



**Biodiversity and
Conservation Science**

Dirk Hartog Island National Park Ecological Restoration Project: Vegetation Restoration Program Report 2022/23

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Summary

Changes in vegetation cover across Dirk Hartog Island (DHI) were assessed using imagery from the Landsat satellite series, captured between 1988 and 2023 and photo point observations. From the analysis of these data the influence of the feral goat removal program is evident. A map identifying areas of significant vegetation cover change since destocking (2008) was also created. This suggests that to 2023, 39% of DHI has experienced a significant increase in vegetation cover, this is up from 37% in 2022. The area of sand dunes on the Island decreased by 5%.

Fieldwork was carried out in October 2022, with multi-spectral imagery from a remotely piloted aircraft (RPA) being captured across 28 sites. The imagery was captured with higher positional accuracy than previous years. Work is now underway to reprocess all the RPA imagery captured by the project to date so it can be analysed against the new imagery. The project has undergone several iterations of RPA imagery, but it is envisaged that the new imagery will be the standard for the foreseeable future.

An efficient workflow to process the new RPA imagery and analyse the changes against the historical imagery has also been developed, the development took slightly longer than expected, as a result a detailed analysis of vegetation cover change has only commenced at two of the 36 sites. However, at site AGWA657 the median shrub diameter increased from 1.8 m in 2015 to 2.7 m in 2022. Species identification will also be carried out using a combination of imagery and field checking.

An alternate approach to monitoring vegetation cover change using Landsat satellite imagery is also presented and the advantages and disadvantages of this approach are discussed.

Objectives for 2023/24:

- Analyse vegetation cover changes over DHI from Landsat imagery (1990 to 2023).
- Provide a report with summary statistics of vegetation change from analysis of Landsat imagery.
- Report on vegetation change related to destocking and goat removal.
- Complete field trips to collect field data in May 2023.
- Capture RPA imagery of monitoring sites and continue back-processing previously captured imagery to new standards.
- Expand species level assessments of plot level vegetation cover change.

1 Introduction

Satellite imagery is being used to report on vegetation recovery for the Dirk Hartog Island National Park Ecological Restoration Project (the Project). Objectives for 2022/23 were:

- Analyse vegetation cover changes over DHI from Landsat imagery (1990 to 2023).
- Provide a report with summary statistics of vegetation change from analysis of Landsat imagery.
- Report on vegetation change related to destocking and goat removal.
- Complete field trips to collect field data in October 2022 and May 2023.
- Complete analysis into changes in buffel grass extent/occurrence
- Capture drone imagery of exclusion plots and develop an automated processing, analysis and reporting workflow.

Achieving the 2023/24 objectives will help achieve the wider objective to:

- Evaluate vegetation recovery in terms of species diversity and cover and correlate to environmental and grazing factors.
- Gain a greater understanding of species level vegetation the change across the Island.

2 Progress

The following section outlines progress towards achieving the 2022/2023 objectives.

2.1 Vegetation Cover Change

The analysis of vegetation cover change has continued using the same methodologies as outlined in “DHI remote sensing report - 2016-17” (DBCA) delivered August 2017.

3 Results

3.1 Spatial extent of change

A map showing areas of significant vegetation change to 2009, 2013, 2017 and 2023 based on a 1988 to 2008 baseline are shown in Figure 1. Green areas indicate areas of significant vegetation cover increase, whereas orange and red indicate a reduction. Increases in vegetation cover are predominantly located in the southern third of the Island.

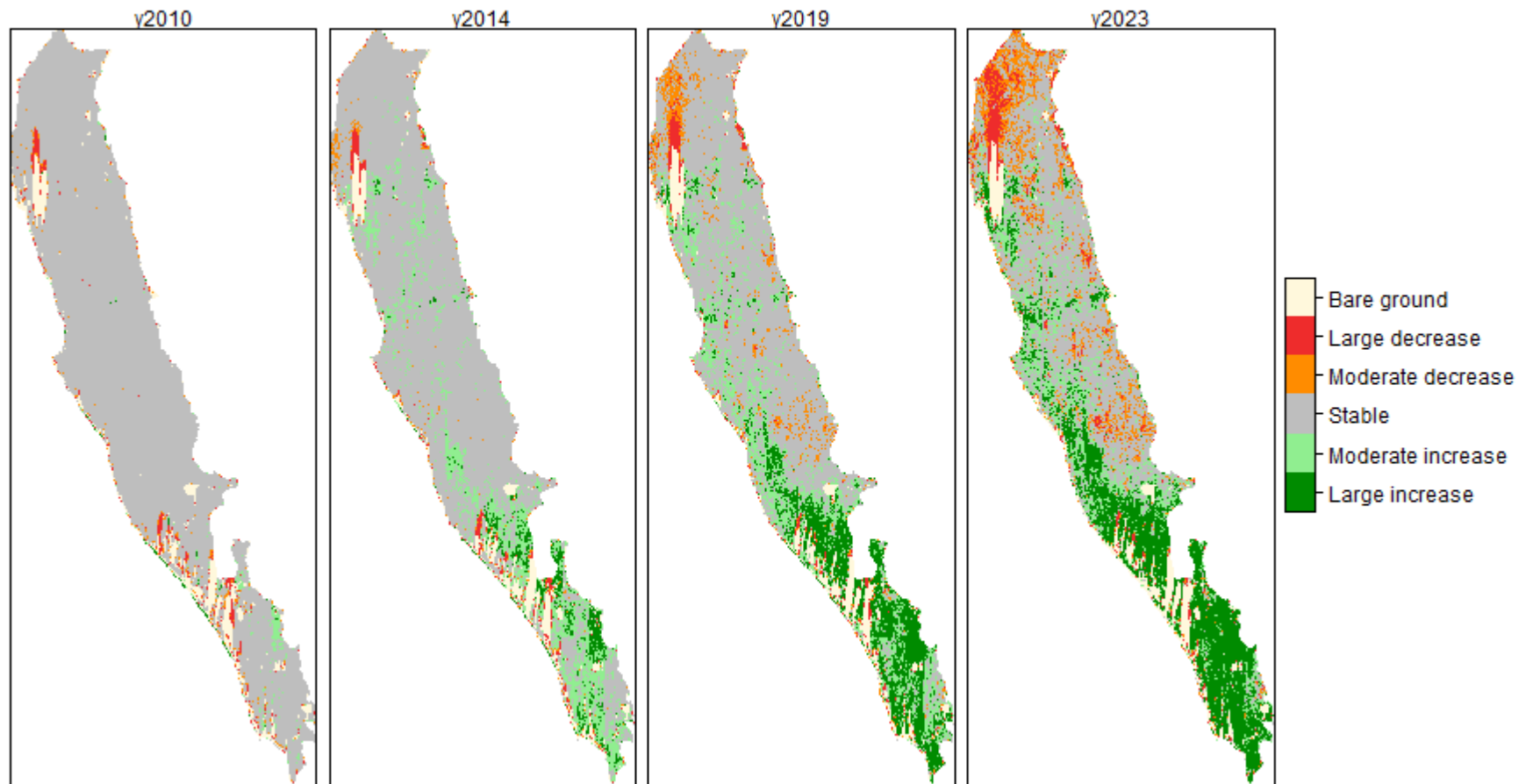


Figure 1: Significant vegetation cover change for years 2009, 2013, 2017 and 2023 based on the 1988 to 2008 baseline.

Area calculations for the classes in Figure 1 are shown in Table 1. The majority of DHI (39%) recorded no significant increase in vegetation cover since destocking, while 39% recorded either a moderate or significant increase. A decrease was recorded over 14% up from 11% in 2022. The area with decreasing cover is predominantly north of the north-western dune and is assumed to be due to the movement of sand.

Table 1: Percentage of area per change class for 2015 to 2023 on Dirk Hartog Island.

Class	2015	2016	2017	2019	2020	2021	2022	2023
Large increase	6	10	14	17	18	22	24	26
Moderate increase	16	17	17	16	14	14	13	13
Stable	67	61	55	53	50	45	42	39
Moderate decrease	2	2	3	5	7	8	9	9
Large decrease	2	2	2	2	3	3	4	5
Bare ground	8	8	10	8	8	8	7	9

Time series plots of three points located in areas of “decreasing” vegetation cover are shown in Figure 2. At the three locations selected vegetation cover since ~2020 has increased however the mean cover in the baseline period (pre 2012) is still higher than the post destocking period. The fact that these points are still in the “decreasing” class is a function of the lag in the cumulative sum statistic used in the imagery analysis.

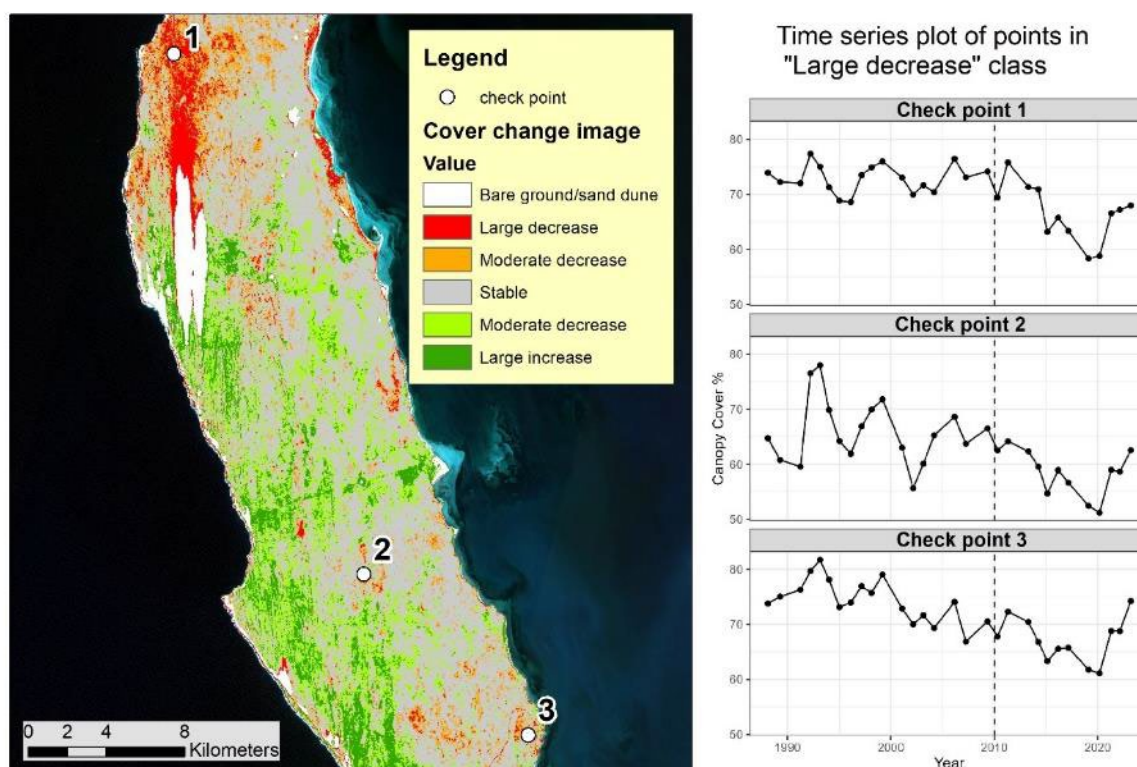


Figure 2: Areas of decreasing cover and vegetation cover timeseries plots.

An alternative way to monitor and report on vegetation cover change on DHI is to calculate the difference between current cover levels and the pre-destocking (2008) mean (Figure 3). Using this approach, the change classes can be described in a quantitative manner in terms of percent decrease or increase. The main drawback of this approach is that the statistics tend to fluctuate by ~10 % annually as seasonal effects push areas from one class to the next.

The advantage of the cumulative sum approach, used in Figure 1, is that it only picks up a sustained change from the baseline. However, this now seems ineffective as small changes, even 1 to 2 %, which have been sustained since 2008, are mapped as “significant”. While a change of this manner may be statistically significant, it is unlikely to be ecologically significant. Additionally, areas where vegetation cover has dipped, and returned to pre-destocking levels are continually mapped as having a decrease for a number of years after they have recovered.

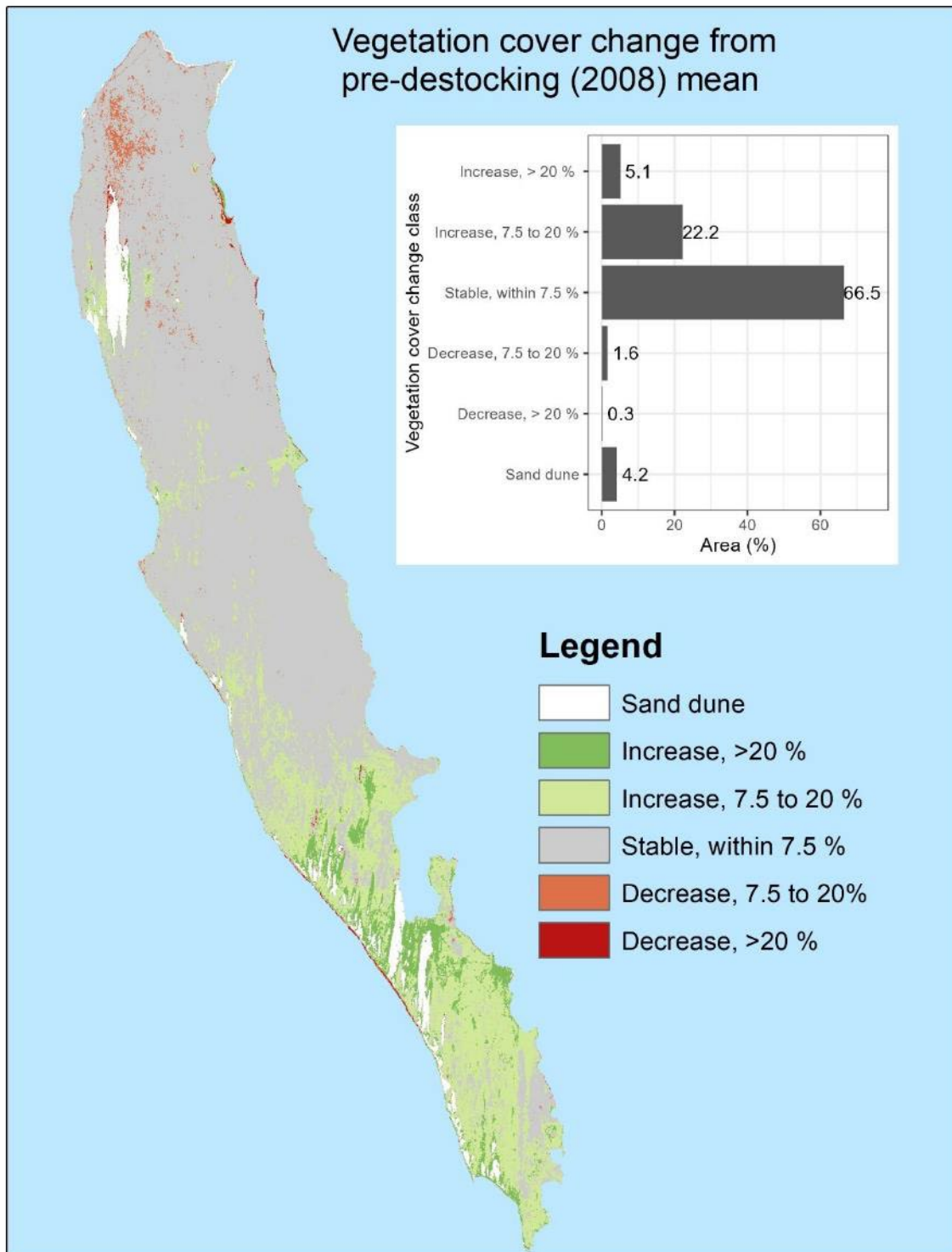


Figure 3: Vegetation cover change from pre-destocking (2008) mean on Dirk Hartog Island.

3.2 Sand dune extent changes

The area of sand dune extent on DHI over the period 1957 to 2023 is shown in Figure 4. The area of sand dune on the southern third reached a maximum of 2402 ha in 2009 and is now 1429 ha.

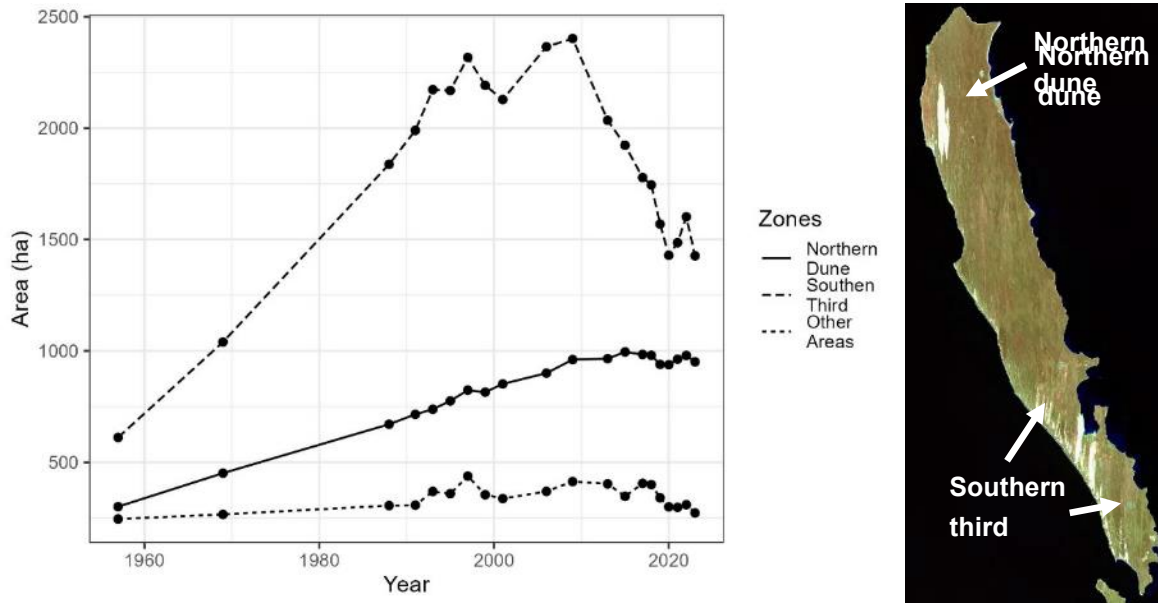
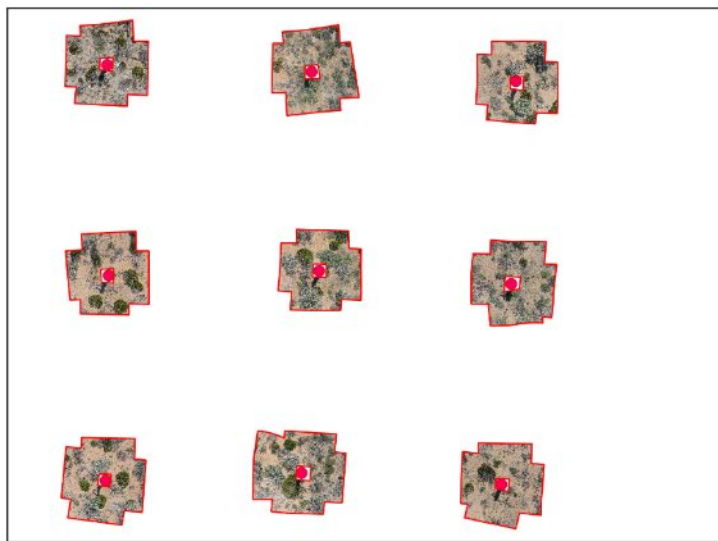


Figure 4: Sand dune extent changes across Dirk Hartog Island from 1957 to 2023.

3.3 Vegetation change

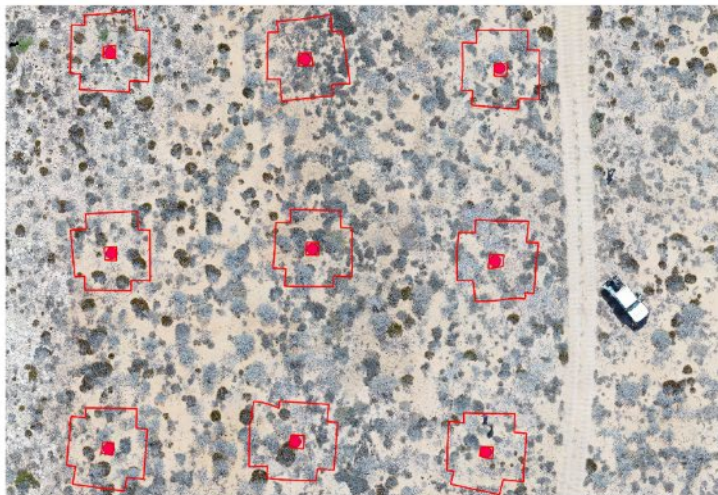
With the advancement of RPA technology comes the task of aligning previously captured imagery to the new, more accurate, positions. This is quite a large task which will be completed in the next few years. However, once this data is aligned detailed and comprehensive assessments of vegetation change can be made. An example of this is shown below.



Site 5 - 2015

Nadir (top down) photographs extent for each photo point recorded at site 05. 4 photographs are taken from the centre of each photo point.

0 5 10 15 20 meters



Site 5 - 2018

2018 drone capture with locations of photo points and areas covered by nadir photographs at each photo point, shown with red lines.

0 5 10 15 20 meters



Site 05 - 2022

2022 drone capture with locations of photo points and areas covered by nadir photographs at each photo point, shown with red lines.

0 5 10 15 20 meters



□ 2015 Nadir photograph extent
● Photo points

Figure 5: Photographic monitoring data of DHI vegetation monitoring site 5, from nadir photography in 2015, to RPA imagery in 2018 and 2022.

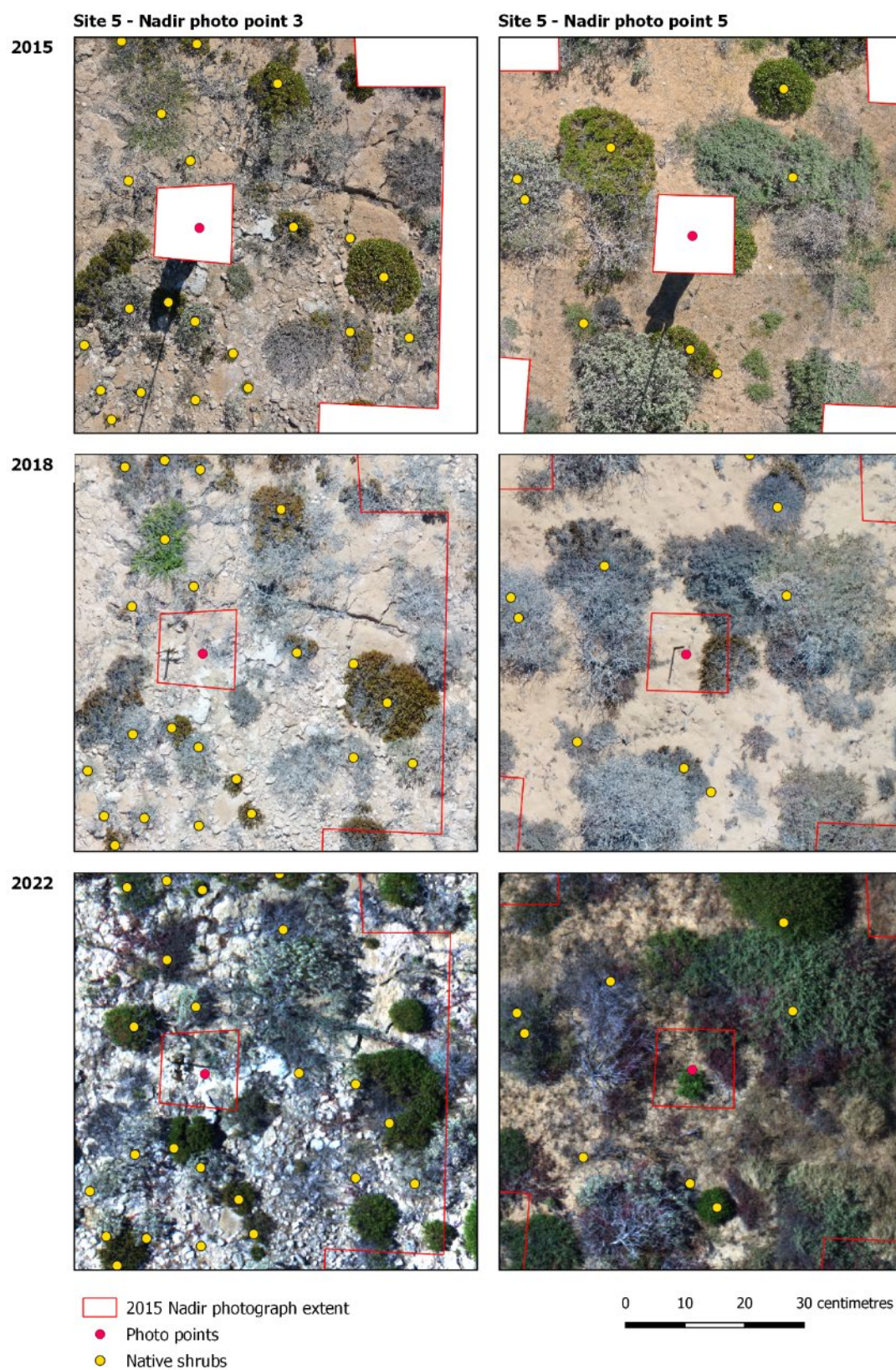


Figure 6: A zoomed in view of photographic data from two points within vegetation monitoring site 5.

For sites AGWA657 and DHI05 the longest and shortest diameters of as many individual plants as possible was manually digitized from imagery from 2015, 2018 and 2022. The data was then grouped by year and is displayed as boxplots in Figure 7. T-tests between each pair of measure were added to the figure.

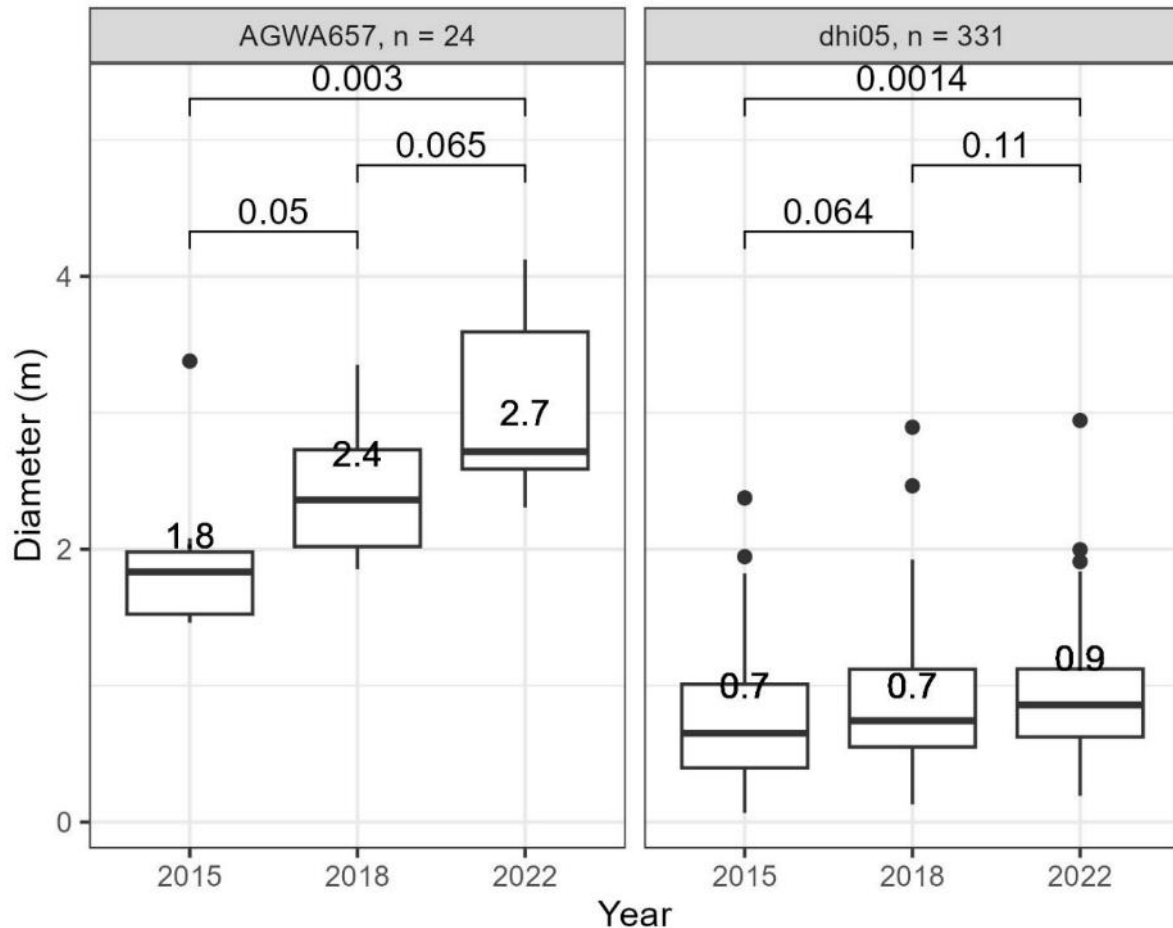


Figure 7: Shrub diameter measures from sites AGWA 657 and DHI05 from 2015, 2018 and 2022.

The shrub diameter statistics can be broken down further and analysed by species. At this stage species identification has only been carried out directly from the RPA and nadir photography and is incomplete. This shows that (unfortunately) the most significant increase has occurred in species that are yet to be identified ("NoID").

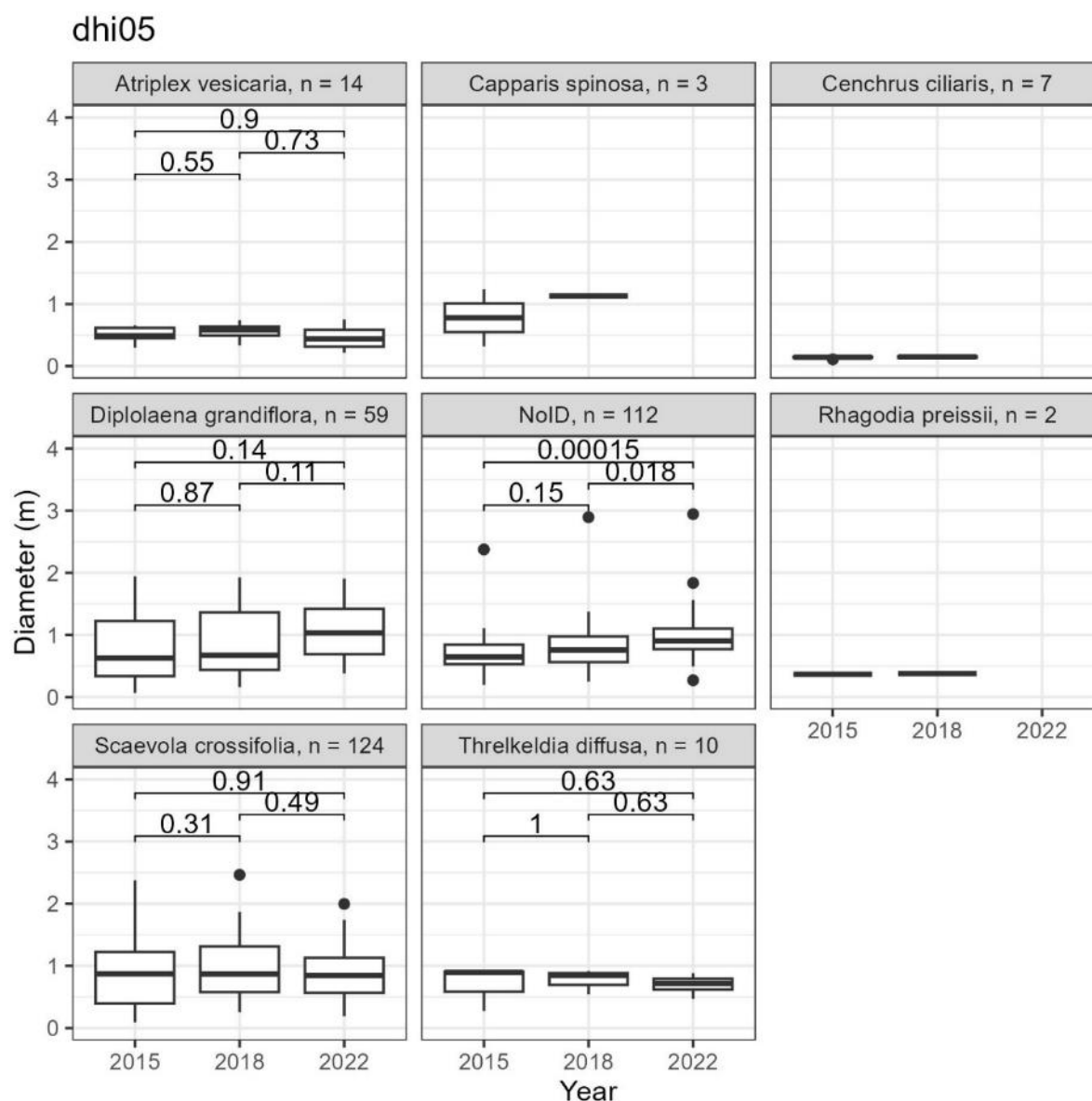


Figure 8: Species level shrub diameter change for site 5.

3.4 Monitoring site observations and analysis

Site data for all photo point monitoring sites and sites added in 2014 are shown in the Appendix. Site descriptions were recorded by Greg Keighery (Senior Principal Research Scientist, DBCA) in 2014, 2016 and 2018.

Photo point photos are shown. Time series graphs of canopy cover from 1988 to 2019 are shown as are cusum charts. The aim of cusum charts is to determine if significant changes to vegetation cover have occurred since destocking (2008). The 1988 to 2008 time period is used as a baseline to assess significant change.

Appendices 1

The following time series graphs show vegetation cover derived from Landsat satellite data from 1987 to 2023 and mean (1987 to 2008) baseline (top). CUSUM chart with 3 standard deviation control line (bottom).

Site 1

Description:

Low Very Open Shrubland (2% cover); 0.5-1 metres *Acacia ligulata* with rarely recorded *Acacia tetragonophylla*.







Low shrubland (30-70% cover) 0.3- 0.5 metres of *Thryptomene baeckeacea* and *Melaleuca cardiophylla*, with rarely recorded shrubs of *Stenanthemum* sp., *Persoonia* sp., *Halgania cynaea* and *Olearia axillaris*.

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*.

Over scattered herbs and low shrubs (<2% cover) of *Halgania cyanea*, *Cassytha* sp., *Logania* sp. and *Dianella revoluta*.



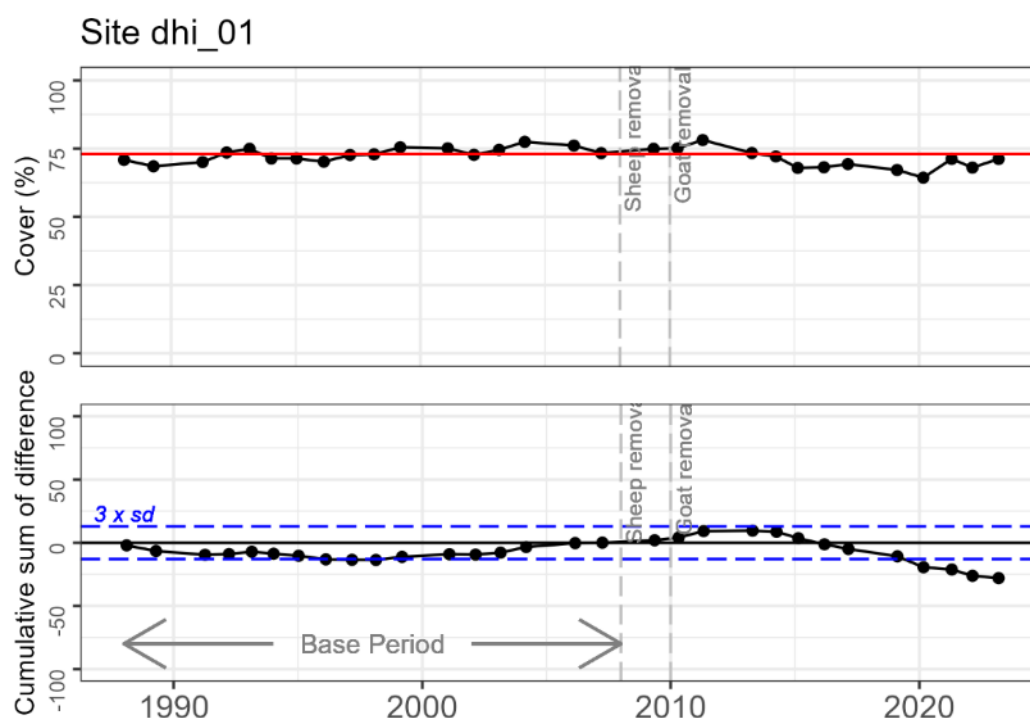
Photo point photographs of site 1.

		
May 2006	May 2007	September 2008
		
October 2009	January 2012	April 2014



Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover is observed (3 standard deviation lines on cusum chart are breached).

Site 2

Description:

Low heath of *Melaleuca cardiophylla*/*Pileanthus limacis* (30-70% cover avg 60%) 0.2 metres








Low very open grassland of *Triodia plurinervata* (10% cover) 0.2 metres

Rare shrubs of *Mirbelia ramulosa*/ *Thryptomene baeckeacea*/
Leptosema macrocarpum

Rare herbs of *Conostylis stylidioides*

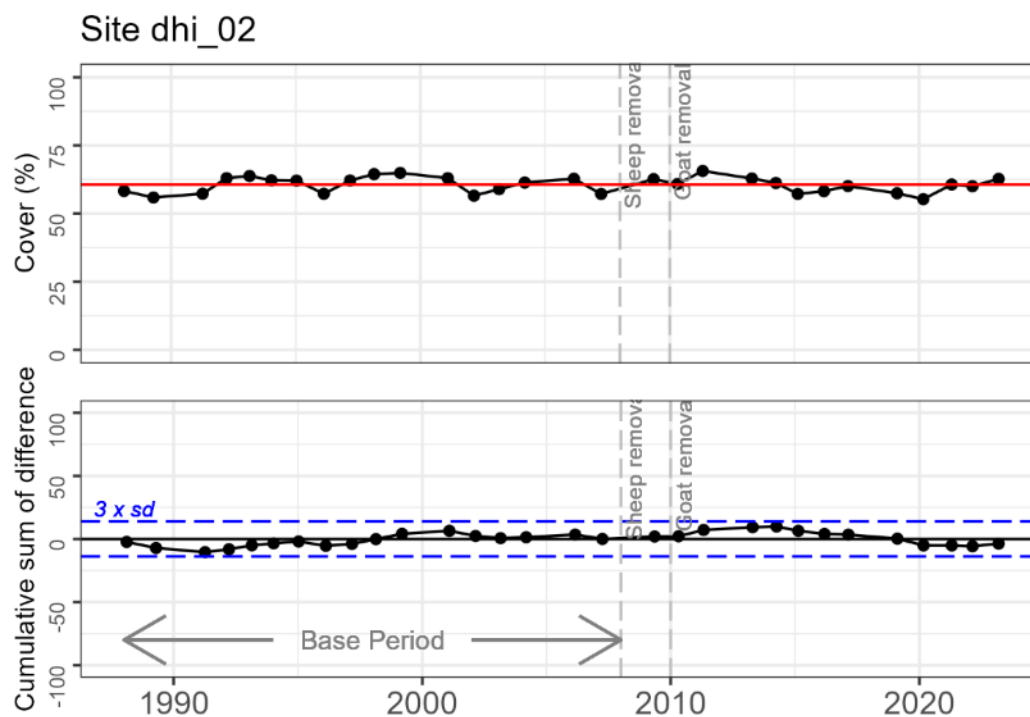


Photo point photographs of site 2.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
May 2016		

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 3

Description:

Low Open Shrubland (2-10% cover) 0.5-1 metres *Acacia ligulata* and *Atriplex vesicaria*







Low shrubland (10-30% cover) 0.3- 0.5 metres of *Thryptomene baeckeacea* and *Melaleuca cardiophylla*, with rarely recorded shrubs of *Ptilotus obovatus*, *Maireana* sp., *Atriplex* sp. and *Threlkeldia diffusa*

Over low hummock grassland (2- 10 % cover) of *Triodia plurinervata*

Over scattered herbs, grasses and low shrubs (<2% cover) of *Acanthocarpus robustus*, *Cymbopogon oblectus*, *Carpobrotus candidus*, *Senecio pinnatifolius* and *Dianella revoluta*.

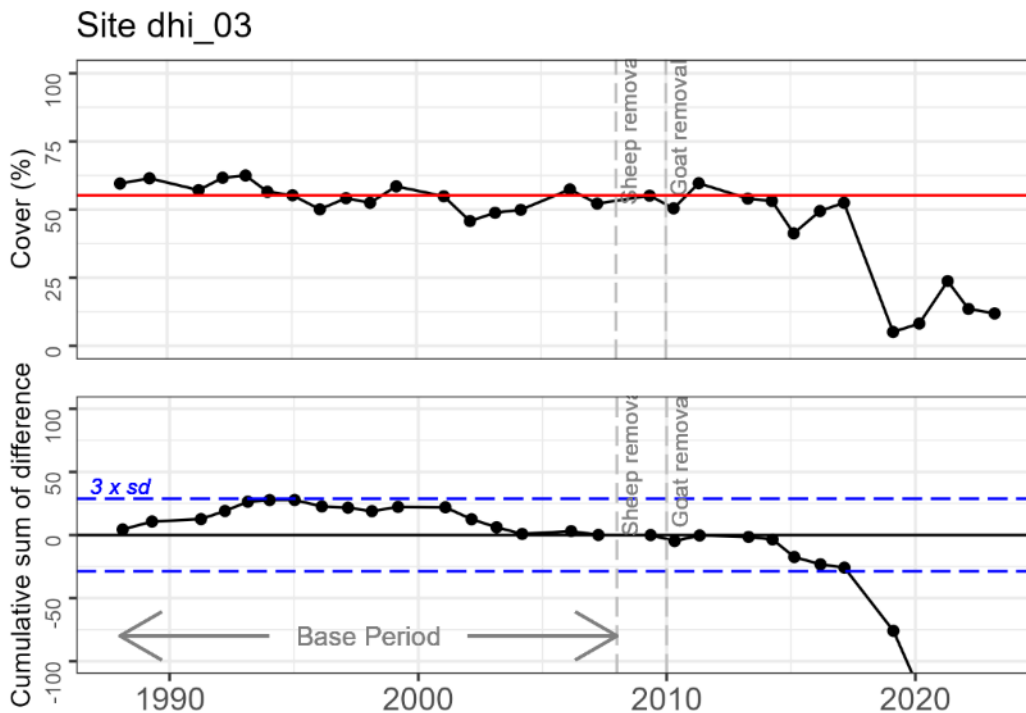


Photo point photographs of plot 3.

		
April 2006	May 2007	September 2008
		
January 2012	April 2014	May 2017

Vegetation cover time series analysis:

Lower control line in the cusum chart has been breached in 2014 indicating a loss in cover. This site is now being encroached by a mobile dune.



Time series graph of vegetation cover derived from Landsat satellite data from 1987 to 2021 and mean (1987 to 2008) baseline (top). CUSUM chart with 3 standard deviation control line (bottom).

Recommendations:

The declining cover at this site is difficult to discern from the site photographs. This is due to changes in location of the central marker in 2014. However, analysis of Landsat imagery shows that the sand dune movement may be a factor. In 1988 the closest sand dune was approximately 250 m to the west, this dune is now encroaching on the site.

Site 4

Description:

Tall Open Shrubland (2-10% cover) 2-2.5 metres of *Diplolaena grandiflora* with *Acacia* (estimated species) *sclerosperma* (dead), *Alectryon oleifolium* and *Rhagoda* –*Preissii* subsp. *Obovata*, *Scaevola tomentosa*

Low shrubland (30% cover) 0.3- 0.5 metres of *Thryptomene baeckeacea*

Prostrate to decumbent shrubland (10-30%) of *Threlkeldia diffusa*, mostly dead 10% alive in 2018







Over low grassland (2-10 % cover) of **Cenchrus ciliaris* and *Austrostipa nitida*

Over scattered herbs and low shrubs (<2% cover) of *Angianthus tomentosus*, *Podotheca gnaphaloides*, **Urospermum picroides* and **Brassica tournefortii*. *Euphorbia boophthona*/ *Euphorbia australis*/ *Commicarpus australis*/ **Sonchus oleraceus*, *Ptilotus obovatus*, *Atriplex vesicaria*, *Zygophyllum eremaeum*

1 seedling of *Acacia sclerosperma*, 3 seedlings of *Acacia ligulata*



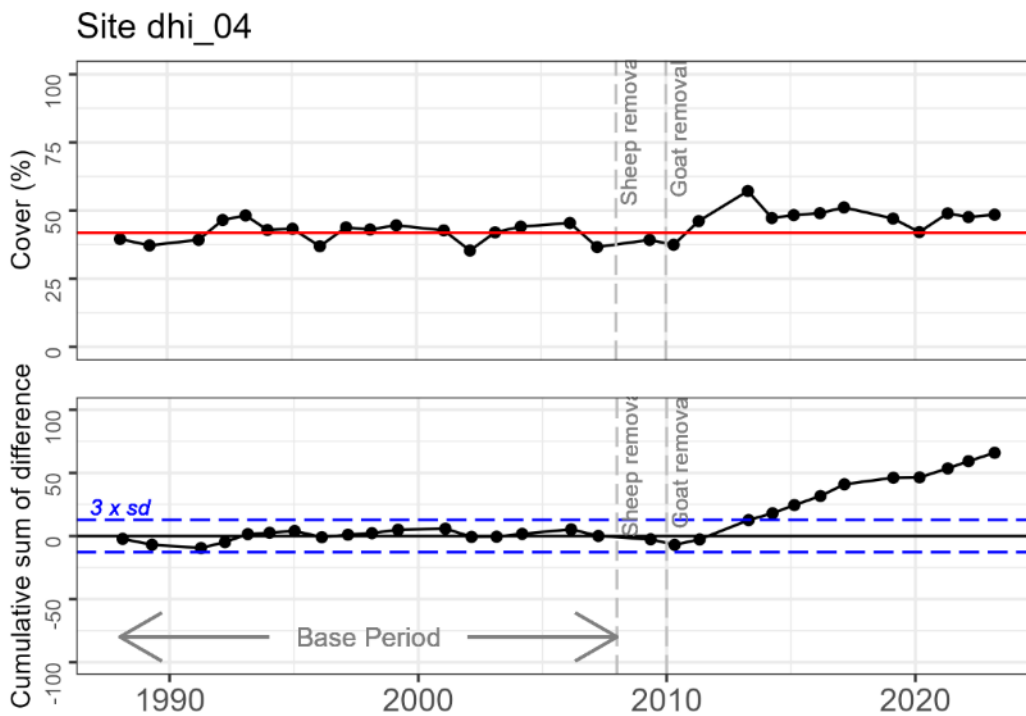
Photo point photographs of plot 4

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012

 <p>April 2014</p>	 <p>May 2015</p>	 <p>May 2016</p>
 <p>May 2017</p>	 <p>May 2018</p>	 <p>May 2019</p>
 <p>May 2021</p>		

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

The significant increase in vegetation cover at this site appears directly related to the removal of feral goats. The change in cover and degree of trampling is evident when comparing the 2007 (above) and 2017 (below) site photographs.



Site 5

Description:

Open shrubland *Diplolaena grandiflora* (20% cover) to 1 metre, over *Scaevola crassifolia*










Low shrubland *Capparis spinosa*/ *Frankenia pauciflora*/ *Pimelea gilgiana*/ *Atriplex vesicaria*/ *Threlkeldia diffusa*/ *Rhagodia preissii* (20-30% cover) 0.2 metres over prostrate herbs of *Carpobrotus* sp. Thevenard Island (10-20%)

Scattered herbs of **Centaurea melitensis*/ *Euphorbia australis*/ *Euphorbia boophthona*/ **Brassica tournefortii*/ **Sonchus oleraceus* (<1% cover)

Scattered grasses *Cenchrus ciliaris* (<2% cover), *Eragrostis dielsii* (<1% cover)

Photo point photographs of plot 5.

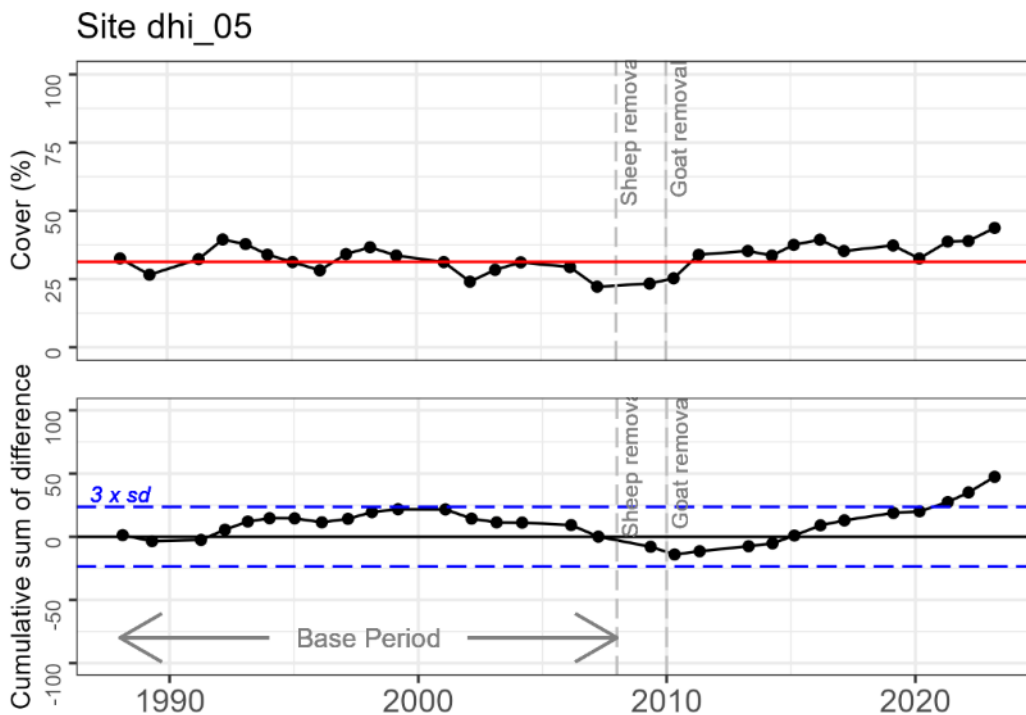


		
May 2006	May 2007 (peg was reinstalled)	September 2008
		
October 2009	January 2011	January 2012
		
May 2015	May 2015	May 2017



Vegetation cover time series analysis:

A significant increase in vegetation cover is evident in the time series graph and site photos. The increase appears to occur following 2010, this coincides with the removal of large numbers of goats from the area.



Recommendations:

The significant increase in vegetation cover at this site appears directly related to the removal of feral goats. The change in cover and degree of trampling is evident when comparing the 2007 (above) and 2017 (below) site photographs.



Site 6

Description:

Acacia coriacea/ Acacia tetragonophylla (10% cover) 1 metre over
Sparse low Thryptomene baeckeacea (10% cover) shrubland 0.2
metres

Scattered Trioda plurinervata grassland (<5% cover) 0.2 metres over

Herbs of Euphorbia boophthona/ Ptilotus gaudichaudii/ Gnephosis
arachnoidea/ *Sisymbrium orientale/ *Brassica tournefortii/ Salsola
australis/ Carpobrotus sp. Thevenard Island

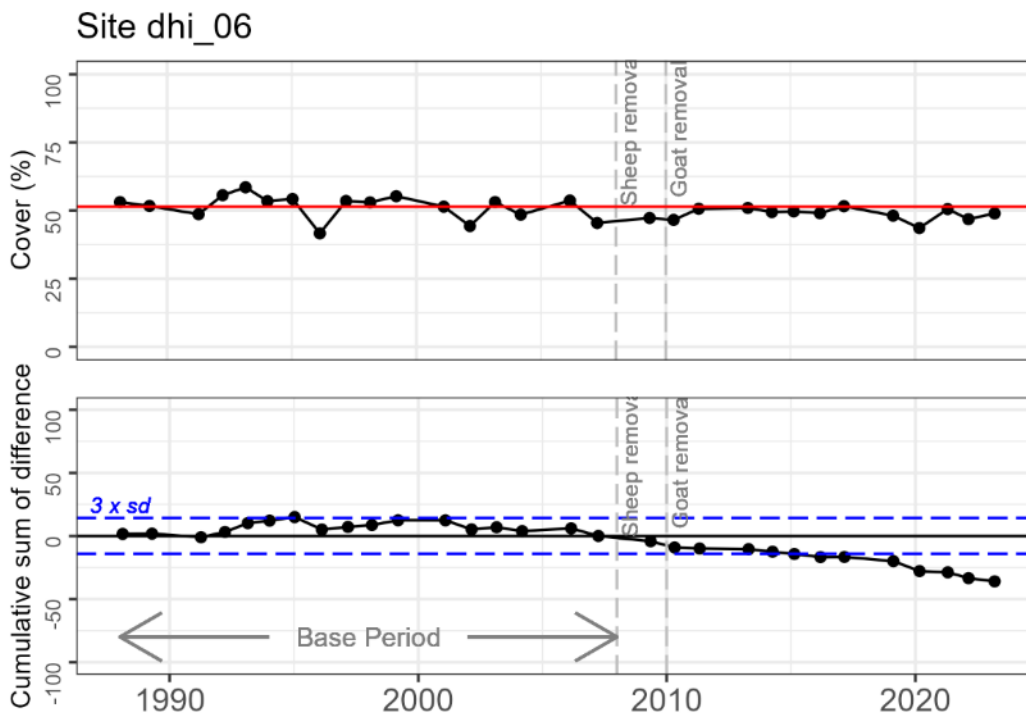


Photo point photographs of plot 6.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
May 2015	May 2016	

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition in 2020 as a significant deviation from baseline vegetation cover has now occurred (3 standard deviation lines on cusum chart are breached).

Site 7

Description:









Low Shrubland (10-30% cover) 1-2 metres of *Acacia ligulata* with scattered *Diplolaena dampieri*, *Alogyne hakeifolia*, *Alectryon oleifolia* and *Exocarpus aphyllus*

Low shrubland (30% cover) 0.3- 0.5 metres of *Thryptomene baeckeacea* (90%), with rarely recorded shrubs of *Santalum spicatum*, *Atriplex vesicaria*, *Rhagodia* (estimated species) *crassifolia* and *Threlkeldia diffusa*

Over succulent low shrubs (2-10% cover) of *Carpobrotus candidus*.

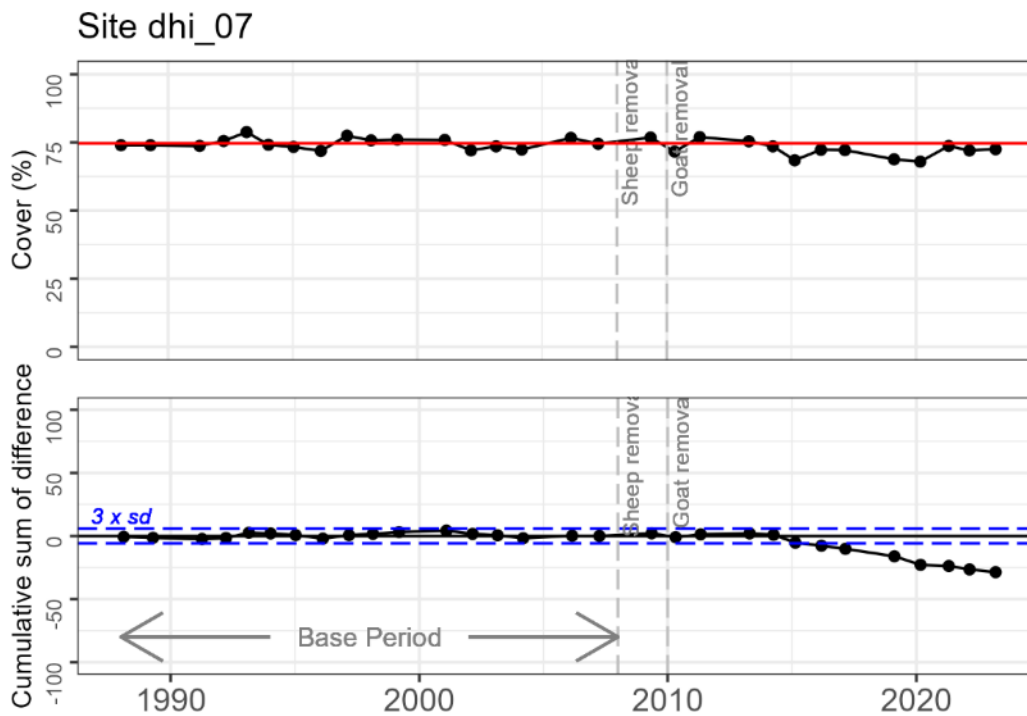


Photo point photographs of plot 7.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
April 2014	May 2021	

Vegetation cover time series analysis:

A slight decline in vegetation cover is now evident at the site.



Recommendations:

Recapture photograph points and reassess site condition in 2020.

Site 8

Description:

Very scattered *Acacia ligulata* (<1% cover) 0.5 metres






Low heath of *Melaleuca cardiophylla*/ *Thryptomene baeckeacea* (30-70% cover avg 60%) 0.2 metres over

Grassland of *Triodia plurinervata* (5% cover) 0.2 metres

Scattered herbs (<5% cover) of *Salsola australis*/ *Ptilotus gaudichaudii*

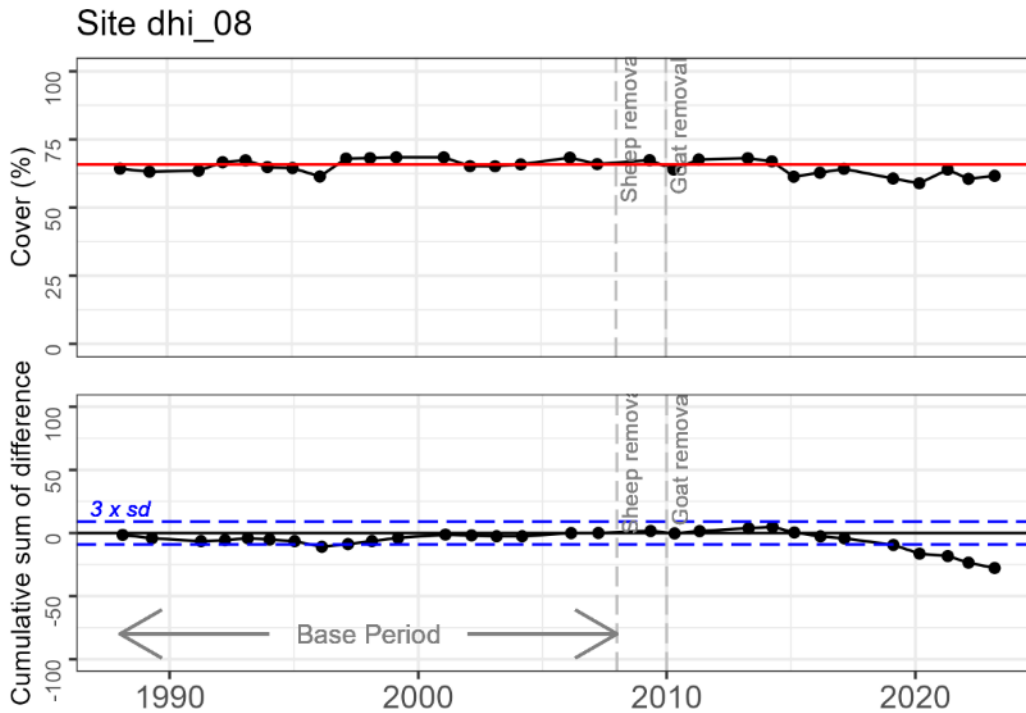
Photo point photographs of plot 8.



		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
May 2015	May 2016	

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 9

Description:

Low Open Shrubland (10-30% cover) 1-1.5 metres *Acacia ligulata* dominated (90%) with scattered shrubs of *Stylobasium spathulatum* and *Stenanthemum* sp.

Low shrubland (30% cover) 0.3-0.5 metre of *Thryptomene baeckeacea*, with rarely recorded shrubs of *Melaleuca cardiophylla* and *Pileanthus limacis*

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*







Over scattered herbs of *Dianella revoluta* and *Acanthocarpus preissii*

(Note at this site there was a tall layer of *Acacia coriacea* and *Acacia tetragonophylla*, now mostly dead, little evidence or regeneration, possible fire)

Note: Site of interest for long term monitoring as the upper stratum of *Acacia* has been lost with little sign of regeneration.



Photo point photographs of plot 9.

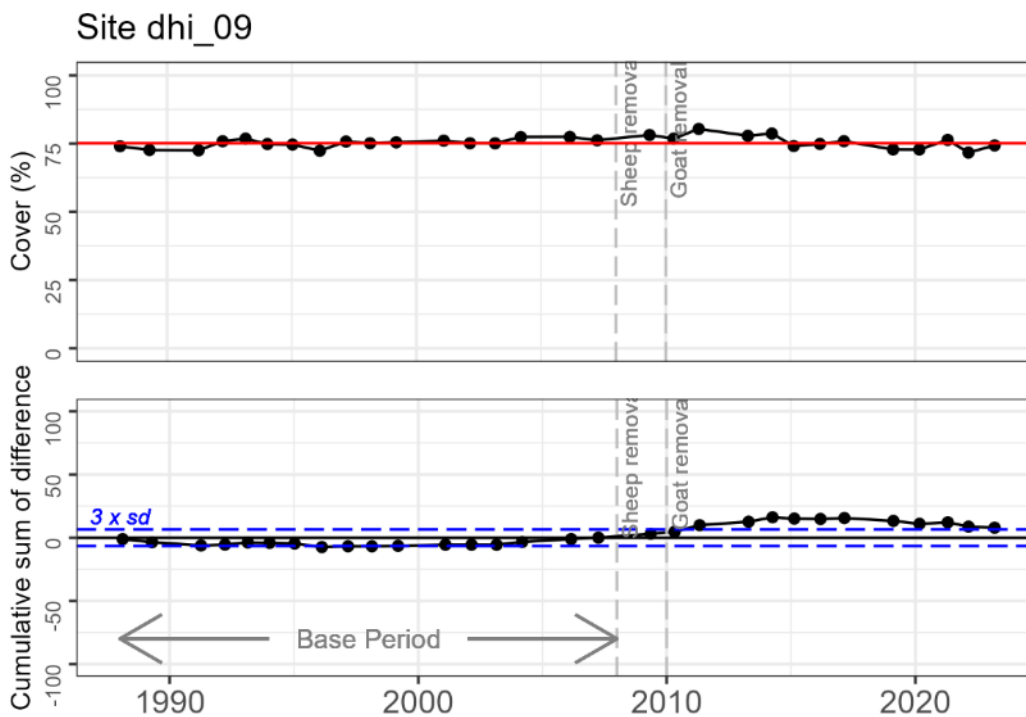
		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012



April 2014

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 10

Description:

Low Open Shrubland (10-30% cover) 1-1.5 metres *Acacia ligulata* dominated (90%) with scattered shrubs of *Stylobasium spathulatum*

Low shrubland (30% cover) 0.5-1 metre of *Thryptomene baeckeacea*, with rarely recorded shrubs of *Melaleuca cardiophylla*, *Stenanthemum* sp. and *Pileanthus limacis* / *Acanthocarpus robustus*

Over low shrubland (2-10% cover) < 20cm *Halgania andromedifolia*/ *Zygophyllum billardierei*/ *Beyeria calycina*/ *Ptilotus obovatus*

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata* with many young *Triodia* scattered though.

Herbs of *Dianella revolta*.

(Note at this site there was a tall layer of *Acacia coriacea* and *Acacia tetragonophylla*, now mostly dead, little evidence or regeneration, ?fire)

Note: Site of interest for long term monitoring as the upper stratum of *Acacia* has been lost with little sign of regeneration.

Undergoing successional change

Photo point photographs of plot 10.



May 2006 (view angle inconsistent)



May 2007



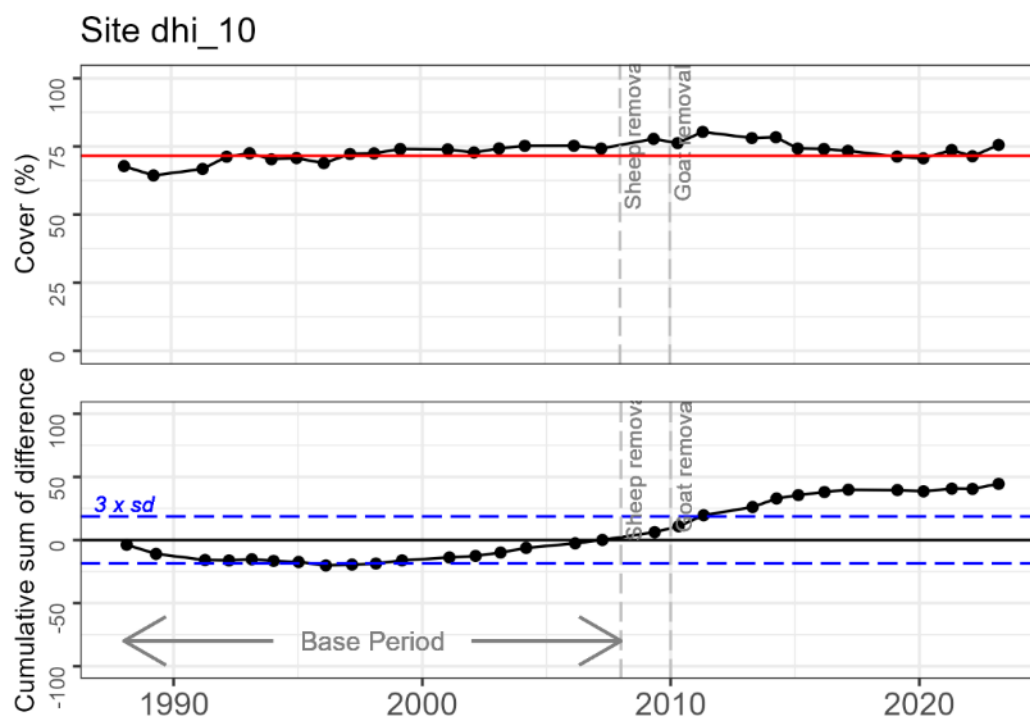
September 2008



		
October 2009	January 2011	January 2012
		
April 2014	May 2015	May 2016
		
May 2017	May 2018	May 2019
		
May 2021		

Vegetation cover time series analysis:

The upward trend in vegetation cover has continued since the last report. The increase in cover may be due to long term recovery from fire or reduced grazing pressure. Grazing in the north of DHI is known to have decreased from the 1960s.



Recommendations:

Reassess baseline period due to vegetation cover appearing to increase during the baseline period.

Site 11

Description:

Very Open Shrubland (2-10%) 1-2 metres of *Acacia sclerosperma* and *Acacia tetragonophylla* (largely dead)

Low Open Shrubland (2-10% cover) 1 metres *Acacia ligulata*

Low shrubland (30% cover) of 0.3- 0.5 metres of *Thryptomene baeckeacea* and *Melaleuca cardiophylla*, with rarely recorded shrubs of *Stylobasium spathulatum*, *Stenanthemum sp.* and *Pileanthus limacis*








Over low hummock grassland (30 % cover) of *Triodia plurinervata*

Over scattered herbs (<2%) of *Conostylis stylidioides* and *Dianella revoluta*.

Note: Site of interest for long term monitoring as the upper stratum of *Acacia* has been lost with little sign of regeneration.

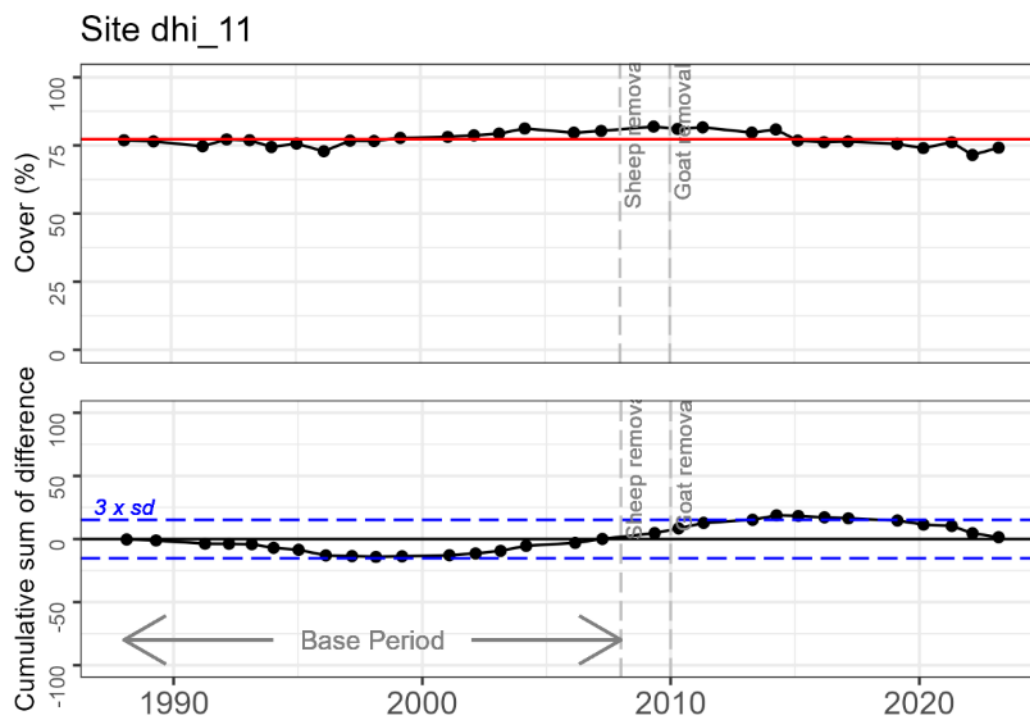
Photo point photographs of plot 11.



		
May 2006	May 2007	September 2008
		
October 2009	January 2011	April 2014
		
May 2018		

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 12

Description:

Open Mallee shrubland, 1-1.5 metres of *Eucalyptus fruticosa* and *Eucalyptus oraria*









Low Open Shrubland (2-10% cover); 1 metre of *Acacia ligulata*

Low dense shrubland (30-70% cover) of 0.3- 0.5 metres of *Thryptomene baeckeacea* and *Melaleuca cardiophylla*, with rarely recorded shrubs of *Stylobasium spathulatum*, *Stenanthemum* sp., *Olearia dampieri* and *Pileanthus limacis*. With vines of *Cassytha racemosa*

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*

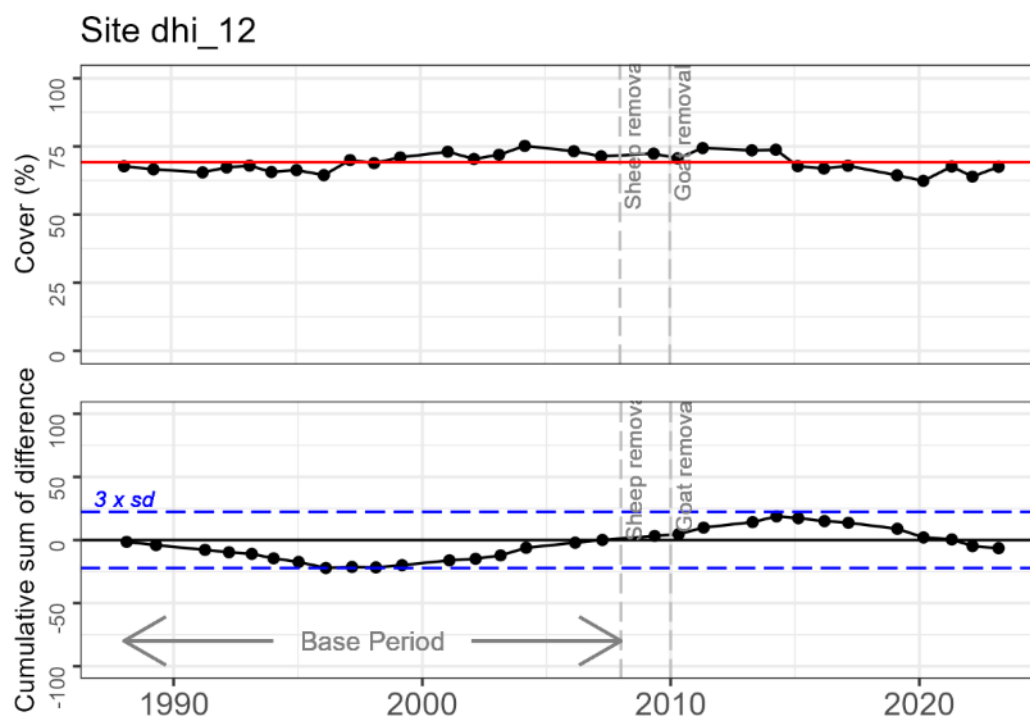


Photo point photographs of plot 12.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
April 2014	May 2018	

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 13**Description:**

Low Open Shrubland (2-10% cover) 1 metres *Acacia ligulata*









Low shrubland (30% cover) 0.3- 0.5 metres of *Thryptomene baeckeacea* and *Melaleuca cardiophylla*, with rarely recorded shrubs of *Stenanthemum* sp., *Mirbelia ramulosa* and *Pileanthus limacis*

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*

Over scattered herbs and low shrubs (<2% cover) of *Halgania cynea*, *Cassytha* sp., *Logania* sp. and *Dianella revoluta*.

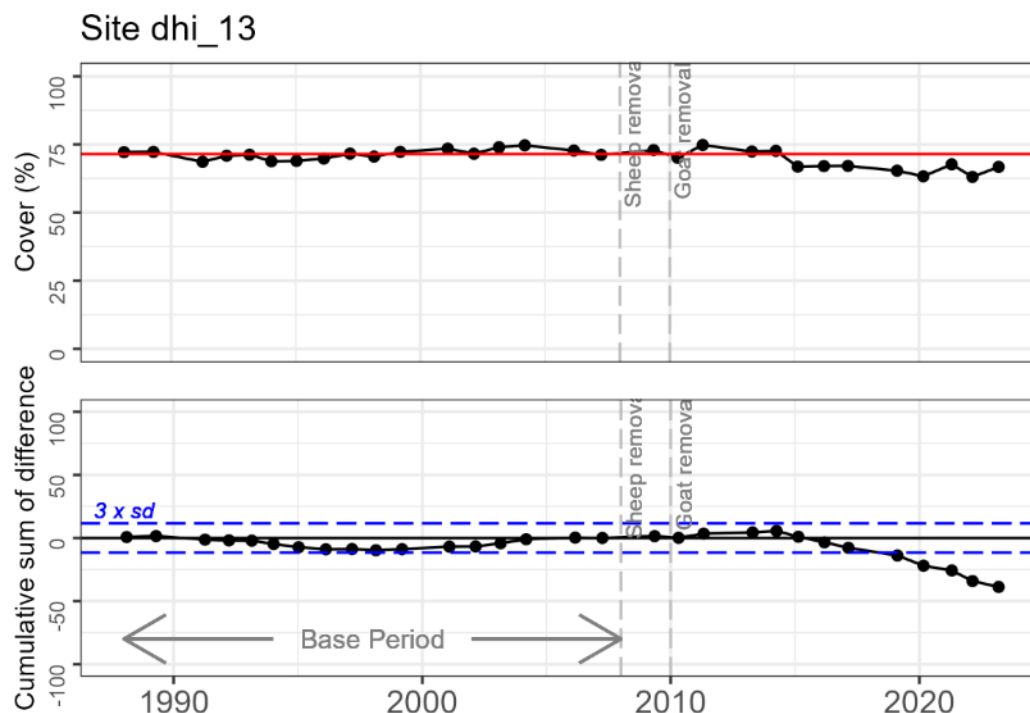


Photo point photographs of plot 13.

		
May 2006	May 2007 (peg reinstalled)	September 2008
		
October 2009	January 2011	January 2012
		
April 2014	May 2018	

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 14

Description:

Low Open Shrubland (2-10% cover) 1-2 metres *Acacia ligulata* dominated (70%) with *Exocarpus aphyllus*

Dense low shrubland (30-70% cover) 0.5-1 metre of *Melaleuca cardiophylla*, *Thryptomene baeckeacea*, *Westringia rigida* and scattered *Stylobasium spathulatum* and *Pileanthus limacis*










Over low open shrubs (2% cover) of *Halgania cyanea*

Over low hummock grassland (10 % cover) of *Triodia plurinervata*

Over scattered herbs of *Salsola australis* and *Angianthus tomentosus*

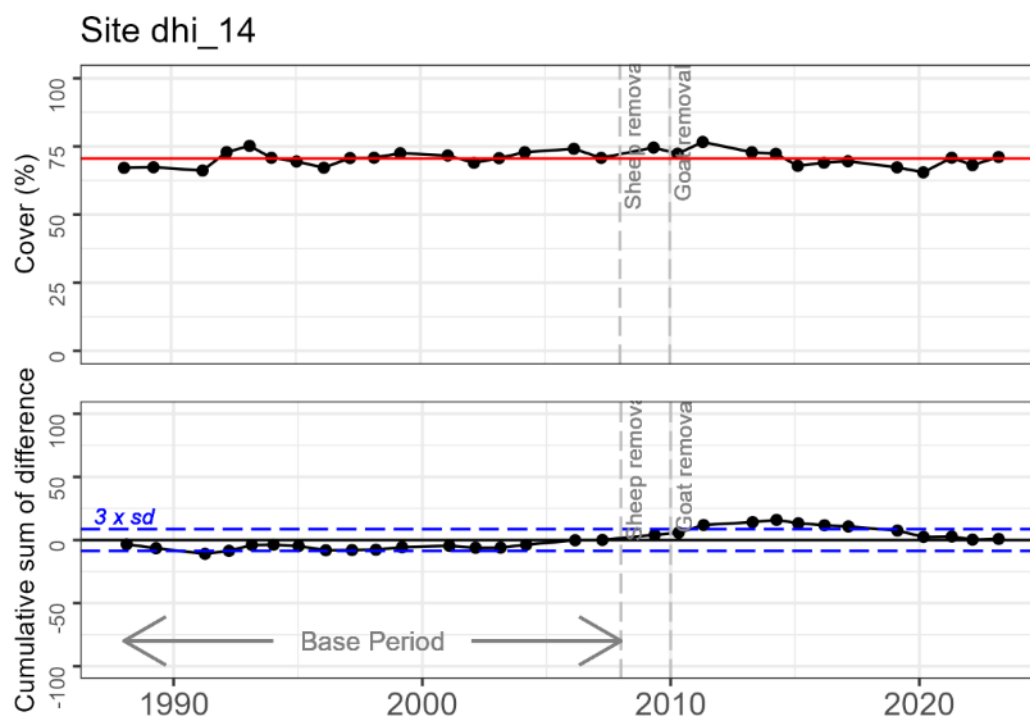


Photo point photographs of plot 14.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
April 2014	May 2016	May 2021

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 15

Description:

Low Open Shrubland (2-10% cover) 0.5-1.5 metres *Acacia ligulata* dominated (70%) with *Exocarpus aphyllus* and *Alectryon oleifolius*










Over low shrubland (2-10% cover) 0.5 metre of *Olearia axillaris* (70%) and *Mirbelia viminea*, *Diplolaena grandiflora*, *Rhagodia baccata*, *Enchylaena tomentosa*, *Acacia tetragonophylla* and *Thryptomene baeckeacea*/ *Scaevola spinescens*/ *Scaevola crassifolia*. Rare *Atriplex vesicoica*, *Solanum orbiculatum*, *corpobrotus candidus*, *Acacia linophylla*, *Threlkeldia diffusa*, *Scaevola tomentosa*

Over low grassland (30 % cover) of *Triodia plurinervata*

Over scattered herbs of *Salsola australis* and *Angianthus tomentosus*/ *Acanthocarpus preissii*/ *Austrostipa nitida*



Photo point photographs of plot 15.

		
May 2006	September 2008	October 2009
		
January 2011	January 2012	April 2014
		
May 2015	May 2016	May 2018

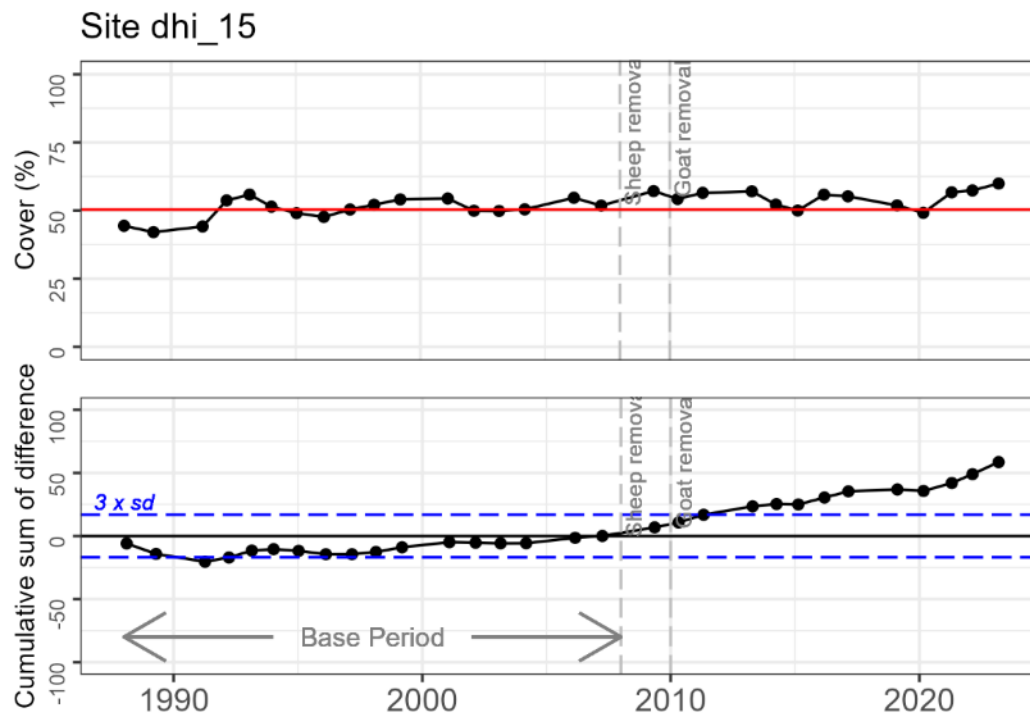


Vegetation cover time series analysis:

A continual upward trend is evident with a step increase following 1991. The increase in cover may be due to long term recovery from reduced grazing pressure. Grazing in the north of DHI is known to have decreased from the 1960s. This is supported by nearby fence posts (see image below), indicating that the area was once a yard and would therefore have been grazed heavily.



The graph below shows vegetation cover derived from Landsat satellite data from 1987 to 2021 and mean (1987 to 2008) baseline (top). CUSUM chart with 3 standard deviation control line (bottom).



Recommendations:

Reassess baseline period due to trend within the baseline period.

Site 16

Description:

Tall very open shrubland, 2-3 metres (< 2% cover) of scattered *Pittosporum phillyraeoides*

Low Open Shrubland (10-30% cover) 1-2 metres; *Acacia ligulata* dominated (70%) with *Exocarpus aphyllus* (20%) and *Alectryon oleifolius*

Over low shrubland (2-10% cover) 0.5 metre of *Thryptomene baeckeacea* with scattered shrubs of *Mirbelia viminea*, *Olearia dampieri*, *Westringia rigida*, *Rhagodia crassifolia*, *Acanthocarpus robustus*, *Acacia leptospermoides* and *Melaleuca cardiophylla*, *Scaevola spinescens*, *Scaevola tomentosa*, *Solanum orbiculatum*, *Zygophyllum eremaeum*, *Westringia dampieri*

Over low dense grassland (30-70 % cover) of *Triodia plurinervata*


Over scattered herbs of *Salsola australis*, *Maireana triptera*, *Ptilotus gaudichaudii* and *Angianthus tomentosus*.

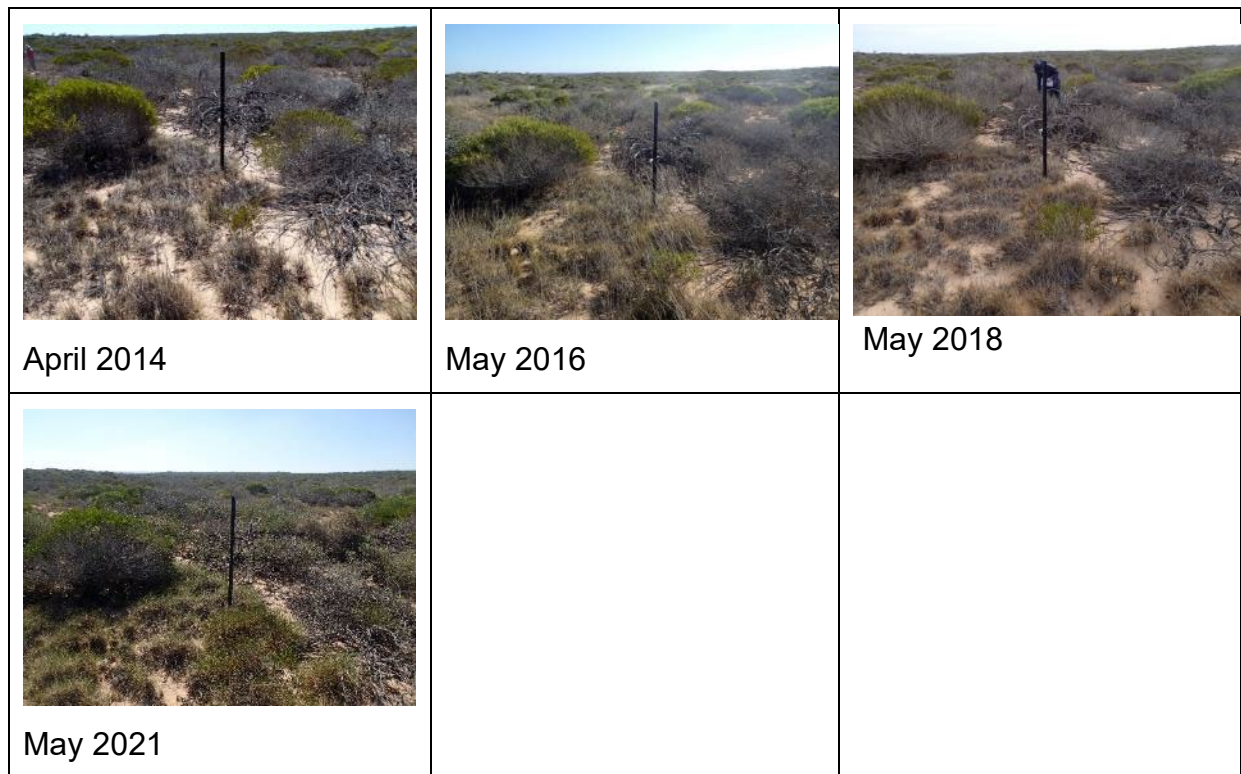
With vine *Aphanopetalum clematidium*

cryptogamic soil crust (30% cover)



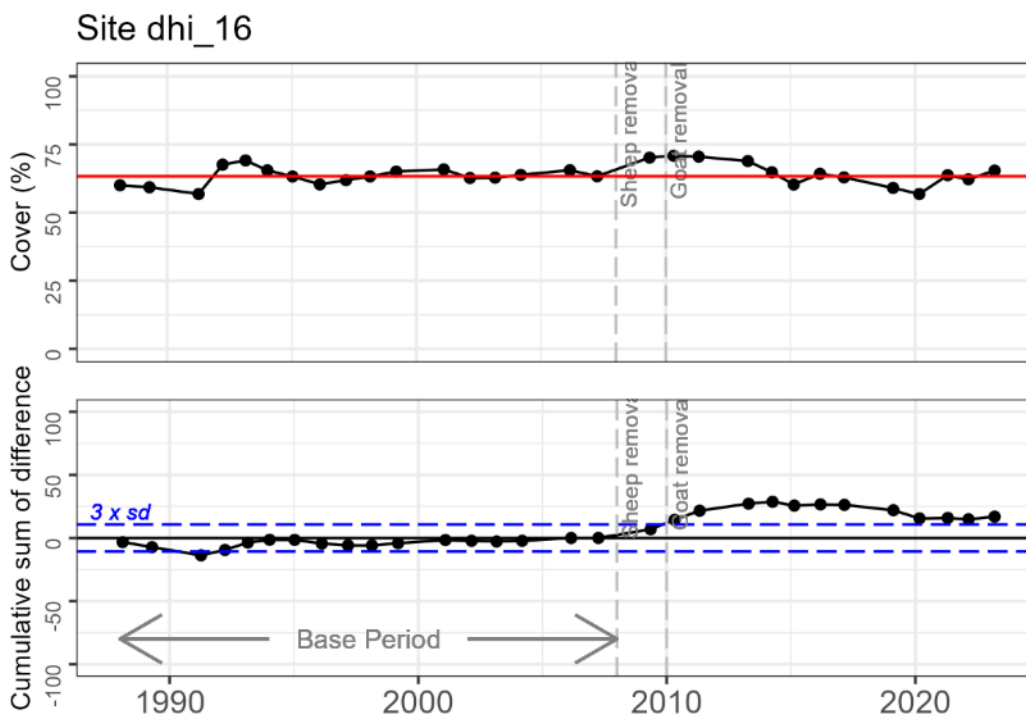
Photo point photographs of plot 16.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012



Vegetation cover time series analysis:

A significant increase in vegetation cover was recorded at this site. This increase appears to be part of a continual upward trend, with a step increase following 1991. The increase in cover may be due to long term recovery from reduced grazing pressure. Grazing in the north of DHI is known to have decreased from the 1960s.



Recommendations:

Reassess baseline period due to trend within the baseline period.

Site 17

Description:










Low dense bunch grassland (>80 % cover) of *Cenchrus ciliaris*


With rare shrubs of *Keraundrinia hermaniifolia*

Note: Site of interest for long term monitoring for shrub encroachment.



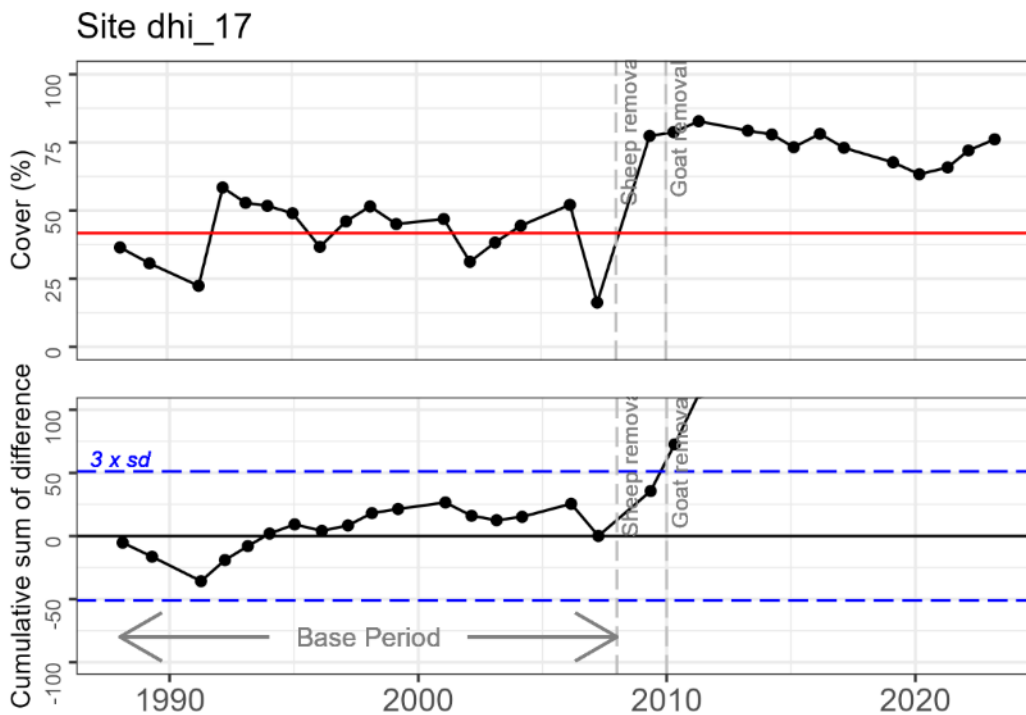
Photo point photographs of plot 17.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
April 2014	May 2016	May 2017

 <p>May 2021</p>		
---------------------------------------------------------------------------------------------------	--	--

Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. This increase appears directly related to a reduction in grazing pressure following the removal of livestock in 2008. The increase can be attributed to buffel grass (*Cenchrus ciliaris*).



Recommendations:

As the cusum chart indicates a significant change since destocking, monitoring should be continued on a biennial basis. The baseline will need to be reassessed to be sensitive to further change.

Site 18

Description:

Low Open Shrubland (2-10% cover) 1-2 metres of *Acacia ligulata*










Dense low shrubland (30-70% cover) 20 cm- 0.5 metre of *Thryptomene baeckeacea* (60 %) with *Melaleuca cardiophylla*, *Westringia rigida* and scattered *Hemigenia* sp., *Spyridium* sp., *Alogyne hakeiformis* and *Pileanthus limacis*


Over low hummock grassland (10 % cover) of *Triodia plurinervata*

Over scattered herbs of *Salsola australis* and *Angianthus tomentosus*



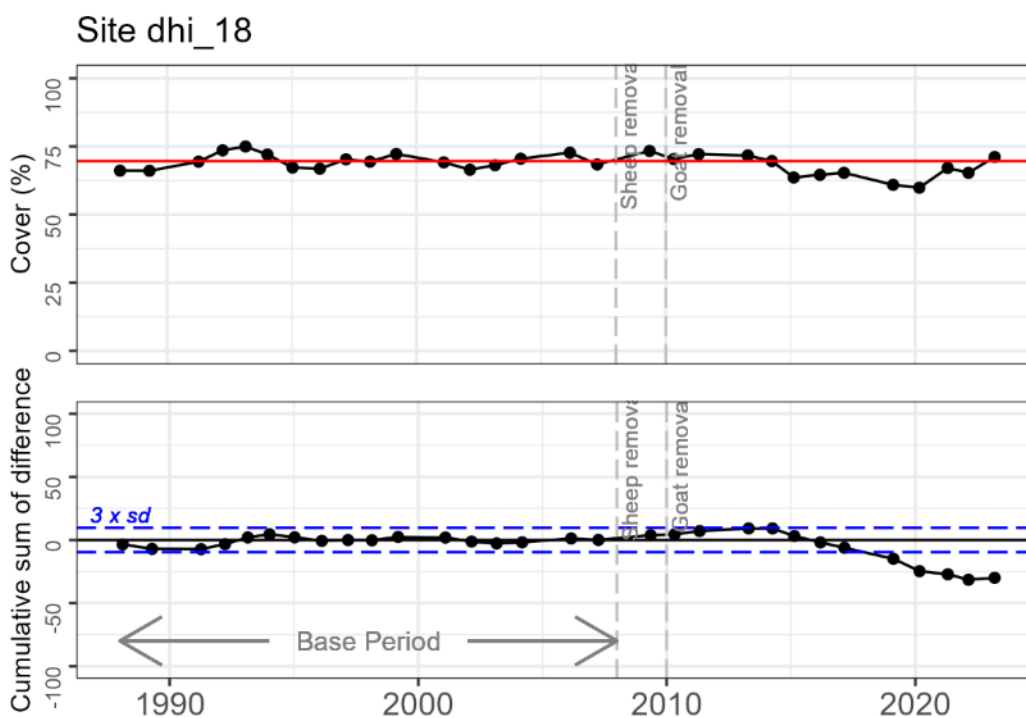
Photo point photographs of plot 18.

		
May 2006	May 2007	September 2008
		
October 2009	January 2011	January 2012
		
April 2014	May 2015	May 2016

 <p>May 2021</p>		
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Vegetation cover time series analysis:

Vegetation cover has now experienced a significant decline (even though the decline is relatively small).



Recommendations:

Recapture photograph points and reassess site condition in 2020.

Site 19

Description:

Open shrubland *Acacia ligulata*/ *Acacia tetragonophylla*/ *Acacia coriacea*/ *Melaleuca* sp? (10-30% cover) 1-2 metres

Very open shrubs of *Exocarpos aphyllus*/ *Rhagodia crassifolia*/ *Atriplex cinerea*/ *Scaevola tomentosa* (<2% cover) 0.5-1 metre

Low very open shrubland of *Frankenia pauciflora*/ *Solanum aviculare* (<25 cover) 0.2 metres over

Low grassland of **Cenchrus ciliaris* (30-70% cover , 2-10% in areas) 0.3 metres

Scattered herbs of **Brassica tournefortii*/ **Sonchus oleraceus*/ **Silene nocturna*/ **Reichardia tingitana*, *Acanthocarpus robustus*







Scattered grasses of *Eragrostis dielsii*/ *Austrostipa nitida*/ *Austrostipa elegantissima*/ *Rytidosperma occidentale*

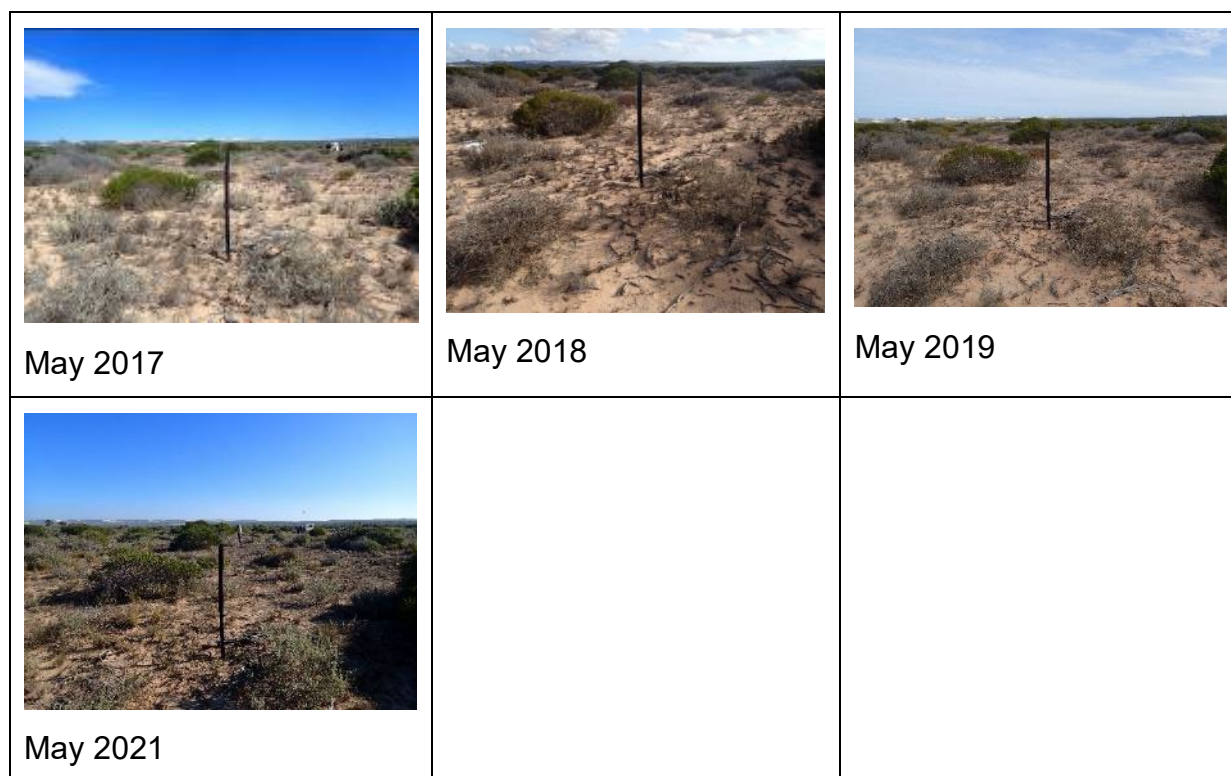
Vines observed in 2018 *Threlkeldia diffusa*, *Aphanopetalum clematidium*, *Enchylaena tomentosa*

Evidence of major germination of weeds in 2015 and *Ptilotus obovatus*



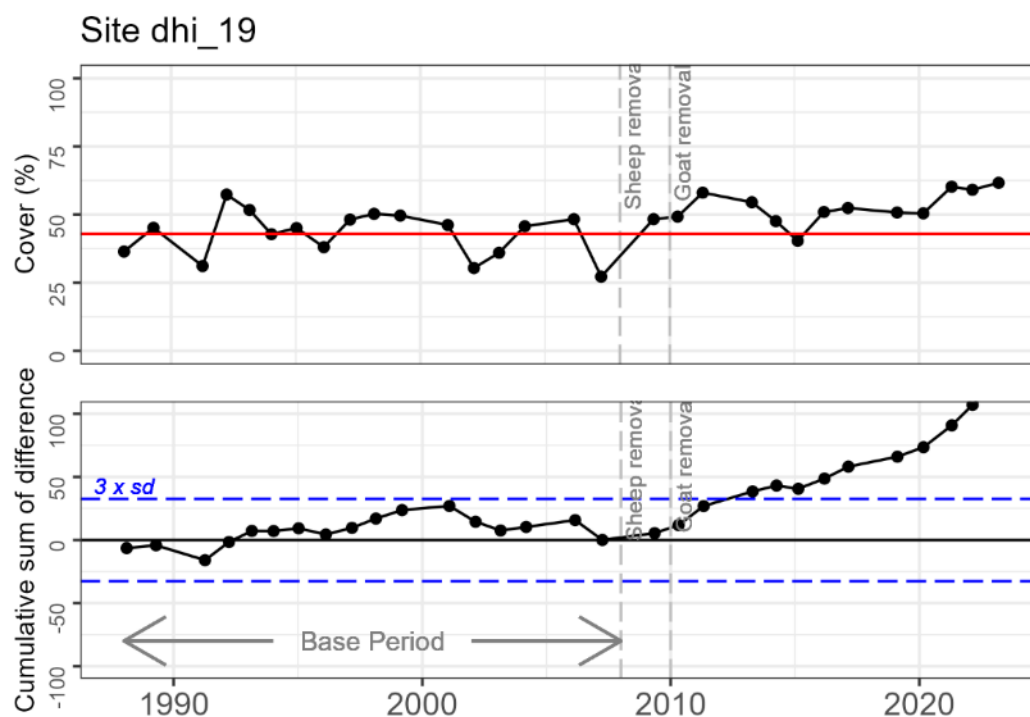
Photo point photographs of plot 19.

		
May2006	May 2007	September 2008
		
October 2009	May 2015	May 2016



Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. Change in cover and composition at the site continues with new species of vines noted in 2018.



Recommendations:

Recapture photograph points and reassess site condition in 2019 if upward trend in vegetation cover continues. Reassess baseline period.

Site 21

Description:

Low Open Shrubland (10-30% cover) 1-2 metres *Acacia ligulata*, *Atriplex vesicaria*, *Alectryon oleifolius*, *Exocarpus aphyllus*/ *Scaevola spinescens*/ *Scaevola tomentosa*

Low shrubland (10-30% cover) 0.3- 0.5 metres of *Pimelea gilgiana*, *Frankenia pauciflora* and *Sclerolaena diacantha*/ *Myoporum insulare*







Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*

Herbs (2-10%) *Chenopodium melanocarpum*, *Angianthus tomentosus*, *Calotis hispidula*, *Brachyscome iberioidifolia*, *Maireana georgei* and *Ptilotus gaudichaudii*/ *Lawrenia viridigrisea*

Abundant germination of annual in 2015 of *Lawrenia* sp./ *Euphorbia boophthona*/ *Austrostipa nitida*

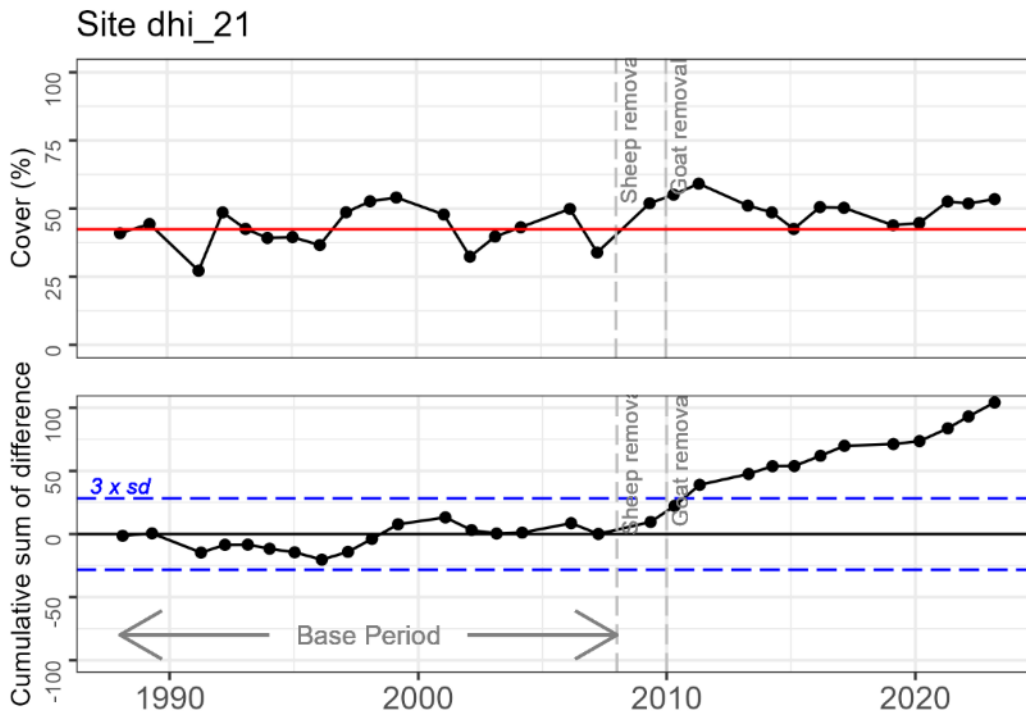


Photo point photographs of plot 21.

		
May 2006	September 2008	October 2009
		
April 2014	May 2015	May 2016

Vegetation cover time series analysis:

A significant increase in vegetation cover was recorded at this site following destocking.



Recommendations:

Recapture photograph points and reassess site condition in 2018 and reassess baseline period.

Site 22

Description:

Low Open Shrubland (2-10% cover) 1-2 metres *Acacia rostellifera*, *Exocarpos aphyllus*

Low dense shrubland (30-70 % cover) 0.3-0.6 metres of *Thryptomene baeckea* (40%), with *Rhagodia* (estimated species) *crassifolia*, *Scaevola crassifolia* and *Diplolaena grandiflora*







Low open shrubland (2-10 % cover) of less than 0.5 metres of *Pimelea gilgiana* and *Threlkeldia diffusa*, *Frankenia paniculata*, *Enchylaena tomentosa*

Over dense hummock grassland (50-70 % cover) of *Triodia plurinervata*

Over herbs, grasses and low shrubs (2-10 % cover) of *Senecio glossanthus*, *Bromus arenarius*, **Brassica tournefortii*, *Acanthocarpus preissii* and *Angianthus tomentosus*.

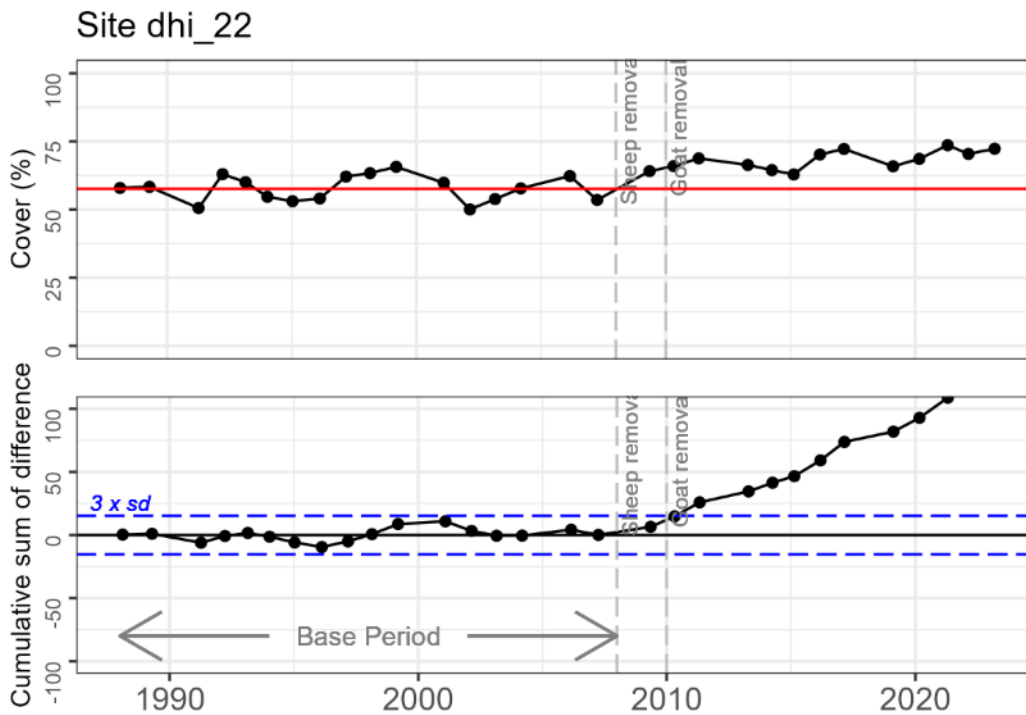


Photo point photographs of plot 22.

		
May 2006	September 2008	October 2009
		
April 2014	May 2018	May 2021

Vegetation cover time series analysis:

A significant increase in vegetation cover was recorded at this site following destocking.



Recommendations:

Recapture photograph points and reassess site condition in 2020 and reassess baseline period.

Site 23

Description:

Low Open Shrubland (2-10% cover) 1-2 metres *Acacia ligulata* and *Pittosporum phylliraeoides*






Low shrubland (30% cover) 0.3- 0.5 metres of *Scaevola nitida*, *Atriplex vesicaria*, *Scaevola tomentosa*, *Thryptomene baeckeacea*, *Pimelea gilgiana*, *Daviesia hakeoides*, *Rhagodia crassifolia*, *Bossiaea spinescens*, *Exocarpus aphyllus*, *Solanum orbiculare*, *Olearia dampieri*, *Threlkeldia diffusa*, *Frankenia pauciflora*, *Ptilotus obovatus*, *Scaevola spinescens*, *Diplolaena grandiflora*



Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*

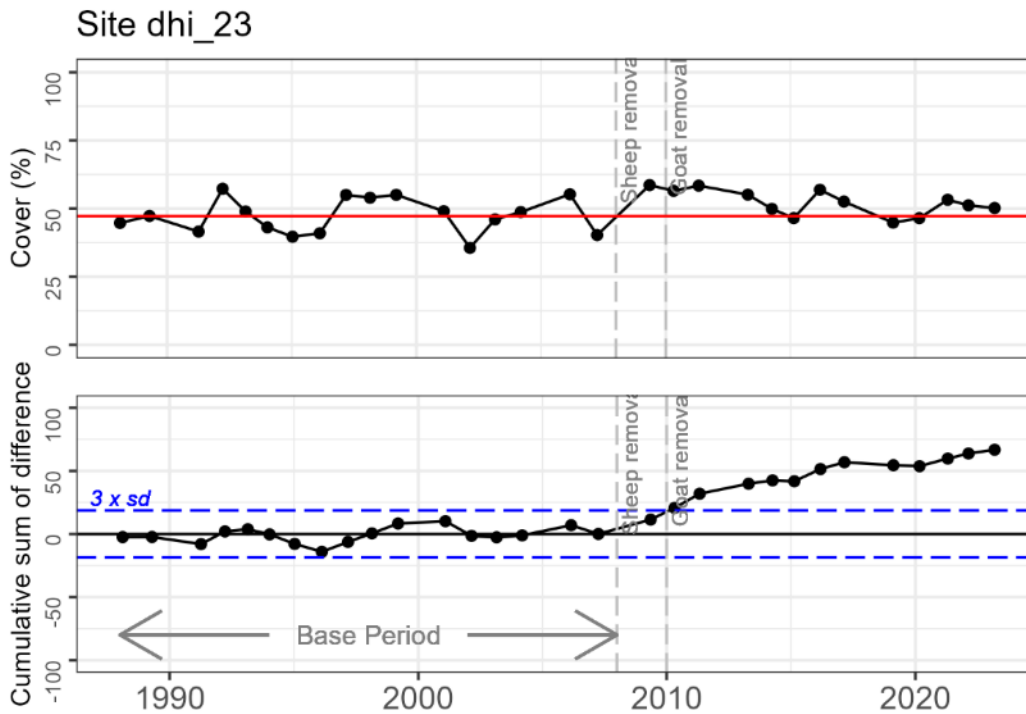
Over herbs, grasses and low shrubs (2-10 % cover) of *Senecio pinnatifolius*, *Maireana* sp., *Austrostipa* sp., **Brassica tournefortii*, *Acanthocarpus robustus*, *Gnephosis arachnoidea* and *Dianella revoluta*.

Photo point photographs of plot 23.

		
May 2006	September 2008	October 2009
		
April 2014	May 2018	

Vegetation cover time series analysis:

A significant increase in vegetation cover was recorded at this site following destocking.



Recommendations:

Recapture photograph points and reassess site condition in 2020 and reassess baseline period.

Site 30

Description:

Open Shrubland (2-10% cover) 0.5-1metres *Acacia ligulata*, *Capparis spinosa*, *Atriplex vesicaria*, *Rhagodia baccata*, *Scaevola tomentosa*, *Exocarpus aphyllus* and *Scaevola spinescens*

Low shrubland (<2% cover) < 0.5metres of *Frankenia pauciflora*, *Solanum orbiculatum*, *Threlkeldia diffusa*, *Diplolaena grandiflora* and *Pimelea gilgiana*

Over low bunch grassland (10-30 % cover) of **Cenchrus ciliaris* and **Cenchrus setiger*

Over herbs, grasses and low shrubs (<10 % cover) of **Melilotus indicus*, **Sonchus oleraceus*, **Brassica tournefortii*, *Euphorbia australis*, *Enchyleana tomenytosa*, **Urospermum picroides*, **Malva parviflora*, *Crassula colorata*, **Bromus diandrus* and **Chenopodium murakle*.

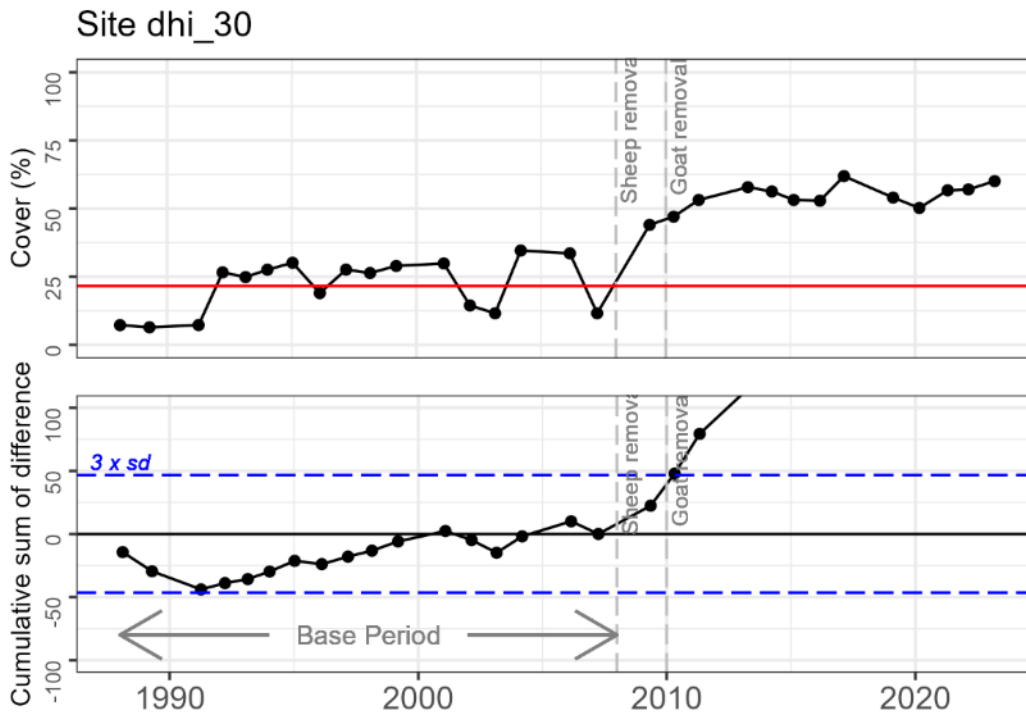


Site photograph, April 2014



Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. The increase is likely to be due to an increase in buffel grass (*Cenchrus ciliaris*) cover.



Recommendations:

Due to the rocky nature of the site no monitoring stakes have been added and no further field visits are being carried out.

Site 31

Description:

Open Shrubland (2-10% cover) 1-2 metres *Diplolaena grandiflora* (mostly dead)

Low shrubland (10-30% cover) 0.5-1 metres of *Acacia ligulata*, *Rhagodia crassifolia*, *Atriplex vesicaria*, *Pembertonia latisquamea*, *Scaevola tomentosa* and *Exocarpus aphyllus*/*Scaevola spinescens*/*Pimelea microcephala*

Over low bunch grassland (2-10 % cover) of *Austrostipa nitida*, *Austrostipa elegantissima*, *Amphipogon* sp. and **Cenchrus ciliaris*

Over herbs, grasses and low shrubs (10 % cover) of *Bromus arenarius*, **Bromus diandrus* (both major components), *Frankenia pauciflora*, *Ptilotus gaudichaudii*, *Angianthus tomentosus*, **Brassica tournefortii*, *Chenopodium melanocarpum*, *Tetragonia diptera*, *Senecio pinnatifolius* and *Ptilotus polystachyus*.

Note: Here the upper shrub *Diplolaena grandiflora* has largely died, however, this species (on Bernier and Dorre) appears en masse after fire or heavy storms grows and eventually dies out. This would be a very interesting site to monitor long term for natural cycles.

2015 abundant germination of *Threlkeldia diffusa*/ *Ptilotus obovatus*

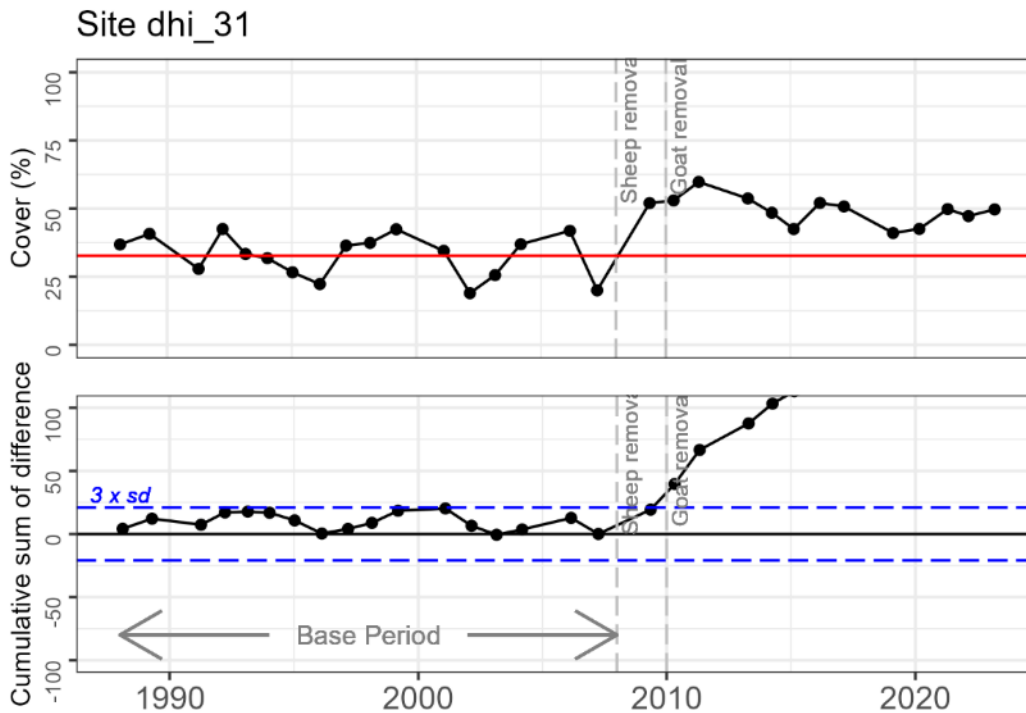


Site photographs,



Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. The increase is likely to be due to an increase in buffel grass (*Cenchrus ciliaris*) cover.



Recommendations:

Site added as a permanent monitoring plot to be reassessed biennially.

Site 32

Description:

Open Shrubland (2-10% cover) 1-2.5 metres *Atriplex vesicaria*,
Rhagodia baccata

Low shrubland (10-30% cover) 0.5-1 metres of *Acacia ligulata*,
Rhagodia crassifolia, *Solanum orbiculatum* and *Threlkeldia diffusa* /
Mirbelia ramulosa

Over low bunch grassland (2-10 % cover) of **Cenchrus ciliaris*

Over herbs, grasses and low shrubs (10-30 % cover) of *Bromus arenarius*, **Bromus diandrus* (both major components), **Mesembryanthemum crystallinum*, **Centaurium erythraea*, **Brassica tournefortii*, **Centaurea melitensis*/ **Chenopodium murale*

Note: Site of interest for long term monitoring for changes in buffel grass cover.

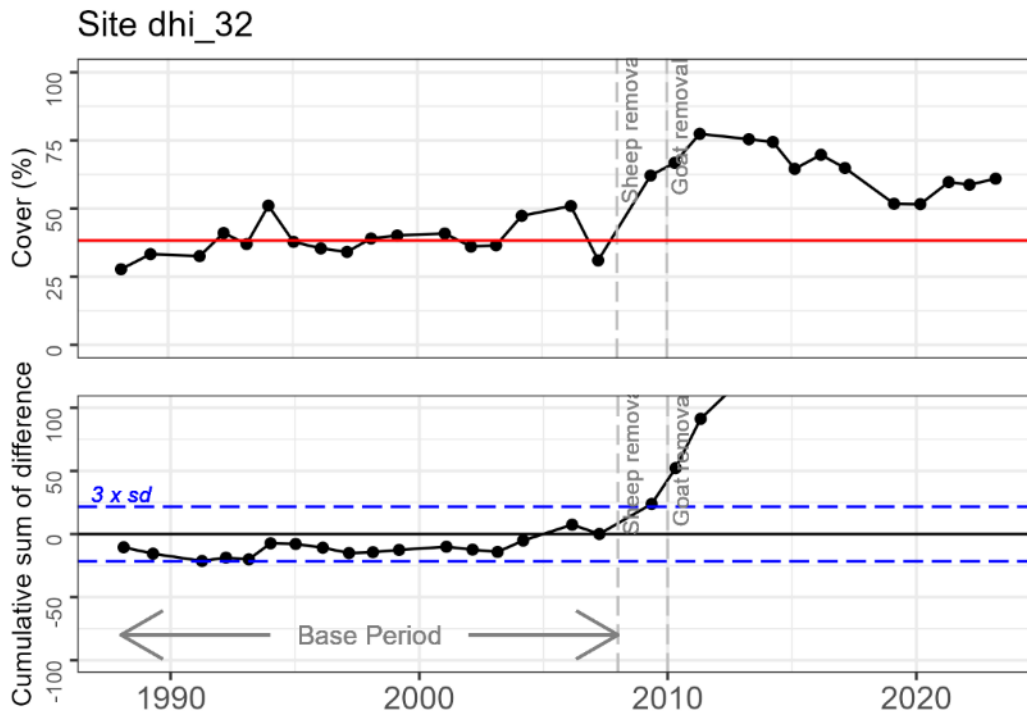


Site photographs

May 2015	May 2017	

Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. The increase is likely to be due to an increase in buffel grass (*Cenchrus ciliaris*) cover.



Recommendations:

Site added as a permanent monitoring plot to be reassessed biennially.

Site 33

Description:

Open Shrubland (10-30% cover) 1-2 metres *Acacia ligulata* (50% dead), *Scaevola tomentosa*, *Exocarpus aphyllus*, *Atriplex vesicaria*

Low shrubland (10-30% cover) of < 0.5 metres of *Threlkeldia diffusa*, *Diplolaena grandiflora*, *Pimelea gilgiana*, *Mirbelia ramulosa*, *Pembertonia latisquamea*, *Rhagodia crassifolia*, *Acacia idiomorpha*, *Dampier asp.*, *Thryptomene baeckeacea*, *Stylobasium spathulatum*,



Over low hummock grassland (30-70% cover) of *Triodia plurinervata*

Over low very open bunch grassland (2-10 % cover) of *Austrostipa nitida*, *Austrostipa elegantissima*, *Amphipogon sp.* and **Cenchrus ciliaris*

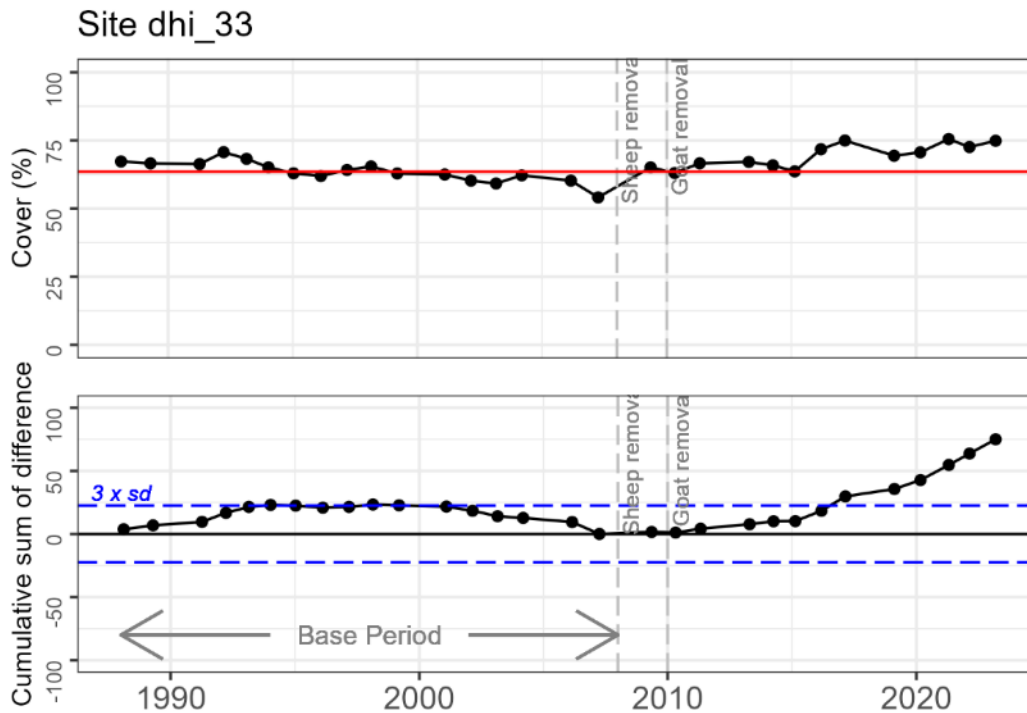
Over herbs, grasses and low shrubs (<10 % cover) of *Acanthocarpus preissii*, *Acanthocarpus robustus*, *Bromus arenarius*, **Bromus diandrus* (both major components), *Frankenia pauciflora*, *Ptilotus gaudichaudii*, *Angianthus tomentosus*, **Brassica tournefortii*, *Chenopodium melanocarpum*, *Tetragonia diptera*, *Senecio pinnatifolius* and *Ptilotus polystachyus*.

Site photograph, April 2014



Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series. Cover values appear to drop rapidly in 2006 and 2007 coinciding with low rainfall but return to the normal range after 2008.



Recommendations:

Recapture photograph points and reassess site condition either in 2020 or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site 34

Description:

Low very open trees (<2%) *Pittosporum phylliraeoides*

Open Shrubland (10-30% cover) 1-2 metres *Acacia ligulata*, *Alectryon oleifolius*, *Atriplex vesicaria*, *Exocarpus aphyllus*, *Ptilotus obovatus* and *Stylobasium spathulatum*/ *Scaevola spinescens*/*Scaevola tomentosa*

Low shrubland <2% cover) 0.3- 0.5 metres of *Pembertonia latisquamea*, *Frankenia pauciflora*, *Rhagodia crassifolia*, *Pimelia gilgiana*, *Enchylaena tomentosa*

Over low hummock grassland (30-70 % cover) of *Triodia plurinervata*

Over low bunch grassland (2-10 % cover) of *Austrostipa nitida* and *Austrostipa elegantissima*

Over herbs, grasses and low shrubs (10 % cover) of *Bromus arenarius*, **Bromus diandrus* (both major components), *Angianthus tomentosus*, **Brassica tournefortii*, *Chenopodium melanocarpum*, *Senecio pinnatifolius* and *Ptilotus polystachyus*.

2015 rain abundant annuals of *Ptilotus nobilis*/ *Euphorbia boophthona*/ * *Sisymbrium erysimoides*/ *Lobelia gibbosa*

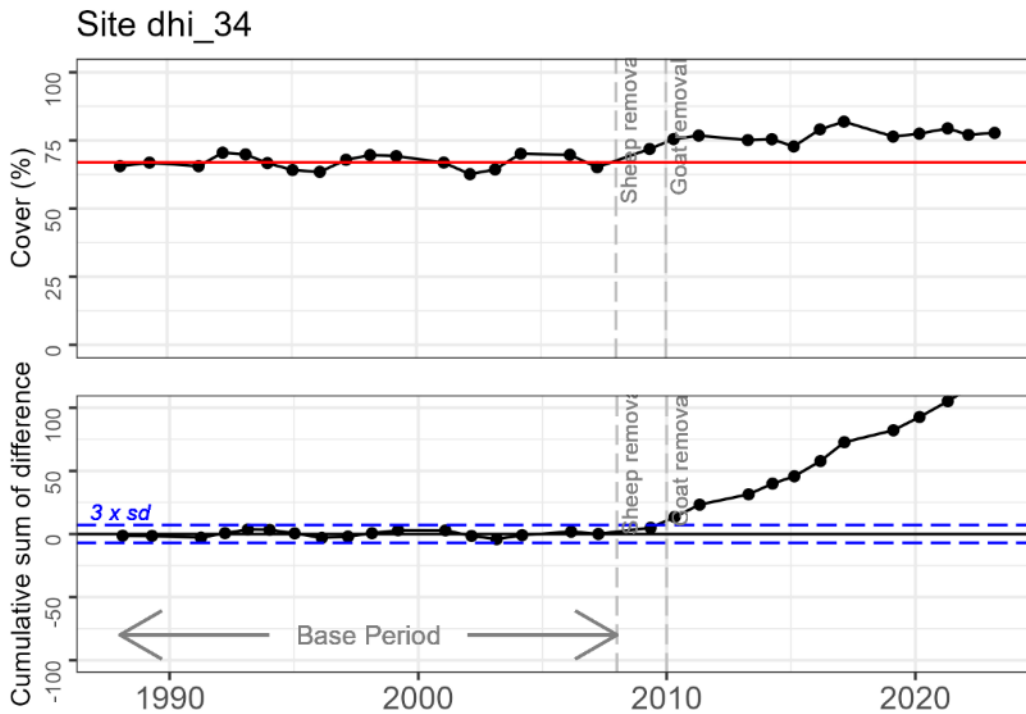


Site photographs

		
April 2014	May 2017	May 2018
		
May 2019		

Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. No buffel grass (*Cenchrus ciliaris*) was evident at the site.



Recommendations:

Site added as a permanent monitoring plot to be reassessed biennially.

Site 35

Description:

Low Open Shrubland (10-30% cover) 1-2 metres *Acacia ligulata* and *Scaevola spinescens*

Low shrubland (30% cover) 0.3- 0.5 metres of *Atriplex vesicaria*, *Threlkeldia diffusa* and *Frankenia pauciflora*/ *Rhagodia candolleana*/ *Pimelea microcephala*/ *Bossiaea spinescens*

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata* and *Triodia schinzii*

Over low bunch grassland (2-10 % cover) of *Austrostipa nitida* and *Austrostipa elegantissima*





Over herbs, grasses and low shrubs (10 % cover) of *Bromus arenarius*, **Bromus diandrus*, *Angianthus tomentosus*, *Angianthus* sp., **Brassica tournefortii*, *Chenopodium melanocarpum*, *Goodenia* sp., *Enchylaena tomentosa*

Abundant germination of annuals – *Lawrencina viridigrisea*



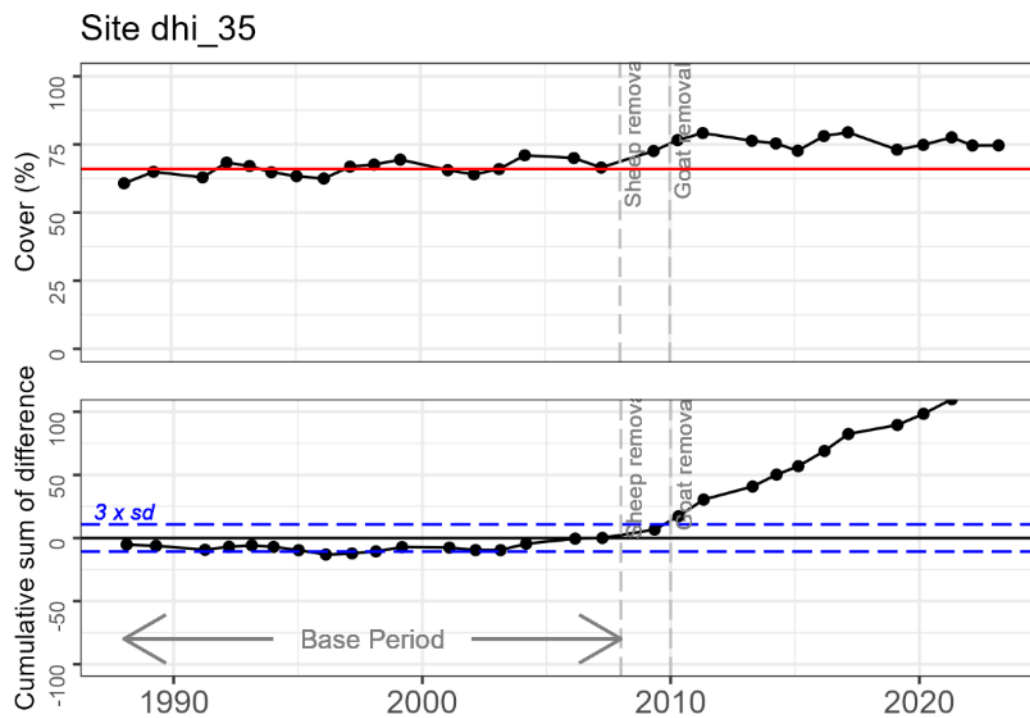
Note: Buffel grass evident at 2-10 % cover in 2014 and 2016 but could not be found alive or dead in 2018.

Site photographs

		
April 2014	May 2016	May 2018
		
May 2019		

Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. Some buffel grass (*Cenchrus ciliaris*) was evident at the site.



Recommendations:

Site added as a permanent monitoring plot to be reassessed biennially.

Site 36

Description:

Low Open Shrubland (2-10% cover) 1 metre *Acacia teragonophylla* and *Acacia coriacea* (90% dead) with *Diplolaena grandiflora* (60% dead)

Low shrubland (10-30% cover) 0.1- 0.5 metres of *Capparis spinosa* (30%), *Atriplex vesicaria*, *Alogyne hakeifolia*, *Solanum lasiophyllum*, *Pimelea microcephala*, *Thryptomene baeckeacea*, *Threlkeldia diffusa*, *Rhagodia crassifolia* and *Ptilotus obovatus*



Over grassland (10-30 % cover) of *Cymbypogon obtectus*, **Cenchrus ciliaris*, **Bromus japonicas*

Over herbs and low shrubs (2-10% cover) of **Urospermum picroides*, **Bidens bipinnata*, **Solanum nigrum*, **Sonchus oleraceus*, **Centaureum erythraea*, *Conostylis stylidioides*, *Acanthocarpus preissii*, **Hypochaeris glabra*, *Euphorbia boopthona*, **Brassica tournefortii*, *mHalgania cynea*, *Cassytha* sp., *Logania* sp. and *Dianella revolute*, *Goodenia* sp 2, *Senecio pinnatifolius*, *Maireana* sp., *Austrostipa* sp., **Brassica tournefortii*, *Gnephosis arachnoidea* and *Eragrostis dielsii*.

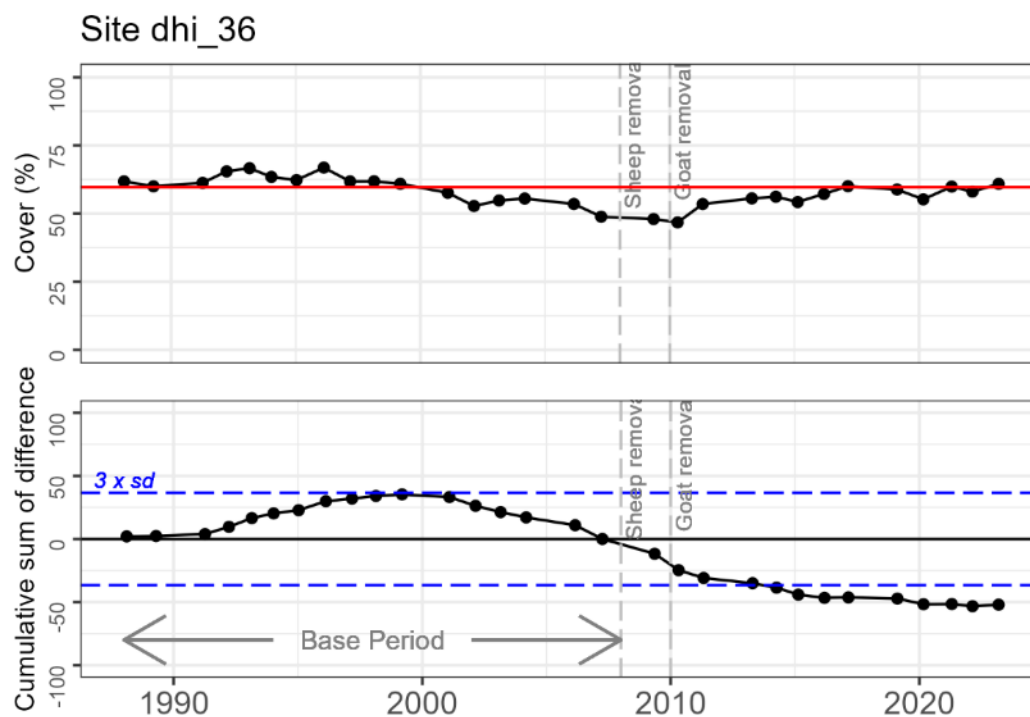
Note: *Acacia* layer has died no apparent regeneration. Lots annual weeds. Obviously must have been heavily grazed, perhaps after a fire and sheep/goats ate all the seedlings or there was a drought after a small fire or both.

Site photo, April 2014



Vegetation cover time series analysis:

A step decrease in vegetation cover appears to occur following 2000. The cause for this is not evident.



Recommendations:

Site added as a permanent monitoring plot to be reassessed biennially.

Site 37

Description:

Low mixed heath of *Thryptomene baeckeacea*/ *Atriplex vesicaria*/ *Scaevola tomentosa*/ *Melaleuca cardiophylla*/ *Acacia ligulata*/ *Frankenia pauciflora*/ *Dodonaea aptera*/ *Rhagodia baccata*/ *Exocarpos aphyllus* (30-70% cover, avg 60%) 0.2-0.5 metres

Open grassland of *Triodia plurinervata* (30-70% cover) 0.2-0.5 metres, rare *Austrostipa elegantissima*

Herbfield of *Salsola australis*/ *Acanthocarpus robustus*/ *Urospermum picroides*

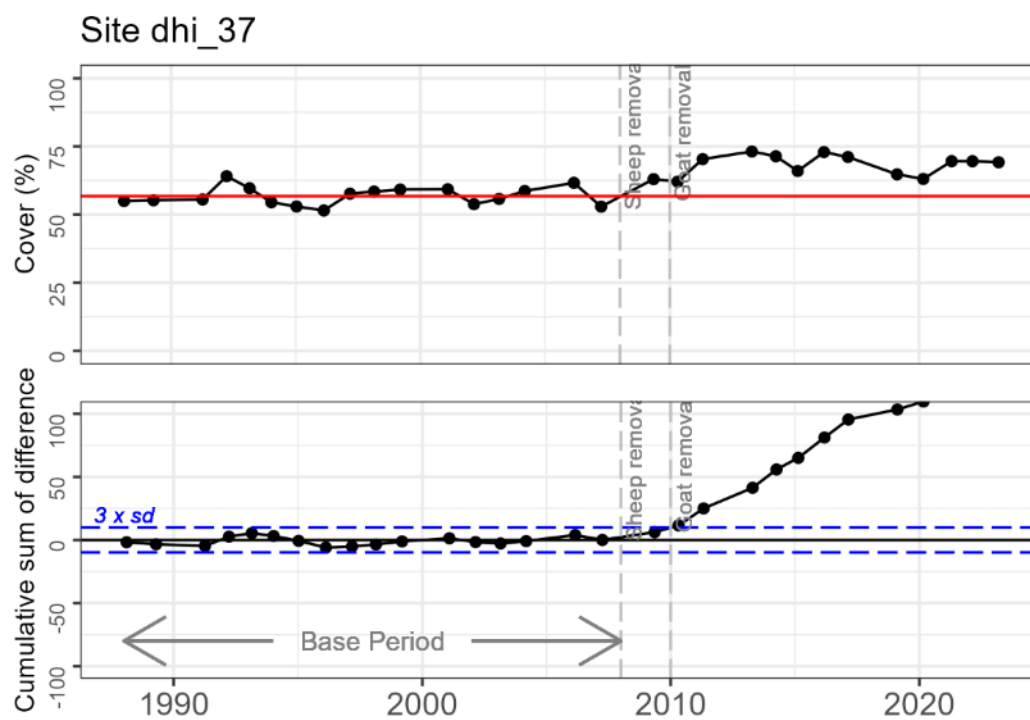
Annual grasses of *Austrostipa nitida*

Many young *Acacia ligulata* plants

Few scattered *Diplolaena grandiflora*



Vegetation cover time series analysis:



Site AGWA 657

Description:

Low very open trees (<2%) *Pittosporum phylliraeoides*

Low Open Shrubland (2-10% cover) 1-2 metres of *Exocarpus aphyllus*, *Scaevola tomentosa*, *Diplolaena grandiflora* and *Scaevola spinescens*

Low shrubland (10-20% cover) 0.5-1 metres of *Atriplex vesicaria*, *Scaevola nitida*, *Teragonia implexicoma*/ *Stylobasium spathulatum*/ *alectryon oleifolius*

Low shrubland 2-10% cover) 0.3- 0.5 metres of *Pembertonia latisquamea*, *Ptilotus obovatus*, *Frankenia pauciflora*, *Rhagodia crassifolia*, *Threlkeldia diffusa*, *Aphanopetalum clematidium* and *Pimelia gilgiana*/ *Solanum orbiculatum*/ *Acanthocarpus preissii*

Over low bunch grassland (10-30 % cover) of **Cenchrus ciliaris*, *Austrostipa nitida* and *Austrostipa elegantissima*











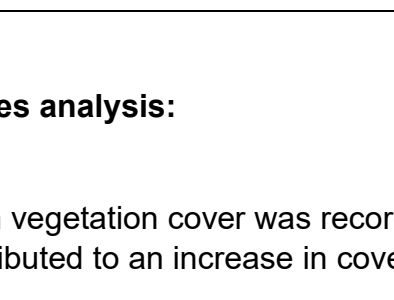
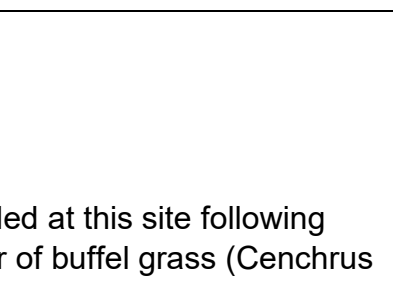
Over herbs, grasses and low shrubs (10 % cover) of *Acanthocarpus robustus*, *Bromus arenarius*, **Bromus diandrus*, *Angianthus tomentosus*, *Angianthus sp.*, **Brassica tournefortii*, *Chenopodium melanocarpum*, *Goodenia sp.*, *Goodenia sp 2*, *Senecio pinnatifolius*, **Brassica tournefortii*.

2015 germination of *Ptilotus obovatus*

In 2018 some coverage of buffel but plants appear to be only surviving as rootstock.

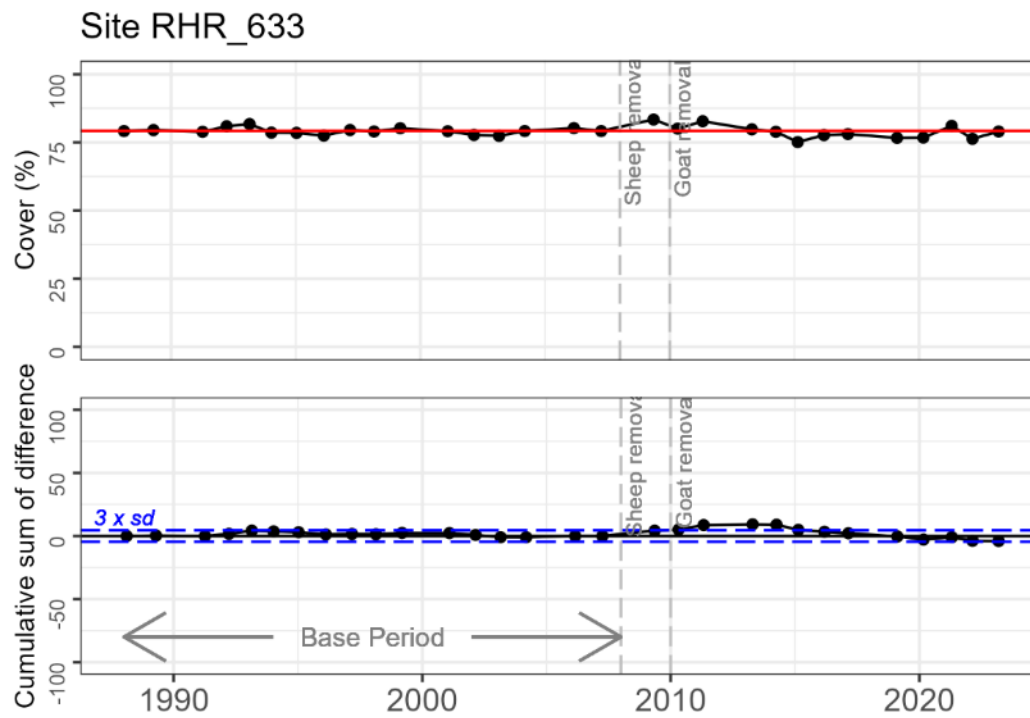
Photo point photographs of plot AGWA657.



May 2007	September 2008	October 2009
		
January 2011	January 2012	April 2014
		
May 2015	May 2016	May 2017
		
May 2018	May 2019	May 2021
		

Vegetation cover time series analysis:

A significant step increase in vegetation cover was recorded at this site following destocking. This may be attributed to an increase in cover of buffel grass (*Cenchrus ciliaris*).



Recommendations:

Recapture photograph points and reassess site condition in 1 year. Reassess baseline period in 1 year.

Site AGWA 662

Description:

Low Very Open Shrubland (2% cover) 0.5- 0.6 metre of *Acacia ligulata*

Dense low shrubland (40-70% cover) 0.3- 0.5 metre of *Melaleuca cardiophylla*, *Thryptomene baeckeacea* and scattered *Stenanthemum* sp., *Pileanthus limacis*, *Halgania cyanea*, *Mirbelia ramulosa* and *Exocarpus aphyllus*

Over low hummock grassland (10-30 % cover) of *Triodia plurinervata*

Over scattered herbs of *Salsola australis*

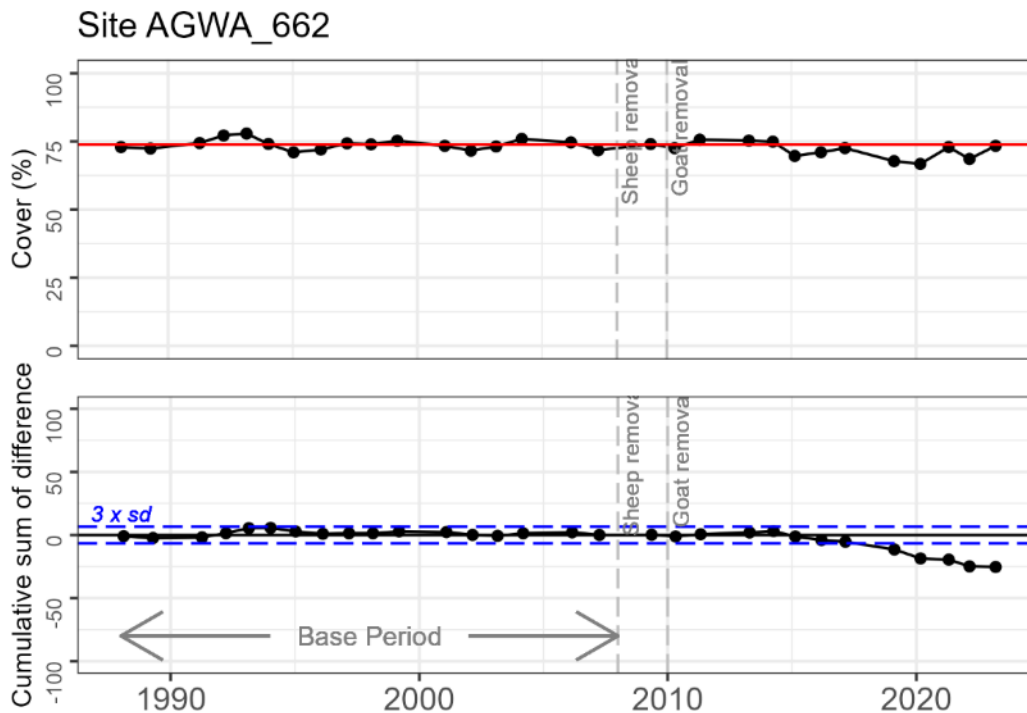


Photo point photographs of plot RHR633.



Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 4 year or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).

Site RHR 633

Description:

Very Open Shrubland (2-10%) 1-2 metres of *Acacia coriacea* and *Acacia tetragonophylla*

Low Open Shrubland (10% cover) 0.5-1 metres *Acacia ligulata*

Low shrubland (30% cover) 0.3- 0.5 metre of *Thryptomene baeckeacea* and *Melaleuca cardiophylla*, with rarely recorded shrubs of *Stylobasium spathulatum*, *Mirbelia viminea*, *Leptosema macrophyllum*, *Acacia biddimorpha*, *Halgania cynanea*, *Stenanthemum* sp. and *Pileanthus limacis*

Over low open hummock grassland (2-10 % cover) of *Triodia plurinervata*

Over scattered sedges (2-10%) of *Lepidobolus preissianus*.

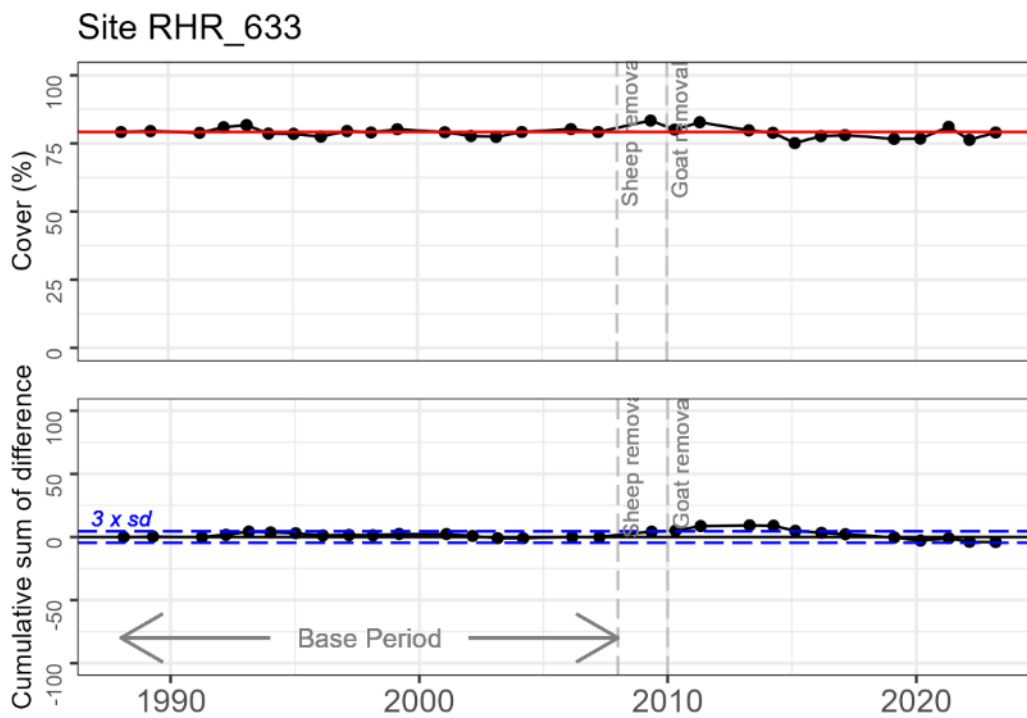


Photo point photographs of plot RHR633.

		
May 2006	May 2007	September 2008
		
January 2011	January 2012	April 2014

Vegetation cover time series analysis:

No significant change in vegetation cover is evident in the time series.



Recommendations:

Recapture photograph points and reassess site condition either in 4 years or if a significant deviation from baseline vegetation cover are observed (3 standard deviation lines on cusum chart are breached).