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Identifying A Statistical Model For North Dakota K-12 Public School Transportation Funding By Comparing Fifteen State Transportation Funding Formulas

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IDENTIFYING A STATISTICAL MODEL FOR NORTH DAKOTA K-12 PUBLIC SCHOOL TRANSPORTATION FUNDING BY COMPARING FIFTEEN STATE TRANSPORTATION FUNDING FORMULAS

by

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Chairperson

This dissertation meets the standards for appearance, conforms to the style and format requirements of the Graduate School of the University of North Dakota, and is hereby approved.

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ABSTRACT

The purpose of this study was to review the history of North Dakota K-12 transportation funding system, identify how school districts are reimbursed for transportation expenses, and compare this information with fourteen other state transportation funding systems. North Dakota utilizes a block grant structure that has been in place since 1972 and has remained unchanged except for reimbursement factors used in the mileage and rider statistics collected at the state level. Despite the need for alternative structures that promote efficiency and actual costs, the system remains in its current block grant format.

Each of the 50 states in the United States possess a K-12 transportation structure that coexists with the general state funding formula or is part of the general state budget formula. The funding formulas fall into four basic types of transportation funding. Each structure is reviewed and compared based on the strengths and weaknesses of each method. The choice of structure utilized by each state depends on initiatives regarding transportation funding created by individual state legislatures. As a result, states rely on legislative interpretation and action in designing and revising transportation funding methods.

The study utilizes a multiple regression statistical analysis to generate expected costs for district transportation services provided by North Dakota school districts. The analysis displays the cost/reimbursement ratios present with the current funding system compared with the ratios found with the Expected Cost statistical model. The statistical model promotes the concept of transportation efficiency and better reflecting the actual costs consumed by the school district.

Keywords: North Dakota, school transportation funding, block grant, Expected Cost

CHAPTER I

INTRODUCTION

History of School Transportation

"Yellow school bus transportation is one of the best deals your community receives for their tax dollar" (San Diego Unified, 2011, p. 1). While school bus transportation is viewed as a respectable use of tax payer dollars in terms of safety and value to the education process, America public education started well before student transportation systems were part of public school operations. American public education dates back to the mid 17th century as churches across the nation began to provide education to young students. As public education became an inalienable right of the newly formed democracy and the country slowly expanded westward, school systems began to evolve and become an organized establishment in urban and rural communities. With the evolution of a system of public education, the concept of school transportation became a function of school districts toward the end of the 19^{th} century (National Association of State Directors of Pupil Transportation Services, 2000).

Massachusetts was the first American state to establish an operable pupil transportation program in 1869 (Gray, 2007). In 1886, Wayne Works of Richmond, Indiana produced the first horse drawn "school cars" that were otherwise known as "school carriages" or "school hacks." By 1900, 16 other states had established a public transportation program for students (Gray, 2007). The first actual school bus was manufactured by Navistar and was known as the Model F. The bus was created for the Rivina School District in South Dakota (Gray, 2007). By 1919, all 48 states in the contiguous United States had enacted laws permitting the use of public funds toward the funding of public transportation systems for students (Gray, 2007).

By the 1930s, the country's roadway system was maturing and expanding into rural areas across the United States. However, this expansion resulted to increased focus on roadway safety in the manufacturing and operating practices of school buses. In 1939, representatives from 48 states gathered in the first of 15 conferences known as the National Conference on School Transportation (National Association of State Directors of Pupil Transportation Services, 2000). The primary focus of the national conference was to address recommendations for specifications and other school bus operations procedures. The purpose of the 1939 conference was to formulate a set of recommended standards for school buses of 20 or more passengers (National Association of State Directors of Pupil Transportation Services, 2000). The over 300 delegates of the National Conference on School Transportation convene every five years to address school bus safety and manufacturer issues (National Association of State Directors of Pupil Transportation Services, 2000).

From 1930 to 1980, as transportation expanded and rural areas became more accessible to student transportation, the percentage of all school children transported to school by bus grew annually and at a relatively consistent rate (Killeen & Sipple, 2000). Starting in the mid-1980s, however, the percentage of students transported to school by bus began to decline from a peak of slightly more than 60% of the student population. By 2007, the number of students transported by public expenses represented 55.6% of the total public school population with approximately 25,631,000 students annually (United States Department of Education, 2010).

While federal regulations require local school districts to provide provision of transportation to students as part of special education plans and Section 504 accommodations, beyond that, there is no federal mandate to provide home to school transportation for public education students. Without federal mandate, state obligations vary from state to state and range from no direct payments to complete reimbursement of all student transportation expenses. States could use their own rationale for providing separate payments or simply include transportation costs in the basic per pupil payments generated from the state level (ECONorthwest, 2008). Thus, equity and adequacy issues pertaining funding of individual school districts could impact how a state views its transportation funding system.

Without federal mandate, or in the case of North Dakota, the lack of a state mandate, regarding the transportation of students to school, the reorganization of a school district can provide a local transportation mandate that precedes any state or federal law. In North Dakota, school district reorganization plans must include provisions for student transportation which can mandate specific transportation services be provided by the reorganized school district (Decker, 2004). Transportation costs of reorganized school districts have increased following their reorganization implementations despite the general reorganization goals of efficiency and cost savings (Killeen & Sipple, 2000). Thus, rural school districts that have consolidated and reorganized are at a disadvantage to their larger, non-reorganized counterparts due to the requirements and cost of student transportation services in their school districts and potential transportation mandates.

School bus transportation is still considered a safe mode of transporting students to school each day. There is evidence to suggest that, “There is no safer way to transport a child than in a school bus” (School Bus Information Clearinghouse, 2011, p. 1). With about 450,000 school buses on the roads each year, covering four billion miles travels on 10 billion student trips, schools buses would statistically be subject to a high volume of severe accidents (National Association of State Directors of Pupil Transportation Services, 2000). While bus accidents do occur, they are not common and could be considered rare compared to other transportation methods. Between 1990 and 2000, even though unacceptable, an average of six students died each year in a school bus accident (School Bus Information Clearinghouse, 2011).

School bus safety came to the forefront with the passage of the federal Traffic and Motor Vehicle Safety Act of 1966 and the School Bus Safety Amendments of 1974. Since the legislation passed, 36 Federal Motor Vehicle Safety Standards have been issued applying directly to school buses (National Association of State Directors of Pupil Transportation Services, 2000). Consequently, school buses are statistically one of the safest methods of transportation available in the United States. From 1989 to 2001, less than one third of 1% of all fatal traffic crashes in the United States involved a school bus (North Dakota Legislative Council, 2001). According to the National Safety Council in 1996, yellow school buses are 172 times safer than the family automobile, eight times safer than passenger trains, four times safer than transit buses, four times safer than intercity buses, and eight times safer than scheduled airlines (San Diego Unified, 2011). Therefore, based on their safety records, stakeholders continue to push for school transportation as a legitimate use of school district and tax payer dollars.

Historically, school transportation funding nationally is related to trends in the numbers of students served by transportation services. However, with an increase in the number of students requiring bus transportation over the past few decades, transportation spending per student rose dramatically. The number of students transported during the 1980-1981 school year and 2006-2007 school year was 22,272,000 and 25,631,000 respectively – a growth rate of 15% (United States Department of Education, 2010). Additionally, the average expenditure per student transported during the 1980-1981 school year and 2006-2007 school year was $484/student (adjusted in constant 2007-2008 dollars) and $808/student (adjusted in constant 2007-2008 dollars) respectively – a growth rate of 67% (United States Department of Education, 2010).

Statement of the Problem

Although over 20 billion dollars is spent on school transportation at the federal level, the cost to transport students has grown exponentially and has pushed state funding mechanisms to keep up with the cost growth (United States Department of Education, National Center for Education Statistics, 2010). The total state funding to school transportation for the 2009-2010 school year was $7,299,904,570 (School Bus Fleet, 2011). Transportation expenditures consistently exceed the growth rates for overall student enrollment and the number of students transported by bus to school. School districts across the country are bearing the burden of the costs associated with student bus transportation. The cost burdens associated with the transportation of students are greater in rural areas compared to urban counterparts (Killeen & Sipple, 2000). The disparity in transportation funding for the current block grant system has been reviewed by the state legislature for several years but without any changes. The question remains how transportation funding is related to the equity and adequacy goals established by the North Dakota Legislative Assembly and the formation of the Commission on Educational Improvement in 2006.

State laws across the country mandate compulsory attendance regulations to school age children in an effort to promote the entitlement to a free public education. However, if students are unable to get to and from school due to time, distance, hazards, or any other physical or demographic reasons; they are essentially denied a free education (Brimley, 2012). Consequently, to ensure attendance, school districts assume the responsibilities of getting students to and from school as part of their necessary budget operation (Brimley, 2012). Transportation of students is left to the local schools, and the impact on local school district expenditures varies based on school district demographic factors. Therefore, the operation of a school district transportation system can have substantial ramifications on the educational system due to substantial costs associated with maintaining a school bus fleet (Brimley, 2012).

North Dakota Transportation Funding

K-12 public school transportation funding in North Dakota has remained relatively unchanged in its basic structure and function as a block grant system since the early 1970s (North Dakota Department of Public Instruction, 2010a). Despite some legislative intent to change the current system, the state has consistently reverted back to the current block grant funding method. Until 2010, reimbursement per mile for a large bus was actually less than that about a decade ago. For instance, the 1982-1983 reimbursement was $0.76 per mile with the average cost of a gallon of gas at $1.24

(1980s Flashback, 2011) while the 2008-2009 reimbursement was $0.735 per mile with gasoline and diesel prices peaking over $4.00 per gallon (Meinero & Rooney, 2008).

The North Dakota Legislative Assembly continues to seek guidance on how to appropriately address transportation funding based on district needs while accounting for variances present in district demographic factors across the state. Each district faces unique challenges in providing transportation services, including the density of the student population, the number and type of schools, unique geographic and weather conditions, and other obstacles such as railroads and interstate highways that require the alteration of bus routes.

Purpose of the Study

During the 2009-2010 school year, the percentage of total expenditures utilized for student transportation ranged from 0% to 18% among North Dakota school districts (North Dakota Department of Public Instruction, 2011a). This discrepancy reflects the variety of demographic factors and economic challenges in providing student transportation services by individual North Dakota school districts. The researcher reviewed transportation funding studies performed in Oregon and Washington State used to initiate legislative changes in their respective state legislatures. The researcher applied a statistical model that calculates the expected transportation costs of school districts utilizing transportation factors collected by the Department of Public Instruction from individual North Dakota school districts. Therefore, the purpose of this study was to review the history of North Dakota K-12 transportation funding system, identify how school districts are reimbursed for transportation expenses, and compare this information with other transportation funding systems in fourteen states.

Research Questions

1. To what extent does the current North Dakota K-12 pupil transportation funding system reflect the actual transportation expenditures of North Dakota school districts?
2. To what extent does an Expected Cost model accurately predict the actual transportation expenditures of North Dakota school districts?
3. How does a K-12 pupil transportation funding system based on expected costs, rather than a block grant, provide greater equity and adequacy regarding school district transportation funding levels in North Dakota?

Researcher's Background

The researcher of this study is a practicing superintendent of schools for the McKenzie County Public School District 1 with school buildings located in Watford City, ND. The researcher has been in the superintendent position for six years after previously being employed in the central and eastern portion of North Dakota. The McKenzie County Public School District 1 is significantly impacted by transportation funding due to its physical size and unique topography and provides an example of a rural school district in North Dakota and its transportation demographics.

McKenzie County Public School District 1

The McKenzie County Public School District 1 is located in northwest North Dakota and spans a distance of 1,679 square miles. Comparatively, the square miles of the state of Rhode Island equal 1,214 miles and can easily fit into the size of the McKenzie County Public School District 1 (Rhode Island, 2011). In 1962, 18 school districts in the central and northern portions of McKenzie County were merged in a reorganization plan that consolidated the school districts in McKenzie County Public School District 1 (Reorganization Plan, 1962). In accordance with the reorganization plan, door-to-door transportation services were to be provided to rural children whenever feasible (Reorganization Plan, 1962). With the reorganization, the school district expanded its transportation services accordingly and put emphasis on transportation services for students to access school buildings.

The McKenzie County Public School District 1 average daily K-12 grades membership for the 2010-2011 school year was 611.91 students (North Dakota School District Financial Report, 2011b). Further, the total transportation expenditures for this district during the same year were $831,014.73. The average transportation cost per pupil whether or not the student actually utilized bus transportation for the 2010-2011 school year was $1,358.07 per pupil while the total number of student transportation miles for the same school year was 355,672 miles – equates to approximately 2,080 miles each school day (North Dakota Department of Public Instruction, 2011a). This is about the driving distance from Watford City, ND to Seattle, WA – approximately 1,138 miles or 2,276 miles round trip (Google Maps, 2011). For the 2010-2011 school year, McKenzie County Public School District 1 was accountable for 82,980 rides on the 20 rural bus routes (North Dakota Department of Public Instruction, 2011a). The McKenzie County Public School District 1 does not have a transportation levy and does not charge any transportation fees to its patrons.

The topography of McKenzie County varies dramatically based on the location within the county itself. The Badlands run through the southern portion of the school district and also serve as the change from the Central Time Zone to Mountain Time Zone.

This implies that some students who attend Watford City Elementary School or Watford City High School, which are located in the Central Time Zone, reside in the Mountain Time Zone. The farthest distance from the school buildings in the district to any student residence is approximately 50 miles and the longest ride time length in the school district is 100 minutes per run (North Dakota Department of Public Instruction, 2011a). The Badlands also provide challenge to bus transportation as the steep terrains make it nearly impossible for bus transportation during certain weather conditions.

The McKenzie County Public School District 1 is also in the midst of an oil boom in the Williston Basin of North Dakota. The high volume of oil traffic greatly impacts the transportation system with the adverse conditions of rural roads and the general truck traffic issues. The ability to recruit new drivers is also challenged by the oil field wages for drivers possessing a Commercial Driver's License in competition with the applicants for open bus driving positions.

Significance of the Study

The North Dakota state K-12 funding system was overhauled during the 2007 Legislative Assembly spurred by the stay in litigation that occurred in 2006 (School Funding, 2008). Whether or not the new system truly offers equity and adequacy in school funding across the state remain to be seen. Nevertheless, an effort to improve a funding formula that existed for several years was demonstrated. North Dakota, since its initiation of public school transportation payments to school districts, has enacted a block grant system that does not address actual costs obtained by school districts or maintain an established level of state cost share funding for school districts. While the state has expressed interest in a transportation funding system that provides incentives for school district efficiencies, no such system has been implemented for North Dakota school districts (North Dakota Legislative Council, 2004).

Transportation funding is an issue for North Dakota rural school districts and it is essential the state avoid penalizing school districts because of the geographical location by ensuring a disproportionate amount of local funding is not required to provide transportation services as part of a quality educational experience. Despite having no funding method that is considered a best practice across the nation, acceptable funding systems should recognize differences in geography, topography, and student population density. Identifying acceptable and appropriate funding formula would provide the North Dakota legislative assembly the options to pursue an equitable and adequate level of state funding for K-12 pupil transportation expenditures for North Dakota school districts.

Delimitations

This researcher recognizes that no one funding formula is considered a universal best practice for all states or local districts. However, acceptable funding formula should reflect the transportation goals of the state and ensure demographic variances are taken into consideration. There is limited research on this topic despite some information available from recent education and transportation funding studies. There is also limited research literature on this topic since comparisons of state funding systems or methods of improving transportation funding are mostly provided on a state-by-state basis. For the purpose of this study, the researcher utilized study information available from individual states that have recently addressed their K-12 student transportation funding systems as a foundation for research information.

Assumptions

The data utilized in this study is limited to the public finance facts that are provided to the Department of Public Instruction (DPI) by North Dakota school districts. The researcher assumes the data provided to the Department of Public Instruction is accurate and correctly documented by each school district in North Dakota. The researcher also assumes the Department of Public Instruction accurately reports the data provided by school districts.

Definitions/Acronyms

The definitions provided in this section are based on educational leadership professional practice and commonly accepted definitions in the educational field.

Adequacy: A level of funding that provides for the basic needs (transportation) of the district and its students; sufficient resources to meet the transportation policies and goals of the school district (Illinois State Board of Education, 2011).

Average Daily Attendance (ADA): A school funding statistic that represents the total number of days students are in attendance in a school building, divided by the total number of school days in a given period (Education, 2011).

Average Daily Membership (ADM): A school funding statistic that represents the aggregate student enrollment (membership) during a reporting period divided by the number of days the school is in session during the period (National Center for Education Statistics, 2011).

Block Grant: A form of grant distribution that is provided equitably to all school districts and does not account for variances in school district demographics in its distribution.

Class A/Class B school: Classification system used in North Dakota for extracurricular activities that is based on school enrollments. A Class A school district has greater than 325 students in grades 9-12; a Class B school has fewer than 325 students in grades 9-12 (North Dakota High School Activities Association, 2011)

Commission on Educational Improvement: Committee established by the North Dakota Legislative Assembly following the stay in a lawsuit brought against the state regarding the equity of the public school funding system. The Lieutenant Governor was appointed the chair of the committee with the other members appointed by the governor.

Constitutional Obligation: An initiative that is written in the constitution of a state or federal government and mandates a service to be provided to a political subdivision.

Department of Public Instruction (DPI): State agency responsible for the supervision and administration of public education services within a state.

Efficiency: The ability to utilize resources, at the lowest cost possible, and meet the needs (transportation) of the students and the school district.

Equity: The amount of variance in the per-pupil expenditures (transportation) from school district to school district and the revenue capacity of the school district to provide transportation services (Federal Education Budget Project, 2011).

Expected Cost Model: A statistical model utilizing multiple regression analysis to predict expected transportation expenditures for individual school districts based on transportation related demographic variables.

Hold harmless: The concept of ensuring a school district does not lose funding based on a legislative initiative.

K-12: Inclusive of grades Kindergarten through Grade 12 of a typical secondary school setting.

Local control: The ability of the local school district to make decisions regarding transportation operations and use of funds without the restrictions of state or federal mandates.

Midwest: A region of the United States that represents the following states: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin (NCES, 2011).

Multicollinearity: Situation in which two or more variables in a multiple regression model are highly linearly related.

Natural Logarithm: A logarithm in which the base is the irrational number *e*; which equals approximately 2.71828 (Answers, 2011).

Non-essential: A factor or component that is not required for the basic level of services (transportation) required or mandated by the state or school district.

North Dakota Legislative Council: The association responsible for legislative management and is involved in the organization of legislative studies, meetings, and activities that occur during the interim between legislative sessions (North Dakota Legislative Branch, 2011).

North Dakota Legislative Education Committee: A committee appointed by the House of Representatives and the Senate to hear testimony regarding education legislation and determines if a proposed legislative bill will reach either floor for a vote.

North Dakota Small and Organized Schools: Organization of North Dakota school districts with a mission to address issues specifically related to small, rural school districts. During the 2010-2011 school year, 91 school districts belonged to the group (North Dakota Small and Organized Schools, 2011).

Per pupil payment: Financial payments made to school districts from the state based on the number of students in the school district at a particular point during the school year.

Poisson Distribution: Variable distribution that is not normal or symmetrical, but is skewed in its distribution and typically to the left (Business Dictionary, 2011).

Pupil Density: A factor representing the amount of students (riders) in a particular area. Pupil density is generally low for a rural school district and high for an urban school district.

Reorganized school district: A reorganized school district combines and/or consolidates geographically neighboring school districts into one school district based on declining enrollments and efficiency factors.

Transportation Funding Systems: Funding provided from the state level to offset the costs associated with school district student transportation. Systems can range from no state funding to 100% funding from the state level for transportation expenses.

Transportation Revenue Control Limit (TRCL): Arizona education finance reform variable intended to provide a method for local school districts to raise funds for transportation costs not supported by the Transportation Supportive Limit factor.

Transportation Supportive Limit (TSL): Calculated by taking the miles to and from school and multiplying by the state level support per mile plus allowances for athletics and other activities and used in the Arizona transportation funding system.

Variance Inflation Factor (VIF): Quantifies the severity of multicollinearity and in an ordinary least squares regression analysis.

Washington Administrative Code (WAC): Codifies the regulations and arranges them by subject or agency for the Washington legislative assembly.

Weighting factor: Funding mechanism used to establish the amount of funding provided to school district that accounts for a portion of the base amount and promotes equity in school district funding.

Summary of Successive Chapters

Chapter II examines, in the first section, current literature available regarding the field of K-12 school district pupil transportation funding systems and their use in the funding of K-12 public education pupil transportation services. Additionally, the researcher reviews the types of transportation funding systems found across the country. A second section explores K-12 pupil transportation funding systems utilized by 14 states and represents the various funding structures present today. The Midwest states share common characteristics regarding rural population and demographics relevant for comparison with the North Dakota system. A third section identifies examples of state K-12 transportation funding systems found under each of the four main categories and philosophies behind transportation funding mechanisms. The final section of Chapter II provides two state school transportation funding system studies completed in the past five years to illustrate how other states have formally addressed issues with adequacy and efficiency in transportation funding systems.

Chapter III explores the methodology used to complete the study while Chapter IV provides the findings of this study. These findings are drawn from a statistical analysis of the school transportation data from North Dakota school districts during the 2009-2010 school year. In Chapter V, the researcher provides summary, conclusions, and recommendations for possible future action based on the study findings.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter contains a summary of information obtained from a review of literature pertinent to this study. The chapter organization is based on four interrelated topics. The first section reviews the funding mechanisms of K-12 pupil transportation systems across the country and the advantages and disadvantages of each system. The second section addresses transportation funding system of North Dakota and the states adjacent to North Dakota and within the Midwest demographic. The third section explores state systems within each of the four main funding mechanism areas and how it is implemented in each unique state system. The final section describes two major studies in Oregon and Washington State that addressed state funding of K-12 public school districts transportation systems within the past five years.

State Transportation Funding Structures

An ongoing debate surrounding the state transportation funding of K-12 public schools is how to ensure equity and adequacy of the funding mechanisms in place. It is generally difficult to find one system that addresses the unique needs and demographics of all school districts in a state. As a result, there is likely no one way to fund education that will provide equality and adequacy to all schools while taking into consideration all external factors that affect the cost of educating students in a specific area or region. The same could be said of the state transportation funding systems for K-12 public schools.

However, states have adopted philosophies or separate funding structures through which school districts receive their transportation reimbursements.

In 2006, the Washington State Legislative Assembly mandated a Joint Legislative Audit and Review Committee to conduct a survey to examine the transportation funding structure used by each state across the 50 states. Five states did not provide direct funding for K-12 student transportation systems. The responsibility for student transportation in those states lay with the local district and the state funds based on student payments needed to be allocated for transportation costs as seen fit by the local district (Joint Legislative Audit and Review Committee, 2006). No portion of the funding was based on transportation factors of any kind.

The report identified four main methods (Pure Block Grant, Approved Cost, Per-Unit Allocation, and Predictive or Efficiency-Driven Formula) with different purposes, from partially or fully offsetting the costs of transportation to encouraging efficiency in bus transportation operations. Each of the four funding systems identified reflected individual state goals and objectives and their involvement with local school districts in regards to financial, political, or operational environments. The broad methods were frequently customized to address unique demographics and environmental issues in every state (Joint Legislative Audit and Review Committee, 2006).

The Pure Block Grant funding method refers to a system where funding for transportation is provided as part of the foundational per student grant given to school districts; a portion of a state's annual student allocation is intended to offset a portion of the costs of student transportation. At the time of the survey, 13 states used this method (Joint Legislative Audit and Review Committee, 2006). However, three of the states provided transportation funding related to only special education services. This method is used by states with geographically diverse demographics and characteristics. It does not account for efficiency, and funding practices are left up to the local school district.

The Approved Cost funding method supports reimbursement for specific costs that are associated with student transportation programs. This method recognizes differences in site demographics and the differences in costs associated with those factors. There are two basic approaches to the approved cost method. In the first approach, the state reimburses districts for all or a percentage of the approved costs reported. The costs reported could vary from bus driver salaries to general maintenance costs. The second approach is a limited reimbursement that is based on the statewide average costs of student transportation. Seven states use an approved cost method for student transportation funding with their own list of approved costs and reimbursement standards (Joint Legislative Audit and Review Committee, 2006).

The Per-Unit Allocation funding system provides a fixed amount of funding for a specific unit of service. States that use this method typically allocate transportation funds based on a per mile or a per student basis. Twelve states use the per-unit allocation method as part of their transportation funding systems with Hawaii state using a different unit known as a per ride value as part of the per-unit allocation system (Joint Legislative Audit and Review Committee, 2006).

The Predictive or Efficiency-Driven Formula method is designed around the idea of efficiency and is geared toward promoting district behaviors that reduce costs and improve operational efficiency. The funding levels for this method are determined based on the wealth of the school district or others using a statistical model to help predict costs for the school district. This cost is based on multiple factors that would include district density, bus occupancy, geography, number of students transported, and miles driven. States using this method often fund districts based on predicted cost levels established by a predetermined level of efficiency. This method provides funding based on a district's performance relative to the most efficient district in the state. Thirteen states use a predictive or efficiency-driven formula for funding their student transportation systems with significant differences found in the type and complexity of the statistical models used to determine efficiency (Joint Legislative Audit and Review Committee, 2006).

Despite having no funding method that is considered a best practice across the nation, it is important to have common criteria toward assessing school transportation funding goals in every state. The aforementioned study conducted in Washington State used the following six criteria to evaluate K-12 public school transportation funding methods:

1. Does the funding method reflect the actual costs of providing to/from transportation?
2. How easy is the method to implement and administer?
3. Does the method promote efficient use of state and local resources?
4. Does the method maintain local control?
5. Is the method easy to understand?
6. Does the method result in predictable levels of funding?

   (Joint Legislative Audit and Review Committee, 2006, p. 33)

Each funding method offers certain strengths and weaknesses in response to addressing the criteria questions. Table 1 provides a summary of how each funding method addresses the criteria questions listed above.

Table 1

Funding System Evaluations Based on Evaluation Criteria

Evaluation Criteria	Pure Block Grants	Approved Cost Funding	Per-unit allocation	Predictive/Efficiency Formula
Reflects Actual Costs	Negative	Positive	Neutral	Neutral
Ease of Implementation/Admin	Positive	Positive	Positive	Negative
Promotes Efficient Use of Resources	Negative	Neutral	Negative	Positive
Maintains Local Control	Positive	Positive	Positive	Neutral
Easy to Understand	Positive	Positive	Positive	
Predictable Levels of Funding	Neutral	Neutral	Positive	Positive

(Joint Legislative Audit and Review Committee, 2006)

The pure block grant receives three positives, two negatives, and one neutral point using the evaluation criteria. The block grant does not necessarily reflect actual costs as it is often part of a foundation payment program and not directly related to transportation expenditures. The block grant is extremely easy to implement and administer with minimal record keeping and reporting oversight. The block grant does not include any factors of efficiency in its formulation and could be considered a valid funding formula in terms of local control as local districts decide operations and efficiencies without state approval or input. The block grant is generally easy to understand since it incorporates limited factors, and while it is predictable in terms of state funding, local school districts may deem it unpredictable as demands for other services may change from year to year (Joint Legislative Audit and Review Committee, 2006).

The approved cost method might be considered the best option to assess actual costs states reimburse based on actual costs that are found on an approved cost items list. The approved cost method promotes some efficiency, especially in those states that use statewide averages to determine reimbursement percentages. Local control is strong for an approved cost model as district operating practices are not the basis for determining funding amounts. It is easy to implement once an approved cost reimbursement list is provided. Even so, it is not a predictable method for states as reimbursement is correlated to costs. However, school districts may deem it as predictable since they are aware of the items that will be reimbursed (Joint Legislative Audit and Review Committee, 2006).

The per-unit allocation is generally easy to implement since a limited amount of recordkeeping is required. The structure also provides local control as funding amounts are not based on district operative practices. Even so, the per-unit allocation funding structure generally fails to account for operational costs for individual districts and does not promote efficiency. However, the per-unit allocation stays constant regardless of the efficiencies in the transportation system. The predictability of the per-unit allocation is high for both the state and local district as the reimbursement is directly related to the change in the factors themselves (Joint Legislative Audit and Review Committee, 2006).

The predictive or efficiency-driven formula is better designed to attain efficiency and not reimbursement for actual costs. Given that most funding methods are designed to reimburse at less than actual costs, this formula could be used to fund districts on actual or predicted costs. The greatest downfall of this funding method is the difficulty in administering and understanding the formula – a high level of state involvement and oversight is often required with this structure and a greater dependence on local reporting and record keeping procedures. However, this method has the ability to promote and encourage transportation program efficiencies as state funding is reflected in such practices. Local control can be limited in this approach as statistically expected operational practices dictate funding levels rather than actual expenses. The predictive factor of this method is difficult to understand and could be very high at the state level even with the established reimbursement rates and efficiency benchmarks (Joint Legislative Audit and Review Committee, 2006).

In summary, there is no answer to the question regarding best practices for transportation funding. This is not surprising given that the consultants in the Joint Legislature Audit and Review Committee were unable to determine a universal formula that will work for each individual state. The Committee, in its report, stated the following:

> Based on an extensive review of funding practices nationwide, our consultants determined that there are no best practices in funding methods, but there are best operating practices that can potentially be used in any of the funding methods. Best practices in funding methods do not exist because, as mentioned earlier, each state's method reflects its unique political, financial, and operational climate as well as its own goals for funding transportation. However, any funding method should recognize the differing burdens presented by geography, topology, and density. (Joint Legislative Audit and Review Committee, 2006, p. 51)

The best practices that could promote efficiency in operations and the use of resources in transportation funding systems could be described in four categories. The first category is eligibility requirements. Eligibility requirements are common in state transportation funding structures and assist in the goal of efficiency. Many states have a requirement that students are eligible for transportation if they live further than one to two miles from school and must utilize the shortest roadway route. In some stances, the shortest route is not the most feasible route, and states have procedures for auditing the process used by school districts (Joint Legislative Audit and Review Committee, 2006).

States frequently establish bus capacity utilization factors that target a percentage of available capacity for buses used on a regular basis. In some cases, 80-90% of available capacity is used to plan for the number of students eligible for transport services. While this approach could be perceived as a best practice, it poses challenges to rural school districts that have a smaller number of students spread over a larger physical area (Joint Legislative Audit and Review Committee, 2006). A different practice involves route pairing, and allows a bus to be used at multiple times of the school day. For example, a bus could be utilized to transport students to the elementary school and immediately following, transport students to the high school. Route pairing would reduce available bus needs and reduce costs with maintenance and bus driver salary (Joint Legislative Audit and Review Committee, 2006).

Seating guidelines are also used in many states and three states actually use them in their funding formulas (Joint Legislative Audit and Review Committee, 2006). The guidelines basically account for the seating capacity differences involved with elementary students and middle school or senior high students. For example, a bus may have a manufacturer capacity of 47 passengers, but if that bus is used for strictly high school students, the realistic capacity is closer to 32 students. It is common to expect three elementary students and two high school or middle school students per seat (Joint Legislative Audit and Review Committee, 2006).

Table 2 provides a summary of the 15 states reviewed in this chapter. It displays the positives, negatives, and neutral aspects of the state funding formula based on the funding formula criteria shared in this chapter.

Table 2

Summary of State Ratings Compared to Funding Formula Criteria

Summary of State Funding System Positive/Negative/Neutral ratings based on the funding system criteria:							
State	Method	Reflects Actual Costs	Ease of Implementation	Promotes Efficient Use	Maintainls Local	Easy to Understand	Predictable Levels
	of Funding		Administration	of Resources	Control		of Funding
North Dakota	Block Grant	Negative	Positive	Negative	Positive	Positive	Neutral
Minnesota	Block Grant	Negative	Positive	Negative	Positive	Positive	Neutral
Montana	Per-Unit	Neutral	Positive	Negative	Positive	Positive	Positive
South Dakota	Block Grant	Negative	Positive	Negative	Positive	Positive	Neutral
Wyoming	Approved Cost	Positive	Positive	Neutral	Positive	Positive	Neutral
Colorado	Per-Unit	Neutral	Positive	Negative	Positive	Positive	Positive
Wisconsin	Per-Unit	Neutral	Positive	Negative	Positive	Positive	Positive
Iowa	Block Grant	Negative	Positive	Negative	Positive	Positive	Neutral
Arizona	Per-Unit	Neutral	Positive	Negative	Positive	Positive	Positive
North Carolina	Predictive	Neutral	Negative	Positive	Neutral	Negative	Positive
Indiana	Block Grant	Negative	Positive	Negative	Positive	Positive	Neutral
California	Block Grant	Negative	Positive	Negative	Positive	Positive	Neutral
West Virginia	Approved Cost	Positive	Positive	Neutral	Positive	Positive	Neutral
Oregon	Approved Cost	Positive	Positive	Neutral	Positive	Positive	Neutral
Washington	Per-Unit	Neutral	Positive	Negative	Positive	Positive	Positive

History of North Dakota Transportation Funding and Litigation

Since it became the 39th in 1889, North Dakota has been a rural state with an economy heavily based on agriculture. Wide open prairies and small farmsteads marked the landscapes of early North Dakota while small township schools serving students in the rural areas minimized the need for student bus transportation. During the 20th century, the larger farms and migration of population to urban areas led to land consolidation in rural areas of North Dakota. From 1950 to 1980, the number of school districts across the country went from 83,642 to 15,987 (Kenny & Schmidt, 1994). North Dakota also followed the national trend that marked a substantial decline in the total number of school districts. In the fall of 2009, the number of school districts in North Dakota totaled 185 districts (North Dakota Department of Public Instruction, 2010b).

As the one-room schoolhouses became vacated and school district physical size grew larger during the later part of the 20th century, so was more focus placed on bus transportation of students to school on a daily basis. School districts also began pursuing reorganization agreements with neighboring districts to address declining enrollment. Agreements are required, due to the changes in physical size of the school district, to specifically address bus transportation and how the service would be provided for the new district by (North Dakota Century Code, 2011). Further, in order to change any aspects of the reorganization agreement, a vote of the school district patrons is required.

The terms of any agreements remain in place today for many school districts that have experienced reorganization patterns in its history and mandate the terms in which a given school district currently provides and operates its school transportation system. Despite the lack of a state mandate regarding school transportation in North Dakota, the fact school districts must include provisions for student transportation in reorganization plans creates a variety of individual school district commitment levels to student transportation (Decker, 2004).

North Dakota transported 38,371 students over 20,891,084 miles to school each day during the 2009-2010 school year, at a cost of $42,995,588 (North Dakota Department of Public Instruction, 2010a). The average cost per pupil was $1,120.52 and the average cost per mile was $2.06 (North Dakota Department of Public Instruction, 2010a). Based on the 93,715 North Dakota students enrolled in K-12 public education during the 2009-2010 school year, approximately 41% of students in the state rely on school transportation to access education services (North Dakota Department of Public Instruction, 2010a)

State funded transportation payments for North Dakota school districts began during the 1972-1973 school year. The initial system was based on a per-mile reimbursement from the North Dakota Department of Public Instruction. The 1972-1973 payment was $0.07 per mile for small buses and $0.16 per mile for large buses. During the 1977-1978, a per-pupil day payment was initiated at $0.15 per pupil bus rider. By the 1982-1983 school year, the payments increased to $0.38 per mile for small buses, $0.76 per mile for large buses, $0.19 per pupil day, and family and in-city reimbursements were initiated at $0.10 per mile for family transportation and $0.095 per ride for in-city bus routes (North Dakota Department of Public Instruction, 2010a).

During the 1988-1989 school year, school district transportation payments were reduced to $0.34 per mile for small buses and $0.70 per mile for large buses due to a state general fund revenue shortage. There was further reduction during the 1989-1990 and 1990-1991 school years to $0.25 per mile for small buses and $0.65 for large buses due to a voter ratification involving the referral of sales and income tax increases (North Dakota Department of Public Instruction, 2010a). The tough economic times of the late 1980s and early 1990s, posed a major setback to the North Dakota school transportation funding, and drew more attention to other general school funding structures.

In 1993, Bismarck Public School District 1 filed a lawsuit against the state of North Dakota regarding the equity of the school funding formula. As part of the litigation process, the Superintendent of Public Instruction presented *A Plan Providing Educational Equity for North Dakota Students* on March 15, 1993 (North Dakota Legislative Council, 1997). It was recommended that a sound transportation funding plan be established and revise the current one that involved reimbursement based on student population density factors related to the number of students transported per square mile. The six categories formed would each have a weighted factor assigned to determine the portion of the foundation payment utilized for each student transported (North Dakota Legislative Council, 1997). Following the victory by the state over the lawsuit brought to the North Dakota Supreme Court, the plan created by the Superintendent of Public Instruction was not implemented into policy.

During the same legislative session, SB 2432 was presented to the North Dakota Legislative Assembly and introduced a new factor in school transportation funding. The bill set transportation reimbursement at $0.35 per mile plus 50% of the difference between the mileage reimbursement and the transportation operating expenses reported by the school district to the Superintendent of Public Instruction for the most recent year, plus the five-year average of transportation equipment (North Dakota Legislative Council, 1997). Reimbursement was also set to be capped at 70% of actual costs. However, this bill was defeated in the Senate during the 1993 legislative session.

The 1993 North Dakota legislative session changed one aspect of school district transportation funding. HB 1003, the governor's budget, was passed and for the first time introduced a cap for state reimbursement to school districts. The cap was established at 90%, which ensured school districts would not receive more than 90% of their reported transportation costs to the Department of Public Instruction (North Dakota Legislative Council, 1997). Proposed changes to school transportation funding continued in 1995 with further legislative action. The North Dakota Legislative Assembly passed SB 2059 which added in-city reimbursement per mile and confirmed the 90% cap initiated during the 1993 session (North Dakota Legislative Council, 1997). The in-city rate was set at $0.25 per mile. The 90% cap has been in place since 1995 and is still part of North Dakota Century Code (North Dakota Department of Public Instruction, 2010a).

The 1997 Education Committee reviewed a project from North Dakota State University (Data Envelopment Analysis Project) that proposed a method for ensuring greater efficiency of school district transportation (North Dakota Legislative Council, 2002). This proposal involved an analysis of comparable operating units in which all North Dakota school districts would be divided into categories or peer groups that have comparable circumstances such as administrators, drivers, mechanics, repairs, and fuel. The proposal used a mathematical formula to analyze the relative efficiency of each district compared to other districts in its category. The ultimate funding would be based on operational costs of the most efficient district in each category. The formula would be used to determine funding as well as be used as a tool for districts to measure their efficiency in establishing bus routes (North Dakota Legislative Council, 2002).

During the 1997 North Dakota Legislative Assembly, Senate Bill 2032 was established which called for an appropriation of $50,000 to the Superintendent of Public Instruction for the completion of the Data Envelopment Analysis Project (North Dakota Legislative Council, 2002). The committee believed that this project had the potential of replacing the current formula for determining transportation payments to school districts. The committee recognized large payment differentials between districts having seemingly similar demographics. The bill passed and the allocation was provided. However, no additional appropriations were made to the project during the 1999 and 2001 North Dakota legislative sessions (North Dakota Legislative Council, 2002).

In 2003, the 58th North Dakota Legislative Assembly eliminated all statutory reference to the transportation funding system, effective July 1, 2007, and provided that all school districts are given a block grant equal to the amount they received from transportation funding during the 2001-2003 biennium. Additionally, the Legislative Assembly appropriated $50,000 for completion of the Data Envelopment Analysis Project that was geared to provide a viable and equitable method of funding K-12 public school transportation (North Dakota Legislative Council, 2004). The appropriation was also meant to allow the 2005 Legislative Assembly to consider this as a potential new funding system (North Dakota Legislative Council, 2004).

Following the 2003 Legislative Assembly, the Education Interim Committee heard and recommended House Bill 1033 which would require the Superintendent of Public Instruction to use Data Envelopment Analysis as the basis for calculating school district transportation payments (North Dakota Legislative Council, 2004). There were concerns that 75 districts and 125 district would gain and lose money respectively under the new formula. The bill, therefore, provided a phase-in process of holding harmless the school districts that would lose money and provide time to address the inefficiencies that existed with the new formula (North Dakota Legislative Council, 2004).

In 2005, HB 1033 was re-introduced during the 59th Legislative Assembly by the Legislative Council and the Education Committee. The bill would introduce a data envelopment analysis as part of the transportation funding system; however, it failed to pass and did not become policy due to concerns regarding its lack of simplicity and understanding by practitioners. The legislature reverted back to the block grant system with HB 1013 utilizing an allocation of $33,500,000 over the biennium with the second year of the biennium providing the same allocation as the 2005-2006 school year (North Dakota State Government, 2005).

In 2009, the Education Committee heard testimony from the North Dakota Small and Organized Schools association that called for an influx of money into the student transportation payment system. The association bought attention to the fact the 1982-1983 funding of $0.76 per mile was greater than the 2008-2009 allocation of $0.735 per mile. If a simple 3% inflation factor was applied to the state funding level of 1982-1983, the allocation for school transportation payments would be nearly three times the 2007-2009 biennium allocation of $33,500,000.00 (North Dakota Legislative Council, 2007).

The 61st Legislative Assembly responded with passing HB 1400 which allocated an additional $10,000,000 to transportation funding for a total of $43,500,000 with an additional $5,000,000 distributed based on fiscal trigger points (North Dakota Legislative Council, 2009). The school district reimbursement was increased to $0.92 per mile for rural and in-city students transported by a bus with a capacity of 10 or more students, $0.44 per mile for those transported by a bus with a capacity less than 10 students, and $0.24 for one-way trips. The average cost of transporting a student in 2008-2009 was $2.03 per mile (North Dakota Department of Public Instruction, 2009).

The 62nd Legislative Assembly addressed transportation funding with SB 2150. The bill includes an increase of $5,000.000.00 to the block grant payment system that would bring the reimbursement to $1.03 per mile for large buses with a capacity greater than 10, $0.46 per mile for vehicles with a capacity of less than 10, $0.46 per mile one-way, and $0.26 per student for each one-way trip (North Dakota Legislative Council, 2011). For the 2009-2010 school year, the cost of transportation was $2.06 per student and the state reimbursement provided 44.6% of the reported school district transportation operational costs (North Dakota Department of Public Instruction, 2010a).

Litigation

The nature of transporting students to school was brought to the forefront when a family sued Dickinson Public School District regarding the constitutionality of charging a fee for bus transportation. The case reached the United States Supreme Court and the language provided in the opinion of the court serves as precedence regarding the mandatory nature of school transportation (United States Supreme Court, 1988). Another issue addressed by the North Dakota State Legislature is the reorganization of school districts. Under North Dakota statutes, school districts are authorized to “reorganize” themselves into larger districts under the rationale of efficiency but provide provisions for transporting students to and from their homes However, Dickinson Public School District is not a reorganized school district. In 1973, the Dickinson School Board instituted a door-to-door bus service and began charging a fee for such transportation. In 1979, North Dakota enacted a statute authorizing non-reorganized school districts to charge a fee for school bus service, not to exceed the district’s estimated cost of providing the service (United States Supreme Court, 1988).

In 1985, Mrs. Kadrmas refused to comply with a fee charged for school transportation services and began transporting her daughter, Sarita, to school privately. She later sought legal action to prevent the district from charging a transportation fee. The case was brought before the North Dakota Supreme Court and the court upheld the 1979 statute on the basis it did not violate state law or the Equal Protection Clause of the Fourteenth Amendment. The appellants contended the statute unconstitutionally discriminates on the basis of wealth (United States Supreme Court, 1988). The United States Supreme Court upheld the state court decision thereby making it constitutional for a transportation fee to be charged to school district patrons. The United State Supreme Court decision stated that applying the "rational relation test," a state's decision to allow local school boards the option of charging patrons a user fee for bus service is constitutionally permissible (United States Supreme Court, 1988).

The case was vital to the school transportation funding system discussion as it reaffirmed federal constitutional requirements regarding bus transportation. The court stated the federal constitution does not require such service be provided at all, and choosing to offer the service does not insinuate a constitutional obligation to offer it at no charge. Further, the court explained that state encouragement of school districts to provide bus service is a legitimate state purpose. The court believed it was rational for the state to refrain from undermining its objective with a rule that would require general revenues be utilized to support an optional service that would benefit a minority of district families (United States Supreme Court, 1988).

Following the restructuring of the K-12 school funding formula during the 2007 legislative session and the passing of HB 1400, North Dakota hired a consultant to address the second half of the equity and adequacy goal established with the settlement of the lawsuit brought forth by Williston Public School District 1 in 1996. Lawrence O. Picus and Associates prepared a substantial study of the North Dakota funding system to report back to the 2009 Legislative Assembly regarding the goal of adequacy in the funding of elementary and secondary education in North Dakota. In this extensive study, transportation costs were not included in the final recommendations to the state. The report stated that:

> Transportation is not included in the net educational costs … if a state does not pick up 100% of the transportation costs, it would be necessary to allow districts to raise the dollars needed to pay their transportation costs . . .The cost recommendation in the report is based on the use of all dollars and resources available to schools . . . the recommendations in the report allow for the use of all those dollars in the most effective and efficient manner possible. (North Dakota Legislative Council, 2008, p. 2)

Shortly after the report was shared with the Education Committee, the curriculum, class size, diploma, and transportation sub-committee met on September 24, 2008 to discuss the study results. The meeting notes provided from that meeting stated that:

> The sub-committee talked about transportation issues for districts. It was noted that the main reasons that transportation funding has lagged included:
> 1. Issue with the quality of data that is reported.
> 2. Not a constitutional requirement.
> 3. Deemed a nonessential part of the "instructional costs" of education. (North Dakota Legislative Council, 2008)

North Dakota Transportation Funding System Today

Despite a need for change being noted on many levels, actual change to the methodology or philosophy behind K-12 public school transportation funding has yet to be accomplished. During the 2009-2010 school year, North Dakota had 185 school districts with physical sizes ranging from seven square miles to 1,679 square miles (North Dakota Department of Public Instruction, 2010b). The school districts vary in geography from the rugged terrain of the western portion of the state to the flat, agricultural rich land found in the eastern portion of the state. The density of the school districts also vary and are generally higher in the eastern, more populous, portion of the state compared to the western half of North Dakota. The larger school districts may or may not provide transportation to students due to their relative small geographic area and population density. However, smaller enrollment districts with large district boundary areas may find it essential to provide transportation to students to ensure higher attendance rates and quality of education controls.

North Dakota's current K-12 pupil transportation funding system is a block grant system. The Department of Public Instruction requires school districts to submit transportation data to the state by June 30 of each school year. The data is representative of the previous school year student transportation statistics. The state collects information in two basic reports. The transportation route report requires a school district to enter the following information regarding the district school bus routes: route number, route type, vehicle type, license number, vehicle capacity, total runs, total rides, total miles, rides per run, miles per run, and maximum ride time. The vehicle inventory report requires a school district to enter the following information regarding district owned transportation vehicles: license number, type of vehicle, type of ownership, purpose of vehicle, vehicle capacity, year of manufacturer, year purchased, type of fuel, type of transmission, type of communication system, and if equipped to transport special education students (North Dakota Department of Public Instruction, 2010b).

The data collected is used to determine school district funding by legislatively established payment coefficients that are based on the number of miles, students, and size of vehicle. During the 2010-2011 school year, the North Dakota Department of Public Instruction provided each school district a payment of $0.92 per mile for reported bus route miles utilizing a bus with a capacity of 10 or more students and $0.44 per mile for bus routes using a bus with a capacity of fewer than 10 students (North Dakota Department of Public Instruction, 2010a). The 2009 Legislative Assembly unified the payments for both rural and in-city mileage eliminating discrepancies resulting from in-city routes previously being paid a lower reimbursement rate than rural bus routes.

The state also provides payment for family transportation. Family transportation is for school districts that pay families to transport their children to school. For families that transport their children directly to school each day, the school district is reimbursed at a rate of $0.40 per mile, one way only, and the first two miles must be subtracted from the total miles used for reimbursement. For families transporting their children to the nearest bus stop, the rate of reimbursement for a school district is $0.40 per mile; however, the first two miles are not subtracted from the eligible mileage factor (North Dakota Department of Public Instruction, 2010a).

The number of student rides is determined by the number of students that are transported on a daily basis to and from school. The payment provided for daily ridership was $0.24 per student, regardless of rural or in-city routes (North Dakota Department of Public Instruction, 2010a). This factor provides the school district a general payment for the raw number of students that are transported by the school district to school each day. The 90% reimbursement cap restricts a school district from receiving more than 90% reimbursement on the transportation costs reported to the state through its annual district financial report. The number of schools that were restricted state funding due to the reimbursement cap during the 2009-2010 school year totaled nine school districts (North Dakota Department of Public Instruction, 2011a). Of those nine districts, one was a special education unit and the remaining were small districts with an average block grant reimbursement of $42,080.47 (North Dakota Department of Public Instruction, 2011a).

Table 3 represents a sample school district and how the transportation funding system is applied to the school district data submitted to the Department of Public Instruction. The sample district transportation expenditure total is equal to $125,000.

Table 3

North Dakota Transportation Funding Formula Applied to a Sample School District

Block Grant	Rate	Miles	Rides	Total
Small Bus Miles	0.440	5,000.00		2,200.00
Large Bus Miles	0.920	50,000.00		46,000.00
Rural Rides	0.240		11,000	2,640.00
Small In-City Miles	0.440			
Large In-City Miles	0.920	10,000.00		9,200.00
In-City Rides	0.240		3,000	720.00
Family—To School	0.200			
Family—To Bus	0.200	1,000.00		200.00
Not Reimbursable				
Total Reimbursement		66,000.00	14,500	60,960.00
Reimbursement Cap: 90%				112,500.00
Block Grant Total				60,960.00

(North Dakota Department of Public Instruction, 2011a, p. 1)

The actual costs of student transportation for school districts during the 2009-2010 school year averaged $2.06 per mile. The average transportation cost per pupil was

$1,120.52. In comparing the reimbursement rates and the actual costs, the North Dakota student transportation funding system covers only 44.6% of the actual costs consumed by all school districts in the state (North Dakota Department of Public Instruction, 2010a). Since the state funding for transportation costs falls were below the 50% mark, school districts must support a majority of transportation expenses with local or other state general aid revenues. In considering the North Dakota transportation formula in their 2008 study regarding the adequate funding of North Dakota schools, Picus and Associates (2008) made the following statement on the adequacy of transportation funding in North Dakota:

> Since transportation costs vary so greatly across districts, North Dakota should consider keeping transportation separate and funded through a separate formula. In the adequacy context, the reimbursement rate (proportion of costs paid by the state) should be substantially increased. A reasonable argument could be made for the state to fund 100% of estimated transportation costs. If the state funds less than 100%, it should provide a means for districts to raise the local revenues needed to meet their full transportation costs. (pp. 7-8)

The North Dakota K-12 public school transportation funding system is a block grant and the revenue is received in the same nature as the general per-pupil payments from the North Dakota Department of Public Instruction with no verification process in place to ensure the funding was specifically spent on transportation expenses. The North Dakota funding system does not perform well in a reflection of actual costs based on the evaluation of the funding methods criteria. Specifically, North Dakota does not attempt to reimburse for transportation costs based on any actual costs as the flat rate is only based on miles and riders. The actual cost of transportation is available at the state level, but not used in any funding initiatives.

The positives of the North Dakota system are its ease of implementation and high understandability factor. The state can appropriate funds for the system comfortably knowing the allocation will not be exceeded by the actual funding distribution. Local school districts may not, however, be able to predict their actual transportation funding levels as other costs may increase and leave fewer funds available for transportation services. On the other hand, the funding system does not provide any financial incentives for school districts to implement the four efficiency practices. The challenge in a rural state such as North Dakota is the low population density and attempts to run a "full" bus would create bus routes beyond recommended bus route timeframes. Keeping a student on a bus for two hours in an effort to achieve capacity utilization is not conducive to the educational process. Route pairing and seating guidelines are not part of the current North Dakota funding structure and such decisions at the local level are not supported by state transportation funds (North Dakota Department of Public Instruction, 2011a).

The question of whether or not the current North Dakota K-12 transportation system is an effective model for North Dakota schools is one that cannot be answered unless the state clearly establishes its goals for such funding. If the state philosophy is to provide local control to districts and ensure the formula is clear and relatively easy to understand, the current system would generally meet such goals. However, if the goals of the funding structure are to reflect actual costs or provide incentives for school district efficiency, the current funding system fails to meet that. Given that the current system falls short of reimbursing school districts actual transportation costs at a nominal level, opportunities for the state legislature to address this issue would include revising the current formula or providing a dramatic influx of funds into the current formula.

Minnesota Funding System

The Minnesota K-12 pupil transportation system is a block grant system. In 1997, the Minnesota Legislative Assembly agreed to move transportation funding from a categorical transportation expense fund to a general operating fund by including the payments in the total per pupil payment provided to individual school districts (Fitzgerald, 2010). The previous system was a categorical system that provided varying amounts of revenue for each of three different categories of transportation services (Minnesota House of Representatives, 2001). The formula for determining school district transportation revenue in the new system includes multiplying the district's basic per pupil revenue, the adjusted marginal cost pupil unit, and a determined percentage transportation portion of the per-pupil general fund allocation.

In Minnesota, school districts are required by state law to provide transportation to and from school. Public, charter, and non-public students in secondary school who live two miles or more away from school, and elementary students who live one mile or more away from school must be provided with transportation by the school district (Fitzgerald, 2010). School boards have the flexibility to manage the routes, location of bus stops, and the method of transportation used in ferrying the students to and from school. Since 1997, the transportation portion of the per-pupil payment has been linked to the 4.85 percentage factor (Fitzgerald, 2010). For example, the per-pupil payment for Minnesota public schools during the 2009-2010 school year was $5,124, which creates a $248.51 per pupil transportation funding factor based on 4.85% of the general education pupil payment (Minnesota Department of Education, 2009). The school district is not obligated to spend the money on transportation.

The per-pupil payment transportation funding in Minnesota appears to favor the larger school districts with a higher student population density. Additionally, the inclusion of transportation payments in general per-pupil allocation is subject to criticism. Fitzgerald, in his publication, *The Wrong Way: Minnesota School Transportation Disparities* (2010), challenges the disparities present in the current funding system and provides recommendations for change to the legislative assembly that includes:

1. Since Minnesota's constitution guarantees education and state law guarantees school transportation, the state must property invest in all aspects of education, including transportation.
2. Policy should be changed to take transportation funds out of each district's general operating budget and into a special categorical fund, while giving districts the flexibility to apply to the Minnesota Department of Education to transfer transportation funds in times of crisis.
3. It's fundamentally important that the state adequately fund transportation so districts can provide students with a safe trip to and from school.
4. Minnesota should change the current transportation funding formula, which is based on enrollment, to a more effective system based on miles traveled and student usage.
5. Better overall funding will eliminate the need for four-day school weeks and cuts in after school transportation to fill budget and transportation gaps. (p. 1)

The Minnesota K-12 pupil transportation funding system provides what is termed a transportation sparsity revenue factor. The sparsity factor is provided to school districts with fewer than 200 pupil units per square mile (Minnesota Department of Education, 2009). The sparsity allowance gradually increases as population density decreases, reflecting the relationship between average transportation costs and population density. The transportation sparsity definitions and formula for revenue allowance are provided in Minnesota State Statute Subd. 17 and 18. The total transportation sparsity revenue is equal to the transportation sparsity allowance times the adjusted marginal cost pupil units (Minnesota Department of Education, 2009).

The Minnesota Automated Reporting Student System is used to report the number of public school students transported to and from school during the regular school term (Minnesota Association of School Business Officials, 2009). The Uniform Financial Accounting and Reporting Standards report is used for data collection that tabulates the cost of providing transportation services to school districts. The Minnesota Department of Education provides pertinent information to school district administrators through its official report, *Transportation Reporting and Funding*.

Montana Funding System

The Montana K-12 pupil transportation funding system is a per-unit allocation structure that utilizes a mileage based formula and consideration of the type of bus used to transport students from home to school. The formula does recognize and allow for different seating capacities for elementary and secondary students as previously determined in best operating practices. The Montana funding system is the combined responsibilities of the state and individual counties. The individual county has a county transportation committee whose membership is established by Montana state law (Montana Office of Public Instruction, 2009). Section 20-10-131 stipulates the goal of the committee as that of coordinating the orderly provision of a uniform transportation program within a county. The members include:

1. The county superintendent.
2. The presiding officer of the board of county commissioners or member designee.
3. Except for a K-12 school district, a trustee or district employee designated by the trustees of each high school district of the county.
4. One representative from each high school district of the county who is a trustee of an elementary district encompassed within the high school district and who has been selected at a meeting of the trustees of the elementary districts.

5. Two representatives of each K-12 school district of the county, each of whom is either a trustee or a district employee designated by the trustees.
6. A representative of a district of another county when the transportation services of the district are affected by the actions of the county transportation committee, but the representative has a voice only in matters affecting transportation within the district or by the district.
7. The county transportation committee must have at least five members.
8. The county superintendent is the presiding officer of the county transportation committee. (Montana Office of Public Instruction, 2009, p. 11)

The county transportation committee is responsible for all aspects of student transportation within the county. The committee makes all decisions regarding bus routes, changes to any bus routes, and the route costs. In cases of a disputed mileage claim or issue, representatives of the committee would be present when the mileage is officially measured for use on a bus route. The decision made by the transportation committee may be appealed by trustee or patrons of the district to the Superintendent of Public Instruction, who shall issue a final decision based on the facts established by the transportation committee (Montana Office of Public Instruction, 2009).

The county superintendent is responsible for computing the amount of revenue available to finance the transportation fund budget of each school district. The scheduled amount is determined by the bus mileage data and the state established reimbursement rate. The scheduled rate and the budget for the school district transportation fund are compared and the smaller of the two is used to establish the one-half reimbursements of the state and the county transportation fund. The system ensures an equal revenue obligation from the state level and the county level with the county transportation fund structure.

The Transportation Fund is used to pay for the costs of getting the students from home to school and back. The costs could include the purchase of buses, the building of a bus storage facility, bus maintenance, bus driver salary and benefits, hiring a contractor to run the transportation program, and transportation reimbursement contracts. The state and county share the funding for "on-schedule" costs that are based on bus routes and mileage contracts with parents. The state transportation reimbursement is one half of the expenditures established in the transportation fund or accounted for with the on-schedule costs established through bus mileage data and the type of bus used by the district (Montana Office of Public Instruction, 2009). Additional funding is available through fund balance re-appropriation, non-levy revenues, and a district transportation fund levy.

The Montana pupil transportation also provides a bus depreciation reserve fund. The fund may be established for use of conversion, remodeling, or rebuilding a bus or for the replacement of a bus or radio. It may also be used to purchase additional buses if meeting specified requirements. An individual school district may appropriate an amount each year that does not exceed 20% of the original cost of a bus or a two-way radio (Montana Office of Public Instruction, 2009). The amount budgeted may not, over time, exceed 150% of the original cost of a bus or two-way radio (Montana Office of Public Instruction, 2009).

The Montana Legislative Assembly establishes mileage rates determined as the maximum reimbursement to districts for school transportation from the state and county transportation revenue. The rates do not limit the amount a district can budget in its transportation fund budget to cover costs of school transportation for the upcoming school fiscal year. However, the bus miles used for reimbursement must be approved by the county transportation committee. The utilization of a non-bus vehicle is allowed if driven by a school bus driver to and from an overnight location to school when the location is more than 10 miles from the school. The following represents the reimbursement rates established by the Montana Legislative Code for 2009:

1. $0.95 for a school bus with a rated capacity of not more than 49 passenger seating.
2. $1.15 for a school bus with a rated capacity of 50 to 59 passengers.
3. $1.36 for a school bus with a rated capacity of 60 to 69 passengers.
4. $1.57 for a school bus with a rated capacity of 70 to 70 passengers.
5. $1.80 for a school bus with a rated capacity of 80 or more passengers.
6. Non-bus mileage, meeting the requirements of subsection (1), must be reimbursed at a rate of $0.50 per mile.
7. Maximum reimbursement rates for individual transportation are established in Montana Code 20-10-142. (Montana Office of Public Instruction, 2009, p. 1)

South Dakota Funding System

South Dakota funds school district transportation costs through the general education per-pupil payment and is, therefore, considered a block grant. The per-pupil payment is provided to districts to determine the best way to use the funds and no separate factor is included for student transportation. However, the foundation payment provides a provision specifically for special education students but makes no reference to student transportation. School districts may use their overlay fund, or building fund, for up to 15% of transportation costs (Tamera Darnell, personal correspondence, January 19, 2010). However, these are all locally generated funds. The per-pupil payment for South Dakota, for 2009-2010, was $4,804.60 plus a small school adjustment found in the formula that adds an additional $847.54 per student for qualifying districts (South Dakota Department of Education, 2010).

Wyoming Funding System

The Wyoming K-12 pupil transportation funding system is an approved cost model that provides reimbursement for all transportation services including home to school, field trips, and activity trips. The amount of reimbursement is based on the previous year expenditures for approved transportation costs outlined through administrative regulations. This funding system provides equal to 100% of the actual approved expenditures by the district for transportation services as provided by W.S. 21-13-320 and Wyoming Department of Education Rules and Regulations, Chapters 8 and 20 (Willmarth, 2008). Wyoming utilizes a school district report and a Reimbursement Pupil Transportation Expenditures Report to calculate qualifying expenditures and reimbursement. However, the amount provided on the transportation worksheet of the payment model is limited to:

> (a) daily maintenance and operations costs associated with providing transportation to and from school and related activities; (b) field trips; (c) necessary training and workshops; and (d) personnel, such as the transportation director, mechanics, bus drivers, and bus zone aides. (Willmarth, 2008, p. 141)

Additional costs included in the Wyoming transportation funding system include: bus purchases and leases, maintenance, and isolation payments for family transportation. If a school bus purchases a bus, it is reimbursed for 20% of the eligible purchase amount over the next five school years in accordance with W.S. 21-13-320 (Willmarth, 2008). If a school district leases a bus, each lease payment will be reimbursed the following school year. A school district can provide transportation payments to a student's parent or legal guardian meeting the qualifications of an isolated pupil. The reimbursement amount is calculated by multiplying the total approved round trip miles traveled each day, to and from the bus stop or school, by the state approved mileage reimbursement rate (Willmarth, 2008). With a unique funding factor, the district can make maintenance or rent payments to the student's parent or legal guardian if it is more advantageous for the isolated pupil to live near the school in accordance with W.S. 21-4-401(e) (Willmarth, 2008).

The Wyoming transportation funding system offers an ideal system from the perceptive of the school administrator or school district and matches the comments made regarding adequacy and the North Dakota formula by Picus and Associates (2008). The philosophy of having all approved transportation expenditures reimbursed from the state at a 100% level cannot be argued as inadequate with regards to the reflection of actual costs. Even so, from the state perspective, there may be little incentives for the local school district to remain efficient if there is a guarantee of 100% reimbursement. The system, with its approved cost funding structure, is easy to implement, maintains local control, and is easy to understand based on the evaluation criteria (Joint Legislative Audit and Review Committee, 2006).

The system is unpredictable as the reimbursement is based on the previous year's expenditure report. Specifically, the current year may provide substantial changes to transportation services that will not be reimbursement until the following school year. The system as used by practitioners in the field is not a formal criterion for evaluating a transportation funding system. However, D. Leeds Pickering, the Director of the Health and Safety Unit of the Wyoming Department of Education, noted: "Almost everyone loves the rules (system). BUT, it only works in states with enough money to fully fund it" (D. L. Pickering, personal communication, November 10, 2008).

Colorado Funding System

The Colorado pupil transportation funding system is a per-unit allocation structure that provides a legislatively established per mile travel reimbursement rate to school districts. For the 2008-2009 school year, the mileage reimbursement rate was $0.3787 per eligible reimbursed bus miles (Williams, 2009). The transportation mileage by school district is reported on the official count date, which is October 1 of each school year. That number is multiplied by the number of student contact days held during the school year to determine the district mileage entitlement.

The Colorado transportation funding system provides a provision for actual excess costs not included in the mileage reimbursement allotment. The excess costs is calculated by taking the total current operating expenditures for pupil transportation and subtracting out the capital outlay for pupil transportation by independent contractors to get a net current operating expenditures data point (Colorado Department of Education, 2008). The mileage entitlement number is subtracted from the net current operating expenditure number to get the excess costs calculation. That number is multiplied with a factor of 0.3387 to get an excess cost reimbursement amount. The mileage entitlement and the excess costs are added together for total mileage entitlement amount. The amount of reimbursement cannot exceed 90% of the net current operating expenditures reported by the school district (Colorado Department of Education, 2008). A prorated reimbursement factor is also included to advance payment for the current school year.

The Colorado pupil transportation system provides reimbursements to cover operating expenses such as driver salaries, fuel, and repairs, with no direct state funding available to cover capital costs such as a school bus purchases. About 42% of the total Colorado public school student enrollment in the budget year 2009-2010 used district-provided transportation (Williams, 2009). During the same budget year, $49.6 million was reimbursed to school districts based on the prior year's expenditures and covered approximately 55.2% of districts' total reimbursement claims (Williams, 2009). School districts could impose a transportation levy to local revenues to cover the difference.

Beginning the 2005-2006 school year, the Colorado Legislative Assembly allowed school districts to impose a transportation user fee without prior voter approval (Williams, 2009). The school board is required to have a school board approval and a formal resolution to establish a user fee schedule. Prior to adopting the resolution, a public meeting must be held and notice must be posted 30 days prior to the meeting date (Williams, 2009). As of 2009-2010, 11 school districts in Colorado received voter approval for a transportation levy to be utilized and no school district had issued a separate transportation user fee (Williams, 2009).

Wisconsin Funding System

The Wisconsin pupil transportation funding formula is a per-unit allocation system that uses reimbursement payments for all transportation services including home to school and field or activity trips. The amount of the reimbursement is based on approved costs as defined by administrative regulations and is based on the previous year's expenditures. The state provides an annual flat amount through the primary aid program that is provided based on the miles required for transportation to school. Table 4 provides a summary of the Wisconsin Public Schools transportation funding system.

Table 4

Transportation Funding Chart for Wisconsin Public Schools

Distance	Regular Year	Summer School
0-2 Miles (Hazardous Areas)	$15	---
2-5 Miles	$35	$4
5-8 Miles	$55	$6
8-12 Miles	$110	$6
12 Miles and Over	$220	$6

(Kava & Merrifield, 2011, p. 23)

420 school districts in Wisconsin were projected to receive aid in 2010-2011 for transporting a total of 503,691 public school pupils and 38,849 private school students (Kava & Merrifield, 2011). The total state funding provided based on the transportation funding factors for 2009-2010 was $23,858,000. Wisconsin state law, 2007 Act 20, allocates $35,000 annually to reimburse 75% of school district costs of transporting pupils to and from school from an island over ice, including costs for equipment maintenance and storage. One district qualified for this provision and received an allocation of $17,100 in the 2009-2010 school year (Kava & Merrifield, 2011).

Iowa Funding System

The Iowa K-12 pupil transportation funding formula is a block grant system that is similar to South Dakota’s transportation funding system. Transportation funding in the state of Iowa is included in the district’s foundation grant that is paid by the state for all students. There is no separation of the general student payment for transportation services and no mandate exists to utilize the general student payment for any transportation related services. An additional supplemental weighting factor equal to 0.02 per enrolled pupil initiated by Iowa General Assembly in July 1, 2007 (and continuing through July 1, 2012) was made available to Iowa school districts (Iowa Association of School Boards, 2008). The payment is made available to school districts that share one or more operational functions with another school district or political subdivision. This initiative is to provide an incentive for school districts to pursue operational efficiency through cooperation and coordination between neighboring school districts. The legislative assembly used Senate File 447, 2007 as a way to encourage the sharing of transportation staff (director), vehicles, vehicle maintenance, and bus routes (Iowa Association of School Boards, 2008). Supplemental funds received by a school district, however, could not be used for non-general fund purposes.

Other State Funding Systems

Arizona Funding System

The Arizona K-12 pupil transportation funding system is a per-unit allocation structure that provides aid based on the average daily route miles per eligible student transported. Arizona Revised Statutes 15-921 provides the basis for transportation funding with specifics found in ARS 15-945 and 946 (ECONorthwest, 2008). The law allows school districts to provide general education transportation but sets the procedure and reporting required if receiving state funding for transported students. The state defined eligible students in two categories: Common and High school students. Common school students are kindergarten through eighth grade and are eligible if they live more than one mile from the school they attend. High school students are eligible if they live more than one and a half miles from school (ECONorthwest, 2008).

The Arizona funding formula uses two primary calculations to determine the state funding support for local district transportation expenditures. The Transportation Support Limit (TSL) is the operating expenses level that is state calculated and determines the operating expenses that should be obtainable by the local district. The Transportation Revenue Control Limit (TRCL) is the "grandfathered" amount that represents funding levels prior to 1984 and increased annually by the expense in the TSL from the current budget year (ECONorthwest, 2008). The TSL calculations are based on the miles and student riders or state increases to the mileage reimbursement rates.

The Transportation Support Limit is calculated by taking the miles to and from school and multiplying by the state level support per mile plus allowances for athletics and other activities. The state reimbursed school districts at $2.27 per mile for 0.5 miles or less, $1.85 per mile for more than 0.5 and less than 1.0, and $2.27 per mile for more than 1.0 mile during the 2008-2009 school year (Arizona Senate Research, 2009). In November 2000, voters passed Proposition 301 that increased the sales tax to support education programs and added a mandatory annual inflationary increase to components of the Basic State Aid formula to include the TSL (Arizona Senate Research, 2009).

The Transportation Revenue Control Limit was established in 1980 as part of Arizona education finance reform and was intended to provide a method for local school districts to raise funds for transportation costs not supported by the TSL. The TRCL is not equalized through the Basic State Aid formula, such is the case with the TSL, and is funded solely through property taxes and subsidized by the state through the Additional State Aid program (Arizona Senate Research, 2009). According to ARS 15-946, the TRCL is calculated by taking the difference in a school district's current budget year TSL and its new budget year TSL amount. Any increase to the TSL amount is then applied to the current TRCL amount used in determining the following year's TRCL amount. School districts with declining enrollment may experience an increasing gap in the TSL and TRCL amounts. This was addressed in 2007 when the Legislative Assembly passed Chapter 234, which prohibits a school district from increasing their TRCL if it is 120% or more than its TSL (Arizona Senate Research, 2009).

Arizona paid $3.6 billion in basic state aid, of which $223 million, or 3.7% of the basic aid amount, was provided through the Transportation Support Level and $12.1 million through the Transportation Revenue Control Limit during the fiscal year 2008-2009 (Arizona Senate Research, 2009). The transportation payments are provided through the basic aid payments and included in the general fund support checks provided by the Arizona Department of Education. The 2008 Legislative Assembly heard SB 1047 – aimed at restricting grant dollars to transportation-related services only – but it was defeated in the House of Representatives (Arizona Senate Research, 2009). The current transportation funding remains unrestricted and part of the Basic State Aid program.

North Carolina Funding System

The North Carolina K-12 pupil transportation funding formula uses a predictive/efficiency model which has been used as an example of an alternative transportation funding model for many states pursuing a change to their funding system. The 1989 North Carolina Legislative Assembly passed legislation that required the Department of Public Instruction to initiate a study that would "achieve improved efficiency and economy in the pupil transportation system . . . (including) incentives for cost-efficient operations in local school administrative units" (Joint Legislative Audit and

Review Committee, 2006, p. 26). Prior to the pursuit of a new system, the old funding mechanism funded approximately 90% of the transportation costs incurred by the local school districts (Joint Legislative Audit and Review Committee, 2006). The new formula provides a competitive element to determine the transportation allocation to each local education agency since individual school district transportation efficiency is gauged against other school districts in the state.

The North Carolina system gauges efficiency for each school district based on a comparison of how school districts in the state perform on several factors including the number of buses used and the cost per pupil for transportation services. The formula evaluates the factors based per 100 students transported and the actual costs used to determine base costs via a regression model (ECONorthwest, 2008). The formula adjusts for site demographics, and the final factor is calculated based on the adjusted students times the cost per student. The final factor is compared to other districts in the state to determine the relative efficiency of the transportation system and ultimately the level of state funding. The Department of Public Instruction set standards and guidelines to which all school districts must adhere to receive state funding (ECONorthwest, 2008).

The funding structure itself is based on a funding base and a budget rating provided to each school district. The funding base is determined by the previous year's eligible expenditures. The legislative appropriation assumes growth consistent with inclining enrollments and salary increases meaning some counties become "capped" each year if expenditures exceed the growth in enrollment (ECONorthwest, 2008). The budget rating is created by utilizing inputs such as expenditures, students transported, buses operated, and site characteristics that are beyond local control. Examples of site characteristics include: “(a) average distance from school, (b) street network as determined by statewide computer routing system, (c) pupil density, (d) seats per bus, and (e) percentage of special needs students” (ECONorthwest, 2008, p. 27). Further, the cost per student is calculated along with the number of buses per 100 students in each county.

The use of a linear regression model creates an individual budget rating for each school district in the county. The lowest budget rating identifies the lowest expense per student and is rewarded with an additional 10% transportation funding beyond the funding base allocation (ECONorthwest, 2008). The higher the budget rating, the greater percentage of the funding base is received in state support. The less efficient districts based on the budget rating receives less than full funding and a smaller portion of their established funding base factor. With this formula, most districts receive approximately 90% of their transportation costs funded with some “efficient” districts receiving the full 100% (ECONorthwest, 2008).

There is evidence to show that the mileage, when viewed as a proportion of the number of students enrolled statewide, decreased by 27% from the 20-year trend line and the total number of buses in the state as a proportion of student enrollment has decreased by 28% (Joint Legislative Audit and Review Committee, 2006). Therefore, the predictive/efficiency formula has produced results that display notable improvement in the efficiency of the North Carolina student transportation system. Even so, there is the potential sacrifice of longer bus ride times (students on the bus for longer) to improve the efficiency rating. Another concern is the perceived benefit to wealthy districts that are in a better position to obtain operational efficiencies, and quality for a greater percentage of funding versus the economically disadvantaged school districts. Even so, the North

Carolina predictive/efficiency system provides school districts a model to review for efficiency based funding system (Joint Legislative Audit and Review Committee, 2006).

Indiana Funding System

The Indiana K-12 pupil transportation funding system is a block grant mechanism. In 2006, Indiana Code (IC) 20-46-4-3 identified the last state distribution for general education transportation service and noted that no expenditure for pupil transportation beyond special education is required (ECONorthwest, 2008). Despite the lack of direct state funding, the state continues to regulate transportation when provided and identifies the specific funds that must be utilized for accounting purposes. The state limits the growth in transportation funding to 5% over the previous year or the average percent of annual growth in property value for the past three years with a maximum of 10% (ECONorthwest, 2008). The state also mandates that buses purchased for pupil transportation must remain in service for at least 12 years (ECONorthwest, 2008).

Indiana public school districts can establish a transportation fund as one of five statutory school funds. The fund is largely supported by local property taxes, but transfer of money between funds requires legislative approval. Special education transportation receives state support based on the previous year expenses for eligible students with a limit of 80% (ECONorthwest, 2008). The overall state support for public transportation, including special education, is less than 1% (ECONorthwest, 2008).

California Funding System

California utilizes a block grant for its K-12 pupil transportation system to support the optional service available to its school districts. The system is based on school district and county office entitlements to the lesser of the previous fiscal year approved home to school transportation expenses or the current fiscal year home to school transportation entitlement increased for the statewide average growth and statewide average cost of living (Joint Legislative Audit and Review Committee, 2006). The state transportation payments accounted for less than 50% of the cost of state approved trips to and from school during the 2006-2007 school year (School Transportation Coalition, 2007). The state provided transportation aid per pupil grew by 40% from 1985 to 2005 while state K-12 expenditures per pupil grew 130% over the same timeframe (School Transportation Coalition, 2007).

Bus transportation in California has dropped 40% in the past two years and the state has one of the oldest bus fleets in the country with an average of 15-years-old (national average was nine years) (School Transportation Coalition, 2007). This has created a growing school bus transportation issue for California public schools. The funding mechanism provides reimbursement rates that range from 0 to 100% and displays inequities, especially for large, poor districts (School Transportation Coalition, 2007). The situation caused the California State Auditor to recommend to the California Department of Education to seek legislation that revises current law and allows for two goals: “(1) All school districts that provide transportation services should receive funds and (2) All school district are funded equally through the Home-to-School Transportation program” (School Transportation Coalition, 2007, p. 3).

West Virginia Funding System

West Virginia has an approved cost system for K-12 pupil transportation funding. State reimbursement for actual transportation expenditures that include maintenance, operations, and related costs (exclusive of all salaries) is 85% for the school districts whose ratio of student population to square miles is greater than the state average and 90% for the school districts whose ratio is less than the state average (Joint Legislative Audit and Review Committee, 2006). Insurance premium costs for buses, buildings, and equipment owned by the school district are reimbursed at 100% provided a competitive bid process have been followed (Joint Legislative Audit and Review Committee, 2006).

The West Virginia system provides a level of state funding for capital projects. The state offers an 8.3% payment to school districts for the current replacement value of each school district's bus fleet and the remaining replacement value of buses purchased after July 1, 1999 that has obtained 180,000 miles (Joint Legislative Audit and Review Committee, 2006). Those school districts that experience a net enrollment increase can apply for additional bus funding at the state level. Transportation of students to multi-county vocational centers is reimbursed at a 95% level for all approved expenditures (Joint Legislative Audit and Review Committee, 2006). School districts in West Virginia are limited or capped at one third of the computed state average allowance per mile multiplied by the total mileage for each district. The state mandates all school districts expend one half of 1% of their reimbursement for trips related to classroom curriculum.

Oregon Transportation Funding Study

The Oregon K-12 pupil transportation funding system is an approved cost model in which each school district is ranked to their average cost per student for state approved expenditures. According to that ranking, a school district will receive 70%, 80%, or 90% of its approved cost in state reimbursement funds (Joint Legislative Audit and Review Committee, 2006). The school districts below the 80th percentile receive 70% of their approved transportation costs from the state, districts that are between the 80th and 90th percentile receive 80% of their approved transportation costs, and districts above the 90th percentile receive 90% of their approved transportation costs (Joint Legislative Audit and Review Committee, 2006). The ranking occurs each fiscal year and the school district with the highest approved costs per ADM is placed at the top of the order for Oregon school districts.

Oregon state law requires school districts to provide transportation to and from school for elementary students that live more than 1 mile from school and high school students that reside more than one and a half miles from school (ECONorthwest, 2008). Oregon reimbursed school districts a total of $151 million to cover the total reported expenditures of $215 million, or approximately 70% of the actual costs during the 2005-2006 school year (ECONorthwest, 2008). However, as part of the Oregon Department of Education budget appropriation determined by the 2007 Oregon Legislative Assembly, a budget note was included to require the Department of Education to study alternative methods of funding transportation. The budget note reads as follows:

> The Oregon Department of Education will conduct a study on alternative methods to funding transportation costs for students. The study should focus on reducing costs and increasing efficiency. The Department will report to the interim Joint Committee on Ways and Means or the Emergency Board on the options available along with recommendations on suggested changes before the 2009 Legislative session. (ECONorthwest, 2008, p. i)

The budget note did not provide neither recommendations on the level of service provided nor standards that the Oregon system needs to fulfill in pursuing more efficient transportation practices. The budget noted that approved cost method used by Oregon, like other approved cost formulas, can have inherent inefficiencies as the transportation savings are frequently not proportional to the actual costs. The action by the Oregon legislature in 2007 propelled the Oregon Department of Education to hire the

ECONorthwest research group to provide the documentation and recommendations requested in the budget note. On December 2, 2008, the *Oregon Public School Transportation Funding: An Evaluation of Alternative Methods* was published on behalf of the Oregon Department of Education (ECONortwest, 2008).

The core of the study focuses on methods the state could use to reduce costs and increase efficiency for state transport systems. The study explored two main questions for research:

1. Could districts deliver transportation services similar to levels delivered during the 2007-2008 school year, but at a reduced cost?
2. Is it likely that a change in the finance system could facilitate that cost reduction? (ECONorthwest, 2008, p. i)

The study reviewed the current finance system and exposed inequity and inefficiencies involved and ultimately provided recommendations for addressing those issues. The study utilized research information gathered to establish a framework guiding the selection of a new transportation funding system. The framework consisted of the following three components:

1. Confirm or modify the goals sought through a funding formula.
2. Identify the finance method that helps the state and school districts meet the agreed-upon goals.
3. Communicate clearly the impact a change in the finance method would have on local school district budgets and ensure districts can maintain effective and safe operations during the implementation of the new method. (ECONorthwest, 2008, p. iv)

The goals specific to state vision for funding public school transportation are rarely found in state legislative code. Each state faces its own challenges and demographics that make it difficult to replicate another system and meet all state goal and expectations in creating a new state formula. Oregon did not have state goals to specifically address school transportation, but possessed targeted characteristics for public school systems in their legislative code ORS 329.025 (ECONorthwest, 2008). The targets were summarized as the following: "(a) equity for all students, (b) flexibility and local control, (c) safety, (d) community involvement, (e) promote health, and (f) adjust for uncontrollable differences" (ECONorthwest, 2008, pp. 6-7).

The study identified two goal areas for the legislature to consider when evaluating finance options for public transportation. The first includes public finance goals. The researchers identified five commonly advanced goals of public revenue and distribution systems. The areas include: "(a) efficiency; (b) equity; (c) ease of administration, simplicity, and transparency; (d) stability and predictability; and (e) adequacy" while the goals specific to a transportation system were also included as the following: "(a) access to education opportunities, (b) enrich school programs, (c) safe and healthful transportation, and (d) efficient service" (ECONorthwest, 2008, pp 7-8).

In its statistical analysis, the Oregon study developed a model to explain student transportation expenditures and to quantify the factors that affect school district transportation expenditures. Some of the factors used were outside the control of the school district, while some were controlled by the school district in its daily operations and planning. Through the use of a statistical model, the researchers identified school districts that operated in the most efficient manner and developed a "best practices frontier," against which other districts would be compared (ECONorthwest, 2008).

The statistical model utilized in the study was known as the stochastic frontier cost function model. The cost function referred to the economic model that accounts for the costs of producing a product or providing a service as a function of output level and the prices of inputs. The stochastic referred to the assumption of two forms of randomness known as random shocks and inefficiency effects (ECONorthwest, 2008). The frontier refers to the mathematical structure of the model that focuses on the best practices observed of school district transportation operations. The model has the phenomenon of interest regressed against the factors believed to have influence on it. The frontier cost function also allows the statistical analysis of the factors affecting transportation cost and estimates the performance of transportation operations with respect to minimizing costs.

The results of the statistical analysis using the stochastic frontier cost function model indicated that student transportation operated at approximately 90% cost efficiency between the 1999-2000 and 2006-2007 school years (ECONorthwest, 2008). Over that same timeframe, school districts, on average, increased their cost efficiency by approximately 2.2% each year (ECONorthwest, 2008). This showed a slowed growth in transportation spending by school districts and below the expected increases based on the increase in riders and input costs over the time period. At an average relative efficiency of 91% in 2006-2007, transportation operations had room to improve cost efficiency within their transportation funding and finance structures (ECONorthwest, 2008).

The Oregon study reported a substantial step forward in analyzing Oregon school transportation funding in three fundamental ways:

1. An estimate regarding the best practices frontier of cost efficiency was established, not simply the average cost efficiency that is required using traditional regression methods.
2. The assumptions that school districts are successful cost minimizers in their own district transportation operations were relaxed and instead the assumption that school districts are attempting to operate in a cost minimizing fashion and not all operations are equally successful were utilized. Due to this ability, the researchers are able to estimate each operation's rate of cost efficiency.
3. Key environmental factors that affect school transportation spending were controlled by estimating the inefficiency effects equation jointly with the

> frontier cost function. Controlling these factors allowed the researchers to obtain cost efficiency estimates that are comparable among school districts. (ECONorthwest, 2008, p. 63)

The study presented alternative methods of state funding for student transportation for the Oregon Legislative Assembly to consider. The researchers also provided details on how the state could implement a funding model that meets the five goals of public finance utilizing the main funding structures available that include the block grant, approved cost, per unit cost, an expected cost, and an efficiency-based formula. The key findings of the Oregon study were:

1. Approved cost formulas provide weak incentives for efficiency.
2. Data currently collected by the Department of Education provide for a robust investigation of school district efficiency.
3. Expenditures could be reduced by an estimated 9% by districts adopting practices of the most cost-efficient districts.
4. Oregon school districts were more efficient in 2006-2007 than the 1999-2000 school year.
5. Inefficient school districts spend more per bus in regards to operation costs compared to efficient districts.
6. Operational efficiencies and inefficiencies are found in large and small school district equally.
7. Cost efficiency factors such as cost per rider and cost per mile do not account for the environmental factors under which individual school districts operate.
8. The pursuit of alternative transportation funding methods that place consequences on transportation decisions made at the local level should accelerate Oregon's pursuit of cost-efficiency. (ECONorthwest, 2008, pp. ii-iv)

Washington State Transportation Funding Study

The Washington State K-12 pupil transportation funding system is a per-unit allocation structure that is based on the number of students at each radius mile from the school, with a maximum of 17 radius miles, the distance between bus stops and the school in radius miles, and the number of trips provided per day of school (Joint Legislative Audit and Review Committee, 2006). Each route type has a "weighted student" number at each radius mile distance and is then multiplied by the state allocation rate in calculating the state transportation funding levels. Students within one mile of the school building are not eligible for state funding. The 2009-2010 school year funding factor was $48.27 (Joint Legislative Audit and Review Committee, 2006). A minimum load factor allows for extra funding to districts that have an average bus load less than 74 students (Joint Legislative Audit and Review Committee, 2006). In 2004-2005, 200 school districts received minimum load funding from the state (Joint Legislative Audit and Review Committee, 2006).

Additional funding adjustments are available to school districts beyond the basic funding factor rate. A special education load factor is also provided for all special transportation home to school bus routes. The special load factor varies depending on the number of riders and the limit on the number of riders due to the special needs of the students. A kindergarten through fifth-grade enrollment factor allows for compensation to school districts that transport K-5 students within one mile from the school building. In 2004-2005, 289 school districts received K-5 enrollment funding (Joint Legislative Audit and Review Committee, 2006). The district car allocation provides funding to districts that provide to and from school transportation in district owned cars or vans.

Beginning the 1980-1981 school year, the Washington State Legislative Assembly established a statutory commitment to fund school district transportation at 100% or as close thereto as reasonably possible. Later legislation clarified an eligible student in terms of to and from school pupil transportation. The transportation funding system and philosophy has remained virtually unchanged for over 20 years (Joint Legislative Audit and Review Committee, 2006)

The 2005 Washington State Legislative Assembly with SB 6090, which created the 2005-2007 operating budget, mandated a study to be conducted regarding the state pupil transportation method. The study was to be overseen by the Joint Legislative Audit and Review Committee that was comprised of a bipartisan group of eight senators and eight representatives (Joint Legislative Audit and Review Committee, 2006). The Joint Legislative Audit and Review Committee staff conducted an extensive study that would provide quality information to the Washington legislature regarding opportunities for change in the current transportation formula. The study identified four main objectives:

1. To what extent do school districts track or report pupil transportation costs?
2. To what extent does the current pupil transportation funding method reflect the actual costs of providing pupil transportation?
3. Are there alternative funding methods that would more accurately reflect the actual costs of pupil transportation? Do these alternative funding methods both promote the efficient use of state and local resources and allow local control of pupil transportation systems?
4. Are there nationally recognized "best practices" for funding pupil transportation? If so, does Washington follow best practices? To what extent do they apply to Washington? (Joint Legislative Audit and Review Committee, 2006, p. i)

The 2005-2007 operating budget appropriated $500 million for pupil transportation, $77 million for school bus purchases, and $423 million for the operations of bus transportation systems (Joint Legislative Audit and Review Committee, 2006). The study was to review the $423 million allocation and how that allocation would best serve the school districts of Washington State. The study also provided a response to the extent school districts track and report transportation costs separately from other general costs. Washington state law requires three reports to be submitted to the Office of Superintendent of Public Instruction that relate to transportation expenditures. The three reports include the Ridership Report—which identifies the number of student being transported, the Mileage Report—which reports miles traveled to and from school and includes field trips and activities, and the Annual Financial Statement—the summary of the general district financial report which includes transportation cost categories (Joint Legislative Audit and Review Committee, 2006).

Even so, the standard financial statement submitted to the Superintendent of Public Instruction does not identify the to/from costs separately from the total pupil transportation costs. The district reports all transportation costs together without separating the to/from costs from other transportation service costs. The financial statement also does not attribute indirect costs to pupil transportation. The report indicated that that direct costs did not accurately reflect all costs attributed to transportation services. The study also recognized that transfer costs between programs were neither consistent nor audited and did not accurately reflect all transportation costs (Joint Legislative Audit and Review Committee, 2006). Further, some transportation costs were billed directly to internal and external organizations and were not identified separately on the financial statement. There were also discrepancies on how expenses were categorized from district to district.

The committee provided some recommendations for change. The first recommendation to the Legislature was to require school districts to separate to/from transportation costs from other transportation costs in reporting transportation expenditures to the state to allow for accurate data in determining the effectiveness of a funding system (Joint Legislative Audit and Review Committee, 2006). The second recommendation was requiring the Superintendent of Public Instruction to consult with the State Auditor and adopt rules and clarify definitions and instructions for transportation expenditures (Joint Legislative Audit and Review Committee, 2006).

The Joint Legislative Audit and Review Committee developed a cost allocation method to separate the to/from costs from the other transportation costs reported at the state level. The cost allocation method was based on the total reported costs and the existing levels of to/from services that are provided by the school districts. The Joint Legislative Audit and Review Committee also utilized data from school districts that accounted for both driver hours and miles and compared it to the miles only data. The results showed minimal differences and the Joint Legislative Audit and Review Committee applied the miles only method to all school districts in Washington (Joint Legislative Audit and Review Committee, 2006).

The results of the statewide cost allocation method application showed that approximately $300 million of the $332 million in total reported transportation expenditures statewide were for to/from transportation. In trying to account for the lack of detail and specifics involved with the Annual Financial Statement submitted to the state as documentation of pupil transportation costs, the study noted that 90% of the reported pupil transportation costs were related to to/from transportation (Joint Legislative Audit and Review Committee, 2006).

The Joint Legislative Audit and Review Committee asked consultants to develop a statistical model that would estimate transportation costs based on a set of independent district characteristics that are outside the control of school districts. The goal of the model would be to identify district characteristics with statistically significant impacts on transportation costs and also provide an estimate of district transportation costs to/from school that could be expected given certain characteristics. The model would provide for an opportunity to compare statistically expected costs and the costs determined by the Joint Legislative Audit and Review Committee cost allocation method. The statistical model would also identify a range of confidence in the estimate based on a statistical margin of error.

The statistical model utilized eight potential independent variables that influence cost and are applicable to Washington State. Of the eight characteristics, the study found three were not statistically significant and included pupil density, proportion of total area that is comprised of water, and the proportion of special education student trips (Joint Legislative Audit and Review Committee, 2006). The eight variables were:

- Number of regular transportation student trips.
- Number of special transportation student trips.
- Pupil density.
- Proportion of regular transportation student trips that are in lieu or private party contracts, public transit, or shuttle trips.
- Number of square miles within the district that is land.
- Number of square miles within the district comprised of water.
- Total number of students transported.
- Proportion of all trips that are special transportation student trips. (Joint Legislative Audit and Review Committee, 2006, p. 25)

The Joint Legislative Audit and Review Committee consultants eliminated the three non-statistically significant variables and created a multiple regression model to determine the statistically expected costs for every Washington school district. The statistically expected costs would represent the cost one would expect a district to incur for providing to and from school transportation given its independent characteristics. The results of the statistical model yielded a 95% probability of falling between $289,168,492 and $310,925,515 and an expected value of $300,047,004 compared with the

$300,339,302 cost estimate provided by the Joint Legislative Audit and Review Committee cost allocation method (Joint Legislative Audit and Review Committee, 2006). The study used the statistically expected costs as determined by the statistical model to compare state general fund revenues.

The report identified estimated funding variance as determined by the degree to which the state funding varied from the statistically expected to and from school transportation costs. A positive variance meant that the district received more money from the state than its statistically expected costs while a negative variance meant the district received less money from the state than its statistically expected costs. A neutral variance meant the funding received from the state was equal to the statistically expected costs. The Joint Legislative Audit and Review Committee (2006) estimated from the analysis that a 95% probability exists that the total negative funding variance for the state was between $92,619,322 and $114,376,345 for the 2004-2005 school year. Further, 187 pupil transportation systems experienced a negative funding variance and 76 experienced a positive funding variance.

The Joint Legislative Audit and Review Committee (2006) did not recommend the legislature simply increase the allocation rate used in the current funding mechanism in new funding as that could exacerbate disparities that already existed with the current system. However, they recommended a change in the Washington State pupil transportation funding system to reflect the state’s priorities in funding. If the state focus was local control and reflecting actual costs, it was recommended the state pursue an approved cost methodology. If the state wanted a system with highest priority being efficient use of state and local resources, it was recommended the state pursue a predictive or efficiency-driven formula to reflect actual costs (Joint Legislative Audit and Review Committee, 2006). Either way, the committee felt a change was necessary and a new funding model should be customized to Washington's specific needs.

Following the 2006 study publication by the Joint Legislative Audit and Review Committee, the Washington State legislature followed with a directive for an additional study enacted under Chapter 139, Laws of 2007 and Section 129(6) of Chapter 522 Laws of 2007 (Management Partnership Services, 2008). The legislation called for the development of two options for a new state student transportation funding methodology and presentation to the Governor and Legislature in a final report for budget development and consideration.

The study was conducted under the direction of the Office of Fiscal Management and in consultation with the Joint Legislative Audit and Review Committee and the Office of the Superintendent of Public Instruction by Management Partnership Services, Inc. A 12-member Project Advisory Committee consisting of school administrators, transportation coordinators, classified staff and business managers, regional transportation coordinators, organized labor representatives, and the Office of Superintendent of Public Instruction was formed to assist and provide advisement during the study duration (Management Partnership Services, 2008). The advisory committee offered individuals perspectives and met with the project leaders on a regular basis.

The study outlined two primary objectives that included:

1. Create a methodology for generating and allocating student transportation funds to school districts that reflect actual costs and also provide incentives for efficient use of resources.
2. Provide school districts with predictable levels of state transportation funding to the extent possible. (Management Partnership Services, 2008, p. 1)

Two statistical models were developed to produce funding allocations for student transportation. An additional model was also created to estimate the minimum target cost and used to test how far each funding mechanism varied from the costs that were predicted for each school district at peak efficiency (Management Partnership Services, 2008). The first statistical model was a Unit Cost model. The ideology behind the Unit Cost model was to reimburse each school district for the activities that it undertakes based on the statewide average cost for one unit of each activity. The Unit Cost model establishes statewide values for hourly wages and benefits for drivers and mechanics, mechanical hours required per 10,000 miles driven for large and small buses, fuel efficiency for large and small buses, and fuel cost per gallon (Management Partnership Services, 2008). The model then uses simple equations, along with the school district's numbers of basic and special education riders and land area, to compute an annual cost of transporting students to and from school.

As a result of the statistical analysis using the Unit Cost model, allocations were generated for each school district in Washington State for the 2006-2007 school year. The study showed that the overall allocation to school districts using the Unit Cost model was $305,274,892 or 30.5% more than the $233,892,887 allocated by the current formula in Washington State and 14.3% less than the total expenditures of $356,386,229 (Management Partnership Services, 2008). Two thirds of the school districts representing 85.7% of the students transported statewide receive more money under the Unit Cost model than under the current allocation formula (Management Partnership Services, 2008).

The advantage of the Unit Cost model is that it is relatively clear in its methodology using simple arithmetic and is easily converted into a spreadsheet format. The model is easy to administer and the predictability is high for school districts and transportation managers. However, the Unit Cost model is weaker in terms of fairness in its reimbursements to school districts. This is caused by the inability to account for several site characteristics that are both practically and statistically significant. Also, the Unit Cost model provides school districts with low incentive to improve the efficiency of transportation operations.

The second model created is an Expected Cost model that reimburses a school district based on the average cost of transporting students under local site characteristics. The Expected Cost model computes the average, or expected expenditures for each school district through the construction of a multiple regression equation. Multiple regression analysis is one of the most widely used statistical techniques today (Management Partnership Services, 2008). The variables and used in the multiple regression included:

- Number of basic education riders.
- Number of special education riders.
- Land area.
- Average distance to school.
- Roadway miles.
- Number of locations served.
- Transport of high school students to another district.
- Number of midday Kindergarten trips per week. (Management Partnership Services, 2008, p. 38)

The results of the Expected Cost model showed an overall allocation of $337,236,250 for the Washington State during the 2006-2007 school year (Management Partnership Services, 2008). This represented 44.2% more than the allocation created by the 2006-2007 funding formula for Washington State school districts. The allocation generated also represented a 5.4% shortfall from the total expenditures reported for 2006-2007 at $356,386,229 (Management Partnership Services, 2008). The results also show that 68.9% of the school districts representing 95.0% of the students transported statewide received more money under the Expected Cost model compared to the current allocation formula (Management Partnership Services, 2008).

The Expected Cost model provides a strong and statistically sound dependence on transportation data, which helps to ensure its validity and accuracy (Management Partnership Services, 2008). The ability to incorporate a reasonable number of site characteristics also makes for a good choice regarding equity. The model is relatively easy to use and understand, although the regression analysis may be confusing to some practitioners. The Expected Cost model also provides a mild incentive for efficiency in operations. A school district can receive full funding for achieving the average performance factor implying that the model may fall short of providing incentives to aggressively reduce transportation costs (Management Partnership Services, 2008).

The study created a Target Cost tool which projected allocations based on the best possible performance of each school district relatives to peer school districts and accounting for site characteristics. The Target Cost tool identifies an empirically based and mathematically sound minimum expenditure level that allows the school district to transport to and from school and recognize local site demographics (Management Partnership Services, 2008). The purpose of the tool is to specifically use it with another funding model and as a management diagnostic tool. The tool can be used by the Office of Superintendent of Public Instruction or regional transportation coordinators to identify school districts that exhibit less efficient operations (Management Partnership Services, 2008).

The study provided statistical data showing the Unit Cost model and the Expected Cost model both performed substantially better than the current funding model in regards to reflecting the actual transportation costs of school districts. The Expected Cost model provided a higher level of state allocation and shows signs of leading to a long-term increase in expenditures over time. To address that issue, the researchers recommended also using the Target Cost tool, in particular, if using the Expected Cost model for determining a state funding transportation allocation (Management Partnership Services, 2008). However, the study recommended the state to consider all important factors and not implement any changes prior to the start of the 2011-2012 school year.

The Management Partnership Services (2008) study analysis confirmed the earlier findings of the Joint Legislative Audit and Review Committee (2006) study. The current funding formula for Washington State was not sufficient to meet the requirements of providing a reasonable level of funding for student transportation systems (Management Partnership Services, 2008). The two models displayed in the study provided a substantially higher level of funding compared to the actual expenditures reports for the 2006-2007 school year. In conclusion, the study recommended the Washington State Legislative Assembly put a new formula in place to start the 2011-2013 biennium (Management Partnership Services, 2008).

The results of both studies led to Washington State legislative initiatives that are currently being reviewed by the Washington State Legislative Assembly in the form of WAC 392-141-300. The WAC 392-141-360 is outlined as Operation Allocation

Computation and states the operation allocation shall be calculated using the following factors:

> 1. The combined student count of basic program students.
> 2. The combined student count of special program students.
> 3. The district's prorated average distance.
> 4. The district's total land area.
> 5. The district's total number of roadway miles.
> 6. The district's number of destinations served by home to school routes.
> 7. The district's number of kindergarten routes operated during ten consecutive school days that include the count period and are all within the report period
> 8. If the school district is a non-high district, the answer to the following question: Does the district provide transportation service for the high school students residing in the district? (Washington State Office of Superintendent of Public Instruction, 2010, pp. 12-13)

WAC 392-141-360 also states:

> For each district, an expected allocation is determined using the coefficients resulting from a regression analysis of (a) through (h) of this subsection, evaluated statewide against the prior school year's total to and from transportation expenditures and including the local characteristics factor. (Washington State Office of Superintendent of Public Instruction, 2010, p. 13)

The changes to the WAC language regarding the new student transportation system is comprised of 22 pages of new state law and the initial proposal of this language was made at a legislative hearing on December 8, 2010 (Washington State Office of Superintendent of Public Instruction, 2011).

CHAPTER III

METHODOLOGY

The purpose of this study was to provide information on K-12 student transportation funding formulas utilized in 14 states and the effectiveness of these systems as measured by research based criteria for school transportation funding systems. This study utilized a multiple regression model to predict costs of transportation services for North Dakota school districts and provide allocations based on those expected costs to K-12 school district transportation operations in the state. The Expected Cost model could replace the current transportation funding system and provide a new transportation funding system based on expected costs and not the reimbursement per mile and rider currently set by the legislative assembly.

Research Questions

1. To what extent does the current North Dakota K-12 pupil transportation funding system reflect the actual transportation expenditures of North Dakota school districts?
2. To what extent does an Expected Cost model accurately predict the actual transportation expenditures of North Dakota school districts?
3. How does a K-12 pupil transportation funding system based on expected costs, rather than a block grant, provide greater equity and adequacy regarding school district transportation funding levels in North Dakota?

Participants

The sample for this study consisted of 165 public school districts in North Dakota that reported transportation data during the 2009-2010 school year to the Department of Public Instruction (Department of Public Instruction, 2011). The estimated number of pupils transported for K-12 education during that year was 38,371 covering a total of 20,891,084 miles (North Dakota Department of Public Instruction, 2010b).The total cost of transportation services for the state was $42,995,588. The average transportation cost per pupil and transportation cost per mile for the same year were $1,120.52 and $2.06 respectively (North Dakota Department of Public Instruction, 2010a). The names of individual school districts were to demonstrate the current system and the effects of the Expected Cost model on transportation variables.

Data Collection

The data for this study if from the 2009-2010 fiscal year and was obtained from the North Dakota *State School Aid: Transportation Report*, distributed in January of 2011 by the North Dakota Department of Public Instruction Office of School Finance and Organization. Local school districts provide data that is compiled by the state Department of Public Instruction through the Transportation Routes and Vehicle Inventory Report (North Dakota Department of Public Instruction, 2011a). The data is available in hard copy from the North Dakota Department of Public Instruction upon request.

Data Analysis

The researcher obtained transportation data collected by the Department of Public Instruction for the 2009-2010 school year, and included all public school districts in North Dakota. The data set was reduced to include only school districts that reported all required transportation factors to the Department of Public Instruction for the 2009-2010 school year. The data set was then categorized according to the factors used in the Washington State Expected Cost model and correlated to the data set collected by the Department of Public Instruction for North Dakota public school districts.

Multiple regression analysis with the ordinary least squares procedures (OLS) has become one of the most common and widely used statistical techniques for variable relationships today (Ethington, 2002). Therefore, multiple regression analysis was done with five North Dakota transportation factors used in the Expected Cost model. This type of analysis produces an expected cost level for each school district and a corresponding allocation based on the predicted transportation expenditure levels. The analysis is performed using the five established factors as independent variables and transportation expenditures as the dependent variable. The result is added to the 10% buffer factor and the school district allocation is generated by the analysis of comparing this value to the actual expenditures and determining the smaller value. The variables utilized in the multiple regression analysis include the following:

- Number of total riders.
- Land area of the school district.
- Average distance to school (miles).
- Total roadway miles.
- Number of locations or schools served.

The Expected Cost model predicts the funding amounts by adding 10% to the amount computed by the formula.   This buffered value is used to help account for any transportation demographic factors not addressed in the multiple regression analysis.

Each school district's allocation is determined by the smaller of the amount computed by the basic formula plus the buffer or the school district's actual expenditures. The result is a methodology that generates student transportation funds to school districts based on actual costs and, to some level, provides an incentive for efficient use of resources. The model also provides a predictable level of state transportation funding to school districts.

The results of the multiple regression analysis was compared to the current North Dakota K-12 pupil transportation funding system and evaluated on the basis of the percentage of transportation expenditures reimbursed through the North Dakota transportation funding formula. The researcher used criteria for a funding system including, high clarity, high equity, high efficiency motivation, low administrative burden, and high predictability. The researcher summarized the evaluation criteria of the North Dakota funding system and the Washington State funding system to determine the success of the Expected Cost model compared to the current North Dakota model.

The model is able to predict, with statistical accuracy, the transportation expenditures of a school district and account for unique transportation factors in the process. A new funding formula based on the expected costs could assist the legislature to determine the appropriate amount of funding based on the expected costs. Efficiency factor in this model is based on appropriate expected costs – not just actual reported costs of transportation services or offering reimbursement for actual costs deemed excessive in the minds of the Department of Public Instruction or the Legislative Assembly.

Chapter IV contains the data developed and the analysis of this data while Chapter V provides the summary, conclusions, and recommendations for possible future action based on the examination of the findings.

CHAPTER IV

ANALYSIS OF DATA

The purpose of this study was to provide information on K-12 student transportation funding formulas utilized in 14 states and the effectiveness of these systems as measured by research based criteria for school transportation funding systems. The current block grant transportation funding system in North Dakota does not account for actual expenditures. The statistical model utilized in this chapter is aimed at providing a funding system that reflects the costs of school districts for equitable and adequate levels of responsibility and accountability for school district and the state.

The following research questions were addresses in this study:

1. To what extent does the current North Dakota K-12 pupil transportation funding system reflect the actual transportation expenditures of North Dakota school districts?
2. To what extent does an Expected Cost model accurately predict the actual transportation expenditures of North Dakota school districts?
3. How does a K-12 pupil transportation funding system based on expected costs, rather than a block grant, provide greater equity and adequacy regarding school district transportation funding levels in North Dakota?

Demographics Information

The study data set includes 165 North Dakota school districts that reported on the five transportation factors identified in this study to the Department of Public Instruction for the 2009-2010 school year. A map showing school district boundaries in North Dakota is found at the following website: http://www.dpi.state.nd.us/resource/map.pdf. The researcher did not include any school district that did not report one or more of the five identified transportation factors to the Department of Public Instruction during the 2009-2010 school year. The study also includes school districts that offered K-12 or K-8 services. Special education units were not included in the data set utilized by the researcher. The five school district transportation factors utilized in this study were selected in reference to the study performed by Management Partnership Services, Inc. for the state of Washington in 2008 (Management Partnership Services, 2008),

Total Miles Transportation Factor

Five transportation factors were included as variables in the statistical analysis. The first, Total Miles transportation factor, reflects the total number of miles traveled by school district transportation for the 2009-2010 school year. This factor includes mileage covered by school district buses for rural or in-city services offered by the school district. It can also include mileage covered by families receiving family transportation payments from the school district. Family transportation can be offered to families in which the school district is unable or unwilling to offer bus transportation but with an obligation for transportation services. The family transportation mileage is measured from the home to the nearest bus route or the school building—depending on the school district and the demographics of its bus routes.

The total miles factor includes all recorded transportation miles for any school district authorized transportation of students to and from a school building to receive educational services. Mileage accumulated for the purposes of extracurricular activities or field trips is not included in the Total Miles factor provided to the Department of Public Instruction. Figure 1 represents the distribution of the Total Miles traveled by school district transportation factor within the data set. The vertical axis Count represents the number of school districts and the horizontal axis Total Miles represents the total mileage of the school district.

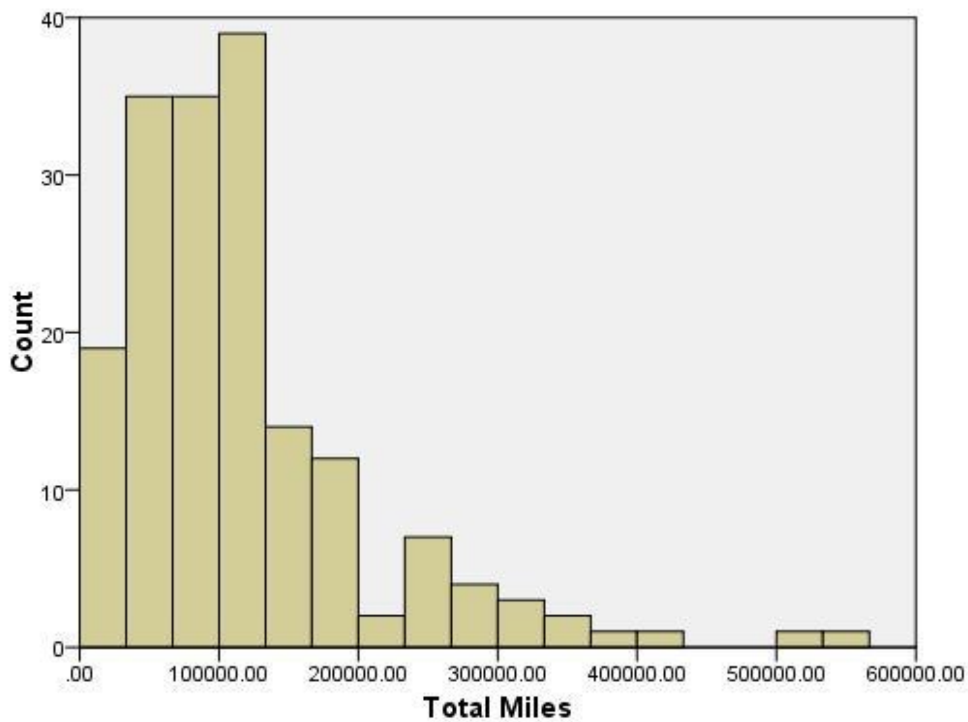

Figure 1. Total Miles Traveled by School District (2009-2010).

Total Riders Transportation Factor

The Total Riders factor reflects the number of students transported from home to school or school to home or both. Total Riders represents actual students using school district transportation services of any form: either rural, in-city, or family transportation services for the 2009-2010 school year. Students are not differentiated by the method of transportation, such as size of school bus or family transportation, or the length of which they utilize the transportation. If the student(s) used school district transportation of any kind provided by the district, the student falls under the Total Rides transportation factor. Figure 2 represents the distribution of the Total Riders by school district transportation factor within the data set. The vertical axis Count represents the number of school districts and the horizontal axis TotRiders represents the total student transportation riders of the school district.

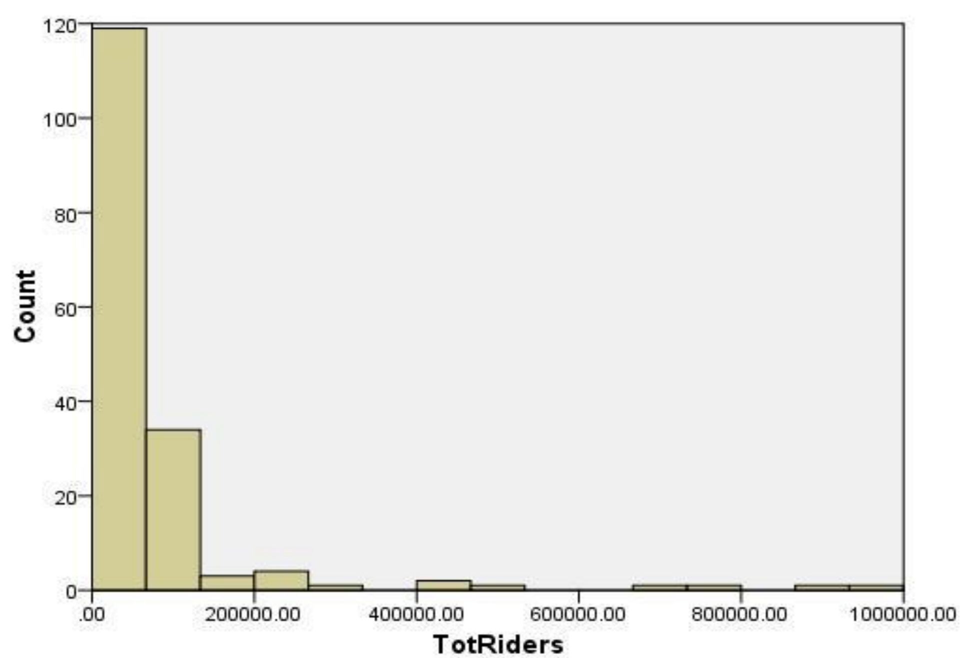

Figure 2: Total Riders by School District (2009-2010).

Land Area Transportation Factor

The Land Area factor represents the reported school district physical size as measured in total square miles. The Land Area factor does not represent any correlation to the area covered with bus routes or how the school district services all areas of its school district boundaries, but it is the actual raw distance the school district boundaries cover for the 2009-2010 school year. Figure 3 represents the distribution of the Land Area transportation factor within the data set. The vertical axis Count represents the number of school districts and the horizontal axis LandA represents the total land area in square miles of the school district.

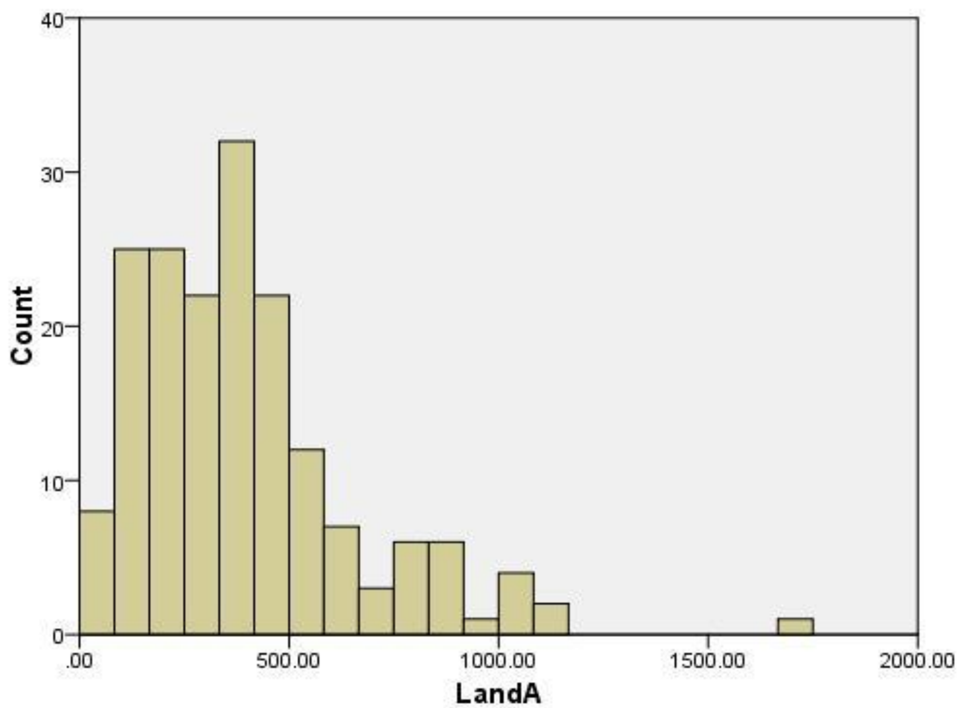

Figure 3. Land Area (in total square miles) by School District (2009-2010).

Number of Schools Transportation Factor

The Number of Schools factor represents the number of school buildings located within the school district that provides educational services for students ranging from Kindergarten to Grade 12. The number of school buildings served by a school district can vary dramatically in size and type of educational services provided. The number of school buildings can affect transportation factors based on lunch program, physical education, or other programs involving transportation of students from building to building within a school district. Figure 4 represents the distribution of the Number of School buildings served by school district transportation factor within the data set. The vertical axis Count represents the number of school districts and the horizontal axis NSchools represents the number of school buildings in the school district.

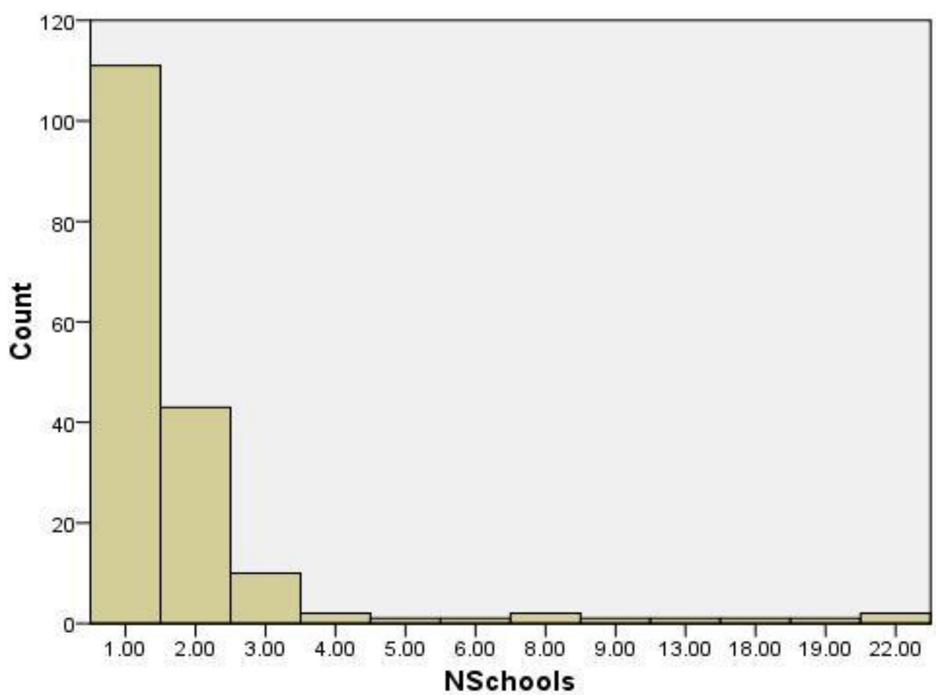

Figure 4. Number of School Buildings Served by School District (2009-2010).

Average Mileage Transportation Factor

The last factor – the Average Mileage to School factor – is calculated by averaging the length in miles of each route reported to the Department of Public Instruction. School districts are required to report the length of each transportation route in miles. These values were used by the researcher to calculate an Average Mileage to School factor. Since the Department of Public Instruction does not collect an actual distance to school statistic, the researcher used the average of individual bus routes mileage to represent this value. Figure 5 represents the distribution of the Average Mileage of each route by school district transportation factor within the data set. The vertical axis represents the number of school districts and the horizontal axis AvgM represents the average mileage of school district bus routes.

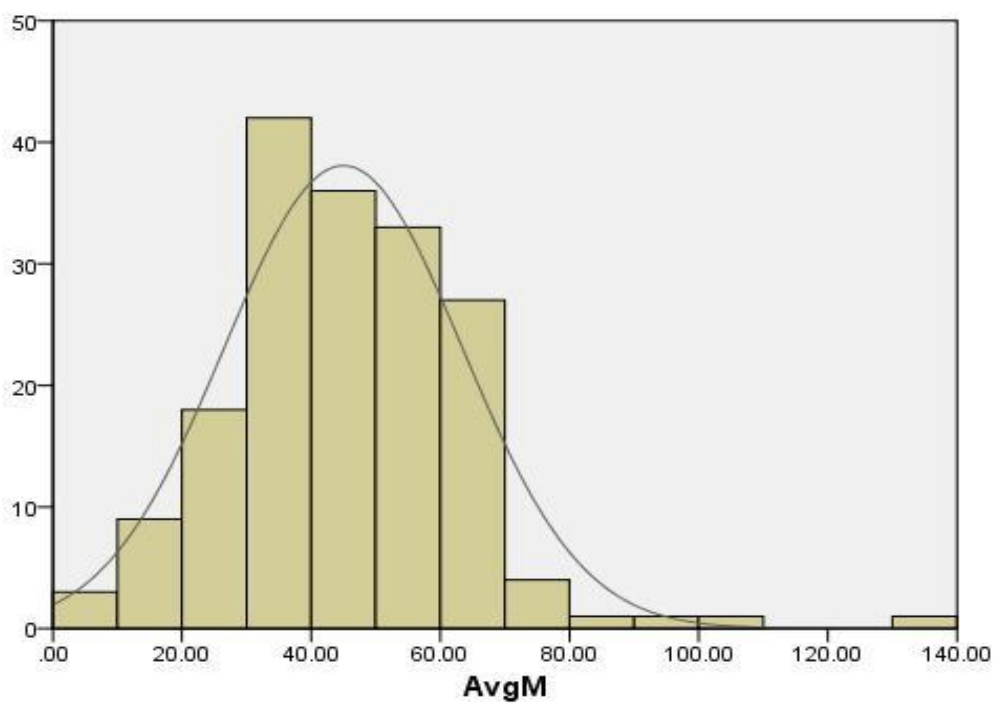

Figure 5. Average Length (in miles) of Each Route by School District (2009-2010).

Table 5 represents statistical information regarding the five transportation factors utilized in the statistical model of this research study:

Table 5

Descriptive Statistics of the Five Transportation Factors (2009-2010) (N=165).

FACTOR	LOW	HIGH	AVERAGE	STANDARD DEVIATION	TOTAL
Total Miles	11,152	560,196	121,523	89,618	20,051,280
Total Riders	346	998,464	76,446	138,189	12,613,646
Land Area (Square Miles)	15	1,679	404	265.94	66,704
Number of Schools	1	22	2.1	3.3	352
Average Mileage	12	109	46	15.79	7,583.19

The Washington State study utilized an Expected Cost model that calculated a predicted expenditure level for individual school districts that transported the same number of students with the same site characteristics. The model used a multiple regression equation with the dependent variable of district expenditures and independent variables that included:

1. Number of basic education riders (natural logarithm).
2. Number of special education riders +1 (natural logarithm).
3. Land Area of school district in square miles (natural logarithm).
4. Average Distance to Schools in miles.
5. Roadway miles of school provided transportation.
6. Number of locations served within the school district.

7. Binary value = 1 if the school district transports its high school students to another district.
8. Binary value = 1 if the school district does not transport its high school students.
9. Number of midday kindergarten trips per week.

In an attempt to apply the Washington State Expected Cost model to North Dakota school districts, the researcher utilized data available from the Department of Public Instruction that correlated to the variables used in the Washington State study. The five transportation factors selected for the statistical analysis were the five factors that could be extrapolated from North Dakota school district transportation data and used in the statistical model. The researcher applied the multiple regression model to the North Dakota transportation factors to evaluate the results compared to the data collected in the Washington State model.

The Expected Cost model used in the Washington State study used the natural logarithm function for three of the independent variables included in the analysis as well as the dependent variable of total expenditures. The independent variables in which the natural logarithm was utilized were the basic education riders, number of special education riders, and the land area. The study stated the use of natural logarithm in regression models is common and leads to natural interpretations of parameters used in the analysis (Management Partnership Services, 2008). The natural logarithm converts the variable to a normal distribution for variables possessing a skewed distribution.

The results of the Washington State study generated the following statistical analysis. The model resulted in an R-squared value of 0.9536 (Management Partnership

Services, 2008). The factors basic education riders and special education riders accounted for an R-squared value of 0.9231 by themselves (Management Partnership Services, 2008). The analysis also showed all coefficients as statistically significant. The definition of statistically significant used in the study was a p-value less than 0.05; generally accepted as statistically significant in statistics study (Management Partnership Services, 2008). The highest p-value of the model coefficients was 0.0090 (Management Partnership Services, 2008). The p-values of the coefficients, therefore, displayed a confidence in how important each variable is when used in the regression model.

In addressing collinearity in the Expected Cost model, the highest variance inflation factor (VIF) in the Washington State analysis was 6.6. The authors of the study addressed collinearity in the following manner: Collinearity is a minor concern if one or more variance factors is greater than 5 and a major concern if one or more factors is greater than 10 (Management Partnership Services, 2008). With only one factor greater than 5, the study researchers determined all coefficients in the model to be plausible and to not undermine the validity of the study results.

The Washington State model used a 10% buffer that was applied after the model determined the school districts' predicted expenditures. The allocation for each Washington State school district was determined by the smaller of the school district's actual expenditures and 110% of the value computed by the regression model. In order to receive full funding, a school district must reduce expenditures to within 110% of the predicted expenditures level generated by the regression model. The results of the Expected Cost model for Washington State were 5.4% less than the total expenditures of Washington State school districts for the 2006-2007 school year (Management

Partnership Services, 2008). This result was also 44.2% more than the allocations provided by the current transportation funding formula for Washington State in 2006-2007 (Management Partnership Services, 2008).

Results

Research Question 1

To what extent does the current North Dakota K-12 pupil transportation funding system reflect the actual transportation expenditures of North Dakota school districts?

Total Expenditures Transportation Factor

The total transportation expenditures for the 165 school districts included in the data set was $44,108,338. The average expenditures of a North Dakota school district for this data set in 2009-2010 were $267,323 and the standard deviation was $369,855. The smallest amount of transportation expenditures was $3,711 by the White Shield 85 school district. The largest amount of transportation expenditures was $3,317,801 by the Fargo 1 school district. Figure 6 represents the distribution of the total expenditures by school district transportation funding variable. The vertical axis represents the amount of school districts and the horizontal axis represents the total expenditures of a school district.

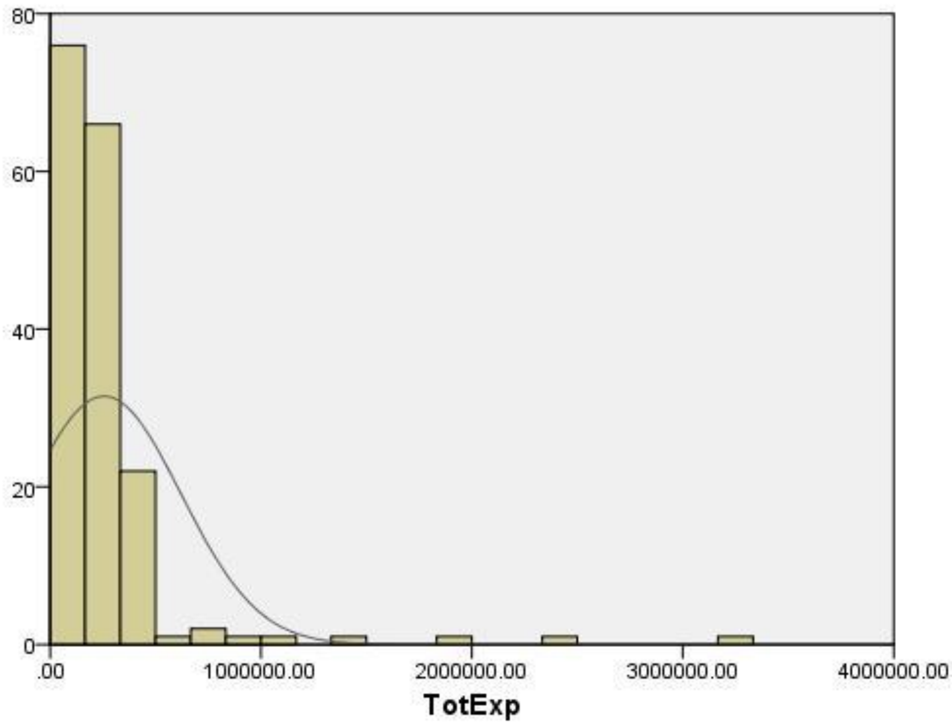

Figure 6. Transportation Expenditures by School District (2009-2010).

State Funding Transportation Factor

The amount of state funding for transportation services in North Dakota is generated through a block grant based on a legislatively selected mileage and rider reimbursement rate. The total amount of state transportation funding for 2009-2010 with this data set was $20,727,469. The average amount of state funding per school district was $125,621 and the standard deviation was $109,101. The minimum amount of transportation state funding in 2009-2010 was $3,340 for the White Shield 85 School District. The maximum amount of transportation state funding in 2009-2010 was $755,012 for the West Fargo 6 school district. Figure 7 represents the distribution of the state block grant transportation funding factor by school district. The vertical axis represents the number of school districts and the vertical axis represents the amount of state block funding provided to school districts.

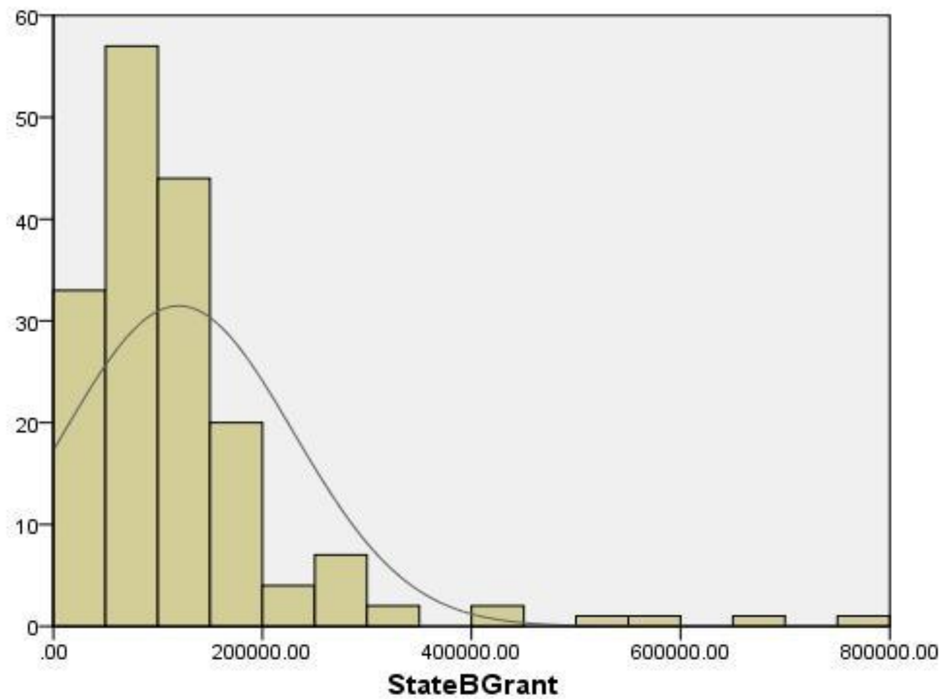

Figure 7. State Block Grant Funding by School District (2009-2010).

The percentage of a school districts reported transportation expenses reimbursed by the state block grant formula is capped at 90% by North Dakota Century Code (North Dakota Legislative Council, 1997). A total of seven school districts received 90% of their transportation expenditures through the state block grant formula. Those districts averaged transportation expenditures of $75,589 – below the state average of $267,323. Additionally, these school districts averaged a Total Miles factor of 105,542 –below the state average of 121,523. The school districts that reached the 90% cap regarding state funding versus actual expenditures were all smaller school districts with fewer miles and transportation expenses compared to the rest of the data set. The smallest percentage of state funding was 11% for the Williston 1 School District. The Williston 1 School District reported $231,909 in transportation expenditures and received $25,401 in state transportation funding.

The average percentage of transportation expenditures, in the data set, reimbursed through the North Dakota block grant transportation funding system was 54.3% for the 2009-2010 school year. The average transportation expenditure for a school district in 2009-2010 was $267,323. The average state block grant transportation funding for North Dakota school districts was $125,621. The average cost per mile and the state block grant reimbursement for 2009-2010 was $2.20/mile and $0.92/mile respectively. Evidently, the current block grant system does not reflect the actual transportation expenses of school districts at a level close to full funding and a substantial amount of school districts are well below the 50% state transportation funding mark.

Research Question 2

To what extent does an Expected Cost model accurately predict the actual transportation expenditures of North Dakota school districts?

The researcher created a multiple regression model utilizing the transportation factors defined in this chapter. The regression analysis shows a model based on the five independent variables: Total Miles, Total Riders, Land Area, Number of Schools, and Average Miles to School. The following regression equation was used: Total Expenditures = -38,494.53 + .717 (Total Miles) + 1.431 (Total Riders) + 67.467 (Land Area) + 36,402.548 (Number of Schools) + 95.73 (Average Miles). The t-values/p-values for the independent variables were as follows: Total Miles = 3.187 (t-value), 0.002 (p-value); Total Riders = 9.778 (t-value), 0.000 (p-value); Land Area = 1.508 (t-value), 0.134 (p-value); Number of Schools = 7.777 (t-value), 0.000 (p-value); and Average Miles = 0.152 (t-value), 0.152 (p-value). The constant term in the model was -38,494.53. Land Area and Average Mileage were found to be statistically insignificant.

The generally accepted p-value of less than 0.05 for statistical significance shows that two variables; Land Area and Average Miles were above the 0.05 level and the effect of these factors on the model might not be significant. The p-values of the remaining factors: Total Miles, Total Riders, and Number of Schools were well below the 0.05 level and their statistical significance is substantiated. The effect of the two factors with higher P-value levels are addressed in later models utilized in the statistical analysis.

The regression model had a confidence level of 99.9% (F-value = 327.8, P-value = 0.000) in predicting the total transportation expenditures of North Dakota school districts. The adjusted R-squared value for this model was 90.9% and compares to the R-squared value of 95.86% of the Washington State Expected Cost model. Generally, the R-square value of 90.9% indicates variability of predicting transportation expenditures can be reduced by 90.9% given the data available from the five transportation factors used in the regression model.

The collinearity of values in the model caused some concern. The correlation r-factor between Total Miles and Total Riders was 0.776; between Total Miles and Number of Schools was 0.678, and between Total Riders and Number of Schools was 0.800. In general, a correlation factor greater than 0.70 is cause for concern regarding the correlation of two independent variables. The Variable Inflation Factor (VIF) of the five independent variables were: Total Miles = 5.336, Total Riders = 5.377, Land Area =

1.86, Number of Schools = 3.033, and Average Mileage = 1.295. The two factors with VIF values greater than five were Total Miles and Total Riders.

VIF values greater than five are cause for concern, but in reference to the Washington State study, values greater than five are cause for minor concern and values greater than 10 are a major concern (Management Partnership Services, 2008). The highest value in the Washington State study was 6.6. Thus, in comparison, the values used in this study represent VIF values less than 6.6. Even so, the multicollinearity present is acknowledged and remains a concern regarding the multiple regression model used in this analysis.

To address the multicollinearity issue with the two independent variables, Total Miles and Total Riders, the multiple regression model was run without the two variables included and using the three independent variables; Number of Schools, Land Area, and Average Miles in the analysis. The result of this change was an R-squared value of 0.755. This change removed the multicollinearity issue. Even so, the drop in the R-squared value was significant without the Total Miles and Total Riders variables included in the model. The Total Miles and Total Riders variables were included in the statistical model and the multicollinearity issue was present in the statistical analysis of this study.

Two of the independent variables, Total Riders and Number of Schools, and the dependent variable, Total Expenditures, appeared to follow a Poisson distribution when the multiple regression model was executed. The Total Miles variable showed a borderline Poisson distribution. A Poisson distribution is one that is not normal or symmetrical, but is skewed in its distribution and typically to the left (Business Dictionary, 2011). In a detailed examination of the Poisson distribution of these variables, the following outliers were identified with the following standard deviations from the mean: Bismarck 1 (5.35), Fargo 1 (6.18), West Fargo (5.69), Grand Forks 1 (3.36), Mandan 1 (3.67), Devils Lake (2.48), Belcourt 7 (2.48), Jamestown 1 (1.63), and Minot 1 (2.74). These nine school districts listed above are among the top 11 K-12 enrollment school districts in North Dakota (North Dakota Department of Public Instruction, 2011c). The enrollment size of these school districts compared to the other school districts included in this sample set is substantial and understandable in presenting a skewing of data. However, current demographics of North Dakota shows a disparity in enrollment from the larger enrollment school districts to the rest of the state.

In response to the presence of Poisson distribution with some of the variable used in the statistical model, the natural logarithm of those variables was used to mediate this effect. In the Washington State study, the natural logarithms were used for Total Riders (General Education), Total Riders (Special Education), Land Area, and Total Expenditures. In comparison, the Washington State study acknowledged the Poisson distribution issue for the same variables as this study, with the exception of the Land Area variable that was normal in this study and the Number of Schools Served variable that was Poisson in this study and normal in the Washington State study. As a result, the researcher in this study acknowledged the use of natural logarithms and included a model that addresses the Poisson distribution in four of the variables in the study.

Model 1

The first model identified in this study is a multiple regression analysis that included five independent variables (Total Miles, Total Riders, Number of Schools, Land Area, and Average Miles) and the dependent variable (Total Expenditures). This model generated an adjusted R-squared value of 0.909 and an F-value of 327.762 (df = 5,159).

Figures 8, 9 and 10 represent the outcome of the first model used in the study.

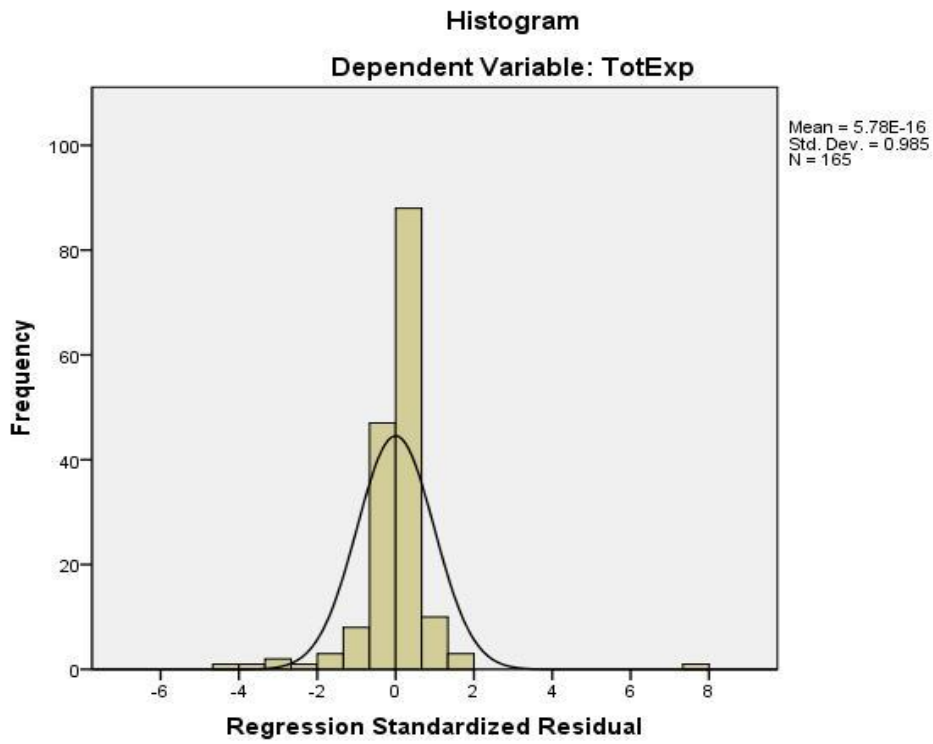

Figure 8. Model 1: Histogram of Regression Model with Standardized Residual.

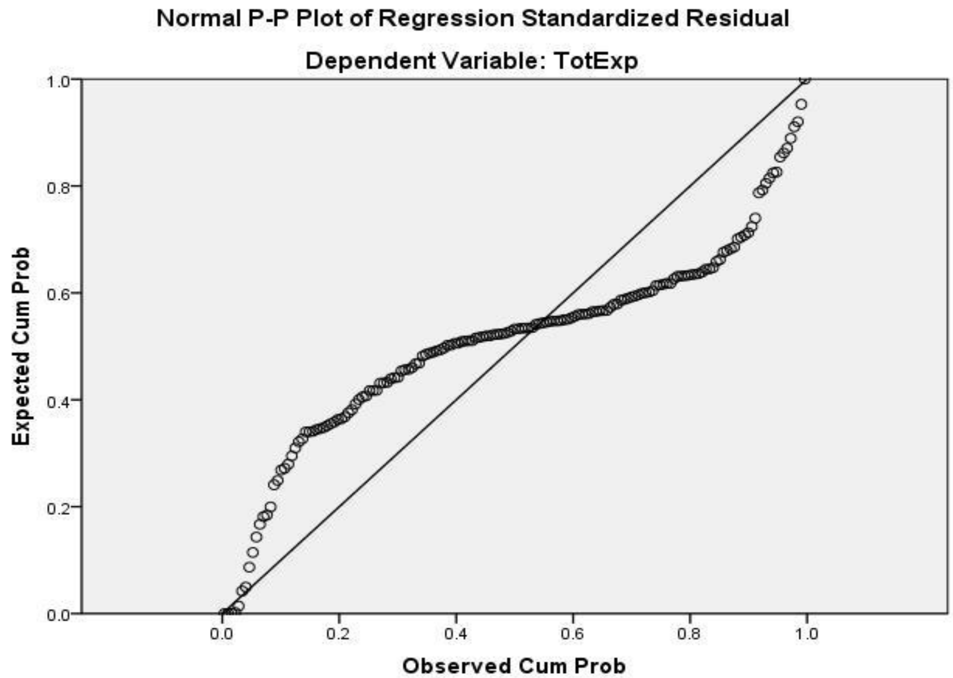

Figure 9. Model 1: P-Plot of Regression Model with Standardized Residual Comparing Expected Cumulative Probability and Observed Cumulative Probability.

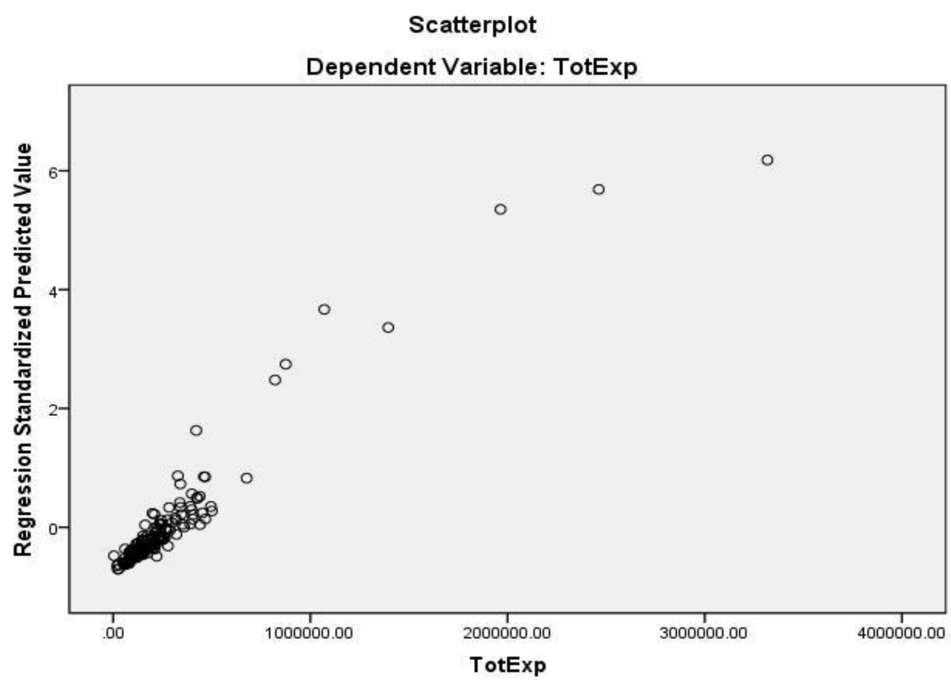

Figure 10. Model 1: Scatterplot Comparison Total Expenditures and the Predicted Value from the Regression Model.

Model 2

The second model utilized in this study addresses the Poisson distribution issue and use of natural logs to mediate the distribution concerns. The second model uses the following variables: Independent variables (log Total Riders, log Number of Schools, Total Miles, Land Area, and Average Miles) and Dependent Variable (log Total Expenditures). The multiple regression analysis provided the same R-square value of 0.909 and the same F-value = 327.76 (df = 5,159). The Variance Inflation Factors of the independent variables also remained the same as the original analysis. Figures 11, 12, and 13 represent the outcome of the second model used in the study.

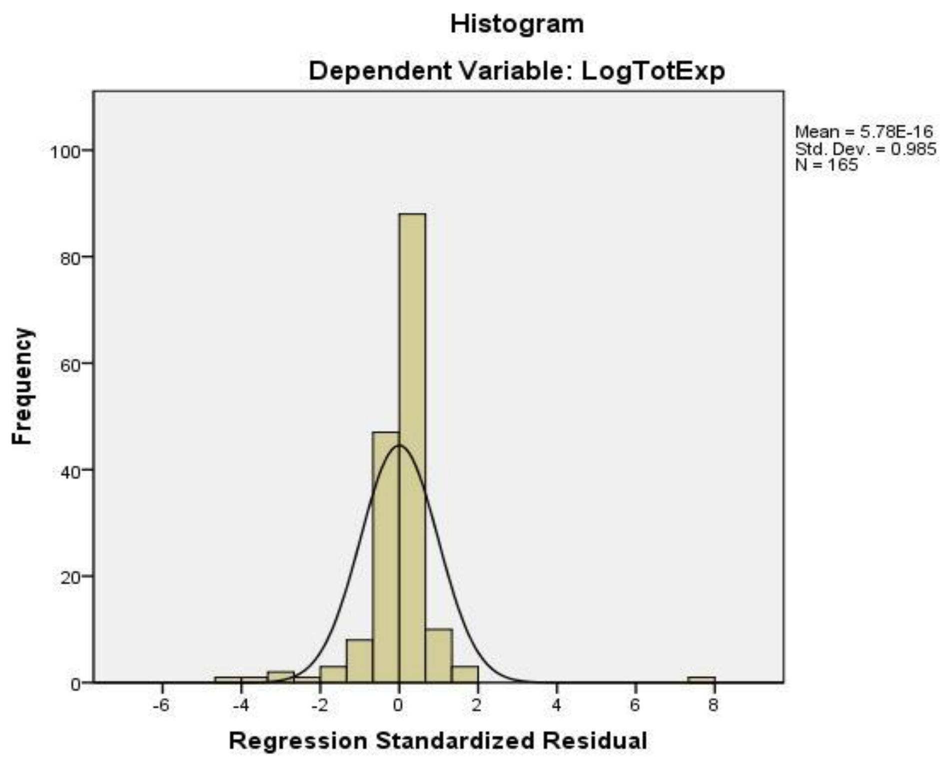

Figure 11. Model 2: Histogram of Regression Model with Standardized Residual.

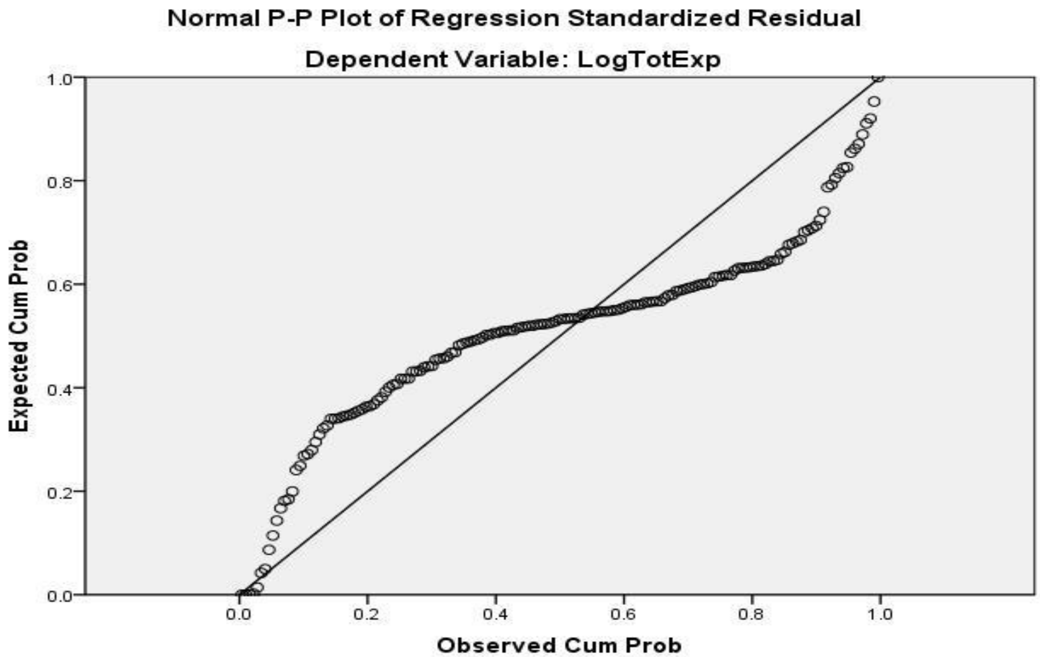

Figure 12. Model 2: P-Plot of Regression Model with Standardized Residual Comparing Expected Cumulative Probability and Observed Cumulative Probability.

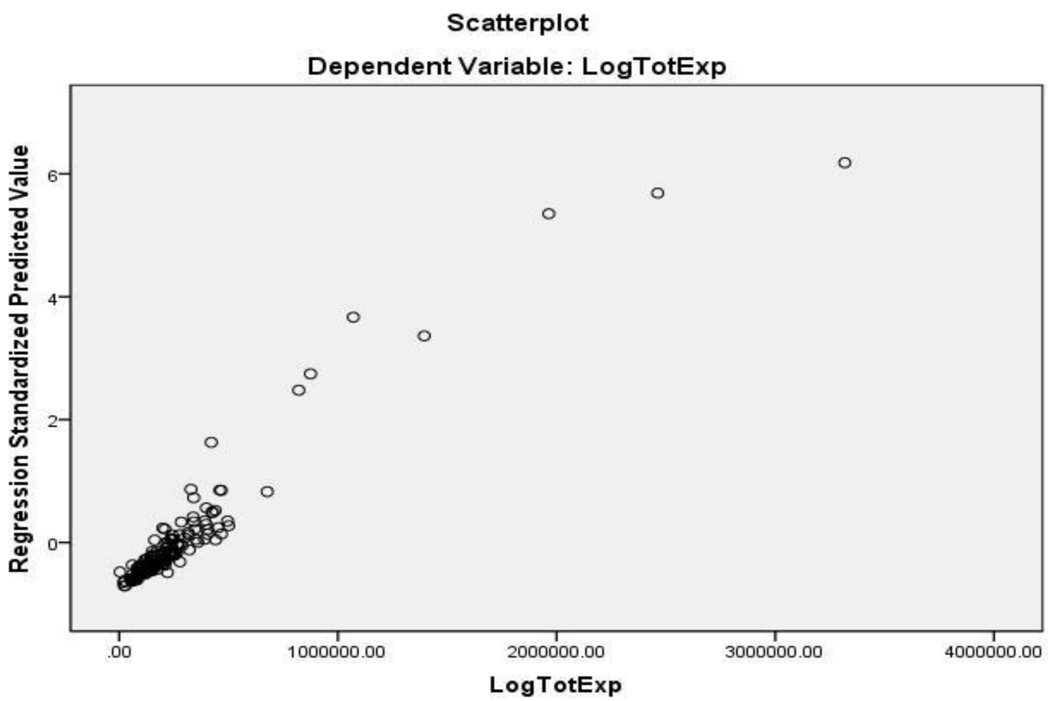

Figure 13. Model 2: Scatterplot Comparing Log Total Expenditures and the Predicted Value from the Regression Model.

The use of natural logarithms in the second model generated no change in the statistical significance or analysis of the data set. The assumption was the natural logarithms would affect the analysis based on the accounting for skewed distributions. However, it appears the larger sample size negated the effect of the natural logarithms, in this case, as the data tends to approximate a normal distribution. The inclusion of this model is significant in comparison to the Washington State model and the use of natural logarithms in that study. In conclusion, the use of natural logarithms had no significance in the statistical analysis of this study.

Model 3

The third model utilized in this study addresses the significance of all independent variables and the relatively high P-values of two independent variables: Land area (0.134), and Average Mileage (0.152). The statistical model used is a Stepwise Regression model that involves the identification of all independent variables, but the model selects the independent variables one at a time based on statistical significance and eliminating those that are not statistically significant (Investopedia, 2011). The Stepwise Regression model used Total Expenditures as the dependent variable; not the natural logarithm of Total Expenditures as referenced in the Washington State study.

The outcome of this model was the use of the natural logarithms of Total Riders, Total Number of Schools, and Total Miles as the statistically significant independent variables; Land Area and Average Mileage were not found to be statistically useful by the regression model. The following steps were identified in the regression model: Step 1 – Log of Total Riders (adjusted R-squared = 0.847); Step 2 – Log of Number of Schools (adjusted R-squared = 0.889), Step 3 – Log of Total Miles (adjusted R-squared = 0.909).

With the use of all three steps, the Stepwise Regression model generated the same R-squared value as the previous two models. The advantage of this third model is the elimination of the two independent variables with less statistically significant P-values and the ability to provide the same level of predictability of total expenditures with two less variables collected – this could provide financial advantages in the cost of collecting the additional data. Figures 14, 15, and 16 represent the outcome of the third model used in the study.

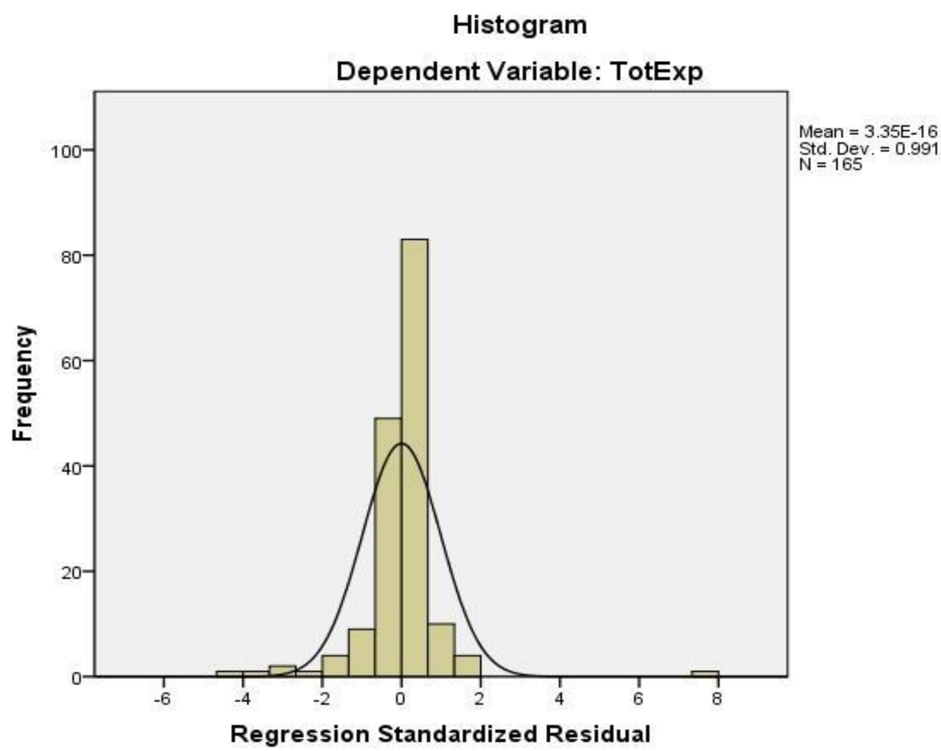

Figure 14. Model 3: Histogram of Regression Model with Standardized Residual.

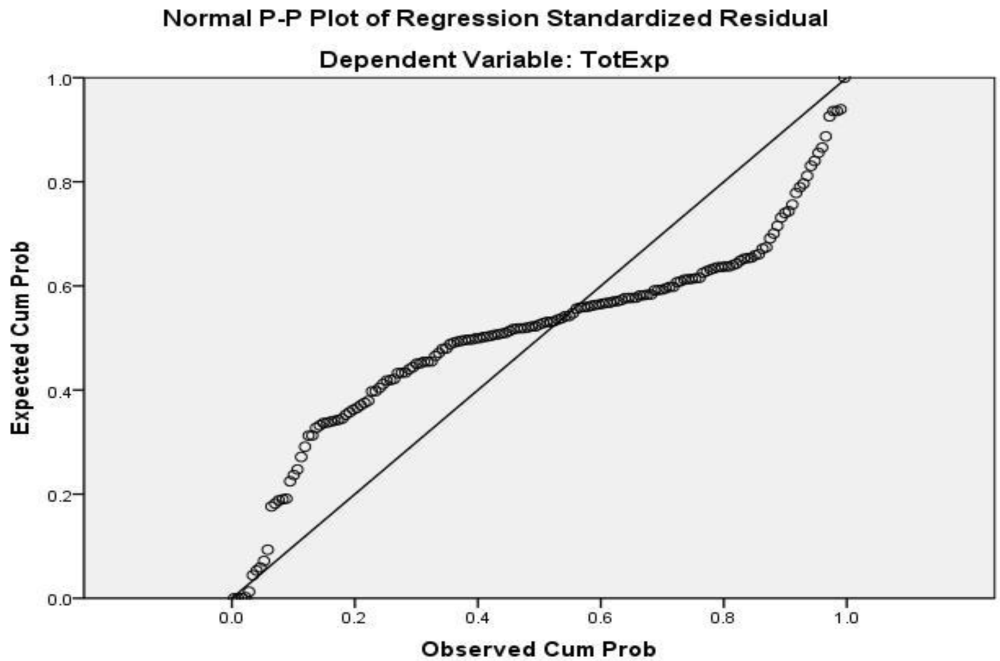

Figure 15. Model 3: P-Plot of Regression Model with Standardized Residual Comparing Expected Cumulative Probability and Observed Cumulative Probability.

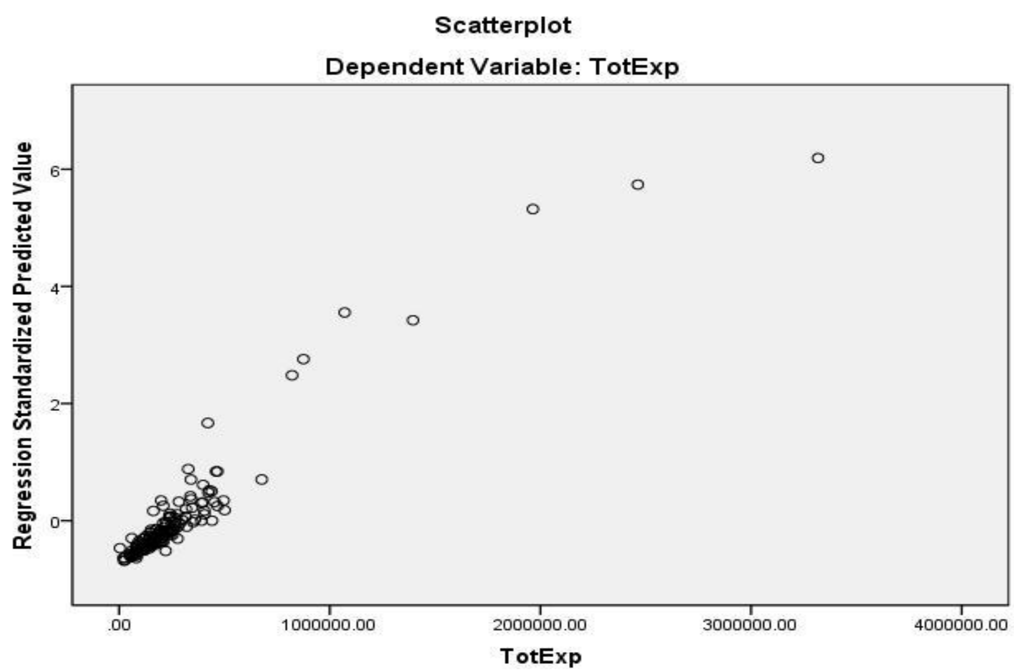

Figure 16. Model 3: Scatterplot Comparison Total Expenditures and the Predicted Value from the Regression Model.

Model 4

The fourth model utilized in this study uses the Stepwise Regression analysis used in the third model, but addresses one change. The dependent variable, Total Expenditures, is changed to the natural logarithm of Total Expenditures as it displayed a Poisson distribution in the variable analysis. The outcome of the fourth model showed the same results as the third model; the adjusted R-square value is 0.909 and the same three variables (Total Riders, Total Miles, and Number of Schools) were used in the model based on statistical significance (p-value). Figures 17, 18, and 19 represent the outcome of the fourth model used in this study.

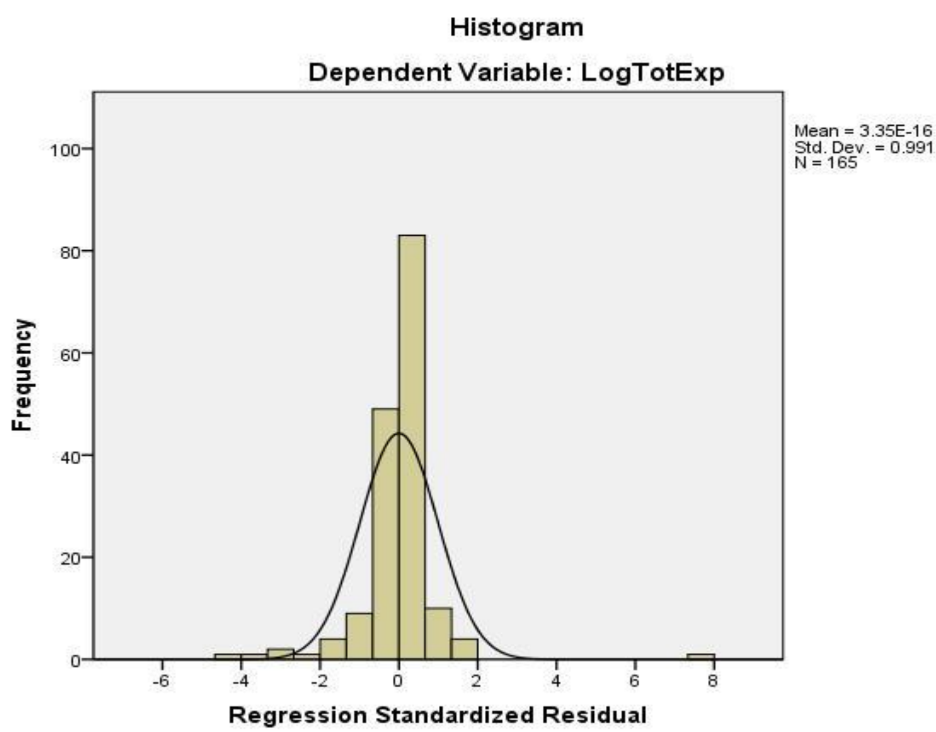

Figure 17. Model 4: Histogram of Regression Model with Standardized Residual.

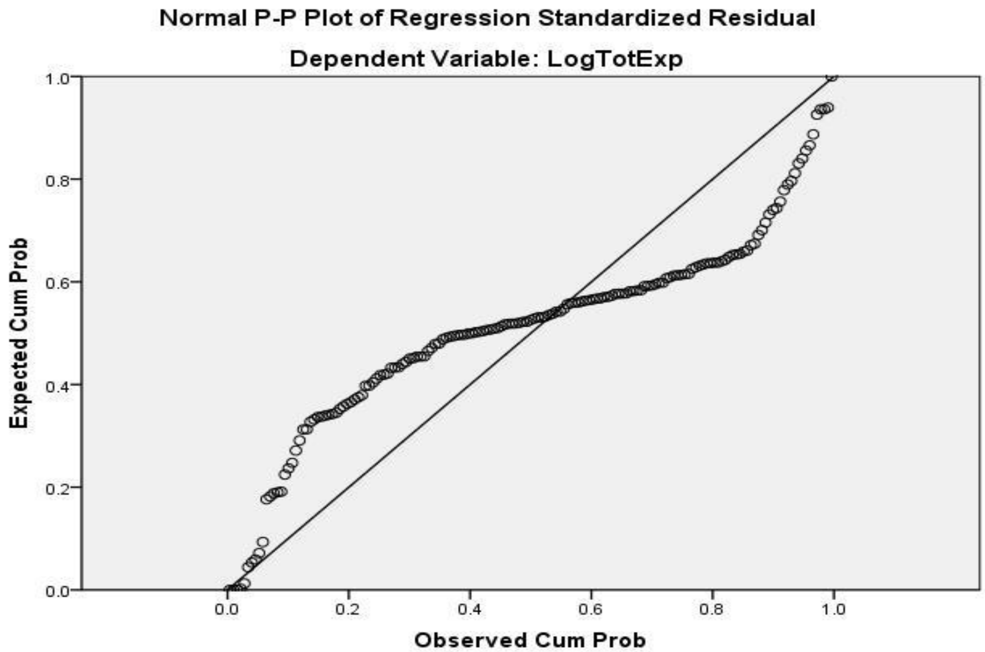

Figure 18. Model 4: P-Plot of Regression Model with Standardized Residual Comparing Expected Cumulative Probability and Observed Cumulative Probability.

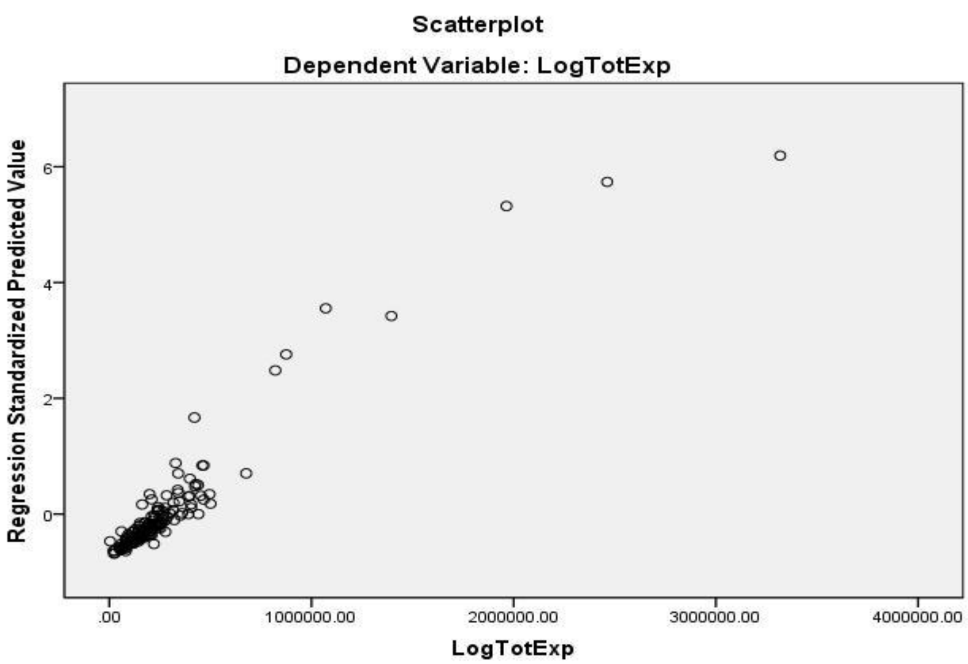

Figure 19. Model 4: Scatterplot Comparing Log Total Expenditures and the Predicted Value from the Regression Model.

In reviewing the statistical models utilized in this analysis, the four models generated the same statistical significance and R-squared values and, therefore, provided the same general results. The choice of a statistical model then becomes a matter of formatting the regression model and the variables that would be utilized in the analysis. The first model utilizes all five independent variables and the original values (not natural logarithms) – all these factors were collected from the Department of Public Instruction for this study. The other practical advantage may be the non-use of natural logarithms that might confuse administrators, legislators, or other stakeholders in the use of a transportation formula. The second model is advantageous as it uses natural logarithms to emulate the Washington State model and its use as a new transportation funding system in Washington. However, its inclusion is insignificant as the sample size appears large enough to use the original values and not affect the statistical significance of the model.

The third model eliminates two variables with higher p-values and fewer variables are required to achieve the same predicted outcomes. However, the natural logarithms are again required and the use of the Stepwise Regression may create confusion among potential stakeholders in the recommendations for change in a funding mechanism. The fourth model acknowledges the Poisson distribution characteristics of the dependent variable, Total Expenditures, and its use in the statistical model. However, it fails through additional level of acknowledgement to natural logarithms in the use of the dependent variable and the Poisson distribution being offset by the large sample size.

The four models generated the same R-square values. Therefore, each model provided validity in its implementation of the statistical analysis. Considering the models applied in the statistical analysis, the first model and all five independent variables (non-logarithm) and the dependent variable (non-logarithm) were used in generating values for the predicted outcomes. Following is a description of the use of this structure in the multiple regression analysis, known as the Expected Cost model, for predicting the actual transportation expenses of North Dakota school districts.

The Washington State study utilized an actual expenditure buffer to account for site characteristics that were not presented in the model. The buffer adds 10% to the actual expenditures and the computed allocation for a school district is the smaller of the school district's actual expenditures and 110% of the value computed by the model. This forces a school district to reduce its expenditures to 110% of the predicted school district transportation expenditures to receive full funding. This represents an efficiency aspect of the model in which school districts must be cognizant of the models predicted expenditures in operating their transportation systems. This study utilized the same buffer idea and the allocation provided to individual school districts based on this model will be the lesser than the actual expenditures and 110% of the model predicted transportation expenditures.

The statistical model generated an expected cost value that was multiplied by 1.1 to create an Expected Cost allocation for every school district in the data set. The total amount of state funding generated by the Expected Cost model totaled $40,845,523. This amount represents approximately 92.6% of the actual expenditures assumed by the North Dakota school districts in the data set during the 2009-2010 school year. In contrast, the current state block grant funding formula allocated $20,727,469 to the North Dakota school districts in the data set during the same year. This amount is approximately 47%

of the total expenditures and the average percentage funding for the data set school districts is 54.3%. The Expected Cost statistical model allocates a total of $20,118,055 additional funding for transportation services provided by North Dakota school districts. The average percentage of funding for transportation expenditures is 93.9% utilizing the Expected Costs model for transportation funding allocations. The total percentage of funding provided for transportation costs using the Expected Cost model was 92.6%. The following graphs represent a comparison of allocation results regarding the North Dakota block grant system and the Expected Cost model.

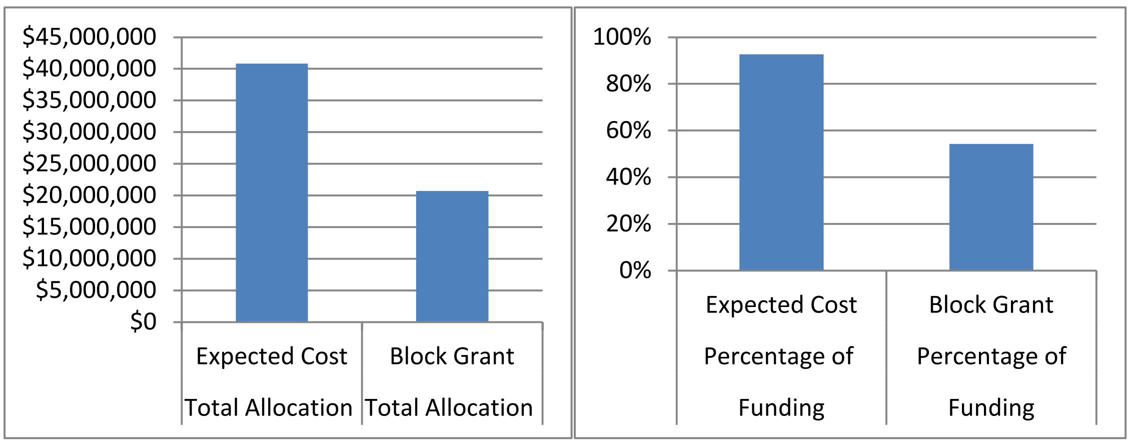

Figure 20. Block Grant Allocations Compared to Expected Cost Allocations.

Every North Dakota school district in the data set increased the amount of transportation funding received utilizing the Expected Cost model versus the current North Dakota block grant system. The minimum increase in actual state funding allocation was $371 by the White Shield 85 School District, which represents 100% of its transportation expenditures for 2009-2010. The maximum increase in actual state funding allocation was $1,660,280 by the Fargo 1 School District, which represents 70.8% of its transportation expenditures for 2009-2010. The average school district increased its transportation funding allocation with the Expected Cost model by

$121,928. The McKenzie County Public School District 1 would increase its allocation with the Expected Cost model by $284,360, which represents 87.3% of its transportation expenses for the 2009-2010 school year. Table 6 represents the adjusted predicted expenditures of districts identified as outliers based on their Poisson distributions:

Table 6

Outlier School District Total Expenditures (2009-2010) and Predicted Expenditures from the Multiple Regression Model (Expected Cost)

District #	District Name	2009-2010 Total Expenditures	Predicted Expenditures	Difference
08-001	Bismarck 1	$1,964,032	$2,222,299	$258,267
09-001	Fargo 1	$3,317,801	$2,135,472	-$1,182,330
09-006	West Fargo 6	$2,462,448	$2,172,677	-$289,771
18-001	Grand Forks 1	$1,394,865	$1,471,328	$76,463
30-001	Mandan 1	$1,070,611	$1,710,311	$639,700
36-001	Devils Lake 1	$821,017	$1,182,449	$361,432
47-001	Jamestown 1	$421,089	$866,265	$445,176
51-001	Minot 1	$874,879	$1,407,070	$532,192

The Expected Cost model produced an increase in state transportation funding allocation percentage for all 165 school districts used in the data set. The smallest percentage increase in transportation funding allocation using the Expected Cost model was 11.11%, which represents the school districts that were at the 90% cap using the current state block grant system. The school district with the largest percent increase with the Expected Cost model was the Williston 1 School District with a 774.82% increase over the block grant allocation; which represented an actual increase in funding of $196,810. The average percentage increase in transportation funding allocation using the Expected Cost model was 87.72% over the current state block grant system.

The percentage of transportation funding allocation compared to the total actual expenditures is significantly higher with the Expected Cost model for the data set school districts. The smallest percentage of state funding versus actual expenditures with the Expected Cost model in the data set was 46.1% for the Mandaree 36 School District. A total of 90 school districts received 100% of their transportation expenses reimbursed by the state allocation with the Expected Cost model. In comparison with the current state block system, the smallest percentage of state funding allocations versus the actual transportation expenditures was 11% for the Williston 1 School District and the largest percentage was 90% due to the legislative cap on transportation funding.

Research Question 3

How does a K-12 pupil transportation funding system based on expected costs, rather than a block grant, provide greater equity and adequacy regarding school district transportation funding levels in North Dakota?

Based on the results of the statistical analysis, it is evident the Expected Costs model provides an increased level of adequacy compared to the current block grant system in North Dakota. In using the study data set, the Expected Cost model provided an average percentage of transportation funding allocation versus actual transportation expenditures of 93.9% for North Dakota school districts. With the block grant allocation method, North Dakota school districts in the 2009-2010 data set averaged 54.3% of transportation funding allocation versus the actual transportation expenditures reported. The difference in the two allocation percentages is 39.6 percentage points. Evidently, the

Expected Cost model provides a higher percentage of reimbursement for actual transportation expenditures.

The minimum percentage of transportation funding allocation with the state block grant for the 2009-2010 data set was 11% and the maximum percentage was 90%. The difference in those percentages is 79 percentage points. With the Expected Cost model to generate predicted transportation expenditures, the smallest percentage of transportation funding allocation versus actual transportation funding expenditures was 46.1% and the largest percentage was 100%. The difference in those percentages is 53.9 percentage points. Specifically, the disparity in the lowest and highest percentages of transportation funding allocations per actual transportation expenditures for North Dakota school districts in 2009-2010 was 25.1 percentage points greater with the state block grant system than the Expected Cost model.

In eliminating the lowest value in percentage of transportation funding allocations with the state block grant system, the next lowest percentage is 20.8% for the Fargo 1 School District. This creates a discrepancy in lowest to highest percentage funding of 69.2 percentage points. In taking out the lowest value in percentage of transportation funding allocations from the Expected Cost model, the next lowest percentage is 61.2% for the Warwick 29 School District. This creates a discrepancy in lowest to highest percentage funding of 38.8 percentage points. The difference in discrepancy for the two funding models is, with this example, 30.4 percentage points. This additional example shows a smaller inequity in the percentage of transportation funding allocation with the Expected Cost model in comparison to the current North Dakota state block grant funding system.

Chapter V provides the summary, conclusions, and recommendations for further action and study.

CHAPTER V

DISCUSSION, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

Since the initiation of state funded K-12 transportation payments to North Dakota public school districts in 1972-1973, the state has utilized a block grant funding system based on a per mile reimbursement rate and then later added a per rider reimbursement factor. The determination of the funding reimbursement factor is limited to changes through legislative action by a legislative body that meets every two years in North Dakota. The block grant formula reimbursement is not based on any factors regarding actual expenditures and does not take any geographic factors into account in its transportation funding allocation. Despite the vast demographic differences existing among North Dakota school districts in terms of physical size, terrain, and road conditions, the state uses the same block grant funding rate factor for transport service reimbursements each school district. This has created a large disparity in transportation funding levels provided to school districts across the state over the past decades.

The funding of general education services in North Dakota has been challenged on two occasions in its history. In 1993, the state was challenged on the equity of its funding formula for public school districts. The North Dakota Supreme Court voted 3-2 that the current formula was unconstitutional, but a super majority number was needed for the challenge to pass. The funding formula was again challenged in 2006. This time, the state of North Dakota and the litigating school districts agreed to a stay to the litigation based on a commitment from the governor to address the equity issue in the 2007 Legislative Assembly with changes addressed by the newly formed North Dakota Commission on Educational Improvement.

The general funding formula was changed during the 2007 Legislative Assembly to address equity in the funding of North Dakota schools (North Dakota Department of Public Instruction, 2011d). The 2009 Legislative Assembly addressed the issue of adequacy and invested in a study to be conducted and provide guidance regarding the definition of adequacy, and how to address the state public education funding. The study recommended a dramatic increase in state funding for public school transportation, but in its report to the North Dakota Commission on Educational Improvement, the issue was not formally addressed (Picus & Associates, 2008).

In both challenges to the North Dakota funding system for public education, discussion or actual plans were formed to address a change in the method of funding K-12 public school transportation. However, these changes did not receive full attention and were not addressed by the North Dakota Legislative Assembly. North Dakota State University was commissioned to create a new transportation funding system that is statistically based and encourages efficiency. Despite some legislative effort to incorporate such a system into North Dakota law, a new statistically based system failed to become law and the state reverted back to its basic block grant funding system.

In many ways, North Dakota legislators and education leaders acknowledge the current transportation funding system as flawed and no longer accurately reflects transportation expenditures for North Dakota schools at an equitable or adequate level.

However, the lack of an alternative or a statistical model that does not create concerns of complexity and confusion among legislators and administrator seems to keep the state from finding a lasting solution to the existing system and enacting change. The seemingly conservative nature of the North Dakota legislative assembly and the general North Dakota culture poses resistance to changes in funding structures, especially if the changes have some levels of uncertainty or potential confusion among the constituents.

Discussion, Conclusions, and Implications

The current North Dakota K-12 public school transportation funding block grant serves the purpose it was originally intended to do. It is easy to understand for the practitioner and is easy to implement and budget legislative allocations at the leadership level. The block grant is easy to manage and allows the legislative assembly to allocate specific amounts that are not reflective of actual increases in the many factors that affect transportation expenditures for a school district. However, with recent efforts to provide equity and adequacy to North Dakota public school funding, a transportation funding system that addresses both adequacy and equity seems plausible. The initiative to increase state funding of K-12 education to a 70% level has been addressed in recent legislative action (North Dakota Legislative Council, 2009). The concept of increasing transportation funding to a 70% level from the current less than 50% level is practical and consistent with sound educational initiatives.

With the current influx of state revenues due to the oil and gas boom in western North Dakota, it appears possible to consider even higher initiatives regarding K-12 pupil transportation funding. Demographically, North Dakota is very similar to Wyoming, especially regarding the oil and gas revenues present in each state. Wyoming currently has a pupil transportation system that provides 100% funding of approved transportation expenditures for its school districts. Given the nature of North Dakota's current financial prosperity and budget surpluses, efforts to increase transportation funding closer to 100% could be promoted with greater hopes of legislative success. The timing may be perfect to explore a new pupil transportation funding formula that reflects the current initiatives in place for the general education funding formula and promotes efforts of equity and adequacy. Picus and Associates adequacy study for North Dakota in 2008 reported:

> A reasonable argument could be made for the state to fund 100% of estimated transportation costs. If the state funds less than 100%, it should provide a means for districts to raise local revenues needed to meet their full transportation costs. (pp. 7-8)

The multiple regression analysis utilized in this study, referred to as the Expected Cost model, provides a statistical method to predicting the transportation expenditures of North Dakota school districts and the ability to fund those expenditures at an adequate level. The Expected Costs model utilized data already reported to the Department of Public Instruction for the 2009-2010 school year is statistically able to predict total expenditures with a 99.9% confidence level and an adjusted R-square value of 90.9%. This model would allow the state to predict the actual transportation expenditures of a school district that accounts for demographic characteristics of the school district within the model. Given that transportation expenditures of a school district could be predicted with a high level of statistical relevance, the state could provide an allocation based on predicted expenditures and not just on the blind block grant philosophy.

The use of the Expected Cost model as a North Dakota pupil transportation funding mechanism for the 2009-2010 school year basically equates to a school district, on average, having to fund 6.1% of its transportation expenditures locally. That compares to the North Dakota block grant system in which a school district, on average, is responsible for 45.7% of its transportation expenditures locally. The statistical model was designed to reimburse school districts at or close to a 100% level. However, the current North Dakota system does not fund transportation expenditures anywhere near 100% and is much closer to the 50% level. An increase in the allocation of transportation funding was expected in the use of the Expected Cost model. The success of the Expected Cost model is the ability to predict school district transportation expenditures with statistical accuracy and to construct a funding mechanism utilizing the predicted transportation costs of a North Dakota school district.

The model provided an increase to state funding for all school districts in the data set. The increase can be attributed to the function of the model to equate funding to the expected transportation expenditures. The current funding system does not take expected transportation expenditures into account in the determination of school district funding levels. The issue with the North Dakota State University Data Envelopment Analysis Project that failed during the 2003 Legislative Assembly was the fact that 125 school districts would lose money with the new system. The benefit of the Expected Cost model would be the unilateral increase in funding for all school districts in the data set.

The effect of the Expected Cost model on the adequate funding of North Dakota public school pupil transportation systems is evident from the statistical analysis. The increase in total funding allocations and the dramatic increase in the percentage of state funding for actual total expenditures are substantial. Using the block grant system, the average school district received 54.3% of its transportation expenditures in state funding the 2009-2010 school year. With the Expected Cost model, the average school district received 93.9% of its transportation expenditures in state funding and 90 school districts received 100% funding of their transportation expenditures. Evidently, this model addresses adequacy concerns of North Dakota public school transportation funding.

The effect of the Expected Cost model on the equity of transportation funding to North Dakota school districts is also evident in the statistical analysis. With the state block grant system for 2009-2010, the disparity among school districts in regards to the percent of transportation expenditures reimbursed with state funding was 79 percentage points. Utilizing the Expected Cost model for the same 2009-2010 data set, the disparity among school districts in the same regards was 53.9 percentage points. Taking out the lowest school district, the disparity of the block grant system dropped to 69.2 percentage points while the disparity of the Expected Cost model dropped to 38.8 percentage points. This is a major decrease in the disparity of state versus local funding of transportation systems and could address the equity issues among North Dakota school districts.

The largest increases in transportation funding with the Expected Cost model were found in the large student population school districts in North Dakota. The largest dollar increases in transportation allocations were Class A school districts in North Dakota. Class A school districts are the largest populated districts in the state and require a Grade 9 through Grade 12 population of 325 students. The largest allocation increases in dollars using the Expected Cost model were Class A school districts – the top nine school districts receiving allocation increases were Class A school districts.

Issues related to K-12 school district transportation have generally been regarded as small school district issues. The small populated school districts with large physical areas to provide service are generally considered to be greatly impacted by transportation funding. The North Dakota Association of Small Organized Schools has lobbied since the 2009 Legislative session for increases in transportation funding for school districts. The Expected Cost model results show the larger populated school districts as a substantial benefactor in the change to the regression model for transportation funding. This is a positive trend in the transportation funding structure. With the majority of legislative representation coming from the urban areas of North Dakota, the large school districts benefiting from the Expected Cost model may assist in the legislative process.

The Expected Cost model for North Dakota school districts provides the opposite strengths compared to the current block grant system. The Expected Cost model, while not reflecting actual costs, provides a statistical model for predicted costs that is accurate according to the statistical analysis. It also promotes efficient use of resources and predictable levels of funding at the local school district level. These three strengths are the negatives involved with the block grant system. The decision to change to a new system then reflects the transportation funding philosophy of the state and what it wants to accomplish in the funding of K-12 transportation services. While there is no one perfect transportation funding system, an appropriate one should, however, reflect the educational ideals of the state and the vision for the students using the services.

Recommendations for Action

This study should serve as a preliminary investigation into the viability of the current North Dakota K-12 pupil transportation funding system in terms of equity and adequacy for all students in North Dakota school districts. The North Dakota Century Code requirement for a uniform public education system can be challenged regarding the implications for school districts funding a majority of their transportation expenditures locally and the potential for educational-based uses for those funds if not required for transportation. In the legal sense, school districts are not required to offer transportation services and the state is not obligated to fund them. However, in a practical sense, it must be acknowledged that transportation services are crucial to the education process for a majority of North Dakota school districts. Without district-sponsored transportation services, there is a likelihood for substantial declines in student attendance in school and cocurricular/extracurricular activities. North Dakota is still considered a rural state and transportation services are essential to the overall benefit of North Dakota students and their education. Without such services, home school and online educational opportunities might be considered due to economic impacts on student transportation for parents.

Recommendation for Action 1

The researcher recommends North Dakota initiate a legislative study, based on this dissertation study, to review the issues present with the current transportation funding system and the rationale for a change in its structure. The State Legislature and the Department of Public Instruction should communicate clear goals and vision for K-12 pupil transportation funding and the characteristics for an effective transportation funding structure. The study reviews the four main funding system structures and the goals for funding student transportation and education services. The study could provide direction to the legislative assembly and educational leaders on potential changes in transportation funding that could best fit North Dakota state and its educational initiatives.

Recommendation for Action 2

The researcher recommends the state of North Dakota consider creating a statistical model that fits the criteria of a Predictive/Efficiency formula model and addresses actual or predicted transportation expenditures in its funding structure. With a clear direction for transportation funding in place, the initiative for a new funding structure that best meets the transportation goals of the state and assimilates to the adequacy and equity initiatives in general education could occur. This study and the statistical analysis performed show the possibilities present with a statistical model that could account for transportation factors and represent the amount of transportation expenditures a school district should accrue given the demographics present for that school district. The statistical model does not have to be overly complex in its nature, as was the issue with the previous attempt at a statistical model for transportation funding in North Dakota. The multiple regression model, for instance, used in this study is easy to understand and administer.

Recommendation for Action 3

The researcher recommends the state to consider a transportation funding structure that attempts full funding of transportation expenditures for school districts. The Expected Cost model used in this study, based on the 2009-2010 school districts data set, was able to effectively predict the transportation expenditures of a school district based on the transportation factors the school district reported to the Department of Public Instruction. Using the model from the Washington State study, the state collects transportation data that matches five of the eight variables used in the Washington State study. This information is readily available in the Department of Public Instruction. With the statistical model in place and the data already collected from North Dakota school districts, the ability to implement this new model is relatively easy for the state or the school districts. The requirement to collect new data or change the responsibilities of the school districts or the state might create financial and time implications for both parties. However, with this particular model, neither is an obstacle in its implementation.

The state of North Dakota may choose not to attempt full funding of school district transportation expenses as initiated in other states across the country, but could use the model to initiate measures to fund transportation at specific funding levels such as the 70% initiative for general education funding. The state is enjoying a booming economy with a billion dollar surpluses to the state general fund. It seems plausible to remove the local responsibility for transportation expenditures to allow additional local money to be used for the general education needs of each school district in the state.

The Expected Cost model, or other predictive model, would serve the purpose of moving current local transportation funding responsibilities to the state level. Doing so can ensure the unique transportation challenges present across the state do not affect the ability of the school district to offer a high quality education. The concept of uniform educational opportunities is more attainable if the topography and physical size of a school district do not affect the amount of local dollars required to sustain student transportation systems and promote quality education.

Recommendations for Further Study

Recommendation for Further Study 1

The researcher recommends further study into an efficiency application that can work in conjunction with the Expected Cost model and serve as a reference point on the extent to which the Expected Cost model is aligned with transportation expenditures. The Expected Cost model is limited in its ability to provide efficiency incentives to school districts. The major disadvantage of funding formulas that approach the full funding of transportation expenditures is the legislative perspective of keeping schools from expanding transportation services and adding costs in a frivolous manner without local resources involved in the process. However, the question remains: What is the incentive to keep transportation expenditures down if the state is going to potentially reimburse the entire cost of transportation services?

The Target Cost model that was outlined in the Washington State study and used in conjunction with the Expected Cost model greatly improved the efficiency aspects of the Expected Cost model. The Target Cost model produces allocations based on the best possible performance of the individual school district while taking into account school district site characteristics in comparison to peer school districts. The model identifies an empirically based mathematical calculation for each school district for a minimum expenditure level regarding transportation to and from the school building. It also takes into account local site characteristics that influence transportation expenditures, but are beyond the control of the school district.

The Target Cost model was designed to be used in part with a transportation funding model and serve the purpose of a management diagnostic tool. In theory, the Target Cost model allows the funding formula to expand beyond what the actual transportation expenditures of the school district are or predicted to be and allows a comparison of what the transportation services of each school district working efficiency should be. On the legislative level, the Target Cost model would provide a fully funded school district transportation system with areas for improvement and goals for increased efficiency. The "target" in the Target Cost model becomes the theoretical goal of each school district in attempting to operate more efficiently with its transportation services.

The Target Cost model uses the concept of linear programming rather than the linear regression utilized in the Expected Cost model of this study. The Target Cost model is actually based on the methodology of Data Envelopment Analysis that was utilized in the North Dakota State University proposed transportation funding system in the 1990s and 2000s that did not gain legislative approval. While the argument against the use of the Target Cost model will be the complexity it adds to the formula, the advantages gained in providing efficiency targets for school districts should be considered if implementing a statistical based transportation formula.

In reference to the Washington State study, when the Target Cost model was used in conjunction with the Expected Cost model, it found nearly half of the school districts were consider efficient by the model. When compared with the Expected Cost model, the Target Cost model decreased the total allocations to school districts by over 14 million dollars and reduced the percentage of expenditures reimbursed by 3.8%. The Target Cost model may reduce the total allocation for school districts in its identification of efficiency and less funding may be provided to school districts that are deemed inefficient through the model. However, this researcher highly recommends the Target Cost model—similar to the Data Envelopment Analysis project previously reviewed by the North Dakota Legislative Assembly—be considered as a viable option for further study if used with another funding system such as the Expected Cost model.

Recommendation for Further Study 2

The researcher recommends further study into the third model analyzed in this study using only three factors—Total Miles, Total Riders, and Total Number of Schools. This investigation may determine a reasonable alternative to the model used in this study given the advantage of utilizing two less transportation variables. The variables used in this study for the Expected Cost model, the variable Land Area and Average Miles had P-Values higher than 0.05 and could be considered statistically insignificant as independent variables. While Land Area seems plausible as a consideration for transportation services, its inclusion in the statistical model should be considered. The Average Miles factor is a variable that was extracted from individual bus route information submitted to the Department of Public Instruction. The average length of the bus routes in miles was used as the Average Mileage to school factor. The researcher acknowledges that the inclusion of this factor could be arguably one factor used in this study that is not directly collected by the Department of Public Instruction for the purpose of determining an average distance to school for bus transportation.

Recommendation for Further Study 3

The researcher recommends further study and data collection regarding the various transportation factors present in the state of North Dakota. The number of school districts with reorganization plans in place generally affects the non-mandated nature of transportation services for school districts. If school transportation is mandated for a reorganized school district, or simply a perceived necessity based on the size or rural nature of the school district, it should be considered in discussions involving equity and adequacy of K-12 school district funding. As school districts explore creative ways to maintain transportation services, such as the implementation of a four day school week, the state of North Dakota needs to be conscious of the various impacts transportation services have on North Dakota school districts and provide further funding and flexibility to meet the needs of the local patrons and students.

In further data collection, an extensive survey should include a large sample of North Dakota school district officials, parents, and community members may be plausible to further understand the common school district transportation perceptions and the general expectations of those the school transportation system affect. Additionally, the legislative assembly needs to consider the actual implications of school district transportation on the educational experience for students and not simply rely on the legal mandate regarding school district transportation. Their actions need to be student and education centered without regard for their legal obligations. Other pertinent data relating to safety of students driving to and from school should be gathered and studied.

The state should also begin to consider the funding of transportation data collection and routing software for North Dakota school districts. In a similar fashion the school district attendance and grading software mandated by the state, transportation software could provide a consistent and validated system of collecting transportation data from school districts. The software could assist in the Legislative Assembly confidence levels with school transportation reported to the Department of Public Instruction and encourage efficiency in the implementation of bus routes. Best practices for school district transportation in North Dakota could be developed with statewide transportation software implementation and the ability to compare data in a more efficient manner.

Recommendation for Further Study 4

The final recommendation for further study is to consider the special circumstances that are occurring in the western portion of North Dakota due to the oil industry boom and the impacts schools are facing regarding the roads traveled and transportation systems. In an effort to provide a K-12 school transportation funding system that considers school district site characteristics that impact transportation expenditures, the researcher recommends more attention in addressing unique situations present in western North Dakota related to oil industry impact on school transportation systems. The formula is designed to accommodate school district demographics and unique site characteristics, but the impacts from an oil boom potentially present funding issues that are not reflected in a normal transportation formula situation. Further study into best practices and funding opportunities for school districts faced with such unique challenges is highly recommended.

APPENDIX

Appendix A

North Dakota School District Transportation Variables 2009-2010 and Analysis Results

North Dakota School Districts 2009-2010 Transportation Data and Statistical Analysis Results												
District Number	**District Name**	**Total Miles**	**Total Riders**	**Land Area**	**# of bldgs**	**Ave. Miles**	**Block Grant**	**Total Expend.**	**Adj. Pred. Ex. + 10%**	**Model Allocation**	**% Reim.**	**Act. Diff.**
01-013	Hettinger 13	110,347.22	13,774.00	861.00	1.00	30.83	95,253.81	174,366.76	172,776.18	172,776.18	0.991	77,522.37
02-002	Valley City 2	117,220.00	142,552.00	358.00	3.00	19.47	136,304.96	283,107.21	425,913.57	283,107.21	1.000	146,802.25
02-007	Barnes County North 7	317,776.00	357.00	717.00	3.00	56.50	264,747.44	452,725.51	369,025.54	369,025.54	0.815	104,278.10
02-046	Litchville-Marion 46	88,230.00	48,246.00	512.00	2.00	31.88	92,750.64	232,927.42	224,078.01	224,078.01	0.962	131,327.37
03-005	Minnewaukan 5	256,488.00	77,282.00	230.00	1.00	92.75	254,516.64	466,933.80	323,891.49	323,891.49	0.694	69,374.85
03-006	Leeds 6	76,712.00	24,768.00	385.00	1.00	55.75	76,519.36	138,334.46	131,371.86	131,371.86	0.950	54,852.50
03-009	Maddock 9	107,260.00	28,521.00	397.00	1.00	38.75	105,524.24	170,872.64	160,384.21	160,384.21	0.939	54,859.97
03-016	Oberon 16	26,994.92	12,048.00	93.00	1.00	39.01	27,726.85	58,634.57	48,669.21	48,669.21	0.830	20,942.36
03-029	Warwick 29	69,200.00	61,646.00	231.00	1.00	50.00	78,459.04	277,638.14	170,006.32	170,006.32	0.612	91,547.28
03-030	Ft Totten 30	214,520.00	84,424.00	34.00	1.00	68.89	146,072.90	162,303.22	323,975.46	162,303.22	1.000	16,230.32
04-001	Billings Co 1	179,613.80	11,407.00	1,152.00	2.00	21.33	116,778.57	279,663.33	282,855.89	279,663.33	1.000	162,884.76
05-001	Bottineau 1	264,542.00	116,312.00	644.00	2.00	58.87	263,776.72	427,229.83	483,966.67	427,229.83	1.000	163,453.11
05-017	Westhope 17	64,702.00	34,600.00	346.00	1.00	62.33	67,829.84	123,756.16	135,394.25	123,756.16	1.000	55,926.32
05-054	Newburg-United 54	60,550.00	19,030.00	383.00	1.00	58.33	60,273.20	109,597.97	109,774.14	109,597.97	1.000	49,324.77
06-001	Bowman County 1	169,713.00	64,356.00	1,048.00	2.00	54.50	171,581.40	315,164.86	356,840.50	315,164.86	1.000	143,583.46
06-033	Scranton 33	104,492.00	40,136.00	489.00	1.00	30.20	105,765.28	205,897.41	181,994.76	181,994.76	0.884	76,229.48
07-014	Bowbells 14	38,752.00	8,176.00	342.00	1.00	56.00	37,614.08	84,613.76	71,990.68	71,990.68	0.851	34,376.60
07-027	Powers Lake 27	86,846.00	20,502.00	350.00	2.00	62.75	84,818.80	168,539.97	170,813.50	168,539.97	1.000	83,721.17
07-036	Burke Central 36	52,950.00	21,798.00	399.00	1.00	57.00	52,278.96	116,409.52	109,005.45	109,005.45	0.936	56,726.49
08-001	Bismarck 1	419,871.00	753,242.00	198.00	22.00	23.83	567,059.40	1,964,031.57	2,444,528.71	1,964,031.57	1.000	1,396,972.17
08-028	Wing 28	85,106.00	23,528.00	408.00	1.00	52.20	83,944.24	158,530.36	137,291.57	137,291.57	0.866	53,347.33
08-035	Sterling 35	56,744.00	9,342.00	182.00	1.00	54.67	54,446.56	76,128.13	76,292.22	76,128.13	1.000	21,681.57
09-001	Fargo 1	508,327.30	921,159.00	57.00	22.00	14.00	688,739.28	3,317,801.40	2,349,018.88	2,349,018.88	0.708	1,660,279.60
09-002	Kindred 2	138,314.00	253,046.00	399.00	2.00	24.24	187,855.12	340,647.76	587,437.11	340,647.76	1.000	152,792.64
09-004	Maple Valley 4	162,474.00	83,652.00	504.00	3.00	37.77	166,314.00	346,023.20	378,898.34	346,023.20	1.000	179,709.20
09-006	West Fargo 6	560,195.82	998,464.00	127.00	13.00	19.83	755,011.51	2,462,448.08	2,389,944.58	2,389,944.58	0.971	1,634,933.07
09-007	Mapleton 7	11,152.00	3,114.00	70.00	1.00	34.00	11,007.20	22,705.42	20,054.62	20,054.62	0.883	9,047.42
09-017	Central Cass 17	170,058.00	155,008.00	401.00	1.00	32.87	190,583.28	397,918.32	408,195.51	397,918.32	1.000	207,335.04
09-080	Page 80	83,592.00	26,267.00	213.00	1.00	48.60	83,208.72	175,591.32	125,099.00	125,099.00	0.712	41,890.28
09-097	Northern Cass	244,358.00	180,696.00	421.00	1.00	64.82	266,310.16	398,376.11	517,083.87	398,376.11	1.000	132,065.95
10-019	Munich 19	80,618.00	26,434.00	354.00	1.00	38.83	80,512.72	121,657.18	133,213.00	121,657.18	1.000	41,144.46
10-023	Langdon Area 23	149,586.00	53,284.00	920.00	2.00	46.30	138,865.68	350,713.81	310,137.98	310,137.98	0.884	171,272.30
11-040	Ellendale 40	130,892.00	57,902.00	504.00	2.00	64.00	134,317.12	224,445.18	276,671.47	224,445.18	1.000	90,128.06
11-041	Oakes 41	129,577.00	87,322.00	498.00	2.00	30.08	140,168.12	238,562.53	318,274.77	238,562.53	1.000	98,394.41
12-001	Divide County 1	189,954.00	34,946.00	1,026.00	2.00	49.91	171,685.20	299,118.06	323,660.71	299,118.06	1.000	127,432.86
13-016	Killdeer 16	154,653.80	82,348.00	856.00	1.00	22.67	141,623.08	390,667.09	309,852.22	309,852.22	0.793	168,229.14
13-019	Halliday 19	24,289.20	5,190.00	315.00	1.00	38.10	21,847.03	24,274.48	52,855.46	24,274.48	1.000	2,427.45
14-002	New Rockford-Sheyenne 2	128,089.20	40,316.00	353.00	1.00	74.04	127,517.90	216,576.84	194,930.39	194,930.39	0.900	67,412.49
15-006	Hazelton-Moffit-Braddock 6	96,214.00	30,448.00	539.00	1.00	48.50	93,314.48	164,104.74	166,442.14	164,104.74	1.000	70,790.26
15-010	Bakker 10	17,704.50	346.00	84.00	1.00	21.92	15,237.81	28,389.17	20,375.99	20,375.99	0.718	5,138.18
15-015	Strasburg 15	88,236.00	28,298.00	355.00	2.00	51.30	87,968.64	169,739.86	183,560.12	169,739.86	1.000	81,771.22
15-036	Linton 36	136,324.00	54,668.00	414.00	1.00	65.67	138,538.40	259,066.52	227,872.86	227,872.86	0.880	89,334.46
16-049	Carrington 49	151,760.00	58,721.00	778.00	2.00	40.45	153,712.24	440,531.39	308,174.88	308,174.88	0.700	154,462.64
17-003	Beach 3	34,751.10	22,840.00	765.00	2.00	20.02	31,514.41	128,395.03	161,448.66	128,395.03	1.000	96,880.62
17-006	Lone Tree 6	133,329.00	18,630.00	243.00	1.00	21.63	53,997.97	59,997.74	157,971.15	59,997.74	1.000	5,999.77
18-001	Grand Forks 1	355,446.00	402,446.00	77.00	18.00	26.10	423,597.36	1,394,864.57	1,618,460.56	1,394,864.57	1.000	971,267.21
18-044	Larimore 44	138,262.00	88,354.00	330.00	2.00	30.79	147,658.64	247,469.97	314,311.80	247,469.97	1.000	99,811.33
18-061	Thompson 61	79,538.00	69,200.00	117.00	1.00	40.67	80,834.80	172,951.87	182,164.57	172,951.87	1.000	92,117.07
18-125	Manvel 125	65,587.00	45,762.00	136.00	1.00	38.50	71,322.92	160,614.84	134,958.71	134,958.71	0.840	63,635.79
18-127	Emerado 127	76,258.00	44,796.00	104.00	1.00	31.44	80,908.40	93,020.94	140,263.25	93,020.94	1.000	12,112.54
18-128	Midway 128	111,856.00	74,642.00	297.00	1.00	35.73	111,615.20	262,296.06	228,345.41	228,345.41	0.871	116,730.21
18-129	Northwood 129	83,732.00	78,162.00	257.00	1.00	40.33	95,792.32	146,206.42	210,621.50	146,206.42	1.000	50,414.10
19-018	Roosevelt 18	101,805.80	27,527.00	471.00	1.00	48.68	100,267.82	199,739.67	160,934.00	160,934.00	0.806	60,666.18
19-049	Elgin-New Leipzig 49	128,250.00	36,849.00	692.00	1.00	41.67	126,833.76	253,178.61	211,522.19	211,522.19	0.835	84,688.43
20-007	Midkota 7	143,724.00	34,093.00	594.00	2.00	64.71	140,408.40	213,089.94	255,976.65	213,089.94	1.000	72,681.54
20-018	Griggs County Central 18	131,826.00	46,364.00	423.00	1.00	63.50	132,407.28	235,513.27	211,988.41	211,988.41	0.900	79,581.13
21-001	Mott-Regent 1	177,384.00	31,843.00	880.00	1.00	73.29	170,835.60	242,415.58	260,422.94	242,415.58	1.000	71,579.98
21-009	New England 9	115,218.00	37,368.00	638.00	1.00	66.60	114,968.88	144,657.23	202,783.69	144,657.23	1.000	29,688.35

22-001	Kidder County 10	238,394.00	76,812.00	1,070.00	2.00	53.00	227,792.56	391,407.63	431,611.26	391,407.63	1.000	163,615.07
23-003	Edgeley 3	103,472.00	40,670.00	414.00	2.00	48.00	103,405.60	188,049.43	219,192.08	188,049.43	1.000	84,643.83
23-007	Kulm 7	92,036.00	20,414.00	497.00	2.00	66.50	84,590.08	117,556.87	187,697.78	117,556.87	1.000	32,966.79
23-008	LaMoure 8	97,226.00	56,052.00	426.00	2.00	35.13	99,578.80	151,022.02	238,673.52	151,022.02	1.000	51,443.22
24-002	Napoleon 2	106,794.00	36,676.00	552.00	1.00	44.43	102,156.72	177,558.57	185,165.20	177,558.57	1.000	75,401.85
24-056	Gackle-Streeter 56	94,804.00	24,485.00	605.00	1.00	68.50	93,096.08	143,167.04	163,254.44	143,167.04	1.000	50,070.96
25-001	Velva 1	133,694.00	2,422.00	562.00	1.00	23.00	103,799.92	209,107.13	147,631.91	147,631.91	0.706	43,831.99
25-014	Anamoose 14	59,552.00	27,904.00	205.00	1.00	36.40	61,456.00	85,734.03	107,793.18	85,734.03	1.000	24,278.03
25-057	Drake 57	73,586.00	30,906.00	435.00	1.00	31.00	66,976.24	145,510.60	139,596.77	139,596.77	0.959	72,620.53
25-060	TGU 60	297,432.00	83,040.00	1,043.00	2.00	64.00	266,057.28	423,823.34	488,542.04	423,823.34	1.000	157,766.06
26-004	Zeeland 4	36,334.08	13,865.00	156.00	1.00	53.12	36,754.95	50,217.38	65,508.29	50,217.38	1.000	13,462.43
26-009	Ashley 9	97,470.00	34,097.00	477.00	1.00	57.00	97,855.68	150,595.04	169,651.02	150,595.04	1.000	52,739.36
26-019	Wishek 19	103,108.00	33,642.00	473.00	1.00	61.60	102,933.44	174,967.50	173,260.96	173,260.96	0.990	70,327.52
27-001	McKenzie Co 1	325,646.00	122,147.00	1,679.00	2.00	36.65	310,150.72	676,977.01	590,818.30	590,818.30	0.873	280,667.58
27-002	Alexander 2	95,842.00	10,782.00	323.00	1.00	69.25	90,762.32	142,765.86	120,720.95	120,720.95	0.846	29,958.63
27-014	Yellowstone 14	34,600.00	26,642.00	147.00	1.00	33.33	38,226.08	85,894.11	81,093.53	81,093.53	0.944	42,867.45
27-036	Mandaree 36	45,672.00	23,009.00	395.00	1.00	44.00	47,540.40	220,656.28	101,804.36	101,804.36	0.461	54,263.96
28-001	Montefiore 1	104,838.00	34,636.00	266.00	1.00	60.60	96,459.60	158,690.46	160,780.16	158,690.46	1.000	62,230.86
28-004	Washburn 4	62,626.00	49,328.00	244.00	1.00	22.63	69,454.64	146,980.48	144,799.58	144,799.58	0.985	75,344.94
28-008	Underwood 8	44,030.00	34,486.00	199.00	1.00	34.20	48,784.24	122,105.13	104,611.72	104,611.72	0.857	55,827.48
28-050	Max 50	92,036.00	44,288.00	338.00	1.00	48.67	95,302.24	177,087.72	169,988.45	169,988.45	0.960	74,686.21
28-051	Garrison 51	98,032.32	46,091.00	393.00	2.00	55.91	100,396.63	227,775.19	222,337.93	222,337.93	0.976	121,941.30
28-072	Turtle Lake-Mercer 72	102,762.00	42,904.00	522.00	1.00	33.00	104,838.00	204,304.36	187,941.42	187,941.42	0.920	83,103.42
28-085	White Shield 85	48,335.00	33,600.00	191.00	1.00	46.03	3,339.66	3,710.73	109,033.09	3,710.73	1.000	371.07
29-003	Hazen 3	95,483.56	59,850.00	303.00	3.00	47.07	100,289.57	288,303.63	274,294.94	274,294.94	0.951	174,005.37
29-027	Beulah 27	200,748.00	88,888.00	669.00	3.00	38.53	191,177.76	495,459.06	427,045.23	427,045.23	0.862	235,867.47
30-001	Mandan 1	375,491.00	682,560.00	908.00	8.00	24.26	502,544.20	1,070,611.06	1,881,342.63	1,070,611.06	1.000	568,066.86
30-013	Hebron 13	74,992.00	21,672.00	394.00	1.00	109.00	74,193.92	122,664.21	131,131.96	122,664.21	1.000	48,470.29
30-039	Flasher 39	199,728.00	23,666.00	632.00	1.00	73.00	189,429.60	320,588.68	242,956.27	242,956.27	0.758	53,526.67
30-048	Glen Ullin 48	91,344.00	41,866.00	426.00	1.00	52.80	94,084.32	140,594.88	172,946.03	140,594.88	1.000	46,510.56
30-049	New Salem - Almont 49	149,888.00	56,454.00	461.00	2.00	44.67	150,415.84	264,168.00	283,601.29	264,168.00	1.000	113,752.16
31-001	New Town 1	113,254.00	90,264.00	317.00	2.00	23.47	123,976.40	359,289.68	292,912.75	292,912.75	0.815	168,936.35
31-002	Stanley 2	276,753.20	67,250.00	766.00	2.00	54.08	249,515.94	341,464.12	427,491.41	341,464.12	1.000	91,948.18
31-003	Parshall 3	75,410.00	64,868.00	358.00	2.00	27.63	84,945.52	203,828.67	228,854.69	203,828.67	1.000	118,883.15
32-001	Dakota Prairie 1	283,918.00	76,189.00	907.00	2.00	63.31	279,489.92	338,407.32	460,582.41	338,407.32	1.000	58,917.40
32-066	Lakota 66	88,550.00	54,600.00	401.00	2.00	63.25	94,570.00	246,535.36	229,058.18	229,058.18	0.929	134,488.18
33-001	Center-Stanton 1	128,656.00	45,268.00	539.00	1.00	74.80	129,227.84	200,865.00	218,167.91	200,865.00	1.000	71,637.16
34-006	Cavalier 6	60,550.00	51,208.00	339.00	1.00	43.75	67,995.92	200,541.29	155,029.52	155,029.52	0.773	87,033.60
34-019	Drayton 19	52,938.00	13,494.00	142.00	1.00	26.00	48,619.92	85,505.72	73,392.89	73,392.89	0.858	24,772.97
34-100	North Border 100	162,620.00	76,812.00	115.00	3.00	67.14	168,045.28	317,824.66	342,194.87	317,824.66	1.000	149,779.38
34-118	Valley-Edinburg 118	125,770.00	60,915.00	552.00	1.00	30.50	130,328.00	171,688.39	237,770.17	171,688.39	1.000	41,360.39
35-001	Wolford 1	33,908.00	7,266.00	196.00	1.00	49.00	24,469.12	52,155.56	55,544.10	52,155.56	1.000	27,686.44
35-005	Rugby 5	193,442.00	58,322.00	805.00	2.00	51.45	191,963.92	404,664.31	344,965.65	344,965.65	0.852	153,001.73
36-001	Devils Lake 1	335,196.00	506,042.00	473.00	5.00	31.64	429,830.40	821,016.73	1,300,693.48	821,016.73	1.000	391,186.33
36-002	Edmore 2	77,158.00	12,516.00	395.00	1.00	55.75	73,989.20	144,448.08	112,929.59	112,929.59	0.782	38,940.39
36-044	Starkweather 44	58,474.00	23,840.00	278.00	1.00	56.33	59,517.68	95,776.48	107,918.64	95,776.48	1.000	36,258.80
37-006	Ft Ransom 6	31,320.00	20,880.00	67.00	1.00	45.00	33,825.60	56,027.04	65,028.66	56,027.04	1.000	22,201.44
37-019	Lisbon 19	112,056.00	88,740.00	429.00	3.00	46.00	124,389.12	275,976.60	342,845.84	275,976.60	1.000	151,587.48
37-024	Enderlin Area 24	105,876.00	68,429.00	416.00	1.00	30.60	113,828.88	207,798.19	222,888.86	207,798.19	1.000	93,969.31
38-001	Mohall-Lansford-Sherwood 1	185,110.00	79,926.00	814.00	2.00	59.44	189,483.44	404,642.93	374,453.77	374,453.77	0.925	184,970.33
38-026	Glenburn 26	121,770.00	70,930.00	346.00	1.00	49.38	127,899.60	252,643.58	235,829.34	235,829.34	0.933	107,929.74
39-008	Hankinson 8	73,179.00	57,263.00	240.00	1.00	45.00	81,067.80	112,267.49	168,536.55	112,267.49	1.000	31,199.69
39-018	Fairmount 18	33,070.00	10,094.00	92.00	1.00	42.00	32,846.96	59,770.66	50,651.03	50,651.03	0.847	17,804.07
39-028	Lidgerwood 28	59,512.00	33,908.00	190.00	1.00	43.00	62,888.96	151,644.17	116,035.20	116,035.20	0.765	53,146.24
39-037	Wahpeton 37	126,847.70	245,587.00	257.00	4.00	11.54	175,640.77	460,001.24	630,082.05	460,001.24	1.000	284,360.47
39-042	Wyndmere 42	112,154.00	64,121.00	311.00	1.00	32.40	118,570.72	233,002.28	212,811.87	212,811.87	0.913	94,241.15
39-044	Richland 44	237,002.00	89,951.00	222.00	2.00	30.92	178,847.42	198,719.36	405,607.18	198,719.36	1.000	19,871.94
40-001	Dunseith 1	146,034.00	129,618.00	199.00	2.00	61.00	165,459.60	209,255.39	381,539.74	209,255.39	1.000	43,795.79
40-003	St John 3	168,488.00	85,900.00	109.00	1.00	80.71	175,624.96	265,789.23	281,610.79	265,789.23	1.000	90,164.27
40-004	Mt Pleasant 4	50,598.00	19,886.00	258.00	1.00	34.60	21,926.64	86,304.64	91,633.19	86,304.64	1.000	64,378.00
40-029	Rolette 29	58,820.00	28,372.00	281.00	1.00	56.67	60,923.68	116,551.44	115,361.64	115,361.64	0.990	54,437.96

41-002	Milnor 2	57,448.00	27,520.00	193.00	2.00	55.67	59,456.96	102,581.07	147,090.71	102,581.07	1.000	43,124.11
41-003	North Sargent 3	25,480.00	28,028.00	117.00	1.00	35.00	30,168.32	81,539.64	73,977.50	73,977.50	0.907	43,809.18
41-006	Sargent Central 6	94,458.00	61,415.00	476.00	1.00	54.60	101,640.96	215,215.87	209,545.57	209,545.57	0.974	107,904.61
42-016	Goodrich 16	34,254.00	3,793.00	264.00	1.00	49.50	32,424.00	55,938.13	55,387.13	55,387.13	0.990	22,963.13
42-019	McClusky 19	72,314.00	9,776.00	429.00	2.00	41.80	68,875.12	91,588.96	146,927.73	91,588.96	1.000	22,713.84
43-003	Solen 3	88,931.00	59,844.00	315.00	2.00	36.93	83,889.16	241,898.60	228,975.71	228,975.71	0.947	145,086.55
43-008	Selfridge 8	57,964.00	38,410.00	295.00	1.00	54.67	62,545.28	80,463.38	132,143.56	80,463.38	1.000	17,918.10
45-001	Dickinson 1	180,981.60	78,203.00	498.00	9.00	25.01	174,549.02	466,379.44	635,564.03	466,379.44	1.000	291,830.42
45-009	South Heart 9	125,919.00	42,622.00	304.00	1.00	52.91	126,074.76	203,123.17	191,763.68	191,763.68	0.944	65,688.92
45-013	Belfield 13	31,832.00	17,393.00	144.00	1.00	46.00	33,459.76	65,806.71	65,597.02	65,597.02	0.997	32,137.26
45-034	Richardton-Taylor 34	152,822.20	89,440.00	523.00	2.00	34.46	157,269.27	241,463.49	342,473.55	241,463.49	1.000	84,194.22
46-010	Hope 10	46,440.00	23,736.00	253.00	1.00	45.00	48,421.44	119,110.96	94,766.14	94,766.14	0.796	46,344.70
46-019	Finley-Sharon 19	60,550.00	33,880.00	293.00	1.00	35.00	63,837.20	84,701.61	124,572.30	84,701.61	1.000	20,864.41
47-001	Jamestown 1	310,605.50	231,142.00	474.00	8.00	49.51	341,231.14	421,088.86	952,891.19	421,088.86	1.000	79,857.72
47-003	Medina 3	110,735.00	32,178.00	405.00	1.00	47.21	107,183.56	191,105.07	170,363.11	170,363.11	0.891	63,179.55
47-010	Pingree-Buchanan	101,098.00	41,383.00	335.00	2.00	49.63	92,480.96	150,715.52	213,021.20	150,715.52	1.000	58,234.56
47-014	Montpelier 14	66,732.00	26,693.00	217.00	1.00	50.25	67,799.76	132,907.49	113,363.47	113,363.47	0.853	45,563.71
47-019	Kensal 19	38,060.00	6,285.00	170.00	1.00	55.00	36,523.60	73,023.81	55,584.09	55,584.09	0.761	19,060.49
48-010	North Star 10	113,380.00	30,563.00	610.00	1.00	55.00	111,644.72	143,084.01	186,611.60	143,084.01	1.000	31,439.29
48-028	North Central 28	23,100.00	6,426.00	387.00	1.00	33.00	22,794.24	81,029.17	57,513.32	57,513.32	0.710	34,719.08
49-003	Central Valley 3	69,546.00	73,352.00	243.00	1.00	50.25	81,586.80	127,912.12	192,045.81	127,912.12	1.000	46,325.32
49-007	Hatton 7	45,326.00	43,232.00	153.00	1.00	32.75	52,075.60	103,910.83	116,322.10	103,910.83	1.000	51,835.23
49-009	Hillsboro 9	78,540.00	63,290.00	278.00	2.00	36.29	87,446.40	244,816.51	223,264.67	223,264.67	0.912	135,818.27
49-014	May-Port CG 14	121,088.00	66,736.00	444.00	2.00	58.67	127,417.60	269,034.41	277,168.08	269,034.41	1.000	141,616.81
50-003	Grafton 3	100,349.00	87,416.00	202.00	3.00	24.92	110,125.72	237,639.31	313,225.39	237,639.31	1.000	127,513.59
50-005	Fordville-Lankin 5	53,284.00	18,508.00	207.00	1.00	60.00	53,192.14	59,102.38	90,983.79	59,102.38	1.000	5,910.24
50-020	Minto 20	58,118.00	16,799.00	158.00	1.00	41.75	53,353.12	97,124.26	85,793.00	85,793.00	0.883	32,439.88
50-078	Park River 78	106,340.00	73,380.00	227.00	1.00	37.42	106,286.56	207,579.56	217,662.88	207,579.56	1.000	101,293.00
50-128	Adams 128	65,048.00	9,656.00	172.00	1.00	47.00	62,161.60	90,230.28	81,661.11	81,661.11	0.905	19,499.51
51-001	Minot 1	261,216.35	267,798.00	104.00	19.00	61.35	290,283.68	874,878.67	1,547,777.49	874,878.67	1.000	584,594.99
51-004	Nedrose 4	79,598.00	98,431.00	32.00	1.00	27.00	93,602.08	177,245.48	221,461.53	177,245.48	1.000	83,643.40
51-007	United 7	193,760.00	261,230.00	340.00	2.00	32.94	240,954.40	327,863.20	641,719.47	327,863.20	1.000	86,908.80
51-016	Sawyer 16	52,592.00	27,842.00	201.00	1.00	50.67	55,066.72	107,173.06	103,048.00	103,048.00	0.962	47,981.28
51-028	Kenmare 28	112,796.00	23,182.00	601.00	2.00	65.20	109,336.00	241,942.62	213,429.46	213,429.46	0.882	104,093.46
51-041	Surrey 41	56,760.00	57,963.00	129.00	1.00	41.25	66,130.32	147,541.62	147,382.49	147,382.49	0.999	81,252.17
51-070	South Prairie 70	101,292.36	54,288.00	164.00	1.00	48.51	106,218.09	215,883.56	179,384.43	179,384.43	0.831	73,166.34
51-161	Lewis and Clark 161	250,671.00	69,892.00	877.00	4.00	61.75	239,671.56	438,932.66	497,694.31	438,932.66	1.000	199,261.10
52-025	Fessenden-Bowdon 25	114,180.00	28,718.00	562.00	1.00	66.00	111,937.92	174,918.66	181,357.71	174,918.66	1.000	62,980.74
52-035	Pleasant Valley 3	28,032.00	4,525.00	135.00	1.00	39.00	18,913.24	21,014.71	41,344.08	21,014.71	1.000	2,101.47
52-038	Harvey 38	128,020.00	66,086.00	571.00	2.00	61.67	133,639.04	209,569.77	292,604.62	209,569.77	1.000	75,930.73
53-001	Williston 1	29,449.00	734.00	15.00	6.00	16.06	25,400.84	231,909.41	222,210.40	222,210.40	0.958	196,809.56
53-002	Nesson 2	95,832.00	35,566.00	479.00	1.00	62.60	95,779.68	193,466.04	170,678.81	170,678.81	0.882	74,899.13
53-006	Eight Mile 6	39,444.00	44,980.00	85.00	1.00	30.75	45,588.96	107,228.30	108,950.29	107,228.30	1.000	61,639.34
53-008	New 8	196,182.00	48,863.00	1,161.00	3.00	47.25	178,263.84	500,685.98	390,378.71	390,378.71	0.780	212,114.87
53-015	Tioga 15	102,416.00	87,677.00	451.00	2.00	37.00	115,265.20	221,394.02	294,384.47	221,394.02	1.000	106,128.82
53-099	Grenora 99	51,900.00	11,907.00	821.00	1.00	50.00	50,605.68	92,940.24	124,860.11	92,940.24	1.000	42,334.56

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