Applied Human Geography GEOG*2260: Final Report

‘In the Speed and Eramosa River trail region, how are the winter maintenance preferences of different user groups varied and why?’

Prof: Drs. Amanda Hooykaas and Roberta Hawkins
T.A: Kendal Clark
7 April 2017
Submitted by: Emma Stelter, Evan Lavine, Kylie Barwise, Laura Joyce
Introduction:

With a rapidly expanding network of trails running throughout the City of Guelph, Bike Friendly Guelph is working hard to establish the safest method of trail management in the winter. With a long-established reputation of being environmental stewards, the City of Guelph is making the management of their trail systems a top priority. The purpose of this report is to define and explain the current winter trail maintenance preferences among users of the Speed and Eramosa River trail region. This purpose was met by answering the question ‘In the Speed and Eramosa River trail region, how are the winter maintenance preferences of different user groups varied and why?’. This report also explores sub questions which examines winter maintenance preferences within and between user groups. Initially, researchers predicted that the various users groups would share similar maintenance preferences. Likewise, snow cleared and sanded was hypothesized to be the preferred method among researchers. Over the course of data collection it was established that users of the Speed and Eramosa River trail region prefer snow to be cleared and sanded from the trails for primarily safety and environmental concerns. The following points highlight the key questions asked, and how they were answered through data collection and data analysis to reach answer our research question.

1. The initial data provided from the community partner allowed for a generalization of user groups. User groups were organized into four categories: pedestrian, cyclist, wheels (skateboarding, inline skating), and other.

2. Through initial observational field research, researchers determined a key site for data collection along the Speed and Eramosa River Trail region. The key site established was the covered bridge on Gordon Street. This site was determined through criteria such as: high volume of people, safe, and providing some protection from weather (Figure 1).

3. Current winter maintenance and data collection methods were determined through a review of academic and community based literature.

4. Intercept surveys were used to collect data on trail users’ preferred winter maintenance practices on the Speed and Eramosa River Trail region.

5. Researchers made suggestions to the community partners regarding preferences and explanations of users’ maintenance choices. Recommendations were also given on how the community partner can implement desired maintenance strategies.

Literature Review:

Prior to this project, research had already been conducted regarding the demographics and motives of different user groups on various trails. Most researchers agree that motivations
for cycling are determined by a mix of contextual factors such as: life stages, personal history, intrinsic values, and facilitating conditions (Christensen et al. 2012). Although studies like “Evaluation of the Cycling City and Towns Programme” focus on research that will improve trail infrastructure, it omits any information regarding what kind of winter maintenance should be used and how it will be implemented (Christensen et al. 2012).

Most studies provide information about trail maintenance, although they are conducted in regions with climates different from that of Guelph. For example, “Four Types of Cyclists” discusses maintenance in terms of cyclist safety, but as the study took place in Portland, snow is not as prevalent (Geller 2006, p.1). Therefore, much of the existing literature will help to establish a foundation for the research being conducted on Guelph’s winter trail maintenance preferences and why.

Some of the existing literature uses the terms “path” and “lane” interchangeably. For example, Lalonde (2012) refers to winter maintenance preferences for “bike paths” in Montreal. However, what she calls “paths” may be more commonly referred to as “lanes” on paved streets. Since there is no uniform term being used amongst research throughout the existing literature, it can be challenging to establish a baseline for winter maintenance preferences. This study will focus explicitly on bike ‘trail’ maintenance as opposed to much of the existing literature which more broadly focuses on bike ‘paths’ and ‘lanes’.

Some aspects of previous literature can be applied to the study. For example, the methodologies in “Evaluation of City Cycling” have provided a strong basis for the research methods. Christensen et al. (2012) used qualitative research methods to determine if a trail user’s behaviour and frequency had changed since their city implemented new infrastructure. Researchers conducted 140 interviews and surveys throughout Ontario’s trail systems allowing researchers to categorize users into three groups: continuing regular, new regular and non regular. Christensen et al. (2012) also effectively used a method called “accompanied journey” for data collection in their study. This method involved researchers to accompany cyclists on the trails by riding alongside them on bikes of their own in order to conduct interviews. This way, cyclists would not have to stop their own journey to participate in the study, and more interviews could be completed.

“International Winter Road Congress 2002” discusses how winter maintenance on roadways impacts cyclists, but the study does not extend to trail maintenance specifically (Öberg 2002). Most road cyclists agree that snow is not removed well enough from bike lanes, although is adequately cleared from car lanes (Öberg 2002). Many cyclists believe this trend in maintenance practices stems from the prioritization many cities place on driving over cycling. This study attempts to ensure that all user groups’ concerns are heard and not neglected like the user groups in Öberg’s (2002) study.

Overall, much of the previous literature leads into this research topic as it provides a framework for the chosen methodology of surveys. This research will contribute to the literature on cycling within the City of Guelph because it will provide insight into the winter trail maintenance preferences specific to various user groups. As a result, our research should be a
valuable addition to our community partner’s knowledge base and be able to influence the City’s current winter maintenance practices.

Methods:

This study used intercept surveys conducted on the Speed and Eramosa River trail, mainly at the covered bridge beside Gordon Street. This study used a sample population, which included: residents, temporary residents, and visitors of Guelph. Participants were required to be over 18 years of age to participate in the survey. Researchers used observational methods to determine key sites for data collection. Key sites were defined as areas with a high volume of trail users, while also providing some protection from the weather, such as bridges and resting stops (Figure 1). The researchers determined that the covered bridge met all criteria of a key site. The proposal did not state what key site would be used since they were determined during the data collection period.

Surveys were conducted over five days, beginning on Saturday March 4th, recommencing Thursday March 9th and finishing on Saturday March 11th. The researchers included different days of the week and time of day in order to try to incorporate as many users as possible. A total of 49 surveys were conducted and researchers followed the ‘accompanied journey’ method proposed by Christensen et al. (2012), which proved successful. Similarly, splitting the researchers into groups of two, proved to be an effective method as participants were not intimidated by a large group of students. Researchers could also reach more participants by dividing. Participants were more likely to agree to participate in the survey if the researchers offered to scribe for them. Scribing was not mentioned in the literature or the proposal although was very effective in this instance.

There were three components to the survey. The first was an introductory letter describing the research project in detail and included contact information as well as a coded number that allowed participants to withdraw from the survey at any time. The next component was the consent form. Participants were asked to give written consent which allows their data to be analyzed, published and quoted. Finally, the survey came last and contained a combination of qualitative and quantitative questions.

Challenges were faced during data collection, and adjustments were made accordingly. Originally, electronic surveys were going to be administered, but this method was not approved by the ethics board in time. Paper surveys were used instead, but posed a challenge in the cold and windy environment. With temperatures averaging -15 degrees celsius, fine motor skills were limited, making it difficult to write answers down on paper surveys. The cold weather also deterred some people from participating in the survey.

After data was collected, it was entered into a spreadsheet in Excel and categorized into the specific questions asked throughout the intercept surveys. Categorization also allowed for anonymity of participants and enabled researchers to easily remove any findings if a certain
participant wanted to be removed. The main themes of the project -user groups, trail maintenance preferences and the reasons for the preferences - were then highlighted and further analyzed. For example, multiple pie and bar graphs were created based on the maintenance preferences and reasons for pedestrians and cyclists. The survey questions that had multiple responses were categorized to allow for more efficient data analysis. Categorization proved to be an effective method for organizing user groups and their preferences. As a result, seven categories were formed including environmental, safety, and no response. Further analysis was undertaken in an attempt to find a connection between age and reason for one’s preference. The results were placed into graphs to create a visual representation of the findings.

Findings:

The data collection process enabled the identification of relevant user groups and their preferences on winter trail maintenance associated with the Speed and Eramosa River trail region. It was hypothesized that each user group would have similar winter trail maintenance preferences as well as explanations for their preferences. The hypothesis was proven when the findings of the cyclists were compared to the pedestrians during data analysis (Figure 5). Both user groups chose ‘snow cleared and sanded’ as their preferred method. 46% of pedestrians and 34% of cyclists chose the ‘snow cleared and sanded’ method (Figure 3). The second most preferred method was ‘snow packed down’, in which 25% of cyclists and 19% of pedestrians chose this method (Figure 3). Finally, both user groups contained individuals who preferred ‘no treatment’, or simply had no preference, but this category did not include a large portion of the population size.

By analyzing the age of each respondent, researchers evaluated the significance of user's age as it relates to the activity exercised on the trail (Figure 2). Out of the 37 surveyed pedestrian users, the majority were situated within the 18-25 or 41-64 age demographics. The age group with the highest number of responses was 41-64, with a total of 15 users. In contrast, age was fairly evenly distributed throughout the 12 cyclists age demographics. Users between ages 18-25 was the largest age group represented among cyclists consisting of 4 participants and the smallest being aged 65+, with only 1 user. Nonetheless, both pedestrian and cyclist preferences were analyzed individually to most effectively answer the research question.

Pedestrians were analyzed with a focus on their preferred winter maintenance method (Figure 3). Figure 3 shows that 46% of pedestrians chose ‘snow cleared and sanded’ as their preferred method. ‘Snow packed down’ was popular among 19% of pedestrians, although only 14% selected ‘snow cleared and salted’. Alternatively, 11% of pedestrian respondents chose ‘no preference’, suggesting that they were unaware of current winter maintenance on the Speed and Eramosa River trail.

Next, pedestrians were asked to explain their trail maintenance preferences. Their explanations were organized into seven categories: safety, economic, environmental, footwear, animal, no response, and other. Results indicated that safety was a strong motivating factor, with 40% of pedestrians highlighting this concern (Figure 4). Likewise, environmental concerns were
also explained for 29% of pedestrian trail users. In contrast, 10% referred to animal related concerns, such as the potential damage to dogs’ paws from salt. Trail safety and environmental concerns were the most common reasons for winter trail maintenance preferences among pedestrians. It is for these reason that pedestrian trail users prefer ‘snow cleared and sanded’ in contrast to maintenance methods such as ‘snow cleared and salted’ which can deplete riparian ecosystems and the overall integrity of the trail.

Cyclists’ motivations for winter maintenance preferences were somewhat similar to that of the pedestrians’. Cyclists explained their maintenance preferences stemmed from environmental concerns (46%) and safety concerns (13%) (Figure 7). In contrast, 29% of pedestrians rationalized their preferences to the environment, 40% of pedestrians felt concerned with safety (Figure 8).

There were some similarities between cyclists and pedestrians’ rationales. The ‘economic’ and ‘footwear’ categories were uncommon for both user groups. One pedestrian and one cyclist mentioned ‘footwear’, whereas only one cyclist listed ‘economic’ as a concern (Figures 4 and 7). While there were some differences among cyclists and pedestrians, both users expressed concerns surrounding safety and the environmental repercussions of winter maintenance practices. Although the motivations for individuals’ preferences were similar, the frequency of responses was different among the two user groups.

Overall, the findings demonstrate that both pedestrians and cyclists have similar winter trail maintenance preferences, despite having different reasons for their preferences. The majority of these explanations included environmental degradation caused by maintenance strategies such as salt, as well as the damaging affects to both the users’ items and their pets. These findings answer the research question through the analysis of user groups and their rationale for their chosen winter trail maintenance preference.

Discussion:

Through the research question, survey, and data analysis, researchers were able to identify three main themes. The themes can be broken down into maintenance preferences, the explanation of preferences, and how each preference is varied by user group. Regarding maintenance preferences on the Speed and Eramosa River Trail region, on average, both cyclists and pedestrians agree that snow cleared and sanded is the most effective and desired winter maintenance method. Similarly, both of the trail user groups selected snowpack down as the second favoured winter trail maintenance preference. The user groups also have similar explanations of why they chose their preferred maintenance method. Safety and environmental concerns are the greatest motivating factors for pedestrians’ choices, with 40% and 29% respectively (see Figure 3). The majority of users that mentioned these reasons referred to the impacts of salt on local ecosystems and the corrosive impacts on bikers’ and runners’ equipment during the winter season. However, it became very surprising that those who mentioned the environmental impacts of salt showed little environmental knowledge around the other maintenance practices, such as snow cleared and sanded. Overwhelmingly, 46% of cyclists
stated that environmental concerns, particularly salt concerns, were the greatest driving factor in their decision making process (see Figure 6). The second most influencing factor was safety, with 13% of cyclists listing it as a motivating factor, meaning more pedestrians were concerned with traction on the trails than cyclists (see Figure 6).

In general, the initial hypothesis that both user groups - pedestrians and cyclists - will share similar opinions on winter trail maintenance preferences and the reasons for those preferences was partially true. For example, the average winter trail maintenance preference, snow cleared and sanded, for both user groups were alike. However, the reasons for this preference were slightly different, with safety being most common in pedestrians and environmental having the highest number of responses in cyclists. Another surprise that came from the findings was the minimal variation in user groups, such as the lack of representation of the “wheels” user group.

Regarding previous research, the findings of this study do not directly link to the information in the literature. Many of the findings in other studies like Geller (2009) and Lalonde (2012) are irrelevant to Guelph because they either have a different climate, or are conducted on ‘bike lanes’ on paved roads and do not discuss trail systems specifically. However, the methods used in the Speed and Eramosa River Trail region are similar to many other studies, especially Christensen et al. (2012). To summarize, the ‘accompanied journey’ method, finding key data collection sites, and breaking apart into smaller groups all proved to be effective.

Since the findings of this study do not match the literature, they offer insight to the community partner and the City of Guelph. The generalized feedback from the intercept surveys on winter trail maintenance can help to provide suggestions for improvements and the implementation of new projects on this topic in the future. For example, the preferred preference of snow cleared and sanded can be taken into consideration in the new developments of trail maintenance strategies. Also, providing information on trails can add to the phenomenon of overall bike trails across the region that have not necessarily been discussed before. This could hopefully carry some relevance to other cases within the region or across Canada that are also investigating winter trail maintenance.

Partaking in the surveys and research project itself encountered many strengths and weaknesses. As previously mentioned, the weather conditions, such as snow, wind and the overall cold temperature, limited the amount of surveys collected due to many potential respondents unwilling to participate and affected motor skills. The researchers predicted that the lack of visible snow at the time of data collection may have influenced participant’s answers about preferred maintenance. Also, the implications of the weather in Guelph made it difficult for the researchers to be organized, in particular with the collection of surveys. More specific to the findings themselves, the sample size may have had influenced the data and skewed results because the sample size was small. As a result, this sample size may not have been a good representation of the larger population of Guelph and visitors to the trails.

On the other hand, the research project also saw many strengths, especially when trying to adapt data collection to the already mentioned weaknesses, such as weather. For example, by
walking alongside the participants the researchers enabled surveys to be collected from those who said they ‘didn’t have the time’. As well, dividing into smaller groups allowed the researchers to cover more ground and collect surveys with more efficiency resulting in data collection only lasting for those specific five days. Finally, the pre-planned script helped the researchers with data collection by providing them with the best approach to interact with participants. Overall, these strengths enabled the most efficient form of data collection and allowed the transition into data analysis to be easier.

Conclusion:

Instead of focusing on just winter trail maintenance, it could be beneficial to community partners to look at the larger picture of how people use the trails and what they generally would like to see change. Within this type of research, there could be a subcategory for winter maintenance. Although not relevant to this particular study, this direction is recommended as it is evident that there are users that see other potential improvements in the downtown trail system, such as more information boards or garbage bins. A broader study on a topic such as this would advantage to the community partner.

In the future, managing Guelph’s trails by clearing and sanding them while also packing the snow down is an alternative approach to trial management. By combining the top two preferred methods of maintenance among users in Guelph, the overall winter trail maintenance could be improved in many ways. This method could improve overall trail safety by providing more traction.

There are some negative aspects regarding the snow cleared and sanded method. In comparison to the current method, using snow packed down and sanded means more money will be spent on resources while also having a larger impact on the environment. That being said, maintaining safe and accessible trails is a top priority of the City of Guelph. By combining the top two preferred maintenance methods, improved safety could be achieved.

Another recommendation that could be implemented is the minimization of trail maintenance in general. Since many trail users were either oblivious to existing trail maintenance or chose ‘no preference’ or ‘no treatment’ as their preferred method, minimal or no maintenance is a possibility. No or limited maintenance consists of minimal effort and is inexpensive. As the trail systems would remain untouched, they would look more natural and would be more aesthetically pleasing than sand or tire markings from snow plows. On the other hand, this recommendation neglects the large amount of users that want the trails to be safe and well maintained. To simplify, questions of what is more important, safety of users or the appearance of the trail system, are raised.

A final recommendation towards the community partners in this study is more broad than just the trail winter maintenance. This recommendation regards the overall trail maintenance and the suggestions by the community. Throughout the study, participants were requesting more information boards, garbage, and better maintenance of the asphalt paths. It is recommended to the trail maintenance crew to focus on the overall appearance of the trail and be mindful of its
maintenance during other seasons too. Such maintenance would create more interactive trails that are cleaner and safer to use. The only disadvantage to such maintenance would be an economic cost to the department that may not appear cost effective or beneficial in the future potentially due to the long-term maintenance that would be required.

One potential avenue for future research is to consider whether age correlates with winter trail maintenance preferences. Researchers could conduct short online surveys using closed questions to establish user preferences. A strength of this approach allows for data to be collected from multiple participants from a diverse range of ages. A potential weakness for this method of data collection is under representation of the 65+ age cohort. Older generations may have a limited knowledge of the internet, so online surveys would not be as effective. To compensate for this possible discrepancy in data collection, researchers could verbally conduct intercept surveys on high traffic trails throughout the City of Guelph and manually input the data into an iPad. This method helps researchers to further understand which methods of winter trail maintenance is most suitable for specific areas of Guelph according to age. For example, this research would help determine which age groups frequent the various trail of Guelph, allowing the method of maintenance to best suit users’ needs.

Another direction that could be pursued would be to redefine and narrow the focus of the categorical user groups. It was found in this study that users were either a cyclist or pedestrian. In terms of winter users, the user group ‘wheels’ seemed very out of place as not one user fell into this category. This applied to ‘other’ as well. The pedestrian user group however, was felt to be too broad and encompassed many users that participated in diverse activities. These different activities could influence their trail maintenance preferences. A runner could have a very contrasting view in comparison to a dog walker. Unfortunately, these variations in preferences could not be studied due to the defined user group categories. Other user groups that could be taken into consideration would be runner, dog walker, commuter and leisure.

Furthermore, when doing field surveys, it is recommended that if more research were to be pursued in the future, that it is conducted when there is snow on the ground. Although weather is conditional and unpredictable, it was agreed that participants may have a more direct response when they could better relate to the situation. Since the surveys were acquired when there was no snow on the ground, participants were sometimes unaware of the current maintenance practices and as a result had not necessarily given the subject much thought. Thus, surveys could have pressed participants into making quick preferential choices.

To conclude, this research is a valuable addition to studies being completed on winter trail maintenance. Since there is a lack of detail on winter trail maintenance, this study fills a gap in the field that could benefit not only our community partner, but other cities on a national scale. Other studies, such as Christensen et al. (2012), noted that intercept surveys and the accompanied journeyed approach worked best. Such findings will help with data collection in any region.

Further information on users’ preferences presents valuable information relevant to community partners and the future development of trail maintenance. The research question stating: ‘In the
Speed and Eramosa River trail region, how are the winter maintenance preferences of different user groups varied and why?” adds to this information by providing a study specific to the City of Guelph. Across both user groups, snow packed down and snow cleared and sanded present a coherent overall user preference. Although reasons vary from user group and age group, there is an overwhelming correlation between preferences, the environment and, safety. This relationship becomes more relevant when deciding what trail maintenance method should be applied and how its implementation has external effects.
References:


Appendix:

Figure 2: Age distribution of user groups

Figure 3: Winter trail maintenance preferences according to pedestrians
Figure 4: Reasons for winter trail maintenance preferences according to pedestrians

Figure 5: Winter trail maintenance preferences according to cyclists

Figure 6: Overall winter trail maintenance preferences
Figure 7: Reasons for winter trail maintenance preference according to cyclists

Figure 8: Overall reasons for the winter trail maintenance preferences