

# The case for a permanent Significant Landscape Overlay for Harman's Valley.

Prepared by:

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On behalf of the *Friends of Volcano Country*

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## 1. Introduction

Modern rock crushing methods pose a large threat to geological features. (Figure 1) The Harman's Valley landscape containing these geological features is important for not only geological but ecological, historical, cultural, aesthetic, educational and economic reasons.



**Figure 1.** Harman's Valley rock crushing proceeding in July 2016. Photo taken from the Port Fairy-Hamilton Road Lookout looking east toward Mt Napier.

Harman's Valley is a landscape of international and State significance as a unique collection of volcanic features from an eruption 32,000 years ago. It is a long lava flow valley extending from the western side of Mount Napier to Condah Swamp. It is the best example of a lava flow constrained by a valley and one of the most intact, significant collections of young volcanic features in Australia.

The lava flow itself and multiple individual features along the valley are of international geological significance. Lava blister mounds, known as *tumuli*, are the largest of their kind in Australia and internationally rare. Harman's Valley displays a textured valley of stony rises weaving across the landscape. The Byaduk Caves are the most accessible lava caves in Australia.

The section of the lava flow within Southern Grampians Shire is -

- The most publically visible section.
- Most closely connected to the Mount Napier eruption point.
- Contains a high concentration of *tumuli*.

## 2. Scientific Importance: Geology and Ecology

### 2.1 Geological Importance: Harman's Valley lava flow and related features.

The lava flow in the Harman's Valley came from an eruption of Mt Napier, Tapoc in the local aboriginal language, 32,000 years ago. It is one of the youngest volcanoes in Australia. Mt Napier has a composite shield with a superimposed scoria cone which rises 150m above the surrounding plains to an elevation of 440m.

The Harman's Valley lava flow is one the best preserved young volcanic structures and examples of lava features in Australia. It clearly illustrates a number of volcanic processes that were widespread over the Western Victorian Newer Volcanic Province during late Quaternary times (the last 2 million years). It is unusual because lava flows of many other regional volcanoes are generally obscured by erosion, dispersal or vegetation compared to this outstanding example.

The sites of significance outlined here are representative and in some cases, unique features of the lava flow: -

- The view towards the volcanic cone of Mt Napier,
- confined valley lava flows,
- collapse depressions,
- *tumuli* (also known locally as 'lava blisters'),
- illustration of the effect of the lava on drainage systems, e.g. swamp and lake formation, lateral stream development,
- dry stone walls constructed from lava rocks by the early European settlers.

As one of the most recent volcanic actions in Western Victoria, the Harman Valley lava flow has retained many of its characteristics since the cooling event itself, making it a rare and valued geological exposure. The entire volcanic systems of Mount Eccles and Mount Napier are of significant geological and geomorphological interest to secondary and tertiary students of earth sciences, volcanism, landscape evaluation and environmental assessment. The Geological Society of Australia, through their Victorian Division, have recognised this importance by funding three prominent interpretation signs at the lookout overlooking the volcano and the lava flow for all visitors.

At least three phases of volcanic activity have been recognized in Western Victoria and Southeast South Australia. The earliest evidence of volcanic activity are basalts dated as approx. 4 million years old (early Pliocene) and are known as the Hamilton Basalt. These rocks are now deeply weathered and underlie the undulating land surface. The second phase of the volcanic activity (Greenwald - Cobboboonee Basalt) occurred just prior to the Pleistocene 3 -2 million years ago. Some of these basalts are located along the coast at Cape Nelson and Bridgewater Bay to the south of the Harman's Valley-Lake Condah region. The third phase and the most evident sign of volcanic activity in the Shire are the Harman's Valley and the downstream Tyrendarra lava flows.

Both these flows followed existing river valleys. The current lookout on the Port Fairy-Hamilton Road offers an excellent view of the upper Harman's Valley. Sections of the Harman's flow to the west of the lookout area led to the formation of a number of swamps behind low lava dams and naturally-formed diversions.

The Harman's Valley flow displaced the original creek which now seeps in part beneath the lava flow through numerous tunnels and fractures that developed as the original hot flow sequence cooled in stages. Mt Napier was the source of a large and continuous flow of lava. The view from the lookout on the Hamilton-Port Fairy Road takes in the lava flow to the top of the mountain, giving a real perspective of the massive regional land forming processes of volcanoes (Figure 2.)



**Figure 2.** The Harman's Valley flow with Mount Napier in the background. Photo taken from the Port Fairy-Hamilton Road before any rock crushing works. Bracken cover delineates most of the lava flow.

The Harman's Valley flow has been little modified by weathering and erosion and retains many characteristics of a young flow. Radiocarbon dating of wood covered by the downstream Tyrendarra flow and Condah Swamp peats indicate that the flow occurred between approximately 20,000 - 6,000 years ago, shortly before commencement of the construction of the Egyptian Pyramids on the other side of the world. The Harman's Valley flow appears to be slightly older than the Tyrendarra flow that comes from Mount Eccles to the south.

## 2.2 Ecological Importance

The geologically recent age of the lava flow has allowed little time for soil development. As a consequence the stony rises were left largely undeveloped because of their low productivity. Extensive clearing of the adjacent valley walls and surrounding plains produced rich farmland. In this setting the stony rises of the lava flow become important as an "island" of remnant bushland providing habitat for native plants and animals

## Flora

Native plants known to be present on the lava flow are listed in Table 1. This list has been compiled from Trust for Nature surveys, information from local landowners and field visits by one of us (Sherwood) and is not regarded as comprehensive. Bracken and the shrub Tree Violet (*Melicytus dentatus*) form the dominant vegetation with occasional taller trees including the wattles *Acacia mearnsii* and *Acacia melanoxylon*. It is a diverse assemblage of native plants (at least 50 species). The introduced Monterey Pine (*Pinus radiata*) and other weed species not listed here are also components of the vegetation assemblage.

The vegetation is an open grassy shrub land (Figure 3). It consists predominantly of three Ecological Vegetation Classes (EVCs; Table 2).



**Figure 3.** View across the lava flow to Mt Napier. Tree violets are the most common shrub with a Blackwood tree on the right.

**Table 1.** Indigenous native plant species identified on the Lava flow

Habit	Biological Name	Common Name
Tree (>3m)	<i>Acacia mearnsii</i>	Black Wattle
	<i>Acacia melanoxylon</i>	Blackwood
Shrubs	<i>Acacia verticillata</i>	Prickly Moses
	<i>Amyema sp (probably preissii).</i>	Mistletoe
	<i>Bursaria spinosa</i>	Sweet Bursaria
	<i>Cassinia aculeata</i>	Dogwood
	<i>Leptospermum lanigerum</i>	Woolly Tea Tree
	<i>Melicytus dentatus</i>	Tree Violet
	<i>Rubus parvifolius</i>	Native Raspberry
Herbs and grasses	<i>Acaena nova-zealandiae</i>	Bidgee Widgee
	<i>Acaena ovina</i>	Australian Sheep's Burr

	<i>Arthropodium strictum</i>	Chocolate Lily
	<i>Austrodanthonia sp.</i>	Wallaby Grass
	<i>Convolvulus erubescens</i>	Australian Bindweed
	<i>Dichondra repens</i>	Kidney Weed
	<i>Drosera peltata</i>	Tall Drosera
	<i>Elymus scaber</i>	Wheat Grass
	<i>Epilobium sp.</i>	Willow herb
	<i>Geranium solanderi</i>	Austral Crane's-bill
	<i>Hypericum gramineum</i>	Small St John's Wort.
	<i>Hypoxis vaginata</i>	Yellow Star
	<i>Juncus pallidus</i>	Pale Rush
	<i>Lythrum hyssopifolia</i>	Small Loosestrife
	<i>Microlaena stipoides</i>	Weeping Grass
	<i>Microtis sp.</i>	Onion Orchid
	<i>Pelargonium rodneyanum</i>	Magenta Stork's-bill
	<i>Poa labillardieri</i>	Common Tussock Grass
	<i>Rumex brownii</i>	Slender dock
	<i>Senecio lautus</i>	Variable Groundsel
	<i>Senecio quadridentatus</i>	Cottony Fireweed
	<i>Themeda triandra</i>	Kangaroo Grass
	<i>Tricoryne elatior</i>	Rush lily
	<i>Urtica incisa</i>	Native Stinging Nettle
Wetland Plants	<i>Baumea sp.</i>	Twig Rush
	<i>Eleocharis acuta</i>	Common Spikerush
	<i>Gahnia sp.</i>	Sawsedge
	<i>Isolepis sp.</i>	Knobby Rush
	<i>Lobelia alata</i>	Angled Lobelia
	<i>Neopaxia australasica</i>	White Purslane
	<i>Phragmites australis</i>	Common Reed
	<i>Schoenoplectus sp.</i>	Club Rush
	<i>Schoenus sp.</i>	Bog Rush
	<i>Selliera radicans</i>	Swampweed
	<i>Triglochin striata</i>	Small Water Ribbon
	<i>Typha domingensis</i>	Bullrush
Ferns	<i>Adiantum aethiopicum</i>	Maiden Hair Fern
	<i>Blechnum wattsii</i>	Hard Water Fern
	<i>Marsilea sp.</i>	Nardoo
	<i>Pleurosorus rutifolius</i>	Blanket Fern
	<i>Pteridium esculentum</i>	Austral Bracken

**Table 2.** Ecological Vegetation Classes of the Harman's Valley Flow.

<b>EVC No</b>	<b>EVC description</b>
68	Creekline Grassy Woodland
885	Damp Sands Herb-rich Woodland/Plains Grassy Woodland Mosaic
792	Stony Rises Woodland/Stony Knoll Shrubland Complex

## Wetlands

Sections of the Harman's flow contain semi-permanent (spring-fed) wetlands as well as ephemeral wetlands. During wet periods overland flows link many of these water bodies, in dry periods they become isolated or dessicated. The Glenelg –Hopkins Catchment Management Authority estimates that over 60% of the region's wetlands have been lost due to drainage and conversion to agriculture, increasing the ecological importance of those that remain intact (GHCMA 2016/17 Annual Report , p19)

Water birds congregate on these wetlands, sometimes in large number. Figure 4 shows part of a mixed flock of over 100 grey and chestnut teal on a lake just west of the Old Crusher Road tumuli lookout on 28<sup>th</sup> September, 2017. Black-winged stilts and masked lapwings were present along the water's edge at this site. A family of black swans was seen at another wetland (Mermaid Lake) on the Stevenson property on that day (Figure 5).



**Figure 4.** Part of a large flock of grey and chestnut teal on a water body within the lava flow. (Photo taken 28<sup>th</sup> September, 2017.)



**Figure 5.** A family of black swans on Mermaid Lake on the Stevenson property. (28<sup>th</sup> September, 2017.)

## Fauna

There have been no targeted fauna surveys of the Valley's stony rises. As a consequence information on invertebrates, amphibians, reptiles and small marsupials is scarce.

Common native mammal inhabitants of the stony rises of the valley include the grey kangaroo (*Macropus giganteus*; Figure 6) and black wallaby (*Wallabia bicolor*). In the absence of mammal surveys there is only indirect evidence of smaller species. Fauna surveys by the Hamilton Field Naturalists over 20 years (1974 – 1995) identified mammal species present in the Mt Napier State Park. Results were reported in *The Victorian Naturalist*. (Volume 114(2), pp 52 -66, 1997). Three of their 26 sites were on the upper reaches of the Harman's Valley flow (their stations 7, 9 and 23). The Dusky Antechinus (*Antechinus swainsonii*) and Bush Rat (*Rattus fuscipes*) were the most common small native mammals captured over all surveys. The Brown Antechinus (*Antechinus agilis*) and Swamp Rat (*Rattus lutreolus*) were less common. Of these, the Dusky Antechinus, Brown Antechinus and Bush Rat were trapped at one or more of the stations 7, 9 and 23. The lava flow acts as a conduit to the volcano and mammals may be expected to migrate along it if suitable habitat is available.

The lava caves and stony knolls of the valley are also good habitat for skinks and snakes. Tiger snakes are recorded but no other information is available.



**Figure 6.** Grey kangaroos on the lava flow. (October 2017.)

Seventeen Australian native bird species have been recorded for the stony rises (Table 3). This list has been compiled from isolated surveys and is not regarded as comprehensive.

**Table 3.** Bird species recorded for the lava flow during Trust for Nature surveys and during a field visit by one of us. (Sherwood.)

<b>Species</b>	<b>Common Name</b>
<i>Anas castanea</i>	Chestnut Teal
<i>Anas gracilis</i>	Grey Teal
<i>Anthochaera carunculata</i>	Red Wattlebird
<i>Cacatua sanguinea</i>	Sulphur Crested Cockatoo
<i>Circus approximans</i>	Spotted Harrier
<i>Circus approximans</i>	Swamp Harrier #
<i>Clalcites osculans</i>	Black eared Cuckoo
<i>Cygnus attratus</i>	Black Swan #
<i>Elanus axillaris</i>	Black Shouldered Kite
<i>Ephianura albifrons</i>	White fronted Chat
<i>Himantopus leucocephalus</i>	Black winged Stilt
<i>Malurus cyaneus</i>	Superb Blue Wren
<i>Neochmia temporalis</i>	Red browed finch
<i>Phylidonyris novaehollandiae</i>	New Holland Honeyeater
<i>Porzana tabuensis</i>	Spotless Crake
<i>Rallus philippensis</i>	Buff-banded Rail
<i>Vanellus miles</i>	Masked Lapwing

# Species recorded as nesting in the stones



### 3. Historical and Cultural Importance

#### 3.1 Aboriginal Cultural Importance

Remains of stone houses provide testament to occupation of the lava flow by aboriginal people (Figure 7). In addition archaeologist Heather Builtth has identified possible fish traps along water courses amongst the stones (Figure 8).

Immediately adjacent to the south of the proposed SLO is the Budj Bim-Lake Condah area. The Gundijmirring Traditional Owners have applied for UNESCO World Heritage Listing of Lake Condah because of its unique examples of lava stone channels, weirs, wind breaks, fish traps, hollowed trees for smoking eels and stone huts. It should not be surprising that Harman's Valley appears to have been occupied by Traditional Owners in a similar way to Lake Condah.



**Figure 7.** Remains of a horseshoe shaped Aboriginal stone house on the Harman's Valley flow, within the area covered by the SLO. Photographed by Sherwood in 1984.

#### 3.2 European Cultural Importance

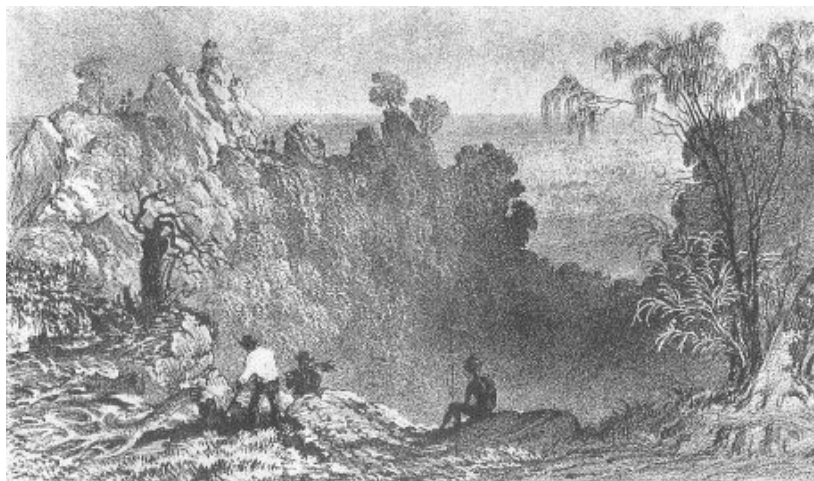
Mt Napier was named by Major Thomas Mitchell on his third expedition in 1836. Three Napier brothers had served with him during the Peninsular War. He remarked of the volcano's lava flow:

*all the stringy, twisted marks of fusion were as sharp and fresh as if the lava had but recently cooled* (Taken from James Bonwick (1857) *Western Victoria: Its geological and social condition*. p168).

An engraving of the summit of Mt Napier appeared in Volume 2 of his *Three Expeditions to the Interior of Eastern Australia* (Figure 9.)



**Figure 8.** Possible fish trap across a water course on the Stevenson property. (Photographed September 2017.)



**Figure 9.** Engraving of the summit of Mt Napier prepared for Volume 2 of Major Mitchell's account of his three expeditions. Engraving title: PLATE 22: CRATER OF MURROA, OR MOUNT NAPIER, IN AUSTRALIA FELIX. (Source: <http://gutenberg.net.au/ebooks/e00036.html>)

Dry stone walls using lava stones were constructed by early settlers in parts of the landscape and contribute to the aesthetic and cultural significance of the valley (Figure 10).



**Figure10.** An example of stone walls still common along the valley.

#### 4. Aesthetic Values.

The views across Harman’s Valley towards Mount Napier (Tapoc), the tallest eruption point on the Western Volcanic Plains are particularly prominent from the lookout on the Port Fairy – Hamilton Road. This high point is unusual in giving such good views of the inspirational landscape which is recognised for its beauty. Renowned artist John Wolesley began painting the lava flow in 2011 as part of the work he did for the *Fire and Water - Moths, Swamps and Lava Flows of the Hamilton region* tapestry that now hangs in the Hamilton Art Gallery (Figure 11).



**Figure 11.** This tapestry by John Wolesley features aspects of the Harman’s Valley flow. It is reproduced with permission of the Hamilton Art Gallery.

At geological sites, it is important to maintain the right balance of natural vegetation. If there is too much vegetation, the geological features lose their visibility. Shrubs and grasses but not trees offer the best opportunities for viewing and appreciating the features. Currently the whole length of the lava flow and its varied features can be clearly seen from the lookout and at vantage points along the Valley's roads. This aspect of the Harman's Valley needs to be protected.

## 5. Educational Importance

The entire volcanic systems of Mt Eccles and Mt Napier are of significant geological and geomorphological interest to secondary and tertiary students of earth sciences, volcanism, landscape evaluation and environmental assessment.

Mt Napier, Harman's Valley lava flow with its *tumuli*, and Byaduk Caves allow visitors to see for themselves first-class examples of volcanic activity. For visitors, it is part of the Kanawinka Geo Trail, Australia's most extensive volcanic province with 60 sites from Colac to Naracoorte.

Information provided by the Volcano Discovery Centre (VDC), Peshurst for January 2015 to 30 June 2017 gives some idea of the widespread educational and tourism importance of the region's volcanic sites:

- 17 regional primary school groups (350 students) have visited the VDC
- 18 secondary school groups (602 students) have visited the VDC from as far away as Melbourne, Mount Barker SA, and Sydney NSW.
- Regular field trips are made by Monash University and La Trobe University, and the Australian Geography Teachers Association.
- 4,764 Individuals from 23 countries have visited the Centre. Most of these are from Australia (4,539 tourists) with the majority from Victoria (3,778 tourists).

Visitors to the Centre and the nearby Budj Bim National Park are encouraged to visit Harman's Valley (Figure 12).



**Figure 12.** Delegates at a Statewide conference of the Australian Plants Society visited Harman's Valley in October 2016.

Three specially-prepared signs sited at the lookout on the Hamilton-Port Fairy Road (Figure 13) explain Mt Napier and the lava flow’s formation and significance. The signs were designed by the Geological Society of Australia (Victorian Division).



**Figure 13.** (Top) The Harman’s Valley lookout on the Hamilton-Port Fairy Road. Part of the Shire’s tourism assets. (Bottom) One of the three explanatory notices at the Lookout.

## 6. Economic Importance.

There is already economic importance from the tourism attracted to the area. This tourist income could be increased with further marketing of the Kanawinka Geo Trails to international special interest groups. Kanawinka Geo Trails, in Australia’s most extensive volcanic province has over 60 sites of interest from Colac, Victoria to Naracoorte, SA.

The local attractions are:

- Mt Napier, Harman's Valley lava flow, its *tumuli* and the Byaduk Caves.
- Peshurst Volcanoes Discovery Centre.
- Mount Eccles, Budj Bim lava flow, and Lake Condah's fish traps and stone houses, perhaps to be listed as a UNESCO World Heritage site.
- Heritage-registered Tower Hill and its Interpretation Centre

## 7. Acknowledgements

Jill Mibus of the Volcano Discovery Centre kindly supplied their visitor statistics.

Damian Magner and Sophie Stevenson provided access and information regarding their Harman's Valley property.

Some information was adapted from *An Assessment of the Geological/Geomorphological Significance of Private Land in the Shire of Portland (1981)* by N. Rosengren, J. Mallen, T. Shepherd.

The Friends of Volcano Country and all supporters protecting the Harman Valley lava flow owe a great debt of gratitude to local geologist Ken Grimes who researched, documented and provided much quality scientific information about the Harman Valley and many other Western Victorian volcanoes and features over many years. He was always very generous with his time and knowledge, particularly for local clubs and school groups. His dedication has strongly enhanced the public appreciation of the region's volcanic character. This submission is in part a tribute to Ken who died unexpectedly in an accident late in 2017. We are all carrying on his work.