



The genuine land steward is a person of many varied talents and abilities. Not only do they have that close inner connection to the land that compels and motivates their management decisions, but they must also have a deep working knowledge and curiosity about the land and how it works. An important component of this land knowledge is the ability to read the land. Land reading entails the ability to observe and study and conclude what lessons the land provides. This is not some notion that nature mystically communicates with people; rather it is a pragmatic ability to observe and correctly interpret the visual evidence as presented in the plants, soil, water and animals. Without the ability to read the land, a landowner or land manager will be handicapped when it comes to a full understanding of land stewardship, watershed management, wildlife conservation, or ranching.

In 1955, the famous prairie ecologist John Ernst Weaver wrote these words: "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 predictions of the future."

Even a brilliant naturalist such as Weaver never completely figured out the message of the land. He continued to learn new land reading skills each day of his life. For the serious and committed land steward, land reading is a lifelong process; the book is never finished. The Texas Hill Country is much more complex than the North American prairie that Weaver studied. The Hill Country is a transition between grassland, forest, savanna and shrub land. It contains all of these types of land, often in close proximity and the mixture of these types is dictated by soil, topography, fire and management. The following information is a primer for basic land reading in the Hill Country.

## **Part 1 - Learning How to Read**

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 your sons and daughters before you ever taught them the first thing about reading. You instilled within them an appreciation and excitement and curiosity for books and stories. Soon they wanted to read for themselves.

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 words are linked into simple sentences. We all learned to read gradually by repetition, instruction and practice over a long period of time.

### **The Language of the Land**

The primary language of the land is the plant life. The aspiring land reader needs to become familiar with the most common plants on your ranch as a starting place. The more plants you know, the better reader you will become. Learning plant names will help you communicate with others and to speak the same language. Nowadays there are plenty of good books and online resources to help land readers learn the plants in any region of Texas and more are being published each year.

Why not begin keeping a list of all the plants found on your ranch, hunting lease, or your favorite places, much like birders keep a list of birds they have seen. Add to that list each season and you will be amazed how it enhances



your land reading skills and comprehension. After you have learned the names of plants, you will naturally want to learn some of the values and functions of each plant, thus deepening your understanding of the land.

As Weaver described, the land is like several different books combined into one. 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. The land is also like a book of prophecy, providing clues regarding what is possible and probable in the future. More than anything, the land is a dynamic book, the contents of which change with the season, the weather and with the management being applied.

### **Owner's Manual**

Some people desire to read the land from purely an aesthetic viewpoint. This is normal and natural since the land is a thing of great beauty. However, since beauty is in the eye of the beholder, aesthetic reading is too subjective and can be misleading. For example, a tract of land covered with bluebonnets and Indian paintbrush may look very attractive during spring, but is usually not a healthy piece of land. The kind of reading that is more useful to the land manager is objective and practical. It is more like reading an owner's manual than a piece of poetry or fiction. Looking at flowers and identifying grasses and shrubs is fun and interesting, but a more in-depth reading is required to help discover the important and relevant messages of the land.

Different people will read the land from different perspectives based on their individual interests. The rancher interested primarily in cattle production will interpret what he is seeing differently than the landowner who is interested primarily in quail. The landowner trying to provide the very best deer habitat will view the land differently than the cattleman or the quail manager. Each of these has his own particular objectives and they will look at the land from different angles and see different things. In each case, plant life is the basis of reading the condition and health of the land.

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" and observe trends. These skills will grow with time and practice, but it all starts with the basic recognition and understanding of the plant life on your ranch. After an initial time of learning and practice, land reading will begin to become more automatic and natural. You will not have to think about it – it will become instinctive.

And keep in mind, 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 yourself three questions. What do I see? What does it mean? What will I do with this information? Reading the land does not give a person all of the information needed to develop a complete strategy of management, but it is a good starting place. As management changes, the land will change, so periodic reading and evaluating is an important form of monitoring to see if you are getting the results you desire.



### **A Place to Start**

Spend a few hours each week or each month evaluating your land and developing your reading skills. Get out of the truck and walk slowly across different parts of each pasture and observe. Don't get in a hurry. Stop frequently and look. Get down on your hands and knees and look closely. Try hard not to just see what you want to see. You are examining the land in much the same way as a doctor would examine their patient - looking for telltale signs of health or sickness. If you are not sure how to start, use the following list of questions to help guide you through the land reading process:

1. Are the majority of spots on each acre covered by desirable perennial plants? Evaluate ground cover by looking straight down (not across) every ten feet or so.
2. How much bare ground is present, and is it excessive for your specific goals? How much erosion can you observe?
3. Are bare areas in the process of being covered by new plants?
4. How much decaying plant litter and mulch is present on the soil surface? Is the soil protected from direct sun and from raindrop splash? Plant litter/mulch helps protect and improve the soil, promote infiltration of rainfall and reduce evaporation.
5. Can you recognize and name the ten most common grasses on your property? Which are most productive? Which are more readily grazed by livestock? Which provide nest cover for ground nesting birds? Which species are increasing? Can you recognize these grasses without a seed head?
6. Can you recognize and name the ten most common broadleaf forbs on your property? Can you recognize them without the flower? Which of them are eaten by deer? Which provide good seed for birds or good habitat for native pollinators? Which are green in winter? Which species are perennial vs annual?
7. Can you recognize and name the ten most common shrubs or trees on your property? Which of them provide desirable berries or fruit for wildlife? Which provide the best nesting, roosting or loafing cover? Which are more preferred as browse? Can you discern the development of browse lines or hedging as they begin to form on key browse plants? Can you identify these species in winter when the leaves have fallen?
8. Can you walk 100 yards on any part of the property and identify at least 25 different plant species? Plant diversity is one of the key characteristics of a healthy landscape.
9. Can you notice recent reproduction (young plants) of the more desirable grasses, perennial forbs and woody plants? Or, are the less desirable species reproducing or spreading faster than the desirable species?
10. Can the more desirable grasses, forbs and shrubs be easily found in open accessible areas or are they often confined to protected areas such as pricklypear, algerita, catclaw or brush piles?

As you begin to consider these questions, you will see many other things that are relevant to your specific piece of land and your particular objectives. Writing down your observations and keeping a land journal is a good way to preserve your observations and will help serve as a benchmark and a measure of change. Photography adds another useful way to document your observations and share them with others. Photo points are a good way to track change over time. Establish photo point locations at representative locations. Ensure there is a recognizable feature (dead tree, large rock) in the picture or mark with a t-post, and re-take the same photo from the same angle once or twice a year. Over time, you will be able to note what changes in vegetation are taking place and whether or not



those changes are in keeping with your goals for the property. Keeping a written description of each photo will add value to the photo point monitoring.

Another excellent way to accelerate your reading skills is to erect cages which exclude livestock and deer. Cages made of welded wire panels or old net wire and t-posts are very instructive and will usually show visible differences in the first year. Make sure the openings are small enough so that a deer cannot stick their head into the cage. Caging of choice shrubs, young trees and perennial forbs is especially informative. On grazed pastures, differences in grass cover and grass species will often be noticeable after a few years. After the cages have taught you a few lessons at one location, move them to new locations. Keeping a photographic or written narrative of your findings is very useful.

Reading the land can seem complex and overwhelming at first. With a methodical step by step approach, patience and persistence the story of the land will become understandable. We must be open-minded and honest in our reading. The temptation may be to ignore some of the ugly truths we discover. But if we ignore part of the story, we are not going to be able to make the best management decisions. Another temptation is to skip ahead to those parts of the book we want to read. To do an honest job of reading, we must read the book in its entirety, learning the lessons of each page and each acre. Everything we see on the land is there for a reason, and usually compound reasons. Reading carefully will help us see a true picture and help us gain a better perspective on how to manage and take care of the land entrusted to us.

## **Part 2 - Indicator Plants for Texas Hill Country**

One of the best and easiest ways to read the land is to understand the value of indicator plants. Many plant species are indicative of certain conditions; they either thrive or fail to thrive under various kinds of management. Their presence, absence or abundance tells a story of the past, much like a detective looking for clues and evidence. The material presented below is specific to the Hill Country and surrounding regions. Other regions will have different plants which can be used as indicators to help read the land.

### **Overgrazing**

Chronic overgrazing is one of the most damaging practices for the long term health of the land. Chronic overgrazing causes increased bare ground, loss of plant diversity, loss of litter, erosion, decline of soil health and other ecological problems. Some plants thrive extremely well on severely overgrazed rangeland. An abundance of these plants tells the truth about past grazing practices, even if the land is no longer being overgrazed. Even under good management, these plants will often be present in small to moderate amounts, but if any of these are dominant or very abundant, it is probably a sign that the area has been subject to chronic overgrazing.

Mealycup sage  
Prairie coneflower  
Queen's delight  
Dogweed  
Gold aster  
False nightshade

Curlycup gumweed  
Field ragweed  
Red grama  
Texas grama  
Hairy grama  
Hairy tridens

Threeawn  
Hall's panicum  
Red lovegrass  
Gummy lovegrass  
Tumble lovegrass  
Tumblegrass



### The Healing Process

The good news is that abused, overgrazed land will usually begin to recover naturally after a period of improved management. Certain grasses, often called “Increasers” usually begin to establish on their own within several years of better management. These plants are indicative that the healing process is beginning. If you notice these grasses increasing after a long period of abusive grazing has ended, it is a good sign that the land is responding to improving management.

Meadow/Tall dropseed	Hooded windmill grass
Sand dropseed	Fall witchgrass
Silver bluestem	Reverchon bristlegrass
Texas wintergrass	Slim tridens
Curlymesquite	

As the land continues to recover from decades of overgrazing, other grasses will usually begin to show up and increase as a second stage of recovery. These are further indication that land healing process is continuing.

Little bluestem	Buffalo grass
Sideoats grama	Thin paspalum
Vine-mesquite	Canada wildrye
Plains lovegrass	Virginia wildrye

### Healthy Land

Just as there are plants that indicate poor conditions and improving conditions, there are also plants that are indicative of healthy land and good management. When these plants are present or abundant and out in the open, it is a sure sign that the ranch has been well taken care of in recent years. A landscape with these plants tells the story of conscientious and careful management. The absence or rarity of these plants usually means that they were nearly extirpated from a piece of land by overgrazing sometime in the past. A healthy tract of land need not have all of these plant species, but it should have some of these in addition to other species listed above under “The Healing Process”. If you notice the establishment or increase of any of these species, it is a sign that your management is good and that the land is healthy and improving.

Big bluestem	Engelmann daisy	Bundle flower
Indiangrass	Western primrose	Sensitive briar
Texas cupgrass	Dayflower	Penstemon
Three-flower melic	Heath aster	Bush sunflower
Texas bluegrass	Prairie acacia	
Arizona cottontop	Prairie clover	

### Recovery Stalled

In some cases, overgrazed degraded land does not automatically improve when livestock are removed or their numbers reduced. Sometimes conditions may improve initially up to a point but not continue. If excessive bare ground, poor plant cover, lack of litter and a crusted soil surface persist, even after several years of rest, something else may be needed to jump-start the recovery process. This may mean that re-seeding is needed, or some specialized grazing management employed. If previously overgrazed land does not begin to improve naturally according to the pattern described above, or if the rate of improvement is very slow and unsatisfactory, a more aggressive approach may be needed. This will usually entail the assistance of experienced professionals. In some



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cases excess populations of exotics, especially axis deer can do just as much or more damage than overgrazing with livestock; their numbers must be reduced to see any meaningful recovery.

### Over-Abundance of Weeds

Annual weeds, forbs and wildflowers will naturally come and go with changing seasons and rainfall, and this fluctuation occurs even on healthy land. The mere presence of annual weeds does not indicate that the land is unhealthy. However, if annual weeds dominate the land year after year and if they are out of balance with perennial grasses, it is an indication of poor land health. Annual weeds, forbs and wildflowers will naturally be abundant following disturbances such as drought, fire, or mechanical soil disturbance. This weed stage is often the first step of the healing process. But if annual weed cover is repeated year after year, it indicates a problem.

Cool Season Annual Weeds will be present from about February through late May

Filaree	Bitterweed	Hedge parsley
Tallow weed (plantain)	Basin sneezeweed	Huisache daisy
Rabbit tobacco	Pepperweed	Bladderpod
Peavine	Bluebonnet	Coreopsis
Vetch	Indian blanket	Rescuegrass
Bur clover	Wild carrot	Japanese brome grass
Henbit	Queen Anne's lace	

Warm Season Annual Weeds will be present from about late April through frost.

One-seeded croton	Lazy daisy
Buffalobur	Spurges
Cowpen daisy	Prairie verbena
Broomweed	Camphor weed
False ragweed	

It should be noted that these weeds and wildflowers are not bad plants - in fact they are often very desirable for wildlife habitat. Although these plants have some definite ecological value, when they dominate the landscape unnaturally, it indicates an out-of-balance system.

### Tree and Shrub Diversity

The Hill Country has a naturally rich diversity of trees and shrubs and it is one of the special ecological features of the region. However, the Hill Country has been subject to extreme browsing for many years. Whether the browsers are goats, sheep, white-tailed deer, or exotic ungulates, the damage can be extreme and long lasting. Over a long period of heavy browsing the most preferred plants will be eliminated or perhaps exist only in protected niches. They will cease to reproduce. The least preferred browse plants will multiply and may eventually dominate.

Trees and Shrubs Indicative of Healthy Land - If some of these species are present, healthy and successfully reproducing, it is a sign of good conditions. If these species are present, but not reproducing, it indicates a trend of declining conditions.

Spanish oak	Texas mulberry	Hackberry
Post oak	Hawthorn	Carolina buckthorn
Black cherry	Possumhaw	Rusty blackhaw
Wild plum	Shrubby boneset	Kidneywood
White honeysuckle	Cedar elm	



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**Trees and Shrubs Indicative of Over-Browsed Land** - If these species dominate the landscape and if more desirable species are absent or rare, it indicates poor conditions.

Algerita	Persimmon
Catclaw mimosa	Lotebush
Fragrant mimosa	Condalia
Mountain laurel	Juniper
Whitebrush	

### Brush

Brush encroachment and brush management are important considerations on most Hill Country lands. Keeping an eye on the kinds of shrubs and trees which are increasing is an important aspect of land reading. These woody plants, which are often lumped together and called brush, are all native species which belong in the region. But if their density gets too thick, they can interfere with ranching, wildlife habitat, aesthetic enjoyment, and can cause lasting changes in the landscape.

Some landowners do not mind, and actually prefer having moderate to thick trees and brush on all or part of their land. Other landowners prefer a more open landscape. There is no right or wrong density of woody plants, except to note that in general, most Hill Country land naturally supported at least a modest density and large diversity of shrubs and trees. The "right" density for each individual landowner may vary from a 10% canopy to a nearly closed canopy. Contrary to popular opinion, a moderate to dense cover of shrubs and trees does not necessarily represent poor land condition and may in fact indicate healthy land.

One aspect of land reading is to be able to discern the early stages of woody plant establishment. Make careful observation across all parts of the property, taking special note of the number, kinds and spacing of young woody plants, especially the more aggressive species. If many young cedar, mesquite, pricklypear, persimmon or whitebrush plants are visible or if their numbers appear to be increasing, this is the early warning that a major change is about to take place.

For example, 100 small cedars per acre, one to three feet tall, is a negligible impact, causing no current harm. Give those 100 cedar ten years of growth and they will increase in diameter to perhaps 10 feet. Now those same 100 cedars are occupying about 20% of each acre. Give those cedars another 20 years, and their diameter may increase to about 16 feet and their combined canopy will be nearly 50%. In a short span of 30 years, an area can go from open grassland to a 50% coverage of cedar. This is just an example of how rapidly cedar can take over. Cedar is a natural part of the Hill Country, but many landowners prefer to keep it from dominating the landscape. It is easy and relatively inexpensive to control or thin young cedar when they are small; it is difficult and very expensive to control cedar when they are large.

Mesquite, persimmon, whitebrush, pricklypear, tasajillo, pricklyash, catclaw and other brush species can also get out of hand. Their rates of increase are all different and they do not usually have the same dominating effect as cedar. Nevertheless, the best time to control, reduce or thin out these potential brush species is when they are small, sparse and easily controlled.



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### Exotic Plants

The presence and abundance of certain non-native plants is an important aspect of land reading. Not all exotic plant species are problematic - some serve useful purposes and do not spread and take over. However some species are aggressive, undesirable, and have invasive characteristics that warrant immediate attention.

Undesirable exotic plant species are almost always brought onto a piece of property accidentally via hay, seed, road material, cattle, vehicles or equipment. Disturbed soil is usually where they first show up. Any new construction sites, road work, disturbed areas or places where outside seed can get a start should be watched closely for signs of new and different plants that may be getting started.

Exotic plants or their seed can also float down a creek during high water or the seed can blow in from nearby locations. Once any of these plants becomes established and makes seed, the increase can be rapid and exponential. At the very first sign of new unfamiliar plants, try to get a positive identification. If it is a plant known to cause problems, hoe it, pull it, or spray it before it makes seed. The list below contains some of the major exotic plants of the Hill Country that have the potential to dominate, crowd out native vegetation, and spread to neighboring property.

Malta star thistle  
Distaff thistle  
Musk thistle  
Yellow-spine thistle  
Bull thistle  
Blessed milk thistle

Bastard cabbage  
K R bluestem  
Varieties of old world  
bluestem  
Mexican ricegrass  
Waxleaf ligustrum

Chinese privet  
Chinaberry  
Chinese tallow  
Giant cane

### Conclusion

Reading the land can be a difficult skill to learn by yourself; don't hesitate to ask for help in learning how to read. Experienced land readers are usually very happy to help others learn how to read. Seek the help of local ranchers, wildlife managers, naturalists, TPWD biologists, NRCS conservationists, AgriLife Extension specialists, consultants or retired experts. Host a guided pasture walk with one of these people and some of your neighbors and everyone can learn together.

Another good way to help you remember the plants on a piece of land is to make your own plant collection. A collection of pressed plants, plant scans, or plant photos put into a book with notations is a permanent record that will reinforce your plant skills.

Weaver concluded his remarks by saying, "Some see without understanding; but let us look closely and understandingly, and act wisely, and in time bring our methods of land use and conservation into close harmony with the dictates of nature."

Weaver was admonishing land readers to look closely and read carefully so that they could understand the story of the land. After a basic ability to read the land is learned, it brings with it the responsibility of insuring that our management is promoting good land health. The story of the land can be a complex story, but it is understandable if we know the characters and their personalities. Learning to read can be slow at first, but with practice it will become natural and will help you unlock hidden stories of your land and motivate you to become a better steward.