Topic 2: Mercury in Bass

Mercury contamination of edible freshwater fish poses a direct threat to the health of those who catch and eat fish. Largemouth bass were studied in 60 Florida lakes to examine lake characteristics associated with fish mercury concentration. Surface water samples were collected from the middle of each lake. The pH level, the alkalinity, the amount of chlorophyll and the amount of calcium were measured in each sample. Next, four (or more) largemouth bass were sampled from each lake. The age of each fish and mercury concentration in the muscle tissue was measured. Fish age is important because bass accumulate mercury, so older fish tend to have higher mercury concentrations. The measured age and mercury concentration were used to estimate mercury in a standardized 3 year-old fish. The mercury value for each lake in the data set is the average mercury concentration in 3 year-old fish. Florida has set a standard of 1/2 part per million as the unsafe level of mercury concentration in edible foods.

There is one row of data for each of the 60 lakes.

The data set has one row for each of the 60 lakes in the study. The variables are:

Hg: average fish mercury concentration, standardized to 3 year-old fish.

units are parts-per-million (ppm), which is mg Hg / kg fish muscle

Alkalinity: lake alkalinity as Calcium Carbonate equivalent, units are mg/L

pH: lake pH

Calcium: lake Calcium concentration, units are mg/l

Chlorophyll: lake Chlorophyll concentration, units are mg/l

The data set I send you will have just Hg and the variable you requested.

Specific questions are:

1) Describe the relationship between your variable and mercury in largemouth bass.

In other words: The largemouth bass mercury concentration in a lake that is pH 6 is 0.3 ppm higher (or is 40% higher), on average, than in a lake that is pH 5.

2) You are looking for a quick way to identify new lakes that are reasonably likely to exceed the 0.5 ppm safety criterion. Alkalinity, pH, Calcium, and Chlorophyll are very quick and cheap to measure. What value of (insert your lake variable: Alkalinity, pH, Calcium, or Chlorophyll) corresponds to a predicted fish Hg concentration above 0.5? (No need to figure out a precision or confidence interval for the estimated lake variable).