Long Gully Bush Reserve

Management Plan

December 2015

Wellington
Natural Heritage Trust

Vision: *Long Gully Bush Reserve is a flourishing native ecosystem where ecologically-appropriate restoration occurs unimpeded by pest animals and pest plants.*

In memory of Robert Logan, Long Gully Bush Reserve visionary, seen here with fencer Ash Millar (right), Glow-worm Gully entrance, March 2007. (Photo: Barbara Mitcalfe)

Cover photo: Glow-worm Gully. Tim Park, 2007.

WWF New Zealand provided funding for this management plan.

Contents

1. Introduction

The Wellington Natural Heritage Trust Inc (the Trust) owns a 65-ha property close to Wellington City that includes open space of high ecological value. Although not a reserve in law, the property is known as Long Gully Bush Reserve (LGBR).

Clothed mostly in regenerating native forest, LGBR lies close to several other significant areas of protected native forest and is almost contiguous with Zealandia. The Trust's land is protected in perpetuity by a Queen Elizabeth II National Trust open space covenant. The Trust is firmly committed to protecting LGBR's native forest and ensuring that the process of natural regeneration takes place.

Several neighbours have contributed parts of their properties to be managed together with the Trust's land: the combined total is 107 ha. A goat-proof fence surrounds most of the area and animal pests within the fence are controlled. For the purposes of this document, the entire 107 ha is considered to be a single management area.

The Trust's covenant document requires that the Trust prepares a management plan for LGBR. A draft Management Statement was prepared by the QEII National Trust in 2000. The LGBR Management Plan draws on that document, together with other documentation held by the Wellington Natural Heritage Trust, discussions with trustees, neighbours, city and regional council staff, the Wellington Rural Fire Authority, the local QEII National Trust representative, NIWA and Landcare Research. The Trust is especially grateful to Glen Falconer of GWRC Biosecurity, who generously helped prepare the maps for this document.

WHNT acknowledges the support of the World Wildlife Fund NZ, which provided most of the funds to prepare this management plan. The plan was written by Chris Cosslett and reviewed by Clive Anstey, Chris Horne, Barbara Mitcalfe, Tim Park and Colin Ryder of WNHT, and by Trevor Thompson of QEII National Trust.

2. Background

2.1 Terms used in this document

"CVNZ"	Conservation Volunteers New Zealand
"DOC"	Department of Conservation
"GWRC"	Greater Wellington Regional Council
"QEII Trust"	Queen Elizabeth II National Trust
"LGBR," "Long Gully Bush," "the management area"	Long Gully Bush Reserve, including, for the purposes of this management plan, all lands which are enclosed by the goat-proof fence, including land owned by neighbours (see Map 2)
RPMS	Regional Pest Management Strategy
"The Trust," "WNHT"	Wellington Natural Heritage Trust Incorporated
"Trustee"	A trustee of the Wellington Natural Heritage Trust Incorporated
"WCC"	Wellington City Council
"WRFA"	Wellington Rural Fire Authority.

2.2 Location and site description

Long Gully Bush Reserve lies in semi-coastal hill country about five kilometres southwest of Wellington City. The land ranges in elevation from 120 to 360 m and is steep to very steep. LGBR is inaccessible by public road. The eastern end of the block can be reached from Wrights Hill, or from Hawkins Hill Road, via a privately owned right-of-way known as Long Gully Road. Access from the west is possible via an easement off South Karori Track (a private right-of-way from South Karori Road), and (subject to permission) through a private property that occupies the Silver Stream valley downstream of LGBR.

LGBR includes a section of Silver Stream (a true left tributary of Karori Stream) from where it makes a sharp turn to the west after flowing northeast along Long Gully for over 3 km. The stream flows year-round.

The underlying geology comprises Mesozoic alternating dark-grey argillite and greywacke sandstone, with rare fossiliferous limestone bands. The rocks tend to be highly deformed and broken because the area is geologically active. The Wellington Fault traverses Long Gully, which originates southwest of the eastern end of LGBR[1].

The soils are very thin, with much exposed rock and gravel evident on steep slopes. Where soils are present they are typically heavy clays derived from loess and the underlying greywacke and argillite rock. Broken rocks, moved by erosive forces and shaped by flowing water, are more prominent than soil over much of the block.

The locality is frequently buffeted by strong winds, with west to northwest winds prevailing. Summers are warm and humid and winters are mild. The average annual rainfall is between 900 and 1,200 mm, evenly distributed throughout the year.

LGBR lies near the boundary of the Wellington and Cook Strait ecological districts. The original forest cover would have been tall podocarp/broadleaf forest, with rimu, mataī and northern rātā emergent over a mixed broadleaf forest of tawa, kohekohe, māhoe, rewarewa, nīkau, hīnau and kāmahi.

The original forest was cleared and burnt, probably in the late 19th Century, and for about a century the land was grazed, although pockets of forest appear to have survived both the fire and the subsequent farming. During the 1980s, several farmers in southwest Wellington took up goat farming. The remains of two-wire electric fences indicate that this probably took place in at least part of the area now occupied by LGBR. Following the removal of government subsidies for farming in the 1980s, farming intensity in southwest Wellington declined and a pattern of reversion from pasture, through scrub, to native forest has since dominated. Pest animals and, to a lesser extent, pest plants have hampered this natural reversion.

The remnant and regenerating native forest in LGBR is surrounded by other areas of regenerating native forest, fernland, gorse and tauhinu-dominated scrub, and a pine plantation. Zealandia, a predator-proof bird sanctuary, lies on the eastern boundary.

[1] After running the length of Long Gully, the fault continues to the northeast through the Zealandia valley, through Thorndon and along the western side of Wellington Harbour and the Hutt Valley.

Properties along the northern boundary are dominated by plantation forestry and native reversion, with some small-scale hobby farming. Properties to the west are dominated by reversion to scrub and native forest, having been retired from grazing. Land to the south is still lightly grazed but is mostly dominated by gorse and tauhinu, with regenerating native vegetation in gullies and on moister faces.

2.3 A brief history of LGBR

During the mid-1990s, the block at the core of LGBR (referred to as Lot 1) was put up for sale by its private owners. Interested parties, led by Robert Logan of the Southern Environmental Association (SEA), lobbied Wellington City Council to purchase the land for addition to the Outer Green Belt. They argued that the block contained an area of significant native forest which was worth protecting, and that it would add coherence to the network of protected open spaces around Zealandia (at that time called Karori Wildlife Sanctuary). Wellington City Council decided against buying the land.

In 1996, SEA applied to the Forest Heritage Fund and the Lottery Grants Board for funds to purchase the land. These applications were unsuccessful. Eventually, funding for the purchase was secured by way of a generous gift by an anonymous donor. Robert Logan then convened the Wellington Natural Heritage Trust as an entity to own and manage the land. The Trust was incorporated in July 1999, and the original 50.5 ha Lot 1 was purchased by the Trust in that same month.

Following the Trust's purchase of Lot 1, several neighbouring property owners agreed to have parts of their land managed by the Trust as part of LGBR. The first such area was 8 ha transferred to the Trust's ownership by the Marshall family in 2004, as part of a subdivision of that family's property. This area contains substantial regenerating native forest between Lot 1 and the ridgeline on the northern side of the gully and adds greatly to LGBR's coherence.

Between 2006 and 2008 the Trust hired contractors to build a goat-proof perimeter fence. The Trust and the owners of neighbouring Long Gully Station (the Watsons) agreed that the fence would be built in the most practicable location, as close as possible to the common boundary, lying partly on the Trust's property and partly on the Watsons' land. For practical reasons, the fence ran high above the southern boundary of the Trust's land, taking in approximately 18 ha of steep gully owned at that time by the Watsons (Pine Tree Gully). Also included within the fenced area was the 8.9 ha Glow-worm Gully (also part of Long Gully Station) and an 18-ha section of the property owned by the Jones family to the west (the Jones Covenant). The completed fence is approximately 5.1 km long.

The goat-proof fence, newly constructed (2007). This view is from the northwest boundary of the Jones Covenant, looking south. The fence-line in the distance is on the southwest boundary of the Jones Covenant. (Photo: Tim Park)

In 2009 the Watson family transferred the bulk of Glow-worm Gully (7 ha) to the Trust. This was a reserve contribution made as part of an eight-lot subdivision of Long Gully Station. The gully includes important regenerating forest and provides the easiest access into LGBR from the eastern (upstream) end. The Watson family retains ownership of the remaining 1.8 ha of Glow-worm Gully that lies within the goat fence. This section was surveyed and placed under a Wellington City Council RMA s221 covenant as a condition of a 16-lot subdivision of Long Gully Station in 2014.

View north (downstream) from the head of Glow-worm Gully, 2007. Long Gully Road is visible crossing the slope at top and to the right. (Photo: Tim Park)

In 2015 the Trust undertook a land swap with the Watson family, in which the Trust gained approximately 4 ha of the 18 ha Pine Tree Gully area, in exchange for approximately 4 ha at the eastern end. The land gained by the Watson family lies between Long Gully Road and the Zealandia fence, so its inclusion within the Trust's goat-proof fence had not been practicable, owing to the need for gates across Long Gully Road and the difficulty of linking with Zealandia's pest-proof fence. The property boundaries of the former Lot 1 were adjusted to take account of these changes[2].

[2] The lot number was changed in 2015 to Lot 3 DP 481107.

In 2015 the Watsons sold lot 4 (to the south of LGBR) to Joe Lupi. Lot 4 includes approximately 14 ha at the head of Pine Tree Gully, which lies within the fenced management area. Part of the goat-proof fence lies along the boundary between Lot 4 and the Trust's land, and the part which runs around the head of Pine Tree Gully lies within Joe Lupi's land.

Although Zealandia has had a "head start" over LGBR, there are similarities in the two areas' land-use history. Both were almost entirely cleared and farmed to supply early Wellington, both were used for town water supply, and in both cases stock has been excluded, pests have been controlled, and substantial native regeneration has taken place.

2.4 Tenure and legal description

Besides land owned by the Trust, Long Gully Bush Reserve includes parts of several properties owned by neighbours. For the purposes of management, these parcels are collectively treated as a single unit. See Map 2.

CT	Land parcel	Area within LGBR	Title	Notes	Address
673674	Lot 3 DP 481107	49.9323 ha	Freehold in the name of Wgtn Natural Heritage Trust Inc.	Original 50.5 ha (Lot 1) after adjustments in 2015 land swap	48c Ashton Fitchett Dr
673674	Lot 6 DP 340327	8.1648 ha	Freehold in the name of Wgtn Natural Heritage Trust Inc.	Marshall family gift (2004)	48c Ashton Fitchett Dr
673674	Lot 9 DP 392856	7.1177 ha	Freehold in the name of Wgtn Natural Heritage Trust Inc.	Glow-worm Gully A	48c Ashton Fitchett Dr
WN19D/910	Part Section 50 Karori District	17.80 ha	Freehold in the name of MR and RM Jones	The Jones covenant	287 Sth Karori Rd
	Part Lot 1 DP 57234	Approx 8.7 ha	Freehold in the name of Puawai Trust (B and R Bargh)	Not currently fenced but managed as part of LGBR	169 South Karori Rd
	Part Lot 4 481107	13.8128 ha	Freehold in the name of Joe Lupi	That part of Pine Tree Gully not owned by WNHT	48c Ashton Fitchett Dr
	Part Lot 17 DP 462620	1.78 ha	Freehold in the name of SM and CM Watson	Glow-worm Gully B: WCC covenant owned by Watsons	48c Ashton Fitchett Dr

2.5 QEII National Trust open space covenants

The QEII covenant over WNHT's original purchase (the 50.5 ha Lot 1) was signed in September 2002. All of the parcels of land owned by WNHT are covenanted (see Map 2). That part of the Jones's property within the main goat-proof fence, and the remnant kohekohe forest on that property, are also under a QEII covenant (the "Jones Covenant").

The objectives listed in the Trust's covenant are to:

a) Protect and enhance the natural character of the covenant area with particular regard to the native flora and fauna.

b) Maintain and enhance the landscape value of the covenant area.

c) Enhance the contribution that the covenant area makes to the protection of native biodiversity, by encouraging (where appropriate) the restoration of native cover on the covenant area.

d) Prevent subdivision of the covenant area.

In line with these objectives, the Trust's QEII covenant prohibits or restricts various activities, including the following (for details, refer to the Covenant document):

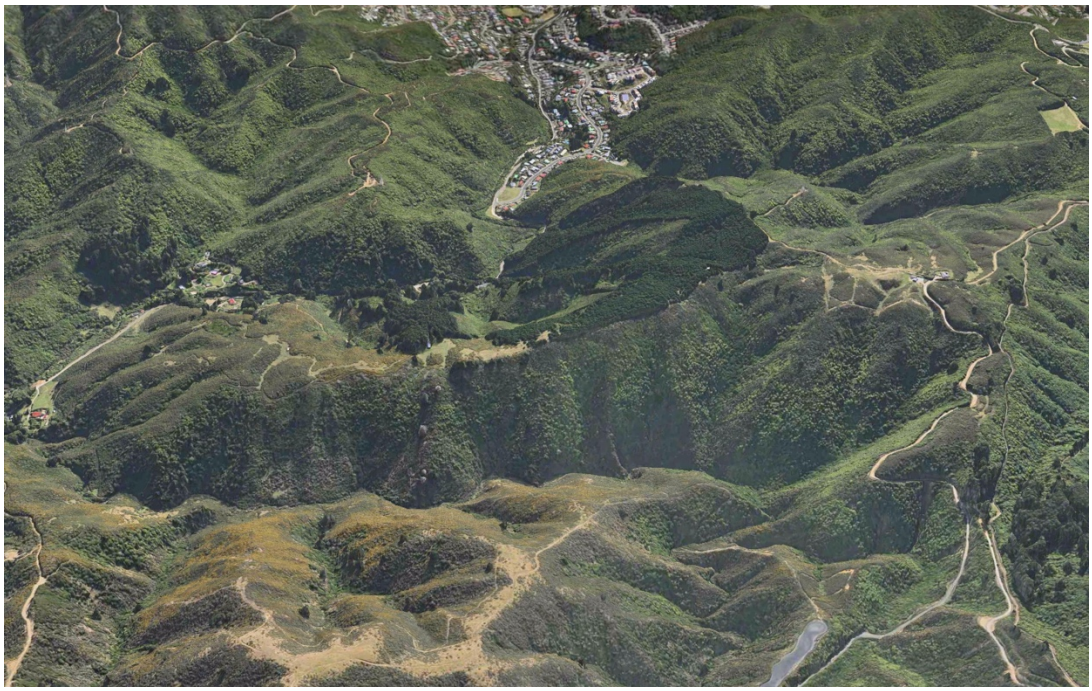
- Damaging native plants (other than for approved tracks and collecting plant material for propagation)
- Planting or otherwise introducing plants (other than those from appropriate local sources)
- Earthworks
- Construction of buildings
- Erection of signs
- Mining and prospecting
- Dumping and storage of rubbish
- Grazing
- Interference with water bodies.

The covenants oblige the owners to comply with the Biosecurity Act 1993 and the Wild Animal Control Act 1977.

2.6 Aerial images

These images are 3D digitised representations of the area using 2013 aerial photography.

Aerial view of Long Gully Bush Reserve from the east, looking downstream. The contrast between dry north-facing slopes dominated by gorse and moist south-facing slopes of advanced native regeneration is marked. A bend of Long Gully Road appears in the foreground at bottom left. A section of the goat-proof fence-line can be seen at left in the middle distance, running parallel to the southern access track.



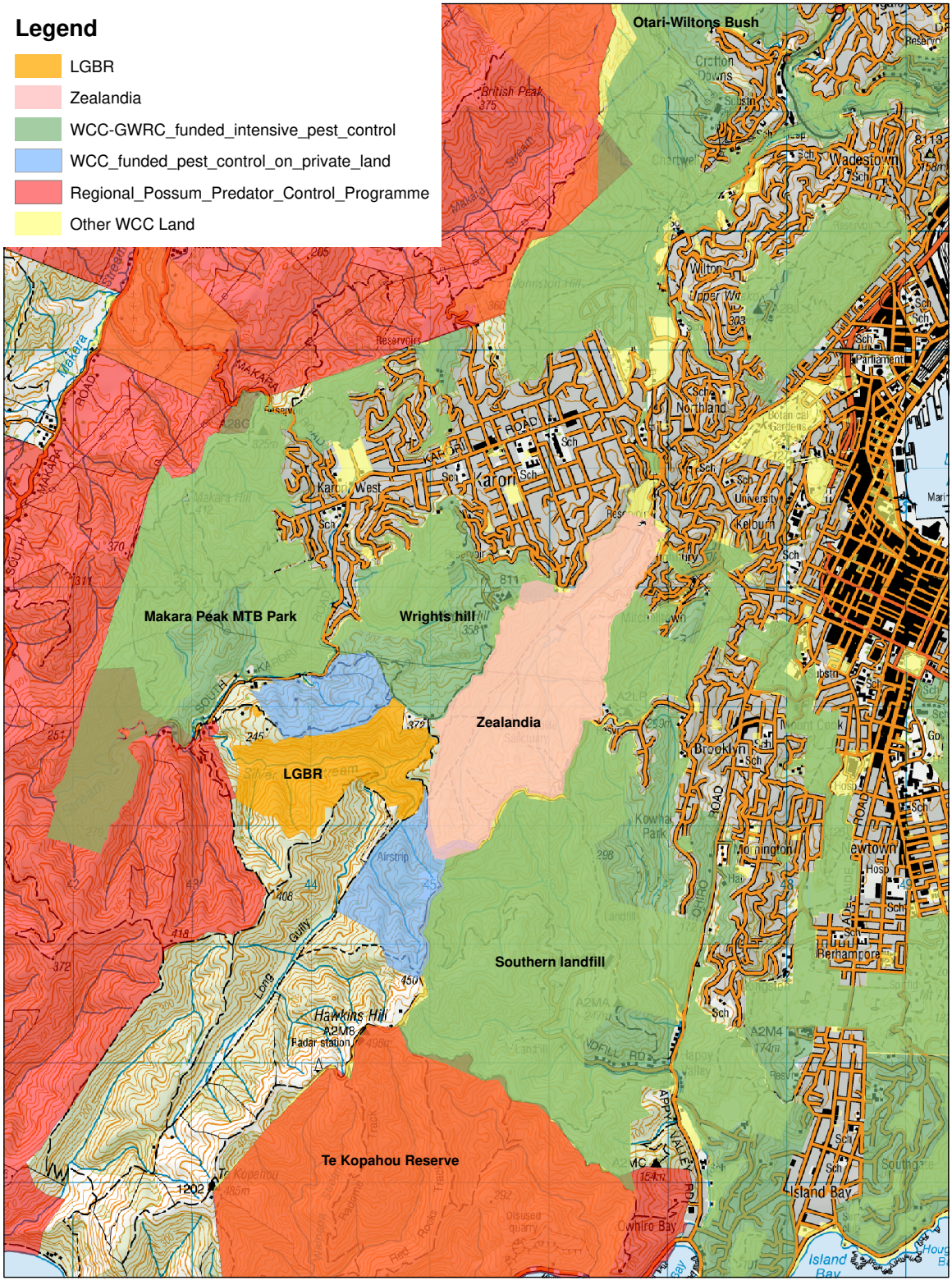
Aerial view from the south. The sharp bend in Silver Stream lies just beyond the old Long Gully airstrip (asphalt strip, lower right). Long Gully Road and the Zealandia fence run up the right side of the image. South Karori is visible at the top, beyond the Barghs' pine forest. South Karori Road is visible at left. The Jones's house (red roof) is at the extreme left, near the junction of Silver Stream and Karori Stream.

Aerial view from the west. Long Gully Road is in the far distance, the Jones's house (red roof) is at bottom left, the right-of-way from South Karori Road runs up the ridge in the foreground. A section of goat-proof fence can be seen zig-zagging up a steep spur at the right of the image.

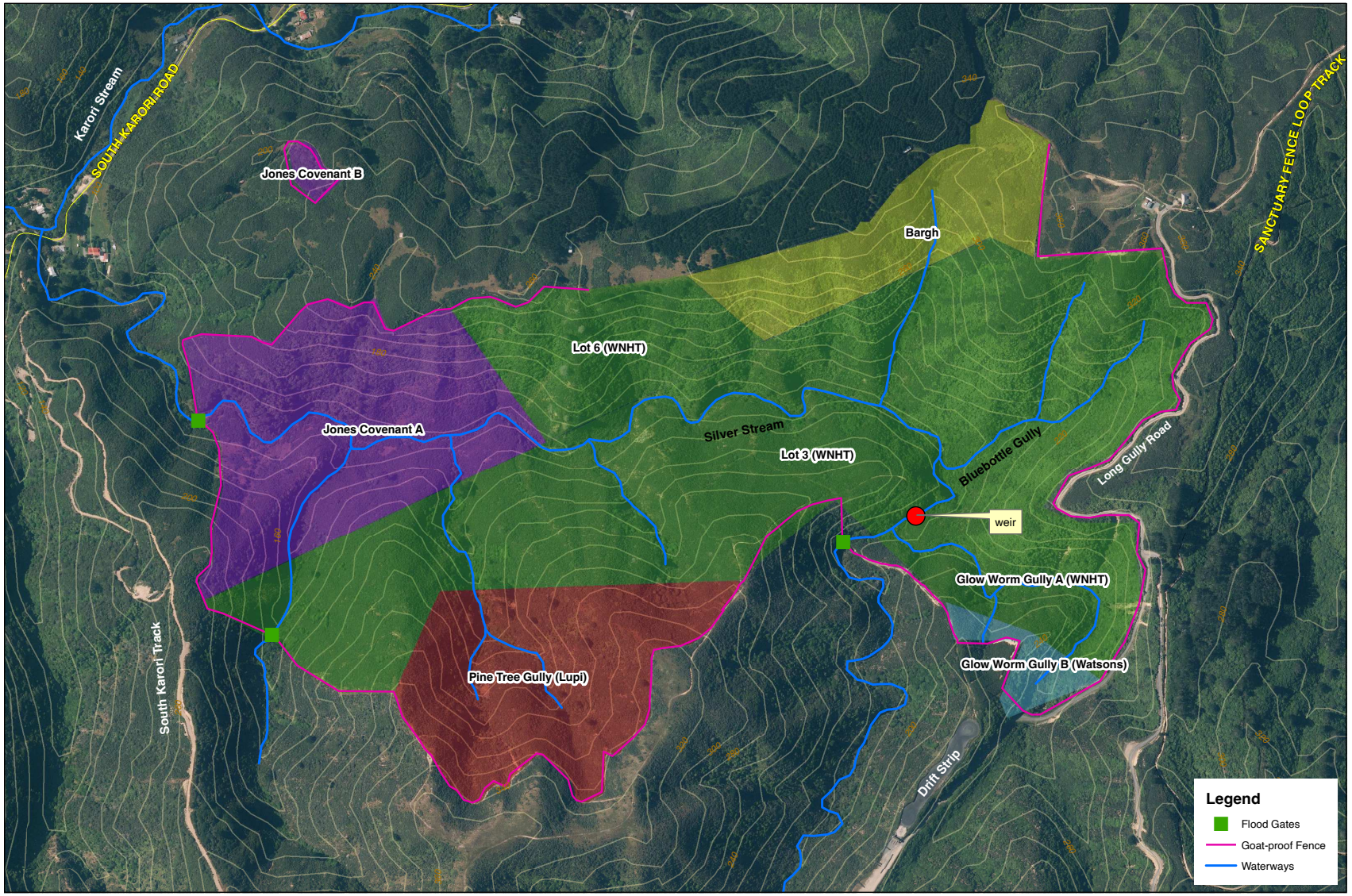
Aerial view of the head of Pine Tree Gully (owned by Joe Lupi) from the northwest. The bulldozed line of the goat-proof fence is clearly visible, running across the head of the gully and zig-zagging down the steep spur on the right. Regeneration is advanced in the gullies. The drier slopes appear totally gorse-dominated from this distance, however native broadleaf species are emerging above the gorse throughout.

Aerial view up Silver Stream from the west. The Jones Covenant occupies most of this view. Large emergent rewarewa dominate the advanced regeneration at left. A remnant rimu – probably LGBR's largest – stands above the scrub to the right (circled). The transition from gentle to steeper slopes as one travels upstream is indicated by the changing angle of spurs dropping to the stream.

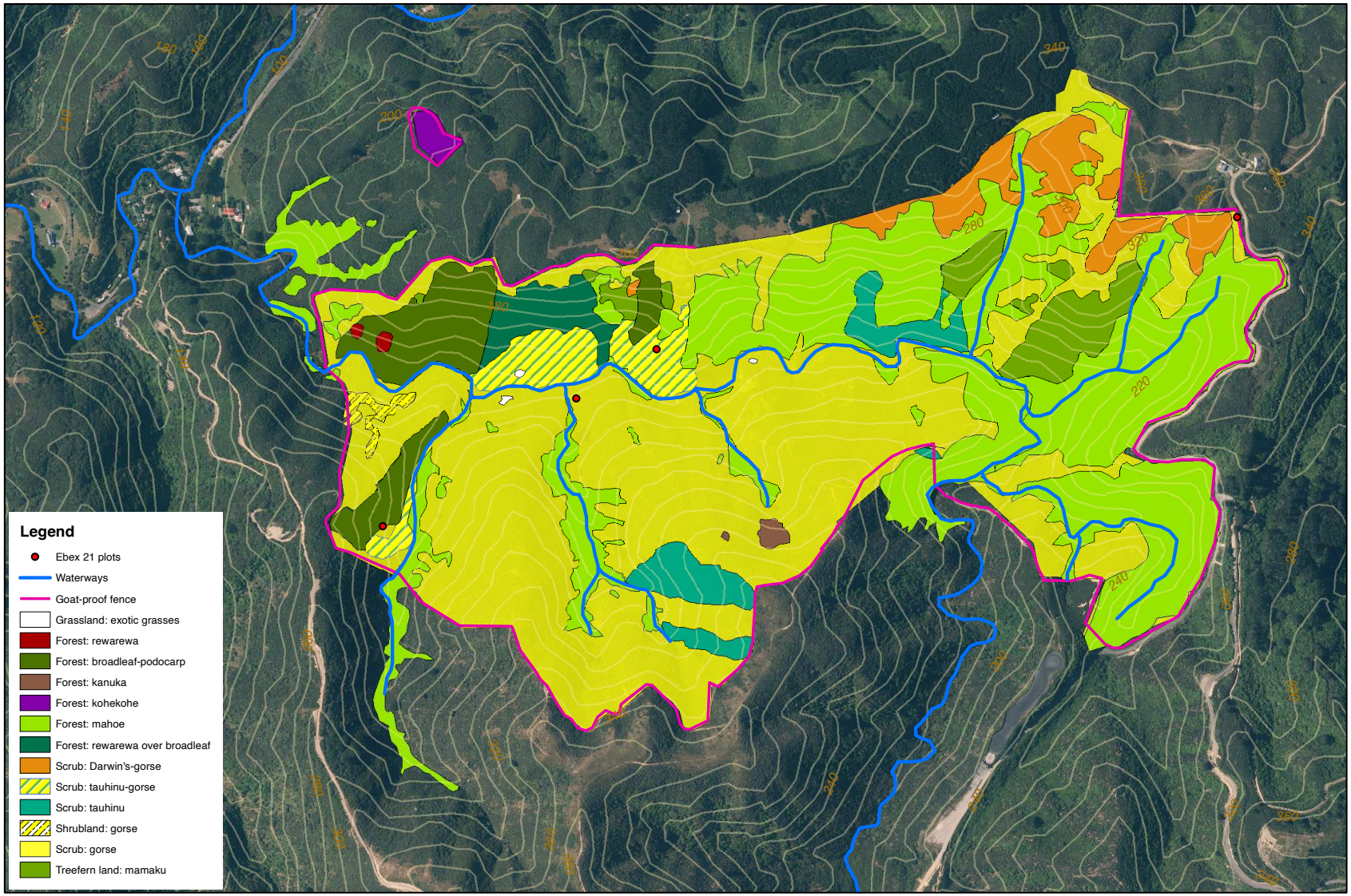
3. Maps



Map 1 - Context



Map 2: LGBR Land Tenure and Features



LGBR Vegetation Classes 2013

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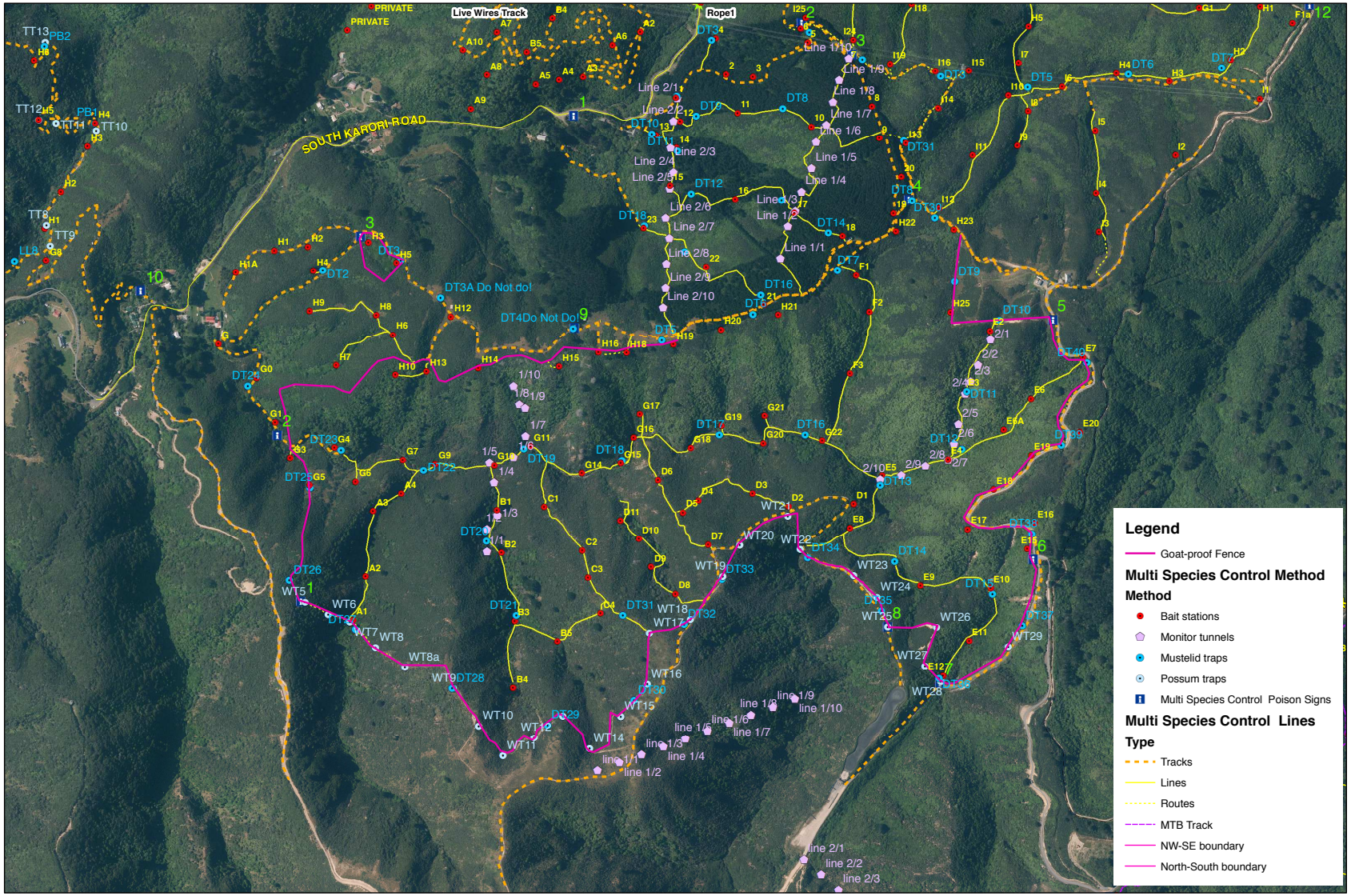

Map 4: LGBR Pest Animal Control 2015

4. Natural and other values

4.1 Flora

A strong pattern of reversion from pasture through native shrubland and gorse scrub to native forest is evident within LGBR. This is most advanced on the south-facing slopes on the true right of Silver Stream, which is ecologically diverse compared with many other protected natural areas nearby. The valley is unusual in the Wellington context in that it runs east-west rather than north-south. A consequence of this is that the south-facing slopes are unusually shady and moist. There are indications that the impact of past fires on these south-facing slopes was probably less than across much of the surrounding area.

The north-facing slopes on the true left are dominated by gorse, however bush is present in the gullies and some native broadleaved species are now emerging through the gorse canopy on even the driest slopes.

Native forest in LGBR is dominated by māhoe and mamaku on lower to middle slopes, and māhoe and wineberry on the gully floors. Diversity is high compared with many similar areas in the region. Nīkau, rewarewa, pigeonwood, kāmahi, tōtara, and pukatea reach the canopy and in many places emerge above it. A range of sub-canopy species is present, including tarata, kawakawa, māhoe, pāpāuma, puka, ponga, kānono, hangehange, māpou, lancewood, rangiora, wineberry, koromiko, putaputawētā, kamahi and pate. The presence of kiekie, and of fruiting miro and nīkau, is of particular value. The presence of podocarp species emerging through the canopy, and as saplings in the sub-canopy, is significant. Rimu is particularly prominent. Some tawa occur in the area. Although outside the main block's goat-proof fence, a half-hectare remnant of kohekohe forest is present on the Jones's property and is separately goat-fenced and covenanted. A full list of plant species identified in LGBR is included in Appendix I.

Typical regeneration pattern: mahoe forest dominates the gully bottoms while scrub (in this case mainly Darwin's barberry and gorse) dominates the drier ridges. Note the large area of mamaku treefern land on the face in the centre of the photo. View to the northeast. Bluebottle Gully, running straight away from the camera, lies below Long Gully Road at right. (Photo: Chris Cosslett, 2015)

The condition of the understorey is variable. Browsing by goats was severe over much of LGBR until recent times. Goat numbers have now been greatly reduced and vegetation within the browse tier is recovering. Species such as pate, hangehange, hen and chickens fern and other *Asplenium* ferns are now prevalent in many areas.

The age of the secondary forest is uncertain, but much of it probably dates from between 1940 and 1960, judging by the size of the trees. A map dating from 1946 suggests native forest was present on the true right at that time. Some of the larger trees in the gullies and near Silver Stream may be much older.

Very few weeds are present within the closed-canopy native forest, and native species dominate the edges of tributary streams. Long reaches of Silver Stream, however, are dominated by gorse and a number of pest plants are present. In particular, tradescantia, selaginella and buddleia are widespread along the stream.

4.2 Fauna

Birds known to be resident at the time the original Lot 1 was purchased included kererū, korimako/bellbird, tūī, pīpīwharauroa/shining cuckoo, riroriro/grey warbler, pīwakawaka/fantail, tauhou/silvereye and kahu/harrier.

Zealandia is home to a range of wildlife not generally found on the mainland and LGBR provides an extension of habitat for some of these. Kākā, kākāriki/red-crowned parakeet, tieke/saddleback and hihi/stitchbird have been seen in Long Gully Bush Reserve. Some observers suggest that kākā and tieke may have nested in LGBR and on neighbouring private properties.

The NIWA freshwater fish database lists the following species as present in Karori Stream: longfin and shortfin eel, inanga, kōaro and banded kōkopu, upland bully, lamprey, kōura and the introduced brown trout. It is likely that all are present in Silver Stream, considering the high water quality, clean, cobbled bottom and extensive vegetation cover. The weir at LGBR's upstream end (see below) would be impassable to some species of native fish.

4.3 Landform

LGBR occupies a deeply-incised valley. Steep faces, bisected at intervals by narrow gullies, press in on either side of a narrow valley floor. Silver Stream zigzags down the length of the valley, creating a series of small terraces that alternate to left and right.

At the downstream (western) end, the valley floor is relatively wide, with moderately-sloping sides. Travelling upstream, the valley becomes progressively narrower and deeper, and the sides steeper. Near the top, between Bluebottle and Glow-worm gullies, the stream runs through a short gorge with sheer rock walls and deep pools. Here the bush growing on either side meets overhead and it is easy to forget the centre of Wellington is only five kilometres away.

WNHT trustee Chris Horne enjoys a rest in the Silver Stream gorge. (Photo: Chris Cosslett, 2015)

Some slopes above the Wellington Fault's trace have been subject to frequent slipping because of unstable substrate and a history of heavy grazing. The protection of vegetation within the management area, together with a recent large reduction in goat numbers on the neighbouring Long Gully Station, is helping to protect these slopes and can be expected to reduce the severity of erosion.

4.4 Water

Water quality within LGBR appears to be excellent. The bed of Silver Stream is cobbled and largely free of fine sediment and the water appears clean. Observed reduction in the amount of sediment on the stream bed suggests that water quality has improved since goat numbers were reduced in the Silver Stream catchment. Vegetation shades much of the stream. It is likely that the water in Silver Stream is less contaminated than in the main Karori Stream because much of the latter's catchment is urban.

4.5 Cultural heritage

A disused water-supply weir and associated pipeline are located at the southeastern end of LGBR, at the top of the gorge between Bluebottle and Glow-worm gullies. This system used to draw water from Silver Stream to supplement Wellington's water supply. Drawings of the scheme held in the Wellington City Council archives are dated 1944 and the scheme became operational in 1945. It was probably used until completion of the Hutt water supply scheme, which brought water from Kaitoke to the city, in 1957.

Water drawn from the weir was piped a short distance downstream to a mechanical pump which then pumped it, via a pipe up a spur east of the weir, over the ridge to enter Kaiwharawhara Stream above the Karori reservoirs. The weir structure is in relatively good repair and can be accessed via Silver Stream from either end of LGBR. The platform on which the pump sat is clearly visible, as are parts of the pipeline.

The Silver Stream weir. The concrete strip running towards the camera supported the pipe to the pump downstream. (Photo: Chris Cosslett, 2015)

Top left: inspection ladder leading to the chamber beneath the weir.

Top right: construction date (22.3.45) on the pump platform.

Left: the start of the pipeline, above the true right of Silver Stream, opposite the pump platform.

(Photos: Chris Cosslett, 2015)

5. Threats

5.1 Pest animals

Southwest rural Wellington has a history of serious pest-animal problems. Until very recently LGBR and the surrounding area were heavily infested with feral goats. These have been greatly reduced, thanks to a control campaign funded by Wellington City Council and the Department of Conservation, from Te Kopahou Reserve to South Makara Road. A largely goat-proof fence protects LGBR itself. This fence has done much to reduce reinfestation from surrounding properties but breaches do occur (owing mainly to goats forcing their way under the bottom barbed wire, to slips, and to washouts under floodgates). Wellington City Council and volunteer hunters control a steady trickle of goats into the management area. Recent years have seen between 50 and 60 goats per year shot inside the goat-proof fence. Goats remain a threat, given their destructive browsing and rapid breeding potential, and variable control efforts on surrounding private land.

Other pest animals present include possums, feral pigs and fallow deer, all of which damage native plants and the first two of which also prey on native wildlife. Mustelids, rodents, hedgehogs and feral cats directly threaten native wildlife. With goats now greatly reduced, possum browsing is currently the most serious problem affecting forest regeneration.

5.2 Pest plants

Other than gorse and Darwin's barberry, minor infestations of pest plants are present. These are of low to medium threat to ecological and amenity values. Invasion by shade-tolerant and smothering weeds has the potential to threaten native vegetation. Some pest plants are more visually dominant than native species and therefore compromise amenity values.

Pest plants can enter LGBR as windblown or bird-dispersed seed, by adhering to the clothing or equipment of visitors, by being washed down from properties upstream, and through the dumping of garden waste. The proximity of residential gardens and lifestyle blocks means that invasion by pest plants and other weeds is likely to be a continual problem.

Pest plants and other weeds found in LGBR include rank grasses, buddleia, Darwin's barberry, gorse, old man's beard, *Pinus radiata*, tradescantia, selaginella, montbretia, escallonia, tutsan, giant bindweed, and English mint.

Many of the pest plants found in LGBR and surrounding areas are not shade tolerant. As native forest forms a closed canopy across the managed area, these species will tend to be shaded out. Over time the effort needed to control pest plants (with exceptions, as noted above) may decline. The control of animal pests – especially possums and goats – is essential for the recovery of a robust native canopy.

5.3 Fire

Fire could seriously damage LGBR's ecological and landscape values.

The flammability of different vegetation types is variable. Gorse, mānuka and kānuka tend to be highly flammable because they include high concentrations of dry fuel and burn with great intensity, even when green. The dominance of gorse tends to increase after a fire because its seed survives and is stimulated to germinate by heat. Sites of repeated wild fires in the Wellington area tend to become heavily gorse-dominated, and therefore highly susceptible to further fires. Native forest species tend to be of far lower flammability.

Large parts of LGBR are dominated by gorse growing on dry north-facing slopes (see Map 3). This makes the area vulnerable to fire. While the risk of fires starting within LGBR can be minimised by, for example, banning smoking and open flames, there remains a serious risk that fires started outside the boundary could spread to the management area. South Karori Road and private properties to the north and west are likely ignition sources, considering that gorse scrub extends continuously from that area to LGBR, and that the prevailing wind is from the west to northwest. Of particular concern is the large area of dense gorse that adjoins South Karori Road on the Jones's property boundary. The other main risk of fire spread is Long Gully Station, particularly motor vehicles using tracks and roads near the southern and eastern boundaries of LGBR, and the "drift strip" on the old airstrip[3].

5.4 Erosion

Long Gully is an active fault zone. The steep, unstable hill slopes are vulnerable to erosion. The recent control of feral goats has helped to stabilise the thin, rocky soils. Poorly-located tracks, roads or other development would be detrimental to soil stability, water quality and drainage, and would degrade landscape amenity.

[3] The Long Gully airstrip is no longer used for aviation. A section of it has been tar-sealed and is used for various motorised recreational activities. One such activity is "drifting". This refers to driving a car in such a manner as to achieve sustained loss of traction by the driving wheels, otherwise known as a "burnout".

6. Vision and objectives

Vision

Long Gully Bush Reserve is a flourishing native ecosystem
where ecologically-appropriate restoration occurs
unimpeded by pest animals and pest plants.

Explanation
The Wellington Natural Heritage Trust is a charitable community organisation with limited funds that relies on altruistic trustees, volunteers and fundraising to achieve its objectives. Resources available for "ecological restoration" work are limited. The Trust believes that the best approach to achieving the recovery of LGBR's native ecosystem is to let nature take its course, while removing the harmful influences of pest plants and pest animals. Abundant local seed sources exist, both within LGBR itself and in neighbouring protected areas such as Otari, Wrights Hill Reserve and Zealandia. Given time, and with the assistance of Wellington's birds and wind, locally-appropriate native species will reappear in LGBR. It is worth remembering that when the upper Karori water supply dam was completed in 1908, the catchment that is now Zealandia was a working farm clothed in pasture. The transition from grass to near-complete native canopy has taken only about four human generations. Long Gully Bush Reserve has already progressed well beyond grass.

The restoration of Long Gully Bush Reserve will be a demonstration of what can be achieved on a minimal budget, by being patient and allowing the natural process of regeneration to work. We hope that this will inspire other landowners to follow the Trust's example, and that this practical demonstration of a low cost / minimal intervention approach will make the management of reversion seem less daunting.

Objectives

1. That the native biodiversity and cultural heritage values of Long Gully Bush Reserve will be protected and restored.
2. That Long Gully Bush Reserve will be clothed in closed-canopy, healthy native forest which represents, as far as possible, local pre-European ecosystems.
3. That Long Gully Bush Reserve will provide a safe haven for birds and other native biota that occur naturally within the Wellington area.
4. That Long Gully Bush Reserve will be a significant component of Wellington's protected areas network.
5. That the success of Long Gully Bush Reserve will encourage others to protect and restore natural regenerating areas.

7. Management policies

7.1 Native vegetation management

WNHT's approach to managing the process of natural regeneration is to let nature take its course as far as possible. It is envisaged that this will eventually result in a diverse semi-coastal native podocarp/broadleaved ecosystem. Natural regeneration is progressing strongly in some areas, notably the shady faces on the true right of Silver Stream and in gully bottoms. On drier north-facing slopes the process is slower but is progressing well now that browsing by goats has been largely eliminated.

The QEII covenant permits WNHT to:

- Collect and remove propagules from, and seedlings of, native trees, shrubs or other plants for propagation
- Plant, sow or scatter trees, shrubs or plants or the seed of trees, shrubs or plants provided they are sourced from local native flora.

WNHT's position is that the best approach to managing native vegetation recovery is to focus on controlling pest animals and plants, and to allow natural processes to distribute seed, spores and pollen from local sources. Sources for some of these exist inside LGBR, while others are present in nearby protected areas. Seed, spore and pollen movement is rapid in Wellington thanks to a flourishing bird population, due in large part to Zealandia and the halo pest-control projects, and the wind.

Regenerating forest on land owned by the Trust is registered under the EBEX21 (emissions biodiversity exchange). This scheme may provide opportunities for the Trust to earn income by trading credits for carbon sequestered by the regenerating forest. The amount of carbon sequestered is calculated by measuring vegetation change on four permanent 20 x 20 m vegetation plots (known as EBEX21 plots) which were established in 2007 (see Map 3). The Trust may choose to sell the credits accumulated over a particular period. To assess the extent of carbon sequestration, the Trust could choose to re-measure the four plots, however since the Trust's land is under 100 ha the Trust can choose instead to use standard multipliers to calculate sequestration relative to the baseline measured in 2007. In any case, the Trust may choose to re-measure these plots periodically to monitor forest growth.

At least one photo-point exists for each of the four separate QEII-covenanted blocks in LGBR. The local QEII Trust representative re-photographs these every two years.

Policies

1.1 The protection of native vegetation, and of natural regeneration, are the first priorities of management.

1.2 No planting of native or exotic plants, or any distribution of seed or other propagules, will take place within LGBR.

1.3 If, in the future, compelling scientific evidence in favour of the limited re-introduction of selected native plant species should come to light, then policy (1.2) may be reviewed accordingly.

1.4 No collection of native plants or propagules from LGBR is allowed, except by permit with appropriate conditions as agreed to by the Trust at the time.

1.5 Forest growth, and consequently carbon sequestration, will be monitored.

7.2 Agreements with neighbours

All but one of the neighbours who own land within the goat-proof fence have agreed to the Trust's management of those areas as part of LGBR:

- The Jones's open space covenant includes a provision that the owners of that land "… shall permit officers, employees or agents of the Wellington Natural Heritage Trust Incorporated to enable maintenance of the fence and the carrying out of pest control provided that the prior consent of the Owner [the Joneses] is sought before access is made."
- The Watsons have verbally agreed to the Trust's management of Watson land within the fence (1.8 ha on the southern edge of Glow-worm Gully), but no formal management agreement exists.
- The Barghs have verbally agreed to the Trust's management of that portion of their land to the south of the ridge, but no formal agreement exists.

The exception is in the case of the 14 ha owned by Joe Lupi in the head of Pine Tree Gully. The Watsons sold this land to Mr Lupi in 2015[4]. Part of the goat-proof fence runs through land now owned by Mr Lupi, and most of the remainder of the southern run of the fence is on the boundary between the Trust's Lot 3 and Mr Lupi's land. No agreement exists between the Trust and Joe Lupi. Negotiation of an agreement regarding the Trust's access to and management of the 14 ha Pine Tree Gully, and maintenance of the southern section of the goat-proof fence, is an urgent matter which the Trust is pursuing.

Two other properties to the north of LGBR adjoin the goat-proof boundary fence. Brent Layton owns the ex-Marshall property, between the Jones and Bargh properties. John and Sarah McDermott own land between the Bargh and Watson properties. The Trust has no formal agreement with either of these parties regarding the maintenance of the fence or the perimeter track.

Policies

2.1 The Trust will endeavour to set up and maintain formal written agreements with neighbours who own land within the management area, regarding the Trust's access to and management of those areas.

2.2 The Trust will endeavour to set up and maintain formal written agreements with other adjoining neighbours regarding maintenance of the fence and the perimeter track.

[4] The Trust and the Watsons previously had an agreement regarding siting and management of the fence along the southern boundary of LGBR, which ran partly on the Watsons' land where it skirted the head of Pine Tree Gully. This agreement is no longer relevant since the land has been sold to Joe Lupi.

7.3 Fence

Excluding feral goats, pigs and deer from LGBR is central to the objective of fostering the regeneration of native vegetation. The goat-proof fence is the first line of defence against a return to historically-high goat densities.

Besides the land owned by the Trust, the fence encloses land owned by the Watsons, Joe Lupi and the Jones family. The Bargh family is currently unwilling for the fence to be built along the ridge on their land. Therefore, there is a gap in the fence on the north side of the management area (a fence does exist here but it is far from goat-proof). Goats are controlled to very low numbers on the Bargh and neighbouring Layton properties, however minimising the risk of reinvasion by completing the fence remains a priority for the Trust.

Threats to the integrity of the fence include:

- Vegetation growing through and over the fence
- Slips damaging and undermining it
- Stream-bed and stream-bank erosion creating gaps under and beside flood gates
- Flood damage to flood gates
- Pigs and goats digging or pushing under the bottom barbed wire
- Goat numbers building up in the area next to the fence gap on the north side
- Corrosion of wires (which may be rapid, owing to salt-laden winds)
- Mechanical damage, including by people climbing the fence, and damage by vehicles
- Fire
- Gates being left open
- Vandalism.

To protect the fence and to make regular inspection possible, the Trust must maintain a clear strip along at least one side by mechanically clearing vegetation and cutting and/or spraying regrowth to a width of at least one metre (pest plants can be cleared wider than one metre). Vegetation on the non-cleared side can be cut or sprayed from the clear side to stop it growing through the fence. Metsulfuron will be the preferred chemical because while it kills gorse it tends to do little harm to some native species (including māhoe, hangehange and kawakawa).

Under the QEII covenant the Trust is responsible for repairs to and replacement of the fence (with limited exceptions defined in clause 8 of the covenant agreement).

Fence specifications are included in Appendix II and a fence inspection checklist is included in Appendix III.

Policies

3.1 The Trust will negotiate with the Barghs regarding the completion of the fence on the north side of the management area.

3.2 A clear strip of at least one metre will be maintained on at least one side of the fence.

3.3 The entire fence will be inspected at least annually to identify any breaches or weaknesses. An inspection checklist is included in Appendix III.

3.4 Breaches or weaknesses found during the course of other activities must be promptly reported.

3.5 Breaches and weaknesses will be fixed as quickly as possible after discovery.

3.6 Any section of fence dismantled for management purposes will be reinstated promptly.

3.7 If public access to LGBR is to be allowed (see section 7.9, *Public use*) then the Trust will install goat-proof stiles at access points and lock access gates to ensure they cannot be left open.

3.8 The Trust will plan for full replacement of the fence at intervals of 25 years.

3.9 The Trust will negotiate with neighbours regarding sharing the cost of maintenance and replacement. Where the fence lies along a property boundary, the Trust may invoke the cost-sharing provisions of the Fencing Act 1978.

3.10 Should feral goats be eliminated from or reduced to very low levels on the southwest Wellington peninsula, then the Trust may decide, in consultation with the QEII National Trust, to maintain the fence to stock-proof rather than goat-proof standard.

7.4 Pest animals

Possums, feral goats, feral pigs, and occasional feral deer can be found in LGBR. All do significant damage to native vegetation. Goats and pigs can damage the fence by pushing and/or digging underneath it.

Until recently goats were the most serious threat to vegetation. Since the construction of the goat-proof fence, and follow-up hunting to control incursions, the density of goats within LGBR has been dramatically reduced. A long-term objective of the Trust and WCC is to eliminate feral goats from the entire southwest Wellington peninsula. Council-funded hunting has greatly reduced goat densities on Council and private land around LGBR, which has helped reduce the rate of incursions through the goat-proof fence, however goats continue to breach the fence in low numbers. Possums are probably now the greatest threat to LGBR's vegetation.

Predatory pests found in LGBR include rats, mice, mustelids, hedgehogs, possums and feral cats.

LGBR is long and narrow with a long boundary, which makes it vulnerable to reinfestation by pests. Control efforts on neighbouring land are variable. Pest animals other than mice have been eliminated from Zealandia to the east. Large areas of land to the north are subject to intensive control by owners and GWRC on contract

to WCC. However, pest control is limited to the south, and this area is probably the main source of reinfestation by all pest species. Improved pest control in that area, particularly in the area immediately adjacent to Zealandia, would greatly benefit LGBR.

Animal pest-control methods used in LGBR include shooting, trapping, poisoning and, in the case of pigs and goats, hunting with dogs. A network of pest-control tracks gives access to possum-control bait stations, Warrior possum traps and DOC200 predator traps[5] (see Map 4). LGBR's steep, rugged terrain and dense vegetation make hunting and trapping difficult and time-consuming.

Various combinations of volunteers, contractors and GWRC staff have monitored and controlled animal pests within LGBR. Changing priorities have meant fluctuations in the levels of official support. LGBR does not qualify for pest control under GWRC's Key Native Ecosystem programme, although this may change as regeneration progresses. Other possible sources of funding and support include DOC's Community Fund, the Rural Halo Project[6], the Regional Possum Predator Control Programme, and professionally-organised volunteer groups. A priority for the Trust is to secure sustainable long-term funding, resources and labour for pest control.

Hunting by private individuals can contribute to the control of serious pests such as goats and pigs. Access by private hunters will be at the discretion of the Trust. Matters to be considered include relationships with neighbours and the safety of private hunters and others in LGBR and on surrounding lands.

As the vegetation on the true left of the valley progresses from open, sunny scrub towards a closed native canopy it will become increasingly difficult to locate goats that get inside the fence. Goats will always gravitate to a sunny, dry clearing in an area of dense bush, particularly in winter. The Trust may choose to maintain at least one clearing, on a site known to be favoured by goats, above the true left of Silver Stream, to act as a magnet for invading goats. Maintaining such a "hot spot" would help with monitoring and control.

GWRC monitors rodent abundance in LGBR. Tracking tunnels, set out along two lines (see Map 4) are used, following a standard Department of Conservation protocol. Monitoring began in 2007 and since then has been done two or three times each year. Monitoring results for the period 2007 – 2015 are shown in the following graph (reproduced here courtesy of the Environmental Science Department, GWRC). Recorded rodent densities are higher in LGBR than in nearby monitored sites such as Wrights Hill Reserve, reflecting the lower level of control within LGBR than on lands managed by GWRC and WCC.

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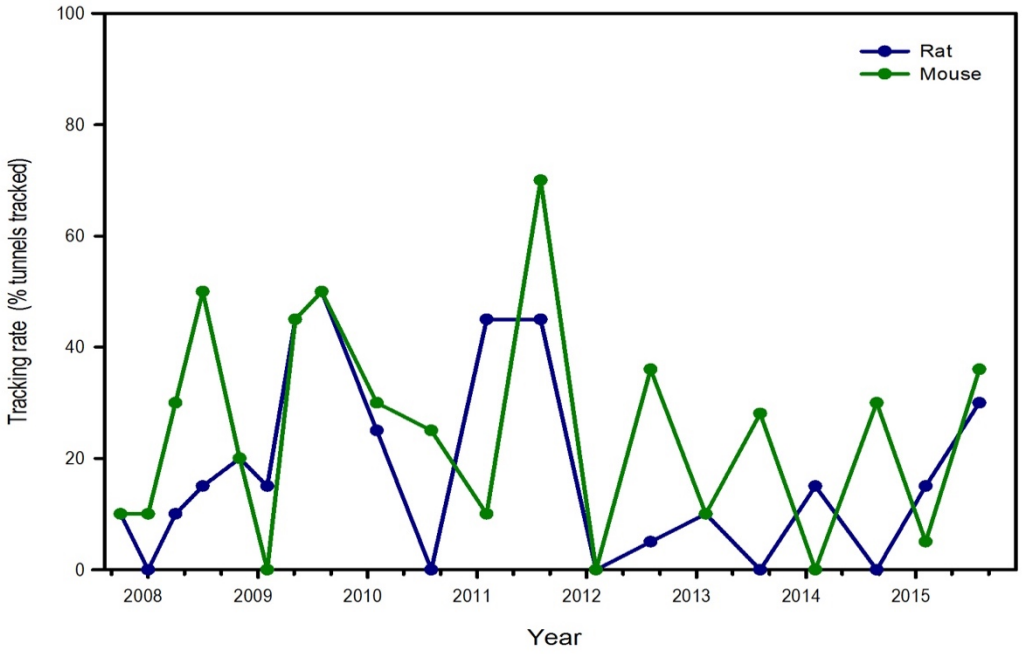
[5] At the time of writing some of these mild-steel DOC200 traps are falling into disrepair and need to be replaced with stainless steel traps.

[6] The objective of the Rural Halo Project is to provide safe habitat for birds flying in and out of Zealandia. Dispersal of species re-introduced to Zealandia is occurring but these birds are vulnerable to predators outside the sanctuary fence. The Halo project involves intensive animal pest control on public and private land within a 1 km radius of Zealandia's fence. Long Gully Bush Reserve does not currently receive Halo funding because at the time funding was approved for the project, pest control in LGBR was funded by GWRC. The GWRC-funded pest control has since been withdrawn.

Rodent Monitoring Results, LGBR, 2007-15



Pest-animal control targets for LGBR

Pest species	Target density
Goats	0% or < 1 kill per 10 hunting hours
Deer	0% or < 1 kill per 10 hunting hours
Pigs	0% or < 1 kill per 10 hunting hours
Possums	< 5% RTC (residual trap catch)
Rats	< 5% TTI (tracking tunnel index)
Mustelids	< 1% TTI (tracking tunnel index)
Hedgehogs	Low levels
Cats	Low levels

See also section 7.11, *Health and safety management*.

Policies

4.1 The presence, density and distribution of pest animals within LGBR will be monitored.

4.2 Pest animals will be controlled to the lowest practical densities with available resources, generally targeting levels in the table above.

4.3 The control of animal pests will be done in accordance with the RPMS and the Biosecurity Act 1993.

4.4 Priority will be given to those pest species that most threaten ecological values.

4.5 The target for goats, pigs and deer will be elimination and exclusion from within the management area.

4.6 The Trust will co-operate with GWRC and WCC and with neighbours, as appropriate, to manage animal pests within the management area and on surrounding lands.

4.7 The use of firearms and hunting dogs in LGBR is subject to the approval of the Trust, and to any applicable health and safety requirements.

4.8 Where appropriate, the Trust will advocate on behalf of GWRC and WCC efforts to control pests on surrounding private land.

4.9 The Trust will employ new monitoring and control techniques where these are demonstrated to improve efficiency and effectiveness.

4.10 The use of toxins will be minimised, however cost effectiveness and practicality will be considered.

4.11 Limited private hunting will be allowed where the Trust considers this can safely contribute to management objectives.

4.12 Access by private hunters will be subject to approval by the Trust.

4.13 All hunters must comply with the Health and Safety management policies in this plan (section 7.11) and with the Trust's conditions for hunting in LGBR (Appendix V).

7.5 Pest plants

The control of pest plants is the responsibility of the Trust under the Biosecurity Act 1993 and under the Trust's QEII covenant. In cases where pest plants pose a threat to the natural values of LGBR, greater control than that required by the RPMS will be necessary. Invasion by pest plants that are shade-tolerant (e.g., sycamore, tradescantia, selaginella) or smothering (e.g., old man's beard) is a potential threat to LGBR's native vegetation. Because some pest plants are visually dominant, they also compromise amenity values. The proximity of existing pest plant infestations, residential gardens and lifestyle blocks makes it likely that invasion by pest plants will be a continuing problem.

Gorse and old man's beard are designated boundary-control pest plants under the RPMS. This means that the Trust is required to clear these plants from within 10 m of a property boundary or road where the adjoining land is free of that plant, and when the neighbouring owner requests it. In the case of gorse this does not apply to any boundary of the Trust's land: no adjoining properties are gorse-free. The Trust's

approach to gorse management will be to allow natural succession to replace gorse with native vegetation. Protecting LGBR from fire, and controlling animal pests, are the main strategies here. Old man's beard, on the other hand, is a serious environmental weed and will be destroyed, as soon as possible, wherever it is identified within LGBR.

Darwin's barberry is widespread on high open ground on the true right of the stream. It is well established in areas of reversion around Wellington and is difficult and expensive to control. There is evidence that, over the long term, Darwin's barberry plays a role similar to gorse, forming dense thickets early in its life cycle, but eventually becoming leggy and allowing shade-tolerant native plants to establish underneath and eventually overtop it. It appears, however, that the process is slower in the case of Darwin's than in the case of gorse. In the absence of cost-effective control that does not significantly harm desirable plants, the best policy is probably to rely on natural succession to eventually crowd out Darwin's barberry.

Native species not naturally occurring within the Wellington Ecological District will be removed. Species such as karaka (already present), karo and its relative, *Pittosporum ralphii*, lacebark (*Hoheria populnea*), pohutukawa and puriri are examples.

A list of adventive vascular plants found in LGBR is included in Appendix I, and a list of priority control pest plants is found in Appendix IV.

Policies

5.1 The distribution of pest plant species will be surveyed and monitored biennially (every two years). Surveys will be conducted when pest plants are most visible. Particular attention will be paid to routes of likely dispersal, such as along tracks and streams. Casual observations will be recorded as they are made, ideally to naturewatch.org.nz.

5.2 The Trust will maintain a register of priority pest plants identified in LGBR, including locations and details of treatment and follow-up.

5.3 The control of pest plants will be done in accordance with the RPMS and the Biosecurity Act 1993.

5.4 Priority will be given to controlling pest plants that most threaten ecological values.

5.5 Biological and physical control methods will be favoured over chemical methods, where practicable. The use of toxins will be minimised.

5.6 In the course of pest-plant control, damage to native biota will be minimised.

5.7 The handling, storage, application and disposal of herbicides will be done in accordance with NZS8409 2004 (Management of Agrichemicals) and any relevant regional plan rules for private land.

5.8 The Trust will co-operate with GWRC and WCC and with neighbours, as appropriate, to manage pest plants within LGBR and surrounding areas.

5.9 The Trust will employ new monitoring and control techniques where these are demonstrated to improve efficiency and effectiveness.

5.10 In the case of tradescantia, selaginella and buddleia, the priority will be to progressively control towards the goal of eradication, working downstream from the top of the catchment.

7.6 Fire-risk management

Long Gully Bush Reserve is vulnerable to fire because large parts of it are clothed in gorse-dominated scrub which is highly flammable. Mature native forest tends to be of comparatively low flammability, having little dry material in the understorey and burning with relatively low intensity. Certain native species, such as flax and broadleaf (*Griselinia littoralis*), are of low flammability and if planted strategically can help slow the spread of fire.

In the short term, the priorities will be to prevent fire starting in or spreading to LGBR, and to prepare to respond to a wild fire should one occur. In the longer term these imperatives will remain but fire risk should decline as gorse-dominated scrub gives way to less flammable native vegetation. Intensive pest-animal control will hasten this transition.

Should fire take hold in LGBR then the Wellington Rural Fire Authority will be responsible for fighting it. Given the area's relative inaccessibility, aerial fire fighting would be likely to take the lead role. Fire-fighting water can be drawn from the Karori reservoirs, ponds on Long Gully Station, the sea and streams. LGBR is located near the airport so aircraft frequently fly above it, and plenty of people live nearby, so a fire is likely to be reported quickly.

The Wellington Regional Fire Authority has a fire plan for Long Gully Station, which identifies water sources, access, contact details, etc. The Trust will co-operate with the Authority and the station's owners in planning for fire suppression and control. For example, the Trust will provide the authority with updates to the LGBR vegetation map, together with priorities for defence in the event of a fire.

Policies

6.1 The Trust will co-operate with the Wellington Rural Fire Authority, neighbours and WCC over the management of fire risk.

6.2 Fire risk will be monitored, particularly during dry periods.

6.3 Fires, smoking, camping stoves and other sources of ignition are prohibited in LGBR at any time.

6.4 The requirements of policy (6.3) will be included on information signs at LGBR entrances.

6.5 The Trust may choose to exclude the public from LGBR during periods of high fire risk.

6.6 Machinery that presents an ignition risk (e.g., chainsaws and scrub bars) will not be used during periods of high fire risk.

6.7 The Trust will encourage neighbours to manage vegetation on their own properties so as to hasten the transition from gorse-dominated scrub to lower flammability vegetation.

7.7 Access and right-of-ways

There is no public road access to LGBR. A private right-of-way (Long Gully Road) gives the Trust legal access from the Airways Corporation road (Hawkins Hill Road) off Ashton Fitchett Drive, Brooklyn. Long Gully Road runs along the eastern boundary of LGBR and gives access to the foot track down to Glow-worm Gully and the pest-control line down Bluebottle Gully. A second right-of-way (South Karori Track) provides access to the southwest corner of LGBR from South Karori Road, via the properties owned by Askin and Wright. The owners of neighbouring properties are responsible for the upkeep of these right-of-ways. The Trust is not required to contribute to the cost of maintaining the right-of-ways.

The Trust has the right to permit any party to use these right-of-ways, including any person visiting LGBR for management purposes, and may permit access to members of the public. Note that, as the Trust will allow the public to visit LGBR only on foot, it will not be necessary to extend permission to the public to drive on the right-of-ways.

Pedestrian access up the stream from South Karori Road is via the Jones's property. No formal access agreement exists, however the Joneses are open to negotiating a formal easement to provide the Trust with certainty of access. The Silver Stream track is currently accessed, from the west, via the Jones's home, which is unsatisfactory in the long run in view of the proposal to allow limited public access to LGBR. Resolving the alignment of a new section of track to bypass the Jones's home, to the satisfaction of the Joneses and the Trust, is a matter of priority.

Policies

7.1 The Trust will negotiate with the Barghs regarding the formation of an easement for management purposes across their property. Ideally, this would provide the Trust with access to establish and maintain a fence along the bushline and carry out pest control.

7.2 The Trust and the Joneses will negotiate the alignment of a new section of track to bypass the Jones's home and give access from South Karori Road to the existing track up the valley.

7.3 The Trust will negotiate with the Joneses to establish a formal easement over the Jones's property to the LGBR boundary.

7.4 If people accessing LGBR from Long Gully Road intend leaving a vehicle at the boundary, a text message is to be sent to Steve Watson, notifying him in advance.

7.8 Tracks and routes

The QEII covenant permits the Trust to form, maintain and upgrade walking tracks within LGBR, subject to consultation with the QEII Trust.

Tracks provide access for reserve management including monitoring and controlling pest animals and plants, and inspecting and maintaining the fence. Formed tracks around the perimeter fence[7] and through the centre (alongside Silver Stream) give

[7] The perimeter track runs mainly around the outside of the goat-proof fence.

access to an extensive network of pest-control lines. A passable route exists from the head of Glow-worm Gully down to Silver Stream, down past the weir and gorge, over the stream terraces to LGBR's western boundary, then through the Jones's property to the west of LGBR to South Karori Road (see Map 4).

Given the steep, broken nature of the land in LGBR, anyone travelling through it needs to be capable of navigating in rough terrain. To develop tracks above the standard of a basic tramping track is considered unnecessary by the Trust. Pest-control lines are maintained to route standard only.

The QEII covenant restricts the felling of native trees during the construction, maintenance and upgrading of tracks and pest-control lines.

Policies

8.1 Before forming new tracks or upgrading existing tracks beyond basic standard, the Trust will consult with the QEII National Trust.

8.2 Tramping-grade tracks will be maintained alongside the perimeter fence and alongside Silver Stream.

8.3 Streams will be forded rather than bridged.

8.4 The network of pest-control lines will be maintained to a minimal standard sufficient to provide unhindered access to bait stations, traps and monitoring tunnels.

8.5 Clearance of native vegetation for tracks (other than the perimeter track) will be no wider than one metre. Pest plants including gorse and Darwin's barberry can be cleared by more than one metre.

8.6 No native tree of greater than 100 mm diameter at 1.3 m above ground may be felled during the formation, maintenance or upgrading of any track within LGBR.

8.7 All track construction and upgrading will be done in such a manner as to minimise erosion, impacts on waterways, and visual impacts during and after construction.

7.9 Public use

The main valley route from the head of Glow-worm Gully to South Karori Road would be a valuable addition to Wellington's Outer Green Belt recreational network. It represents a potential link between Hawkins Hill/Zealandia to the east, and to South Karori Road/Makara Peak to the west. The route offers geological, scenic and historical interest, including the old weir and the dramatic gorge downstream of it. The track down Silver Stream below the gorge provides reasonably easy travel. If LGBR were publicised there would likely be considerable interest.

Publicity about and public access to LGBR would help build public support for the Trust's work. It could also help encourage others to follow the Trust's lead and undertake forest restoration projects on their own land.

A concern for the Trust is that public use could expose people to risks associated with management activities such as pest-animal and pest-plant control. The Trust will

therefore limit public access so as to minimise the likelihood of visitors being in LGBR during management activities that could pose a risk to others in the vicinity.

Another concern is that visitors can pose risks to LGBR's natural values. Careless people can start fires, damage vegetation or harm water quality or wildlife.

For now, public use will be restricted to organised parties, such as organised tramping groups. Permission to use LGBR must be sought from the Trust for each visit. Establishing the most practical public access, up the valley from South Karori Road, depends on the successful negotiation of formal access across the Jones's property. Until such time as the main route alongside Silver Stream is made suitable, access to the area will not be made available to the general public.

See also sections 7.11, *Health and safety management* and 7.7, *Access and rights-of-way*.

Policies

9.1 Appropriate public use of LGBR will be permitted, subject to approval from the Trust.

9.2 Authorised visitors can access LGBR via the Long Gully Road and South Karori Track right-of-ways.

9.3 Until such time as suitable access is negotiated and constructed across the Jones's property, public access up Silver Stream from South Karori Road will be subject to the express permission of the Joneses.

9.4 Public access will be restricted to walkers.

9.5 Mountain bikes, motorised transport and horses will not be permitted.

9.6 Camping will not be permitted on WHNT land.

9.7 People who visit LGBR for recreation will do so at their own risk.

9.8 Signs at each entrance will explain the relevant public use, fire prevention and risk management policies, and give contact details to apply for access.

7.10 Dogs

Dogs can harm native wildlife, particularly birds that spend time on the ground. Trained hunting dogs are needed for feral pig and goat control. Some dogs are trained for conservation purposes such as finding small pests or particular native species.

Policies

10.1 Dogs are permitted in LGBR **only** where necessary for management purposes.

7.11 Health and safety management

Long Gully Bush Reserve's rugged topography, isolation and minimal development make it an inherently risky place. The management activities associated with it (pest control, spraying, track cutting, fencing) are also inherently risky. The Trust will endeavour to ensure that all visitors are made aware of the hazards they may encounter in LGBR.

Under the Health and Safety at Work Act 2015, the Trust, being a voluntary organisation, **does not** constitute a *person conducting business or undertaking* (PCBU). The Trust does not have responsibilities as an employer under the Act.

While management activity is taking place, LGBR can be considered as a work site. The Trust will take all practicable steps to ensure that the public is excluded while management activities (including hunting, spraying, and the use of machinery) that could pose a risk to others in the vicinity are taking place.

The Trust may, at its discretion, require proof that people undertaking management activities within LGBR, be they professionals or volunteers, have adequate experience and/or qualifications to do the work, and have an adequate health and safety management plan. People working alone within LGBR will be required to have an acceptable health and safety management plan that includes a solo fieldwork procedure.

All visitors to LGBR must notify the Trust's Health and Safety Officer (HSO) before entering the area. At the time of writing the HSO is Rose Mary Jones. Contact details are included in Appendix V.

It must be recognised by visiting members of the public that there are potential hazards on the land. All visitors should accept responsibility for any actions taken by them which are contrary to the advice offered either in person, by published information, or by signage on site.

Policies

11.1 The Trust will comply with the Health and Safety at Work Act 2015.

11.2 If general public use is to be allowed, signs will be erected, in consultation with the QEII Trust, at main entrances, advising of site-specific hazards.

11.3 All visitors to LGBR, either for management purposes, research or recreation, **must** check with the Trust's Health and Safety Officer before the day of the intended visit. The Health and Safety officer will advise intending visitors of known hazards.

11.4 No other party will be permitted to enter LGBR while hunting with firearms and/or dogs is taking place.

11.5 Public use will not be permitted while management activities that could pose a risk to others in the vicinity are taking place.

11.6 In general, permitted public access will be restricted to weekends.

11.7 Should public access be permitted during the week at some future time, LGBR will be temporarily closed to the public during management activities that could pose a risk to others in the vicinity. Temporary signs will be placed at entrances advising that the management area is closed, and listing activity-specific hazards.

11.8 The Trust may require proof that any party undertaking management activities within LGBR operates an adequate health and safety plan, including a system for identifying and managing hazards.

11.9 Recreational hunters will be required to sign a copy of the *Permission and conditions for hunting in Long Gully Bush Reserve* form (Appendix V).

7.12 Cultural heritage

The Silver Stream weir remains in good condition and is a point of interest for visitors to the gorge area. The pump platform, and large sections of the pipeline running up the spur to the northeast, also remain, although the pipe is difficult to access and has mostly disappeared from view beneath the scrub.

The weir would block passage by some native fish. If comparative fish surveys demonstrate a significant difference in aquatic biodiversity above and below the weir, the Trust may decide to construct a fish ladder that bypasses the weir. On the other hand, the weir may benefit some fish in the headwaters by preventing the passage of brown trout.

No evidence of other historical structures, or of pre-European habitation or activity, is known to exist in LGBR.

Policies

12.1 No management action will be deliberately detrimental to the historic weir and pipeline.

12.2 Should other historic (pre- or post-European) sites be found in LGBR, the Trust will notify Heritage New Zealand.

12.3 The Trust will co-operate with Heritage New Zealand regarding the management of heritage features, subject to the vegetation-management policies of this management plan.

7.13 Unmanned aerial vehicles (UAVs)

Unmanned aerial vehicles or "drones" can be useful for monitoring, especially for surveying canopy pest plants and for surveying goats or other matters concerning management. UAVs can, however, disturb wildlife and detract from natural amenity. The use of a UAV must, by law, be approved by the owner of the land over which the machine is flown.

Policies

13.1 UAVs may be used within LGBR for reserve management purposes only, and subject to the approval of the Trust.

13.2 The operator is responsible for ensuring that the operation of a UAV within LGBR meets legislative requirements.

13.3 Permission to use a UAV over LGBR does not extend to neighbouring properties.

13.4 No recreational use of UAVs is allowed.

7.14 Funding for management costs

The Trust intends to rely as much as possible on volunteer labour for management activities. The Trust has a working relationship with Conservation Volunteers New Zealand (CVNZ). This organisation provides work experience for overseas visitors, co-ordinates local volunteers, provides field supervision, and raises funds to pay for equipment and supervision. CVNZ has done some track maintenance in LGBR. CVNZ intends to be able eventually to take over the maintenance of all tracks and pest-control lines, and also to service bait stations and predator traps. This will be subject to the organisation securing adequate funding.

Regardless of the extent to which CVNZ and others can help in a voluntary capacity, the Trust will need continuing funding for activities that require input beyond what can reasonably be expected of volunteers and/or that involve substantial capital outlay. These could include:

- Monitoring pest plants and pest animals
- Monitoring native biota
- Hunting
- Fence maintenance and replacement
- Major track maintenance
- Publicity and promotion
- Health and safety material
- First aid kits
- Tools
- Bait-station and trap replacement, servicing, maintenance and consumables
- Specialist clothing.

Potential funding sources include GWRC, WCC, QEII National Trust, DOC's Community Fund, the World Wildlife Fund, the Pacific Development and Conservation Trust, the Lotteries Commission, local community gaming trusts, the Nīkau Foundation, Rotary, Lions, the Morgan Foundation, and corporate sponsorship.

Policies

14.1 The Trust will minimise the costs of management by supporting and enabling as much volunteer labour as possible, and by seeking to have LGBR included in pest-plant and pest-animal control programmes funded by GWRC and WCC.

14.2 The Trust will apply for funding to cover costs that cannot be met by policy (14.1).

7.15 Research

LGBR is located near research institutions including Victoria and Massey universities, DOC, Zealandia, Wellington Zoo and Te Papa. LGBR may provide opportunities for ecological research. Such research can improve the Trust's understanding of LGBR, thereby improving management. It is therefore in the Trust's interest to encourage the appropriate use of LGBR for research into ecology, e.g., botany, zoology, pest plants and pest animals. Research activity must not impact significantly on LGBR's natural or cultural values.

Policies

15.1 The use of LGBR for appropriate ecological research will be encouraged, provided that research does not negatively impact on the area's ecological, landscape or heritage values.

15.2 The results of and reports associated with any such research, including any published material, are to be provided to the Trust at no cost.

15.3 The Trust may request interim progress reports.

15.4 The Trust will maintain an archive of all research material relating to LGBR in the Trust's own library, and lodge copies in the National Library.

7.16 Review

This is a living document that may be updated by the Trust at any time in response to changing circumstances, with changes to be formally endorsed at an AGM of the Trust, in consultation with the QEII Trust. Regardless of any such interim changes, the management plan must be fully reviewed every ten years.

Policies

16.1 This management plan will be reviewed at intervals of ten years.

Appendix I: Native & adventive vascular plant species lists

Map: NZTopo50-BQ31 Wellington, centred on grid reference 440255.
Area: 65 ha (this list applies only to land owned by Wellington Natural Heritage Trust).
Geology: Wellington greywackes: alternating dark-grey argillite and greywacke sandstone, intensely sheared and semi-schistose; Balfour Series, Triassic. (*NZ Geological Map* 1:250,000 Wellington, Sheet 12, 1st edition. 1975).
Soils: Korokoro – Makara soils. (*Soils of Wellington District*. Soil Bureau, DSIR. 1960).
Catchment: Silver Stream, a true left tributary of Karori Stream.
Elevation range: c. 90 m – c. 340 m above sea level.
Landform: Main valley, with a series of spurs and gullies with tributary streams.
Ecological District: Wellington Ecological District 39.01.
Rainfall: 1,228.9 mm p.a. (gauge at Kelburn Meteorological Office).
Aspect: true right of stream: south; true left of stream: north.
Forest classification: regenerating, semi-coastal, podocarp-broadleaf forest; with mixed indigenous-adventive shrublands; rank pasture; scattered pine trees.
Tenure: Wellington Natural Heritage Trust Inc.
Regional authority: Greater Wellington Regional Council.
Territorial Local Authority: Wellington City Council.
Status: protected in perpetuity by QEII Open Space Covenants nos. 5-07-333, 5-07-366, and 5-07-385.

Abbreviations and symbols
agg. = aggregate
# = not naturally occurring in Wellington Ecological District 39.01
(P) = planted
sp. = species
subsp. = subspecies
var. = variety

Notes
The property is protected by:
- a deer-, goat-, pig-proof, mesh fence, topped by a three-strand fence.
- a network of possum-bait stations, "Warrior" possum traps and DOC200 predator traps.
- hunting of goats, pigs and deer.

LIST 1: INDIGENOUS VASCULAR PLANTS[8]

BOTANICAL NAME	MĀORI NAME	COMMON NAME
GYMNOSPERM TREES		
Dacrydium cupressinum	rimu	rimu
Prumnopitys ferruginea	miro	miro
MONOCOTYLEDONOUS TREES		
Cordyline australis	tī kōuka	cabbage tree
Cordyline banksii	tī ngahere	forest cabbage tree
Rhopalostylis sapida	nīkau	nīkau
DICOTYLEDONOUS TREES AND SHRUBS		
Aristotelia serrata	makomako	wineberry

[8] LIST 1 compiled by Robert Logan, 1999; revised by Barbara Mitcalfe, October 2000; additions from "Bluebottle" catchment*, by B Mitcalfe and J C Horne 29.12.07. (*begins at grid reference 450258 on right-of-way).

Brachyglottis repanda	rangiora	rangiora
Carpodetus serratus	putaputawētā	marbleleaf
Coprosma foetidissima	hūpiro	stinkwood
Coprosma grandifolia	kānono	kānono
Coprosma lucida	karamu	karamu
Coprosma propinqua subsp. propinqua		a coprosma sp.
Coprosma rhamnoides		a coprosma sp.
Coprosma robusta	karamu	karamu
# Corynocarpus laevigatus	karaka	karaka
Fuchsia excorticata	kōtukutuku	tree fuchsia
Gaultheria sp.	tāwiniwini	bush snowberry
Geniostoma ligustrifolium var. ligustrifolium	hangehange	hangehange
Griselinia littoralis	pāpāuma	broadleaf
Griselinia lucida	puka	broadleaf
Hedycarya arborea	porokaiwhiri	pigeonwood
Knightia excelsa	rewarewa	rewarewa
Kunzea robusta	kānuka	kānuka
Leptospermum scoparium agg.	mānuka	mānuka
Lophomyrtus bullata	ramarama	ramarama
Melicytus ramiflorus subsp. ramiflorus	māhoe	māhoe
Myrsine australis	māpou	māpou
Nestegis cunninghamii (P)	maire	black maire
Olearia paniculata	akiraho	akiraho
Olearia rani var. colorata	heketara	heketara
Olearia solandri	takupurenga	coastal tree daisy
Ozothamnus leptophyllus	tauhinu	tauhinu
Piper excelsum subsp. excelsum	kawakawa	kawakawa
Pennantia corymbosa	kaikōmako	kaikōmako
Pittosporum eugenioides	tarata	lemonwood
Pittosporum tenufolium	kohuhu	kohuhu
Pseudopanax crassifolius	horoeka	lancewood
Schefflera digitata	patē	patē
Solanum aviculare	poroporo	poroporo
Urtica ferox	ongaonga	tree nettle
Veronica (Hebe) parviflora	koromiko tāranga	tree hebe
Veronica stricta var. stricta (= Hebe stricta var. atkinsonii)	koromiko	koromiko
Weinmannia racemosa	kāmahi	kāmahi
MONOCOTYLEDONOUS LIANES		
Freycinetia banksii	kiekie	kiekie
Ripogonum scandens	kareao	supplejack
DICOTYLEDONOUS LIANES		
Clematis forsteri	pikiarero	small white clematis
Clematis paniculata	puawānanga	white clematis
Metrosideros diffusa	rātā	white rata
Metrosideros fulgens	akakura	scarlet rata
Metrosideros perforata	akatea	clinging rata
Muehlenbeckia australis	pōhuehue	pōhuehue
Parsonsia heterophylla	kaihua	a parsonsia sp.
Rubus cissoides	tātarāmoa	a bush lawyer sp.
LYCOPODS		
Lycopodium volubile	waewaekoukou	climbing club moss

Lycopodium sp.		a lycopodium sp.
FERNS		
Adiantum cunninghamii	huruhuru tapairu	maidenhair
Asplenium bulbiferum	manamana	hen and chickens fern
Asplenium flaccidum	makawe o Raukatauri	hanging spleenwort
Asplenium flabellifolium		necklace fern
Asplenium gracillimum		Hen and chickens fern
Asplenium hookerianum		Hooker's spleenwort
Asplenium oblongifolium	huruhuru whenua	shining spleenwort
Asplenium polyodon	petako	sickle spleenwort
Blechnum chambersii	nini	lance fern
Blechnum colensoi	peretao	waterfall fern
Blechnum discolor	piupiu	crown fern
Blechnum filiforme	pānako	thread fern
Blechnum minus		swamp kiokio
Blechnum procerum		small kiokio
Cyathea dealbata	ponga	ponga
Cyathea medullaris	mamaku	mamaku
Cyathea smithii	kātote	soft tree fern
Dicksonia squarrosa	whekī	whekī
Histiopteris incisa	mātātā	water fern
Hymenophyllum demissum	irirangi	drooping filmy fern
Hymenophyllum flexuosum	mauku	a filmy fern sp.
Hypolepis ambigua	rarauhi nehenehe	a hypolepis sp.
Lastreopsis glabella		smooth shield fern
Lastreopsis hispida	pongaweka	hairy fern
Leptolepia novae-zelandiae		lace fern
Leptopteris hymenophylloides	heruheru	single crepe fern
Loxogramme dictyopteris		lance fern
Notogrammitis heterophylla		comb fern
Paesia scaberula	mātā	ring fern
Pellaea rotundifolia	tarawera	round-leaved fern
Microsorum pustulatum subsp. pustulatum	kōwaowao	hound's tongue
Microsorum scandens	mokimoki	fragrant fern
Pneumatopteris pennigera	pākau	gully fern
Polyphlebium endlicherianum		a polyphlebium sp.
Polystichum neozelandicum subsp. zerophyllum	pikopiko	a shield fern sp.
Polystichum vestitum	pūniu	prickly shield fern
Pteridium esculentum	rārahu	bracken
Pteris macilenta	titipo	sweet fern
Pyrrosia eleagnifolia	ota	leather-leaf fern
Rumohra adiantiformis	karawhiu	leathery shield fern
ORCHIDS		
Pterostylis graminea	tutukiwi	a greenhood sp.
GRASSES		
Poa cita	wī	silver tussock
SEDGES		
Carex uncinata	matau a Māui	hooked sedge
Carex virgata	pūrei	swamp sedge
RUSHES		
Luzula banksiana		a woodrush sp.

Juncus sp.	wīwī	a juncus sp.
MONOCOTYLEDONOUS HERBACEOUS PLANTS, other than orchids, grasses, sedges, rushes		
Astelia solandri	kōwharawhara	perching astelia
Astelia hastata	kahakaha	a perching lily sp.
Phormium cookianum subsp. cookianum	whararikī	coastal flax
COMPOSITE HERBACEOUS PLANTS		
Anaphalioides bellidioides		hell's bells
Anaphalioides keriense	puatea	a cudweed sp.
Euchiton (= Gnaphalium) audax		a cudweed sp.
Helichrysum filicaule		creeping everlasting daisy
Leptinella squalida		a leptinella sp.
Senecio minimus		a fireweed sp.
DICOTYLEDONOUS HERBACEOUS PLANTS, other than composites		
Acaena anserinifolia	piripiri	a bidibid sp.
Aciphylla squarrosa	taramea	speargrass
Cardamine sp.	panapana	NZ bitter cress
Centella uniflora		centella
Dichondra repens		Mercury Bay weed
Epilobium nummularifolium		a willowherb sp.
Epilobium rotundifolium		round-leaved willowherb
Galium propinquum	māwe	bedstraw
Hydrocotyle heteromeria		a waxweed sp.
Hydrocotyle moschata		hairy pennywort
Oxalis exilis		yellow oxalis
Parietaria debilis		NZ pellitory
Stellaria decipiens	kohukohu	NZ chickweed
Urtica incisa	ongaonga	scrub nettle
Wahlenbergia sp.	rimuroa	harebell

LIST 2: ADVENTIVE VASCULAR PLANTS[9]

BOTANICAL NAME	MĀORI NAME	COMMON NAME
GYMNOSPERM TREES		
Pinus radiata		Monterey pine
MONOCOTYLEDONOUS TREES – none recorded		
DICOTYLEDONOUS TREES AND SHRUBS		
Berberis darwinii		Darwin's barberry
Buddleja davidii		buddleia
Cytisus scoparius		broom
Escallonia sp.		redclaws (possibly exterminated)
Hypericum androsaemum		tutsan
Rubus fruticosus agg.		blackberry
Ulex europaeus		gorse
MONOCOTYLEDONOUS LIANES – none recorded		
DICOTYLEDONOUS LIANES		
Clematis vitalba		old man's beard

[9] As of 30 November 2015, no detailed listing of adventive vascular species has been done. This list includes species recalled from various visits.

Calystegia silvatica subsp. disjuncta		greater bindweed
Hedera helix		English ivy
LYCOPHYTES		
Selaginella kraussiana		Krauss's club moss
FERNS – none recorded		
ORCHIDS – none recorded		
GRASSES		
Cortaderia jubata		purple pampas
SEDGES – none recorded		
RUSHES – none recorded		
MONOCOTYLEDONOUS HERBACEOUS PLANTS, other than orchids, grasses, sedges, rushes		
Crocosmia x crocosmiiflora		montbretia
Tradescantia fluminensis		wandering willie
COMPOSITE HERBACEOUS PLANTS – none recorded		
DICOTYLEDONOUS HERBACEOUS PLANTS, other than composites		
Articum sp.		burdock
Cedronella canariensis		balm of Gilead
Chrysanthemoides monilifera subsp. monilifera		boneseed
Mentha spicata		spearmint
Parietaria judaica		spreading pellitory
Senecio glastifolius		pink ragwort

Appendix II: Fence specifications

The existing goat-proof fence meets the following specifications:

- Posts at not more than 5 m spacing
- No. 1 quarter-round 2.1 m posts set 1.5 m above ground level
- Goat-netting at bottom (900 8 300), approximately 100mm above ground
- Single barbed-wire approximately 50 mm below the netting and 50 mm above the ground
- Two guide-wires for the netting
- Three single wires evenly spaced above the netting to a total height of 1.45 m
- Horizontal stay assemblies
- Angle stays are not permitted on the outside of the fence
- Strainer assemblies, tiebacks, tie-downs and plates as required by the contour, and the length of strains.

Appendix III: Fence inspection checklist

Vegetation encroachment into buffer strip at least 1 m wide on one or other side (pest plants including gorse and Darwin's barberry may be cleared wider than this)

Vegetation growing through the fence from the non-cleared side

Loose, broken or rusted wires and staples

Loose, broken or damaged posts

Undermining

Evidence of animals pushing under the fence (may include gaps, animal tracks, hair left on bottom wire, pig rooting)

Serviceability of gates and locks

Free swinging of flood gates

Gaps under or beside flood gates

Launching points from which goats could jump or climb the fence from the outside, e.g., fallen trees, over-growing vegetation, slumped earth, rockfalls.

Note regarding the repair of fence breaches

If timber is to be laid on or dug into the ground, then ground-durable timber must be used – sections of fence post are ideal. H3-treated timber may be used to block holes (e.g., by stapling it onto fence wires), provided it is not in contact with the ground.

Appendix IV: Pest-plant priority control list

Species	Priority	Action required (time after detection)
Blackberry	2	Annually – spray in early summer before fruit set
Buddleia	1	As soon as possible after discovery
English ivy	2	As soon as possible after discovery
English mint	3	As resources allow
Escallonia	2	As soon as possible after discovery
Karaka	2	Annually – before seed sets
Karo	2	Annually – before seed sets
Montbretia	3	As resources allow
Old man's beard	1	As soon as possible after discovery
Periwinkle	2	As soon as possible after discovery
Pinus radiata	2	As resources allow
Selaginella	1	As soon as possible after discovery
Sycamore	1	Annually – before seed sets
Tradescantia	1	As soon as possible after discovery
Tutsan	2	As soon as possible after discovery

Appendix V: Permission & conditions for hunting in Long Gully Bush Reserve

Date: ___ / ___ / _____

To: _____ (hunter's name)

These are the conditions under which the Wellington Natural Heritage Trust permits you to access Long Gully Bush Reserve for the purpose of hunting.

1. You must notify the WNHT Health and Safety Officer, neighbours and the Karori Community Constable (listed on the attached page) before accessing the land with a firearm. Notice may be for a single day or a series of designated days. **You may assume permission is granted only if it has been confirmed verbally, by email or in writing**. You will not be given permission if it has been granted to someone else for the day.
2. Before the first occasion on which you access WNHT land via the Watsons' land (i.e. from Long Gully Road or the airstrip) you must make yourself known **in person** to Steve Watson.
3. Before the first occasion on which you access WNHT land via the Jones's land (287 South Karori Road) you must make yourself known **in person** to Rose Mary or Mark Jones.
4. You must shoot only within the goat-proof fenced area, unless you have permission from the owner(s) of neighbouring property/ies to shoot elsewhere.
5. You must be responsible for your own health and safety whilst on the land.
6. You must agree that the liability for any accident or injury which you suffer from, or cause, whilst on WNHT land, is your responsibility.
7. You must assume responsibility for other people or dogs taken by you on to the land, and for their actions.
8. You must not take any people on to the land in return for monetary reward.
9. When carrying a firearm in LGBR you must carry your current Firearms Licence.
10. You must adhere strictly to the seven basic rules of the NZ Arms Code.
11. You must not shoot at animals on the skyline.
12. No wounded animals are to be left alive. Where possible, please also kill any goat kids or piglets associated with your kill.
13. Please remove dead animals from streams or swampy areas if they fall or are found in this situation.
14. WNHT would appreciate your assistance with keeping tracks clear.
15. You must not interfere with any track markers or animal control equipment.
16. Before 9 p.m. following a day's hunting you must report the number of animals killed, and other relevant observations, to the WNHT Secretary.

We shall be grateful if you will confirm your agreement with the above conditions by signing this letter and returning to us a duplicate. This permit is valid for two years from the date above.

Yours sincerely,

Colin J Ryder, Chair, Wellington Natural Heritage Trust

I agree to the above conditions.

Signed: …….....

Date: ___ / ___ / _____

Full Name: ……..

Address: ……

Firearms Licence number: ……..

Phone (hm): ……. (mobile): ……..

Email: …….

Trustees' Details

Colin Ryder (Chairman): 478 4391, rydercj@xtra.co.nz

Tim Park: 907 4007 hm, 499 4444 wk, parkecology@gmail.com

Chris Horne: 475 7025, jchorne@clear.net.nz

Rose Mary Jones (**Health & Safety Officer**): 476 4640 hm, Rose.jonesnz@gmail.com

Barbara Mitcalfe: 475 7149, bmitcalfe@clear.net.nz

Chris Cosslett: 972 3490, cosslett.hunter@paradise.net.nz)

Clive Anstey: 939 2973, c.anstey@paradise.net.nz

John Bishop: (970 7496, bishop.lamb@paradise.net.nz)

Neighbours' Details

Rose Mary and Mark Jones: 476 4640 (287 South Karori Road) joneses@paradise.net.nz

Brian Bargh: 473 9262 wk 476 6050 hm (169 South Karori Road) brian.bargh@huia.co.nz

Steve Watson: 476 5296 hm 0274 427 334 (48 Ashton Fitchett Drive, Brooklyn) longully@xtra.co.nz

Jo Schofield: 385 5634 wk 027 578 1770 (183 South Karori Road) joswims@actrix.co.nz

Zealandia Operations Manager: 920 2223

Karori Police Community Constable, Jayne Ross: 381 2000

Action plan

To give effect to the objectives and policies of this management plan, the Trust needs to undertake a series of actions. Some of these actions contribute to one particular objective, while others contribute to two or more. For instance, maintaining tracks facilitates pest animal and pest plant control, thereby contributing to a healthy native forest and a safe haven for native biota. It also helps encourage others to protect other regenerating areas by providing for visits by interested parties, thereby allowing people to see what the Trust has achieved.

Some actions will be achieved through volunteer efforts, either by trustees or by others from the community. Other actions will have to be paid for with funds raised by the Trust. Wherever possible, the Trust will seek the assistance of other agencies, in particular WCC and GWRC.

The actions outlined in this section will be prioritised and scheduled according to the following scales:

Priority
1 = Action essential to plan's success
2 = Action important to plan's success
3 = Action useful to plan's success

Time for completion
Continuing
Short (1 – 3 years)
Medium (3 – 5 years)
Long (5 – 10 years)

Note that all costs in the following tables exclude GST.

Action area / action	Priority	Responsi-bility	Time for completion	Resource/cost	Success indicator/monitoring measure
Fence					
Maintain clear ground alongside the fence by cutting / spraying a strip of at least 1 metre on at least one side of the fence	1	Trust contractor/ volunteers	Continuing	See Tracks section below.	Clear access maintained around entire fence line Fence kept free of encroaching/ damaging vegetation
Fence condition inspections and repairs	1	Trust contractor/ volunteers	Annually and as required	Inspection: no cost – by volunteers and regularly by contractor in the course of other work Minor repairs: 2 contractor days per year. Total cost $1,000 per year including materials. Substantial fence repairs will necessitate separate funding to be raised by Trust.	Fence breaches repaired promptly following detection
Build stiles and lock gates	3	Trust contractor	Only if general public use is permitted in future	$2,000	Stiles complete and gates locked at main entrances (Glow-worm Gully and South Karori Road)

Action area / action	Priority	Responsi-bility	Time for completion	Resource/cost	Success indicator/monitoring measure
Pest animals					
DOC 200, Warrior and AT220 trap servicing	1	Trust contractor/ volunteers	Continuing, monthly	10 contractor days per year to service traps on months when this is not done in the course of other work (bait station servicing and rodent monitoring). $4,900 per year including bait.	Traps checked, cleared, rebaited, re-set and maintained monthly. All traps in working order with fresh bait, AT220s with charged batteries and liquid lure in bait tanks. All catch and rebaiting data is recorded in trap.nz and included in monthly reports to the Trust.
Bait station servicing	1	Trust contractor	Continuing, 5 times per year	20 contractor days per year to service bait stations as per GWRC protocol. $9,500 per year including toxin.	All bait stations cleared of old bait and cleaned, fresh bait added, flour lure blaze on trees – 360 degrees for brodifacoum, single blaze for diphacinone. (Traps are serviced in the course of this work.)
Goat presence monitoring	1	Trust contractor/ volunteers	Continuing	No cost – done in the course of other activities	Presence of goats / new sign inside the fence is reported promptly to Trust.
Goat hunting	1	Trust contractor/ volunteers	Continuing, as required	Up to 2 contractor days per year. Total cost $830 per year including labour and ammunition. To be done in course of other work where possible.	All goats detected inside fence are promptly followed up and killed. Details included in monthly reports to Trust.
Pig hunting	1	Trust volunteers	Continuing, as required	No cost – by volunteer pig hunters	Presence and location of new pig sign is promptly reported to pig hunter. Pigs are killed as quickly as possible. Details in monthly reports to Trust.

Action area / action	Priority	Responsi-bility	Time for completion	Resource/cost	Success indicator/monitoring measure
Rodent monitoring	2	Trust contractor	February and August each year	6 contractor days per year including one extra day per round to complete trap service. $2,400 per year.	Completed tracking tunnel cards provided to GWRC for inclusion in Halo monitoring reports. Reports provided to Trust.
Maintain goat clearing(s) as forest regenerates (if deemed necessary)	3	Trust contractor/ volunteers	Long	No cost – volunteer labour or in the course of other duties	Future goat incursions are detected at maintained clearing(s).

Pest plants

Pest plant inspections	1	Trust contractor/ volunteers	Continuing	Pest plant incidence is continually monitored in the course of other work. Annual OMB survey (see below).	Distribution of all priority pest plants is recorded on inaturalist.org.nz. Details of treatment included in monthly reports to Trust.
Tradescantia and *Selaginella* spraying on stream banks and at other sites including alongside Southernthread Road.	1	Trust contractor	Continuing	6 contractor days, $2,580 per year including labour and chemicals	*Tradescantia* and *Selaginella* are confined to stream banks and prevented from spreading up valley sides or developing large patches.
Old man's beard (OMB)	1	Trust contractor/ volunteers	Late January to early February each year	1 contractor day per year, $410 including labour and chemical	Known sites are visited annually (during flowering season) and all live plants killed. Surrounding areas inspected for new flowering plants. Any new sites are treated before seed sets and recorded on inaturalist.org.nz

Action area / action	Priority	Responsi-bility	Time for completion	Resource/cost	Success indicator/monitoring measure
Woody pest plants including buddleia, cherry, sycamore, karaka, pine	2	Trust contractor/ volunteers	Continuing	As resources allow. One contractor day per year allowed for, $410 including labour and chemical. Done as much as possible in the course of other work.	Streambeds kept clear of flowering buddleia. Other species are monitored for in the course of other work and controlled as soon as possible, preferably before reaching seeding size. Cherry, sycamore and karaka are also controlled on some neighbouring properties as a buffer.
Other priority pest plants including bindweed, *Montbretia*, ivy, everlasting flowers, Japanese honeysuckle	2	Trust contractor/ volunteers	Continuing	As resources allow. Done as much as possible in the course of other work.	Monitored in the course of other work and controlled as soon as possible. These species also controlled on some neighbouring properties as a buffer.

Native biota

Monitoring of native vegetation	1	Trust / specialists	Continuing	No cost – by Trust, GWRC or others	
Monitoring of native fauna	1	Trust / specialists	Continuing	No cost – by Trust, GWRC or others	

Fire-risk management

Provide Fire and Emergency Te Ūpoko with any updated vegetation maps of LGB and instructions about priorities for protection in the event of a fire	1	Trust	Continuing	No cost	Fire and Emergency Te Ūpoko has the most current version of the vegetation map for LGB
Encourage owners to plant low-flammability vegetation alongside South Karori Road	1	Trust / neighbours / WCC	Short – medium	No cost to Trust	Gorse between South Karori Road and base of hill replaced by appropriate fire-resistant native vegetation

Action area / action	Priority	Responsi-bility	Time for completion	Resource/cost	Success indicator/monitoring measure
Access					
Negotiate agreement with South Karori Road neighbours regarding formalising valley access from South Karori Road	1	Trust / neighbours	Short	Legal fees and easement survey costs	Formal easement secured for management purposes and possible future limited public access
Negotiate alignment and develop pedestrian access through South Karori Road neighbours' property	2	Trust / neighbours	Medium	No cost – volunteer labour	Walking track that satisfies both parties negotiated and complete
Tracks					
Maintain pest animal control access tracks and lines in open and regenerating areas, including alongside fence	1	Trust contractor/ volunteers	Continuing	8 contractor days per year. Total cost $3,600 per year including chemical and machinery charges. 5 volunteer days per year	Fence line, main valley and other access lines maintained to route standard. Access lines other than fenceline and main valley marked with pink squares.
Maintain pest animal control access tracks and lines under bush canopies	1	Trust contractor/ volunteers	Continuing	No additional cost – done in the course of other duties	Fence line, main valley and other access lines maintained to route standard. Access lines other than fenceline and main valley marked with pink squares
Hazard management					
Install permanent hazard warning signs at main entrances	3	Trust	Only if general public use permitted	$1,000	Clear signs detailing conditions for entry, dog policy, vegetation management policy, fire restrictions and hazards installed at Glow-worm Gully and South Karori Road entrances

Action area / action	Priority	Responsi-bility	Time for completion	Resource/cost	Success indicator/monitoring measure
Review					
Comprehensive management plan review	1	Trust	Medium (2025)	$6,000	Revised plan completed to satisfaction of the Trust and QEII Trust

Annual work programme

Month	Task	Number of days	Notes
January	Service all bait stations and all DOC200, Warrior and AT220 traps	4	Empty, clean and refill all bait stations and flour blaze trees in line with GWRC protocol. Record bait remaining and bait applied in GWRC Survey 123 database. January is usually a diphacinone application with a single flour blaze. All traps cleared, cleaned, re-baited, tested to ensure they trigger smoothly at the appropriate weight, and adjusted if necessary. Check AT220s have charged batteries and liquid bait and are operating correctly. Record manual trap catches in trap.nz
Late Jan or early Feb	Old man's beard survey and control	1	Choose an overcast day. Visit sites of previous infestation and control seedlings. Survey canopy for new flowering plants using binoculars. Note that flowering in LGB peaks exactly 4 weeks after flowering peaks in Upper Hutt. If the survey is missed at this time it can be done in winter when OMB seed is fluffy. Consider using drone.
February	Rodent monitoring	2	Set out cards and collect the following day, in line with GWRC protocol.
	Service all DOC200, Warrior and AT220 traps	1	Service traps, as per January, during rodent monitor. One additional day is allowed over and above rodent monitoring to complete trap servicing.
March	Service all DOC200, Warrior and AT220 traps	2	As per January for traps.
April	Spray *Tradescantia* and *Selaginella* in Glow-worm Gully and Silver Stream	3	Spray mix includes glyphosate at double label rates (20ml per litre if using 360 concentrate) + Triclopyr at 6ml/litre + penetrant at 1ml/litre + dye. Notify downstream neighbours at least 2 days in advance so they can fill water tanks. No spraying into water. Where possible, hand-weed small patches and remove from site. Selaginella can also be sprayed with 25% bleach.
	Service all bait stations and all DOC200, Warrior and AT220 traps	4	As per January for bait stations and traps. April is usually a diphacinone application with a single flour blaze.
May	Service all DOC200, Warrior and AT220 traps	2	As per January for traps.

Month	Task	Number of days	Notes
June	Service all bait stations and all DOC200, Warrior and AT220 traps	4	As per January for bait stations and traps. June is usually a diphacinone application with a single flour blaze.
July	Service all DOC200, Warrior and AT220 traps	2	As per January for traps.
August	Rodent monitoring	2	Set out cards and collect the following day, in line with GWRC protocol.
	Service all DOC200, Warrior and AT220 traps	1	Service traps, as per January, during rodent monitor. One additional day is allowed over and above rodent monitoring to complete trap servicing.
September	Spray *Tradescantia* and *Selaginella* in Glow-worm Gully and Silver Stream	3	As per April
	Service all bait stations and all DOC200, Warrior and AT220 traps	4	As per January for bait stations and traps. September is usually a brodifacoum application with 360 degree flour blazes.
October	Service all DOC200, Warrior and AT220 traps	2	As per January for traps.
November	Service all bait stations and all DOC200, Warrior and AT220 traps	4	As per January for bait stations and traps. November is usually a brodifacoum application with 360 degree flour blazes.
December	Service all DOC200, Warrior and AT220 traps	2	As per January for traps.
Throughout year as time and conditions allow	Track / line / fenceline cutting and spraying	8	The most overgrown tracks/lines/fence sections have highest priority. If spraying, use metsulfuron (met) + penetrant as default, however note that met does not kill muehlenbeckia nor mahoe. To control those species, either cut and paste using picloram gel or spray with double-strength glyphosate. For Darwin's barberry, use a combination of met + triclopyr + penetrant in spring/summer. Use triclopyr + penetrant in summer to control broom. Spraying gorse with met is easiest in winter, when grass has died down. Do not use motorised cutting tools during summer or other times when fire risk is elevated.
Throughout year as needed	General pest plant control	1	Control through cutting and pasting / spraying as appropriate and when required.

Month	Task	Number of days	Notes
Throughout year as needed	Fence maintenances	2	Repairs to minor breaches found in the course of regular inspections.
Throughout year as needed	Goat hunting	2	As necessary in response to incursions.