Rangeland Health Assessment

for Grassland, Forest & Tame Pasture

Field Workbook

Alberta
SUSTAINABLE RESOURCE DEVELOPMENT
Public Lands

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Range health assessment documents are available on our website at:
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Click on the link to**: Range and Pasture Health Assessment**

Rangeland Health Assessment for Grassland, Forest and Tame Pasture

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The philosophy of rating ecological function of rangelands has been inspired by riparian health tools developed by Dr. Paul Hansen and William (Bill) Thompson and the Cows and Fish Program. We would like to express our thanks to Paul Hansen and Bill Thompson, Bitterroot Restoration, Corvallis, MT, and to our Cows and Fish colleagues Lorne Fitch, Norine Ambrose, Greg Hale, Kelsey Spicer-Rawe, Kerri O'Shaughnessy and Michael Gerrand.

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ABOUT THIS WORKBOOK

Why Use This Workbook?

Rangelands are complex and diverse, but with practical field training, it is possible to consistently evaluate the condition or health of a range site. Traditional range condition assessment sometimes seems complex and cumbersome. This new methodology provides a visual system that allows users to readily see changes in range health and to provide some early warning when management changes are needed. Like the system of riparian health assessment developed by the Cows and Fish Program in Alberta, range health assessment is intended to help users "tune" their eyes to some key indicators of range health.

Who Is This Workbook For?

This workbook is for livestock producers, resource managers, agency staff, energy companies, protected area managers and anyone with an interest in the protection and maintenance of rangeland plant communities.

What Will The Workbook Do For Me?

The workbook can be used as an aid to field training and a field reference for on the ground range health assessments. The workbook provides pages where health scores can be recorded for future reference.

Where Does It Apply?

The field workbook is designed for application on a full spectrum of range landscapes, including native grassland, native forest and tame pastures. It is also useful for modified rangelands where range plant communities have become dominated by non-native species.

INTRODUCTION

What are Rangelands?

Rangeland (*syn*. Range) is land supporting indigenous or introduced vegetation that is either grazed or has the potential to be grazed and is managed as a natural ecosystem. Rangeland includes grassland, grazeable forestland, shrubland, pastureland and riparian areas (Public Lands Range Resource Management Program 2002). Rangeland ecosystems have traditionally been valued as an important source of forage for the livestock industry. Today there is a growing awareness of the important functions and values that rangelands provide to society. We must act as careful stewards to maintain rangelands in healthy condition. This field workbook is intended as a tool to measure rangeland health and help producers, resource managers and all users to make sustainable use of these lands.

What is Range Health?

We use the term "range health" to mean the ability of rangeland to perform certain key functions. The term health conveys the meaning that all parts that make up the whole, are present and working together. Range health is analogous to the health of the human body. When we are ill or under stress, important functions like circulation, immunity, cell growth, excretion, mental processes or reproduction may be impaired.

For rangelands, the functions of healthy range (Table 1) include: net primary production, maintenance of soil/site stability, capture and beneficial release of water, nutrient and energy cycling and functional diversity of plant species. Healthy rangelands provide sustainable grazing opportunities for livestock producers and also sustain a long list of other products and values. Declines in range health will alert the range manager to consider management changes.

Table 1. Functions of healthy rangelands and why they are important.

Rangeland Functions	Why Is the Function Important?
Productivity	• Healthy range plant communities are very efficient in utilizing available energy and water resources in the production of maximum biomass • Forage production for livestock and wildlife • Consumable products for all life forms (e.g. insects, decomposers etc.)
Site Stability	• Maintain the potential productivity of rangelands • Protect soils that have taken centuries to develop • Supports stable long-term biomass production
Capture and Beneficial Release of Water	• Storage, retention and slow release of water • More moisture available for plant growth and other organisms • Less runoff and potential for soil erosion • More stable ecosystem during drought
Nutrient Cycling	• Conservation and recycling of nutrients available for plant growth • Rangelands are thrifty systems not requiring the input of fertilizer
Plant Species Diversity	• Maintains a diversity of grasses, forbs, shrubs and trees • Supports high quality forage plants for livestock and wildlife • Maintains biodiversity, the complex web of life

Why Do We Need A New Methodology?

The range condition (RC) concept evolved in response to grazing management problems on western rangelands going back to the early 1900's. Alberta's first stocking guide for prairie grasslands was published in 1966 (Smoliak et. al 1966). The range condition approach measures the alteration of plant species composition due to grazing or other disturbances, relative to the climax plant community, the potential vegetation for the site. The RC approach has worked well in semi-arid grasslands and has been well accepted by ranchers and wildlife managers. It relies on descriptions of relatively undisturbed range sites and their plant communities. However, the evolution of scientific thought in North America has highlighted a number of shortcomings of the RC concept. One of the key assumptions is that all declines in range condition are reversible. Experience shows that this may not be the case. Plant succession may establish stable states that are relatively resistant to change, even with decades of rest.

A very significant shortcoming relates to communities that are invaded by non-native species or are seeded to non-native species and show no apparent trend back towards climax with any management treatment. Furthermore, the concept of a single climax or potential natural community under a forest community does not address the dynamic character of the forest under-story as stand succession proceeds.

The traditional range condition approach did not consider management needs of soil. Range managers should be concerned if management practices are leading to accelerated erosion. A more robust range health assessment tool must include soils indicators like site stability. In developing the range health assessment procedure, we have reflected on the discussion of this concept within the International Society for Range Management and among federal and state agencies in the US. Since 1999, an Alberta Range Health Task Group has selected indicators and developed a scoring system to address key ecological processes and the diversity of Alberta rangelands ands tame pastures.

How Is Range Health Measured?

Range health builds on the traditional range condition approach that considers plant community type in relation to site potential, but also adds new and important indicators of natural processes and functions. Range health is measured by comparing the functioning of ecological processes on an area of rangeland to a standard known as an ecological site description. An **ecological site** is similar to the concept of **range site**, but a broader list of characteristics are described. *An ecological site, as defined by the Task Group on Unity and Concepts (1995), "is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation".*

With some background knowledge about the local soils and vegetation, range health is rated for a site by scoring a series of questions that reflect key indicators of healthy range. This chapter will explain the key indicators of range health and their importance. Chapters two, three and four provide the actual range or tame pasture health questions and scores. In chapter five, general field sampling instructions are available along with blank field worksheets. Chapter six provides some insights on what the scores mean and how to interpret them. Additional reference materials are found in the back pages of the workbook.

Why Does Range Health Matter?

Ask anyone what they would prefer, sickness or health. We can all describe what its like to be ill and how much better we can work and play when we are healthy. We can demonstrate the same contrast for rangelands. Healthy rangelands can sustain a broad range of values and benefits (Table 2). When range health declines, so does the flow of values and benefits we might otherwise enjoy.

Table 2. Values and benefits of healthy rangeland:

Rangeland Users	Values and Benefits of Healthy Range
Livestock Producers	• Lower feed costs • Renewable and reliable source of forage production • Stability of forage production during drought • Greater flexibility and efficiency for alternate grazing seasons (e.g. autumn or winter where applicable) • Lower maintenance costs like weed control • Does not require the input of inorganic fertilizers and other soil amendments and additives. • Reduced concern for noxious weeds
Resource Managers	• Quality wildlife habitat • Maintain fisheries habitat • Maintain grazing opportunities • Preventing soil erosion • Timber production • Increased total net benefits
The Public	• Esthetic landscape values • Watershed protection • Water quality • Large soil carbon sinks • Bio-diversity • Opportunities for passive and consumptive recreation like hunting and tourism
Socio-Economics and Governance	• Healthy rangelands provide increased cooperation, increased total benefits to society with fewer conflicts to resolve, less regulation and enforcement. This means lower costs!

What Are the Indicators of Range Health?

Range health questions are indirect measures of the following indicators. An evaluation allows the manager to see whether important ecological functions are being performed.

1. Integrity and Ecological Status

Plant species composition is a fundamental consideration in range health assessment. Plant species composition influences a sites ability to perform functions and provide products and services. Native plant communities evolve within their environment and slowly change over time as environmental factors change. Significant short term changes in plant composition do not normally occur unless caused by significant disturbances like continuous heavy grazing, high levels of recreational traffic, prolonged drought, prolonged periods of high precipitation, exotic species invasion, frequent burning or timber removal.

Plant species changes due to disturbance pressures are predictable:

- Perennial species that tend to be most productive and palatable, are also the most sensitive to disturbance and decline with increased disturbance such as a continuous and heavy grazing regime.
- With heavy grazing, species with greater adaptation to disturbance pressure will increase in abundance because they are provided opportunities to compete successfully. These disturbance-induced, weedy species include pussytoes, yarrow, dandelion and noxious weeds .

Range management objectives tend to favor the later stages of plant succession (late-seral to potential natural community (PNC) or good to excellent range condition). Late seral plant communities tend to be superior in the efficient capture of solar energy, in cycling of organic matter and nutrients, in retaining moisture, in supporting wildlife habitat values and in providing the highest potential productivity for the site. In contrast, early seral stages represent plant communities with diminished ecological processes, which are less stable and more vulnerable to invasion by weeds and non-native species. They also have diminished resource values for livestock forage production, wildlife habitat and watershed protection. When disturbance impacts are reduced or removed, the present plant community may react in a number of ways:

- May appear to remain static
- May move toward a number of identifiable plant communities including the potential natural community or modified plant communities
- May move to a modified plant community type

Modified plant communities are communities that have become dominated by non-native species. To the best of our knowledge, long-term rest of these modified plant communities does not return them to native species composition. A separate set of questions is used to determine the health status of these community types.

Tame pastures, are areas of rangeland that have been converted to agronomic species and they can be managed using a modified version of native range health assessment. In this field workbook there is a special set of questions for rating the health of tame pastures.

Some Important Ecological Concepts

- **Plant communities** are mixtures of plant species that interact with one another.
- **Succession** is the gradual replacement of one plant community by another over time.
- **Successional pathways** describe the predictable pathway of change in the plant community as it is subjected to different types and levels of disturbance over time.
- **Seral stages** are each step along a successional pathway.
- **Seral stages** begin at the pioneer stage of **early seral**, and progress upward in succession to **mid-seral**, then **late seral** and finally **potential natural community(PNC or climax)**.
- **Reference plant community (RPC)** is the term we use for the potential natural community since we use it as the “reference” for comparison.
- An **ecological site** is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.
- **Ecological status** is the degree of similarity between the present plant community and the **reference plant community**. Plant communities are **modified** when disturbance has altered them to non-native species (like smooth brome, timothy or Kentucky bluegrass) with a composition of greater than 70% non-native species.

2. Community Structure

Nutrient cycling and energy flow is more efficient in diverse plant communities with varied canopy structures and rooting depths that can use sunlight, water and nutrients from different zones in the canopy and soil. Plant community structure is particularly important in maintaining net primary production in forested rangelands, and in the maintenance of habitat values for a spectrum of wildlife species including browsing opportunities for ungulates, and feeding and nesting sites for breeding birds. Patchy grazing may be an important source of plant canopy structure in prairie grassland environments providing valuable habitat diversity for breeding birds.

3. Hydrologic Function and Nutrient Cycling

This indicator deals with abundance and distribution of live and dead plant material on an ecological site. Plant residue promotes moisture retention and nutrient cycling and is linked to another indicator, site stability (soil exposure and erosion). When functioning properly, a watershed captures, stores and beneficially releases the moisture associated with normal precipitation events. Uplands make up the largest part of the watershed and are where most of the moisture is captured and stored during precipitation events. Live plant material and litter (either standing, freshly fallen or slightly decomposed on the soil surface) is important for infiltration (slowing runoff and creating a path into the soil), reducing soil erosion from wind and water, reducing evaporative losses and reducing raindrop impact.

Litter also acts as a physical barrier to heat and water flow at the soil surface. Litter conserves moisture by reducing evaporation making scarce moisture more effective. Litter removal will reduce forage yields by about 50% in mixed grass prairie and by about 30% during dry years in the foothills. Litter or, organic residue, acts as a nutrient pool on forested sites, is an important rooting medium for many understory plants, protects the soil surface and provides a home for decomposers. Litter performs many of the same functions in tame pastures as it does in native grasslands and forests.

4. Site Stability

Rangelands show varying degrees of natural soil stability depending on climate, site, topography and plant cover. The amount of sediment produced by water and wind erosion from a particular ecological site type is termed geologic erosion. Managers strive to prevent accelerated erosion due to land management practices, by maintaining adequate vegetation cover and minimizing exposed soil. Adequate vegetation cover protects the soil surface from the impact of raindrops, detains overland flow, maintains infiltration and permeability and protects the soil surface from erosion. Soil loss is a serious concern since erosion tends to remove the finer lighter particles like clays, silts and organic matter which are most important to soil fertility and moisture holding capacity. Long term studies show that ongoing soil loss due to overgrazing or other disturbances, will eventually transform the soil into a shallower, drier, less productive and less stable soil type. Excess sediment production has a negative impact on water quality since the fine particles that are eroded have a greater potential to absorb and carry nutrients and chemicals.

RANGE HEALTH HINTS

Vegetation Canopy Protects Soil

- ✔ Like a tent or umbrella, vegetation canopy protects soil from the erosive impact of raindrops.
- ✔ Most rangeland plant communities are stable and normally have adequate vegetation to prevent soil erosion.
- ✔ Some rangelands like badlands, certain steep river slopes and sand dune environments have natural bare soil and erosional processes are natural.
- ✔ On any type of rangeland, managers should strive to prevent accelerated erosion beyond the natural extent.

Some range sites are normally unstable and erosion and sediment production can be viewed as a natural process (e.g. badlands). Unstable sites will tend to exhibit significant exposed soil and have shallow soil profiles (e.g. seepage and slumping areas, badlands, thin breaks, saline lowlands, solonetzic soils, some sandy soils). This range health indicator principally focuses on loss of key soil particles from well developed sites that are normally stable.

5. Noxious Weeds

Noxious weeds are invasive plants that are alien species to the rangeland plant community. Weeds are seldom a problem in vigorous, well managed rangelands although weed invasion may occasionally happen in healthy stands. Weeds may be introduced to relatively healthy stands through rodent burrows, but generally their presence indicates a degrading plant community. Weeds most often invade range where grazing practices have resulted in available niche space (bare soil, surplus moisture); available micro-habitats normally occupied by range plants, but now available to weeds due to overgrazing or some other land use or natural disturbance. Noxious weeds diminish the agricultural productivity of a site, threaten biological diversity, reduce structure and function and sustainability of ecosystems. They also reduce the multiple uses and values that range is normally capable of providing.

Grazing management strives to maintain plant vigor and vegetation cover so that space is filled by one or more plant communities that minimize weed invasion.

GETTING STARTED

How to use the field workbook?

The field workbook is a training and awareness tool and a field assessment guide to facilitate rapid, repeatable and consistent assessments of range and pasture health. Some basic training and familiarity with local plant community information is required to use the guide effectively. The workbook is intended for producers and resource managers as a tool to identify the presence, scale and magnitude of range resource issues and problems. It can be used to measure effects and impacts of management changes and to help formulate management objectives and practices to address specific issues.

The field workbook can be used at three levels:

- **Awareness.** Basic training will better "tune your eye" to the elements of range health, so that you can recognize general health impacts on the land.
- **Rapid Assessment.** With study and repeated field training, you can utilize the rapid assessment method provided in this field workbook.
- **Range Inventory.** With expert training and vegetation inventory methods and field forms (available from Alberta Sustainable Resource Development), detailed range vegetation surveys can be completed including range health assessment.

Before You Go to the Field

Range health assessment requires that you have some basic understanding about the plant communities and soils that you intend to assess. Range plant community guides provided by the Rangeland Management Branch, Public Lands Division (ASRD) are important tools in the interpretation of ecological status. Plant community type descriptions provide a standard you can compare to the plant communities on the ground. A complete list of these documents is provided in the "Range Health References" section on page 96.

Make use of all reference materials available to you including:
- Soil survey reports,
- Natural Subregion Reports
- Forest Ecosite Guides
- Lists of native plant species including invaders and noxious weeds,
- Past range inventory data and reports.

Picking the Site for Range Health Assessment?

- Map and stratify the pasture unit you wish to monitor. This will allow you to better select the sites you should sample by separating different soil and vegetation types so that more uniform areas can be selected. Avoid sampling across different vegetation types (e.g. native grassland to tame pasture). Assessment areas should be representative of the dominant plant communities you are concerned about in the pasture. Keep your assessment reflective of one management regime or grazing unit.

- Consider the purpose of where you may sample. Do you want to select a portion of the pasture that is representative of the average for the management unit, or, are you wanting to select a "hot" spot where problems are apparent, which you want to monitor over time?

- If you are in a riparian area, use one of the riparian health assessment guides listed on page 96.

- The assessment area should be representative of the dominant plant communities you are concerned about in the pasture.

- Variability is normal on rangelands. No matter how hard you try to assess within like areas, you will find variation in the assessment parameters and other factors such as grazing pressure present and past. Don't worry about this. What is important is that your assessment captures and be representative of this variation.

- If the pasture has a significant, uneven distribution of weeds or woody regrowth, you may want to consider dividing the pasture into smaller sample areas.

When Should I Rate Range Health?

When plants can be readily identified. Common health assessment windows for native grasslands and tame pastures:

- In the Grassland Natural Region - mid-June to late July
- In the Boreal Forest and Rocky Mountain Natural Regions - July and August.

- Wetter or drier years will require that you modify assessment windows.
- If you are interested in total current annual forage production, this is best measured towards the end of the growing season and before weathering and/or frosts, commonly late July or early August.
- Repeated assessments over a series of years should be done at similar seasons and grazing conditions.

How much time does an assessment take?

- In the training phase, it may take 45 min to an hour to complete a range health assessment at a single site.
- With experience and the necessary reference materials, health assessments can be completed in 15 to 20 minutes.

Using the Range Health Worksheet

Three types of field worksheets are found at the back of this workbook:

- **Native or Modified Grassland** (page 79),
- **Native or Modified Forest** (page 81) or
- **Tame Pasture** (page 83).

Worksheets allow you to record the date and location of your assessment including GPS coordinates. You can estimate range health around a single point, over a fixed distance between two points (termed a transect) or you can average range health over a polygon (a unit of landscape like a soil or vegetation type). Carefully document and describe the area you have sampled for future reference. Space is provided to list major grasses, forbs, shrubs and trees and estimate canopy cover of the dominant species. Plant species abundance will help you to identify the plant community. Other methods and tools for detailed vegetation inventories are available from the Rangeland Management Branch (last page of workbook)

Photographs and Record Keeping

Consider taking photographs representative of the area for range

health assessment. Better yet, locate a permanent location for recording the picture and for future photographs each time you repeat the range health assessment. Over time you will have a visual record to go along with your written information. As always, it is important to keep good records and keep them organized. In addition to range health, please consider keeping rotation pasture records (See page 96 Grazing Record Booklet by Alberta Sustainable Resource Development).

A Few Words of Caution

As with any field workbook, this is just a guide that must be used with good judgment. A complex mosaic of community types will require that you subdivide your sampling area into smaller units. In addition, you may choose to make written comments to further support the differences. In some cases, a particular question may not fit the observation area. If so you must decide whether or not to include this question in the range health score. If something does not make sense to you, ask more questions and think things over before proceeding. We are interested in your feedback as well. This workbook will improve with your questions and comments. It will be an ongoing process as we strive to make a new method work in a complex world.

What is my next step?

Determine what kind of pasture you are observing. Is it native grassland, forest or tame pasture? Go to the appropriate chapter and work through health assessment questions.

RANGE HEALTH HINTS

A Tool For Training Your Eye to Rangeland Health

Using The Range Health Guide

- ✔ **Awareness. Basic training will better "tune your eye" to the elements of range health.**
- ✔ **Rapid Assessment. With study and repeated field training, you can effectively utilize the rapid assessment method.**
- ✔ **Range Inventory. With expert training, vegetation inventory methods and field forms, detailed range vegetation surveys and range health assessments can be completed.**

INSTRUCTIONS AND CODES

Before you proceed with grassland health assessment, review the previous chapter including the sections on the *Indicators of Range Health* and *Getting Started*. Also note the field worksheet on page 79 for recording the health assessment information and comments.

Question 1. Integrity and Ecological Status

What kind of plants are on the site?
What is the plant community?

Plant species composition is the key indicator of grassland health. It strongly influences a sites ability to perform important ecological functions and to provide products and services. In grassland communities, a few key grass species normally provide most of the biomass and indicate ecological status. Key stages of plant succession are based on the dominant plant species. These stages are called "seral stages" and they reflect the amount of disturbance to the plant community. With practice, you can use seral stages to recognize ecological status.

Traverse the map unit or polygon of interest and estimate plant species composition. Use available reference materials including: plant community guides, benchmark data and eco-site guides that describe potential natural communities and successional pathways.

If the plant community is a native grassland, answer **Question 1 A**. If the **integrity** of the native plant community has been lost and species are mostly non-native (greater than 70% of composition is of non-native species), the plant community is **modified** answer **Question 1 B**.

Questions 1 A
The plant community is a NATIVE GRASSLAND:

What is the ecological status of the native grassland plant community?

Scoring:

24 = The plant community closely resembles the reference plant community for the site and alteration of the plant community due to grazing or other disturbances is minimal.

Example 1 Dry Mixed Grass: Needle-and-thread - Northern wheatgrass - Thread-leaved sedge
Example 2 Foothills Fescue Grassland: Rough fescue - Parry oatgrass - Idaho fescue
Example 3 Peace River grasslands: Western porcupine grass - Green needle grass - Northern wheat grass

16 = Compared to the reference plant community, the plant community shows minor alteration, due to grazing or other disturbances. Grazing impact is light to moderate.

Example 1 Dry Mixed Grass: Needle-and-thread/Blue grama
Example 2 Foothills Fescue Grassland: Parry oatgrass - Rough fescue and minor amount of non-native invaders like Kentucky bluegrass
Example 3 Peace River Grasslands: Northern wheat grass - Western porcupine grass - June grass

8 = Compared to the reference plant community, the plant community shows moderate alteration, due to grazing or other disturbances, compared to the reference plant community for the site. Grazing impact is moderate to heavy.

Example 1 Dry Mixed Grass: Blue grama - Needle-and-thread
Example 2 Foothills Fescue Grassland: non-native invaders form a significant component of the community, but native plant species are still present
Example 3 Peace River Grasslands: June Grass – Sedge - Northern wheat grass

0 = Compared to the reference plant community, the plant community shows significant alterations, due to grazing or other disturbances, compared to the reference plant community for the site. Grazing impact is heavy to very heavy. If the grassland community you are evaluating is within the Montane, Lower Foothills, Upper Foothills, Foothills Fescue, Foothills Parkland, Central Parkland or Boreal Mixedwood natural subregions and is significantly invaded by non-native species (>70% are non-native) the plant community is **modified** and your should, go to question **1 B**.

Example 1 Dry Mixed Grass: Blue grama - June grass - forb
Example 2 Foothills Fescue Grassland: non-native species dominate the community
Example 3 Peace River Grasslands: Sedge - June grass - forb

Scoring Notes – Question 1 A

- For grassland plant communities, the reference plant community (RPC) is the potential natural community for the site under light grazing disturbance.
- The RPC in grasslands is not assumed to be those grassland plant communities that develop under prolonged periods of rest since the natural system evolved under cyclic disturbances especially fire and grazing.
- In many grassland plant communities, prolonged rest allows a few competitive grass species to become dominant and to shade out other grasses and forbs that are normally important in the plant community.

Question 1 B
The plant community is a MODIFIED GRASSLAND

Percent desirable species of modified grassland community?

This question reflects the need to identify those grassland communities that have been modified to non-native species due to human and/or naturally caused disturbances. Recent data has shown that many native grasslands, once modified, are not likely to change back to a native plant community regardless of management changes. This is particularly true of grasslands in the Montane, Lower Foothills, Upper Foothills, Foothills Fescue, Foothills Parkland, Central Parkland or Boreal Mixedwood natural subregions. For modified grasslands, the objective is to manage the plant community for it's modified grazing potential and prevent bare soil, erosion, undesirable forage species and weedy species. Use the scoring system provided in Question 1 B. Should the plant

community recover to less than 70% non-native plant species, use the scoring system in Question 1 A.

Scoring:

9 = Site is dominated by desirable and productive non-native species. Palatable plants, vigorous with tall stems, large healthy leaves and reproductive as evidenced by seed stalks
Example: Smooth brome - Timothy

5 = Site is mixture of desirable/productive and weedy/disturbance-induced non-native species. Productivity is reduced due to the abundance of lower value species. Palatable plants showing evidence of reduced vigor with shorter stems, smaller leaves and seed heads. Less palatable plants generally vigorous.
Example: Kentucky bluegrass – Timothy - Clover

0 = Site is dominated by weedy and disturbance-induced non-native species. Palatable plants weak, with short stems and leaves and very few to no seed stalks evidenced across site. Less palatable plants also showing signs of reduced vigor from increased use.
Example Dandelion - Plantain

Scoring Notes – Question 1 B

- We anticipate that further field studies will allow us to better understand the successional dynamics of modified plant communities. This coarse filter approach may be replaced with specific directions on how to score these communities with plant community guides.

- To function well, modified grasslands must be dominated by desirable species with all other health parameters receiving top health scores. A healthy modified plant community is not equal in ecological function to a healthy native plant community. A healthy score for a modified plant community simply recognizes that despite changes in the plant communities integrity, the site is being managed as well as can be expected based on current knowledge.

Question 2.0 Plant Community Structure

Are the expected plant layers present?

Native grasslands normally have a diversity of plant species that vary in size, height and rooting depth. This characteristic of plants to grow in different "layers" is called structure. When plants occupy different layers, they are able to use sunlight, water and nutrients from different zones in the vegetation canopy and soil profile. This provides for efficient nutrient cycling and energy flow, supporting forage production and important habitats for wildlife.

Structural layers in grasslands include: 1) low shrubs, 2) tall graminoids and forbs 3) medium graminoids and forbs and 4) ground cover (graminoids, forbs, moss, lichen). **Always rate life form layers relative to the reference plant community (see Fig. 1).**

Scoring:

6 = The life form layers closely resemble the reference plant community.
4 = Compared to the reference plant community, one life form layer is absent or significantly reduced.
2 = Compared to the reference plant community, two life form layers are absent or significantly reduced.
0 = Compared to the reference plant community, three life form layers are absent or significantly reduced.

Scoring Notes Question 2

- Use canopy cover of major life form layers from range plant community guides to answer this question. Review benchmark data, plant community guides, photographs or adjoining lightly or ungrazed areas to gain an understanding of expected plant layers. Where possible, compare the unit to a benchmark on a similar site in the area. Keep notes of the variety of species, life forms and age classes as you move across the unit and compare to the available data.
- In both native and modified plant communities, determine the normal life form layers expressed in the reference plant

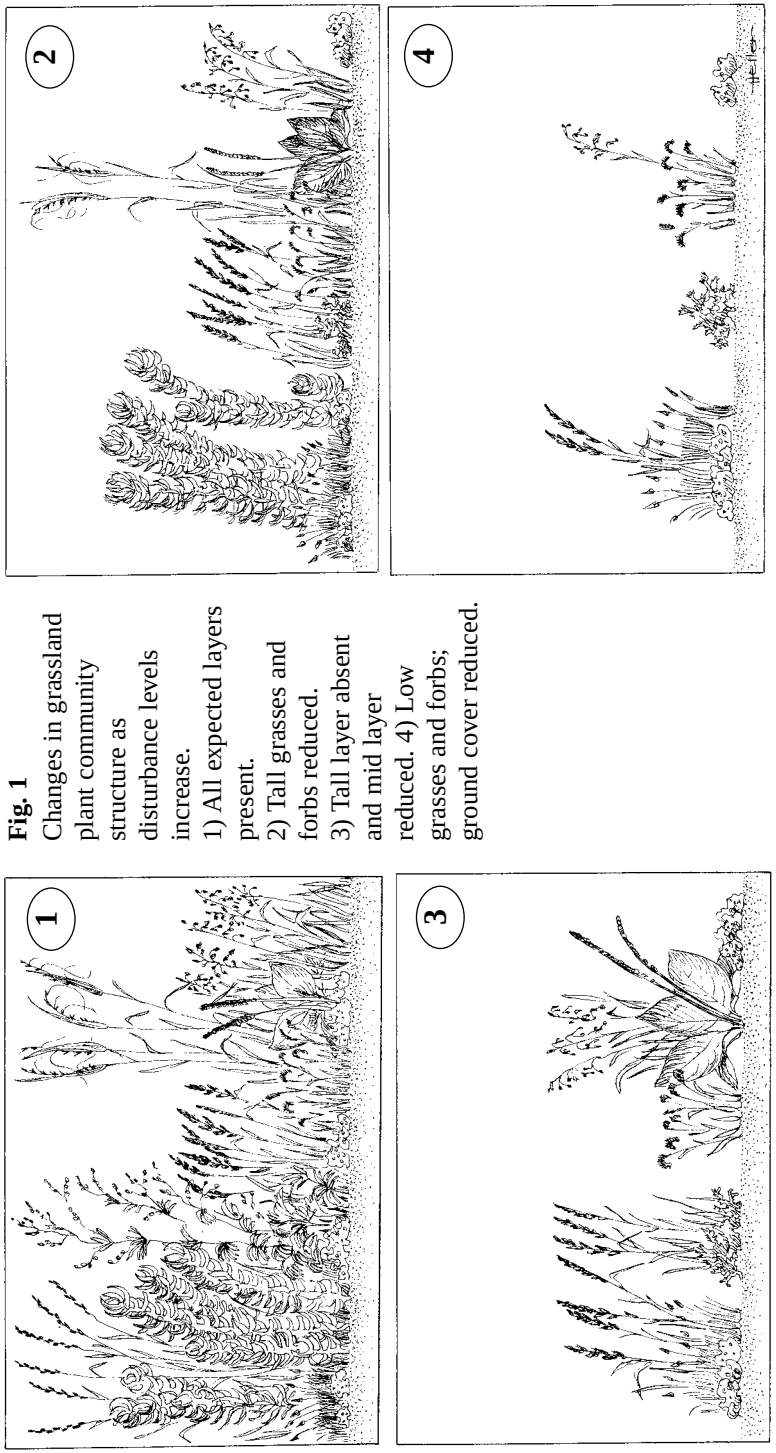
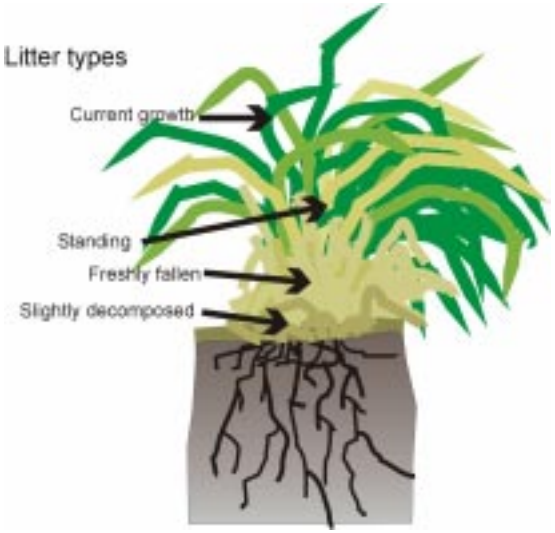


Fig. 1
Changes in grassland plant community structure as disturbance levels increase.
1) All expected layers present.
2) Tall grasses and forbs reduced.
3) Tall layer absent and mid layer reduced. 4) Low grasses and forbs; ground cover reduced.

community and look for these layers, not the species (e.g. A modified plant community, where the RPC was Rough Fescue-Parry oatgrass, now dominated by a vigorous stand of Timothy and Brome, still has a tall graminoid layer and would get full marks for this layer).

- "Significantly reduced" implies that the structural layer is reduced by more than 50% compared to the reference plant community.
- If two structural layers show moderate reduction (25 to 50%), then reduce the score by one category.
- If you think a structural layer is reduced, look to see if it is under stress (e.g. low shrubs with heavy browsing use of the 2nd year and older wood).
- If you are unsure how many structural layers should be present, check for grazing impact on the plants, especially shrubs. Browsing of generally unpalatable shrubs such as snowberry and sagebrush usually indicates more desirable shrubs have been reduced or eliminated by grazing or browsing.
- Note that moss and lichens are important diagnostic layers. These layers can be reduced by trampling (hoof impact), recreation or excessive shading (non-use with heavy litter build up).
- When a natural disturbance removes a life form layer, note the missing layer in the comments section and the likely cause (e.g. insect damage, drought, fire, decadence), but don't downgrade the score.
- Shrubland communities are commonly found between the grassland and forest plant communities in parkland landscapes. Evaluate these transition plant communities on their own unique characteristics because their presence may be part of normal successional processes and may not relate to grazing impacts on site. Consult available range plant community guides to see how they fit into succession.
- Site management goals may require that you manage for lower structural scores:
  - maintenance of the ratio of grassland:shrub:forest cover in parkland,
  - maintenance of patch diversity for prairie breeding birds and other wildlife - grazing practices adapted to reducing taller layers on a portion of the landscape,

- manipulation of woody cover adjoining certain riparian area.



Question 3.0 Hydrologic Function and Nutrient Cycling

Does the site retain moisture?
Is the expected amount of litter present?

In grasslands, litter acts as a physical barrier to heat and water flow at the soil surface. Litter conserves scarce moisture by reducing evaporation, improving infiltration and cooling the soil surface.

This question evaluates the ability of a site to retain scarce moisture based on amounts of organic residue. Litter weight (lb./ac.) estimates are made in representative areas and compared to "litter normals" that are appropriate to the site being evaluated. Litter is sampled from a number of representative areas by hand raking from a .25 m^2 area or plot frame. Figure 2 provides litter normals for a broad range of natural subregions and range site types. Litter normals are developed from long-term benchmark monitoring of healthy and productive sites under light to moderate grazing. Litter includes ungrazed residue from previous years growth including standing stems, fallen stems and leaf material, and partially decomposed material. Estimate litter across the entire unit. Your reference should be light to moderately grazed range with enough litter to retain moisture. Look at the distribution, evenness

and patchiness of litter across the site.

Scoring:

15 = Litter amounts are more or less uniform across site and include standing dead plant material, fallen dead plant material and variably decomposed material on the soil surface. Litter standing crop (lb./ac.) is in the range of 65 to 100% of expected levels under moderate grazing levels.

8 = Litter amounts appear slightly to moderately reduced and are somewhat patchy across the site. The standing dead plant material is less frequent in distribution with fallen dead plant material and variably decomposed material on the soil surface being the dominant litter types. Litter standing crop (lb./ac.) is in the range of 35 to 65% of expected levels under moderate grazing levels.

0 = Litter amounts appear greatly reduced or absent. The extent and distribution of exposed soil has increased. There is little or no standing or fallen litter. Decomposing material on the soil surface is the main type of litter. The distribution of litter is fragmented across the site. Litter standing crop (lb./ac.) is in the range of less than 35% of levels expected under moderate grazing levels.

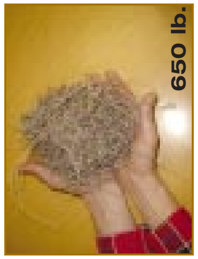
<u>Scoring Notes – Question 3.1</u>

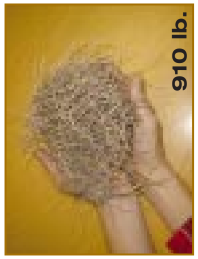
- In the grassland natural region, litter reserves are closely linked to forage yield. The extra effort it takes to estimate litter levels provides a strong prediction of the sites ability to retain moisture.
- Another option for learning to measure litter amounts is by collecting litter and making your own litter bags. You can then compare these bags to the area being scored for litter. Hand rake litter from a .25 m^2 frame, oven dry it and weigh it into kg/ha (grams x 1.12) or lbs./acre (grams x 35.6). Obtain a variety of bags that represent the thresholds of the RPC found in litter normals Figure 2.
- Examples of sample weights and corresponding lb./ac. value: (Sample 1 25.5 gms = 910 lb./ac., Sample 2 21.8 gms = 780

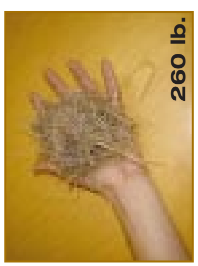
Rangeland Health Assessment Litter Thresholds (lb/ac)

Natural Subregion (Soil Zone)	Range Sites	Healthy (Base value and>65%) Average	Healthy (65%)	Health but with Problems (65%-35%)	Unhealthy (<35)
Aspen Parkland (Black)	Loamy	1500	(>975)	975 - 525	<525
	Sandy	1100	(>715)	715 - 385	<385
	Sands	800	(>520)	520 - 280	<280
	Choppy sandhills	400	(>260)	260 - 140	<140
Foothills Fescue, Foothills Parkland and Montane (Black)	Thick Black Loamy	1400	(>910)	910 - 490	< 490
	Orthic Black Loamy	1200	(>780)	780 - 420	< 420
	Shallow-to Gravel and Limy	1000	(>650)	650 - 350	<350
	Thin Breaks	500	(>325)	325 - 210	<175
Mixed Grass (Dark Brown)	Loamy (>1100 m*)	900	(>585)	585 - 315	<315
	Loamy (<1100 m*) + Limited	600	(>390)	390 - 210	<210
	Thin Breaks	300	(>195)	195 - 105	<105
Dry Mixed Grass (Brown)	Loamy	400	(>260)	260 - 140	<140
	Blowout	250	(>160)	160 - 85	<85
	Thin Breaks	150	(>95)	95 - 50	<50

*Elevation > means greater than







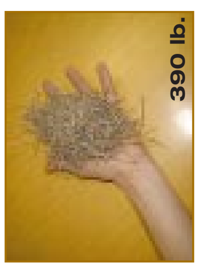


Fig. 2 Litter thresholds for native grassland communities.

lb./ac., Sample 3 18.2 gms = 650 lb./ac., Sample 4 16.4 gms = 585 lb./ac., Sample 5 10.9 gms = 390 lb./ac., Sample 6 7.3 gms = 260 lb./ac., Sample 7 4.5 gms = 160 lb./ac.).

- These values represent most of the key litter threshold values listed in figure 2.
- When rating range health practice hand raking litter from representative areas (from .25 m^2 frames; 50 cm x 50 cm or 18 inches by 18 inches) and then make comparisons to the standards found in the ziplock litter samples or the pictures in figure 2.
- When raking litter don't include in the sample, any herbage that grew in the current year. Only include the standing stems that readily rake into your hand.
- Compared to native plant communities, modified communities produce less forage during dry periods. Litter on modified sites is more subject to loss from weathering processes. As a result, modified sites may not be capable of sustaining litter reserves at the threshold level for healthy moisture holding capacity.

Question 4.0 Site Stability

Is the site subject to accelerated erosion?
Is there human-caused bare ground?

To estimate "human-caused" bare ground and recognize accelerated erosion, you need to know what normal soil exposure and erosion processes are like for your site. Most sites in Alberta have continuous ground cover. If the ecological site is normally unstable, then you must look for human-caused erosion over and above normal or geologic rates. Early or initial erosion may require close observation by getting down close to the ground and looking under green live plant cover to see if there is any movement of light surface material (litter or soil). Look for evidence of erosion on any slope as deposition of soil particles at the bottom of slopes.

Use benchmark data or field guides applicable to the site to determine if it is naturally unstable or if the extent of bare ground is within the normal range for the site. Reduced live plant and litter cover from excessive disturbance can lead to erosion. Indicators of a heavy to very heavy grazing regime include abundant manure, hoof tracks and plant pedastalling (Fig. 3). Slopes may show signs

of hoof shearing and soil exposure from higher stock or wildlife trampling.

Is the site being observed normally stable or unstable, check below?

Site normally stable: ☐ Site normally unstable: ☐

Scoring:

Question 4.1
Evidence of site instability (accelerated erosion, see Fig. 3).

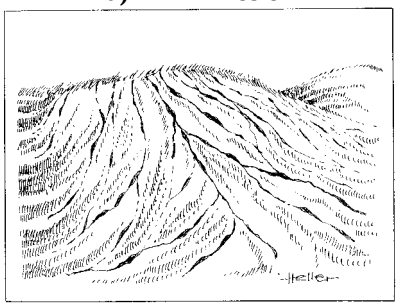
6 = No sign of soil movement, deposition of soil/litter, plant pedestalling, coarse sand or aggregate remnants, flow patterns and/or scouring, or hoof sheering beyond the natural extent for the site.

4 = Some evidence of slight soil movement or deposition of soil/litter, plant pedestalling, coarse sand or aggregate remnants, flow patterns and/or scouring, that is human-caused and beyond the natural extent for the site. Old erosion features may be stable and vegetated. Flow patterns may be short and shallow. Extent of exposed soil is only slightly greater than expected for the site.

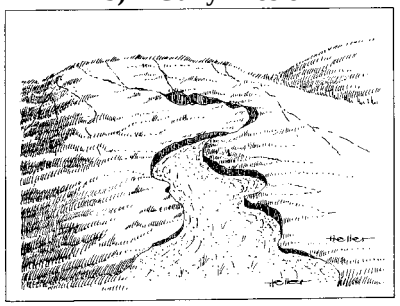
2 = Moderate amounts of soil movement or deposition of soil/litter, plant pedestaling, flow patterns and/or scouring is visible across site. Erosion features are active but limited to the site with no off-site movement of material. Flow patterns have a well-defined branching pattern. The extent of exposed soil is obviously greater than expected for the site but vegetation (live plants and litter) still protects most of the site. Signs of hoof sheering may be evident in localized patches.

0 = Extreme amounts of soil movement with material being carried off site. Flow patterns are obvious and fan deposits may be present. Rills are abundant and deep. Gullies are deep with sharp edges. Erosion features are active. Pedestalled plants with exposed roots and rocks exposed or sitting on the surface. Hoof sheering may be common across the site, beyond localized patches. Evidence of instability.

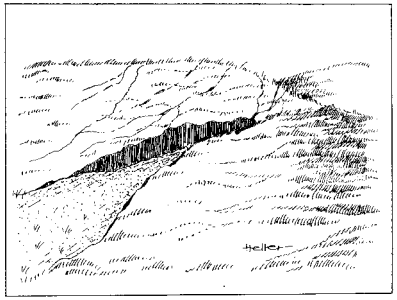
a) Rill Erosion



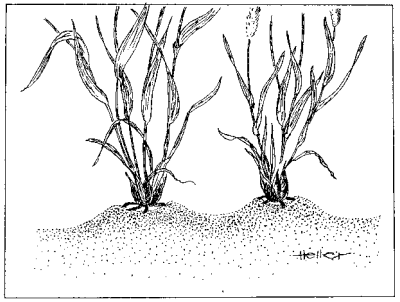
b) Gully Erosion



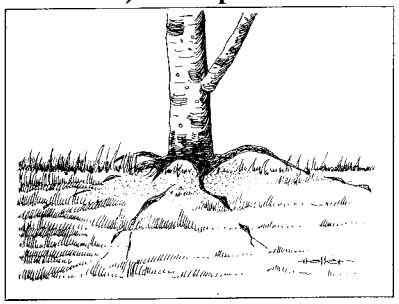
c) Gully Erosion



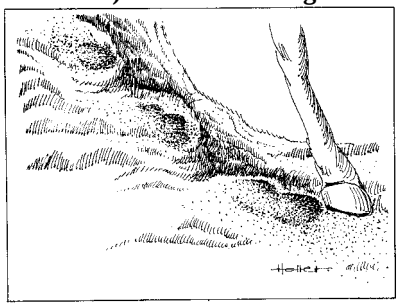
d) Pedastalling



e) Compaction



f) Hoof Shearing



g) Trailing

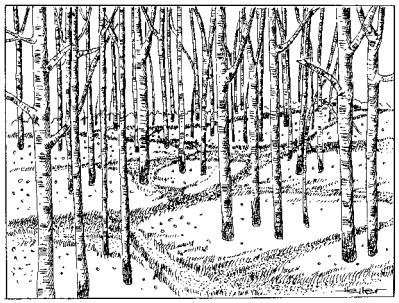
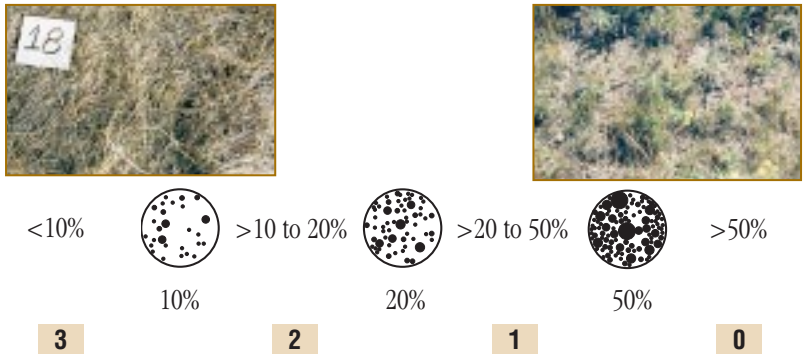


Fig. 3 Examples of soil erosion, compaction, hoof shearing and trailing.

Fig. 4 Increase in human-caused bare soil as disturbance levels increase.



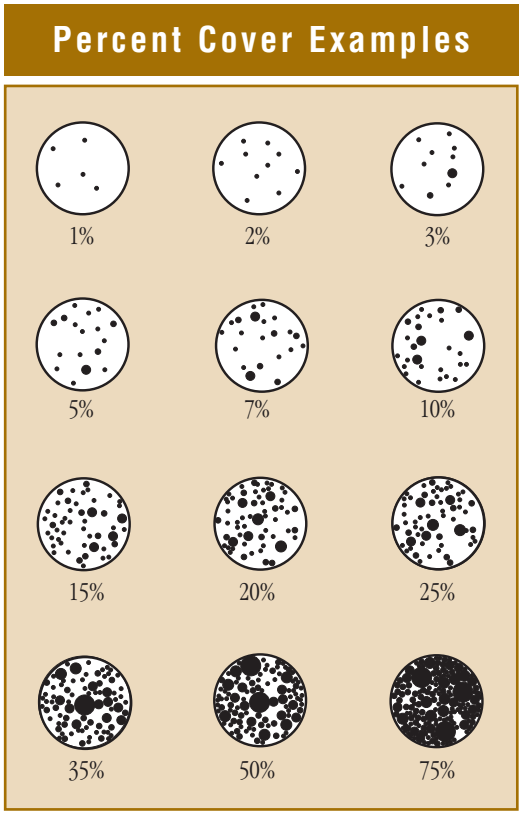


Fig. 5 This graphic helps to develop a mental picture of the percent cover of bare soil or vegetation canopy. It will appear a number of times in this workbook for easy reference.

Question 4.2 Percent increase in human-caused bare soil (see Fig. 4 & 5)

3 = 10% or less of exposed soil is human-caused.
2 = greater than 10 and up to 20% of exposed soil is human-caused.
1 = greater than 20 and up to 50% of exposed soil is human-caused.
0 = greater than 50% of exposed soil is human-caused.

Scoring Notes – Question 4.2

General Scoring Comments

- The check box allows you to recognize the significance of hazards associated with increased soil exposure on normally stable sites.
- To estimate human-caused bare soil, first estimate total bare soil, subtract the amount considered to be expected or naturally occurring. The difference will be considered human-caused bare soil. Report this amount on the field sheet. Take time to record moss and lichen cover as well as this layer helps stabilize the site.
- Range plant community guides provide soil exposure standards for judging the "human-caused" portion.
- This question focuses on increased soil exposure and the increased potential for soil erosion on range sites that are normally stable and less of a concern where ongoing soil loss is a natural process.

Rodent Burrowing and Bare Soil

- On healthy sites, rodent burrowing activity is normally limited in its extent and impact on the amount of bare soil.
- Bare soil from rodent burrows tends to increase on modified and heavily grazed sites.
- Ground squirrel and pocket gopher activity increases in response to foraging opportunities associated with introduced and weedy species, especially tap-rooted forbs like dandelion.
- Therefore on modified and heavily grazed sites, a significant portion of the bare soil from rodent burrows should be considered human-caused.

Livestock and Wildlife Impacts on Bare Soil

- Large numbers of elk and deer may increase bare soil on preferred range sites.
- Winter ranges may be especially prone to hoof shear resulting in increased bare soil.
- When wildlife impacts result in increased soil exposure, treat it as human-caused and note the source of the impact in the comment section.

Question 5.0 Noxious Weeds

Are noxious weeds present?
Infestation of the polygon with noxious weeds.

This question considers the degree of infestation of the site. Infestation is a function of weed plant density and patchiness or evenness over the monitoring area. All noxious weeds are considered collectively, not individually. Use a weed list that is standard for the locality and indicate which species are included (see the suggested weed list on page 100). Record on the worksheet the species and density distribution of all noxious weeds observed as you move across the site.

Scoring:

Question 5.1 Canopy Cover of Noxious Weeds (see Fig. 5)

3 = No noxious weeds present.

2 = Noxious weeds present with a total canopy cover less than 1%

1 = Noxious weeds present with a total canopy cover between 1 and 15%

0 = Noxious weeds present with a total canopy cover of less than 15%

Question 5.2 Density Distribution of Noxious Weeds (see Fig. 6)

3 = No noxious weeds on the site (see Scoring Notes)
2 = Noxious weeds are present at a low level of infestation. (density distribution 1, 2, 3)
1 = Noxious weeds are present at a moderate level of infestation. (density distribution 4, 5, 6, 7)
0 = Noxious weeds are present at a heavy level of infestation. (density distribution 8, 9, 10, 11, 12)

Scoring Notes – Question 5.0

- The canopy cover and density distribution of noxious weeds in the pasture can provide clues as to the health and function of the pasture. Noxious weeds commonly establish where disturbance has increased open ground and available moisture.
- Variations in weed infestation can be averaged across the site. Your observation is a cumulative evaluation of all the noxious weed species present. You can record specific canopy cover and density distribution of specific weed species in the comment section in the field worksheet.
- The density and distribution of dots in figure 6 relates to the density and distribution of weeds in the sampling area (polygon). Point ratings decline as infestation increases and rating values are on the right margin of the figure.
- Include noxious and restricted weed species defined in the Weed Act (see suggested list of weed species on page 100). Use a weed list that is standard for the community (i.e. your County or Municipal District).
- **Do not** rate nuisance weeds or disturbance species in this question (e.g. dandelion, strawberry, plantain, yarrow).
- If the pasture has a significant, uneven distribution of weeds, you may want to divide the pasture into smaller sample areas.

Fig. 6 Density distribution guide for rating weed infestation.

Density Distribution

Class	Description of abundance in polygon	Distribution	Weeds Score
0	None		3
1	Rare		2
2	A few sporadically occurring individual plants		
3	A single patch		
4	A single patch plus a few sporadically occurring plants		1
5	Several sporadically occurring plants		
6	A single patch plus several sporadically occurring plants		
7	A few patches		
8	A few patches plus several sporadically occurring plants		0
9	Several well spaced patches		
10	Continuous uniform occurrences of well spaced plants		
11	Continuous occurrence of plants with a few gaps in the distribution		
12	Continuous dense occurrence of plants		

INSTRUCTIONS AND CODES

Before you proceed with the forest health assessment, be sure you have reviewed the first chapter including the sections on the *Indicators of Range Health* and *Getting Started*. Also note the field worksheet on page 81 to record dominant plant species, associated cover values, for recording your scores for each of the range health parameters and making specific comments.

1. Integrity and Ecological Status

What kinds of plants are on the site?
What is the plant community?

This parameter considers species composition of the plant community.

- Plant species composition is a key indicator of forest health.
- Plant species influence a site's ability to provide forage.
- Shrubs, forbs and grasses provide a diversity of forage and nutrient values.
- Changes to plant species composition can reduce forage production and management flexibility.
- Management goal is to maintain the production potential of the plant community at the level produced under a light to moderate grazing regime. The plant community should resemble its potential or the reference plant community for the site and forest successional stage.
- As grazing pressure increases from light to moderate to heavy and very heavy, there is a change in the understory species composition.

If the plant community is a native forest, answer **Question 1 A**. If the **integrity** of the native plant community has been lost and species are mostly non-native, the plant community is termed modified (greater than 70% of composition is of non-native species), answer **Question 1 B**.

Question 1 A The plant community is a NATIVE FOREST

What is the ecological status of the native forest community?

Scoring:

18 = Observed plant community resembles the reference plant community. Grazing regime is light to moderate.
Example Aspen-Rose-Tall Forb

12 = Observed plant community changes are minor and representative of a moderate grazing regime.
Example Aspen-Rose-Low Forb

6 = Observed plant community changes are representative of a heavy grazing regime.
Example Aspen-Rose-Clover

0 = Significant changes are present and representative of a very heavy grazing regime.
Example Aspen-Kentucky bluegrass-Dandelion

Scoring Notes Question 1A:

- In some cases the changes in plant community can be the result of the natural maturity of the forest understory. As a sapling poplar stand matures, it shifts along the successional pathway towards a mixed poplar stand and finally a coniferous stand. This takes many years and for our purposes if the aspen stand is 20 to 60 years of age, consider the natural succession influence minor. Our objective is to score the changes caused by grazing.

- If the score is 0, you may wish to consider if the plant community is a modified forest plant community? If so, go to Question 1B.

QUESTION 1 B
The forest plant community is a MODIFIED FOREST
Percent desirable species of the modified forest community?

A modified forest is a forest where more than 70% of its understory species are non-native. When a forest plant community has been grazed at heavy to very heavy stocking rates over a prolonged period, the plant community may look very different from its potential. For example, a normally waist high Aspen-Rose-Tall Forb stand may be changed to an ankle high stand of Aspen-Kentucky Bluegrass-Dandelion.

We are unsure if we can restore a modified forest plant community to its potential as found in Question 1A. It is important to manage for its non-native forage potential while preventing weed and erosion problems.

Scoring:

9 = greater than 70% of the understory is productive non-native forage species such as brome, timothy, Kentucky bluegrass.

5 = greater than 70% of the understory is non-native forage species. Weedy and disturbance-induced species like strawberry, dandelion, and clover are present.

0 = greater than 70% of the understory is non-native forage species. Site is dominated by weedy and disturbance-induced species, and noxious weeds like Canada thistle.

Question 2.0 Plant Community Structure

Are the expected plant layers present?
Are there any changes in forest plant community structure?

Forest plant communities are biologically diverse with a variety of woody, broad-leaved and grass species present. Commonly, shrubs and forbs dominate. The characteristic growth of plants in different "layers" is termed structure. When plants occupy different layers, they are able to use sunlight, water and nutrients from different zones in the vegetation canopy and soil. This diversity supports optimum grazing values for livestock and provides diverse habitats for many wildlife species, and other uses and values.

When rating structure, compare the grazed forest plant community

to the plant community appearance under light to moderate grazing. Structural layers in forest communities include five distinct layers:

- overstory tree layer like aspen poplar
- understory trees and a tall shrub layer (e.g. aspen, conifer regeneration, alder or willow)
- low shrubs layer (less than 3 m; e.g. rose, raspberry, low bush cranberry)
- tall forb layer (e.g. fireweed, wild sarsaparilla, cow parsnip, tall grasses)
- ground cover layer including grasses, low forbs, ground shrubs (e.g. bearberry), mosses and lichens

In combination, these five layers provide a diversity of forage species and nutrient values. Structural layers will be reduced as grazing pressure becomes heavy to very heavy. As structure declines, so do the values and benefits from the site.

Scoring:

18 = All five life form layers are present and closely resemble the reference plant community.

12 = One life form layer is absent or significantly reduced compared to the reference plant community.

6 = Two life form layers are absent or significantly reduced compared to the reference plant community.

0 = Compared to the reference plant community three life form layers are absent or significantly reduced.

Scoring Notes Question 2:

If you score 0 for this question, the plant community may be a modified forest. Double check your scoring choice to Question 1 A.

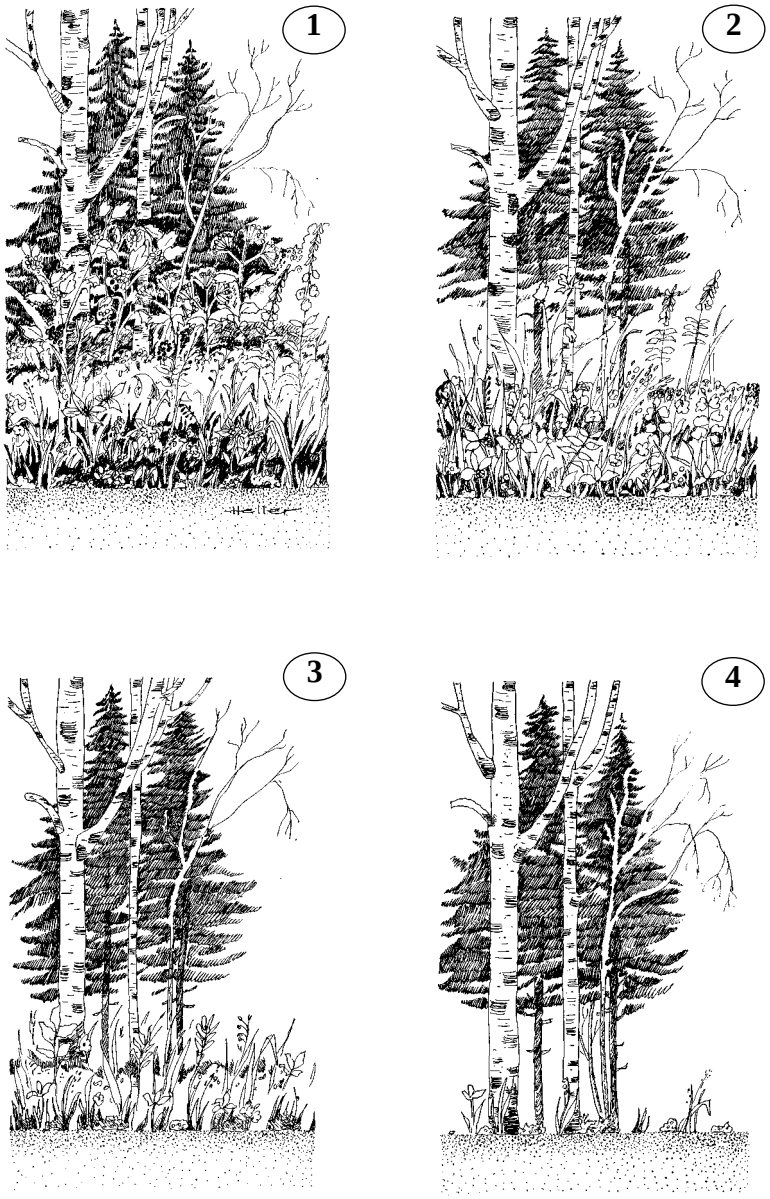


Fig. 7 Changes in forest plant community structure as disturbance increases. 1) All expected layers present. 2) Tall shrubs reduced. 3) Tall and medium shrubs eliminated. 4) Two shrub layers missing, as well as grass and tall forb layers.

Question 3. Hydrologic Function and Nutrient Cycling

What is the thickness of the Litter Layer (LFH)?

In forest plant communities, water and nutrient cycles are related to the organic layer of litter, fermenting and humified vegetation above the mineral soil (hence the name LFH). In its natural state LFH is a spongy and uncompacted layer. The thickness of the LFH varies between dry and moist sites, so some field sampling is required to determine normal thickness for your site. A healthy LFH layer performs important functions including storing and releasing energy and water, buffering erosive forces, reducing evaporation and providing nutrients for forest plants. By measuring the sponginess of LFH (compressibility and resistance) and thickness, you can obtain an indirect measurement of the health of the nutrient and water cycling processes on the site (Fig. 8). Be sure to review the LFH scoring method (page 47) and definitions before you try this procedure. **Note that "protected areas" refers to areas of the forest understory where cattle access has been limited. "Grazed" refers to representative grazed areas that are typical for the grazing regime for the site.**

Scoring:

9 = **LFH Thickness** - When measuring the LFH (knife or shovel) thickness between protected and grazed areas there is no significant difference. For average to moist sites the difference is less than 20% and for dry sites the difference is less than 30%. LFH is continuous and livestock trailing is absent to light.
LFH Compressibility - When measuring the LFH using the pencil between grazed and protected areas there is no significant difference. There is less than 20% difference in effort in the compressibility or resistance to penetration by a pencil between between protected and grazed areas.

6 = **LFH Thickness** - There is a difference in LFH thickness between protected areas and grazed areas. For average to moist sites the difference is between 20 to 30% and for dry sites the difference is between 30 to 40%. LFH is somewhat patchy due to thickness variation.
LFH Compressibility - LFH in grazed areas more compact and more difficult to squeeze; significantly more resistant to penetration (up to 50% more effort required). Some trailing and hoof damage to

LFH is noticeable in places. Protected areas and grazed areas show differences in species composition and layers. Residual plant cover and distribution is slightly to moderately reduced and patchy.

3 = **LFH Thickness** Difference in LFH thickness between protected and grazed areas is typically 30 to 40% on average for moist sites and between 40 to 50% for dry sites. LFH is clearly patchy both by measurement and by visual assessment.
LFH Compressibility LFH in grazed areas is significantly compressed and much more resistant to penetration by a pencil relative to that in protected areas (50 to 200% more effort required). Trailing and hoof shearing is common across the site. Protected areas are relatively small and isolated. Residual plant cover and distribution is greatly reduced.

0 = **LFH Thickness** Difference in LFH thickness between grazed and protected areas typically greater than 40% on average to moist sites and greater than 50% on dry sites. LFH thickness is typically less than 1.5 cm on grazed areas.
LFH Compressibility LFH compaction and resistance to penetration very high (greater than 200% more effort required, which might even break the pencil). LFH damage over a significant area by hoof action and distribution is patchy. Protected areas tend to be very small. Residual plant cover and distribution is greatly reduced.

Scoring Notes Question 3:

Methods for Estimating LFH Thickness (Fig. 8 & 9)

- You will need a knife or a shovel and a pencil for sampling LFH thickness.
- **Protected areas** refer to areas that grazing animals find difficult to utilize and therefore are likely to be ungrazed or lightly grazed and relatively untrampled (between clumps of closely spaced trees, underneath dense shrub cover, areas with considerable deadfall, areas immediately adjacent to single trees).
- **Representative Grazed areas** are any surrounding areas that are freely accessed by grazing animals. The areas you sample are representative of the grazing regime present on the site.

- The "**LFH Poke (Pencil) Test Method**" can be used to assess LFH thickness and compaction. To do this, place the eraser end of a sharp pencil (or similar object) in the middle of your palm and then, with a straight arm, push the pencil into the LFH. Gauge the resistance you feel as the pencil moves through the LFH. Thickness of the LFH can be estimated by the distance the pencil penetrates before it hits mineral soil. Generally more resistance is found where management has affected the site.
- Pick a representative area and within this area look for representative grazed and protected areas (Fig. 9). Push your pencil into the LFH at various locations to compare the ease of penetration between grazed and protected areas. For a more systematic approach, sample in a transect beginning no closer than 40 cm from a tree and moving out to grazed areas but before you come to a trail.
- If sampling after leaf fall, carefully brush away the leaves from the current year to ensure an accurate measure of LFH thickness.
- Practice the method before sampling to better perfect the "LFH Poke Test Method". You may want to do several samples to represent the variation found, for example do three protected and three similar grazed sites.
- If you need additional information to score the health and function of the LFH, consider the "LFH Shovel (or knife) Test Method". Take samples of the LFH thickness in a protected area compare them to the LFH thickness in an open, similar site. Consider taking at least three samples of each to better represent the variation found. It is very important to sample in the same moisture regime because any thickness differences may be due to natural variation. Use the measurements found here along with the "LFH Poke Test Method" to determine the score that fits best. In the Lower Foothills, indicators of dry sites are southeast and westerly aspects greater than 20% slope and/or coarse-textured, gravelly/sandy soils. Indicator species include common wild rose, blueberry, juniper, buffalo-berry, bearberry, and sometimes green alder. Forbs are sparse and hairy wild rye grass or pine grass are dominant in the southern foothills. Ecosite examples include: Aspen/buffalo berry, Aspen/green alder-hairy wild rye. For further information see ecosite field guides (Beckingham et al. 1996a; Lane et al. 2000).

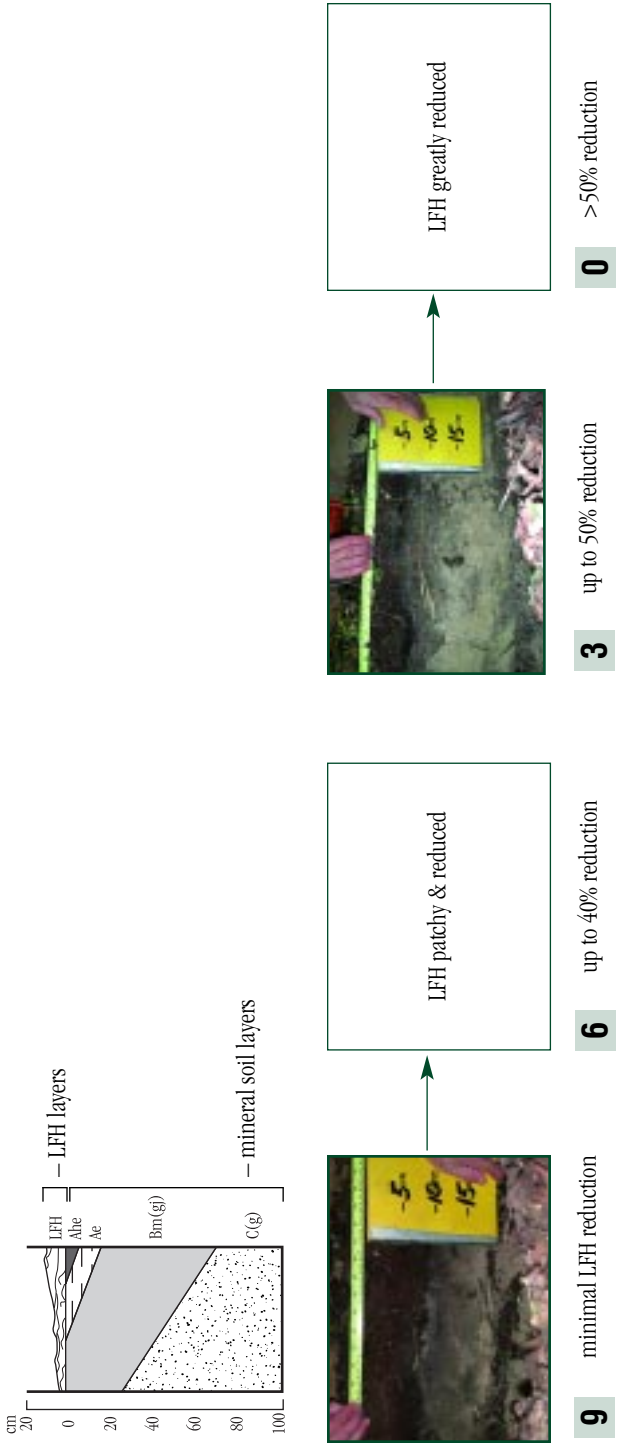


Fig. 8 Impact of increasing grazing pressure on LFH thickness.

- In the Central and Dry Mixedwood, indicators of dry sites are southeasterly to westerly aspects greater than 20% slopes and coarse-textured, gravelly/sandy soils. Indicator species include common wild rose, blueberry, Labrador tea and bearberry. Overstory stands appear open and have low shrub understory. Ecosite examples include: Aspen/blueberry-bearberry and Aspen/blueberry-Labrador tea. For further information see ecosite field guides (Beckingham et al. 1996; Willoughby 2003).
- Compared to dry sites, average to moist sites often have fine-textured parent materials (i.e. silts and clays) and are mainly on gentler slopes or where slopes are steep on easterly or northerly aspects. Plant diversity is greater and plant cover is thicker with denser layering. In the Lower Foothills, ecosite examples include Aspen/Saskatoon, Aspen/low-bush cranberry and Aspen/rose. In the Central and Dry Mixedwood ecosite examples include: Aspen/beaked willow, Balsam Poplar-Aspen/honeysuckle-fern, Aspen/forb and Aspen/beaked hazelnut. For further information see ecosite field guides (Beckingham et al. 1996b; Willoughby 2003).

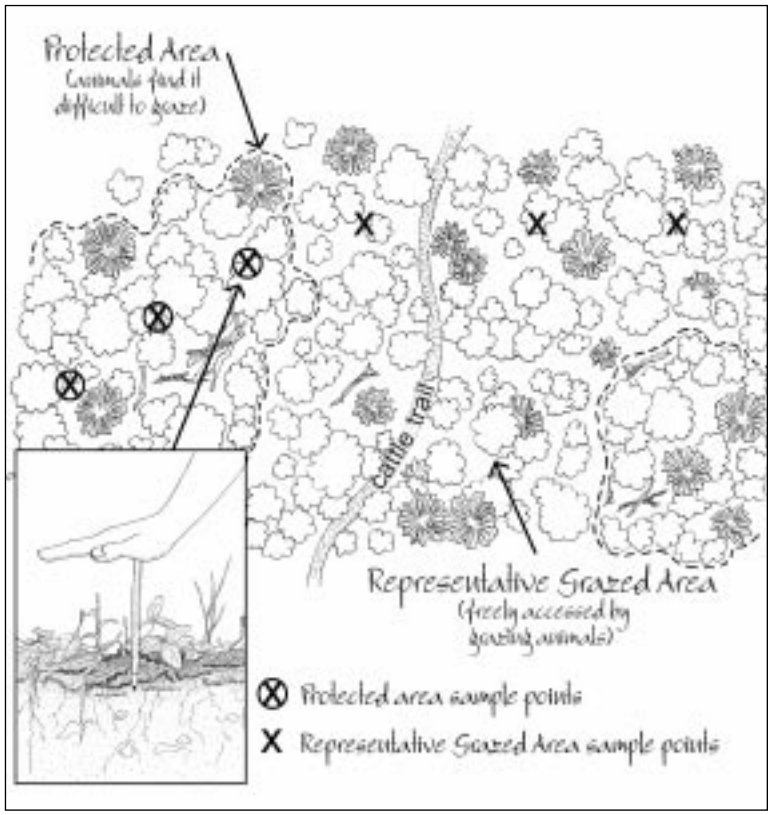


Fig. 9 Example of sample site selection in protected versus representative grazed areas for the "Poke Test".

Earth Worms

In the Lower Foothills Natural Subregion of the province you may encounter earthworms in the forest soil. If so, the above LFH thickness thresholds may not apply. How do you tell if earthworms are present?

- soil mixing altering the natural thickness of the LFH.
- earthworm casts (feces), round cylinders about 2 mm in diameter by 5 mm long may be found in clumps.
- the soil mixing provides a light and dark streaking in the soil profile, and parts of the LFH, i.e. the H part may be found below the lightly colored layers.

Question 4.0 Site Stability

Question 4.1 Is there evidence of accelerated erosion?

Accelerated erosion due to human management activities is a serious issue, leading to long-term negative impacts on the site potential. If we recognize the early signs of accelerated erosion, or increases in human-caused bare ground, we can make management changes before the situation becomes serious.

To estimate "human-caused" bare ground and recognize accelerated erosion, you need to know what normal soil erosion processes are like for a forest plant community. Before you look for human-caused erosion, be sure what the normal expectations are for the site. Sandy forest sites or steep river breaks may be naturally unstable and erodable. The majority of forest range sites in Alberta have continuous ground cover and are stable.

Is the site being observed normally stable or unstable? (check one below)

Site normally stable: ☐ Site normally unstable: ☐

Question 4.1 Evidence of site instability (accelerated erosion) (Use Fig. 10 & 11)

Scoring:

3 = No visual evidence of soil movement, deposition of soil/litter, plant pedestalling, coarse sand or aggregate remnants, hoof shear, soil compaction, flow patterns and/or scouring beyond the natural extent for the site.

2 = Some micro evidence of the above. Hoof shear may be present on micro slopes. Old erosion features may be stable and vegetated or flow patters on site short and shallow. Extent of exposed soil is only slightly greater than expected for the site.

1 = Macro evidence of moderate amounts of soil movement or deposition of the above. Erosion features are active but limited to the site with no off-site movement of material. Flow patterns have a well-defined branching pattern. The extent of exposed soil is obviously greater than expected for the site but vegetation (live plants and litter) still protects most of the site.

0 = Macro evidence of extreme amounts of soil movement with most material being carried off site. Flow patterns are obvious and fan deposits may be present. Rills are abundant and deep. Gullies are deep with sharp edges. Hoof shear is significant. Erosion features are active. Pedestalled plants with exposed roots and rocks exposed or sitting on the surface. Evidence of instability.

Question 4.2 Percent Increase in human-caused Bare Soil? (Use Fig. 12)

Scoring:

6 = 1% or less of exposed soil is human-caused

4 = between 1 to 5% of exposed soil is human-caused

2 = between 5 to 15% of exposed soil is human-caused

0 = greater than 15% of exposed soil is human-caused

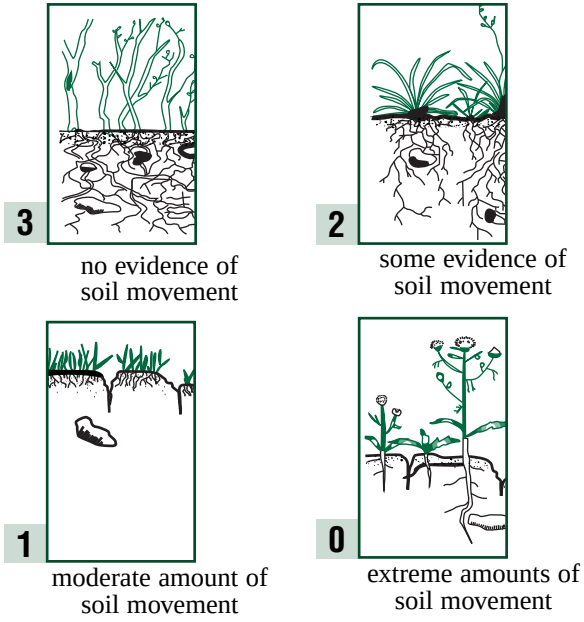
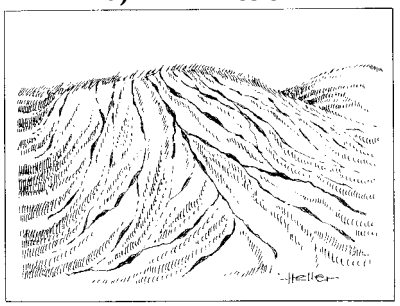


Fig. 10 Evidence of accelerated soil erosion.

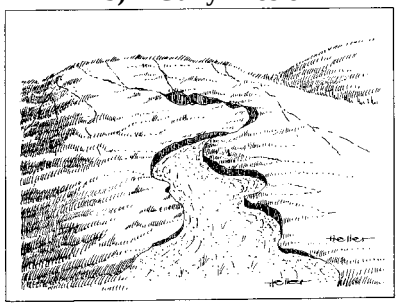
Scoring Notes Question 4:

- The check box allows you to evaluate the significance of greater hazard associated with increase soil exposure to normally stable sites.
- To estimate human-caused bare soil, first estimate total bare soil, subtract expected or naturally occurring bare soil and the difference is human-caused bare soil. Report this amount on the field sheet. Take time to record moss and lichen cover as well as this layer helps to stabilize the site.
- Include the bare soil percent found in livestock trails in human-caused portion.
- Ecological site descriptions include soil exposure standards for judging the “human-caused” portion.
- Bare soil from rodent burrows tends to increase on modified or heavily grazed sites
- Rodent activity increases when there is an increase of weedy, tap rooted species.
- On modified and heavily grazed sites, most of the bare soil from rodent burrows should be considered human-caused bare soil.

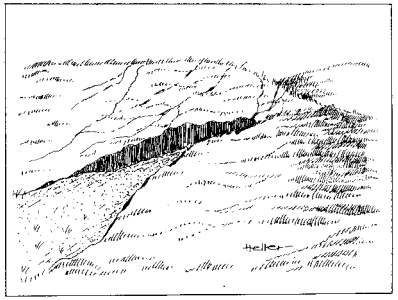
a) Rill Erosion



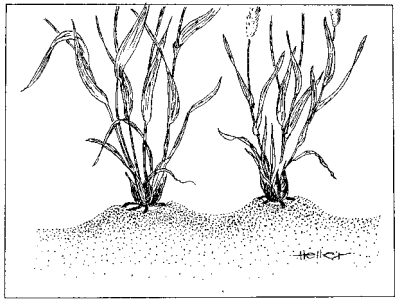
b) Gully Erosion



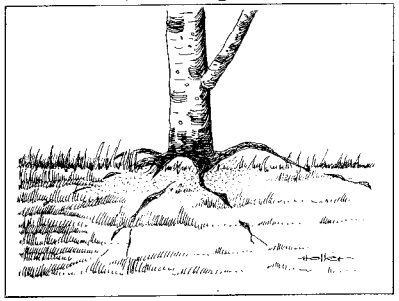
c) Gully Erosion



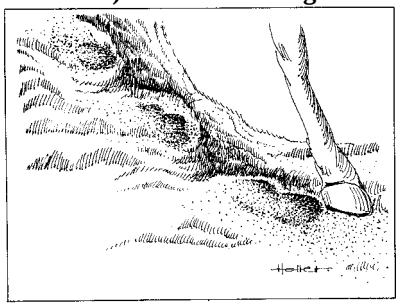
d) Pedastalling



e) Compaction



f) Hoof Shearing



g) Trailing

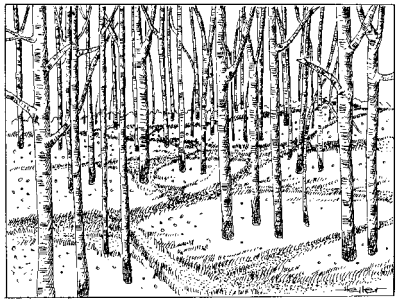


Fig. 11 Examples of soil erosion, compaction, hoof shearing and trailing.

Percent Cover Examples

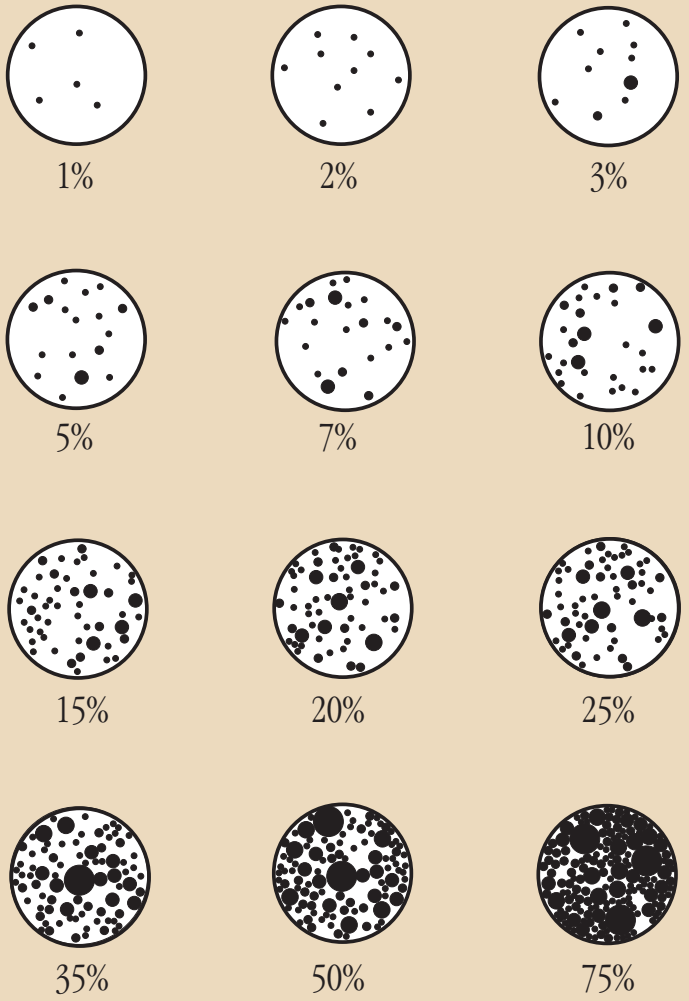


Fig. 12 This graphic helps to develop a mental picture of the percent cover of bare soil or vegetation canopy. It will appear a number of times in this workbook for easy reference.

- High ungulate use may lead to increased bare soil on their preferred ranges. Winter sites are especially prone to hoof shear resulting in increased bare soil. When wildlife impacts result in increased soil exposure, treat it as human-caused and note the source of the impact in the comments section. For earthworm activity see 51.

Question 5.0 Noxious Weeds

Are noxious weeds present on the site?
Infestation of the polygon with noxious weeds.

Noxious weeds are invasive plants that are seldom a problem in a healthy and functional plant community. Even in modified plant communities, noxious weeds are not always a problem. When the presence of noxious weeds becomes noticeable, they can have a negative impact on forage production and the many other values of forest rangeland. Detecting the presence of noxious weeds at the early stages can alert you to make changes in management practices to prevent further spread and increase costs of controlling these noxious weeds.

Question 5.1 What is the canopy cover of noxious weeds? (Use Fig. 12)

Scoring:

3 = no noxious weeds present

2 = noxious weeds present with a total canopy cover less than 1%

1 = noxious weeds present with a total canopy cover between 1 to 15%

0 = noxious weeds present with a total canopy cover of greater than 15%

Question 5.2 Noxious Weed Density Distribution Class? (Use Fig. 13)

Scoring:

3 = No noxious weeds present

2 = A low level of noxious weeds found in density distribution class range of 1, 2 or 3

1 = A moderate level of noxious weeds found in density distribution class range of 4, 5, 6 or 7

0 = A heavy level of noxious weeds found in the density distribution class range of 8, 9, 10, 11 or 12.

Scoring Notes Question 5:

- The canopy cover and density distribution of noxious weeds in the pasture can provide clues as to the health and function of the pasture. Noxious weeds commonly establish where excessive disturbance has caused an increase in open ground and available moisture.
- Variations in weed infestation can be averaged across the polygon. Your observation is a cumulative evaluation of all the noxious weed species present. You can record specific canopy cover and density distribution of specific weed species in the comment section in the field worksheet.
- The density and distribution of dots in figure 13 relates to the density and distribution of weeds in the sampling area (polygon). Scores decline as infestation increases and the values are on the right side of the figure.
- Include noxious and restricted weed species defined in the Weed Act (see suggested list of weed species on page 100). Use a weed list that is standard for the community (i.e. County or Municipal District). **Do not** rate nuisance weeds or disturbance species in this question (e.g. dandelion, strawberry, plantain, yarrow).
- If the pasture has a significant, uneven distribution of weeds, you may want to consider dividing the pasture into smaller sample areas.

Fig. 13 Density distribution guide for rating weed infestation.

Density Distribution

Class	Description of abundance in polygon	Distribution	Weeds Score
0	None		3
1	Rare		2
2	A few sporadically occurring individual plants		
3	A single patch		
4	A single patch plus a few sporadically occurring plants		1
5	Several sporadically occurring plants		
6	A single patch plus several sporadically occurring plants		
7	A few patches		
8	A few patches plus several sporadically occurring plants		0
9	Several well spaced patches		
10	Continuous uniform occurrences of well spaced plants		
11	Continuous occurrence of plants with a few gaps in the distribution		
12	Continuous dense occurrence of plants		

INSTRUCTIONS AND CODES (QUESTIONS 1-6)

Before you proceed with the tame pasture health assessment, be sure you have reviewed the first chapter including the sections on the *Indicators of Range Health* and *Getting Started*. Also check the field worksheet for tame pastures on page 83 for recording dominant plant species, associated cover values and scores for each of the tame pasture health parameters.

Question 1.0 Plant Composition

Do introduced forage plants dominate the site?

Introduced forage species include plants you seed, and can also include introduced species that come into the pasture by natural encroachment or are grazing induced (e.g. Kentucky bluegrass and clover). Desirable native species include peavine, rough fescue, hairy wild rye and wheat grasses. Disturbance induced or nuisance weedy species like dandelion and pussytoes are not considered desirable. The tame pasture plant community should resemble its reference plant community that is the introduced forage species that were seeded. For a modified pasture, with less than 50% introduced species, the reference plant community is the combination of introduced and native species that it was modified to.

Tame grasses, and in some areas legumes, are fundamental to a productive tame pasture. Maintaining these planted species is an indication of managing for optimum forage production. It is important that you the manager know what is still growing in the pasture. Sometimes, the tame pasture development method is not a traditional one like disking and seeding. Perhaps seeding and scarification has been applied to an existing native plant community or cut-block. In this situation, you can end up with a complex mixture of native and tame species. A modified tame pasture often reflects the range improvement method rather than grazing practices. An absence of either seeded forages or desirable native forage species is a good indication that the grazing regime may be

too heavy and range health is declining.
This question is judged on plant species composition of the tame pasture. If the tame pasture has 50% or greater cover from introduced forage plants, answer **Question 1 A**. If the tame pasture has less than 50% cover from introduced forage species, answer **Question 1 B.** In this case, the pasture is considered a **Modified Tame Pasture.**

Question 1 A Tame Pasture

Scoring:

8 = greater than 90% of cover is from introduced forage species

6 = 75 to 89% cover is from introduced forage species

3 = 50 to 74% cover is from introduced forage species

Question 1 B Modified Tame Pasture

Even modified tame pastures can be managed for their "modified" potential, while preventing weed and erosion problems.

Scoring:

6 = 75% or greater cover is from a mixture of desirable native species and introduced forage species (less than 50% cover is from seeded forages)

3 = 40 to 74% of the cover is from desirable native species and introduced forage species (less than 50% cover is from seeded forages)

0 = 39 % or less cover is from desirable native species and introduced forage species

Scoring Notes:

- In question 1A, introduced species are introduced forage varieties that are seeded (grasses and legumes) and those introduced species that come into the forage stand by natural means or with grazing (e.g. Kentucky bluegrass, clovers, quackgrass).
- In question IB, Do Not include woody regrowth in the scoring (see question 6).
- In question 1B, include in the scoring introduced forage species and desirable native species such as peavine, harry wild rye, rough fescue, wheatgrasses, Parry oatgrass and vetch.

Question 2. 0 Desirable Species Composition Shift?

Are there changes to the taller, more productive, and deeper-rooted species in the tame or modified tame pasture?

The seeded and native forage plants may respond differently to a particular grazing regime. Tame or modified tame pastures are most often maintained moderate stocking levels. When the grazing regime increases to heavy or very heavy grazing (i.e. regime that provides continuous heavy grazing without effective rest), plant species changes occur. With heavy grazing, alfalfa and desirable grasses with high growing points are replaced by more grazing resistant grasses with low-growing points like Kentucky bluegrass and creeping red fescue, and legumes like white Dutch clover. Changes in grazing management will be needed to favor taller, more productive forage species, which are better able to withstand droughty conditions and permit more flexible rotational grazing management. Shorter and shallow rooted species, particularly in drier areas of the Province, and during drought, can reduce grazing management options and stocking rates.

Question 2.1 Desirable Species Shift

Scoring:

8 = greater than 75% cover from tall, productive, palatable, introduced and desirable native species. Minor amounts of grazing resistent species present.

4 = 40 to 74% cover from tall, productive, palatable, introduced and desirable native species. Plants may be declining in health and

vigor. Grazing resistant species may be replacing the taller, more productive species. Shift may be due to grazing or other causes.

0 = less than 39% cover from tall, productive, palatable, introduced and desirable species. Plants may be weak and have reduced vigor. Taller, more productive species may have been largely replaced by grazing resistant species. Shift in composition due to grazing or other causes.

Question 2.2 Weedy and Disturbance Induced Species Shift?

This question considers the abundance of undesirable species such as dandelion, strawberry, yarrow, pussytoes, and other disturbance-induced species that increase with grazing pressure and as the competitiveness of seeded forages or desirable native species declines. As the combined cover of weedy and disturbance-induced species increases, a corresponding and serious decline in forage production follows. Other changes to watch for include bare soil, soil erosion and low litter reserves.

Scoring:

8 = less than 25% cover from weedy and disturbance-induced species.

4 = 26 to 49% cover is from weedy or disturbance induced species.

0 = 50 % or greater cover is from weedy or disturbance induced species.

Scoring Notes:

Include nuisance weeds but not noxious weeds (see Question 5). See page 100 for a list of common disturbance-induced and weedy species.

Question 3.0 Hydrologic Function and Nutrient Cycling

Do you have enough litter on your pasture?

Litter includes ungrazed residue from previous years growth,

including standing stems, fallen stems, leaf material and partially decomposed material. The amount and distribution of litter across the site is an indicator of healthy function because litter:

- Protects soil surface from drying out,
- Provides natural fertilizer which becomes part of the top soil,
- Protects pasture from wind and water erosion, and
- Reduces open spots for weeds and disturbance-induced species to move into the forage stand.

The amount of litter, which includes the seeds, stems and leaves that fall to the ground is estimated in lbs./ac. Litter estimates provide an indirect measurement of the health and functioning of the nutrient and water cycle, (also includes other recycled inputs like cow pies and urine). As litter declines, the benefits of litter usually declines as well. The following litter thresholds are initial estimates of what we think are suitable for tame pastures. Actual litter thresholds will vary across the province. Further studies will help us to better define litter thresholds. Litter estimates are made from hand raking in a plot area of 50 x 50 cm or 18 x 18 in. (see Fig. 14).

Scoring:

15 = A distinct litter layer is visible. Litter has a uniform distribution across the pasture with less than 5 % of the pasture lacking an adequate thickness. Hand raked litter is estimated at 450 lbs./acre or more, an amount equal to about one handful of litter.

10 = A distinct litter layer is visible, but litter thickness is reduced and is no longer uniform. Litter is reduced on about 5 to 25% of the pasture with some areas having little or no litter. Hand raked litter is estimated at about 250 to 450 lbs./acre, an amount equal to about ? to 1 handful of litter.

5 = No litter layer is visible. Ground litter is mostly from this year's growth with previous years' litter significantly reduced. About 25 to 67% of the pasture area has sparse to no litter cover. Hand raked litter is between 125 lbs./acre and 250 lbs./acre, an amount equal to between one quarter to one half handful of litter.

0 = Litter is sparse or absent from the majority of the site (greater

than 67% of the area). human-caused bare soil is present. Hand raking produces less than 125 lbs./acre, an amount less than one quarter handful of litter.

Scoring Notes:

- Only include the standing stems that rake into your hand.
- Too much litter can cause a choking effect on forage productivity (e.g. organic rich soils).
- Some species may naturally breakdown faster than others which reduces the buildup of litter.

Question 4. 0 Site Stability

Is the site subject to accelerated erosion and human-caused bare ground?

Recognizing the process of human-caused erosion on tame and modified pastures is very important. Erosion can cause serious losses in the long-term ability of the site to produce forage and provide other values. Early stages of soil erosion require quick action before soil loss is serious and costly. It is unlikely that the tame pasture has been developed on a site that is normally unstable, but start by asking if bare soil and erosion is influenced by soil type (e.g. hardpan soils, very sandy and erodable), then answer questions 4.1 and 4.2.

Site normally stable: ☐ Site normally unstable: ☐

Question 4.1 Evidence of Accelerated Erosion (Fig. 15)

Scoring:

6 = No visual evidence of soil movement, deposition of soil/litter, plant pedestalling, coarse sand or aggregate remnants, hoof shear, soil compaction, flow patterns and/or scouring beyond the natural extent for the site.

4 = Some micro evidence of the above. Hoof shear may be present

Fig. 14 Litter standards for tame pasture.

on micro slopes. Old erosion features may be stable and vegetated or show short and shallow flow patterns on the site. Extent of exposed soil is only slightly greater than expected for the site.

2 = Macro evidence of moderate amounts of soil movement or deposition of the above. Erosion features are active but limited to the site with no off-site movement of material. Flow patters have a well-defined branching pattern. The extent of exposed soil is obviously greater than expected for the site but vegetation (live plants and litter) still protects most of the site.

0 = Macro evidence of extreme soil movement with most material being carried off site. Flow patterns are obvious and fan deposits may be present. Rills are abundant and deep. Gullies are deep with sharp edges. Hoof shear is significant. Erosion features are active. Pedestalled plants with exposed roots and rocks exposed or sitting on the surface.

Scoring Notes:

- Look for human-caused erosion above normal or geologic rates expected for the site.
- To observe early erosion signs, you may need to get very close to the ground looking in and around plants at ground level.

Question 4.2 Percent Increase in Human-Caused Bare Soil?

Human-caused bare soil will alert you to the need for changes in management. Human-caused bare soil can result from the direct impacts of grazing or equipment or indirectly where rodents burrowing is in response to weedy species in the pasture. Bare soil is an obvious loss in forage production and the many other values found in a well-vegetated plant community.

Scoring:

Is your pasture dominated by bunch grasses? If so, use the bunch grass scoring system 4.2 A. If the pasture is a rhizomatous dominated pasture use scoring system in 4.2 B. Note if your pasture is bunch or rhizomatous type species in the comments section of the score sheet.

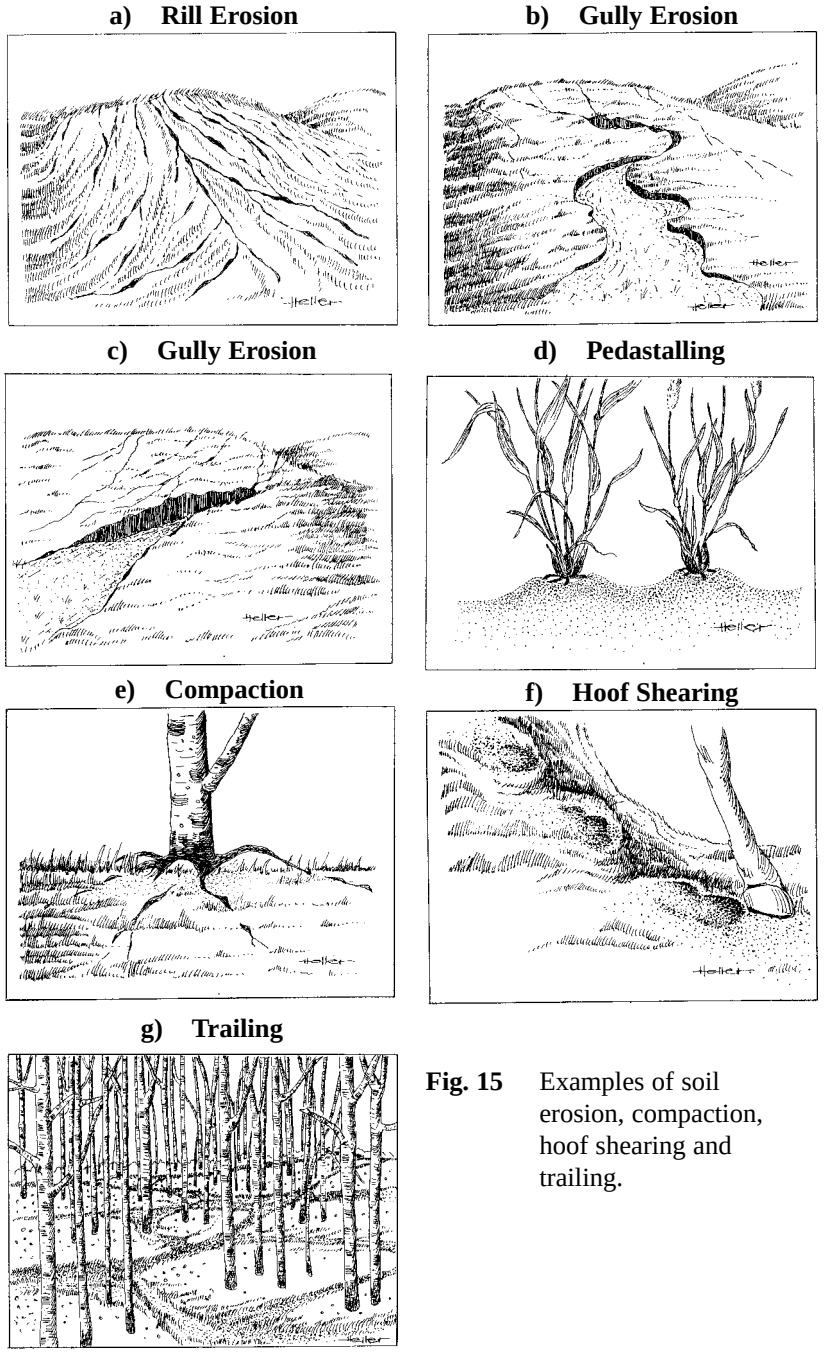


Fig. 15 Examples of soil erosion, compaction, hoof shearing and trailing.

4.2 A Bunch Grass Scoring (Fig. 16):

3 = less than 10% human-caused bare soil

2 = 11 to 20% human-caused bare soil

1 = 21 to 49% human-caused bare soil

0 = greater than 50% human-caused bare soil

4.2 B Rhizomatous Grass Scoring System (Fig. 16)

3 = less than 5% human-caused bare soil

2 = 6 to 10% human-caused bare soil

1 = 11 to 15% human-caused bare soil

0 = greater than 16% human-caused bare soil

Scoring Notes:

- To estimate human-caused bare soil, first estimate total bare soil, subtract the amount considered to be expected or naturally occurring.
- Bare soil may be present in the early stages of tame pasture establishment as plant density and vegetation canopy increases to normal levels for the site.
- Consider the amount of bare soil in livestock trails to be part of human-caused bare soil.
- Be sure to note if the pasture is still in the establishment phase (i.e. one to three years).
- Bunch grass tame pastures, like crested wheat pastures found in the brown and dark brown soil zones of the province, are prone to bare soil levels and may result from row spacing during seeding. Please note this in the comment sheet when evaluating the overall health of the pasture and making management decisions.
- Bare soil from rodent burrows tends to increase on heavily grazed sites

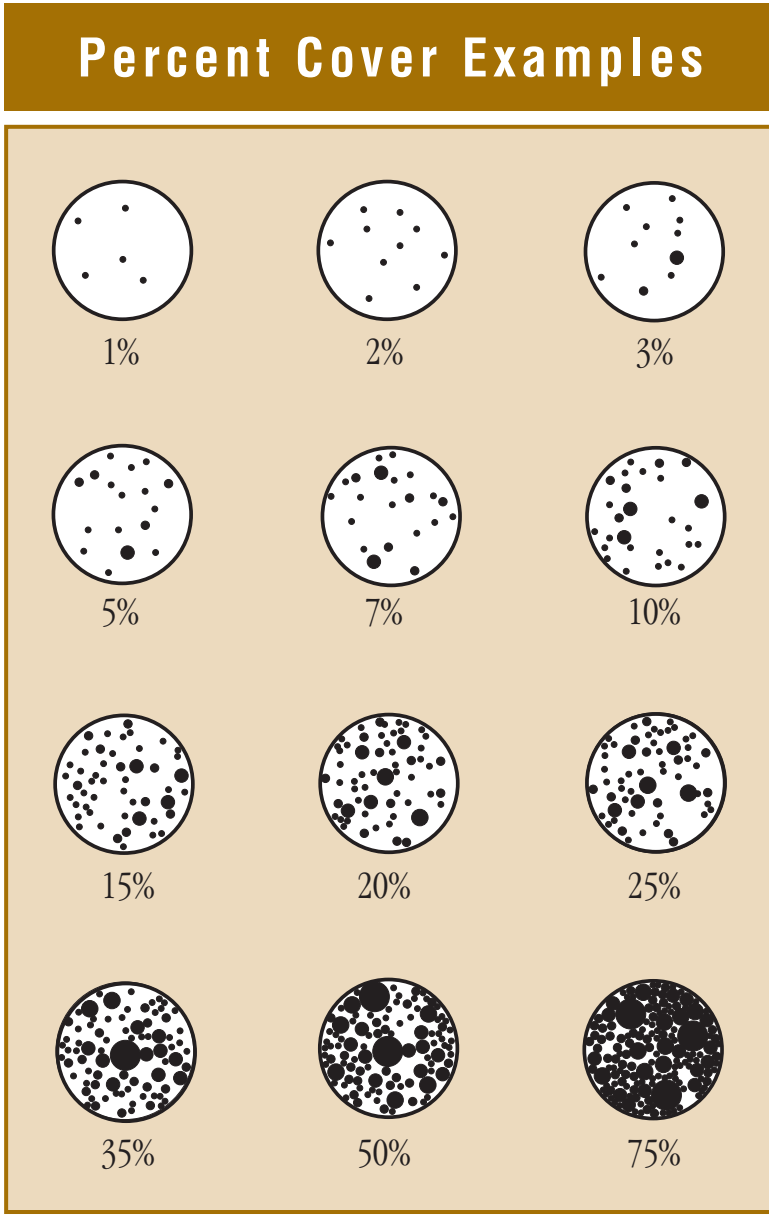


Fig. 16 This graphic helps to develop a mental picture of the percent cover of bare soil or vegetation canopy. It will appear a number of times in this workbook for easy reference.

- Rodent activity increases when there is an increase of weedy, tap rooted species
- On modified and heavily grazed sites, a significant portion of the bare soil from rodent burrows should be considered human-caused bare soil.
- High ungulate use may lead to increased bare soil on their preferred ranges. Wintering sites may be especially prone to hoof shear resulting in increased bare soil. When wildlife impacts result in increased soil exposure, treat it as human-caused and note the source of the impact in the comments section. For earthworm activity see Chapter 2, Question 4, Scoring Notes.

Question 5.0 Noxious Weeds

Are there noxious weeds on the site?

The canopy cover and density distribution of noxious weeds in the pasture can provide clues as to the health and function of the pasture. Noxious weeds commonly establish where excessive disturbance has caused an increase in open ground and available moisture.

This question considers the degree of infestation on the pasture Infestation is a function of weed plant density and patchiness or evenness over the area being sampled. All noxious weeds are considered collectively, not individually. Standard weed lists should be used for your region (see the suggested weed list on page xx). Record the species and the density distribution of all noxious weeds observed as you move across the area being assessed.

Question 5.1 Total Canopy Cover of Noxious Weeds?

Measure the combined cover of all the noxious weeds you find on site. Record their species names and cover in the comments section of the field worksheet. Canopy cover is the percent cover of green material covering the ground (see figure 16).

Scoring:

3 = no noxious weeds present

2 = noxious weeds present with a total canopy cover less than 1%

1 = noxious weeds present with a total canopy cover greater than 1 to 15%

0 = noxious weeds present with a total canopy cover of greater than 15%

Question 5.2 Density Distribution Class of Noxious Weeds?

Measure the combined density distribution of all the noxious weeds you find on site. Record this and their species names in the comment section. Density distribution is a measurement that combines frequency and distribution of individual plants or clumps and is a measure of infestation (see Fig. 17).

Scoring:

3 = No noxious weeds present

2 = A low level of noxious weeds found in density distribution class 1, 2 or 3

1 = A moderate level of noxious weeds found in density distribution class 4, 5, 6 or 7

0 = A heavy level of noxious

Density Distribution

Class	Description of abundance in polygon	Distribution	Weeds Score	Regrowth Score
0	None		3	2
1	Rare		2	
2	A few sporadically occurring individual plants			
3	A single patch			
4	A single patch plus a few sporadically occurring plants		1	1
5	Several sporadically occurring plants			
6	A single patch plus several sporadically occurring plants			
7	A few patches			
8	A few patches plus several sporadically occurring plants		0	0
9	Several well spaced patches			
10	Continuous uniform occurrences of well spaced plants			
11	Continuous occurrence of plants with a few gaps in the distribution			
12	Continuous dense occurrence of plants			

Fig. 17 Density distribution guide for rating weed infestation.

Question 6.0 Woody Regrowth

Is there a brush regrowth problem?

The kinds, proportions and amounts of woody species that grow in tame or modified tame pasture depend on many factors including:

- Site conditions (rocks, soil, forest, parkland or grassland).
- Range improvement method used, grazing management practices and age of pasture.

Depending on the cover, density and species of plants, woody regrowth may act as complementary forage or compete with seeded forage plants. You may choose to maintain a percentage of woody regrowth to support resource goals like timber production, wildlife and riparian area values.

Question 6.1 Woody Regrowth Canopy Cover

Measure the combined canopy cover of all the woody plant species

that you find on the pasture (Fig. 16). You can include in the comment section of the field sheet a breakdown of cover by species. Remember you have included cover estimates in the first part of the field form too.

Scoring:

4 = less than 5% canopy cover

2 = greater than 5 to 15% cover

0 = greater than 15% cover

Question 6.2 Density Distribution Class of Woody Regrowth?

Measure the combined density distribution of all the woody plant species you find on the pasture (Fig. 17). Include the breakdown of density and distribution of each species in the comments section of the field worksheet.

Scoring:

2 = A low level of woody regrowth is present in density distribution classes of 1, 2, 3 or 4

1 = A moderate level of woody regrowth is present in density distribution classes of 5, 6, 7 or 8

0 = A heavy level of woody regrowth is present in density distribution classes 9, 10, 11, or 12.

Scoring Notes:

- Please note that it is desirable to have woody cover in riparian areas that may be found in a tame pasture along streams and wetlands.
- You may find that the distribution of woody regrowth is not uniform in the pasture, so make note of that in the comment section of the question form. If woody regrowth is a problem, provide specific comments on the need for control measures like biological, chemical or mechanical treatments.

USING THE FIELD WORKBOOK AND WORKSHEETS

Determining the Scale of Observation

The field workbook has been designed to assess range health of grassland, forest and tame pasture at a variety of scales (plant community, field or pasture, management unit, or polygon – the observation assessment area). The scale you choose depends on your specific needs and constraints.

- Consider the purpose of the assessment – what do you want to accomplish? Is the sample site an area of concern or is it broadly representative of the pasture as a whole? You may want to know the cover and density of specific weed species in addition to the cumulative measurements for the health indicators. Tame pasture can be assessed on a field basis but woody re-growth is highly variable and will normally require more detailed sampling.

- Determine the amount of time, money and labor you can apply to range health assessment. Once you have started to measure range health, future assessments allow you to establish trend; upward or downward in response to ongoing management practices.

- Sample "like-with-like". This increases the confidence that observations are representative and accurate. For example, always sample within the same fenced management unit, and if you have time, consider sampling within different plant communities. The complexity of the rangeland and the number of intermixed plant communities, will determine the number of samples required.

How Many Points Do I Sample Within a Plant Community, Management Unit or Polygon?

We suggest you pace off a representative distance of the landscape or crisscross the plant community, management unit, or polygon to

get a thorough impression of key health indicators. Consider a minimum of three observation points, making mental notes of variability before you complete the question form. It's a good idea to record information in pencil and refine as you gather more information.

In some cases, you may wish to complete measurements representative of the polygon and break down individual questions into more specific details. In the case of noxious weeds (question 5) or woody regrowth (tame pastures- question 6), the field worksheet allows you to identify specific species in the comments section.

What Sampling Equipment Do I Need?

- Field work book, a pencil and eraser,

- For grassland and tame pasture, a quarter meter frame (50 x 50 cm) for estimating litter amounts. Alternatively you can use a measuring tape and spikes to mark off a quarter meter square or perhaps you can use your feet (boot size),

- For forest, a pencil, knife and/or a shovel and a tape or ruler to measure the LFH.

- Many of the questions ask about canopy cover. You can use a plotless method, visually estimating canopy characteristics of the sample area, be it a plant community, management unit, or polygon.

- A plot frame can tune your eye to measure canopy cover. For grasslands and tame pasture, the frame can be a 20 cm by 50 cm (open on one of the 20 cm sides). For forest, the frame can be 50 by 50 cm (open on one of four sides).

Taking Photos

We recommend taking a planned series of photographs that support your written observations. Note the date, direction of view and location of where you took the picture. Here are a few simple steps for taking reference photos:

- Mark the name or number of the sample plot on a piece of paper with felt pen. Place this marker on the ground at your feet along with a plot frame or some other object to provide scale. Take photo 1, looking as close to straight down as possible.
- Turn 180 degrees on your heel, take four paces away from the spot marked on the ground and turn back towards your first photo plot.
- Sit on the ground; a low camera angle will allow you to look into the structure of the plant community. Point your camera back towards photo plot 1, frame the first site so there is only a thin sliver of horizon in the top of your field of view. Take picture number 2.
- These photos can be captured with a digital camera and then transferred to your home computer.
- A simple graphics program can be used to combine photos with the health score and provide a powerful monitoring record.

How to Use the Form?

Samples of field worksheets are provided on the following pages. The abridged range health guide also includes field worksheets that can be photocopied for additional sample sites. Because the range health questions differ slightly depending on type of range, select the appropriate form for grasslands, forest or tame pasture.

Take time to fill out the top of each form. This information (i.e. date, location, plant community, photo information, etc.) will be important when you are summarizing all your observations and deciding on management actions. A good set of records will allow you to look back over many years and determine if the grazing management practices are in balance with a healthy and functioning rangeland. Basic questions can be answered from these records: Has a site with a “healthy with problems” rating recovered to “healthy”? What indicators have responded (litter, species composition, structure, reduced bare soil)?

Note the species table that is found immediately before the health questions. This is a place to record your best estimate of the dominant plant species and the plant community.

Each health question (five each on the grassland and forest forms, six questions on the tame pasture form) requires you to select the best-fit score for that area. We recommend that you select only the scores provided; don’t try to score values between the numbers provided.

In addition to the health questions you have the opportunity to estimate other important management factors, such as utilization and trend.

We encourage you to answer all questions. However, in some unique situations you may find one of the questions not applicable. You may want to think it over and ask questions. If you decide to not answer a question, remember that you need to adjust the total score so that the % range health is representative of the questions you answered.

When you have completed the questions, tally up the scores for all the questions and calculate the percentage range health based on the actual score divided by the total possible score.

Is it healthy, healthy with problems or unhealthy? Once you have health scores to look at, go to the following chapter to better understand what the scores mean.

Abridged Range Health Worksheets:

We have also developed a condensed version of the three range and tame pasture health assessment procedures, that we call the abridged range health forms. Copies of these worksheets can be obtained from the local offices of the Rangeland Management Branch, Public Lands Division, Alberta Sustainable Resource Development.
The abridged health forms can also be downloaded from our website at: http://www3.gov.ab.ca/srd/land/publiclands/range.html

Click on the link to: Range and Pasture Health Assessment

Note: Full technical version of this workbook with scientific references also available at the above web link.

NOTES

Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** _____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

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Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** _____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

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Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
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Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** _____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

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Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** _____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

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Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**_____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

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	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**_____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

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Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** _____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
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1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
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5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
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Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

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PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD____ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** _____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
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5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**_____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	16	8	0		
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

					Comments	Score
Community Structure	6	4	2	0		

3. Does the site retain moisture?

					Comments	Score
Litter Cover & Distribution	15	8	0	-		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	6	4	2	0	Human caused bare soil (%) _____	
4.2 Bare Soil	3	2	1	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**_____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Actual Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

(Actual Score ÷60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

(Actual Score ÷60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

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Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

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Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

(Actual Score ÷60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

(Actual Score ÷60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

(Actual Score ÷60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township** _____**Range**_____**Meridian** ____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) ____

(Actual Score ÷60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

Unhealthy | *Healthy With Problems* | *Healthy*

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	6	0		
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	6	0		

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	9	6	3	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Erosion	3	2	1	0	Human caused bare soil (%) _____	
4.2 Bare Soil	6	4	2	0	Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Actual Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Tame Pasture Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. Do introduced forage plants dominate the site?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Pasture composition				Comments	Score
1A Tame Pasture	8	6	3		
1B Modified Tame Pasture:	6	3	0		

2. What kinds of plants are on the site?

Shift in plant composition:				Comments	Score
2.1 Tame & desirable native species:	8	4	0		
2.2 Weedy & disturbance species:	8	4	0		

3. Is the site covered by litter?

					Comments	Score
Litter Cover & Distribution	15	10	5	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Evidence of site instability:	6	4	2	0		
4.2 Human-caused bare soil:	3	2	1	0	Human caused bare soil (%) _____ Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
5.2 Density Distribution	3	2	1	0					

6. Does the site have woody regrowth?

Woody Regrowth				Dominant species	% Cover	Density Dist.	Comments	Score
6.1 Canopy Cover	4	2	0					
6.2 Density Distribution	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Vegetative Height (Avg.):_____cm./in.

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← *Unhealthy* →				← *Healthy With Problems* →			← *Healthy* →		

Tame Pasture Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**_____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. Do introduced forage plants dominate the site?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Pasture composition				Comments	Score
1A Tame Pasture	8	6	3		
1B Modified Tame Pasture:	6	3	0		

2. What kinds of plants are on the site?

Shift in plant composition:				Comments	Score
2.1 Tame & desirable native species:	8	4	0		
2.2 Weedy & disturbance species:	8	4	0		

3. Is the site covered by litter?

					Comments	Score
Litter Cover & Distribution	15	10	5	0		

4. Is there accelerated soil erosion? Site Normally (circle) Stable / Unstable

Site Stability					Comments	Score
4.1 Evidence of site instability:	6	4	2	0		
4.2 Human-caused bare soil:	3	2	1	0	Human caused bare soil (%) _____ Moss & Lichen cover (%) _____	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	1	0					
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6. Does the site have woody regrowth?

Woody Regrowth				Dominant species	% Cover	Density Dist.	Comments	Score
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Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / H

Trend (apparent - circle): Upward / Downward / Stable / Unknown

Site Score (total score) _____

(Site Score ÷ 60 x 100) = Percent Health Rating

(_____ ÷60 x 100) = _____%

Healthy = 75-100%; Healthy with problems = 50-74%; Unhealthy < 50%

Vegetative Height (Avg.):_____cm./in.

Observed Utilization _____%

PTS	6	12	18	24	30	36	42	45	48	54
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Tame Pasture Health Assessment - SAMPLE SCORE SHEET

Site _____ **Observer** _____ **Date** _____

LSD___ **Quarter**_____ **Section**_____ **Township**_____**Range**_____**Meridian**_____ **Photo#**_____

GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

_____

SCORING (circle appropriate values and add their sum to the Score box)

1. Do introduced forage plants dominate the site?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %

Pasture composition				Comments	Score
1A Tame Pasture	8	6	3		
1B Modified Tame Pasture:	6	3	0		

2. What kinds of plants are on the site?

Shift in plant composition:				Comments	Score
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GPS Coord (NAD 83) Lat. _____ **Long.** _____ **Estimated forage production** _____

Special Observations (climate, changes in management) _____

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HEALTH SCORES – WHAT DO THEY TELL YOU?

Range Health Categories

The range health score is a cumulative measure of the health and function observed and measured in your sample area. It is a rapid assessment tool and provides a snapshot of the health of the site and possible impacts of management. Range health monitoring alerts livestock producers to potential issues and problems on rangelands so that management changes can be made. First, consider the health categories and what they mean.

Health Categories

***Healthy*:**
A health score between 75 to 100 %. All of the key functions of health rangeland are being performed. This rating provides a positive message about your current management practices. It may tell you that current stocking levels, distribution and grazing practices are maintaining range health. Optimum grazing opportunities for livestock are possible.

Healthy with Problems:
A health score of 50 to 74%. Most, but not all of the key functions of healthy range are being performed. Sites in this category should be on the "watch list" requiring further monitoring. This score is an early warning of the need for minor to major adjustments to management. May be a reduction in livestock grazing opportunities. Recovery to a healthy class can normally be accomplished within a few years.

Unhealthy:
A health score of less than 50%. Few of the functions of health range are being performed. An unhealthy rating means urgent action is required. Significant management changes are essential and it may take years to regain a healthy class. Livestock grazing opportunities are seriously reduced.

RANGE HEALTH HINTS

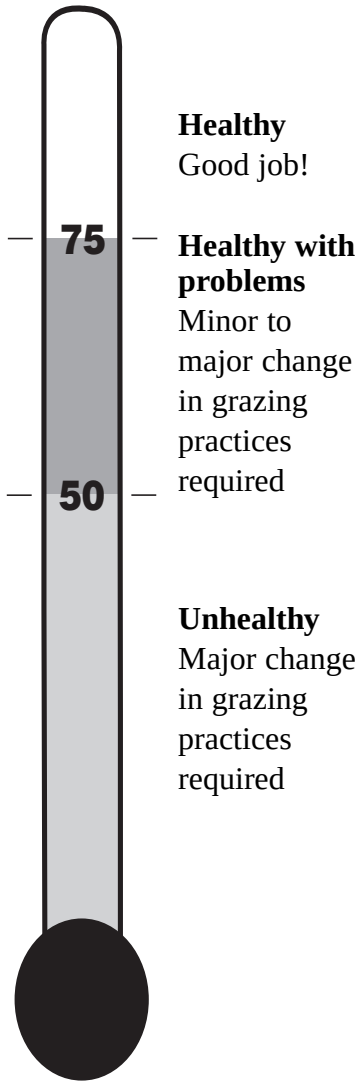
What do the health scores mean?

Range Health Categories

Healthy
A health score of 75 to 100%. All of the key functions of health rangeland are being performed.

Healthy with Problems:
A health score of 50 to 74%. Most but not all key functions of healthy range are being performed.

Unhealthy:
A healthy score of less than 50%. Few of the functions of healthy range are being performed.



Healthy
Good job!

Healthy with problems
Minor to major change in grazing practices required

Unhealthy
Major change in grazing practices required

What Do the Scores of Individual Health Questions Tell You?

Individual health question scores allow you to take a closer look at the specific indicators of range health. The scores for individual health questions or combinations of questions can help you formulate management objectives. Consider the possible score for each question; this tells you the relative importance of the question to the overall rating.

Evaluation of Individual Questions:

- In grasslands - ecological status and in forests - plant community structure, are most important. High scores here will contribute most to establishing a healthy rating. Low scores indicate a large negative impact on the function of the plant community.

- In tame pastures, species shifts to disturbance induced or weedy species will be of greatest concern as they replace the more productive forage plants.

- In modified grassland, forest and tame pastures, the presence of erosion, bare soil and noxious weeds will be of greatest concern and indicate a large negative impact on the function of the plant community.

Litter and LFH

In grasslands and tame pasture, litter scores provide insight into moisture retention functions of the site. High scores mean moisture is being retained and that conditions are favorable for water to infiltrate into the soil. Medium scores mean that moisture retention is being measurably reduced. Lighter stocking, longer and more effective rest periods and improved rotational grazing can usually restore litter levels in a number of years. Low litter ratings mean that little moisture is being retained and the stage may be set for increased soil erosion from the site. Other impacts may come into play, for example the invasion of weeds.

In forests, a combination of reduced LFH thickness and compaction will reduce moisture retention functions and can lead to drying of

the site. A secondary impact may be a decline in the plant community composition and structure. Many years of effective rest may be required to restore plant community structure and LFH thickness and sponginess.

Bare Soil and Soil Erosion

Any human-caused erosion and bare soil puts management on "high alert" status and requires immediate attention and correction. Similar to a domino effect, allowing erosion processes to accelerate will have drastic impacts to the health and function of the plant community and site.

Noxious Weeds

Noxious weed species are another one of those key early warning signs that the system may be under stress and that both weed control measures and management changes are required. Better management to reduce weed levels, like lighter grazing and more rest, will set off a beneficial chain of events. Plant vigor will increase, improving the reproduction of desirable plants and leading to more vegetation cover which in turn adds more litter to the site and reduces bare soil. The outcome will be less space for weeds to establish.

Woody Regrowth In Tame Pastures

Woody regrowth levels are often a function of a combination of site, tame pasture development method, and grazing management practices. Forest regeneration after pasture development is a natural occurence just like after a wildfire. At low densities woody regrowth may serve as a complementary forage as livestock browse woody plants. As tame pasture regenerates back to secondary forest, woody regrowth competes with tame forages as the density, height and stem diameter of shrubs and trees increase, reducing light and increasing shade over the seeded forages. Measuring the cover and density of woody species can help determine if control measures are required.

Rotational grazing systems that maintain healthy and productive stands of seeded grasses and legumes often do not have serious

woody regrowth problems since control is provided by livestock. In contrast, ineffective grazing systems may stimulate woody regrowth and also have negative impacts on surrounding native rangeland health.

Evaluation of Combined Questions:

When the health assessment indicates problems, think about the questions as they relate to each other. This reduces chances of practice changes dealing with the symptoms instead of correcting the problem. For example, the tame pasture health score may indicate woody regrowth, disturbance-induced and weedy species problems as well as low litter reserves. It won't be possible to heal one problem without addressing the others.

Natural, Human-Caused or Both?

A number of natural events and processes may affect a health rating. Events such as drought, wildfire, insect damage, flood, disease and extreme wind events can also effect range health. Maintaining historical records, particularly on moisture, disturbance and disease, and carrying out range health assessments, can help you determine which impacts are natural and which are human-caused. We want to focus on any grazing management problems and correct them.

Sample Range Health Ratings

Example 1-Healthy Category

A native grassland site rates as healthy but the score of 76% falls at the low end of the range. The reduced health score is due to low litter values. A review of management practices suggests that stocking rates may not have been reduced sufficiently during recent dry years. A recent increase in cow size also contributed to increased forage demands on the pasture. Plans are made to reduce stocking slightly and defer grazing in spring.

Example 2 - Healthy with Problems

A forest health assessment has scored 56% and has plant

community and structure problems. Corrective management includes deferred entry until mid June and only one grazing period per growing season. The stocking rate is further adjusted by recognizing that unpalatable shrubs (e.g. alder) should not be included as forage.

Example 3 - Unhealthy:

A tame pasture has a range health score of 28% indicating species, litter, erosion, noxious weed and woody regrowth problems. Years of overgrazing has reduced forage production and limited the ability of the pasture to withstand the recent dry conditions. A review of management practices suggests that the stocking rate should be reduced and extended rest periods are required to rebuild litter levels. Weed control and/or pasture rejuvenation may be required depending on cost/benefit analysis.

Range Health Assessment – A Tool for Adaptive Range Management

Repeated range health assessments can ensure livestock stocking rates are sustainable. Range plant community guides give you recommended or initial stocking rates for each plant community. Range health assessment allows you to fine tune your management. These tools along with livestock grazing records, weather records and photographs, can help you manage through drought cycles and identify early signs of declining pasture health.

Grassland Range Health Assessment - SAMPLE SCORE SHEET

Site Border Field Observer Cal Minner Date June 24/02

LSD ___ Quarter SE Section 27 Township 17 Range 18 Meridian 4 Photo# 10

GPS Coord (NAD 83) Lat. _____ Long. _____ Estimated forage production _____

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?
Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %
Sedge	16	Scarlet mallow	6	Silver Sagebrush	2		
Western Wheat Grass	15	Fringed Sage	2	Buckbrush	1		
Northern Wheat Grass	7	Golden Aster	1				
Needle and Thread	5	Prairie Onion	1				

Community Type _____

Ecological Status					Comments	Score
1A Native Grassland:	24	(16)	8	0		16
1B Modified Grassland:	9	5	0			

2. Are the expected plant layers present?

Community Structure	6	(4)	2	0	Comments	Score
						4

3. Does the site retain moisture?

Litter Cover & Distribution	15	(8)	0	-	Comments	Score
					Litter estimation 310 lbs/ac	8

4. Is there accelerated soil erosion? Site Normally (circle) (Stable) / Unstable

Site Stability					Comments	Score
4.1 Erosion	(6)	4	2	0	Human caused bare soil (%) 5	9
4.2 Bare Soil	(3)	2	1	0	Moss & Lichen cover (%) 80	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	(3)	2	1	0				Annual weeds common	6
5.2 Density Distribution	(3)	2	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M (M) M-H / H

Trend (apparent - circle): Upward / Downward / (Stable) / Unknown

Site Score (total score) 43

(Site Score ÷ 60 x 100) = Percent Health Rating

(43 ÷60 x 100) = 72 %

Healthy = 75-100%; (Healthy with problems) = 50-74%; Unhealthy < 50%

Observed Utilization _____ %

The Reference Plant Community is Wheatgrass/Needle and Thread. Wheat grass cover is reduced.

In more heavily grazed areas, vigour and stature of tall grasses is significantly reduced.

Approximately 310 lbs/ac estimated by raking litter from a 1/4m² frame. Threshold level for healthy range is 390 lbs/ac.

Site is stable, some increase in human-caused bare soil due to livestock trailing but less than 10%. Ant activity has created small patches of exposed soil.

No noxious weeds found on site. Note an increase in annual weeds due to increased moisture in current year.

72%, healthy with problems. Utilization is moderate, and the trend is stable. This score indicates that some management changes should be made to encourage healthier range.

Due to drought conditions in the previous 3 years, production was reduced, decreasing the amount of carryover to the following years. Cumulative effects have dropped litter to half of normal. Consider delaying entry of livestock until late June/July and a slight reduction in cattle numbers.

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90
	← Unhealthy →				← Healthy With Problems →			← Healthy →		

Forest Range Health Assessment - SAMPLE SCORE SHEET

Site Tower Field Observer Barb Smith Date July 5/03

LSD ___ Quarter SW Section 32 Township 55 Range 11 Meridian 4 Photo# 7

GPS Coord (NAD 83) Lat. _____ Long. _____ Estimated forage production 650 lbs/ac

Special Observations (climate, changes in management) _____

SCORING (circle appropriate values and add their sum to the Score box)

1. What kind of plants are on the site? What is the plant community?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %
Hairy Wild Rye	7	Buckbeery	10	Rose	5	Aspen	50
Purple Oat Grass	3	Aster	5	Snowberry	10	Balsam Poplar	15
Rice Grass	1	Fireweed	1	Cranberry	2	White Spruce	1
Awned Wheat Grass	1	Peavine	2	Dogwood	2	Birch	1

Community Type _____

Ecological Status					Comments	Score
1A Native Forest:	18	12	(6)	0	Clovers present and greater percent low forbs	6
1B Modified Forest:	9	5	0	-		

2. Are the expected plant layers present?

					Comments	Score
Community Structure	18	12	(6)	0	Layers reduced	6

3. Thickness of the surface organic layer (LFH)?

					Comments	Score
LFH Thickness	(9)	6	3	0	Spongy, okay thickness	9

4. Is there accelerated soil erosion? Site Normally (circle) (Stable) / Unstable

Site Stability					Comments	Score
4.1 Erosion	(3)	2	1	0	Human caused bare soil (%) <1%	9
4.2 Bare Soil	(6)	4	2	0	Moss & Lichen cover (%) 30%	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	(2)	1	0	Canada Thistle	1	2		4
5.2 Density Distribution	3	(2)	1	0					

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / M-H / (H)

Trend (apparent - circle): Upward / (Downward) / Stable / Unknown

Site Score (total score) 34

(Actual Score ÷ 60 x 100) = Percent Health Rating

(34 ÷ 60 x 100) = 57 %

(Healthy = 75-100%) Healthy with problems = 50-74%; Unhealthy < 50%

Observed Utilization 57 %

Keyed to a native forest Aspen-Rose-Tall Forb

Shrub > 3m and the tall forb layers are much reduced. Palatable shrubs are heavily browsed and peavine is uncommon

Moist site. LFH is spongy and not compressed. Less than 10% difference in LFH thickness.

Stable. No evidence of erosion. Some natural wind-throw. human-caused bare soil cattle trail < 1% bare soil.

57% = healthy with problems. Heavy grazing regime removing two layers.

Management changes required to prevent further decline. Consider later entry to mid-June and remove cattle when understory remains waist high. Fence separate from tame pasture and graze only once each year. Control thistles. Take picture at trail junction north and monitor for improved range health.

Canada thistle present in low numbers. Spreading from drove trail? Spot control.

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

← Unhealthy → ← Healthy With Problems → ← Healthy →

Tame Pasture Health Assessment - SAMPLE SCORE SHEET

Site Riverbank Field Observer Doug Jones Date Aug. 4/03

LSD ___ Quarter SE Section 15 Township 56 Range 9 Meridian 4 Photo# 14

GPS Coord (NAD 83) Lat. _____ Long. _____ Estimated forage production 1000 lb/ac

Special Observations (climate, changes in management) drought

SCORING (circle appropriate values and add their sum to the Score box)

1. Do introduced forage plants dominate the site?

Dominant species

Grasses & Grasslikes	Cover %	Forbs	Cover %	Shrubs	Cover %	Trees	Cover %
Kentucky Bluegrass	45	Dandelion	7	Rose	3	Aspen	1
Quack Grass	20	Strawberry	5	Balsam	1		
Smooth Brome	15	Pussy-toes	5				
Hairy Wild Rye	10	Yarrow	3				

Pasture composition				Comments	Score
1A Tame Pasture	8	(6)	3	decrease in percent of seeded grasses	6
1B Modified Tame Pasture:	6	3	0		

2. What kinds of plants are on the site?

Shift in plant composition:				Comments	Score
2.1 Tame & desirable native species:	8	4	(0)	increase in weedy and increaser species	8
2.2 Weedy & disturbance species:	(8)	4	0		

3. Is the site covered by litter?

					Comments	Score
Litter cover & Distribution	15	10	(5)	0		5

4. Is there accelerated soil erosion? Site Normally (circle) (Stable) / Unstable

Site Stability					Comments	Score
4.1 Evidence of site instability:	6	(4)	2	0	Human caused bare soil (%) 7	6
4.2 Human-caused bare soil:	3	(2)	1	0	Moss & Lichen cover (%) 1	

5. Are noxious weeds present?

Noxious Weeds					Dominant species	% Cover	Density Dist.	Comments	Score
5.1 Canopy Cover	3	2	(1)	0	Canada Thistle	3	3	Spot Control	3
5.2 Density Distribution	3	(2)	1	0					

6. Does the site have woody regrowth?

Woody Regrowth				Dominant species	% Cover	Density Dist.	Comments	Score
6.1 Canopy Cover	(4)	2	0	Balsam			No Control needed	6
6.2 Density Distribution	(2)	1	0	Aspen	1	2		
				Rose	3	2		

Grazing Intensity (est. Long Term (circle)): U / U-L / L-M / M / (M-H) / H

Trend (apparent - circle): Upward / (Downward) / Stable / Unknown

Site Score (total score) 34

(Site Score ÷ 60 x 100) = Percent Health Rating

(34 ÷ 60 x 100) = 57 %

Healthy = 75-100% (Healthy with problems = 50-74%) Unhealthy < 50%

Vegetative Height (Avg.): 1-2 cm/in.

Observed Utilization 80 %

> 50% cover from introduced forage plants

80% cover from introduced forage

Grazing resistant forage plants dominate pasture. Seeded alfalfa not seen.

Litter < 1/2 handful, thin and sparsely distributed.

Plant pedastalling/ hoof shear. Creeping rooted pasture 7% of bare soil.

Canada thistle cover 2% near north repiles and class 3 density. Spot control.

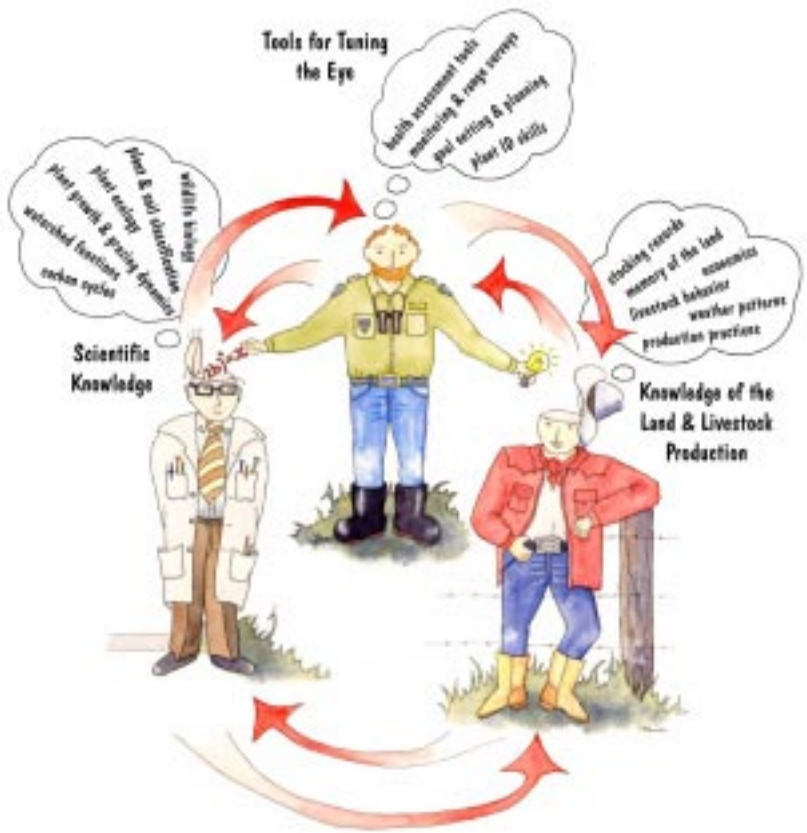
A few balsam poplars and shrub-form aspen near northeast repiles. Woody regrowth is complementary forage.

57% healthy with problems: loss of productive forage species and >% grazing resistant species. Disturbance induced and weedy species close to score of 4. Present management practices not conducive to tall, productive forage species and adequate litter reserves. "human-caused" drought at play. Pasture should be producing about 30% in these conditions and more when the rains come.

Management change required. Implement deferred spring entry, rotational grazing with effective rest, and leave more residual cover to provide carryover and litter. Monitor for improvements. May require reduced stocking rate if the above changes do not work? Take picture at 3rd fence post from gate looking east. Compare to future pictures taken same place.

PTS	6	12	18	24	30	36	42	45	48	54
%	10	20	30	40	50	60	70	75	80	90

← Unhealthy → ← Healthy With Problems → ← Healthy →



A wise person once said, *"No one is as smart as all of us"*. That's the philosophy we like to foster with range health tools. Livestock producers possess tremendous wisdom, knowledge and experience on the land. Science can provide valuable insight into how ecosystems function. Range health tools help to link science and wisdom to improve range management, to make livestock production more sustainable and to help resolve or head off resource conflicts among resource users.

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REFERENCE LIST FOR WEED SPECIES

How to Read the Species Table

Species Code (in the species table) refers to the seven letter code used to record the Latin (scientific) name of a species during range health assessments and inventories. The first four letters are usually composed of the beginning of the genus, while the last three letters of the code are the start of the species name. If the genus is only three letters, then four letters are taken from the species portion. If only the genus is known, then the code is derived from the first six letters of the genus name. These codes are used for consistency and speed of data collection. If you are unfamiliar with the codes or scientific name, ensure that whatever common name you use is verified with a scientific name at a later date, since common names tend to be more variable (and less common) than you might think.

This is a generic species list that is also used for riparian health assessment. Not all plants will be found in all environments.

Regulated Category refers to the designation given weeds (restricted, noxious, or nuisance) under the Weed Designation Regulations.

Based on the Weed Designation Regulation (Weed Control Act) in Alberta:

- Restricted weed species are indicated by '1'. Because of the serious management implications these species pose, they are indicated by bold;
- Noxious weeds are indicated by '2'
- Nuisance weeds are indicated by '3'
- Species that are not regulated are indicated by '0'

Range Health Plant Category refers to the suggested categorization of these plants for range health assessment and inventory purposes. Two plant categories are important in range health assessments /inventories:

- Invasive species are indicated by 'I'. Invasive species include all restricted, most noxious species, and a few nuisance species
- Disturbance-caused undesirable herbaceous species are indicated by 'D'. They include mostly nuisance weed species and some noxious weed species, as well as native species that increase with disturbance on rangelands.

Species	Latin Name	Common Name	Regulated	Range Health
BROMTEC	*Bromus tectorum*	downy chess/brome	3	I
CARDCHA	*Cardaria chalepensis*	hoary cress	2	I
CARDPUB	*Cardaria pubescens*	globe-podded hoary cress	2	I
CARDNUT	*Carduus nutans*	nodding thistle	1	I
CENTDIF	*Centaurea diffusa*	diffuse knapweed	1	I
CENTMAC	*Centaurea maculosa*	spotted knapweed	1	I
CENTREP	*Centaurea repens*	Russian knapweed	2	I
CENTSOL	*Centaurea solstitialis*	yellow star thistle	1	I
CHRYLEU	*Chrysanthemum leucanthemum*	ox-eye daisy	2	I
CIRSARV	*Cirsium arvense*	Canada thistle	2	I
CONVARV	*Convolvulus arvensis*	field bindweed	2	I
CUSCGRO	*Cuscuta gronovii*	common dodder	1	I
CYNOOFF	*Cynoglossum officinale*	hound's tongue	2	I
ECHIVUL	*Echium vulgare*	viper's-bugloss; blueweed	2	I
ELAEANG	*Elaeagnus angustifolia*	Russian olive	0	I
ERODCIC	*Erodium cicutarium*	stork's bill	2	I
EUPHCYP	*Euphorbia cyparissias*	cypress spurge	2	I
EUPHESU	*Euphorbia esula*	leafy spurge	2	I
GALIAPA	*Galium aparine*	cleavers	2	I
GALISPU	*Galium spurium*	false cleavers	2	I
KNAUARV	*Knautia arvensis*	blue buttons, field scabious	2	I
LINADAL	*Linaria dalmatica*	broad-leaved/ Dalmatian toadflax	3	I
LINAVUL	*Linaria vulgaris*	butter-and-eggs/ toadflax	2	I
LOLIPER	*Lolium persicum*	Persian darnel	2	I
LYCHALB	*Lychnis alba*	white cockle	2	I
LYTHSAL	*Lythrum salicaria*	purple loosestrife	2	I
MATRPER	*Matricaria perforata*	scentless chamomile	2	I
MYRISPI	*Myriophyllum spicatum*	Eurasian water milfoil	1	I
ODONSER	*Odontites serotina*	late-flowering eyebright/ red bartsia	1	I
RANUACR	*Ranunculus acris*	tall buttercup	2	I
SILECUC	*Silene cucubalus*	bladder campion	2	I
SONCARV	*Sonchus arvensis*	perennial sow thistle	2	I
TANAVUL	*Tanacetum vulgare*	common tansy	2	I
AGROPEC	*Agropyron pectiniforme*	crested wheat grass	0	D
AGROREP	*Agropyron repens*	quack grass	3	D
AMARRET	*Amaranthus retroflexus*	red-root pigweed	3	D
ANTENN	*Antennaria species*	pussy-toes and everlastings	0	D
APOCAND	*Apocynum androsaemifolium*	spreading dogbane	2	D
ARCTMIN	*Arctium minus*	common burdock	0	D
AVENFAT	*Avena fatua*	wild oat	3	D
AVENSAT	*Avena sativa*	oats	0	D
BRASNAP	*Brassica napus*	canola (Argentine)	0	D
BRASKAB	(*Sinapis arvensis)* *Brassica kaber*	wild mustard	3	D
BRASRAP	*Brassica rapa*	canola (Polish)	0	D
BROMINE	*Bromus inermis*	smooth brome	0	D
BROMJAP	*Bromus japonicus*	Japanese brome	0	D
CAMPRAP	*Campanula rapunculoides*	creeping bellflower/ garden bluebell	0	D
CAPSBUR	*Capsella bursa-pastoris*	shepherd's purse	3	D

Species	Latin Name	Common Name	Regulated	Range Health
CERSARV	*Cerastium arvense*	field mouse-ear chickweed	3	D
CERSNUT	*Cerastium nutans*	long-stalked chickweed	0	D
CERSVUL	*Cerastium vulgatum*	common mouse-ear(ed) chickweed	3	D
CHENALB	*Chenopodium album*	lamb's quarters	0	D
CONVSEP	*Convolvulus sepium*	hedge bindweed/ wild morning-glory	3	D
CREPTEC	*Crepis tectorum*	narrow-leaved/ annual hawk's beard	3	D
DESCPIN	*Descurainia pinnata*	green tansy mustard	3	D
DESCSOP	*Descurainia sophia*	flixweed	3	D
ERUCGAL	*Erucastrum gallicum*	dog mustard	3	D
ERYSCHE	*Erysimum cheiranthoides*	wormseed mustard	3	D
FAGOTAR	*Fagopyrum tartaricum*	tartary buckwheat	3	D
FRAGAR	*Fragaria species*	strawberries	0	D
GALETET	*Galeopsis tetrahit*	hemp-nettle	3	D
HORDJUB	*Hordeum jubatum*	foxtail barley	0	D
HORDVUL	*Hordeum vulgare*	barley	0	D
LAMIAMP	*Lamium amplexicaule*	henbit	3	D
LAPPECH	*Lappula echinata*	bluebur	3	D
MALVROT	*Malva rotundifolia*	round-leaved mallow	3	D
MELILO	*Melilotus officinalis and alba*	sweet clovers	0	D
NESLPAN	*Neslia paniculata*	ball mustard	3	D
PHLEPRA	*Phleum pratense*	timothy	0	D
PISUSAT	*Pisum sativum*	peas (field)	0	D
PLANTA	*Plantago species*	plantains	0	D
POACOMP	*Poa compressa*	Canada bluegrass	0	D
POAPRAT	*Poa pratensis*	Kentucky bluegrass	0	D
POLYCON	*Polygonum convolvulus*	wild buckwheat	3	D
POLYPER	*Polygonum persicaria*	lady's thumb	3	D
POTEANS	*Potentilla anserina*	silverweed	3	D
POTENOR	*Potentilla norvegica*	rough cinquefoil	3	D
POTEREC	*Potentilla recta*	sulfur cinquefoil	0	D
RAPHRAP	*Raphanus raphanistrum*	wild radish	3	D
SALSKAL	*Salsola kali*	Russian thistle	3	D
SCLEANN	*Scleranthus annuus*	knawel	2	D
SECACER	*Secale cereale*	rye (cereal)	0	D
SETAVIR	*Setaria viridis*	green foxtail	3	D
SILECSE	*Silene cserei*	smooth catchfly/ biennial campion	3	D
SILENOC	*Silene noctiflora*	night-flowering catchfly	3	D
SINAARV	*Sinapis arvensis*	wild mustard	3	D
SONCOLE	*Sonchus oleraceus*	annual sow thistle	3	D
SPERARV	*Spergula arvensis*	corn spurry	3	D
STELMED	*Stellaria media*	common chickweed	3	D
TARAOFF	*Taraxacum officinale*	common dandelion	3	D
THLAARV	*Thlaspi arvense*	stinkweed	3	D
TRIFOL	*Trifolium species*	clovers	0	D
TRITAES	*Triticum aestivum*	wheat	0	D
VACCPYR	*Vaccaria pyramidata*	cow cockle	3	D
XTRITIC	*X Triticosecale*	triticale	0	D

Contacts For Further Information on Rangeland Health Assessment

SE Region

Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
Agriculture Centre,
#100, 5401 - 1 st Ave South
Lethbridge, Alberta, T1J 4V6.
(403) 382-4299

SW Region

Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
6203 - 49 St. Box 4534
Barrhead, Alberta, T7N 1A4
(780) 674-8231

Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
Box 540
Blairmore Alberta, T0K 0E0
(403) 562-3141

Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
8660 Bearspaw Dam Road,
Calgary, Alberta, T3B 5K3
(403) 297-8804

NE Region

Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
417 Provincial Bldg., 5025-49 Avenue
St. Paul, Alberta T0A 3A4
(780) 645-6336

NW Region

Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
Rm 1001, Provincial Building
10320 - 99 St.
Grande Prairie, Alberta T8S 1T4
(780) 538-5260

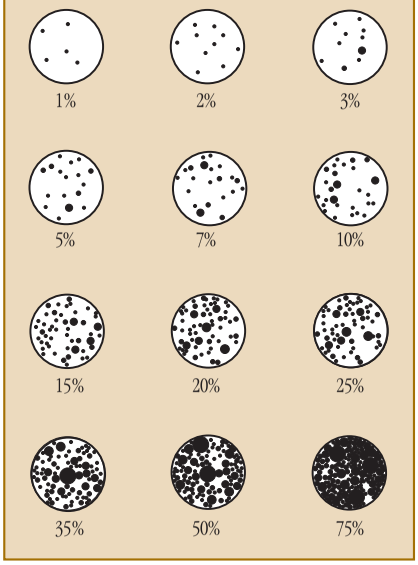
Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta Sustainable Resource Development
Bag 900-35, Room 115, Provincial Bldg.,
9621-96 Avenue
Peace River, Alberta T8S 1T4
(780) 624-6116

Edmonton
Range Resource Management Program
Rangeland Management Branch
Public Lands Division, Alberta
Sustainable Resource Development
Rm 200 J.G. O'Donoghue Bldg.
7000 113th Str.
Edmonton, AB
T6H 5T6
(780) 422-4598

Density Distribution

Class	Description of abundance in polygon	Distribution	Weeds Score	Regrowth Score
0	None		3	2
1	Rare		2	
2	A few sporadically occurring individual plants			
3	A single patch			
4	A single patch plus a few sporadically occurring plants		1	1
5	Several sporadically occurring plants			
6	A single patch plus several sporadically occurring plants			
7	A few patches			
8	A few patches plus several sporadically occurring plants		0	0
9	Several well spaced patches			
10	Continuous uniform occurrences of well spaced plants			
11	Continuous occurrence of plants with a few gaps in the distribution			
12	Continuous dense occurrence of plants			

Percent Cover Examples



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