SECTION 8.13

REMEASUREMENT OF EXPERIMENTAL PLOTS IN NATURAL STANDS

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8.13 REMEASUREMENT OF EXPERIMENTAL PLOTS IN NATURAL STANDS

To evaluate the growth and yield of different forest types, the Research Branch established permanent growth plots from 1921 until 1949. To protect this large investment from any type of disturbance, a reserve was placed around each plot. In 1957 the Research Branch transferred responsibility for 65 experimental plots (all still in a natural state) to the Inventory Branch. Since then the Growth and Yield Section of the Branch has continued to remeasure them periodically (10-year periods). Some of the original 65 have been abandoned owing to increased pressure on the area for other uses or to the fact that sufficient data have been collected.

8.131 Office Preparation

Collect field record sheets that allow room to record new measurements. If the previous measurements were recorded in imperial units, convert them to metric equivalents for diameter and height, and enter these equivalents in the margin for comparison with the new measurements. Obtain maps showing plot locations and others for navigation as well as the most recent photos showing the original tie points.

8.132 Field Training

All personnel involved in remeasurement must attend a short training course on field procedures. After the course, crews should begin to work under direct supervision to gain a full understanding of the work.

8.133 Relocation of the Plot

8.1331 Location and Access Description

Originally only a general access description to each experimental plot was required, which has occasionally resulted in time wasted in relocation of the plot. For the benefit of future remeasurement crews, make a detailed location and access description. When describing routes and distances to a tie point, always start from an easily identifiable point, the location of which will likely remain unchanged in the intervening ten-year period between measurements. En route to the tie point, clock all kilometerage from road junctions, from creek crossings, or from other prominent features to it. Describe the tie tree well noting species, diameter, and location.

8.1332 Tie Point

Whenever possible, the reference or tie point was located close to a prominent topographic feature. The tie point was marked with a cedar post driven firmly into the ground. However, over time many of these posts have rotted and are difficult to find. When the tie point cannot be found, try to find the tie line by crossing back and forth, looking for a blaze or flagging tape on the trees. Having found the tie line, reverse the tie line bearing and look for the tie point location. To aid future relocation of the tie point, use a well marked tree, rather than a cedar post. At the time of remeasurement, choose a suitable

tree near the post and attach to it two aluminum growth plot markers at a point approximately 2 m up the tree. Each marker should be in line with the tie line bearing and nailed on opposite sides of the tie tree. Also flag the tie tree with two strands of red plastic flagging tape, one above and one below the markers.

Inscribe each of the aluminum growth plot markers with the following information: experimental plot number, region number, compartment number, bearing and distance to the plot, and date of plot establishment.

Note: "Date" is the original date of plot establishment.

8.1333 Tie Line

From the tie point the tie line was run with a hand compass, abney and chain, and was marked with blazes on each side of trees at approximately 10 m intervals, or at shorter intervals where undergrowth reduced visibility.

If the original tie line can be found, renew the old blazes and flag the tie line with strands of red flagging tape.

Sometimes the tie point and the tie line cannot be found. To locate the plot, first find the approximate location of the tie point and proceed in the direction of the tie line bearing. When the approximate distance of the tie line has been travelled begin crossing the tie line back and forth looking for metal tags, flagging, and corner posts. Within the experimental plot, tags were nailed onto trees at breast height. When the light is adequate these tags can be seen from a great distance.

If the experimental plot cannot be found select a new tie point that is easy to recognize on the photos and on the ground. Plot the tie point on the map and measure the new bearing and distance to the experimental plot. Set the new bearing on the hand compass and run the tie line. Mark distance on the ground every 40 m (or only 20 m on broken terrain) and on sloping terrain, use a clinometer to make an allowance for slope.

8.1334 Corner Posts

At the experimental plot, locate all four corner posts. Each of the corners was marked with a cedar post driven into the ground around which a rock cairn was sometimes built.

Check that each post is solid enough to last another 10 years and mark each one with red flagging tape. When necessary, replace a post with a new one or with a tubular aluminum stake.

8.134 Measurement of the Plot

To maintain high standards, accurate conscientious work is required from the field crews. Emphasis is on the quality rather than on the quantity of measurement.

Experimental samples are either square or rectangular in shape. Single plot experimental samples range in size from 0.04 ha to 0.40 ha. The most common is the 0.16 ha plot. There are also some multiple plot experimental samples that range in size from 0.06 ha (2 plots) to 1.38 ha (34 plots). On file with each experimental sample is a map showing its layout.

At the time of sample establishment all living tees 2.5 cm and over in diameter at breast height (1.37 m) were tagged with numbered metal tags. To simplify tagging the plot was divided into strips. Tagging was begun in one corner of the plot and was continued up and down each strip.

8.1341 D.B.H. Measurement and Tree Classification

Measure diameter above the nail for all numbered living trees and record it to the nearest millimetre. Withdraw the nail holding the tag enough to allow for diameter growth over the next 10 years. If a tag is missing, replace it. With an ambosser, inscribe the required number on the aluminum tag. Nail the aluminum tag onto the tree at breast height (1.37 m). Compare each new diameter measurement with the previous measurement to verify that it is within the expected range. Re-check any diameter that is unchanged, has increased beyond the expected range, or has decreased since the previous measurement. Place a check mark beside each double-checked data entry.

Each living tree 6.5 cm and greater in diameter at breast height is classed as either residual, suspect, or veteran. In the tree class column, enter the code number that describes the tree being tallied:

Code No.	Tree Class (T.C.)
1	Residual
2	Suspect
3	Dead potential (not used)
4	Dead useless
5	Veteran on Wolf tree

Note: A tree can be properly classified only when it is viewed from all sides. Since most defects in the upper two thirds of a tree are not visible to an observer standing at its base, the recorder must move around so that the crown of each tree being tallied is clearly visible. The person who measures d.b.h. is responsible for the classification of the lower third of the tree whereas the recorder is reponsible for that of the upper two thirds.

Suspect Characters (2)

A tree with one or any combination of these eight suspect characters is classed as Suspect (2):

C	Conks	- In immature stands they are encountered mainly in deciduous trees.
BC	Blind Conks	- very seldom in immature trees
Sc	Scars	- including old, recent, grown over or open scars

FK CK	Fork or Crook	- including double or multiple leaders
M	Mistletoe	- on trunk and branches
R Br	Rotten Branches	- may be present on vets
D/B T	Dead or Broken Top	- old or recent, and including broken leaders

From the pathological code table (see Appendix 8-7) select the numerical pathological code that best describes the location by thirds of each suspect character on the tree being tallied.

Enter the numerical pathological code for each suspect character under "Pathological Remarks" on the growth sample record sheet (see Appendix 8-6).

Examples:

A. Suppose that a suspect tree has scars in the lower and middle third, and a fork in the middle third. In the "Pathological Remarks" section undr "Sc", enter 4; and under "FK-CK", enter 2.

B. Suppose that a suspect tree has a dead top, conks in the lower third, and a crook in the middle third. In the "Pathological Remarks" section under "D/B T", enter 3; under "C: enter 1; and under "FK-CK", enter 2.

C. Suppose that a suspect tree has a fork in the middle third, a large scar extending the whole length of the tree, and one of the leaders from the fork is broken. In the "Pathological Remarks" section under "FK-Ck", enter 2; under "Sc", enter 7; and under "D/B T", enter 3.

Residual (1)

If none of the eight suspect characters is present and if the tree does not belong to an older age class than that of the plot, then class the tree as residual (1).

Veteran (5)

A veteran is a tree that belongs to a distinctly older age class than that of the main stand. Use the increment borer to determine the ages of suspected veterans. Place in tree class 5 any tree the age of which is at least 30 years older than that of the oldest bored tree in the main stand.

8.1342 Ingrowth and Small Tree Count

Ingrowth refers to trees that have grown to 6.5 cm + d.b.h. in size since the plot was last measured. Give all previously untagged trees with diameters now equal to or greater than 6.5 cm, a consecutive number for that plot and tag them with an embosser-produced number. For each tree enter the tree number, species, measured diameter to the nearest millimetre, tree class, and tree number of the closest previously numbered living tree.

When all previously numbered trees have been measured for diameter and classified, record the small tree count on the reverse side of the growth sample record sheet. As mentioned in Section 8.134, originally all living trees 2.5 cm d.b.h. and over (and in some cases 1.3 cm trees and greater) were tagged with numbered metal tags. Owing to the considerable time it takes to look for and to measure small diameter trees, classify and measure only those trees with diameters equal to or greater than 6.5 cm. Group trees with diameters of less than 6.5 cm as in Table 8-11.

Table 8-11 DBH Class, Limits, and Tree Gauge Opening

D.B.H. Class	D.B.H. Limits	Tree Gauge Opening
A	up to 1.4 cm	smallest opening of tree gauge
B	1.5 cm - 3.9 cm	second opeing of tree gauge
C	4.0 cm - 6.4 cm	third opening of tree gauge

Make a stem count by d.b.h. class, species, and by sequent. Use the simple dot count method of tallying and an aluminim diameter guage to assess diameter. For trees which were tagged when the plot was last measured and are still less than 6.5 cm in diameter, record the the appropriate d.b.h. class (A, B, or C) on the growth sample record sheet in the space where diameter is normally written. In addition, record each of the trees in d.b.h. class B and C in a dot count format on the back of the tally sheet in the respective spaces headed "1", and "2".

If a previously tagged tree cannot be found after a reasonable time spent looking for it, assume that it is dead (it most likely is buried under windfall) and note on the tally sheet that it has not been found and is assumed to be dead.

Record those trees that were <u>not</u> tagged when the plot was last measured and which still have diameters less than 6.5 cm placing them into d.b.h. classes B and C, in a dot count format on the back of the tally sheet in the spaces for d.b.h. classes "1" and "2" respectively.

For trees in d.b.h. class A, make only a general note as to their presence or absence on the back of the tally sheet.

8.1343 Sample Trees for Height

Remeasure the heights of all previously recorded sample trees, provided they are still suitable for height measurement. Sample trees that are nor longer suitable are those with broken tops (caused by wind and snow),

those with forks or crooks, and those that have died. To replace a sample tree, choose a tree of the same species and diameter when possible. Double-check measurements which indicate that trees have shrunk or have grown excessively between the two measurements.

The number of sample trees previously taken usually satisfy the requirements for dominants and codominants but not always the intermediate and overtopped trees.

For single plot experimental samples 14 heights are required for each major species in the plot, of which 10 are to be from the dominant and codominant crown classes and from the intermediate and overtopped classes to cover the range in diameter. For minor and scattered species, take 4 and 1 heights respectively. Check the species composition of the previous measurement and use it as a guide for sample tree requirements.

For multiple plot experimental samples remeasure all previously used sample trees provided that they are suitable. The minimum number of sample trees required for each plot is 10. Species composition is used to select sample trees by species. For each species, select sample trees in a ratio of 10 dominants and codominants to 4 intermediate and overtopped trees.

8.1344 Crown Closure

On the growth sample record sheet, record an estimate of the plot crown closure to the nearest percent (percent of the ground covered by the crowns of the trees forming the main stand).

8.1345 Damage to the Experimental Plot and Return of Growth Sample Record Sheet

Even though reserves were placed around the experimental plots, people are still able to disturb them through logging, road building, pipe-line or power line right of way clearings, and escaped fires. Nature can also damage some of the experimental plots through windthrow, slides, snow, fungi, insects, and fire.

Remeasure plots if at least 50% of the initially measured trees are still alive. Forward a detailed description of the damage together with the sample record sheet to the Growth and Yield Section of the Inventory Branch.