INDIGENA BIOSECURITY INTERNATIONAL

NON-NATIVE PLANTS ON SOUTH GEORGIA
Season Report 2016/17

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Season Report 2016/17

Kelvin Floyd
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This report was prepared by Indigena Biosecurity International Limited for the Government of South Georgia and the South Sandwich Islands

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INTRODUCTION

Alien plant management work during the 2016/17 season focused on undertaking actions to implement the 'South Georgia Non-Native Plant Management Strategy 2016 – 2020'. Control was undertaken on low incidence species and sites, along with continuing plant surveys to fill gaps in distribution data.

There are now 79 alien plant species recorded from South Georgia. Of these, 35 species are historic and presumed extinct, 3 are widespread and naturalised, and 4 are common locally. There are 34 species (Class One) that are managed on a zero population density basis.

This season seemed to be a particularly good growing year for many species, with grass species forming very dense swards and other previously unknown species and populations becoming visible.

Three new species records for the island located this season are to be formally identified by the Royal Botanical Gardens at Kew.

Non-native plant species classes

Class	Description
Class One – Species-Led	Priority species; require species-led control at the island-wide level, to control all plants before they reach maturity. All sites with these species have a 'Site Tag' in the Weeds Database, to enable managing follow-up visits.
Class Two – Site-Led	Species of moderate distribution, requiring site-led control. Priority populations are those at high-use visitor sites, and sites with small infestations where control will reduce further dispersal.
Class Three – Site-Led	Species which are widespread and abundant, and require management at high-use visitor sites and at some remote outlier sites where appropriate.
Research	More information required before classification.

WORK UNDERTAKEN THIS SEASON

This season the field team was led by Kelvin Floyd. The team consisted of Sally Poncet, Ken Passfield and Nigel Parkinson.

Work began when Kelvin arrived on the FPV Pharos on the 7th January. The first bittercress sweep was undertaken along with Class Two and Three control around King Edward Point (KEP) and Grytviken. Sally and Ken arrived at KEP on the 18th January and assisted with bittercress control before departing for Husvik on the 22nd January. The FPV Pharos provided support to drop equipment and personnel at Husvik villa and also to visit Grass Island on the same day. Sally and Ken were based at Husvik until the 28th February working in the Stromness bay area**,** following up on Class One sites and undertaking Class two control in selected units.

Nigel arrived at KEP on the cruise ship Akademik Sergey Vavilov 1st February. Kelvin and Nigel continued searching bittercress sites, undertook Class One and Two control on the Thatcher Peninsula and Barff Peninsula before joining Sally and Ken at Husvik on the 20th February via a boat drop off at Gulbrandsen Valley. Jen Lee (GSGSSI) also arrived at Husvik

via the cruise ship Plancius and several days were spent at Husvik on Class Two species and planning future management unit control. Jen, Kelvin and Nigel departed Husvik for KEP on the 24th February via Carlita Bay. Sally and Ken continued Class two control until returning to KEP on the 28th February.

Sally and Nigel departed KEP on the cruise ship National Geographic Explorer on the 1st March. Ken and Kelvin stayed on at KEP for further Class Two control on the Thatcher, Green and Barff Peninsulas, although early March snowfalls disrupted some of the planned work.

Ken departed KEP on the FPV Pharos 18th March and Kelvin departed on the cruise ship Polar Pioneer 20th March.

Summary of work undertaken:

- 849 square metres of Class Ones treated this year compared to 25,817 square metres last season, the main decline being the good results from the *Rumex acetosella* control.
- 22,448 square metres of Class Two species were treated this season.
- The first record for *Galium saxatile*, identification to be confirmed.
- The first record for *Holcus lanatus*, identification to be confirmed.
- A new grass species, possibly an *Agrostis*. Identification to be confirmed.

Herbicide usage and species details were recorded daily with all information entered into the South Georgia Plants Database.

Ken Passfield surveying on the Greene Peninsula

SOUTH GEORGIA NON-NATIVE PLANT STATUS 2016/2017

Species have been classified within the Non-Native Plant Strategy and are separated into each class below with summaries for each species. A full species list is contained at the end of this report.

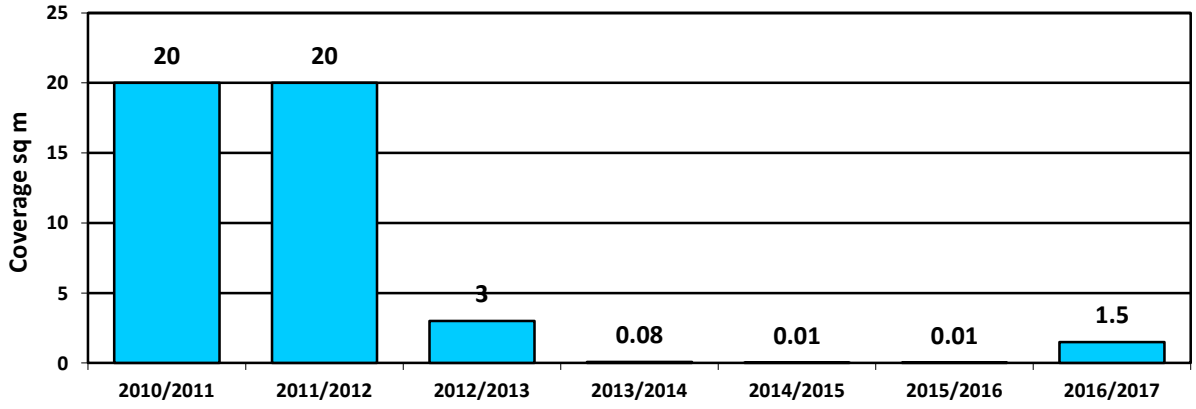
CLASS ONE SPECIES

Each species summary includes a graph showing total plant coverage treated in square metres for each control season.

Class One locations visited 2016/17

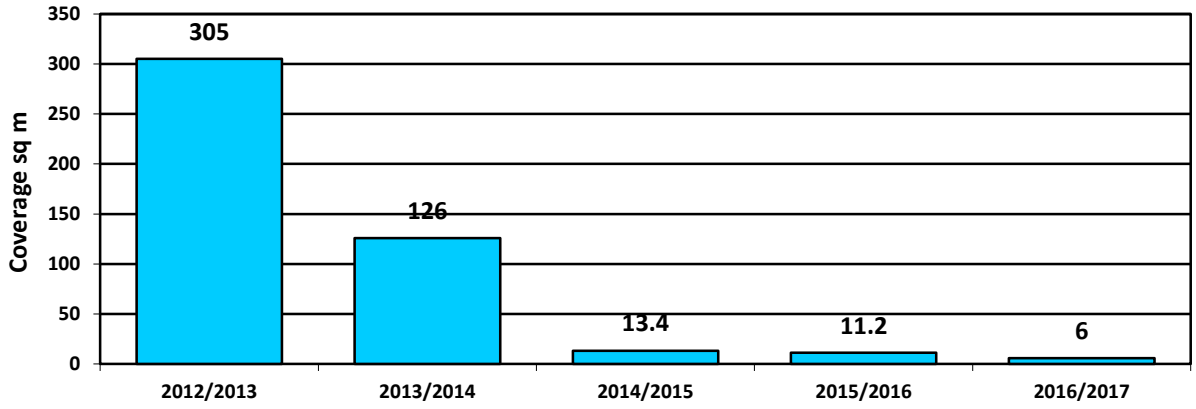
Achillea millefolium yarrow

No plants found at the Grytviken site this season. A small area of plants at Husvik previously seen in 1979 was visible this year and treated.



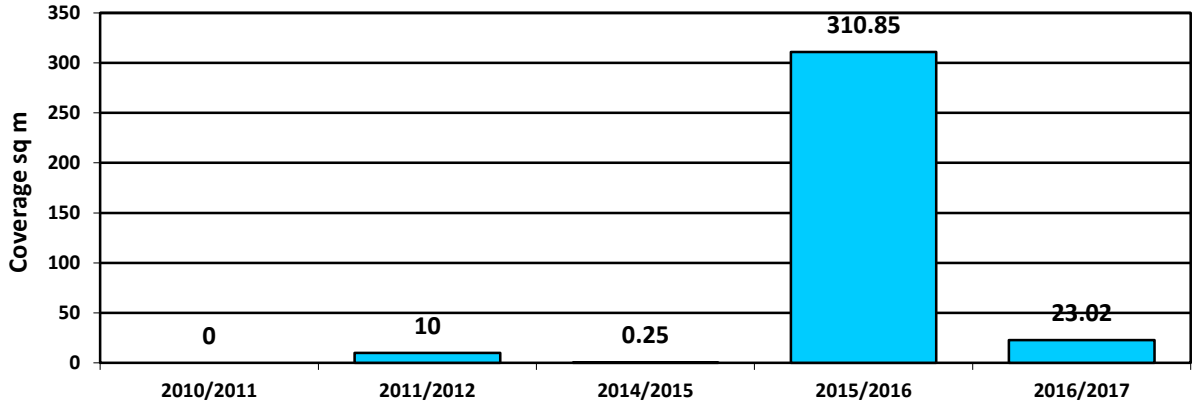
Achillea ptarmica sneezewort

Plants are continuing to be found from fragments spread in flood zones at Husvik but are declining in the amount found. 6 sq m treated this season.



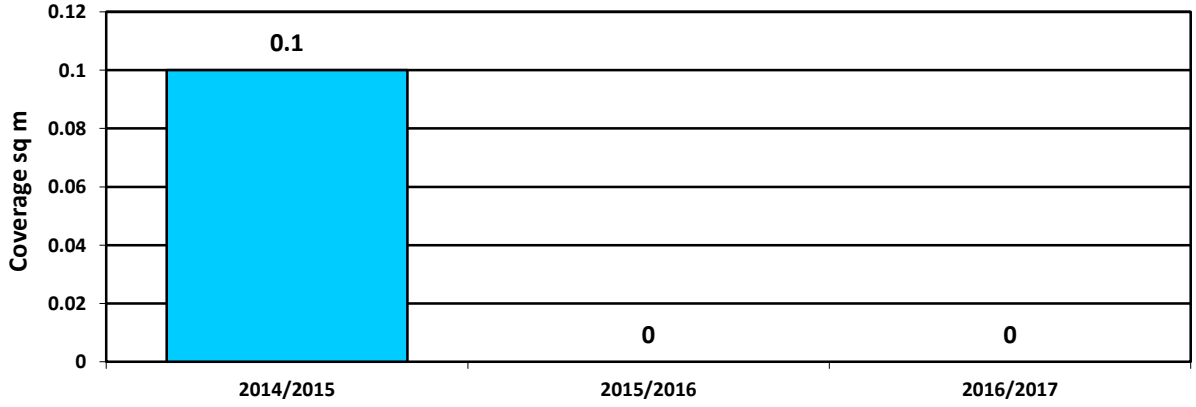
Agrostis vinealis brown bent

Follow up on all known sites was undertaken with 23 sq m treated this year.



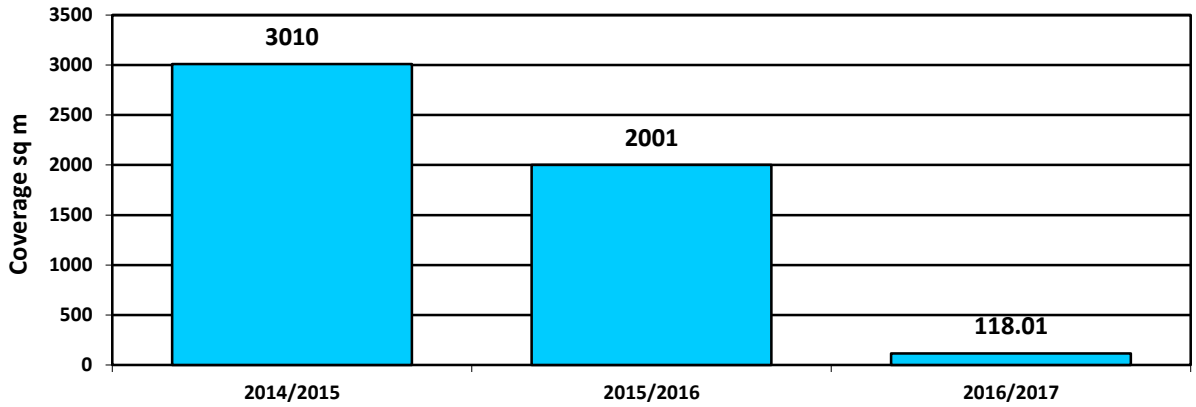
Allium schoenoprasum chives

Nothing found at the Leith Harbour site this season.



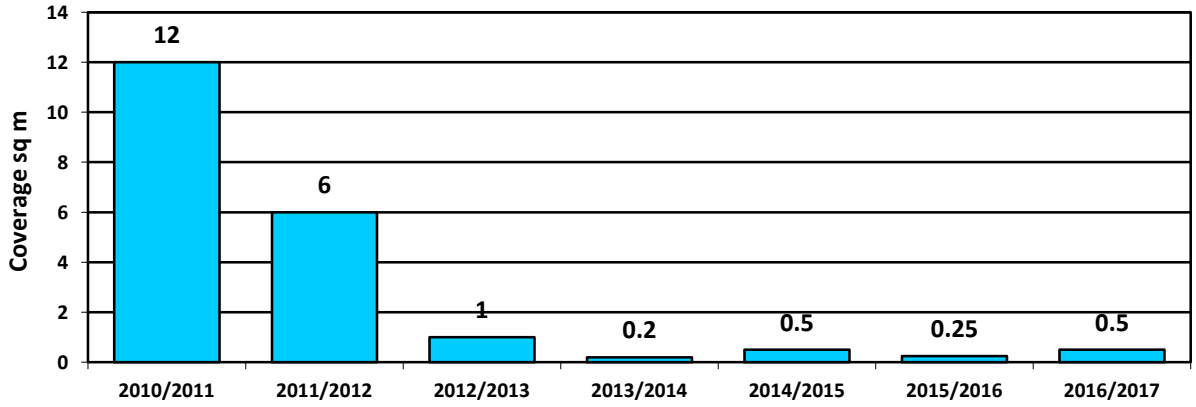
Anthoxanthum odoratum sweet vernal grass

Sweet vernal grass occurs at one site on the lower slopes of the Husdal, Husvik. Follow up this year shows treatment is proving effective although seedlings are difficult to locate. A single plant was also found at Maiviken.



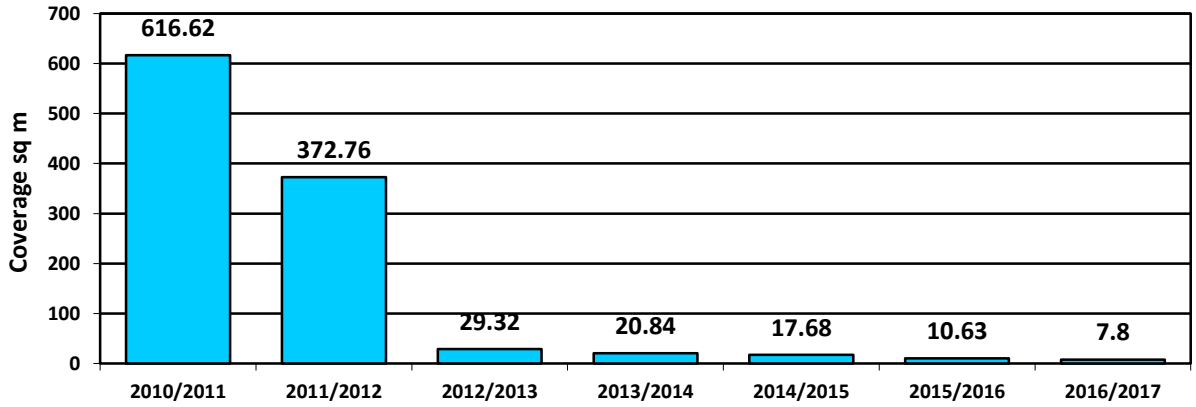
Anthriscus sylvestris cow parsley

The single site of this species is on the northern side of Nybrakka at Grytviken. Plants found were controlled before they produced seed; however this site continues to produce seedlings from the original plant's seed bank.



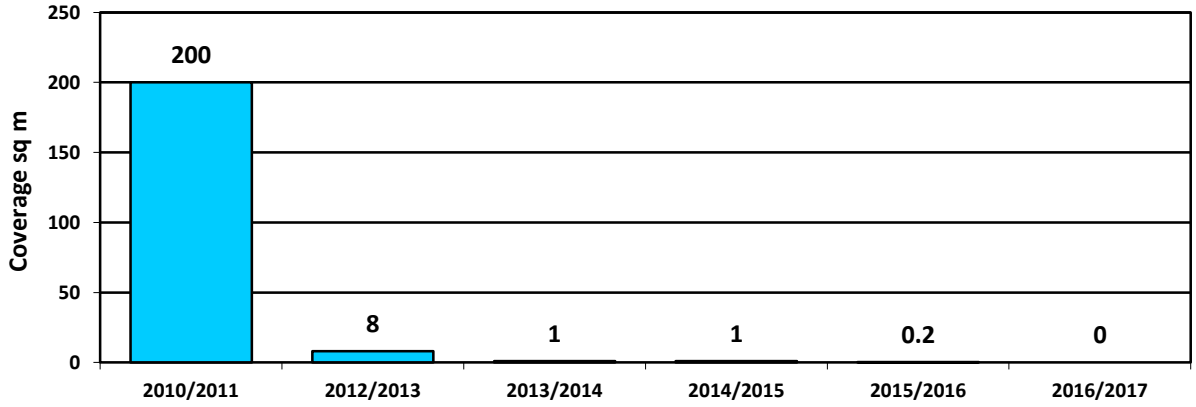
Cardamine glacialis bittercress

Three sweeps of the bittercress sites were completed this season with all maturing seed pods collected. In total, 7.8 sq m of bittercress was found this season.



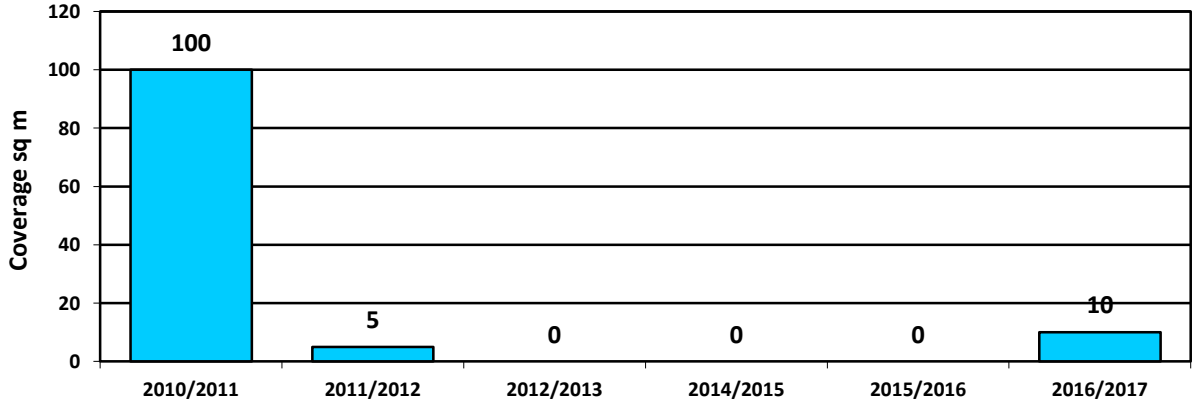
Carex aquatilis water sedge

No plants found at the Husvik site this season.



Carex nigra common sedge

No plants were found this season at the Ocean Harbour site. A new site was located and treated behind the Husvik whaling station.



Carex sp. sedge species

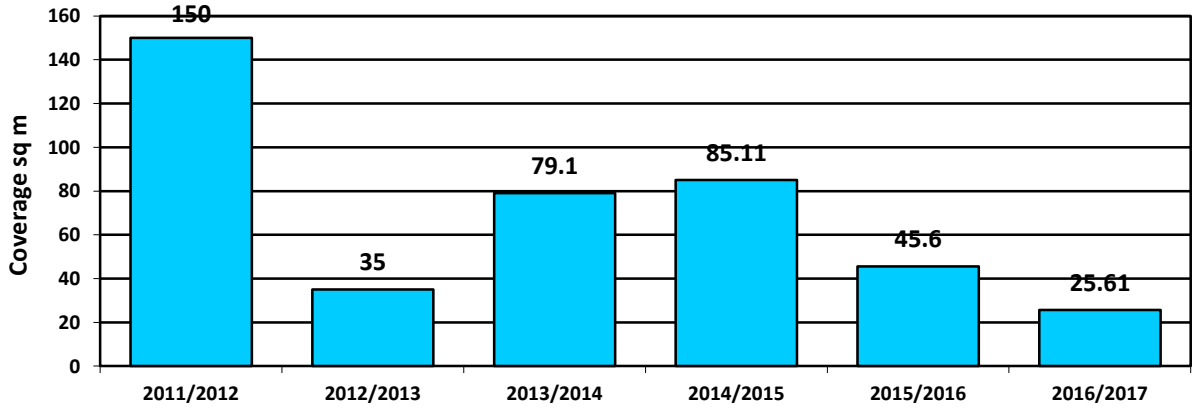
The small patch of *Carex* species sprayed in 2012/13 at Karrakatta Gorge and the small patch sprayed on the west shore of Block Lake in 2013 were not found this year.

Dactylis glomerata cocksfoot

No sign of the single plant controlled in 2010 at Grytviken was found this season.

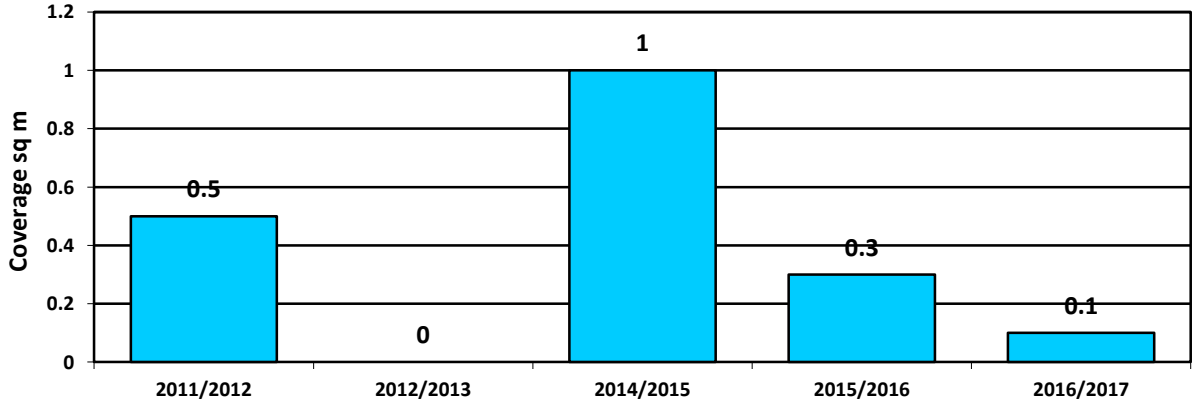
Deschampsia cespitosa tufted hair-grass

Previous control has been effective at Grytviken, Husvik, Stromness and Leith. However, new clumps continue to be found as the flower heads show themselves above other vegetation; these were all treated.



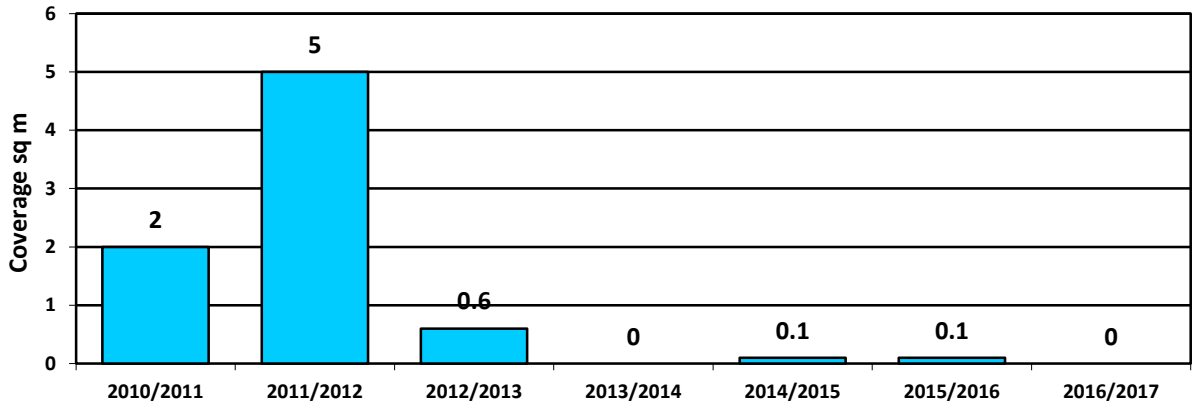
Deschampsia flexuosa wavy hair-grass

No plants were found at the Maiviken or Karrakatta sites and a small amount of follow-up was required at the Husdal site.



Elytrigia repens Couch Grass

No couch grass was recorded from Husvik, Leith and Grytviken this season.

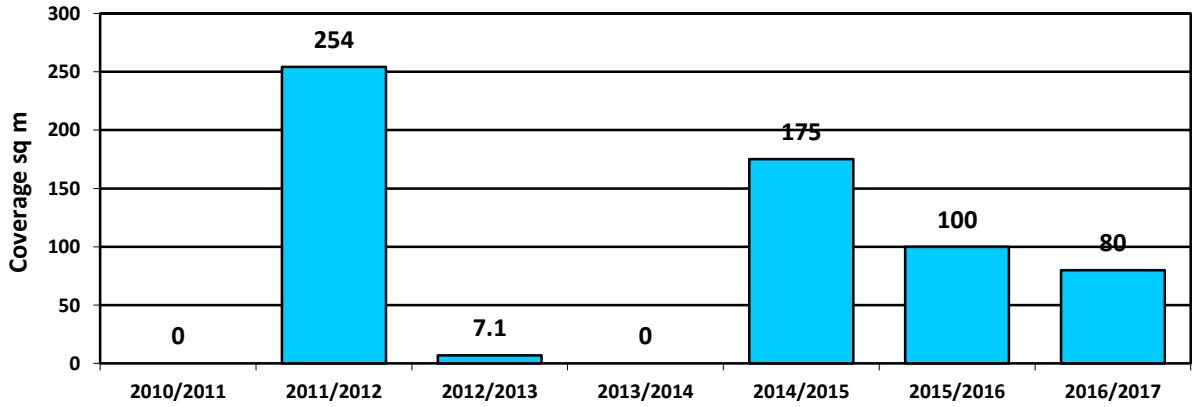


Empetrum rubrum diddle-dee

The site of the diddle-dee plant at Hestesletten was revisited and no regrowth found.

Festuca rubra red fescue

Red fescue was treated at all sites this season, previous control with haloxyfop was found to be not very effective and so plants found this season were treated with glyphosate.

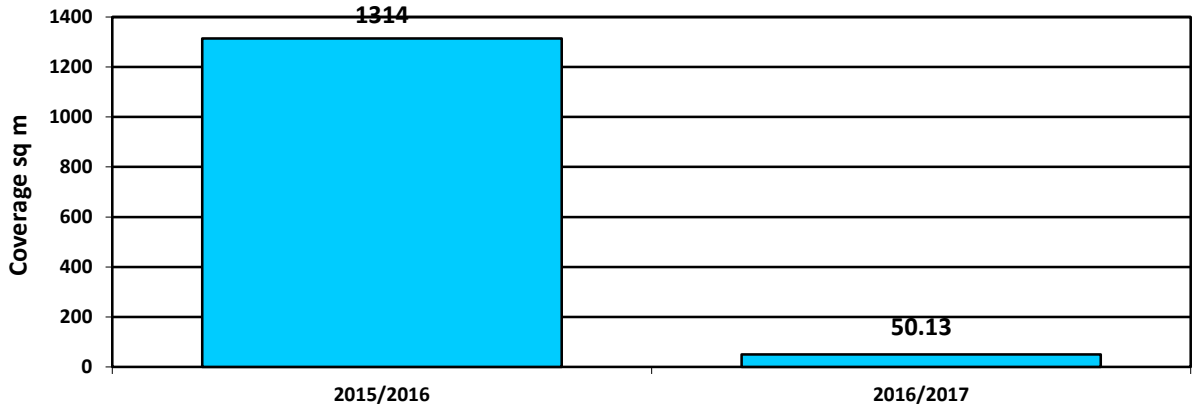


Juncus filiformis thread rush

No regrowth was found at the 2 thread rush sites in Stromness Bay this season.

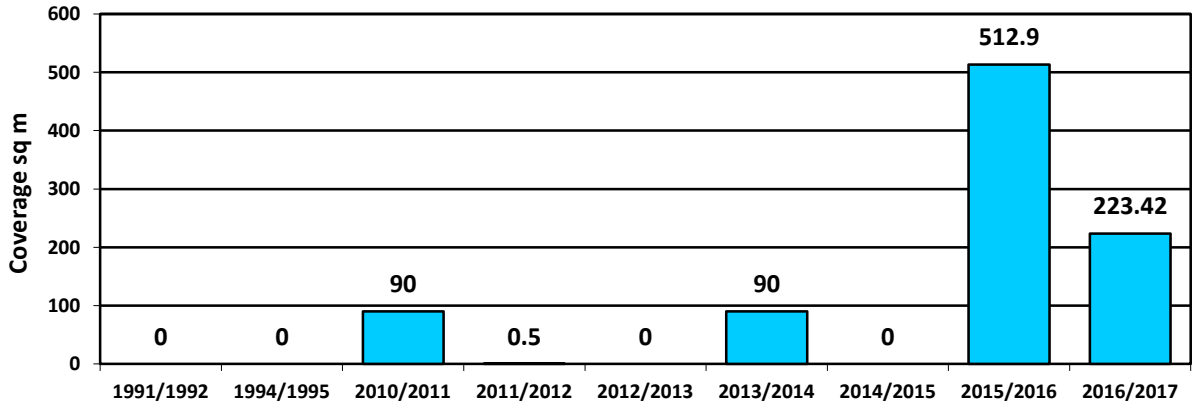
Leptinella scariosa feathery buttonweed

Sites in the Hansen Valley were followed up this year and several new sites were found in the vicinity and treated.



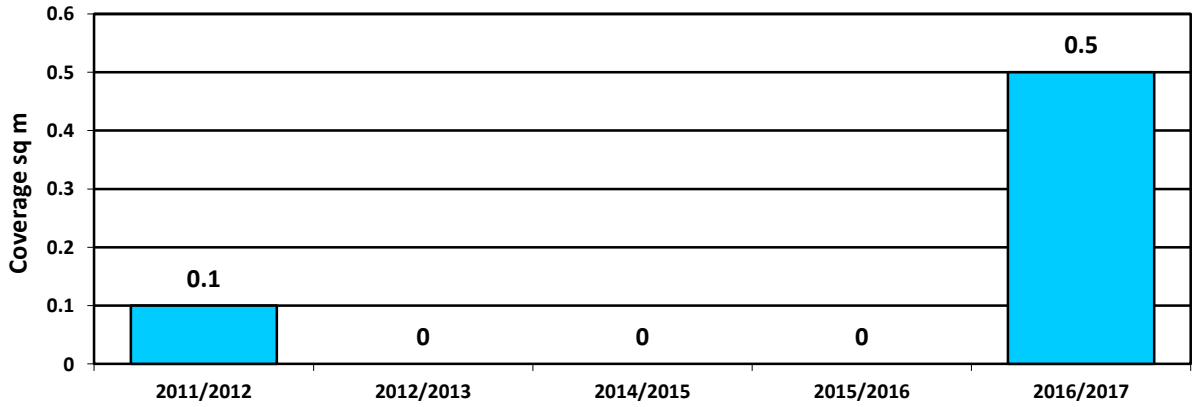
Lobelia pratiana berry-lobelia

Follow-up was undertaken on all sites with 223 sq m recorded this season. Several new sites were found in Karrakatta valley and treated.



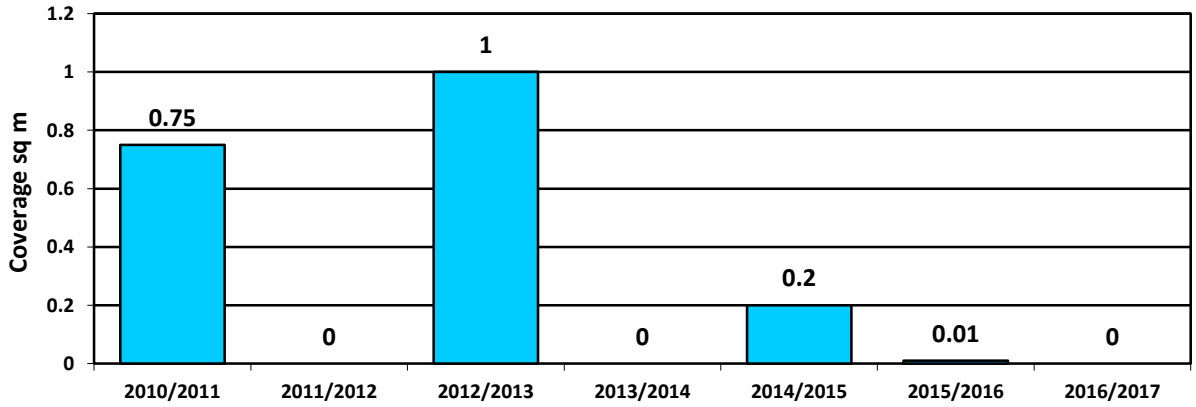
Luzula muliflora var congesta heath wood-rush

The original Heath wood-rush at King Edward Point was not found this season however a new site was found in the whaling station at Grytviken.



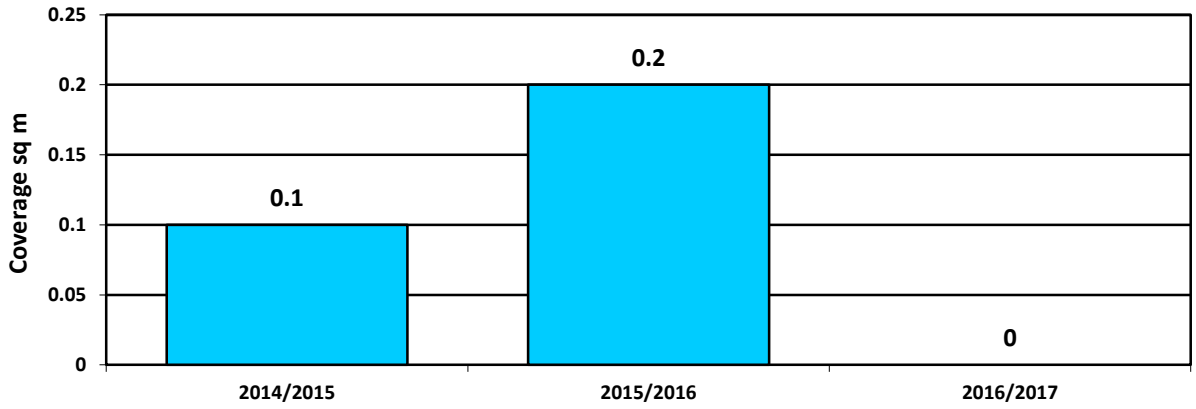
Nardus stricta mat grass

Nothing was found at any of the sites this season.



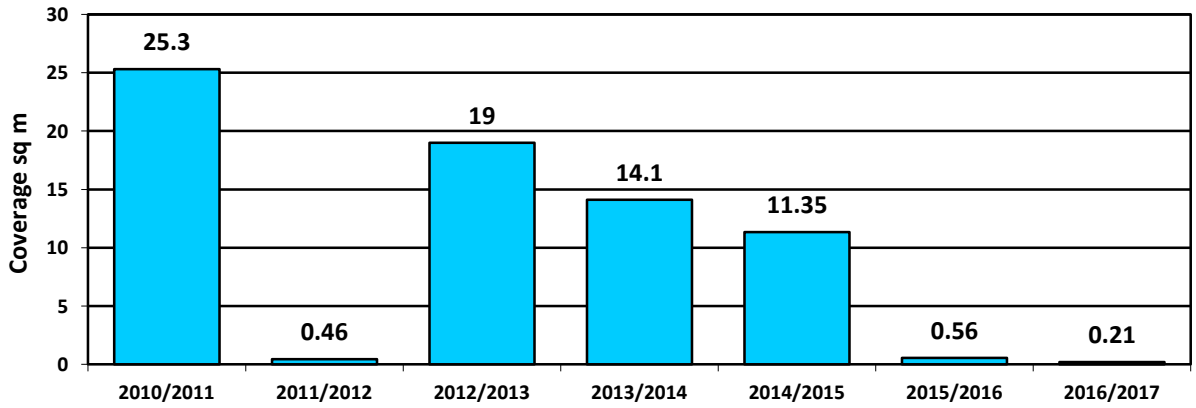
Ranunculus acris meadow buttercup

Nothing found at the Karrakatta Valley site this season.



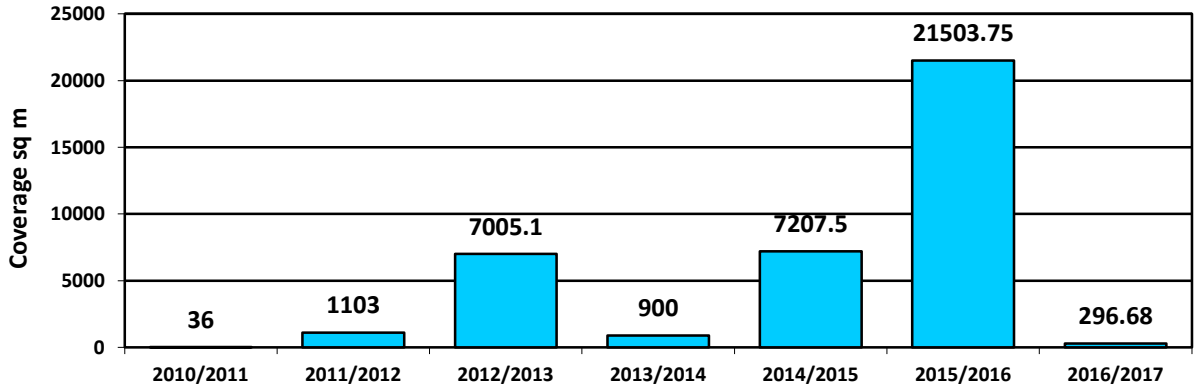
Ranunculus repens creeping buttercup

Some follow up was required at buttercup sites, with some new small plants appearing at Grytviken.



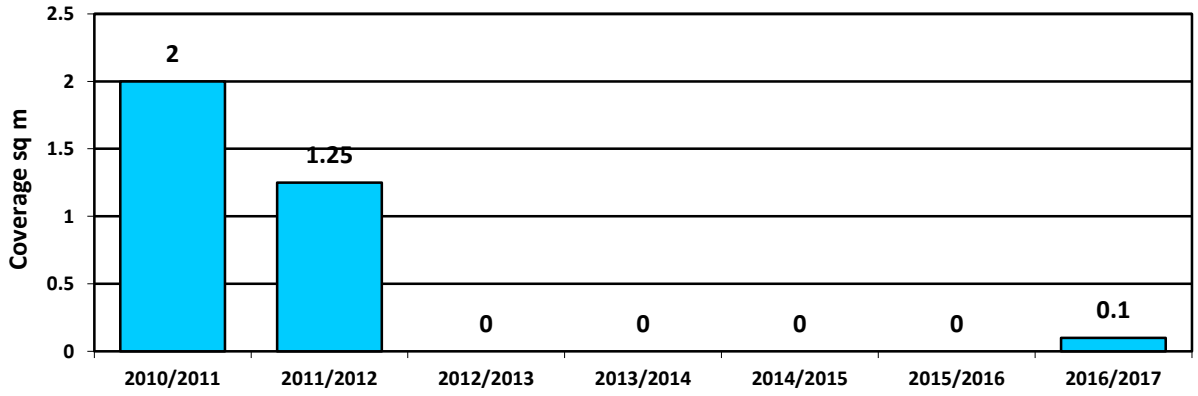
Rumex acetosella sheep's sorrel

Follow up control on all sites was undertaken, with very good results from the previous control. Initial control on most sites was undertaken in 2015/16. A new site was also found near Stromness Whaling Station.



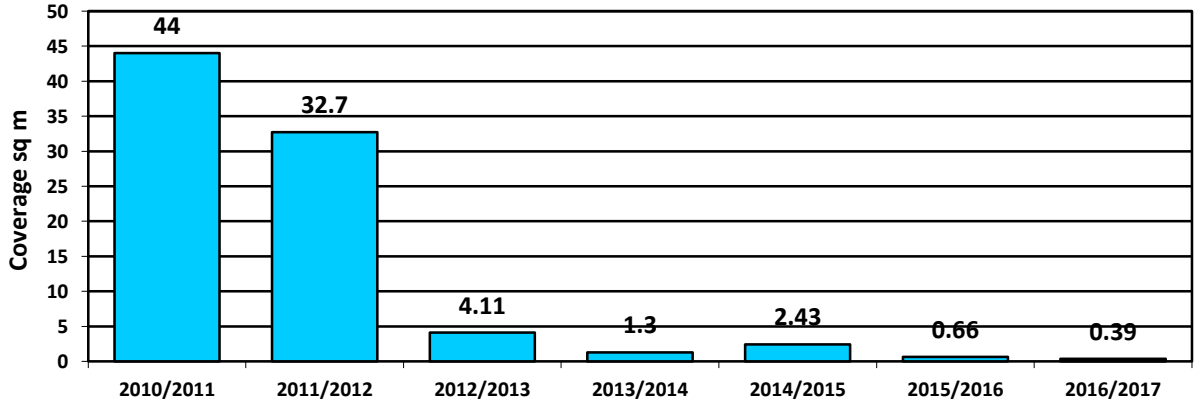
Rumex crispus curled dock

No plants were found at any of the sites where the species had previously been recorded, although a new plant was found this season within Grytviken whaling station.



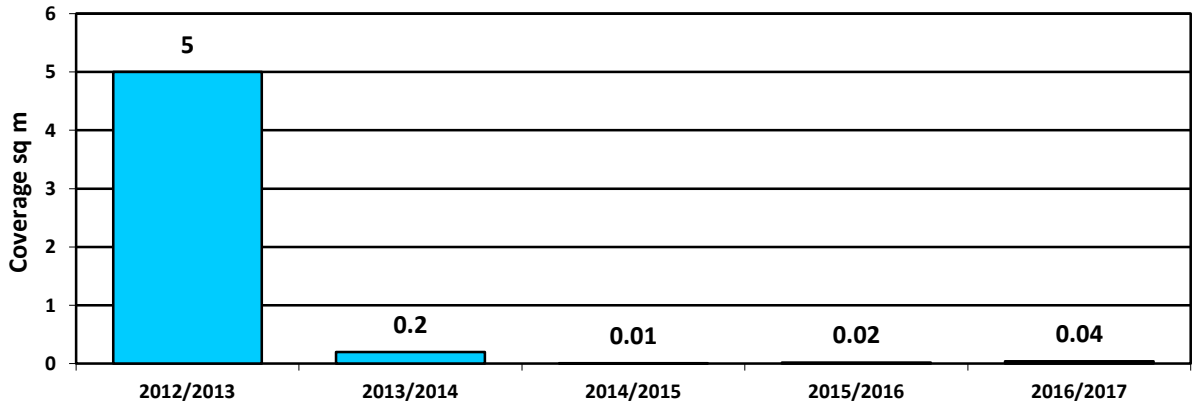
Sagina procumbens pearlwort (procumbent)

0.39 sq m was found and treated this season. Mostly seedlings were found although a few larger plants were found hidden in moss and another site was found in Karakatta valley.



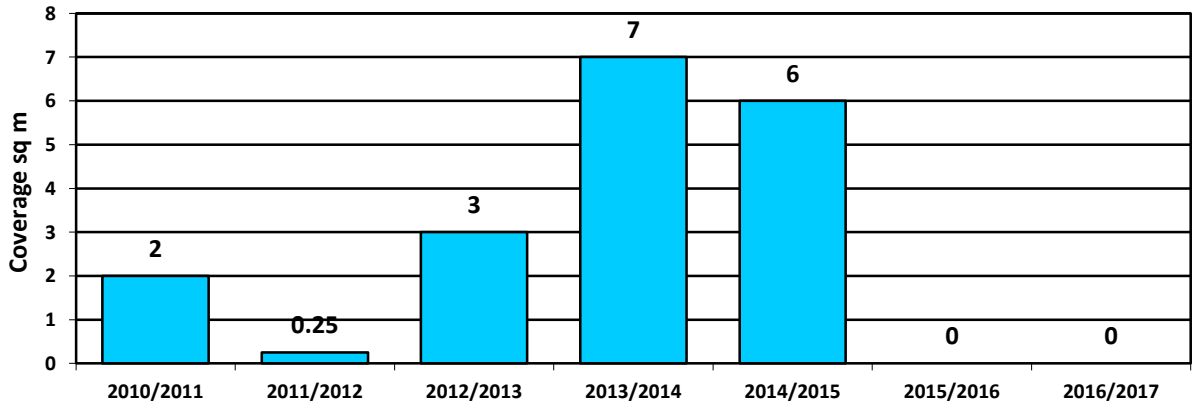
Scorzonerioides autumnalis Autumn hawkbit

One plant found this season at the single known site in Karakatta valley.



Trifolium repens white clover

All known sites were checked and no plants found this season.

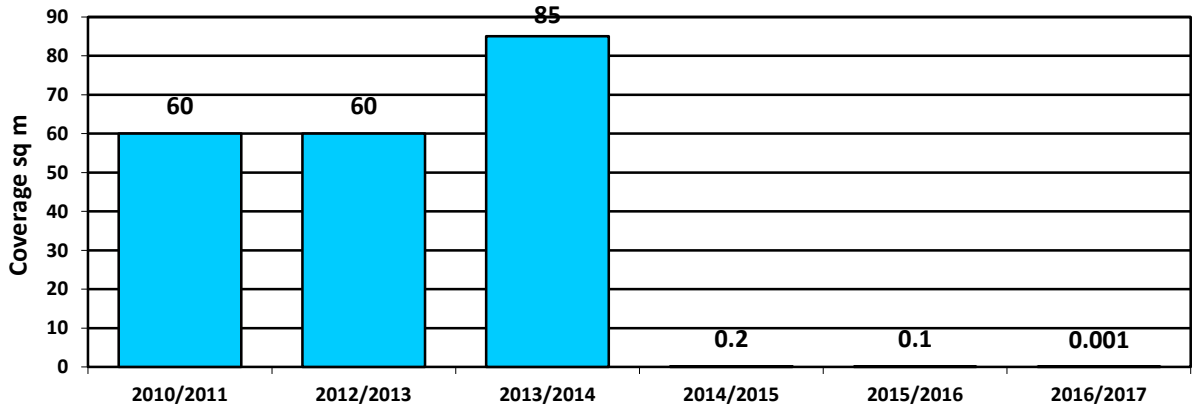


Tripleurospermum indorum scentless mayweed

Scentless mayweed, previously recorded at Grtyviken, was not seen this season.

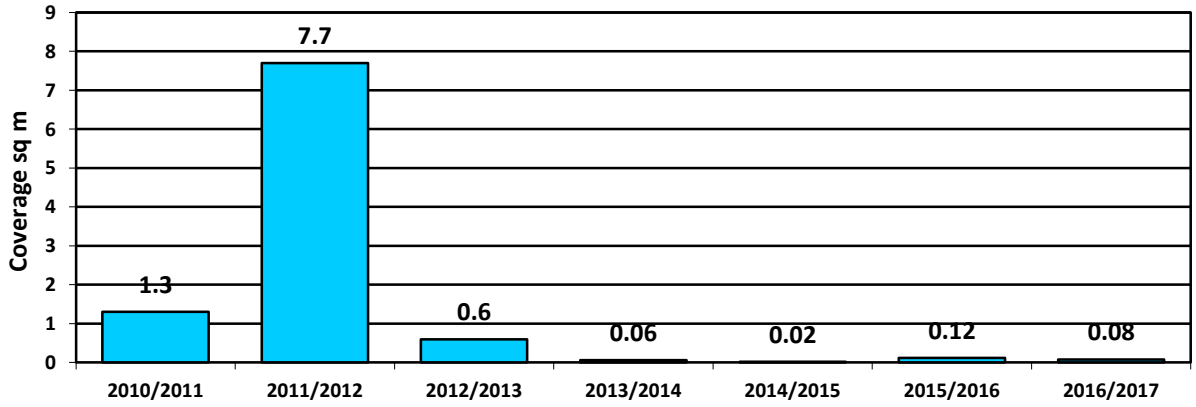
Vaccinium vitis-idaea cowberry

Some very small stems were found and treated at the Husdal site with no plants found at the Pintail Peninsula site.



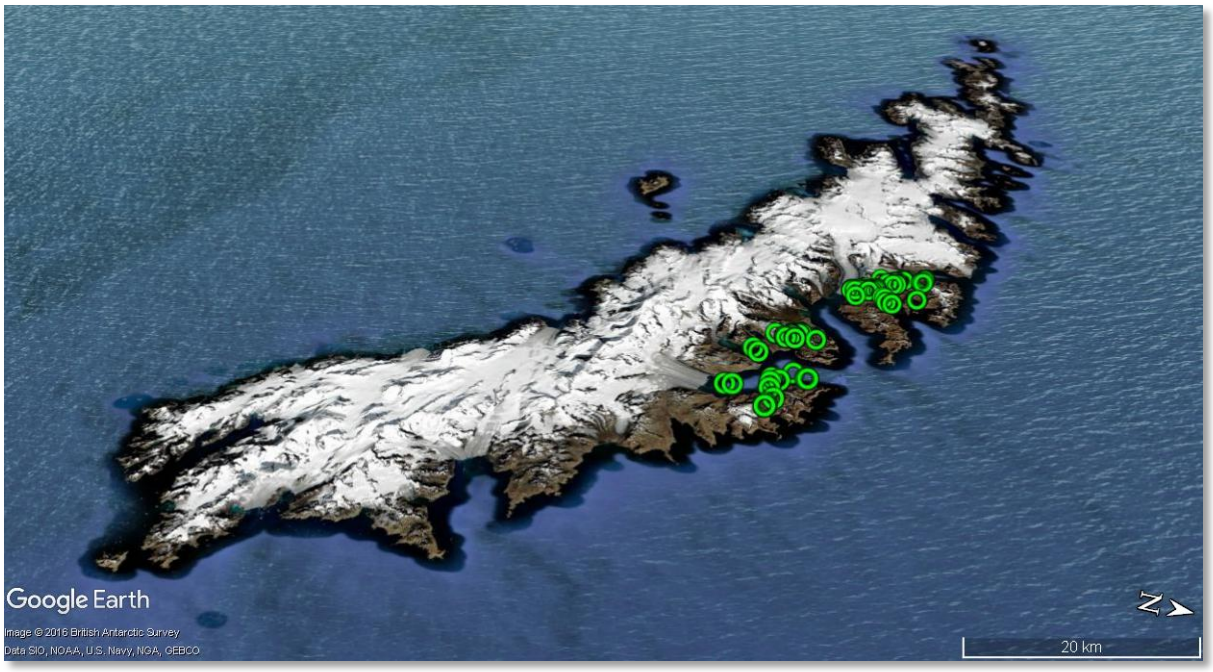
Veronica serpyllifolia thyme-leaved speedwell

A few small plants (totalling 0.08 sq m) were treated at Grytviken.



CLASS TWO SPECIES

Tables for each species show square meters treated this season in each management unit.



Class Two control locations in 2016/17

Agrostis capillaris common bent

All known sites were treated on the Thatcher Peninsula, and outlier control was undertaken in other units.

Unit	sq m Treated
Bore Valley	1
Brown Flats	810
Godthul	400
Grass Island	1
Grytviken	5900
Husvik	3100
Karrakatta	5
Misery Bay South	25
Olsen	1
Penguin River	50
Shackleton Valley	15
Total	**10308**

***Agrostis capillaris* control from 2015/16 season, Grytviken**

Deschampsia cf. parvula punkgrass

This grass covers large areas in Karrakatta Valley with a few smaller patches on Pintail Peninsula and Kelp Point. Following the cessation of grazing by reindeer, this species now has the potential to spread rapidly within Stromness Bay. Some outlier control was undertaken in areas outside the main population.

Unit	sq m Treated
Husvik	2.01
Karrakatta	11
Kelp Point	13
Olsen	1
Total	**27.01**

Poa pratensis smooth meadow grass

Control of this species this season was on small outlier populations and around high visitor use sites such as Grytviken and King Edward Point to reduce the risk of spread. This grass continues to show itself as plants recover from grazing and good growing seasons allow it to dominate other vegetation.

Unit	sq m Treated
Barff Point	125
Brown Flats	2100
Carlita	536
Corral	400
Godthul	130
Greene	65
Grytviken	3850
Husdal	40
Husvik	1200
Karrakatta	980
King Edward Point	1000
Leader Valley	125
Maiviken	4
Olsen	1473
Reindeer Valley	0.5
Shackleton Valley	63
Total	**12091.5**

Trisetum spicatum spike trisetum

This grass covers very large areas in Karrakatta Valley, Stromness, Shackleton Valley and Hansen Valley with small patches at Cape Saunders, Grytviken, Pintail Peninsula and Kelp Point. Following the cessation of grazing by reindeer, this species is spreading rapidly within Stromness Bay. Site-led control of outlying plants and populations was carried out in management units detailed below.

Unit	sq m Treated
Brown Flats	0.25
Grass Island	0
Husdal	1.25
Karrakatta	17.51
Kelp Point	3
Total	**22.01**

CLASS THREE SPECIES

This class consists of *Cerastium fontanum* (common mouse-ear), *Poa annua* (annual meadow grass) and *Taraxacum officinale* (dandelion). These are widespread species especially on the central east coast of South Georgia. Some control was undertaken at the high-use visitor sites and around buildings at Grytviken and King Edward Cove to reduce to risk of these being further spread around the island.

RESEARCH SPECIES

Three previously unrecorded species were found this season on the island. Samples have been collected and sent to Kew for identification and to add the herbarium. They have been tentatively identified on the island and once confirmed by Kew will be added as Class One species.

Galium saxatile **heath bedstraw**

Single plant found next to the walking track near the Maiviken hut.

Holcus lanatus **Yorkshire fog**

Single plant found on Brown Flats terraces opposite King Edward Point.

Agrostis sp.

Small patch found in Husdal, Husvik.

HERBICIDE USAGE THIS SEASON

Herbicide types and amounts used this season.

Herbicide	Total used
Blue Dye	7281 ml
Flexidor 125	303 ml
Glyphosate 360g/L ai	3050 ml
Grazon 90	390 ml
Haloxyfop 100	5047 ml
Meturon	44 gm
Organosilicone	1368 ml

Herbicide stocktake March 2017.

Herbicide	On Base	Ordered
Blue Dye	12 litres	10 litres
Flexidor 125	21 litres	
Glyphosate 360g/L ai	6 litres	
Grazon 90	31 litres	
Haloxyfop 100	10.5 litres	10 litres
Meturon	600 gm	
Organosilicone	2 litres	5 litres

MONITORING

Monitoring plots have been established this season to look at vegetation changes following herbicide applications. These 10m x 10 m plots each containing 5 quadrats have been set up and use the same monitoring protocol as the long-term vegetation monitoring.

Plots have been set up to look at changes following control of:

- *Agrostis capillaris* common bent x 1
- *Deschampsia cf. parvula* punkgrass x 2
- *Poa pratensis* smooth meadow grass x 2
- *Rumex acetosella* sheep's sorrel x 1
- *Trisetum spicatum* *spike trisetum* x 2

Photo points have also been established at Grytviken and King Edward Point to monitor changes in vegetation following control around the buildings and whaling station.

Further quadrat monitoring will be undertaken next season at selected Class One sites to monitor vegetation recovery following control at sites where non-natives were a monoculture.

Results from the monitoring will be incorporated into the Standard Operating Procedures which contain species specific control methodologies and information. The SOP's are part of the South Georgia Weeds Database.

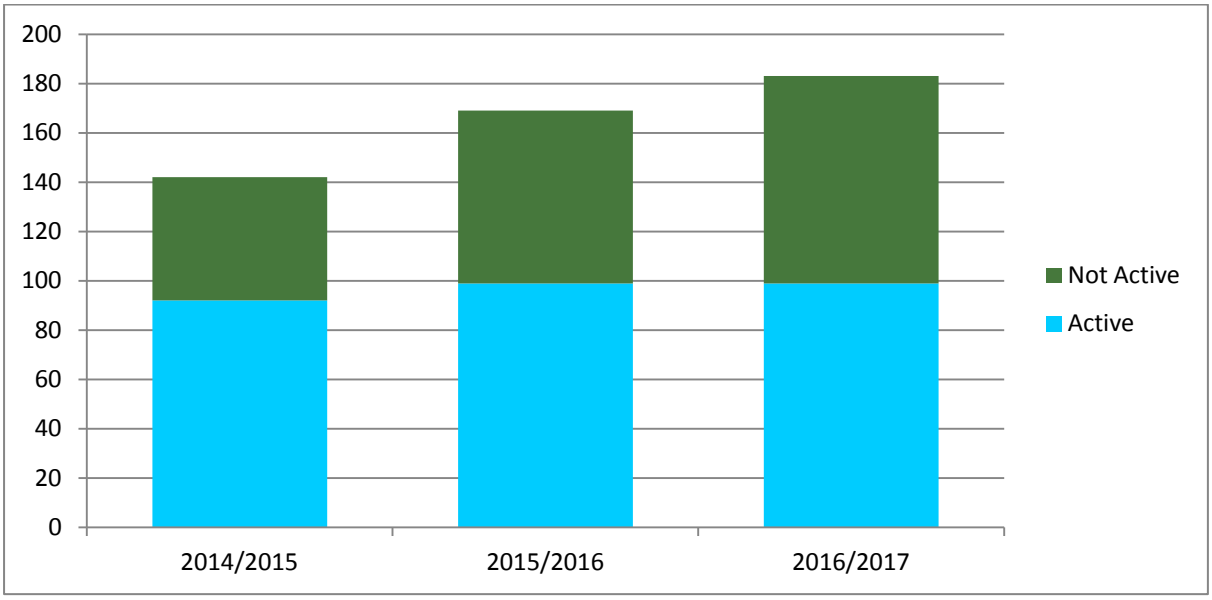
Monitoring plot locations

SEASON SUMMARY

227 person days were spent working on the project this season. This number includes travel days. The 'South Georgia Non-Native Plant Management Strategy 2016 – 2020' has key performance indicators required to be reported on annually. Results are shown in the table below.

Strategy KPI	Season Result
All Class 1 species will be at zero population density.	All class one sites populations controlled
At least 75% of Class 1 species will be eradicated by 2020.	In progress
Class 2 populations will be surveyed and mapped	Continuing
10,000 square metres (1 Hectare) of land containing Class 2 species will be controlled annually.	22,448 square metres controlled this season, 2016/17
Class 2 non-native plant populations will be reduced in abundance and distribution annually.	Ares controlled above included small outlier populations to reduce distribution.
In high visitor traffic areas at King Edward Point and Grytviken, Class 2 non-native plants will be maintained at zero density.	Initial control undertaken this season.
More detailed information will be gathered on the distribution of Class 3 species to inform control decisions at outlying sites.	Ongoing as opportunities arise to visit remote management units.
Issues of the origin will be resolved within 12 months of them being added to the Research Class.	Three new species to classify from this season.

The chart below shows the number of Class One sites per season that are active (have plants present at the visit) or not active in that season. The number of sites has increased each year as new populations have been found.



ISSUES FROM THIS SEASON

The loss of internet at King Edward Point for 6 weeks in January and February made logistics more complicated than usual this season. We were fortunate to have a very experienced team in the field so disruption was minimised. However, it highlights a risk to the programme in an alternative situation where we are relying on email to arrange transport logistics, or trying to sort out any type of difficulty requiring external support. Weekly reporting was unable to be completed for the period of the outage.

RECOMMENDATIONS FOR NEXT SEASON

- Field work is continued as per the 'South Georgia Non-Native Plant Management Strategy 2016 – 2020'
- A logistical support request is made as part of pre-season planning to use the FPV Pharos to access Prince Olav Whaling Station, Moltke Harbour, Gold Harbour, Grass Island and to support the team based at the Husvik Villa in Stromness Bay
- A base VHF unit is made available to the Husvik team. A base set was trialled this season and enabled radio communication from Husvik villa to King Edward Point.
- GSGSSI liaises with South Georgia Heritage Trust regarding planning for the rat monitoring trip as it may allow opportunities to reach remote areas for weed surveys and control. For example, Holmestrand has an area of *Poa pratensis* which needs survey or control.

Sally Poncet and Ken Passfield on Grass Island, Stromness Bay.

OUTREACH AND CAPACITY BUILDING

In 2016 we negotiated with a potential candidate from the Falkland Islands to join the Indigena team for South Georgia. Unfortunately, the candidate was already employed in various roles in the Falkland Islands and was unable to get away for the duration. Nigel Parkinson from Wellington New Zealand was selected to join the established Indigena Team on South Georgia for the 2017 season.

In July 2017, Bradley Myer, Kelvin Floyd, Sally Poncet and Ken Passfield will attend the Island Invasives Conference in Dundee, Scotland. Bradley will be presenting a paper written by the aforementioned team along with Dr Jennifer Lee from GSGSSI. Here is the abstract of the paper that will be presented:

Persistence, accuracy and timeliness: finding, mapping and managing non-native plant species on the island of South Georgia

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South Georgia (353,304 ha) is part of the UK Overseas Territory of South Georgia & the South Sandwich Islands. It is located in the South Atlantic approximately 1,450 km south-east of the Falkland Islands. The landscape of South Georgia is mountainous and glaciated with only the
coastal fringes which are snow free in the summer months supporting vegetation. An estimated 8% of the land mass of South Georgia provides suitable habitat for vascular plants. There are 25 indigenous vascular plants species and 41 non-native plants present on South Georgia.

The objective was to develop and implement a non-native plant management strategy as an integral part of an ecosystem-based habitat restoration programme supporting rodent and reindeer eradications.

Following removal of grazing pressure from introduced mammals, surveys were conducted to quantify non-native plant populations and enable a control strategy to be developed for the island. Due to the vast scale of the island, multiple seasons were required to carry out rapid surveys of key indicators. These indicators are the species, the area of plant coverage in square meters and age class (mature or juvenile); they are also used for long-term control-based monitoring of outcomes. Both survey and control data are entered into a spatial database to enable analysis and allow data informed management decisions.

Forty one non-native plant species are present on the island and their distributions' mapped; of these, 34 are being managed at zero density with 56,851 m2 controlled to date; 4 species are managed at specific sites with 22,443 m2 controlled to date, the remaining 3

species are widely established and receive limited control.

Spatially quantifying the distribution and control of non-native plants has enabled the development and implementation of an effective management strategy which contributes to the restoration of South Georgia's native biodiversity.

SOUTH GEORGIA NON-NATIVE PLANT SPECIES 2017

Latin Name	Common Name	Family	Weed Class	Weed Category
Achillea millefolium	yarrow	Asteraceae	Class One - Species-Led	Restricted naturalised
Achillea ptarmica	sneezewort	Asteraceae	Class One - Species-Led	Restricted naturalised
Aegilops sp	goat grass	Poaceae	Historic	Historic
Agrostis capillaris	common bent	Poaceae	Class Two - Site Led	Widespread naturalised
Agrostis vinealis	brown bent	Poaceae	Class One - Species-Led	Restricted naturalised
Agrostis? unknown	unknown grass - TBC	Poaceae	Research	Persistent
Alchemilla monticola	velvet ladys mantle	Rosaceae	Historic	Historic
Allium schoenoprasum	chives	Amaryllidaceae	Class One - Species-Led	Persistent
Alopecurus genicularus	marsh foxtail	Poaceae	Historic	Historic
Anthoxanthum odoratum	sweet vernal grass	Poaceae	Class One - Species-Led	Restricted naturalised
Anthriscus sylvestris	cow parsley	Apiaceae	Class One - Species-Led	Persistent
Artemisia sp.	mugwort	Asteraceae	Historic	Historic
Avena fatua	wild-oat	Poaceae	Historic	Historic
Brassica cf. napus	rape	Brassicaceae	Historic	Historic
Capsella bursa-patoris	shepherd's purse	Brassicaceae	Class One - Species-Led	Persistent
Cardamine glacialis	bittercress	Brassicaceae	Class One - Species-Led	Widespread naturalised
Carex aquatilis	water sedge	Cyperaceae	Class One - Species-Led	Persistent
Carex nigra	common sedge	Cyperaceae	Class One - Species-Led	Restricted naturalised
Carex sp.	sedge unknown (not flowering)	Cyperaceae	Class One - Species-Led	Restricted naturalised
Carex vallis-pulchrae	marsh sedge	Cyperaceae	Class One - Species-Led	Restricted naturalised
Carum carvi	caraway	Apiaceae	Historic	Historic
Centella sp.	centella	Apiaceae	Historic	Historic
Cerastium arvense	field mouse-ear	Caryophyllaceae	Historic	Historic
Cerastium fontanum	common mouse-ear	Caryophyllaceae	Class Three - Site Led	Widespread naturalised
Dactylis glomerata	cocksfoot	Poaceae	Class One - Species-Led	Transient
Daucus carota	carrot	Apiaceae	Historic	Historic
Deschampsia cespitosa	tufted hair-grass	Poaceae	Class One - Species-Led	Widespread naturalised
Deschampsia flexuosa	wavy hair-grass	Poaceae	Class One - Species-Led	Persistent
Deschampsia parvula	punk grass	Poaceae	Class Two - Site Led	Restricted naturalised
Elytrigia repens	couch grass	Poaceae	Class One - Species-Led	Restricted naturalised
Empetrum rubrum	diddle dee	Ericaceae	Class One - Species Led	Persistent
Festuca ovina	sheep's fescue	Poaceae	Historic	Historic
Festuca rubra	red fescue	Poaceae	Class One - Species-Led	Restricted naturalised
Galium saxatile	heath bedstraw	Rubiaceae	Research	Persistent
Holcus lanatus	Yorkshire fog	Poaceae	Research	Persistent
Hypericum tetrapterum	square-stemmed St John's-wort	Clusiaceae	Historic	Historic
Juncus filiformis	thread rush	Juncaceae	Class One - Species-Led	Restricted naturalised
Lactuca sp.	wild lettuce	Asteraceae	Historic	Historic
Lamium purpureum	red dead-nettle	Lamiaceae	Historic	Historic
Leptinella scariosa	feathery buttonweed	Asteraceae	Class One - Species-Led	Transient
Lobelia pratiana	berry lobelia	Campanulaceae	Class One - Species-Led	Restricted naturalised
Lolium multiflorum	Italian rye grass	Poaceae	Historic	Historic

Lolium temulentum	darnel ryegrass	Poaceae	Historic	Historic
Lotus corniculatus	bird's foot trefoil	Leguminceae	Historic	Historic
Lupinus sp	lupin	Fabaceae	Historic	Historic
Luzula multiflora var congesta	heath wood-rush	Juncaceae	Class One - Species-Led	Transient
Matricaria discoidea	pineapple weed	Asteraceae	Historic	Historic
Nardus stricta	mat grass	Poaceae	Class One - Species-Led	Persistent
Phleum pratense	timothy grass	Poaceae	Historic	Historic
Pisum sativum	pea	Fabaceae	Historic	Historic
Plantago sp	hoary plantain	Plantaginaceae	Historic	Historic
Poa annua	annual meadow grass	Poaceae	Class Three - Site Led	Widespread naturalised
Poa pratensis	smooth meadow grass	Poaceae	Class Two - Site Led	Widespread naturalised
Poa trivialis	rough meadow grass	Poaceae	Historic	Restricted naturalised
Ranunculus acris	meadow buttercup	Ranunculaceae	Class One - Species-Led	Transient
Ranunculus repens	creeping buttercup	Ranunculaceae	Class One - Species-Led	Restricted naturalised
Raphanus sp.	radish	Brassicaceae	Historic	Historic
Rorippa islandica	Northern yellow-cress	Brassicaceae	Historic	Historic
Rumex acetosella	sheeps sorrel	Polygonaceae	Class One - Species-Led	Widespread naturalised
Rumex alpinus	alpine dock	Polygonaceae	Historic	Historic
Rumex crispus	curled dock	Polygonaceae	Class One - Species-Led	Persistent
Sagina procumbens	pearlwort (procumbent)	Caryophyllaceae	Class One - Species-Led	Widespread naturalised
Scorzonerioides autumnalis	Autumn hawkbit	Asteraceae	Class One - Species-Led	Restricted naturalised
Senecio vulgaris	common groundsel	Asteraceae	Historic	Historic
Sinapis arvensis	charlock	Brassicaceae	Historic	Historic
Solanum tuberosum	potato	Solanaceae	Historic	Historic
Sonchus sp	sow thistle	Asteraceae	Historic	Historic
Stellaria graminea	grass leaf starwort	Caryophyllaceae	Historic	Historic
Stellaria media	common chickweed	Caryophyllaceae	Class One - Species-Led	Transient
Taraxacum officinale	dandelion	Asteraceae	Class Three - Site Led	Widespread naturalised
Thlaspi arvense	field penny-cress	Brassicaceae	Historic	Historic
Trifolium hybridum	alsike clover	Leguminceae	Historic	Historic
Trifolium repens	white clover	Leguminceae	Class One - Species-Led	Persistent
Tripleurospermum indorum	scentless mayweed	Asteraceae	Class One - Species-Led	Transient
Trisetum spicatum	spike trisetum	Poaceae	Class Two - Site Led	Widespread naturalised
Urtica dioica	common nettle	Urticaceae	Historic	Historic
Urtica urens	annual nettle	Urticaceae	Historic	Historic
Vaccinium vitis-idaea	cowberry	Ericaceae	Class One - Species-Led	Restricted naturalised
Veronica serpyllifolia	thyme leaved speedwell	Scrophulariaceae	Class One - Species-Led	Persistent

MONITORING PROTOCOL

'What happens to vegetation communities once weeds have been removed with herbicide'?

Do they revert to the same vegetation/species composition as the surrounding area? Do native species re-collonise? Does removing one weed just leave an opportunity for another to move in? How does this feed then inform our management approach?

Methodology

- Plots/ quadrats are photographed each year to show change in vegetation pre and post spraying.
- Variables such as species composition and abundance are recorded
- Other factors which may be affecting site other than herbicide i.e. seals are recorded
- Sites should have a good spread across different target species/habitat types and different herbicide treatment regimes
- Combine this type of longer term monitoring with spot checks of sites and include this in standard data that was recorded i.e. on follow up visit to site, make a note of what species has taken the place of the one which was sprayed or if it is still bare ground/dead vegetation.

Most of the sites are easily accessed at King Edward Point. There are a few plots at Husvik also.
Most Class ones are controlled so difficult to assess so suggest we concentrate on the class two species control, with the addition of photo points and sheep's sorrel sites.
Use Vegetation monitoring plot protocol (minus soil sample) to measure five 1mx1m quadrats, marked and measured, in a 10mx10m plot.
As well as quadrat records, general notes on spray rates and efficacy to be taken, and other factors present at site.
Agrostis capillaris – 1 x plot at KEP
Deschampsia parvula – 2 x plots at Husvik
Poa pratensis – 2 x plots at KEP
Trisetum spicatum – 2 x plots at Husvik
Rumex acetosella – 1 x plot at KEP

Photo points

There are 13 photo points at the interpretation panels at Grytviken. These have been maintained since 2015. These are retaken annually with details of any herbicide activity undertaken within the photo area.

There are also 3 points at KEP which have one photo from 2016. These are retaken annually with details of any herbicide activity undertaken within the photo area.