NATURAL RESOURCES CONSERVATION SERVICE

WASHINGTON PRACTICE SPECIFICATION GUIDESHEET

PRESCRIBED GRAZING

CODE 528

DEFINITION AND PURPOSE:

This specification provides guidance for the planning and implementation of prescribed grazing on rangeland, pastureland, riparian areas, forestland, dormant season grazing, and winter feed areas. Prescribed grazing is managing the harvest of plants by the grazing animal. Application of this practice will manipulate intensity, frequency, duration and season of grazing.

Rangeland & Pastureland Inventory Tools & Processes

1. The planning of 528 begins with a good inventory and evaluation of all grazing units so we know what we are managing – native jointed, introduced jointed, non-jointed, annuals
    a. How healthy or in what condition is the unit?
    b. What are the estimated yields and seasonal distribution of the existing forages?
    c. Balance of forage requirements with forage supply
    d. What is the current use pattern?
    e. What are the existing water sources and where are the drinking facilities? What are the other potential water sources?
    f. What are the types and condition of the existing fences?
2. No grazing system has universal applicability to all forage types (Use appropriate grazing guidelines in Range Technical Note - TN34).
3. Planned recovery periods on range – critical to plant recovery and health. Evaluate the effect of grazing at different seasons of the year on key species.
4. Planned recovery periods on units with non-jointed species (pastures) will be designed and applied during the growing season.
5. Impacts of
    a. Early spring use
    b. Late spring use
    c. Heavy to severe grazing intensity
    d. Long grazing periods especially during the growing season
6. Timing of Grazing – Season of grazing, Frequency, Duration
7. Intensity of USE – No grazing system can overcome overstocking, or heavy to severe grazing intensity.
8. Calendar dates should be provided as indicators, but plant phenology is the real “trigger” for managing activities needed to implement the grazing system. Other “triggers” in the system are utilization levels (stubble height – See Utilization-2009 version 1.xls), changes in diet selection (annuals to perennials), and animal behavior (change in preferred grazing areas or lingering near water/supplement locations).

	Pastureland	**Rangeland**
Capability, potential & limitations	Soil map units Soil interpretations & reports	Ecological site • Landform & climate • Soil • Ecological dynamics • Historic climax plant community • Animal preferences • Grazing interpretations • Rangeland Health
Existing plant community (kind, proportion & amount)	Pasture condition record • Noxious weeds • Plant vigor & health	• Range 5 • Noxious weeds • Plant vigor & health
Sub-dividing the operation into significant delineations	Based on pastures/fences, soils, landform, aspect, existing plant community	Based on ecological sites, landform, aspect, existing plant community, pastures/fences, and utilization patters
Assessment of Ecological Status	Pasture Condition Scoring Trend	Rangeland health • Site stability • Hydrologic function • Biotic integrity Trend Similarity index
Forage demand	Livestock inventory by month	Livestock inventory by month
Forage inventory and Balance	Forage summary by pasture Forage – livestock balance by month	Forage summary by pasture Forage – livestock balance by month ACTUAL USE RECORDS 2009 version 1.xls
Infrastructure	Existing fence Existing water – developed, natural Location of power	Existing fence Existing water – developed, natural Location of power
Previous management	• Stocking rate • Distribution or grazing patterns • Utilization/ grazing intensity/stubble height • Timing of grazing periods & recovery periods	• Stocking rate • Distribution or grazing patterns • Utilization of grazing intensity • Timing of grazing periods & recovery periods
Riparian	Stream Visual Assessment Proper function & condition (PFC) Bank stability Greenline assessment Biology Technical Note 14 - Riparian Forest & Stream	Stream Visual Assessment Proper function & condition (PFC) Bank stability Greenline assessment Biology Technical Note 14 - Riparian Forest & Stream
Wildlife	Biology Technical Note 14 – pasture	Biology Technical Note 14 – range
Others	T&E plants & animals Irrigation efficiency WIN-PST Water Quality Technical Note 1 Soil test for nutrients Cultural resources	T&E plants & animals Cultural resources
Resource concerns	CPA-52	CPA-52

RANGELANDS

PRESCRIBED GRAZING SYSTEM

Specific guidelines for the management of different types of grasses, brush, and riparian areas are contained in Range Technical Note 34 (September 2009). Any designed grazing system and target utilization levels shall be based on the guidelines in Range Technical Note 34.

The forage requirements of the animals must be balanced with the total forage supply of the unit. Forage production data may be field measured (clipped and weighed) or estimated on a site-specific basis. Refer to the National Range and Pasture Handbook for guidance regarding development of initial stocking rates and accepted inventory methods. Livestock breed, age, size, physiological stage and weight must be considered to assign the appropriate animal unit equivalent factor.

Consider the accessibility of forage during the period when livestock are scheduled to graze. **Accessibility factor(s)** that affect an animal's ability to access and graze forage include distance from water, topography, palatability/forage preference, and other site factors. Current utilization levels can be assessed and mapped to evaluate feed/forage balance and accessibility factors.

A prescribed grazing system shall be designed that is comprised of multiple units that are alternately grazed in a planned sequence to provide adequate recovery periods. An annual grazing schedule is developed to specify the time of the year grazing is to occur, the length of the grazing period, and the frequency and extent of plant defoliations. Scheduled periods for plant recovery after grazing are essential, and must occur within the current or following growing seasons of the plant species being managed.

Facilities such as fences and water developments may need to be developed before initiating a grazing system. For optimum livestock performance, sufficient water must be available so that all livestock can drink within a 2-hour period. Check delivery capacities of wells and springs, and seasonal availability of ponds, streams, or other live water sources. Provide adequate storage in watering facilities in the unit.

There is no single grazing system that can be applied to all situations, as each management unit is unique. Limitations such as poisonous plants, lease requirements, and seasonal availability of water must be considered. The season of use (early spring, critical period, late and dormant) within a unit should be planned according to management objectives, plant physiological requirements, animal nutritional needs and coordinated with livestock management operations, such as winter feeding, handling for branding, vaccinating, breeding and calving periods, or other requirements. Systems that minimize animal stress will provide for higher animal performance.

Calendar dates showing the time each unit can be grazed (after establishing the initial stocking rates from the feed and forage balance), provide an initial guide to the landowner/manager to match animal kind and numbers with plant growth and phenology, length of grazing period, target utilization levels, and frequency of grazing. As the landowner/manager becomes more familiar with plant growth and phenology, frequency and intensity of grazing of key species and the effects of weather changes from year to year, they can rely less on the calendar dates.

A contingency plan will be developed to serve as a guide for adjusting the grazing prescription. The system must have built in flexibility to accommodate unplanned events such as severe drought, insects, or wildfire. The contingency plan will detail potential problems and identify specific "triggers" the manager will use to recognize and implement a change in management

HERBACEOUS UTILIZATION ON RANGELANDS

Target utilization levels are used to help ensure that resource objectives are met. Attaining a specified use level of key species is not an objective, but serves as a reference point to evaluate the grazing system and its effect on the desired plant communities.

Wildlife, insects, hail, or wildfire may also place demands on the forage resource that are beyond the control of the manager. The manager must provide an adequate recovery period following these types of events to sustain a healthy plant community.

WOODY (BROWSE) UTILIZATION ON RANGELANDS

When designing a grazing strategy with the objective to maintain or restore woody species, the timing of grazing and recovery must consider the phenology and needs of the woody plants themselves.

Utilization of woody species will not exceed 50 percent of annual leaf and twig growth within reach of animals. Wildlife use of woody browse must be considered, as it may pose special management concerns.

Other factors to consider in evaluating grazing effects on woody species are: age and size classes of key browse species; season of the year that browsing occurs; evidence of severe hedging; grazing use of plant growth older than one year; evidence of browse lines; presence of dead or dying plants; use of low preference species; and amount of reproduction of key species.

Where woody browse utilization becomes excessive, it may be an indicator that overall forage quality or quantity are not adequate to meet animal nutritional needs. Season of use, length of grazing periods, and stocking levels should be evaluated and adjusted if browse utilization exceeds planned levels.

For acceptable methods for measuring utilization, reference NRCS National Range and Pasture Handbook, 2003, Chapter 4, Pages 4-9–4-10.

ESTABLISHING KEY AREAS AND KEY SPECIES ON RANGELANDS

Key areas serve as monitoring sites to evaluate management. Key grazing areas will be selected that are representative and can be used to prescribe and monitor grazing use. A minimum of one key area will be selected per 1,000 acres of grazing land within a unit (i.e., on a 2,000 acre unit, two key areas will be selected). If the entire ranch is less than 1,000 acres in size, a minimum of one key area will be selected. A key grazing area must provide a significant amount of the accessible forage in the unit, and contain the key plant species to be managed. When riparian areas make up part of the unit, key areas and key species must be selected in these areas (see Additional Planning Considerations for Riparian Areas Selecting - Key Areas and Species).

Key plant species (one or more) will be selected that are important to management objectives, and will comprise more than 15 percent of the accessible forage by species or groups of species. Other species may be selected based on specific management considerations, such as for stabilizing streambanks, competing with noxious weeds, promoting the growth of desirable native plants, or wildlife habitat.

> Areas of animal concentration, such as stream crossings, watering points, fence lines, or gate areas, should not be selected as key areas, as they are not representative of the whole unit. These might be considered critical areas, which may be chosen to monitor for a specific management objective.

Management checks should be made prior to grazing, throughout the grazing period, and during recovery periods to determine the degree of use and other resource conditions for adjustments in grazing management.

Key areas may need to be reselected when significant changes in grazing management occurs, such as changing the season of use, adding structural improvements that influence livestock distribution, or changing the kind and/or class of grazing animal.

For a more detailed discussion of selecting key areas and key species, reference NRCS National Range and Pasture Handbook, 2003, Chapter 5, Pages 5.1-5 to 5.1-8.

LIVESTOCK DISTRIBUTION ON RANGELANDS

When evaluating livestock grazing and distribution patterns, strong emphasis should be to manage the unit as a whole, considering both upland and riparian distribution patterns. Identify areas that are utilized heavily, and those that receive less than full use. Accessibility and utilization levels must be evaluated to prevent resource degradation. The determination of accessible forage allocated to grazing include kind and class of animal, distance to water, slope, topography, species preferences and palatability, and additional site specific factors.

Determine reasons for uneven use patterns, such as differences in forage quality or long distances to high quality drinking water. Facilitating practices and activities, such as salting, water developments, fencing, trails, and herding can often be used to change livestock behavior and use patterns.

Small areas of livestock concentration (fence lines, gates, supplement locations) may be expected, but should not be allowed to cause significant resource damage.

When provided, salt and minerals will not be placed adjacent to watering locations or in riparian or meadow ecological sites, unless specifically placed to concentrate animals for a management objective such as targeting noxious weeds or other undesirable plants. At a minimum, supplements will be placed in an adjacent upland ecological site to lure livestock away from watering areas or other sensitive areas and to contribute to more desirable grazing distribution. On large rangeland areas, place supplements a minimum of one-quarter mile away from water to encourage use of uplands.

Salt and minerals will not be located in areas where loose soil will be susceptible to wind or water erosion. Rotate salt and mineral locations periodically. Use salt troughs whenever possible.

I. PASTURELAND

Any designed grazing system and target utilization levels (stubble heights) shall be based on the guidelines in appropriate Forage Suitability Group for the dominant soil component in the pasture, specifically referencing the Pasture Calendar in Western Washington. In Eastern Washington, the designed system will meet the requirements in RGE-TN-34 for the key pasture species.

Rotational or strip grazing systems will be designed and applied during the growing season. The planned grazing system for the pastures must identify targeted desirable species. The planned grazing system will balance forage supply with animal demand. Pasture condition and yield information will be used to determine appropriate stocking rates.

The Pasture Condition Score Sheet ratings will be used to identify and address limiting factors (Individual Score of 3 or less) using the planned grazing system and supporting practices or actions. The designed system will bring all elements to at least an individual score of 4.

Occasionally pasture plants may become over-mature and livestock will reject them. In this instance mowing is desirable to maintain high quality pasture. Mowing pastures should be done only if there is a need to remove undesirable or stagnant vegetation.

Pastures must maintain an appropriate amount and balance of nutrients to be productive. Fertilizer programs will consider the maintenance requirements of the plant species, desired production levels, and soil textures. Soil tests are required prior to the application of fertilizer.

With rotational stocking methods the need to spread manure should be minimal. There may be areas of manure accumulation where continuous stocking occurs that will need to be dragged to redistribute nutrients back to the pasture.

Small areas of livestock concentration (fence lines, gates, supplement locations) may be expected, but should not be allowed to cause significant resource damage.

Salt and minerals will not be located in areas where loose soil will be susceptible to wind or water erosion or where it will increase the risk of water quality degradation. Rotate salt and mineral locations periodically. Use salt troughs whenever possible.

The maintenance of vigorous stands of forage plants and an adequate fertilizer program will help control weedy plants. If new populations of weeds appear in a pasture, it may be a sign of improper grazing management. Grazing periods can be adjusted to target harvesting of undesirable plants. A combination of control methods should be initiated if weeds become a problem.

Reseeding should be the last step in making a pasture become more productive. In many cases, controlling the management of grazing animals by implementing a grazing plan, followed by correcting deficiencies in soil fertility, will be adequate to bring a pasture back to an acceptable level of productivity. Pasture reseeding should only be considered after these factors have been implemented and evaluated.

On irrigated pastures, the type and scheduling of irrigation must be considered when designing the grazing plan. Ideally, pastures should reach field capacity following irrigation before livestock are allowed to graze.

III. RIPARIAN AREAS

This section contains additional planning considerations for managing riparian areas associated with rangeland, pasture or grazed forests. This section will be used in conjunction with the appropriate planning considerations for the specified land type or use. Riparian areas are not considered separate land units for management, but must be considered in the overall management of the ranch and grazing units for their specific resource concerns and planned resource conditions.

Considerations for establishing management objectives on riparian areas should include:

1. The ecological site potential and current resource conditions, including the geology, topography, soils, vegetation, hydrology, and stream characteristics.
2. The desired plant community to provide adequate streambank stability and cover.
3. The benchmark and planned condition of resources including the physical structure of stream channels and characteristics of the plant community, soils, landform, and recovery potential.
4. Maintaining a balance between the grazing use of upland and riparian plant communities.
5. Upstream and downstream influences on the stream channel and its stability.

STREAMBANK STABILITY

Streambank stability is critical for maintaining or improving riparian condition and function. Riparian functions of a stream include sediment filtering and transport, bank building, water storage, aquifer recharge, and energy dissipation. These and other stream functions are necessary to provide for beneficial uses of water and are dependent on stable streambanks. Reference NRCS Stream Visual Assessment Protocol, NRCS-WA Range Technical Note 14 – Riparian Forest & Stream Worksheets, and TR 1737-15 1998 A User Guide to Assessing Proper Functioning Condition and the Supporting Science for Lotic or Lentic Areas.

Streambank disturbance from grazing must be managed according to the stream type, planned resource conditions, and management objectives for the stream. Areas that should be considered of high concern are those with actively eroding banks, or high erosion potential; those that contain sensitive fish or plant species and nesting bird habitat. Riparian areas in poor functioning condition will also be considered of high concern.

SELECTING KEY AREAS AND SPECIES FOR RIPARIAN AREAS

Key areas in riparian units should be selected based on their ability to provide streambank stability and filtering capabilities, such as native sedges and other deep-rooted grasses and shrubs. On sites where potential exists for both woody and herbaceous vegetation, key species of each type should be selected.

> Areas of animal concentration, such as stream crossings, watering points, fence lines, or gate areas, will not be selected as key areas, as they do not represent the unit as a whole. They may be selected as critical areas for monitoring if chosen for specific management objectives. However, if concentration areas make up a significant portion of the riparian area, efforts should be made to relocate concentration areas away from the riparian zone.

LIVESTOCK GRAZING PATTERNS AND DISTRIBUTION IN RIPARIAN AREAS

When managing riparian areas within units comprised primarily of uplands, management should be directed toward proper distribution of livestock throughout the entire unit. Riparian areas are often preferred by livestock over upland range areas, particularly during portions of the grazing period when air temperatures are hot. Several factors can influence grazing distribution in riparian areas, including kind and class of livestock, season of use, quality of adjoining upland forage, presence of off-site water and/or supplements, stream accessibility to livestock, alternative shade, and landform.

Facilitating practices are often needed to control grazing use of riparian areas. Some of these practices include: riding or herding, salt placement in upland areas, fencing, off-stream development of high quality water, renovating and seeding uplands, and placement of rock or vegetative obstacles (tree branches, brush piles, etc.,) on streambanks. Reference BLM TR-1737-20 Riparian Area Management - Grazing Management Processes for additional practices.

PLANNED GRAZING SYSTEMS FOR RIPARIAN AREAS

A grazing system designed to maintain, enhance or recovery riparian conditions will:

1. Specify grazing periods and outline specific recovery periods following grazing that are needed to maintain desired streambank integrity and proper functioning condition of the riparian area(s),
2. Specify season of use,
3. Outline target utilization levels that will maintain both herbaceous and woody vegetation (according to site potential) and the desired plant community.
4. Leave sufficient plant residue to protect streambanks and filter sediments,
5. Be consistent with other resource values and overall management objectives, and
6. Manage streambank shearing and trampling to meet grazing strategy objectives.

Continuous or season long stocking in the growing season is not a viable option for improving deteriorated riparian-wetland areas, or for sustaining those riparian-wetland areas in high functioning condition.

Planning the preferred season of use on riparian areas and meadows is essential to avoid over use of these areas when upland vegetation has cured and woody species become more desirable. Where maintenance or enhancement of woody species is an objective, season of use should be alternated from year to year to prevent damage to woody regeneration.

Periodically defer riparian units from grazing during the critical growth period of key plant species, which are critical for streambank stability and cover.

Management should allow for flexibility regarding the timing that livestock are turned into or removed from a unit, based on yearly variations in climate. For example, during years of below normal precipitation, livestock may tend to graze riparian areas earlier in the season and more intensively than during periods of normal or above normal precipitation. The management strategy should allow for livestock to enter the unit earlier in the season to better utilize all available forage, and then be taken out of the unit sooner. If this is not practical due to breeding or calving cycles, livestock should be put into an alternative "dry year" unit when utilization target levels are met earlier than usual.

HERBACEOUS FORAGE UTILIZATION IN RIPARIAN AREAS

Target utilization levels of plant communities within or adjacent to riparian wetland areas need to be planned in accordance with management objectives, the type of grazing system, and planned recovery periods. The amount of greenline vegetation needed to keep streambanks protected, and to trap and filter sediments to maintain water quality conditions also needs to be considered. The greenline is defined as the first perennial vegetation above the bankfull flow of a stream or water body.

Attaining target utilization levels on riparian vegetation is often difficult in riparian areas that are small in size and are associated with larger upland grazing areas. Livestock will be attracted to these riparian areas, so it may be difficult to keep riparian use levels within planned ranges and also achieve sufficient planned use of the upland areas. To remedy this, assure that temporary heavier use of the riparian area is compensated for by providing sufficient recovery periods and/or alternating the grazing season of use annually.

Adequate vegetative stubble height on the greenline at the end of the growing season is important to provide streambank stability, protect streambanks from runoff events and trap and filter potential sediment deposits. Desired vegetation that can meet these criteria are deep-rooted water-tolerant (hydrophytic) species.

Grazing management should allow for a minimum of 3 to 5 inches of stubble height to remain on riparian herbaceous species at the time of year protection is needed for peak runoff events, such as springtime flows or summer storms. Some sites may require more stubble height to protect beneficial uses.

In certain stream types, when riparian areas are of high concern, herbaceous utilization levels approaching 50% may also be associated with other resource impacts such as over-browsing of desirable woody species, and causing streambank shearing or trampling. The type of soil material, amount of rock on streambanks, type and amount of vegetation, length of grazing and recovery periods, and season of use all dictate how these resources

are effected and to what degree. Evaluate greenline stubble heights, browsing of woody vegetation and streambank disturbance at one point in time to determine if management objectives are being met (in other words don't concentrate on any one objective, but always have all three objectives in mind, no matter what time of year grazing/browsing occurs).

MANAGING WOODY RIPARIAN SPECIES ON RANGE

Trees and/or shrubs are essential for stabilizing certain stream types and riparian plant communities. Where present, woody species act as a barrier to livestock and wildlife and help prevent streambanks from being trampled and/or eroded by animals trailing along the banks.

Maintaining woody species for streambank protection is often the most efficient way to protect streams from degradation. Trees and shrubs can be managed to reduce animal access to streambanks. Relatively dense stands of willow, alder or other species along the stream channel will protect the streambanks from animal trampling and also provide winter and summer shelter and cover for both livestock and wildlife.

Wildlife use of woody browse species can be a significant factor when trying to maintain or recover woody vegetation. Wildlife use should be documented in the unit so that it is not attributed to livestock. The grazing manager should work with local and state wildlife biologists to assess wildlife use and coordinate wildlife management in the unit.

IV. DORMANT SEASON GRAZING AND WINTER FEED AREAS

The following factors must be considered when planning dormant utilization levels: amount of plant cover needed to protect soil resources, physical damage to plants if they are grazed too close, and the amount of plant height and cover needed to trap snow and retain moisture.

Planned herbaceous utilization levels during the dormant season will not exceed 60 percent use. Use levels that exceed 60% in the dormant season reduce thermal cover for remaining stems, remove carbohydrate storage sites, damage buds, etc. Dormant season utilization levels may need to be lower than 60% to meet target objectives for herbaceous cover for spring nesting birds.

Livestock will often select woody browse during the dormant period of herbaceous vegetation, and may begin to use woody species excessively. Avoid grazing deciduous trees and shrubs when they may have green leaves at the beginning or end of the dormant period. Utilization of woody species will not exceed 50 percent of annual leaf and twig growth. Use of woody browse species by wildlife must be considered.

Feed and mineral sites will be placed as far as possible from riparian areas or watercourses. Development of year-round off-stream stock water will reduce trampling damage and build up of manure within the riparian area.

Avoid supplement feed placement near natural shelter except during periods of extreme weather conditions, i.e., wind chill, heavy snow, etc. This will protect these areas for use when they are specifically needed for calving or wind protection. Planted windbreaks may be necessary if natural shelter is limited or if woody vegetation is being overly affected by grazing. Portable shelters can also be used.

Select feeding areas to minimize manure buildup and potential runoff into streams. Select rocky areas with good drainage or sod-bound areas. It is possible to increase plant growth on thin soils or sod-bound areas by encouraging feeding and manure spreading in these areas.

Winter feeding areas must be managed to prevent physical damage to plant and soil resources. The impacts from heavy concentrations of livestock can be minimized by rotating winter feed areas periodically, rotating feed placement within a feeding area, and reducing the amount of time livestock spend in each feed area. Encourage even distribution of animal impacts within a feeding area by changing feed placement locations, and providing artificial shelter, i.e., hay stacks, wooden shelters, equipment, etc. To avoid livestock manure buildup in feeding areas, feed in the same patterns as you would spread manure for fertilizer.

V. DEVELOPMENT OF CONTINGENCY PLANS FOR GRAZING LANDS

All grazing plans will include a contingency plan that details potential events such as drought, flood, etc., and a guide for adjusting the grazing prescription to ensure proper resource management and economic feasibility. Changes **must** be made in a proactive, rather than reactive, manner to minimize negative effects during prolonged periods of reduced precipitation or other events.

Knowledge of the long-term average stocking rate that achieves a balance between maintenance of the forage base with acceptable livestock performance during wet or dry years is vital. Determining long-term forage production, and thus the proper stocking rate for rangelands or introduced forage pastures, comes from historical records of forage production, precipitation levels, and stocking rates over a period of years. Sound record keeping relative to forage production and grazing management is an important aspect of good ranch management

Here are some management strategies the producer may consider.

1. Maintain a flexible breeding herd, which means maintaining only two-thirds to three-quarters of the herd as a cow-calf operation and carrying the remainder as yearlings for replacements. Yearlings become expendable when adjusting for drought (shift from a cow-yearling to a cow-calf marketing strategy, purchase rather than raise herd replacements, or reduce the size of the cow herd through culling heavily the older cows, cows with physical defects, open cows, cows that have difficult birth).
2. Have a reserve of hay, which may vary with climate, to supplement grazed forage;
3. Purchase hay or other feed sources,
4. Place livestock in a feedlot or sell them,
5. Find additional grazing land to lease;
6. Wean early,
7. Complementary use of perennial and annual pastures can alleviate short term drought conditions
    a. Use crop residues to replace lost forage lost to pests, fire or drought;
    b. Have an emergency pasture,
    c. If moisture is adequate, the annual production with annual forage plants may be as much as four times that of native range or two times tame perennial forage production. Use fall or spring seeded annual crops for emergency pasture
8. Initiate pest or weed control programs.

The contingency plan will include how the client will recognize the potential problem(s) in the early phases and a plan of action that will be taken to offset and minimize the deterioration of the resources, livestock, wildlife and the economics of the operation.

Here are some warning signs of potential problems with “triggers” for management action.

1. Grasshopper densities exceed the threshold for damage.

Table 1. Treatment guidelines based on number of grasshoppers (nymphs and adults) per square yard.

Grasshopper population	*Within fields*	*Field borders*	*Treatment/management action necessary?*
Non-economic	0-2	5-10	No
Light	3-7	11-20	Questionable, depends on size, species, crop
Moderate	8-14	20-40	Probably
Abundant	15 or more	41 or more	Yes

2. Utilization levels in a pasture during or at the end of the season are heavier than expected based on long-term averages or the planned levels in the grazing schedule. If utilization exceeds 65% on a unit or several units, the producer should implement a contingency plan action.
3. Drought Monitoring Tools at http://www.drought.unl.edu/monitor/monitor.htm indicate a severe,

extreme, or exceptional drought concern.

a. As winter progresses without adequate precipitation, moisture for spring planting or pasture growth becomes a concern. Long-term forecasts for the next three to six months, or even longer, are available and may be worth considering.

b. Temperature forecasts are more reliable than precipitation forecasts. It is also important to consider the local situation when interpreting the forecast. For example, winter precipitation measured at the ranch is more than 25% below normal.

4. The producer could have a target for unfed hay reserves (carryover) at the end of the feeding season (usually 20-50%) of the total annual winter feed requirement. If the feed reserve falls below the target level consider additional actions.

5. The producer could have management objectives for body condition score (BCS) throughout the production cycle. Failure to meet or exceed the target would trigger management action.

   a. For example, BCS – 5 on 90% of the cow herd the first of October.

   b. Monitor bull condition throughout breeding season with specific BCS targets for pre-, during, and post. Yearling bulls should have a body condition score of 5.5 to 6.5 at the start of the breeding season. The producer should assess the body condition score of bulls during the breeding season as well as observe the bulls' ability to service the cows. Bulls often lose from 100 to 200 pounds during the breeding season. Post breeding, monitor the body condition of the bulls closely and make adjustments to reach the body condition score of "6" before the next breeding season begins.

6. The producer could have a target for normal weaning weights. For example, a 10% decline in weaning weights would indicate a concern.

7. When cows do not get adequate nutrition, either before or after calving, they respond by missing one or more heat periods or remain open throughout the season. For example a trigger might be, pregnancy checks indicate more than 15% of the cow herd is open.

8. Monitor the water supplies on the ranch for reliability. Stream flow or spring delivery rates are less that 50% of normal or not adequate to meet herd needs.

9. Decreases in the abundance/vigor of desired forage species. On spring cheatgrass ranges, cold/dry springs can reduce production by more than 50%.

10. Weed densities exceed a predetermined economic threshold. For example, research indicates that when the spotted knapweed population ranges from 40 to 60% cover, an herbicide application will increase profitability. Cover below 40% does not impact forage production enough, and cover above 60% will decrease bunchgrass density.

VI. MONITORING REQUIREMENTS FOR GRAZING LANDS

Monitoring is the orderly collection, analysis and interpretation of resource data to evaluate the effectiveness of management decisions. Monitoring techniques are different from the inventory process because monitoring uses the same location (permanent) on a repetitive basis over time so that comparisons can be made to detect change. The monitoring information is collected and analyzed to guide the producer's management decisions for the next grazing season.

All prescribed grazing plans will include a monitoring plan that details the objectives of the landowner, location of key areas to be monitored, identification of key species, and a prescription for the monitoring method used at each key area (if different across the ranch).

Minimum annual monitoring requirements are pasture and livestock records that include kind/class of animals, number, in and out dates, and utilization (stubble heights) at end of grazing period. Other monitoring methods, may include photographs, cover and/or other vegetative indicators of the effectiveness of a grazing management strategy over time. These other monitoring methods must be based on permanent, marked locations and read at least every three (3) years.

Representative monitoring methods gather specific quantitative and/or qualitative data that are responsive to the specific objectives identified by the landowner. For example, if the landowner is interested in improving water capture, appropriate characteristics to measure are plant cover and bare ground. A monitoring transect that is responsive to tracking plant cover and bare ground changes over time (such as line-point and/or line-intercept to measure cover) would be an appropriate method on the identified key areas. Qualitative and to some degree quantitative data can be obtained with the use of photographs. These transects will be set up as permanent points or transects.

Critical area monitoring is smaller areas that may have serious resource repercussions if not addressed in a timely manner-these could include a new head cut in a drainageway, a noxious weed invasion that has recently been discovered, etc. They can be evaluated with the same techniques as the representative monitoring, but are usually much smaller in size than the areas that are monitored for representative monitoring. This kind of monitoring is not necessarily permanent, but would be monitored for some period of time until the concern was eliminated or controlled.

Site-specific monitoring can also be developed to measure responsiveness and effectiveness of a certain management technique or conservation treatment (e.g., brush management). This type of monitoring will be established on an as-needed basis with the producer. It does not replace the need for monitoring to measure the effectiveness of the grazing prescription.

The required minimum monitoring requirements include:

1. Goals and objectives for the ranch and the monitoring plan.
2. Grazing use records outlining grazing periods (turn-in, turn-out dates) with numbers and kinds of animals in each grazing unit.
3. Target and actual utilization levels or stubble heights of key plants in key areas.
4. Assessment(s) used to evaluate monitoring goals–such as cover measurements (could be basal, ground, surface and/or canopy cover), and/or photographs of vegetation, ground cover, streambank condition, and/or other acceptable monitoring techniques. One kind of assessment may be sufficient to meet the goal(s) of a monitoring plan in one instance, while there may need to be multiple monitoring methods needed to meet a different monitoring goal(s).

Permanent monitoring plots or transects will be installed within the first two years of the development of the prescribed grazing plan. When a conservation plan is under contract (EQIP, WHIP, CSP, etc.), the assessments (e.g., cover) would be established and examined at the beginning of the contract, at some point during the middle of the contract and during the final year of the contract. Photo plots should be photographed at least every other year, but preferably, every year.

<u>Producers are responsible for keeping documentation of their monitoring plan, including photographs, grazing use records, utilization studies and assessment method(s) data such as cover measurements.</u>