Appendix 2
Habitat survey of Dry Gut and the Southern Ridge
Site Descriptions

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(Final version)

Contents

Introduction

This version replaces all previous versions of the site suvey descriptions and should be read in conjunction with the report of the ***Habitat and Invertebrate Survey of Dry Gut and the Southern Ridge*** (October 2012).

Habitat survey methodology

The approach to the habitat survey was based on the general framework outlined in JNCC's National Vegetation Classification (Rodwell, 2006). Habitat descriptions followed the nomenclature devised by Lambdon and Darlow (2008) for St Helena.

In each of the survey areas the Domin Scale of cover/abundance was used to record the quantitative contribution that the different species made to the vegetation in each area described.

Cover	Domin
91 - 100%	10
76 - 90%	9
51 - 75%	8
34 - 50%	7
26 - 33	6
11 - 25%	5
4 - 10%	4
<4% (many individuals)	3
<4% (several individuals)	2
<4% (few individuals)	1

In this arid area bare ground and rocky substrates form significant proportions of the ground cover. Bare ground, in undisturbed areas, can be covered with ground crusting lichens and algal crusts (cryptobionts) that form essential ecological functions, and protect the desert soils. Where these are present they have been recorded. Rocks, lichens and algae are all critical elements in the ecology of the desert environment supporting native flora and fauna. The different substrate types were divided into 8 types:

- fine dust (fine dust which can be covered in algal crusts and where obvious they were described as such;
- fine grit and dust (a combination of fine dust with consolidated weathered rounded dust which creates a more open loose soil structure);
- grit and small stones (1-15cm);
- rocks and boulders (15cm-1m);
- exposed weathered outcrop
- vertical cliff
- alluvial silt
- open water

In each of the survey areas, data was collected on slope, aspect, altitude, ground cover composition and abundance and substrate and factors influencing the distribution and composition, including for example threats from invasive species. The total percentage of vegetation cover was recorded broken down into any obvious layers. These were, from right to left: ground layer of cryptogams, herb or sub-shrub layer; shrub layer and woody canopy species. In the case of this study, examples of the herb or sub-shrub layer include annuals, grasses, *Atriplex semibaccata* and *Carpobrotus edulis*, shrub species *Suaeda fruticosa* and *Lantana camara* and woody species: *Schinus terebinthifolius*, *Nicotiana glauca*, *Acacia cyclops* and *Olea europaea subsp. africana*.

Lichens are the dominant organism of Dry Gut. Thallus measurements were taken at three sites where the lichen communities were particularly well established to get an indication of age.

Five random 2m x 2m quadrats were surveyed across the 7 sites on the southern ridge. The southern ridge will be subject to habitat restoration post construction and this supplementary information was gathered to give a more accurate reflection of the current status of the area. Additional data recorded included plant heights of those species contributing to the vegetation layers, soil analysis for pH, mineral composition including sodium and phosphorous, electrical conductivity, organic carbon and particle size analysis. Chemical composition of the soils will influence which species can become established and thereafter plant species composition and soil quality will be influenced by each other. In desert soils organic carbon and nitrogen levels are low. Phosphorus levels on the southern ridge may be influenced by the presence of seabird guano from former seabird colonies. Soil surface horizons are not well developed and soil nutrients will primarily be in the thin (first few cms) surface layer. Disturbance by vehicles, development, water or wind erosion easily removes this surface layer as well as important soil biota (lichens, cryptobionts, fungi).

Where obvious significant differences were observed, percentage cover occupied by live and dead plant material was recorded separately. Litter is a very important part of the ecology, providing shelter and food for detritivores at the bottom of the food chain. The type of litter is also important, creeper litter provides a very different environment compared to natives such as *Eragrostis cilianensis* (*i*) which during this study appeared more often as dead plants, with fewer young plants occupying less ground. Dead material takes time to decompose and regeneration may be in small flushes during wet weather, rather than a single flush.

Dry Gut and Prosperous Bay Plain are arid environments whose ecologies change significantly between seasons, according to water availability. This survey was carried out between June and July. The first flush of winter flowering desert annuals were germinating and flowering but late comers like *Hydrodea crytantha** were quite scarce. Species composition and vegetation cover will vary between seasons. Invertebrate communities will also vary between seasons. It is possible that ephemeral invertebrate communities could emerge in late winter, feeding from the seed of the annual plants that form an abundant flush after the rains. Algal crusts were a frequent feature of level areas of dusty substrate in samphire, *(i)Suaeda* fruticosa, dominated areas of the southern ridge. These were dry at the time of survey, despite the winter months, and are obviously an important component of the desert ecology.

Format of descriptions

The sites surveyed are described below and primarily focus on habitat and plant species found. Reference is made to the invertebrates observed during the habitat survey together with a note on key species found during the invertebrate survey. The invertebrate survey is described in detail in the main report. Invertebrate collections have been sorted and the majority of species identified, however the identity of some species is still to be confirmed and have been provisionally assigned to a family or genus where it is possible to do so. These species will require specialist attention.

In addition to this document, full species lists are available as an Excel spreadsheet. This data format could be usefully transferred into an Access database for future record and analysis.

Key: Endemic species are marked with a single asterix *, species within endemic genera **, species with uncertain identity but thought to be endemic *? Indigenous species are described with an *i*. Note that all lichens are indigenous, with a few endemic or near endemics as marked.

Lichens marked x = recorded presence, domin scale % cover added in brackets where % cover was a significant element of the ground cover.

GPS references (UTM zone 30L) and altitudes are given which approximate to the centre of the survey site. The accuracy of the altitude measurements is uncertain.
Site maps for all the areas surveyed are provided in Appendix 1.

Dry Gut

Dry Gut is an arid sparsely vegetated valley, through which an ephemeral stream flows after heavy rains. Water flows in from the large catchment of the upper valley from Woody Ridge. Small catchments and water channels drain into Dry Gut on both the north and south slopes.

The slopes are weathered to intensively weathered larva flows and have a dark to light orange brown colour and are associated with iron rich mineralisation (Baker, 2010). Distinctive concentric rings are clearly visible on the upper south (north facing) slope. Lower in the valley slopes, raised cindery 'humps' and a hard black rock layer are exposed.

The prevailing south easterlies, coming straight off the sea are moisture laden and create ideal conditions for lichens. Sea mist regularly descends to 300 m in this area, particularly during the winter. It is a diverse and biologically rich valley for species adapted to arid habitats.

A detailed habitat study across the whole site was not possible given the time constraints for the study (construction work was expected to begin within two weeks). We chose to focus our attention instead on a subset of habitat types, that were definable and that we considered from our experience were likely to be of biological interest and represented a range of habitats found within the construction area. The whole area was initially subdivided into 29 sites that were considered to hold homogenous habitat through visual observation from a distance followed by walk-over, and included the valley slopes, rocky terraces, valley bottom, summit plateaux, cliffs and ridges. Of these, 19 sites were chosen for detailed habitat assessment. Two sites, Earwig Gully and the rocky slope above Gill Waterfall, were surveyed by the Ashmoles (Ashmole and Ashmole, 2004) and therefore add to the existing body of knowledge of the flora and fauna in these areas, providing some indication of the changes which have taken place over the past decade.

Earwig Gully, site reference PBP4, was so named by the Ashmoles (Ashmole and Ashmole, 2004). They found it to be a rich site for invertebrates including a variety of habitats. This is the site where the access road into Dry Gut begins. It will be lost to the construction for the road and thereafter the runway apron. Gullies provide a very different set of environmental conditions to those of the Prosperous Bay Plain (PBP) or Dry Gut and thus can support quite distinct communities. The area as described by the Ashmoles included the whole gully from its upper catchment. This study broadly covers the same area (with the exception of the dusty basin in the northern edge of the upper catchment where the mole spider is to still be found), that has been subdivided into smaller areas of observable similar characteristic habitat types for more detailed study.

Dry Gut Site Descriptions

DG01 (Earwig Gully_west facing slope) **GPS Ref**: E216691.43 N8233208.04
Habitat classification: sparsely vegetated rocky slope
Altitude: 299 m Aspect: south west
Slope: 30-45^{o} Layers cover: % % 18% 1%

Site and Vegetation description

The dry sheltered west facing rocky slope of the gully, that falls south easterly towards the flat area of outwash before running down the cliff face and into Dry Gut.

Sparsely vegetated rocky slope, with cliff overhangs, loose rocks and large boulders with pockets of grit and fine dust. Rocks and boulders provide habitat for lichens with some characteristics of the lichen communities of the summit plain but lower in diversity, probably due to the sheltered aspect which makes the site more arid. The main value is the presence of good *Suaeda fruticosa (i)* stands and, perhaps, good microhabitats for burrowing invertebrates due to the range of boulder and stone sizes with many crevices.

Eragrostis cilianensis (i), *Carpobrotus edulis* and *Atriplex semibaccata* occasional across the site.

Micro-moth pupal cases found to be common in soil captured in tiny cracks and crevices in rocky boulders.

Soils have a bleached surface of fine dust and grit, no obvious horizons, weathered substrate, consistent, pale brown fine dust (clayey) becoming more orange at depth, mixed with small stones and larger rocks, deposition as fine dust are washed down from overlying horizons. Roots of *Suaeda* penetrate to a metre or more in depth. Soil depth, less than 5cm top of slope, increasing to approx. 10cm base of slope.

Some disturbance along the upper ridge by quarrying activity, but not as extensive as DG8 Earwig Gully west facing quarry slope, exposing white rock, considered to be guano (Ashmole & Ashmole, 2004).

Area shares characteristics with the rocky slopes habitat described by the Ashmoles (2004a), Sites 12, and 1.

Several cat scats observed around the rim and close to the watercourse. 2 mice and two geckos observed.

Fishermen's footpath crosses mid gully.

Substrate & Species List

fine grit & dust			7
rock and boulders (15cm-1m+)			7
Suaeda fruticosa	i		5
Eragrostis cilianensis (live)		*	1
Eragrostis cilianensis (dead)		*	3
Opuntia ficus-indica			1
Acacia cyclops			1
Atriplex semibaccata			3
Carpobrotus edulis (combined)			4
Mesembryanthum crystallinum			1

Lichens

Amandinea lecideina	i	x
Caloplaca flavocitrina	i	x
Caloplaca flavovirescens	I	x
Candelaria concolor	i	x
Chrysothrix xanthina	i	x
Collema coccophorum	i	x
Dirinaria applanata	i	x
Haematomma fenzlianum	I	x
Hafelia leptoclinoides	i	x
Lecanora sanctae-helenae	near endemic	x
Lecidiella chodati	i	x
Lepraria usnica	i	x
Psilolechia lucida	i	x
*Ramalina sanctae-helenae**		x
Rinodina oxydata	i	x
Roccella linearis	i	x
Unidentified species D	i	x
Xanthoparmelia molybdiza	i	x
Xanthoparmelia pseudocongensis	i	x

DG02 (Earwig Gully_west facing slope lichen boulders)
As for DG01

Site and Vegetation Description
On the southern end of the west facing slope this area was treated separately because it formed a distinct example of a lichen-rich boulder community. Slope 20^{o} with large angular and rough surfaced (pitted) embedded boulders. Flat patches of light fine dust and grit and small stones provided habitat for *Portulaca oleracea(i)*, *Eragrostis cilianensis* (i) and *Sonchus oleraceus* whilst the rocky slope below was covered by *Suaeda fruticosa (i)*. No soil crusts evident. This site had very similar characteristics to those of the east facing lichen outcrop on the opposite side of the gully, with a similar, rich lichen community: less diverse due to the small size of the site but with a few more species characteristic of sheltered habitats. Bryophyte, *Weissia sp*. growing in sheltered and shaded crevices at the base of boulders. **Ramalina sanctae-helenae* and *Lecanora sanctae-helenae* the dominant lichen species.

Substrate and Species List

fine grit & dust		3
rock and boulders (15cm-1m+)		7
Suaeda fruticosa	*i*	8
Portulaca oleracea	*i*	1
Eragrostis cilianensis (combined)	*i*	1
Carpobrotus edulis (combined)		1
Sonchus oleraceus		1
Bryophytes		
Weissia sp I		X
Lichens		
Buellia halonia	*i*	X
Caloplaca flavocitrina	*i*	X
Caloplaca flavovirescens	*i*	x(3)
Candelaria concolor	*i*	X
Dirinaria applanata	*i*	X
Haematomma fenzlianum	*i*	X
Hafelia leptoclinoides	*i*	x(3)
Heterodermia speciosa	*i*	X
Lecanora sanctae-helenae	*near endemic*	x(6)
Lecidiella chodati	*i*	X
Parmotrema crinitum	*i*	X
Ramalina ketna-oostrae	*	X
Ramalina lacera	*i*	
Ramalina rigidella	*	X
Ramalina sanctae-helenae	*	xD(7)
Teloschistes flavicans	*i*	X
Unidentified species C (Parmotrema sp.)	*i*	X
Xanthoparmelia subramigera	*i*	x(3)

DG03 (Earwig Gully_east facing slope lichen outcrop

GPS Ref: E216598.40 N8233182.51

Habitat classification: inland cliff

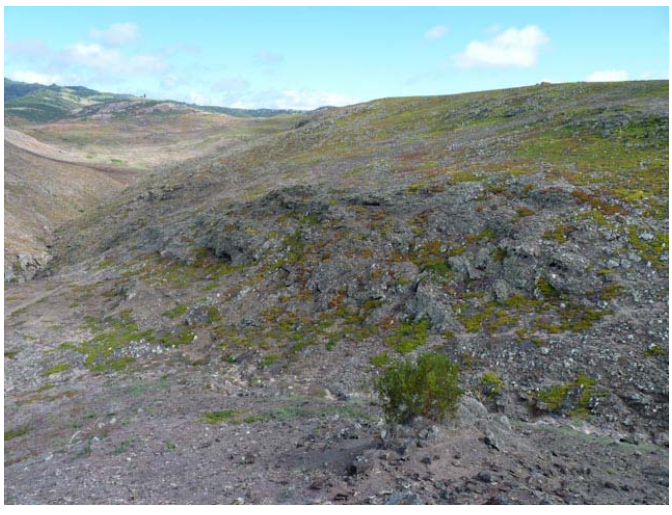
Altitude: 289m

Aspect: south east

Slope: 30-90°

Layers cover: % % 20% 70%

Site and Vegetation Description



Most southerly end of the east facing slope of Earwig Gully, an exposed rocky outcrop smothered in lichens. Slope variable 30-45^{o} with vertical sections and overhangs and a flat area on top. Few loose stones and grit in between. A second boulder outcrop with similar characteristics and vegetation composition, but less diverse, to the north was also included in this site description.

Carpobrotus edulis is abundant and regenerating on the rock face, extending into the rocky slope below, and is the dominant vascular plant in this area. **Ceterach hautonii, Cyperus polystachyos* and *Polycarpon tetraphyllum* are present in low numbers in damp soil pockets between rocks and in rock crevices predominantly on the southern and more exposed edge.

Most of the upper part is dominated by *Ramalina* lichens with relatively low diversity. Several of these species are endemic, but paradoxically the community they form is potentially less important for conservation as all of the endemic *Ramalina* species are abundant elsewhere on the island. The lower, more sheltered part with some small undercut cliffs contain richer communities with fewer endemics but more species which are locally rare on St Helena. Similarly, the drier more sheltered crest of the outcrop (south and south west facing) supports the endemic *Dimelaena triseptata* which is rare; stands are usually small (largest known to date is at Great Stone Top) and dispersed, usually found on west facing, sheltered and drier rocky outcrops and rock faces. In all sections of the boulder outcrop, the lichen colonies are particularly large, suggesting that the habitat has remained undisturbed for an unusually long period (probably at least a century, perhaps more). There were also two mosses here (*Campylopus flexuousa* and *Bryum subapiculatum*) which have not previously been recorded from such extreme dryland sites on the island. Along with the more common *Weissia* sp., the moss tussocks lie at the base of the rocks and appear to provide important habitat for some invertebrates which burrow amongst the rhizoids.

Substrate and Species List

grit & small stones (1cm-15cm)		4
exposed weathered outcrop		8 (lichen covered)
Portulaca oleracea	*i*	1
Eragrostis cilianensis (combined)	*i*	1
Cotula coronopifolia	*i*	1
Ceterach haughtonii	*	1
Carpobrotus edulis (combined)		5
Polycarpon tetraphyllum		1
Sonchus oleraceus		1
Cyperus polystachyos		2
Bryophytes		
Bryum subapiculatum	*i?*	x
Campylopus flexuosus	*i*	x
Weissia sp	*i*	x
Lichens		
Buellia tesserata	*i*	x
Caloplaca bolacina	*i*	x
Caloplaca flavovirescens	*i*	x(3)
Candelaria concolor	*i*	x
Dermatiscum pusillum	*	x
Dimelaena triseptata	*	x
Dirinaria applanata	*i*	x
Enterographa anguinella	*i*	x

Flavoparmelia soredians	*i*	x
Haematomma fenzlianum	*i*	x
Hafelia leptoclinoides	*i*	x
Heterodermia speciosa	*i*	x
Lecanora sanctae-helenae	*near endemic*	x(4)
Lecanora suphurescens	*i*	x
Lecidiella chodati	*i*	x
Ochrolechia Africana	*i*	x
Parmotrema reticulatum	*i*	x(3)
Psilolechia lucida	*i*	x
Pyxine petricola	*i*	x
Ramalina arabum	*i*	x
Ramalina geniculatella	*	x
Ramalina lacera	*i*	x
Ramalina sanctae-helenae	*	x(7)
Rinodina oxydata	*i*	x
Roccella linearis	*i*	x
Teloschistes flavicans	*i*	x
Unidentified species C (Parmotrema sp.)	*i*	x
Unidentified species F (Xanthoparmelia sp?)	*i*	x
Xanthoparmelia pseudocongensis	*i*	x

Lichen thallus measurements

Species	Measurement		Sample number	Length (cm)
Ramalina sanctae-helenae	branch length		1	26.1
Ramalina sanctae-helenae	branch length		2	16.5
Ramalina sanctae-helenae	branch length		3	41.5
Ramalina sanctae-helenae	branch length		4	28.5
Ramalina sanctae-helenae	branch length		5	26
Ramalina sanctae-helenae	branch length		6	21.4
Ramalina sanctae-helenae	branch length		7	20.6
Ramalina sanctae-helenae	branch length		8	17.5
Ramalina sanctae-helenae	branch length		9	21
Ramalina sanctae-helenae	branch length		10	29
		mean		**24.81**
		stdev		**7.296643**
Xanthoparmelia molybdiza	thallus diameter		1	18.3
Xanthoparmelia molybdiza	thallus diameter		2	7.2
Xanthoparmelia molybdiza	thallus diameter		3	15
		mean		**13.5**
		stdev		**5.7**

DG04 Earwig Gully_east facing slope **GPS:** E216678.08 N8233208.93

Habitat classification: sparsely vegetated slope (hillside)

Altitude: 299m Aspect: south

Slope: 10^{o} Layers cover: % % 15% %

Site and Vegetation Description

A shallow rocky slope extending from the break of slope to the west and the water channel to the east. Some exposed rocky outcrops, not as rich as the east facing slope lichen outcrop and more protected from prevailing winds and incoming mists. Not easily distinguished in habitat character from DG 7 (Earwig Gully_stony creeper hillside) immediately to the west. The slope is steeper at 20-30^{o}, with a greater predominance of exposed rocky outcrops and less well vegetated compacted rocky ground. Creeper waste (almost exclusively formed from *Carpobrotus edulis*) is the dominant vegetation type and regenerating.

Substrate & Species List (for lichens see DG 03 as lichen covered boulder outcrop on east facing slope described with east facing slope lichen outcrop)

Grit & small stones (1cm-15cm)	7
rock and boulders (15cm-1m+)	8
Eragrostis cilianensis (combined) i	1
Cotula coronopifolia i	1
Atriplex semibaccata	2
Carpobrotus edulis (combined)	5
Sonchus oleraceus	1
Lantana camara	1
Tetragonia microptera	1
Nicotiana glauca	1

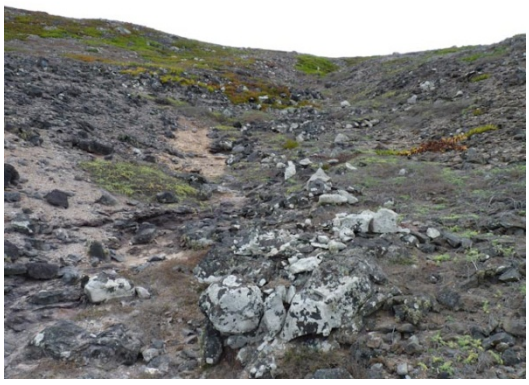
DG05 Earwig Gully_waterchannel **GPS Ref:** E216683.54 N8233208.53

Habitat classification: dry gully

Altitude: 299 m Aspect: south

Slope: 10^{o} Layers cover % 8% 12% 2%

Site and Vegetation Description



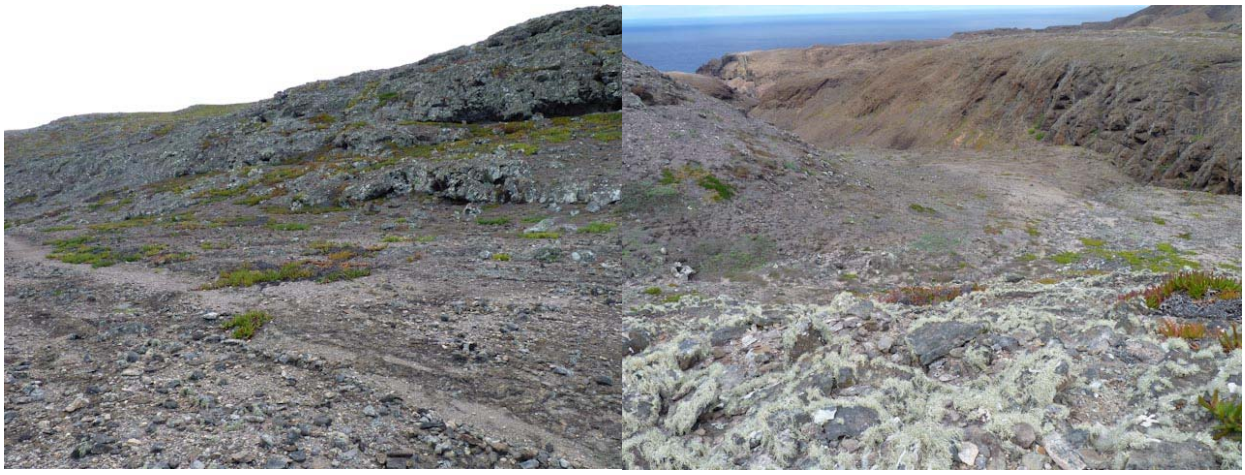
A narrow ephemeral water channel falling from the eastern plateau south eastwards to Dry Gut. The area starts in the north-west where the water channel which begins on the plateau becomes more pronounced, and the steepness of the slope increases, falling south easterly. The site follows the limit of the water course to the break of the gully slopes downstream to the point where it runs onto the flat ground (Earwig Gully_mouthflat) above the cliffs of Dry Gut.

The channel was dry at the time of survey and probably only has water flowing after prolonged rainy periods. A narrow water channel 1 to approx. 3 metres at its widest, and sheltered. Some exposed rocky surfaces with frequent pockets of grit and white-yellow silt have been captured in flat areas supporting plant growth; with rocky boulders within the stream bed. *Suaeda fruticosa* (i) and *Atriplex semibaccata* are the dominant species within the watercourse. *Carpobrotus edulis* is beginning to invade. Not a particularly diverse area for lichens.

Substrate and Species List

fine grit & dust		6
grit & small stones (1cm-15cm)		3
rock and boulders (15cm-1m+)		8
Suaeda fruticosa	*i*	5
Eragrostis cilianensis (live)	*i*	1
Opuntia ficus-indica		1
Atriplex semibaccata		5
Carpobrotus edulis (combined		3
Mesembryanthum crystallinum		1
Sonchus oleraceus		1
Cyperus polystachyos		1
Lantana camara		1
Lichens		
Buellia halonia	*i*	x
Caloplaca flavovirescens	*i*	x
Chrysothrix xanthine	*i*	x
Dimelaena oreina	*i*	x
Dirinaria applanata	*i*	x
Haematomma fenzlianum	*i*	x
Heterodermia speciosa	*i*	x
Lecanora sanctae-helenae	*near endemic*	x
Lecidiella chodati	*i*	x
Lepraria usnica	*i*	x
Ochrolechia Africana	*i*	x
Ramalina ketna-oostrae	*	x
Ramalina sanctae-helenae	*	x
Roccella linearis	*i*	x
Unidentified species C (Parmotrema sp.)	*i*	x
Xanthoparmelia subramigera	*i*	x

DG06 Earwig Gully_mouthflat GPS: **E216611.14 N8233161.23**
Habitat classification: stony heath
Altitude: 283 m Aspect: south
Slope: 5° Layers cover: % % 18% 14%



Site and Vegetation Description
A gently sloping (5°) area falling south west and south east, defined by the cliff top to the south and east and the narrow corridor between the cliff edge and the lichen rich boulder outcrop through which the footpath winds. An exposed stony outwash fan, before the land slopes off into Dry Gut. The footpath from Woody Ridge runs east-west through the site.

The narrow water channel from Earwig Gully runs through the centre of this area and down over the cliff into Dry Gut. There is a small alluvial fan of gritty ground alongside the water channel before reaching the exposed weathered rock of the cliff top. The area has a predominantly flat and compacted surface of small slabby rocks and grit. Water movement is evident. Good communities of lichens on rocks, an area which favours certain lichens such as *Lecidiella* and *Xanthoparmelia* species. There are some large colonies which are probably very old. Lichens in general are abundant in this area. The site is sparsely vegetated with vascular plants, *Carpobrotus edulis* and *Atriplex semibaccata* scattered through site, no obvious dominants both species recruiting.

Substrate and Species List

fine grit & dust		4
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		6
Suaeda fruticosa	*i*	2
Hydrodea cryptantha	*	1
Portulaca oleracea	*i*	1
Eragrostis cilianensis (combined)	*i*	2
Digitaria ciliaris	*i*	1
Cotula coronopifolia	*i*	1
Opuntia ficus-indica		1
Atriplex semibaccata		4
Carpobrotus edulis (combined)		5
Mesembryanthum crystallinum		1
Polycarpon tetraphyllum		1
Sonchus oleraceus		1
Cyperus polystachyos		1

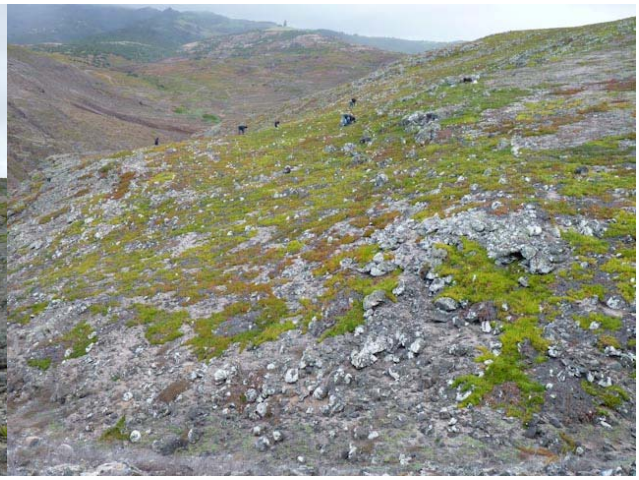
Lantana camara		1
Tetragonia microptera		1
Ageratum conyzoides		1
Bryophytes		
Bryum argenteum	*i*	x
Lichens		
Caloplaca bolacina	*i*	x
Caloplaca flavovirescens	*i*	x(3)
Candelaria concolor	*i*	x
Diploschistes eugeneus	*i*	x
Dirinaria applanata	*i*	x
Haematomma fenzlianum	*i*	x
Hafelia leptoclinoides	*i*	x
Lecanora sanctae-helenae	*near endemic*	x(4)
Lepraria usnica	*i*	x
Physcia dimidiate	*i*	x
Physcia sorediosa	*i*	x
Psilolechia lucida	*i*	x
Ramalina lacera	*i*	x
Ramalina sanctae-helenae	*	x(6)
Roccella linearis	*I*	x(3)
Unidentified species C (Parmotrema sp.)	*i*	x(3)
Xanthoparmelia subramigera	*i*	x

Lichen thallus measurements were taken from a stone shelter GPS co-ordinated UTM 30L E216673 N823304 at the south eastern edge of the site to give an indication of the age of the structure and colonisation rate.

Species	Location	Measurement	Sample number	Length (cm)
Ramalina sanctae-helenae	stone shelter	branch length	1	2
Ramalina sanctae-helenae	stone shelter	branch length	2	2.3
Ramalina sanctae-helenae	stone shelter	branch length	3	9.5
Ramalina sanctae-helenae	stone shelter	branch length	4	6.8
Ramalina sanctae-helenae	stone shelter	branch length	5	6.8
Ramalina sanctae-helenae	stone shelter	branch length	6	4.2
Ramalina sanctae-helenae	stone shelter	branch length	7	4.5
Ramalina sanctae-helenae	stone shelter	branch length	8	4
Ramalina sanctae-helenae	stone shelter	branch length	9	3.8
Ramalina sanctae-helenae	stone shelter	branch length	10	6.5
				5.04
				2.323407

DG 07 Earwig Gully_stony creeper slope **GPS Ref:** E216622.12 N8233211.93
Habitat classification: Creeper waste
Altitude: 297m Aspect: south southeast
Slope: 10-15^{o} Layers cover: % % 58% 2%

Site and Vegetation Description

An exposed gritty area with small stones and scattered boulders with a gentle slope (5-10^{o}) to the south east. A depauperate area, of creeper waste dominated by *Carporbrotus edulis* with stands of *Atriplex semibaccata* and *Eragrostis cilianensis (i)*.

Grit - consolidated dust, now weathering – windblown? forming fine light rounded or cylindrical particles that turn to dust when compressed and produce a very loose open substrate. Below the bleached surface, a small horizon (10 cm of darker soils bounded by roots of creeper has humus content, and below this the grit is very uniform pale grey brown to depth (well below 1 m) with small stones and boulders distributed throughout. This is the type of soil found across much of the southern plateau (including Ashmoles site PBP 17 Plateau Trig Point, site north of Bradleys (described in the ES) and southern ridge creeper – described below).

Potentially a good area for lichens with many large, slabby boulders and exposure to the incoming mists which favours *Ramalina* species on the higher outcrops. There are still moderately good communities in the open areas, but where the boulders have been smothered by *Carpobrotus edulis* the lichens have disappeared. Removal of this creeper layer would offer potential for restoring lichens to this and other similar sites, but colonisation/re-colonisation would only occur over a long time period.

Habitat similar to the creeper dominated areas described by the Ashmoles (2004a).

Two subfossil snail shells (Sublinidae, *Chilonopsis spp*.), were found

Three Gecko eggs. *X. tridentiger* egg cases common under boulders.

Substrate & Species List

grit & small stones (1cm-15cm)		6
rock and boulders (15cm-1m+)		5
Eragrostis cilianensis (live)	*i*	1
Atriplex semibaccata		4
Carpobrotus edulis (combined)		8

Polycarpon tetraphyllum		1
Lichens		
Amandinea lecideina	*i*	x
Buellia tesserata	*i*	x
Caloplaca flavovirescens	*i*	x(3)
Chrysothrix xanthine	*i*	x
Dermatiscum pusillum	*	x
Dirinaria applanata	*i*	x
Flavoparmelia soredians	*i*	x
Haematomma fenzlianum	*i*	x
Lecanora sanctae-helenae	*near endemic*	x(4)
Lecidiella chodati	*i*	x
Lepraria usnica	*i*	x
Parmotrema reticulatum	*i*	x(3)
Psilolechia lucida	*i*	x
Ramalina arabum	*i*	x
Ramalina rigidella	*	x
Unidentified species A	*i*	x
Xanthoparmelia pseudocongensis	*i*	x

DG08 Earwig Gully_west facing quarry slope **GPS Ref:** E216650.73 N8233144.41

Habitat classification: erosion slope

Altitude: 280m Aspect: south west

Slope: 30-45^{o} Layers cover: 1% % 25% 5%

Site and Vegetation Description

An erosion slope, this site forms the most southern extent of the west-facing slope of Earwig Gully. This site has been subject to significant disturbance from quarry activity along the upper rocky edge in the past. It is an unstable dry and dusty site of mineral soils, with loose rocks, sheltered from the prevailing wind. It thus does not provide ideal habitat for either plants or lichens. However it is a surprisingly diverse site, there are moderately good populations of some of the more xeric-tolerant lichens (e.g. *Xanthoparmelia subramigera* and *Flavoparmelia soredians*) on the larger, more sheltered boulders, and it is also a moderately good site for the rarer endemic *Dimelaena triseptata*, which favours sheltered micro-habitats. It also holds several annual species including a number of

natives; *Eragrostis cilianensis (i)*, *Amaranthus thunbergii(i)*, and *Portulaca oleracea* (i) and species that are able to colonise disturbed ground: *Mesembryanthum crystallinum* and *Atriplex semibaccata*.

Two cat scats observed on the crest of the ridge and one the slope.

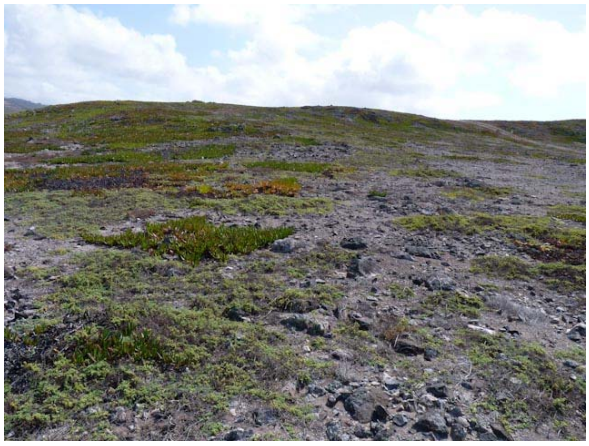
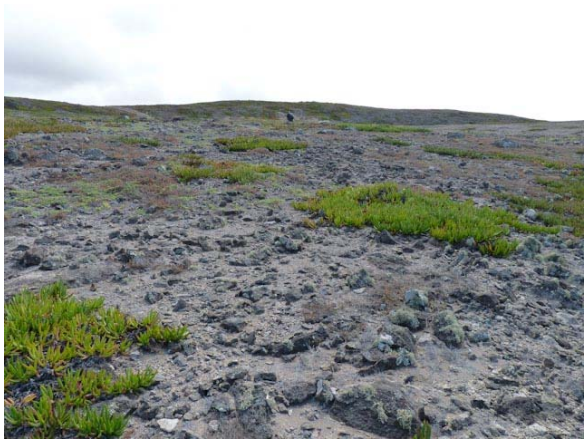
Substrate and Species List

fine grit & dust		4
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		8
vertical cliff		3
Suaeda fruticosa	*i*	1
Portulaca oleracea	*i*	2
Amaranthus thunbergii	**subspecies?*	1
Eragrostis cilianensis (live)	*	1
Eragrostis cilianensis (dead)	*	3
Opuntia ficus-indica		1
Acacia cyclops		1
Atriplex semibaccata		5
Carpobrotus edulis (combined)		2
Mesembryanthum crystallinum		3
Sonchus oleraceus		1
Lantana camara		1
Tetragonia microptera		1
Nicotiana glauca		2
Sonchus tenerrimus		1
Bryophytes		
Bryum argenteum	*i*	X
Lichens		
Caloplaca bolacina	*i*	X
Caloplaca flavovirescens	*i*	X
Caloplaca haemotodes	*i*	X
Candelaria concolor	*i*	X
Dimelaena triseptata	*	X
Dimelena radiata	*i*	X
Diploschistes eugeneus	*i*	X
Dirinaria applanata	*i*	X
Flavoparmelia soredians	*i*	X
Haematomma fenzlianum	*i*	X
Hafelia leptoclinoides	*i*	X
Heterodermia speciosa	*i*	X
Hyperphyscia granulata	*i*	
Lecanora sanctae-helenae	*near endemic*	X(4)
Lecanora suphurescens	*i*	X
Lecidiella chodati	*i*	X
Lepraria usnica	*i*	X
Ochrolechia africana	*i*	X
Psilolechia lucida	*i*	X
Ramalina ketna-oostrae	*	X

Ramalina sanctae-helenae	*	X(2)
Roccella linearis	*i*	X
Teloschistes flavicans	*i*	X
Unidentified species A	*i*	X
Xanthoparmelia molybdiza	*i*	X
Xanthoparmelia subramigera	*i*	X(3)

DG09 Earwig Gully_catchment **GPS Ref:** E216640.69 N8233281.37
Habitat classification: semi-desert
Altitude: 312m Aspect: south east
Slope: 0-5^{o} Layers cover: 1% 10% 22% 4%
(note here at this exposed site samphire is prostrate and generally shorter than creeper)

Site and Vegetation Description

West of Earwig Gully, this site extends from the base of the ridge slope on the north-west to the erosion channel in the north east that forms on the plateau and becomes Earwig Gully to where the plateau starts to slope off south eastwards into Earwig Gully and south to Dry Gut where the habitat changes to a creeper dominated grit and boulder slope.

An exposed site sloping gently south-eastwards, 2-5^{o}, with a compacted bleached gritty surface substrate with abundant small rocks and boulders. Below the surface the soil is uniform to depth well below 0.5 m comprising rounded particles with small stones and rocks dispersed throughout similar to PBP_SR19 .

Stony ground with plenty of bare patches, *Carpobrotus edulis* is the dominant species with *Suaeda fruticosa (i)* and *Atriplex semibaccata* abundant. *Caprobrotus* regenerating from seed.

This site is an example of the exposed stony areas described by the Ashmoles (2004a) and the habitat type considered to be most at risk from airport development.

As for the DG07_Earwig Gully stony creeper slope on the east side of Earwig Gully, the upper plateau could potentially provide good habitat for lichens if creeper was removed. There are still moderate numbers of colonies of some of the commoner species on flat, slabbly rocks (especially *Buellia* species and *Dirinaria applanata*), and some of them appear to be quite old, but they are confined to the few remaining exposed rocks. As the topography is quite simple, the diversity is not particularly high, but this does not detract from the potential value of the habitat which is present.

Two wirebirds were regularly seen in the area. Rabbits present.

Geckos (3) and *Scolopendra mortisans* (with young) were found here. Woodlice colonies (3) and large numbers of *Xeropigo tridentiger* also common under rocks.

Substrate and Species List

fine grit & dust		5
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		5
Suaeda fruticosa	*i*	4
Eragrostis cilianensis (combined)	*i*	2
Opuntia ficus-indica		1
Atriplex semibaccata		4
Carpobrotus edulis (combined		5
Mesembryanthum crystallinum		1
Polycarpon tetraphyllum		2
Lantana camara		1
Nicotiana glauca		1

DG10 Dry Gut_boneseed outwash **GPS Ref**: E216746.62 N8233054.87

Habitat classification: erosion & scree slope

Altitude: 254m Aspect: south

Slope: 45-60^{o} Layers cover: 1% % 13% 4%

Site and Vegetation Description

A fan-shaped south facing erosion and scree slope. Shallow soils between rocks, some patches of light light orange brown soils of weathered (consolidated) rock. Site is subject to disturbance from rock fall from cliffs above and water movement downslope and weathering. Soils (on gentle sloping benches) have surface sealing, indicating that they are not moving and these support a range of annual species, notably **Osteospermum sanctae-helenae*, **Hydrodea cryptantha*, (i) *Amaranthus thunbergii* and (i)*Portulaca oleracea*. Numbers recorded were small when surveying took place. However collection since the survey has indicated that this area supports a sizeable population of **Osteospermum sanctae-helenae*.

Substrate and Species List

fine grit & dust		4
grit & small stones (1cm-15cm)		4
rock and boulders (15cm-1m+)		8
Osteospermum sanctae-helenae	*	1
Hydrodea cryptantha	*	1
Portulaca oleracea	*i*	1
Amaranthus thunbergii	*subspecies?	1
Mesembryanthum crystallinum		1
Opuntia ficus-indica		1
Atriplex semibaccata		5
Carpobrotus edulis (combined)		1
Sonchus oleraceus		1
Sonchus tenerrimus		1
Chenopodium murale		1
Coronopus didymus		1
Lichens		
Buellia tesserata	*i*	x
Caloplaca flavovirescens	*i*	x
Haematomma fenzlianum	*i*	x
Lecanora sanctae-helenae	*near endemic*	x
Lepraria usnica	*i*	x
Ramalina sanctae-helenae	*	x
Roccella linearis	*i*	x

DG 11 Dry Gut_exposed stony terrace north slope **GPS Ref: N**216736.87 E8232962.07

Habitat classification: Stony heath

Altitude: 223m Aspect: south south east

Slope: 5-20^{o} Layers cover: % % 30% 1%

Site and Vegetation Description

Whole site

Close up

Eragrostis and *Portulaca* habitat

A hard seam of black rock in the lower valley that forms a raised sloping terrace made up of slabby flat rocks with horizontal and diagonal strata. The site is windswept and slopes generally south east with uneven slopes between 5-20^{o} with some areas of flat ground. Loose slabby rocks lying over bedrock or grit. The occasional boulder is present but is likely to have originated from the valley sides above.

There are small soil pockets of fine dust and grit between the slabby flat rocks. Very compacted surface.

Site shares characteristics with the Ashmoles (2004a) cliff tops, crags and rocky gullies, of which sites 3 and 7 are examples.

Eragrostis cilianensis (i) is the dominant vascular plant here. Endemic **Hydrodea cryptantha* and indigenous *Portulaca oleracea* (i) and *Cotula coronopifolia* (i) are also present across the site in small numbers.

Good stand of the rare endemic **Dimelaena triseptata* which was found in specific micro-habitats: sheltered, often west facing, sloped or vertical rocky positions not subject to water run-off, at several sites in Dry Gut (DG03, DG15, DG19) but only ever in small numbers. This may be a candidate species for translocation to a site(s) outside the development area.

Substrate and Species List

grit & small stones (1cm-15cm)		7
rock and boulders (15cm-1m+)		7
Hydrodea cryptantha	*	1
Portulaca oleracea	*i*	3
Eragrostis cilianensis (live)	*i*	4
Eragrostis cilianensis (dead)	*I*	4
Cotula coronopifolia	*i*	1
Atriplex semibaccata		3
Carpobrotus edulis (combined		5
Sonchus oleraceus		2
Solanum nigrum		1
Lycopersicon esculentum		1
Lichens		
Dimelaena triseptata	*	X(1)

DG 12 Dry Gut_watercourse

GPS Ref: upper limit E216555.99 N8233065.43 lower limit E216971.37 N8233536.96

Habitat classification: Dry gully with riparian margins

Altitude: upper limit 260m lower limit 206m

Aspect: east

Slope: 0-<5^{o}

Layers cover: 1% 4% 4% 1%

Site and Vegetation Description

The narrow bed of Dry Gut through which an ephemeral stream flows from west to east, is described from the western edge of the ADA to the eastern extent just above the waterfall leading to Gill Point. At the western edge deep silt terraces of about 1 m in height have formed either side of the narrow water cut channel that are colonised predominantly by *Suaeda fruticosa (i)*. As it falls eastwards the width of the watercourse varies and comprises a variety of habitats: silt terraces, exposed polished bedrock, anoxic mud flats and narrow gritty and stone strewn floodplain. This is an ephemeral stream bed which held water in muddy bottomed pools at the time of survey.

The watercourse is overall sparsely vegetated but water movement and disturbance have contributed to the site supporting a wide variety of species that grow on the floodplain, silt terraces and rocky margins. *Suaeda fruticosa* (i) is found frequently throughout the site and is the most abundant species present. *Atriplex semibaccata, Carpobrotus edulis* and *Digitaria ciliaris* (i?) are common in small patches. Species which are not found elsewhere in Dry Gut are recorded here including the indigenous *Polypogon monspeliensis* (i) which is represented by only a few individuals.

Moss tussocks lie at the base of the rocks and appear to provide important habitat for some invertebrates which burrow amongst the rhizoids. Micro-moth pupal cases were found in holes cut through the moss into the soil formed beneath.

The area is lichen poor. *Xanthoparmelia molybdiza* is the dominant lichen on water worn bare rock and from the growth form must be of considerable age. *Lecidiella chodati* and *Caloplaca* spp. are also present.

Little is known about invertebrates associated with ephemeral water in the arid coastal zone. It is a rare, seasonal habitat which must be important for certain species. A pond-skater fly, which referring to the Ashmoles' report, is likely to be *Hydrophorous praecox* (Dolichopodidae), only previously recorded from Fisher's Valley was observed. This is a probable native and needs to be positively identified. Numerous small black flies (shore flies?) which rest on the damp mud banks were also observed but not collected. These are possibly also native. Suitable habitat (of the sort of muddy, ephemeral watercourse in Dry Gut) is extremely scarce on the island and we are probably losing the best example on the island. Therefore, anything that could potentially be of high conservation value in this habitat should be given some detailed consideration.

Mice were observed and there was evidence of rabbits.

Substrate and Species List

Alluvial silt		4
fine grit & dust		5
grit & small stones (1cm-15cm)		4
rock and boulders (15cm-1m+)		7
open water		3
Suaeda fruticosa	*i*	4
Hydrodea cryptantha	*	1
Portulaca oleracea	*i*	1
Eragrostis cilianensis (live)	*i*	1
Eragrostis cilianensis (dead)	*i*	1
Digitaria ciliaris	*i*	3
Opuntia ficus-indica		1
Acacia Cyclops		2
Atriplex semibaccata		3
Carpobrotus edulis (combined		3
Mesembryanthum crystallinum		1
Sonchus oleraceus		2
Cyperus polystachyos		2
Solanum nigrum		1
Schinus terebinthifolius		1
Lycopersicon esculentum		1
Chenopodium murale		1
Bidens pilosa		1
Polypogon monspeliensis		1
Sporobolus africanus		1
Eriochloa procera		1
Bromus catharticus (wild oats)?		2
Conyza bonariensis		1
Blainvillea acmella		1
Bryophytes		
Bryum argenteum	*i*	X

Weissia sp	*i*	X
Lichens		
Xanthoparmelia molbdiza		X(3)

DG 13 Dry Gut_south facing slope below lichen cliffs **GPS Ref:** E216639.00 N8233962.07
Habitat classification: scree & sparsely vegetated hillside
Altitude: 245m Aspect: south
Slope: 45-67^{o} Layers cover: 2% % 40% 4%

Site and Vegetation Description

A dry steep (45-67^{o}) unstable rocky slope that lies in the upper western end of the Gut before it narrows into a gorge. The site extends from the western edge of the extent of cut, marked by painted white stones to the west, south the watercourse, north to the base of the cliff and west to the raised cinder area west of DG11.

The vertical cliffs above, steep slope and narrow valley at this point result in the site, particularly the upper slope, being in shade for most of the day. The site is sheltered but subject to disturbance by rockfall from the cliffs above and landslip on the steep rocky slope. This area has a variety of habitats from flat dry dusty ground immediately under the cliff, unstable rocky slopes to more stable areas of boulder field. It supports a relatively diverse variety of plants and includes a large population of **Chenopodium helenense*: the only site found in Dry Gut. A small number of the non-native *Chenopodium murale* were also found growing alongside **C. helenense* and it is possible that hybridisation between the two species takes place. Some individuals looked like putative hybrids.

Due to the unstable nature of the area, most of the rock surfaces have had relatively short periods to become colonised by lichens. Communities thus tend to be rather simple and dominated by crustose forms such as *Buellia* and *Caloplaca* species. However, some shaded overhangs contain *Ochrolechia africana* and other more specialised lichens. This was also a site for an as yet unidentified crustose species (Unidentified species A) with black, sunken fruiting bodies, which is probably a new record for the island. The species was otherwise only recorded from a few rocks in Earwig Gully.

This is a nice site with a good mix of species. Whilst not especially diverse, it is a habitat type that supports the endemics *Osteospermum* and *Chenopodium*.

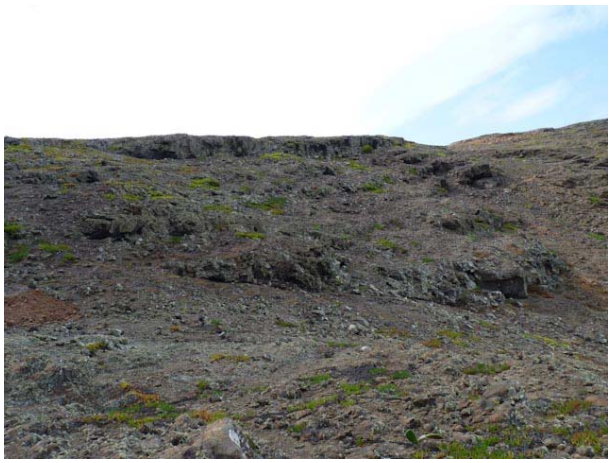
Substrate and Species List

fine grit & dust		5
rock and boulders (15cm-1m+)		7
Osteospermum sanctae-helenae	*	1
Portulaca oleracea	*i*	1

Chenopodium helenense	*	2
Eragrostis cilianensis (live)	*i*	1
Eragrostis cilianensis (dead)	*i*	2
Digitaria ciliaris	*i*	1
Cotula coronopifolia	*i*	1
Opuntia ficus-indica		2
Acacia cyclops		1
Atriplex semibaccata		6
Carpobrotus edulis (combined		5
Mesembryanthum crystallinum		2
Sonchus oleraceus		2
Cyperus polystachyos		2
Lantana camara		1
Ageratum conyzoides		1
Solanum nigrum		1
Nicotiana glauca		2
Lycopersicon esculentum		1
Chenopodium murale		1
Sporobolus africanus		1
Eriochloa procera		1
Chrysanthmoides monilifera		1
Conyza bonariensis		1
Olea europaea subsp. Africana		1
Coronopus didymus		1
Bryophytes		
Trichostomum brachydontium	*i*	X
Lichens		
Buellia stellulata	*i*	X
Buellia tesserata	*i*	X
Caloplaca bolacina	*i*	X
Candelaria concolor	*i*	X
Diploschistes eugeneus	*i*	X
Hafelia leptoclinoides	*i*	X
Hyperphyscia granulate	*i*	X
Lecanora suphurescens	*i*	X
Lecidiella chodati	*i*	X
Lepraria usnica	*i*	X
Ochrolechia Africana	*i*	X
Pannaria fulvescens	*i*	X
Parmotrema reticulatum	*i*	X
Psilolechia lucida	*i*	X
Rinodina oxydata	*i*	X
Unidentified species A	*i*	X
Unidentified species B	*i*	X

DG14 Dry Gut_upper northern slope lichen and barn fern cliffs GPS Ref: E216716.73 N8233109.58
Habitat classification: inland cliff and rocky areas
Altitude: 275m Aspect: south
Slope: 45-90° Layers cover: 1% % 15% 40%

Site and Vegetation Description

This area hosts one of the richer lichen communities, it is a south-facing slope with plenty of vertical cliff face and rock overhangs. It is an actively eroding slope with vertical cliff face subject to rockfall events. *Ochrolechia africana*, generally the dominant species of overhangs in the Dry Gut area, is particularly abundant, but also *Diploschistes* species, *Enterographa anguinella* and *Opegrapha subelevata* are of particular interest.


Ramalina species dominated cliff face: lichens branch length measurements give an indication of age, here individuals are over 100 years of age[1]

Moss patches in soil-filled crevices at the base of boulders

[1] Lichen ages are at best and estimate because it is difficult to make comparisons between sites, lichens only grow when there is available moisture so growth rates can vary considerably. Lichen age was estimated by comparison with lichen lengths and ages recorded by Aptroot (2006)

Ceterach haughtonii, barn fern grows in rock crevices where water is trapped after running through rock crevices and seams or drips from rock faces

Xanthoparmelia molybdiza; lichens grow slowly, a thallus of this size is likely to be of considerable age, possibly a century.

In keeping with similar habitats at other sites, the crevices at the foot of the cliffs, where the overhangs form a shady, dusty ledge, are potentially important. They support a sparse but distinctive invertebrate community which seems to be associated with silverfish, a long-legged Symphylan, and a Gnaphosid spider (the latter was not caught but seen on a few occasions). This community remains poorly known and it is not known whether the species present are endemic.

The upper ledges of the cliffs support part of the extensive and very large population of barn fern, **Ceterach haughtonii*, that runs along much of the northern cliff slopes of Dry Gut. Although a detailed island-wide census has not yet been conducted, it is thought that this site may currently comprise at least 60% of the world population. Patches of **Ceterach haughtonii* are often associated with *Trichostomum* and *Weissia* moss patches in soil-filled crevices at the foot of cliffs and boulder overhangs. This community is specific to a very narrow micro-habitat in which a shaded southerly aspect is likely to be important. The presence of mosses may create a better microhabitat for fern gametophytes. The majority of the Barn ferns had already been removed from this site to the Environmental Conservation Section Nursery prior to the survey.

Substrate and Species List

grit & small stones (1cm-15cm)		4
rock and boulders		7
exposed weathered outcrop		5
vertical cliff		5
Portulaca oleracea	*i*	2
Amaranthus thunbergii	**subspecies?*	1
Cotula coronopifolia	*i*	1
Ceterach haughtonii	*	1
Acacia cyclops		1
Atriplex semibaccata		2
Carpobrotus edulis (combined		4
Mesembryanthum crystallinum		3
Polycarpon tetraphyllum		1
Sonchus oleraceus		1
Ageratum conyzoides		1
Nicotiana glauca		1
Sonchus tenerrimus		1
Chenopodium murale		1

Coronopus didymus		1
Bryophytes		
Trichostomum brachydontium	*I*	X
Weissia sp	*I*	X
Lichens		
Buellia sp	*I*	X
Caloplaca bolacina	*I*	X
Caloplaca flavovirescens	*I*	x(3)
Caloplaca haemotodes	*I*	x(1)
Coccocarpia palmicola	*I*	x(1)
Dermatiscum pusillum	*	x(1)
Diploschistes muscorum	*I*	X
Diploschistes prominens	*I*	X
Dirinaria applanata	*I*	X
Enterographa anguinella	*I*	1
Haematomma fenzlianum	*I*	x(3)
Hafelia leptoclinoides	*I*	X
Heterodermia speciosa	*I*	X
Lecanora sanctae-helenae	*near endemic*	x(6)
Lecanora suphurescens	*I*	X
Lepraria pallida	*I*	x(2)
Lepraria lobificans	*I*	X
Lepraria usnica	*I*	X
Ochrolechia africana	*I*	x(4)
Opegrapha subelevata	*I*	X
Parmotrema reticulatum	*I*	X
Physcia sorediosa	*I*	X
Psilolechia lucida	*I*	x(2)
Ramalina ketna-oostrae	*	x(2)
Ramalina sanctae-helenae	*	x(6)
Rinodina oxydata	*I*	X
Roccella linearis	*I*	x(2)
Teloschistes flavicans	*I*	x(1)
Unidentified species C (Parmotrema sp.)	*I*	x
Xanthoparmelia molybdiza	*I*	x(1)
Xanthoparmelia pseudocongensis	*I*	x(1)

Lichen thallus measurements

Species	Measurement	Sample number	Length (cm)
Xanthoparmelia molybdiza	thallus diameter	1	8.5
Xanthoparmelia molybdiza	thallus diameter	2	10.5
Xanthoparmelia molybdiza	thallus diameter	3	9
Xanthoparmelia molybdiza	thallus diameter	4	6
Xanthoparmelia molybdiza	thallus diameter	5	17.1
		Mean	**10.22**
		stdev	**4.173368**

Species	Measurement	Sample number	Length (cm)
Ramalina sanctae-helenae	branch length	1	11.6
Ramalina sanctae-helenae	branch length	2	15.2
Ramalina sanctae-helenae	branch length	3	11.1
Ramalina sanctae-helenae	branch length	4	15
Ramalina sanctae-helenae	branch length	5	19
Ramalina sanctae-helenae	branch length	6	28
Ramalina sanctae-helenae	branch length	7	28
Ramalina sanctae-helenae	branch length	8	30
Ramalina sanctae-helenae	branch length	9	17.5
Ramalina sanctae-helenae	branch length	10	24.9
		Mean	**20.03**
		stdev	**7.126328**

DG 15 Dry Gut_ Boneseed triangle **GPS Ref:** E216828.53 N8233010.09

Habitat classification: inland cliff and rocky areas

Altitude: 251m Aspect: south

Slope: 5-45-90^{o} Layers cover: 1% % 15% 70%

Site and Vegetation Description

Site photo taken looking eastwards

View to lichen rich exposed rocky slope

Rocky areas with water run-off supporting good populations of *Xanthoparmelia molybdiza* and *Dirinara applanata*, whilst on sheltered sections not directly in line of water run-off - **Dimelaena triseptata*

A triangular shaped outcrop (when viewed from the west) mid valley on the north slope (predominantly south west facing) of exposed weathered rock with variety of habitats: steep slope, vertical cliff and benches of gentle slope where soil collects. Shallow soil pockets have accumulated

up to 10cm indepth on benches and support good populations of bryophytes and *Portulaca oleracea* (i) and *Eragrostis cilianensis* (i). The site supports a diverse but sparse vascular flora and lichens are the dominant feature of this site.

This was the most diverse site for lichens in the survey area, and probably represents one of the finest examples of saxicolous (living on or among rocks) lichen communities on the island. The richness is largely due to the good diversity of habitats. In particular, the site contains a steep area where water clearly occasionally runs-off, and this zone is characterised by abundant and large colonies of *Dirinaria applanata* and *Xanthoparmelia molybdiza*. The occasional water movement is probably not enough to cause abrasion but just sufficient to disperse spores down the slope. The site also appears to occupy the narrow transitional zone between high-moisture capture (supporting abundant but species-poor communities of dominant *Ramalina* species) and the arid lowlands (again with few species). This transitional zone is characterised by a high diversity of rarer species. Such sites are scarce. Rarer species of note at this site included good numbers of the endemic **Dermatiscum pusillum*, and *Enterographa anguinella*, *Pannaria fulvescens*, *Psora cerebriformis*, *Opegrapha subelevata*, *Roccellina jamesii (near endemic)*, *Endocarpon pallidum*, **Dimelaena triseptata* and an unidentified soil crust species which appears not to have been recorded on the island previously. The lower parts of the slope probably also benefit from occasional water run-off, supporting good population of boneseed, **Osteopsermum sanctae-helenae*. However, some invasive species such as *Schinus terebinthifolius* are starting to encroach.

Large numbers of micro-moth caterpillars were observed which formed silken tubes on the undersides of boulders, the base of plants and also on cliff faces is also of note. This is clearly a very good site. Moths reared from collected caterpillars proved to be a species of ***Helenoscoparia*, an endemic genus of five recognised species. These have since been identified as ***H. nigritalis*.

Substrate and Species List

fine grit & dust		5
exposed weathered outcrop		8
vertical cliff		4
Osteospermum sanctae-helenae	*	1
Portulaca oleracea	*I*	2
Eragrostis cilianensis (combined)	*I*	4
Digitaria ciliaris	*I*	3
Cotula coronopifolia	*I*	2
Opuntia ficus-indica		1
Acacia cyclops		1
Atriplex semibaccata		1
Carpobrotus edulis (combined)		3
Mesembryanthum crystallinum		1
Polycarpon tetraphyllum		1
Sonchus oleraceus		1
Cyperus polystachyos		1
Lantana camara		1
Solanum nigrum		1
Nicotiana glauca		1
Sonchus tenerrimus		1
Schinus terebinthifolius		1
Lycopersicon esculentum		1
Conyza bonariensis		1
Coronopus didymus		1

Bryophytes		
Bryum argenteum	*I*	x(1)
Trichostomum crispulum	*I*	x
Lichens		
Amandinea lecideina	*I*	x
Buellia althaea	*I*	x
Buellia stellulata	*I*	x
Buellia tesserata	*I*	x
Caloplaca flavovirescens	*I*	x(3)
Caloplaca haemotodes	*I*	x(2)
Cladonia sp.	*I*	x(1)
Collema coccophorum	*I*	X
Dermatiscum pusillum	*	x(2)
Dimelaena triseptata	*	x(1)
Diploschistes eugeneus	*I*	x(2)
Dirinaria applanata	*I*	x(3)
Endocarpon pallidum	*I*	X
Enterographa anguinella	*I*	X
Flavoparmelia soredians	*I*	X
Haematomma fenzlianum	*I*	x(3)
Lecanora sanctae-helenae	*near endemic*	x(4)
Lecidiella chodati	*I*	x(3)
Lepraria usnica	*I*	x(1)
Ochrolechia africana	*I*	x(2)
Opegrapha subelevata	*I*	X
Pannaria fulvescens	*I*	X
Parmotrema reticulatum	*I*	x(2)
Physcia dimidiate	*I*	X
Psilolechia lucida	*I*	x(1)
Psora cerebriformis	*I*	x(1)
Ramalina arabum	*I*	X
Ramalina ketna-oostrae	*	x(2)
Ramalina sanctae-helenae	*	x(6)
Roccella linearis	*I*	x(1)
Unidentified species E	*I*	x
Xanthoparmelia molybdiza	*I*	x(3)
Xanthoparmelia pseudocongensis	*I*	x(2)

Lichen thallus measurements

Species	Measurement	Sample number	Length (cm)
Ramalina sanctae-helenae	branch length	1	19.1
Ramalina sanctae-helenae	branch length	2	19.6
Ramalina sanctae-helenae	branch length	3	28.4
Ramalina sanctae-helenae	branch length	4	19.0
Ramalina sanctae-helenae	branch length	5	20.8
Ramalina sanctae-helenae	branch length	6	30.0
Ramalina sanctae-helenae	branch length	7	22.3
Ramalina sanctae-helenae	branch length	8	22.8

Species	Measurement	Sample number	Length (cm)
Ramalina sanctae-helenae	branch length	9	20.5
Ramalina sanctae-helenae	branch length	10	26.0
Ramalina sanctae-helenae	branch length	11	22.2
		Mean	**22.7909091**
		stdev	**3.76442679**

Species	Measurement	Sample number	Length (cm)
Xanthoparmelia molybdiza	thallus diameter	1	14.0
Xanthoparmelia molybdiza	thallus diameter	2	12.0
Xanthoparmelia molybdiza	thallus diameter	3	10.0
Xanthoparmelia molybdiza	thallus diameter	4	9.0
Xanthoparmelia molybdiza	thallus diameter	5	9.5
Xanthoparmelia molybdiza	thallus diameter	6	9.0
Xanthoparmelia molybdiza	thallus diameter	7	9.5
		Mean	**10.4285714**
		stdev	**1.88034951**

DG 16 Dry Gut_ Upper northern slope above gill waterfall **GPS Ref:** E216983.14 N8232592.82
Habitat classification: Rocky area and sparsely vegetated hillside
Altitude: 210m Aspect: south
Slope: 65-70^{o} Layers cover: % % 10% 5%

Site and Vegetation Description

Steep south facing slope 65-70^{o} immediately above Gill Waterfall. Site extends eastward to the cliff face where the land drops away dramatically to another level and up to the top of the ridge and then westward extending along the slope until the aspect changes to south westerly. The southern extent of the site extends to the change in the angle of the slope to 45^{o} and the substrate becomes stonier. An exposed dry site, rock here extremely weathered, orange brown.

Sparsely vegetated hillside, but quite diverse. *Digitaria ciliaris (i?)* most abundant species with *Sonchus oleraceus*, *Atriplex semibaccata*, *Portulaca oleracea* (i) and **Osteospermum sanctae-helenae* growing closely associated amongst soil pockets.

This site does not have the lichen diversity of DG 15 Dry Gut_Boneseed triangle. It probably gets more sun, and lacks the vertical rock and overhangs which add a great deal to the habitat diversity. The presence of larger quantities of *Caloplaca haematodes* suggests that it is rather arid. Good populations of *Lecidiella buellastrum* in this part of the Dry Gut catchment are of note, as are the boneseed patches. *Trichostomum brachydontium* and *Bryum argenteum* occur where water seeps through crevices and between rocks.

Nicotiana glauca and *Aptriplex semibaccata* recruiting. Osteospermum still germinating.Cheni

This survey area approximates to Ashmoles (2004a) Site 7, habitat type cliff tops, crags and rocky gullies.

Substrate and Species List

fine grit & dust		4
grit & small stones (1cm-15cm)		7
rock and boulders (15cm-1m+)		8
Osteospermum sanctae-helenae	*	2
Portulaca oleracea	*I*	3
Digitaria ciliaris	*I*	4
Opuntia ficus-indica		1
Atriplex semibaccata		3
Carpobrotus edulis (combined		1
Sonchus oleraceus		3
Cyperus polystachyos		1
Lantana camara		1
Ageratum conyzoides		1
Solanum nigrum		1
Nicotiana glauca		1
Lycopersicon esculentum		1
Chrysanthmoides monilifera		1
Conyza bonariensis		1
Bryophytes		
Bryum argenteum	*I*	X
Trichostomum brachydontium	*I*	X
Lichens		
Buellia sp	*I*	X
Caloplaca bolacina	*I*	X
Caloplaca flavovirescens	*I*	X

Caloplaca haemotodes	*I*	X
Dermatiscum pusillum	*	X
Dirinaria applanata	*I*	x(2)
Haematomma fenzlianum	*I*	X
Lecanora sanctae-helenae	*near endemic*	X
Lecidiella buellastrum	*I*	X
Lecidiella chodati	*I*	x(2)
Lepraria pallida	*I*	X
Lepraria usnica	*I*	x(1)
Ochrolechia Africana	*I*	x(1)
Psilolechia lucida	*I*	X
Ramalina sanctae-helenae	*	X
Roccella linearis	*I*	X
Xanthoparmelia molybdiza	*I*	x(2)
Xanthoparmelia pseudocongensis	*I*	x(1)

DG 17 Dry Gut_Lower northern slope above Gill Point **GPS Ref:** E216964.29 N8232572.44
Habitat classification: erosion slope, sparsely vegetated
Altitude: 208m Aspect: south
Slope: 30-45^{o} Layers cover: 1% 4% 20% 1%

Lower scree slope 30-45^{o} which extends east to the cliff face, west to the change in aspect from south facing to south west and north but and bound by DG16 Dry Gut_Upper northern slope above Gill Point.

A dry rocky slope of small rocks with no large boulders, more exposed to the sun that the steeper slope above and less diverse.

The more xeric tolerant species are abundant including *Atriplex semibaccata*, *Eragrostis cilianensis* (i) and *Suaeda fruticosa (i).*

Substrate and Species List

fine grit & dust		5
grit & small stones (1cm-15cm)		8
rock and boulders (15cm-1m+)		5
Suaeda fruticosa	*I*	4
Osteospermum sanctae-helenae	*	2
Portulaca oleracea	*I*	2
Eragrostis cilianensis (live)	*I*	1
Eragrostis cilianensis (dead)	*I*	4
Digitaria ciliaris	*I*	3
Cotula coronopifolia	*i*	1
Opuntia ficus-indica		1
Atriplex semibaccata		5
Carpobrotus edulis (combined		1
Mesembryanthum crystallinum		1
Sonchus oleraceus		1
Solanum nigrum		1
Nicotiana glauca		1
Lycopersicon esculentum		1
Chenopodium murale		1

Chrysanthmoides monilifera		1
Bryophytes		
Bryum argenteum	*i*	X
Weissia sp	*i*	X
Exormotheca pustulosa	*i*	X
Lichens		
Caloplaca flavovirescens	*i*	X
Dermatiscum pusillum	*	X
Heterodermia speciosa	*i*	X
Lecanora suphurescens	*i*	X
Lecidiella chodati	*i*	X
Lepraria usnica	*i*	X
Roccella linearis	*i*	X
Xanthoparmelia molybdiza	*i*	X

DG 18 DGrunwayend **GPS Ref:** E216820.12 N8232701.26

Habitat classification: stony heath

Altitude: 225m Aspect: domed summit plateaux

Slope: 0-5^{o} Layers cover: 1% % 10% 1%

Site and Vegetation Description

A dry and barren site with very few invertebrates despite numerous crevices in the soil between buried rocks. However, a large population of *Eragrostis cilianensis* (i) could provide food for a short-lived invertebrate community when it sets seed. There is also a small population of **Hydrodea cryptantha*. The lichen community was also sparse. The presence of both *Dimelaena oreina* and *D. radiata* was notable, but there were very few colonies of either.

Cat scat observed.

Substrate and Species List

fine grit & dust		5
grit & small stones (1cm-15cm)		7
rock and boulders (15cm-1m+)		8
Hydrodea cryptantha	*	1
Eragrostis cilianensis (combined)	*i*	4
Cotula coronopifolia	*i*	2
Carpobrotus edulis (combined)		3
Sonchus oleraceus		2
Cyperus polystachyos		1
Nicotiana glauca		1
Bryophytes		
Trichostomum brachydontium	*i*	X
Lichens		
Caloplaca flavovirescens	*i*	X
Caloplaca haemotodes	*i*	X

Dermatiscum pusillum	*	X
Dimelaena oreina	*i*	X
Dimelena radiate	*i*	X
Dirinaria applanata	*i*	X
Lecidiella buellastrum	*i*	X
Lecidiella chodati	*i*	X
Lepraria usnica	*i*	X
Ramalina sanctae-helenae	*	X
Xanthoparmelia subramigera	*i*	X

DG 19 Dglichenrunwayend **GPS ref:** E216658.79 N 823670?.19

Habitat classification: inland cliff

Altitude**:** 255m Aspect: south

Site Area: Slope: 0-90^{o}

Layers cover: 1% % 1% 50%

Site and Vegetation Description

View east of cliff site

View westwards of gravely terraces on submit

Close-up of lichen rich cliffs

This east facing cliff site is extremely exposed. It is an unusual weathered landscape that rises in a series of stepped terraces westwards to Bencoolen with flat areas of gravel in between vertical pitted rock outcrops. Vertical rock faces are friable. Vegetation is sparse and found on the erosion slope, gravelly areas and in rock crevices. Indigenous *Eragrostis cilianensis (i)*, *Cotula coronopifolia* (i)

and *Portulaca oleracea* (i) are present but rare. *Carpobrotus edulis* seedlings indicate it is recruiting successfully, if it becomes well established it will smother the rich lichen flora.

This site is amongst the most important for lichens in the Dry Gut area, not only containing a rich community of rare species, but also a very different community from the hotspot on the other side of the valley, Site DG 15 Dry Gut_Boneseed triangle. The two locations combined represent lichen assemblages of considerable conservation value. As with Site DG15, the principle interest comes from the presence of south-facing cliffs with overhangs, which are not dominated by *Ramalina* species. Amongst the most notable species of this site are good populations of *Buellia stellulata*, and *Ochrolechia africana* (some of which had very mis-shapen fruiting bodies and could conceivably be a different, previously unrecorded species), together with the moderately rare endemic, **Roccella sanctae-helenae*. Other species not globally threatened but probably moderately scarce on St Helena are *Diploschistes caesoplumbaeus*, *Enterographa anguinella*, *Opegrapha saxigena*, *Peterjamesia circumscripta*, and *Pyxine petricola*. The overhanging cliffs contain other non-fruiting crustose species which could not be identified. Aside from these sheltered microhabitats, the open flats form a strange and interesting landscape of low terraces, which contain abundant *Ramalina* species on the rocks, but between them are flat, soil-filled areas with excellent populations of the scarce endemic **Dimelaena triseptata*.

Substrate and Species List

grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		5
vertical cliff		8
Portulaca oleracea	*i*	1
Eragrostis cilianensis (combined)	*	1
Cotula coronopifolia	*i*	1
Acacia cyclops		1
Atriplex semibaccata		1
Carpobrotus edulis (combined)		2
Sonchus oleraceus		1
Bryophytes		
Trichostomum brachydontium	*i*	X
Lichens		
Buellia stellulata	*i*	X
Buellia tesserata	*i*	X
Caloplaca flavovirescens	*i*	X
Dimelaena triseptata	*	X
Diploschistes caesoplumbaeus	*i*	X
Dirinaria applanata	*i*	X
Enterographa anguinella	*i*	X
Haematomma fenzlianum	*i*	X
Hafelia leptoclinoides	*i*	X
Lecanora sanctae-helenae	*near endemic*	X
Lecidiella buellastrum	*i*	X
Lecidiella chodati	*i*	X
Lepraria lobificans	*i*	X
Lepraria usnica	*i*	X
Milospium graphideorum	*i*	X
Ochrolechia Africana	*i*	X

Opegrapha saxigena	*i*	X
Parmotrema crinitum	*i*	X
Peterjamesia circumscripta	*i*	X
Psilolechia lucida	*i*	X
Pyxine petricola	*i*	X
Ramalina rigidella	*	X
Ramalina sanctae-helenae	*	X
Roccella sanctae-helenae	*	X
Unidentified species B	*i*	X
Xanthoparmelia pseudocongensis	*i*	X
Xanthoparmelia subramigera	*i*	X

Southern ridge of Prosperous Bay Plain
Descriptions of the topography, geology and habitats of Prosperous Bay Plain are given in Ashmole & Ashmole (2004) and Baker (2010).

The Southern Ridge forms part of the raised plateau, making up three sides of the depression called the Central Basin. The top of the slopes of Dry Gut mark the southern extent of the southern ridge which extends westwards to Bone Gully, the main catchment draining into the Central Basin and eastwards to the south east rim of the Central Basin at Widow Slope (Ashmoles, 2004 site WS12)

The area was initially quartered on foot to define the survey area and identify similar habitat types. Seven areas were initially identified for surveying. The two main gullies draining the Southern Ridge (called here Terminal Samphire Gully and Crescent Gully) into Dry Gut were later identified as providing valuable habitats for native flora and fauna. Creeper Hill was subdivided into smaller defined areas (SR29 & SR30) during surveying and the slope (SR28) dividing SR23 southern ridge Samphire and SR27 southern ridge creeper flat was also included for completeness. These areas are described but were not surveyed in full due to lack of time. The gullies are natural drainage channels that may be used to discharge water arising from the construction site works in which case a more detailed assessment of the vegetation would be advisable prior to construction works.

Southern Ridge Site Descriptions

PBP_SR 19 Southern Ridge_ Terminal Samphire **GPS:** E215829 N8233900
Habitat classification: semi-desert

Altitude:	330m	Aspect: level and very exposed
Sample Area:	3.23ha	Slope: 0
Layers, mean height:	17.45cm: 8.95cm: mm	Layers cover: % 15% 10% 3%
Soil texture:	sand	Soil pH: 4.2-4.5 (3 samples)

Site and Vegetation Description
The site extends immediately west of the dust bowl marked by a single *Acacia cyclops* tree to the base of Creeper Hill and from the main track in the north to the transitional vegetation of the ridge in the south before it falls of into Dry Gut.

A predominantly level and exposed site ridge, probably subject to sea mist, substrate is a fairly even mix of fine dust and gritty soils, small rocks and larger boulders. More sheltered aspect as land slopes gently above the gully in the south west corner. Subsurface horizon, deep fine light brown dust and grit (consolidated dust, now weathering – windblown? forming fine light rounded particles that turn to dust when compressed and produce a very loose open substrate), and small stones with occasional larger boulders to depth greater than 1 m. No obvious subsurface horizons.

Suaeda fruticosa (i) is the dominant vegetation type with plenty of bare ground. There are good populations of *Eragrostis cilianensis* (i) and small populations of annual endemics **Hydrodea cryptantha* and **Chenopodium helenense*. *Amaranthus thunbergii* (i) is rare here. *Atriplex semibaccata* and *Carpobrotus edulis* are frequent and are both actively recruiting. There are good populations of saxicolous lichens.

In the *Suaeda*-dominated areas of the summit plateau, the bare ground between the shrubs is critically important. Not only does it provide good burrowing substrate for invertebrates, but there is plenty of evidence of thin, dry algal crusts. These presumably form in flushes during particularly wet periods (perhaps after prolonged periods of high condensation) and could sustain ephemeral communities of springtails and other small grazing invertebrates for short periods, which lie at the bottom of a food chain. We did not see evidence of this type of community, but it is far too dry to

expect it at the moment. A second ephemeral invertebrate community could emerge in late winter, feeding from the seed of the annual plants which form an abundant flush after the rains.

A night time search of the area confirmed it to be a rich site for native invertebrates, including rare endemic and habitat restricted *Hogna nefasta** (Prowling Wolf Spider), *Trochosippa sp**?*. (Lurking Wolf Spider) and putative burrow mounds of the Mole Spider (*Lycosidae sp*.**?). A daytime walk-over with Basil Read staff gave a rough estimate of over 350 individual mounds across the whole site which were often clustered in small groups within fine gritty areas. However, we don't know how many individuals this equates to because the spiders could produce several burrows per individual. This does however represent a large and significant proportion of the world population.

The area has experienced some compaction damaged caused by vehicle movement and it is likely that *Hogna nefasta* and *Trochosippa sp.* have already been seriously impacted by that. The coverage of Mole spider mounds is extensive across the whole area and it is possible that so far it has been less impacted.

This area shares characteristics with the exposed stony area Site 17 (Ashmoles, 2004a). A good stand of Suaeda for shelter, as well as surface stones combined with open gritty areas, makes this a rich site for invertebrates.

2 wirebirds observed. 2 mice observed.

Substrate and Species List

fine dust		3
fine grit & dust		4
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		5
algal soil crust		1
Suaeda fruticosa	*i*	5
Hydrodea cryptantha	*	1
Portulaca oleracea	*i*	1
Chenopodium helenense	*	1
Amaranthus thunbergii	*subspecies?	1
Eragrostis cilianensis (live)	*	1
Eragrostis cilianensis (dead)	*	2
Opuntia ficus-indica		1
Atriplex semibaccata		4
Attriplex suberecta		1
Carpobrotus edulis (live)		4
Carpobrotus edulis (dead)		2
Mesembryanthum crystallinum		1
Polycarpon tetraphyllum		1
Sonchus oleraceus		1
Tetragonia microptera		1
Bryophytes		
Bryum argenteum	*i*	1

Lichens		
Buellia tesserata	*i*	x(3)
Caloplaca bolacina	*i*	x(2)
Caloplaca flavocitrina	*I*	x(1)
Caloplaca flavovirescens	*i*	x(3)
Candelaria concolor	*i*	x(1)
Chrysothrix xanthina	*i*	x(1)
Dimelaena oreina	*i*	x(2)
Dirinaria applanata	*i*	x(3)
Endocarpon pallidum	*i*	x(3)
Flavoparmelia soredians	*i*	x(1)
Haematomma fenzlianum	*i*	x(1)
Hafelia leptoclinoides	*i*	x(1)
Heterodermia speciosa	*i*	x(3)
Hyperphyscia granulata	*i*	x(2)
Lecanora sanctae-helenae	*near endemic*	x(2)
Lecidiella buellastrum	*i*	x(1)
Lecidiella chodati	*i*	x(1)
Lepraria lobificans	*i*	x(1)
Ramalina sanctae-helenae	*	x(1)
Teloschistes flavicans	*i*	x(3)

Table of 2 x 2 m quadrat survey data

	Q1	Q2	Q3	Q4	Q5	Q6
exposed weathered outcrop						
fine dust	4					5
fine grit & dust			7	5	6	
grit & small stones (1cm-15cm)	5	6	3	3	4	4
rock and boulders (15cm-1m+)	5	4	2	5	4	5
vertical cliff						
algal soil crust	1			1		
[i]*Sueada fruticosa*	6	4	5			8
Atriplex semibaccata (live)		2	5	5	5	
Atriplex semibaccata (dead)					5	
Carpobrotus edulis(live)	3	6	2	5		3
Carpobrotus edulis (dead)		4		5		
**Eragrostis cilianensis* (dead)	1		5	3		1
**Eragrostis cilianensis* (live)		1	2			
Tetragonia micoptera			1	2		
**Chenopodium helenense*			1			
Mesembryanthum crystallinum	1		1		1	
Polycarpon tetraphyllum					1	
Sonchus oleraceus					1	

PBP_SR20 Southern Ridge_Terminal Gully

This site was not surveyed but was identified as important habitat during a site walk-over. An erosion gully draining from Creeper Hill and the PBP_SR19 Southern Ridge terminal samphire. A

Creeper dominated area with good examples of lichen boulder and rock outcrop. Over 60 *Barn fern growing amongst the rocks of the eastern lichen covered rocky gully rim and two clumps of Neglected Sedge, **Bulbostylis neglecta* on the western lichen rich rocky rim. *Amaranthus thunbergii* (i) and *Portulaca oleracea* (i) also present. *Acacia cyclops* on rocky south slope, attracting seed eating birds. *Acacia cyclops* seed found on PBP_SR19 Southern Ridge_terminal samphire. It is apparent that this species although rare across PBP and Dry Gut is spreading through dispersal by birds.

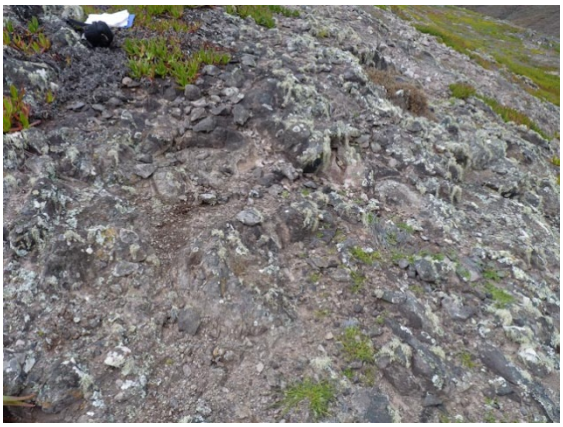
Gullies provide a variety of habitats quite distinct from the upper plateau and slopes below.

The extent of cut for the fill in Dry Gut will extend close to this area and the gully could be used to drain water from the Terminal buildings into Dry Gut. There is therefore likely to be an impact on this site from construction. The extent of the impact will need to be determined when the detailed design is available. Enforcing surface water pollution standards will be very important and controlling the spread of undesirable and habitat modifying *Carpobrotus edulis* and *Acacia cyclops* and other priority alien species. This is a good site for habitat enhancement.

PBP_SR21 Southern Ridge_Creeper Hill **Grid Ref:** E215645 N8233903
Habitat classification: Creeper waste with rocky areas
Altitude: 308m Aspect: south south east
Slope: variable 0-5-45-90^{o}
Sample Area: 0.29ha Layers cover: % % 50% 15%

Site and Vegetation Description






This is the highest ground on the Southern Ridge. The area surveyed included the south (as far as the lower terrace which is a transitional area before the creeper dominated rocky slope of Dry Gut) and

eastern slope (extending to PBP_SR19_Terminal Samphire) and the summit. The sheltered and lower northern slopes are much more depauperate and probably disturbed and the west slope has been quarried.

The rocky knoll has a combination of deep gritty soils - consolidated dust, now weathering – windblown? forming fine light rounded or cylindrical particles that turn to dust when compressed and produce a very loose open substrate, like that of PBP_SR23_Southern Ridge Creeper and areas of PBP_SR19_Southern Ridge_Terminal Samphire but with more organic matter; boulder slope and exposed rock creating a variety of small but rich habitats – vertical cliff, overhangs, rocky slope with south easterly and south, south westerly aspects. The area is being actively encroached by Creeper. Whilst the vascular flora is poor, dominated as it is by Creeper, the exposed rock and boulders hold a surprisingly rich diversity of lichens and bryophytes, including an unidentified white crusting lichen, an isidiate *Parmotrema* species, *Lecanographa farinentula*, a *Graphis* sp., *Dirnia insularis*, *Cladonia marioni* and the liverwort *Frullania depressa*, which we haven't recorded from any other site in the study and is rare in dryland parts of St Helena.

Deep fine windblown soil has built up on the eastern slope and there were a number of Mole Spider, *** Lycosidae?* burrow mounds.

Substrate and Species List

fine dust		1
fine grit & dust		4
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		5
exposed weathered outcrop		1
vertical cliff		1
Eragrostis cilianensis (live)	*	1
Eragrostis cilianensis (dead)	*	2
Atriplex semibaccata		1
Carpobrotus edulis (live)		5
Carpobrotus edulis (dead)		5
Mesembryanthum crystallinum		1
Polycarpon tetraphyllum		1
Sonchus oleraceus		1
Coronopus didymus		1
Bryophytes		
Bryum argenteum	*i*	x(1)
Trichostomum brachydontium	*i*	x(1)
Frullania depressa	*i*	x(1)
Lichens		
Buellia sp	*i*	x(2)
Buellia stellulata	*i*	x(1)
Caloplaca flavovirescens	*i*	x(1)
Candelaria concolor	*i*	x(1)
Cladonia marioni		x(1)
Dermatiscum pusillum	*	x(1)
Dimelaena triseptata	*	x(1)
Diploschistes prominens	*i*	x(1)
Dirinaria applanata	*i*	x(2)

Dirnia insularis		x(1)
Endocarpon pallidum	*i*	x(1)
Flavoparmelia soredians	*i*	x(2)
Graphis sp	*i*	x(1)
Haematomma fenzlianum	*i*	x(1)
Hafelia leptoclinoides	*i*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(2)
Lecidiella chodati	*i*	x(2)
Lepraria pallida	*i*	x(1)
Lepraria usnica	*i*	x(1)
Ochrolechia africana	*i*	x(1)
Parmotrema reticulatum	*i*	x(2)
Physcia sorediosa	*i*	x(1)
Psilolechia lucida	*i*	x(1)
Ramalina arabum	*i*	x(1)
Ramalina geniculatella	*	x(1)
Ramalina rigidella	*	x(1)
Ramalina sanctae-helenae	*	x(3)
Roccella linearis	*i*	x(1)
Teloschistes flavicans	*i*	x(2)
Unidentified species G (white crust black dots)		x(1)
Xanthoparmelia pseudocongensis	*i*	x(2)
Xanthoparmelia subramigera	*i*	x(2)

Table of 2 x 2 m quadrat survey data

	Q1	Q2	Q3	Q4	Q5
exposed weathered outcrop				1	
fine dust				4	
fine grit & dust (including silt?)	6	1	5	5	7
grit & small stones (1cm-15cm)	4	5	4	5	7
rock and boulders (15cm-1m+)	5	5	4	7	5
vertical cliff					
algal soil crust					
Sueada fruticosa					
Atriplex semibaccata (live)				1	
Atriplex semibaccata (dead)					
Carpobrotus edulis(live)	1	6	6	3	4
Carpobrotus edulis (dead)	5	6	5	3	4
Eragrostis cilianensis (dead)			1	3	
Eragrostis cilianensis (live)	2			1	1
Tetragonia micoptera					
Chenopodium helenense					
Mesembryanthum crystallinum	1				
Polycarpon tetraphyllum				2	
Sonchus oleraceus				1	
Coronopus didymus				1	

PBP_SR 22 Southern Ridge_Quarry Samphire **GPS Ref:** E215536 N8233963

Habitat classification: semi-desert

Altitude: 310m Aspect: plateau

Site Area: 2.58ha Slope: 0-5

Layers: mean height samphire:15.6cm: creeper 10.9cm Layers cover 1% 25% 5% 3%

Soil texture: sandy loam/loamy sand pH: 3.9-7.5 (5 samples)

Site and Vegetation Description

This is a *Suaeda* dominated area with lots of bare ground that lies immediately west of the highest point on the southern ridge 'Creeper Hill' and east of the creeper dominated area mid-ridge. The site straddles the ridge sloping gently (5^{o}) to the south east towards Dry Gut. The north and western extent of the site may contribute to the small gully draining into the Central Basin.

The topography creates variable conditions across the site, exposed ground to the south is subject to higher winds and moisture, behind which *Suaeda* accretes soil particles, creating mounds and ridges whilst sheltered conditions are created in the lee of Creeper Hill. The underlying geology mixed with human disturbance and the possibility that at least part of the site was used by seabirds has led to a variable substrate. The site has been significantly disturbed in the past by quarrying activity and more recently criss-crossed by vehicle tracks to support construction activity: drilling and positioning of marker posts. Quarrying activity on the west face of the high point identified as 'Creeper Hill' has led to the loss of vegetation and soil structure, leaving behind barren eroded depressions of fine dust, blue/purple, coloured by the dominant rock minerals. The presence of a pale yellow white grit and rock was thought to have arisen from old seabird guano. A sample of rock taken for analysis had a phosphorus content of 10,980mg/kg compared to 5,890mg/kg the average for site SR22 and 4,200mg/kg the average for all the other sites combined.

Substrate is a combination of fine dusty areas, areas of stony ground with small surface rocks and degraded erosion areas. Soil profile: the dust is to depths greater than 50cm, consistent dust and fine grit undispersed with small stones; a slight variation in character of the profile in the stony ground which has larger stones and rocks. Soil texture and pH of soils is also variable across the site and sodium content was the highest for all the sites of the southern ridge.

Not a rich site for lichens but there is a small, undisturbed area with abundant lichen soil crusts formed from at least 3 species (2 *Endocarpon* and one or more *Caloplaca* spp.). Such habitat is extremely rare across the survey area as a whole, but indicates that much more extensive soil crusting communities may have existed previously in the absence of human disturbance and the spread of invasive creeper. Saxicolous species are thinly distributed on the larger rocks, and include **Dimelaena triseptata*.

Whilst open *Suaeda* (i) scrub is the predominant vegetation there is active recruitment of creeper and other non-native species, more typical of disturbed areas. Annual endemic **Hydrodea cryptantha* is present in low numbers in the dust and gritty areas closest to the main track and can be seen germinating in vehicle tracks, where the compact soils either help to channel or retain water. *Tetragonia microptera* was observed frequently across the site; whilst numbers are still low, it is recruiting. This species has only recently been recorded from St Helena, possibly only arriving in the last 40 years (Lambdon and Darlow, 2008). It is now well established in PBP and Dry Gut and the speed of establishment indicates that this is a species where control on its spread is likely to be required.

More animals than might be expected considering this is such a disturbed site. Likely that the good stands of *Suaeda* important here together with the variety of substrates with places to hide and burrow. Scopula separata moths frequently observed flying around *Suaeda*. A small green caterpillar

mimicking the samphire leaves was also present – this was commonly found on *Suaeda* at all sites where Suaeda was present. The wasp *Podalonia canescens* (2) seen actively hunting. Non-native and predatory species were common. This included *Scolependra mortisans* (8), gecko (3) (*Hemidactylus frenatus*? Java or Asian house gecko? (The assumption on the island seems to be that the specimens in wild areas are a dark morph of the Java house gecko, presumably induced by the conditions. The Ashmoles don't mention a dark morph, and they look longer-snouted and more scaly-backed. Reptiles have been poorly-studied locally and we are not sure anyone has ever scientifically confirmed the identity? If not, it should really be checked. There is apparently a 3rd, as yet undetermined species living relatively commonly on Ascension which has never been studied). S*teatoda capensis* under rocks. At night the cockroach *Afrobalta decellei* was very common on *Atriplex semibaccata.*

2 wirebirds observed in the area and enjoying the ridge over Dry Gut for soaring.

Mice and rabbits present. Cat scat observed. Geckos common her, three observed during day time search and 3 at night.

Dumped metal waste present.

At night light shine from vehicle headlights revealed dust deposits on plants adjacent to the track. This deposition is primarily due to vehicular movement and possibly also from test drilling operations. Aggregate has been deposited on the track. When construction works get underway dust suppression will be required and levels and impact of dust will need to be monitored.

Substrate and Species List

fine dust		5
fine grit & dust		3
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		1
Suaeda fruticosa	*i*	6
Hydrodea cryptantha	*	1
Portulaca oleracea	*i*	1
Eragrostis cilianensis (live)	*	2
Eragrostis cilianensis (dead)	*	2
Opuntia ficus-indica		1
Acacia cyclops		1
Atriplex semibaccata		2
Attriplex suberecta		1
Carpobrotus edulis (combined		3
Mesembryanthum crystallinum		1
Sonchus oleraceus		1
Lantana camara		1
Tetragonia microptera		1
Chenopodium murale		1
Coronopus didymus		1
Bryophytes		
Bryum argenteum	*i*	x(1)
Lichens		
Amandinea lecideina	*i*	x(2)
Buellia althaea	*i*	x(1)

Buellia tesserata	*i*	x(3)
Caloplaca bolacina	*i*	x(1)
Caloplaca flavocitrina	*i*	x(1)
Caloplaca flavovirescens	*i*	x(2)
Chrysothrix xanthina	*i*	x(1)
Dimelaena oreina	*i*	x(1)
Dimelaena triseptata	*	x(1)
Diploschistes prominens	*i*	x(1)
Endocarpon pallidum	*i*	x(1)
Endocarpon pusillum	*i*	x(1)
Hafelia leptoclinoides	*i*	x(1)
Heterodermia speciosa	*i*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(1)
Lecanora suphurescens	*i*	
Lecidiella buellastrum	*i*	x(1)
Lecidiella chodati	*i*	x(1)
Parmotrema grayianum	*i*	x(1)
Parmotrema reticulatum	*i*	x(2)
Ramalina sanctae-helenae	*	x(1)
Rinodina oxydata	*i*	x(2)
Unidentified species C (Parmotrema sp.)	*i*	x(2)
Unidentified species E	*i*	x(1)
Xanthoparmelia molybdiza	*i*	x(1)

2x2m random quadrat survey data

	Q1	Q2	Q3	Q4	Q5
exposed weathered outcrop					
fine dust		5	4		8
fine grit & dust (including silt?)	5			8	
grit & small stones (1cm-15cm)	5	3	7	3	5
rock and boulders (15cm-1m+)		2			
vertical cliff					
algal soil crust					
[i]*Sueada fruticosa*	4	8	7	6	4
Atriplex semibaccata (live)	2	1		2	1
Atriplex semibaccata (dead)					
Atriplex suberecta	2				
Carpobrotus edulis(live)		1			4
Carpobrotus edulis (dead)		1			
Eragrostis cilianensis (dead)	5			2	5
Eragrostis cilianensis (live)	5	1		2	3
Tetragonia micoptera	1	4		1	3
**Chenopodium helenense*					
Mesembryanthum crystallinum		1		1	
Polycarpon tetraphyllum					
Sonchus oleraceus				1	
Coronopus didymus	1				
Lepridium africanus					
Opuntia ficus indica					1

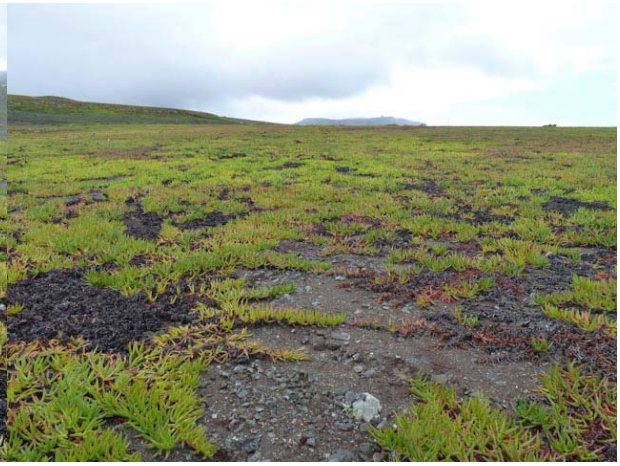
PBP_SR23 Southern Ridge_Creeper **GPS Ref:** E215402 N8234052

Habitat classification: creeper waste
Altitude: 310m
Site Area: 2.76
Layers: mean height creeper 11.1cm
Soil texture: sand

Aspect: ridge top plateau
Slope: 0
Layers cover % % 90% %
pH: 4.4-5.4 (3 samples)

Site and vegetation description

Northern extent looking west, northwest



Southern extent looking west,northwest

Deep fine grit interspersed with small stones and rocks. Very few surface rocks of any size, none bigger than 0.5 m diameter. Grit formed of fine light rounded or cylindrical particles (turning to dust when compressed) that produce a very loose open substrate. Below the bleached surface, small horizon (10 cm of darker soils bounded by roots of creeper) has humus content, and below this the grit is very uniform pale grey brown to depth (well below 1 m) with small stones and boulders distributed throughout. This is the type of soil found across much of the southern plateau (including Ashmoles site PBP 17 Plateau Trig Point, site north of Bradleys (described in the ES) and southern ridge creeper – described below). These sites which are far less encroached by *Carpobrotus edulis* and support far richer flora and fauna and give an indication of how much is lost to the spread of creeper.

This site contains the lowest plant diversity of all the sites surveyed. Creeper provides a near complete carpet across the area, what few surface rocks remain are in the process of being smothered. With very little bare ground or rock cover lichen diversity and abundance is also very low. The few species left holding on are all that is left from would undoubtedly have been much more diverse flora. Creeper grows and dies back, at this site live and dead creeper are fairly equal in their coverage and together formed 90% of the ground cover. The proportion of cover of live to dead creeper is probably important for Wirebirds. High proportions of dead creeper, like bare patches between the creeper provide areas for Wirebirds to feed. Two were seen frequently foraging in the area during the study. Wirebirds can tolerate creeper, and will use creeper debris to cover nests, but when it becomes too dense it does not support good breeding or presumably feeding habitat.

Invertebrate diversity at this site is low, it is not nearly as rich as the *Suaeda* dominated areas and is dominated by non-native species, including worrisome predators: *Scolependra mortisans* (3) and geckos (3). The area supports populations of native species: Salticid spiders, blackflies and tineid moths were observed and collected. The high production rate and ground coverage provided by creeper litter might provide good feeding for detritivores and those that hunt them.

2 Wirebirds foraging (3/7/12). Three geckos under a rock.

Substrate and Species List

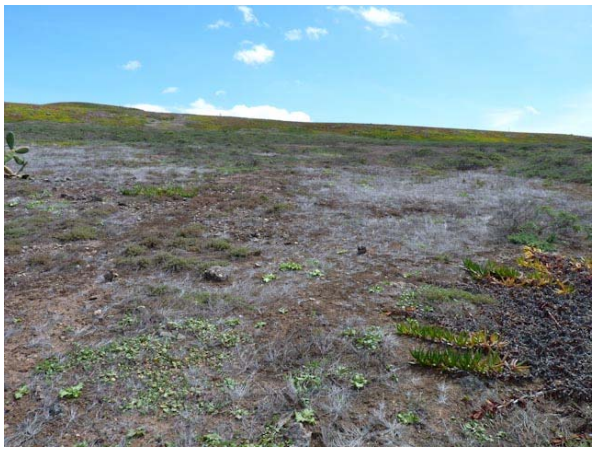
fine grit & dust		4
grit & small stones (1cm-15cm)		4
rock and boulders (15cm-1m+)		3
Suaeda fruticosa	*i*	1
Amaranthus thunbergii	**subspecies?*	1
Opuntia ficus-indica		1
Carpobrotus edulis (live)		7
Carpobrotus edulis (dead)		7
Polycarpon tetraphyllum		1
Lichens		
Buellia althaea	*i*	x(1)
Buellia tesserata	*i*	x(1)
Caloplaca flavovirescens	*i*	x(1)
Dirinaria applanata	*i*	x(2)
Hafelia leptoclinoides	*i*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(2)
Psilolechia lucida	*i*	x(1)
Ramalina sanctae-helenae	*	x(1)
Roccella linearis	*i*	x(1)

2x2m random quadrat survey data

	Q1	Q2	Q3	Q4	Q5
exposed weathered outcrop					
fine dust					
fine grit & dust (including silt?)	4	3	5	2	4
grit & small stones (1cm-15cm)	2	4	5	2	4
rock and boulders (15cm-1m+)			4	4	5
vertical cliff					
algal soil crust					
Sueada fruticosa					
Atriplex semibaccata (live)					
Atriplex semibaccata (dead)					
Carpobrotus edulis(live)	8	7	7	7	7
Carpobrotus edulis (dead)	6	7	7	7	7
Eragrostis cilianensis (dead)	1				
Eragrostis cilianensis (live)					

PBP_SR24 Southern Ridge_Samphire **GPS Ref:** E 215296 N 8234117
Habitat classification: semi-desert
Altitude**:** 320m Aspect: plateau
Site Area: 1.22 ha Slope: 0
Layers: mean height samphire 48.7cm: (creeper, Eragrostis & Mesembryanthemum) 7.2cm
Layers cover 1% 50% 10% 3%
Soil texture: Sand/loamy sand pH: 6.5-6.7 (2 samples)

Site and vegetation description



This is a level *Suaeda* (i) dominated area with a mixture of fine dust and grit with small surface rocks and the rare larger rock. Subsurface horizon light orange brown, fine dust with a few small stones, combination of fine light rounded or cylindrical particles (turn to dust when compressed) and dust that produces a very loose open substrate this is deep in some places >1m but in others it is more rocky and difficult to dig to depth beyond 20cm.

A sheltered dry dusty site at the base of the narrow slope leading to a higher platform to the west. *Suaeda* growth here is bushy and shrub-like. The access road cuts through the northern edge of the area where deep ruts of fine dust and grit have formed. Dust deposits on plants either side of the track are evident.

A small patch of grass, of uncertain identity, was observed occupying about a 3 x1 m stretch alongside and within the old vehicle track. Samples are being grown on for identification as it was not possible to do so without flowers. It is most likely that this species has been introduced into the area associated with vehicle movements (or animal movement – donkeys and cattle dung seen in Bencoolen view?). It has not been seen anywhere else on the Plain. The introduction and potential establishment of new species in to the area could pose serious risks to native biota and is one that needs to be managed well to avoid future problems.

We found the introduced *Steatoda* capensis under rocks. This species is thought to hail from South Africa, it's also well established in New Zealand (shipping routes!). The Ashmoles (Ashmole and Ashmole 2004b) referred to reports that *S. grossa* preys on Black Widows to which it bears some resemblance. *Steatoda* was also found at PBP_SR22 Southern Ridge_Samphire quarry and PBP_SR19 Southern Ridge_terminal samphire. It is interesting to note that no Brown Widows have been observed during the course of the survey, although a few potential widow webs were found in Dry Gut.

Dead shells of both *Helix asper* and *Succinea sanctae-helenae* were abundant here, in one of the 2m x 2m quadrats they formed a notable proportion of the ground cover (<4% several individuals).

Solitary wasp, *Podolonia canescens*. Ants, woodlice and button worms.

Mice very common – 5 observed

Substrate and Species List

fine dust		4
fine grit & dust		4
grit & small stones (1cm-15cm)		4
rock and boulders (15cm-1m+)		2
algal soil crust		3
Suaeda fruticosa	*i*	7
Amaranthus thunbergii	**subspecies?*	1
*Eragrostis cilianensis (combined)**		3
Gramineae sp[2]		1
Opuntia ficus-indica		1
Atriplex semibaccata		3
Carpobrotus edulis (combined		3
Mesembryanthum crystallinum		3
Sonchus oleraceus		1
Tetragonia microptera		1
Lepidium africanus		1
Pennisetum clandestinum		1

Bryophytes		
Bryum argenteum	*i*	x(1)
Weissa sp.	*I*	x(1)

2x2m random quadrat survey data

	Q1	Q2	Q3	Q4	Q5
exposed weathered outcrop					
fine dust	4	5			4
fine grit & dust (including silt?)			3	5	
grit & small stones (1cm-15cm)	4	8	4	2	3
rock and boulders (15cm-1m+)			3	2	2
vertical cliff		1			
algal soil crust	5			1	7
[i]*Sueada fruticosa*	8	3	5	9	
Atriplex semibaccata (live)	5				3
Atriplex semibaccata (dead)					
Carpobrotus edulis(live)			3	2	2
Carpobrotus edulis (dead)			5	1	
**Eragrostis cilianensis (dead)*				2	7
**Eragrostis cilianensis (live)*			4		1
Tetragonia micoptera	2				5
**Chenopodium helenense*					
Mesembryanthum crystallinum	7	5		1	
Polycarpon tetraphyllum					
Sonchus oleraceus			1		1
Coronopus didymus					

[2] UTM 30L E215817 N 823697

	Q1	Q2	Q3	Q4	Q5
Lepridium africanus		1			1

PBP_SR25 Southern Ridge_Cresent gully

This site was only partially surveyed due to time constraints however because it was identified as important habitat during a site walk-over and because the gully and is likely to provide a natural drainage channel for water from the construction site. Provisional surveying was carried out.

This is a broad, deep gully draining from the Southern Ridge into Dry Gut. A very distinct erosion slope has formed leading to the gully from Southern Ridge Terminal Samphire, the ground looks scoured and it is possible that surface rock collection has exacerbated the erosion here. The lush sheltered upper gully basin is dominated by creeper which is actively regenerating across the whole area. The drier and lower rocky erosion slopes have good populations of annuals including *Eragrostis cilianensis (i), Amaranthus thunbergii (i),* and *Portulaca oleracea (i)*. A few small clumps of Barn fern **Ceterach haughtonii* were found growing amongst the rocks of the eastern lichen covered rocky gully rim. *Acacia cyclops* on rocky east slope, attracting seed eating birds. Seedlings found in amongst the rock crevices above. *Opuntia ficus indica* occasional. *Suaeda* predominant on the drier west slope and base of the gully.

Good populations of lichens on eastern rocky rim.

A variety of habitats, including rocky slope, cliff and overhangs with erosion slopes with plenty of soil pockets and bareground. A good area for invertebrates: amongst the notable native and endemic species, **Scopula separata*, ***Mellisius* sp.,(grub and dead), ***Primnia sanctaehelenae*, *Creontiades pallidus*, and **Anthicodes fragilis*. Gullies provide a variety of habitats quite distinct from the upper plateau and slopes below. Notable non-natives found include *Scolependra mortisans* and *Agrotis ipsilon* (cutworm). Woodlice and cockroaches (*Euthyrrhapha pacifica* and *Periplaneta australasiae*) common.

This is a rich site that could be impacted as a result of the construction of the works site. Enforcing surface water pollution standards will be very important and controlling the spread of undesirable and habitat modifying *Carpobrotus edulis* and *Acacia cyclops* and other priority alien species. This is a good candidate site for habitat enhancement.

PBP_SR26 Southern Ridge_BencoolenView **GPS Ref:** E215192 N 8233989

Habitat classification: semi-desert
Altitude: 320m Aspect:
Site Area: 1.46ha Slope: 0
Layers: mean height samphire 23cm: (Creeper, Mesembryanthemum, Atriplex) 8.4cm
Layers cover % 30% 20% 5%
Soil texture: sandy loam/loamy sand pH: 4.5-6.6 (3 samples)

Site and Vegetation Description

This area is south west of PBP_SR24 Southern Ridge_Samphire, it is an extension of the southern plateau before sloping off into Dry Gut. This site was included in the study, because it is not expected to be directly impacted by the construction and as a comparison between the 3 other *Suaeda* dominated areas that will be. This is a gently sloping (0-5^{o}) site to the south east.

Fine orange brown soils non to superficial organic material and weathered subsurface horizons, with small stones and rocks. The bare ground between the shrubs commonly had thin, dry algal crusts covering its surface.

Vehicle track through the area.

An exposed and eroded site, depauperate with floristic composition typical of more disturbed and degenerating areas with predominance of non natives. First record of *Leonotis* on PBP. Needs eradicating immediately.

Poor in lichens. Very few surface stones or rocks.

Rabbits present.

Substrate and Species List

fine dust	6
fine grit & dust	3

grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		1
algal soil crust		4
Suaeda fruticosa	*i*	6
Portulaca oleracea	*i*	1
Eragrostis cilianensis (combined)	*	4
Opuntia ficus-indica		1
Atriplex semibaccata		2
Attriplex suberecta		1
Carpobrotus edulis (combined		4
Mesembryanthum crystallinum		3
Sonchus oleraceus		1
Tetragonia microptera		2
Chenopodium murale		1
Leonotis nepetifolia		1
Lepidium africanus		1

Table of 2 x 2 m quadrat survey data

	Q1	Q2	Q3	Q4	Q5
exposed weathered outcrop					
fine dust		5	7	9	6
fine grit & dust	8	4			
grit & small stones (1cm-15cm)	3	6	7	4	5
rock and boulders (15cm-1m+)					
vertical cliff					
algal soil crust		6	6	3	6
Sueada fruticosa	7		5		8
Atriplex semibaccata (live)	1	3			
Atriplex semibaccata (dead)					
Carpobrotus edulis(live)	4	5	2		
Carpobrotus edulis (dead)					
Eragrostis cilianensis (dead)					
Eragrostis cilianensis (live)	3	6	5	3	1
Tetragonia micoptera					
Chenopodium helenense					
Mesembryanthum crystallinum	3	3	2	3	1
Polycarpon tetraphyllusm					
Sonchus oleraceus		1	1		
Coronopus didymus					
Portulaca oleracea		1			
Atriplex suberecta				3	

PBP_SR 27 Southern Ridge Creeper Flat **GPS Ref:**

Habitat classification: creeper waste

Altitude**:** 362m | Aspect: south east

Site Area: ha | Slope: 5°

Site and vegetation description

This is a gently sloping (0-5°) site to the south east immediately east of the hillock marking south eastern extent of Bone Gully. The site extends south east towards Bencoolen View, stopping at the top of slope, and east towards southern ridge samphire, again stopping at the top of the shallow slope before it steps down to the lower ridge plateau. The site extends northwards, along the eastern rim of Bone Gully towards the Central Basin, stopping at the top of the slope before it drops to a lower level.

The site has a combination of eroded mineral soil, caused by water run-off west to east from the Bone Gully hillock which has formed a visible wide erosion channel. Some dust and gritty soils and small stones with soil crusting lichens are colonising bare soils. Very few surface stones of any size. Poor in lichens.

Vehicle tracks through the area.

An eroded site, depauperate with floristic composition typical of more disturbed and degenerating areas with predominance of non natives. *Carpobrotus edulis* and *Mesembryanthemum crystallinum* actively recruiting.

As this is a site that will be highly disturbed during the construction period any surface rocks should be picked up and moved to a safe site for post construction reinstatement.

Wirebird feeding in the area.

2 Myna birds

Blushing snail and *Helix asper* common.

Substrate and Species List

fine grit & dust		5
grit & small stones (1cm-15cm)		4
rock and boulders (15cm-1m+)		1
Suaeda fruticosa	*i*	3
Portulaca oleracea	*i*	1
Eragrostis cilianensis live		1
Eragrostis cilianensis dead	*	2
Opuntia ficus-indica		2
Atriplex semibaccata		3
Attriplex suberecta		1
Carpobrotus edulis (live)		7
Carpobrotus edulis (dead)		5
Mesembryanthum crystallinum		3
Sonchus oleraceus		1
Tetragonia microptera		1
Chenopodium murale		1

Bryophytes

Bryum argenteum	*i*	x(1)
Lichens		
Buellia sp	*i*	x(1)
Caloplaca flavovirescens	*i*	x(1)
Candelaria concolor	*i*	x(1)
Dirinaria applanata	*i*	x(1)
Haematomma fenzlianum	*i*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(1)
Lecidiella chodati	*i*	x(1)
Lepraria usnica	*i*	x(1)
Parmotrema reticulatum	*i*	x(2)
Ramalina sanctae-helenae	*	x(1)
Roccella linearis	*i*	x(1)
Teloschistes flavicans	*i*	x(1)

PBP_SR28 Southern Ridge Creeper Slope

Narrow strip of steep slope between the higher ground of the western edge of the southern ridge and the lower ground - middle (saddle). Dominated by creeper but with some good lichen populations on rocky outcrops and boulders which are still exposed (not engulfed in creeper).

Shells of *Succinea* and *Helix* common.

Substrate and Species List

fine grit & dust		4
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		3
Suaeda fruticosa	*i*	1
*Eragrostis cilianensis (combined)**		2
Atriplex semibaccata		2
Attriplex suberecta		2
Carpobrotus edulis (combined)		9
Sonchus oleraceus		1
Chenopodium murale		1
Lepidium africanus		1
Coronopus didymus		1
Opuntia ficus- indica		1

Bryophytes		
Weissa sp.	*I*	x(1)
Lichens		
Buellia sp	*i*	x(1)
Caloplaca flavovirescens	*i*	x(1)
Candelaria concolor	*i*	x(1)
Dirinaria applanata	*i*	x(1)
Flavoparmelia soredians	*i*	x(1)
Haematomma fenzlianum	*i*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(1)
Lecidiella chodati	*i*	x(1)
Lepraria usnica	*i*	x(1)

Ochrolechia africana	*i*	x(1)
Parmotrema sp. (x2 sp)	*i*	x(2)
Ramalina arabum	*I*	x(1)
Ramalina sanctae-helenae	*	x(2)
Roccella linearis	*i*	x(1)
Teloschistes flavicans	*i*	x(1)
Xanthoparmelia pseudocongensis	*i*	x(1)
Xanthoparmelia subrameigra	*i*	x(1)

PBP_SR 29 Creeper Hill north

Substrate and Species List

fine dust		4
grit & small stones (1cm-15cm)		5
rock and boulders (15cm-1m+)		1
vertical cliff		2
Suaeda fruticosa	*i*	4
Eragrostis cilianensis (live)	*	1
Eragrostis cilianensis (dead)	*	2
Atriplex semibaccata		1
Carpobrotus edulis (live)		7
Carpobrotus edulis (dead)		5
Opuntia ficus-indica		1
Soncus oleraceus		1
Bryophytes		
Bryum argenteum	*i*	x(1)
Lichens		
Buellia sp	*i*	x(2)
Caloplaca flavovirescens	*i*	x(1)
Candelaria concolor	*i*	x(1)
Dimelaena triseptata	*	x(1)
Dirinaria applanata	*i*	x(1)
Flavoparmelia soredians	*I*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(1)
Lecidiella chodati	*i*	x(2)
Parmotrema reticulatum	*i*	x(2)
Ramalina sanctae-helenae	*	x(3)
Teloschistes flavicans	*I*	x(1)
Xanthoparmelia pseudocongensis	*i*	x(2)

PBP_SR 30_Creeper Hill Quarry Slope
Erosion slope with some semi-desert.

Highly disturbed site due to former quarrying activity. Small triangle of reasonable quality samphire dominated semi-desert on the north and west of creeper hill alongside the main vehicle track which is frequented by Wirebirds.

Creeper actively recruiting.

Myna birds using Nicotiana as an observation perch. Canaries –associated with Acacia.

Mouse observed.

Substrate and Species List

fine dust		4
fine grit & dust		4
grit & small stones (1cm-15cm)		7
rock and boulders (15cm-1m+)		3
vertical cliff		2
Suaeda fruticosa	*i*	4
Eragrostis cilianensis (live)	*	1
Eragrostis cilianensis (dead)	*	2
Acacia cyclops		1
Atriplex semibaccata		3
Carpobrotus edulis (combined)		5
Mesembryanthum crystallinum		3
Nicotiana glauca (live)		1
Nicotiana glauca (dead)		2
Opuntia ficus-indica		1

Bryophytes		
Bryum argenteum	*i*	x(1)

Lichens		
Buellia sp	*i*	x(2)
Caloplaca flavovirescens	*i*	x(1)
Candelaria concolor	*i*	x(1)
Lecanora sanctae-helenae	*near endemic*	x(1)
Lecidiella chodati	*i*	x(2)
Parmotrema reticulatum	*i*	x(2)
Ramalina sanctae-helenae	*	x(3)
Xanthoparmelia subramigera	*i*	x(2)

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Table of soil sample results

Lab No	Sample Ref	Texture	pH	Resistance	Acidity	Ca	Mg	Na		K	T-value	P	C	Sand	Silt	Clay	Ammonium N
			(KCl)	(ohm)	(cmol/kg)	(cmol/kg)	(cmol/kg)	(mg/kg)	(%)	(mg/kg)	(cmol/kg)	(mg/kg)	(%)	(%)	(%)	(%)	%
PS/12/03643	SR19-01-0712	Sand	4.3	290	5.71	18.64	6.74	2428	-	1302	44.98	3857	3.67	93	2	5	0.27
PS/12/03644	SR19-02-0712	Sand	4.2	40	7.86	13.14	7.41	5430	-	2140	57.49	4991	4.29	93	2	5	0.34
PS/12/03645	SR19-03-0712	Sand	4.5	50	5.06	34.63	7.98	4121	-	1605	69.69	5693	2.73	87	6	7	0.23
PS/12/03646	SR22-01-0712	Loamy sand	3.9	10	6.09	9.71	7.09	6853	-	1459	56.42	4700	2.77	81	10	9	0.25
PS/12/03647	SR22-02-0712	Sandy loam	6	10	-	25.22	21.79	13855	-	2155	112.77	8838	0.99	79	10	11	0.1
PS/12/03648	SR22-03-0712	Sandy loam	4.2	10	5.65	9.68	10.15	10293	-	1952	75.22	6003	2.5	77	12	11	0.23
PS/12/03649	SR22-04-0712	Loamy sand	7.5	10	-	19.9	20.3	8583	-	2436	83.76	4797	1.35	79	12	9	0.15
PS/12/03650	SR22-05-0712	Loamy sand	6.2	50	-	14.86	6.51	6085	-	2118	53.25	5115	0.9	83	8	9	0.12
PS/12/03651	SR23-02-0612	Sand	4.4	130	5.16	20.36	4.63	2072	-	799	41.2	3499	5.15	93	2	5	0.31
PS/12/03652	SR23-01-0712	Sand	5.4	80	1.69	21.87	7.8	2405	-	1978	46.88	3124	4.95	93	2	5	0.35
PS/12/03653	SR23-03-0712	Sand	4.7	40	3.33	25.71	9.82	3140	-	1412	56.12	4174	6.01	89	4	7	0.47
PS/12/03654	SR24-01-0712	Sand	6.5	160	-	14.34	8.5	4717	-	2543	49.86	3799	2.26	89	4	7	0.28
PS/12/03655	SR24-02-0612	Loamy sand	6.7	460	-	33.54	14.17	1814	-	2069	60.9	4680	2.22	83	8	9	0.24
PS/12/03656	SR26-01-0612	Sandy loam	6	40	-	8.7	7.38	3077	-	591	30.98	3328	0.65	77	12	11	0.08
PS/12/03657	SR26-03-0612	Sandy loam	4.5	10	3.74	27.82	15.21	9873	-	1079	92.46	5015	2.38	79	10	11	0.13
PS/12/03658	SR26-02-0712	Loamy sand	6.6	90	-	4.95	4.4	1591	-	876	18.52	880	1	81	10	9	0.11
PS/12/03659	SR26-05-0712	Sandy loam	5.8	20	-	21.53	14.54	8868	-	1922	79.55	6525	2.3	75	14	11	0.26
PS/12/03660	DG07-01-0612	Sand /	6.1	10	-	29.58	15.01	2463	-	1411	58.92	4443	5.07	91	4	5	0.33
PS/12/03661	DG10-01-0612	Loamy sand	6.7	160	-	18.8	11.97	2000	-	1210	42.57	4798	1.64	85	6	9	0.17
PS/12/03662	SR22-04A-0712	-	-	-	-	-	-	-	-	-	-	10980	-	-	-	-	-