



# HIGH VALUE AREAS

## ECOLOGICAL ASSESSMENT REPORT

*Mamaku Point*



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## Ecological Assessment Report

Mamaku Point, AGLM10



**urtica**  
ECOLOGY

Survey completed by Chris Stowe

31 August 2019

Report completed by Chris Stowe (Urtica Ecology)



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## **Purpose of the HVA Programme**

Thank you for allowing this ecological assessment to be undertaken. The purpose of the High Value Areas (HVA) assessment programme is to provide landowners with factual information about the presence, condition and relative value of indigenous biodiversity on their land. It is hoped that this will assist landowners with decision making concerning the management, preservation and possible protection (legal or otherwise) of natural habitats on their properties. To this end, funding may be sought from a number of trusts and organisations throughout the province and the rest of New Zealand. For example, a \$40,000 Environmental Enhancement Fund administered by the Southland Regional Council is available and gives priority to HVA survey sites. Environment Southland can provide you with further advice, support or assistance with this, and other funding opportunities.

## **Scope of this report**

HVA surveys entail the broad-scale description, mapping and classification of plant communities/ecosystems and an assessment of their ecological significance at regional scales. Field observations of fauna are included as are limited 'desktop' investigations of potential fauna and other values. Note that the owners may shortly be commissioning a detailed restoration plan for Mamaku Point. This is beyond the scope of the current report, though it will provide some general management/restoration recommendations.

The major area of (rimu)-kamahi-hardwood forest within the predator proof fence had previously been surveyed by Brian Rance, Department of Conservation. Consequently, the current survey focused on the northern coast and hillslopes. Unfortunately, a lack of time meant that the southern and eastern coastal areas from Horseshoe Bay around to Mamaku Point were not inspected.

## **Background**

Up until 2000, Mamaku Point was a privately owned block with the seaward faces farmed and grazed by sheep and cattle. In late 2000, the Dancing Star Foundation purchased the property, turning it into a biodiversity reserve. The same owners in 2005 enclosed much of the property in a 2.1km long predator-proof fence extending from Horseshoe Bay to Lee Bay. An extensive biosecurity grid is maintained both inside and outside the fence and both the fence and the biosecurity grid are remotely monitored using VHF, cellular and satellite communications to ensure that any biosecurity breaches are detected immediately.

In 2017, the Reserve was purchased by a family trust associated with Roy and Rachel Thompson, who subsequently established the Mamaku Point Conservation Trust. The trust is an incorporated charitable trust and registered charity. The primary objectives of the Trust are:

- Maintaining and enhancing biodiversity within the reserve.
- Making the reserve accessible by the public for conservation education and eco-tourism activities
- Working toward the financial and environmental sustainability of the Reserve's operations.

## **Location and Access**

The HVA is located c. 4km north of Halfmoon Bay, the main populated area on Stewart Island (Fig. 1). Access must be arranged with Mamaku Point management in order to gain access through the predator proof fence.



Figure 1: Topographical map showing the HVA location (shown in red).

## Landscape Context and Ecological Setting

### Ecological District

The site is located in the Anglem Ecological District. This district covers the northern part of Rakiura north of Freshwater Valley and Paterson Inlet and includes the populated area at Halfmoon Bay. The district is most unusual when compared to lowland areas over most of Southland and New Zealand in that its historic ecosystems remain largely unchanged in extent and degree of modification since human occupation.

Consequently, the district remains dominated by montane *Olearia* muttonbird scrub (70%) with lowland/montane rimu-kamahī forest accounting for a further 15% of its area. Coastal and sub-alpine ecosystems (shrubland, rushland and tussockland) collectively accounted for a relatively minor proportion (15%) of the total area<sup>1</sup>.

Modifiers include logging of lowland rimu-kamahī forest in the east around Halfmoon Bay and Paterson Inlet, minor areas of past clearance for farmland (much of which has reverted to native scrub/shrubland), and historic burning of some of headlands on the north coast to facilitate hunting of deer.

### Nearby Natural Habitats and Connectivity<sup>2</sup>

The HVA is exceptionally well connected ecologically. The majority is bordered by the marine environment while western portions of the area are contiguous with similar intact and regenerating forest primarily protected within public conservation land. On the southern side of the reserve, land parcels are in private ownership, are smaller and have no legal protection. These areas are somewhat fragmented and include

<sup>1</sup> Southland Protection Strategy. A report to the Nature Heritage Fund Committee. M. A. Harding. 1999.

<sup>2</sup> Connectivity refers to the extent that native habitats are linked together in the landscape. It is important because it helps determine the diversity and abundance of flora and fauna that can survive and persist in native habitats, particularly in fragmented and modified landscapes.

some areas cleared of their former forest cover and now grassland. Legally protected habitats on private land are relatively few on the island, with a total of just three QEII covenants in the Halfmoon Bay area (Fig. 2).



**Figure 2: Aerial photograph showing the location and protection status/land tenure of habitats near the HVA. DOC land is shown in green. The HVA is shown in red. QEII covenants are shown outlined in blue. Stars = known archaeological sites (source: NZAA).**

***Recent Development History and Vegetation Change***

The northern coastal faces were cleared of their former forest cover probably well before 1959; the earliest easily available aerial imagery obtained for the site (Fig. 3a). Despite presumably still being grazed between 1959 and 1978 (Fig. 3b), regenerating native forest and shrubland appears to have expanded, notably in the western coastal areas near Lee Bay (north of waypoint 1 in Fig. 4a) and along the northern tall forest margin and down into the major gully between Bob’s Point and Mamaku Point (east of waypoint 8 in Fig. 4a). Though still grazed between 1978 and 2000, the current aerial imagery taken c. 2014 (Fig. 4a-4c) suggests that the regeneration of forest and scrub has continued over this time in similar areas.



Figure 3a and 3b: Aerial photographs of Mamaku Point from 1959 (top) and 1978 (above). Imagery sourced from Retrolens (<http://retrolens.nz>).

## Site Description and Features

### *Physical Description*

The site consists of a broad peninsula surrounded by the sea on three sides, with the road from Horseshoe Bay to Lee Bay largely defining the western boundary of the reserve (though the predator/browser proof fence does not follow this boundary). The total area of habitat mapped at the site was 176 ha.

The site includes a range of aspects, landforms and topography ranging from hill country of moderate relief to sandy beaches, rocky shorelines and steep coastal embankments and cliffs. The altitudinal range encompasses 0-120m. Climatically, much of the northern coastal area is exposed to frequent, strong, salt laden winds from the westerly quarter, as well as less frequent easterly gales.

### *General Site Features*

The reserve has outstanding biodiversity and aesthetic values. The diversity of fauna, plants, plant communities and ecosystems the reserve supports is one that is not often found on private land anywhere on Stewart Island, or in Southland. There are at least eight distinct plant communities which can be classified into seven ecosystem types<sup>3</sup>. Plant diversity is correspondingly high with at least 130 native species so far recorded. No doubt further botanical surveys would yield additional plant species.



While some of the vegetation patterns are clearly the result of past disturbance, the coastal influences of wind and salt play a major part in shaping the composition and structure of the vegetation communities on the northern coast. These notably include coastal herbfield, grassland-rushland and shrubland that support a range of plants particularly adapted to the environment. Though not comprising a substantial area, these communities contribute greatly to the floristic diversity at Mamaku Point, and support a number of specialist ferns, herbs and shrubs.

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<sup>3</sup> Singers, J. D. & Rogers G. M. 2014. A classification of New Zealand's terrestrial ecosystems. Science for Conservation 325. Department of Conservation, Wellington.

Due to the predator/browser proof fence, the natural recovery of vegetation both in intact and previously farmed areas should be assured. In his 2013 report<sup>4</sup> and survey of the forested areas, Brian Rance (DOC) noted an abundance of deer and possum palatable species inside the fence compared to outside the fence (e.g. tree fuchsia and wineberry) and unhindered regeneration of these and other palatable species such as raukawa (*Raukawa edgerleyi*), haumakoroa (*Raukawa simplex*), broadleaf (*Griselinia littoralis*) and hen and chicken fern (*Asplenium bulbiferum*) elsewhere within the forest. He also noted the rapid establishment of shrubland within grassland areas previously cleared for farming. These trends should continue naturally provided browsers, particularly deer, are kept at nil to low densities within the reserve. Importantly, the increased health of plant communities and the birdlife they support inside the reserve is likely to have positive benefits beyond the reserve's boundaries.

### **Vegetation**

HVA surveys employ a hierarchical classification of vegetation types (or "habitat units") grouped under a higher level, nationally recognised ecosystem classification<sup>5</sup>. Habitat units are named after the dominant plant species present and one or more habitat units may be present within an ecosystem. Habitat units and ecosystems at Mamaku Point are outlined below. Note that it is habitat units that are mapped onto the aerial imagery (Figures 4a-4c) on the following pages along with the location of waypoints/photopoints.

*Notes:* The habitat units shown in Figs 4a-4c include areas outside the predator/browser proof fence (which is visible in the aerial imagery). The mapped area includes some marginal strip, coastal strip and road reserve (LINZ) and a small DOC block on the headland of Bobs Point.

Mapping of vegetation is approximate and broad scale. The area inspected was primarily coastal immediately above the high tide line and northern hillslopes. These included herbfield, grassland, sedgeland, scrub and shrubland communities described in this report. Habitat unit 5 probably occurs in suitable habitat additional to the one small area mapped. The intact hill-country forest was not inspected, neither were southern and eastern areas of the reserve around from Horseshoe Bay; therefore, the delineation of plant communities may be inaccurate in these areas. One additional ecosystem type (CL5 Harakeke, *Hebe elliptica* flaxland/rockland) is arguably present on some of the steep coastal faces but has been included within SA9 and/or VS6.

**Ecosystem:** SA9 *Olearia*, *Brachyglottis* and *Dracophyllum* scrub/herbfield/loamfield [muttonbird scrub]

➤ **Unit 1:** muttonbird scrub-manuka-hardwood scrub (6.8 ha)

Indigenous scrub with a characteristic composition and c. 2-5m in height found intermittently around the immediate coastal zone. It consists mainly of one or a mix of muttonbird scrub (*Brachyglottis rotundifolia*), manuka, shore hebe (*Veronica elliptica*), inaka (*Dracophyllum longifolium*), common tree daisy (*Olearia arborescens*) and various other woody species such as shining karamu (*Coprosma lucida*), *Coprosma areolata*, broadleaf (*Griselinia littoralis*) and red mapou (*Myrsine australis*). The understorey is variable. In the more exposed coastal locations, a number of distinctive, specialist ferns are locally abundant. These include spleenworts (*Asplenium* spp. with numerous hybrid forms) and *Blechnum* spp.. Other associates may include a range of herbs, coastal sedge (*Carex appressa*), bracken and bush flax (*Astelia fragrans*).

On some of the steep coastal faces, a low scrub/shrubland dominated by shore hebe is present i.e. that which is partly visible in waypoint/photopoint 3 (Fig. 4a and Appendix 2). This community is more akin to the CLF5 ecosystem (Harakeke, *Hebe elliptica* flaxland/rockland) but was included within SA9 as it couldn't be readily differentiated for mapping purposes with the aerial imagery available.

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<sup>4</sup> Rance, B. 2013. Dancing Star Foundation land, Horseshoe Bay – Vegetation report. Unpublished report, Department of Conservation, Southland.

<sup>5</sup> Singers, J. D. & Rogers G. M. 2014. A classification of New Zealand's terrestrial ecosystems. Science for Conservation 325. Department of Conservation, Wellington.



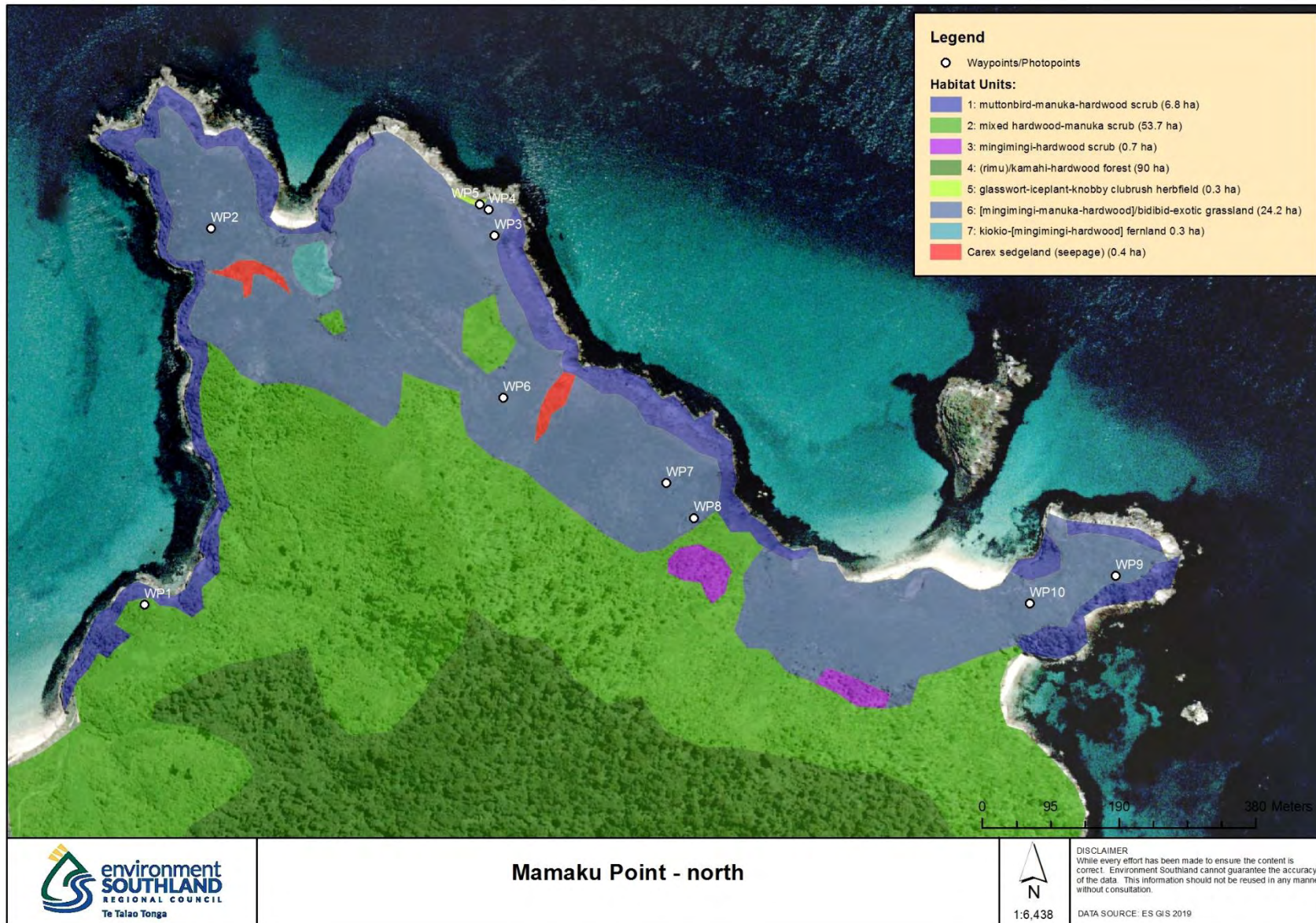
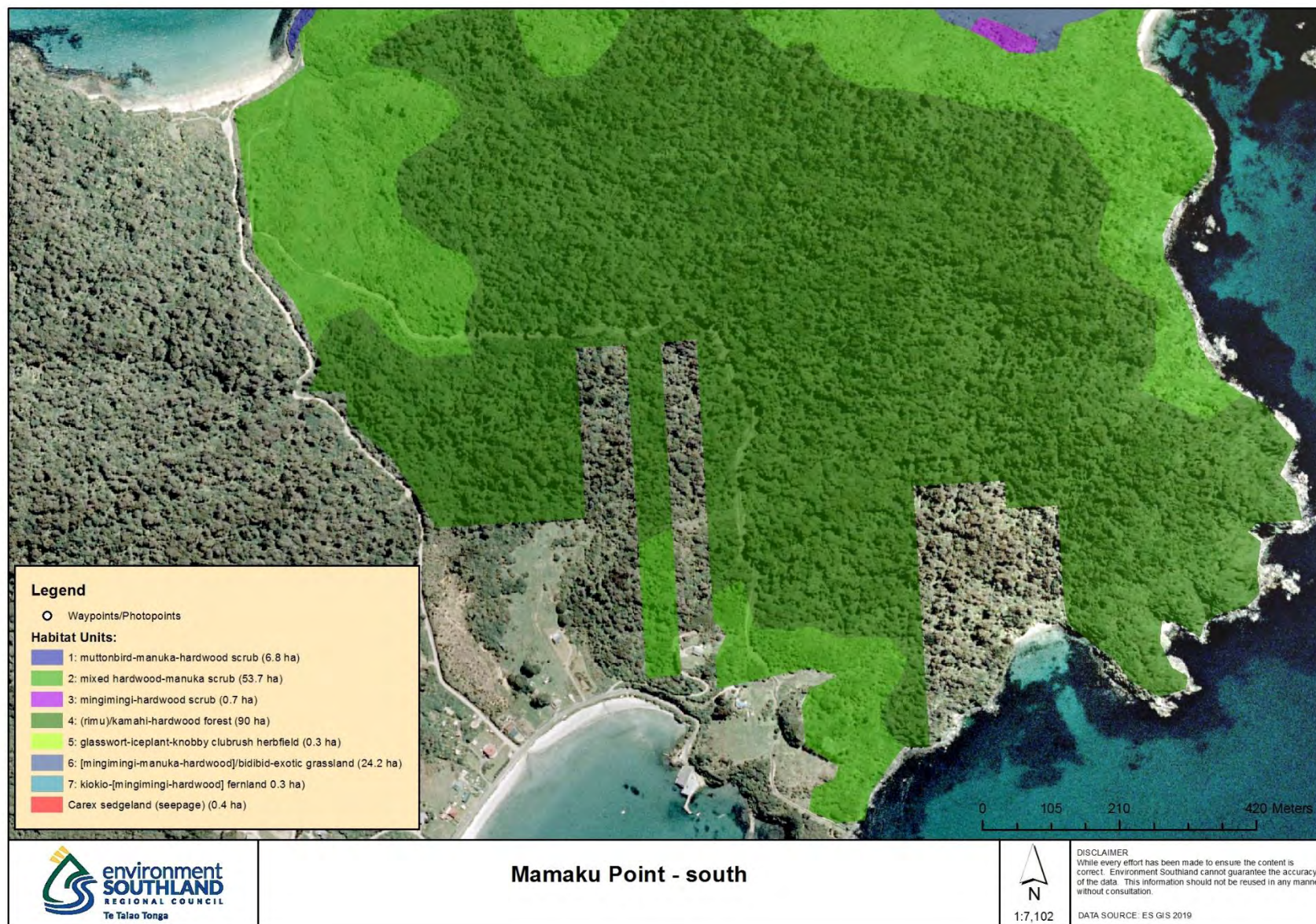


Figure 4a: Aerial imagery showing the habitat units described in this report and the location of photopoints/waypoints. Boundaries are approximate. Refer to Appendix 1 for key to photopoints/waypoints. Photographs can be viewed in Appendix 2.



**Figure 4b: Aerial imagery showing the habitat units described in this report and the location of photopoints/waypoints. Boundaries are approximate. Refer to Appendix 1 for key to photopoints/waypoints. Photographs can be viewed in Appendix 2.**

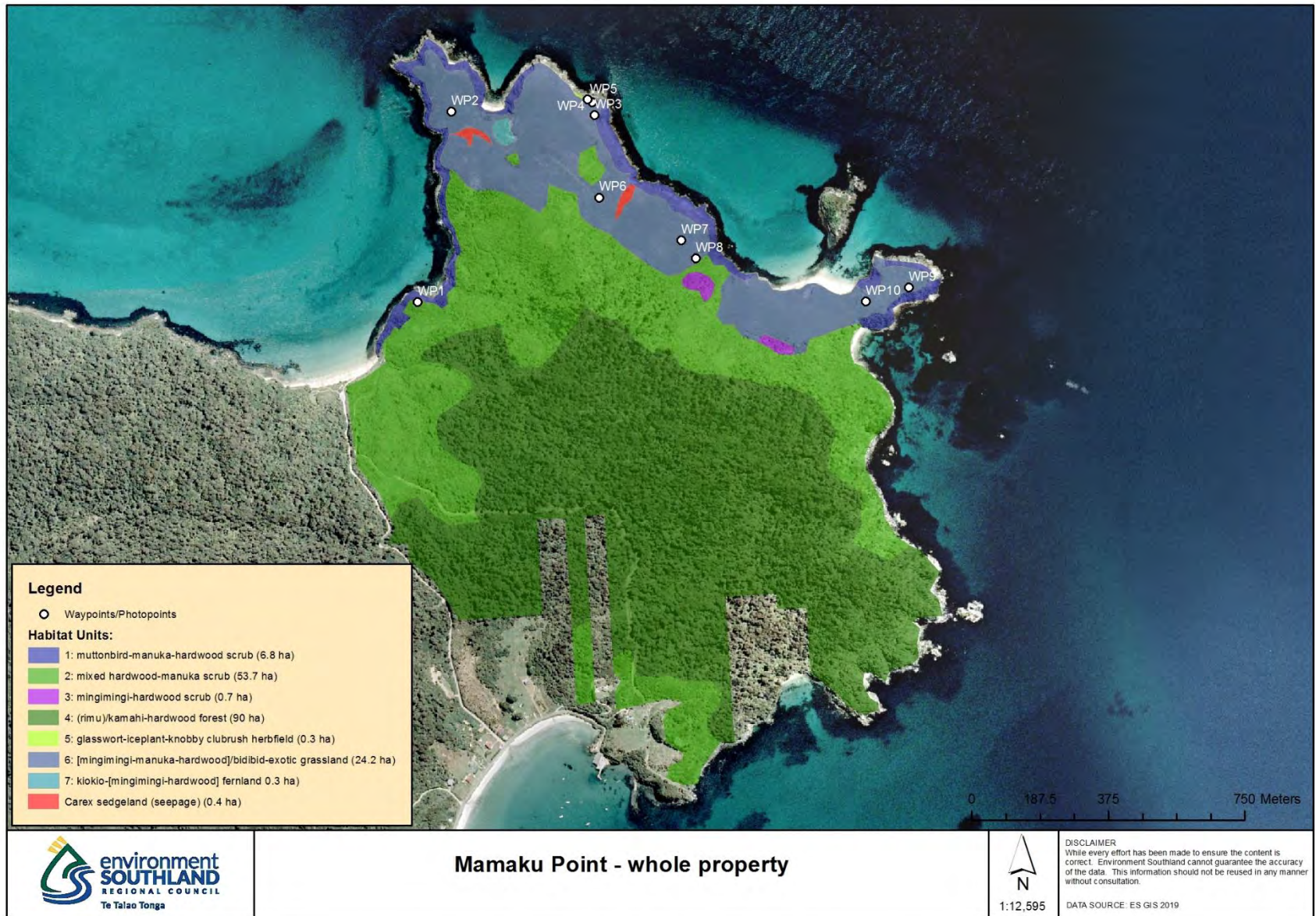


Figure 4c: Aerial imagery showing the habitat units described in this report and the location of photopoints/waypoints. Boundaries are approximate. Refer to Appendix 1 for key to photopoints/waypoints. Photographs can be viewed in Appendix 2.

**Ecosystem:** VS5 Broadleaved species scrub/forest

➤ **Unit 2:** mixed hardwood-manuka scrub (53.7 ha)

This community represents the younger, regenerating forest at the site. It merges somewhat with the coastal scrub of unit 1 and with the more intact podocarp-hardwood forest of unit 4. It consists of a range of hardwood species include manuka (which can be locally dominant), red mapou, kamahi (*Weinmannia racemosa*), shining karamu, *Coprosma areolata*, broadleaf, tree fern (*Dicksonia squarrosa*) and others. Occasional emergent rimu punctuate the canopy in places. Where this community extends down the main gully between Bob's Point and Mamaku Point (i.e. just east of waypoint 8), half a dozen mamaku tree ferns (*Cyathea medullaris*) can be found.

**Ecosystem:** VS6 Matagouri, *Coprosma propinqua*, kowhai scrub [Grey scrub]

➤ **Unit 3:** mingimingi-hardwood scrub (0.7 ha)

There are two small areas of this vegetation. Both are dominated by mingimingi (*Coprosma propinqua*) with scattered *Coprosma areolata*, tree fern (*Dicksonia squarrosa*), broadleaf, shining karamu, wineberry and other hardwoods. Regeneration of hardwoods within this community is likely to be relatively rapid.

➤ **Unit 6:** [mingimingi-manuka-hardwood]/bidibid-exotic grassland (24.2 ha)

This unit generally represents the previously farmed and grazed portions of the reserve. It occurs all along the northern coast and patchily in the west within regenerating forest towards Lee Bay. Overall, it is dominated by exotic grasses and herbs with some large patches of bidibid (*Acaena anserinifolia*) as well as water fern (*Histiopteris incisa*), shield fern (*Polystichum vestitum*) and bracken (*Pteridium esculentum*). Scattered to locally common regenerating natives are also present (e.g. mingimingi, manuka, broadleaf, *Coprosma areolata*). These represent the future trajectory of vegetation change towards native scrub/forest given time and the continued absence of browsing animals. The open grassland areas are the locations in which 'assisted' regeneration of native plant communities could be instigated.

A slightly different community occurs within this unit on some of the exposed, steep coastal faces. These areas may support scattered to abundant shore hebe, knobby clubrush (*Ficinia nodosa*), blue shore tussock (*Poa astonii*), pohuehue (*Muehlenbeckia complexa*), New Zealand spinach (*Tetragonia implexicoma*), shore spleenwort (*Asplenium obtusatum*) and Stewart Island forget-me-not (*Myosotis rakiura*).

**Ecosystem:** CLF6 Kamahi, southern rata, podocarp forest

➤ **Unit 4:** (rimu)/kamahi-hardwood forest (90.0 ha)

This is the dominant vegetation at Mamaku Point. The following description is derived from Brian Rance's observations from his 2013 visit. The canopy is dominated by kamahi (*Weinmannia racemosa*) with much emergent rimu (*Dacrydium cupressinum*), along with occasional miro (*Prumnopitys ferruginea*) and southern rata (*Metrosideros umbellata*). The canopy is c. 15m tall though the emergent rimu reach 20m height. The understory is also dominated by kamahi, along with occasional broadleaf (*Griselinia littoralis*) and haumakoroa (*Raukaua simplex*). The shrub layer includes much hard tree fern (*Dicksonia squarrosa*) and stinkwood (*Coprosma foetidissima*), along with some *Coprosma rhamnoides*, soft tree fern (*Cyathea smithii*) and occasional other species. The forest floor contains much crown fern (*Blechnum discolor*) and the filmy fern *Hymenophyllum demissum*, with *Lastreopsis hispida* being locally common.

**Ecosystem:** SA7 Iceplant, glasswort herbfield/loamfield

- **Unit 5:** glasswort-iceplant-knobby clubrush herbfield (0.03 ha)

This herbfield community occupies areas close to, or within, the splash zone of waves on the shoreline. In these locations, glasswort (*Salicornia quinqueflora*), native ice plant (*Disphyma australe* subsp. *australe*), shore stone crop (*Crassula moschata*), knobby clubrush (*Ficinia nodosa*), shore gentian (*Gentiana saxosa*), native celery (*Apium prostratum* var. *filliforme*), sea primrose (*Samolus repens* var. *repens*), slender clubrush (*Isolepis cernua* var. *cernua*) and shore pimpernel (*Selliera radicans*) are common.

**Ecosystem:** CL10 Kiokio fernland/rockland

- **Unit 7:** kiokio-[mingimingi-hardwood] fernland (0.33 ha)

This unit occupies a poorly drained slump or slip. Kiokio fern (*Blechnum novaezelandiae*) is dominant but is interspersed with mingimingi (*Coprosma propinqua*), broadleaf, *Coprosma areolata* and shining karamu.

**Ecosystem:** WL22 *Carex*, *Schoenus* sedgeland

- **Unit 8:** *Carex* sedgeland (seepage) (0.4 ha)

At least two seepages are present on the northern hillslopes. These are dominated by sedges and exotic grasses with cutty grass (*Carex coriacea*) and *C. appressa* common. Though supporting plants more typical of wetlands, and classified as such, these areas are likely to have supported forest originally.

### **Flora**

In his brief survey of forest and some edge/pasture habitats, Brian Rance recorded 107 species (89 native and 18 exotic). The current rapid survey of the northern coast increased this to 167 species in total (137



The 'naturally uncommon' Stewart Island forget-me-not (*Myosotis rakiura*) on the north coast of Mamaku Point.

native and 30 exotic). This is considered diverse but additional surveys would no doubt increase the tally. See Appendix 3 for a full species list.

The flora includes a substantial number of plants that are nationally threatened or at risk, as well as several that are uncommon or notable in a regional or Stewart Island context (Table 1).

Scientific Name	Common Name	National status <sup>6</sup>	Regional status	Comments
<i>Neomyrtus pedunculata</i>	rohutu	threatened: nationally critical	-	Locally common in forest. Threat status reflects potential effects of myrtle rust.
<i>Metrosideros diffusa</i>	white climbing rata	threatened: nationally vulnerable	-	Common in more intact forest. Threat status reflects potential effects of myrtle rust.
<i>Metrosideros umbellata</i>	southern rata	threatened: nationally vulnerable	-	Coastal scrub and forest. Threat status reflects potential effects of myrtle rust.
<i>Leptospermum scoparium</i>	manuka	at risk: declining	-	Abundant and widespread in coastal scrub and regenerating forest. Threat status reflects potential effects of myrtle rust.
<i>Sonchus kirkii</i>	shore puha	at risk: declining	-	Coastal. Uncommon.
<i>Euphorbia glauca</i>	shore spurge, sea spurge, waiu-atua	at risk: declining	-	One clump on beach below coastal bank on western side of Mamaku Point.
<i>Asplenium scleroprium</i>	southern shore spleenwort	at risk: naturally uncommon	-	Confined to Sub-Antarctic islands, Stewart Island and scattered on south coast of South Island. On Stewart Island, uncommon and coastal only. Locally common at Mamaku Point.
<i>Gentiana saxosa</i>	shore gentian	at risk: naturally uncommon	-	Strictly coastal, exposed locations often with coastal turf species.
<i>Myosotis rakiura</i>	Stewart Island forget-me-not	at risk: naturally uncommon	-	Uncommon. Coastal faces near waypoint 4 and probably elsewhere.
<i>Carex aucklandica</i>	a hooked sedge	at risk: naturally uncommon	-	Brian Rance observation. Unsure of location.
<i>Cyathea medullaris</i>	mamaku, black tree fern	-	uncommon	Approx. 8 in gully at waypoint 8. Very uncommon in Southland (Omaui, Round Hill, Waitutu and scattered along Fiordland coast). Rare and local on Stewart Island in sheltered coastal gullies as far south as Port Adventure. Maori introduction? Those at Mamaku Point occur where the Maori kaik was supposedly located.

<sup>6</sup> De Lange et al. 2018. Conservation status of New Zealand indigenous vascular plants, 2017 New Zealand Threat Classification Series 22. Department of Conservation, Wellington.

Scientific Name	Common Name	National status <sup>6</sup>	Regional status	Comments
<i>Asplenium appendiculatum</i> subsp. <i>appendiculatum</i> ?	ground spleenwort	-	uncommon	Rare on Stewart Island, coastal scrub and light forest only. Not positively identified by B. Rance or C. Stowe.
<i>Asplenium lyallii</i>	Lyall's spleenwort	-	uncommon	Local and uncommon, coastal only. Occasional at Mamaku Point.
<i>Asplenium X</i>	Asplenium hybrid unknown parentage	-	of interest	A great diversity of <i>Asplenium</i> spp. are present at Mamaku Point. Hybrids are not uncommon and make ID difficult due to uncertain parentage. This one possibly <i>A. gracilentum</i> X <i>A. obtusatum</i> – coastal headland at base of large rock.
<i>Blechnum blechnoides</i>	shore hard fern	-	local	Local on Stewart Island, strictly coastal.
<i>Blechnum durum</i>	-	-	local	Local on Stewart Island, strictly coastal.
<i>Polystichum neozelandicum</i> subsp. <i>zerophyllum</i>	a shield fern	-	uncommon	Local on Stewart Island, mostly coastal. One plant seen in light coastal scrub.
<i>Poa astonii</i> ?	blue shore tussock	-	uncommon	Confined to coastal areas.
<i>Urtica ferox</i>	stinging nettle, ongaonga	-	uncommon	Very local distribution on Stewart Island (Ackers Point, Mamaku Point and north-eastern muttonbird islands) and in Southland in general. One patch seen at Mamaku Point in the same gully as the mamaku tree ferns (waypoint 8).

**Table 1: Nationally threatened/at risk and regionally notable plant species known from Mamaku Point.**

### **Fauna**

As would be expected, given the location and long-term predator control/exclusion, fauna values at Mamaku Point are very high.

The area supports a great range and abundance of bird life, some which is absent or uncommon on the mainland. Bellbird, black back gull, brown creeper, fantail, fernbird, grey warbler, harrier hawk, kaka, kereru, magpie, South Island pied oystercatcher, rifleman, silveryeye, skylark, swallow, tomtit, tui, sub-Antarctic skua, red crowned parakeet, blue penguin, Fiordland crested penguin, long tailed cuckoo, morepork, kingfisher, Stewart Island robin, shining cuckoo, sooty shearwater, Southern brown kiwi and white fronted tern have been recorded during this and previous bird surveys. A number of these are nationally threatened or at risk (Table 2).

Scientific Name	Common Name	National status <sup>7</sup>	Comments
<i>Apteryx australis lawryi</i>	Southern brown kiwi	threatened: nationally endangered	Bird observation – Mamaku Point
<i>Bowdleria punctata stewartiana</i>	fernbird	threatened: nationally vulnerable	Bird observation – Mamaku Point
<i>Eudyptes pachyrhynchus</i>	Fiordland crested penguin	threatened: nationally vulnerable	Bird observation – Mamaku Point
<i>Nestor meridionalis</i>	kaka	threatened: nationally vulnerable	Bird observation – Mamaku Point
<i>Puffinus griseus</i>	sooty shearwater	at risk: declining	Bird observation – Mamaku Point
<i>Haematopus finschi</i>	South Island pied oystercatcher	at risk: declining	Bird observation – Mamaku Point
<i>Sterna striata</i>	white fronted tern	at risk: declining	Bird observation – Mamaku Point
<i>Eudyptula minor</i>	blue penguin	at risk: declining	Bird observation – Mamaku Point
<i>Catharacta antarctica</i>	sub-Antarctic skua	at risk: naturally uncommon	Two birds on end of Mamaku Point observed during HVA survey – territorial. Nest every year pers. comm. Ernie Mason via Rachel Edgerton. Probably not commonly nesting on Stewart Island itself.
<i>Eudynamys taitensis</i>	long tail cuckoo	at risk: naturally uncommon	Bird observation – Mamaku Point
<i>Cyanomorphus novaezelandiae</i>	red crowned parakeet	at risk: relict	Bird observation – Mamaku Point
<i>Petroica australis</i>	Stewart Island robin	at risk: relict	Bird observation – Mamaku Point
<i>Acanthisitta chloris chloris</i>	rifleman	not threatened	Bird observation – Mamaku Point. Reintroduced to mainland Stewart Island from Codfish Island.

**Table 2: Nationally threatened/at risk and regionally notable plant species known from Mamaku Point.**

A search of the National Herpetofauna Database (DOC) reveals that seven species of lizards are, or were, known from Stewart Island. The southern skink (*Oligosoma notosaurus*), not threatened, is probably already present in the Mamaku Point reserve (presumably this is the species commonly seen by the manager, Anthony Simpson). A summary of the lizard fauna on the island is shown in Table 3. Note that the ‘likelihood of occurrence’ and ‘suitability for translocation’ are based only on my very limited expertise.

Other fauna could include native bats which are known to occur around Halfmoon Bay, and occasional seals, sea lions, leopard seals or elephant seals which are occasional visitors elsewhere on the island.

<sup>7</sup> Robertson et al. 2016. Conservation status of New Zealand birds. New Zealand Threat Classification Series 19. Department of Conservation.



Scientific Name	Common Name	Conservation status 2015 <sup>8</sup>	Known locations (source...)	Notes	Date	Likelihood of occurrence at Mamaku Point	Suitability for trans-location to Mamaku Point
<i>Oligosoma aff. polychroma</i> clade 5	Southern grass skink	at risk: declining (taxonomically indeterminate)	Lee Bay, Masons Bay, Little Hellfire, Big Hellfire, translocated to Ulva Island.	Definitely on Stewart Island but not common. One record from Lee Bay - captured and identified in 1975 by the Wildlife Service (unknown observer), though this could have been a mis-ID.	various dates, 1975 at Lee Bay.	low-moderate	high?
<i>Mokopirirakau nebulosus</i>	Cloudy gecko	at risk: recovering	North-eastern muttonbird islands.		1960's.	low?	high?
<i>Oligosoma chloronoton</i>	Green skink	at risk: declining	The Neck, Rollers Beach (forest 250m).	Two records only.	1979, 1988.	low-moderate	high?
<i>Oligosoma notosaurus</i>	Southern skink	not threatened	Little Hellfire, Table Hill (700m), Masons Bay, northern Freshwater, Herekopare Island/Marama Island (NE muttonbird islands).	The 'common skink' on Stewart Island - dark and fast and in high densities at most places it occurs.	various.	already present? Probably the skink commonly seen by the manager (Anthony Simpson).	high?
<i>Oligosoma stenotis</i>	Small-eared skink	at risk: naturally uncommon	Table Hill, Blaikies Hill, Mount Anglem, Mount Rakeahua, north of Thomsons Ridge, east of Mount Allen.		1980's, 1990's and 2000's.	low?	high?

<sup>8</sup> Hitchmough et al. 2015. Conservation status of New Zealand reptiles. New Zealand Threat Classification Series 17. Department of Conservation.

<i>Sphenodon punctatus</i>	Tuatara	at risk: relict	Native Island, Back Beach (The Neck).		1983 at The Neck (bone), 1951 at Native Island (dead specimen).	low	high?
<i>Tukutuku rakiurae</i>	Harlequin gecko	threatened: nationally vulnerable	North of Thomsons Ridge, south-west of Bald Hill, Rakeahua River, east of Mount Allen.		2009 +	low	high?
<i>Oligosoma</i> sp.	Oligosoma species (undetermined)	n/a	Table Hill, Mount Anglem, Whero Rock, Martins Creek, Masons Bay, Bird Island (Ruapuke Group).		1950-2000+	n/a	n/a

**Table 3: Lizard fauna, past and present, of Stewart Island. Source: DOC Herpetofauna Database.**

### **Other values**

The reserve has great value and potential as a vehicle for conservation education and advocacy.

Historic and pre-historic archaeological sites are dotted around Halfmoon/Horseshoe Bay (Fig. 2) and attest to the long human history and resource use of the area. At Mamaku Point itself, a historic settlement, or kaik, was present. The location of this, according to the NZ Archaeological Association database, was just east of the main gully on the northern coast (though it should be noted that coordinates for older NZAA records may be inaccurate). Other known sites beyond the reserve include timber mills and tram lines as well as older signs of Maori occupation such as middens, ovens (some with moa bones), kainga and stone flaking sites.



**Sub-Antarctic skua; one of a pair that regularly occupy Mamaku Point. North-eastern muttonbird islands in the background.**

### **Threats and Modifiers**

Since the erection of the predator/browser proof fence, pest numbers are likely to have been maintained to very low levels (some reinvasion occurs around the ends of the fence where they meet the coast). Cats, possums and rats have been trapped inside the reserve, but in very low numbers. Deer were not recorded as present in the first year of the Trust's operation, but could be present at very low densities (?). Mustelids, rabbits, hares and pigs are absent from the island.

The main area of intact rimu-kamahi forest, like most reasonably accessible areas around present day Halfmoon Bay and Horseshoe Bay, has almost certainly been logged in the past. The northern portions of the site have been cleared of their former forest cover and were grazed up until 2000. However, these areas would be expected to revert relatively quickly to native shrubland and scrub over time, particularly given the absence of key mammalian herbivores such as deer, hares, rabbits, rats and possums. The understorey over much of the reserve should also be benefitting from intensive pest control.

Weed issues are surprisingly minor. At least 37 exotic plant species are present, but these consist mainly of ubiquitous grasses and herbs, and there are few weeds of conservation concern present. Those that are present are generally not abundant or widespread. These include macrocarpa, gum trees, ragwort, Chilean rhubarb (*Gunnera tinctorial*), Darwin's barberry (*Berberis darwinii*), gorse, bidibid and exotic grasses.

Common Name	Scientific Name	Comments
Darwin's barberry	<i>Berberis darwinii</i>	Not seen during the survey. Landowner observation. Barberry is the subject of an on-going eradication program by DOC and control has extended to the reserve.
gorse	<i>Ulex europaeus</i>	Uncommon, seen in just a few places on ex-farmland on the north coast. There could be more in the south near Horseshoe Bay. Controlled by the owners.
bidibid	<i>Acaena anserinifolia</i>	Locally abundant and dominant in ex-grassland. Probably suppresses natural regeneration of native woody colonisers (?).
exotic grasses	<i>various</i>	Probably suppresses natural regeneration of native colonisers to some extent, and will need controlling around plantings i.e. release weeding.
macrocarpa	<i>Cupressus macrocarpa</i>	Not seen during HVA survey. Being removed by the owners.
gum tree	<i>Eucalyptus sp.</i>	Not seen during HVA survey. Being removed by the owners.
ragwort	<i>Jacobaea vulgaris</i>	Present in ex-farmland and in disturbed areas. Being removed by the owners.

**Table 4: Conservation weeds at Mamaku Point.**

## Ecological Significance

An ecological significance assessment table is provided in Appendix 4. Significance is assessed using a range of commonly used criteria including representativeness, naturalness, threat, rarity/special features. Note that scores reflect significance at regional scales.

In general terms, the natural environments of the greater Stewart Island/Rakiura area have national significance. They are both physically and ecologically highly connected, and have experienced a limited amount of modification compared to mainland New Zealand<sup>9</sup>.

Specifically:

- The area supports an outstanding and unusually diverse range of habitats and ecosystems, many of which are in excellent condition and have few threats. Habitats range from the rocky foreshore/coast and sandy beaches to coastal faces and hill country.
- Under a national ecosystem classification, the HVA supports at least seven distinct ecosystem types, and at a minimum, eight vegetation types. These reflect both natural environmental gradients (particularly of salinity) and past human disturbance.
- The flora is highly representative of Stewart Island's plant communities. The forest species in particular represent a major proportion of the forest flora of Stewart Island.

<sup>9</sup> Department of Conservation. *Stewart Island/Rakiura Conservation Management Strategy and Rakiura National Park Management Plan 2011-2021*  
Department of Conservation, Southland.

- Mamaku Point supports a great number of nationally threatened flora and fauna and given the pest free status of the site, there is huge potential for the translocation or reintroduction of others. Coastal turfs are classified as a naturally rare<sup>10</sup> and critically endangered ecosystem<sup>11</sup>.
- The degree to which the site exhibits ecological connectivity/buffering is outstanding. The unbroken transitions from the marine environment and shoreline to terrestrial plant communities are a feature of the site. Intact, natural transitions of this nature are relatively uncommon outside of Rakiura.
- Under regional guidelines, almost all of the natural habitats would meet or exceed one or more of the criteria for significance (i.e. representativeness; rarity and distinctiveness; diversity and pattern; and ecological context) under the Southland Regional Policy Statement<sup>12</sup>.

## Recommendations/Management

Note that a restoration plan will probably be commissioned by the owners in the future. Such a plan is beyond the scope of this report. However, some recommendations follow regarding management and restoration.

*Pest control:* It is obvious that the ongoing control of non-native mammals is critical to the health of both flora and fauna within the reserve, and to the potential of the site for future species translocations. Intensive pest control has been in place since about 2000. The biosecurity fence is the first and arguably the most important aspect for maintaining pest numbers to low or non-existent levels. The second line of defence is provided by fenced cells on the Reserve side of each end of the fence. The third line of defence is provided by trapping and baiting throughout the property and immediately outside the biosecurity fence.

*Protection:* To my knowledge, the reserve does not have long-term legal protection. QEII covenants are one way to achieve this even if the property changes hands in the future.

*Weed control:* The Trust's weed control strategy appears sound, particularly their approach to gorse. In some situations, it is known as a 'nursery' plant that facilitates the regeneration of native species. However, considering its low profile currently within the reserve, and potential to spread to other properties, I agree that its control and eradication are the right approach. Darwin's barberry, Chilean rhubarb, macrocarpa and gums should all continue to be controlled/eradicated. Rank grass and the native bidibid (*Acaena anserinifolia*) will also need to be controlled prior to any restoration plantings.

*Restoration plantings:* In the absence of any human assistance, over time shrubland would naturally establish in the ex-pasture land. However, there is certainly plenty of scope for 'enhanced' regeneration of the northern grassland slopes through large-scale plantings, with possible assistance from the Billion Trees Fund. This would be consistent with the Trust's aims with respect to re-wilding some areas, though this would need to be balanced against any need to maintain some areas of open grassland/shrubland as suitable habitat for translocated species in the future e.g. lizards or other fauna.

Rank grass and bidibid will need to be sprayed off before planting, and release weeding is likely for at least 2 years to minimise plant losses. Given the exposure of the site, plant guards would be a worthwhile investment. However, the absence of rabbits, hares and deer is good news for restoration plantings.

A great variety of native shrubs and trees could be considered for the northern hillslopes. These include locally sourced kamahi, *Coprosma areolata*, broadleaf (*Griselinia littoralis*), marbleleaf (*Carpodetus serratus*), shore hebe (*Veronica elliptica*), rimu, manuka, *Coprosma propinqua*, *Olearia lineata*, *Olearia*

<sup>10</sup> Williams et al. 2007. New Zealand's historically rare terrestrial ecosystems set in a physical and physiognomic framework. *New Zealand Journal of Ecology* 31 (2): 119-128.

<sup>11</sup> Holdaway et al. 2012. Status Assessment of New Zealand's Naturally Uncommon Ecosystems. *Conservation Biology* Volume 26, Issue 4, pages 619–629.

<sup>12</sup> Environment Southland 2017. Southland Regional Policy Statement.

*arborescens*, *Brachyglottis rotundifolia*, southern rata, kohuhu (*Pittosporum tenuifolium*), shining karamu (*Coprosma lucida*), wineberry (*Aristotelia serrata*), stinkwood (*Coprosma foetidissima*), *Coprosma rigida*, red mapou (*Myrsine australis*), narrow-leaved mahoe (*Melicactus lanceolatus*), tree fuchsia, lancewood (*Pseudopanax crassifolius*), three-finger (*Pseudopanax colensoi*), *Olearia avicenniifolia* and probably others. These plants are all naturally found on Stewart Island in similar habitat and could be relatively hardy and/or fast growing. However, test plantings could be advisable to narrow down the list.

Re-planted areas, and possibly some of the existing naturally regenerating scrub and shrubland, would also qualify for carbon credits. One company that can provide advice on this is Ekos (<https://ekos.org.nz/>).

*Additional plant restoration opportunities:* Plant species presumably absent but which could be considered for translocation include the following:

- Punui (*Stilbocarpa lyallii*; status: At Risk - Recovering): This species is a highly palatable mega-herb endemic to the Stewart Island region. It would once have been widespread around the coast and coastal forest of Stewart Island, however is now close to extinction on the mainland. It remains abundant on Whenua Hou/Codfish Island and on muttonbird islands.
- Coastal Carrot (*Anisotome lyallii*; status: At Risk - Relict): This herbaceous plant is endemic to southern New Zealand. It is another highly palatable plant and has been much reduced in abundance on Stewart Island and the mainland.
- *Drymoanthus flavus* (status: At Risk - Declining): This small perching orchid is thought to have been reduced by possum. It is not known if this species has been successfully translocated previously.
- *Coprosma wallii* (status: At Risk - Declining). Habitat includes forest margins, scrub, shrubland. On Stewart Island, known only from the Rakeahua valley.
- *Olearia lineata* (status: At risk - Declining). On Stewart Island, known only from the Rakeahua and Freshwater Valleys in low altitude scrub, shrubland and scrubby forest.
- *Melicactus flexuosus* (status: Threatened: Nationally Vulnerable). Locally common in low altitude scrub. Known from Masons Bay, Rakeahua/Freshwater Valleys and Port Pegasus.
- Slender wine sedge (*Carex tenuiculmis*) (status: At risk – Declining). Habitat includes seepages and swampy areas.
- *Carex strictissima* (status: Threatened – Nationally Endangered). Rare on Stewart Island. Habitat includes coastal and low altitude damp scrub and shrubland.
- Sand spurge (*Euphorbia glauca*) (status: At Risk - Declining). Present in one location on the beach below Mamaku Point. Could be translocated to other suitable habitats within the reserve to safeguard the population.
- Stewart Island forget-me-not (*Myosotis rakiura*) (status: At Risk – Naturally Uncommon). At least one good population present in one area at Mamaku Point but could be translocated to other suitable habitats.

*Further biodiversity surveys:* It would also be worth undertaking further flora surveys to gain a better appreciation of the flora that is present. Also, bat and lizard surveys.

*Monitoring:* Deer control remains the ‘elephant in the room’ when it comes to pests on Stewart Island, and apart from a limited number of 20m x 20m enclosure/control permanent forest plots on DOC land (which may no longer be maintained), and comparison with areas where deer are absent (e.g. Ulva Island, Codfish

Island and others) scientific evidence for the continued impact of deer on the health of Stewart Island's forests is scarce. Therefore, it could be worth formally documenting vegetation recovery and state within the reserve with permanent plots, transects and/or photopoints.

*Fauna reintroductions and translocations:* Consideration of this is beyond the scope of this report. However, the Trust has the aim of conserving and seeking to re-establish absent native species including yellowhead/mōhua, South Island saddleback/tieke, tuatara and potentially other lizard species.

## **Summary**

Mamaku Point supports an outstanding and unusually diverse range of flora, fauna, habitats and ecosystems, many of which are in excellent condition and have few threats. These are attributes not often found on private land anywhere on Stewart Island, or in Southland.

Even if its status as a predator/browser free sanctuary was ignored, it would still have outstanding biodiversity values. However, it is clear that as a sanctuary, its pest free status is having benefits for the whole ecosystem. The area already supports a great number of nationally threatened flora and fauna and given the pest free status of the site, there is huge potential for the translocation or reintroduction of others.

Mamaku Point has much to offer in terms of biodiversity enhancement, conservation advocacy and education. With or without additional efforts to enhance biodiversity within the reserve, the area will no doubt continue to recover and flourish. However, fulfilment of this potential will benefit the ecology of the reserve as well as nearby areas, and the wider community.

For further details please contact:

Mark Oster, Environment Southland – ph. 03 211 5115

Chris Stowe, Urtica Ecology – ph. 03 234 9343 or 021 128 6486

## Appendix 1: Waypoint/Photopoint list

Waypoint no.	Grid reference	Bearing	Description
1	E: 1228536 N: 4798707	40	Photopoint: Dense, regenerating coastal scrub south of Bob's Point.
2	E: 1228629 N: 4799230	110	Photopoint: Face south of Bob's Point with scattered manuka, mingimingi and one of the two seepage wetlands. The dryland areas would benefit from restoration plantings.
3	E: 1229023 N: 4799220	110	Photopoint: Steep coastal faces towards Mamaku Point with shore hebe, knobby clubrush, <i>Poa</i> spp., exotic grasses and <i>Coprosma propinqua</i> .
4	E: 1229015 N: 4799256	70	Photopoint: Another exposed coastal face with <i>Poa astonii</i> (?), knobby clubrush and shore hebe. Stewart Island forget-me-not is present in this area.
5	E: 1229002 N: 4799264	210	Photopoint: Small area of coastal 'turf' at bottom of slope with much glasswort and native ice plant. Coastal turfs are considered a threatened ecosystem.
6	E: 1229086 N: 4799065	120	Photopoint: Another of the large ex-grassland areas midway along coast towards Mamaku Point. One of the seepages is also visible. This would be good habitat for <i>Carex tenuiculmis</i> .
7	E: 1229261 N: 4798876	130	Photopoint: Area of <i>Coprosma</i> grey scrub and regenerating hardwoods.
8	E: 1229300 N: 4798828	60	Photopoint: One of about eight or so Mamaku tree ferns in the gully midway along the coast.
9	E: 1229887 N: 4798747	170	Photopoint: View south from Mamaku Point into less disturbed forest and scrub along the eastern coastline.
10	E: 1229767 N: 4798708	240	Photopoint: View west along open faces with the mamaku gully in the background.
n/a	n/a	n/a	Shore spurge ( <i>Euphorbia glauca</i> ) on the beach head below Mamaku Point.
n/a	n/a	n/a	Wind-shorn scrub on a coastal bank towards Bob's Point. Restoration plantings will have to deal with strong, salt laden winds.



**Appendix 2: Photopoint images**



**Photopoint: Dense coastal and regenerating mixed hardwood scrub south of Bob's Point (waypoint 1).**



**Photopoint: Face south of Bob's Point with scattered manuka, mingimingi and one of the two seepage wetlands. The dryland areas would benefit from restoration plantings (waypoint 2).**



Photopoint: Steep coastal faces towards Mamaku Point with shore hebe, knobby clubrush, *Poa* sp., exotic grasses and *Coprosma propinqua* (waypoint 3).



Photopoint: Another exposed coastal face with *Poa astonii* (?), knobby clubrush and shore hebe. Stewart Island forget-me-not is present in this area (waypoint 4).



**Photopoint: Small area of coastal 'turf' at bottom of slope with much glasswort and native ice plant. Coastal turfs are considered a threatened ecosystem (waypoint 5).**



**Photopoint: Another of the large ex-grassland areas midway along coast towards Mamaku Point. One of the seepages is also visible. This would be good habitat for *Carex tenuiculmis* (waypoint 6).**



**Photopoint: Area of *Coprosma* grey scrub and regenerating hardwoods (waypoint 7).**



**Photopoint: One of about eight or so Mamaku tree ferns in the gully midway along the coast (waypoint 8).**



**Photopoint: View south from Mamaku Point into less disturbed forest and scrub along the eastern coastline (waypoint 9).**



**Photopoint: View west along open faces with the mamaku gully in the background (waypoint 10).**



**Shore spurge (*Euphorbia glauca*) on the beach head below Mamaku Point (no waypoint).**



**Wind-shorn scrub on a coastal bank towards Bob's Point. Restoration plantings will have to deal with strong, salt laden winds (no waypoint).**

### Appendix 3: Site plant species list

Note: This species list has been compiled during the rapid HVA field survey of the northern coastal areas of Mamaku Point and an earlier survey of the forested areas by Brian Rance (DOC). The HVA survey focused on dominant and common species, as well as some rarer indicator species; therefore, it is not a complete list for the site.

Observer:

B = Brian Rance (unpublished report May 2013)

C = Chris Stowe (HVA survey)

\* denotes introduced species.

Life form	Species Name	Common Name	Observer
Climber/Scrambler	<i>Clematis paniculata</i>	clematis	B
Climber/Scrambler	<i>Metrosideros diffusa</i>	white climbing rata	B C
Climber/Scrambler	<i>Muehlenbeckia axillaris</i>	creeping poeuhue	C
Climber/Scrambler	<i>Muehlenbeckia complexa</i>	pohuehue	C
Climber/Scrambler	<i>Ripogonum scandens</i>	supplejack	B C
Climber/Scrambler	<i>Rubus australis</i>	a bush lawyer	B C
Climber/Scrambler	<i>Rubus cissoides</i>	a bush lawyer	B C
Climber/Scrambler	<i>Tetragonia implexicoma</i>	New Zealand spinach	C
Fern	<i>Asplenium appendiculatum</i>	ground spleenwort	B? C?
Fern	<i>Asplenium bulbiferum</i>	mauku, mouki, hen and chicken	B C
Fern	<i>Asplenium flaccidum</i>	raukatauri, hanging spleenwort	B C
Fern	<i>Asplenium gracillimum</i>	hen and chicken fern	C?
Fern	<i>Asplenium lyallii</i>	Lyall's spleenwort	C
Fern	<i>Asplenium obtusatum</i>	shore spleenwort	C
Fern	<i>Asplenium polyodon</i>	petako, sickle spleenwort	C
Fern	<i>Asplenium scleroprium</i>	southern shore spleenwort	C
Fern	<i>Asplenium x</i>	Asplenium hybrid unknown	C
Fern	<i>Blechnum blechnoides</i>	shore hard fern	C
Fern	<i>Blechnum chambersii</i>	rereti, lance fern	B C
Fern	<i>Blechnum discolor</i>	piupiu, crown fern	B C
Fern	<i>Blechnum durum</i>		C?
Fern	<i>Blechnum fluviatile</i>	kiwakiwa, creek fern	B C
Fern	<i>Blechnum novae-zelandiae</i>	horokio, kiokio	B C
Fern	<i>Blechnum procerum</i>	small kiokio	C
Fern	<i>Blechnum vulcanicum</i>	korokio, mountain hard fern	C
Fern	<i>Cyathea medullaris</i>	mamaku, black tree fern	C
Fern	<i>Cyathea smithii</i>	katote, soft tree fern	B C
Fern	<i>Dicksonia squarrosa</i>	wheki, rough tree fern	B C
Fern	<i>Histiopteris incisa</i>	mata, water fern	B C
Fern	<i>Hymenophyllum demissum</i>	irirangi, pipiripi	B C
Fern	<i>Hymenophyllum dilatatum</i>	matua mauku	B
Fern	<i>Hymenophyllum flabellatum</i>	fan-like filmy fern	B
Fern	<i>Hymenophyllum frankliniae</i>	rusty filmy fern	B
Fern	<i>Hymenophyllum rarum</i>	a filmy fern	B
Fern	<i>Hymenophyllum revolutum</i>	a filmy fern	B C
Fern	<i>Hymenophyllum sanguinolentum</i>	a filmy fern	B
Fern	<i>Hypolepis ambigua</i>		C
Fern	<i>Lastreopsis hispida</i>	hairy fern	B
Fern	<i>Leptopteris hymenophylloides</i>	heruheru, single crape fern	B
Fern	<i>Microsorium pustulatum</i>	paraharaha, hound's tongue	B C
Fern	<i>Notogrammitis billardiarei</i>	a finger fern	B C
Fern	<i>Notogrammitis heterophylla</i>	comb fern	C



Life form	Species Name	Common Name	Observer
Fern	<i>Paesia scaberula</i>	matata, ring fern	B C
Fern	<i>Polystichum neozelandicum</i>		C
Fern	<i>Polystichum vestitum</i>	puniu, prickly shield fern	B C
Fern	<i>Pteridium esculentum</i>	aruhe, bracken	B C
Fern	<i>Pyrosia eleagnifolia</i>	leather-leaf fern	B C
Fern	<i>Rumohra adiantiformis</i>	climbing shield fern	B
Fern ally	<i>Lycopodium volubile</i>	waewaekoukou, clubmoss	B
Fern ally	<i>Tmesipteris elongata</i>	a chain fern	B
Fern ally	<i>Tmesipteris tannensis</i>	a chain fern	B C
Herb	<i>Acaena anserinifolia</i>	bidibid	B C
Herb	<i>Apium prostratum</i> var. <i>filliforme</i>	NZ celery	C
Herb	<i>Callitriche stagnalis</i> *	starwort	C
Herb	<i>Cardamine debilis</i>	NZ bitter cress	C
Herb	<i>Centella uniflora</i>	a native herb	B C
Herb	<i>Cerastium fontanum</i> *	mouse ear chickweed	C
Herb	<i>Cerastium glomeratum</i> *	mouse ear chickweed	C
Herb	<i>Cirsium arvense</i> *	Californian thistle	B C
Herb	<i>Crassula moschata</i>	shore stone crop	C
Herb	<i>Crepis capillaris</i> *	hawksbeard	C
Herb	<i>Disphyma australe</i> subsp. <i>australe</i>	horokaka, native ice plant	C
Herb	<i>Epilobium pedunculare</i>	long-stalked willow herb	B C
Herb	<i>Erythranthe guttatus</i> *	monkey musk	C
Herb	<i>Euchiton ruahinicus</i>	a cudweed	B C
Herb	<i>Euphorbia glauca</i>	shore spurge, sea spurge,	C
Herb	<i>Gentiana saxosa</i>	shore gentian	C
Herb	<i>Hydrocotyle heteromeria</i>	a penny wort	B C
Herb	<i>Hydrocotyle moschata</i>	a penny wort	C
Herb	<i>Hydrocotyle novae-zelandiae</i>	a penny-wort	B C
Herb	<i>Hypericum androsaemum</i> *	tutsan	C
Herb	<i>Hypochoeris radicata</i> *	catsear	B C
Herb	<i>Jacobaea vulgaris</i> *	ragwort	B C
Herb	<i>Lotus pedunculatus</i> *	birdsfoot trefoil	B C
Herb	<i>Luzuriaga parviflora</i>	lanternberry	B C
Herb	<i>Melilotus indicus</i> *	King Island melilot	C
Herb	<i>Montia fontana</i>	Blinkswater chickweed	C
Herb	<i>Myosotis rakiura</i>	Stewart Island forget-me-not	C
Herb	<i>Nasturtium microphyllum</i> *	watercress	C
Herb	<i>Nertera depressa</i>		B C
Herb	<i>Nertera villosa</i>		B C
Herb	<i>Oxalis exilis</i>	a native oxalis	C?
Herb	<i>Plantago australis</i> *	swamp plantain	B
Herb	<i>Plantago lanceolata</i> *	narrow leaved plantain	B C
Herb	<i>Pseudognaphalium luteo-album</i>	a cud weed	B C
Herb	<i>Ranunculus acris</i> *	giant buttercup	B C
Herb	<i>Ranunculus membranifolius</i>	a native buttercup	B
Herb	<i>Ranunculus repens</i> *	creeping buttercup	B C
Herb	<i>Rumex acetosella</i> *	sheeps sorrel	B C
Herb	<i>Salicornia quinqueflora</i>	glasswort	C
Herb	<i>Samolus repens</i> var. <i>repens</i>	Sea primrose, shore pimpernel	C
Herb	<i>Selliera radicans</i>	Selliera, remuremu	C
Herb	<i>Senecio glomeratus</i>	a native groundsel	C
Herb	<i>Senecio minimus</i>	a native groundsel	B C
Herb	<i>Sonchus asper</i> *	prickly sow thistle, puha	C

Life form	Species Name	Common Name	Observer
Herb	<i>Sonchus kirkii</i>	shore puha	C
Herb	<i>Sonchus oleraceus*</i>	sow thistle	B C
Herb	<i>Stellaria media*</i>	chickweed	C
Herb	<i>Stellaria parviflora</i>	native chickweed	C
Herb	<i>Trifolium repens*</i>	white clover	B C
Herb	<i>Viola filicaulis</i>	a violet	C
Mistletoe	<i>Ileostylis micranthus</i>	green mistletoe	C
Monocot	<i>Astelia fragrans</i>	bush flax	B C
Orchid	<i>Corybas sp.</i>		C
Orchid	<i>Corybus trilobum</i>	a spider orchid	C
Orchid	<i>Dendrobium cunninghamii</i>	lady's slipper orchid	B
Orchid	<i>Earina autumnalis</i>	Easter orchid	B
Orchid	<i>Earina mucronata</i>	bamboo orchid	B
Orchid	<i>Thelymitra longifolia</i>	a sun orchid	B?
Rush/Sedge/Grass	<i>Agrostis capillaris*</i>	brown top	B C
Rush/Sedge/Grass	<i>Agrostis stolonifera*</i>	creeping bent	B C
Rush/Sedge/Grass	<i>Anthoxanthus odoratum*</i>	sweet vernal	C
Rush/Sedge/Grass	<i>Austroderia richardii</i>	toetoe	B C
Rush/Sedge/Grass	<i>Carex appressa</i>		B C
Rush/Sedge/Grass	<i>Carex aucklandica</i>	a hooked sedge	B
Rush/Sedge/Grass	<i>Carex coriacea</i>	a cutty grass	B C
Rush/Sedge/Grass	<i>Carex lectissima</i>	a hooked sedge	C
Rush/Sedge/Grass	<i>Carex trifida</i>	mutton-bird Sedge, tataki	C
Rush/Sedge/Grass	<i>Carex uncinata</i>	a hooked sedge	B C
Rush/Sedge/Grass	<i>Carex virgata</i>	pukio, swamp sedge	C?
Rush/Sedge/Grass	<i>Dactylis glomerata*</i>	cocksfoot	B C
Rush/Sedge/Grass	<i>Ficinia nodosa</i>	wiwi, knobby club rush	C
Rush/Sedge/Grass	<i>Hierochloe redolens</i>	holy grass	B C
Rush/Sedge/Grass	<i>Holcus lanatus*</i>	Yorkshire fog	B C
Rush/Sedge/Grass	<i>Isolepis cernua var. cernua</i>	slender clubrush	C
Rush/Sedge/Grass	<i>Juncus articulatus*</i>	jointed rush	B
Rush/Sedge/Grass	<i>Juncus edgariae</i>	wiwi, Edgar's rush	B C
Rush/Sedge/Grass	<i>Juncus planifolius</i>	flat leaved rush	C
Rush/Sedge/Grass	<i>Juncus procerus*</i>	a giant rush	B C
Rush/Sedge/Grass	<i>Microlaena avenacea</i>	bush rice grass	B C
Rush/Sedge/Grass	<i>Poa astonii</i>	blue shore tussock	C?
Rush/Sedge/Grass	<i>Rytidosperma gracile</i>	a native grass	B
Sub-shrub	<i>Gaultheria antipoda</i>	bush snowberry	C
Tree/Shrub	<i>Aristolelia serrata</i>	makomako, wineberry	B C
Tree/Shrub	<i>Berberis darwinii*</i>	Darwin's barberry	C
Tree/Shrub	<i>Brachyglottis rotundifolia</i>	muttonbird scrub	B C
Tree/Shrub	<i>Carpodetus serratus</i>	putaputaweta, marble leaf	B C
Tree/Shrub	<i>Coprosma areolata</i>		B C
Tree/Shrub	<i>Coprosma foetidissima</i>	stinkwood	B C
Tree/Shrub	<i>Coprosma grandifolia</i>	kanono	B C +
Tree/Shrub	<i>Coprosma lucida</i>	shining karamu	B C
Tree/Shrub	<i>Coprosma propinqua</i>	mingimingi	B C
Tree/Shrub	<i>Coprosma rhamnoides</i>		B C
Tree/Shrub	<i>Coprosma rotundifolia</i>	round leaved coprosma	B C
Tree/Shrub	<i>Dacrydium cupressinum</i>	rimu	B C
Tree/Shrub	<i>Dracophyllum longifolium</i>	inaka	C
Tree/Shrub	<i>Fuchsia excorticata</i>	kotukutuku, tree fuchsia	B C
Tree/Shrub	<i>Griselinia littoralis</i>	kapuka, broadleaf	B C

Life form	Species Name	Common Name	Observer
Tree/Shrub	<i>Leptospermum scoparium</i>	manuka	B C
Tree/Shrub	<i>Melicytus lanceolatus</i>	narrow leaved mahoe	B C
Tree/Shrub	<i>Metrosideros umbellata</i>	southern rata	B C
Tree/Shrub	<i>Myrsine australis</i>	matipou, red mapou	B C
Tree/Shrub	<i>Neomyrtus pedunculata</i>	rohutu	B C
Tree/Shrub	<i>Olearia arborescens</i>	common tree daisy	C
Tree/Shrub	<i>Pittosporum tenuifolium</i>	kohuhu	B
Tree/Shrub	<i>Prumnopitys ferruginea</i>	miro	B C
Tree/Shrub	<i>Pseudopanax colensoi</i>	three finger	B?
Tree/Shrub	<i>Pseudopanax crassifolius</i>	lancewood	B C
Tree/Shrub	<i>Pseudowintera colorata</i>	horopito, pepper tree	B
Tree/Shrub	<i>Raukawa edgerleyi</i>	raukawa	B
Tree/Shrub	<i>Raukawa simplex</i>	haumakoroa	B
Tree/Shrub	<i>Schefflera digitata</i>	pate, seven-finger	B C
Tree/Shrub	<i>Solanum laciniatum</i>	poroporo, bullibulli	C
Tree/Shrub	<i>Ulex europaeus*</i>	gorse	B C
Tree/Shrub	<i>Urtica ferox</i>	onga onga	C
Tree/Shrub	<i>Veronica elliptica</i>	shore koromiko	B C
Tree/Shrub	<i>Weinmannia racemosa</i>	kamahi	B C

#### Appendix 4: Ecological Significance Assessment Table

Arguably present – CL5 Harakeke, Hebe elliptica flaxland/rockland on steep coastal faces but classified and included within SA9. Likely to be present in more than the one location mapped - SA7 Iceplant, glasswort herbfield/loamfield.

Site ID/Name: AGLM10 Mamaku Point					Assessor: Chris Stowe (Urtica Ecology)				Date: 31 August 2019		
Ecosystem code/name	Area (ha)	Representativeness <sup>13</sup>	Diversity & pattern	Rarity & special features	Naturalness & intactness	Size & shape	Viability & sustainability	Buffering & Connectivity	Threat & fragility <sup>14</sup>	Management input <sup>15</sup>	Total score /50
SA9 <i>Olearia</i> , <i>Brachyglottis</i> and <i>Dracophyllum</i> scrub/herbfield/loamfield [muttonbird scrub]	6.8	8	3.5	4	3.5	3.5	4	3	4	4	37.5
VS5 Broadleaved species scrub/forest	53.7	7	3.5	3	3	3.5	4	3.5	4	4	35.5
VS6 Matagouri, <i>Coprosma propinqua</i> , kowhai scrub [Grey scrub]	24.9	6	2.5	2	2.5	2	3	3.5	4	4	29.5
CLF6 Kamahi, southern rata, podocarp forest	90.0	8	3.5	4	4	4	4.5	4.5	4.5	4.5	41.5
SA7 Iceplant, glasswort herbfield/loamfield	0.03	8	3.5	3.5	4	3	4	3.5	3.5	4	37
CL10 Kiokio fernland/rockland	0.33	7	2.5	2.5	2.5	2.5	2.5	2	3.5	3.5	28.5
WL22 <i>Carex</i> , <i>Schoenus</i> sedgeland	0.4	7.5	2.5	3	3	3	3	2	3	3.5	30.5
<b>Overall site score:</b>		<b>8</b>	<b>5</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>42.0</b>

Scoring system: 1 = very low; 2 = low; 3 = moderate; 4 = high; 5 = very high

<sup>13</sup> Double the representative value score to score /10

<sup>14</sup> Counter-intuitive score where high ranking = low threat and fragility

<sup>15</sup> Counter-intuitive score where high ranking = low management input required

**Representativeness:** Does the site represent a good example of one of the characteristic types of native vegetation in the region/district? Includes an evaluation of the degree of modification of the site assessed, and comparison with natural areas of the same type and their historical and current rarity. Higher values are placed on the best examples but if few examples remain of a given type then poor quality sites can be rated highly.

**Diversity/pattern:** Is there a notable range of species and habitats? The diversity of flora and fauna, number of vegetation/habitat types, and presence of ecological gradients or intact ecotones/vegetation transitions.

**Rarity/special features:** Are there rare species or communities? Are there any features that make the site stand out locally, regionally or nationally? Rarity is the degree to which species or habitat types are reduced in extent or number, or are naturally rare, or support native species that are uncommon or threatened.

**Naturalness/intactness:** The combined degree of absence of disturbance or modification by human activity, pests and weeds.

**Size and shape:** How do size and shape influence character and viability? The size of an area of vegetation or habitat and the degree to which its shape influences the viability of the site.

**Viability/sustainability:** Does the site possess the resilience to maintain its ecological integrity and processes? The degree to which existing natural habitat is capable of maintaining or recovering its structure and composition; either in the absence of additional management, or, with a restoration programme if feasible.

**Buffering/surrounding landscape/connectivity:** What buffering exists for the site e.g. adjoining vegetation, waterways, fencing? What is the degree of ecological connection with surrounding areas? The extent to which an indigenous natural area is buffered from surrounding modifying influences and its connectivity with other natural areas. It also considers the degree to which an area of native habitat or vegetation links other such areas or contributes to the ecological significance of the immediate vicinity.

**Threats and fragility:** What are the main threats to the site? Threats are factors that could disturb the natural equilibrium of ecosystem functioning in the area while fragility measures its intrinsic vulnerability to environmental change taking into account other factors above e.g. threat processes and agents, effects of any proposed or future modification.

**Management input:** an assessment of the human effort that is required to maintain the inherent natural viability of a natural area. For example, weed control, fencing or replanting that is required. Assessment could include the nature and scale of intervention necessary and restoration potential.