program. Bottles should be labeled in the field as the sample is being collected to ensure proper identification. Pre-labeling bottles in the laboratory before taking them to the field can cause confusion for the person collecting samples as he or she searches for the appropriate bottle.

Additionally, field labeling forces the collector to be fully aware of the site being sampled, limiting the potential for mislabeling. It may be desirable to label a bottle for a site even if no water is available to sample at the site. This ensures that the receiving personnel in the laboratory know that the site was visited and no sample was available.

The label should include the time, date, site, station, and name of the person collecting the sample. For best results, use waterproof/ permanent marking pens and write directly on the bottle. The writing will come off in the washing procedure. Alternatively, self-adhesive waterproof labels can be used. Removal of the labels, however, can be a time consuming, messy task.

Grab Sampling

Grab samples are manually collected by a person present at the site. They may be taken from a water body randomly, systematically, or at regular intervals such as daily, weekly, or monthly (see Izuno, Bottcher, and Davis, 1991 for details). These samples are generally used for establishing nutrient concentrations at specific points in time. Grab samples are useful for establishing long-term trends or point-in-time concentrations.

Grab samples can be dipped manually or pumped from a body of water (Izuno, Bottcher, and Davis, 1991). Pumping is the recommended method. In this case, a suction strainer assembly and a peristaltic pump are necessary. The suction strainer is simply a coarse filtering device with holes small enough to prevent the passage of material too big to pass through the suction hose. These strainers are commercially available from several different companies that manufacture water sampling instruments.

Alternatively, suction strainers can be constructed out of non-corrosive, chemically inert materials. The strainer should be attached to a rigid shaft for ease in lowering the unit to the desired depth in the water body. A hose should be attached to the strainer and can be connected to the pump inlet hose. A battery-operated peristaltic pump is used to pump the sample into the bottle from the desired depth (see Izuno, Bottcher, and Davis, 1991, for determining appropriate depth).

Where adequate water is available for grab samples (i. e., in canals or ditches full of water), the sample bottle should be rinsed with water from the source being sampled. To do so, simply collect a sample as would normally be done, and empty the bottle before collecting the sample for return to the laboratory. Do not just dip water from the surface for the rinse process since the surface of the water body may have a different chemical and biological make-up than the water at the desired depth.

The cost of the suction strainer assembly is approximately $50. A suitable peristaltic pump is manufactured by Tat Engineering Company* and costs less than $500. Rechargeable 12-volt ni-cad or lead acid batteries are available from numerous vendors. The number of strainers and pumps necessary will depend upon the number of sampling locations, the number of samples desired, and the number of personnel assigned to the task. The equipment necessary for collecting grab samples is shown in Plate 1.

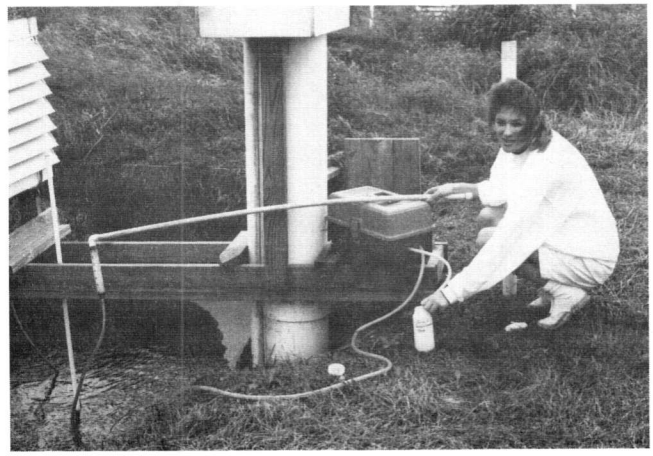

Plate 1: Collecting water grab samples using a pump with suction strainer arrangement.

Autosampling

An autosampler is a device that automatically collects water at preset times, on preset intervals, and in preset volumes. The instrument consists of a timer, controller, pump, sample distributor, and sample bottles. The timer unit can be programmed to initiate a sampling event and to continue taking samples on set time increments. Alternatively, electronic pulses from flow sensors can be used to trigger sample collection.