TEXAS A&M AGRILIFE EXTENSION

4-H Range Evaluation Manual

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Introduction

More than half the land in Texas is rangeland. Rangeland is noncultivated land that produces native or introduced vegetation for grazing. Abandoned fields reseeded to native or certain introduced forage plants are also classified as rangeland. Much of the agricultural income and food for Texas is generated from the production of more than 20 million grazing animals. Wildlife on rangeland adds income and pleasure. A range with a good cover of grasses and other forage plants protects watersheds by reducing soil erosion and enhancing rainfall infiltration.

Range management includes planning and directing the grazing of range forage for maximum sustained and efficient livestock production consistent with the wise use and development of the range resources—vegetation, soil, water, and wildlife. Proper stocking with productive livestock on healthy rangeland will produce more net income for the stockman than improper stocking with poor livestock performance on poor condition range.

What is Range Evaluation?

Range evaluation is a 4-H contest which offers an opportunity to learn rangeland ecology and practical application and decision making that are essential to range management. Range evaluation tests management skills and knowledge, as well as emphasizes proper management of a valuable natural resource.

Information about good range management is learned through preparation and participation in range evaluation contests. Contestants become familiar with grasses, forbs, woody plants, ecological sites and the effects of grazing animals. They also learn the differences in plants, how grazing affects plant growth, what plants grow on certain ecological sites, the different vegetation states and the management practices that will improve a range.

The Contest
Part I: Plant Identification

In Part I, 20 to 40 live plants from the 4-H Master Plant List are staked and numbered for identification. Transplanted specimens may be used if they can be kept from wilting. Duplicate plants may be used.

The contestant must identify the plant, write in the common name and check its plant characteristics on the plant identification scorecard. Plant characteristics include: longevity—annual or perennial; season of growth—cool or warm; origin—native or introduced; and economic value for wildlife and grazing (including poison). The 4-H Master Plant List explains these characteristics.

Contestants are usually allowed 45 seconds to identify each plant and mark their scorecards. The time limit may be increased to one minute if plants are spaced some distance apart or contestants are very young or inexperienced. (Time for moving from one plant to the next is part of the total time allotted per plant.)

On Part I, there are 10 points possible per plant—six points for the plant name and one point for each characteristic. If the plant name is missed, no credit is given for the characteristics. Possible total scores for Part I will be 200 to 400 depending on the number of plants used.

NOTE: At the contest, each contestant will need a clipboard, pencil, and calculator.

Part II: Range Evaluation

An area which may represent an entire ranch, one or more pastures, or a small par of a pasture is staked off for Part II. The scorecard for Part II has seven sections: degree of utilization, kind of site, successional stage, similarity index, vegetative state, recommended stocking rate, and management decisions.

The judging committee will instruct contestants about conditions to be considered when evaluating Part II (ranch scenario on Part IIb). These considerations

would include the number of grazing and improvement decisions to be checked.

Part II has 100 possible points, 50 points total for the Ecological Site Assessment Section and 50 points for the Management Decisions Section. The judging committee will determine specific point values for each check and calculation within these two sections. Contest grading is described on p. 10.

Ecological Site Assessment

Degree of Utilization

Degree of utilization will be determined from two plants of a key plant species. One plant is left unaltered. One plant is clipped to simulate the degree of utilization. These plants will be clearly marked outside the plot.

Three degrees of utilization are considered during judging. After examining the two utilization plants, decide which of the three choices apply and mark an "X" in the block.

1. **Unused or light.** Less than 25 percent utilization of total plant-production.
2. **Moderate.** Twenty-six to 60 percent utilization of total plant-production.
3. **Heavy.** More than 60 percent utilization of total plant-production.

Kind of Site

An ecological site is a soil or group of soils that are capable of producing the same kinds and amounts of native forage. Ecological site determines forage production and the potential stocking rate.

For this contest, the depth of soil determines the ecological site classification. However, when making a practical range survey, other site factors such as parent material, topography and drainage should be considered.

Soil depth is the amount of soil which plant roots will penetrate above the parent material or bedrock. Soil depth determines moisture and plant nutrient storage space, and may limit root growth. Soil depth may greatly influence the kinds and amounts of forage produced.

Four general ecological sites are used in range evaluation.

1. **Bottomland.** High-production soils, nearly level, greater than 20 inches deep which receive frequent overflow flood water from a draw, stream, creek or rive. Driftwood, gravel and sand deposits may be evident.
2. **Deep upland.** High-production soils, nearly level, greater than 20 inches deep. High producing soils of divide or valley areas. Not subject to frequent overflow water.
3. **Shallow upland.** Medium-production soils 10 to 20 inches deep, may have some pockets of deep soil. Nearly level to rolling.
4. **Very shallow upland.** Low-production soils less than 10 inches deep, may have pockets of deep soil. Nearly level to rolling. May have small unattached rocks on surface.

A hole will be dug near the plot for contestants to use in determining the kind of site. If plant roots are evident through the soil profile exposed by the soil pit, assume soil depth to be the same as depth of the soil pit.

Successional Stage & Similarity Index

For this part of the contest, several plants will be staked for identification. Pounds of production will be provided for each of these plants. Contestants will be provided an Ecological Site Description for the site which will list plants that occur in the Reference Plant Community and their allowable production in pounds per acre. An example is shown in the table below.

Similarity Index = Allowable pounds of production ÷ total production/acre for the Reference Plant Community (RPC).

Ecological Site Description example for Reference Plant Community similarity index determination.

Species Name	Reference Plant Community, lbs/acre	Annual production, lbs/acre	Allowable, lbs/acre
Sideoats grama	400	100	100
Little bluestem	800	100	100
Silver bluestem	200	100	100
Buffalograss	600	800	600
Red lovegrass	0	100	0
Red grama	0	200	0
Purple threeawn	0	200	0
Annual brome	0	200	0
Total	2000	1800	900

Similarity index (SI) for the example in the table above is as follows:

SI = (900 lbs allowable forage ÷ 2000 lbs RPC production) * 100 = 45%

The similarity index is used to determine the successional stage of the plant community.

The four successional stages are:

1. Potential natural: similarity index 76-100 percent.
2. Late: similarity index 51-75 percent.
3. Mid: similarity index 26-50 percent.
4. Early: similarity index 0-25 percent.

Vegetation State

Different plant communities may exist on an ecological site. These plant communities are called vegetation states. Plant communities on an ecological site can change from one vegetation state to another as a result of management practices.

For this contest, four general vegetation states listed below will be used. The photoguide illustrating these vegetation states at the end of this manual will be used to decide the proper check for this part of the contest. A rope-line will be placed in front of the area to consider. If necessary, a second rope-line will be place in back of this area to indicate depth of the area. Trees are defined to be 16 feet or more tall and shrubs are less than 16 feet tall. An 8-foot reference pole will be placed in this contest area to help determine woody plant height.

1. Open Grassland (Reference Plant Community, less than 10% woody vegetation).
2. Grassland with shrub encroachment (10 to 30% woody vegetation).
3. Shrubland (shrub dominated, >50% shrub cover).
4. Woodland (tree dominated, >80% tree cover).

Recommended Stocking Rate

Plants staked for determining similarity index and successional stage will also be used to determine the recommended stocking rate. Only plants marked "Desirable" on the Ecological Site Description provided at the contest are used for this calculation. Desirable pounds of production is totaled for the site and divided by 4 (25% harvest efficiency) to determine usable forage. Then the annual air-dried forage allowance per animal unit (10,000 pounds/Animal Unit Year (AUY)) is divided the by the pounds of usable forage to obtain the Acres/Animal Unit Year. Equations for these calculations are shown below.

1) Desirable forage (pounds/acre) ÷ 4 (25% harvest efficiency) = Useable forage (pounds/acre)

2) 10,000 pounds/AUY demand ÷ Usable forage (lbs/ac) = acres/AUY

Example Calculation:
Little bluestem 750 lbs/acre & desirable
Silver bluestem 450 lbs/acre & undesirable
Sideoats grama 500 lbs/acre & desirable
Plains lovegrass 400 lbs/acre & desirable
Buffalograss 350 lbs/acre & desirable
Upright prairie coneflower 250 lbs/acre & undesirable

1) 2000 pounds/acre of desirable forage ÷ 4 (25% harvest efficiency) = 500 pounds/acre usable forage

2) 10,000 pounds/AUY demand ÷ 500 pounds/acre usable forage = 20 acres/AUY

Management Decisions

Grazing Decisions

1. Livestock Grazing

a) Continue present grazing system.

If range successional stage is Potential Natural or Late, the degree of use is moderate and present range management is satisfactory, continue the present grazing use. If a system using deferment is being followed, this decision should be checked. For range management to be satisfactory, some kind of deferment is usually necessary for plant vigor to remain high. The situation information provided at the site will indicate if the manager is currently following a systematic deferred-rotation grazing system, uses decision deferment or grazes until a certain utilization of the key management species is obtained, etc. Key species serves as indicators of degree of use. Grazing management of a specific range is based on use of key management species.

b) Initiate planned, deferred-rotation grazing system.

Rangeland should be placed into some kind of a planned deferred-rotation grazing program, of which there are many. Rate of range improvement and livestock and wildlife performance will vary with the system. As indicated, situation information for the site will provide a clue to selecting this alternative.

c) No livestock.

If the site situation indicates that landowners only wish to manage for wildlife, this decision should be checked. Unless the site situation indicates that other grazing

decisions should be checked, this would be the only grazing decision checked if landowners do not want to manage livestock.

d) Introduce livestock to manage wildlife habitat.

In some cases, vegetation disturbance by livestock is desirable for certain wildlife species. For example, white-tailed deer can benefit from forb production generated within areas where livestock grazing has opened the soil to sunlight. In addition, bobwhite quail need areas with frequent basketball-size grass clumps for nesting but also need more open areas for travel and foraging for seed and insects.

2. Defer grazing in a pasture or pastures during growing season for increased vigor and seed production of desirable plants.

On overgrazed and low successional pastures, this decision is sometimes desirable to give key plants a chance to grow and allow natural seeding, accumulate plant litter and mulch on the soil, and determine if artificial seeding is necessary. Deferred grazing will provide an opportunity for seeded stands to become established prior to grazing. This decision should be checked if utilization is heavy or the present grazing system is continuous.

3. Defer grazing before noxious plant control to allow seed production of forage plants.

The presence or absence of key forage plants has a bearing on the method used to control and mange noxious (brush, herbaceous weeds and poisonous) plants. Often with dense stands of noxious plants, desirable forage plants are overgrazed and impossible to identify positively. Plants that have been deferred usually make a more rapid recovery following noxious plant control. Where 10 percent of the vegetation is from key species and is fairly well distributed, chemical plant control may be more feasible than mechanical control because reseeding may not be necessary. If less than 10 percent of the vegetation is from key species, mechanical control may be the logical brush control method to help prepare a seedbed for reseeding. Check this decision if prescribed burning will be applied.

4. Defer grazing after noxious plant control for reestablishment of desirable forage plants.

Noxious plants use four to eleven times more water to produce a pound of plant material than desirable grasses use to produce a pound of nutritious forage. Whenever noxious plants are controlled, defer grazing to aid reestablishment of desirable forage plants and to obtain the greatest range improvement, forage production and grazing capacity.
Increased forage production and livestock products help pay for control measures. Graze the treated area moderately during winter following control measures. Vigorous grasses will help keep noxious plant seedlings under control. Check if improvement decision numbers 1, 2, 3 or 4 (broadcast herbicide, broadcast mechanical, or prescribed burning only) are checked.

5. Distribute salt for more uniform grazing.

Many times a watering place is not ideally located and construction of a new facility is not feasible. Grazing distribution may be improved by moving salt and mineral boxes to the under-used areas. Under average conditions, livestock will easily find the salt. On ranges with high salt content forage, add cottonseed meal to salt or use low-salt feed supplements to entice animals to graze under-used areas.

Salt and water do not need to be side-by-side for animals to use the salt. Experiments show that eight or more hours may elapse between eating salt and drinking water. Place salt boxes in under-used areas about one-half mile from water. Put them on knolls, benches, openings in timber and brush or on gentle slopes. Granulated salt is better because animals eat salt rather than lick it.

An intense short duration grazing method with a “cell” pasture arrangement would be an exception. The water, salt and minerals could be placed in the cell center.

6. Initiate flexible stocking.

Practice flexible stocking to limit forage use. As a general rule, for proper use, limit use to 50 percent (by weight) disappearance of desirable plant yearly growth. Half of the

disappearance (25% of annual production) would be allotted to grazing animals and the other half to insects, trampling, and decay of plant material.

With a flexible livestock operation, range health can be maintained or even improved. If animals are purchased, sell extra stock when moderate use of vegetation is obtained. If the year is dry and forage is short, sell the year's calf crop earlier than usual. This practice will help keep good plant cover and sufficient forage during winter to maintain the foundation herd.

A systematic deferred-rotation grazing system coupled with flexible stocking can improve range health while grazing the pasture and will maintain the ranching operation on a sound economic basis. Flexible stocking should be used regardless of the grazing system.

Contestants will be provided a ranch situation statement indicating whether flexible stocking is currently used. If the ranch situation indicates that flexible stocking is not currently used, contestants should consider checking this alternative.

7. Change to other kinds or combinations of domestic animals.

A basic range management principle is to fit the grazing animal to the forage being produced. Cattle are classified as grazers and eat mostly grasses. Sheep eat mostly grasses, but also eat a high percentage of forbs. Goats are classified as intermediate feeders. They eat almost half grass and half browse and some forbs. Intermediate feeders can be very flexible in what they eat. Most exotic wildlife species are classified as intermediate feeders. Deer are classified as browsers and eat mostly browse and forbs and very little grass.

A mixture of cattle, sheep and goats can graze pastures when rangeland forage is a mixture of grasses, forbs, and browse.

The contest situation, with respect to the kind of animal currently grazing the range, management goals and vegetation within the plot, will determine whether or not to check this alternative.

8. Reduce stocking rate.

Check this decision if utilization is heavy (based on the two marked utilization plants) or if the story shows a higher stocking rate than the calculated recommended stocking rate. Remember that a stocking rate of 10 acres/animal unit/year is greater than 20 acres/animal unit/year.

Improvement Decisions

1. Seed adapted species.

Artificial seeding with adapted forage species is recommended when less than 10 percent of the forage production is from plants allowed on the Ecological Site Description**.** These plants should be well distributed over the plot.

Practice artificial seeding and deferred grazing when native grass turf is destroyed by mechanical methods. Control annual weed growth with chemicals to insure grass seedling establishment.

2. Control or manage herbaceous weeds.

Control measures are necessary when weeds are abundant enough to reduce forage production. Concentrations of three or more weeds (such as annual broomweed, western ragweed, bitter sneezeweed or western bitter weed) per square foot would necessitate control. Weeds to consider should be on the Master Plant List or Ecologicial Site Description.

Annual weeds can be controlled or managed by mowing, using chemicals or grazing the areas with sheep and goats.

Mowing is not practical in rough Texas range areas, but may be suitable in some native grass pastures. Chemical weed control can be economical and beneficial.

Another method of weed management is biological. This method involves grazing the area at a heavy stock density with sheep and/or goats until the young annual weeds have been used, then rotate the animals to another weedy pasture. If sheep, goats or deer are currently grazing the site and annual weeds are palatable and nutritious, this reason should not be checked.

3. Control poisonous plants.

Generally if a plant in the plot is listed on the ecological site description or 4-H Master Plant List as poisonous, then this item should be checked. Space does not allow for discussion of all the exceptions. Certainly species such as western bitterweed, woolly loco and threadleaf groundsel should be controlled. However, live oak, which is poisonous only under very limited

conditions, is usually a desirable browse for goats or for cover and food for many species of wildlife and should not be controlled. The contest situation should provide insight into whether or not to check this item.

4. **Woody plant, cacti and/or yucca management.** The ranch situation will determine if management of these plants is desirable and the specific practices to be checked.

    a. Broadcast aerial or ground herbicide spray. This practice is a possible check when plant density is 400 or more per acre.
    b. Broadcast mechanical treatment. This practice is a possible check when plant density is 400 or more per acre.
    c. Individual plant treatment – mechanical. This practice is a possible check when plant density is less than 400 or more per acre.
    d. Individual plant treatment – stem spray. This practice is a possible check when plant density is less than 400 or more per acre. It is a good choice when there are 3 or fewer stems per plant.
    e. Individual plant treatment – leaf spray including pricklypear pad-spray. This practice is a possible check when plant density is less than 400 or more per acre. It is a good choice when there are more than 3 stems per plant and plants are no more than 6 feet high.
    f. Prescribed burning. This practice is excellent for management of Ashe juniper which is under 4 feet tall. It is also a good practice for pricklypear management because it reduces the number of pads even if it does not kill the entire colony. It is not as desirable a practice with re-sprouting species such as mesquite. Depending on the ranch situation statement, this practice could also be used for brush suppression of re-sprouting species or vegetation management such as wildfire suppression.

    To determine brush plant density for the contest, contestants will be given plot sizes as follows:

Plot Size, acres	Multiply Plant Density by
One	1
One-tenth	10
One-one-hundredth	100
One-one-thousandth	1000

    If plants are valuable as browse (live oak, skunkbrush), honey plants (whitebrush, guajillo) quail cover (lotebush), nesting cover for certain song birds (ashe juniper for golden-cheeked warbler), etc., control might not be appropriate based on management goals.

5. **Water development.**

    In many areas, fencing for better livestock distribution and more uniform grazing is not economically feasible, but redistributing water and salting facilities instead can help improve range use.

    Generally, livestock watering facilities should be located about one mile apart. However, watering places may need to be one-half mile apart in excessively steep or brushy country, while in flat country they could be a maximum of two miles apart. Another option is to water one or more pastures from a single location by constructing pipelines. The watering facility can be an earthen tank, a windmill and water tanks, springs, or streams with permanent water.

    If watering facilities are inadequate to encourage good grazing distribution, this item should be checked. Contest situations presented to contestants should provide keys for deciding whether or not to check this item.

6. **Fence to implement management decisions.**

    Contest situations presented to contestants should provide keys for deciding whether or not to check this item.

Part III. Rangeland Health

In Range Evaluation Part III, four square plots will be staked off and numbered 1, 2, 3, and 4. Part III has 100 possible points: plot range health is worth 40 points and 10 questions about the plots are worth 6 points each.

Under the range health category for each plot, contestants evaluate each plot separately, checking the range health problem indicator(s) that they observed in each plot. In the plot range health section, participants check a box for each plot's range health category (healthy, at risk, or unhealthy) depending on the number of health problems observed in that plot.

Range Health-Problem Indicators

Photoguide Indicators

Five of the range health problem indicators used to determine the range health category are shown in the training photoguide at the end of this manual. These

characteristics include pedestaled plants, litter dams, rill/gully, erosion shelves, and soil capping.

Excessive Bare Ground

The excessive bare ground indicator will be determined by comparing each plot to a reference plot established by the contest Superintendent. The bare ground reference plot will represent the acceptable amount of bare ground for the site. If any plot has a greater amount of bare ground present than the reference plot, then this indicator will be checked. This indicator is determined by examining the amount of bare mineral soil exposed where plants, rocks and plant litter are not considered as bare ground.

Noxious Plants

The noxious plant indicator will be checked when one or more noxious plants are present in the plot. For each 4-H range evaluation contest, the contest Superintendent will provide a list of noxius plants for the contest ecological site for participants to review and make their decision. If a plant on the contest noxious plant list is not included on the 4-H Master Plant List, the Contest Superintendent will stake and label the plant for contestants to learn and use.

Noxious plants will include native or introduced plant species capable of invading and increasing on a site even under good management. For example, the Low Stony Hill ecological site in Howard County might have an invasive plant list of redberry juniper, pricklypear, ashe juniper and King Ranch bluestem.

From the 4-H Master Plant List, non-native plants that can be listed as noxious will include rattail smutgrass, field bindweed and Japanese brome. In addition, introduced forage species such as bermudagrass, dallisgrass, bahiagrass, Johnsongrass and buffelgrass may be listed as noxious under certain situations.

Contest participants will be given a list of plants on the Ecological Site Description that are considered noxious or invasive for the contest site.

Range Health Categories

Healthy: Check if 0 health problem indicators are checked.

At-risk: Check if 1 or 2 health problem indicators are checked.

Unhealthy: Check if 3 or more health problem indicators are checked.

Plot Evaluation

For the "Plot Evaluation" section, the participant must determine which of the plots (1, 2, 3, or 4) contains the item asked for in each of the 10 categories. Occasionally, the difference between plots may be too difficult to determine so the contest committee could allow more than one correct answer. Also, there may be situations where none of the plots have browse, poisonous plants, annual plants, etc. Zero would be the correct answer.

1. **Greatest number of species allowed on ecological site description.**

   The plot with the greatest number of species on the Ecological Site Description is the best plot. If two plots had the same number of species, but one had seedling plants and the other had mature, healthy plants, the plot with mature plants is better because of forage production and conservation of soil and water.

2. **Most ground cover of species allowed on ecological site description.**

   Cover is the amount of live and dead desirable plants that cover the plot's soil surface. Ground cover is beneficial because it protects the soil from erosion. Invaders seldom protect the soil properly because many are either annuals that leave soil exposed during certain periods or perennials that compete with or prevent desirable plants from growing on the site.

3. **Most pounds of current year's growth from plants allowed on ecological site description.**

   This is the plot with the most current production or standing crop from desirable plants. If new year's growth has not begun, previous year's growth should be used.

4. **Most ground cover of cool season plant species on the 4-H Master Plant List.**

   This is the plot with the most ground cover of cool-season plants such as Engelmanndaisy, Texas wintergrass, wildryes, Western wheatgrass, etc.
   Winter forage on range helps maintain good year-round grazing.

5. **Most desirable forb and herbaceous legume species allowed on ecological site description.**

   This is the plot with the most ground cover of allowable forbs and legumes listed on the Ecological Site Description for the contest.

   Many legumes are palatable and furnish considerable forage throughout the year. Some native legumes are poisonous on certain soil types, but on other soils, they are good forage plants. One example is peavine, which is good for sheep when it is not growing on granitic soils. Some desirable native forbs are Engelmanndaisy, orange zexmenia, perennial sunflower and dotted gayfeather.

6. **Most ground cover of poisonous plants.**

   This is the plot with the greatest ground cover of plants designated on the 4-H Master Plant List as poisonous.

7. **Most desirable browse.**

   This is the plot with the most forage provided by allowable woody plant species listed on the Ecological Site Description and within reach of livestock and deer. Exotic wildlife species are considered livestock. Some plots with certain species may be those selected for both 6 and 7.

8. **Most rock cover.**

   This is the plot with the most rock cover. Rock can help to protect soil from erosion by slowing rainfall movement. It can also help to reduce raindrop impact with causes soil capping. However, rocky soils are shallow and less productive.

9. **Most bare ground.**

   This is the plot that has the most exposed mineral soil not covered by rock, litter, or live plants.

10. **Most plant litter.**

    This is the plot with most plant litter which is dead plant material decomposing on the soil surface.

    Plant litter is dead plant material and acts as a soil conditioner. Plant litter prevents puddling from raindrop splash, reduces fluctuations in soil temperature and tends to reduce soil water loss by evaporation. During summer months, litter breaks the direct sun rays and during winter months it holds heat within the soil. Usually, range used moderately will have enough plant litter to allow rapid intake of water by the soil.

Planning the Contest

Careful planning and organization before the contest is essential for its success. Representatives from agricultural agencies within the county should comprise the range evaluation contest committee. Someone should be designated to take the lead in planning the contest.

Duties of the range evaluation contest committee are to:

- Publicize the event ahead of time to attract participants.
- Select a suitable place for contest activities.
- Select plants from the 4-H Master Plant List for identification.
- Stake and rope off the area for Part II. Dig the hole for site determination. Set up two utilization plants outside the plot. Stake plants for identification to be used in similarity index and successional stage determinations. Rope off an area for vegetation state determination and place a reference pole for woody plant height.
- Stake and number four plots and one bare ground reference plot for Part III. Plots should be on the same ecological site.
- Determine correct answers for all parts of the contest.
- Select appropriate awards and recognition.
- Have sufficient copies of Range Evaluation Part I, Part II, Part IIa, Part IIb, and Part III contest forms.
- Arrange for a public address system if groups are large.
- Locate a parking area away from the contest area.
- Have water and cups available.

Training Contestants

Range evaluation is successful only when contestants learn to identify and classify range plants by kinds of grasses, forbs, legumes, and woody plants.

The adult leader and county Extension agent should begin range evaluation training with plant identification and classification using plant mounts and then progress to other parts of the contest.

After 4-H members have learned plant mounts, they should be taken to the field to practice with live plants. Explain that plants have different appearances under varying growth conditions.

Work with one part of the contest at a time. Team members should be familiar with one part before moving to the next.

NOTE: At the contest, each contestant will need a clipboard, pencil, and calculator.

Summary

Range evaluation is more than a contest. It's a method of determining the productive potential of native rangelands. Principles of range management that should be taught in range evaluation are: ●Plants and their forage value.
●Different plants grow on different ecological sites and each site has a specific production potential.
●Ways to determine forage production to estimate grazing rates on each pasture.
●Why multiple-use must be adapted to each range for maximum sustained use of natural resources.
●How grazing affects plant growth and the results of what proper grazing will do for a pasture.
●Why it is important to use different kinds of animals to graze different ranges.
●Importance of a systematic deferred-rotation grazing program.
●Ways to determine the degree of use on different forage plants.
●How to adapt different range practices on a specific ecological site and vegetation state to improve the range.
●How noxious plants affect forage production.
●Flexible stocking concept.

Support Materials

The following support materials are available through the Texas AgriLife Extension Bookstore at: https://agrilifebookstore.org

B-6136, Using Livestock to Manage Wildlife Habitat. Texas Cooperative Extension.

E-391. What Range Herbivores Eat—and Why. Texas Agricultural Extension Service.

E-98. Integrating Deer, Quail and Turkey Habitat. Texas Agricultural Extension Service.

E-44 Brush Management Methods

Contest Grading

Part I – 200-400 points

1) Each plant counts 10 points **including characteristics**.
2) If the common name on the Master Plant List is not used, no points are given.
3) Each characteristic (longevity, season of growth, origin, wildlife economic value, grazing economic value, and poisonous) counts one point each.

Part II – 100 points

1) The Ecological Site Assessment Section including degree of utilization, kind of site, successional stage, similarity index, vegetation state, and recommended stocking rate counts a total of 50 points. The contest committee will assign points among the six parts of this section according to degree of difficulty for the various parts.
    a. Similarity index can be entered as a decimal or rounded to the next whole number. For example, a similarity index could be entered as 55.4% or rounded to 55% and 55.6% could be entered as the decimal or rounded to 56%.
    b. Recommended stocking rate can also be entered as a decimal or rounded to the next whole number.
    c. Partial credit can be awarded for similarity index and stocking rate calculations. See instructions on the next page.

2) The Management Decisions Section counts a total of 50 points.

    a. Contestants are given the number of Grazing and Improvement Decisions to check. For every check above the designated number of checks, deduct the point value for each check within each group of decisions.
    b. Example: Contestants are told to check 4 grazing and 2 improvement decisions. The contest committee decides each grazing decision is worth 10 points and each improvement decision is worth 5 points for a total of 50 points. A contestant checks 5 grazing and 3 improvement decisions. In this case graders would deduct 10 points from the grazing side for the extra check so the most points a contestant could get for correct grazing decision checks would be 30. Graders would also deduct 5 points from the improvements side so that the most points the contestant could get for correct improvement decisions would be 5. The lowest score for this section because of deductions for extra checks would be zero.

Part III – 100 points

1) The Plot Range Health Section is worth a total of 40 points.
2)
    a. Each plot is worth 10 points.
    b. The Range Health Category is worth 3 points. Contestants can receive credit for correct Range Health Indicator checks even if the Range Health Category is incorrect.
    c. Each Range Health Indicator is worth one point each (7 points total). Contestants receive credit for correctly checked and correctly unchecked indicators.

        i. Positive Points:
            1. If an indicator is supposed to be checked and is, the contestant receives a point.
            2. If an indicator is not supposed to be checked and is not, the contestant receives a point.
        ii. Negative Points:
            1. If an indicator is supposed to be check and is not, deduct one point.
            2. If an indicator is not supposed to be checked and is, deduct one point.

3) The Plot Evaluation Section is worth 60 points with each question worth 6 points each. Correct answers can be 0, 1, 2, 3, or 4. Sometimes, because there is not an apparent difference between or among plots for a question, the contest committee will accept more than one answer, for example, 2 or 4, but not both 2 and 4. An answer of 0 is correct when none of the plots match the criteria for the question. For example, if none of the plots have a poisonous plant, the correct answer would be 0.

Part II
Similarity Index and Recommended Stocking Rate Calculation
Partial Credit Procedure

The reason for considering partial credit for Similarity Index and Stocking Rate calculations is to reward contestants for understanding how to do these calculations rather than an all-or-none approach. For example, without partial credit, a contestant only needs to misidentify one plant to lose full credit for calculations.

1. For Similarity Index and Recommended Stocking Rate scores, check the boxes on the score-sheet for correct entries. If entries in these boxes are correct according to the Part II Score Sheet Key, give full credit for the answer(s).

2. If no numbers are entered in the Similarity Index and Stocking Rate boxes, no credit can be given.

3. If numbers are entered in the Similarity and Stocking Rate boxes, but are not correct, use the contestant's **Ecological Site Description & Plant Production Worksheet** to check that calculations have been done correctly. Contestants must turn in this worksheet to receive partial credit.

    a. For Similarity Index calculations:
        i. A number for total Allowable Production must be entered in the "Total" box for that column in the worksheet. This total must be entered in Similarity Index Equation.

        ii. The Reference Plant Community Total (provided on the worksheet) must be entered in the Similarity Index Equation.

        iii. A percentage must appear at the end of the equation. See example below.

Similarity Index (SI) = (__500__Allowable lbs/acre ÷ __1000___RPC production lbs/acre) * 100 =___50___%
Transfer this number to Part II Score Sheet

        iv. If all of these entries appear and the calculated percentage shown on the worksheet matches the entry on the contestant's score sheet, give the contestant the partial credit indicated by the contest committee.

    b. For Recommended Stocking Rate calculations:
        i. A number for total Desirable Annual Production must be entered in the "Total" box for that column in the worksheet. This total must be entered in the Recommended Stocking Rate Equation.

        ii. Numbers must appear in all blanks (Useable Forage, ac/auy). See example below.

Desirable Annual Production (lbs/ac)_____2000_____ ÷ 4 = Usable Forage _____500_____(lbs/ac)
Recommended Stocking Rate (ac/auy)
10,000 lbs/animal unit year ÷ ___500_____ Usable Forage (lbs/ac) = ___20_____ac/auy
Transfer this number to Part II Score Sheet

        iii. If all these entries appear and the calculated stocking rate shown on the worksheet matches the entry on the contestant's score sheet, give the contestant the partial credit indicated by the contest committee.

Ecological Site Vegetation State Examples

Open grassland (<10% woody canopy cover)

Shrubland (shrub dominated, >50% shrub cover)

Grassland with shrub encroacment (10-30% woody canopy cover)

Woodland (tree dominated, >80% tree cover)

Range Health-Problem Indicator Examples

Pedestaled Plant

Erosion Shelf

Litter Dam

Soil Capping

Rill/Gully (Eroded channels: rills are a few inches deep; gullies are one foot or more deep)