

Vegetation Report for the development of public access to Sardinia Bay Beach, Port Elizabeth, Eastern Cape

(done in-house by Merika Louw, Botanical Specialist, CEN IEM Unit)

1. Vegetation Maps and Conservation Plans

The beach, bypass dunefield and inland coastal plain of Sardinia Bay – which includes the two proposed site alternatives for the location of a parking area, ablution and surf lifesavers' club facilities – falls within a protected area i.e. the Sardinia Bay Local Authority Nature Reserve, a formal land-based protected area (National Biodiversity Assessment, 2011).

The Eastern Cape Biodiversity Conservation Plan (2007) indicates that the Sardinia Bay Nature Reserve largely falls within a Terrestrial Critical Biodiversity Area 2 (Coast C2, Corridor 1, STEP T3). Terrestrial CBA2 areas are included within Biodiversity Land Management Class 2: Near-natural landscapes. The recommended land use objectives for BLMC 2 areas are to 'maintain biodiversity in a near natural state with minimal loss of ecosystem integrity. No transformation of natural habitat should be permitted' (Berliner *et al.*, 2007).

The site does not fall within an Aquatic CBA, as mapped in the ECBCP (2007).

Mucina and Rutherford (2006) have mapped vegetation of the greatest part of the Sardinia Bay Nature Reserve, which includes the proposed site alternatives, as Algoa Dune Strandveld (AZs 1) vegetation, an Azonal vegetation type, falling within the Eastern Strandveld Bioregion. Algoa Dune Strandveld vegetation is assigned a conservation status of *Least Threatened*, and a protection status of *Poorly Protected* [Conservation target: 20%; Protected: 4.1% (+ 7.2%); Remaining habitat: 88.9%].

Algoa Dune Strandveld vegetation is described as 'tall (up to 5 m) dense thickets on dunes mainly outside the influence of salt spray, dominated by stunted trees, shrubs (often armed with spines and thorns), abundant lianas and sparse herbaceous and grassy undergrowth' (Mucina and Rutherford, 2006). This vegetation type is further described as present on aeolian quaternary (dune) sands, and dominated by trees and shrubs typical of coastal thicket vegetation, which experiences salt-laden winds and regular veld fires. Though a good description of coastal thicket vegetation of the more densely-vegetated dune slacks at Sardinia Bay – it does not describe the significant presence of fynbos-thicket mosaic-type vegetation on the inland coastal plain, beyond the dunefield, in which the site alternatives fall.

Vegetation at the proposed parking area site alternatives is, therefore, classified in more detail in the Nelson Mandela Bay Conservation Assessment and Plan (Stewart, 2015). Though the sites are mapped as Driftsands Bypass Dunefield vegetation, which falls under the broader Bypass Dunefield habitat unit, an Azonal vegetation type [Ecosystem status: *Endangered*] – vegetation at the sites is most accurately classified as St Francis Dune Fynbos Thicket Mosaic vegetation [Ecosystem status: *Endangered*].

St Francis Dune Fynbos Thicket Mosaic vegetation, first described as St Francis Dune Thicket by STEP (Vlok and Euston-Brown, 2002), is described as ‘typically present on sands of marine origin’ (Stewart, 2015). It consists of ‘clumps of Algoa Dune Thicket, with Dwarf Cape Beech (*Rapanea gilliana*), within a matrix of fynbos typically confined to shallow soils’ (Stewart, 2015) – a true description for vegetation at the two site alternatives. Fynbos species characteristic of St Francis Dune Fynbos Thicket Mosaic vegetation, include: *Agathosma apiculata*, *Carpobrotus deliciosus*, *Carpobrotus edulis*, *Osteospermum moniliferum*, *Diospyros lycioides*, *Erica chloroloma*, *Metalasia aurea*, *Metalasia muricata*, *Morella quercifolia*, *Osteospermum imbricatum*, *Passerina falcifolia*, *Passerina obtusifolia*, *Searsia crenata* and *Syncarpha argentea*. Species characteristic of dune thicket clumps, present in deeper, moist sands, include: *Carissa bispinosa*, *Lauridia tetragona*, *Osteospermum moniliferum*, *Euclea natalensis*, *Searsia laevigata*, *Searsia longispina* and *Scutia myrtina* (Stewart, 2015).

2. Vegetation / Site Description

Vegetation of the coastal plain on which the two site alternatives are located, is best described as St Francis Dune Fynbos Thicket Mosaic vegetation. Vegetation is reasonably species rich and diverse – it being a mosaic-type vegetation, which experiences veld fires (burnt at least within the last 6 years), and given that it is present on poor, very shallow dune sands and calcrete bands. There is also a low to negligible presence of alien plants i.e. *Acacia cyclops*, in the general area. Except for the presence of dirt tracks, and horse / walking trails, vegetation of the general area can be described as intact and, therefore, of moderate to high conservation value.

Site Alternative 1 is located in a flat area, with shallow, sandy soil and exposed calcrete in some areas, and is dominated by low-growing Fynbos shrubs i.e. *Metalasia muricata*, *Phyllica ericoides* var. *ericoides*, *Morella quercifolia*, *M. cordifolia*, *Jamesbrittenia microphylla* and *Chironia baccifera*. Species of Conservation Concern (SCC’s) *Syncarpha sordescens* (VU) and *Rapanea gilliana* (EN) are also present on site (see **Figure 1**).

Site Alternative 2, located just east of Sardinia Bay Road, slopes gently from the south to the north, and is located in a shallow and relatively flat and wide dune slack. Coastal thicket species i.e. *Scutia myrtina*, *Searsia crenata* and *Searsia glauca*, occur in the deeper sandy soil to the south, along the dirt track. The site is, however, largely dominated by low-growing Fynbos shrubs i.e. *Erica glumiflora*, *E. chloroloma*, *Metalasia muricata*, *Phyllica ericoides* var. *ericoides* and *Coleonema pulchellum*, with patches of restio’s i.e. *Chondropetalum microcarpum*, and grass species i.e. *Stipagrostis zeyheri*. It is important to note that *Erica glumiflora* (VU) and *E. chloroloma* (VU) which are both SCC’s, are present as dominant shrubs across the site, with *Syncarpha sordescens* also present (see **Figure 2**).



Figure 1. Google Earth image with GPS waypoints indicating the presence of SCC's in the general Sardinia Bay Nature Reserve area [Key – *Erica glumiflora*: Eri_glum; *Erica chloroloma*: Eri_chlor; *Rapanea gilliana*: Rap_gill; *Syncarpha sordescens*: Syn_sord].

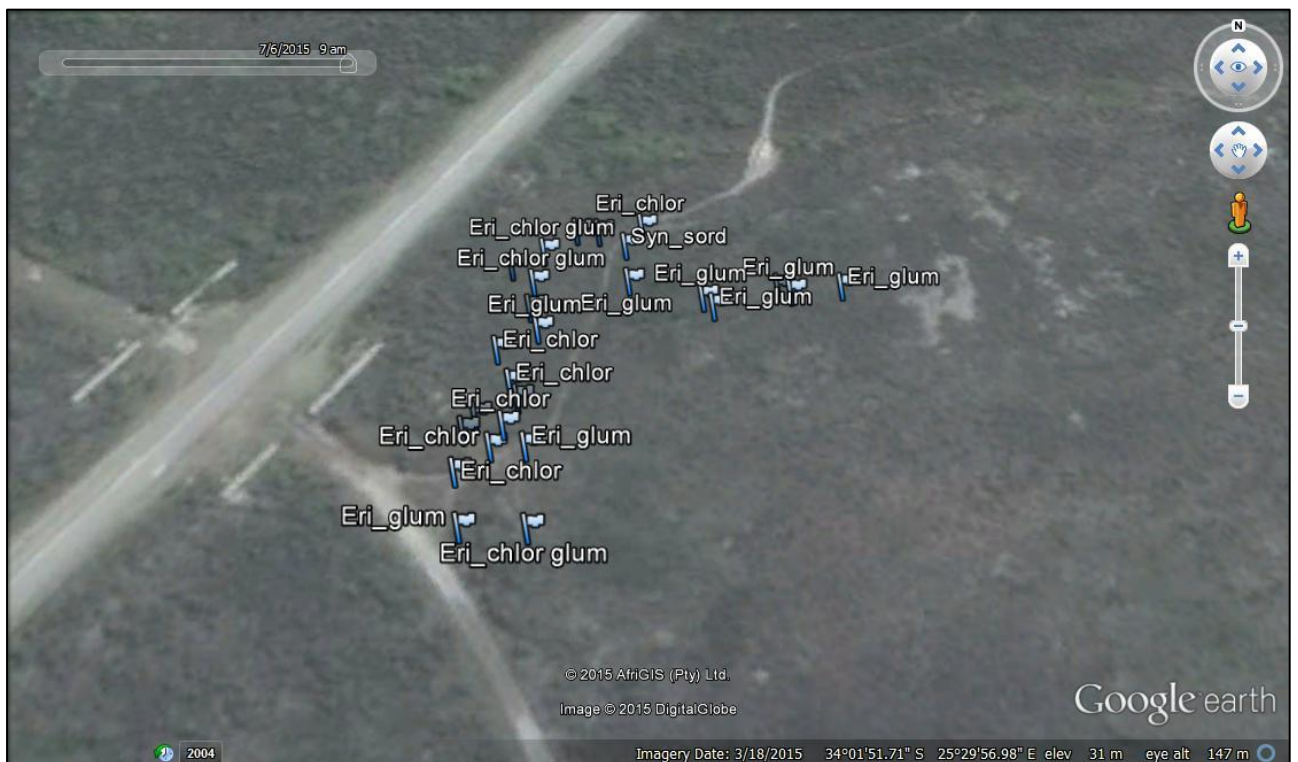


Figure 2. Google Earth image with GPS waypoints indicating the presence of SCC's on and around Site Alternative 2 [Key – *Erica glumiflora*: Eri_glum; *Erica chloroloma*: Eri_chlor; *Syncarpha sordescens*: Syn_sord].

2.1 Soils

The general description for soil on site is 'greyish, sandy soils' (Biodiversity GIS online interactive maps, 2007). Soil is classed as 'imperfectly drained sandy' soil – the coastal plain of Port Elizabeth is characterised by the presence of calcrete bands, particularly in dune slacks, creating seasonal wetlands and / or waterlogged sands. A favourable property of this soil class is that it has 'favourable water-holding properties'. Limitations are that soil 'may be highly erodible' (Biodiversity GIS online interactive maps, 2007), as is typical of coastal sands.

2.2 Protected Plants and Species of Conservation Concern (SCC's)

A total of fifty-eight plant species were identified on site, of which two are listed as exotic and/or invasive species (see **Table I**, below) i.e. *Acacia cyclops*, which is classified as a Category 2 invader under the Conservation of Agricultural Resources Act 43 of 1983 (CARA), and Category 1b under the National Environmental Management: Biodiversity Act 10 of 2004 (NEM:BA) – National Invasive Terrestrial and Fresh-water Plant Species List (published August 2014). *Pennisetum clandestinum* (Kikuyu Grass) is not listed under CARA, but it is listed as a Category 1b invader under NEM:BA, due to its presence in a Protected Area.

Protected plants, listed under the Eastern Province Nature and Environmental Conservation Ordinance of 1974 and the Eastern Cape Environmental Conservation Act of 2003, identified on site, include: a number of commonly-found mesems i.e. *Aizoon rigidum*, *Carpobrotus deliciosus*, *Mesembryanthemum aitonis* and *Tetragonia fruticosa*; *Cynanchum natalitium*; *Lauridia tetragona*; *Euclea racemosa*; *Chironia baccifera* and *C. decumbens*; *Pelargonium capitatum*; a commonly-found restio i.e. *Chondropetalum microcarpum*; *Agathosma apiculata* and *Coleonema pulchellum*.

There is also a marked presence of Species of Conservation Concern i.e. threatened plant species listed under the Red List of South African Plants (2014.1), on and around the site alternatives, and along the dirt road between site alternatives. *Erica chloroloma*, *Erica glumiflora* and *Syncarpha sordescens* (see **Photos 1 to 3**, below) are listed as Vulnerable. *Rapanea gilliana* (see **Photo 4**) is listed as Endangered. *Syncarpha sordescens* is found scattered and widespread in coastal fynbos vegetation in the general Sardinia Bay Nature Reserve area, whereas *Erica glumiflora* and *Rapanea gilliana* occur in smaller, isolated patches on level calcrete areas. *Erica chloroloma* occurs in continuous stands in the wetter dune slacks to the west and east of Sardinia Bay Road, and on level calcrete areas with *Erica glumiflora*, as seen at Site Alternative 2. **Figures 1 and 2**, above, show waypoints taken for presence of the abovementioned SCC's.

Protected plants require permits from the relevant authorities i.e. DEDEAT and DAFF, prior to their disturbance (which includes trimming of the branches of protected trees), removal, and/or transplantation. However, *no protected trees* listed under the National Forests Act 84 of 1998 (updated 7 September 2012), were identified on site.



Photo 1. *Erica chloroloma* (VU).



Photo 2. *Erica glumiflora* (VU).



Photo 3. *Syncarpha sordescens* (VU).



Photo 4. *Rapanea gilliana* (EN) (Photo: Adriaan Grobler).

2.3 Preferred site alternative

Site Alternative 2 has higher species richness, with 37 plant species identified, and a strong, significant presence of SCC's i.e. dense populations of *Erica glumiflora* and *E. chloroloma* (see **Photo 5**, below), than Site Alternative 1, which has a species richness of 31, and a relatively weaker presence of SCC's i.e. *Syncarpha sordescens* and *Rapanea gilliana*, which occur as scattered individuals across the Sardinia Bay Nature Reserve area.



Photo 5. Site Alternative 2, facing north, showing significant presence of *Erica glumiflora* (yellowish shrubs) and *Erica chloroloma* (red-flecked shrubs).

Table I. Annotated list of plant species identified at the proposed site alternatives and surrounds at Sardinia Bay.

Family	Species	Red List of South African Plants, version 2014.1	CARA 43 of 1983; NEM:BA No. 10 of 2004 (Amended 2014)	Eastern Province Nature and Env. Cons. Ordinance of 1974	Eastern Cape Environmental Conservation Act of 2003
AIZOACEAE	* <i>Aizoon rigidum</i> L.f.	LC		Schedule 4: Protected	Schedule 5: Protected
AIZOACEAE	<i>Carpobrotus deliciosus</i> (L.Bolus) L.Bolus	LC		Schedule 4: Protected	Schedule 5: Protected
AIZOACEAE	<i>Mesembryanthemum aitonis</i> Jacq.	LC		Schedule 4: Protected	Schedule 5: Protected
AIZOACEAE	<i>Tetragonia fruticosa</i> L.	LC		Schedule 4: Protected	Schedule 5: Protected
ANACARDIACEAE	<i>Searsia crenata</i> (Thunb.) Moffett	LC			
ANACARDIACEAE	<i>Searsia glauca</i> (Thunb.) Moffett	LC			
ANACARDIACEAE	<i>Searsia laevigata</i> (L.) F.A.Barkley	LC			
ANACARDIACEAE	<i>Searsia pterota</i> (C.Presl) Moffett	LC			
APOCYNACEAE	<i>Cynanchum natalitium</i> Schltr.	LC			Schedule 5: Protected
ASPARAGACEAE	<i>Asparagus asparagoides</i> (L.) Druce	LC			
ASTERACEAE	<i>Cotula sericea</i> L.f.	LC			
ASTERACEAE	<i>Felicia echinata</i> (Thunb.) Nees	LC			
ASTERACEAE	<i>Helichrysum cymosum</i> (L.) D.Don	LC			
ASTERACEAE	<i>Helichrysum</i> sp.	LC			
ASTERACEAE	<i>Helichrysum teretifolium</i> (L.) D.Don	LC			
ASTERACEAE	<i>Metalasia muricata</i> (L.) D.Don	LC			
ASTERACEAE	<i>Osteospermum moniliferum</i> L.	LC			
ASTERACEAE	<i>Senecio</i> sp. (cf. <i>erubescens</i> Aiton)	LC			
ASTERACEAE	<i>Senecio litorosus</i> Fourc.	LC			
ASTERACEAE	<i>Syncarpha sordescens</i> (DC.) B.Nord.	VU			
CARYOPHYLLACEAE	<i>Silene crassifolia</i> L. subsp. <i>primuliflora</i> (Eckl. & Zeyh.) J.C.Manning & Goldblatt	LC			
CELASTRACEAE	<i>Lauridia tetragona</i> (L.f.) R.H.Archer	LC			
CYPERACEAE	<i>Ficinia lateralis</i> (Vahl) Kunth	LC			
EBENACEAE	<i>Euclea racemosa</i> Murray	LC			Schedule 5: Protected
ERICACEAE	<i>Erica chloroloma</i> Lindl.	VU		Schedule 4: Protected	Schedule 5: Protected
ERICACEAE	<i>Erica glumiflora</i> Klotzsch ex Benth.	VU		Schedule 4: Protected	Schedule 5: Protected
FABACEAE	** <i>Acacia cyclops</i> A.Cunn. ex G.Don	NE	Category 2; Category 1b		
FABACEAE	<i>Indigofera denudata</i> L.f.	LC			
FABACEAE	<i>Otholobium virgatum</i> (Burm.f.) C.H.Stirt.	LC			
GENTIANACEAE	<i>Chironia baccifera</i> L.	LC			Schedule 5: Protected

Family	Species	Red List of South African Plants, version 2014.1	CARA 43 of 1983; NEM:BA No. 10 of 2004 (Amended 2014)	Eastern Province Nature and Env. Cons. Ordinance of 1974	Eastern Cape Environmental Conservation Act of 2003
GENTIANACEAE	<i>Chironia decumbens</i> Levyns	LC			Schedule 5: Protected
GERANIACEAE	<i>Pelargonium capitatum</i> (L.) L'Hér.	LC			Schedule 5: Protected
MENISPERMACEAE	<i>Cissampelos capensis</i> L.f.	LC			
MYRICACEAE	<i>Morella cordifolia</i> (L.) Killick	LC			
MYRICACEAE	<i>Morella quercifolia</i> (L.) Killick	LC			
MYRSINACEAE	<i>Rapanea gilliana</i> (Sond.) Mez	EN			Schedule 4: Endangered
POACEAE	<i>Ehrharta villosa</i> J.H.Schult.	LC			
POACEAE	<i>Imperata cylindrica</i> (L.) Raeusch.	LC			
POACEAE	<i>Pennisetum clandestinum</i> Hochst. ex Chiov.	NE	Not Listed; Category 1b (present in Protected Area)		
POACEAE	<i>Sporobolus virginicus</i> (L.) Kunth	LC			
POACEAE	<i>Stenotaphrum secundatum</i> (Walter) Kuntze	LC			
POACEAE	<i>Stipagrostis zeyheri</i> (Nees) De Winter	LC			
POACEAE	<i>Sporobolus africanus</i> (Poir.) Robyns & Tournay	LC			
POLYGALACEAE	<i>Muraltia alopecuroides</i> (L.) DC.	LC			
RESTIONACEAE	<i>Chondropetalum microcarpum</i> (Kunth) Pillans	LC		Schedule 4: Protected	Schedule 5: Protected
RESTIONACEAE	<i>Restio</i> sp.	LC			
RHAMNACEAE	<i>Phylica ericoides</i> L. var. <i>ericoides</i>	LC			
RHAMNACEAE	<i>Scutia myrtina</i> (Burm.f.) Kurz	LC			
RUBIACEAE	<i>Anthospermum aethiopicum</i> L.	LC			
RUTACEAE	<i>Agathosma apiculata</i> G.Mey.	LC			Schedule 5: Protected
RUTACEAE	<i>Coleonema pulchellum</i> I.Williams	LC			Schedule 5: Protected
SALVADORACEAE	<i>Azima tetraantha</i> Lam.	LC			
SANTALACEAE	<i>Colpoon compressum</i> P.J.Bergius	LC			
SANTANLACEAE	<i>Thesium</i> sp.	LC			
SANTALACEAE	<i>Thesidium fragile</i> (Thunb.) Sond.	LC			
SCROPHULARIACEAE	<i>Hebenstretia integrifolia</i> L.	LC			
SCROPHULARIACEAE	<i>Jamesbrittenia microphylla</i> (L.f.) Hilliard	LC			
SCROPHULARIACEAE	<i>Selago</i> sp. (cf. <i>geniculata</i> L.f.)	LC			
SOLANACEAE	<i>Solanum africanum</i> Mill.	LC			
THYMELACEAE	<i>Passerina falcifolia</i> (Meisn.) C.H.Wright	LC			

* Species in GREEN are listed as threatened and/or protected.

** Species in RED are listed as alien and/or invasive.

Table II. Plant species identified at Site Alternatives 1 and 2 at Sardinia Bay.

Family	Species	SITE 1	SITE 2
FABACEAE	<i>Acacia cyclops</i> A.Cunn. ex G.Don	X	X
AIZOACEAE	<i>Aizoon rigidum</i> L.f.	X	X
AIZOACEAE	<i>Carpobrotus deliciosus</i> (L.Bolus) L.Bolus	X	X
AIZOACEAE	<i>Mesembryanthemum aitonis</i> Jacq.	X	
ANACARDIACEAE	<i>Searsia crenata</i> (Thunb.) Moffett		X
ANACARDIACEAE	<i>Searsia glauca</i> (Thunb.) Moffett		X
ANACARDIACEAE	<i>Searsia laevigata</i> (L.) F.A.Barkley		X
ASTERACEAE	<i>Cotula sericea</i> L.f.		X
ASTERACEAE	<i>Felicia echinata</i> (Thunb.) Nees	X	X
ASTERACEAE	<i>Helichrysum cymosum</i> (L.) D.Don		X
ASTERACEAE	<i>Helichrysum</i> sp.		X
ASTERACEAE	<i>Helichrysum teretifolium</i> (L.) D.Don	X	
ASTERACEAE	<i>Metalsia muricata</i> (L.) D.Don	X	X
ASTERACEAE	<i>Osteospermum moniliferum</i> L.	X	X
ASTERACEAE	<i>Senecio</i> sp. (cf. <i>erubescens</i> Aiton)	X	
ASTERACEAE	<i>Senecio litorosus</i> Fourc.		X
ASTERACEAE	<i>Syncarpha sordescens</i> (DC.) B.Nord.	X	X
CARYOPHYLLACEAE	<i>Silene crassifolia</i> L. subsp. <i>primuliflora</i> (Eckl. & Zeyh.) J.C.Manning & Goldblatt		
CYPERACEAE	<i>Ficinia lateralis</i> (Vahl) Kunth	X	X
EBENACEAE	<i>Euclea racemosa</i> Murray	X	X
ERICACEAE	<i>Erica chloroloma</i> Lindl.		X
ERICACEAE	<i>Erica glumiflora</i> Klotzsch ex Benth.	X	X
FABACEAE	<i>Indigofera denudata</i> L.f.		X
FABACEAE	<i>Otholobium virgatum</i> (Burm.f.) C.H.Stirt.	X	X
GENTIANACEAE	<i>Chironia baccifera</i> L.	X	X
GENTIANACEAE	<i>Chironia decumbens</i> Levyns	X	X
MYRICACEAE	<i>Morella cordifolia</i> (L.) Killick	X	X
MYRICACEAE	<i>Morella quercifolia</i> (L.) Killick	X	X
MYRSINACEAE	<i>Rapanea gilliana</i> (Sond.) Mez	X	
POACEAE	<i>Imperata cylindrica</i> (L.) Raeusch.	X	
POACEAE	<i>Stenotaphrum secundatum</i> (Walter) Kuntze		X
POACEAE	<i>Stipagrostis zeyheri</i> (Nees) De Winter	X	X
POACEAE	<i>Sporobolus africanus</i> (Poir.) Robyns & Tournay	X	X
POLYGALACEAE	<i>Muraltia alopecuroides</i> (L.) DC.	X	X
RESTIONACEAE	<i>Chondropetalum microcarpum</i> (Kunth) Pillans		X
RESTIONACEAE	<i>Restio</i> sp.	X	X
RHAMNACEAE	<i>Phyllica ericoides</i> L. var. <i>ericoides</i>	X	
RUTACEAE	<i>Agathosma apiculata</i> G.Mey.	X	
RUTACEAE	<i>Coleonema pulchellum</i> I.Williams	X	X
SALVADORACEAE	<i>Azima tetracantha</i> Lam.		
SANTALACEAE	<i>Colpoon compressum</i> P.J.Bergius		X

Family	Species	SITE 1	SITE 2
SANTALACEAE	<i>Thesium</i> sp.		X
SANTALACEAE	<i>Thesidium fragile</i> (Thunb.) Sond.	X	
SCROPHULARIACEAE	<i>Jamesbrittenia microphylla</i> (L.f.) Hilliard	X	X
SCROPHULARIACEAE	<i>Selago</i> sp. (cf. <i>geniculata</i> L.f.)	X	X
SOLANACEAE	<i>Solanum africanum</i> Mill.		X
THYMELACEAE	<i>Passerina falcifolia</i> (Meisn.) C.H.Wright	X	X
	Total number of species identified (of which are threatened/protected):	31 (11)	37 (10)

3. References:

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