January 1997

Aide Memoire for Holistic Grazing Planning

(Adapted From Aide Memoire Planning Procedures of the Royal Military Academy, Sandhurst)

The Holistic Grazing Plan

A holistic 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.

The livestock moves you plan serve only as a guideline to the order of moves. The planned moves do not replace your common sense judgement at the time a move is due.

Holistic grazing planning is particularly important when droughts, fires and other catastrophes strike. This is when you will *least* want to "waste" your time planning on paper and are *most* likely to make costly mistakes.

Useful Definitions

Animal Days per Acre (ADA)—The volume of forage taken from an area in a specified time. The figure is calculated as follows:

$$\frac{\textit{Animal numbers x days of grazing}}{\textit{Area of land (in acres)}} = ADA$$

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.

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.

Grazing Cell - An area of 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, even when more than one herd (or flock) is present. 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.

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 pregnant cow of approximately 1000 lbs is used as the standard against which different classes of stock in a herd, and their physiological states, are compared. This enables you to better plan for and meet varying nutritional requirements. (Some countries use variations of the SAU, but to the same effect—better planning). SAU x days = ***Stock Days***.

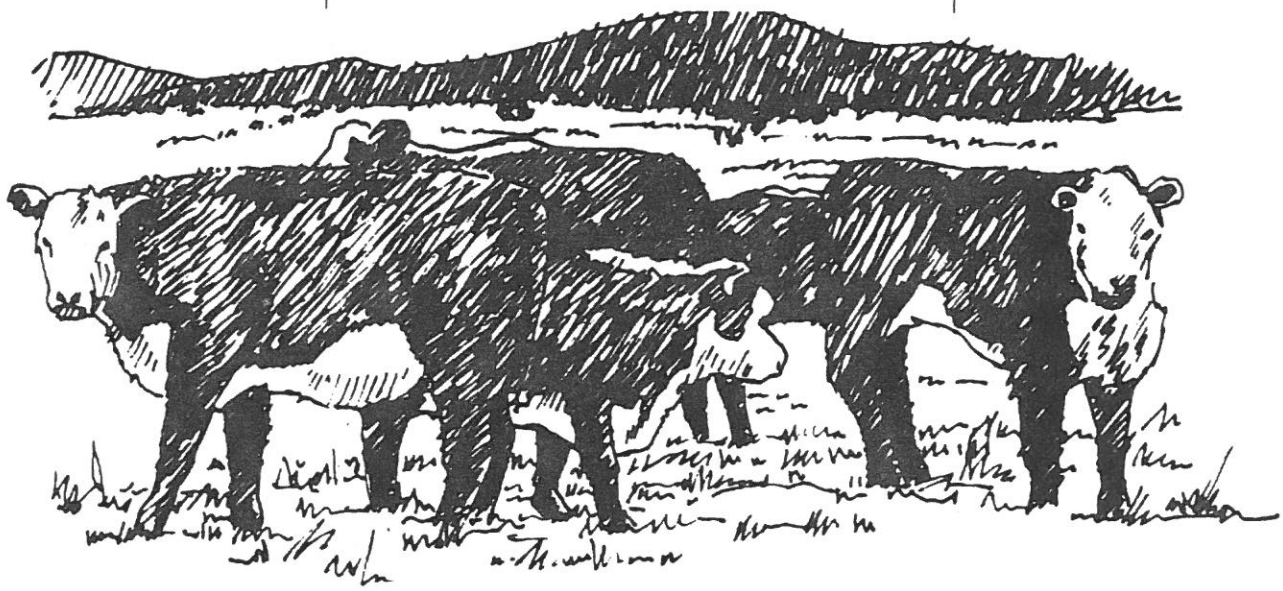
Stock Days per Acre (SDA) - The volume of forage taken from an area in a specified time, but based on Standard Animal Units instead of total animals. The figure is calculated as follows:

$$\frac{\textit{animal numbers (in SAU) x days of grazing}}{\textit{Area of Land (in acres)}} = SDA$$

Strip-Grazing Within a Paddock - Using a herder, a portable electric fence, or a combination of both, to bunch livestock on small portions of land within a paddock, for short periods (from under an hour to a day).

Aide Memoire
for
Holistic Grazing Planning

Center for Holistic Management



Guidelines for Planning

—**Familiarize yourself with the planning process.** This *Aide Memoire* is not designed to *teach* you the holistic grazing planning process—for that you need to study the Holistic Management textbook and workbook, or attend a brief training session. The *Aide Memoire* merely serves as an aid to jog your memory on each of the steps and the order in which they should be taken.

—**Keep your plan simple in the beginning.** 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 *Aide Memoire* is always used in conjunction with a Grazing Plan & Control Chart which records all decisions taken. The number of factors dealt with will overwhelm even the best unaided mind, and other people cannot contribute much to a plan they cannot see.

—**Follow the *Aide Memoire* carefully.** Don't skip steps, 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 pessimistically on any point on which you have any doubt at all.**

—**Plan creatively every time.** Easy planning year after year, especially with a simple land layout and few factors to consider, will tempt you to abandon the 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 guess about the future. No matter how well you plan, events will occur that will 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.

—**Create one plan for the growing season and another for the non-growing season.** 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. It you plan earlier, you will need to estimate paddock ratings. The growing season plan should project well ahead but remain *open-ended* (see *Definitions*). The steps for growing season planning begin on page 4.

The non-growing season plan should be done toward the end of the growing season when growth has nearly stopped and you know the amount of forage you will have available over the non-growing period. Because the amount of forage will not change (though quality will), you can project the plan forward to a theoretical end point, making this a *closed plan*. You will ration out the forage over the non-growing months to ensure your livestock are fed, leaving some for wildlife (as both feed and cover), and some as litter to help cover soil. ***If you want to plan for the non-growing season now, go to page 19.*** (If this is your first attempt at planning, read through the growing season planning steps first to familiarize yourself with the full year's planning).

The Growing Season Plan

Step 1
Opening Decisions

Gather for a pre-planning session all the people responsible for putting the plan into effect. (If you are planning grazing on public lands, include environmentalists, wildlifers, foresters and others who may have a say in how you run your livestock, or be concerned about the wildlife). Think of all the factors that need to be considered at some stage in the planning: those that influence livestock, wildlife, crops, haying, and what you are trying to achieve on the land in your holistic goal. Don't judge any item or go into detail. Just write down all the factors and keep the list handy.

Now think over the months you are planning and try to envision the whole ranch/farm. Then answer the following questions:

1. Is the entire area going to serve as one grazing cell or will different areas become different cells? Your answer will determine how many plans you need to create. Each cell requires a separate plan and a separate Grazing Plan & Control Chart.

2. Do you want to run herds just as before or change?

3. What stocking rate do you intend to carry? (This could change in the course of the planning, but at this stage you will probably have an idea of what you want and what you think is reasonable).

4. What crops will be planted, and where? (If these are first planned on worksheets, as in the sample in *Appendix A* (page 35), you will then know when livestock should avoid fields and when they are needed on them).

5. Has your biological monitoring identified any problems that need to be resolved? Do you need to increase animal impact in some areas? Increase rest in other areas? Reduce partial rest all over?

Step 2
Set Up the Planning Chart

Set up your chart as follows (use one chart per cell):

- **Record the year, the name of the grazing cell, and the season** (growing) at the top of chart.

- **Write in the names of the months** for which you are planning in the blank columns at the

top of the chart. If you are planning for more than seven months, tape (or cut and paste) two charts together horizontally. Each month has fine lines that demarcate 31 days. If a specific month has less than 31 days, draw a line down the column through the extra day(s).

- **Record the paddock name or number in both column 3's**—one is left of the months and the other is right of them. Be aware that although you may want to retain names for your paddocks (for cultural and historical reasons) as you increasingly divide them and increase their numbers, names can become cumbersome and you may want to switch to numbering them all. If you have more than 20 paddocks in the cell, cut apart other charts and paste on enough vertical sections to give every paddock a line.

- **Record each paddock's size in acres to the left in Column 3**. If your paddocks are to be temporarily subdivided for strip-grazing (see *Definitions*), ignore that at this point.

- If you have croplands, schedule planting, cultivating, and harvesting, and plan crop rotations, etc., on a worksheet (see *Appendix A*, page 35). If any croplands are to have livestock run on them in the months being planned, transfer them to the chart as paddocks. If you are subdividing a crop field into small divisions (with temporary electric fence) for special treatment, treat the field as one paddock in this step.

- **Enter the total cell size in row 35; enter your stocking rate in row 36.**

Step 3
Record Management Concerns Affecting the Whole Cell

Using fine-point color-coded felt or nylon-tipped pens, *box in all the management events that affect the cell as a whole.* Draw vertical lines through all of the paddocks on the starting and ending dates of the management concern (bulling, calving, etc.) and connect them at the top of the planning chart (above the months). Explain the meaning of the lines by writing the title of each management event on the top connecting horizontal line.

- First, consider livestock events such as breeding/bulling (red), calving, lambing or kidding (blue), weaning (yellow), etc.

- Next, use the list of planning factors you created earlier to help you think of all the events which *affect the whole grazing cell*—wildlife factors, hunting seasons, and so on—and mark them in.

- Finally, you may want to schedule in events such as family vacations or times when critical people are away.

The emphasis here is on the events you need to note, no matter where the livestock are later placed, because these events could influence the livestock, or your management, no matter which paddocks animals are in.

Step 4
Record Livestock Exclusion Periods

With a fine, color-coded pen, draw a horizontal line through (or box out) any months or parts of a month when a paddock *cannot under any circumstances* have livestock in it. This can be due to factors such as a lack of water, annual flooding, hay cutting, trout or salmon spawning, field preparation for crops, recreational uses, forest plantings, etc. (Be careful not to exclude paddocks which, although they have problems, like poisonous plants or limited cover for wildlife, may still be able to have livestock in them). Use different colors for different factors and explain the meaning of the colors with a legend in the "remarks" space at the bottom of the chart. *Do not write on the main body of the chart.*

Step 5
Check for Unfavorable Grazing Patterns

Inspect past grazing charts for any unfavorable grazing pattern that might be developing. In particular, note any paddocks that repeatedly received an "H" (for heavily grazed) early or late in past growing seasons, and plan to avoid this repetition. (Otherwise, many plants may be overgrazed in these paddocks). You may, in fact, want to exclude the affected paddock, or paddocks, entirely for these periods in this growing season.

Step 6
Record Paddocks Still Available

Record the number of paddocks that remain available for grazing in each month in row 26. If you see that a paddock is available for more than 50 percent of the month, count it as available for the whole month.

If a paddock is marked unavailable for a period, but that period is less than the average recovery period you are likely to use, count it as available. For example, if a paddock was marked unavailable for 50 days and your recovery periods were likely to range from 30 to 90 days (an average of 60 days) you would count that paddock as available. You are able to do this because you can graze the paddock on either side of the unavailable period. By treating it as available, you keep the numbers of paddocks higher and that is to your advantage because the more paddocks you have, the faster your animals can move through them.

Step 7
Note Special Management Needs

Focus on each paddock individually and decide whether any problems or limitations are associated with it, and whether any areas within a paddock will require special treatment when the livestock are in it. The latter is particularly important because *this is the step in which you will plan to use such tools as grazing and animal impact to achieve the future landscape described in your holistic goal.*

Using a color-coded highlighter, clearly mark through any paddock that needs special attention. (Make sure the highlighter allows you to later write legibly over it with pencil). Factors to consider might include bare, eroding ground that needs healing, or noxious weeds you want to reduce—both of which could require herd effect. You might want to rest some areas to create brush cover for wildlife, and you might want to graze off fire-prone areas before they become a danger. If you are not strip-grazing all paddocks, mark those that will be strip-grazed.

At the same time, think about any limitations that could affect the livestock—proximity to crops or a neighbor's bulls, poisonous plants, sharp seedheads that could harm lambs, lack of shelter, parasite cycles that need to be broken, and so on. And don't forget to consider any multiple use factors that could affect a paddock—such as logging operations, campsites and hiking trails.

Use the brainstorming list you made earlier to remind you of any other factors you need to be aware of in grazing any paddock. This is where you should plan for wildlife management factors, crop preparation, other uses, etc. so do not be hasty in this step.

Explain the meaning of the highlighter colors with a legend in the "remarks" space at the bottom of the chart. ***Do not write on the main body of the chart.***

Step 8
Rate Paddock Productivity

Each paddock will differ from the others in size and in its ability to produce forage. In this step you rate paddocks relative to one another, in terms of quality and size, so you can vary the time livestock are in them to ensure the best animal performance possible. Your ratings can only be approximate and may be off to a degree. How animals actually perform in any paddock will indicate what adjustments need to be made. Over time your ratings will become more accurate.

Rating Paddock Quality:

If you are starting out and have no knowledge yet of working in animal days per acre (ADA—see *Definitions*), you can use a simple 1–10 scale to get an approximate rating. Rate the best paddock—the one you think has the best quality forage—as a 10. Then rate all the other paddocks relative to this one. A paddock with forage half as good would rate a 5, and so on. Do not consider the size of each paddock in this step, only its quality. **Record the rating you gave each paddock to the right of the slash in column 1.**

If you are familiar with ADA ratings then you should use these for your estimates. You can get the ADA figures for each paddock in one of two ways:

- *Use the ADA figures from your last non-growing season plan.* These should appear in column 8 on the last chart. **Transfer these figures to column 1 under "actual".**

If you did not calculate the figures for column 8, do so now. Add up all the ADA taken from

each paddock in the non-growing season (these figures will appear in ink to the right of each grazing line). Make adjustments for paddocks grazed late in the previous growing season that did not fully regrow before dormancy. **Record the actual ADA figure for each paddock to the left of the slash in column 1.**

- *If you have no past records to go by,* you can estimate ADA by taking field samples:

  In each paddock pace off several randomly chosen squares that could feed one animal for a day. (It helps greatly if four people do the pacing and can stand at each corner while you judge whether the area *could* feed one animal for a day). Compute the area in square yards by multiplying the lengths of two sides of the square, then divide that number into the number of square yards in one acre (4,840). This will give you an estimated ADA. When you have done a few of these in each paddock, average the answers to get an estimated ADA yield for that paddock.
  Record the estimated ADA figure for each paddock to the right of the slash in column 1.

  These ADA figures are for comparison of *quality only* and may not reflect actual forage yield.

Factoring-in Size:

Now you need to cancel out differences in size, so paddocks can be compared fairly. To do this for each paddock, multiply the actual or estimated ADA figure (or the figure from your 1–10 rating) recorded in column 1, by the size of the paddock (column 3).
Record the resulting figure in column 2 (if the figure is very large, as it usually is when using ADA, drop the zeros—14,000 would be written as 14). Remember, these numbers only indicate the productivity of paddocks in relation to each other. They have no other meaning.

Compute the Average Rating:

Add all the figures in column 2 and divide the sum by the total number of paddocks. This gives you the average paddock rating which will be used to help calculate the grazing periods. **Record this figure in the box at the bottom of column 2.**

Step 9
Record Number of Herds & Paddocks Allocated to Them

First decide if animals will run as one herd for the whole season—or, if not, how many herds you will have and during what periods. (Remember that the more herds you have, and the less paddocks per herd, the lower your forage and livestock production will be). There are several alternatives to running a single herd:

- Two or more herds that will move through all the paddocks.

- Two or more herds that will move through paddocks allocated specifically to each herd.

- Two or more herds on "follow-through" grazing, where one herd leaves a paddock as another herd enters it. (Though this alternative may offer the best solution in some situations, it is difficult to manage and requires paddocks that are reasonably uniform in size and quality).

To help you decide which alternative is best, you need to make some comparisons: On a separate sheet of paper list the various alternatives (including one herd), and beside each one note the number of herds, the average grazing periods (use the formulae found in Step 11, on page 10), herd size, average stock density, and average ADA taken from paddocks. If you lay these out in tabular form it makes thinking about it easy (see *Appendix B*, page 36). Think of the consequences to the land, livestock, other land uses, and the degree of management each alternative requires. Then make your decision.

Record your decision in row 25. If you are planning a follow-through grazing pattern, note which herd goes first (the size of the first herd will affect the performance of the following herd). For one herd of 250 animals you would enter *1/250*. For two herds on follow-through—one of 50 replacement heifers and the other of 250 cows—you would enter *2/50h-250c*. If you had 50 paddocks to allocate between those same two herds, you might record it as *2AP: 50h-20p/250c-30p* (two allocated paddocks: 50 heifers in 20 paddocks and 250 cows in 30 paddocks). For dairy animals you might have three herds—high-yield milkers, the main group, and the followers—you would enter *3/20h-40m-34f*. **Use whatever abbreviations are clearest to you.**

Step 10
Determine the Length of Recovery Periods

Before you can determine the length of grazing periods, you first have to establish the length of the recovery periods. If you have a hundred or more paddocks per herd, or are strip-grazing within a few paddocks, you can use a single recovery period. In all other cases you need to use a *range* of recovery periods.

Selecting a Single Recovery Period

A recovery period between grazings as long as, or longer than, the entire growing season will enable most plants to fully recover from a severe grazing, regardless of daily growth rates. You must have enough paddocks, though, to ensure that grazing periods are three days or less in any one paddock. If your growing season was 180 days and you used that as your recovery period for running one herd through 100 paddocks, your grazing periods would average 2 days, and you should not overgraze plants. If the number of paddocks you have per herd and the length of your growing season make this possible, you can use a single recovery period.

Note that you can simulate 100 or more paddocks by strip-grazing within larger paddocks. You would need about 30 paddocks per herd to do this and not overgraze plants (if you had a radial fencing layout and used cross fences for strip grazing).

Selecting a Range of Recovery Periods

If the number of paddocks per herd would lead to grazing periods of more than 3 days, you should use a range of recovery periods to avoid overgrazing plants during rapid regrowth. Within that range, the shortest, or minimum, recovery period must allow enough time for a severely grazed plant to recover under rapid growing conditions. The longest, or maximum, recovery period must allow enough time for the plant to recover under poor growing conditions. The exact point of full recovery is unknown and varies with species. In practice you are fairly safe if you reckon a plant is recovered when it is hard to distinguish it from previously ungrazed plants.

You will develop your own knowledge quickly about your area. But, in the meantime use these guidelines:

- On arid and semiarid land, 30 to 150 days will usually suffice, with recovery likely to be about the average of these figures. (*Do not use the average recovery period* in your planning, or you may run into trouble. You must use the minimum and maximum recovery periods).

- Given higher (or more effective) precipitation, and more fibrous vegetation, 20 to 40 or 60 days may do.

- For planted pastures (irrigated or not), particularly those with runner-type grasses, try 15 to 30 days to get yourself started. Runner grasses require less time to recover as less of the plant is defoliated when grazed, and these shorter recovery periods will favor them. If you want to introduce greater complexity by encouraging the establishment of bunch grasses, select longer recovery periods. (Short recovery periods tend to knock out bunch grasses).

As you begin to monitor actual growth rates, you will be able to more accurately determine the range of recovery periods that fits your situation best.

Record your recovery period(s) in days in row 27 under each planned month on the chart—one figure for a single recovery period, and two figures (the minimum and maximum) for a range of recovery periods.

Step 11
Calculate Average Grazing Periods

Calculating grazing periods requires two steps. In this first step you determine the *average* grazing period (or periods) for each month, and will assume that all paddocks are equal in size and quality. In step 12 you will factor in paddock size and quality to calculate the *actual* grazing period(s) for each paddock that will be used in the planning.

If the number of paddocks per herd will not change, you only need calculate average grazing periods once. If the number of herds or the number of paddocks do change during the growing season (as recorded in rows 25 and/or 26), you will have to do separate calculations for the months in which these changes occur. (The information on recovery periods is in row 27).

1. **One herd with a single long recovery period:**

$$\frac{\text{Recovery period}}{\text{Number of paddocks} - 1} = \text{Average Grazing Period}$$

If you have many paddocks, the Average Grazing Period in each paddock will only be a few days—i.e., 1.5 or 2.6, or whatever. You should include the full decimal figure for now, but will round it off to the nearest whole number after completing the next step.

If you have few paddocks per herd but intend to strip-graze within them, the figure will reflect many days of grazing in each paddock because of the long recovery period. In reality, however, each strip within a paddock will only be grazed for a few hours up to a day.

Record the average grazing period in each month in row 28.

2. **One herd with a range of recovery periods.** You have to calculate two average grazing periods here—a minimum period for fast growth and a maximum period for slow growth.

$$\frac{\text{Minimum recovery period}}{\text{Number of paddocks} - 1} = \text{Average Minimum Grazing Period (AMGP)}$$

$$\frac{\text{Maximum recovery period}}{\text{Number of paddocks} - 1} = \text{Average Maximum Grazing Period (AMxGP)}$$

Record these average days in row 28 (e.g., 2.6–7.2).

3 **Two or more herds using any paddock in the cell**. Here again you will have to calculate two grazing periods:

$$\frac{\text{Minimum recovery period}}{(\text{\# of paddocks} \div \text{number of herds}) - 1} = \text{Average Minimum Grazing Period (AMGP)}$$

$$\frac{\text{Maximum recovery period}}{(\text{\# of paddocks} \div \text{number of herds}) - 1} = \text{Average Maximum Grazing Period (AMxGP)}$$

Record these average days in row 28 (e.g., 3.6–11.7)

4. **Two or more herds with certain paddocks allocated to each herd.** In this case you are going to have to calculate four average grazing periods—two per herd.

Herd one:

$$\frac{\text{Minimum recovery period}}{\text{\# of paddocks allocated} - 1} = \text{Average Minimum Grazing Period (AMGP)}$$

$$\frac{\text{Maximum recovery period}}{\text{\# of paddocks allocated} - 1} = \text{Average Maximum Grazing Period (AMxGP)}$$

Herd two:

Repeat the above calculations using the number of paddocks you have allocated to the second herd.

Record all four of these average days in row 28 (e.g., 3.6–11.7/ 2.5–6.6).

Note: If you are using this policy, go to column 3 and color-code which paddocks are to be used by each herd. (This information will be needed in the next step).

5. **Two or more herds on follow-through grazing.** If you are using *one recovery period* you will calculate one grazing period, but that grazing period will be used by each herd. For example, if you had two herds and a 2-day grazing period, the first herd would be in each paddock two days on average, and the second herd the next two days. The paddock would thus have animals in it for 4 days (2 herds x 2 days).

$$\frac{\text{Recovery period}}{\text{\# of paddocks - \# of herds}} = \text{Average Grazing Period}$$

If you are using *a range of recovery periods* you will calculate two average grazing periods. The same now applies, except the lower grazing period figure will guide the speed of moves in fast growth and the longer figure in poor growing conditions. (This is very difficult to manage if you lack experience or if paddocks are uneven in size or quality).

$$\frac{\text{Minimum recovery period}}{\text{\# of paddocks - \# of herds}} = \text{Average Minimum Grazing Period (AMGP) (for each herd)}$$

$$\frac{\text{Maximum recovery period}}{\text{\# of paddocks - \# of herds}} = \text{Average Maximum Grazing Period (AMxGP) (for each herd)}$$

Record these average grazing period(s) in row 28 (e.g., 3.5, or 1.2–4.3)

Step 12
Calculate Actual Grazing Periods

Now you need to factor in paddock productivity to ensure your animals receive the highest plane of nutrition possible. The resulting figures will become the actual grazing period(s) used. To calculate the actual grazing periods for each paddock, *divide the quality rating* of each paddock (in column 2) *by the average quality rating for all paddocks* (recorded in the box at the bottom of column 2). Then *multiply that figure by the average grazing period for the month* (row 28). The figure you get for each paddock will tell you how long it should be grazed relative to all the others.

Note: If paddock numbers change over some months, your average paddock rating will also

change. Recalculate the average rating based only on the paddocks used, not the total number of paddocks.

Choose the formula below that fits your case.

One herd with a single long recovery period. The formula in this case is:

$$\frac{\text{Paddock rating}}{\text{Average paddock rating}} \times \text{Average Grazing Period} = \text{Grazing Period}$$

Record the grazing period, rounded off to a whole number, in the appropriate paddock row in column 4. (Use a light pencil, as these figures may need to be changed).
*If the number of paddocks or herds changed during some months, you will end up with two figures. **Record the second figure in the blank column, to the right of column 4.***

One or more herds in any of the combinations covered in Step 11. Use the same formula in each case:

$$\frac{\text{Paddock rating}}{\text{Average paddock rating}} \times \text{AMGP} = \text{Minimum Grazing Period}$$

$$\frac{\text{Paddock rating}}{\text{Average paddock rating}} \times \text{AMxGP} = \text{Maximum Grazing Period}$$

In each case, this will give you the actual Minimum Grazing Period for each paddock (to be used when growth is fast) and the actual Maximum Grazing Period (to be used when growth is slow). Using a soft pencil, **record both figures, rounded off to whole numbers, in column 4.**

*If the number of paddocks or herds changed during some months, you will end up with two sets of figures. (If the number of paddocks changed, make sure your average paddock rating is based only on the paddocks used, not the total number of paddocks). **Record the second set of figures in the blank column, to the right of column 4.***

Step 13
Check for Overgrazing in Longer-Grazed Paddocks

If you are new to holistic grazing planning and still have some paddocks that are much larger than others or very different in quality, some overgrazing and overtrampling may occur because the larger/high quality paddocks tend to get both the longest grazing periods and the shortest recovery periods. By the time you have many paddocks and are using single recovery periods, you can bypass this step.

Check to see that the recovery period *of each longer-grazed paddock* is adequate by doing the following:

1. Add all the *Minimum* Grazing Periods (in column 4, or the blank column) together.

2. From the total, subtract the longest Minimum Grazing Period of any paddock to find the *actual* recovery period for that paddock.

3. If this recovery period is much too short (much less than what you planned in row 27), you must add days to the Minimum Grazing Periods in other paddocks that can absorb them. (Just use your common sense judgement on deciding which ones can do this).

4. Follow the same procedure for the Maximum Grazing Periods, though there is less danger of overgrazing if you can't balance out the adjustments.

Step 14
Plan the Animal Moves

Use a soft pencil to mark in the actual moves of the herd, or herds, on the chart. Show the length of the grazing period by the length of the penciled line—the chart has fine lines for each day to assist you. To distinguish the herds when more than one is run, pencil in a symbol, number or letter that identifies each herd to the side of each grazing line. Follow these guidelines:

- If you are using a range of recovery periods, *use the longest (maximum) grazing period* given in column 4.

- Look over all the color-coded events you recorded previously to ensure that your animals go to the right place at the right time and for the right reasons.

- Events such as calving, lambing or kidding show clearly on the chart if these occur in the planned months. *Now is the time to plan the moves so that, if possible, mothers move to adjacent paddocks while calves, lambs or kids are small.*

- *Plan grazings backwards from periods when livestock nutrition, or other needs, are critical.* To do this reserve paddocks that you know will have high-quality forage, ample cover, or whatever, at critical times, then plan which paddocks animals should come from in order to get there. Planning forward, or worse, merely rotating animals, rarely assures this. And animal performance consequently suffers.

- Where you have problems or special management concerns in some paddocks (indicated by your color-coded marks), you need to address them. *If there are poisonous plants, shorten grazing periods below the planned figures in column 4 to reduce the likelihood of animals feeding on these plants.* (You probably don't want to exclude the animals, and rest these paddocks, because that could lead to an increase in the poisonous plants. You usually need the animal impact to help move succession beyond them). If you see wildlife need cover you will probably lighten the grazing by shortening it.

- If you shorten too many grazing periods you will need to add days of grazing to other paddocks that can take them. Otherwise, recovery periods could become too short in some paddocks.

- As you plot the moves and the lengths of grazing periods, constantly watch the recovery periods. Every day taken off a *single* grazing period actually takes a day off the recovery period in *every* paddock. This cumulative effect on the recovery periods, which can have disastrous consequences, will always shows up on a chart, but won't in a notebook, or on scraps of paper. ***The greatest danger of overgrazing stems from recovery periods that are too short, not grazing periods that are too long.***

Your plan is now complete.

Step 15
Operating & Monitoring the Plan

Although you have now produced the best plan you could possibly produce, circumstances are bound to change over time and adjustments will have to be made. Monitoring becomes a critical part of the process. No plan ever unfolds exactly as expected. That's why a military planning procedure, based on hundreds of years of experience in handling dramatic changes very quickly, was used to develop this *aide memoire*.

In implementing and monitoring your plan, follow these guidelines:

- *Monitor daily growth rates if you are using a range of grazing periods.* You need to determine how quickly grazed plants are regrowing. When growth becomes rapid, you need to drop to the minimum grazing period. Compare grazed plants in the paddock the animals have just left to grazed plants in the paddock the animals are now in to help you judge the rate of regrowth. You can also mark grazed plants in any paddock with flagged wire stakes or other markers to help you observe regrowth.

  Growth rates will seldom be rapid for more than a few days at a time. As the growth rate slows, move back toward the longer (maximum) grazing period shown in column 4. If ever you have doubt about the growth rate, assume it is slow—it normally is. If you are very observant you will find the color of the grass also indicates whether or not growth is rapid.

  If the growth rate continues to be rapid for a prolonged time and the grazings thus shift far off the plotted moves, you will need to replan from that date forward. This replanning normally only involves changing the plotted moves.

  Note: When you have 100 paddocks or more and are able to use a single long recovery period, you do not need to monitor daily growth rates. It is difficult for plants to be overgrazed when given the entire growing season, or nearly as long, to recover. But you do need to continue monitoring livestock, forage bulk, wildlife factors, and other concerns that affect your plan.

- With low paddock numbers overgrazing can occur either when stock stay too long in a paddock during fast growth or *when they return too quickly during slow growth.*

- *With higher paddock numbers the greatest danger is in returning too soon during slow growth.* This rarely happens when paddock numbers are as high as 100 or more, but you still need to keep an eye on the recovery period in each paddock if for any reason you have to shorten grazing periods.

- If you are using a range of recovery periods, when growth rates are slow move livestock as slowly as nutritional needs and the maximum grazing period guideline permit. Animals generally perform better when moving through paddocks faster, but if they move too quickly, plants will be overgrazed. If you can see ahead that animals are going to return to paddocks before plants have recovered, you are moving too fast, and you *must slow down. Not doing so (generally because you want to favor your animals), is one of the most common mistakes people make, with costly consequences.*

- If you are using a range of grazing periods and find that animals run out of forage in any paddock, even though you are using the minimum (shortest) grazing period, you have seriously misjudged the paddock. If you run out of forage in many paddocks, your judgement could again be at fault, but you are more likely to be overstocked. If you are using a single grazing period (and single long recovery period) and run out of forage, the reasons will be the same.

  In either case, if you suspect paddock quality was misjudged, move the animals immediately and note on the chart that the paddock was not as good as you thought it was. If you suspect that animals may run out of forage in other paddocks (and that you might be overstocked), you need to take appropriate action to avoid running into trouble with shortened recovery periods.

- **Field Checks:**

  If you want to check paddocks ahead of the animals in the field, then calculate the ADA you plan to take from the paddocks not yet grazed. Pencil in the figures next to the planned grazing period line. Then go out into the paddocks and sample areas that will need to feed one animal for one day. To get the sample area size, divide 4840 (square yards to an acre) by the ADA figure and punch the square root button on your calculator. This will give you the length of each side of the square that is needed to feed one animal for one day.

  If you decide you cannot feed one animal for a day on the samples taken in any one paddock, and your ADA figure was based on the maximum (or longest) grazing period, then you *may* have misjudged the paddock, or you *may* be overstocked. But if your ADA figure was based on the minimum (or shortest) grazing period, or on a single grazing period (when using a single long recovery period), and the sampled areas in most of the paddocks will not feed one animal for one day, *you are definitely carrying too many animals and will need to do something about it very quickly.*

Appendix C
Standard Animal Unit Tables
PHYSIOLOGICAL FACTOR — SHEEP

Est. Weight		Ewes In Moderate condition For fat ewes use 10 kgs (22 lbs) lower weight						Rams	Lambs	
Lbs*	Kgs*	A	B	C	D	E	F+	G+	Early weaned	Fattening
22	10								0.63	
27.5	12.5								0.74	
33	15								0.84	
38.5	17.5								0.94	
44	20								1.04	
49	22.5								1.15	
55	25								1.25	
60	27.5								1.36	
66	30	0.65					1.15		1.46	1.19
71	32.5	0.67					1.17			1.26
77	35	0.69					1.18			1.34
83	37.5	0.70					1.20			1.48
88	40	0.72					1.21	1.68		1.61
93	42.5	0.74					1.20	1.72		1.66
99	45	0.75					1.20	1.76		1.71
104	47.5	0.77					1.19	1.79		1.76
110	50	0.79	0.86	1.44	1.96	2.23	1.18	1.83		1.81
115	52.5	0.81	0.90	1.45	1.99	2.28	1.18	1.87		1.86
121	55	0.83	0.94	1.50	2.05	2.33	1.18	1.91		1.91
126	57.5	0.85	0.98	1.54	2.09	2.37	1.18	1.95		
132	60	0.86	1.02	1.58	2.14	2.42	1.18	1.98		
137	62.5	0.88	1.04	1.62	2.19	2.47	1.16	2.01		
143	65	0.90	1.06	1.66	2.24	2.52	1.14	2.04		
148	67.5	0.92	1.08	1.70	2.28	2.57	1.12	2.07		
154	70	0.94	1.10	1.74	2.33	2.61	1.10	2 09		
159	72.5	0.96	1.12	1.76	2.35	2.66		2.12		
165	75	0.98	1.14	1.78	2.38	2.71		2.15		
170	77.5	1.00	1.16	1.80	2.40	2.76		2.18		
176	80	1.02	1.18	1.82	2.42	2.80		2.20		
181	82.5		1.84	1.91				2.20		
187	85		1.87					2.20		
193	87.5		1.89					2.20		
198	90		1.91					2.20		
200	91							2.20		
202	92							2.20		
205	93							2.20		
207	94							2.20		
209	95							2.20		
211	96							2.20		
213	97							2.20		

Est. Weight		Rams
Lbs*	Kgs*	G+
216	98	2.20
218	99	2.20
220	100	2.20
222	101	2.19
224	102	2.18
226	103	2.18
228	104	2.17
231	105	2.16
233	106	2.15
235	107	2.14
237	108	21.4
238	109	2.13
242	110	2.12
244	111	2.11
246	112	2.10
248	113	2.10
251	114	2.09
253	115	2.08
255	116	2.07
257	117	2.06
260	118	2.06
262	119	2.05
264	120	2.04

LEGEND:

Non-lactating ewes
- Maintenance (in moderate condition) . . . .A
- First 15 weeks gestation . . . . . .B
- Last 6 weeks gestation C

Lactating ewes suckling single lambs
- First 8 weeks lactation . . . . . .D
- Last 8 weeks lactation C

Lactating ewes suckling twin lambs
- First 8 weeks lactation . . . . . .E
- Last 8 weeks lactation . . . . . .D

Ewes, replacement lambs, and yearlings . . . . .F

**** Weight given per head while all SAU figures pertain to 5 head each of that weight.***

+ Values for replacement lambs (rams and ewes) start at time they are weaned.

Compiled by A.H. Penderis

Appendix C
Standard Animal Unit Tables
PHYSIOLOGICAL FACTOR — CATTLE

Est. Weight		Steer/heifer desired daily weight gain, lbs/kgs				Lactating Cow	Dry, Pregnant Cow	Bulls
Lbs	Kgs	1.65/0.75	1.1/0.50	0.55/0.25	0/0			
330	150	0.73	0.67	0.57	0.44			
341	155	0.76	0.69	0.59	0.45			
352	160	0.80	0.71	0.60	0.46			
363	165	0.83	0.73	0.62	0.48			
374	170	0.87	0.76	0.63	0.49			
386	175	0.90	0.77	0.65	0.50			
396	180	0.93	0.79	0.67	0.51			
407	185	0.95	0.82	0.69	0.52			
418	190	0.98	0.84	0.71	0.52			
429	195	1.00	0.87	0.73	0.53			
440	200	1.03	0.89	0.75	0.54			
451	205	1.06	0.91	0.76	0.55			
462	210	1.09	0.93	0.77	0.56			
473	215	1.12	0.95	0.78	0.58			
484	220	1.15	0.97	0.80	0.59			
495	225	1.18	0.99	0.81	0.60			
506	230	1.20	1.01	0.82	0.61			
517	235	1.23	1.03	0.84	0.62			
528	240	1.25	1.06	0.85	0.63			
539	245	1.28	1.08	0.87	0.64			
550	250	1.30	1.10	0.88	0.65			
561	255	1.32	1.12	0.89	0.66			
572	260	1.34	1.14	0.91	0.67			
583	265	1.36	1.16	0.92	0.68			
594	270	1.38	1.18	0.94	0.69			
605	275	1.40	1.20	0.95	0.70			
616	280	1.42	1.22	0.96	0.71			
627	285	1.44	1.24	0.97	0.72			
638	290	1.46	1.26	0.99	0.72			
649	295	1.48	1.28	1.00	0.73			
660	300	1.50	1.30	1.01	0.74			1.62
671	305	1.52	1.32	1.02	0.75			1.63
682	310	1.54	1.33	1.03	0.76			1.64
693	315	1.56	1.35	1.05	0.77			1.66
704	320	1.58	1.36	1.06	0.78			1.67
715	325	1.60	1.38	1.07	0.79			1.68
726	330	1.62	1.40	1.09	0.80			1.69
737	335	1.64	1.42	1.10	0.81			1.71
748	340	1.66	1.44	1.12	0.82			1.72
759	345	1.68	1.46	1.13	0.83			1.74
770	350	1.70	1.48	1.15	0.84	1.40	0.86	1.75
781	355	1.72	1.50	1.16	0.85	1.41	0.87	1.76
792	360	1.74	1.52	1.17	0.85	1.43	0.88	1.78
803	365	1.76	1.54	1.19	0.86	1.44	0.88	1.79
814	370	1.78	1.56	1.20	0.86	1.46	0.89	1.81
825	375	1.80	1.58	1.21	0.87	1.47	0.90	1.82
836	380	1.81	1.59	1.22	0.88	1.48	0.91	1.83
847	385	1.82	1.60	1.23	0.89	1.49	0.92	1.84
858	390	1.84	1.61	1.24	0.89	1.51	0.93	1.85
869	395	1.85	1.62	1.25	0.90	1.52	0.94	1.86
880	400	1.86	1.63	1.26	0.91	1.53	0.95	1.87
891	405					1.54	0.95	1.88
902	410					1.55	0.96	1.89
913	415					1.55	0.96	1.90
924	420					1.56	0.97	1.91
935	425					1.57	0.97	1.92
946	430					1.58	0.97	1.93
957	435					1.59	0.97	1.94
968	440					1.60	0.98	1.95
979	445					1.61	0.98	1.96
990	450					1.62	0.98	1.97
1001	455					1.63	0.99	1.98
1012	460					1.64	1.00	1.98
1023	465					1.65	1.02	1.99
1034	470					1.66	1.03	1.99
1045	475					1.67	1.04	2.00
1056	480					1.68	1.05	2.01
1067	485					1.69	1.06	2.02
1078	490					1.69	1.06	2.03
1089	495					1.70	1.07	2.04
1100	500					1.71	1.08	2.05
1111	505					1.72	1.08	2.05
1122	510					1.73	1.09	2.05
1133	515					1.73	1.09	2.05
1144	520					1.74	1.10	2.05
1155	525					1.75	1.10	2.05
1166	530						1.11	2.05
1177	535						1.12	2.05
1188	540						1.12	2.06
1199	545						1.13	2.06
1210	550						1.14	2.06
1221	555						1.15	2.06
1232	560						1.16	2.06
1243	565						1.17	2.06
1254	570						1.19	2.06
1265	575						1.20	2.06
1276	580						1.21	2.06
1287	585						1.21	2.06
1298	590						1.22	2.05
1309	595						1.22	2.05
1320	600						1.23	2.05
1375	625							2.05
1430	650							2.03
1485	675							2.02
1540	700							2.00
1595	725							1.98
1650	750							1.95
1705	775							1.91
1760	800							1.88
1815	825							1.85
1870	850							1.81
1925	875							1.75
1980	900							1.70

Compiled by A.H. Penderis

Appendix B
Comparison of Different Herd Strategies

Number of paddocks	56
Size of cell	3,000 acres
Average paddock	54 acres
Average recovery period	90 days
Number of animals	600 steers (100 will be marketed earlier)

Possible Strategy	**Avg Graze Period**	**Avg Stock Density**	**Herd Size**	**Avg ADA /Grazing**
A. 1 Herd	1.6	11.0	600	17.7
B. 2 Herds	3.3	1.8	100	6.1
All Paddocks	3.3	9.3	500	30.5
C. 1 Herd/20 Paddocks	4.7	1.8	100	8.7
1 Herd/36 Paddocks	2.6	9.3	500	24.1
D. 2 Herds on Follow-Through	1.7/1.7	1.8/9.3	100/500	3.1 + 15.7 (18.8 total)

Comments

- From the land's point of view, Strategy A gives the lowest grazing pressure, the highest stock density (animal impact), and the shortest grazing period. The second best alternative is Strategy D.

- From the cattle's point of view, Strategy D 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 A.

Consider what each strategy will do for the land, the animals, and yourself (in terms of management stress). Then make your decision.

Date _____

WORKSHEET

Planning Sheet Column Reference _____ Worksheet No _____

	January	February	March	April	May	June	July	August	September	October	November	December	Total
Biological Year	Snow	Snow	←			Rains →					Snow Possible		
					←	Main Growth	→						
Crop Field/Area													
C-1/300 acres	Livestock		← Field Prep		Plant (specific crop)			→	Harvest		Livestock on Residue →		
C-2/450 acres	end of 5 years in grass		← Preparation	←	Plant Two Interplanted Crops			→	Harvest		Livestock on Residue →		
C-3/270 acres	Livestock on Residue		← Plant to Grass for 5 Years					→	←	Livestock	→		
C-4/325 acres	Livestock		← Field Prep		Plant (specific crop)			→	Harvest	←	Livestock on Residue →		
Note:	This is an example of a master worksheet to show all fields and												
	when livestock can graze them or are needed for field maintenance.												
	A separate worksheet could be used for each crop field to plan several												
	years of crop rotations.												
Total													

draw a green line down through all paddocks for that day, and label it "Growth Started". At this point you would create your next growing season plan and abandon the rest of this plan (which usually only includes the drought reserve).

- In order to create both your next growing season and non-growing season plans, you need to record the forage each paddock yielded in this non-growing season. To get these figures, add together all the grazings noted in ADA or SDA in each paddock *from the green line you have just drawn, back to the green line you drew to mark the end of the previous growing season and the beginning of the present non-growing season.* **Using a light pencil, record these figures in column 8.**

  You will need to add to the yields of some paddocks. Those that you can see were grazed late in the last growing season, and thus did not fully regrow, could potentially yield more than the non-growing season yield shows. And those paddocks that have an **M** or an **L** behind the last grazing taken, had more forage in them than the ADA (or SDA) taken shows. In either case, estimate how much additional forage each of these paddocks could yield and add this amount to the yields in column 8. **Record the final figures, in ink, in column 8.**

- Add any comments on the chart that will help you do better in future planning—not on another piece of paper that can get lost, but on the back of the chart where you have plenty of space.

  Remember that you have based paddock assessments either on ADA or SDA estimates, or actual performance in previous seasons (with adjustments). In brittle environments especially, errors are certain to occur in your estimates. *You will find that livestock at higher densities in smaller, more well-defined areas, are going to show up assessment faults better than you could have determined them by any other means.* Therefore, keep an open mind and make note of all errors that can affect next year's plan.

- Finally, summarize livestock and land performance in the cell over the year in the lower right corner of the chart (the two blank lines provided are for recording any other significant measures). Most important is to note the total yield per acre of products sold (meat, milk, wool, and so on).

In the non-growing season, you need mainly to monitor forage consumption. If you find that animals run out of forage in any paddock, you probably misjudged the volume or quality of the forage. If you run out of forage in many paddocks, your judgement could again be at fault, but you are more likely to be overstocked.

If you suspect paddock quality was misjudged, move the animals immediately and note on the chart that the paddock was not as good as you thought it was. If you suspect that animals may run out of forage in other paddocks (and that you might be overstocked), you need to take appropriate action before animal performance is seriously depressed.

If the health and stability (or growth) of wildlife populations is mentioned in your holistic goal, you will need to monitor to ensure that cover, feed, lack of disturbance at critical times, and any other factors, are being catered for.

Step 17
Keeping the Record

The main purpose for recording what happens is to fine-tune your paddock assessments and management decisions for future planning.

- Record actual events *in ink* as the season progresses. **For every paddock, ink in a line on the chart that covers the number of days the herd actually spent there.**

- Behind or to the right of the actual grazing line, **record the volume of forage taken by the animals in ADA (or SDA)** and then follow this figure with your assessment of how heavy that grazing was. Use *L* for Light (you can hardly see the paddock was grazed), *H* for Heavy (you had to remove animals), and *M* for Medium (everything in between). Do not judge close to water, but well out in the paddocks. (Your record would look something like this: -------*34/M*, if you wanted to show that the grazing that occurred over the days marked, was 34 ADA (or SDA) and was a medium grazing in terms of total bulk.

- **Record Precipitation—rain or snow—in rows 21 and 22.** The spaces between the heavier lines represent 5-day periods. You may want to note the exact day of major storms with a dot on a single line and a written comment in the "Remarks" section on the chart. Note your **average annual precipitation in row 37.** Record the **total precipitation received for the season in row 38.**

- **If any growth at all takes place over the period planned, mark in the letter G (for Growth) in row 23 in the five-day periods provided.** (Some greening-up or very slow growth does occur in many areas in the non-growing season. If this growth spreads over more of each year, as it can with an increasingly effective water cycle, this record should prove useful.)

- When the next growing season begins (make your best guess of the actual starting date),

the physiological state of the animals. If the animals are dry, pregnant cows you would ask the same question as above, "Would this area feed one cow today?" If they are lactating cows, you would ask, "Would this area feed one cow *very comfortably* today?" If lactating cows were about to be bred and you wanted them to be on a rising plane of nutrition, you would ask, "Would this area feed one cow *very comfortably and with forage to spare*? If any paddocks provide feed or cover for wildlife at critical times you could ask, "Would this area feed one cow today *and leave adequate forage for wildlife cover and feed?*"

Convert ADA to SDA:

1. **List all classes of livestock in rows 29—33** on the grazing chart. Then, under each month record the number of animals in each class and their average weight.

2. Go to the tables in *Appendix C* (page 37-38) to find the percentage unit of each class of animal according to its weight and physiological state. Record the figure in the "% unit" column.

3. For each month, multiply the number of animals in each class by the percentage unit and note the answer in the "total units" column.

4. Total the resulting figure for each class to get the total number of SAUs for that month. **Record this figure in row 34**.

5. To determine the SDA to be taken in each grazing, use the following calculation:

$$\frac{\text{Total SAU x days in paddock}}{\text{Area of paddock (in acres)}} = \text{SDA}$$

6. Pencil in the SDA figure beside the grazing period lines in each paddock row. Then add them together and **record the total in column 7.**

7. Now use these figures to determine the size of the sample you need to pace out. This will usually turn out to be a smaller sample area than the one used with ADA figures, and you merely ask yourself if the area would feed one animal for one day.

If you are satisfied with the results of your field checks, your plan is now complete.

Step 16
Operating & Monitoring the Plan

Although you have now produced the best plan you could possibly produce, circumstances are bound to change over time and adjustments will have to be made. *No plan ever unfolds exactly as expected.* That's why monitoring becomes a critical part of the process.

grazing periods below the planned figures in column 4 (or in the "drought reserve" column) to reduce the likelihood of animals feeding on these plants. (You probably don't want to exclude the animals, and rest these paddocks, because that could lead to an increase in the poisonous plants. You usually need the animal impact to help move succession beyond them.) If you see wildlife need cover you will probably lighten the grazing by shortening it.

- If you shorten too many grazing periods you may need to add days of grazing to other paddocks that can take them. But *this is not critical in the non-growing season or the drought reserve period.*

- Remember, this is a closed plan and thus you will be planning livestock moves right through the drought reserve period to a theoretical end of all forage. The carrying capacity you calculated in Step 1 assured that forage would be available until this point.

- When planning the animal moves in the drought reserve months you will find that you generally have to come through the same paddocks once again. There will be enough forage (if you assessed your carrying capacity correctly right through the drought reserve), but it will have been selected over one or more times and will not be as high in quality.

Step 15
Make a Final Field Check

If you have any doubts about the ability of any paddocks to feed animals over the days required, or any concerns about the plan in general, you need to make a final check. You can use ADA or, to be more accurate, SDA ratings:

- Calculate the ADA that will be taken in a paddock during each grazing period over the months planned. Pencil the figure in lightly next to the grazing period lines. Add all the figures in each paddock row to get the total planned demand. **Record this figure in column 7.**

- Then go out into the paddocks and sample areas that will need to feed one animal for one day. To get the sample area size, divide 4840 (square yards to an acre) by the ADA figure in column 7 and punch the square root button on your calculator. This will give you the length of each side of the square that is needed to feed one animal for one day.

Factoring in Physiological State:

If you want to be even more accurate in your estimates, you should factor in the physiological state of your animals. There are two ways to do this. The first is fairly simple and very quick. The second is more complicated and only slightly more accurate:

Pose the Question Differently:

Use the ADA figures in column 7 to determine the size of the sample you need to pace out, just as you did above. However, this time rephrase the question you ask to take into account

change. Recalculate the average rating based only on the paddocks used, not the total number of paddocks.

The formula looks like this:

$$\frac{\text{Paddock rating}}{\text{Average paddock rating}} \times \text{Average Grazing Period} = \text{Grazing Period}$$

Record the grazing periods, rounded off to whole numbers, for the non-growing months in the appropriate paddock row in column 4.

Record the grazing periods, rounded off to whole numbers, for the drought reserve months in the column you labeled "drought reserve" (to the right).

Note: If row 28 included two figures in the non-growing months, you will need to calculate actual grazing periods based on each average figure and record both in column 4, using a slash to separate them. (For example, if you had 3-day grazing periods from October through December, and 2-day grazing periods from January through March, you could record that as 3Oct-Dec/2Jan-Mar in column 4). You are unlikely to have more than one figure in row 28 for the drought reserve months, but if you did, you would record both figures in the blank column.

Step 14
Plan the Animal Moves

Use a soft pencil to mark in the actual moves of the herd, or herds, on the chart. Show the length of the grazing period by the length of the penciled line—the chart has fine lines for each day to assist you. To distinguish the herds when more than one is run, pencil in a symbol, number or letter that identifies each herd to the side of each grazing line. Follow these guidelines:

- Look over all the color-coded events you recorded previously to ensure that your animals go to the right place at the right time and for the right reasons.

- Events such as calving, lambing or kidding show clearly on the chart if these occur in the planned months. *Now is the time to plan the moves so that, if possible, mothers move to adjacent paddocks while calves, lambs or kids are small.*

- *Plan grazings backwards through the non-growing months from periods when livestock nutrition, or other needs, are critical.* To do this reserve paddocks that you know will have high-quality forage, ample cover, or whatever, at critical times, then plan which paddocks animals should come from in order to get there. Planning forward, or worse, merely rotating animals, rarely assures this. And animal performance consequently suffers.

- Where you have problems or special management concerns in some paddocks (indicated by your color-coded marks), you need to address them. *If there are poisonous plants, shorten*

3. **Two or more herds with certain paddocks allocated to each herd.** In this case you are going to have to calculate two average grazing periods—one per herd.

Herd one:

$$\frac{(\text{\# of drought reserve days} \div \text{\# of paddocks allocated})}{\text{\# of selections}} = \text{Average Grazing Period}$$

Herd two:

Repeat the above calculations using the number of paddocks you have allocated to the second herd.

Example: If you had 100 paddocks, a drought reserve of 60 days, and one selection, and you allocated 25 paddocks to heifers and 75 paddocks to the cow herd, the average grazing period for the heifers would be 2.4 days, and for the cow herd 0.8 days. (Include the full decimal figure for now).

Record both figures in row 28 under each month. (e.g., h/2.4–c/0.8). (*Go to column 3 and color-code which paddocks are to be used by each herd if paddocks will be allocated differently during the drought reserve period).*

4. **Two or more herds on follow-through grazing.** You will only calculate one grazing period, but that grazing period will be used by each herd.

$$\frac{(\text{\# of drought reserve days} \div \text{\# of paddocks})}{\text{\# of selections}} = \text{Average Grazing Period (for each herd)}$$

Example: If you had 100 paddocks, a drought reserve of 60 days, one selection, and two herds on follow-through, your grazing period for each herd will be 0.6 days. Each herd would spend 0.6 days on average in each paddock. (Include the full decimal figure for now).

Record both figures in row 28 under each month. (e.g., 0.6–0.6).

Step 13
Calculate Actual Grazing Periods

Now you need to take into account paddock quality to ensure your animals receive the highest plane of nutrition possible. The resulting figures will become the actual grazing periods for each paddock and will be used to plan animal moves. To calculate the actual grazing periods for each paddock, *divide the quality rating of each paddock* (in column 6) *by the average quality rating for all paddocks* (recorded in the box at the bottom of column 6). Then *multiply that figure by the average grazing period for the non-growing months and the drought reserve (row 28).* The figures you get will tell you how long each paddock should be grazed over the non-growing months and drought reserve, relative to all the others for best animal performance.

Note: If paddock numbers change over some months, your average paddock rating will also

$$\frac{(\text{\# non-growing days} \div \text{\# paddocks})}{\text{\# of selections}} = \text{Average Grazing Period (for each herd)}$$

Example: If you had a non-growing season of 180 days, 100 paddocks, one selection, and two herds on follow-through, your grazing period would be 1.8 days for each herd. Each herd would spend 1.8 days on average in each paddock. You should include the full decimal figure for now, but will round it off to the nearest whole number after completing the next step.

Record both figures in row 28 under each month (e.g., 1.8–1.8).

Step 12
Calculate Average Grazing Periods for the Drought Reserve

Now calculate the average grazing periods for the months of drought reserve. In most cases you will only plan to take one selection during the drought reserve period (row D). However, if you live in a highly drought-prone area where six months or more of drought reserve is required, you may want to plan more than one selection.

1. **One herd** (grazing many paddocks, or strip-grazing a few paddocks):

$$\frac{(\text{\# of drought reserve days} \div \text{\# of paddocks})}{\text{\# selections}} = \text{Average Grazing Period}$$

Example: If you had 100 paddocks, 60 days of drought reserve, and one selection, the average grazing period would be 0.6 days.

If you have few paddocks per herd but intend to continue to strip-graze within them remember the figure will appear high but you are only going to graze each strip within a paddock for a few hours up to a day.

Record the average grazing period for the drought reserve in row 28 under each month. (e.g., 0.6)

2 **Two or more herds using any paddock in the cell**

$$\frac{\left(\text{\# of drought reserve days} \div (\text{\# of paddocks} \div \text{\# of herds})\right)}{\text{\# of selections}} = \text{Average Grazing Period}$$

Example: If you had a drought reserve of 60 days, 50 paddocks, two herds, and one selection, your average grazing period would be 2.4 days. (Include the full decimal figure for now).

Record the average grazing period for the drought reserve in row 28 under each month. (e.g., 2.4).

up to a day.

Record the average grazing period for the non-growing months in row 28 under each month (e.g., 1.8).

2 **Two or more herds using any paddock in the cell:**

$$\left(\frac{\text{\# of non-growing days} \div (\text{\# of paddocks} \div \text{\# herds})}{\text{\# of selections}} \right) = \text{Average Grazing Period}$$

Example: If you had a non-growing season of 180 days, 50 paddocks, two herds and two selections, your average grazing period would be 3.6 days. You should include the full decimal figure for now, but will round it off to the nearest whole number after completing the next step.

Record the average grazing period for the non-growing months in row 28 under each month (e.g., 3.6).

3. **Two or more herds with certain paddocks allocated to each herd:** In this case you are going to have to calculate two average grazing periods—one per herd.

Herd one:

$$\frac{(\text{\# of non-growing days} \div \text{\# of paddocks allocated})}{\text{\# of selections}} = \text{Average Grazing Period}$$

Herd two:

Repeat the above calculations using the number of paddocks you have allocated to the second herd.

Example: If you had a non-growing season of 180 days, 100 paddocks, two selections, and you allocated 25 paddocks to heifers and 75 paddocks to the cow herd, the average grazing period for the heifers would be 3.6 days and for the cow herd 1.2 days. You should include the full decimal figure for now, but will round it off to the nearest whole number after completing the next step.

Record both figures in row 28 under each month (e.g., h/3.6–c/1.2). *If you are using this policy, go to column 3 and color-code which paddocks are to be used by each herd. (This information will be needed in Steps 12 and 13).*

4. **Two or more herds on follow-through grazing:** You will only calculate one grazing period, but that grazing period will be used by each herd. For example, if you had two herds and a 2-day grazing period, the first herd would be in each paddock two days on average, and the second herd the next two days. The paddock would thus have animals in it for 4 days (two herds x two days) on average.

the number of herds, the average grazing periods (use the formulae found in Step 11, on page 26), herd size, average stock density, and average ADA taken from paddocks. If you lay these out in tabular form it makes thinking about it easy (*see Appendix B*, page 36). Think of the consequences to the land, livestock, other land uses, and the degree of management each alternative requires. Then make your decision.

Record your decision in row 25. If you are planning a follow-through grazing pattern, note which herd goes first (the size of each herd will affect the performance of the following herd, or herds). For one herd of 250 animals you would enter *1/250*. For two herds—one of 50 replacement heifers and the other of 250 cows—on follow-through you would enter *2/50h-250c*. If you had 50 paddocks to allocate between those same two herds, you might record it as *2AP:50h-20p/250c-30p* (two allocated paddocks: 50 heifers in 20 paddocks and 250 cows in 30 paddocks). For dairy animals you might have three herds—high yield milkers, main group and followers—you would enter *3/20h-40m-34f*. **Use whatever abbreviations are clearest to you.**

Step 11
Calculate Average Grazing Periods for the Non-Growing Months

Calculating non-growing season grazing periods requires three steps. In this first step you determine the *average* grazing period (or periods) for each non-growing month, and will assume that all paddocks are equal in size and quality. In Step 12 you determine the average grazing period for the drought reserve, again assuming paddocks are equal in size and quality. In Step 13 you take into account paddock size and quality to calculate the *actual* grazing period(s) to be used in planning for the non-growing months and drought reserve.

If the number of paddocks per herd will not change, you only need calculate average grazing periods for the non-growing months once. If the number of herds or the number of paddocks changes in some months during the non-growing period (as recorded in rows 25 and/or 26), you will have to do separate calculations for the months in which these changes occur. Choose the formulae below that fit your case. (The information on number of selections is in row 27 and the non-growing season figure is in row B).

1. **One herd** (grazing many paddocks, or strip-grazing a few paddocks):

$$\frac{(\text{\# of non-growing days} \div \text{\# of paddocks})}{\text{\# of selections}} = \text{Average Grazing Period}$$

Example: If you had a non-growing season of 180 days, 100 paddocks, and one selection, your average grazing period would be 1.8 days. You should include the full decimal figure for now, but will round it off to the nearest whole number after completing the next step.

If you have few paddocks per herd but intend to strip-graze within them, the figures will reflect many days of grazing in each paddock because of the length of the non-growing period. In reality, however, each strip within a paddock will only be grazed for a few hours

a large number of paddocks (100 or more) to assure this. (If you have not calculated grazing periods in the non-growing season before, you may want to look at the formulae in Step 11 (page 26) to see how long the grazing periods would be, based on the length of your non-growing season and number of selections you are thinking of using.)

- If you have relatively few paddocks but will be strip grazing within all or most of them, this puts you in the category of having a great many paddocks. You can use a single selection.

- If using one selection would mean that grazing periods are so long that animals became nutritionally stressed toward the end of each grazing period, you will need to use two or more selections. (Alternatively, you could consider bulk feeding toward the end of each grazing period, particularly if you have major wildlife considerations). Two or more selections will shorten grazing periods, but they will also make it necessary for animals to come into paddocks more than once. There should be time for fouling to wear off between the grazings, but forage quality will drop with each selection from the same forage. Thus, in this alternative, any nutritional stress your animals experience will likely be delayed until later in the season.

When you have decided on the number of selections you will use, **record the figure in Row 27 on the chart under each month.**

(Note: If you are unclear on the relationship between length of grazing periods, number of selections, and the plane of nutrition, re-read Chapter 26, "Time and Livestock Nutrition," in the Holistic Resource Management *textbook).*

Step 10
Record Number of Herds & Paddocks Allocated to Them

First decide if animals will run as one herd for the whole season—or, if not, how many herds you will have and during what months. (Remember that the more herds you have, and the less paddocks per herd, the lower your stock density and animal impact will be). There are several alternatives to running a single herd:

- Two or more herds that will move through all the paddocks.

- Two or more herds that will move through paddocks allocated specifically to each herd.

- Two or more herds on "follow-through" grazing where as one herd leaves a paddock another enters it. (Though this alternative may offer the best solution in some situations, it is difficult to manage and requires paddocks that are reasonably uniform in size and quality or productivity).

To help you decide which alternative is best, you need to make some comparisons: On a separate sheet of paper list the various alternatives (including one herd) and beside each one note

Explain the meaning of the highlighter colors with a legend in the "remarks" space at the bottom of the chart. *Do not write on the main body of the chart.*

Step 8
Calculate Average Paddock Quality

Now you need to compute the average quality rating for all paddocks so you can take this figure into account when planning the actual grazing periods. Add all the figures in column 6 dropping the three zeros from each (or take the total recorded in row A and drop the three zeros) and divide the sum by the total number of paddocks. **Record this figure in the box at the bottom of column 6.**

Note: If this is your first plan and you bypassed Step 1, you will not have the figures in column 6 to work with. To calculate average paddock quality you can use a simple 1–10 scale to get an approximate rating. Rate the best paddock—the one that, acre for acre, you think has the best forage—as a 10. Then rate all the other paddocks relative to this one. A paddock with forage half as good would rate a 5, and so on. ***Record these ratings in Column 6*** *for each paddock. Then average these ratings (add all the figures in column 6 together, and divide the total by the number of paddocks).* ***Record the average rating in the box at the bottom of column 6.***

Step 9
Determine Length of an Average Non-Growing Season & Number of Selections

Before you can determine the length of grazing periods to use in the non-growing season, you first have to establish the number of no-growth days you experience on average. Base your estimate on past experience or on the actual records for your area. If you planned the drought reserve and stocking rate in Step 1, the figure you need will be in **row B** at the bottom right of your chart.

Choosing the Number of Selections:

Since you will not be concerned about overgrazing plants (you are unlikely to overgraze them if they are not growing significantly), you do not need to determine a *range* of recovery periods, even when you have very few paddocks, as you will not be concerned with growth rates. *The main decision you need to make now is how many times you want your animals to graze each paddock during the non-growing months*—what we call the number of selections. In making your decision, remember that each time a paddock is grazed in the non-growing season, forage quality and volume decreases. So you want to aim for as few selections as possible. Also remember that if you do run into the drought you have planned for, your animals will automatically return through some paddocks. Follow these guidelines:

- Use one selection if the grazing periods will be so short (one to two days) that animals would not remain long enough in a paddock to be nutritionally stressed. You generally have to have

Step 5
Record Livestock Exclusion Periods

With a fine, color-coded pen, draw a horizontal line through (or horizontally box out) any months or parts of a month when a paddock *cannot under any circumstances* have livestock in it. This can be due to factors such as no water, heavy snow, field preparation for crops, recreational uses, logging, game management factors, etc. (Be careful not to exclude paddocks which, although they have problems, like poisonous plants, limited water or limited cover for wildlife, may still be able to have livestock in them). Use different colors for different factors and explain the meaning of the colors with a legend in the "remarks" space at the bottom of the chart. Many people feel they know these reasons so well they need not code them but three years later cannot recall why the paddocks were excluded! *Do not write on the main body of the chart.*

Step 6
Record Paddocks Still Available

Record the number of paddocks that remain available for grazing each month in row 26. If you see that a paddock is unavailable for a period of two months or less, count it as available in this step.

Step 7
Note Special Management Needs

Focus on each paddock individually and decide whether any problems or limitations are associated with it, and whether any areas within a paddock will require special treatment. The latter is particularly important because *this is the step in which you will plan to use such tools as grazing and animal impact to achieve the future landscape described in your holistic goal.*

Using a color-coded highlighter, clearly mark through any paddock that needs special attention. (Make sure the highlighter allows you to later write legibly over it with pencil). Factors to consider might include bare, eroding ground that needs healing, or noxious weeds you want to reduce—both of which could require herd effect. You might want to rest some areas to create brush cover for wildlife, and you might want to graze off fire-prone areas before they become a danger. If you plan to strip-graze, but will not be strip-grazing all paddocks, mark those that will be strip-grazed.

At the same time, think about any limitations that could affect the livestock—poisonous plants, heavy snow, lack of shelter, limited water supply, and so on. And don't forget to consider any multiple-use factors that could affect a paddock—such as wildlife management needs, cropland preparation, logging operations, campsites, hiking trails, etc.

Use the list of planning factors you made earlier to remind you of any other factors you need to be aware of in grazing any paddock.

- **Write in the heading "drought reserve" in the blank column to the right of column 4.**

- **Record the paddock name or number in both column 3's**—one is left of the months and the other is right of them. Be aware that although you may want to retain names for your paddocks (for cultural and historical reasons) as you increasingly divide them and increase their numbers, names can become cumbersome and you may want to switch to numbering them all. If you have more than 20 paddocks in the cell, cut apart other charts and paste on enough sections vertically to give every paddock a line.

- **Record each paddock's size in acres to the left in Column 3**. If your paddocks are to be temporarily subdivided for strip-grazing (see *Definitions*), ignore that at this point.

- If you have croplands that will be grazed in the non-growing period, you need to include them as paddocks. (If these are first planned on worksheets, as in the sample in *Appendix A* (page 35), you will then know when livestock should avoid fields and when they are needed on them). If you are subdividing a crop field into small divisions (with temporary electric fence) for special treatment, treat the field as one paddock in this step.

- **Enter the total cell size in row 35; and your stocking rate in row 36.**

Step 4
Record Management Concerns Affecting the Whole Cell

Using fine-point color-coded felt or nylon-tipped pens, *box in all the management events that affect the cell as a whole regardless of where the livestock might be placed.* Draw vertical lines through all of the paddocks on the starting and ending dates of the management concern (bulling, calving, etc.) and connect them at the top of the planning chart (above the months). Explain the meaning of the lines by writing the title of each management event on the top connecting horizontal line.

- First, consider livestock events such as breeding/bulling (red), calving, lambing or kidding (blue), weaning (yellow), etc.

- Next, use the list of planning factors you created earlier to help you think of all the events which *affect the whole grazing cell*—wildlife factors, hunting seasons, and so on—and mark them in.

- Finally, you may want to schedule in events such as family vacations or times when critical people are away.

The emphasis here is on the events you need to note, no matter where the livestock are later placed, because these events could influence the livestock or your management no matter which paddocks they are in.

Once you feel comfortable with the number of animals you can carry on the forage produced by your land through the non-growing season (and drought reserve planned), and that you have ensured sufficient feed and cover for wildlife as well, proceed to the next step.

Step 2
Opening Decisions

Gather for a pre-planning session all the people responsible for putting the plan into effect. (If you are planning grazing on public lands, include environmentalists, wildlifers, foresters and others who may have a say in how you run your livestock, or are concerned about the wildlife). Think of all the factors that need to be considered at some stage in the planning: those that influence livestock, wildlife, crops, haying, waters that may dry early, fire danger areas and prevailing winds as well as what you are trying to achieve on the land in your holistic goal. Don't judge any item or go into detail. Just write down all the factors and keep the list handy.

Now think over the months you are planning and try to envision the whole ranch/farm. Then answer the following questions:

- Is the entire area going to serve as one grazing cell or will different areas become different cells? Your answer will determine how many plans you need to create. Each cell requires a separate plan and a separate Grazing Plan & Control Chart.
- Do you want to run herds just as before or change?
- Has your biological monitoring indicated any problems that need to be resolved? Do you need to increase animal impact in some areas? Increase rest in other areas? Reduce partial rest all over?

Step 3
Set Up the Planning Chart

Set up your chart as follows (use one chart per cell):

- **Record the year, the name of the grazing cell, and the season** (non-growing) at the top of chart. The non-growing season is defined as the period when most plants are dormant, although in many areas plants may green up or continue to grow very slowly.
- **Write in the names of the months** for which you are planning in the blank columns at the top of the chart. If you are planning for more than seven months, tape (or cut and paste) two charts together horizontally. Each month has fine lines that demarcate 31 days. If a specific month has less than 31 days, draw a line down the column through the extra day(s).

- Multiply the ADA (or SDA) figures in Column 5 by the acreage of each paddock to get the estimated animal days (ADs) or stock days (SDs) for each paddock. **Record these figures in Column 6.**

- Total the figures in Column 6 and **record the total animal days (ADs) or stock days (SDs) estimated in the cell in row A** at the bottom right of the chart.

- **Enter the *average season's days of non-growth* in row B**. Think hard about this figure and use all the past records you have to guide you.

- If you expect prolonged periods under heavy snow, or any other situation which would lead to bulk feeding of the animals when they are taking little if anything from the land, **record those days in row C.** Work out the bulk feed requirements for those days and **record the type and amount of feed under the appropriate month in row 24.**

Plan the Drought Reserve:

- **Enter the number of days you need to set aside as drought reserve in row D.** This figure reflects the number of days of grazing you plan to reserve in case the next growing season is a dry one. In some very arid and erratic rainfall areas, the drought reserve could include most of the year.

- **Add the figures in rows B and D and subtract the figure in row C (if entered).** The resulting figure is the total days of grazing required off the land. **Record this figure in row E.**

Assess Stocking Rate:

- Divide the animal days (or stock days) in row A by the figure in row E. This is your estimated carrying capacity—the number of animals the land can support without any additional bulk feeding. **Record this figure in row F.** If you worked in ADA, the carrying capacity figure will likely be higher than if you were working in SDA (which is based on standard animal units that factor in the physiological state of the animals). If you now want to work in standard animal units (SAU) to be more conservative, you can reduce the AD figure based on the number and type of animals you have. For example, if your estimated carrying capacity in ADs was 500, but you had large cows that needed a very high plane of nutrition, you might say that each cow represented 1.3 animal units. If you divide the 500 ADs by 1.3 you would find you only had enough forage to feed 385 cows.

- If the figure in row F is much lower than the number of animals you now have (based on actual numbers, or converted to standard animal units), you may want to reduce animals now. *If you have to reduce stock, the earlier you do it the less you have to reduce.*

The Non-Growing Season Plan

Step 1
Assess Forage Volume, Stocking Rate & Drought Reserve

Before you start to plan for the non-growing season, you need to make a preliminary assessment of the forage on hand, your stocking rate, length of the non-growing season (or length of time perennial grasses will remain dormant), and the time that needs to be reserved in case the next growing season arrives late (what we call a drought reserve). This assessment enables you to determine whether you have too many animals, or too little drought reserve *before* you start to plan, and will influence your plan considerably. You will need to record the results of your assessment on the Grazing Plan & Control Chart.

Note: If this is your first plan, and if you have a low stocking rate, and the likelihood of drought is slight, you can skip this step and move on to Step 2.

Assess Forage on Hand:

- Estimate in ADA (see *Definitions*) forage volume that will be available. You can get the ADA figures for each paddock in one of two ways:

  1. *Use the ADA (or SDA) figures from your previous non-growing season plan* (these figures will appear in column 8 on the previous plan). **Transfer these figures to column 1 on the new chart to the left of the slash.** (If you calculated SDA rather than ADA, use the SDA figures).

     Make adjustments up or down for each paddock based on how much better or worse you feel the production was in the growing season just experienced. **Record your estimate of the ADA (or SDA) you now have in column 5.**

  2. *If you have no past records to go by,* you can estimate ADA by taking field samples:

     In each paddock pace off several randomly chosen squares that could feed one animal for a day. Be pessimistic in your judgements about the area required. (It helps greatly if four people do the pacing and can stand at each corner while you judge whether the area *could* feed one animal for a day). Compute the area in square yards by multiplying the lengths of two sides of the square, then divide that number into the number of square yards in one acre (4,840). This will give you an estimated ADA. When you have done a few of these in each paddock, average the answers to get an estimated ADA yield for that paddock.

Record the estimated ADA figure for each paddock in column 5.

Step 16
Keeping the Record

The main purpose for recording what happens is to fine-tune your paddock assessments and management decisions for future planning.

- Record actual events *in ink* as the season progresses. **For every paddock, ink in a line on the chart that covers the number of days the herd actually spent there.**

- Behind or to the right of the actual grazing line, **record the volume of forage taken by the animals in ADA (or SDA)** and then follow this figure with your assessment of how heavy that grazing was. Use ***L*** for Light (you can hardly see the paddock was grazed), ***H*** for Heavy (you had to remove animals), and ***M*** for Medium (everything in between). Do not judge close to water, but well out in the paddocks. (Your record would look something like this: ------ *34/M* if you wanted to show the grazing occurred over the days marked, was 34 ADA (or SDA) and was a medium grazing in terms of total bulk.

- **Record precipitation received in rows 21 and 22.** The spaces between the heavier lines represent 5-day periods. You may want to note the exact day of major storms with a dot on a single line and a written comment in the "Remarks" section on the chart. Note your **average annual precipitation in row 37.** Record the **total precipitation received for the season in row 38.**

- **Put your opinion of daily growth rates in the same 5-day periods on Row 23** using **S** for Slow, **F** for Fast and **0** for No Growth.

- When you judge that the growing season has ended (and you are ready to move to your non-growing season plan) draw a green line down through all paddocks, and label it "Growth Ended."

- Add any comments on the chart that will help you do better in future planning—not on a piece of paper that can get lost, but on the back of the chart where you have plenty of space.

Remember that you have based paddock assessments either on ADA or SDA estimates, or actual performance in previous seasons (with adjustments). In brittle environments especially, errors are certain to occur in your estimates. *You will find that livestock at higher densities in smaller, more well-defined areas, are going to show up assessment faults better than you could have determined them by any other means.* Therefore, keep an open mind and make note of all errors that can affect next year's plan.

Factoring in Physiological State:

ADA calculations do not take into account the physiological state of the animals. If they did, you would generally find you had to reduce the size of the sample areas in your field checks—you would be more conservative in judging how much forage would be needed to feed one animal for one day. And you would know with more certainty whether you are overstocked. There are two ways to factor in the physiological state of the animals. The first is fairly simple and very quick. The second is more complicated and only slightly more accurate:

Pose the Question Differently:

Use the ADA figures to determine the size of the sample you need to pace out, just as you did above. However, this time rephrase the question you ask to take into account the physiological state of the animals. If the animals are dry, pregnant cows you would ask the same question as above, "Would this area feed one cow today?" If they are lactating cows, you would ask, "Would this area feed one cow *very comfortably* today? If lactating cows were about to be bred and you wanted them to be on a rising plane of nutrition, you would ask, "Would this area feed one cow *very comfortably and with forage to spare*? You get the idea.

Convert ADA to SDA:

1. List all classes of livestock in rows 29—33 on the grazing chart. Then, under each month record the number of animals in each class and their average weight.

2. Go to the tables in *Appendix C* (page 37-38) to find the percentage unit of each class of animal according to its weight and physiological state. Record the figure in the "% unit" column.

3. For each month, multiply the number of animals in each class by the percentage unit and note the answer in the "total units" column.

4. Total the resulting figure for each class to get the total number of SAUs for that month. Record this figure in row 34.

5. To determine the SDA to be taken in each grazing, use the following calculation:

$$\frac{\text{Total SAU x days in paddock}}{\text{Area of paddock (in acres)}} = \text{SDA}$$

6. Use the SDA figure, rather than the ADA figure to determine the size of the sample you need to pace out. Since this will generally be a smaller sample area than used with ADA figures, you merely ask yourself if the area would feed one animal for one day.

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