

Utilizing NRCS Pasture Condition Score Worksheet

- NRCS PCS is a systematic way to evaluate management and resources within a pasture
- It can be found on MD FOTG -> Section 2 Natural and Cultural Resources Info -> E Resources Assessment tools -> 3. Pasture Management -> PCS worksheet
- Assesses key indicators: desirable plants, percent legumes, live plant cover, plant diversity, soil cover, utilization, plant vigor, livestock concentration areas, compaction, and erosion
- Scale of 1-5 points, 1 being lowest (poorest) and 5 being highest (best) condition

Pasture Condition Scoring should be performed...

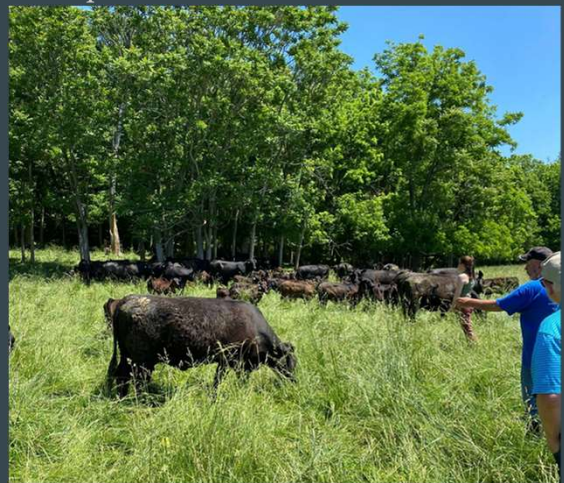
- As a benchmark condition of the pasture
- Early in growing season before grazing event
- At peak forage supply periods
- At low forage supply periods
- During plant stress periods (drought, flooding, ect.)
- After conservation management has been applied



For best results, the livestock manager should evaluate the pastures the **same time each year** to note changes in the condition of the pasture.

Main things to discuss

- Goals and Objectives
- Grazing Heights!! The recommendation for most species is 4-6"
- **DO NOT graze below 4-6" !!!**



DON'T GRAZE BELOW 4-6"

Percent Desirable Plants

- Readily consumed, provide high tonnage & quality for significant part of the growing season.
- Functional group 1. **Perennial grasses** Cool-season: KY bluegrass, orchardgrass, perennial ryegrass, reed canary, smooth brome, tall fescue, timothy Warm-season: Bermudagrass, big bluestem, dallisgrass, eastern gamagrass, indiangrass, switchgrass
- Functional group 2. **Annual grasses** Cool-season: Annual ryegrass, barley, oats, rye, triticale, wheat Warm-season: Corn, crabgrass, millet (browntop, foxtail, pearl), sorghum, sudangrass
- Functional group 3. **Legumes** Cool-season: Alfalfa, birdsfoot trefoil, clover (alsike, Kura, large white, red, sweet), pea, vetch (bigflower, hairy) Warm-season: Annual lespedeza, cow peas, soybean, sunn hemp
- Functional group 4. Other **forbs** bred for forage: Beet, chicory, kale, plantain, radish, rape, swede, turnip
- INTERMEDIATE PLANTS Consumed by livestock but provide low tonnage or lose quality fast. Grasses: Barnyardgrass, little bluestem, phragmites, purpletop, quackgrass, wildrye Forbs: Black medic, chickweed, dock, dandelion, garlic, lambsquarter, clover (hop, small white), pepperweed, plantain
- UNDESIRABLE PLANTS Rejected by livestock, cause undesirable side effects, or crowd-out desirable species. Grasses/rushes/sedges: Basketgrass, broomsedge, carpetgrass, foxtail, goosegrass, johnsongrass, nutsedge, stiltgrass Forbs: Bindweed, burdock, buttercup, cocklebur, dogbane, henbit, horsenettle, ironweed, jimsonweed, maretail, milkweed, mullein, perilla, pigweed, poison hemlock, pokeweed, ragweed, smartweed, thistle (biennial, Canada), white snakeroot

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Percent Legumes

% of stands total dry matter weight

- Provide an important source of nitrogen for pasture
- Improve quality of forage when legumes make up ~20% of total DM
- Amount can vary considerably throughout growing season
- Too many legumes can lead to bloat potential
- To perform this indicator, visually estimate the % of legumes present in the total forage biomass



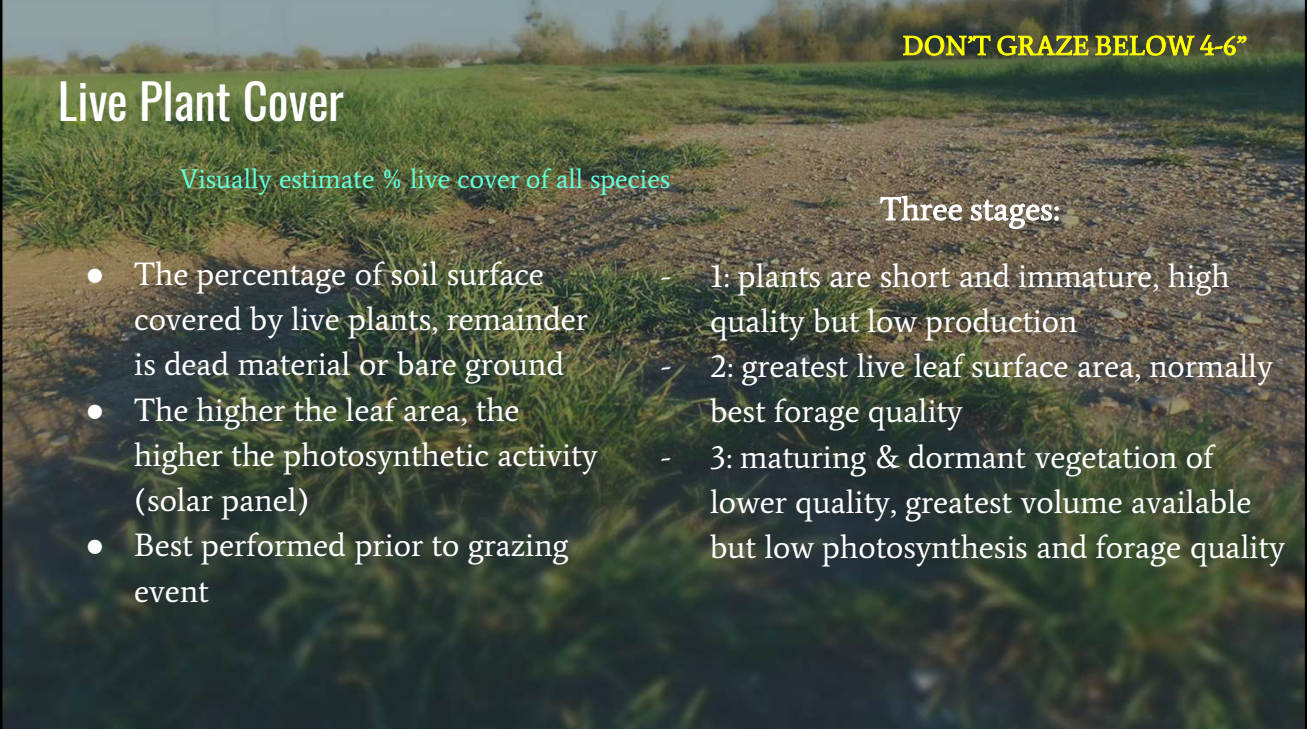
Around 6% DM (10% visual wet)



Around 15% DM (30% visual wet)



Around 27% DM (50% visual wet)



DON'T GRAZE BELOW 4-6"


Live Plant Cover

Visually estimate % live cover of all species

- The percentage of soil surface covered by live plants, remainder is dead material or bare ground
- The higher the leaf area, the higher the photosynthetic activity (solar panel)
- Best performed prior to grazing event

Three stages:

- 1: plants are short and immature, high quality but low production
- 2: greatest live leaf surface area, normally best forage quality
- 3: maturing & dormant vegetation of lower quality, greatest volume available but low photosynthesis and forage quality



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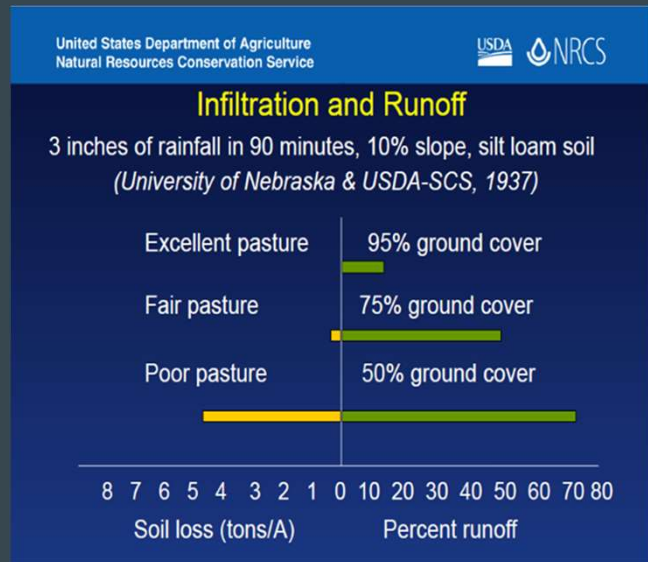
Plant Diversity

- Describes the number and abundance of well-represented forage plants and plant functional groups
- Having multiple dominant desirable forage species in a pasture offers some "insurance", higher likelihood of productivity under a wide range of conditions
- Low species diversity makes pastures more vulnerable to stress and changing conditions
- Mixed species pastures with at least two functional groups and three or more well represented forage species are generally the most productive

DON'T GRAZE BELOW 4-6"

Plant Residue and Litter

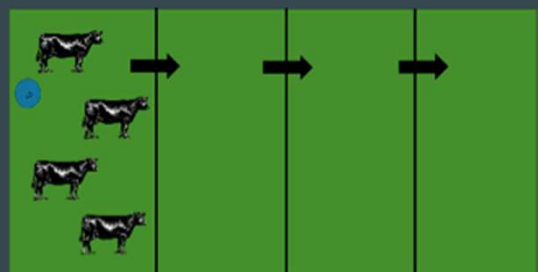
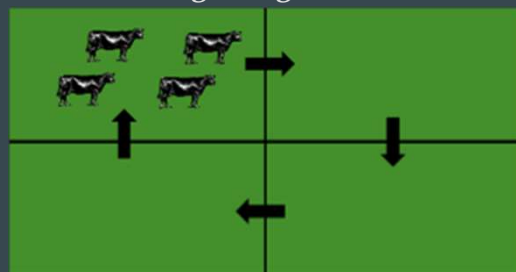
- Soil Cover is important for slow evaporation, **maintaining temperatures**, carbon and food source for soil life, deterring erosion, and helping with **water infiltration**
- In a well-managed system, there should always be some plant residue and litter present
- Excessive amounts can interfere and slow down growth
- Visually estimate the percent cover between live plants in the stand



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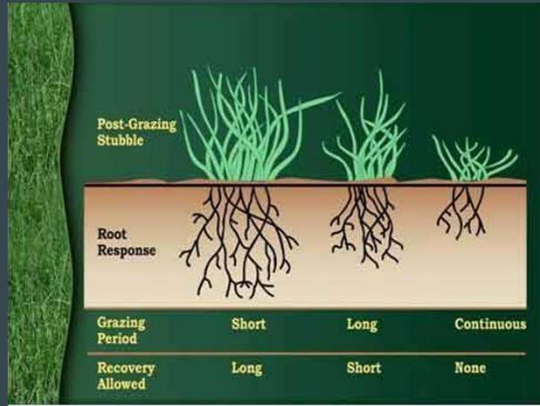
Grazing Utilization and Severity

- The proper amount and frequency of grazing are critical
- Differences in species, plant maturity, stocking rate, location and distance to water, shade, and mineral availability, may cause uneven grazing
- Over grazing and severely under grazing are both detrimental
- Uniform grazing through proper management has an ideal “stop grazing height”
- Poor grazing utilization decreases efficiency



Plant Vigor

- Consider: color, rate of regrowth after a grazing period, grazing heights, density of plants, and productivity



DON'T GRAZE BELOW 4-6"



Growth Rate

- Influenced by time of year, type of plant, and management
- Recovery period is often too short
- Ideally; slow growth- longer recovery time
- Highly influenced by how severely grazed the pasture was
- Grazing height importance

Livestock Concentration Areas

- Places in field where livestock linger and frequent, near feeding areas, water, shade, minerals, etc.
- Leads to; reduced vegetative cover, compaction, concentration of animal waste, increased bare ground, may increase erosion and become pathways for transport of nutrients and sediment
- Assess size of area and connectivity to waterways

DON'T GRAZE BELOW 4-6"



Soil Compaction and Soil Regenerative Features

DON'T GRAZE BELOW 4-6"

Bring a shovel!

- **Compaction:** diminished pore space that hold air and water
 - Negatively impacts hydrologic and nutrient cycles
 - Increases runoff
- **Roots:** morphology and direction of growth
 - Shallow/sparse roots indicate possible overgrazing or mismanagement is occurring
- Only one of the scores for Compaction or Roots indicators is added to your total score, whichever is lower



Soil Regenerative Features Cont.

DON'T GRAZE BELOW 4-6"

Color & Soil life score are not added to total

- Focuses on the condition of plant roots and abundance of soil life
- **Color:** visible evidence of carbon/ organic matter accumulation in topsoil
- **Soil life:** visible evidence of soil life (tunnels, earthworms, larvae, ants, ect.)
- What to observe when digging:
 - Ease of digging
 - Soil structure
 - Rooting depth
 - Root morphology and direction of growth
 - Color
 - Worms tunnels or other biotic activity



Erosion (VERY bad)

DON'T GRAZE BELOW 4-6"

Always score sheet & rill

- Sheet and Rill - Soil loss caused by water drop impact, drip splash from water dropping off plant leaves and stems onto bare soil, and a thin sheet of runoff water flowing across the soil surface
- Streambank, Shoreline - Based upon Maryland Nutrient Management requirements we shouldn't have streambank erosion
- Gullies - an advanced stage of sheet and rill erosion
- Wind erosion - We don't live in Kansas, so not applicable



Conclusion

DON'T GRAZE BELOW 4-6"

- After you have scored all categories, add up the totals for each field
- Score indicates level of management changes needed
- A score of 30 or above is necessary to complete prescribed grazing practice
- Page 3 also includes interpretation of scores
- When in doubt, stop grazing at 4-6 inches!!



Natural Resources Conservation Service Guide to Pasture Condition Scoring



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Introduction

Pasture condition scoring (PCS) is a systematic way to assess how well a pasture is being managed and resources protected. A pasture rated with a high score is well-managed with productivity (plant and animal) being sustained or enhanced. By rating the key indicators common to all pastures, pasture condition can be evaluated and the primary reasons for a low condition score can be identified. A low rating typically means the pasture has one or more challenges, such as poor plant growth, weedy species invasion, poor animal performance (low forage quantity and quality), visible soil loss, increased runoff, and impaired water quality in or adjacent to the pasture.

The PCS should be performed several times a year during critical management periods throughout the grazing season. The revised “Pasture Condition Score Sheet” (PCSS) should be used to rate individual pastures. Regardless of the time of year selected to do the PCS, the best time to score a pasture is just before it is grazed.

The PCS should be performed—

- As a benchmark condition of the pasture.
- Early in the growing season before grazing events occur.
- At peak forage supply periods.
- At low forage supply periods.
- At plant stress periods such as drought or very wet conditions.
- When conservation practices (management) have been fully applied.

For best results, the livestock manager and conservation planners should evaluate the pastures the same time each year to note changes in the condition of the pasture.

PCS results can be useful in deciding when to move livestock or planning other management actions. It assists in identifying which improvements are most likely to improve pasture condition or livestock performance.

The PCS is not a replacement for doing a forage inventory or forage production estimates. The pasture planner should consider other available data such as pasture state information in an ecological site description, forage suitability groups, or pasture and hay suitability groups.

PCS involves the visual evaluation of 10 indicators, listed and described below, which rate the pasture vegetation and soils. Rating subjectivity can be reduced by incorporating quantitative measures. For example, using the step-point method for evaluation can provide measured results for five of the indicators (percent desirable plants, percent legume, live plant cover, plant diversity, and plant residue). Also, by pacing to measure the livestock concentration areas and using a shovel to quickly evaluate the soil compaction and soil regenerative indicator, the user of the PCSS



The step-point method can provide data for five indicators.

and guide can have confidence in each indicator rating and the total score.

On the PCSS, each indicator or factor has five possible ratings, ranging from lowest (poorest) condition (1) to highest (best) condition (5). This objectively identifies the extent of any pasture challenges and helps determine the likely causes. Evaluate each indicator separately. The indicators can then be combined into an overall score for the pasture unit or utilized as individual scores and compared with the other nine indicators. Indicators receiving the lowest scores can be targeted for corrective action. The plant vigor indicator is rated one of the last because previous indicators in the assessment give insight into the plant health and productivity of the pasture.

Indicator Descriptions

Percent Desirable Plants

These are the key species that provide most of the quality forage ingested by the grazing animal being fed. The percent is calculated by dry matter weight.

Desirable Plants

Desirable species are well-adapted to the site, are readily consumed, show persistence, and provide high tonnage and quality, with sufficient fertility, for a significant part of the growing season. The most desirable species may be grazed first and close to the ground in poorly managed systems and therefore, may decline in prevalence. Meanwhile, other less-palatable species that can avoid grazing impacts may increase. These less-desirable species can eventually displace the desirable ones since they are grazed less, if at all. This replacement is important to this indicator and should not be overlooked when the desirability score is low. Some examples of desirable species are orchardgrass, white clover, Kentucky bluegrass, and big bluestem. Refer to your State or regional desirable plant list, and ideally, by grazing livestock type (cattle, sheep, goats) for scoring this indicator. Desirable, intermediate, and undesirable species will depend upon geographic region and livestock type



Intermediate Species

These are adapted to the prevailing site conditions; just as desirable species are. Intermediate species are those which, while eaten, provide low production or lose quality fast, are only eaten by certain species, and often have a short-lived grazing-use period. Intermediates increase as desirable species are selectively grazed out but will be the next set of species to decrease if grazing management doesn't intervene. When adequate forage allotments are presented to livestock, the utilization rate of these species will be less than that of the desirable species. Examples of intermediates are dandelions, wild plantains, barnyard grass, and hop clover.

Undesirable Species

Those that typically are not eaten (rejected) by most livestock, cause undesirable side effects when eaten, or have little or no forage value. They include some woody invaders, noxious weeds, toxic plants, and plants that crowd out more desirable species. A few forages are undesirable during a specific growth stage when they produce toxins. On severely overstocked sites, such as exercise

lots, undesirable species will become the only surviving plants. Examples of undesirable species are nimblewill, wild garlic, horsenettle, and buttercup. Record notes in the comment section of the scoresheet for invasive species creating plant pest pressure concerns. Some woody plants such as brush species may be present in the ratings of 1, 2, or 3 on this indicator in amounts economically impacting the herbaceous desirable species and should be noted in the rating.

In this indicator assessment, determine the type and amount of plants within the pasture that the livestock will readily graze that are desirable and intermediate. Estimate visually the proportion (percent) of desirable species present in the entire sward by dry matter weight and score accordingly. The technique of estimating dry weight through visual assessment requires training and knowledge of plant identification. The use of the step-point method is highly recommended for this indicator.

Percent Legume

This indicator measures the average amount (percent) of legume present in a forage stand during the growing season expressed as dry matter weight. The percent legume present at a given time during the growing season can vary considerably, depending upon climate (especially heat), stability, and seasonal growth cycle of the legumes being assessed, the timing and severity or laxity of grazing events, and the timing and level of agronomic inputs.

Legumes are important sources of nitrogen for pastures and improve the forage quality of the pasture mix when they comprise at least 20 percent of total air-dry weight of forage. Deep-rooted legumes also provide grazing during hot, dry periods in midsummer.

Pastures can sometimes be limited in nitrogen, especially ones lacking enough legumes and low in organic matter. Nitrogen excreted by animals often is not distributed well due to lack of pasture management or the location of water, mineral, or shade except in some types of grazing systems such as high-density short-duration grazing. Pastures with few or no legumes will need added nitrogen for increased forage production. Legumes growing along with grasses in pastures have been shown to improve animal intake and performance.

If the proportion of legumes is too high, especially legumes with bloat potential, forage consumption can cause bloat and thus be detrimental to ruminant livestock health. Legume cells rupture easily after ingestion, causing a high fermentation rate to occur in the rumen. This causes the formation of gas bubbles in a stable foam, which can lead to the rumen distending and causing lung malfunction. When bloating legumes, such as clovers and alfalfa (see your State's plant list for additional species), are greater than 40 percent of total forage dry weight, bloat incidence in ruminants is likely without preventative steps.

To perform this indicator, visually estimate the percentage of legume present in the total forage biomass. When conducting the visual assessment on most introduced cool-season legumes (except red clover which has a higher dry weight (90%) and alfalfa (100%)), the estimate will need to be reduced by approximately 50 percent of the visual estimate when converting to a dry matter weight basis. Most legumes have their leaves in the upper part of the plant with only stems below. Thus, the upper part of the plant appears denser visually when compared to grasses which are denser at the base of the plants. For rare cases where legume percentages are greater than 40 percent of the stand, but still are less than 40 percent bloat-type legumes, rate as a 5.



Legumes at 6% by dry weight
(approximately 10% visual wet).



Legumes at 15% by dry weight
(approximately 30% visual wet).



Legumes at 27% by dry weight
(approximately 50% visual wet).

Live Plant Cover (includes dormant)

The percentage of the soil surface covered by live plants is important for pasture production, and soil and water protection. This indicator rates how well your plant solar panel is working. The higher the leaf area, the higher the photosynthetic activity. A dense stand (high-stem count) of live leaf area ensures, when properly grazed, high animal intake and high sunlight interception for best forage growth. Bare, open spots allow for weed encroachment, increased water runoff during intense rains, soil erosion, and lost production. Attached, standing dead plant material can reduce forage quality, photosynthesis, and new tillering depending on the amount and height.

Live cover assessment can be determined at any time on continuously grazed pastures but is best done closer to optimal grazing heights. On rotational pastures, ideally estimate canopy cover of the paddock the day prior to livestock entry. This will represent the best possible condition. If cover rates fair or lower at this growth stage, management changes are recommended. It can also be used to assess postgrazing events to determine if adequate residual is left or not.

Several things can influence live plant cover, especially time of year, rest period prior to review, forage present, weather conditions, and management.

Forages can be easily placed into three different stages.

- Stage one plants are short and immature, having high quality but low production. Stage one plants are good for being a solar panel, but they lack the surface area of stage two, which generally ends right at the early boot stage for grasses.
- Stage two has the greatest live leaf surface area and normally the best forage quality.
- The third stage has maturing vegetation of lower quality and dormant vegetation. Although this stage has the greatest volume of forage available, mature and dormant plants are performing less photosynthesis and forage quality is less.

The management factor in live plant cover is very important. Frequency of grazing, length of grazing period, stop-grazing height, stocking rates and density, length of rest period and nutrient management are factors to be managed to achieve the highest production of quality forage for animal growth.

There are times when letting the forage mature longer can certainly be a positive move, especially to grow deeper roots and potentially build soil organic matter. Dormant forage and stockpiled forage may not be the best collector of sunlight but shouldn't be scored as the 5-point category but could still score moderately well on the PCS scoresheet if everything else is met.

Forage stands with dead or dying intact material should be rated lower accordingly, this includes attached standing dead plant material. This material is not collecting sunlight, and it is not desirable for the livestock, although there is some fiber benefit early in the season. Too much standing dead material may cause the forage to be rejected by the grazing animal or lead to other forages being selectively grazed. Note when forage is dormant stockpile for future reference.



How good is my solar panel?

Visually estimate percent live cover of all species. Assign a value based on live green leaf canopy. If the estimate is inconclusive, or difficult to complete because of the complexity of species or stage of growth, then use the step-point method to estimate or use a camera-based, accurate green canopy cover measurement tool.

Plant Diversity

This indicator is done by dry matter weight. Forage production varies throughout the grazing season because of changing weather, growing degree days, management, and insect or disease pressures. Increasing diversity can help moderate negative changes. Having multiple dominant desirable forage species in a pasture offers some “insurance” and it’s more likely that there is something that can be productive under a wide range of conditions. Warm season grasses for example, can provide quality forage during hot, dry summer periods for areas where adapted, when most cool-season forage tend to go dormant. Low species diversity makes pastures more vulnerable to stress and to changing conditions.

The plant diversity score describes the number and abundance of well-represented forage plants and plant functional groups. For the PCS scoresheet rating, desirable forage species must comprise more than 50 percent of the total biomass to score above a 1. Any time there are more undesirable than desirable plant species, the score will be 1. Refer to your State or regional desirable plant list and ideally by grazing livestock type (species).

The PCSS considers a dominant species to be one that makes up at least 15 percent of the pasture biomass by dry weight. Dominant species contribute substantially to the total forage biomass, and having several similar dominant desirable species helps to spread the production and lower the risk.

A functional group includes plant species that have similar management requirements, biological contributions, and attributes. For most of the United States, the four basic functional groups for improved pastures are cool-season grasses, warm-season grasses, legumes, other grazable nonleguminous forbs (e.g., brassicas, forage chicory, dandelion), or a functional group designated by the State. A functional group is counted even if it has no dominant species, if the group collectively makes up at least 15 percent of the pasture biomass.



Warm-season grasses are a functional group that when present in the system can ease summer slump periods.

Plants from different functional groups are most compatible when they can be successfully managed together. Mixed species pastures with at least two functional groups and three or more well-represented forage species are generally the most productive. Higher total diversity within a functional group does not ensure higher productivity and may cause animals to avoid some species and graze others heavily, as species differences in palatability and maturity are more likely. The greatest benefit for the grazing system is often achieved by the addition of another functional group.

Adding legumes to the stand increases protein and energy improving forage quality, boosts

production, fixes nitrogen for the grasses in the stand, are agronomically sound, environmentally friendly, and economically advantageous. The addition of forbs can provide plants with deeper roots that can bring up nutrients from deeper in the soil profile, provide some additional drought tolerance to the pasture, and often provide highly preferred species that livestock desire.

Some climates may have other functional groups to assess to accomplish the desired outcomes of this indicator.

The PCS scoresheet rating for diversity balances the number of dominant desirable species within a functional group and the number of functional groups to provide a score that indicates general forage productivity and manageability.

Plant Residue and Litter as Soil Cover

Soil cover is important to slow evaporation, maintain and stabilize ideal soil temperatures, be a carbon and food source for soil life, deter erosion, and to help with water infiltration. Residue is dead plant material in varying states of decay.



Decomposing surface residue is detached plant material that typically creates a light duff layer directly on the soil surface. It is highly subject to microbial activity and is in constant flux. Litter is generally the uppermost layer of detached residue on the soil surface including freshly fallen or slightly decomposed vegetative material. This can include flattened plant material from a recent grazing event with high stock densities that may still be attached. Litter is slightly more stable for a longer period depending on the presence and amount of biological activity.

In a well-managed system, there should always be some plant residue and litter present. Extremely active biological systems, such as an intensely grazed dairy or a beef finishing operation, where vegetation is consistently grazed in the vegetative stage, often lack enough residue and litter most of the season. This can be resolved if needed by increasing the rest period and thus allows more trampling of mature forages onto the soil surface.

Excessively high amounts of residue, especially litter, can interfere and slow down new tiller growth, and tie up nitrogen. These systems often lack enough biological activity. This can be resolved if needed by shortening the rest period, adding more diversity, especially legumes, and increasing stock density.

Grazing events, grazing systems, soil biology and life, weather, and management are constantly changing and often quite fluid. The percentage of ideal cover is not exact but should be in most cases a minimum of 60 percent with good soil biological activity. The higher the requirements of microbial life, the higher amount of residue and litter is needed to support it.

First assess the amount of bare soil. Cover is easily assessed during the step-point method by gently moving the aboveground plant cover to one side with your hand or foot if needed to see if soil cover is provided between plants and under the canopy. The soil should be covered by either live plants and tillers or residue. Visually estimate the percent cover between live plants in the stand; the step-point method is a good quantitative way to do this.



Estimate the amount of bare soil. When bare soil is easily seen it is rated a 1. This should not be common.

Grazing Utilization and Severity

The proper amount and frequency of grazing are critical in maintaining productive pastures.

Close and frequent grazing causes loss of vigor, reduces density of desired species and yield, can promote erosion, and have impact on bite size and intake. Differences in species, plant maturity, stocking rate, location and distance to water, shade, and mineral availability may cause uneven grazing to occur.

Grazing utilization and severity are directly related to uniformity of grazing by livestock, except when continually overgrazing. Though an overgrazed pasture may look uniform, the impact of this severity places such pastures in the lowest rating. Uniform grazing results in almost all desirable and intermediate species being grazed to a targeted residual or “stop-grazing” height or slightly higher. Uniform grazing, without overgrazing, usually only exists when proper grazing management techniques are employed and especially where smaller allocations are made.

Nonuniformity is spotty or patterned grazing that appears uneven throughout a pasture, with some plants or parts of paddocks grazed heavily and others grazed lightly or not at all. Individual forage species are being selected by the livestock based on their palatability, nutritional value, amount of other forages available, and location in the pasture.

Selectivity is also affected by differences in stage of maturity among species, amount of forage offered to livestock, their length of stay in the paddock, and the livestock stocking density. In most instances, livestock will readily select younger plants over more mature ones. Livestock will also usually refuse to graze where manure and urine have recently been deposited. This leads to a continuing cycle of uneven grazing patterns and reduced efficiency.

Zone grazing occurs when one end of the pasture is heavily grazed, and the other end is lightly grazed or ungrazed. It often occurs on pastures with long walking distances from one end to the other, especially when shady areas, windbreaks, hay, creep, or mineral feeding and watering sites are a long distance from some parts of the field. Pastures with abrupt topography changes can also cause zone grazing.

For this indicator solely visually assess. When zone grazing is occurring, along with some uneven grazing throughout, rate it a 3. Rate the pasture a 4 if the pasture is uniformly grazed to target residual heights but there is some zone grazing occurring.

While understocking will lead to more selectivity and the potential for uneven grazing, continual

overstocking can result in pastures being uniformly grazed (mowed lawn appearance) but to heights that are too low to maintain all the desirable species. These uniformly overgrazed pastures should be rated low on the score sheet.

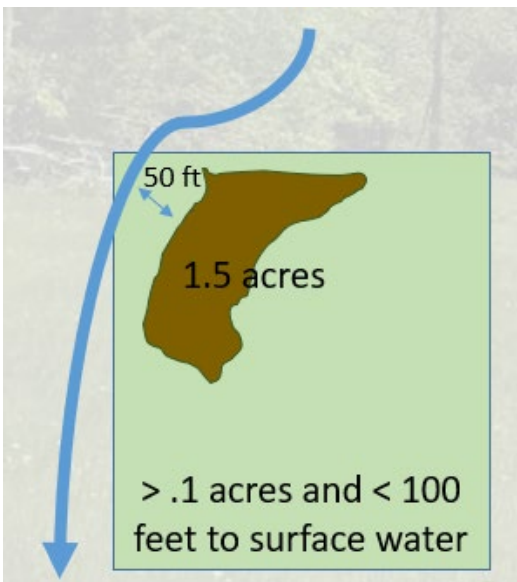
Livestock Concentration Areas

Concentration areas are places in pastures where livestock return frequently and linger near feeding areas, gates, water, mineral or salt, or shade. These areas may have reduced vegetative cover, increased bare ground, and have concentrated animal waste. Livestock trails to and from these preferred areas can create pathways that may increase erosion and become conduits for sediment, nutrients, and pathogens to nearby water bodies.

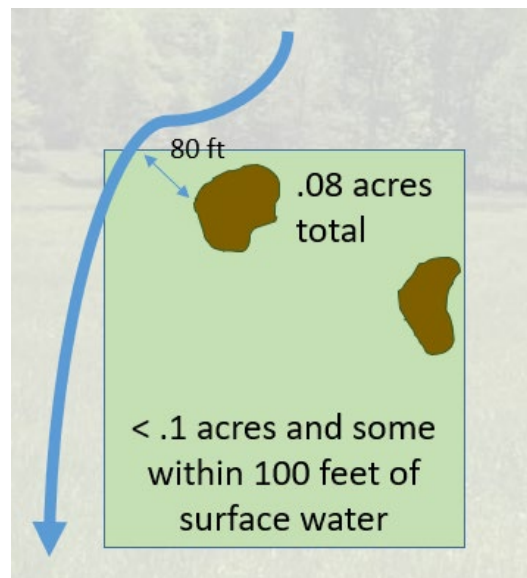
This indicator addresses the potential impacts on water quality by assessing the size of the disturbed areas and the connectivity to adjacent water bodies through trailing and location. Livestock concentration areas near water sources or with direct conveyance to surface water can create resource concerns. Additionally, these areas on pervious soils over shallow ground water can also create water quality problems from introduced contaminants when close to adjacent waterbodies.

For estimates and comparisons, one square acre is 208' by 208' and 10 percent of that or 0.1 of an acre is 66' by 66'. When assessing pastures that are less than 1 acre, use 10 percent of grazing unit area as an alternative to 0.1 acres, to determine score.

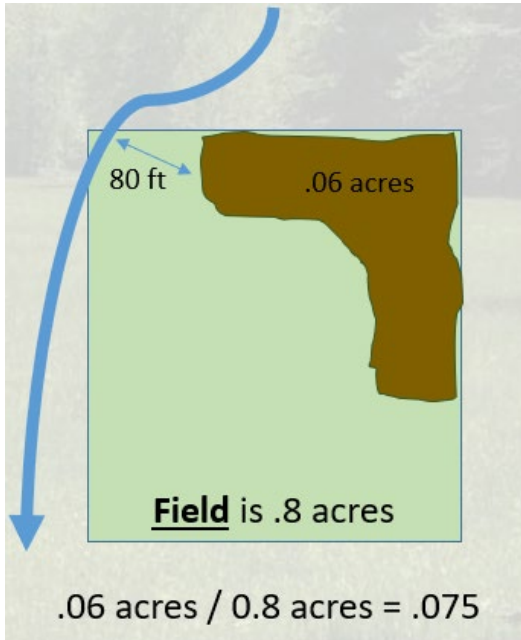
Pace unknown distances and assess the amount of concentration area for this indicator.



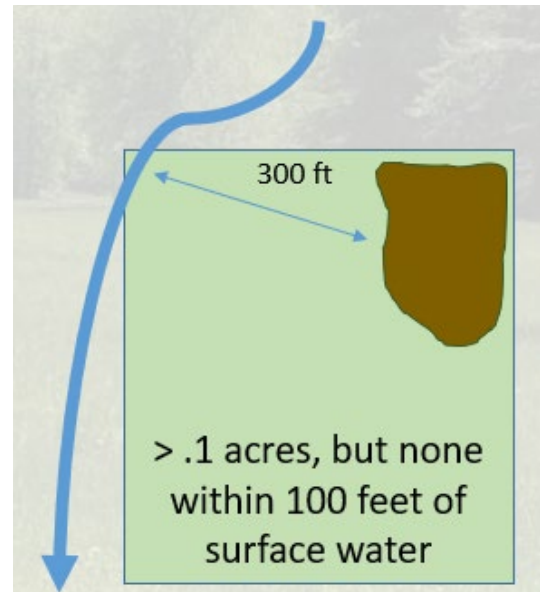
Example of a 1-point rating.
Concentration areas are within 100 feet of water body and more than .1 acre in size.



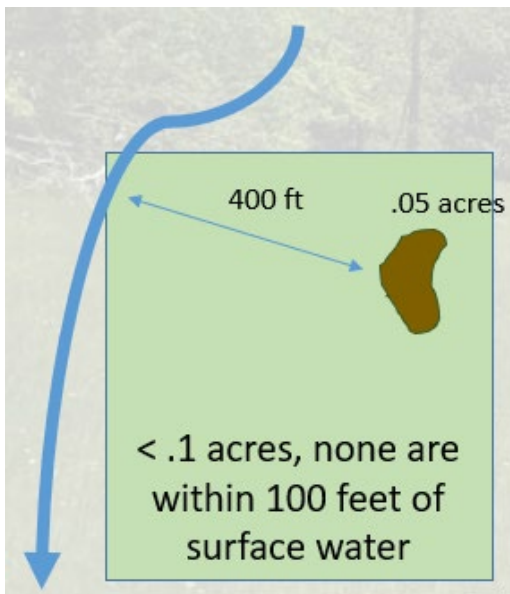
Example of a 2-point rating.
Concentration areas are within 100 feet of water body and less than .1 acre in size.



Example of a 2-point rating where the field is less than 1 acre. It receives a rating of a 2.



Example of a 3-point rating. Concentration areas are greater than 100 feet of water body and more than .1 acre in size.



Example of a 4-point rating. Concentration areas are greater than 100 feet of water body and less than .1 acre in size.

Soil Compaction and Soil Regenerative Features

Soil compaction is the diminished pore space between soil aggregates that hold air and water. Compaction reduces a pasture's ability to infiltrate water by minimizing pore space and increasing bulk density of the soils, negatively affecting hydrologic function, nutrient cycling, and the energy flow throughout the pasture ecosystem. Compaction affects the ability of plant roots to access water and nutrients. Increased runoff resulting from soil compaction creates the potential to transport contaminants such as sediment, nutrients, and pathogens to surface water, degrading water quality.

Roots can be diminished by not only compacted layers, but also from overgrazing and haying. Shallow or sparse roots that do not move deeper in the soil profile, especially when there are no limiting layers, are good indicators these possible management activities are occurring.



Compaction is one of the most detrimental resource concerns.

Soil regenerative features focus on the condition of plant roots and the abundance of soil life, both of which can improve important soil attributes like structure and organic matter. Soils with roots growing deep and downward have the potential to feed a large and diverse population of soil life. These soil organisms can improve water-holding capacity, nutrient cycling, plant productivity, plant health, and nutrient density.

To evaluate, use a shovel to dig a hole in the pasture, large enough to see the indicator features.

If a comparison is needed or desired, locate one hole in a protected area, such as a fence line where grazing can occur, but soil is not adversely affected by hoof action, and the other within the pasture away from the protected area and on the same soil type to compare differences in soil features.

Soil features to observe and or to compare in the soil of each hole are —

- Ease of getting the shovel into the soil.
- Soil structure—look for platiness and aggregates in the top twelve inches.
- Rooting depth.
- Root morphology and direction of growth—roots should be growing downward through the soil profile.
- Color—contrasting color changes in the soil with darker soil in the more biotically active upper layer.
- Worms, tunnels, or other biotic presence and activity.

When rating this indicator, begin with the primary subindicators (compaction layer, then root characteristics) and use these two subindicators as the main scoring factors, with the **most adverse** factor of the two subindicators determining the score. Soil color and soil life subindicators are secondary indicators and can be considered where applicable but used primarily for discussion with the manager and planning for improving soil health. When rating the compacted or platy layer, consider if the layer is within a zone where primary forage roots would typically extend to (not potentially).



Healthy pasture soils should have good aggregates, vertical roots, and soil life.

Plant Vigor

In simplest terms, plant vigor refers to the health of a plant. Another interpretation is the plant's robustness in comparison to others of the same species, relative to the size and age of the plant within the environment and weather where it is growing. A loss of plant vigor can cause a loss in desirable species and plant cover. Primary things to consider when rating plant vigor are color and rate of regrowth (recovery) following a grazing event, but also taking into consideration the grazing height of plants, size (density) of plants, and productivity. This indicator is purposely placed as one of the last indicators to score doing this PCS. The scorer can then use the earlier indicator scores information to better score plant vigor.

Color is a major indicator of plant vigor. Yellowing plants indicate drought, insect damage, or prolonged heavy usage (continuous grazing). Pale green grass plants can be indicative of low fertility or cool, wet, and poor soils and growing conditions. Fields where nitrogen-starved grasses exist will be obvious and have dark green spots under dung or urine patches with the rest of the pasture area or unit being pale in comparison. Frost-damaged plants will turn yellow or to a blue-gray cast depending on the severity of the cold damage.

Leaf color can also change due to age. Older, lower leaves of plants turn yellow as they become more shaded and nutrients are translocated from them to the younger leaves higher in the canopy. This type of progressive vigor decline on a single plant is critical to the producer timing the rotation of livestock from one pasture to the next. In general, color is a visual indicator of either mineral deficiencies or, occasionally, of over-fertilization. Over-fertilization is not separated out in this indicator but should be annotated in the notes when observed and rated a 1 if an issue. Excess applications of nitrogen can cause some major nitrate toxicity issues. A lush, lodged, very dark green-to-bluish-green grass can be indicative of over-fertilization especially by nitrogen. It can also occur where livestock have concentrated on a pasture such as at a permanent water trough or feed bunk. These spot areas are often ungrazed by livestock due to taste, smell, or



Recovery and forage color are good indicators of plant health.

postingestive feedback caused by low level nitrate poisoning.

Growth rate is a key trait of plant vigor, which is greatly affected by the management of the plant community. Plant recovery should be evaluated based on average growth rates for the plant community involved at the time of the season being rated. This is easier to evaluate on rotational pastures, because the last time an individual plant was grazed is likely to be known.

Too often, the recovery period for the plants is too short. Ideally, when growth is slow, longer recovery is needed, and when growth is fast, shorter recovery is needed. Recovery is influenced by the time of year, the type of plants, and even manager goals, such as if it is planned to be used for stockpiled forage or not. It is highly influenced by how severely the pasture was used the last time it was grazed. The more severe the grazing (below recommended stop-grazing heights), the longer the recovery required. Most severe grazing occurs when a pasture is overstocked. Pasture plants when continuously grazed have little or no recovery. In contrast are pastures that are rarely grazed below stop-grazing heights and management is initiated at prime plant recovery and intake amounts. Make notes on any disease or insect stresses (pressure) on the plants. Using color as a plant vigor indicator may be difficult during a plant's dormant season. Under such conditions, use the ratings of all indicators along with overall plant health and remaining leaf area to assist in a vigor score.

Erosion

Soil erosion involves the detachment, transport, and redistribution of soil particles by forces of water, wind, or gravity. The types of erosion evaluated for pasture condition score are below.

Sheet and Rill

Soil loss caused by water drop impact, drip splash from water dropping off plant leaves and stems onto bare soil, and a thin sheet of runoff water flowing across the soil surface. Sheet and rill erosion increases as cover decreases. Evidence of sheet erosion appears as small debris dams of plant residue that build up at obstructions or span between obstructions. Some soil aggregates or worm castings may also be washed into the debris' dams. Rills are small, incised channels in the soil that run parallel to each other downslope. When rills appear, serious soil loss is occurring. This erosion type includes most irrigation-induced erosion.

Streambank, Shoreline

When in pastures, channels or shorelines can have heightened erosion problems and loss of vegetative cover that typically grows on them. These accelerated damages can result from grazing animal traffic in or on them. Open channels may be intermittent or perennial flowing streams or dry washes. The factors that affect the extent of disturbance livestock cause to streambanks, shorelines, and their associated vegetation include—

- Livestock traffic patterns.
- Frequency, duration, and intensity of use.
- Attractiveness of these channels or banks as sunning, dusting, travel lanes, watering, grazing, or rubbing areas.
- Channel shape and steepness of banks.
- Water flow characteristics (frequency, depth, sediment load, velocity, and turbulence).
- Only consider erosion caused or influenced by livestock use.

Wind

Wind is the transport and deposition of soil from one location to another, occurring when heavier, windblown soil particles abrade, exposing soil and causing particles to become airborne. Deposition of the heavier soil particles occurs downwind of obstructions, such as fence lines, buildings, and vegetation. Often vegetative debris is windrowed against obstructions and in extreme cases soil will abrade and smother vegetation.

Gullies

Gullies are an advanced stage of water erosion, developing in situations where rill erosion has not been addressed. Concentrated, fast-moving water can cause gully expansion through both mass soil caving along sides and head-cutting upslope, creating deep channels in the ground. Both ephemeral and advanced classic gullies should be addressed under this subindicator.



There are at least two types of erosion on this field. Circle both on the PCSS. The lowest rating score which accounts for the worst erosion present should be given.

Circle or mark all erosion types found within the planning unit. Rate the indicator with the score for overall erosion as the lowest scoring point value of the erosion types.

References

USDA NRCS. 2019. National Resources Inventory Grazing Land On-Site Data Collection, Handbook of Instructions, Chapter 13, Dry Weight Rank Method, Page 13-8. Iowa State University of Science and Technology. <https://grazingland.cssm.iastate.edu/reference-materials>.

USDA NRCS. 2003. Title 190, National Range and Pasture Handbook. Washington, D.C. <https://directives.sc.eov.usda.gov/>.

Pasture Condition Score Sheet

| | | | | | | |
|--|--|--|--|---|---|---------------|
| Operator: | | | | | Date: | |
| Evaluator: | | | | | Pasture ID: | |
| Soil(s), ESD(s) and or FSG(s): | | | | | Livestock type: | |
| Current Season's Precipitation (check one) | | Above Normal | Normal | Below Normal | | |
| Seasonal Temperature Trend (check one) | | Above Normal | Normal | Below Normal | | |
| <p>Evaluate the site and rate each indicator based upon your observations. Scores for each indicator may range from 1 to 5. Sum the indicator scores to determine overall pasture condition score.</p> | | | | | | Score |
| Indicator | 1 Point | 2 Points | 3 Points | 4 Points | 5 Points | Points |
| Percent Desirable Plants* (Dry Weight; for Livestock Type) | Desirable species <20% of stand. | Desirable species 20 – 40% of stand. | Desirable species 41 – 60% of stand. | Desirable species 61 – 80% of stand. | Desirable species exceed 80% of stand. | |
| Percent Legume by Dry Weight | <5% OR >50% bloating legumes. | 5-10% legumes OR >40% bloating legume. | 11-20% legumes. | 21-30% legumes. | 31-40% legumes. No grass loss; grass may be increasing. | |
| Live (includes dormant) Plant Cover | Less than 40% is live leaf canopy. Remaining is either dead standing material, or bare ground. | 40-65% is live leaf canopy. Remaining is either dead standing material, or bare ground. | 66-80% live leaf canopy. Remaining is either dead standing material, or bare ground. | 81-95% live leaf canopy. Remaining is either dead standing material, or bare ground. | More than 95% live (non-dormant) leaf canopy. Remaining is either dead standing material, or bare ground. | |
| Plant Diversity by Dry Weight (*See footnote at bottom of page) | Diversity: Very low | Diversity: Low | Diversity: Moderate | Diversity: High | Diversity: Very high | |
| | <50% desirable species OR 1 dominant desirable species in 1 functional group OR No dominant desirable species and all minor species in each functional group totaling <15% | 2 dominant desirable species in 1 functional group OR 2 functional groups each represented by minor species totaling ≥15% | 3 dominant desirable species in 1 functional group OR 2-3 dominant desirable species in 2 functional groups OR 3 functional groups each represented by minor species totaling ≥15% | 4 dominant desirable species in 2 functional groups OR 3 dominant desirable species in 3 functional groups OR 3 dominant desirable species in 2 functional groups AND 1 additional functional group represented by minor species totaling ≥15% | 4 dominant desirable species in 3 functional groups OR 4 dominant desirable species in 2 functional groups AND 1 additional functional group represented by minor species totaling ≥15% | |
| Plant Residue and Litter as Soil Cover (Pull back canopy) | Bare soil is very easily seen; | Openings of bare soil can be seen fairly easily; | Small openings of bare soil can be seen, but minimal; | No bare soil is easily seen; | No bare soil is seen; | |
| | There is <20% cover on the soil surface or it is excessive, and slow to break down. | Soil cover is 21-40%. | Soil cover is 41-60%. | Soil cover is 61-80%. | Soil cover is >80% with good biological activity and decomposition of older residue. | |
| Grazing Utilization and Severity | Pasture is overgrazed throughout. | Pasture consists primarily of overgrazed and/or refused areas (former dung areas, older plants, undesired plants). | Pastures show uneven grazing throughout with heavier grazing near water or feeding areas, or distinct zone grazing. | Pasture grazed evenly throughout with minimal overgrazing with some under grazed small areas and heavier use near water sources. | Pasture grazed evenly throughout with no overgrazing. | |

*Use NRCS plant list for livestock species. Functional groups are as appropriate for your state (cool-season grasses, legumes, warm-season grasses, non-leguminous forbs). **Any time there are more undesirables than desirables, it will be 1 point. Desirable species must total more than 50% of the total biomass. Dominant species are ≥15%. Functional groups must be ≥15% of stand to be counted.**

| Indicator | 1 Point | 2 Points | 3 Points | 4 Points | 5 Points | Points |
|--|--|--|--|---|--|--------|
| Livestock Concentration Areas (If field <1 acre, see ** footnote) | Livestock concentration areas are within 100 feet of, or are a direct conveyance to surface water, and cover more than 0.1 acre, including trails. | Livestock concentration areas are within 100 feet of, or are a direct conveyance to surface water, and cover less than 0.1 acre, including trails. | Livestock concentration areas are farther than 100 feet from and are not a direct conveyance to surface water, and cover more than 0.1 acre, including trails. | Livestock concentration areas are farther than 100 feet and are not a direct conveyance to surface water, and cover less than 0.1 acre, including trails. | Livestock concentration areas, including trails, not present. | |
| Soil Compaction and Soil Regenerative Features (***)See footnote at bottom of page) | Compaction: Dense or thick platy layer very distinct; | Compaction: Dense or moderate platy layer noticeable; | Compaction: Thin dense or platy layer still present; | Compaction: Minor dense or platy layer; good aggregates common (crumbly soil); | Compaction: No dense or platy layers; crumbly soil throughout; | |
| | Roots: Dominantly horizontal; most shallow/sparse; | Roots: Numerous horizontal; moderate amount shallow/sparse; | Roots: Some horizontal with increasing downward; | Roots: Few horizontal, more downward through the soil profile; | Roots: Abundant growth primarily downward through the soil profile; | |
| | Color: Surface horizon same as subsoil; | | Color: Surface horizon moderately darker than subsoil; | | Color: Surface horizon dramatically darker than subsoil; | |
| | Soil Life: Few or no signs. | Soil Life: Signs scattered in surface layer. | Soil Life: Signs scattered throughout. | Soil Life: Signs numerous throughout. | Soil Life: Signs abundant throughout. | |
| Plant Vigor | No plant recovery after grazing/harvest. Pale, yellow or brown, or severe stunting of desirable forage. | Some recovery. Yellowish green forage, or moderately or slight stunting of desirable forage. | Adequate recovery of desirable forage. Yellowish and dark green areas due to manure and urine patches. | Good recovery of desirable forage. Light green and dark green forage present. | Rapid recovery of desirable forage. All healthy green forage. | |
| Erosion (Circle all that apply; the overall indicator score will be the lowest rating indicated) | Sheet and Rill: Plant density is insufficient to stop runoff, with poor infiltration. Erosion easily visible throughout pasture; | Sheet and Rill: Plant density slows runoff. Erosion present and easily seen on steeper terrain; | Sheet and Rill: Plant density good and runoff moderate. If present, erosion concentrated on heavily used areas; | Sheet and Rill: Plant density high, runoff low, good infiltration. May have evidence of past erosion if present; | Sheet and Rill: Plant density high, no runoff, good infiltration. No evidence of present or past erosion; | |
| | Wind: Severe scoured areas and deposition throughout; | Wind: Scoured areas common, deposition effecting plants; | Wind: Occasional scoured areas, litter windrolled; | Wind: Minimal soil exposed, some detached vegetation windrolled, minor plant damage; | Wind: No exposed soil; | |
| | Streambank and/or Shoreline: Banks bare, major sloughing, no bank vegetation; | Streambank and/or Shoreline: More than half the bank vegetation trampled; sloughing. | Streambank and/or Shoreline: Less than half the bank vegetation trampled; eroding at crossing/entrances. | Streambank and/or Shoreline: Eroding at crossings, entrances; all the bank vegetation is intact and banks are stable. | Streambank and/or Shoreline: Vegetation intact and stable, hardened crossings and alternative water sources used; | |
| | Gully: Very large mass movement, caving sides. | Gully: Advancing upslope, increasing fingering extensions. | Gully: Not all active but extensions present. | Gully: Stable with vegetative cover. | Gully: None, drainage ways vegetative. | |

** If field size is less than 1 ac. Use 10% of field size in place of 0.1 acre. ***Use a shovel. Root and Compaction subindicators are primary and should be considered first. Soil color and soil life are secondary subindicators which can be considered where applicable.

| Overall Pasture Condition Score | Individual Indicator Score | Management Change Suggested |
|---------------------------------|----------------------------|---|
| 45 to 50 | 5 | No changes in management needed at this time. |
| 35 to 45 | 4 | Minor changes would enhance, do most beneficial first. |
| 25 to 35 | 3 | Improvements would benefit productivity and/or environment. |
| 15 to 25 | 2 | Needs immediate management changes, high return likely. |
| 10 to 15 | 1 | Major effort required in time, management and expense. |

Overall Pasture Condition Score =

Comments/Notes:

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