



Conserved Land, Poverty Factors and General Purpose Aid to Maine School

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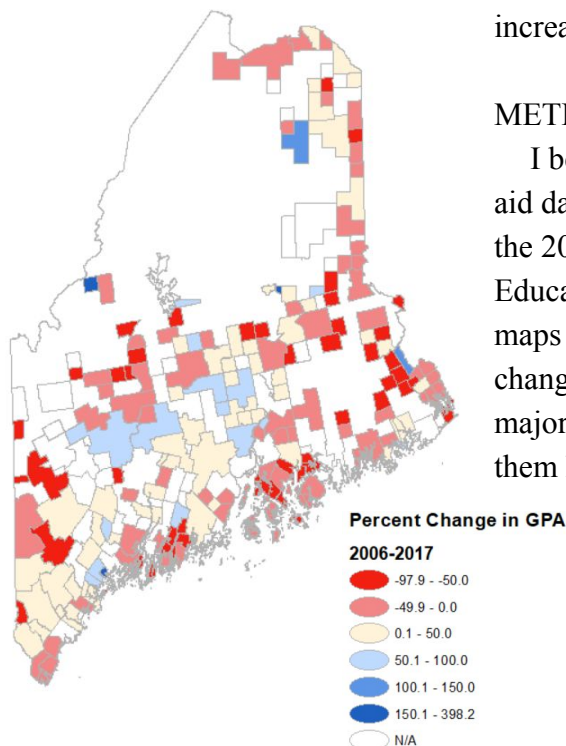
INTRODUCTION

The purpose of this analysis was to examine state funding (general purpose aid or GPA) to public schools in the State of Maine. To do this I've tested the correlation of aid per student and a number of factors, including property tax per person by town, poverty rates per town, and the percent of students that receive free or reduced lunch per school district. State funding to schools is based on a number of factors, including the number of students and the town's ability to fund the schools. The majority of school funding comes from the property taxes of towns that the school's students come from. In recent years many people, especially in rural communities, have complained of property taxes being too high, an issue that they blame on the schools. One theory as to the reason for this is a decrease in state funding to rural schools; the formula for determining general purpose aid changed around 2012, and people feel that it could be a cause. This would cause schools to need to make up for the funding which would lead towns to increase property taxes to help fund the schools. Another idea, which can also be seen in addition to the first theory is that more land in rural communities is being conserved, and since conserved land

can't be taxed or can only be taxed to a lesser extent, it increases the tax on other property to make up for it.

METHODS

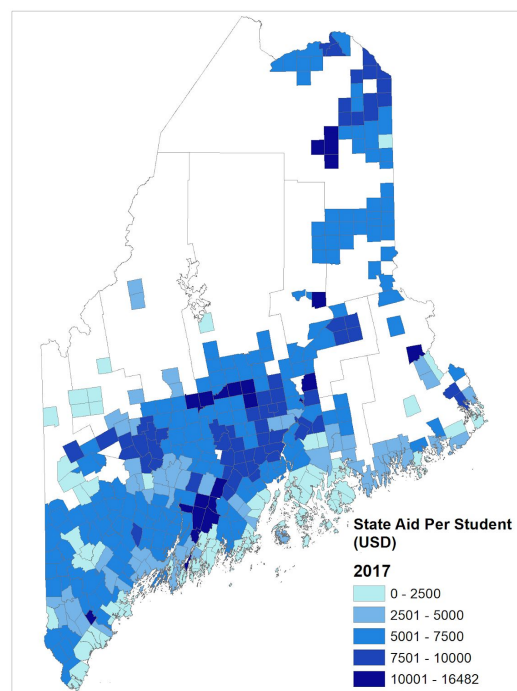
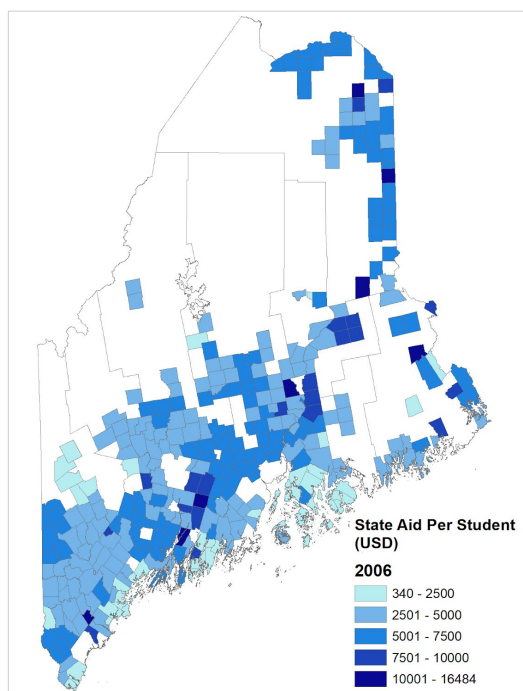
I began this project last semester, using the general purpose aid data for school districts from the 2005-2006 school year to the 2016-2017 school year from the Maine Department of Education (<https://www.maine.gov/doe/funding/gpa>), I made maps depicting the amount of funding to each district and the change in funding to school districts (left). I ran into some major issues with school districts, as the towns that are part of them have changed over the years, and some towns have left them or joined them. I was able to account for most of these in the current study to map each year's data. I also was provided with student counts per school district so that I was able to normalize the data for the Aid per Student maps presented below.

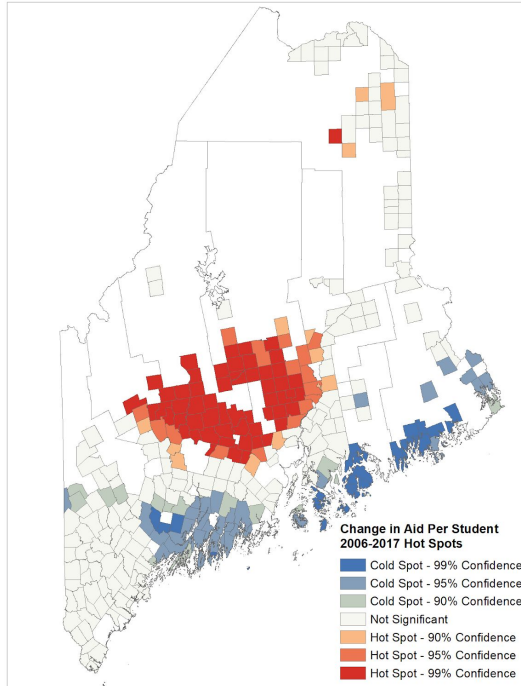
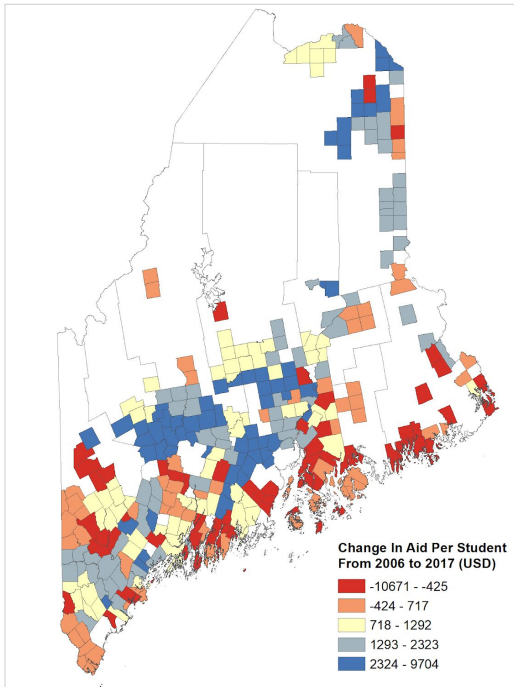


Property tax data were acquired from the Maine Municipal Association. Poverty came from the United States Census Bureau. Free and reduced lunch and student population data came from the Maine Department of Education. These were joined to the school district or township layers from the Maine GeoLibrary to create choropleth maps. Percent change values for aid per student were calculated by subtracting past from current values. I created choropleth maps for each data set using the Universal Transverse Mercator, Zone 19N projection.

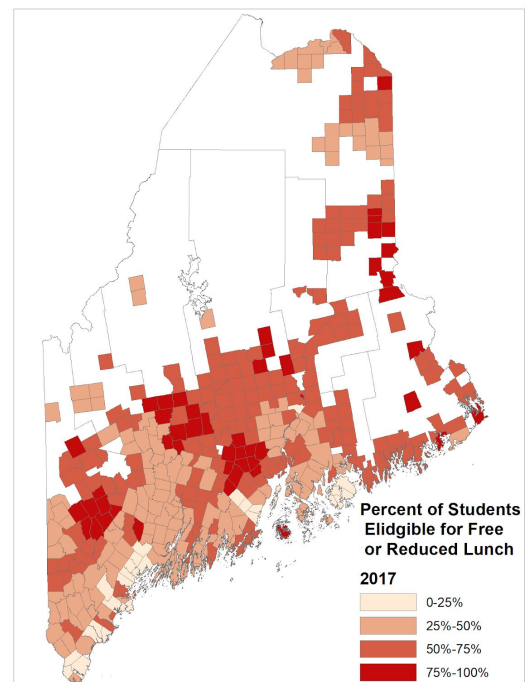
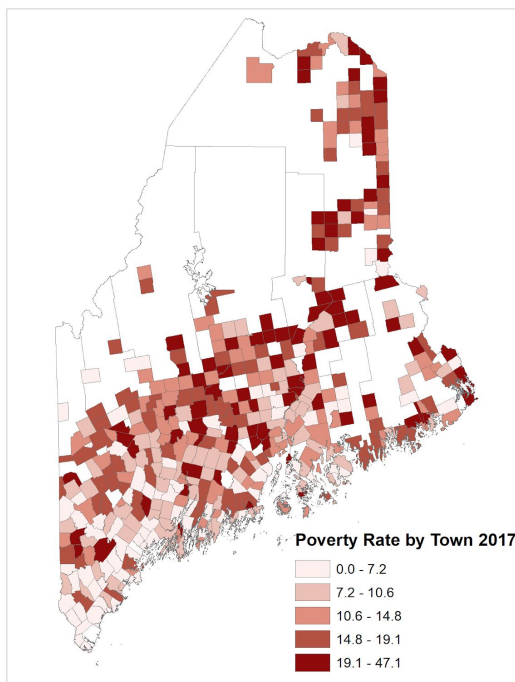
RESULTS

The maps below depict the amount of general purpose aid per student in 2006 and 2017; blank areas are where there was no data. The maps show that the state funding per student has actually increased in most places, but there are some rural, coastal areas where it hasn't changed or has decreased. An increase would make sense; many schools have been trying to incorporate more technology into their curriculums and to provide students with computers which would increase the overall amount that's needed for each student in the first place. The actual amount of funding to many schools, rural ones in particular, have decreased (as shown in the percent change map) which indicates that the number of students have decreased with it. This raises a question, though: how much funding is necessary for a school? Base funding is needed to ensure that the school is staffed and that all subjects have someone to teach them, because even if a school has increased funding per student if the funding has decreased they may not be able to meet the base need which would result in budget cuts that many rural schools are dealing with.





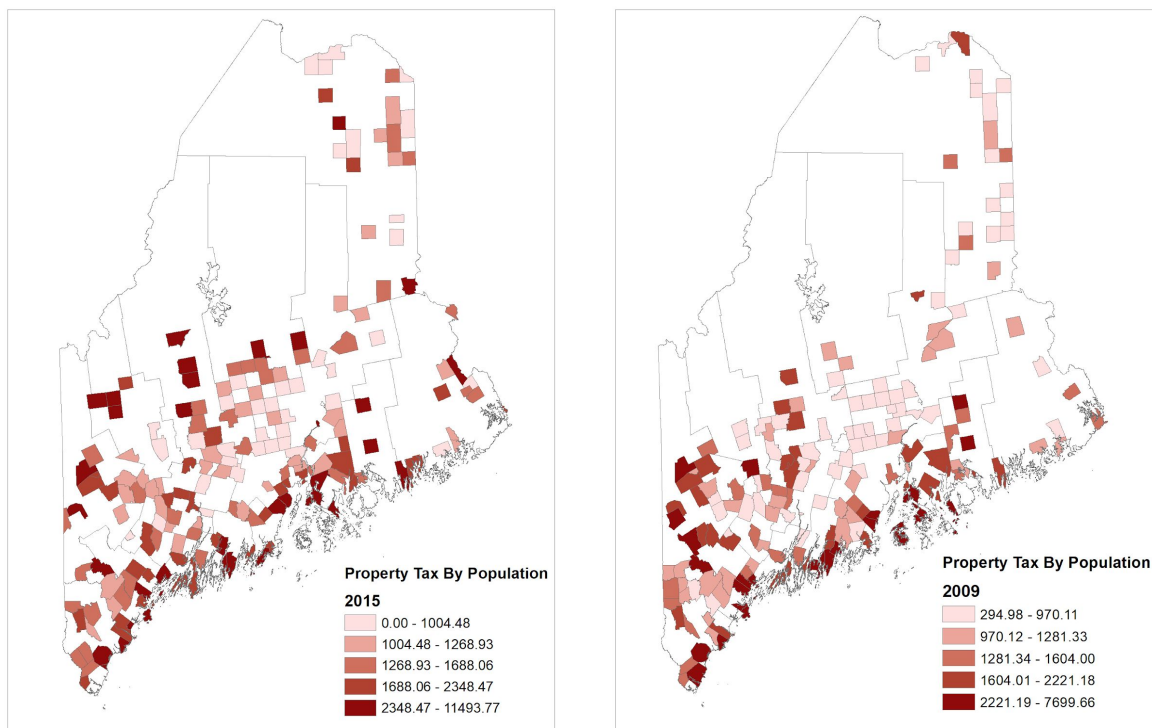
The change in aid per student looks as though it's increased through most of the state, but when looking at more rural areas, in particular the coast, aid per student has actually decreased or hardly changed at all. From looking at the change per student map we can see that it probably has hotspots, when running a hotspot analysis on the map we can see that there's a hot spot around the Bangor and Augusta area and cold spots around the coast further enforcing what we see in the original change map and change per student map. Specifically, it shows that the pattern that seems apparent in the change in GPA per student is statistically significant. This doesn't tell



us much in regards to the other variables involved, and why the changes may have occurred, but it does show that there's been a distinct pattern in the change.

Other factors that may be involved in the amount of aid per student is poverty rates, which I could only find for 2017 right now, and percent of students eligible for free or reduced lunch again which I could only find for 2017. The data appears to be all over the place in terms of poverty and shows no distinct pattern; it also has no correlation with change in aid per student, with the r-squared value being roughly 0.03. The same goes for free/reduced lunch eligibility, it's fairly high throughout most of the state and shows no correlation to change in aid per student.

Property taxes paid by each town is only available for roughly half the towns included in the aid per student maps leaving a good part of the picture blank. We also don't see much of a pattern to the data, other than property taxes seem to be higher in rural and coastal areas. Comparing this to the amount of conserved land by town would be the next step in this process, then calculating changes in property tax and comparing it to changes in amount of conserved land as well as changes in state aid per student to see if there's any correlation. If what is assumed about property taxes increasing to make up for state aid is true, then we should be seeing a correlation between the two variables. For now this analysis gives us a rough idea of appropriations of state aid, but will need to be continued and expanded upon in the future.



Projection Used: NAD 1983 UTM Zone 13N

Property Tax Data: Maine Municipal Association

Poverty Data: United States Census Bureau

Aid Per Student: Maine Department of Education

Free and Reduced Lunch Data: Maine Department of Education