UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

UBC SEEDS Biodiversity Policies and Practices Analysis

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Executive Summary

In 1992, the United Nations stated in their *Convention on Biological Diversity* that "*[we must be] conscious of the intrinsic value of biological diversity and of the ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity and its components*". This was the beginning of a global effort to rethink the way developments in our societies affect the diversity of life and the ecosystems around us.

The University of British Columbia does not currently have a single plan which addresses biodiversity across campus. This has encouraged Campus + Community Planning to spearhead the creation of a policy which addresses biodiversity campus-wide. Creating this policy is necessary because UBC exists as its own jurisdiction, separate from Vancouver, and has its own governing body. Therefore, development on campus is done independently from Vancouver's guidelines and approvals, requiring UBC to create its own policies that address building and operating guidelines. One such policy, *The Campus Plan*, declares that UBC's academic mission is the University's core business, meaning that any modifications to the physical change and design strategies for future growth must reinforce the University's academic teaching, research and learning objectives. Consequently, this suggests that without the guidance and reinforcement of a proper biodiversity strategy, these concerns will not be met.

At first, our goal of creating recommendations for UBC was to review any current

documents relating to sustainable development on campus in general. This was meant to provide

a framework which we could build on with any biodiversity recommendations we encountered.

Some examples of policies that we considered are: The Campus Plan, The Green Building Plan,

and The Integrated Stormwater Plan. These policies covered topics such as the layout and design

of the campus, uses for stormwater management, green building planning and guidelines, and

campus land use allocation. Then, we compared policies from all over the world at every scale:

country, city, and institution. Examples include Australia, Edmonton, Metro Vancouver, Surrey,

Singapore and United Nations, as well as the Cities Biodiversity Index, which was created by

Singapore. Finally, we reviewed any other policies regarding biodiversity that fit into our

framework. These included topics such as pollination, renewable energy, water action plan and

invasive species.

It was during this review process that we realized the magnitude of information and

potential changes that we would encounter in this evolving global effort. This forced us to

consider whether a single, static document made from whatever fraction of potential policies we

were able to review would be a sufficient contribution to the desired improvements on campus. It

was that notion that caused us to rethink our method and come up with the Biodiversity Matrix.

The Biodiversity Matrix is built to be a live document. By creating an interface which allows anyone who is reviewing a policy for biodiversity enhancing ideas to input any relevant, actionable items directly into it, we have created something that will change and grow, just as new policies and ideas are changing and being created. This also creates one single tool which over time will become UBC's best summary of all biodiversity policies from around the world.

The other aspect which is important about our Matrix, is that is selectively isolates only actionable items. There are vast amounts of systems thinking, and elaborately worded passages which inspire the idea of biodiversity in each policy we reviewed, but narrowing these documents down to actionable items which may lead to tangible results often yielded scarce amounts of information. With the interaction and simplicity of a Google Sheet, the inevitable "fluff" which would take up the vast percentage of each policy would be eliminated, leaving direct and impactful solutions to biodiversity concerns, with references to the exact page it was found so that one could go to read more about the context and thinking that went into each item.

When deciding on the context of our Biodiversity Matrix, we first determined that UBC does not take a preservationist point of view, meaning that our approach has to work alongside development rather than against it. The matrix therefore uses UBC's Major Capital Projects Development Process (which is used for projects which are more than $5 million), and divides it into three phases of development: pre-development, development and post development. We

then categorized each actionable item we found by a number of broad categories that fit within each step of the development plan. Each actionable item was given a keyword and page number, which can be used to find the relevant policy, linked in the matrix's glossary. We also included an 'Additional Information Section', which serves to encapsulate all of the information that could not be fit in the above sections, as well as having valuable information such as additional documents and the definition of terms.

Finally, while reading each policy we kept in the back of our minds the future development of Stadium Road Neighbourhood. This neighbourhood is located on the southern end of UBC's Point Grey Campus and is directly adjacent to an old growth forest (which is currently protected). The development will hopefully be underway in the first quarter of 2019 and will be a combination of high rise, mid size buildings as well as townhouses. The developed area will also include pedestrian and bike paths as well as greenspace. Finding applications for our matrix in the development of Stadium Road is our first goal in testing it's value.

Background

In June 2010, UBC released a three-part Campus Plan which outlines future intentions for development. Concepts such as land-use, protected areas, connectedness, and sustainability are examples of characteristics which were highlighted during this process. Of these concepts, sustainability proved to be one of the more difficult concepts to define on its own, due in part to the fact that "sustainability" requires many levels of analysis before actionable outcomes can be achieved for its sake. These understandings are of urgent importance, however, because UBC has declared in their *Campus Plan* that "*UBC's academic mission is the University's core business. The physical change and design strategies for future growth embodied within The Campus Plan must reinforce the University's academic teaching, research and learning objectives by providing an environment for creativity and innovation*[1]", essentially suggesting that the academic mission takes first priority. This means that without the proper guidance and reinforcement of a biodiversity policy, development will not wait, and these concerns will not be met.

In order for the campus to be able to develop in a way that satisfies academic needs without great costs to sustainability, we have to first define what sustainability is and which components we can act on. Upon analysis, one of the concepts that emerges is biodiversity, which plays an essential role in the stability of an ecosystem and essentially reduces the dependence of 'sustainability' on human efforts. Proper diversity of life provides a network of interspecies benefits which are self-sustainable, and accrues additional benefits to humans in the

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[1] The UBC Board of Governors (2014) *The University of British Columbia Vancouver Campus Plan: Part 2 Campus Plan* (p. 5)

form of resources and the luxury of connectedness with nature[2]. Biodiversity gained international

attention as of 1992, when the UN's *Convention on Biological Diversity* was signed and stated

that all consenting parties [are] "*Conscious of the intrinsic value of biological diversity and of*

the ecological, genetic, social, economic, scientific, educational, cultural, recreational and

aesthetic values of biological diversity and its components[3]". This acknowledgement has since

led to the development of many policies around the world, including in the UK, Canada and

Singapore. One example of a successful development is the Singapore Index, which is a valuable

biodiversity tool they created to help other cities define, create, improve and execute their own

policies.

While Vancouver actually has its own biodiversity policy, UBC exists as its own separate

jurisdiction from Vancouver, and has its own governing body. This means that development on

campus is done independently from Vancouver guidelines and approvals. Therefore, without

UBC's own biodiversity policies, they are unrestrained from Vancouver's guidelines. Our

partner, the UBC SEEDS Sustainability Program, within the Campus + Community Planning

department has recognized this and decided that it is imperative that one is created.

Stadium Road Neighbourhood

The imminent Stadium Road Neighbourhood development project, which is currently in

the planning phase, is the most pressing issue with which they felt an urgent need to call on these

ideas. Having a unifying document which they can use to improve biodiversity conditions in

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[2] Singapore National Parks Board (2009) *Conserving Our Biodiversity* (p. 3)
[3] United Nations (1992) *Convention of Biological Diversity* (p. 1)

Stadium Road would be an important first step toward establishing UBC as a biodiverse campus. The project planning stage started in the fall of 2017, and will be completed in eighteen months through four different stages which will involve the community. The planning process will include a mix of housing types, from twenty-two storey buildings to six storey buildings and different densities. Along with developing the buildings there will also be open and green space as well as thinking about how the new development will impact the UBC community.

Project outline and goals

During our first meeting with our partners we got a sense of what deliverables they were looking for. It was imperative to understand that the University of British Columbia was not only the land owner but also the delegator of the territory in which it resides, this meant that they have the opportunity to develop land independant from Metro Vancouver. In this sense, they are autonomous. We were informed about the constant struggle developers had to go through in order to successfully manage to create and conserve an environment in which there is a positive balance between the urban and natural landscape. Additionally, our partners highlighted the unique geographical location that the University finds itself in. It is located on a peninsula and has the University Endowment Lands to the east which serves a buffer from the busy residential streets. In turn this means that we have some unique flora and fauna on campus which must be conserved at all costs but are constantly threatened by the continual development which occurs daily. In order to address this issue, we agreed upon creating a biodiversity database that could be continuously referred to with the aim of ensuring that the developers would be causing the least possible damage to the environment, all the while continuing to develop on campus.

We were tasked to review policies from all around the world, including biodiversity practices that had been implemented in cities as well as universities. It was imperative that we kept in mind how these policies would be relevant to the University of British Columbia. The main goal was to synthesize the information that we would gather, all the while making sure it would be helpful and relevant information when developing the urban landscape. One of the biggest challenges that was raised during our first meeting pertained to the question of how efficient the best practices and policies that we found would be in today's rapidly developing world. Our goal was not to highlight sustainability over urban development, but rather to find a compromise in which both nature and humans benefit from the inevitable development that is sure to come. Our partners made it clear to us that every development on campus must ultimately be restorative and regenerative in order to have a net positive impact with every building that is constructed.

Research Methods

A recurrent example that kept coming up was the imminent development of stadium road, a currently forested area which is soon due to be transformed into a neighbourhood. Our partners informed us that by completing this project and creating a database which highlights effective biodiversity strategies, the developers of stadium road would have a reference guide which would hopefully prevent any unsustainable developments in the area. So, we began by compiling a list of major policies recommended to us and through our own research, which we thought might provide a relevant set of guidelines based on UBC's unique biodiversity requirements. We

summarized policies from Vancouver, Surrey, CABE, the UN, a UK case study and others, and took note of emerging themes and concepts.

What we first noticed was that each of these biodiversity policies contained lots of broad efforts to define biodiversity, and to identify elements which can be acted on for a net benefit. It seemed to us that biodiversity policies at that particular level were actually efforts to engage in a systems thinking approach and were creating inputs/outputs, elements to the systems, and the connections between the elements. Therefore, while we were able to gain an understanding of biodiversity from a systems perspective, we found that specific, actionable items and tools were hard to come by.

It was at this point that we decided a re-evaluation of our project was important, because summarizing these documents essentially resulted in a lot of "fluff". Prior to our second meeting, we did note the importance of the elements we encountered most often, such as the Green Infrastructure Network[4]; the importance of designing roadways with animal crossings in mind; considering how windows and other design elements affect bird collisions and deaths; landscaping strategies which are not devoid of nectar, pollen and other life-sustaining components; green walls, roofs and other green spaces; water management strategies; and maintaining a species index. Although, UBC has already implemented some biodiversity measures in order to increase the positive effects throughout campus it has ignored these policies in the past.

A clear example in which we can see UBC's lack of biodiverse development is one of their most iconic buildings; Buchanan tower. This building was developed without considering

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[4] Diamond Head Consulting (2004) *Surrey Biodiversity Strategy* (p. 67)

the potential positive biodiverse elements it could possess. Instead, it is a plain concrete building

which lacks any advantageous features to the surrounding ecosystem. Contrary to that, when we

look at the newly built AMS student nest, we can see the multiple biodiverse features it

possesses such as hanging gardens, wooden beams as well as a roof garden which produces

vegetables for the restaurants in the building. It is imperative to consider the different measures

that must be taken, this way we can be sure to build a prosperous campus.

  During our second meeting, we established with the partners that we wanted a list of

actionable items, that contained as little "fluff" as possible. The idea being that there is already

enough systems thinking available in other policies to conceptualize a "biodiversity strategy",

and that the most efficient tool at this point would be to collect detailed information that can

create changes in development and yield measurable results.

  In order to do this, we had to dig deeper than the biodiversity strategies we already had,

and look for specific documents on each of the elements we had noted earlier. For example, the

preservation of birds requires looking into multiple documents which investigate how birds live

in our ecosystem, and what causes them to die or become displaced. An example of one of the

documents we have referenced is the *Bird Friendly Design* document, which specifically

investigates why birds collide with windows and what changes can be made to reduce this. Some

examples in the document include minimizing the quantity of glass; increasing the visibility of

glass and dampening reflections to reduce the appearance of clear passage to sky or vegetation;

applying visual markers to glass surfaces in the critical zone (defined within the document);

avoiding interior vegetation near windows; and a number of other specific, actionable

recommendations. We decided that documents and recommendations such as this would be the

core of our project going forward, though as you can imagine, this becomes extremely complicated as each element of biodiversity ultimately will break down exponentially into a massive amount of considerations. So how does a small group of three tackle such a monumental task? This was where a metacognitive approach was necessary.

We took our newfound considerations into a third meeting with the partners and finally decided on what would be our ultimate deliverable. By discussing the sheer mathematical complexity of our project with the partners, and acknowledging the extensive amount of fluff surrounding each piece of valuable, actionable information in each policy we were looking for, we decided that creating a "biodiversity reference matrix" was ultimately the most effective and valuable design for them. A number of layouts were proposed before we settled on our current model.

Reference Matrix

The reference matrix, which we designed in excel in order to utilize the organizational capacity of combining cells and tables, accomplishes a number of important things. It effectively breaks down each step of the development process on one axis into pre/during/post development categories, so we can quickly locate which phase and which step of development we are currently considering; it breaks down the types of biodiversity considerations on the other axis into specific themes that we have identified from reading many policies, such as 'birds', 'reptiles', 'water management', 'green walls/roofs' and leaves room for the addition of any new, previously unconsidered themes; and finally, it lists the actionable terms from each document and the page number where the steps to be followed can be found. Also, any document

referenced in our matrix will have a link provided in the 'Additional Information' section of the spreadsheet.

The reason we consider the design of the matrix to be a more important achievement than the current level of content in it, is that in our meeting we discussed the important notion that biodiversity policies change over time, and that there will continuously be newer, more relevant policies all the time. Our matrix offers the utility of being a living document that is easily understood and easily edited to remain relevant over time. We offered to submit a baseline of information to the matrix for them, based on the documents we had already summarized, and that could be used to demonstrate how the matrix is applied to a development project. From there, anyone interested in maintaining the matrix can be given access to it and can add any new and relevant information they encounter as they consider better practices in improving biodiversity. One example would be the *Water Action Plan*, which aims to set water conservation targets in UBC, but is still in development. Upon its completion, it is recommended that someone scans the document for actionable guidelines and submits page references so that anyone utilizing the matrix can quickly access that information while reviewing the relevant stages of development.

Conclusion

It is our conclusion that biodiversity is indeed a valuable asset to mankind, and that careful attention is required in order to sustain it for future generations. Losses of green space, and habitats are occurring in many places, but cities such as Vancouver have set targets to reverse these trends. Leading by example is important at this time, and contributing to the biodiversity community also inspires others to follow suit. Despite the expectation that

biodiversity comes at a cost to development, there need not be any disparity between developers and biodiversity policy. We conclude that with the right attitudes and incentives, development projects actually stand to gain from these improvements, and may additionally inspire the public to appreciate their developers. People tend to enjoy experiencing nature in their day to day lives, so working toward enhancing those experiences is a noble pursuit, and we feel that our reference matrix is a valuable contribution to streamlining these efforts.

Recommendations

We have the following recommendations for managing and improving the Biodiversity Matrix going forward from conclusion of this project:

1. Consider partnering with a computer science program or an established developer next to have this made into an app, or a more properly interactive interface.

2. If made into an app/program, consider allowing the user to open/view any policy through the app, with the added functionality of being able to highlight a portion of the document and then click from a list of keywords that pop up that will sort the information away instantly into a cell

3. If made into an app/program, consider having a database of the policies included in the app, so that if you click any particular cell in the matrix, a pop-up with the exact page it is referencing will appear on the screen

4. Finding methods/strategies to streamline the user's ability to input information and find information within the matrix would enhance the speed and convenience

5. Revising the development steps used. It might not be the ideal set of 35 steps, and we encourage this to be revised as people become familiar with the usage of the matrix

6. Finding a way to make it open source and publicly available without risking the destruction of the current content. Consider having an admin and approved changes.

Appendix A: Biodiversity Matrix

https://docs.google.com/spreadsheets/d/18vQUW0SDBU3KGdA9fkurEeY5WkTgjz3dEye96CZwezw/edit?usp=sharing

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