

Increasing Forage & Animal Productivity: Holistic Management® Grazing Planning

Key Outcomes

You will learn:

- How to get your livestock to the right place at the right time and for the right reasons
- How to maximize your stocking rate
- How to plan your grazing to increase your profits from meat, milk, or fiber
- How to utilize the “tools” of grazing and animal impact to create the future landscape described in your holistic goal
- How to effectively plan and utilize stock density, and herd effect
- How to maximize production (and profitability) from both land and animals
- How to maximize forage production in the growing season and ration it out in the non-growing season without animal performance drops
- How to plan for, and survive a drought with minimal financial losses
- How to integrate all other activities on the property with the grazing plan to avoid stress, surprises, and to lower costs
- How to integrate your current grazing plan, financial plan and the gradual development of you long term physical infrastructure land plan to avoid high capital costs

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Holistic Management® Grazing Planning

As a farmer or rancher, you care about the land and want to be a good land steward while making a decent living and having time for your family and community. Holistic Management International has developed a grazing planning process to help you achieve that.

A study done by Ohio State University of early adopters of Holistic Management® across the U.S. found that at a time when some 600,000 farmers and ranchers went bust,

Holistic planned grazing enables you to get animals to the right place at the right time for the right reasons

these early Holistic Management adopters were making healthy profits. The reason for this dramatic difference is they used holistic planned grazing combined with land planning and financial planning. The three planning processes work in harmony.

Not only does holistic planned grazing play a critical role in dramatically increasing profitability, but it takes stress out of your life by always producing the best possible plan.

Generally people plan their grazing without accounting for such complexities as differing plant growth rates, managing for ecosystem health rather than plant species, maximizing effectiveness of rain or snow, livestock performance, calving, lambing or kidding without mismothering, differing trampling levels and treatments to produce your desired future landscape that will sustain your business, wildlife breeding, watering and other needs, fitting crop rotations into a plan that uses animals to improve crop fields, hunting, fishing, recreational pursuits, and a host of other variables.

How does Holistic Management® Grazing Planning differ from Management Intensive Grazing (MIG) or rotational grazing? In MIG and rotational grazing you generally plan grazing periods, plan forward and tend to use a calendar in some way rather than a planned grazing chart or other visual aids. Most of the emphasis is on minimizing overgrazing of plants and grazing is usually done toward one objective such as achieving maximum weight gain in the shortest amount of time.

Holistic Management® Grazing Planning

Holistic planned grazing on the other hand differs in three key ways:

- 1) recovery periods are planned rather than grazing periods (which are derived from recovery periods),
- 2) planning is done backwards in critical periods, and
- 3) the plan is always done on a chart which displays the plan in at least three dimensions—time, area, and volume (of forage) and many other variables.

This presentation gives peace of mind—much more so than a list of paddock moves—because you can see in time and space how everything can potentially work out. A list can't do that. This peace of mind is one of the key benefits of doing the planning in the first place.

In addition, grazing planning is done to maximize animal impact, which in some situations can be even more important than minimizing overgrazing to move you toward permanent prosperity and healthy land.

Using **Holistic Management® Planned Grazing** and a **Grazing Plan and Control Chart** to record all the factors mentioned above, you can then plot livestock moves, avoiding areas with ground-nesting birds at certain times, grazing others first to create firebreaks, saving others for calving/lambing/kidding time, and so on. And most important, you can plan backwards over the most critical periods of the year.

The Holistic Management® Grazing Plan

Enables you to manage land, animals, and wildlife so that:

- In the growing months the land can produce the maximum amount of high quality forage on an increasing or sustained basis;
- In the non-growing months there is adequate forage and/or cover for livestock and wildlife;
- Droughts can be dealt with effectively;
- The nutritional requirements of the livestock and wildlife are adequately met;
- There is minimal stress on the animals from physical handling, as well as on the people;
- There is maximum coordination with cropping, wildlife needs, and other land uses, as well as with the personal schedules of those who will operate the plan;
- You are constantly moving toward your holistic goal.

Holistic Management® Grazing Planning

Without this sort of planning, it is difficult to handle the complexity that must be faced rather than avoided. And it is difficult to maximize animal impact—the most powerful tool for enhancing rainfall effectiveness, forage and animal production—while minimizing overgrazing of plants. Unlike other tools, such as bulldozers and tractors, a herd of cattle or a flock of sheep or goats cannot be simply parked until they're needed again. At all times the herd is doing something that affects the soil and plants. And because of this, we have to know ahead of time where they will be on any given day and what we want them to do there besides graze.

Whether you are grazing 100 sheep in New England or a herd of 5,000 cattle in Texas, you can use this grazing planning process to improve land and animal health and productivity while reducing stress for yourself.

Growing & Non-Growing Season Plans

The *growing season plan* should ideally be done as the growing season begins. At that point you will have the information (needed for planning) on paddock performance and forage availability from the *non-growing season* just ended. If you plan earlier, you will need to estimate paddock ratings. The growing season plan should project well ahead but remain *open-ended* (see *Definitions*), because no matter how good or bad the season is, forage volume is likely to be increasing, even if very slowly.

The *non-growing season plan* should be done toward the end of the growing season when growth has nearly stopped **or much earlier if little or no growth occurs and you realize it will not be a normal growing season**. Because you know the amount of forage you will have available over the non-growing period, and no more can grow, this is a *closed plan*. Because the amount of forage will not change (though quality will), you can project the plan forward to a theoretical end point which is what makes it a *closed plan*. You will ration out the forage over the non-growing months to ensure your livestock are fed, commonly leaving some for wildlife (as both feed and cover), and some as litter to help cover soil.

If you are new to grazing planning, make one plan for each herd you plan to run and consider the paddocks allocated to each herd as one grazing cell. Normally one grazing plan is made for each cell whether it contains one or multiple herds. A cell is any piece of land on which livestock moves are planned as a unit and recorded on a single grazing chart. A farm or ranch may have one to several grazing cells. Cells are then divided into grazing areas called paddocks. Paddocks may or may not be fenced.

Holistic Management® Grazing Planning

Holistic Planned Grazing

Why:

To effectively use animal impact and grazing to move the health and productivity of your land as quickly as you economically can toward the condition described in your holistic goal.

In planning grazing we are coordinating the use of two primary land management **tools** to create a landscape based on your knowledge of how those tools affect your landscape (keeping in mind the brittleness scale).

- **Grazing** (and browsing) of plants.
- **Animal impact** essential to grassland & pasture health.

You use the tools of **human creativity** and **money and labor** to help you use the two tools mentioned above the most effectively.

You use four **management guidelines** concerning those tools:

1. Population management (stocking rate)
2. Time
3. Stock density
4. Herd effect

The livestock moves you plan serve only as a guideline to the order of moves. The planned moves do not replace your common sense judgment at the time a move is due. Likewise, as you develop your grazing objectives for the year, you will be testing your decisions toward your holistic goal (refer to Introduction to Holistic Management Manual for a review of the testing questions) and considering how to improve the four ecosystem processes.

Just as with financial planning, you will then monitor for results and use a feedback loop to help you replan if necessary.

Holistic Management® Grazing Planning

Guidelines for Planning

Learn The Basics

This manual is an introduction to Holistic Management® Grazing Planning. For a more in-depth knowledge of holistic planned grazing study *Holistic Management: A New Framework for Decision Making* and *Holistic Management Handbook*, or attend a training session.

Keep It Simple

Try to keep the number of herds to a minimum—two at most—until you have gained experience in planning and monitoring the grazings. It is also wise to avoid more sophisticated grazing strategies, such as ‘follow-through’ grazing, until you have more experience.

Plan On Paper

This manual is always used in conjunction with HMI's *Grazing Plan & Control Chart*, which shows length of recovery periods clearly, areas of land and planned volume of grazing. The number of factors dealt with can overwhelm anyone, and it helps to have a document everyone can view when you ask for other people's help.

One Step At A Time

To reduce stress and eliminate confusion, don't skip steps in the grazing planning process, or take them out of order, or take shortcuts. Read through each step, make sure you understand what it is asking you to do, then do it, recording what you need to on the planning chart. Then move on to the next step.

Plan Conservatively

Plan conservatively on any point on which you have doubt.

Keep It Fresh

Easy planning year after year, especially with a simple land layout and few factors to consider, will tempt you to abandon the grazing planning process and fall into a routine that will sooner or later lead you far enough from your holistic goal to cost you plenty.

Monitor The Plan

What you put on paper is a guide—your most educated projection for the future. No matter how well you plan, events can occur that take you off plan. Thus, you have to monitor what you have planned against what actually happens, and modify the plan as needed. In the event of a major catastrophe, such as a fire that sweeps through most of your paddocks, you should replan altogether.

Grazing Planning—Mastering the Basics

1. Why Plan Your Grazing?

Good handling of your animals, which provide the two most important and inexpensive **tools** available for soil management (**grazing** and **animal impact**) will enable you to maximize rainfall and the harvesting of solar energy through plant growth.

Why:

To ensure prosperity through maximizing land and animal performance.

You plan grazing to:

- Move toward your holistic goal
- Achieve planned profit
- Increase animal numbers and performance
- Minimize overgrazing of plants
- Eliminate overrest of plants and soil surface
- Speed biological decay and mineral cycling
- Coordinate management activities
- Reduce labor
- Improve efficiency and reduce stress and unexpected surprises

The planning centers on these questions:

1. What *landscape* are you trying to create?
2. How much total *forage* will the *cell* have to supply?
3. How much *forage* will the average *acre/hectare* have to supply?
4. How *long* will standing forage last?
5. How long a *recovery period* do you feel is required?
6. Given the recovery period required, how *long* will animals spend in each *paddock*, and when will they return?
7. *When* and *where* will you have to concentrate animals even more to maintain healthy plants and soils, reduce weeds and woody vegetation or heal serious erosion?

Animal Days per Acre

2. Measuring Forage Utilization - in Days Animal Days per Acre

Why:

Animal days per acre/hectare is a very accurate way of estimating or later recording forage eaten.

One animal day per acre (animal day per hectare), or ADA (ADH) represents the amount of forage one animal consumes in one day. ADA/H can easily be converted to the actual square yards (meters) required to feed one animal for one day. This calculation helps to determine paddock size as well as carrying capacity/stocking rate.

Exercise: Current Situation

Currently, how many cells, paddocks, and herds are you running on your ranch/farm?

Make notes and list the reasons for operating as you are.

What are the reasons you have planned your grazing in the past?

On what questions did you center your planning?

What were your strong areas? Where might you need to enhance your learning or planning?

Exercise: Animal Days of Grazing

You may never have thought in terms of animal days before.

See if you can calculate the total animal days of grazing that were taken from the land you managed last year. T

This would be the number of animals X the number of days of grazing.

Review the Conversion into Standard Animal Units box on page 50 or talk to your extension agent.

Grazing and Recovery Periods

3. Grazing and Recovery Periods

What:

Establish the recovery periods you believe perennial grass plants require in your situation or area.

Why:

To minimize overgrazing. Adequate recovery time is more important than grazing periods.

Recovery periods dictate grazing periods. In winter rainfall zones, where the predominant vegetation is annual grasslands or rangelands, the recovery period is also paramount.

Although it is difficult to kill these individual plants through overgrazing within their growing season, total forage produced can be dramatically affected by managing recovery

periods correctly (i.e., irrigated runner grasses versus bunch grasses and what you're trying to produce in terms of succession, water cycle, etc.).

Even if you have an annual pasture you should plan your grazing to move it toward perennial grasses.

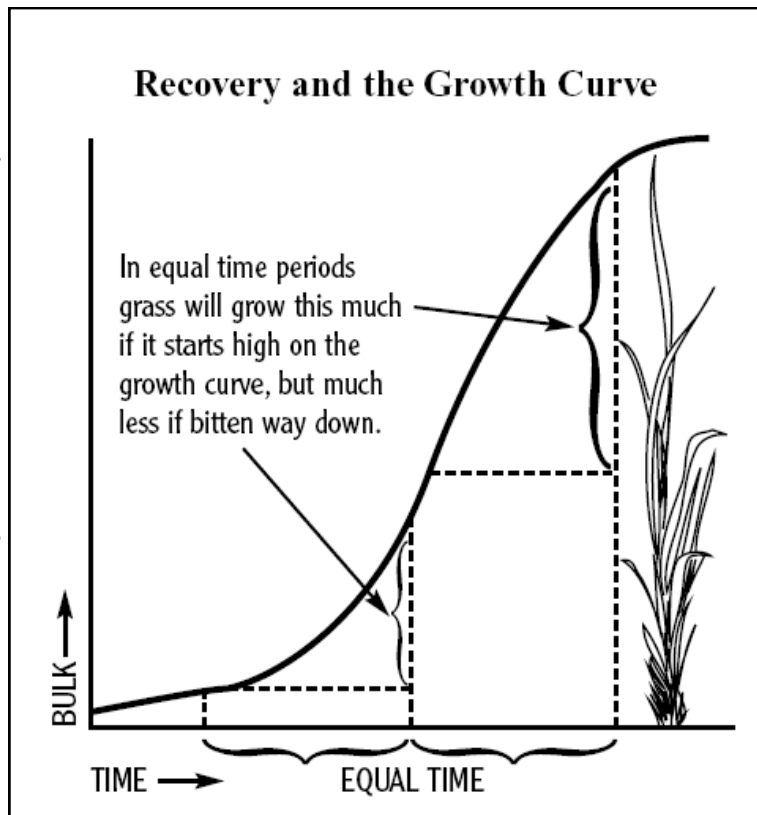
To understand how to figure grazing periods, see page 49 in the Appendix.

When you shorten a grazing period in one paddock, you shorten the recovery periods in all paddocks, so plan the recovery period first. Recovery periods then dictate average grazing periods.

Slow growth = slow moves (and a longer recovery period).

Fast growth = fast moves (and a shorter recovery period).

When in doubt use slow moves to minimize overgrazing.



Time and Paddocks

4. Time, Paddocks, and Land Divisions The Effect of Paddock Numbers on Timing

What:

Determine recovery time required, and the number of paddocks per herd determines grazing periods.

Why:

Expose plants and soils to grazing/browsing/ trampling for the shortest time you can while providing adequate recovery periods for the plants.

Recovery and grazing periods are interlinked and one cannot change without the other changing.

Working from predetermined recovery times, the more divisions of land you have, the more recovery time per day of grazing each paddock gets.

More land divisions do not change the ADA/H yielded – rather, each acre or hectare gives up its feed in a shorter time. As the number of paddocks increases, grazing periods become shorter, steadily and increasingly minimizing overgrazing.

To see the effects of timing with various paddock numbers, see page 50 in the Appendix.

**Exercise: Animal Days per Acre/
Hectare**

Thinking in terms of animal-days/acre or hectare, can you estimate how many animal-days/acre or hectare the individual paddocks you managed supplied last year?

**Exercise:
Recovery Periods**

Consider other grazing regimes in the context of holistic grazing planning and the concepts of grazing and recovery periods. When are grazing periods or recovery periods planned in those cases? Why does it matter?

Paddocks and Stock Density

5. The Effect of Paddock Numbers on Density

What:

Build up paddock numbers.

Why:

Animal impact increases with increasing stock density. The more paddocks you create, the greater the stock density.

With good planning, higher density begins to address problems of overrest and speeds land improvement. So keep increasing density and stocking rate but make sure you keep planning.

Advantages of high stock density:

- More plants grazed more evenly.
- More even distribution of grazing, urine and dung
- Quicker moves for animals to fresh un-fouled ground, better nutrition
- Tighter plant communities through increased animal impact
- More even litter laying for soil cover
- Animal performance improves
- More effective rainfall
- Quicker land improvement (greater diversity of plants, etc.)

To learn more about the Effects of Splitting Paddocks, see page 51.

Exercise: Paddock Numbers and Recovery Periods

How many paddocks do you have? Are you clear that the number of paddocks you have does not determine the recovery period(s) you choose, and that recovery period is whatever it needs to be, regardless of paddock numbers? For example, if you need to plan 100-day recovery periods, it doesn't matter if you have 5 paddocks or 50, you still plan for a 100-day recovery period. Higher paddock numbers decrease the length of grazing period per paddock for any given recovery period, and allow for higher graze/trample to recovery ratios.

Stock Density and Animal Nutrition

6. Stock Density and Animal Nutrition

What:

Improve animal nutrition by increasing stock density while keeping stocking rate the same for that cell.

Why:

When you increase paddock numbers (through fencing or herding), stock density automatically increases.

Animal performance improves with more paddocks, because animals can move more quickly onto fresh grazing, and because the animals graze more evenly, which results in better forage quality (fewer old and stale plants).

The moment you begin planned grazing, even though you may have few paddocks, stock density increases. Initially you are likely to have few paddocks, and you may experience a slight fall off in individual animal performance, even though overall production may be enhanced. This poorer performance can be due to a variety of factors, some of which are associated with a lack of diversity in plant species and poor age structure following years of partial rest and overgrazing, or the need for livestock to adjust to grazing at higher densities.

To avoid this:

- Plan your grazing to ensure an even plane of nutrition through moves to fresh grazing as fast as recovery periods will permit.
- Do not hold animals back to clean up forage they do not want to eat unless you are running a class of animal whose performance doesn't matter, or when you're using your stock to clean up old material in the non-growing season.
- Supplement what the forage lacks until forage quality improves sufficiently, but avoid the trap of selecting for animals that are dependent on supplementation.
- Ensure that concentrated animals are provided adequate watering facilities.
- Handle animals calmly.

Stock Density and Animal Nutrition

- Allow animals to move themselves between paddocks rather than driving them.
- Plan paddock moves to adjacent paddocks during calving, lambing, kidding.
- Plan grazing 'backwards' over breeding, calving, lambing or kidding to ensure paddock moves are over minimal distances and least stressful. (Instead of beginning in a certain paddock and planning your moves **into** future paddocks from there, when planning 'backwards' you are assessing which paddock you must come **from** in order to move into a certain paddock at a particular time.).
- Plan grazing backwards to ensure a rising plane of nutrition as breeding begins.
- From two months prior to calving, until the end of the bulling period, make sure the animals are on a high plane of nutrition.
- If grass is getting away from you in the growing season, leave a paddock or two out. These paddocks can be used in the nongrowing season or when animal performance is not critical.

Exercise: Animal Impact

Can you picture an area on the land you manage that has had high animal impact and has it been good for the land? How about an area where animal impact has had a negative effect on the land? How does the management guideline of "Time" factor in here?

Forage and Drought Reserve

7. Forage and Drought Reserves

What:

Anticipate that every year will be a drought year, (i.e., the rains are likely to arrive late) and plan to reserve grazing “*time*” rather than grazing “*area*” to avoid or minimize a loss of production.

Why:

A drought reserve is a buffer that reduces the likelihood of having to buy hay, destock, damage your land, etc.

A reserve in area—a paddock or two set aside, just in case—causes you to lose production over the entire property and also on animal performance because you have fewer paddocks to graze. A time reserve, because it leaves all paddocks in the grazing plan, enables you to grow more forage and keep animal performance higher because you can move more quickly.

Holding Forage Reserves in **time**:

- Increases the production on every plant grazed in every paddock, because the grazing-to-recovery ratio of every paddock is increased. (See *Useful Definitions*).
- Budgets animal days for reserve for as long as required
- Decreases the risk of losing reserve to fire, as the reserve is spread over the whole cell
- Improves animal performance through the whole season because animals move more frequently when there are more paddocks included in a cell. This means less fouling and more even flow of quality feed into the rumen
- If a drought is experienced, it brings animals through in better condition
- Closed (non-growing season) planning done early, if the current season was poor, results in greatly reduced need to sell off animals, and thus fewer animals sold, at earlier sale and higher prices (before others panic)

Forage and Drought Reserve

Holding Forage Reserves in **area**:

- Forage may lose nutritional value in paddocks held as reserve
- Overrested grassland in reserve paddocks may shift to forbs and woody species in both brittle and non-brittle environments
- Lowers animal performance in all paddocks through entire growing season because there are fewer paddocks to graze and speed of moves decreases
- Lowers production of all plants bitten in all paddocks grazed because the grazing-to-recovery ratio decreases

**To learn more about Holding Reserves in Time or Acres,
see page 52.**

Exercise: Drought Reserve

How have you typically planned for drought? If you set aside acreage how did that work for you? Can you see the advantages of setting aside a “time reserve” of forage?

A Note on Forage Digestibility

The more digestible the forage is, the more a cow can eat, assuming protein and mineral requirements are met. The less fiber, or lignin, in the forage, the faster the rumen microbes can digest the forage and the faster the cow can empty and refill her rumen. The more lignin in the forage, the slower the rumen passage and the longer she stays full. That means she refills less, and thus her total dry matter intake is less. This is why the better the forage, the more the animals gain; they not only can digest more, they also can consume more total dry matter.

Stocking Rate

8. Determining Correct Stocking Rates

What:

Get the stocking rate right for your land.

Why:

To make sure you have adequate forage to feed your livestock, provide litter for the soil surface, and, if you manage for any significant wildlife population, to provide wild grazers feed and cover, too.

Most managers want a stable livestock production policy without too much fluctuation in numbers. If you have been running your livestock on continuous graze and/or based your stocking rate on the “take half, leave half” rule, you can almost certainly increase your stocking rate under planned grazing, which for many overcapitalized operations makes an enormous difference.

The simple technique described in the appendix for assessing stocking rates enables you to calculate approximately how many animals you can safely run year round or for a prolonged time. It measures the forage available by checking the area needed to feed one animal for one day at various stocking rates.

See pages 53-54 on determining correct stocking rates.

The same technique can also be used to check that you are not overstocked at any point during the year.

To check stocking rates during the growing season:

- Sample one or more of the longest recovered paddocks (i.e., greatest time since its last grazing)
- From your grazing plan take the number of ADA/H required for the shortest grazing periods. From the ADA/H figure compute the area needed to feed one animal for one day (i.e., one animal day, or AD). Sample several squares of this size asking the question, “Could this comfortably feed one animal today?” If you keep coming up with “No” answers you are probably overstocked.

Stocking Rate

To check stocking rates during the non-growing season:

- Do your closed season plan, including the drought reserve. At the end of this you will know the ADA/H demanded of all paddocks and you can compute the area required to feed one animal for one day in several paddocks. Sample several areas on the land and determine if they will feed one animal today.
- At any time in the non-growing season you can also do a quick stocking rate check, even before the planning is done. Simply determine how many days remain until you can *reliably* expect significant growth, which should include days for drought reserve. Multiply number of animals by that many days and divide by the total area and you have an average ADA/H figure required. Convert this figure to the area required to feed one animal and sample in the field asking if squares of this size could feed one animal today. If many are turning up as “No’s” you are probably overstocked.

Signs of overstocking:

- Running out of forage in the non-growing season
- Animals picking up excessive litter and risking exposure of bare soil
- In snow prone areas, removal of taller plants that would normally be present to catch snow
- Animals agitated or unsettled

Exercise: Stocking Rates

How do you figure stocking rates currently?

What is the stocking rate on your place?

Dormant Season

9. The Critical Non- or Slow- Growth Season

What:

If your plan shows you will have to destock, act sooner rather than later

Why:

Closed season planning is done to avoid running out of forage. The later you destock, the heavier the destocking has to be.

Avoiding Running Out of Feed

In order to ensure the remaining animals have access to sufficient forage to reach the end of the non-growing period, more animal will have to be sold if you destock later (See page 58). In addition, any forced sale late in the season almost inevitably results in poorer prices, which means the slower your subsequent financial recovery will be.

If you think you may run out of forage:

- Do stocking rate field checks, converting planned ADA/H to the area (square yards or square meters) required to feed one animal for one day. This will help you to make better judgments.
- If you have not already done so, combine all herds/flocks into the absolute minimum number possible.
- Increase paddock numbers through temporary fencing or by physical herding.
- Destock sooner rather than later.

Dormant Season

For the long term

- Do your non-growing season planning each year as soon as growth stops, making sure you think through each step carefully.
- Always plan sufficient drought reserve in this closed plan to ensure you will readily cope with a significantly delayed start to the next growing season. This is particularly important if the stock you run will be calving/lambing or kidding at the expected start of the growing season, and it is difficult or impossible to physically remove them for a period.
- Always plan for droughts/slow or delayed growth developing at the start of the growing season.
- When you run into a drought during the growing season immediately develop a closed plan and start following it. Do not procrastinate!
- Increase the number of paddocks, either through fencing or herding. This will increase stock density and thus animal impact and help improve the water cycle. This is your greatest insurance against drought.

Make sure you really have to run more than one herd. Every additional herd costs significantly more than most ranchers and farmers ever realize unless they work it out. That cost is seen in reduced forage production over the entire property, and often in reduced individual animal performance as well.

Exercise:
Dormant Season Grazing

How do you typically plan grazing during the dormant season?

The earlier you reduce stock, the less you have to reduce.

Nutrition and the Dormant Season

10. Nutrition during Non- and Slow-Growth Periods

What:

Equalize the differing quality and size of paddocks so that grazing moves subsequently ensure a good, and even plane of nutrition for your livestock.

Why:

If animals are provided a very uneven plane of nutrition during the non-growing months it depresses animal performance and lowers profitability.

Nutritional value of plants drops during the dormant season. Livestock generally have more than they need early in the season and less than required at the end when they are often approaching breeding and need to be on a rising plane of nutrition. It is important to balance out the need to minimize the number of times animals have to return to already-grazed paddocks against the effect that has on keeping them in paddocks too long: poorer nutrition on increasingly fouled ground. The more paddocks, the less time animals have to graze in each of them, and the more even the plane of nutrition tends to be.

To learn more about plane of nutrition, see page 59.

Managing a Drought

11. Managing a Drought

What:

Having planned for drought, when you do experience one, be prepared to change your management of the animals and the grazing.

Why:

You don't need to worry about overgrazing during dormancy. Favor your animals until new growth is underway.

If caught in a serious drought (with or without previous good planning) change your mindset and act decisively. Under these conditions you can take otherwise unwise actions because there is likely to be no physical plant growth, and little risk of overgrazing plants. If for some reason you cannot sell or remove animals and you have to save what you can in a worst case scenario, ruthlessly amalgamate herds. This will speed the frequency of moves onto fresh ground because the herd has more paddocks available to it. There is a degree of psychology involved here: animals that are moved very frequently (every day for example) will do better than animals confined to the one piece of increasingly fouled land. Frequent moves seem to give animals greater "hope". The worst possible thing in a drought is to spread your animals. Bunch them and keep them moving and you will save most of your animals.

Watering Large Herds

12. Watering Large Herds

What:

Plan water development to ensure rapid delivery rates (tank to trough) and adequate storage (several days' supply).

Why:

To maximize herd size without stress at water points.

When designing your land plan it is critical to plan for water supplies that will be sufficient to enable you to maximize herd size. In the meantime, if you want to maximize herd size you will have to be creatively practical in meeting your water needs—haul water to your animals, drive them to water, and so on. The costs associated with “creatively” getting water to big herds have to be weighed against the benefit of combining them in the first place.

Before deciding to haul water, do some calculations about the financial and social costs involved, compared to the revenue expected as a result. The experience of many holistic managers has been that the amount spent on hauling water is often never recouped (i.e. the activity has a low marginal reaction). Think it through for your situation.

Exercise:**Watering Large Herds**

Is water the limiting factor to increasing herd size on land you manage or more effectively using all your land? If so, how could you address this shortfall?

Herd Effect

13. Creating Herd Effect

What:

Apply very high animal impact, or herd effect, by inducing a behavior change in large numbers of concentrated animals, to speed land restoration.

Why:

Partial rest and patch grazing greatly reduces land health and productivity.

The behavior change that creates herd effect can be induced by running your herd at ultra-high stock densities, or, more commonly, by using an attractant, such as a few bales of old hay, or coarse salt (to animals denied salt blocks), that causes animals to bunch closely and mill around *for a short* time on a chosen site. You can also use stock dogs for the same effect but be careful of stressing your herd.

Herd Management

14. Single vs. Multiple Herds

What:

Run all your animals in one herd if possible.

Why:

To increase stock density, the graze/trample-to-recovery ratio, the evenness of the grazing, the ability of animals to select their diets, speed of moves onto fresh grazing and more without a change in your stocking rate.

Single Herd Management

All these things lead to higher animal, and, more importantly, land performance and profit.

If animals need to be pulled from this herd, i.e. bulls, consider set stocking them, not using the same paddock each year so that the bulk of your animals can keep moving over more ground though more paddocks.

Herd Management

15. Multiple Herd Management

What:

When multiple herds are really necessary, do your best to minimize the loss of production from the land and animals.

Why:

Because multiple herds carry a high hidden cost in lost animal and land performance.

Evaluate each herd you plan to run in terms of animal performance and land performance to determine the best herd number strategy for you.

There are several ways you can run additional herds (covered on page 58) and minimize loss of land production. Herds can be allocated to specific paddocks with the larger herd getting more paddocks. Herds can pass through all paddocks but be separated by several paddocks to ensure recovery times. Herds can follow one another immediately on what is called follow through grazing. The different alternatives should be penciled out looking at several factors – stock densities, timings, ADA/H taken, and frequency of move to fresh grazing being among the more important.

**For more details, see pages 222-225 in the
*Holistic Management Handbook.***

Wildlife

16. Wild Grazers and Browsers

What:

Anticipate that wild grazers and browsers will associate with your herd in the growing season.

How:

Make every effort to maximize animal impact while minimizing stock time in a paddock.

Wild grazers and browsers will associate with a livestock herd, sometimes directly, but more often one or two moves behind the livestock, where they benefit most from fresh regrowth. This behavior effectively lengthens grazing periods and thus shortens the recovery periods that were planned. The presence of wild grazers may not be a major concern from a plant health perspective.

Often of more concern is the volume of feed that the wild grazers remove. You need to know how many you have and if you are willing to share that volume or if you will need to control wildlife numbers. Experience suggests that numbers may need to be controlled. If so, management regimes should be instituted that are appropriate for the location and species present.

Animal Breeding Cycles

17. Matching Animal Cycles to the Environment

What:

Match livestock breeding cycles to the environment to enhance reproduction rates.

Why:

This enables you to improve animal breeding performance at minimal cost and thus contribute more to profitability.

Compare your herd's varying nutritional needs to nature's cycles of forage supply. Note when wild grazers on your land are breeding and giving birth as they have learned the optimum times over thousands of years. Don't let tradition or peer pressure stand between you and your holistic goal—you are the only expert on the land you are managing.

Exercise:**Animal Cycles and Land Cycles**

If you run a breeding herd, when do you calve, lamb or kid now? Would you achieve better results by timing breeding so that young drop when high quality forage is available to their mothers?

Disrupting Insect Cycles

18. Pests, Parasites, and Other Headaches

What:

Plan your grazing moves to help break parasite breeding cycles.

Why:

Breaking the breeding cycles of flies, liver fluke, ticks and other parasites through the planning of moves, and particularly recovery periods, goes a long way toward more healthy animals with less problems at lower social, monetary or environmental cost.

Learn what you can about the basic biology of any parasites and pests you have to deal with. Use this knowledge when planning the moves of your stock. For example, avoid having your animals return to an area where liver flukes were present until long after the flukes have completed their life in the wet ground and died for lack of a host. This will keep your stock from being reinfected.

Also consider, as many ranchers have successfully done, using pigs and chickens, especially in concentration areas, to kill fly larvae, physically pick ticks off cattle, and to help keep these areas clean.

Likewise with other problems, when you know certain areas are prone to flooding or standing water, you can plan to graze affected areas afterward, since ungrazed plants will slow the flow and trap sediment.

**Exercise:
Pests & Parasites**

List potential pest and parasite challenges you have. Identify the weakest point in their lifecycle (get help from your local extension office) and what you could do to take advantage of that weak point and reduce their numbers. Think through how your current grazing management is enhancing or hindering the successful spread of the pest or parasite.

Creating Your Plan

Grazing Chart Basics

What:

Generate a grazing plan that takes into account any number of variables and displays them graphically and in great detail.

Why:

To allow you to sort out a number of options to advance several priorities at once, see your situation at a glance, and change the plan easily as circumstances demand.

Holistic Management® Grazing Planning

Only through holistic planned grazing do livestock managers report feeling free of worry and stress and fully in control of their situation no matter what nature's seasons might throw at them. Your holistic grazing plan is created by following a simple, step-by-step process that allows you, through concentrating on one step at a time, to handle more variables than people can ever handle in their heads all at once. A plan that considers many variables graphically tends to generate the best possible outcome.

Step 1**Make Opening Decisions:****Look at the Seasonal Big Picture**

Hold a preplanning session with people responsible for putting the plan into effect, to consider factors that touch on livestock, wildlife, crops, haying, etc. Consider changes needed to create the landscape described in your holistic goal. Make a list of all these factors and keep it handy. Then, think through how the entire ranch will be used considering number of cells, number of herds, stocking rate, cropping, drought reserve, and biological monitoring.

Exercise:**Creating Your Own Grazing Plan****Step One**

Gather all the people responsible for putting your grazing plan into effect and proceed to complete this step. Document these opening decisions so you have them as you complete the next steps of your grazing plan.

Creating Your Plan

Step 2

Set Up the Grazing Chart

Set up one grazing chart per cell, i.e., for each herd you plan to run..

- Record across the top the Year, Name of the Grazing Cell, and circle “Open-Ended” (growing season) or “Closed” (nongrowing season).
- In the blank row along the top, write in the names of the months you are planning.
- Record the paddock numbers in both column 3’s and the paddock sizes in the left column 3.
- Next, add crop fields considered paddocks because they will have livestock on them during the months being planned. If it is a closed plan, change column 4 heading to “Non-Growth”, and head the blank column next to it “Drought Reserve”.

See page 55 for an example of a master cropping plan worksheet and page 57 for an example of a cell planning drawing.

Step 3

Record Management Concerns Affecting the Whole Cell

(Use color-coded fine-tipped felt pens)

Box in the management events that could affect your animals or your management, no matter where livestock are later placed. Draw vertical lines through all the paddocks on the starting and ending dates of the management concern and connect them across the top of the chart. Explain the meaning of the lines by writing the title of each event on the top connecting horizontal line.

Consider:

- Livestock events (birthing – blue, breeding – red, weaning - yellow, etc.),
- Other specific events such as hunting seasons that might influence the sequence of moves
- If it is a closed plan, mark in the expected start of next season’s growth (which is also the date your drought reserve would kick in),
- Scheduled social events such as vacations, or other family or community activities

This will begin to define parameters around which your grazing will be planned.

Creating Your Plan

Step 4

Record Herd Information

- Record **types of animals and numbers** for each month in **rows 29-33**. Convert stock numbers to a standard form or description that is appropriate for your environment or country – loosely called Standard Animal Units (SAUs). (In other countries the concept is variously known as Dry Sheep Equivalents (DSE), Large Stock Units (LSU), Stock Units (SU) and so on.
- Record **total SAUs** each month in **row 34** and note the peak figure (highest from all months) in the first column of row 34.
- Enter **total cell size** in the first column of **row 35**.
- Calculate **Stocking Rate** by dividing the cell size by the peak SAU figure and record the result in the first column of **row 36**.

Step 5

Record Livestock Exclusion Periods

(Use color-coded fine-tipped felt pens)

Draw a horizontal line through any time periods when a paddock cannot under any circumstances have the herd in it. Use different colors for each factor and explain the meaning with a legend in the “Remarks” space at the bottom of the chart. Do not write on the main body of the chart. Use a symbol like the following to indicate. “Keep Out!”

Step 6

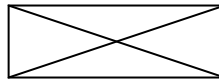
Open-Ended Plan Only:

Check for Unfavorable Grazing Patterns

(Use color-coded fine-tipped felt pens)

Skip this step if this is your first grazing plan. Otherwise, check paddock by paddock over previous grazing charts for evidence of inappropriate heavy use of individual paddocks, repeated early or late season use of particular paddocks, or of paddocks that failed to receive adequate recovery time in the recent past.

If paddocks were marked as heavily grazed, especially early or late in the season last year, exclude them in the early and late growing season this year to avoid repetition.



Creating Your Plan

Step 7

Record Paddocks Still Available

Record (for each month) in **row 26** the **number of paddocks still available**. Count a paddock as available for the month if it is available for more than 50% of the month.

You should also count a paddock as available if it is excluded from grazing for a period of time, but the period of exclusion is somewhat less than the expected period of recovery. For example, if a paddock requires exclusion for 40 days, but the expected plant recovery period is 50 days, the paddock can be counted as 'Available' (in practice, grazing could occur immediately before and immediately after the locked up period, without need for animals to be in the paddock during the locked up period).

Step 8

Note Paddocks Requiring Special Attention

(Use a color-coded highlighter)

Highlight any paddocks that need special treatment over any particular time period. Such paddocks could include a sacrificial paddock where you plan to run some animals on continuous graze, bare, eroding ground that needs healing, areas you want to rest for brush cover for wildlife, areas where you need to remove forage for fire protection, paddocks you plan to strip graze. Review the list of planning factors you created in Step 1.

Creating Your Plan

Step 9

Rate Paddock Productivity

A. Rate Forage Quality

Rate each paddock's quality relative to the others using one of three methods. If this is your first year to plan you will have to use the first method—the 1-10 scale. Switch to one of the others, which rate paddock quality in ADA/H, as soon as possible.

1. **Rate paddock quality** from 1-10. Record the rating to the **right of the slash in column 1**. **or**,
2. **Estimate ADA/H** by physically visiting each paddock. Pace off randomly chosen squares you believe would adequately feed one animal for a day and leave the ground covered with litter. Record the rating to the **right of the slash in column 1** (open-ended plan) or in **column 5** (closed plan). **or**,
3. Use actual figures in **column 8** from last year's closed plan. **Record the figure to the left of the slash in column 1**.

B. Factor Forage Quality and Area into Paddock Productivity

In an open-ended plan:

1. Multiply paddock rating (**column 1**) by the size in acres/hectares (**column 3**). **Record the result in column 2**.
2. Compute the **average rating for all paddocks** by adding the figures in column 2 and dividing the sum by the total number of paddocks. **Record this figure in the box at the bottom of column 2**.

In a closed plan:

1. Multiply the ADA/H figures in **column 5** by the number of acres (column 3) in each paddock to get the estimated animal days of forage in each paddock. **Record these figures in column 6**.
2. Add all the figures in **column 6 and record the total in row A**. Compute the average ADs of forage for all paddocks by dividing the figure in row A by the total number of paddocks. Record the result in the **box at the bottom of column 6**.

NOTE: If the plan has different numbers of 'paddocks available' in significant blocks of three, four or more months, then the average paddock rating should ideally be calculated for the exact group of paddocks available. When this is done and the paddock numbers change, the new average paddock rating is calculated using only the paddocks actually involved in that paddock count.

Creating Your Plan

Step 10

Open-Ended Plan Only:

Determine the Length of Recovery Periods

Record your **minimum and maximum recovery periods** in row 27 for each planned month on the chart. Unless you have a great many paddocks per herd and can safely choose a single recovery period, you will have to determine the expected plant recovery period under fast growth conditions and the expected plant recovery period under slow growth conditions.

Recovery Periods

- Shorter and longer recovery periods reflect the length of time that severely bitten plants need to recover.
- The faster the growth, the shorter the recovery period required. The slower the growth, the longer the recovery period.
- On arid or semi-arid land, a range of 30-90 days may suffice. Higher or more effective precipitation and fibrous vegetation—20-40 or 60 days. For pastures, particularly with runner-type grasses—15-30 days.

These times are guidelines only! Some graziers try for much longer recovery periods to create more forage that will be fed into the soil by animal impact to increase soil fertility.

Note: Avoid endless debates over when a grazed plant has fully recovered. Research shows, for instance, that grazed bunch grass will grow more root mass if only grazed once in a year rather than twice. How much recovery you plan will depend on a number of factors including animal performance, your desire to build up soil organic matter, improve water or mineral cycle and so on. ***In general, a plant will have recovered sufficiently when it looks like ungrazed plants nearby.***

Creating Your Plan

Plant Recovery

A useful way to assess plant recovery in most environments, whether they predominantly contain annual or perennial grasslands, is to use pasture cages. Construct a number of cages from netting or welded steel mesh, each about 2 feet by 2 feet by 2 feet (60cm x 60cm x 60cm) with an open bottom. Place a cage at permanent locations in paddocks in the grazing cell (ideally one cage per paddock but at least one cage every third paddock) and then begin to graze the paddocks.

To assess if a paddock has recovered: prior to its next graze inspect the height and general appearance of the grazed plants outside the cage against the ungrazed plants inside the cage. If the material outside the cage looks substantially like the protected material within the cage, in terms of plant physiological form, and overall pasture height and volume, it is likely full recovery has occurred. Prior to bringing the animals into the paddock, relocate the cage to an area of freshly recovered material. Repeat the process before each grazing.

Step 11

Open-Ended Plan Only:

Calculate Grazing Periods

A. Calculate **average minimum and maximum grazing periods** for the cell as a whole. **Record in row 28.**

$$\text{Average minimum grazing period} = \frac{\text{Minimum recovery period (from Row 27)}}{\text{Number of paddocks} - 1}$$

$$\text{Average maximum grazing period} = \frac{\text{Maximum recovery period (from Row 27)}}{\text{Number of paddocks} - 1}$$

B. Convert **average grazing periods** into **actual** minimum and maximum grazing periods for

Creating Your Plan

each paddock by multiplying paddock rating and the average min (max) grazing period and divide by average paddock rating. **Record in column 4.**

Min (max) grazing period =

$$\frac{\text{Paddock rating for this paddock} \times \text{average min (max) grazing period (from Row 28)}}{\text{Average paddock rating (Bottom of Column 2)}}$$

All of the above calculations apply only if there is one herd in the cell. If you are running more than one herd, in the above calculations the formula would be the minimum or maximum recovery period divided by "Number of Paddocks minus Number of herds in cell" or see Appendix on page 58.

C. Check to see that **recovery periods are adequate** in paddocks with longer grazing periods

- Add together all *minimum* grazing periods.
- From the total, subtract the longest minimum grazing period to find the *actual* recovery periods for these paddocks.
- If any recovery period is much too short, you must add days to the minimum grazing periods in other paddocks that can absorb them.

Follow the same procedure for maximum grazing periods, though the problems will probably be less critical if you can't make complete adjustments.

Step 12

Closed Plan Only:

Assess Forage Volume, Carrying Capacity, and Drought Reserve

Use the rows on the lower right of the chart to record:

- Row B: Expected days of nongrowth (based on past records)
- Row C: Days of bulk feeding (work out the bulk feed requirements for those days and record the type and amount of feed under the appropriate month in row 24.) Bulk feeding days are those days when the animals do not take their feed from the forage in the paddock, but are hand fed. Typically this would only occur in regions where snow stops the animals grazing for a period of days, and they rely on hauled in feed.
- Row D: Days of drought reserve required (the number of days of grazing you plan to reserve in case next growing season is late beginning or is a dry one overall).
- Row E: Total days grazing required (add the figures in rows B and D and subtract the figure in row C – if entered).
- Row F: Estimated carrying capacity (divide animal days in row A by the figure in row E).

NOTE: You need to feel comfortable with the number of animals you can carry through the non-growing season and drought reserve period. If you are not, the earlier you reduce stock, the less you have to reduce.

Step 13

Creating Your Plan

Closed Plan Only:

Plan the Number of Selections and the Grazing Periods

Divide total days of grazing required in the non growing season (**row B**) by the number of selections (i.e. passes through each paddock—try one or two—to see what the recovery period would be.

Ex. If there are 210 total days of grazing and you want two selections
 $210 \div 2 = 105$ days of recovery.

Then divide that number by number of paddocks to get the **average grazing period**.

Ex: If you had 15 paddocks then $105 \div 15 = 7$ days

Record the **number of selections** in **row 27** and the **average grazing period** in **row 28**

Next calculate **drought reserve average grazing periods** in the same way and record in **row 28** under the appropriate weeks or months.

Convert average grazing periods to **actual grazing periods** by taking into account forage quality, or paddock rating (column 6). Use the box at the bottom of column 6 as your average paddock rating. Record the figures, rounded off to whole numbers.

$$\text{Grazing Period} = \frac{\text{Paddock rating for this paddock (Column 6)} \times \text{Average grazing period (Row 28)}}{\text{Average paddock rating}}$$

In the non-growing season you are not concerned about overgrazing plants and less concerned about recovery periods, which now reflect recovery from fouling and trampling. However, it is important to keep stock concentrated to manage animal impact, enhance mineral cycling, and maintain animal nutrition. The fewer times a paddock is grazed the better. But the length is important as the longer they graze in a paddock the more nutritionally stressed they may become due to fouling, and the overall daily decline in feed quality, even though the total quantity of available feed in the paddock remains adequate.

Step 14

Plot the Grazings

In pencil, mark in the planned herd moves by:

- Reviewing color-coded events
- Reviewing livestock management needs (calving, lambing, etc.)
- Addressing special management concerns (poison plants, nesting areas, etc.)

Creating Your Plan

- Planning grazing backwards from those needs
- Planning conservatively with the longest (maximum) grazing period during the growing season (open-ended plan)
- Watching recovery periods (taking off a day from a *single* grazing period takes off a recovery day in every paddock) during the open-ended plan

Remember: as minimum grazing periods drop, check recovery periods for each paddock even more closely. A single day under fast recovery conditions may cause plants to be overgrazed..

NOTE: Herd moves go on the chart last as they can now be planned in the context of all the other factors that need to be considered. These other factors have all been added to the chart through the previous steps.

Step 15

Make a Final Check of Your Plan

Up to this point you haven't factored in the physiological state of your animals or changes in herd size. Here's how you do that:

Calculate the ADA/H you are planning to take out of the paddock during each grazing period planned. To do that look below the penciled-in grazing line to row 34 and multiply the SAU figure (which will reflect any herd size changes) by the number of days the paddock will be grazed. Then divide the total by the size of the paddock (column 3). Write the **ADA/H** lightly in pencil to the **left of the planned grazing line**.

Ex. $300 \text{ animals} \times 20 \text{ days} \div 850 \text{ acres/hectares} = 30 \text{ ADA/H}$

- In an open-ended plan, make adjustments to grazing periods based on paddock quality and the physiological state of the animals. If you see that the grazing pressure is likely to be too high in a paddock you rated as poor, reduce the grazing period by a day or so. If lactating animals are being bred, you might want to move them more quickly. Remember – every day taken off a single grazing period takes a day off the recovery period in every paddock, so ensure that a day reduced in one paddock is added to another paddock that can handle the additional grazing.
- Make a field check of sample areas in any paddock of concern to see if those areas could feed one animal for one day, qualifying the question to cater for physiological state of the animals. If for example, lactating animals were about to be bred and you wanted them on a rising plane of nutrition, you could ask, "Right now, would this area feed one of my female animals comfortably and with forage to spare?"
- In a closed plan, add together all the ADA/H figures you penciled in next to the grazing line and record the total for each paddock in **column 7**.

Creating Your Plan

- Make a field check to ensure that each paddock will in fact yield the ADA/H you plan to take from them. In this case ask whether the sample area will feed one animal adequately and still leave enough to provide litter for the soil and feed for wildlife.

Step 16

Implement (and Monitor) the Plan

Open-Ended Plan:

- Monitor daily growth rates (With fast growth, drop to minimum grazing period. When it slows, go back to maximum grazing periods.)
- If animals run out of forage in any paddock, you may have misjudged the paddock; move animals immediately and note your error on the grazing chart.

If you run out of forage in several paddocks, you are probably overstocked. Do a field check using sample areas based on current forage production: Multiply the minimum grazing period listed in column 4 by the SAU figure in row 34, and divide the total by the size of the paddock—column 3.

This gives the planned demand in Animal Days per Acre/Hectare (ADA/H). Then divide the area of an acre (4,840 sq. yards) or a hectare (10,000 sq. meters) by the ADA/H to obtain the number of sq. yards/meters each animal has available to it per day (Animal Day or AD). If using a calculator, hit the square root button to find the length of each side of a square that would provide the required square yards/meters per animal per day.

If the sampled areas in most of the paddocks won't feed one animal for one day, you are definitely overstocked and need to take immediate action. The choices are, broadly, to reduce numbers quickly and/or (where applicable) to begin subdividing (strip grazing) paddocks with electric fencing, ensuring that there is always a back fence immediately behind the animals. This action increases the Graze to Recovery ratio and may increase the total volume of feed produced.

Creating Your Plan

Planning Backwards

The success of your grazing plan relies to a considerable degree on your human creativity. In order to maximize this creativity, find the factor that you most want to achieve during this plan. This is very likely to be somewhere in the middle of the planning period. For instance, the important date(s) might be proximity to handling facilities on a given date, or, for management reasons, being away from a certain spot at a particular date.

Plan to have the animals grazing the appropriate paddock at the correct time to ensure your objective is achieved. Then work backwards, asking and answering the question: “which paddock must the animals move from in order to enter the desired paddock at the right time?” Keep repeating this step, asking which paddock the animals must move from in order to reach the current paddock, until you reach the beginning of the plan, which is where the animals should start on Day 1 of the plan.

Closed Plan

- Monitor forage consumption. If you run out of forage in any paddock you probably misjudged the paddock; if you run out of forage in many paddocks you are probably overstocked and need to reduce quickly.
- If the growing season doesn't start when expected, you will need to start using your drought reserve. But before you do, reassess your plan to take into account actual animal days used in the nongrowth period. Adjust the remaining ADs available and, where necessary, recalculate the grazing period for each paddock over the drought reserve period.
- As growth begins, do not speed up moves to chase the green.
- If the rains never materialize and you run through your drought reserve, then create a new closed plan without delay.
- When the rains do start and growth gets under way, create an open-ended plan.

Creating Your Plan

Step 17

Record Your Results

- Record actual grazings in ink
- Record ADA/H taken and how heavy the grazing was, in ink to the right of the grazing line (use L for light; H for heavy; and M for medium)
- Mark any paddocks where serious errors were made
- Record precipitation in **rows 21 and 22**
- Record average annual precipitation in **row 37**
- Record total precipitation in **row 38**
- Summarize livestock and land performance on bottom right of chart

Open-Ended Plan

- Enter your opinion of **daily growth rates** on row 23 (S= slow, F=fast, 0=no growth)
- When you judge that the growing season has ended, draw a brown line down through all paddocks and label it “Growth Ended”

Closed Plan

- If any growth takes place over the planned period, mark in the letter “G” on row 23.
- When the next growing season begins make your best guess of the actual start date and draw a green line down through all paddocks for that day and label it “Growth Started.”

See pages 60 & 61 for an example of a grazing chart.

Thoughtless rotation is a major cause of stock stress in the nongrowing season. In order to avoid this, put your best effort into every step of the plan!

Next Steps

After having done all this work, it is imperative that you summarize the grazing plan to see what happened, what was learned, and how to improve in the future. Results from this plan will be used to develop the next grazing plan.

While it is easy to fall into routines or habits and end up essentially not planning, those managers who continue to plan continue to increase the health and productivity of their land and animals. This productivity turns into improved profit and quality of life. Do a grazing plan every year to use your current infrastructure to harvest more sunlight and create the desired landscape and you'll find it is some of your most valuable time. Many managers say this grazing planning time is the "working on the business" time for which they would have to pay someone else hundreds of dollars an hour. Why not pay yourself that wage and reap the benefits?

Useful Definitions

Animal Days per Acre/Hectare (ADA/H)

A term used to express simply the volume of forage taken from an area in a specified time. It can relate to one grazing in a paddock or several, in that more grazings than one can be added to give a total ADA or ADH figure. If you're running a breeding herd, or mixed species herd, you will need to convert animal numbers to standard animal units (*see definition below*) to better assess the volume of forage required to feed the herd or, following a grazing, the volume of forage taken.. The ADA or ADH figure is arrived at by a simple calculation as follows:

$$\frac{\text{animal numbers (in SAU)} \times \text{days of grazing}}{\text{area of land in acres or hectares}} = \text{ADA or ADH}$$

Closed Plan

The grazing plan created for the non-growing months of the year, including the time reserve planned for drought. In this plan you ration out the forage over the months ahead to a theoretical end point, which should be a month or more after your most pessimistic estimate of when new growth could occur.

Drought (or Time) Reserve

The number of days or months of grazing you plan to reserve in case of drought. This time period would extend from the end of an average non-growing season to a month or so past the date you expect to receive new growth. Base your estimate on the longest possible weather records available.

Effective Recovery Period

One in which a severely grazed plant has actually grown new leaves and stems and re-established roots that may have been sacrificed or stopped growing. This can only occur under active growing conditions.

Graze/Trample-to-Recovery Ratio

The number of days animals are on a piece of land, divided into the number of days they will be off it before returning. Generally, the shorter the grazing periods and the longer the recovery periods—or the higher the ratio—the better the performance of both land and animals, although there is more to it than that. Bear these general points in mind in deciding:

A very high ratio, especially during the growing season, when all recovery time is effective in terms of growth, will tend to result in improved soil condition due to considerably more root growth and organic matter build-up. However, when soils are leached, rainfall is high, or excessive lignin develops in plants, individual livestock performance could drop. This drop is somewhat offset by the very short grazing periods necessary to achieve the high ratio. Generally, a high ratio will allow for a higher stocking rate. A doubling of stocking rate generally leads to higher profitability unless individual performance drops 40% or more.

Useful Definitions

Grazing Cell

An area of subdivided land that is *planned as one unit* to regulate the time that plants and soils are exposed and re-exposed to grazing and trampling. A cell is always planned on one Grazing Plan & Control Chart, and often, especially in the beginning, only includes one herd. Several smaller cells can be combined to form one large cell for planning purposes.

Grazing Selections

The number of times you plan to have animals move through a paddock in the *non-growing season* (when there is no significant regrowth between each grazing).

Open-Ended Plan

The grazing plan created for the growing months of the year. In this plan you are trying to grow as much forage as possible and you do not have to plan to a specific date. The plan remains open because you don't know when growth will end or exactly how much forage will grow before that date.

Paddock

A division of land within a grazing cell, either fenced off or demarcated for herding. Several or many paddocks together make up a cell, provided they are planned as one unit on a planning chart. The American term 'pasture', when used to define an area of land, is synonymous with paddock, as is the southern Africa term "camp", and in New Zealand the term "block."

Pasture

A planted grass or other forage crop. (In the U.S., *pasture* can refer to grass on the range, a planted grass sward, or to a division of land. To avoid confusion we use the word *paddock* to refer to a division of land, *pasture* to refer to a planted grass sward or forage crop and *rangeland* to refer to natural forage).

Standard Animal Unit (SAU)

A single class of animal against which you rate all the other classes/species of animals in a herd to better assess the herd's forage requirements. A mature cow is often used as the standard, where a cow equals 1 animal unit. A cow and her calf would be 1.5 units, a bull 2 units; 5 sheep 1 animal unit, etc. $SAU \times \text{days} = \text{Animal Days}$ (the amount of forage the standard animal would eat in a day). In Australia a widely accepted standard animal description is the DSE or Dry Sheep Equivalent, and in New Zealand the Stock Unit (SU).

Strip Grazing

The grazing of animals on narrow strips of land generally behind a frequently moved electric fence. In some cases, different areas are strip-grazed within a paddock.

Quiz

1. Name four reasons why Holistic Management® Grazing Planning is so effective at increasing forage production and enhancing livestock productivity.
2. True or false. Holistic Management® Grazing Planning is rotational grazing.
3. True or false. It is more important to plan the grazing periods for animals than the recovery periods for plants.
4. True or false. A drought reserve based on time rather than area results in less forage production over the entire cell.
5. True or false. In the nongrowing season, the nutritional value of a paddock decreases each time the animals select forage from it.
6. True or false. You should always graze the same paddocks at the same time each year.
7. Animal days per acre/hectare (ADA/H) helps you:
 - a) estimate how much forage stock or wildlife will require from a given area of land
 - b) plan for dormant season and drought reserves
 - c) assess the impact of grazing on areas of different quality
 - d) determine a realistic stocking rate quickly
 - e) all of the above
8. Plan your grazing to:
 - a) minimize overgrazing of plants
 - b) reduce labor and improve efficiency
 - c) reduce or eliminate overrested plants and soil surfaces
 - d) enhance animal performance
 - e) all of the above
9. True or false. During slow growth you should speed up moves to keep from overgrazing plants.
10. True or false. With more paddocks you never have to worry about overgrazing plants.
11. True or false. Smaller paddocks result in greater stock density.
12. True or false. Stocking rate and stock density are the same thing.

Quiz

13. You can use herd effect to
- a) Improve stocking rate
 - b) Keep from overgrazing plants
 - c) Reduce infestations of noxious weeds
 - d) A&B
 - e) All of the above

Answers:

1) Work with nature; focus on plant recovery times; account for all the variables; plan backwards. 2) F; 3) F; 4) F; 5) T; 6) F; 7) E; 8) E; 9) F; 10) F; 11) T; 12) F. 13) C

Conversion into Standard Animal Units

If you're running a breeding herd, or a mixed-species herd, you will need to convert to standard animal units to better assess the volume of forage required to feed the herd. To do this, merely select one class of animal as your standard and then rate all the other species or classes to that standard animal.

The simplest way to do this is to use the following formula:

a cow = 1 animal unit

a cow and her calf = 1.5 animal units

a weaned calf = 0.75 animal units

a bull = 2 animal units

You can also rate a herd based on weights and percentages: A 1,000-pound (450-kilogram) cow is commonly used as the standard animal in the United States, but if your cows average closer to 800 pounds (324 kilograms), use that as your standard if it makes things easier. If a 1,000-pound cow is your standard animal, then,

a 500-pound calf = 0.5, or 50% of an animal unit,

a 750-pound steer = 0.75, or 75% of an animal unit,
and

a 2,000-pound bull = 2, or 200% of an animal unit.

Use either approach when factoring in different species. The formula commonly used for small stock relative to cattle is as follows:

5 adult sheep, goats, or pigs = 1 animal unit

10 lambs, kids, or piglets = 1 animal unit

Here's how you would calculate animal days of grazing for a mixed herd of cows, bulls, calves, ewes, and lambs using the above formula:

100 cows = 100 animal units

4 bulls = 8 (4 × 2) animal units

85 calves = 43 (85 × 0.50) animal units

200 ewes = 40 (200 ÷ 5) animal units

300 lambs = 30 (300 ÷ 10) animal units

Total = 221 animal units

If this herd spent five days in a paddock, it would consume 221 animal units × 5 days = 1,105 animal-days of forage.

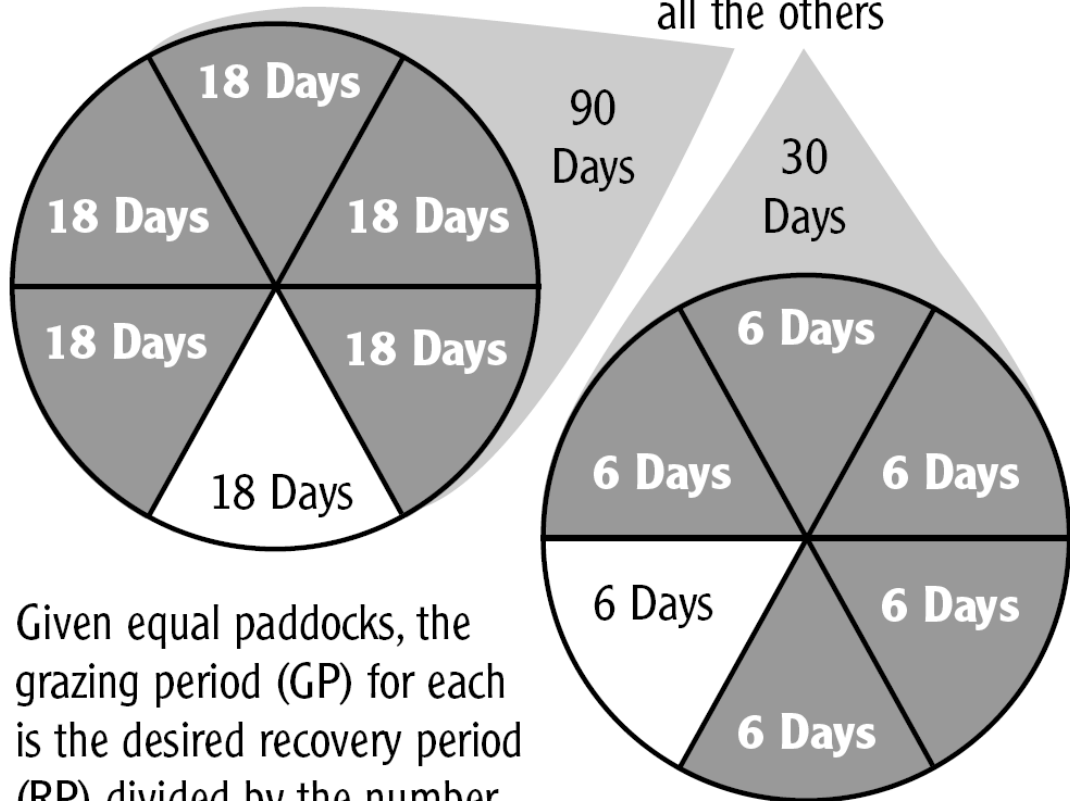
What these standard units don't do is factor in the physiological needs of the animals. A prize bull or lactating cow will have different forage requirements than a young steer. But don't assume it's just the bulk of forage that matters. A lactating cow won't usually eat much more than a dry cow, at least not enough to have a significant impact on planning. Her nutritional requirements are much greater, of course, but she will eat only until she is full. A dry cow will do the same. She'll just gain weight instead of producing milk.

In earlier days we attempted to account for physiological condition using sophisticated tables that factored in desired weight gain, physiological state, and so on. But many people have found that the tables offered no real advantage over simple field checks that involve a special line of questioning, described in the box referred to in the note below. Most managers will be working in ever changing conditions, so precise calculations to account for physiological condition often don't help.

Note: If you prefer to use techniques that more closely determine an SAU, refer to the box "Factoring in Physiological State and Wildlife Needs" (under "Forage and Drought Reserves") and use whatever technique you are most comfortable using.

Figuring Grazing Periods

The recovery period for one paddock is the sum of grazing periods in all the others



Given equal paddocks, the grazing period (GP) for each is the desired recovery period (RP) divided by the number of other paddocks.

$$GP = RP \div (\text{Total Paddocks} - 1)$$

Effects of Timing

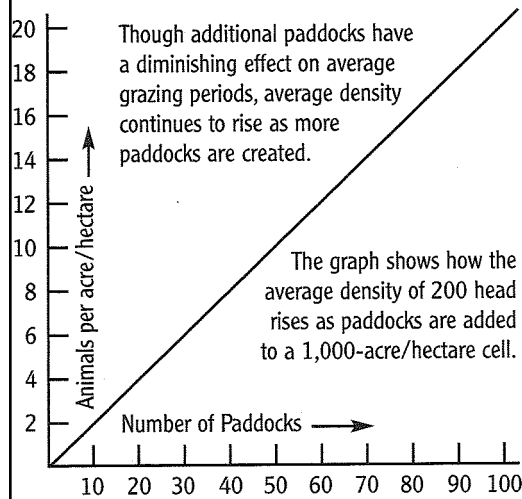
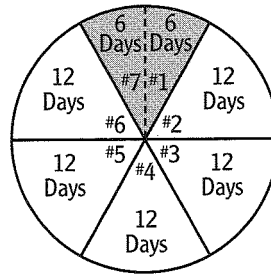
Effects of Timing with Various Paddock Numbers

Paddocks	Days/Grazing	Days/Recover	Rapid Growth		Slow Growth	
			Grazing Period	Recovery Period	Grazing Period	Recovery Period
8	4	30	FAIR (Few plants grazed at low stock density)	GOOD	GOOD	GOOD
8	13	90	DANGER regrowth regrazed	GOOD (More plants grazed as time in paddock increased)	GOOD	GOOD
31	1	30	GOOD	GOOD (More plants grazed at higher stock density)	GOOD	EXTREME OVERGRAZING
31	3	90	FAIR	GOOD (Even more plants grazed at higher stock density and longer time)	GOOD	GOOD
91	1	90	GOOD	GOOD (Many plants grazed at very high stock density)	GOOD	GOOD

Effects of Splitting Paddocks

Consider a cell that has six equal paddocks, as shown here. A grazing period of twelve days in each will allow each paddock sixty days to recover. The herd will cover the whole cell in seventy-two days.

Cutting paddock 1 in half to create paddock 7 will obviously double the stock density in those two paddocks. If, to keep the ADA(H) constant, you then graze the small paddocks for only six days, you'll notice that they now get sixty-six days to recover instead of only sixty.



In practice, for the sake of convenience, we compute the grazing periods from a desired *average* recovery period rather than a minimum, like sixty days in this example. The numbers don't look quite so neat, but the principle remains: When you subdivide paddocks, you reduce grazing periods and increase stock density and recovery periods in those paddocks.

Holding Reserves in Time or Acres

Compare different reserve strategies for similar 1,000-acre, ten-paddock cells.

In terms of forage consumed, the plans seem equal.

Cell A grazes 800 acres and saves 200 acres for times when drought causes insufficient winter feed. In a good year, the 800 grazed acres should yield:

$$\frac{200 \text{ cows} \times 365 \text{ days}}{800 \text{ acres}} = 91.25 \text{ ADA}$$

The reserved feed will be roughly 200 acres \times 91.25 ADA = 18,250 ADs. The yield could be lower, as it is only a nongrowing season yield when finally used.

Land in Cell B will yield:

$$\frac{200 \text{ cows} \times 365 \text{ days}}{1,000 \text{ acres}} = 73 \text{ ADA}$$

Assuming grass grows equally in both cells, each acre of the time-reserve cell will have roughly:

$$91.25 - 73 = 18.25 \text{ AD of feed left.}$$

Total reserves are again:

$$1,000 \text{ acres} \times 18.25 \text{ ADA} = 18,250 \text{ ADs}$$

In a bad year, when reserves are necessary, all the numbers will be smaller, but the arithmetic will still show both plans equal.

A. Acre-Reserve Cell

100 acres	100 acres	100 acres		
100 acres	100 acres	100 acres	100 acres	100 acres

B. Time-Reserve Cell

100 acres	100 acres	100 acres	100 acres	100 acres
100 acres	100 acres	100 acres	100 acres	100 acres

1,000 acres, 10 paddocks, 200 cows, 210-day growing season

In terms of production, however, the time-reserve cell will do much better:

1. Cattle in the acre-reserve cell take 25 percent more ADA from the land they graze, meaning more grass starts recovering from lower on the growth curve (see figure 2.6). Thus it regrows less in the same time than grass in Cell B.
2. Given an average sixty-three-day recovery period in each cell, grazing periods are two days shorter in Cell B:

$$\text{GP time} = \frac{63}{10 - 1} = 7 \text{ days (Cell B)}$$

$$\text{GP time} = \frac{63}{8 - 1} = 9 \text{ days (Cell A)}$$

3. Cattle move to fresh grass 25 percent more often in Cell B, converting more of it into beef.

Figuring Approximate Stocking Rate (Acres)

Imagine a sheep ranch in very poor country with a stocking rate of about 1:20. That means 20 acres for every sheep. To keep the numbers simple, assume you're keeping no lambs through a winter, which lasts from mid-October to mid-April (180 days). Thus every 20 acres has to supply 180 sheep-days, or animal-days (ADs), of winter feed:

$$180 \text{ AD} \div 20 \text{ acres} = 9 \text{ sheep-days per acre (ADA)}$$

So $\frac{1}{9}$ of an acre must be able to feed one sheep for one day.

Now look at your land after the first frost and see if one sheep could eat for one day on a selection of $\frac{1}{9}$ -acre samples:

$$1 \text{ acre} = 4,840 \text{ square yards}$$

$$\frac{1}{9} \text{ acre} = 4,840 \div 9 = 538 \text{ square yards}$$

Pushing the square-root button on a pocket calculator will quickly tell you that one side of a square covering 538 square yards is 23 yards. You can then step off several random squares (see figure 2.12), and in each case ask: *Could this square feed one sheep for a day?* (It helps greatly if four people do the pacing, so that one can stand at each corner while you judge whether the area *could* feed one sheep for a day.)

You can also work the same problem the other way to find out what stocking rate your land can carry through the winter. After a very dry summer, suppose you find that a square of 23 yards to a side will not feed one sheep for one day. Suppose you find that the square has to be at least 35 yards on each side. From this you can determine how much stock you must sell to get through the winter (or how many sheep-days of feed you must buy):

$$35 \text{ yards} \times 35 \text{ yards} = 1,225 \text{ square yards needed to feed one sheep for one day}$$

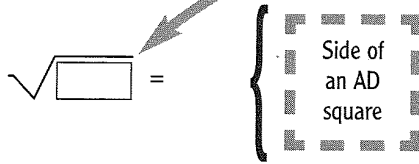
Therefore, to find out how many sheep one acre would support for a day, you divide 4,840 (square yards in an acre) by 1,225 (area required for one sheep) to give you the answer: 3.95, or 4 sheep.

A 40,000-acre ranch supplies 160,000 ADs (4 ADA \times 40,000 acres = 160,000 animal days). (Note: You need to subtract from your total land area places such as roads and steep hillsides that will obviously never be grazed. This

To figure an animal-day plot

$$\begin{array}{ccc} \text{No growth days} & & \text{Stocking rate} & & \text{ADA needed} \\ \boxed{} & \div & \boxed{} & = & \boxed{} \end{array}$$

$$\begin{array}{ccc} \text{Yd}^2/\text{Acre} & & \text{ADA} & & \text{Yd}^2/\text{AD} \\ \boxed{} & \div & \boxed{} & = & \boxed{} \end{array}$$



to figure ADs available

$$\begin{array}{ccc} \text{Side of an AD square} & & \text{Yd}^2/\text{AD} \\ \boxed{}^2 & & \boxed{} \end{array}$$

$$\begin{array}{ccc} \text{Yd}^2/\text{Acre} & & \text{Yd}^2/\text{AD} & & \text{ADA available} \\ \boxed{} & \div & \boxed{} & = & \boxed{} \end{array}$$

$$\begin{array}{ccc} \text{ADA} & & \text{Total acres} & & \text{Total ADs} \\ \boxed{} & \div & \boxed{} & = & \boxed{} \end{array}$$

$$\begin{array}{ccc} \text{ADs} & & \text{No-growth days} & & \text{Herd sustainable} \\ \boxed{} & \div & \boxed{} & = & \boxed{} \end{array}$$

ranch might have a total land area of 42,000 acres, but only 40,000 would actually be grazed and thus should be considered in our estimates.)

For 180 days, 160,000 ADs feed only 889 sheep (160,000 ADs \div 180 days = 889 sheep). If you normally run 2,000 sheep, you can expect them to run out of forage in about 80 days (160,000 ADs \div 2,000 sheep = 80 days).

Figuring Approximate Stocking Rate (HA)

Imagine a sheep ranch in very poor country with a stocking rate of about 1:5. That means 5 hectares for every sheep. To keep the numbers simple, assume you're keeping no lambs through a winter, which lasts from mid-April to mid-October (180 days). Thus every 5 hectares has to supply 180 sheep-days, or animal-days (ADs), of winter feed:

$$180 \text{ ADs} \div 5 \text{ hectares} = 36 \text{ ADs per hectare (ADH)}$$

So $\frac{1}{36}$ hectare must be able to feed one sheep for one day.

Now look at your land after the first frost and see if one sheep could eat for one day on a selection of $\frac{1}{36}$ -hectare samples.

$$1 \text{ hectare} = 10,000 \text{ square meters}$$

$$\frac{1}{36} \text{ hectare} = 10,000 \div 36 = 278 \text{ square meters}$$

Pushing the square-root button on a pocket calculator will quickly tell you that one side of a square covering 278 square meters is 17 meters. You can then step off several random squares (see figure 2.12), and in each case ask: *Could this square feed one sheep for a day?* (It helps greatly if four people do the pacing, so that one can stand at each corner while you judge whether the area *could* feed one sheep for a day.)

You can also work the same problem the other way to find out what stocking rate your land can carry through the winter. After a very dry summer, suppose you find that a square of 17 meters to a side will not feed one sheep for one day. Suppose you find that the square has to be at least 25 meters on each side. From this you can determine how much stock you must sell to get through the winter (or how many sheep-days of feed you must buy):

$$25 \text{ meters} \times 25 \text{ meters} = 625 \text{ square meters needed to feed one sheep for one day.}$$

Therefore, to find out how many sheep one hectare would support for a day, you divide 10,000 (square meters in a hectare) by 625 (area required for one sheep) to give you the answer: 16 sheep.

A 10,000-hectare ranch supplies 160,000 ADs (16 ADH \times 10,000 hectares = 160,000 ADs). (Note: You need to subtract from your total land area places such as roads and steep hillsides that will obviously never be grazed.)

To figure an animal-day plot

$$\begin{array}{ccc} \text{No growth} & & \text{Stocking} & & \text{ADH} \\ \text{days} & & \text{rate} & & \text{needed} \\ \square & \div & \square & = & \square \end{array}$$

$$\begin{array}{ccc} \text{M}^2/\text{Hectare} & & \text{ADH} & & \text{M}^2/\text{AD} \\ \square & \div & \square & = & \square \end{array}$$

$$\sqrt{\square} = \left\{ \begin{array}{l} \text{Side of} \\ \text{an AD} \\ \text{square} \end{array} \right.$$

to figure ADs available

$$\begin{array}{ccc} \text{Side of an AD square} & \square^2 & \text{M}^2/\text{AD} \\ \square & & \square \end{array}$$

$$\begin{array}{ccc} \text{M}^2/\text{Hectare} & & \text{M}^2/\text{AD} & & \text{ADH available} \\ \square & \div & \square & = & \square \end{array}$$

$$\begin{array}{ccc} \text{ADH} & & \text{Total Hectares} & & \text{Total ADs} \\ \square & \div & \square & = & \square \end{array}$$

$$\begin{array}{ccc} \text{ADs} & & \text{No-growth} & & \text{Herd} \\ \square & \div & \text{days} & = & \text{sustainable} \\ \square & & \square & & \square \end{array}$$

This ranch might have a total land area of 10,100 hectares, but only 10,000 would actually be grazed and thus should be considered in our estimates.

For 180 days, 160,000 ADs feed only 889 sheep (160,000 ADs \div 180 days = 889 sheep). If you normally run 2,000 sheep, you can expect them to run out of forage in about 80 days (160,000 ADs \div 2,000 sheep = 80 days).

Master Cropping Plan Worksheet

Master Cropping Plan

Date 2006

WORKSHEET

Planning Sheet
Column Reference Cross Worksheet No. 4

	Jan	Feb	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Biological Year	Snow	Snow	← Field Preparation →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →	← Rain Main Growth →
Field/Size												
D2 250 ac Livestock			← Field Preparation →		← Corn →			← Harvest →		← Livestock on Residue →		
H3 400 ac Livestock			← Field Preparation →		← Preparation & Plant →			← Harvest →		← Livestock →		
Total												

Deciding the Number of Herds

You have 600 steers on 3,000 acres or hectares divided into 56 paddocks, averaging 54 acres (hectares) in size. You'd like to push 100 steers ahead and market them early. Consider four strategies in terms of your holistic goal:

1. Keep all 600 together in one herd, and select the best 100 at sale time.
2. Separate the 600 into two herds that graze through all of the paddocks but are separated in time by the recovery period being used. This allows the 100 head a greater ability to select their ideal diet, and all paddocks still benefit from the larger herd.
3. Separate the 600 into two herds in two cells; graze the 100 steers in the cell made up of the 20 best paddocks and the remaining 500 steers through the other cell of 36 paddocks.
4. Let the 100 make the first selection in each paddock, and let the 500 remaining follow right behind with no break between one herd and the next. *(Note: Both herds must run in the same cell. Instructions for planning this option—follow-through grazing—are included in appendix 2.A. Attempt it only after you have several years' experience in planning and an abundance of paddocks.)*

If you desire a ninety-day average recovery period, these factors will bear on your decision: length of grazing period, stock density, and ADA(H) harvested.

Consider the following:

- Land, and thus overall production, benefits from larger herds, high density, and short grazing periods.
- Livestock benefit from rapid moves to fresh ground and lower ADA(H) take.

To choose, think first about impact on the land and overall production, then about impact on livestock.

- From the land's point of view, strategy 1 gives the lowest grazing pressure in terms of ADA(H) harvested per grazing period, the highest stock density, and the shortest grazing period. This will undoubtedly grow the most forage and make rainfall most effective. The second best alternative is strategy 4.
- From the cattle's point of view, strategy 4 will give the best results on the 100 early-marketed steers but not on the main herd of steers, which would be slightly better off in strategy 1.
- Strategies 2 and 3 are poor from the land's point of view because forage production and rainfall effectiveness would decrease significantly.
- From the cattle's point of view, strategy 2 is likely to be better than strategy 3 for both herds.

THE CALCULATIONS

Average Grazing Period

$$\text{Strategies 1 and 3: Avg. Grazing Period} = \frac{\text{Recovery Period}}{\# \text{ Paddocks} - 1}$$

$$\text{Strategy 2: Avg. Grazing Period} = \frac{\text{Recovery Period}}{(\# \text{ Paddocks} \div \# \text{ Herds}) - 1}$$

$$\text{Strategy 4: Avg. Grazing Period} = \frac{\text{Recovery Period}}{\# \text{ Paddocks} - \# \text{ Herds}}$$

Average Stock Density

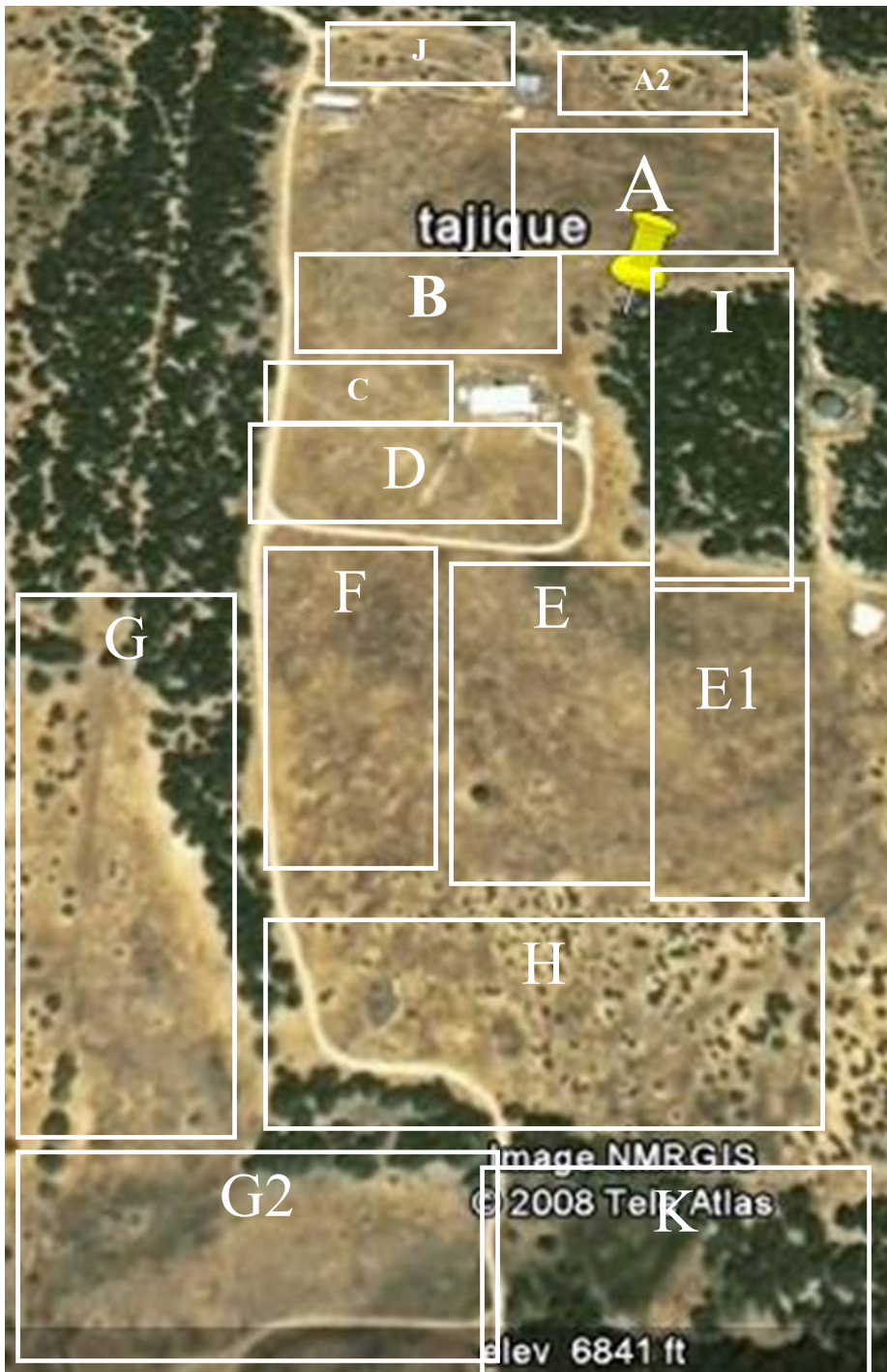
$$\frac{\text{Number of Animals}}{\text{Average Paddock Size}}$$

Average ADA(H) per Grazing

$$\frac{\text{Avg. Grazing Period} \times \text{Herd Size}}{\text{Average Paddock Size}}$$

Possible Strategy	Avg Grazing Period (days)	Avg Stock Density	Herd Size	Avg ADA(H) per Grazing
1. 1 herd	1.6	11.1	600	17.7
2. 2 herds	3.3	1.8	100	6.1
All paddocks	3.3	9.3	500	30.5
3. 1 herd/20 paddocks	4.7	1.8	100	8.7
1 herd/36 paddocks	2.6	9.3	500	24.1
4. 2 herds on follow-through	1.7/1.7	1.8/9.3	100/500	3.1+15.7 (18.8 total)

Cell Planning (Virtual Paddocks)



Paddocks (sq. ft.)

A	195,300
A2	72,450
B	71,881
C	20,000
D	72,900
E	232,389
E1	161,150
F	161,150
G	94,464
G2	147,420
H	184,896
I	191,619
J	19,530
K	80,892

Landscape/

Management

Considerations

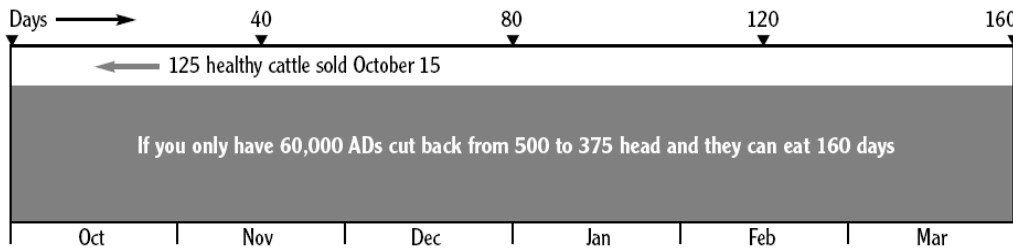
K = Seasonal Pond

Winds NW

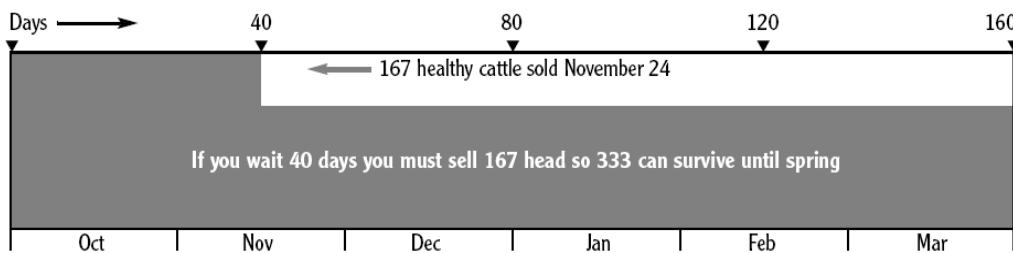
Use wooded areas in winter

A & A2 for spring kidding

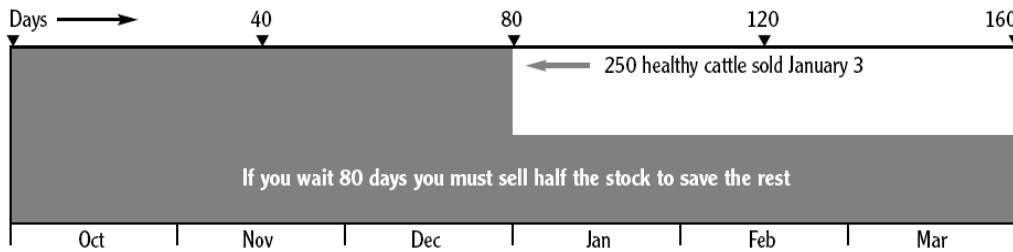
Destocking Schedule



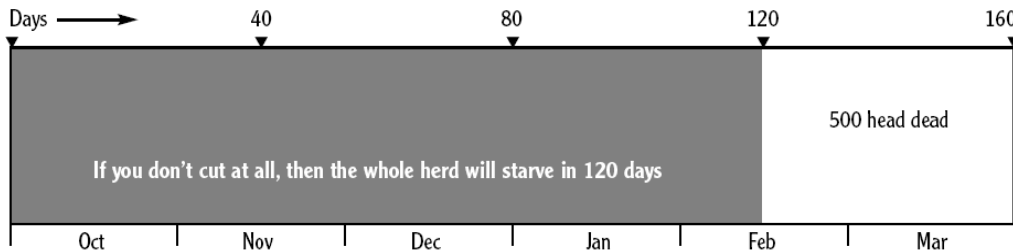
$500 \text{ animals} \times 160 \text{ days} = 80,000 \text{ AD}$ but $60,000 \text{ AD} \div 160 \text{ days} = 375 \text{ animals}$



$60,000 \text{ AD} - (500 \text{ animals} \times 40 \text{ days}) = 40,000 \text{ AD} \div 120 \text{ days left} = 333 \text{ animals}$

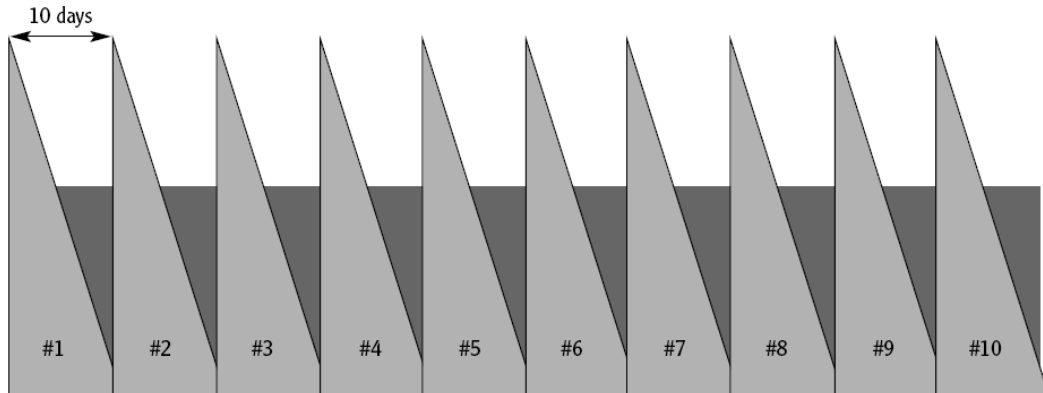


$60,000 \text{ AD} - (500 \text{ animals} \times 80 \text{ days}) = 20,000 \text{ AD} \div 80 \text{ days left} = 250 \text{ animals}$

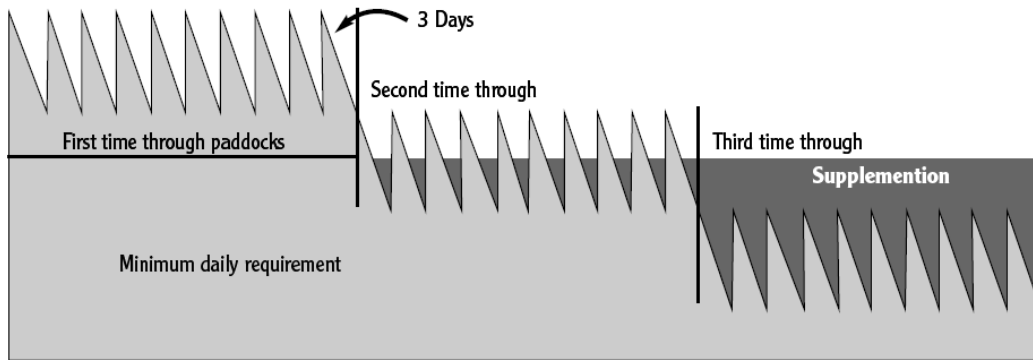


$60,000 \text{ AD} \div 500 \text{ animals} = 120 \text{ days before everything is gone}$

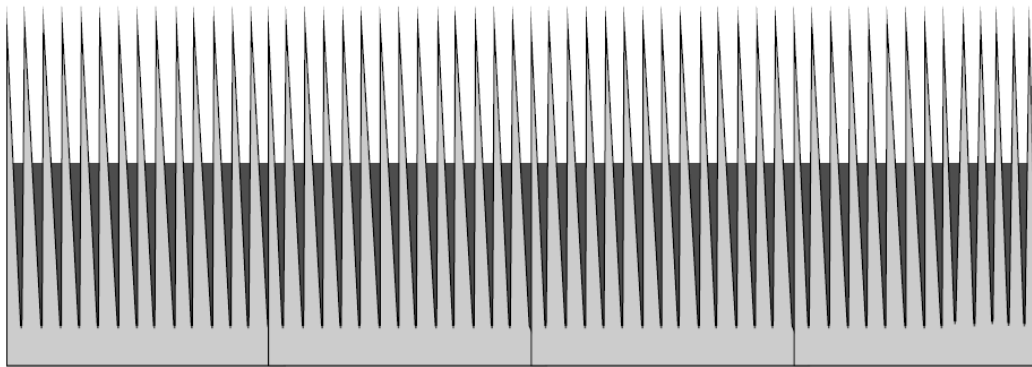
Plane of Nutrition



Graph B: Even a few paddocks will somewhat balance nutritional needs across time.



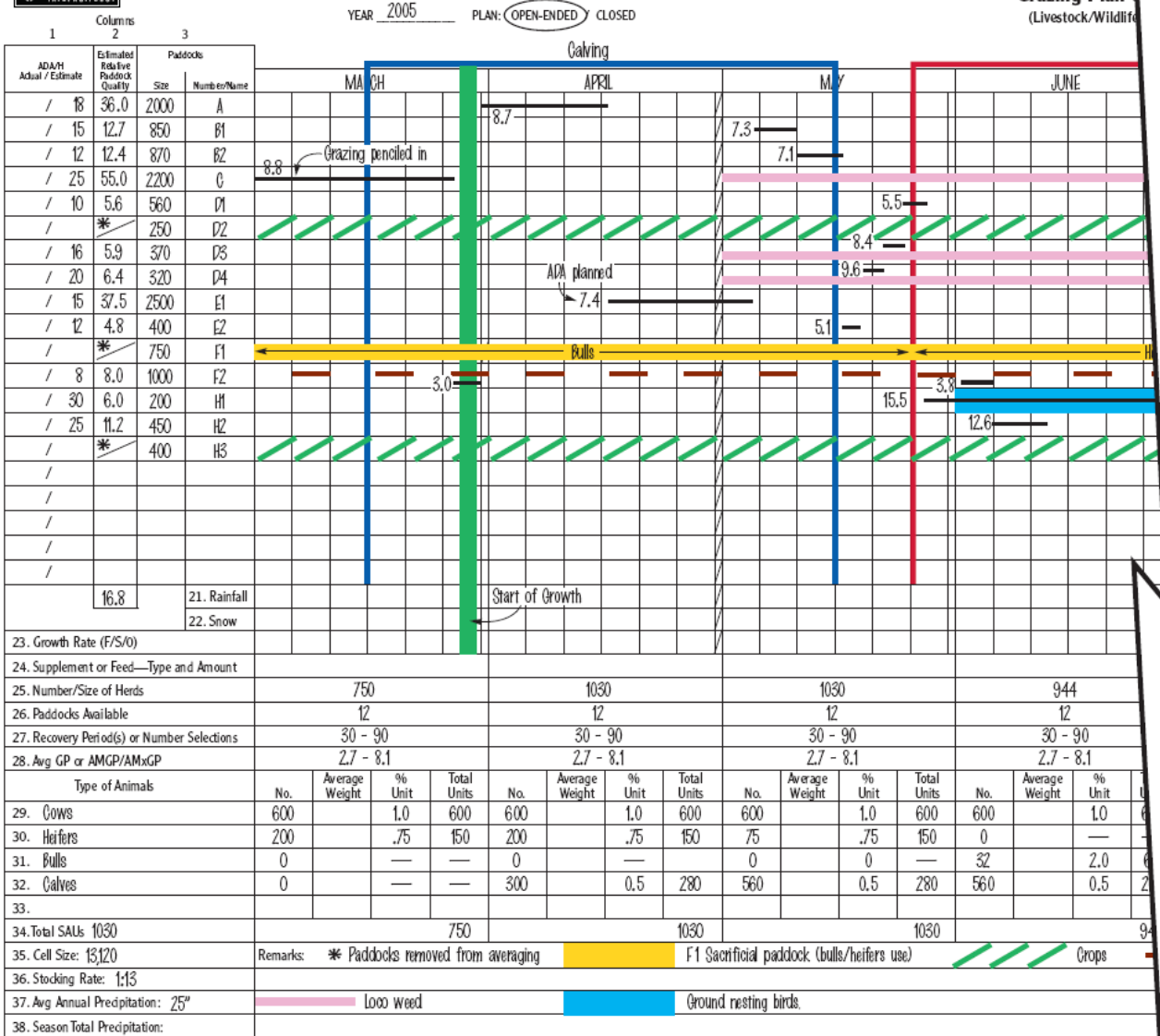
Graph C: A rapid rotation creates a deficit at the end of the season.



Graph D: High paddock numbers keep nutritional plane high throughout.

Sample Grazing Chart

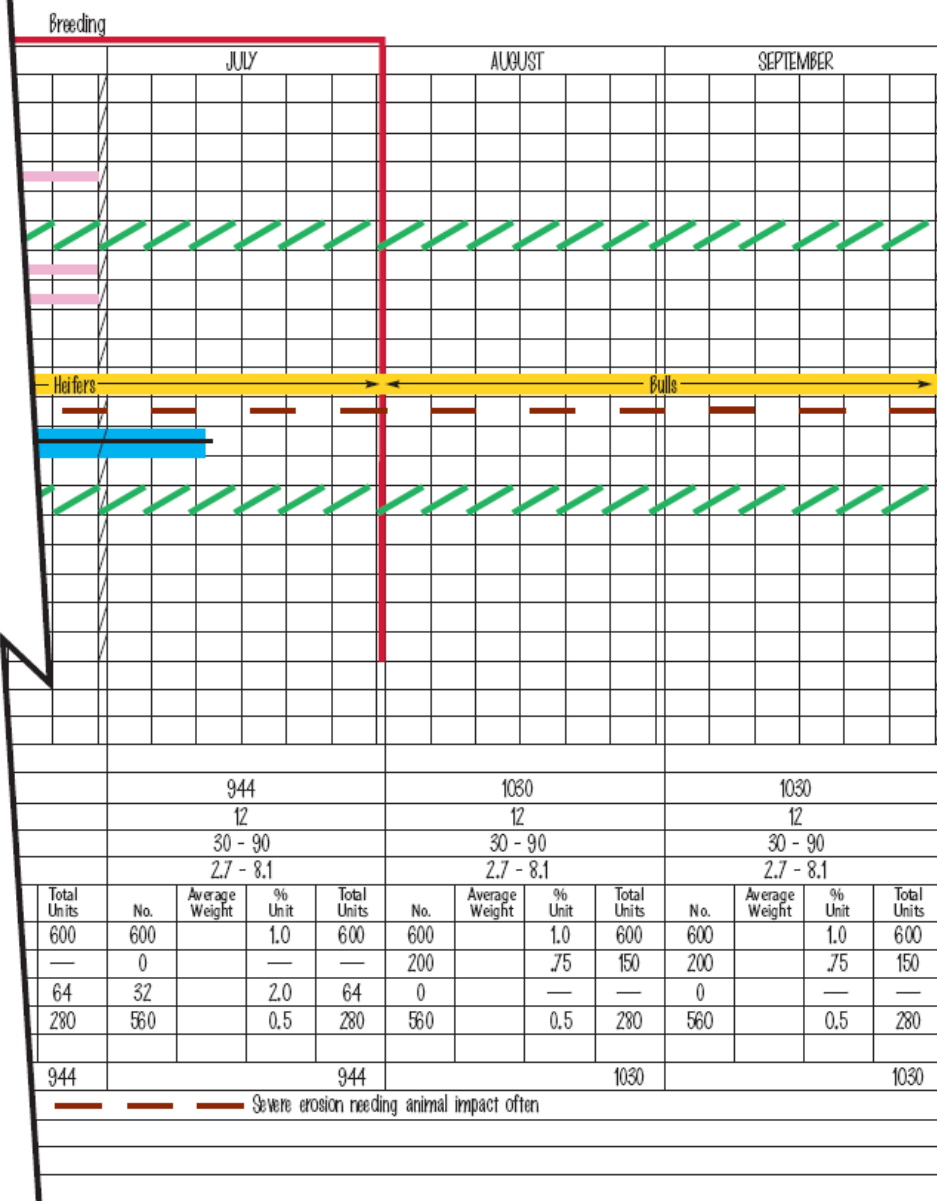
Chart With Grazings Plotted (Open-Ended Plan)



Sample Grazing Chart

Plan & Control Chart
(Wildlife/Crops/Other Uses)

Grazing Cell River Bend Ranch



Paddock Number/Name	Maximum Guidelines	Non-Growing Season			
		Estimated ADA/H	Available ADs	Planned Demand ADA/H	Total Yield ADA/H
A	6-17				
B1	2-6				
B2	2-6				
C	9-26				
D1	1-3				
D2	—				
D3	1-3				
D4	1-3				
E1	6-18				
E2	1-2				
F1	—				
F2	1-4				
H1	1-3				
H2	2-6				
H3	—				

- A. Estimated Total ADs (Livestock/Wildlife) _____
- B. Estimated Days of Non Growth _____
- C. Days of Bulk Feeding _____
- D. Days of Drought Reserve Required _____
- E. Total Days Grazing Required _____
- F. Estimated Carrying Capacity _____

SUMMARY LIVESTOCK AND LAND PERFORMANCE

Calving/Lambing/Kidding _____ %

Avg Weaning Weight _____ Age _____ (Mths)

Daily Weight Gains _____ Lbs
(Growing) (Non-Growing)

SDA(H)/inch (cc) rainfall _____

Total Yield (\$/d) per acre/hectare _____ Lbs

Bale Grazing

Winter Bale Grazing—Feeding the Soil

by Kelly Sidoryk



Our family has been involved in Holistic Management for over 20 years. In that time our operation has moved from a custom feedlot to a forage-based, cow-calf/yearling outfit. We have been practicing planned grazing for many years. The weak link in our operation has been resource conversion. We were not growing as much forage as we could. There was more bare ground than we would have liked. In our winter climate, one of the biggest expenses is winter feed. We wanted to extend our grazing season and simplify the winter-feeding. That meant handling the feed as little as possible. As we had changed the operation, we had gotten rid of most of the feed producing equipment and our calculations showed it was cheaper to buy the feed than make it.

One of our guiding principles was to make the cows do most of the work. The idea of setting hay bales out in the paddocks in the winter and moving the cows regularly started to make more sense. In effect we would be moving the cows in the non-growing season similar to how they were in the growing season.

Giving It A Go

In 1996 we began moving out into the paddocks with winter-feeding. Initially different combinations of straw and pellets were fed. Then in 2003 on this particular paddock we began bale grazing hay. It has turned out to be better than we had hoped. Production has significantly increased, as has biodiversity.

Production in the form of ADAs has been a little more difficult to assess in our operation as we have been using some as stockpiled forage into the next year.

The biological monitoring supports this improvement. We looked at the monitoring results on a particular paddock that had been bale grazed for three winters over the last five years. Bare ground has decreased from around 20% to virtually zero. The average distance between plants has gone from over 3 inches to .6 inches.

Bale Grazing

Some have questioned how much waste there is and if this will choke out or kill the grass. Our answer is we do not consider leftover hay to be waste as it becomes litter, which builds organic matter. The increase in production and health of the grass plants more than makes up for the plants that may be lost. Initially, there is a tremendous increase in growth in a circle around the bale butt, which makes up for the mat in the center.

However, we have observed if the litter is initially quite thick there will be a delay in the grass growing through. Some have dealt with this by harrowing the bale butts, but one question that arises is the cost of running the equipment to do this. The bale butt is a large deposit of organic matter, which becomes a food source for micro-organisms. These in turn enhance the availability of nutrients to the plants. The thick growth of the circles then continues expanding.

Others have also utilized this form of winter-feeding and done trials comparing bale grazing to other types.

Don Campbell, from Meadow Lake, Saskatchewan, a fellow Holistic Management® Certified Educator, estimates the increase in forage production from bale grazing to be two to four times in the next growing season. Bale grazed land can out-produce the land not bale-grazed by up to \$75/acre more in the first year.

University of Manitoba soil scientist, Don Flaten notes the value of a ton of alfalfa in terms of soil nutrients is \$40. Information from Katherine Buckley with Agri-Food Canada, Brandon, Manitoba says that a 1,400-pound (636-kg) cow excretes 22,880-29,480 pounds (10,400-13,400 kg) of manure/year. The value of manure would be: \$56.30/cow.

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Forage Sampling

Forage Evaluation Tool—The Fritzier's Ring

by Terry Gompert

One of the basics to master in Holistic Management® Grazing Planning is how much forage will be available per acre and per cell in the current planning period. Ultimately the accuracy of this information will help best plan the correct stocking rate and moves.



I have found the Fritzier's Ring very helpful for teaching planning period available forage. I call it the Fritzier's Ring because a grazier friend, Gary Fritzier of Plainview, Nebraska, showed me the simplicity of the ring and his calculations. The ring is a standard ring found on all 55 gallon barrels. It costs nothing. The ring is 22 1/3 inches (56.82 cm) in diameter. It, by chance, is the right size. Each one ounce of weight contained in the ring area is equivalent to 1,000 pounds (450 kg) of forage per acre. Of course, the forage moisture content needs to be factored in.

Step 1

Measure average height of pre-clipped and clipped grass in the 22 1/3 inch diameter ring (this is grazed height). Pull grass to desired grazed height.

Step 2

Weigh the grass to 1/10th ounce weight.



Forage Sampling

Step 3

Take weight X the determined dry matter.

As with silage, twisting the sample will give you a clue to moisture. If moisture forms in hand after twisting it is over 65% moisture. If the twist provides greater droplets when twisted, the higher the percent of moisture.

Taking a sample and weighing wet and after dried with a microwave will give an accurate dry matter moisture test.

Cool season legumes when very actively growing will tend to have 15 to 30 percent dry matter. A more mature, slower growing cool season grass may have 30 to 50 percent dry matter.

Step 4

Each ounce of dry matter grass equals 1,000 pounds (450 kg) of dry matter available per acre.

Step 5

Dry matter per acre in inches equals dry matter per acre divided by grazed inches.

Calculations

Step 1 - 9 inches (23 cm) – 4 inches (10 cm) = 5 inches (13 cm) harvested

Step 2 - 8 ounces (224 grams) harvested

Step 3 - DM = 35% (by squeeze)

Step 4 - $8 \times 1,000 \times .35 = 2,800$ pounds/acre (3,150 kg/ha) dry matter harvested

Step 5 - 2,800 pounds divided by 5 = 560 pounds/inch (641 kg/centimeter) of dry matter

A Use or graze to Trample ratio needs to be established that reflects your holistic goal and grazing plan. You will need to decide how much you can leave behind and what your stock density will be to help incorporate that forage into the soil to feed it. So, if a standard animal unit is generally considered to use 26 pounds of dry matter per day, then calculate the animal days per acre (ADA) available using forage available X percent use to trample ratio (utilization) divided by 26.

Forage Sampling

Animal Days Per Acre (ADA) Available Calculation

*Use: trample ratio - 60 percent (5 inches of 9 inches standing)

* AD assumption = 26 pounds dry matter needed per day

(2800 x .60) divided by 26 = 65 ADA's Available

Percent Leaf in a collected sample is a good estimator of total digestible nutrients (TDN). The higher the TDN, the higher the digestibility and the higher the forage quality is. Separate the leaf from the rest of the plant matter harvested and determine percentage of leaf by weighing leaf volume. For example, if from the 8 ounces harvested, 2 ounces are leaves, then you have 25% leaf or 47.5 TDN.

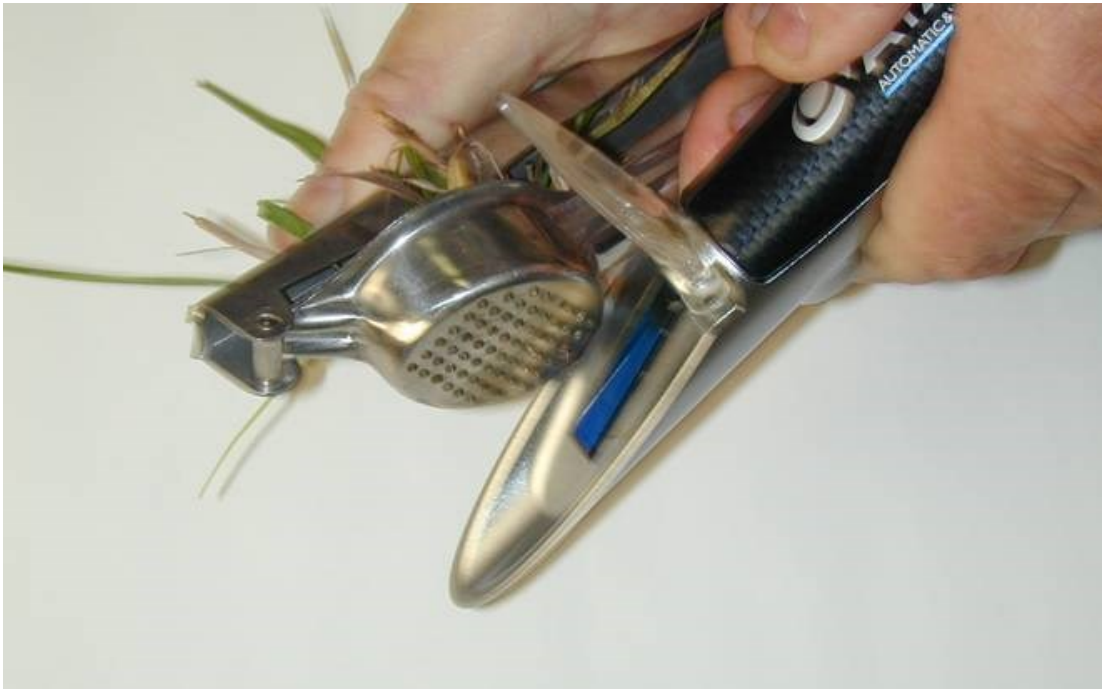


<u>Percent Leaf</u>	<u>TDN Estimate</u>
0%	35
10%	40
20%	45
30%	50
40%	55
50%	60
60%	75

Forage Sampling

Another consideration is digestibility of plant. The higher the fiber the lower the digestibility. A simple general measuring of fiber is to pull on the leaf until it breaks. The harder you have to pull to break it, the greater the fiber and the lower the quality.

Another simple tool to determine forage quality is a refractometer which measures Brix level, estimated sugar content, and mineral density. The higher the reading, the higher the forage quality. Just squeeze 2 drops of the forage juice on to the refractometer to get a reading.



Brix Level

0
6
10
12

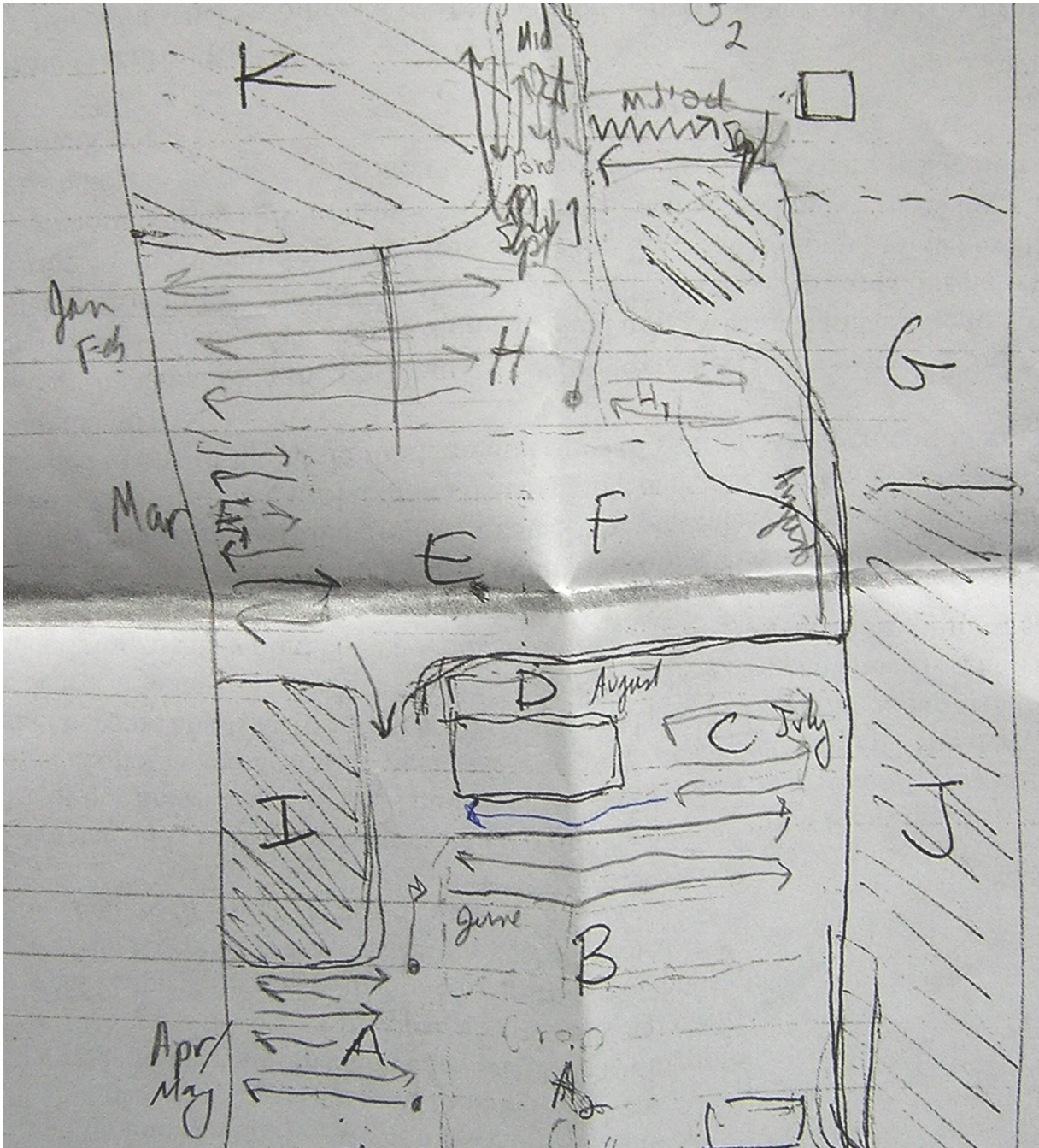
Estimated Sugar

Poor
Fair
Excellent
Sustainable

The Fritzer's Ring has been very helpful as a teaching tool. I use it to determine:

- * Dry Matter (DM) forage available/per acre, per inch, per cell.
- * Animal days per acre (ADA) available
- * Estimate DM, TDN, Fiber, and Energy

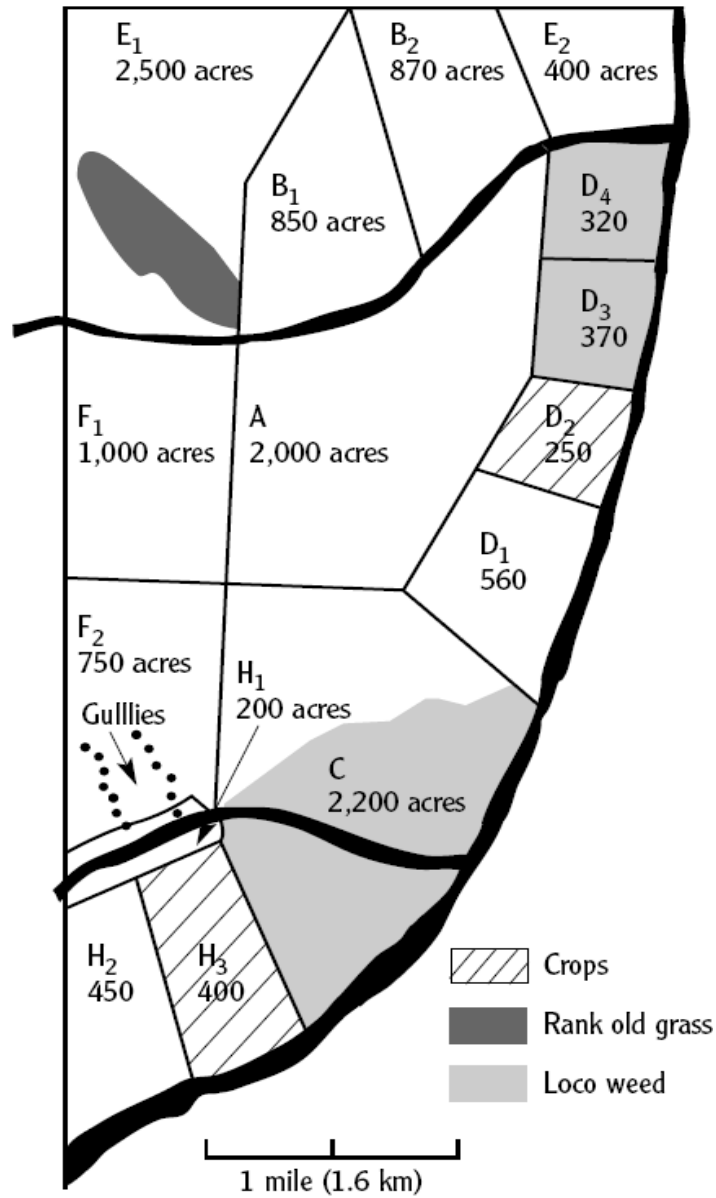
Grazing Map



If you choose to not use the grazing chart to plan and record actual moves, record them on a map of your farm each year so you have a record of where you were. You still need to make sure you record management considerations, recovery and grazing periods and forage assessment figures on a chart to make sure you are taking into account all factors in planning your grazing.

Grazing Map

River Bench Ranch



Simplified Grazing

Simplified Grazing Planning—

Another Approach to Planned Grazing
by Aspen Edge

With a degree in animal husbandry and a doctorate in veterinary medicine, Ben Bartlett is no stranger to livestock—he's been raising them for almost 50 years in the upper Midwest of the United States. He has also put his knowledge to work for operations in Japan and Korea, and has worked as an educator with the Michigan State University Extension system for over 30 years. These experiences have given him extensive insights into how animals can be most effectively managed to maintain both pasture and livestock performance in non-brittle environments.

Use It or Lose It

Ben, and his wife Denise, live in Traunik in the north most part of Michigan, where they experience a very short growing season, cool summers, and very snowy winters. Here they have been managing their 988 acres (400 ha) of owned and rented land for the last 30 years. Operating under the name of Log Cabin Livestock, they currently have 150 head of stocker cattle, purchased in the autumn and sold 12 months later as large feeders for the feedlot, and a 500-head ewe flock producing about 750 lambs for replacements and feeder lambs, sold to feedlots.

They manage their land in a way which emphasizes the utilization of their high quality grazing forage which uses the excess spring growth for wintering the ewe flock and small steers. They get 50% of their forage growth in the first 60 days of the growing season, the other 50% of their forage in the next 120 days, and then no forage growth for about 180 days with an average of 150 inches (375 cm) of annual snow fall.

They have lots of sunshine during the peak growth period because they are so far north, about the 47th parallel, which generates a very fast growth rate. The forage that grows in the first 60 days has to be used, or it's lost due to the non-brittle conditions. It was these conditions, which posed particular

Simplified Grazing Plan

- 1) **Outline objectives for both the grazing livestock and the grazing land.** A holistic goal is the best option for determining objectives. For example, husband and wife unit with 40 beef cows for recreation and some income, requiring simplicity of management, wanting to decrease costs, sell weaned calves in autumn, and make winter feed.
- 2) **Determine grazing and stored feed parameters and potential yield.**
For example, the acreage of the areas to be grazed or mechanically harvested, the expected yield in terms of tons of mechanical harvest or the number of times each area could be grazed.
- 3) **Identify feed needs for grazing and non-grazing periods.**
For example, 40 cows (including replacements and bulls) Assume 1,200 lbs. (545 kg) of feed harvested per acre per grazing.
Assume 1 cow grazes 45 lbs. (20.45 kg) grass per day.
So, 40 cows graze 1,800 lbs. (818 kg) per day.
So, number of acres needed per day = 1,800 divided by 1,200 = 1.5 acres per day
Stored feed 35 lbs. (16 kg) feed per cow/day x 40 head = 1,400 lbs. (636 kg) x 180 days = 126 tons.
- 4) **Make note on grazing plan of special considerations.**
For example, sheltered calving area, paddock used for hunting, area too wet for grazing during damp autumn season, weaning paddocks.
- 5) **Schedule in the number of days grazing.**
For example, number of days grazing (D) by area and by month or the tonnage of mechanical harvest (T) by area and by month. This was completed by working backwards from the previously identified special considerations and considering necessary recovery periods for grasses.
- 6) **Review plan.**
Review for appropriate recovery times, identify flexible use of acreage (hay or graze), double check for considerations, and identify animal production goals that determine successful grazing practices.

Simplified Grazing

challenges when using holistic planned grazing protocols.

Back to the Basics

As they harvest at least twice a year and sometimes up to five, they found that the current holistic grazing planning procedure did not really suit their circumstances. They found it very challenging to be grazing a group of sheep, a group of cattle and mechanically harvesting the spring excess, and trying to plot this out on the grazing plan—particularly when rainfall would require re-planning. They needed to intensively harvest/capture the flush of early growth while working towards finding the right balance of grazing and mechanical harvest.

In addition, Ben and his farming clients, found the existing holistic grazing plan worksheet intimidating, and this resulted in lack of commitment to following the plan once created. The result was that some very important “grazing scheduling” issues were being missed, simply because the cure was considered to be worse than the condition!

The key missing factor was farmers were not looking at total grazing area and were

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Grazing & Stored Feed Plan For Non-Brittle Areas

Name Sample
Year 2007
Farm Size 160 Acres

Field	Acres	Yield	Considerations	Grazing						Stored Nov- Dec	Stored Jan- Apr
				May	June	July	Aug.	Sept.	Oct.		
Homestead	10	--									
A	20	2T/3G	Early Calving Area	12 D	12 D					12 D	
B	30	2T/3G	Graze Only	18 D		18 D		20 D		18 D *	
C	30	2T/3G	Graze Only		18 D		10 D	10 D			
D	20	2.5 T	Hay or Graze		30 T	12 D			12 D		
E	20	2.5 T	Hay or Graze		30 T		20 T				
F	10	2.5 T	Hay or Graze		15 T		7 D		7 D		
G	20	2.5 T	Hay or Graze		30 T		13 D		12 D		
H											
I											
J											
K											
L											

Significant Time Events

	Calving			Vacation		Wean		
	30 D	105T / 30D	30 D	20T /30D	30 D	31 D	30 D	

Yields

Animal Performance Factors

Cow Condition Scores 3.5 On April 1st
 Reproductive Rates _____
 Weight Gains/ Weaning Wts. Weaning Wts - 550 # avg.
 Milk Production Levels _____
 Other _____

* Depending on snow cover

Notes

T = Tons G= Grazings
Hay Yield 2.5 T = 1.5 T 1st cut / 1.0 T 2nd Cut

Totals

Hay Yields	125 Ton	128 T	- 1 Ton
Grazing Days	210 Days	180 Days	+ 30 Days

Recovery Periods	Spring	Summer	Fall
	20D	30D	45D

Simplified Grazing

managing just for current rotation, and not for the whole year and for years to come even though they followed Intensive Grazing practices. Ben also felt it was difficult and discouraging for graziers in non-brittle areas to try and chart every move. So the concept of simplified holistic planned grazing was born.

Ben went back to basics. He knew the focus of holistic planned grazing was for a person to control the harvesting of solar energy (grazing of plants) to ensure indefinite profitability and sustainability—having the livestock at the right place at the right time for the right reasons. He also saw he needed to be in certain paddocks at certain times of the year and that certain paddocks should not be grazed at particular times and so on.

He began with the idea that if people did no more than note those special situations, it did not really matter where they were in between those particular circumstances as long as they had enough feed. From those two starting points, he did a rough projection of how many acres/paddocks he would need for the “average” year.

A plan would give him the acres that he knew he would graze and the acres he would mechanically harvest, and would help identify those acres that would be flexible depending upon the weather. He also needed to know early in the season if his growth was on track or if he was running short of pasture or stored feed in the winter. This would enable him to make appropriate decisions, such as shift some land planned for late mechanical harvest to pasture or simply to know that the pasture season would be shorter and he would require more stored feed. Despite the fact that there are no “average” years, it is possible to shift fields from mechanical harvest to grazing and vice versa. Now the principles needed to be put into practice

Putting Principles Into Practice

The summer of 2007 was to be the first time simplified grazing planning was put into practice, on Ben and Denise’s operation. Unfortunately, they had the worst drought in about 20 years and ended up feeding stored feed for 30 days. This was the first time they had to feed during the grazing season in 30 years! Despite the challenge, they were able to keep in mind they needed certain paddocks for certain activities such as weaning lambs or late autumn grazing of weaned lambs or newly purchased calves.

Even with 30 years of experience, Ben still found it valuable to have his simplified grazing plan to look at. By referring to his paddock inventory this winter, for instance, he could see what modifications he could make in case they experienced a severe feed shortage again. The simplified grazing plan also provided a history of cattle moves so they could avoid turning up at the same paddock at the same time each year.

With this experience to draw upon Ben created the form and the process to introduce simplified holistic planned grazing to other graziers in Michigan. He thought it would encourage farming clients to do a field inventory, and begin to see what their operation would look like on paper. This would enable them to see what fields might need improvement or modification.

Through this simplified grazing process, graziers were introduced to the concept of balancing the relationship between people, animals and plants in a planned way. They were also exposed to the trade off between holistic planned grazing, which can be perceived as management intensive, and capital inputs, such as barns, tractors and so on. And, they were encouraged to take a long-term view and consistently move towards the outcomes they wanted.