

University of  
Lethbridge

# HOUSEHOLD SURVEY RESULTS BARRIERE, BC, 2010

*Technical Report*

## THE HOUSEHOLD SURVEY

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## Background

Mounting concerns about individual and community preparedness for disasters are being voiced, in part as natural disasters are increasing. In Canada, circumstances such as pine beetle infestations, reduced precipitation coupled with above normal temperatures, and an increased number of homes in forested areas contribute to the increased occurrence of wildfires and their impact on humans. In order to understand community response to wildfires, a mixed method study was conducted (2008-2010) in two communities in western Canada: Barriere, British Columbia and La Ronge, Saskatchewan (ruralwildfire.ca). These two communities were selected as they had endured wildfires that resulted in community evacuation with significant loss of property (McClure fire in BC, 2003; and, Mallard fire in SK, in 1999).

Specifically, the study was developed to determine the types of local social dynamics and institutional structures which contribute to resiliency in rural settlements that have experienced disasters and to determine how resiliency is manifested under these circumstance at: a) an individual or household level; and, b) a collective level. Local advisory boards were created and local individuals were hired to work as re-search assistants. Qualitative interviews were initially conducted with the simultaneous development of community profiles of the participating communities. Household surveys were also conducted in each community and another community which did not experience a wildfire (Coaldale, Alberta). This technical report presents the findings from the household survey that was conducted in Barriere, BC and the surrounding area.

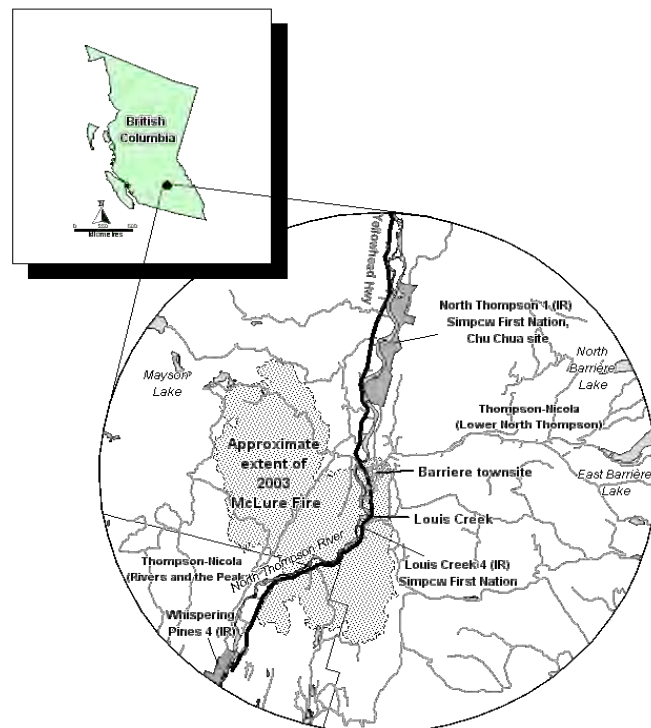


Figure 1

Barriere Study Area



**Skull Mountain After the Fire**  
*Photo Courtesy of J. Kulig*

***“Our local people are taking the wisdom that they received from the fire and are working with it to try and develop stuff that is going to make a difference”***

***Community Member***

## ETHICAL CONSIDERATIONS

Institutional ethical approval was granted by the University of Lethbridge for the project. In addition, the proposal was reviewed and approved by the Interior Health Services.

## SURVEY DEVELOPMENT

In the original research proposal, we proposed to conduct a mailed household survey in the participating communities. Four of the research team members worked by distance throughout 2008 to devise a questionnaire that would capture the wildfire experience of residents and their perceptions of social support, social cohesion, community resiliency, health and well-being, as well as residents' reported behaviours of community participation. The literature, findings from the qualitative interviews, and the researchers' past experience with previously developed tools guided the development of the questionnaire.

The *General Inventory Questionnaire for Disasters*<sup>1</sup> was modified to specifically inquire about wildfires. For those participants in Barriere and LaRonge, respondents were asked about the amount of warning they had to prepare for the wildfire, the danger and damage experienced by the wildfire, and experience of evacuation. A series of questions about social support were replicated from the *New Rural Revitalization* (NRE) project<sup>2</sup>, as well as from the *General Social Survey*.<sup>3</sup> The previously designed questions were modified to capture participant actions before, during and after the wildfire. Social cohesion questions asked about the feelings of respondents living in their respective communities; the questions were taken from the NRE survey and originally were based on the *Neighborhood Cohesion Instrument*.<sup>4</sup> Questions related to community resiliency were based on a previous mailed survey used in Alberta.<sup>5</sup> The questionnaire also contained questions on self-reported health and selected questions about chronic health problems, taken from the *Canadian Community Health Survey* (CCHS) and a question about stress from the NRE survey. Queries about active involvement at the local community level and rural well-being were based on work by Hungerford and Townsend.<sup>6</sup> Demographic variables were constructed to mirror the information gathered in national surveys, such as the CCHS.

Members of the local advisory teams in Barriere and LaRonge provided input and feedback about the content, format and length of the questionnaire and plans for mail delivery. It was during an onsite visit to LaRonge in October 2008 that the researchers realized that distributing the questionnaire via the mail would not result in the desired response rate. After much discussion, a decision was made to change the method of questionnaire administration to a structured interview and to hire local research assistants to gather the information by interviews with residents from randomly selected households. This revised strategy was applied to the two communities that had experienced wildfires, as well as the control community. The final versions of the structured interview guide and the participant selection guide, tailored for each community, were finalized in January 2009. Standardized training sessions for the research assistants were conducted in February 2009 in Barriere, and in LaRonge at the end of April 2009.

## SELECTING THE HOUSEHOLD SAMPLE & REPRESENTATIVENESS

A sampling strategy was developed to choose randomly selected households within the study region. The sample frame of households was developed as follows:

- 1) a GIS (Geographical Information Systems) software (MapInfo Professional) was used to identify a 25 km buffer region surrounding the population centre of Barriere for which coordinates were derived from the National Atlas of Canada. This region included the communities of Louis Creek and McLure, as well as the First Nations community of Chu Chua (see Figure 1).
- 2) All postal codes lying within the 25km buffer region were identified.
- 3) An electronic route planning software with combined electronic telephone directory (Street Atlas USA 2009+) was used to identify all residential names/addresses matching these postal codes ( $n=1439$ ).
- 4) All of these addresses were geocoded to identify residential location. The geocoding produced four levels of geocoding accuracy: exact street and address accuracy; street-level accuracy; FSA (Forward Sortation Area) accuracy; and regional accuracy. The last two provide unreliable locational information in terms of household contacts and so only those households with exact or street-level accuracy were retained in the sampling frame ( $n=1013$ ).



*Photo Courtesy of MDS*

From the sample frame of 1013 households with reasonable location accuracy, three sets of 250 randomly selected (without replacement) households were identified. Each set was mapped over a series of 1 km by 1 km grids using the GIS to check for adequate sample coverage throughout the study area. Each sample set functioned as the primary, secondary, and tertiary sampling lists for the researchers conducting the face-to-face interviews.

A day-long training session was held in Barriere during February 2009 for locally hired interviewers by two members of the research team (J. Kulig; I. Townshend). Research procedures, including use of the sampling lists, issues of confidentiality, and practice using the structured questionnaire guide occurred during the training session. Face-to-face structured interviews were carried out by a team of local research assistants; each assigned a share of the primary, secondary, and tertiary sample lists. Households on the primary list were approached and to ensure random selection of male and female respondents, an adult with the most recent birthday was invited to participate in the survey. Members of the household were ineligible to participate if they did not reside in the community during the wild-fire. If participants were ineligible, or if there was no response or contact after 3 visits, an address from the secondary sample list (or tertiary list if required) was used as a substitute. Household contacts continued in this manner from February 27 to August 7, 2009. Weekly teleconferences were held with research assistants and one of the researchers (D. Edge) to discuss data collection issues. Guidance to interviewers was provided through a weekly scheduled teleconference call during the duration of data collection. The household survey in Barriere yielded 202 useable responses, providing a reasonable measure of survey accuracy. Assuming a population of 1439 households in the area, the sample data provides a margin of error of +/- 6.4% at the 95% confidence level and +/- 5.4% at the 90% confidence level.



"The Valley"

Photo Courtesy of MDS

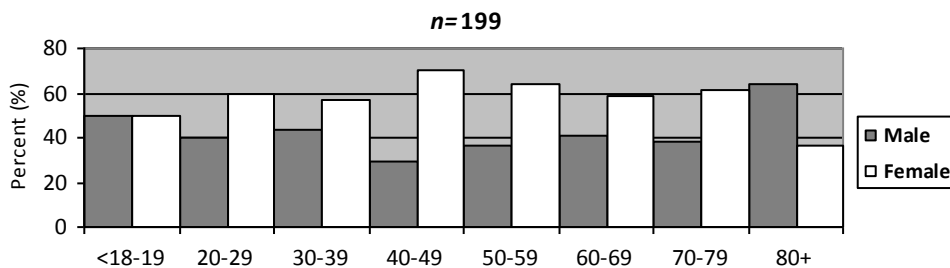
### WHO WERE THE PARTICIPANTS?

In the Barriere household survey, the largest proportion of respondents were female ( $n=122$ , 61.3%). Females are over-represented amongst Barriere respondents by approximately 10% compared to the proportion of Barriere females reported in the 2006 Census (49.5% female). The households ranged in size from 1-6 persons with 48% composed of 2 people. The vast majority of responding households had no minors living with them ( $n=160$ , 80.4%). Forty-four percent of the respondents were between the ages of 45 and 64 ( $n=89$ ) (See Figure 2), which is consistent with the census information from 2006 ( $n=1060$ , 42%). Slightly more married people participated in the survey compared to the total Barriere population in 2006 (57% vs. 52%). The majority of respondents (58%) had a high school diploma or less, with 5% reporting being unemployed, 38% were employed and the majority of respondents (46%) reported being retired. Annual household income for 42% of respondents was reported to be between \$20,000-39,000, which is comparable to the median reported earnings of \$15,681 and average earnings for full time workers of \$38,192 in Barriere in the 2006 census.

*"Tragedy draws people together, it's not that that has to be the way it happens. As far as restoring this community, I think there's more of a chance for resiliency now in the community than ever before"*

*Community Member*

Figure 2: Age Structure



### EVACUATION EXPERIENCES

Of the 201 individuals who responded, 57% ( $n=115$ ) did not have a chance to prepare for the evacuation. Of the 84 respondents who reported having a chance to prepare, nearly 30% ( $n=25$ ) had more than 12 hours of warning time regarding the fire, whereas 15% had less than one hour to prepare. Those who reported having time to prepare were asked about their preparation to deal with the fire and 82 responded. Of these, 27% ( $n=22$ ) had previous training, 37% ( $n=30$ ) had previous knowledge and 29% ( $n=24$ ) had previous experience dealing with fires. Of the total sample, 68% ( $n=136$ ) were overwhelmed by the suddenness of the fire and 77% ( $n=154$ ) were overwhelmed by the severity of the disaster. Despite the severity of the fire, only 7% ( $n=15$ ) came near death and of this group only one individual thought they would die and four thought it was possible they would die while dealing



Photo Courtesy of MDS



Photo Courtesy of MDS

with the fire. Thirty-one participants (15%) reported that someone close to them came near death due to the fire.

Many individuals assisted in the fire efforts of their own property or of other family and friends. Sixty-three Barriere residents (31%) reported the hours they actively fought the McClure fire. Among this group, the hours spent fighting the fire ranged from 1 -720 hours. The mean number of hours fighting the fire was 95 hours (SD=176.8).

Among the household survey respondents, 34 (16.9%) indicated that they defended their property against the fire. Seventeen (8.4%) respondents reported being trapped by the fire and 2.5% ( $n=5$ ) were injured but only one had a moderately severe injury and three suffered mild injuries. The other individual did not respond about injury severity.

Ninety percent ( $n=181$ ) of the household respondents were evacuated. Of this total, 63% ( $n=114$ ) were evacuated once, 27.6% ( $n=50$ ) were evacuated twice, 8.3% ( $n=15$ ) were evacuated three times and 1% ( $n=2$ ) were evacuated four times. Approximately 40% ( $n=72$ ) of all respondents reported being separated from family during evacuation.

Fifty-three respondents (26.2%) lost their home; twenty-seven (13.4%) lost their business or farm, 60 (29.7%) lost their neighbourhood, and 103 (51.2%) lost their town due to the fire. Of those who lost their home, 8 (4.0%) indicated it was totally destroyed, 10 (5.0%) noted it was partially destroyed and 32 (15.8%) said their home was damaged, but not severely. For those who lost their town, 60 indicated it was partially destroyed.

The clean-up after the fire also required extensive time for those who had been evacuated and then returned to their property to deal with the damage ( $n=125$ ). The range of clean-up days was from one-half day to 365 days, with a mean of nearly 21 days (SD=43.9). A number of individuals spent up to 20 days doing clean up ( $n=96$ , 48.6%).

After the fire, 65 respondents (32%) indicated that they had lost their ability to work. For this subgroup of respondents, 22 respondents (34%) indicated that their workplace was destroyed by the fire. An additional seven individuals noted that their work was not needed and 16 had lost a personal capacity to work. Eighteen respondents indicated that there were other reasons for not working after the fire. Many of the reasons were directly related to the fire, including that the consumer base was lost due to the loss of the Tolko mill, bankruptcy of the company due to the fire, loss of clientele due to their relocation or inability to secure business due to the fire.

Beyond the responses to the specific questions, there were numerous individual responses regarding the impact of the fire. People disclosed that they had continual health problems (breathing difficulties), some experienced heart attacks, others had severe anxiety, depression and nervous breakdowns. Many have had continual financial problems due to the lack of home insurance and loss of their home; others lost their jobs and have had to move away or stay and manage on limited incomes.

## SOCIAL SUPPORT NETWORKS

After the fire, there were many changes that the individuals within the affected communities had to address. For those in the Barriere area, 63.2% ( $n=110$ ) of the individuals experienced a change in their living arrangement, 52.8% ( $n=95$ ) in their financial income, 42.4% ( $n=75$ ) in their employment, and 32.7% ( $n=56$ ) in their health after the fire. The change in their living arrangements were identified as being the one with the **greatest impact** ( $n=46$ , 22.8%) followed by financial income ( $n=43$ , 21.3%), health ( $n=26$ , 12.9%) and then employment ( $n=20$ , 9.9%). However, the respondents were also asked about the change with the greatest impact, 61.5% ( $n=110$ ) indicated it was resolved and 34.6% ( $n=62$ ) stated it was ongoing.

From a list of possible resources, the respondents chose the following most frequently that they accessed: society public benefit organization (40.2%,  $n=78$ ), social services (33.5%,  $n=68$ ), religious organizations (34.7%,  $n=67$ ), radio (33.3%,  $n=65$ ), and television (26.7%,  $n=52$ ). The most common family resources were spouse (29.6%,  $n=58$ ), friends (25.1%,  $n=49$ ) and other relatives (14.8%,  $n=29$ ). The most common professional resources were physicians (15.9%,  $n=31$ ), counselors (12.8%,  $n=25$ ), religious leaders (8.2%,  $n=16$ ) and accountants (7.2%,  $n=14$ ). Barriere was not incorporated at

*“The whole experience was like a dream, you can’t actually believe it’s happening and even after this day when you go through McClure and Louis Creek...oh dear. This did happen! It’s still really unbelievable.”*

*Community Member*



Photo Courtesy of MDS

the time and hence the questions in relation to government assistance were not applicable.

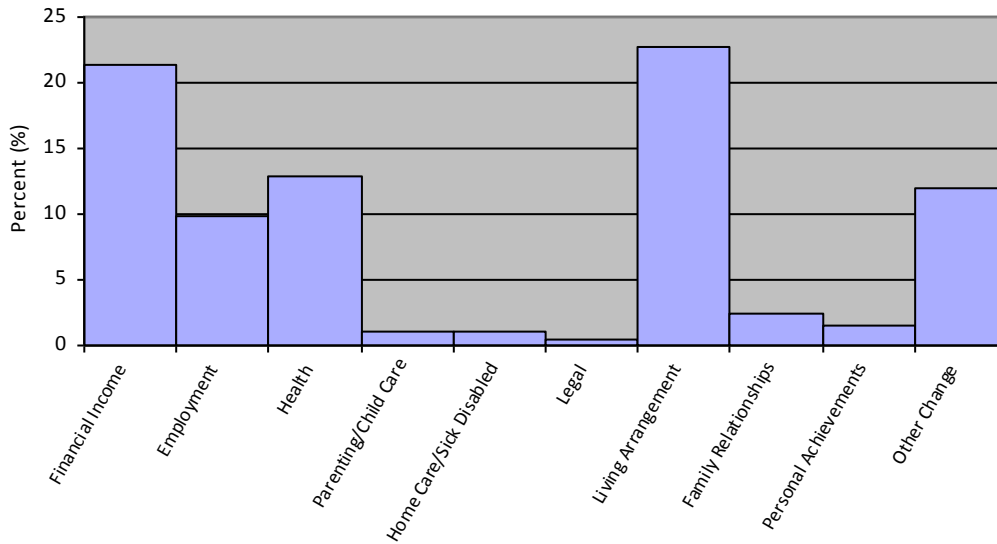
There were both positive and negative impacts due to the changes that were experienced (See Figure 3). The only ones that had more positive changes related to relationships (friends {22.0%, n=44}, family {20.0%, n=40}) whereas the remainder were more negative: (wealth {31.3%, n=63}, work success {25.6%, n=51}, mental well being {24.0%, n=46}, and physical health {10.0%, n=20}).

As individuals, respondents did not believe that the physical environment negatively affected their lives (strongly disagree and disagree: 75.1%, n=148), things to stay healthy (strongly agree and agree: 95.0%; n=190), they have support from others to stay healthy (strongly agree and agree: 89.0%, n=178) and they can deal with problems in their life (strongly agree and agree: 92.9%, n=185).



Photo Courtesy of MDS

Figure 3: Degree of Change (positive or negative)



*“Then again, that speaks to the bottom line of rural community and rural gentry. They do what it takes to get things done and will do it as long as it takes to get it done.”*

*Community Member*

## HEALTH & WELL-BEING

As noted in Figure 4, the respondents most often reported their health as good (40.0%, n=80). Nearly the same number of people (n=79, 39.5%) reported their health as ‘very good’ or ‘excellent’. This compares to nearly 59% of British Columbians who reported their perceived health as ‘very good’ or ‘excellent’ in June 2010.<sup>7</sup> One hundred thirty-five individuals (67.8%) reported that their health was about the same compared to before the fire, with only 37 (18.6%) reporting it as somewhat worse. In total, 93 (46.7%) of the respondents indicated that their life was somewhat stressful whereas 63 (31.7%) indicated it was not stressful, 23 (11.6%) said it was not at all stressful, and 9% (n=18) reported their life as very stressful.

A 21-item scale measuring anxiety was used in the survey. Scores could range from 0 to 63, with a higher score indicating a higher level of anxiety. The average anxiety levels in all three communities were low and highly skewed, with an overall mean of 4.59 (SD=6.5). In Barriere, the scores ranged from 0 to 51, with a mean score of 4.88 (SD=6.66), slightly higher than the combined mean. Two symptoms rated higher than others with respect to severity among Barriere respondents: inability to relax; and, indigestion or discomfort in the abdomen. Interestingly, anxiety disorders and intestinal/stomach ulcers were reported more frequently (11.5% and 15.5%, respectively) among Barriere survey respondents than participants in the other communities.

Survey participants were presented with 14 medical diagnoses and asked to comment if anyone in their household had been diagnosed with the condition(s). The most common household chronic conditions among the sample were: arthritis (45.5%), high blood pressure (39.5%) and chronic back pain (35.0%). If an answer was affirmative, respondents were then asked if the diagnosis had occurred after the wildfire in their community. Proportionally, the greatest increased diagnosis following the wildfire was anxiety disorder. This also held true for the comparison community of LaRonge, SK.

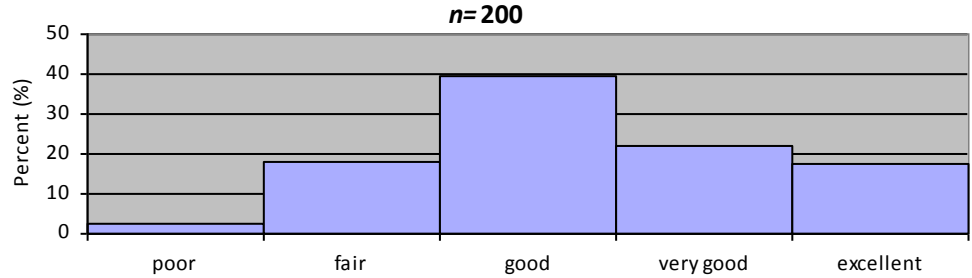


Photo Courtesy of MDS



Photo Courtesy of MDS

Figure 4: Self-Reported Health



**SOCIAL RELATIONS**

The participants were all asked to respond to questions about living in the Valley. The responses reinforce their satisfaction living in this rural area. For example, 91.0% (n=181) strongly agreed or agreed that they were attracted to living in the Valley and 88.5% (n=176) felt like they belonged in the community. Furthermore, the respondents strongly agreed or agreed that the Valley gave them a sense of community (n=167; 84.3%); there was fellowship between themselves and their neighbors (n=140, 70.7%) and they had a sense of rootedness (n=147, 74.2%) in the area. Only 29 (14.6%) strongly agreed or agreed that they would move out of the Valley if given the opportunity. In total, 170 (85.5%) strongly agreed or agreed that they would remain a resident in the Valley for a number of years in the future.

Having positive connections with their neighbors was clearly evident in their strongly agree and agree responses shown below:

- 141 (70.8%) indicated that they visit with their neighbors
- 178 (89.5%) noted that the friendships and associations they have in their community mean a lot to them
- 195 (97.5%) said that neighbors help in emergencies
- 168 (84.0%) would go to someone in their community if they needed advice
- 164 (82.8%) felt loyal to the people in their community
- 182 (91.4%) regularly stop and talk with the people in their community
- 121 (60.8%) noted that they borrow and exchange favours with the neighbors
- 107 (53.8%) strongly disagreed or disagreed that they rarely have neighbors over
- 58 (29.1%) agreed that they rarely had neighbors over

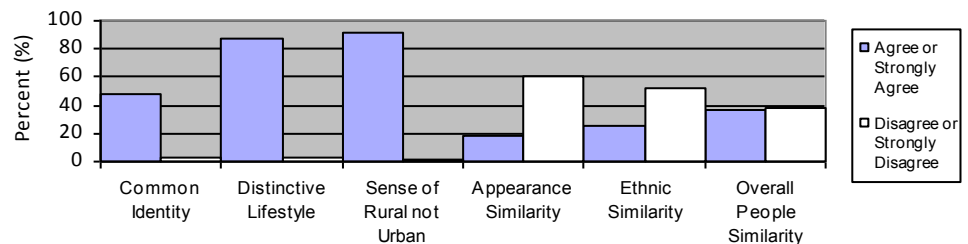
The respondents also strongly agreed or agreed that they share with their fellow residents about what was most important in their life (n=134, 67.0%) and that they saw themselves as most similar to others in the Valley (n=151, 75.9%).

Any planning in the community is seen as a process that involves “we” rather than “they” (strongly agree and agree: n=107, 53.8%), however 35.2% (n=70) had a neutral response to this question. In addition, 180 (90.0%) strongly agreed and agreed that they would be willing to work on things together with their fellow residents.



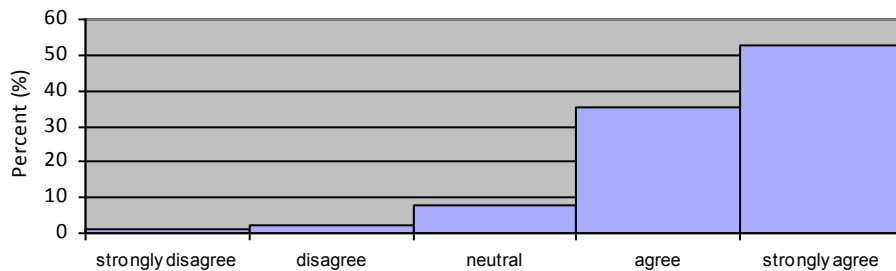
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Figure 5: Community Sense of Identity



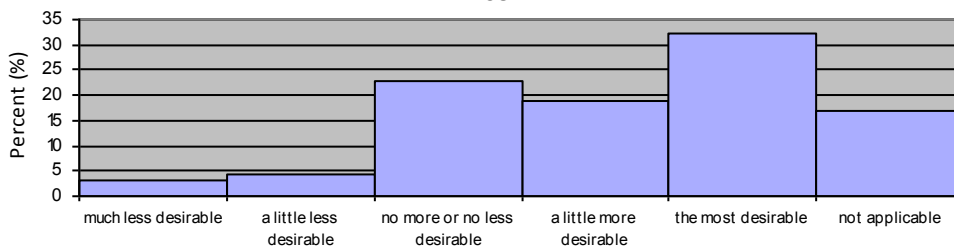
**Figure 6: Feel Like I Belong in Barriere**

*n*=199



**Figure 7: Community Desirability**

*n*=198



**Wildfire Monument, McLure BC**  
*Photo Courtesy of J. Kulig*

## COMMUNITY RESILIENCY

All the participants were asked to respond to the 15 item Community Resiliency Scale. Over a third did not feel isolated from the rest of the province (strongly disagree and disagree: 40.0%, *n*=80) although 37.0% (*n*=74) felt neutral in this regard. 89.5% (*n*=179) either strongly agreed or agreed that people in the community helped one another. The majority of the participants also felt that the people in the community helped one another. Most participants agreed that people in the community shared similar values (strongly agree and agree: 56.0%, *n*=112). 47.0% (*n*=11) strongly agreed that people in their community were open to new ideas; 41.0% (*n*=82) were neutral in regards to this statement.

The participants also indicated that:

- The changes in their community were positive (strongly agree and agree: 65.4%, *n*=130),
- They believed that residents of the community participated in community events (strongly agree and agree: 84.9%, *n*=169),
- There is strong community leadership (strongly agree and agree: 57.2%, *n*=114) and that leaders listen to the residents (53.1%, *n*=105),
- There is a sense of community pride (strongly agree and agree: 76.0%, *n*=152),
- Community members are able to deal with problems (strongly agree and agree: 70.9%, *n*=141),
- There is satisfaction with the quality of current health care services in their community (strongly agree and agree: 77.0%, *n*=154)

As individuals, they did not believe that the physical environment negatively affected their lives (strongly disagree and disagree: 73.3%, *n*=148). Most do things to stay healthy (strongly agree and agree: 94%, *n*=190), have support from others to stay healthy (strongly agree and agree: 88.1%, *n*=178) and believe they can deal with problems in their life (strongly agree and agree: 91.5%, *n*=185).



*Photo Courtesy of J. Kulig*





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Additional electronic copies may be obtained from:  
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