



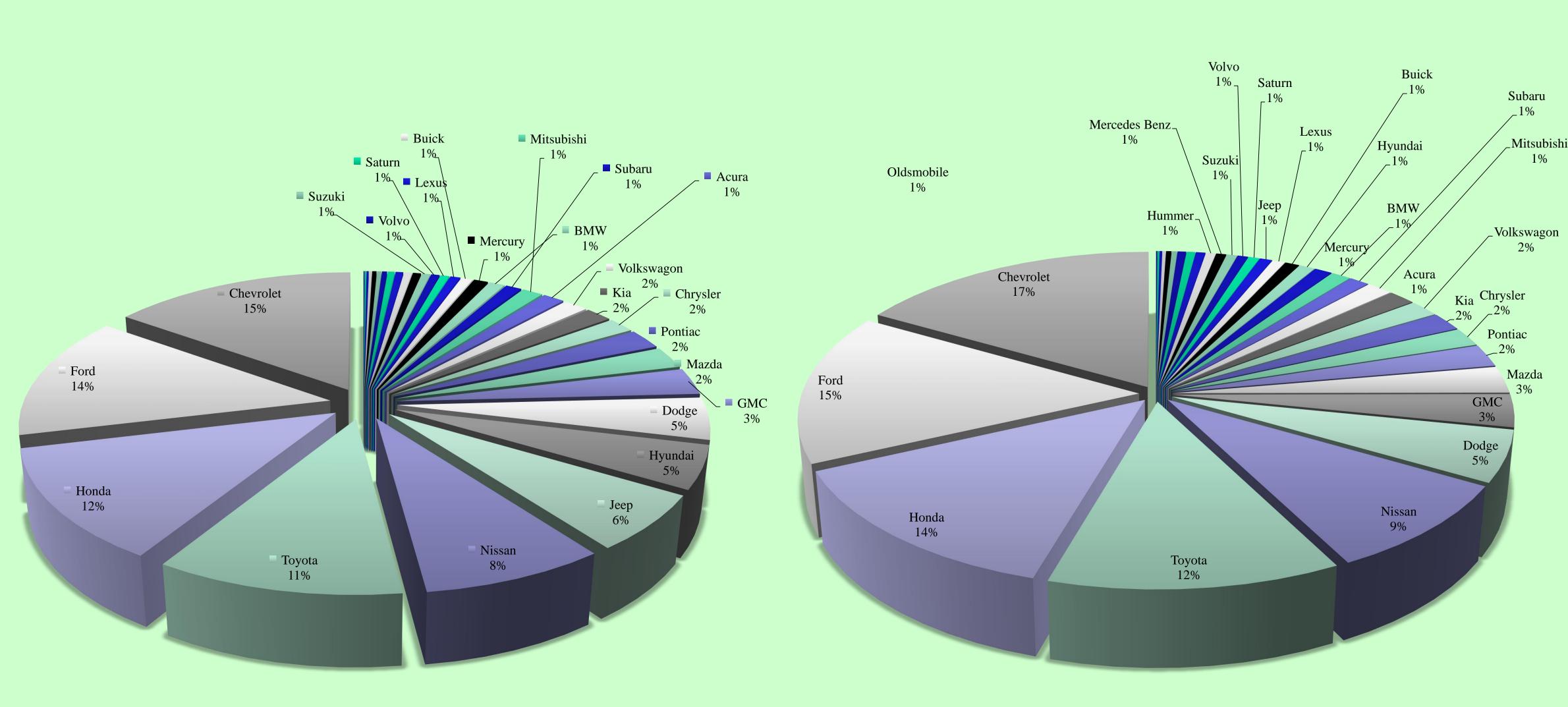
ARKANSAS

The Problem

Following the University of Arkansas' commitment to grow and progress in a sustainable nature, I became interested in the amount of carbon produced from all faculty and students who drive to campus. In order to calculate the carbon emissions from commuters to the university I had to first find the round trip distance each individual commuter makes on a daily basis and the fuel economy of the vehicle. Using parking pass permits records from the University of Arkansas Department of Transit and Parking I was able to obtain all the required information and construct an estimate of our total carbon emissions produced during a semester. This project will mark the first attempt at recording our carbon emissions from those who drive to campus. In order to be better educated regarding our carbon footprint at the university as a whole, we need to continue to calculate our carbon output in the transportation sector.

Sustainability

This project directly estimates the amount of carbon that the individuals who drive to campus everyday produce. The results of this project provide an estimate of where we are currently with regards to carbon emissions. In order to monitor our progress toward a sustainable future we need to have a benchmark to compare our findings to. This project establishes that precedent. The scope for this project was restricted due to the unreliability in the data. In order to gain a better understanding of our impact on the University's carbon footprint as a whole we must ensure that useable records are kept. I am hopeful that this first glance into the carbon output directly related to commuting sparks interest in my peers and drives further research and monitoring of emissions.



Carbon Emissions from Commuters to the University of Arkansas Cort Murdoch Geology, Sustainability

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9 1106 W Maple St PMB 0330	Fayette AR	72701	Acura	CL	0	19	0	17.68	0	18687.82065	249.5083088	1	
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3 1708 N Evening Shade Dr	Fayette AR		Acura	CL-SERIES	5.8	19	0.305263158	17.68	5.397052632				
4 195 N McIlroy PMB 0064	Fayette AR	72701		Integra	0	25	0	17.68	0			-	
5 2476 W SAINT PETES CT APT 304	Fayette AR	72701 /		Integra	3.87	25	0.1548	17.68	2.736864				
6 3116 Yorkshire Cir Apt B	Springd AR		Acura	Legend	22.4	18.5	1.210810811	17.68	21.40713514				
7 1106 W Maple St PMB 1081	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
8 1365 W Cleveland Ave PMB 0820	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
9 1106 W Maple St PMB 0412	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
0 1106 W Maple St PMB 0705	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
1 1263 W Cleveland PMB 0032	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
2 118 N Duncan Ave APT 109	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
3 177 N Garland Ave PMB WS-0227	Fayette AR	72701		MDX	0	16.5	0	17.68	0				
4 2476 W St. Pete's Ct	Fayette AR	72202		MDX	3.87	16.5	0.234545455	17.68	4.146763636				
5 791 N. Rupple Road	Fayette AR	72704		MDX	8.38	16.5	0.507878788	17.68	8.97929697			-	
6 629 Wordsworth Lane	Fayette AR	72704		MDX	8.49	16.5	0.514545455	17.68	9.097163636				
7 3004 Reisling Ln			Acura	MDX	21.94	16.5	1.32969697	17.68					
8 177 N Garland Ave PMB GR-0042	Fayette AR	72701		RL	0	17.75	0	17.68	25.50504242				
9 301 N Garland Ave PMB 0315	Fayette AR	72701		RL-SERIES	0	17.75	0	17.68	0				
0 177 N Garland Ave PMB GR-0056	Fayette AR	72701		RSX	0	25	0	17.68	0				
1 31 S Stadium Dr PMB 0374	Fayette AR	72701		RSX	0	25	0	17.68	0				
2 1263 W Cleveland PMB 0547				RSX	0	25	0	17.68	- 0				
3 1263 W Cleveland PMB 0245	Fayette AR	72701 /		RSX	0	25	0		0				
4 6526 Bernice Ave	Fayette AR Socionad AR			RSX	25.06	25	1.0024	17.68	17.722432				
5 4337 Backus Ave	Springd AR		Acura Acura	RSX		25	1.0024	17.68	17.722432				
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6 155 N McIlroy PMB 0120 7 1263 W Cleveland PMB 0394	Fayette AR	72701		TL	0		0						
8 1365 W Cleveland Ave PMB 0318	Fayette AR	72701		TL	0	18.6 18.6	0	17.68 17.68					
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9 195 N McIlroy PMB 0068	Fayette AR	72701			0	18.6	0	17.68					
0 195 N McIlroy PMB 0295	Fayette AR	72701		TL	0	18.6		17.68					
1 1365 W Cleveland Ave PMB 0821	Fayette AR	72701 /		TL	0	18.6	0	17.68					
2 195 N McIlroy PMB 0431	Fayette AR	72701		TL	0	18.6	0	17.68					
3 1106 W Maple St PMB 1308	Fayette AR	72701		TL	0	18.6	0	17.68					
4 1106 W Maple St PMB 1274	Fayette AR	72701 /		TL	0	18.6	0	17.68	0				
5 1263 W Cleveland PMB 0427	Fayette AR	72701 /		TL	0	18.6	0	17.68	0				
6 1106 W Maple St PMB 0579	Fayette AR	72701		TL	0	18.6	0	17.68	0				
7 1263 W Cleveland PMB 0532	Fayette AR	72701		TL	0	18.6	0	17.68	U				
8 3877 W. Crystal Downs	Fayette AR	72704	Acura	TL	0	18.6	0	17.68	0				

This picture shows an example of how I organized the data after it was received from the Department of Parking and Transit. Of the 14,768 permits they issued, only 1,938 (13.12%) were deemed as reliable data.

Percent of Total Carbon Emissions of Each Make of Vehicle

This pie chart illustrates the percentage each make of car accounts for from the total weight of CO_2 produced in a semester (676.07 tons, or 1,352,152.64 lbs. Makes that accounted for less than .5% of the total weight were not included in the legend. These include: Audi, Cadillac, Geo, Hummer, Infinity, Isuzu, Jaguar, Land Rover, Lincoln, Mercedes Benz, Mini, Oldsmobile, Plymouth, Rover, Saab, and Scion.

This pie chart illustrates the percentage of fuel that each make of car consumes during a semester worth of commutes. Makes that account for less than .5% of the total gallons of gas consumed during the semester (76,479.18 gallons) were excluded from the legend. These makes include: Hummer, Oldsmobile, Infinity, Cadillac, Lincoln, Scion, Geo, Audi, Isuzu, Land Rover, Jaguar, Sab, Rover, Plymouth, Mini

Percent of Total Fuel Used per Day by Each Make of Vehicle

Using the parking pass records I was able to obtain the round trip mileage for each vehicle via MapQuest. Also, I was able to average the recent fuel economy estimations for the models of the cars by using the United States Department of Energy Fuel Economy Standards to give an estimation of the fuel efficiency of the car in miles per gallon. Multiplying the round trip mileage by the MPG returned the number of gallons of gas used in a trip for the specific individual. The process was repeated for each permit. It was assumed that if the car was registered on campus it would not be commuting. If the permit was registered to an address that was outside of 40 miles from the University of Arkansas it was assumed to be unrealistic data and was not used. Summing all of the gallons of gas used by commuters in a round trip we were able to determine the total gallons of gas consumed during travel to campus. The total gallons of gas consumed in one day was then multiplied by the pounds of carbon emitted from combusting one gallon of gasoline (17.68 lbs.). This returned the weight of carbon emitted per day in pounds. Multiplying this number by 73, the typical number of days in the college semester, I found the total carbon emissions for commuters in a semester.

This project taught me valuable computation and data analysis skills as well as provided me with an opportunity to further explore my interests in the natural systems of the Earth. Working on this project gave me a valuable researching and time management experience. I hope that further analysis of the carbon emissions from the transportation sector of the university stems more ideas on ways to cut our carbon output. I also hope that my project marks the beginning of a new interest in carbon emissions in my peers.





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Methods

Discussion