

**Forest Service Manual
National Headquarters - Washington Office
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**Forest Service Manual 7100 – Engineering Operations
Chapter 7150 - Surveying**

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Posting Instructions: This is a technical amendment that converts the format and style of this FSM title from Applixware to the current corporate word processing application. Since this amendment replaces all text except Interim Directives (ID's), do not check for the last transmittal received for this title, instead place this transmittal sheet at the front of the title. DO NOT remove ID's when posting this amendment. ID's are not being reformatted at this time.

Digest: Following is an explanation of the changes throughout the directive by section.

Please read the new posting instructions carefully. These directions apply to this transmittal only.

7100: Entire amendment text is replaced. New text corresponds with text located on the Service-wide Directives Home Page in the Forest Service Web

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(<http://fsweb.wo.fs.fed.us/directives/index.html>) and the World Wide Web
(<http://www.fs.fed.us/im/directives>).

Although some minor typographical and technical errors were corrected, substantive direction has not been changed.

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The administration and management of National Forest System lands requires the full range of surveying services including Land Surveys (FSM 7151), Engineering Preconstruction and Construction Surveys (FSM 7720, FSM 7154, and FSH 7709.56) and Geodetic and Control Surveys (FSM 7155.)

7150.6 - National Information Requirements

[Reserved]

7151 - Land Surveying

7151.01 - Authority

The Secretary of Agriculture, under the authority granted in the Organic Act of 1897 (16 U.S.C. 474), has delegated to the Chief of the Forest Service the authority to identify, define, administer, and manage National Forest System lands and resources. This mission requires the Forest Service to make or acquire both administrative (engineering, cartographic, geodetic) surveys and legal (cadastral or land) surveys. The Forest Service has limited statutory authority to conduct legal surveys.

1. Federal Survey Authority

a. Public Land Ordinance of May 20, 1785. The Public Land Ordinance of May 20, 1785, vested survey authority in the Department of the Interior (USDI) Bureau of Land Management (BLM). The BLM creates, identifies, and maintains the Public Land Survey System and defines the limits of the public domain either by actual survey or protractors based on official surveys.

National Forest System lands have been reserved by Congress for a special purpose and are set apart from public domain status.

b. Townsite Act Authority. The Townsite Act of July 31, 1958, provides the Forest Service survey authority to locate and describe parcels of land as a part of the conveyance process (FSM 7152.03 and FSM 7152.6).

c. Small Tracts Act Authority. The Small Tracts Act of January 12, 1983, provides the Forest Service authority to survey, monument land corners, mark and post property lines, and describe parcels of land as a part of the conveyance process (FSM 7152.03, FSM 7152.6).

2. Individual State Authority. After title to land has passed from the public domain into private ownership, jurisdiction over the property, including survey authority, passes to the State. Every State has laws which govern land surveying practices.

The Forest Service obtains State authority to perform surveys by employing or contracting with State licensed surveyors.

State authority applies to any boundary between private land and National Forest System land. Jurisdiction of any boundary dispute on Federally owned lands are heard in the Federal court system.

7151.02 - Objectives

Provide legal land surveys and related services to locate, mark, post, and maintain land corners, property corners, and property lines between National Forest System land and other ownerships for the protection and management of National Forest System lands and resources.

7151.03 - Policy

Land surveys affecting the legal real property rights of the United States, the adjoining landowner, or both, shall be made in accordance with applicable laws, regulations, rules of procedures, and acceptable professional practices.

7151.04 - Responsibilities

[Reserved]

7151.05 - Definitions

1. Accessory to the Corner. Any physical object that helps to fix the true original location of the corner. By law, an accessory to a public land survey corner is a "part of the corner." Therefore, if an accessory to a corner is recovered, the corner itself is recovered, even if the monument is missing. The term "recovered" is taken to mean found or located.
2. Administrative Boundary. A line between two land areas which are administered differently.
3. Administrative Survey. Any survey made to assist in the management or administration of lands. Such surveys are only informational and usually have no legal implications.
4. Cadastral Survey. A survey which creates, marks, defines, retraces, or reestablishes the boundaries and subdivisions of the public domain lands of the United States. An official cadastral survey must be performed under Federal survey authority.
5. Corner. A geographic point on a land boundary at which two or more boundary lines meet.
6. Easement. A nonpossessory right or interest in a parcel of land held by one person in the land of another whereby the first person is accorded partial use of such land for a specific purpose. An easement restricts but does not abridge the rights of the owner(s) to the use and enjoyment of the land.

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7. Land Line Location. A Forest Service land surveying program that identifies, marks, posts, and maintains legal property lines and administrative boundaries where property rights and/or management activities require accurate field delineation because of a legal requirement.

8. Land Survey. A survey made to retrace, establish, or reestablish land boundaries, performed by one authorized by State authority to perform such function.

9. Land Survey Plat. A diagram drawn to scale showing all essential data pertaining to the boundaries of a tract of land, as determined by an official land survey. A plat should show all data required for a complete and accurate description of the land which it delineates, including the bearings and lengths of the boundary lines. A plat may constitute a legal description of land and used in lieu of a written description.

10. Land Surveyor. A professional surveyor licensed to practice land surveying under State survey authority.

11. Marking. The act of blazing and painting trees and placing physical objects such as posts or pins along a property line to perpetuate its location, without extensive resurvey.

12. Monument. A physical object which marks the location of a corner or other survey point. The terms "corner" and "monument" are not synonymous.

13. Property Corner. A geographic point on the surface of the earth that is on, is part of, and controls a property line.

14. Property Controlling Corner. A survey corner that is not on a property line, but which influences or fixes the location of one or more property corners.

15. Property Line. A landownership division line between two parcels of land. A separation of real property rights.

16. Posting. The act of placing signs along a property line so it is recognizable.

17. Public Domain Lands. The term applies to any and all areas of land ceded to the Federal Government by the colonial States, and to lands acquired by the Federal Government later by purchase from or treaty with the native Indians, or with the foreign powers that have previously exercised their sovereignty.

These areas are subject to administration, survey, and transfer of title under the Public Land Survey System laws of the United States. The Public Land Survey System laws are not applicable within the colonial States or any of the Atlantic Coast States except Florida, nor within the States of West Virginia, Kentucky, Tennessee, and Texas.

Public lands now include the original public-domain lands, title to which is still in Federal ownership; lands which were obtained by the Government in exchange for original public-domain lands or for timber on such lands; original public-domain lands which have reverted to Federal ownership through operation of the public-land laws.

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Public domain lands fall into two categories (reserved and unreserved). Unreserved public lands are for sale or disposal. Reserved public lands are not subject to disposal. National Forest System lands are reserved public domain lands.

18. Right-of-Way. The term has two significant meanings:

- a. A privilege or right which one person or persons may have of passing over the land of another in some particular line, and/or;
- b. A strip of land for the construction, use and maintenance of a facility such as a roadway, powerline, pipeline, irrigation canal, or ditch, and so forth.

19. Remonumentation. The act of placing a new monument and accessories at an original corner position by means of physical evidence discovered at the site. It does not include measurements to adjacent corners, but may include measurements to nearby accessories.

7151.07 - References

EM 7150-3, Land Surveying Guide.

7151.1 - Standards

[Reserved]

7151.2 - Operations

[Reserved]

7152 - Land Line Location Program

7152.02 - Objective

Provide the land manager and the public with visible and legally defendable administrative and property boundary lines on the ground, and to accurately depict the location of landownership lines on administrative maps produced by the Forest Service.

7152.03 - Policy

1. Legal

- a. Employees who certify land surveys or recommend acceptance of contract land surveys shall have State survey authority by licensure in their respective States (FSM 7151.01). The registration requirement shall be a part of the employees' job description.
- b. Boundary line surveys (cadastral surveys) requiring Federal survey authority shall be conducted under Special Instructions from the BLM under the interagency

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Memorandum of Agreement dated March 19, 1980, or as a reimbursable BLM survey (see FSM 7152.1 and 7152.5 - Cooperation). A request for BLM surveying service shall be prepared on Form FS-7100-54, Request for Cadastral Survey, executed by the Forest Supervisor and submitted to the Regional Forester for necessary coordination (EM 7150-3, Land Surveying Guide). All contacts about surveying services with the BLM shall be made at the Regional level.

- c. Land survey plats and land corner recordation certificates shall be recorded and filed as a public record.
- d. Land corners shall require verification and acceptance by a Forest Service licensed land surveyor before the corner may be remonumented or the property line is marked, posted, and maintained to Forest Service standards (FSM 7152.6).
- e. Land surveys shall not be started without a written request from the Forest Supervisor; every land survey plat entered into the public record shall contain the date and signature of the Forest Supervisor certifying the survey was made at the request of a line officer.

2. Administration

- a. Contracting shall be used wherever possible to provide for land surveying and related services while retaining in-Service expertise to provide for contract administration, new or unusual procedural development, equipment evaluation, emergency or complex land survey projects, and where litigation is anticipated.
- b. Accurate program statistical data in tabular and map format shall be maintained at the Forest level (EM 7150-3, Land Surveying Guide).
- c. Each land survey plat shall receive a technical and legal peer review to ensure correctness of procedure, completeness, and data accuracy before the plat is entered into the public record. The review procedure shall be standardized within the Region.
- e. Each Region shall develop property corner and line visibility standards that meet local land management requirements and ensure compliance with the established standard (reference FSM 7152.6 and EM 7150-3, Land Surveying Guide).
- f. Each Region shall develop and accomplish a program to establish geodetic control or State plane coordinates on land corners established by survey. Geodetic control shall conform to Federal Geodetic Control Committee (FGCC) requirements (FSM 7155, FSH 7109.12, and Report FS-7100-H).

3. Land Stewardship

- a. All National Forest System property boundary lines adjoining private, State, and public trust lands, such as Indian Reservations, shall be located, monumented, marked, and posted to prescribed Forest Service standards prior to undertaking land

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management activities that will occur near or adjacent to the property line (FSM 7152.6).

b. All land management practices shall use, occupy, and/or protect the land and resources of the United States up to the property line to prevent the creation of a false or misleading use line.

4. Public Relations

a. Land surveying program objectives shall be explained to the general public, our adjoining landowners, and other Agencies.

b. Adjoining landowners shall be contacted before land surveying field activities begin to acquire permission for access to adjoining land for surveying purposes, and permission to use corner reference objects and mark trees on private land along the property line. If contact cannot be established within an acceptable time or permission is denied, the situation shall be documented and referred to the responsible line officer for approval to proceed. Under these conditions, trees on private land shall not be marked.

c. Land survey records, such as corner cards, survey plats, corner certificates, land descriptions, notes, reports, and so forth, shall be maintained at the Regional or Forest level in a retrievable format and shall be made available as a public record document (FSH 6209.11, R20-172, and EM 7150-3, Land Surveying Guide).

d. Adjoining landowners shall be contacted to encourage their participation in cost sharing land surveying activities (EM 7150-3, Land Surveying Guide).

e. Each Forest shall develop and accomplish a land corner and property line maintenance program to ensure high visibility of property lines to prevent encroachments and the need for costly resurveys (FSM 7152.6).

f. When surveyed, marked, and posted National Forest System land is conveyed to a private landowner, take prompt action to ensure that National Forest Boundary Line Signs (54-2) are removed so that the general public is not mistakenly attracted onto the private land. Either the new owner or Forest Service employees may remove the signs.

7152.04 - Responsibilities

[Reserved]

7152.05 - Definitions

[Reserved]

7152.1 - Survey Systems

Two basic systems of surveys are used in the United States.

1. Colonial or Metes and Bounds. This is a method of describing land by distance and direction (metes) or limits of the boundary lines (bounds). The most common method is to recite the direction and length of each line as one would walk around the perimeter of the property. Metes and bounds can be recited by reference to deeds of record, natural and cultural features and/or ownership boundary lines. This system is generally used to describe the original English, French, Spanish grants and other irregular parcels of land located in the 13 original States.

2. Rectangular or Public Land Survey System (PLSS). This is the system of surveys adopted for the division of public domain lands established by the Public Land Ordinance of May 20, 1785; it covers all land ceded to the Federal Government by the Original Colonies, and all lands acquired by treaty. Lands within the rectangular survey system are located from a principal meridian and base line by township, range, and section.

A metes and bounds system is also used to describe irregular parcels of land within the Public Land Survey System. An example of this would be a mineral survey or homestead entry survey.

The metes and bounds system was also used to convey title to land before the Public Land Survey System surveys were completed. An example of this occurs in the southwest where Spanish land grants were made before the land became a part of the United States. The boundaries of the grants were tied into and became a part of the rectangular system surveys.

7152.2 - Program Activities

1. Inventory of corners and property lines controlling landownership and partial interests.
2. Recovery, restoration, and perpetuation of corners to establish and/or reestablish property and property controlling corners between different ownerships which are part of the original survey system.
3. Locating, marking, posting, and maintenance of land corners and property boundaries.
4. Documentation of all land surveys with plats, certificates, and/or affidavits by prescribed format to be filed in the local public record (FSH 6209.11 and EM 7150-3, Land Surveying Guide).
5. Maintaining a permanent file of survey records in local Forest Service Offices.
6. Documentation of encroachments.

7152.3 - Program Priorities

Property corners and boundary lines shall be located, monumented, posted, and maintained according to the following descending order of priorities:

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1. Where known litigation is pending or a title claim has been asserted.
2. Where significant resource values exist and utilization or manipulation of those resources is planned. This includes the location, by survey, of easements necessary for resource management.
3. Where encroachment is suspected, or where the probability of encroachment can be reduced.
4. All remaining property lines.

7152.4 - Legal Aspects

The legal interpretation of real property instruments and evidence is the fundamental controlling factor in the execution of land surveys. A clear distinction shall be made between: (1) the survey to identify the written title lines to determine boundaries, and (2) suggestions that a survey establishes title to the land. There shall be no deviation from legal and technical principles by Line or Staff personnel.

All boundary survey have the potential to be challenged in court. Therefore, surveys must satisfy the requirements for legal evidence, required procedures, and recognized standards to be acceptable to the courts.

The registered land surveyor acts as an agent of the Forest Service but is personally liable for gross negligence and constitutional rights tort actions.

Land surveyors are not judicial officers, but, in many cases, they act in a quasi-judicial capacity and must exercise good sense and sound judgment in dealing with boundary and title matters.

Numerous Federal and State laws require, refer to, or indirectly relate to land surveying.

1. Federal Laws. The BLM is authorized to make rules and regulations to implement the land laws of the United States. These laws, rules, regulations, and policies, which are applicable to most Federal lands, are contained in the BLM Manual of Surveying Instructions. Many States have laws requiring that surveys under State jurisdiction be performed in accordance with Manual procedures. National Forest System acquired lands usually come under the State survey jurisdiction. Land ownership cases involving the United States are heard in Federal court.

2. State Laws. The laws of the various States regulate the survey of patented and acquired National Forest System lands within their borders.

All States have provisions for the registration of land surveyors. Some State laws provide exemption from registration to Government employees; however, Forest Service employees engaged in land surveying activities shall be registered land surveyors or work under the guidance, technical supervision, and direction of a registered land surveyor when private adjoining property lines are being identified. The Forest Service employee who is working

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under Federal Land Surveying Authority (FSM 7152.5) shall also have State land surveyor registration from the State in which the work is being performed.

Land surveying activities require access and entry on private land. Most State laws provide the surveyor access to land monuments for the purposes of survey. Line clearing and other surveying activities on private land shall be minimal to prevent adverse relations with the landowner and the potential for a damage or liability claim against the surveyor.

State laws dictate survey standards and document recordation format and procedures. Forest Service surveys shall comply with State survey standards unless our minimum standards are greater than required by the State (FSM 7152.6). The Forest Service shall comply with the State procedures and format for recording documents in the public record.

3. Local Laws and Customs. Line and Staff Officers shall be knowledgeable of local laws and customs affecting land surveys. Any conflicts between Federal, State, and local laws shall be resolved in consultation with the Office of the General Counsel.

7152.5 - Interagency Cooperation

The BLM and Forest Service cooperative survey program includes the following (FSM 1531.1):

1. The Interagency Memorandum of Agreement dated March 19, 1980, provides for Federal survey authority for selected Forest Service employees to accomplish specific land surveying projects under special instructions issued by the BLM.

2. A reimbursable survey or fund transfer program for long-term, project type work that will be financed by the Forest Service and surveyed or accomplished by the BLM. The work may be done entirely by the BLM, or a BLM supervisory surveyor may be assigned to a Forest Service unit to accomplish land surveys using Forest Service field crews and/or contracting procedures.

3. A cooperative training program to develop and accomplish interagency training courses, slide/tape training courses, and some college level training courses in selected surveying subjects.

4. Unusual surveying equipment is available for Forest Service use from the BLM equipment cache.

7152.6 - Standards

1. Survey standards for the establishment of property corners and/or reestablishment of lost corner positions are usually specified by either Federal regulations or State statutes. Minimum Forest Service survey accuracy standards are:

- a. Survey techniques shall ensure a survey error of closure of not less than 1/5000 (1 unit of error in 5000 units).

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- b. Corner positional accuracy standards are specified in EM 7150-3, Land Surveying Guide.
 - c. State and Federal statutory standards, which are more rigid, shall be used as appropriate.
2. Monumentation Standards. Monumentation of property and property controlling corners is a function reserved by Federal and State law to properly authorized surveyors.
- a. Corner monuments:
 - (1) Surveys performed under Federal survey authority must use monuments and procedures as specified by the BLM.
 - (2) Minimum Forest Service standards for monuments set under State survey authority shall be 2-1/2 inches outside diameter pipe, made of iron, aluminum, or corrosion resistant thermoplastic, with a base width of 4 inches (min.) and a 3-1/4-inch diameter tablet or cap made of aluminum or brass. Regions may develop standards to provide for drilled or driven monuments with 3-1/4-inch caps. See EM 7150-3, Land Surveying Guide for appropriate tablet markings, additional details on setting monuments, and special case monumentation.
 - b. Monument accessories:
 - (1) Bearing trees and/or reference objects. All corners must be referenced by a minimum of two accessories (EM 7150-3, Land Surveying Guide).
 - (2) Guard Post and Sign. Every monument must have a guard post with appropriate sign or signs set near by (EM 7150-3, Land Surveying Guide).
3. Property Boundary Line Marking and Posting. The location of the corner point or monument at each end of a line defines location of the property line. The property line may be either a straight line or a curved line between the beginning point and the ending point, depending on the legal description of the property.
- a. Land corners must be monumented to standard before property lines are marked and posted.
 - b. Line Trees. Line trees are trees identified as being on the property line. See EM 7150-3, Land Surveying Guide for marking details and procedures to use line trees to reestablish a lost corner position.
 - c. On-Line Monuments. A line monument must be set on the property line. Documentation of the monument location is required. See EM 7150-3, Land Surveying Guide for details on establishing and using a point-on-line monument to reestablish a lost corner position.

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d. State and Federal statutory standards, which are more rigid, must be used as appropriate.

e. Property Line Visibility. Each Region shall establish visibility standards for line marking (blazes, hacks, and painting) and posting (placing of property boundary signs) based on the visibility guidelines found in EM 7150-3, Land Surveying Guide and commensurate with topography, vegetative cover, management concerns, land uses and values, and the risk of encroachment, within the following minimum standards:

(1) Boundary line signs must be placed on posts or trees within a 4-foot wide posting corridor which is defined as being 2 feet on each side of the exact location of the property line. See EM 7150-3, Land Surveying Guide for post and signing details.

(2) Trees blazed, hacked, and painted must be located within a 6-foot wide blazing corridor being defined as 3-feet wide on each side of the exact location of the property line. In sparse timber areas, increase the intensity of posting rather than expanding the width of the blazing corridor. See EM 7150-3, Land Surveying Guide for blazing, hacking, and painting details.

(3) Red enamel (GSA #11105) shall be the color used to identify National Forest System land corners and property lines.

4. Boundary Maintenance. Each Region shall establish a maintenance cycle commensurate with resource needs and field conditions.

Corners and lines not located and established by an acceptable official survey of record shall not be maintained.

See EM 7150-3, Land Surveying Guide for details on maintenance activities and how to handle property lines that were surveyed and marked to standards that are different from current standards.

7153 - Rights-of-Way Surveys

A right-of-way may be created by easement deed, permit, license, deed reservation, or exception in a deed. They may be obtained for a definite time period or in perpetuity.

The deed for a right-of-way in fee title or as a partial interest (easement) must be executed with the same formalities as any other deed and must convey those rights intended by both parties.

The deed must contain an adequate legal description and clearly define the area and rights to be conveyed.

Lands surveys may be required when the Forest Service acquires or grants an easement for a road right-of-way or any other type of right-of-way. Permits or licenses may also require a survey.

See FSM 5460 for more information on road rights-of-way.

7153.01 - Authority

Authority to survey rights-of-way and easements is vested with State survey licensure.

7153.02 - Objectives

Provide a recordable, locatable, and accurate land description that clearly documents the intent of the parties to the transaction.

7153.03 - Policy

1. Surveys for a fee title right-of-way shall be made using State survey authority and conform to State monumentation and documentation requirements. Minimum survey accuracy standards shall conform to FSM 7152.6. The survey shall be in sufficient detail to allow the preparation of an adequate written description and/or plat.

2. When the right-of-way is for temporary use, fee title is not acquired, and condemnation is not required, a precise legal survey may not be required. The authorizing document shall include a legal description which is tied or projected to the land net and/or contain a general centerline or other description of the land intended to be occupied. Each Region shall develop local survey and documentation standards to fit temporary use conditions.

3. Survey requirements for a right-of-way description for acquiring or granting rights or interests lying somewhere between fee title and temporary use shall be developed by each Region.

4. Each permit or license description shall include a plat which may vary from a line on a photograph or map, to a centerline survey description, depending on the duration of the permit and the rights or privileges being conveyed.

7153.04 - Responsibilities

[Reserved]

7153.05 - Definitions

EM 7150-3, Land Surveying Guide.

7153.1 - Administration

EM 7150-3, Land Surveying Guide.

7153.2 - Operations

EM 7150-3, Land Surveying Guide.

7154 - Engineering Surveys

[Reserved]

7155 - Geodetic and Control Surveys

Regions shall notify the Washington Office Engineering Staff Unit of planned projects meeting the reporting requirements of the Federal Geodetic Control Committee (FGCC). These requirements are:

1. All surveys that conform to the Federal specifications for second order control surveys.
2. All surveys that require connection to the Geodetic Survey System that exceed a cost of \$20,000. The funding period for the \$20,000 cost may exceed 1 year and includes ongoing control densification efforts.

The Washington Office will provide the reporting forms as required by FGCC.