

# **NEBRASKA TECHNICAL NOTE**

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The attached Technical Note is on Procedures for Conducting a Grazing Land Inventory and Assessment. It outlines a process for completing a grazing land (rangeland, pastureland, annual forages, hayland, and/or crop aftermath) inventory of a management unit, ranch, or other unit. These procedures should be completed on site with the land manager in order to get a complete understanding of the operation.

## PROCEDURES FOR CONDUCTING A GRAZING LAND INVENTORY AND ASSESSMENT

### Inventory process:

The following outlines a process for completing a grazing land (rangeland, pastureland, annual forages, hayland, and/or crop aftermath) inventory of a grazing management unit or ranch. This process should be completed on site with the land manager in order to get a complete understanding of the operation. The inventory will provide the conservation planner and land manager with enough information about the physical, vegetative and animal resources to help the land manager make decisions on conservation alternatives for improved grazing management.



*Photo by D.Larsen, USDA-NRCS, Nebraska, 2004*

### *Suggested Field Documentation Methods to Complete the Grazing Land Inventory*

<b>Rangeland</b>	<b>Pastureland</b>	<b>Form #</b>	<b>Form Title</b>
X	X	NE-ECS-63	Grazing Lands Assistance Questionnaire
X	X	NE-ECS-8	Grazing Lands Monitoring Plan and Key Area Documentation
	X	NE-ECS-40	Pasture Inventory Worksheet
	X	NE-ECS-13	Pasture Condition Score Sheet
	X	NE-ECS-14	Degree of Use Worksheet for Pastures
X		NE-ECS-1	Range Inventory Worksheet
X		NE-ECS-9	Similarity Index Worksheet
X		NE-ECS-11	Rangeland Health Evaluation Worksheet
X		NE-ECS-12	Apparent Trend Worksheet
X		NE-ECS-50	*Forage Inventory Based on Current Stocking Rate, Trend, Health and Utilization
X	X	NE-ECS-60	Forage Inventory
X	X	NE-ECS-61	Livestock Inventory and Forage Balance Worksheet
X		NE-ECS-65	University of Nebraska-Sandhills Defoliation Response Index System
X		NE-ECS-66	Worksheet for Determining Range Condition

*\*Use NE-ECS-50 during end of grazing season field reviews with the land manager. NRCS conservation planners need to have JAA Level V in Prescribed Grazing to use this method for establishing average carrying capacities of management units.*

### Materials Recommended in Complete the Grazing Land Inventory:

- Clippers
- 60, 100 or 300 gram scales
- Lunch bags or sacks
- 1.92 Sq. ft. clipping frame or .96 sq. ft. frame for dense vegetation
- Measuring ruler or tape in inches

- Pin flags
- Ecological Site Descriptions or Range Site Descriptions (rangelands)
- Forage Suitability Group Descriptions (pastureland)
- Soil maps and soil interpretations
- Sharp Shooter (Shovel)
- Conservation Plan Map with property boundaries delineated
- Pencils and Markers
- GPS (recommended)
- Camera

**Physical Inventory:**

An on-site inventory of existing structures should be noted on the conservation map. Include functioning physical structures on the final conservation plan map by using Toolkit conservation planning symbology where applicable to identify structures. Non-functioning structures such as abandoned wells and downed fence-lines can be included if that information is needed to assist with planning. Highlight or identify resource concerns to aid in planning and analysis of progress toward objectives. Do not place sensitive information such as cultural resource locations on the final conservation planning map. The physical resources inventory shall include:

- Water developments –(type and size, or storage capacity in gallons may be considered as an additional map layer or as a separate inventory)
- Existing Fences – (note type, i.e. electric, two-strand barbed wire, suspension, etc.)
- Existing usable power sources for potential well sites
- Traditional salt, mineral and creep feeder locations
- Trails, gully erosion, blowouts and other eroded areas

**Vegetative Inventory:**

The vegetative inventory process will help the planner and the land manager determine the following:

- If there is a balance between livestock forage availability and forage demand.
- Production and health of the existing and potential vegetative resources.
- Types of forages available, what they are used for and where they are located (seeded vs. native).
- Types and location of noxious weeds or invasive plant species.

**Rangeland Procedure***1. Identify and Mark a Key Area and Key Species*

A key area should be selected with the land manager after a thorough on-site review of the management unit(s) has been completed. The use of a Global Positioning System (GPS) unit is recommended to document key area locations. Navigation to the key area with a GPS allows the site to be easily located without permanent markers. The key area should be marked on the inventory map. If time does not permit collection of data on

other sites across the unit, the data collected at the key area may be used as a reference to compare and interpret the resource condition of similar sites on the unit. These sites shall be noted on the planning map or appropriate inventory form. See *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems*, Herrick et. al, Chapter 2 for more information on stratifying land into monitoring units and selecting key areas. Select a key plant species and record key area and key plant information on [Monitoring Plan Worksheet, NE-ECS-8](#).

#### *2. Determine or verify the Ecological Site/Range Site*

Use soil maps and soil interpretations along with the Ecological Site Descriptions or Range Site Descriptions to verify sites. Indicate the site(s) on the inventory map using the Ecological Site/Range Site initials, i.e. Ly for Loamy, Sa for Sands. Refer to Conservation Plan Map Legend, NE-CPA-37 for site abbreviations and other planning symbols.

#### *3. Determine Production*

Use [Similarity Index Worksheet, NE-ECS-9](#) when clipping or [Range Inventory Worksheet, NE-ECS-1](#) when estimating production. When clipping to determine production, a minimum of two frames should be clipped and 8 frames should be estimated. Clipping for total production or clipping by individual plant species should be a decision based upon the overall objectives of the grazing management plan. Ocular estimates of production should be substituted for the clipping method when the planner becomes comfortable with forage estimates.

#### *4. Determine Rangeland Similarity Index or range condition*

Use the [Similarity Index Worksheet, NE-ECS-9](#) from the key area(s) and Ecological Site Descriptions to estimate the similarity index for the corresponding ecological site in each management unit. Delineate changes in the similarity index within the same ecological site on the conservation plan map. Express the similarity index in terms of a percentage. Proceed in estimating the similarity indexes of the remaining ecological sites throughout the management unit(s). See Exhibit B.

Note the range condition for the range sites in each management unit when ecological site descriptions are not available. Delineate changes in condition within the same range site on the conservation plan map. See Exhibit A. Summarize the range condition information on [NE-CPA-17, Range Inventory Summary](#).

#### *5. Determine Apparent Trend*

Use the [Apparent Trend, NE-ECS-12](#) to document range trend for the ecological site/range site at the key area.

#### *6. Determine Rangeland Health*

Use the [Rangeland Health Evaluation, NE-ECS-11](#) to document the rangeland health index at the key area.

### *7. Utilization mapping (optional).*

Delineate the major grazing use patterns within the pasture on the inventory map. Denote the appropriate Utilization Class for the entire pasture or major use patterns within the pasture. *NE-ECS-5 Utilization Documentation-Landscape Appearance* can be used to record ocular estimates of forage utilization based on the general appearance of rangeland. This option should be used when livestock grazing distribution has been identified as a cause of resource concern.

## Pastureland Procedure

### *1. Identify and Mark a Key Area and Key Species*

A key area should be selected with the land manager after a thorough on-site review of the management unit(s) has been completed. The use of a Global Positioning System (GPS) unit is recommended to document the key area location. Navigation to the key area with a GPS allows the site to be easily located without permanent markers. The key area should be marked on the inventory map. If time does not permit collection of data on other sites across the unit, the data collected at the key area may be used as a reference to compare and interpret the resource condition of similar sites on the unit. Sites with similar condition or similarity index to one of the representative sites on the unit may be noted on the planning map or appropriate inventory form. See *Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems*, Herrick et. al, Chapter 2 for more information on stratifying land into monitoring units and selecting key areas. Select a key plant species. Record key area and key plant information on [Monitoring Plan Worksheet, NE-ECS-8](#).

### *2. Determine or verify the Forage Suitability Group*

Use soil maps and soil interpretations to make this determination. Indicate the forage suitability group (FSG), on the inventory map using the appropriate initials, i.e. Ly for Loamy, Sa for Sands. Refer to Conservation Plan Map Legend, NE-CPA-37 for site abbreviations and other planning symbols. See Exhibit B for an example of a pastureland inventory.

### *3. Determine Production*

Use the [Pasture Inventory Worksheet, NE-ECS-40](#) when clipping or [Forage Inventory, NE-ECS-60](#) when estimating the production at a key area. Production on hayland may also be obtained during the land manager interview (i.e. a 25 acre field producing 50 bales each weighing 1200 lb would equate to 2400 lbs /ac). When clipping to determine production, a minimum of two frames should be clipped and 8 frames estimated per site. Ocular estimates of production should be substituted for the clipping method when the planner becomes comfortable with forage estimates.

### *4. Determine the Pasture Condition Score*

Use [NE-ECS-13 Pasture Condition Score Sheet](#) to determine the pasture condition and record suggested management changes, as appropriate. Indicate the pasture condition score on the conservation plan map.

### *5. Utilization mapping (optional).*

Delineate major grazing use patterns within the pasture or evaluate the pasture as a whole. Indicate on the planning map the appropriate landscape appearance class for the entire pasture or major use pattern within the pasture. [NE-ECS-5 Utilization Documentation-Landscape Appearance](#) can be used to record ocular estimates of forage utilization based on the general appearance of pastureland. This option should be used when livestock grazing distribution has been identified as a cause of resource concern.

### Annual Forages and Crop Aftermath Procedure

The following information should be collected for annual forages or cropland fields grazed after harvest. Usable forage production from annual forages or crop aftermath is highly variable and can be difficult to predict due to a number of factors. Factors such as precipitation, type of annual forage or crop residue, amount of volunteer crop growth after harvest and level of grazing management can affect the amount of forage available and the efficiency with which the animal will harvest the forage.

Options for estimating forage production on annual forages and crop aftermath should include one or more of the following:

1. Determine amount of usable forage by clipping, drying and weighing forage samples from a representative site(s). Use [Pasture Inventory Worksheet, NE-ECS-40](#) to record this information. When clipping to determine production, a minimum of two frames should be clipped and 8 frames estimated per site.
2. Utilize land manager's knowledge of previous years' production (i.e. hay yield from previously harvested annual forages) and/or previous grazing levels.
3. Use Table 1. in the Analysis and Interpretation section. These figures should only be used as a guide.

### **Animal Inventory**

Gather animal inventory information from the land manager. Use [Livestock Inventory and Forage Balance Worksheet, NE-ECS-61](#), or [Grazing Lands Questionnaire, NE-ECS-63](#).

The following information about the animal inventory will assist the land manager and planner in developing the grazing management plan:

- Type of herd (purebred, commercial)
- Kinds (cows, bison, elk, sheep etc)
- Classes (cow calf pairs, yearlings)
- Average weights
- Number of animals in each herd during the grazing season
- Pastures for each herd
- Grazing dates for each pasture
- Breeding season
- Weaning date
- Potential conflicts with neighboring herds

- When normal winter feeding begins and ends

### **Analysis and Interpretation:**

#### 1. Determine Initial Recommended Stocking Rate:

Where available, use land manager records of existing stocking rate in conjunction with results from field observations of utilization, trend, and range health to develop an estimated initial stocking rate. Use [Forage Inventory Based on Current Stocking Rate, Trend, Health and Utilization, NE-ECS-50](#), to record this information. Use of this method alone to determine a suggested initial stocking rate for the management unit requires that an NRCS conservation planner have Prescribed Grazing JAA Level V.

Using clipping data or ocular observations collected from the representative key areas for the management unit, interpolate an initial stocking rate for the other sites on the operating unit. This can be done by adjusting production estimates on the other sites based upon the collected data and then calculating a stocking rate using the following formula:

$$*(\text{Pounds air dry biomass} \times \text{harvest efficiency}) \div 913 \text{ lbs/month} = \text{AUM/ac}$$

Use the information in the Forage Suitability Group (FSG) descriptions to verify field recorded data or observations. When estimating an initial stocking rate from an FSG, use forage production figures under “low management” times 35% harvest efficiency divided by 913 lbs of air dry forage.

*\*National Range and Pasture Handbook, Rev. 1, 2003, Chapter 6-8. The NRCS has elected to use 30 lbs of air-dry weight (as-fed) of forage per day as the standard forage demand for a 1,000 lb. cow (one animal unit.) This equates to 913 pounds of air-dry forage per month. The oven-dry standard of forage required is 26 pounds of forage per day or 790 lbs of oven-dry forage per month. This consumption rate is equal to 2.6 % of the body weight.*

Use the information in the Ecological Site Descriptions/Range Site Descriptions to verify field recorded data or observations to establish an initial recommended stocking rate for each ecological/range site with each rangeland field. The initial stocking rates shown in some of these descriptions are estimates based upon knowledge and experience gained during past grazing land planning and follow-up efforts. These figures should only be used to support or verify actual field inventory information (i.e. initial planning phase) and may be supplemented and adjusted by local knowledge.

**NOTE:** Guidance provided in [Chapter 11 of the NRCS National Range and Pasture Handbook](#) is very specific regarding the role of NRCS planners in determining stocking rates. Part 600.1103(j) (1) states, “NRCS does not establish grazing capacities. Neither does it require an agreed-on stocking rate in conservation plans. NRCS assists land users in making their own decisions concerning the number and kinds of animals that can be safely and profitably grazed.”

#### 2. Calculate Forage Balance

Calculate the forage availability to animal demand for forage balance and record on [Prescribed Grazing Jobsheet, \(NE-ECS-528\)](#). If the current forage demand exceeds existing forage availability by 20% or more, then a re-evaluation of the range resource objectives with the land manager should be scheduled. An assessment should then be

made as to whether the resource objective can be achieved through grazing management alone under the current stocking rate. An alternative grazing plan should then be prepared with the land manager that can result in a more balanced ratio so that grazing land resource objectives can be realized.

**3. Interpret Monitoring Information**

Analysis and interpretation of the monitoring information in the form of apparent trend, rangeland health assessments, pasture condition scores, observations of utilization, photo points, as well as climate records should be conducted on an annual basis with the land manager. If the planned goals or objectives are not being met, or there is degradation of any of the resources, including animal performance, the grazing plan should be adjusted. Annual, on-site follow-up evaluations will allow the land manager to make these decisions in a timely manner.

For cropland aftermath grazing and grazing annual forages, use the figures in Table 1. to estimate initial stocking rates if site specific production data is unavailable.

**Table 1. Production Estimates of Various Cropland Aftermaths**

Harvested Roughage AUMs/Ton *		Annual Pastures AUMs/ac**		Crop Aftermath***	
All hays	3.0	Sudan Grass	2.0-4.0	Small grain stubble	0.1-0.4
Corn silage	1.2	Winter Rye	0.5-2.0	Corn Stalks	0.3-0.6
Grass silage	0.9	Triticale	3.0-6.0	Irrigated Corn Stalks	1.0-2.0
Corn Fodder	2.0	Pearl Millet	2.5-6.5	Dry Bean Stubble	0.1-0.3
Wheat Straw	1.5			Hayland Re-growth	0.1-0.3

\* Roughage assumed to be of good quality. Reduce values if hay is cut late or is badly weathered prior to feeding.

\*\*Assume 1.0 AUM for each 1500 pounds of air dry forage production. The difference between allowance and use is to adjust for trampling loss and wastage.

\*\*\* AUM ratings are based on the following:

0.1 AUM for each 10 bu production on small grain and corn.

0.15 AUM for each 10 bu production on irrigated corn

On erosive soils, aftermath grazing may have to be reduced or eliminated so adequate cover can be maintained.