

MEASURE AND MANAGE

Sampling Protocol for Agricultural Water Sites

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The result of any analytical determination can be no better than the sample that was submitted.

General Considerations

The objective of sampling is to collect a portion of material small enough in volume to be transported effectively and still accurately represent the material being sampled. This implies that the relative proportions and concentrations of analytes will be the same in the sample as in the material being represented. The sample will be handled in such a way as to preserve the integrity so no significant composition changes occur during transport. All precautions to avoid contamination or composition changes due to temperature or physical handling must be minimized.

The person taking the sample assumes responsibility of collecting, identifying and preserving the sample integrity. The person shall record every sample collected and identify every bottle attaching appropriate tags or labels and cross referencing to the submission form with sufficient information to properly identify the results after analysis for database management.

Such items as location, date, temperature if required, weather at time of sampling, stream flow, post sampling handling, initial all paper work and keeping duplicate copies are requirements. Use maps, stakes, GPS coordinates, buoys or landmarks that are permanent for the duration of the project to mark locations of samples. Use chain of custody forms if provided.

Well Sampling

It may be necessary to pump sufficient water before collection to assure that the intended character of the water is captured. It may be necessary to record pump times and pump rates to ascertain that sufficient draw down has occurred before collecting representative samples.

Stream or River Sampling (including tile outlets)

When samples are to be collected from a moving river observed results will vary with the character of the flow. It is preferable to collect a composite from near shore, mid flow and at different depths from side to side. If only a grab sample can be collected do it at mid stream at mid depth. Do it safely.

When collecting from a tile outlet rinse the bottle 3 times before final fill. It may be useful to determine flow rate. A bucket of known volume and a stop watch can be used to determine flow in gallons per minute. Time how long it takes to fill the bucket and work out the results in gallons per minute etc.

It may be advantageous to collect a sample before land application of prescribed materials, during, and 24 hours after application. Preferential flow usually takes place in the first 5 minutes of application and then subsides. Pre-tillage reduces macropore flow. Macropore flow is most prevalent in early spring when soils are near field capacity and tiles are flowing.

When filling collection bottles fill and rinse the bottle 3 times with the intended sample before final collection. Always use clean or sterile bottles suitable for materials being collected.

Lakes and Reservoirs

These bodies of water can be subject to seasonal changes, stratification, runoff, and wind. Location and frequency of sampling needs consideration. Avoid areas of turbulence, calm areas such as docks and weirs and avoid surface scum. When a source is known to vary over time grab samples may be needed at different times and analyzed separately to characterize the source. Seasonal variations are probably most applicable to agriculture. Monthly samples may be necessary to establish meaningful data.

Composite Sample

A composite sample refers to the mixing of grab samples collected at the same sample site in different locations. A “time composite sample” is sometimes used. This method collects grab samples from the same location over time for observing average composition. Although this is most appropriate for 24 hour periods only. In agriculture composite samples collected and submitted seasonally is most realistic with a consideration given to a mean weighted average.

Safety

You only get one chance to work safely. When working near open water, work with someone, tether yourself to an anchored position, wear a lifejacket, carry extra clothing, keep cell phone charged and let a supervisor know of your location and expected time of

return. Have appropriate sampling equipment to perform the task at hand do not over reach or extend yourself beyond your comfort zone. No sample is so important that you need to take personal risks.

Summary

It is impossible to predetermine sampling protocols for every situation. The sampling protocol and integrity is often determined by the reason for testing, the nature of the intended sample and data requirements. Often times the best judgement of the person collecting samples is most important. By following the basic sampling protocols outlined here and a program of sample collection and identification that does not rely on memory or personal guidance should satisfy auditing, traceability and ongoing requirements for improvement.