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Title: **The Impacts of 'No-Mow' Areas on Floral Diversity: A Case Study at the University of Otago**

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Figure 1: *no-mow sign at Te Rua Tī, University of Otago campus.*

Executive Summary

This study explores how mowing cessation impacts floral diversity at the University of Otago. The primary objective was to determine if there is a significant difference in plant species richness between mown and unmown areas on campus. By evaluating the biodiversity benefits of reduced lawn maintenance, the study aims to inform future landscaping practices at the university.

Proximal mown and unmown areas across three sites were compared for floral diversity, with all vascular plants recorded within each. A paired t-test evaluated if unmown areas had significantly more plant species than mown areas. Summary statistics quantified findings and guided recommendations.

A total of 98 distinct plant species were identified, with 94 present in unmown areas, and 22 in mown areas. The mean taxon richness in unmown areas was 43 species, compared to just 14 species in mown areas. Significant differences were detected between groups, with unmown areas richer in floral taxa ($p = 0.01$).

These results exemplify the benefits of reduced mowing on floral diversity. However, there was no discernible difference in the proportions of native and exotic species. Despite this, urban green spaces are considered 'novel ecosystems', supporting humans and fauna in urban centres regardless of species' origin. Challenges to encouraging diversity include weed and pest mammal threats and biosecurity risks, which may suppress the reported benefits.

Cultural perceptions of beauty influence urban grassland maintenance. The European history of the lawn reflects a harmful ideology that suppresses both diverse biota and peoples. The re-wilding of urban lawns offers an opportunity for campuses and cities to create inclusive spaces for everyone – tāngata whenua and tāngata tiriti.

This study underscores that reduced mowing can create biodiversity refuges in little-used corners of greenery in urban centres. However, careful management is needed to address the challenges presented by these novel ecosystems.

Introduction

Background:

The University of Otago is internationally recognised as a beautiful campus. It is characterised by stone buildings, deciduous feature trees and perfectly manicured lawns and hedgerows – an aesthetic originating in Scottish and British constructs. This contrasts sharply with Dunedin city's adjacent wild places, which showcase Aotearoa's floral diversity in dense, tangled and uncontrolled bush. This dichotomy reflects a global tension in the character, and importantly, in the maintenance of urban spaces. It also invites us to ask about our outdoor living spaces: what is beauty?

The world's environments are collapsing in the wake of climate breakdown. The loss of biodiversity is causing significant economic challenges in food production, transport, clean water, and energy (Klaus, 2013). Ecological systems such as pollination, natural water filtration and land stability are breaking down with ever-increasing losses in both taxonomic richness and abundance of species (Rudolph et al., 2017). With unabated deforestation worldwide, a simple fact has become apparent: we need to focus our attention on biodiversity gains in urban spaces as well as in wilderness areas to benefit from diverse biosphere (Sehrt et al., 2020).

The political and social landscapes in which this goal must be achieved are complex, and well exemplified in the case of no-mow, or un-maintained, areas of the cityscape. For changes in the usual maintenance of green spaces in cities to be accepted, both moral and social pressures need to be resolved. As I will discuss in the literature review, no-mow regimes clearly increase biodiversity values. Socially, however, the tension between what works and what looks 'tidy' guides decision-making and policy. No-mow areas are perceived as being unkempt and messy, while shaven lawns imply prestige. Universities could be central pillars of change in this setting. They are hubs of life, with students, faculty and ordinary citizens utilising campuses and engaging with new ideas. They are a perfect starting point for 'letting it grow'.

In 2022 the Sustainability Office of the University of Otago considered the biodiversity benefits of no-mow areas and a potential implementation strategy. They recommended that mowing cease at two sustainability neighbourhoods on campus: Te Rua Tī and He Kaika Ora. The goal was to increase biodiversity values on campus in inconspicuous areas where students were inclined to be supportive, and later expand once social license allowed (personal communication, Ray O'Brien, April 2024). Sustainability neighbourhoods are elective at the university: students choose to live in a block of flats or houses promoting 'green' living. An additional and incidental no-mow area was added to the project when a demolition on Union Street West left behind an un-mowable area with significant rutting. Together, these three sites became trials for the no-mow

regime at the university and, if proven successful, could be expanded into other areas of the campus.

This study seeks to quantify the success of the three sites, and whether the cessation of mowing has increased floral diversity. I use my survey results to inform recommendations for biodiversity improvements on campus in the context of no- or low-maintenance green areas.

Objectives:

- To investigate the impacts of mowing on floral diversity at three sites on the University of Otago campus.
- To make recommendations for the future of no-mow policy at the University of Otago.

Literature review:

The diversity of urban green spaces has been thoroughly explored in the published literature, with universities often leading the no-mow movement. Reduced lawn maintenance has indisputable biodiversity benefits, but mown areas also offer recreational and social advantages (Sehrt et al., 2020). Historically, lawns originated in medieval England as symbols of power and prosperity, representing control over the natural world and a 'civilised' existence for wealthy Englishmen (Ignatieva et al., 2020). However, the impacts of colonial gardens and lawns in Aotearoa on indigenous and non-Pākehā populations are less explored. Introducing more unmanaged green spaces in urban centres may improve biodiversity, and better reflect diverse perspectives.

In urban settings such as university grounds, biodiversity can mean more than solely native species. Ignatieva et al. (2020) presents two types of biodiversity for Australia and Aotearoa, due to their recent settlement: 'wild' and 'urban' natural spaces. While restoration practices in wild places focus on native flora proliferation and weed control, urban environments require a different lens, where novel ecosystems necessitate novel management strategies (Klaus, 2013). We therefore define 'biodiversity' in this study as the number of different taxa, inclusive of exotic species. A comprehensive German study supports this notion, concluding that the "conservation of biodiversity in the urban century must take novel forms if it is to be effective" (Vega & Küffer, 2021).

Low-maintenance green spaces enhance biodiversity under this definition. Sehrt et al. (2020) compared frequently mown areas (6-12 mows per year) with low-maintenance areas (mown once or twice per year). After 6 years, floral diversity increased by 30%, with a shift in composition away from the likes of *Bellis perennis* and *Poa annua* to meadowland species intolerant of frequent disturbance by mowing. They conclude that reduced grass-cutting is a simple and effective strategy to improve urban biodiversity (Sehrt et al., 2020). Mown areas have limited floral diversity, and consequently cannot support diverse fauna (Lerman et al., 2018). Replacing or supplementing mown areas with urban meadowlands could benefit both people and nature (Klaus, 2013).

Despite concerns about public attitudes toward reduced lawn maintenance, the literature suggests broad support for associated ecological gains (Fischer et al., 2020; Säumel et al., 2016). Across continents, citizens are open to change (Ignatieva et al., 2017; Ignatieva et al., 2020). In Aotearoa, Heyzer (2024) surveyed attitudes toward urban biodiversity between different ethnic communities. She found that Māori prefer less manicured green spaces, indicating that reduced mowing may benefit mana whenua in urban centres. While all ethnic groups favour native plants over exotics, Māori preferences aligned with spiritual and cultural connections, rather than familiarity with species (Heyzer, 2024). Lower-maintenance green areas could help to reconnect tāngata whenua with colonial cityscapes, where early settlement demanded wilderness be 'tamed' in the name of progress (Mogren, 2013).

Several universities have adopted no-mow policies successfully. Liverpool John Moores University (LJMU) supported 'No Mow May' in 2024 on the premise that mowing obscures biodiversity on campus. They plan to survey resulting floral diversity to inform campus biodiversity strategies ("No Mow May: We're working towards improving biodiversity across LJMU," 2024). Aberystwyth University in Wales participates in No Mow May to support pollinator species ahead of summer. Additionally, they have permanent low-maintenance areas which are cut just once a year, to encourage wildflowers and associated invertebrate fauna. Vice Chancellor Professor Neil Glasser emphasised that universities should practice what they preach in biodiversity enhancement (Davis, 2024). This sentiment urges tertiary institutions to lead with integrity and apply academic knowledge to real-world practices – ahakoa ngā wero.

Methodology

Study Design:

In order to compare diversity between mown and unmown areas at the University of Otago, three unmown areas and three proximal mown areas were surveyed for floral taxon richness in early June 2024. The sites were selected conditional on being unmown for 6 months or more, with adjacent mown areas for comparison. Two of the three unmown sites were instigated by the university's Sustainability Office in support of the sustainability neighbourhood kaupapa, while the third is a vacant, unmown plot. Ideally, more replicates would have been measured, but the highly manicured state of the campus meant that appropriate sites were not identified.

Although many studies underscore increased invertebrate diversity from no-mow initiatives, I focused on floral diversity. Floral changes are visually pronounced in unmown areas, with increased vegetative mass. In the context of attitudinal change, I judged this to be an appropriate measure. Flora is also my area of competence, allowing for more thorough data collection than a less-familiar taxonomic group may have afforded.

I opted for a paired comparison study design, with each of the three sites (Te Rua Tī, He Kaika Ora, and Union Street West) having both mown and unmown treatment areas.

Each mown area was measured for size, and an adjacent unmown area of equivalent size identified to ensure comparability. Despite challenges due to infrastructure such as fencing and buildings, a mown area of equivalent size and attributes was identified in all cases (Table 1).

Table 1: Site attributes, area, and mow status.

Site	Date last mown	Time since last mow	Unmown area	Topography
He Kaika Toitū, He Kaika Ora	Oct-23	9 months	20 x 10 = 200m2	Flat
Te Rua Tī	Dec-23	7 months	70 x 5 = 350m2	Flat, sloping
Union St West	Prior to Jun-23	12+ months	12 x 25 = 300m2	Depressed hollow

Data Collection:

Data collection occurred on June 3, 2024. All vascular plant species were recorded within each site for both mown and unmown areas. The time of year meant that spring annuals were not captured in the survey. Site metadata, including slope and aspect, was recorded. Mature tree species were noted for context but excluded from the species lists as they were not impacted by mowing activities.

Each site was thoroughly grid-searched to ensure complete coverage, and the identification of all vascular plants recorded. Survey times were 1.5 hours per site (1 hour for unmown areas and 0.5 for mown). The shorter survey times for mown areas is reflective of the lower observed species richness.

Figure 2: *sprayed boundary at the unmown area at Te Rua Tī. The spraying is keeping the ivy and periwinkle (left) from encroaching on the unmown area and the lawn.*

Figure 3: *guerilla planting of several rengarenga, undertaken by resident students in the He Kaika Ora unmown area. Rank grass can be seen behind the plantings.*

Several observations of site-specific factors were noted:

Spray activity was recorded at the Te Rua Tī site. The length of the unmown area (70m) is bounded on one side by mown lawn, and mixed native/exotic garden on the other. This includes swathes of exotic ivy (*Hedera helix)* and periwinkle (*Vinca major*), both of which are mat-forming and prevent the germination and emergence of new plants. The university's property services have sprayed the edge of the swathe, presumably to prevent ingress into the lawn space (Figure 2). Similarly, the edges of bench seats within the unmown area, and the bases of several mature cherry trees have been sprayed. Spraying is undertaken next to the unmown area and may impact flora and pollinator presence (Todd et al., 2016).

An anomaly was noted at He Kaika Ora, where resident students have undertaken 'guerilla' planting activities. Several rengarenga (*Arthropodium cirratum*) have been planted and mulched in the no-mow area under a large rātā (*Metrosideros umbellata*) and tarata tree (*Pittosporum eugenioides*) (Figure 3). He Kaika Ora is the most established sustainability neighbourhood, which may explain this activity. Residents appear to have strong buy-in to the kaupapa. The original idea for no-mow areas manifested here, with a resident student suggesting it to the Sustainability Office (personal communication, Ray O'Brien, April 2024).

Faunal observations included a resident pīwakawaka at both Union St West and He Kaika Ora, and a Pittosporum Shield Bug (*Monteithiella humeralis*) in the unmown area at He Kaika Ora.

Statistical Analysis:

In order to assess whether there was a significant difference in floral taxonomic richness between mown and unmown areas, I used statistical analysis software R 4.3.2 for my analysis, with significance set to conventional levels ($p = 0.05$).

The response variable, taxonomic richness, was defined as the number of plant species recorded at each site for both mown and unmown areas. The categorical predictor variable was 'mow status' with two levels: mown and unmown (Table 1).

Given the small sample size ($n = 3$), the analysis has low statistical power. This was reflected in poor distribution of the response variable. I therefore log-transformed the data using the natural log, normalising the distribution ahead of analysis to meet the assumption of equal variance between groups (Figure 4).

Due to the small sample size ($n = 3$) I calculated descriptive statistics with the mean number of plant species and standard deviations (SD) for each group. A paired t-test was then used to compare the log-transformed taxon richness between groups. The results, including mean diversity and log-transformed diversity, are presented in Table 2.

Despite the limitations of the dataset, it was beneficial to quantify differences between groups using a formal test and provide a baseline analysis ahead of potential expansions of no-mow areas on campus.

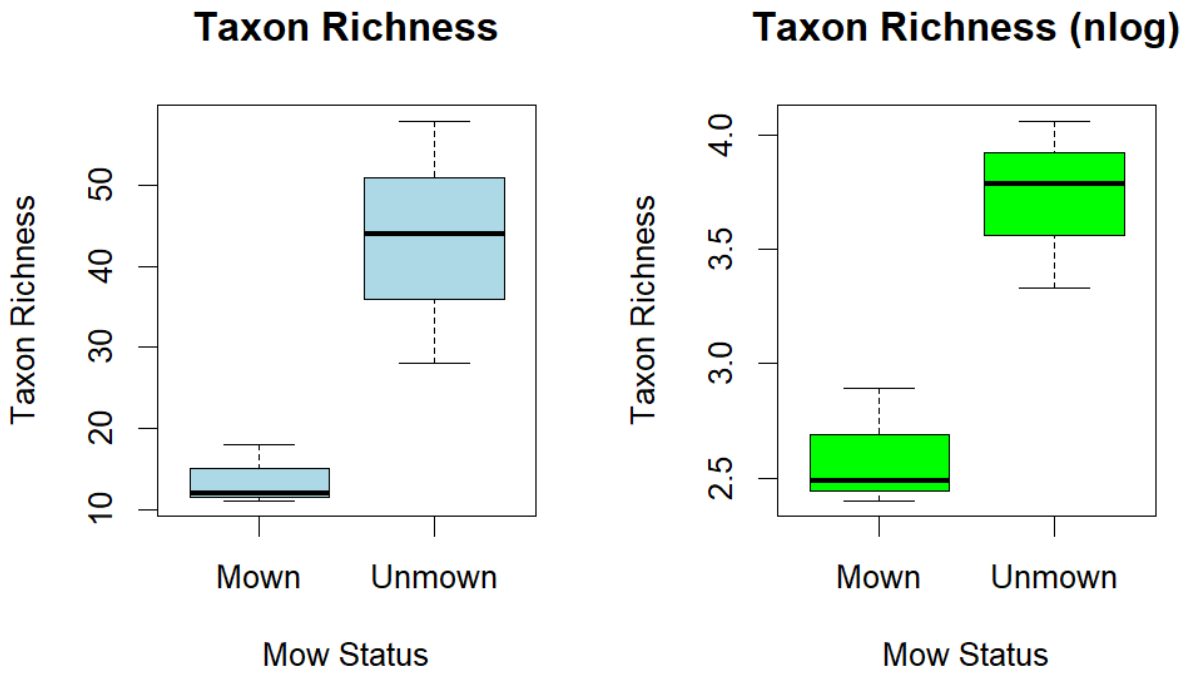

Figure 4: *boxplots showing the impact of mow status (mown versus unmown) on floral taxon richness at three University of Otago sites, for both raw and log-transformed data.*

Results

Descriptive statistics:

A total of 98 distinct plant species were identified in the survey, 28 of which were native species (28.6%). Of the 98 taxa, 94 were identified in the unmown areas, compared with just 22 in the mown areas. Only four species were unique to mown areas, while 75 species were unique to unmown areas. Unmown areas were *four times* more species-rich than mown areas, with the cessation of mowing resulting in a 327.3% increase in taxa. This calculation underscores the substantial positive impact of stopping mowing on floral diversity in the study areas.

The mean taxon richness was higher in the unmown group (M = 43, SD = 15) compared to the mown group (M = 14, SE = 4) (Table 2), with a mean difference between groups of 29 plant species.

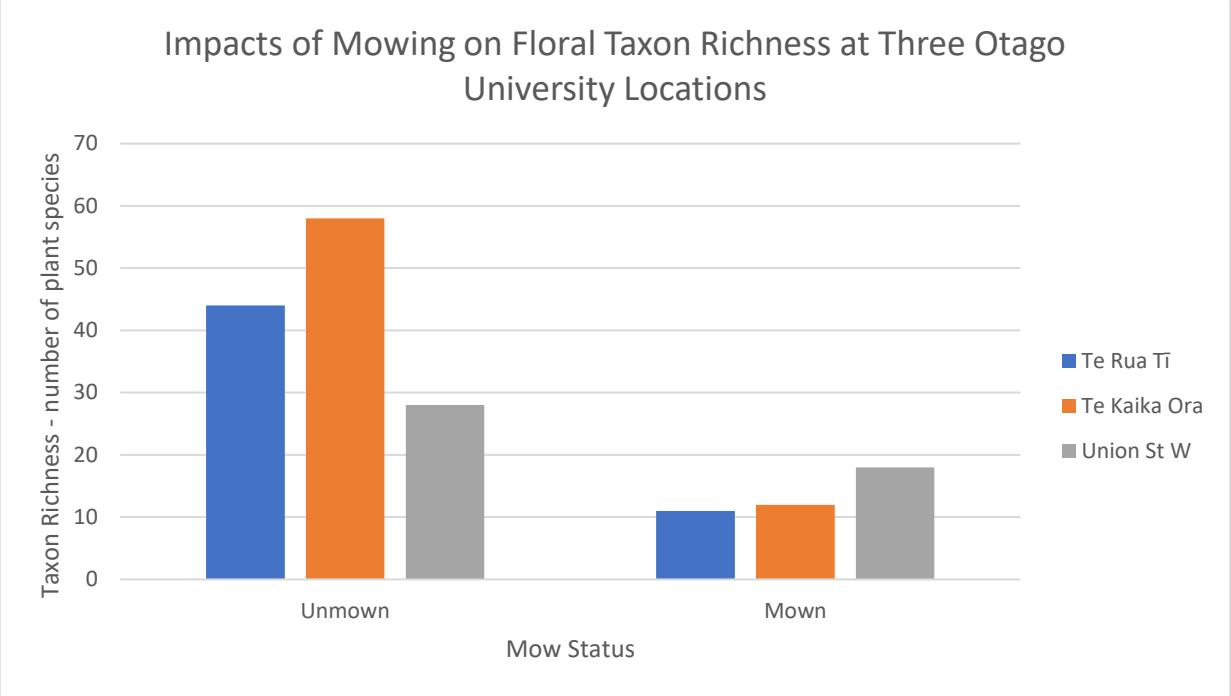

***Figure 5**: Bar graph showing the number of plant species recorded in both mown and unmown areas at each of the three University of Otago survey sites (Te Rua Tī, He Kaika Ora and Union Street West).*

Statistical analysis:

The paired t-test revealed a significant difference between the mean natural log-transformed floral taxon richness between the mown and unmown areas (t = -4.35, SE = 0.26, df = 3.62, p = 0.01). Mowing activity had a significant negative impact on species richness.

Table 2: mean taxon richness and mean log-transformed taxon richness, with SEs.

Mow Status	Mean Taxon Richness (species)	SD (Mean Taxon Richness)	Log-Transformed Taxon Richness	SD (Log-Transformed Taxon Richness)
Mown	**13.67**	3.79	2.59	0.26
Unmown	**43.33**	15.01	3.73	0.36

Qualitative findings:

Broadly speaking, the dominant vegetative cover in mown areas was homogenous, consisting mainly of *Poa annua, Bellis perennis, Trifolium repens* and *Taraxacum officinale*. In contrast, the dominant species in the unmown areas varied between sites.

Although unquantified, the vegetative mass of the unmown areas was significantly greater than the mown areas after just 7-12 months without mowing (Figure 6). This mass consisted mainly of rank grasses such as *Bromus catharticus* and weedy composites like *Erigeron sumatrensis* and *Achillea millefolium.* While no set of species dominated all

unmown areas, microhabitats had formed with associate species, such as small depressions filled with *Hydrocotyle* species and *Ranunculus repens*, or dappled light areas with *Coprosma robusta* and *Hoheria sexstylosa* seedlings.

In the two sustainability neighbourhoods, the rank grasses and knee-height vegetation had provided shelter for dozens of native tree seedlings to germinate during the autumn growth period. However, these were met by equivalent weed threats, such as *Acer pseudoplatanus* in Te Rua Tī and He Kaika Ora. The balance of these successional species will need to be carefully considered if the project continues.

Figure 6: *survey sites at Union Street West (left) and Te Rua Tī (right), showing vegetative mass increases after approximately 12 months and 7 months respectively since the last mow. The no-mow sign can be seen (left).*

Discussion

The benefits of unmown green spaces for floral and invertebrate biodiversity are well documented in the literature, and our findings align with these conclusions. In this study, plant species richness in unmown areas was four times higher than in mown areas. While at first glance the vegetation appeared similar between the sites, closer inspection revealed significant differences in floral diversity at the unmown locations. This prompts a deeper exploration of what 'diversity' means in the context of urban environments, particularly in Aotearoa, where the conservation ethos focuses on regenerating native species to pre-European or even pre-human ecosystems.

Interestingly, all the mown areas in this study were dominated by European lawn species such as *P. annua* and *B. perennis* (Rudolph et al., 2017), which thrive under regular mowing due to their resilience to disturbance and defoliation (Sehrt et al., 2020). These species outcompete native flora, which generally lacks the turf-forming capacity to thrive outside specific habitats such as salt or alpine turfs (personal observation). The dominance of these species reflects the global ubiquity of the colonial lawn, and the difficulty of reintroducing native species in urban settings.

Our statistical analysis shows that floral diversity significantly improves with reduced mowing, increasing both exotic and native taxon richness across all unmown sites. These gains support the diversification of other orders, such as invertebrates, which benefit from greater plant diversity- regardless of species origin (Loranger et al., 2014). In urban environments dominated by exotic plant species, a return to pre-human vegetation is unrealistic. Instead, our conceptions of biodiversity may need to adapt under a new framework of novel ecosystems (Klaus, 2013). Net increases in biodiversity, including exotic species, may be more advantageous than none.

The unmown areas also exhibited early signs of ecological succession, with tree seedlings beginning to establish. If left unmown, these areas could eventually progress from scrub to full canopy cover. However, invasive species such as *Hedera helix* (ivy), *Vinca major* (periwinkle), and *Erigeron karvinskianus* (Mexican daisy) threaten this process by suppressing seedling growth and reversing biodiversity gains. For instance, at Te Rua Tī, heavy herbicide use is necessary to manage these invasive species, challenging the notion of no-mow areas being truly low-maintenance. Although species richness has not yet been affected, the need for active weed control underscores the importance of careful site selection and ongoing management to sustain biodiversity benefits. The dream of zero management for no-mow areas may be an urban myth. Alternatively, a program of annual or biennial mowing may be necessary to maintain open green spaces while supporting a wider range of species than regularly mown areas (Sehrt et al., 2020).

Arboreal cover also played a role in species richness. Union Street West, the only site without mature trees, had the lowest number of taxa for both mown and unmown areas (18 and 28, respectively). This may be due to a lack of perching trees for birds, and therefore less seed spread. Additionally, it was the only site without adjacent hedgerows or gardens, potentially leading to poor recruitment of new species. The seedling tree species found in the unmown areas often mirrored nearby established trees, suggesting that proximity to established flora supports ecological succession.

Despite the ecological benefits, no-mow areas could lead to unintended consequences, such as increases in mammalian pests like rodents. The proliferation of rank grass and dandelions provides ideal habitats and seed sources for rodents, potentially leading to a surge in their populations if no-mow programs expand (Angelstam et al., 1987; Le Roux et al., 2002). Managing rodent numbers may therefore become necessary as mowing decreases, though this aligns with broader campus biodiversity goals, as well as Dunedin's Predator Free 2050 initiative (Peltzer et al., 2019).

Additionally, the promotion of no-mow areas introduces biosecurity concerns. Urban environments may act as source populations for the spread of invasive species to nearby conservation areas, particularly through vehicle and foot traffic (Kowarik, 2008). If urban no-mow areas are implemented on a larger scale, cities could become hubs of exotic plant life, posing a threat to ecologically sensitive areas.

Cultural perceptions also influence the reception of no-mow areas. In a post-colonial context, where university grounds often reflect European aesthetics, the concept of 'untidy' spaces may be met with resistance. These spaces, however, provide opportunities for rethinking biodiversity in urban settings. How might tāngata whenua

feel studying at this place, where the very grounds reflect a history of deep hurt? Wild, unmanaged areas offer a counter-narrative to the dominant cultural landscape, allowing for more inclusive ecological spaces. As seen at Te Kaika Ora, where guerrilla plantings have taken place, people can reclaim these spaces for their own cultural and ecological purposes. Wild spaces allow for areas where the dominant cultural influence does not prevail.

No-mow areas present an opportunity for a biodiverse and novel ecosystem to flourish in under-utilised green spaces around the University of Otago campus and throughout Dunedin. Verges, empty plots, grassy strips, and underused lawns hold potential for rewilding. While maintenance challenges persist, particularly regarding invasive species, no-mow areas invite a reconsideration of urban beauty. They offer a chance for people on campus to deepen their appreciation of biodiversity in urban landscapes, potentially catalysing a shift in public perception and enriching everyday life.

Recommendations, Te tī ka rito

My recommendations advocate for the gradual but widespread adoption of no-mow areas on the university campus. These recommendations are guided by the principles outlined in the University of Otago's sustainability framework (*Tī Kouka: The Sustainability Strategic Framework*, 2022). The document is inspired by Tī Kouka (*Cordyline australis)*, a taonga plant to Kai Tahu mana whenua, symbolising resilience and adaption in the region's cold climate before European settlement.

***Te tī e wana ake**: a regenerative approach to change*

Regeneration of biodiversity in a historically colonial institution requires empathy. The manicured campus currently does not serve the flora and fauna of central Dunedin and does not reflect the diversity of the city's peoples. We recommend beginning with acknowledgement from university leadership that new strategies are needed around campus biodiversity. This should be followed by educational engagement to grow empathy for the organisms with which we share our campus, whether tāngata or te taiao.

***Ka hau te tī:** Regional and global impact*

The national and international reputation of the university is important. No-mow areas are a forward-thinking and climate-focused initiative which, if publicised, could improve the university's reputation. Positive publicity around policy commitments to biodiversity improvement on-campus could counter any negative feedback about aesthetic changes. A renewed "most beautiful campus in the world" campaign could include redefining beauty as inclusive of thriving, free-growing green spaces.

***Whāia te ara tī:** leadership and governance in support of biodiversity improvement*

Changes such as no-mow areas will make biodiversity a visible and tangible part of daily life for students, faculty, and visitors. University leaders must spearhead these efforts to ensure meaningful change. A no-mow policy document should be presented by the

Sustainability Office to the Council for approval, with a summary of practical recommendations. Implementation should be gradual to allow for attitude shifts. A reduced mowing schedule of once a year may be necessary to manage woody weeds. This should be reviewed annually, and policy amended in tandem.

Timeline for implementation:

- **By Dec 2025**: Select 10 to 12 small lawn sites for no-mow areas. Choose locations that have the support of adjacent departments, and that are not used for access or leisure and do not pose human safety hazards.
- **By Dec 2026**: Select five larger lawn areas, such as adjoining verges or building surrounds, for no-mow areas. These will be in visible locations to increase engagement.
- **By Dec 2028:** Conduct a campus survey to assess attitudes towards no-mow areas and 'messier' green spaces. If positive, expand the initiative to a large, impactful areas such as the true left of the Leith River under the clocktower building, where the lawn is little-used (Figure 7).

Figure 7: *the Leith River, looking across to the lawn area on the true left of the river and the University of Otago Clocktower Building. The area in front of the clocktower is little-used and would be a good location for a no-mow area. The manicured and colonial look of the university is apparent.*

Enhanced pest control, especially for rodents, will be needed alongside this initiative, to counter the habitat and food sources created by taller vegetation and seed proliferation (Angelstam et al., 1987). This will also benefit resident herpetofauna, birds and invertebrates. Collaboration with Predator Free Dunedin (PFD) can provide pest control advice and support.

Te puaka tī, he tohu Raumati*: educational initiatives in support of campus biodiversity awareness*

- **Seasonal bioblitz**: Partner with existing university groups such as the Animal, Aquatic, Plant, Ecological Society (APPES) to run seasonal bioblitzes on campus, with a focus on no-mow areas. Provide a simple lunch to encourage participation.
- **Orientation week competition**: Encourage new students to familiarise with the campus by challenging them to locate no-mow areas and make observations on the iNaturalist app, with prizes for the winning teams.

- **Signage:** Install bilingual signage in te reo Māori and te reo Pākehā to inform and engage the community with the no-mow innovation in the context of Dunedin's ecological and cultural history. Include QR codes linking to more information on the project.

E kore e riro, he tī tāmore: *further research.*

This study identifies biodiversity increases in the absence of mowing. However, social responses to the cessation of mowing have yet to be assessed. Surveys of faculty and students are needed to gauge support for no-mow areas and to identify potential locations for the project's expansion. Such surveys could also explore perspectives across ethnic and cultural groups, considering the bio-culturally diverse nature of urban landscapes (Rayne, 2021).

Additionally, current no-mow areas should be re-assessed in spring or summer, to capture floral diversity inclusive of spring annuals, improving the robustness of these findings.

There are also many ways to enhance and measure biodiversity on campus. For instance, floral diversity can be assessed within distinct 'biotopes', which represent urban niches such as lawns, hedges, roadside verges or pavement cracks (Stewart et al., 2009). This method provides a more targeted approach that accounts for different patterns of floral colonisation in the absence of management (Ignatieva & Stewart, 2009). While this approach is beyond the scope of the current study, it highlights the mosaic nature of urban landscapes, incorporating factors such as historical maintenance practices and microhabitat differences. Future research may wish to incorporate this framework.

Conclusion

This study aimed to determine the impacts of reduced mowing on biodiversity at the University of Otago. The findings show that the number of plant species at unmown sites is significantly greater than at their mown counterparts. The total number of species across all unmown areas was 94, compared to just 22 at mown areas. These results underscore mowing reductions as a simple and effective tool to increase diversity in urban areas.

The university's campus is renowned for being one of the most beautiful campuses in the world. However, colonial ideals of beauty continue to dictate the manicured state of its European-style lawns and gardens. An opportunity exists in reduced mowing for an urban re-wilding which openly invites diversity into university and city life. The look and feel of a place ought to reflect the people who use it.

The no-mow areas surveyed in this study are, in the main, less than a year old. Although their small size mean they won't have huge biodiversity impacts as standalone areas, they represent a movement toward novel ecosystems. They form part of a narrative around biodiversity in city life. This study recommends the gradual expansion of no- or low-maintenance lawn areas into more visible locations on campus. Increased exposure

to different ideas of what is beautiful gives university communities the opportunity to engage with urban biodiversity and question their place in it.

In conclusion, while the immediate impacts of no-mow areas on Dunedin's biodiversity may be limited, they present opportunities for engagement in and appreciation of urban ecosystems. Future efforts should focus on the expansion of these areas, to maximise ecological, cultural, and educational benefits.

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Kei te mihi au ki ngā mana whenua o te rohe nei, Kai Tahu. Te tī ka rito tonu.

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Appendices

Appendix A: Complete species lists for each of the three surveyed sites, with species shared between adjacent unmown and mown areas in yellow.

*Plants with an asterix * are exotic species.*

Te Rua Tī, Unmown Area				
Grass	**Herbaceous**	**Vines**	**Asters**	**Shrubs/Trees**
*Agrostis capillaris**	*Anethum graveolens**	*Hedera helix**	*Bellis perennis**	*Acer pseudoplatanus**
*Agrostis stolonifera**	*Cerastium fontanum**	*Meuhlenbeckia australis*	*Erigeron sumatrensis**	*Coprosma robusta*
*Bromus catharticus**	*Coriandrum sativum**		*Hypochaeris radicata**	*Genista monspessulana**
*Lolium perenne**	*Echium vulgare**		*Lapsana communis**	*Hoheria sexstylosa*
*Poa annua**	*Epilobium ciliatum**		*Senecio quadridentatus*	*Prunus avium**
	*Euphorbia helioscopa**		*Taraxacum officinale**	*Quercus robur**
	*Geranium gardneri**			*Sophora tetraptera*
	*Geranium robertianum**			
	Hydrocotyle heteromeria			
	*Hypericum androsaemum**			
	*Iris foetidissima**			
	*Lepidium coronopus**			
	*Linaria purpurea**			
	*Lupinus polyphyllus**			
	*Plantago major**			
	*Ranunculus repens**			
	*Rumex crispis**			
	*Rumex obtusifolius**			
	*Solanum nigrum**			
	*Trifolium incarnatum**			
	*Trifolium repens**			
	*Unknown composite**			
	*Vicia sativa**			
	*Vinca major**			
Te Rua Tī, Mown Area				
Grass	**Herbaceous**	**Vines**	**Asters**	**Shrubs/Trees**
*Holcus lanatus**	*Cerastium fontanum**		*Bellis perennis**	
*Poa annua**	*Hydrocotyle heteromeria*		*Hypochaeris radicata**	
	Hydrocotyle moschata		*Taraxacum officinale**	
	*Plantago major**			
	*Ranunculus repens**			
	*Trifolium repens**			

He Kaika Ora, Unmown Area				
Grass	**Herbaceous**	**Vines and Ferns**	**Asters**	**Shrubs/Trees**
*Agrostis capillaris**	*Allium triquetrum**	*Dryopteris filix**	*Achillea millefolium**	*Acer pseudoplatanus**
Anamanthele lessoniana	*Calendula officinalis**	*Hedera helix**	*Bellis perennis**	*Aristotelia serrata*
*Lolium perenne**	*Capsella bursa-pastorus**	*Meuhlenbeckia australis*	*Cotula australis*	*Carpodetus serratus*
*Poa annua**	*Carex comans*		*Erigeron karvinskianus**	*Coprosma robusta*
	*Cerastium fontanum**		*Erigeron sumatrensis**	*Cordyline australis*
	*Epilobium ciliatum**		*Euchiton sphaericus**	*Cotoneaster franchetii**
	*Fragaria vesca**		*Hypochaeris radicata**	*Melicytus ramiflorus*
	Hydrocotyle hetermomeria		*Jacobaea vulgairs**	*Metrosideros umbellata*
	Hydrocotyle moschata		*Mycelis muralis**	*Pittosporum eugenioides*
	*Iris foetidissima**		*Taraxacum officinale**	*Pittosporum tenuifolium*
	*Lepidium coronopus**		*Tripleurospermum inodorum**	*Prunus avium**
	*Lobelia erinus**			*Pseudopanax arboreous*
	*Lobularia maritima**			*Solanum laciniatum*
	*Malcomia maritima**			
	Oxalis exilis			
	*Plantago lanceolata**			
	*Prunella vulgaris**			
	*Ranunculus repens**			
	*Rumex obtusifolius**			
	*Sagina procumbens**			
	*Solanum nigrum**			
	Sonchus oleraceous			
	*Stellaria media**			
	*Trifolium repens**			
He Kaika Ora, Mown Area				
Grass	**Herbaceous**	**Vines and Ferns**	**Asters**	**Shrubs/Trees**
*Holcus lanatus**	*Carex comans*		*Achillea millefolium**	
*Poa annua**	*Hydrocotyle heteromeria*		*Bellis perennis**	
	Hydrocotyle moschata			
	*Ranunculus repens**			
	*Rumex obtusifolia**			
	Solanum nigrum			
	*Stellaria media**			
	*Trifolium repens**			

Union Stree West, Unmown Area				
Grass	**Herbaceous**	**Vines**	**Asters**	**Shrubs/Trees**
*Agrostis capillaris**	*Cerastium fontanum**		*Achillea millefolium**	
*Agrostis stolonifera**	*Epilobium ciliatum**		*Cirsium vulgare**	
*Dactylis glomerata**	*Linaria purpurea**		*Crepis capillaris**	
*Lolium multiflorum**	*Lysimachia arvensis**		*Erigeron sumatrensis**	
*Paspalum sp.**	*Plantago lanceolata**		*Euchiton sphaericus**	
*Phleum pratense**	*Polygonum aviculare**		*Pseudognaphalium luteoalbum*	
*Poa annua**	*Ranunculus repens**		*Senecio glomeratus*	
	*Rumex obtusifolius**		*Sonchus oleraceous*	
	*Spergula arvensis**		*Taraxacum officinale**	
	*Trifolium pratense**		*Tripleurospermum inodorum**	
	*Trifolium repens**			
Union Street West, Mown Area				
Grass	**Herbaceous**	**Vines**	**Asters**	**Shrubs/Trees**
*Holcus lanatus**	*Cerastium fontanum**		*Achillea millefolium**	
*Poa annua**	*Epilobium ciliatum**		*Bellis perennis**	
	Hydrocotyle heteromeria		*Cirsium vulgare**	
	Hydrocotyle moschata		*Taraxacum officinale**	
	*Plantago lanceolata**			
	*Plantago major**			
	*Polygonum aviculare**			
	*Ranunculus repens**			
	*Rumex obtusifolius**			
	*Stellaria media**			
	*Trifolium pratense**			
	*Trifolium repens**			