

**FINAL REPORT TO THE
LEGISLATIVE MANAGEMENT COMMITTEE
UTAH LEGISLATURE**

**ESTIMATING DEMAND AND
SUPPLY RESPONSE TO
TUITION TAX CREDITS FOR
PRIVATE SCHOOL TUITION IN
UTAH**

UTAH STATE UNIVERSITY
LOGAN, UTAH

DECEMBER 1, 2004

TABLE OF CONTENTS

Table of Contents	2
List of Figures and Tables.....	3
Executive Summary	4
Historical Background on Tuition Tax Credits in Utah.....	10
Plan of Action	13
Economic Analysis Linked to the Introduction of a TTC in Utah.....	15
Demand and Supply Elasticities in the Market for Primary and Secondary (K-12) Education: Economic Fundamentals	15
Demand Issues as Represented by Focus Group Participants.....	18
Analysis of the Focus Group Discussion	18
Public School Choice.....	20
Estimating the Own Price Elasticity of Demand for Private Schooling in Utah.....	23
Conceptual Demand Model	23
Empirical Model Specification	24
Model Estimation and Results	26
Estimation Results	27
Cost Function Estimates	29
Theory	29
Who Are the Buyers of the School Districts’ Production?	31
What Are the Inputs?	31
What Is the Appropriate Measure of Cost?.....	32
Methodology	34
Results.....	35
Monte Carlo Simulation of Induced and Non-induced Enrollment Effects by School District.....	43
The State Enrollment Allocation Model	43
The School District Enrollment Allocation Model	45
Aggregated District-Level Fiscal Impacts	45
Private School Survey.....	50
Analysis of Public School Capacity.....	54
The Impact of Tuition Tax Credits for Contributions to SGOs on Other Charitable Giving.....	58
Conclusion and Policy Recommendations.....	60
Bibliography	62
Appendix One – Focus Group Handouts and Sample Focus Group Notes	
Appendix Two – Data Set Used in the Demand Analysis	
Appendix Three – Maps: Distribution of Public, Charter and Private Schools by County	
Appendix Four – Simulation Data Set	
Appendix Five – Private School Telephone Survey Instrument	
Appendix Six – Private School Telephone Survey Spreadsheet	
Appendix Seven – Key Informant Interview Template for Public School Administrators	

LIST OF FIGURES AND TABLES

Table 1 – Summary of Fiscal Consequences of Adopting TTC under Different Elasticity Assumptions	8
Table 2 – Private Schools Used in the Demand Analysis	24
Table 3 – Variable Definitions	25
Table 4 – Variable Summary Statistics	26
Table 5 – Regression Results	27
Table 6 – Correlation of Salaries across Licensed Employees.....	32
Table 7 – Correlation of Salary with Benefits.....	32
Table 8 – Correlation of WPU Categories with Each Other	36
Table 9 – Translog Cost System Estimates	37
Table 10 – Full Output of Translog Cost System Estimates	38
Table 11 – Fitted Input Shares.....	39
Table 12 – Price Elasticities by School District	40
Table 13 – Returns to Scale by District.....	41
Table 14 – Marginal Costs by District	42
Table 15 – Statewide Aggregated Fiscal Impacts for Different Elasticities and TTC Values – Quartile Summary	46
Table 16 – Statewide TTC-induced Private School Enrollment Summary for Different Elasticities and TTC Values – Quartile Summary	48
Table 17 – Private School Enrollment.....	51
Table 18 – Tuition and Expenses	52
Table 19 – Populations Served.....	52
Table 20 – Other Descriptors	53
Figure 1 – Monte Carlo Simulation Model	9

EXECUTIVE SUMMARY

Educational choice has long been debated as a controversial reform proposal designed to address the problems with current educational performance or to enhance family freedom. Today, however, it has become a potential solution to address the problem, or at least to soften the effects, of absorbing fast-growing school age populations. It is this argument that has reinvigorated the debate in Utah, as policymakers struggle with the prospect of absorbing 100,000s of new students in an already stretched educational funding arena.

Throughout the legislative debates about tuition tax credits (TTC) in Utah, the fiscal notes have been the key variable. For example, in the last session, the LFA assumed that one percent of public school students would exit to private schools (“switch rate”) in the first year of implementation. In the second year, he assumed the switch rate would decrease to 0.5 percent. In the third and succeeding years, he assumed that the switch rate would be one percent per year. The second key assumption in the estimate was variable cost per pupil, which he estimated at \$2,793.

While these estimates flowed from the best existing information available under the time constraints, they were deemed inadequate to inform debate on such a critical issue. Based on the desire to have a more complete measure of the impact of the proposed policy change, Utah’s Legislative Management Committee commissioned this study. Over the course of the last four months, a team of scholars from Utah State University and Southern Utah University designed an econometric simulation model and qualitative studies of the effects of implementing tuition tax credits (TTC) on Utah educational demand and supply decisions. This report contains the results of that effort.

The one conclusion with which there can be no disagreement is that understanding the fiscal future of Utah education’s marketplace is extremely complex. After tackling the problem using research and analytic strategies from a variety of fields including economics, public policy analysis, education evaluation and business management, we constructed a simulation model. The model uses assumptions derived from the rich tapestry of education decision making in Utah to estimate the most likely response to the introduction of a \$2,000 TTC constructed around the design principles outlined in H.B. 271. The major components of the bill which we considered in this analysis are a refundable 50% parental tuition tax credit up to a maximum of \$2000 per student and a nonrefundable credit for contributions to a scholarship granting organization up to a maximum of \$2000 per student funded, not to exceed 50% tuition. Scholarships would be distributed to low income students (free or reduced lunch qualified) and could be combined with a parent contribution for a credit not to exceed \$3000 total per student. No students currently enrolled in private school would be eligible for the credit. We do not judge whether, given our results, this proposal is good for Utah. To make that judgment requires a fuller debate regarding the educational or individual freedom benefits that may be associated with the legislation. Instead, our analysis focuses on the cost considerations involved in the policy and whether a TTC could be expected to generate additional funds for public education in the future.

As the 2004 committee hearing on H.B. 271 noted, the most important variable involved in such an analysis, and the one of which least is known, is the switch rate. The switch rate is one expression of the price elasticity of demand, an economic measure describing how consumers respond to a change in price. Elasticity varies by the nature of the good, time and place. The literature on the price elasticity of demand for private education is rather limited and of little help in explaining Utah. Although estimates vary between -0.3 and -1.3, most analyses have used -.48. This Chiswick and Koutramanes estimate, however, is rather dated. In addition to using data from the 1980 Census, it also relies on a national sample that we cannot a priori presume is applicable in the unique Utah environment.

For this study, we use existing data regarding private school demand to estimate own price demand elasticities. Building on these estimates and our qualitative analysis of 14 parent focus groups, we

generate an equilibrium model using two different assumptions regarding Utah private school demand elasticities – one at a low switch rate of -0.5 and the other at a high rate of -2.0. It is likely given the results of our focus group analysis of Utah parents that the exact demand parameter falls somewhere between these two estimates.

While it is important to evaluate specific estimates of demand elasticities, the more important aspect of this analysis is the detailed outline of what factors and assumptions impact such elasticities. During September and October we conducted 12 focus groups studies of school parents in six Utah Counties (Salt Lake, Utah, Washington, Beaver, Davis and Carbon) and two home school parents groups (one in Cache County and one on the Wasatch Front). In addition, we conducted 27 key informant interviews of public school administrators and a telephone survey of over 100 private school administrators. Together these qualitative studies enrich our quantitative study with logic to support the assumptions and estimates adopted in a number of ways.

To generate demand assumptions to be used in our simulation model, we examine historic patterns of private school demand for a set of 15 of the largest and most stable private schools in Utah and relate that demand decision to price differentiation in the marketplace. What we find is two fold: First, demand elasticity for this set of private schools in Utah is not statistically different than zero. In other words, historically the parent decisions to send their children to a private school in Utah has little, if anything, to do with price. Second, the factors that led to this particular demand pattern in the past appear to be breaking down in the current market. Thus, estimating future demand requires an extrapolation that includes understanding Utah's unique past of low private school participation, changing demographics and a desire by parents to maximize the educational experience of their own children in the future.

A second consideration critical to good decision making with respect to this policy is an estimate of the costs associated with a student coming into or leaving the public school system. The legislature needs to know how much will be saved if a student leaves a public school in Utah. This value is known to economists as marginal cost. We estimate marginal cost per weighted pupil unit (WPU) in 2002-2003 to be \$8,675 for the typical Utah school district. All Utah school districts have estimated marginal costs in the range of \$7,700 to \$10,350. It is a testament to the worthiness of our schools that they invest so much in each additional student. But, this is then also the value that the state and local districts can be expected to save from public school appropriations if a single student leaves a publicly funded school.

This figure significantly exceeds per student spending (which was about \$6,500 in 2002) or spending per WPU which was just under \$6,000 in 2003 (economists call these measures average total cost). This is to be expected and is a natural result of school district managers doing their job well – economists argue that managers should operate at output levels for which marginal costs do not exceed average total cost.

The economic analysis of decisions involving the production of things works from the premise of profit maximization. However, profit does not refer to the commonly understood accounting profit but to a broader measure encompassing the net monetary as well as net non-monetary benefits of activities. As such, the principle of profit maximization applies to entities which are not normally thought of as being in the business of making monetary profits and, in this study, specifically to non-profit enterprises such as school districts.

An important economic principle known as duality is that profit maximization is equivalent to cost minimization. Economic analysis of a school district proceeds under the assumption that if the management of a school district is trying to do the best job that they can (without making any profits or incurring any losses), then they must be minimizing costs for the level of educational output they are achieving.

The three fundamental cost measurements for economic analysis of supply decisions are marginal cost, average variable cost and average total cost. The latter two usually correspond better to the non-

economists understanding of the world, while marginal cost is a concept stressed by economists because it is more tightly related to actual decision making. Marginal cost is the cost of producing one additional (or one less) unit of output from the current level of production. This is critical to decision making because all decisions are fundamentally about changing production from one level to another. In this case, Utah is concerned about how a tuition tax credit will change enrollments and costs from their current level. The cost of those changes is the basis for making decisions. Costs not related to that change are irrelevant to a decision about change; however, they may be important for evaluating overall business performance.

While a debate over correct assumptions regarding demand and costs is the dominant issue driving Utah's tuition tax credit debate, other issues remain unresolved. Given the low level of private school enrollment, for example, legislators and other observers often wonder how many students can actually attend private school. If the classrooms are already full, the initial switch rate is likely to be quite low. In the long run, most observers believe the supply of private schools is highly elastic. We conducted a survey of all available private school administrators in Utah and discovered two things – in the current market, private schools may accommodate an additional 5000 students or 36% of total enrollment within existing facilities and over 70% of them are open to expanding to meet increased demand. There seems little doubt that if the legislature passes TTC legislation, access to private school slots will not be a problem. Even in the face of stagnant enrollments over the last few years, the private school market has experienced continuing expansion with many new schools opening. Similarly, the swift expansion in the Charter School market suggests that educational supply can adjust very quickly to new sources of demand and revenue. As we show below, there is every reason to believe that supply of private school slots in Utah is very elastic. Thus, an assumption of supply elasticity at 2.0 is very plausible within the current market and may underestimate the responsiveness of the market, while the fully elastic supply of 100 represents the other end of the spectrum. Given the responsiveness of new expansion in the private and charter market even full elasticity remains a reasonable assumption. The critical variable between the simulations we present here is the level of demand elasticity used and the size of the TTC.

Using the assumptions and estimates derived from these different analyses, we generated a Monte Carlo Simulation model of expected number of students who would switch from the public schools to the private schools based on the inducement of the TTC under three demand and supply scenarios (low (-0.5), medium high (-1.5) and high (-2.0) demand) and two levels of tuition tax credit (\$2000 and \$1000). We used this simulation to estimate the revenue effects of TTC by districts and for the state as a whole over the time period from 2005 to 2018, when the policy will be fully implemented. A flow chart of the simulation model and its component parts is contained in Figure 1 below.

We predict that the resulting costs to Utah's public school funding of implementation with an assumed rate of demand elasticity of -0.5 and a supply elasticity of 2.0 would range from gains in the first year of -\$7,158,909 to a loss in public school funding of \$21,519,804 when fully implemented in 2018. Under a high demand elasticity of -2.0 and a fully elastic supply of 100.0, TTC is estimated to result in savings to total public school funding of \$72,952,334 in the first year and \$92,873,458 in savings by 2018. We list a summary of the financial impact of adopting a tuition tax credit at the \$2000 or \$1000 level under three different parameter sets in Table 1. Note that the overall losses or savings generated by students transferring from public to private schools with a \$2000 TTC can vary under these assumptions from a low in the range of **-\$179,289,693** under low demand and supply elasticities to a high of **\$1,181,620,163** under high demand and supply elasticities. For a TTC set at \$1000, the rates vary less across the different parameters with total savings or losses over 14 years of anywhere from a loss of **\$73,222,726** for low demand and supply elasticities to savings of **\$811,121,608** at the high elasticities. As these results suggest, the assumption of a lower TTC dampens the risk throughout the entire range resulting in low estimates that are somewhat higher than those produced under the \$2000 TTC, but highs that are lower as well. Thus, if policymakers expect the introduction of a TTC to spur high levels of new demand, they should adopt a \$2000 TTC, but if they think that demand for private schools based on price

will continue at low levels, then adopting a \$1000 credit is less risky or even consider an alternative amount. The introduction of a TTC results in savings under most assumed parameters for the period considered, but under the lowest demand levels, those initial annual savings are reversed before the plan is fully implemented (2017). This is driven by the fact that the relatively low number of students induced by the TTC to enroll in private schools at the low demand assumptions do not result in sufficient savings to offset the new costs of funding students who would have attended private school even in the absence of the tax credit.

The model results in differential impacts across districts that are based on the past trend in private school enrollments in that district. Districts with growing private school enrollments in the recent past are expected to benefit more from the introduction of the credit than those districts with stagnant or declining private school enrollments. A summary of the total state effects under different assumption sets are shown by year in Table 15. This shows how the expected state savings or losses are distributed throughout the period and across different parameter estimates for the middle of the distribution. Each of these figures is the median of a distribution of possible fiscal consequences.

In evaluating which of these demand assumptions might best represent demand in Utah, several factors are important. Unlike most states, Utah's very low base of private school enrollees suggests a demand relation that in the past has been relatively insensitive to price. The question is whether the population segment impacted by the new policy will behave like the population already in the private school market. In our focus groups, many parents expressed a desire to have access to a TTC to make it possible to consider alternatives for a particular child not well served by the public school environment. As Utah grows to look more like the national model with increased diversity and perhaps more of the problems of other states' school systems, demand in Utah for private schools may also trend upwards towards that national level. With the changing demographics of the state and the demand issues raised in our focus groups, even the high demand figure can be justified. However, given all that we know about the Utah marketplace, it is our best judgment that a figure somewhere in between the two estimates of 0.5 and 2.0 is most likely and would result in a prediction of net positive gain from the policy relative to predicted spending in the absence of TTC. While the high demand elasticities may seem high by national standards, they represent relatively low numbers of students moving to private schools as compared with other state averages. In Table 16, we include the number of students induced into the private school market by the TTC, the number of private school students that would be expected in the absence of the TTC and the number of expected public school students. Note that the private school enrollment levels are really quite low with only about 5% in the private marketplace after 14 years with the low demand assumption scenario and less than 9% at the high elasticity level. Compared with the 10-12% currently prevalent in most states, these assumptions seem reasonable and may even be low.

The key to evaluating whether a TTC is good for Utah's education system from a cost perspective depends on the degree to which families may be encouraged to take the TTC and on the estimated benefit it might produce for families. The simulation suggests that the more students who can be induced to switch from public to private schools relative to those who would have been in private schools without a TTC, the greater the cost savings to the state. As a result, savings grow at a somewhat slower pace with smaller credits (although the per-credit loss in revenue would be less as well). A TTC will result in a windfall for those parents who would have invested in private school without the TTC. If the TTC can pull others into that private market at significant levels, then the savings from these students leaving the public school can more than offset the cost of this windfall. However, if interest in private schools remains low in the face of the TTC, then we would predict that policy would cost the state to fund the program. Whether the benefits of such a policy outweigh these costs is beyond the scope of this study.

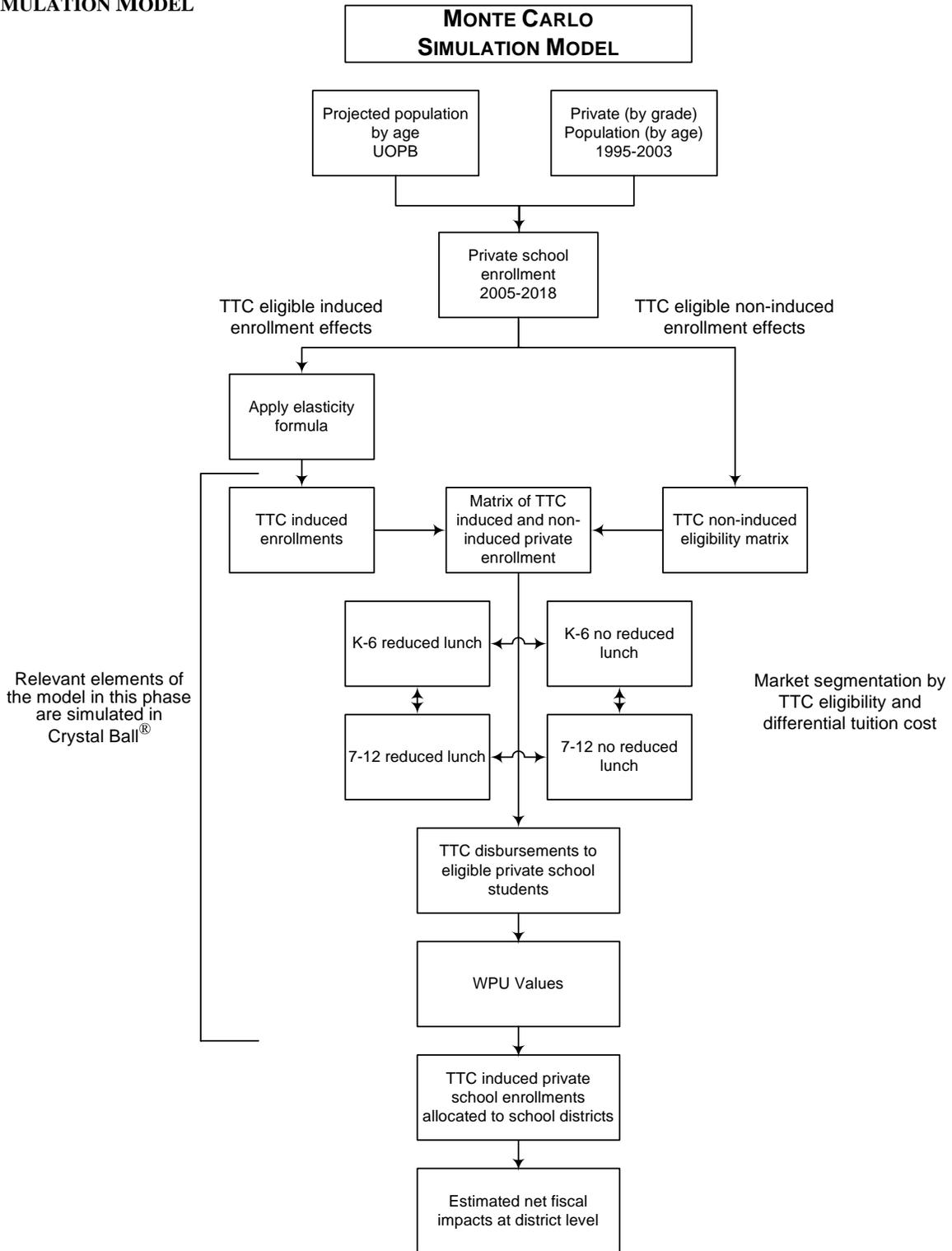
TABLE 1: SUMMARY OF FISCAL CONSEQUENCES OF ADOPTING TTC UNDER DIFFERENT ELASTICITY ASSUMPTIONS

	0.5 demand elasticity 2.0 supply elasticity		1.5 demand elasticity 100.00 supply elasticity		2.0 demand elasticity 100.00 supply elasticity	
\$2000 TTC	-\$179,289,693 Total costs		\$754,670,937 Total savings		\$1,181,620,163 Total savings	
	-\$12,806,406 Average loss	-\$42,834,526 2018 loss	\$53,905,066 Avg. annual savings	\$50,215,912 2018 savings	\$84,401,440 Avg. annual savings	\$92,873,458 2018 savings
\$1000 TTC	-\$73,222,726 Total costs		\$539,383,626 Total savings		\$811,121,608 Total savings	
	-\$5,230,194 Average loss	-\$21,519,804 2018 loss	\$38,527,401 Avg. annual	\$39,495,820 2018 savings	\$57,937,257 Avg. annual	\$66,696,492 2018 savings

A final consideration in evaluating the policy effects of TTC is an examination of the distributional effects of allowing a credit for educational scholarships while all other charitable activities received only deductibility. There is little doubt that a credit will induce additional contributions to fund scholarships but at least part of that expansion will come at the expense of other charitable giving. In other states, the overall increase is \$1.31 contribution to \$1.00 credit with a different distribution across charitable activities. While this may create conflict between charitable organizations, there are two factors that may reduce the impact in Utah. First, most charitable giving in Utah is directed to the LDS church as tithing which is unlikely to change in relation to a tax credit. Second, since all charitable deductions in Utah come at the expense of educational funding (out of the income and corporate tax funds dedicated to education), there is a legitimacy to encouraging giving consistent with the educational mission. If policymakers wish to limit this effect, they might consider total credit limits as used in Florida or Pennsylvania.

While we believe the two simulations run for every district and for the state as a whole represent a good estimation of the effect of the proposed policy, we would encourage the fiscal analyst and other interested parties to work with the model under a variety of assumptions and under changing demographics as new projections become available. We think that it, along with the many rich data sets compiled in this study, may be useful in examining not just this policy, but the dilemmas of educational funding in Utah more generally.

**FIGURE 1 – MONTE CARLO
 SIMULATION MODEL**



HISTORICAL BACKGROUND ON TUITION TAX CREDITS IN UTAH

Educational choice has long been debated as a controversial reform proposed to address the problems with current educational performance or to enhance family freedom. Today, however, it has become a potential solution to address the problem, or at least softening the effects, of absorbing fast-growing school age populations. It is this argument that has reinvigorated the debate in Utah, as policymakers struggle with the prospect of absorbing 100,000s of new students in an already stretched educational funding arena.

During the 1990s, Utah's economy flourished, while the number of student-age children remained constant. These favorable circumstances allowed the state to dramatically increase per pupil spending. In fact, according to overall spending figures from the Utah State Office of Education (USOE), expenditure growth in the period from 1994 to 2000 resulted in over \$43,000 in new expenditures for every additional student added to the Utah school rolls, an additional teacher for every three students, and an additional administrator for every four students. Without question, this period allowed Utah's policymakers to make up some ground. Today these trends seem to be reversing. About four years ago, Utah's demographers began predicting that 100,000 new students would enter Utah classrooms over the coming decade. Since that time, those estimates have been revised upwards. In fact, the Governor's Office of Planning and Budget expects Utah's classrooms will bulge with 740,021 students in 2018.¹ While predicting this dramatic growth in student populations, economic forecasts are far less sanguine. Average annual growth in the state's total employment is expected to lag the growth in student population.²

These changing trends are further complicated by the relatively low levels of per capita education spending and the already high levels of taxation Utah residents face. Regardless of how it is measured, Utah taxes are among the highest in the nation.³ Increasing taxes could harm Utah's economic prospects by creating the impression that Utah is not a business friendly state. At the same time, providing the best education possible to the coming generation is central to maintaining and improving the state's economic prospects.

This context is vital in understanding Utah's debate over tuition tax credits. Precisely because the proponents of tuition tax credits claim they can educate more children for fewer tax dollars, tuition tax credits (TTC) have become one of the most hotly debated issues on Capitol Hill.

During the 2003 legislative session, Senator Chris Buttars sponsored S.B. 34. Although tuition tax credit bills had been before the Legislature the previous two years, 2003 offered the first serious opportunity. The bill's fiscal note would be critical to the bill's success. With the state budget tight, legislators were loathe to approve a bill that was not at least revenue neutral. After much debate between Senator Buttars and the non-partisan Legislative Fiscal Analyst (LFA) about the correct policy assumptions, the LFA produced a fiscal note predicting \$53 million in savings over 13 years. While these circumstances presented the best probability of passage, the bill eventually died under the threat of gubernatorial veto and continuing controversy.

Building on the support from S.B. 34, Rep. Jim Ferrin sponsored H.B. 271 in 2004. In this analysis, we examine the effects of H.B. 271 from the 2004 legislative session. It permits parents to claim 50 percent of tuition paid to a qualifying private school (40 students) up to a maximum of \$2,000 as a refundable credit against their Utah income tax. Additionally, the bill allows corporations or individuals to claim a nonrefundable tax credit for contributions to a scholarship granting organization (SGO) that would distribute scholarships equal to the smaller of either 50 percent of tuition or \$2,000 to students from families with incomes of 185 percent of the federal poverty rate or less. The SGOs may claim no

¹ Governor's Office of Planning and Budget, "Economic and Demographic Summary, 2000-2030, Table 1." Available online at: <http://www.governor.state.ut.us/Projections/R0102B30.xls>.

² *Ibid.*

³ According to the Utah Taxpayers Association, Utah's tax burden ranks 9th nationally.

more than two percent in administrative costs. All undistributed SGO funds revert to the Uniform School Fund. While many other state proposals designed their plans in a way that creates equity issues or limited impact, this bill was designed with the idea of meeting those concerns. It provides a sufficiently large deduction that it is likely to encourage the desired behavior. It directs disproportionate assistance to lower income students and provides an opportunity for all families seeking a solution for the problems of an individual student.

The LFA's fiscal note of H.B. 271 predicted a savings of nearly \$7.2 million in the first two years. However, the USOE released its own fiscal analysis predicting a \$3.5 million savings in year one, but a drain of \$9.5 million in year two.⁴

The fiscal analyses differed because the LFA and the USOE based their analyses on different estimates of how many students would switch from public to private school. LFA Mike Kjar told the *Salt Lake Tribune*, "We felt one percent [of public school enrollment] was as reasonable a number as any. Anybody's guess is as good as the next person's."⁵

With a controversial, but positive fiscal note, another issue reared. The Utah Nonprofit Association indicated they would oppose the bill if the tax credit for SGOs remained in the bill. They worried that their contributions, for which donors could receive only a tax deduction, would decrease, as donors would instead send contributions to SGOs, for which donors could receive a tax credit.⁶ Rather than taking on the United Way and other prominent non-profits, Rep. Ferrin stripped the SGO component from the bill, leaving a refundable tuition tax credit.⁷

The House Revenue and Taxation Committee considered the revised bill, H.B. 271, 1st Substitute, for nearly two hours. Resurrecting the debate over the bill's fiscal note, they focused on one fundamental question: how many students would use a tuition tax credit to exit public schools and attend a private school?

Relying on a PriceWaterhouseCoopers study commissioned by the Utah School Boards Association,⁸ one witness testified that the bill would prompt just 36 students to switch from public to private schools. Moments later, a mom testifying in favor of the bill elicited a round of laughter by noting that her 14 children would provide nearly half of those 36 students. What was clear from this exchange is that Utah's private school demand is based on more than the simple economics of price. Although the committee approved the bill, in a series of procedural votes House members voted not to debate the bill, and another tuition tax credit bill failed in the House.

Throughout these debates, the fiscal notes have been the key variable. First, the LFA assumed that one percent of public school students would exit to private schools ("switch rate"); in the first year of implementation. In the second year, he assumed the switch rate would decrease to 0.5 percent. In the third and succeeding years, he assumed that the switch rate would be one percent per year. The second key assumption in the estimate was variable cost per pupil, which he estimated at \$2,793.⁹

As the committee hearing on H.B. 271 noted, the most important variable, and the one of which least is known, is the switch rate. Assuming a one percent annual switch rate produces a savings to the

⁴ Ronnie Lynn, "Expert says tuition credits may hurt public schools," *Salt Lake Tribune*, February 23, 2004.

⁵ *Ibid.*

⁶ The fullest expression of this argument is in PriceWaterhouseCoopers, "Financial and Economic Impacts of Utah's Proposed Tuition Tax Credit Legislation," January 19, 2004. Prepared for Utah School Boards Association. See also Jon Bakija, "Distinguishing Transitory and Permanent Price Elasticities of Charitable Giving with Pre-Announced Changes in Tax Law," Williams College mimeo, October 2000.

⁷ Jennifer Toomer-Cooke, "Measure advances on tuition tax credits," *Deseret Morning News*, February 20, 2004.

⁸ PriceWaterhouseCoopers, 2004.

⁹ Because this assumption did not include any local or federal monies, however, that estimate likely understates the variable cost. Recent evaluations of variable costs in education from South Carolina and New Hampshire suggest that the variable cost of education, when projected beyond a single year, is a substantial proportion of total cost. See Cotton M. Lindsay, "Fiscal Impact of the Universal Tuition Tax Credit Proposal," Clemson University, 2004; and Brian J. Gottlob, "The Fiscal Impacts of School Choice in New Hampshire," the Josiah Bartlett Center for Public Policy, February 2004.

state that more than offsets the new costs associated with students who would have attended private school without a tuition tax credit. Analyses using lower switch rates anticipate significant costs.¹⁰ The switch rate is one expression of the price elasticity of demand, an economic measure describing how consumers respond to a change in price. This principle is discussed in greater detail in subsequent sections of the report.

Across the country, students attending private school constitute approximately 12 percent of all K-12 students,¹¹ while enrollment in Utah private schools is about 2.8 percent of all K-12 students.¹² This remarkable difference between private school enrollment in Utah and in other states indicates that the demand for private schools in Utah may be largely untapped or it might mean that the relative value of public schools to private schools is much higher in Utah.

While these two issues are the dominant questions that have driven Utah's tuition tax credit debate, other issues remain unresolved. Given the low level of private school enrollment, for example, legislators and other observers often wonder how many students can actually attend private school. If the classrooms are already full, the initial switch rate is likely to be quite low. In the long run, most observers believe the supply of private schools is highly elastic.¹³

In a 2002 survey of private schools, The Employer's Education Coalition found that Utah's private schools are at about two-thirds capacity.¹⁴ In addition, the ability of charter schools to find suitable facilities, despite not being able to issue bonds, leads to the expectation that private schools can and will expand to meet increased demand.¹⁵

Evidence from Utah's growing number of charter schools and from other states indicates that the private sector is well-equipped to generate new supply of private school slots.¹⁶ By paying for these new buildings, the private sector could help offset the capital and debt costs districts face as they expand to meet the growing enrollment of the next decade. The requirement of constructing new facilities under the guidelines of the existing laws and regulations that bind school boards imposes much higher costs than are possible in the private sector where expectations regarding physical plants are lower. This permits more of the educational dollar to be directed towards the classroom.

An additional issue relevant to the Utah debate is the differential effect of tuition tax credits in rural versus urban communities or declining versus growing districts. Because many Utah students live in rural school districts with few and often no private schools, rural legislators have feared tuition tax credits would hurt their constituents. At the very least, they worry it won't help their district. Opponents of tuition tax credits have used the lack of private schools in rural school districts to argue against these bills.

Recently, however, supporters of tuition tax credits have compared the financial well-being of districts with static, declining and growing enrollment.¹⁷ This analysis indicates that declining enrollment districts have lower pupil teacher ratios, and spend a greater proportion of their funds on classroom instruction.¹⁸ Given the parallel between the effects of declining enrollment due to shifting demographics and due to tuition tax credits, this new wrinkle in Utah's tuition tax credit debates is quite important. We would expect that the effect of a TTC on low population districts could be quite different depending on the rural/urban status of the district. Declining urban or suburban schools could use their low

¹⁰ See, e.g., [cite Utah State Tax Commission analysis] and PriceWaterhouseCoopers.

¹¹ See *Digest of Education*, Tables 39 and 61, National Center for Education Statistics, 2002.

¹² USOE, "Utah Private and BIA Schools," Fall Enrollment Summary by School, October 1, 2003, Available online at <http://www.usoe.org/data/nonpub.html>.

¹³ See Chiswick and Koutramanes, 1996.

¹⁴ EEC, 2003.

¹⁵ Locating and preparing a facility remains one of the two biggest hurdles for charter schools. Nevertheless, the number of charter schools in Utah is growing each year.

¹⁶ Clive R. Belfield, Henry M. Levin and Heather L. Schwartz, "School Choice and the Supply of Private Schooling Places," Occasional Paper No. 84, National Center for the Study of Privatization in Education, 2003.

¹⁷ Utah Taxpayers Association, "Urban school districts benefit from declining enrollment", *The Utah Taxpayer*, February 2004.

¹⁸ Growing districts spend much of their local dollars building new facilities.

student/teacher ratios and commitment to student funding to attract students using a TTC. Rural counties may have fewer options. Exploring this issue will be critical for addressing Utah policy.

Another question legislators must confront is who will benefit from tuition tax credits. If they only subsidize choices already made by families attending private schools, they will do little to help the state cope with the coming enrollment growth. With a number of plans in place across the country,¹⁹ and a great deal of research on this point, researchers have reached a greater degree of consensus than they have in other aspects of the tuition tax credit debate.

Hoxby concludes that, true to its design, the Milwaukee voucher program primarily benefits low-income families.²⁰ In evaluating the Milwaukee plan, Metcalf notes, “students who entered the CSTP in second grade did not differ from public school students with respect to their estimated family income.”²¹

Greene reports similar findings in his summary of data on school choice proposals across the country.²² “In all studies of existing choice programs the evidence shows that participants have very low family incomes, predominantly come from single-mother households, and have a prior record of low academic performance.” Supporters and opponents of school choice both criticize the Arizona plan precisely because the low ceiling on tax credits limits its benefits to families already attending private schools.²³ The most serious problems with the Arizona credit are the low \$500 total, the fact that the credit may only apply to tax liability and the requirement that SGO monies be distributed or lost. When faced with no new low-income students to accept the credit, SGOs roll the money over to current private school students which results in more money being distributed to the higher income students who could afford the tuition without a subsidy. Clearly, the impact of any TTC proposal depends on how the policy is structured. The design of the Utah proposals is quite a bit different. First, the Utah law limits scholarships to low-income recipients. Second, if scholarship funds are unused, the money returns to the Uniform School Fund and cannot be directed towards more economically advantaged children. Finally, the Utah credit is refundable, which makes it equally valuable to families regardless of tax liability. We think that all of these design features are important to the cost advantages created by this policy. Thus, policymakers should carefully weigh the unintended consequences of changing conditions of the plan such as refundability without evaluating the way such conditions drive other behavior in the program.

Plan of Action

In order to evaluate the effect of H.B. 271 type tuition tax credits on public school funding, parental choice, and the overall educational mix in Utah, we developed a consumer-driven model of TTC induced and non-induced changes in primary and secondary school enrollment in Utah. The model captures the dynamics of consumer and taxpayer behavior in response to changes in price structure and the tax code. The model estimates the effects of a TTC upon tax revenues and public-sector expenditures for primary and secondary education; it also provides a mechanism for policymakers to generate future estimates based on different assumptions regarding anticipated behavior.

We have organized the analysis into six major parts. First, we use an econometric model to estimate the expected demand elasticity of private school choice in Utah. The effect of the proposed tuition tax credit depends crucially on how individuals respond to the new economic incentive. From a

¹⁹ There are tuition tax credit plans in Florida, Pennsylvania and Arizona. In addition, Cleveland, Washington, D.C., Milwaukee, Florida, Vermont and Maine all have varieties of publicly funded voucher programs. Privately funded scholarship programs with extensive data also exist in Dayton, Ohio, New York City and San Antonio.

²⁰ Caroline Hoxby, “School choice and school competition: Evidence from the United States,” *Swedish Economic Policy Review* (10):11-67, 2003.

²¹ Kim Metcalf, Stephen D. West, Natalie A. Legan and Kelli M. Paul, “Evaluation of the Cleveland Scholarship and Tutoring Program: Summary Report 1998-2002,” Indiana University School of Education, p. 7.

²² Jay P. Greene, “A survey of results from voucher experiments: Where we are and what we know,” *Manhattan Institute Civic Report No. 11*, July 2000.

²³ Kevin G. Welner, “Education Tax Credits: No net benefit to Arizona’s impoverished students,” Education Policy Research Unit, Arizona State University, February 2003; Glen Y. Wilson, “The equity impact of Arizona’s education tax credit program: A review of the first three years,” Education Policy Research Unit, Arizona State University, March 25, 2002; Lips and Jacoby, 2001.

parent's point of view, the tax credit effectively lowers the price of private schooling. The key question is how many children will switch, or want to switch, from public to private schools because of the price decrease implied by the tax credit. The own price elasticity of demand is an economic construct designed to measure these kinds of effects.

The second part of this analysis is a qualitative analysis of demand for private versus public schools. We know that private school demand in Utah is markedly different from observed patterns in other states. As a result, we conducted a series of 14 focus group meetings of Utah parents to elaborate the thinking that would go into future demand decisions. Analysis from this context suggests the factors that shape parents preferences beyond price and give policymakers a context within which to understand the future demand decisions. Thus, while it is important to generate specific estimates of demand elasticities, the more important aspect of this analysis is the detailed outline of what factors impact such elasticities. We developed a model rich in the features of education and family economics in Utah using a combination of economic modeling, focus group analysis to illuminate the dimensions of the demand side for private versus public education services and key-informant surveys to inform the supply side of the model.

In the third part, we estimate the cost of educating Utah's school children by district and represent these figures as marginal cost (the cost of educating the next student) and average costs. Using these cost figures permits us to evaluate the potential savings or losses associated with a student opting out of the public school system because of the tuition tax credit and contrast that with the future spending estimates.

The fourth part of the model integrates the demand and costs models into a single simulation spreadsheet model that generates the overall effect of the proposed legislation on the estimated revenue impacts at both the state and school district levels. This model used a Monte Carlo simulation to generate distributions of the enrollment and fiscal impacts on each district.

The fifth part used to examine this question is a survey of private school administrators to measure the current supply of private school alternatives. Policymakers have expressed concern that the private school market can expand to accommodate the new demand this policy will generate. This survey of over 100 private schools identifies existing capacity and suggests the potential capacity available in the existing private system to address demand in the short-run.

The sixth part outlines the capacity question from the public school perspective using enrollment figures and a series of key informant surveys with district administrators. These interviews are intended to pick up enrollment trends and outline cost effects and planning windows needed for the public schools to absorb these changes.

A final section examines the impact of the tax credit logic of H.B. 271 from the perspective of other charitable giving in Utah. Many wonder how the presence of a credit for education will impact the willingness of individuals and other corporations to invest in other charities that only qualify for a tax deduction. We examine the experience in other states and evaluate it in the context of Utah's unique tax structure.

Critical to the successful implementation of any educational choice program in the state of Utah is a comparison of the costs of proposed reforms with the future expected costs of the current educational programs. Support for any proposed change depends not simply on the expected cost, but also on the anticipated returns of the proposed reforms. Even a costly reform may be justified if the benefits are sufficiently great. However, our analysis focuses solely on the cost differential between the two systems and only suggests possible benefits parents expressed in our focus group analysis.

ECONOMIC ANALYSIS LINKED TO THE INTRODUCTION OF A TTC IN UTAH

To most appropriately analyze the effect of a proposed tuition tax credit on the equity and efficiency of primary and secondary (K-12) education in Utah, it is necessary to review a few fundamental economic concepts that are critical to the assessment. First, our tradition of public "production" of primary and secondary education is founded upon the principle that society as a whole receives significant benefits above and beyond those that accrue directly to the individuals and families receiving an education. In economic parlance, this characteristic of public education leads to a type of market failure that is commonly referred to as a "positive externality." This type of market failure may lead to inefficient levels of provision without some incentive to increase demand and/or supply through some form of public intervention. Additionally, there are potential equity considerations that push education into the arena of a *public good*. Both of these considerations suggest problems for a pure competitive market response. The rich literature in economics and public goods theory can be brought to bear on strategies for provision. Second, estimates of the net impact of all proposed alterations in the funding allocation to public education will ultimately hinge upon estimates of the elasticity of demand and supply in the market for public and private education. For this reason, credible estimates of elasticity are crucial to the credibility of any analysis. As such, we start with a brief review of these fundamental economic concepts.

Demand and Supply Elasticities in the Market for Primary and Secondary (K-12) Education: Economic Fundamentals

The term *elasticity* is used by economists to summarize the responsiveness of supply and demand to changes in their respective determinants. For example, price *elasticity* is used to describe the responsiveness of quantity demanded and quantity supplied to changes in the price. Another common elasticity measure is *income elasticity* which measures the responsiveness of quantity of any good demanded to changes in income.²⁴

Economists have identified a few primary factors which are most likely to influence the magnitude of supply and demand price elasticities. These are frequently referred to as the *determinants of elasticity*. It is important to keep these elasticity determinants in mind as one contemplates the uncertainty associated with employing point estimates of elasticity to analyze the impact of policy on individual choice. The primary determinants of demand elasticity include the availability of close substitutes and the length of time over which a person has an opportunity to make a purchase decision. The primary determinants of supply elasticity include the underlying market structure for inputs which affect the cost structure of a supplier and the time with which a supplier has to adjust their level of production. It is important to note that both supply and demand elasticities are significantly influenced by time. In both cases, elasticities become larger (more elastic) as the time horizon for the decision making process is expanded. In the case of demand elasticities, the availability of close substitutes would tend to increase the elasticity of demand. We would expect that as opportunities to access private school alternatives expand, the elasticity of demand for private school will increase. This will likely increase the magnitude of TTC effects resulting from changes in the effective tuition prices facing consumers. With supply elasticities, changes in the cost of constructing new education facilities and changes in the market for teachers and support staff can significantly alter supply price elasticities. For example, if minimum staffing standards for teachers and support staff were imposed it would tend to decrease the price elasticity of supply.

²⁴When the percent change in quantity demanded or supplied is more than proportionate to a percent change in a determinant (e.g., price or income) the relationship is said to be *elastic*, otherwise it is said to be *inelastic*. The concept of elasticity is frequently presented as the (inverse) slope of the demand or supply curve. This over simplification frequently leads to a problem in comparing elasticities along a given supply or demand curve. More correctly, the concept of elasticity is a *unitless* measure of the percentage change in quantity divided by a percentage change in the determinant.

Starting with the seminal work of Barlow (1970) and Barzel (1973), economists have attempted to better understand the underlying structure of the market for K-12 education. On the supply-side, most theoretical and empirical work in the areas of primary and secondary education considers schooling to be approximated by a constant cost industry, where elasticity of supply is perfectly elastic at the long-run average cost. As mentioned above, the ability to assume perfectly elastic supply is significantly affected by the time in which supply is allowed to adjust to changing market demand. As such, this characterization of supply elasticity is more typically consistent with a "long-run" concept. The supply of education has a "lumpy" characteristic in the sense that the marginal cost of one or two students per classroom, distributed across many classrooms is likely to add little to the short-run or long-run incremental cost of providing education. However, concentrating an additional 100 students in one school and one grade could potentially be very expensive (thus altering short-run elasticity of supply) if new capital facilities are required to meet the educational needs of the new students. Policymakers need to be very careful in considering how projected growth patterns will impact the cost of providing education. Many claim that all new growth requires all new capital facilities. However, past evidence from Salt Lake City School District would suggest that there are many opportunities for growth to be accommodated by existing capital facilities that are significantly underutilized.²⁵ Similarly, despite concerns that parents are unwilling to transport students to underutilized capital facilities, there appears to be much evidence from the private school markets to contradict this claim when parents perceive a qualitative differential in the education environment offered to their children. They simply are unwilling to do so for what they frequently believe is a lesser quality education.

A unique factor that affects the willingness of private education suppliers to increase their capacity is that many institutions are supported by private financial endowments or some portion of their operating and capital costs are underwritten by private organizations. These are most likely to be endogenous to the market, and it is possible that an intended reduction in the tuition price facilitated by a TTC would be exactly offset by reductions in external private donations. This would leave supply at current levels with private institutions directly capturing all of the benefit of the TTC. This is a mitigating circumstance that is difficult to measure without more information about the underlying financial structure of private school providers. However, if this scenario is not binding, then long-run supply will expand to meet demand at the inflation adjusted price currently offered in the market. In other words, demand at current price is the only constraint to increased supply, and a TTC induced increase in demand will be satisfied by increased capacity of private providers.

The discussion of elasticity generally points to elasticity of demand as the most important factor affecting the fiscal implications of the TTC. The literature on the price elasticity of demand for private education is rather limited because defensible demand elasticities for commodities and services that are only thinly traded in private markets are very complex to estimate.

Although the literature on the own price elasticity of demand for private education is quite limited, most likely because of the limited availability of adequate data, a few researchers have estimated the own price elasticity for private schooling in other states and for the U.S. as a whole. Previous analyses of tuition tax credit and voucher programs have typically relied on demand elasticities from one or more of these secondary sources (e.g., Anderson et al., 1997; Moody and Ellig, 1999; and Belfield, 2001).

A 1988 study by West and Palsson focused on teacher strikes as a source of alienation that drove parents to choose private schooling. Using cross-sectional, state-level data from the 1970s, West and Palsson estimated a demand function for private schooling and concluded that price elasticity was between -1.50 (census data) and -3.0 (National Association of Independent Schools data). Another 1988 study by Long and Toma focused on income elasticities of demand using 1970 and 1980 census data.

²⁵ Heather May, "Wanted: Families With Kids, Rogan seeks to head off east-side school closure," Friday, December 15, 2000, The Salt Lake Tribune (www.sltrib.com/12152000/utah/53889.htm) and Heather May, "Board Plans To Shutter S.L. School," December 13, 2000, The Salt Lake Tribune (www.sltrib.com/2000/dec/12132000/utah/53191.htm)

Estimates based on the 1970 data found statistically insignificant demand response to private school tuition; the 1980 model found a significant positive response (private schools with higher tuition had more demand). In an econometric study using New York state data for 1970-80, Erikson (1982) also found a positive price elasticity for Catholic schools (1.28). For non-Catholic private schools, Erikson found the expected negative and significant price elasticity of -2.88 . Menga and Lee (1990) focus their research on the price and income elasticities of demand for public education using data from 371 Wisconsin schools. Their estimate of price elasticity of demand was -0.659 . A study by Lankford and Wyckoff (1992) examined New York state schools using 1980 census data and found insignificant effects of tuition on the demand for private education. In the latter two cases, income elasticities are virtually identical. The similarities in income elasticities provide some confidence in assuming similar price elasticities between public and private education. The most often cited sources of price elasticities for private school appear to be Chiswick and Koutroumanes (1996) and Gwartney and Stroup (1997). Without describing the research methodology involved in obtaining the estimate, Gwartney and Stroup assert an own price elasticity of demand for private education of -1.1 ; the primary source of this number could not be obtained to assess its validity and relevance.

The best study to date appears to be Chiswick and Koutroumanes. Using 1980 census data across the entire U.S., the authors estimated the probability that an individual school-age child will be enrolled in a private school as a function of the price of attending private school (the average private school tuition level in the child's state); family income; the child's gender; the quality of public schools in the child's state; the family's religion; whether the child's mother works; and a long list of regional, demographic and other control variables.²⁶ Chiswick and Koutroumanes estimated the own price elasticity of demand for all types of private schools to be -0.48 , with a 95 percent confidence interval extending ± 0.10 in each direction.

Although the econometric methodology of Chiswick and Koutroumanes is sound, it cannot be replicated for purposes of this study. The primary reason is that the state of Utah does not have enough cross-sectional geographic units for analysis. The county is the most feasible geographic unit to use for such analysis. However, in 2003, for example, viable private school alternatives to traditional public schools were operating in only eight of Utah's 29 counties, implying very few available observations on the price variable (i.e., average tuition level of private schools in the county).

In the Menga and Lee article, the demand price elasticity was estimated using 371 Wisconsin schools. Because the cultural climate and market structure in Utah differs significantly from Wisconsin, a few caveats are in order. First, there has been a strong public school tradition in Utah that has been fostered by a fairly homogeneous population. As such, the public schools may be perceived as "local parochial schools" by the dominant local culture. For those who embrace the dominant local culture there are strong cultural pressures to have children remain in local public schools (particularly in grades K-6) to foster childhood socialization needs, regardless of the quality of the educational product offered. This effect would tend to dampen price elasticity of demand for private schools in Utah relative to other regions of the country. For those Utah residents who do not embrace the dominant local culture, it is likely that we would observe much stronger price elasticity effects. These consumers are likely to be much more price-sensitive because they may feel their children are already alienated from the neighborhood socialization network. Regardless, as Utah's population grows and cultural diversity expands, we would expect to see price elasticity of demand become more elastic, all else constant.

²⁶ Chiswick and Koutroumanes used a special statistical technique called a probit regression model designed to estimate the probability that a given individual will make a certain choice.

DEMAND ISSUES AS REPRESENTED BY FOCUS GROUP PARTICIPANTS

The demand for private schools in Utah is distinctly different from other states; it is significantly lower even controlling for income. An answer as to why demand historically has been so much lower is suggested by comments from our focus group analysis. We conducted a series of 14 parent focus groups to address the issue of tuition tax credits and attitudes about public and private schools within seven different districts. We conducted two focus groups in each of the following counties: Davis, Salt Lake, Carbon, Beaver, Utah and Washington. Additionally, we conducted two focus groups of home school parents in Cache County and on the Wasatch Front. For each focus group, we tried to recruit between six and ten parents interested in the topic of tuition tax credits. Two major methods of selection were used. First, we recruited groups through the PTA and school administration who were generally opposed to the idea of a TTC. Second, we recruited mixed groups that were evenly split between opponents and proponents of the proposed legislation. For home schooling parents there was no such distinction. Each focus group lasted no more than 90 minutes.

After the focus group participants were recruited, we distributed some background material to each of them: a position piece in favor of a TTC written by Royce VanTassel; a position piece opposed to a TTC written by Steven O. Laing; and a set of terminology used in the debate over school choice. These handouts are included in Appendix One. We did not discuss the papers during the focus group session, but we wanted everyone to have a core of common knowledge about the debate before they engaged each other.

The focus groups were conducted by members of the USU team and followed the format outlined below. We asked each group to respond to seven major questions:

1. How satisfied are you with your neighborhood school?
2. Have you ever considered a private school for any of your children and if so why did you decide for or against it?
3. How familiar are you with private schools in your area?
4. If finances were an issue in your decision, at what level of out of pocket cost would you consider sending your children to private school?
5. If you know anyone whose children attend a private school, what reasons have they offered for their decision?
6. Where do you get information about schools, educational issues, and proposed changes or reform initiatives?
7. Suppose you had one minute to speak to the state legislature about tuition tax credits. What would you say?

We include sample notes from three of the focus group sessions in Appendix One as well.²⁷

Analysis of the Focus Group Discussion

One major incentive driving private school demand in other states is the parents' desire for a moral/religious environment for their children consistent with their family belief structure. There is little doubt that this is an important consideration for most Utah parents as well, but many Utah parents continue to believe that such needs can be met in Utah public schools. Frequently, parents noted that Utah schools remain moral and relatively safe environments as compared to schools elsewhere. This perception seemed to stem from a sense of shared culture/religion and the generally held idea that moral teaching was an appropriate part of the Utah educational process. Those who had found that moral or cultural environment in the public schools were quite protective of that environment. Others argued that while this was once the case, public schools no longer functioned as moral or safe arenas due to rising diversity and increased regulations mandating a more secular schoolhouse. Those expressing these latter

²⁷The complete set of focus group notes are available upon request from the project manager.

views were far more likely to favor access to a tuition tax credit to permit selection of a moral environment consistent with family values in a private school. While this is an important indicator of potential future demand, the overall sentiment remains the belief that the secular decline prevalent in other states has yet to undermine Utah's strong moral climate in the schools. Thus, the parent discussions suggest that a major source of private school demand in other states has been to this point limited in Utah. While this accounts for the relatively low levels of private school demand of the past, it also suggests a future vulnerability as demographics and religiosity in the schools change. Based on the comments in every one of our focus groups, we would expect the demand among parents who rate moral environment and community consensus high to rise into the future, especially if cost of private school alternatives were reduced with a TTC.

A second general perception that emerged from the focus group analysis was the view that Utah public schools are good for the average student, but they frequently fall short in addressing the needs of those outside this norm. Several parents who were generally pleased with the public schools noted that for one or more of their children or the children of friends, the public schools simply did not work. In these cases, parents expressed a desire for the alternative presented by tuition tax credits. What seemed universal is the view that the legislature should support whatever approach would best serve the educational needs of their children and that no single approach would likely do that. Parents want choice when addressing the needs of children who fall at the ends of the learning continuum, especially if it is their child who may not fit.

Support for public schools and opposition to tuition tax credits was greatest among participants who felt that their demand for choice was being met within the public school system. Several noted that they had been effective at starting new programs or transferring and exercising choice within the public school system to find a good fit for their children. There seemed to be a correlation between a sense of control in their own child's education and the satisfaction they felt with public schools overall.

Those frustrated by efforts to make the public system fit their needs, whether on academic or social or moral grounds, were far more supportive of the idea of using a TTC for all of their children. They expressed concerns about the growing problems in the public school from the academic standards to complex social and declining moral environment. Many thought that the competitive forces of more choice in the market would improve not only their family's educational experience, but also would result in a stronger public school system.

Some argued for a TTC on the grounds that competition would improve the public schools by creating more options and forcing more responsiveness. They also valued the freedom that such an instrument would allow in making decisions so critical to families. These participants articulated frustration of a system that is perceived as unresponsive to their needs and resulted in too much bureaucracy and inefficiency; they felt that many of these problems would be reduced by bringing free market principals into the system.

Within our groups, we also observed participants worried that tuition tax credits could harm public schools. They argued that such credits should be opposed even if they saved money for the public schools. These participants expressed concern about whether most parents were capable of making the judgments needed to exercise choice over the range of private and public school options. This position was most likely to be expressed by parents who also worked for or had family members working in the public school system. Perhaps as a result of their knowledge of the system, most of these parents felt empowered by their personal access within the public school system and that their interests were fully addressed. Parents in this group were more likely than others to believe that private schools and home schools were inferior to the public school system, a view that was opposite of those who favored or were neutral on TTC. Many opponents of TTC noted that they thought students from non-public settings were less well-rounded and lagged behind their public school peers. All in all, they argued for the superiority of the public schools and worried that tuition tax credits would weaken those schools. These parents

often expressed support for parental involvement in education, but they had succeeded in finding a path for satisfying their own choices through their relationships with the schools. Parents who were less successful in this regard were more likely to be open to school choice, at least under some conditions.

Among home school parents, two features of demand emerge. First, many parents who currently home school have no interest in moving their children back into an organized school environment even if the cost were reduced by a TTC. Nor were they interested in receiving funds from the government to assist them in home schooling. They expressed concerns that money would come with regulatory strings that would adversely impact their positive home school experience. The second pattern that emerged from the home school group came from those with some time in public schools before home schooling. In these cases (about half of our sample), they pulled their children out of the public schools because of difficulties the children were having in the public school environment. These difficulties ranged from discipline/learning problems to inadequate challenges for more gifted students. For this group, the presence of a private school alternative at the time they encountered their problems could well have resulted in choosing that option over home schooling. They noted that many of the new enrollees into the charter schools in their community were former home schoolers seeking alternatives to mainstream schools. This suggests higher demand for alternatives made possible by a TTC. Parents also suggested that there were times in a child's educational cycle (perhaps high school) when an organized private school setting would be more desirable than the home school option they have chosen.

Thus, if our groups are representative of the broader home school population, the tuition tax credit would result in a small percentage of current home schoolers returning to a private school setting, but perhaps a larger portion of potential home schoolers in the future opting for private schools over home settings. With between 7,000 and 40,000 children currently home schooled in Utah, the desire for low cost alternatives to public schools is unquestioned. The remaining issue is how many of this group in the future may end up in private school settings. Of the parents that were open to the public school setting at one time, we would project a high rate of demand for private school options. The issue for this group is two-fold: (1) do private school options exist; and (2) are they affordable given the refundable tax credit?

What seems clear from all of our focus groups is that the primary motivation for parents supporting each policy position is that they wish to maximize the results that the Utah educational system produces. They want every child to learn to the best of his or her ability even though they were divided on how best to do that. As a result, even many who worried about the effects of tax credits on the public schools expressed the desire to have options for a child who might not fit the average education model. Among all but the most hard core opponents, our participants considered empowering parents within or outside the public school system as a legitimate policy goal. When it came to their own children, they wanted to have as many options as possible to improve their child's education. Some worried that money going to a TTC could hurt the success they had found in the public schools. They were suspect that credits would save educational funds and, thus, they opposed them. When pressed, some suggested they would prefer tax increases to address future growth rather than allow tuition credits. Many others who had suspicions about a TTC were open to them if they could be shown to save money. Finally, those who had problems with the public schools or thought competition would result in stronger schools saw the benefit of opening up those options and were supportive regardless of the economic benefit or cost.

Public School Choice

There is little doubt that the existence of inter- and intra-district transfer options in Utah public schools reduces the demand for a broader choice option among many parents. Several factors limit the effectiveness of this choice option in practice. The option is frequently not available due to overcrowding or closed schools. Similarly, the requirement that requests to transfer be submitted between December and February prevents many parents who make schooling decisions in relation to problems that may occur at any time. Another factor reducing the desirability of such choice options is the fact that transfers are renewed each year based on space availability. Thus, a parent who successfully transfers their child in

one school year may have to transfer that child back if enrollment levels change. This lack of control creates frustration for parents considering such options. Further limitations are placed on transfers that would require additional resources by the receiving school. Frequently, parents expressed a desire for alternatives to their local schools for a child who needed a more challenging environment or additional assistance for learning problems. Yet students who may require additional resources are often unable to obtain them through public school choice as worries about matching resources to children create risk for administrators. For each of these reasons, public school choice has been somewhat limited in its effect.

As schools face even greater growth over the next decades, it is likely that the school choice options within the public system may become less available. We would expect that few public schools in the growing districts most likely to produce private school options will have space to allow outside students. As a result, demand for private school options or a TTC would be expected to increase and satisfaction with the flexibility of the current public system is likely to decline.

One factor that represents the demand for choice in schooling decisions is the fast growth in the charter school population wherever they have opened. Charter schools in Utah began slowly, with a limited number allowed in 1998. After expanding two years ago, charter schools around the state have quickly filled and now educate over 3,000 students. As noted in the discussion of demand by our parent groups, several factors impact the parents' perceptions of their own schools and the desirability of choice as an option. One of the most critical is whether a community is rural or urban. Urban parents are much more likely to select a private school as an alternative for their children even in the absence of a tax credit. Rural parents frequently do not feel the need to exit their rural schools and even if they do, they do not have access to the range of choices within their community. Included in Appendix 3 are maps of each county showing the location of public, private and charter schools as well as the distances between potentially competing schools. What is clear from these representations is that the degree to which choice is a preferred or even viable option for parents is largely determined by where you live. Parents in rural counties with few schools and great distance between those schools have little potential to exercise choice within the current system unless they or their child can move to do so. This conclusion is based on the existing distribution of schools. Under new financial inducements associated with the TTC proposal, we would expect new schools to emerge especially in the larger rural settings. Such schools do, however, face greater risk from drawing on a relatively small population. This would suggest that policymakers think carefully about the minimum size requirement for TTC eligible schools. Many private schools operate in Utah with well below the 40 student limit included in last years debate. As a result of fewer options, parents in these rural counties worried more about the potential negative impacts of choice programs on their counties.

Another factor reducing the impact of TTC on rural counties is the cohesion of community that still marks these counties. The close-knit nature of the community creates pressure for parents to work together within the existing group. Furthermore, we noted a high degree of consensus building intended to get everyone on board to support the community position. This teamwork approach almost always resulted in parents being supportive of the local schools. In large districts in population centers such as Salt Lake or Utah County, a school community may find itself embedded in a broader community where individuals share work, politics and social life but are separated into numerous school communities. It is common for people working together in the community to have links to many different school environments. As a result, parents from a city may know of many other school experiences to compare to his or her own. City residents are often more willing to think of a broader metropolitan area as their community and as such they are presented with many options of public or private schools to consider within their town. Rarely do these kinds of choices present themselves to the rural resident. But just as positive options come with growth, there are also significant negative consequences. Large urban schools are frequently marked by fast growth and overcrowding that results in lower evaluations by parents. Small rural schools may have fewer choice options, but students may benefit from additional attention

and small class size within their neighborhood school. As with many policy decisions in Utah, the impact of the proposal plays out very differently in rural versus urban settings.

ESTIMATING THE OWN PRICE ELASTICITY OF DEMAND FOR PRIVATE SCHOOLING IN UTAH

The effects of the TTC induced enrollment depend crucially on how individuals respond to economic incentive. From a parent's point of view, the tax credit effectively lowers the price of private schooling. The key question is how many children will switch, or want to switch, from public to private schools because of the price decrease implied by the tax credit.

The own price elasticity of demand is an economic construct designed to measure these kinds of effects. It is defined as the percentage change in the quantity demanded for a good or service brought about by a small percentage change in the price of the good or service. For present purposes, the own price elasticity can be interpreted as the percentage change in the quantity demanded for private school slots caused by a one percent change in the price of attending a private school. If the demand elasticity is -0.5, for example, it implies that a one percent decrease in the price of attending private schools will induce a 0.5 percent increase in the demand for private school seats. The effects of larger price changes can be estimated by extrapolation.

The theory and methodology for statistically estimating elasticities of demand is well developed. Economists have estimated elasticities for thousands of products and services, including, in some instances, private schooling. One objective of this project is to econometrically estimate the own price elasticity of demand for private schooling in Utah from available data. To our knowledge, no prior estimates exist specifically for the state of Utah.

Conceptual Demand Model

Because of the difficulties involved in using data at the individual family level, this study is based at the individual school level. Following standard economic theory and previous literature, the demand for slots at a given private school (*PvtSchool*) is specified as

$$PvtSchool = f(Price, Income, Pop, P_y, PubSchQual, Tastes)$$

where *Price* is the cost of attending the school, *Income* is the disposable income of families with school-age children in the relevant geographic market region, *Pop* is the school-age population of the region, P_y is a vector of prices for competing private schools, *PubSchQual* is the quality of public schools in the region, and *Tastes* represents the tastes and preferences of individuals in the school's region. Each explanatory factor is discussed in more detail below:

1. *Price*. In principle, the *Price* variable should reflect the net economic cost of attending the private school, including tuition, fees, books and travel costs, less scholarships and other forms of financial aid. As indicated by standard economic theory, *Price* should have a negative impact on the dependent variable.
2. *Income*. Family income is expected to have a positive impact on the demand for private school (i.e., private education is a normal good). As income goes up, families can better afford private schooling.
3. *Pop*. Clearly, the school-age population of a region should have a positive impact on *PvtSchool*, ceteris paribus.
4. P_y . The prices of competing private schools should have a positive impact on *PvtSchool*, if the cost of attending a competing school goes down, some students will switch to the less expensive alternative.
5. *PubSchQual*. This factor represents the academic quality of available public school alternatives as well as other perceived "quality" factors such as safety and ethnic or religious composition. When public schools are of higher quality, the demand for private schools should go down.

6. *Tastes.* Although tastes and preferences are not observable, they are often closely associated with demographic factors that are observable, in principle, such as the religion, ethnic and age distribution of the relevant population. For instance, if there is a larger percentage of Catholics in a given region, one would expect the demand for private school education to be higher, *ceteris paribus*.

Empirical Model Specification

Given considerations of theory and data availability, a fixed-effects, pooled time-series cross-section regression model is specified. Cross-sectional units consist of 15 Utah private schools, selected on the basis of stability and data availability (Table 2).²⁸ For each private school, annual observations are available for the time period 1998-2003. Thus, the data set consists of 90 total observations (six annual observations for each of the 15 private schools).

TABLE 2—PRIVATE SCHOOLS USED IN THE DEMAND ANALYSIS

Private Schools	Affiliation	County	School District	Type of School
Salt Lake Lutheran High School	Lutheran	Salt Lake	Granite	Secondary
St. Francis Xavier Elementary	Catholic	Salt Lake	Granite	Elementary
St. Vincent Elementary School	Catholic	Salt Lake	Granite	Elementary
Blessed Sacrament Elementary	Catholic	Salt Lake	Jordan	Elementary
Waterford Elementary School	Secular	Salt Lake	Jordan	Elementary
Waterford Middle & High School	Secular	Salt Lake	Jordan	Secondary
Christ Lutheran Elementary	Lutheran	Salt Lake	Murray	Elementary
Judge Memorial High School	Catholic	Salt Lake	Salt Lake	Secondary
Redeemer Lutheran Elementary	Lutheran	Salt Lake	Salt Lake	Elementary
Redeemer Lutheran Middle	Lutheran	Salt Lake	Salt Lake	Secondary
Rowland Hall Elementary School	Catholic	Salt Lake	Salt Lake	Elementary
Rowland Hall High School	Catholic	Salt Lake	Salt Lake	Secondary
Meridian Elementary School	Secular	Utah	Provo	Elementary
Meridian High School	Secular	Utah	Provo	Secondary
St. Joseph's High School	Catholic	Weber	Ogden	Secondary

The empirical model is given by

$$PvtSchool_{it} = \beta_0 + \beta_1 Price_{it} + \beta_2 Income_{it} + \beta_3 Pop_{it} + Trend_t + \mathbf{d}\delta + \varepsilon_{it}$$

where $PvtSchool_{it}$ is the total number of students enrolled in the i th private school in year t ; $Price_{it}$ is real, annual tuition and fees for school i in year t ;²⁹ $Income_{it}$ is real per capita income in the county where the i th school is located in year t ; Pop_{it} is the school-age population in the i th school's county in year t ;³⁰ \mathbf{d} represents a set of 14 dummy variables representing each school in the sample (the arbitrarily selected benchmark school, Waterford Middle and High School, is excluded); $Trend_t$ is a standard linear

²⁸ There were about 67 private schools operating in Utah in 2003. The schools used in the study represent approximately 28.5% of all 2003 Utah private school enrollments.

²⁹ For those private schools that indicated a range for tuition or fees, the midpoint of the range was used.

³⁰ For elementary schools, the school-age population is defined as 6-11; for secondary schools, it is defined as 12-17.

time trend variable; and ε_{it} is a random error term. Each variable is summarized in Table 3; descriptive statistics are presented in Table 4.

TABLE 3 – VARIABLE DEFINITIONS

Variable	Definition
<i>PvtSchool</i>	The dependent variable: total number of students enrolled in each private school in each year.
<i>Price</i>	Real tuition plus fees for each school and year (2003 dollars), using the median values for those schools that have a range for tuition and fees.
<i>Income</i>	Real per capita income for the county in which each school is located (2003 dollars).
<i>Pop</i>	School-age population of the county in which each school is located. School-age population is defined as 6-11 for elementary schools and 12-17 for secondary schools.
d	A set of 14 dummy variables representing each private school in the sample (equal to one for the <i>i</i> th school and zero otherwise). Included to capture differences across schools that do not vary over time.
<i>Trend</i>	A time trend (1 for 1998, 2 for 1999, ...) included to capture omitted time-wise effects. (Does not vary over cross sectional units.)

School dummy variables are included to capture unobservable differences across schools that do not change over time, or that change very little over time. Thus, the dummy variables capture factors such as school quality, religious affiliation, and grades offered (e.g., whether 7th and 8th grades are included in a secondary school). The dummy variables also help control for factors that differ across regions such as demographic characteristics of the school’s target population and the quality of nearby public schools, which probably changed very little over the six year time span under consideration.

The *Trend* variable is included to capture omitted time-wise effects that impact all schools in a similar way, such as a general change in preferences for private versus public schools. Year dummy variables were also considered but were subsequently dropped in favor of the *Trend* variable—thus increasing efficiency—because they added very little to the explanatory power of the model.

The *Price* variable does not represent the net economic cost of attending the school, as theory suggests it should, since this data was unavailable. Nevertheless, it is expected that tuition and fees are a good indicator of the net economic cost. The empirical model does not include prices of competing private schools since this data was also unavailable. Although one cannot be certain of the consequences, this probably creates some degree of omitted variable bias. It is not a serious problem if private schools are highly differentiated, meaning that the competitive effects are small.

TABLE 4 – VARIABLE SUMMARY STATISTICS

	Min	Max	Mean	St Dev
<i>PvtSchool</i>				
Elementary	65	489	248	131
Secondary	37	963	302	282
Total	37	963	273.4	215.4
<i>Price</i>				
Elementary	2,698	10,815	5,238	2,914
Secondary	3,387	13,005	7,397	3,195
Total	2,698	13,005	6,246	3,219
<i>Income</i>				
Elementary	19,604	29,570	27,745	2,923
Secondary	19,604	29,570	27,006	3,184
Total	19,604	29,570	27,400	3,053
<i>Pop</i>				
Elementary	37,940	90,168	82,685	16,217
Secondary	19,826	93,798	72,541	28,133
Total	19,826	93,798	77,951	23,009
Number of Observations = 90				

Note: Price and income are expressed in 2003 real dollars.

Model Estimation and Results

A key issue in the estimation of demand functions is whether it is necessary to use Instrumental variable methods rather than least squares. A Hausman test (as described, for instance, in Davidson and MacKinnon, 1993, pp. 237-42) was conducted to examine the possible endogeneity of the price variable. If *Price* is endogenous, it is correlated with the error term and OLS is biased and inconsistent. Two instrumental variables were used to implement the Hausman test: (1) the average cost per pupil for public schools in each school district, a proxy for private school input prices; and (2) the number of private schools in each school district. Both variables represent supply shifters and should identify the demand function if price and quantity are simultaneously determined by the interaction of supply and demand. Using these instruments, along with the other exogenous variables in the model, the Hausman test was unable to reject the null hypothesis that the *Price* variable is exogenous at any significant level. This suggests that the private school market behaves somewhat like an oligopolistically or monopolistically competitive industry in which price is not determined by a market-equilibrium relationship.

Standard diagnostic tests for serial correlation, AR(1), and heteroskedasticity showed no indication of either problem.

Alternative functional forms were considered including log-log (constant elasticity) and semi-log specifications. None performed better than the linear specification in terms of results conforming to theory; in addition, the RESET test for functional form misspecification indicated that the linear model is preferred. Alternative model specifications which allowed the slope coefficients to vary across elementary and secondary schools, across counties, and across religious affiliations were also considered. Estimation results and hypothesis tests showed no economically or statistically significant differences across any of these groups. Finally, both infinite and finite distributed lag models were examined to investigate the dynamic properties of the demand relationship. In particular, it may take time for people to adjust to changes in the price of private education. After some experimentation, it was concluded that distributed lag specifications add little to the explanatory power of the model.

Estimation Results

Regression estimates are presented in Table 5. As indicated, the *Price*, *Pop*, and *Income* variables all have the wrong sign and are statistically insignificant at usual confidence levels. The most notable result is that *Price* has a positive sign and might be considered “almost significant,” considering the size of the data set.³¹ This means that an increase in price is associated with an increase in enrollment, holding constant the other factors in the model. Evaluated at the data means, the estimated coefficient implies a price elasticity of .29; i.e., a one percent increase in price is associated with a .29 percent increase in enrollment.

TABLE 5 – REGRESSION RESULTS

Variable	Estimated Coefficient	Standard Error	P-value
<i>Constant</i>	529.4	265.8	.05
<i>Price</i>	0.013	0.009	.14
<i>Pop</i>	-0.002	0.002	.27
<i>Income</i>	-0.004	0.005	.48
<i>Trend</i>	-4.030	1.943	.04
School Dummies*			
Rowland Hall HS	15.3	13.6	.27
Judge Memorial HS	553.3	45.5	.00
St. Joseph’s HS	-275.6	149.2	.07
Meridian HS	-357.7	124.3	.01
Salt Lake Lutheran HS	-225.1	62.3	.00
Redeemer Lutheran MS	-250.4	74.8	.00
Rowland Hall Elementary	37.2	22.3	.10
Waterford Elementary	108.5	24.3	.00
St. Francis Xavier Elementary	-62.1	81.1	.45
Blessed Sacrament Elementary	-45.3	81.1	.58
St. Vincent Elementary	-47.4	80.8	.56
Meridian Elementary	-358.1	125.1	.01
Christ Lutheran Elementary	-145.7	74.6	.06
Redeemer Lutheran Elementary	-145.5	75.4	.06
R ²	.99		
Standard Error	23.6		
Observations	90		

* The benchmark school is Waterford Middle and High School.

The *Trend* variable is negative and statistically significant, indicating a general decline in private school enrollments. This result suggests that Utah private schools within the sample lose about four students per year on average. The school dummy variables conform to expectations for the most part.

³¹ Interacting *Price* with county dummy variables, as mentioned above, suggested that this positive price effect only applies to Salt Lake county. The effect of price is essentially zero in Utah and Weber counties, but this result could be due to the small number of observations available for these two counties.

For instance, schools with the same affiliation and located in the same area tend to have very similar fixed-effects parameter estimates.

While the econometric results are contrary to theory and expectations, with respect to the key slope variables, the theoretical and statistical properties of the regression model appear to be satisfactory. The model was thoroughly tested and analyzed from many points of view. It is possible that increases in tuition and fees cause perceptions to change in a way that encourages enrollment. However, it is more likely that the estimated coefficient on *Price* is not valid because of either an omitted variable of some type or inadequacies in the available data. With respect to omitted variables, the lack of price data for competing schools has already been mentioned. Other possible omitted variables include unobservable factors such as changes in tastes, preferences, or perceptions that cannot be captured with trend or dummy variables.

The available data are seriously limited in terms of both quantity and quality. As previously discussed, the price variable does not capture the net economic cost of attending each school. Similarly, enrollment (the dependent variable) may not actually measure demand if schools restrict enrollment in some way. The population variable controls for changes in the total school age population in each region but it does not control for changes in the Catholic or Protestant populations, which are probably the relevant populations for most of the private schools. The income variable has a similar problem. Finally, the data set is small (i.e., the number of schools and years is small) and may not be representative of the population, since schools were selected on the basis of data availability rather than statistical appropriateness. Additionally, this data sample misses the new form of private school opportunities emerging in many areas of the state. Many of these schools are characterized by smaller, more affordable and, frequently, religious based options. The reliance of the empirical model on past behavior where cultural alienation may have been the most significant determinant of private school enrollment may limit the accuracy of such extrapolations for predicting future choice behavior.

Econometric analysis has failed to provide a useful estimate of the own price elasticity of demand for private schooling in Utah. The only conclusion that can plausibly be drawn from this investigation is that the own price elasticity of demand is likely to be relatively small for Utah. In terms of a point estimate, the analysis of the impact of the tuition tax credit will have to rely on secondary sources and qualitative information.

To estimate the effects of the TTC, the model must predict the behavior of education consumers (parents) to changes in the price structure. Demand theory indicates that consumers respond to changes in prices (including non-monetary prices such as transportation of students, quality and convenience). The Utah TTC will lower the private price of public school alternatives, thus increasing consumer incentives to consider purchase of private schooling. The size of this response to lowered prices will dictate the rate of migration from public schools to private schools. Markets for schooling have existed for some time in preschools, trade schools and higher education. However, the migration rates associated with primary and secondary education are shaped by a somewhat different set of considerations. For example, preschoolers are completely dependent on parents for transportation arrangements, and, thus, the parent's arena of movement marks the range of the school market. For higher education and trade schools, students are generally independent, and, thus, the market is determined by the market choices of the student. For K-12 students, they face intermediate level of dependence that can impact the willingness of the parents to consider a wide market of choice. We, therefore, expect that the willingness to consider alternatives at this level will be different from these other educational demand measures.

COST FUNCTION ESTIMATES

Although there are many studies that examine educational cost functions, there is no solid evidence on the key variable: the cost reduction caused by students who switch from public to private schools. (See Belfield 2001, p. 5). This is the economic concept of “marginal cost.” Most of the studies completed to date focus upon economies of scale and scope in education, which are long-term concepts that are of little use in estimating the effects on the margin.

The most applicable analysis is Lindsay’s analysis of educational cost functions for South Carolina public schools. Using 2001-2002 data for 1,040 schools, Lindsay estimated marginal cost for three categories of students: \$4,821 for regular students; \$3,622 for gifted students; and \$7,318 for disabled students (see his Table 2). Lindsay’s conclusion was that the movement of students in all categories would generate fiscal ease, as opposed to fiscal pressure, in South Carolina.

Average variable cost per student has been estimated in several studies. While variable cost is a better measure than average cost, it is still inferior to marginal cost. Gottlob (2004) used a simple cost function model to estimate average variable cost in New Hampshire. Gottlob found these variable costs ranged from \$5,920 to \$7,200 in FY 2004, including transportation costs. Aud (2004) estimated South Carolina variable costs of \$2,560 in 2002-2003.

Most of the educational cost-function literature focuses on long-term costs and economies of scale; i.e., what is the optimum size school and/or school district. A 2002 article by Andrews *et al.* reviews these studies and finds a consensus that movement from very small districts (500 or fewer students) to districts in the 2,000-4,000 student range offer clear economies. For school size, Andrews *et al.* found an empirical consensus that elementary schools in the range of 300-500 students and high schools with 600-900 students had attained lowest average cost. Chakraborty *et al.* (2000) examined scale economies in Utah schools and found strong evidence of district economies, but little evidence of school size economies.

Theory

Demand – The theory of how individual decision makers choose what to buy and what not to buy is well developed in economics. Demand is an integral part of estimating cost functions: as prices change, quantity demanded will too, necessitating changes in output that lead to further adjustments in costs.

Within the estimates below, demand is incorporated through the shares of costs devoted to certain inputs. As the quantity demanded increases (decreases), the amount of each input that must be purchased by the producer increases (decreases). But the relationship with shares is richer, as producers may shift from one type of input at a certain level of production to an input that is more efficient at a higher level of output (for example, the share of income spent by a family on minivans changes with the number of children).

Profit Maximization – The economic principle underlying management decision making is profit maximization. What is maximized is economic profits rather than accounting profits as conventionally understood. Economic profits include non-monetary benefits and costs that affect decision making.

Even though school districts are not making a profit, this does not mean that they are not maximizing profits. In fact, what they do is to set profits to zero, and determine how they can get the most production out of the resources they have given that assumption.

Cost Minimization and Dual Theory – A basic principle of economics is that profit maximization and cost minimization are dual problems: a solution to one solves the other. This is convenient because costs are more objective and easy to observe and understand for an institution like a school district. Below, school districts managers are viewed as minimizing costs subject to the provision of a minimal level of educational production (and in practice a far above minimum level of production).

Cost Functions – A desirable outcome of theoretical examination of management decisions is the cost function. The cost function incorporates the production technology that generates the output, as well as the relationship between quantities demanded, prices and preferences. As such, the cost function explains the costs of the operation in terms of the output of the production unit, and the price of inputs into production.

Cost functions incorporate several economically meaningful features. First, they are homogenous in prices; for example, a doubling of all prices will double costs. Second, they permit an estimation of the degree of returns to scale: that is, do costs rise faster or slower than output does. Third, estimation of the cost function yields estimates of elasticities of costs with respect to each of the prices and outputs. Lastly, marginal cost – the variable of most interest for this study – is typically only obtainable from an estimated cost function.

One problem with cost functions is that the functional form of the cost function depends on the assumed functional forms of demand and production. This is an inherent weakness, but is the price that is paid for a high degree of functionality. The most basic cost function with desirable economic properties is the Cobb-Douglas.

The Translog Cost Function – Given the arbitrary nature of the functional form that can be assumed for a generic cost function, the economics profession has created a series of flexible functional forms that contain other cost functions as special cases, and which allow testing of a wide variety of economically interesting hypotheses.

The most common flexible functional form for cost function estimation is the translog. This is a second order approximation (that is, it is capable of capturing a high degree of curvature) to a broad family of cost functions.

Cost functions can also be tested for a number of economically meaningful restrictions. The most general of these is the null hypothesis of homotheticity. This is the name for the property that as total costs change, the underlying demand for input factors changes in proportion (for example, the null hypothesis implies that as a district grows, it hires new teachers and builds new buildings in the same proportions that it is using currently). Conditional on the failure to reject this hypothesis, homogeneity of output can be tested. This is the property that as costs change there is no interaction between input prices and output quantities (for example, as a district's costs grow, its output will grow at the same rate whether benefits are expensive or cheap). Conditional on failure to reject the null hypothesis of homogeneity, the null of constant returns to scale can be tested. This is the property that costs and outputs move together in a one-to-one fashion. Conditional on failure to reject all three of these hypotheses, the restriction that the cost function is of the Cobb-Douglas form can be tested. This is a desirable outcome - since the Cobb-Douglas is easier to visualize and explain to non-specialists – but is by no means necessary.

Relative Prices – All microeconomic analyses rely on relative rather than absolute prices. Absolute prices are those defined in terms of dollars. These are not appropriate because they depend sensitively on inflation determined by macroeconomic policy and events. Relative prices are the prices of one good in terms of the prices of another good. Relative prices capture whether one good is more expensive or less expensive than another.

Who Are the Buyers of the School Districts' Production?

Fundamentally, the buyers of the product of any enterprise are the agents who exchange revenue for production. In the case of school districts, the buyers of their products are the local, state and federal governments. The state is by far the largest of the three, and to some extent acts as a conduit for the other two.

What Do They Buy? A large number of inappropriate arguments can be made for what the state buys from schools: education, graduates, truancy avoidance, buildings, social services and so on. These suggestions miss the mark. What is critical for understanding costs is figuring out what the exchange of revenue is being made for. Predominantly, this is WPU. This is a measure created by the Utah State Board of Education that assigns different weights to over a dozen different student types. Each type is assigned a value based on the likely expense to educate that student for one year.

Districts report enrollment (average daily membership) data to the state every year. From these, the state calculates numbers of WPU of each type per district and the compensation for each class of WPU statewide. Funds are dispersed to the individual school districts following these guidelines.

What Are the Inputs?

Schools keep track of a large number of inputs into their production process. They maintain excellent data on the amount they spend on different categories. However, within those categories it is sometimes difficult to determine what the price of the inputs are and in what quantities they were purchased.

By far, the most important of these is salaries from the M&O subcategory. These average 45 percent of school district budgets. On average, the second largest component is benefits from the M&O subcategory. These average 17 percent of school district budgets.

Expenditures on capital projects are the third largest component, averaging 13 percent of school district budgets across the state. However, there is a great deal of volatility in this measure (e.g., it is as high as 50 percent of the 2003 budget for the South Summit School District).

Cost function estimation requires a price measure for each input, and one of two measures of the quantity of the input purchased, either the raw quantity, or the share of the budget devoted to that input (the share is simply the price times the quantity). Obviously, many categories of expenditure are summations across a broad array of inputs whose prices are unlikely to be available.

The budget categories defined on the Revenue and Expenditures by Fund statement calculated by each district offer a limited set of categories for which the share of costs could be calculated. However, many of these categories do not have prices which can be reasonably associated with the entire category. There are two exceptions. First, the M&O Salaries category can reasonably be argued to depend most highly on the average salaries of teachers. Second, the M&O Benefits category can reasonably be argued to depend most highly on the price of the average benefits package for a teacher.

All other expenditure categories are much harder to associate with a specific price. It is argued below that this is a problem that can be finessed without loss of accuracy. For now, we will aggregate all other expenditure sub-categories into one catch-all category called missing inputs (this refers to the price of these inputs being excluded or "missing" from the initial estimates).

What Do the Inputs Cost? For teacher related expenses, there is good data on the average price and benefits for teachers on a school district basis. Salaries for licensed employees of school districts are available for a wide variety of classifications. However, it is not necessary to use all of these categories. The correlations between the salaries of all the teacher classifications, counselors and librarians are all near one. Since these comprise the vast majority of FTE employees of districts, the average salary of these employees is used as the price that is representative of the entire M&O Salaries budget category.

Table 6 reports the set of correlations across salary categories, and demarks those that are not highly correlated with the others. In the future, it may be desirable to use those uncorrelated salaries as an additional input cost.

TABLE 6 – CORRELATION OF SALARIES ACROSS LICENSED EMPLOYEES

	Elementary Teachers	Secondary Teachers	Special Educations Teachers	Librarians	Counselors	Psychologists	Social Workers	Administrators
Elementary Teachers	1.0	1.0	0.9	0.9	-.01	-0.1	0.3	0.4
Secondary Teachers	1.0	1.0	0.8	0.8	0.8	-0.2	0.2	0.5
Special Education Teachers	0.9	0.8	1.0	0.8	0.8	0.2	0.3	0.3
Librarians	0.9	0.8	0.8	1.0	0.9	0.0	0.1	0.4
Counselors	0.9	0.8	0.8	0.9	1.0	0.0	0.4	0.3
Psychologists	-0.1	-0.2	0.2	0.0	0.0	1.0	0.1	-0.3
Social Workers	0.3	0.2	0.3	0.1	0.4	0.1	1.0	-0.4
Administrators	0.4	0.5	0.3	0.4	0.3	-0.3	-0.4	1.0

Benefits for licensed employees are also widely available. These are highly correlated with salaries across some subcategories as reported and demarcated in Table 7. Health spending is the largest component and is not highly correlated with salaries. So, the health benefits package per FTE is used as the price proxy for the M&O Benefits expenditure category.

TABLE 7 – CORRELATION OF SALARY WITH BENEFITS

	Salary	Social Security	Retirement	Health	Dental	Life	Industrial	Unemployment	Long-term Disability
Salary	1.0	1.0	1.0	-0.1	0.3	-0.1	0.0	0.1	0.1
Social Security	1.0	1.0	1.0	-0.1	0.3	-0.1	0.0	0.1	0.1
Retirement	1.0	1.0	1.0	-0.1	0.2		-0.1	0.1	0.1
Health	-0.1	-0.1	-0.1	1.0	0.2	0.0	0.2	0.0	-0.1
Dental	0.3	0.3	0.2	0.2	1.0	0.0	-0.3	0.2	0.2
Life	-0.1	-0.1	0.0	0.0	0.0	1.0	-0.1	-0.1	-0.2
Industrial	0.0	0.0	-0.1	0.2	-0.3	-0.1	1.0	0.0	0.2
Unemployment	0.1	0.1	0.1	0.0	0.2	-0.1	0.0	1.0	0.1
Long-term Disability	0.1	0.1	0.1	-0.1	0.2	-0.2	0.2	0.1	1.0

For the other missing category, a price proxy will not be necessary, as discussed below.

What Is the Appropriate Measure of Cost?

School districts keep detailed information on a large number of accounting measures. The choice of the appropriate measure of the total costs of educating students is probably the most critical in the estimation of the marginal cost of educating a student.

There are three reasonable choices for costs. We use the broadest and most comprehensive measures: expenditures. Other alternatives were explored, and continue to be worthy of future consideration, but have significant drawbacks that preclude their use here.

Expenditures – The most basic measure of school district total costs is their expenditures. This is a formal measure, accounted for on the Revenues and Expenditure by Fund statement. This includes what an economist would view as fixed and variable costs. The strength of using the expenditure category is that it includes all funds disbursed by the district. The weakness is that the accounting on this statement is made using cash basis accounting, so that the district reports what funds they received and disbursed, rather than what funds they recognized (as having contributed to the productive mission of the district).

A major weakness of this measure is that it includes a capital projects sub-category that is highly volatile on a year-to-year basis. The information in this category is important to incorporate into our estimates, but it changes somewhat arbitrarily as districts spend from bond issues only after their passage, issuance and disbursement, and then only within the time frame allotted for the use of those funds.

Net Current Expenditures – Net current expenditure is an alternative measure produced by school districts. This is a measure defined by the U.S. Department of Education to include instruction and support services expenditures from which are deducted Title I and Title VI expenditures, food service, tuition, transportation, textbook, summer school and student activities revenues. Note that this definition excludes expenditures on property, equipment, community services and debt service. The strength of the measure is that it is akin to variable costs as understood by economists.

The major drawback to using net current expenditures is that it excludes many fixed costs. While the use of these is problematic when addressing the marginal cost of an individual student, it is still true that the individual student accounts for some portion of those fixed costs. The reason for this is that many costs that are viewed as fixed by accountants (and which are excluded from this measure) are not viewed as fixed by economists. For example, the cost of building a school could be viewed as a fixed cost that does not impact the marginal cost of educating a student. However, economists would argue that a student consumes services from the building that are partially reflected in its initial cost. The exclusion of these factors precludes the use of this measure of cost for this study.

Another drawback is that it is very difficult to modify this figure from the available information. The categories that are deleted or excluded from this measure do not appear readily in other financial statements.

A primary reason for using this measure is that it excludes a great deal of volatile capital project spending. Nonetheless, there is a great deal of variability still left in the net current expenditures. These vary from 42 percent to 87 percent of expenditures, depending on the district. There does not appear to be a quick way to reconcile this variability with Revenues and Expenditure by Fund. This figure can only be poorly approximated with the sum of local and state M&O revenues and local capital projects revenues minus the lesser of M&O property expenditures or 10 percent of the capital projects expenditures.

Expenses Net of Change in Assets – Expenses and Change in Assets are two figures drawn from the Statement of Activities within the Comprehensive Annual Financial Report of the school district. The former captures the recognized expenses of the school district, while the latter nets out any change in district assets which could be drawn off at a later date from the expenses incurred this year. For example, the school district might report expenses which include the accumulation of a cash fund for unforeseen expenses, which would in turn be regarded as an asset increase for the district.

From a public accounting standpoint, the best measure of accounting costs to use is Total School District expenses minus the Change in net assets from the school districts Statement of Activities. This statement is akin to the income statement for a public company. The figures listed here are preferable because they show activities related to the stock variables kept track of as capital expenses on an accrual

basis. An accrual basis indicates that the figures are recorded when they are incurred rather than when they are paid. This is the measure of costs that has the fewest weaknesses.

One difficulty with this measure is that it is not fully reported by all districts at this time. Currently, only about two-thirds of districts produce a statement of activities, and for most of those districts this has only been done for one year. A second problem is that this statement combines parts of certain expenditure categories. This makes the choice of an appropriate price to proxy for the category muddier. For example, the instructional services category on the statement of activities includes both salaries and benefits, as well as other instructional expenses of schools. Using this is much more problematic than using the M&O Salaries sub-category from the Revenue and Expenditures by Fund statement, to which average teacher salaries can be reasonably assumed to represent price.

Methodology

Degrees of Freedom – Degrees of freedom refers to the statistical idea that the number of available observations limits the number of parameters that can be estimated from the data. In a regression context, overall degrees of freedom is the number of observations minus the number of parameters estimated.

Regression estimates cannot be made at all if the degrees of freedom is less than one. In practice, applied researchers seek parsimonious models, those in which the number of parameters estimated is actually a small fraction of the number of observations, thus leaving a large number of degrees of freedom.

The constraining feature in this data set is that there will be occasion to make estimates on an annual basis. During each year, there is data from 40 school districts, so 40 is an upper limit on the number of parameters that can be estimated. In practice, something substantially less than 40 is desirable. Further, only 26 school districts currently have activity statements, so any use of that data requires a further reduction in the number of parameters to be estimated to even make the use of that data possible in the future.

Number of Parameters Estimated – A translog cost function explains costs in terms of input prices and output quantities. If the total number of prices and quantities is n , then the total number of parameters that must be estimated is $1 + n + n(n+1)/2$ (i.e., an intercept, n terms for the first order portion of the approximation, and $n(n+1)/2$ terms for the second order portion of the approximation). For our data set this implies that at the very most seven first order effects can be modeled and that we would be much better off if this were reduced downward.

Available Observations – In any given year, the number of available observations is the number of school districts (40). A panel data set constructed from several years of data would of course have forty times the number of years of observations. However, the limiting feature should probably be 40, since annual estimates are undoubtedly interesting to potential users of these results.

Multicollinearity – Multicollinearity is that name given to the fact that pairs – and often broader groups of variables – are highly correlated with each other.

Multicollinearity is a problem in regression analysis in that the inclusion of variables that are multicollinear with one another can lead to the false impression that those variables have little explanatory power.

There is no easy solution for multicollinearity. The generally accepted way of addressing this problem is to delete all but one independent variable from a set of multicollinear independent variables within a given regression.

For this project, this means that we should not be able to capture separate effects on costs from, say, elementary and secondary teacher salaries. There is just too much correlation between these categories.

The same argument can be made for a WPU, where all categories except three are highly correlated (those three are immunization, necessarily small schools and administrative costs).

Estimation of a Singular System – A fully specified cost specification is singular. This is the mathematical way of saying that the theoretical set up leaves no room for the fact that data should be expected to have some random deviations from theoretical prediction. The solution to this problem is to drop one of the share equations from the estimation. Because the theoretical framework is complete, all information in the “missing” equation can be imputed from the estimates of the other equations. For this estimation, we choose to group inputs into three categories: salaries, benefits, and other inputs. We drop the estimation of the share equation modeling other inputs. This has the virtue that we don’t need information on quantities for this set of inputs.

Results

Input Price Correlations – Salaries are highly correlated across the four subcategories of classroom teachers (*i.e.*, elementary, secondary and special education, as well as librarians). In turn, the elements of that set of subcategories are also highly correlated with salaries of counselors. However, this group of five subcategories is not highly correlated with the other three subcategories of principals (and assistant principals), social workers and psychologists. Further, those three categories are not highly correlated with each other either. These correlations are reported and demarcated in Table 1.

Among benefits, both social security and retirement are highly correlated with salaries. The other six categories of benefits are not highly correlated with the former group, or with each other. Among these categories, health insurance is predominant: the minimum school district average for health insurance is no less than three times larger than the sum of the maximum school district contributions for the other five categories combined. These correlations are reported and demarcated in Table 2.

We conclude that the two prices that are most relevant for analyzing school district costs are the average salary per FTE, and the average health benefits package per FTE. We also need a price measure for these missing inputs. For this we use the Producer Price Index for intermediate goods and services (observed in January for each school year). To create relative prices we divide salaries and benefits by this index.

Output Quantity Correlations – The fundamental output quantity in this study is the WPU. Data is available on a wide variety of breakdowns of a WPU. An analysis of correlation between these breakdowns indicates that the majority of them are extremely highly correlated and can be effectively modeled with their sum. Table 8 reports and demarcates these groups. These are the WPU for four of the seven subcategories of basic programs (kindergarten, grades 1 through 12, early graduation and professional staff), all five of the special education subcategories and both of the applied education subcategories. The three WPU subcategories that are not highly correlated with the other eleven subcategories are those for immunization, necessarily small schools and administrative costs.

We conclude that the two outputs that are most relevant for analyzing school district costs are an “other” WPU category, that includes immunization, necessarily small schools, administrative costs and a “plain” WPU category that is the sum of the other subcategories.

Translog Estimates — Estimates reported here are for a single year, 2002-2003. The model is capable of providing estimates for more years (subject to data availability). One drawback of this is the volatility of capital projects – external macroeconomic events, acting through the capital projects category, may make the marginal cost of educating a student fluctuates severely. We feel that 2002-2003 is reasonably representative of the six full years of data we have. It is also the most recent year for which we have complete data.

The model that we estimated thus contains two prices and two outputs. For each of these there is a first order effect. Interaction of prices and outputs creates ten more second order effects: there are four

variables that can interact with each other for a total of 16 possibilities, but six of these are expected to be symmetric to six others (for example, the interaction effect of salaries and benefits is the same as the interaction effect of benefits and salaries), leaving 10. Adding a constant to the model leaves us with fifteen parameters to be estimated and conserves twenty-five degrees of freedom to provide accurate estimates.

TABLE 8 – CORRELATION OF WPU CATEGORIES WITH EACH OTHER

		Basic Programs				Special Education Programs					Applied Tech. Ed.		Class Size Reduction K-8	Basic Programs		
		Kindergarten	Grades 1-12	Early Graduation	Professional Staff	Add On	Self Contained	Pre-School	Extended Year / Severely Disabled	State Programs	Add On	Set Aside		Immunization	Necessarily Small schools	Administrative Cost
Basic Education	Kindergarten	1.0	1.0	0.8	1.0	1.0	1.0	1.0	0.7	0.8	1.0	0.8	1.0	-0.5	-0.4	-0.8
	Grades 1-12	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.7	0.9	1.0	0.9	1.0	-0.5	-0.4	-0.8
	Early Graduation	0.8	0.9	1.0	0.9	0.9	0.9	0.8	0.7	0.9	0.9	0.7	0.9	-0.6	-0.3	-0.7
	Professional Staff	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.7	0.9	1.0	0.9	1.0	-0.6	-0.4	-0.8
Special Education	Add On	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.7	0.8	1.0	0.8	1.0	-0.6	-0.4	-0.8
	Self Contained	1.0	1.0	0.9	1.0	1.0	1.0	0.9	0.7	0.9	1.0	0.8	1.0	-0.6	-0.4	-0.8
	Pre-School	1.0	1.0	0.8	1.0	1.0	0.9	1.0	0.7	0.8	1.0	0.8	1.0	-0.6	-0.4	-0.9
	Extended Year / Severely Disabled	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1.0	0.7	0.7	0.5	0.7	-0.2	-0.3	-0.7
	State Programs	0.8	0.9	0.9	0.9	0.8	0.9	0.8	0.7	1.0	0.9	0.7	0.9	-0.5	-0.3	-0.6
Applied Tech. Ed.	Add On	1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.7	0.9	1.0	0.8	1.0	-0.5	-0.4	-0.8
	Set Aside	0.8	0.9	0.7	0.9	0.8	0.8	0.8	0.5	0.7	0.8	1.0	0.9	-0.4	-0.3	-0.7
Class Size Reduction K-8		1.0	1.0	0.9	1.0	1.0	1.0	1.0	0.7	0.9	1.0	0.9	1.0	-0.6	-0.4	-0.8
Basic Education	Immunization	-0.6	-0.5	-0.6	-0.6	-0.6	-0.6	-0.6	-0.2	-0.5	-0.5	-0.4	-0.6	1.0	0.1	0.4
	Necessarily Small Schools	-0.4	-0.4	-0.3	-0.4	-0.4	-0.4	-0.4	-0.3	-0.3	-0.4	-0.3	-0.4	0.1	1.0	0.4
	Administrative Cost	-0.8	-0.8	-0.7	-0.8	-0.8	-0.8	-0.9	-0.7	-0.6	-0.8	-0.7	-0.8	0.4	0.4	1.0

A translog cost function estimate is actually a combination of a cost equation, and demand equations corresponding to each included price, expressed as equations for forecasting shares. Each share equation contains a constant and a number of parameters equal to the sum of input prices and output quantities.

In order to make a translog estimation economically meaningful, a set of cross-equation restrictions must be imposed on the parameters. These restrictions constrain the parameters of the share equations to equal certain parameters of the cost equation. In this case, there are 10 of these restrictions.

The model is reported in Table 9. Most of the parameters are individually insignificant, but we disregard this, since the translog is modeling cost behavior by the collective behavior of the entire set of coefficients. Given the high degree of fit of the cost equation, it is clear that the set of coefficients is

capturing most of the variation of costs (98.3 percent in fact). Note that the values of the individual parameters are not directly meaningful; it is only combinations of them that are economically interesting.

TABLE 9 – TRANSLOG COST SYSTEM ESTIMATES

Observations = 40		
Dependent Variable = Log of Real Costs		
Centered R-Squared = 98.3%		
Variable	Coefficient	Standard Error
Constant	11.76	9.54
LOG_P_SALARY	-0.23	1.21
LOG_P_BENEFITS	0.01	0.48
LOG_Q_WPU	0.14	0.41
LOG_Q_OTHER_WPU	-0.50	0.50
LOG_PP_SALARY	0.09	0.09
LOG_PP_BENEFITS	0.05	0.02
LOG_PP_SAL_BEN	-0.03	0.04
LOG_QQ_WPU	0.07	0.03
LOG_QQ_OTHER_WPU	0.07	0.04
LOG_QQ_WPU_OTHER	0.04	0.03
LOG_PQ_SAL_WPU	0.00	0.01
LOG_PQ_SAL_OTHER	-0.01	0.01
LOG_PQ_BEN_WPU	0.00	0.00
LOG_PQ_BEN_OTHER	0.00	0.00
Dependent Variable = Cost Share of Salaries		
Centered R-Squared = 3.4%		
Variable	Coefficient	Standard Error
Constant	-0.23	1.21
LOG_P_SALARY	0.09	0.09
LOG_P_BENEFITS	-0.03	0.04
LOG_Q_WPU	0.00	0.01
LOG_Q_OTHER_WPU	-0.01	0.01
Dependent Variable = Cost Share of Benefits		
Centered R-Squared = 13.5%		
Variable	Coefficient	Standard Error
Constant	0.01	0.48
LOG_P_SALARY	-0.03	0.04
LOG_P_BENEFITS	0.05	0.02
LOG_Q_WPU	0.00	0.00
LOG_Q_OTHER_WPU	0.00	0.00

Table 10 reports the estimates in a manner that is easier to interpret for non-specialists. It also displays the sequential hypothesis tests. The least restrictive test on the translog is the null of homotheticity. This cannot be rejected. This implies that the second order interactions between prices and outputs are jointly zero. The next most restrictive test is homogeneity of output, and this can be rejected at a very low

significance level. This suggests that school districts do not have costs that react directly to changes in outputs. Since the sequence of tests is conditional on failure to reject, we stop at this point.

TABLE 10 – FULL OUTPUT OF TRANSLOG COST SYSTEM ESTIMATES

Type of Effect on What Variable	Coefficient	Standard Error
Constant	11.761	9.538
Direct Effect of Salaries Alone	-0.230	1.215
Direct Effect of Benefits Alone	0.010	0.479
Direct Effect of Other Inputs' Prices	1.220	1.600
Direct Effect of (Plain) WPU's Alone	0.138	0.410
Direct Effect of (Other) WPU's	-0.502	0.502
Interaction of Salaries with Salaries	0.094	0.094
Interaction of Salaries with Benefits	-0.030	0.036
Interaction of Salaries with Missing Inputs	-0.065	0.116
Interaction of Salaries with (Plain) WPU's	0.001	0.009
Interaction of Salaries with (Other) WPU's	-0.008	0.010
Interaction of Benefits with Salaries	-0.030	0.036
Interaction of Benefits with Benefits	0.054	0.019
Interaction of Benefits with Missing Inputs	-0.024	0.046
Interaction of Benefits with (Plain) WPU's	-0.004	0.004
Interaction of Benefits with (Other) WPU's	-0.004	0.004
Interaction of Missing Inputs with Salaries	-0.065	0.116
Interaction of Missing Inputs with Benefits	-0.024	0.046
Interaction of Missing Inputs with Missing Inputs	0.089	0.012
Interaction of Missing Inputs with (Plain) WPU's	0.003	0.014
Interaction of Missing Inputs with (Other) WPU's	0.011	0.153
Interaction of (Plain) WPU's with Salaries	0.001	0.009
Interaction of (Plain) WPU's with Benefits	-0.004	0.004
Interaction of (Plain) WPU's with Missing Inputs	0.003	0.014
Interaction of (Plain) WPU's with (Plain) WPU's	0.073	0.029
Interaction of (Plain) WPU's with (Other) WPU's	0.037	0.032
Interaction of (Other) WPU's with Salaries	-0.008	0.010
Interaction of (Other) WPU's with Benefits	-0.004	0.004
Interaction of (Other) WPU's with Missing Inputs	0.011	0.153
Interaction of (Other) WPU's with (Plain) WPU's	0.037	0.032
Interaction of (Other) WPU's with (Other) WPU's	0.066	0.044
Test of the null hypothesis of homotheticity Chi-Squared(4)= 7.22 (marginal significance = 0.1249)		
Test of the null hypothesis of homogeneity of constant degree in output Chi-Squared(3)= 16.60 (marginal significance = 0.0009)		
<small><i>This note must be included in all presentations of this output. This is not standard output from a translog estimation. Included here are 16 parameters and standard errors that are not part of the estimation, but rather are solved for from algebraic identities. Note that 11 of these are reported for completeness; they are actually mirror images of other parameters in the table. For example, interaction of salaries with benefits is equal to interaction of benefits with salaries.</i></small>		

An important check on the fit of the model is monotonicity. This is checked by examining the fitted values of the share equations, which these should be between zero and one for all input categories. This holds true, as shown in Table 11, indicating that costs are larger in districts with higher output.

TABLE 11 – FITTED INPUT SHARES

District	Salary Share	Benefits Share	Other Input's Share
Alpine	0.47	0.16	0.37
Beaver	0.43	0.18	0.39
Box Elder	0.45	0.15	0.40
Cache	0.47	0.16	0.37
Carbon	0.44	0.16	0.40
Daggett	0.43	0.18	0.39
Davis	0.47	0.16	0.36
Duchesne	0.44	0.15	0.41
Emery	0.45	0.17	0.38
Garfield	0.43	0.17	0.39
Grand	0.45	0.16	0.39
Granite	0.48	0.17	0.35
Iron	0.45	0.16	0.39
Jordan	0.47	0.16	0.36
Juab	0.45	0.17	0.38
Kane	0.44	0.17	0.40
Logan	0.46	0.17	0.37
Millard	0.44	0.17	0.39
Morgan	0.46	0.17	0.38
Murray	0.47	0.16	0.37
Nebo	0.47	0.17	0.37
North Sanpete	0.45	0.18	0.37
North Summit	0.44	0.18	0.38
Ogden	0.47	0.16	0.36
Park City	0.47	0.17	0.36
Piute	0.44	0.18	0.38
Provo	0.47	0.17	0.37
Rich	0.44	0.17	0.38
Salt Lake	0.49	0.16	0.35
San Juan	0.44	0.16	0.40
Sevier	0.45	0.15	0.40
South Sanpete	0.44	0.17	0.39
South Summit	0.45	0.16	0.39
Tintic	0.45	0.18	0.37
Tooele	0.43	0.17	0.40
Uintah	0.45	0.17	0.38
Wasatch	0.45	0.18	0.37
Washington	0.45	0.16	0.39
Wayne	0.44	0.17	0.39
Weber	0.46	0.15	0.38

Own price elasticities can be calculated from the estimates for every school district. The values are reported in Table 12 below, and are broadly similar across districts. The general pattern is that the own price elasticities indicates that school districts are inelastic with respect to salaries, benefits and other inputs. The natural response to rising prices is to buy less of something. However, buying a smaller

quantity does not guarantee that you spend less on purchases of that good as a whole (for example, if gas prices rise, you may drive less, but the total amount you spend on gas probably goes up. Alternatively, if the price of apples rises, you not only buy less apples, but probably spend less on apples as well). The low elasticities estimated for the three categories of inputs suggest that when the prices of these inputs rise, districts are not able to cut purchases enough to keep their costs from rising. In the case of salaries, a 10 percent rise in salaries is associated with only a three percent drop in the quantity of salaries paid. The picture is somewhat better in benefits, where a 10 percent price increase is associated with a five percent quantity drop. With other inputs, a 10 percent price increase leads to a four percent quantity drop.

TABLE 12 – PRICE ELASTICITIES BY SCHOOL DISTRICT

District	Salary Elasticities			Benefits Elasticities			Other Input Elasticities		
	Own	Benefits	Other Inputs	Own	Salaries	Other Inputs	Own	Salary	Benefits
Alpine	-0.33	0.10	0.23	-0.51	0.29	0.22	-0.39	0.29	0.10
Beaver	-0.35	0.11	0.24	-0.52	0.27	0.25	-0.38	0.27	0.12
Box Elder	-0.34	0.09	0.25	-0.49	0.26	0.24	-0.38	0.29	0.09
Cache	-0.33	0.10	0.23	-0.51	0.29	0.22	-0.39	0.29	0.10
Carbon	-0.35	0.10	0.25	-0.51	0.26	0.25	-0.38	0.28	0.10
Daggett	-0.35	0.11	0.24	-0.52	0.27	0.25	-0.38	0.27	0.11
Davis	-0.33	0.10	0.22	-0.51	0.29	0.21	-0.39	0.29	0.10
Duchesne	-0.35	0.09	0.26	-0.50	0.25	0.25	-0.37	0.28	0.10
Emery	-0.34	0.11	0.24	-0.52	0.27	0.24	-0.38	0.28	0.11
Garfield	-0.35	0.11	0.24	-0.52	0.26	0.25	-0.38	0.27	0.11
Grand	-0.34	0.10	0.24	-0.50	0.27	0.24	-0.38	0.29	0.10
Granite	-0.32	0.10	0.22	-0.51	0.31	0.20	-0.40	0.30	0.10
Iron	-0.34	0.10	0.25	-0.51	0.26	0.24	-0.38	0.28	0.10
Jordan	-0.33	0.10	0.23	-0.51	0.29	0.22	-0.39	0.30	0.10
Juab	-0.34	0.11	0.23	-0.52	0.28	0.23	-0.39	0.28	0.11
Kane	-0.35	0.10	0.25	-0.51	0.26	0.25	-0.38	0.27	0.11
Logan	-0.34	0.10	0.23	-0.51	0.28	0.23	-0.39	0.29	0.10
Millard	-0.34	0.10	0.24	-0.51	0.27	0.24	-0.38	0.28	0.11
Morgan	-0.34	0.10	0.23	-0.51	0.28	0.23	-0.39	0.28	0.10
Murray	-0.33	0.10	0.23	-0.51	0.29	0.22	-0.39	0.29	0.10
Nebo	-0.33	0.10	0.23	-0.51	0.29	0.22	-0.39	0.29	0.10
North Sanpete	-0.34	0.11	0.23	-0.52	0.28	0.24	-0.39	0.28	0.11
North Summit	-0.34	0.11	0.23	-0.52	0.28	0.24	-0.39	0.27	0.11
Ogden	-0.33	0.10	0.23	-0.51	0.29	0.21	-0.39	0.30	0.10
Park City	-0.33	0.10	0.22	-0.51	0.29	0.22	-0.39	0.29	0.10
Piute	-0.35	0.11	0.24	-0.52	0.27	0.25	-0.38	0.27	0.11
Provo	-0.33	0.10	0.23	-0.51	0.29	0.22	-0.39	0.29	0.10
Rich	-0.34	0.11	0.24	-0.52	0.27	0.24	-0.38	0.27	0.11
Salt Lake	-0.32	0.10	0.22	-0.51	0.31	0.20	-0.40	0.30	0.09
San Juan	-0.35	0.10	0.25	-0.51	0.26	0.25	-0.38	0.28	0.10
Sevier	-0.34	0.08	0.26	-0.49	0.25	0.24	-0.38	0.29	0.09
South Sanpete	-0.35	0.11	0.24	-0.52	0.27	0.25	-0.38	0.27	0.11

South Summit	-0.34	0.09	0.25	-0.50	0.26	0.24	-0.38	0.28	0.10
Tintic	-0.34	0.11	0.23	-0.52	0.28	0.24	-0.39	0.27	0.11
Tooele	-0.35	0.10	0.25	-0.51	0.25	0.26	-0.38	0.27	0.11
Uintah	-0.34	0.10	0.24	-0.51	0.27	0.24	-0.38	0.28	0.10
Wasatch	-0.34	0.11	0.23	-0.52	0.29	0.23	-0.39	0.28	0.11
Washington	-0.34	0.09	0.25	-0.50	0.26	0.24	-0.38	0.29	0.09
Wayne	-0.35	0.10	0.24	-0.51	0.26	0.25	-0.38	0.27	0.11
Weber	-0.33	0.09	0.24	-0.50	0.27	0.23	-0.38	0.29	0.09

The cross price elasticities reported in Table 12 above indicate that the three input categories are all substitutes, but that the degree of substitutability is quite small. For example, a 10 percent increase in the price of benefits induces school districts to spend about one percent more on teacher salaries. All of the six cross price elasticities are in the range of 0.1 to 0.3, indicating that very modest substitutability is the rule.

Estimates of returns to scale can also be obtained from the translog estimates, and are reported in Table 13. Not surprisingly, the three of the four large districts (Alpine, Davis and Jordan) have modest decreasing returns to scale (Granite School District shows essentially constant returns to scale). These districts are at the point where getting larger will make them less efficient. Also not surprisingly, the smaller districts statewide tend to have increasing returns to scale (Tooele School District is the only smaller one without increasing returns to scale). This makes sense, since these districts are providing many services at a level that is too small to be efficient.

TABLE 13 – RETURNS TO SCALE BY DISTRICT

District	Returns to Scale	District	Returns to Scale
Alpine	0.99	Nebo	1.05
Beaver	1.15	North Sanpete	1.17
Box Elder	0.99	North Summit	1.19
Cache	1.07	Ogden	1.07
Carbon	1.05	Park City	1.15
Daggett	1.40	Piute	1.30
Davis	0.98	Provo	1.07
Duchesne	1.03	Rich	1.24
Emery	1.09	Salt Lake	1.04
Garfield	1.13	San Juan	1.04
Grand	1.18	Sevier	1.03
Granite	1.01	South Sanpete	1.09
Iron	1.04	South Summit	1.18
Jordan	0.97	Tintic	1.29
Juab	1.19	Tooele	0.98
Kane	1.12	Uintah	1.05
Logan	1.12	Wasatch	1.15
Millard	1.07	Washington	0.96
Morgan	1.22	Wayne	1.23
Murray	1.11	Weber	0.97

Lastly, marginal costs are reported in Table 14. The marginal costs estimated from the translog estimates are remarkably uniform across the districts. The mean marginal cost is about \$8,675 per student per year. This varies from a low of \$7,700 in Logan School District to a high of about \$10,350 in Tintic School District.

TABLE 14 – MARGINAL COSTS BY DISTRICT

District	Marginal Cost	District	Marginal Cost
Alpine	\$8,794	Nebo	\$8,199
Beaver	\$8,693	North Sanpete	\$8,166
Box Elder	\$8,703	North Summit	\$8,806
Cache	\$8,076	Ogden	\$8,298
Carbon	\$8,241	Park City	\$8,449
Daggett	\$9,434	Piute	\$9,279
Davis	\$9,280	Provo	\$8,153
Duchesne	\$8,401	Rich	\$9,332
Emery	\$9,131	Salt Lake	\$9,243
Garfield	\$9,328	San Juan	\$9,594
Grand	\$7,871	Sevier	\$8,688
Granite	\$9,855	South Sanpete	\$8,623
Iron	\$8,066	South Summit	\$7,856
Jordan	\$9,208	Tintic	\$10,327
Juab	\$8,114	Tooele	\$8,989
Kane	\$8,845	Uintah	\$8,319
Logan	\$7,799	Wasatch	\$8,018
Millard	\$8,953	Washington	\$9,057
Morgan	\$7,888	Wayne	\$8,578
Murray	\$8,161	Weber	\$8,543

The only restriction that the tests suggest would be reasonable to impose is homotheticity. Imposition of this constraint did not seriously affect any of the estimates and are not reported here. Using these cost and demand estimates, we now turn to an estimation of overall cost effects of the policy

MONTE CARLO SIMULATION OF INDUCED AND NON-INDUCED ENROLLMENT EFFECTS BY SCHOOL DISTRICT

Evaluation of the fiscal impact of the TTC is primarily driven by estimates of TTC induced and non-induced changes in private and public school enrollments. There remains much controversy about core parameters that determine these estimates. To address this uncertainty, the model used in this analysis simulated enrollment and fiscal impacts using Monte Carlo simulations based on 1000 iterations of the enrollment projection model using random draws from a set of core underlying parametric distributions. The simulations were all done using Crystal Ball[®] Pro – a Microsoft[®] Excel[®] add-in subroutine. Since little information about standard deviation of the parametric distributions exists, a triangular distribution was used as the standard parametric distribution in the simulations. It is important to keep in mind that many simplifying assumptions are made to ensure a tractable, and reasonable, model. The forecasts that arise from the Monte Carlo simulations are designed to provide policymakers with a context for understanding the uncertainty inherent in making predictions of future behavior based on observed patterns of behavior reflected in historical data. A general overview of the model flowchart is presented in figure 1.

The State Enrollment Allocation Model

Projections of the school-age population, by age category, were obtained from the Governor’s Office of Budget and Planning (OBP). Since state-wide school enrollment projections, by grade, through 2018 are not available, the OBP age categories were used as a proxy for grade level population estimates (i.e. # 5-year olds = # kindergarten students, # 6-year olds = # 1st grade students, #7-year olds = #2nd grade students, etc.) An estimate of private school enrollments for the period 2005-2018 were obtained by the following method: First, actual private school enrollments, by grade, for the period 1995-2003 were obtained; second, the ratio of private school enrolments to OPB estimates of school age population were obtained for the years 1995-2003; third, a trend lined was estimated for each grade category for the 1995-2003 period; and, finally, the trend line was used to estimate the ratio of private school enrollments to projected OBP estimates of school-age population, by grade for the period 2005 to 2018. Using the OBP estimates of state-wide school-age population for the years 2005 to 2018, the matrix of private school to school-age population, by grade and year was used to estimate the matrix of estimated private school enrollments, by grade for the years 2005 to 2018. As a statewide estimate, the model predicts 15,044 private school students in the year 2005 (approximately 2.9% of the school age population) and grows to 32,817 private school students in the year 2018 (approximately 4.4% of the school age population). These private school enrollment projections reflect the baseline growth in private school enrollments without tuition tax credits and are used to anchor the baseline estimates of impact from the introduction of a tuition tax credit program.

The language in H.B. 271 disallows credits for children currently enrolled in private schools. This restriction only allows kindergarten children to be fully eligible for the TTC in the first year of implementation (year 2005 in our model). In the second year of implementation, only kindergarten and first grade children will be allowed to receive the tax credit, etc. These private school enrollments are considered as non-induced TTC eligible participants. The “non-induced” term is used because these enrollments would occur without TTC incentives. There is also some “churning” in the system where new participants in private school education will be eligible for the TTC at all grade levels. The churn factor is a method that allows us to include individuals who move from the home school sector to the private school sector as a result of tuition tax credits, as well as other types of TTC eligible movement to the private school sector that does not come at the expense of public school enrollments. To facilitate this in the model we introduce a “churn” parameter to capture the TTC eligible turnover in private school enrollments at all of the grade levels.

The induced TTC eligible participants are those where parents choose to enroll their children in private school because of the subsidy represented by the tuition tax credit. There are two critical elements

to estimating the induced enrollment effects. First, we segment the market into four categories to capture some of the complexities of TTC eligibility in our forecast. The four categories are: grade K-6 students who are eligible for reduced lunch; grade K-6 students who are not eligible for reduced or free lunch; grade 7-12 students who are eligible for reduced or free lunch; grade 7-12 students who not are eligible for reduced or free lunch. The grade K-6 and grade 7-12 stratification was used to reflect the significant average increase in private school tuition as students left the elementary school grades. The statewide percentage of students eligible for reduced lunch was obtained as the statewide average for the years 1995-2003. Second, we need to determine how the TTC will affect market equilibrium as the induced change in demand seeks a new equilibrium with supply. We use a linear approximation to this change in equilibrium enrollments by applying the formula:

$$\Delta q = \frac{vq\varepsilon\eta}{p(\eta - \varepsilon)}$$

Where Δq = TTC induced change in market equilibrium private school enrollments; η = own price elasticity of demand; ε = price elasticity of supply; v = per student subsidy for private school tuition (size of the average tuition tax credit); p = pre-TTC private school tuition; and q = pre-TTC private school enrollments. [See Appendix Four for complete derivation.]

Induced enrollments were estimated by starting with a grade-level and eligibility for free or reduced lunch stratified data set for the years 2005 to 2018. The above formula was then applied using the appropriate elasticity, tuition tax credit and private school enrollment and tuition values. The private school tuition parameter was obtained by taking the 2003 enrollment weighted average tuition for a sub-sample of private schools in Utah. The model simulation was conducted under several parametric assumptions ranging between relatively low demand response and a modest supply response where own-price elasticity of demand was selected to be -0.5, and the elasticity of supply of 2.0 at the low end and a more responsive own-price elasticity of demand of -2.0, and an elasticity of supply of 100 at the high end. Several different parameter sets between these two were run and the statewide results are reported in Table 15. Two different TTC assumptions were used to generate estimates of the fiscal impact of a TTC. The first scenario allows a fully refundable \$2000 individual credit, and an SGO sponsored TTC contribution that will raise the value of the TTC for students who are eligible for reduced price lunch to \$3000. The second scenario allows a fully refundable \$1000 individual credit, and an SGO sponsored TTC contribution that will raise the value of the TTC for students who are eligible for reduced price lunch to \$2000. All estimated induced enrollments are considered eligible for tuition tax credits and credits are allocated according to the four strata identified above.

Fiscal impacts at the state level are generated by linking the estimated induced and non-induced enrollment effects (and their resulting impact on projected TTC disbursements) with estimates of statewide WPUs, estimates of projected Basic School Program (BSP) funding and the resulting projected WPU values for 2005-2018. Projected BSP funding for the period 2005 to 2018 was obtained using a linear trend line based on funding levels over the period 1995 to 2004. Since the WPU allocation calculation is so complex, we felt that the most effective way to estimate district level WPU units was to use regression analysis to identify the historical relationship between enrollment and WPU allocations. This was done using pooled district level data on enrollment and WPU allocations for the past five years. The regression fit for this model generated an R^2 of 0.99. The regression coefficients from the enrollment-WPU regression were used to transform statewide public school enrollment projects into statewide WPU allocations. The estimated WPU value was then calculated as the ratio of BSP funding divided by the WPU allocation.

School district level enrollment projections used in the WPU calculations are based on county-level projections of the aggregate school-age population for 2005 to 2018, obtained from the Governor's Office of Budget and Planning. Allocation of the school-age population to grade categories was done by

calculating the average share of total enrollments, by grade, for the years 1998-2003. Where multiple districts exist within a county, district-level enrollments are summed to create a county-wide total. The total county-wide enrollments, by year were compared to OPB projections to identify slack between OPB projects and actual enrollments. A ratio of the average slack between actual and projected enrollments was calculated to make adjustments to the OPB population projections so that they more closely reflected actual public school enrollment history. Aggregated county-wide enrollments, by grade, for the years 1998-2003 were used to calculate the average share of enrollments in each grade category K-12. These average shares were then used to allocate the adjusted OPB school-age population estimates to appropriate grade categories. Average school district level shares of county enrollment, by grade, for the years 1998-2003 were then used to allocate county-wide enrollment projections to the respective school districts within each county for the years 2005-2018.

The School District Enrollment Allocation Model

Estimates of district level fiscal impact of TTC legislation were generated from the district level public school enrollment projections (discussed above) and an estimate of private school enrollments based on the historical trend line of percent of private school enrollments, by school district. With regard to district level estimates of private school enrollments, several school districts have experienced a declining share of statewide private school enrollments so where the trend line exhibited a negative value these were truncated at zero (no “negative” values are allowed). We also used a 2% reallocation rule to distribute enrollments to districts that have not had private school opportunities in the past. This is an “ad hoc” adjustment to the allocation model to capture the potential of a small amount of migration from public schools to private schools for every district in the state. Fiscal impact is calculated as the difference between BSP funding under the status quo and BSP funding that accounts for TTC induced changes to public school enrollment, plus the net gain in foregone cost from the induced effect of enrollment transfers between public and private schools.

Aggregated District-Level Fiscal Impacts

Table 15 is a statewide aggregation of district-level fiscal impacts generated by the simulation model using various assumptions on elasticity and level of tuition tax credits available to students. Reported fiscal impacts are reported at the distribution quartile values for simulated WPU value and TTC induced enrollments. It is important to keep in mind that the reported results are intended to suggest a range of savings that might be available and provide context for policymakers to consider the effects of the policy under different assumptions underlying proposed policies. Since the simulation model generates a distribution of fiscal impacts for each year, replications of the model will generate estimates that may vary slightly from the ones reported. Two important caveats are in order: First, this model assumes a tax policy that preserves the historical funding patterns established over the period 1995-2004 and second, the model assumes that school districts will be able to adjust their cost structure to reflect the estimated marginal cost savings associated with incremental changes in enrollment. Note that as you move from left to right across the table, we are examining scenarios in which demand for and supply of private school slots increase. For each set of parameters, we examine the expected savings (loss) of an individual \$1000 and a \$2000 TTC side by side.

TABLE 15 – STATEWIDE AGGREGATED FISCAL IMPACTS FOR DIFFERENT ELASTICITIES AND TTC VALUES - QUARTILE SUMMARY

Year	d=0.5, s=2.0, ttc=1000	d=0.5, s=2.0, ttc=2000	d=1.0, s=2.0, ttc=1000	d=1.0, s=2.0, ttc=2000	d=1.5, s=2.0, ttc=1000	d=1.5, s=2.0, ttc=2000	d=2.0, s=2.0, ttc=1000	d=2.0, s=2.0, ttc=2000	d=1.0, s=100, ttc=1000	d=1.0, s=100, ttc=2000	d=1.5, s=100, ttc=1000	d=1.5, s=100, ttc=2000	d=2.0, s=100, ttc=1000	d=2.0, s=100, ttc=2000	Total Projected Public School Enroll- ments	Total Private School Enroll- ments without TTC
50th Quartile																
2005	\$7,158,909	\$10,297,338	\$13,850,230	\$20,690,907	\$18,727,510	\$28,272,634	\$22,548,774	\$34,391,060	\$22,617,762	\$34,349,624	\$35,326,040	\$53,236,826	\$47,780,919	\$72,952,334	492,968	15044
2006	\$5,772,912	\$7,691,417	\$12,933,253	\$18,802,441	\$18,155,402	\$26,939,658	\$22,258,532	\$33,486,393	\$22,327,086	\$33,431,838	\$35,917,498	\$53,669,685	\$49,255,790	\$74,727,642	504,515	16070
2007	\$4,345,133	\$4,992,891	\$11,987,755	\$16,870,941	\$17,586,823	\$25,567,497	\$21,946,472	\$32,577,787	\$22,018,932	\$32,520,436	\$36,558,811	\$54,160,831	\$50,835,748	\$76,621,148	517,739	17158
2008	\$2,845,530	\$2,157,984	\$11,009,818	\$14,826,754	\$16,944,829	\$24,084,325	\$21,602,216	\$31,590,601	\$21,723,400	\$31,514,382	\$37,199,507	\$54,609,779	\$52,445,636	\$78,541,888	531,691	18280
2009	\$1,235,270	-\$888,860	\$9,954,658	\$12,664,503	\$16,312,271	\$22,503,819	\$21,292,091	\$30,542,744	\$21,377,557	\$30,428,983	\$37,931,689	\$55,106,209	\$54,232,234	\$80,667,915	547,714	19508
2010	-\$493,930	-\$4,142,704	\$8,827,358	\$10,329,483	\$15,632,291	\$20,844,129	\$20,930,528	\$29,465,998	\$21,050,166	\$29,307,103	\$38,734,583	\$55,683,844	\$56,116,453	\$83,005,490	565,375	20838
2011	-\$2,280,721	-\$7,517,500	\$7,654,726	\$7,915,398	\$14,914,735	\$19,108,076	\$20,520,533	\$28,304,524	\$20,648,802	\$28,113,244	\$39,505,271	\$56,212,178	\$58,010,435	\$85,297,618	583,138	22216
2012	-\$4,193,911	-\$11,100,009	\$6,410,109	\$5,353,505	\$14,159,688	\$17,275,040	\$20,109,141	\$27,093,207	\$20,248,496	\$26,847,789	\$40,345,472	\$56,827,824	\$60,076,237	\$87,774,759	602,510	23693
2013	-\$6,297,733	-\$15,018,874	\$4,959,143	\$2,433,652	\$13,194,696	\$15,093,651	\$19,476,922	\$25,495,542	\$19,657,204	\$25,198,983	\$40,952,974	\$57,038,775	\$61,898,445	\$89,862,254	620,813	25185
2014	-\$9,307,169	-\$20,506,316	\$2,632,883	-\$2,069,628	\$11,376,694	\$11,373,023	\$18,001,734	\$22,387,684	\$18,193,949	\$22,090,240	\$40,799,329	\$55,772,226	\$62,937,626	\$90,616,027	638,751	26721
2015	-\$13,054,639	-\$27,287,613	-\$406,944	-\$7,772,049	\$8,823,070	\$6,405,432	\$15,843,390	\$18,088,515	\$16,098,708	\$17,710,384	\$39,916,796	\$53,336,609	\$63,361,844	\$90,231,669	655,628	28285
2016	-\$16,875,101	-\$34,201,477	-\$3,545,183	-\$13,692,361	\$6,182,193	\$1,231,812	\$13,578,212	\$13,520,206	\$13,867,342	\$13,171,742	\$38,857,236	\$50,669,693	\$63,614,730	\$89,512,827	671,478	29863
2017	-\$20,557,471	-\$40,931,443	-\$6,540,926	-\$19,397,416	\$3,642,154	-\$3,737,741	\$11,378,712	\$9,172,790	\$11,624,796	\$8,824,555	\$37,842,600	\$48,130,546	\$63,859,017	\$88,935,134	684,881	31367
2018	-\$21,519,804	-\$42,834,526	-\$6,866,134	-\$20,338,018	\$3,767,110	-\$3,958,563	\$11,822,320	\$9,539,237	\$12,091,964	\$9,185,264	\$39,495,820	\$50,215,912	\$66,696,492	\$92,873,458	696,586	32817
Total	-\$73,222,726	-\$179,289,693	\$72,860,747	\$46,618,113	\$179,419,465	\$211,002,792	\$261,309,578	\$345,656,287	\$263,546,163	\$342,694,568	\$539,383,626	\$754,670,937	\$811,121,608	\$1,181,620,163		

In evaluating which of the demand assumptions might best represent demand in Utah, several factors are important. We show the enrollment figures for public and private schools generated by each of the parameter sets in Table 16. Note that across all assumptions, the level of private school enrollments remains lower than the national averages. Unlike most states, Utah's very low base of private school enrollees suggests a demand relation that in the past has been relatively insensitive to price. The question is whether the population segment impacted by the new policy will behave like the population represented by historic private school markets or will adapt to the expressed demand of a changing Utah. In our focus groups, many parents expressed a desire to have access to a TTC to make it possible to consider alternatives for a particular child not well served by the public school environment. As Utah grows to look more like the national model with increased diversity and perhaps more of the problems of other states' school systems, demand in Utah for private schools may also trend upwards towards that national level. With the changing demographics of the state and the demand issues raised in our focus groups, even our high demand figure can be justified. However, given all that we know about the Utah marketplace, it is our best judgment that a figure somewhere in between the two estimates of 0.5 and 2.0 is most likely and would result in a net savings from the policy relative to predicted spending in the absence of TTC. While the simulations are suggestive of the overall pattern in the state, they are probably not a good predictor of individual county behavior especially when tested at the ends of the continuum. As we develop a better sense of the actual demand and supply elasticities by county, this simulation will allow policymakers to examine a variety of different policy interventions.

The key to evaluating whether a TTC is good for Utah's education system from a cost perspective depends on the degree to which families may be encouraged to take the TTC and on the estimated benefit it might produce for families. The simulations suggests that the more students who can be induced to switch from public to private schools relative to those who would have been in private schools without a TTC, the greater the cost savings to the state. As a result, savings grow at a slower pace with smaller credits (although the per-credit loss in revenue would be less as well). While a TTC will result in a windfall for those parents who would have invested in private school without the TTC, the overall savings to the state of pulling others into that market more than offset these costs under all but the most conservative estimates of demand. Adopting the \$1000 credit over the \$2000 credit results in a more risk averse strategy as it dampens the effects of the TTC at all levels resulting in a narrower range between the first and last years. Similarly, a strategy that limits the size of the TTC based on income using a graduated approach would reduce the costs of bringing in the non-induced private school students relative to the TTC induced group. Such an approach would seem to be less risky, especially if policymakers are concerned that the actual switch rate in Utah is low.

TABLE 16 – STATEWIDE TTC-INDUCED PRIVATE SCHOOL ENROLLMENT SUMMARY FOR DIFFERENT ELASTICITIES AND TTC VALUES - QUARTILE SUMMARY

Year	d=0.5, s=2.0, ttc=1000	d=0.5, s=2.0, ttc=2000	d=1.0, s=2.0, ttc=1000	d=1.0, s=2.0, ttc=2000	d=1.5, s=2.0, ttc=1000	d=1.5, s=2.0, ttc=2000	d=2.0, s=2.0, ttc=1000	d=2.0, s=2.0, ttc=2000	d=0.5, s=100, ttc=1000	d=0.5, s=100, ttc=2000	d=1.0, s=100, ttc=1000	d=1.0, s=100, ttc=2000	d=1.5, s=100, ttc=1000	d=1.5, s=100, ttc=2000	d=2.0, s=100, ttc=1000	d=2.0, s=100, ttc=2000	Total Projected Public School Enrollments	Total Private School Enrollments without TTC
50% - Quartile																		
2005	1345	2389	2225	3946	2864	5076	3366	6002	1735	3003	3379	5982	5044	8820	6670	11774	492,968	15044
2006	1441	2559	2384	4228	3069	5440	3606	6430	1858	3215	3618	6409	5406	9451	7144	12611	504,515	16070
2007	1542	2738	2552	4526	3285	5823	3859	6882	1989	3441	3872	6862	5786	10118	7648	13495	517,739	17158
2008	1646	2924	2726	4835	3509	6219	4121	7350	2124	3674	4136	7329	6179	10809	8170	14410	531,691	18280
2009	1760	3125	2916	5171	3752	6649	4406	7859	2271	3927	4423	7837	6608	11557	8734	15407	547,714	19508
2010	1882	3342	3118	5532	4013	7111	4713	8405	2429	4199	4730	8382	7069	12359	9340	16480	565,375	20838
2011	2006	3562	3324	5896	4277	7580	5023	8959	2589	4476	5041	8934	7534	13173	9956	17565	583,138	22216
2012	2137	3795	3540	6279	4555	8073	5350	9543	2758	4768	5370	9516	8023	14032	10605	18707	602,510	23693
2013	2267	4025	3753	6656	4830	8562	5674	10119	2924	5058	5694	10090	8507	14880	11248	19840	620,813	25185
2014	2398	4259	3969	7039	5109	9057	6002	10704	3093	5352	6023	10671	8999	15735	11894	20991	638,751	26721
2015	2531	4495	4187	7424	5390	9551	6334	11294	3264	5649	6357	11255	9493	16597	12550	22153	655,628	28285
2016	2663	4727	4406	7813	5671	10050	6664	11881	3434	5945	6690	11845	9980	17456	13208	23305	671,478	29863
2017	2788	4948	4615	8182	5939	10525	6978	12442	3596	6223	7003	12405	10443	18275	13825	24406	684,881	31367
2018	2908	5161	4816	8533	6196	10979	7276	12980	3752	6491	7304	12943	10894	19059	14425	25457	696,586	32817
Induced Private School Enrollment As a Percentage of Total Projected Public School Enrollment -- Summary for Different Elasticities and TTC Values - Quartile Summary																		
50% - Quartile																		
2005	0.27%	0.49%	0.45%	0.81%	0.58%	1.04%	0.69%	1.23%	0.35%	0.61%	0.69%	1.23%	1.03%	1.82%	1.37%	2.45%		
2006	0.29%	0.51%	0.47%	0.85%	0.61%	1.09%	0.72%	1.29%	0.37%	0.64%	0.72%	1.29%	1.08%	1.91%	1.44%	2.56%		
2007	0.30%	0.53%	0.50%	0.88%	0.64%	1.14%	0.75%	1.35%	0.39%	0.67%	0.75%	1.34%	1.13%	1.99%	1.50%	2.68%		
2008	0.31%	0.55%	0.52%	0.92%	0.66%	1.18%	0.78%	1.40%	0.40%	0.70%	0.78%	1.40%	1.18%	2.08%	1.56%	2.79%		
2009	0.32%	0.57%	0.54%	0.95%	0.69%	1.23%	0.81%	1.46%	0.42%	0.72%	0.81%	1.45%	1.22%	2.16%	1.62%	2.89%		
2010	0.33%	0.59%	0.55%	0.99%	0.71%	1.27%	0.84%	1.51%	0.43%	0.75%	0.84%	1.50%	1.27%	2.23%	1.68%	3.00%		
2011	0.35%	0.61%	0.57%	1.02%	0.74%	1.32%	0.87%	1.56%	0.45%	0.77%	0.87%	1.56%	1.31%	2.31%	1.74%	3.11%		
2012	0.36%	0.63%	0.59%	1.05%	0.76%	1.36%	0.90%	1.61%	0.46%	0.80%	0.90%	1.60%	1.35%	2.38%	1.79%	3.20%		
2013	0.37%	0.65%	0.61%	1.08%	0.78%	1.40%	0.92%	1.66%	0.47%	0.82%	0.93%	1.65%	1.39%	2.46%	1.85%	3.30%		

2014	0.38%	0.67%	0.63%	1.11%	0.81%	1.44%	0.95%	1.70%	0.49%	0.84%	0.95%	1.70%	1.43%	2.53%	1.90%	3.40%		
2015	0.39%	0.69%	0.64%	1.15%	0.83%	1.48%	0.98%	1.75%	0.50%	0.87%	0.98%	1.75%	1.47%	2.60%	1.95%	3.50%		
2016	0.40%	0.71%	0.66%	1.18%	0.85%	1.52%	1.00%	1.80%	0.51%	0.89%	1.01%	1.80%	1.51%	2.67%	2.01%	3.60%		
2017	0.41%	0.73%	0.68%	1.21%	0.87%	1.56%	1.03%	1.85%	0.53%	0.92%	1.03%	1.84%	1.55%	2.74%	2.06%	3.70%		
2018	0.42%	0.75%	0.70%	1.24%	0.90%	1.60%	1.06%	1.90%	0.54%	0.94%	1.06%	1.89%	1.59%	2.81%	2.11%	3.79%		
Induced and Non-Induced Private School Enrollment As a Percentage of Total Projected Public School Enrollment -- Summary for Different Elasticities and TTC Values - Quartile Summary																		
Year	d=0.5, s=2.0, ttc=1000	d=0.5, s=2.0, ttc=2000	d=1.0, s=2.0, ttc=1000	d=1.0, s=2.0, ttc=2000	d=1.5, s=2.0, ttc=1000	d=1.5, s=2.0, ttc=2000	d=2.0, s=2.0, ttc=1000	d=2.0, s=2.0, ttc=2000	d=0.5, s=100, ttc=1000	d=0.5, s=100, ttc=2000	d=1.0, s=100, ttc=1000	d=1.0, s=100, ttc=2000	d=1.5, s=100, ttc=1000	d=1.5, s=100, ttc=2000	d=2.0, s=100, ttc=1000	d=2.0, s=100, ttc=2000		
50% - Quartile																		
2005	3.33%	3.55%	3.52%	3.88%	3.65%	4.12%	3.76%	4.32%	3.42%	3.68%	3.76%	4.32%	4.12%	4.93%	4.47%	5.57%		
2006	3.48%	3.71%	3.68%	4.06%	3.82%	4.31%	3.93%	4.52%	3.57%	3.85%	3.93%	4.51%	4.30%	5.16%	4.67%	5.83%		
2007	3.62%	3.86%	3.83%	4.23%	3.97%	4.49%	4.09%	4.71%	3.71%	4.01%	4.09%	4.70%	4.48%	5.37%	4.86%	6.08%		
2008	3.76%	4.01%	3.97%	4.39%	4.13%	4.66%	4.25%	4.89%	3.85%	4.16%	4.25%	4.88%	4.65%	5.58%	5.05%	6.32%		
2009	3.90%	4.16%	4.12%	4.55%	4.28%	4.83%	4.40%	5.07%	3.99%	4.31%	4.40%	5.07%	4.83%	5.79%	5.24%	6.56%		
2010	4.03%	4.30%	4.26%	4.71%	4.43%	5.01%	4.56%	5.25%	4.13%	4.46%	4.56%	5.25%	5.00%	6.00%	5.43%	6.80%		
2011	4.17%	4.45%	4.40%	4.87%	4.58%	5.18%	4.71%	5.43%	4.27%	4.61%	4.72%	5.42%	5.17%	6.21%	5.61%	7.03%		
2012	4.30%	4.59%	4.55%	5.03%	4.72%	5.34%	4.86%	5.60%	4.41%	4.76%	4.87%	5.60%	5.34%	6.41%	5.79%	7.26%		
2013	4.44%	4.74%	4.69%	5.18%	4.87%	5.51%	5.02%	5.78%	4.55%	4.91%	5.02%	5.78%	5.50%	6.61%	5.98%	7.49%		
2014	4.58%	4.88%	4.83%	5.34%	5.02%	5.68%	5.17%	5.96%	4.69%	5.06%	5.18%	5.95%	5.67%	6.81%	6.16%	7.72%		
2015	4.72%	5.03%	4.98%	5.51%	5.18%	5.86%	5.33%	6.14%	4.84%	5.22%	5.34%	6.14%	5.85%	7.02%	6.35%	7.96%		
2016	4.86%	5.19%	5.14%	5.68%	5.34%	6.03%	5.49%	6.33%	4.98%	5.38%	5.50%	6.32%	6.02%	7.24%	6.54%	8.20%		
2017	5.01%	5.34%	5.29%	5.84%	5.49%	6.21%	5.66%	6.51%	5.13%	5.54%	5.66%	6.51%	6.20%	7.45%	6.73%	8.44%		
2018	5.15%	5.49%	5.44%	6.01%	5.65%	6.39%	5.82%	6.70%	5.28%	5.70%	5.82%	6.69%	6.37%	7.66%	6.93%	8.68%		

PRIVATE SCHOOL SURVEY

It is possible that migration will be bounded by the availability of private school slots. To answer the extent to which this will constrain the switch rate, we conducted an inventory of existing private school capacity by school district. The National Center for Education Statistics indicated that there were 78 private schools operating in Utah in 1999 with an average enrollment of approximately 160. Today there are nearly 200 with a total enrollment of over 15,000.

The Utah private school enrollment is remarkably low relative to other states and one question posed by TTC reformers is the degree to which Utah's private market can absorb the new demand. The Mackinac Center indicates that private school enrollment can expand at 15 percent per year.³² For example, The Christian Heritage School in Riverdale has been growing at an annual rate of 15 percent since 1995. From 2001-2002, the school added 25 percent to its enrollment. Our survey of private school administrators indicates considerable capacity currently available in the system. Private school administrators reported excess capacity right now at a level of 35 percent above current enrollment or 5,600 additional slots. While still remarkably low compared with other states, the growth in new private schools and their expressed willingness to expand in the face of new demand suggests considerable elasticity in the supply of private school slots.

It was the intention of this survey to interview representatives from every private school in the state of Utah that provided a full educational experience for grades between and including K-12. The initial list was taken from the Utah State Office of Education Schools Directory. This list included 120 schools. Additional schools were added from both internet searches as well as the Sutherland Institute's list of private schools. This population of private schools totaled 171. As the interviews were carried out, it was clear that many schools were no longer in business, and many others were tutorial services that should not be included as an alternative to public education. This current summary is preliminary and includes 103 completed interviews. Of those contacted, 16 declined to participate or were not full-time educational alternatives. Grade ranges varied, but 10 schools served typical high school grades, 17 were secondary schools that included 7th to 12th grades, 15 schools included all grades from kindergarten to 12th grades, two schools had traditional middle school grades, 28 schools served both elementary and middle school ages, seven schools served elementary grades, and the last eight served pre-kindergarten and kindergarten students. Of the 87 schools, there were also 31 schools that did not target a specific population based on faith, talent or needs. They are summarized separately in each table. The spreadsheet listing the private schools contacted as part of our survey is included in Appendix Six.

What follows is a numerical summary of enrollment numbers and policies, tuition and expenses, population variables and other descriptors. Most figures are means with minimum and maximum values in parentheses.

³² Patrick L. Anderson et al., *The Universal Tuition Tax Credit: A Proposal to Advance Parental Choice in Education*, Mackinac Center for Public Policy, Midland Michigan, 1997.

TABLE 17 – PRIVATE SCHOOL ENROLLMENT

School Type	Current Enrollment	Enrollment Trend	Additional Accommodation	Willingness to Expand	Have Waiting List
Kindergarten School (n=8)	189 (28-480)	25% up 50% static 25% down	46 (1-194)	38%	63%
Elementary School (n=7)	196 (30-620)	0% up 67% static 33% down	29 (0-130)	71%	67%
K-8 School (n=28)	198 (13-526)	38% up 31% static 31% down	94 (0-800)	68%	68%
Middle School (n=2)	275 (195-355)	0% up 0% static 100% down	8 (5-10)	50%	100%
All Grades School (n=17)	205 (10-1,100)	13% up 37% static 50% down	43 (5-150)	100%	50%
Secondary School (n=17)	96 (16-400)	33% up 50% static 17% down	36 (0-175)	94%	69%
High School (n=10)	303 (0-861)	33% up 67% static 0% down	164 (14-900)	70%	13%
All Schools (n=87)	194 (0-1,100)	27% up 43% static 30% down	70 (0-900)	76%	60%
Non-targeted Schools (n=31)	221 (0-1,100)	35% up 41% static 24% down	78 (0-800)	71%	66%

Enrollment data are from the current school year. Enrollment trends were determined qualitatively by examining data from the last two to five years. Schools were rated “up” or “down” if trends were clear and otherwise were rated “static.” For schools that provided only current enrollment date, no trend was coded. Additional accommodations are provided in number of students. The last two columns show the percentages of schools willing to expand if more students were available and the percentage of schools that keep a waiting list.

TABLE 18 – TUITION AND EXPENSES

School Type	Low Tuition	High Tuition	Additional Expenses
Kindergarten School (n=8)	\$1,262 (\$252-\$2,160)	\$4,974 (\$1,620-\$10,910)	\$66 (\$0-\$150)
Elementary School (n=7)	\$3,115 (\$720-\$10,910)	\$5,369 (\$2,520-\$10,910)	\$140 (\$0-\$395)
K-8 School (n=28)	\$3,021 (\$0-\$7,100)	\$4,293 (\$0-\$11,900)	\$252 (\$0-\$1,234)
Middle School (n=2)	\$7,695 (\$2,500-\$12,890)	\$8,375 (\$3,860-\$12,890)	\$402 (\$353-\$450)
All Grades School (n=17)	\$2,327 (\$0-\$4,900)	\$4,804 (\$0-\$14,250)	\$243 (\$0-\$1,175)
Secondary School (n=17)	\$31,053 (\$4,500-\$68,000)	\$34,053 (\$6,390-\$68,000)	\$227 (\$0-\$1,700)
High School (n=10)	\$8,373 (\$2,700-\$17,500)	\$10,493 (\$2,700-\$30,300)	\$438 (\$0-\$705)
All Schools (n=87)	\$7,950 (\$0-\$68,000)	\$10,112 (\$0-\$68,000)	\$245 (\$0-\$1,700)
Non-targeted Schools (n=31)	\$4,298 (\$252-\$17,500)	\$6,980 (\$1,620-\$30,300)	\$218 (\$0-\$705)

Knowing that some private schools charged a range of tuition depending on age of child or other variables, both the lowest and highest full annual tuitions were collected. The presence of zeros in this table may indicate that the schools included tuition assistance in their response. These schools will be called again to finalize that data. Expense dollars represented standard fees that are billed to families outside of tuition. These expenses are unlikely to include all remaining expenses necessary to send a child to that school.

TABLE 19 – POPULATIONS SERVED

School Type	Tuition Assist	LD	ESL	Out of Area	Out of Utah	Resident School	Targeted
Kindergarten School (n=8)	9% (0%-33%)	8% (0%-21%)	9% (0%-26%)	12% (0%-50%)	1% (0%-2%)	0%	13%
Elementary School (n=7)	17% (4%-35%)	7% (0%-23%)	3% (0%-5%)	13% (0%-49%)	0% (0%-0%)	0%	57%
K-8 School (n=28)	25% (0%-100%)	7% (0%-18%)	11% (0%-79%)	18% (0%-100%)	3% (0%-50%)	7%	56%
Middle School (n=2)	29% (22%-35%)	17% (15%-20%)	5% (5%-5%)	12% (5%-20%)	2% (1%-3%)	0%	50%
All Grades School (n=17)	9% (0%-25%)	22% (0%-100%)	8% (0%-50%)	24% (0%-92%)	12% (0%-68%)	13%	79%
Secondary School (n=17)	28% (1%-100%)	57% (0%-100%)	6% (0%-24%)	55% (0%-100%)	76% (0%-100%)	76%	94%
High School (n=10)	44% (16%-72%)	11% (0%-39%)	15% (0%-25%)	34% (2%-89%)	30% (1%-89%)	20%	56%
All Schools (n=87)	23% (0%-100%)	19% (0%-100%)	9% (0%-79%)	26% (0%-100%)	20% (0%-100%)	22%	63%
Non-targeted Schools (n=31)	20% (0%-100%)	10% (0%-50%)	6% (0%-32%)	21% (0%-100%)	7% (0%-100%)	3%	0%

Population data for those receiving tuition assistance, those having learning disabilities, those that speak English as a second language and those residing outside of the school locale or the state of Utah are reported in percentage of the student body. The last two columns represent the percentage of schools with

resident students and the percentage of schools that target a specific audience based on faith, talent or needs.

TABLE 20 – OTHER DESCRIPTORS

School Type	Acceptance Method	Families	Standard Testing
Kindergarten School (n=8)	25% By skills or other talents 75% First come – first served	75%	50%
Elementary School (n=7)	17% By skills or other talents 66% First come – first served 17% Other method	100%	57%
K-8 School (n=28)	4% All comers 52% First come – first served 44% Other method	96%	68%
Middle School (n=2)	50% By skills or other talents 50% Other method	100%	50%
All Grades School (n=17)	58% First come – first served 42% Other method	60%	60%
Secondary School (n=17)	21% First come – first served 79% Other method	6%	63%
High School (n=10)	25% By skills or other talents 25% First come – first served 50% Other method	78%	89%
All Schools (n=87)	1% All comers 7% By skills or other talents 0% Lottery 48% First come – first served 44% Other method	69%	65%
Non-targeted Schools (n=31)	18% By skills or other talents 56% First come – first served 26% Other method	81%	55%

These final variables summarize the method by which these private schools select their students, either from application pools or their waiting lists. The “other method” category has not been examined for this preliminary report. The final two columns represent the percentage of schools that typically serve multiple children within families and the percentage of schools that claim to employ the same standardized tests as Utah’s public schools.

It is clear that the supply of slots in private schools in Utah appears quite elastic. New schools are being added every day in response to perceived interest by Utah families. In fact, in our analysis, we uncovered an additional 50 private schools not included in the list available in Utah education statistics. We are currently in the process of collecting data on those schools as well which we will report as part of our oral presentation to the committee. It is possible that these discovered schools are relative newcomers to the Utah school market and that they represent a trend towards an even greater number of private school slots. This could account for the decline in enrollments experienced by several schools in our sample. As new offerings open up, competition for the existing students leads some to lose out to other schools that more closely meet the demands of parents. There is no indication that the overall number of private school students in Utah is in decline.

ANALYSIS OF PUBLIC SCHOOL CAPACITY

In order to provide a richer qualitative understanding of the enrollment trends school districts across Utah are experiencing, we conducted face to face or phone interviews with key financial officers in 28 of the 40 Utah School Districts. We contacted all 40 of the school districts, but were unable to get any response from 12 of them within our tight deadline. We believe that this set represents a valid sample of the overall patterns within the state.

The first issue we wanted to address was a measure of school capacity that we might use to judge how district planners might accommodate loss of enrollment from TTC and future public school capacity problems. To elicit these measures we asked each financial officer the following questions: Is your district facing problems with enrollment capacity? What percentage of schools is currently at 90 percent capacity or greater? What are the trends over the next five years and what building changes are planned in response to the enrollment changes? A copy of the interview template is included in Appendix Seven.

After reviewing the responses to the capacity questions, four clear categories emerged. The first category included the set of districts with growing enrollments and several schools currently at capacity. These include Alpine, Davis, Murray, North Summit, South Summit, Tooele, Uintah, Washington and Weber. These school districts had 18-100 percent of their schools at 90 percent capacity or greater and virtually no schools in the district had declining enrollments. The second category of districts can be represented as stable and includes Granite, Jordan, Logan, Ogden and Park City school districts. These districts are experiencing a slow but steady growth pattern with 25-100 percent³³ of schools at 90 percent capacity or greater and only 12.5-45 percent of schools experiencing declining enrollment. The third category of districts, which included Box Elder, Morgan, Piute, Provo and Sevier school districts, is characterized as stable/declining. They face a situation in which only 15-33 percent of schools were at 90 percent capacity or greater and 50-66 percent of schools are experiencing declining enrollment. The last category includes Daggett, Duchesne, Emery, Garfield, Grand, Millard, Rich, San Juan and Wayne school districts and is characterized by low and declining enrollment. Among these districts, no schools had enrollment at 90 percent capacity or greater and 75-100 percent of schools were experiencing declining enrollment.

In evaluating the impact of TTC on districts, those at either end of the spectrum present the easiest case for addressing the problem. Those schools that are decreasing in population and those growing at a fast pace are not likely to be negatively impacted by access to more choice in the educational arena. In small declining districts, few students are predicted to use the credit and so impacts will be light. In growing districts, exit can be absorbed and, in fact, if enough students opt out of the public system it could slow the planning and capital projects to allow more thoughtful outcomes.

As one would expect given overall growth patterns in Utah, the districts facing the most problems with declining enrollment are those in rural areas at significant distance from population bases. These schools are already under pressure when it comes to covering the marginal costs of their student population. As expected, they are fearful of the effect of any potential loss of revenue that may be associated with the passage of tuition tax credits. As noted from our econometric analysis above, the impact on these small districts is quite small and is further dampened by other factors impacting demand such as the lack of an existing private school and the transportation issues posed by large distances. As in the past, schools that operate with cost structure that disadvantage the district will continue to require some form of subsidization as currently exists in the necessarily small school subsidy and the basic school guarantees. The effect on funding capacity in these districts is not expected to be significant.

³³ Ogden School district accounts for the existence of a district with a 100 percent of schools at full capacity but also experiences declining enrollment in virtually every school. They stated that with their declining enrollment implies that the entire district could drop below full capacity in the future. As a result, we decided that they might best be placed within this category.

In fast growing districts, the effect of a TTC should be easily absorbed into the anticipated growth and demands for new facilities. With a TTC potentially reducing the pace of growth, fast growing districts will be able to slow the pace of bonding and building that they are currently doing. As a result, a TTC can save the district as noted in the earlier analysis and ease the frantic pace at which they currently have to adapt to growth. These are also the districts most likely to see the emergence of new supply of private school slots.

In stable/slow growing districts, we expect neutral to small positive consequences from the introduction of the TTC. The revenue loss due to the TTC will depend on the demand elasticity assumption used in the model and the degree to which capital investment decisions can be adjusted to changes in enrollment. At low responsiveness levels, the introduction of a TTC will result in losses for these districts as few students opt out of existing schools and stable growth pattern fails to allow for significant savings from offsetting capital investments. At higher levels, and if the district is responsive to changing demand, they can save money that might be spread over a broader public school population.

In stable but slowly declining districts, the effect of the TTC will result in more schools with available slots. As noted in our earlier discussion, public school choice is a critical way in which parents feel empowered within the public system. As a district has greater capacity for transfers within the district, we would predict less demand for private school options since even with the credit, private schools remain a more expensive alternative to uncrowded public schools. Since these districts are less likely to face over-crowded classrooms and more options within the district, we would expect the number of parents seeking TTC to be less, all things equal.

In responding to what districts are doing to address change, we found that 11 districts are planning to build new schools, 14 districts are planning to remodel existing schools, eight districts are planning on replacing existing schools and six are planning on closing schools. Most of the remodeling and replacement plans in decreasing enrollment districts were due to the age and condition of buildings, not necessarily based on enrollment or some other need. The majority of relatively stable districts that were building new schools were doing so because of population shifts, such as in Jordan District. Where population patterns change, empty or underused school facilities might be sold or leased to private or charter schools seeking new or expanded facilities. New construction that is driven by significant population growth, as in Washington District with nine new schools under construction or online, is one of the most costly aspects included in Utah's education marginal costs. To the extent that some of this cost may be avoided by spending in the private sector, then we would predict that more of the education funding raised in local communities would be directed towards the operational costs of education. The questions impacting this result are whether enough students will leave the system and whether districts can be constrained from building new facilities anyway.

In terms of potential population shifts within districts, we asked administrators how they accommodate the change in enrollments at the school level as shifts in population occur. For those districts with stable or declining enrollment, most responded that population shifts rarely occur because their numbers are so low. As a result, they did not see how this question applied to their situation. To address shifting patterns, district representatives suggested they used a variety of strategies. They change district boundaries; shift teachers from one school to another; bus students from one area to another; consolidate schools; add portables; change class schedules; change year schedules (from year-round back to traditional); hire part-time teachers to replace retiring teachers; add advance placement programs; add special education cluster programs; and add or eliminate school buildings. Uintah School District has created a very unique structure using a school configuration method to accommodate for this change. Instead of a more traditional set up, they have created a system that is K-2, 3-4, a 5th grade center, a junior high school and a high school.

The current teacher-pupil ratio ranged everywhere from 28:1 for Ogden high schools to 14:1 for Piute High School. Relative to national ratios, almost all Utah schools operate with significantly higher

margins. With the exception of the very small districts which have low student teacher ratio, there was no clear pattern in the responses to teacher/student ratio.

We asked each representative how they responded to shifts in enrollment that fell between the neat boundaries of a full classroom unit and the responses varied. Several said that if enrollment decreases below that ratio they would adjust for a teacher rather than other resources, because of the expense of the salary and benefits for a teacher. However, others reported that they would rather adjust teacher's aides, secretarial services and would even redraw boundaries to accommodate a shift in population change. The districts that have more resources available (i.e., school choice or high enrollment numbers) do everything they can to protect their teachers by considering other resources. One unusual situation that is worth mentioning is occurring in San Juan School District. In this district, the student-teacher ratio fluctuates depending on whether there are reservation students in the classroom. Unlike most districts that have different ratios depending on class level, San Juan's ratios shift with the presence of often at-risk Native Americans. If there is a strong demand for special services, the district will distribute additional teachers to their ratio calculations who are not specifically assigned to a classroom but provide resources for the remaining classes.

The second section of our key informant interviews asked questions to uncover what the districts were doing in terms of planning. We sought information about staffing adjustments and staffing predictions made at the school level. In terms of staffing adjustments, a large majority of districts do not make significant adjustments after the school year begins. They agree that while there may be a couple of circumstances where enrollment projections were a little off, for the most part they are so insignificant that districts are able to compensate without too much strain on staff or resources. There are a few districts that make adjustments year round, but most will look at enrollment before school begins, compare it with the actual enrollments after October 1, and then make adjustments accordingly. If enrollments are higher, they may add staff or resources. If they are lower, they honor contracts and make adjustments in other areas.

When asked how districts predict staffing needs for the next school year, they usually use enrollment projections done by the district and by the state to determine their needs. In order to project enrollments, districts may compare graduation numbers with entering kindergarten numbers. They adjust for things like employment trends, demographics, population shifts, class size expectations, new births, building permits within the district and even potential retirement of teachers. Finally, we asked about planning and timing cycles for textbook adoption and instructional materials. The majority of schools in this survey reported a four to seven year cycle. However, there were a couple of schools that adopted textbooks and instructional material based on need and available funding with no set pattern.

The third section of the key informant interviews dealt with revenue/cost management at the district level. We asked the districts what they considered a standard classroom unit for planning purposes. Of all of the questions in this survey, this was perhaps the most difficult to answer for most districts. Six of the districts reported that there really was no standard and it varied across the district based on particular school and class. Nine of the districts used their reported ratio as the standard. Ten districts said they do have a standard but there was no common level across the districts.

We also inquired whether districts altered their classroom unit if special needs students were identified within the class. Every district responded that the standard does not change. If special needs students require additional resources, the districts are more inclined to add teacher aides or physically modify the classroom to accommodate individual situations. Jordan School District does address this issue differently than others in our sample. They have created special education cluster schools to fulfill the needs of special education students throughout the district and obtained some economies of scale.

The second question in the revenue/cost management section asked how much flexibility local school administrators have in allocating resources within their district. Most districts reported a sizeable amount of flexibility in the allocation of both staffing needs and school resources at the school level.

However, the term “flexibility” was defined very differently throughout all districts. In some cases, “flexibility” was complete flexibility given by the district to the schools to budget and spend all funding where local administrators see fit. In other cases, schools were given a budget by the district with school flexibility within specific funding guidelines. Even though some districts professed “flexibility,” they had a number of limitations placed upon the schools. Such limitations included allowing schools to be flexible only with school-generated funding and special grant money; limiting abilities to transfer funding outside of textbook and library book budget areas into others that are in greater need; and fulfilling staffing needs at the district level only.

We asked about the criteria school districts use to allocate operating revenue to individual schools. Most districts used enrollments as their main determinant of funding. However, some districts also considered factors such as size of school, age of school facilities, teacher count and a base allocation for all schools within the district. One factor that was only mentioned by schools at or near capacity was the use of historical precedent and past budgets to determine an appropriate allocation of operation revenue.

In responding to choice, administrators again had a range of responses from open to the possibility as long as there was adequate time to plan to complete frustration with lost revenues that choice created. Several administrators mentioned the dollars lost to home school or charters without recognizing the costs required if those students were in their classrooms. From an administrative standpoint, most reacted comparably regardless of whether the competition flowed from public school choice, home school or private school choice. From a funding and planning perspective, each form of competition with institutions outside the district created dilemmas for the district. Within district transfers seemed less problematic. In fact, in Granite school district as many as 10,000 students attend a school other than their neighborhood school and the schools and district had adapted well to this flexibility.

When asked what time frame was needed to adjust to changes in enrollment due to competing school alternatives, most answered anywhere from six months to a year as the optimal time frame. Several referenced the timeframe used for public choice requests. A few administrators were skeptical of whether any timeframe would be successful. Even though a time frame that allowed planning would work best for their districts, they argued that it often doesn’t work because private schools and parents fail to communicate with them within the timeframe most appropriate for planning.

There is little doubt that adjusting to a changing policy environment is risky and as such frightening to school administrators, teachers, and parents accustomed to the current order. The extent to which public school districts must adjust depends on the extent to which new families can be induced to take the exit option. Even if school districts lose funds (under lowest demand options) the most likely result will be no noticeable effect on quality in the public schools (if quality is measured by student achievement).

The existing literature on the link between spending per pupil and achievement is very mixed. Using a meta-analysis, Eric Hanushek (1999) examined the results of 400 studies and found no conclusive evidence that either per pupil spending or class size affected student achievement. Utah has had similar experiences. From 1990-2000, Utah real per pupil expenditures have increased by 23 percent and class size has fallen by eight percent. There have been little to no corresponding changes in National Assessment of Educational Progress scores or ACT scores.

THE IMPACT OF TAX CREDITS FOR CONTRIBUTIONS TO SGOs ON OTHER CHARITABLE GIVING

As noted, the success of a TTC program is sensitive to sources of other funds that are made available to supplement the credit for low- and middle-income students. To evaluate the effect of a tax credit on contributions to education and other charitable causes, we evaluated the data from states including such programs to develop estimates of impact in Utah. We examined the effect of different limits on the ability to generate scholarships and the tradeoff in decline (if any) in other charitable giving. We would expect that the effect on other giving will be most impacted in areas of charitable giving that are close in purpose to the SGOs.

Three states (Minnesota, Iowa and Illinois) offer a direct tax credit or deduction for parents and three other states (Florida, Pennsylvania and Arizona) offer scholarship credits to individuals or corporations making donations usually on behalf of low-income students. The option of a tax credit makes contributions to educational charity distributing scholarships much more beneficial to taxpayers. For example, a \$100 donation to an SGO results in a reduction of \$100 in state tax liability and an additional reduction in federal tax liability. By contrast, the same donation to another charity would reduce tax liability by the relevant state tax rates (five or seven percent versus 100 percent for credit). In other words, contributions to SGOs cost the taxpayer less than comparable donations to other charitable organizations. As a result, such credits increase this form of giving, but could result in a reduction for other charities. It is impossible to determine the exact shift, but we can speculate based on the experience in other states.

In an analysis of Florida's new corporate tax credit, the Collins Center estimated a net gain in education spending per Florida public school child of \$20 after 10 years. While not a large windfall for public school students, it does not decrease the level of funding available. Moreover, they find that the Florida credit does result in a redistribution between charities with small, less well known charities most likely to lose out. Because of the potential effects of such redistribution in Florida, they have capped the total corporation credit at \$50 million and use a first come, first served approach for corporations obtaining the credit. In Florida's first year of operation, 19 corporations claimed the entire \$50 million dollar credit available. Pennsylvania has used a similar limit on the total credit, but they additionally cap each corporation at a maximum \$100,000 credit. We would expect redistribution problems to occur in Utah, particularly when we consider the open-ended nature of the Utah proposal.

Much research suggests that the direct parental credits will have little to no effect on the overall charitable contributions; at least that has been the pattern in the three states where such parental credits are available. One factor that distinguishes these three programs from the proposed plan in Utah is the size of the credit. Minnesota allows a deduction up to \$2,500 and a credit of \$1,000 per child up to \$2,000 per family, but only if family income is below \$37,500. Iowa allows a 25 percent credit on expenses up to \$1,000 for a total credit not to exceed \$250. Illinois allows a 25 percent credit on family educational expenditures between \$250 and \$2,250 for a maximum credit of \$500. In each case, educational spending in private, public or after school programs qualifies. Thus, these credits are distinctly different from the proposed credit considered by the Utah legislature

Existing data on SGO credits indicates strong income elasticity. In Arizona for example, less than 1 percent of taxpayers making \$75,000 or less took the credit; over three percent of those making \$500,000 or more took the credit. The SGO credit data from existing states would also allow one to calculate the tax credit elasticity (the percent change in the credit given changes in income) that would allow for a more accurate estimate of SGO credits as incomes grew from 2006-2019.

In evaluating the number of scholarships that will be provided by the SGOs in Utah, we consider the design of the system. There is zero cost to a corporation or individual to direct their tax liability towards a scholarship organization since it operates as a non-refundable credit. They either pay it to the

scholarship organization or to the state and given the psychological benefit associated with scholarship programs, the limit on giving is set by the number of private school students who qualify to receive the scholarships.

Several other factors make other states experience only marginally relevant to Utah. Arizona, with the longest running TTC program, allows a much smaller amount (\$500, \$625 married) which may not be used directly for your own children. Instead all contributions must go to a scholarship organization for distribution. This may limit the willingness of some to use such a contribution mechanism. Moreover, Arizona also allows a credit for contributions to a number of other charitable activities directed at other social problems. As such, education in Arizona does not have a disproportionate advantage over other charitable giving.

An additional factor that sets Utah apart from other states is in the nature of the current deductible giving that takes place here. Utah is the most giving citizenry of any state in the nation according to IRS statistics. However, tithing by members of the LDS church accounts for most of that charitable giving. It is unlikely that the introduction of a tuition tax credit will lead to any decline in this activity. In this circumstance, as in most charitable giving, people give because they are committed to the purpose to which the giving is directed (ASU, 2003). Thus, if we are to see redistribution among causes it is most likely to be seen in closely related educational or social activities not applicable for the credit.

In a study of the effect of tax credits on giving more generally, DeVita and Twombly (2004) found that credits do result in expanded giving but that the distribution of giving changes in response to the distribution of credits. When credits are given, the pie gets bigger but not everyone benefits from that enlarged giving. They also found that larger organizations tended to benefit more as they provided the least risky access to the tax benefit. In a study of educational tax credits in Michigan, Feldman and Hines (2003) identify a similar result where certain organizations dominate the new.

The unique nature of education funding and the Utah income tax structure in Utah suggests that the problems of redistribution and possible decline in non-education funding should not be a reason to disallow such a credit for education. In Utah, all income tax revenue is directed to fund the important task of educating Utah's students. Whenever a corporation or individual takes a deduction for a contribution to a non-educational activity, such as the United Way or a homeless shelter, it results in a transfer from education to the other charitable activity. For example, a \$100 corporate contribution to a homeless shelter would result, at a five percent corporate tax rate, in \$5 in education targeted revenues being redirected to these other purposes. If that same corporation directed a contribution to an educational scholarship fund, then the entire \$100 would be used for the core purpose of education, either for a scholarship for a low-income student in private school or, if the scholarship were unneeded, in a full contribution back into the Uniform School fund. As a result, the credit may be a more effective way of ensuring that the income tax funds dedicated to educating Utah's youth remain directed to that purpose.

Certainly, citizens, in making decisions on giving, will be sensitive to the price of that giving. But, just as in the case of private school purchases, price is not the only issue. If there is significant concern about the effect of shifts in giving patterns, then the legislature may modify the tax credit for SGO contributions to limit the total or the individual tax credit available as did Florida and Pennsylvania. Additionally, they may regulate the SGOs to ensure that ethical practices are used. Since the TTC proposal in H.B. 271 limits the administrative costs an SGO can incur to two percent, it is likely that the most serious problems of abuse can be avoided.

CONCLUSION AND POLICY RECOMMENDATIONS

In this study, we used economic analysis and social science methods to examine the effects of adopting a tuition tax credit to incentivize parents to enroll their children in private schools. Over the next decade, Utah schools will face projected enrollment increases of nearly 160,000 new students. With the projected economic growth less than needed, policymakers are looking for creative solutions to maintain some of the gains they have made in school funding over the last 10 years. Proponents of a TTC argue that they can ease the spending burden by drawing families out of the public schools and into private schools at an expected cost less than their marginal cost to the system. By inducing parents to help subsidize the education of their children rather than depend entirely on the taxpayer subsidized system, the hope is that the Utah education system can do more with less.

The Utah private school market is different from any other and, as such, there is considerable question about how it will respond to reducing the price of tuition for a whole new group of prospective enrollees. In our study, we found that the private school market was larger and broader than originally believed. Over 170 schools offer educational services in the state with capacity to accept as many as 6,000 students next year. Moreover, nearly 75 percent of those included in our survey expressed a willingness to expand beyond current capacity if the need arose. Utah's private school market is poised and ready to move to a new stage to meet new demand created by a TTC. Thus, we assume that supply is completely responsive to whatever the demand. The question remains, if you build it will they come?

In order to measure the response of Utah parents to a TTC based on H.B. 271, we constructed economic models of private school demand elasticities, marginal costs of public school education by district and an equilibrium simulation to project the savings or losses associated with offering the credit. Using a model of established private schools, we estimated private school demand elasticity as close to zero or very insensitive to changes in price. Currently, students choose schools within the private market for reasons other than the price differentiation between the schools. This is certainly consistent with the historical data, but is somewhat at odds with information collected for this study using parent focus groups in seven counties. In discussions with parents to consider the quality of public schools and the factors that might go into a demand decision for private school, we observed a substantial willingness to consider private school options at least under certain conditions. For many parents willing to consider private school options, the prohibitive cost of most private schools in Utah stood in the way of that decision. Some parents did not value private schools at a level that would justify the decision no matter what the subsidy, but most in our group seemed open to policies that would assist them with the tuition. It is important to recognize, however, that price of private schools is not the only issue. There were other factors that increased the cost parents faced, ranging from no private school options in the county to the demand for transportation costs. Using this qualitative data alongside the econometrically induced demand data and analysis used in other states, we assumed demand elasticities that range from a low of -0.5, to a demand of -2.0 at the high end.

Parents desire empowerment when it comes to their children's education. Our analysis says that this desire could well be met by adopting a TTC policy. If it cannot be achieved using tax credits or private school vouchers, however, then efforts should be made to enhance the potential for choice within the public school system. One way of enhancing this possibility especially in times of changing enrollments is by allowing a public choice commitment for a period longer than a year at a time. Once a transfer is made, choice should be honored even if capacity levels change.

A further concern of policymakers was the question of how much might be saved by not having to educate the next student in the public school system. If one child opted out of the system, at the cost of \$2,000 - \$3,000 to the overall school fund, what, if anything, would the schools save? Would the loss in revenue overwhelm the potential savings? In order to measure this, we compiled a cost model of education by district and generated marginal cost rates that average \$8,675 for the state and range from a low of \$7,700 in Logan to a high of \$10,335 in Daggett.

Using the econometric estimates of demand and supply elasticities and a measure of the marginal costs, we simulated the effect on future growth patterns in the public and private school system under alternative assumptions. We generated equilibrium predictions indicating the degree to which a TTC would save the state money. We found under many reasonable assumptions regarding demand and supply, the overall saving to the state would be positive. However, there may be redistributive effects that will need to be tracked to ensure that all Utah public school children benefit from the savings.

While our economic models indicate support for the adoption of a TTC on cost grounds, such factors are not the only consideration. Other factors such as the effect of the tax credit on overall contributions as well as the distribution of charitable giving were also considered. We argued that while some redistribution across similar charitable activities may occur as a result of a TTC, there were factors specific to Utah that would mitigate these effects. Other factors that were beyond the scope of this study impact the desirability of a tuition tax credit policy. These include a more complete measure of the benefits of tuition tax credits. Some benefits that should be examined more carefully include parental involvement in education of their children, the sorting effects of additional learning methods that allow a better match between schools and students, the competitive impacts on all schools that must compete for students, and the ability of families to include factors beyond academics, such as discipline, in selecting schools. Factors that could work against support for TTC include less accountability as private schools may not require standardized tests as public schools do or increased segmentation of the population in a community.

As the population of school age children expands in Utah, the projected revenues associated with the Uniform School Fund and property taxes are not expected to keep pace. It is critical that policymakers take a hard look at the cost side of the education equation to consider all the costs associated with educating the marginal child. In the absence of potential gains from TTC or other school reforms over the next 12 years, we predict that the WPU will fall significantly and schools will have to do more with less. An examination of the costly aspects of Utah's education system requires a closer look. Capital investment and operating costs need to be merged in the analysis of the cost of educating a growing population so that decisions reflect the true priorities of Utah's parents.

BIBLIOGRAPHY

- Andrews, Matthew, William Duncombe, and John Yinger. 2002. "Revisiting Economies of Size in American Education: Are We Any Closer to Consensus?" *Economics of Education Review* 21:245-262.
- Anderson, Patrick et al. 1997. *The Universal Tuition Tax Credit: A Proposal to Advance Parental Choice in Education*. Mackinac Center for Public Policy, Midland, Michigan.
- Arizona State University. *Arizona Giving and Volunteering*. ASU Center for Nonprofit Leadership Management, <http://www.asu.edu/copp/nonprofit>.
- Aud, Susan L. 2004. *An Analysis of South Carolina Per Pupil State Funding*. Milton and Rose Friedman Foundation for Educational Choice.
- Bakija, Jon. 2000. *Distinguishing Transitory and Permanent Price Elasticities of Charitable Giving with Pre-Announced Changes in Tax Law*. Williams College, mimeo, October.
- Barlow, Robin. 1970. "Efficiency Aspects of Local School Finance." *The Journal of Political Economy* 78(5):1028-1040.
- Barzel, Yoram. 1973. "Private Schools and Public School Finance." *The Journal of Political Economy* 81(1):174-186.
- Barry, Tanya. 2004. "Charter Schools: Academy Hopefuls Plentiful." *Ogden Standard Examiner*, May 14.
- Beck, Nathaniel and Jonathon N. Katz. 1995. "What to Do (and Not to Do) with Time-Series-Cross-Section Data." *American Political Science Review* 89:634-47.
- Beck, Nathaniel and Jonathon N. Katz. 1996. "Nuisance vs. Substance: Specifying and Estimating Time-Series-Cross-Section Models." *Political Analysis* 6:1-34.
- Belfield, Clive R. 2001. *Tuition Tax Credits: What Do We Know So Far?* Occasional Paper No. 33, National Center for the Study of Privatization in Education.
- Belfield, Clive, R., Henry M. Levin and Heather L. Schwartz. 2001. *School Choice and the Supply of Private Schooling Places*. Occasional Paper No. 84, National Center for the Study of Privatization in Education.
- Belfield, C.R. and H.M. Levin. 2001. *The Economics of Tuition Tax Credits*. Working paper, www.ncspe.org.
- Berndt, E.R. 1990. *The Theory and Practice of Econometrics: Classic and Contemporary*. Addison-Wesley, New York..
- Berndt, E.R., and D. Wood. 1975. "Technology, Prices, and the Derived Demand for Energy." *Review of Economics and Statistics* 57:376-86.
- Christenson, L.R., D.W. Jorgenson and L.J. Lau. 1971. "Conjugate Duality and the Transcendental Logarithmic Production Function," *Econometrica* 39:255-6.

- Christenson, L.R., D.W. Jorgenson and L.J. Lau. 1973. "Transcendental Logarithmic Production Frontiers." *Review of Economics and Statistics* 55:28-45.
- Chakraborty, Kalyan, Basudeb Biswas and Chris Lewis. 2000. "Economies of Scale in Public Education: An Econometric Analysis." *Contemporary Economic Policy* 18:238-247.
- Chiswick, B.R. and S. Koutroumanes. 1996. "An Econometric Estimate of the Demand for Private Schooling." *Research in Labor Economics* 15:209-237.
- Cobb, C., and P.H. Douglas. 1928. "A Theory of Production." *American Economic Review* 18:139-65 (supplement).
- Cordes, Joseph J. 2001. "The Cost of Giving: How Do Changes in Tax Deductions Affect Charitable Contributions?" *Emerging Issues in Philanthropy No. 2* (The Urban Institute).
- Davidson, R. and J.G. MacKinnon. 1993. *Estimation and Inference in Econometrics*. Oxford University Press, New York.
- De Vita, Carol J. and Eric C. Twombly. 2004. "Charitable Tax Credit: Boon or Bust for Nonprofits?" *Charting Civil Society No. 16*, July (The Urban Institute)
- Doan, T. 2001. *RATS User's Manual*, Volume 5.0, Estima, Chicago.
- Erekson, Homer O. 1982. "Equity Targets in School Finance, Tuition Tax Credits, and the Public-Private Choice." *Journal of Educational Finance* 7:436-449.
- Feldman, Naomi E. and James R. Hines, Jr. 2003. *Tax Credits and Charitable Contributions in Michigan*. University of Michigan, Ann Arbor.
- Frey, D.E. 1983. *Tuition Tax Credits for Private Education. An Economic Analysis*. Iowa State University Press, Iowa.
- Frey, D.E. 1991. "Optimal-sized Tuition Tax Credits Reconsidered – Comment." *Public Finance Quarterly* 19:347–354.
- Gottlob, Brian. 2004. *The Fiscal Impacts of School Choice in New Hampshire*. The Josiah Bartlett Center for Public Policy, February.
- Governor's Office of Planning and Budget. *Economic and Demographic Summary, 2000-2030, Table 1*. Available online at: <http://www.governor.state.ut.us/Projections/R0102B30.xls>.
- Greene, Jay. 2000. "A Survey of Results from Voucher Experiments: Where We Are and What We Know." *Manhattan Institute Civic Report No. 11*.
- Greene, W.H. 1997. *Econometric Analysis* (3rd edition). Prentice Hall, New York.
- Greene, W.H. 1992. *LIMDEP User's Manual and Reference Guide, Version 6.0*. Econometric Software Inc., Bellport, New York.

Gwartney, James D. and Richard L. Stroup. 1997. *Economics: Private and Public Choice* (8th edition). Dryden, New York.

Hanoch, G. 1975. "The Elasticity of Scale and Shape of Average Costs." *American Economic Review* 65:492-7.

Harvey, A. 1990. *The Econometric Analysis of Economic Time Series* (2nd edition). MIT Press, Cambridge, Massachusetts.

Hoxby, Caroline. 2003. "School Choice and School Competition: Evidence from the United States." *Swedish Economic Policy Review* 10:11-67.

Kemerer, F.R. 2001. *Vouchers and Tax Credits: Alternatives to Constitutional Initiatives*. National Center for the Study of Privatization in Education, mimeo, www.ncspe.org.

Kmenta, J. 1986. *Elements of Econometrics* (2nd edition). Macmillan, New York.

Lankford, Hamilton and James Wychoff. 1992. "Primary and Secondary School Choice among Public and Religious Alternatives." *Economics of Education Review* 11:317-337.

Levin, H.M. 2000. *A Comprehensive Framework for Evaluating Large-scale Vouchers*. National Center for the Study of Privatization in Education, mimeo, www.ncspe.org.

Lindsay, Cotton. 2004. *Fiscal Impact of the Universal Tuition Tax Credit Proposal*. Clemson University.

Lips, Carrie and Jennifer Jacoby. 2001. "The Arizona Scholarship Tax Credit," *Cato Policy Analysis No. 414*.

Long, James E. and Eugenia F. Toma. 1988. "Determinates of Private School Attendance." *Review of Economics and Statistics* 70:351-357.

Longanecker, D.A. 1983. "The Public Cost of Tax Credits." In: James T and Levin HM (eds) *Public Dollars for Private Schools: The Case of Tuition Tax Credits*. Temple University Press, Philadelphia.

Lynn, Ronnie. 2004. "Expert Says Tuition Credits May Hurt Public Schools." *Salt Lake Tribune*, February 23.

Martinello, F. and E.G. West. 1988. "The Optimal Size of the Tuition Tax Credit." *Public Finance Quarterly* 16:425-438.

Martinello, F. and E.G. West. 1991. "Education Budget Reductions Via Tax Credits: Some Further Considerations." *Public Finance Quarterly* 19:355-368.

May, Heather. 2000. "Wanted: Families With Kids, Rogan Seeks to Head Off East-side School Closure." *The Salt Lake Tribune*, December 15 (www.sltrib.com/12152000/utah/53889.htm).

May, Heather. 2000. "Board Plans To Shutter S.L. School." *The Salt Lake Tribune*, December 13 (www.sltrib.com/2000/dec/12132000/utah/53191.htm).

- Megna, Richard and Tong Hun Lee. 1990. "Estimation of the Demand for Local Public Education under a Kinked Budget Constraint." *The Review of Economics and Statistics* 72(4):596-602.
- Moody, Carlisle and Jerry Ellig. 1999. *The Universal Tuition Tax Credit: Achieving Excellence in Education without a Tax Increase*. Virginia Institute for Public Policy, September.
- Metcalf, Kim, Stephen D. West, Natalie A. Legan and Kelli M. Paul. 2002. *Evaluation of the Cleveland Scholarship and Tutoring Program: Summary Report 1998-2002*. Indiana University School of Education.
- Moe, Terry. 2001. *Schools, Vouchers and American Public*. Brookings Institution, Washington, DC.
- Moody, Carlisle and Jerry Ellig. 1999. *The Universal Tuition Tax Credit*. Virginia Institute for Public Policy, September.
- NCES. 1995. <http://nces.ed.gov/pubsold/D95/dintro2.html>.
- NCPA. 2001. *The Tax Credits Program for School Choice*. National Center for Policy Analysis, mimeo, <http://www.ncpa.org/studies/s213/s213b.html>.
- Nechyba, T. 2000. "Mobility, Targeting, and Private School Vouchers." *American Economic Review* 90:210-244.
- Olsen, D.A., C. Lips and D. Lips. 2001. "Fiscal Analysis of a \$500 Federal Education Tax Credit to Help Millions, Save Billions." *Cato Institute Policy Analysis* #398.
- PriceWaterhouseCoopers. 2004. *Financial and Economic Impacts of Utah's Proposed Tuition Tax Credit Legislation*. (prepared for Utah School Boards Association)
- Teske, Paul and Mark Schneider. 2001. "What Research Can Tell Policymakers about School Choice." *Journal of Policy Analysis and Management* 20(4):609-631.
- Toomer-Cooke, Jennifer. 2004. "Measure Advances on Tuition Tax Credits." *Deseret Morning News*, February 20.
- Toomer-Cooke, Jennifer. 2004. "School Spending Declines." *Deseret Morning News*, February 19.
- USOE. 2003. "Utah Private and BIA Schools," *Fall Enrollment Summary by School* October 1, <http://www.usoe.org/data/nonpub.html>.
- Utah Taxpayers Association. 2003. *Annual School Report*.
- Utah Taxpayers Association. 2004. "Urban School Districts Benefit from Declining Enrollment." *The Utah Taxpayer*, February.
- Welner, Kevin G. 2003. *Education Tax Credits: No Net Benefit to Arizona's Impoverished Students*. Education Policy Research Unit, Arizona State University, February.
- West, E.G. 1985. "The Real Costs of Tuition Tax Credits." *Public Choice* 46:61-70.
- West, Edwin G. and Halldor Palsson. 1988. "Parental Choice of Schooling Characteristics: Estimation Using State-Wide Data." *Economic Inquiry* 26:725-740.

Wilson, G.Y. 2000. "Effects on Funding Equity of the Arizona Tax Credit Law." *Education Policy Analysis Archives* 8:38.

Wilson, Glen Y. 2002. *The Equity Impact of Arizona's Education Tax Credit Program: A Review of the First Three Years*. Education Policy Research Unit, Arizona State University, March.

APPENDIX ONE
FOCUS GROUP
HANDOUTS
AND
SAMPLE FOCUS
GROUP NOTES

INFORMED CONSENT FORM
ESTIMATING DEMAND AND SUPPLY RESPONSE TO TUITION TAX CREDITS
FOR PRIVATE SCHOOL TUITION IN UTAH

Introduction/Purpose

During the 2004 legislative session, H.B. 271 – a bill seeking to establish a tuition tax credit – was debated without conclusion in the Utah Legislature. Therefore, the Legislative Management Committee decided to commission a study to analyze the effects on Utah state government and school districts of various proposals to offer an income tax credit for private school tuition. Utah State University (USU) was awarded a contract to conduct this study and proposed conducting a series of focus group discussions as part of its activities. You have been identified as someone who may be interested and willing to participate in this process. Your name was given to us by state and local educational organizations in which you participate.

Procedures

Focus groups will consist of approximately 6-10 people. The session will last no more than 90 minutes and the discussion will be audio recorded. Individual names or identities will not be used in reporting the data nor will your identity be used during the discussions or interviews. The results of these focus groups will be used for academic research purposes only.

Risks/Benefits

There are no anticipated risks to this study. Every effort will be made to maintain your confidentiality in reporting the data. We will provide you with a transcript of the focus group discussion for your information and records. The benefits gained from this research are to provide an opportunity for parents and administrators to share their general experience and impressions about tuition tax credit issues.

Confidentiality

To maintain your confidentiality, the tapes and transcripts will be stored in a locked filing cabinet and only the researchers at Utah State University will have access to this information. The audiotape of the focus group session will be transcribed without any information that could identify you. The tapes and transcripts will be kept for five years after the study is completed and then destroyed.

Voluntary Participation/Withdrawal

Your participation is completed voluntary and you may withdraw at anytime without consequence. If you have any questions about this study you may contact Roberta Herzberg at (435) 901-1617 or by email at Robertaherzberg@aol.com. This research has been approved by USU's Institutional Review Board (IRB) for the protection of human subjects. If you have any questions about your rights or any concerns please contact the IRB Office at (435) 797-1821.

Copies of Consent

Two copies of the Informed Consent have been provided for your signature. Please sign and date both copies, retain one for your files, and return the second copy at the focus group session.

Researcher Statement

I certify that the research study has been explained to the individual by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research. Any questions that have been raised have been answered.

Robert Herzberg, Director
Political Science Dept.
Utah State University
Telephone: (435) 901-1617
Email: Robertaherzberg@aol.com

Date _____

By signing below I agree to participate in this research.

Name (print) _____ Date _____

Signature _____

TUITION TAX CREDITS STUDY

GENERAL INFORMATION FOR FOCUS GROUPS

- Each focus group will have 6-10 participants
- Sessions will run no more than 90 minutes
- Position papers (for and against) will be distributed at least three days prior to the meeting

DEFINITIONS

- **Tax Deduction for Education Expenses:** Allowing certain itemized costs of education to be deducted from gross income prior to the computation of tax.
- **Voucher:** An authorization by the state for an individual to spend a certain amount of state funds on the education of a student in a private school.
- **Tuition Tax Credit:** Allowing all or a portion of money spent by a taxpayer on private education services to be removed from the amount of tax owed to state government. Tuition tax credits have been one of two forms: (1) states grant credits to parents for their education-related expenses, or (2) states grant tax credits to persons, groups or businesses that contribute money to an organization that then distributes the contributions in the form of student scholarships or grants.
- **School Tuition Organization, STO (also known as Scholarship Granting Organization, SGO):** A private, non-profit organization that receives tax credit funds and distributes tuition grants to students for use at qualified private primary or secondary schools.
- **Public School:** A school that is owned and operated by a government entity.
- **Private School:** A school that is neither owned nor controlled by a government entity.
- **Charter School:** A school that may or may not be owned by a government entity, but is authorized by a government entity. Charter schools are generally subject to the same regulations as other public schools.
- **Refundable Tax Credit:** A refundable tax credit refers to the concept of giving tax refunds to individuals in excess of the amount of tax actually paid. By making a tax credit refundable, a government uses the tax system to redistribute the wealth. Refundable tax credits can result in a net payment to the taxpayer beyond their own payments into the tax system.

POSITION PAPER FOR TUITION TAX CREDITS

by Royce Van Tassell, Executive Director of Education Excellence in Utah

H.B. 271: AN EQUAL OPPORTUNITY FOR A QUALITY EDUCATION

The research on educational reform is long and varied, but time and again it converges on one central point: parental involvement is the most important factor in a child's education. They know more than anyone else about what their children need because they care more about their children than anyone else. Teachers, administrators and school officials have the best intentions, but their specialized training can only supplement a parent's understanding of their children. By making parents and teachers partners, parental choice helps schools and teachers create schools and programs that meet every child's need. In addition, parental choice programs can provide significant taxpayer savings, which is increasingly necessary as Utah classrooms grow by more than 145,000 students over the next decade.

In an attempt to empower parents as the directors of their children's education, last year Rep. Jim Ferrin sponsored H.B. 271. Like previous parental choice bills, this bill offers an equal opportunity for a quality education to all Utah children. Instead of having to pay twice for their children's education—once in income and property taxes, and again in tuition—H.B. 271 allows taxpayers to receive a refundable tax credit of a nickel for every dime they pay in tuition, up to a maximum of \$2000. In addition, it helps low income families enjoy the benefits of choice by awarding a non-refundable tax credit for donations made to scholarship granting organizations (SGOs), charities that distribute scholarships to low income families.

Today the housing market divides Utah communities into educational "haves" and "have nots." Studies have confirmed that school quality is a significant determinant in choosing where to build or buy a home for middle and upper income families. Lower

income families, on the other hand, choose a home in a neighborhood they can afford. In theory, choice among public schools could ameliorate these difficulties. Utah is one of 5 states allowing every family to choose which public school their children will attend. In nearly all cases, though, this choice is illusory, because the best schools are already full. Only a small minority of students can actually transfer to a public school outside their neighborhood.

H.B. 271 will help break these economic divides. Instead of drawing students from tight geographic boundaries defined by the housing market, SGOs and tuition tax credits bring students from different neighborhoods together. As they and their parents learn about the challenges faced by families in other parts of the community, they can better marshal their diverse resources and experience to help each other.

Evidence from other states shows that H.B. 271 will make education better for all Utah students. Studies from Harvard, Princeton and the Manhattan Institute show that students who use a voucher or tax credit have higher achievement. A few studies have found no appreciable difference in achievement, but none have indicated any hint of parental choice lowering student achievement.

Student achievement in public schools facing "a little healthy competition" also goes up. In the Milwaukee public schools, student achievement went up in 12 of 15 categories after the city's voucher program blossomed. Since Florida began the A+ Scholarship program, student achievement in public schools whose students are the most likely to receive a voucher has increased 15.2 points more than other Florida students. And a recent Harvard

study found that public schools become more effective and efficient when parental choice introduces “a little healthy competition.”

Improved communities and better student achievement are not the only benefits H.B. 271 offers. It will also help Utah schools cope with the looming funding crisis. In 10 years the state’s already crowded classrooms will need to hold another 145,000 students. That means more teachers, more buildings, and more taxes. With Utah taxes already among the highest in the country, raising taxes even higher will only hurt Utah’s economy. This “collision course with disaster” is the single biggest obstacle Utah education now faces.

H.B. 271 can help avert this disaster. According to the non-partisan Legislative Fiscal Analyst, H.B. 271 would save Utah schools \$7.2 million in just the first 2 years. Recent studies in New Hampshire and South Carolina suggest much greater taxpayer saving from programs like H.B. 271. In addition, H.B. 271 will save money by diverting some of the projected student growth into private schools built by private money, instead of ever increasing property taxes.

These savings translate into greater per pupil spending. The Utah Constitution requires that state income taxes must pay for education. They can’t be diverted for road, water or natural resource projects.

On average, Utah schools spend nearly \$6,000 per student. Under H.B. 271, low-income parents could use up to \$2,750 of that money to send their child to the school

of their choice. The savings—more than \$3,000—would remain in the public schools. So when a student uses a tuition tax credit to attend private school, the number of students in Utah’s class room goes down by 1, while more than \$3,000 taxpayers would have spent on that student goes to students remaining in public schools. Per pupil spending must go up.

Utah families understand and want the benefits of H.B. 271. Utah’s lone SGO, Children First Utah, already provides half-tuition scholarships to 225 low-income Utah families every year. With an average household income of just \$25,000, these families make tremendous sacrifices to give their children a quality education. One mother washes 10 bathrooms every day to pay for her half of her children’s tuition. Another aunt chips in several hundred dollars every month so her 2 nephews can attend the school of their choice.

Unfortunately, these families are the lucky few. CFU relies solely on word of mouth, but they still turn away hundreds of low-income families every year. There just isn’t enough money to help all of them.

H.B. 271 would give all Utah families an equal opportunity for a quality education. It would improve student achievement for all Utah children. It would help Utah policy makers avert what Governor Leavitt called “the collision course with disaster.” It would re-enthroned parents as the central decision makers in their children’s education. Utah families deserve a choice. Utah families deserve H.B. 271.

OPPONENTS REBUTTAL TO TUITION TAX CREDITS

Parental involvement in the education of a child is an important factor in the child’s learning. That involvement is most productive when the parent takes interest in the child’s school work, provides a place and time in the home for study, consults

with and collaborates with the educators at the child’s school, and participates in the democratic governance of education. All of these are available to concerned parents within the public schools and are not created by tuition tax credits.

Choice and competition already exist within the public school system; including private schools in that arena would add little. Utah's choice in education laws (53A-2-207), accountability provisions under the Utah Performance Assessment System for Students (U-PASS) and No Child Left Behind (NCLB), and requirement to publish annual school report cards already bring choice and competition into education. Public schools are keenly aware of their results and those of similar schools. Unless private schools participate in these same statutory requirements, the playing field for competition would not be level. Few, if any private schools will subject themselves to statutory regulation equivalent to that of public schools in exchange for tuition tax credits for attending students. Asserting per pupil spending is increased when a tuition tax credit is given ignores

important funding realities. For example, school building debt remains the same whether one student leaves the building or not. The same is true for funds targeted to specialized populations, such as special education funds. While often included in average per pupil expenditure figures, these funds are only available for the specific purpose or targeted population intended and do not appreciably increase the funds available for all students remaining in a school when a regular student leaves because of using a tuition tax credit.

Parental involvement, parental choice, and school competition already exist within Utah public schools, while increased per pupil spending in public schools because of tuition tax credits is the result of gross calculations without regard to very important elements of educational costs.

SUPPORTERS RESPONSE TO REBUTTAL

We're thrilled to see that the opponents appreciate the importance of parental choice and parental involvement in a child's education. That is exactly why H.B. 271 is so important. It helps parents partner with teachers and administrators to make education better for every Utah child.

The opponents fail to grasp a critical element of choice, though. In a system designed to serve more than 500,000 students, it's no surprise that public schools take a cookie cutter approach. Unfortunately, a cookie cutter approach can not meet the unique needs of each individual child.

Once they've bought a home, few Utah families have a choice for educating their children. The legal prescriptions cited by the opponents that allow parents to transfer a child to a different public school mean little. Virtually all public schools are already overflowing. Wealthy families can buy a house near a good school, but most Utah

children have to attend the school in the neighborhood their parents can afford. That's why H.B. 271 is so important. Utah can't afford to let family income decide who gets a good education.

From a funding perspective, there is no difference between a student leaving a public school when the family moves, and when the family gets a tuition tax credit. The Jordan school district is proving quite capable at closing and opening schools based on natural demographic changes in enrollment. However the opponents claim such adaptations aren't possible.

POSITION PAPER AGAINST TUITION TAX CREDITS

by Steve Laing, State Superintendent of Public Instruction, Retired

“[Public] Education then, beyond all other devices of human origin, is a great equalizer of the conditions of men.” (Horace Mann, 1848)

Tuition tax credits as proposed in H.B. 271 do not support this fundamental purpose of public education. Tuition tax credits:

- Erode the American commitment to the equal education of all children
- Discriminate against families of lesser means
- Abandon Utah’s standards for the education of all children

TUITION TAX CREDITS ERODE THE AMERICAN COMMITMENT TO THE EQUAL EDUCATION OF ALL CHILDREN

America is a land of incredible diversity. We are perhaps the most diverse nation on the earth. While that diversity is a great source of strength to our society, it also brings with it the potential for divisiveness. The long held commitment to public education for all children provides a common experience for the young from all cultures, ethnicities, ideologies, religions, and philosophies that make up this great nation. Tuition tax credits subsidize costs for individuals who opt out of this common commitment in favor of placing their children in private facilities. Tuition tax credits make possible the diversion of education tax revenues to schools which cater to one race, one philosophy, one religion, or one ideology; thereby emphasizing our differences and eroding the common good of educating all children equally.

Private schools and home schools have long been meaningful and important options for those who choose them. However,

participants in these schools still participate in the social commitment to educate all children through the taxes they pay. Tuition tax credits like those of H.B. 271 emphasize the support of individual children rather than all children. *Tuition tax credits facilitate an inappropriate shift of citizen interest from the benefits of educating all children to the more selfish benefit of educating my child.* Such a shift erodes of the common commitment to the quality education of all children and will be counterproductive in a society as diverse as ours. *Common commitment to the principals of American democracy and freedom are weakened when children attend schools only with others who look, think, go to church, speak with the same accent, or have the same ancestral heritage as they do. Our commitment to public education for all children, regardless of diversity, is the greatest common denominator of our great American democracy.*

TUITION TAX CREDITS DISCRIMINATE AGAINST FAMILIES OF LESSER MEANS

A tax credit implies the tax payer has a tax obligation against which the credit is applied. Only those with incomes sufficient to owe taxes equal to the amount of the tax credit will benefit to the extent of the credit. Such tax policies are regressive, i.e. they benefit the wealthy more than those with lesser means.

H.B. 271 proposes a refundable tax credit, that is, each participating tax payer receives a tax refund whether or not they actually owed taxes equal the refund amount. However, the tax credit proposed in H.B. 271 (\$1500 or \$2000) is limited to one-half of the tuition paid. Consequently, only those

with additional means will be able to provide the additional tuition and ancillary costs typically not covered at private schools such as transportation, materials and supplies, uniforms, activities, and lunch. Studies of tuition tax credits in Arizona and Illinois have confirmed that wealthier citizens claim the overwhelming majority of the credits, while families of lesser means, unable to participate in tuition tax credit programs because of the additional costs of private education over and above the tax credit received, claim relatively few tax credits.

Any tax credit will be costly to the revenue dedicated to the education of all children. Ultimately, all students currently attending private schools will be eligible for the credit,

whether immediately or over the course of several years, depending on the language of the legislation. The H.B. 271 tax credit of about \$2000 will eventually result in a diversion of about \$30 million dollars from revenue supporting all public schools without private schools serving one additional student. Unless enrollment opportunities increase and tuitions are reduced to the amount of the tuition tax credit, *those individuals and families of lesser means will be left out of the private school option, and funding otherwise dedicated to educating their children will be diverted through tax credits to those of additional means sufficient to meet the actual costs of the private school.*

TUITION TAX CREDITS ABANDON UTAH'S STANDARDS FOR THE EDUCATION OF ALL CHILDREN

Utahns, through their legislators, have carefully described the qualities and characteristics of the education they want for their children. One entire title of the Utah Code (53A) and the 29 chapters within that title prescribe the conditions that public schools in Utah must meet. These prescriptions ensure the accessibility, accountability, equality, and quality of the educational experience for all Utah children regardless of whether those children live in urban, suburban, or rural areas of the state.

Private schools are not obligated by the legislative standards governing public schools; they do not have to give the same tests, follow curriculum directives, or report test results or other important school information. (H.B. 271 does require private schools to administer and report test results, but it does not require the tests be the same

for all schools, thereby negating the value of data comparisons.) Providing tuition tax credits to individuals and families sending children to private schools constitutes society's investment in the education of those children without protecting society's interest in the accessibility, quality, or equality of the experience those children receive. While most existing private schools offer very good educational programs, there is no guarantee that all private schools will. *Tuition tax credits without oversight or obligation to follow existing education law create too many possibilities for discrimination, inferior education, or misuse of funds—conditions Utah cannot abide, especially since we spend the least per student of any state to educate our children. Our precious resources must be spent as wisely and carefully as possible.*

In summary, because of the three reasons above, tuition tax credits do not support our interest in educating all children.

REBUTTAL FROM SUPPORTERS OF TUITION TAX CREDITS

“Tuition tax credits facilitate an inappropriate shift of citizen interest from the benefits of educating all children to the more selfish benefit of educating my child.”

This statement illustrates perhaps the most fundamental disagreement between the proponents and opponents of H.B. 271. Far from being selfish, parents are more concerned and more in tune with the unique needs of their child’s education than any bureaucrat, however well intentioned. In condemning “selfish” parents who seek a better opportunity for their child, the opponents seem more interested in defending the system, than in providing the best education possible for Utah children.

A brief visit to a few private schools in the state shows that private schools are much more diverse than traditional public schools, and it’s not hard to understand why. Traditional public schools draw from very tight geographic boundaries, making them one of the most segregated institutions in our society. Again, the opponents seem to believe that only the government-run system can impart the societal benefits of a quality education. Commonsense and

evidence from across the country suggests otherwise. A system that empowers parents with many choices, public and private, would create an education system that excels at meeting every child’s needs.

H.B. 271 was specifically designed to benefit low income families. First, the credit is refundable, just like the Earned Income Tax. If a family pays more in tuition than they owe in taxes, the state will write them a check. Second, while all Utah families can receive a refundable tax credit for the tuition they pay out of pocket, **only** low-income families are eligible to receive the scholarships distributed by the SGOs H.B. 271 creates. Including these scholarships, H.B. 271 covers up to three-fourths of tuition for low income families.

By empowering parents, H.B. 271 will re-enthroned parents as the ones primarily responsible for their child’s education. It will help promote cooperation between parents, teachers and administrators in creating the best schools for every Utah child.

NON-SUPPORTERS RESPONSE TO REBUTTAL

A refundable tuition tax credit is a voucher. So the real question becomes, “Should we as a society abandon our universal commitment to the education of all children in favor individual families selecting private schools, knowing there is no means of assuring either the quality or comprehensiveness of the educational programs offered in those schools?” The greater, common good of a society, especially one as diverse as ours, is jeopardized when concerned and activist parents use tuition tax credits to disengage themselves from the admittedly difficult work of improving the plight of all children, favoring instead the support of only their children and those of similar persuasion or

circumstance. There are some social functions that require the universal participation of all citizens, and education, like police, fire, and roads, is one of those functions. Even those with private security or safety forces participate in the greater, common societal good through taxes for those services within the broader community. So too, must all support the education of all children.

Tuition tax credits are unnecessary. Scholarship granting organizations are free to grant scholarships to as many and in any amounts they desire. They are only limited by their ability to persuade donors to contribute to their charitable purposes,

donations which already qualify for tax deductions. Between individual means and assistance from such scholarship organizations, parents already have choice to participate in private schools. At the same time, under existing Utah law parents already have choice within the public school system.

**TUITION TAX CREDIT (TTC) STUDY
UTAH STATE UNIVERSITY**

Principal Investigator (PI): Roberta Hertzberg, PhD, Associate Professor of Political Science

Co-PIs: Chris Fawson, PhD, Professor of Economics and Vice Provost for Academic and International Affairs, and Richard West, PhD, Executive Director, School for the Future

Focus Group: Davis County

Date: 16 September 2004

Time: 6:00 p.m.

INTRODUCTION BY CHRIS FAWSON:

The purpose of this study is principally to develop an economic model that will help legislators determine and understand the impact of tuition tax credits to the public school education system in Utah. Utah is a unique state that does not follow the models developed in other states and so it is critical that Utah develop its own model, based on its own characteristics and needs. As researchers, we felt it was important to look at this economic analysis within a human context. Therefore, we have set up a series of 14 focus groups (see below) throughout the State of Utah to gather opinions, experiences, and concerns that cover a wide range of viewpoints.

The purpose of the focus group is not to provide an arena for debate. Rather, we want this to be a conversation in which all participants' viewpoints are respected. The documents (see below) that you were given to review prior to tonight's focus group were meant for informational purposes only. Again, we are not here tonight to debate the issue but rather to discuss your viewpoints on why or why not you would support tuition tax credits and why or why not you support the public education system. The facilitator will ask seven questions which will take 10-15 minutes each. He will ask clarifying questions if needed. We will be taking notes and will record this session for research purposes only; individuals will not be identified with their comments. You will be provided with a copy of the notes on tonight's session.

In addition to the focus groups, we will also be conducting a series of key informant interviews with public education administrators throughout the state. These interviews will provide us with financial and economic data that we will use to create our economic model that will allow us to better understand how tuition tax credits would impact public education.

This study was mandated by the Legislative Management Committee (LMC) of the Utah State Legislature. Our report will be submitted to the LMC on 1 November 2004.

Focus Groups Held In: Davis County, Salt Lake County, Beaver County, Carbon County, Washington County, Utah County. In addition, two focus groups were conducted with home schoolers in Cache County and on the Wasatch Front.

Documents Provided Prior to this Session: letter with general information; informed consent form; position paper for TTCs; position paper against TTCs; definitions of terminology

QUESTIONS LED BY RICH WEST:

1. How satisfied are you with your own neighborhood school?

- a. What do you like best about your neighborhood school?**
- b. How is your child's school better or worse than other schools with which you may be familiar?**
- c. What matters most to you in choosing where your children attend school?**
- d. Under what conditions would you consider enrolling your child in a different school?**
- e. What suggestions would you make concerning changes you believe are necessary in our educational system?**
- f. Suppose you were a principal, superintendent, or other school official, and you could make one change that would make schools better – what would it be?**

- Totally satisfied. My school is easy to work with.
- Quality of teachers is high.
- Teacher quality is paramount to have a good school.
- Specific needs in my child's junior high school not being met. There are some good things but there is a problem if a child doesn't meet their model. They need more teachers, more help, better attitudes.
- There are accelerated programs (Spectrum program) but there is not much for students with ADD or learning disabilities.
- I enjoy it more if I am involved as a parent. In Granite, the schools are not as good as in Davis but I still know my children are getting a good education. The exterior of the building is not as important as the "interior" of the building. Being involved is critical and buildings are secondary.
- Davis County is open to parental involvement.
- I've adopted six high risk kids and the schools have been open to meeting their needs. This is a big challenge and a partnership with parents is very important. The schools have been open to this. It's fun to serve on PTA, etc.
- Have had good and bad experiences being an involved parent but have been able to work with administrators, teachers, etc.
- Had a 7th grader who was being taught 4th grade English principles. My daughter was told to stay in the class even if the lessons were "dummied down". Had to petition for honor classes.
- Again, parental involvement is critical. You can work within the system. It can be frustrating but you must persevere.
- The most important thing is to have (1) good teachers, (2) technology, and (3) choice of classes (e.g., accelerated) that meet individual needs.
- If could make changes, would change class size.
- In California, have small classes, but there are still problems. One thing I would changes would be the threat to child's safety. I can work with the rest.
- Provide enough funding so that quality teachers would stay.

2. Have you ever considered a private school for any or your children, and if so, why did you decide for or against it?

- Put one child into private school. Had some positive experiences, but missed the variety of teachers and activities. Went back to public schools.
- The public school in my area refused to let my child advance in math, however the private school was too far away. But the Spectrum program started, which is an option in public education.
- Have a child with ADD. The public school tries hard but the time required for this child is a drawback. So, have put child into a charter school.
- Spectrum program meet some specific needs but need to provide own transportation.
- We moved in mi-year and our children finished up the year in their old school. There was no problem. Children had friends in both schools. We choose schools for programs. Parents should be allowed to choose.
- A neighbor wanted children in public schools but child had a severe learning disability. Parent battled for him but the school felt threatened and it wasn't a good experience. The school didn't want the parent's input. My children have done okay. However, my neighbor feels there is a way for the schools to provide what her child needs and so she perseveres.

3. How familiar are you with private schools in your area?

- Drive past one every day but unfamiliar with the programs
- Listen to news reports.

4. If finances were an issue in your decision, at what level of out-of-pocket cost would you consider sending your children to a private school?

- a. **More than \$2,000 per year**
- b. **\$2,000 per year**
- c. **\$1,500 per year**
- d. **\$1,000 per year**
- e. **\$500 per year**
- f. **I wouldn't be willing to pay anything.**
- g. **Finances aren't the issue.**

- Can't afford for all my children so not an option.
- Travel time an issue.
- Cost is not the issue. There is no need unless public education system out of sync.
- It's not about cost, it's about education, socialization.
- I believe in public education and for most kids it is a good experience.
- Other places are in awe of Utah schools.
- My limit would be \$3,000 total.
- Have never considered except once when living in L.A. Believe strongly in diversity.
- Have relatives back East whose kids go to private schools because they don't feel public education system is adequate. For them it

- 5. If you know anyone whose children attend a private school, what reasons have they offered for their decision?**
- I know persons whose children attend private schools, but I've never spoken with them about their reasons.**
 - I don't know any persons whose children attend private schools.**
- Have relatives back East who feel public education not adequate. Want faith-based education. They are having a great experience.
 - May be good for some but not right for me.
 - Specific needs, like religion, can be met.
 - Friend from work sent son to private school. He got some individualized attention but didn't find there was much difference. He's back in public school. Socialization is important.
 - Respect needs for alternatives if public school not meeting needs.
- 6. Where do you get information about schools, educational issues, and proposed changes or reform initiatives?**
- What kinds of information are most important to you as you consider school changes or improvement?**
 - Whom do you trust the most to provide you with information about schools and issues facing them?**
- PTA in Utah is a valuable resource. It's not a special interest.
 - Educators. They know their job and what is needed in education. Also, PTA.
 - School newsletters, PTA, school board
 - Minutes of school board meetings
 - Talking to other parents, kids, own kids, newspaper, PTA
 - KSL talk radio – you hear both sides, Internet, people in the community and state
 - Don't trust the news, legislators (they don't listen to us), most people have their own bias, Eagle Forum, radical organizations
- 7. Suppose you had one minutes to speak to the state legislature about tuition tax credits. What would you say?**
- What do you see as the greatest benefits of tuition tax credits?**
 - What is your greatest concern with tuition tax credits?**
 - What effect would tuition tax credits have on you personally, or on your family?**
 - How much do you know about the proposed legislation as contained in HB 271?**
- Show me the numbers.
 - How will economics work in state if only one student from each class switches? But my neighbors are not sending their children to private schools and so my school has the same expenses. Don't understand how get more money for schools if take money away.
 - This will dilute public education. My other concern is that only those who can afford private education will take advantage of this. The U.S. offers free public education for all.
 - If using my tax dollars, then how will they account for them? What standards will they use in private education? If they can show me, then I'm okay with it.
 - Will there be testing?

- If students move back into public education, will it be seamless and will they be at the same level?
- Why aren't they spending money to fix the current system rather than creating a new one? Why do they want to take away from the good we have?
- Public education is what makes countries great. We need a public education system. If TTCs hurt or destroy the public schools, then I don't want them. If TTCs don't hurt them, then I'm okay with them. Some specific needs require alternatives.
- Concerned about pulling money out of a struggling system.
- Parents can contribute by helping schools with the supplies they need for science projects, etc. But, pulling money from here and there weakens the public schools.
- The way to judge the impact is to see if programs are cuts, honors and other special programs are cut or terminated. If schools are closed rather than just reducing class size, then don't want TTCs.
- We've already seen cuts in the arts and other programs.
- Can we afford two systems and will both flourish? We should stick with what we have.
- No one is opposed to choice but TTCs are not working elsewhere and are having a negative impact.
- Will there be the same requirements for teachers?
- All children are important. TTCs harm the overall quality.
- Greatest benefit to TTCs would be smaller class sizes, more opportunities in class, but they will hurt the public schools.
- The group is important though we need to serve the individual with special needs. They present the greatest risk to society.
- It's important to learn more about this issue. All children should be served. I have a grandchild who is legally blind and I don't want his public education programs affected.
- I keep hearing that lower income families will benefit from TTCs but I don't know if these families can really afford a private education.
- All kids should have school choice but the cost of education makes school uneven.
- Rural areas will be affected differently than the Wasatch Front. Is only the Wasatch Front to benefit from this?

TUITION TAX CREDIT (TTC) STUDY

UTAH STATE UNIVERSITY

Principal Investigator (PI): Roberta Hertzberg, PhD, Associate Professor of Political Science

Co-PIs: Chris Fawson, PhD, Professor of Economics and Vice Provost for Academic and International Affairs, and Richard West, PhD, Executive Director, School for the Future

Focus Group: Salt Lake County Homeschool Parents

Date: 14 October 2004

Time: 7:00 p.m.

INTRODUCTION BY ROBERTA HERZBERG:

The purpose of this study is principally to develop an economic model that will help legislators determine and understand the impact of tuition tax credits to the public school education system in Utah. Utah is a unique state that does not follow the models developed in other states and so it is critical that Utah develop its own model, based on its own characteristics and needs. As researchers, we felt it was important to look at this economic analysis within a human context. Therefore, we have set up a series of 14 focus groups (see below) throughout the State of Utah to gather opinions, experiences, and concerns across a wide range of viewpoints.

The purpose of the focus group is not to provide an arena for debate. We ask all participants to respect the viewpoints of others. The documents (see below) that you were given to review prior to tonight's focus group were meant for informational purposes only. We are not here tonight to debate the issue but rather to discuss your viewpoints on why or why not you would support tuition tax credits and why or why not you support the public education system. The facilitator will ask seven questions which will take 10-15 minutes each. He will ask clarifying questions if needed. We will be taking notes and will record this session for research purposes only; individuals will not be identified with their comments. You will be provided with a copy of the notes on tonight's session.

In addition to the focus groups, we will also be conducting a series of key informant interviews with public education administrators throughout the state. These interviews will provide us with financial and economic data that we will use to create our economic model that will allow us to better understand how tuition tax credits would impact public education.

This study was mandated by the Legislative Management Committee (LMC) of the Utah State Legislature. Our report will be submitted to the LMC on 1 November 2004.

Focus Groups Held In: Davis County, Salt Lake County, Beaver County, Carbon County, Washington County, Utah County. In addition, two focus groups were conducted with home schoolers in Cache County and on the Wasatch Front.

Documents Provided Prior to this Session: letter with general information; informed consent form; position paper for TTCs; position paper against TTCs; definitions of terminology

QUESTIONS LED BY RICHARD WEST:

8. How satisfied are you with your own neighborhood school?

- a. **What do you like best about your neighborhood school?**
- b. **How is your child's school better or worse than other schools with which you may be familiar?**
- c. **What matters most to you in choosing where your children attend school?**
- d. **Under what conditions would you consider enrolling your child in a different school?**
- e. **What suggestions would you make concerning changes you believe are necessary in our educational system?**
- f. **Suppose you were a principal, superintendent, or other school official, and you could make one change that would make schools better – what would it be?**

Not good, I left it and drove 35 minutes across town each way but that did not work for me either and eventually I figured if I had to spend this much time I might as well commit it to educating them myself.

The principal was asleep, I was always correcting the teachers mistakes, their politics didn't match and discipline was non-existent.

Religious environment with purity of doctrine is critical

Curriculum a problem

School size done for administrators not for the children – doesn't meet the special needs of the students

Serious discipline problems, bullies and rude children with no respect.

Not enough parental control

Too bureaucratic

Bad textbooks, should teach more of the classics and the founding fathers.

More flexibility regarding when subjects introduced to accommodate different learning rates

9. Have you ever considered a private school for any or your children, and if so, why did you decide for or against it?

No, children are secure and I am learning constantly so I wouldn't give it up now

Private still have many of the same problems as public

Cost is a huge factor with 11 kids how would I do it

At first it was cost, but now it is the wonderful family experience of home schooling. I can't imagine going back

Babies need their mommies, everything else is too institutional. My son did not want to go to school and I told him he needed to have a good reason for that decision. He said "They won't let me sing during lunch." That seemed like a good reason to me.

We sacrifice with our own careers and family finances to make this decision. Access to money or credit might have changed my decision in the beginning, not now.

10. How familiar are you with private schools in your area?

- Very familiar , We use the seminary at Waterford, and I would never consider that school

Catholic schools are popular with many home schoolers when the children get older

We use private correspondence schools which are accredited for high school -- \$1000 for 4 years -- North Atlantic Regional School

Diploma is sometimes important for scholarships and these work for that

11. If finances were an issue in your decision, at what level of out-of-pocket cost would you consider sending your children to a private school?

- a. More than \$2,000 per year
- b. \$2,000 per year
- c. \$1,500 per year
- d. \$1,000 per year
- e. \$500 per year
- f. I wouldn't be willing to pay anything.
- g. Finances aren't the issue.

Not an issue for us but might have been when we started

Same

12. If you know anyone whose children attend a private school, what reasons have they offered for their decision?

- a. I know persons whose children attend private schools, but I've never spoken with them about their reasons.
- b. I don't know any persons whose children attend private schools.

Dissatisfaction with public and don't believe in home school
Transition to home schooling when problems in public schools

Religious training

Special needs not met in school need help beyond home school

13. Where do you get information about schools, educational issues, and proposed changes or reform initiatives?

- a. What kinds of information are most important to you as you consider school changes or improvement?**
- b. Whom do you trust the most to provide you with information about schools and issues facing them**

Least is media – too biased

Email network among other parents who home school

Reading

I participate in the process and use all sources,

I keep informed because we care about the schools and how they are shaping society

Websites of organizations I trust

Technology is a boon to the home school lifestyle – information is everywhere – we judge quality by checking references and sources

Yearly conference, discussion groups

14. Suppose you had one minutes to speak to the state legislature about tuition tax credits. What would you say?

- a. What do you see as the greatest benefits of tuition tax credits?**
- b. What is your greatest concern with tuition tax credits?**
- c. What effect would tuition tax credits have on you personally, or on your family?**
- d. How much do you know about the proposed legislation as contained in HB 271?**

We don't want them, money always comes with strings and regulation and we don't need that.

We want freedom not oversight. It would turn us into what we left – the public schools

We are in this for the long-run not just a given year, we can be flexible in when we learn something not as rigid as state curriculum

Market might be good at improving the system,

This could result in some coalitions working together to start their own schools but not likely to meet the conditions of the state

If this is good for an individual student then they should go for it, not everyone can do what we have done and the schools will not work for all.

How many home schoolers are there in Utah?

We have 10,000 families at our convention. Most have several children perhaps as many as 40,000 total and that does not count the polygamists.

We are not all registered with the schools. Many don't want to do that even though they know we are here.

TUITION TAX CREDIT (TTC) STUDY UTAH STATE UNIVERSITY

Principal Investigator (PI): Roberta Hertzberg, PhD, Associate Professor of Political Science

Co-PIs: Chris Fawson, PhD, Professor of Economics and Vice Provost for Academic and International Affairs, and Richard West, PhD, Executive Director, School for the Future

Focus Group: Carbon County

Date: 15 October 2004

Time: 8:00 p.m.

INTRODUCTION BY ROBERTA HERTZBERG:

The purpose of this study is principally to develop an economic model that will help legislators determine and understand the impact of tuition tax credits to the public school education system in Utah. Utah is a unique state that does not follow the models developed in other states and so it is critical that Utah develop its own model, based on its own characteristics and needs. As researchers, we felt it was important to look at this economic analysis within a human context. Therefore, we have set up a series of 14 focus groups (see below) throughout the State of Utah to gather opinions, experiences, and concerns across a wide range of viewpoints.

The purpose of the focus group is not to provide an arena for debate. We ask all participants to respect the viewpoints of others. The documents (see below) that you were given to review prior to tonight's focus group were meant for informational purposes only. We are not here tonight to debate the issue but rather to discuss your viewpoints on why or why not you would support tuition tax credits and why or why not you support the public education system. The facilitator will ask seven questions which will take 10-15 minutes each. He will ask clarifying questions if needed. We will be taking notes and will record this session for research purposes only; individuals will not be identified with their comments. You will be provided with a copy of the notes on tonight's session.

In addition to the focus groups, we will also be conducting a series of key informant interviews with public education administrators throughout the state. These interviews will provide us with financial and economic data that we will use to create our economic model that will allow us to better understand how tuition tax credits would impact public education.

This study was mandated by the Legislative Management Committee (LMC) of the Utah State Legislature. Our report will be submitted to the LMC on 1 November 2004.

Focus Groups Held In: Davis County, Salt Lake County, Beaver County, Carbon County, Washington County, Utah County. In addition, two focus groups were conducted with home schoolers in Cache County and on the Wasatch Front.

Documents Provided Prior to this Session: letter with general information; informed consent form; position paper for TTCs; position paper against TTCs; definitions of terminology

QUESTIONS LED BY RICH WEST:

15. How satisfied are you with your own neighborhood school?

- a. What do you like best about your neighborhood school?**
- b. How is your child's school better or worse than other schools with which you may be familiar?**
- c. What matters most to you in choosing where your children attend school?**
- d. Under what conditions would you consider enrolling your child in a different school?**
- e. What suggestions would you make concerning changes you believe are necessary in our educational system?**
- f. Suppose you were a principal, superintendent, or other school official, and you could make one change that would make schools better – what would it be?**

- I volunteer at public school at lot, 20-40 hours/week. Very happy with elementary school and we have a good junior high. Both allow parental involvement. There is a diverse population: religion, income, ethnicity. High school needs more parental involvement. Need more academic teachers rather than just coaches. There is not enough funding for things like music and the arts. We need extracurricular activities other than sports.
- Kids have needed both gifted and talented and special services. We have received both adequately. There is a good breadth of services. Services go beyond academics.
- I want to see more arts and music for kids who are not athletic. Public schools can serve all needs with increased funding.
- I work with at risk students in state custody and have seen great cooperation from schools and teachers to help these kids succeed.
- The kids get better than what I got. The school is established, has the expertise. It is more satisfying to work within an established institution rather than introduce new things that never meet expectations. Public education has the most experience in adapting to students. Changes may be slow but why start from scratch with something that may or may not be better?
- Small rural areas like Price have advantages. We've had opportunity to expand into a community college (K-14 rather than K-12). Diversity here forces us to build on each other's strengths. Parents should be involved in identifying goals and expectations for schools.
- Want uniform standards, but charter and private schools don't have to comply. Public schools do consistently better than charters. Charter school presence has introduced elitism and a division.
- Charter and private schools can create division. You divide the community when you divide the funding. Charters not held to the same standards.
- Public schools offer diversity and help to build a community.
- You can't impose on small communities the same variety that exists on the Wasatch Front.
- A big challenge is low parental expectations. You can't compare private, public, and charter. Parents who care will go for private and charter.

- Scores are lower in charter schools.
- This adds a burden on the public school system. Schools required to teach financial math. Why isn't this parents' responsibility? This is our unfunded burden. We need to make parents, not schools, responsible for children. Private school parents are shirking their responsibility.
- Kids do better when parents are involved.
- We need to increase time spent on some tasks.
- We have an unfunded mandate: summer school for failing students. Need a funded program to help kids stay caught up. Kids need to feel successful in school or they will look for it elsewhere.

16. Have you ever considered a private school for any or your children, and if so, why did you decide for or against it?

- Pulled child out of private school after I found out that teachers didn't have to be certified. Charter school didn't offer the same scope of opportunity. I did like the discipline, dress codes, and academic opportunities.
- Couldn't see difference in quality.
- Real world catches up to private school students. They end up like everybody else. With private, you don't get interaction with the community and you end up a stranger in your own community.
- Lots of social issues if they try to go back to the public school.

17. How familiar are you with private schools in your area?

- Familiar

18. If finances were an issue in your decision, at what level of out-of-pocket cost would you consider sending your children to a private school?

- a. More than \$2,000 per year
- b. \$2,000 per year
- c. \$1,500 per year
- d. \$1,000 per year
- e. \$500 per year
- f. I wouldn't be willing to pay anything.
- g. Finances aren't the issue.

- Don't want to stigmatize child.
- Moot point for this group.

19. If you know anyone whose children attend a private school, what reasons have they offered for their decision?

- a. I know persons whose children attend private schools, but I've never spoken with them about their reasons.
- b. I don't know any persons whose children attend private schools.

- Students get an elitist attitude. An aunt put her children in private school because kids wanted to go to an elite school. They did and they struggled.
- People go for the structure, discipline, and dress code.
- Gifted nephew excelled in a private school.
- Want to cloister children for religious reasons.
- Discipline, discipline, discipline.

20. Where do you get information about schools, educational issues, and proposed changes or reform initiatives?

- a. What kinds of information are most important to you as you consider school changes or improvement?**
- b. Whom do you trust the most to provide you with information about schools and issues facing them?**

- Principals, superintendent, PTA, volunteer at school, Internet to research legislative issues
- Teachers, people in “the trenches”
- Newspapers

21. Suppose you had one minutes to speak to the state legislature about tuition tax credits. What would you say?

- a. What do you see as the greatest benefits of tuition tax credits?**
- b. What is your greatest concern with tuition tax credits?**
- c. What effect would tuition tax credits have on you personally, or on your family?**
- d. How much do you know about the proposed legislation as contained in HB 271?**

- Just another way to privatize. Lead to elitism and segregation. Will be demise of our country.
- Standards in private and public must be the same. Vouchers need to apply equally. Teachers must be equally certified.
- How many legislators have interest in private institution? Who will benefit financially?
- Healthy competition does not create change. It creates winners and losers. Can't divide up the money without affecting entire institution. Legislators are not seeing how good public schools and teachers are. We are already doing a good job.
- If charter parents would commit themselves the same way that they are required to in charters, public school would be great. This dilutes our resources. Vouches also need to be offered for public schools for things like the arts.
- If is just another tax break for those who already have tax breaks. Won't help those who need to raise standards of living.
- Does this allow the poor to choose?
- Violation of church and state. Legislative motives are not pure nor informed.
- If there is so much support, why do they need government help?
- There is already open enrollment.

APPENDIX TWO
DATA SET USED
IN THE
DEMAND ANALYSIS

Data Set Used in the Demand Analysis

Key Informant Analysis

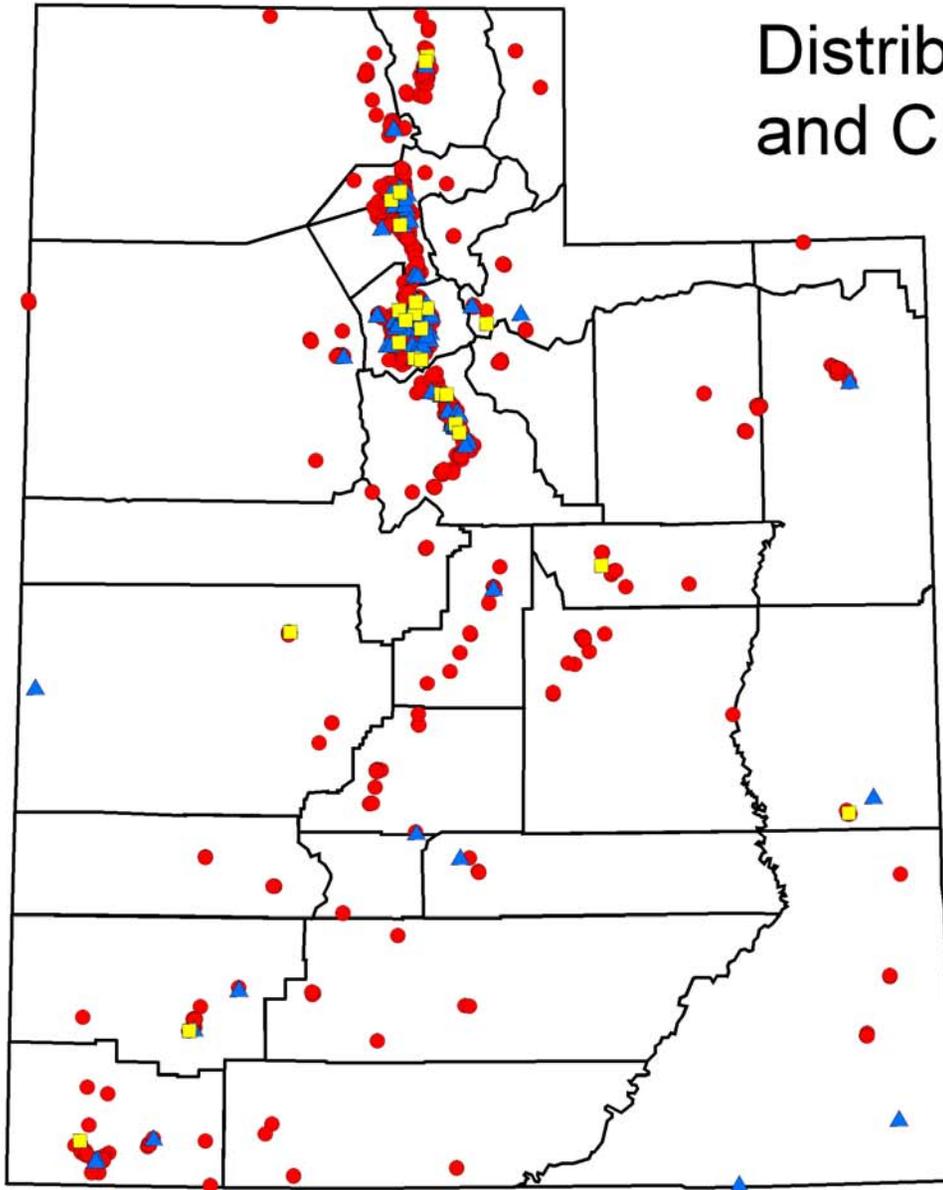
At its most basic level, policy impacts the lives of individuals. While individuals can be stratified into many stakeholder groups, the most concentrated and easily identified stakeholder group in this analysis is the set of private and public school administrators and school board members in each community. As such, we begin our analysis with the premise that administrators' perceptions are pivotal in understanding how elastic the supply side of educational services is in that community. Administrators are typically at the forefront of understanding the source of rising or changing patterns of demand and limitations on supply that are exacerbated or ameliorated through government programs. School Administrators are uniquely positioned to describe changes in demand or supply in their communities, and how the proposed T.T.C. program is likely to impact their market.

The impacts of choice are nothing new to most of Utah's public school administrators. With public school choice in the form of inter- and intra-district choice and the rise of charter schools, financial officers and administrators have had to cope with greater uncertainty in planning for the district resources. These concerns frequently resulted in distribution of resources that were suboptimal. For example, several administrators noted that parents wishing to exercise choice in charter schools and other public schools, hedged their bets by not releasing their slot in the neighborhood school until after the school year began. The instability created by the political debate regarding opening up school options resulted in parents not trusting their own decisions. As a result planning information used in neighborhood schools enrollment was inaccurate and resulted in district administrators scrambling to reduce costs after enrollment levels fell below planned numbers. Thus, more than opposing choice overall, administrators expressed concern that whatever the policy they needed sufficient time to adapt to such changes. If the lead time were long enough and if the period of change was limited to no less than a year at a time, then they could adapt to these changes.

Growth levels expected

APPENDIX THREE
MAPS:
DISTRIBUTION OF
PUBLIC, CHARTER AND
PRIVATE SCHOOLS
BY COUNTY

Distribution of Public, Private and Charter Schools (K-12)



- Public Schools
- ▲ Private Schools
- Charter Schools

Total Number of
Students in Utah: 484,000
Public Schools: 798
Private Schools: 92
Charter Schools: 29

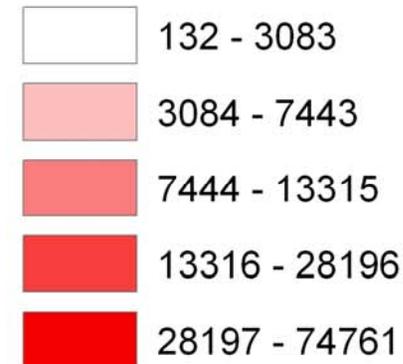
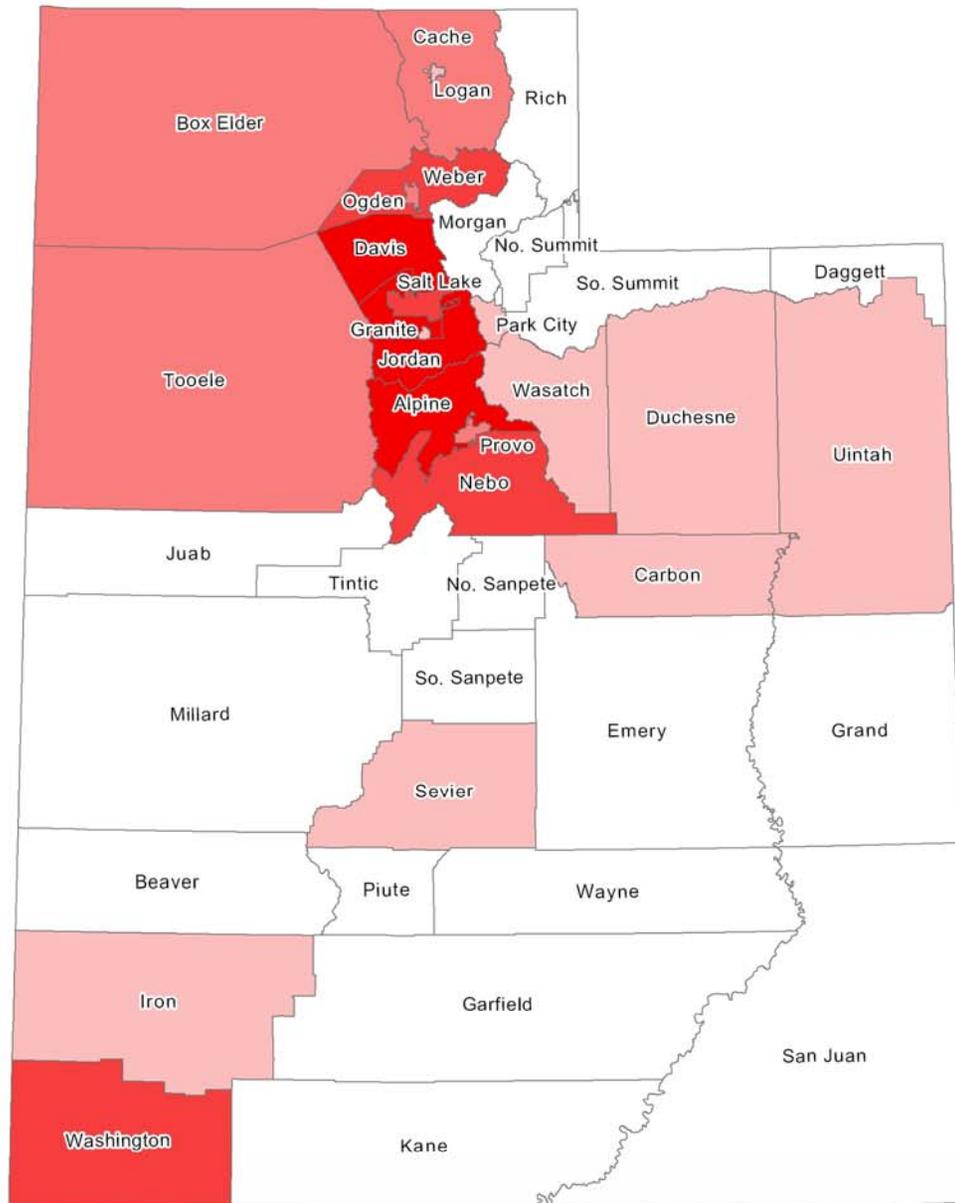
0 20 40 80 Miles



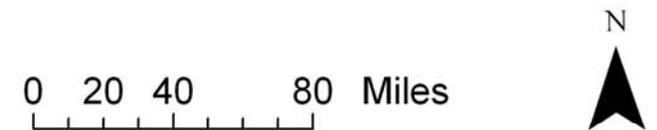
Sources:
State of Utah Office of Education (2004)
<http://www.usoe.k12.ut.us/>
Utah AGRC
<http://agrc.its.state.ut.us/>

Cartography by:
Ryan Hill

Number of Students (K-12) Per School District (Fall Enrollment 2003)



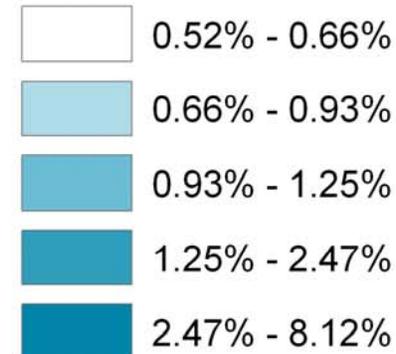
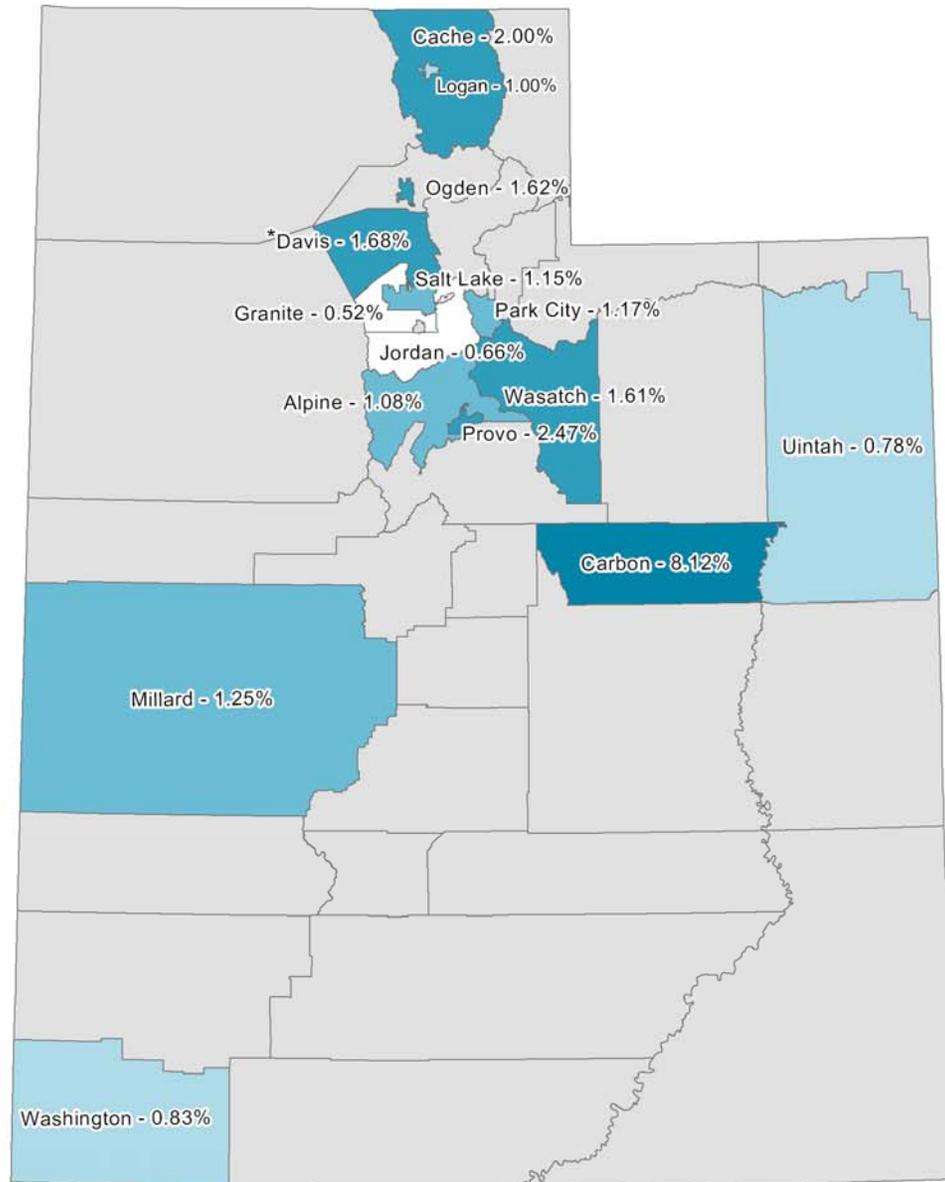
Total Number of Students in Utah: 484,000
 Mean: 12,000
 Minimum: 132 (Daggett County School District)
 Maximum: 75,000 (Jordan School District)



Sources:
 State of Utah Office of Education
<http://www.usoe.k12.ut.us/>
 Utah AGRC
<http://agrc.its.state.ut.us/>

Cartography by:
 Ryan Hill

Percent of Students (K-12) Enrolled in Charter Schools Per District (Fall Enrollment 2003)



Total Number of Charter Students: 3,253

Mean: 232

Minimum: 39 (Millard County School District)

Maximum: 1,025 (Davis School District)

* Davis County Charter Schools Opened August 2004

0 25 50 100 Miles



Sources:

State of Utah Office of Education

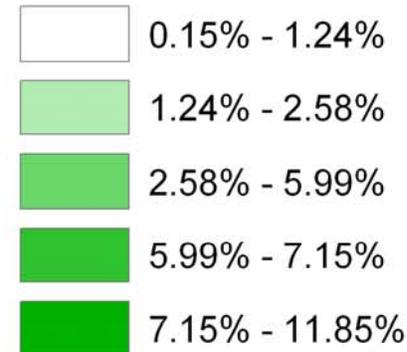
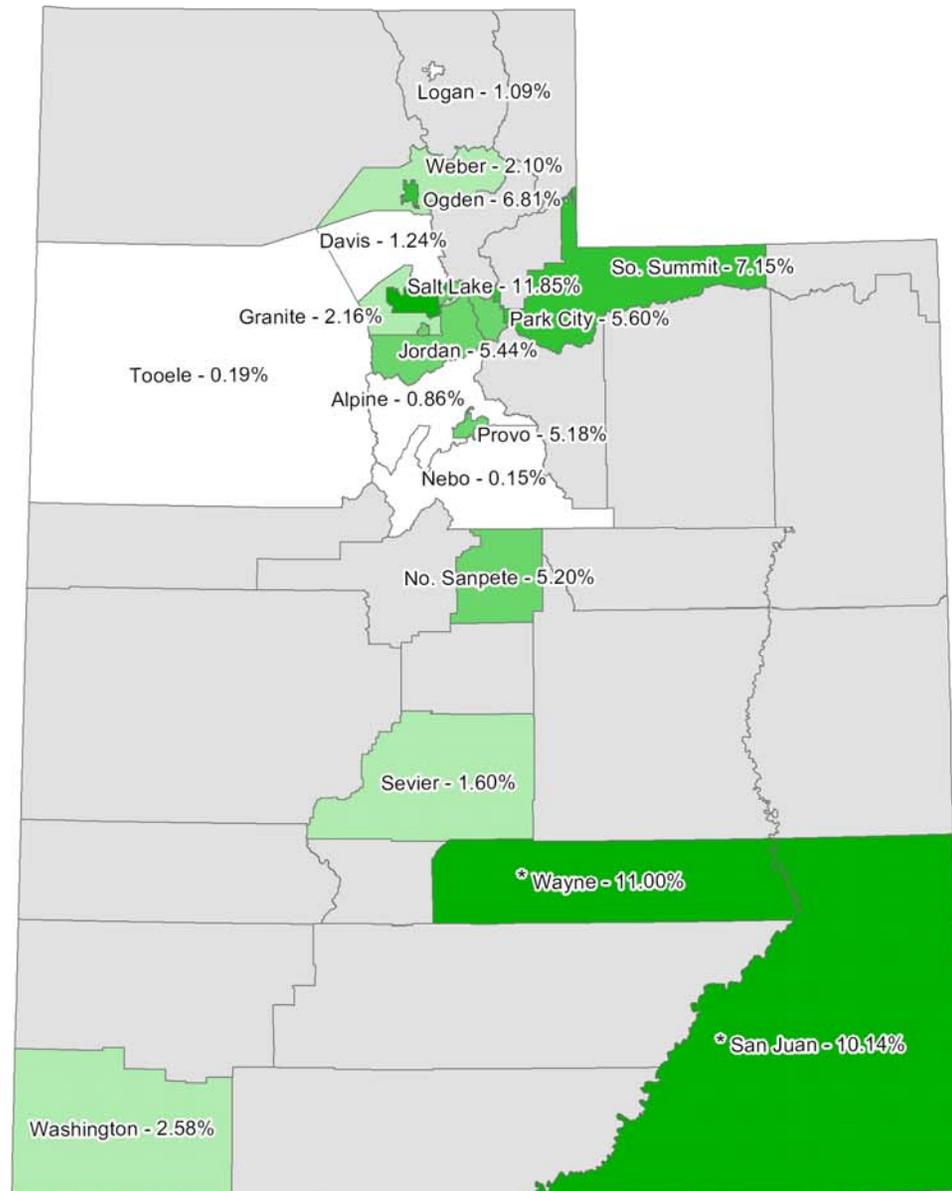
<http://www.usoe.k12.ut.us/>

Utah AGRC

<http://agrc.its.state.ut.us/>

Cartography by:
Ryan Hill

Percent of Students (K-12) Enrolled in Private Schools Per District (Fall Enrollment 2003)



Total Number of Private Students: 14,520

Mean: 764

Minimum: 20 (Tooele County School District)

Maximum: 4,297 (Jordan School District)

* Bureau of Indian Affairs

0 25 50 100 Miles

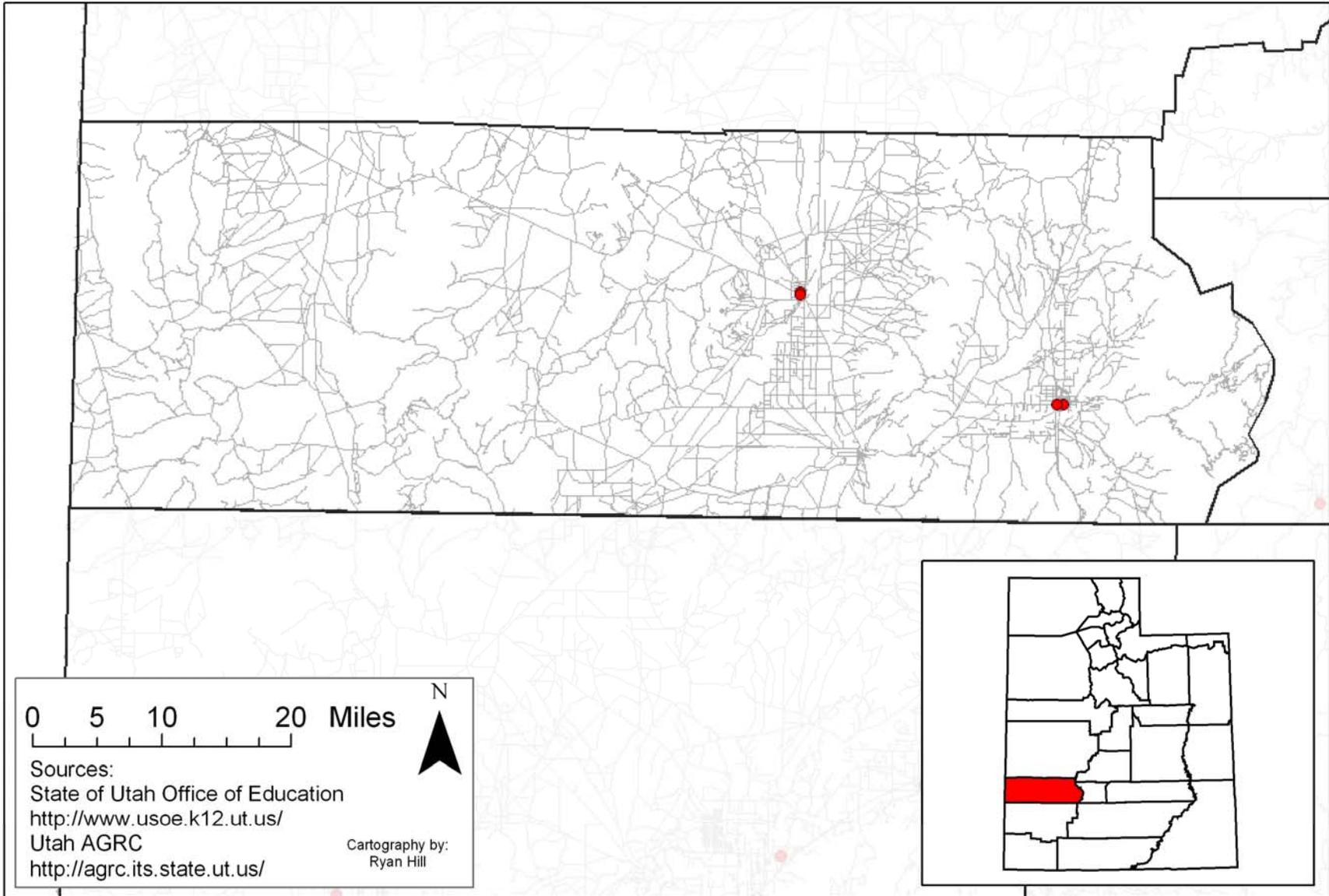


Sources:
State of Utah Office of Education
<http://www.usoe.k12.ut.us/>
Utah AGRC
<http://agrc.its.state.ut.us/>

Cartography by:
Ryan Hill

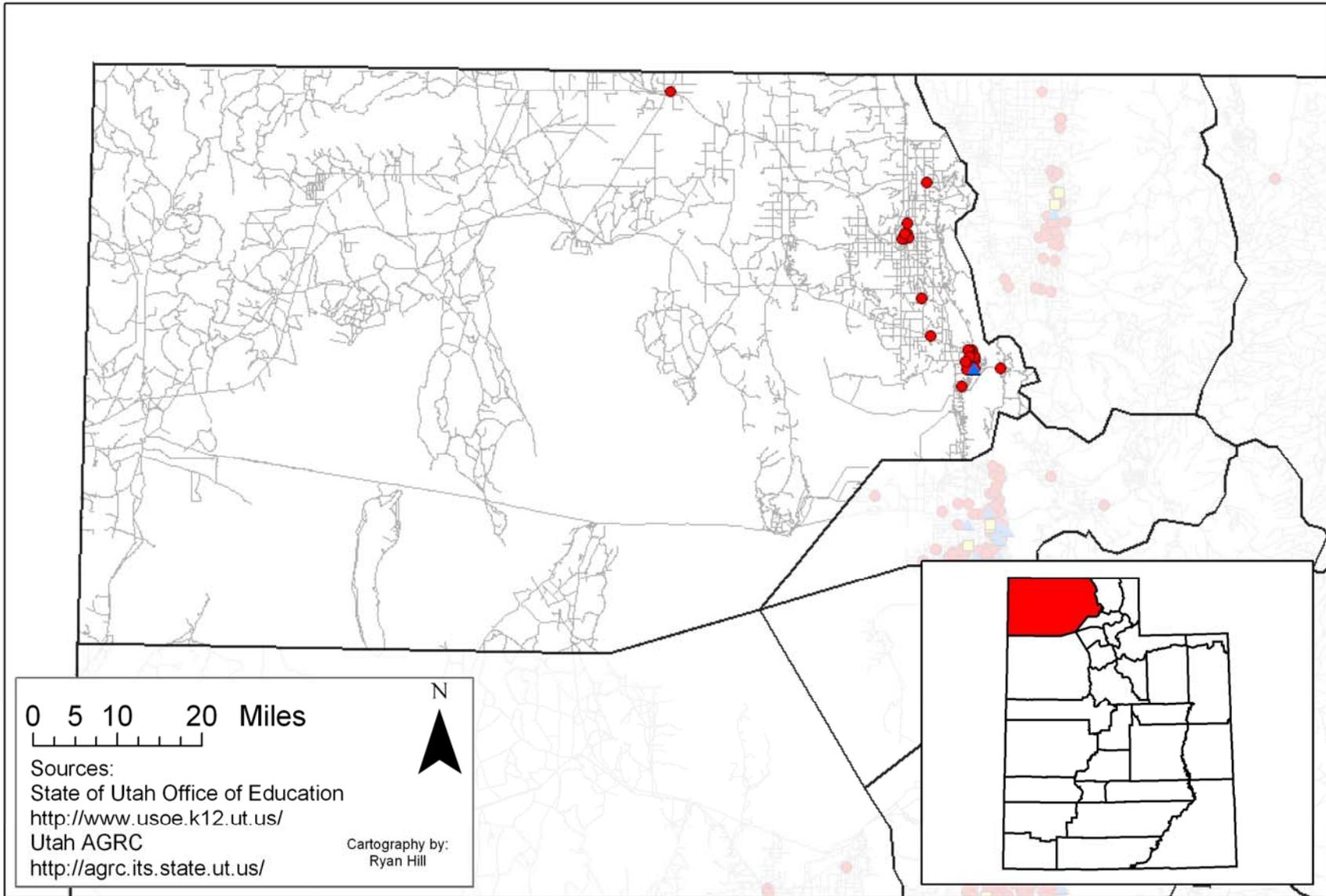
Public, Private and Charter Schools within Beaver County

- Public Schools
- ▲ Private Schools
- Charter Schools



Public, Private and Charter Schools within Box Elder County

- Public Schools
- ▲ Private Schools
- Charter Schools

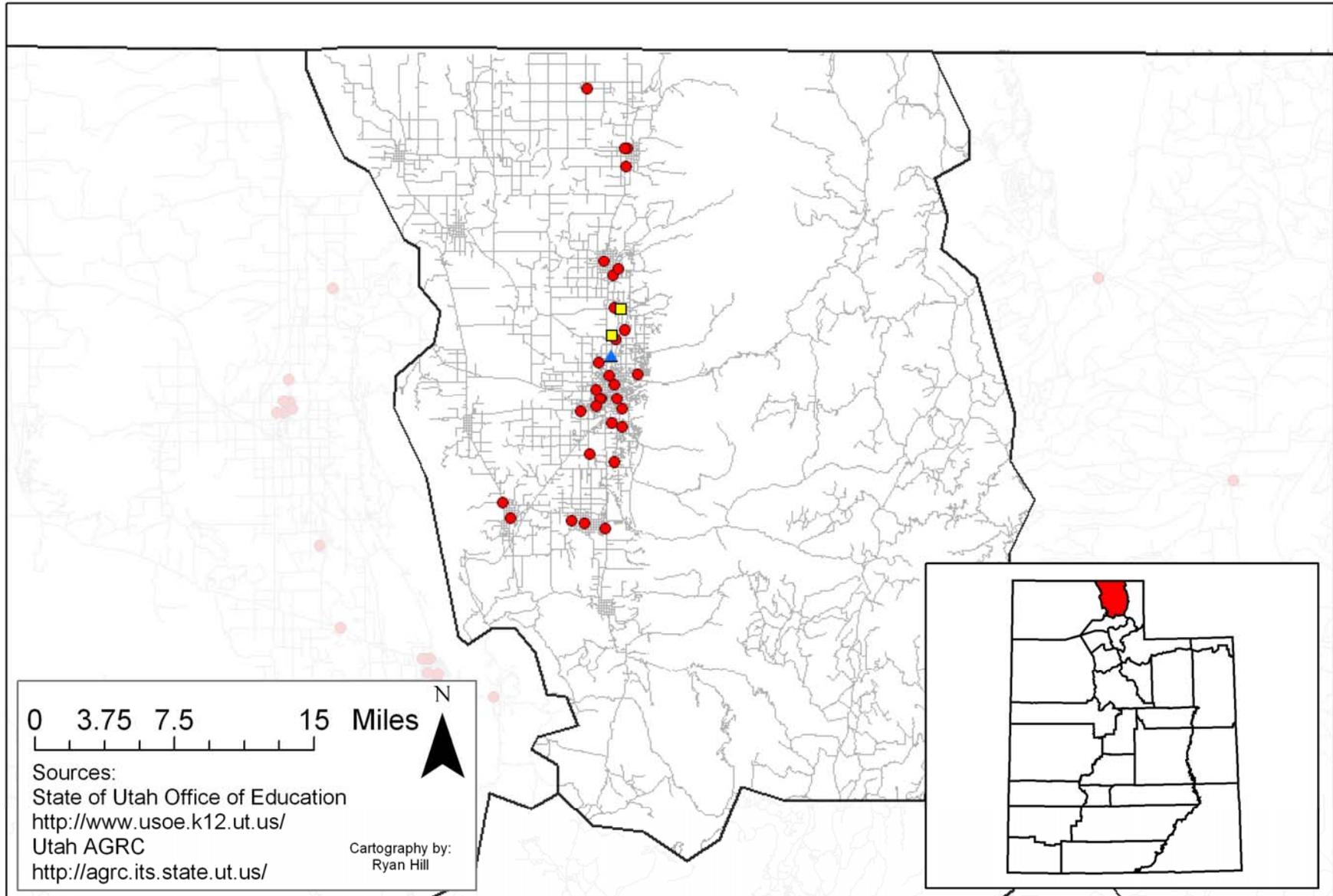


Public, Private and Charter Schools within Cache County

● Public Schools

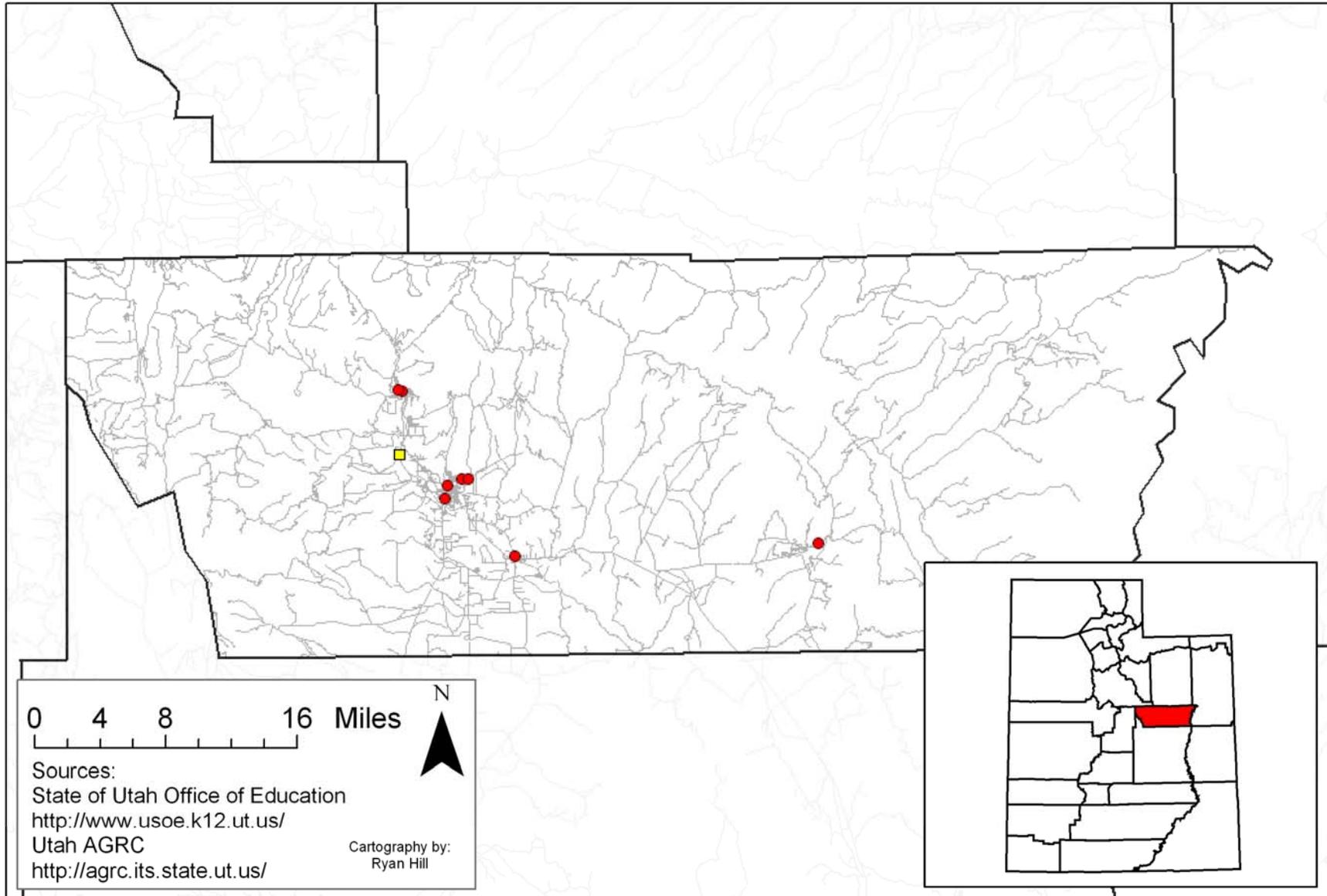
▲ Private Schools

■ Charter Schools



Public, Private and Charter Schools within Carbon County

● Public Schools ▲ Private Schools ■ Charter Schools



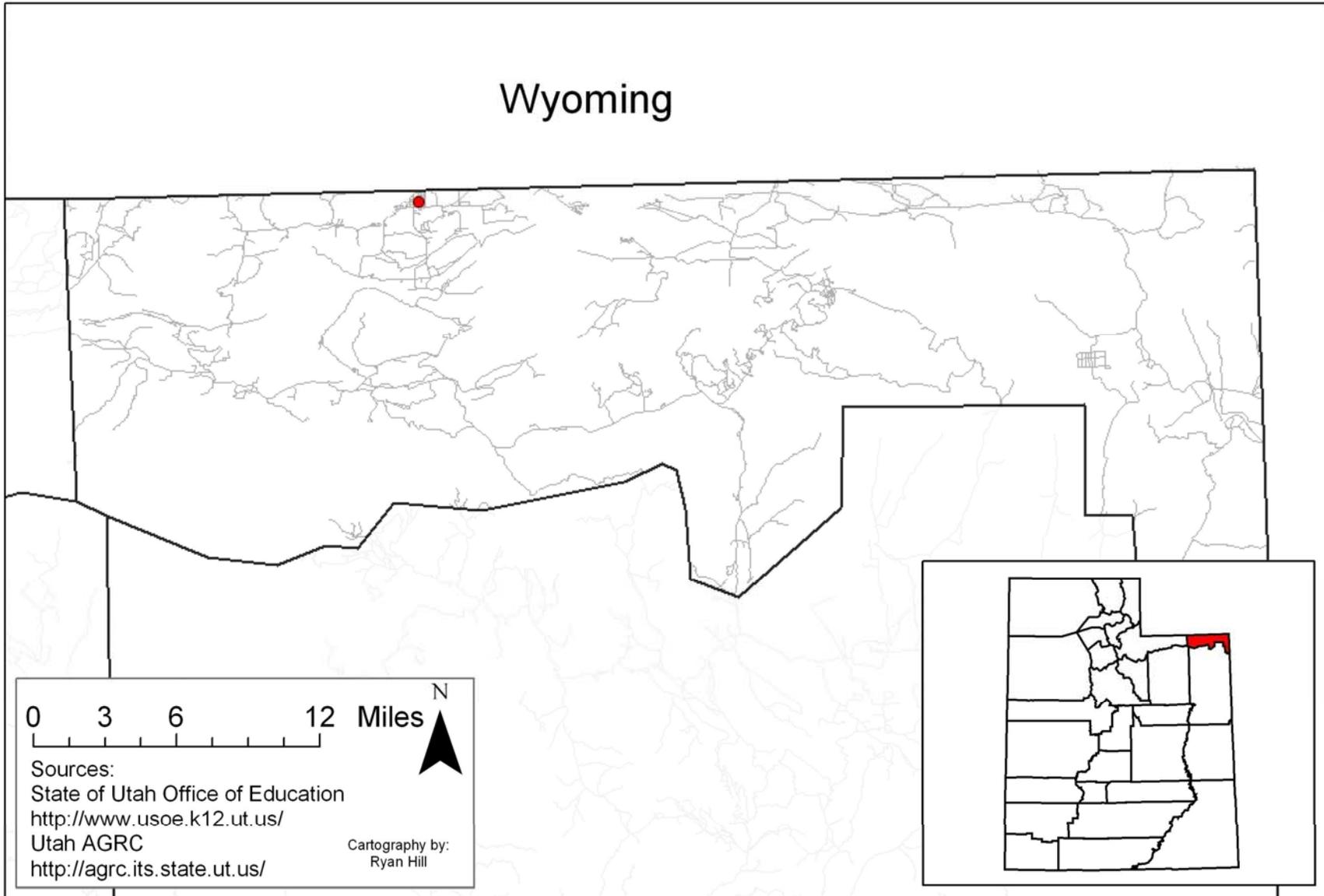
Public, Private and Charter Schools within Daggett County

● Public Schools

▲ Private Schools

■ Charter Schools

Wyoming



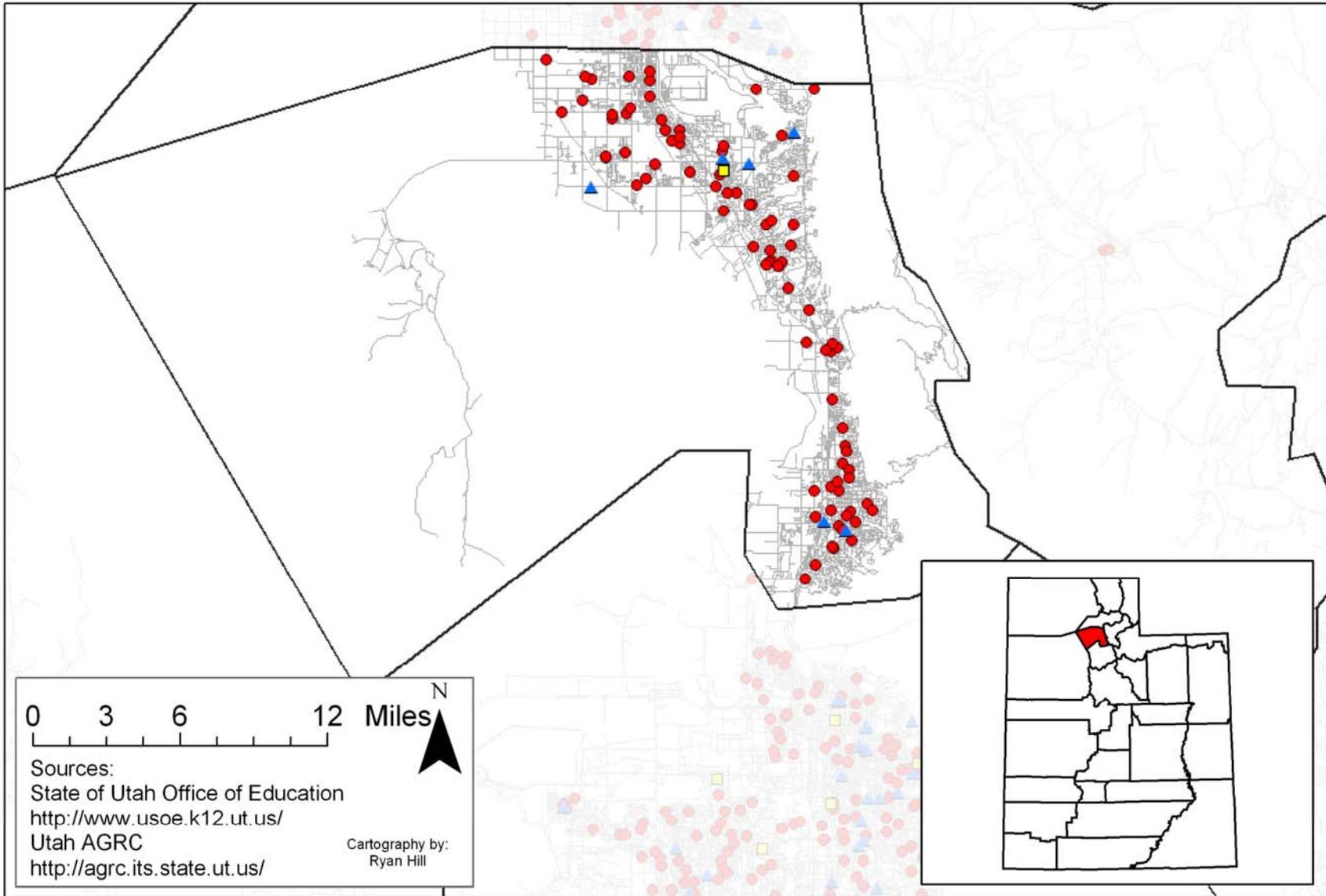
0 3 6 12 Miles

Sources:
State of Utah Office of Education
<http://www.usoe.k12.ut.us/>
Utah AGRC
<http://agrc.its.state.ut.us/>

Cartography by:
Ryan Hill

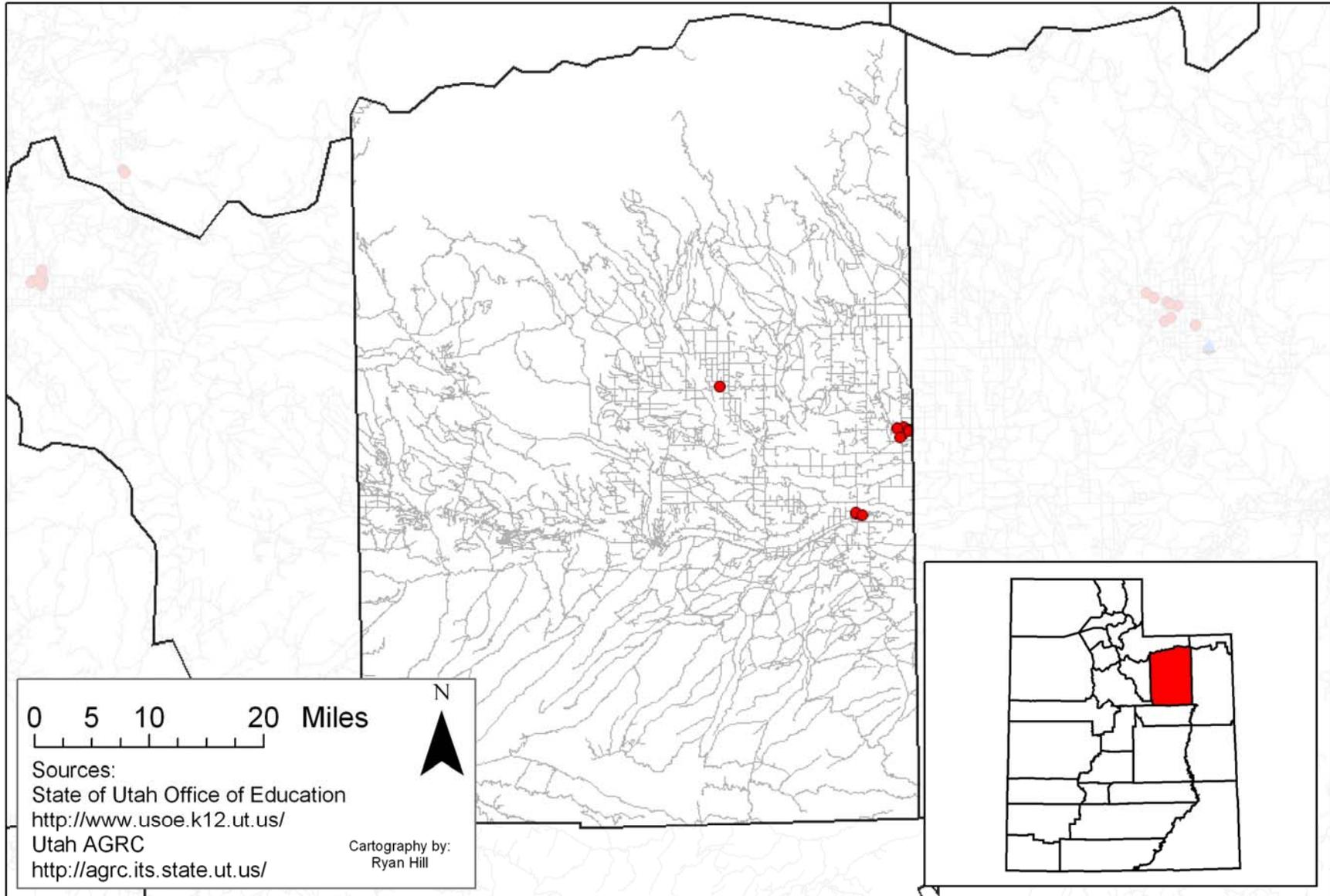
Public, Private and Charter Schools within Davis County

- Public Schools
- ▲ Private Schools
- Charter Schools



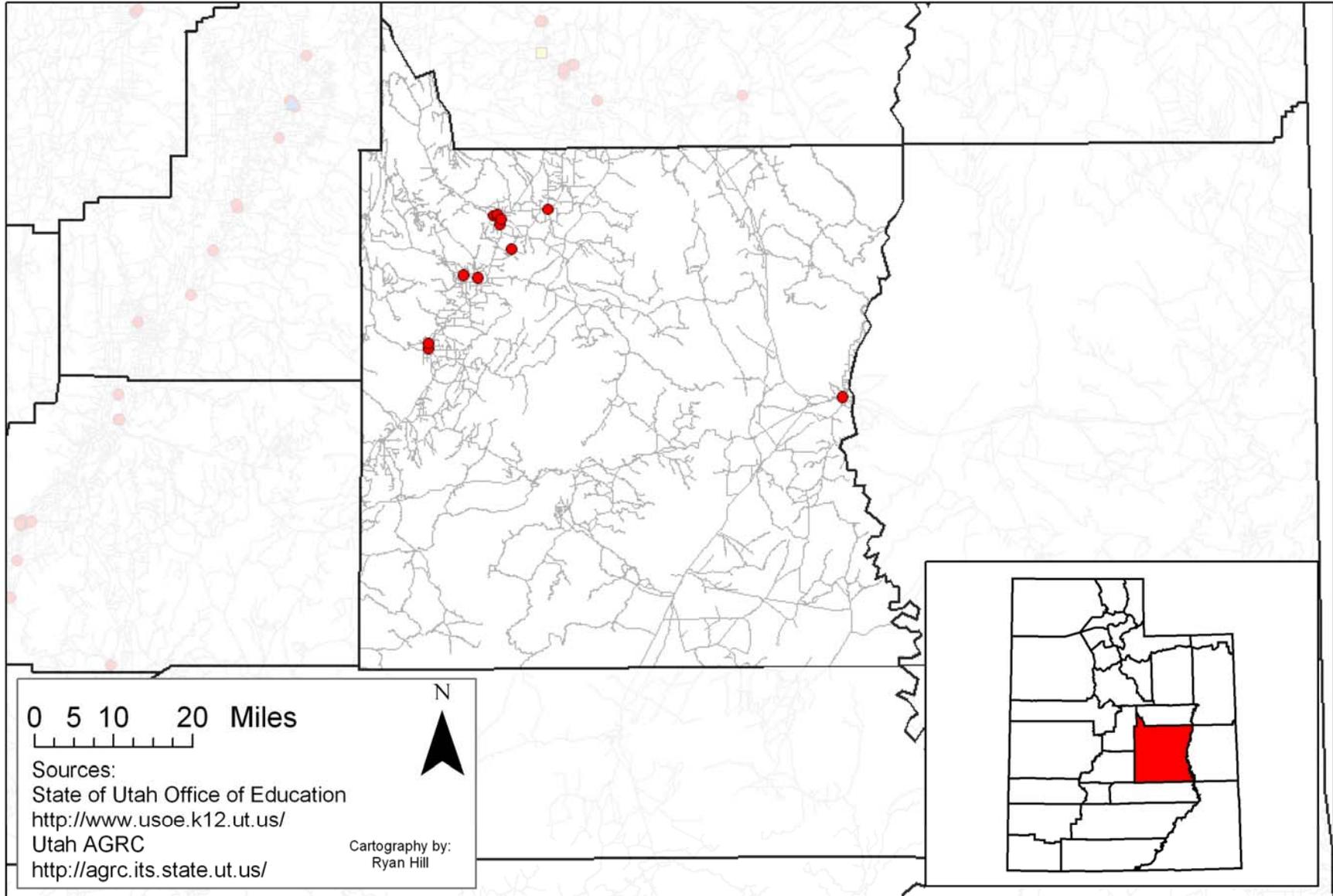
Public, Private and Charter Schools within Duchesne County

● Public Schools ▲ Private Schools ■ Charter Schools



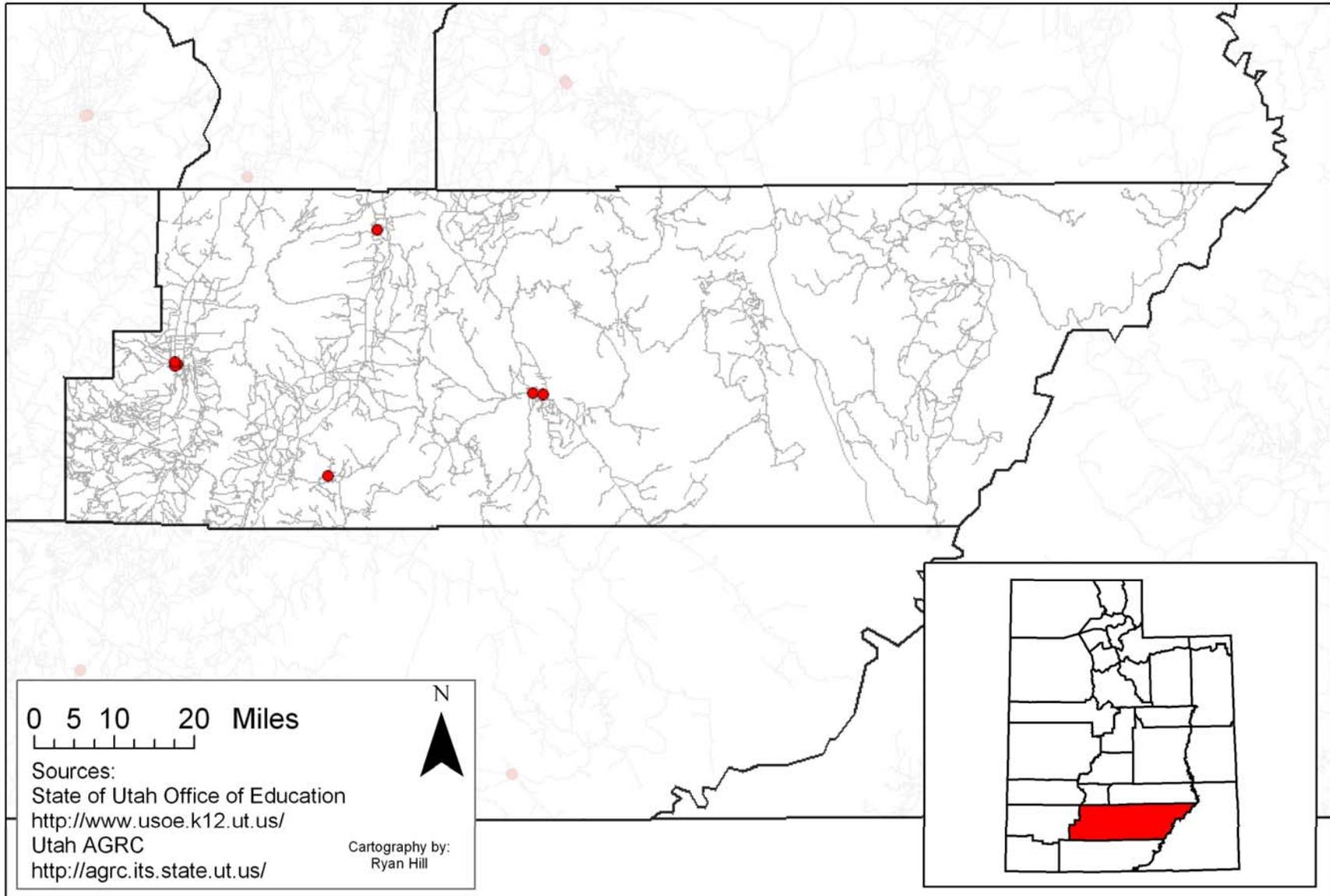
Public, Private and Charter Schools within Emery County

● Public Schools ▲ Private Schools ■ Charter Schools



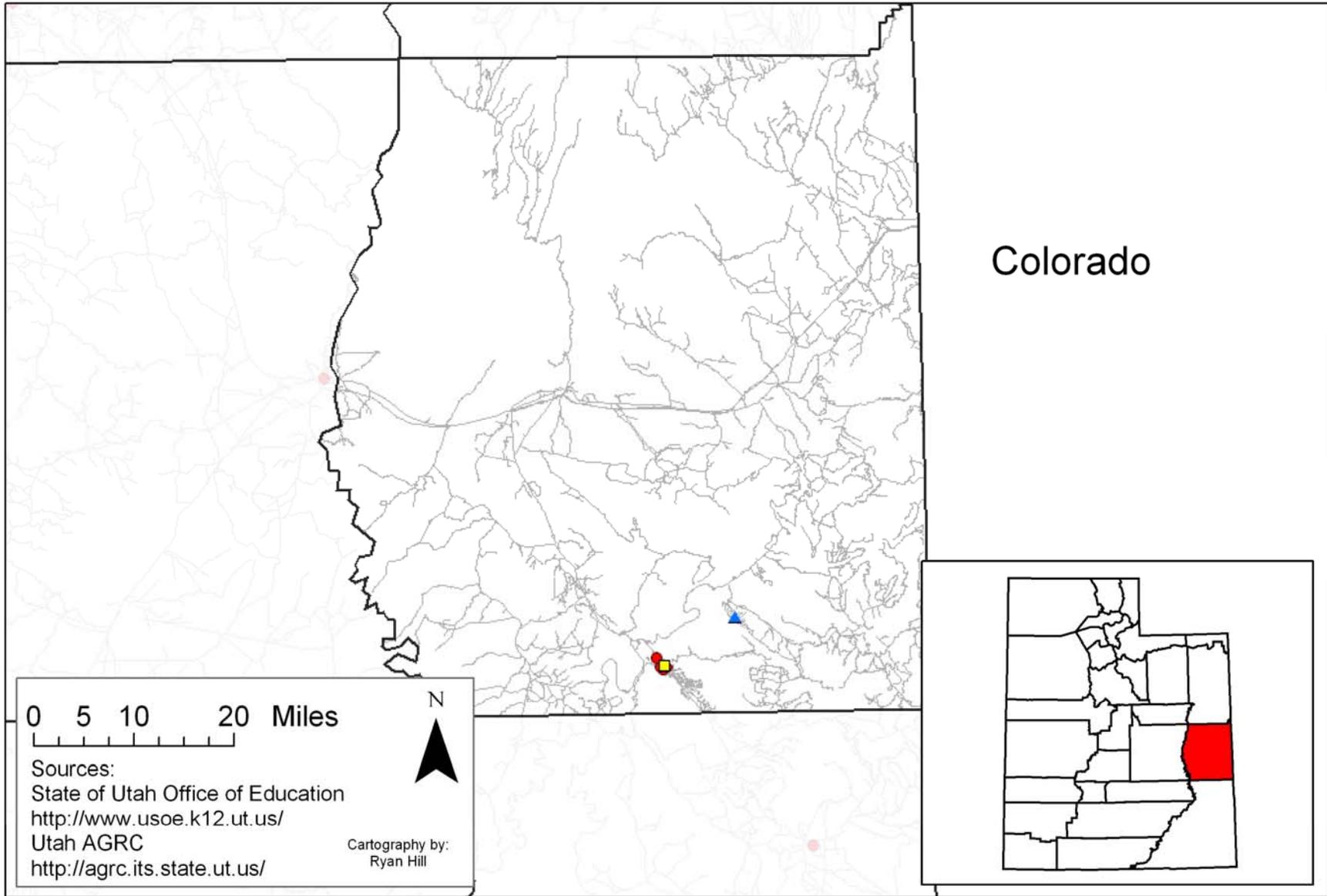
Public, Private and Charter Schools within Garfield County

● Public Schools ▲ Private Schools ■ Charter Schools



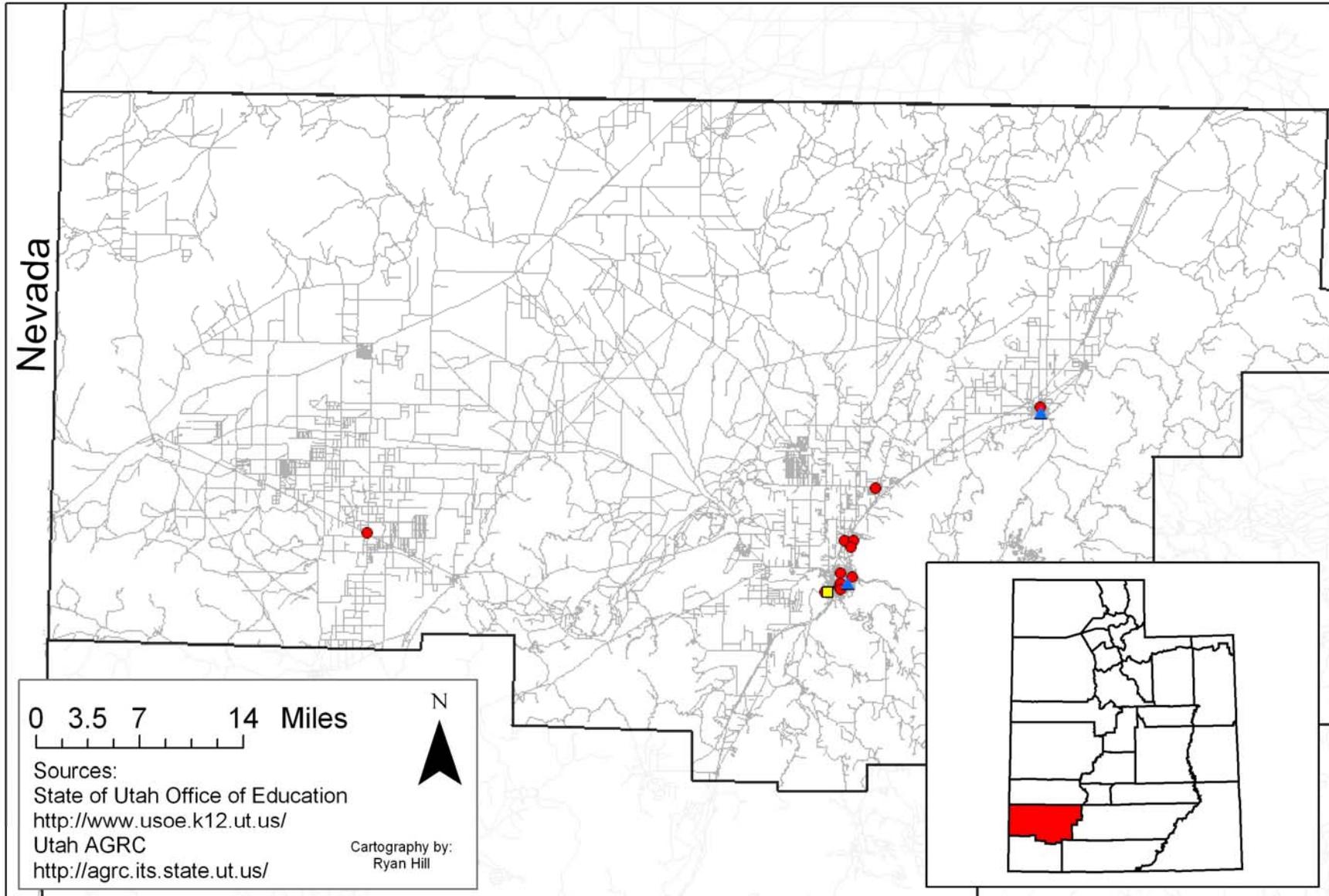
Public, Private and Charter Schools within Grand County

- Public Schools
- ▲ Private Schools
- Charter Schools



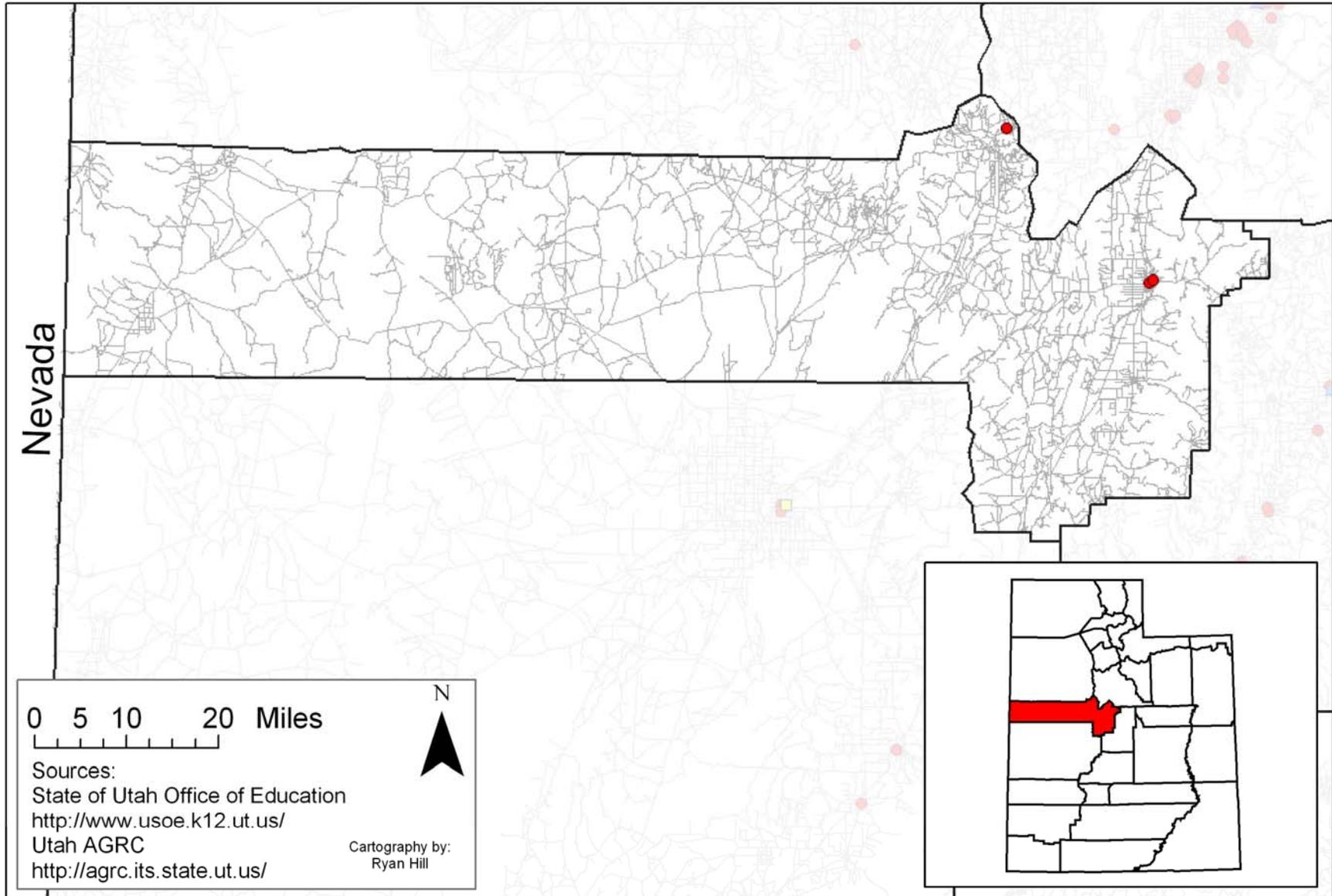
Public, Private and Charter Schools within Iron County

- Public Schools
- ▲ Private Schools
- Charter Schools



Public, Private and Charter Schools within Juab County

● Public Schools ▲ Private Schools ■ Charter Schools



Public, Private and Charter Schools within Kane County

● Public Schools ▲ Private Schools ■ Charter Schools



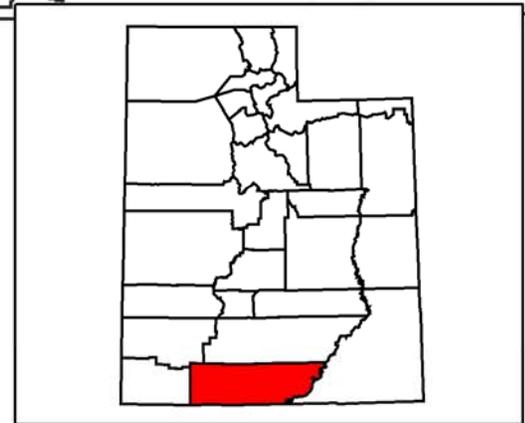
0 5 10 20 Miles

Sources:
State of Utah Office of Education
<http://www.usoe.k12.ut.us/>
Utah AGRC
<http://agrc.its.state.ut.us/>

Cartography by:
Ryan Hill

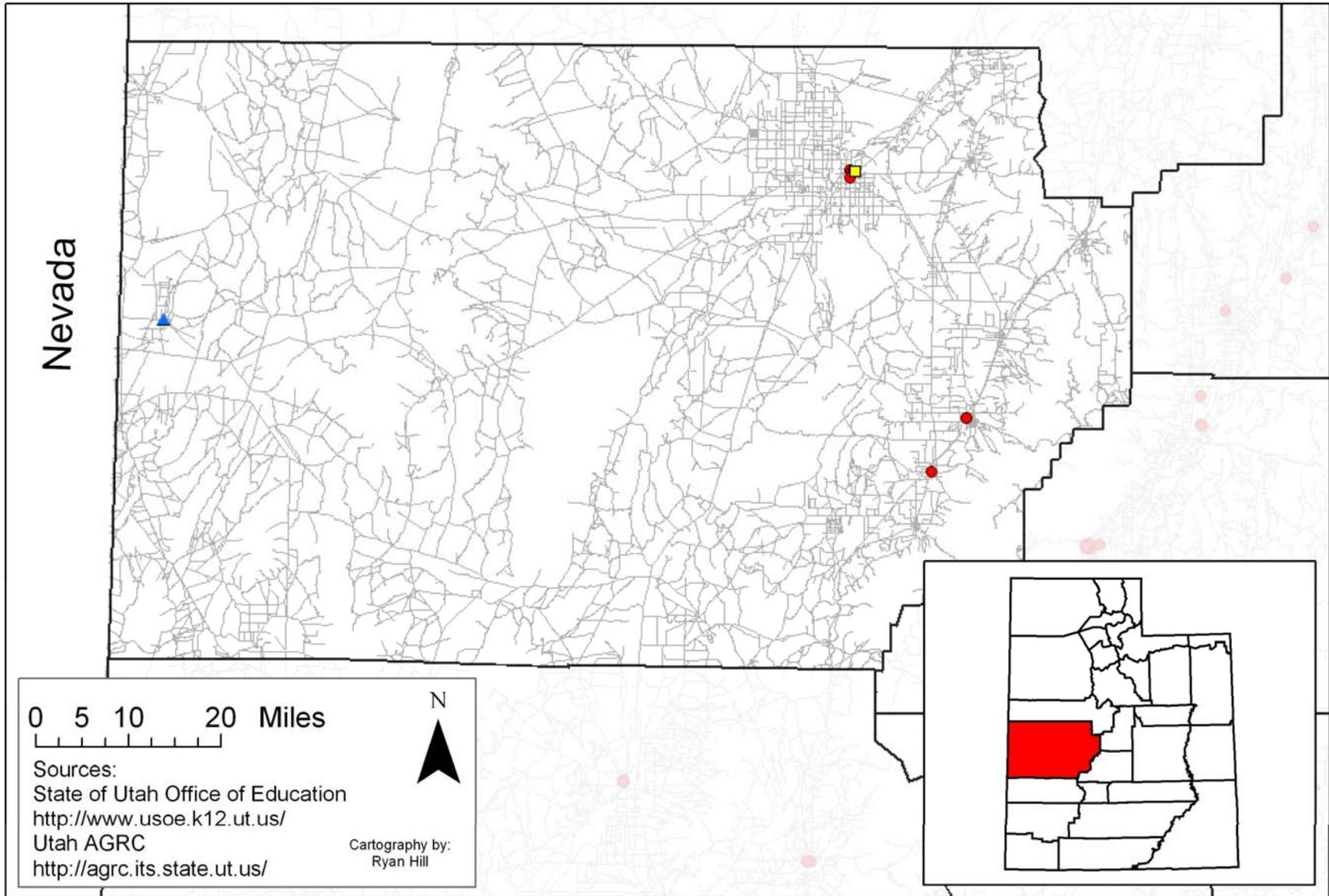


Arizona



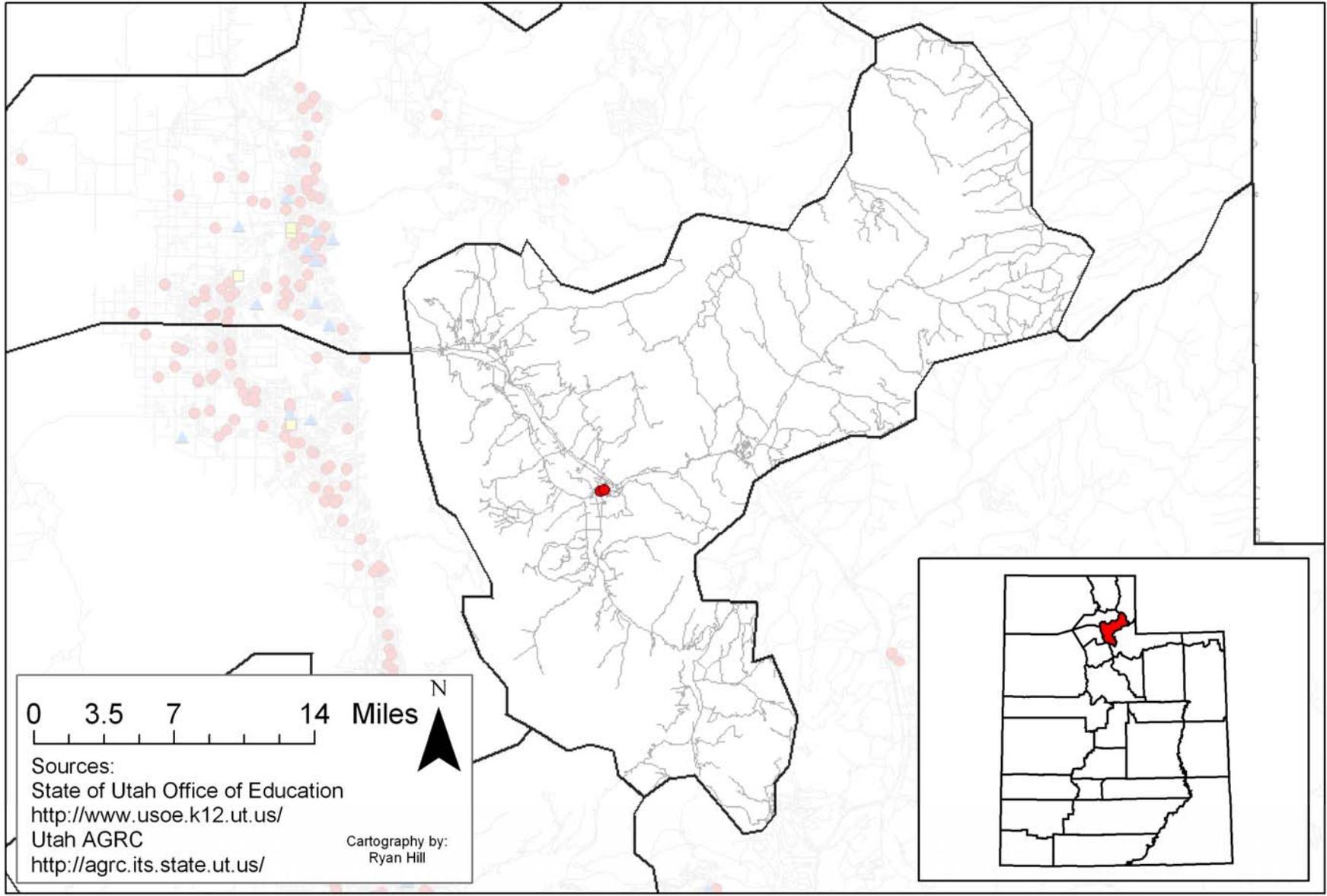
Public, Private and Charter Schools within Millard County

- Public Schools
- ▲ Private Schools
- Charter Schools



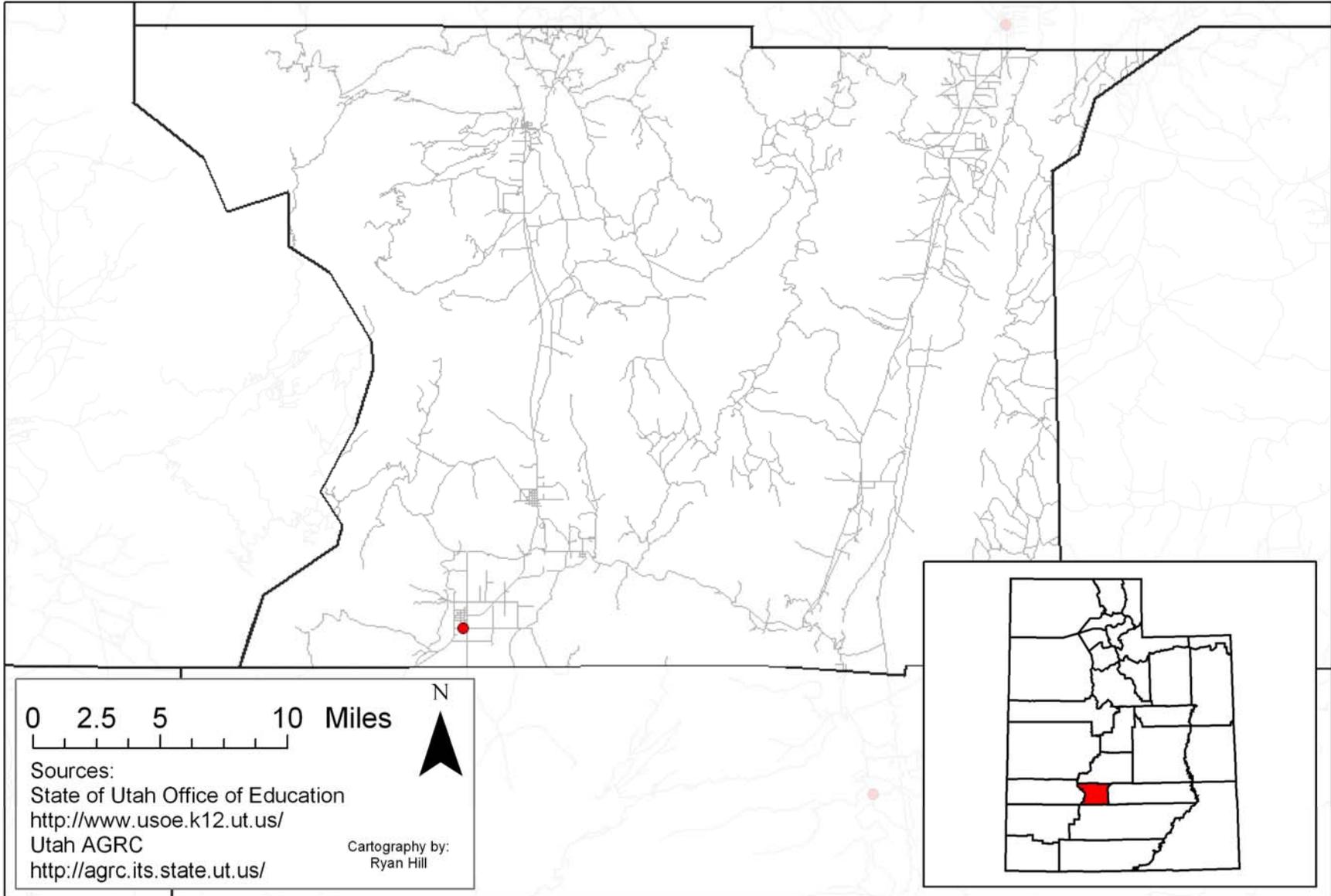
Public, Private and Charter Schools within Morgan County

● Public Schools ▲ Private Schools ■ Charter Schools



Public, Private and Charter Schools within Piute County

● Public Schools ▲ Private Schools ■ Charter Schools

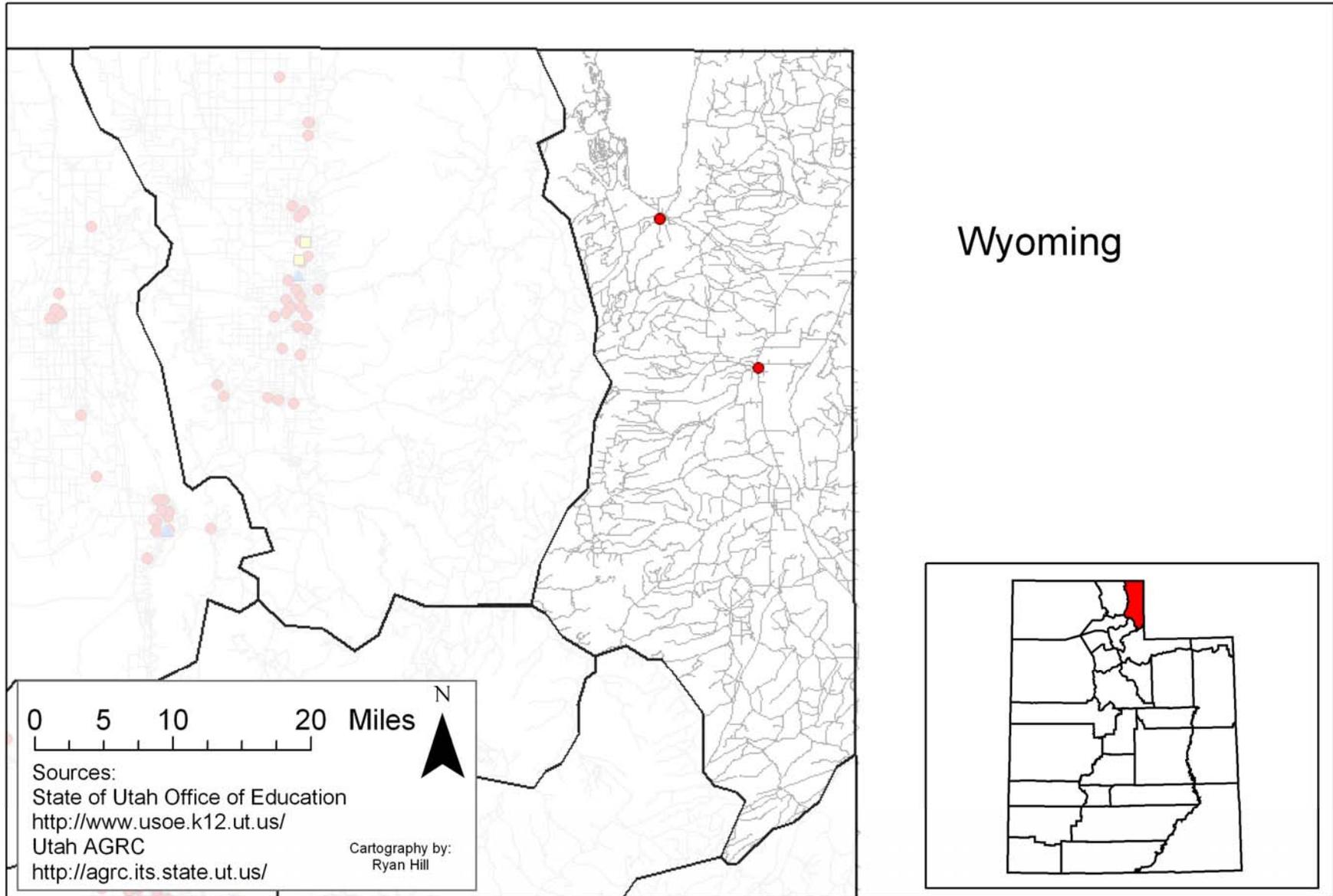


Public, Private and Charter Schools within Rich County

● Public Schools

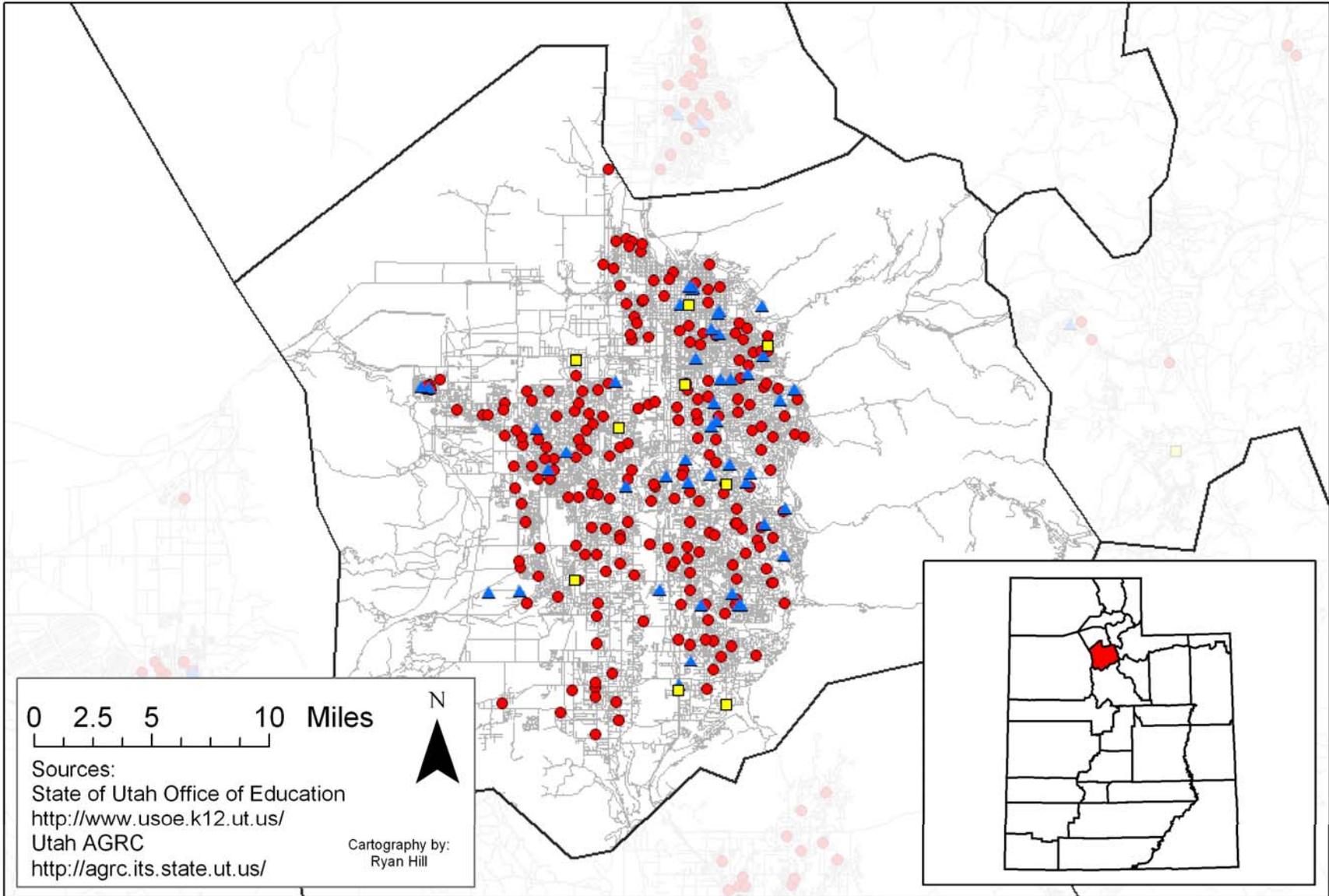
▲ Private Schools

■ Charter Schools



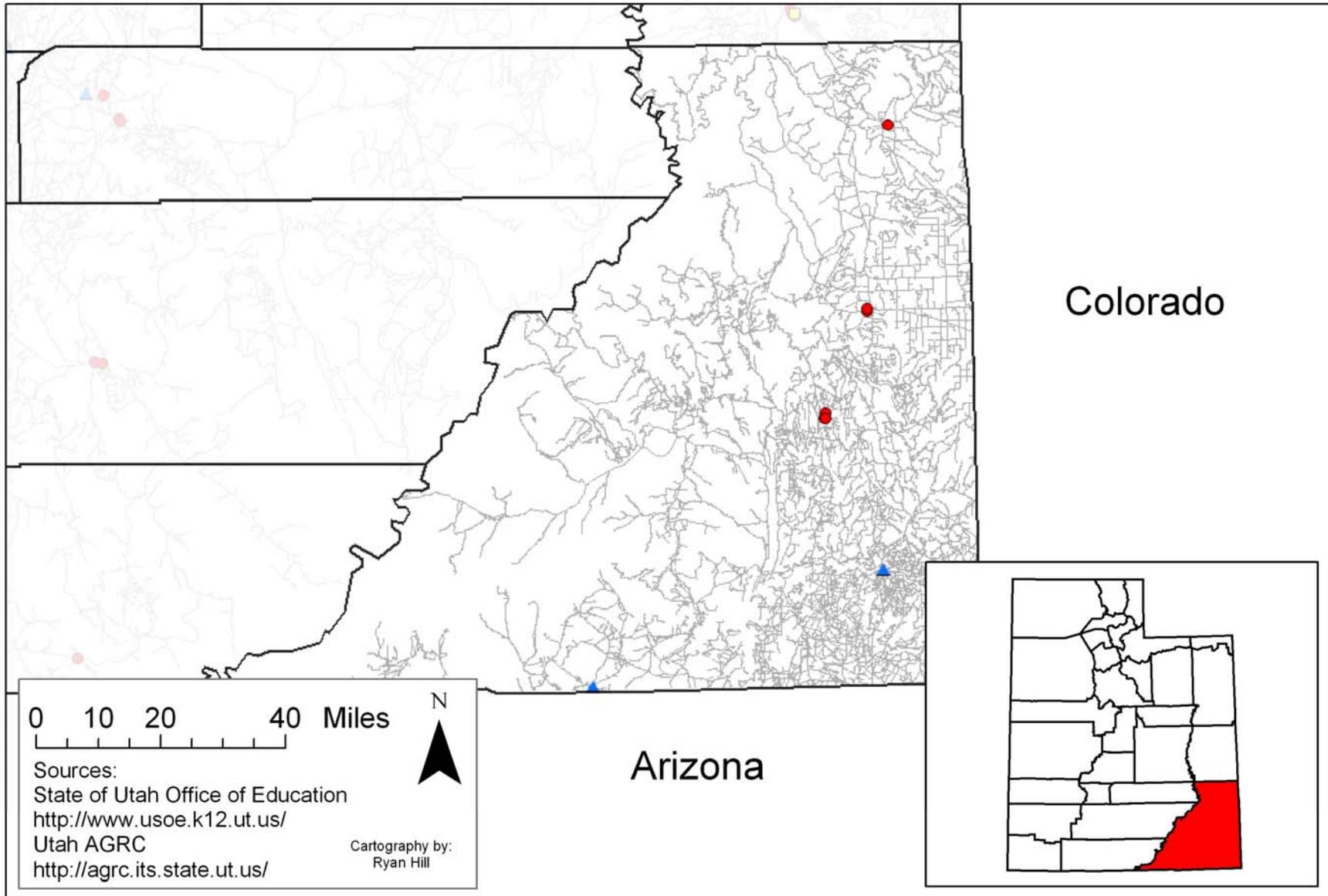
Public, Private and Charter Schools within Salt Lake County

● Public Schools ▲ Private Schools ■ Charter Schools



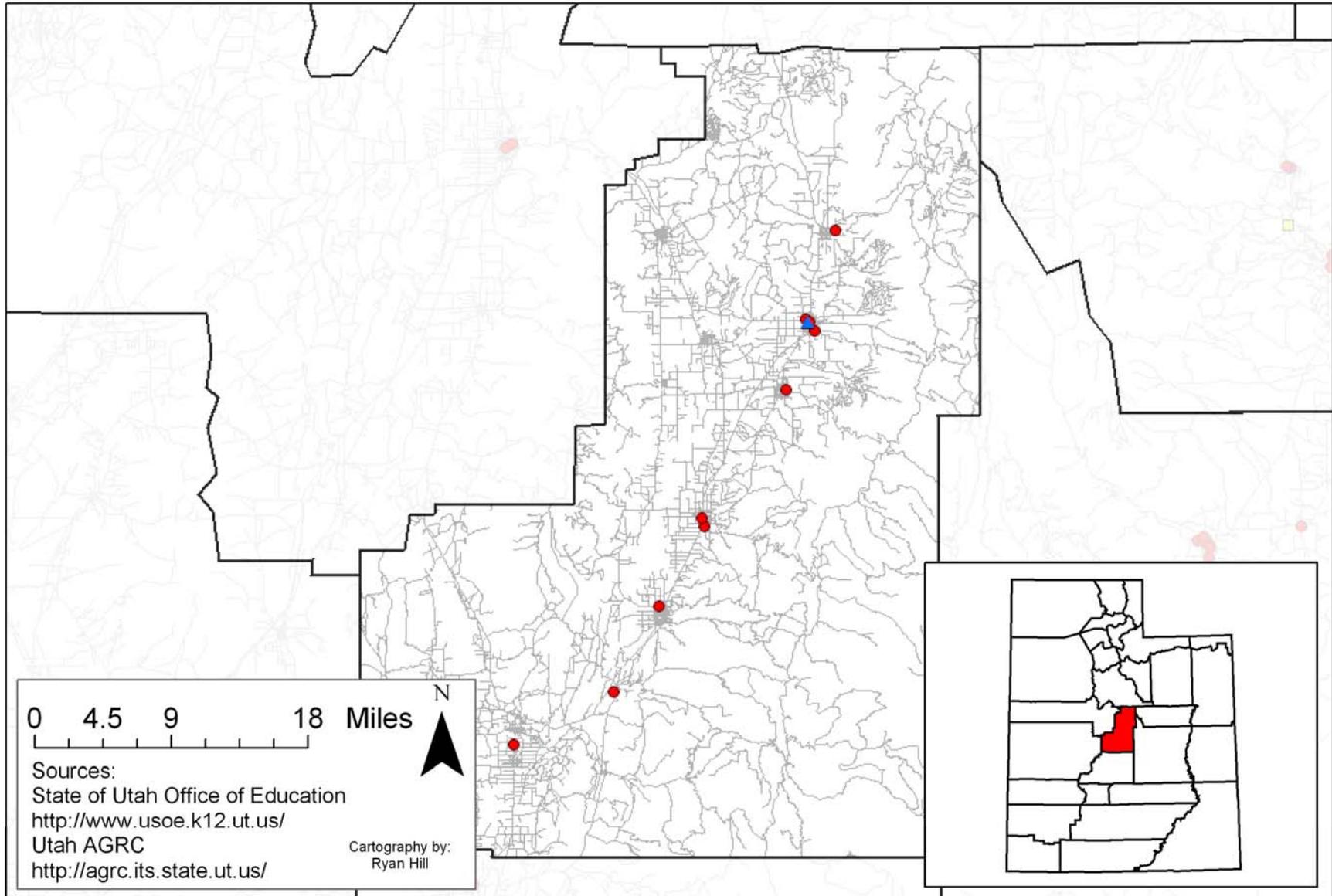
Public, Private and Charter Schools within San Juan County

● Public Schools ▲ Private Schools ■ Charter Schools



Public, Private and Charter Schools within Sanpete County

● Public Schools ▲ Private Schools ■ Charter Schools

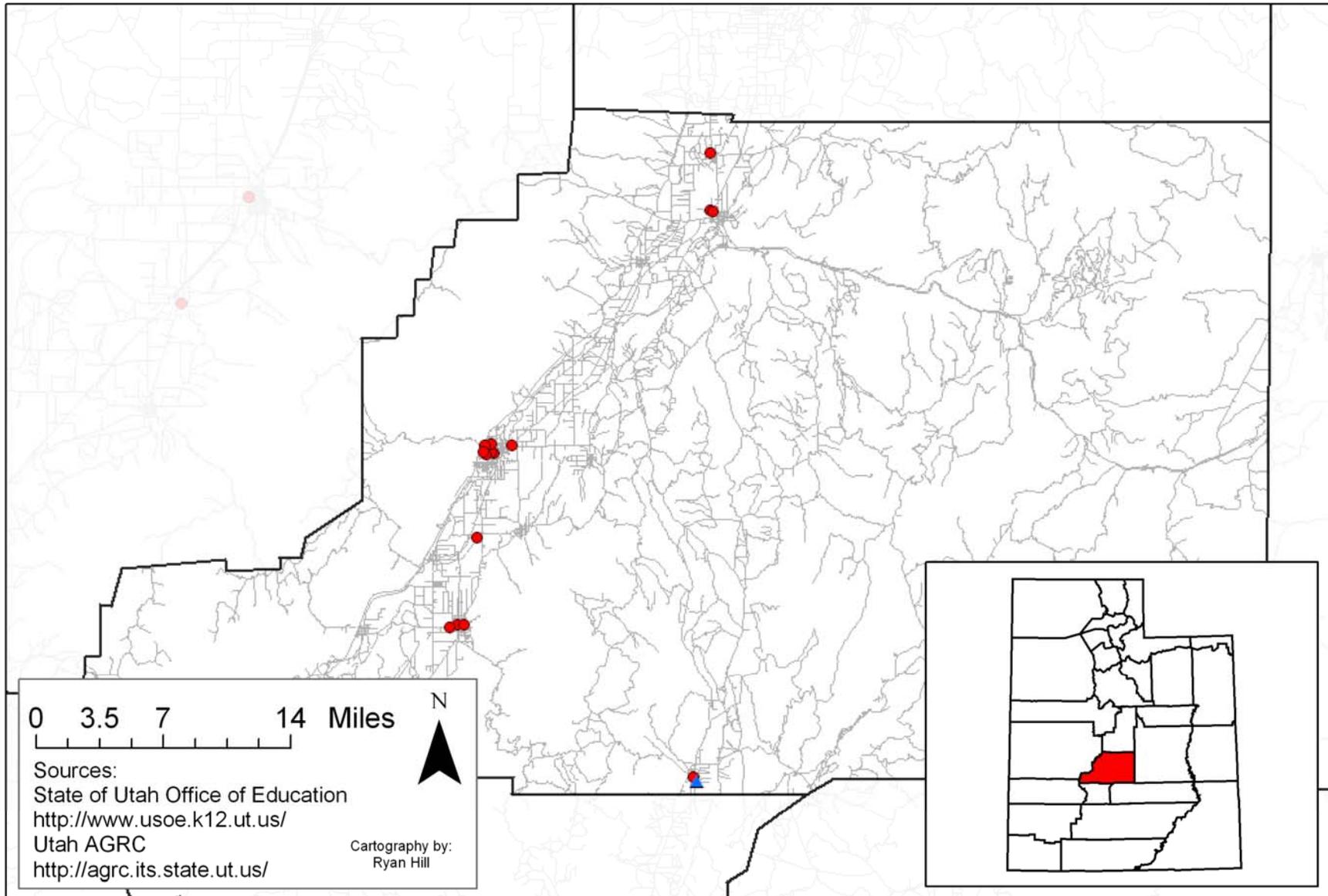


Public, Private and Charter Schools within Sevier County

● Public Schools

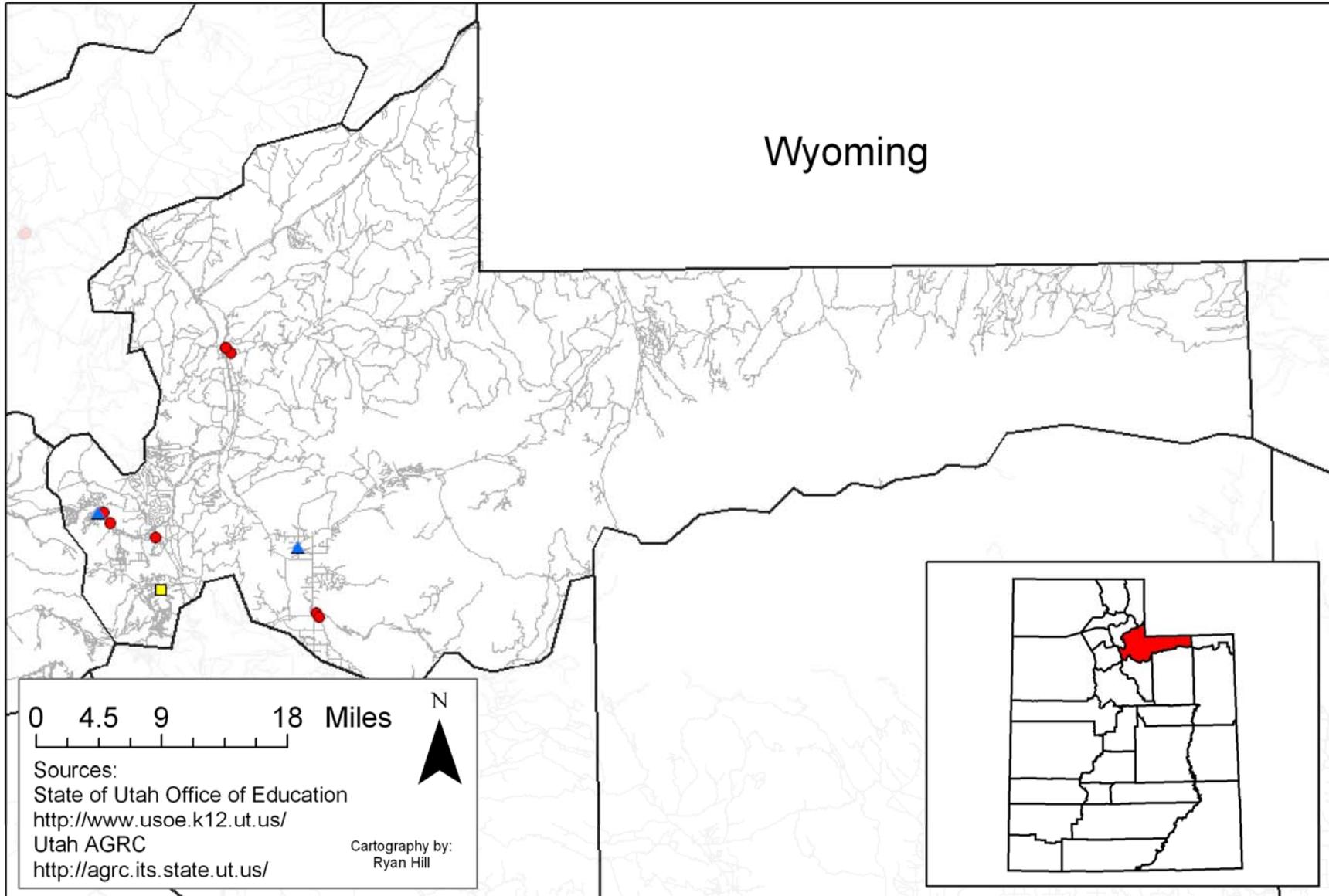
▲ Private Schools

■ Charter Schools



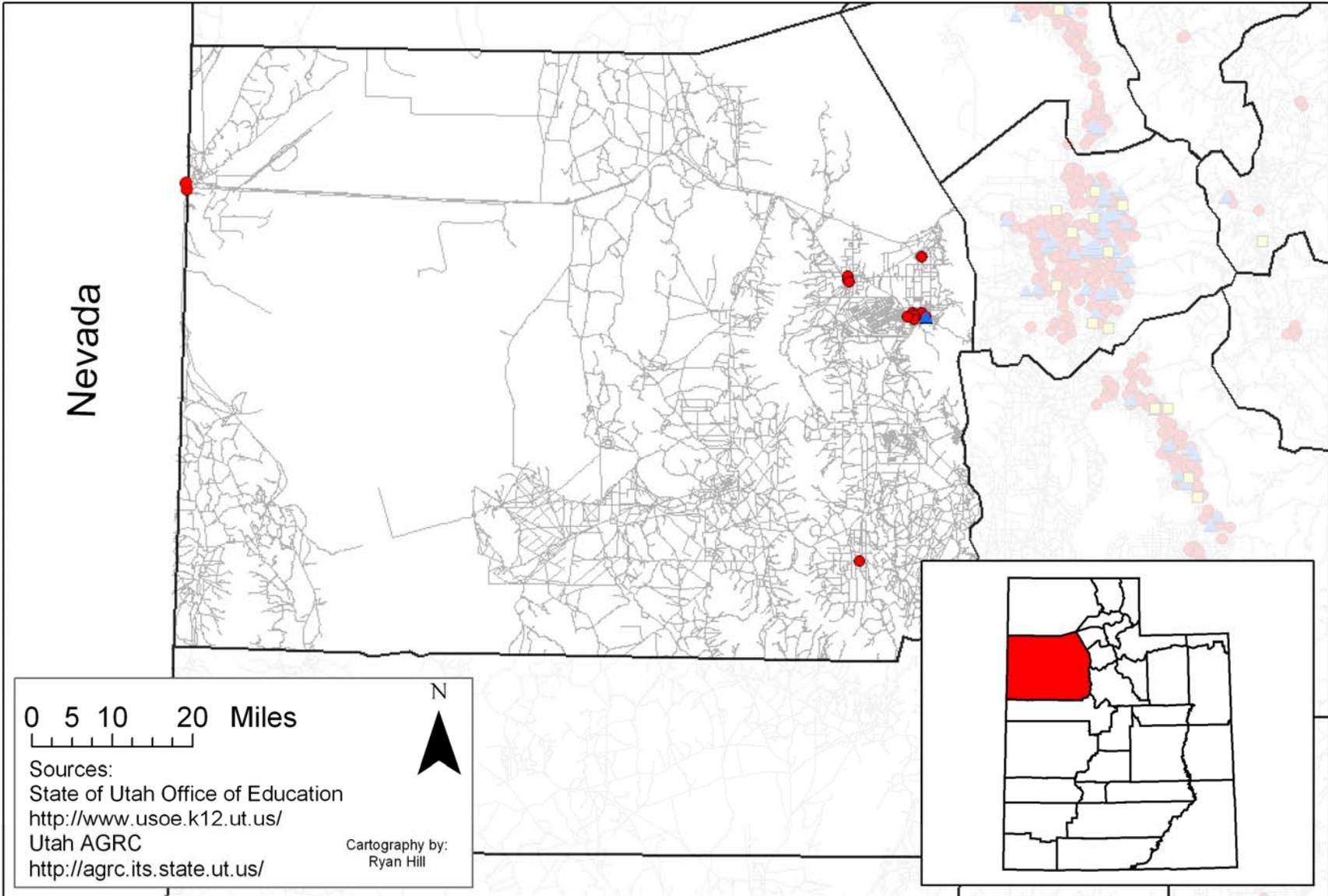
Public, Private and Charter Schools within Summit County

- Public Schools
- ▲ Private Schools
- Charter Schools



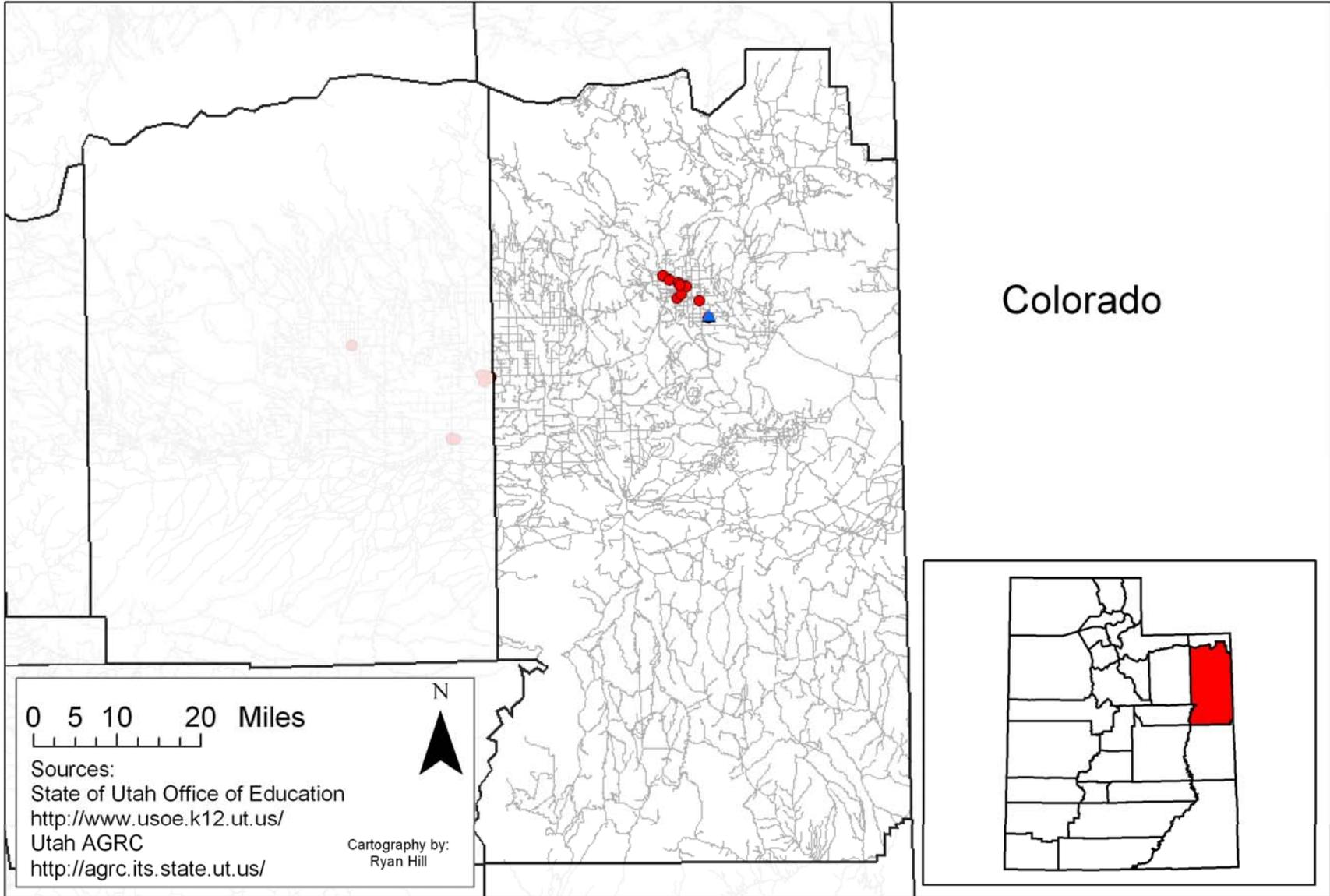
Public, Private and Charter Schools within Tooele County

- Public Schools
- ▲ Private Schools
- Charter Schools



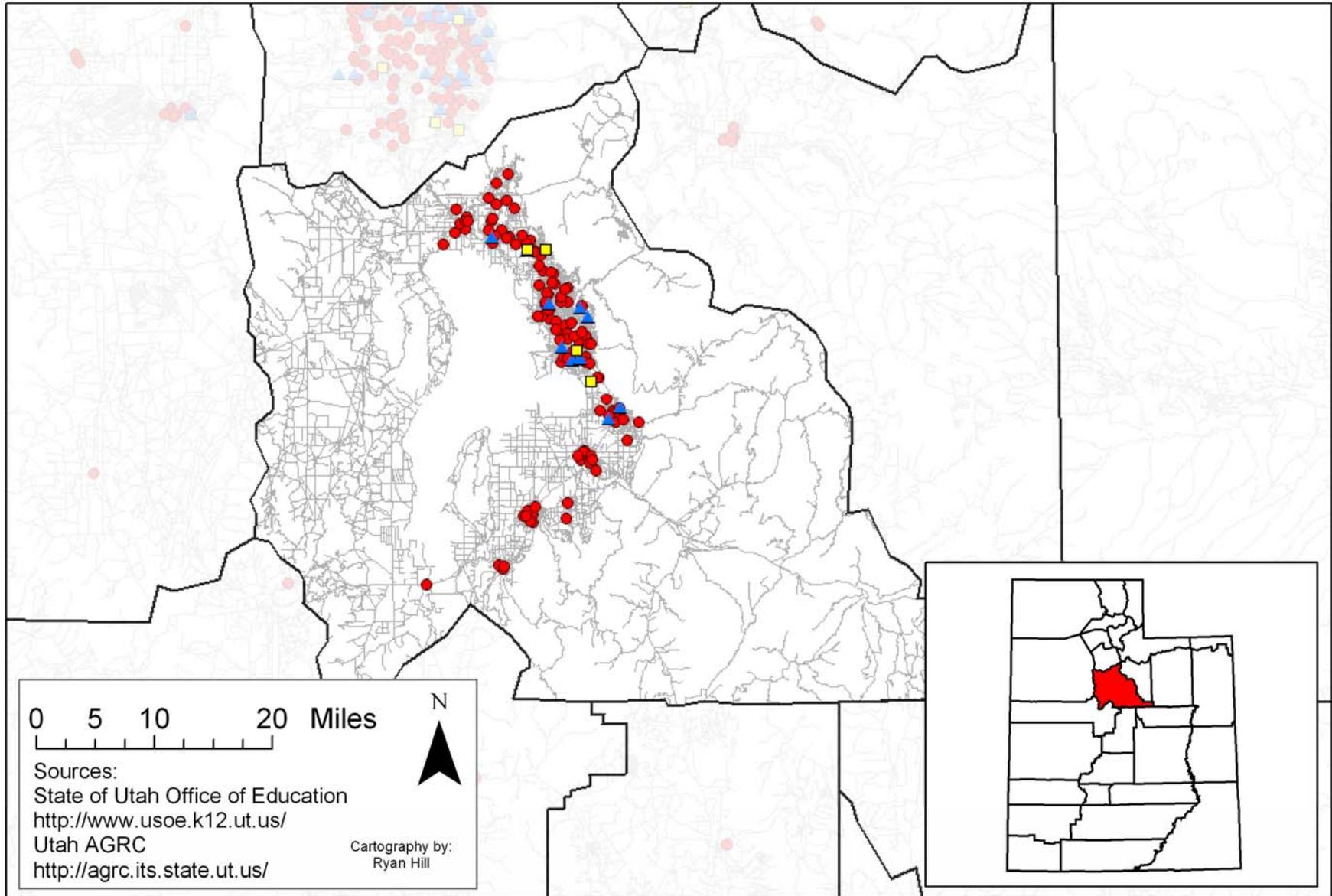
Public, Private and Charter Schools within Uintah County

● Public Schools ▲ Private Schools ■ Charter Schools



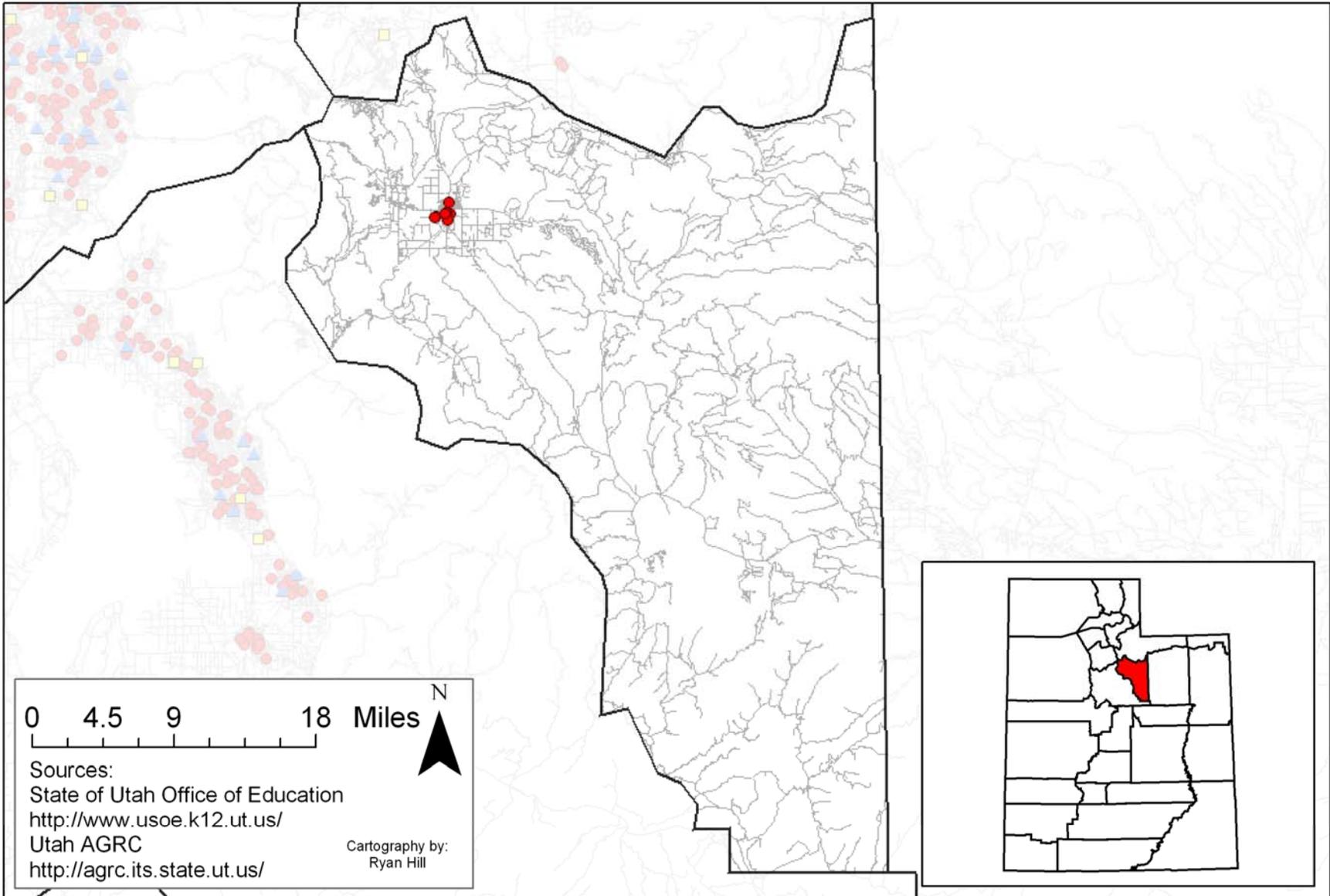
Public, Private and Charter Schools within Utah County

● Public Schools ▲ Private Schools ■ Charter Schools



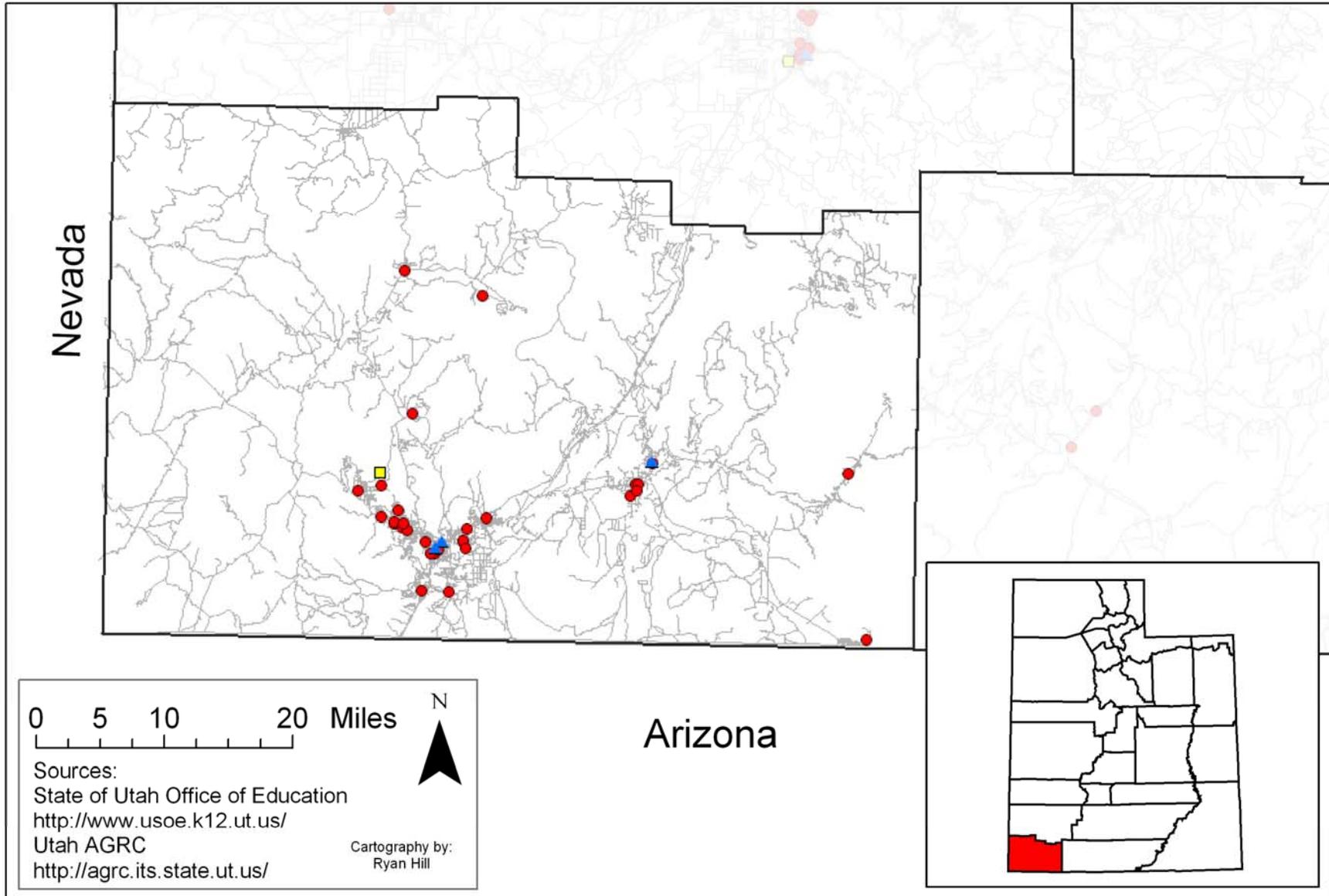
Public, Private and Charter Schools within Wasatch County

● Public Schools ▲ Private Schools ■ Charter Schools



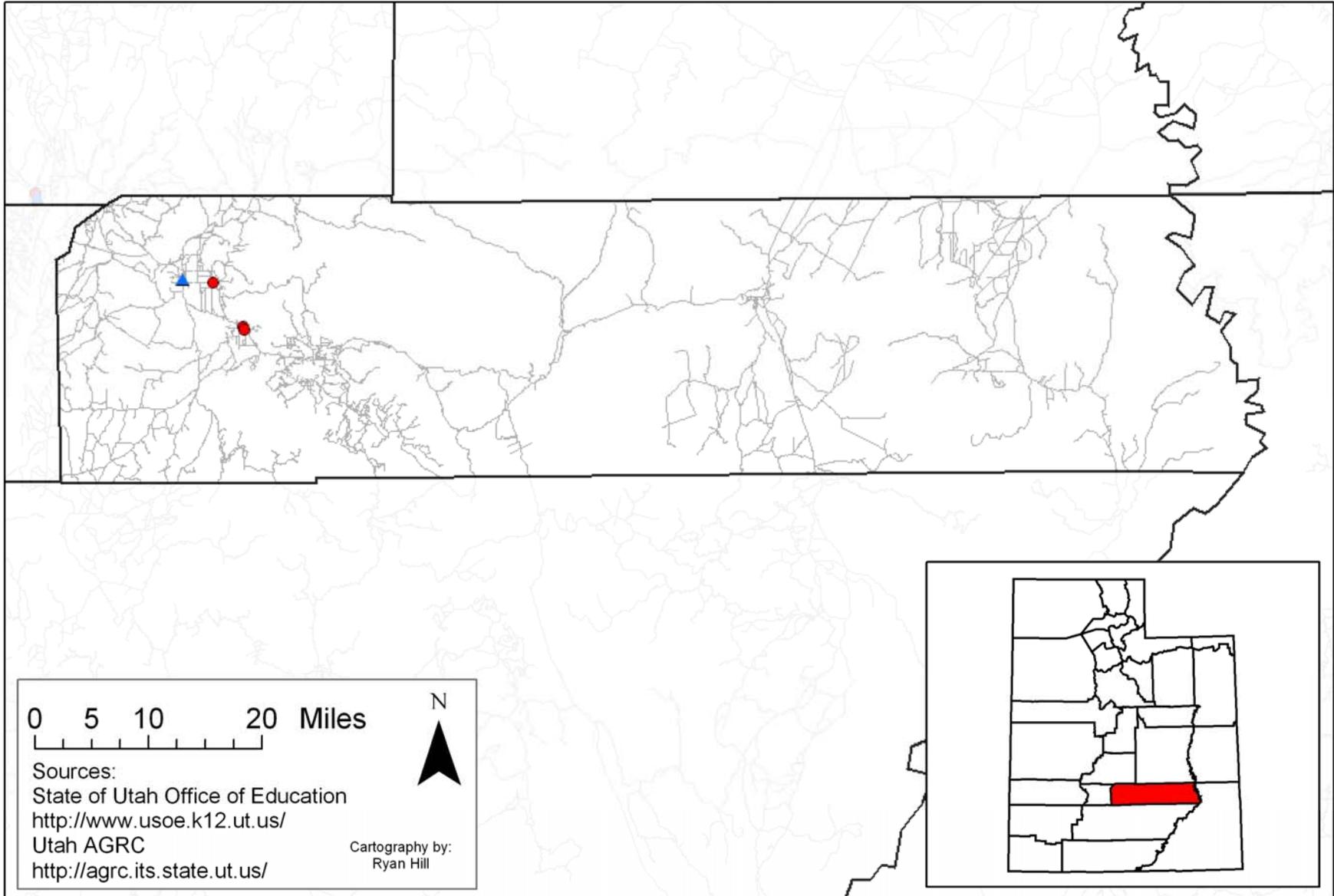
Public, Private and Charter Schools within Washington County

- Public Schools
- ▲ Private Schools
- Charter Schools



Public, Private and Charter Schools within Wayne County

● Public Schools ▲ Private Schools ■ Charter Schools

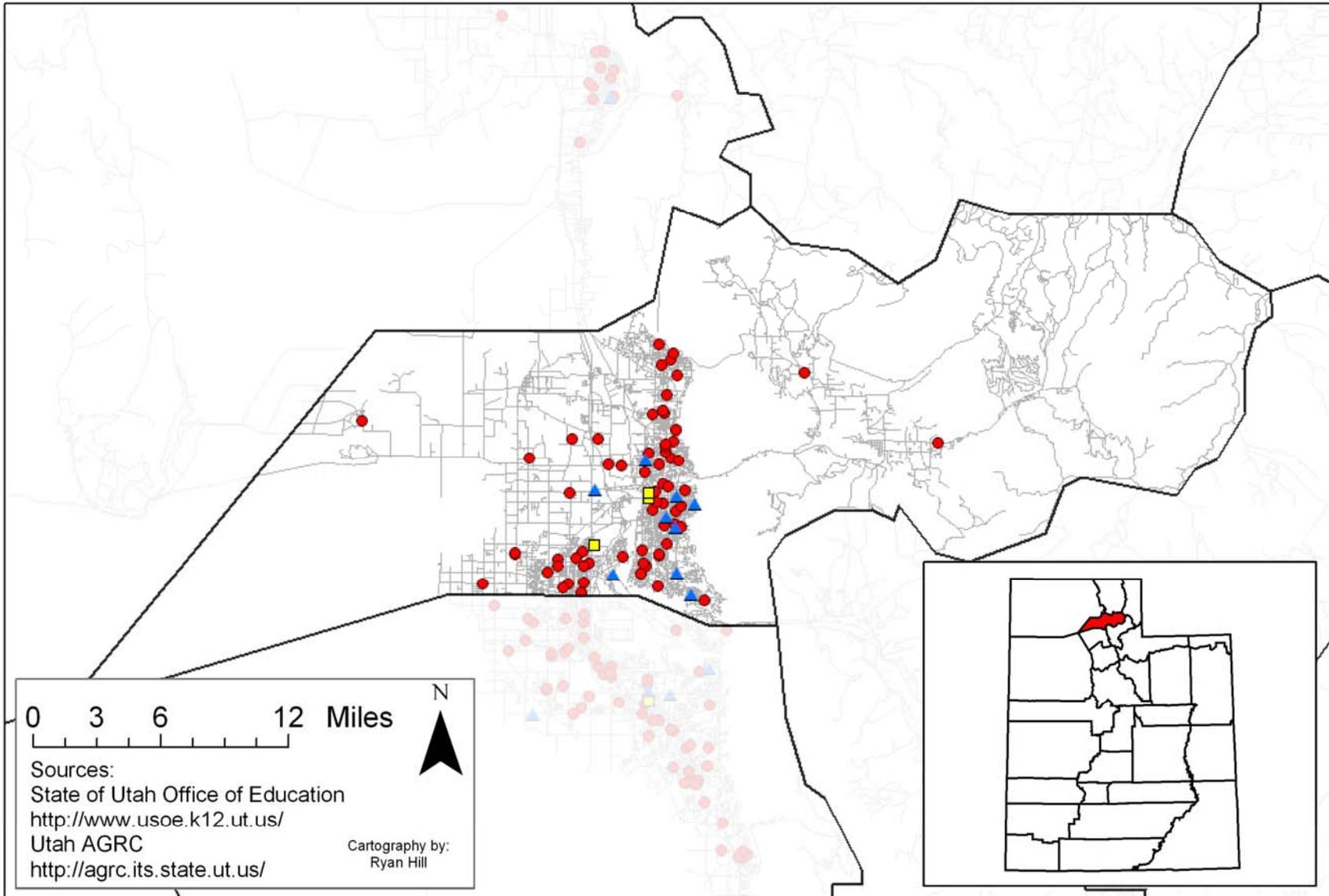


Public, Private and Charter Schools within Weber County

● Public Schools

▲ Private Schools

■ Charter Schools



APPENDIX FOUR

ANALYTICAL SIMULATION MODEL

Deriving a linear approximation to the relationship between tuition tax credits (Δp) and changes in the market equilibrium for private school enrollments (Δq)

At the initial equilibrium point (q_o, p_o) , the slope of the demand curve is

$$\eta\left(\frac{q}{p}\right)$$

where η = own price elasticity of demand and the slope of the supply curve is

$$\varepsilon\left(\frac{q}{p}\right)$$

where ε = price elasticity of supply. A triangle abc has a line segment bc that is defined by the tuition tax credit (Δp) and a line segment internal to the triangle ad that is defined as the equilibrium change in quantity (Δq). The line segment ad divides the original triangle into two right triangles from which two equations for Δq can be derived.

$$\Delta q = -(1 - \alpha)v\eta\left(\frac{q}{p}\right)$$

$$\Delta q = \alpha v\varepsilon\left(\frac{q}{p}\right)$$

where v = change in price (size of the UTTC voucher) and $\alpha \in [0,1]$. Since both equations are equal to Δq , we can solve for α by setting the right-hand sides equal to each other.

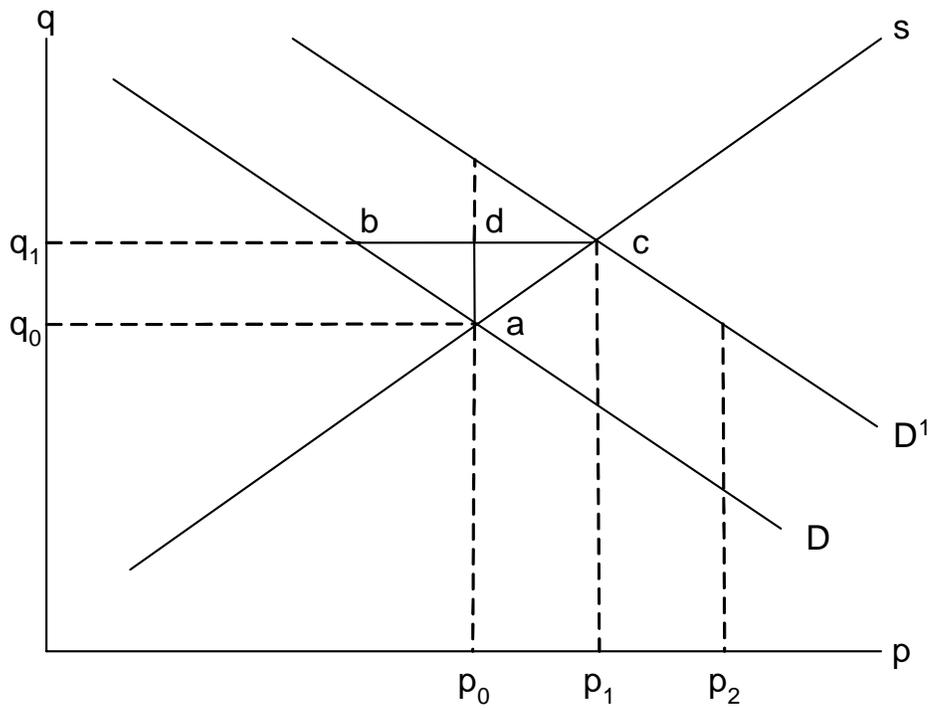
$$-(1 - \alpha)v\eta\left(\frac{q}{p}\right) = \alpha v\varepsilon\left(\frac{q}{p}\right)$$

$$(\alpha - 1)\eta = \alpha\varepsilon$$

$$\alpha = \frac{\eta}{\eta - \varepsilon}$$

Δq can now be expressed in terms of $v, \varepsilon, \eta, p_o, q_o$ and.

$$\Delta q = \frac{vq\varepsilon\eta}{p(\eta - \varepsilon)}$$



APPENDIX FIVE
PRIVATE SCHOOL
TELEPHONE
SURVEY
INSTRUMENT

Private School Telephone Survey Instrument

1. What grades are served at your school?
 - a. Numerical Response (low grade)
 - b. Numerical Response (high grade)
2. Since what year has the school been operating?
 - a. Year
3. What is your school's current enrollment?
 - a. Numerical Response
4. What was your school's enrollment for each of the four previous school years?
 - a. Numerical Response
 - b. Numerical Response
 - c. Numerical Response
 - d. Numerical Response
5. Is your school a commuter school, a residence school, or both?
 - a. Categorical Response (See above)
6. What is the full cost of tuition for one year?
 - a. Full High price without assistance – Numerical Response
 - b. Full Low price without assistance – Numerical Response
7. Are there other expenses beyond tuition that you bill to the family? How much is that expense typically for one year?
 - a. Dollar Response
8. How many more students could your school accommodate under its current configuration (i.e., facilities, technology resources, instructional materials, etc)?
 - a. Numerical Response
9. If enough additional students were available, would your school consider building and/or purchasing more resources to accommodate additional growth?
 - a. Yes/No
10. How many of your students receive tuition assistance?
 - a. Number of students (not percentage)
11. How many of your students have learning disabilities or other special health or learning needs?
 - a. Number of students (not percentage)
12. How many of your students come from ESL families?
 - a. Number of students (not percentage)
13. How many students have parents or guardians living outside the immediate area? Outside Utah?
 - a. Number of students (not percentage)
 - b. Number of students (not percentage)
14. How many students are on your waiting list?
 - a. Numerical Response
15. How are students chosen for admission or from the waiting list (e.g., all comers, by academic skills or other talents, lottery, first come-first served, other)?
 - a. Categorical Response (see above)
16. Is there an audience you target for recruitment (e.g., specific faith, talents, or needs)? What is it?
 - a. Yes/No – plus Qualitative Response
17. Do most of your families send all of their children to your school?
 - a. Yes/No

APPENDIX SIX
PRIVATE SCHOOL
TELEPHONE
SURVEY
SPREADSHEET

Utah's Private Schools

<i>School Name</i>	<i>Lowest Grade</i>	<i>Highest Grade</i>	<i>Low Tuition</i>	<i>High Tuition</i>	<i>Current Enrollment</i>	<i>Space Available</i>
1 Adventures in Learning -or- Educare	p	4	1230	4715	97	130
2 American Heritage	k	8	2900	3170	360	20
3 Anchor Christian Academy	k	12	1485	1665		
4 Aneth Community School	k	6				
5 Benchmark School	8	12			80	0
6 Berean Baptist Christian Academy	k	12	1800	2300	28	50
7 Blessed Sacrament	p	8	3500	3850	305	15
8 Cache Valley Learning Center	k	8	4200	4200	95	5
9 Carden Memorial School	p	8	3900	6100	400	0
10 Cedar Hills/Woodland Hills School	7	12	9100	9100	119	175
11 Challenger School (1260 E 8600 S, Sandy)	p	k	1360	3400	267	194
12 Challenger School (10685 S 1000 E, Sandy)	p	k	1360	5120	480	60
13 Children's Classic (5820 Wasatch Dr. South Ogden)	p	k	2160	5880	201	18
14 Children's Classic (160 9th St. Ogden)	k	k	1750	6125	210	19
15 Christ Lutheran	p	8	946	3888	171	250
16 Colby School	p	8	3500	11900	106	160
17 J.E Cosgriff Memorial	k	8	3850	3850	271	44

<i>School Name</i>	<i>Lowest Grade</i>	<i>Highest Grade</i>	<i>Low Tuition</i>	<i>High Tuition</i>	<i>Current Enrollment</i>	<i>Space Available</i>
18 Deamude Seventh Day Adventist	1	9	2300	3060	13	15
19 Deseret Academy	k	12	2000	5900	130	30
20 Ensign School (LDS)	k	8	2000	3800	140	15
21 Grace Baptist School	k	12	1470	2650	45	60
22 Grace Lutheran School & Preschool	p	8	900	3300	250	5
23 Hawthorne Academy	9	12	2700	2700	0	65
24 Horizon Educational System	p	6	720	2520	87	0
25 Intermountain Christian	1	12	1800	4700	320	60
26 Juan Diego Catholic High School	9	12	6000	7600	700	900
27 Judge Memorial High School	9	12	7650	7650	861	139
28 Kearns-St. Ann School	k	8	3500	3850	313	30
29 Layton Christian Academy	k	12	3200	3600	530	15
30 Learning Techniques	k	12	2500	2500	10	20
31 Madeleine Choir School	k	8	4000	4000	214	11
32 McGillis Jewish Community Center/Elementary School	1	7	6200	6700	180	0
33 Meridian School	p	12	3400	10000	212	75
34 Montessori Children's House	p	k	252	5040	28	16
35 Montessori School of Salt Lake	p	3	1890	3285	30	20
36 Monument Valley (SDA) Mission School	k	8	1300	1300	24	10
37 Mount Vernon Academy	k	12	3375	4725	150	50

<i>School Name</i>	<i>Lowest Grade</i>	<i>Highest Grade</i>	<i>Low Tuition</i>	<i>High Tuition</i>	<i>Current Enrollment</i>	<i>Space Available</i>
38 Newtyme School	k	12	2000	5040	12	22
39 Northridge Learning Center	k	12			100	
40 Our Lady of Lourdes	k	8	3150	3850	220	100
41 Park City Academy	k	8	3250	9350	129	50
42 Realms of Inquiry	p	12	4900	9200	90	30
43 Redeemer Lutheran	k	8	2650	3650	186	34
44 Reid School	p	9	7100	7595	200	800
45 Rowland Hall- St. Mark's elementary	1	5	10910	10910	318	5
46 Rowland Hall-St Mark's (Middle School)	6	8	12890	12890	195	5
47 Rowland Hall (high school)	9	12	12890	13180	294	30
48 Salt Lake Junior Academy	k	8	3750	4050	47	33
49 Salt Lake Lutheran High School	9	12	5195	6195	90	40
50 Soaring Wings Montessori School	p	4	3700	7990	120	0
51 St Francis Xavier Catholic School	p	8	3500	3925	315	
52 St John the Baptist Elementary School	p	5	2500	3860	620	0
53 St John the Baptist Middle School	6	8	2500	3860	355	10
54 St John the Baptist High School	9	12	6500	7500	705	200
55 St. Marguerite Preschool & Kindergarten	p	k	850	1700	125	20
56 St Olaf School	p	8	3500	3850	190	100
57 St Paul Lutheran School	p	8	1060	3380	257	35

<i>School Name</i>	<i>Lowest Grade</i>	<i>Highest Grade</i>	<i>Low Tuition</i>	<i>High Tuition</i>	<i>Current Enrollment</i>	<i>Space Available</i>
58 St Sophia Hellenic Orthodox School	p	5	857	4302	98	50
59 St Thomas Moore Preschool	p	k	990	1620	36	37
60 St. Vincent DePaul School	p	8	3500	3850	320	
61 StillWater Academy/turnabout	7	12	4500	31500	45	5
62 Valley Christian School	k	8	2500	2800	85	205
63 Waterford School	p	12	4050	14250	1100	150
64 Winter Sports School	9	12	13800	13800	46	14
65 Woodland Hills School	7	12	9100	10100	40	60
66 St. Joseph Catholic Elementary School	k	8	3515	4360	526	160
67 St. Joseph Catholic High School	9	12	5499	8000	162	60
68 Southeastern Christian Academy	k	12	600	720	12	5
69 Uintah Basin Christian Academy	p	8	650	2000	65	35
70 Rowland Hall Preschool	p	k	1375	10910	164	1

APPENDIX SEVEN
KEY INFORMANT
INTERVIEW TEMPLATE
FOR PUBLIC SCHOOL
ADMINISTRATORS

**KEY INFORMANT INTERVIEW TEMPLATE
PUBLIC SCHOOL ADMINISTRATORS**

Name of Person Interviewed _____

Position Title _____

District/School _____

Date and Time of Interview _____

I. CAPACITY QUESTIONS

1. a. Is your district facing problems with enrollment capacity?
Yes ____ No ____ Explain _____
 - b. What percentage of schools are currently at 90% capacity or greater?
Percentage _____%
 - c. Are any district schools experiencing declining enrollment?
Yes ____ No ____
Percentage _____%
 - d. How do you expect the current enrollment pattern to change over the next five years?
 - e. What is the district doing to address these changes in enrollment over the next five years?
Building _____ new schools
Remodeling _____ existing schools
Replacing _____ existing schools
Closing _____ schools
 2. As student populations shift within the district how do you accommodate the change in enrollments at the school level?
 3. What is your current teacher-pupil ratio? If enrollment increases or decreases less than that ratio, do you adjust resources other than a teacher to accommodate the change? (prompt – teacher’s aide, etc)
-

II. PLANNING QUESTIONS

1. How often are significant adjustments in staffing patterns made after the school year begins? (Are the adjustments due to higher or lower total district enrollment than expected or due to different distributions of enrollment across schools in the district?)
 2. How do you predict staffing needs for the next school year?
 3. What is the timing cycle for textbook adoption and instructional material (technology)?
-

III. REVENUE/COST MANAGEMENT

1.
 - a. What is considered a standard classroom unit for planning purposes?
 - b. How does the standard classroom unit definition change when special needs students are identified within a particular classroom?
 2. How much flexibility do local school administrators have in allocating resources within their schools?
 3. Does your school district allocate operating revenue to schools on the basis of enrollments or does it use other factors in the allocation method? Please explain.
 4. How has your district enrollments been impacted by the presence of charter schools, private schools, and home school enrollments in or near your district?
 5. What time frame is needed to adjust to changes in enrollment due to competing school alternatives?
-

IV. SCHOOL CHOICE OPTIONS

1. From a practical standpoint, are students free to select any school within the district? In other words, do space considerations allow students to transfer readily/
2. Does the district keep track of the number of intra-district requests each year?
 - a. How frequently are such requests made?
 - b. What goes into the decision to honor or reject such requests?
3. Are transfers between and within districts distributed proportionately across all types of students (special education, ESL, low income, ethnic/racial diversity, etc.)? Please explain.
 - a. How are costs impacted by the particular type of student that might exit the district schools for alternative school settings? In particular, how are your estimates impacted if the primary group to leave is special education students? If low-income?, if ESL?, etc.
ESL
Low Income
Special Education
ATE
Racially Diverse
Other
 - b. Do the costs differ based on the level of school?
High School
Middle School
Elementary School
Please explain.