

# TECHNICAL NOTES

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NATURAL RESOURCES CONSERVATION SERVICE  
ALEXANDRIA, LOUISIANA

## PLANT MATERIALS TECHNICAL NOTE NO. 12

### CALCULATING SEED MIXTURES - STEPS TO GUIDE YOU IN DEVELOPING CONSERVATION SEED MIXTURES

#### INTRODUCTION

The success of any conservation plantings depends on seed quality, planting techniques, and your understanding of knowing what to plant and how much seed is needed. Having a basic understanding of the steps used to calculate seed mixtures will guide you in being able to purchase the right amount of seed for a successful planting.

Any successful planting begins with identifying the purpose of the planting; selecting suitable species that meet the desired objectives of the resource concern; and determining how much seed needs to be purchased and planted. Making the wrong decisions when buying and/or planting seed may cost you time, money, and the possible chance of having a stand failure.

#### CALCULATING SEED MIXTURES

Planning is always the first step that should be undertaken when you're thinking about installing any conservation planting. Developing a seed mixture worksheet for each planned site will act as a guide for, 1) planning what to plant, 2) knowing how much seed to purchase, and 3) for use when calibrating planting equipment.

Attachment A provides a blank form of a seed mixture worksheet that could be used when developing planting mixes with up to 8 species.

Attachment B provides an example of an electronic version of a seed mixture worksheet that could be used when developing mixtures in Louisiana. The [Louisiana Conservation Seed Mixture Worksheet - Version 1.1](#) with electronic worksheet is tied to planting specifications and recommendations associated with conservation practice standards listed in the Louisiana NRCS Field Office Technical Guides.

It is strongly recommended that you develop a seed mixture worksheet for each planned site. Even if you're planting 3 fields with the same species it's a good ideal to treat each site as a separate planting. Combining all your seeds in the drill for multiple sites and finding out half way through the first planting that the drill was set to incorrectly will cost you time and the cost of purchasing additional seed.

Following are 13 steps to guide you in the development of a seed mixture worksheet.



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**Step 1 - Name and date your planting.**

Anytime you develop a seed mixture name and date the planting. Identify each planting by the field number or site where planted. This is especially important if you’re installing several planting on the same landowner or farm. See Figure 1.

**Step 2 - Identify the conservation practice that will be used to guide the planting.**

NRCS conservation practice standards have specific species identified that are suited to meet the objective of the practice. Learn to use only those species that have been tested, are recommended, and are commercially available. See Figure 1.

**Step 3 - Determine the number of acres you will be planting.**

Determine the number of acre that you plan on planting. Remember to treat each site as a separate planting. See Figure 1.

**Step 4 - Identify the planting method.**

Will the planting be broadcast seeded or will you use a grass seed drill to apply the seed. If you plan on broadcast seeding you may want to consider using one of the higher seeding rates (if available for the species). When you’re drill seeding identify the drill row spacing used on the drill. This will help you locate planted rows when you go back to evaluate stand establishment. See Figure 1.

Figure 1 - Seed Mixture Worksheet

Planting Name *1		Conservation Practice *2	
South Field - Site 1		Practice327	
Planned Acres *3	Seeding Method *4	Row/Drill Spacing *4	
10.00	Drilled	10	

**Step 5 - Select the plant species you would like to seed.**

Select and list those species that meet your conservation objectives such as grazing, wildlife, or erosion control. Many conservation practices list both native and introduced species that could be used. Don’t mix native species with introduced species. Plant either a native plant mix or one using introduced species. Learn to plant species that are compatible, complement each other and are adapted to the planting site. Select only those varieties that have been tested and proven through plant materials centers and/or universities evaluations. See Figure 2

Refer to the Louisiana FOTG - Section IV, References, Planting Rates, Appendix 1 - Planting Rates for Louisiana by MLRA’s and attached “Footnotes for Appendix 1- Planting Rates for Louisiana by MLRA’s for recommended species for use by conservation practice in Louisiana.

**Step 6 - Identify the recommending PLS seeding rate for each selected species.**

Next to each plant you selected list the recommended PLS seeding rate for that species. See Figure 2

Refer to the Louisiana FOTG - Section IV, References, Planting Rates, Appendix 1 - Planting Rates for Louisiana by MLRA’s and attached Footnotes for Appendix 1 - Planting Rates for Louisiana by MLRA’s for recommended seeding rates in Louisiana.

**Step 7 - Establish the percent composition of each species within the mix.**

The next step is to determine at what percent of the mixture (1%-100%) do you want to seed each plant species. The only time you would use 100% for an individual species would be if you are seeding a single species. Remember the recommended planting rate of each species should reflect only a specific percent of the total mixture. Other plants within the mix will make up the remaining percent of the mixture (100% Total). The final percent used for each species is based on the conservation objective of the planting (e.g. wildlife vs. erosion control). See Figure 2

Figure 2 - Seed Mixture Worksheet

Species *5	PLS Seeding Rates lb/ac *6	% Mix *7
Switchgrass	4	50.00%
Partridge Pea	10	50.00%
		100.00%

**Step 8 - Calculate the recommended PLS planting rate**

This step involves calculating the recommended PLS planting rate per acre of each species in the mix. See Figure 3. To calculate the recommended PLS planting rates per acre of each species in the mix use the following formula.

PLS Seeding Rate (lb/ac) x the % composition of each species in the mix. = Recommended Planting Rate

An example of how to use this formula is listed below. The NRCS- Louisiana’s minimum recommended seeding rate for switchgrass is 4 pounds PLS per acre. The % composition of switchgrass in a mix might be set to 50%.

4 lb PLS per acre x 50% = 2 lb PLS per acre of switchgrass

**Step 9 - Calculate the total PLS lbs of seed you need to purchase based on the acres planned**

This next step will help you calculate your total PLS needs for each species based on the number of acre you plan on planting. This step takes the recommended PLS lb per acre planting rate of each component (Step 8) and multiplies it by the planned acres. This calculation give you the total PLS lbs you’ll need of each individual species within the mix to seed your planned acres. These figures are very important and should be used when you talk with seed dealers and purchase seed. Knowing your total PLS lbs of each species and the cost per PLS lb will also assist you in determining your total seed cost of the planting. See Figure 3.

To figure your Total PLS Lbs use the following formula.

Recommended Planting Rate in PLS per acre x Total Planned Acres = Total PLS lbs

From the example above in Step 8 we’ve determined that if we want to seed switchgrass in a mix and we want switchgrass to makeup 50% of the mixture, than we would need to seed it at 2 lb PLS per acre. We’re planning on seeding 10 acre, so 2 lb PLS per acre x 10 acres = 20 PLS lbs

Now when you go shopping for seed you can tell the seed dealer that you'll need a total of 20 PLS lbs of switchgrass to do the job. If you get a price quote of \$20.00 per PLS lb than you'll know that your switchgrass seed cost for this job would cost you \$400.00.

Figure 3 - Seed Mixture Worksheet

PLS Seeding Rates lb/ac *6	% Mix *7	PLS Planting Rate Per Acre *8	Total PLS Lbs You Need To Purchase *9
4	50.00%	2.00	20.00
10	50.00%	5.00	50.00
		0.00	0.00
	100.00%	7	70

### Step 10 - Buy your seed

After determining the total PLS lbs of seed that you'll need of each species in the mix you can then think about buying your seed. A few important points to always remember when purchasing conservation seed include:

- 1) Always buy by PLS lbs
- 2) Shop around
- 3) Get price quotes
- 4) Don't have your seed mixed. Keep each component in a separate bag. That way you'll know you received everything you ordered
- 5) Be sure you get a seed analysis tag for each lot
- 6) Buy only proven varieties or those of known origin. Don't get talked into buying a variety just because it's the only one the dealer has. Remember it may not be adapted to your planting site.

### Step 11 - Calculate the bulk planting rate per acre

The bulk seeding rate is used whenever you're calibrating a seed drill or even a broadcast planter. Planting equipment can not be calibrated to apply actual pure live seed amounts. Remember pure live seed or PLS is an indication of the actual amount of viable seed within a given weight that has the ability to germinate. To accurately set your planting equipment to apply the recommended PLS you'll need to use bulk seeding rates.

After you've purchased your seed calculate the PLS % of each seed lot. Refer to Louisiana Plant Materials Technical Note 11 for guidance. Divide the PLS Planting Rate of each species (Step 8) by the PLS % of each lot. This figure will give you the bulk planting rate per acre for each species. Add together all the individual bulk planting rates and you'll have the total amount of bulk seed that you'll need to plant per acre. Set your planting equipment to apply the total bulk pounds per acre. Planting the calculated bulk seeding rate guarantees you'll plant the recommended PLS planting rates for each species. See Figure 4.

### Step 12 - Calculate the total bulk planting rate

After you've calculated the total bulk planting rate per acre, multiply that figure by the total acres that are planned for planting and you'll have your Total Bulk Seed Lbs. Compare this figure with the weight of the seed purchased and they should match. See Figure 4.

**Step 13 - Calculate seed cost**

Seed cost may be calculated before seed is purchased to give an estimated cost of materials. List the seed cost per PLS lb (from a quote or catalog) of each individual seed lot you plan on purchasing; multiply by the total PLS lbs needed (Step 9) that you previously figured for each species. This gives you the total cost of each lot of seed you'll plan on purchasing. If you add all the component cost together this will give you an ideal of your total seed cost for the planting. See Figure 4.

Figure 4 - Seed Mixture Worksheet

PLS Seeding Rates lb/ac *6	% Mix *7	PLS Planting Rate Per Acre *8	Total PLS Lbs You Need To Purchase *9	% PLS of Seed *11	Bulk Planting Rate Per Acre *11	Total Bulk Planting Rate (lbs) *12	Seed Cost/lb *13	Total Cost *13
4	50.00%	2.00	20.00	92.00%	2.17	21.74	\$15.00	\$300.00
10	50.00%	5.00	50.00	97.00%	5.15	51.55	\$10.00	\$500.00
		0.00	0.00		0.00	0.00		\$0.00
	100.00%	7	70		7.33	73.29		\$800.00

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**REFERENCES**

Louisiana Department of Agriculture & Forestry, Seed Programs, 2008, Louisiana Seed Certification Standards, Baton Rouge, LA.

Louisiana Department of Agriculture & Forestry, Seed Programs, 2008, Louisiana Seed Laws, Baton Rouge, LA.

Reading Seed Packaging Labels and Calculating Seed Mixtures, 2002, USDA NRCS Plant Materials Technical Note No. 4, Boise, ID.

USDA Natural Resources Conservation Service, 2007, National Plant Materials Manual, Fourth Edition, Beltsville, MD.

Association of Official Seed Certifying Agencies, 2003, The Native Plant Connection, Boise, ID.

Association of Official Seed Analysis, 2008, Rules for Testing Seed Manual, Stillwater, OK.

Attachment A - Seed Mixture Worksheet

Planting Name *1	Conservation Practice *2	Acres *3	Seeding Method *4	Row/Drill Spacing *4

Species *5	PLS Seeding Rates lb/ac *6	% Mix *7	PLS Planting Rate Per Acre *8	Total PLS Lbs You Need To Purchase *9	% PLS of Seed *10	Bulk Planting Rate Per Acre *11	Total Bulk Seed (lbs) *12	Seed Cost/lb *13	Total Cost *13
		100.00%							

Instructions for Seed Mixture Worksheet

1. Planting Name
2. Conservation Practice
3. Enter number of planned acres for seeding
4. Select planting method (drilled, broadcast) and drilled row spacing
5. Select individual components of mix from conservation seeding tables (up to 8 species may be used)
6. Select seeding rate for each species from conservation seeding tables (PLS lb/ac)
7. Enter % species composition of mix (Total should add up to 100 %)
8. Recommended PLS Planting Rate = PLS Seeding Rate (lb/ac) X the % composition of each species in the mix.
10. % PLS of each seed lot after purchase = Percent (%) Purity x Percent (%) Total Germination /100
11. Bulk Planting Rate per Acre = PLS Planting Rate/PLS % of each lot
12. Total Bulk Seed lbs = Bulk Planting Rate X Total Acres
13. Enter seed cost per PLS lb of each seed component. Total Cost = Seed Cost Per Lb X Total PLS Lbs

Attachment B - Example of Louisiana Conservation Seed Mixture Worksheet - Version 1.1

Planting Name \*1 Conservation Practice \*2  
 South Field - Site 1 Practice327

Planned Acres \*3 Seeding Method Row/Drill Spacing  
 10.00 Drilled 10

Species *4	PLS Seeding Rates lb/ac *5	% Mix *6	Cultivars *9
Switchgrass	4	50.00%	Alamo
PartridgePea	10	50.00%	Lark
		100.00%	

Mix OK

Species	PLS Lb Planting Rate Per Acre	Total PLS Lbs You Need To Purchase of Individual Species for Planned Acres	Species Seed per lb	PLS Seeds per Square Foot
Switchgrass	2.00	20.00	380,000	17.447
PartridgePea	5.00	50.00	58,000	6.657
0	0.00	0.00	0	0.000
0	0.00	0.00	0	0.000
0	0.00	0.00	0	0.000
0	0.00	0.00	0	0.000
0	0.00	0.00	0	0.000
0	0.00	0.00	0	0.000
	7	70		24.10

Purchase the Following Species and Amounts ✓Purchased

Switchgrass	Purchase	20.00	Pure Live Seed (PLS) pounds of this species	
PartridgePea	Purchase	50.00	Pure Live Seed (PLS) pounds of this species	
0	Purchase	0.00	Pure Live Seed (PLS) pounds of this species	
0	Purchase	0.00	Pure Live Seed (PLS) pounds of this species	
0	Purchase	0.00	Pure Live Seed (PLS) pounds of this species	
0	Purchase	0.00	Pure Live Seed (PLS) pounds of this species	
0	Purchase	0.00	Pure Live Seed (PLS) pounds of this species	
0	Purchase	0.00	Pure Live Seed (PLS) pounds of this species	

Your potential seedling density for this planting will be **24.10** seedlings per square foot.

South Field - Site 1

Species	% PLS of Seed *7	Bulk Planting Rate Per Acre	Total Bulk Planting Rate (lbs)	Seed Cost/lb *8	Total Cost
Switchgrass	92.00%	2.17	21.74	\$15.00	\$300.00
PartridgePea	97.00%	5.15	51.55	\$10.00	\$500.00
0		0.00	0.00		\$0.00
0		0.00	0.00		\$0.00
0		0.00	0.00		\$0.00
0		0.00	0.00		\$0.00
0		0.00	0.00		\$0.00
0		0.00	0.00		\$0.00
		7.33	73.29		\$800.00

Your seed drill should be calibrated to apply approximately 7.33 bulk pounds per acre.

Based on your inputs, your planned cost per acre will be \$80.00 per acre.

Based on your planned 10.00 acres. Your total seed purchase will cost you \$800.00

### Instructions for Seed Mixture Worksheet

- Start filling in worksheet with planting name at top and work down. **Dropdown list are available in most cells.**
- Conservation Practice must be filled in to populate worksheet.
- Enter number of planned acres for seeding
- Select individual components of mix from drop down menu (up to 8 species may be used)
- Select seeding rate (PLS lb/ac) for each species from drop down menu.  
**Note - Seeding rates used are identical to those found within Louisiana Conservation Practice Standards - "Appendix 1 - Planting Rates for Louisiana by MLRA's".**
- Enter % species composition of mix (Total should add up to 100 %)
- Enter % PLS of purchased seed (from seed tag)(Percent PLS = Percent Germination X Percent Purity ÷ 100)
- Enter cost (\$ per PLS lb) of seed components from catalog or purchase invoice.  
**Note - Seed cost may be inserted prior to the purchase of seed to give the producer an estimated cost of planting.**
- Enter "Cultivar/Variety" name if known
- Print worksheet for record and erase values prior to next use.**  
This worksheet "Can Not Be Used" where traditional bulk planting rates are used (i.e. wheat, annual ryegrass, etc)
- 

### Worksheet will automatically calculate:

- \* PLS Planting Rate (lb/ac) by component and total
- \* Total PLS Pounds Needed (Use when purchasing seed)
- \* Bulk Planting Rate Per Acre (by component and total) (useful when calibrating seed drill)
- \* Total bulk seed (lbs) required to seed specified acres, by component and total
- \* Total cost of mix and of individual components
- \* Potential seedling density or potential plant population