Post-Project Appraisal in Social Relationships between the Ecological Restoration Project on Stoney Creek and the Surrounding Community, Burnaby, British Columbia

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Scientific studies upon ecological restoration projects and their relation to nearby environments such as soil quality, invasive species, beetles living habitat have been studied extensively by varies research groups. However, researchers seem to have neglected the social relation between residence and the ecological restoration project. Knowledge on public attitudes and perceptions toward ecological restoration projects is essential in exploring the public's degree of supportiveness and in creating a sustainable restoration project. Using Stoney Creek in Burnaby, British Columbia as a case study, this study searches for the relationship between community members attitudes and knowledge towards ecological restoration by examining the correlation of the resident's place attachment, length of residency, and their willingness to engage. The study has found a direct relation between public's interest in ecological restoration and their willingness to engage. The public's willingness to engage also has a relation to their attachment to the creek. The public's awareness and knowledge is related to the residents' attachment to Stoney Creek and the duration of residency in the area. Proximity to the creek, however, does not seem to have a correlation to the public's perception of Stoney Creek's ecological restoration project.

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1. Introduction

As urban and agricultural developments encroach on stream environments, it is increasingly important to design and implement comprehensive management plans to ensure that the integrity of these ecosystems is not compromised. Following the completion of such projects, it is equally vital to assess the success of the project based on environmental, social and economic indices. While the science of ecological restoration projects (ERPs) has been extensively studied, the social implications of such projects have not been thoroughly researched or may even be overlooked (Petts, 2007). Public perceptions and community integration of an ecological restoration project is key to the sustainability of the project as it requires community members to ensure the stewardship of these projects in the long-term. Public perceptions, attitudes and knowledge toward ecological restoration should be studied as social aspects of ERPs such “place attachment” for ecosystem restoration have not been extensively studied ((Alam, 2011). Hidalgo and Hernandez (2001) defined place attachment as an affective bond or link between people and specific places. There are similar conceptual terms such as sense of community (Mcmillan & Chavis, 1986), community attachment (Trentelman, 2009), sense of place (de Wit, 2012), etc. (Hidalgo & Hernandez, 2001). Length of residency and proximity to the site has direct relation in affecting place attachment to a particular site as some studies suggests that resident’s attachment of the physical environment can be enhanced by long-term residency (Mesch & Manor, 1998) (Alam, 2011).

2. Case Study

Stoney Creek (SC) drains a watershed that covers 7.3km2 of Burnaby Mountain, British Columbia and flows 11.2km south into the Brunette River. Stoney Creek is a classic example of the salmon-bearing creek impacted by the surrounding urban area and the associated anthropogenic activities. Effects such as loss of riparian vegetation, reduction of stream complexity, and channel erosion caused by urbanization has an immediate effect on Stoney Creek's habitat degradation (Coast River Environmental Service Ltd & Kerr Wood Leidal Associates Ltd., 2000). Several ecological restoration projects were implemented over the years including building fish weirs that increase structural complexity and redirect fish to nearby fish ladder, off-channel pond and habitat that benefits salmon production, and replanting riparian forest. The Stoney Creek Environment Committee, the City of Burnaby, Metro Vancouver, the Department of Fisheries and Oceans, and Pacific Salmon Foundation were all integral players in the design and implementation of this project (Coast River Environmental Service Ltd & Kerr Wood Leidal Associates Ltd., 2000).

3. Problem Statement

While scientific indices such as invasive species, water chemistry and soil quality were found to be well studied, there was an apparent gap in understanding the social implications of ERPs. The goal of our post-project appraisal was therefore to explore social relationships between the ecological restoration project on Stoney Creek and the surrounding community with a particular focus on place attachment. We wanted to gauge awareness, perceptions and willingness to contribute time or money to ecological restoration projects. Additionally, we want to investigate whether there were relationships between the duration and proximity to

the creek of the residents and the levels of awareness, perceptions and engagement.

Some of the questions we wanted to answer were: How well is this project integrated into the community? What are the perceptions and the level of awareness of the surrounding Stoney Creek and the ecological restoration? In addition, we want to investigate what communities have already been created because the presence of the creek. How can we encourage existing communities such as schools to leverage the creek as a resource, an educational opportunity as well as an opportunity for citizen engagement and stewardship? Through our social survey, we intend to create recommendations to planners and ecological restoration project managers to enable them better integrate their ERPs into the surrounding community

4. Methods

The study consists of three components: social survey & SPSS (Statistical Product and Service Solutions) for the residents, visitors to the area and surrounding community, interviews with the restoration project planner and the organizations involved, and spatial analysis to illustrate the physical relationships between the creek, the urban trail and adjacent zoning. Details of the methods utilized to collect data and information for the project are presented in this section.

4.1 Social Survey and SPSS

The project aimed to measure people's level of interest, awareness, along with any other views concerning the ecological restoration project with this survey. There were fifty people to participate in the survey in the areas of Stoney Creek Community School and urban trail. Demographic and socio-economic factors were asked in the intercept survey. The quality

of the sample selected often determines the quality of the data, and can be representative of a larger population. Therefore, the survey investigated people's background information such as age, sex and highest level of education they have completed to gain a better understanding of where the information was obtained from. The study asked whether people have heard of Stoney Creek, whether they know that it is a salmon spawning environment and whether they know that it has been restored. The distance the participants live away from Stoney Creek and the time they have been living in the current neighborhood were believed to have impact on the frequency people use the trail. That might as well have influenced people's perceptions on how well connected they feel to Stoney Creek and how much they value the restoration projects and if they are likely to volunteer and donate.

SPSS was applied to analyze and interpret the results of the questionnaire by operating sample t-test to show the significance in age as an indicator of making a donation, correlation to reveal the relationships between residency duration, the awareness and connection to Stoney Creek, etc. Descriptive statistics and histogram revealed the basic understanding of data obtained from participants such as the total values in each category, average, maximum and minimum values. Regression and multiple regression models were used to make estimation for people's perception of their impact on the creek and the time they would volunteer, and other indices. *See attached questionnaire in Appendix A.*

4.2 Interviews

Interviews were taken with Alan James, the secretory of Stoney Creek Environment Committee, and Jonathan Bullcock, the environmental engineer from Department of Fisheries

and Oceans Canada. Both of them were highly involved with the design and implementation of the ecological restoration project. Their job responsibility and why their positions are significant to the project were asked to gain a basic understanding to the interviewees. The questions in the interview asked whether the interviewees noticed the increasing social awareness of the project over the year, the result of the project met his and/or the committee's expectations, and what are the indicators in saying the project was successful.

4.3 Spatial Analyses

For a spatial analysis of the area we discussed what type of maps and photographs might be useful in showing the social component of this habitat restoration project. There were many relevant maps available from sources such as the Lougheed Town Center Plan (City of Burnaby 1997). Although some maps were useful other maps were too cluttered or did not adequately depict the features of the study area. To remedy this we decided to create our own maps of the study area. Spatial analysis was done in three stages: group planning, GPS and photographic data collection, and mapping with a geographic information system.

Group planning began in the field when we started to look at different social aspects of the restoration project that had a spatial context. We decided to look at accessibility in a spatial context because previous studies have suggested that the accessibility of urban riverfront areas is important in achieving both ecological and social benefits (Che et al 2012). There have been many definitions of accessibility in various disciplines. Sociological accessibility could refer to how open and hospitable a place is or it could refer to how likely a space is to fully realize its "recreational, aesthetic, and educational values" while protecting species and ecosystems (Che et al 2012). Some components of a locations accessibility listed by

Che et al's 2012 paper include footpaths (which improve waterfront accessibility), adequate signage and navigational aids, equity (across income, living location and physical ability), visibility, and the capacity for various activities to coexist within a space.

Photographs were taken to indicate features of the study area and GPS data was collected for mapping purposes. A panoramic photo was taken to provide context of the visibility from the trail and photos of different types of graffiti were taken. GPS data was collected using a handheld Garmin 78s unit as "points" and "lines" and imported into Google Earth as .gpx files.

We used Google Earth to indicate features of the study area using the "Polygon" tool to create a map of the features of our study area. These points, lines, and polygons were saved as .kml files and then imported into ArcGIS using the KML to Layer conversion tool. Further mapping with ArcGIS 10.1 showed the location of the study area using a base map (BC Base WMS v2) with the study area highlighted in green. The part of the study area around the Elementary school was considered for the survey and not spatially analyzed.

By collecting GPS and photo data we were able to spatially analyze accessibility and better understand the area and how it is used by the public. Map 6 of the Lougheed Community Plan (Figure 1) was particularly interesting for comparison purposes because it predated the habitat restoration project and recommended locations for public trails around the restoration project. Even simple photographs were able to provide a better visual context of the trail and when combined with maps showing their locations they allowed for a better understanding of the space in and around the Stoney Creek ER project (Figures 1-7, 11).

5. Results

5.1 Quantitative Results - Participants Background & General Perceptions

The background information portion of the questionnaire helped provide a background for the analysis of the results. Due to time constraints, a representative sample size of 50 people was obtained. The mean age of our participants was 44 (Figure 10). Of the fifty participants, 44% of the respondents were male and 56% percent were female. Twenty-eight percent had taken some college or university education, 24% had obtained a bachelor's degree and 28% of the participants had completed graduate school or further, while the remaining 10% had high school level education or lower (Figure 11). The majority (82%) of respondents lived within 5km of the stream while 60% lived within 1km of the stream.

Ninety percent of respondents had heard of Stoney Creek and 56% were aware of the ecological restorations projects (ERPs) that had been implemented. The average participant felt that they were "somewhat" knowledgeable (2.88 out of 5) and "somewhat" connected (3.90 out of 5) to SC. They also felt that they had very little impact (1.92 out of 5) on the creek environment. In terms of the indices for the level of interests, 68% would donate towards ERPs, 64% were interested in finding out more, but less than half (only 44%) would be willing to volunteer for ERPs. Finally, it is noteworthy that 82% of respondents thought that it was very important restoration to have ERPs on Stoney Creek.

Based on the data on participant's length of residence, proximity of residence, knowledge of the restoration project and willingness to engage, 60% of the participants live less than 1 km away from Stoney Creek, and the mean length of these participants was 98 months. 90% of the participants have heard of Stoney Creek that runs through the area, and around 62%

of these participants acknowledge there were several restoration projects happening on Stoney Creek.

Pearson Correlation Results

Using the Pearson Correlation to analyse the data, the following relationships were discovered:

1. Age was positively correlated with whether or not they had heard of SC, how knowledgeable they perceived themselves to be about SC as a salmon-spawning environment, how connected they felt to SC and how important they thought it was to have ERPs on SC.
2. A strong positive correlation between the frequency with which the participant visited the urban trail adjacent to SC and their level of connection to the stream.
3. A positive correlation was established between the proximity of the participant's residence and their level of connectedness to SC.
4. A weak negative correlation between the duration of residency in the participant's current neighbourhood and their willingness to volunteer for ERPs.

The strongest relationship was found between the frequency with which the participant visited the urban trail adjacent to SC and their level of connection to the stream which resulted in a Pearson *r* value of 0.569 and a two-tailed significance value less than 0.000 which indicates an extremely high level of significance. Another prominent positive correlation was established between the proximity of the participant's residence to the creek (Q6) and their level of connectedness (Q12) with an *r* value of 0.369 and a high degree of significance (0.008). The two relationships suggest that a personal connection to the creek can be established by frequently

visiting or living close to the stream environment. This conjecture is consistent with place attachment theory coined by Hidalgo & Hernandez (2001).

While gender (Q2) and education (Q3) did not appear to have an effect other variables, age (Q1) was found to correlate with several indices of place attachment to SC. Age was positive correlated with whether or not they had heard of SC (Q4), how knowledgeable they perceived themselves (Q9), how connected they felt to SC and how important they thought it was to have ERPs on SC for significance and Pearson correlation coefficient.

An unexpected finding was that there was a weak negative correlation (r = -0.293) between the duration of residency in the participant's current neighbourhood and their willingness to volunteer supported by a significance level of 0.039. This meant that as the longer the duration of residency, the less likely that they would be willing to volunteer. This relationship is surprising because it contradicts the placement attachment theory supported by the previous two relationships. A barrier that many participants noted was that they would be inclined to volunteer if only they had more time. Perhaps, time and not disengagement was the main factor explaining this weak negative correlation. Additionally, when a person first moves into a new neighbourhood, they may more inclined to get involved in the community in order to get to know their neighbours and develop a sense of attachment to the place. Future studies could replicate this experiment with a larger sample size to verify the strength of the relationship (Table 1).

According to t-test results, participants' donation willingness appears to be different between age groups. Older age group (above average 44 years) shows a higher willingness to donate compare to younger age group (r^2 = 0.036) (Table 2).

The reported willingness to volunteer and to donate was associated with age and proximity to the creek. Older respondents living closer to the creek were more likely to donate and volunteer than younger respondents living further away. By using stepwise regression, participants are more interested in knowing about restoration project are more willing to volunteer if there are volunteering opportunities available (Table 3). There is also a positive correlation between participants' perceived impact on the creek and their willingness in volunteering for the ecological restoration project. Participants with a higher interest in donating money to the organizations that support ecological restoration tend to have lived to the neighborhood for the longest duration and tend to have a stronger sense of the importance of having ecological restoration on Stoney Creek. This may due to participants felt more connect and related to the creek, thus wanted to participate more in helping the creek (Table 1&4) . Distance lived from the creek was related to perceptions of the importance of ecological restoration. This was show by participants who live closer to the creek responding that ecological restoration was more important than those living farther away. However, proximity of home to the creek had no effect on awareness of the salmon habitat restoration project.

5.2 Qualitative Results

74% of the participants claimed to know very little or somewhat knowledgeable about Stoney Creek as a salmon spawning environment. Participants acquired their knowledge on Stoney Creek through varies way including local newspaper, nearby elementary school, and annual salmon send-off event. As we conducted the survey in a residential area, and encountered most of the participants near the Stoney Creek Community School, most of the

participants acquired their knowledge about Stoney Creek through their children who attend the elementary school. The Stoney Creek Community School was highly involved in educating the students on the importance in protecting the creek environment as section of the creek that runs right by the elementary school is easily accessible. Many of the participants also noted that the annual Great Salmon Send Off event held by SCEC was one of the most successful events in raising public awareness and knowledge in salmon habitat and restoration projects on Stoney Creek. Few of the participants acquired their knowledge from signage and posters along the creek (Figure 11).

When participants were asked about what recommendations they had on better integrate ecological restoration projects on Stoney Creek into the community, many of them suggested more signs and posters should be put to raise public awareness of the sensitive ecology of SC. Some of them suggested that updates on Stoney Creek should be mentioned more frequently so that people who don't read local newspaper as often would still have a higher chance to catch the updates on Stoney Creek.

In an interview with Allan James, secretary of the Stoney Creek Environmental Committee, Allan has mentioned that there's definitely an increase in awareness throughout the year as garbage and shopping carts used to be a major concern and disruption of the nearby ecology. However, he was not clear whether the awareness has increased in the past few years as he no longer lived in the Stoney Creek neighborhood. But annual family events such as the Great Salmon Send-off would unquestionably be a great way to raises public awareness in the community as the amount of salmon returning has been increasing since 2004 (James, per comm).

5.3 Additional Findings

The spatial analysis of our study area (Figure 2) looked at accessibility as well as other factors such as cleanliness, openness, and variety of activities present. The accessibility of the area was found to be fairly good, with two access points (Figure 3) leading to the Urban Trail (Trail on Figure 3). Some trails that were recommended for construction in the 1997 Lougheed Town Center Plan were not eventually built like the Burnaby Mountain Urban Trail. The red line "Footpath" on Figure 3 shows one such trail that did not end up being constructed but is currently being used unofficially by the public.

There were not many alternative activities in our study area although there were tennis courts in Eastlake Park North East of the area. The main activities involve trail use such as walking or biking. The park is very open and welcoming although there was some evidence of graffiti. One type of graffiti found was the classic "spray paint vandalism" defacing concrete pillars by the Skytrain (Figure 7) but "positive" graffiti was also present in the study area. The bridge upstream of the ER project had chalk depictions of salmon, flowers, water flowing over rocks, and cats chasing mice alongside some extremely positive comments like "You can see everything from the Skytrain!" and "Have a nice day!". This is shown in Figure 8.

This type of evidence illustrates the variety of human activity that can be present in assessing the public interactions with a specific area. Accessibility is also an important consideration that should be reconsidered after an ER project is completed to assess things like how adequate existing trails are. A more comprehensive spatial analysis with a larger study area and more data collection would better explain these issues.

6. Conclusion

The act of restoration, according to Edgar (2007), is an inherently cultural act "between humans and nature that is mediated by social norms". We examined the human ecology of urban salmonid habitat restoration in Stoney Creek, BC, Canada. The salmonid is a cultural keystone species that inspires the restoration project. This particular project is focused on restoring fish access for upstream migration and rehabilitation off-channel habitat for juvenile rearing. Since the project started in summer 2012, it has met their objectives of successfully improving self-sustaining salmonid population on Stoney Creek (James, unpublished). Ecological restoration actions are critical not only for the ecosystem health, but also are essential for its cultural, recreational, and educational value for its residents (Alam, 2011). This study explored the relationship between community members' attitude and knowledge towards ecological restoration by examining the correlation of the residence's place attachment, length of residency, and their willingness to engage.

The Stoney Creek Ecological Restoration was initially focused on the techniques of improving the salmonid population on the creek. Residents acquired their knowledge through varies signage and posters that were set up adjacent to the actions sites on the creek. In the later phases of the project, the Stoney Creek Environmental Committee had collaborated with Stoney Creek Community School create ecology educational programs, such as Annual Great Salmon Send-off and information sections on the school newsletters. The committee have increased their brochures and educational displays through different events. They also provide opportunities for residents to participate in their monitoring and enhancement projects. As more outreach programs being implemented, it encourages more local residents to become

interested and involved during the whole process. Public attitudes toward the restoration program become one of the most critical ways to continuous maintain and monitor the projects in the long term.

7. Appendix B

Correlations

		Q1_Age	Q2_Gender	Q3_Education	Q4	Q5	Q6	Q7	Q8 (months)	Q9_Knowledge_salmon_env	Q10_Connection	Q11_Impact_2	Q12_Importance_restore_2	Q13_Volunteer	Q14_Volunteer_time	Q15_Donation	Q16_Interest_restoration_2
Q1_Age	Pearson Correlation	1	-.280*	.046	-.405**	-.252	-.027	.290*	.292*	.425**	.440**	.006	-.287*	.119	.076	-.154	-.229
	Sig. (2-tailed)		.049	.752	.004	.077	.851	.041	.039	.002	.001	.965	.043	.410	.599	.286	.109
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q2_Gender	Pearson Correlation	-.280*	1	-.177	-.107	.136	-.085	.216	-.128	.017	.189	-.041	.036	.026	.090	.003	-.109
	Sig. (2-tailed)	.049		.220	.458	.345	.558	.132	.374	.905	.189	.777	.804	.858	.535	.981	.450
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q3_Education	Pearson Correlation	.046	-.177	1	-.183	-.265	.196	-.118	-.030	.187	-.030	.133	-.082	.007	.142	-.063	-.075
	Sig. (2-tailed)	.752	.220		.204	.063	.172	.416	.834	.194	.839	.359	.573	.960	.327	.666	.604
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q4	Pearson Correlation	-.405**	-.107	-.183	1	.376**	.132	-.139	-.244	-.508**	-.512**	-.143	.149	.027	.032	.057	.089
	Sig. (2-tailed)	.004	.458	.204		.007	.362	.335	.088	.000	.000	.321	.302	.853	.824	.693	.540
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q5	Pearson Correlation	-.252	.136	-.265	.376**	1	.085	-.041	-.264	-.353*	-.319*	-.121	.264	-.188	-.187	.169	.207
	Sig. (2-tailed)	.077	.345	.063	.007		.558	.779	.064	.012	.024	.401	.064	.190	.193	.240	.150
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q6	Pearson Correlation	-.027	-.085	.196	.132	.085	1	-.419**	.120	-.056	-.369**	.076	-.052	.048	-.001	.130	.197
	Sig. (2-tailed)	.851	.558	.172	.362	.558		.002	.405	.697	.008	.602	.718	.742	.994	.369	.169
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q7	Pearson Correlation	.290*	.216	-.118	-.139	-.041	-.419**	1	-.210	.097	.568**	.026	-.213	.251	.209	-.092	-.360*
	Sig. (2-tailed)	.041	.132	.416	.335	.779	.002		.143	.503	.000	.857	.138	.079	.145	.523	.010
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q8 (months)	Pearson Correlation	.292*	-.128	-.030	-.244	-.264	.120	-.210	1	.472**	.131	.039	-.070	-.368**	-.293*	.277	.152
	Sig. (2-tailed)	.039	.374	.834	.088	.064	.405	.143		.001	.363	.789	.629	.009	.039	.052	.293
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q9_Knowledge_salmon_env	Pearson Correlation	.425**	.017	.187	-.508**	-.353*	-.056	.097	.472**	1	.547**	.241	-.291*	-.079	.067	-.004	-.130
	Sig. (2-tailed)	.002	.905	.194	.000	.012	.697	.503	.001		.000	.092	.040	.587	.644	.978	.368
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q10_Connection	Pearson Correlation	.440**	.189	-.030	-.512**	-.319*	-.369**	.568**	.131	.547**	1	.100	-.301*	.221	.129	-.049	-.354*
	Sig. (2-tailed)	.001	.189	.839	.000	.024	.008	.000	.363	.000		.490	.033	.122	.371	.738	.012
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q11_Impact_2	Pearson Correlation	.006	-.041	.133	-.143	-.121	.076	.026	.039	.241	.100	1	-.112	.121	.224	-.041	.140
	Sig. (2-tailed)	.965	.777	.359	.321	.401	.602	.857	.789	.092	.490		.438	.401	.118	.775	.331
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q12_Importance_restore_2	Pearson Correlation	-.287*	.036	-.082	.149	.264	-.052	-.213	-.070	-.291*	-.301*	-.112	1	-.204	-.101	.332*	.263
	Sig. (2-tailed)	.043	.804	.573	.302	.064	.718	.138	.629	.040	.033	.438		.155	.485	.018	.065
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q13_Volunteer	Pearson Correlation	.119	.026	.007	.027	-.188	.048	.251	-.368**	-.079	.221	.121	-.204	1	.773**	-.342*	-.450**
	Sig. (2-tailed)	.410	.858	.960	.853	.190	.742	.079	.009	.587	.122	.401	.155		.000	.015	.001
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q14_Volunteer_time	Pearson Correlation	.076	.090	.142	.032	-.187	-.001	.209	-.293*	.067	.129	.224	-.101	.773**	1	-.235	-.319*
	Sig. (2-tailed)	.599	.535	.327	.824	.193	.994	.145	.039	.644	.371	.118	.485	.000		.101	.024
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q15_Donation	Pearson Correlation	-.154	.003	-.063	.057	.169	.130	-.092	.277	-.004	-.049	-.041	.332*	-.342*	-.235	1	.297*
	Sig. (2-tailed)	.286	.981	.666	.693	.240	.369	.523	.052	.978	.738	.775	.018	.015	.101		.036
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
Q16_Interest_restoration_2	Pearson Correlation	-.229	-.109	-.075	.089	.207	.197	-.360*	.152	-.130	-.354*	.140	.263	-.450**	-.319*	.297*	1
	Sig. (2-tailed)	.109	.450	.604	.540	.150	.169	.010	.293	.368	.012	.331	.065	.001	.024	.036	
	N	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 1 Correlation of all variables in the survey

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Volunteer Willingness	Equal variances assumed	.201	.656	.970	48	.337	.231	.238	-.247	.709
	Equal variances not assumed			.994	47.934	.325	.231	.232	-.236	.697
Donation Willingness	Equal variances assumed	4.675	.036	-1.190	48	.240	-.159	.134	-.428	.110
	Equal variances not assumed			-1.171	42.071	.248	-.159	.136	-.433	.115

Table 2 Independent samples test between different age group with volunteer and donation willingness. The significant value for willingness to donate is 0.036<0.05.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	3.463	1	3.463	5.430	.024[b]
	Residual	30.617	48	.638		
	Total	34.080	49			
2	Regression	5.975	2	2.987	4.996	.011[c]
	Residual	28.105	47	.598		
	Total	34.080	49			
a. Dependent Variable: Volunteer willingness						
b. Predictors: (Constant), Interest in restoration.						

c. Predictors: (Constant), Interest in restoration., Impact to Stoney Creek

Table 3 Stepwise regression with volunteer willingness as denpendent variable, predictors are impact to the stoney creek and interest in restoration.

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1.202	1	1.202	5.960	.018[b]
	Residual	9.678	48	.202		
	Total	10.880	49			
2	Regression	2.186	2	1.093	5.908	.005[c]
	Residual	8.694	47	.185		
	Total	10.880	49			
a. Dependent Variable: Donation Willingness						
b. Predictors: (Constant), Importancy of Restoration Project						
c. Predictors: (Constant), Importancy of Restoration Project, Residential Period						

Table 4 Stepwise regression with donation willingness as denpendent variable, predictors are importancy of restoration project and residential period.

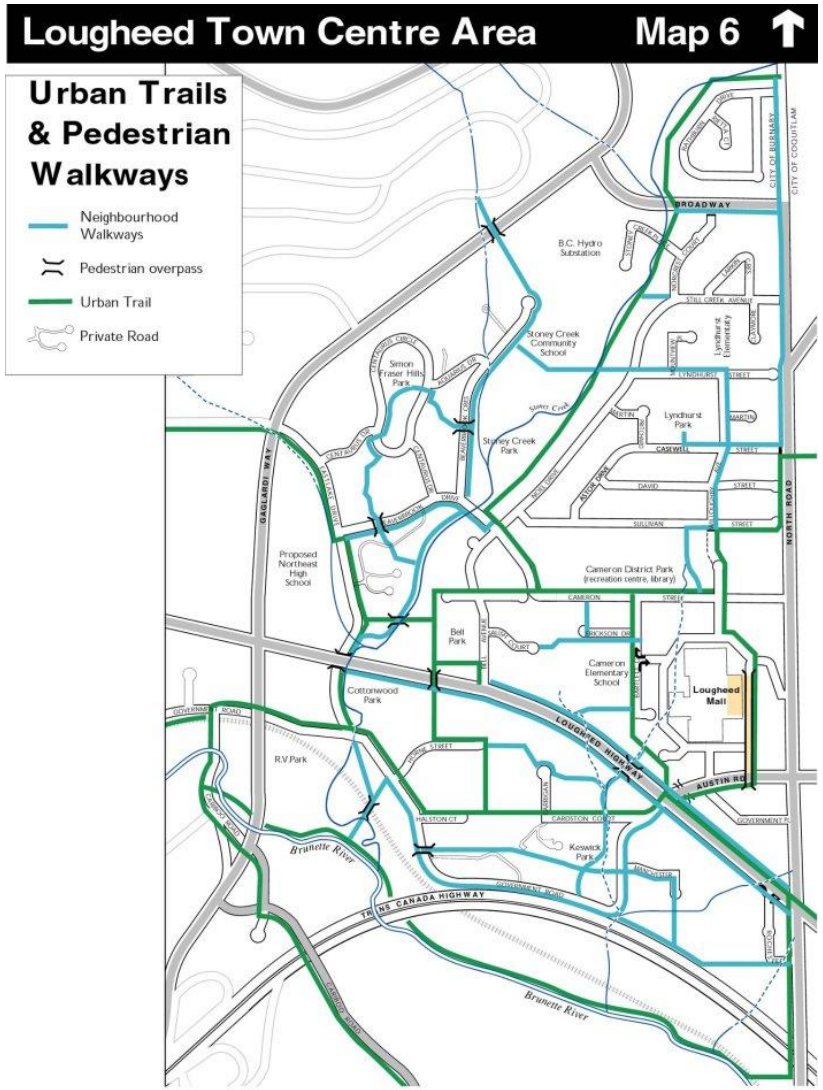

Figure 1 – Proposed trails and walkways from the 1997 Lougheed Town Center Plan (1997)

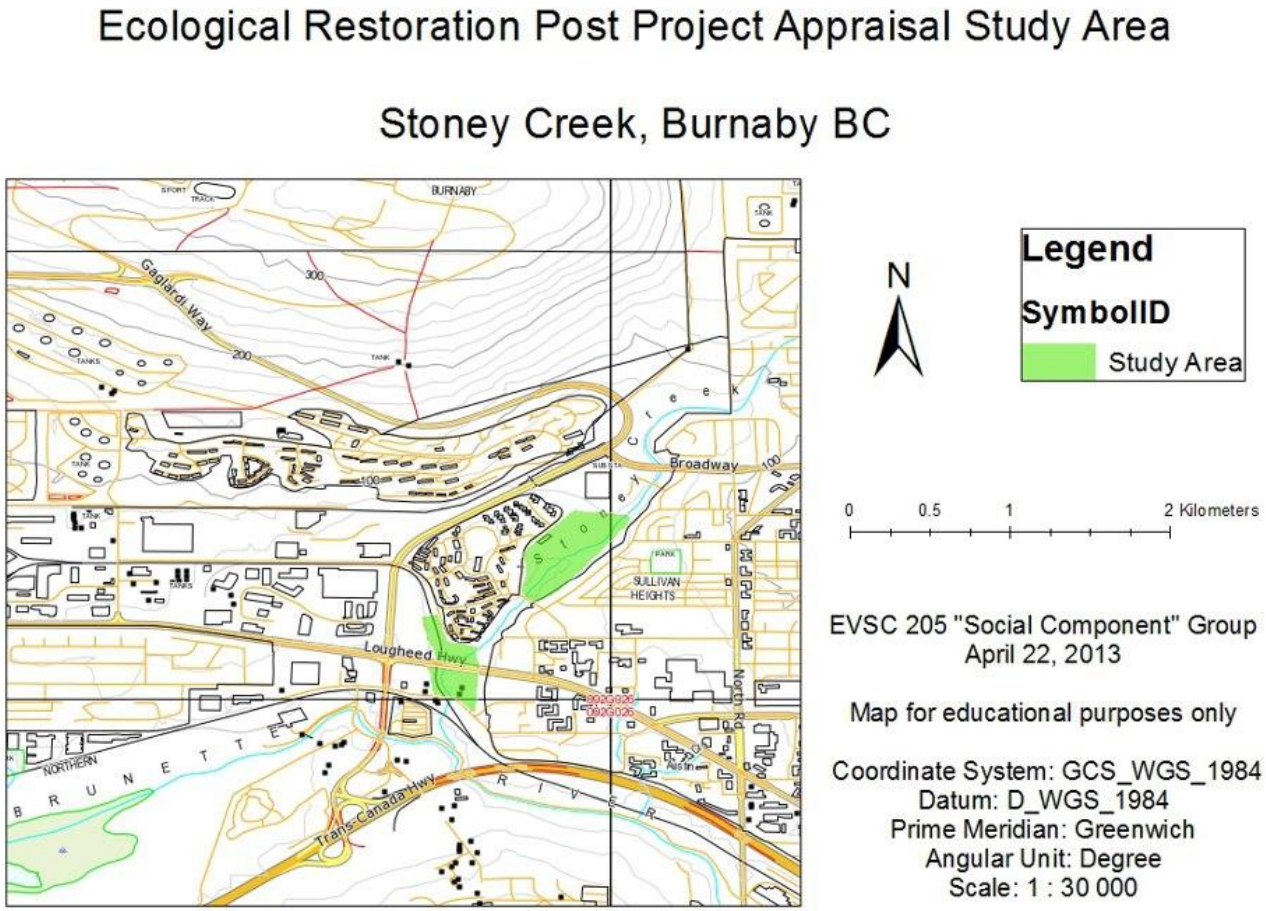

Figure 2 - The study area in Stoney Creek. Stoney Creek flows South West into Brunette River. Created in ArcMap 10.1

Figure 3.The accessibility area of the urban trail. Features indicated include access points, hand drawn stream, GPS data based trails, bridge, and ecological restoration components (ie. pond/monitoring station). Created in Google Earth Pro.

Figure 4 – (looking North) South Access of Burnaby Urban Trail (Access 2 on Figure 2)

Figure 5 – (Looking North West) North Access of Burnaby Urban Trail (Access1 on Figure 2)

Figure 6 – (Looking North East from Access3) “Unofficial” footpath near Stoney Creek stream (Also shown as red line in Figure 2)

Figure 7 – Ugly spray painted graffiti on Skytrain pillar

Figure 8 – (Looking SouthWest from Bridge) Awesome chalk graffiti. Notice salmon and stream on top rail and “Skytrain lets you see everything” comment on lower rail. Footpath indicated in Figure 2 is visible in background.

Figure 9. Signage and posters along Stoney Creek.

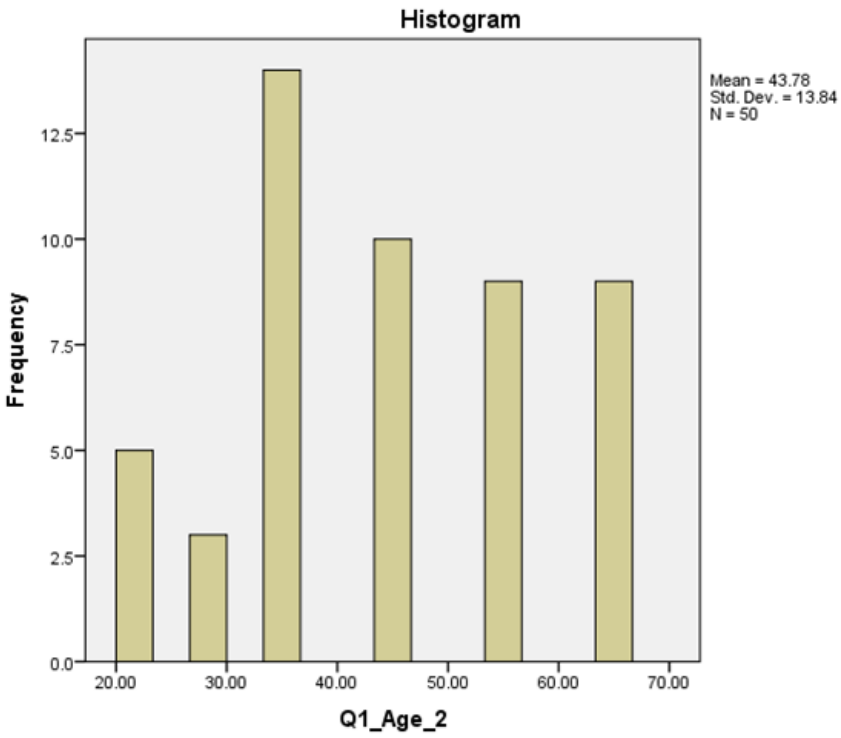

Figure 10 - Frequency of age for the participants.

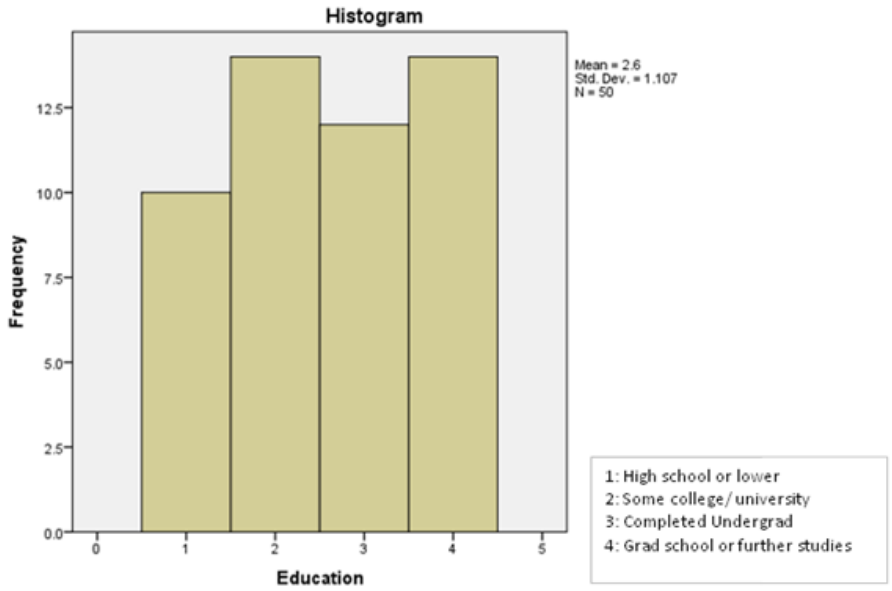

Figure 11 Histogram of education level

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