# Total vegetation cover soil protection Region: NRM Mackay Whitsunday QLD

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













**Date: January 2008** 

# **Vegetation Cover Jan 2008**

#### Land use and forest cover

Catchment Scale

of Australia (2018)

(2018) and Forests

of Australia (2018)

Anomaly show how many percetage points each pixel is from

the mean. That

lower than the

pixel. The mean

month of the map

mean of that

is only for the

using baseline from 2001 to

2019.

is, red pixels are about 20%

Derived from

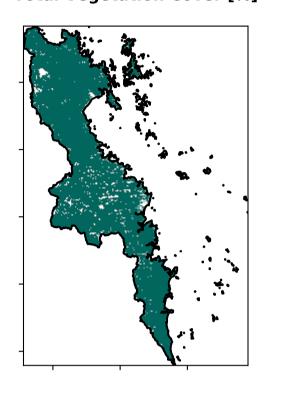
Use of Australia

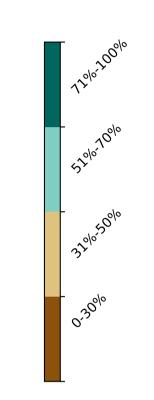
Land Use and Forests

Catchment Scale Land

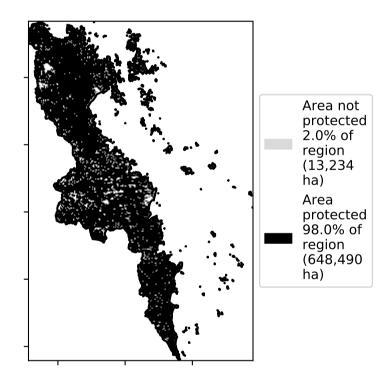
#### Legend with land class forest cover and number, i.e. Forests is 12 1 Conservation and natural environments -2 Conservation and natural environments -3 Conservation and natural environments -Non-Woodland forest 4 Agriculture - Grazing - Non-forest 5 Agriculture - Grazing - Woodland forest 6 Agriculture - 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 13 Other uses

# **Total Vegetation Cover [%]**

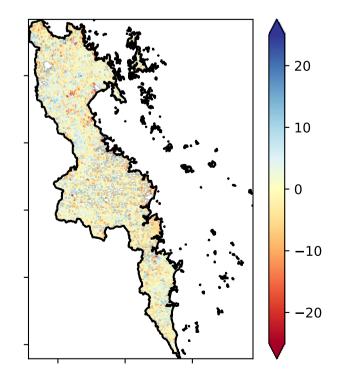




#### % Area protected from water erosion (>70%)

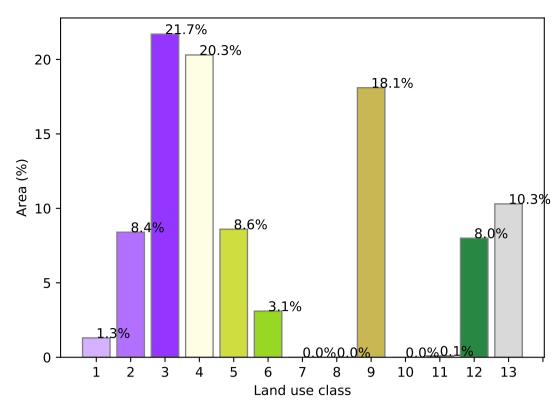


#### **Total Vegetation Cover Anomaly [%]**

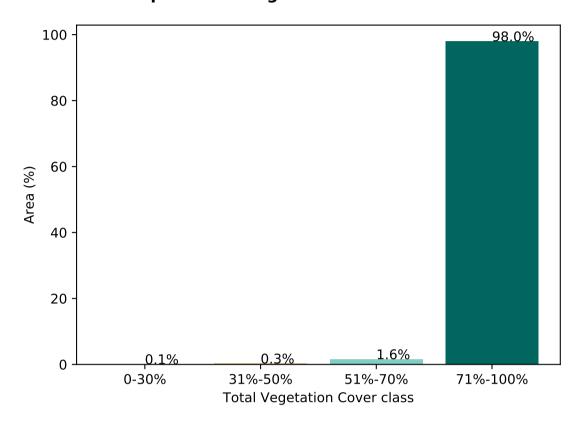


pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of the map using baseline from 2001 to 2019.

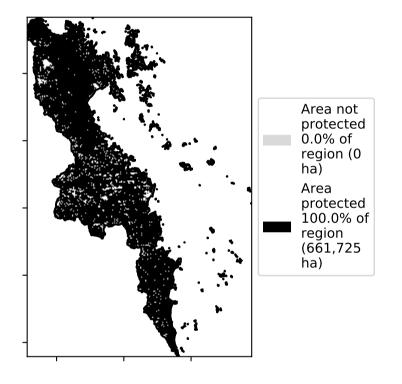
#### Proportion of each land class in area



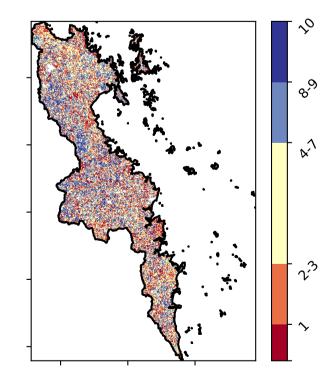
#### Proportion of vegetation cover class in area



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



Deciles show where the records for that month of





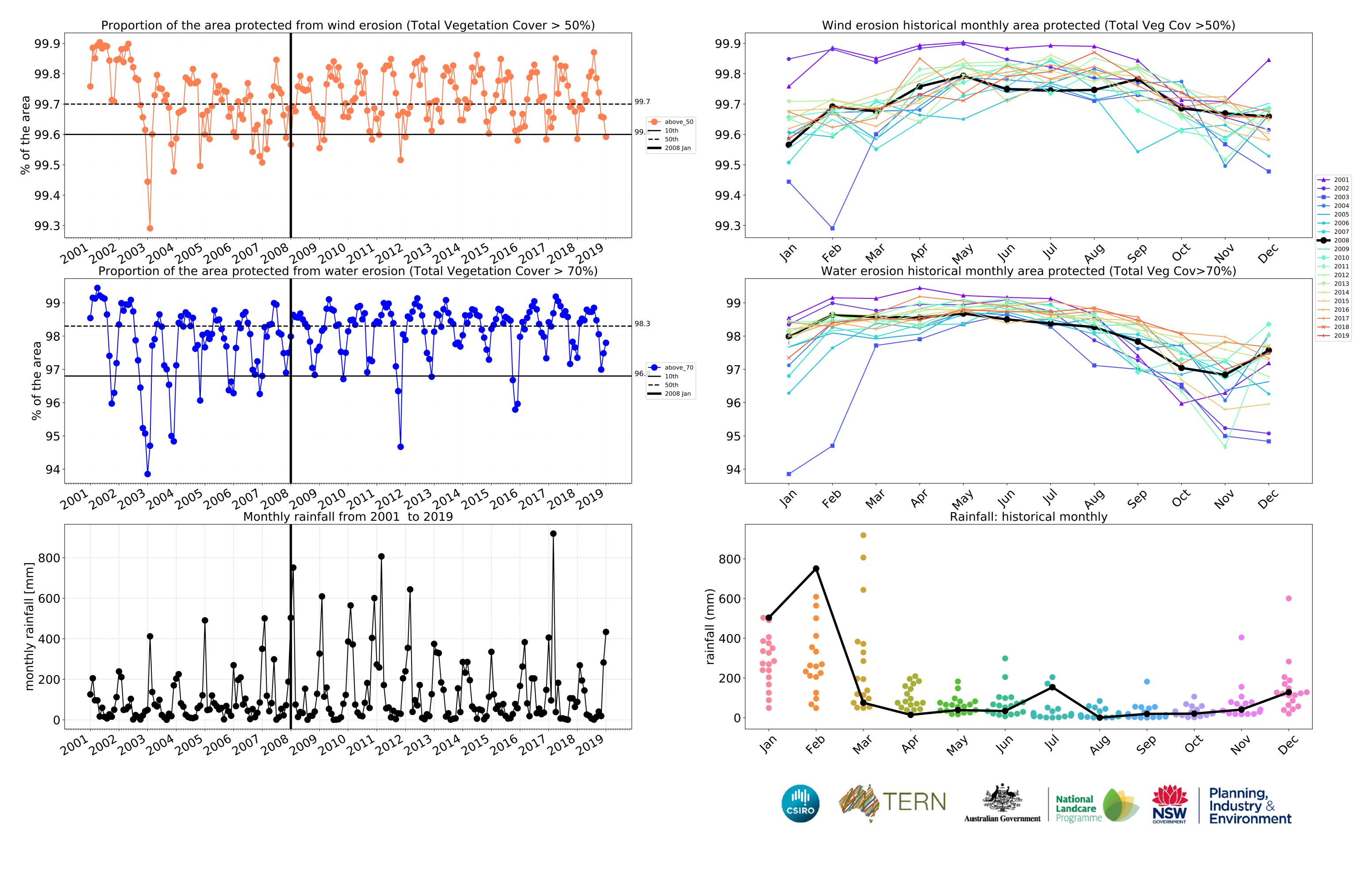


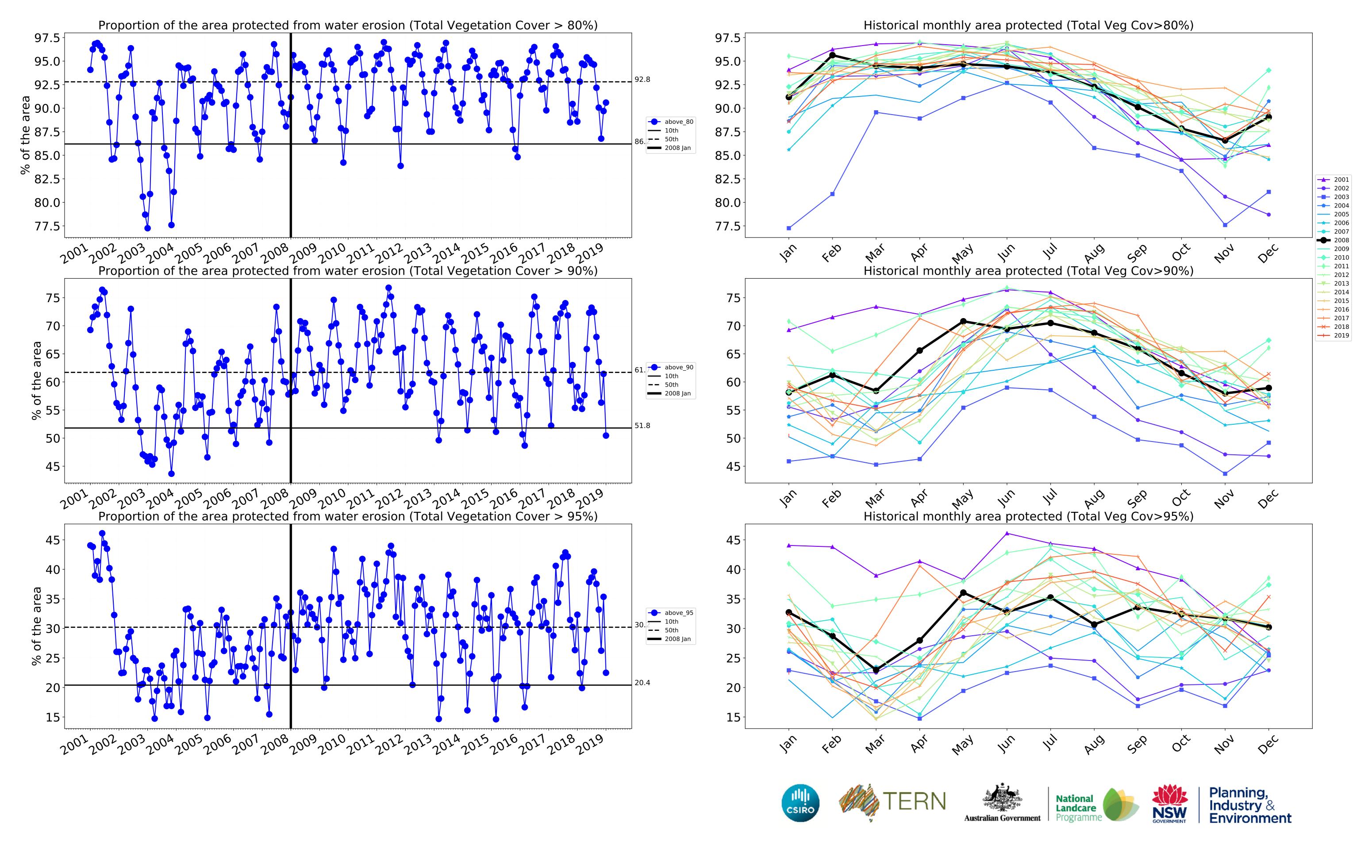












### **Conservation and natural environments**

#### Land use and forest cover

Catchment Scale Land Use and Forests

of Australia (2018)

(2018) and Forests

of Australia (2018)

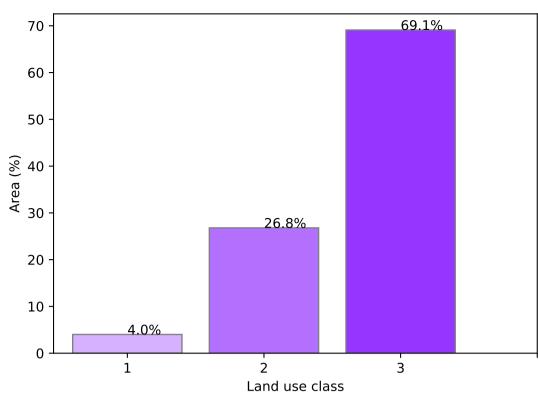
Catchment Scale Land

Derived from

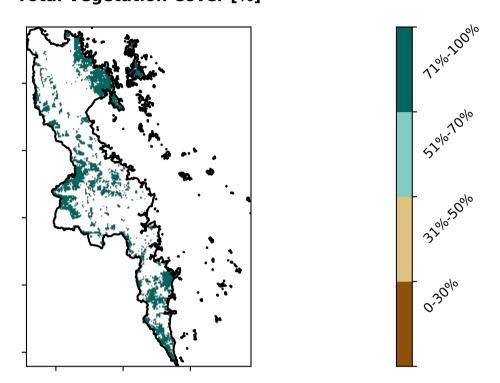
Use of Australia

# 1 Conservation and natural environments - Nonforest 2 Conservation and natural environments - Woodland forest 3 Conservation and natural environments - Nonwoodland forest

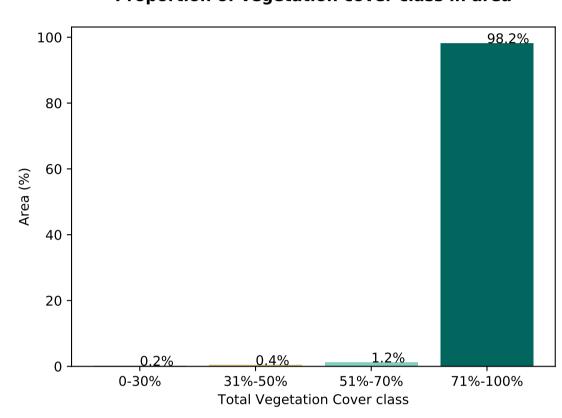
# Proportion of each land class in area



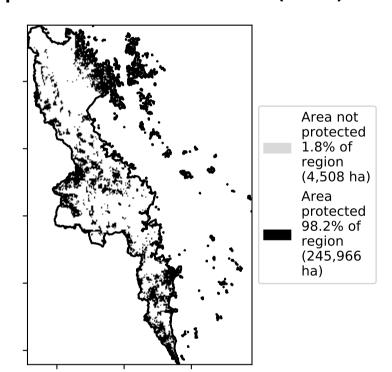
#### **Total Vegetation Cover [%]**



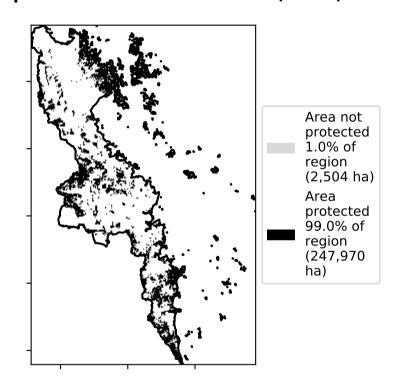
Proportion of vegetation cover class in area



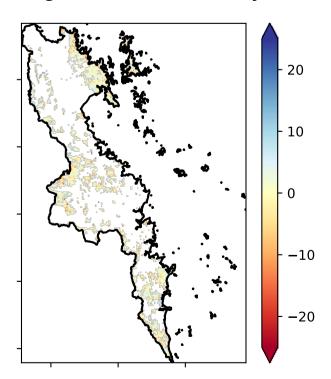
#### % Area protected from water erosion (>70%)



% Area protected from wind erosion (>50%)

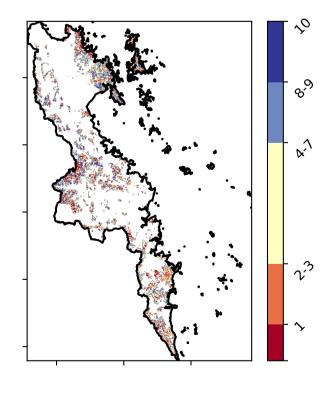


#### **Total Vegetation Cover Anomaly [%]**



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

#### Total Vegetation Cover Decile [%]



using baseline from 2001 to 2019.

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

is only for the month of the map

is, red pixels are about 20% lower than the mean of that



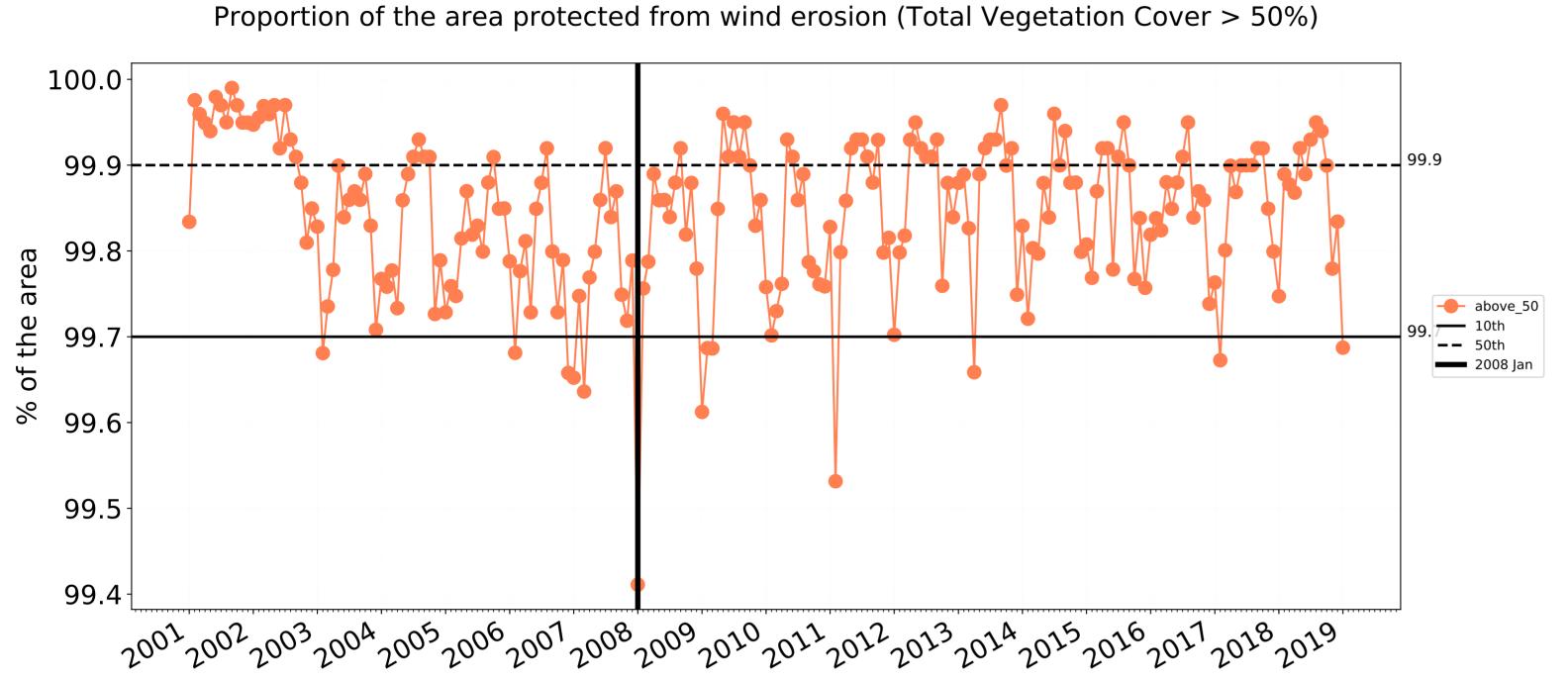




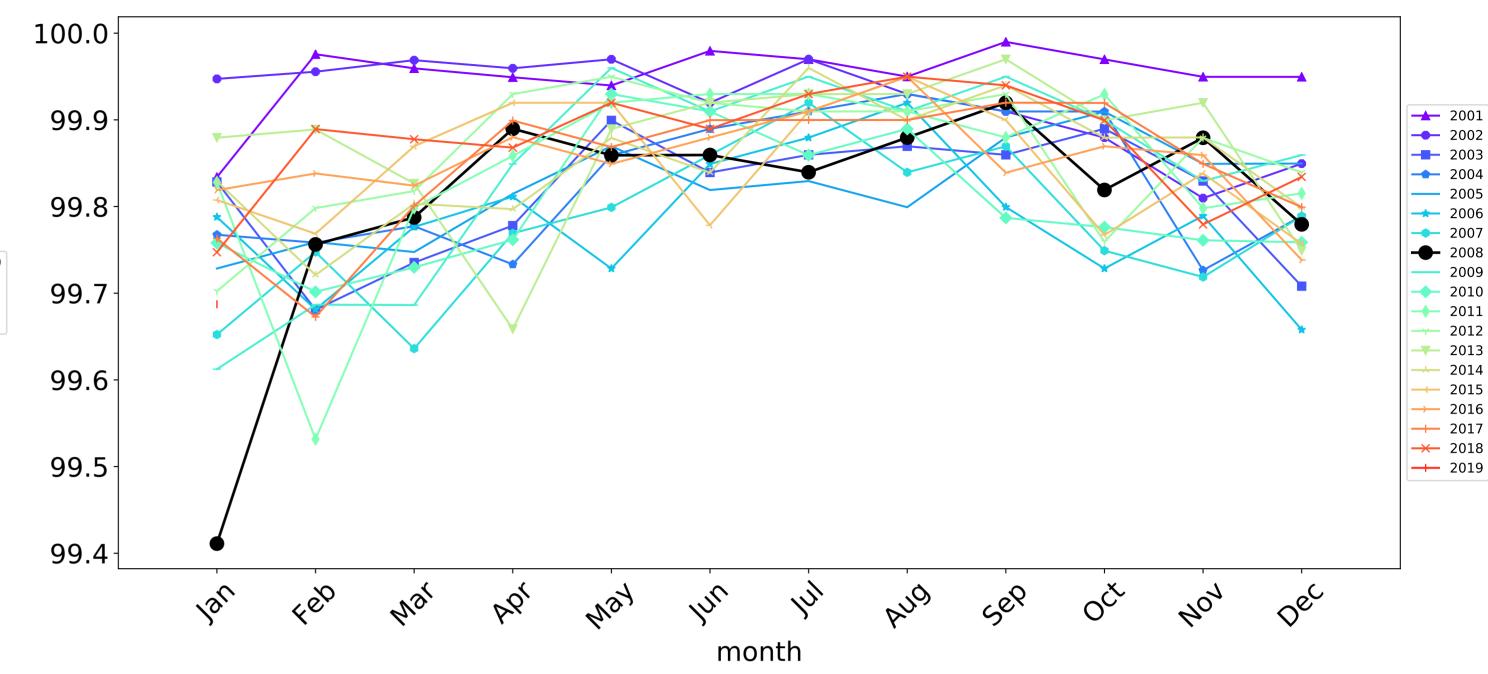


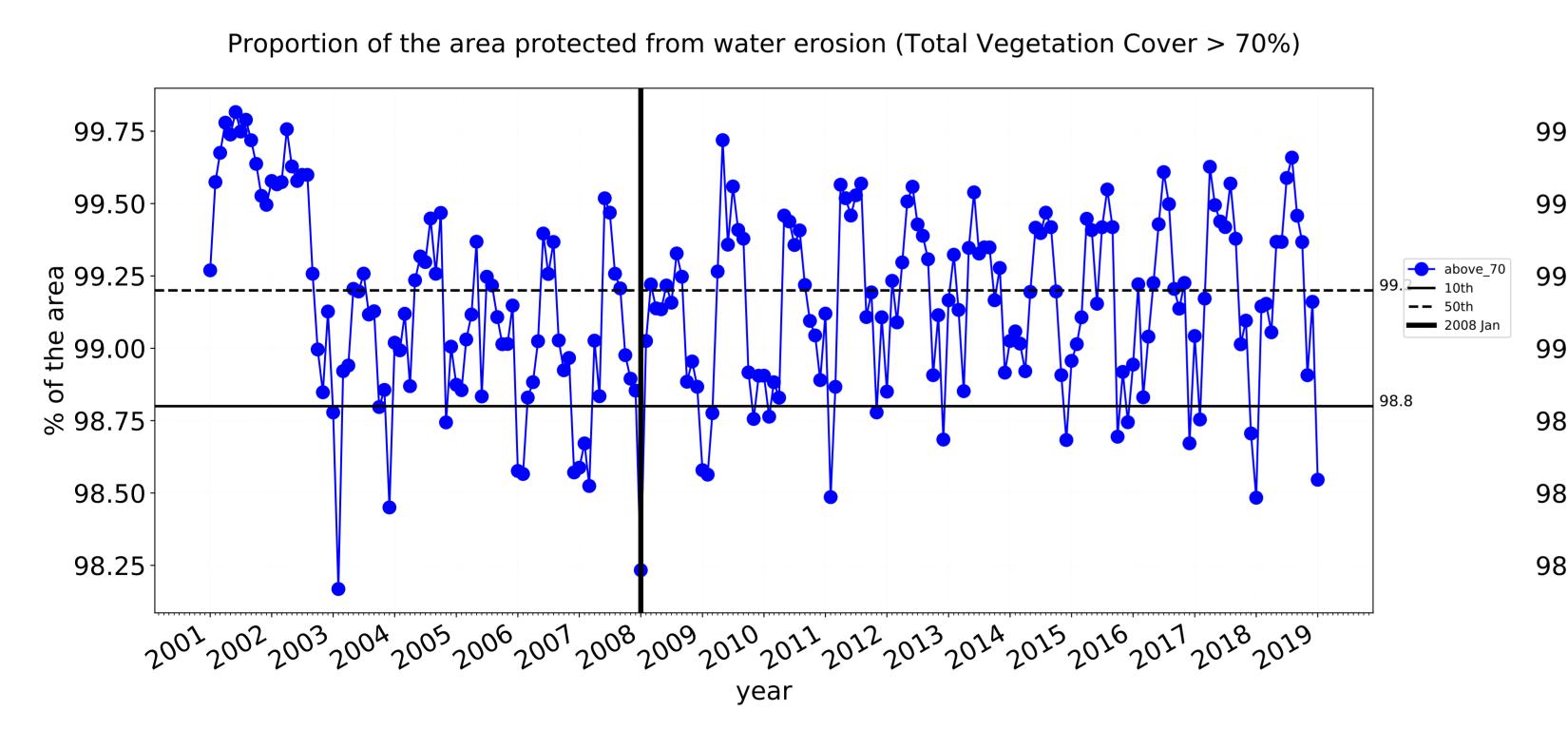


# **Conservation and natural environments timeseries**

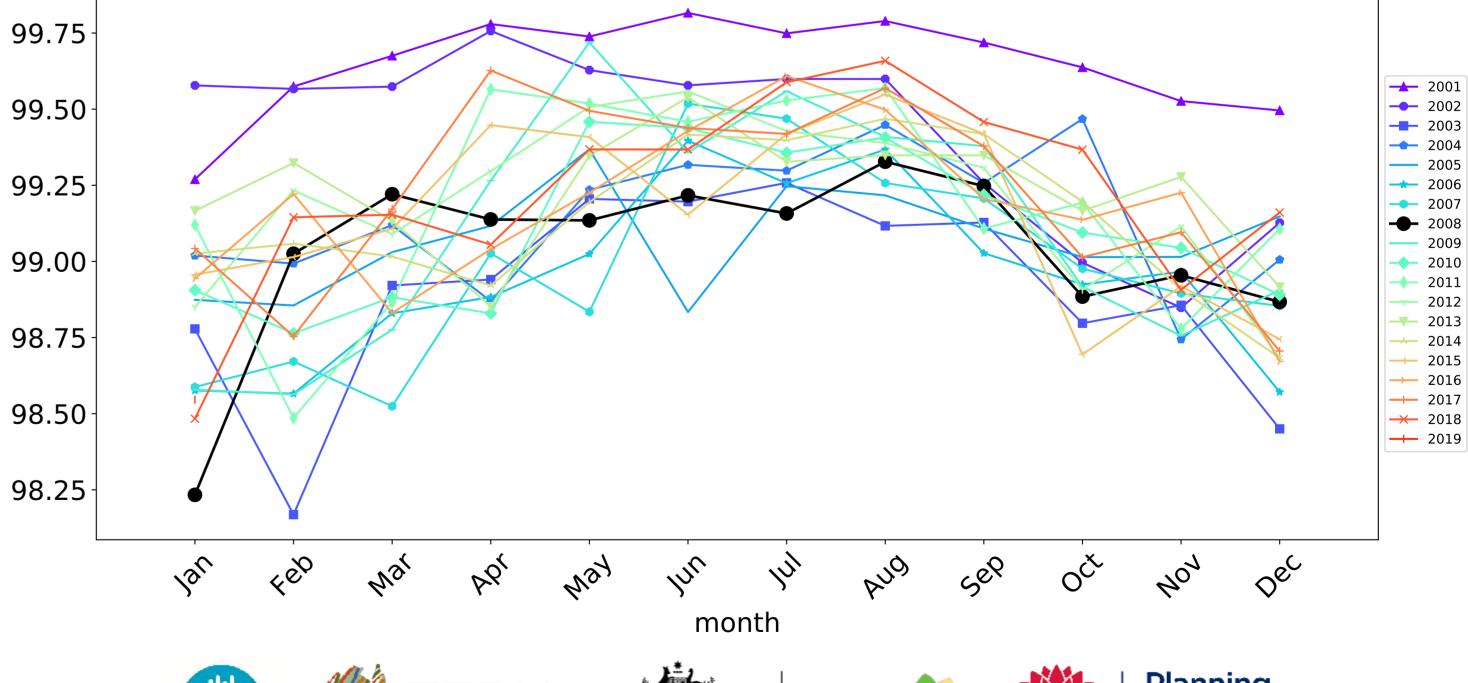


# Wind erosion historical monthly area protected (Total Veg Cov >50%)





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





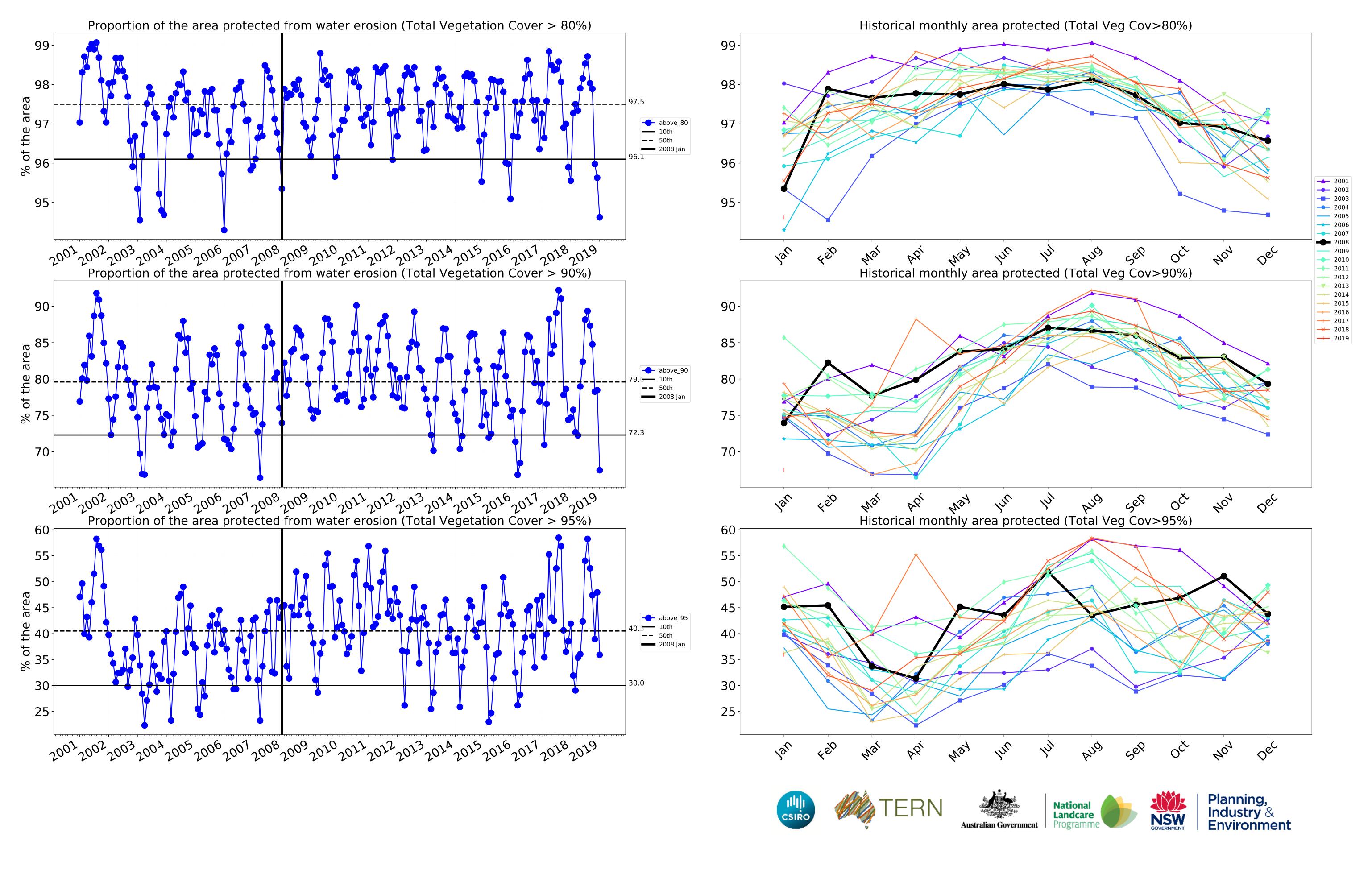












# **Conservation and natural environments non forest**

#### 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)

Anomaly show how many percetage points each

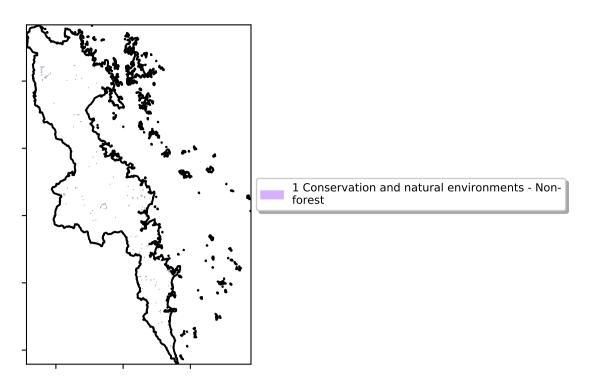
pixel is from the mean. That

pixel. The mean

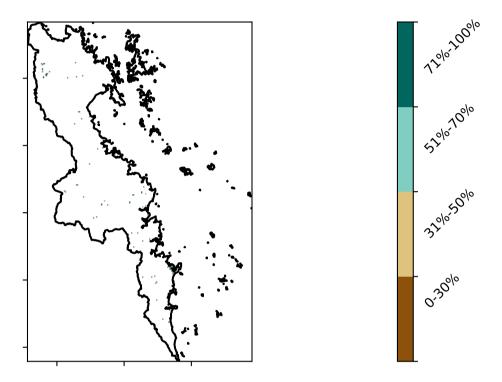
using baseline from 2001 to 2019.

is only for the month of the map

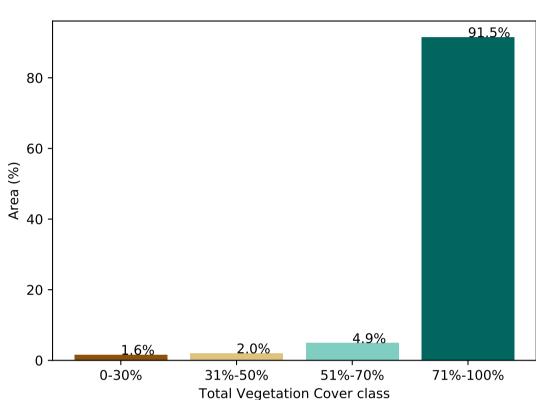
is, red pixels are about 20% lower than the mean of that



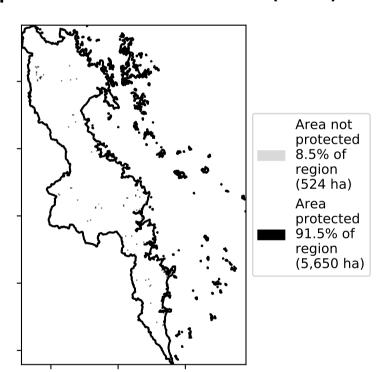
#### **Total Vegetation Cover [%]**



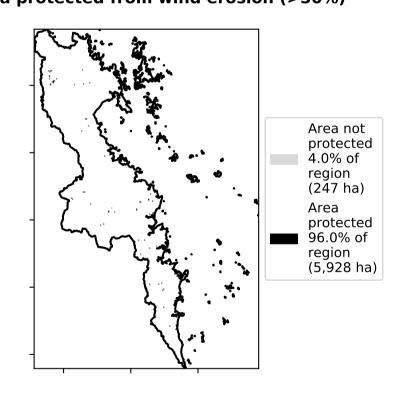
# Proportion of vegetation cover class in area



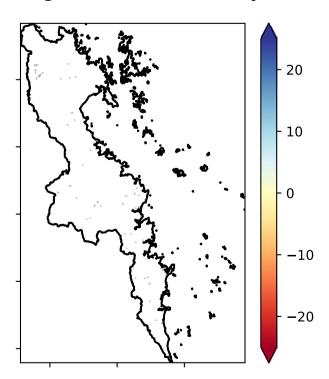
#### % Area protected from water erosion (>70%)



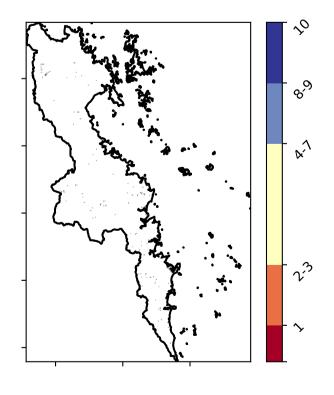
% Area protected from wind erosion (>50%)



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



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.





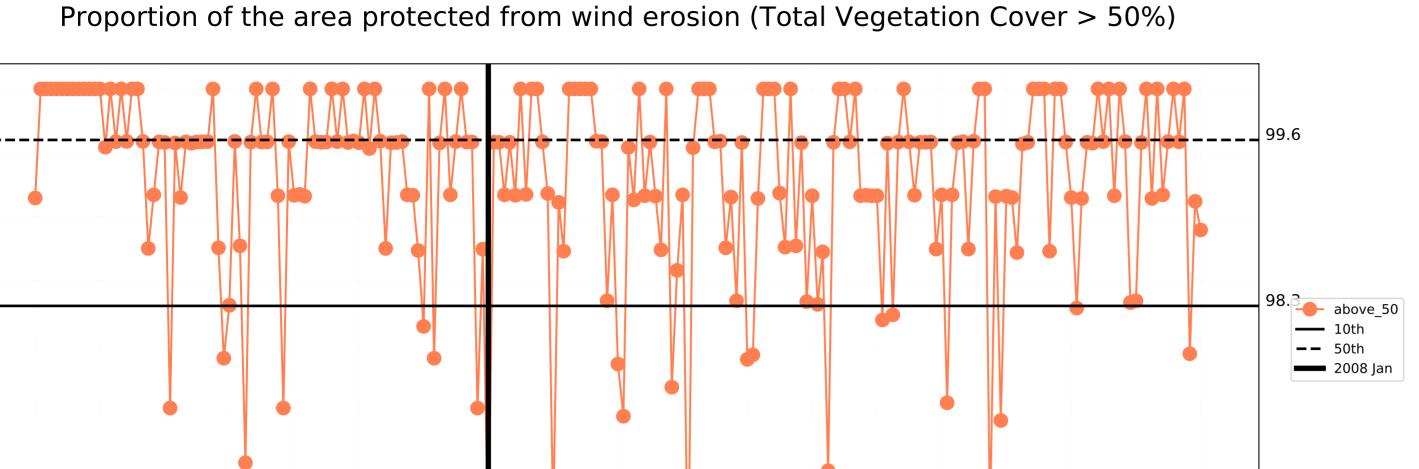












2001 2002 2003 2004 2005 2006 2001 2008 2009 2010 2011 2012 2013 2014 2015 2016 2011 2018 2019

100.0

99.5

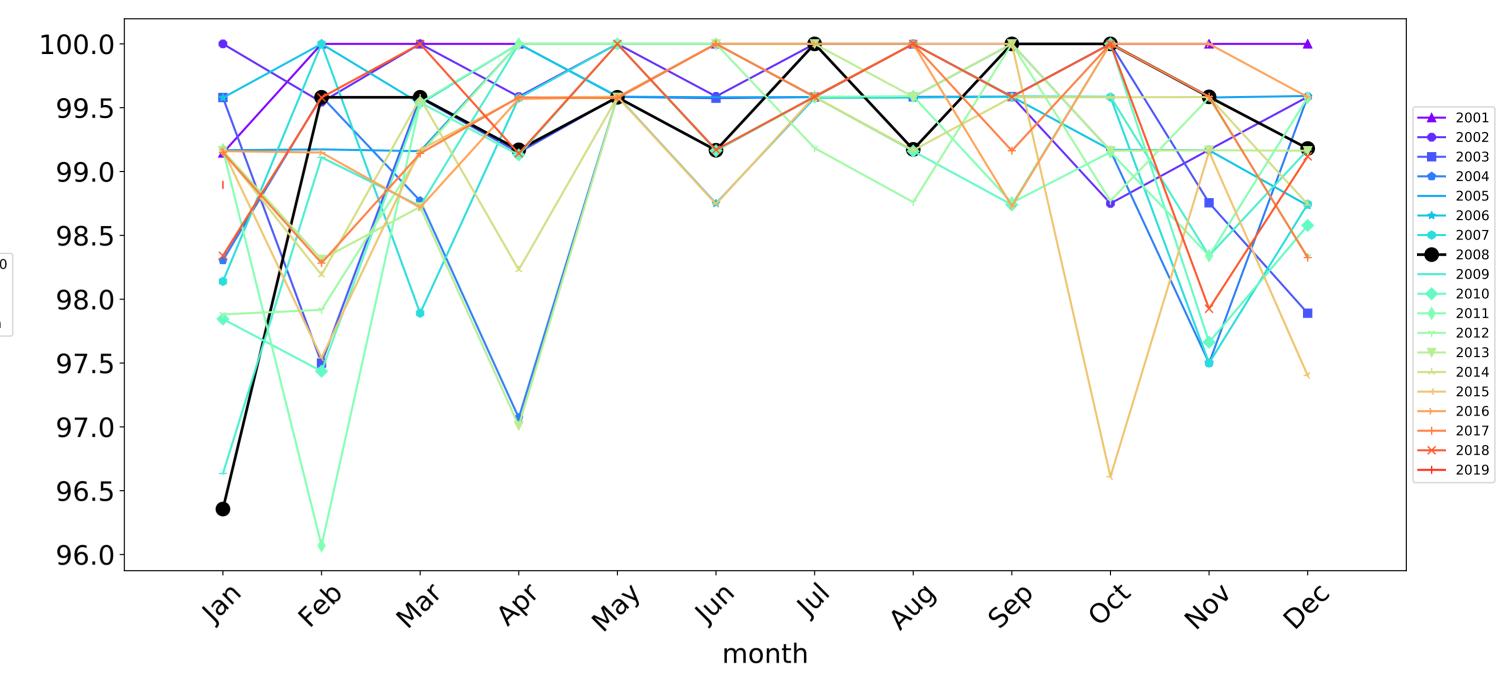
99.0

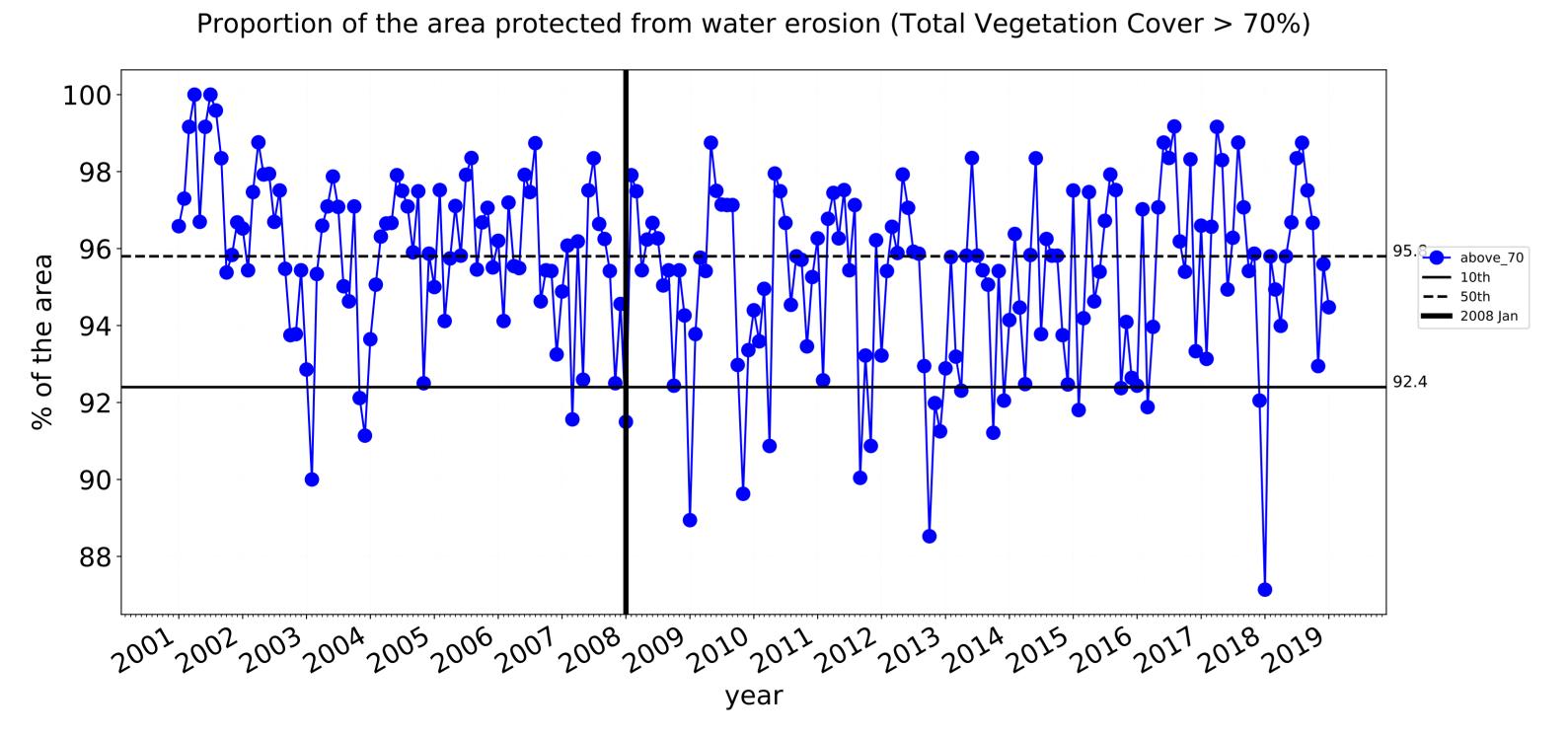
97.0

96.5

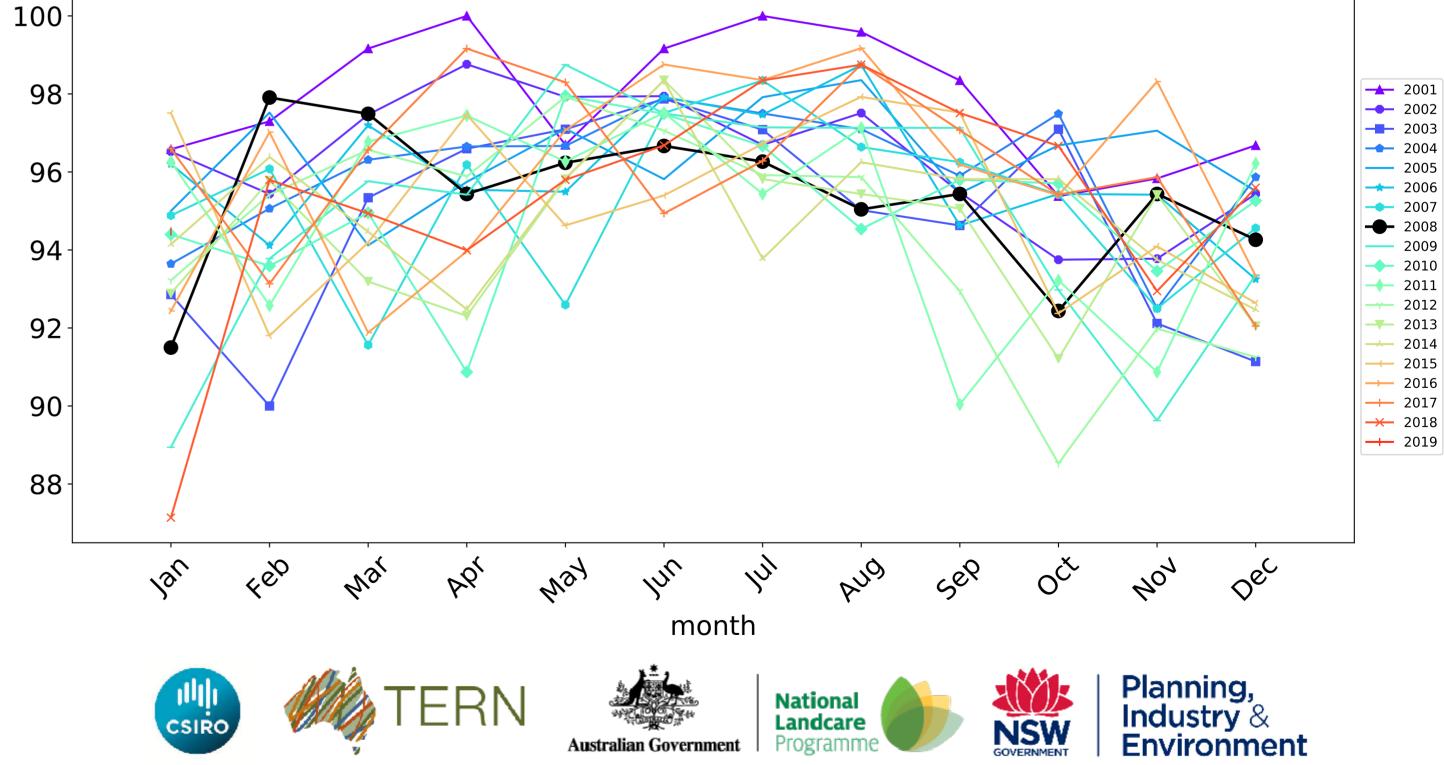
96.0

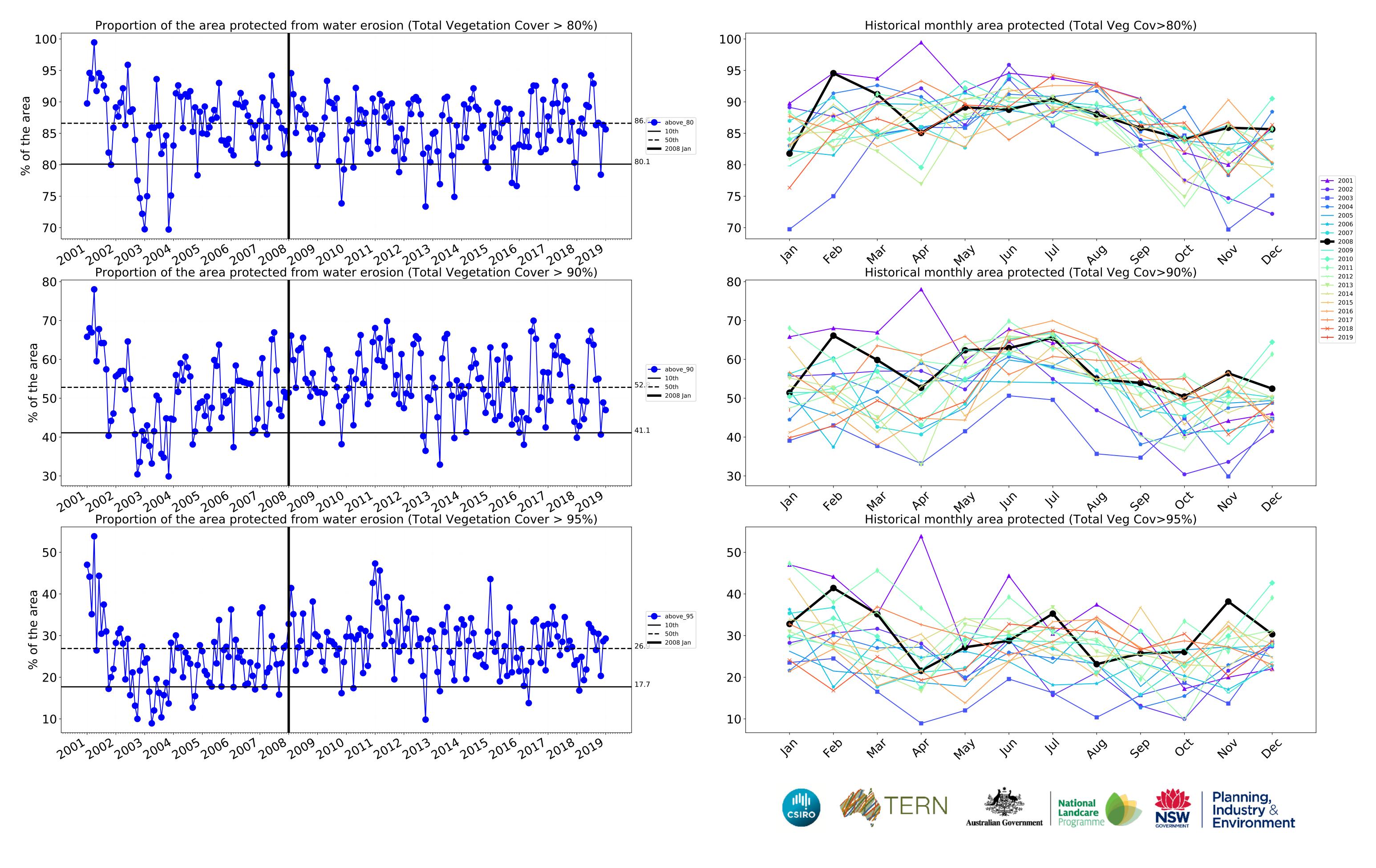
# Wind erosion historical monthly area protected (Total Veg Cov >50%)





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

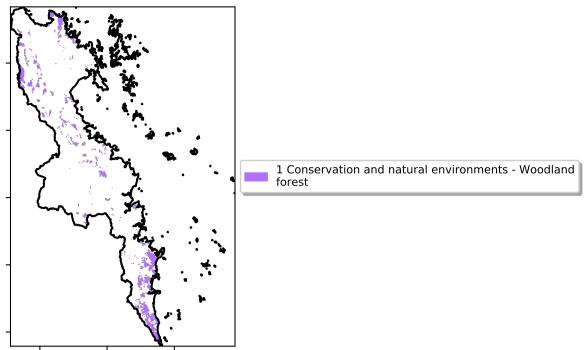




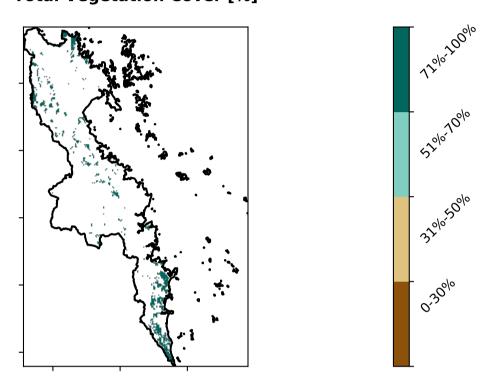
# **Conservation and natural environments Woodland forest**

#### Land use and forest cover

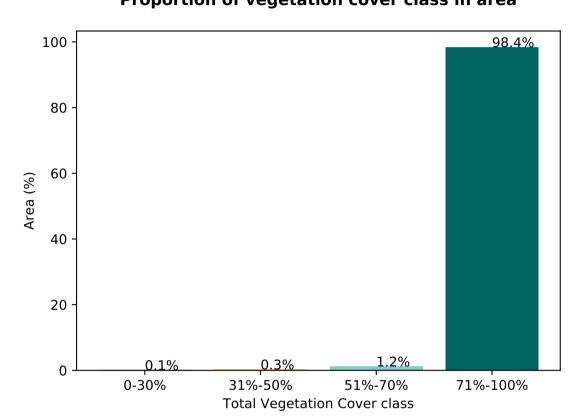
Catchment Scale
Land Use and Forests
of Australia (2018)
Derived from
Catchment Scale Land
Use of Australia
(2018) and Forests
of Australia (2018)



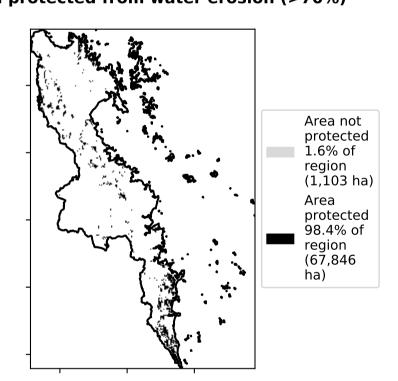
#### **Total Vegetation Cover [%]**



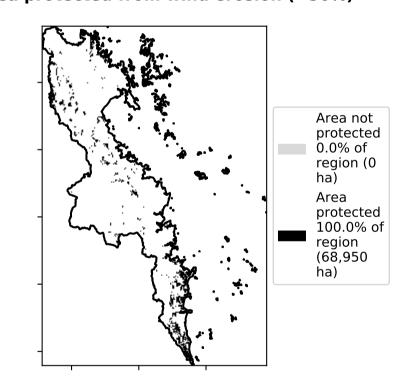
# Proportion of vegetation cover class in area



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



% Area protected from wind erosion (>50%)



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

Anomaly show how many percetage points each

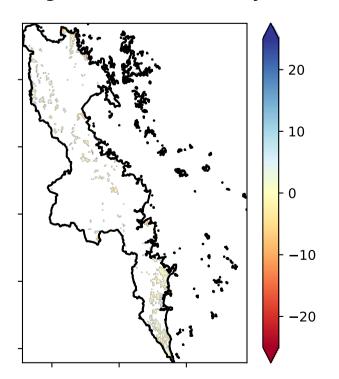
pixel is from the mean. That

pixel. The mean

using baseline from 2001 to 2019.

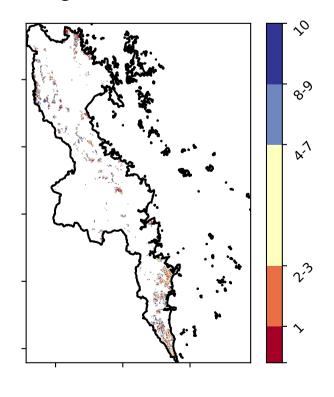
is only for the month of the map

is, red pixels are about 20% lower than the mean of that



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

Total Vegetation Cover Decile [%]







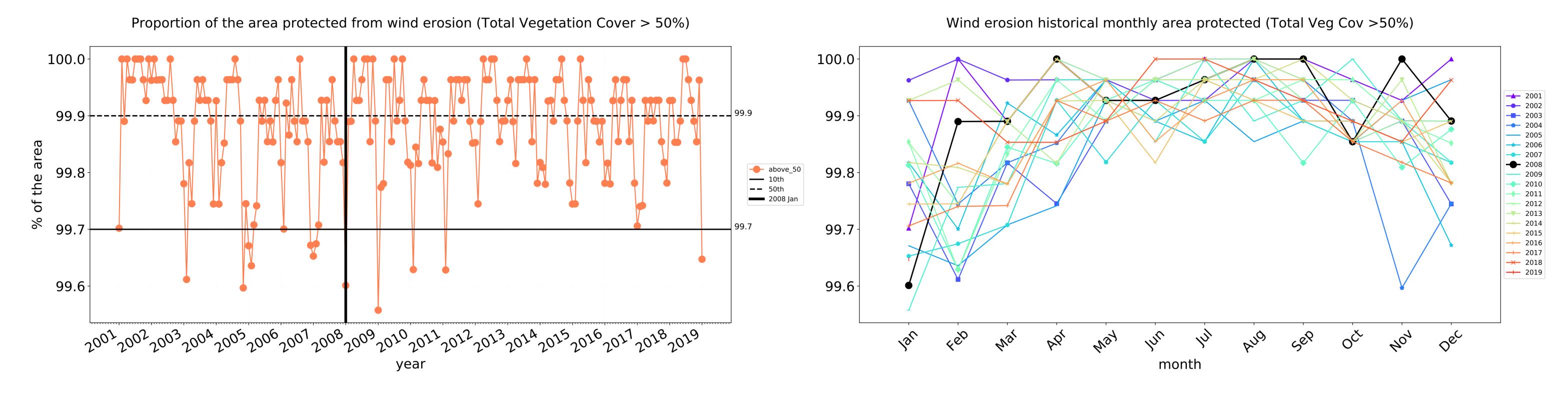


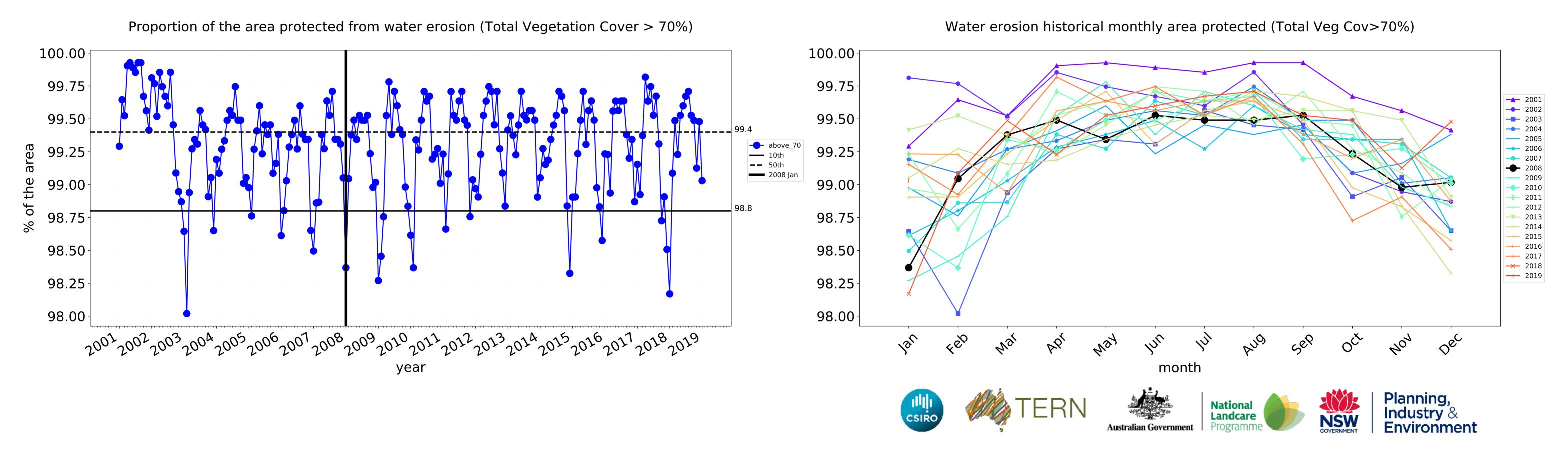


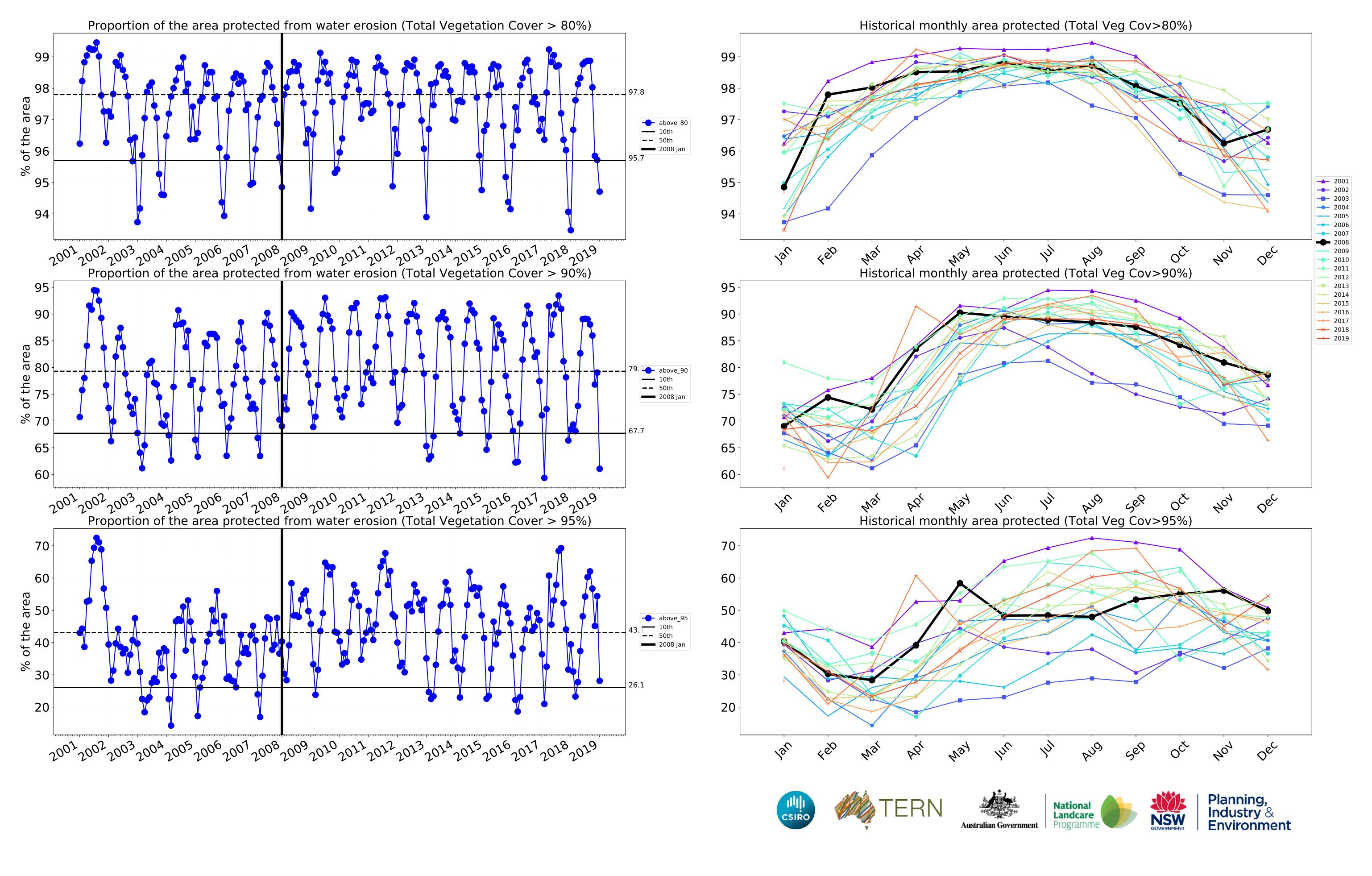




# Conservation and natural environments Woodland forest timeseries



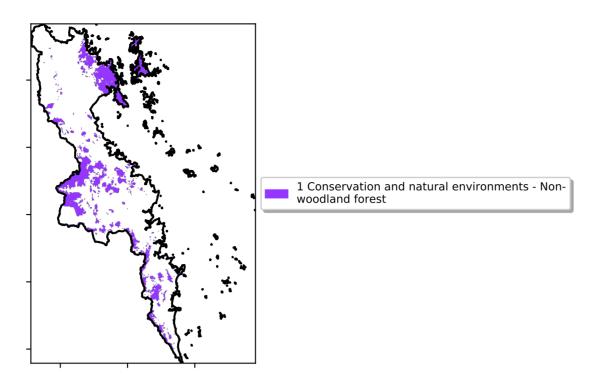




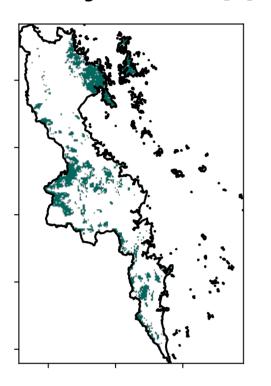
# **Conservation and natural environments Forest (non woodland)**

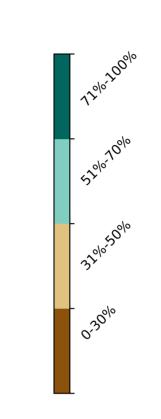
#### Land use and forest cover

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

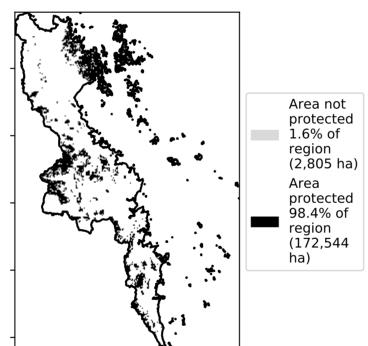


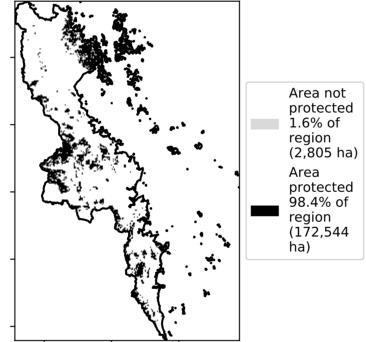
#### **Total Vegetation Cover [%]**



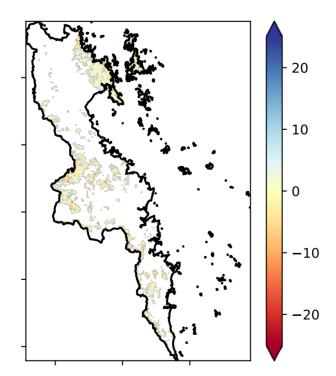


#### % Area protected from water erosion (>70%)



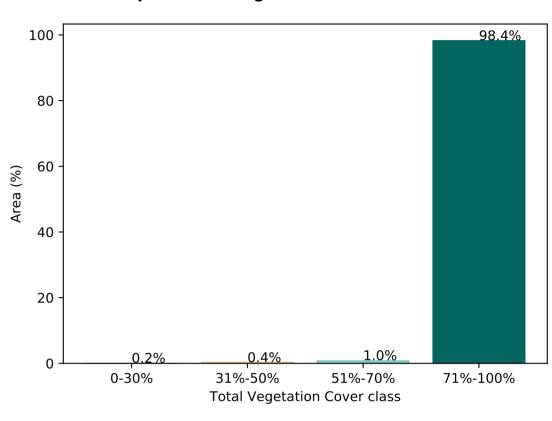


### **Total Vegetation Cover Anomaly [%]**

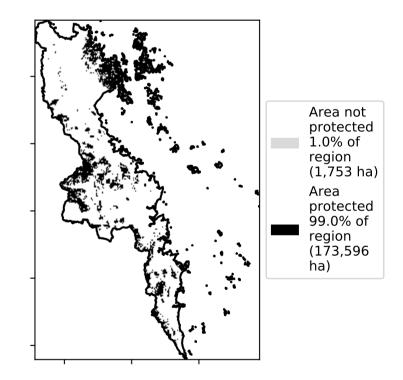


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

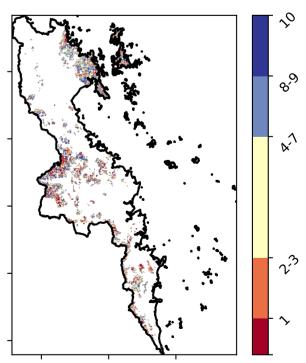
#### Proportion of vegetation cover class in area

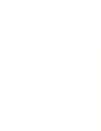


#### % Area protected from wind erosion (>50%)



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





Anomaly show how many percetage points each

pixel is from

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.

the mean. That

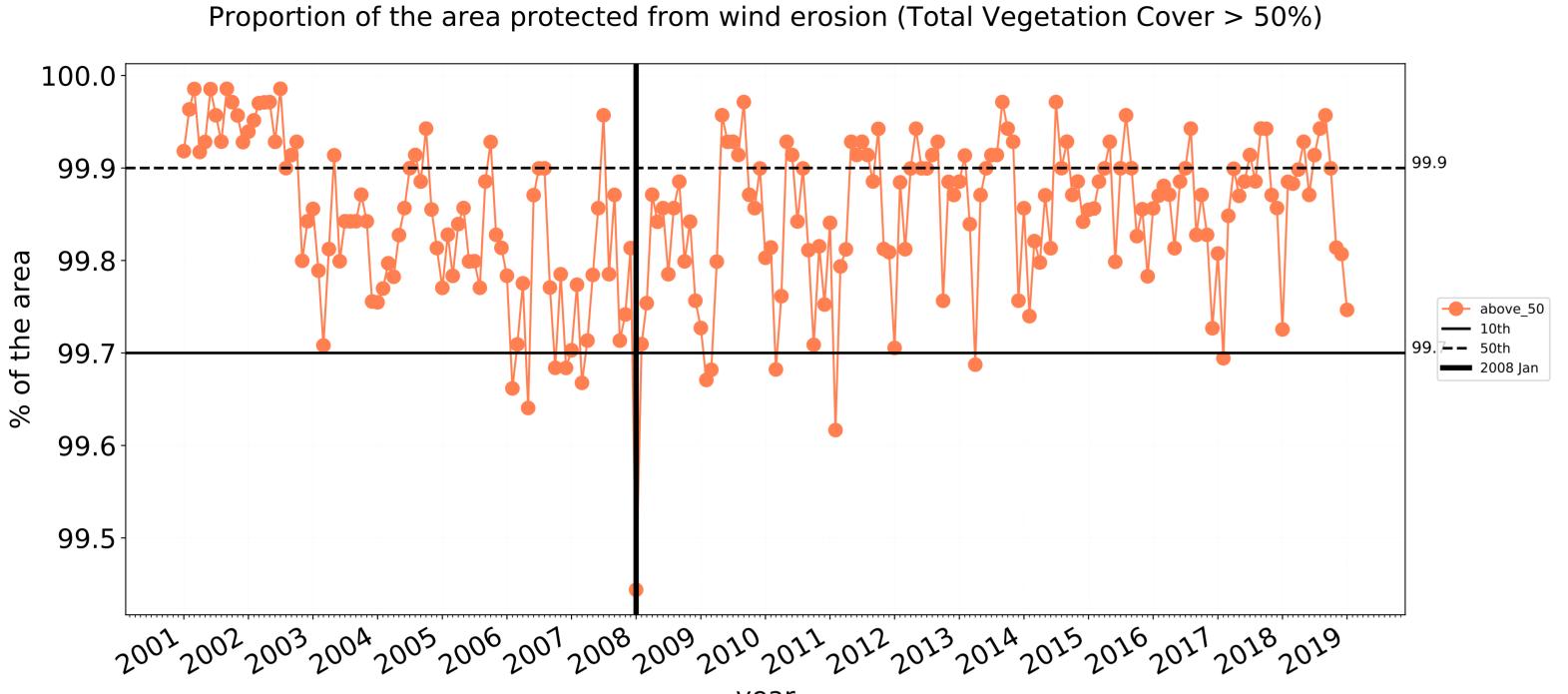


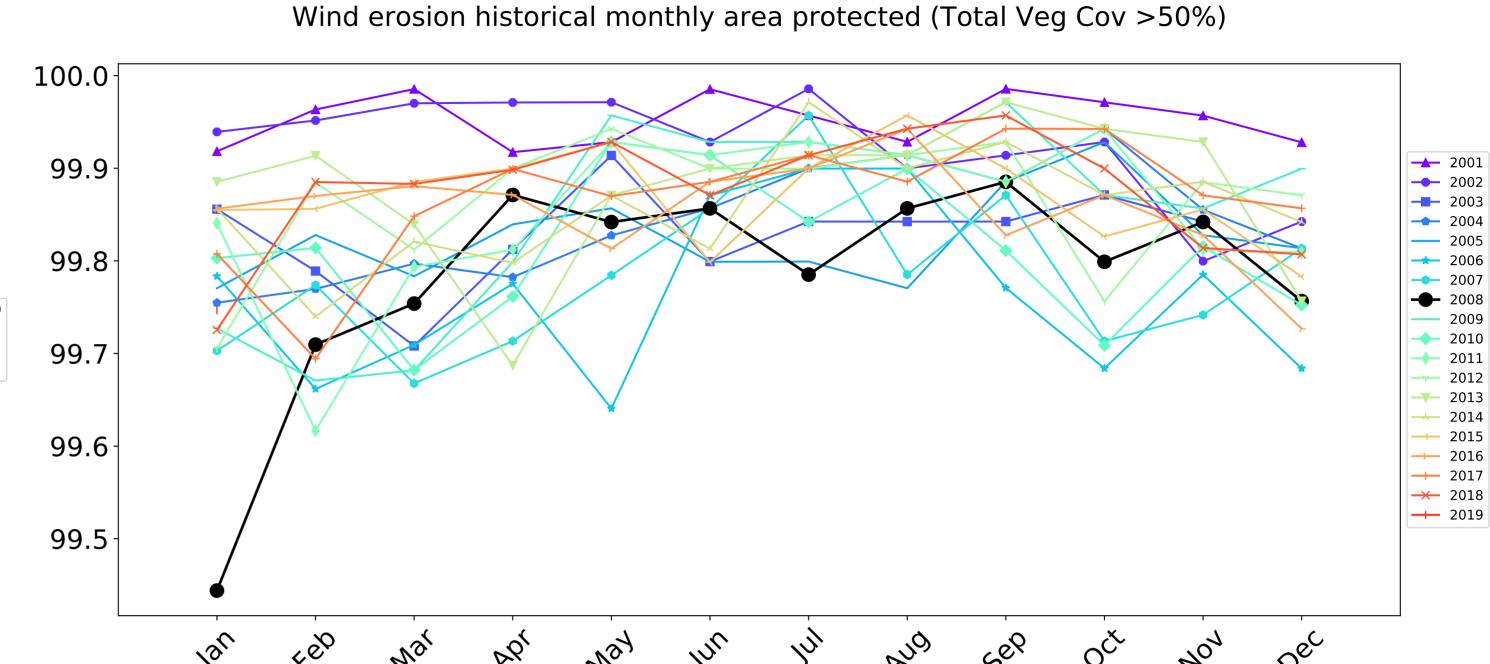




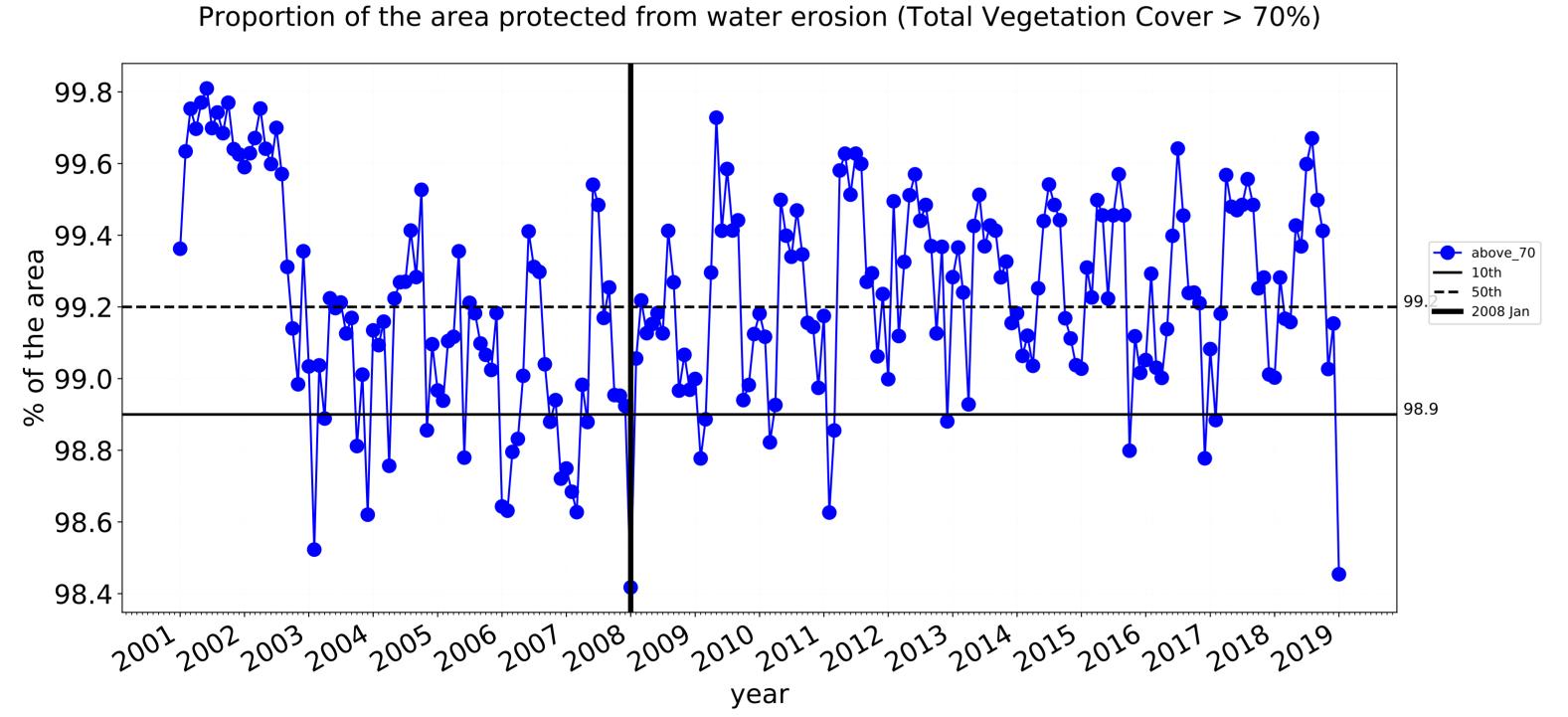


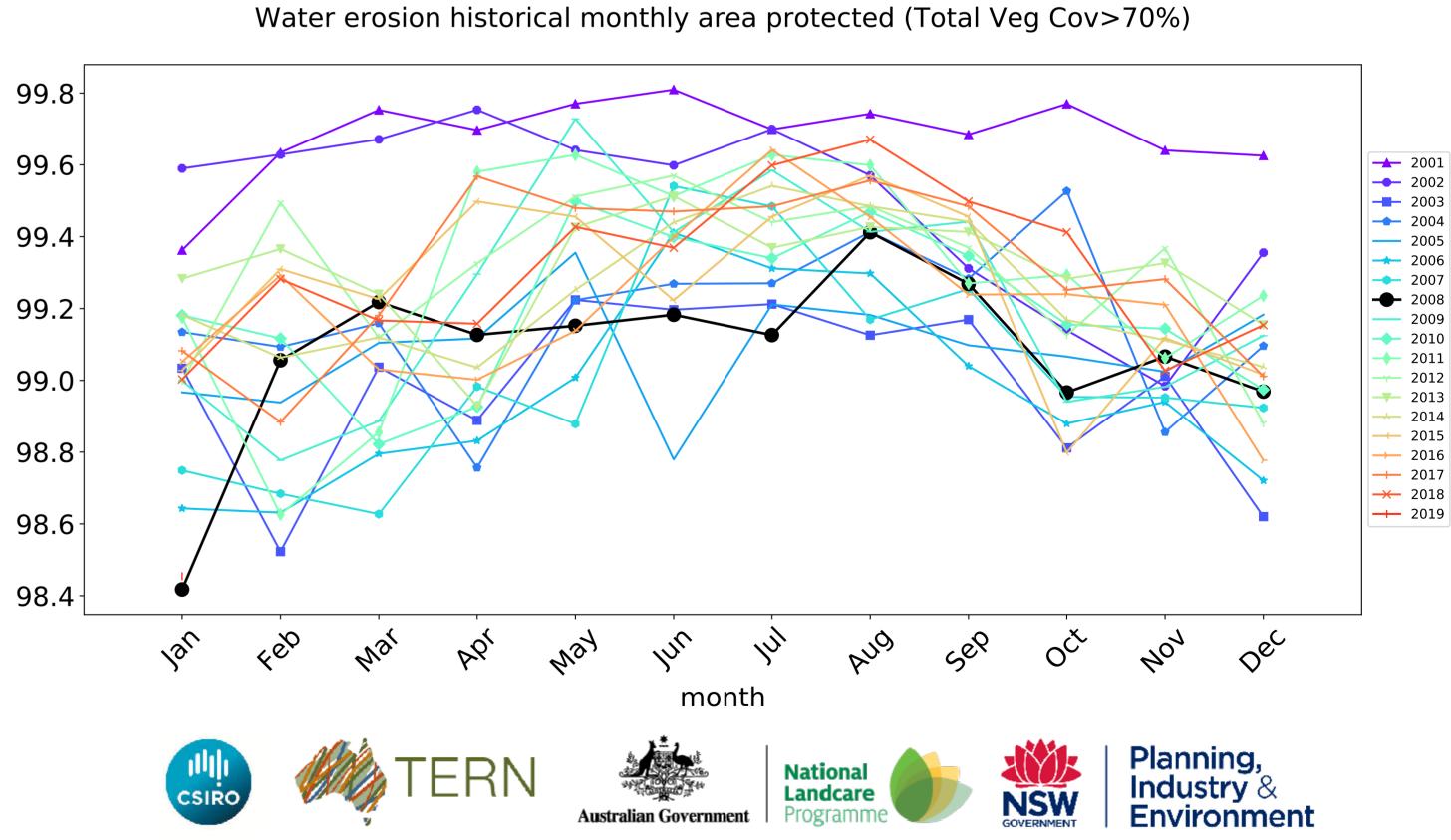


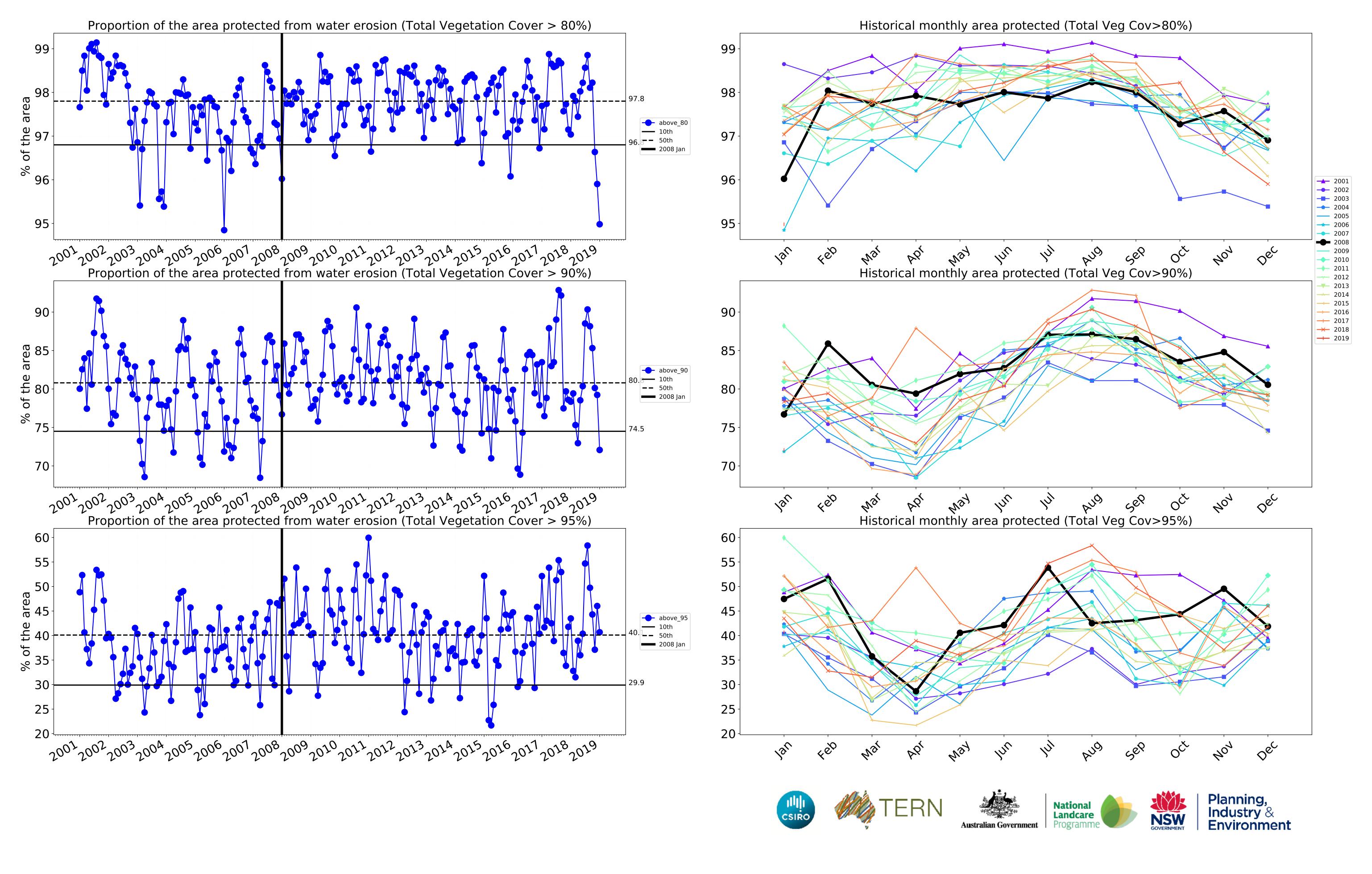




month







# **Agriculture**

#### Land use and forest cover

Catchment Scale

of Australia (2018)

(2018) and Forests

of Australia (2018)

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

using baseline from 2001 to 2019.

is only for the month of the map

is, red pixels are about 20% lower than the mean of that

Derived from

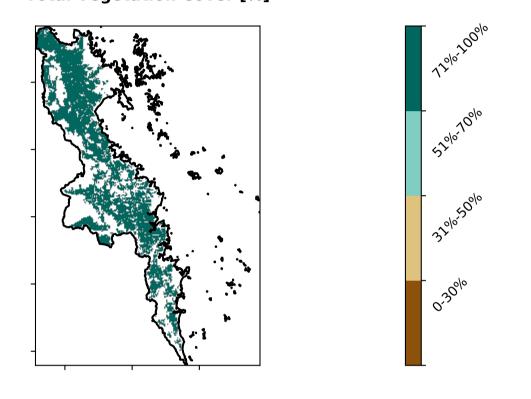
Use of Australia

Land Use and Forests

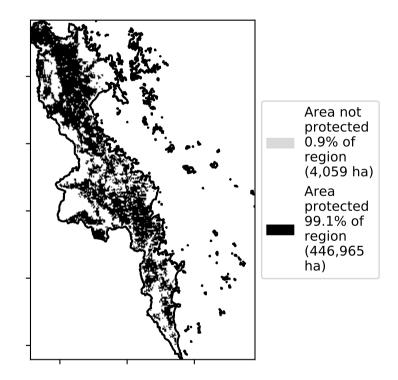
Catchment Scale Land

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

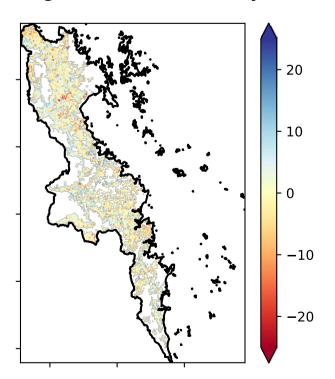
# Total Vegetation Cover [%]



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

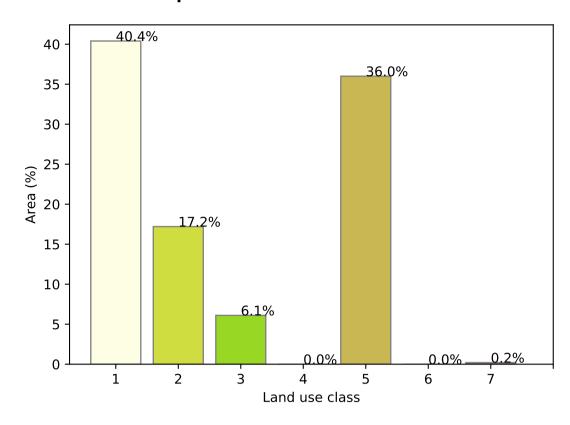


#### **Total Vegetation Cover Anomaly [%]**

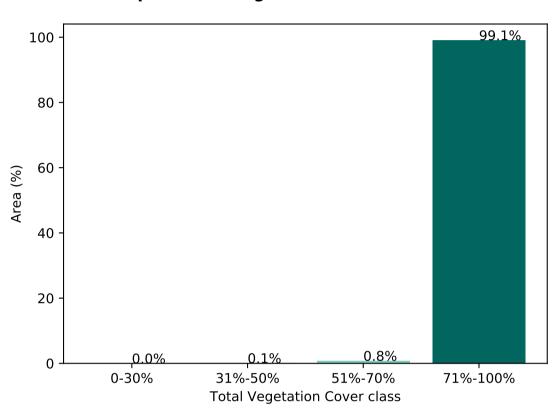


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

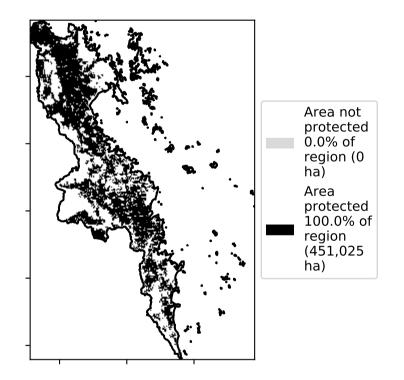
#### Proportion of each land class in area

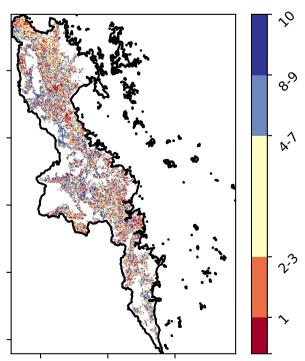


#### Proportion of vegetation cover class in area



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









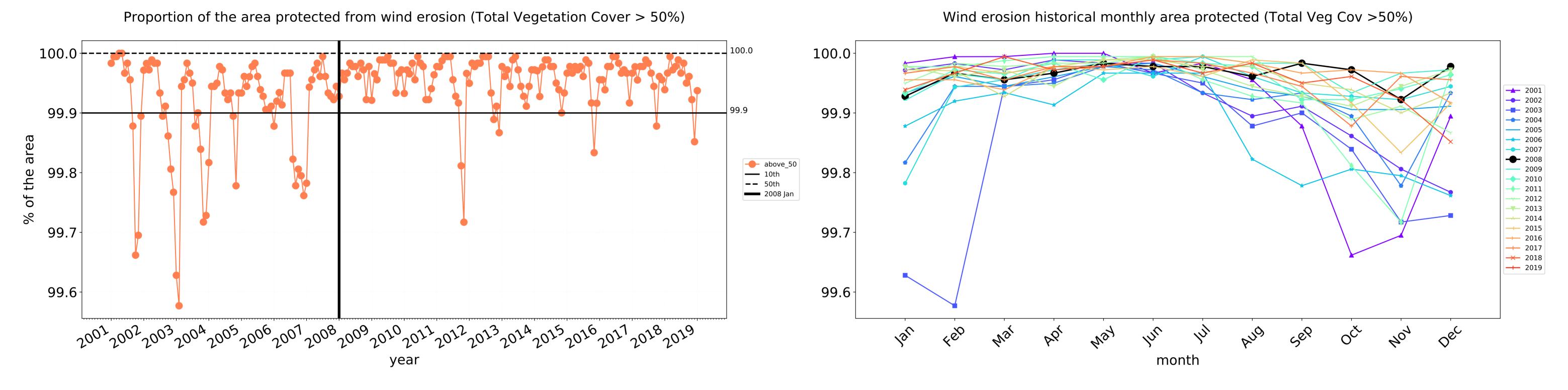


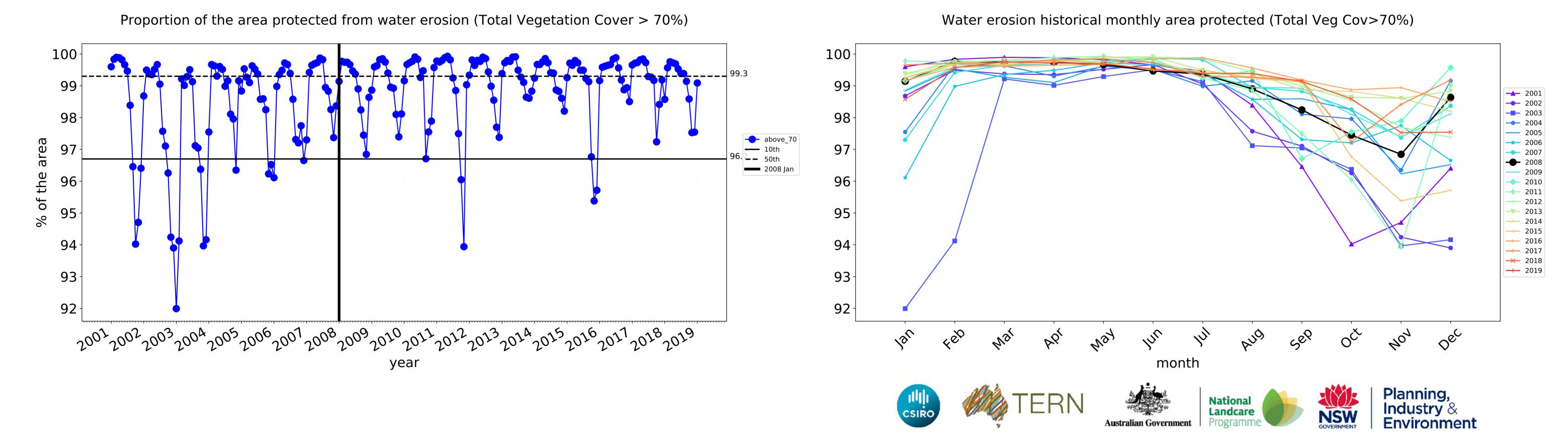


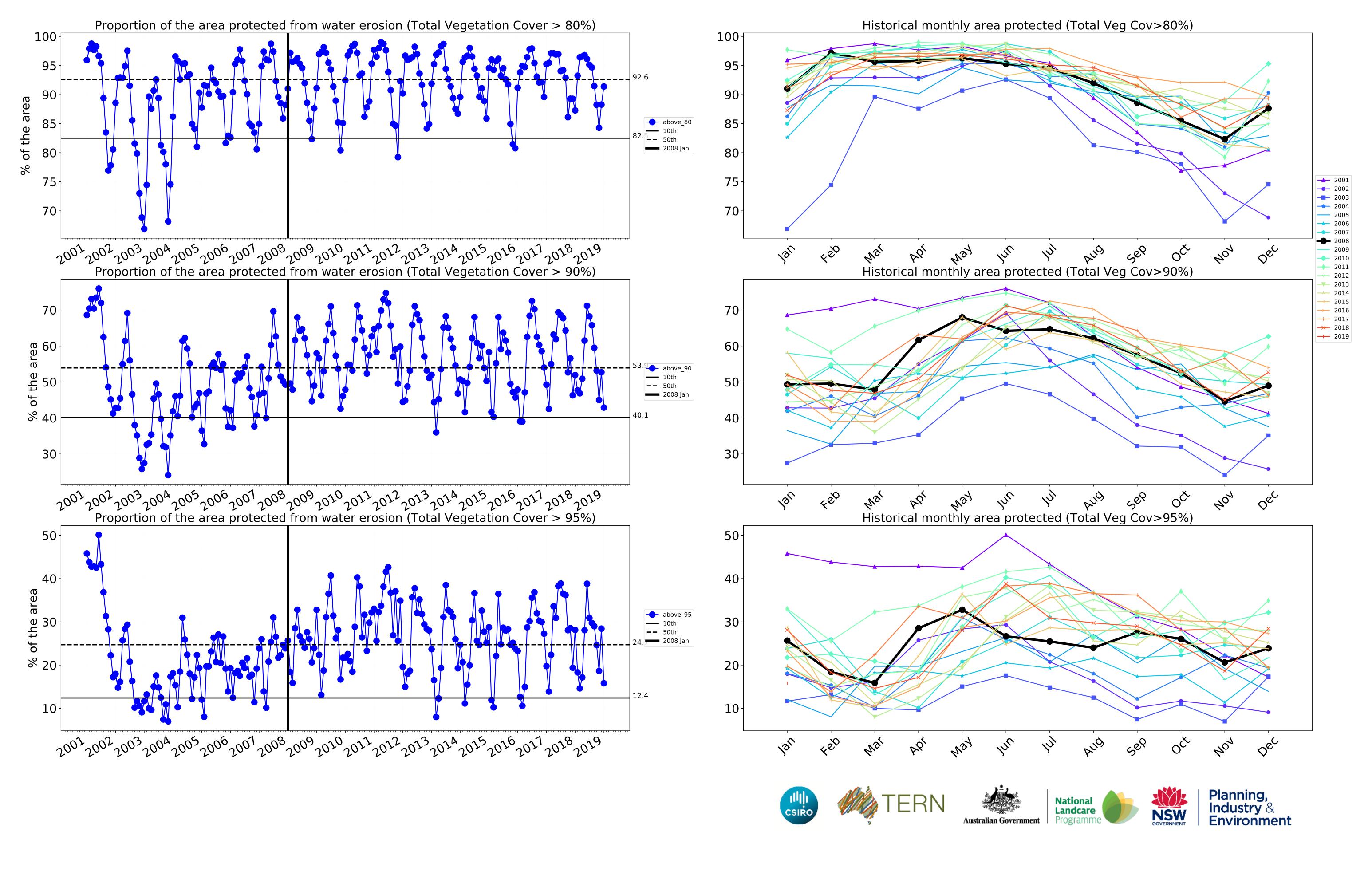




# **Agriculture timeseries**







# Grazing

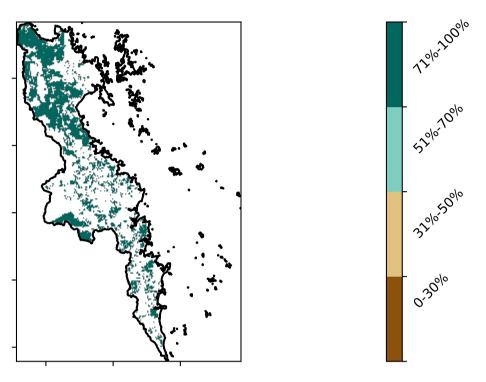
#### Land use and forest cover

# 1 Agriculture - Grazing - Non forest 2 Agriculture - Grazing - Woodland forest 3 Agriculture - Grazing - Non-woodland forest

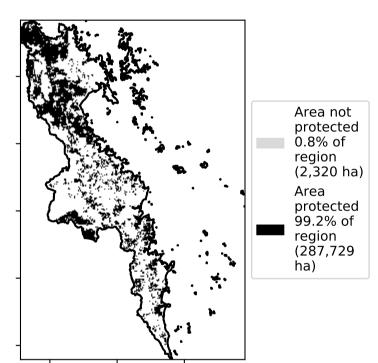
#### Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

Catchment Scale

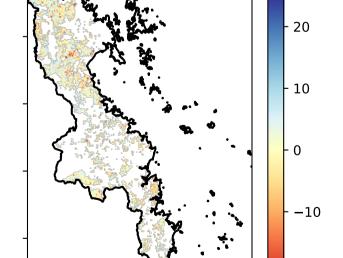
#### **Total Vegetation Cover [%]**



% Area protected from water erosion (>70%)



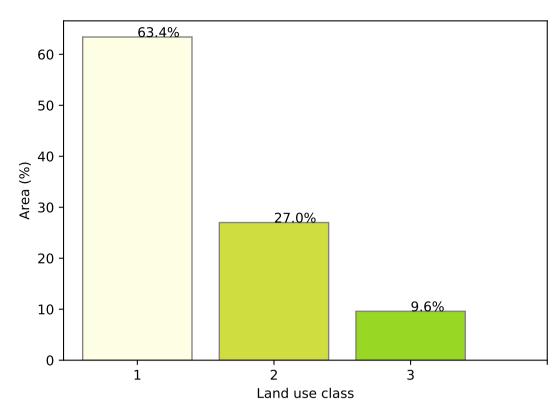
Anomaly show how many percetage points each pixel is from the mean. That is, red pixels are about 20% lower than the mean of that pixel. The mean is only for the month of the map using baseline from 2001 to 2019.



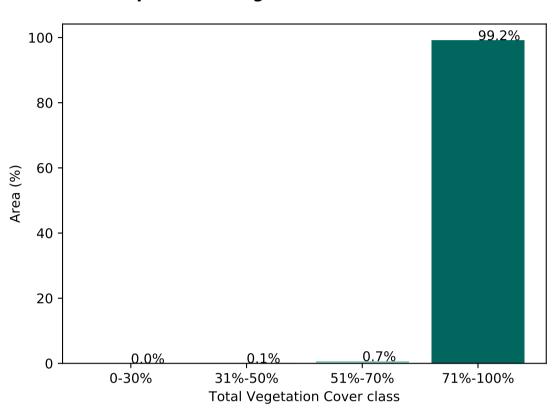
**Total Vegetation Cover Anomaly [%]** 

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.

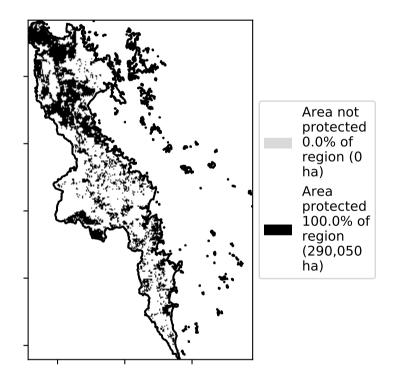
#### **Proportion of each land class in area**



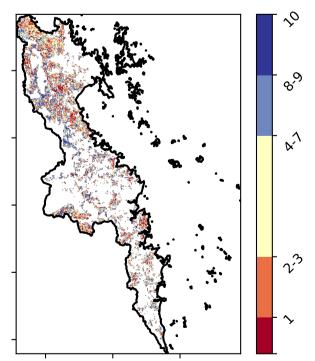
Proportion of vegetation cover class in area



% Area protected from wind erosion (>50%)



Total Vegetation Cover Decile [%]







**-**20

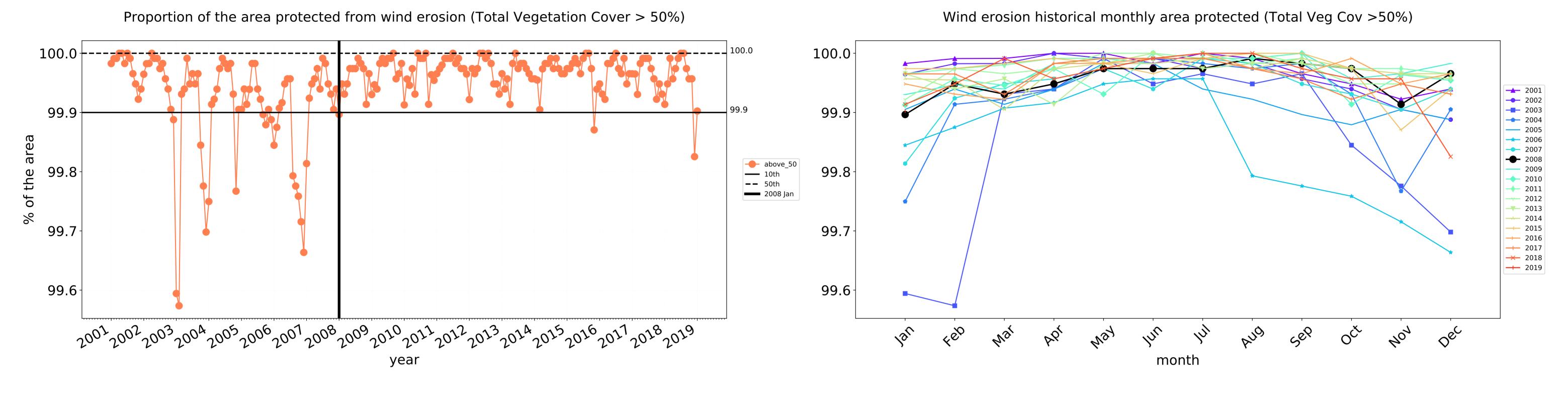


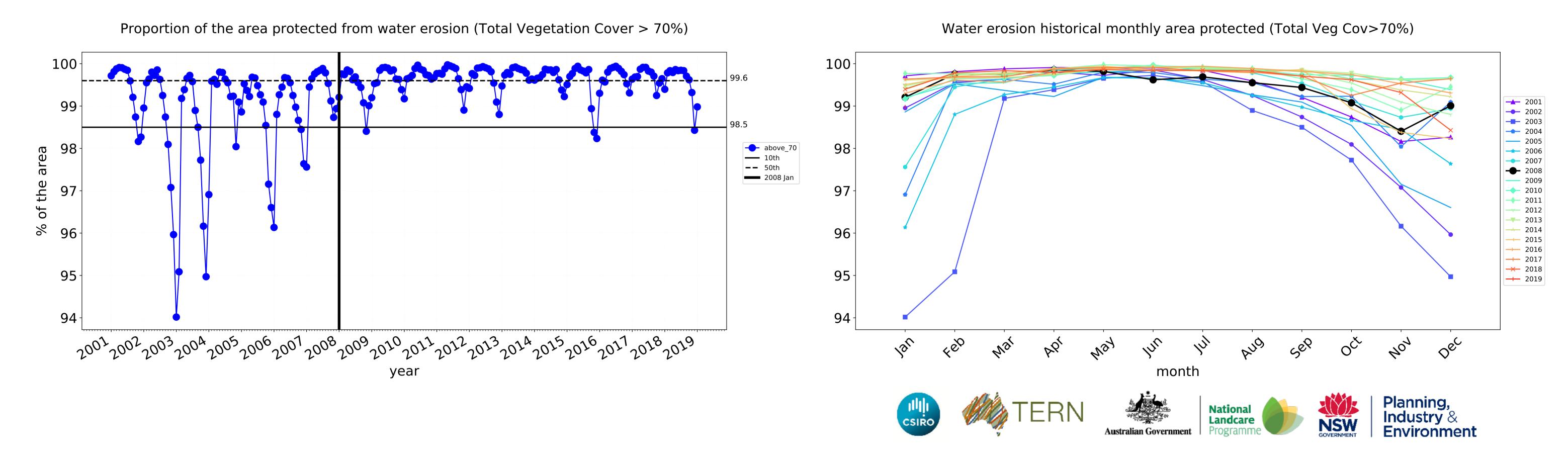


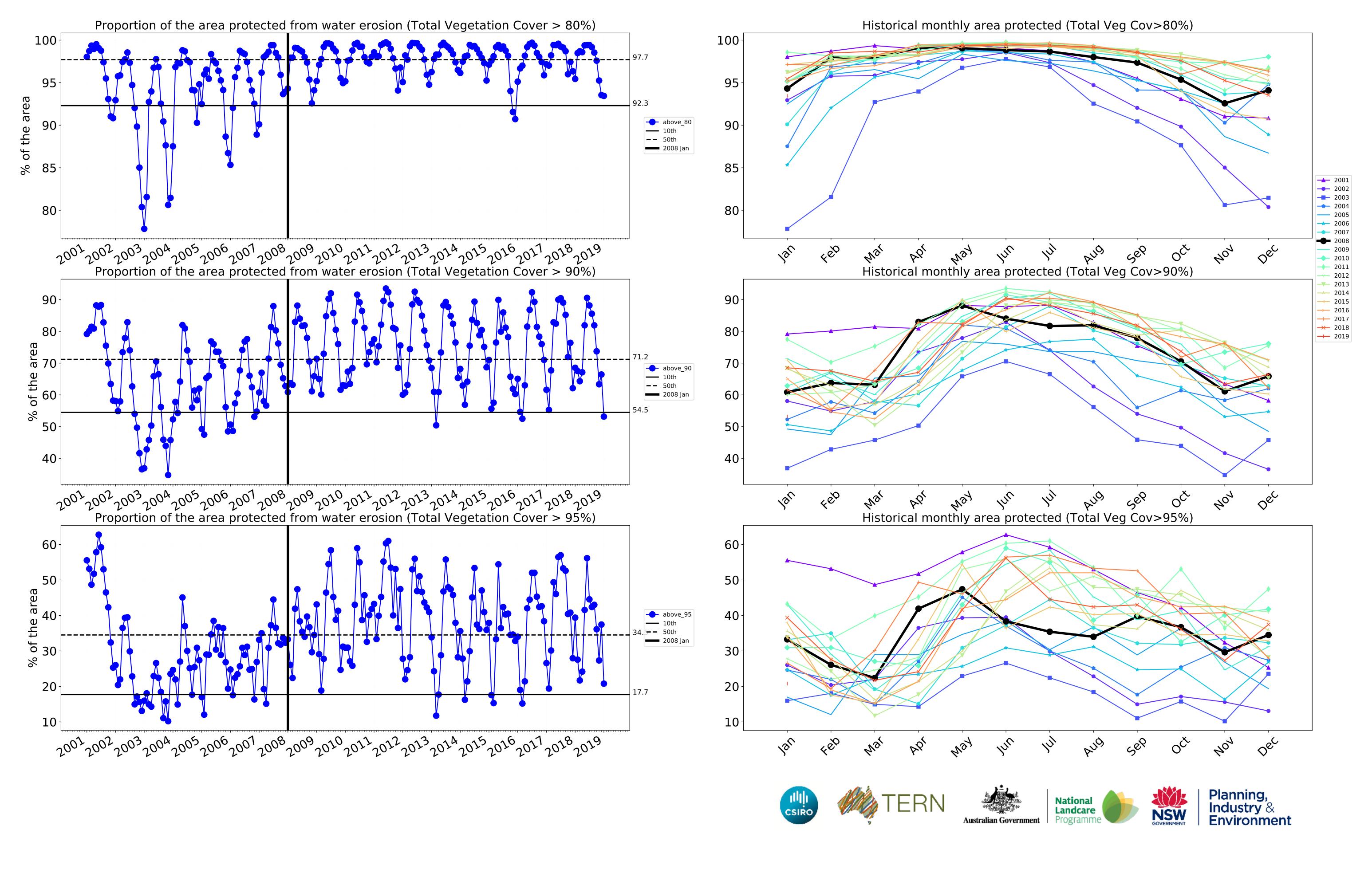




# **Grazing timeseries**







# **Grazing non forest**

#### Land use and forest cover

1 Agriculture - Grazing - Non forest

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

Anomaly show how many percetage points each

pixel is from the mean. That

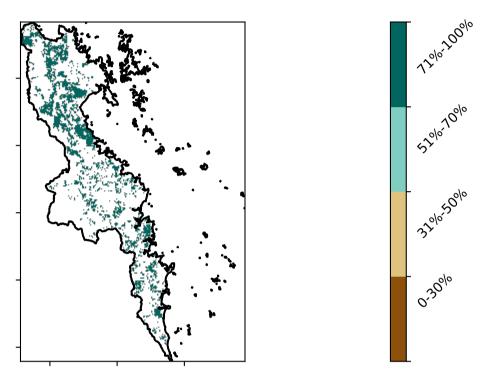
is, red pixels are about 20% lower than the mean of that

pixel. The mean

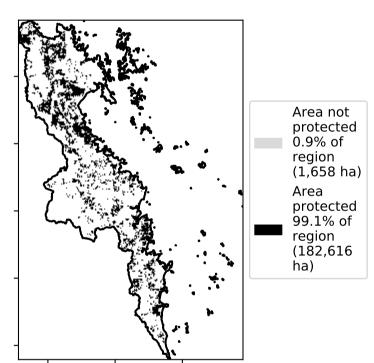
using baseline from 2001 to 2019.

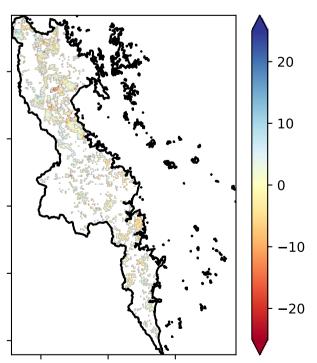
is only for the month of the map

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



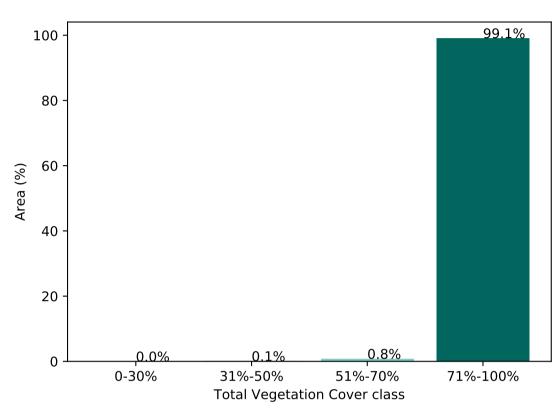
#### % Area protected from water erosion (>70%)



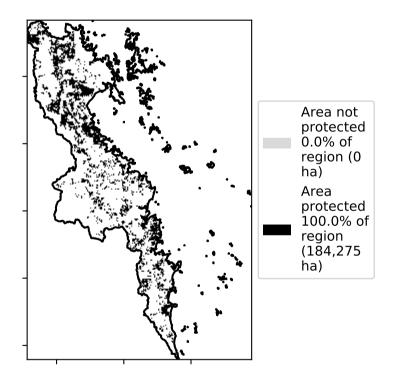


pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of the map using baseline from 2001 to 2019.

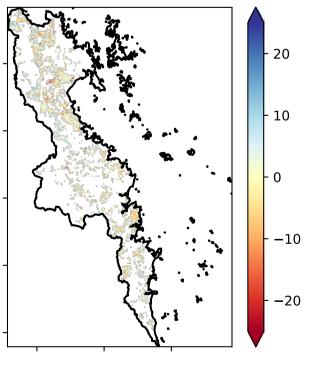
#### Proportion of vegetation cover class in area



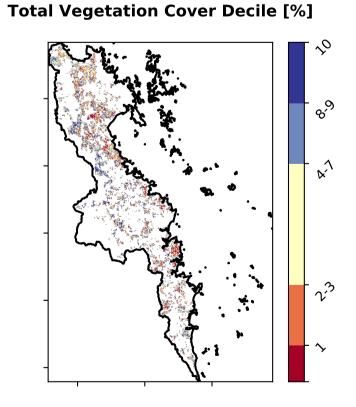
#### % Area protected from wind erosion (>50%)



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



Deciles show where the records for that month of







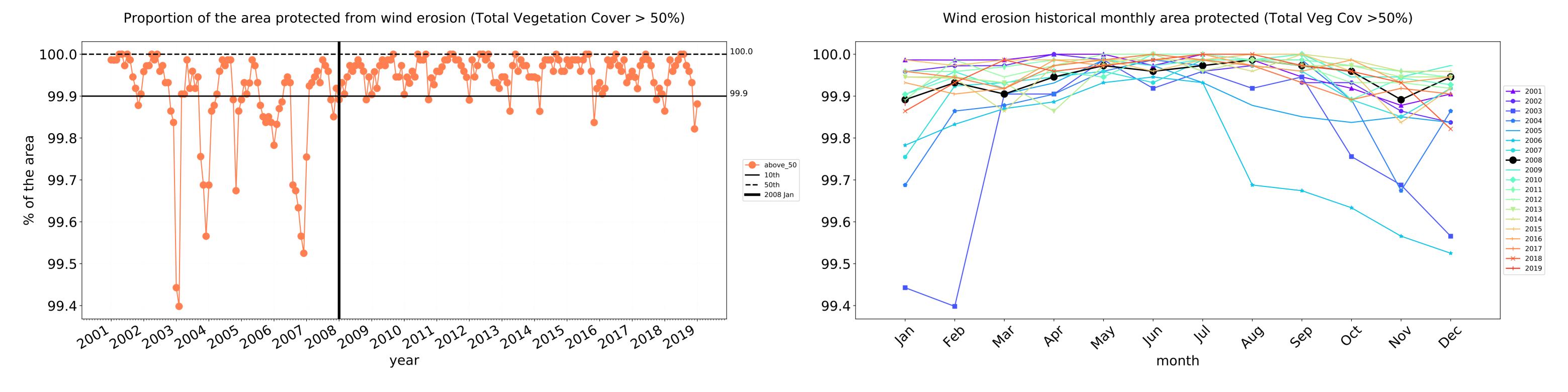


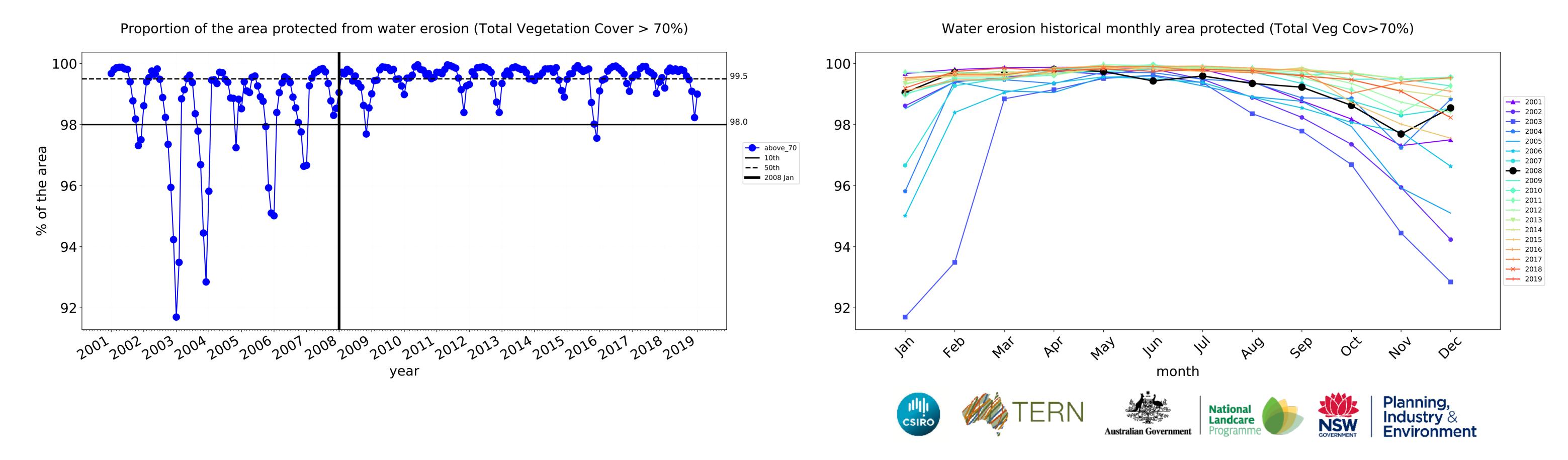


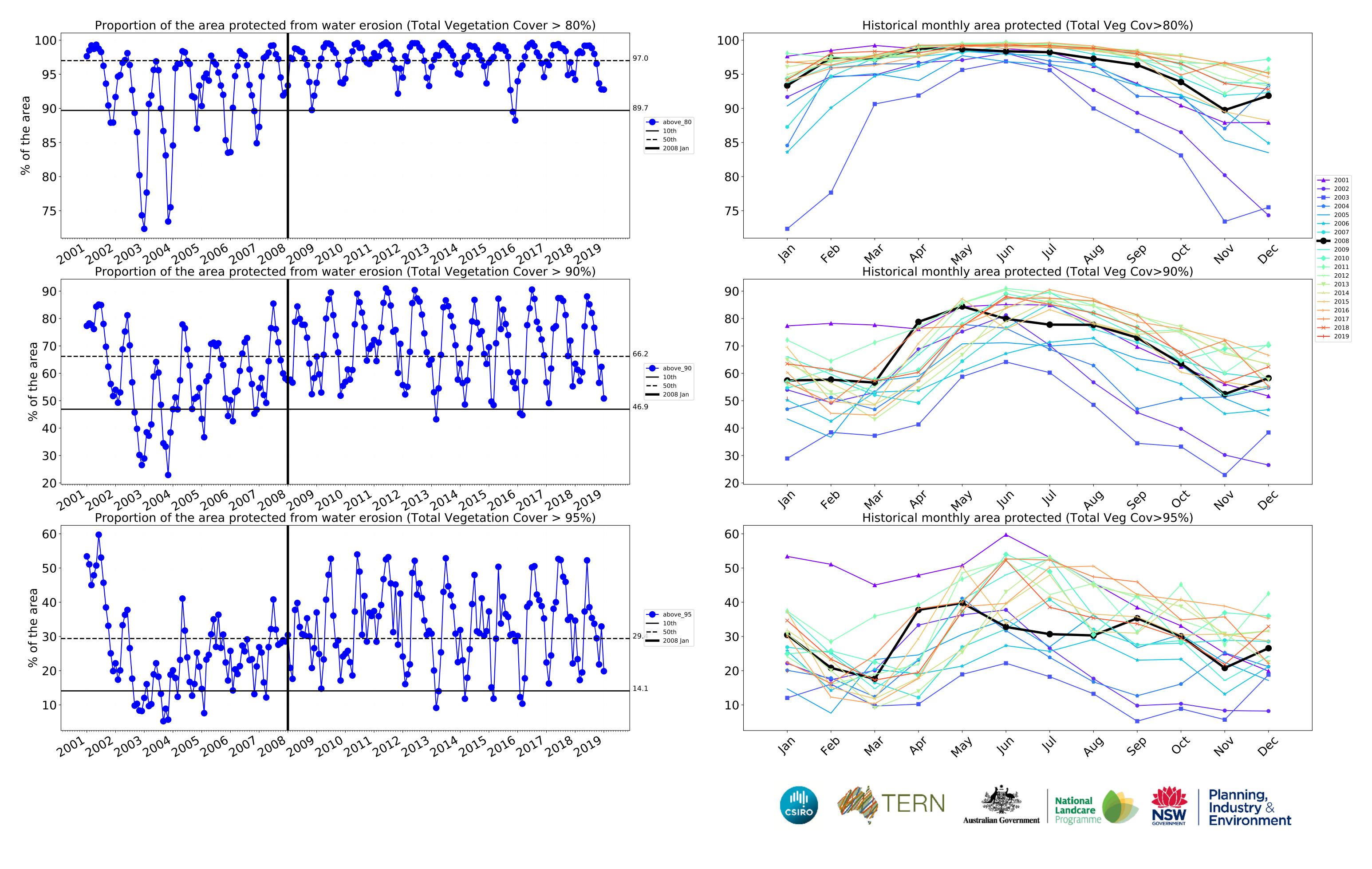




# **Grazing non forest timeseries**







# **Grazing Woodland forest**

#### Land use and forest cover

📕 1 Agriculture - Grazing - Woodland forest 🛭

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

Anomaly show how many percetage points each

pixel is from the mean. That

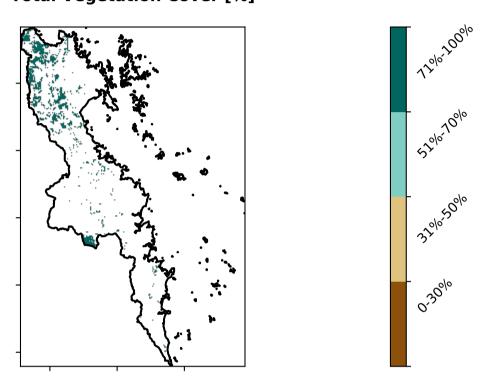
pixel. The mean

using baseline from 2001 to 2019.

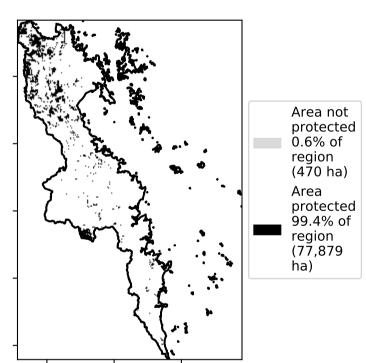
is only for the month of the map

is, red pixels are about 20% lower than the mean of that

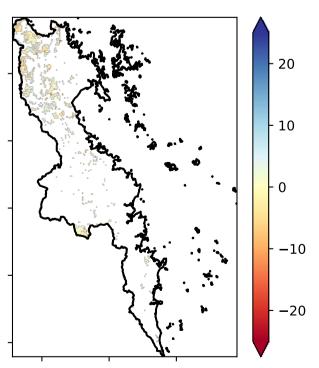
#### **Total Vegetation Cover [%]**



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

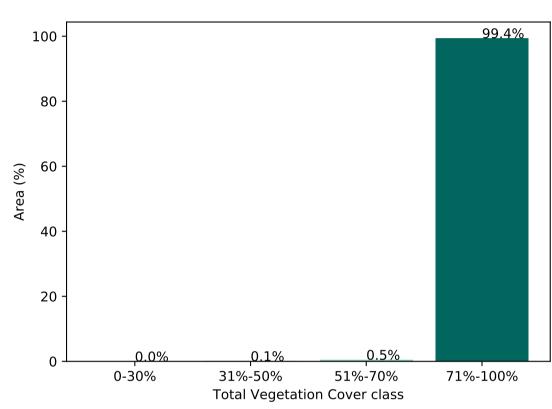


#### **Total Vegetation Cover Anomaly [%]**

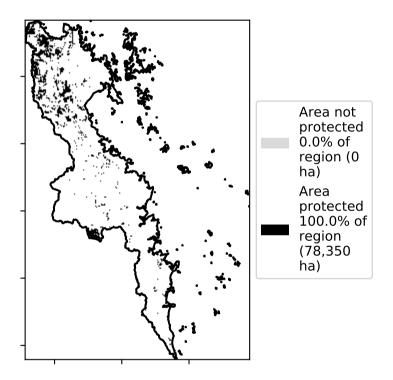


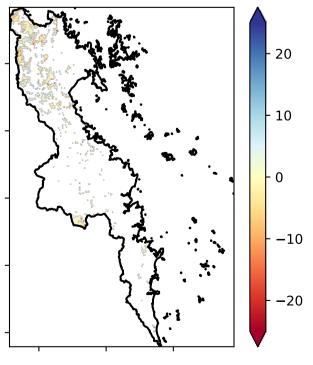
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of the map using baseline from 2001 to 2019.

#### Proportion of vegetation cover class in area

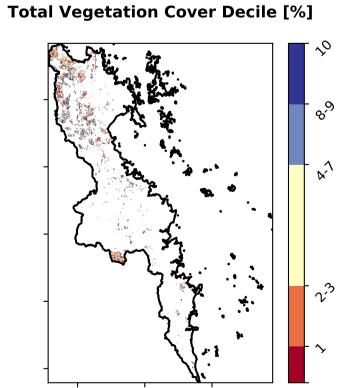


#### % Area protected from wind erosion (>50%)





records for that month of







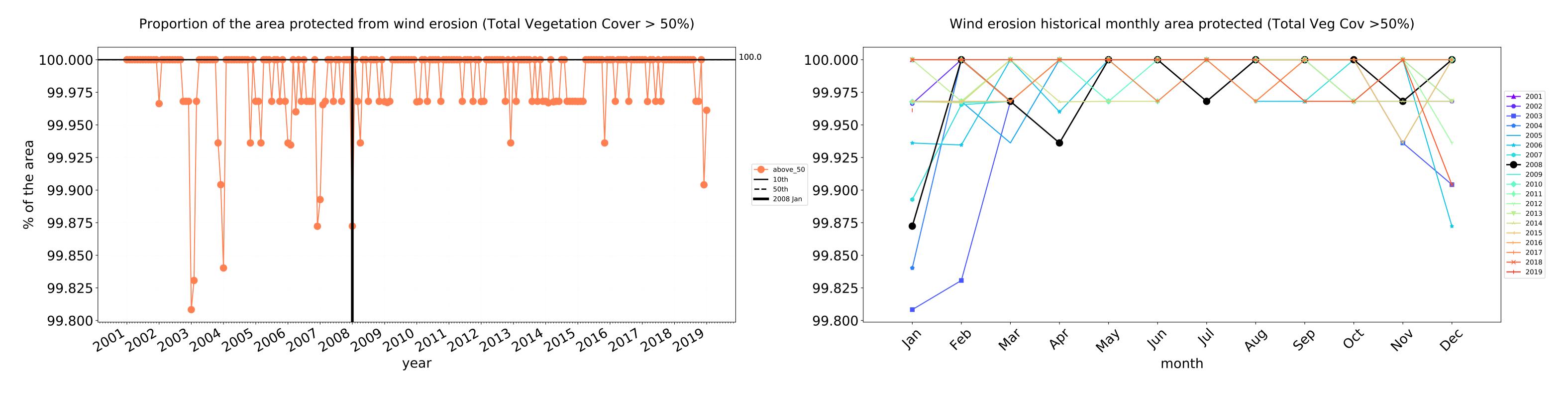


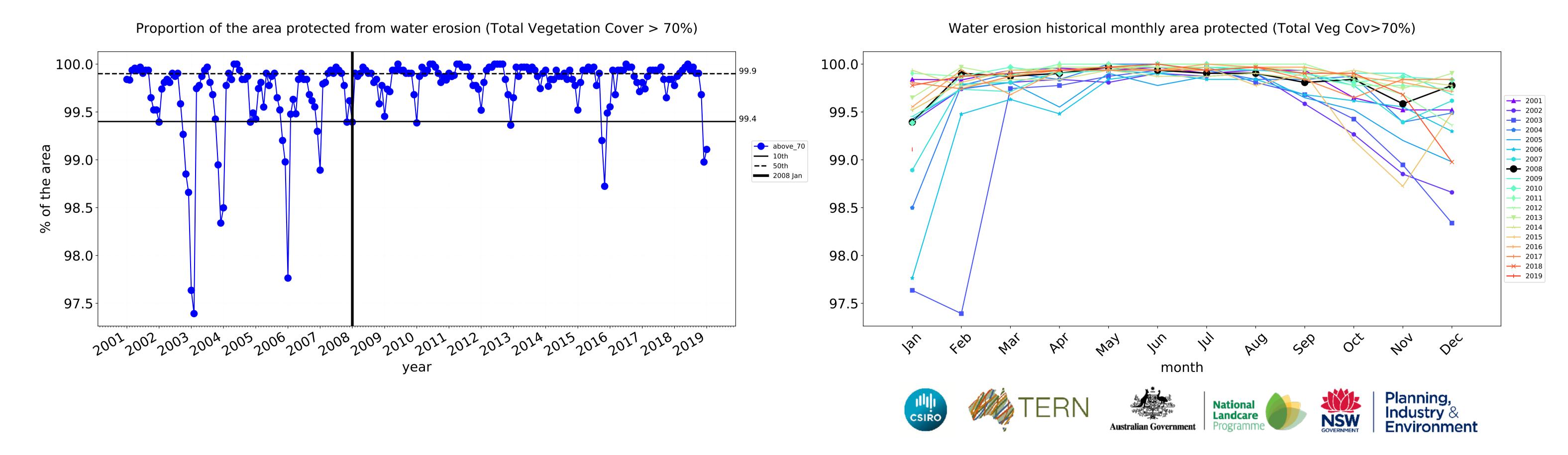


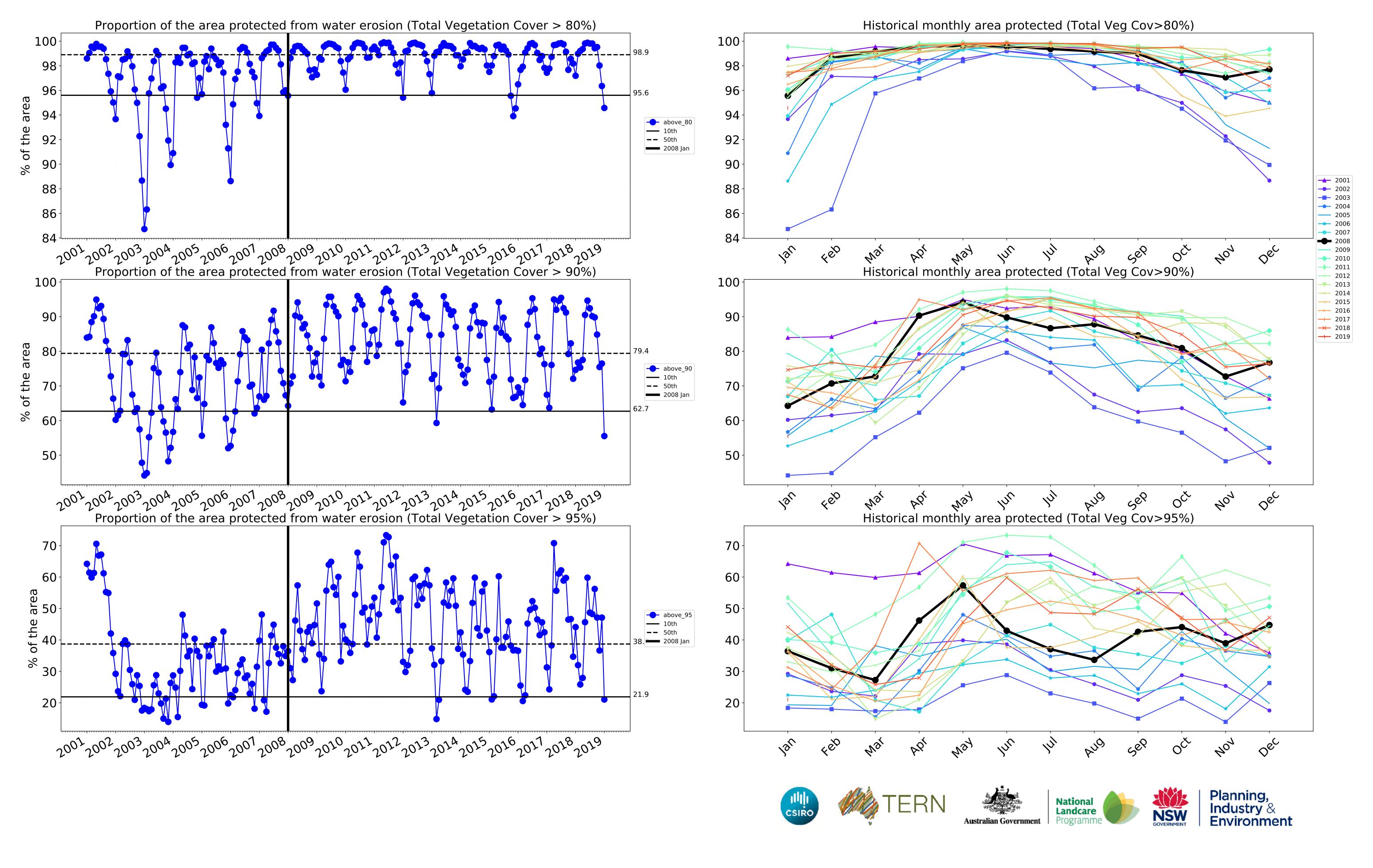




# **Grazing Woodland forest timeseries**







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

#### Land use and forest cover

1 Agriculture - Grazing - Non-woodland forest

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

Anomaly show how many percetage points each

pixel is from the mean. That

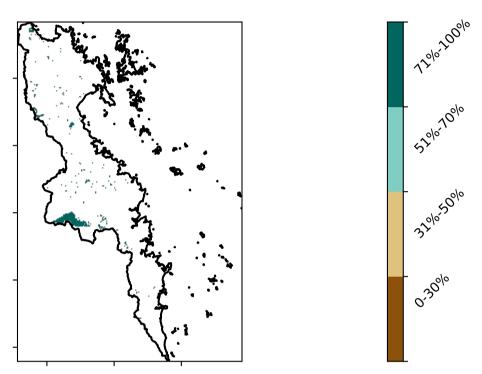
pixel. The mean

using baseline from 2001 to 2019.

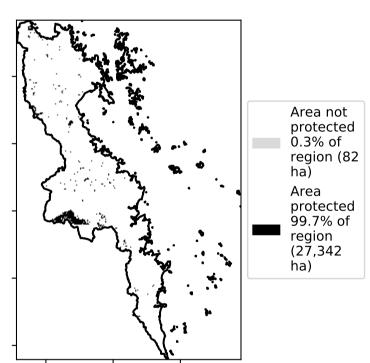
is only for the month of the map

is, red pixels are about 20% lower than the mean of that

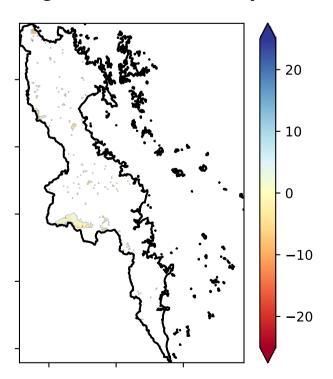
#### **Total Vegetation Cover [%]**



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

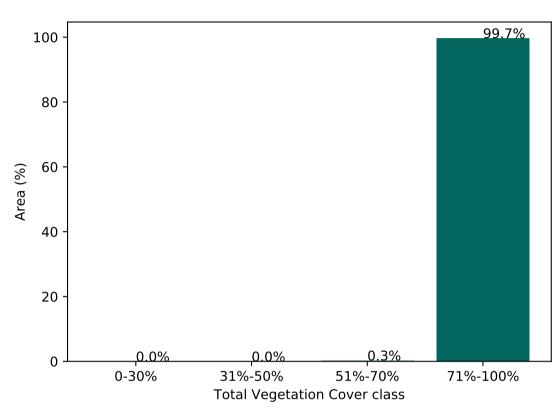


#### **Total Vegetation Cover Anomaly [%]**

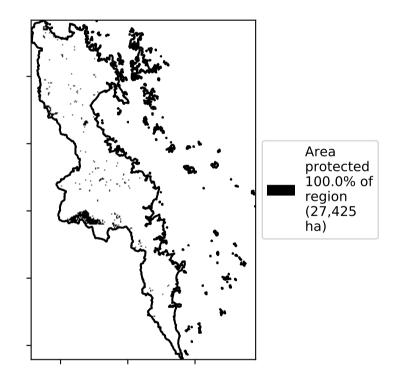


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

#### Proportion of vegetation cover class in area



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





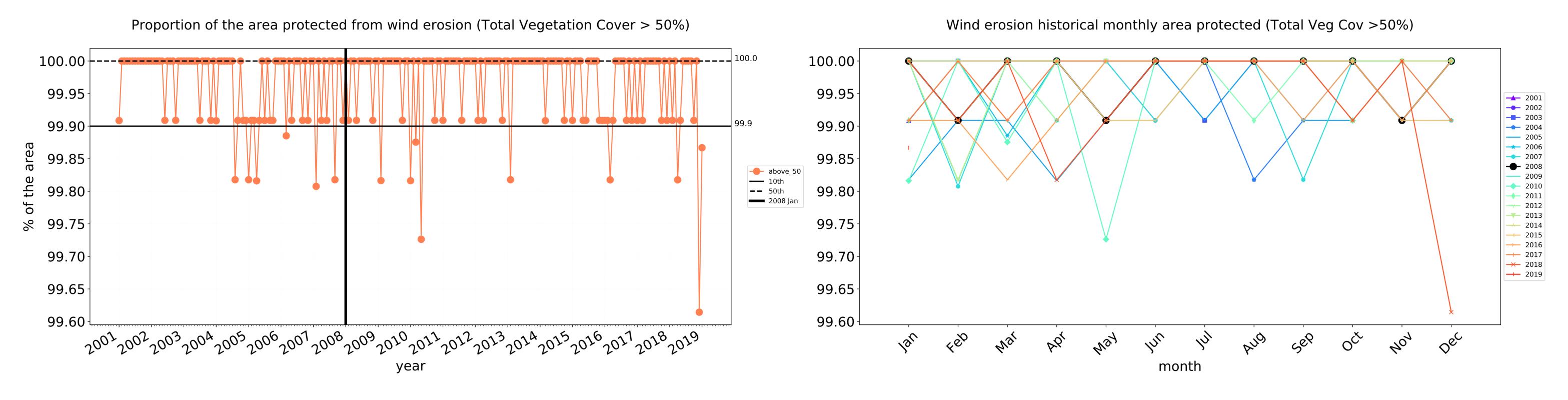


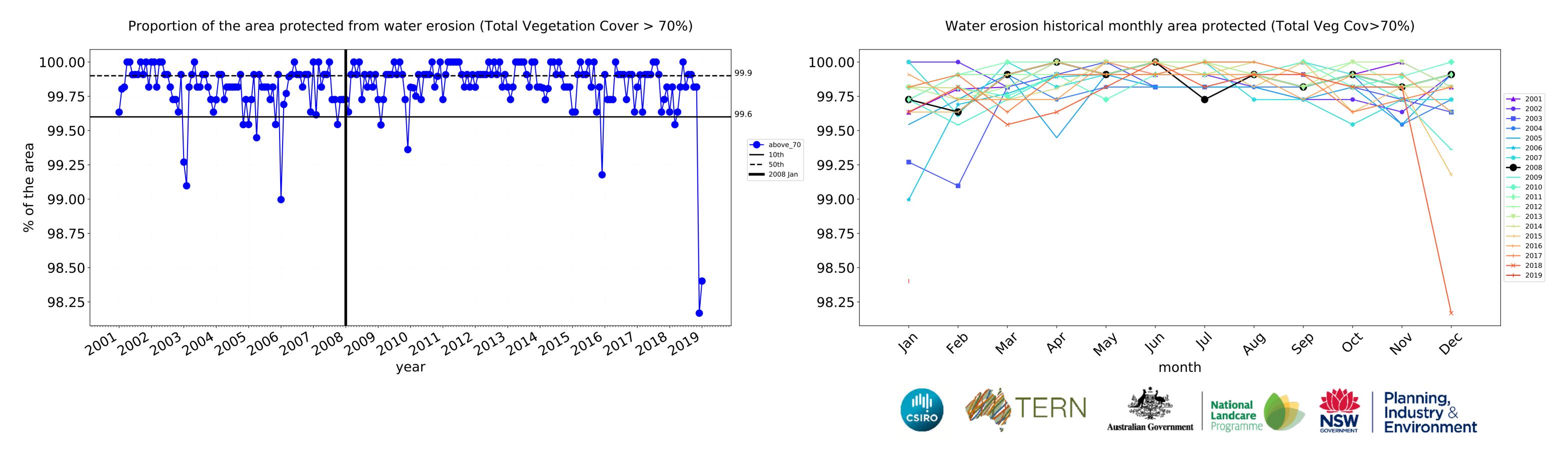


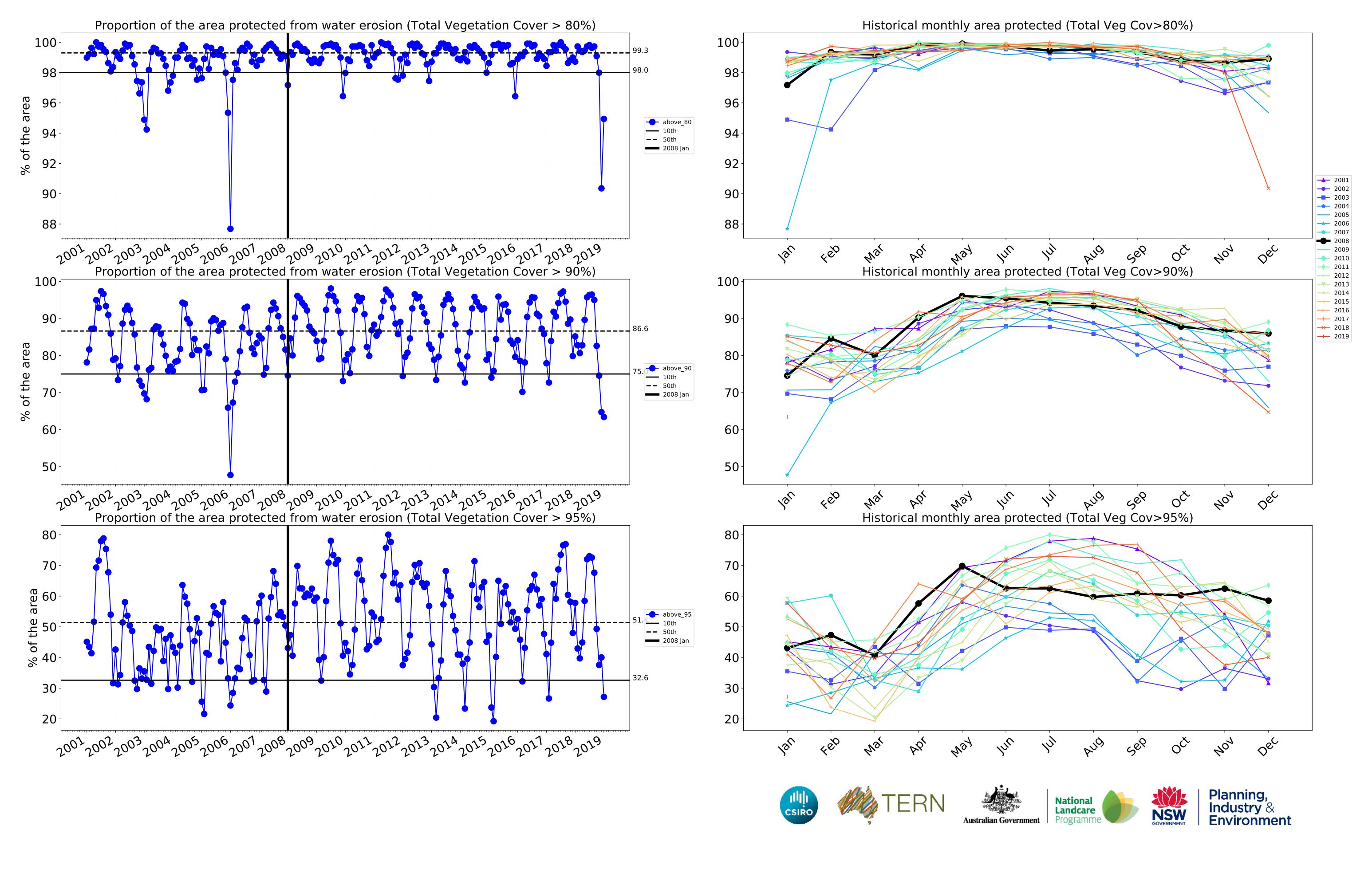












# **Irrigation**

#### Land use and forest cover

Catchment Scale Land Use and Forests of Australia (2018)

Catchment Scale Land

Derived from

Use of Australia (2018) and Forests

of Australia (2018)

Anomaly show how many percetage points each

pixel is from the mean. That

pixel. The mean

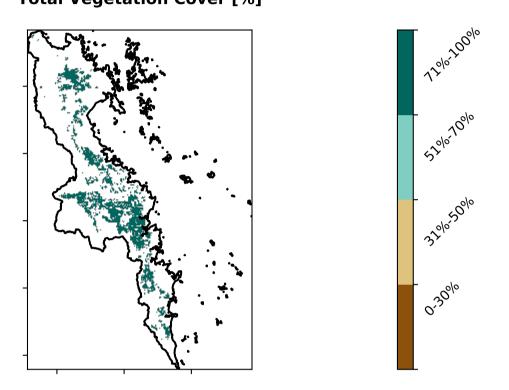
using baseline from 2001 to 2019.

is only for the month of the map

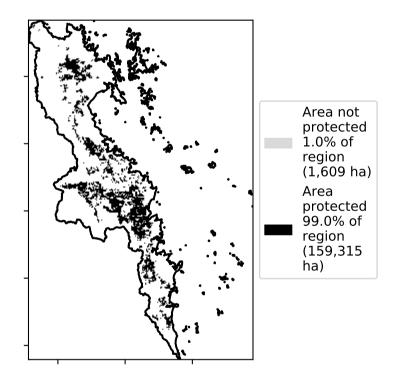
is, red pixels are about 20% lower than the mean of that

# 1 Agriculture - Grazing - Irrigated 2 Agriculture - Cropping - Irrigated 3 Agriculture - Horticulture - Irrigated

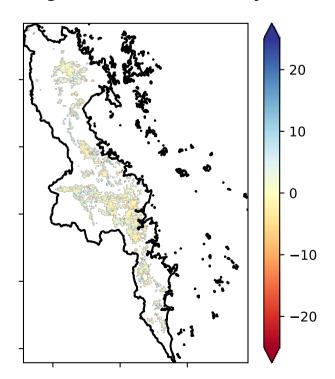
# Total Vegetation Cover [%]



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

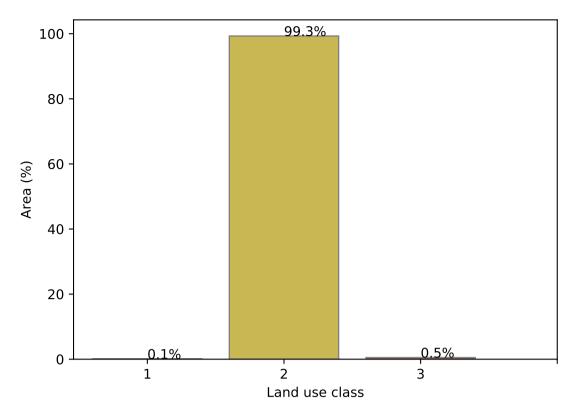


#### **Total Vegetation Cover Anomaly [%]**

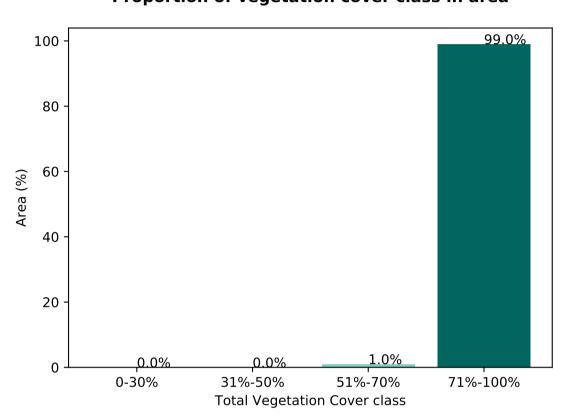


Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

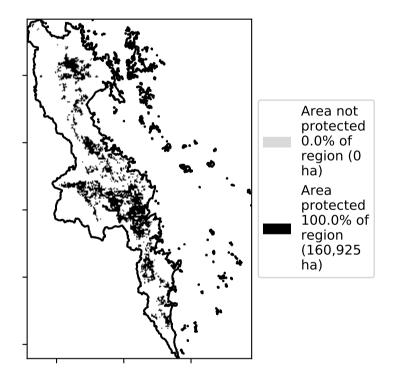
#### Proportion of each land class in area

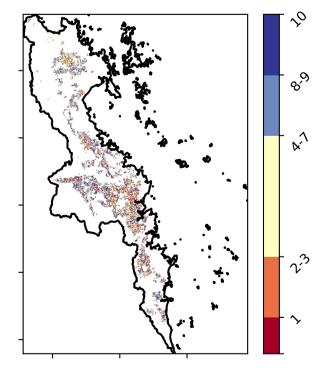


#### Proportion of vegetation cover class in area



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









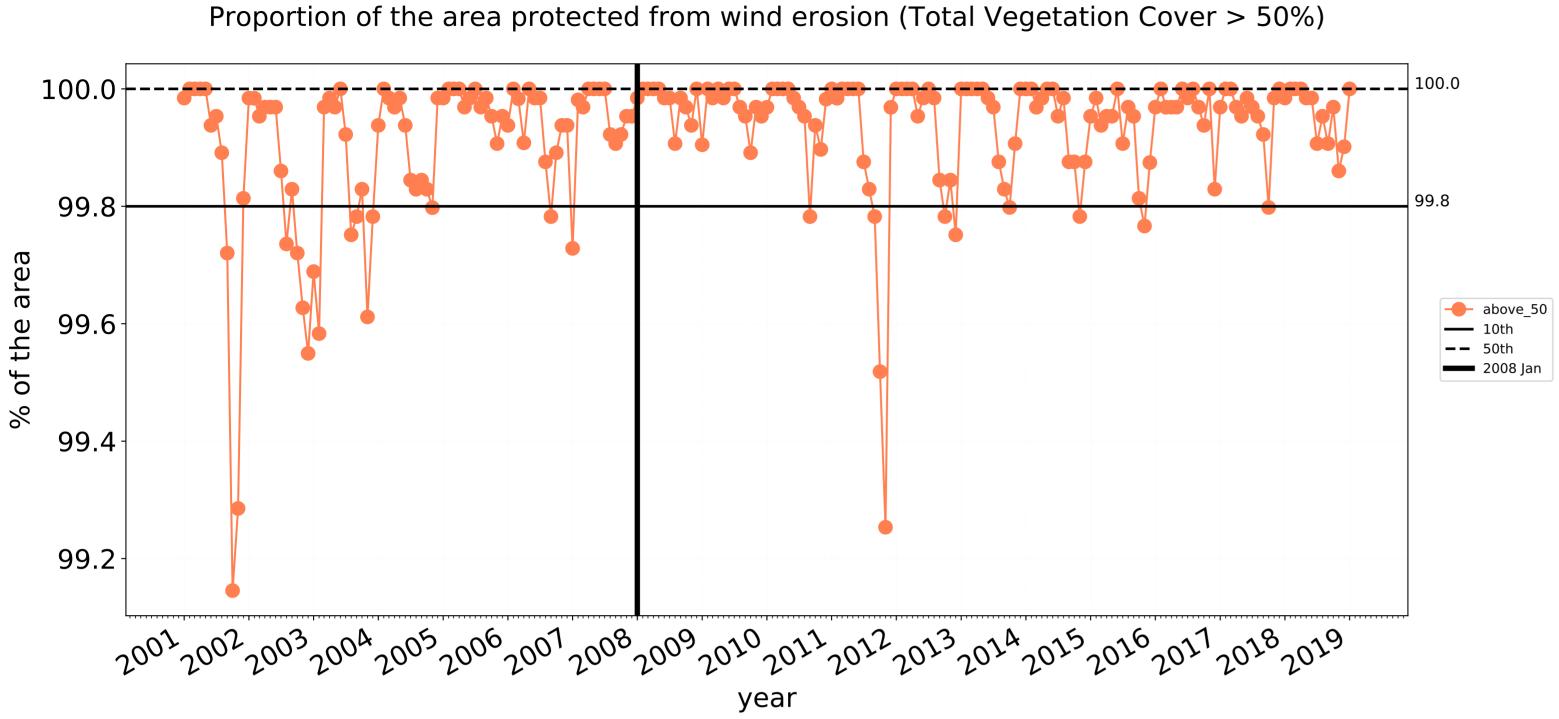


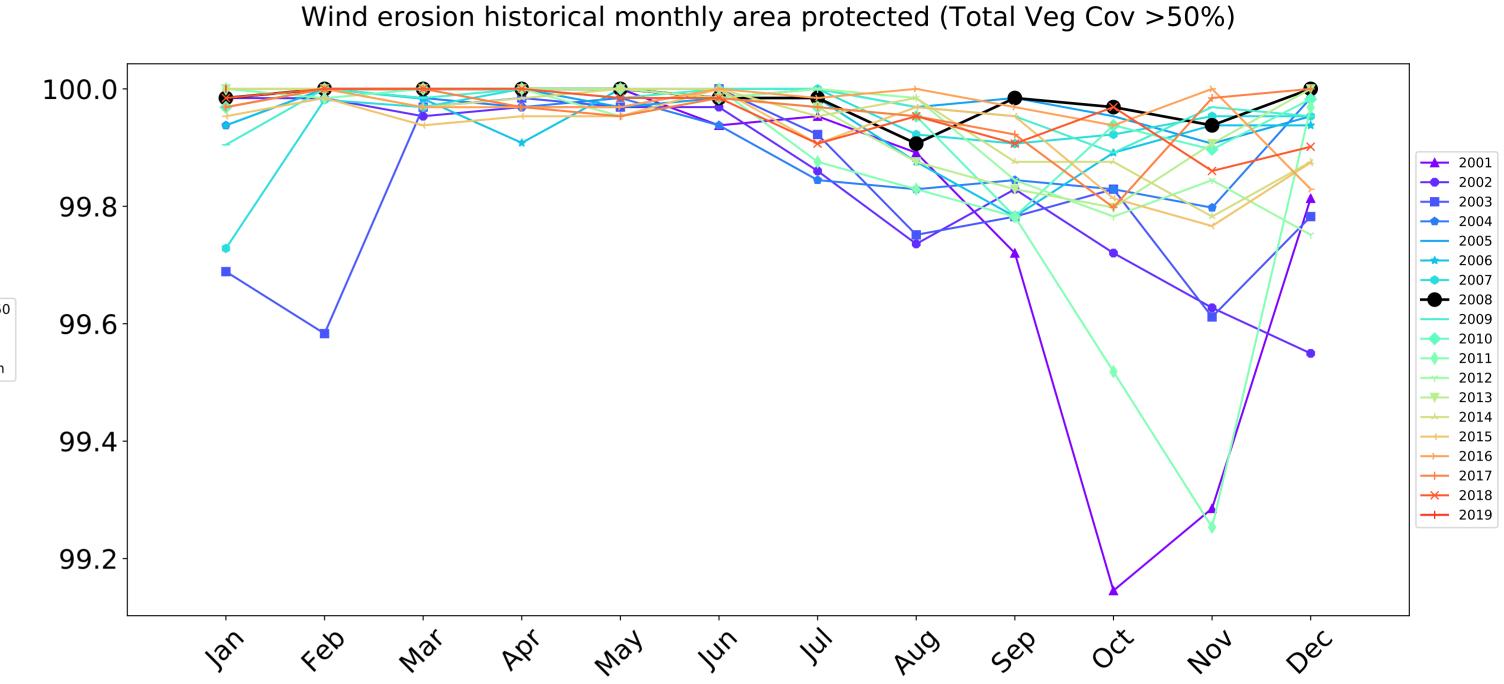




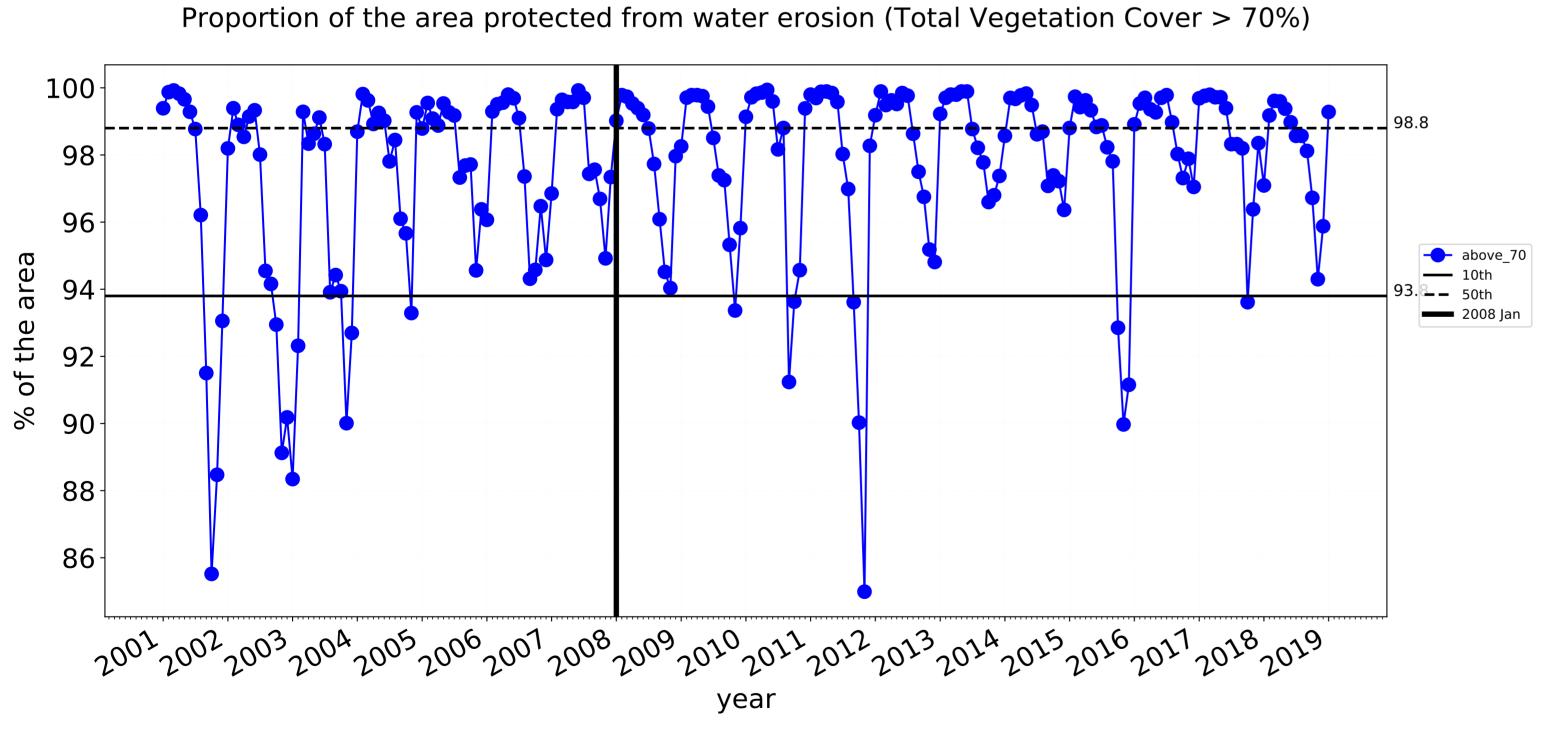


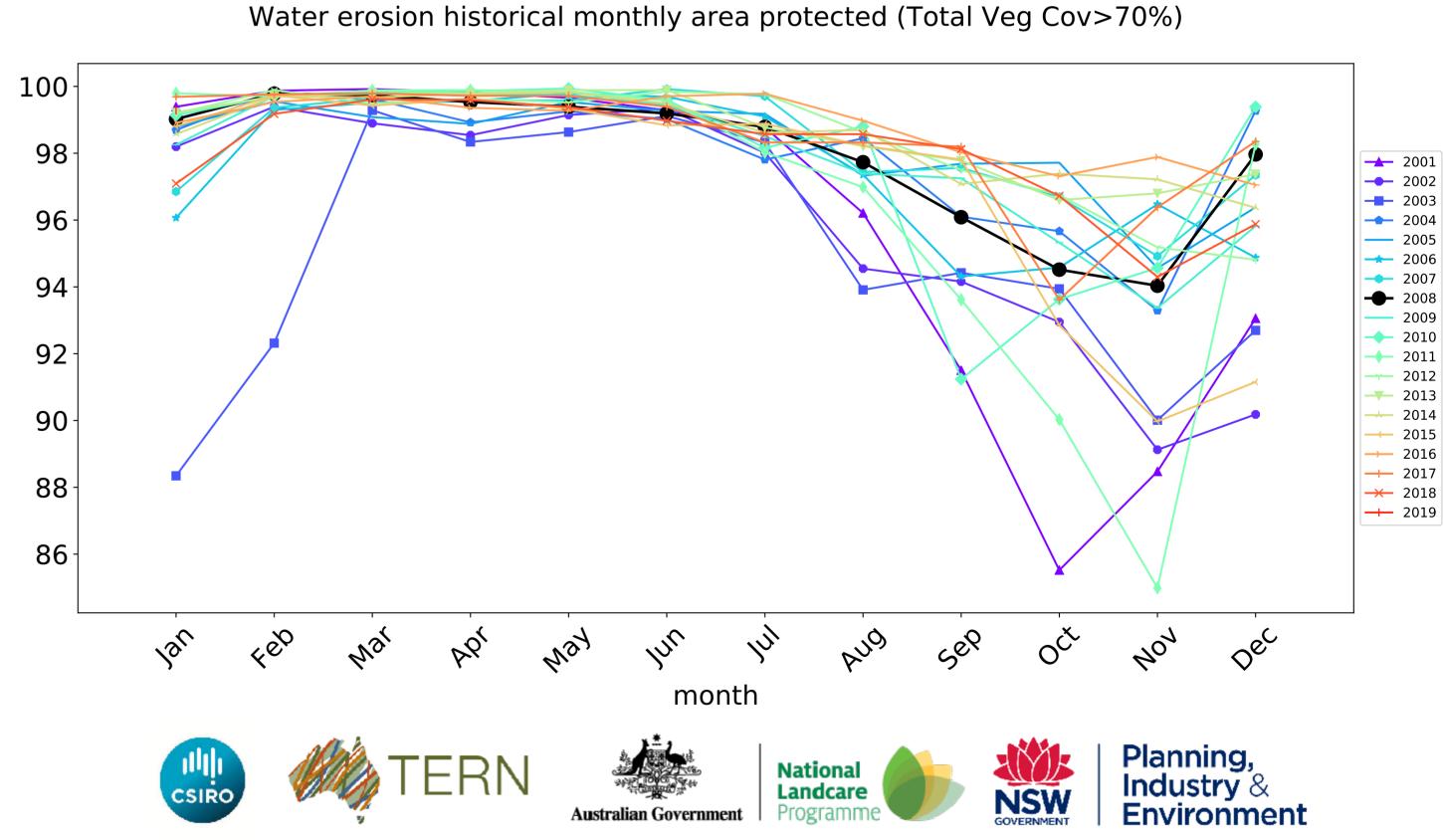
# Irrigation timeseries

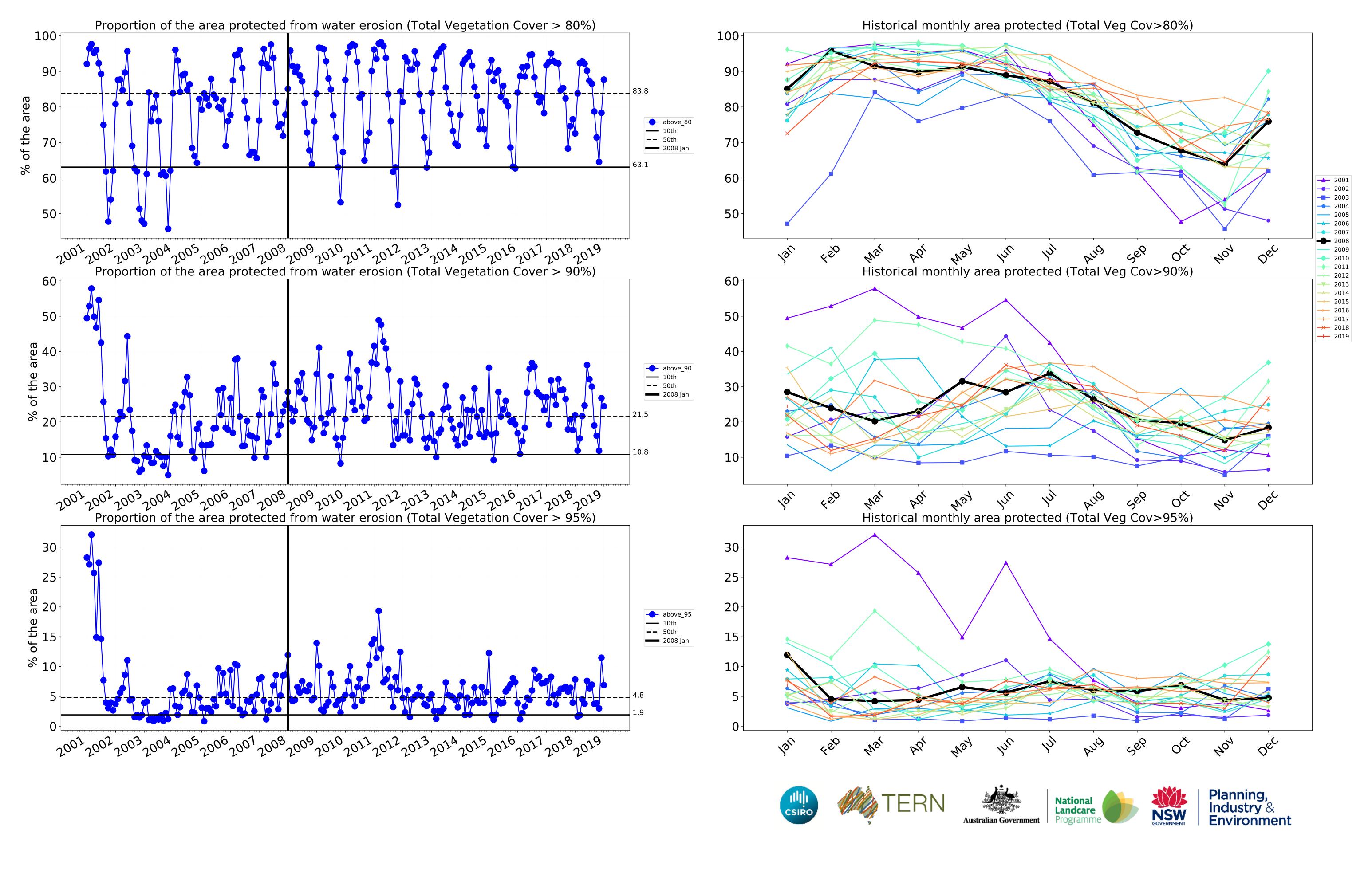




month







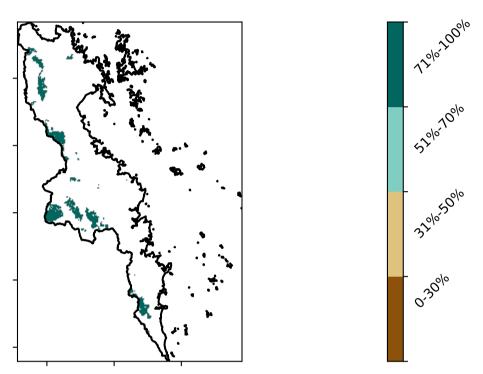
# **Production native forests and plantation forests**

#### Land use and forest cover

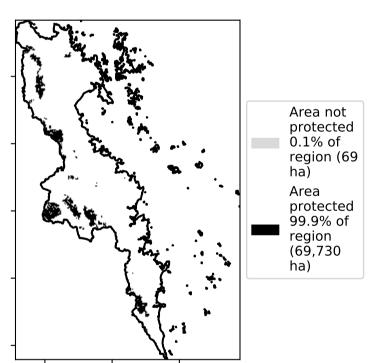
1 Production native forests and plantation forests

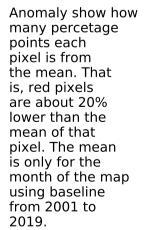
Catchment Scale Land Use and Forests of Australia (2018) Derived from Catchment Scale Land Use of Australia (2018) and Forests of Australia (2018)

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

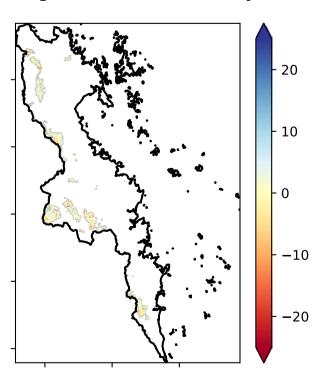


#### % Area protected from water erosion (>70%)



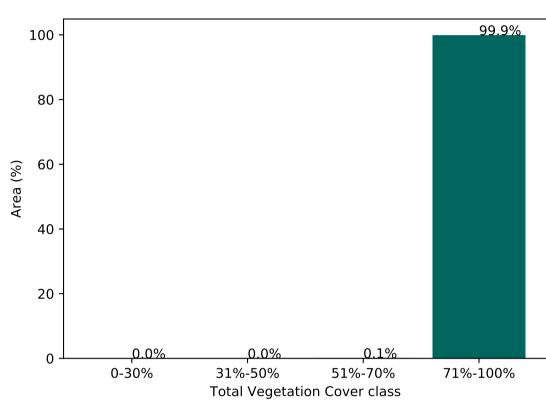


#### **Total Vegetation Cover Anomaly [%]**

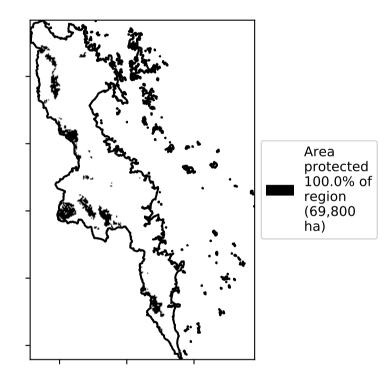


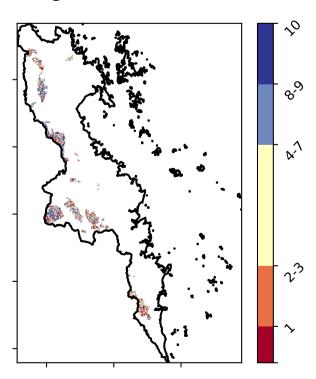
Deciles show where the pixel value lies in the record, from highest to lowest, for that month. That is, red pixels are in the lowest 10% of records for that month of the map using baseline from 2001 to 2019.

### Proportion of vegetation cover class in area



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









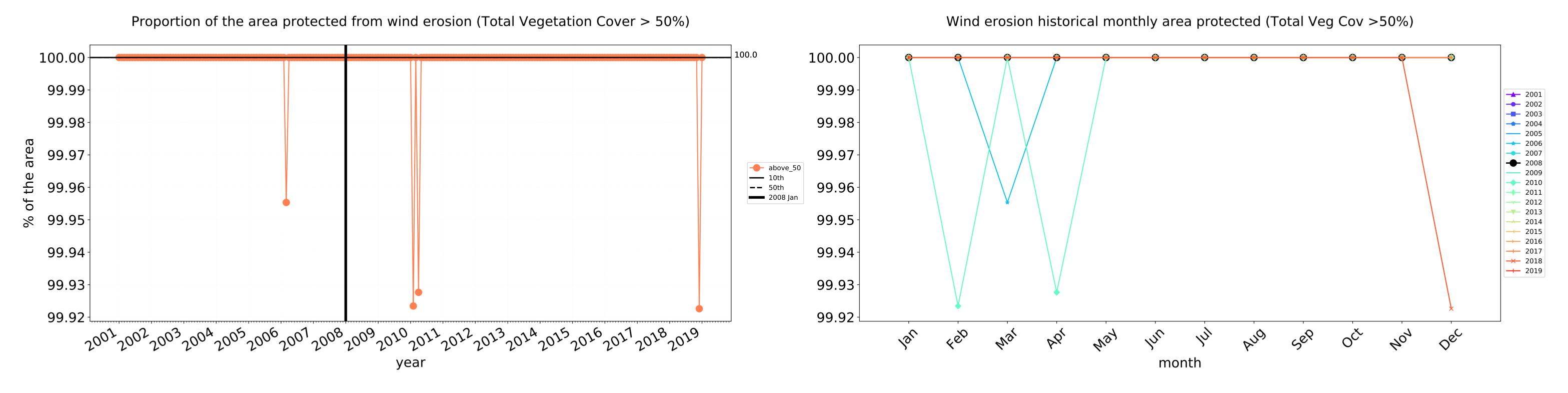


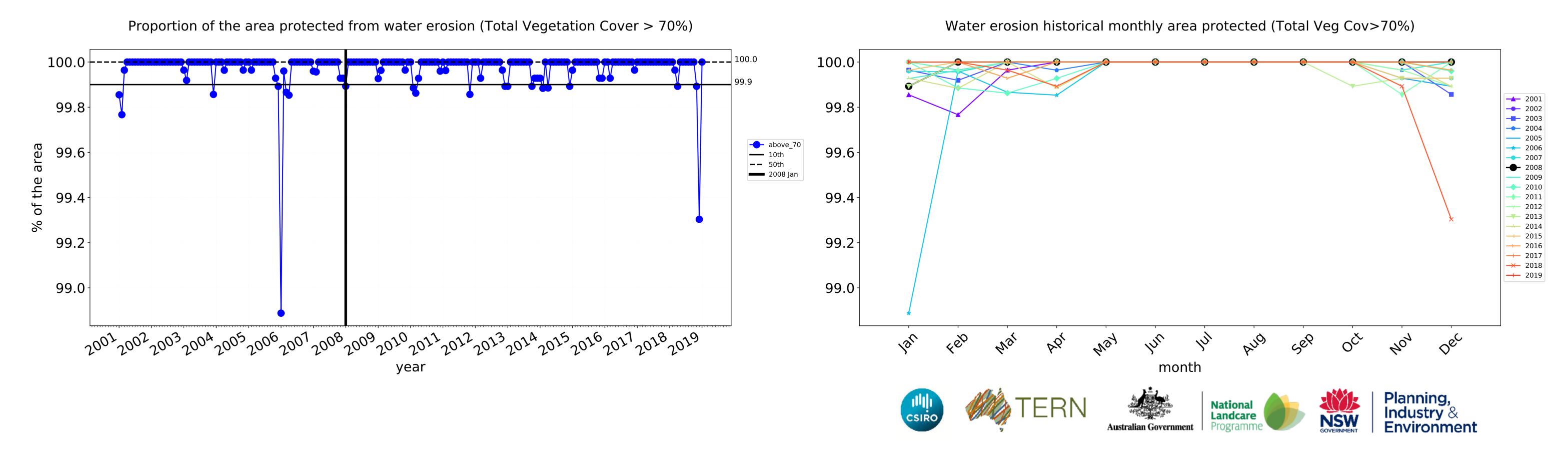


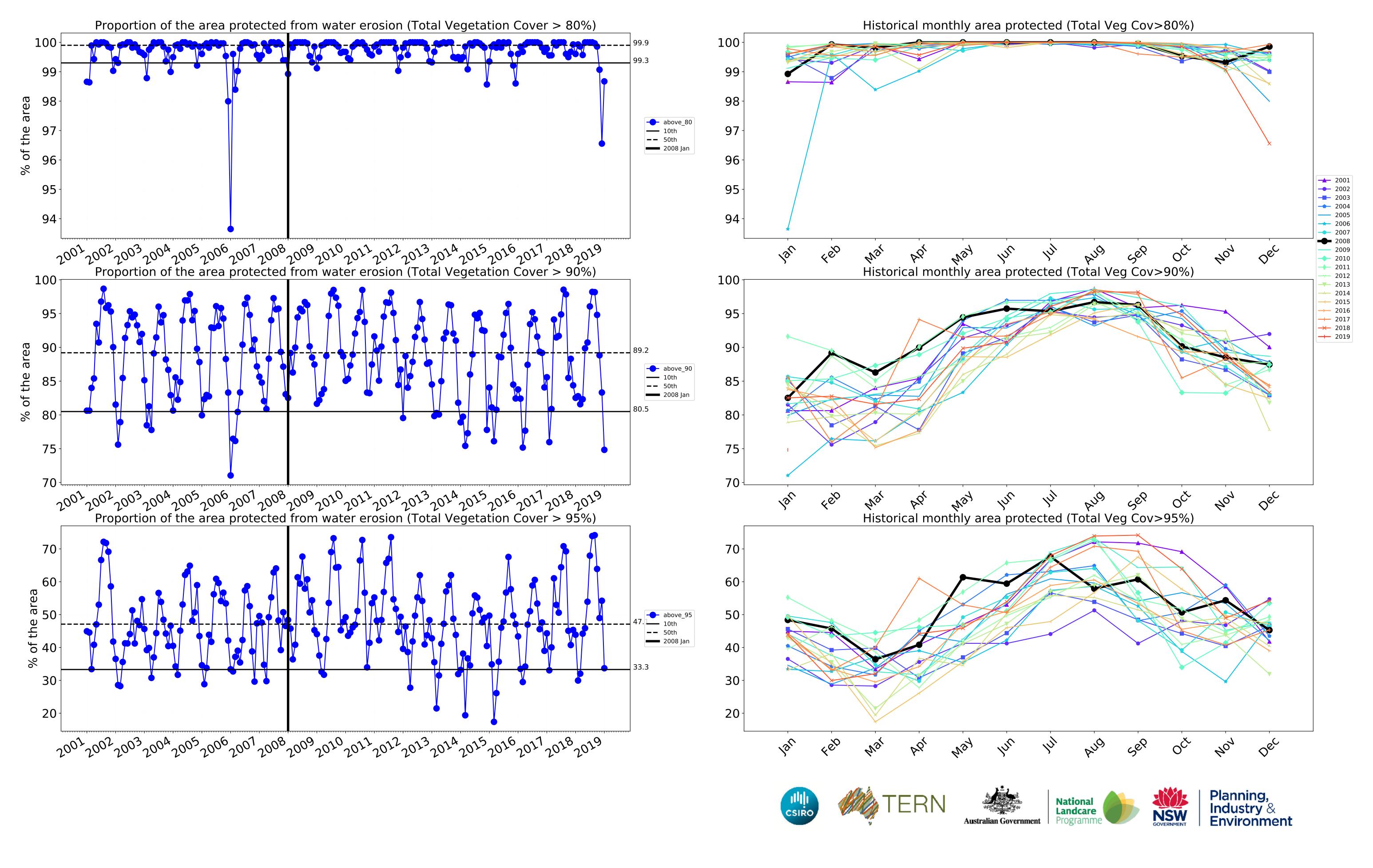




# **Production native forests and plantation forests timeseries**







# Mackay Whitsunday (661,725 ha and no data 271,335 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	661,725	99.9% 660,909	99.6% 658,852	98.0% 648,412	91.2% 603,351	58.1% 384,685	32.7% 216,512
Conservation and natural environments	250,475	99.8% 250,025	99.4% 249,000	98.2% 246,050	95.3% 238,825	74.0% 185,275	45.1% 113,050
Conservation and natural environments non forest	6,175	98.4% 6,075	96.4% 5,950	91.5% 5,650	81.8% 5,050	51.4% 3,175	32.8% 2,025
Conservation and natural environments Woodland forest	68,950	99.9% 68,850	99.6% 68,675	98.4% 67,825	94.9% 65,400	69.0% 47,600	40.3% 27,800
Conservation and natural environments Forest (non woodland)	175,350	99.9% 175,100	99.4% 174,375	98.4% 172,575	96.0% 168,375	76.7% 134,500	47.5% 83,225
Agriculture	451,025	100.0% 450,975	99.9% 450,700	99.1% 447,150	91.0% 410,575	49.3% 222,450	25.7% 115,700
Grazing	290,050	100.0% 290,000	99.9% 289,750	99.2% 287,750	94.3% 273,550	60.9% 176,550	33.3% 96,475
Grazing non forest	184,275	100.0% 184,250	99.9% 184,075	99.1% 182,525	93.4% 172,025	57.4% 105,750	30.4% 56,100
Grazing Woodland forest	78,350	100.0% 78,325	99.9% 78,250	99.4% 77,875	95.6% 74,875	64.3% 50,350	36.4% 28,550
Grazing - Forest (non woodland)	27,425	100.0% 27,425	100.0% 27,425	99.7% 27,350	97.2% 26,650	74.6% 20,450	43.1% 11,825
Irrigation	160,925	100.0% 160,925	100.0% 160,900	99.0% 159,350	85.1% 136,975	28.5% 45,875	11.9% 19,225
Production native forests and plantation forests	69,800	100.0% 69,800	100.0% 69,800	99.9% 69,725	98.9% 69,050	82.5% 57,600	48.4% 33,775











