



# Body Condition at Calving Tool

## What is this tool?

This is a **gap calculator** tool. It measures the difference between the herd’s actual and desired body condition (BCS) profile at calving and assesses the likely impact of this difference on herd reproductive performance and milksolids production.

## Why use this tool?

Even when ‘best-practice’ policies are followed, cows that calve at BCS 4.0 have reduced reproductive performance and produce less milksolids than those calving at BCS 5.0. Excessively fat cows at calving (above BCS 6.0) are prone to metabolic diseases. This tool will enable you to monitor how successful you are at achieving calving BCS targets (heifers 5.5, cows 5.0).

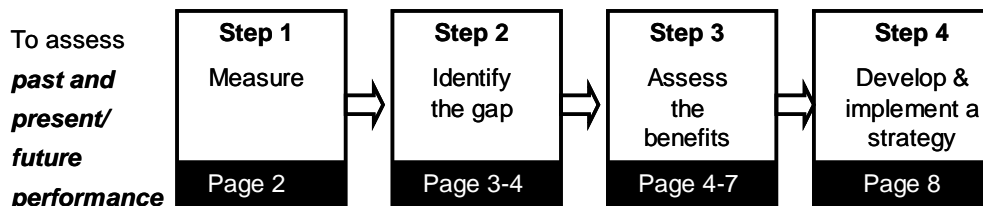
For more information, see *The InCalf Book*, Chapter 9: “Body condition and nutrition” and the *Condition Scoring Made Easy* booklet.




See pages 55-76

## How to use this tool

Work through this tool’s four basic steps:



When you see this symbol  you need to fill in some information or do some calculations before continuing.

**Proceed to page 2** 

## Step 1) Measure

### **How many cows and when?**

The minimum is to condition score 70 cows randomly at four critical times: 1) end of mating; 2) in late lactation (3-4 months before the Planned Start of Calving (PSC) date); 3) just before PSC; and, 4) two weeks before the Planned Start of Mating (PSM) date.



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### **What to do?**

Use the 'hands on' method initially to calibrate the eye so that quick visual assessments can be made in the paddock or dairy shed. Refer to the simple procedures explained on pages 8-9 and 34-35 of the "Condition Scoring Made Easy" booklet.



See pages 8-9 and 34-35

Use the InCalf BCS Recording Sheet (page 9 of this tool) to score 70 cows using the 'picket-fence' scoring method. The 'picket-fence' scoring method as shown on page 35 of the "Condition Scoring Made Easy" booklet is recommended.

### **During the last 2-3 weeks before calving starts calculate:**



- (A).....% are too thin** Add up the total number of cows with BCS below 5.0. Divide this by the total number of cows assessed (x 100 %).
- (B).....% are too fat** Add up the total number of cows with BCS above 5.5. Divide this by the total number of cows assessed (x 100 %).
- (C) Average BCS .....** Write down the number of cows in each BCS category. Multiply this number of cows by the BCS (eg. 24 cows at BCS 4.5 = 108). Add all these values together and divide by the total number of cows assessed. The result is average BCS.

## Step 2) Identify the gap

Once you have measured the BCS of your herd using the method described in Step 1) the risk to herd reproductive performance and milk production associated with your herd's BCS profile at calving can be estimated.



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The key figures are the percentage of cows calving below 5.0 and the percentage of cows calving above 5.5. The gap to be calculated will depend on these percentages rather than the average BCS of the herd. (See *The InCalf Book*, page 60)

### Part 1: Carry over the results of your measurement from Step 1

% cows below BCS 5.0 .....% (A)

% cows above BCS 5.5 .....% (B)

Average BCS ..... (C)

### Part 2: Assess the risks associated with your herd's BCS profile at calving

**Assess the risk associated with too many thin cows (BCS below 5.0) just before calving:**

% cows below 5.0 (A)	Risk assessment	What you should do
Less than 5%	<b>Low:</b> It is likely that few cows in the herd are too thin.	No action is required at this stage.
5–15%	<b>Moderate:</b> The % of cows in the herd that are too thin is approaching a critical level. There is a moderate chance of losses in milk production and reproductive performance.	Action is recommended to increase body condition.
More than 15%	<b>High:</b> A substantial number of cows in the herd are too thin. There is a high chance of losses in milk production and reproductive performance.	Action is needed to increase body condition to prevent substantial losses in milk production and reproductive performance.

Risk level: Low / Moderate / High (circle identified level) 

**Too many fat cows (BCS above 5.5) just before calving may also be a concern:**

% cows above 5.5 (B)	Risk assessment	What you should do
Less than 5%	<b>Low:</b> It is likely that few cows in the herd are too fat.	No action is required at this stage.
5–15%	<b>Moderate:</b> The % of cows in the herd that are too fat is approaching a critical level. There is a moderate chance of reduced reproductive performance.	Review dry-cow feeding management (pages 66-68 of <i>The InCalf Book</i> ). Seek professional advice to assess whether gains in milk production from high BCS at calving are greater than costs associated with reduced reproductive performance.
More than 15%	<b>High:</b> A substantial number of cows in the herd are too fat. There is a high chance of reduced reproductive performance.	

Risk level: Low / Moderate / High (circle identified level) 

### Part 3: Calculate the gap

Consider your herd's actual BCS profile at calving and a more desirable BCS profile that you would aim to achieve at calving (i.e. reduced % of the herd below 5.0 and above 5.5 at calving toward or into the InCalf target zone: no more than 15% of cows below 5.0; and no more than 15% of cows above 5.5.). Complete this table to calculate your gaps in % of the herd below 5.0 and above 5.5.

<b>BCS at calving</b>	<b>Actual</b>		<b>Desired</b>		<b>Gap</b>
% below 5.0	.....% (A)	–	.....% (D)	=	.....% (F) 
% above 5.5	.....% (B)	–	.....% (E)	=	.....% (G)

### Step 3) Assess the benefits

#### Part 1: Estimate the likely effect of closing the gaps on herd reproductive performance

##### A) Effect of calving condition profile on 6-week in-calf rate

- Circle the square in the chart below that corresponds to your actual BCS profile, i.e. (A) and (B). The number in this circle is the expected % decrease in 6-week compared to a herd where all heifers calved at BCS 5.5 and all cows calved at BCS 5.0.
- Then, circle the square in the chart below that corresponds to the desired BCS profile, i.e. (D) and (E).

(See example over page if required)

		% of cows above 5.5																				
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
% cows below 5.0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1
	10	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2
	15	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3
	20	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3
	25	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
	30	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
	35	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
	40	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4
	45	-3	-3	-3	-3	-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	50	-3	-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	55	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	60	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	65	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	70	-4	-4	-4	-4	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
	75	-4	-4	-4	-4	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
80	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	
85	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	
90	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	
95	-5	-5	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	
100	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	

- Use Table 1 below to compare the two circled figures and calculate the difference. This difference is the potential improvement in your herd's 6-week in-calf rate.

**Table 1: Potential improvement in your herd's 6-week in-calf rate**

	6-week in-calf rate figure
Your herd's actual BCS profile (A and B)	.....%
Desired profile (D and E)	.....%
Difference (your potential improvement in 6-week in-calf rate)	.....% <b>(H)</b>

**For example:**

Let's assume that you actually have 55% of cows in the herd below 5.0 and 20% above 5.5. The current impact on 6-week is -4% (See circled '-4%' box in the chart below) What would be the improvement in 6-week in-calf rate if you achieved a more desirable profile with 15% of cows in the herd below 5.0 and 15% above 5.5?

Note: InCalf recommends no more than 15% of cows below 5.0 and no more than 15% above 5.5.

BCS at calving	Actual		Desired	=	Gap
% below 5.0	...55...% (A)	–	...15....% (D)	=	...40...% (F)
% above 5.5	...20...% (B)	–	...15....% (E)	=	...5...% (G)

Applying these figures to the chart, the two squares circled are:

		% of cows above 5.5																					
		0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	
% cows below 5.0	0	0	0	0	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	
	5	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	
	10	-1	-1	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	
	15	-1	-1	-1	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	
	20	-1	-1	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	
	25	-2	-2	-2	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
	30	-2	-2	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	
	35	-2	-2	-2	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3
	40	-2	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	45	-3	-3	-3	-3	-3	-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	50	-3	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	55	-3	-3	-3	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	60	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	65	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
	70	-4	-4	-4	-4	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
	75	-4	-4	-4	-4	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5
80	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	
85	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	
90	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	-5	
95	-5	-5	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	
100	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	-6	

The difference is therefore between -4% and -1%, i.e. 3%, so in this case the herd's potential improvement in 6-week in-calf rate is 3%.

### B) Effect of calving condition profile on not-in-calf rate

Studies show that any reductions in the 6-week in-calf rate due to cows calving below BCS 5 is associated with 1% increase in not-in-calf rate for every 2.5% reduction in the 6-week in-calf rate. The impact of your condition score profile at calving on not-in-calf rate can be estimated by completing the following:



Calculated difference in 6-week in-calf rate		Estimated increase in not-in-calf rate
(H) .....%	X 0.4 =	.....% (I)

### Part 2: Estimate the likely effect of closing the gaps on milk production

Achieving increased body condition at calving affects milk production as well as fertility. Milk production must therefore be considered in assessing the benefit of improved body condition.

The net effect of your herd's condition score profile at calving is calculated by subtracting additional milksolids from cows greater than BCS 5.5 from those that calve less than BCS 5.0. Complete Table 2 below to estimate the effect on milk income from closing the body condition score gaps, relative to cows calving in optimal body condition (5.0–5.5) for reproductive performance.



**Table 2: Change in milksolids when the BCS at calving gaps are closed.**

BCS at calving gap	Gap (from page 4)		Change in milksolids
% less than 5.0	(F) ..... %	X 15 ÷ 100 =	..... kg MS (J)
		(kg MS)	
% above 5.5	(G) ..... %	X 4 ÷ 100 =	..... kg MS (K)
		(kg MS)	
Change in kg MS per 1 % of herd		J – K =	..... kg MS (L)

**(I)** Fatter cows (BCS above 5.5) lose more than 1.0 BCS condition after calving, as compared to cows that calve at BCS 5.5 or less. This extra condition is converted to more milksolids. On the other hand, thinner cows (BCS below 5.0) have limited body condition available to convert to milksolids in early lactation. New Zealand research shows that the extra milksolids production from each incremental BCS unit at calving increases from 4 kg MS between BCS 5.0 – 6.0, 15 kg MS between BCS 4.0 – 5.0 and 18 kg MS between BCS 3.0 – 4.0.

**Part 3: Determine the likely economic benefits of improved herd reproductive performance from closing the gaps**

Use Table 3 below to estimate the likely economic benefits of improving the herd's body condition profile at calving.

**Table 3: What are the likely annual economic benefits of closing the calving condition score gaps?**

**1. What is closing your 6-week in-calf rate 'gap' worth?**

Gap (H)..... X \*\$4 X ..... cows in herd = \$ ..... (M)

\* This economic multiplier was estimated through modeling assuming a \$5.50 per Kg MS payout. The financial consequences of empty cows were excluded from this estimate.

**2. What is closing your not-in-calf rate 'gap' worth?**

Gap (I)..... X \*\*\$10 X ..... cows in herd = \$ ..... (N)

\*\* This economic multiplier assumes a \$1000 value differential between an empty and in-calf cow.

**3. What is closing your milksolids 'gap' worth?**

Gap (L) ..... X \$..... per kg MS X ..... cows in herd = \$ ..... (O)

**4. What is closing the calving condition profile gap worth overall?**

**Total operating profit (M) + (N) + (O) = \$ ..... per year**

## Step 4) Develop & implement a strategy

Work closely with your adviser to develop your own personal farm strategy to achieve these benefits.

### **Key issues to consider:**

Response to strategies implemented to improve body condition depend on variables such as:

- Current lactation status both in Days in Milk (DIM) and current level of milk production. These will influence how much of the additional dietary energy inputs above maintenance the cow partitions into more milk vs. body condition.
- The feeds available to be fed. Different feeds can result in different responses to energy input.
- Availability of feed may limit the level of energy that can be supplied to the cow efficiently.
- Composition of both individual feeds and rations. Response to feeding will be significantly affected by the way different feeds are fed in a full ration and in a production system.
- Whether the nutrition programme is applied to the whole herd or just the thin cows in the herd (via physically separating the thin cows or by using an electronically controlled individual cow feeding system).

Professional advice is recommended.



For information on how to achieve body condition targets through the lactation and dry periods, see *The InCalf Book*, pages 64-69.



For information on using quick nutrition checks that may alert you to nutritional problems in your herd, see *The InCalf Book*, pages 70-75.

*No warranty of accuracy or reliability of the information provided by this InCalf Herd Assessment Pack tool is given, and no responsibility for loss arising in any way from or in connection with its use is accepted by DairyNZ or Dairy Australia. Users should obtain specific professional advice for their specific circumstances.*

*Regularly check the InCalf web site ([www.dairynz.co.nz/incalf](http://www.dairynz.co.nz/incalf)) for updated versions of any of the InCalf Herd Assessment Pack tools.*





# (Pre-calving) Body Condition Score Recording Sheet

**Cow/heifer group:**.....

**Date:**.....

Score each cow with one mark in the relevant tally box using the 'picket fence' system.

Once all the cows have been scored, enter the tally total in the column to the right of the tally box.

Multiply the tally total by the Condition Score for the group. Then follow the instructions below.

Body Condition Score	Tally box Use the III system to record each cow	Tally total	Multiply BCS by tally for each group
2.5			X 2.5 =
3			X 3 =
3.5			X 3.5 =
4			X 4 =
4.5			X 4.5 =
Number of cows below 5.0: .....			
Divide by total number of cows to give <b>% of cows below 5.0 =</b> .....		<b>% (A)</b>	
5			X 5 =
5.5			X 5.5 =
6			X 6 =
6.5+			X 6.5 =
Number of cows above 5.5: .....			
Divide by total number of cows to give <b>% of cows above 5.5 =</b> .....		<b>% (B)</b>	

1. Add the totals of the multiples for each separate condition score: .....
2. Add the 'tally totals' up to record the total number of cows: .....
3. Divide totals of multiples by total no. of cows = Average BCS ..... **(C)**
4. Now refer to the Step 2) of this BCS tool to identify the gap in your herd's body condition profile at calving, using the figures for % below 5.0 (A) and % above 5.5 (B). Average condition score (C) will be used in the 'Body condition loss in early lactation tool'.