



United States
Department of
Agriculture

Forest Service

**Rangeland
Management
Staff**

Washington, DC

August, 2014

Threatened, Endangered And Sensitive Plants Survey

Protocol and Field Guide





**USDA Forest Service
Threatened, Endangered and Sensitive Plants
Survey Protocol and Field Guide**

August, 2014

USDA Forest Service Threatened, Endangered and Sensitive Plants Survey Protocol and Field Guide

August, 2014

Table of Contents

OVERVIEW

ERROR! BOOKMARK NOT DEFINED.

<i>GENERAL DESCRIPTION</i>	1
<i>NATIONAL DATA STANDARDS</i>	1
<i>AREA OF USE</i>	3
<i>MAPPING THE SURVEY AREA</i>	3
SURVEY FIELD FORM INSTRUCTIONS	5
<i>GENERAL INFORMATION</i>	5
<i>SURVEY VISITS</i>	ERROR! BOOKMARK NOT DEFINED.
<i>TARGET SPECIES</i>	7
<i>SPECIES LIST OF SURVEYED AREA</i>	8
<i>LOCATION DETAILS</i>	9
<i>DIRECTIONS</i>	11
APPENDIX A - LITERATURE CITED	12
APPENDIX B – TES PLANTS SURVEY LIST OF VALUES	13
APPENDIX C - FOREST SERVICE TES PLANT SURVEY FIELD FORM	17
<i>GENERAL INFORMATION</i>	17
<i>SURVEY VISITS</i>	17
<i>TARGET SPECIES</i>	18
<i>SPECIES LIST OF SURVEYED AREA</i>	19
<i>OPTIONAL LOCATION INFORMATION</i>	20

USDA Forest Service Threatened, Endangered and Sensitive Plant Survey Protocol and Field Guide

General Description

Plant surveys typically consist of searching a specific geographic area to determine the presence of particular species, or to evaluate the habitat suitability for those species in that area. Surveys are commonly conducted to search for threatened, endangered and sensitive (TES) plants. Tracking of “watch” species, or species of concern at a Forest level, may also be accomplished using this protocol. The purpose of this protocol is to describe corporate data standards and attributes that summarize information about a TES Plant Survey. It is important to know where and when these surveys were conducted, even if the object of the survey (the target species) was not located. Although lack of detection does not absolutely prove lack of presence, information on the absence of a rare plant species can be as valuable as information on the presence of the species in a specific area. The ***USDA Forest Service TES Plant Survey Protocol*** is a consistent way to record the date, surveyor(s), location, type, target species, and results for a survey.

The TES Plant Survey Protocol is used to document the actual search or survey process. When a target species is located, data about the distribution and condition of that particular population is recorded using the ***USDA Forest Service TES Plant Element Occurrence Protocol*** (USDA Forest Service, 2005).

Plant surveys are conducted for a number of legal, policy and management reasons. A project proposal, such as a timber sale, prescribed burn, or road construction, will often require a survey under the auspices of the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), and USDA Forest Service policy. In such cases, the purpose for the survey is to locate any threatened, endangered or sensitive plant species within the project area that might be affected by the proposed project. In other cases, the purpose of the survey may be to search for locations of TES plant species where potential habitat has been identified. Such “targeted” surveys are conducted outside the context of a project, and are typically used as part of a status assessment for specific species.

Some survey information needs to be compiled prior to fieldwork, including general survey location information, the target species, survey type and focus. This preliminary (or *Pre-survey*) information is needed by the surveyors to help them perform the survey, and map any detected element occurrences.

National Data Standards

Following a corporate approach for collection of TES plant survey data facilitates:

- data sharing within the agency
- data sharing with partners
- data storage, tracking and reporting
- program consistency and efficiencies

The national TES Plant Program has developed agency data standards for collection and storage of TES plant data. Beginning in November 2001, a program working group, consisting of the Regional Botanists and a group of botanists on the National Forests and Ranger Districts, provided the guidance for protocol development. In May 2004, the draft products were reviewed in detail by a larger group of field botanists across the agency, representing the program user community.

All of the corporate data standards and attributes published in this protocol are supported in the Natural Resource Information System (NRIS). A required set of core attributes must be collected during field work and electronically stored in the corporate NRIS application to meet the minimum business needs of this protocol. All other fields are considered optional and can be used as needed or conditionally required at the Regional or local level to meet specific objectives. Table 1 lists the required attributes for plant surveys. Some attributes are auto-generated and populated in the NRIS application from the polygon feature. Detailed attribute descriptions and collection standards follow later in this document.

Pre-Surveys and Active Surveys	Completed Surveys
Survey Polygon (<i>spatial feature</i>)	Survey Polygon (<i>spatial feature</i>)
Survey ID	Survey ID
Survey Status	Survey Status
Survey Area in acres (<i>Auto-generated in NRIS</i>)	Survey Area in acres (<i>Auto-generated in NRIS</i>)
Target Focus	Target Focus
	Survey Type
	Survey Focus
	Visit Dates
	Examiners
	Target species plant code(s) (<i>i.e. objects of survey</i>)
	Suitable habitat found (<i>for the target species</i>)
	Target species found

Table 1: Fields required by the USDA Forest Service TES Plant Survey Protocol

Pre-survey information can be entered into the NRM TES Plants (TESP) Application, and reports generated that can be utilized by the field crews. Since some surveys may extend over many weeks, data can be entered into TESP prior to the survey being complete (active surveys). Completed surveys must have all required fields populated.

Data can be recorded in the field using the standard field form for TES Plant Surveys (Appendix C) and then entered into NRM TESP Application. The NRM application uses an ArcMap “Task Assistant” and Windows data entry forms to guide the user through a common workflow to enter and edit the spatial representation of the survey polygon and the associated attribute data. The data entry screens mimic the workflow as presented on the paper field form. Block headings on the paper form correspond to tabs or buttons on the electronic forms. Future development work may also support field data entry on electronic portable data recorders (PDRs).

This TES Plant Survey Field Guide makes occasional references to the NRM TESP computer application. However, the field guide is not meant to be a user guide for the NRM application as a whole. User Guides, Administrative Guides, Stewardship Guides and other relevant information can be accessed via the NRM FSWeb website:

http://fsweb.nris.fs.fed.us/products/TESP_Invasive_Species/documentation.shtml

Area of Use

The TES Plant Survey Protocol is applicable to all vegetation types in terrestrial, riparian and aquatic environments. The protocol can be applied to surveys conducted on National Forest System (NFS) lands and other ownerships as appropriate.

Mapping the Survey Area

This protocol requires spatially locating and delineating each survey to display the location and the extent of the survey. Spatial representation can be created by a number of methods:

- Hand-drawing the perimeter of the survey on maps or aerial photos, then redrawing the survey polygon within the NRIS TES Plants application;
- Using a GPS (Global Positioning System) device to define smaller areas, converting them to a shapefile, and importing the file into the TESP layer using TESP-IS Task Assistant ArcMap functionality;
- Digitizing the survey polygon with a computerized mapping system (Geographic Information System [GIS]) and importing it into the TESP layer using TESP-IS Task Assistant ArcMap functionality.

Regardless of the method used to delineate a plant survey in the field, the protocol requires that basic location information and the polygon be digitized and stored in ArcMap format. Survey polygons must be entered into TESP before additional survey attributes can be entered.

To ensure consistency, the scale for hand-drawn survey polygons on maps should be 1:24,000. This is the scale of United States Geological Survey (USGS) 7.5-minute quadrangle (quad) maps. Note that maps with a variety of scales are utilized in Alaska. Aerial photos, orthophoto quads and remote sensing approaches can also be useful formats for delineation.

There is no minimum size for a delineated survey polygon. The NRM application will allow very small surveys to be accurately depicted and located.

To facilitate consistency and information sharing in GIS, all TES plant surveys will be mapped and stored as polygons. Line and point data (layers) will not be supported. Surveys that could be mapped as “lines,” such as those occurring along ridges, streams, trails, or roadsides, will be stored as long, narrow polygons.

Figure 1 illustrates two possible ways in which a survey can be entered spatially using the TES Plant Survey protocol. In some cases the survey area may simply include one contiguous polygon (“Survey 1”), while in other cases a survey area may consist of adjacent subunits that are all part of the same survey (“Survey 2”). For example, a timber sale with multiple non-contiguous units that need to be surveyed for the same purpose and target species would be a multi-part polygon survey. Survey data apply to the *entire* survey. Detailed data for each separate polygon of the survey is not specifically tracked in the collection methods, field form, or NRM application. Although each “part” will be drawn in the NRM application, acres for all parts comprising one survey are combined to calculate and auto-populate the survey area in the NRM application. If there are significant differences in survey type, focus, or target species between polygons, it may be appropriate to identify and document them as separate surveys.

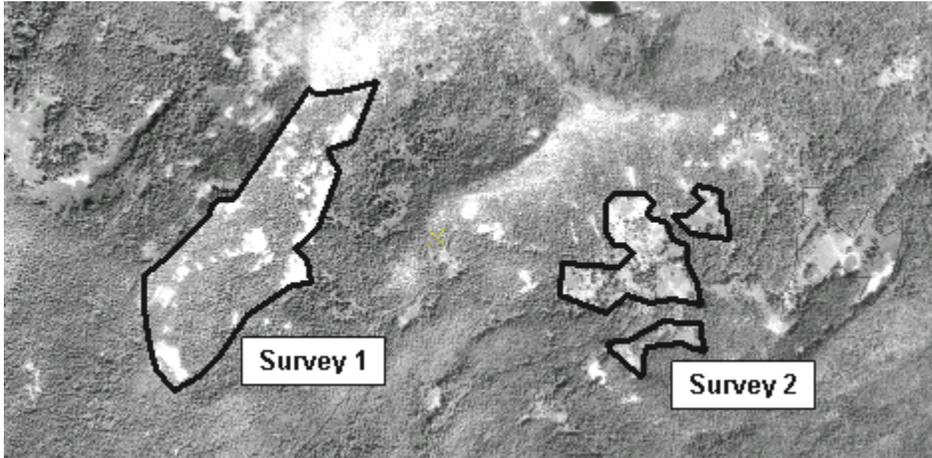


Figure 1: Survey 1 is single survey represented by one contiguous polygon. Survey 2 is a single survey represented by a multi-part polygon.

In addition to storing the spatial representation of the survey, the NRM TESP Application will automatically derive and populate Latitude and Longitude in decimal degrees based on the centroid of the survey feature. Other tabular location fields are provided in the field form and the application, but are purely optional. These fields can be used to record a Legal Description for the survey when desired (available tabular location fields are outlined in the “Location Details Section”).

GPS technology can be helpful in locating, mapping and relocating the survey. A photograph of the general setting and location may also be helpful but is not required.

Survey Field Form Instructions

Descriptions of data fields are presented below. Required data fields are also indicated in the description and on the attached field form. Category headings and field numbers correspond to the layout and naming conventions used on the attached TES Plant Survey Field Form. **Fields that have a standard “List of Values” (LOV) associated with them are listed in Appendix B.** The TES Plant Survey field form is found in Appendix C of this field guide.

General Information

1) Survey ID: *Required*.

Assign a unique identification number to the survey. Each survey should have a unique Survey ID at the Forest level. This field is the unique identifier for the survey polygon(s). The Survey ID can be any combination of numbers and letters, up to 30 characters in length. It is recommended that Regions establish and follow a consistent approach for labeling survey IDs. It is highly recommended that the combination of Region, Forest and District numbers form the first six digits of the Survey ID, followed by “S” and a unique survey number (example: RRFDDDS##### [060805S00055]). This convention will facilitate consistent regional/district tracking and reporting.

2) Survey Name:

Enter a descriptive label for the survey. Up to 240 alphanumeric characters can be used. Include the project type as appropriate in the survey name. Examples: *Salmon River Meadows Prescribed Burn* or *Elkhorn Timber Sale*.

3) Survey Status: *Required (LOV)*.

This field is used primarily to support tracking in the NRM TESP Application and to indicate when survey results are ready for use in analysis. The application can be used to enter certain data prior to, during, or after survey field data collection.

Survey Quality Control (Q/C) Certification Flag: A check box indicator that the completed survey information has been reviewed and accepted by the appropriate data steward and deemed ready for use in comprehensive analysis and data sharing (“unchecked” is the default value until certified). Survey Status must be set to “Complete” which indicates that all required field work and data entry is complete, before a survey can be certified. The certification date and person’s name is displayed on the form when the Q/C flag is checked. Only a person with the *Data Steward Role* can certify the survey within the NRM TESP application. Persons with the Editor Role can enter and edit data, including changing the survey status to Complete as appropriate. Once a Survey is flagged certified by the Data Steward, it is locked for general editing.

Target Focus: *Required (LOV)*: The type of Protocol followed for the survey. Select from a List of Values. This field sets the protocol to follow in the field and the required fields in the application.

4) Source of Work: *(LOV)*.

Indicate the primary work force used to perform the survey work.

5) Survey Type: *Conditionally Required (LOV)*.

Enter the type of survey that was conducted. Up to three survey types may be entered. If the survey types are significantly different from one another, however, use the “Survey Comment” field to describe why.

6) Survey Focus: *Conditionally Required (LOV).*

Record the predominant focus of the survey from the List of Values. More than one choice can be recorded if survey target species occur in more than one of these general habitats.

7) Area Surveyed: *Calculated.*

The actual area in acres will be calculated and auto-populated from the spatial feature once the Feature is created in the TESP Application. A single survey may be comprised of more than one polygon. Acres for all polygons comprising a particular survey are combined to calculate and auto-populate the total survey area in the application.

8) Elevation:

For the spatial extent of the survey, record the maximum, minimum, and average (or “predominant”) elevation of the area.

9) Elevation Unit of Measure: *(LOV).*

Record whether the unit elevation was measured in feet or meters. *If elevation is entered this field is required.*

10) Survey Parameters:

Enter the parameters, strategies or ecological characteristics that were used to define or direct the survey. They could include such characteristics as habitat types, north slopes, calcareous soils, or distance in feet on each side of the road. Information in this field will be useful for interpreting survey results and for defining necessary fieldwork in pre-survey documentation. Up to 2000 characters can be entered into the parameter field.

11) Survey Comments:

This field is available to document any relevant information about the survey. Record general comments about the survey work, the survey area or findings. Include comments about specific visits, survey focus, land management within the survey area, etc., as needed. Up to 4000 characters can be entered into the Comment field.

12) Visit Date(s): *Conditionally Required.*

Plant surveys may be conducted over days, weeks and even months. The protocol allows you to record each day of field survey. The date format is MM/DD/YYYY. Record the calendar month, day, and year for each survey visits. These were the actual days that the survey was performed in the field and not the date(s) the data were entered into the application. Survey dates provide information about the time of year plants or habitats were observed. Surveys conducted at certain times of year may not reveal certain species that have already senesced or have yet to emerge in the spring. This field also indicates the age of the survey information, which may help identify the need for follow-up surveys.

13) Examiner(s): *Required (LOV).*

Record the last name and first name of all examiners present on any given visit date.

Number of Traverses:

Designates the number of traverses or passes through the survey area which provides the means to quantify survey intensity. As an example if a 2 person crew used pace transects across an open slope and each individual completed 3 passes a total of 6 traverses would be recorded.

Fiscal Year Obligated:

The fiscal year that survey funds were obligated to conduct the planned action. If the source of the work was Force Account then FY obligated is the year the personnel conducted the survey. If contracts or agreements are used, FY obligated would be the year that the document was approved or awarded and funds obligated.

Survey Funding (LOV):

The Fund Code(s) used to finance the Survey from a List of Values. Each survey record may have more than one fund code (BLI). If multiple fund codes (including contributed or volunteers) are used to finance a survey the funding grid must include the additional fund code with an estimated percent funded.

*Target Species***14) Plant Code *Conditionally Required (LOV)* and 15) Scientific Name: .**

Record all plant species (plant code and/or scientific name) that are the object of the survey. Codes for plant species must follow the USDA *PLANTS* database, plant symbols convention (USDA, NRCS 2002). Botanical nomenclature should follow a standard flora for the geographic area being sampled. Target species are typically determined via a pre-field review of information about the habitats that are known or suspected to occur in the survey area.

There is no limit to the number of target species that may be entered. It is a good habit to write out the name or a portion of the name on the field form to minimize misapplication of plant codes. The NRM TESP Application will auto-populate the entire scientific name when plant codes are entered, and can auto-populate the NRCS plant code when the scientific name is chosen from a standard list. Include the genus, species, and subspecies or variety as needed to properly identify the TES plant.

Plant lists can be created and stored in TAXA by the regional and local TAXA data stewards for repeated use in the TESP application. Many plant species can be quickly imported from a stored plant list to save data entry time for a long list of target species. The list of target species that is imported can then be modified to accurately represent the current survey.

16) Suitable Habitat Found: *Conditionally Required (LOV)*.

Habitat for a target species may be present even though the species itself may not be present. Record (yes/no) whether or not suitable habitat for each particular target species was found during this survey. This field may only be left blank if target species data are entered for pre-survey purposes or during an active survey while fieldwork is still ongoing. A yes or no must be entered for every target species before the survey can be considered complete. (Alternatively, if a target species initially included in a search list was not assessed in the field, the species name should be removed from the target species list in order to tag the survey as complete.)

17) Plant Found: *Conditionally Required (LOV)*.

Record (yes/no) whether or not an occurrence of each particular target species was found during this survey. This field may only be left blank if target species data are entered for pre-survey purposes or during an active survey while fieldwork is still ongoing. A yes or no must be entered for every target species before the survey can be considered complete. (Alternatively, if a target species initially included in a search list was not assessed in the field, the species name should be removed from the target species list in order to tag the survey as complete.)

If a target species is located during this survey, you are required to create an **Element Occurrence (EO) Record** for each unique occurrence of this species in the survey area. *FS Site ID* is a required field on the EO form (*refer to the USDA Forest Service TES Element Occurrence Protocol [USDA Forest Service. 2005]*). (**Note:** this ID number is separate from the “EO #” which is created and managed by the state Natural Heritage Program and Conservation Data Center offices.) Including the FS Site ID field on the paper survey form simply provides a link to any associated element occurrence records.

Associated Species List of Surveyed Area

Optional. A list of all plant species found during the survey, or a partial list of species found to meet some desired criteria, can be stored for the survey area. The reasons for compiling species lists for surveyed areas include: 1.) developing floristic information for a Ranger District, National Forest or Grassland; 2.) assembling additional habitat characterization information for any associated TES plant species; and 3.) refining knowledge about the distribution and frequency of plant species on a Ranger District, National Forest or Grassland.

18) Completeness of Species List: (LOV).

An indication of how thorough the list of species recorded is for the survey area. *If a list of species is recorded, this field is required.*

19) Cover Method: (LOV).

Required only if percent cover is recorded for any of the plant species on the species list. This field defines the method used for estimating cover: either a cover class set of codes or actual (continuous variable) estimates. **NOTE:** In this case, cover values are estimated and recorded for the survey polygon(s) as a whole (e.g., these values are **not** recorded using plot- or transect-based methods). The purpose for entering cover values in this case is simply to provide relative estimates that might be used to compare the general abundance of species in the survey area. As such, these cover values would **not** be appropriate for more rigorous quantitative analyses of vegetation data. If such rigorous data are desired, then the examiner(s) should use one of the appropriate vegetation protocols available such as ocular macroplot, cover-frequency, or line intercept (USDA Forest Service, 2003).

20) Plant List Comments:

A text field to describe what guidelines were used for recording species or to give a text description of how complete or thorough the species list is. It is good practice to explain in this comment section what criteria were used to collect any partial plant list.

21) and 22) Plant Code and Scientific Name: (LOV).

Record all plant species (plant code and/or scientific name) that are to be included in the survey area plant list. Codes for plant species must follow the USDA *PLANTS* database, plant symbols convention (USDA, NRCS, 2002). Botanical nomenclature should follow a standard flora for the geographic area being sampled.

There is no limit to the number of species that may be entered. It is a good habit to write out the name or a portion of the name on the field form to minimize misapplication of plant codes. The NRM TESP Application will auto-populate the entire scientific name when plant codes are entered from the standard list. Include the genus, species, and subspecies or variety as needed to properly identify the plant.

Flag any species recorded on the field form that are considered to be non-native plants. Refer to the USDA *PLANTS* database for this specification (USDA, NRCS 2002).

23) Lifeform: (LOV).

Lifeform is defined as the characteristic form or appearance of a species at maturity. As desired, enter the lifeform code for each species recorded in the survey.

24) Habitat:

Text field to briefly indicate the habitat in which that particular species was found in the survey area.

25) Percent Cover or Class: [\(LOV\)](#).

Ocular estimates of canopy cover of live foliage for plant species are an effective way to quickly collect abundance information about plants. This information can be collected using direct values or by using established canopy cover classes. Indicate the cover class method used (field 25). Cover class codes come from a list of values, whereas actual estimates are recorded as a number from 0.1 to 100.0. Since survey areas can be large, these estimates are merely approximate values, and are intended simply to give a general picture of the composition and relative abundance of species in the area. See the note in the description of field 25 regarding the use of cover data in this form.

Roads/Trails Surveyed

Optional. A list of roads and trails that were searched as part of the Survey. Record the Type (Road or Trail), the Number, and if appropriate the name of the road or trail.

Location Details

This protocol requires spatially delineating each survey to display the location and the extent of the survey (refer to *Mapping the Survey Area* on page 5). In addition to storing the spatial representation, the NRM TESP Application will automatically derive and populate Latitude and Longitude from the centroid of the feature.

Geopolitical Units (field form only)

It can be useful to record the political or administrative units on the field form. A survey may span two or more geopolitical units for any particular field. For example, a survey may extend across a state, county or National Forest boundary. In this case, record all that apply.

26) State:

Record the code for the state (or states) in which the survey is located. These codes are the same as the postal state codes.

27) County:

Record the county (or counties) in which the survey is located.

28) Region:

Record the Forest Service Region (or Regions) in which the survey is located. This field is not required when ownership is on non-Forest Service lands.

29) National Forest/Grassland: *Required*.

Record the National Forest or Grassland (or more than one) in which the survey is located. Forest/Grassland codes will be auto-populated in the application as the VPD unit code when the spatial feature is created.

30) District:

Record the Ranger District (or Districts) in which the survey is located. This field is not required when ownership is on non-Forest Service lands.

Alternative Location Methods

Tabular location fields beyond those mentioned above are provided in the field form and in the application, but are purely optional. These fields can be used to record a representative point or area for the location of the survey, when desired. Tabular data can be recorded about quad maps or legal description.

31) USGS Quad Number:

The number of the primary USGS quadrangle map containing the survey. These codes are stewarded nationally by the ALP application. *(Note: currently only one representative quad can be entered in the application and surveys may commonly cross into more than one).*

32) USGS Quad Name:

The name of the primary USGS quadrangle map containing the survey. These codes are stewarded nationally by the ALP application. *(Note: currently only one representative quad can be entered in the application and surveys may commonly cross into more than one).*

33) Forest Quad Number:

The locally stewarded number for the primary USGS quad map where the survey is located. *(Note: currently only one representative quad can be entered in the application and surveys may commonly cross into more than one).*

34) Forest Quad Name:

The locally stewarded name for the primary USGS quad map where the survey is located. *(Note: currently only one representative quad can be entered in the application and surveys may commonly cross into more than one)*

35) Legal Description (Public Land Survey System or “PLSS”):

For areas of the country where the Public Land Survey System is available, it is desirable and required to record this information to an appropriate level of detail **on the field form only**. Since legal descriptions will not auto-populate in the application, this information must be manually entered into the NRM TESP data entry form if it is desired to be electronically stored. (These fields can be used only to record a representative point or area for the survey, when desired.)

Meridian: (LOV).

Record the code for the line of longitude from north to south that is the basis for local legal descriptions. These lines are also known as Principal Meridians and have distinct names.

Township/Direction: (LOV).

A Township is a unit of land containing 36 mile-square sections. Townships run in rows that parallel the local Base line. Each Township row is sequentially numbered relative to the row's order from, and whether it's north or south of, the local Base line; e.g., T2N (for the second township row north of the local Base line). To accommodate fractions of townships an additional code is required after the Township number, where 0 will equal no fraction; 1 equals $\frac{1}{4}$; 2 equals $\frac{1}{2}$, and 3 equals a $\frac{3}{4}$ township (see table of examples below).

Range/Direction: (LOV).

The Range numbers run parallel to the local Principal Meridian. Range rows are sequentially numbered relative to the row's order from, and whether it's east or west of, the Principal Meridian; e.g. R2E (for the second Range row east of the Principal Meridian).

Township & Range Example	Description
7 N 14 E	Township 7 North Range 14 East
7.1 N 16 E	Township 7 1/4 North Range 16 East
8.2 N 12.0 W	Township 8 1/2 North Range 12 West

Section: (LOV).

Each 36 square-mile township is subdivided into smaller squares called Sections. Record the Section where the center of the survey polygon is located. A Section is equal to one square mile, 2.59 square kilometers, 640 acres, or 1/36 of a township. (*Note: only one representative section can be entered in the application and surveys may commonly cross into more than one*)

Quarter Section: (LOV).

The quarter-section subdivision where the center of the survey polygon is located. For example: the NE quarter of section 4 (NE ¼).

Quarter, Quarter Section: (LOV).

The quarter-quarter section subdivision where the center of the survey polygon is located. For example: the NW quarter of the NE quarter of Section 4 (NW ¼ NE ¼).

Quarter, Quarter, Quarter Section: (LOV).

The quarter-quarter-quarter section subdivision where the center of the survey polygon is located. For example: the SE quarter of the NW quarter of the NE quarter of Section 4 (SE ¼ NW ¼ NE ¼).

Quarter, Quarter, Quarter, Quarter Section: (LOV).

The quarter-quarter-quarter-quarter section subdivision where the center of the survey polygon is located. For example: the SW quarter of the SE quarter of the NW quarter of the NE quarter of Section 4 (SW ¼ SE ¼ NW ¼ NE ¼).

36) Decimal Degrees**Geodetic Datum: (LOV).**

Record the geodetic datum for the Latitude and Longitude coordinates. See table above for datums.

Latitude Decimal Degree:

Latitude in a degree value. Consists of the latitude in degrees to at least 6 decimal places.

Longitude Decimal Degree:

Longitude in a degree value. Consists of the longitude in degrees to at least 6 decimal places.

37) GPS Equipment Used:

The manufacturer and model number of the GPS unit used.

38) Directions:

A general description of the survey location, with directions as needed to return to the survey area including Metes and Bounds if appropriate. Metes and bounds is a system or method of describing property or real estate when it is surveyed. The system was used in England and, by custom, was applied in the original 13 colonies that became the United States. The system uses physical features of the geography along with directions and distances to define a piece of land. It is sometimes referred to as a *Boundary Survey*. The application accommodates up to 4000 characters in the Directions field.

APPENDIX A - LITERATURE CITED

Elzinga, C., *et al.* 1998. Measuring and Monitoring Plant Populations. BLM Technical Reference 1730-1. Denver, Colorado. 477 pp.).

FGDC. 1997. Vegetation Classification Standard. FGDC-STD-005. Vegetation Subcommittee, Federal Geographic Data Committee. FGDC Secretariat, U.S. Geological Survey, Reston, Virginia, USA.

USDA Forest Service. 2003. National Range Protocols. Washington Office – Detached Rangelands Staff, Ft. Collins, Colorado.

USDA Forest Service. 2005. TES Plant Element Occurrence Protocol. Draft, in press.

USDA, NRCS 2002. The PLANTS database, version 3.5. National Plant Data Center, Baton Rouge, LA
<http://plants.usda.gov>

Appendix B – TES Plants Survey List of Values

3) Survey Status: *Required.*

Code	Description
Presurvey	Prior to beginning fieldwork, information can be entered to help with survey planning and fieldwork preparation. In addition to the spatial survey boundary, the survey ID and survey status are required at this stage of data entry. If pre-field review information is available to formulate a target species list, that list may also be entered at this stage, and would enable printing a list of target species to take in the field.
Active	Used when initial survey results are being entered into the application, but fieldwork (or data entry work) is not yet complete. Since surveys may span an extended period of time within the field season, it may be advantageous to begin data entry prior to the completion of fieldwork. This category indicates that the survey is incomplete and should not be used for final data interpretations. In addition to the spatial survey boundary, the survey ID and survey status are required at this stage of data entry. “Active” will be the default value for this field in NRIS until set otherwise.
Inactive	Surveys that have been suspended for a variety of reasons, including when the proposed project that required the survey is postponed or suspended.
Cancelled	Surveys that are stopped before they are completed because the proposed project that triggered the need for the survey was cancelled, or for other relevant reasons, including funding and personnel changes or modified priorities.
Completed	Fieldwork and data entry work are complete for the survey, and survey data are ready to be certified for analysis. The survey polygon and all required fields from the field survey protocol must be entered before the status field of “Complete” can be used in the application.

Target Focus: *Required*

Code	Description
IS	Invasive Species Survey Protocol with required Invasive Species Target list(s)
TESP	TES Plant Survey Protocol with required TES Target Species list
TESP/IS	TES Plant & Invasive Species Survey Protocols with required target list(s)

4) Source of Work:

Code	Description
Force Account	Seasonal or permanent Forest Service employees
Contract	A contracted work crew or consultant(s)
Volunteer	Survey provided by unpaid volunteer(s)
Academia	Faculty, graduate student(s) or researcher(s) from an academic or research institution
Historic	Survey conducted previously, with source of work unknown
Other	

5) Survey Type: *Required.*

Code	Description
Field Check	In a Field Check, the survey area is given a quick “once over” but the surveyor does not walk completely through the project area. The entire area is not examined.
Cursory	A Cursory survey is appropriately used to confirm the presence of species of interest identified in previous surveys or in the pre-field analysis. By its nature, the cursory survey is rapid, and does not provide in-depth environmental information. The entire area is traversed at least once. For example, stand condition as seen in aerial photography can be verified by a cursory survey. Also, a cursory survey can be used to determine if a plant population that had been previously documented at a site remains present or intact.
General	The survey area is given a closer review by walking through the area and its perimeter or by walking more than once through the area. Most of the area is examined
Focused (Intuitive Controlled)	The Focused, or Intuitive Controlled, survey is the most commonly used and most efficient method of surveying for TES plants. During pre-field analysis, potential suitable habitat is identified for each species of interest and the survey effort is focused in those areas. This method requires adequate knowledge of suitable habitat in order to accurately select the areas of focused searching. When conducting intuitive controlled surveys, an area somewhat larger than the identified suitable habitat should be searched to validate current suitable habitat definitions.
Random	Random surveys employ an undirected, typically non-linear, traverse through a project area. They are employed either when there is inadequate natural history information about a species to discern its suitable habitat and the surveyor is simply searching for occurrences, or when a target species is very abundant within a search area and the surveyor is attempting to make estimates of population parameters such as intra-patch variations in density or the occurrence of predation or herbivory. However, a stratified random survey may be more effective in these latter cases.
Stratified Random	The Stratified Random survey is most often used within known population areas of target species, or when an area to be surveyed is of unknown habitat suitability and is relatively large. Stratified random surveys employ a series of randomly selected plots of equal size within a project area that are each thoroughly searched for target species. When conducting a stratified random survey, it is important to sample an adequate number of plots that are of sufficient size if statistical inference regarding the survey area is desired (for discussion of sample designs, see Elzinga, C., <i>et al.</i> 1998).
Systematic	The Systematic survey is typically used in limited areas where the likelihood of occurrence of a target species may be evenly distributed throughout the survey area. Systematic surveys are often employed either within focused search areas (e.g., stratified random and intuitive controlled methods), or when a proposed project is likely to produce significant habitat alterations for species that are especially sensitive to the proposed activities.

6) Survey Focus: *Required.*

Code	Description
Terrestrial	Upland areas.
Riparian	Areas of seasonal or periodic flooding and/or areas of transition from aquatic to upland areas.
Aquatic	Aquatic surveys are confined to surveys within water bodies such as springs, streams, lakes, ponds and irrigation canals. Vegetation can be classified as emergent, floating, hydrophytic, or submergent. For surveys that include the transition zone to uplands and areas of seasonal or periodic flooding, also record <i>riparian</i> .
Features	The survey focused on an area in and adjacent to developed features such as roads, trails, campgrounds, parking lots and boat launches.

18) Completeness of Species List:

Code	Description
Complete	Represents an attempt to list all species found. The survey area was surveyed intensively.
Reduced	Incomplete species list for some reason, e.g., partial search, only species above a certain cover value were recorded, etc. Indicate any specific criteria in the Comments field (field 26).
Selected	Only recorded species according to some selection criteria, such as only certain life forms, only species of specific interest, etc. Indicate any specific selection criteria in Comments field (field 26).

19) Cover Method:

Code	Description
DAUBEN	Daubenmire Canopy Cover Classes, modified to include trace.
NRMCOV	Cover Ten Codes - National Rangeland Methodologies Data Dictionary Canopy Cover Classes
CVRPCT	The actual estimated canopy cover percent.

23) Lifeform:

Code	Name	Description
AL	Algae	A general name for the single-celled plant plankton, seaweeds, and their freshwater allies.
FB	Forb/herb	Vascular plant without significant woody tissue above or at the ground. Forbs and herbs may be annual, biennial, or perennial, but always lack significant thickening by secondary woody growth and have perennating buds borne at or below the ground surface. Federal Geographic Data Committee (FGDC, 1997) definition includes graminoids, forbs, and ferns; in PLANTS, graminoids are separated.
FU	Fungi	A non-flowering plant of the kingdom Fungi, lacking chlorophyll.
GR	Graminoid	Grass or grass-like plant, including grasses (Poaceae), sedges (Cyperaceae), rushes (Juncaceae), arrow-grasses (Juncaginaceae), and quillworts (<i>Isoetes</i>). An herb in the FGDC classification (FGDC, 1997).
LC	Lichen	Organism generally recognized as a single plant that consists of a fungus and an alga or cyanobacterium living in symbiotic association. Often attached to solid objects such as rocks or living or dead wood rather than soil.
LI	Liana	Climbing plant found in forests with long, woody, rope-like stems of anomalous anatomical structure. A shrub in the FGDC classification (FGDC, 1997).
NP	Nonvascular	Nonvascular, terrestrial green plant, including mosses, hornworts, and liverworts. Always herbaceous, and often attached to solid objects such as rocks or living or dead wood rather than soil.
SH	Shrub	Perennial, multi-stemmed woody plant that is usually less than 4 to 5 meters or 13 to 16 feet in height. Shrubs typically have several stems arising from or near the ground, but may be taller than 5 meters or single-stemmed under certain environmental conditions.
SS	Subshrub	Low-growing shrub usually under 0.5 m or 1.5 feet tall (never exceeding 1 meter or 3 feet tall) at maturity. A dwarf-shrub in the FGDC classification (FGDC, 1997).
TR	Tree	Perennial, woody plant with a single stem (trunk), normally greater than 4 to 5 meters or 13 to 16 feet in height; under certain environmental conditions, some tree species may develop a multi-stemmed or short growth form (less than 4 meters or 13 feet in height).
UN	Unknown	Lifeform is unknown.
VI	Vine	Twining/climbing plant with relatively long stems, which can be woody or herbaceous. FGDC classification (FGDC, 1997) considers woody vines to be shrubs and herbaceous vines to be herbs.

25) Percent Cover or Class:

Modified Daubenmire Classes: Set Code = DAUBEN

Code	Cover Class	Mid Point
T	0 - 1.0%	0.5
1	1.1 - 5.0%	3.0
2	5.1 - 25.0%	15.0
3	25.1 - 50.0%	37.5
4	50.1 - 75.0%	62.5
5	75.1 - 95.0%	85.0
6	95.1 - 100%	97.5

National Range Management "Cover Ten Codes": Set Code = NRMCOV

Code	Cover Class	Mid Point
T	0.1 - 1%	0.50
0	1.1 - 5%	3.0
1	5.1 - 15%	10.0
2	15.1 - 25%	20.0
3	25.1 - 35%	30.0
4	35.1 - 45%	40.0
5	45.1 - 55%	50.0
6	55.1 - 65%	60.0
7	65.1 - 75%	70.0
8	75.1 - 85%	80.0
9	85.1 - 95%	90.0
A	95.1 - 100%	97.5
X	99.1 - 100%	99.5

Appendix C - USDA Forest Service TES Plant Survey Field Form

(® = Required Fields)

General Information

1) SURVEY ID: ®	2) SURVEY NAME:
3) SURVEY STATUS: ®	4) SOURCE OF WORK:
5) Survey Type: ®	
6) Survey Focus: ®	
7) Estimate of Survey Area Size (acres): ®	
8) Elevation: Min: Max: Average:	9) Elevation UOM:
10) Survey Parameters <i>(Describe any ecological parameters, criteria or combinations of these used to focus the survey. (I.e., north slopes, specific habitat types, certain soils within certain forest conditions, etc.):</i>	
11) Survey Comments <i>(Directions, area description, specific comments by visit date, etc.):</i>	

Survey Visits

Enter a Date (MM/DD/YYYY) and Examiners for each visit made.

12) VISIT DATE ®	13) LAST NAME ® AND FIRST NAME OF EXAMINERS FOR EACH VISIT

Optional Location Information

Location information to represent the survey area may be recorded, in addition to entering the spatial feature in the application

26) State:	27) County:	28) Region:	29) Forest:	30) District:

31) USGS Quad Number:	32) USGS Quad Name:
33) Forest Quad Number:	34) Forest Quad Name:

35) Legal Description: Required where public land survey is available.				
Meridian:	Township and Range:			
Section: __	Q Sec: __	QQ Sec: __	QQQ Sec: __	QQQQ Sec: __

36) Latitude and Longitude (decimal degrees)	
GPS Datum:	
GPS Lat. Dec. Degrees:	GPS Long. Dec. Degrees:

37) GPS Unit Used: Manufacturer:	Model:
---	---------------

38) Directions to Survey Area

Sketch of Survey Area

