

NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION

FORAGE HARVEST MANAGEMENT (ACRE)

CODE 511

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

PURPOSE:

- Optimize yield and quality of forage at the desired levels
- Promote vigorous plant re-growth
- Maintain stand life
- Manage for the desired species composition
- Use forage plant biomass as a soil nutrient uptake tool
- Control insects, diseases and weeds
- Maintain and/or improve wildlife habitat.

Secondary Benefits:

- Forage -- maintain or improve life of stand, vigor, quality and quantity of forage
- Control Disease, Insect, Weed and Invasive Plant Infestations
- Utilization of excess nutrients
- Improve Wildlife habitat
- Erosion control.

Where Used: This practice applies to all land uses where machine harvested forage crops are grown, including seeded hayland, native grass/sedge meadows, and rangeland harvested for hay.

Conservation Management System

Forage harvest management is normally established as part of a conservation management system to address the soil, water, air, plant, animal, and human needs as related to the owner's goals and objectives. It is important to consider the conservation crop rotation, nutrient and pest management, livestock forage and grazing requirements, wildlife habitat needs, and other conservation practices, when designing management of forages. Forage harvest management can also provide erosion control, benefits to soil health, and improve farm aesthetics. It is most effective in providing conservation benefits when used in combination with other agronomic practices.

Wildlife: Forage harvest management can enhance wildlife objectives depending on the vegetative species used and management practiced. Consider using species that can provide food and cover for important wildlife. Delay harvest until after nesting season if practical.

Specification MT511-2

Design Specifications: For optimum benefits, forage must be harvested at a frequency and height that will maintain a healthy plant community. Forage harvest recommendations must be based on state of maturity, moisture content, length of cut, stubble height and harvest interval.

Native hay meadows with a high water table throughout the growing season or meadows that receive supplemental water during the growing season may be harvested for hay more than once per year. Upland range sites will be harvested for hay no more than every other year to allow adequate recovery of plant vigor. Grazing on rangeland harvested for hay is limited to the dormant season in both the harvest and following year.

To ensure the highest quality forage, a forage quality test is recommended after each cutting. An appropriate analysis, as a minimum, includes TDN (Total Digestible Nutrients) and percent crude protein. Additional analyses may include acid detergent fiber, neutral detergent fiber, crude fiber, lignin, calcium, phosphorus, potassium, and magnesium.

Stage of Maturity. Harvest forage at the stage of maturity that provides the desired quality and quantity. Tables 1 and 2 provide guidelines for harvest stages and minimum cutting heights.

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

A final hay harvesting following a fall killing frost is acceptable provided adequate stubble is left to protect the soil from erosion and over-winter damage.

Moisture Content. Harvest silage/haylage crops within the optimum moisture range for the type of storage structure(s) being utilized.

Treat direct cut hay crop silage (moisture content > 70%) with chemical preservatives or add dry feed stuffs to avoid fermentation and seepage losses of digestible dry matter.

For optimal dry hay quality, rake hay at 30 to 40 percent moisture and ted or invert swaths when moisture is above 40 percent.

To preserve forage quality and quantity, bale field cured hay at 15-20 percent moisture and bale force air dried hay at 20-35 percent moisture.

Length of Cut. When harvested for ensilage forage should be chopped to a size appropriate for the type of storage structure (high moisture wrapped or tubed bales) that allows adequate packing to produce the anaerobic conditions necessary to ensure the proper ensiling process.

Contaminants. Forage shall not contain contaminants or debris that can cause illness or death to the animal being fed or rejection of the offered forage.

If noxious weeds are present in the stand, harvest the hay prior to weed seed maturity to prevent the spread of viable seed. If herbicides are used, follow label directions for the interval of time from chemical application to safe harvest.

OPERATION AND MANAGEMENT: 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.

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. Fall grazing is not recommended to maintain stand productivity. However, if hay lands are fall grazed, grazing should be delayed until after a killing frost.

Ensure that a balanced fertility program is utilized to minimize the potential for **grass tetany**, a condition that occurs in ruminant cattle when soil nitrogen, magnesium and potash are improperly balanced. Problems are most common in the spring with lush grass growth. Magnesium minerals may also be utilized to supplement feed where concerns are an issue.

Nitrate poisoning may also be a concern during certain stages. Nitrate poisoning may occur if animals ingest forages with high nitrate concentrations (in excess of 0.35% to 0.45% nitrate in diet). Nitrate poisoning can occur in annual forages as well as perennial forages. Common causes of nitrate poisoning are:

- High applications of nitrogen fertilizer or high soil nitrate levels
- Drought conditions
- Low light intensity
- Management (if animals are made to graze closely, they will eat more of the lower stem tissue).

Management to minimize nitrate poisoning includes conducting a chemical analysis on species known for accumulating nitrates (sudan, sorghum, oat hay) prior to feeding, test water source for nitrates, ensilage forage (reduces nitrate levels by 40-60%) dilute high nitrate feeds with low nitrate feeds, change rations over a 7-10 day period, if pasture is suspected of high nitrate levels only graze a few animals the first week and when deemed safe turn the rest of animals out, do not use damp feed (dampness heightens toxicity levels) 0.0 to .44% KNO₃ is considered safe to feed.

Table 1. Cutting Management Guide for Hayland

Species	Minimum Cutting Height (inch)
Alfalfa	3
Big Bluegrass	4
Bluestem - Little, Sand	3
Bluegrass, Kentucky	2
Bromegrass, Smooth	4
Bromegrass, Meadow (Regar)	4
Canarygrass, Reed	6
Clover, Alsike	4
Clover, Ladino	4
Clover, Red	4
Clover, White	4
Fescue, Tall	4
Foxtail, Creeping	4
Foxtail, Meadow	4
Milkvetch, Cicer	4
Needlegrass, Green	4
Orchardgrass	4
Ryegrass, Perennial	4
Sainfoin	4
Sweetclover	4
Switchgrass	6
Timothy	4
Trefoil, Birdsfoot	4
Wildrye, Beardless	4
Wildrye, Russian	2
Wildrye, Altai	6
Wildrye, Basin	8
Wheatgrass, Beardless	6
Wheatgrass, Bluebunch	6
Wheatgrass, Crested	2
Wheatgrass, Hybrid	4
Wheatgrass, Intermediate	6
Wheatgrass, Pubescent	6
Wheatgrass, Siberian	2
Wheatgrass, Slender	6
Wheatgrass, Tall	6
Wheatgrass, Thickspike	4
Wheatgrass, Western	4

Table 2. Cutting Management by Growth Stages (for quality)

Hay Harvest Cuttings	Growth Stage
Grasses - warm season	boot-before inflorescence emergence
Grasses - cool season	boot to early bloom
Alfalfa - all cuttings	one-tenth bloom
Cicer milkvetch - all cuttings	one-tenth bloom
Birdsfoot trefoil - all cuttings	one-tenth bloom
Clovers - all cuttings	one-fourth bloom
Sainfoin - one cutting	one-half to full bloom

Table 3. Final Harvest Date

Hay Harvest Cuttings ^{1/}	Growth Stage
Grasses - warm season	boot-before inflorescence emergence
Warm season grasses	Before July 15
Most native cool season grasses	June 15 to July 1
Most domesticated cool season grasses	August 20 to September 5
Alfalfa	30 days prior to killing frost
Birdsfoot trefoil	August 20 to September 5
Clovers	August 20 to September 5
Cicer Milkvetch (second cutting)	End of growing season
Sainfoin (one cutting)	Early to mid-July

^{1/} The last cutting of legumes may not reach the one-tenth bloom stage. If this occurs, harvest early enough to allow for fall re-growth to provide plant root reserves to regenerate or delay harvest until after a killing frost.