

**Forest Service Handbook
National Headquarters - Washington Office
Washington, DC**

**Forest Service Handbook 1909.14 – Resource Inventory Handbook
Chapter 10 - Inventory Planning, Designs, and Documentation**

Amendment:

Effective date:

Duration: This amendment is effective until superseded or removed.

Superseded Directive:

Approved by:

Date approved:

Responsible Staff:

Explanation of changes:

Table of Contents

11 - Inventory Planning.....	3
11.1 - Scope	3
11.2 - Basic (Core) Information.....	4
11.3 - Existing Inventories	4
11.4 - Data Collection Goals	4
11.5 - Duties Assignment	4
12 - Inventory Designs	4
12.1 - Design Options.....	5
12.2 - Precision Requirements.....	5
12.3 - Inventory Units	5
12.4 - Sampling Units and Sampling Intensity	5
12.5 - Data Collection.....	5
12.6 - Use of Permanent Samples.....	5
12.7 - Scheduling	6
12.8 - Quality Control.....	6
12.9 - Data Reporting.....	6
13 - Inventory Documentation	7
13.1 - Inventory Work Schedule	7
13.2 - Inventory Files	8

11 - Inventory Planning

This chapter provides guidance for the planning, design, and documentation of integrated or coordinated inventories of the land, soil, timber, forage, water, air, fish and wildlife, aesthetics, recreation, wilderness, and energy and mineral resources for the 1999 Resources Planning Act (RPA) assessment, State and National Forest planning, and for other local needs. Use this guidance when planning resource inventories.

11.1 - Scope

As a minimum, plan inventories to provide the land, soil, timber, forage, water, air, fish and wildlife, aesthetics, recreation, wilderness, and energy and mineral information needed for the 1999 Resources Planning Act assessment and, as appropriate, for National Forest Planning. During the planning phase, consider the following to meet additional local needs:

1. Users of the inventory information.
2. Inventory unit (size, location, variability, use, condition, access).
3. Dominant issues, concerns, and opportunities within the inventory unit.
4. Information required to address the concerns and issues.
5. Applicability of current information, remote sensing, and geomechanics technology to provide needed information.
6. Required precision and statistical reliability for additional information.
7. Sample design and intensity.
8. Scheduling of the inventory to meet budgets and time frames.
9. Integration of other existing and proposed resource inventories through the use of coordinated data collection and geographical information systems (GIS).
10. Analysis procedures, interpretations to be made, and report format (tables, data bases, reports).
11. Dissemination of the resulting information (who gets what, where, when, why, and how).
12. Maintenance and monitoring requirements.

13. Schedules for reinventories or updates.

14. Useful lifespan of collected data.

11.2 - Basic (Core) Information

Identify the basic information to be collected for the Resources Planning Act assessment and, as appropriate, for National Forest planning, and the data normally collected to produce that information. This is core information. Identify additional information required to meet local concerns and issues. Then determine the data necessary to produce that information. Use established data element definition and standards as appropriate. Develop new definitions and precision requirements where needed.

11.3 - Existing Inventories

Review suitability of existing inventories and identify new data for collection. Where necessary, convert existing data into the standard formats to make them more usable.

11.4 - Data Collection Goals

State the goals for conducting the inventory including the area to be covered, general description of data to be collected, the source of the data (whether field-collected or derived, and from what source), and the needs to be met by the inventory. Include goals for meeting the Resources Planning Act (RPA) assessment needs and as appropriate, the National Forest planning needs.

11.5 - Duties Assignment

Once the data to be collected have been identified, assign the responsibilities for conducting the inventories.

12 - Inventory Designs

Design coordinated resource inventories to ensure they produce, at a minimum, the information identified during inventory planning and that they meet local needs in a cost effective manner.

Area information may be derived from mapping or sampling, whereas attribute information, such as forage production or tree volume is usually derived from sampling. Use statistically valid designs to provide a basis for an unbiased estimate of past, present, and potential resource conditions. Design inventories to provide information to support a full range of land use alternatives based upon resource capability.

12.1 - Design Options

Use single function or multiple resource inventories, as appropriate. If conducting single function inventories, reference all information to common units of land. If conducting multiple resource inventories, use a common sample designs that permit reorganization of sample unit information to describe the land base for each resource.

12.2 - Precision Requirements

Design inventories to meet the precision requirements for the 1999 Resources Planning Act assessment and, as appropriate, for National Forest planning. Supplement these to meet local issues and concerns. When feasible, derive area estimate from maps to eliminate area sampling errors.

12.3 - Inventory Units

Designation of the inventory unit usually depends on the goals and objectives of the inventory. For Resources Planning Act assessments and National Forest planning, political or administrative boundaries define the inventory unit. Forest Inventory and Analysis research units usually use a State or a subdivision thereof as an inventory unit. National Forests are frequently the inventory units within a Region. The inventory unit may be further divided into sampling strata. Sampling strata are usually defined by physical and biological conditions.

12.4 - Sampling Units and Sampling Intensity

Sampling units must fall completely within the inventory unit and sampling stratum. Sampling intensity will vary by the objectives of the inventory, the anticipated variation within the target population, the sample design used, and the funding available.

12.5 - Data Collection

Collect quantitative, continuous data rather than subjective, categorical data; for example, measure and express forage production in pounds per acre rather than reporting the forage production to be low, medium, or high.

12.6 - Use of Permanent Samples

Use permanent plots for monitoring changes or for establishing trends in the resource base. Establish permanent plots, transects, or point locations on repeatable, representative units of land where needed for establishing trends or for monitoring responses to management activities. Remeasure a sufficient number of samples often enough to establish trend analyses and projections. Integrate previously established permanent samples into subsequent

resurveys where an adequate sample is available and where trend or monitoring information is necessary.

12.7 - Scheduling

Schedule inventories to support the preparation of the 1999 Resources Planning Act assessment and, as appropriate, for the development of Forest plans. Coordinate the scheduling and budgeting of data collection for all resources and uses.

If it is necessary to revise the Resources Planning Act assessment or Forest plan before the completion of the next scheduled inventory, update the inventory records to reflect changes in trends and conditions. Base inventory adjustments on the following:

1. Availability of field examinations with unbiased allocation of plots and statistically valid designs.
2. Changes resulting from treatments reported to data base information systems.
3. Natural catastrophes of sufficient severity to change the inventory classification of the affected attributes.
4. Natural changes since the previous inventory.
5. Growth models and other simulated projections.
6. Coordination or integration of several inventories.

Set up firm inventory schedules to collect needed data. Keep time frames as short as possible so commitments do not lag with personnel turnover, shifts in priorities, or fiscal direction.

12.8 - Quality Control

Develop quality and quantity control standards for contractors, cooperators, coordinators, crew leaders, and crew members. Inspect inventories as specified in the inventory work schedule. Emphasize accuracy, objectivity, and efficiency.

12.9 - Data Reporting

Data representing one sample are usually expressed as single numbers or subjective values, with associated error estimates. For data representing more than one sample (by replication or aggregation), a decision must be made as to how to display the data. First, consider whether to represent the data as a sum, range of values, average (mean), mode, or median, or some combination of these. Some variables should be displayed as a range (elevation, for example),

others as an average (soil pH), others as a sum (timber volume). Still others, typically the subjective variables, will be displayed, as a concatenation of all states found (landforms, soil series); use caution in displaying such data as the typical or modal expression. Base this decision on the goals of the inventory as stated.

13 - Inventory Documentation

Documentation of data collection, methodology, and standards is essential for verification and monitoring changes in the inventory. Document the organization and progress of inventories by preparing an inventory work schedule and storing the resulting information in the inventory files.

13.1 - Inventory Work Schedule

Inventory schedules address how data are to be collected, compiled, and used and how the results are to be documented, disseminated, and maintained. The schedule should cover inventory development through reporting that includes:

1. A description of the inventory objectives.
2. A review of existing measured and derived data.
3. A list of expected results.
4. A determination of how existing data may be combined with the proposed inventory.
5. A list of cooperators, including the responsibilities of each.
6. The time schedule and resource and budget assignments, including personnel and equipment.
7. Classification, stratification, and sampling procedures to be used and sampling intensity required. If appropriate, include the statistical design, precision of required measurements, and precision and accuracy of derived data.
8. A set of local field instructions describing field forms, measurement techniques, and codes. Use standard codes where appropriate.
9. Requirements for training, quality control, and inspections.
10. Time frame for tracking and reporting accomplishments within the established procedures.

11. Analysis and reporting procedures.
12. Data compilation methods.
13. Specifications for the storage of the field data files, including paper files, microfilm, and computer data bases.

13.2 - Inventory Files

Prepare and maintain the inventory documentation and resulting data in accordance with established direction and include:

1. A copy of the inventory work schedule.
2. Accomplishments using established procedures.
3. Items such as field samples not measured or established.
4. Substitute samples.
5. Production rates.
6. Unusual situations that affect the inventory results or costs.
7. Inspection reports evaluating measurement errors.
8. Tabular results of the inventories, including statements of attained sampling errors.
9. Maps of the inventory unit. All inventory sample and map data, where applicable, should be geographically referenced to Forest Service 1:24,000 scale primary base series maps or U.S.G.S. Quads for future geographic information system applications. Establish a minimum of three geographic reference points per graphic layer. Maps should show the following minimum information:
 - a. Land status (title, encumbrances, partial interest, and use restrictions).
 - b. Management area boundaries.
 - c. Location of sampling units and their identification number.
 - d. Extent of the resources, using established mapping standards. Provide appropriate stipulations regarding information reliability.

10. Aerial photographs. Stereo pairs of each field location sampled. These are desirable for relocation and remeasurements in subsequent inventories and for monitoring changes.

11. Cost summaries.

12. Information on schedules, specific objectives, and summary findings.

13. Data files. Inventory data tapes and plot records provide the basic source for compiling Forest, State, Regional and national summaries.

a. Manage, protect, store, and maintain data and information under established data management principles and standards.

b. Keep plot location coordinates stored separately from the sample information.

c. Use existing information systems to summarize data from the files.

d. To the extent possible, make data easily accessible and available to other users.