

Considering Nature: An Examination of Student Perceptions towards Manicured Green Space
Environments at Dalhousie University

Liam Ferguson, David J. Shuman, Rebecca Steele, Erin Walton
Department of Earth and Environmental Science, Dalhousie University
ENVS 3502: Campus as a Living Laboratory
Dr. Caroline Franklin & Alex Legault
Monday, April 8th, 2024

Table of Contents

Abstract	3
Keywords	3
Introduction	4
Methods	7
Procedure.....	8
Limitations	9
Results	9
Qualitative Results	9
Quantitative Results	11
Discussion	15
Conclusion	18
Literature Cited	19
Acknowledgements	21
Appendix A	22
Appendix B	24
Appendix C	25

Abstract

Scholarship surrounding the impact of urban green spaces on the wellbeing of populations has provided rich insights that can help further our understanding of interactions between natural and built environments. However, there are few studies of green spaces within the context of learning environments. This study's purpose was to identify Dalhousie University student perceptions of green spaces and their local biodiversity composition within a university campus. Previous studies have focused on general aesthetic and health benefits of green spaces. Our research intends to characterize how students perceive the status of green environments on Dalhousie University's Studley, and Sexton campuses. By performing a hybrid of qualitative and quantitative analysis on data collected via a survey, we were able to develop insights into student priorities for green spaces. We determined that there is moderate evidence ($R^2 = 0.3206$) to support a relationship between students who perceive green spaces as positively contributing to their learning experience and students who feel that accessibility to green spaces increases their willingness to engage in environmental or sustainability related initiatives or organizations across campus. Using involvement in student societies and other initiatives focused on conservation and sustainable lifestyles as a maxim for positive impact from green spaces, we attempt to draw connections between students' experience with green spaces and how willing they are to participate in their community. It is our hope that decision makers, like urban planners and campus administrators, will use the data we collected in this study to inform how they design the built environment at Dalhousie, in Halifax, and beyond. With an understanding that green spaces positively contribute to student well-being, building greener campuses comes with another benefit.

Keywords

Manicured, Green Spaces, Biodiversity, Campus, University, Sustainability, Native species, Education, Student, Wellbeing, Perception

Introduction

This investigation hopes to examine the correlation between students' knowledge regarding local biodiversity and their commitment to environmental responsibility on Dalhousie University's Studley, Carleton, and Sexton campuses. By assessing how awareness of biodiversity influences attitudes and behaviors, the study aims to shed light on the potential implications for fostering sustainable practices across various aspects of life. Specifically, we will collect data via a survey created by our team and advertised in high-traffic areas across Dalhousie's Halifax campuses. Our respective research question was: "To what degree does student knowledge of local biodiversity and native plant species influence their willingness to adopt sustainable attitudes within a campus environment". Our main objectives for this study were to (a) implement accessible forms of information regarding local biodiversity to create a greater feeling of connection with the environment, (b) to conceptualize student attitudes towards the integration of additional native plant species within manicured green space environments and (c) to formulate usable strategies that aim to strengthen and adapt current campus green space conservation practices to be more inclusive of student's perceptions.

Exposure to urban green spaces can be beneficial to the health and well-being of residents (De Haas et al., 2021). In an urban setting, exposure to nature is reduced, which can cause stress and disconnection between people and the environment. Urban green space is defined as urban land that is at least partly covered with grasses, trees, or other vegetation. Examples of urban green spaces include parks, green roofs, and cemeteries, as well as urban bodies of water, such as ponds and riverbanks (De Haas et al., 2021). Moreover, manicured green spaces are those that are not kept wild but are more strictly managed, such as parks with regular grass cutting. The relationship between these manicured green spaces and individuals can be explored on a campus at a smaller scope, this provides a wide diversity of targets and exploring how their knowledge and exposure to green spaces influence their relationship with sustainable initiatives. Student perception of biodiversity within a campus remains to be a topic that withholds a plethora of undiscovered knowledge.

Studies show that student perception of campus environment is critical when it comes to the selection process of attending a post-secondary institution (Speake et al., 2013). Furthermore, these findings show that student perception is highly correlated with biodiversity within manicured green spaces. Although these studies suggest overall well-being (Holt et al., 2019),

we still do not understand the correlation between green space and increased environmental conservation within a campus community. It has been hinted that biodiversity conservation falls under two key proponents, protecting nature intrinsically within its complete entity and protecting nature to amplify human benefit (Kalicka, 2021).

A study conducted in 2020 recommends that institutions involve themselves in green space research to understand ecosystem interactions to promote sustainability. Their study garnered significant public attention and appreciation (Giovannetti et al., 2020). This was useful in justifying our research based on existing findings that demonstrate validity to our goal of the project. A study on green spaces and quality of life revealed that frequent engagement with green spaces is associated with higher quality of life and better mood among students (Ha et al., 2022). Although not directly health-focused, this study provides a model for comparing students and green spaces, offering insights into potential data collection methods and we believe similar public appreciation can be an additional outcome.

Furthermore, academics at Liverpool Hope University initiated a research project to delve into the dynamics of student engagement with campus green spaces, recognizing a gap in understanding despite spending time within them (Speake et al., 2013). Importantly, the study highlighted a preference among students for manicured green spaces over naturalistic ones, indicative of a potential lack of ecological awareness among the student body. This insight underscores the significance of promoting ecological education and awareness among students to foster a deeper appreciation for biodiversity and environmental stewardship. This aspect presents an avenue for further exploration, suggesting a need to examine the implications of prioritizing manicured green spaces over natural habitats in campus environments. This study showed growing evidence that the benefits of urban green spaces are not equally distributed. Studies also examine social exclusion and the role of urban green spaces enhancing social equity (De Haas et al., 2021). This study demonstrated evidence suggests that green spaces contribute to unequal outcomes in health, wealth, and overall-wellbeing. They found this by using four ideal typical mechanisms of inclusion and studied three cases.

Finally, there have been similar ENVS 3502 research projects in the past which respectively focus on the perception and utility of green space on Dalhousie's Studley campus, as well as perception and native species. More than half of the survey participants regarded Dalhousie as a "green campus" (Stepan et al., 2014). While this data is now a decade old, it may

give us some insight as to how students perceive Dalhousie's green spaces, or it may show us how students' perception of green spaces on campus has changed as students have become more conscious and critical of environmental practices. These will be helpful guides during our project to ensure that we are keeping originality throughout our study and provide inspiration and examples of what this group found helpful with collecting their data.

One study questioned whether more biodiverse green spaces have more restorative effects than conventional lawns in campus environments. Focusing on the effect of multisensory stimuli on mental restoration, the study examined the perceived biodiversity and possible association with psychological responses. This research provides helpful insight into the potential influence that a campus green space can have on students, and we may be able to link these findings with participation in sustainable initiatives (Ha & Kim, 2021).

Alternatively, one research study pointed out the lack of actual policy behind the incorporation of green spaces on campus. Reliability of the information collected was greatly influenced by the pandemic (Kalicka, 2021). This will be a helpful example of what limitations we may face during the collection of data portion of our project but also help make some assumptions on what data findings might look like across a campus.

Researchers conducted an environmental education-oriented landscape study to observe, identify, and map ecosystem services on a university campus based on social values. These incorporated the perception and associated preference of participants by pointing out locations where ecosystem services exist on campus, they then evaluate the changes in understanding, attitudes, and behaviors relevant to the ecosystems (Huang et al., 2023). It showed that environmental education reshapes their social values by elaborating on the knowledge of functions provided by plant communities and increased contact with nature through outdoor experience. Through this study, participants recognized how a campus landscape functions and shapes the sustainability of a local community.

This study aims to formulate a connection between biodiversity knowledge and student willingness to participate in campus conservation efforts. Our findings hope to yield subsequent information towards foreseeable biodiversity benefits perceived through both intrinsic and anthropogenic standpoints. Another hopeful outcome of our bottom-up approach aims to quantify if biodiversity knowledge specifically correlates to an increase in student engagement within a campus environment. Relating our findings to that of Stepan et al., 2014: where

Dalhousie participants supported land use changes when a congruency was established between individual perception, we hope to critically evaluate thresholds between biodiversity knowledge and student behavior.

Urban green space is open land reserved to include plants, water features, and other features of the natural environment (De Haas et al., 2021). In this paper, we draw a distinction between two types of urban green spaces: wild green space and manicured green space. Wild green space is that which resembles the natural environment and is not receive regular and intensive management. Manicured green space is an area that receives regular management to ensure aesthetic uniformity, such as lawns or playing fields. Due to it making up most of the urban green space on Dalhousie University's Studley, Carleton, and Sexton campuses, our research primarily focuses on manicured green spaces. The relationship between these manicured green spaces and individuals can be explored on a campus at a smaller scope, this provides a wide diversity of targets and exploring how their knowledge and exposure to green spaces influence their relationship with sustainable initiatives.

Methods

We created a survey using Microsoft Forms to acquire the relevant information to answer our research questions. There are 16 different questions in the survey (Appendix B) that respondents must answer regarding their demographic, involvement on campus, and perceptions on the green spaces available on Dalhousie campuses. The survey had a variety of question types, including Likert-scale questions, simple 'yes or no' questions, and open-ended questions, so participants could specify their current thoughts and feelings on a specific subject relating to campus green spaces. A poster was created to advertise the survey across campus to students who would otherwise not hear about the study (Appendix C). The study was also advertised personally by the authors to friends, classmates, and teammates in school activities. Our research ethics application was approved by the Department of Earth and Environmental Sciences.

A survey was used as the method of collecting the information, because it was the most efficient way to get specific information to answer research questions. Interviews would have been more time and labor intensive as a collection method. Furthermore, specific information is needed to answer the research questions of this study, and there may not be any relevant information received through an interview.

Procedure

With a very short timeframe being available for the data collection process, it was critical that we collected as many responses as possible in the respective window. To maximize the yield of participant engagement, we designed posters to promote our respective study. The posters were put up primarily within the Studley and Sexton campuses. The posters posted at the Sexton campus were in the Emera Idea Building, the Richard Murray Design building, and throughout the A, B, C, and D building complexes. Posters on the Studley campus were posted at the Killiam Memorial Library, Life Sciences Centre, Chemistry Building, and the Dalplex. Students could fill out and submit their online surveys from March 18th to March 26th, 2024.

On March 26th, the data was stored in the Microsoft excel document, and it was anonymized. This was done to ensure it adhered to the privacy and confidentiality section 2.7.1 in the ethics application form (Appendix A). Once participant personal information was anonymized, survey questions four to 11 were specifically coded to prepare for quantitative analysis in RStudio. Survey questions 12 and 13 were coded using a hybrid of *a priori* and *a posteriori* methods to prepare the data for qualitative analysis.

Regression analysis was performed on all coded responses that passed the normality, related pairs, and level of measurement assumptions. Responses that yielded to be non-normally distributed were subjected to simple analysis in Microsoft Excel.

Limitations

Throughout the duration of this study, we identified two prominent limitations. The first limitation was a restricted time frame due to the length of the class. This limited period made it challenging to reach our target sample size of 378 individuals. By the survey deadline we only received 45 responses, thus adding a factor of sampling bias towards our findings. The second limitation we identified was participant engagement. Since our survey could only be open for a limited period to allow for data analysis, composition of the presentation, and final report, individuals may not have noticed our posters, or they may have been uninterested in completing the survey.

Results

Qualitative Results

Open-ended questions were used to gauge student opinion regarding improvement of campus green spaces and Dalhousie University's role in encouraging sustainable lifestyle choices. These questions asked students: a) if they believe there is room for improvement for campus green spaces, and why, and b) how might Dalhousie "encourage and support students in actively participating in conservation efforts and sustainable practices?" We used qualitative coding to compare survey results and develop insights from student answers.

Regarding room for improvement within campus green spaces, we coded within two streams of analysis: a) whether students believe they can improve and b) themes of suggestions. While we found most students believe in the university's ability to improve campus green spaces, their suggestions for improvement vary widely. Twenty-four percent of respondents expressed suggestions relating to biodiversity, such as a need for more plant diversity and less grass-based lawns (Table 1). Twenty-two percent of respondents expressed a need for more green space in general. Also, 22% suggested green spaces ought to be made more inviting and accessible (Table 1). Some respondents suggested infrastructure like park benches and tables to allow for students to actively use green spaces for studying and recreation. Three students mentioned promotion and advertisement, with one saying: "if there was more promotion and advertisement it would help to plant the seed in someone's head to plan a visit I to their day" (sic). While the pun is appreciated, the underlying sentiment plants a seed as well; students do not know about green spaces available on campus. One student said they were only aware of one green space on campus, suggesting there might be a wider communication problem between Dalhousie and its student population regarding green spaces. This could be fixed, as another suggested, with "more signage, postings, and events to increase awareness." These suggestions can be unified into a general vision: Dalhousie University should increase the amount of green space that is biodiverse, inviting, and accessible to students, and serves their needs in an expansive way. Two respondents stood contrary to the rest, representing about 4% of all respondents. One stated that they do not believe Dalhousie has the interest or means to improve them, while the other said they do not believe green spaces need improvement.

Table 1

Qualitative coding of Dalhousie University students' suggestions for improving green spaces

Code	Frequency	Percentage
Biodiversity	11	24%
More inviting and accessible	10	22%
More area	10	22%
Native species	7	16%
Management	4	9%
Environmental benefits	3	7%
Anti-lawn	3	7%
Promotion	3	7%
Community needs	3	7%
Less manicured	2	4%
Aesthetics	2	4%

To understand respondents' views on university encouragement around conservation and sustainability, both *a priori* and *a posteriori* codes were chosen to reflect broad directions of improvement. Forty-four percent of students suggested promotion as an avenue for improvement, while 29% mentioned education was a large area for improvement. Eighteen percent suggested incentive-based encouragement, while 16% suggested both work with student societies and improvement of green spaces as worthwhile.

Table 2

Qualitative coding of Dalhousie University students' suggestions for encouraging conservation- and sustainability-based practices

Code	Frequency	Percentage
Promotion	20	44%
Education	13	29%
Incentive	8	18%
Societies	7	16%
Spatial	7	16%
Curriculum	5	11%
Extracurriculars	4	9%
Partnerships	4	9%
Management	2	4%

Quantitative Results

Of the 45 students that participated in our study 62.22% of the population responded to strongly agree with the survey question that stated, “Manicured campus green spaces positively contribute to students’ overall learning experience” as shown in Figure 1A. After a normality test was performed and passed for both the response and predictor variables, a Regression analysis was performed. The results of the respective regression analysis revealed that there was moderate evidence ($R^2 = 0.3206$) of a relationship between students who perceived green spaces to positively contribute to their learning experience and students who perceived accessibility to green spaces to increase their willingness to engage in environmental or sustainability related initiatives or organizations across campus (Figure 1B).

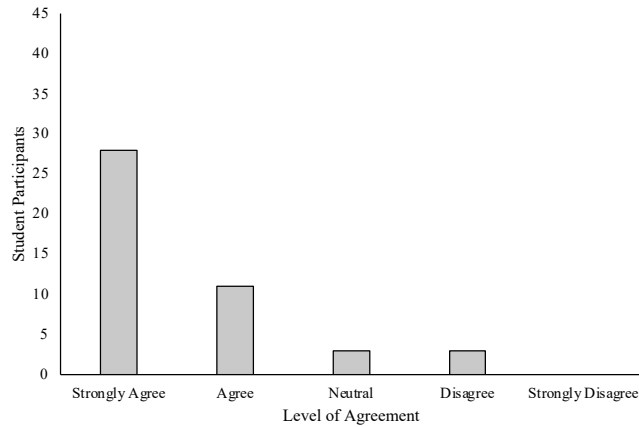


Figure 1A. Bar chart summarizing the quantity of student responses (n =45) within their respective level of agreement corresponding to the statement that “manicured campus green spaces positively contribute to students’ overall learning experience”.

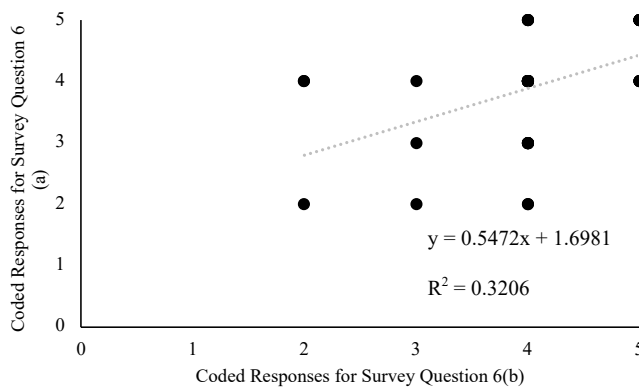


Figure 1B. Scatterplot displaying coded student responses (n= 45) to the survey question that asked manicured campus green spaces positively contribute to students’ overall learning experience” (response) vs coded participant responses (n= 45) to the survey question which stated Access to manicured green spaces increases students’ willingness to engage in environmental or sustainability related initiative, societies, or organizations on campus” (predictor). Linear trendline incorporated with the yielded linear expression and Regression coefficient (R²). Scatter plot generated in Microsoft excel.

Critically analyzing how students perceived the accessibility and availability of green spaces across Dalhousie campuses revealed that only 44.44% (Figure 2) of participants felt Dalhousie did not have a suitable green space presence when in opposition 28.89% felt Dalhousie had a suitable presence of green space across the Halifax campuses. By calculating the mean value for the corresponding coded student responses, it was determined the average

response to survey question 6 (c) was 2.8. It should be acknowledged that the corresponding codes were oriented as 2 equal to ‘disagree’ and 3 equal to ‘neutral’.

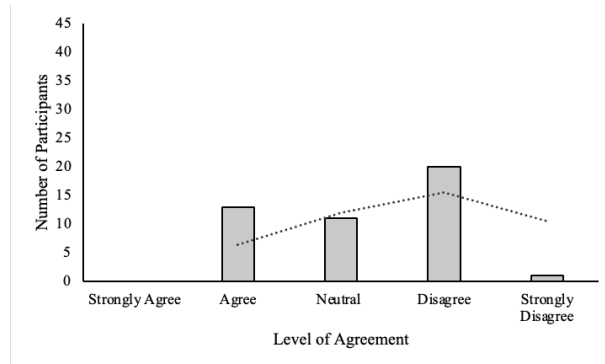


Figure 2. Bar chart summarizing the quantity of student responses given their level of agreement relating to survey question which stated, “Dalhousie’s Halifax campuses have a good amount of available green space”. Trendline revealing the moving average of responses in relation to their responded level of agreement.

Analyzing participant responses to survey question seven which asked “Do you consider yourself knowledgeable about the importance of native species” revealed that 60 percent of the population felt rather uneducated about the significance of native species in terrestrial ecosystems. Further assessment of student’s perceived awareness towards the biodiversity displayed through Dalhousie’s Halifax campuses revealed that 62.22% of the sample population felt somewhat aware of the species present where 22.22% felt completely unaware. When asked “In your opinion, should campus have more native plant species” a total of 86.66% of participants responded in agreement with the statement where 44.44% strongly agreed and 42.22% responded with agree (Figure 3).

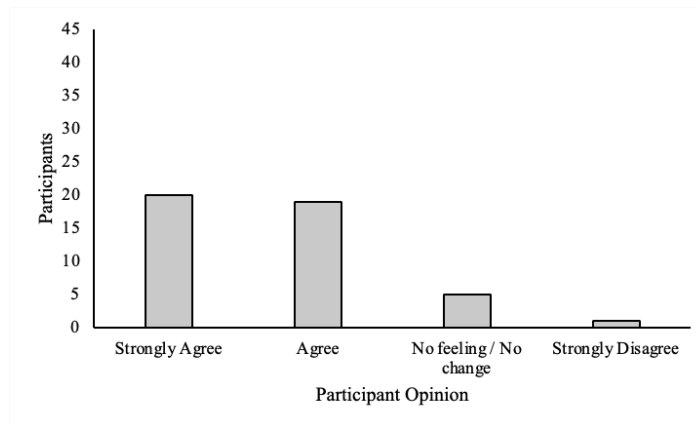


Figure 3. Bar chart displaying participants responses to the inquiry if Dalhousie should plant more native species throughout Halifax campus green spaces.

The respective perception of the presence of native species throughout Dalhousie's Studley and Sexton campuses represented 55.56% of the sample population upholding the opinion that approximately half of the species are native in nature. Another 35.56% of students felt as though almost none of the species present were native (refer to Figure 4). The mean response that was yielded from the coded data was 1.14. The coding sequence for survey question nine was constructed as 'almost none' equal to zero, 'about half' equal to one, and 'the majority' equal to two.

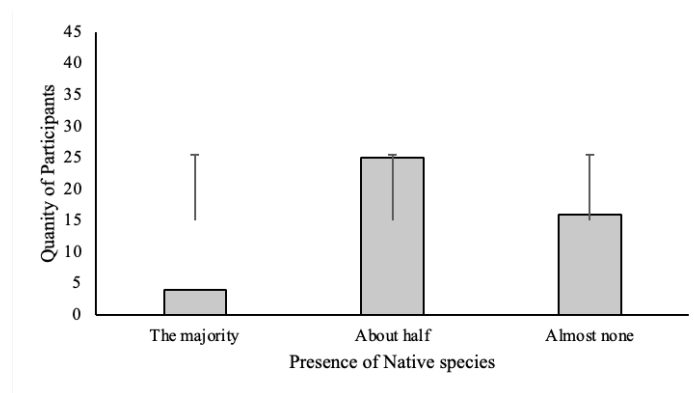


Figure 4. Bar chart representing participant perception of the native species presence through Dalhousie's Studley and Sexton campuses. Error bars are used to display data within 1 standard deviation of the mean response.

The general consensus pertaining to if students felt there should be more readily available information on local biodiversity at Dalhousie revealed 95.56% of participants felt as stronger efforts should be made to inform the campus community of the local biodiversity on campus. Testing the relationship between students' opinion if more native species should be integrated across Dalhousie's Halifax campus green spaces and if there should be more readily available information on local biodiversity found weak evidence ($R^2 = 0.2268$) that there is a relationship shared between the two variables (Figure 5). The number of participants that felt as though Dalhousie should not make information of local biodiversity readily available was substantially smaller, representing only 4.44% of the population.

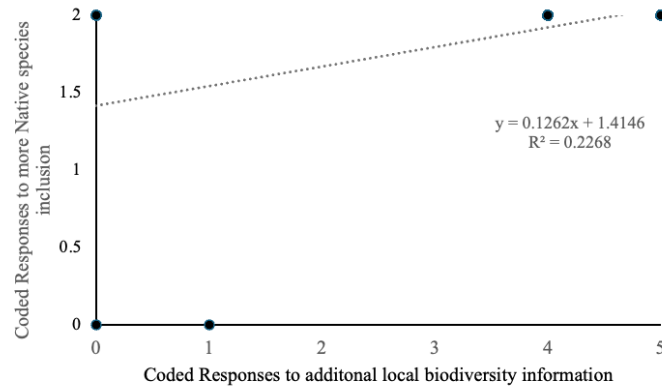


Figure 5. Scatterplot displaying coded student responses (n=45) to the survey question that asked “Do you consider yourself knowledgeable about the importance of native plant species?” (response) and to the survey question which asked “Do you think there should be more readily available information on local biodiversity?” (predictor). Linear trendline displaying the trend of the linear model with linear expression and respective Regression R^2 value. Scatter plot generated in Microsoft excel.

Discussion

Most students who responded to our survey believed Dalhousie University can improve the green spaces on the Halifax campuses. Nearly one quarter of participants felt that the Halifax campuses needed more green spaces in general, and roughly another quarter suggested that green spaces that are already available should be changed to be more inviting and accessible to students. Some respondents stated that including infrastructure such as benches and picnic tables could better facilitate student’s needs out of the available green spaces on Dalhousie’s campuses. Only two of the survey respondents did not express agreement that Dalhousie’s green spaces could improve. One of these respondents believed that Dalhousie did not have the interest or means to improve green spaces on campus. This means the student does not believe that Dalhousie is concerned about whether there are sufficient green spaces on campus or if the available green spaces are suited to the students' needs and wants. The other respondent said they believe the green spaces on campus do not need improvements.

Nearly all respondents believed that there should be stronger efforts to inform the campus about the local biodiversity. In addition to this, the majority of respondents (86.66%) agreed that there should be more native plant species on Dalhousie’s Halifax campuses, with 42.22% of participants agreeing with the statement, and 44.44% strongly agreeing with the statement. Findings of a 2014 study also conducted at Dalhousie University revealed similar results as

majority of participants withheld a desire to amplify the quantity of native tree species by either adding additional species that were already present or integrating species that had not yet been introduced to terrestrial green space ecosystems throughout campus (Stepan et al., 2014). We identified a weak relationship ($R^2 = 0.2268$) between the students who believed that there should be more native species on campus, and the students who believed that there should be more readily available information on the biodiversity on campus. Meaning, students who believed that Dalhousie should incorporate more native species in the green spaces on campus were more likely to believe that there should be more readily available information of the biodiversity on campus, and vice versa.

62.22% of the survey respondents strongly agreed to the notion that manicured green spaces positively contribute to students' overall learning experience. Meaning, more than half of the participants believed that the amount, and quality of green spaces on campus are important to their learning, and experience at university. This contributes to the notion published by previous studies that demonstrates exposure to green spaces is considered beneficial to the health and well-being of urban residents (De Haas et al., 2021). Furthermore, there is moderate evidence ($R^2 = 0.3206$) of a relationship between the students who believe that green spaces positively contribute to their learning experience, and the students who believe that increased accessibility to green spaces increases student willingness to engage in environmental or sustainability-related initiatives or organizations on campus.

One respondent said, “[a] lot of the manicured spaces I see on campus are not species rich, appear to be crafted almost entirely for aesthetic appeal, and do not always offer the most useful services to students.” This student identified a need for natural biodiversity and a need-factor beyond aesthetic. While they did not elaborate on which ‘services to students’ they would like to see, another student simply stated that green spaces could be improved “with more gardens,” while another said they would appreciate plants species one could use as herbs, food, or medicine. When a student suggested promotion would “plant a seed in someone’s head,” they alluded to a deeper issue: students do not know about green spaces available on campus. One student said they were only aware of one green space on campus, suggesting there might be a wider communication problem between Dalhousie and its student population regarding green spaces. This could be fixed, as another suggested, with “more signage, postings, and events to increase awareness.” These suggestions can be unified into a general vision: Dalhousie

University should increase the amount of green space that is biodiverse, inviting, and accessible to students, and serves their needs in an expansive way.

Scoping our study specifically towards students that frequently visit the Studley and Sexton campuses enabled us to distinguish participants' perceptions of local green spaces at a broadened scale. Incorporating the Studley and Sexton campuses within our study area also enabled us to conceptualize how students perceived the local biodiversity present within the green spaces found within both Halifax campuses. This helped maximize the diversity of participant responses and allowed multiple academic disciplines to voice their opinions and feelings towards the green space subject matter. Although ample efforts were put into collecting as many responses as possible in the data collection timeframe, 45 total responses added a level of difficulty to the analysis portion of this study.

With most of participant responses being the same, in several circumstances the normal distribution of errors assumption for regression analysis was not met. Given these circumstances regression analysis of the coded responses could not go forward for the following survey questions:

- How much time do you spend outdoors per week?
- Are you involved in any environmental or sustainability related initiatives or organizations on campus?
- How aware are you about the biodiversity on campus?
- Given your experience within campus green spaces, how many of the plant species on campus are native species?
- How much influence do you think biodiversity on campus has on students' willingness to adopt more sustainable habits?

Being unable to perform a regression analysis on these variables prevented us from identifying any relationships shared between our pre-determined response and predictor variables, and minimized further findings that would support our research objectives. Also, achieving less than ten percent of our target sample size adds a factor of sampling bias and it is unfair to assume our results are representative of the student population at large.

Conclusion

The study's outcomes were to determine what influence students' perception of green spaces and activity has on their responsibility on sustainable and environmentally friendly practices. We hope to use our findings towards the integration of more local species, and this will hopefully increase in a feeling of connectivity between students and the environment which will in turn foster healthier relationships towards environmental sustainability on campus. We aimed to determine the most effective methods to educate the campus population and increase their interest regarding information on local species and how to be more environmentally conscious.

Some important aspects to consider local biodiversity and where on campus there are resources to find more information, so far, we hypothesize that the McCulloch Museum and the Office of Sustainability will have the most accessible methods currently for students to learn about their local environment without cost. We hope that through this project there will be an increase in the demand for information on the subjects touched upon and this will create an availability to produce accessible information that will be found around campus. Some ideas involve the creation of infographics of local biodiversity and/or sustainable practices, potentially even a workshop that is partnered with the co-curricular record which recognizes your accomplishments out of the classroom experiential learning including campus life and community engagement. We needed to determine what the commonalities between students that feel they practice sustainability and their time spent in green spaces and vice-versa.

Literature cited

- De Haas, W., Hassink, J., & Stuiver, M. (2021). The role of urban green space in promoting inclusion: Experiences from the Netherlands. *Frontiers in Environmental Science, 9*.
<https://doi.org/10.3389/fenvs.2021.618198>
- Giovanetti, M., Giuliani, C., Boff, S., Fico, G., & Lupi, D. (2020). A botanic garden as a tool to combine public perception of nature and life-science investigations on native/exotic plants interactions with local pollinators. *Plos One, 15*(2).
<https://doi.org/10.1371/journal.pone.0228965>
- Ha, J., & Kim, H. J. (2021). The restorative effects of campus landscape biodiversity: Assessing visual and auditory perceptions among university students. *Urban Forestry & Urban Greening, 64*, 127259. <https://doi.org/10.1016/j.ufug.2021.127259>
- Ha, J., Kim, H. J., & With, K. A. (2022). Urban green space alone is not enough: A landscape analysis linking the spatial distribution of urban green space to mental health in the City of Chicago. *Landscape and Urban Planning, 218*, 104309.
<https://doi.org/10.1016/j.landurbplan.2021.104309>
- Holt, E., Lombard, Q., Best, N., Smiley-Smith, S., & Quinn, J. (2019). Active and passive use of green space, health, and well-being amongst university students. *International Journal of Environmental Research and Public Health, 16*(3), 424.
<https://doi.org/10.3390/ijerph16030424>
- Huang, C.-W., Hsieh, C.-H., & Chen, C.-I. (2023). To see what we need: Recognizing ecosystem services in a campus landscape through environmental education. *Landscape and Ecological Engineering, 19*(2), 199–210. <https://doi.org/10.1007/s11355-022-00536-4>
- Huang, W., & Lin, G. (2023). The relationship between urban green space and social health of individuals: A scoping review. *Urban Forestry & Urban Greening, 85*, 127969.
<https://doi.org/10.1016/j.ufug.2023.127969>
- Speake, J., Edmondson, S., & Nawaz, H. (2013). Everyday encounters with nature: Students' perceptions and use of university campus green spaces. *Journal of Studies and Research in Human Geography, 7*(1), 21–31. <https://doi.org/10.5719/hgeo.2013.71.21>
- Stepan, K., Schuter, L., Cole, J., Davison, T., McKay, W. (2014) Green Space Perception. Dalhousie University. *ENVS 3502 past projects*.
<https://dalspace.library.dal.ca/handle/10222/76792>

Timms, E., McKee, I., Scheunert, M., & Calnan, G. (2023). Student perceptions on incorporating 'native plant'-- focused green spaces on Dalhousie University's Studley Campus. 1-15.
<http://hdl.handle.net/10222/82591>

Acknowledgements:

We express our sincere gratitude to Dr. Caroline Franklin, whose guidance, expertise, and unwavering support were instrumental throughout the entire research process. Dr. Franklin provided invaluable insights, constructive feedback and encouragement that enriched the quality of this work. We also extend our heartfelt thanks to Alex Legault whose dedication, patience and assistance was indispensable during the execution of this study. Alex played a crucial role in facilitating discussions, aiding with study procedures, and offering valuable suggestions contributing to the completion of this research. Furthermore, we would like to acknowledge Dalhousie University's database, the Office of Sustainability, the McCulloch Museum, and the Dalhousie Library for providing the necessary resources and facilities for conducting this research effectively. We are grateful to all the individuals who participated in this study. This work would not have been possible without the time they put in and for that we are profoundly grateful.

Appendix A: Consent Form

You are invited to take part in a research study being conducted by David J. Shuman, Erin Walton, Liam Ferguson, and Rebecca Steele, undergraduate students in the Department of Earth and Environmental Sciences at Dalhousie University. The purpose of this research is to determine students' perceptions of manicured green spaces on campus.

If you choose to participate in this research, you will be asked 16 questions about manicured green spaces at Dalhousie University and their impact on your student experience. This survey should take approximately 10 minutes to complete. All participants are free to withdraw from the study at any given time. In the event a participant wants to withdraw after March 26th, 2024, their responses will be permanently deleted. A confirmation email will be sent to inform the participant that such actions have been taken.

Your participation in this research is entirely your choice. You do not have to answer questions that you do not want to answer (by selecting prefer not to answer), and you are welcome to stop the survey at any time if you no longer want to participate. All you need to do is close your browser. Our analysis will not include any incomplete surveys.

Your responses to the survey will be anonymized. You will not be asked for personal information such as your name and email address. Responses will be saved in a secure Dalhousie University repository until (enter study end date). Researchers will retain the anonymous survey information until April 30th, 2024, at which point it will be destroyed. Only the researchers listed above will have access to the survey results.

Research findings will be presented in a closed academic presentation and through a social media infographic. The report generated from the findings of this research will be made publicly available on DalSpace, the official Dalhousie University repository for student works.

The risks associated with this study are no greater than those you encounter in your everyday life. There will be no direct benefit to you in participating in this research. The research, however, might contribute to new knowledge that can be used to strengthen and adapt current

green space conservation practices used within a campus environment and to identify educational opportunities for students to become better informed about manicured green spaces across Dalhousie's Studley campus.

You should discuss any questions you have about this study with the researchers. Please ask as many questions as you like before or after participating. You can contact our lead researcher Liam at lm751321@dal.ca at any point during the study.

Appendix B: Survey

1. Please respond to the following to continue...
2. What is your academic major or field of study?
3. What is your current year of study?
4. How much time do you spend outdoors per week?
5. Are you involved in any environmental or sustainability related initiatives or organizations on campus?
6. Respond to the following statements:
 - a. Manicured campus green spaces positively contribute to students' overall learning experience.
 - b. Access to manicured green spaces increases students' willingness to engage in environmental or sustainability related initiative, societies, or organizations on campus.
 - c. Dalhousie's Halifax campuses have a good amount of available green space.
7. Do you consider yourself knowledgeable about the importance of native plant species?
8. How aware are you about the biodiversity on campus?
9. Given your experience within campus green spaces, how many of the plant species on campus are native species?
10. In your opinion should campus have more native plant species?
11. How much influence do you think biodiversity on campus has on students' willingness to adopt more sustainable habits?
12. Do you believe the manicured green spaces could be improved? What or why not?
13. How can Dalhousie encourage and support students in actively participating in conservation efforts and sustainable practices?
14. Do you think there should be more readily available information on local biodiversity?

Appendix C: Poster



CONSIDERING NATURE

Examining the influence Student perception of Biodiversity
on Conservation Engagement at Dalhousie University

Survey: 10 minutes
16 questions



<https://forms.office.com/r/Eye4ui45sr?origin=lprLink>

We are a group of 4 students conducting a survey for our research project in ENVS3502: Campus as a living Lab, the results of this survey will only be used for this project.

For any questions please contact us at:

- lm751321@dal.ca

**This research was approved by the Department
of Earth and Environmental Sciences at
Dalhousie University**

