

Problem Statement

Free Ride serves to address the problem of unnecessary commuting via vehicle by making commuting with bikes easy and attractive. Our school has a very low bike usage rate, and increasing usage would provide benefits to student health, to the environment and to the campus atmosphere. In recent years, the campus has promoted bicycling opportunities by installing bike racks around campus. However, major challenges persist that create obstacles for student bicyclists. The first major challenge that students face is the inability to repair their bikes while they are at school. A second issue is that students may not have a bike or did not bring their bike with them. A third problem is the lack of student awareness of the benefits of bicycling to their own health and the health of the environment. Many students actually drive incredibly short distances between classes.

Increasing bicycle use in our local communities is a winning strategy towards the effort of curbing nonrenewable energy use, reducing wear on our roads, increasing the time people spend outdoors and also increasing people's mental and physical health. The European Cyclists Federation completed a study finding that a car produces almost 13 times more than a bicycle (Maus 2011). In 2010 the University of California at Berkeley completed a study comparing the pavement wear of bicycles to motor vehicles; they concluded that a single vehicle has the impact of 9,600 bicycles (Carroll 2013).

Our population's health has become seriously impacted by our sedentary life style. Riding a bicycle is an outlet that can allow you to combine transportation with exercise. Compared to jogging, bicycle riding reduces the impacts on your joints and allows you to go farther and see more area in less time. Countless studies have linked exercise with mood boosting and stress relief (Woodcock et al. 2009, WebMD 2013); biking allows you to go where you need to at the same time and can only reduce your stress levels.

This project intends to supply our campus with an environmentally friendly, heart healthy and economical solution to getting around town and to class.

Project Summary/Background

The idea of the project is to take the idea of a bike clinic to the streets, literally. We have been given a space for a permanent bike supply storage but it is not readily accessible to students. It is the mobile aspect of the project that makes it unique. We propose instead to outfit an enclosed trailer with tools and parts for fixing bicycles. For one thing, having the trailer will allow us to engage the community as well as the student body. It will also allow us to attend events and spread the word. This project is about encouraging people to bike, but also teaching them to maintain the bikes they already have. We would be able to have a wider impact by having a mobile shop so that we can go to the people. By having a trailer we can bring to the center lawn in campus or the town's central park we can give a guaranteed time and place that we will be available. This removes the problem of people trying to find our headquarters (it's very tucked away) and wondering if someone will even be there to help them when they get there. This would be even more inconvenient with a bent derailleur or flat tire slowing things down. With the mobile bike shop we would be more accessible and reliable.

We used the funds from this grant to purchase bike tools and parts for hosting bike clinics. For students who are more mechanically inclined, we will help them build a bike from the parts and whole bicycles we have received. For students who already have bikes here we can help them maintain and repair their bicycles. Our intent is to be able to provide these resources solves the problems of students not being able to maintain their bikes while on campus and provides a bicycle for students who do not have access to one. We will park our trailer on the central campus lawn for several hours a week during peak bike riding periods. By having a

mobile bike repair shop we can increase the visibility of our pro-bike message and promote the importance of using bikes instead. By exposing them to the benefits of biking and making bike use accessible to students we believe that we will be able to increase bike use on campus.

We plan to offer bike repair to the community during Earth Day Week this Spring. We will rent out space in the park in the center of town and will advertise this event in advance. All advertising is paid through our student government office. There are numerous community events that our club participates in and we could also bring the trailer and offer our services during those events as well. We are already booked for 3 festival type events that are hosted by our school and are hugely popular with the local community.

To make bikes appealing throughout the town we have also coordinated with local businesses. The town used to have a bike program where people could come and fix their bikes and build new ones. It was tremendously popular in the community and was only discontinued because the organizer and fixer of all things moved on. The previous bike program was a major draw for local youth with many attending weekly. This project aims to revitalize this opportunity and regenerate interest among the community's youth in bike riding. It will also create a forum for bikers in the community to advocate for bike lanes (we currently have ~200yards of bike lane), bike racks at local businesses and stores, and bike ride meet-ups. This in turn would benefit local businesses. Already the majority of the businesses in town plan to have bike racks in place in front of their businesses until September.

We feel that this is a very practical approach as it is cost effective, accessible to the students, and clearly promotes a reduction in fossil fuel use on campus while promoting healthy activities. Moreover, this approach has been found to be successful in other locations. For example, UC Berkeley has installed repair stations on their campus to aid bike commuters in keeping their rides safe and working properly. They are planning to install two more stations on

the campus. The stations provide students with tools like screw drivers, tire pumps and digital repair manuals (Gordon 2012). Also, Boston's Nicole Freedman has developed a biking program for the city. It consists of 61 kiosks and 600 bicycles; the plan is to make it more convenient for the city's residents to ride instead of drive. Bikes can be taken from any kiosk and returned to any other kiosk making for convenient commuting on the city streets (Terwilliger 2011).

To keep the project running after we leave the school we plan on using funds granted to us by the school to hire a professional bike repair specialist to host a teaching clinic. We are also working with the school to create a work study position. The work study would pay a mechanically minded student to be trained in bicycle repair and to run the weekly Free Ride clinics.

Relationship to Sustainability

This project has the potential to be of tremendous benefit to the community (Holtzman 2008). There is a small in-town commuter population already and with increased opportunity and visibility the use of bicycles for commuting should grow. Many intercity students attend our school and would like to use bikes more if there was a way to have them here (hard to transport via bus and ride them safely).

With the widespread interest in biking we feel that we could have a significant impact for reducing vehicle use. Many commuter students drive from under 3 miles away and even drive between classes to get slightly closer to one building or another. Our project will give them the resources to get to class some other way. We also have demonstrated that it is often much more efficient time-wise to bike to class and avoid traffic. This aspect of biking has been very appealing to several students who get caught in the commuter lot traffic jams.

This is the major impact this project will have is to reduce the carbon output in our town

and on our campus. Personal vehicle use is a major source of carbon which contributes to global climate change. Initial starting of vehicles uses a disproportionate amount of fuel thus short distances contribute a larger amount of carbon than the distance incorporated to a longer trip. Automobile use also accounts for 52% of nitrogen oxides and a significant portion of sulfur oxides. These air pollutants are the main culprits in acid rain which has its own host of environmental problems (U.S. EPA, 1994). The only carbon tradeoff would be transporting the trailer which would require a vehicle. While this seems counterproductive we believe the net gain from people biking would offset the .5 mile round trip required to get the trailer from our headquarters to the campus yard and the 1 mile round trip to the center park of the village. Considering that these drives would only occur weekly for the campus and monthly for the park (in the beginning stages) we believe that the carbon output would not be unreasonable.

Materials and Methods

The first part of the task was procuring a trailer to get our project mobile. We had several hang ups with getting the trailer ready to hold out supplies. While we found several sellers that were interested in the project however the grant office at our university had such a long process that the trailers always were sold or the seller's became exhausted by the process. We settled on a temporary fix of running the clinic out of the bed of a truck until we have a trailer ready. The school was interested in this project and gave us \$800 for additional funds and supplies. This is helpful because we are able to hold a large portion of our available funds for a trailer while still being able to purchase supplies.

The next part of the project was getting parts and tools. A big boon came with the donation of several boxes of miscellaneous parts from a bike project that used to be in town. This donation gave us a large starting inventory so that we would be prepared for a wide variety of

problems. It also gave us some idea as to what parts we should be looking for. We made a point to ask as many students as possible what problems they had with their bikes and what parts they needed and tended to need when they had problems in the past. This led us to the realization that tire issues are the main problem our sample of students deals with. We didn't have much in our initial inventory in the way of inner tubes so that was an area we were able to cover with funds from the school. It also gave us the idea to make tire repair kits available at the University Police Department so that quick repairs could be done when we aren't having clinics. The other thing we decided to spend money on in terms of equipment was reflectors. We feel that we should be communicating safe bike riding so that people feel comfortable riding the bikes that are in freshly working condition (see Inventory after Works Cited).

Since the project is about providing a bike repair service we had to actually be able to fix bikes. This involved talking to people who have good reputations for fixing bikes, taking a couple bikes apart, and consulting the owner of a bike shop that offers repair lessons.

The last step, at this point, is to host a bike clinic which kicked off with the Spring Bike Cleaning and Tune-up on 11 April 2014. This was a good way to make the project visible. We set up in the center of campus in a high foot traffic area with all our parts and tools as well as some bike books and manuals. This was a great event in that several students who hadn't heard about the project stopped to look at what we were doing and sign up on our notification list for future events. We have planned a community bike repair event on April 22nd in the village's central park, and a co-club event on campus on April 26th.

Results, Evaluation and Demonstration

We eventually plan to survey Free Ride users on previous bike use and how having the Free Ride services available to them has impacted their bicycle use. We have started to keep a

record of the costs of this project because we would like to make it easy for other schools to duplicate our program. We have a starting inventory of all the bikes and tools with the associated prices and notes on whether or not they were donated. For all our clinics we will record what parts were used, what fixes performed, and what bike problems people bring. This will help us track the parts as well as inform us as to what parts or tools we need to order and what problems we should be learning about. The general fixes can be performed by most people in the college club associated with our project. For the more advanced fixes we will need to have someone who is more experienced. To accommodate this we are negotiating a work study position with the school so that we will not have a cost from labor. The other labor will be either volunteer or for extra credit for the Sustainability 101 class (and possibly one of the Agriculture Engineering classes). We would also like to use some of the school funds to bring in a professional from a bicycle repair shop to host a more demonstrative clinic.

For every clinic that we advertise in advance to the community we will receive \$40 from the student government association. This money will be tracked so that any monies gained from Free Ride will be set aside for its continuation. With the school and park clinics alone this would provide at least \$40/month which can cover the cost of fuel for the trailer, and any unforeseen expenses. The fuel from moving the trailer will be recorded as will any additional parts or tools purchased for this project.

Our main priority is to increase the use of bikes in the area. As the project catches on we could hold the clinics more frequently which would be the best way to scale the project. Just by the nature of being a mobile shop this project is very transferable. With the success of the mobile bike shop we could make more trailers or have a more centralized headquarters. Also, by bringing our clinic to other schools with bike clubs and to local festivals could garner support for additional trailers and buy more materials as necessitated by demand. Further into the future we

may also be able to start a Free Ride bike share program for commuting around or sprawling campus with the bikes built from our scrap parts.

Our first clinic on 11 April 2014 was advertised as a Spring Tune-up. We had 6 bikes show up for this 1.5 hour event. For all the bikes we showed people how to degrease the chains and gears and had everyone test to see if their bikes were shifting properly. We had a couple of more complex fixes that we were able to complete (see Table 1).

We will have documentation from our first clinic to show at the exhibition event. We will have concrete data on use and expenditures as well as photos from the clinic. We plan to present this project as a poster.

Name	Type	Problem	Fix	Parts/tools used
Tracy Testo	MTB	Tune-up, rear flywheel missing teeth, brakes bad	Degreased chain, repaced rear flywheel,	Rag, degreaser, flywheel wrench, allen wrench
Mike Bernard	MTB	Tune-up	Degreased	Rag, degreaser
Dan Frank	MTB	Tune-up, flat tire	Degreased, patched tire	Rag, degreaser, tire patch, tire pump
Jason Jackson	Road bike	Tune-up	Degreased	Rag, degreaser
Jacky Butcher	MTB	Tune-up	Degreased	Rag, degreaser
Shawn Michalet	ATB	Tune-up, loose brakes	Degreased chain, tighened brakes	Rag, degreaser, allen wrench

Conclusions

This project ended up being a pilot project at the time of writing for our overall project goal. We learned some of the local processes with our school's grant office that we will be better prepared for when we do get our trailer. We also were encouraged by the fact that students seemed hungry for a program like this. We feel that with some coordination this can be a integral part of our college's community. At the moment we are mostly interested in putting our energy into the upcoming clinics and getting solid, reportable data and feedback for the project. This

data will inform the future administrators of the project and give the students running it a solid base and reputation to work with.

The school has been working lately to improve its image on the sustainability front and has offered us support. Aside from the start up funds of \$800, a faculty member volunteered to pay for the cost of insuring the trailer and to pay all costs incurred from transportation throughout the projects lifetime. Facilities staff will also allow us to use campus vehicles to transport the project when we need to. We feel confident that this project is feasible and achievable. We won't know for sure our impact on bike use until we are able to survey users and get their response but given that a past program was so successful we feel we could have a major impact on the carbon produced by our student population.

Works Cited

- Carroll, Jayne. 2013. Bicycle Transportation Alliance campaign likely to fuel tensions between motorists, cyclists: Guest opinion. Oregon Live LLC. <http://www.oregonlive.com>
- Gordon, Jeremy. 2012. UC Berkeley Installs DIY Bike Repair Station. The Daily Californian. <http://www.dailycal.org/2012/10/14/self-service-bicycle-repair-station-installed-northwest-of-uc-berkeley-campus/>
- Holtzman, David. (2008). Share-a-bike: advocates see bicycle exchanges as part of the answer to congestion. *Planning*, 74; 20.
- Jonathan Maus. 2011. New study compares bicycling's CO2 emissions to other modes. <http://bikeportland.org>. PedalTown Media Inc.
- Terwilliger, Cam. 2011. A Biking Makeover In Boston A New Bike Share, and a New Pro-Biking Reputation, for Boston. The Online Home of E-The Environmental Magazine. <http://www.emagazine.com/magazine/a-bikingmakeover-in-boston#sthash.3AfZ7tb9.dpuf>
- U.S. Environmental Protection Agency; R.W. Bunel, Fox, D.L. Turner, D.B., & Stern, A.C. 1994. *Fundamentals of air pollution*. Academic Press.
- WebMD. 2013. Exercise and Depression. Depression Health Center. 2005-2013 WebMD, LLC. <http://www.webmd.com/depression/guide/exercise-depression>.
- Woodcock, J., P. Edwards, C. Tonne and B.G. Armstrong. 2009. Public health benefits of strategies to reduce greenhouse-gas emissions: urban land transport. *The Lancet*.

Inventory List

Bike Part	size (if applicable)	Quantity	notes	CostPerUnit
MTB Tires	24 x 1.95	2		donated
MTB Tires	26 x 2.4	1		donated
MTB Tires	26 x 2.1	1		donated
MTB Tires	26 x 2.1	1	w/ inner tube	donated
Road Tire	700 x 23 c	1		donated
Road Tire	26 x 1.38	2		donated
Hybrid "ATB" tires	26 x 175	2		donated
MTB Tires	26 x 2	2	w/ tube	donated
Hybrid "ATB" tires	26 x 1.9	4	1 pair w/ tubes	donated
MTB Tires	26 x 1.95	4	1 w/ tube	donated
axel		14		donated
handlebar		12	complete w/ cable and brake shoe	donated
brake levers		14		donated
gear shifters		8		donated
cable guide		4		donated
brake arm		27		donated
brake arm w/ shoe		19		donated
handlebars		11	in pieces	donated
misc headsets and bolts		30	approximation	donated
tiretape		20		donated
single handles		5		donated
handle grips		16		\$7.00
handle grip plugs		10		donated
Chains		100 feet	approximation	donated
peddles		25		donated
peddle axel		7	+ associated parts	donated
peddle cages		2		donated
derailers		26		donated
brake sets		12		donated
bucket of nuts, bearings, gear sets				donated
gear sets		7		donated
single gears		28	+ associated parts	donated
seat posts		14		donated
seats		3	+ associated parts	donated
peddle assembly/large chain ring		12		donated
handle bar stems		18	+ associated parts	donated
forks		12		donated
tube repair kits		20		\$1.08
reflectors		20	full kit w/ 4 units plus attachments	\$3.00
tire pump		1		\$45.37
allen wrenches		5	full sets	Pre-owned
WD-40		1		Pre-owned
assorted rags				Pre-owned
degreaser		2	aerosol	\$12.00
degreaser		1	liquid	\$10.99
lubricant		5		\$7.39
bike stand		2		\$85.99