

SPECIFICATIONS

Forage Harvest Management Hayland – 511S

Forage Harvest Management on Hayland shall be planned and applied in accordance with the 511 standard detailed in Section IV of the Field Office Technical Guide. The standard describes the definition, purpose, conditions where Forage Harvest Management applies, along with the criteria, considerations, and operation and maintenance requirements for developing site-specific plans for this practice.



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1. Forage Harvest Management Plan

A forage harvest management plan shall include the following information as a minimum:

Location - field numbers, acreage, and map or sketch of areas planned and areas excluded.

Key species, growth stage for cutting, cutting heights, and re-growth by killing frost.

Planned dormant season grazing if appropriate.

Plan date and signature(s).

Forage Harvest Management Plan and Documentation Record NE-CPA-80 or equivalent documentation can be used to meet these requirements.

2. Harvesting

Forage will be harvested at the appropriate height, frequency and time in order to maintain a productive hay stand as follows:

a. Cutting Height

- Refer to Table 2 for appropriate harvest height by species and minimum re-growth before frost, and the following:

1. When multiple species are present in the hay field select the key forage species to determine the appropriate cutting height (i.e. Big Bluestem in a native prairie in Eastern Nebraska).
2. Increase cutting height if poor soil moisture/drought conditions exist, plant vigor is poor, or stand loss is occurring in order to allow for a quicker recovery, improve plant vigor, decrease stand loss or to ensure adequate regrowth prior to frost.
3. To improve residual cover for wildlife, maintain a cutting height of at least 4 inches if a significant portion of the field is left un-cut, and at least 5 inches if the entire field is cut.
 - a. Techniques intended to reduce mortality of wildlife will be implemented, including:
 - i. use of a “flushing bar” as an attachment on the cutting machine,
 - ii. cutting only during daylight hours,
 - iii. cutting in an “inside-out” pattern or from one side of the field toward suitable escape cover,
 - iv. leaving borders (30’ or wider) uncut adjacent to field edges and cover.
4. Avoid cuttings that do not allow for adequate regrowth prior to frost. This will result in low plant vigor and stand loss, especially if repeated year after year.
5. Vary cutting height from one year to the next, which allows for more regrowth. This is important on mixed stands i.e. native prairie sites. Using the same cutting height places stress on the same forage species year after year, resulting in stand loss and an increase in less desirable species.

Cutting Frequency

- Refer to Table 2 for appropriate cutting frequency by species, and the following:
 1. When multiple species are present, select the key forage species to determine the appropriate cutting frequency.
 2. Reduce cutting frequency by one cutting, if poor soil moisture/drought conditions exist, plant vigor is poor, or stand loss is occurring in order to allow for a quicker recovery, improve plant vigor, decrease stand loss or to ensure adequate regrowth prior to frost.
 3. When there is adequate soil moisture, additional cuttings of cool season grasses and legumes, sub-irrigated meadows and irrigated hayland may be appropriate if adequate regrowth will occur prior to frost.
 4. A second cutting of single species stands of Eastern gamagrass and Switchgrass may be taken when ideal soil moisture conditions and growth are present. Second cuttings of Eastern gamagrass and Switchgrass shall occur at least six weeks prior to a frost.

Time of Harvest

- Refer to Table 2 for approximate harvest timing for maximum protein and total digestible nutrient (TDN) for various forage species and the following:

1. If higher forage quality is desired, harvest date shall be slightly earlier.
2. If higher forage quantity is desired, harvest date shall be slightly later.
3. When multiple species are present select the key forage species to manage for (i.e. Big bluestem in a native prairie in Eastern Nebraska, Prairie sandreed in wet meadows in the Sandhills etc.).
4. Time of harvest shall be adjusted from year to year to avoid poor plant vigor and stand loss. This is especially important for native prairie sites, because the same forage species will be stressed year after year, resulting in stand loss and an increase in less desirable species.
5. Repeated late cuttings that do not allow for adequate regrowth prior to frost will result in low plant vigor and/or stand loss.

b. Moisture Content

- Forage will be put up at appropriate moisture content to avoid excessive spoilage during storage, minimize leaf loss and ensure maximum forage quality.
- Ideal moisture contents for various hayland types will vary depending on the storage method (refer to Table 1).

Table 1 Recommended Moisture Content For Various Methods of Putting Up Hay (Provide by Dr. Bruce Anderson, UNL Extension Forage Specialist):

Type of Storage Method	Suggested % Moisture
Large Squares (>800 pounds)	14-15%
Large Round Bales	16-18%
Small Square Bales	18-19%
Stacks/Loaves	20-22%

Grazing

- When appropriate, grazing during the growing season may be substituted for second cuttings where plant roots reach the water table, in favorable soil moisture conditions, or under irrigation. Refer to Prescribed Grazing Standard 528 for guidance.
- Dormant season grazing of forage aftermath may be appropriate if all of the following apply:
 1. Regrowth after the last cutting meets or exceeds the heights listed in Table 2.
 2. Grazing heights shall be no lower than listed for haying heights in Table 2
 3. Field conditions are not too muddy in order to avoid damage from livestock hoof action and/or pulling plants out by the root.

3. Wildlife Habitat Evaluation Criteria

Use appropriate harvest schedule(s), cover patterns, and minimum plant heights to provide suitable habitat for the desired specie(s).

Avoid harvest and other disturbance during nesting and fawning period, May 1 through July 15. Refer to Upland Wildlife Habitat Management (645) or Wetland Wildlife Habitat Management (644) for additional

information. Complete the Hayland Habitat Evaluation Worksheet (NE-CPA-33) to evaluate forage harvest timing and frequency, plant species composition, and residual cover options to meet minimum quality criteria for wildlife.

4. Invasive Grass/Weed/Brush Control

Competition from annual or perennial weeds, invasive grasses, brush or undesirable plants that affect hay quality and yield shall be controlled as necessary.

Invasive grasses/weeds and brush will be controlled using cultural measures, herbicides, prescribed burning, or a combination of these methods. Use as appropriate according to the Integrated Pest Management Standard (595).

Herbicide Treatments

Must be applied in accordance with product label directions and the current Guide for Weed Management in Nebraska for control of invasive grasses/weeds and brush.

- Pest scouting, herbicide selection, application method, additives, timing, weed stage and other aspects of Integrated Pest Management are necessary to ensure adequate efficacy for chemical weed control methods.
- Invasive grasses such as Smooth brome grass invading a native warm season grass prairie site can be controlled by applying burn down herbicides at the appropriate time and rate to avoid damaging desired native plants.
 1. The timing, rate and type of burn down herbicide should be such to avoid damage to desired plant species.
 2. Prescribed burning or haying can be used to manage plant residue and ensure uniform and active regrowth of invasive grass in order to improve the efficacy of burn down herbicides.
 3. When remaining stand of grass is not adequate after applying burn down herbicide, seeding native grasses will be necessary. Refer to Range Seeding 550 and Herbaceous Vegetation Design Procedures 550DP for additional guidance.

Prescribed burning can be utilized to manage/control brush encroachment, weeds, or invasive grass. A prescribed burn management plan is required with this treatment method. Refer to the standard, Prescribed Burning (338) and use Prescribed Burn Management Plan NE-ECS-72 when using this method for managing weeds and brush.

Mechanical removal of brush may be used in lieu of prescribed burning or herbicide application or in conjunction with them. Refer to the Brush Management Standard (314) for appropriate brush control measures.

Noxious weeds must be controlled according to Nebraska Noxious Weed laws.

5. 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.

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

To control forage plant diseases, insects, and movement of weeds, clean harvesting equipment after harvest and before storing.

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.

Follow all agricultural equipment manufacturer's safety measures when operating forage harvesting equipment.

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

Dispose of the plastic wrap or bags used to store forage in an environmentally sound manner.

Refer to Section 16 of the Herbaceous Vegetation Design Procedures (550DP) for additional guidance in the operation and maintenance of forage stands. Use the NE-CPA-8a for stand evaluation documentation.

Nutrient Management

University of Nebraska nutrient recommendations and soil testing procedures will be followed.

Nitrogen, Phosphorus, Potassium and pH levels are especially critical for maintaining forage quality and quantity.

Refer to the Nutrient Management Plan (590) standard for additional guidelines.

6. DEFINITIONS:

Harvesting plants at their proper growth stages will maintain stand and vigor and ensure a higher quality, palatable forage.

- Early Boot - 10 percent of heads in upper sheath,
- Boot – about 50 percent of heads in upper sheath, but prior to emergence
- Early Head - tip of head emerging on not more than 10 percent of the stems
- Medium Head - about 50 percent of the heads emerged or emerging
- Full Head - heads fully emerged but prior to any flowering
- Early bud - no flower color showing on 80 percent of plants
- Late Bud - Shows flower color on 80 percent
- Early Bloom - 10 percent flowers out
- Late Bloom - all flowers are out

7. SUPPORT REFERENCES

[Forage Harvest Management Plan and Documentation Record NE-CPA-80](#)

[Pest Management Standard \(595\)](#)

[Herbaceous Vegetation Design Procedures \(550 DP\)](#)

[Guide for Weed Management in Nebraska](#)

[Prescribed Burning Standard \(338\)](#)

[Prescribed Burn Management Plan NE-ECS-72](#)

[Nutrient Management Standard \(590\)](#)

[Hayland Habitat Worksheet, NE-CPA-33](#)

Table 2. Forage Harvest recommendations based on approximate growth stage, cutting height, and minimum plant regrowth before killing frost				
SPECIES (for mixtures select the key forage species to manage for)	NUMBER OF CUTTINGS	GROWTH STAGE FOR OPTIMAL HARVEST	CUTTING HEIGHT (in)	REGROWTH BY KILLING FROST (in)
COOL SEASON GRASSES				
Creeping foxtail	1	Early to full head	3	4
	2	Early head or when 8-10" tall		
Crested wheatgrass	1	Boot to early head	3	4
	2	Boot or when 8-10" tall		
Green needlegrass	1	Boot to early head	3	5
	2	Boot or when 8-10" tall		
Intermediate wheatgrass	1	Early to full head	3	7
	2	Early head or when 8-10" tall		
Meadow brome	1	Early to full head	3	4
	2	Early head or when 8-10" tall		
Orchardgrass	1	Boot to early head	3	6
	2	Boot or when 8-10" tall		
Pubescent wheatgrass	1	Early to full head	3	7
	2	Early head or when 8-10" tall		
Reed canarygrass	1	Early boot	3	8
	2	When basal sprouts appear		
Smooth brome	1	Early to full head	3	4
	2	Early head or when 8-10" tall		
Tall fescue	1	Prior to heading	3	5
	2	Prior to heading		
Tall wheatgrass	1	Early to full head	3	7
	2	When 8-10" tall		
Western wheatgrass	1	Early to full head	3	5
	2	When 8-10" tall		
Wildryes	1	Early to fullhead	3	4
	2	When 8-10" tall		

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WARM SEASON GRASSES				
Big bluestem and sand bluestem	1	Boot to medium head	5	8
Eastern gamagrass (refer to cutting frequency guidance above to determine if 2 nd cuttings are appropriate for single species stands)	1	Boot to medium head	5	8
Indiangrass	1	Boot to medium head	5	8
Little bluestem	1	Boot to medium	4	6
Prairie cordgrass	1	Early Boot to Boot	5	8
Prairie sandreed	1	Boot to medium head	4	8
Switchgrass (refer to cutting frequency guidance above to determine if 2 nd cuttings are appropriate for single species stands)	1	Early Boot to Boot	4	8
LEGUMES				
Alfalfa	1	Late bud to early bloom	2	6
	2	Early bloom to ¼ bloom		
	3	Early bloom to ¼ bloom		
Alsike clover	1	¼ to ½ bloom	2	5
Birdsfoot trefoil	1	Early flower to ¼	3	5
Cicer milkvetch	1	At all stages	3	5
	2	Every 45 days		
Red clover	1	¼ to ½ bloom	2	5
Sweetclover	All	Bud to early flower	3	4
OTHER				
Grass-legume mixtures	All	Base cutting height and regrowth by the key legume species		
Native Warm Season Mixture	1	Refer to key forage species above		

