Procedures for sieving sediment for macrofossil identification

Macrofossils definitively establish the presence of a particular plant species at a particular lake during a window in time, and as such, are a very desirable specimen. This protocol describes the methods of their acquisition from lacustrine core material.

Sieving is destructive to the overall sample, and as such, should only be done when all other desired testing on the material about to be sieved has been completed. If 14C dating is a possibility, sieving should be performed on 1-cm segments of core using ddH_2O.

Working with one sample at a time in a clean room:

1) Label an archive vial (usually a plastic scintillation vial) in which the macrofossils will be stored with the name of the lake, the lake depth interval, your initials and the date on which the sample was sieved. (Ex. MOR 135-140, 12/26/11, ALW).
2) Gently remove sediment from the source storage bag or tube, leaving at least 1 cubic centimeters of sample in the source container for future analysis. It is not beneficial to mix the sample, as this may break delicate macrofossils, rendering them unidentifiable.
    a. Samples that are particularly dry or clayey may benefit from soaking in water or phosphate detergent to release clumps. This greatly reduces the sieving time.
    b. If using large volumes of sediment (>10 cm3) that is slow to disaggregate while wet sieving, place sample in glass container with snap lids with 10% sodium hexametaphosphate and shake gently overnight in shaking water bath.
3) Using the 8-inch 250 micrometer sieve and the "RO water" spigot in room 215 Pacific, gently wash the sample through the sieve. Use low pressure and "sprinkle" the water on the sediment. Keep track of plant material as it appears on the screen. When all material has been washed through, use a squirt bottle to gently wash the plant material to one side of the screen. Then, wash into the sample vial. This can be done in several washes if the vial fills up with water. Once the material has settled to the bottom of the vial, excess water may be pipetted off the top in order to create more space in the vial. All plant material from each depth should be combined into the vial.
4) Note: it is easy to break conifer needles with tweezers. If you wish to pick them up, use a small paintbrush and let the macrofossil adhere to the paintbrush with water tension.
5) Keep samples refrigerated.

Macrofossils are identified under a stereoscope in 217 Pacific (or 216 Pacific) while in a glass petri dish. Use a small paintbrush to gently handle the macrofossils and move around the petri dish. For each conifer needle, record 1) species (and notes about confidence in ID if needed), 2) proportion of needle (e.g., ¼, ½, ¾), 3) which portion of needle (tip, mid, base, or entire) Reference material for all conifers exists in 217 Pacific.

Dunwiddie, P.W., 1985. Dichotomous key to conifer foliage in the Pacific Northwest. Northwest Science 59, 185-191.