



No. 2

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Resource Inventory Notes

Definitions

Before we can get into any detail discussions of inventory techniques and procedures, we must have a clear understanding of the terms we'll be using. Just what is an inventory?

In resource management, we can surmise that an inventory of any natural resource may be at least a listing of how much of the resource is available at a given instant in time. A good inventory also describes the quality of the resource and, in addition, some of the characteristics of the land which is found. Inventories may include descriptions of the area and ownership, estimates of production (volumes, pounds, animals, users, etc.) and perhaps, if measured periodically, estimates of changes. Specific types of inventories, such as a cruise or census, may emphasize one or more of the above items.

Definitions of various types of inventories are given below. Most are taken either wholly or in part from the Society of American Foresters' "Terminology of Forest Science, Technology, Practice and Products" and "Forest Terminology".

Appraisal, Range. An evaluation of the capacity of range lands to produce income, which includes not only consideration of grazing capacity, but also facilities for handling livestock, accessibility, and relation to other feed sources. The classification and evaluation of a range from an economic and production standpoint.

Assessment. The process of estimating the value of property for purpose of taxation.

Census. A complete counting, with classification, of a population or group at a point in time, as regards some well-defined characteristic(s) (e.g., of traffic on particular roads). The term census usually has a governmental and economic social connotation. (Censuses are often used in wildlife surveys).

Count, Range. A census of the animals using a grazing area, usually including a determination of the respective ownership.

Count, Tree. A simple, rapid method of timber survey in which dependence is placed on counting the number of trees without reference to their diameter and heights.

Cruise. A survey to locate and estimate the quantity of timber on a given area according to species, size, quality of possible products, or other characteristics.

Enumeration. In a forest, the counting of one or more species, generally above a specific size limit, and their classification by size, condition, etc.

Estimate. In mensuration, an approximate determination of the volume and quality of standing timber. Syn. Cruise.

Inventory, Management-Volume. An enumeration of such pertinent data as volume or basal area and increment and mortality of stands made to assess silvicultural opportunities.

Reconnaissance. A preliminary inspection or survey of a forest or range area to gain general information useful for future management.

Reconnaissance, Forest. A cruise of a forest property to obtain general information, often preliminary, on the forest conditions.

Reconnaissance, Range. An extensive range survey.

Reconnaissance Method is a standard technique in range surveys for estimating average density and composition of range vegetation within a type or subtype without use of systematically established plots.

Scale. To estimate the sound content of a log or group of logs. To measure timber (individually or collectively) and fuelwood.

Survey, Forest. A survey to determine, on a given area, data such as soil conditions and topography, together with the extent, condition, composition, and constitution of the forests, for such purposes as purchase or management, or as a basis for forest policies and programs. An inventory of forest land to determine area, condition, timber volume, and species.

Survey, Range. A survey to determine, on a given area, data such as soil conditions and topography, together with the extent, composition, and condition of the range plant cover, or a basis for management plans. A systematic and comprehensive inventory and analysis of the range resources and related management problems of a range area and the development of plans of management therefrom. Such surveys are intensive or extensive depending on the degree of sampling and size of types or sub-types recorded and mapped. A non-intensive survey is generally termed a range reconnaissance.

A 100% inventory is rarely possible in surveying our natural resources. Therefore, some types of sampling are commonly used. Again, the SAF provides definitions of various types of sampling designs we're likely to run across in our discussions of inventories.

Attribute Sampling. Sampling where the characteristics under consideration are attributes.

Cluster Sampling. Sampling (commonly attribute sampling) in which the unit of observation is a group of individuals; e.g., the trees in a sample plot and the unit value is the proportion of the individuals in the group having the specified attribute.

Dynamic Sampling. Any form of forest sampling designed to discover significant changes with time, particularly seral changes or increments. (Continuous forest inventory is a form of dynamic sampling).

Exploratory Sampling. Forest sampling to determine such basic ecological or economic data as composition and condition, constitution and stocking, generally for introducing management into forests.

Random Sample. (Simple Random Sample). A sample selected in such a manner that all possible samples of the same size have an equal and independent chance of being included.

Stratified Random Sample. A randomized sample composed of two or more sets of random samples, each drawn from a single homogeneous unit (stratum) of a heterogeneous population. (Stratification is the subdivision of a population into groups or strata, each of which is more homogeneous in respect of the variable being measured than the population as a whole).

Systematic Sample. A sample consisting of sampling units selected in conformity with some regular pattern (e.g., the sample formed from every 20th two-chain strip of forest, or from every 10th tree in every 5th row).

Within any of the above sampling schemes, we can have any of the following plot designs.

Angle-count Method. (Angle-gauge method, variable-radius or plot method, point-sampling, prism-count method, plotless sampling, Bitterlich method). This method is used to estimate the basal area of a stand by use of an instrument (e.g., an angle gauge or prism wedge) incorporating a fixed angle, with which a 360° sweep is made from a series of sampling points, counting at each point the number of stems whose breast-height diameter appears larger than the fixed angle they subtend. The average stem number multiplied by a factor appropriate to both the fixed angle and the units of measurement chosen gives the basal area per unit area of the stand. The probability of selection is proportional to the size of the variable being measured.

Line-intercept Method. The sampling of vegetation by recording the plants intercepted by a measured line set close to the ground or by vertical projection from the line. In regeneration assessments, this method is termed linear regeneration sampling. (This method is common in residue surveys).

Line-plot Survey: (Line Plot) A survey employing lines of sample plots, generally laid out at regular intervals along parallel survey lines.

Quadrat. A small, clearly demarcated sample area of known size on which ecological observations are made. The term was originally applied to square areas, but it is now frequently applied to rectangles and circles. The area is generally a square decimeter, a square meter, or a milacre.

Quadrat Method. A method used to determine the frequency of the various plant species or reproduction found on an area by taking quadrat samples.

Sample Plot. A plot of vegetation chosen as a representative of a much larger area. Note: (1) It is used mainly in enumerations and studies of growth or in determining the effects of types and degrees of thinning or increment. If measurements are taken only once, it is a temporary sample plot; if taken at intervals over a period of years, it is a permanent sample plot, growth plot, permanent growth plot, or permanent inventory plot. (2) If along a line (generally an open traverse), it is termed a linear sample plot, sample strip, sample indicator line, or a transect plot, the line being used either to locate individual sample trees or as the plot base-line, generally its median line.

Sample Strip. A long narrow strip used as a sampling unit in surveys.

Square foot Method. A standard technique in range surveys for determining average density and composition of range vegetation, using systematically located plots on which the herbage of each species is estimated individually in square feet of ground covered.

Strip Count or Strip Enumeration. Any complete count taken on a sample strip through a nursery bed or a stand.

Strip Survey. (Strip Cruise). A survey of one or more sample strips, these commonly being based on regularly-spaced, open traverses (whence termed a linear survey) along which recording of data is continuous. A survey employing continuous narrow strips as sampling units. Strips $\frac{1}{2}$, 1, or 2 chains wide are run across the area to be surveyed.

Transect. A cross section of an area used as a sample for recording, mapping, or studying vegetation and its use. A transect may be a series of plots, a belt or strip, or merely a line, depending on why it is being used.

Weight Method. A method of arriving at the volume of forage or herbage on a range area by clipping and weighing samples or by estimating weight.

In future issues of Resource Inventory Notes, we'll be discussing, in detail, many of the above terms.

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Current Literature

Need an understanding of 3P (probability proportional to prediction) Sampling? See the June 1975 issue of The Consultant (20(3): 78-79) for the article by Harry Wiant, Jr. entitled "3P Sampling Made Simple". If you don't have access to The Consultant, drop a line to Harry Wiant, c/o Division of Forestry, West Virginia University, Morgantown, West Virginia 26506 and ask for a reprint.

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Want more information on 3P? Drop us a note and we'll send you a copy of "3P Sampling: An Annotated Bibliography". This booklet tells you what's been written on the subject and briefly describes the contents of over 75 articles and publications.

Recreation your bag? See the March 1975 issue of Forest Science (21(1): 40-44) for "Instant-and Interval-Count Sampling: Two New Techniques for Estimating Recreation Use". Instant-count provides estimates of visitor-days of use in small areas such as wayside parks and scenic vistas. Interval-count is a sampling technique for larger areas such as campgrounds.

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The winter 1974 edition of the Naturalist (Volume 25, No. 4) has two interesting articles on waterfowl survey methods.

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"Counting Ducks and Duck-ponds in Prairie Canada: How and Why", by R. C. Hanson and A.S.Hawkins (pages 8-11) describes the procedures used in the annual nesting ground inventory of waterfowl. The article entitled "Land Capability for Waterfowl Production" by G. D. Adams and R. E. Murray outlines the waterfowl capability mapping program of the current Canada Land Inventory.

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The Forestry Division of the Missouri Department of Conservation, North 10-Mile Drive, Box 180, Jefferson City, Missouri 65101, has put together procedures for surveying wildlife habitat and watershed conditions, using ERTS imagery as part of the sampling base. Details are given in "Procedures for the Grand Platte River Basin Multi-objective Land Use Planning Study" by Bob Anderson.

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Meetings

The SAF inventory working group will hold a special meeting Monday evening, September 29, at the SAF National Convention in Washington, D.C. The special guest speaker will be Dr. W. W. Bitterlich, sponsored by Forestry Suppliers, Inc. of Jackson, Mississippi. Dr. Bitterlich was the first to employ the horizontal angle-gauge for estimating basal area. His work led to the development of sampling by probability proportional to size (pps). Dr. Bitterlich will speak on recent development in European forestry and on the Telareluskop. The meeting will be held at 7:00 p.m., Gallery A, in the Statler-Hilton.

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The Inventory Working Group business meeting will be held 8 - 9 a.m., Tuesday, September 30 in the Massachusetts Room of the Statler-Hilton.

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The Midwest Forest Mensurationists will be holding a meeting on October 30 and 31 at the Lake Barkley Lodge in Cadiz, Kentucky. For further information, contact Charles Meyers, Department of Forestry, Southern Illinois University, Carbondale, Illinois 62901.

A workshop entitled "Quantitative Ecology: Its Application to Forest Resources Management and Education" will be held at the New England Center for Continuing Education on December 1, 2, and 3. Registration will be limited. Those interested in attending should contact:

James P. Barrett
Professor - Forest Resources
College of Life Sciences and Agriculture
University of New Hampshire
Durham, New Hampshire 03824

Plans are underway for the 1976 International Union of Forest Research Organizations (IUFRO) Congress in Oslo, Norway, next June. For information on what the inventory group will be doing, contact:

T. Cunia
School of Environment and Resource Mgmt.
State University of New York
Syracuse, New York 13210

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Miscellaneous

Jack Jacks, Geologist on the Wayne-Hoosier National Forest, gives us this tip on inventorying problems related to transportation planning. Jack prepares a map or map overlay that identifies landslides, embankment failures, cut-slope failures, fill settlement, culvert failure, severe ditch erosion, stream undercutting, etc. These problem areas are further classified as major or minor, depending on elements such as frequency of occurrence and repair costs. This data, together with terrain information, contributes to the basic data file for land use planning.

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Mike Bonnor of the Forest Management Institute, Canadian Forestry Service, would like to know if anyone has explored the Critical Height Method of estimating plot volume, either in theory or practice, with or without the tele-relascope. If you have any information on this subject, please send it to Mike at 396 Cooper Street, Ottawa, Ontario, K1A 0W2.

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Please address all correspondence to:

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