AN ECOLOGICAL ASSESSMENT OF THE CHRISTCHURCH CITY COUNCIL GRASSLAND RESERVE ADJACENT TO SOL QUARRIES ON CONSERVATORS ROAD, MCLEANS ISLAND

providing outstanding ecological services to sustain and improve our environments

Wildlands

R5054

AN ECOLOGICAL ASSESSMENT OF THE CHRISTCHURCH CITY COUNCIL GRASSLAND RESERVE ADJACENT TO SOL QUARRIES ON CONSERVATORS ROAD, MCLEANS ISLAND

Large areas of the Conservators Road grassland reserve are hard-grazed, flat and stony with mosses being the dominant indigenous ground cover, along with lichens on the stones. Indigenous grasses and herbs are extremely rare and shrubs non-existent.

Contract Report No. 5054

May 2019

Project Team:
Brian Patrick - Report author
Peter Heenan - Report author

Prepared for:
SOL Quarries
33 Guys Road
Yaldhurst
Christchurch

CHRISTCHURCH OFFICE: 7A VULCAN PLACE, MIDDLETON, CHRISTCHURCH 8024;
P.O. BOX 9276, TOWER JUNCTION, CHRISTCHURCH 8149; Ph 03-338-4005

HEAD OFFICE: 99 SALA STREET, P.O. BOX 7137, TE NGAE, ROTORUA
Ph 07-343-9017; Fax 07-343-9018, email ecology@wildlands.co.nz, www.wildlands.co.nz

CONTENTS

Reviewed and approved for release by:

_____

Des Smith
Principal Ecologist
Wildland Consultants Ltd

© *Wildland Consultants Ltd 2019*

This report has been produced by Wildland Consultants Ltd for SOL Quarries. All copyright in this report is the property of Wildland Consultants Ltd and any unauthorised publication, reproduction, or adaptation of this report is a breach of that copyright.

1. INTRODUCTION

SOL Quarries are extending their quarrying operations at Conservators Road, McLeans Island, and require an ecological assessment of the proposed extension on the adjacent Christchurch City Council (CCC) managed grassland reserve on the western side of the end of Conservators Road, following a S92 request from CCC.

Dust from the quarrying operation has been considered a potential threat to the biodiversity values of the grassland reserve. To minimise this threat a range of measures have been implemented by SOL Quarries as follows:

- A bund about two metres high has been constructed around the quarry perimeter to intercept wind-blown dust.
- Two water tankers are on site to control dust when required.
- An irrigation system is used for dust suppression when required.
- When wind speed exceeds 10 metres per second quarrying activities cease for the duration of the high winds.

The semi-natural dry grasslands west of Christchurch City in the vicinity of McLeans Island, have long been regarded as of ecological and conservation importance for their array of indigenous flora and fauna that is now localised and rare following agricultural and urban development of the Canterbury Plains over the past 170 years. The flora has been documented by Heenan and Molloy (2004) and Partridge and McMillan (2016), and the insect fauna by Macfarlane *et al.* (1999) and Wildland Consultants (2019).

SOL Quarries has requested Wildland Consultants to assess the ecological values of the part of the grassland reserve adjacent to the quarry including the proposed extension, and report on the present effects of dust on the indigenous biodiversity values of that part of the reserve.

2. METHODS

A literature search gathered both botanical and entomological information on the biodiversity values of the Conservators Road grassland reserve. The botanical reports, including that of Heenan and Molloy (2004) and entomological summary of Patrick (2017) and supporting data from 22 site visits (B. Patrick personal data) were analysed to highlight the key values present in the grassland reserve.

On the 16 May 2019 Dr Peter Heenan and Brian Patrick of Wildlands carried out a walkthrough survey of the part of the CCC Conservators Road grassland reserve adjacent to the existing SOL quarry and the proposed quarry extension. This was done in ideal clear, fine and calm weather conditions with special attention to observe the extent of indigenous vegetation including small herbs and grasses amongst the predominately exotic ground cover.

Photographs were taken to support the field observations.

3. VEGETATION AND FAUNA VALUES

3.1 Vegetation

Visually, the vegetation of the Conservators Road grassland reserve is overwhelmingly exotic and standing at the boundary fencelines and looking west across the area, the site's vascular vegetation cover is mostly dominated by exotic grassland (Plate 1), accompanied by exotic herbaceous weeds. The vegetation comprises no indigenous woody shrubs and few indigenous herbaceous species. The main exceptions to this are shallow and/or skeletal soils were mosses such as *Polytrichum juniperinum* are locally dominant and other more stony sites where *Racomitrium curiosissimum* and *R. pruninosum* are locally dominant (Plate 2). Lichens are abundant on the surface of exposed stones in many parts of the reserve. The site is clearly hard-grazed by merino sheep, which were present during our inspection, and there are abundant sheep and hare droppings across the site. Hares were also observed during our visit.

Notable indigenous vascular plants found on the reserve close to the existing quarry operation and proposed extension are:

- One small area of seven plants of the orange cushion plant *Scleranthus uniflorus* (Plate 3).
- Two small patches of creeping pōhuehue *Muehlenbeckia axillaris*, tucked in at the edge of large stones.
- One small patch of *Raoulia monroi*. This species is Threatened, Nationally Vulnerable (de Lange *et al.* 2018).
- Two patches of *Geranium retrorsum*, each with 4-5 plants (Plate 4). This species is Threatened, Nationally Vulnerable (de Lange *et al.* 2018).

The presence of *Raoulia monroi* and *Geranium retrorsum* at the site is significant as both species are Threatened, Nationally Vulnerable (de Lange *et al*. 2018). The mossfields and lichen adorned stones are also considered to be significant ecologically as together with their dependent insect fauna they represent an ecosystem characteristic of the Canterbury Plains. However, the overall ecological values of indigenous vegetation in the fenced area of the grassland reserve adjacent to the quarry and proposed quarry extension are low, as they are poor examples of Canterbury Plains dryland vegetation.

The lack of indigenous woody shrubs at the site, that occur in other areas nearby, is a significant absence and highlights intensive grazing by merino sheep. For example, mikimiki (*Coprosma propinqua*), *Coprosma brunnea*, climbing pōhuehue (*Muehlenbeckia complexa*), river bed shrubby daisy (*Olearia adenocarpa*), native broom (*Carmichaelia australis*), and matagouri (*Discaria toumatou*) occur at nearby sites (Heenan & Molloy 2004; Shadbolt 2014; pers. obs. PBH and BHP). These sites include Environment Canterbury land leased to Isobella Smythe (School Road), Conservators Road Dry Plains Grassland (eastern side of Conservators Road-End),

and the Canterbury Gun Club (Chattertons Road). Other subshrub species, such as *Leucopogon fraseri*, *Muehlenbeckia ephedroides* and *Carmichaelia corrugata*, were not observed at Conservators Road, but present at the nearby sites (Heenan & Molloy 2004; Shadbolt 2014).

Plate 1: Dense exotic grassland dominates much of the site at the western and southern parts of Conservators Road grassland reserve.

Plate 2: *Racomitrium* mosses growing on dry, stony sites within the grassland reserve.

Plate 3: One small area of seven plants of the indigenous cushion *Scleranthus uniflorus* was found in the field adjacent to the quarrying operation.

Plate 4: The herbaceous *Geranium retrorsum*, Threatened, Nationally Vulnerable, is growing in exotic grassland at the site.

3.2 Fauna

The open dry stony grasslands at the western end of Conservators Road, within the Christchurch City Council's grassland reserve are dominated by exotic low-growing grasses and herbs on a gently undulating topography (Frontispiece, Plate 1). These exotic grasslands support a small indigenous insect fauna comprised of widespread moths, beetles, flies, a grasshopper and a cricket which have adapted nationwide to exotic habitats such as this.

Based on many site visits by the authors between 2012-2017 a moderately diverse indigenous insect fauna inhabits these areas kept low and open by sheep grazing. The main insect groups recorded from here are:

3.2.1 Grasshoppers and crickets (Orthoptera)

These are numerous here with the short-horned grasshopper *Phaulacridium marginale*, a widespread species of dry short-tussock grasslands, particularly abundant and conspicuous on warm summer days. The black cricket *Pteronemobius bigelowi* is also abundant here and again conspicuous and active over the warmer months from late September to April. Crickets were active at the time of our visit on 16 May 2019.

3.2.2 Moths and butterflies (Lepidoptera)

Indigenous moths and butterflies are moderately diverse in these open grasslands. The Spring-emerging striped grassmoth *Orocrambus corruptus* is common flying by day in the most open areas during October and November. It is joined by the more ubiquitous grassmoths *O. flexuosellus, O. vittellus* and *O. ramosellus* which are all found over the warmer months throughout the area

Several moths including the orange and silver-coloured *Eudonia feredayi* and *E. manganeutis* inhabit the dominant mossfields with their larvae feeding on the various moss species. Both are common here.

The large moth family Geometridae is represented here by the day-flying *Arctesthes catapyrrha* a local species of semi-natural dry grassland-herbfields (Plate 5). Its colourful larvae feed on both indigenous and exotic herbs enabling it to survive in semi-natural areas such as here. The nocturnal grey geometrid *Helastia corcularia* is also common here. It is a widespread species of open areas where its larvae feed on various mosses.

The undescribed Canterbury boulder copper butterfly (*Lycaena* new species) is locally common here (Plate 6), particularly around patches of its larval hostplant the creeping pōhuehue (*Muehlenbeckia axillaris*). With shining purple males and orange females it is conspicuous where found and delights to sunbathe on bare stony sites close to where its foodplant grows. Another butterfly of the family Lycaenidae, the New Zealand blue butterfly (*Zizina oxleyi*) is also common here in the short grasslands where it has adapted to feeding as larvae on introduced clover species. Its native hostplant, prostrate brooms in the genus *Carmichaelia* are gone from much of its

Plate 5: The caterpillar (above) and adult of the day-flying moth *Arctesthes catapyrrha*, which is common across the grassland reserve.

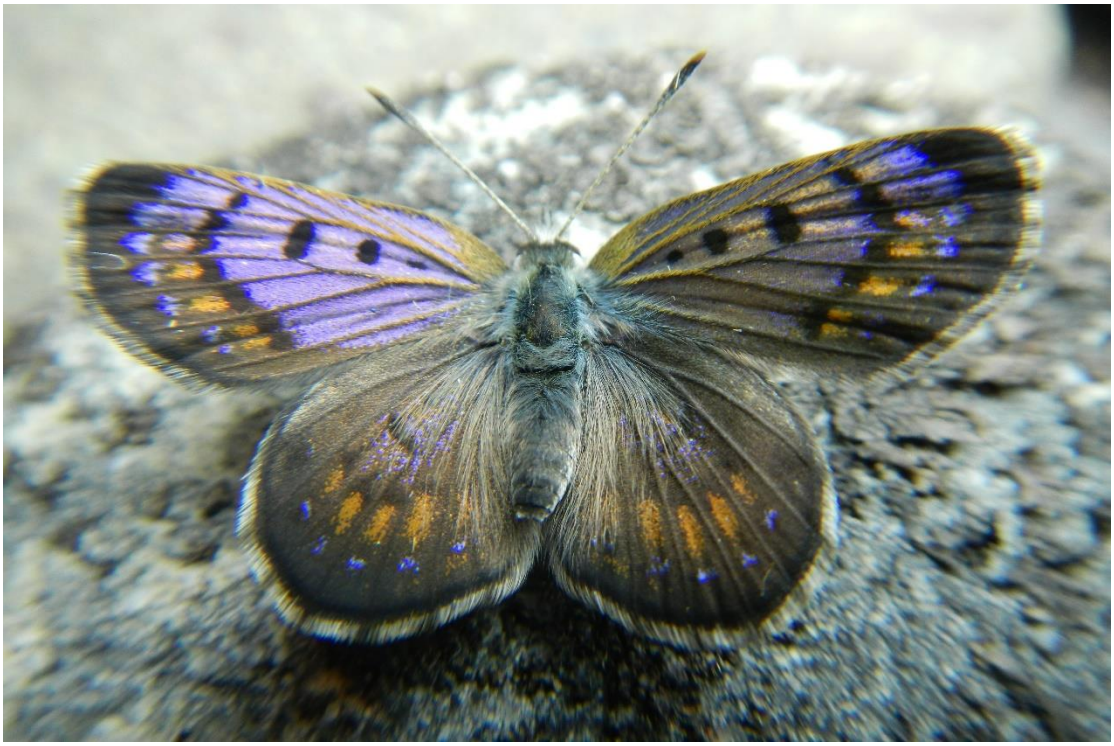

Plate 6: The undescribed boulder copper butterfly (*Lycaena* n. sp.) has been recorded from this grassland reserve in recent years.

original habitats including here, so it is fortunate that it has been able to adapt to another hostplant of the same plant family (Fabaceae). Additionally, through most of its national distributional range it has been replaced by the invasive Australian blue (*Z. labradus*) from north to south, so it is almost gone from the North Island and northern third of the South Island. How far south this replacement and local extinction of the New Zealand blue butterfly will go is not known, but it makes these Canterbury populations important from a conservation standpoint as the New Zealand blue butterfly is naturally only found south to Central Otago.

A small day-flying leaf-roller moth *Eurythecta robusta* is locally common in these grasslands. The species is noteworthy as it has a short-winged and flightless female, greatly reducing its dispersal ability. The adult males fly in October-November period with the larvae feeding on a range of both native and introduced herbaceous plants. This moth was once widespread and common in such Canterbury Plains grasslands but is now local in occurrence, and confined to uncultivated sites such as here. Its conservation status is listed as "Naturally Uncommon" in Hoare *et al*. (2017) in the list of threatened New Zealand moths and butterflies.

3.3 Potential impact of SOL Quarries operations

There is no evidence that dust from the SOL Quarries operation is having any adverse effect on the indigenous flora and fauna. We saw no evidence of the presence of dust deposits on any vegetation in the grassland area.

Our assessment is that the current hard-grazing regime on the site is having the greatest impact on the indigenous flora and fauna. There was a substantial quantity of animal droppings on the ground and these together with urine will be having a significant effect on soil fertility, indigenous vegetation cover, exotic grass and weed growth, and the long-term viability of both indigenous plants and insects.

4. CANTERBURY REGIONAL POLICY STATEMENT ASSESSMENT

The site is located within the Canterbury Region and is therefore subject to provisions in the Canterbury Regional Policy Statement (RPS). Appendix 3 of the Canterbury RPS sets out 10 criteria to be used to determine ecological significance under Section 6(c) of the Resource Management Act (1991). A site is considered to be ecologically significant if it meets one or more of the criteria. Guidance on interpretation of the criteria is provided in Wildland Consultants (2013). The ecological significance of the vegetation, fauna and habitat in the western portion of the Conservators Road grassland was assessed using the Canterbury Regional Policy Statement criteria in Table 1 (below).

This assessment shows that:

- At present the western part of the Conservators Road grassland reserve is ecologically significant only in terms of two Threatened and one At Risk species that are present (Criterion 4).
- None of the other ecological criteria are met, as overall the site is highly degraded.

The effects of SOL Quarries mining operations on the Threatened and At Risk species is considered to be less-than-minor. Given that the site is essentially uncultivated it has the potential for its other ecological values (Criteria 1-3, 5-10) to be significant, but this would require a change to the current management based on a well-thought out plan covering ongoing grazing and enhancement and restoration of the indigenous plant cover.

Table 1: Site assessment based on the Canterbury Regional Policy Criteria.

Criterion	Met	Explanation
Representativeness		
1. Indigenous vegetation or habitat of indigenous fauna that is representative, typical or characteristic of the natural diversity of the relevant ecological district. This can include degraded examples where they are some of the best remaining examples of their type, or represent all that remains of indigenous biodiversity in some areas.	No	• Both the indigenous flora and insect fauna are so degraded that they are no longer characteristic of natural lowland grasslands in the Low Plains Ecological District. Additionally, better examples are still in existence, some nearby on Chattertons Road and School Road.
2. Indigenous vegetation or habitat of indigenous fauna that is a relatively large example of its type within the relevant ecological district.	No	• The extent of the indigenous plants and insect fauna is very small within the context of the Low Plains Ecological District.
Rarity/Distinctiveness		
3. Indigenous vegetation or habitat of indigenous fauna that has been reduced to less than 20% of its former extent in the Region, or relevant land environment, ecological district, or freshwater environment.	No	• The present quality of the indigenous habitat remaining on the site is insufficient to meet this criterion.
4. Indigenous vegetation or habitat of indigenous fauna that supports an indigenous species that is threatened, at risk, or uncommon, nationally or within the relevant ecological district.	Yes	• Three species, the moth *Eurythecta robusta* (At Risk, Naturally Uncommon) and herbs *Geranium retrorsum* and *Raoulia monroi* (both Threatened, Nationally Vulnerable) are listed as threatened species by the Department of Conservation in their latest published lists (de Lange *et al*. 2018, Hoare *et al*. 2017).
5. The site contains indigenous vegetation or an indigenous species at its distribution limit within Canterbury Region or nationally.	No	• None of the indigenous species found are at their distributional limits.
6. Indigenous vegetation or an association of indigenous species that is distinctive, of restricted occurrence, occurs within an originally rare ecosystem, or has developed as a result of an unusual environmental factor or combinations of factors.	No	• None of the species found fit this criterion.

Criterion	Met	Explanation
Diversity and Pattern		
7. Indigenous vegetation or habitat of indigenous fauna that contains a high diversity of indigenous ecosystem or habitat types, indigenous taxa, or has changes in species composition reflecting the existence of diverse natural features or ecological gradients.	No	• The site is not ecologically diverse.
Ecological Context		
8. Vegetation or habitat of indigenous fauna that provides or contributes to an important ecological linkage or network, or provides an important buffering function.	No	• The degraded and declining habitat quality limits its value as an important link across the landscape at present.
9. A wetland which plays an important hydrological, biological or ecological role in the natural functioning of a river or coastal system.	No	• The site is not a wetland.
10. Indigenous vegetation or habitat of indigenous fauna that provides important habitat (including refuges from predation, or key habitat for feeding, breeding, or resting) for indigenous species, either seasonally or permanently.	No	• The present quality of the indigenous habitat and extent of indigenous plants is not sufficient to meet this criterion.

5. DISCUSSION AND RECOMMENDATIONS

5.1 SOL Quarries operation and site values

We conclude that the current quarrying operation and the proposed extension have sufficient management of dust from their quarrying operation that prevents it settling on the adjacent grassland. This includes:

- The perimeter bund to intercept wind-blown dust.
- Two water tankers to control dust.
- An irrigation system for dust suppression.
- Quarrying activities cease when wind speed exceeds 10 metres per second.

Our assessment of the western portion of the Conservators Road grassland reserve has concluded that this site is highly degraded in regard to indigenous biodiversity, but that this condition is not the result of dust from the quarry. This degradation is caused by the current hard-grazing regime at the site. Furthermore, the large amount of animal droppings and urine will have an effect on soil fertility, favouring profuse exotic grass and weed growth over indigenous vegetation and fauna.

5.2 Conservation of indigenous grassland flora and fauna

There is a network of protected semi-natural grasslands in the McLeans Island area of the Canterbury Plains under the management of Environment Canterbury, Christchurch City Council or private landowners with Queen Elizabeth II covenants.

Our inspection of the western portion of Christchurch City Council's Conservators Road grassland reserve, and our recent observations from a range of other such protected sites in the area, highlight the issue of a general degradation of many of these areas in protecting indigenous biodiversity. There is an urgent need to address this long-term degradation by the current management practices by landowners and leasees.

An assessment of the level of managed grazing that is necessary to maintain and nurture the indigenous component of these grasslands is required. Research and monitoring are required to formulate the optimum grazing type, timing and regularity to achieve this. A management plan must be developed that addresses the type, level and timing of the recommended grazing regime that best nurtures the range of indigenous biodiversity values of these ecosystems.

ACKNOWLEDGEMENTS

We thank Simon Hedley of Lands and Survey for providing a copy of the Christchurch City Council S92 request for further information, and showing us the quarrying operation as it relates to dust control.

REFERENCES

de Lange P.J., Rolfe J.R., Barkla J.W., Courtney S.P., Champion P.D., Perrie L.R., Beadel S.M., Ford K.A., Breitwieser I., Schonberger I., Hindmarsh-Walls R., Heenan P., and K. Ladley 2018: Conservation status of New Zealand indigenous vascular plants. *New Zealand Threat Classification Series 22*. Department of Conservation, Wellington. 81 pp.

Heenan P.B. and Molloy B.P.J. 2004: Taxonomy, ecology and conservation of *Olearia adenocarpa* (Asteraceae), a new species from braided riverbeds in Canterbury. *New Zealand Journal of Botany 42*: 21-36.

Hoare R.J.B., Dugdale J.S., Edwards E.D., Gibbs G.W., Patrick B.H., Hitchmough R.A., and J.R. Rolfe 2017: Conservation status of New Zealand butterflies and moths (Lepidoptera). *New Zealand Threat Classification Series 20*. Department of Conservation, Wellington. 13 pp.

Macfarlane R.P., Patrick B.H. and Vink C.J. 1999: McLeans Island Invertebrate inventory and analysis. Privately published by the senior author. 44 pp.

Partridge T. and McMillan K. 2016: Field notes; botanical survey McLeans Island Grassland Park Lot 3 & 10 and adjoining unformed road reserve (south of Lots 3 and 10) - 29 January 2016. *Unpublished Christchurch City Council Report*.

Shadbolt A. 2014: Christchurch District Plan Site of Ecological Significance. Conservators Road Dry Plains Grassland (site SES/LP/16). *Unpublished Christchurch City Council Report*.

Wildland Consultants 2013: Guidelines for the application of ecological significance criteria for indigenous vegetation and habitats of indigenous fauna in Canterbury Region. *Wildland Consultants Ltd Contract Report No. 2289i*. Prepared for Environment Canterbury, Christchurch. 19 pp.

Wildland Consultants 2019: Invertebrates of Environment Canterbury lands west of Christchurch. *Wildland Consultants Ltd Contract Report No. 4909*. Excel spreadsheet prepared for Environment Canterbury. 5 pp.

Providing outstanding ecological services to sustain and improve our environments

Call Free 0508 WILDNZ
Ph: +64 7 343 9017
Fax: +64 7 3439018
ecology@wildlands.co.nz

99 Sala Street
PO Box 7137, Te Ngae
Rotorua 3042,
New Zealand

Regional Offices located in
Auckland, Hamilton, Tauranga,
Whakatane, Wellington,
Christchurch and Dunedin

ECOLOGY RESTORATION BIODIVERSITY SUSTAINABILITY

www.wildlands.co.nz