Extension
University of Missouri

Native Warm-Season Grass Planning Budget

Using this budget, farmers can estimate the costs and returns of establishing native warm-season grass (NWSG) forage species. Table 1 presents estimates for replacing existing forage stands with NWSG in Missouri. Assumptions were based on price forecasts as of October 2021. The NWSG forage species mix used in this budget includes big bluestem, indiangrass, little bluestem and forbs. The mix was assumed to be planted in a dormant season. Multiple calendar years are needed for the NWSG stand to reach full forage yield potential. Seeding mixes are designed to enhance wildlife habitat and meet eligibility for cost share practices. Use the "Your estimate" column to plan your operation's costs and returns for 2022.

Table 1. Missouri big bluestem, indiangrass, little bluestem and forbs budget for 2022.

	Year 1 Preparation	Year 2 Establishment	Year 3 Half production	Year 4 Full production	Your estimate
Income					
Haying	0.00	0.00	140.00	280.00	
Grazing	0.00	0.00	18.00	36.00	
Total income	0.00	0.00	158.00	316.00	
Operating costs					
Warm-season grass seed	0.00	165.50	0.00	0.00	
Forb/minor species seed mix	0.00	62.50	0.00	0.00	
Fertilizer and soil amendments[1]	81.90	0.00	39.53	79.06	
Competition management	28.80	26.00	0.00	0.00	
Chemical application	6.95	6.95	0.00	0.00	
Fertilizer application	6.18	0.00	6.18	6.18	
No-till drill use	0.00	20.00	0.00	0.00	
Hay baling and preparation	0.00	0.00	64.17	128.33	
Operator labor	0.00	8.75	0.00	0.00	
Operating interest	3.03	7.10	2.69	5.13	
Total operating costs	126.86	296.80	112.57	218.81	
Ownership costs					
Farm business overhead	0.00	0.00	0.00	0.00	
Machinery overhead/depreciation	0.00	0.00	0.00	0.00	
Real estate charge	8.50	34.00	34.00	34.00	
Total ownership costs	8.50	34.00	34.00	34.00	
Total costs	135.36	330.80	146.57	252.80	
Income over operating costs	**-126.86**	**-260.80**	**45.13**	**97.19**	
Income over total costs	**-135.36**	**-294.80**	**11.43**	**63.19**	

Note: Totals may not sum due to rounding.

1. University of Missouri Soil Test Lab recommends 2 pounds of P_2O_5 and 14.6 pounds of K_2O per ton of hay yield.

Written by
Joe Horner, State Specialist, Agricultural Business and Policy Extension
Ryan Milhollin, State Specialist, Agricultural Business and Policy Extension
Drew Kientzy, Student Assistant, Agricultural Business and Policy Extension

Year 1: Fall burndown and seedbed preparation

Year 1 reflects the fall season before planting occurs. The seedbed preparation process begins in early fall when the existing stand is chemically eradicated. Soil tests are taken and fertilizer applied according to soil test recommendations. Fertilizer application and spraying are performed by a custom operator. If the soil test indicates lime is required, it should also be applied at this time. If the existing pastureland is grazed, allocate 75 percent of ownership costs to the previous pasture stand and 25 percent to the new NWSG stand because of lost grazing days in the fall. If additional pasture must be rented to carry livestock for the remainder of the year, the cost of renting should be applied to the NWSG.

Table 2. Input prices in NWSG budget.

Description	Dollars per unit
Hay market price, per ton	80.00
Pasture, per animal unit month	18.00
Nitrogen, per pound N	0.70
Phosphorus, per pound P_2O_5	0.65
Potassium, per pound K_2O	0.58

Year 2: Seeding and competition management

Year 2 begins with no-tilling the seed and forb mix during the winter dormant season. There will be no hay or pasture harvest. Weed control includes an application of Imazapic for broadleaf and cool-season grass control if the label recommends for the seeding mix used. Additional charges were included in the budget above for competition management if mowing becomes necessary later in the season. Ownership costs are limited to a land charge plus any owned machinery costs associated with replacing custom work.

Year 3: Fertilization, hay and graze, half mature yield

Measurable production of the NWSG stand begins in Year 3, which is at least one full year after seeding. In this year, forage yield is typically 50 percent of full production. Costs incurred include a nitrogen application to boost yield and plant vigor along with potassium and phosphorous applied according to soil test recommendations based on yield goals. If weed pressure is an issue, an application of an approved herbicide can be used or the area can be mowed for broadleaf control.

Yield in Year 3 is measured both in tonnage harvested as hay (1.75 tons) and animal unit months (AUM) of grazing (1 AUM). An AUM represents one month of grazing per 1,000 pounds of animal. The first cutting of hay is typically harvested in the beginning of July, then either hayed again in August or grazed until 45 days before frost.

Year 4: Fertilization, hay and graze, full production

Full production of the NWSG stand is achieved in Year 4, or at least two full years after the NWSG was sown. Costs include nitrogen, phosphorus and potash applied according to soil test recommendations to achieve full production yield. Forage yield of 3.5 tons hay and 2 AUM per acre are budgeted and are expected to remain stable in the future if the stand is properly managed.

Develop your own budget

Farmers can also customize this budget to fit their own operations by using the Native Warm-Season Grass (NWSG) Planning Tool (https://extension.missouri.edu/media/wysiwyg/Extensiondata/Pro/AgBusinessPolicyExtension/Docs/NWSGBudgets.xlsx). Download the spreadsheet tool to create an electronic copy of your cost and return estimates for NWSG. Budget worksheets are available for the following NWSG scenarios:

1. Big bluestem and indiangrass with no forbs, dormant season planting
2. Big bluestem and indiangrass with no forbs, spring planted following winter cover crop
3. Big bluestem, indiangrass, little bluestem and forbs, dormant season planting
4. Big bluestem, indiangrass, little bluestem and forbs, spring planted following winter cover crop
5. Eastern gamagrass, dormant season planting

Extension
University of Missouri

Issued in furtherance of the Cooperative Extension Work Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Director, Cooperative Extension, University of Missouri, Columbia, MO 65211 • MU Extension provides equal opportunity to all participants in extension programs and activities and for all employees and applicants for employment on the basis of their demonstrated ability and competence without discrimination on the basis of race, color, national origin, ancestry, religion, sex, sexual orientation, gender identity, gender expression, age, genetic information, disability or protected veteran status. • 573-882-7216 • extension.missouri.edu