Alaska Field Guide to Live Fuel Moisture Sampling

The methods below are generally based on R.A. Norum and M. Miller, 1984. Measuring Fuel Moisture Content in Alaska: Standard Methods and Procedures. USFS General Technical Report PNW-171. See also Fuel Moisture Collection Methods 2011, http://www.fs.fed.us/t-d/pubs/pdf/11511803.pdf

General Collecting Methods

Number of Samples - The number of samples needed depends on the variability of the site and size of the area you are characterizing. Generally for a fairly homogeneous spruce stand, at a minimum collect 3-4 samples for each species or life form. To represent varying conditions (differing aspects or slopes) per 100 acres, collect up to 10 samples. When fuels and sites are variable, as many as 20 samples may be required for collection.

What to Sample - Collect the dominant vegetation in the area. Collect by species preferably or by life form (i.e., shrubs, herbaceous, grasses). If collecting by life form, collect deciduous and evergreen plants separately. Shrubs should be separated by height into these three classes: tall shrub (6-20 ft tall), medium shrub (2-6 ft tall), and low shrub (<2 ft tall).

Collecting a Sample - Move around in an area clipping the species or fuel type of interest from multiple plants in the vicinity. Be sure to follow the specific collecting methods below. As a rule of thumb: for ***conifers*** collect the *previous two years growth*, for ***woody stem plants*** **(shrubs)** collect the *current and last year's growth* of leaves and stems, for ***grasses*** collect the leaves, for ***herbaceous plants*** collect the full plant, but no flowers or fruit. For all plants **DO NOT** include flowers, berries or seeds. Cut the stems and leaves of each shrub and herbaceous plant into small pieces as they are dropped in the container.

Collect enough samples to fill the sampling container 3/4 or more full. Don't compress the material in the container. Do not collect during rainfall or when water drops are present on leaves or stems, this will cause large errors in the calculations.

When the container is full, immediately **replace the lid tightly**. Record the fuel type (species name) and container number on the data sheet! **NOTE:** If using tin canisters, it is recommended to tape the top with masking tape.

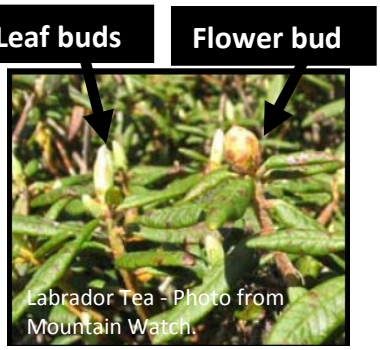
Specific Collecting Methods

Spruce Trees (Foliar) - Collect needles and stems from the previous 2 years growth on the branches, last years and the year prior. **Discard this year's growth (the bud and stem).** The new stem and needles are pale green. Some branches do not produce new needles every year, so it is important to distinguish between current year's growth and last year's growth. The new year's growth has a much higher moisture content and will bias the moisture content. Collect from all sides of the trees. **NOTE:** *If this year's growth has not occurred yet (early spring), then clip off last year's new growth and discard. Once the current years bud is evident, then remove this new growth section of the stem.*

Shrubs (Live Woody) - When sampling shrubs, collect only the new, small diameter stems and their associated leaves for current and last year's growth. Collect samples from both exposed and shaded locations. Eliminate all dead twigs and insect-infested leaves. **DO NOT include flower buds, flowers, seed pods, or berries in any stage of development.**

Shrub birch (*Betula glandulosa* and *B. nana*) - Sample stem and leaf material produced this year and last year. New stems of shrub birch are very pale brown. After the 2nd year growth, twigs become gray and glandular dots on the stem surface become less obvious. **DO NOT** include flower buds, flowers, or cones.

Labrador tea (*Ledum palustre* subs. *decumbens and groenlandicum*) - Labrador tea is an evergreen shrub that retains its leaves for two growing seasons. Collect the *current* and *previous years* stem growth and any attached leaves. **DO NOT** include stem sections and leaves more than 2 years old. Age can be determined from bud scars. There are two types of stems, flower and leaf. Collect the leaf buds, but remove the flower buds and/or flowers from the flowering stems.



Labrador Tea - Photo from Mountain Watch.

Cranberry (*Vaccinium vitis-idaea*) - Low-growing evergreen shrub that retains its leaves for several years. Some stems produce new shoots with leaves, others develop flowers, and some stems produce no growth at all. Sample all three kinds of stems. Clip the stems just above the moss layer and include the sections of the stem with healthy leaves. Discard flowers and all green or ripe berries.

Blueberry (*Vaccinium uliginosum*) - Collect leaves and stems on new and 2 year old stems. Leaves will only be found on new stems. Look for bud scars to identify > 2 year old stems. Older stems are much darker and have shaggier bark than younger stems. **DO NOT** include berries or flowers (young berries are green).

Willow (*Salix* spp.) – Although not described in Norum and Miller (1984), collect leaves and stems produced this year and last year. **DO NOT** include flowering catkins or seeds.

Herbaceous Vegetation

Grasses and Grasslike Plants – Try to collect only the leaves of grasses and sedges, if possible. **DO NOT** collect stems, seed heads or succulent white or pale-green leaf bases. For tall grasses, such as bluejoint (*Calamagrostis canadensis*), clip the leaves from all vertical portions of the plants, cutting the blades near their point of attachment to the stem. Include both live and dead thatch of grasses or tussocks (representative of the leaves attached to the grass or sedge). *See grass collection cheat sheet*.

Forbs – Collect the entire plant of small, single-stemmed forbs, such as winter-green (*Pyrola* spp) or bunchberry (*Cornus canadensis*) by clipping the stem at ground level.

Fireweed (*Epilobium angustifolium*) - Collect the entire stem and leaves of the plant. Discard all flowers and fruits in any state of development.

Drying the Samples

The ***Wet Weight*** of the samples can be determined in the field or in the office. After weighing, open the containers and place them in the drying oven (with the lids off) for approximately 24 hours at 100°C (212° F). For spruce samples lower temperatures (80°C) or less time will be required. When the drying process is complete, replace the lid and weigh the container to obtain the ***Dry Weight***. Discard the container contents and weigh the empty container to get the ***Tare Weight***. Record the ***Wet Weight, Dry Weight,*** and ***Tare Weight*** on ***Datasheet***.