**EMI 7125**

**Assignment 3: Design**

**Due: Nov 6**

**Submit via email.**

You are being asked to set up a study to determine the effect of smelting on benthic invertebrate communities. The smelting process causes heavy metals to enter waterways both directly and indirectly through atmospheric deposition, and these metals have important consequences for the environment. In the first phase of the study design (of which this assignment question is based), you are required to select lakes to be used in the study that represent sites impacted by smelting; sites that are likely to resolve an effect of smelting on the benthic invertebrate community in the lake. The second phase will involve the selection of control sites in reference areas at least 50km from Sudbury (you are NOT doing that here). Using the attached table (from Wesolek *et al*. 2010), select 5 lakes you will use in your study. Provide clear and convincing rationale for your choices. (/10)

Table description: Distance to smelter: is the physical distance between the lake and the closest smelter; Time since pH 6.0(y): this is the number of years since the lake has been at a pH of 6. Acid deposition at the peak of smelting caused many lakes to drop to a very low pH, often making the lakes sterile. Through abatement and direct remediation, lake pH has been increasing to more favourable levels (the authors have considered anything above pH 6 as being a reasonable sign of recovery); Area: lake area in hectares; pH: the actual pH of the lake; Ftox: is a composite measure of a number of factors including pH and the concentration of multiple metals. ‘tox’ refers to toxiciology- the higher the number the more ‘toxic’ it is; Ca/Cu/Ni: these are the concentrations of calcium, copper and nickel respectively; % cobble: is an index of the amount of cobble (stone and rock) on the lake bottom.

