

Baring Head ecological values

Prepared by Philippa Crisp



For more information, contact Greater Wellington:

Wellington
PO Box 11646

T 04
384 5708 F
04 385 6960

PK12/02/08

June 2011

www.gw.govt.nz

www.gw.govt.nz info@gw.govt.nz

1. Introduction

In July 2010, 284 hectares of land surrounding the Recreation Reserve were purchased for inclusion in East Harbour Regional Park and at the writing of this report was proposed to become a scenic reserve. This land sits adjacent to the Baring Head Recreation Reserve (11 ha) contains the lighthouse complex which has been part of the Greater Wellington Parks network since 1992.

Baring Head is a spectacular headland that contains a range of landform and ecosystem types in close proximity to each other. This mix of interconnected ecosystems provides a diverse variety of habitats for indigenous species and their communities. The Wellington Natural Heritage Trust pointed out in their submission to Greater Wellington that studies, as early as 1984, show that the property was noted for its exceptional ecological values. Many rare and threatened ecosystems are present in the area.

The ecological values described in this report have been drawn from a number of sources. Information provided in the Nature Heritage Fund application (Department of Conservation, 2010a) has been extensively used. Material from past and recent surveys has also been incorporated. Reference material includes botanical surveys (Frank, 1974; Micalfe and Home 1997; Hopkins *et al.* 2010; Emright, 2011), lizard surveys (Romijn, 2011) and invertebrate studies (Patrick, 2004).

1.1 Recent history of vegetation at Baring Head

A map dating back to 1859 indicates that the land was generally covered with 'fern and grass', with the marine terraces described as 'fine grazing land' (NZ Archaeological Association Newsletter, 1963). The northern section of the Baring Head property had an abundance of karaka, which extended for about half a mile. To the north of this area, the Wainuiomata Valley was forested with species including rimu, tītoki, kahikatea, rewarewa, maire, rātā, hinau, tawā, tōtara and "other pines of the finest description". At that time, sections of the river flats were used for cultivation of potatoes.

The land appears to have been farmed for a long period of time, initially by Maori but by the 1900s it is likely that Pakeha farmers had already leased or bought the land from its Maori owners for sheep farming. It is unclear which areas had been fenced off throughout this time, but old fences can be found around some of the native vegetation, e.g. on the valley scarp. All accounts indicate that the land has been farmed predominately for sheep and cattle (although pigs and horses have had access) up to the present day. In June 2011 this was limited to sheep grazing only.

1.2 Geology and landforms of Baring Head¹

In terms of geology, the Baring Head area is fairly typical of the wider Wellington region's Cook Strait coastline (in terms of greywacke and gravels). On the Baring Head property, substantial scree fans are conspicuous on the slopes above and adjacent to the Wainuiomata River. These have been created by two processes: erosion and earthquakes. The freeze-thaw

¹ Written with the assistance of Dr Hamish Campbell, Senior scientist, GNS Science.

effect on fractured rock has resulted in the angular rock found in the screes. Slope failure due to intense seismic shaking (i.e. earthquakes) has also had an effect. The last great earthquake to affect the Wellington region was the Wairarapa Earthquake of 14 January 1855, estimated to be of magnitude 8.2 or greater. There was a large displacement on the Wairarapa Fault causing about 60% of all slopes in the Rimutaka and Orongorongo Ranges to fail. These scree fans are still visible but are largely inactive today.

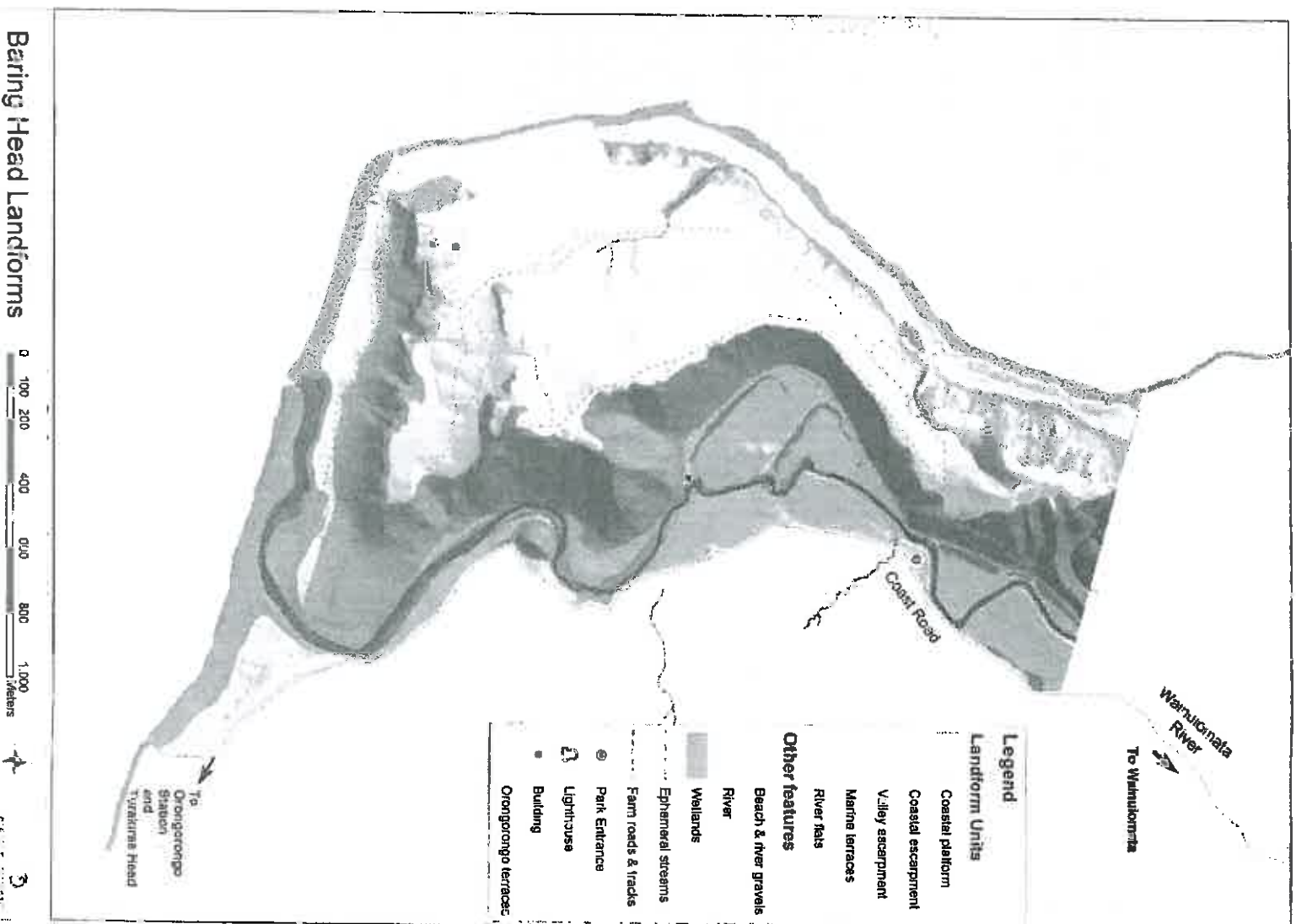
In terms of geomorphological attributes of the area, particularly notable are the wellpreserved remnants of raised beach ridge. This is one of the least disturbed sites known, and without protection is susceptible to natural degradation and human modification. Secondly, on Baring Head itself, remnants of two marine-cut surfaces can be seen. Since their original undersea formation both surfaces have been uplifted, and tilted to the north by successive rupture events on the Wairarapa Fault (located some eight kilometres to the southeast of Baring Head). The two uplift marine terraces are listed in the Hutt City Council District Plan as being of regional/national significance.

When comparing the 1859 map with current aerial photographs it is evident that the river course has experienced very little change in its course over the last 150 years. The mouth appears to have moved westward which maybe due to gravel dispersal by the Orongorongo River along the coast. The Wainuiomata River which runs along the eastern section of the land is a water body of National Importance. Baring Head is listed in the operative Regional Policy Statement as a Regionally Important Landscape and is a prominent feature of the Wellington Harbour.

Figure 1 (overleaf) shows the five distinct landforms within the block. These are:

1. A belt of coastal land extending from the high water mark through a stabilised coastal platform of sand and gravel dunes to the cliff base (63 hectares);
2. The coastal scarp which rises steeply from sea level to some 100 metres high in the north to around 40 metres high in the south. This scarp is comprised of a belt of steep cliff vegetation comprising coastal flaxland and grey scrub (25 hectares);
3. The coastal marine terraces comprising largely improved pastoral grassland in partially fenced blocks currently being used for sheep grazing (88 hectares);
4. A steep valley scarp above the Wainuiomata River valley covered in regenerating forest and grey scrub, with some gorse on the drier ridges (49 hectares); and
5. The river flats of the meandering lower Wainuiomata River valley comprising pastoral grassland, sedge land and pockets of gorse shrubland, ending in an ephemeral lagoon at the mouth, which periodically breaks through to the sea (60 hectares).

Figure 1: Landforms at Baring Head



2. Ecology by area

The ecological features of each of the landforms listed above are discussed in this section.

2.1 Coastal platform

The coastal platform is important for not only its fauna, but also its plant species and its plant communities. The raised shingle beach ecosystem (comprising of cushion plants, with spinifex (*Spinifex sericeus*) and sand tussock (*Poa billardierei*; Declining) has been described as a rare ecosystem type by Landcare Research, as have the coastal turf and rock stacks (Williams *et al.*, 2006). These South Wellington shingle beaches are thought to be among the best condition in the country (Susan Wiser, pers. comm.). Historical and recent surveys indicate that a number of fauna and flora have been recorded at this site. These are listed below:

Fauna:

- Bird species recorded include variable oystercatcher (*Haematopus unicolor*), banded dotterel (*Charadrius bicinctus*; Nationally endangered) and Caspian tern (*Sterna caspia*; Nationally threatened). Cook Strait blue penguin (*Eudyptula minor*) are also known to nest along the coastal platform.
- Lizard species include abundant common skink (*Oligosoma nigripantara polychroma*) and common gecko (*Hoplodactylus maculatus*), present on the dune and beach, while spotted skink (*Oligosoma lineocellatum*; Relict) and copper skink (*Oligosoma aeneum*) have been found there in the past.
- The coastal platform is important habitat for the coastal *Notoreas* moth (Chronically threatened), an invertebrate that feeds specifically on *Pimelea* spp.
- Katipo (*Larodectus katipo*; Chronically threatened), red admiral butterfly (*Vanessa gonerilla*) and Myers' cicada (*Maoricicada myersi*; At risk) are some of the more iconic invertebrates found at the site, along with healthy populations of some uncommon species of invertebrates (for example, *Helastia siris*, *Austrocidaria lithurga* and *Graphania omicron*).

Flora:

- Raoulia-dominated cushionfield, with mingimingi (*Coprosma propinqua* var. *propinqua*) and *Muehlenbeckia complexa*;
- Sand tussock and spinifex are found along with marram (*Ammophila arenaria*) and tauhinu (*Ozothamnus leptophyllus*) on the foredune. A small patch of pingao (*Ficinia spiralis*; Relict) is also present. Other plants recorded in the foredune include native broom (*Carmichaelia australis*), *Plagianthus divaricatus*, woollyhead (*Craspedia uniflora* var. *grandis*), *Carex pumila* and the native spinach (*Tetragonia implexicoma*).
- Rosette plants are scattered over loose gravels with storm debris. The adventives here are exotic horned poppy (*Glaucium flavum*) is found with occasional *Senecio elegans*, and introduced sand binding marram;
- Seepages containing *Crasula trkii* (Naturally uncommon), *Isolepis basilaris* (Nationally endangered) have been identified.

Issues associated with the coastal platform are pest plants and animals, stock grazing and the impacts of four-wheel drive vehicles. There is an extensive area of boxthorn (*Lycium ferocissimum*) and lupin (*Lupinus arboreus*) in the eastern section of the coastal area, which will require some effort to control. Nesting birds and lizards will be affected by predators.

There is a long history of motorised vehicle use in the area. The majority of vehicles enter from the coast road close to the river mouth, finding crossing points before proceeding through the foredunes along tracks. Fauna and flora are very vulnerable to grazing and 4WD impacts especially when vehicles leave the established tracks. The banded dotterel and variable oystercatchers nest in scrapes in the gravel, while the indigenous sand-binders such as spinifex and pingao and the low-growing mat daisy (*Raoulia australis*) are damaged by browsing, trampling and vehicles.

Figure 2: Coastal platform (view from terrace towards rock formations and scree slope)



2.2 Coastal escarpment

This feature comprises vegetation at the toe of the scarp, rising through the steeper sections of the cliff to the marine terrace above. As with the coastal platform, this area is also important for flora and fauna, with a number of species present that are not found elsewhere along this section of the coast. The toe of the scarp is largely covered in divaricating species, such as mingimingi and pohuehue (*Muehlenbeckia complexa*), with large areas of tauhinu. Further up the slopes, flaxland dominates, with areas of tall shrubs or trees, such as thick-leaved mahoe (*Melicytus crassifolius*), coastal tree daisy (*Olearia solandri*) and *Hebe stricta*. Other species recorded include *Pimelea carnosa* hybrid, taupata (*Coprosma repens*), speargrass (*Aciphylla squarrosa*) and a number of fern species.

Common skink, copper skink, common gecko and spotted skink are all found on the coastal cliffs. Many of the moth species noted in the coastal platform also use this habitat.

The main issues to be addressed are the grazing of animals on the coastal scarp, environmental weeds, inappropriate plantings, and predators. While there is less grazing damage from stock on the steeper cliffs, stock can still access many areas, especially on the lower slopes. Along with Boxthorn, karo (*Pitrosporum crassifolium* agg.) is also present and although it is indigenous, it is not naturally-occurring in the Wellington Region. It was planted as an amenity species in recent years around the lighthouse buildings and it has spread extensively down the cliffs and is dominating the local flora in this area. It is known to form a monoculture of low ecological value if left unmanaged, so removal is necessary and urgent. Finally, predators (cats, rats, and mustelids) are reducing the native fauna populations.

Figure 3: Coastal escarpment



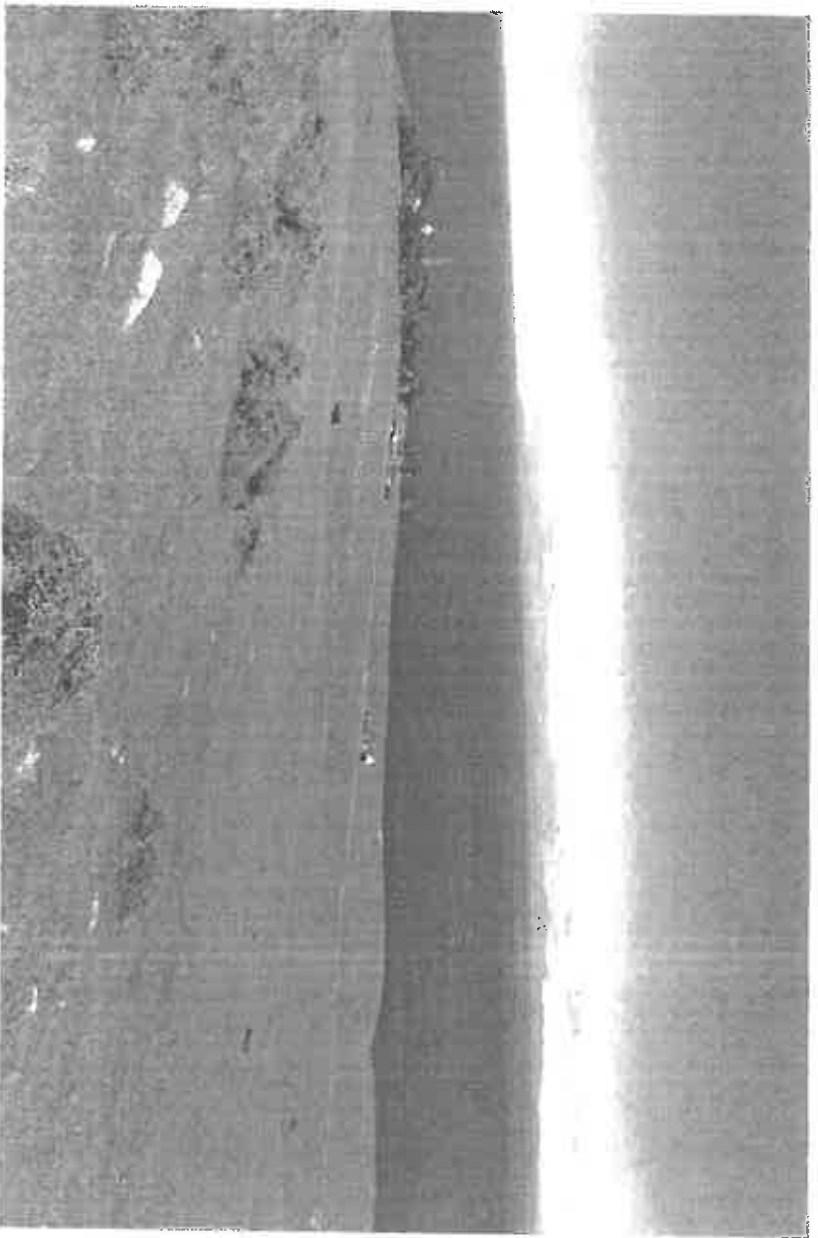
2.3 Marine Terraces

This area has largely been cleared for pastoral farming and today is predominately pastoral grassland though tauhinu is gradually extending on to the terraces. Mingimingi and pohuehue are found in this area, also the naturally-uncommon semi-woody herb, *Einadia allanii*. Pipit (*Chrysococcyx lucidas*), spur-winged plover (*Vanellus miles*) and Australasian harrier (*Circus approximans*) have been noted here.

In comparison with the other land forms units, there are fewer ecological values associated with the marine terraces because of the historical vegetation clearance. However, there has been some discussion as to how this area should be treated in the future. There are varied opinions as to

whether grazing should be retain, and debate as to how reversion of native plant species might occur. Currently there is very little gorse (*Ulex europaeus*) on the terraces and ongoing pest plant control will be needed if grazing were to be removed.

Figure 4: Marine terraces



2.4 Valley escarpment

This site has very high ecological values. The forest, shrubland, grey scrub and grassland contain threatened plant and animal species. The 'grey scrub community' is regarded as a 'rare plant community with a proposed conservation status of "Serious Decline"' (Sawyer, 2004). Grey scrub has evolved in the Cook Strait in response to exposure to the severe southerly storms which carry salt-laden air inland, restricting vegetation to mainly small-leaved, salt-tolerant shrubs and lianes (Wellington Botanical Society, 2011). Their decline is attributed to coastal farming and lianes expansion as well as adventive plant invasion. Species noted in the Baring Head 'grey scrub' community include Grey's groundsel (*Brachyglottis greyii*; Naturally uncommon), matagouri (*Discaria tomatow*; Regionally rare), *Clematis foliata*, and the mistletoes *Leostyilus micranthus* and *Korthalsella lindsayi*.

Much of the vegetative cover in the valley escarpment is of a low stature, with mingimingi, native broom, cabbage trees, tauhinu, *Clematis forsteri* and pohuehue present. Grey's groundsel, matagouri, *Clematis foliata*, mistletoes and coastal kowhai (*Sophora molloyi*; Naturally uncommon) are all rare species found in the area. Recent lizard surveys (Romjin, 2011) recorded

high lizard numbers in this area. Common gecko, copper, spotted and common skinks were found. Spotted skinks are found now only at a very few sites on the mainland of the region.

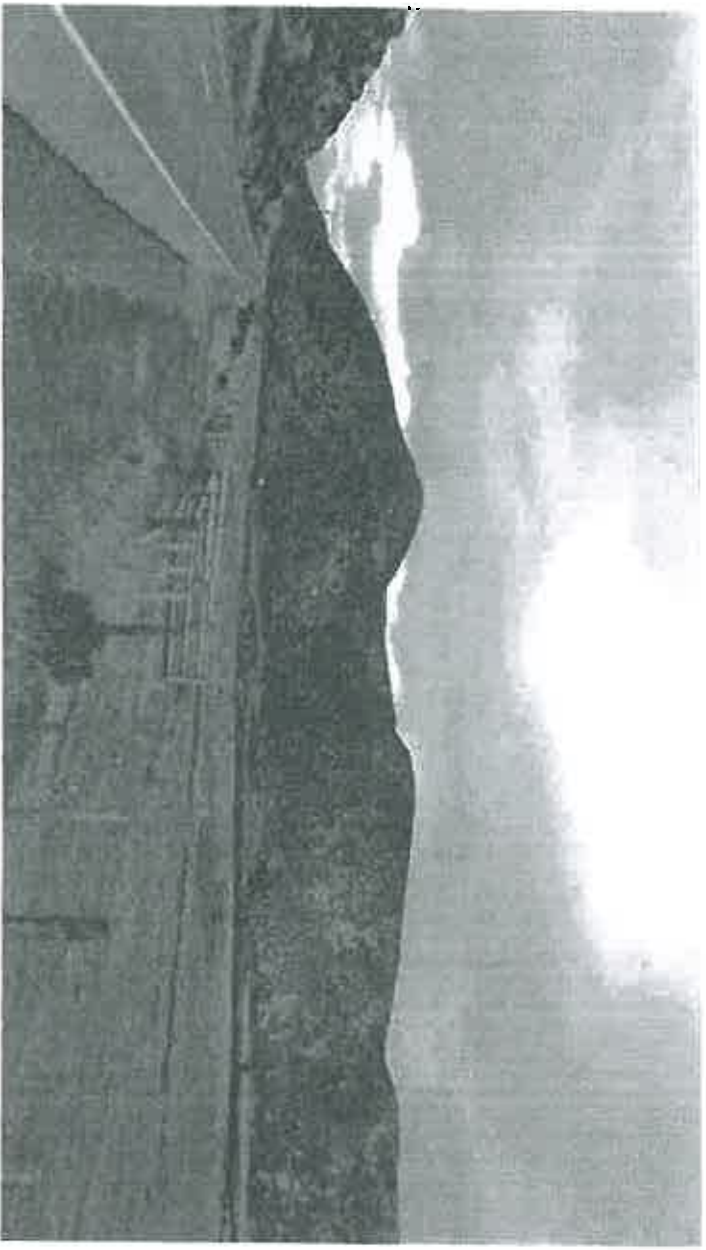
To the north of the river scarp, regenerating forest containing pigeonwood (*Hedycara arborea*), tītoki (*Alectryon excelsus* subsp. *excelsus*), ngaio (*Myoporum laetum*), red māpou (*Myrsine australis*), kākōmako (*Pennantia corymbosa*), manuka (*Leptospermum scoparium*) and cabbage tree (*Cordyline australis*) can be found. A grove of karaka trees (*Corynocarpus laevigatus*) is also present. It is presumed that this grove is a remnant dating back to Maori occupation of the area.

Bird species recorded include bellbird (*Anthornis melanura*), pipit (*Chrysococcyx lucidas*), New Zealand falcon (*Falco novaeseelandiae*; Nationally threatened), waxeye (*Zosterops lateralis*) and grey warbler (*Himantopus himantopus* subsp. *leucocephalus*).

There are some pest plants present in this area including some small patches of gorse and occasional boxthorn plants. These can be managed relatively easily and ongoing monitoring will ensure no future infestations.

Lizards find their home in the rock crevices that are cascade down the scarp. Permanently lowering rat and mice numbers would improve the habitat for these species. There is debate about whether or not stock should be allowed to continue to browse the area as a potential issue is the loss of grey scrub over time, as natural regeneration occurs. There is also the possibility that such regeneration or the introduction of pest plants such as veld grass (*Ehrharta erecta*) may affect lizard habitat if it invades, by invading the rock crevices. On the other hand, there is at present, an ongoing loss of the rarer plants being browsed by stock. The Wellington Botanical Society recently noted a loss of *Neostylus micranthus* plants and damage to *Clematis foliolata* through browsing by stock (Wellington Botanical Society, 2011). There is also debate as to whether or not the harsh environment will continue to maintain the vegetative cover as a grey scrub community. One possible way to investigate this would be to remove grazing animals and to monitor vegetation growth.

Figure 5: Valley escarpment (viewed from the Coast Road looking south)

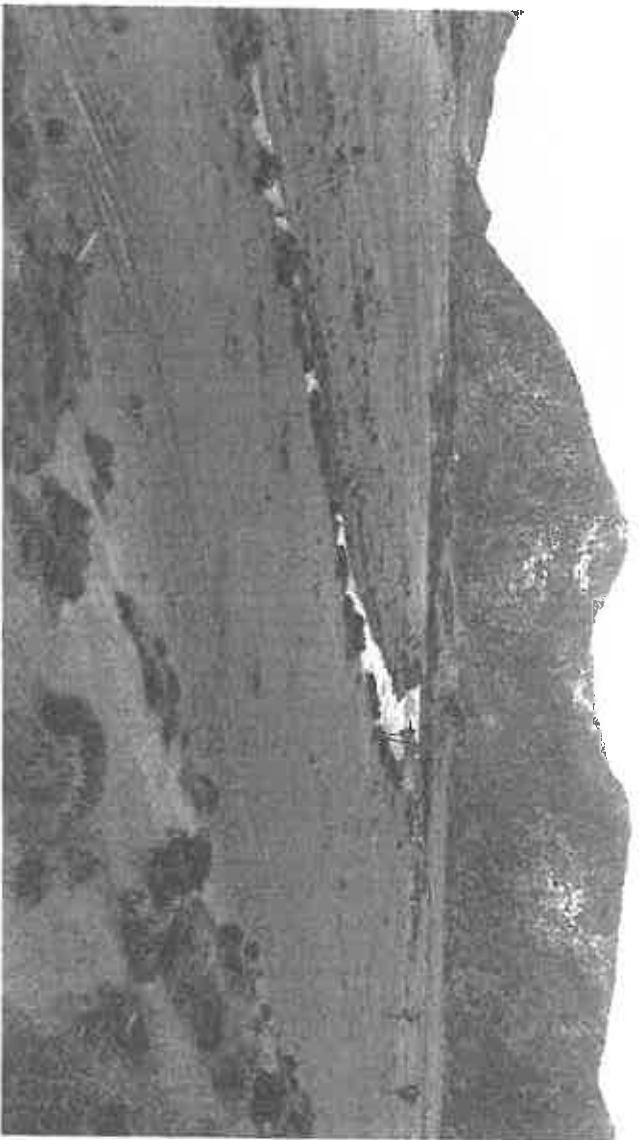


2.5 River Flats

This section comprises wetland areas between the toe of the scarp and the Coast Road. The old river course can be seen in the remnants of oxbows and some of the pasture land is reverting to wetland vegetation, such as rushes and sedges. There are large areas of gorse along both sides the river. The nationally endangered shrub, *tororaro* (*Muehlenbeckia astonii*) is also present in this section of Baring Head.

The lower river displays all the characteristics of a tidal river-mouth estuary, with a gravel bar obstructing the mouth, backed by a wide river basin almost 1km in length and an accompanying dune. Owing to earthquake uplift the river-mouth is now raised several metres above the high tide line. As there is little influence of salt water in the system, the river mouth is classed as a 'hapua' coastal lagoon. On this exposed site, vegetation is scarce and patchy; right up to the southern bank of the river, which blends into a dune ecosystem almost immediately, with large areas of shingle or bare substrate. Vegetation is densest in the lee of the dune, and mainly consists of patches of sand tussock, spinifex and *Carex pumila*. Mingimingi and thick-leaved māhoe are also present here, in low numbers. On the bare substrate, particularly along the river bank, mats of raoulia are present. Several threatened plant and invertebrate species have been recorded here. *Crassula makatona* and *Carex dipsacea* have recently been identified near the river.

Figure 6: River Flats



The Wainuiomata River is a listed WONI (Water of National Importance- Chadderton *et al.* 2004) with protection of its lower reaches described as of national importance. Wet sedgeland areas are particularly important as fish habitat while the lower section of the river (in the Baring Head block) provides good inanga spawning habitat.

The Wainuiomata River contains the following species of native fish: short and long finned eel (*Anguilla australis* and *A. dieffenbachia*); inanga (*Galaxias maculatus*); lamprey (*Geotria australis*); common, giant and red fin bully (*Gibiomorphus coitidamus*, *G. gobioides*, *G. huttoni*); koaro (*Galaxias brevipinnis*) and giant kokopu (*Galaxias argenteus*). All these species except short-finned eel and common bully have a conservation status of "Declining". There is an aquatic weed, *Egeria densa* present in the river in the vicinity of the white bridge.

Bird species recorded here include grey duck (*Anas superciliosa*; Nationally threatened), black shags, black swan and paradise shelduck. Baring Head has previously been recorded as a significant nesting site for black-backed gulls – the largest mainland colony in the region (Stephenson 1977). White heron (*Egretta alba*; Nationally critical) have also been seen here.

Pressure from unauthorised four-wheel drive vehicles is damaging the indigenous plants and their wetland habitat in the estuarine area. Grazing stock are also damaging to the wetlands and river edges, while pest animals such as mustelids and rats are impacting nesting birds numbers. Large patches of gorse need to be controlled to keep this pest plant from expanding further into the pasture grassland. There is debate about whether or not grazing should be continued in this area. It would be possible to remove stock from the waterways or the wetland areas by fencing, but some concern has

also been raised about the impact on lizards in the adjacent valley scarp. Grass left to go rank will seed and may attract rodents who eat the grass seed and then likely to predate on the lizards when the seed runs out. Ideally rodent control should be put in place around the lizard habitat on the river scarp if the stock were removed from the area.

3. Summary

The report illustrates the diverse range of indigenous flora and fauna that have been recorded in the Baring Head area. The number of rare and threatened species and communities surviving there in the area is testament to the special ecological status of the area as recognised by many who supported the purchase of Baring Head and its inclusion in East Harbour Regional Park. Management of this new area of the park needs to protect the values “in situ”. Management decisions need to consider how changes to the system (such as stock removal) will impact on habitats and plant communities. For example, a decision to no longer graze may mean an increase in rodent populations, which will in turn predate on lizard populations. Conversely, allowing stock to have access to native vegetation or wetland areas will have impacts on those ecological values.

Solutions must be tailored to the specific requirements of each landform area. An integrated approach of pest control and fencing to exclude stock, where it is necessary to continue grazing, will ensure that the flora and fauna are able to flourish. The priorities for protecting the area are:

- Removal of unauthorised four wheel drive vehicle access to the coastal platform
- Retirement of some landscape areas from grazing (at a minimum, the escarpments and coastal platform).
- Implementation of a pest plant and pest animal control programme (The Animal Health Board currently control possums and the Ranger has been culling goats, but immediate control of rodents and mustelids is recommended to assist the recovery of fauna).

Ongoing monitoring is needed to ensure that management decisions provide the best outcomes for the ecological values. It has been suggested that in the case of the ‘grey scrub’ communities that stock be removed from Baring Head and that this area be monitored against a grey scrub community of similar character which is grazed nearby.

There is debate about whether or not restoration plantings are required on the block. For example there may be a case for the reintroduction of appropriate plant species, where the numbers have been depleted over time, e.g. pingao and sand tussock on the foreshore.

4. References

- Chadderton, W.L.; Brown and D.J.; Stephens, R.T. 2004. Identifying freshwater ecosystems of national importance for biodiversity. Criteria, methods, and candidate list of nationally important rivers. Department of Conservation, Science & Research Unit.
- Begg, J.G. and Johnston, M.R. 2000. Geology of the Wellington area. GNS Science 1:250,000 Geological Map 10.
- Begg, J.G. and Mazengarb, C. 1996. Geology of the Wellington area. GNS 1:50,000 Geological map 22

- Department of Conservation 2010a. Nature Heritage Fund Application, Wellington Hawkes Bay Conservancy. Protection of private land at Baring Head.
- Department of Conservation, 2010b. Estuaries in Wellington Region (in draft).
- Enright, P. 2011. Vascular Plants Recorded on the Coastal section of the Baring Head block.
- Frank, M. 1994. A wildlife and vegetation assessment of Baring Head.
- Hopkins, C. et al, 2010. Vascular Plants Recorded on the Baring Head block.
- City of Lower Hutt - District Plan, Appendix Significant Natural, Cultural and Archaeological Resources 1 (page 14E/8) Updated 18 March 2004.
- McLean, Gavin, 1991. New Zealand Tragedies, Shipwrecks and Maritime Disasters. Grantham House
- Mitcalfe, B.J. and Horne, J.C. 1997. Indigenous vascular plants on Baring Head property, East Harbour Regional Park.
- New Zealand Archaeological Association Newsletter, *Maori Sites in Fitzroy Bay* September 1963, p120-125.
- Patrick, B. 2004. Coastal butterflies and moths of Wellington and South Wairarapa.
- Ronjin, R. 2011. Lizard Fauna of Baring Head. Greater Wellington report.
- Sawyer, J. 2004. Plant Conservation Strategy, Wellington Conservancy (excluding Chatham Islands) 2004-2010, Department of Conservation.
- Stephenson, G. 1977. *Wildlife and wildlife areas in the Wellington Region*. Report 77.31, Wellington Regional Planning Authority.
- Wellington Botanical Society, 2011. Site visit 26 March 2011, Baring Head, Wainuiomata.
- Williams, P.A., Wisser, S., Clarkson, B. and Stanley, M. 2006. A physical and physiognomic framework for defining and naming originally rare terrestrial ecosystems: First approximation. Landcare Research Internal Report LCO536/185.