Commuting Research

Megan Bessey, Kyle Braman, Hannah Davis

ENVS 4100: Appropriate Technology and Sustainability – The Campus as a Living Laboratory

Session: Spring 2010

Table of Contents

Executive Summary

Commuting issues have a profound effect on every member of Western Michigan University. A student's choice of commuting method is determined by the distance from campus, schedule, bus routes, and convenience, and some methods have a much greater effect on the overall sustainability of the campus than others. Over 60% of students here commute the most often by personal car, and the emissions from these trips make up about 31% of the university's total greenhouse gas (GHG) emissions. Our goal in this project is to explore the current student commuting situation, as well as high-leverage opportunities for improving the sustainability of our commuting system and reducing our environmental impact.

Western Michigan University has taken some steps so far to encourage the use of alternative forms of transportation, but there is still a lot more which can be done. The Metro bus service is free to use for faculty and staff, and cars cannot be driven through the center of campus. A couple student initiatives have addressed the issues of overall sustainability and bike ridership. However, the current student body generally commutes by car and there is a lot of work we can do to convince students to use more sustainable transportation and reduce our GHG emissions in the process.

Campuses across the country are trying different methods for making their transportation systems more sustainable. Strategies range from carpooling incentives, car bans, and car sharing programs to bike share initiatives and financial incentives to commute without using a personal car. From this range of options we looked at the strategies the schools used who had been highlighted as doing the best job of improving the sustainability of their transportation system, and used those ideas as our starting point for making recommendations for WMU to use.

In order to get a better picture of the current commuting situation on our campus, as well as students' willingness to try other transportation methods, we distributed a survey to the College of Arts and Sciences and the College of Engineering. We asked for respondents' opinions about possible programs such as carpooling, flex parking, and bike- and car-sharing. Our results have helped us develop recommendations for improving the commuting situation at our university.

From our survey, we found that around 56% of students live closer than 3 miles from campus, which was what we estimated as the upper limit for people to commute by bicycle. This presents an opportunity for increasing bike ridership through several initiatives. The options which were most popular amongst survey takers were having the sidewalks plowed in the winter, more and safer bike paths – safety was a big concern at the ingress and egresses to campus – and covered bike racks.

When asked to list reasons for not using the bus system more often, survey takers listed the length of the commute, as well as issues with lining up their personal schedules with the bus schedule. For engineering students, the biggest problem was the length of the trip: the two bus trips with a transfer in between can take an hour or more, compared to a ten minute drive by car. The existing bus system should be investigated further to remedy the timing issues and help convince more students to utilize it.

A carpooling system held significant interest for the survey respondents. The most popular options for program implementation were using one permit on multiple cars, splitting the cost of a permit between members of the pool, and having preferred carpool parking spots. Potential next steps in this study could include a pilot project with a smaller group on campus. The university could partner with a student apartment complex to begin forming carpool groups to test the viability of the program on a larger scale. This could also be a potential program for faculty and staff to use, since their hours may be more regular than those of students.

Possible solutions which were popular on other campuses were bike sharing, flex parking, car bans, and car sharing programs such as Zipcar. Our survey respondents seemed uninterested in the idea of car sharing, but the other options provided inconclusive results and need further research before recommendations can be made.

The recommendations listed above are possible proposals to help move our car-focused transportation system toward a more sustainable structure which places the emphasis on alternative ways for WMU students, staff, and faculty to get to campus and back. We hope that these recommendations, if implemented, will be successful in encouraging sustainable practices in the transportation system, and the campus as a whole.

Introduction

Commuting is an issue that Western Michigan University must address as part of the Talloires Declaration and the Presidents' Climate Commitment. Our goals were to analyze the current methods of commuting that students and faculty are utilizing to get to campus. Along with analyzing their current methods, we also wanted to find out which alternative commuting methods the students and faculty would find most preferable.

The Talloires Declaration was, according to the University Leaders for a Sustainable Future, "the first official statement made by university administrators of a commitment to environmental sustainability in higher education" (ULSF.org). So named for the city in France in which it was drafted, the Talloires Declaration is a ten point plan for sustainability and environmental literacy to be incorporated into teaching and research. The American College & University Presidents' Climate Commitment (ACUPCC) is an action plan that a network of Colleges and Universities have signed on to that states that the institution will eliminate GHG emissions over time while submitting a GHG inventory and then setting milestones in order to achieve climate neutrality. Our research seeks to find the high leverage areas in which we could positively affect our GHG emissions and fulfill our commitments to the Talloires Declaration and the ACUPCC.

In conjunction with uncovering past and possible future commuting habits, we researched other Universities to see what solutions or alternatives other schools were using. This research is significant because it sheds light on high leverage points that could also be present on our campus. We found that many other campuses use strategies such as carpooling, bike sharing, car sharing, and car bans to help mitigate their commuting concerns.

The positive effects of employing such techniques on our campus would be multifaceted and effect many areas including air quality, fostering a culture of sustainability, and reducing our GHG emissions. The consequences of neglecting these opportunities would result in the degradation of our campus – we would be negating our responsibilities as community leaders.

Methodology and Data

The first step to our analysis was to collect information regarding what other college campuses are doing to improve their campus transportation. This involved researching three relevant websites and then organizing our findings to look for common trends. We kept track of the schools which had carpooling incentives and bike and/or car sharing programs, as well as the setting of the school – rural, suburban, or urban.

The first website was 'The College Sustainability Report Card' (greenreportcard.org). This website has an extensive study that gives colleges an overall grade ranging from "A" to "F", as well as an individual grade for their Administration, Climate Change & Energy, Food & Recycling, Green Buildings, Student Involvement, Transportation, Endowment Transparency, Investment Priorities, and Shareholder Engagement. Each grade is based on how sustainable the college is within the area of interest. For our research, we only looked at colleges that scored an "A" for transportation. Once narrowed down, this leaves us with a total of 105 schools. We looked at each school individually and noted the techniques each one used. This information was then compiled into a spreadsheet so we could keep track of trends across the group.

The second website we researched was 'Campus Ecology' (campusecology.org). This website, owned by the National Wildlife Federation, contains a case study database that outlines specific examples of college campuses addressing sustainability. We looked at the 25 schools highlighted for their work in transportation for inspiration.

The third and final website was 'The Association for the Advancement of Sustainability in Higher Education' (aashe.org). This website has a resource center and for our research, we focused on the articles about sustainable transportation methods. Within this resource section, we examined three specific topics: bicycle sharing/rental programs, car-sharing, and campus car bans. The bicycle sharing/rental program section was divided into two subsections, including free bicycles and rental programs. The car-sharing section listed colleges who used the Zipcar program and those who used the Zimride program. The campus car ban section separated its case studies by schools with bans for first-year students and those with extended bans. There was a total of 75 campuses listed using free bicycle sharing, 17 for bicycle rental programs, 77 for car-sharing through Zipcar, 1 for car-sharing through Zimride, 65 for first-year car bans, and 10 for extended car bans. We looked through the list of 245 colleges and universities and kept track of the innovative solutions used within each topic, collecting it to be used as starting material for our own school.

Our next approach was to find out what information was already available pertaining to transportation and Western Michigan University. This was initially done by interviewing and speaking to individuals on campus that had completed relevant research, such as Chris Caprara and Dave Lemberg. Chris, along with Kate Shields, had previously performed a commuting survey for a GHG emissions assessment, and Dr. Lemberg had a previous research project about the campus commuting situation. Email correspondence and a brief in-class meeting were enough to gather information from Chris, and we scheduled a meeting with Dr. Lemberg to discuss his research.

In order to gain a more complete picture of the transportation situation at Western Michigan University, we decided that a survey would need to be constructed and distributed. The survey was composed and distributed digitally on Survey Monkey (surveymonkey.com). It consisted of 15 questions which included 11 multiple choice, 2 short answers, and 2 choice

matrices, designed to find out students' current habits and willingness to try new methods of commuting to campus. The survey is found in Appendix 3.

Examples of Best Practices on Campus

There are many Student Initiatives that have been conducted and are being conducted on campus; some are directly related and others are indirectly related to the transportation issue that we are addressing. The Kalamazoo Bike Works Project completed by Matt Hollander, Magan Lippman, and Ryan Sibert in 2007 is directly related to improving more sustainable practices for commuting to WMU Campus.

The Bike Project sought to increase bike ridership for students and faculty; they personally rode the routes to campus to discover the deterrents to bike riding. They interviewed members of faculty to discuss infrastructure issues, spoke to members of the bike community in Kalamazoo to gather more information about biking in the Kalamazoo area, and researched best practices of other communities with similar issues. A great deal of information can be taken away from The Bike Project; the group identified the high leverage areas and gave insight on what path should be taken to increase ridership.

Another study that was conducted on campus was the GHG Emissions Survey conducted by Chris Caprara and Kate Shields. Caprara and Shields' mission was to establish a baseline rate of GHG Emissions for which the College was directly responsible. During their engagements with various professional persons on campus, they were able to create a formula that could be used to calculate the University's emissions. This formula can be used accurately to extrapolate our yearly emissions from limited data, drastically reducing the amount of labor involved in gathering the information. It is no secret that transportation is responsible for contributing to a large portion of our GHG Emissions and this project directly relates to the outcomes we seek from our project.

There have been a few initiatives implemented on campus to make our transportation system more sustainable as well. The campus is configured with a ring road around the outside, but very little parking in the center, forcing commuters to park their cars and walk. An arrangement with Kalamazoo's Metro bus system allows students and faculty to use the bus for free with their Bronco ID. The Bronco Transit service transports students to various places on main campus and the other nearby campuses. Also, many student apartments offer a bus service to and from campus during the day. However, there has been almost no effort by the university to encourage interest in bike riding or other forms of alternative transportation, and there is still a lot of work to be done.

Examples of Best Practices on Other Campuses

Green Report Card

The College Sustainability Report Card has detailed information on over 300 schools' efforts to increase the sustainability of their campus. The Sustainable Endowments Institute (SEI) sends out surveys to the universities and colleges, analyzes the information returned and gives each school ratings based on their overall success at increasing their sustainability. The overall rating is split into categories such as Administration, Climate Change & Energy, Food & Recycling, Green Building, Transportation, Student Involvement, and others. We looked at schools that had earned a Transportation grade of A and analyzed the programs they had each implemented, to see the ways they had made their systems more sustainable. From this information we hoped to gain new knowledge about the topic of campus transportation, and find possible strategies which could be implemented on our own campus.

Our results revealed strong trends amongst the A-grade schools. Although they differed in the details and implementation, almost all of the schools offered carpooling incentives, had bike sharing and repair programs, and subsidized or otherwise encouraged the use of public transportation to commute to campus. Many also had partnered with Zipcar or a similar car sharing program. The popularity of programs like these helped us to focus our research further into the most effective methods of encouraging more sustainable transportation systems at WMU.

Campus Ecology

The National Wildlife Federation has developed a case study database to highlight schools nationwide who are working to make their campuses more sustainable. We found the 25 schools tapped for their efforts in the transportation segment and looked at their efforts for further inspiration at our own school. Much of the information from the case studies focused primarily on what campuses are doing in terms of bicycle rental programs for students.
One college distributed a survey concerning bike racks on their campus. The University of South Carolina surveyed each bicycle rack around campus and observed that many of the racks were significantly damaged. This information was put online so that students could view any bike rack on campus and determine whether their bike would be safe there.

Three colleges had a well-established community bicycle rental program, all of which involve bright yellow bikes being made available for the college community.
The Southern Illinois University at Carbondale had the smallest examined bike fleet, consisting of five bikes. This fleet had also seen the smallest amount of success, citing lack of proper maintenance procedures and lack of funding as their major issues. They recommend that the bicycles not be too old and recycled, due to the fact that they require more frequent and immediate repairs. They also suggest having users sign a waiver before renting and riding.

The University of Kentucky has a community bicycle program consisting of seventeen bikes. The only major problem that they have seen is the inability to keep up with maintenance. They recommend developing a convenient way of reporting maintenance needs and issues.

The final college was the College of Wooster, which had the program that seemed the best planned. The program consists of eleven bikes, each of which has a plastic placard with the bike's I.D. number and the repair phone number. There are three clear rules listed for their program, Rack, Lock, 2740. Rack refers to returning all bikes to an on-campus rack after use, so that the bike may be used by the next person. Lock refers to using the lock that is provided on the bike, whose combination is on the back of the placard. 2740 is the extension to be used in case of a lost bike or the need for repair. They recommend that more bikes should be used in the fleet if possible, since having more available bikes decreases the probability of bike hoarding. Also, fragile and older bikes are not recommended, due to the inevitable increase in repairs. The plastic placards should be changed into metal dog placards, do that they are less prone to damage. Also, warning and small fines should be given in the instance that a bike is taken out of circulation by an individual.

AASHE

The Association for the Advancement of Sustainability in Higher Education, or AASHE, was a valuable research tool for us since it had compiled best practices for many facets of sustainable transportation. Notable topics were bike sharing programs, campus car bans, and car sharing programs.

The schools highlighted in the AASHE database had many different methods of implementing a bike sharing program on their campuses. Options ranged from public bike use – bicycles left at points around campus for anyone to ride – to severely restricted rentals, where users have to leave their ID at a certain location and bring the bike back to that place to retrieve their card. Some schools offer free bike use, while others charged an hourly rate, and sometimes a fee to apply to the program. Most, if not all, of the bicycles used were painted or decorated all over to distinguish them from personal bikes and discourage theft. Different types of locks could be used: some schools utilized combination locks and changed the numbers around each month, while others gave out keys and had the same padlocks on each bike. Only a few of the schools in the database allowed the bikes to be taken off campus or into the dorms.

These bike share programs regularly have to contend with the issue of preventing theft and vandalism of their bikes. One method could be to find a way to track the individual bikes as they travel across campus, and to only allow students to use a bike after they have somehow registered it with their ID card. This way the administrators of the program would know which student takes the responsibility for keeping the bike safe and functional, and can have students pay for repairs or replacement if it is lost or damaged.

The many different permutations of a bike share program mean our university has many options for how to implement a program like this. Looking through these best practices really

helped illustrate the different alternatives we have available, along with giving us some direction for what would work best for our own campus.

Case Studies

While our research encompassed campuses across the nation, we chose to focus on cases that resembled our own situation in terms of weather conditions and urban setting. This gave us a chance to see how other universities had tackled the same issues WMU has to confront.

Madison, Wisconsin

The University of Wisconsin-Madison has many alternatives to traditional transportation to and from campus, including bicycling, carpooling, and car sharing. The bicycle section of their website includes safe routes and bike parking locations for bicycles only. The carpooling area lists how one might qualify and how to setup carpooling whether you have a car or are in need of a ride, but the program is for faculty only. Their car sharing program includes easy registration and a car to rent by the hour available on campus.

Fort Collins, Colorado

Colorado State University offers its students the opportunity to participate in carpooling programs that are available to students and faculty. They also promote bicycle ridership in a similar capacity; bike racks are available at every building and they have provided safe routes of travel. The bus system, like Western's, offers free rides to students, and there is also vanpooling available.

Cambridge, Massachusetts

The Massachusetts Institute of Technology practices carpooling systems, encourages bicycling with covered parking and safe route selection, a car sharing program that is available on campus, and a train subsidy for students and faculty. The component that sets MIT apart from other schools is that it offers an alternative transit subsidy; this incentive offered to employees is toward those who use public transit to commute to work. The College will reimburse the employees 50% of their commuting cost up to $120 per month.

New York State

The State University of New York (SUNY) campuses are located throughout the state of New York. On some of the bigger campuses, SUNY has implemented a car sharing program that is available to students who pay the $100 membership fee. Students and faculty have access to hybrid and alternative fuel vehicles that are available for hourly rent.

Discussion

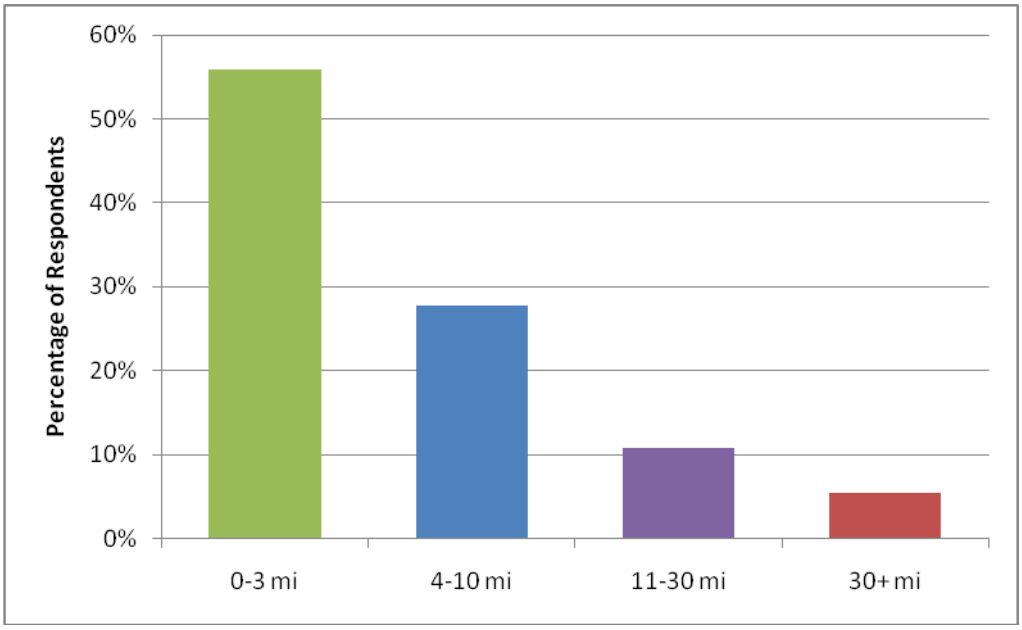
The majority of the information we now have on the current commuting situation on WMU's campus was collected through a survey of students, staff, and faculty. We asked questions regarding respondents' current commuting habits, as well as how open and interested they were in alternative strategies to reduce car drivership on campus. The results of some questions were surprising.

The majority of respondents were students. Out of 706 responses, only 24 were from faculty or staff. Since students make up the majority of the campus population and will be the most affected by new transportation policies, it is appropriate that they have a significant voice in the discussion.

We partnered with Chris Caprara to obtain updated information for his Greenhouse Gas (GHG) emissions survey, asking questions about the frequency and distance of people's commute, as well as what type of car they drive and the mileage it gets. This information will help Chris update his report for the university, and it also helps us in our analysis of the commuting situation.

One very telling piece of information is described in Figure 1, below. Survey takers were asked to estimate the one-way distance of their commute. We estimated that a three-mile commute would be the upper limit, after which people would be unwilling to ride a bicycle and would instead choose to take the bus or drive. Many respondents lived on campus, and their commute was recorded as zero miles. Over half – about 56% – of people who answered this question lived within three miles of campus. These people could quite easily ride their bicycles or walk to class, weather permitting. Further, 28% of respondents lived between 4 and 10 miles away, making them prime candidates to utilize the public transit system in the city. There may also be some opportunities to form carpools from nearby student apartment complexes to campus. About 17% of commuters lived further than 10 miles away (not including the helpful responders who said they lived 500 miles from campus), and their situation would make it hard to do anything but drive.

Figure 1: Distance of Campus Commute

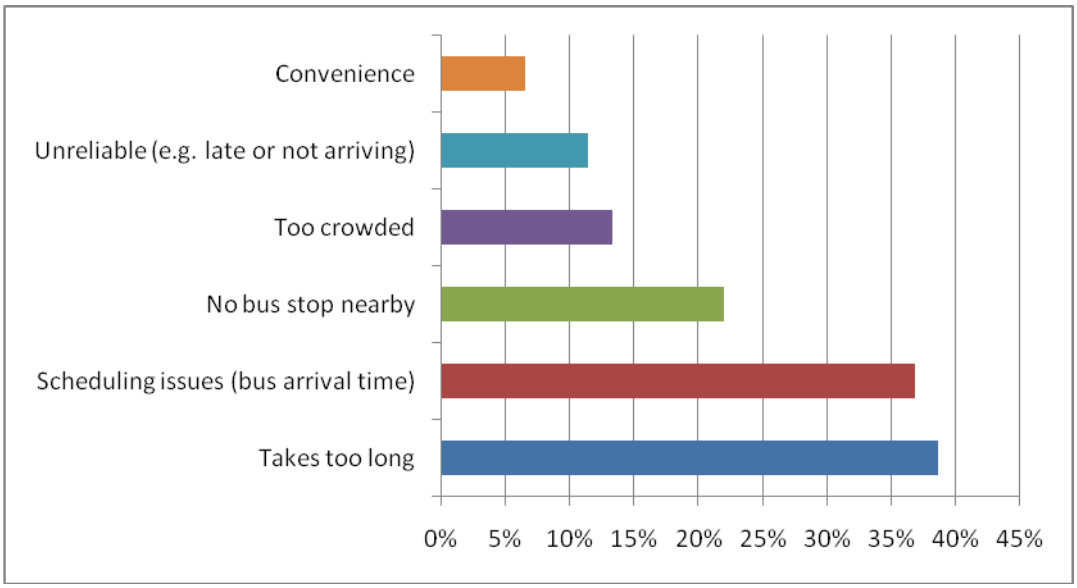


Despite these apparently favorable living conditions, the responses to the question of how people commute, and how often, showed most people overwhelmingly favoring the convenience of a personal car over any other form of transportation. When asked to rate the possible methods of transportation from most to least often used, 62% of respondents listed their personal car as the mode they used the most. It seems that, despite the high cost of parking permits for students, the wide availability of permits and the convenience of a personal car make driving by far the most popular option. In the comments, a frequent reason given for not using public transportation or bicycling was that people often came straight to or from their jobs to class. If work is in another part of town (or in another town altogether), utilizing any form of transport other than a personal car becomes all but impossible.

However, most respondents did not use the reason of coming to or from work. In fact, it seems the vast majority of people using a personal car do so mainly for the added convenience of having their own transportation between home, campus, and work. Since 56% of respondents live closer than three miles from campus, distance is usually not the deciding factor in people's commuting choices. Figures 2 and 3 describe the most popular reasons people gave for not using either the bus system or riding a bicycle. Two-thirds of respondents said they had not used the bus system recently. With the Metro system, timing issues seemed to be the greatest obstacle. Many respondents listed scheduling problems or the travel time as reasons for not using the bus. For engineering students the travel time was an even bigger problem. Since there is no Metro route which stops at the Parkview campus, students have to take a Metro bus to the main campus stop, then transfer to the Bronco Transit bus to the Engineering campus. By bus, it takes about an

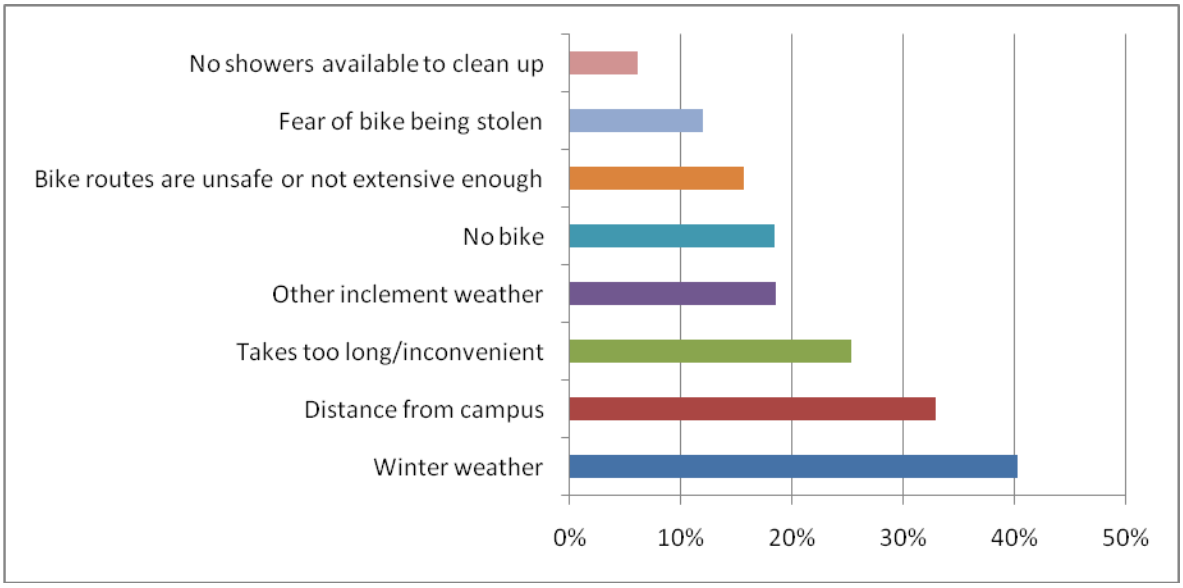
hour to make the one-way trip, while driving is about ten minutes. There is definitely room for improvement with regards to the bus system, both on and off campus.

Figure 2: Reasons for Not Using the Bus



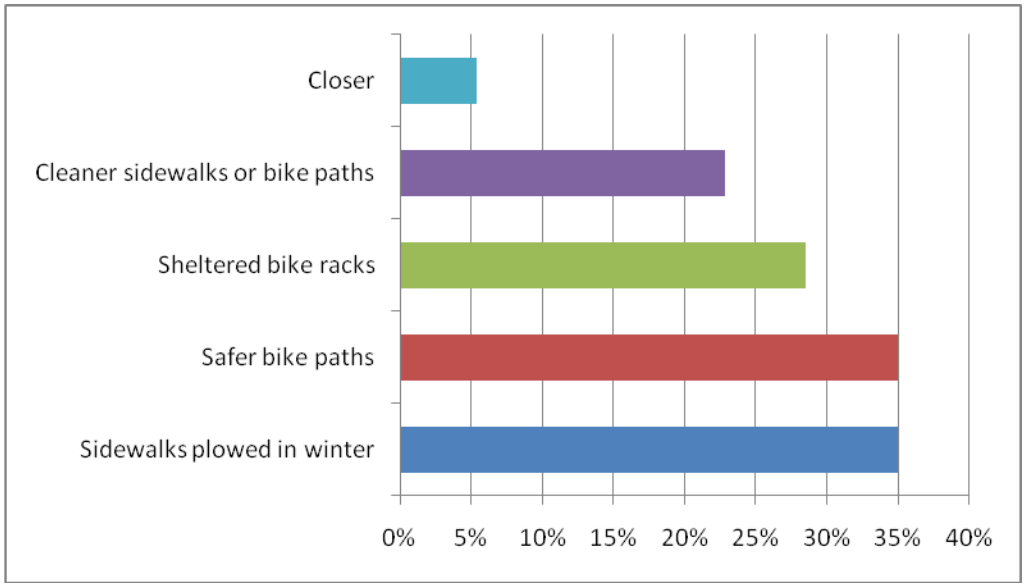
As shown below in Figure 3, survey respondents had many reasons to not ride their bicycles more often. The most common reasons were the Midwest weather, distance from campus, and convenience. Students generally are unwilling to cut down on the things they carry to and from campus, and don't want to take the extra time to commute by bicycle when it is easier and faster to drive. Many respondents also listed that they did not own a bike, or they mentioned a fear of being hit by a car. Previous research projects have already established that the system of bike routes in the areas surrounding the campus is very much in need of renovation, especially the entries and exits to campus which can be very dangerous on a bicycle. Distance from campus was frequently cited as a reason not to bicycle, but analysis of the survey data showed that almost all of the people who listed it lived further than three miles away.

Figure 3: Reasons for Not Bicycling



Reasons were varied for why people would choose to ride their bicycle more often. The options we gave for answers were somewhat limited, so the results may be skewed. However many people took the opportunity to write their opinions in the comments section, listing reasons such as living closer, owning a bike, lower risk of theft, or fewer hills. For about 20 people, there would be no change that could convince them to ride, such as the respondent who wrote, "Nothing, I DRIVE". However, most respondents appeared open to the option of riding their bicycles, and the most popular choices are listed in Figure 4 below. We were surprised to see that having the sidewalks plowed in the winter was so popular, although we aren't sure doing this would actually inspire people to ride in the winter. Also popular incentives were safer bike paths and sheltered bike racks. Having safer bike paths would likely make a big difference in people's willingness to ride, considering the limited spread of bike routes in the area and the high risk of riding in the road with cars. Sheltered bike racks might help convince people to ride when the weather is more questionable, since there would be less risk of riding home with a soggy seat.

Figure 4: Incentives to Bicycle More



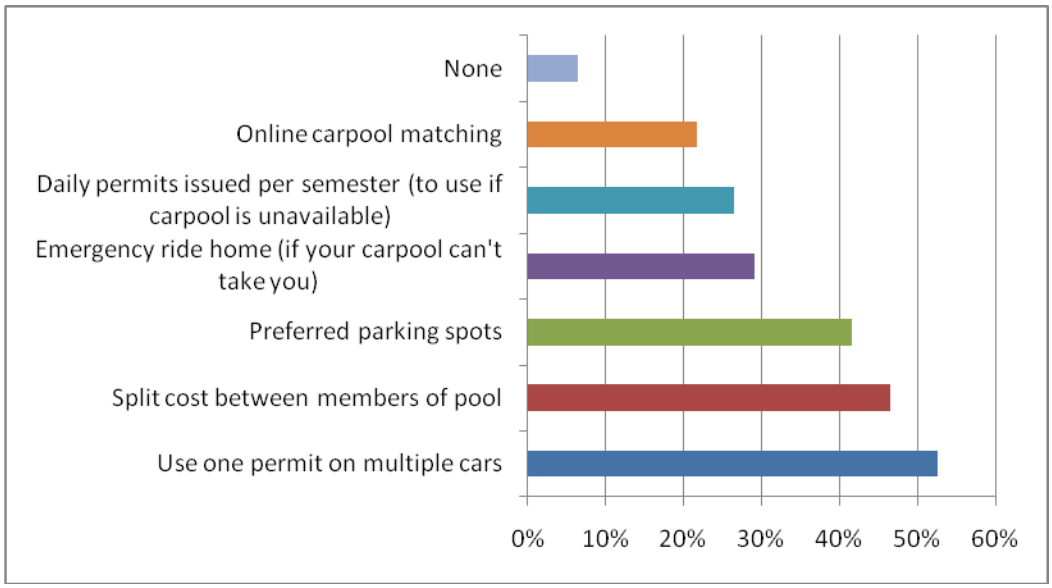
Carpooling seemed to be a popular new option for many respondents. The possibility of saving money by sharing a parking permit and splitting the cost between members of the pool proved enticing, as did having a preferred parking space. Optional features such as an emergency ride home, daily permits, and online carpool matching had some support too.

If the university were to increase the cost of a carpool permit such that it would only be cheaper if it were split between two or more people, that would cut down on the impulse to buy the permit just for the preferred parking. The permit itself could be made either to hang from the rearview mirror, or to be made of a static cling material so it could easily be switched between cars. The lot would have to be monitored to make sure no one used the spots when driving alone. Another way to discourage "cheating" could be to issue a certain number of daily permits each semester, for use in emergencies when a carpool is not available. The driver would forfeit the preferred parking but wouldn't have to miss class or risk a ticket. Online carpool matching would make it easier for groups of people to set up pools together, especially if it were organized by apartment complex.

Since campus-wide implementation of a program like this poses a lot of risk to the university, a pilot program could be introduced on a smaller scale. The program could be open to campus employees initially, since their schedules would likely be more regular than those of students. Faculty and staff may be more likely than students to embrace a program like this. Alternatively, the university could partner with a nearby student apartment complex to create a carpool program there. This would especially be advantageous if the apartment in question did not offer a bus service to campus, as students would be looking for alternative forms of transportation. Carpools would be easier to arrange on this scale since all members would be

travelling to and from the same locations, and it would be easy to get to know ride-mates since they live nearby.

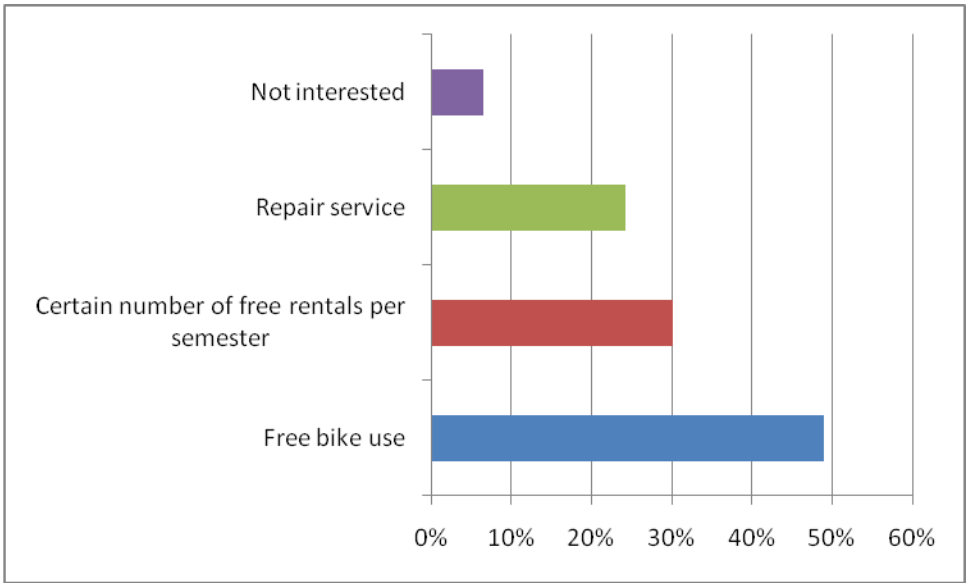
Figure 5: Incentives to Carpool



For all the revealing information we were able to get from our survey, there were some ill-defined questions which resulted in inaccurate data. The question we asked about bike sharing is the most prominent example. Without a good explanation of what the system would consist of, many respondents misinterpreted it as using the bike to replace their normal commute, or having to share their personal bike with others. Any information we could have gathered from this question is cast into doubt by the fact that so many people were clearly confused about the program. This could still be a viable option here, but the numbers presented here do not help the argument: more research would have to be done to confirm this.

Although it is unclear how much interest the campus population has for the program, some work has already been done on campus to test a bike sharing program, using abandoned bicycles from the police. Bike share programs in other locations frequently run into common property issues including vandalism and theft, and some solutions have been proposed to minimize this risk. Using strategies like a tracking system for the bikes and holding the user personally accountable for the bike could help keep down instances of “tragedy of the commons”.

Figure 6: Bike Sharing



Many universities have bought Zipcars or used other car-sharing services on their campuses for short term car rentals. These services tend to be quite expensive, and as such are only utilized by the schools with the extra money to afford them. This option had been brought up as a way to reduce the number of personal cars being brought to campus by commuters, and we posed the question to our survey respondents. The results were very clear: 75% of the respondents said they would not use such a service if it were available. One problem which has come up when evaluating the viability of a service such as Zipcar is that it is very hard to tell if the program is actually successful. When asked, Zipcar can give statistics such as the number of rides reserved through their website or how many carpools were set up online, but they do not keep data on whether or not the ride or carpool actually occurred. It is hard to judge success like that, and this has contributed to the university's hesitation to adopt such a program. The results of our survey show that the student body has little interest in a car sharing program, and our recommendation is that it not be adopted. The money saved could go to more effective programs instead.

As explained in the Best Practices on Other Campuses, the University Of Wisconsin-Madison has a Flex Parking system for their employees who can find alternative transportation for most of the week, but may need to use a personal car on occasion. The system is Pay-As-You-Go: instead of paying for an annual permit to park any time, the user pays to park only when needed. One idea was that a system like this could be extended to students as well. The thought is that students end up buying an annual permit then using it even if they have other options, because it was expensive and they want to get the most value out of it.

The question of flex parking was posed to the survey takers, and results were mixed. About 43% of respondents said that yes, their driving habits would change if such a program were implemented, compared to 53% who said their habits wouldn't change. The many possible permutations of the program meant the question had to be ambiguous as possible, and a few people responded that it would depend how the program were implemented. Some misread the question: one respondent said "I already pay, so this would not affect me", reading the question as being asked to compare free and paid parking instead of the current flat rate versus pay-per-use. Also, the wide range of responses has led us to doubt the legitimacy of the percentages. In many instances, people wrote that they would drive less if they had to pay less, but then said that the system would not cause them to change their habits. This and many similar responses lead us to believe the question was framed too ambiguously and only resulted in confusion.

One response to the flex parking question was a comment that, since the respondent came to campus so little, the cost to buy an annual permit would actually be greater than the cost to pay the parking ticket. This brings up an important issue when discussing flex parking: that of pricing. The rate for parking would have to be low enough that parking tickets would be more expensive, but at the same time high enough to encourage users to find alternative forms of transportation whenever possible.

We think more research is needed into a flex parking system, since the results of our question were so varied. The interest seems to be there, but since the program could be implemented in so many different ways, some of the details will need to be worked out first. Further research into other universities with similar programs would be very helpful.

Another idea proposed after our survey had been completed has been quite popular on other campuses. Universities have implemented car bans of varying degrees and effects. For example, Michigan State University does not allow its freshmen to have a car on campus, Middlebury College charges an extra fee to register a car, and other universities do now allow cars on their campus. To encourage the use of alternative forms of transportation, Temple University provides employees a financial incentive to purchase a home in the zip codes surrounding the campus. A potential adaptation for WMU to use could be not allowing students to buy an annual or semester parking permit if they live closer than a mile from the campus. From that close it would be quite easy for them to use the bus, walk, or ride their bike.

Our survey returned many interesting results detailing the current commuting situation on campus, as well as highlighting potential programs and strategies which WMU could use to increase interest in alternative forms of transportation. The results of our survey are summarized in Table 1, below.

Table 1: Survey Results

Survey topic	Response / Results
Distance from campus	56% live <3 mi from campus, 28% live 4-10 mi away
Commuting method	62% drive primarily
Why not bus?	67% had not used bus recently, most complained about scheduling, travel time
Why not bike?	Complaints: weather, distance from campus, convenience
Ways to bike more	Popular incentives: plow sidewalks in winter, safer/more bike paths, sheltered bike racks
Carpooling	Share permit between multiple cars, split cost between carpool members, preferred parking spots
Bike sharing	Unclear information (question was often misunderstood) - results not reliable
Car sharing	75% of respondents say they would not use
Flex parking	Mixed results, possible misinterpretation of question

Limitations of Your Analysis & Future Work

Our research was limited by an inability to gather much previously existing information. We were unable to obtain the full research done by Dr. Lemberg, and we did not utilize many others for information that they might have had. It would have been useful to conduct more extensive interviews with Vice President Rinker, Portage mayor Pete Strazdos, and Matt Hollander.

As helpful and informative as the Green Report Card was in doing our best practices research, we found some flaws in the system. The first was the fact that the universities themselves were filling out the survey and sending it in. This introduces error, since a school's grade is based only on what they share with SEI. The school is not an objective observer of their own programs. Also, the Transportation section grading is only dependent on the programs the university has implemented, regardless of whether they were successful or not in convincing students to use alternative transportation methods. This is not something which can easily be fixed, especially considering the scale of the Green Report Card project – however it is something to keep in mind when using the data to draw conclusions.

Another issue when looking at information about car and bike-share programs is how to judge whether the program is successful or not. The available data generally covers the number of bikes or cars in the program, and in the case of car sharing the number of rides reserved. However these data do not tell anything about whether or not those bikes are actually being ridden, or whether the reserved rides were actually picked up. Without this information it is very difficult to see whether an initiative like this actually has the interest of the student body, or is simply an expensive boondoggle. When developing any program for the university, we should take a lot of care to ensure that there is an accurate method in place to determine its success.

Interviewing and speaking with individuals involved with successful programs at other universities would be insightful in the future. Though research was done about the programs happening at other campuses, it is not known how effective and successful these programs are. Email correspondence or phone interviews with program directors or university affiliates would be beneficial.

Additionally, our survey was not perfect. More preliminary information should have been provided to participants about what bike sharing and ride sharing are. This would have ensured that everyone had an equal understanding of the programs. Also, more program features should have been included with these programs. In regards to bike sharing, this is where an extensive interview with Matt Hollander would have been useful.

Future surveys should not only be more complete, but they should also be distributed to a larger range of students. Though the sample that we gathered was fairly representative due to distribution to the College of Arts & Sciences and the College of Engineering, it would be beneficial for it to be sent to each college at Western Michigan University.

Conclusions / Recommendations

At this point, there is still a lot more research which needs to be done on the feasibility of the various methods of improving the sustainability of our university's transportation system. However, we feel that with the knowledge gained over the course of our research, we can make several recommendations for the direction of future action. Our recommendations are summarized in Table 2, below.

Students appeared open to the option of riding their bikes more often, if the campus setting were more amenable to doing so. Plowing or cleaning sidewalks and bike paths, installing covered bike racks, and extending the area and safety of bike paths could help convince more people to use their bicycles. One important note is the safety of the entrances to campus, which was addressed in a previous research project (Kalamazoo Bike Works). If this could be improved and the risk to riders decreased, increasing student interest could be made easier. From here, future research should be performed into financing for projects like this, as well as whether or not the university would support such an initiative.

Although having free bus service is a fantastic way to convince students to take the bus to class, that is only part of the issue. The inconvenience of scheduling and timing bus routes has not done the program any favors, especially for students who need to commute to other campuses such as Parkview. We recommend future researchers look into ways to make the situation more user-friendly, by improving the timing and length of bus routes. A focus on the Parkview bus, which is used by engineering students who live close to main campus, could go a long way towards convincing them it is worthwhile.

The idea of a carpooling program was well received by survey respondents and is definitely worth some further research and development. The idea is that users are able to buy a specific carpool permit which could be used on multiple cars, split the cost of the permit between members of a pool, and use preferred parking spots while in the program. This initiative would require the full support of the university, and as such would necessitate a large amount of research into the costs and benefits to WMU and the students. Since full implementation of the program would be difficult, we suggest starting on a pilot scale. Two options are to open the program to employees of the university or to the residents of a student apartment complex.

We spent a lot of time researching bike share programs across the country, and found that the details of how such a program would be implemented were extremely varied. Schools found innovative ways to set the community bikes apart, as well as reduce theft and vandalism. The Kalamazoo Bike Works project from spring 2007 looked into the idea, but there is still more work to be done to gauge student interest and develop the plan for implementation which would work for our own school.

The survey results for flex parking were mixed, so more research into the viability of a program will help solidify our options. The important issue will be setting the price correctly, so that the daily cost of a permit is less than that of a parking ticket, but still high enough to encourage users to minimize the time they spend driving.

These are our major recommendations, all of which will require more investigation before they can be turned into reality. However the support of the student body and the university seems to be there and we think this is a great opportunity to help make our campus more sustainable moving into the future.

Table 2: Recommendations Summary

Topic	Strategies	Future Work
Bike ridership	Plow sidewalks in winter	Research into financing and university support
	More/safer bike paths	Important: improve ingress/egress to campus
	Covered bike racks	
Bus system	Shorten commuting time to Parkview, etc. to convince more people to use it	Further investigation to improve timing and route issues, esp. to campuses other than main
Carpooling	Use on permit on multiple cars	Pilot program for employees
	Split cost of permit between members	Pilot program for student apartment complex
	Preferred parking	
Bike sharing	Tracking/accountability system	Further research to gauge interest, develop details
Flex parking	Members pay based on how often they park on campus	Further research into viability, financing, etc.
	Set rate so paying a ticket is more expensive than paying for parking / users are motivated to find other modes of transportation	
Car sharing	Survey says no: not enough interest at this time to pursue	None
Car ban	Students living <1 mile away can't buy permit?	Further research - prevent fraud, etc.

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Appendices

Appendix 1 – Current Contact List

Name	Phone Number	Email
Megan Bessey	616-835-7123	Megan.e.bessey@wmich.edu
Kyle Braman	269-924-8570	Kyle.m.braman@wmich.edu
Hannah Davis	269-808-6403	Hannah.e.davis@wmich.edu

Appendix 2 – Contact List and Logs

Capara, Chris – Environmental Studies Dept. Assistant

Glasser, Harold - Associate Professor of Environmental Studies at WMU

Hollander, Matthew - Environmental Studies Dept. Assistant

Lemberg, Dave – Associate Professor and AICP of Geography at WMU

Appendix 3 – Survey Questions

1. What is your university affiliation?
   -Faculty (full time)
   -Faculty (part time)
   -Staff (full time)
   -Staff (part time)
   -Student (full time)
   -Student (part time)
2. How many miles from campus do you live (one way)?
3. What type of vehicle do you use?
   -Car (four door)
   -Car (two door)
   -Truck
   -SUV
   -Don't own a vehicle
   -Other (please specify)
4. If you own a car, what is its average MPG?
5. How do you commute to campus? Please rank in order of the methods you use most frequently.

-Personal Car
-Bicycle
-Metro transit
-Bronco transit
-Walk
-Carpool
-Motorcycle/scooter/moped
-Other (please specify)

6. How often do you use each mode of transportation to commute to campus round trip?
   -Personal Car
   -Bicycle
   -Metro transit
   -Bronco transit
   -Walk
   -Carpool
   -Motorcycle/scooter/moped
   -Other (please specify)
   (Options included 1/Day, 1/Week, 2/Week, 3/Week, 4/Week, 5/Week, 6/Week, 7/Week, 8+/Week)
7. Have you used the bus system recently?
   -Yes
   -No
8. If you don't use the bus system as frequently as you might (or don't use it at all), please choose the top two reasons why.
   -No bus stop nearby
   -Scheduling issues (bus arrival time)
   -Unreliable (e.g. late or not arriving)
   -Takes too long
   -Too crowded
   -Other (please specify)
9. What keeps you from riding your bicycle more often?
   -Winter weather
   -Other inclement weather
   -Distance from campus
   -Takes too long/inconvenient
   -Bike routes are unsafe or not extensive enough
   -Fear of bike being stolen
   -No showers available to clean up
   -Other (please specify)
10. If there were a carpooling program available, what incentives would convince you to use it?

-Use one permit on multiple cars
-Split cost between members of pool
-Preferred parking spots
-Emergency ride home (if your carpool can't take you)
-Online carpool matching
-Daily permits issued per semester (to use if carpool in unavailable)
-Other (please specify)

11. If a short term car rental/car sharing program were available (such as Zipcar), would you use it? (Zipcar is a program where one is able to view vehicle availability and reserve a self-service car via the internet, iPhone app, or telephone, in increments as short as one hour and pay only for the time they reserve.)
    -Yes
    -No
12. What features of a bike sharing/rental program would you be interested in?
    -Repair service
    -Free bike use
    -Certain number of free rentals per semester
    -Other (please specify)
13. What would make you more likely to ride your bicycle?
    -Safer bike paths
    -Sidewalks plowed in winter
    -Cleaner sidewalks or bike paths
    -Sheltered bike racks
    -Other (please specify)
14. Would paying for parking based on how often you drive to campus change your driving habits? If so, in what way?
    -Yes
    -No
15. What are your main reasons for driving your car to campus?
    -Distance from campus
    -Convenience
    -Purchased the permit and felt obligated to use it
    -Other (please specify)

Following completion, the survey was distributed to students via its web-link (surveymonkey.com/s/commuting). The link was made available on Facebook as well as through the list-servs of the College of Arts & Sciences and the College of Engineering.

The survey was available from March 29, 2010 to April 12, 2010 and a total of 706 responses were collected.