

11.5 PROTOCOL FOR TRANSECT WITH QUADRAT MACROPHYTE SAMPLING

Overview

Determining biomass is a quantitative assessment that requires considerably greater effort than qualitative assessment of aquatic macrophyte communities. Quantification of aquatic macrophytes is based on stratified-random sampling designs requiring at least a basic understanding of water body geomorphic conditions, the nature and distribution of plant community types. Biomass studies are usually impractical in large water bodies because of the effort involved and are typically limited to smaller ponds or discrete portions of lakes and rivers (e.g., bays or reaches).

Sources

British Columbia MWLAP (2003), Alberta Environment (2006 a), Développement durable, Environnement et Parcs, Gouvernement du Québec (2007)

At a glance

consistency

1 Select transect locations on a stratified-random basis, ensuring that all strata (i.e., bed types or geomorphically similar units) are equitably represented.

2 Pre-select or field-select sampling sites provided that they conform to study design protocols.

3 Conduct sampling at each sampling site in a consistent manner and with a consistent level of effort. Determine the appropriate number of replicate samples collected at each site from the study design.

4 Drop or throw the quadrat in a random manner and allow it to sink to the bottom at each site.

5 Use a diver to harvest all the plants rooted within the quadrat. Cut plants at the water/substrate interface and place the entire plant in a mesh bag. If the roots are to be collected, they should be dug out of the substrate and rinsed before being placed in the bag.

6 Bring plants to the surface and transfer them to a plastic bag along with a label providing all pertinent information. Record sample collections in a notebook or on field sheets, along with the sample number, all pertinent site information, and GPS location.

7 Record water depth at each site as well as GPS waypoints, Secchi depth, turbidity and bottom light level (if equipment is available). Record water temperature or profile at several shallow and deep sites within the study area.

*dry to
remove
surface
water*

8 Sort plants from each sample by species as soon as convenient. Include whole plants and plant fragments, but exclude senescent plants.

9 Spin each species in a centrifuge dryer to remove all surface water. Weigh plants to determine the 'fresh' weight for each species within the sample. Record total weights for each species. Re-bag the plants for further analysis or discard them if no

longer needed.

10 Retain representative samples for each species for verification of species identification. Record sample collections in a note book or on field sheets, along with a sample number, any pertinent site information, and the GPS location.

11 Properly preserve in a plant press samples to be archived or included in reference collections. Express biomass, or standing stock, as *fresh weight of each species g/m²*, and *total fresh weight g/m²*, or as *dry weight g/m²*. Use the detailed procedures for determining fresh weight and dry weight from the following points.

12 Place an individual sample into the centrifuge dryer (e.g., salad spinner) ensuring that any rocks, sticks, and detritus are removed. Centrifuge the sample for approximately one minute at a moderate speed (approximately one revolution per second). Spin samples until all the surface moisture has been removed. Remove and weigh on an electronic balance or with a spring scale in a plastic bag (subtract the bag weight). Record the weight.

*oven-drying
method*

13 To use an oven-drying method, wash the sample using a sieve tray to remove rocks, debris, and invertebrates. Place each sample on a pre-weighed oven pan. Label it and place it in an oven at 105° C for 24 hours. After 24 hours, remove and weigh the sample on a balance (remember to subtract the pan weight). Record the weight.

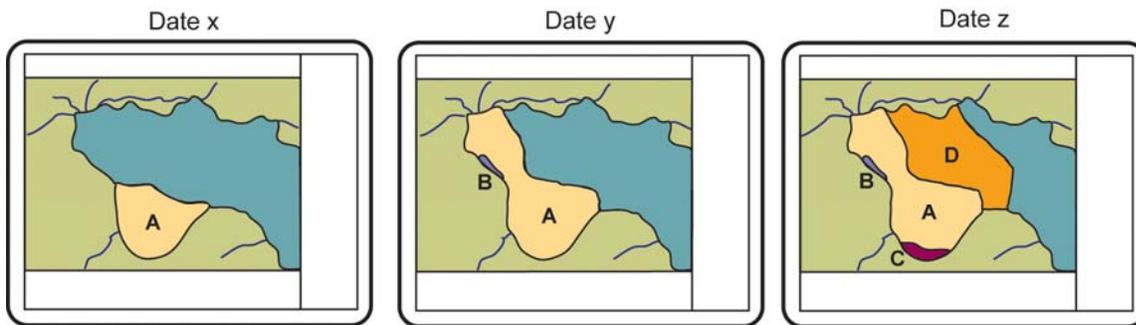


Figure 22. Example of use of aquatic macrophyte mapping through time
(Source: Développement durable, Environnement et Parcs, Gouvernement du Québec (2008b))