

Sustainable Land Use

Options and opportunities





The Challenges

- 2.9% vs 92%. “Conservation” vs agricultural. But <1% formally protected
- 2.5% currently managed for conservation (passive / active)
- Only 2 of 17 (2.6%) Important Plant Areas managed for conservation
- The landscape is drying and increasingly susceptibility to erosion
- 94% of soils classed as at medium to high risk of erosion
- 5,000 ha (and growing) of bare black tussac peat exists - efforts over 20 years have planted 70 ha – at this rate it will take 1,500 years to restore

To scale up conservation must be adopted and function at the landscape scale within sustainable land-use.

Middle Island

November 2004 (11/2004)

Clay patches along the northern shore are limited and the areas of tiller planting would have covered up to the southern boundary of the eroded and deposition areas.



2004

Google Earth

Image © 2022 Maxar Technologies



Middle Island

December 2011 (12/2011)

At the western end the erosion and windblown deposition now extends across the full breadth of the island.

The clay-patches are moving inland from the northern coast and the deposition areas now extend south from the currently planted areas.



2011

Google Earth

Image © 2022 Maxar Technologies



Middle Island

July 2023. Including the 2023 planting.

2023

Google Earth

Image © 2023 Airbus

Middle Island

N

400 m



Middle Island

November 2004 (11/2004)

Clay patches along the northern shore are limited and the areas of tiller planting would have covered up to the southern boundary of the eroded and deposition areas.

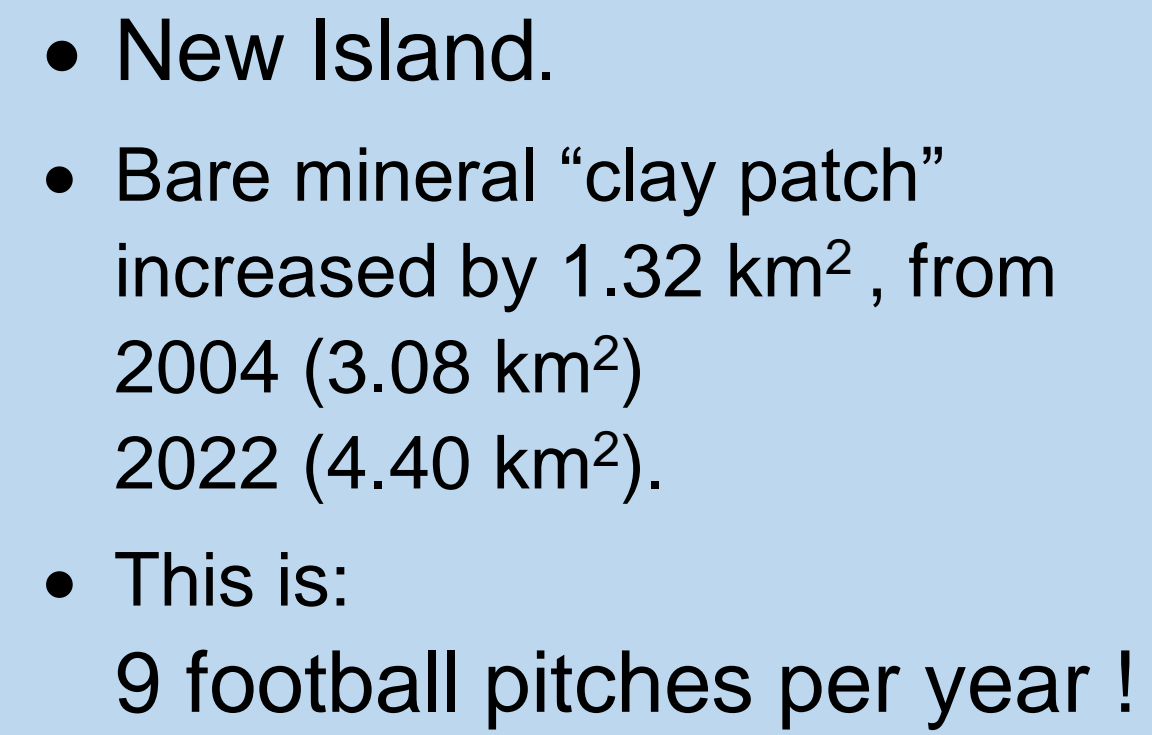


2004

Google Earth

Image © 2022 Maxar Technologies





- New Island.
- Bare mineral “clay patch” increased by 1.32 km² , from 2004 (3.08 km²) 2022 (4.40 km²).
- This is:
9 football pitches per year !



Opportunities

- A chance for agriculture and conservation to work together to tackle common challenges of a drying landscape supporting both native habitats and the rural economy.
- Native habitats are the key defense against drying and the lynch-pin of agricultural production - every kg of wool is 95%–98% protein taken from the pasture - like a solar panel & battery system.
- **A Space for Nature:** Set Aside Schemes, Private Protected Areas
- **Using Nature:** Responsible Wool Standard, Carbon Credits
- **Restoring Nature:** Set-Aside, Sustainable Restoration Economy
- We must work with the ecology of the native pastures



Tussock / Bunch Grasses



- Tussock channels water to plant
- Outer leaves reduce exposure & desiccation of growing center, act as mist-net, shade moderates soil temperature, develops own micro-climate (once lost hard to re-gen)
- Leaf litter is absorbent, stops surface run off, cushions rain, provides slow release + accumulates carbon
- Deep rooting



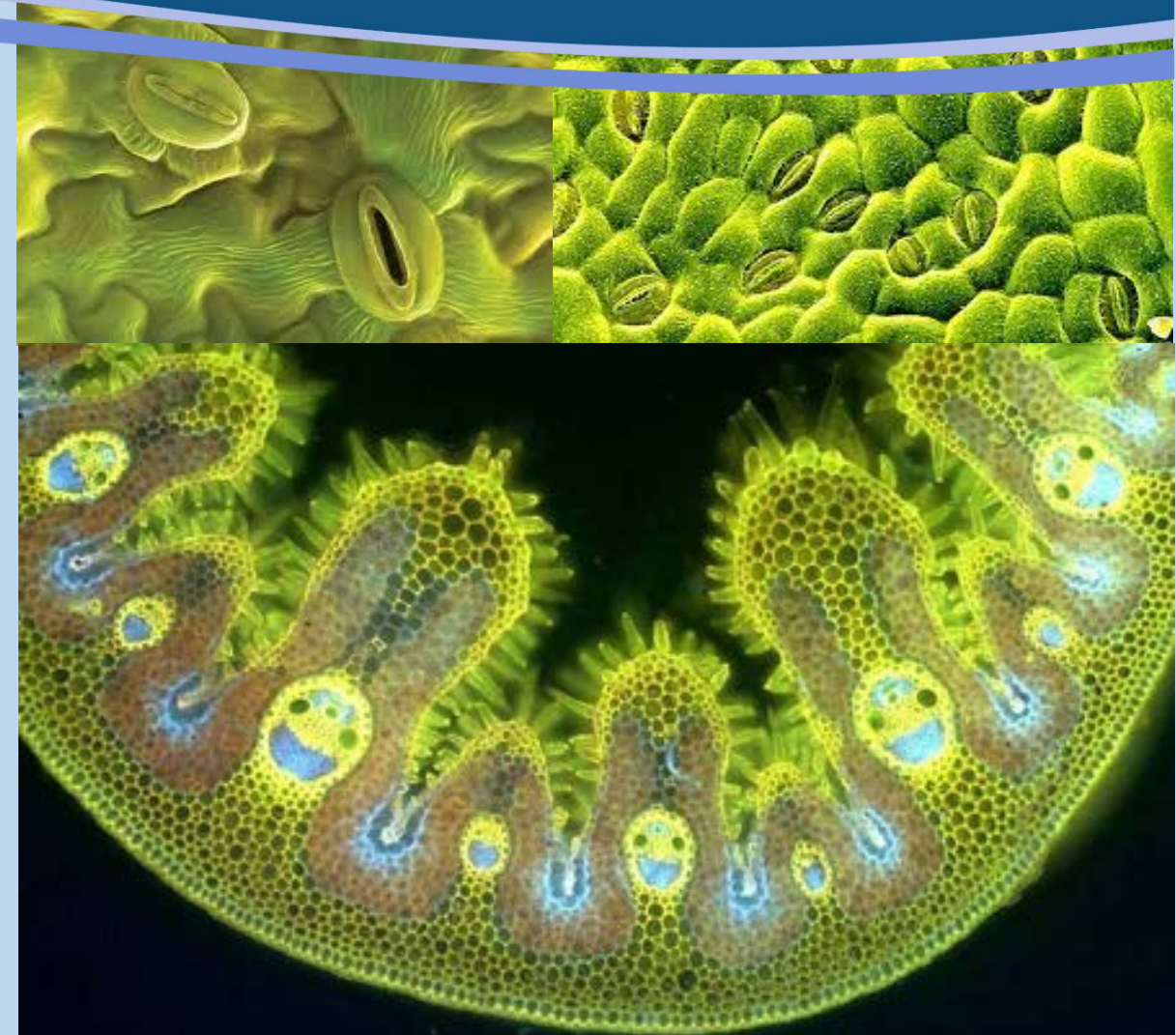
There is not complete overlap but it is about balance and making space for both



Stomata & the importance of hydration

- Gas exchange is essential for photosynthesis
- Plants must balance gas exchange with moisture loss.
- Waxy cuticles; hairy, pitted or curled leaves all help, but stomata control
- - As soon as the plant is moisture stressed the stomata lose turgidity and close. Photosynthesis and growth stops.

Grass is always smiling and happy to see U

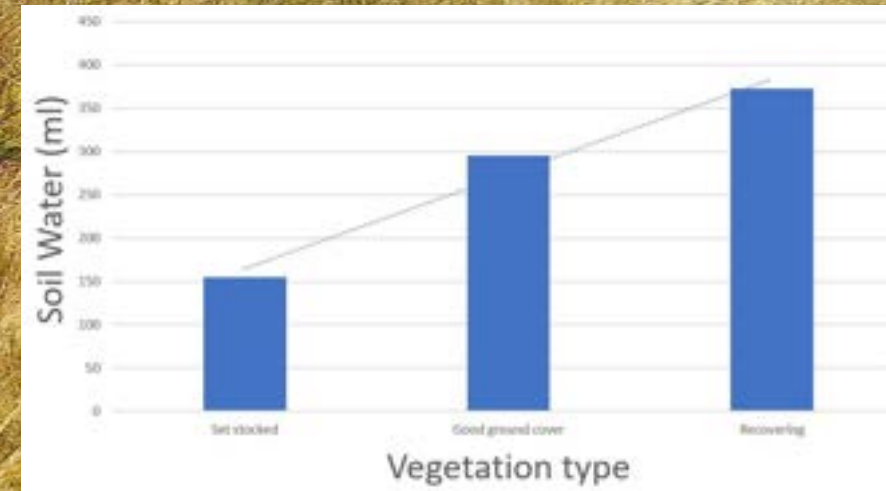




What does this mean ?



- The 3-year Darwin + Peatlands project has shown that under healthy native habitats soils have:
 - Higher moisture contents
 - Lower bulk density
 - Greater organic matter / carbon
- Thus, more likely to have:
 - Longer growing period
 - Greater soil / peat depth
 - Greater productivity



	Neutral Grassland	Tussac Grass	Factor Higher in Tussac
Sample Points	10	10	
Average Soil Depth (cm)	20.8	54.7	x 2.6 deeper
Average Soil Moisture (%)	7.0 %	28.2 %	x 4.0 wetter



Identify & Value



- An additional product of the Darwin + Peatlands project is a simple scoring sheet which can be used to both identify high-value habitats and for subsequently site monitoring:
 - 5-stops along a 100m transect
 - Simple range of indicator & proxy species
- A useful tool for land-managers to:
 - Identify key areas of high value
 - Monitor effects of management interventions &/or grazing
 - Objective (not what we want to see) and reportable



A New Falkland Island Habitat Assessment



For the past two years the Peat Wetlands project, funded by the Dorset Initiative, has assessed Falkland's habitats: the health of the vegetation, the diversity of birds, among others. From this, the Habitat Assessment has been developed to measure the relative quality of land to identify locations with the highest conservation value.

Between one-off surveys, rapid surveys (several habitats in a short period) or long-term monitoring, this method can provide a variety of data that will help the Falkland Islands get a better understanding of its land.

How does it work?

The survey is a combination of a 50-metre line transect with 5 spot surveys at approximately 10-metre intervals to capture enough information to give confidence in the results, see Figure 1.

The first survey acts as a baseline. Further surveys can be carried out every year, ideally at every five years to capture negative, positive or no change trends. Where regular repeat surveys will note negative changes faster, allowing us to quickly assess measures to prevent further degradation.

Vegetation: 5 x 2m spot surveys

At each spot survey measure:

- sward height
- area of bare soil
- Measure 5 fescue and 5 boxwood if present



Figure 1: The survey method combines transects with spot surveys to capture enough information to be confident of the results. The first task is to complete the first survey to avoid disturbance and then the vegetation survey can be completed on the return walk. The survey is designed to be quick while providing meaningful indicators to assess habitat health.

What are we looking for?

To assess the value of a survey site, the method uses a range of measures from individual indicators such as specific plant species, to proxy indicators like sward height as a surrogate for soil moisture.

I Bird survey

The first part of the method is the bird survey which is a tened 5-minute survey over 30 metres. The small birds have been aggregated to reduce identification issues making the survey a simple measure of bird activity. The first score is based on the number of birds recorded. The most common are those which score as a species, are easy to identify and act as a proxy for ground wetness. Domestic geese score positively if there is a known distance.

II Plant surveys

These cover negative and positive scoring species based on conservation values. Plants can be identified and recorded anywhere along the 50-metre line transect, to ensure a robust method, 3 steps have been included every 10 metres where more detailed plant surveys take place over a 2-metre square area. Some plants have been grouped to avoid identification issues and are given an average score based on individual species scores. The final number is the sum of all scores.

III Vegetation cover

This is a measure of unvegetated bare ground and is a visual assessment at each of the five steps. This measure offers an understanding of vegetation cover and acts as a proxy indicator for soil moisture, erosion potential and carbon loss as well as an assessment of vegetation health. Categories range from 0% to 100% bare ground (score: -100) to below 2% bare ground (score: 5 - the only positive score in this category). If ground cover is made up only of negative scoring plant species it is unlikely to score worse than the 0% to 100% bare ground category.

IV Sward height

Sward height is measured as the functional height of the vegetation and is an indicator for the site's soil moisture (Figure 2). There are 3 categories: between 0 and 10cm (score: 1), between 10 and 20cm (score: 2) and above 20cm (score: 3) - a nice healthy sward! Five measurements need to be taken, one at each of the steps and the average sward height is recorded for scoring. If tussock grass, leucosced or fescue are present on some score of 1 can be recorded for the following: 5 fescue plants above 75cm, 1 boxwood plant above 125cm, 2 tussock plants above 100cm.



Figure 2: Sward height is measured to the height the vegetation naturally sits at, as opposed to the full length of the grass blades, so this is the functional height of sward.

V Presence of freshwater

Any freshwater (pond, stream, river) within 30 metres of the survey site scores 10.

VI Non-native mammals

The presence or absence of these should be based on existing knowledge. A known absence of grazing animals (sheep, cattle, goats, guinea pigs, horses, reindeer), cats, rats and mice as well as rabbits and hares each score 5 points. A known presence of these scores -5.

VII Final score

The final score for the survey is the total sum of all groups and will fit the location into categories ranging from very good to very poor (Figure 3).



Figure 3: The scores are divided to reflect habitat condition ranging from high quality bluegrass habitats on offshore islands left marginal to areas of extensive bare peat such as on Cape Pembroke (right image).

By evaluating habitats we can get a clear idea of the health of our peat wetlands and monitor the health of the Falkland Islands terrestrial ecosystems. From this we will be able to pinpoint areas for restoration before it gets to the final stages of erosion allowing effective protection of high-value conservation areas. We hope the Habitat Assessment will become a common value by which we manage our land across the Falkland Islands.

I Bird Species - 50m linear survey over 5 minutes

Bird Species	Score
All small native birds including black-chinned skua, grass wren, white-bellied fring, long-tailed meadow lark, dark-bellied ground lark, austral thrush and Falklands pipit (not shown)	1 - 2 birds: 2 3-10 birds: 5 11-20 birds: 7 21-30 birds: 10
Falklands pipit	3
Greater abundance of domestic geese	5
TOTAL	



II Plant Surveys - 5 spot surveys (e.g. of 2 x 2m)

Plant species	Score
Any orchid species	5
Bluegrass or Thymus rock	2
Fescue	2
Native wood rush	1
Boxwood	1
Tussock grass	1
Falklands native vegetation	1
Sward grass	1
TOTAL	



Plant species	Score
Coltsfoot	-20
Any 'purple' flake e.g. creeping flake & spiky flake	-20
Common or creeping bent	-10
Australian grass	-10
Mouse-wired hawkweed	-10
Heather	-7
Any 'yellow' flake e.g. prickly snow flake	-7
TOTAL	



III Vegetation Cover

Vegetation cover	Score
0% - 100% bare soil	-100
10% - 20% bare soil	-80
21% - 40% bare soil	-60
41% - 60% bare soil	-40
61% - 80% bare soil	-20
81% - 100% bare soil	0
5 fescue > 75cm tall	5
1 boxwood > 125cm tall	5
2 tussock grass > 100cm	5
TOTAL	



Figure 3: Six above scores of the bare ground categories to help understand how this is assessed. This measure offers an understanding of vegetation cover and acts as a proxy indicator for soil moisture, erosion potential and carbon loss as well as an assessment of vegetation health.

Non-native mammals and geese	Score
Known absence of rabbits and hares	5
Known absence of cats and mice	5
Known absence of sheep	5
Known absence of grazing animals (sheep, cattle, goats, reindeer, horses, geese)	5
Known presence of hares	-5
TOTAL	

VII Final score	Overall TOTAL SCORE
Location	Start Date Reference
Date	End Date Reference
Surveyor's Name	
Working site in bluegrass units per hectare (1 hectare unit = e.g. 10 sheep or 1 deer)	
Overlook species note	

Scores:

- Birds
- Indicator Plant Presence (+) & Invasives (-)
- Vegetation Cover (Bare Ground)
- Sward Height
- Freshwater Presence
- Non-native Mammals
- Final Cumulative Score Talled

Takes approximately 15 - 20 minutes to complete

- Very Good ≥ 41
- Good $21 - 40$
- Moderate $1 - 20$
- Poor $0 - -25$
- Very Poor ≤ -26



Responsible Wool Standard



- The Responsible Wool Standard is a global scheme to certify wool growers who meet best practice guidelines in land management including soil & biodiversity conservation. Gives greater market access.
- Requires farmers to:
 - Monitor pasture and biodiversity
 - Formulate a “Farm Biodiversity Management & Monitoring Plan”
- A joint initiative between Falklands Conservation and FIG Department of Agriculture will provide farmers with the tools to comply with scheme requirements.
 - 38 farms currently participating (c. 50%)



Responsible Wool Standard



- The project will:
 - Provide a “Monitoring Handbook” covering pasture, biodiversity and water-table monitoring techniques
 - Provide a “Farm Biodiversity Management Plan & Monitoring Handbook” with the process, template and fully worked up example
 - Conduct 6 practical workshops with farmers (3 on West, 3 on East) on monitoring and identification. Including a practical run-through of the monitoring techniques and the habitat scoring sheets
- Interactive between Falklands Conservation, FIG Department of Agriculture and farmers – not just talking but also listening



Can We Farm “Carbon” ?



- There is a global market for “Carbon Credits” as companies try to offset their carbon footprints
- Can we use set-aside or modify farming practices to increase the rate of carbon sequestration and provide diversified income ?
- Historically the Falklands have accumulated carbon, but this is an average from peat cores reaching back 10,000 years, what is happening now ?
- Joint initiative between Falklands Conservation, SAERI, FIG, RSK, BAS and UK CEH.
 - 4 Flux towers to measure current carbon balance
 - Practicalities and economics of a “Peatland Code” scheme



If not, Can we Set-Aside ?

- Set-Aside, Agri-Environment Schemes, Easements and Covenants can all be used to encourage land-use change or meet national policy
- Generally, an annual compensatory payment is made over a set scheme duration if criteria are met
- May provide an alternative income source to farmers or provide a proportion of “guaranteed” income in a volatile wool market.
- Requires:
 - Objective financial valuation of land (fair, sufficient, sustainable)
 - Societal support that culturally values the environment to allocate public funds to a national scheme (30 by 30)



Set-Aside

- Prevention is better than cure
- Catch it early when it can still regenerate passively before resource intensive active restoration is needed – point of no return
- But farmers must be able to afford to spell or set-aside land within the farming model
- CBD has a global target of 30% in conservation management by 2030
- How much would it take to achieve this in the Falklands (£700,000 p.a.?) and do we value our environment enough to meet it ?





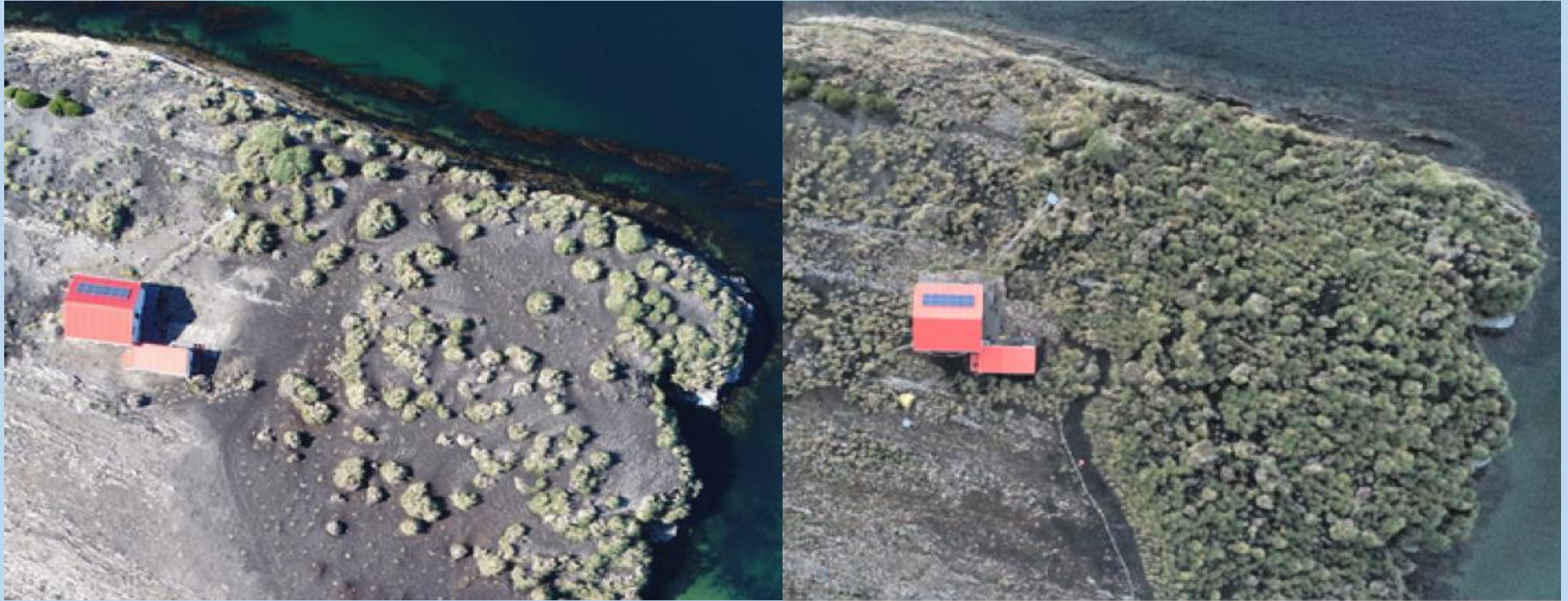
Dunbar Farm:
Set-Aside & Planting



Restoration Economy

- Ideally catch early before required but if not, we require restoration
- To scale up requires a critical mass such that:
 - Nurseries know they can sell planting stock, and
 - Planters know it is sustainable seasonal employment (like contract shearing or fencing) and are available
- “Value Added” restoration funding can be linked to carbon-credits or set-aside where external funders want longterm security
- Springcreek through FC has provided 3-year funding to 4 restoration initiatives this year; Philimore Group, Dyke, Little Creek & Atlantic Harvest
- Darwin Local developed to facilitate landowner applications

Hummock Island: Antarctic Research Trust and Island LandCare



2019

2023



A National Scheme

- Valiant efforts are being made by a number of organisations and individuals on their own-account and funded by Springcreek, Darwin, FIG ESB, and EU BEST (50% on 7 islands + 20 paddocks on 13 farms).
- But nationally we are still going backwards – bare land is forming faster than we are planting.
- If we value our environment and if we value our rural heritage, we need coordinated national effort at a landscape scale to include the farming community.
- Only then will we have the scale needed to provide climate resilience, erosion control and rural sustainability



Hill Cove National Park

12,126 ha (1% of our land-area)

A Big Step Forward at a Landscape Scale

Public Consultation in January

Survey Effort

2 People

90 miles

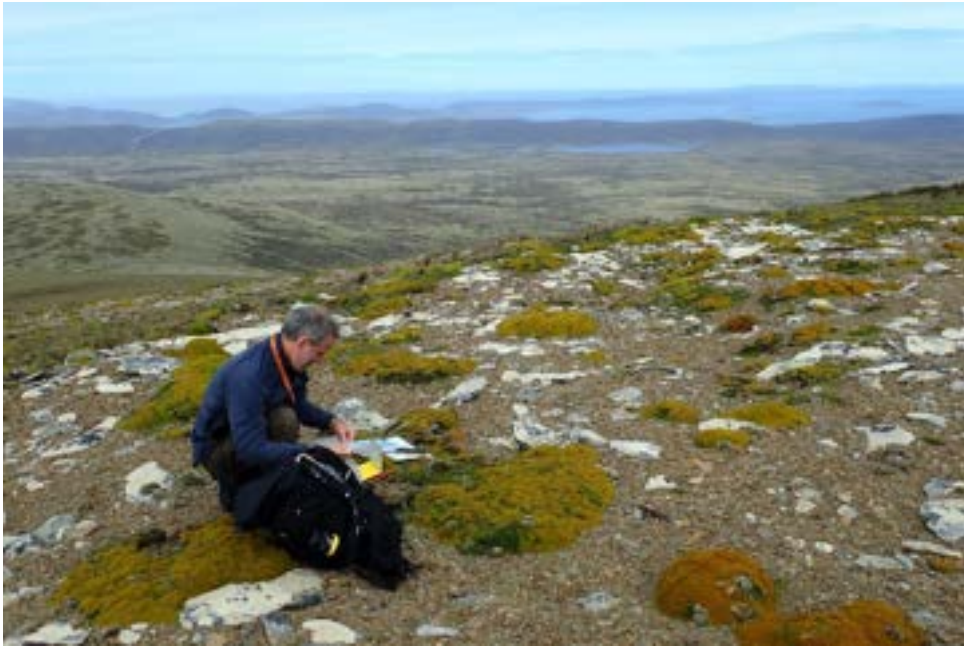
5 days

774 Plant Records



Importance of Hill Cove Mountains IPA

- **103 native plants** are recorded. This represent 52% of the FI native plant species (181).
- **9 Endemic plants** are recorded. This represents 64% of the FI endemic plant species (14).
- **3 IUCN listed plants** are recorded. This represents 43% of the FI globally listed plant species (7).
- **12 IUCN &/or National Red List species.** This represents 28% of the Falklands 43 threatened species (\geq near-threatened)
- **13 broad habitat types** including Bluegrass acid grassland & Fachine-scrub National Priority Habitats



Falklands Nassauvia

New to science !

Endemic
Critically Endangered

Discovered 2009
Described 2013

Hill Cove Mountains
3 Sites, 5 Populations
Mt Donald x2
Mt Robinson x1
Mt Edgeworth x2

Hornby Mountains
2 Sites, 2 Populations
Green Mtn. x 1
Clay Mtn. x1





“The Hole” – Mt. Robinson

A ferny fantasia

Brittle Bladder Fern

Strap Fern

Shield Fern

Twisted Filmy Fern

Falkland Filmy Fern





Mt. Adam – Northern Scarp

Variety of habitats around the slopes from the peak to the lower tarn gave good species diversity

