Going to the Sun Road Shuttle System and Visitor Study Synthesis Report

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Executive Summary

In 2007, Glacier National Park (GNP) began a major reconstruction of the Going to the Sun Road. As part of this project, GNP established a free public shuttle to help alleviate traffic congestion and construction delays. GNP managers in partnership with the University of Montana College of Forestry and Conservation have been studying how the shuttle system may be impacting visitor behavior, visitor use levels, and patterns of use within the park throughout the reconstruction process. The transit system was originally established to help reduce traffic on the GTSR by ten percent in order to reduce the impacts of the reconstruction process on visitor experience. However, the University of Montana's studies of the shuttle system and visitor behavior suggest that the transit system has had many more impacts, both negative and positive, on the road and the park as a whole. This report provides a synthesis of five years of research on visitor use of the GTSR and the new shuttle system.

The shuttle and visitor use study was divided into five phases. Phases one and two examined recreational use at viewpoints along the road in order to inform the development of the transit system and to provide baseline data for comparison with data gathered after the transit system was in implemented. Phase three provided an initial assessment of the shuttle service including visitor activity choices, quality of the service, and the experience of shuttle riders vs. non-shuttle riders. It also provided some recommendations for improving the shuttle system. Phase four provided information about parking lot usage at two high-use viewpoints along the GTSR that were known by park staff to have pedestrian and parking issues, which may have been impacted by the addition of shuttle stops at the viewpoints. The final phase of the study examined the role of the shuttle in influencing visitor activities such as choices about where to stop along the GTSR and what activities to engage in at viewpoints and changes in choices about hiking and backcountry camping. It also provided data about how visitors used shuttle related information sources and which sources visitors found most useful.

Use of the Going to the Sun Road

The transit system has had a limited impact on the number of visitors that drive a vehicle on the GTSR. Even though many visitors ride the shuttle, this does not necessarily mean that their vehicle is removed from high congestion areas of the GTSR. It turns out that many visitors drive to a parking area located on the road and then take the shuttle, rather than boarding the shuttle at one of the transit centers. For example, many people who use the shuttle to facilitate a one way hike along the Highline trail drove their personal vehicle to the Loop or Logan Pass trailheads and left their car parked there during their hike.

Overall, there appears to be very little change in the use of roadside pullouts over the course of the study. For example, Avalanche Lake trailhead, a popular parking area where visitors park to take a hike, use the facilities, or to have a picnic, showed no significant change in why people

stop or the amount of time they spend there from 2006 to 2008. Similarly, there has been no change in the activities visitors engage in or the amount of time people are stopped at the Loop from 2005 to 2009. Visitor's primary reasons for stopping at the Loop in both 2005 and 2009 were to take a photograph or enjoy the view, and their stops were usually very short.

Shuttle Users

Visitors who drive the road in their own car are very similar to those who choose to ride the shuttle, however there are some small differences. Shuttle riders travel in smaller groups than non-shuttle riders. Shuttle riders were more likely to be traveling alone or with one other person, while non-shuttle riders had a slightly higher percentage of people traveling in groups of three or four. Non-shuttle riders are more likely to be traveling with children.

Approximately 11% of park visitors used the shuttle system in 2007. The proportion of riders dropped slightly in 2008 when approximately 10% of visitors used the shuttle service. Ridership was up again in 2009 when about 12% of all park visitors rode the shuttle. The proportion of riders was higher in July than in August in all three years.

Impact of Shuttle Use on Other Parts of the Park

There is no evidence the shuttle has reduced parking congestion along the road. However, the shuttle has made hiking more accessible for visitors -- especially longer hikes like the Highline Trail that can be done as one way hikes more easily by using the shuttle. Backcountry camping has also increased a little since the transit system was put into place. The shuttle has the potential to have both positive and negative impacts on the environment. The shuttles themselves are a more energy efficient method to move visitors through the park than individual vehicles and the transit centers are LEED certified. However, if visitors are still driving deep into the park to catch the shuttle, this energy efficiency benefit is reduced. In addition, there has been trampling of vegetation around shuttle stops and to the extent that shuttles have encouraged more people to hike in the park, there is more opportunity to for visitors to impact areas around trails.

Dissemination of Information

Initially there were some issues with distributing accurate information about the transit system to potential riders. However the dissemination of information has improved greatly over the last three years. Information about the shuttle seems to be influential in visitor's decisions to ride the shuttle. New strategies are being used to present accurate information to visitors and most shuttle riders found the information they used about the shuttles very helpful.

Visitor Satisfaction

The quality of service provided by the shuttles has improved greatly over the last three years. Limited rider capacity remains the biggest issue, but other problems such as bad driver behavior and safety concerns have been addressed very well. Many changes have been made to enhance

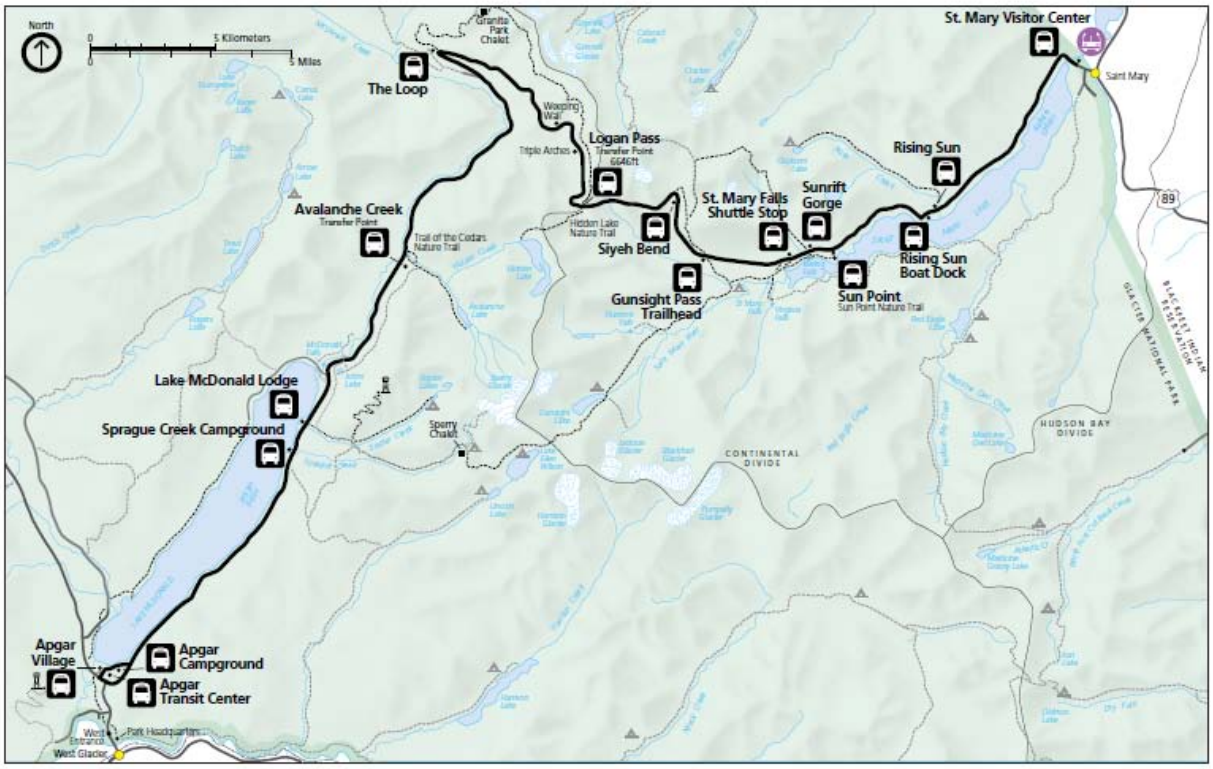
the service and rider satisfaction seems to reflect these improvements.

History of the Going to the Sun Road and Shuttle System

The Going to the Sun Road is the primary route through Glacier National Park. In 1932 construction was completed on the road which connects the east and west entrances of the park and is a main attraction for visitors. Over two million people visited the park in 2009 and 80% of those visitors traveled the Going to the Sun Road.

A ten-year construction project began in 2007 to improve and rehabilitate the GTSR. As part of the plan to mitigate the effects of the project on park visitors, local businesses, and tourism, GNP implemented a free shuttle bus system along the GTSR that services the area from the Apgar transit center on the west side of the park to the transit center in St. Mary on the east side. The shuttle system is just one element of a plan to minimize disruptions to visitors traveling the road during reconstruction and reduce impacts on park values in the long run (NPS, 2003).

In its initial year of operation 29 shuttles drove three routes with a total of 17 different shuttle stops. Due to the popularity of the shuttles, the number of busses has been increased in 2009. The Apgar route and the Lake McDonald Valley route service the west side of the park and the St. Mary Valley route serves the East side of the park. Large busses run between the Avalanche Lake parking area and the Apgar transit center and from St. Mary to Logan Pass. Smaller Dodge Sprinter busses navigate the road's sharp turns between Avalanche Lake and Logan Pass.



The shuttle system is operational from July 1 or the first day the road is completely open through Labor Day. The initial ridership goal for the shuttle system was 800 to 1,600 rides per day. The first year, the shuttle system provided approximately 2,000 rides per day. By the third year, ridership was up to over 2,400 rides per day.

Research Methods

The research described in this report was conducted over a five-year study period. It began in 2005, two years before the shuttle system was initially put in place to gain baseline data on visitor use of roadside viewpoints that could be compared with information collected while the shuttle system was in operation and to assess visitor perceptions of the proposed shuttle system. Data was gathered through a variety of methods including observations, interviews, surveys, and stakeholder meetings.

Phase One, undertaken in the summer of 2005, provided data on visitor types and distribution at 13 viewpoints along the GTSR including Red Rock, the upper and lower Loop, Big Bend, Oberlin Bend, Lunch Creek, Siyeh Bend, upper and lower Jackson, St. Mary Falls, Sunrift George, and Wild Goose Island. Each viewpoint was observed for a two-hour period during varying times of the day. Throughout the summer each viewpoint was observed multiple times and team members recorded information about the behavior and characteristics of visitors. Interviews were also conducted at each of the viewpoints, with a total of 1,707 interviews completed. The collected information provides insight into the nature of viewpoint use, including principal activities at viewpoints and willingness to use the shuttle system (Freimund et al, 2005).

The 2006 study compiled baseline data for four major viewpoints along the road. Observations and interviews were conducted at Lake McDonald Lodge, Avalanche Lake Trailhead, Logan Pass, and Sun Point to provide baseline data on visitor behavior at these sites and to gain a better understanding of how the shuttle system might influence visitor behavior and experiences. Each area was observed 5 times over the course of the summer, and interviews were conducted at each viewpoint 5 different times. Throughout the summer, over 7000 observations and 850 interviews were completed (Freimund et al, 2006).

A stakeholder evaluation was completed in 2007 to assess the impacts of the new shuttle system. Comments about the shuttle system were gathered through 376 surveys from park visitors, local constituents and concessionaires, park volunteers, shuttle drivers, traffic management personnel on the GTSR construction team, and park staff. The evaluation provided an assessment of the quality of the shuttle service and recommendations for improvement (Freimund and Baker,

2007).

Observations of visitor use at two additional high use viewpoints, Avalanche Lake and Sunrift Gorge, were completed in 2008 to provide information on visitor use for comparison with data collected before the shuttle service was in place. The Avalanche Lake parking area was observed eight times and Sunrift Gorge parking was observed five times during the month of July. Information was collected on group characteristics and the activities people engaged in at the viewpoints (Dimond and Freimund, 2008).

The final phase of study was conducted during the summer of 2009 at Logan pass and the Loop. Three different surveys were given to visitor: one for people who rode the shuttle, a second for individuals who drove a personal vehicle, and a third for people who had taken a hike in the park. A total of 1281 surveys were completed. Observations were also conducted at the Loop parking area on seven different occasions. The data provided information about how the transit system influences visitor use of roadside viewpoints, the relationship between the shuttle service and hiker decisions about taking long day hikes, and how visitors use information about the transit system (2009).

How has use of the Going to the Sun road changed over time?

This study suggests the transit system has had some influence on how visitors use the Going to the Sun road including where people choose to stop, what activities they do at each stop, the amount of time spent at each viewpoint, and the overall amount of vehicles traveling the road.

Impact of shuttle use on visitor use of roadside viewpoints

Over the five-year study period observations were completed at fifteen different viewpoints and parking areas along the GTSR to help assess the impact of the shuttle system on visitors' use of roadside viewpoints. Based on this observation data, the presence of the shuttle has not had a lot of influence on the length of time people stop at viewpoints or on what visitors choose to do at viewpoints. For example, parking lot usage and parking duration, as well as visitor activities, observed at the Avalanche Lake and the Loop viewpoints did not change significantly from observations made before the shuttle system was implemented to those made after the shuttle was in place. However, survey data suggests that the shuttle may influence people's decisions about when and where to stop. When shuttle riders were asked directly if the shuttle influenced where they chose to stop, almost 50% said they changed their plans because they rode the shuttle (2009).

Visitor use at Lake McDonald Lodge

The Lake McDonald Lodge area is different from many stops along the road because it offers a

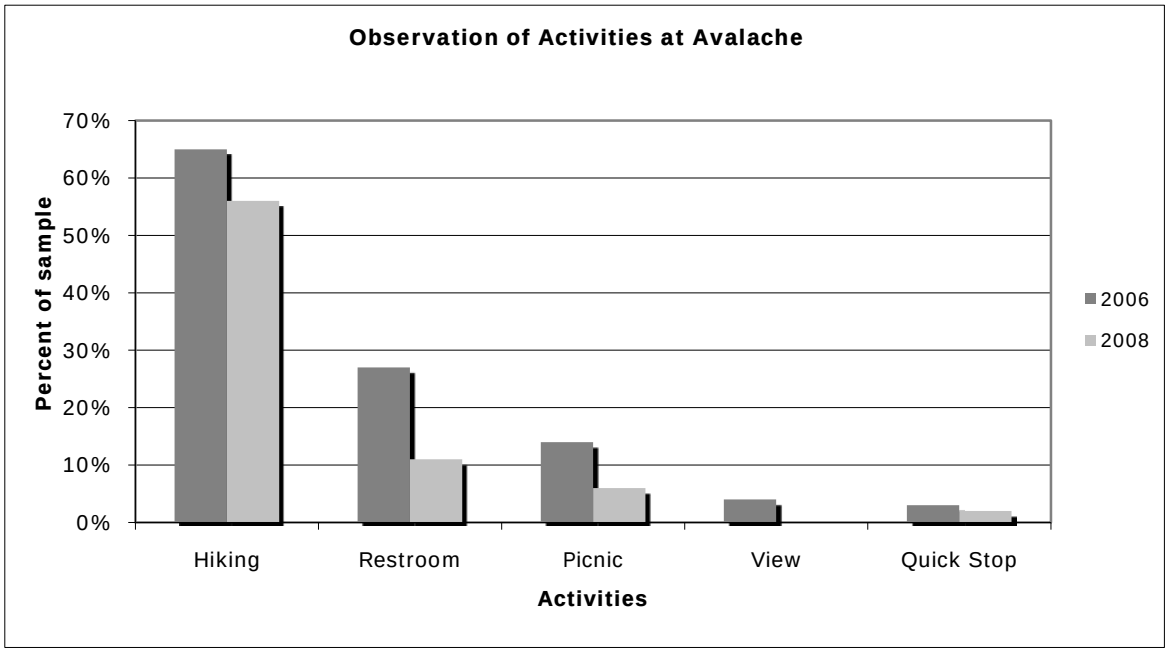
wider range of activities and facilities than other stops. The most common reason for stopping at Lake McDonald Lodge was to begin a hike (20%). Almost 14% of visitors stopped there to take a boat ride while another 14% of visitors indicated they stopped to eat. 13% stopped to see the lodge and 10% indicated they were there to see the view (Freimund et al, 2006).

Parking around Lake McDonald Lodge was observed during the 2006 study, however, only the main loop parking area was included in the observation. Visitors to Lake McDonald Lodge tend to stay for slightly longer period of time than some of the other roadside viewpoints because they have an activity or goal in mind and because it takes some time to see all of the sights in the area. The average length of stop at Lake McDonald Lodge was 90 minutes, with a median length of 64 minutes. 25% of vehicles were parked in the lot for more than two hours. The parking area was full during 12% of the observations (Freimund et al, 2006a).

Interviews and observations at the Lake McDonald parking area were only conducted in 2006, so it is not possible to compare the activities visitors engage in and the length of time visitors stop at Lake McDonald Lodge before and after the shuttle was implemented.

Visitor Use of Avalanche Lake

The Avalanche Lake parking areas are very complex and include several outlying parking lots. In 2006 only the main parking lot was observed, but in 2008 the observation was expanded to include outlying parking areas. The 2006 observations found that 65% of visitors stopped at Avalanche Lake parking area to take a hike. Another 27% of visitors parked in order to use the restroom, and 14% to have a picnic (Freimund et al, 2006b). Interviews were also completed in 2006 and visitors were asked about their reasons for stopping. In interview responses, over 65% of respondents said they stopped to take a hike, 18% needed to use the facilities, 16% stopped to enjoy the view, and only 2.7% of respondents said they were there for a picnic (Freimund et al, 2006). Based on observation data from 2008, hiking remained the most popular activity with 56% of visitors observed taking a hike. Based on observations, 11% of visors in 2008 used the restroom, and 6% stopped to have a picnic (Dimond and Freimund, 2008).



The average duration of stops at the Avalanche Creek parking lots in the 2006 study was 79 minutes and the median length was 58 minutes (Freimund et al, 2006b). In 2008 the average duration of parking stops at Avalanche was 84 minutes and the median length was 47 minutes (Dimond and Freimund, 2008). Based on the average duration of parking stops in 2008 (47 minutes) and the fact that 75% of Avalanche visitors parked there for less than 119 minutes, it is not likely that many people are parking at Avalanche to ride the shuttle. For example, it would take well over 45 minutes to ride the shuttle from Avalanche to Logan Pass and back. The percentage of time the observed parking areas were full increased from 2006 to 2008. In 2006, the lot was at or above capacity for 34% of the observations (Freimund et al, 2006b). The lots were full for 44% of the observations in 2008 (Dimond and Freimund, 2008).

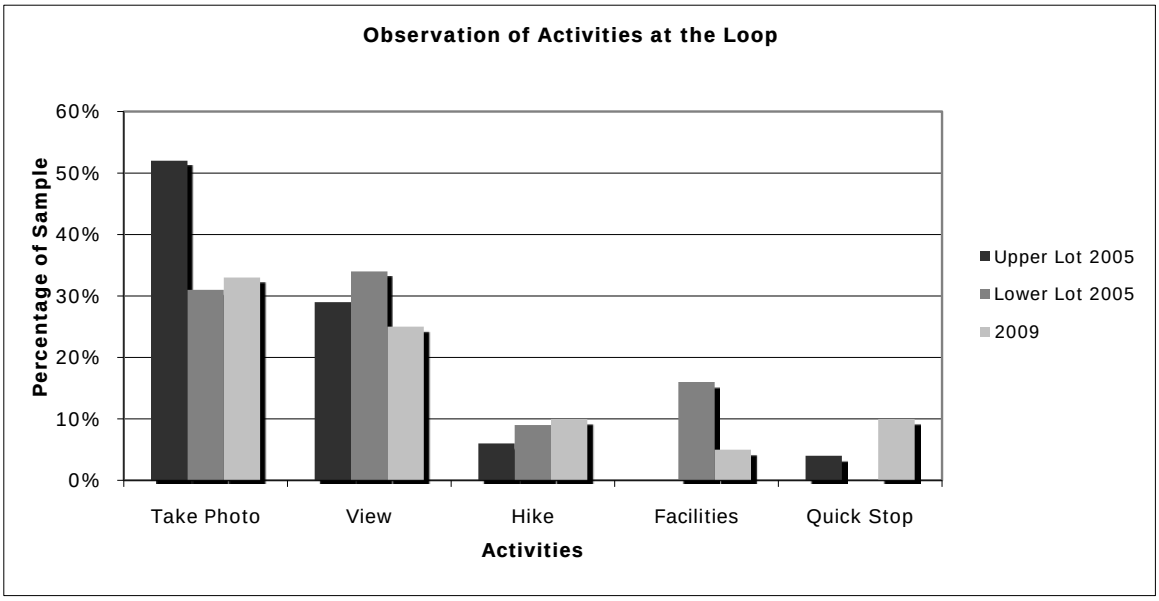
Based on both observation data in 2006 and 2008, and interview responses in 2006, Avalanche Lake trailhead is not a quick stop for most people, but it does not seem to be an "all-day" parking area either.

There was no significant change in why people stop at Avalanche or how long they stop from 2006 to 2008. This suggests that the shuttle has not had a major impact on use of this roadside viewpoint.

Visitor Use of the Loop

The Loop parking area is a major stopping point along the GTSR. Bathroom facilities are available, there is an interpretive exhibit, and the Highline trail loop ends there. It also provides an exceptional view. The Loop parking area was observed in 2005 and 2009, however the 2005 data was analyzed with parking split into the "upper" lot and the "lower" lot while in 2009 the

observations considered the two lots as a single, large lot. There has been little change in the activities visitors engage in at the Loop since the shuttle began. Taking a photograph and enjoying the view were the two most common reasons why people stopped at the Loop in 2005 and 2009. The 2009 study found that 33% of visitors stopped to take a photograph (Dimond and Freimund, 2009), while in 2005, 52% of people stopped at the top lot and 31% at the lower stopped to take a photograph. In 2005, 29% of upper lot visitors and 34% of lower loop visitors observed stopped to enjoy the view. In 2009, 25% of visitors stopped for the view. Hiking was the third most popular activity both years. In 2005, 6% of upper loop and 9% of lower loop visitors stopped there for a hike (Freimund et al, 2006a), while 10% of visitors in 2009 stopped for a hike (Dimond and Freimund, 2009). There may be a few more hikers using the parking and facilities at the Loop since the shuttle started, but in general visitors are enjoying the same activities at the Loop that they did before the shuttle service began.



The Loop is a quick stop for most visitors. At the upper loop in 2005 the average duration of stops was 5.6 minutes and the median duration was 8 minutes. The upper lot was at full capacity for 36% of the observations. The average duration of stops at the lower loop was 6.4 minutes and the median duration was 6.4 minutes. The lot was full for 14% of the observations (Freimund et al, 2006a). In 2009, the average duration of stops for both parking lots was 9 minutes, and the median duration was 6 minutes. The lots were full for 18% of the observations (2009). The Loop remains a quick stop where most visitors take a picture or use the facilities and then continue on up the road.

There was no significant change in why people stop at the Loop or how long they stop from 2005 to 2008. This suggests that the shuttle has not had a major impact on use of this roadside viewpoint.

Visitor use of Logan Pass

Logan Pass, a high use area along the GTSR, was observed in 2006. There are multiple things to do at Logan Pass; wildlife is common in the area, several popular hikes begin there, and there is a visitor center with interpretive exhibits and interpretive ranger talks. In 2006, 41% of respondents stopped to look at the view and 36% of respondents indicated they stopped to take a hike; 11% indicated they stopped to use the facilities; another 11% stopped to photograph the view; and 10% of visitors stopped to see the interpretive exhibit (Freimund et al, 2006a).

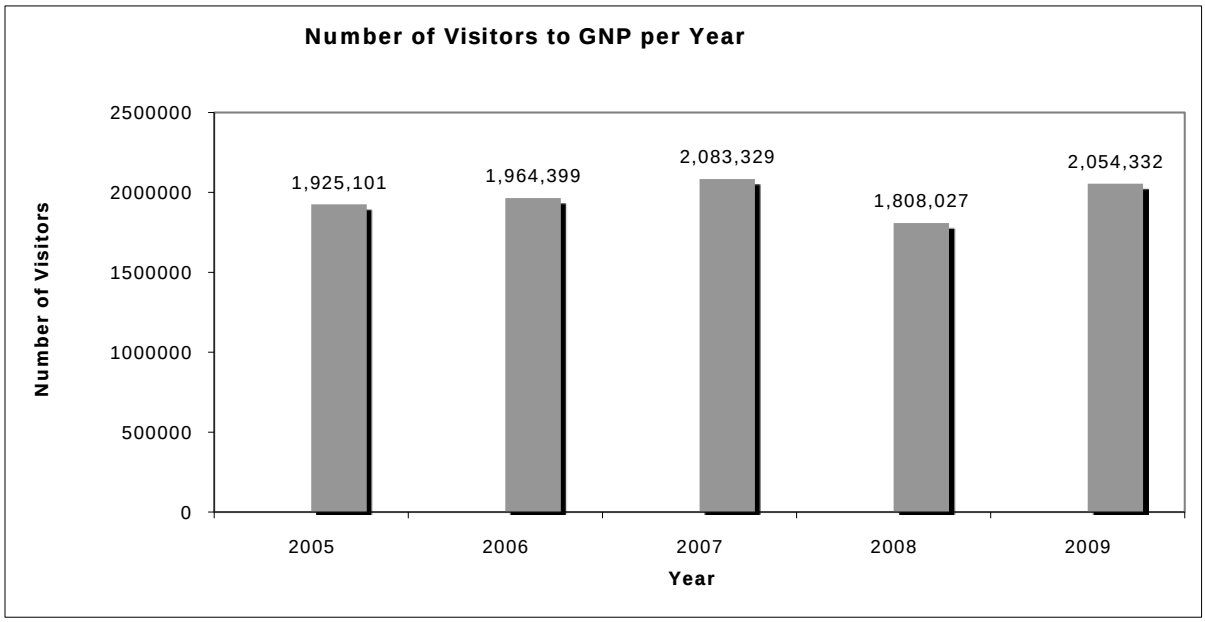
The average duration of stops at Logan Pass was 34 minutes with a median of 63 minutes. The parking area was full 13% of the time, usually between the hours of 11 am and 2 pm. Most stops at Logan Pass are fairly short, probably to look at the visitor center or hike a little bit up one of the hiking trails. However, the high median parking time observed at Logan Pass in 2006 suggests that some vehicles are parked there for long periods of time; it is possible that day hikers pulled up the median time (Dimond and Freimund, 2008).

Visitor use of other viewpoints and roadside stops

Many smaller viewpoints and pull-offs were observed for one year out of the five-year study period. Although there is no comparable data, there are still some observations worth noting. Taking a photo and enjoying the view were the most common reasons visitors stopped at most of the smaller viewpoints observed as part of this study. Big Bend, Oberlin Bend, Upper Jackson and Wild Goose Island are very popular viewpoints for a quick stop and a picture. Road Camp, Red Rock, and Lunch Creek are lesser-used stops, but the main activity there was still enjoying the view or taking a photograph. Stopping for the view and photos are common at Siyeh Bend, lower Jackson, St. Mary Falls, Sunrift Gorge and Sun Point, but these stops function more as parking for hikers than the other smaller viewpoints we observed. The average amount of time vehicles were parked was longer at parking areas utilized by hikers, such as St. Mary Falls and Sunrift Gorge, than at the stops that function as a scenic viewpoint, such as Big Bend and Wild Goose Island.

Survey data on the impact of the shuttle on visitor activities

Simply tracking the observed activities of visitors may not accurately reflect the impact of shuttle use on the actions of riders. Therefore, the 2009 shuttle survey asked shuttle riders if riding the shuttle changed their planned activities. Almost half (48%) of the shuttle riders indicated riding the shuttle did not impact where they stopped or the activities they did there. Among the half of shuttle riders who did change their planned activities due to riding the shuttle 24% of those sampled stopped at fewer stops than if they had driven, 11% stopped at more stops than if they had driven, and 10% of riders stopped at different viewpoints as a result of riding the shuttle (Dimond and Freimund 2009).



Shuttle impact on parking congestion

The number of visitors to the park could also impact parking lot usage if there were big fluctuations in the number of visitors from year to year. There was a modest increase from 2005 to 2006, and then a fairly large jump in the number of visitors from 2006 to 2007. Then there was a big drop in the number of visitors in 2008 to the lowest number in the five-year sample followed by a small recovery in 2009 (NPS, 2010).

Impact of shuttle on traffic

Based on a survey of visitors and stakeholders in 2007 the shuttle service has helped decrease the number of visitors driving the road in a personal vehicle. Traffic control employees (flaggers) working in the construction zone reported there was less traffic on the GTSR while the shuttle was in operation as compared to the week after shuttle service ended (Baker and Freimund, 2007). The shuttle may have helped park managers meet the goal of keeping vehicle wait times under 30 minutes with the longest wait of the 2007 season only lasting 24 minutes.

On the other hand, based on the 2009 surveys of hikers who use the shuttle system to facilitate their hike, the impact of the shuttle on reducing the numbers of cars on the road may be somewhat limited. This survey found that many hikers who use the shuttle still drove on the GTSR to the Loop or Logan Pass and then boarded the shuttle. The 2009 study found that 50% of hikers who left a car somewhere else in the park while taking a hike left it at Logan Pass and another 20% left a car at the Loop (2009). Therefore, just because a visitor rode the shuttle does not mean the same person did not also drive a personal vehicle up the road.

Shuttle Use

Who uses the shuttles?

The 2007 and 2009 surveys compared differences between visitors who rode the shuttle and those who did not ride to determine if any difference existed between the two groups with respect group characteristics or the types of activities in which they planned to engage.

For example, in 2007 shuttle riders and non-shuttle riders were asked about the most important things they wanted to gain from their park experience. Shuttle riders and non-shuttle riders were similar on most measures however shuttle riders rated seeing scenic beauty and being in a place that was quiet as significantly more important than non-riders. On the other hand, non-shuttle riders rated being in control of things that happen significantly higher than shuttle riders. A larger proportion of shuttle riders planned to engage in activities such as walking/running, hiking, picnicking, camping in vehicle, ranger led programs, backpacking, and fishing. However more non-shuttle riders planned to engage in auto touring (Baker and Freimund, 2008).

In 2009, the reasons for stopping at Logan Pass and the Loop were assessed for shuttle riders and non-shuttle riders. For both groups the most common reasons for stopping were to enjoy the view and to take a photograph. Hiking was the third most popular reason for stopping for both groups. The number of hikers may have been underestimated in the 2009 study because hikers completed a different survey than shuttle and non-shuttle riders. However, 84% of hikers reported they used the shuttle to facilitate their hikes (Dimond and Freimund, 2009).

In 2008 and 2009, shuttle riders and non-shuttle riders differed on the size of their group. In 2008, shuttle riders traveled in smaller groups, with an average group size of 3, while non-shuttle riders traveled in somewhat larger groups with an average size of 4 people per group (Baker and Freimund, 2008). In 2009, non-shuttle riders were slightly more likely to be traveling in a larger group. Non-shuttle riders had a slightly lower percentage of singles and pairs and a slightly higher percentage of groups of three and four. (Dimond and Freimund, 2009).

No differences were found in the 2007 study between shuttle riders and non-riders regarding the number of children less than six years of age or between the ages of 10 and 18 years in their travel group. However, non-shuttle riders traveled with more children between the ages of six and ten years old than shuttle riders (Baker and Freimund, 2008). Similarly, in 2009, there was little difference between shuttle riders and non-riders in the number of groups traveling with children; 27% of non-shuttle riders had children with them compared to 26% of shuttle riders who had children with them (Dimond and Freimund, 2009).

What proportion of visitors actually ride the shuttle?

During the first two years of the study, before the shuttle was in operation, visitors were asked hypothetically if they would ride the shuttle if it was available. Over 70% of people surveyed in

2005 said they would ride a free shuttle (Freimund et al, 2006a). Only 25% indicated they were not interested in riding the shuttle. Visitors in 2006 also were very interested in the shuttle with 71% of people surveyed indicating they would be willing to ride a free shuttle (Freimund et al, 2006b).

The proportion of visitors who actually did rode the free shuttle in 2007 and 2008 was much less than the predicted proportion. About 10% of visitors to the park rode the free shuttle in July of 2007. Almost 12% of visitors rode the shuttle August 2007. The percentage of shuttle riders dropped a little in 2008, with only 10% of visitors riding the shuttle in both July and August. Ridership was at its highest point in 2009 with almost 13% of visitors riding in July and 12% of visitors riding in August.

How does shuttle use impact other parts of the park?

The impacts of the transit service extend beyond simple road use and access to activities at different parking areas. The shuttle makes it easier for visitors to day hike and camp in the backcountry. If more visitors choose to hike and camp in the backcountry due to the shuttle, there is the potential for the shuttle and its riders to impact the physical environment.

Parking

The shuttle may have impacted parking at major parking areas along the road. For example, it seems that the Loop parking lot was full for a smaller percentage of time in 2009, after the shuttle was in operation, than in 2005. Parking at the lower Loop in 2005 was full during 14% of observations. The upper Loop was full for 36% of the observation time, substantially more than the lower lot (Freimund et al, 2006a). The Loop lot was full only 18% of the time in 2009 (Dimond and Freimund, 2009). This suggests a decrease in parking lot use from 2005 to 2009. However, because the Loop parking lots were observed as a single lot in 2009, this decrease is slightly less than it appears as the percentage of time the lot was full in 2009 is similar to the percentage of time lower lot was full in 2005. On the other hand, the number of visitors to Glacier National Park increased by over 129,000 people from 2005 to 2009. Therefore, the decrease in parking lot use in 2009 is made even more surprising by the fact that there were more people visiting the park that year. The shuttle may have played a part reducing parking congestion at the Loop.

Parking congestion at Avalanche also seems to have reduced slightly during the five year sutyd period. The main parking lot at Avalanche was full for 50% of the observation periods in 2006 (Freimund et al, 2006b). The main lot and auxiliary lots were full for 40% of the observation period in 2008. However, the fact that more lots were observed in 2008 than in 2006 may have impacted this finding. The overall number of visitors to the park dropped by over 156,000 people

from 2006 to 2008. So the drop in the proportion of time the parking lot at Avalanche was full may simply be a reflection of the decrease in people visiting the park.

Impact of the shuttle on hiking

The shuttle appears to be impacting hiking behavior in the park. Hikers may be more likely to hike new trails, especially "one-way" trails such as the Highline trail, because the shuttle offers convenient transportation back to a vehicle or lodging. In 2009, 80% of hikers surveyed indicated they had knowledge of the shuttle when they decided to take their hike and 84% of hikers surveyed indicated they used the shuttle to facilitate their hike (Dimond and Freimund, 2009). Most hikers surveyed hiked the Highline trail, so the percentage of people who used the shuttle is probably higher than if the surveys had been completed at the trailhead hat accesses an out-and-back trail like Avalanche Lake. However this does indicate that a large percentage of visitors hiking the Highline trail to the Loop are taking advantage of the shuttle system.

The shuttle has increased the proportion of hikers that leave a car elsewhere in the park. In 2005, 6.4% of hikers indicated that they had parked a vehicle elsewhere in the park (Freimund et al, 2006a). Hitchhiking was a common way for these hikers to get back to the vehicle. In 2006, 7.8% of hikers surveyed had left a vehicle somewhere else in the park (Freimund et al, 2006b). The 2009 survey saw a huge jump to 74% of hikers who indicated they had left a car elsewhere in the park (Dimond and Freimund, 2009). This spike could be due to the fact that most of the hikers surveyed were hiking the Highline trail which is a long hike that connects two trail heads. This makes it more likely that people would leave a vehicle either at a trailhead at the end or the beginning of hike. Of those who left their vehicle elsewhere in the park in 2009, 50% left it in the parking lot at Logan Pass and 20% left it at the Loop (Dimond and Freimund, 2009). Unfortunately, this means that a large percentage of Highline Trail hikers are taking up space in these high-use parking lots for an extended period of time while taking the 12 mile hike. It also means that the shuttle is not reducing congestion on the GTSR road as much as it could. It was not very common for visitors to take the shuttle from a transit center or campground if they were going on a hike.

The 2009 survey asked hikers how seeing other hikers, experiencing a pristine environment, non-natural sounds and overflights, seeing wildlife, and experiencing solitude affected their hiking experience.

Seeing very few other hikers had no effect on most hikers' experiences. About 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. Seeing a lot of other hikers detracted slightly from 35% of hikers and had no effect on 42% of hikers sampled. However 40% of hikers said that seeing a lot of other hikers detracted from their experience. 31% of hikers indicated that seeing a lot of other hikers on the trail added to their experience. Experiencing solitude added greatly or

somewhat to 76% of respondent's experience (2009). These results suggest that overcrowding may be a problem on the Highline trail for some hikers.

Almost half (48%) of hikers said that non-natural sounds did not affect their hike and 61% said airplane and helicopter over flights had no effect on their experience. However, non-natural sounds detracted either slightly or a lot for 39% of hikers, and over flights detracted either slightly or a lot for 28% of hikers (2009).

Most hikers experienced the trail as pristine. Approximately 83% said the pristine areas around the trail added greatly to their hike. Seeing wildlife also had a very positive effect on hiker experience. About 69% of hikers surveyed said seeing wildlife added greatly to their experience, and another 20% said it added somewhat (2009).

Overall, these results suggest that negative social or physical impacts do not stand out as a problem for the hikers sampled. However, overcrowding may be an issue on the Highline trail considering that 40% of hikers sampled said that seeing too many people detracted from their hiking experience. On the other hand, it is difficult to tell if respondents answered these hiking experience questions based on their actual experience, or if they answered based on how these factors would hypothetically affect their hiking experience. Therefore, it is somewhat difficult to draw conclusions from the survey results. Nonetheless, the results are worth considering.

Backcountry camping

The number of hikers who stayed overnight in the backcountry has increased a little over the course of this study. In 2005, 1.7% of hikers stayed overnight in the backcountry (Freimund et al, 2006a). In 2006 the proportion of hikers that planned to stay overnight in the backcountry increased slightly to 2.5% (Freimund et al, 2006b). The proportion of hikers increased a little more in 2009, when 4.3% of hikers surveyed stayed overnight in the backcountry (2009). Therefore, this data suggests that there has been a small increase in the number of overnight, backcountry hikers since the shuttle began running. The shuttle may play some role in this increase as makes it possible for hikers to begin a backcountry trip in one area of the park and end somewhere else, instead of limiting visitors to an out-and-back hike.

The Environment

The shuttle system has the potential to have both positive and negative impacts on the natural environment. Positive environmental effects include reduced traffic, fewer cars driving the road, and the LEED certified transit center at Apgar. However, based on the results of the 2009 study, it appears many people who are using the shuttle to facilitate a hike are still driving most of the way through the park in their own vehicles. There were also some negative impacts of the shuttle related to vegetation. Trampling of vegetation and social trailing were problems specifically cited by park personnel. The lack of benches at some shuttle stops causes people to sit on the

vegetation around the shuttle stop (Baker and Freimund, 2007). Another issue is related to increased hiking in the backcountry. If more visitors are hiking, there is going to be more impact on the trails and backcountry areas.

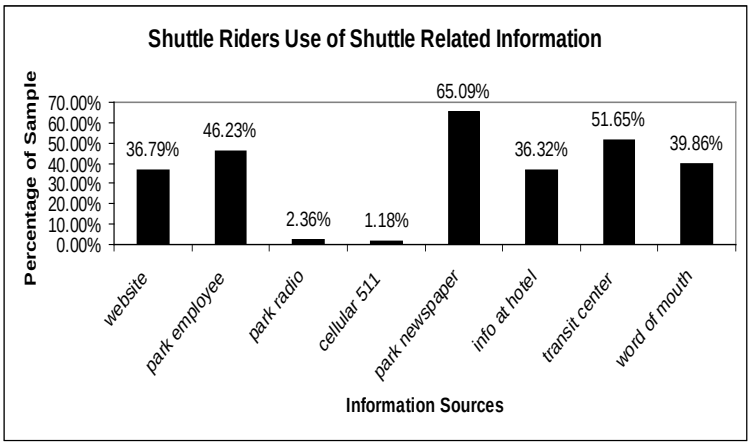
What role does information play in the use of the shuttles?

Initially, there were many problems distributing accurate information about the shuttle to potential riders. The 2007 stakeholder evaluation identified some specific problems with the dissemination of information about the shuttle system and offered some suggestions for change.

Initially, riders were confused about the destination of shuttles because boarding areas were confusing, and the shuttles were not labeled for their routes. The boarding queue was not clear and some riders may have lost their spot in line because they were not aware of the procedure of signing up with the volunteers. Visitor experience was also negatively impacted by receiving misinformation about the shuttles. Specifically, there were concerns about inaccurate statements made by shuttle drivers about park resources and the scheduled shuttle stops (Baker and Freimund, 2007).

Stakeholders provided recommendations about how to improve the quality of information about the shuttle system. Most suggestions focused on improving general information about the system, queuing and loading, and driver communication.

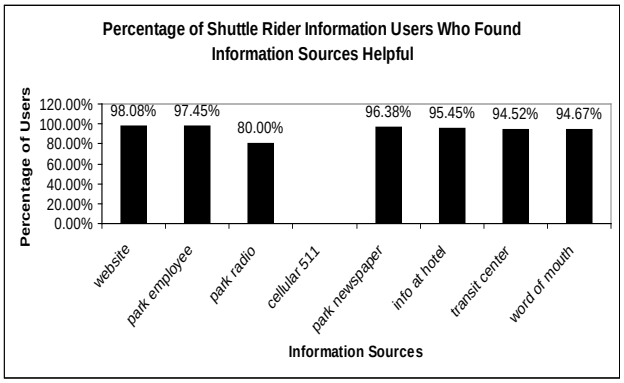
Shuttle related information has improved significantly based on the 2009 surveys of shuttle riders and non-shuttle riders. The 2009 surveys asked shuttle riders directly about their use of information about the shuttle. Information about the shuttle had a positive influence on most shuttle rider's decisions to ride the shuttle, but did not really influence non-shuttle riders. 75% of shuttle riders said that information about the shuttle influenced their decision to ride the shuttle, but only 22% of non shuttle riders were influenced in their transportation decision by information about the shuttle. However, only 3% of non-shuttle riders said that the information they viewed convinced them not to ride the shuttle (2009).

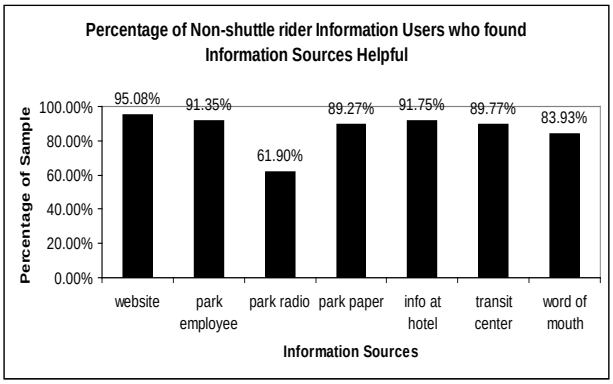


Shuttle and non-shuttle riders were asked what information they had obtained about the shuttle. The park newspaper was the most popular source of information about the shuttle for both shuttle riders and non-shuttle riders. 65% of shuttle riders use the park

brochure/newspaper, 52% used information posted at the transit centers, 46% talked to a park employee, 40% found information via word of mouth, 37% used the website, and 36% used information at their hotel or campsite. Less than one percent of visitors surveyed used the 511-phone information or the radio station (Dimond and Freimund, 2009).

Of those who used these information sources, over 95% of shuttle riders found the information helpful. Between 80% and 95% of non-shuttle riders considered the information they used about the shuttle helpful, depending on the information source (2009).





How satisfied are visitors with the shuttle experience?

This study suggests that the service provided by the shuttles has improved over the last three years. Many of the issues that arose the initial year of service have been addressed and visitor comments reflect these changes. However, the capacity of the shuttle system continues to be a problem.

Visitors in 2007 were generally happy with the shuttle service. Over half of the visitor comments were positive and only 26% were negative. Another 20% of comments were suggestions for improvement or questions (Baker and Freimund, 2007).

Positive evaluations in 2007 centered primarily on the quality of the shuttle service enabled by the shuttle drivers and volunteers. The safety and convenience of the shuttles was also a positive aspect of the service to many visitors. For example, the shuttles make the park more accessible for people who are driving vehicles such as RV's that are not allowed on the road because of size limits (Baker and Freimund, 2007).

Limited rider capacity was a common complaint in 2007. The demand for shuttle service exceeded the available space, especially at peak times. This resulted in long lines and long waits at shuttle stops. Crowding was also an issue in the shuttles. Shuttle drivers, volunteers, and visitor comments focused on increasing the capacity of the system with more shuttles and larger shuttles (Baker and Freimund, 2007).

The dissemination of information about the shuttles was another reason cited for bad service quality in 2007. There was confusion about the signup procedure at Apgar Transit Center. Some visitors did not know they had to sign up with a volunteer and so they lost their place in line to someone who was aware of the signup procedure. There was also confusion about the direction and destination of each shuttle. Buses are not clearly labeled so there is no way for people to know which way the bus is heading. Also, there was a need for signs to designate waiting areas and to provide information about the shuttle system (Baker and Freimund, 2007).

Safety was a concern for some stakeholders. Several of the shuttle stops the first year were planned so that riders had to cross traffic in order to board the bus including the stops at Sprague Creek and Gunsight Pass. It was recommended that the shuttle stop at Avalanche Lake should be relocated because it was in a very busy part of the parking area. Standing on the shuttles was a concern and it was recommended that there should be a formal policy on standing (Baker and Freimund, 2007).

Incidents of bad driver behavior were a reason for poor service quality in the 2007 report. GNP employees and park visitors both commented on drivers exceeding the speed limit. There were also comments about drivers not stopping at all of the designated shuttle stops. As a result, people waiting to get on a shuttle did not know if the shuttle failed to stop because it was full or if there was some other reason the driver did not stop. There were incidents of drivers being rude, unfriendly, or derogatory to some of the visitors and volunteers (Baker and Freimund, 2007).

The park has made great efforts to respond to visitor comments about the shuttle and their efforts have had good results. Visitor satisfaction has increased since the first year of service. Half of all shuttle rider comments in 2009 were positive. Only 17% of comments were negative, and 33% were simply suggestions for improvement, neither negative nor positive (20090.

Most of the positive comments in 2009 were general comments about the park and shuttle system such as “We love the park and will return. We also plan to make further use of the transit system.” About one-third of comments were pleas for the shuttle to stay in service after the construction on the GTSR was completed. Several comments praised the shuttle drivers and park personnel (2009).

All but one of the negative comments addressed the limited rider capacity of the shuttles. At peak times there can still be very long waits even though shuttles have been added to address the problem. Most comments suggested adding more shuttles, or adjusting the shuttle schedule to accommodate more riders during peak times. There was also a single complaint that a shuttle driver had not been friendly. However there were no comments about the lack of information

about the shuttles, a significant improvement from 2007. Also missing from the 2009 comments were negative remarks about the safety of the shuttles and loading procedures (2009).

Many changes have been made over the past few years to various aspects of the transit service to address the issues that have been identified over the years. To help resolve the confusion surrounding boarding procedures, signs have been erected at shuttle stops that show the shuttle routes, transfer stations, and a general schedule. The signs also provide useful general information about using the shuttles and fun facts about the area around the shuttle stop. Crosswalks and shuttle loading areas have been added to several of the stops, to address safety issues when walking across the road and to indicate where the shuttle will stop to pick up passengers. Shuttle drivers now use magnetic signs that attach to the side of the shuttle that indicate the destination of the shuttle to help visitors understand which shuttle to board.

Computers have been installed in each shuttle, which helps address the issue of driver safety and speeding. The computers track the speed the shuttle is traveling and how long the shuttle is stopped. More shuttles have also been added to address the limited rider capacity of the shuttles.

Discussion/Management Implications

The shuttle system has had many impacts during its three years of service in Glacier National Park from increasing the number of hikers in the backcountry to changing the activities people decided to engage in along the road. The five phases of this study provide several suggestions for improving management of the shuttle system and the park as a whole.

The limited rider capacity of the shuttle system continues to be an issue. Certain shuttle stops seem to become very backed up at certain times of the day such as the Logan Pass in the afternoon or the Loop from approximately eight to ten in the morning when hikers park their car at the Loop to catch a ride on a shuttle to the Highline trailhead. Further research is needed to identify the shuttles stops that experience an accumulation of riders at certain times of the day. Ideally, more shuttles could be added or routes could be changed to address the problem of limited rider capacity.

The transit system does not seem to have significantly decreased the number of visitors driving the GTSR. Many people who ride the shuttle still drive part of the road and board the shuttle at high congestion parking areas. For example, visitors planning to hike the Highline trail often drive to the Loop or Logan Pass and then use the bus to shuttle back to their car after the hike. If hikers were encouraged to park at one of the transit centers, ride the shuttle up the trailhead, and then back to the transit center after the hike it would decrease the number of cars on the road, reduce parking congestion, and alleviate some capacity pressure on the shuttle at peak times.

The dissemination of information about the shuttle has improved significantly but could still be improved. The park newspaper is the most commonly used source of information by park visitors, so important information about the shuttle and any major changes in the shuttle system should be placed in a prominent spot in the park newspaper. Employee training and education is still needed to make sure employees are passing on the most up-to-date and accurate information to visitors. Information on signs should be double checked for clarity and accuracy. Some signs give visitors incorrect information, for example the sign at Granite Park Chalet says that the last shuttle of the day leaves at Logan Pass at 7:30 p.m. when it actually leaves closer to 7 pm.

Additional research is also recommended to fill in knowledge gaps and other issues identified through this research. For example, more research could be done to understand how the shuttle affects visitors' decision to take a hike; what impacts the increase in hikers is having on the environment, wildlife, and other hikers; and how other "one-way" trails such as Siyeh Pass have been impacted by the shuttle.

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.

Baker, Melissa L. 2008. An Evaluation of Visitor Decisions Regarding Alternative Transportation in Glacier National Park. Missoula, MT: University of Montana Department of Society and Conservation.

Dimond, Alison and Freimund, Wayne. 2008. Recreational Use of Selected Viewpoints on the Going-to-the-Sun Road, 2008. 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 Viewpoints on Going-to-the-Sun Road, 2006. Missoula, MT: University of Montana Department of Society and Conservation.

National Park Service (NPS), 2003. Record of Decision: Rehabilitation of the Going-to –the-Sun Road, Glacier National Park. http://www.nps.gov/archive/glac/pdf/gttsr-rod03.pdf, accessed 1/17/10

National Park Service (NPS). 2010. NPS Reports. http://www.nature.nps.gov/stats/park.cfm?parkid=578, accessed 1/24/10.