# Adequacy-Based Funding for Small, Isolated Schools: An Approach for Maine

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How to adequately fund small schools is becoming a pressing issue in Maine due to numerous factors, including state and federal accountability laws and declining enrollments. The Maine Planning office projects a decrease of 12.5% in school-age enrollment throughout the state between October 1, 2004 and October 1, 2013. Four Maine counties are predicted to experience declines in resident enrollment of over 20%. (Maine Department of Education, 2004). Moreover, small schools are expected to be among the hardest hit by enrollment losses. Schools with fewer than 300 students are expected to average approximately a 20% drop in enrollment.

Among the changes on the horizon in Maine in addition to declining enrollments are additional state requirements pertaining to Maine's *Learning Results*, and new Federal accountability requirements due the *No Child Left Behind* law. Along with high per-pupil costs, small schools in rural areas are often challenged in ways that may impact their ability to operate efficiently while meeting the state and federal accountability requirements. Mathis (2003) summarized the discussions of a meeting of both education finance scholars and personnel of the *Rural and School and Community Trust*. The following were among the challenges facing small rural schools cited at the meeting: a) attracting and retaining qualified teachers, b) attracting and retaining qualified specialty teachers such as music teachers, nurses, science teachers, special education personnel, c) less visible but increased proportions of students living in poverty, d) availability of trained special education staff for severe, low-incidence disabilities, and e) cost of living adjustments that further exacerbate the problem of attracting and retaining high quality teachers.

Determining the extent to which these and other potential issues exist in Maine and identifying potential solutions are crucial. Among potential solutions that have been major topics of discussion in Maine are the use of technology and distance education opportunities, participation in regional efforts, and

additional funding changes. This paper describes one piece of this complex equation: a funding adjustment for small, geographically isolated schools.

A new, adequacy-based model for school funding in Maine was written into law in 2003. The goal of this model is to provide districts with the financial means to insure all students achieve the educational standards set forth for graduates of Maine schools, regardless of where they live. The model, called Essential Programs and Services (EPS), is to be used to fund public education in Maine for the 2005 – 2006 school year.

The EPS funding model is based on district enrollment and includes recommended staff-student ratios, per pupil amounts for supplies and equipment, specialized services, (professional development, student assessment, technology, instructional leadership support, co-curricular and extra-curricular student learning), and district services. Additional dollars are also provided for specialized populations that have been determined to increase costs, such as students in early grades, students with limited English proficiency, disadvantaged students (defined as students eligible for free or reduced lunch), and students with disabilities (Maine State Board of Education, 1999).

Economic theory suggests that larger schools benefit from economies of scale while small schools will operate at a higher cost per pupil due to necessary fixed expenditures and a small number of students. According to the National Center for Education Statistics, Maine was the seventh lowest among the states in average grade school and middle school sizes and fifteenth lowest in average high school size. (National Center for Education Statistics, 2003, pp. 15-16)In many cases small schools are necessary in Maine to provide all students, regardless of location, access to educational resources. However, the core of the EPS funding model does not take into account additional costs that may be required to operate small schools. An adjustment is necessary to accommodate the fact that many districts must operate schools with low enrollments due to their rural nature. If higher per-pupil costs exist in small, rural districts, such districts either need to spend the resources necessary to continue to provide their students with a quality education, or be content with

curriculum limitations (Monk as cited in Verstegen, 1991). If schools do not have adequate financial means, the quality of a student's education may be related to their residential circumstances, and this contradicts the goals of EPS.

In some states, supplemental funds to offset higher per-pupil costs are provided to small schools that qualify based on low enrollment or a combination of low enrollment and geographic isolation. States that use strictly enrollment criteria maintain a policy to provide additional support to all small schools, while states who use both enrollment and geographic isolation criteria maintain a policy to offset only the higher per-pupil costs of small schools when there are no feasible alternatives to operating a small school (Bass & Verstegen, 1992).

Adjustments in other states have been examined for enrollment thresholds and geographic isolation definitions. As of the 1998-99 school year, fourteen states included an adjustment in their school finance formulas that provide additional funds to districts based on small school size (National Center for Education Statistics, 2001). Eleven included separate elementary and secondary enrollment thresholds; three had one threshold that applies to all schools. There was considerable variation in the enrollment thresholds used for the adjustments. The secondary enrollment thresholds ranged from 35 to 970. Six of the ten, however, were between 300 and 599. Seven of the 14 states with small school adjustments also included "necessary" or "geographically isolated" criteria that a school must meet to receive an adjustment. Three states used the criteria to determine the level of adjustment schools would receive. Table 1 displays the number of states with small school adjustments by type. In addition, 15 states provide additional funding to small districts. Four of these adjustments require geographic isolation criteria to be met, on the basis of pupil sparsity. Tables A-1 and A-2 in the appendix include more detail about each state's method of adjustment.

**Table 1. Summary of Small School Funding Adjustments in Other States**

| State Small School Adjustments | Number of States |
|---|---|
| **States with small school adjustment** | 14 |
| **Uses of Isolation Criteria:** | |
| Isolation criteria for qualification | 7 |
| Isolation criteria for level of funding | 3 |
| **Types of isolation criteria:** | |
| Distance to nearest school | 6 |
| Sparsity | 2 |
| Other | 2 |

## I. Small Size Threshold and Adjustment Amount

METHODOLOGY

*Secondary schools.* To determine what apparent enrollment thresholds exist where per-pupil costs rise as a result of low enrollment, two analyses were conducted. First, a comparison was made between actual operating expenditures and expected operating costs under the EPS model. Special education, vocational education, and transportation costs were excluded from this analysis. Second, teacher-student ratios were examined to determine the size at which schools are operating with lower ratios under current practice.

*Elementary schools.* Due to a lack of school-level expenditure data, the same methodology used for developing the size criteria for secondary schools could not be used for elementary schools. Teacher-student ratios, which are available at the school level, were examined to determine the size at which elementary schools operate with lower ratios. Due to varying grade configurations in elementary schools throughout Maine, the average number of students per grade was used as the enrollment measure.

RESULTS

*Secondary schools.* Table 2 displays the mean per-pupil expenditures, EPS per-pupil estimates and teacher-student ratios by enrollment groupings of 100 students, and Figure 1 portrays the teacher-student ratios by these enrollment groupings. These results suggest that secondary schools with fewer

than 200 students spend more to educate their students and operate with lower teacher ratios than schools with 200 or more students. It was therefore recommended that secondary schools enrolling fewer than 200 students be considered small and thus meet the size criterion for a funding adjustment.

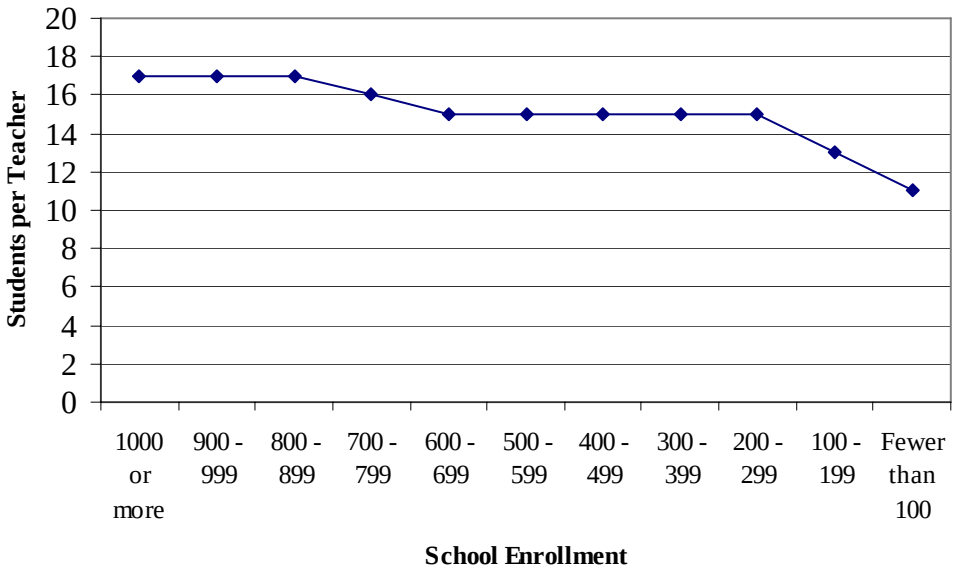
The recommended method of adjustment for secondary schools was to adjust the teacher portion of the EPS allocation to account for the lower ratios seen in the smaller schools. The model student-teacher ratio for secondary schools in EPS is 1 : 15. With the recommended small school adjustment, eligible schools with 100 – 199 students will receive a cost allocation assuming a 1 : 13 teacher-student ratio, and those with fewer than 100 students will receive a cost allocation assuming an 1 : 11 ratio.

**Table 2. Secondary Schools: Difference Between EPS Estimates and Expenditures by Enrollment Groupings**

| Enrollment Group | Number of Schools | Mean Per-Pupil Expenditures* | Mean Per-Pupil EPS Estimate** | Mean % Difference | Mean Students per Teacher*** |
|---|---|---|---|---|---|
| 1000 or more | 13 | $5,798 | $6,413 | -9.65% | 17 |
| 900 – 999 | 5 | $5,867 | $6,245 | -6.03% | 17 |
| 800 – 899 | 7 | $6,151 | $6,282 | -2.09% | 17 |
| 700 – 799 | 9 | $5,871 | $6,127 | -4.09% | 16 |
| 600 – 699 | 9 | $6,193 | $6,096 | 1.72% | 15 |
| 500 – 599 | 10 | $6,659 | $6,071 | 9.60% | 15 |
| 400 – 499 | 8 | $7,060 | $6,311 | 11.93% | 15 |
| 300 – 399 | 19 | $6,713 | $6,035 | 11.29% | 15 |
| 200 – 299 | 15 | $7,032 | $6,110 | 15.09% | 15 |
| 100 – 199 | 15 | $7,085 | $6,097 | 17.28% | 13 |
| Fewer than 100 | 8 | $10,486 | $5,952 | 78.05% | 11 |

* 2001 – 2002 inflated to 2003 - 2004
** 2003 – 2004 estimates
*** 2001 – 2002 staffing data used

**Figure 1. Secondary Teacher Ratios by Enrollment Grouping**



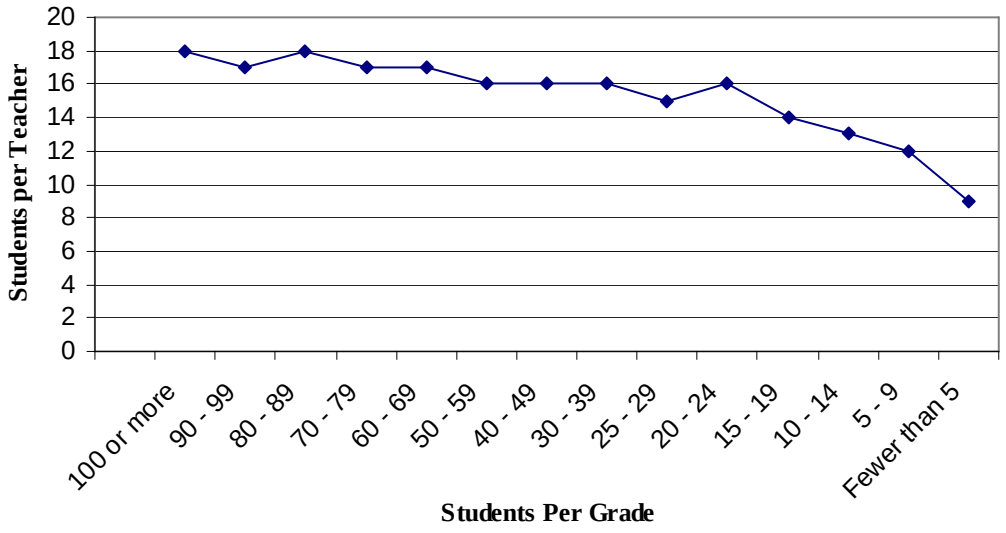

*Elementary schools.* Table 3 and Figure 2 display the teacher ratios for elementary schools. The results suggest that schools with fewer than 15 students per grade operate with lower teacher ratios than those in larger schools. It was therefore recommended that elementary schools with fewer than 15 students per grade be considered small and thus meet the size criterion for a funding adjustment. The results also may suggest a funding adjustment based on reducing the EPS recommended teacher-student ratios from small schools. However, due to the lack of school level expenditure data and challenges in determining the geographic isolation criteria for elementary schools (discussed in the next section of this paper) a temporary funding adjustment was place in the EPS model pending further research. The estimated financial impact of the secondary adjustment on the secondary EPS rates was an increase of approximately 10%. Therefore, as a temporary measure, elementary schools that qualify as small, isolated schools will be allocated an additional 10% times the EPS rate for each student in the school.

**Table 3. Elementary Schools: Teacher Ratios by Enrollment Groupings**

| Students per Grade | Number of Schools | Students per Teacher | Number of Schools Excluding Middle Schools | Students per Teacher* |
|---|---|---|---|---|
| 100 or more | 101 | 17 | 45 | 18 |
| 90 – 99 | 17 | 17 | 15 | 17 |
| 80 – 89 | 31 | 17 | 20 | 18 |
| 70 – 79 | 18 | 17 | 13 | 17 |
| 60 – 69 | 34 | 18 | 25 | 17 |
| 50 – 59 | 47 | 16 | 37 | 16 |
| 40 – 49 | 44 | 16 | 42 | 16 |
| 30 – 39 | 54 | 16 | 52 | 16 |
| 25 – 29 | 32 | 16 | 29 | 15 |
| 20 – 24 | 27 | 16 | 25 | 16 |
| 15 – 19 | 38 | 15 | 38 | 15 |
| 10 – 14 | 46 | 13 | 45 | 13 |
| 5 – 9 | 30 | 12 | 30 | 12 |
| Fewer than 5 | 19 | 9 | 19 | 9 |

* Based on 2003 – 2004 staffing data.

**Figure 2. Elementary Students per Teacher by Enrollment Grouping**



## II. Geographic Isolation Criteria

METHODOLOGY

Once the criteria for determining which schools are small were in place, the next step was to develop criteria for determining which small schools are geographically isolated. Criteria for secondary and elementary schools are again developed separately. Elementary schools are more plentiful and therefore tend to be closer to one another than high schools.

*Secondary schools.* Identifying how far students *actually* travel to attend school is a challenge. In Maine the state does not collect data providing the location of each student relative to their school. However, the longest distance a pupil might *potentially* have to travel to attend the high school may be estimated. With one exception, each of Maine's school districts has at most one regular high school. For the purpose of this study, the furthest distance students are potentially traveling was determined using the approximate travel distances both (a) between the high school and the furthest point in its district and (b) between the high school and the nearest other high school. These average distances for schools with 200 or greater students were then used as comparison points to determine how far high school students should be expected to travel if their high school were not in operation. Distance data was unavailable for eight of the 118 public secondary schools.

*Elementary schools.* Due to the fact that many districts in Maine operate more than one elementary school, the distance between the furthest point in the district and the nearest school is not the maximum potential travel distance. Other district schools may be closer. Therefore the methodology that was used for identifying secondary isolated schools could not be used for elementary schools. Rather, the average distance between the school and the nearest school with a comparable grade configuration for schools with 15 or more students per grade was used to define isolated elementary schools. A comparable grade configuration is one that could accommodate the students from the sending school. For example, a school with a K – 6 grade configuration would be able to accommodate students from a K – 4 school. Middle schools

were excluded from the analysis, due to a lack of representation of middle schools in the group of small schools (with fewer than 15 students per grade) and the fact that middle schools in Maine—for historical reasons—are not located near schools with comparable grade configurations in areas where geographic isolation might be a concern. Of the 424 elementary schools in Maine, distance data was not available for 46 schools.

## RESULTS

*Secondary schools.* An analysis of the mileage data for secondary schools suggests that the distance a student may have to travel is related to the organizational structure of the school administrative unit where they reside. Four major organizational structures exist in Maine. School Administrative Districts (SADs), Community School Districts (CSDs), and Unions of Towns all are combinations of two or more municipalities that pool their educational resources in varying ways. Cities or Towns with Individual Supervision are single municipalities that educate all grades in that city or town. An analysis of variance revealed that the maximum distance students are potentially traveling to attend a high school in a City or Town with Individual Supervision is significantly different than that of a high school that is part of an SAD or Union ($p < .01$). Table 4 displays the average distance between the furthest point in a district and the high school and between the high school and the nearest high school for schools with 200 or more students by district type.

**Table 4. Average Distance Between Secondary Schools* by District Type**

| District Type | Number of Schools | Miles From Furthest Point to School | Miles to Nearest School |
|---|---|---|---|
| SAD | 46 | 19 | 9 |
| City or Town Under Individual Supervision | 35 | 11 | 6 |
| Union | 7 | 21 | 7 |
| CSD | 7 | 13 | 12 |

* Only schools with 200 or more students were included.

The average distance between the high school and the furthest point in the district for multiple-town districts with schools enrolling at least 200 students is 18.5 miles, and the average distance between schools is 9.3 miles. The criteria to be used to identify a high school as isolated is the following: a) the distance between the furthest point in the district and the nearest high school must be at least 18.5 miles and the distance between the school and the nearest high school must be at least 9.3 miles. High schools located on islands without brigdes or causeways to the mainland are also considered geographically isolated, and are discussed in the following section of this paper. Table 5 displays the number of high schools that meet the geographic isolation criteria. Of these schools, those with fewer than 200 pupils qualify for the geographic isolation adjustment.

**Table 5. Geographically Isolated Secondary Schools by Enrollment Group**

| Enrollment Group | Number of Schools | Number of Isolated Schools | Isolated as % of Schools |
|---|---|---|---|
| 1000 or more | 13 | 4 | 31% |
| 900 – 999 | 5 | 1 | 20% |
| 800 – 899 | 7 | 0 | 0% |
| 700 – 799 | 9 | 4 | 44% |
| 600 – 699 | 9 | 1 | 11% |
| 500 – 599 | 10 | 3 | 30% |
| 400 – 499 | 8 | 2 | 25% |
| 300 – 399 | 19 | 8 | 42% |
| 200 – 299 | 15 | 6 | 40% |
| 100 – 199 | 15 | 10 | 67% |
| Fewer than 100 | 8 | 7 | 88% |

*Elementary schools*. The analysis of the mileage data for elementary schools showed that the distance between elementary schools is also partly dependent on the organizational structure of the school administrative unit. This is consistent with the findings from the secondary analysis. An analysis of variance revealed that the distance to the nearest elementary school for schools in a City or Town with Individual Supervision is significantly different than that of school that is

part of a School Administrative District or Union ($p < .01$). Table 6 displays the average distance between elementary schools for schools with at least 15 students per grade.

**Table 6. Average Distance Between Elementary Schools by District Type**

| District Type | Number of Schools | Miles to Nearest School |
|---|---|---|
| SAD | 177 | 8 |
| City or Town Under Individual Supervision | 106 | 4 |
| Union | 59 | 9 |
| CSD | 6 | 12 |

The average distance between elementary schools for schools with at least 15 students per grade in districts that are not operated under individual supervision is approximately eight miles. The criteria to be used to identify an elementary school as isolated are: a) the school must be at least eight miles from the nearest elementary school of a comparable grade configuration or b) the school is located on an island. Table 7 displays the number of elementary schools that qualify as isolated under this definition.

**Table 7. Isolated Elementary Schools by Enrollment Grouping**

| Average Number of Students per Grade | Number of Schools | Number of Isolated Schools | Isolated as % of Schools |
|---|---|---|---|
| 100 or more | 45 | 9 | 20% |
| 90 – 99 | 15 | 1 | 7% |
| 80 – 89 | 20 | 5 | 25% |
| 70 – 79 | 13 | 3 | 23% |
| 60 – 69 | 25 | 4 | 16% |
| 50 – 59 | 37 | 14 | 38% |
| 40 – 49 | 42 | 12 | 29% |
| 30 – 39 | 52 | 10 | 19% |
| 25 – 29 | 29 | 11 | 38% |
| 20 – 24 | 25 | 11 | 44% |
| 15 – 19 | 38 | 15 | 39% |
| 10 – 14 | 45 | 19 | 42% |
| 5 – 9 | 30 | 19 | 63% |
| Fewer than 5 | 19 | 17 | 89% |

## III. A Funding Adjustment for Island Schools

### METHODOLOGY

The cost of operating a school on an island is generally higher than the cost of operating other schools. The following methods were used to identify additional costs associated with island schools: a) the operation and maintenance costs for island districts were compared to non-island districts of comparable sizes to identify the additional operation and maintenance costs of operating a school on an island and b) the staffing within island schools were compared to non-island schools of similar sizes to identify whether any additional staffing categories were driving up personnel costs of the island schools.

### RESULTS

Table 8 displays the results of this comparison between island and mainland districts of comparable sizes. The results suggest that elementary island schools with 1 – 20 students operate with per-pupil operation and

maintenances expenses 13% higher than non-island schools, and elementary island schools with 21 – 75 students cost 26% more on a per-student basis. Secondary island schools with fewer than 100 students appear to cost 25% more on a per-student basis than non-island schools.

**Table 8. Comparison of Operation and Maintenance Expenditures**

| | Elementary | | | | Secondary | |
|---|---|---|---|---|---|---|
| | 1 – 20 Students | | 21 – 75 Students | | Fewer than 100 Students | |
| | Non-Islands | Islands | Non-Islands | Islands | Non-Islands | Islands |
| Average Number of Students | 14 | 9 | 54 | 49 | 71 | 37 |
| Number of Districts | 3 | 5 | 18 | 3 | 5 | 3 |
| Oper and Maint Exp Per Student | $1,575 | $1,780 | $1,179 | $1,488 | $1,192 | $1,490 |
| % Difference Oper and Maint | | 13% | | 26% | | 25% |

* Expenditures are from the 2001 – 2002 school year.

The examination of staffing categories and average salaries in island and non-island schools displayed that the higher personnel costs in island schools are predominantly a function of lower student-teacher ratios and higher average salaries rather than a particular category of staff. Tables A-3 and A-4 in the appendix display the comparisons of the island and non-island staffing patterns. The adjustment for island schools is: a) the same staffing or percentage adjustments as the non-island schools in the same size category and b) a percentage increase in the operation and maintenance allocations.

## Discussion

The methodologies outlined in this paper provide a reasoned approach to recognizing the additional cost of operating small schools within an adequacy-based funding model. Current practice is used as a guideline in establishing the adjustment, both in terms of travel distances and teacher-student ratios, a feature that may make this type of small school adjustment attractive to other

rural states. Small schools do not need to be extraordinarily far apart to qualify for the adjustment or be extraordinarily thrifty to operate at the expenditure levels described by the cost model. To receive the adjustment, small schools need only be at least as far apart from each other and, in the case of high schools, at least as far from the furthest point in the district as typical moderately-sized schools in multiple-town districts. To operate at the expenditure levels described by the model, schools need only operate like other similarly sized schools.

The increased sophistication of the geographical isolation criteria for high schools may also make the adjustment attractive to other states. Including a criterion involving distance to the furthest point in the district may be preferable to having distance between schools as the sole criterion for geographic isolation. Unfortunately, estimating the maximum potential travel distances for elementary school students was not feasible.

For this reason, and due to the varying grade configurations and lack of school-level expenditure data in elementary schools, the adjustment for elementary schools explained in this paper was put into place only as a temporary adjustment for the first year of EPS implementation. It was determined that the complications in examining elementary schools in Maine called for additional analysis prior to developing a permanent adjustment. Research plans include an analysis to identify the characteristics of high-performing, cost-effective small schools to guide the development of the permanent adjustment. An additional examination of the geographic isolation data is also planned and is expected to include such considerations as building capacity and the condition of the nearest school. As the educational environment continues to change in rural areas, additional analysis and policy changes will certainly be necessary to ensure that students in small schools continue to have access to adequately funded, high quality education.

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# Appendix