

Map Resources for Sumner



A discussion on the creation of effective map development and design for the Sumner area.

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Executive Summary

- Our research question was “what are the most effective ways to portray Sumner’s assets to attract, inform and direct visitors.”
- The aim of this project was to analyse what map style is the most attractive and informative to Sumner’s visitors in order to create an effective resource for the Sumner Community Residents Association to have for visitors to Sumner.
- A review of previous literature on effective map methodologies was done. Available GIS data of the Sumner area was searched as well as common map symbology used by the Department of Conservation and the Christchurch City Council. Using GPS devices, additional and updated track, amenity and attraction data was collected. Combining this primary and secondary data, 4 map styles were created. In a survey, participants identified their favourite map, why they liked it and what was learnt from the maps. The survey results were analysed and a final map was produced incorporating the identified effective elements.
- Maps C and D were more effective because they were simple and detailed respectively. Tourists preferred Map C and Christchurch residents preferred Map D.
- Methodological limitations included the style of survey sampling, having no surveys conducted in Sumner and also the limited track data collected. Analysis limitations included being unable to use data from questions 3 and 5 from the survey due to the ambiguous questions and answers.
- Suggestions for future research include the Sumner Community Residents Association defining their target audience, either tourists, Christchurch residents or both, and create a map accordingly. Reopened track data should be collected in the future, allowing Sumner to present further local assets to their visitors.

Introduction

The aim of our research was to determine what is an effective map that attracts, informs and direct visitors to Sumner's assets. Sumner has a variety of beaches, surfing and fishing spots, and walking and mountain biking tracks, within its surrounding hills and coastline. Along with its recreational assets, Sumner has a multitude of historical attractions including the gun emplacements upon Godley Heads dating back to World War II. Sumner was a popular destination for both tourists and locals alike, yet after the Canterbury earthquakes, many buildings, recreational areas and walking tracks have had to close. With significant changes to the face of Sumner, representatives of the Sumner Community Residents Association (SCRA) asked for a map that shows Sumner's variety of assets in a way that would help to increase the number of visitors in to the area, and could be used as a resource to give to visitors. In the context of this report, assets refer to tracks, attractions such as the penguin breeding area, playgrounds, picnic areas and Godley Head structures and amenities including toilets. To investigate how an effective map could be created, a literature review was conducted to identify key cartographic elements to include. The methodological process included the literature review, primary and secondary GIS data collection, gathering historical information, creating 4 map styles, surveying the public and analysing the results. Lastly, a final map style was created incorporating the results that is recommended to the SCRA as an effective map for visitors to Sumner.

Literature Review

The literature review process consisted of analysing 11 scientific papers revolved around the effective designs of maps and tourism in recreational areas. Using these findings, were able to incorporate predominant features into our map design. Most studies concluded that simple maps with clear detail were the most effective for novice map users (Kee Soh & Smith-Jackson, 2004; Talbot, Kaplan, Kuo, & Kaplan, 1993).

Symbols on the map that were bold, universally recognised and represented structures in real-life were most effective in an individual's ability to quickly recognise a correct amenity or pathway (Leung & Li, 2002; Maguire, Miller, Weston, & Young, 2011). This type of information was key in determining how to create effective survey maps and a final map for the SCRA. Simple, well known symbols were chosen over more abstract and creative symbols. Research into typical Department of Conservation (DOC) map symbols was done to see what symbols are commonly used in New Zealand.

Another body of literature focused on the mindfulness of visitors; referring to the way visitor's respects and values a particular place and how visitors become more mindful or mindless toward this place (Moscardo, 1996). A key element from this literature is that visitors should be encouraged to question their surroundings. This research was particularly helpful in determining what type and how much information should be placed into maps. For instance, it can be assumed that historical information such as the gun emplacements and Kinsey's Cabin will allow visitors to find a connection to the place and encourage them to return. This was a key point in the SCRA's perspective as well. The SCRA wanted more visitors into the area to enjoy what Sumner has to offer, without them potentially exploiting the area.

Methods

The research was started by reviewing literature on different methodologies and examples of attractive and informative maps. During the literature review process, maps of the Sumner area were found online through many organizations. This led us to question how our research fitted into the wider community, considering that some resources were already available. After talking to the SCRA, we were then able to redefine our question to focus primarily on the walking tracks and assets along these tracks. GIS data of tracks, attractions and amenities were collected from online sources and data that needed updating was collected manually in the field. This was done using GPS devices. The primary and secondary GIS data was used in ArcMap and ArcScene to create 4 maps. The 4 map concepts included: the map design recommended by the SCRA, hill contours recommended by Smith-Jackson and Soh (2004), aerial imagery and photos recommended by Rossetto (2012) and a simple google styled map. Historic information of Sumner's assets was gathered online and in books. A survey was used to determine which map was most popular, why it was attractive, what was learnt and whether survey participants were attracted to the Sumner area. The survey was analysed and the most popular maps and map elements were determined. Using the survey findings, a final recommended map was created.

Examination of map development methodologies within the literature review

The first stage of the research methodology was to identify key elements of effective maps. A total of 11 research papers were reviewed covering map development methodologies. This included identification of effective cartographic symbology, labelling, map positioning in space, and map presentation.

GIS Data Collection: Track, Attraction and Amenity Data

The next stage was to explore online GIS data of the tracks, attraction and amenities using *Canterbury Maps*, *Land Information New Zealand* and *Koordinates*. We were able to retrieve GIS data from DOC for the Godley Head tracks, yet GIS data for the attractions and amenities along these tracks was unavailable. There was also no GIS data available for the remaining tracks in the Sumner area. The GIS data used from *Canterbury Maps* was Canterbury Park Data, *Koordinates* was a Canterbury 15m Digital Elevation Model (DEM), New Zealand 2015 census area unit map, aerial imagery and road line data and from DOC we obtained Godley Head track data.

Up-to-date track, attraction and amenity GIS data in the Sumner area was gathered in field work. Sumner assets were identified through consultation with the SCRA, on the DOC website and google maps. Using GPS devices, the tracks were walked to gather GIS data to be used in ArcMap and ArcScene. The GPS data was cleaned and adjusted to increase the accuracy of the data's spatial referencing. Both primary and secondary GIS data was used in ArcMap and ArcScene to create 4 map styles.

Asset Information

The third stage was to collect information of the assets from online sources. This referred to the history of the tracks, the Godley Head Defence area, Kinsey's Cabin, Clifton Tce Walks and the penguin breeding area. The information for these assets was developed into two categories, firstly short summaries for the maps, and secondly longer, more detailed information to be used at the site location if required.

The assets chosen to be included in the research was based on two things: the recommendations of the SCRA, and the availability of information. The SCRA wanted to include a walk based on Kinsey's Cabin and the penguin colony on Godley Head. Information of Kinsey's Cabin and the penguin breeding site was collected from the Department of Conservation Website and other internet sources (Nicholson, 2012; White-flipped Penguin Trust, 2009). Information of the Godley Head defence area was about Clifton Terrace's history was discovered in a book by Pickering et al. (2001) titled "Walk Christchurch". The final maps therefore display assets considered important to the SCRA and also those with adequate information available.

We were aware of only representing the European history of the area. We looked for Maori history information and areas of interest but there was little information available. We found references to early Maori settler's artefacts in Moncks Cave and Moa-bone point cave near Clifton (Christchurch City Libraries, n.d), but as these caves are closed, they were not included in the map. There was also information of a Maori legend about Shag Rock, located on the main beach, however the township itself was not included in our research area.

Map Development

The following stage was to create four different map designs to encompass the desires of the SCRA and the findings from the literature review. Each of the 4 maps include the same tracks, attractions, amenities, parks, labels, symbols and historic information. The designs differ in their profile of Sumner, the aerial imagery of Sumner, contour details of the Port Hills and colours.

Map A was designed with regards to the maps given to the group by the SCRA with the map design preferred by them (Figure 1). This map showed a 3D profile of Lyttleton with aerial imagery of the township. This was contrasted by bright, bold lines representing tracks and a legend situated at the bottom of the map. Map A represents a 3D view of the Sumner and Godley Head area, along with track and amenity data (Figure 2). The main aspect that was being examined was the 3D design. The colours of the tracks were bright and the Sumner area also had a bold green background with lighter green emphasising the parks.

Map B was created by developing on the findings from the literature review, that suggests that maps showing contours and elevation are easy to read (Figure 3). The colours of the tracks, background and parks was kept the same as Map A, so this map could be used as a control against the 3D map. Contours of the Port Hills was included in the background with a bird's-eye view profile which was recommended in the literature review (Smith-Jackson and Soh, 2004)

Map C was designed similarly to a simple Google Maps design (Figure 4). This included a light yellow background with contrasting bold, bright tracks and parks. No contours of the Port Hills were included and this map had a bird's-eye view profile.

The Map D style (Figure 5) was influenced by literature findings that people are better able to identify elements of a map that are representative to real-life (Maguire, Miller, Weston, & Young, 2011). This map was characterised by the use of aerial imagery with contrasting bright tracks and parks and had a bird's eye view profile of Sumner.

The final recommended map encompassed the findings from the survey and included aerial imagery overlaid with a light yellow background (Figure 6). This was contrasted with bright,

bold tracks and soft green for the parks. To increase the simplicity of the map, a close-up map of the Godley Head area was included with an extent help identify the where Godley Head is situated within the Sumner area (Figure7). The colours, profile, aerial imagery and park data was synonymous to the first recommended map.



Figure 1. 3D map recommended by the SCRA of Lyttelton

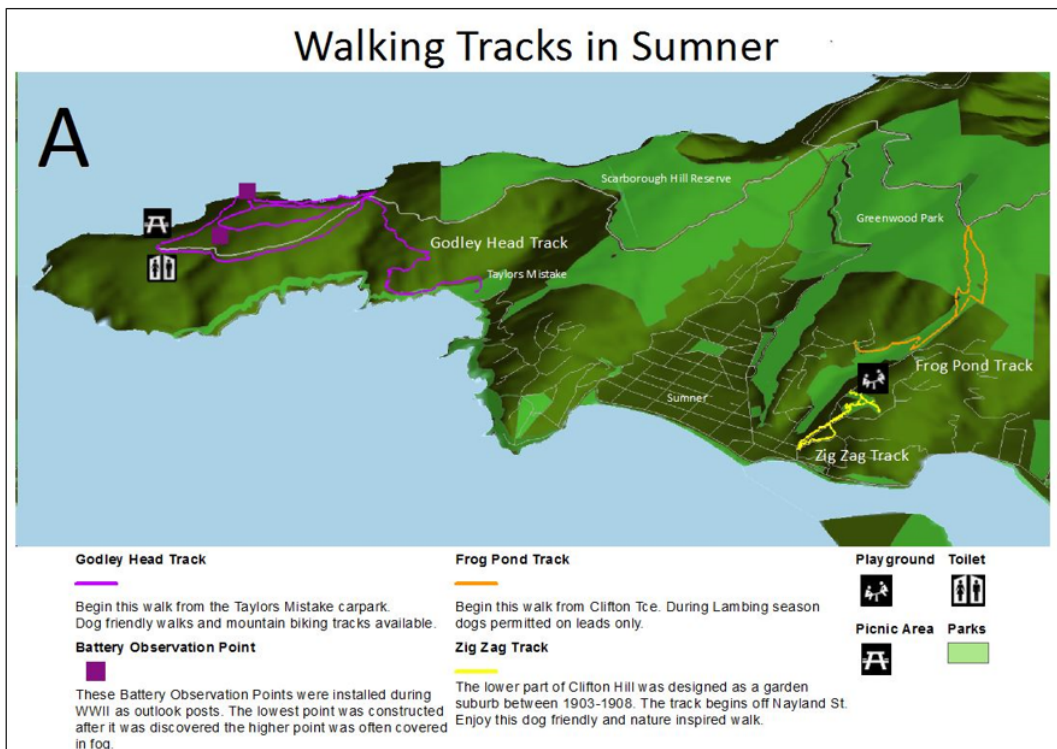


Figure 2. Map A using a 3D design of Sumner

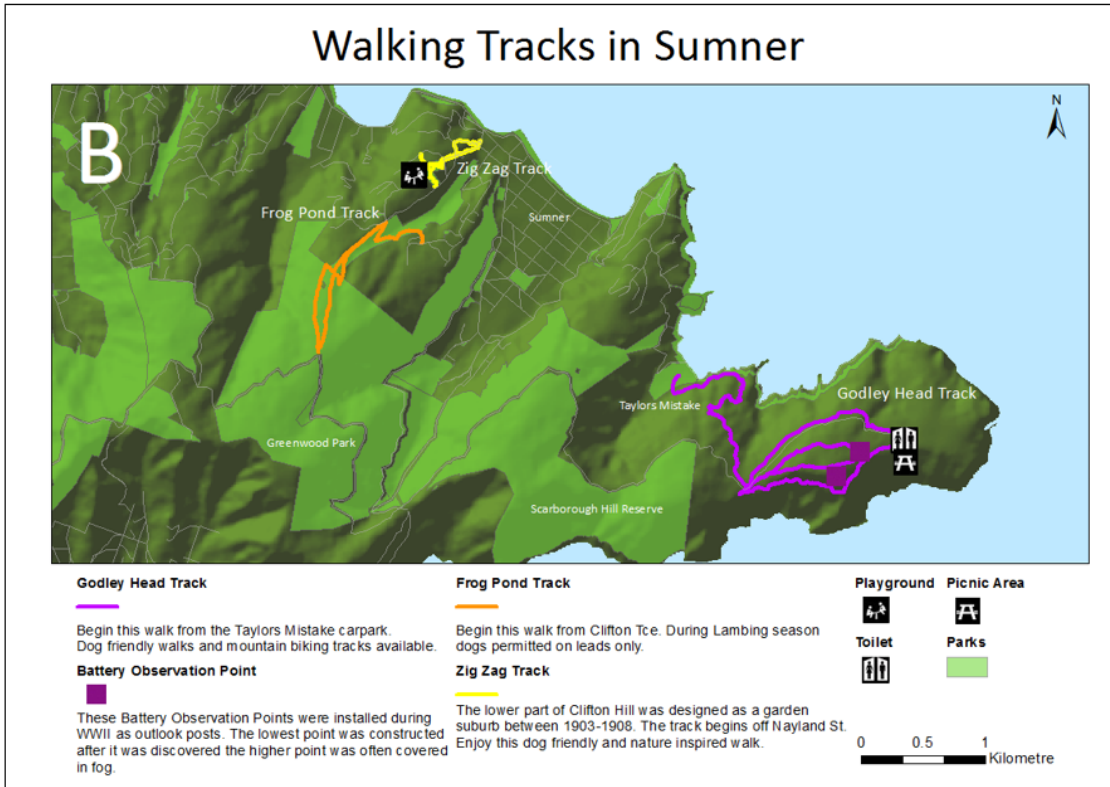


Figure 3. Map B displaying hillshade and contours



Figure 4. Map C using a simple google map design.

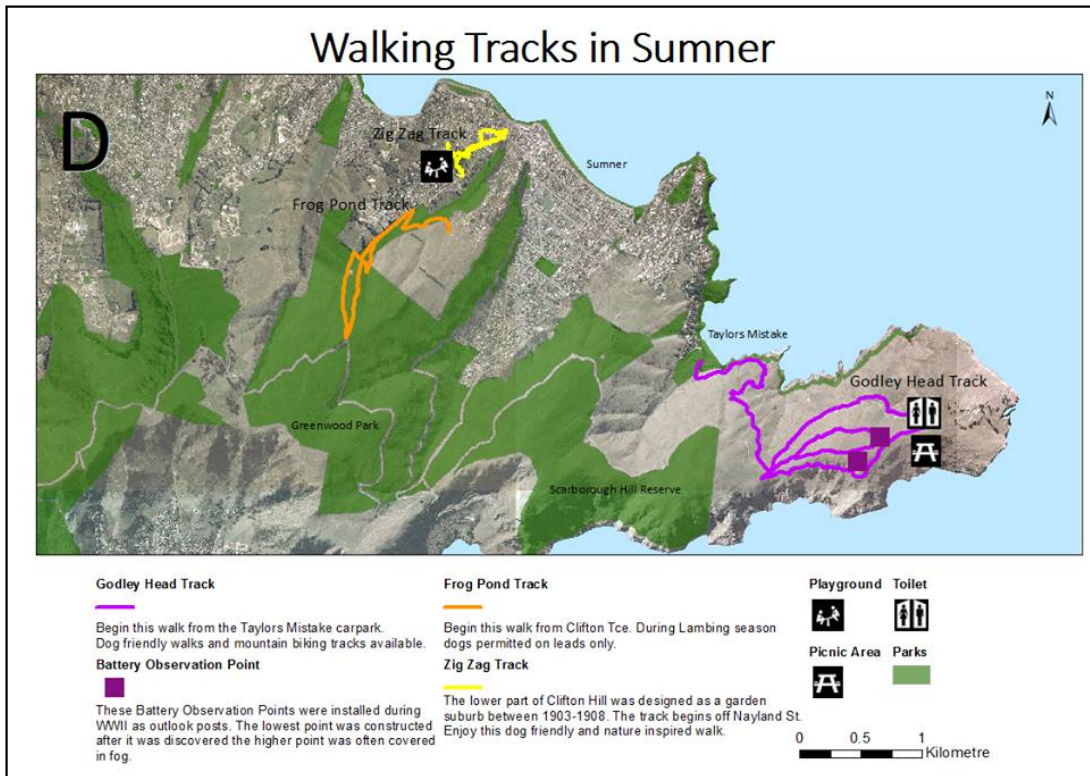


Figure 5. Map D using aerial imagery.

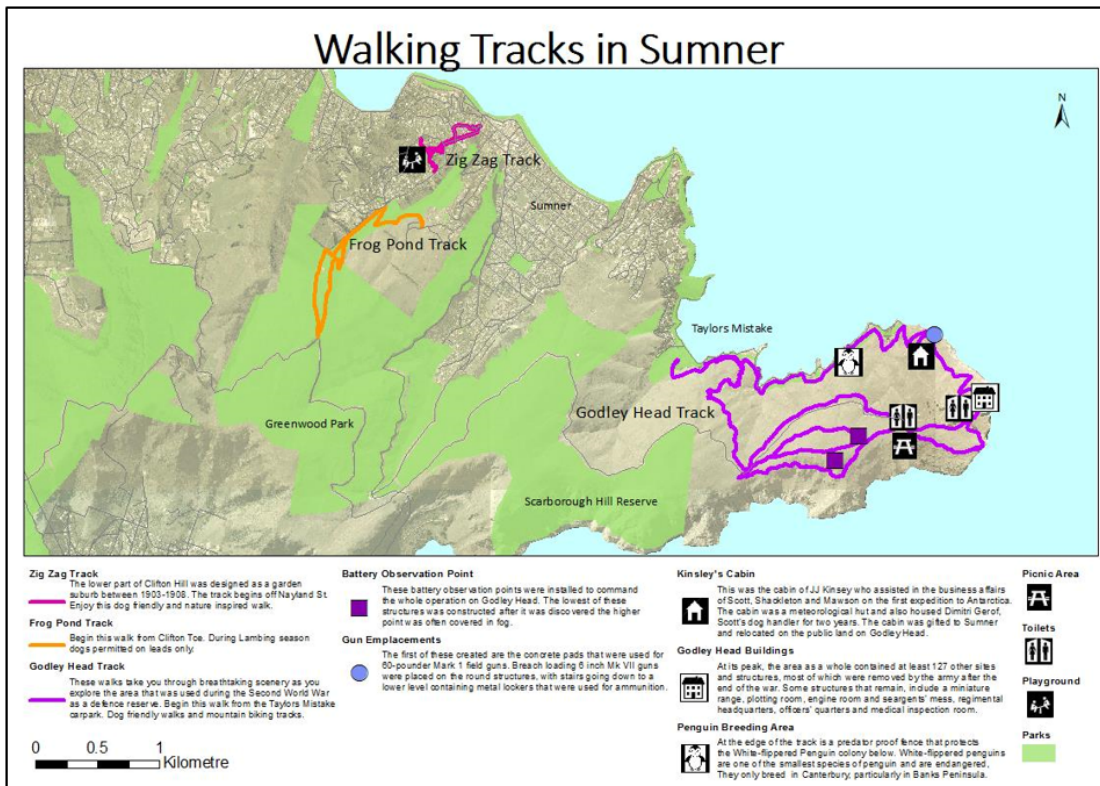


Figure 6. Final recommended map design

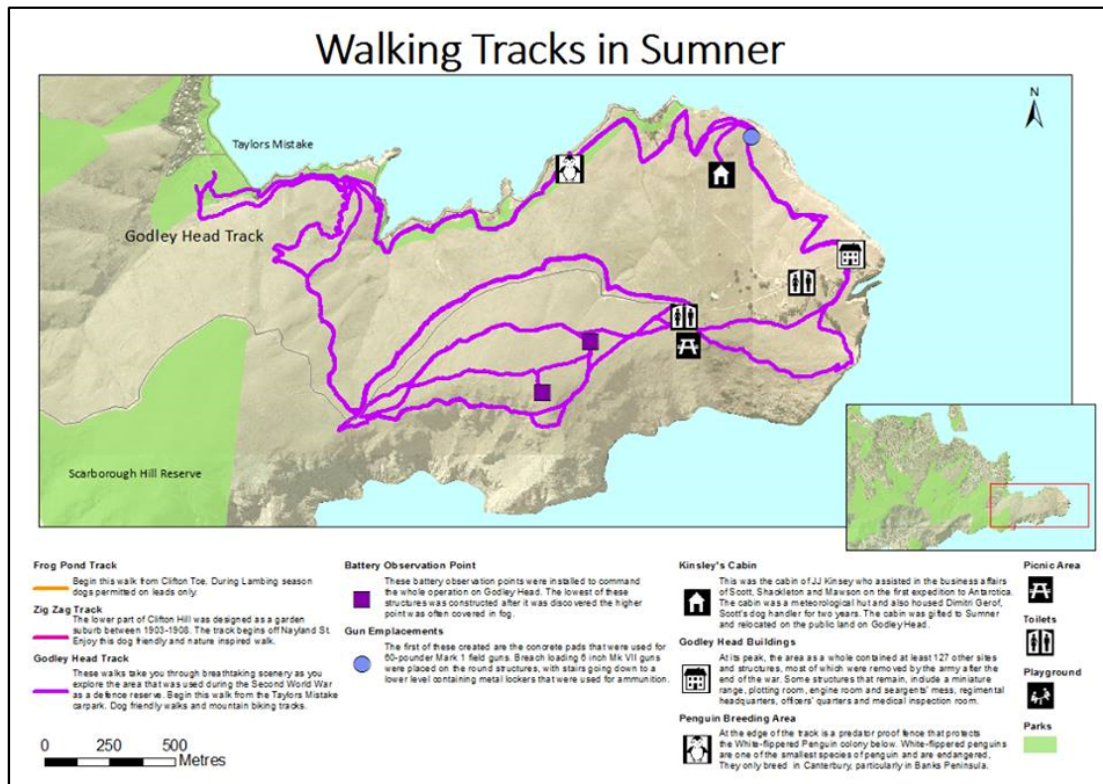


Figure 7. Final recommended map as a close up of Godley Head

Survey

The fifth stage of the methodology was to investigate which of the four maps was the most popular, why it was preferred, what new information was learnt. A survey was constructed addressing these three aspects (appendix). Question 1 was used to identify how often survey participants go to Sumner, and therefore establish their familiarity with the area. The next question asked which map the participant would like to take with them if they were to go to Sumner. This question assumes that participants would choose the map that they like the best. Participants then described that map selecting from adjectives such as colourful, unique, 3D, detailed, simple or informative. Question 3 was an open question that asked what was recognisable on the map. This question identified which map elements stood out to participants. Next, participants were asked about their knowledge of Sumner's assets. Participants chose from a list of options including the tracks, playgrounds, and toilets. This identified which assets people knew, and also what information was new to them. Question 5 asked participants to indicate how likely they were to explore the tracks on the map from 'Very Likely', 'Likely', 'Unlikely' to 'Unsure'. This was used to identify the degree that each map would attract people to Sumner's assets.

A total of 60 participants were surveyed at the Container Mall and at Westfield Riccarton Mall. These locations were chosen as local Christchurch residents and tourists were the target population for the survey. Demographic information such as age and gender were also included in the survey to identify differences in opinions. A convenience style of sampling was done as this was quick and effective (explorable.com, 2009). In some cases, groups of people were sampled at the same time.

Analysis

Analysis of the results from the surveys was the final stage. Demographic information and Question 1 were analysed qualitatively to help identify demographic factors that may have influenced survey participant's choices of the survey questions. Question 2, 3, 4 and 5 were analysed quantitatively and comparatively. For questions 2 and 3, ranks were given to map popularity and the factors why the participants chose their favourite map. Questions 4 ranked well-known to least well-known Sumner assets and question 5 compared the likelihood of participants going to Sumner with their previous answer to question 1. These results were constructed into bar graphs. Finally, a summary of the main findings and a discussion of their implications was done. Using this information, and a final recommended map style was able to be created (Figure 6).

Results

Attractiveness of the maps

Maps C and D were the most popular maps chosen out of all four options presented to participants. Map C was chosen by 38.3% and Map D was chosen by 35% of people. Because only 16 out of 60 survey participants chose either Map A or Map B, we have not analysed these in great depth because the results are less likely to be an accurate representative sample. However, we had enough responses for Maps C and D, so we have analysed those in greater depth.

Results for Map C

Map C was mostly chosen for two main reasons, its simplicity and the ability to read this map easily (Figure 8). We also found that almost half of the people who chose Map C were not from Christchurch, but were tourists (Figure 9).

Results for Map D

Map D appears to have been chosen for a wide variety of reasons, including being detailed, informative and having a realistic presentation (Figure 8). This map was also the most preferred by local Christchurch residents (Figure 9). Survey participants did not find that Map D was simple.

The findings pertaining to Map C and D confirm results indicated in previous research. The literature suggests that simple maps are easy to read, colourful maps are more attractive, and that it is easy to identify map elements when they are represented and replicated in real-life (Kee Soh & Smith-Jackson, 2004; Talbot, Kaplan, Kuo, & Kaplan, 1993).

Informativeness of the maps

Results from question 4 allowed us to see which Sumner assets people already knew about, and therefore determine whether our map was providing any new information. It is important to note that previous knowledge also depends on whether they were Christchurch residents or tourists. Results show that all four maps provided information that was new to participants about the Zig Zag and Frog Pond track compared to the well-known Godley Head tracks and common public amenities such as toilets and picnic areas (Figure 10). Referring to Figure 8, although Maps C and D both displayed the same track and historic information, survey participants found Map D more informative than Map C.

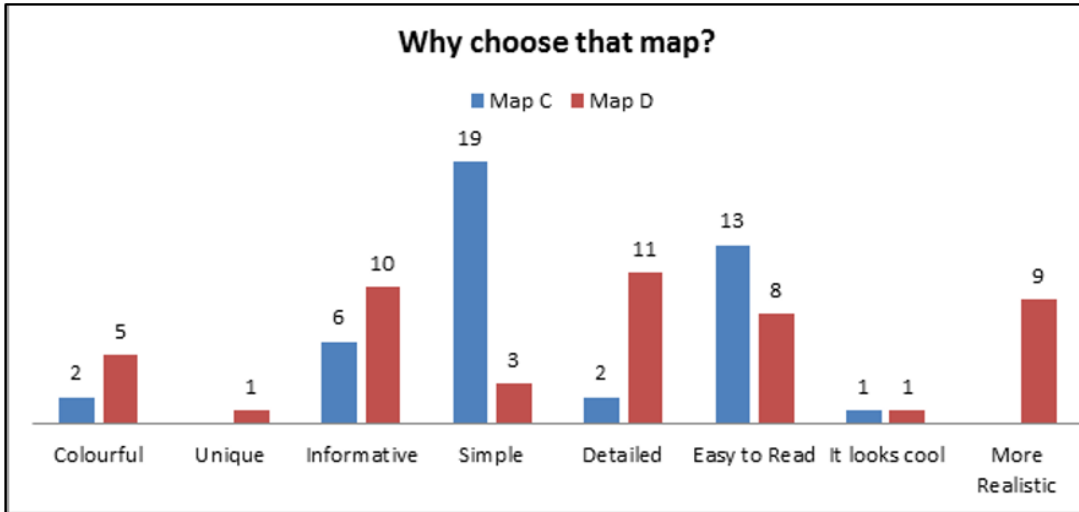


Figure 8. Ranks of reasons why Map C or D were chosen.

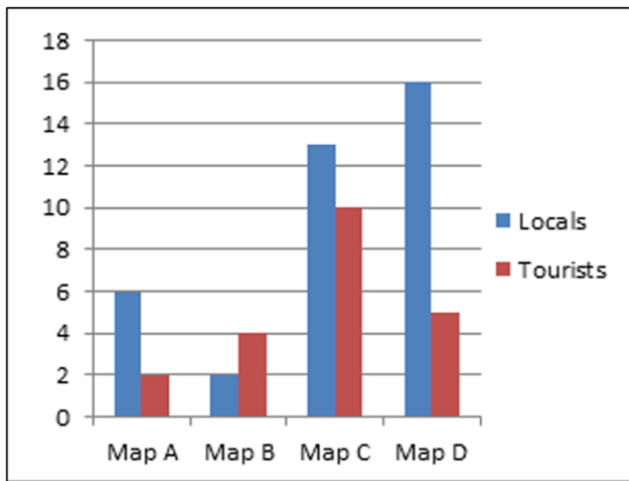


Figure 9. Map preferences of tourists and Christchurch residents.

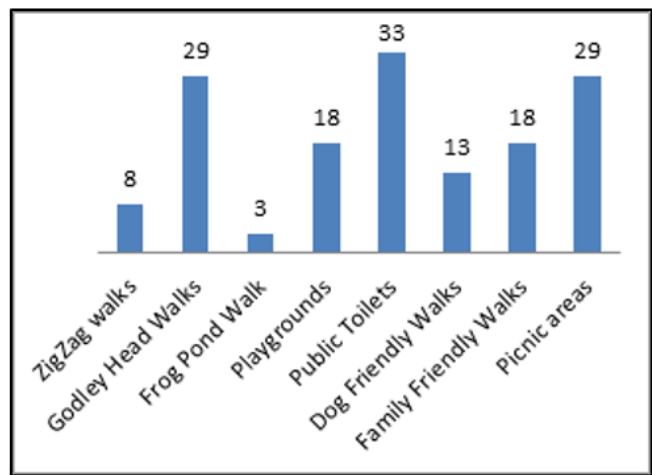


Figure 10. Summer assets well-known to survey participants.

Discussion

The aim of this project was to analyse what map style was the most attractive and informative for Sumner's visitors in order to create an effective resource for the SCRA to give to visitors. The findings from our surveys suggest that there are two main map styles which are most likely to achieve this. We see above that simple and more commonly used symbols on the map gave participants a better understanding of the information on the map. A satellite overlay on the map showed where towns and major features on the map were and helped set the context of Sumner for users. A clear layout, with short summaries of the history of the Sumner's assets was easy for viewers to read and also provided new information about the area. We suggest that it is possible to incorporate these elements into a single map to meet the preferences of both international tourists and Christchurch residents visiting Sumner and provide an effective map resource.

The two most popular elements of Map C and D are very different in nature. Map C was popular due to its simplicity, yet Map D was popular because it was detailed. It is possible that Map D was popular as the detailed aerial imagery was a way of providing extra information to the reader that helps make view Sumner's assets in context. Due to this, we therefore believe that this is an important aspect to be included in the final map. Simplicity was a leading reason why these two maps were chosen. Elements of the well-known and widely used google styled maps as designed in Map C should be included. However, this should be contrasted with bright colours and common symbols displaying the tracks and other Sumner assets to attract the eye to these aspects. The map should balance the level of information between the objective of informing and not be crowding the map with information. A close up view of the Godley Head area could be another resource option for users to increase simplicity and readability (Figure 7).

Responses to Question 2(b) (Appendix) showed that Christchurch residents found Map D the most effective map because they were more familiar with the Sumner area, and could identify elements in the map that represents real-life places. This question also showed that some of the tourists preferred Map C as the style of the map is used world-wide. Familiarity with the map style may have been a factor influencing the survey participants map choice. Although the style of Map A was recommended by the SCRA, it was only the third most popular map. This may have occurred due to participants being unfamiliar with the map style. Map A was designed with the intention of creating a unique and colourful map, yet Figure 8 shows that these two elements were not among the top reasons why the best maps were chosen. According to the literature, maps showing contours and hill shade provide the viewer with information that helps the reader to understand elevation better. Although the elevation of the Port Hills in the Sumner area was incorporated into Map B, this was not considered to be as effective at representing the hills compared to Map D. In summary, tourists preferred the well-known google styled map and Christchurch residents preferred a more detailed and realistic representation of Sumner through the use of aerial imagery.

The findings from this project are consistent with many findings from previous literature. The literature suggests that simple maps are easy to read and that it is easy to identify map elements when they are represented and replicated in real-life (Kee Soh & Smith-Jackson, 2004 & Talbot, Kaplan, Kuo, & Kaplan, 1993). However, our results differ with previous literature in regards to uniqueness and colourfulness (Moscardo, 1996). As found in our research, people chose Map C and D which were described as simple and detailed respectively, rather than the colourful and unique Maps A and B that they were unfamiliar with.

With the results in mind we have a number of recommendations for the SCRA. We firstly recommend that the SCRA should decide what type of visitors to Sumner they want to attract; tourists, Christchurch residents or both. If tourists, we would recommend the Map C style, Christchurch residents, Map D and both, we would recommend the Final Map. As transport was shown to be an issue with whether people would want to go to Sumner and try the tracks (Appendix, Question 5), we would suggest that in the map created for the Sumner township, that bus information also be included. Results also showed that tracks such as the Zig Zag and Frog Pond tracks were not well-known. We would suggest that bollards with detailed information about these walks be available at the start of these tracks, accompanied with the Final Map in this report containing the short summaries. We also suggest that the bollards containing the main Sumner Area map in the main centre and also the smaller

bollards at the walk entrances incorporate the 'uniqueness' factor, rather than the map itself. This could be achieved by incorporating surfboards alongside the map which would also reflect the character of Sumner. The smaller bollards at the entrances to the walks could also carry on this theme by having the maps printed onto segments of surfboards, such as shown in Figure 11. We also recommend that the Kinsey's Cabin be renovated and detailed information of the history of the cabin be available on a small bollard with information on what the cabin is, and why it is on Godley Head. We suggest shaping one of the Godley Head tracks into an 'Antarctic Walk' with information boards spaced along the path to Kinsey's cabin telling the story of what it is and how it got there. This coupled with an information board at the cabin, or a walkthrough information tour would help unlock the wealth of history in the building and engage the visitor. The final recommended stages would be to take these maps to professional map and information board designers to create these maps for the Sumner area.



Figure 11. Recommended bollard style.

The future plans of the Sumner area should be also taken into consideration throughout the final map construction. It was noted throughout field data collection, that many tracks were temporarily closed, and the face of Sumner was changing through residential development. We suggest that an online format of the map become available on the SCRA website, to allow for changes to Sumner's assets to be quickly and effectively updated. We also suggested that temporarily closed assets could be included on these online maps along with historic information. An example has been raised of the historic Maori caves in the Sumner area that were closed post-earthquake. Aerial footage has been taken inside of these caves, which could be used to change perceptions that the area is dangerous, to an area of interest. Available online footage and information of these sites would provide Sumner's visitors with a safe and informative way of interacting with previously considered dangerous areas. Future investigations as to whether this would help change the post-earthquake perceptions of Sumner would be recommended before this was implemented.

Limitations

There are a number of research limitations, specifically in the data collection methodology and data analysis.

The first limitation was collecting primary GIS data. As Sumner is currently going through a period of post-earthquake development and recovery, there are a number of temporary closed tracks that could not be included in the map. Therefore, the GIS track and asset data in this project will need to be updated as tracks are reopened at a later stage. The next limitation was the use of convenience sampling. When groups were sampled together, some participants may have been influenced by others opinions. We would recommend that in future surveys, participants be asked individually. Bias may have also occurred due to the location of where the surveys were conducted. It is possible that transport issues to Sumner may have been a factor when determining how likely survey participants were to go to Sumner after seeing this map (Appendix, question 5). The final map that will be constructed will be located in Sumner, and would potentially increase the likelihood that people reading the map would be more inclined to try the tracks and visit the assets displayed. However,

this issue has also helped raise awareness to the accessibility to Sumner and we therefore recommend bus information be readily available for visitors, not only in Sumner, but also in the city centre.

During analysis it was apparent that we did not have enough participants that chose either Map A or Map B and these therefore could not accurately be analysed. We also found that questions 3 and 5 were ambiguous (Appendix). In question 3, we were wanting to identify which aspects of the map people recognised better such as the symbols, lines or labels, but the responses we got were not useful for the purpose of the question such as 'the north arrow' and 'the sea'. Question 5 (Appendix) was also subject to transport as a confounding factor and therefore did not return valid results. A limitation to question 4 (Appendix) was that participants were not asked what was known about the assets they were familiar with, for example, where the tracks are or the history of the walks. Although almost half of the survey participants knew of the Godley Head walks, they may not have known anything beyond it's existence. Future research is recommended to address these limitations.

Conclusion

The aim of our research was to determine what is an effective map that attracts, informs and directs visitors to Sumner's assets. Through the initial literature review, we were able to focus the project on creating an overall effective map, and created four map styles. The map styles represented firstly the guideline map as presented to us by the SCRA, secondly the contours of the Port Hills as suggested from the literature review, thirdly, a simple google-map styled map and fourthly a map including aerial imagery. A survey was conducted to investigate which of these four map styles was the most attractive. Map C and D were shown to be the most attractive to survey participants, with reasons ranging from the maps simplicity, detail, information and readability. There was also a difference between the map style preferred by tourists compared to Christchurch residents, which is believed to be due to the reader being more attracted to what is most familiar to them. To encapsulate the map preferences of tourists and Christchurch citizens, a final recommended map was created. We have suggested that more information be provided in the form of bollards at assets that are less well-known to visitors, such as the Zig Zag Walk and Frog Pond Track and that the 'uniqueness' aspect to the maps be included in the overall presentation of the bollard. We also suggest that a Kinsey's Cabin walk and information board be created to inform and engage visitors with this special Sumner asset. To conclude, the recommended map created in this project includes all the aspects that were found to be most effective in our surveys and research. If the SCRA incorporated these aspects into their final map they will find there will be a positive reaction from Sumner's visitors.

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Appendixes

3. On the map you have selected, please list three things you recognize in the map?

- 1.
- 2.
- 3.

4. Before seeing this map, were you aware Sumner had these attractions and amenities?

- | | |
|--|--|
| <input type="checkbox"/> Zig Zag Walk | <input type="checkbox"/> Public Toilets |
| <input type="checkbox"/> Godley Head Walks | <input type="checkbox"/> Dog friendly walks |
| <input type="checkbox"/> Frog Pond Walk | <input type="checkbox"/> Family friendly walks |
| <input type="checkbox"/> Playgrounds | <input type="checkbox"/> Picnic Areas |

5. How likely are you to go and explore the Sumner area after seeing these maps?

- | | |
|----------------|-------------|
| a. Very likely | c. Unlikely |
| b. Likely | d. Unsure |

Thank-you very much