SEEDLING SURVIVAL SURVEY GUIDELINES

For Use on Survival Surveys Completed by OFS Personnel

Forestry Services Division
Oklahoma Department of Agriculture, Food, and Forestry

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Purpose

Oklahoma Forestry Services (OFS) instituted a system of formal seedling survival surveys in 1975. This was done for several reasons:

a. Evaluate a planting for success to help the landowner determine replanting needs
b. Evaluate a cost-shared planting to assure it meets practice specifications
c. Give the OFS Forester an additional contact with landowners
d. Give the OFS Forester the opportunity to take a closer look at on-the-ground accomplishments to improve the quality of planting jobs
e. Provide the OFS Forest Regeneration Center (located in Goldsby, OK) feedback on seedling quality and distribution
f. Help identity problems with particular species or other factors in tree planting to improve out-planting success

Sampling Guidelines

Sample Frequency

OFS recommends that each forester sample approximately 10 percent of all seedling orders in their respective areas of responsibility. Ideally, this 10 percent will include all planting jobs the forester actually prescribed or assisted with, all plantings that involved cost-share assistance and sufficient additional surveys of other seedling orders selected at random. If a particular tract has been planted at random and is difficult to accurately measure it should be omitted from the sample.

Timing

Survival checks may be done either in late spring/early summer or in the fall. Early survival checks, particularly of evergreens, may be indicative of seedling quality, planting technique and handling, while surveys done in the fall may reflect the influence of weather conditions during the growing season.

Field checks of pine and other evergreen plantings should be conducted while vegetation is dormant to facilitate locating the trees. Conduct field checks of deciduous tree and shrub species after leaf-out in the spring but before other vegetation obscures the planting.

The forester may choose to conduct follow-up checks of the same planting after the initial one to obtain confirmation or additional information, but these are not required. The value of a follow-up check in the fall will be to confirm survival over the summer and assess replanting needs.
Sampling Intensity and Method

Obviously, it is not feasible to count 100% of the trees planted on all orders surveyed. Therefore, a sampling scheme is necessary, especially for large plantings. Another factor involved is the diversity of our plantings statewide. Survival surveys of windbreaks will probably be different than those for southern pine plantations. The format of your sample is left to the professional decision of the forester. However, the critical factors are to make the sample representative of the planting as a whole, including random sampling of each species planted, and to eliminate bias. Acceptable sampling techniques are described below. Choice of method and intensity is influenced by tract size, total number of trees planted in each species, layout (evenly spaced rows, windbreak, clumps, etc.), and spacing.

Row Counts – Use this method in linear plantings, such as windbreaks. On smaller plantings, a 100% tally may be possible. Otherwise, randomly select every “nth” row to be sampled. Beginning at the edge of the planting, and end of row, for each tree or planting space, record species and whether the tree is alive, dead or missing for the entire row. Repeat every “nth” row.

Strips (transects) – Used on small to mid-sized tracts. Typically strips of a certain width are located randomly within the forest stand, in random or predetermined direction, or strips of predetermined length and width can be randomly distributed in the stand (this is the equivalent of using very elongated, rectangular plots).

Circular Plots – On larger tracts, use one-hundredth acre circular plots (1/100th) with a radius of 11’ 9.3”. Plots must be representative of the planted area and should be uniformly distributed across the entire planting. On each plot, record the species, and whether each planting space contains a live tree, a dead tree or is missing. Use the table below to determine the number of plots:

<table>
<thead>
<tr>
<th>Planting Size</th>
<th>Minimum # Plots</th>
<th>Maximum # Plots</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 acres</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>10 to 25 acres</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>25 to 150 acres</td>
<td>5</td>
<td>1 plot/5 acres</td>
</tr>
<tr>
<td>More than 150 acres</td>
<td>5</td>
<td>30</td>
</tr>
</tbody>
</table>

**Note:** GPS coordinates are required no matter which sampling method is used.

Survival Tally

Regardless of the survey method used, data collected in the field should be recorded using standard forest inventory nomenclature and be summarized on the OFS Seedling Survival Survey Form (See Form 2) using statistical analysis methodology.
Special Considerations for Cost-Share Plantings
Approval of forestry practice payments is dependent upon the planting meeting practice standards and specifications. Complete surveys as soon as practicable following planting, but not later than eight weeks.

Special Considerations for WRP Tree Survival Surveys for the NRCS
OFS conducts seedling survivability surveys on Wetlands Reserve Program (WRP) plantings as a part of its contribution agreement with the Natural Resources Conservation Service, effective in October 2008. The purpose of these surveys is to determine planting success of existing WRP projects and identify any future restoration needs. Forestry Services agreement with the NRCS includes the following considerations:

1. Communication with the landowner is critical to the success of this project. OFS Foresters will contact the appropriate local NRCS District Conservationist prior to conducting any survival survey to coordinate landowner notification, access, etc., preferably at least two weeks in advance. OFS or NRCS (preferably NRCS) will notify the landowners about what will take place on the easement and an estimated date when the survey will be conducted. Appendix 1 includes an example letter for landowner notification.

2. OFS will obtain tree planting plan maps and a list of species and quantities planted from the appropriate NRCS Field Office. In some cases, a planting may include both bare-root (BR) and air-root-pruned (ARP) seedlings, which must be accounted for separately.

3. A representative from the NRCS Field Office will accompany OFS, if scheduling permits. This will provide an opportunity for NRCS employees to become more familiar with forestry techniques.

4. For each planting, OFS will provide a map that includes the GPS waypoint of all sample plot locations.

5. OFS will develop a summation of the tree planting, along with follow-up treatment recommendations if needed. If these summations and recommendations are specific in prescription, maps will be included.

6. The survival counts will be separated between air-root-pruned and bare-root tree plantings. In the field, air-root-pruned trees are distinguished by the white rodent guard.

7. OFS recognizes that the most important issues for these counts are that the trees are being planted and established for WILDLIFE purposes, not forestry products, and the NRCS never recommends non-native species on WRP.
Seedling Survival Survey Documentation

All seedling survival surveys completed must be properly documented utilizing forms specified by OFS. There are two forms:

Form 1. Data Collection

This form is designed to collect plot data while in the field conducting the survival survey. Required information includes the geographic coordinates of each plot surveyed, planting purpose, site quality, site prep, planting method, cultural treatments, species, and number planted/survived (dot tally).

The form can be used for up to three plots. Additional plots require the use of additional forms.

Codes used for data entry are included on the reverse side of the form and are described on pages 5 and 6 of this document.

Form 2. Summary (to be completed using data collected in the field)

The front side of this form contains information about the landowner (be certain to provide all contact information on the landowner - including an email address if possible), and the planting's purpose, method of planting, site preparation, after planting cultural treatment and site quality. Please note that a GPS coordinate locating the planting is required, in addition to the legal description and general sketch on the map grid, for each planting site.

Complete the reverse side of the form by providing descriptions of the factors and conditions which may have affected the planting outcome.
Explanation of Codes for Data Entry

**Planting Purpose**

Designate the one-digit code that best describes the purpose of the planting:

1. Windbreak
2. Fuelwood
3. Erosion Control
4. Post Lot
5. Wildlife
6. Timber Production
7. Christmas Trees
8. Other _____________________

**Planting Method**

Designate the one-digit code for how the trees were planted:

1. Dibble planting bar
2. Planting shovel (such as a sharpshooter)
3. Regular shovel or spade
4. Hoedad
5. Post hole diggers
6. Tree planting machine
7. Combination of hand and tree planting machine
8. Other _____________________

**Site Preparation**

Designate the one-digit code for the method of site preparation used, if any:

None 1. No site preparation
Light 2. Mow or brush hog
3. Plow or disk
4. Prescribed burning
Medium 5. Chemical - single tree injection
6. Chemical - spot or strip treatment. This may be either soil applied or sprayed, but the area actually treated is limited in size.
7. Chemical - broadcast. This may be either soil applied or sprayed, but covers the entire area planted.
Heavy 8. Chop, shear, pile and burn, rip. This may include one or a combination of more intensive site preparation methods.
**Follow-up Cultural Treatment**

Use a two-digit code to indicate the type and intensity of follow-up care given to the trees. *Please note*: if more than one code applies, add the two numbers together and put the sum on the form.

Example 1: A landowner hoes around each tree (4 - moderate weed control) and waters infrequently (2 - light watering) = 6.

Example 2: A landowner sprays a three-foot diameter circle around each tree (4 - moderate weed control) and installs a drip irrigation system (7 – frequent watering) = 11.

**Code:**

00. None – trees did not receive any additional treatment after planting
01. Light weed control – some effort made at controlling competition
02. Light watering – trees watered sporadically
04. Moderate weed control – The area adjacent to each tree is kept weed free and/or is mulched
07. Frequent watering – drip or other irrigation system installed and used regularly
10. Complete weed control - all competition eliminated through spraying or cultivation
13. “Total” tree care - competition control either moderate or complete, watering as needed, mulch, shingles, insect and disease control, etc.

**Site Quality**

Seedling survival within a species will vary depending upon the quality of the site for that particular species. For example, planting black walnut on a poor site (for walnut) would likely result in poor survival. To avoid negatively affecting the sample by planting species “off-site” where we would expect walnut to struggle, list this site as poor so that this can be factored into the results. The rating for walnut will be most useful when comparing seedling survival on sites that are fair to good in quality.

Use the one-digit code that best describes the relative site quality as follows:

1. Good
2. Fair
3. Poor
Records Distribution and Retention

Foresters should distribute and maintain records of the surveys completed within their assigned areas according to the following outline:

<table>
<thead>
<tr>
<th>Original</th>
<th>Copies</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field Data Collection Form</strong></td>
<td>Maintain by Forester</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Seedling Survival Summary Form</strong></td>
<td>OFS and WRP Surveys – Send to FRC/CW Area (Original will be forwarded to OKC HQ)</td>
</tr>
</tbody>
</table>

- All original field data collection forms and a copy of the completed Seedling Survival Survey Summary should be maintained in the forester’s permanent files and be available for review by OFS.
- The signed original Seedling Survival Summary Form should be forwarded to Forest Regeneration Center/Central Western. These will be forwarded to Oklahoma City staff.
- Copies of the Field Data Collection forms must be forwarded to Forest Regeneration Center/Central Western for surveys completed on WRP plantings. These will be forwarded to Oklahoma City staff.
- In the case of seedling survival surveys completed on WRP plantings, Oklahoma City staff will complete all reports and summary forms to NRCS.

Summary

Using the data provided by these surveys, Oklahoma Forestry Services’ Forest Regeneration Center will prepare an annual summary of the survival surveys completed. While it does take time to gather seedling survival information in the field, careful collection and analysis of this data allows for the continuous evaluation and improvement to the performance of our seedlings and Forest Regeneration/Tree Improvement programs. The ultimate goal of this process is to achieve better results for our landowners.
Appendix 1. Examples of Seedling Survival Survey Results Expected

**Example A**

<table>
<thead>
<tr>
<th>Species</th>
<th>County</th>
<th>Planting seasons</th>
<th>All Plantings</th>
<th>W/ Outside Influence</th>
<th>No Outside Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loblolly pine – Improved</td>
<td>all counties</td>
<td>all years</td>
<td>7</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Number of samples</td>
<td>105,900</td>
<td>0</td>
<td>105,900</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number planted</td>
<td>68,938</td>
<td>0</td>
<td>68,938</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent surviving</td>
<td>65.1</td>
<td>0</td>
<td>65.1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Example B**

<table>
<thead>
<tr>
<th>Species</th>
<th>County</th>
<th>Planting seasons</th>
<th>All Plantings</th>
<th>W/ Outside Influence</th>
<th>No Outside Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Species</td>
<td>all counties</td>
<td>all years</td>
<td>66</td>
<td>2</td>
<td>64</td>
</tr>
<tr>
<td>Number of samples</td>
<td>124,300</td>
<td>1,800</td>
<td>122,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number planted</td>
<td>78,270</td>
<td>550</td>
<td>77,720</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent surviving</td>
<td>63</td>
<td>30.6</td>
<td>63.4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 2. SAMPLE LANDOWNER NOTIFICATION LETTER FOR WRP PLANTINGS

Landowner Name
Address
City, State Zip Date

RE: Easement Tree Survival Counts, Wetlands Reserve Program (WRP)
    WRP Contract #xx-yyyy-zz-00

Dear Landowner:

This office is scheduling easement tree survival inspection activities on Wetlands Reserve Program (WRP) easements. These inspections consist of assessing the survival of the bottomland hardwood trees planted on your easement and the progress in habitat development. Foresters from the Oklahoma Department of Agriculture, Food & Forestry will be conducting the tree survival counts.

Tentatively, the planned visit to your easement is scheduled for (date) at (time). You are welcome to visit with the forester about your planting while they are on-site if you wish. If you have any questions or desire a different date, please contact me at (phone).

Sincerely,

NRCS DC or ODAFF District Forester

cc:
Name, DC, NRCS
Steve Barner, WRP, TSO, NRCS, McAlester, OK