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Dear Madelyn

RESULTS OF YEAR 7 ANNUAL SOUTH MORANG GRASSY EUCALYPT WOODLAND MONITORING (SOUTH MORANG LOT 52)

Kellogg Brown & Root Pty Ltd (KBR) has been engaged by VicTrack to complete an annual condition assessment of the site known as the South Morang Grassy Eucalypt Woodland (SMGEW) located on Railway Lot 52. The annual monitoring of the vegetation condition and response to management is a requirement of the *South Morang Grassy Eucalypt Woodland Management Plan* (SMREP 2014), management action 6.2.

Purpose and objectives

Annual monitoring is required to assess the state of the vegetation community and any threats from weeds, biomass and pest animals (including kangaroos). A site inspection was conducted by two ecologists on 16 October 2017, to assess the above threats and the overall site condition.

The annual monitoring program is also required to identify any changes to the current management practices and to inform management over the subsequent year. Therefore, recommendations within this letter provide adaptive management solutions to the existing planned management detailed within the SMGEW Management Plan (SMREP 2017).

Mernda Rail Extension Project

Recently, a 0.82 ha section of the SMGEW was cleared for the Mernda Rail Extension Project (MREP). The Victorian Government project is being delivered by the Level Crossing Removal Authority (LXRA), who gained approval for the project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) via a new approval for the MREP (EPBC 2016/7674) and an amendment to the existing approval for the South Morang Rail Extension Project (EPBC 2010/5313).

As the approval for the South Morang Rail Extension Project protected the SMGEW, the MREP was required to 'offset the offset' to be consistent with the Department of Environment and Energy's (DoEE) offset policy. Effectively the to gain an amendment to approval (EPBC 2010/5333) for the MREP, the offset required the impact of 0.82 ha of the nationally listed woodland in the site to be doubled, and the *South Morang Grassy Eucalypt Woodland Management Plan* (SMREP 2017) to be updated to reflect the changes to the site.

The MREP impacted the northern boundary of the site, which included the disused rail line. The disused line was a single narrow-gauge track that occurred in a rail cutting. Along the rail cutting, on both sides, was the highest quality vegetation within the SMGEW site and the highest concentration of extant matted flax-lilies, the greatest diversity of understorey species and the lowest weed cover within the site.

Current site condition

There was a clear increase in the cover of grassy weeds on site. In consideration of the impacts of the MREP, the percent cover of annual grasses has increased significantly (by approximately 10 per cent from 2016), due to both a natural increase in weed cover and the approved removal by the MREP of higher quality understorey areas with high native cover (of around 70 per cent). The impact to areas with high native cover has altered the proportions of weeds and native species over entirety of the site.

There was very high cover of annual grasses, which has increased from 2016. The most dominant exotic grasses were sweet vernal grass (*Anthoxanthum odoratum*), soft brome (*Bromus hordeaceus*), great brome (*Bromus diandrus*), annual rye-grass (*Lolium rigidum*), squirrel-tail grass (*Vulpia bromoides*), large quaking-grass (*Briza maxima*) and lesser quaking-grass (*Briza minor*).

In addition to this was an observed increase in cover of perennial grasses, including cocksfoot (*Dactylis glomeratus*), Yorkshire fog (*Holcus lanatus*), Chilean needle-grass (*Nassella neesiana*), Texas needle-grass (*Nassella leucotricha*) and phalaris (*Phalaris aquatica*).

The site maintains a moderate cover and diversity of native grasses, herbs and forbs; however, these were noted to be at lower levels than in previous years. Species, mainly chocolate lily (*Arthropodium strictum*), milkmaids (*Burchardia umbellata*), tufted bluebell (*Whalenbergia communis*) and bulbine lily (*Bulbine bulbosa*), were present in high concentrations throughout most of the site.

Kangaroo grass (*Themeda triandra*) and a variety of wallaby grasses (*Rytidosperma* spp.) remain the dominant native species, although the cover was reduced from 2016 to approximately 40 per cent cover. As noted above, this is predominately as a result of the removal of the area cleared for MREP, where prior to removal contained high covers of kangaroo grass and wallaby-grasses.

The translocated matted flax-lilies in Site 4 (translocation site) are still in good condition. Although this is down from their very healthy condition in 2016 (KBR 2016), mainly due to the increase in native understorey species common woodruff (*Asperula conferta*) and kidney weed (*Dichondra repens*), which are now smothering some of the plants, reducing their general health. However, the fenced plots of Receptor Site 4 are still in good condition and weeds are considered under control.

Grassy and herbaceous weeds

The cover of grassy and herbaceous weeds is still at high levels. The overall cover of grassy and herbaceous weeds is approximately 55 to 60 per cent, comprised of an increase in the cover of annual grasses (50 per cent cover), and maintenance in cover of perennial grasses (5-10 per cent cover) and herbaceous weeds (2 per cent cover).

These species remain a high priority for management, as they comprise the greatest biomass of exotic species within the site and have the ability to outcompete native values within the site, including the remaining extant population of matted flax-lilies and the components that make up the listed GEWVVP

community. The GEWVVP community specifically requires at least 50 per cent cover of native perennial cover or more than 10 native understorey species (DSEWPAC 2011). Figure 2 (below) shows the level of grass cover present within the SMGEW.

Figure 2. High levels of the annual exotic grass along the southern boundary and central part of the site.

The cover of target perennial grasses, mainly Chilean needle-grass, Mexican needle-grass, phalaris and cocksfoot remains comparatively low, approximately 5 per cent cover, which is similar to the last monitoring period. Chilean needle-grass and Mexican needle-grass appears at similar cover across the site, with several small patches of the species observed.

Phalaris and cocksfoot have increased in cover mainly toward the western boundary. This area is regularly mown or slashed as a fire break, although grass cover and height is much higher in comparison to previous years. These species have also been managed, with levels in the eastern half of the site lower than observed for several years.

High threat herbaceous weeds were also at very low levels (less than 1 per cent cover), likely the lowest observed since monitoring began. Species, particularly Paterson's curse (*Echium plantagineum*) and twiggy turnip (*Brassica fruticulosa*), comprised only a very small portion of the weed cover, with the majority of herbaceous weed cover contributed by the low threat weed, fumitory (*Fumaria muralis*).

The high threat perennial grasses and herbaceous weeds have been targeted for weed control (Figure 3), which has limited their spread and cover.

Annual grasses have been subject to less sustained management and are increasing steadily in cover. These species are now considered to comprise about half the vegetative cover over the site at the time of monitoring. These species, including several Bromes (*Bromus* spp.), large quaking-grass and sweet vernal grass, make up the majority of annual grasses, represented at the site.

Figure 3. Area of site management targeting perennial grasses.

Woody weeds

The cover of woody weed species remains low (1 per cent) with scattered occurrences of blackberry (*Rubus fruticosus* spp. agg.), hawthorn (*Crataegus monogyna*) and sweet briar (*Rosa rubiginosa*) across the site. The impact from the MREP along the northern boundary removed some of the larger patches of woody weeds.

Ongoing management of woody weeds should continue in order to maintain this low cover.

Biomass

Management of high threat perennial grasses on site has helped maintain grass biomass levels. The biomass on site is considered to have reduced throughout most of the site compared to 2016. It was observed that most of the perennial exotic grasses, which often provide high biomass, have been controlled and was dead or dying.

The wet conditions experienced in 2016 (BoM 2016), with mild conditions over the last four months (BoM 2017) have resulted in increased amounts of biomass from annual grasses. Although the annual grasses will die-back over the next month or two, there is likely to be a significant increase in the amount of dead grass material on site.

Additionally, biomass along the western boundary with McDonalds Road was also high. This area requires a 10 m fuel break along the boundary to be maintained, but grass levels of large perennial grasses, such as cocksfoot (Figure 4), were significantly greater.

Figure 4. High grass cover along the western site boundary with McDonalds Road.

Pest and Native Animals

An individual rabbit was observed in the SMEW. The individual, when flushed, exited the site at the eastern boundary, where the new boundary fence with the MREP is being erected. A gap has been left between the new and the old fence, allowing space for rabbits to enter. This indicates that rabbits are accessing the site, but have not established a warren. Rabbits are likely to keep accessing the site while gaps are present. Rabbit activity and presence will need to be monitored following completion of fence works to make rabbit-proof.

No kangaroo activity was observed on the site. With construction works occurring between known kangaroo populations and habitat and the site, it is unlikely that kangaroos will utilise the site in future.

No damage was observed to translocated matted flax-lilies from rabbits, and no significant grazing or damage was observed within the SMGEW.

Adjacent Land Use and Fence Condition

The MREP has significantly decreased the size of the SMGEW and impacted the overall site quality, through a reduction in the abundance and diversity of native understorey species. The project has approval to impact 0.82 ha of the site, but has offset the permanent rail reserve fence approximately 1-2 m north of the approved impact (Figure 5). Response from the project was that this was due to the need to protect the root zones of adjacent large trees contained within the ‘protected’ area and to enable construction of the permanent fence.

This has left a slightly disturbed area between the approved impact boundary and the new fence. It is likely that this area will become weedy following the disturbance and provide a source of weeds into the site. Also, as noted above, the project has left a gap between the new and existing fence, which will need to be fixed and the fence made rabbit-proof.

Figure 5. Photo taken from the edge of the approved Mernda Rail Extension Project area, with new rail reserve fence installed to the north of the approved impact.

Adjacent commercial development has also increased, with a new business established along the southern boundary. Discussions with Abzeco indicated that during construction of an adjacent commercial site at 318 McDonalds Road, an offsite, third party contractor impacted the site fence to the south, which has since been rectified.

Rubbish is at very low levels throughout the site, with almost no rubbish present. Along the car park side of the site, there is rubbish piled up on the outside of the site.

Existing Matted Flax-lily

The high levels of biomass on site are considered to pose an immediate risk to the presence of matted flax-lily. Although the amount of biomass is predominately associated with annual grasses, which flower and set seed and senesce earlier than matted flax-lily; the build-up of biomass (including dead material following senescence) is likely to negatively affect matted flax-lily. Significant seed set is also likely with this season's growing conditions, which is likely to provide significant future competition with existing matted flax-lily.

Observations from the annual monitoring of the translocated matted flax-lily indicate that crowding by annual grasses, particularly those species that display an allelopathic effect (chemically suppress growth of surrounding vegetation), is likely to affect the persistence and health of the matted flax-lily.

Conclusions

The loss of 0.82 ha of the community to the MREP means the site is at greater risk to threats. This will be increased as the surrounding area becomes further developed for industrial and commercial land use.

Threats, particularly grassy and herbaceous weeds, now pose a greater risk to the ecological values present, including the condition thresholds that qualify the site as the listed GEWVVP community. The site is still considered to meet the condition thresholds to qualify, particularly as there is more than 10 native understorey species (DSEWPAC 2011); however, the cover of annual exotic grasses is currently threatening the site containing at least 50 cover of perennial native understorey cover. This has been accentuated by the impact from the MREP, which removed the area of highest quality understorey.

Site management is maintaining and reducing levels of high threat perennial grassy weeds, herbaceous weeds and woody weeds. However, the cover of annual weeds is steadily increasing and appears to be gradually impacting the abundance of native grasses and forbs. This has been exacerbated by the MREP impacting high quality and diverse areas along the old rail cutting, where the proportion of exotic species has increased over native species.

Management of annual exotic grasses, particularly of Bromes (*Bromus* spp.), sweet vernal grass and large quaking-grass, should be prioritised with control of high threat perennial exotic grasses and herbaceous species.

With ongoing management and suppression of high threat exotic perennial grasses and herbs, annual exotic grass species pose the biggest threat by suppression of native species and the overall condition of the site. Of note, wallaby-grasses, which once dominated the site, appear to have steadily reduced in cover over the previous two years (KBR 2016). Wallaby-grasses are now being replaced by exotic perennial and annual grasses. Kangaroo grass, last year considered to be increasing in cover (KBR 2016), is now observed at a reduced overall cover, varying in cover over the site from 25-35 per cent.

The ongoing management of perennial exotic grass cover has assisted in maintaining biomass levels across the site. Any management of exotic annual grass species will also improve biomass levels to the benefit of native understorey species and the health of the community.

Recommendations

From the above conclusions the following recommendations are made to maintain effective site management:

- Continue targeting high threat weed species, emphasising Chilean needle-grass, Texas needle-grass, cocksfoot, phalaris, Paterson's curse, blackberry, briar rose and hawthorn. This is applicable to Management Action 6.1;
- Include annual grasses for priority weed control from August to October. In particular, Bromes (*Bromus* spp.), sweet vernal grass and large quaking-grass. These should be targeted with a

combination of mow-and-catch of flowering or early stages of seed development and appropriate herbicide spraying. This is applicable to Management Actions 6.1 and 6.4;

- Additional management days should be considered to target concentrations of exotic grasses, including cocksfoot, phalaris, sweet vernal grass, large quaking-grass and Bromes (*Bromus* spp.). This is applicable to Management Actions 6.1;
- Identified fuel breaks should be mown or slashed as soon as practical, in accordance with Management Action 6.6. These areas could be increased where high cover of grassy weeds are present;
- The 'gap' between the old fence along the eastern boundary and the newly installed rail corridor fence (by MREP) should be closed as soon as practical and made rabbit-proof;
- Following completion of fence works by MREP, inspect the site for evidence of rabbits and conduct a control program to eradicate any resident individuals;
- Recommend the area behind the new permanent active rail corridor fence, disturbed by the MREP, up to 2 m wide, be revegetated or seeded by the project with native grasses to prevent weed growth into the site.

Where possible, tt is recommended VicTrack increases or concentrates budgeted days spent by bushland managers to complete actions associated with weed control (Management Action 6.1) and biomass control (Management Action 6.4). These actions are considered the highest priority to assist in reducing the overall cover of exotic species, particularly annual grasses, to ensure the quality of the site will continue to meet the condition thresholds as the listed GEWVVP community.

The MREP will also need to complete fence works to ensure rabbits cannot enter the site, and it is recommended that the project contractor revegetate the area on the SMGEW side of the new active rail corridor fence to minimise weed invasion.

If you have any queries regarding the above please contact me at adam.rigg@kbr.com or on (03) 9828 5421.

Yours sincerely,

Adam Rigg
Senior Ecologist

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