Reading the Land

A practical guide to evaluating rangeland for livestock, wildlife and stewardship

Central Texas

"Nature is an open book for those who care to read. Each grass-covered hillside is a page on which is written the history of the past, the conditions of the present, and the predictions of the future."

J. E. Weaver

Learning How to Read

The ability to read the land is an important skill to develop as part of a comprehensive conservation and land management program. Without this skill, a landowner or manager will be handicapped when it comes to a full understanding of ranching and wildlife management.

Learning to read the land is a lot like teaching a child to read. Think back as you taught your own children how to read. You probably spent hours and hours reading to little Bobby before you ever taught him the first thing about reading. You instilled within him an appreciation and excitement for books and stories. Soon, he wanted to read for himself.

You began by teaching your children to recognize and to say the name of each letter of the alphabet. Then, you taught them to pronounce the sounds of the letters and showed them how several letters can be combined to form simple words. As that ability grew, you showed them how link words into simple sentences. We become proficient at reading only by repetition and practice over a long period of time.

The land too, is like an open book, waiting to tell a story. It is like a history book in that it indicates what has happened in the past. It is like a newspaper in that it tells what is happening currently. To a lesser extent, the land is like a book of prophecy – it provides clues regarding what is possible in the next few years.

Some desire to read the land from an aesthetic viewpoint which is normal and natural, since the land is a thing of beauty. However, the kind of reading that is useful to the land manager is more objective and practical. It is more like reading an owner's manual than a piece of poetry or fiction. In the pages that follow, you will find some of the basic principles of reading the land.

The primary language of the land is the plant life. You need to become familiar with most of the plants on your ranch, and the more plants you know, the better reader you will become. You will want to learn to recognize many different species of grass, forbs, vines, shrubs and trees as listed on page 3. Learning their names will help you communicate with others and to speak the same language.

After you have learned the names of plants, you will want to learn some of the values and uses of each plant as found on page 4.

As you learn how to read the land, you will want to combine your knowledge of animals with your knowledge of plants. Different people will read the land from different perspectives based on their objectives. The rancher interested primarily in cattle production will read the land much differently than the rancher who places equal emphasis on cattle and quail. The landowner trying to provide the very best deer habitat at the expense of cattle or quail production will look even differently at the land. Each of these three has his own particular objective and they will look at the land from three different angles and see different things. See page 5

You will then want to learn how plants respond to management such as grazing, rest, browsing, fire, and soil disturbance as listed on page 6.

Page 7 is an examination that asks 20 key questions about your land and your management.

Page 8 provides wisdom from some of the top range and wildlife experts from past and present.

After you have gained experience and confidence in basic land reading, you will begin to add more dimensions to your reading. You will be able to see the big picture as well as the close-up view. You will learn the ability to "read between the lines", observe trends, and see red flags. Some of the signs you will learn to recognize and interpret include: degree of grazing use (light, moderate or heavy), browse lines and hedging, bare ground, amount of litter, subtle signs of erosion, plant diversity, plant vigor, plant reproduction. These skills will come with time and practice, but it all starts with the basic recognition and understanding of the plant life on your ranch.

And remember - learning to read the land is not the final objective – it is only a means to help you make informed decisions about your management. When reading the land, you should ask: What does it say? What does it mean? What will I do? This guide is intended to help you get started in the right direction.

Plants – The language of the land

Warm Season Perennial (WSP) Tall Grass

Big bluestem
Indiangrass
Little bluestem
Switchgrass

WSP Mid Grass

Sideoats grama
Texas cupgrass
Vine-mesquite
Plains lovegrass
Arizona cottontop
Green sprangletop
Sand lovegrass
Blue grama
Thin paspalum
Purpletop tridens
Silver bluestem
Sand dropseed
Hooded windmill
Meadow dropseed
Tobosagrass
Plains bristlegrass
Slim tridens
White tridens
Fall witchgrass
Wright threeawn
Hall's panicum

WSP Short Grass

Buffalograss
Curlymesquite
Texas grama
Hairy grama
Red grama
Red lovegrass
Hairy tridens
Tumblegrass
Tumble windmill
Tumble lovegrass
Gummy lovegrass

Cool Season Perennial Grass

Canada wildrye
Texas wintergrass
Threeflower melic
Texas bluegrass
West wheatgrass
Scribner's panicum
Cedar sedge

Warm Season Annual Grass

Oldfield threeawn
Poverty dropseed
Six weeks grama
Texas panicum
Browntop panic
Barnyard grass
Fringed signalgrass
Sandbur

Cool Season Annual Grass

Ozarkgrass
Little barley
Rescuegrass
Japanese brome

Introduced Grass

K. R. bluestem
O. W. bluestems
Johnsongrass
Bermudagrass
Kleingrass
Blue panic
Weeping lovegrass
Wilman lovegrass

Cool Season Annual Forbs

Filaree
Tallow weed
Deer vetch
Peavine
Tansymustard
Huisachedaisy
Indian blanket
Coreopsis
Bladderpod
Bluebonnet
Pellitory
Wild carrot
Carolina geranium
Bluecurls
Horsemint
Burclover
Rabbit tobacco
Pepperweed
Flax

Warm Season Annual Forbs

Sunflower
Doveweed
Spurges
Broomweed
Snow-on-the-mt
Giant ragweed
Partridgepea
Clammyweed
Pigweed
Lambsquarter
Pricklypoppy
Buffalobur
Basketflower

Cool Season Perennial Forbs

Winecup
Spiderwort
Engelmanndasiy
Primroses
Gaura
Penstemon
Mx sagewort
Low menodora
Texas nightshade

Warm Season Perennial Forbs

Bushsunflower
Bundleflower
Dayflower
Rockdaisy
Lazydaisy
Sida
Indian mallow
Dalea
Ratany
Prairie acacia
Prairie clover
Heath aster
Western ragweed
Field ragweed
Wild mercury
Queen's delight
Prairie coneflower
Noseburn
Hairy tubetongue
Snakeherb
Knot leafflower
Showy menodora
Milkwort

Trees

Mesquite
Hackberry
Bumelia
Soapberry
American elm
Cedar elm
Live oak
Post oak
Blackjack oak
Spanish oak
Lacey oak
Chinquapin oak
Redberry juniper
Blueberry juniper
Redbud
Littleleaf lead tree
Mexican plum
Black cherry
Pecan
Black walnut
Red mulberry
Black willow
Honey locust
Sycamore
Cottonwood
Bois 'd arc
Texas sophora

Woody Vines

Greenbriar
Snailseed
Grapevine
Virginia creeper
Old man's beard
Scarlet clematis
Dewberry
Balsam gourd
Ivy treebine
Poison ivy
Trumpet vine

Cactus and Succulents

Pricklypear
Tasajillo
Cholla
Yucca
Sacahuiste
Lechuguilla
Sotol

Shrubs

Skunkbush sumac
Flameleaf sumac
Lilttleleaf sumac
Evergreen sumac
Elbowbush
Shin oak
Vasey oak
Kidneywood
White honeysuckle
Pricklyash
Mx persimmon
Lotebush
Green condalia
Hogplum
Algerita
Rough dogwood
Possumhaw
Hawthorn
Blackhaw
Sand plum
Smallflower peach
Fourwing saltbush
Catclaw acacia
Roemer acacia
Fragrant mimosa
Catclaw mimosa
Ephedra
Broom snakeweed
Mexican buckeye
Button bush
Wolfberry

Common Food Plot Plants

Wheat
Oats
Ryegrass
Grain sorghum
Egyptian wheat
Proso millet
Foxtail millet
Browntop millet
Cowpea
Lablab
Austrian winterpea
Hairy vetch
Turnips
Sweetclover
Alfalfa
Sunflower
Sesame
Japanese millet

Plants - Recognizing their Value

More Desirable Cattle Forage

Big bluestem
Indiangrass
Little bluestem
Plains lovegrass
Sand lovegrass
Vine-mesquite
Sideoats grama
Arizona cottontop
Tx wintergrass
Canada wildrye
Green sprangletop
Buffalograss

Less Desirable Cattle Forage

Tobosagrass
Silver bluestem
Meadow dropseed
Sand dropseed
Hall's panicum
Curlymesquite
Threeawn
Hariy grama
Texas grama
Red grama
Hairy tridens
Red lovegrass
Tumblegrass
Sand bur

Seasonal Cattle Forage

Rescuegrass
Japanese brome
Winter weeds/forbs
Summer weeds/forbs
Mesquite beans
Pricklypear apples
Persimmon fruit

More Desirable Deer Food

Dayflower
Bundleflower
Bushsunflower
Engelmanndaisy
Low menodora
Spiderwort
Heath aster
Rockdaisy
Primrose
Hairy tubetongue
Snakeherb
Milkwort
Knotwd.leafflower
Mistletoe
Greenbriar
Grapevine
Snailseed
Old man's beard
Elbowbush
Ephedra
Hackberry
Bumelia
Roemer acacia
Kidneywood
Mesquite beans
Elm
Sand plum
Possumhaw
Texas sophora
Fourwing saltbush
Oaks
Sumacs

Less Desirable Deer Food

Most grasses
Pricklyash
Lotebush
Mesquite leaves
Juniper
Catclaw mimosa
Pricklypear
Tasajillo
Algerita
Persimmon
Whitebrush
Wolfberry
Doveweed
Broomweed
Coneflower
Queen's delight

Desirable Quail Nest Cover

Little bluestem
Big bluestem
Indiangrass
Tobosa
Texas cupgrass
Plains lovegrass
Vine-mesquite
Sideoats grama
Meadow drop
Slim tridens
Silver bluestem
Plains bristlegrass
Fall witchgrass
Low pricklypear

Desirable Quail Food

Western ragweed
Doveweed
Spurges
Sunflower
Basketflower
Pricklypoppy
Sawtooth daisy
Dayflower
Bundleflower
Peavine
Noseburn
Buffalobur
Deer vetch
Mesquite
Bumelia
Hackberry
Pricklyash
Johnsongrass
Signalgrass
Browntop panic
Hall's panic

Desirable Dove Food

Doveweed
Sunflower
Pricklypoppy
Buffalobur
Pigweed
Pricklyash
Spurges
Browntop panic
Snow-on-the-mt

Desirable Quail Loafing Cover

Sand plum
Lotebush
Green condalia
Pricklyash
Skunkbush sumac
Littleleaf sumac
Shin oak
Bumelia thicket
Greenbriar patch
Algerita
Wolfberry
Catclaw mimosa
Elbowbush
Fourwing saltbush

Desirable Turkey Food

Hackberry fruit
Bumelia berry
Tasajillo fruit
Pricklypear apples
White tridens seed
Slim tridens seed
Rescuegrass
Tx wintergrass
Pecans
Acorns
Sumac fruit
Soapberry fruit
Switchgrass seed
Indiangrass seed
Sidoats grama
Texas cupgrass
Bloodberry
Poke weed berry
Most winter forbs
Texas nightshade
S L nighshade
Wild mercury
Mexican buckeye
Indian mallow

Desirable Native Hummingbird and Butterfly Plants

Standing cypress
Salvia
Turk's cap
Flame acanthus
Columbine
Paintbrush
Horsemint
White honeysuckle
Red yucca
Redbud
Trumpet creeper
Mistflower
Milkweed
Aster
Indian blanket
Gayfeather
Yarrow
Lantana
Purple coneflower
Baccharis
Bush sunflower
Goldenrod
Ironweed
Clammyweed

Plants That Stabilize Creeks and Protect Riparian Areas

Emory river sedge
Sawgrass
Switchgrass
Eastern gamma
Bushy bluestem
Spikerush
Bulrush
Knotgrass
Virginia wildrye
Black willow
Cypress
Button bush
Indigo bush
Sycamore
Cottonwood
Little walnut
Pecan
Elm
Western soapberry
Baccharis
Water willow

Animals That Use the Range

Cattle Requirements
Range beef cows consume about 2.5% of their body weight per day, or about 25 to 30 pounds of forage per day (dry weight basis) and about 10,000 pounds annually. Cattle are primarily grass eaters, but at times they do consume large amounts of weeds, forbs and browse. Forage should be of adequate quality to provide at least 6% crude protein during non lactation and at least 9% crude protein during lactation. Phosphorus will usually have to be supplemented for good reproduction. Indicators of excessive cattle numbers include poor calf crops, poor weaning weights and short grazed pastures.

Beef cows need an average of 15 gallons of water per day, possibly more in summer. Forage consumption and animal nutrition will drop if cows lack water. Milk production will decline drastically with a lack of water.

Shade is needed in summer. Some dense brushy cover is desirable as windbreak during winter storms.

Deer Requirements
White-tailed deer consume about 3.5% of their body weight per day in forage (dry weight basis). Deer are primarily weed eaters, and brush eaters, although when mast and fruit is available, it may be their first choice. Grass usually makes up less than 10% of the deer diet. An average sized deer would need about 1600 pounds per year. Deer forage should ideally be at least 16% crude protein with TDN of 65% or more, although they can survive on lower quality forage. For good antler production and fawn survival, deer require a high mineral content in their diet, especially phosphorus. Indicators of excessive deer numbers include a high proportion of spikes in the yearling age class, low deer weights, poor antler development and hedging of browse plants. A properly balanced deer herd does not need supplemental feed in order to produce high quality animals.

Deer need to have access to permanent water, although during certain times of the year, lush green forage may provide much of their water requirement.

Deer prefer large areas of moderate to thick brush for cover. Mature bucks especially desire to live in thicker brush areas. Excessive brush control will decrease the deer population. Numerous small openings surrounded by brushy cover provide good habitat arrangement. A clearing ratio of 30% openings and 70% brush or 40% opening and 60% brush may be ideal for best deer habitat, although recommendations will vary from place to place. Deer need brush – they eat in and they live in it.

Quail Requirements
Bobwhite quail have more exacting habitat requirements than either cattle or deer and the right kind of cover is probably more critical than food. Quail need an abundance of lightly grazed or un-grazed bunchgrass clumps for nest cover. An average of 300 such grass clumps (about the size of a basketball) per acre is needed for adequate nest cover. Otherwise, destruction of nests by predators becomes excessive.

Quail also need the proper distribution of low dense brush for loafing and escape cover. A large clump or thicket of low brush (such as lotebush, sumac or plum) scattered about 100 feet apart across a pasture is desirable for good quail habitat. Carefully planned, selective brush control (Brush Sculpting), when combined with conservative grazing management is the best combination for enhancing quail habitat.

Quail are primarily bug eaters and seed eaters, but will also graze on tender greens in winter. They eat primarily the seeds of forbs, and weeds but also the seed of some woody plants and grasses. In spring and early summer an adequate supply of insects is essential for good chick survival. Quail must also have an adequate amount of bare ground or sparse vegetation for young broods to maneuver and search for food.

All of these habitat components (grass, low brush, bare ground, forbs) must be closely inter-mixed, since quail normally spend their entire life within 40 acres or so. Each 40 acre block needs to provide all of these attributes for maximum quail habitat.

Turkey Requirements
Turkey range over 10 to 15 miles in their yearly travels, therefore they can easily relocate to find the most suitable habitat. Turkeys prefer large groves of tall trees in creek bottoms for ideal roosting areas, but will also roost in mesquite and on power line poles and tank batteries. Turkey nest in dense grassy or weedy ground cover, usually 18 inches or more in height. Turkeys are bug eaters, fruit and berry eaters, and grazers. They also strip the seed-heads off of several kinds of grass. A large variety of vegetation including grasses, forbs, vines, shrubs, cactus and trees is needed over a large area for ideal turkey habitat. Turkeys need a permanent source of water.

Other Livestock and Wildlife
Fortunately, land that provides good habitat for various combinations of cattle, deer, quail and turkey also provides good habitat for other kinds of livestock and hundreds of other wildlife species.

Plants – Their Response to Management

Grasses and Forbs Favored by Conservative Stocking and Rotational Rest-Graze Cycles

Big bluestem
Indiangrass
Switchgrass
Little bluestem
Sideoats grama
Texas cupgrass
Vine-mesquite
Plains lovegrass
Canada wildrye
Texas bluegrass
Threeflower melic
Arizona cottontop
Sand lovegrass
Purpletop tridens

Engelmanndaisy
Bush sunflower
Bundleflower
Dayflower
Prairie acacia
Max sunflower
Spiderwort
Primroses
Gaura
Penstemon
Heath aster
Snakeherb
Hairy tubetongue
Prairie clover
Winecup
Tick clover
Rockdaisy
Giant ragweed

Grasses that Quickly Increase and Respond to Improved Grazing Management

Tall dropseed
Sand dropseed
Hooded windmill
Silver bluestem
Curlymesquite
Buffalograss

Grasses and Forbs that Thrive Under Conditions of Heavy Stocking and/or Continuous Grazing

Tobosagrass
Curlymesquite
Threeawn
Texas grama
Red grama
Hairy grama
Hairy tridens
Red lovegrass
Annual grasses

Prairie coneflower
Queen's delight
Bullnettle
Croton
Broomweed
Pricklypoppy
S L nightshade
Milkweed
Curlycup gumweed
Sawtooth daisy
Frostweed
Mealycup sage
Horehound
False nightshade
Ratear coldenia
Twinleaf senna
Buffalobur
Verbena
Curly gumweed
Dogweed
Goldaster
Broom snake
Pepperweed
Salvia
Rabbit tobacco
Filaree
Tallow weed
Peavine
Spurges
Bladderpod
Dogweed

Plants Tolerant to or Invigorated by Winter Fire

Big bluetem
Indiangrass
Little bluestem
Texas cupgrass
Vine-mesquite
Sideoats grama
Blue grama
Buffalograss
Tobosa
Bush sunflower
Bundleflower
Prairie clover
Prairie acacia
West ragweed
Dayflower
Sida
Flame leaf sumac
Redbud
Yucca

Plants Harmed or Killed by Winter Fire

Broom snakeweed
Pricklypear
Tasajillo
Blueberry juniper

(Most winter weeds and Rescugrass can be suppressed by late winter burning)

Shrubs and Trees that Thrive Under Conditions of Heavy Browsing

Algerita
Juniper
Mesquite
Persimmon
Pricklyash
Lotebush
Catclaw mimosa
Baccharis
Wolfberry
Mountain laurel
Mexican buckeye
Pricklypear
Tasajillo

Shrubs and Trees Sensitive to (Harmed) by Heavy Browsing

Hackberry
Elm
Plum
Bumelia
Skunkbush
Elbowbush
Possumhaw
Hawthorn
Blackhaw
Red oak
White honeysuckle
Kidneywood
Texas sophora
Ephedra
Redbud
Greenbriar
Grapevine
Snailseed
Bois 'd arc

Forbs and Grasses Stimulated by Soil Disturbance

Doveweed
Sunflower
Pricklypoppy
Snow-on-the-mt
Spurge
Pigweed
Broomweed
Partridgepea
Lambsquarter
Buffalobur
Basketflower
Burclover
Filaree
Tallow weed
Peavine
Bladderpod
Rabbit tobacco
Pepperweed

Hall's panium
Texas panicum
Browntop panic
Fringe signalgrass
Sand bur

Shrubs, Trees, Forbs and Grasses That Are Able to Spread by Root Sprouts, Rhizomes, and Runners

Sand plum
Texas sophora
Bumelia
West soapberry
Shin oak
Live oak
Honey locust
Roughleaf dogwood
Greenbriar
Snailseed
Poison ivy
Flameleaf sumac

Mexican sagewort
Maximilian sunflow
Heath aster
Dwarf aster
Prairie acacia
Western ragweed
Field ragweed
Texas nightshade
Low menodora
Tall goldenrod
Snakeherb
Hariy tubetongue
Leatherweed croton
Frogfruit

Big bluestem
Indiangrass
Sideoats grama
Western wheatgrass
Texas bluegrass
Vine-mesquite
False switchgrass
Tobosa
Buffalograss
Curlymesquite

Testing You and Your Land – What is your Stewardship Score

Spend a few hours each month evaluating your land and your management skills. Get out of the truck, turn off the cell phone and walk across different parts of each pasture. Answer the following questions with a simple Yes or No.

1. Are the majority of points on each acre covered by desirable perennial plants?
2. Is there an abundance of old decaying grass litter and residue on the ground?
3. Are large bare areas in the process of being covered by desirable perennial plants?
4. Are you taking specific action to help stabilize and heal any active gullies, headcuts or other types of erosion?
5. Does the majority of each pasture support enough vegetation to carry a fire?
6. Does the majority of a hard 2 inch rain soak into the ground?
7. Can you walk 100 yards on all parts of the ranch and observe at least 25 different kinds of plants? (an indicator of good plant diversity)
8. Do you recognize the names and values of at least half of the grasses, shrubs and forbs on your ranch?
9. Do you practice a systematic or planned method of pasture rotation and does the majority of acreage on the ranch get at least a 90 day rest during the growing season each year?
10. Is your stocking rate flexible and do you make frequent adjustments in livestock numbers based on changing forage supply?
11. Is your stocking rate low enough, so that you can withstand dry periods without overgrazing?
12. Have you been able to avoid using hay to keep your livestock well fed during the winter in most years?
13. Do you provide preferential grazing treatment to springs, riparian and creek-bottom areas by limiting access and use?
14. Do your pastures look shaggy with dry grass at the end of winter?
15. Is there absence of an obvious browse line on key browse plants?
16. Can the most desirable grasses, forbs and shrubs be easily found in open accessible areas (as opposed to protected areas such as pricklypear clumps or brush piles)?
17. Do your ranch management practices make good economic sense?
18. Do you have written records to document calf crops, weaning weights, grazing management decisions, deer harvest information, cost of supplemental feed, etc?
19. Do you know as much about range plants and wildlife habitat as you do about livestock?
20. Do you consider yourself a good environmental steward of the land?

A desirable stewardship score would be a Yes answer to 15 or more of these questions

Range & Wildlife Wisdom

The selection of the right stocking rate is the most important grazing management decision from the standpoint of vegetation, livestock, wildlife, water, and financial return.
Larry Holecek

The right stocking rate is the key to success or failure of all other practices and is the most effective form of risk management known.
Chip Merrill

The weakest point [in the range livestock industry in Texas] would be failure to adjust animal numbers to forage availability in a timely way that would prevent overgrazing.
Chip Merrill

Optimism because of green grass has probably broken more ranchers than drought.
Dolph Briscoe Sr

Thanks to the drought, we are running less than 50% of what we were running two years ago. If I have my way, we will not ever get back to that number of cows, but stock the ranches conservatively with cows and utilize any excess forage with a yearling program.
Donald Keeling

Good land managers rise to the top during a drought – like the cream on Flossie's milk.
Gary Valentine

All great quail ranches have great quail cover
Dale Rollins

Little if any southwestern rangeland will support a desirable canopy of tallgrass with satisfying regularity unless it is periodically rested from grazing.
Val Lehman

No habitat management tool is more powerful than the cow … she manages millions of acres of bobwhite cover. She can be harmful or helpful, depending on how she's applied.
Fred Guthery

About half of the variation in a bobwhite crop can be explained by precipitation; the other half rests with the land manager. We're basically helpless to affect the first half, but we can do a lot about the other half with our brush and grazing management.
Dale Rollins

Good nutrition is the key to good deer management.
Donnie Harmel

The most cost effective way to increase the deer food supply is to decrease the number of animals on the range -both deer and livestock.
Al Brothers

What I am doing now, I wasn't doing last year, nor do I expect to be doing it exactly this same way next year.
Chip Merrill

He that knoweth not, and knoweth not that he knoweth not, is a fool. Shun that man. He that knoweth not, and knoweth that he knoweth not is a wise man. Follow him.
Author unknown

The mountains and hills were covered with soil and there was an abundance of timber. The plains were full of rich earth, bearing an abundance of food for cattle. The land received the rainfall into herself and stored it up in the soil, then letting off the water into the hollows which it absorbed from the heights, providing abundant fountains and rivers. Such was the state of the country, which was cultivated by true husbandmen, who made husbandry their business, and had a soil the best in the world and abundance of water.
Plato, about 400 B.C.

You're free to choose your actions, but you're not free to choose the consequences.
Preacher Paul Shero