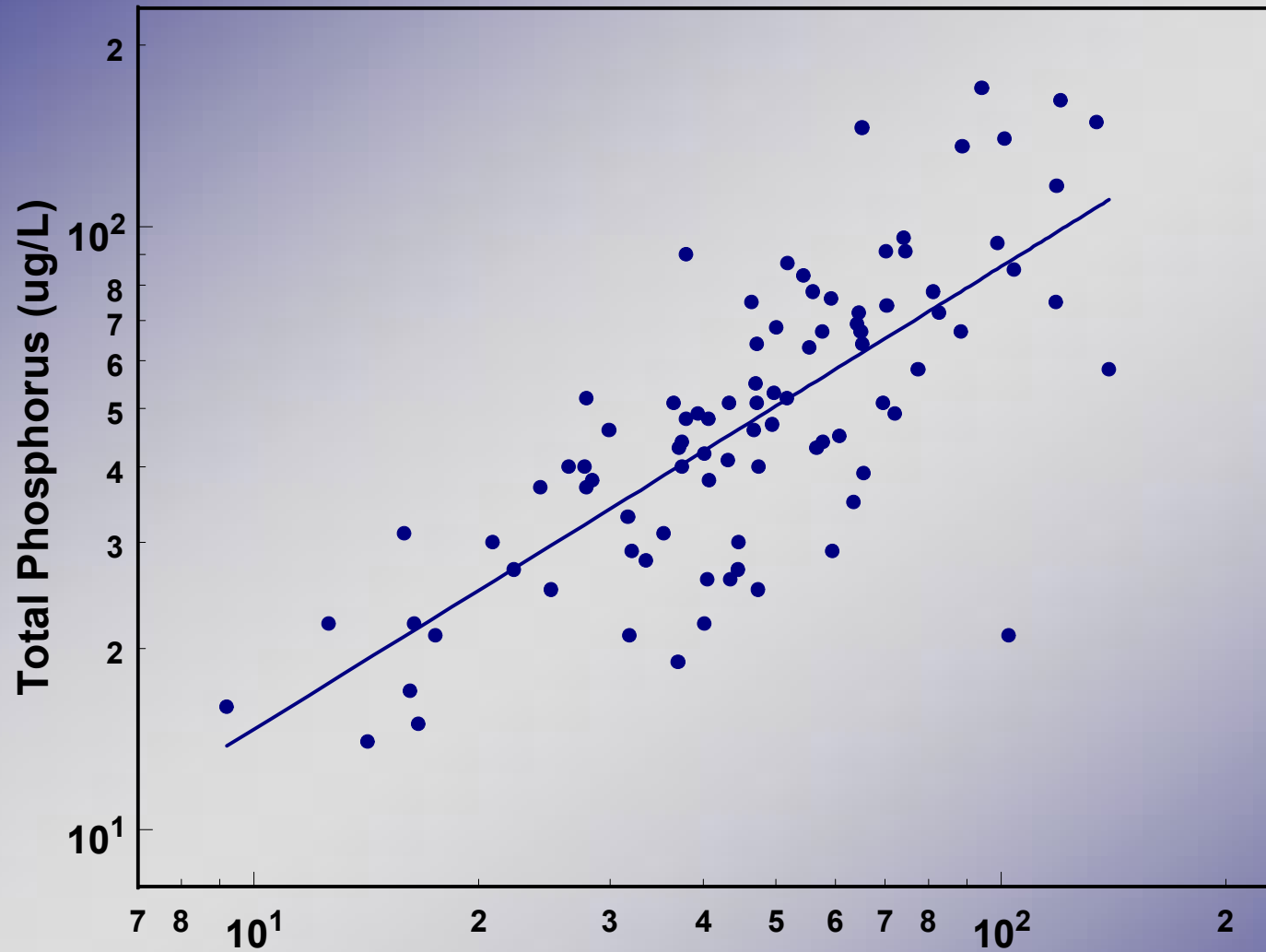


Nutrient Criteria for the plains regions of Missouri

Using the proportion of the watershed that was historically prairie (measure of natural soil fertility), flushing rate (inflow volume relative to reservoir volume), and dam height (estimate of lake depth) we can predict the phosphorus concentration of reservoirs located in the plains region of Missouri.

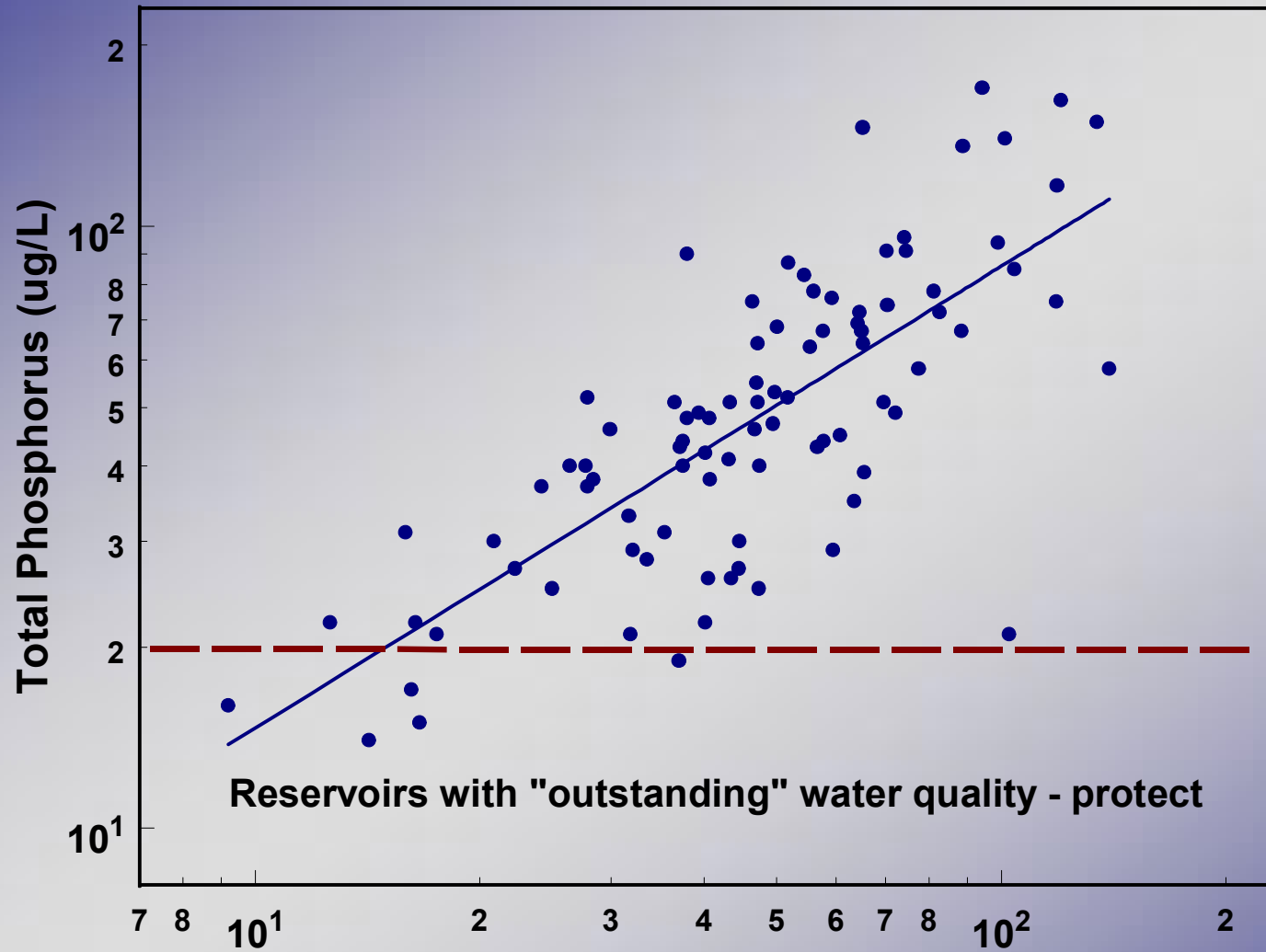
In the following graphics the horizontal axis is the predicted phosphorus and the vertical axis is the long-term phosphorus concentration. Each symbol represents an individual reservoir in the plains region of Missouri, and the diagonal line shows the general relationship between predicted and actual phosphorus levels.



$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$

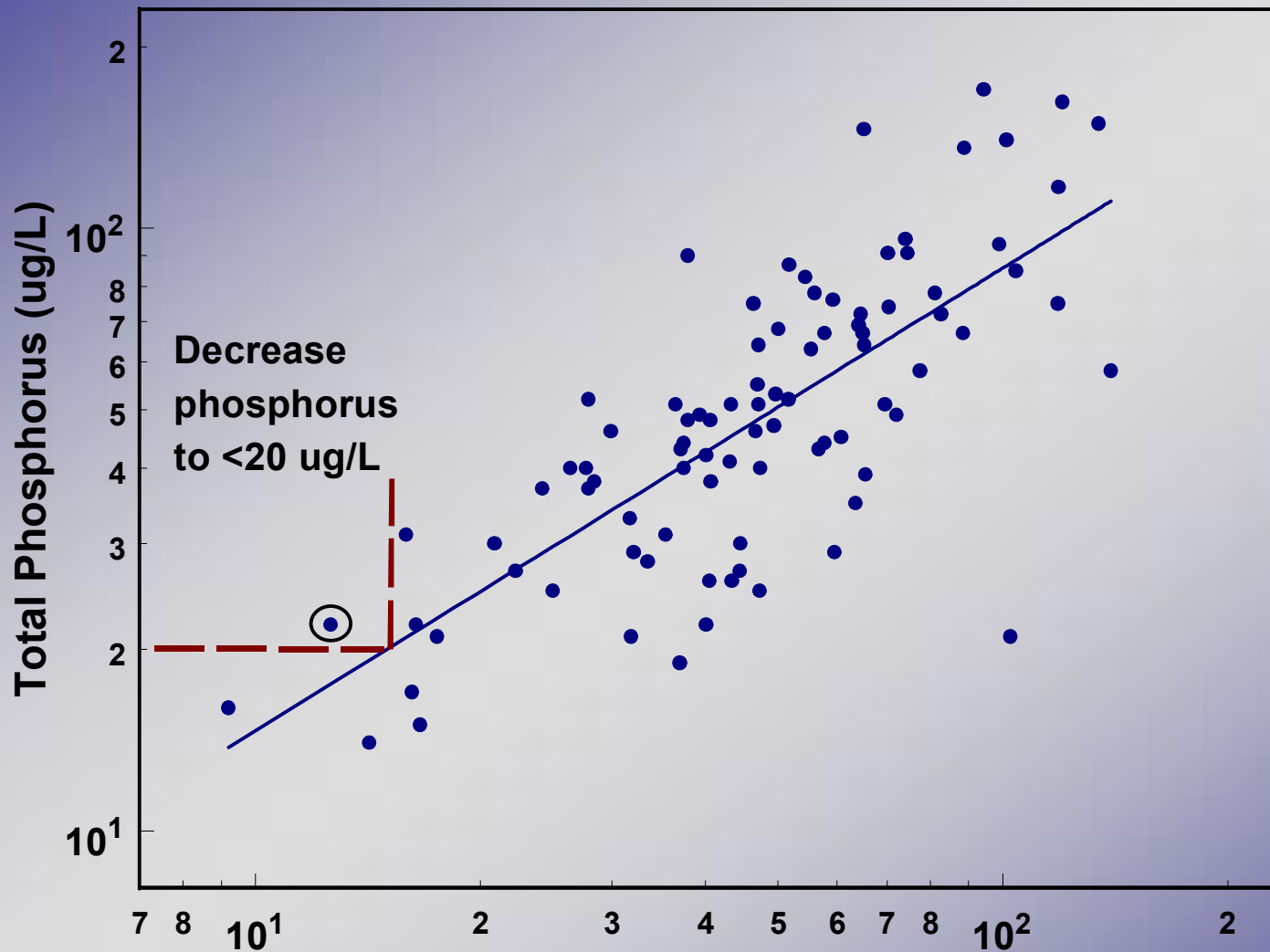
Some of the reservoirs in the plains region were built in pockets of forest, and have water quality that reflects this difference in watershed land cover. These reservoirs could be considered as “outstanding” and protected from cultural eutrophication by setting a lower phosphorus standard.

In the following example the phosphorus level of 20 µg/L has been indicated with the dashed line. Those reservoirs that have long-term phosphorus concentrations below this level would be listed as “outstanding” waters and the goal would be to maintain <20 µg/L phosphorus in these reservoirs.



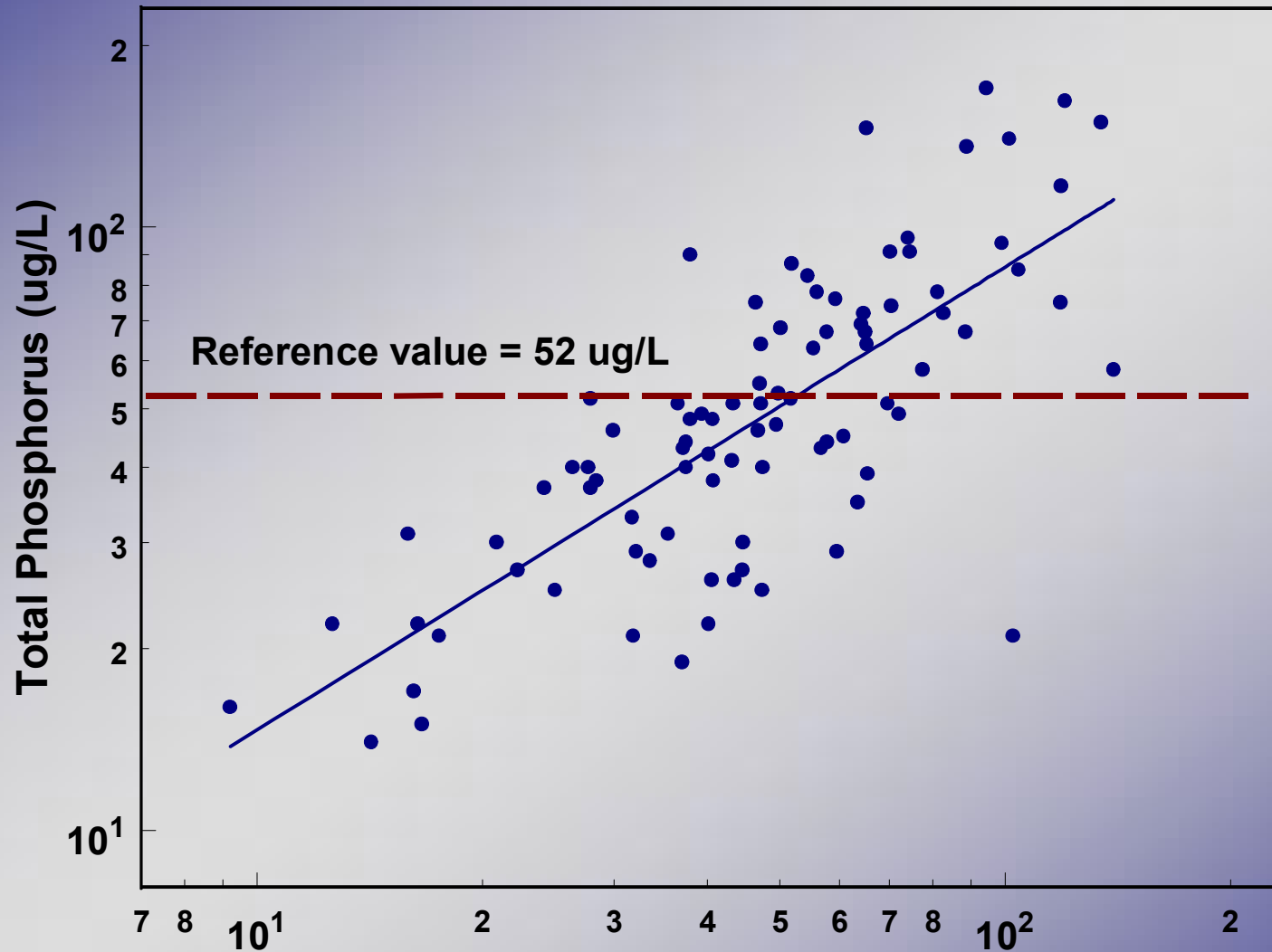
$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$

One reservoir has a long-term phosphorus concentration that is above the 20 µg/L “outstanding” level as well as above the predicted phosphorus. This reservoir could be targeted for nutrient reduction to get it below the 20 µg/L level.



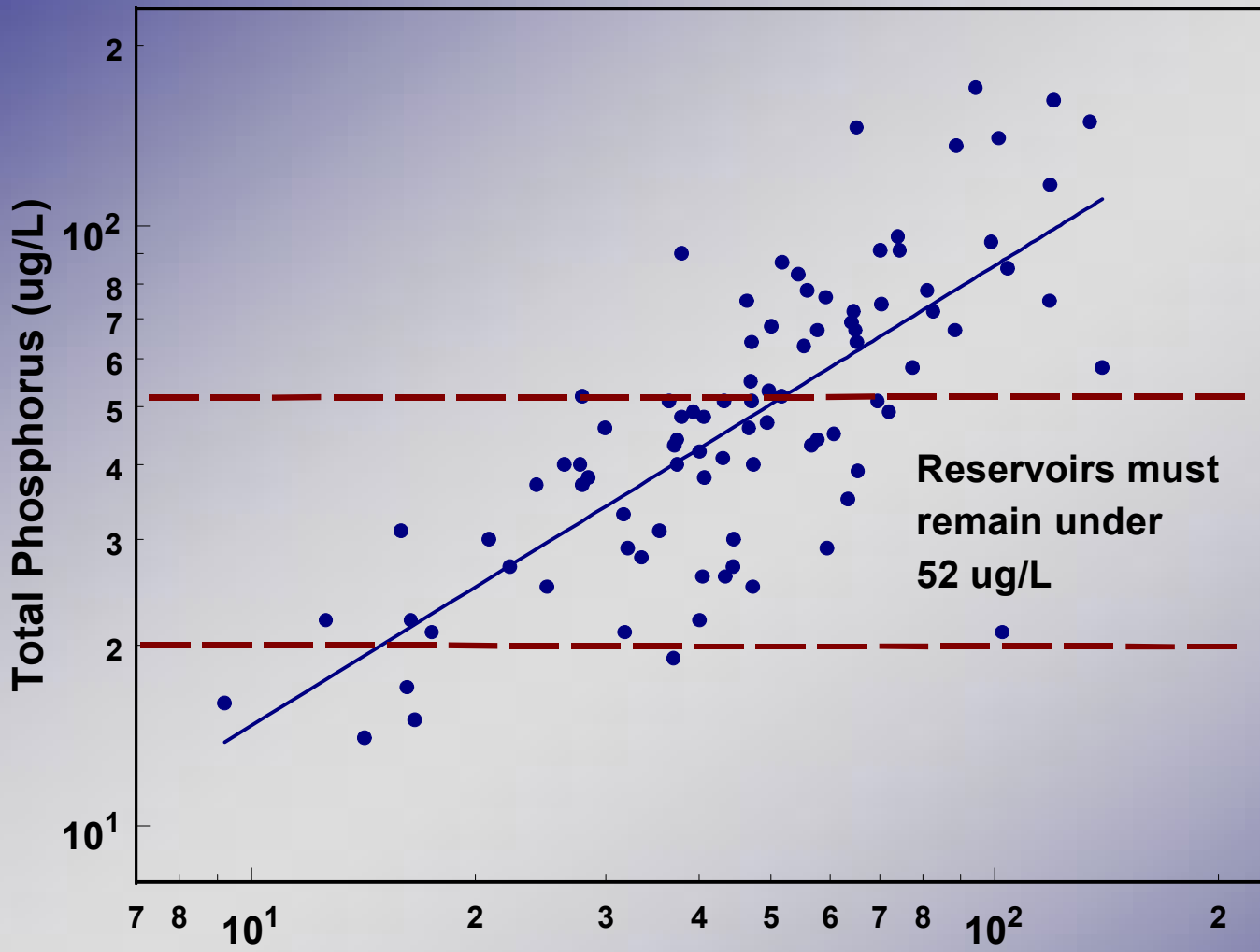
$$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$$

A higher phosphorus criteria could be set using a variety of methods. In the following example the value of 52 $\mu\text{g}/\text{L}$ is used. This value is the 75th percentile of the plains reference lakes (reference defined as having watersheds with limited urban and/or agriculture, no point sources and originally dominated by prairie land cover).



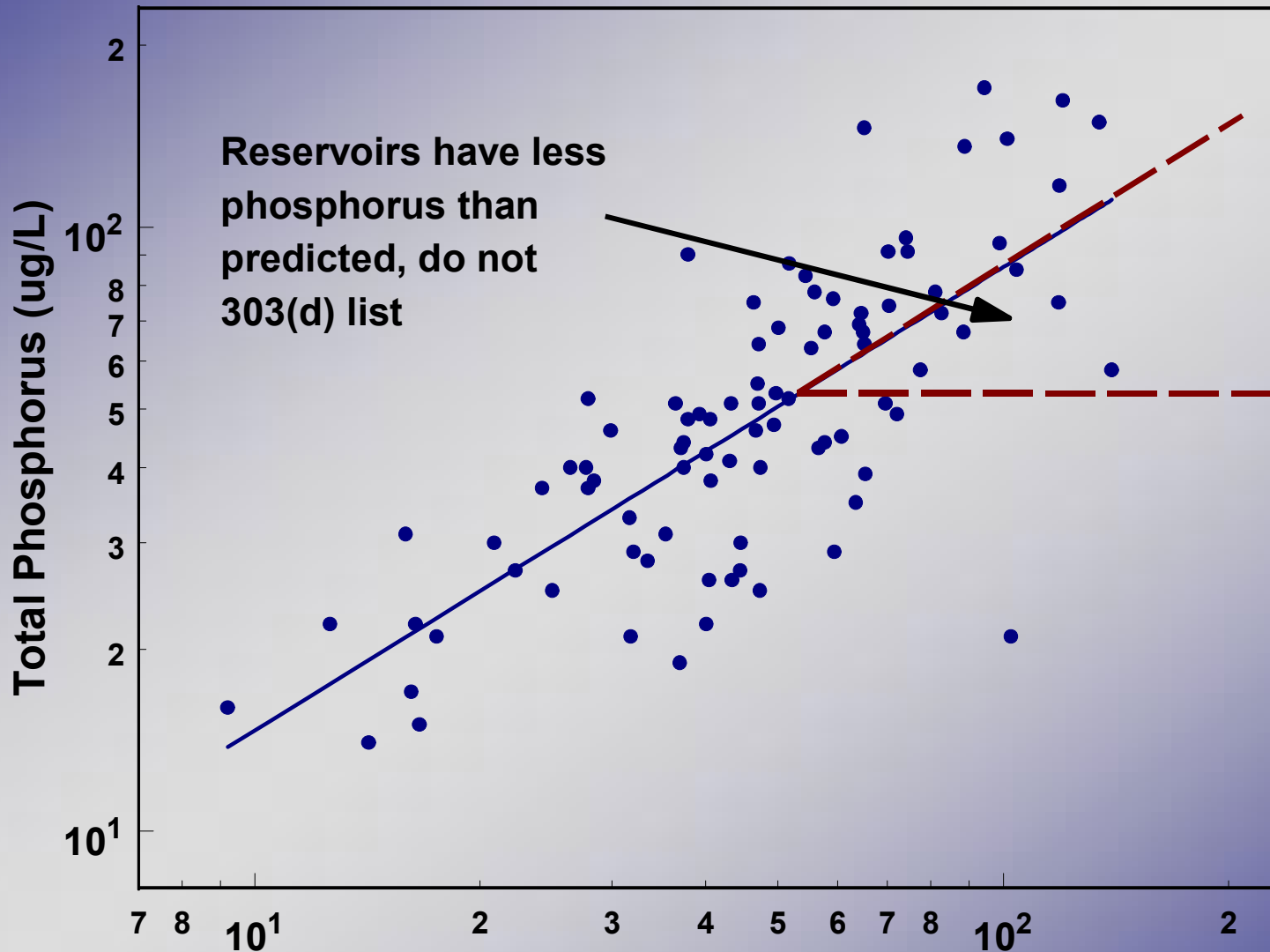
$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$

Reservoirs with long-term phosphorus concentrations that fall between the two standards would not be listed as they are below the “reference” phosphorus level.



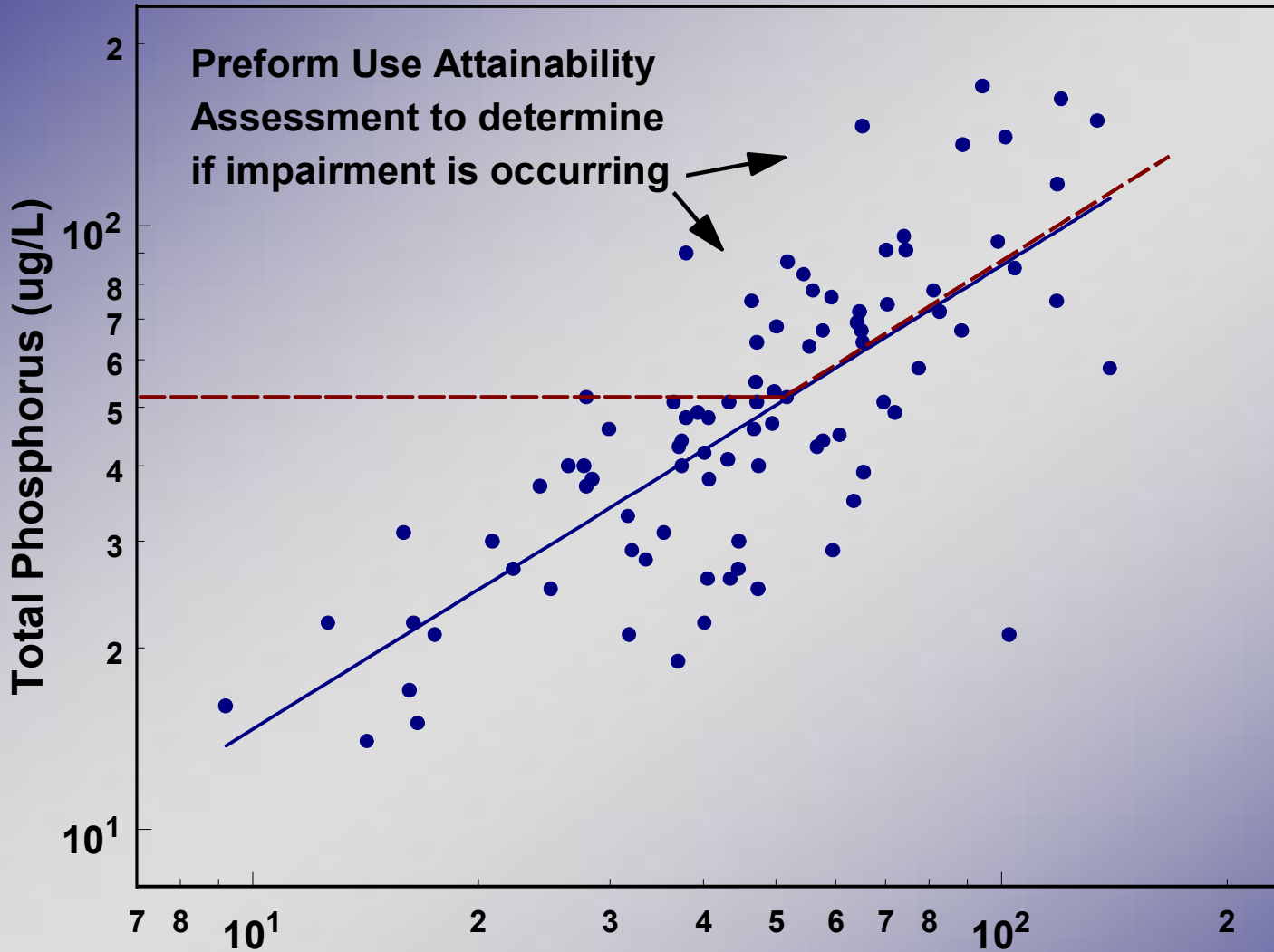
$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$

Reservoirs with long-term phosphorus concentrations that are above the “reference” phosphorus level but below predicted values would not be listed.



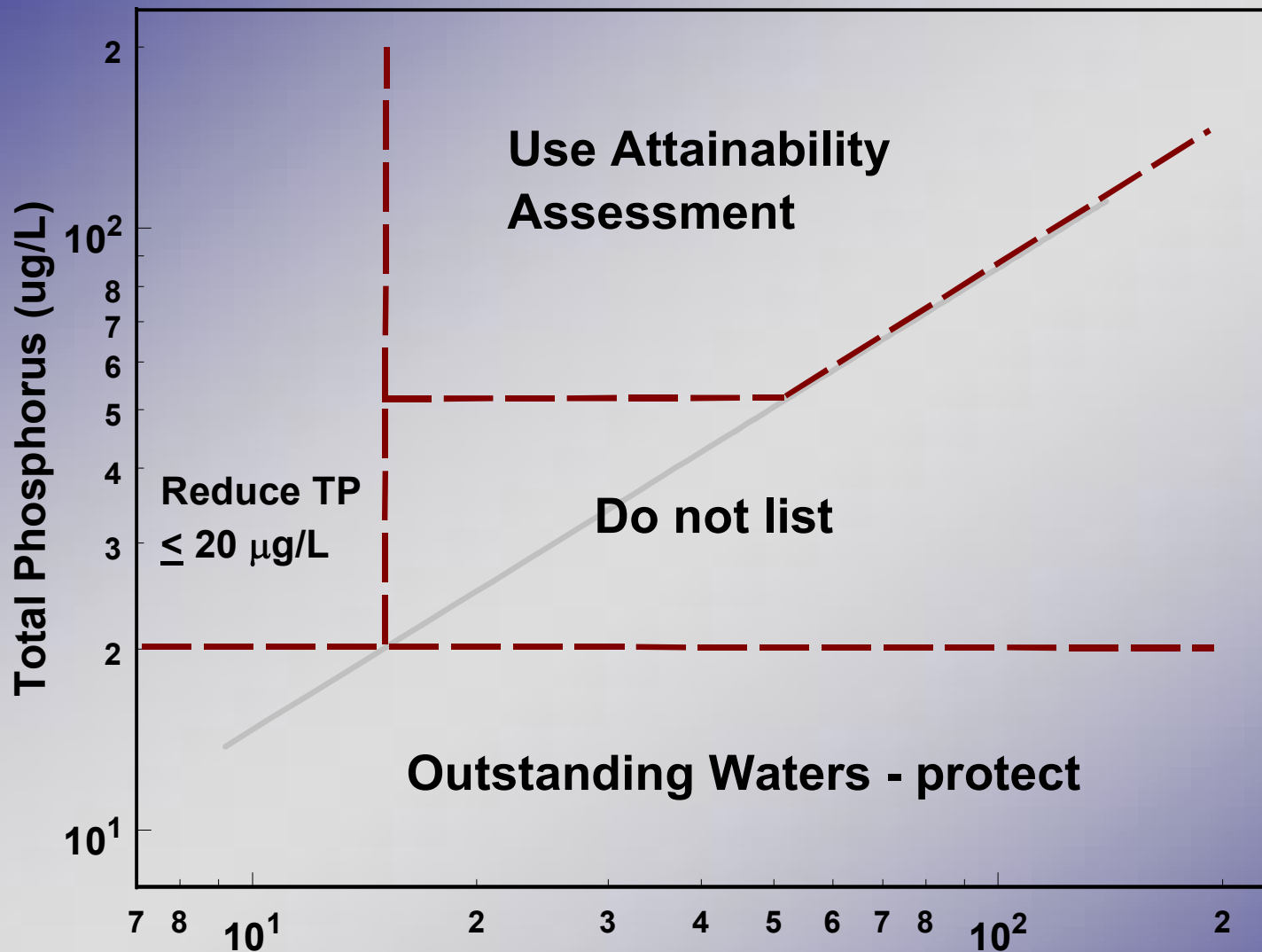
$$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$$

Those reservoirs with long-term phosphorus that is above both the reference level and the predicted value would go through Use Attainability Assessments to determine if impairments are occurring.



$$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$$

To summarize



$(\% \text{ old prairie}/4) + (\text{flushing rate} \times 16) + (570/\text{dam height in feet})$

The following flow chart shows the decision process for those reservoirs that are above the “outstanding” waters standard.

