CAMP Phytoplankton Sampling Protocol

Phytoplankton monitoring is conducted in conjunction with the water quality monitoring program. Details regarding site access and collection of site and supporting information are consistent with the water quality sampling program. The phytoplankton monitoring program consists of:

- Chlorophyll *a* Monitoring: this component is incorporated directly into the water quality sampling program. Sampling is conducted at all sites and sampling times. See the CAMP Water Quality Sampling Protocol for details.
- Phytoplankton Bloom Monitoring: samples are collected across the euphotic zone at all water quality sampling sites in the open-water season concurrent with the water quality sampling. Where concentrations of chlorophyll *a* are equal to or greater than 10 µg/L at a site, the phytoplankton samples are submitted for analysis of microcystin (a toxin that can be produced by some algae) and phytoplankton taxonomic identification and enumeration.
- Phytoplankton Community Composition Monitoring: analysis of phytoplankton taxonomy and biomass is done annually at four sites (Cross, Setting, Split, and Assean lakes).

Sample Collection

During the open-water season, samples of surface water for analysis of the phytoplankton and microcystin are generally collected as integrated samples of the euphotic zone. The euphotic zone is estimated as two times the Secchi disk depth measured at the time of sampling. Secchi disk depth is measured as the average of two measurements: the depth at which a black and white disk lowered into the water is no longer visible; and the depth at which the disk re-appears when raised from the water column. Secchi disk depths are measured in the shade (i.e., in shade from the wing of the aircraft).

To sample the euphotic zone, an uncapped weighted bottle (i.e., chlorophyll *a* sampler) is lowered to the bottom of the euphotic zone and then retrieved to the surface. The bottle is lowered and retrieved at a consistent rate such that the bottle fills continuously until it is recovered at the surface. The water collected by the sampler is then transferred into sample bottles provided by the analytical laboratory.

For high-velocity sites, where Secchi disk depths cannot be reliably obtained, phytoplankton samples are collected as surface grabs. Surface grab samples are collected by directly filling the sample bottles provided by the analytical laboratory at a depth of approximately 30 cm.

During the winter sampling period, phytoplankton samples are collected as surface grab samples at all sites. Under ice-cover conditions, surface grabs are obtained through the deployment of a Kemmerer water sampler below the ice. The Kemmerer sampler is retrieved, and the sample bottles are filled at the surface.

Sample Handling and Transport

Samples for analysis of community composition and biomass are preserved with Lugol's solution. Phytoplankton and microcystin samples are kept cool and in the dark until submitted for analysis.

Laboratory Methods

Samples are submitted to a Canadian Association for Laboratory Accreditation (CALA) accredited laboratory for analysis. All analyses are performed using standard methods and laboratory quality assurance/quality control (QA/QC) procedures.

Field and Laboratory QA/QC Samples

The phytoplankton sampling program incorporates several QA/QC procedures, including collection of triplicate samples and laboratory QA/QC samples (i.e., recounts).