for a relationship between a dichotomous variable (i.e. compliance or no compliance) and a continuous variable." A logistic model cannot require fewer than 0 or more than the number of days available in the month, whereas linear equations (such as one included in written comments of CCWD (CCWD 1994) or quadratic equations (such as the one EPA suggested in the Proposed Rule) can result in unrealistic extrapolations (e.g., resulting in the criteria having to be met less than zero days or more than the number of possible days each month).¹⁹ Kimmerer suggested a sliding scale based on logistic equations that stated

the percentage number of days of compliance during the February to June period as a function of the unimpaired flow for those five months. An example of graphic representations of these equations for Roe Island is shown in Figure 1. EPA has adopted this basic approach; however, as discussed below, EPA has revised the logistic equations to reflect monthly computations of compliance.

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¹⁹While uncommon in some fields, the logistic equation is the basis of many ecological models,

especially for population dynamics and epidemiology. In these ecological applications, the logistic model is useful because of the nature of the dichotomous variables (such as how many individuals are alive or dead in population dynamics, or how many individuals are infected or healthy in epidemiological studies). In each case, the dichotomous variables are arrayed along time as the continuous variable. In both cases, also, the function is constrained between 0 and the total population size, which is biologically realistic. EPA is using the logistic equation to model the number of days of attainment of the 2 ppt value (the dichotomous variable) against unimpaired flow (as the continuous variable). The logistic model also provides that no less than 0 and no more than the total number of days in the month can be required for attainment.