

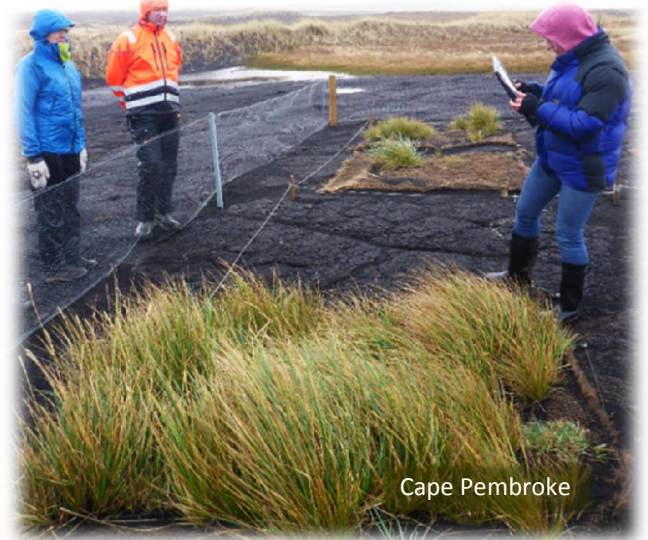


## Using native seed to restore eroded ground in the Falklands: Lessons from habitat restoration trials 2014-2016

We summarise the key findings of trials to identify native plant species that could recolonise eroded ground from seed, and low-cost ground preparation techniques.

### Quick summary

- Native seeds grew successfully on a range of eroded soils. After one year, average plant cover on eroded areas treated with dung and seed-mix was: 81% on clay, 92% on peat and 62% on sand.
- The seeds only grew when sheep dung, dags (mucky bits of wool trimmed off during shearing) or geotextiles were added. Sowing native seeds without these preparations resulted in little or no plant re-colonisation. Dung was the most affective treatment.
- Dung and dags shouldn't be moved from places with invasive plant species to new areas. Other materials (e.g. seaweed or fishmeal) could be trialled for more pristine conservation areas such as un-grazed islands.
- Adding geotextile matting, or baffles (e.g. old pallets, driftwood or stone chevrons) may be useful in sandy or very exposed areas; in combination with dung and dags.
- The most successful colonisers were: Fuegian couch grass, tussac, and coastal blue grass.
- Initially areas need fencing to exclude grazers.
- Currently collection or production of native plant seeds is labour intensive. We plan to support farm-led projects to develop more efficient techniques



Cape Pembroke



Fuegian couch grass, New Island

## Native plants trialled

Plants with high or medium ground-cover (green rows) should be considered for use in other restoration projects. Best results were obtained when seeds were sown in early spring.

\*Acid grassland occurs on poorly drained peat and is often covered in whitegrass. Dwarf shrub heath occurs on better drained soils and is often characterised by diddle-dee and Christmas bush. Follow this link for more information on plant habitats: [Habitat types of the Falkland Islands](#)

Plant	Habitat*	Ground-cover in restoration trials	Notes
<b> Fuegian couch grass </b> <i>Elymus magellanicus</i>	All coastal areas including marsh, stable dunes, rocky strandlines & grasslands; occasionally upland areas	High	<ul style="list-style-type: none"> <li>• Large seeds, easy to collect</li> <li>• Absent from grazed areas</li> <li>• Large plants give good ground cover</li> </ul>
<b> Coastal bluegrass </b> <i>Poa alopecurus</i> (sand)	Widespread, often acid grasslands.	High	<ul style="list-style-type: none"> <li>• Separate male and female plants</li> <li>• Seeds occasionally grow while attached to parent plant</li> </ul>
<b> Tussac </b> <i>Poa flabellata</i>	Coast and inland rocky areas	High	<ul style="list-style-type: none"> <li>• Long-term survival may be site-specific</li> </ul>
<b> Land Tussac </b> <i>Festuca contracta</i>	Widespread, most common in dwarf shrub heath	Medium	<ul style="list-style-type: none"> <li>• Seeds occasionally grow while attached to parent plant</li> <li>• Limited ground cover</li> <li>• Grew best on peat</li> </ul>
<b> Magellanic fescue </b> <i>Festuca magellanica</i>	Widespread, most common in coastal areas with cushion plants	Medium	<ul style="list-style-type: none"> <li>• Limited ground cover</li> <li>• Seeds occasionally grow while still attached to parent plant</li> <li>• Grew best on clay</li> </ul>
<b> Cinnamon grass </b> <i>Hierochloe redolens</i>	Widespread, often in moist areas	Medium	<ul style="list-style-type: none"> <li>• A robust plant that can tolerate some grazing</li> <li>• In trials young plants were small and infrequent but spreading robustly from base</li> </ul>
<b> Button weed </b> <i>Leptinella scariosa</i>	Generally on sandy coastal soils, also other moist areas	Medium	<ul style="list-style-type: none"> <li>• Seeds difficult to harvest mechanically</li> <li>• Most successful on sandy soils</li> </ul>
<b> Mountain bluegrass </b> <i>Poa alopecurus</i> (peat)	Coastal, also lowland acid grasslands & fachine scrub	Medium	<ul style="list-style-type: none"> <li>• Separate male and female plants</li> <li>• Seeds occasionally grow while attached to parent plant</li> </ul>
<b> Native fog </b> <i>Trisetum phleoides</i>	Widespread across habitats, most common in dwarf shrub heath	Medium	<ul style="list-style-type: none"> <li>• Limited initial ground cover</li> <li>• Robust plants</li> </ul>
<b> Prickly burr </b> <i>Acaena magellanica</i>	Wet areas except acid grassland	Low	<ul style="list-style-type: none"> <li>• Did not flower until second growing season</li> </ul>
<b> Wavy hair grass </b> <i>Deschampsia flexuosa</i>	Widespread, most common in dwarf shrub heath & acid grassland	Low	<ul style="list-style-type: none"> <li>• Plants are small &amp; give limited cover</li> </ul>
<b> Native rush </b> <i>Juncus scheuchzerioides</i>	Widespread in moist areas	Low	<ul style="list-style-type: none"> <li>• This species grew very rarely</li> </ul>
<b> Native woodrush </b> <i>Luzula alopecurus</i>	Widespread, most common in dwarf shrub heath	Low	<ul style="list-style-type: none"> <li>• This species grew very rarely</li> </ul>
<b> Dusky sedge </b> <i>Carex fuscula</i>	Widespread except dry areas	None	<ul style="list-style-type: none"> <li>• Did not grow from seed in trial</li> </ul>
<b> Pigvine </b> <i>Gunnera magellanica</i>	Widespread, especially moist areas	None	<ul style="list-style-type: none"> <li>• Did not grow from seed in trial</li> </ul>

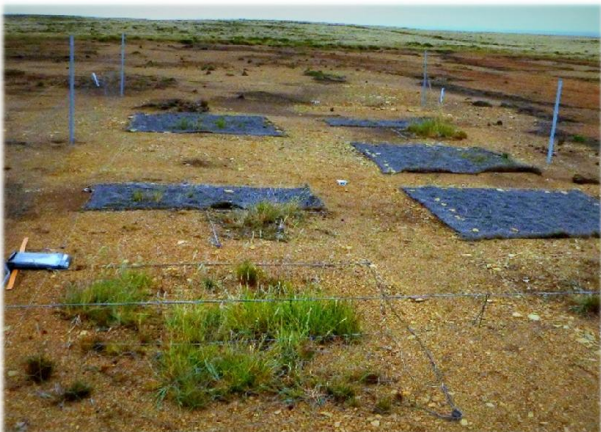


## Trial details

Following pilot studies and advice from farmers we used seed from 15 native plants, and three ground preparation methods to re-vegetate small areas of eroded ground across East Falkland. Trials were set up on 16 sites on eroded peat, clay and sandy soils, they ran from December 2014 until January 2016. Each site was fenced to exclude large grazers (except geese), the ground was raked and native seeds were sown (@ 2.6 gm<sup>-2</sup>). Seeds were topped with sheep dung, dags, or coir geotextile. Treatments were trialled alone and in combination.

### Ground treatments

- Dung (@7.5kg/m<sup>2</sup>) was most affective, increasing average plant cover by 59%, followed by dags (32% increase) and then geotextile (4% increase). Numbers of seed-mix species growing was similarly affected with dung supporting an average of six species compared to four species with dags and one with geotextile. Combinations of treatments were successful but did not work better than dung alone.



- Treatments were most successful on peat soil but plants also grew on severely eroded clay sites and mobile sandy areas. Geotextile was more affective on sand than other soils (increasing final biomass five-fold) however sand results are tentative because only one site was trialled.
- Non-native species that occurred in significant amounts in the trial were: goose grass (*Aira praecox*), red fescue (*Festuca rubra*), and common chickweed (*Stellaria media*); the appearance of these species was sporadic and linked to location rather than the addition of dags or dung.
- Treating areas with dung, dags or geotextile but no seed-mix enabled some plants to establish (seeded from plants nearby), but colonisation was low compared to areas where native seed-mix was added.

### Native seed-mix

- Three plants were strong colonisers across all soil types: Fuegian couch grass, tussac, and coastal bluegrass.
- Other seed-mix species typically had less than 5% cover; three performed best on specific soil types: Magellanic fescue on clay, button weed on sand and land fescue on peat.
- Cinnamon grass, native fog and mountain bluegrass were small but consistent colonisers on peat and the damper clay soils. All species benefited similarly from different ground treatments (i.e. all grew best when dung was added).



## Other considerations

- Where possible (especially when carrying out restoration for conservation purposes) the plants used should be those that would naturally occur in the habitat that is to be restored. For example mountain bluegrass should be used when restoring upland areas, coastal bluegrass and tussac being generally reserved for lowlands and coastal fringes. However other factors, such as grazing tolerance need also be considered.
- In these trials non-native species colonising treated areas appeared to be blown-in from the surrounding area rather than carried in dags or dung. However care should be taken if dung or dags are moved between areas and material from areas with invasive species (e.g. spear thistles and oxford ragwort) should never be used.
- This trial ran for only two growing seasons. The success of species and treatments may vary in the longer term. For example dags release nutrients more slowly than dung and their benefits may therefore be more long-lasting, and, cinnamon grass appeared to be slowly spreading from rhizomes while species such as tussac could die back when nutrients from dung and dags are exhausted.
- Many of the seed-mix species cannot tolerate persistent grazing. Further trials might include seed from some grazing resistant species (e.g. diddle-dee and whitegrass) or document the response of Fuegian couch grass and blue grass to rotational grazing.
- Current native seed production techniques are very labour intensive. We hope that farm-led projects will produce seed more economically, techniques could include using green-hay or drying whole seed heads.
- Occasionally seed-mix species (often tussac) occurred in plots where the ground had been treated but no seed-mix had been added. These appeared to be blown in from plants flowering in near-by plots. Seed requirements might therefore be reduced by treating a whole area in but sowing only strips of seed, across the prevailing wind.

- None of these species can work miracles! Where ground is very exposed and highly mobile additional baffles are likely to be necessary, for example pallets, geotextile or bales of hay (ideally made of native species).



Mountain bluegrass, Mount Adam

## More information

- Contact Frin Ross for more information on any aspect of this restoration work: phone 22247, [habitatsrestore@conservation.org.fk](mailto:habitatsrestore@conservation.org.fk)
- More detailed information on these restoration trials and a leaflet on collecting plant seed in the Falklands is available from the Falklands Conservation website or follow this link: [Habitat Restoration Information](#).
- This work was sponsored by the Darwin Initiative <http://www.darwininitiative.org.uk/> and completed with help the RBG Kew, Falkland Islands Government, Stanley Nurseries and farm managers across the islands.



Kew