Final Report

What are the winter maintenance preferences of user groups for trails within the Hanlon Creek preservation Area?

Olivia Burke, Neelam Gill and Tye Campbell

07/04/2017
# Contents

1 Introduction ........................................................................................................................................... 2
   1.1 Research location and question ........................................................................................................ 2
   1.2 Aims and Objectives ........................................................................................................................ 2
   1.3 Main points ....................................................................................................................................... 3
2 Literature review .................................................................................................................................... 3
3 Methods ................................................................................................................................................ 3
   3.1 Observational Data ........................................................................................................................... 4
   3.2 Surveys ............................................................................................................................................. 4
   3.3 Research methodology literature .................................................................................................... 5
4 Findings .................................................................................................................................................. 5
   4.1 User groups ..................................................................................................................................... 5
   4.2 Entrances ........................................................................................................................................ 5
   4.3 Winter Cycling ................................................................................................................................. 6
   4.4 Current winter maintenance ............................................................................................................ 6
   4.5 Winter maintenance preferences .................................................................................................... 7
5 Discussion .............................................................................................................................................. 7
6 Conclusions ........................................................................................................................................... 8
7 References ............................................................................................................................................. 9
8 Appendix ............................................................................................................................................... 10
1 Introduction

The city of Guelph situated within southern Ontario encourages sustainable transportation within the city, improvements have been made to infrastructure creating more effective lanes and trails for active transportation within the city (City of Guelph, 2012). The City of Guelph have proposed active transportation network (ATN) (Figure 1) forming an extensive network of bike routes, consisting of 110 km of bike trails and 101 lane-km of bike lanes; Guelph stands above other active cities within Canada, such as Vancouver and British Columbia, as a cycling-friendly city (City of Guelph, 2012). The city of Guelph has plans in place to expand cycling routes to a total of 167 km once the ATN has been completed. In 2008 the City of Guelph introduced the ‘Bicycle-Friendly Guelph’ program in order to encourage cycling in the City, in doing so they hope to triple the percentage of daily trips by cycling from the current 1% to 3% (City of Guelph, 2012).

1.1 Research location and question

Aims to encourage more cyclists to use the trails situated throughout Guelph can only be achieved by creating a safe and convenient environment to do so (City of Guelph, 2012). During the summer months the trails remain clear and accessible to cyclists, however, data regarding attitudes towards maintenance of trails in the winter months is lacking. In response to this we designed a research project selecting the Hanlon Creek preservation area situated on the South Western side of the city, spanning the area from College Avenue to Clairfield to be our study area. There are two main motivations for selecting this area, firstly the Hanlon Creek contains a variety of trails, including woodland, parks and lakes, in turn influencing our second motivation for the opportunity to survey a diverse range of user groups. The two of these motivations combined would allow us to provide answers to our final research question being ‘What are the winter maintenance preferences of user groups for trails within the Hanlon Creek preservation Area?’ We created this research question to include three specific elements, the first is that it is specific to our research location, the second is that it specifically targets the user groups of the trails, and the third is that it addresses the winter maintenance preferences.

1.2 Aims and Objectives

The ‘Bicycle-Friendly Guelph’ program states that they aim to ‘provide safe, comfortable travel for pedestrians and cyclist within existing communities and new development’ (The City of Guelph, 2013), safety not being exclusive to just the summer months we concentrated our research question towards the winter maintenance preferences as studies have shown that attitudes towards cycling change in the winter due to safety concerns based upon climatological conditions (Bergström & Magnusson, 2003). Three aims were created in order to provide answers to form one main objective of providing recommendations of the popular winter maintenance preferences of the trail user groups, the first is to identify the popular use groups of the trails, the second was to determine high intensity areas of trails and the third was to investigate and analyse the common winter maintenance preferences.
1.3 Main points

The initial hopes for our research study in terms of data collection and results were continuously challenged, the harsh winter conditions severely limited opportunities for surveys and restricted the variety of user groups. The pedestrian user group dominated results with 100% of respondents identifying as pedestrian, this finding influenced us to break our user groups down further introducing dog walkers due to their overwhelming presence. The results of our investigation proved snow cleared and sanded and snow packed down to be the two most popular winter maintenance preferences.

2 Literature review

We began our study by undertaking generalised research focused upon winter maintenance preferences and cycling infrastructure. In order to gain scope and knowledge regarding the topic of cycling we researched closely into literature based upon trail maintenance preferences, safety concerns and road and weather conditions. Peer reviewed journal articles such as Physical environments influencing bicyclists’ perception of comfort on separated and on-street bicycle facilities (Li, Wang, Liu, & Ragland, 2012) and Models for anticipating non-motorized travel choices, and the role of the built environment (Khan, M. Kockelman, & Xiong, 2014) were able to provide a holistic understanding of the cycling infrastructure desired for the safety of cyclists.

Specific literature on the winter maintenance preferences of user groups, cyclists in particular, based within Ontario were difficult to find in the form of peer reviewed journals, articles, and books. After widening our search an incredibly useful journal ‘Potential of transferring car trips to bicycle during winter’ (Bergström & Magnusson, 2003) was able to provide us with statistics, demographic, geographical and climatological influences towards the changing attitudes of winter cycling and ways in which these attitudes could be changed in order to maximise cyclists in winter. Although this particular study was located in Sweden, a far comparison from Ontario, we decided to undertake the same data collection method of surveys due to their own success. The study was published in 2003 creating concern for our study to undertake similar methods almost 15 years later, however, surveys did prove effective with a 100% response rate in the field.

Furthering our investigation into the active transportation network and trials within the City of Guelph the most useful tool for providing us with detailed information of these were the City of Guelph websites and literature themselves. The Guelph cycling master plan 2012 (The City of Guelph, 2012) was exceedingly valuable in providing accurate and recent data towards all aspects of cycling in Guelph and the Cities objectives of making Guelph a cycling friendly city. The City also provided us with trail maps and key locations for collecting data on cycling in our perspective areas, this information was beneficial in undertaking observational counts and surveys in the Hanlon Creek Preservation and surrounding area.

3 Methods

In order to collect data for the purpose of our research topic, winter maintenance preferences of user groups in the Hanlon Creek Preservation area, we used two main
methods of data collection, observational count and surveys. We specifically chose these two methods as we believed they would allow us to achieve our one main objective of our research question, this is to provide recommendations of the common winter maintenance preferences of users within the trails of the Hanlon Creek.

3.1 Observational Data

We were able to achieve our first and second aim of our study, identifying the user groups and high intensity areas in the trails of the Hanlon Creek, by undertaking an observational count; a tally chart was the simplest and most effective way to do so as a lot of data could be recorded quickly (Youngblood, 2015; Figure 2). The observational counts were taken over three days, one in the morning, afternoon and evening. The choice of observational counts allowed us to mitigated chances of user groups being missed from our study, but the large dominance of dog walkers in our observational counts, 46 out of a total of 52 users, may have been related to the timing of day. Our observational counts could have been improved by undertaking at least one count on a weekend to diversify the potential users. In achieving our second aim the three highest intensity sites realised from our observational counts were Site 1: Highway 6 and Kortright Road Entrance, Site 2: Hanlon Creek Park, and Site 3: Sleeman Brewery Entrance (Figure 3). These sites were chosen as they had the highest numbers of traffic, we then used these three sites to undertake our surveys.

3.2 Surveys

The second data collection method we undertook was surveys, these were both in the form of opportunistic and convenience, through these surveys we were able to achieve our third aim of investigating and analysing the common winter maintenance preferences of user groups. Similarly to our observational counts we undertook these surveys over three days, twice in the afternoon and once in the evening, we realised from our observational counts that the mornings were the least busy and therefore decided to avoid this time. We collected our surveys at the three previously mentioned sites as these had the highest intensity (Figure 3). Our survey was designed using both quantitative and qualitative questions, we found our quantitative questions were most useful in collecting data that was able to be analysed easily and interpreted into graphs (Clifford, French, and Valentine, 2008; Figure 4). Comparatively, our qualitative questions provided various depths of detail from participants; although these were difficult to group they offered further insight into our study (Hay, 2010). We had a total of 26 respondents for our surveys, significantly less than our observed users, although the weather during our observational data had been mild but dry, compared to heavy snow and minus temperatures during survey collection. We then used these surveys, each previously given a code, to organise our data into an excel spread sheet in which data was used to create graphs for the survey questions, these graphs which can be found in the appendix, were incredibly useful in analysing the results of our research and in order to achieve our main objective of providing suggestions of common winter maintenance preferences.
3.3 Research methodology literature

Research methodology literature that influenced our data collection methods were widely available in the forms of textbooks, peer reviewed journal articles and websites, all of which provided in depth knowledge for structuring and undertaking research questionnaires. *Methods in Human Geography: a guide for students doing a research project* (Flowerdew and Martin, 2005) and *Conducting research in Human Geography* (Kitchin and Tate, 2013) were two useful sources that assisted us in creating our research survey, including knowledge of the usefulness of qualitative and quantitative questions and advice for analysing the data we had collected.

4 Findings

4.1 User groups

The results of our survey allowed us to provide answers to our research question, however what we had hoped to see in our survey results and what we actually found differed greatly. Our brief from our Community Partner, Jennifer Juste the Transport Demand Coordinator at the City of Guelph, had initially focused upon collecting results regarding winter maintenance preferences of winter cyclists, therefore we had hoped to find the presence of winter cyclists in order assist with the proposal of the Active Transportation Network in Guelph. However, what we actually found upon our data collection was in fact not a single biker inside of the Hanlon Creek but rather the large presence of dog walkers. Upon our data collection and analysis we found that 100% of respondents identified themselves as pedestrians (Figure 5), realising this could have a large influence on our data we broke the pedestrian user group down further into whether they identified as a dog walker or not (Figure 6). The further breaking down of the pedestrian user group found that 62% identified as dog walkers, this was important in assessing the influence of dog walkers on the common winter maintenance preferences.

![Dog Walkers within the Pedestrian User Group](image)

Figure 6, Graph showing dog walkers within the pedestrian user group

4.2 Entrances

Our second main finding regarded the popularity of entrances in order to access the trails of the Hanlon Creek, the most popular site being Site 1, Highway 6 and Kortright road (Figure 3 & 7) with 73% of all users entering here. We believe that the popularity of this entrance may be due to the availability of onsite parking, this is partly useful for users in the winter and those coming from great distances to use the trails; this entrance is also not coincidentally the entrance to the main dog park. An anonymous respondent solidified these assumptions during our survey collection by informing us that ‘This is the only
entrance I use because of the parking, I don’t live around here but it’s so nice to walk benjie [their dog].

![Graph showing the most popular entrances of users](image)

**Figure 7**, Graph showing the most popular entrances of users

### 4.3 Winter Cycling

Although we were unable to find the presence of cyclists during our observational counts and survey collection we did include a question in our survey (Figure 4) asking users if they had previously cycled on trails within the Hanlon Creek during the winter months, only two of our respondents had (Figure 8). We followed this question with another asking if they had felt safe whilst cycling on these trails, in which both respondents said that they didn’t (Figure 9), this may have influenced why they identified themselves as pedestrians rather than cyclists during our survey collection. From these results we can conclude that the maintenance wasn’t suitable for these two particular respondents quoting one anonymous respondent that “the trails were way to muddy, not up to my standard for cycling”.

### 4.4 Current winter maintenance

In order to determine the respondents’ attitudes towards the current winter maintenance of trails in the Hanlon Creek we asked users if they found the trails properly maintained (Figure 4), in which 65% of our respondents agreed that there was no problem with the trails (Figure 10). These results suggest that while the trails aren’t necessarily suitable for winter cyclists the maintenance is mostly suitable for the main user groups, pedestrians and dog walkers. The other 35% that said that they didn’t find the trails up to their standards said there was too much garbage on the trails and another who cycles every day in summer as his house backs out on to the land quotes that the trails “Should be maintained well as this park attracts a lot of people outside of Guelph and a railing should be placed on bridge to protect children and dogs from injury, if the park is open for another 100 years an accident will occur”.


4.5 Winter maintenance preferences

The final and arguably most important finding of our research regards the objective of our research question, the winter maintenance preferences of user groups of the trails in the Hanlon Creek Preservation Area. We specifically asked their personal preference for winter maintenance of the trails from pre-chosen categories in order to keep in accordance with the City of Guelph (Figure 4), we found from our data analysis that there was a fairly diverse range of preferences but that snow cleared and sanded was the most popular preference at 35% (Figure 11), followed by snow packed down at 27% (Figure 11). From these results it can be seen that pedestrians preferred a more natural look, with one respondent stating "I use the trails for nature walks now and then and would like the natural look to be maintained.", while dog walkers preferred snow to be cleared and sanded, 44% of dog walker respondents (Figure 12), as a few respondents claimed that salt can be damaging to dogs paws.

![WINTER MAINTENANCE PREFERENCE](image)

Figure 11, Graph showing the distribution of user group personal preferences of winter maintenance for the trails in the Hanlon Creek.

5 Discussion

Our study was limited by the lack of cyclist respondents which was especially disappointing regarding our initial hopes for our study as previously mentioned. The limited amount of bike users had a direct impact on relating previous literature to this study, for example the Sweden Study was particularly relevant to cyclists whereas our results weren’t. Further observational research of the Hanlon Creek preservation area also suggested that the weather, physical terrain and the presence of dogs were direct reasons for the lack of cyclists. However, conducting this study during the winter months we anticipated that the number of bike users on the trails would be limited. The weather strongly affected the frequency of respondents in general as seen in the comparison of our observational count where the weather was more favourable observing 52 users, in relation to our survey collection where the weather was much colder, surveying 26 respondents. It can be seen that the weather played a key role in the total volume of users, as well as the distribution of the specific users. Overall we believe that if the weather was warmer during the time of this
research than the potential for bike users throughout the Hanlon Creek Preservation Area would be more likely.

Considering that the Hanlon Creek Preservation Area is an environmentally sensitive area the preservation status limits our potential recommendations for future maintenance. However, from our research we found that the majority of users desired snow to be cleared and sanded followed by snow to be packed down, if it were to be allowed within the preservation restrictions. We believe that this preference of snow being cleared and sanded was popular because the use of sand as opposed to salt would be less harmful for dog’s paws. The large chunks of salt used to melt snow could pose a potential risk to the health of dog’s paws; prolonged contact with this salt could lead to chemical burns on their paws (Johnson, 2014). Due to the high volume of user groups categorised as pedestrians, and more specifically dog walkers, we can conclude that this preference has possible bias towards dog walkers and is not conclusive of cyclist’s preferences.

Overall the timing of our study proved to be unfavourable for collecting responses from both cyclists and user groups in general due to the severe weather conditions. The lack of winter maintenance in some areas, for example the Preservation Park, doesn’t seem to cater to cyclists or other wheels user groups due to the snowy, icy or muddy terrain not allowing for optimal use of this trail by these user groups. In the future we believe that if the trails were to be maintained more frequently and if they were clearer it would allow for the potential of different user groups to utilize the trails during the winter months as well, as was seen in the Sweden Study (Bergström & Magnusson, 2003). Although there was a lack of non-pedestrian users observed, we found a connection between pedestrian commuters using the trails as a shortcut across from residential areas to the Sleeman brewery, this increased the popularity of this entrance site by 12%. With this information we can suggest that further maintenance of trails has the potential to increase cycling trips and reduce car trips, as found in the Sweden study as previously mentioned (Bergström & Magnusson, 2003). Future studies may also benefit from being undertaken over a longer time scale, for example the beginning of winter right through to the end, as this has the potential to yield more results that are specific to winter cyclists. More respondents could also be found by using a similar technique to the Sweden study, dispensing surveys to four major businesses and down to employees rather than to individuals (Bergström & Magnusson, 2003). Another useful method to collect more in depth information regarding winter cycling could be to specifically target cyclist groups or organizations in Guelph through the use of interviews or focus groups.

6 Conclusions

To conclude, we as a research team, we were able to achieve the main objective of our research study of providing recommendations of the popular winter maintenance preferences of the trail user groups, as the two most popular preferences were for snow to be cleared and sanded, or snow to be packed down. This result was heavily influenced by the pedestrian user group, broken down further to include the dog walker sub-group, as we believed it necessary to represent the significant number of respondents that self-identified as dog walkers. In order to offer suggestions and or recommendations to aid with the City of Guelph’s proposed ‘Active Transportation Network (Figure 1) the sub group of ‘dog walker’s’
was relevant to our data analysis as it allowed us to include the specific winter maintenance preferences of what we found to be a rather large group of users. Adding this sub-group also enabled us to form a hypothesis on why cyclists may not be present on the trail during the winter months, as it would seem that this large presence of dog walkers would make it difficult for cyclists to easily manoeuvre around the trails.

Specifically in terms of the dog walker user group we were able to conclude, based on qualitative and quantitative data from our surveys that the majority of this group would prefer for the snow to be cleared and sanded. This preference was highly influenced by their concern of salt damaging the paws of their dogs. The other user group that we identified, pedestrians, were more concerned with a natural look, but stated that they would prefer snow to be packed down for a safer and easier stroll. We found that this safety concern was also present among those pedestrians who declared that they had, in the past, attempted to bike on this trail during the winter. This led us to make a correlation between these concerns and the absence of cyclists during our study period. A proportion of these pedestrians were commuters that were using the trail as a shortcut to the Sleeman Brewery, located at site 3 of our study. Again, in terms of the safety concerns and inability to easily manoeuvre on the trails that our respondents mentioned, we believe that further maintenance of these trails would be beneficial, as well as seems to be desired for the commuters.

Ultimately, our research has lead us to the conclusion that the City of Guelph’s proposed Active Transportation Network would benefit from more winter maintenance within the Hanlon Creek Preservation Area. If possible, within the limits of the preservation restrictions, incorporating the maintenance preferences of the user groups, snow being cleared and sanded and or packed down, would most likely increase public satisfaction. Additionally, if the ATN were to address the safety concerns and ‘lack of sufficient maintenance’ during the winter months, that our respondents divulged to us, it could potentially increase the use of trails for commuting purposes as well as attract cyclists to the trails.

Our study, although lacking in terms of winter cyclist’s preferences, addressed many of the concerns and desires of the user groups that were present on the trails. Although our research team undertook this study within the designated area, during the winter months, and utilized the city’s information on high intensity areas and times, we feel that due to the time constraints of our study, there was still much to results to be found. If further data on winter maintenance preferences of user groups within the Hanlon Creek Preservation Area is to be collected, researchers might do well to collect this data over a longer period of time as to yield better results. If research was to be collected from the start of winter to the near end, the number of respondents, including cyclists, and their preferred winter maintenance preferences may intensify.

7 References


JOHNSON, J. (2014). *BIKE WITH YOUR DOG - HOW TO STAY SAFE AND HAVE FUN* (1st ed.). [S.l.]: FRIESENPRESS.


8 Appendix
<table>
<thead>
<tr>
<th>User group</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td>6</td>
</tr>
<tr>
<td>Dog Walker</td>
<td>46</td>
</tr>
<tr>
<td>Cyclist</td>
<td>0</td>
</tr>
<tr>
<td>Wheels (Inline skating, skateboarding)</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>52</strong></td>
</tr>
</tbody>
</table>

Count for User Groups in the Hanlon Creek

Figure 2, Observational

Figure 3, Site locations for survey collection

Figure 4, Survey for winter maintenance preferences of user groups in the trails of the Hanlon Creek
Winter maintenance preferences of trails in the Hanlon Creek preservation area

Thank you for being a part of our research survey, today your information will be used by University of Guelph Students (The Campbell, Olivia Burke, Neelam Gill) to determine winter maintenance preferences for trails within the Hanlon Creek Preservation Area. Your participation is voluntary and you are free to withdraw at any time.

1) Age: [ ] 19-25 [ ] 26-35 [ ] 36-45 [ ] 46-55 [ ] 56-65 [ ] 66-75 [ ] 75+ [ ]

2) Gender: [ ] Female [ ] Male [ ] Other [ ] Prefer not to say [ ]

3) User group: [ ] Pedestrian [ ] Cyclist [ ] Wheels [ ] Other [ ]

4) How often do you visit the Hanlon creek preservation trails?
   Monthly [ ] Weekly [ ] Daily [ ] First time [ ] Other [ ]

5) What entrance do you most frequently use here on this trail?
   Highway 6/ Kortright [ ] Steeman Browny side [ ]
   Kortright (east entrance) [ ] Other [ ] .........................................................

6) Have you ever biked on this trail during the winter months?
   Yes [ ] No [ ]

7) If yes to 6 (above) did you feel safe while using the trail, and if not why?
   Yes [ ] No [ ]
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................

8) Do you feel as though the trails are maintained appropriately?
   Yes, there is no problem [ ] No, trails were difficult to endure [ ]

9) What is your personal preference of how the trails should be maintained during winter?
   No treatment [ ] Snow cleared & salted [ ] Snow cleared & sanded [ ]
   Snow packed down [ ] No preference [ ] Other (please specify) [ ]
   ........................................................................................................
   ........................................................................................................
   ........................................................................................................
Figure 5, Graph showing distribution of user groups

Figure 8, Graph showing distribution of respondents that had ever biked on the trails during the winter months
Figure 9, Graph showing distribution of respondents that did or didn’t feel safe while biking on the trails during the winter months

Figure 10, Graph showing the distribution of respondents that found the trails properly maintained

Figure 12, Graph showing the distribution of dog walker personal preferences of winter maintenance of trails in the Hanlon Creek