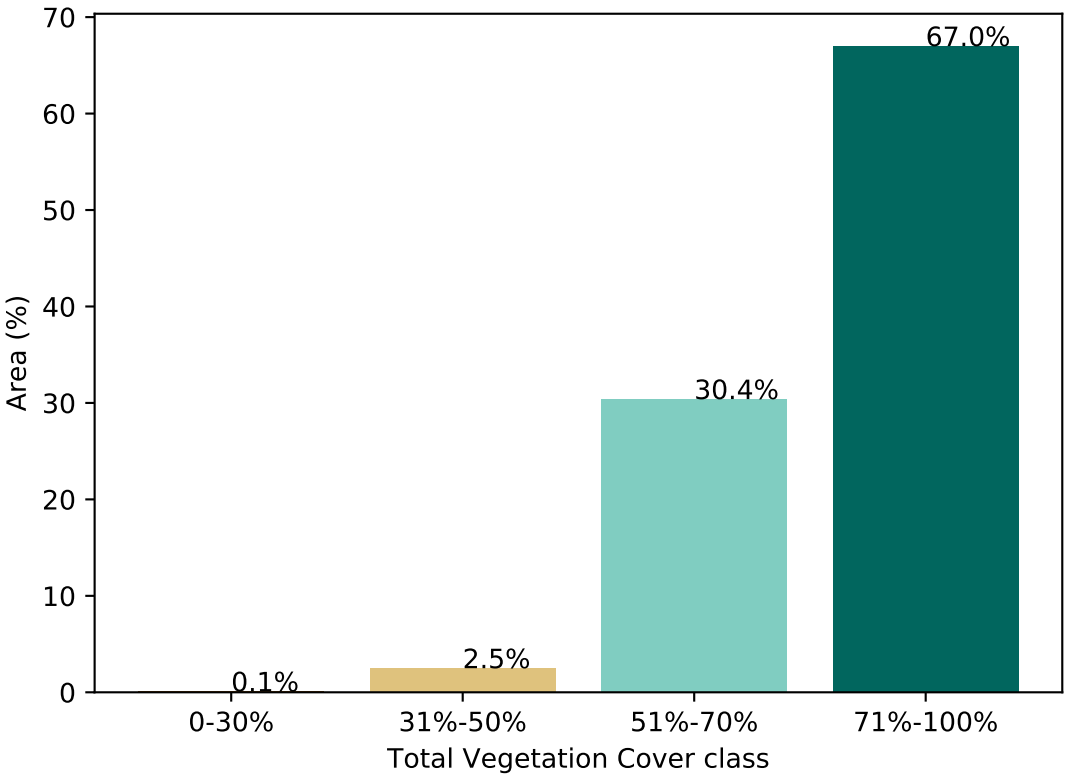
Agriculture

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 - Cropping - Non-irrigated

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
33.0% of
region
(393,277
ha)

Area
protected
67.0% of
region
(798,472
ha)

% Area protected from wind erosion (>50%)

Area not
protected
3.0% of
region
(35,752
ha)

Area
protected
97.0% of
region
(1,155,997
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
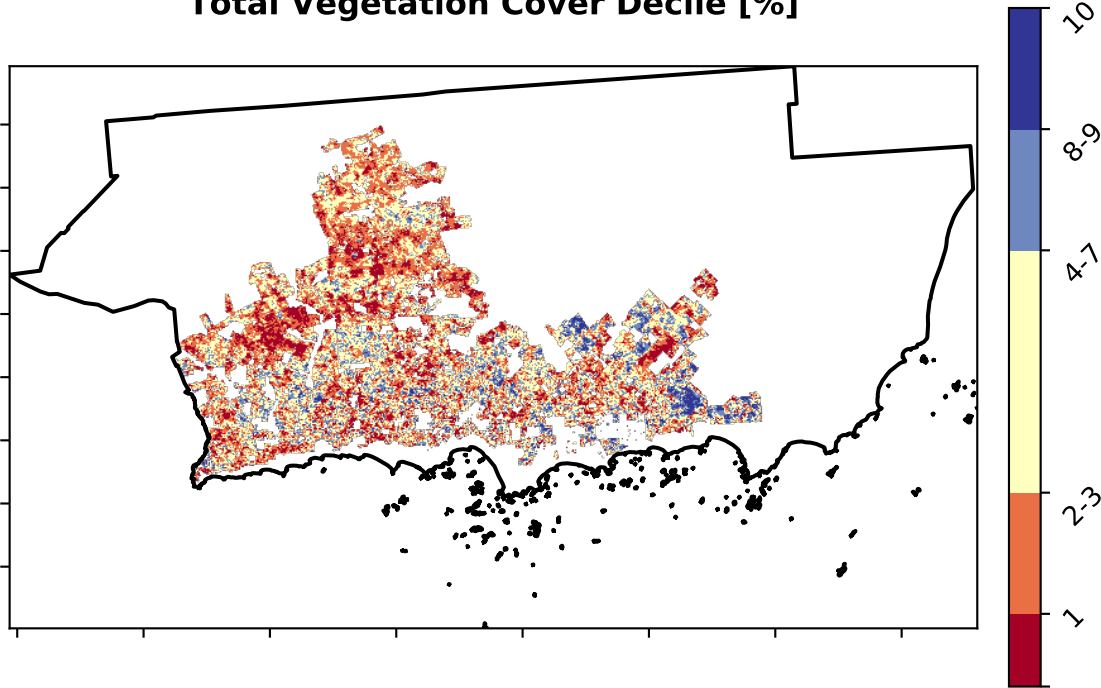month of the map
using baseline
from 2001 to
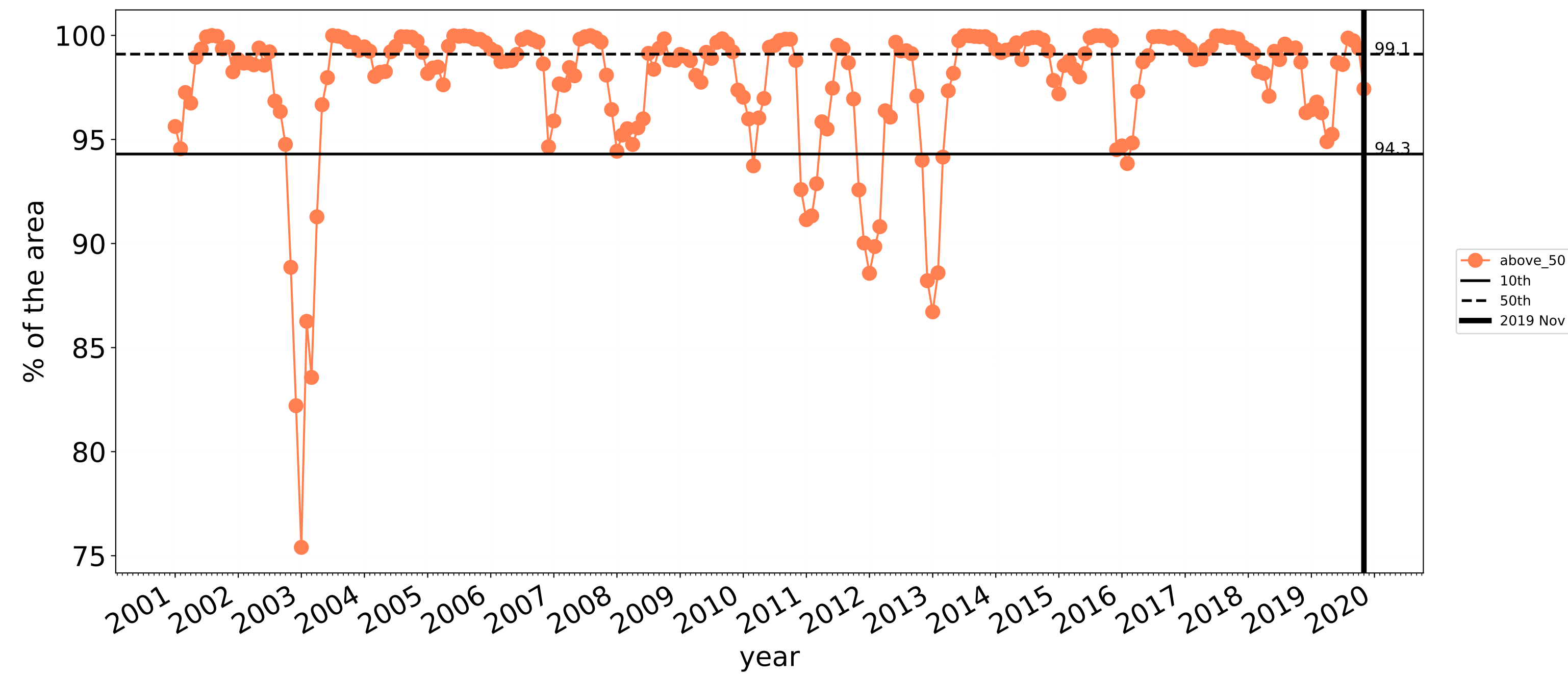2019.

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
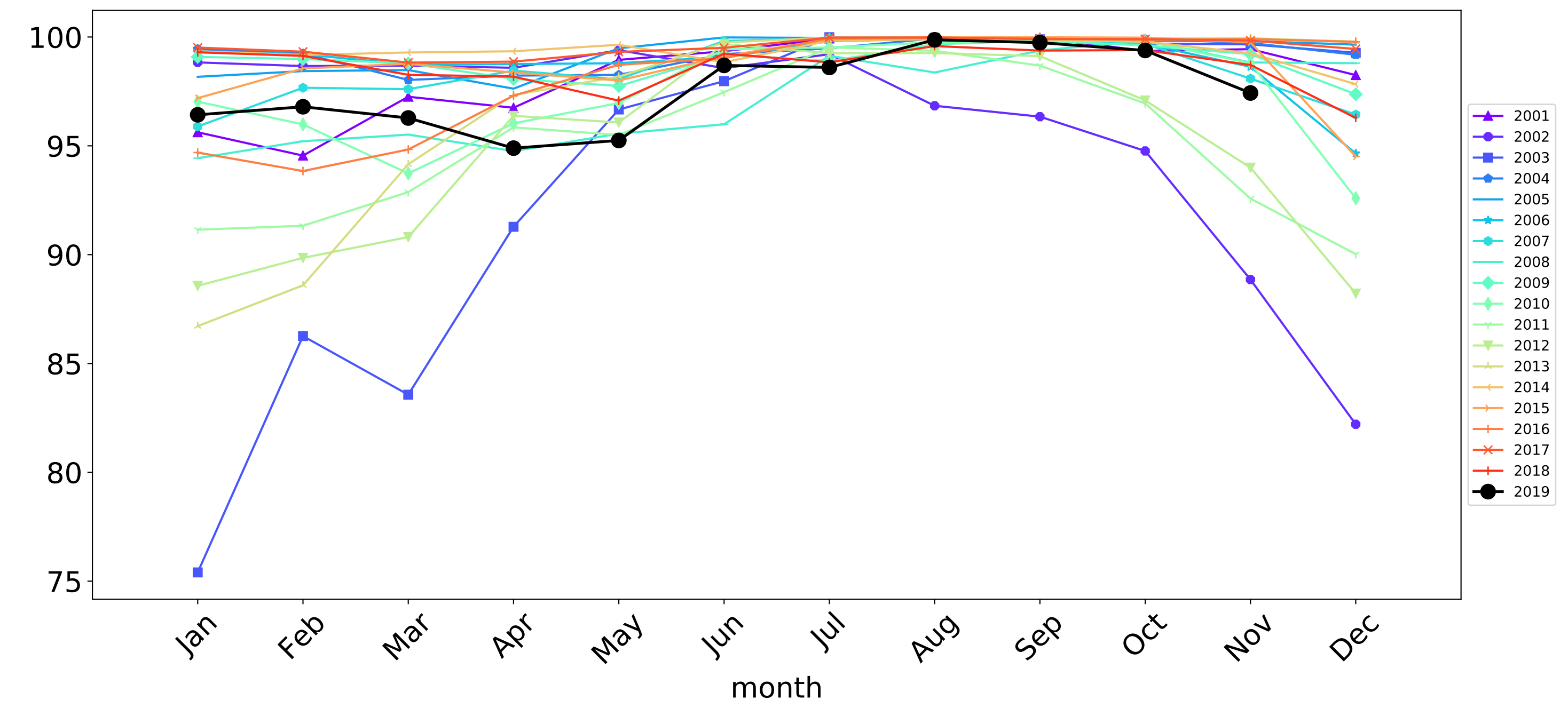from 2001 to 2019.

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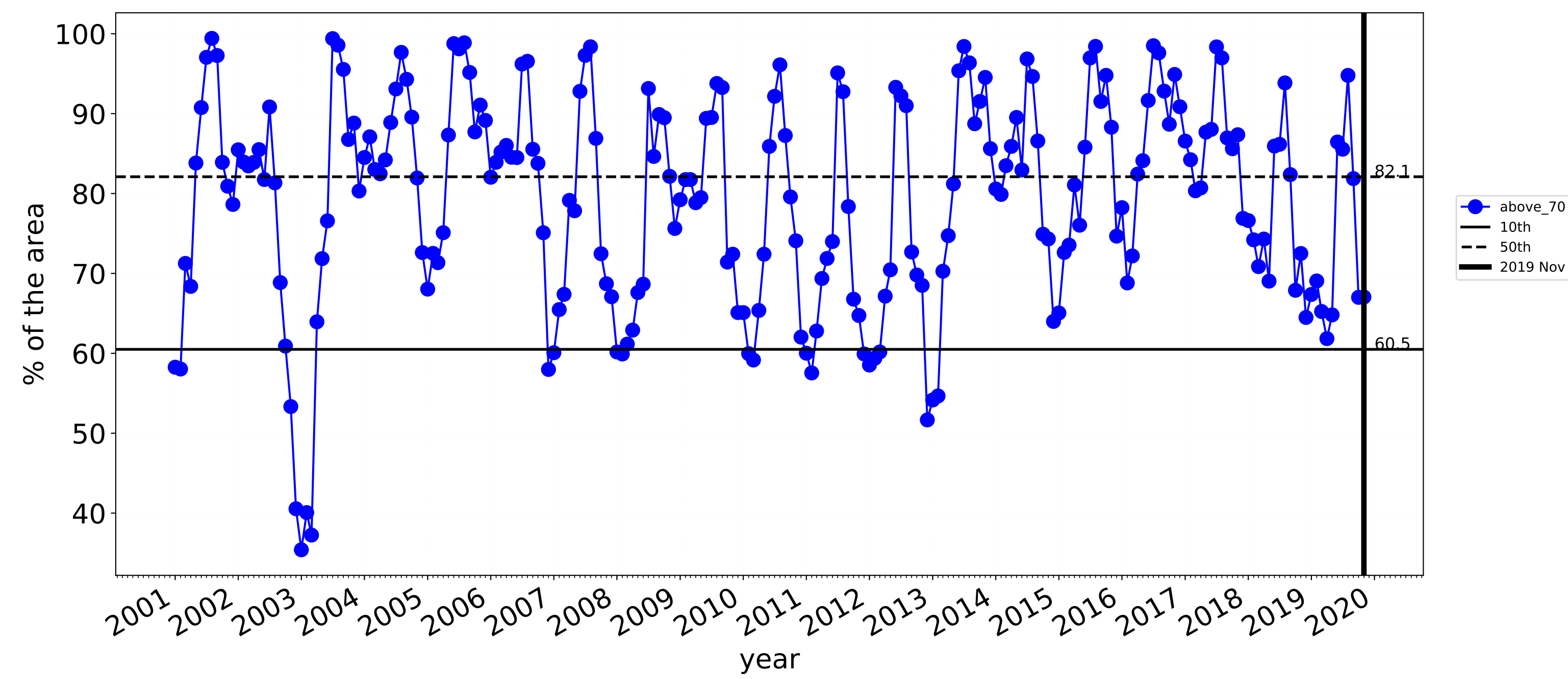8-9
10
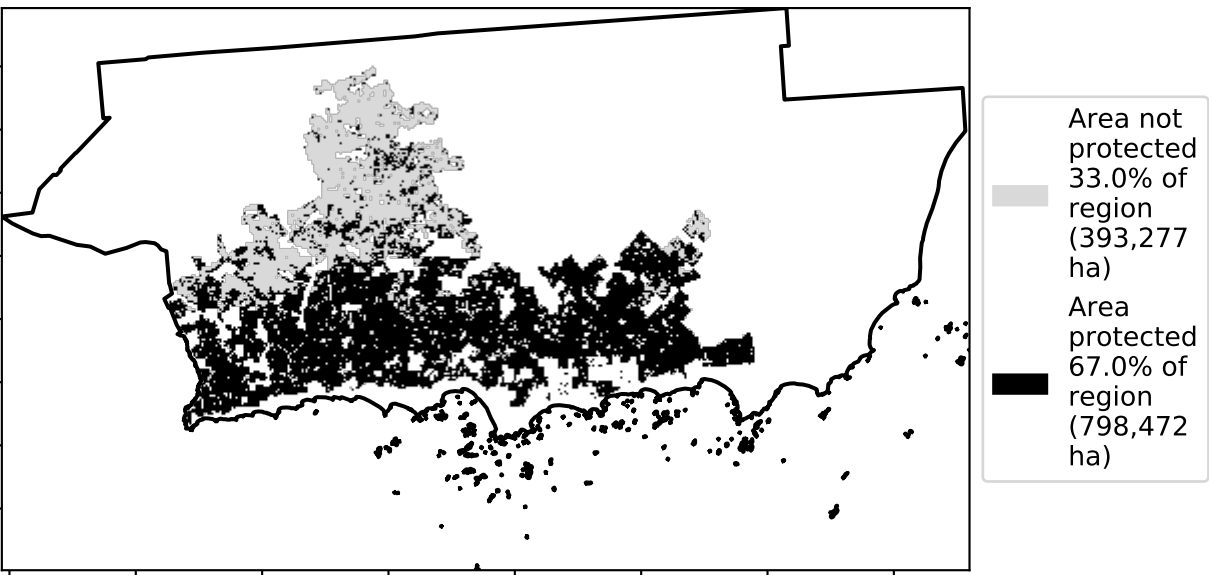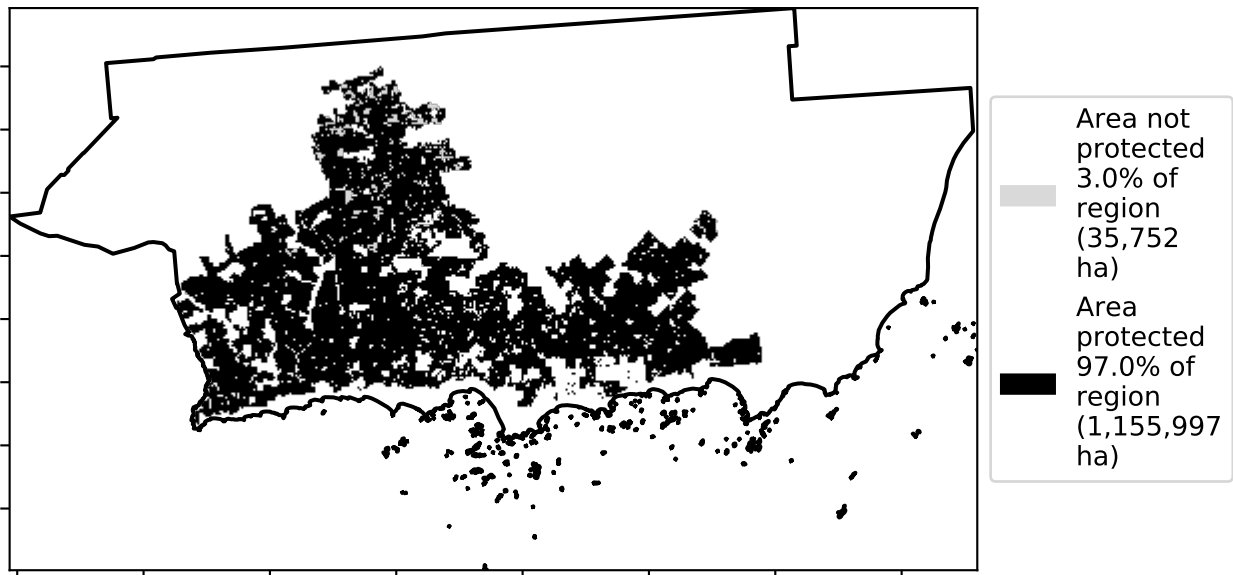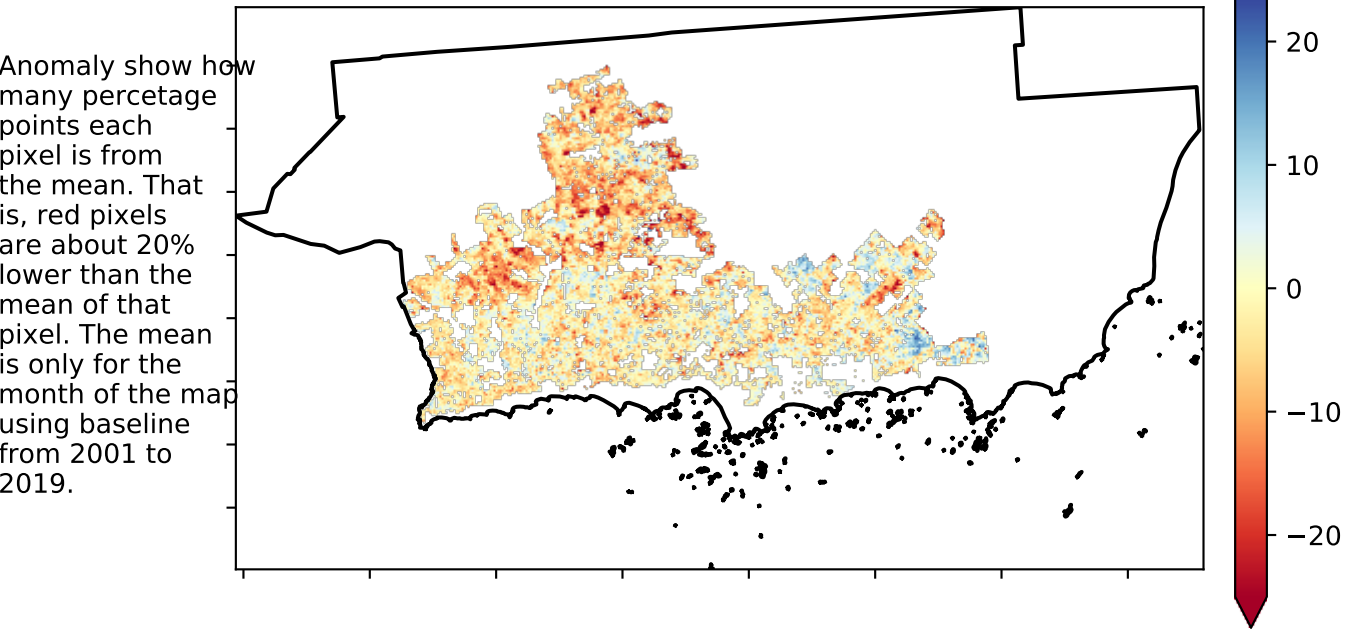
Agriculture timeseries

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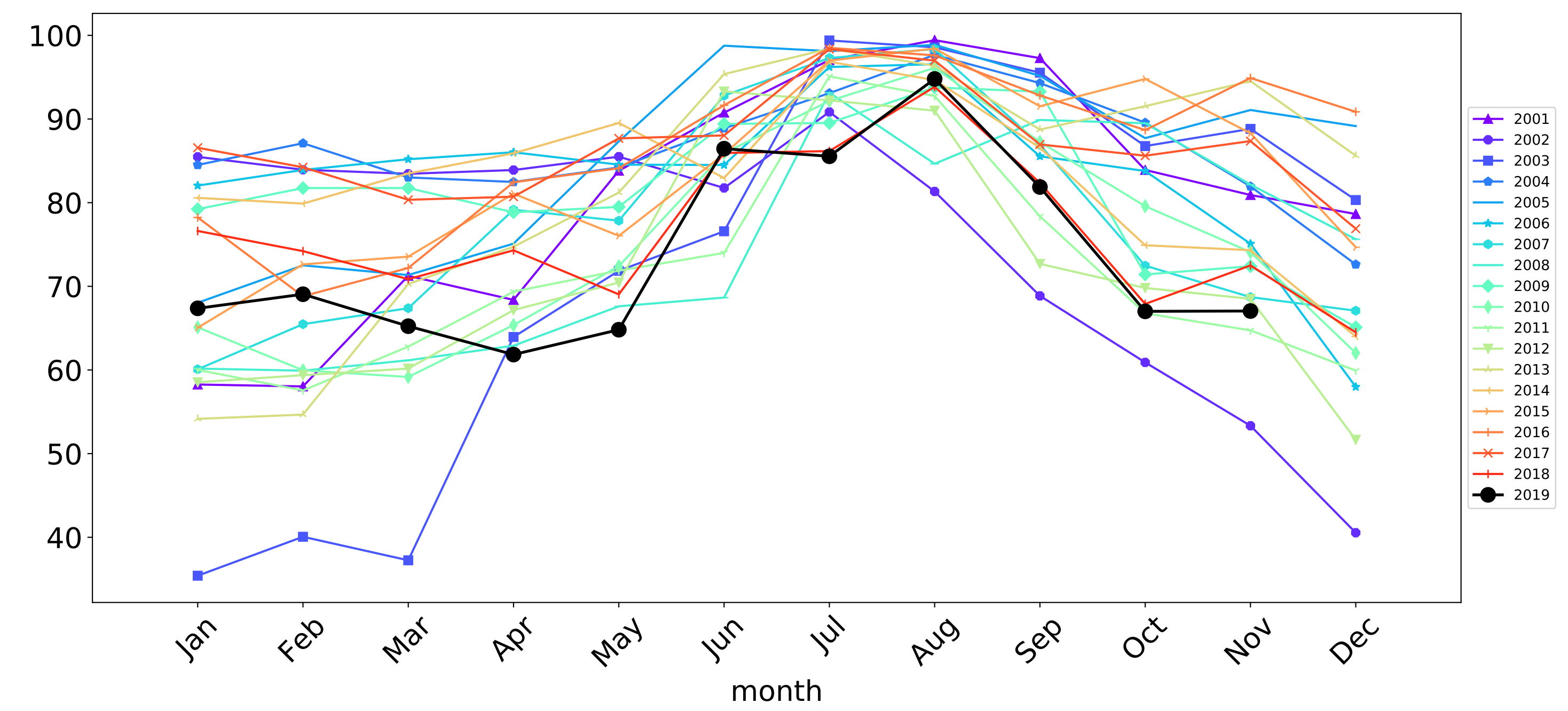

Wind erosion historical monthly area protected (Total Veg Cov >50%)

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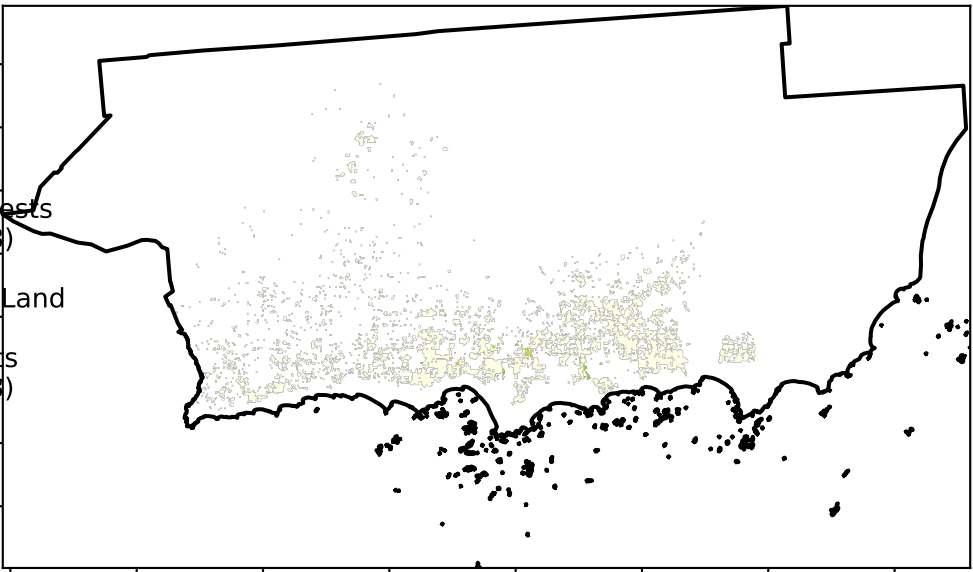

Water erosion historical monthly area protected (Total Veg Cov>70%)

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
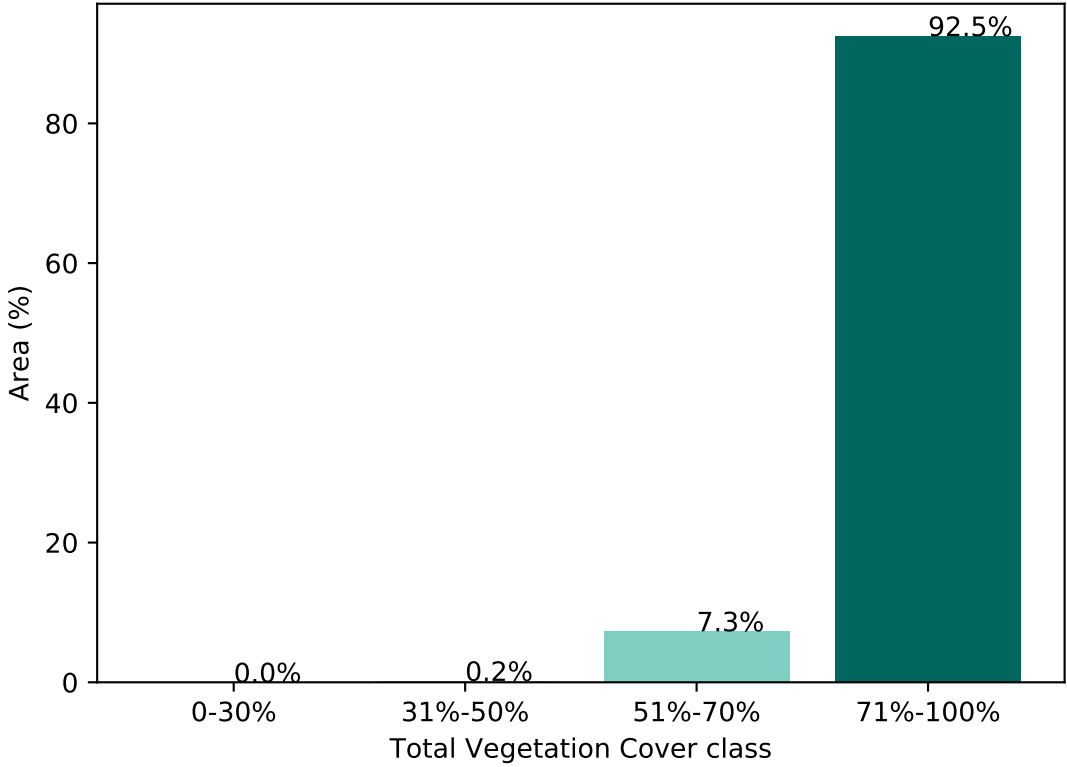
Proportion of each land class in area
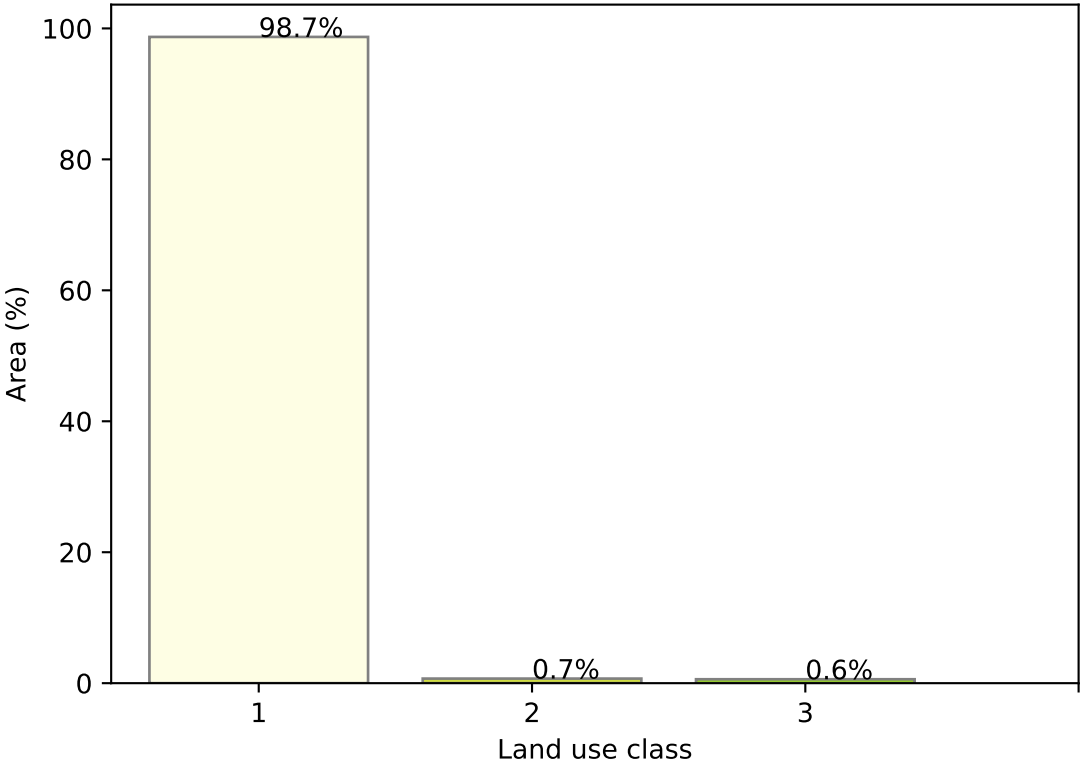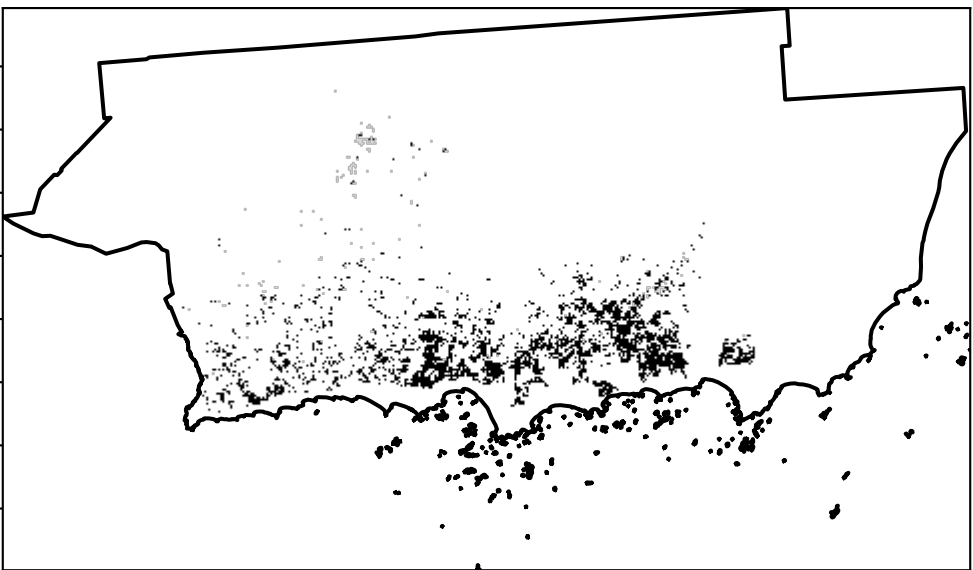

Total Vegetation Cover [%]
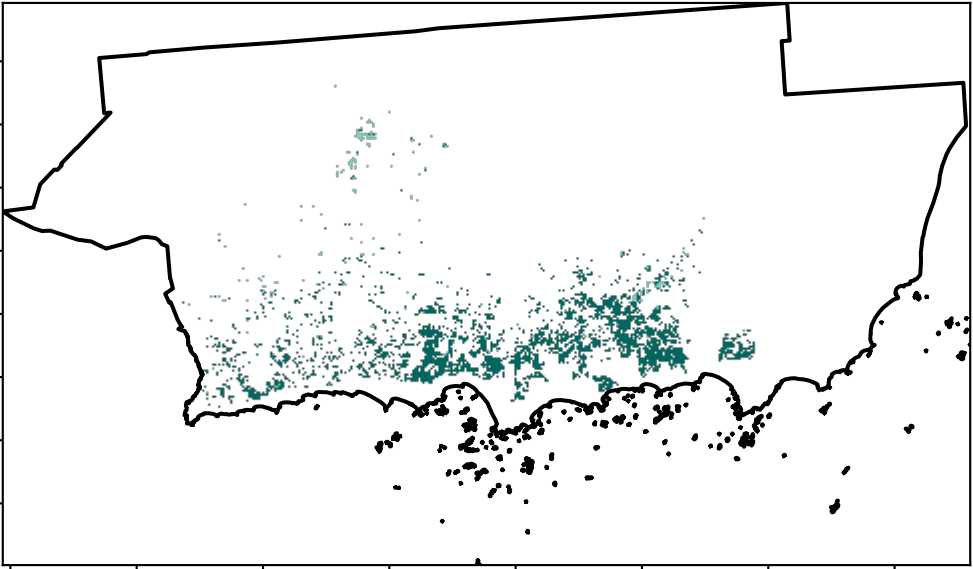
71%-100%
51%-70%
31%-50%
0-30%

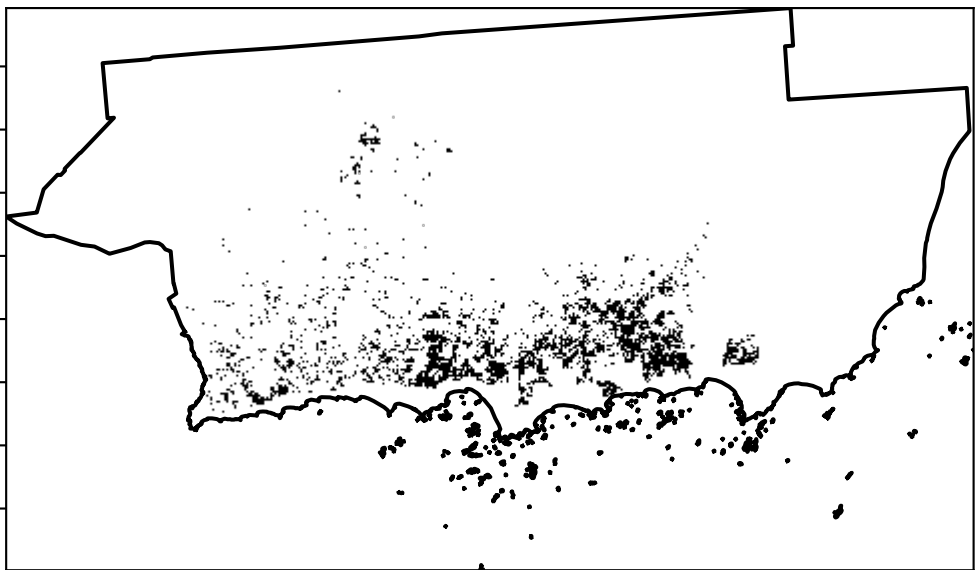### Proportion of vegetation cover class in area

% Area protected from water erosion (>70%)

Area not
protected
7.5% of
region
(14,486
ha)

Area
protected
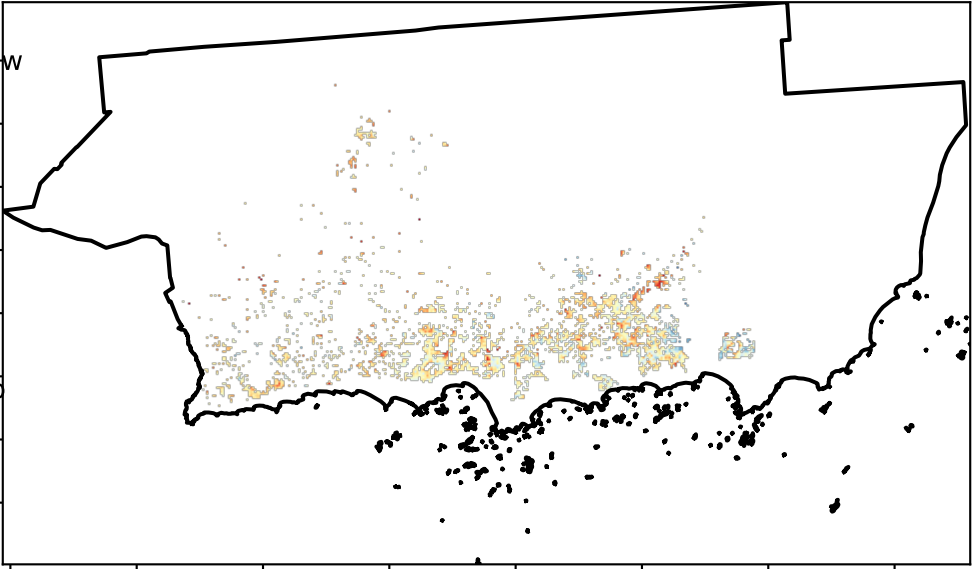92.5% of
region
(178,663
ha)

% Area protected from wind erosion (>50%)

Area not
protected
0.0% of
region (0
ha)

Area
protected
100.0% of
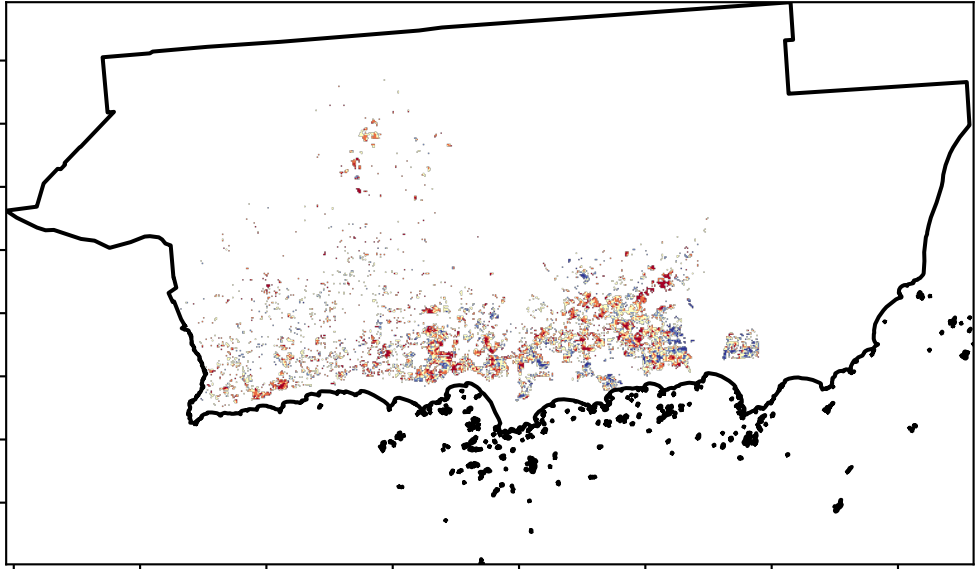region
(193,150
ha)

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

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%)
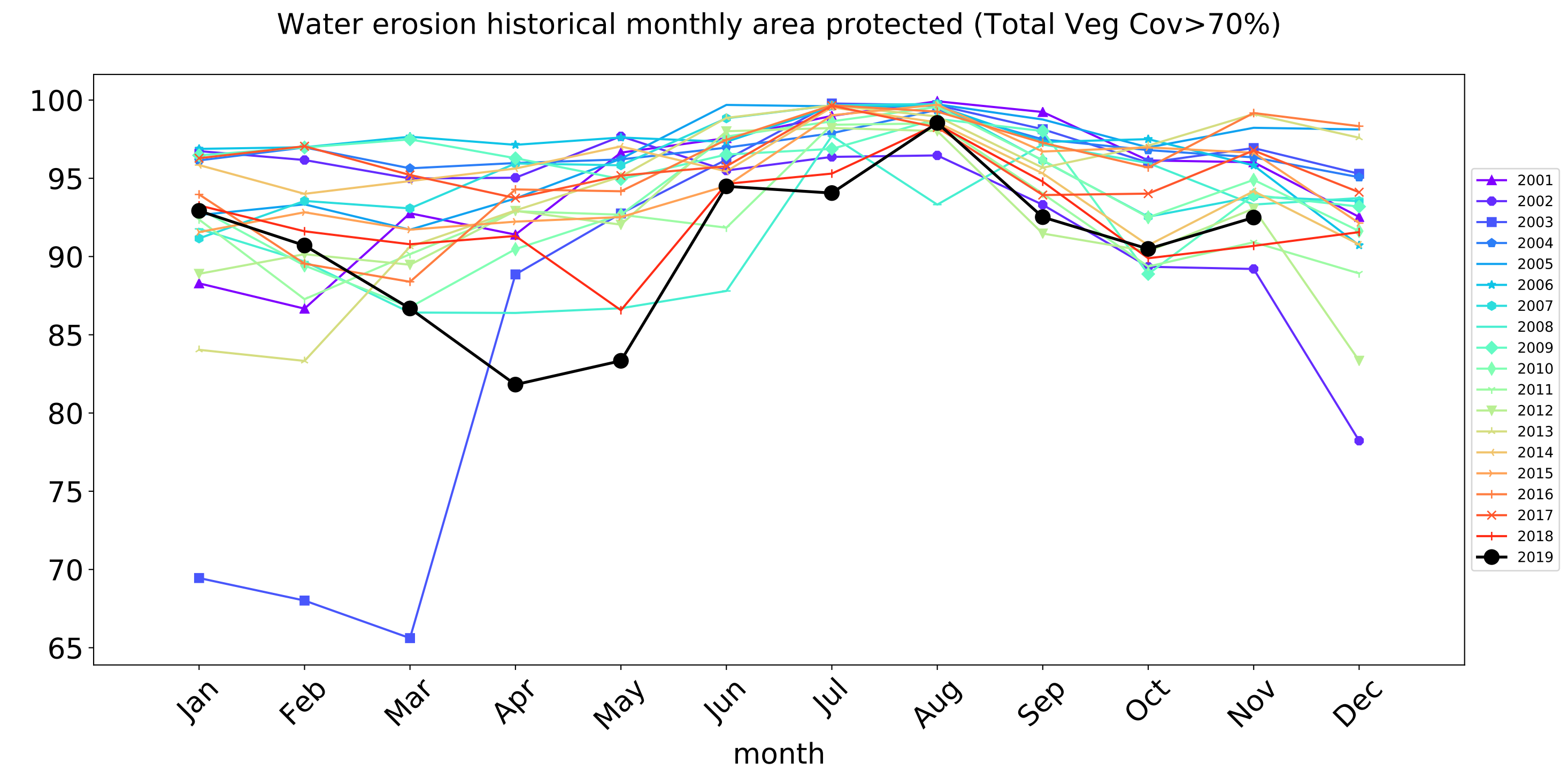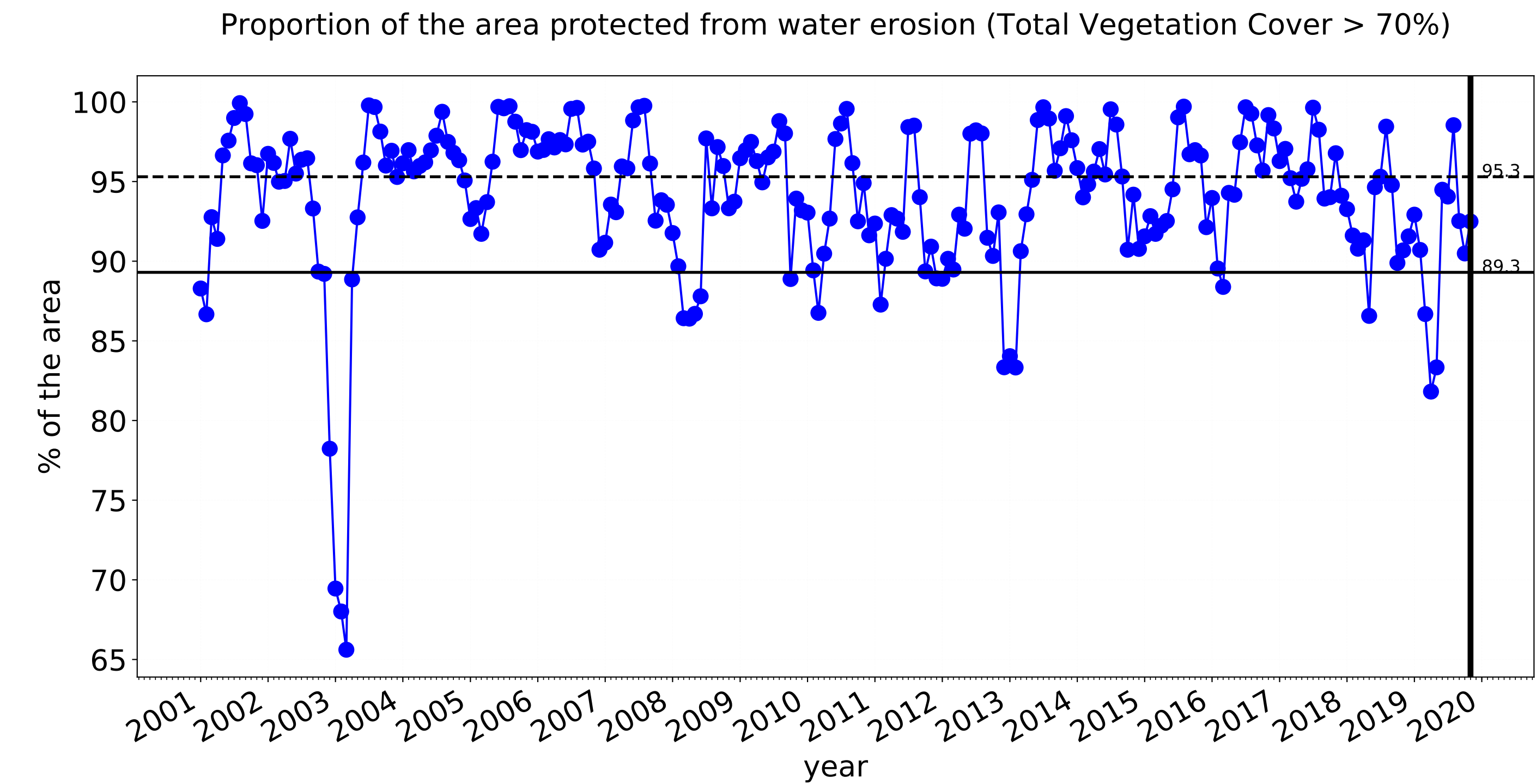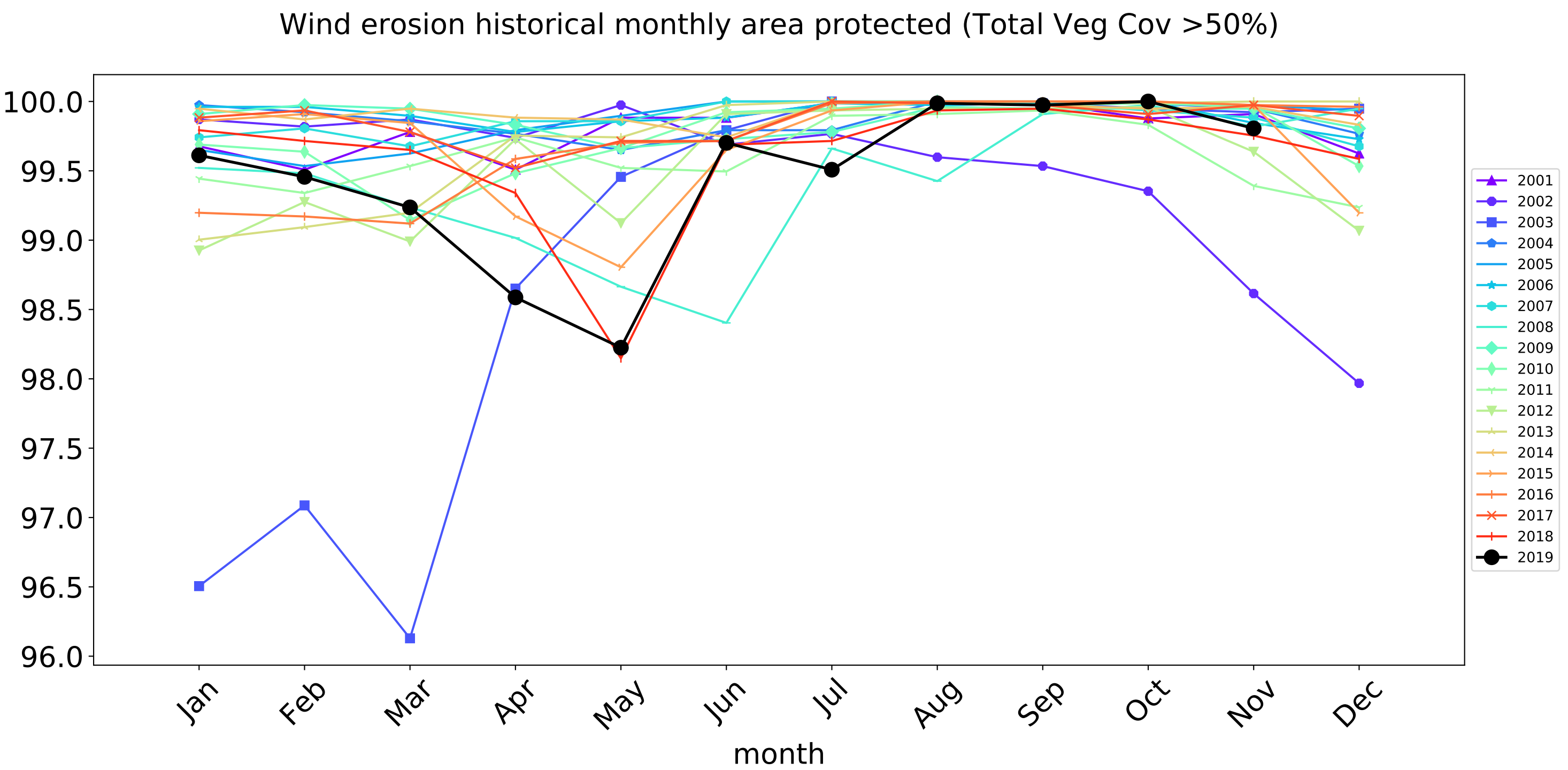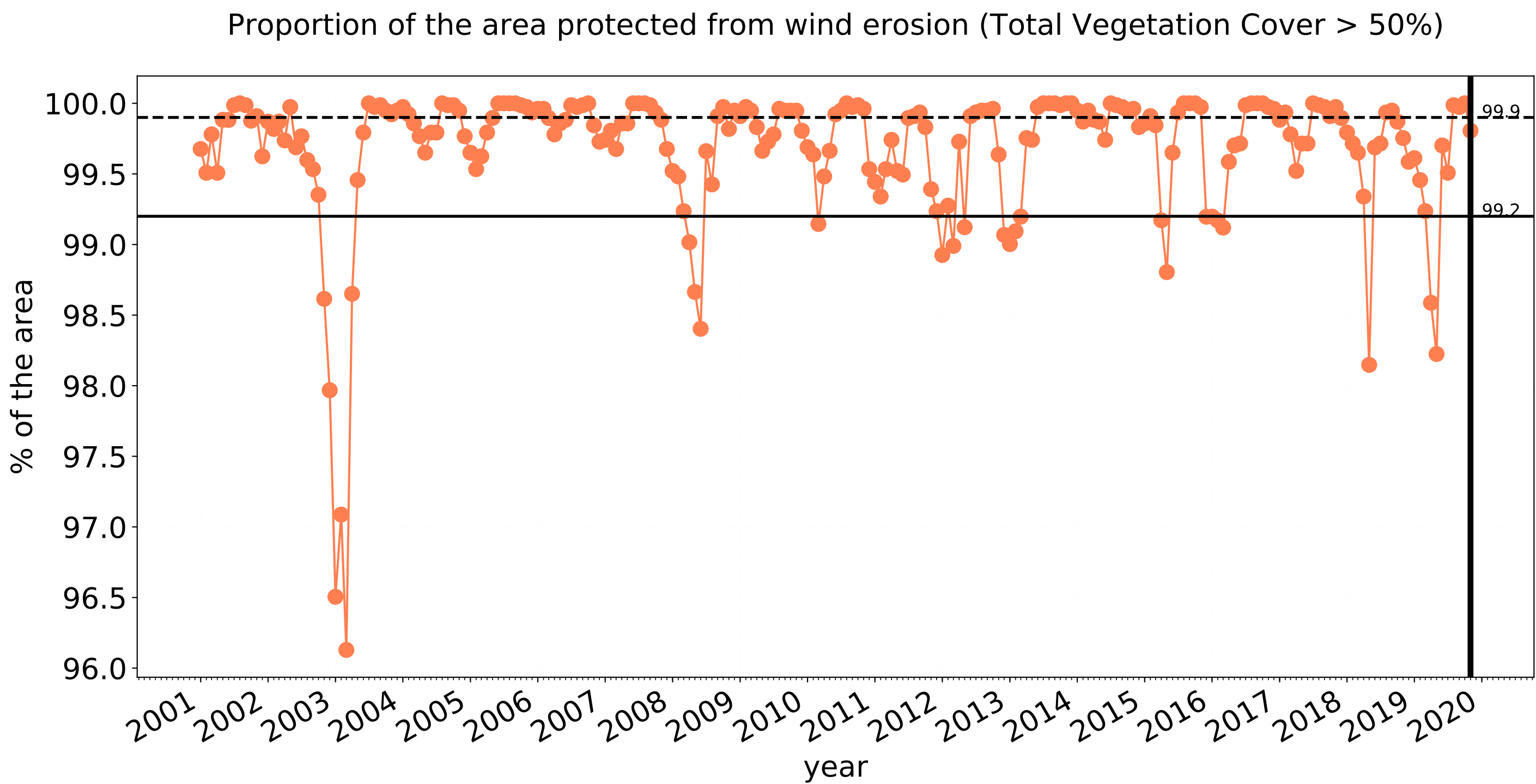
Grazing non forest

Land use and forest cover

1 Agriculture - Grazing - Non forest

Total Vegetation Cover [%]

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

Proportion of vegetation cover class in area

92.4%

7.4%

0.0% 0.2%

Area (%)

Total Vegetation Cover class

0-30%   31%-50%   51%-70%   71%-100%
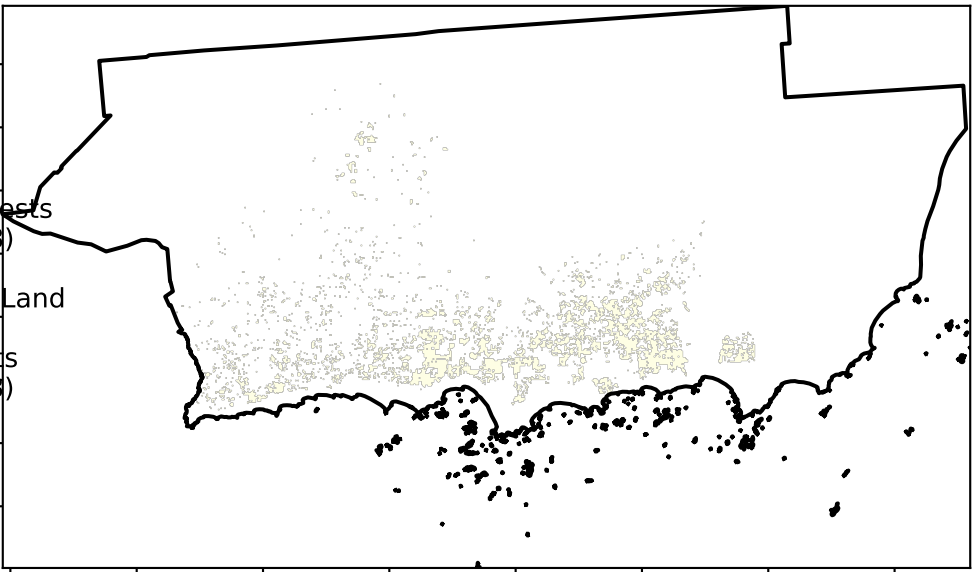
% Area protected from water erosion (>70%)

Area not protected 7.6% of region (14,489 ha)

Area protected 92.4% of region (176,160 ha)

% Area protected from wind erosion (>50%)
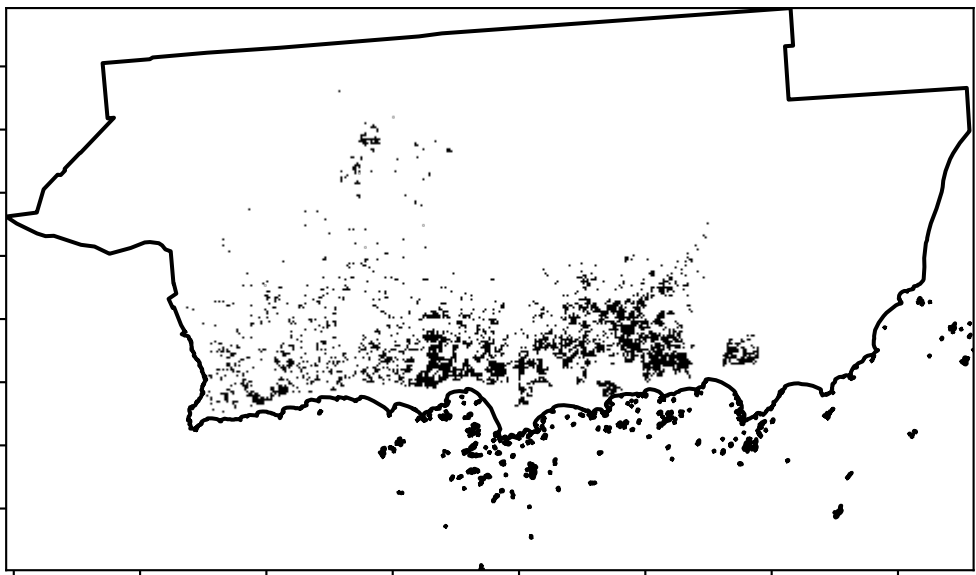
Area not protected 0.0% of region (0 ha)

Area protected 100.0% of region (190,650 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

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%)

Cropping

Land use and forest cover

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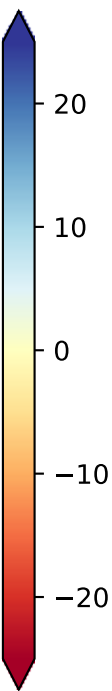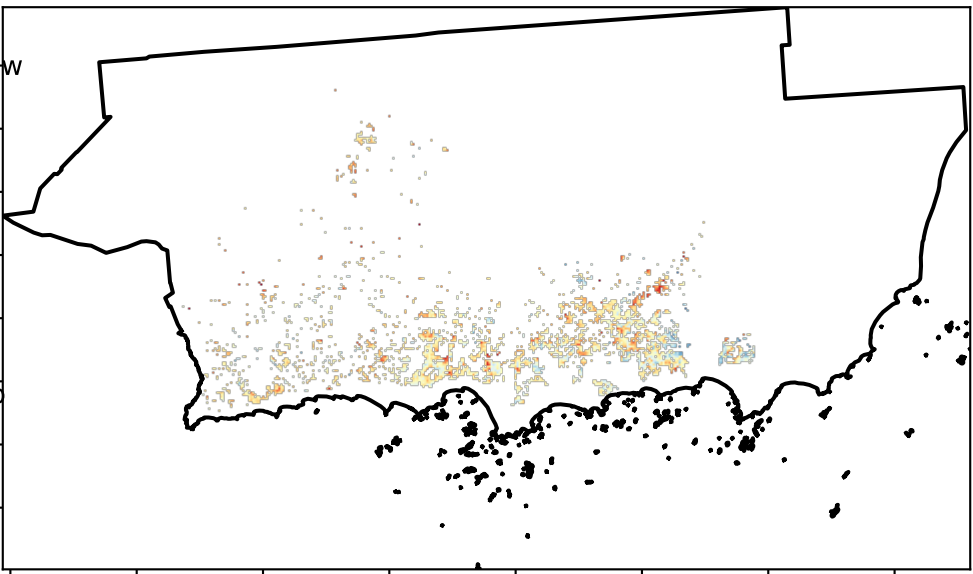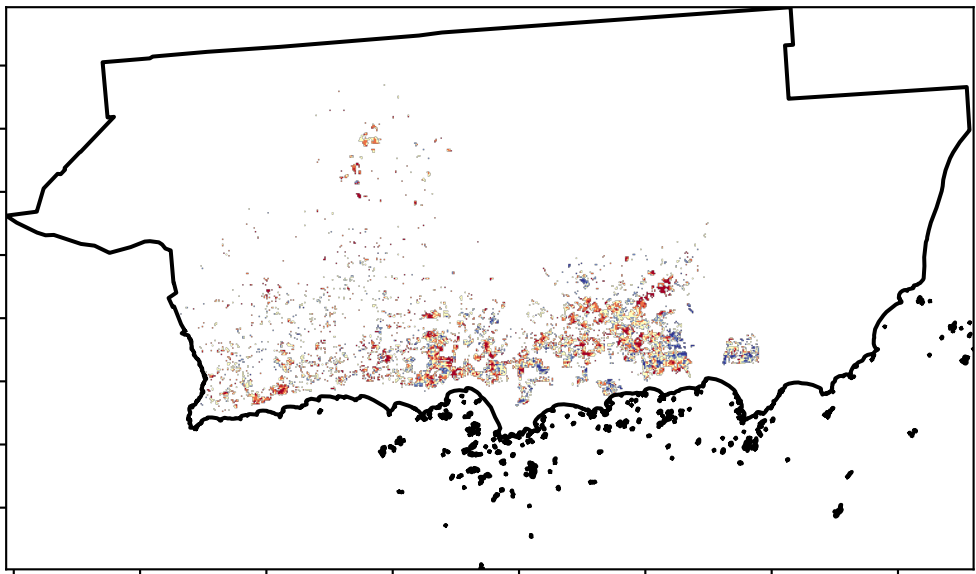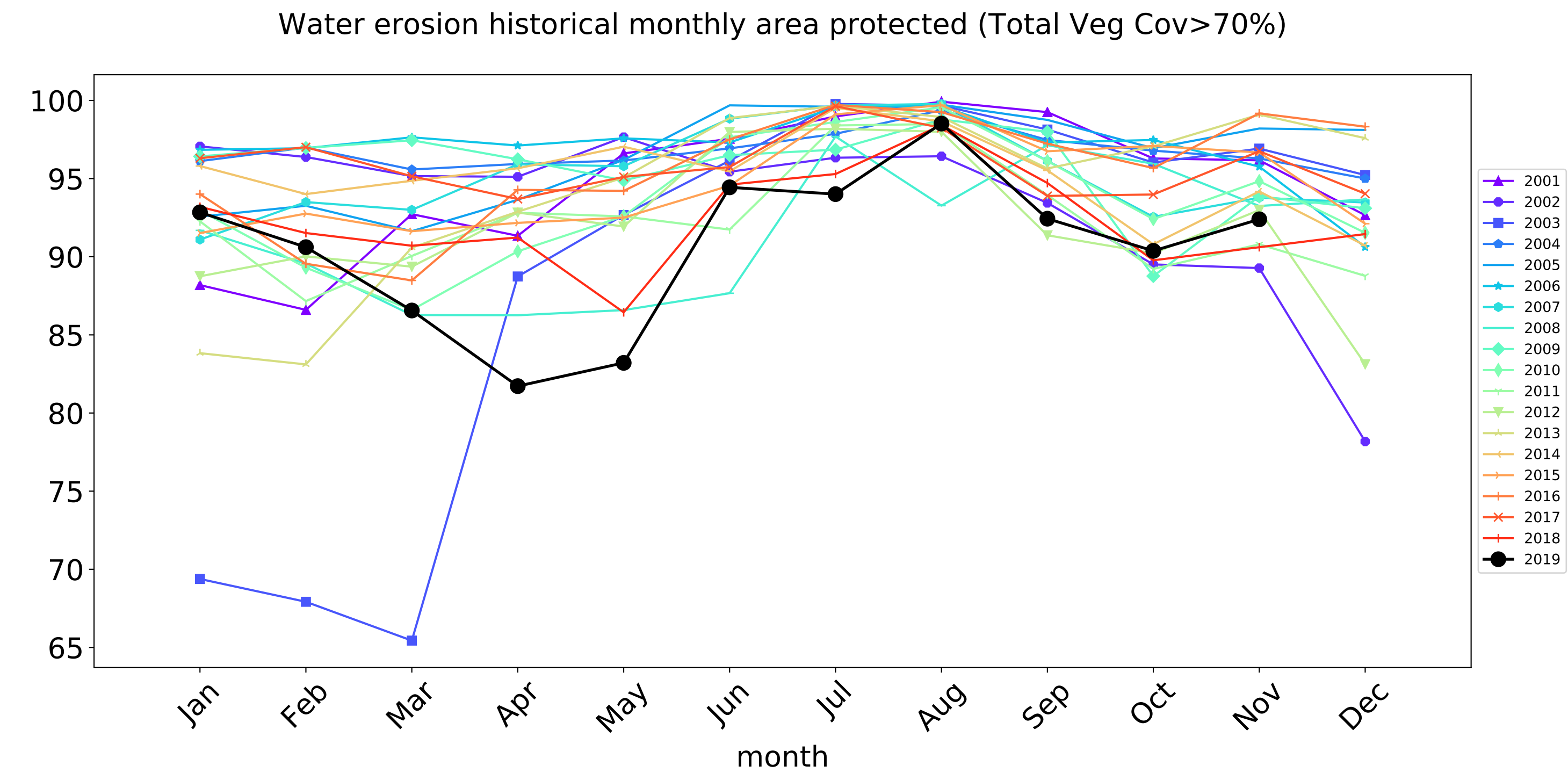Land Use and Forests
of Australia (2018)
Derived from
Catchment Scale Land
Use of Australia
(2018) and Forests
of Australia (2018)

1 Agriculture - Cropping - Non-irrigated

Total Vegetation Cover [%]

71%-100%

51%-70%

31%-50%

0-30%

Proportion of vegetation cover class in area

62.1%

34.8%

3.0%

0.1%

Area (%)

Total Vegetation Cover class

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

% Area protected from water erosion (>70%)

Area not
protected
37.9% of
region
(378,469
ha)

Area
protected
62.1% of
region
(620,130
ha)

% Area protected from wind erosion (>50%)

Area not
protected
3.0% of
region
(29,958
ha)

Area
protected
97.0% of
region
(968,642
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
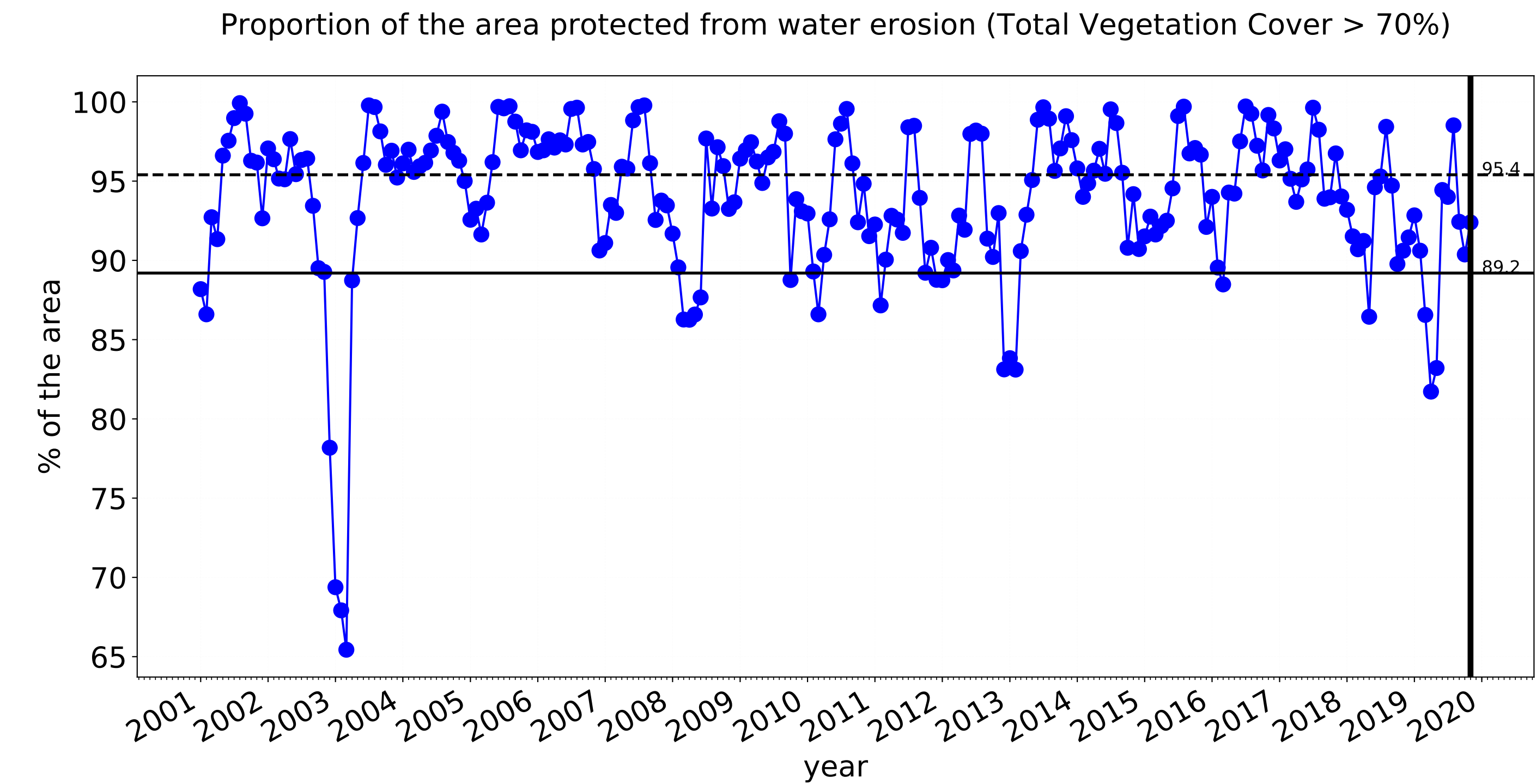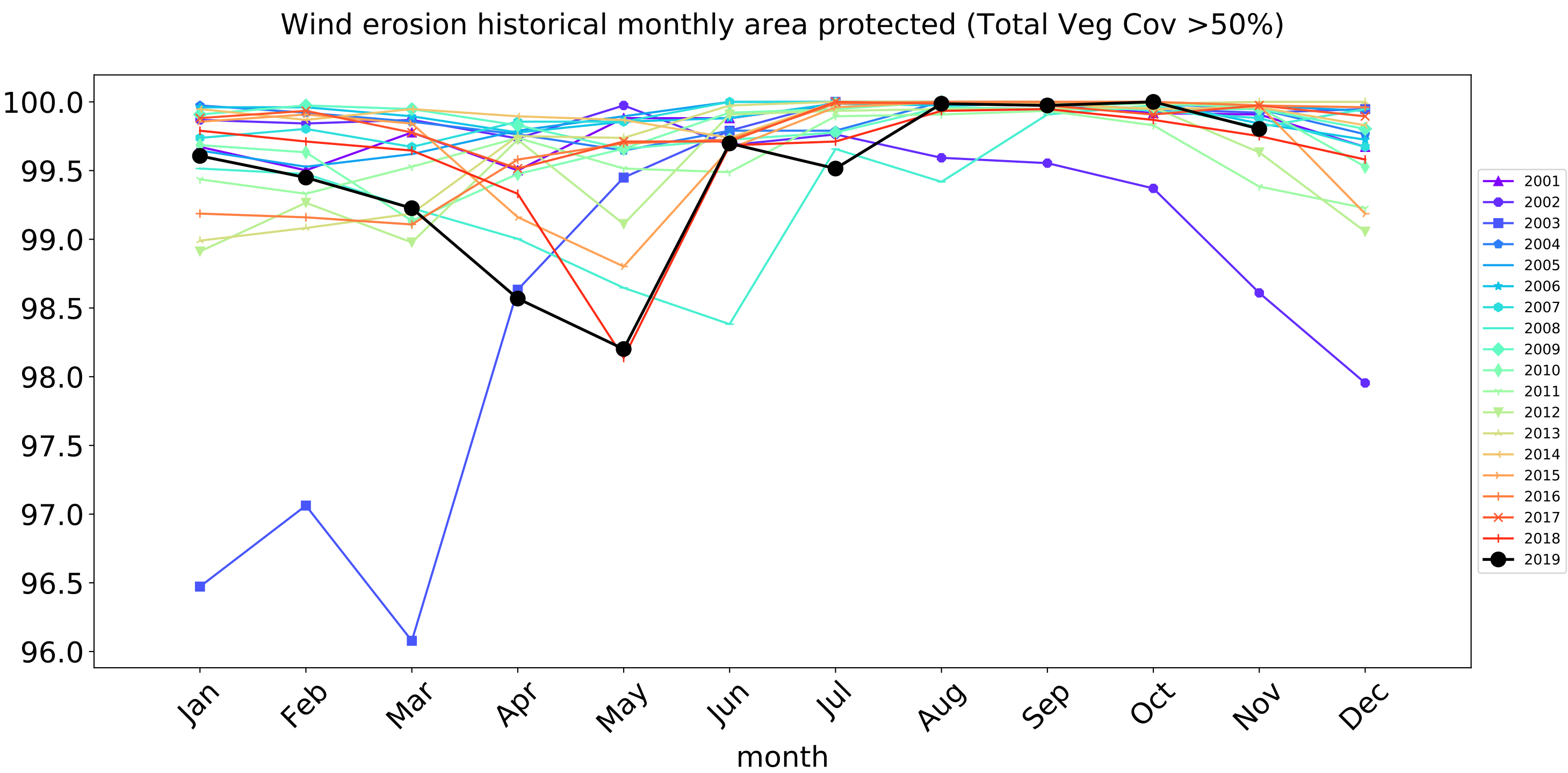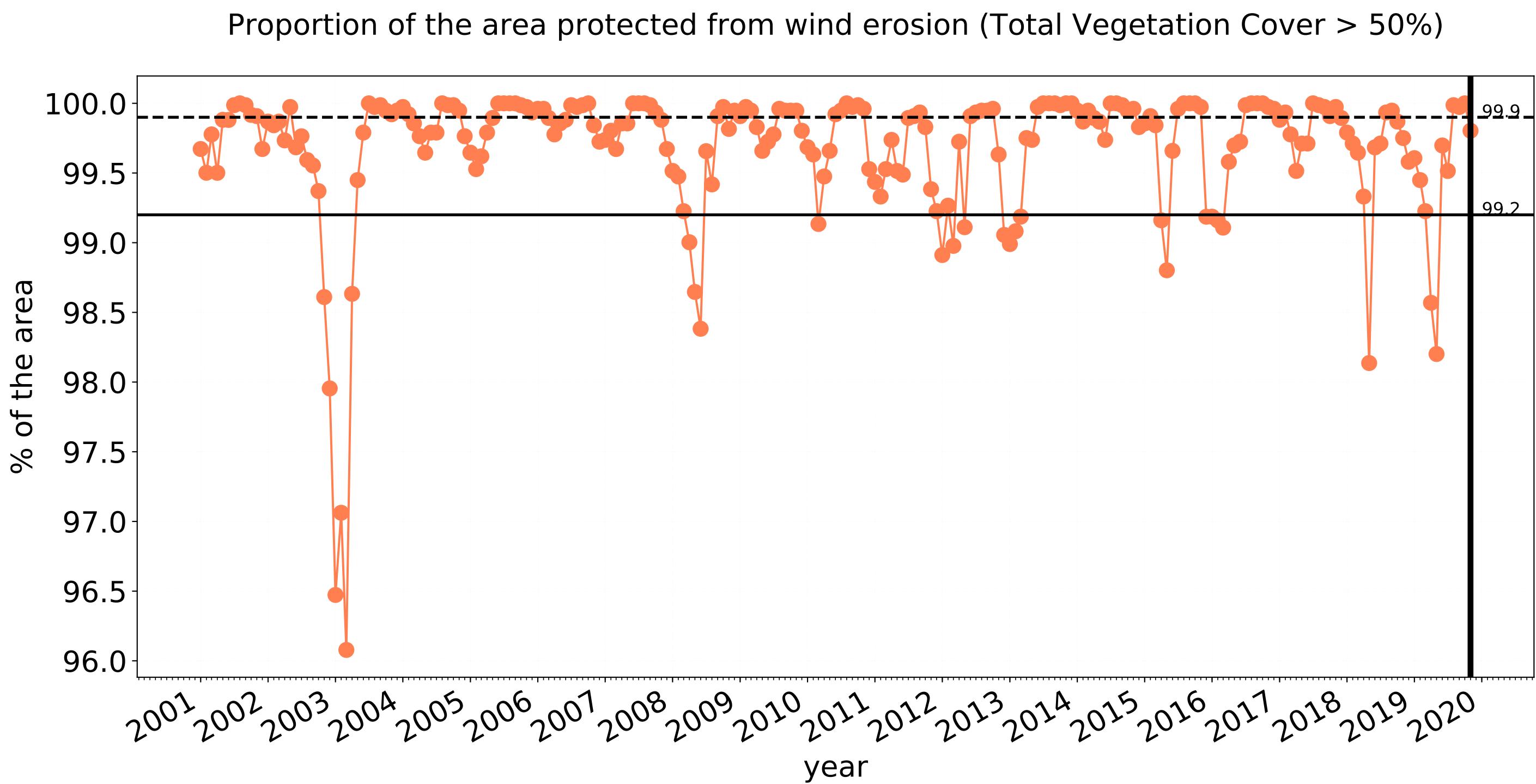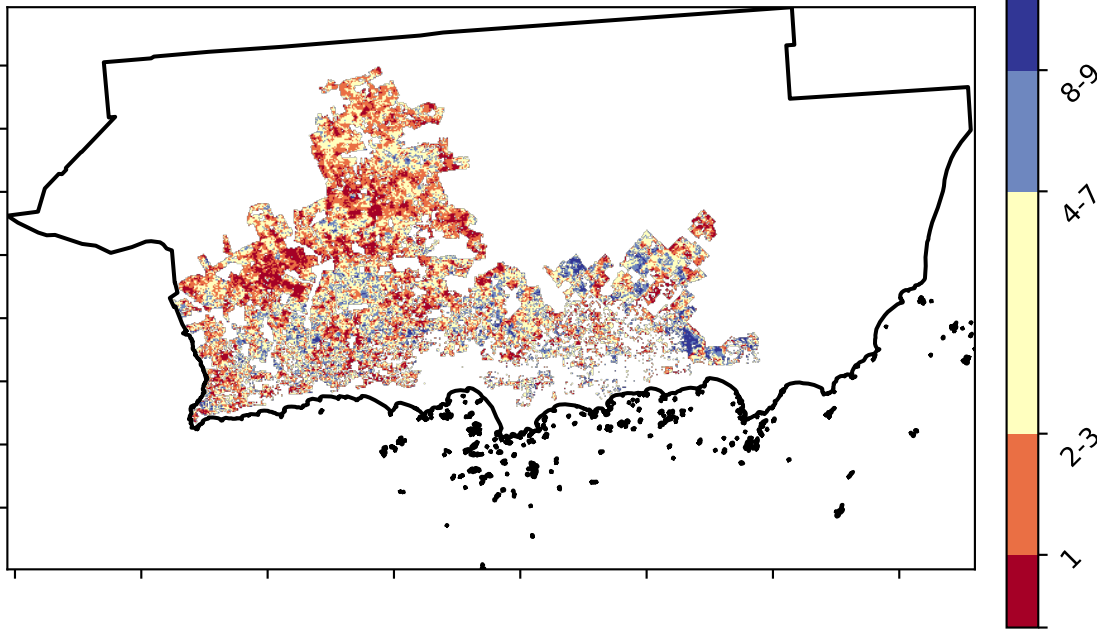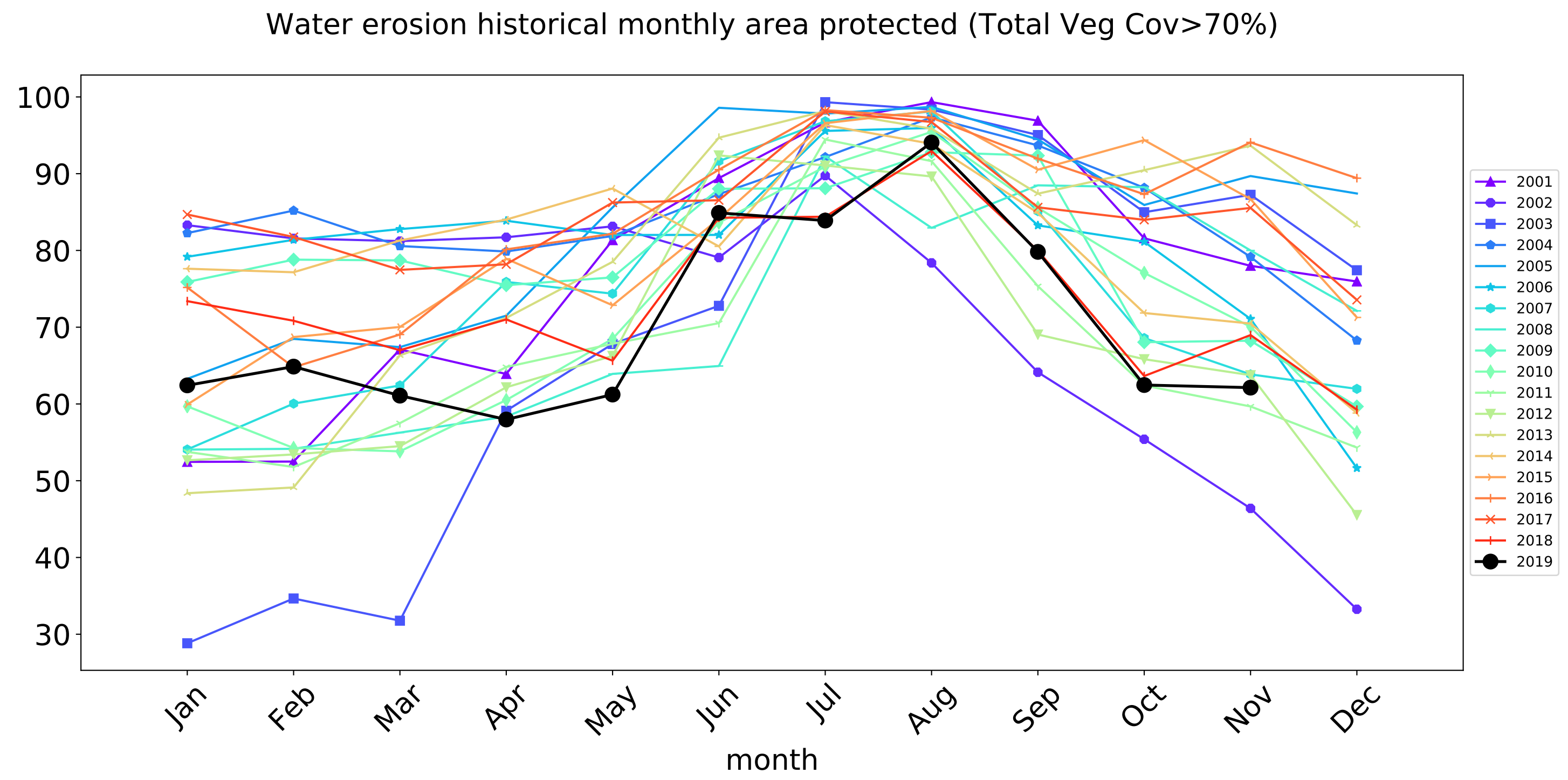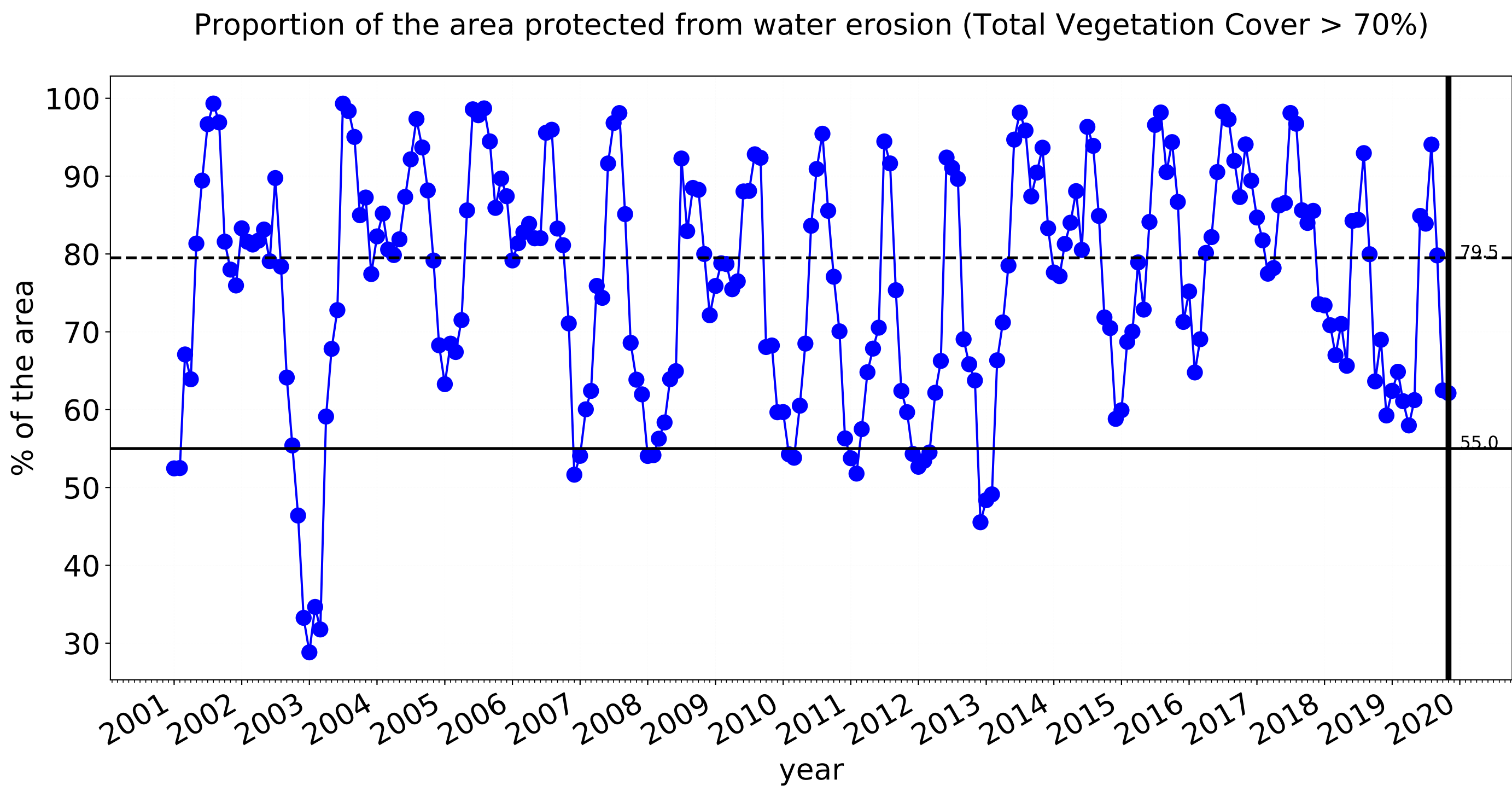records for that month
of the map using baseline
from 2001 to 2019.

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%)

Production native forests and plantation forests

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 Production native forests and plantation forests

Total Vegetation Cover [%]

71%-100%

51%-70%

31%-50%

0-30%

Proportion of vegetation cover class in area

Area (%)

Total Vegetation Cover class

0.0%   0.2%   7.0%   92.8%

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

% Area protected from water erosion (>70%)

Area not protected 7.2% of region (4,035 ha)

Area protected 92.8% of region (52,014 ha)

% Area protected from wind erosion (>50%)

Area not protected 0.0% of region (0 ha)

Area protected 100.0% of region (56,050 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.
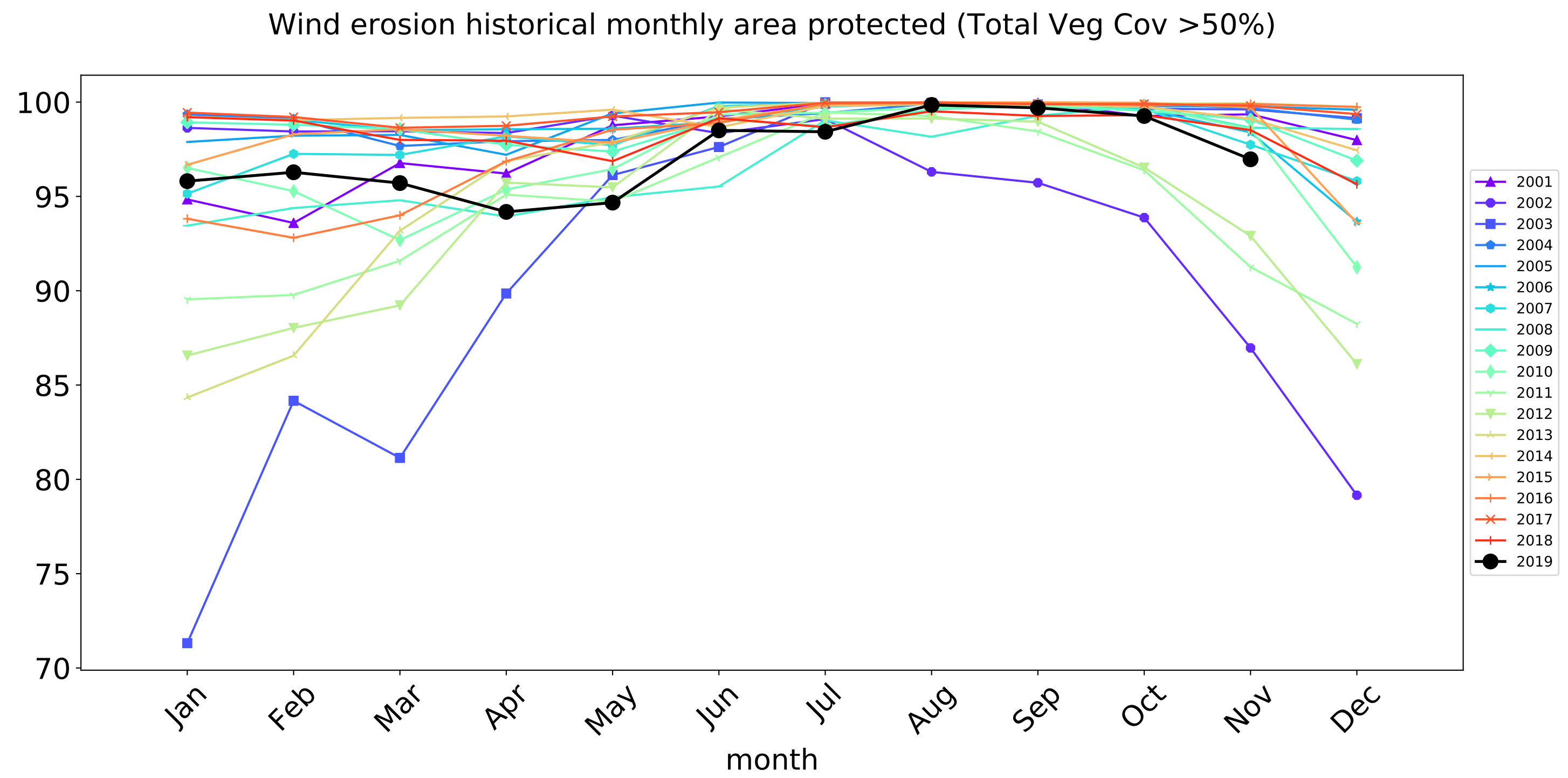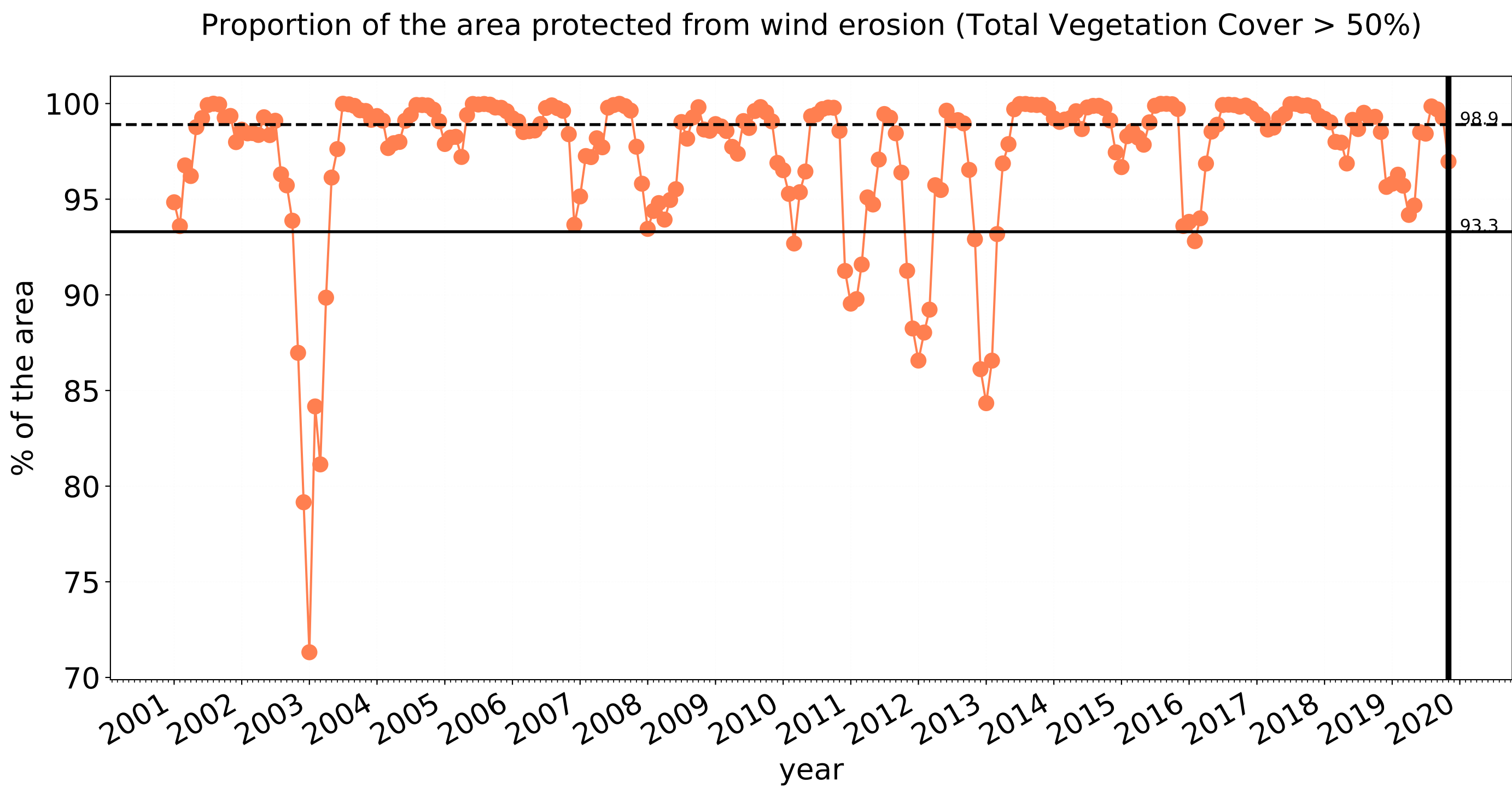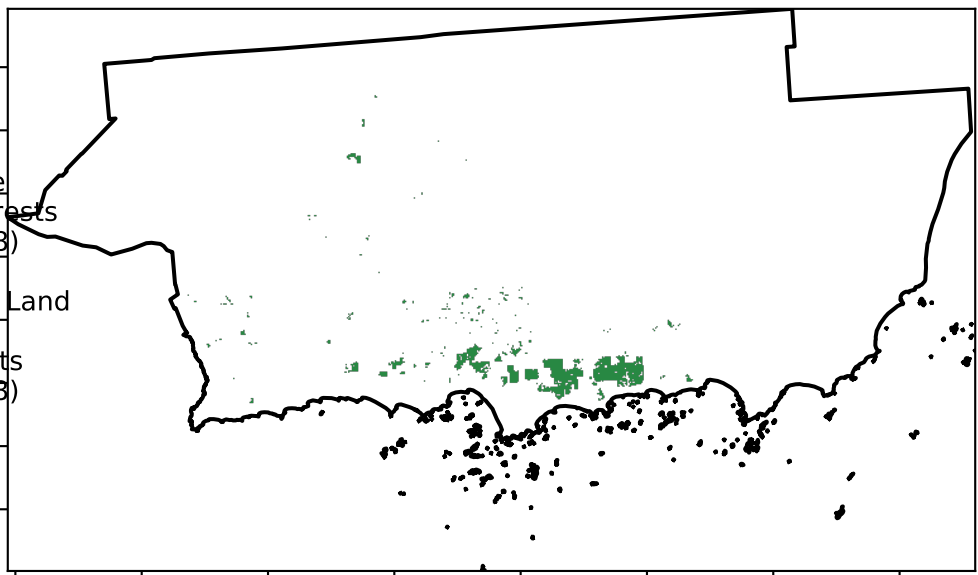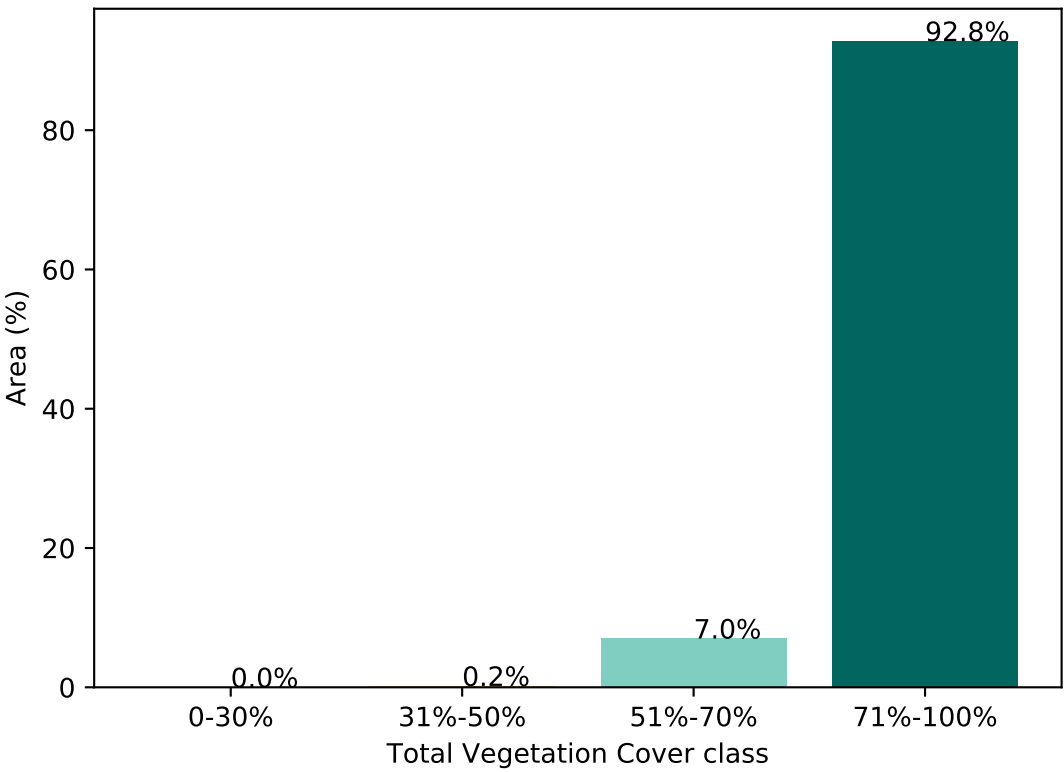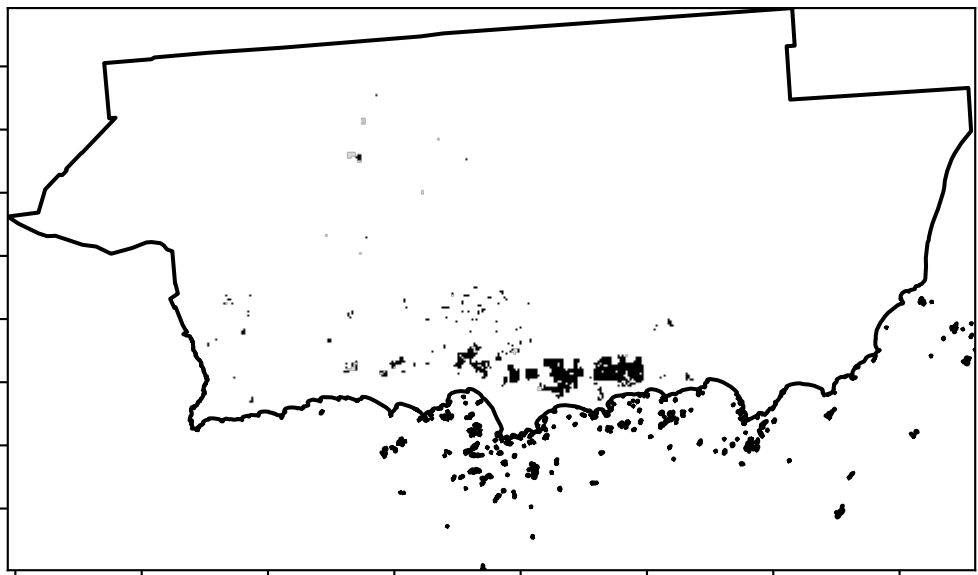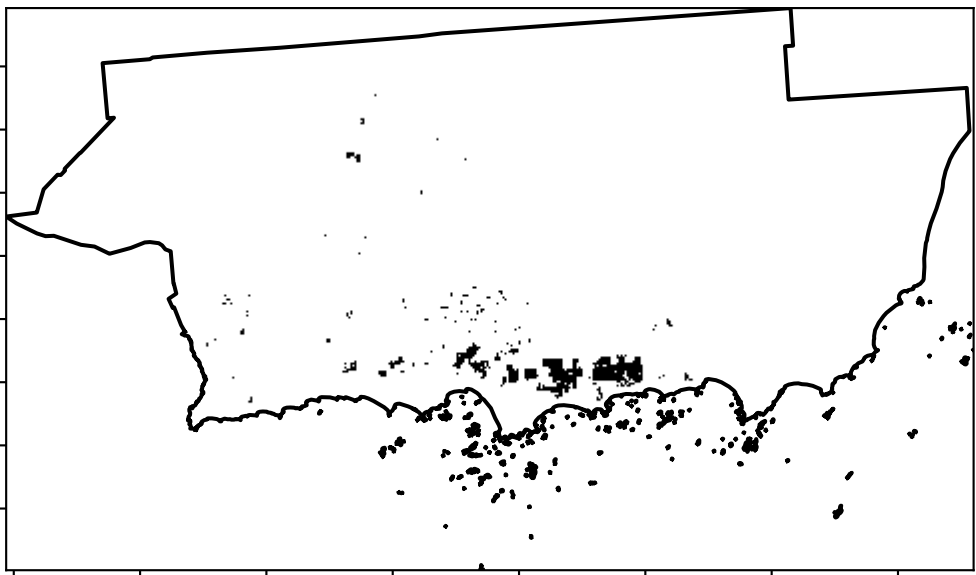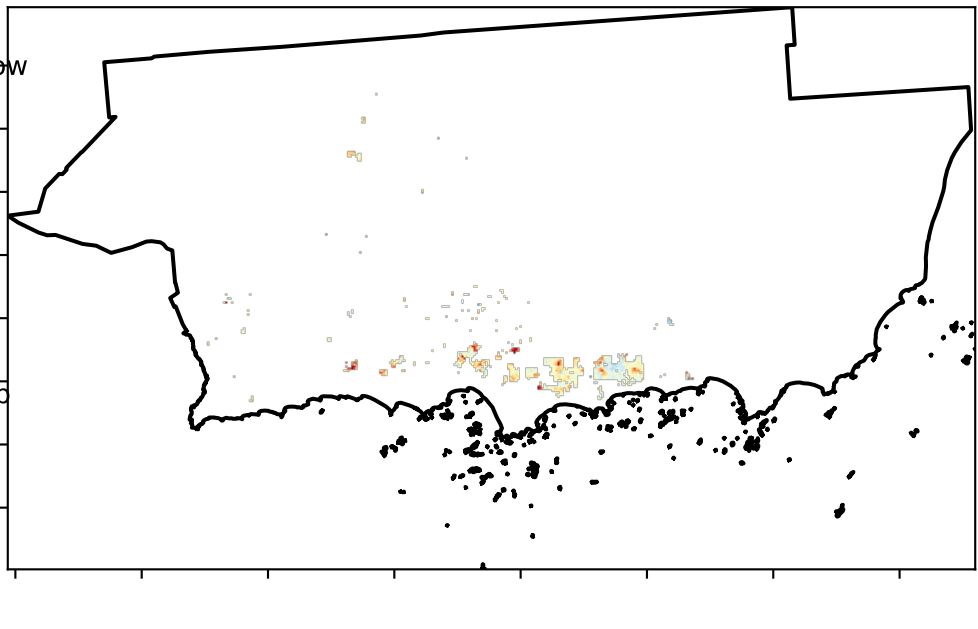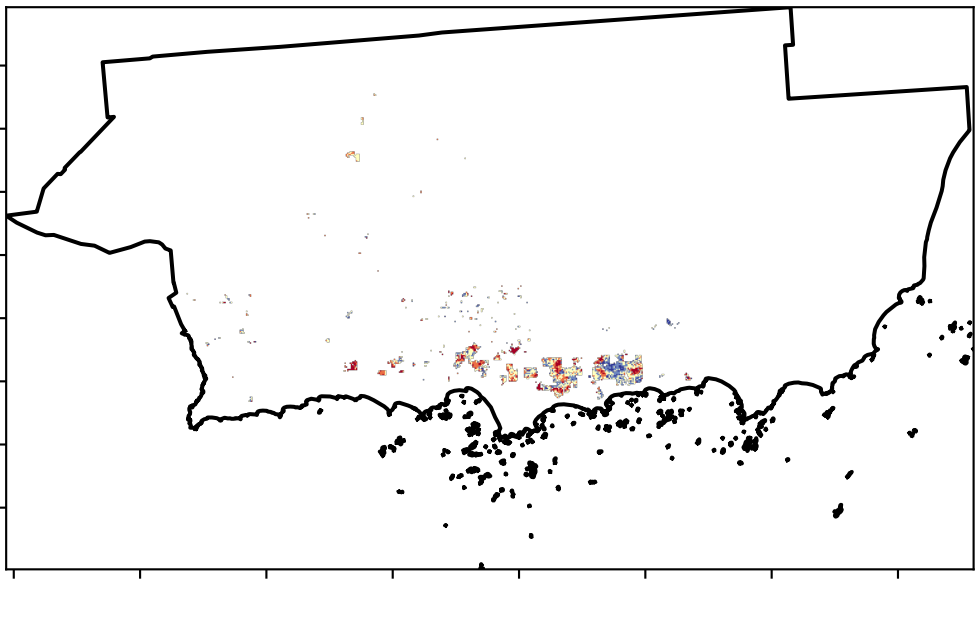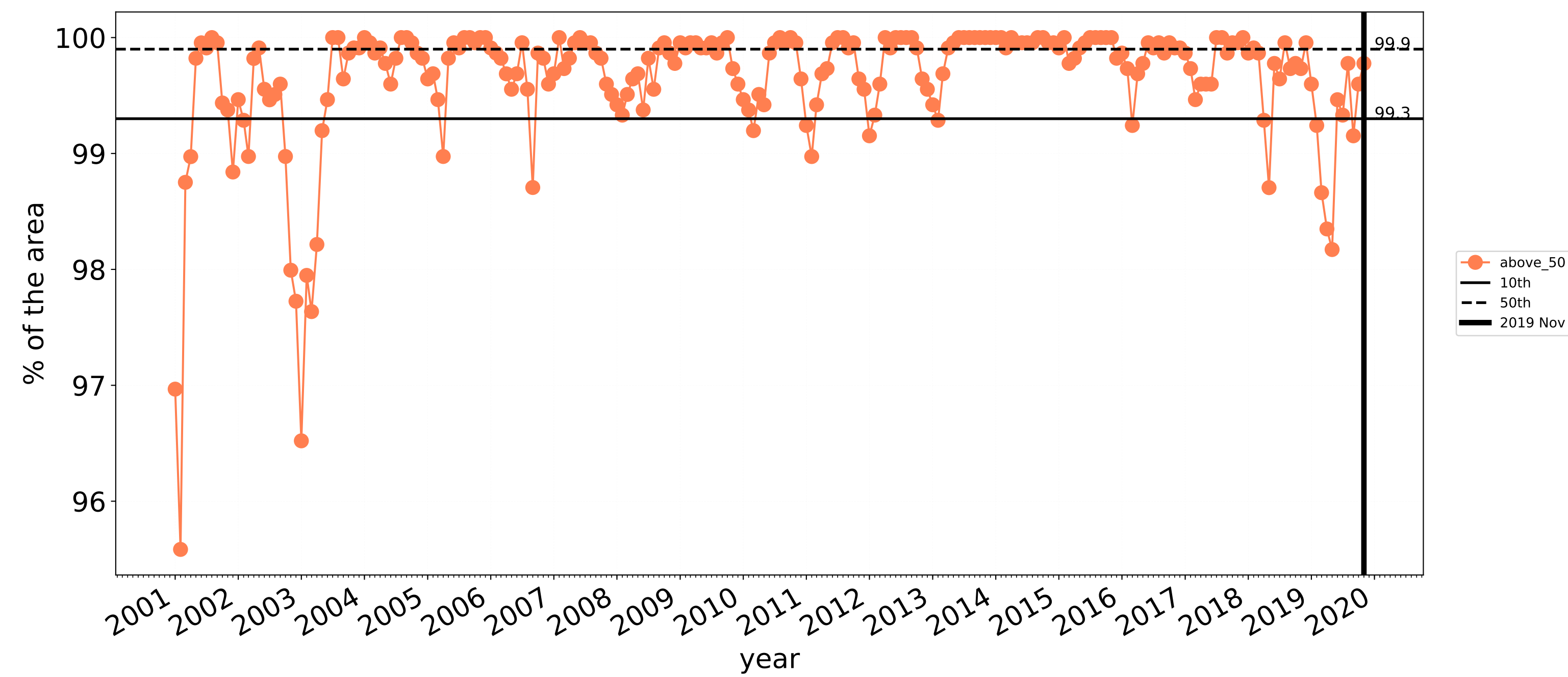
10

8-9

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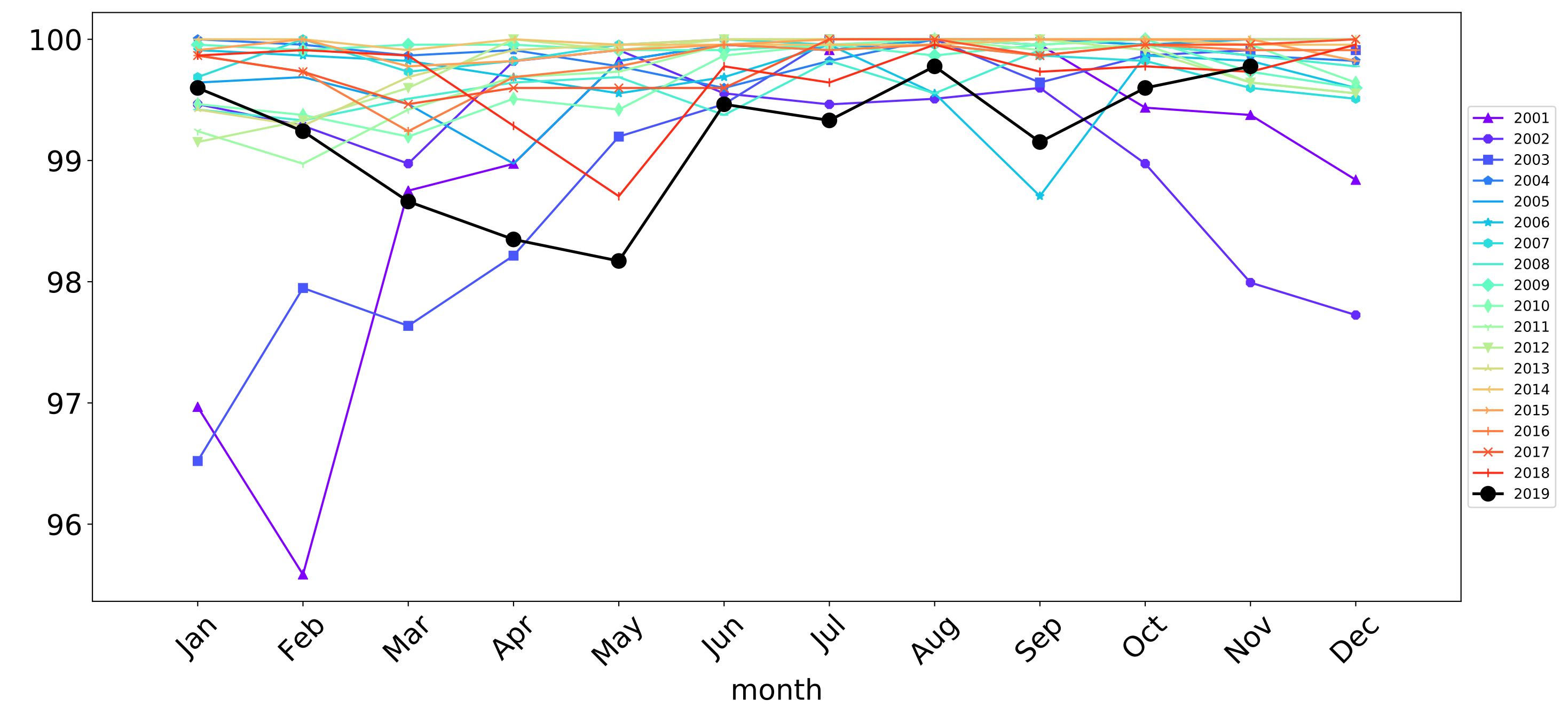## Production native forests and plantation forests timeseries
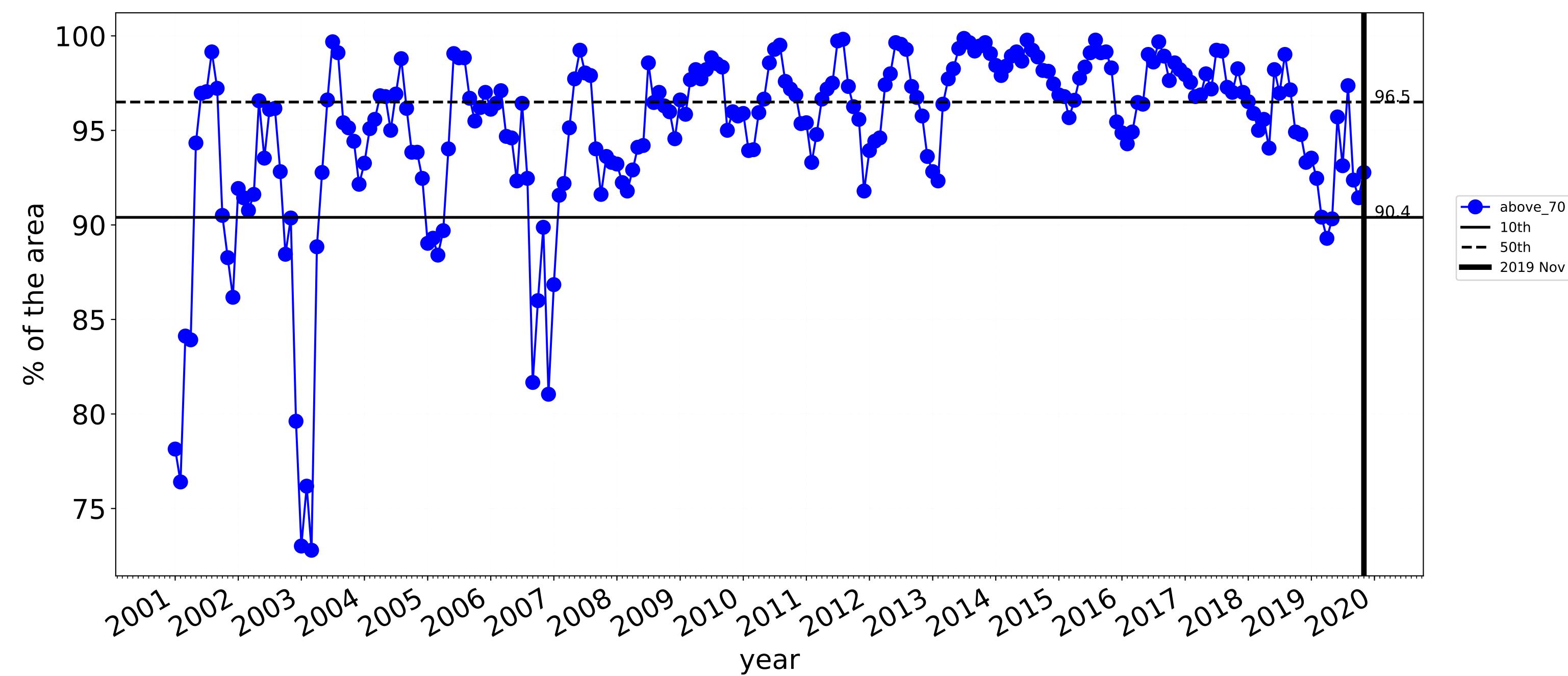

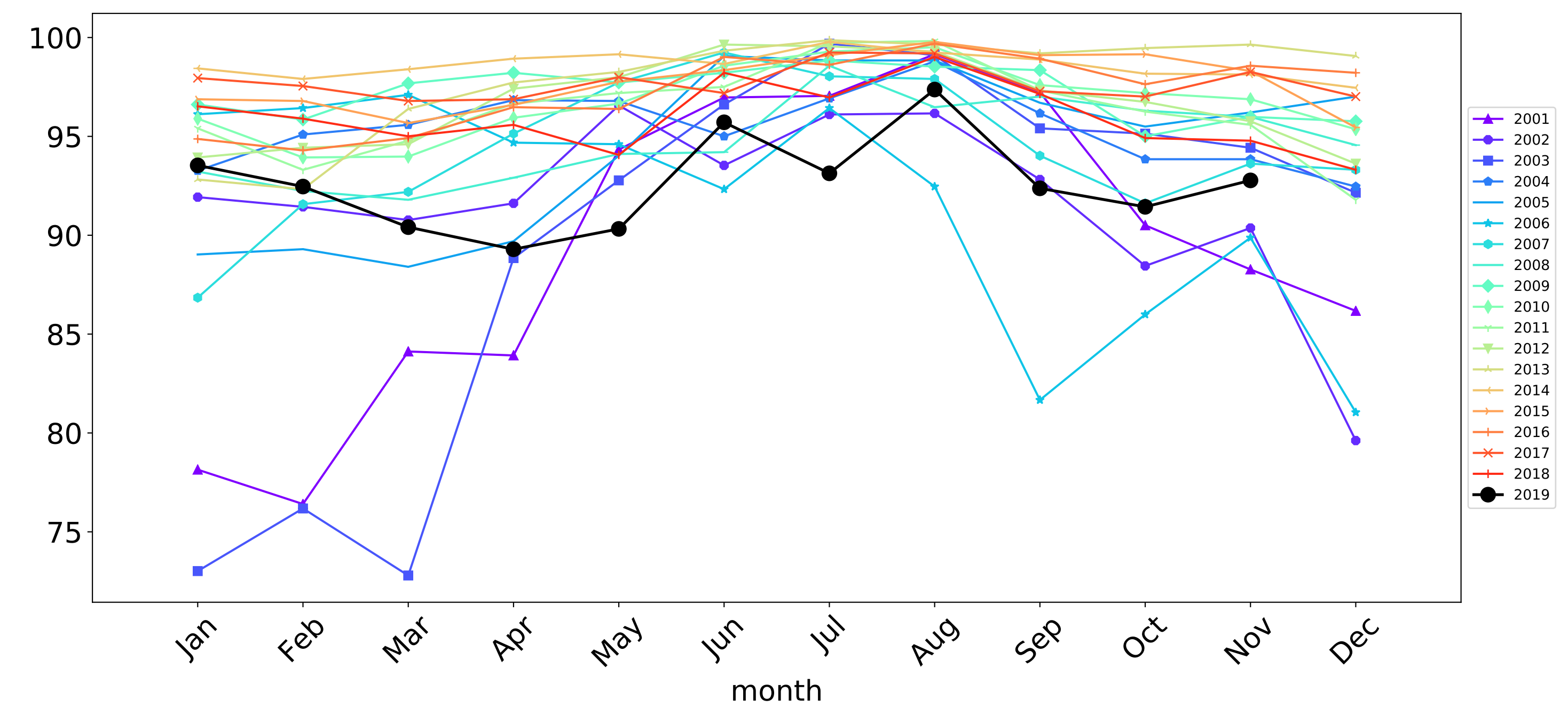Proportion of the area protected from wind erosion (Total Vegetation Cover > 50%)

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%)

Esperance_(S) (4,407,175 ha and no data 70,725 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	4,407,175	98.7% 4,351,975	94.9% 4,181,775	77.4% 3,410,900	43.1% 1,900,925	5.4% 239,350	2.1% 94,750
Conservation and natural environments	3,028,000	98.2% 2,973,700	93.7% 2,835,925	80.7% 2,443,425	43.7% 1,322,625	2.8% 85,775	0.8% 23,500
Conservation and natural environments non forest	914,100	97.2% 888,550	93.6% 855,900	81.4% 744,300	41.2% 376,575	6.0% 55,000	1.9% 16,950
Conservation and natural environments Woodland forest	2,113,250	98.6% 2,084,500	93.7% 1,979,375	80.4% 1,698,525	44.7% 945,525	1.5% 30,725	0.3% 6,550
Agriculture	1,191,750	100.0% 1,191,400	97.4% 1,161,100	67.0% 799,050	37.2% 443,750	6.8% 81,625	2.0% 23,550
Grazing	193,150	100.0% 193,150	99.8% 192,775	92.5% 178,650	68.8% 132,950	19.2% 37,150	6.1% 11,775
Grazing non forest	190,650	100.0% 190,650	99.8% 190,275	92.4% 176,150	68.5% 130,675	19.1% 36,400	6.1% 11,550
Cropping	998,600	100.0% 998,250	97.0% 968,325	62.1% 620,400	31.1% 310,800	4.5% 44,475	1.2% 11,775
Production native forests and plantation forests	56,050	100.0% 56,050	99.8% 55,925	92.8% 52,000	75.9% 42,550	24.9% 13,975	1.9% 1,075