1.1 Spring Rotation Planner

(Refer to DairyNZ FarmFacts 1-12; 1-13a and 1-13b)

Introduction

Grazing management in the first two months after calving largely determines production to Christmas and how well fed the cows are at mating. The Spring Rotation Planner takes the guesswork out of grazing management over this critical period in the early spring and allocates the feed to ensure that the target cover at balance date is achieved.

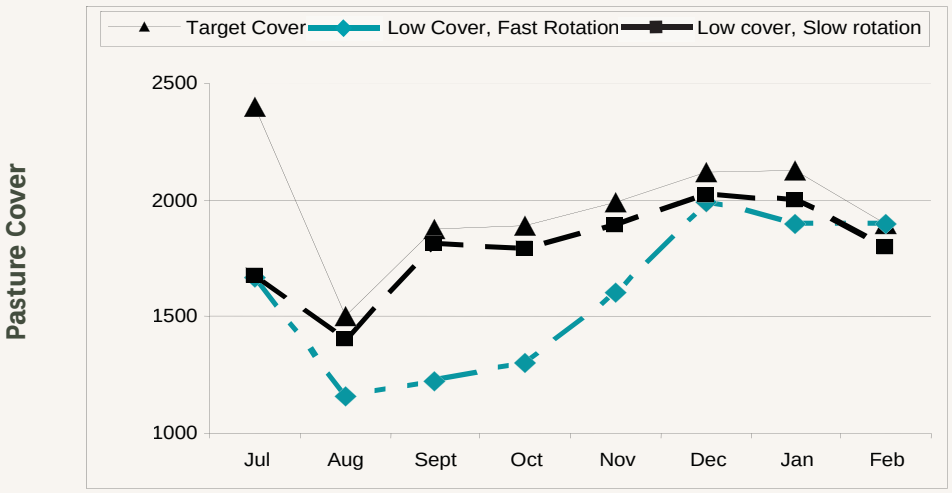
Key targets are APC at the start of calving and APC at balance date (when feed supply = demand).

APC at calving (and supplements available) determines how well fed the cows are for the first two months after calving. APC at balance date determines the quality and quantity of feed at mating. Use DairyNZ FarmFact 1-84 to calculate the APC at balance date.

Research trials on spring grazing management

In the early 1980s a trial at Dairy Research Corporation's No. 2 Dairy looked at the impact of starting with two levels of cover at calving and herds on either a slow or fast rotation after calving (*Figure 1*). The herd that started with low cover at calving but went slow had the same cover at balance date as the herd that started with enough grass at calving. This compares with the herd that started with a low cover at calving and was on a fast round after calving, with the feed cover on the farm not recovering until December. The low cover at calving herd that was on a fast round took a long time to recover as the farmlet did not grow as much grass, as growth rates were reduced due to the fast rotation. Pastures were grazed when there was only 1-2 leaves. *Figure 2* shows the effect in early spring of different rotation lengths that resulted in a range of pasture growth rates. The higher the APC, the higher the potential pasture growth up to 1800 kg DM/ha, due to the frequency of grazing.

Figure 1. Effect of speed of rotation on available feed (kg DM/ha)



Conclusion

It is essential not to speed up the rotation too quickly after calving. Aim to be on your fastest spring rotation at balance date when feed supply equals demand. If short of feed at calving this is even more important and the rotation after calving needs to be kept slow and either cow intakes restricted or supplement fed to make up the difference.

If the farm is on a fast rotation and plants are grazed before the third leaf emerges, resulting in APC dropping below 1800kg DM/ha, pasture growth rates will be reduced as shown in *Figure 2*. Grazing a paddock down to 1000 kg DM/ha does not reduce growth rates providing the paddock is not grazed again before the third leaf stage or pasture is not damaged in grazing to 1000 kg DM/ha i.e. frequency of grazing reduces pasture growth, not intensity of grazing or APC itself. This was demonstrated in a trial at DRC in the early 1990s with four treatments of grazing residuals in mid-July with the treatment that was grazed the hardest in July had the faster growth rate over 52 days and more pasture on the farm was harvested. The results are summarised in *Table 1*.

Therefore a slow rotation that keeps APC above 1800 kg DM/ha is important to maximise pasture growth in the spring.

Figure 2. Average farm cover in spring and the effect on pasture growth

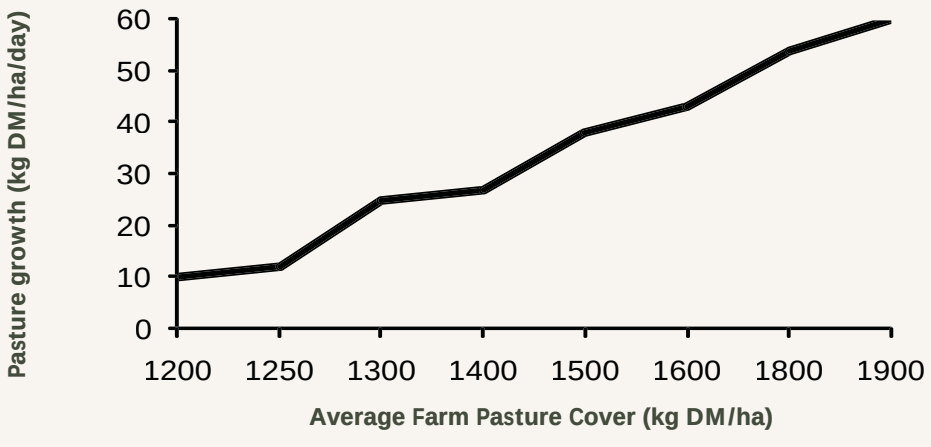


Table 1. Spring grazing trial - Ruakura 1990s

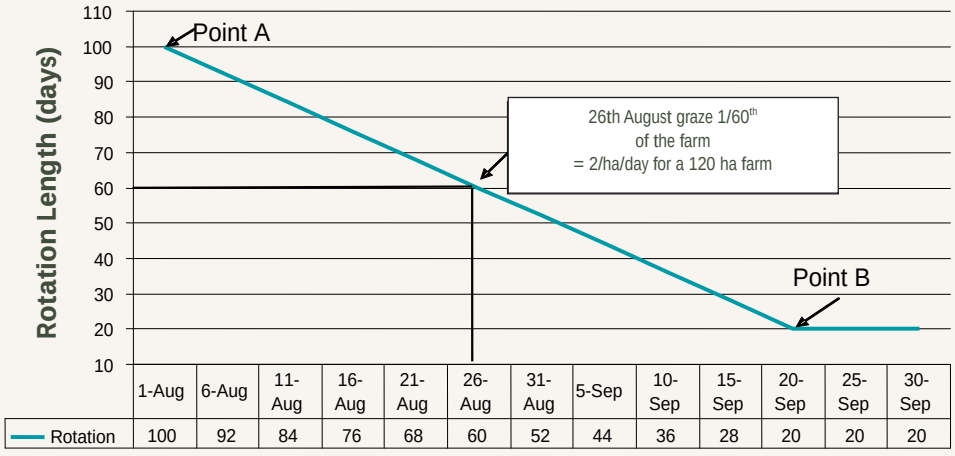
	Kg DM/ha			
Grazing residual at start of 52 day grazing interval	1773	1425	1155	864
Cover after 52 day grazing interval September	3264	3030	3000	2916
Grazing residual at start July	1773	1425	1155	864
Accumulated growth Kg DM/ha/day (52 days)	1491	1605	1845	2052
Average growth rate - Kg DM/ha/day	28.7	30.9	35.5	39.0

How does the Spring Rotation Planner (SRP) work?

The SRP allocates a set area per day (or per week) from when the MA cows calve to balance date, starting on a slow rotation and speeding up to the fastest rotation the farm is on in the spring (excluding when silage paddocks are harvested). The SRP is most effective when actual pasture cover is monitored against target and the rotation is sped up or slowed down to bring APC back on target.

To determine the rotation length from the planned start of calving to balance date, a line is simply drawn between the two points as shown in *Figure 3*.

Figure 3. Spring Rotation Planner



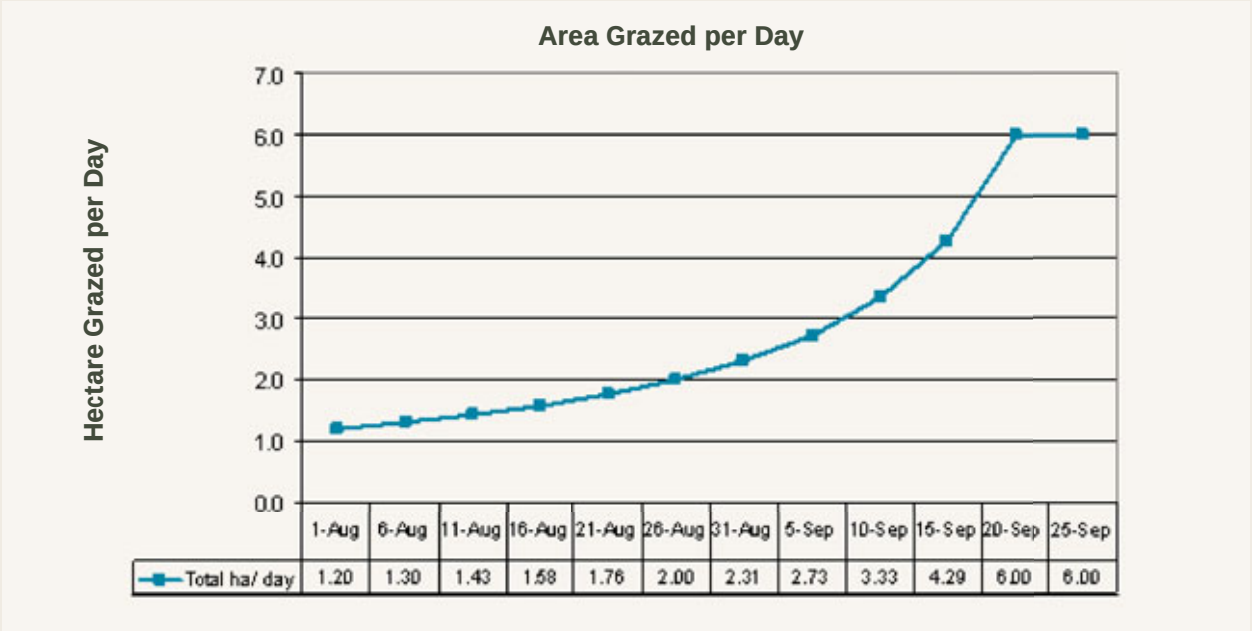
Converting rotation length to area grazed

The next step in using the SRP is to convert the rotation length per day into the area grazed per day or weekly.

From *Figure 3* (the SRP) the area grazed at certain points for a 120 ha farm can be calculated and plotted on a graph *(Figure 4)* or into a table (as per *Table 1* for the example farm) as follows:

Point A	=	120 ha farm / 100 day rotation
	=	1.2 ha grazed per day
1st September	=	120 ha farm / 50 day rotation
	=	2.4 ha grazed per day
Point B	=	120 ha farm / 20 day rotation
	=	6.0 ha grazed per day

Figure 4. Area grazed each day based on Figure 3 for a 120 ha farm



Time from planned start calving (PSC) to balance date

For pasture-based spring calving systems, the time from when the MA cows calve (PSC) to balance date is normally 50 to 60 days. However, on high stocked farms that calve early, this maybe as long as 70 days and a straight line may not be the best option (refer to exceptions below).

Area to include in SRP

The effective area that the milkers will graze at balance date needs to be included in the area, even where there are paddocks set aside for the springers/dry cows, as these will be grazed by the milkers on subsequent rotations.

Rotation length at start of SRP

The rotation length at the start of calving is normally 80–100 days. A slower rotation is required for:

1. High stocked farms that are predominately all grass in the spring
2. Farms where the period from PSC to balance date is greater than 55-60 days.

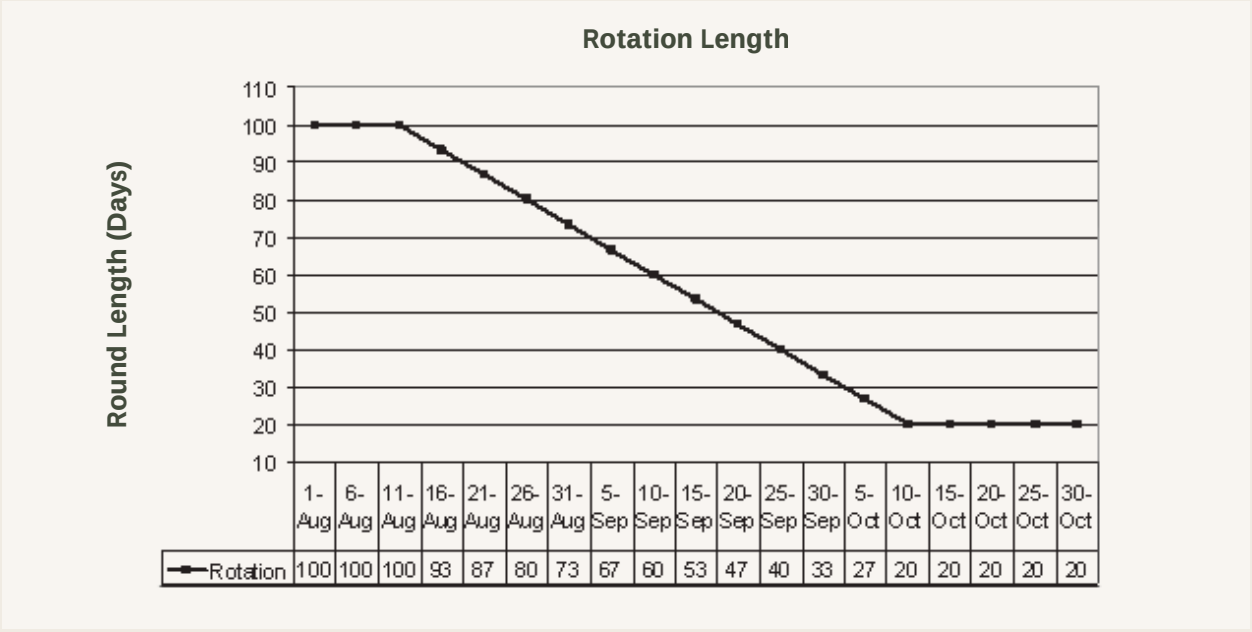
Rotation length at balance date

The rotation length at balance date is usually 20-25 days. Lower stocked farms or farms using high amounts of supplements may go as quickly as an 18 day round. Farms subject to very volatile growth rates (one week 80 kg DM/ha the next week 20 kg DM/ha) tend to have a slower rotation (23-25 days) at balance date as do high stocked farms. A longer rotation reduces the risk of not having enough feed due to a period of slower growth. However for farms that are not highly stocked, a long rotation after balance date resulting in high pre-grazing covers (> 3000 kg DM/ha) will reduce the quality of the feed offered and to get cows to graze to 1500 kg DM/ha (7 clicks), cow intake will be compromised. This is not a concern for high stocked farms.

Exceptions to drawing a straight line from PSC to balance date

There are some situations where a straight line from PSC to balance date is not the best fit. Generally this is when the time is greater than 60 days from the PSC to balance date. For example where dry cows are grazed off the farm for the first two to three weeks of calving and are bought back as they calve and the time from PSC to balance date is 60 days plus. In this situation a straight line should be drawn for the first seven-10 days of the rotation graph. *Figure 5* shows how this works for a farm stocked at 4.0 cows/ha with a PSC of 1 August and balance date is 71 days later, 10 October.

Figure 5. SRP for a farm with 71 days from PSC to balance date stocked at 4.0 cows/ha



How to get a SRP for your farm

1. Download FarmFact 1-12, 1-13a,1-13b on the SRP and 1-84 Cover at balance date from the DairyNZ website and use the graphs or,

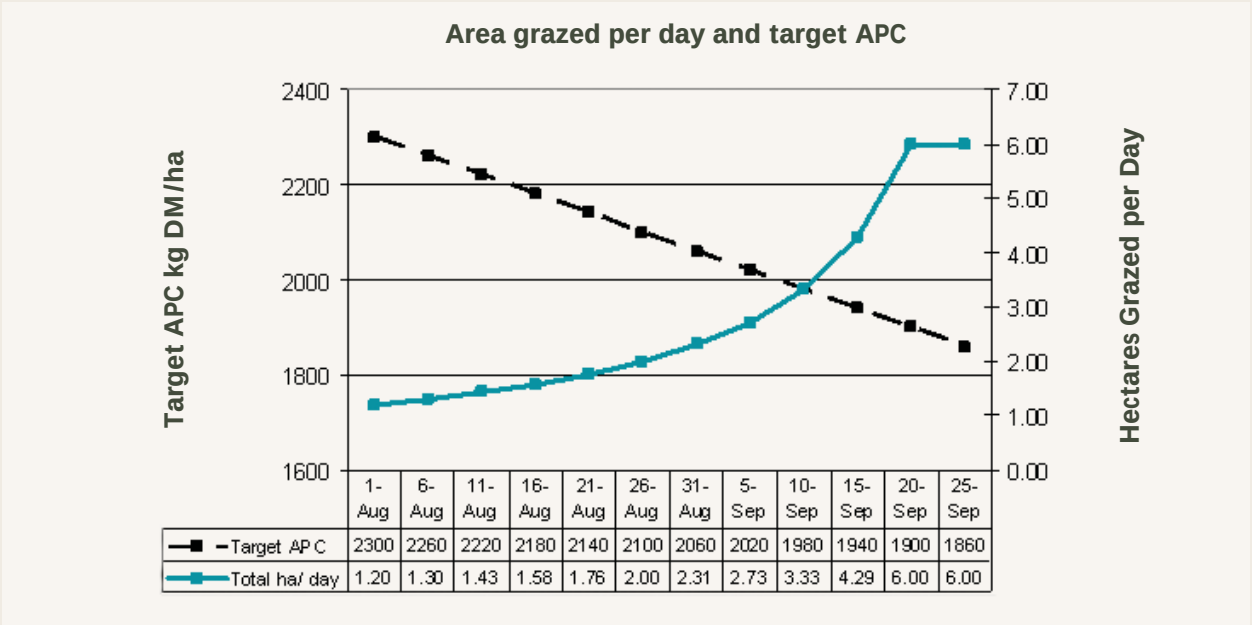
2. Use the Spring Rotation Planner calculator (either the web-based calculator or download the Excel spreadsheet). These can be found in the Production and Feeding Tools section of the website under Pasture Management.

Monitoring target cover and using the Spring Rotation Planner

To get the best value out of the SRP, actual APC needs to be monitored against target APC. This requires having target APC from calving to balance date and walking the farm every week to fortnight in the spring.

The target feed covers can be determined by a feed budget or by simply drawing a straight line from the APC target at calving to the APC at balance date. Use FarmFact 1-84 to calculate cover at balance date. *Figure 6* shows the APC target for the example farm and the hectares per day.

Figure 6. Example farm average pasture cover targets and area grazed per day



Regular monitoring is required (ideally daily or at least twice weekly) of the actual area grazed to date from the PSC. This total can then be tracked against the target area to be grazed to date as calculated from the SRP (see *Table 1* for an example of this). If early in the spring, less area is used than is allocated, the saved area can be used later in the spring as more cows calve.

Average pasture cover below target

If the actual APC on the farm is below the target then the quickest way to get back on track is to hold the rotation length and not speed up, as per the rotation planner until APC is back on target. When this is achieved the area allocated daily is as per the SRP for the current date.

Using *Figure 6* as an example, if actual APC on the 11 August is only 2100 kg DM/ha (compared to target of 2220 kg DM/ha) then the round length needs to be held at 84 days (*Figure 3*) and only 1.43 ha grazed per day (*Figures 4,6*) until the APC is back on line. If by 26 August the APC is 2125 kg DM/ha the area allocation goes back to the original plan of a 60 day rotation (*Figure 3*), grazing 2.0 ha per day (*Figure 3, 4, 6*).

Refer to Section 2.0 Strategies to manage low pasture cover at calving for more information on using the SRP when cover is below target.

Average pasture cover above the target

Should cover be above target, the area can be increased i.e. rotation sped up providing that cows are still grazing to a consistent even residual (refer FarmFact 1-2, Principles of Grazing Management). Where target grazing residuals are not being achieved it may be necessary to take a light crop of silage to restore APC back to target. The quality of silage made in early spring may not be ideal but it is more important to maintain pasture quality. Where paddocks are shut up for long periods in early spring the quality of the silage is often poor and there can be long term damage to the paddock by opening up the sward. Therefore the best option may be to take an early, light crop of silage and restore the APC to target, thereby maintaining pasture quality and maximising pasture growth rates.

Using the Spring Rotation Planner – how to allocate feed

Once you have your target of area grazed per day, management can be simplified by averaging out the area to be grazed every 4–7 days rather than working on a daily target.

Method 1 :
APC on target – milkers get the area left after feeding the dry cows

To use the following method the actual average pasture cover (APC) needs to be as per the target APC and assumes that the target cover has been calculated correctly i.e. there will be sufficient pasture for all mobs of stock. Where this is the position, the area allocated for the dry cows/springers and colostrum cows can be allocated first, based on a set square metres per cow with the milkers getting the balance of the area as per the SRP.

To simplify the exercise of allocating area to various mobs, the area for the dry cows and colostrum cows can be worked out at the start of calving on an allocation of square metres per cow based on the average pasture cover that the dry cows and colostrum cows are likely to graze. This can be calculated during the spring if the pre-grazing covers alter markedly from the original calculations.

For example where the dry cows are being offered 3800 kg DM/ha grazing down to 1200 kg DM/ha, they are being offered 8 kg DM/cow from pasture and 2 kg DM/cow from hay. The area offered per dry cow is 31 m² calculated as follows:

Pre-grazing cover		3800 kg DM/ha
Less residual		1200 kg DM/ha
Available feed	=	2600 kg DM/ha

2600 kgDM/ha ÷ by dry cow intake 8 kg DM/cow	=	325 cows/ha
10,000 m²/ha ÷ 325 cows	=	31 m²/dry cow

The same exercise can be done for the colostrum cows. For example if the colostrum cows are offered 3500 kg DM/ha grazing down to 1500 kg DM/ha, being offered 11 kg DM/cow from pasture and the area offered per colostrum cow is 55 m² calculated as follows:

Pre-grazing cover		3500 kg DM/ha
Less residual		1500 kg DM/ha
Available feed	=	2000 kg DM/ha

2000 kgDM/ha ÷ by colostrum cow intake 11 kg DM/cow	=	182 cows/ha
10,000 m²/ha ÷ 182 cows	=	55 m²/colostrum cow

The allocation to the milkers is then easily calculated. The milkers get the balance of the area after feeding the dry cows and colostrum cows. For the farm example in *Figure 1*, on 6 August the area and intake for the milkers is calculated as follows:

11 August

Area allocation	(as per Figure 4,6)	=	1.43 ha
Dry cows	234 dry cows at 31 m²/cow	-	0.72 ha
Colostrum cows	36 dry cows at 55 m²/cow	-	0.20 ha
Area for milkers	90 milkers	=	0.51 ha

Milkers

Pre-grazing cover		3500 kg DM/ha
Less residual		1450 kg DM/ha
Available feed	=	2050 kg DM/ha
Allocation for 36 cows	=	2050 x 0.51 ha
	=	1107 kg DM
Allocation per cow	=	1107 ÷ 90 milkers
	=	12.3 kg DM/cow

As these cows have only been calved for two weeks at the most, an intake of 12.3 kg DM/cow/day will be sufficient. The check on the farm is to observe residuals and when the cows reach the target grazing residual. If the milkers have grazed lower than 1400 kg DM/ha (6 clicks on the platemeter) or have cleaned out their break within two hours, they have been underfed and supplementation is an option, if profitable (refer Sections 1.3 and 1.4 for more information on feeding supplements).

Use the form below to do the above calculations or go and use the spring feed allocation calculator on the DairyNZ website www.dairynz.co.nz.

Method 2:
Where average pasture cover is below target (insufficient pasture for the milkers)

If average pasture cover is below target or there is insufficient feed for the milkers there are two options:

1. Supplement can be fed to the milkers to achieve a consistent, even grazing residual. In early spring (this is 7 clicks on the rising platemeter for ryegrass/clover pastures or 1400-1500 kg DM/ha using the formula "clicks" x 140 +500)

2. Dry cow intake is reduced to allow more feed to be allocated to the milkers.

Ideally, option 2 should not occur (except where there are unexpected weather events that result in pasture being below target or where previous management has not set the farm up well for spring). DairyNZ does not encourage systems that consistently need to underfeed cows as the target cover at calving is not achieved. However, should pasture cover be below target then the damage must be minimised by recognising and prioritising the most vulnerable stock.

Where option 2 has to be taken then the allocation order needs to be reversed with the **order of importance** being:

1. Colostrum cows
2. Milking cows
3. Springers
4. Dry cows.

The longer the period of underfeeding, the greater the loss in milk production.

The aim is to feed the colostrum cows and milkers 12 kg DM/cow Friesians and 10 kg DM/cow for Jerseys grazing to 1450 kg DM/ha. However, when the farm does not have the resources to feed to these levels the milkers can graze lower. Milkers must be offered a minimum of 10 kg DM/cow Friesians and 8 kg DM/cow Jerseys. These feeding levels will reduce subsequent milk production. The extent of the carry over effect on milk production from underfeeding depends on the length of time cows are restricted. The longer the period of underfeeding, the greater the loss.

The dry cows and springers then get the balance of area. However, these stock must be fed at least 5.0 kg DM/cow. Where the minimum feeding levels given above cannot be met, supplement must be purchased or stocking rate reduced. Refer Section 2.0 and FarmFact 1-36 for more information on strategies to manage a low pasture cover at calving.

Use the form overleaf to do the above calculations or use the spring feed allocation calculator which can be found at www.dairynz.co.nz.

Calculate area for dry cows/springers, colostrum and milkers.

Area for dry cows and springers

Pre-grazing Cover	A	A
Less Residual	B	B
Available Feed/ha	A - B = C	C
Dry Cow Intake kg DM/cow/day	D	D
Dry Cows/ha	C ÷ D = E	E
m²/Dry Cow	10000 ÷ E = F	F

Area for colostrum cows

Pre-grazing Cover	G	G
Less: Residual	H	H
Available Feed/ha	G - H = I	I
Colostrum Intake kg DM/cow/d	J	J
Dry Cows/ha	I ÷ J = K	K
m²/Dry Colostrum Cow	10000 ÷ K = L	L

Calculate area for dry cows (springers), colostrum and milkers

Area Allocated from the SRP				M
	No Head	m²/cow		
Dry Cows	N	F	N x F ÷ 10000 = O	O
Colostrums	P	L	P x L ÷ 10000 = Q	Q
Area for Milkers			M - O - Q = R	R

Intake of milkers

Pre-grazing Cover	S	S
Less: Residual	T	T
Available Feed/ha	S - T = U	U
Total Available Feed	R x U = V	V
No. of Milkers	W	W
Intake of Milkers kg DM/cow/day	V ÷ W = X	X