United States Department of Agriculture

NRCS Natural Resources Conservation Service Plant Materials Program

Jamie L. Whitten Plant Materials Center
Coffeeville, MS

Plant Materials Technical Note No. 102 May 2007

ESTIMATED PRODUCTION COST BUDGETS FOR BIOMASS: Switchgrass, 'Highlander' Eastern Gamagrass, Indiangrass, and Big Bluestem

Homer L. Wilkes
State Conservationist
Jackson, Mississippi

DISCLAIMER

Information provided in this publication constitutes no endorsement or guarantee by the USDA or NRCS of any plant material, supply, equipment or cost listed. While an effort has been made to provide an accurate listing of cost of production, environmental factors may alter individual costs in specific years and locations. The information is a general guide to cost of production of these releases.

INTRODUCTION

Estimated production cost budgets can be good tools when looking for possible producers of biomass. The first question a producer is going to want to know is “how much an acre does it cost to raise a _____ biomass crop”. This information is vital when one is deciding on venturing into biomass production.

Using biomass has various requirements for bio-fuel applications. Therefore the correct material must be selected for the correct application. This document relates only to the production of biomass and not to its final use.

A cost budget can be as detailed as one would like, but a simple chart such as the one used in the Native Grass Seed Production Manual would give a person the basic information of what one could expect expense wise in growing such plant material. A more detailed cost budget like the ones used for row crops by extension services could also be helpful in creating a guide for each release. Perennial crops would have expenses lined out for the establishment year as well as years following. Annual crops would be similar to other row crop cost budgets. An added column that could be left blank for his/her own production factors could be included alongside PMC estimated input cost. Sometimes perennial crops would need a fall and spring planting budget if both planting dates are possible.

References:

1) Productions budgets from Mississippi State University Department of Agricultural Economics.
http://www.agecon.msstate.edu/research/budgets.php

2) Native Grass Seed Production Manual. USDA Plant Materials, Ducks Unlimited, Manitoba Forage Seed Association, and the University of Manitoba. Smith, S.R. and S. Smith (eds). 1998

Acknowledgements:

Cost data was compiled by Jon Allison, Gardener, Coffeeville, MSPMC. Material has been reviewed by: Paul B. Rodrigue, Manager, PMC, Coffeeville, MS; Joel Douglas, PMS, CNTSC, Ft. Worth, TX; Marion Reed, Economist, ECS, Jackson, MS; Sherry Surrette, Plant Materials Specialist, ECS, Jackson, MS.

Recommended Citation:

USDA-NRCS Jamie L. Whitten Plant Materials Center. Plant Materials Technical Note No. 102. ESTIMATED PRODUCTION COST BUDGETS FOR BIOMASS : Switchgrass, ‘Highlander’ eastern gamagrass, Indiangrass and Big Bluestem. USDA-NRCS Jamie L. Whitten Plant Materials Center, Coffeeville, MS, May, 2007. 16p.

Table of Contents

Switchgrass Estimated Production Costs. Establishment Year.

Estimated Production Cost for Switchgrass (biomass) **(year #1 , establishment year)**
Jamie L. Whitten Plant Materials Center 2007 **stale seedbed**
Coffeeville, Mississippi

***note: cost are estimated based on 2007 prices and are subject to change/increase**

Item or Task	Cost / Acre	Your Farm
Seedbed Preparation (disk 2X, harrow, roll)	$92	_____
Plant Cover Crop w/tractor-spreader	$8	_____
Cover Crop Seed (wheat @ 70 lbs/acre)	$14	_____
Switchgrass Seed (@ 8 PLS/acre)	$80	_____
Drill Switchgrass Seed	$35	_____
Apply Herbicides / Insecticide (4 applications)	$24	_____
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Fertilizer (0-0-60 @ 100lbs/acre)	$17	_____
Fertilizer (0-20-20 @ 250lbs/acre)	$42	_____
***Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Insecticide (added to burndown herbicide)	$2	_____
Burndown Herbicide	$8	_____
Preemergence Herbicide	$3	_____
Postemergence Herbicide (broadleaves)	$3	_____
Cut Switchgrass	$26	_____
Swath / Condition Switchgrass	$11	_____
Bale Switchgrass	$28	_____
Total Estimated Production Cost for Establishment Year =	**$463**	_____

***Tons harvested per acre in year #1 =** _____
Price per ton = _____

Gross return minus cost of production = _____

***MSPMC estimated production cost budgets are based upon known production cost on site, university crop budgets, dealer quotes, and other PMC reported production cost. These cost budgets are estimated and individual landowner's production cost will vary.**

Switchgrass Estimated Production Costs. Year Two and Following.

Estimated Production Cost for Switchgrass (biomass) (year #2 and following)
MSPMC

Item or Task	Cost / Acre	Your Farm
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Apply Herbicides (2 applications)	$12	_____
Fertilizer (0-0-60 @ 100lbs/acre)	$17	_____
Fertilizer (0-20-20 @ 250lbs/acre)	$42	_____
Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Soil Applied Residual Herbicide	$3	
Postemerge Herbicide (broadleaves)	$3	
Cut Switchgrass	$26	_____
Swath / Condition Switchgrass	$11	_____
Bale Switchgrass	$28	_____
Total Estimated Production Cost for Year #2 and Following =	**$212**	_____

Tons harvested per acre = _____
Price per ton = _____

Gross return minus cost of production = _____

***MSPMC estimated production cost budgets are based upon known production cost on site, university crop budgets, dealer quotes, and other PMC reported production cost. These cost budgets are estimated and individual landowner's production cost will vary.**

Switchgrass. Schedule of Applications.

Schedule of Applications for Growing Switchgrass for Biomass years 1-10

YEAR	MONTH	APPLICATION	PURPOSE
0	9	160 HP Tractor & 20ft Heavy Disk (2X)	Seedbed Prep
0	10	160 HP Tractor & 20ft Flex Harrow	Seedbed Prep
0	10	90 HP Tractor & Fertilizer Spreader	Plant Cover Crop
0	10	90 HP Tractor & 20ft Cultipacker	Seedbed Prep
1	3	160 HP Tractor & 40ft Spray Boom	Burndown
1	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
1	5	160 HP Tractor & 40ft Spray Boom	Burndown Insecticide
1	5	160 HP Tractor & 20ft Drill	Plant Switchgrass
1	5	160 HP Tractor & 40ft Spray Boom	Apply Preemerge
1	6	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
1	6	90 HP Tractor & Fertilizer Spreader	Apply N
1	9	160 HP Tractor & 10ft Mower	Cut Switchgrass
1	9	90 HP Tractor & 12ft Conditioner/Swather	Swath Switchgrass
1	9	160 HP Tractor & LG RD Baler	Bale Switchgrass
2	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
2	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
2	5	90 HP Tractor & Fertilizer Spreader	Apply N
2	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
2	9	160 HP Tractor & 10ft Mower	Cut Switchgrass
2	9	90 HP Tractor & 12ft Conditioner/Swather	Swath Switchgrass
2	9	160 HP Tractor & LG RD Baler	Bale Switchgrass
3	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
3	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
3	5	90 HP Tractor & Fertilizer Spreader	Apply N
3	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
3	9	160 HP Tractor & 10ft Mower	Cut Switchgrass
3	9	90 HP Tractor & 12ft Conditioner/Swather	Swath Switchgrass
3	9	160 HP Tractor & LG RD Baler	Bale Switchgrass

***note: years 4-10 will follow the same scheduled applications as shown in years 2 & 3**

***note: stands will need to be evaluated after year #10**

Jamie L. Whitten
Plant Materials Center
Coffeeville, MS

'Highlander' eastern gamagrass. Estimated Production Costs. Establishment Year.

Estimated Production Cost for Highlander Gamagrass (biomass) **(year #1 , establishment year)**
Jamie L. Whitten Plant Materials Center 2007 **stale seedbed**
Coffeeville, Mississippi

***note: cost are estimated based on 2007 prices and are subject to change/increase**

Item or Task	Cost / Acre	Your Farm
Seedbed Preparation (disk 2X, harrow, roll)	$92	_____
Plant Cover Crop w/tractor-spreader	$8	_____
Cover Crop Seed (wheat @ 70 lbs/acre)	$14	_____
Highlander Seed (3 to 4 seed/ft, 18lbs/acre)	$162	_____
Plant Gamagrass	$35	_____
Apply Herbicides / Insecticide (4 applications)	$24	_____
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Fertilizer (0-0-60 @ 100lbs/acre)	$17	_____
Fertilizer (0-20-20 @ 250lbs/acre)	$42	_____
***Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Insecticide (added to burndown herbicide)	$2	_____
Burndown Herbicide	$8	_____
Preemergence Herbicide	$3	_____
Postemergence Herbicide (broadleaves)	$3	_____
Cut Gamagrass	$26	_____
Swath / Condition Gamagrass	$11	_____
Bale Gamagrass	$28	_____
Total Estimated Production Cost for Establishment Year =	**$545**	_____

***Tons harvested per acre in year #1 =** _____
Price per ton = _____

Gross return minus cost of production = _____

***note: Tonnage will be less in establishment year compared to subsequent years**
****note: N fertilizer will only be applied in the absence of weed competition**

***MSPMC estimated production cost budgets are based upon known production cost on site, university crop budgets, dealer quotes, and other PMC reported production cost. These cost budgets are estimated and individual landowner's production cost will vary.**

'Highlander' eastern gamagrass Estimated Production Costs. Year Two and Following.

Estimated Production Cost for **(year #2 and following)**
Highlander' eastern gamagrass (biomass)
MSPMC

Item or Task	**Cost / Acre**	**Your Farm**
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Apply Herbicides (2 applications)	$12	_____
Fertilizer (0-0-60 @ 100lbs/acre)	$17	_____
Fertilizer (0-20-20 @ 250lbs/acre)	$42	_____
Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Soil Applied Residual Herbicide	$3	
Postemerge Herbicide (broadleaves)	$3	
Cut Gamagrass	$26	_____
Swath / Condition Gamagrass	$11	_____
Bale Gamagrass	$28	_____
Total Estimated Production Cost for Year #2 and Following =	**$212**	_____

Tons harvested per acre = _____
Price per ton = _____

Gross return minus cost of production = _____

***MSPMC estimated production cost budgets are based upon known production cost on site, university crop budgets, dealer quotes, and other PMC reported production cost. These cost budgets are estimated and individual landowner's production cost will vary.**

'Highlander' eastern gamagrass, Schedule of Applications.

Schedule of Applications for Growing 'Highlander' eastern gamagrass (biomass)

YEAR	MONTH	APPLICATION	PURPOSE
0	9	160 HP Tractor & 20ft Heavy Disk (2X)	Seedbed Prep
0	10	160 HP Tractor & 20ft Flex Harrow	Seedbed Prep
0	10	90 HP Tractor & Fertilizer Spreader	Plant Cover Crop
0	10	90 HP Tractor & 20ft Cultipacker	Seedbed Prep
1	3	160 HP Tractor & 40ft Spray Boom	Burndown
1	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
1	5	160 HP Tractor & 40ft Spray Boom	Burndown Insecticide
1	5	160 HP Tractor & 4row Planter	Plant Gamagrass
1	5	160 HP Tractor & 40ft Spray Boom	Apply Preemerge
1	6	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
1	6	90 HP Tractor & Fertilizer Spreader	Apply N
1	9	160 HP Tractor & 10ft Mower	Cut Gamagrass
1	9	90 HP Tractor & 12ft Conditioner/Swather	Swath Gamagrass
1	9	160 HP Tractor & LG RD Baler	Bale Gamagrass
2	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
2	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
2	5	90 HP Tractor & Fertilizer Spreader	Apply N
2	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
2	9	160 HP Tractor & 10ft Mower	Cut Gamagrass
2	9	90 HP Tractor & 12ft Conditioner/Swather	Swath Gamagrass
2	9	160 HP Tractor & LG RD Baler	Bale Gamagrass
3	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
3	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
3	5	90 HP Tractor & Fertilizer Spreader	Apply N
3	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
3	9	160 HP Tractor & 10ft Mower	Cut Gamagrass
3	9	90 HP Tractor & 12ft Conditioner/Swather	Swath Gamagrass
3	9	160 HP Tractor & LG RD Baler	Bale Gamagrass

***note: years 4-10 will follow the same scheduled applications as shown in years 2 & 3**

***note: stands will need to be evaluated after year #10**

Indiangrass Estimated Production Costs. Establishment Year.

Estimated Production Cost for Indiangrass (biomass) **(year #1, establishment)**
Jamie L. Whitten Plant Materials Center 2007 **stale seedbed**
Coffeevillle, MS

***note: cost are based on 2007 prices and are subject to change/increase**

Item or Task	Cost / Acre	Your Farm
Seedbed Preparation (disk 2X, harrow, roll)	$92	_____
Plant Cover Crop w/tractor-spreader	$8	_____
Cover Crop Seed (wheat @ 70lbs/acre)	$14	_____
Indiangrass Seed (@ 9lbs PLS/acre)	$90	_____
Drill Indiangrass Seed	$35	_____
Apply Herbicides / Insecticide (4 applications)	$24	_____
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Fertilizer (0-0-60 @ 50lbs/acre)	$9	_____
Fertilizer (0-20-20 @ 200lbs/acre)	$34	_____
***Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Insecticide (added to burndown herbicide)	$2	_____
Burndown Herbicide	$8	_____
Preemergence Herbicide	$3	_____
Postemergence Herbicide	$3	_____
Cut Indiangrass	$26	_____
Swath / Condition Indiangrass	$11	_____
Bale Indiangrass	$28	_____
Total Estimated Production Cost for Establishment Year =	**$457**	_____

***Tons harvested per acre in year #1 =** _____
Price per ton = _____

Gross return minus cost of production = _____

***note: Tonnage will be less in establishment year compared to subsequent years**

****note: N fertilizer will only be applied in the absence of weed competition**

Indiangrass Estimated Production Costs. Year Two and Following.

ESTIMATED PRODUCTION COST BUDGETS
FOR BIOFUEL BIOMASS, May 2007
USDA-Natural Resources Conservation Service
Jamie L. Whitten Plant Materials Center, Coffeeville, MS
Ecological Sciences, Jackson, MS

Jamie L. Whitten
Plant Materials Center
Coffeeville, MS

Estimated Production Cost for Indiangrass (biomass) (year #2 and following)
MSPMC

Item or Task	Cost / Acre	Your Farm
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Apply Herbicides (2 applications)	$12	_____
Fertilizer (0-0-60 @ 50lbs/acre)	$9	_____
Fertlizer (0-20-20 @ 200lbs/acre)	$34	_____
Fertilizer (34-0-0 @ 300 lbs/acre)	$54	_____
Soil Applied Residual Herbicide	$3	_____
Postemergence Herbicide	$3	_____
Cut Indiangrass	$26	_____
Swath / Condition Indiangrass	$11	_____
Bale Indiangrass	$28	_____
Total Estimated Production Cost for Year #2 and following =	**$196**	_____
Tons harvested per acre =		_____
Price per ton =		_____
Gross return minus cost of production =		_____

***MSPMC estimated production cost budgets are based upon known production cost on site, university crop budgets, dealer quotes, and other PMC reported production cost. These cost budgets are estimated and individual landowner's production cost will vary.**

***All P and K fertilizers should be applied according to soil test.**

Indiangrass. Schedule of Applications.

Schedule of Applications for Growing Indiangrass for Biomass **years 1-10**

YEAR	MONTH	APPLICATION	PURPOSE
0	9	160 HP Tractor & 20ft Heavy Disk	Seedbed Prep
0	10	160 HP Tractor & 20ft Flex Harrow	Seedbed Prep
0	10	90 HP Tractor & Fertilizer Spreader	Plant Cover Crop
0	10	90 HP Tractor & 20ft Cultipacker	Seedbed Prep
1	3	160 HP Tractor & 40ft Spray Boom	Burndown
1	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
1	5	160 HP Tractor & 40ft Spray Boom	Burndown Insecticide
1	5	160 HP Tractor & 20ft Drill	Plant Indiangrass
1	5	160 HP Tractor & 40ft Spray Boom	Apply Preemerge
1	6	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
1	6	90 HP Tractor & Fertilizer Spreader	Apply N
1	9	160 HP Tractor & 10ft Mower	Cut Indiangrass
1	9	90 HP Tractor & 12ft Swather/Conditioner	Swath Indiangrass
1	9	160 HP Tractor & LG RD Baler	Bale Indiangrass
2	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
2	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
2	5	90 HP Tractor & Fertilizer Spreader	Apply N
2	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
2	9	160 HP Tractor & 10ft Mower	Cut Indiangrass
2	9	90 HP Tractor & 12ft Swather/Conditioner	Swath Indiangrass
2	9	160 HP Tractor & LG RD Baler	Bale Indiangrass
3	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
3	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
3	5	90 HP Tractor & Fertilizer Spreader	Apply N
3	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
3	9	160 HP Tractor & 10ft Mower	Cut Indiangrass
3	9	90 HP Tractor & 12ft Swather/Conditioner	Swath Indiangrass
3	9	160 HP Tractor & LG RD Baler	Bale Indiangrass

***note: years 4-10 will follow the same schedule as shown in years 2 & 3**

***note: stands will need to be evaluated after year #10**

Big Bluestem Estimated Production Costs. Establishment Year.

Estimated Production Cost for Big Bluestem (biomass) **(year #1, establishment year)**
Jamie L. Whitten Plant Materials Center **stale seedbed**
Coffeeville, MS

***note: cost are estimated on 2007 prices and are subject to change/increase**

Item or Task	Cost / Acre	Your Farm
Seedbed Preparation (disk 2X, harrow, roll)	$92	_____
Plant Cover Crop w/tractor-spreader	$8	_____
Cover Crop Seed (wheat @ 70lbs/acre)	$14	_____
Big Bluestem Seed (@ 10lbs PLS/acre)	$130	_____
Drill Big Bluestem Seed	$35	_____
Apply Herbicides / Insecticide (4 applications)	$24	_____
Apply Fertilizer w/tractor-spreader (2 applications)	$16	_____
Fertilizer (0-0-60 @ 50lbs/acre)	$9	_____
Fertilizer (0-20-20 @ 200lbs/acre)	$34	_____
***Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Insecticide (added to burndown herbicide)	$2	_____
Burndown Herbicide	$8	_____
Preemergence Herbicide	$3	_____
Postemergence Herbicide	$3	_____
Cut Big Bluestem	$26	_____
Swath / Condition Big Bluestem	$11	_____
Bale Big Bluestem	$28	_____
Total Estimated Production Cost for Establishment Year =	**$497**	_____

***Tons harvested per acre in year #1 =** _____
Price per ton = _____

Gross return minus cost of production = _____

***note: Tonnage will be less in establishment year compared to subsequent years**

****note: N fertilizer will only be applied in the absence of weed competition**

Jamie L. Whitten
Plant Materials Center
Coffeeville, MS

Big Bluestem Estimated Production Costs. Year Two and Following.

Estimated Production Cost for Big Bluestem (biomass) (year #2 and following)
MSPMC

Item or Task	**Cost / Acre**	**Your Farm**
Apply Fertilizer w/tractor-spreader	$16	_____
Apply Herbicides (2 applications)	$12	_____
Fertilizer (0-0-60 @ 50lbs/acre)	$9	_____
Fertilizer (0-20-20 @ 200lbs/acre)	$34	_____
Fertilizer (34-0-0 @ 300lbs/acre)	$54	_____
Soil Applied Residual Herbicide	$3	_____
Postemergence Herbicide	$3	_____
Cut Big Bluestem	$26	_____
Swath / Condition Big Bluestem	$11	_____
Bale Big Bluestem	$28	_____
Total Estimated Production Cost Year #2 and following =	**$196**	_____

Tons harvested per acre = _____
Price per ton = _____

Gross return minus cost of production = _____

***MSPMC estimated production cost budgets are based upon known production cost on site, university crop budgets, dealer quotes, and other PMC reported production cost. These budgets are estimated and individual landowner's production cost will vary.**

***All P and K fertilizers should be applied according to soil test.**

Big Bluestem. Schedule of Applications.

Schedule of Applications for Growing Big Bluestem for Biomass years 1 - 10

YEAR	MONTH	APPLICATION	PURPOSE
0	9	160 HP Tractor & 20ft Heavy Disk	Seedbed Prep
0	10	160 HP Tractor & 20ft Flex Harrow	Seedbed Prep
0	10	90 HP Tractor & Fertilizer Spreader	Plant Cover Crop
0	10	90 HP Tractor & 20ft Cultipacker	Seedbed Prep
1	3	160 HP Tractor & 40ft Spray Boom	Burndown
1	4	90 HP Tractor & Fertilizer Spreader	Apply P& K
1	5	160 HP Tractor & 40ft Spray Boom	Burndown Insecticide
1	5	160 HP Tractor & 20ft Drill	Plant Big Bluestem
1	5	160 HP Tractor & 40ft Spray Boom	Apply Preemerge
1	6	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
1	6	90 HP Tractor & Fertilizer Spreader	Apply N
1	9	160 HP Tractor & 10ft Mower	Cut Big Bluestem
1	9	90 HP Tractor & 12ft Swather/Conditioner	Swath Big Bluestem
1	9	160 HP Tractor & LG RD Baler	Bale Big Bluestem
2	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
2	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
2	5	90 HP Tractor & Fertilizer Spreader	Apply N
2	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
2	9	160 HP Tractor & 10ft Mower	Cut Big Bluestem
2	9	90 HP Tractor & 12ft Swather/Conditioner	Swath Big Bluestem
2	9	160 HP Tractor & LG RD Baler	Bale Big Bluestem
3	4	90 HP Tractor & Fertilizer Spreader	Apply P & K
3	4	160 HP Tractor & 40ft Spray Boom	Apply Residual Herb.
3	5	90 HP Tractor & Fertilizer Spreader	Apply N
3	5	160 HP Tractor & 40ft Spray Boom	Apply Post Herb.
3	9	160 HP Tractor & 10ft Mower	Cut Big Bluestem
3	9	90 HP Tractor & 12ft Swather/Conditioner	Swath Big Bluestem
3	9	160 HP Tractor & LG RD Baler	Bale Big Bluestem

***note: years 4 -10 will follow the same schedule as shown in years 2 & 3**

***note: stands will need to be evaluated after year #10**