

Identifying Disparities in Definitions of Heavy Trucks

by

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A proposal prepared for the

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PROBLEM STATEMENT

The Montana Department of Transportation (MDT) is investigating disparities in the definitions of heavy trucks to help the trucking industry understand pertinent regulations and assist with future legislation to clarify definitions and language. Through a preliminary literature review and exchange with MDT, the team has identified four areas where confusion may arise including: (1) Permitting/Registration; (2) Size (width, height, and length); (3) Weight; and (4) Safety (e.g., speed limit, safety standards, driver's license standards, hazardous materials, and safety inspection program). For instance, the Montana Code Annotated (MCA) states that vehicles under one ton are subject to a lower fee than vehicles above one ton (MCA 15-8-202). However, the code provisions do not explain whether the weight that is referred to is the manufacturer's rated capacity or the gross vehicle weight at which the vehicle is registered to operate.

The proposed project aims to identify ambiguity and discrepancies existent in the federal and state-level rules regarding heavy trucks. The team will review terms from three sources, namely the (MCA, the Administrative Rules of Montana (ARM), and the Code of Federal Regulations (CFR). The anticipated products include (1) matrices that summarize where ambiguous language occurs and where heavy-truck definitions diverge in the emphasis areas aforementioned and (2) an educational pamphlet to help legislators, MDT personnel, and truckers understand heavy-truck regulations. The results will also help future legislatures to clarify terms and definitions.

BACKGROUND SUMMARY

Safe and efficient movement of heavy trucks is vital to the state of Montana. In 2010 commercial trucks carried 86 percent of shipping tonnage to the state and 13 percent of tonnage out of the state (MDT 2010). Truck shipments within Montana are projected to grow to 92.7 million tons with an estimated value of \$39,780 million in 2035. As heavy truck volumes continue to grow, it becomes even more important for the State to enforce laws, regulations, and rules to ensure that trucks operate in safe and sustainable ways.

While past legislatures have written and re-written commercial motor vehicle laws, ambiguous language remains relative to how heavy trucks are defined with respect to permitting/registration, size and weight restrictions, and safety. For example, trucks with a *gross vehicle weight* (GVW) 26,000 lbs or greater are required to be inspected (MCA 2015). But it is unclear whether this 26,000-lb threshold means the GVW at which the vehicle is registered to operate¹ or the *manufacturer's rated gross vehicle weight* (MDT 2015). For "trucks or truck tractors" over one English ton (or 2240 lbs) *manufacturer's rated capacity*, lower speed limits are imposed ranging from 65 miles per hour (mph) on interstate highways, and 60/55 mph on "any other public highways" depending on daytime/nighttime conditions (MCA 61-8-312).² The MCA indicates that the one ton is the "manufacture's rated capacity" (or manufacture gross vehicle weight), but does not clarify what comprises "trucks or truck tractors"—thus, some vans and sport utility vehicles (SUVs) could have been considered as heavy trucks and subject to the speed limits (ARM 23.3.801).

A distinction must be made between heavy trucks and commercial motor vehicles (CMVs), as the latter includes commercial passenger vehicles as well. While this project will focus on heavy trucks, for which the matrices and the educational pamphlet will be developed, the research team will review definitions of buses and incorporate the findings in the Task Reports and the Final Report. Note that the definitions of CMVs vary. Part 390 (the General section) of the Federal Motor Carrier Safety Regulations (FMCSA) defines a CMV as "any self-propelled or towed motor vehicle used on a highway in interstate commerce to transport passengers or property when the vehicle:

- (1) has a gross vehicle weight rating or gross combination weight rating, or gross vehicle weight or gross combination weight, of 10,001 pounds or more, whichever is greater; or
- (2) is designed or used to transport more than 8 passengers (including the driver) for compensation; or
- (3) is designed or used to transport more than 15 passengers (including the driver), and is not used to transport passengers for compensation; or
- (4) is used in transporting material found by the Secretary of Transportation to be hazardous under 49 U.S. Code § 5103 and transported in a quantity requiring placarding under regulations prescribed by the Secretary under 49 CFR, subtitle B, chapter I, subchapter C." (Title 49 CFR, Part 390)

¹ In most states, the towing vehicle must be registered for the maximum Gross Combination Weight Rating (GCWR) that the trucker plans to operate (Source: the Association of Work Truck Association [NTEA]).

² Daytime condition is defined as the period from one-half hour before sunrise to one-half hour after sunset; otherwise, it is defined as "Nighttime". (MCA 61-8-303)

However, regarding Commercial Driver License (CDL), Part 383 of FMCSA defines a CMV differently: “CMV means a motor vehicle or combination of motor vehicles used in commerce to transport passengers or property if the motor vehicle—

- (1) has a gross combination weight rating or gross combination weight of *11,794 kilograms* or more (*26,001 pounds or more*), whichever is greater, inclusive of a towed unit(s) with a gross vehicle weight rating or gross vehicle weight of more than *4,536 kilograms (10,000 pounds)*, whichever is greater; or
- (2) has a gross vehicle weight rating or gross vehicle weight of 11,794 or more kilograms (26,001 pounds or more), whichever is greater; or
- (3) is designed to transport *16* or more passengers, including the driver; or
- (4) is of any size and is used in the transportation of hazardous materials as defined in this section.”

The objective of this project is to identify the variations and ambiguity in the definitions of heavy trucks and summarize them in matrix format, and to design an educational pamphlet to help law enforcement, MDT personnel, and truckers understand heavy-truck regulations. That objective is achieved by conducting a literature review of state and federal regulations, mainly represented by three sources—the MCA, the ARM, and the CFR. Through exchange with MDT and a preliminary literature search, the research team has identified four emphasis areas as the most relevant to heavy truck operation and safety, consisting of Permitting/Registration; Size (including width, height, and length); Weight; and Safety (e.g., speed limit, safety standards, driver’s license standards, hazardous materials, and safety inspection program). The project results will help MDT work with future legislators to clarify definitions and language regarding the heavy trucks.

BENEFITS AND BUSINESS CASE

Benefits

The immediate benefits of this project are to (1) identify ambiguities and inconsistencies in the State's regulations and rules regarding heavy trucks so that they can be resolved, as appropriate and (2) create an educational pamphlet to help practitioners and truckers understand the regulations. The project results will assist the next legislature with revising regulations and codes for Montana.

In the long term, the results can contribute to safer and more efficient movements of heavy trucks, as truckers develop a better grasp of the various rules pertaining to permits, weight, size, and safety. State agencies responsible for the enforcement of state and federal rules will also be able to do so with greater precision and efficiency.

Business Case

Without identifying disparities in heavy-truck definitions, it would be difficult, if not impossible, for Montana's legislators to improve clarity and consistency of heavy-truck regulations. Given the growing truck flows in the state, these disparities will undermine state agencies' capabilities to manage heavy trucks and the public's ability to understand regulatory aspects of vehicle operations. Occurring at a time leading up to the 2017 legislation, the project will help MDT work with legislators to revise state laws. The Motor Carrier Services Division will also utilize the results in various capacities (e.g., enforcement, permitting, etc.).

OBJECTIVES

The objectives of this project are to:

1. Identify differences in the definitions of heavy trucks in four emphasis areas, namely Permitting/Registration, Size, Weight, and Safety. Tentatively, any such differences will be summarized in a matrix format.
2. Design an educational pamphlet for the trucking industry and MDT personnel. An electronic version of the pamphlet will be provided to MDT for review. A final electronic version of the pamphlet will be submitted to MDT after agreed-upon edits are made by WTI.

RESEARCH PLAN

The objectives will be accomplished by five tasks, as follows.

Task 0. Project Management

The PI will work with the project sponsors via phone calls and meetings, direct and oversee all project activities, and review and revise deliverables. MDT meetings will include (1) a kick-off meeting to inform each project participant of the contractual obligations and define the scope and deliverables of the project; (2) a final presentation focusing on the technical elements and implementation; and (3) other meetings deemed necessary by MDT and/or the research team. Deliverables include Quarterly Reports, Task Reports, an educational pamphlet (in electronic version), and a final report at the completion of the project.

Task 1. Literature Review

The literature review will target four emphasis areas--(1) Registration/Permitting; (2) Size; (3) Weight; and (4) Safety—by dissecting provisions from resources including the MCA, the ARM, and the CFR and additional sources as needed.

In addition, the literature review will examine practices in neighboring states, as needed, including Idaho, North Dakota, South Dakota, and Wyoming. A preliminary search finds that each state has posted a Trucker's Handbook online (except Wyoming). In addition to states' contact information, the handbooks provide an easy-to-read guide for truckers regarding weight and size limitations, driver qualifications (e.g., commercial driver license and registration fees), insurance, hazardous materials, permits, and ports of entry, while referencing state codes or federal regulations. These handbooks can help the team quickly understand each state's regulations and rules and design the educational pamphlet.

A Task Report for Task 1 will be delivered to MDT for review on Oct 31st, 2015.

Task 2. Identifying Disparate Definitions

Disparities in truck definitions and provisions seem to primarily arise from two sources. One source is the ambiguous language used in the various codes and their provisions. For example, “trucks or truck tractors” over one ton are subject to lower speed limits (MCA 61-8-312). Although the MCA indicates that the one ton is the “manufacture's rated capacity” (or manufacture gross vehicle weight), it does not clarify “trucks or truck tractors,” and some vans and sport utility vehicles (SUVs) could be classified as trucks under the ARM 23.3.802 provision, and subject to the speed limits.

Another source of confusion over truck definitions and references relates to the variations in regulations between federal and state levels. For instance, the maximum gross vehicle weight should be less than 80,000 lbs. (except where lower gross vehicle weight is dictated by the bridge formula) based on 23CFR 658; however, consistent with grandfather clauses that are part of the federal truck size and weight provisions, the State allows the maximum weight to exceed 80,000 lbs. (MCA 61.10.107). With regard to length restrictions, the state mandates a 61-ft maximum combined trailer length (MCA 61.10.104), while the federal regulations prohibit imposing an overall length (combined trailer length plus tractor length).

A Task Report for Task 2 will be delivered to MDT for review on December 31st, 2015.

Task 3. Recommendation

This task will make recommendations of what needs to be changed in the regulations to improve clarity and consistency. Combining findings from Tasks 1 and 2, Task 3 will develop a series of matrices that summarizes rules with regards to vehicle permitting/registration, size, weight, and safety. The Task Report, which primarily contains the matrices, is due to MDT on Jan 31st, 2016.

Task 4. Final Report

This task consists of preparing a final report documenting the work on the project and the results. For the four emphasis areas, the final report will discuss where clarity issues and disparate definitions occur and will make suggestions regarding necessary changes. The Final Report is due to MDT on Feb. 29th, 2016.

Task 5. Designing an educational pamphlet and outreach

This task focuses on designing and distributing an educational pamphlet within MDT. The pamphlet will clarify disparate definition of heavy-truck regulations as appropriate. The pamphlet will be posted online to educate the public and stakeholders. WTI will provide MDT with an electronic version of the pamphlet for review. A final version of the pamphlet will be submitted to MDT after WTI has made any agreed-upon edits. In the process to develop the pamphlet and matrices, the team will work with MDT and other stakeholders including the Federal Highway Administration (FHWA), the Montana Motor Carriers Association (MCA), and the Federal Motor Carrier Safety Administration (FMCSA). All outreach activities will go through the MDT research project manager and research panel. The first draft of the educational pamphlet is due to MDT on March 31st, 2016.

MDT INVOLVEMENT

In the event that state and federal regulations and codes are not available online or additional sources are needed that cannot be accessed via internet, MDT will be asked to provide this information to WTI or refer WTI to the sources that might have the information. The research panel will review and comment on project deliverables consisting of task reports, matrices, and the educational pamphlet.

PRODUCTS

The following is a list of products of this project:

- Task Reports for Tasks 1, 2, and 3;
- A Final Report;
- An educational pamphlet (in electronic format);
- Quarterly progress reports.

IMPLEMENTATION

The results will be used by MDT to work with legislators to improve clarity and consistency of heavy-truck regulations and to educate practitioners and truckers to better understand these regulations.

SCHEDULE

As shown in Table 1, the project will take nine months to complete. Presuming a September 2015 start date, the draft final report and the draft pamphlet will be delivered to MDT on March 31, 2016. Allowing a 2-month period for review and revision of the report and the pamphlet, the project end date will be May 31, 2016.

Table 1: Project Timeline

	Tasks	Sept. 2015 – May. 2016									
		Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	
0	Project Management	█	█	█	█	█	█	█	█	█	
1	Literature Review	█	★ T1 Report								
2	Identifying Disparate Definitions			█	█	★ T2 Report					
3	Recommendation				█	█	★ T3 Report				
4	Final Report					█	█	★ Draft Final Report			
5	Develop Outreach Materials						█	█	★ Draft Pamphlet	★	
									█	█	
									Final Report & Final Pamphlet		

BUDGET

This project is estimated to cost \$34,674. The budget includes all anticipated personnel costs, travel expenses, and indirect costs. In-state travel funds include trips to MDT in Helena for the kickoff meeting, general information gathering/exchange (allowance for up to three trips), and final presentation.

STAFFING

Dr. Yiyi Wang will lead the project. She is an assistant professor of transportation engineering in the Civil Engineering Department at Montana State University and a research associate at the Western Transportation Institute (WTI). While at WTI-MSU, she has contributed to several projects, including the Streamline Transit Ridership Study and a project on the travel decisions of Millennials in rural areas. She led a research study on estimating heavy truck volumes of agriculture production on the Montana highway system, forthcoming in *Transportation Research Record*. While a research assistant at the Center of Transportation Research (Austin, Texas), she made substantial contributions to the development of educational materials for the Texas DOT in a project entitled “Economics of Transportation Systems: A reference for practitioners”, among several other projects on safety and non-motorized transportation. Dr. Wang’s resume is presented in the Appendix.

Other key personnel include:

Karalyn Clouser is a Research Scientist at the WTI-MSU. At WTI, she has successfully assisted with multiple research projects including a MDT project on rural special events and a multiple-DOT project on mobility choices of millennials. Her roles range from proposal development, to in-depth literature reviews, to developing outreach materials and survey questionnaires. With an education background in GIS and planning, she has provided support to the Paul S. Sarbanes Transit in Parks Technical Assistance Center, including developing an organized route network for the Boise district office of the Bureau of Land Management. Mrs. Clouser’s resume is provided in the Appendix.

Fahmid Hossein, Graduate Research Assistant, WTI-MSU, is a Masters student in the Civil Engineering Department of MSU in the area of transportation engineering and planning. He has successfully assisted with one research project on two-lane rural highways for the Oregon Department of Transportation. He has taken several courses in traffic safety, transportation planning, statistics, and GIS. His academic and research background are very appropriate to participating on this project. He will assist with various sub-tasks in the literature review, identification of definition discrepancies, formulation of recommendations, and preparation of all reports.

Administrative and support staff will include:

- Jeralyn Brodowy, Director of Administration and Finance
- Carla Little, Editor, WTI-MSU
- Neil Hetherington, Graphic Designer, WTI-MSU

Table 4 shows the project roles with hours on each task. Both Karalyn Clouser and the student are included on the project because of the large number of codes/provisions that need to be reviewed and evaluated. Support staff includes an editor and a graphic designer. Neil Hetherington will assist with the educational pamphlet, and Carla Little will provide editorial support.

Table 4: Summary of Project Roles

Other Commitments

The organizations and individuals assigned to the proposed project will be able to meet all commitments of the proposal. The current commitments to other work during the term of the project are presented in Table 5.

Table 5: Other Commitments of Proposed Staff

Yiyi Wang	Available for MDT Truck Project	30%
Other Commitments	Teaching	40%
	Travel Decisions of Rural Millennials	5%
Karalyn Clouser	Available for MDT Truck Project	50%
Other Commitments	MDT Special Events	30%
	FLTI E-Communications	5%
Fahmid Hossein	Available for MDT Truck Project	60%
Other Commitments	Courses	40%

FACILITIES

The Western Transportation Institute (WTI) is the nation's largest transportation institute focusing on rural transportation issues. The Institute was established in 1994 by the State Departments of Transportation of Montana and California, in cooperation with Montana State University – Bozeman (MSU). WTI has an annual budget exceeding \$7 million and an 85-person multidisciplinary staff of professionals, students and associated faculty from engineering (mechanical/industrial/civil), computer science, fish and wildlife, ecology, business, and economics. WTI has conducted research in more than 30 states, at local, state, and federal levels, as well as conducted international work in Canada, Bulgaria, Norway, Germany, and China.

As a department in the College of Engineering, WTI is also supported by the College and by the umbrella of MSU administrative, academic, and research resources. WTI occupies 27,000 square feet of dedicated space in the Transportation and Systems Engineering Building on the south side of the MSU campus, providing ready access to MSU's library, computing and other facilities. The space includes transportation related laboratories, facilities for archiving, and transmitting data, office space for research and administrative staff, and video and tele-conference capabilities. The researchers at WTI are assisted by a highly qualified group of experienced support staff. Administrative staff members assist with budgeting, procurement, contracts, and accounting. The university provides Extended University services for online educational course development and publications and an Institutional Review Board (IRB) to oversee all research engaging humans.

The proposed work will also be conducted in the Transportation Lab within the College of Engineering. Established in 2004 to support research and instruction in the traffic engineering and the broader transportation engineering area, the lab is equipped with state-of-the-art data collection equipment, ten work stations, and a multimedia conference room. The computers are fully equipped with software necessary to complete this project. All staff members are equipped with office and laboratory computers running Windows 7 or newer, and connected via the University network to a fileserver. The file server is running Windows Server 2008 R2.

No additional equipment will be needed for purchase or lease.

APPENDIX

Yiyi Wang, Ph.D.

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Education

Doctor of Philosophy, Civil Engineering (Transportation) -- University of Texas at Austin

Master of Engineering, Civil Engineering – Beijing University of Technology, China

Bachelor of Engineering, Civil Engineering – Beijing University of Technology, China

Key Qualifications

Yiyi Wang is an assistant professor of transportation engineering in the Civil Engineering Department of Montana State University and a research associate at the Western Transportation Institute (WTI). While at WTI-MSU, she has significant contributions to several projects, including the Streamline Transit Ridership Study and a project on the travel decisions of Millennials in rural areas. While a research assistant at the Center of Transportation Research (Austin, Texas), she made substantial contributions to the development of educational materials for Texas DOT in a project entitled “Economics of Transportation Systems: A reference for practitioners”, among several other projects on safety and non-motorized transportation.

EMPLOYMENT HISTORY

2013.8 – present	Assistant Professor/Research Associate , MSU – WTI, Bozeman, MT
2009.8– 2013.5	Graduate Research Assistant , Center of Transportation Research, University of Texas at Austin
2008.3 – 2008.9	Research Assistant , Polytechnic University of Madrid, Spain
2006.9 – 2009.6	Graduate Research Assistant , Beijing University of Technology, China

PROJECT EXPERIENCE

Assistant Professor, Montana State University

Travel Decisions of Millennials in Rural Areas: Dr. Wang is the co-PI for this project, which aims to provide strategies for transit agencies by studying the travel patterns and preferences of the Millennial population in small urban and rural environment. Millennials-- born between 1983 and 2000-- represent the largest population cohort in the United States. The project is sponsored by the Small Urban and Rural Livability University Transportation Center and pooled funds from several state DOTs.

Estimation of Link-Level Truck Traffic Volume of Agricultural Products: Dr. Wang led this study, which spins off of a project sponsored by MDT. The goal is to estimate heavy truck volumes

associated with agricultural productions across the state's road network and identify locations where traffic counts are under-reported due to seasonal transport of agricultural products. The paper is forthcoming in the *Transportation Research Record*.

Streamline Transit Ridership Study: Dr. Wang served as the faculty mentor for this project, which aims to uncover strategies to improve quality of service and increase ridership of the Streamline bus service. In collaboration with the mobility staff at WTI, the team analyzed survey data to delineate the socio-economic profiles of riders and discuss opportunities to build new routes through map visualization. The project is partially sponsored by the Undergraduate Scholars Program (USP) of MSU.

The Health Impacts of Transportation Accessibility in Small Urban and Rural Communities: Dr. Wang led this project to investigate the physical activity levels and public perceptions of biking/walking facilities by conducting a survey of the residents from three towns (Three Forks, Townsend, and Ennis) in Montana and make recommendations for increasing active travels in rural and small urban communities. The project was sponsored by the Research Experience for Undergraduates (REU) program of the National Science Foundation (NSF).

Graduate Research Assistant, University of Texas at Austin

Economics of Transportation Systems: A reference for practitioners: This project aimed to develop an educational guidebook for practitioners in the transportation domain to understand the economic concepts such as traveler decision making, pricing, and econometric modeling. Dr. Wang had major contributions to this project, specifically in the Chapter of Econometrics and the Chapter of Environmental Impact Analysis. The project was sponsored by Texas DOT.

Estimating Bicycling and Walking for Planning and Project Development: A Guidebook: Dr. Wang assisted with calibrating miles-traveled models for motorized and non-motorized trips. The project was sponsored by the NCHRP.

Quantitative Relationship between Safety & Reduced Roadway Condition Maintenance: Dr. Wang contributed to the crash prediction modeling part for this project, sponsored by Texas DOT.

Dynamic Models for Discrete Responses: Dr. Wang was the research assistant for this project, which aimed to develop an arsenal of tools to unveil the time and space dimensions of transportation data. She developed a host of models for analyzing land use change, including the geographically weighted multinomial logit (GWR MNL) model, the spatial filtering techniques, and area-level models for pedestrian crashes in the Austin region. The project was sponsored by the National Science Foundation (NSF).

HONORS/AWARDS

Faculty Excellence Grant, College of Engineering, Montana State University (2015)
Garrison Award for Best Dissertation in Computational Geography, Association of American Geographers (2014)
Honorary mention in Pikarsky Award for Best PhD Dissertation, Council of University Transportation Center, TRB (2014)
Robert Herman Endowed Scholarship, Department of Civil, Architectural, & Environmental Engineering, UT – Austin (2013)

Women's Transportation Seminar's Heart of Texas Helene M. Overly Memorial Scholarship (2011)

UT Austin's Graduate Student Professional Development Award (2011)

Regional Science Association International's Student Paper Awards Winner (2010)

PUBLICATIONS/PRESENTATIONS

Wang, Y. (2015) The Effects of Socio-Economic and Transportation Accessibility on Area-Level Diabetes Counts: A Latent-Variable Structural Equation Model Approach. Presented at the 94th Transportation Research Board Annual Meeting, January 2015, and submitted for publication at the *Journal of Transport and Health*.

Wang, H., Palm, M., Wang, Y., Vogt, R., and Muller, J. (2015) Evaluating Bicycle Level of Traffic Stress for Predicting Household Demand for Cycling and Walking in Small/Medium Sized Cities. Accepted for presentation at the 94th Annual Meeting of the Transportation Research Board and under review for publication at the *Journal of Transport Geography*.

Forsyth, S., Stephens, J., and Wang, Y. (2015) Link-Level Traffic Flow Estimation of Agricultural Products. Presented at the 94th Annual Meeting of the Transportation Research Board, Washington D.C., January 2015, and forthcoming in *Transportation Research Record*.

Bansal, P., Kockelman, K., and Wang, Y. (2014) Hybrid Electric Vehicle Ownership and Fuel Economy across Texas: Application of Spatial Models. Presented at the 94th Annual Meeting of the Transportation Research Board, Washington D.C., January 2015, and forthcoming in *Transportation Research Record*.

Chen, D., Wang, Y., and Kockelman, K. (2013) Where Are the Electrical Vehicles? A Spatial Model for Vehicle-Choice Count Data. Compendium of the Transportation Research Board's 93rd Annual Meeting, Washington, DC, January 2014. Forthcoming in *Journal of Transport Geography*.

Wang, Y. and Kockelman, K. (2013) A Poisson-Lognormal Multivariate Conditional-Autoregressive Model for Spatial Analysis of Area-Level Pedestrian Crashes. *Accident Analysis & Prevention* 60: 71-84.

Wang, Y., Kockelman, K., & Damien, P. (2013) A Spatial Autoregressive Multinomial Probit Model for Anticipating Land Use Change in Austin, Texas. *Annals of Regional Science* 52(1): 251-278. Presented at the 13th International Association Travel Behavior Research Conference, in Toronto (2012).

Wang, Y., Kockelman, K., & Wang, X. (2013) The Impact of Weight Matrices on Parameter Estimation & Inference: A Case Study of Binary Response Using Land Use Data. *Journal of Transportation and Land Use* 6 (3), November 2013. Presented at the 58th North American Regional Science Association International (RSAI) Conference, Miami, Florida.

Wang, Y., Kockelman, K., & Wang, X. (2013) Understanding Spatial Filtering for Analysis of Land Use Data Sets. *Journal of Transport Geography* 31: 123-131. Presented at the 58th North American Regional Science Association International (RSAI) Conference, Miami, Florida.

Wang, Y., Kockelman, K., & Wang, X. (2011) Anticipating Land Use Change Using Geographically Weighted Regression Models for Discrete Response. *Transportation Research*

Record No. 2245: 111-123, & presented at the 90th Annual Meeting of the Transportation Research Board.

AFFILIATIONS AND SERVICE

Young member of the TRB Statistics Committee (ABJ80)

Member of the Transportation Research Board (TRB) Young Members Subcommittee

Friends of TRB ADB20 Telecommunication & Travel Behavior Committee, Transportation & Air Quality Committee (ADC20), Transportation Economics Committee (ABE20)

Co-advisor of the Institute of Transportation Engineers (ITE) Student Chapter at Montana State University

Faculty mentor for the Montana Apprenticeship Program, MSU

Review service for Transportation Science, Regional Science & Urban Economics, Papers in Regional Science, Transportmetrica, Journal of Public Transportation, Transportation Research Part C, and Transportation Research Record.

KARALYN CLOUSER

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EDUCATION

Bachelor of Science, Earth Sciences; Montana State University, Bozeman

KEY QUALIFICATIONS

Karalyn Clouser is a Research Assistant at the Western Transportation Institute at Montana State University. At WTI, she has provided GIS and planning support to the Paul S. Sarbanes Transit in Parks Technical Assistance Center including developing an organized route network for the Boise district office of the Bureau of Land Management. She has successfully assisted with multiple research projects at WTI including a Montana Department of Transportation project on rural special events and a multiple DOT project on mobility choices of millennials.

EMPLOYMENT HISTORY

2013 – present	Research Assistant , Western Transportation Institute, Bozeman, MT
2012	Volunteer , GPS Service Learning Project, Montana State University, Bozeman, MT
2010 – 2013	Administrative Assistant , Western Transportation Institute, Bozeman, MT

SELECTED PROJECT EXPERIENCE – CURRENT

Montana Department of Transportation Special Events Planning Synthesis: The purpose of this scope of work is for the Western Transportation Institute (WTI) to assist the Montana Department of Transportation (MDT) in documenting existing special event management practices in Montana, identifying the best management practices used across the U.S. that are applicable to Montana, and providing MDT and local governments with recommendations for implementing traffic management strategies for special events. Mrs. Clouser conducted an in-depth literature review of current MDT special events practices and compared them to neighboring states practices, helped prepare a survey of local governments, and will help write the final project report.

Bureau of Land Management Idaho Owyhee Transportation System Development: The objective of this project is to design an organized routes numbering system that facilitates the development of feasible alternatives for the public to access Owyhee County. This project is the first step in the process and will aid the BLM in making decisions about how a route is used and its importance to the system as a whole. This numbering system will allow the Interdisciplinary Team make decisions on an entire route instead of a single segment on a map which drastically reduces workload.

Analysis of the Intercity Travel Network for Creating Livable Small Urban and Rural Communities: Many people in rural and small urban communities have limited transportation options to travel to large, urban areas. This project will analyze demographics in each of the forty-

eight contiguous states, and provide an analysis of the number of rural and small urban communities that have access to intercity bus service. Based on the analysis of this project, further projects (analysis) may be necessary to determine issues in specific states, or to determine overall (national) issues. Mrs. Clouser will be primarily helping with the data mining for this project, and will help prepare a final report for the Small Urban and Rural Livability Center at the Western Transportation Institute.

SELECTED PROJECT EXPERIENCE – PAST

Mobility Mindset of Millennials in Small Urban and Rural Areas: Mrs. Clouser helped conduct an in-depth literature review for this project, which aims to provide strategies for transit agencies by studying the travel patterns and preferences of the Millennial generation in small urban and rural environment. The Millennial Generation, Americans born between the years of 1983 and 2000, are now the largest generation in the United States. This generation has significantly different lifestyle and transportation trends than previous generations which is leading to the need for change in transportation policy and planning.

Streamline Bus System Route Analysis: Mrs. Clouser prepared multiple route maps and geocoded hundreds of Montana State University affiliated addresses and parking permit addresses to help with the analysis current Streamline routes.

Paul S. Sarbanes Transit in Parks Technical Assistance Center: Ms. Clouser assisted senior researchers in conducting literature reviews for technical assistance projects; identifying and summarizing new literature to include in the resource library; and preparing and analyzing online surveys for evaluation of TRIPTAC training, TRIPTAC technical assistance, and alternative transportation system project evaluations at a unit level.

GPS Service Learning: As an undergraduate student, Mrs. Clouser collaborated with seven other students to collect data and create the Lewis Ditch Irrigation dataset for the Association of Gallatin Agricultural Irrigators (AGAI) and the Bozeman GIS Department. Mrs. Clouser performed data collection using a Trimble GeoXH handheld GPS receiver, and edited spatial data in ArcMap to help compile a final dataset that will provide an efficient visual guide for maintenance, planning and water rights, and access for public and private land owners near the Lewis Ditch in Gallatin County.

REFERENCES

Montana Codes Annotated (MCA) URL: http://leg.mt.gov/bills/mca_toc/. Accessed May 21, 2015.

Code of Federal Regulations (CFR) URL: <http://www.ecfr.gov/cgi-bin/ECFR?page=browse>. Accessed May 21, 2015.

Administrative Rules of Montana (ARM) URL: <http://www.mtrules.org/>. Accessed May 21, 2015.

The Association for the Work Truck Industry (NTEA) Are your trucks overloaded? URL: <https://www.ntea.com/content.aspx?id=20194>. Accessed June 22, 2015.