

GEOG309: Research for Resilient Environments
and Communities

Ecological restoration of Governors Bay

How do we incorporate local values into a landscape-scale restoration plan?

Assignment 5: Written Report

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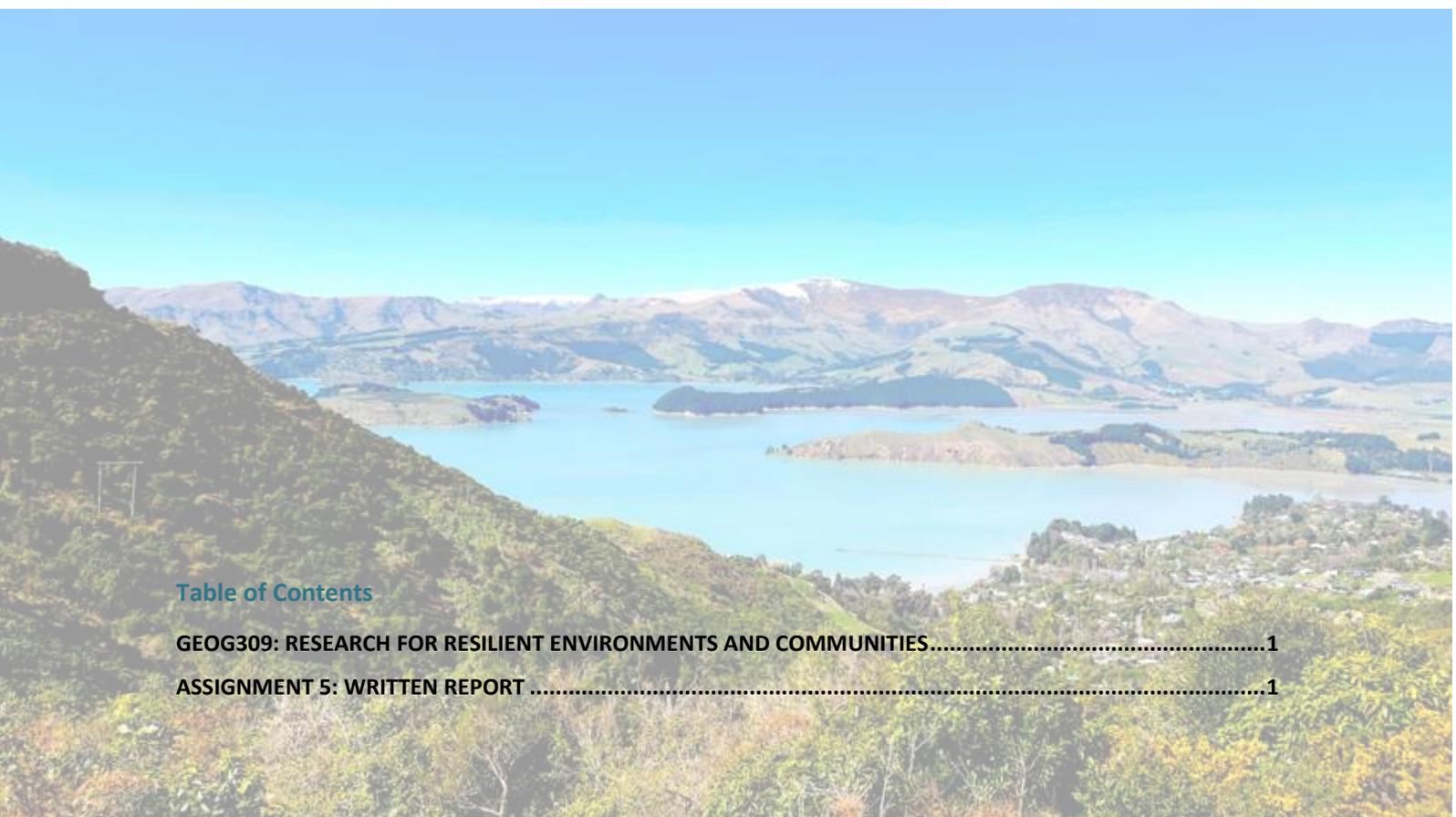


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1. Executive Summary

- Our project aimed to create a long-term vision for the community-led restoration of the red zone land behind Ōhinetahi | Governors Bay in Christchurch.
- Christchurch City Council (CCC) red zone ranger Zane Lazare and Karen Banwell from the Governors Bay Community Association (GBCA) were our community partners.
- The research question was: “How do we incorporate local values into a landscape-scale restoration plan?”
- Research was conducted through desktop analyses, literature reviews, site visits, and community engagement.
- We produced several versions of a brochure that collates the key ideas. This was updated with feedback throughout the process.
- The two-way engagement undertaken means that feedback provided during discussions at our community engagement evenings, survey, and wider consultation will ensure our final plan meets the needs and aspirations of locals.
- We found that locals’ priorities include upgrading walking tracks, providing informative maps and signage, promoting community pest animal and plant control efforts, and restoring features of ecological and cultural significance.
- Our project was time-limited, we could not create a 3D visualisation, Rāpaki engagement unfortunately was late in the timeline, and survey responders were not a true representation of the entire population.
- Further research for this project should focus on mana whenua, further engagement, and connecting the project to existing work around Whakaraupō.

2. Introduction

This report answers our research question of how a landscape restoration plan could include local community values. The question we posed was: how do we incorporate local values into a landscape-scale restoration plan? Our project was based on research conducted by us, with the guidance of our community partners the CCC red zone rangers and GBCA. The report is structured in chronological order of the research.

A literature review was conducted on subtopics that were associated with the project. This aimed to enable a clear understanding of the principles that could be applied to a landscape restoration plan. Prior research of related work, methods, and case studies was valuable in helping to achieve our project aims. Our methodologies and key findings were analysed to better understand how we could apply similar approaches in other projects and avoid any limitations we encountered.

The first site visit took place with our community partners, who guided us through the site. This provided excellent context, and we learnt more about the history of the area. Together, we brainstormed initial ideas for site improvements. This gave us our first understanding of what locals envisioned the site to be used for, through the perspective of our community partners. Community engagement is at the forefront of this project, and these ideas were first presented to the GBCA at their AGM on the 11th of September. After this, a focus group was held and feedback was sought on what could be added, subtracted, or changed entirely.

After consulting with participating residents at the AGM, the ideas were consolidated into a brochure. All feedback we received fed back into revising the plans for the area and updating the brochure. Suggested changes were received via a survey attached to the digital brochure, which was shared with the residents of Governors Bay via email, the community Facebook page and the website.

Most recently, we attended a community fete on the weekend of the 16th of October. Here, we talked with Governors Bay residents, encouraged the use of the brochure and survey to provide us with suggested changes which we would accommodate into the brochure.

Collectively, this process indicates the importance of seeking a local perspective in the context of developing a restoration plan for the community. This is valuable, as the locals will benefit the most from this restoration mahi. It is best for local vision to drive restoration and enhancement plans, to ensure they best represent the community's goals and aspirations.

3. Literature Review

Five subthemes relating to our wider research question were analysed (Sections 3.1-3.5). The literature review critically analysed the methodologies of articles identified any biases and highlighted themes in the text that could provide insight into our research project. These five themes in conjunction formed a solid academic foundation to support our research. The findings are summarised below.

3.1. Community Engagement

Community engagement is essential for answering our research question. Barrett et al. (2019) described the 'central place of social considerations' in restoration efforts. Much of the current literature acknowledges the shortcomings of historic community engagement (Day & Gunton, 2003), and some discuss the legacy effects of exploitative relationships (Adams et al., 2014). Effective community engagement must invite and encourage all to participate, address power imbalances,

and respectfully and openly recognise any issues (Barrett et al., 2019; Jami & Walsh, 2017). This develops common goals and builds positive, lasting relationships as desired by CCC and GBCA. We endeavoured to facilitate and promote two-way interactions through a range of engagement methodologies.

3.2. Application of Ecological Frameworks

The application of the ecological restoration framework was explored to understand how it affects project success. It considered three underlying themes that were identified by literature as being significant to the framework, these included recognizing indigenous and local knowledge (Marques et al., 2019; Matzek et al., 2017; Reyes-García et al., 2019; Walker et al., 2019), using socio-economic measures (Marques et al., 2019; Matzek et al., 2017; Wortley et al., 2013) and understanding contextual settings (Marques et al., 2019; Matzek et al., 2017). This reinforces the voice of the Governors Bay community and Rāpaki in the planning of the project. Furthermore, it highlighted the importance of socio-economic measures such as the qualitative feedback from the survey and indicators of community well-being as measures of success. Finally, we chose to adapt our definition of ecological restoration into the context of the redzone, and the aspirations of the community. For example, the inclusion of the orchard in the plan defies the traditional understanding of restoration.

3.3. Mātauranga Māori

All literature studied in the context of mātauranga Māori, and the engagement and partnership with mana whenua, highlighted the importance of collaborative projects and the knowledge possessed by them in a landscape restoration plan. These works cited that individuals and organisations with whakapapa to an or iwi of the area are considered 'kaitiaki'. Their knowledge is shared through oral traditions which are transcribed into written works. These are often written by scholars with whakapapa themselves (Clapcott et al., 2018; Hikuroa, 2016; Walker et al., 2021) who mention the inclusion of indigenous knowledge and how well it can integrate with plans and ideas of western science. Sometimes, works are done by iwi and government organisations themselves, such as CCC Libraries' 'Tī Kōukā Whenua', 'Kā Huru Manu' by Ngāi Tahu, and Manatū Taonga/Ministry for Culture and Heritage's 'Encyclopaedia of New Zealand'. These compile knowledge on behalf of mana whenua with firm beliefs in kaitiakitanga and spreading the knowledge of Aotearoa's bicultural society.

3.4. Spatial Data in Planning

The spatial data literature review investigated the use of spatial data in planning and approached this topic from three angles. The papers by Cordell et al. (2017) and Uribe et al. (2014) were used to evaluate how stakeholders can engage and collaborate with the project aided by GIS techniques. Uribe et al. (2014) use Multicriteria Decision Analysis (MCDA) in GIS to weigh perspectives and Cordell et al. (2017) investigated what remote sensing data is most useful for decision-making. The combination of these techniques suggests a potential method for weighing quantitative data to aid in stakeholder collaboration. Lovett et al. (2015) and Hayek (2011) discuss map design for engagement. Lovett et al. (2015) contrasts "real-time models" and animations with still fixed images in addition to when and how to use these displays. Hayek (2011) compares fixed images, evaluating how realistic 3D maps compare to 2D maps (Fig. 1).

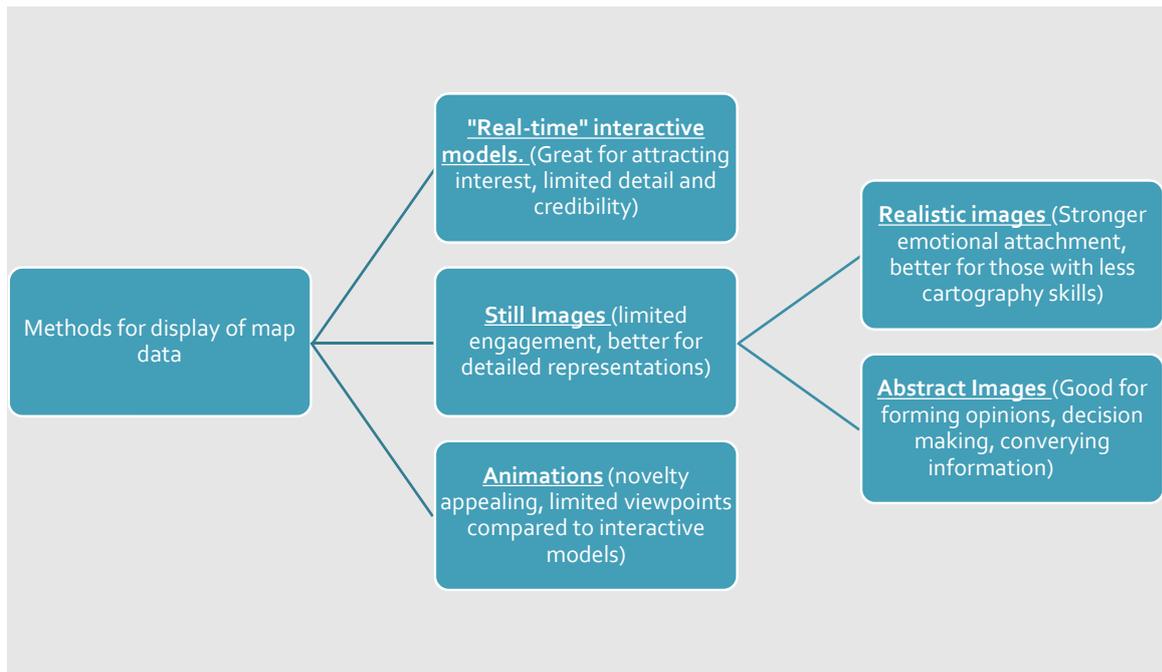


Figure 1. A flow chart of methods for the display of map data. The middle column is data derived from Lovett et al. (2015), while the end column is derived from Hayek (2011).

Alexandridis et al. (2007) used a case study to generate and select a model for restoration that considers the existing level of degradation. A Greek lake was used as a case study to assess the watershed and an analysis was performed. This work proved how quantifiable data can be used in planning and how GIS can supplement framework selection.

3.5. Post-earthquake Restoration

As described by Bajracharya & Michaels (2017), international NGOs, media and politicians often take a ‘westernised’ and economic attitude in post-earthquake restoration, aiming to preserve culturally and ecologically significant sites back to their ‘original’ and ‘authentic’ pre-earthquake form. While local groups are more concerned with restoring ‘functionality’ so they can resume their traditional activities. Therefore, collaboration in such decision-making processes is vital. Accelerating forest succession by planting native dominant, keystone, and pioneer species helps prepare the environment for future earthquakes by improving ecosystem quality and stabilising hillsides (Fu, 2018). Creating short and long-term response plans can also improve earthquake resilience in communities (Annear et al., 2014; Tang et al., 2014).

4. Methods

The methods were developed with our aims and research question in mind and built on our extensive research into current literature. Our process is shown in Figure 2, with the green boxes highlighting the opportunities and methods for gathering feedback at each stage. To properly address the research objectives, we used GIS and community engagement methods. Key community engagement strategies we used include presenting at community meetings, an online information brochure, focus groups, personal conversations, visual displays, and a survey. This use of a wide range of engagement methods was to encompass a wider span of the community and provided multiple opportunities for feedback on our progress throughout.

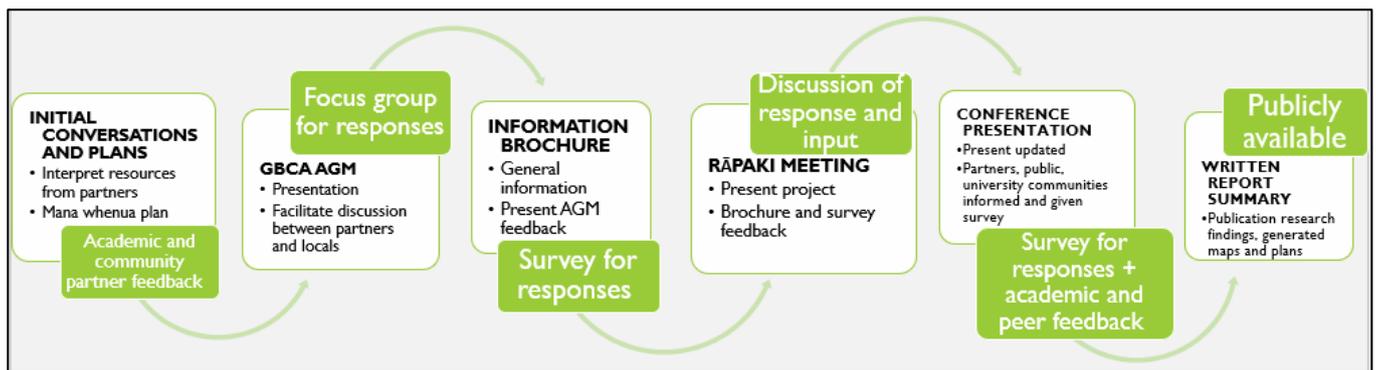


Figure 2. Flow chart of our methods, and the relative timeline of when each was employed. The green boxes indicate the ongoing feedback opportunities throughout, ensuring two-way consultation.

We aimed to engage early with the community and keep in continuous contact with them. Facilitating and promoting two-way interactions with ample opportunities for community input can help establish and build lasting, respectful, and meaningful relationships within the community and between parties. This has proven a challenge for us, as the very nature of our involvement is short-term. Keeping this in mind, we focused on already-established relationships to kickstart our involvement. We hoped to strengthen and facilitate further connections within.

4.1. Initial Research

Before starting our community engagement process, we put considerable effort into creating a mana whenua engagement plan and did extensive background research. These helped to guide our project, and especially to prioritise the engagement of local hapū that might have an interest in this area and project. The area has high cultural significance, and the proximity of Rāpaki marae means they should be involved from both a local and mana whenua perspective. Literature reviews investigating five topics of direct relevance to the project are summarised in Section 3 of this report. They provided a base level of knowledge and context that helped us plan our methods to maximise our time and outcomes.

4.2. GIS/Site Visits

Providing detailed, integrated maps with a range of relevant information was an important aim. Extensive GPS data was collected during two site visits (16/8/22 and 15/9/22), but further research revealed that OpenStreetMaps had more track data that was more accurate for the surroundings, and therefore our GPS data was only used for the central portion of the site, where no online data existed. OpenStreetMaps was used for the tracks and roads around the site, and GPS data mapped the area of the orchard, fire break, central tracks, and some point data of interesting places. During the initial site visit, location data was captured on a mobile phone, and at the second we used Trimble TerraFlex for higher accuracy and precision.

4.3. Community Engagement: AGM

One of the key messages received from the community during our initial engagement was that the community is ready and able to be mobilised, and the plans are in place to start the restoration. Our group's part in the process should be less of a technical details-focused analysis of the area, and more of a big-picture inspiration and community vision aspect. This feedback was used to direct our research onto engaging with the community. This will ensure our work will allow the community vision to guide the project, making certain they are working towards outcomes most desired and beneficial for locals.

The GBCA AGM took place on Sunday the 11th of September 2022 at the Ōtoromiro Hotel and was attended by approx. 30 people. Most were residents, and members of the association. The early ideas we had for the landscape restoration plan were presented. We discussed the outcomes of our first site visit, where we assessed the condition of the trails, identified native and pest plants, learnt about the history, and established connections. We also presented our first map to the community showcasing what the final map might look like, and what information it could contain. This included tracks, predator traps, fruit trees, significant locations, and boundaries. The history and mātauranga Māori were also included, along with the idea of information signs and introducing the te reo name for the area. We presented ideas for some ecological restoration of the Zephyr Stream, including riparian planting, environmental monitoring, bank stabilisation, and path construction to avoid it crossing the tracks. We also noted our aim to reinstate the streams te reo name, working with Ngāti Wheke.

We followed the AGM with a focus group discussion. This was open and respectful, with the chance for input from all present both at the time and through an email address provided. We were seeking feedback, improvements, and suggestions on the ideas we present and anything we missed. These were noted down, directed our next steps, as well as forming the basis for the first edits to our outputs.

4.4. Brochure and Survey

Using the community input we had received so far; we constructed the first draft of an informative brochure. It included an annotated map/overall vision, sections on the history, Mātauranga Māori, biodiversity, walking tracks, foraging, fire break, runoff, pest management, weed species, wider harbour health, signage, access, Zephyr stream, and community involvement. The original brochure was in an online format, paired with a survey of three open-ended questions that allowed for feedback. These were distributed to the community through the GBCA email list, Facebook page, website, individuals who expressed interest, and the snowball method was used to encourage widespread sharing. Ethics approval was obtained, and informed consent before participation was a requirement for access to the survey. As we received feedback, we updated the brochure. Face-to-face interactions and discussions were had at the community fete on the 16th of October, and with Rāpaki on the 19th. Results from the survey were qualitative and were incorporated into the updated brochure and maps.

5. Results, Key Findings and Discussion

5.1. AGM

Feedback was received through the focus group at the AGM. Some of the proposed ideas such as the maps, which included vegetation cover of the area, and fruit trees within the orchard left by the property that once existed on the site were appreciated. This could eventually be integrated into the council's 'SmartView' website, a website which houses information such as fruit trees, water quality, walking trails, etc. across the coverage area of Christchurch City and the Banks Peninsula. Trapping workshops would be established by residents leading them, with resources and guidance from the red zone council rangers. The naming of the area would be done by the mana whenua of the area, Ngāti Wheke at Rāpaki Marae.

When reflecting on the process of consulting with the community through the AGM and focus group, the participants had a strong passion for the area and a drive to get involved in the restoration work. The presented ideas were appreciated by the AGM attendees and most of its members expressed interest in facilitating the plan. The AGM proved that working for the

community by establishing connections and implementing community goals and aspirations instils enthusiasm in the community.

The downsides to the focus group were that people who had the most to say in the focus group had their ideas heard more easily since they had strong attachments to the project and made it seem that their opinions were more important than others. They often had a commanding presence. The lack of a younger audience in the focus group limited youth representation. There were no iwi representatives at the AGM, limiting the mātauranga Māori knowledge and perspectives present. We lacked assurance that these ideas fulfil Te Tiriti o Waitangi, and the meeting was less diverse than it could have been.

5.2. Maps

From the mapping and postprocessing, work, along with a review of open data sources online a series of map layers (shapefiles) are produced. Namely layers of:

Sourced from OpenStreetMaps:

- Tracks from around the edges of the site
- Roads

Sourced from Canterbury Maps

- Red zone site border

Sourced from Christchurch City Council (from our community partner)

- Weed location information
- Optimised locations of stoat and rat traps and possum traps

Primary data collected by us

- Point data on interesting/key features
- Unmapped tracks in the centre of the site
- Polygon areas of the firebreak and the orchard

The combination of these layers allowed for the production of several maps. Figure 3 gives a useful insight into the overall features of the area, and a glance at the key takeaways. The zoomed-out perspective of figure 4 is useful in showing how the tracks within the bay connect to the surrounding tracks and putting the site as a whole into context with the area. Figure 5 provides more detail on the location of the orchard and firebreaks and a closer look at the tracks in the centre of the site. Figure 6 shows the location of where stoat and rat traps and possum traps should be placed, based on the findings of a report from a CCC contractor. It also shows the location of weeds, and the file includes (limited) data on what these weeds are.

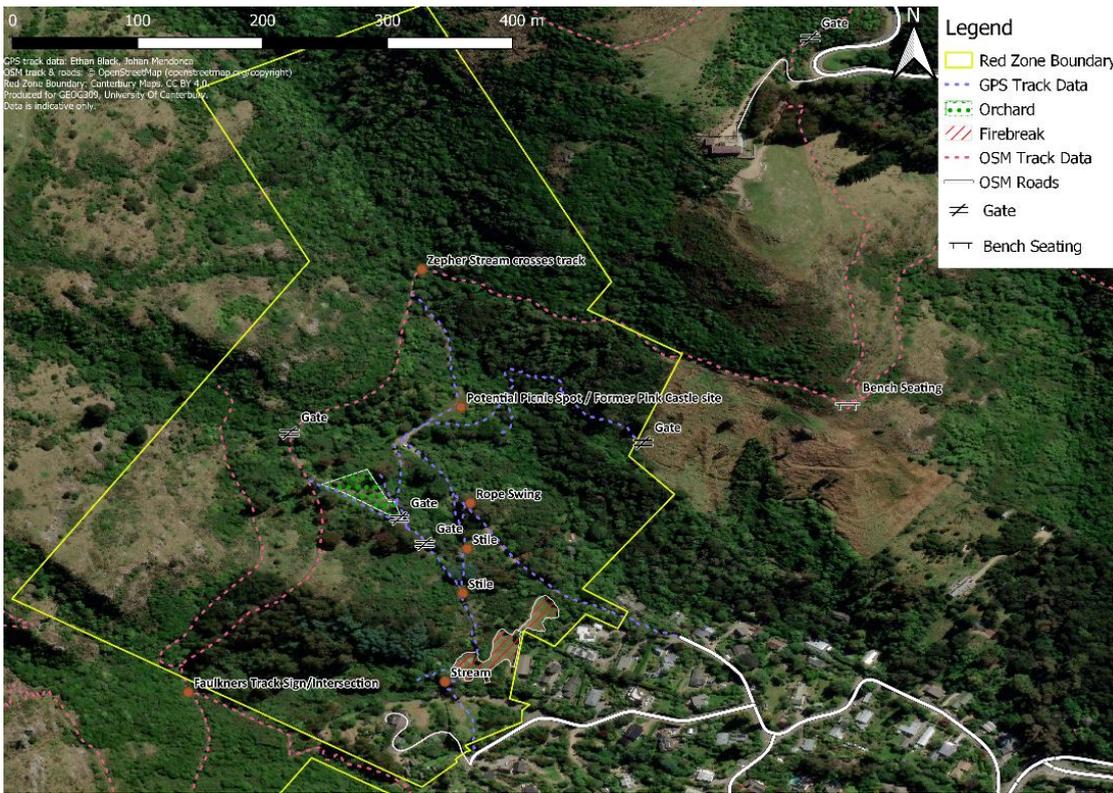


Figure 3. Map of the area displaying the site border, the tracks, locations of interest, the orchard and firebreak zones.

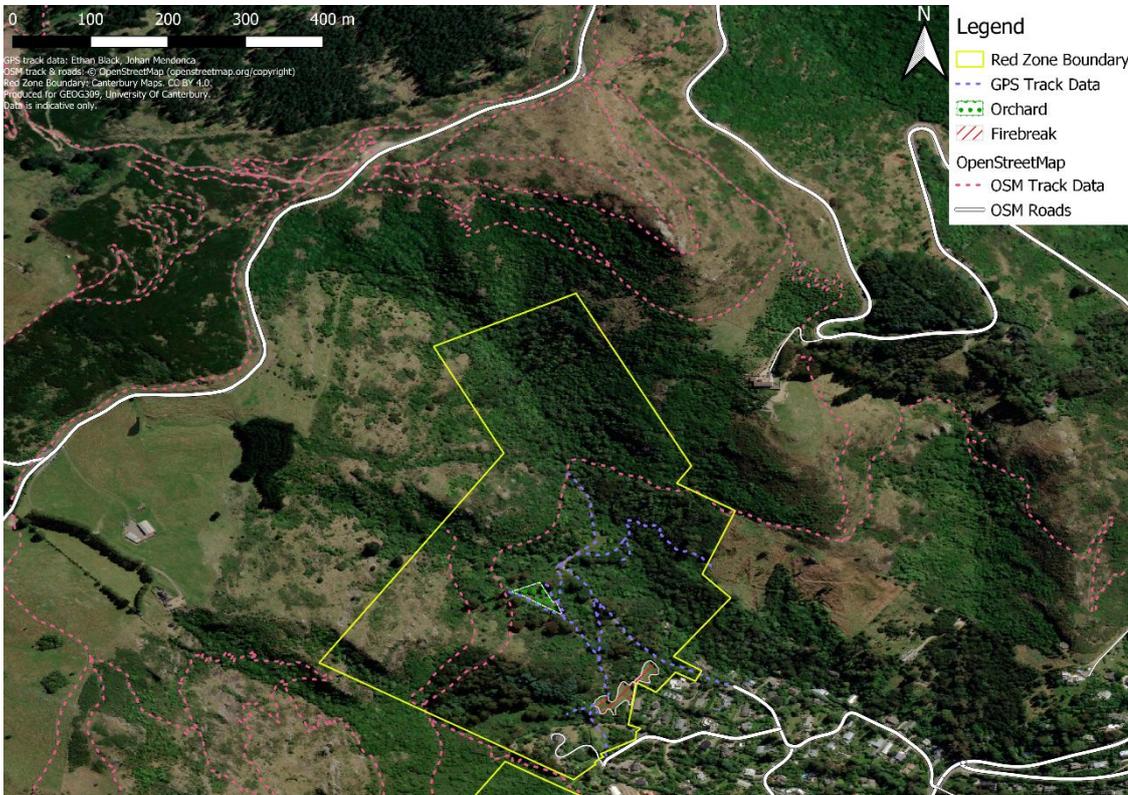


Figure 4. Map of the area displaying the site border, the tracks, the orchard, and firebreak zones.

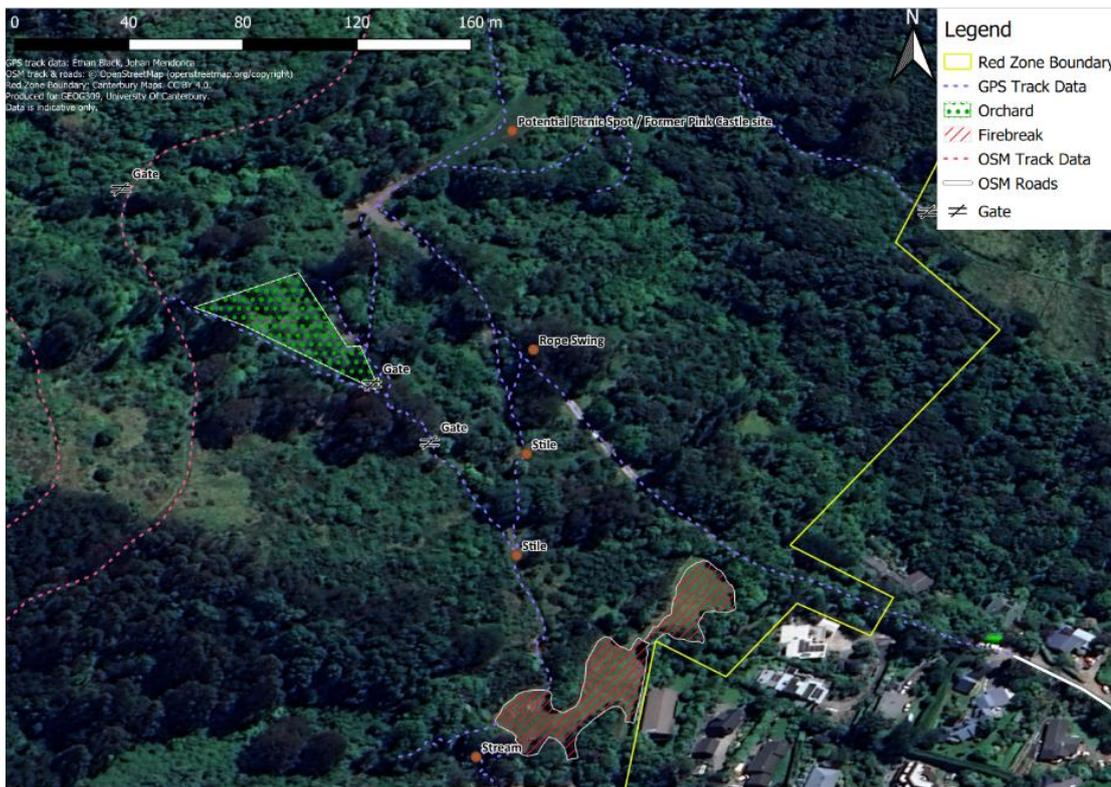


Figure 5. Map of the centre of the site showing the site border, the tracks, locations of interest and the orchard and firebreak zones.

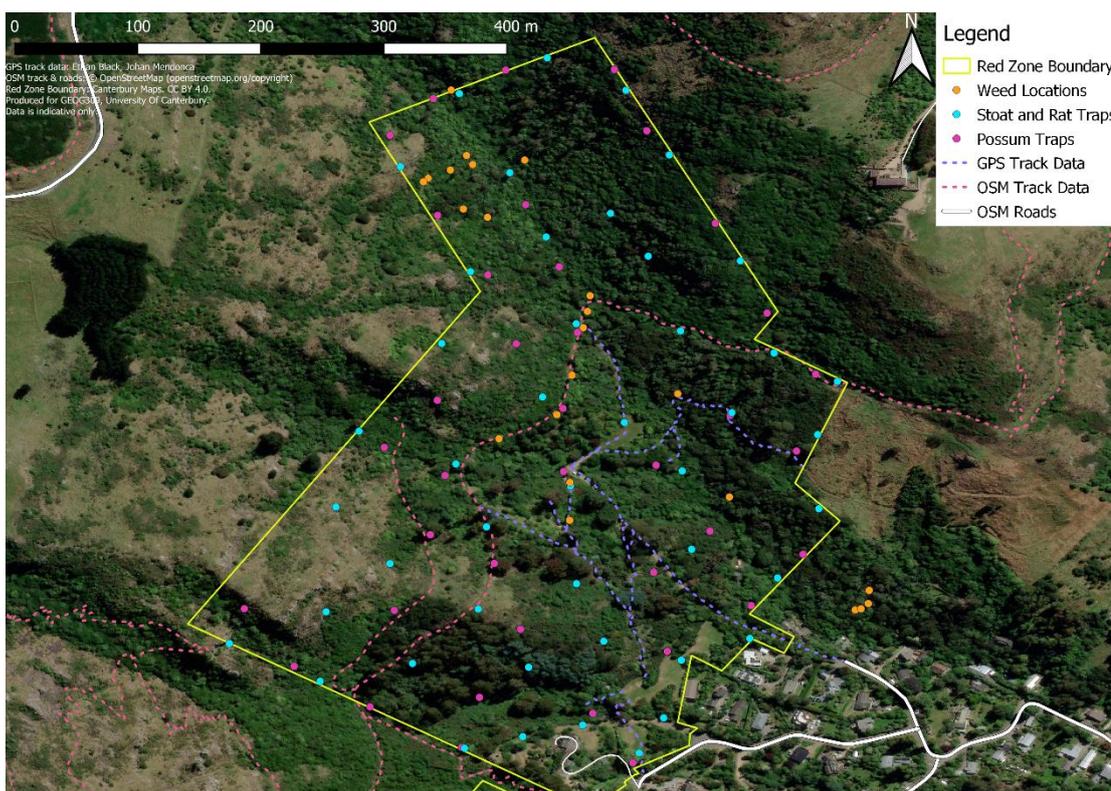


Figure 6. Map of the site displaying the site border, the tracks, locations of weeds and stoat, rat and possum traps.

5.3. Brochure

The main restoration ideas for the Governors Bay red zone were condensed into a fourteen-page brochure. This ensured our content was easily digestible, and people would be more inclined to read each of our ideas than if we had simply given them a report. Brochures can be a particularly effective communication tool when the right balance of words to visuals is maintained, and physical copies are distributed (Soegotto & Istiqomah, 2019). Therefore, we included many photos and maps from

the site, and in addition to an online version, we printed physical copies to share with the Governors Bay community and Rāpaki Marae.

Starting the brochure with a general description of each of the ideas helps to convey the overall restoration vision. This was followed by a page on the cultural history of the Governors Bay area, and the importance of acknowledging this when completing restoration work. By providing a visualisation of the potential flora and fauna species we expect could be found in the area following restoration, we hoped this would encourage more enthusiasm from the community.

Our first idea focused on developing the current walking tracks throughout the red zone and linking them up with those from neighbouring reserves including Faulkners Track in Ōhinetahi reserve to the west, Reuters Park in the east, and the Crater Rim walkway above the red zone. As suggested by our community partner, the tracks could also be improved by introducing wooden planks covered with chicken wire to hazardous, steep sections to reduce the likelihood of slipping and injury.

We also looked at how signage could be established along the walking tracks to help educate track users on the cultural, geological, and ecological history and features of the area. We suggested a cluster of several fruit trees towards the bottom of the red zone are fenced and maintained so they can act as a small orchard for community use. For this, we also considered signage and decided a map of the different types of fruit trees and a description of sustainable harvesting practices would be most useful.

Long-term weed removal and animal pest control were other ideas met with strong enthusiasm from the community. Research and consultation with our community partner and tutor allowed us to determine which species should be prioritized in removal. These were added to our brochure along with potential ways local volunteers could contribute to such efforts, including workshops and apps for both weed identification like iNaturalist and predator control like Trap.NZ. Similarly, we considered the fire risk of existing and new plant species. One idea included establishing a firebreak of fire-resistant species between the red zone and housing.

Regarding the stream running through the red zone, we attached to our brochure a brief guide of different water quality factors to monitor including turbidity, temperature, pH, and phosphorus levels. This would ultimately help promote a healthy stream ecosystem and consequently contribute to the overall harbour health.

5.4. Survey

Survey results as of 18th October 2022 have a consensus of support among participants (n=13), with criticisms directed towards a limited number of brochure suggestions, often with personal interest to the participant. Respondents provided feedback across three questions:

1) Having seen the brochure, what are your thoughts on the proposed ideas?

Nine participants expressed encouragement for the proposed ideas and thought the ideas were “good”. Specific proposed ideas which had support were the planting of native species and implementation of fire breaks, among general support for the other ideas. The remaining four participants expressed neutral statements and/or requested they remain informed.

2) What other ideas would you like to see included that are not mentioned in the brochure?

Seven participants responded to this question. Key ideas mentioned planting/fruited trees and tracks. With regards to tracks, respondents wanted greater interconnectivity, such as additional tracks at the top of the site and a connection to the mountain bike track at Living Springs. A respondent wished for a clear understanding of how the tracks may be used (walkers/cyclists/horses

etc) and who may maintain them in the longer term. This respondent suggested several community groups such as schools, students, scouts, and volunteer groups, and suggested that including younger audiences in this may be important for longevity. These groups may also be important for plant care.

With regards to vegetation, the importance of the edible forest was stressed amongst some respondents, while others emphasised the importance of keeping these tree species contained as they are a weed species in other reserves and that seedlings would need to be controlled. It was suggested that our lower-priority weeds are still of significant importance and threats to native bush. A small native plant nursery close to the water tank and preservation of the sweet chestnut trees were also suggested ideas. Other ideas included the inclusion of disabled access by arrangement and a plan to deal with litter from a picnic area. One respondent commented that too much signage can make a site lose its 'wild feel'.

3) If you have anything else you would like to add, please discuss below.

Respondents to this question suggested spelling and grammar corrections and expressed concerns about the neighbours to the site. Additionally, hope for the reintroduction of tūī and concern for efforts being applied to the community garden over efforts of regeneration was expressed. Suggestions on plant species and their importance/pest status were supplied with a recommendation that trees should have Port Hills trees sourced seeds. A recommendation that other approaches should be taken for the other red-zoned areas in Governors Bay was provided.

These survey results indicate that overall, participants are largely supportive of our proposed ideas. A noticeable theme that came through in the survey responses from residents was their focus on the small-scale, direct actions that they could influence. This was contrasted with the response from Rāpaki, who holds a much more holistic view that encompasses the interconnectedness of the entire catchment. Their priorities are the improvement of the wider ecosystem, while the residents are concentrated on their own red zone.

5.5. Rāpaki Feedback

The literature review emphasises the importance of indigenous voices in restoration. Engagement with mana whenua was an established theme early in our research. The AGM showed that the Governors Bay locals support the incorporation of indigenous knowledge into the restoration and even suggest that a Te Reo name for the area should be developed. Our effort focused on engagement with Ngāti Wheki and the Rāpaki Marae. Our initial contact with a Christchurch City Council ranger on our first site visit presented us with the opportunity to develop a relationship with mana whenua. After this interaction with the ranger, communication began with Rāpaki. We were able to meet representatives within Rāpaki Marae that were working on ecological restoration in the wider area. This hui was very beneficial as it highlighted iwi's aspirations to fulfil the mauri (lifeforce) of the area with a holistic understanding of the interrelationships of the entire harbour. They had been working towards ecological restoration areas around Rāpaki and Living Springs, expressing interest in linking with Governors Bay's red zone to create coordinators for native wildlife.

A key objective of the hui was to initiate the naming process to reinstate the Te Reo name of the red zone area. The GBCA expressed interest in giving the area a unique name to acknowledge its purpose as an ecological restoration area. They were supportive of the inclusion of Te Reo and mātauranga Māori in the signage and naming of biotic and abiotic features of the areas. This is important in recognising the history of the area and reinforces the role of whenua in research (Carter, 2005).

Upon reflection, this relationship would have been advantageous to build on earlier. They had experience in community restoration and had already made important connections within the wider community. In future research, this relationship should be prioritized as mana whenua provide unique perspectives to restoration. These viewpoints have been historically ignored in restoration but often contribute to the success of a project (Reyes-García et al., 2018). Therefore, engagement with mana whenua is crucial to our research as it honours Aotearoa biculturalism, supports restoration success, and justifies the role of indigenous knowledge in science (Marques et al., 2019).

5.6. Research Limitations

Several limitations arose throughout the research process. First, was the time pressure. This restricted our ability to produce 3D visualisation of the site. This was highlighted in our literature review as an effective engagement tool. However, the time constraint pushed us to just focus on the 2D maps. This also restricted engagement with mana Whenua. We were only able to meet representatives from Rāpaki at the end of the research period which impact the consultation process. Despite this hui being extremely useful for our research, it would have been beneficial to have developed this relationship and been able to engage with the wider Rāpaki community.

Another limitation was the availability of remote sensing data. We were reliant on the remote sensing data provided by CCC as we had limited means to generate our own. The data and processes we used are site-specific. Our methods and findings may have limited applicability to other areas e.g., urban Christchurch redzone.

Finally, there are limitations around feedback gathering process. The methods we used to gather feedback favoured certain demographics, members of the AGM, fete goers, and Rāpaki representatives. This would have unequally advantaged certain viewpoints, especially those of our community partners.

5.7. Future Research

Given the nature of our project and the range of restoration sub-topics explored (e.g., track development, stream ecology, pest control, fire-risk management, and orchard maintenance), few of these topics could be researched with much depth within the project's timeframe. As a result, our knowledge of such topics and the information we provide on them in our brochure, presentations, and this report, is often based only on what we have personally learnt in our university courses and secondary sources and studies about the Governors Bay area and successful restoration projects in New Zealand. We, therefore, recommend future research be conducted and expert opinions are consulted before any of our recommended restoration ideas are implemented. For example, adequate research should be conducted into understanding the most suitable track cover for the specific geology, vegetation, and soil type of the red zone. Additionally, determining how the implementation of each of our ideas might impact the overall ecology, geology, and other ideas should also be considered. For example, while some vegetative species might be recommended for increasing biodiversity and native birdlife, they may be detrimental to fire-risk management or mammalian pest control. Finally, we recommend further research to investigate the logistics and financial expenditure of implementing our restoration plan.

6. Conclusion

In conclusion, several key elements successfully incorporate local values into landscape-scale restoration. First is establishing strong relationships within the community. Building this foundation early reinforces trust, develops a common goal, gives many opportunities, facilitates two-way feedback, and enhances engagement with community buy-in. Secondly, was approaching the

research with the perspective that we are facilitators. This allows us to integrate local knowledge systems and academic frameworks to further community aspiration. This emphasises community autonomy and supports the sustainability of the project with community buy-in. Third, using a diverse methodology allowed us to draw on and consolidate a wide range of data. We were able to explore the most effective method to present information to our community and facilitate engagement. Diverse methods integrate qualitative and quantitative material to create comprehensive learning aids to guide their restoration. Finally, the utilisation of contemporary definitions of restoration has been fundamental to the project. This acknowledges the aspirations of the community while considering the financial and logistical limitations. It widened the focus from just ecological health to also include social well-being and financial sustainability. Ultimately, this led to the development of achievable outcomes that embodied the aims of our research.

Future research should focus on the sustainability of restoration, how to get feedback from a wider range of demographics in the community, and prioritising mana whenua input. Understanding the long-term effects of community-centred restoration is critical for ensuring the sustained success for future projects.

7. Acknowledgements

We would like to thank our tutor, Karen Banwell, for all the advice, guidance, and feedback she has given us throughout this project. You have been a great help Karen, and we have appreciated your support and positivity. To our Rāpaki correspondents John Kottier and Lily Middleton, we thank you for your time, passion, enthusiasm, and knowledge. We also acknowledge the GBCA, and CCC red zone rangers Zane Lazare and Hana Walton.

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