These notes are in reference to a graphic dated 20070422 entitled Effect of EPS funding 2004-05 to 2007-08 prepared by R. Chapman (rchapman.utc@gmail.com).

1. **Sources of Data** are accessible through the Maine Department of Education at the listed web sites.

2. **Data Eliminated** are those school administrative units that showed zero funding for at least one of the years analyzed. As a consequence of the formation of new school administrative units (from towns that separated from an existing school administrative unit) or from those that became a part of an existing unit, not all students in the state are included by data points on the graphic.

3. **Data Available** - all original data, including a listing of eliminated data, and all intermediary calculations are available from the preparer in the form of a spreadsheet and in the form of a graphics program file that can be viewed and manipulated by its associated (free) program.

4. **Calculations** for the purposes of this graphic are ratios calculated from the source-tabulated adjusted state allocation for each school administrative unit for each of three years (2004-05, 2005-06, and 2006-07) and the number of resident students from October 1, 2005 to arrive at an adjusted state allocation per student for each school administrative unit. Preliminary data for the school year 2007-08 is similarly used to calculate an adjusted state share including all adjustments per student by using values of 2006 average student counts. All data points are plotted on the same coordinates as adjusted state allocation dollars versus resident student number. A linear regression is shown for each year with its corresponding slope.

5. **Rationale for the Calculations** - to gain an understanding of the effect of the Essential Programs and Services (EPS) funding formula with respect to the size of the school administrative units. In particular, the question that drives this presentation is, "Has EPS preferentially funded larger schools at the expense of smaller schools?" EPS funding went into effect for the first time in 2005-06.

6. **Data Sets Quality** becomes an issue in making any comparison: to assure (rhetorically) that "apples are compared with apples rather than with oranges". Which elements of educational costs are included in each data set seem to vary with time as legislative or departmental rule changes are made. It is not possible in this presentation to assure the necessary correspondence, year-to-year, of the data sets tabulated by the Maine Department of Education.

7. **Multi-Variate Analysis** of properly assembled data sets would allow a better understanding of the variances in the data; that is, it would show the comparative effect of correlations to various measures of circumstance. For instance, it is expected that data would show a correlation between school size and density of population (rural versus urban) and between wealth (poor versus rich). Even wealth can be measured in different ways (income, property value, degree of industrialization, etc) each of which may lead to a different level of correlation. If it can be shown that school funding is correlated with school size, that fact alone does not illuminate which of the other features (population density, wealth, etc) are primarily responsible. This presentation does not communicate the results of a multi-variate analysis. At best, it provides additional motivation for such an analysis to be done.

8. **Alternative Data Display Methods** could be used to gain understanding of the relationship under investigation. In particular, the data clumping shown on a linear plot appears more uniform on a

logarithmic plot. Necessarily, linear regression lines appear curved on logarithmic plots, however. Most significantly, a previous graphic showing much of this information was prepared showing the differences (changes) in the adjusted state allocation for each school administrative unit; such a display was intended to reduce the level of variance shown in the data sets. Unfortunately, the rationale for such a display is one step further removed from the original data: why not use a percentage change (ratio) rather than a difference? Applying a linear regression to the original data set with large variance is itself problematic; the interpretation becomes further muddled by applying a linear regression to difference data or ratio data.

9. **Linear Regression** - simply puts a straight line (on Cartesian coordinates) through the data points so as to minimize the distances of the data to the line. Its use often implies that the data are linearly related, which in this case is a vast oversimplification of what a more detailed analysis could show. However, as a simplifying construct, it does provide evidence to answer the question posed in number 5.

10. **Commentary** - The increasing slopes of the linear regressions for each year demonstrate the successive degree to which EPS results in more state funding directed to large schools than small schools on a per-pupil basis. Importantly, these results could easily have been predicted by analyzing the effect of a proposed formula on historic data prior to the implementation of the formula. Presumably such analyses were done (they surely should have been done) which leads to a contradiction in policy aim and policy effect: it has been an often-stated goal that the funding formula should be equitable. I believe that the burden of proof now rests with the Department of Education to show how the EPS formula implementation satisfies the goal of equitability in the face of their data presented here.