TREE-CORING METHODS - HEMLOCK GRID PH II

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Field Methods

Ninety-five of the largest trees occuring in the Hemlock Grid were randomly selected by computer from the tree-maping data base (60x120-m grid). Selections were made on the basis of dbh measurement alone; all tree species were included in the pool.

All trees were cored with .200 Suutto or Haglof increment borers. An effort was made to core as low on the trunk as possible. Constraints on coring height were imposed by microtopography, the location of previous coring holes and bole configuration. Coring heights averaged 40 (?) cm. Measurements taken in the field included the height of coring hole and length of the core obtained. The approximate cardinal direction of the core hole was noted, along with a rough estimation of the degree of deviation from true center. In most cases, more than two borings were required to obtain a core that intecepted the tree pith. A maximum of 5 core holes were allotted per tree in order not to cause undue damage. If 5 cores were taken without hitting center, the best of the 5 was retained for analysis. Core holes were not plugged or disinfected. Plastic drinking straws were used to store and transport tree cores in this field. The cores were later mounted on rectangles of grooved "Luan" plywood. Each core was smoothed with sand paper of increasing fineness until a glossy finish was obtained.

Tree-Ring Analysis

Age measurements were performed by counting tree rings at 15x with a Wild-~~Hurbrug~~ Heerbrugg stereomicroscope. The average growth increment was obtained by dividing tree age by total core length. Distinct transitions in ring width (~~usually~~ visually identified) over a 2- or 3-year time interval served as the criterion by which cores were divided into segments of differential growth. Average annual growth increment for each segment was determined by dividing ~~this~~ the length of the segment (mm) by the number of tree rings (years) comprising the segment. (Where transitions between segments were of a gradational nature, segment endpoints were located midway between rings with maximum width contrast.) Growth increment was expressed as mm/yr for each segment.

A rough quantitative estimate of ~~relation~~ relative growth rate for each segment was obtained by dividing segment growth rate by average growth rate for the total core length. Two categories of reduced growth were recognized (i.e. slow and suppressed); two categories of fast growth were also established.

Periods of differential growth for the life history of each tree were depicted graphically. Due to the large variation in growth rate between trees, a relative rather than an absolute approach was taken to compare tree growth data. This was accomplished by first constructing a horizontal axis of a length proportional to the age of the tree. Segments of differential growth (deviations from average growth) were represented by bars drawn on the horizontal axis: periods of slow growth were drawn below the axis while intervals of faster growth were drawn above the axis. Bars of increased width indicate greater relative deviations from average growth for that particular tree. By aligning the graphs along a common margin (1990 yrs AD), synchronous changes or trends in growth rate for trees occurring throughout the stand could be visually determined.