



## CONSERVATION ENHANCEMENT ACTIVITY

### E328I

# CONSERVATION STEWARDSHIP PROGRAM

## Forage harvest to reduce water quality impacts by utilization of excess soil nutrients

Conservation Practice 328: Conservation Crop Rotation

APPLICABLE LAND USE: Crop (Annual & Mixed); Crop (Perennial)

RESOURCE CONCERN: Water

ENHANCEMENT LIFE SPAN: 1 Year

### Enhancement Description

Establish a forage crop (single species or mix) following a primary annual crop to take up excess soil nutrients. Select forage known to effectively utilize and scavenge nutrients. Forage shall be harvested for forage, but not be grazed or burned.

### Criteria

- This enhancement is applicable on fields where excess soil nutrients cause or increase water quality degradation concerns. Presence of excess nutrients must be identified in recent soil tests or increased risk to water quality documented by risk assessment tool. **(Refer to state specific guidance of options to maximize nutrient uptake in local climate and cropping systems)**
- Forage species, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods will be consistent with applicable local criteria and soil/site conditions. **(Refer to state specific lists of forage crops known to effectively utilize and scavenge nutrients)**
- Select forage crop (single species or mix of two or more species) and planting dates which will not compete with the other crop(s) yield or harvest. ***If legumes are part of the forage mix, consider that this may add nutrients to the system.***

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- Select forage crop that is compatible with other components of the crop rotation and for its ability to efficiently scavenge and utilize excess soil nutrients, specifically nitrogen or phosphorous, whichever is identified as a potential risk to water quality. Nutrient uptake only occurs when a crop is actively growing. Therefore, it is imperative that the crops in rotation be planted as soon as possible after forage crop harvest (hay/balage/haylage/etc.) to maximize nutrient cycling and minimize offsite transport of nutrients.
- Determine method and timing of forage crop harvest to meet client objectives. Harvest the forage crop as late as practical to maximize plant biomass production and nutrient uptake.
- Ensure any herbicides used in the crop rotation are compatible with forage crop selections.
- Do not burn forage or residue.
- Do not graze forage crop.
- Reduce or maintain soil erosion from water and wind to below soil tolerance (T) level (average annual soil loss).



**Documentation and Implementation Requirements**

**Participant will:**

- Prior to implementation, provide NRCS with the current and planned crop rotation and field operation(s) used for each crop.

**Document excess nutrients identified in soil tests.** *Soil tests should be taken as close to production crop harvest as possible.*

Field	Soil Test Date	Nutrient (Nitrogen or Phosphorus)	Soil Test Nutrient Result (ppm or lbs/ac)

**Current Management Rotation**

Field	Current Crops (in sequence)	Planting Date	Harvest Date

**Current Field Operations for Each Crop**

Field	Crop	Field Operation	Timing of Field Operation (month/year)



**Planned Management Rotation including Forage Crop**

Field	Planned Crops/Forage Crop (in sequence)	Planting Date	Harvest Date

**Planned Field Operations for Each Crop**

Field	Crop	Field Operation	Timing of Field Operation (month/year)

**Planned Forage Crop and Seeding Rate** *(forage crop may be single species or mix of two or more species)*

Species	Variety	Seed Size	Typical Seeding Depth	Seeding Rate (PLS lbs/acre)	Percent of Mix (%)

**Forage Crop Establishment and Management Considerations:**

- Establish forage crop mix as soon as practical prior to or after harvest of the production crop.
- During implementation, forage crop must not be grazed or burned.
- During implementation, notify NRCS of any planned changes in forage crop mix or crop rotation, or management to verify the planned system meets the enhancement criteria.



- After implementation, if changes were made, update the tables above to document the applied crop rotation for the contract period and provide to NRCS.

**After implementation, complete the table below and provide to NRCS**

Task	Provide information and details
Seedbed Preparation	
Seeding Date	
Seeding Depth	
Seeding Method	
Fertilizer, as needed	
Weed Management, as needed	
Harvest Date (window)	
Harvest Method	

**NRCS will:**

- As needed, provide technical assistance in selecting forage crop for the crop rotation or substitute species that would meet the criteria of the enhancement. Forage crop may consist of a single species or mix of two or more species.
- As needed, provide additional assistance to the participant as requested.
- Prior to implementation, verify the enhancement is being planned on fields where excess soil nutrients cause or increase water quality degradation concerns. Presence of excess nutrients must be identified in recent soil tests or increased risk to water quality documented by risk assessment tool. **<REFER TO STATE SPECIFIC GUIDANCE>**
- Prior to implementation, use information provided from the participant to calculate the average annual soil erosion value (water and wind) for each field using NRCS erosion prediction technologies.

**Benchmark Management Soil Loss = \_\_\_\_\_ tons/acre/year**

**Planned Management Soil Loss = \_\_\_\_\_ tons/acre/year**

- During implementation, evaluate any planned changes in forage crop selected, timing in crop rotation, management, or field operations to verify the new system meets the enhancement criteria.



- After implementation, if there were any changes to planned rotation or management evaluate the applied crop rotation using information provided from the participant to calculate average annual erosion value to document that the applied rotation meets the enhancement criteria.

**Applied Management Soil Loss = \_\_\_\_\_ tons/acre/year**

**NRCS Documentation Review:**

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and met all criteria and requirements.

Participant Name \_\_\_\_\_ Contract Number \_\_\_\_\_

Total Amount Applied \_\_\_\_\_ Fiscal Year Completed \_\_\_\_\_

\_\_\_\_\_  
NRCS Technical Adequacy Signature

\_\_\_\_\_  
Date

**ALABAMA – E328I Forage Harvest to Reduce Water Quality  
Impacts by Utilization of Excess Soil  
Nutrients**

-Applicable where soil test P is very high or extremely high or where residual N is expected from the previous crop. Typically, higher amounts of nutrients are removed when vegetation is harvested as hay. No more than 3 years of the rotation may be a perennial grass. The rotation may consist of annual small grains planted at higher seeding rates harvested for hay prior to cash crop planting or perennial grasses/crops. No additional P may be applied in either commercial fertilizer mixes or manure/biosolids. The cover may be fertilized with N for additional growth not to exceed Alabama Cooperative Extension System recommendations if scavenged N is insufficient for adequate biomass production. Refer to Agronomy Technical Note AL-73 Nitrogen Leaching Index for Alabama.

-A current soil test is required each year of the rotation.

-All crops must be planted no till/strip till. Average annual soil loss must be below the soil loss tolerance level. Rotations utilizing strip-till may be limited to grass-based rotations in order to meet this requirement. Do not use this enhancement when maximum biomass is desired to improve soil health. When annual covers only are used, the small grain must be harvested for hay each year of the enhancement. The enhancement is not applicable if the small grain is harvested for seed/grain unless followed by a summer annual harvested for hay.

- Increase small grain seeding rates by 30% if aerially applied.

- Complete the tables on the national jobsheet for documentation. In addition, receipts, copy of seed tags, weight tickets, etc. are needed. Photographs should be taken before and after hay removal.

-Minimum seeding rate for small grains is 90 lbs./ac.

- Harvest as late as possible to maximize biomass and nutrient uptake. Do not plan prior to corn planting (unless late planted) to allow time for adequate cover crop growth.

-No more than 2 years of a 5-year rotation may be planted to the same crop.

**1. A perennial grass grown at least 2 years but no more than 3 years with at least two other crops in the rotation:**

Example:

a. Corn grain, 1 yr., cotton 1 yr., *Fescue or Bahiagrass* 2-3 yr..

OR;

**2. A small grain (*rye, wheat, oat, barley, triticale*) cover crop harvested for hay prior to each cash crop with at least two other crops in the rotation.**

Examples:

a. Corn (grain) 1 yr. , *Wheat* harvested for grain, *Pearl Millet* summer cover crop harvested for hay; *Small grain harvested for hay*; Cotton 1 yr., *Small grain harvested for hay*; peanut, 1 yr. Cover crop must be at least 24 inches tall or 5000 lbs. dry matter prior to harvest.

**TABLE 1. PLANTS COMMONLY USED FOR COVER CROPS IN ALABAMA**

Forage Crop	Seeding Rate (lb/A)	Seeding Depth (in.)	Planting Date			Remarks
			North	Central	South	
<b><u>Warm Season Annual Grasses</u></b>						
<b>Millet, Browntop, Proso, &amp; Foxtail</b>	Drill 20 B-Cast 30	½ - ¾	May 1–Aug 1	Apr 1-Aug 15	Apr 1-Aug 15	Well drained, productive soils.
<b>Millet, Pearl</b>	Drill 15 B-Cast 30	½ - 1½	Apr 20-Jul 1	Apr 15-Jul 1	Apr 1-Jul 15	Adapted to clay and loam soils with good summer moisture. Avoid calcareous Black Belt soils.
<b>Sorghum-Sudan Hybrids</b>	Drill 25 B-Cast 35	½ - 1	May 1–Aug 1	Apr 15-Aug 1	Apr 1–Aug 15	Well drained, productive soils.
<b>Sorghum, Forage</b>	Rows 5 B-Cast 20	1	Apr 20-May 15	Apr 20-May 15	Apr 20-Jul 1	Well drained, productive soils.
<b>Sudangrass</b>	Drill 25 B-Cast 35	½ - 1	May 1-Aug 1	May 1-Aug 1	May 1-Aug 1	Light sandy to heavy clay soils.
<b><u>Cool Season Annual Grasses</u></b>						
<b>Small Grains (Oats, Rye, Wheat, Barley, Triticale)</b>	90-120	1 – 2	Sep 1–Nov 1	Sep 15–Nov 1	Sep 15-Nov 15	Rye is better adapted to well drained, sandy to loam soil and is more tolerant of soil acidity than wheat or oats; Oats are cold sensitive & subject of winter kill, especially in the northern half of Alabama; Wheat more tolerant of heavy wet soils.



**Table 1. (cont.) Plants Commonly Used for Cover Crops in Alabama**

Forage Crop	Seeding Rate (lb/A)	Seeding Depth (in.)	Planting Date			Remarks
			North	Central	South	
<b><u>Warm Season Annual Legumes</u></b>						
<b>Lespedeza, Annual</b>	30	¼ - ½	Feb 15-Apr 1	Feb 15-Apr 1	-	Needs good drainage; tolerant of drought; low fertility and soil acidity. Avoid lime soils of Black Belt.
<b><u>Cool Season Annual Legumes</u></b>						
<b>Austrian Winter Peas</b>	40	1-2	Sept 1-Oct 15	Sept 1-Oct	Sept 1-Oct 15	Best on well drained soils.
<b>Caley Peas</b>	50	½ - 1	Sep 1-Oct 15	Sep 1-Oct 15	Sep 1-Oct 15	Adapted to alkaline and moderately acid Black Belt soil. Seeds are toxic.
<b>Clover, Arrowleaf</b> <i>(see note "F" if seed is coated)</i>	6	0 - ½	Aug 25-Oct 1	Sep 1-Oct 15	Sep 15-Nov 1	Overseed 5 weeks later. Best on well drained soils. Avoid Black Belt soils.
<b>Clover, Ball</b> <i>(see note "F" if seed is coated)</i>	4	0 - ¼	Sep 1-Oct 31	Sep 1-Oct 31	Sep 1-Oct 31	Adapted to most soils. Reseeds well and tolerates wet soils and flooding.
<b>Clover, Crimson</b> <i>(see note "F" if seed is coated)</i>	25	0 - ½	Aug 25-Oct 1	Sep 1-Oct 15	Sep 15-Nov 1	Avoid high pH soils. Best on well drained soils. Overseed 5 weeks later.
<b>Clover, Red</b> <i>(see note "F" if seed is coated)</i>	Drill 8 B-Cast 15	¼ - ½	Sep 15-Nov 15 Or Feb 1-Apr 1	Sep 15-Nov 15 Or Feb 1-Apr 1	Sep 15-Nov 15 -	Fertile, well drained soils.

**Table 1. (cont.) Plants Commonly Used for Cover Crops in Alabama**

Forage Crop	Seeding Rate (lb/A)	Seeding Depth (in.)	Planting Date			Remarks
			North	Central	South	
<b>Clover, Subterranean</b> <i>(see note "F" if seed is coated)</i>	10	¼ - ½	Aug 25-Oct 1	Sep1-Oct 31	Sep1-Oct 31	Best on well drained, productive soils.
<b>Vetch, Common</b> <i>(see note "F" if seed is coated)</i>	35	1-2	--	Sep 1-Oct 15	Sep 15-Nov 1	Best on well drained soils. Certain varieties can freeze if planted late, especially in north Alabama. Nova II is the least cold tolerant.
<b>Vetch, Hairy</b> <i>(see note "F" if seed is coated)</i>	25	1-2	Sep 1 –Oct 15	Sep 1-Oct 15	Sep 15-Nov 1	Best on well drained soils.
<b>Brassicas</b> <b>Daikon radish</b> (Tillage radish)	5	0.25 – 0.5	Aug 30	Sept 15	Sept 20	Adapted to most soils.
<b>Rape/Canola</b>	5	0.25 – 0.75	Aug 15	Aug 30	Sept 15	Adapted to most soils.
<b>Turnip/Purple top</b>	5	0.25 – 0.75	Aug 20	Aug 30	Sept 15	Adapted to most soils.

**NOTES:**

- A. Drill = Drilled and B-Cast = Broadcast.
- B. Where legumes are seeded with grasses, use the seeding dates for the grasses.
- C. Where two or more grasses are used in a mixture, reduce the seeding rate of each by about one-third. Reduce the seeding rates of legumes by about 50% when used in the mixtures of three.
- D. Seeding rates should be increased at least 30% when aerially seeded.
- E. Seeding rates for a cost-share program shall be the rate specified by the program.
- F. Consider the weight of the coated seed in your seeding recommendation to adjust for the proper PLS rate.

# GEOGRAPHICAL AREAS FOR SPECIES ADAPTATION AND SEEDING DATES

