Recreational Use of Selected Viewpoints on the Going-to-the-Sun Road, 2009

Glacier National Park

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I. Executive Summary

This study is part of a five year assessment of visitor use of the Going the Sun Road and the park shuttle system. This portion of the study had three primary goals. First, it assessed if the shuttle is increasing the number of people taking one way hikes on more backcountry trails and understanding how hikers use the shuttle to facilitate their hiking experiences. In addition, it assessed how shuttle riders and non-shuttle riders use roadside pullouts and if the shuttle influences roadside pullout use. Finally, this study assessed how visitors use park-provided shuttle information sources, how useful these information sources are, and possibilities for making them more useful.

The study used three different surveys. One survey was given to hikers and focused on intercepting hikers on the Highline Trail, a backcountry hike that has been made more accessible by the shuttle. A second survey was given to shuttle riders and a third to non-shuttle riders. Surveys were implemented at Logan Pass and the Loop, which are busy roadside pullouts on the Going to the Sun Road and provide access to the Highline Trail. Parking lot usage was also observed at the Loop.

The study provided interesting and useful results. For example, a large majority of hikers on the Highline Trail used the shuttle to facilitate a one-way hike. Furthermore, the ability to use the shuttle seems to be a key factor in people's decisions to hike the Highline Trail: a large majority of hikers surveyed decided to take this hike based on knowledge of the shuttle. However, it appears that hikers are still driving the road and parking in congested areas to reach one of the Highline trailheads – 70% of hikers surveyed parked at either Logan Pass or the Loop. Though the shuttle may be increasing the number of people hiking the Highline Trail, people's hiking experiences do not seem to be highly affected by an increase in hikers. A majority of hikers said that solitude, pristine natural beauty, and wildlife sightings had a positive impact on their hike. However, between 30 and 40% of hikers did feel that overcrowding, non-natural sounds and overflights had a negative impact on their hike.

In addition, the study results suggest that riding the shuttle does not significantly impact how many roadside pullouts people stop at or what they do at roadside pullouts, other than increasing the number of people who choose to hike the Highline Trail. Beyond this difference in hiking behavior, shuttle riders and non-shuttle riders engage in similar activities at the Loop and Logan Pass. This study also found that shuttle related information is considered very helpful by people who look at it. Approximately 50% of shuttle riders used some shuttle related information while between 20 and 40% of non-shuttle riders looked at some shuttle related information. Most shuttle information sources were considered helpful by over 80% of visitors who used them.

This study has some important management implications. For example, it suggests that shuttle related information and park employees should stress the benefits of parking at the transit centers to access major trailheads rather than driving to and parking at trailheads. In addition, the results suggest that shuttle related information could be placed more prominently in the park newspaper and website to encourage more people to use it. This study also suggests some important areas for additional research. For example, more

research could be done to understand if the shuttle is increasing the number of hikers on shuttle accessible trails like the Highline, Siyeh Bend to Sunrift Gorge, and St Mary's Lake, and how this increase in hiker activity is impacting park resources and hiker experiences and behavior.

II. Purpose of Study and Background

A. Background

In 2007, the National Park Service began major reconstruction work on the Going to the Sun Road (GTSR), the primary route though Glacier National Park (GNP) and a primary visitor destination in the park. The construction is scheduled to take place over a seven-to-eight year period. While the road will not be completely closed during this time, visitors may experience significant time delays and changes in access to popular trailheads and scenic overlooks. Therefore, the reconstruction of the GTSR poses important questions about impacts on visitor behavior, use levels and patterns of use within the park, both during and following the construction activity.

Key goals of the reconstruction process are to minimize disruptions to visitors in the short run while reducing impacts on park values in the long run. These goals will be achieved through changes in road design, improved parking, restoration practices, development of a shuttle bus system and other actions. The effectiveness of these actions in achieving these goals is, however, an open question. Visitors to GNP make heavy use of the GTSR, with about 80% of the visitors traveling some part of the road. And while the road tends to be a destination experience itself, it also provides access to several trails and overlooks, particularly for subalpine areas, such as Logan Pass and the Highline Trail. The effects of the proposed construction activity on visitor behavior and levels and patterns of use are unknown, both during and following the activity. Therefore, the initial goal of this project was to develop an information base to identify the consequences of the reconstruction process so that appropriate mitigation actions can be implemented. Since beginning this project, additional issues and research goals have emerged.

This project has been divided into four phases. In Phases One and Two, completed in the summers of 2005 and 2006, visitors were observed and interviewed at 17 pullouts on the Going to the Sun Road. Based on 7000+ observations and 1280+ surveys, this research provided a detailed baseline understanding of visitor use of the GTSR and pullouts before the beginning of road construction and the implementation of the shuttle system (Freimund et al., 2006a; Freimund et al., 2006b). Phase Three was completed in the summer of 2007, the first summer of shuttle operation. Based on 376 completed surveys, this research provided an assessment of the decision processes, motivations, activity choices, and experience of the shuttle riders vs. non shuttle riders. It also provided an assessment of the quality of the shuttle experience and recommendations for improvement (Baker and Freimund, 2007).

Phase Three uncovered some interesting trends in the motivations and activity choices of shuttle riders that deserve further investigation. For example, Phase Three results suggest that people are using the shuttle to facilitate longer point to point, or one way hikes, on more backcountry trails. Before the shuttle, people who wanted to take longer hikes such as the Highline Trail from Logan Pass to the Loop or the Siyeh Pass Trail from Siyeh Bend to Sunrift Gorge would have to hike the trail both ways (requiring 16-22 miles of hiking); have access to two cars (one left at the starting trailhead and the other at the finishing trailhead); or arrange a ride from the finishing point back to their car. The shuttle makes it possible to hike these longer back country hikes in one direction without arranging for rides or using two vehicles. As a result, the shuttle may increase the number of people who hike on these trails. This opens up new opportunities for visitors but may also have physical impacts on the natural environment around the trail and social impacts on the hiking experience such as overcrowding and reductions in solitude.

In addition, Phase Three identified the possibility that people riding the shuttle may use roadside pullouts differently from those driving their own car. For example, shuttle riders may stop less frequently than non-shuttle riders because they do not want to lose their seat on the shuttle or have to wait for the next shuttle.

Park managers have also wondered if the information they are providing about the shuttle is being used by park visitors, if it is useful, and how they might improve the sources or timing of shuttle-related information.

Phase Four will follow up on these information needs by investigating the role of the shuttle in increased point-to-point hiking activity on backcountry trails and how hikers use the shuttle to facilitate their hiking experiences. In addition, it will assess how shuttle riders and non-shuttle riders use roadside pullouts and if the shuttle influences roadside pullout use. This phase will also be used to gain a greater understanding of how visitors use park-provided shuttle information sources, how useful these information sources are, and possibilities for making them more useful.

Based on these broad goals, the specific objectives of Phase Four of this research were to:

- Identify differences in roadside use as a result of the transit system including:
    - If shuttle riding impacts decisions on where to stop
    - If shuttle riding impacts what visitors choose to do at particular stops
- Understand the relationship between shuttle use and choice to take extended day hikes including:
    - If hikers are using the shuttle to facilitate a longer / point-to-point hike
    - If hikers who take the shuttle are leaving a car parked for an extended period in high-use parking lots
    - If more visitors who would not otherwise have done a long hike are engaging in longer day hikes due to the shuttle
- Help managers refine more effective communication with visitors about the shuttle at GNP including:
    - What information sources shuttle riders and non-riders used and which they found useful

- What information sources visitors would prefer and when they would prefer to receive information about the shuttle

III. Research Methods

A. Survey data collection

Three separate surveys were developed to explore these issues. A survey for shuttle riders assessed use of shuttle related information, evaluations of its usefulness, desires for future information sources and preferred location and timing for receiving shuttle related information. The shuttle rider survey also assessed key reasons people decided to ride the shuttle. The second survey for non-shuttle riders also assessed use of roadside pullouts, use of shuttle related information and desires for future use of such information. The third survey for hikers assessed hikers' use of the shuttle to facilitate point to point hiking and use of the road and parking areas to access hikes. The hiker survey also evaluated how a variety of social and psychical conditions such as crowding, wildlife sightings, and solitude impacted people's hiking experience. Finally, this survey assessed how and when hikers made decisions about where to hike as well as previous hiking experience in GNP. See *Appendix 1* for copies of these three surveys.

B. Sampling approach

The sampling universe consisted of all adults over 18 years old who stopped at two high-use areas along the Going to the Sun Road between 8AM and 8PM between July 1, 2009 and September 1, 2009. Accounting for days off, this time period provided 41 days of sampling during the peak visitation months.

Surveys were primarily implemented in two areas: Logan Pass and The Loop. Logan Pass was chosen because it provided access to a broad cross-section of park visitors, including shuttle users, non-shuttle users and backcountry hikers. The Loop was chosen because it provided a cross-section of park users and a concentrated opportunity to survey backcountry hikers who could be using the shuttle to facilitate a point-to-point hike on the Highline Trail, which runs from Logan Pass to the Loop. The hiker survey was also implemented at the Granite Park Chalet, a popular stopping point along the Highline Trail to increase access to hiker respondents. These areas were sampled during the primary daylight hours of operation from 8 a.m. until 8 p.m. Surveys were implemented in six-hour sampling periods that covered this time frame using a morning sampling period from 8 a.m. to 2 p.m. and an afternoon sampling period from 2p.m. to 8 p.m. The sampling procedure used a systematic random sampling process in which the initial study areas and period were randomly selected. Following the initial day of sampling, sampling periods (AM/PM) and study areas were rotated systematically to ensure that over the study period each study area was sampled equally. Overall, there were 21 sampling periods at Logan Pass, 16 sampling periods at the Loop, and four sampling periods at

Granite Park Chalet. These sampling periods were split between AM and PM sessions and between weekends and weekdays. See *Appendix 2* for the sampling schedule.

This sampling approach was intended to gain access to a broad cross section of shuttle and non-shuttle riders while also providing access to visitors who took longer "backcountry" day hikes that are more accessible as point to point hikes now that the shuttle system is in place. As a result, our sample over represents Highline Trail hikers compared to other hikers in the park. There are several other trails that are also made more accessible as point to point hikes by the shuttle system including the Siyeh Bend to Sunrift Gorge hike and longer sections of the St Mary's Lake trail system that runs between Sunpoint to St Mary's Falls.

Surveyors followed OMB-recommended protocol for visitor contact. Contact was based upon a pre-designed systematic schedule starting with the first available group during the sample time. The eligible adult member of each group with the next closest birthday to the sampling day was asked to participate. Hikers were approached as they exited the trailheads at The Loop and at Logan Pass. Shuttle riders were approached at the shuttle stops at Logan Pass and the Loop. Non-shuttle riders were approached in the parking lots of Logan Pass and the Loop. When inclement weather occurred on Logan Pass sampling days, all potential survey respondents were approached in the Logan Pass visitor center as visitors were generally unwilling to complete surveys outdoors in rainy or cold weather.

C. Response rates

424 shuttle rider surveys were collected; the majority of these were collected at Logan Pass as this was a much busier shuttle stop than the Loop. 442 non-shuttle-rider surveys were collected. Approximately 2/3 of the non-shuttle rider surveys were collected at Logan Pass. 415 hiker surveys were collected; approximately 60 percent were collected at the Loop, 25 percent at Granite Park Chalet, and 10 percent at Logan Pass. A total of 1281 surveys were collected. 214 groups were approached but refused to take the survey. Therefore, out of 1495 groups approached to take the survey, the response rate was 85%.

We do not believe that non-response bias is an issue in these results. Non-respondents were not significantly different from respondents based on observable demographic characteristics. We maintained a log of observable demographics, including group size and type, gender, age, and likely activity type of the visitors who refused to take the survey and compared this to the demographic data obtained for survey respondents.

D. Observations

Visitor use of the Loop parking areas was observed on seven days spread throughout the summer season. These observations were undertaken to add the existing base of information about parking lot usage throughout the park, which has been collected throughout the phases of this research project. Observations periods were split between morning sessions from 8 AM to 2 PM and afternoon sessions from 2 PM to 8 PM. Observations gathered data on vehicle state of origin (including rental vs non rental

vehicles as possible), number of visitors in a group, type of group (pair, family, friends, etc.), and the perceived types of activities in which the group participated while parked at the site. All vehicles in the designated parking area during the sampling period were observed. Appendix 2 shows the observation form used to collect data. Appendix 1 shows the observation schedule.

E. Analysis

Data was analyzed using descriptive statistics including means, medians, and standard deviations. Chi-squared analyses were used to test for significant differences between key user groups including between hikers who had taken a long day hike in Glacier before and hikers who had not taken such a long hike before.

III. General Findings: Visitor and Group Characteristics

All three surveys asked respondents some basic questions about themselves and their group including state of residence, group type, number of people in group, if the group included children and if so how many, if the group was an organized tour group, and if the group planned to visit Waterton Lakes National Park as part of this trip. These findings are reported for the total sample of almost 1300 respondents as well as by survey type (hiker, shuttle rider, and non-shuttle rider).

A. Where are visitors from?

In all three groups, the largest percentage of visitors was from Montana (see Tables 1, 2, and 3). However, Montana residents represented a smaller percentage of the shuttle rider sample (9%) than of the hiker and non-shuttle rider samples (16.6% and 18% respectively). This suggests that Montana residents may be less likely to ride the shuttle than out of state visitors. Though the top ten states are not exactly the same across the three samples, California and Washington are in the top four for all samples.

Table 1. Hiker Top Ten States of Residence

State/ Province	**% of total**
Montana	16.6%
Washington	8.2%
California	6.7%
Minnesota	5.8%
Alberta	3.4%
New York	3.1%
Ohio	3.1%
Wisconsin	2.9%
Illinois	2.4%
PA, TX, VA	2.2% (each)

Table 2. Non-shuttle Rider Top Ten States of Residence

State/ Province	% of total
Montana	18%
Washington	5.8%
Oregon	4.7%
California	4.7%
Alberta	4.5%
Minnesota	3.6%
Texas	3.4%
Michigan	3.1%
Illinois	3.1%
Colorado	2.5%

Table 3. Shuttle Rider Top Ten States of Residence

State/ Province	% of total
Montana	9.0%
California	8.8%
Washington	5.7%
Minnesota	5.2%
Florida	3.3%
Illinois	3.3%
Wisconsin	3.3%
Texas	2.9%
Oregon	2.9%
Michigan	2.9%

B. What are the most common types of visitor groups?

Families are the most common group type across the total sample of all respondents and within each survey type. Families represent approximately 60% of the total sample, of the shuttle riders and of the non-shuttle riders. Families make up approximately 50% of hikers surveyed. In the total sample and all three surveys friends were the second most common group type followed by groups made up of family and friends.

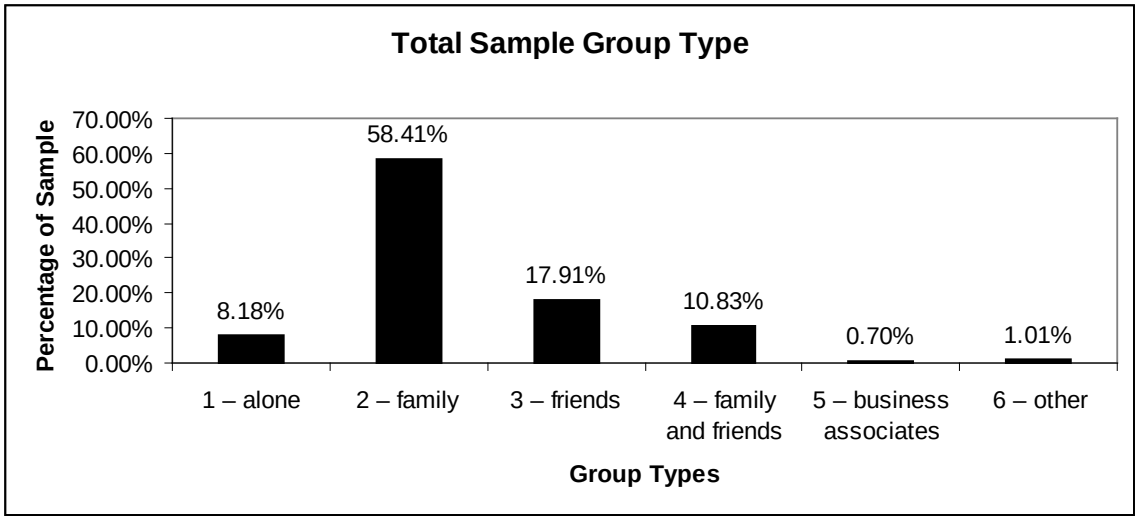

Figure 1. Total Sample Group Type

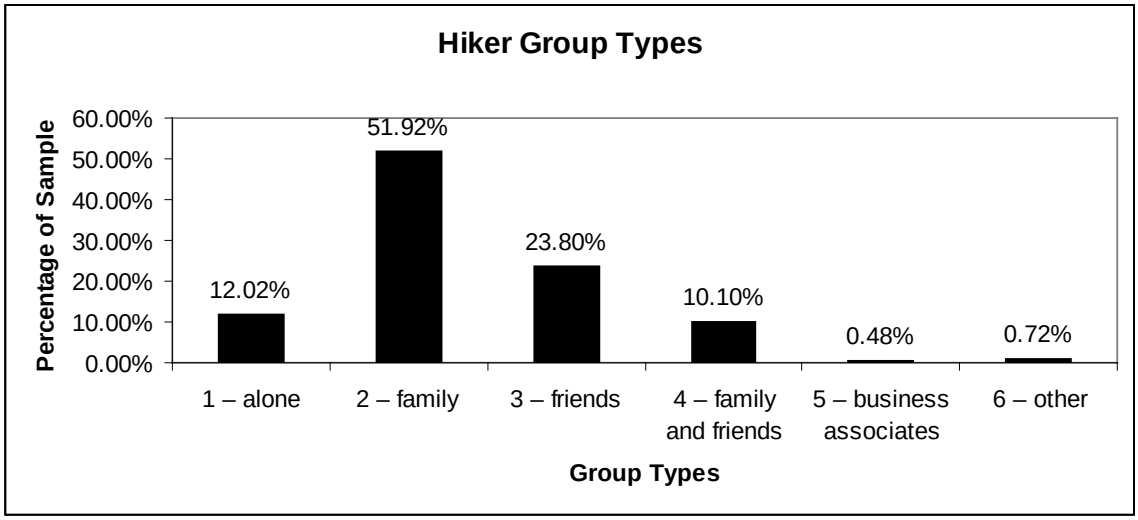

Figure 2. Hiker Group Types

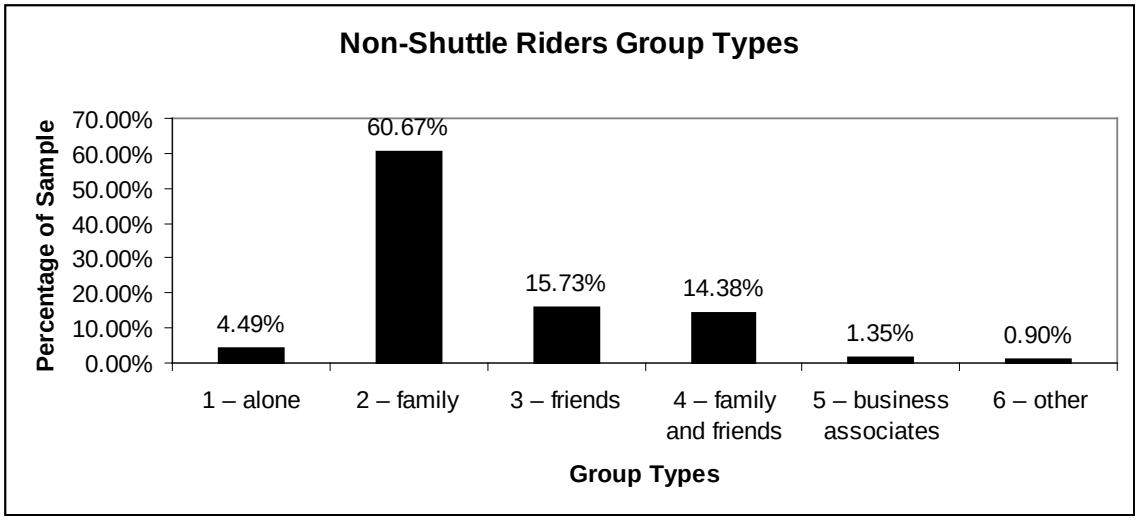

Figure 3. Non-Shuttle Rider Group Types

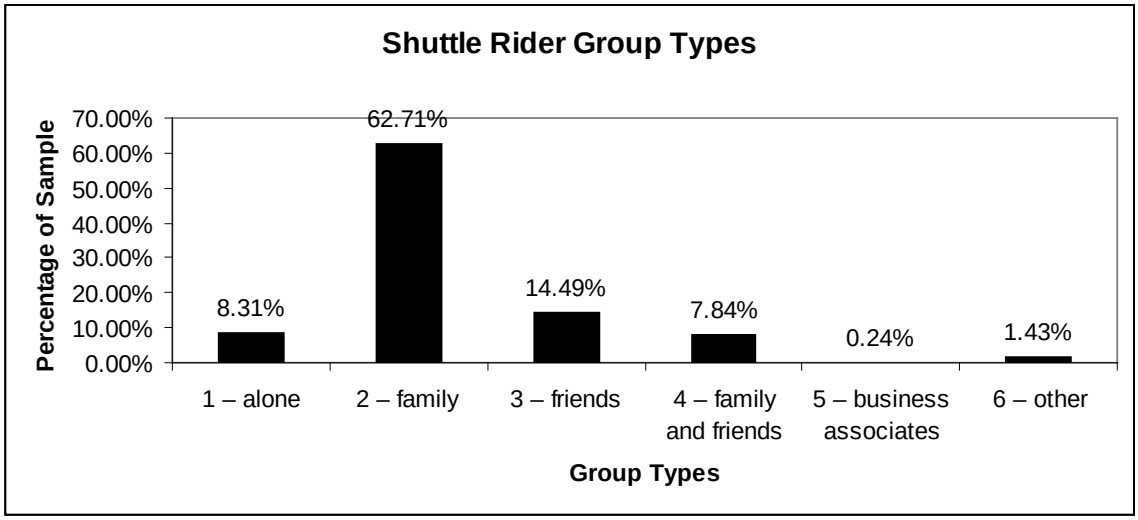

Figure 4. Shuttle Rider Group Types

C. How many people are in visitor groups?

Among the total sample, the median group number was two and the mean group number was 3.5. Approximately 45% of the total sample was in a group of two, followed by 15% in groups of four and 11% in groups of three.

This is similar to the group sizes in each individual survey sample. Among hikers surveyed, 50% were traveling in a group of two, followed by 15% in groups of four, 12% hiking along, and 10% in groups of three. Non-shuttle riders had a slightly lower percentage of pairs (40%) and singles (4%) and a slightly higher percentage of groups of three (13%) and four (17%). Shuttle riders were similar to non-shuttle riders; 43% were

traveling in pairs, 11% in a group of three, and 14% in a group of four. Approximately 6% of shuttle riders were traveling alone.

D. How many children are in visitor groups?

Among the total sample of respondents, approximately 19% were traveling with children. One or two children were most common. Hikers were the least likely to have children in their group. Approximately 16% of hiker groups included children and among these, one or two children were most common. Non-shuttle and shuttle riders were very similar in terms of number of children in groups. Among non-shuttle riders, approximately 26% of respondents had children and one or two children were most common. Among non-shuttle riders, approximately 27% of respondents had children and one or two children were most common.

E. How many visitors are in an organized tour group?

A small minority of visitors were part of an organized tour group. In the total sample, the hiker group, the non-shuttle group, less than 5% of respondents were part of an organized tour group. Among non-shuttle riders, just over 5% were members of an organized group.

F. Are visitors planning to visit Waterton Lakes National Park on this trip?

Approximately 25% of all visitors sampled were planning to include a visit to Waterton Lakes National Park in their trip. There were no significant differences between the different survey groups on this issue.

G. Summary of group characteristics

In general, the shuttle rider, non-shuttle rider, and hiker groups were fairly similar. However some interesting differences do appear. Hikers are slightly more likely to be in a group of friends or alone than shuttle riders and non-shuttle riders; though all groups are most likely to be traveling in a family group. Hikers are also less likely to be traveling with children than shuttle rider and non-shuttle riders. Hikers are also more likely to be traveling alone, though groups of two are most common among all sample groups.

IV. Use of roadside pullouts and shuttle related information among shuttle riders and non-shuttle riders

The shuttle rider and non-shuttle ride surveys had two primary goals. First they sought to understand if there are differences in how shuttle riders and non-shuttle riders use roadside pullouts and make decisions about where to stop. Second, they sought to address how shuttle riders and non-shuttle riders use shuttle-related information sources, how useful those information sources are, and visitors' preferences for getting shuttle related

information on a future visit. The shuttle rider and non-shuttle rider surveys asked nearly identical questions so that comparisons could be made between the two groups. Therefore the results are presented here as comparisons between these two groups for each major study goal and relevant survey questions.

A. Are there differences in why shuttle riders and non-shuttle riders stop at roadside pullouts?

For both groups, the most common reasons for stopping were to look at the view, to start a hike, and to take a photo. However, the percentage of the sample stopping to look the view was slightly higher among non-shuttle riders than shuttle riders (60% vs. 50% respectively). Non shuttle riders were also considerably more likely to stop to look at an exhibit than were shuttle riders (19% vs. 9% respectively). On the other hand, shuttle riders were slightly more likely than non-shuttle riders to stop at the Loop or Logan Pass to start a hike (38% vs. 25% respectively). Shuttle riders were also considerably more likely than non-shuttle riders to stop to view wildlife (23% vs. 8% respectively).

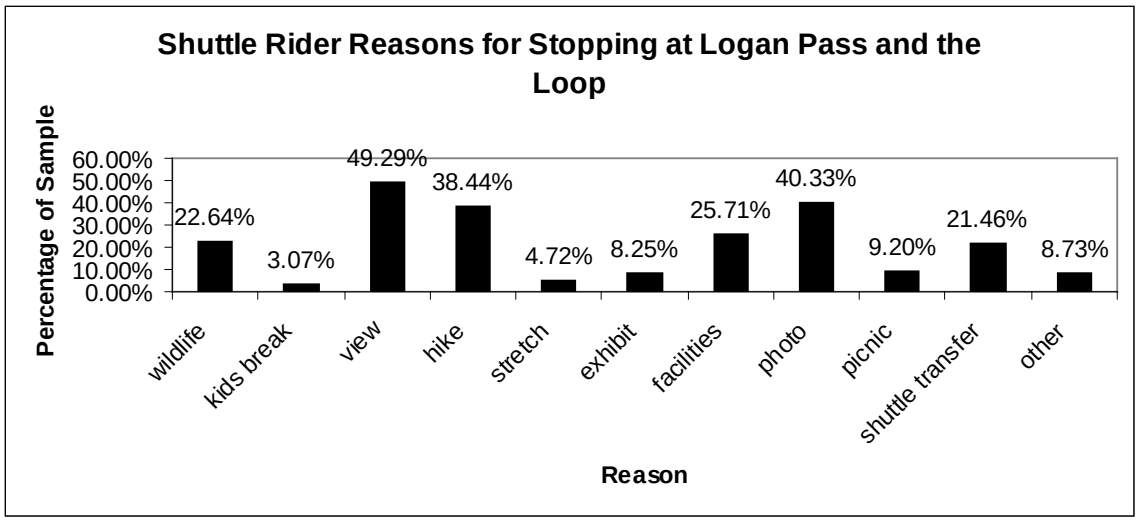

Figure 5: Shuttle rider reasons for stopping at Logan Pass and the Loop

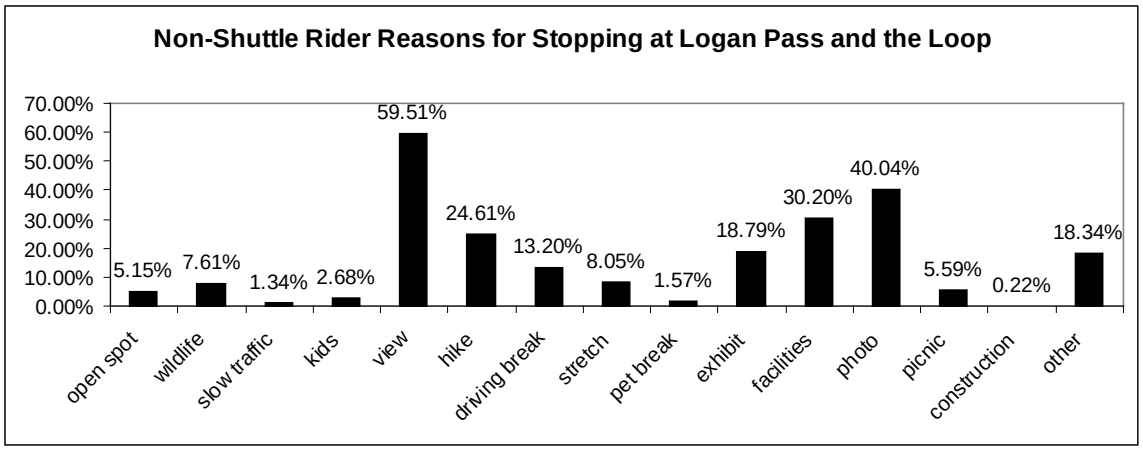

Figure 6: Non-shuttle rider reasons for stopping at Logan Pass and the Loop

B. Are there differences in planned vs. unplanned stops among shuttle riders and non-shuttle riders?

Shuttle riders were significantly more likely to make planned than unplanned stops. 93% of shuttle rider stops at Logan Pass and the Loop were stops planned in advance. For non-shuttle riders, only 66% of stops at Logan Pass and the Loop were planned.

C. Did riding the shuttle influence shuttle riders' decisions on when/where to stop?

Shuttle riders were also asked if their decisions on where and how often to stop at roadside pullouts were influenced by the fact that they were riding the shuttle. Specifically shuttle riders were asked if the shuttle influenced their decisions on where to stop. If it did, shuttle riders were asked if riding the shuttle influenced them to stop at more stops, less stops, or different stops than they would have if they had been driving their own vehicle. Almost 50% of shuttle riders surveyed said that riding the shuttle did not influence their decision on where to stop. However, for those who were influenced by riding the shuttle, most were influenced to stop less than if they had driven their own vehicle.

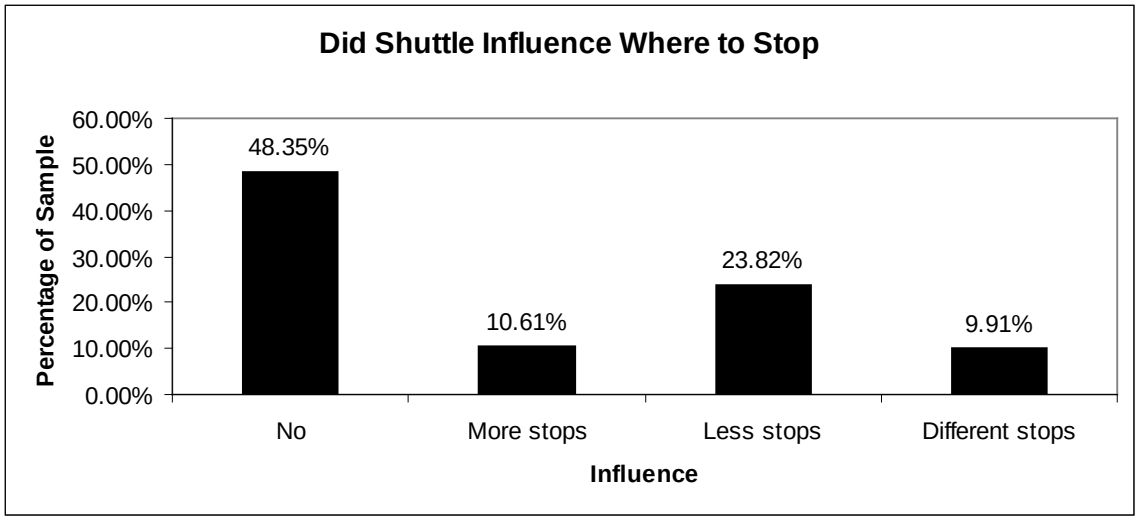

Figure 7. Influence of riding the shuttle on shuttle-riders decisions about where to stop

D. Did riding the shuttle influence shuttle riders' decisions about what to do when they stopped at pullouts?

Shuttle riders were also asked if riding the shuttle influenced what they decided to do when they stopped at Logan Pass or the Loop. A large majority (86%) said that riding the shuttle did not influence what they did at these stops. Shuttle riders who did change their activity due to the shuttle were asked to explain how their activities changed. Of the 45 respondents who did say that the riding shuttle influenced their activities, eight mentioned that they were not able to do what they wanted to do at the stop because they were afraid of missing the next shuttle or that they had to shorten their visit to catch a shuttle. Eight said that riding the shuttle influenced them to take a hike that they would not have otherwise taken. Six said that the shuttle allowed them to stop when they might not have otherwise because they did not to have to park in congested parking area. It should be noted that not all of the respondents who said riding the shuttle changed their activity choice(s) provided an explanation of how their activities were changed.

E. Why do shuttle riders choose to ride the shuttle?

Shuttle riders were asked to evaluate the importance of five possible reasons for riding the shuttle. Avoiding traffic and parking congestion was rated as most important for the largest percentage of the sample (61%), followed by being able to enjoy the scenery without the stress of driving (59%). Avoiding the stress of driving and alleviating traffic and parking congestion were both rated as most important by approximately 56% of shuttle riders sampled. Protecting the environment of GNP was rated as most important by the lowest percentage of shuttle riders (46%). However, protecting the environment was rated at the second highest level of importance by more shuttle riders (34%) than any of the other possible reasons.

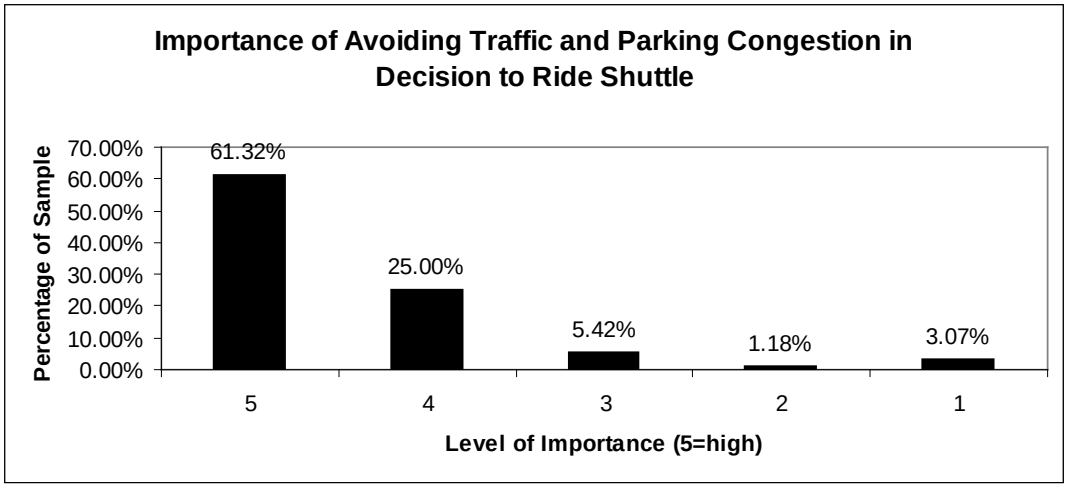

Figure 8. Traffic and parking congestion in decision to ride shuttle

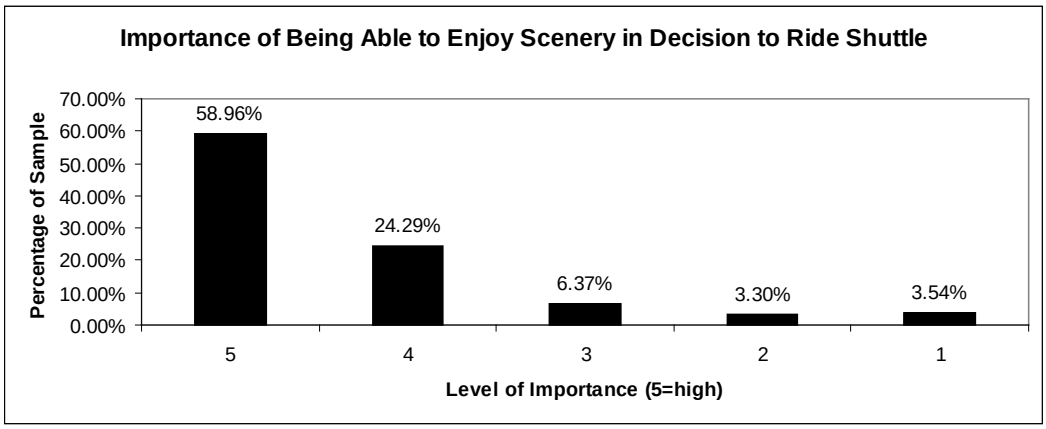

Figure 9. Enjoy in scenery in decision to ride the shuttle

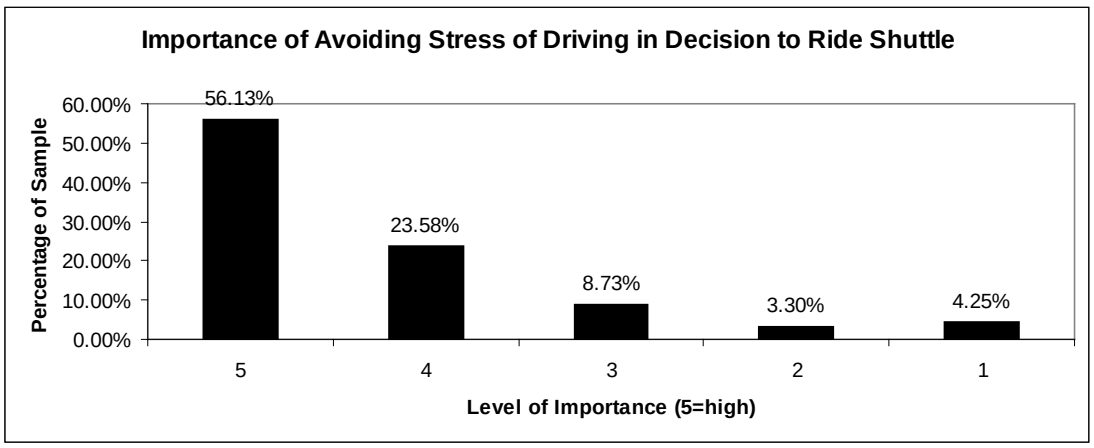

Figure 10. Avoiding stress of driving in decision to ride the shuttle

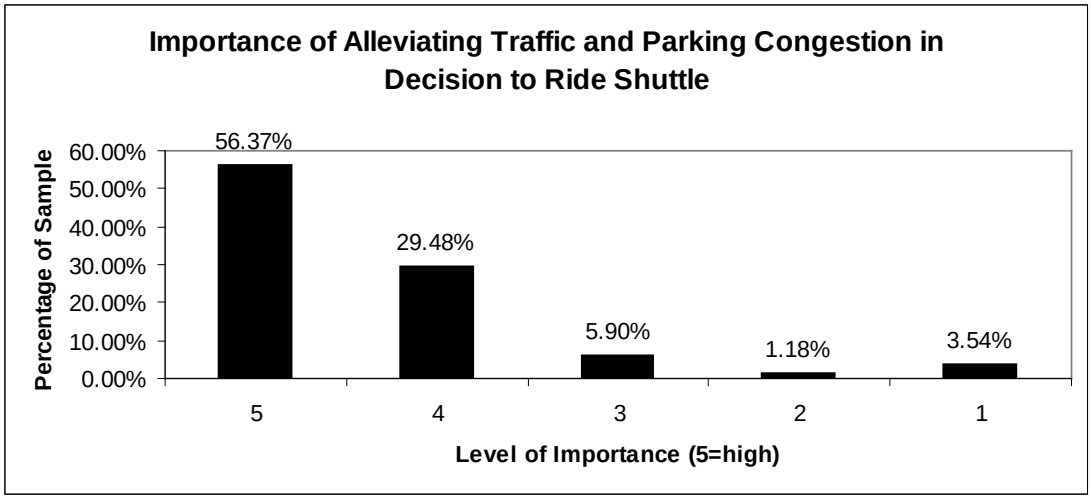

Figure 11. Alleviating traffic and parking congestion in decision to ride shuttle

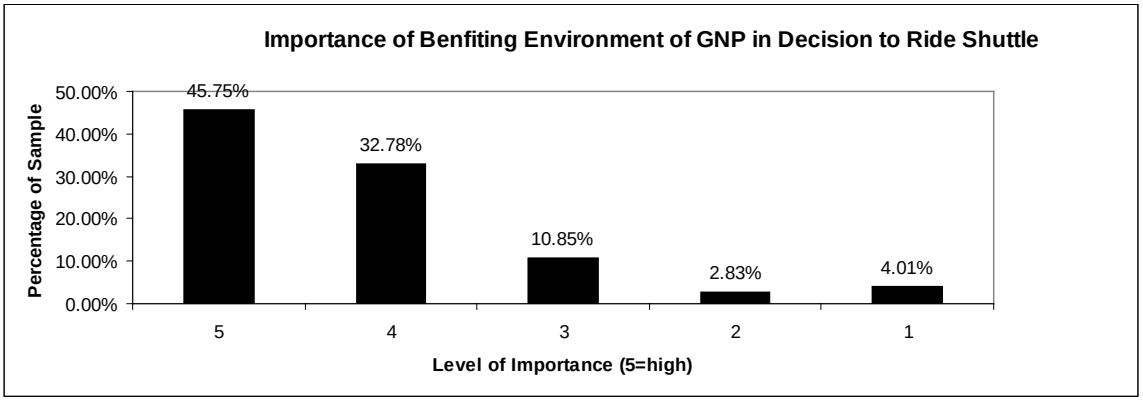

Figure 12. Benefitting environment in decision to ride shuttle

F. Are there differences in how many shuttle riders and non-shuttle riders stop at the St. Mary's and Apgar transit centers?

Shuttle riders are much more likely to stop at the transit centers than non-shuttle riders. 75% of shuttle riders stopped at one of the transit centers while only 35% of non-shuttle riders visited the transit centers. This is not a surprising finding considering that the transit centers are primarily focused on providing information about and access to shuttles. Therefore, it would be expected that people who were not planning to ride the shuttle would visit these centers less often.

G. Are visitors aware of the initial purpose of the shuttle?

Shuttle riders were slightly more aware of the actual purpose of the shuttle than non-shuttle riders. Approximately 60% of shuttle riders were aware that the primary purpose of the shuttle system is to reduce traffic congestion during reconstruction of the Going to

the Sun Road, which will speed up completion of that reconstruction. 50% of non-shuttle riders were aware of this purpose.

H. What shuttle-related information sources do shuttle riders and non-shuttle riders use?

Shuttle riders were more likely than non-shuttle riders to use all of the possible sources for shuttle related information. However, a significant percentage of non-shuttle riders did look at shuttle related information, especially the park newspaper (40%).

Among shuttle riders, the most commonly used sources of information about the shuttle were the park newspaper (65%), information at the transit centers (51%), park employees (46%), word of mouth from other park visitors (40%), the park website (37%) and information available at hotels and campgrounds (36%). Less than 5% of shuttle riders and non-shuttle riders used the park's AM radio channel or the cellular 511 information service.

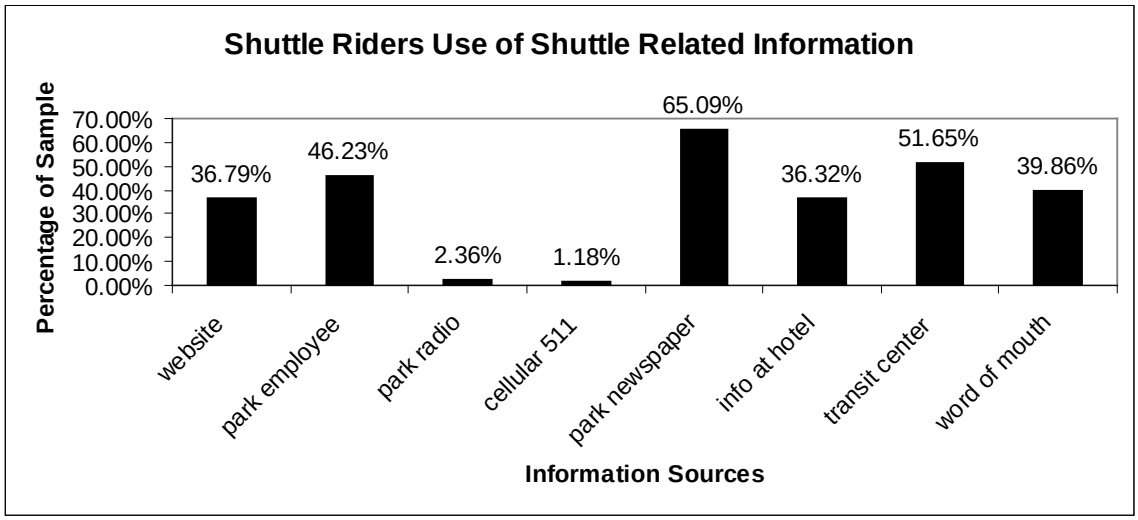

Figure 13. Shuttle riders' use of shuttle related information

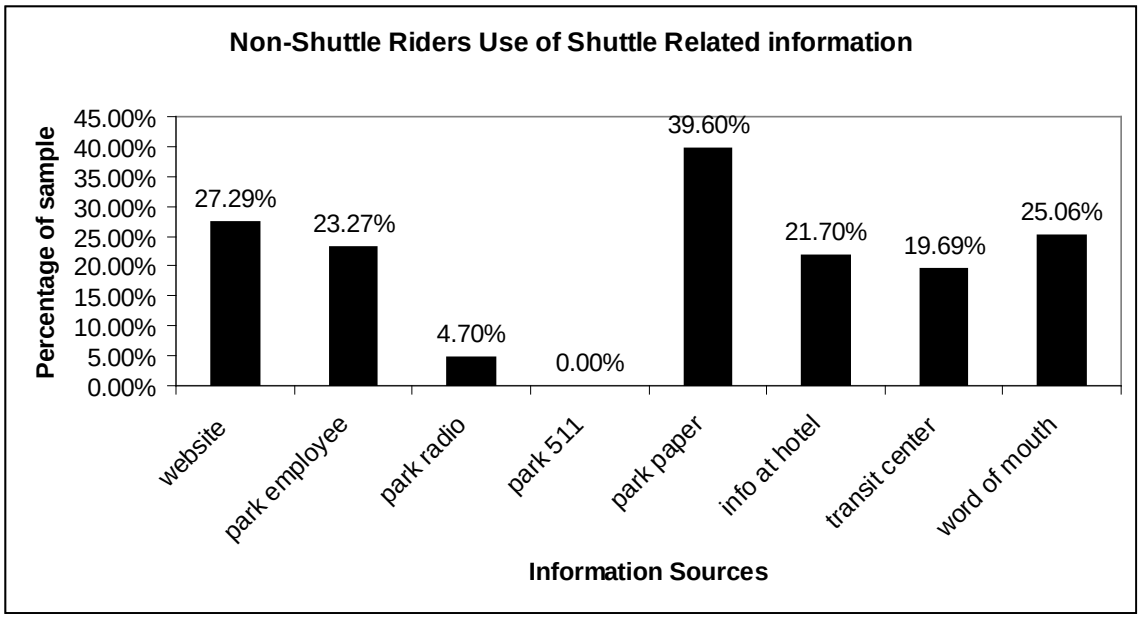

Figure 14. Non-shuttle riders' use of shuttle related information

I. Are the shuttle related information sources useful?

Shuttle riders and non-shuttle riders who used the shuttle related information sources generally found them very helpful. All of the highly used information sources were found to be helpful by over 95% or more of the shuttle riders who used them. Among non-shuttle riders who used shuttle related information, all of the most commonly used sources were considered helpful by 95% to 80% of users depending on the source.

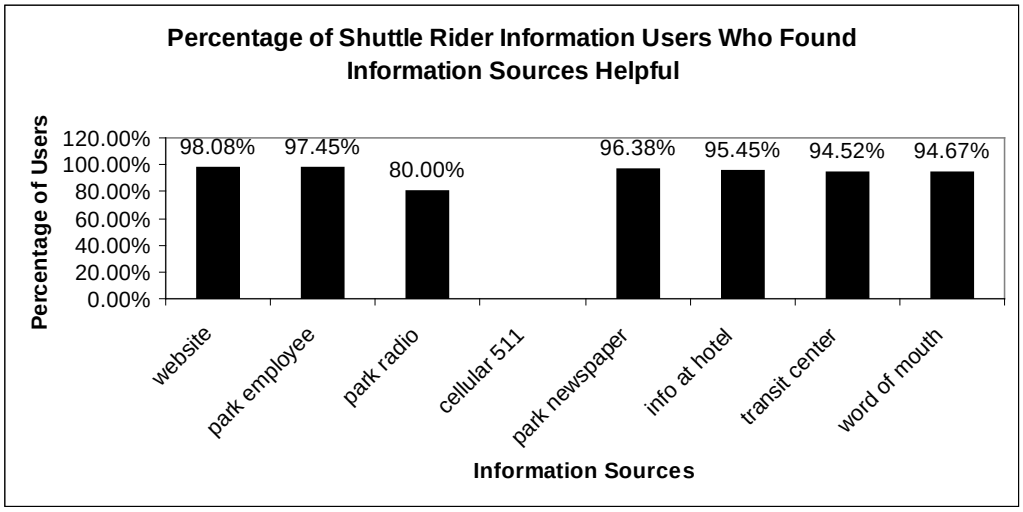

Figure 15. Percentage of shuttle rider information users who found information sources helpful

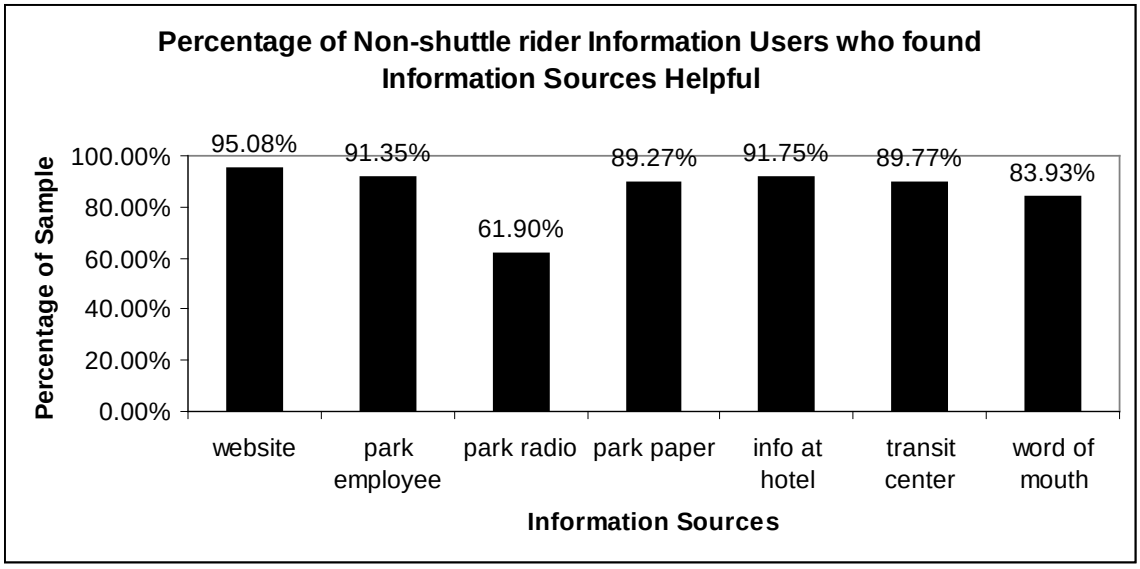

Figure 16. Percentage of non-shuttle rider information users who found information sources helpful

J. Did shuttle related information influence shuttle riders' or non-shuttle riders' decisions about riding the shuttle?

Shuttle related information was quite influential in shuttle riders' decision to ride the shuttle. 75% of shuttle riders sampled said that the shuttle related information they viewed influenced them to ride the shuttle.

Non-Shuttle riders were asked if the information they viewed about the shuttle influenced their decision not to ride the shuttle. For a large majority of non-shuttle riders (78%) the information they viewed about the shuttle did not influence their decision not to ride the shuttle. 10% of non-shuttle riders said that the information they viewed about the shuttle did influence their decision and that it made them more favorable towards riding the shuttle. Only 3% of non-shuttle riders said that shuttle related information influenced them not to ride the shuttle.

K. In the future, what shuttle related information would visitors like to use?

Shuttle riders and non-shuttle riders were asked to identify which shuttle-related information sources they would want to use on a future visit or if they had this visit to do over again. Unfortunately, many respondents did not answer these questions. The average sample size for both shuttle riders and non-shuttle riders was approximately 300, or 70% of the total shuttle rider and non-shuttle rider samples. Therefore, the percentages reported below are based on the number of people who responded to these questions rather than the total sample size. As a result of these smaller sample sizes, these responses may not be as representative of the population of shuttle riders and non-shuttle

riders in the park. Nonetheless, some conclusions can be made about which information sources visitors are most interested in using in the future.

Among shuttle riders, approximately 85% would want to use the park website, park newspaper, and information at the transit centers to get information about the shuttle on a future visit. Approximately 80% would want to use information at their hotel or campground on a future visit. Approximately 70-75% would want to use information from park employees and word of mouth information from other visitors. Approximately 25% of shuttle riders would want to use the park AM radio station on a future visit and 15% would want to use the 511 cellular service.

Among non-shuttle riders, the park newspaper and website were the most frequently cited shuttle related information sources respondents would want to use in the future; approximately 79% of non-shuttle riders would want to use these sources on a future visit. Approximately 70% of non-shuttle riders would want to use park employees, information at their hotel or campground, and word of mouth from other visitors to get information about the shuttle on a future visit. Approximately 60% of non-shuttle riders would want to use information at the transit centers. It is possible that the number of non-shuttle riders who would want to use information from the transit centers is substantially lower than the number of shuttle riders who would want to use this information (85% of shuttle riders vs. 60% of non-shuttle riders) is due to the fact that non-shuttle riders were much less likely to visit the transit centers and view the transit center information about the shuttle. Therefore, non-shuttle riders are less aware of the usefulness of this information than shuttle riders. Approximately 30% of non-shuttle riders would want to use the park AM radio station and 15% would want to use the cellular 511 information service.

L. When would visitors like to use shuttle related information sources?

Shuttle riders and non-shuttle riders were also asked when they would like to use the various shuttle related information sources. Very few people responded to these questions. Less than 20% of the total shuttle rider sample answered these questions and only 5-10% of the total non-shuttle rider sample answered these questions. Therefore, the results are of very limited usefulness. In general, both shuttle riders and non-shuttle riders would like to use the park web site at home before their trip. The other information sources they would prefer to use once they arrive at the park.

M. Summary of shuttle rider and non-shuttle rider use of roadside pullouts and shuttle-related information

Overall, shuttle rider and non-shuttle riders stopped at roadside pullouts for similar reasons. However, there are some interesting differences between the two groups. Non-shuttle riders were more likely than shuttle riders to stop to look at the view. This may be because it is more difficult to view the scenery while driving a personal vehicle. Shuttle riders were more likely to stop to start a hike than non-shuttle riders. This is an interesting finding considering that one of the founding premises for these surveys was

the idea that that people may be using the shuttle to gain access to hikes. These results also suggest that shuttle riders are more likely to be hikers than non-shuttle riders; a result born out by the hiker survey results presented below. Interestingly, shuttle riders are much more likely than non-shuttle riders to plan stops in advance. This may reflect the fact that riding the shuttle requires more advanced planning than driving in a personal car. However, for the most part, shuttle riders reported that riding the shuttle did not change the number or location of their stops or their activities at stops.

Shuttle riders generally ranked all of the possible reasons for riding the shuttle provided in the survey as important in their decision to ride the shuttle. In other words, one single reason for riding the shuttle did not stand out as vastly more important than others. However, shuttle riders rated avoiding driving and parking congestions and avoiding the stress and limitations of driving more highly than alleviating traffic congestion or benefiting the environment of GNP as reasons for riding the shuttle.

Both shuttle riders and non-shuttle riders used information about the shuttle. However, not surprisingly, shuttle riders were more likely to use shuttle related information sources including stopping at the transit centers. Interestingly, less than half of both groups report using information about the shuttle. Both groups were significantly more likely to use the park newspaper than any other information source. Also for both groups, the park website, park employees, word of mouth information, and information at hotels and campgrounds were fairly frequently used. Many shuttle riders also made use of information at the transit centers though non-shuttle riders did not. The park AM radio station and 511 cellular service were rarely used by either group.

All of the information sources that were commonly used were considered very helpful by both groups. Shuttle riders found shuttle related information slightly more helpful than non-shuttle riders. In addition, three quarters of shuttle riders said that the shuttle related information they viewed helped influence them to ride the shuttle. On the other hand, shuttle-related information did not play a significant role in non-shuttle riders' decisions not to ride the shuttle. It appears that those who decided to ride the shuttle feel that the shuttle information was a useful influence on their decision but those who chose not to ride the shuttle did not based that decision on information they gained about the shuttle. It may be that many non-shuttle riders were not considering riding the shuttle and looked at shuttle related information simply out of curiosity. On the other hand, many shuttle riders may have used shuttle related information as part of their decision about whether or not to ride the shuttle. In addition, it is possible that non-shuttle riders misinterpreted these series of questions and answered based on whether or not they had used the listed information sources for any purpose rather than simply for shuttle related information.

It is somewhat difficult to draw conclusions about which information sources people would like to use about the shuttle in the future and when they would like to access them due to the lower response rates on these questions. However, it appears that most visitors would like to continue using the same information sources they actually did use: the park newspaper, the website, park employees, the transit center (for shuttle riders) and information at hotels and campgrounds. This is not surprising considering that those who

used these information sources found them to be very helpful. There was not a clear sign from these results that visitors would like more information to be available before they reach the park. For all the information sources other than the park website, respondents wanted to use the information at the park.

Overall, shuttle related information sources appear to be very useful to those who want to use them. There is no indication from this survey that shuttle-related information needs significant revision or needs to be made available in new ways.

V. Hiker Survey Results

The primary goal of this survey was to understand if hikers are using the shuttle system to access longer day hikes as one way, or point-to-point, hikes. The survey also assessed where people left their vehicle if they used the shuttle to facilitate their hike and how the availability of the shuttle figured into their hiking activity decision process. The survey also assessed how a range of factors including crowding and wildlife sightings impacted people's hiking experience.

A. What trails were most used by hikers in this sample?

Nearly all of the hikers sampled (95%) had a specific destination in mind when they began their hike. A large majority of hikers (85%) we sampled were hiking the Highline Trail. The popularity of this hiking destination in this sample is partly due to the chosen sampling locations, which are the primary trailheads for this hike. Though this high percentage of Highline Trail hikers is likely not representative of overall park visitors, it does provide a useful sample for understanding how the shuttle is influencing hiking on a longer backcountry hikes that has been made more accessible by the shuttle.

The Highline Trail is approximately 11 miles long. As a result of the prevalence of Highline hikers in this sample, the mean hiking length was 6.5 hours and the median hiking length was 6 hours.

Approximately 20% of hikers sampled were taking an overnight trip into the backcountry. Of those who went on an overnight hike, approximately 64% were staying in a designated campground, 37% were staying at a chalet, and 12% were staying at an undesignated campsite.

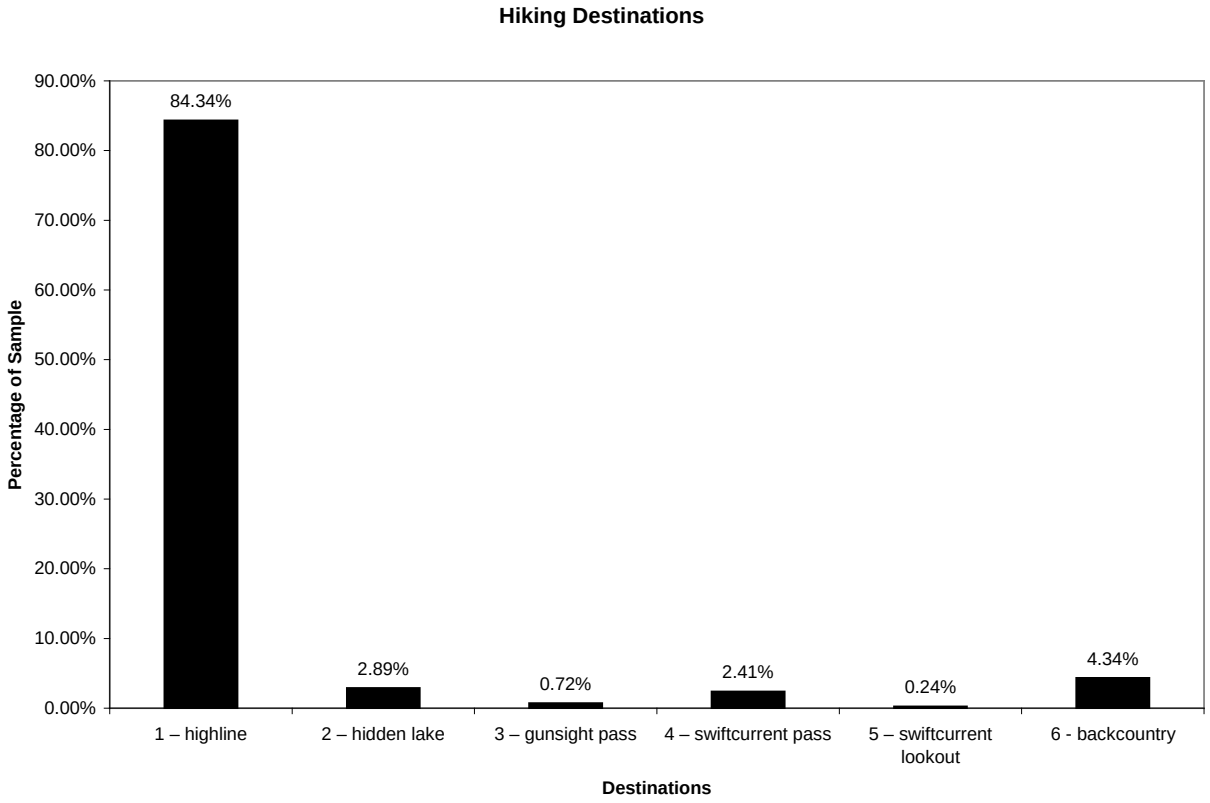

Figure 17. Hiking destinations

B. Are hikers using the shuttle to facilitate a point to point hike?

83% of hikers sampled used the shuttle to facilitate their hike. This finding provides strong support for the hypothesis that hikers are using the shuttle to facilitate taking a point to point hike in the park.

C. Where are hikers parking?

74% of hikers left a car somewhere else in the park while taking their hike. Of those who left a car elsewhere in the park, 50% of left their car at Logan Pass. The Loop was the second most common parking location; 20% of hikers left a car there. This is an important finding because it suggests that people who are using the shuttle to facilitate a hike are still driving on the road and parking in heavily congested parking areas. In conversations with people at survey sites, surveyors found that park Rangers had recommended that visitors who wanted to hike the Highline Trail one way should park at the Loop or Logan Pass. This suggests that if park management hopes to further reduce traffic and parking congestion, park Rangers should instead recommend that visitors park at one of the transit centers and catch the shuttle from there. In addition, hikers who were waiting to catch the shuttle at the Loop in order to get up to the Logan Pass trailhead to

being a hike or to return to the Logan Pass parking lot to retrieve their vehicle after completing their hike had great difficulty getting on a shuttle. Shuttles coming up to the Loop from the west side of the park are usually full when they reach the Loop because very few passengers get off at shuttle stops lower down the road. Therefore, hikers were often stranded at the Loop for a considerable amount of time waiting to get a shuttle to Logan Pass. On the other hand, hikers who did park at the Apgar Transit center or other roadside stops below the Loop also found that many westbound shuttles returning from Logan Pass to Apgar were full at the end of the day after they completed the Highline hike and were hoping to get a shuttle back down to their vehicle. This suggests that additional shuttles might be added between Apgar and the Loop in the later part of the day to facilitate hikers finishing the Highline hike and waiting for a shuttle back down to the road to their vehicle.

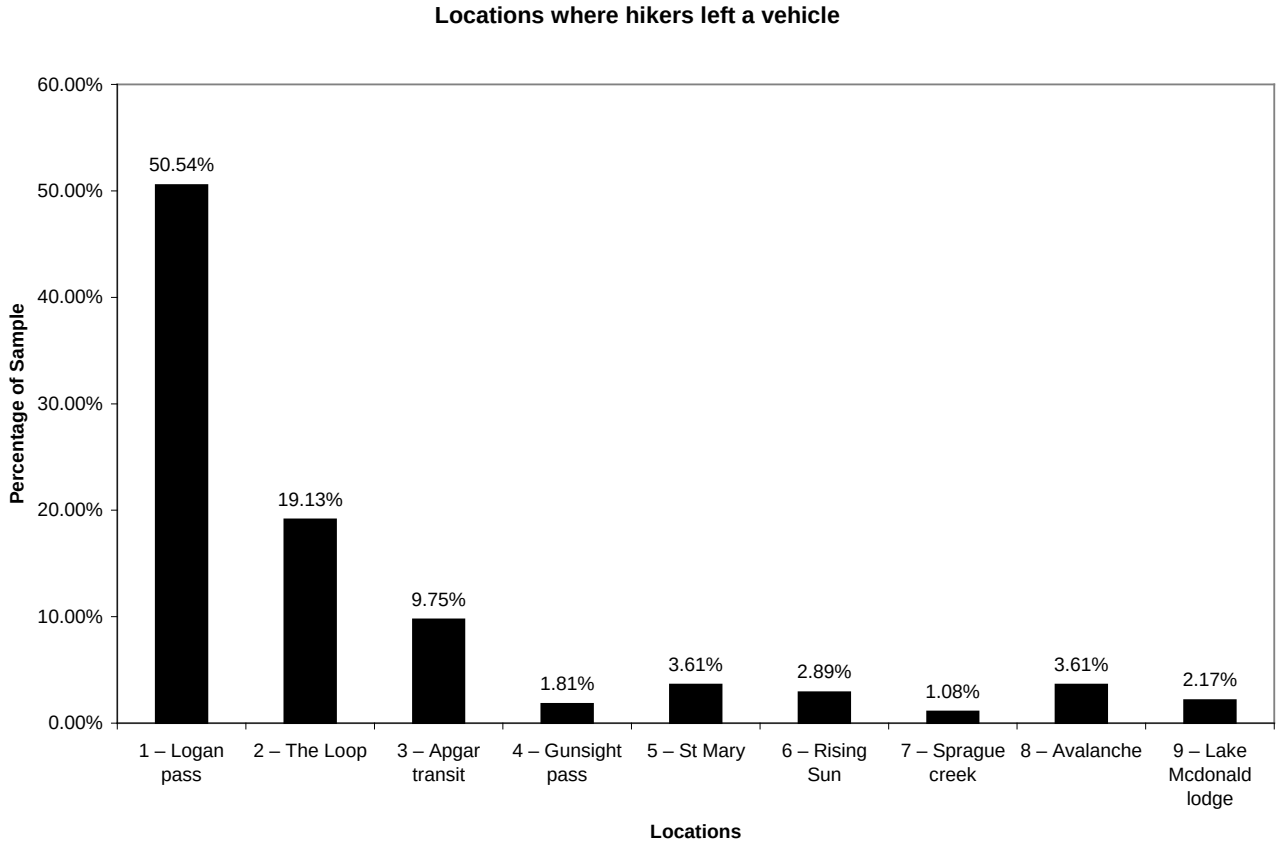

Figure 18. Locations where hikers left a vehicle

D. When do hikers learn about and decide on their hikes?

The majority of hikers (68%) learned about the hike they did before they arrived at the park. Approximately 57% of hikers decided to take their hike before they arrived at the park while 38% decided to take the hike they ended up taking after they arrived at the park.

The shuttle appears to have played an important role in people's hiking decisions. Approximately 77% of hikers decided on the hike they took with knowledge that they could use the shuttle to facilitate a point to point hike. Approximately 46% of hikers sampled decided on their hike before they arrived at the park based on knowledge of the shuttle and approximately 31% of those sampled decided on their hike after they arrived at the park based on knowledge of the shuttle.

E. What impacts hikers' experiences?

Hikers were asked to rate how a range of potential impacts affected their hiking experience including seeing other hikers, experiencing a pristine environment, non-natural sounds and overflights, seeing wildlife, and experiencing solitude.

Seeing a lot of other hikers had no effect or a slightly negative effect on most hikers' experiences; approximately 42% of hikers said that seeing a lot of other hikers had no effect on their experience while it detracted somewhat from the experience of approximately 35% of hikers sampled. Seeing few other hikers had no effect or a positive effect on most hikers experiences; approximately 31% of hikers said seeing few other hikers had no effect on their experience, 20% said it added somewhat and 11% said it added greatly to their experience. A high percentage of people said that seeing other hikers had no effect on their experience, suggesting that overcrowding is generally not detracting significantly from hikers' experience on this trail. However, a relatively large percentage of people also said that seeing a lot of other hikers had a negative effect on their experience (approximately 40% of those sampled), which suggests that overcrowding is a problem for hiking experiences on this trail. It is a little difficult to gauge the actual experience of overcrowding based on the questions that were asked. It is possible that people interpreted the questions to mean "how would" these things influence their experience instead of "how did" these things impact their experience.

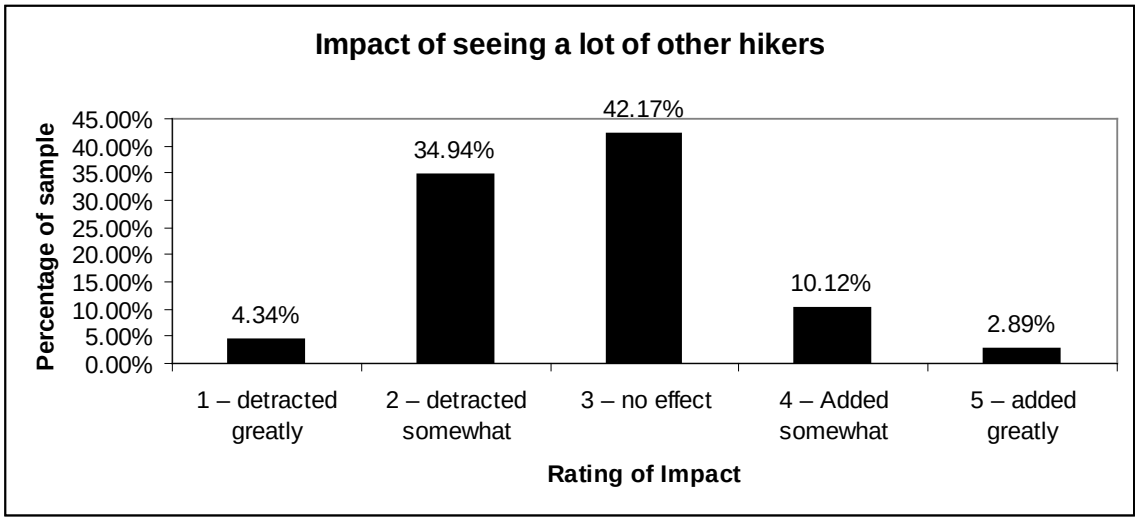

Figure 19. Impact of seeing a lot of other hikers on hiking experience

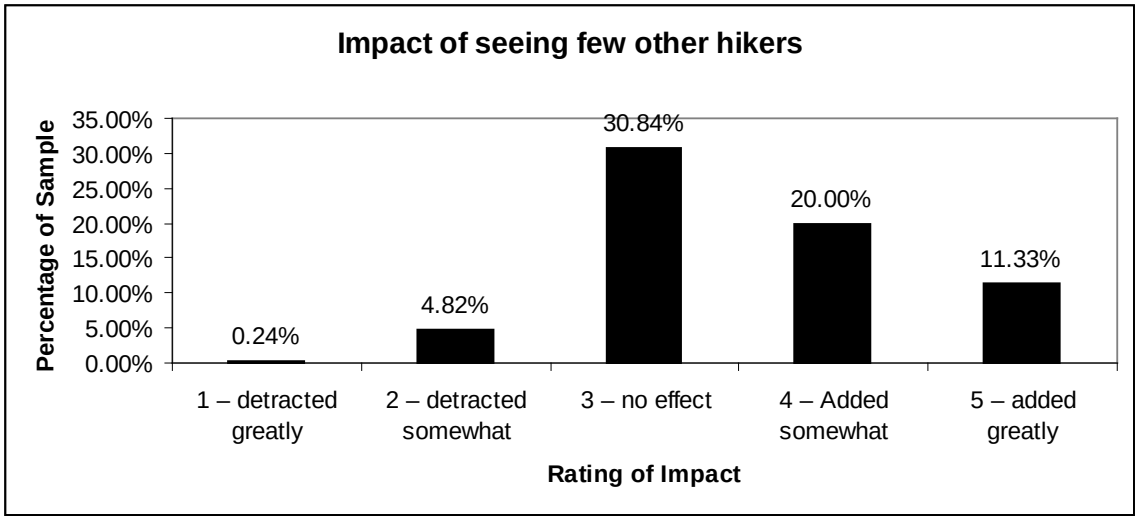

Figure 20. Impact of seeing few other hikers on hiking experience

In general, experiencing solitude had a positive impact on hikers' experience. Approximately 50% of respondents said that experiencing solitude added greatly to their experience and 26% said it added somewhat. This provides additional support to the finding that overcrowding is not a major problem on this trail. However, again it is difficult to know from these responses if people actually experienced solitude on this hike or if the experience of solitude would add to their experience.

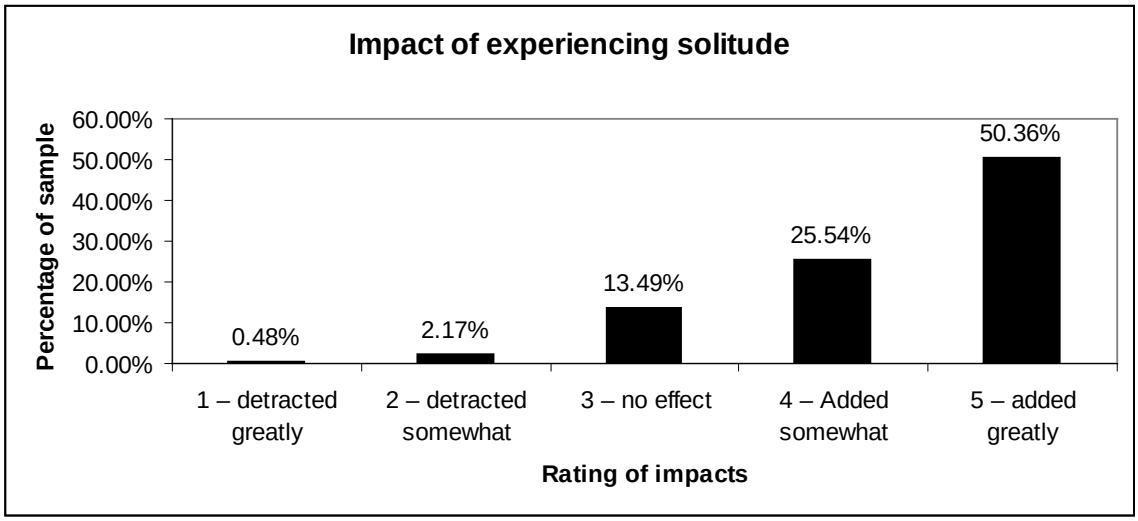

Figure 21. Impact of solitude on hiking experiences

Overflights and non-natural sounds did not impact the majority of hikers' experiences. Approximately 48% of those sampled said that non-natural sounds had no effect on their experience and 61% said that overflights had no effect on their experience. However, non-natural sounds did detract somewhat from the hiking experience of 28% of those sampled and they detracted greatly from the experience of 11% of those sampled.

Overflights detracted somewhat from 18% of those sampled and detracted greatly from 10% of those sampled. These findings suggest that non-natural sounds are a problem for hiking experiences on this trail. However as described above, these results could represent how these things would influence respondents' hiking experience rather than how they did.

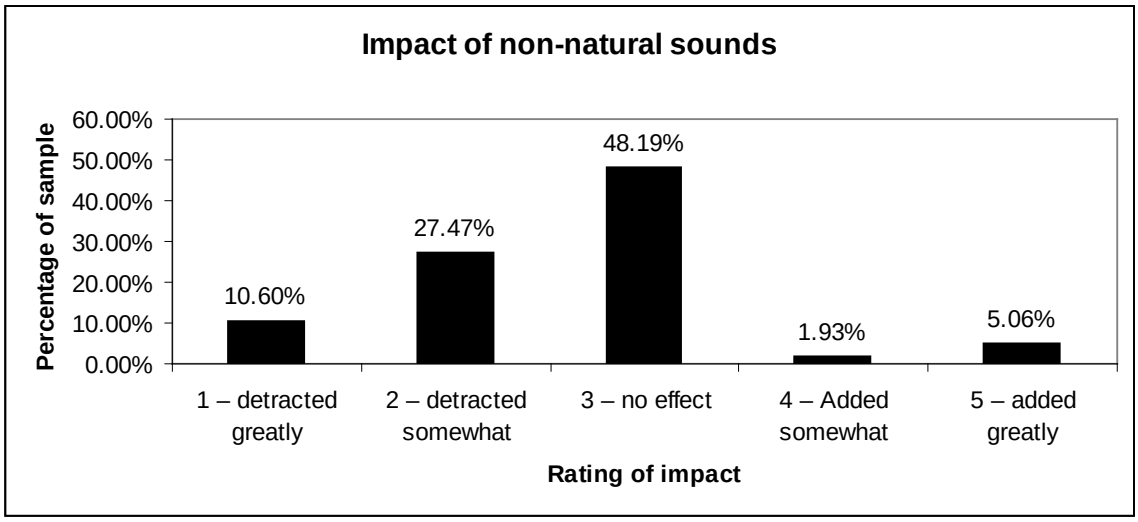

Figure 22. Impact of non-natural sounds on hiking experiences

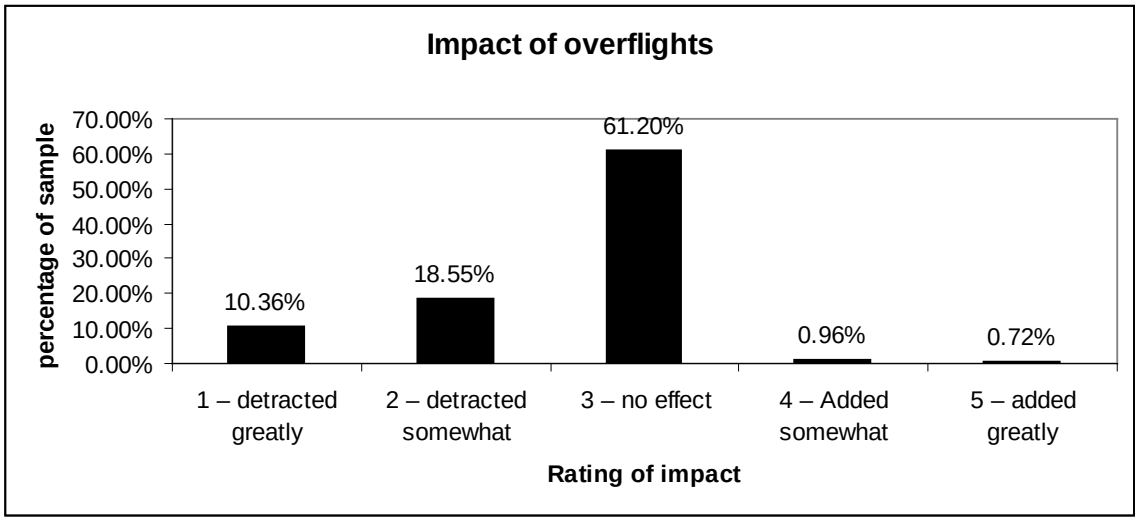

Figure 23. Impact of overflights on hiking experiences

The pristine natural setting had a strongly positive impact on most hikers' experience. Approximately 83% of those sampled said that the pristine natural setting added greatly to their hiking experience. This suggests that the setting of this trail is perceived to be pristine and does not suffer from significant human impacts or other degradation.

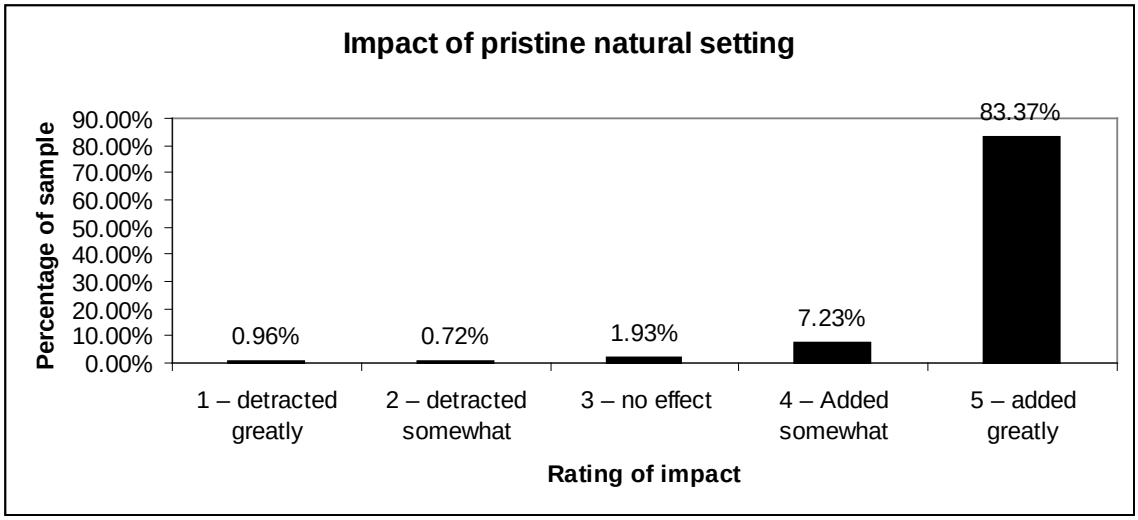

Figure 24. Impact of pristine natural setting on hiking experience

Seeing wildlife had a positive impact on hikers' experience. Approximately 69% of those sampled said that seeing wildlife added greatly to their experience while it added somewhat to approximately 20% of respondents' experiences. Again it is difficult to know from these results if people saw a lot of wildlife or if hypothetically seeing wildlife would add to their experience.

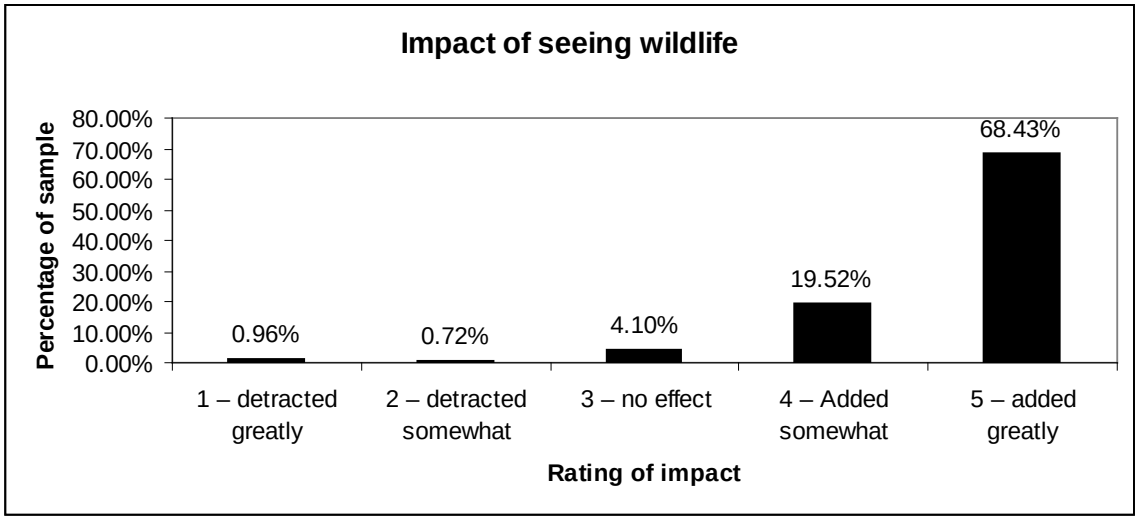

Figure 25. Impact of seeing wildlife on hiking experiences

F. How many hikers had previous hiking experience in the park?

Hikers were asked if they had taken a previous hike of this length in the park. This was asked to help understand if the shuttle was influencing people who might not otherwise take a longer day hike to do so by making it easier to take a one way hike. There was an even split between those who had taken a long hike in the park and those who had not.

Due to this even split, an analysis of how hikers without previous hiking experience in the park differed from those who had previous hiking experience in the park.

G. Are there differences between first time and repeat "long hikers"?

Park managers have wondered if the shuttle system is opening up longer backcountry trails, like the Highline Trail, to people who have not taken long hikes in the park before. The results of the hiker survey suggest that approximately 50% of those hiking the Highline Trail have never taken a long hike in GNP before. This may be in part due to the fact that many visitors have not been to the park before, and therefore have not had the opportunity to take a long hike before. However, it may also reflect the fact that people who would not otherwise take a long hike in the park choose to do so because the shuttle facilitates one-way hikes.

Hikers who had taken a long hike in the park before are similar to those who have not on most of the questions assessed in this survey. However, there are some interesting differences between the two groups. First, respondents who had previously taken a long hike were significantly more likely to be from Montana. This is not surprising considering that fact that Montana residents are likely to have more opportunities to visit GNP and therefore have more opportunities to take longer hikes in the park.

Visitors who had not taken a previous hike of this length in GNP before were more likely to use the shuttle than people who had taken a hike of this length. 89% of hikers who had not taken a previous long hike in the park rode the shuttle compared to 79% of hikers who had taken a long hike in the park before. Shuttle use is significantly different between these two groups based on a Pearson's chi-squared test of difference between groups with a significance level of 0.012, well below the cutoff level of 0.05. The Pearson's chi-square tests if the difference between two groups is based on random chance or if it represents a true difference between the populations represented by the sample groups. This significant difference in shuttle use between first time and previous long hikers suggests that the shuttle is in fact increasing the number of people who are taking longer hikes in the park but may not have without the assistance of the shuttle.

Visitors who had taken a long hike in GNP before were significantly more likely to be bothered by non-natural sounds. 16% of those who had taken a long hike in GNP before said that non-natural sounds detracted greatly from their hiking experience compared to 5% of hikers who had not taken a long hike in the park before. These groups were significantly different with a Pearson's chi-square significance value of less than 0.001. Similarly, previous long hikers were also more likely to be bothered by airplane and helicopter overflights. 13% of previous hikers said that overflights detracted greatly from their experience compared to 7% of first time hikers. The Pearson's chi-squared significance level for differences between these two groups was 0.06, just over the common significance cutoff level of 0.05. Previous long hikers were also slightly more likely to be bothered by a lack of solitude during their hiking experience. 4% of previous long hikers said that their experience of solitude, or the lack thereof, detracted somewhat from their experience compared to 0.05% of first time long hikers. The Pearson's chi-squared test of difference between these two groups was almost significant at 0.096.

These results suggest that people who are repeat hikers in GNP are more bothered by social impacts on their hiking experience such as non-natural sounds, overflights, and lack of solitude.

Previous long hikers and first time long hikers also differed in when they learned about and decided to take their hike. Previous long hikers were more likely to learn about the hike they took before arriving at the park, with 75% learning about the hike before arriving at GNP compared to 59% of first time long hikers. The Pearson's chi-square test of difference between these groups was significant at below 0.001. Visitors who had taken a long hike in the park before were also more likely to decide on their hiking destination before arriving at the park compared to first time hikers (52% of previous long hikers vs. 42% of first time long hikers). First time hikers were more likely to decide on their hike after arriving at the park (43% of first time long hikers vs. 22% of previous long hikers). These differences were significant with a Pearson's chi-square significance below 0.001. However, both groups were more likely to decide on their hike with knowledge that they could use the shuttle to facilitate their hike.

H. Summary of hiker survey results

Probably the most important finding from the hiker survey is the importance of the shuttle in visitors' hiking activities. Over 80% of people hiking the Highline Trail used the shuttle to facilitate their hike. Furthermore, over three quarters of those surveyed made their decision about where to hike based on knowledge that they could use the shuttle to facilitate a one way hike. The survey results also suggest that people who might not otherwise take a long hike in the park are doing so due to the fact that they can use the shuttle to facilitate their hike.

The second key finding is that people who are using the shuttle to facilitate a hike are still driving some of the most congested sections of the road and parking at highly congested parking lots. For example, the majority of hikers sampled parked a car at Logan Pass. Approximately 20% of hikers parked at the Loop. Though this parking lot is before the construction begins for those who enter from the west side, it is a congested parking area.

A related finding, though only anecdotal, is that park Rangers are recommending that hikers park at the Loop or Logan Pass instead of at Apgar. Furthermore, hikers who do park at Apgar have difficulty getting on a shuttle returning from Logan Pass to Apgar in the late afternoon as most shuttles are full returning from Logan Pass at this time. Both of these findings suggest that some small changes to Ranger training and shuttle management would make the shuttles more effective for visitors and for reducing road and parking congestion.

These results also suggest that the Highline Trail is not suffering from significant social or physical impacts due to an increase in shuttle riding hikers. Most hikers said that their experience was not highly impacted by seeing too many hikers and that their experience was improved by the experience of solitude. A large majority of hikers also said the pristine natural setting and wildlife improved their experience. Previous hikers were

slightly more likely to be impacted by airplane overflights and non-natural noise. However overall, no social or physical impacts stood out as a problem for the hikers sampled. In future research, it would be useful to assess directly if people felt they experienced overcrowding or other social and physical impacts on the trail. It might be especially useful to ask previous hikers if they notice any changes to major trails if they have hiked them before the implementation of the shuttle.

VI. Loop Observation Results

Parking lot usage was observed at the Loop. These observations tracked how long groups parked in the Loop parking lots, what activities they appeared to be parking there to do, and basic information about group characteristics including group type, group number, and state of residence based on vehicle license plates. This data also provides a point of comparison to survey data that can be used to support that survey responses are representative of visitors who stop at the Loop.

A. How long do visitors park at the Loop?

The Loop is generally a quick stop for most visitors, who stop there to look at Heavens Peak and the surrounding landscape. This is also a trailhead for the Highline Trail and the closest access point to reach Granite Park Chalet. As a result most of the park data shows short stops of 5-10 minutes with some outliers of over 6 hours or all day for those who are staying at the Chalet.

The average parking time was approximately 9 minutes and the median was 6 minutes. Approximately 20% of vehicles were parked there longer than then the 6 hour observation period. These vehicles are not included in the mean and median parking times.

The lot at the Loop was only full 18% of the time observed. However, the lot was only rated as full when all possible spots were full, including unmarked parallel spots along the north and south walls of the upper parking lot. The lot may have appeared full to visitors more of the time. In fact, visitors were observed pulling in and then leaving without parking or considering pulling in and then continuing along the road without parking when the lot was not technically full. This suggests that the park may want to mark off all allowable parking spots so that visitors can tell more easily when the lot has space and when it does not.

Table 4. Loop Parking Duration and Lot Capacity

Mean duration of stops (mins)	9
Median duration of stops (mins)	6
Percent of observations exceeding observation period*	19.5%
Percent of observations during which lot was full**	18%

* Underestimates duration of stops because some vehicles' parking exceeded observation period
** Not equivalent to real time lot was full

B. Activities and Group Characteristics Observed

The activities and group characteristics observed were similar to those that were assessed by surveys taken at the Loop. This provides support that the survey data is generally representative of visitors who stop at the Loop. The observations reflect the same top four activities found in the shuttle rider and non-shuttle rider surveys: viewing the scenery, taking a picture, starting a hike, and using the facilities.

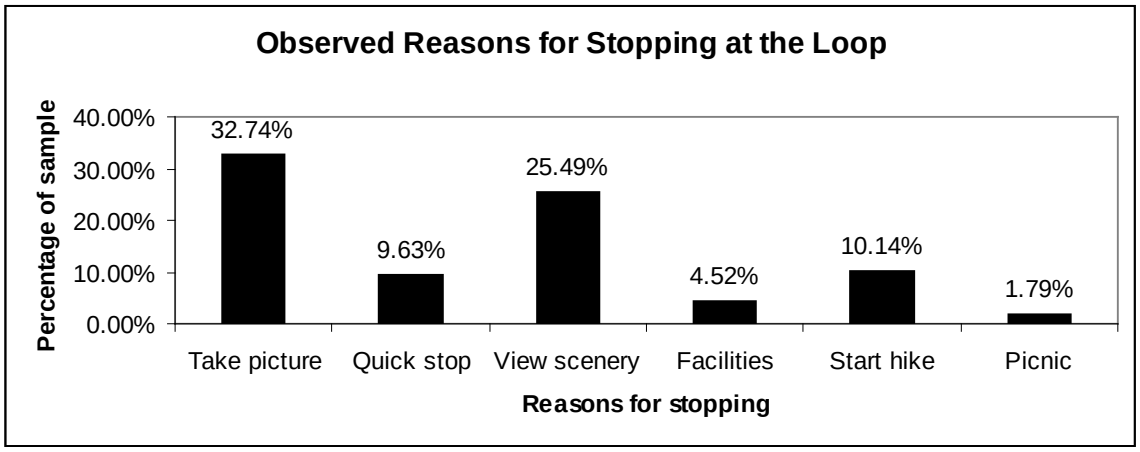

Figure 26. Observed reasons for stopping at the Loop

Observed group characteristics were also very similar to those found in survey data. Similar to shuttle rider, non-shuttle rider, and hiker survey data, the most common group type was family (44% of observations) and the average group number was two.

State of residence observed at the Loop was similar to state of residence data collected in all three surveys. The most common state observed was Montana (33% of observations) followed by Washington (11%) and Alberta (6%). Approximately 10% of vehicles observed were rental cars.

Table 5. Top ten states observed on vehicle license plates at the Loop

MT	33%
WA	11%
AB	6%
CA	4%
ID	4%
OR	3%
CO	2.50%
MN	2.30%
UT	2.30%
WI	2.20%

VII. Overall Conclusions and Recommendations

This study provides useful information about how people are using the shuttle to facilitate longer backcountry hikes in the park, how the shuttle is influencing use of the GTSR and roadside pullouts, why people ride the shuttle, and how people are using shuttle related information. The key findings of this study include:

- A large percentage of people taking longer backcountry day hikes are using the shuttle to facilitate a one-way hike.
- People who use the shuttle to facilitate a one way hike are still driving on the road and parking in congested areas.
- People who hike the Highline Trail are not seriously impacted by overcrowding, airplane overflights, or negative impacts on the natural environment or wildlife. However, approximately 30-40% of hikers did report that overflights and non-natural sounds and too many other hikers had a negative impact on their hiking experience.
- Approximately half of hikers on the Highline Trail had not taken a hike of this length in the park before. There were few major differences between people who had hiked in the park before and people who had not. However, previous long hikers were slightly more bothered by social impacts on the trail while first time long hikers were more likely to use the shuttle to facilitate to take their hike and decide on their hike after arriving at the park.
- The shuttle does not seem to have significant impacts on what people are doing at the Loop and Logan Pass. However, the shuttle does appear to be increasing the number of people who are hiking the Highline Trail as a one way hike.
- Shuttle riders are choosing to ride the shuttle to reduce and avoid road and parking congestion, to avoid the stress of driving the road and be better able to view the scenery, and to benefit the environment of Glacier National Park.
- Both shuttle riders and non-shuttle riders look at shuttle related information and virtually all visitors who looked at shuttle related information found it very helpful.
- The most frequently used sources of information about the shuttle are the park news paper, information at the transit centers, park employees, the park website, information available at hotels and campgrounds, and word of mouth from other visitors. Very few visitors are gaining shuttle related information from the cellular 511 service or the parks AM radio station.

These findings have some important management implications. First, the study found that shuttle related information is relatively well used and is considered very helpful by those who use it. However, most shuttle-related information sources are used by less than 50% of visitors. This suggests that shuttle related information could be more prominently placed in the park newspaper and on the park website to encourage more people to use it.

Another important finding is that the shuttle is not meeting its full potential to reduce road and parking congestion because hikers who use the shuttle are still driving to and parking at congested trailheads. Anecdotal evidence from hikers suggests that park rangers recommend that visitors park at the Loop or Logan Pass to hike the Highline

Trail. In future, rangers could instead recommend parking at the transit centers. In addition, shuttle related communications at the transit centers, in the park newspaper, and on the park website could recommend parking at the transit centers to ride the shuttle to major trailheads.

In addition, these results suggest that there may be some negative social impacts on the Highline Trail. For example, nearly 40% of hikers said that "seeing too many people" and non-natural sounds detracted from their hiking experience and approximately 30% of hikers said that overflights detracted from their hiking experience. These results suggest that the Highline Trail may be suffering from some overcrowding and other social impacts. While the park may not be able to affect overcrowding, they may be able to consider ways to reduce non-natural sounds and overflights.

Some additional research may be worthwhile to further understanding of issues uncovered in this study. For example, the park may want to undertake a more systematic study of what rangers tell people about the shuttles and hiking and what printed shuttle related information suggests about where to park to reach major trailheads. This might be followed up by using alternative information about the shuttle and hiking that would help to reduce road and parking congestion in park employee training and shuttle related publications.

Additional research on hiking experiences might also be useful. For example, it would be useful to ask people if they experienced overcrowding, how many overflights they experienced, and if they saw any degradation of the natural environment along the trail. This study asked if these things detracted from hiking experiences but did not directly assess if people experienced these impacts. It might also be useful to ask people who have previously hiked backcountry trails that have been made more accessible by the shuttle if they notice changes in the trail since the shuttle system began.

This study only assessed people hiking the Highline Trail. Additional research could be done on hikers on other trails that are made more accessible by the shuttle such as Siyeh Bend to Sunrift Gorge and St Mary's Falls to Sunpoint to see if the same trends in shuttle use and hiking experiences are apparent on these trails.

References

Baker, Melissa and Freimund, Wayne. 2007. Initial Season of the Going-to-the-Sun Road Shuttle System at Glacier National Park: Visitor Use Study. Missoula, MT: University of Montana Department of Society and Conservation.

Freimund, Wayne; Mccool, Stephen F; and Adams, John C. 2006a. Recreational Use of Selected Viewpoints on Going-to-the-Sun Road, 2005. Missoula, MT: University of Montana Department of Society and Conservation.

Freimund, Wayne; Baker, Melissa L.; McCool, Stephen F. 2006b. Recreational Use of Selected Viewpointson the Going-to-the-Sun Road, 2006. Missoula, MT: University of Montana Department of Society and Conservation.

Walsh, Susan and John Comer, 2006. Quantitative Methods for Public Administration: Techniques and Applications. Waveland Pr Inc; 3 edition.

Appendix 1: Hiker, Shuttle Rider, and Non-Shuttle Rider Surveys

Hiker Survey

Thank you for agreeing to help Glacier National Park!
Your input is important to park management. Response to this request is voluntary. While you are not required to respond, your cooperation is needed to make the survey results comprehensive, accurate, and timely. This survey is sponsored by the National Park Service, and the information will be used by park managers to better serve the public.

Please answer the following questions about your hike today in GNP.

1. Did/ Do you have a specific hiking destination?
   - ❑No
   - ❑Yes

   b. If **YES**, what is your planned destination _____

   c. How long were (or do you plan) to be walking (estimated hours)?_____

   d. Did/ Are you planning to use the shuttle service to facilitate your hike?
   - ❑No
   - ❑Yes

2. Did you leave a car in another location to allow you to hike only one way?
   - ❑ No (go to question 3)
   - ❑ Yes
     a. If you left a car somewhere else in the park, where did you leave your car?
     - ❑ Logan Pass
     - ❑ St. Marys Falls
     - ❑ The Loop
     - ❑ Siyeh Bend
     - ❑ Sunrift Gorge
     - ❑ Apgar Transit Station
     - ❑ Sun Point
     - ❑ Gunsight Pass Trailhead
     - ❑ Fish Creek Campground
     - ❑ St. Mary Visitor Center/St. Mary Campground
     - ❑ Rising Sun
     - ❑ Sprague Creek Campground
     - ❑ Rising Sun Boat Dock
     - ❑ Avalanche Campground/ Picnic Area
     - ❑ Lake McDonald Lodge
     - ☐ Other: _____

3. Did you or are you planning to take an overnight trip in the backcountry?
   - ☐ No (If no go to question 4)
   - ☐ Yes

a. If **YES**, Did you or are you planning to stay in? (Check **all that apply**)

- ❑ A Chalet
- ❑ A campground
- ❑ Undesignated site

4. Please indicate how the following items affected the primitive, backcountry quality of your hiking experience in GNP.

	1 Detracted greatly	2 Detracted somewhat	3 No effect	4 Added somewhat	5 Added greatly
Seeing a lot of other hikers	1	2	3	4	5
Seeing very few other hikers	1	2	3	4	5
Pristine natural areas surrounding the trail	1	2	3	4	5
Non-natural sounds, such as airplanes	1	2	3	4	5
Airplane over-flights	1	2	3	4	5
Encountering with wildlife	1	2	3	4	5
Experiencing solitude	1	2	3	4	5

5. When did you learn about this hike?
   - ❑ After you arrived at GNP
   - ❑ Before you arrived at GNP

6. When did you decide to take this hike? (Check **ONLY one**)
   - ❑ After you arrived at GNP and learned about the shuttle
   - ❑ After you arrived at GNP but without knowledge of the shuttle
   - ❑ Before you arrived at GNP, but with knowledge of the shuttle
   - ❑ Before you arrived at GNP, but without knowledge of the shuttle

7. Have you taken a hike of this length or longer in Glacier before?
   - ❑ No
   - ❑ Yes

We would like to know a little about you. Please answer the following questions about you and your personal group. Your personal group refers to members of your immediate travel party, such spouse, family, friends, etc. This does not include any larger, organized groups you may be traveling with, such as school, church, scouts, and tour groups.

8. Do you live in the United States or Canada?
   - ☐No
   - ☐Yes

   a. If yes, what your home state/ province and zip code/postal code? _____
   b. If no, what country do you live in? _____

9. On this visit, what kind of personal group (not guided tour/educational/other organized group) were you with? (please **check only one** response)
   - ❑ Alone
   - ❑ Family
   - ❑ Friends
   - ❑ Family and Friends
   - ❑ Business associates
   - ❑ Other (please specify _____)

10. On this visit, how many people are in your personal group, including yourself? _____ number of people

11. On this visit, how many children are in your personal group?
    ____ Children under six years old
    ____ Children six to nine years old
    ____ Children 10 to 18 years old

12. On this visit, were you and your personal group with the following type of groups? Please check the yes or no.
    - Commercial guided tour
      ☐No
      ☐Yes
    - Educational group (school, etc.)
      ☐No
      ☐Yes
    - Other organized group (church, business, etc.)
      ☐No
      ☐Yes

13. Do you plan to/ did you visit Waterton Lakes National Park in Canada as part of this trip?
    ☐No
    ☐Yes

Thank you for your participation!
Please use the back of this page to make any further comment

Shuttle Rider Survey

Thank you for agreeing to help Glacier National Park!
Your input is important to park management. Response to this request is voluntary. While you are not required to respond, your cooperation is needed to make the survey results comprehensive, accurate, and timely. This survey is sponsored by the National Park Service, and the information will be used by park managers to better serve the public.

Please answer the following questions about your decision to stop at this pullout.

1. Which of the following best describe why you chose to stop at this viewpoint (please check **all that apply**):
    ❑ I saw wildlife near by
    ❑ My kids needed a break
    ❑ I wanted to look at this particular view
    ❑ I am starting a hike here
    ❑ I or someone in the group needed a stretch
    ❑ I wanted to see the interpretive exhibit
    ❑ I needed the facilities here (toilet, trash cans, etc.)
    ❑ I wanted to photograph this particular view
    ❑ We wanted to have a picnic here
    ❑ Other (please specify)_____

2. When you got off the shuttle here was it:
    ❑ A spur of the moment decision, or
    ❑ A stop planned ahead of time?

3. Did the fact that you were riding the shuttle influence your decisions about where to stop? Please **check the one answer** that best fits you.
   - ❑ No, go to question 4
   - ❑ Yes, I stopped at more stops because I was riding the shuttle
   - ❑ Yes, I stopped at fewer stops because I was riding the shuttle
   - ❑ Yes, I stopped at different locations than I would have if I had driven my own personal vehicle.
   - ❑ No

4. Did riding the shuttle change what you decided to do at this stop?
   - ❑ No (Go to question 5)
   - ❑ Yes

   4.a. If yes, please explain: _____

Please answer the following questions about your decision to ride the shuttle today in Glacier.

5. Please indicate how strongly you agree or disagree with the following statements about **why you chose to ride the shuttle**.

I chose to ride the shuttle because….	**1 Strongly disagree**	**2 Disagree**	**3 No opinion**	**4 Agree**	**5 Strongly agree**
It will benefit the environment of Glacier National Park	1	2	3	4	5
It will help alleviate traffic and parking congestion in GNP	1	2	3	4	5
I will avoid traffic congestion and difficulty finding a parking spot	1	2	3	4	5
It is more enjoyable way to experience the park because I do not have the stress of driving	1	2	3	4	5
It is a more enjoyable way to experience the park because I can concentrate on viewing the scenery	1	2	3	4	5

6. Did you visit one of the transit centers within Glacier National Park? (Either St. Mary Visitor Center or Apgar Transit Center)
   - ❑ No
   - ❑ Yes

7. Before completing this survey, were you aware that the primary purpose of the shuttle system are to reduce traffic congestion during reconstruction of the Going to the Sun Road, which will speed up completion of that reconstruction?
   - ❑ No
   - ❑ Yes

8. a. Please indicate whether or not you used the following information sources about the shuttle.

   b. <u>For those sources you used</u> (i.e. circled "yes" in part a), please indicate whether or not the information source was helpful.

Information source	**a. Did you use this info?**	**b. Was this info helpful?**
Park service website	No / Yes (→)	No / Yes
Personal communication with National Park Service employees	No / Yes (→)	No / Yes
Traveler radio information system (1610 am)	No / Yes (→)	No / Yes
*511 cellular information service	No / Yes (→)	No / Yes
Park newspaper/brochure	No / Yes (→)	No / Yes
Information available at my hotel or campground	No / Yes (→)	No / Yes
Signs and printed material at Apgar or St. Mary Transit Center	No / Yes (→)	No / Yes
Word-of-mouth information from fellow travelers or local residents	No / Yes (→)	No / Yes

9. Did the information you received about the shuttle system influence your decision to ride the shuttle or not?
   - ❑ No
   - ❑ Yes, It helped convince me to ride the shuttle

10. If you had this experience to do over again, what sources of information would you have liked to use about the shuttle system and when would you have liked to receive this information?

Information source	**Would you like to use this information on a future visit?**	**When would you like to receive this information?** (for example: at home while planning trip, at my hotel, once I arrive at the park, etc).
Park service website	No/ Yes	
Personal communication with National Park Service employees	No/ Yes	
Traveler radio information system (1610 am)	No/ Yes	
*511 cellular information service	No/ Yes	
Park newspaper/brochure	No/ Yes	
Information available at my hotel or campground	No/ Yes	
Signs and printed material at Apgar or St. Mary Transit Center	No/ Yes	
Word-of-mouth information from fellow travelers or local residents	No/ Yes	
Other (please specify):	No/ Yes	

We would like to know a little about you. Please answer the following questions about you and your personal group. Your personal group refers to members of your immediate travel party, such spouse, family, friends, etc. This does not include any larger, organized groups you may be traveling with, such as school, church, scouts, and tour groups.

11. Do you live in the United States or Canada?

☐No (go to question 12)
☐Yes

a. If yes, what your home state/ province and zip code/postal code? _____
b. If no, what country do you live in? _____

12. On this visit, what kind of personal group (not guided tour/educational/other organized group) were you with? (please **check only one** response)

❑ Alone
❑ Family
❑ Friends
❑ Family and Friends
❑ Business associates
❑ Other (please specify _____)

13. On this visit, how many people are in your personal group, including yourself? _____ number of people

14. On this visit, how many children are in your personal group?

____ Children under six years old
____ Children six to nine years old
____ Children 10 to 18 years old

15. On this visit, were you and your personal group with the following type of groups? Please check the yes or no.

- Commercial guided tour
  ☐No
  ☐Yes
- Educational group (school, etc.)
  ☐No
  ☐Yes
- Other organized group (church, business, etc.)
  ☐No
  ☐Yes

16. Do you plan to/ did you visit Waterton Lakes National Park in Canada as part of this trip?

☐No
☐Yes

Thank you for your participation!
Please use the back of this page to make any further comments.

Non-Shuttle Rider Survey

Thank you for agreeing to help Glacier National Park!
Your input is important to park management. Response to this request is voluntary. While you are not required to respond, your cooperation is needed to make the survey results comprehensive, accurate, and timely. This survey is sponsored by the National Park Service, and the information will be used by park managers to better serve the public.

Please answer the following questions about your decision to stop at this pullout.

1. Which of the following best describe why you chose to stop at this viewpoint (please check **all that apply**):
   - ❑ This was the first open spot available
   - ❑ I saw wildlife near by
   - ❑ Traffic was moving too slowly
   - ❑ My kids needed a break
   - ❑ I wanted to look at this particular view
   - ❑ I am starting a hike here
   - ❑ I needed a break from driving
   - ❑ I or someone in the group needed a stretch
   - ❑ My pet needed a break
   - ❑ I wanted to see the interpretive exhibit
   - ❑ I needed the facilities here (toilet, trash cans, etc.)
   - ❑ I wanted to photograph this particular view
   - ❑ We wanted to have a picnic here
   - ❑ The presence of road construction
   - ❑ Other (please specify)_____

2. When you stopped here was it:
   - ❑ A spur of the moment decision, or
   - ❑ A stop planned ahead of time?

3. Did you visit one of the transit centers within Glacier National Park? (Either St. Mary Visitor Center or Apgar Transit Center)
   - ❑ Yes
   - ❑ No

4. Before completing this survey, were you aware that the primary purpose of the shuttle system is to reduce congestion during reconstruction of the Going to the Sun Road, which will speed up completion of that reconstruction?
   - ❑ Yes
   - ❑ No

5. a. Please indicate whether or not you used the following information sources about the shuttle.

   b. For those sources you used (i.e. circled "yes" in part a), please indicate whether or not the information source was helpful.

Information source	**a. Did you use this info?**	**b. Was this info helpful?**
Park service website	No / Yes (→)	No / Yes
Personal communication with National Park Service employees	No / Yes (→)	No / Yes

Traveler radio information system (1610 am)	No / Yes (→)	No / Yes
*511 cellular information service	No / Yes (→)	No / Yes
Park newspaper/brochure	No / Yes (→)	No / Yes
Information available at my hotel or campground	No / Yes (→)	No / Yes
Signs and printed material at Apgar or St. Mary Transit Center	No / Yes (→)	No / Yes
Word-of-mouth information from fellow travelers or local residents	No / Yes (→)	No / Yes

6. Did the information about the shuttle system influence your decision to ride the shuttle or not? Please check one of the following.
   ☐ No (go to question 8)
   ☐Yes, it helped convince me to ride the shuttle
   ☐ Yes, it helped convince me NOT to ride the shuttle

7. If you had this experience to do over again, what sources of information would you have liked to use about the shuttle system and when would you have liked to receive this information?

Information source	**Would you like to use this information on a future visit?**	**When would you like to receive this information?** (for example: at home while planning the trip, at my hotel, once I arrive at the park, etc).
Park service website	Yes/ No	
Personal communication with National Park Service employees	Yes/ No	
Traveler radio information system (1610 am)	Yes/ No	
*511 cellular information service	Yes/ No	
Park newspaper/brochure	Yes/ No	
Information available at my hotel or campground	Yes/ No	
Signs and printed material at Apgar or St. Mary Transit Center	Yes/ No	
Word-of-mouth information from fellow travelers or local residents	Yes/ No	
Other: (Please specify: _____)	Yes/ No	

We would like to know a little about you. Please answer the following questions about you and your personal group. Your personal group refers to members of your immediate travel party, such spouse, family, friends, etc. This does not include any larger, organized groups you may be traveling with, such as school, church, scouts, and tour groups.

8. Do you live in the United States or Canada?
   - ☐No (go to question 12)
   - ☐Yes

   a. If yes, what your home state/ province and zip code/postal code? _____
   b. If no, what country do you live in? _____

9. On this visit, what kind of personal group (not guided tour/educational/other organized group) were you with? (please **check only one** response)
   - ❑ Alone
   - ❑ Family
   - ❑ Friends
   - ❑ Family and Friends
   - ❑ Business associates
   - ❑ Other (please specify _____)

10. On this visit, how many people are in your personal group, including yourself? _____ number of people

11. On this visit, how many children are in your personal group?
    ____ Children under six years old
    ____ Children between six and ten years old
    ____ Children between 10 and 18 years old

12. On this visit, were you and your personal group with the following type of groups? Please circle the yes or no.
    - Commercial guided tour
      ☐No
      ☐Yes
    - Educational group (school, etc.)
      ☐No
      ☐Yes
    - Other organized group (church, business, etc.)
      ☐No
      ☐Yes

14. Do you plan to/ did you visit Waterton Lakes National Park in Canada as part of this trip?
    ☐No
    ☐Yes

Thank you for your participation!
Please use the back of this page to make any further comments.

Appendix 2: Sampling Schedule

Glacier Summer 2009 Survey Schedule

Date	Day	Location	AM/PM
3-Jul	Friday	Logan	AM
4-Jul	Saturday	Loop	AM
5-Jul	Sunday	Logan	AM
6-Jul	Monday	Loop	PM
7-Jul	Tuesday	OFF	
8-Jul	Wednesday	OFF	
9-Jul	Thursday	Logan	PM
10-Jul	Friday	Loop	PM
11-Jul	Saturday	Logan	PM
12-Jul	Sunday	Loop	PM-observations
13-Jul	Monday	Logan	AM
14-Jul	Tuesday	OFF	
15-Jul	Wednesday	OFF	
16-Jul	Thursday	Logan	PM
17-Jul	Friday	Loop	AM -observations
18-Jul	Saturday	Loop	AM
19-Jul	Sunday	OFF	OFF
20-Jul	Monday	Logan	AM
21-Jul	Tuesday	Loop	PM
22-Jul	Wednesday	Logan	AM
23-Jul	Thursday	OFF	
24-Jul	Friday	OFF	
25-Jul	Saturday	OFF	
26-Jul	Sunday	OFF	
27-Jul	Monday	OFF	
28-Jul	Tuesday	OFF	OFF
29-Jul	Wednesday	Loop	PM
30-Jul	Thursday	Logan	PM
31-Jul	Friday	Chalet	AM
1-Aug	Saturday	Logan	PM
2-Aug	Sunday	Logan	AM
3-Aug	Monday	OFF	
4-Aug	Tuesday	OFF	OFF
5-Aug	Wednesday	Logan	AM
6-Aug	Thursday	Loop	PM
7-Aug	Friday	Logan	PM

8-Aug	Saturday	Loop	PM
9-Aug	Sunday	OFF	
10-Aug	Monday	OFF	
11-Aug	Tuesday	Loop	AM
12-Aug	Wednesday	Loop	AM
13-Aug	Thursday	Chalet	AM
14-Aug	Friday	Logan	PM
15-Aug	Saturday	Logan	AM
16-Aug	Sunday	OFF	
17-Aug	Monday	OFF	
18-Aug	Tuesday	Loop	PM
19-Aug	Wednesday	Logan	PM
20-Aug	Thursday	Loop	PM-observations
21-Aug	Friday	Logan	AM
22-Aug	Saturday	Chalet	AM
23-Aug	Sunday	OFF	
24-Aug	Monday	OFF	
25-Aug	Tuesday	Loop	AM-observations
26-Aug	Wednesday	Logan	PM
27-Aug	Thursday	Loop	PM-observations
28-Aug	Friday	OFF	
29-Aug	Saturday	Logan	PM
30-Aug	Sunday	Loop	PM-observations
31-Aug	Monday	Chalet	AM
1-Sep	Tuesday	Logan	AM