A Spatial Assessment of Existing Bike Rack Locations and Usage

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Abstract

Furman University is considered a leading institution in sustainability, and promotes sustainable transportation by providing bike racks for bicycle storage. Yet there is no information on locations of bike racks or their usage available. Bike rack placement on campus is haphazard at best and uninformed by actual needs or use. The existing racks on Furman's campus (as of Fall 2009) were observed for location, type and usage, and were mapped as points on an orthophoto of campus to inform better bike rack placement.

Usage is distributed unevenly across existing bike racks. Racks that are completely unused and those that are overstressed were identified. Suggestions for rearranging existing bike racks and purchasing new ones were derived based on the results from this study. These measures, as well as providing additional support to bicyclists, would improve the sustainability of Furman's bike program.

Background

- Many bikes sit unused on racks for long periods of time, taking up space (*Getting There Greenly* 2009).
- Bikes account for <4% total observed traffic (*Getting There Greenly* 2009).
- Public safety's count of bikes on campus is an underestimate (only registered bikes are counted)
- Better placement and/or additional racks might encourage bike use (*Getting There Greenly* 2009).
- Designated moped parking areas and enforcement of moped use restrictions have created a safer bicycling atmosphere

Objectives

- Create a map of the location of all existing bike racks on campus.
- Characterize use patterns of existing racks.
- Inform better bike storage planning and the overall bike program at Furman with regards to:
  - Rack placement.
  - Locations for covered bike racks.
  - Other measures to encourage bike use.

Methods

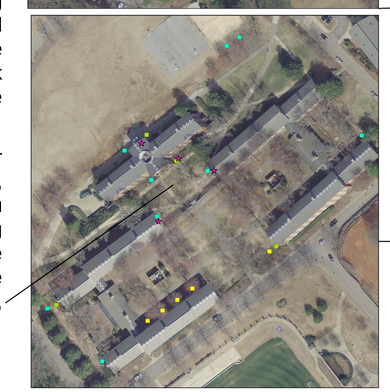
- Location, type, usage (actual bikes secured/near a rack) and maximum capacity of racks was observed and location noted on a 2008 orthophoto of campus.
- Observation times were limited to week days between 12-3:30 PM, October to November 2009.
- Due to time constraints, most bike racks were only observed once.
- Points and rack attributes were mapped on an orthophoto of campus using ESRI's ArcGIS software.
- Usage to capacity ratio was calculated for each rack.
- Rack location and use distribution, as well as "gaps" in bike rack placement were visually assessed.

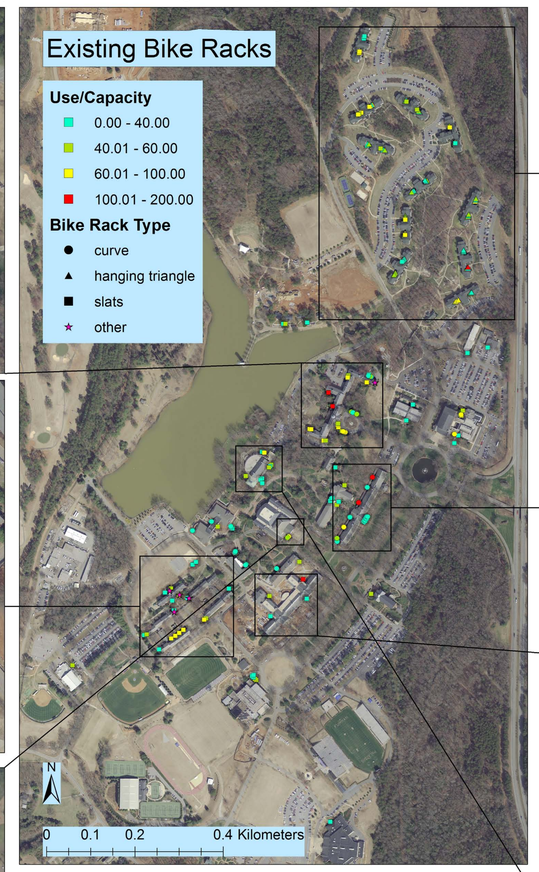
Results

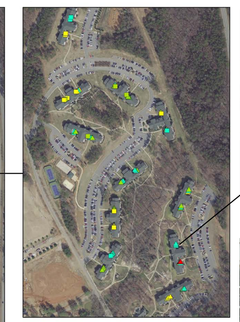
Fig. 1: A complete map of the location, type and use/capacity ratio of every bike rack on Furman's campus. Central image is an overview of the entire campus, with surrounding insets highlighting areas of interest and problematic areas.

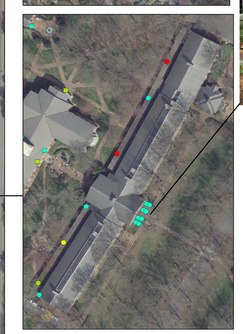
Fig. 2: An alternative bike securing location. This patio off of **Gambrell residence hall** is covered and spacious. Protection from the elements is not provided by existing bike racks on campus, and the patio provides ample storage where bike rack storage is otherwise inadequate.

Railings on the porches of, or adjacent to, residence halls, often serve as impromptu overflow bike securing locations. Four alternative securing locations were identified in **South Housing**, all of which were railings.









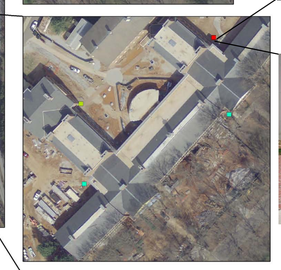


Fig. 3: A "hanging triangle" bike rack by a **North Village** apartment. This type is found only in North Village.

Fig. 4: Eight completely unused "curve" bike racks are installed on the side of **Furman Hall** facing the mall. These could potentially provide storage for about 80 bikes, but are not along a path of student traffic.

Fig. 6: The "slats" bike rack outside the main entrance to the **Science building**.

Fig. 7: This sole rack outside the **Science building** main entrance is often filled to maximum capacity, with additional bikes parked, unsecured, nearby.

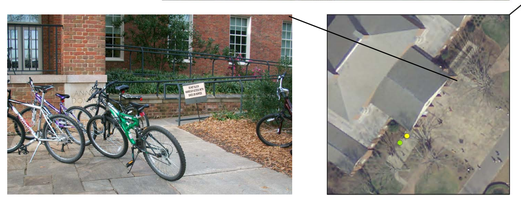


Fig. 5: Bikes and mopeds often block the handicap access ramp to the **library**.

Fig. 8: Total capacity and usage of bike racks

total capacity (estimated)	2151
total usage (Spring 2009)	956*
total usage (Fall 2009)	1075

*some parts of campus omitted; *Getting There Greenly* 2009

Fig. 9: Total number of each type of bike rack on campus

type	symbol	number
curves	circle	37
hanging triangle	triangle	51
slats	square	94
	TOTAL	182
other placement locations	pink star	5
	TOTAL	**187**

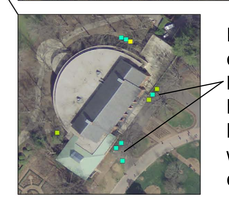


Fig. 10: The front entrance of the **Dining Hall** is a high-use area for bike storage, and would be a candidate for covered bike racks.

Fig. 11: A covered bike rack at the University of Victoria
http://icor.uvic.ca/portal/bikes.html

Discussion/Conclusions

Based on estimates of capacity and observations of use for each rack (Fig. 8), **Furman bicyclists currently utilize about 50% of total available bike storage**. Usage appears to have increased slightly, though this conclusion may be unreliable, as the survey of bike usage omitted some areas of campus, and double-counting may have occurred in both studies.

Locations that are **lacking in adequate bike storage** are the **main entrance to the Science building**, the **front of the library**, the **front entrance of the Dining Hall**, **North Village** and the **side of Furman Hall facing the mall**. Areas **completely lacking in bike storage** are the **Cliff's Cottage** (soon to be offices for the Shi Center for Sustainability), the **baseball fields** and the **Tennis Complex**. **Moving unused bike racks** (e.g. two racks by the South Housing volleyball field, one rack from the front entrance of the music building) to different locations lacking storage would **save Furman the cost of purchasing new racks**.

Covered bike racks would make biking a more attractive transportation option, as bikes would be protected from the elements, keeping bicyclists' bikes from rusting or the seats getting wet. High use bike racks that could be converted to covered racks are those in front of the library and the Dining Hall.

A maintenance/supply shop on campus would be extremely convenient for students, and would help ensure the safety of bicyclists. If bicyclists were supported in this way, mopeds or cars might become less attractive modes of transportation.

Providing **support for campus bicyclists** in the form of well-placed, secure storage should encourage more sustainable transportation choices. Additionally, providing adequate, safe bike storage might reduce bike theft and vandalism on campus.

References

Getting There Greenly: Assessing Transportation Needs and Potential for Furman University. Hedden 2009.

Acknowledgements

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Projection/Data Sources

Projection: NAD_1983_HARN_StatePlane_South_Carolina_FIPS_3900_Intl_Feet

Campus orthophoto: N:\Data\Greenville2008\Aerial\2008COLOR_7.sid
Bike racks: N:\users\hedden\Tori\