

**NATURAL RESOURCES CONSERVATION SERVICE**  
**VIRGINIA CONSERVATION PRACTICE STANDARD**  
**FORAGE HARVEST MANAGEMENT**

(Acre)

Code 511

**DEFINITION**

The timely cutting and removal of forages from the field as hay, green chop, or ensilage.

**PURPOSES**

This practice may be applied as part of a conservation management system to accomplish one or more of the following purposes:

- Optimize the economic yield of forage at the desired quality and quantity
- Promote vigorous plant re-growth
- Maintain stand life for the desired time period
- Maintain the desired species composition of the stand
- Use forage plants for uptake of excess nutrients
- Control insects, diseases, and weeds
- Maintain and/or improve wildlife habitat.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all land uses where machine harvested forage crops are grown.

**CRITERIA**

Forage will be harvested at a frequency and height that will maintain a desired and healthy plant community through its life expectancy.

**GENERAL CRITERIA SUITABLE FOR ALL PURPOSES**

**Stage Of Maturity And Harvest Interval**

Harvest forage at the stage of maturity that provides the desired quality and quantity.

Cut forage plants at a harvest interval that will provide adequate plant reserves and/or basal or axillary tillers or buds for regrowth and/or reproduction to occur without loss of plant vigor.

Cut reseeding annuals at a stage of maturity and frequency that ensures the production of viable seed or ample carryover of hard seed to maintain desired stand density.

If plants show signs of short term environmental stress, management will be applied in a manner that ensures continued health and vigor of the stand.

Delay harvest if prolonged or heavy precipitation is forecast that would seriously damage cut forage.

Where weather conditions make it difficult to harvest the desired quality of forage, use mechanical or chemical conditioners and/or ensile.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

### Moisture Content

Harvest silage and haylage crops at the ideal moisture range for the type of storage structure(s) being utilized.

When direct cut hay crop silage is harvested at a moisture content greater than 70%, treat with chemical preservatives or add dry feed stuffs to avoid fermentation and digestible dry matter losses due to seepage.

For optimal forage quality, rake, ted, or invert swaths and bale when hay has sufficient moisture to prevent leaf loss.

Bale at optimum moisture levels to preserve forage quality and quantity.

Approximate percent moisture for hay should be as follows:

- Ted or invert swaths when moisture is above 40 percent
- Rake hay at 30 to 40 percent moisture
- Bale forced air dried hay at 20 to 35 percent moisture
- Bale field cured hay at 15 to 20 percent moisture

### Stubble Height

Cut forages at a height that will promote the vigor and health of the desired species. Cutting heights will provide adequate residual leaf area; adequate numbers of terminal, basal, or auxiliary tillers or buds; insulation from extreme heat or cold; and/or unsevered stem bases that store food reserves needed for full, vigorous recovery.

Manipulate timing and cutting heights of harvest to ensure germination and establishment of reseeding or seeded annuals.

### Length Of Cut

When harvested for ensilage, forage will be chopped to a size that allows adequate packing to produce the anaerobic conditions necessary to ensure the proper ensiling process.

### Contaminants

Forage shall not contain contaminants at levels injurious to the health of the livestock class and type being fed.

Contaminants are any objectionable matter or toxin that can cause illness, death, or rejection of the offered forage.

#### ADDITIONAL CRITERIA FOR NUTRIENT UTILIZATION CROP

Employ a harvest regime that utilizes the maximum amount of available or targeted nutrients. Reference the [Agricultural Waste Management Field Handbook](#) for plant nutrient uptake by forage crops.

#### ADDITIONAL CRITERIA TO CONTROL DISEASE, INSECT, AND WEED INFESTATIONS

If a foliar disease, insects, or weeds threaten stand survival or production objectives, schedule harvest periods as needed to control disease, insect, and weed infestations.

When weed infestation exceeds the economic threshold and is uncontrollable by forage harvest management alone, weed control should be planned and applied. Coordinate this practice with Virginia Conservation Practice Standard *Pest Management (Code 595)*.

When insect and disease outbreaks exceed economic thresholds and are uncontrollable by harvest management, pesticide applications may be needed. Another option is to select a resistant cultivar when the stand is replaced. See Virginia Conservation Practice Standard *Pest Management (Code 595)*.

Lessen incidence of disease, insect damage, and weed infestation by managing for desirable plant vigor.

## ADDITIONAL CRITERIA FOR WILDLIFE HABITAT IMPROVEMENT

Maintain appropriate harvest schedule(s), cover patterns, and plant height to provide suitable habitat for the desired specie(s). Generally the longer the intervals between harvest the better for wildlife. Most grassland wildlife species are adapted to 8" or greater plant height. Coordinate this practice with Virginia Conservation Practice Standard *Upland Wildlife Habitat Management* (Code 645).

## CONSIDERATIONS

When pastures produce forage in excess of livestock demand during periods of high growth rate, consider preserving forage quality by machine harvesting a portion of the standing forage. Coordinate this practice with Virginia Conservation Practice Standard *Prescribed Grazing* (Code 528A).

Well fertilized plants withstand more intense harvest schedules and may produce a higher quantity and quality of forage. Coordinate this practice with Virginia Conservation Practice Standard *Nutrient Management* (Code 590).

Where wildlife habitat is a priority, consider delaying harvest in a portion of the field or management unit until July 1 or later to allow wildlife nesting and use. Best results can be achieved by leaving a 50' or wider strip along the field edge.

Select cultivar that are suitable for the harvest regime, species mix, and forage quality desired. For specific nutrient uptake, select species that can maximize uptake.

To control forage plant diseases, insects, and weeds, clean harvesting equipment after harvest and before storing. Do not cut forages until dew, rain, or irrigation water on leaves has evaporated.

Direct cut grass and legume silage can create silage leachate (seepage). Consider the collection, storage, and disposal of this leachate as part of an agricultural waste management system.

In conjunction with harvest options, explore storage and feeding options that will retain

acceptable forage quality and minimize digestible dry matter loss.

In regions where rainfall and/or humidity levels cause unacceptable forage quality losses in at least one harvest during the year, consider ensiling the forage to reduce or eliminate field drying time. Other options are the use of desiccants, preservatives, conditioners, macerating implements, or barn curing techniques to reduce field drying time, green chopping, or grazing. These techniques can improve the timeliness of harvest and help preserve forage quality.

To reduce safety hazards, avoid operating harvesting and hauling equipment on field slopes over 25 percent, particularly on cross slope traffic patterns.

## PLANS AND SPECIFICATIONS

Place the detailed specifications in a site-specific job or design sheet, or in the practice narrative of the conservation plan.

These plans and specifications shall be consistent with this standard and shall describe the requirement for applying the practice to achieve its intended purpose.

## OPERATION AND MAINTENANCE

Before forage harvest, clear fields of debris that could damage machinery or, if ingested by livestock, lead to sickness (for example, hardware disease) or death.

Monitor weather conditions and take action accordingly before and after cutting to optimize forage wilting or curing time to preserve feed quality and prevent forage swaths or windrows from smothering underlying plants.

Inspect and repair harvest equipment following manufacturer's preventative maintenance procedures.

All shields shall be in place during machine operation to prevent injury or death. Shut off machinery before working on or unplugging moving parts.

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Select equipment sizes and capabilities that will handle the acreage normally harvested in a timely and economically feasible manner.

Operate all forage harvesting equipment at the optimum settings and speeds to minimize loss of leaves.

Set shear plate on forage chopper to the proper theoretical cut for the crop being harvested. Keep knives well sharpened. Do not use re-cutters or screens unless forage moisture levels fall below recommended levels for optimum chopping action.

Regardless of silage/haylage storage method, ensure good compaction and an airtight seal to exclude oxygen and mold formation.

## REFERENCES

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3. Corn Silage Production, Management, and Feeding by Greg W. Roth et al., American Society of Agronomy, 1995.
4. "Cow-Calf Manager: Winter Feeding and Supplements" by John B. Hall, December 1997 in Livestock Update.
5. Forage-Animal Management Systems by Roy Blaser et al., Virginia Tech Bulletin 86-7.
6. Forages: The Science of Grassland Agriculture, by Barnes, R. F., D. A. Miller, & C. J. Nelson, Fifth Edition. 1995. Iowa State University Press, Ames, IA.
7. Hay as Part of a Cowherd Production System by Mark Wahlberg, 1995, VCE publication 400-055.
8. Minimizing Losses in Hay Storage and Feeding by Bade, D., D. Ball, G. Lacefield, N. Martin, & B. Pinkerton.
9. Nutrient Requirements of Beef Cattle, Seventh Edition, 1996.
10. Penn State Agronomy Guide, 1999-2000, Penn State College of Agriculture, Cooperative Extension.
11. Proceedings, Purdue Cow-Calf Research Field Day by V. L. Lechtenberg et al., Purdue University Agricultural Experiment Station, April 5, 1995.
12. Southern Forages by Ball, D. M., C. S. Hoveland, and G. D. Lacefield. 1991. Potash & Phosphate Institute, Norcross, GA.
13. Southern Regional Cow-Calf Handbook.
14. NRCS, Virginia Field Office Technical Guide, Section IV.
15. Agricultural Waste Management Field Handbook.

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**Approved Practice Narratives**

**(Acre)**

**(CODE 511)**

511 D1 Forage Harvest Management:  
Forage will be harvested at a frequency,  
height, and maturity that maintains a desired  
and healthy plant community through its life  
expectancy while meeting the nutritional needs  
of the livestock.

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