New Zealand Dairy Statistics 2016-17

LIC DairyNZ

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1. Introduction

The purpose of New Zealand Dairy Statistics is to provide statistical information related to the New Zealand Dairy Industry. Funding is provided by Livestock Improvement Corporation (LIC) and DairyNZ Incorporated (dairy farmer levy). Contributors include New Zealand Animal Evaluation Limited.

Data are sourced from the LIC Herd Improvement Database, New Zealand dairy companies, Animal Evaluation database, TB Free New Zealand, Real Estate Institute of New Zealand, and Statistics New Zealand.

New Zealand Dairy Statistics 2016/17 is a report that shows historical information up to and including the 2016/17 season. Data for seasons prior to 2006/07 were released under *Dairy Statistics* from 1998/99 to 2005/06, *Annual Report (Livestock Improvement Division)* in 1987/88, *Livestock Improvement Report* from 1984/85 to 1986/87, and *New Zealand Dairy Board Farm Production Report* up to 1983/84.

Prior to 1991/92 the information for the *Dairy Statistics* publication was obtained primarily from the analysis of the New Zealand Dairy Industry Cow Census (an annual survey of all dairy farmers).

As of March 2002, LIC became a user-owned co-operative, with responsibility for farm production activities and, in particular, dairy herd improvement and herd records.

LIC's activities can broadly be described as genetics, information and advice. Services provided to farmers include farm management information, automation technologies, herd testing and artificial breeding services, DNA analysis, a farm advisory service, research to improve farm profitability, statistical information related to the New Zealand dairy industry, and herd recording on the LIC Database. For more information, visit **www.lic.co.nz.**

DairyNZ is the industry organisation representing New Zealand's dairy farmers, funded by farmers through a levy on milksolids. DairyNZ's purpose is to secure and enhance the profitability, sustainability and competitiveness of New Zealand dairy farming. For more information, visit **www.dairynz.co.nz.**

2. National dairy statistics

A. Industry statistics

i) Production

- *Milksolids processed eases*

In 2016/17, dairy companies processed 20.7 billion litres of milk containing 1.85 billion kilograms of milksolids (Table 2.1). Total milksolids processed decreased by 0.6% from the 1.86 billion kilograms processed in the previous season. The milksolids production in 2016/17 was 41 per cent higher than 2006/07.

Table 2.1: Summary of milk production statistics for the last 35 seasons

Season	Milk processed (million litres)	Milkfat processed (million kgs)	Protein processed (million kgs)	Milksolids processed (million kgs)
1982/83	6,096	290	214	505
1983/84	6,733	324	239	564
1984/85	6,965	332	245	578
1985/86	7,326	350	257	609
1986/87	6,385	301	222	524
1987/88	6,921	333	245	579
1988/89	6,533	311	237	541
1989/90	6,868	330	242	572
1990/91	7,077	343	254	599
1991/92	7,454	365	270	637
1992/93	7,629	373	277	651
1993/94	8,603	423	313	736
1994/95	8,633	422	311	733
1995/96	9,325	452	335	788
1996/97	10,339	506	375	880
1997/98	10,651	513	378	891
1998/99	10,563	503	377	880
1999/00	11,630	560	421	981
2000/01	12,925	626	470	1,096
2001/02	13,607	657	495	1,152
2002/03	13,906	676	515	1,191
2003/04	14,599	716	538	1,254
2004/05	14,103	694	519	1,213
2005/06	14,702	724	543	1,267
2006/07	15,134	750	566	1,316
2007/08	14,745	722	548	1,270
2008/09	16,044	791	602	1,393
2009/10	16,483	817	622	1,438
2010/11	17,339	859	654	1,513
2011/12	19,129	954	731	1,685
2012/13	18,883	939	719	1,658
2013/14	20,657	1,034	791	1,825
2014/15	21,253	1,067	823	1,890
2015/16	20,914	1,050	812	1,862
2016/17	20,702	1,042	809	1,851

Note: *Prior to 1998/99, Table 2.1 consisted of milk production statistics that were processed into export products (i.e., town milk supply was excluded). These statistics on milk, milkfat, protein and milksolids processed were provided by the New Zealand Dairy Board and are no longer available. Consequently, totals from 1998/99 include all milk processed by New Zealand dairy companies, including milk for the domestic market.*

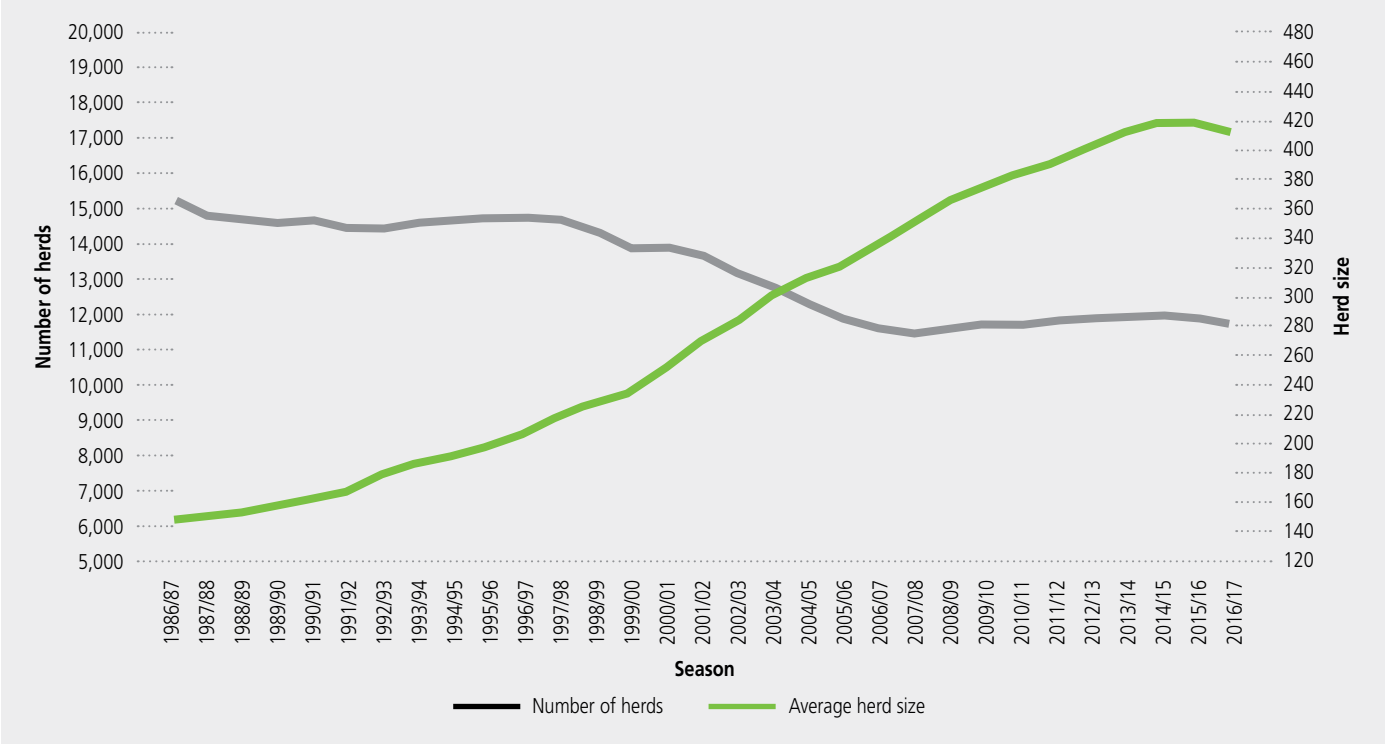
ii) Population

- *Another small decrease in the number of herds*
- *Fewer cows than the last two seasons*

Between 1997-98 and 2007-08 total herd numbers declined at an average rate of about 300 herds per season (Graph 2.1), before levelling off. The total number of herds in the 2016/17 season decreased by 170 to 11,748. This was the second year of easing herd numbers after seven consecutive seasons of small increases.

The average herd size was 414 in 2016/17, which was five cows lower than the previous two seasons. The average herd size has almost tripled in the last 30 seasons, and has increased by almost 200 cows in the last 20 seasons. Expansion of the dairy herd in the South Island has contributed to the increase in average herd sizes.

Graph 2.1: Trend in the number of herds and average herd size for the last 30 seasons



The total cow population in the 2016/17 season was 4.86 million (Table 2.2), a decrease of 2.7% from the previous season. This reflected difficult spring conditions and two years of high cull numbers following low milk prices. Average farm size remained steady at 147 effective hectares. A stocking rate of 2.81 cows per hectare was lower than previous seasons. Total effective hectares (milking platform with support block excluded) were 1.73 million – a decrease of about 23,000 ha on the previous season.

Table 2.2: Summary of herd statistics since 1975/76

Season	Herds	Total cows	Total effective hectares[a]	Average herd size	Average effective hectares[b]	Average cows per hectare[b]
1975/76	18,442	2,091,950	-	113	-	-
1980/81	16,089	2,027,096	-	126	-	-
1985/86	15,753	2,321,012	1,008,192	147	64	2.30
1990/91	14,685	2,402,145	1,023,545	164	70	2.35
1991/92	14,452	2,438,641	-	169	-	-
1992/93	14,458	2,603,049	1,069,892	180	74	2.43
1993/94	14,597	2,736,452	1,122,509	188	77	2.44
1994/95	14,649	2,830,977	1,175,940	193	80	2.41
1995/96	14,736	2,935,759	1,208,352	199	82	2.43
1996/97	14,741	3,064,523	1,267,726	208	86	2.42
1997/98	14,673	3,222,591	1,276,551	220	87	2.52
1998/99	14,362	3,289,319	1,306,942	229	91	2.52
1999/00	13,861	3,269,362	1,292,566	236	93	2.53
2000/01	13,892	3,485,883	1,329,173	251	96	2.62
2001/02	13,649	3,692,703	1,404,930	271	103	2.63
2002/03	13,140	3,740,637	1,463,281	285	111	2.56
2003/04	12,751	3,851,302	1,421,147	302	111	2.71
2004/05	12,271	3,867,659	1,411,594	315	115	2.74
2005/06	11,883	3,832,145	1,398,966	322	118	2.74
2006/07	11,630	3,916,812	1,412,925	337	121	2.77
2007/08	11,436	4,012,867	1,436,549	351	126	2.79
2008/09	11,618	4,252,881	1,519,117	366	131	2.80
2009/10	11,691	4,396,675	1,563,495	376	134	2.81
2010/11	11,735	4,528,736	1,638,706	386	140	2.76
2011/12	11,798	4,634,226	1,638,546	393	139	2.83
2012/13	11,891	4,784,250	1,677,395	402	141	2.85
2013/14	11,927	4,922,806	1,716,464	413	144	2.87
2014/15	11,970	5,018,333	1,746,156	419	146	2.87
2015/16	11,918	4,997,811	1,751,704	419	147	2.85
2016/17	11,748	4,861,324	1,728,702	414	147	2.81

- Not available

[a] Total effective hectares between 1981/82 and 1999/00 are estimates.

[b] Average effective hectares and average cows per hectare for 1981/82 to 1990/91 are based on factory supply herds only.

Note: The number of cows used to calculate the average herd size since 1992/93 includes all cows lactating in that season, whereas in earlier years the number of cows used to produce the average herd size was based only on those cows lactating on 31 December. This change in method has had a small effect on reported cow numbers

B. Herd production statistics

- *Milk production eases*

Herd production has increased most years since 1992/93 (Table 2.3), except for the drought years of 1998/99, 2007/08 and 2012/13. In contrast, the average milksolids per effective hectare of 1,071 kg in 2016/17 was the second highest on record. Production per cow increased by 2.4% in 2016/17 to an average of 381 kg milksolids (comprising 214 kg milkfat and 167 kg protein), the highest level recorded.

Table 2.3: Summary of herd production since 1975/76

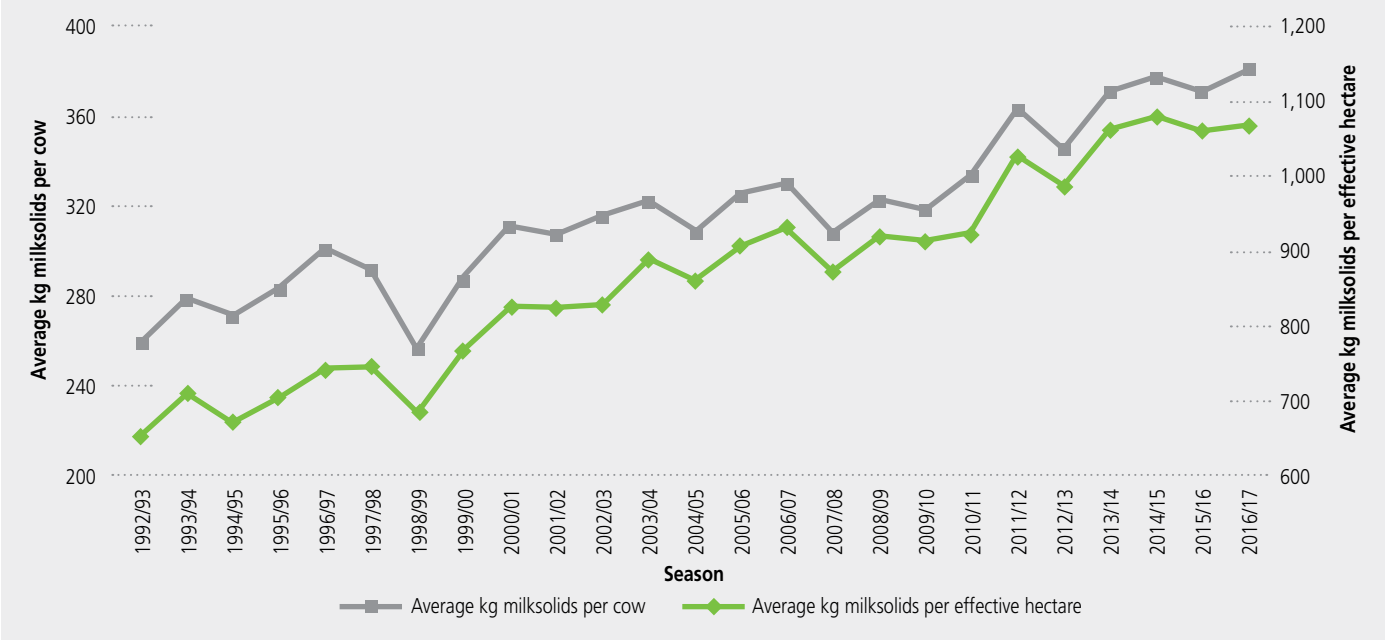
Season	Average litres per herd	Average kg milkfat per herd	Average kg protein per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg protein per effective hectare	Average kg milksolids per effective hectare	Average litres per cow	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow
1975/76[a]	-	15,700	-	-	-	-	-	-	137	-	-
1980/81[a]	-	18,864	-	-	-	-	-	-	147	-	-
1985/86[a]	-	23,489	-	-	379	-	-	-	157	-	-
1990/91[a]	-	24,495	-	-	351	-	-	-	148	-	-
1991/92[b]	-	26,567	-	-	-	-	-	-	157	-	-
1992/93	554,040	26,982	20,138	47,120	374	279	653	-	148	111	259
1993/94	618,139	30,220	22,458	52,678	407	301	708	-	160	119	278
1994/95	614,203	29,886	22,117	52,002	386	285	671	-	156	115	271
1995/96	663,248	32,050	23,827	55,877	405	300	705	-	163	120	283
1996/97	728,874	35,436	26,387	61,823	425	316	741	-	173	128	301
1997/98	752,399	36,383	26,984	63,367	430	318	748	-	168	124	292
1998/99	735,544	35,047	26,254	61,301	392	292	684	-	147	109	256
1999/00	839,066	40,365	30,396	70,761	439	329	768	-	165	123	288
2000/01	930,047	45,063	33,850	78,914	472	353	825	-	177	133	310
2001/02	996,904	48,137	36,300	84,436	471	353	824	-	175	132	307
2002/03	1,058,307	51,447	39,174	90,621	471	357	828	-	179	136	315
2003/04	1,144,938	56,150	42,171	98,321	509	380	889	3,737	184	138	322
2004/05	1,149,262	56,520	42,305	98,825	494	368	862	3,574	176	132	308
2005/06	1,237,228	60,955	45,705	106,660	520	387	907	3,763	186	139	325
2006/07	1,301,308	64,495	48,687	113,182	534	400	934	3,791	189	142	330
2007/08	1,289,337	63,158	47,876	111,033	498	375	873	3,567	175	132	307
2008/09	1,381,573	68,116	51,850	119,966	524	396	921	3,710	184	139	323
2009/10	1,409,875	69,859	53,184	123,043	519	392	912	3,642	181	137	318
2010/11	1,477,531	73,184	55,762	128,946	524	399	923	3,829	190	144	334
2011/12	1,621,344	80,875	61,936	142,811	582	446	1,028	4,128	206	158	364
2012/13	1,587,980	78,948	60,462	139,410	560	429	988	3,947	196	150	346
2013/14	1,731,985	86,682	66,330	153,012	602	461	1,063	4,196	210	161	371
2014/15	1,775,501	89,152	68,734	157,885	611	471	1,082	4,235	213	164	377
2015/16	1,754,836	88,132	68,091	156,223	600	463	1,063	4,185	210	162	372
2016/17	1,762,152	88,667	68,892	157,560	603	468	1,071	4,259	214	167	381

- Not available
[a] Figures prior to 1991/92 exclude town milk herds
[b] 1991/92 figures include some town milk herds

i) Production per cow and per hectare

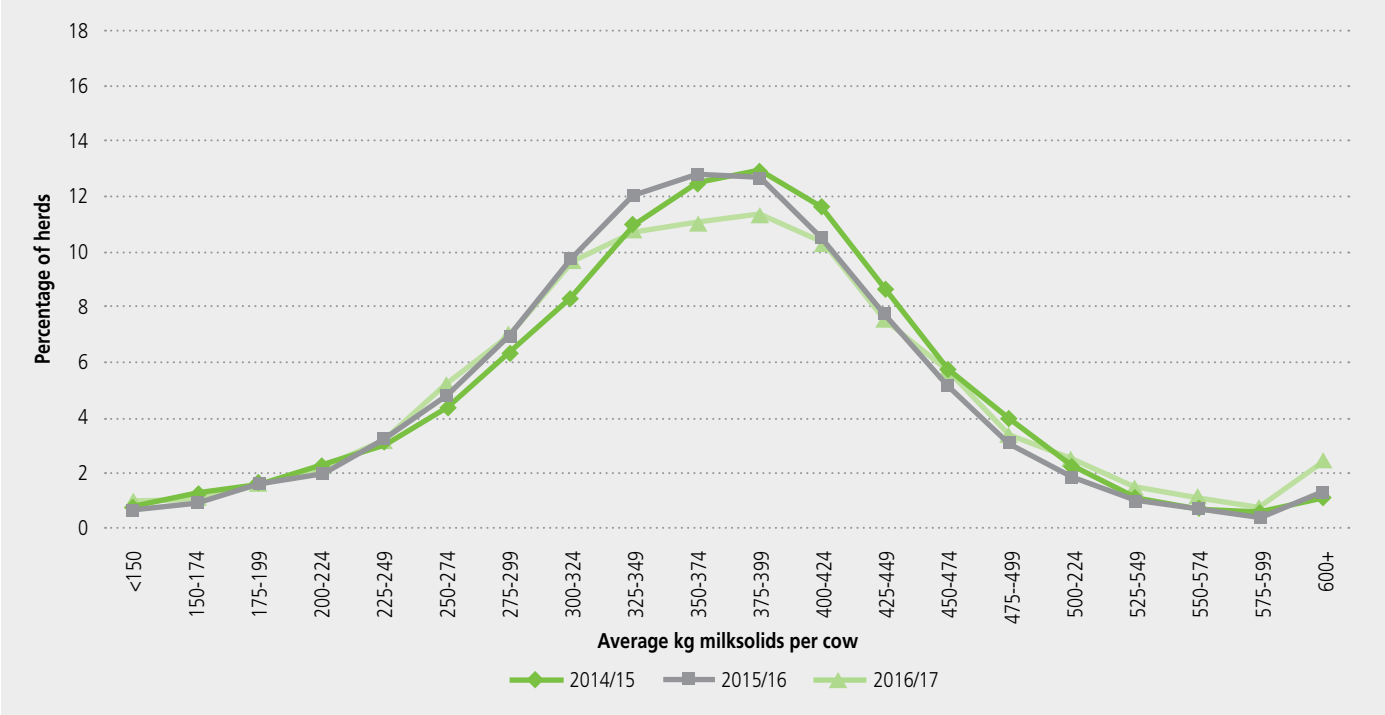
Average milksolids per cow in 2016/17 was 381 kg, compared with 372 kg last season (Graph 2.2). Average milk production per hectare was 1,071 kg – higher than the previous season but below the record high of 1,082 kg set in 2014/15. Variations from season to season are masked by the considerable effect of the weather on each season's actual production. For example, widespread drought in 2012/13 caused milk production to decline while in 2013/14, favourable pasture growth conditions, coupled with increased supplementary feed use, enabled high milk production.

Graph 2.2: Milksolids production per cow and per effective hectare since 1992/93



Average production per cow varies considerably from farm to farm. This variation is caused by many factors, including temperature, rainfall, soil fertility, stocking rate, the genetic merit of the herd, level of supplementary feed and farm management practice. Graph 2.3 shows the distribution of milksolids production in 2016/17 compared with the previous two seasons. Thirty-six per cent of the herds had an average production of over 400 kilograms milksolids per cow, compared with 32% in the previous season and 36% in 2014/15. In 2016/17 8% of herds recorded over 500 kg milksolids/cow.

Graph 2.3: Distribution of herds by milksolids production per cow for the last three seasons



ii) Herd size distribution

- *12% of herds have 750 or more cows*

A little over 50% (5,958) of herds have between 100 and 349 cows (Table 2.4). In 2016/17, 3,394 (29%) had 500 or more cows, 1,357 (12%) had 750 or more cows, and 553 (5%) had 1,000 cows or more. Averages of milkfat, protein and milksolids per cow, by herd size, are also included in Table 2.4.

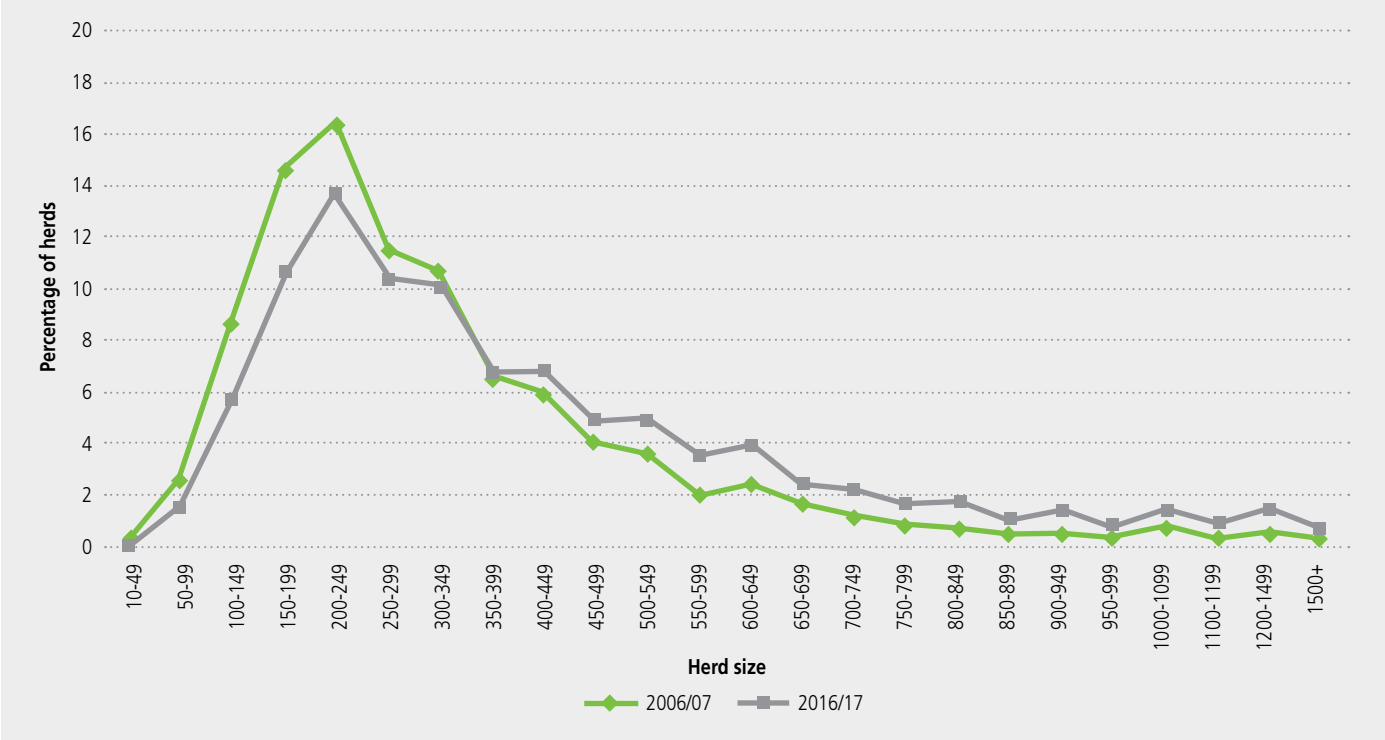
Aside from the 197 herds with fewer than 100 animals, the average milksolids per cow varies between 329 kg (herds with 100-149 cows) and 404 kg (herds with 850-899 cows).

Table 2.4: Average production per cow by herd size in 2016/17

Herd size	*Number of herds*	*Percentage of herds*	*Number of cows*	*Percentage of cows*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
10-49	5	0.0	194	0.0	-	-	-
50-99	192	1.6	15,137	0.3	153	118	271
100-149	678	5.8	84,486	1.7	186	143	329
150-199	1,252	10.7	214,972	4.4	202	154	356
200-249	1,618	13.8	356,567	7.3	207	159	366
250-299	1,219	10.4	326,517	6.7	208	160	369
300-349	1,191	10.1	378,033	7.8	210	161	372
350-399	804	6.8	294,375	6.1	215	166	380
400-449	803	6.8	334,048	6.9	214	166	379
450-499	592	5.0	275,791	5.7	218	169	387
500-549	580	4.9	297,902	6.1	220	171	391
550-599	433	3.7	244,778	5.0	222	173	395
600-649	465	4.0	284,890	5.9	222	174	395
650-699	295	2.5	195,727	4.0	218	171	389
700-749	264	2.2	187,961	3.9	222	174	395
750-799	205	1.7	155,954	3.2	222	175	397
800-849	207	1.8	167,808	3.5	224	176	400
850-899	129	1.1	110,699	2.3	227	178	404
900-949	169	1.4	153,464	3.2	218	172	390
950-999	94	0.8	90,231	1.9	226	177	404
1000-1099	175	1.5	178,755	3.7	220	173	393
1100-1199	116	1.0	129,918	2.7	210	165	375
1200-1499	178	1.5	227,348	4.7	212	167	379
1500+	84	0.7	155,769	3.2	195	152	347
Total/Avg	**11,748**		**4,861,324**		**214**	**166**	**381**

The herd size distribution presented in Graph 2.4 shows an increase in larger herds (400+ cows) and a decrease in herds with fewer than 350 cows compared with 2006/07. The most common herd size remains in the range 200 to 249 cows (comprising 13.8% of herds in 2016/17, compared with 16.5% in 2006/07).

Graph 2.4: Herd size distribution for 2016/17 compared with 2006/07



3. Regional dairy statistics

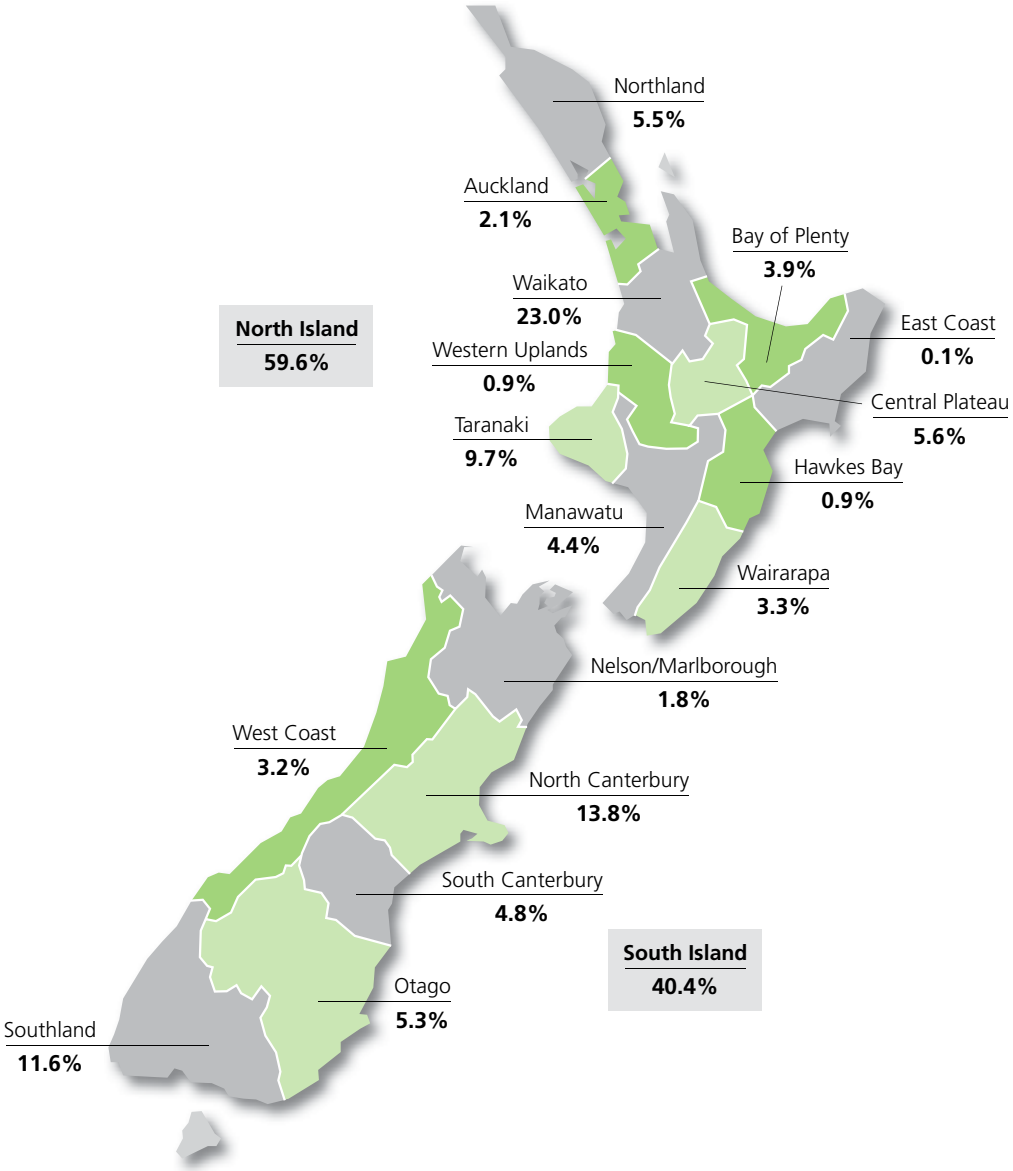
A. Region

- *73% of dairy herds located in the North Island*
- *40% of dairy cows located in the South Island*

The majority of dairy herds (72.6%) are located in the North Island, with the greatest concentration (28.8%) situated in the Waikato region. Taranaki, with 14.1% of dairy herds, is the next largest region.

Although South Island dairy herds account for 27.4% of the national total, they contain 40.4% of all cows milked (Graph 3.1). Twenty-three per cent of all dairy cows are located in the Waikato region, followed by North Canterbury (13.8%), Southland (11.6%) and Taranaki (9.7%).

Graph 3.1: Regional distribution of dairy cows in 2016/17



- *A little under 2 million cows in the South Island*
- *Largest average herd size (770) in North Canterbury*

Farms in the South Island are, on average, larger than those in the North Island (both in terms of farm area and cow numbers, see Table 3.1). The average herd size in both islands decreased this season. Within the South Island, North Canterbury has the largest average herd size (770 cows). In the North Island, East Coast has the largest average herd size of 664 cows. The smallest average herd sizes are in Auckland, Taranaki, and Northland, averaging 264, 286 and 305 cows respectively. North Canterbury has the highest average cows per hectare (3.37), followed by South Canterbury (3.24). The regions with the lowest average cows per hectare are the West Coast (2.23) and Northland (also 2.23).

Table 3.1: Herd analysis by region in 2016/17

Farming region	*Total herds*	*Percentage of herds*	*Total cows*	*Percentage of cows*	*Total effective hectares*	*Percentage of effective hectares*	*Average herd size*	*Average effective hectares*	*Average cows per hectare*
Northland	882	7.5	269,123	5.5	120,661	7.0	305	137	2.23
Auckland	395	3.4	104,425	2.1	43,549	2.5	264	110	2.40
Waikato	3,379	28.8	1,117,411	23.0	383,280	22.2	331	113	2.92
Bay of Plenty	576	4.9	191,491	3.9	68,808	4.0	332	119	2.78
Central Plateau	486	4.1	271,083	5.6	100,452	5.8	558	207	2.70
Western Uplands	87	0.7	44,129	0.9	18,045	1.0	507	207	2.45
East Coast	9	0.1	5,976	0.1	2,155	0.1	664	239	2.77
Hawkes Bay	73	0.6	45,687	0.9	16,754	1.0	626	230	2.73
Taranaki	1,657	14.1	473,110	9.7	170,062	9.8	286	103	2.78
Manawatu	542	4.6	212,816	4.4	78,305	4.5	393	144	2.72
Wairarapa	443	3.8	160,675	3.3	58,572	3.4	363	132	2.74
North Island	**8,529**	**72.6**	**2,895,926**	**59.6**	**1,060,643**	**61.4**	**340**	**124**	**2.73**
Nelson/Marlborough	228	1.9	85,153	1.8	29,859	1.7	373	131	2.85
West Coast	379	3.2	155,655	3.2	69,723	4.0	411	184	2.23
North Canterbury	873	7.4	672,398	13.8	199,288	11.5	770	228	3.37
South Canterbury	311	2.6	232,678	4.8	71,814	4.2	748	231	3.24
Otago	439	3.7	256,497	5.3	88,242	5.1	584	201	2.91
Southland	989	8.4	563,017	11.6	209,133	12.1	569	211	2.69
South Island	**3,219**	**27.4**	**1,965,398**	**40.4**	**668,059**	**38.6**	**611**	**208**	**2.94**
New Zealand	**11,748**		**4,861,324**		**1,728,702**		**414**	**147**	**2.81**

- *Highest average production recorded in North Canterbury*

South Island farms have, on average, higher herd production than herds in the North Island, with North Canterbury recording the highest average herd production at 331,853 kilograms of milksolids (Table 3.2). This reflects a combination of larger herd sizes, a high stocking rate, and high kilograms of milksolids per cow. In the North Island, Central Plateau recorded the highest average herd production of 202,605 kilograms of milksolids, reflecting large herd sizes.

In 2016/17, average production per effective hectare and production per cow was higher in the South Island than in the North Island. North Canterbury recorded the highest average milksolids per hectare in the South Island (1,454 kg), while Waikato had the highest average milksolids production per hectare in the North Island (1,075 kg).

North Canterbury also had the highest average milksolids per cow (431 kg). In the North Island, Taranaki had the highest average milksolids per cow (383 kg).

Table 3.2: Herd production analysis by region in 2016/17

Farming region	*Total kg milksolids*	*Percent milk-solids*	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg protein per herd*	*Average kg milksolids per herd*	*Average kg milkfat per effective hectare*	*Average kg protein per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
Northland	86,226,194	4.7	1,109,033	55,420	42,342	97,762	405	310	715	182	139	320
Auckland	35,557,572	1.9	1,028,624	50,854	39,166	90,019	461	355	816	192	148	341
Waikato	411,889,028	22.3	1,370,018	69,018	52,878	121,897	608	466	1,075	209	160	369
Bay of Plenty	65,502,146	3.5	1,299,706	64,374	49,345	113,719	539	413	952	194	148	342
Central Plateau	98,466,106	5.3	2,282,544	115,014	87,591	202,605	556	424	980	206	157	363
Western Uplands	13,693,234	0.7	1,738,093	89,090	68,304	157,393	430	329	759	176	135	310
East Coast	1,547,512	0.1	1,939,094	97,064	74,882	171,946	405	313	718	146	113	259
Hawkes Bay	14,746,291	0.8	2,292,466	113,344	88,660	202,004	494	386	880	181	142	323
Taranaki	181,411,779	9.8	1,198,045	61,892	47,590	109,482	603	464	1,067	217	167	383
Manawatu	80,804,892	4.4	1,704,636	83,752	65,335	149,087	580	452	1,032	213	166	380
Wairarapa	57,204,046	3.1	1,430,479	73,019	56,109	129,129	552	424	977	201	155	356
North Island	**1,047,048,800**	**56.6**	**1,377,712**	**69,451**	**53,312**	**122,763**	**558**	**429**	**987**	**205**	**157**	**362**
Nelson/Marlborough	30,530,452	1.6	1,473,791	75,937	57,969	133,905	580	443	1,022	203	155	359
West Coast	50,849,212	2.7	1,432,774	76,516	57,651	134,167	416	313	729	186	140	327
North Canterbury	289,707,622	15.7	3,730,135	184,999	146,854	331,853	810	643	1,454	240	191	431
South Canterbury	95,935,671	5.2	3,446,641	172,146	136,329	308,475	745	590	1,336	230	182	412
Otago	103,298,018	5.6	2,631,963	131,313	103,990	235,303	653	517	1,171	225	178	403
Southland	233,638,484	12.6	2,617,261	131,761	104,476	236,237	623	494	1,117	231	184	415
South Island	**803,959,459**	**43.4**	**2,780,758**	**139,582**	**110,173**	**249,754**	**673**	**531**	**1,203**	**229**	**180**	**409**
New Zealand	**1,851,008,259**	**100.0**	**1,762,152**	**88,667**	**68,892**	**157,559**	**603**	**468**	**1,071**	**214**	**166**	**381**

B. District

South Taranaki continues to be the district with the most herds (991) followed by Matamata-Piako (920). The Southland district has the most cows (413,688), followed by Ashburton (339,026) (Table 3.3). Hurunui in North Canterbury has the highest average herd size with 832 cows. The next highest is Ashburton also in North Canterbury, with 827 cows. The number of owner-operators and sharemilkers is included in Table 3.3. Seventy-two per cent of herds are run as owner-operators, while the remainder are run as sharemilkers of various types (Table 3.5).

Table 3.3: Herd analysis by district in 2016/17

Region	District	Total herds	Number of owner-operators	Number of share-milkers	Total cows	Total effective hectares	Average herd size	Average effective hectares	Average cows per hectare
Northland	Far North	254	201	53	73,396	33,549	289	132	2.19
	Whangarei	294	204	81	93,889	40,199	319	137	2.34
	Kaipara	334	275	57	101,838	46,913	305	140	2.17
Auckland	Rodney	148	108	40	39,464	17,379	267	117	2.27
	Manukau / Papakura	14	7	7	2,775	1,109	198	79	2.50
	Franklin	233	144	87	62,186	25,061	267	108	2.48
Waikato	Waikato	660	461	197	216,325	77,991	328	118	2.77
	Hamilton City	17	11	6	5,826	2,001	343	118	2.91
	Waipa	554	390	163	195,070	64,257	352	116	3.04
	Otorohanga	366	255	111	131,594	45,489	360	124	2.89
	Thames-Coromandel	91	72	19	26,127	10,053	287	110	2.60
	Hauraki	395	303	91	110,450	40,659	280	103	2.72
	Matamata-Piako	920	587	333	280,439	90,698	305	99	3.09
	South Waikato	376	262	113	151,580	52,132	403	139	2.91
Bay of Plenty	Western Bay of Plenty	194	154	39	66,595	23,735	343	122	2.81
	Tauranga	13	10	3	5,298	1,838	408	141	2.88
	Kawerau/Whakatane	298	232	66	96,633	34,826	324	117	2.77
	Opotiki	71	49	22	22,965	8,409	323	118	2.73
Central Plateau	Taupo	170	133	37	133,405	49,142	785	289	2.71
	Rotorua	316	226	90	137,678	51,310	436	162	2.68
Western Uplands	Waitomo	60	41	19	31,494	13,012	525	217	2.42
	Ruapehu	27	17	10	12,635	5,033	468	186	2.51
East Coast	Gisborne / Wairoa	9	8	1	5,976	2,155	664	239	2.77
Hawkes Bay	Napier / Hastings	30	26	4	17,654	6,579	588	219	2.68
	Central Hawkes Bay	43	35	8	28,033	10,175	652	237	2.76
Taranaki	New Plymouth	422	290	132	108,357	41,454	257	98	2.61
	Stratford	244	177	67	59,265	22,731	243	93	2.61
	South Taranaki	991	657	334	305,488	105,877	308	107	2.89
Manawatu	Wanganui	20	15	5	7,861	3,080	393	154	2.55
	Rangitikei	88	77	11	40,555	15,063	461	171	2.69
	Manawatu	249	191	58	93,943	34,270	377	138	2.74
	Palmerston North City	50	41	8	20,570	7,889	411	158	2.61
	Horowhenua	117	92	25	44,478	15,794	380	135	2.82
	Kapiti Coast / Upper Hutt	18	16	2	5,409	2,209	301	123	2.45
Wairarapa	Tararua	294	219	75	97,392	36,006	331	122	2.70
	Masterton	18	11	7	8,765	2,987	487	166	2.93
	Carterton	50	46	4	18,785	7,060	376	141	2.66
	South Wairarapa	81	65	16	35,733	12,519	441	155	2.85
North Island		**8,529**	**6,108**	**2,401**	**2,895,926**	**1,060,643**	**340**	**124**	**2.73**

(table 3.3 continued)

Region	District	Total herds	Number of owner-operators	Number of share-milkers	Total cows	Total effective hectares	Average herd size	Average effective hectares	Average cows per hectare
Nelson/Marlborough	Marlborough	55	42	12	17,241	6,038	313	110	2.86
	Kaikoura	22	16	6	9,976	3,245	453	148	3.07
	Tasman / Nelson City	151	132	19	57,936	20,576	384	136	2.82
West Coast	Buller	131	110	21	51,691	22,159	395	169	2.33
	Grey	89	65	24	42,670	18,446	479	207	2.31
	Westland	159	124	35	61,294	29,118	385	183	2.11
North Canterbury	Hurunui	93	77	16	77,360	21,857	832	235	3.54
	Waimakariri	106	83	23	65,468	20,037	618	189	3.27
	Christchurch City	31	27	4	24,765	7,119	799	230	3.48
	Banks Peninsula	6	3	3	1,965	813	328	136	2.42
	Selwyn	227	188	39	163,814	49,950	722	220	3.28
	Ashburton	410	303	107	339,026	99,512	827	243	3.41
South Canterbury	Timaru	175	142	33	124,210	37,263	710	213	3.33
	MacKenzie	16	12	4	12,635	4,994	790	312	2.53
	Waimate	120	79	41	95,833	29,557	799	246	3.24
Otago	Waitaki	142	93	49	97,963	29,900	690	211	3.28
	Dunedin City	64	38	26	26,308	9,333	411	146	2.82
	Clutha	203	144	44	108,766	39,609	536	195	2.75
	Central Otago/Lakes	30	24	6	23,460	9,400	782	313	2.50
Southland	Gore	166	116	49	93,692	35,768	564	215	2.62
	Invercargill	103	72	31	55,637	20,402	540	198	2.73
	Southland	720	510	210	413,688	152,963	575	212	2.70
South Island		**3,219**	**2,400**	**802**	**1,965,398**	**668,059**	**611**	**208**	**2.94**
New Zealand		**11,748**	**8,508**	**3,203**	**4,861,324**	**1,728,702**	**414**	**147**	**2.81**

Ashburton had the highest average production per herd with 363,604 kilograms of milksolids followed by Hurunui with 355,478 kilograms of milksolids (Table 3.4). Hurunui district had the highest average milksolids per effective hectare with 1,513 kilograms. Ashburton and Waimakariri recorded the highest production per cow (440 and 438 kg of milksolids respectively). The North Island district which has the highest milksolids production per herd is Taupo with an average of 278,037 kilograms of milksolids. Of all the North Island districts, South Waikato and Waipa produced the highest average kilograms of milksolids per hectare (1,160 and 1,153 respectively). South Waikato and South Taranaki produced the highest average kilograms of milksolids per cow (399 and 392 respectively).

Table 3.4: Herd production analysis by district in 2016/17

Region	*District*	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg protein per herd*	*Average kg milksolids per herd*	*Average kg milkfat per effective hectare*	*Average kg protein per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg protein per cow*	*Average kg milksolids per cow*
Northland	Far North	1,028,282	51,185	39,027	90,212	388	295	683	177	135	312
	Whangarei	1,202,934	60,741	46,029	106,770	444	337	781	190	144	334
	Kaipara	1,087,788	53,958	41,617	95,575	384	296	680	177	136	313
Auckland	Rodney / Auckland	960,499	48,414	36,884	85,298	412	314	726	182	138	320
	Manukau / Papakura	769,544	37,650	28,693	66,343	475	362	838	190	145	335
	Franklin	1,087,464	53,197	41,244	94,441	495	383	878	199	155	354
Waikato	Waikato	1,327,121	66,241	50,840	117,081	561	430	991	202	155	357
	Hamilton City	1,384,892	69,435	53,447	122,882	590	454	1,044	203	156	359
	Waipa	1,508,330	75,537	58,162	133,698	651	501	1,153	215	165	380
	Otorohanga	1,460,261	73,819	56,600	130,418	594	455	1,049	205	157	363
	Thames-Coromandel	1,045,565	53,442	40,413	93,856	484	366	850	186	141	327
	Hauraki	1,074,298	54,190	41,423	95,613	526	402	929	194	148	342
	Matamata-Piako	1,258,143	64,164	48,817	112,981	651	495	1,146	210	160	371
	South Waikato	1,815,937	90,825	70,010	160,835	655	505	1,160	225	174	399
Bay of Plenty	Western Bay of Plenty	1,280,952	64,793	49,032	113,825	530	401	930	189	143	332
	Tauranga	1,351,581	68,578	52,022	120,600	485	368	853	168	128	296
	Kawerau/Whakatane	1,332,322	65,292	50,277	115,569	559	430	989	201	155	356
	Opotiki	1,204,560	58,607	45,798	104,405	495	387	882	181	142	323
Central Plateau	Taupo	3,109,314	157,884	120,154	278,037	546	416	962	201	153	354
	Rotorua	1,837,763	91,952	70,073	162,025	566	432	998	211	161	372
Western Uplands	Waitomo	1,758,685	90,319	69,285	159,604	416	319	736	172	132	304
	Ruapehu	1,692,333	86,358	66,125	152,482	463	355	818	185	141	326
East Coast	Gisborne / Wairoa	1,939,094	97,064	74,882	171,946	405	313	718	146	113	259
Hawkes Bay	Napier/Hastings	1,931,275	96,904	74,390	171,294	442	339	781	165	126	291
	Central Hawkes Bay	2,544,460	124,814	98,616	223,430	527	417	944	191	151	343
Taranaki	New Plymouth	1,028,930	53,099	40,594	93,693	541	413	954	207	158	365
	Stratford	1,005,360	51,340	39,569	90,909	551	425	976	211	163	374
	South Taranaki	1,317,501	68,234	52,545	120,779	639	492	1,130	221	170	392
Manawatu	Wanganui	1,671,017	77,471	62,578	140,048	503	406	909	197	159	356
	Rangitikei	2,008,587	99,919	77,535	177,454	584	453	1,037	217	168	385
	Manawatu	1,619,943	79,877	62,177	142,054	580	452	1,032	212	165	377
	Palmerston North City	1,806,345	89,811	69,734	159,545	569	442	1,011	218	170	388
	Horowhenua	1,691,124	82,426	64,437	146,863	611	477	1,088	217	170	386
	Kapiti Coast / Upper Hutt	1,232,903	57,073	46,057	103,130	465	375	840	190	153	343
Wairarapa	Tararua	1,269,179	65,162	49,823	114,986	532	407	939	197	150	347
	Masterton	2,153,494	106,326	82,529	188,855	641	497	1,138	218	169	388
	Carterton	1,613,885	80,789	62,699	143,488	572	444	1,016	215	167	382
	South Wairarapa	1,742,056	89,340	68,987	158,327	578	446	1,024	203	156	359
North Island		**1,377,712**	**69,451**	**53,312**	**122,763**	**558**	**429**	**987**	**205**	**157**	**362**

(table 3.4 continued)

Region	District	Average litres per herd	Average kg milkfat per herd	Average kg protein per herd	Average kg milksolids per herd	Average kg milkfat per effective hectare	Average kg protein per effective hectare	Average kg milksolids per effective hectare	Average kg milkfat per cow	Average kg protein per cow	Average kg milksolids per cow
Nelson/ Marlborough	Marlborough	1,340,062	67,444	51,598	119,042	614	470	1,084	215	165	380
	Kaikoura	1,756,304	89,731	69,372	159,104	608	470	1,079	198	153	351
	Tasman/Nelson City	1,481,339	77,021	58,627	135,648	565	430	995	201	153	354
West Coast	Buller	1,374,271	72,793	54,808	127,601	430	324	754	184	139	323
	Grey	1,742,393	92,172	70,081	162,253	445	338	783	192	146	338
	Westland	1,307,665	70,819	53,036	123,855	387	290	676	184	138	321
North Canterbury	Hurunui	3,982,706	199,347	156,131	355,478	848	664	1,513	240	188	427
	Waimakariri	3,093,738	150,159	120,201	270,360	794	636	1,430	243	195	438
	Christchurch City	3,576,185	179,493	142,041	321,534	782	619	1,400	225	178	402
	Banks Peninsula	1,221,332	61,664	46,947	108,611	455	346	802	188	143	332
	Selwyn	3,391,312	167,764	133,087	300,851	762	605	1,367	232	184	417
	Ashburton	4,073,323	202,516	161,088	363,604	834	664	1,498	245	195	440
South Canterbury	Timaru	3,277,609	162,351	129,083	291,434	762	606	1,369	229	182	411
	MacKenzie	3,801,192	192,176	153,158	345,334	616	491	1,106	243	194	437
	Waimate	3,645,872	183,759	144,652	328,412	746	587	1,333	230	181	411
Otago	Waitaki	3,099,470	156,893	123,480	280,373	745	586	1,332	227	179	406
	Dunedin City	1,948,773	94,952	76,222	171,174	651	523	1,174	231	185	416
	Clutha	2,416,387	118,707	94,477	213,184	608	484	1,093	222	176	398
	Central Otago/Lakes	3,335,302	173,106	135,349	308,455	552	432	984	221	173	394
Southland	Gore	2,455,350	124,479	97,769	222,249	578	454	1,031	221	173	394
	Invercargill	2,467,582	123,096	98,276	221,372	621	496	1,118	228	182	410
	Southland	2,676,002	134,680	106,909	241,589	634	503	1,137	234	186	420
South Island		**2,780,758**	**139,582**	**110,173**	**249,754**	**673**	**531**	**1,203**	**229**	**180**	**409**
New Zealand		**1,762,152**	**88,667**	**68,892**	**157,559**	**603**	**468**	**1,071**	**214**	**166**	**381**

Note: *Districts with fewer than four herds have been added to a neighbouring district to preserve anonymity*

C. Operating structures

The main operating structures found on New Zealand dairy farms are owner-operator, sharemilker and, to a lesser extent, contract milker.

Owner-operators are farmers who own and operate their own farms, or who employ a manager to operate the farm for a fixed wage. Owner-operators receive all the farm income, although they may pay wages. Owner-operators comprise the largest group of all operating structures, being 72% of all herds.

Contract milkers are contracted to milk a herd at a set price per kilogram of milksolids produced. The rate is set according to the amount of farm work done. In 2016/17, not all farms with contract milkers could be identified, and consequently any farms with contract milkers are included with owner-operators.

Sharemilking has traditionally been the first step to farm ownership. Sharemilking involves operating a farm on behalf of the farm owner for an agreed share of the farm receipts (as opposed to a set wage). Two types of sharemilking agreement are commonly used: Variable order sharemilking and 50% or herd owning sharemilking agreements.

Herd owning sharemilkers (also called 50/50) own the herd and any plant and equipment (other than the milking plant) needed to farm the property. The sharemilker is usually responsible for milk harvesting expenses, labour, stock-related expenses, and general farm work and maintenance. The owner is usually responsible for expenses related to maintaining the property. The percentage quoted in a 50% sharemilking agreement usually refers to the proportion of milk income the sharemilker receives. While this percentage is most commonly 50%, it can range from 45% to 55%. Under the 50% agreement the sharemilker receives the agreed percentage of milk income plus the majority of income from stock sales, and the farm owner receives the remaining percentage of milk income.

Unlike the 50% agreement, where the owner may have little to do with farm management, a variable order sharemilking agreement often sees the owner retain some involvement in management of the farm. The variable order sharemilking agreement involves the farm owner retaining ownership of the herd and bearing more of the farm costs, such as animal health and breeding. The amount of farm work required by the sharemilker is determined by the individual agreement, with responsibility ranging from herd management only to carrying out all farm work.

- *72% of all herds are operated as owner-operators*
- *60% of all sharemilkers are 50/50 sharemilkers*

The number of herds farmed, average herd size, effective area and number of cows per hectare for each of the main operating structures are shown in Table 3.5. Twenty-seven per cent (3,203) of New Zealand dairy herds operated under a sharemilking agreement in 2016/17, this was a decline in numbers by 362 herds from the previous season. Owner-operator numbers increased by 188 herds reflecting a movement away from sharemilking, particularly variable order, to contract milking with greater certainty of milk income. Sixty per cent (1,922) of all sharemilkers have 50/50 agreements. The majority of the variable order sharemilkers are between 20-29%.

Table 3.5: Herd analysis by operating structure in 2016/17

Operating structure	*Number of herds*	*Percentage of herds*	*Average herd size*	*Average effective hectares*	*Average cows per effective hectare*
Owner-operators	8,508	72.4	418	149	2.80
Sharemilkers:					
less than 20%	133	1.1	653	220	2.96
20-29%	586	5.0	414	145	2.85
30-49%	157	1.3	404	144	2.81
50/50	1,922	16.4	378	133	2.85
over 50%	405	3.4	414	144	2.87
All sharemilkers	3,203	27.3	402	141	2.85
Unknown	37	0.3	529	207	2.55
All farms	**11,748**		**414**	**147**	**2.81**

Note: *Contract milkers are included with owner-operators*

Herd production in each of the main operating structure groups is shown in Table 3.6. The table shows that, on average, sharemilkers on less than 20% agreements have the highest production.

Table 3.6: Herd production analysis by operating structure in 2016/17

Operating structure	*Average litres per herd*	*Average kg milkfat per herd*	*Average kg milksolids per herd*	*Average kg milkfat per effective hectare*	*Average kg milksolids per effective hectare*	*Average kg milkfat per cow*	*Average kg milksolids per cow*
Owner-operators	1,776,671	89,258	158,650	598	1,063	214	380
Sharemilkers:							
less than 20%	3,110,028	157,166	281,098	715	1,280	241	432
20-29%	1,756,612	88,715	157,648	610	1,085	215	381
30-49%	1,685,797	85,301	151,033	593	1,050	211	374
50/50	1,590,281	80,603	142,884	606	1,075	213	378
over 50%	1,814,430	90,835	162,026	629	1,121	219	391
All Sharemilkers	1,717,188	86,808	154,176	616	1,095	216	384
Unknown	2,324,160	114,204	200,359	551	968	216	379
All farms	**1,762,152**	**88,667**	**157,559**	**603**	**1,071**	**214**	**381**

Note: Contract milkers are included with owner-operators

Changes to the operating structure in the last ten seasons have seen the percentage of sharemilkers, including 50/50 sharemilkers, decrease. Table 3.7 shows the percentage of herds in each operating structure type, whereas Table 3.8 gives the actual number of herds. Sharemilkers have declined from 35.4% in 2007/08 to 27.3% of herds in 2016/17. 20-29% variable order sharemilking herd numbers declined 235 (-28.6%) over the past season as some moved to contract milking and others exited the industry.

Table 3.7: Trend in the percentage of herds in each operating structure for the last 10 seasons

Operating structure	*2007/08*	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*
Owner-operators	63.1	63.6	65.1	65.4	65.8	64.6	65.5	67.3	69.8	72.4
Sharemilkers:										
less than 20%	1.0	1.5	1.3	2.0	2.0	1.9	1.7	1.5	1.3	1.1
20-29%	9.1	10.4	10.5	10.9	9.9	9.6	9.7	8.8	6.9	5.0
30-49%	1.7	1.8	1.7	2.3	1.6	1.4	1.5	1.4	1.5	1.3
50/50	21.7	20.5	19.7	19.2	18.8	18.7	18.5	17.1	16.8	16.4
over 50%	1.7	1.8	1.4	0.2	1.8	3.5	2.9	3.6	3.5	3.5
All sharemilkers	35.4	36.0	34.6	34.6	34.2	35.2	34.2	32.4	30.0	27.3
Other/Unknown	1.5	0.5	0.3	0.0	0.0	0.3	0.3	0.3	0.3	0.3

Table 3.8: Trend in the number of herds in each operating structure for the last 10 seasons

Operating structure	*2007/08*	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*
Owner-operators	7,215	7,384	7,616	7,677	7,764	7,679	7,812	8,059	8,315	8,503
Sharemilkers:										
less than 20%	119	177	147	233	234	224	206	179	153	134
20-29%	1,045	1,206	1,222	1,274	1,173	1,140	1,151	1,050	821	586
30-49%	198	207	200	273	193	170	177	171	174	157
50/50	2,483	2,381	2,303	2,249	2,218	2,229	2,201	2,050	2,001	1,925
over 50%	199	207	169	29	216	417	346	429	421	406
All sharemilkers	4,044	4,178	4,041	4,058	4,034	4,180	4,081	3,879	3,570	3,208
Other/Unknown	177	56	34	0	0	32	34	32	33	37
Total	**11,436**	**11,618**	**11,691**	**11,735**	**11,798**	**11,891**	**11,927**	**11,970**	**11,918**	**11,748**

Table 3.9 compares the number (and percentage) of owner-operators with sharemilkers by region in 2016/17. In the South Island there were more variable order sharemilkers than 50/50 sharemilkers, while the opposite was the case in the North Island.

Table 3.9: Operating structure by region in 2016/17

Farming region	*Owner-operators*	*Owner-operators %*	*All share-milkers*	*All share-milkers %*	*50/50 share-milkers*	*50/50 share-milkers %*	*Variable order share-milkers*	*Variable order share-milkers %*	*Total herds (excl. unknown)*
Northland	680	8.0	191	6.0	117	6.1	74	5.8	871
Auckland	259	3.0	134	4.2	95	4.9	39	3.0	393
Waikato	2,341	27.5	1,033	32.2	707	36.7	326	25.4	3,374
Bay of Plenty	445	5.2	130	4.1	93	4.8	37	2.9	575
Central Plateau	359	4.2	127	4.0	88	4.6	39	3.0	486
Western Uplands	58	0.7	29	0.9	17	0.9	12	0.9	87
East Coast	8	0.1	1	0.0	0	0.0	1	0.1	9
Hawkes Bay	61	0.7	12	0.4	10	0.5	2	0.2	73
Taranaki	1,124	13.2	533	16.6	292	15.2	241	18.8	1,657
Manawatu	432	5.1	109	3.4	59	3.1	50	3.9	541
Wairarapa	341	4.0	102	3.2	56	2.9	46	3.6	443
North Island	**6,108**	**71.8**	**2,401**	**74.8**	**1,534**	**79.7**	**867**	**67.6**	**8,509**
Nelson/Marlborough	190	2.2	37	1.2	27	1.4	10	0.8	227
West Coast	296	3.5	83	2.6	40	2.1	43	3.4	379
North Canterbury	679	8.0	194	6.0	101	5.2	93	7.2	873
South Canterbury	233	2.7	78	2.4	24	1.2	54	4.2	311
Otago	299	3.5	125	3.9	57	3.0	68	5.3	424
Southland	698	8.2	290	9.0	142	7.4	148	11.5	988
South Island	**2,395**	**28.2**	**807**	**25.2**	**391**	**20.3**	**416**	**32.4**	**3,202**
New Zealand	**8,503**	**100.0**	**3,208**	**100.0**	**1,925**	**100.0**	**1,283**	**100.0**	**11,711**

Table 3.10 shows the number and percentage of owner-operators and sharemilkers by herd size.

Table 3.10: Operating structure by herd size in 2016/17

Herd size	*Owner-operators*	*Owner-operators %*	*All share-milkers*	*All share-milkers %*	*50/50 share-milkers*	*50/50 share-milkers %*	*Variable order share-milkers*	*Variable order share-milkers %*	*Number of herds (excl. unknown)*	*Percentage of herds*
10-49	3	0.0	1	0.0	0	0.0	1	0.1	4	0.0
50-99	170	2.0	22	0.7	12	0.6	10	0.8	192	1.6
100-149	546	6.4	130	4.1	64	3.3	66	5.1	676	5.8
150-199	918	10.8	331	10.3	238	12.4	93	7.2	1,249	10.7
200-249	1,139	13.4	479	14.9	309	16.1	170	13.3	1,618	13.8
250-299	868	10.2	349	10.9	234	12.2	115	9.0	1,217	10.4
300-349	827	9.7	361	11.3	235	12.2	126	9.8	1,188	10.1
350-399	540	6.4	262	8.2	149	7.7	113	8.8	802	6.8
400-449	554	6.5	247	7.7	145	7.5	102	8.0	801	6.8
450-499	407	4.8	180	5.6	100	5.2	80	6.2	587	5.0
500-549	413	4.9	165	5.1	94	4.9	71	5.5	578	4.9
550-599	313	3.7	116	3.6	62	3.2	54	4.2	429	3.7
600-649	343	4.0	121	3.8	65	3.4	56	4.4	464	4.0
650-699	232	2.7	62	1.9	34	1.8	28	2.2	294	2.5
700-749	189	2.2	74	2.3	40	2.1	34	2.7	263	2.2
750-799	152	1.8	52	1.6	29	1.5	23	1.8	204	1.7
800-849	146	1.7	59	1.8	23	1.2	36	2.8	205	1.8
850-899	98	1.2	30	0.9	14	0.7	16	1.2	128	1.1
900-949	133	1.6	36	1.1	18	0.9	18	1.4	169	1.4
950-999	79	0.9	15	0.5	7	0.4	8	0.6	94	0.8
1000-1099	132	1.6	41	1.3	24	1.2	17	1.3	173	1.5
1100-1199	89	1.0	27	0.8	12	0.6	15	1.2	116	1.0
1200-1499	143	1.7	34	1.1	13	0.7	21	1.6	177	1.5
1500+	69	0.8	14	0.4	4	0.2	10	0.8	83	0.7
Total/Avg	**8,503**	**100.0**	**3,208**	**100.0**	**1,925**	**100.0**	**1,283**	**100.0**	**11,711**	**100.0**

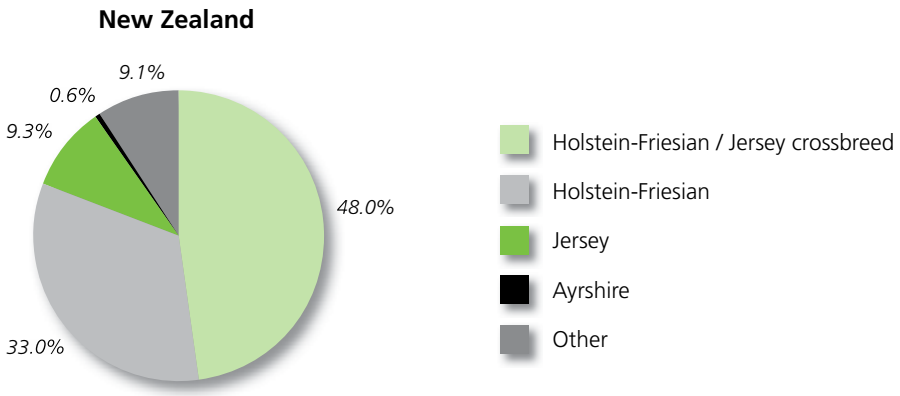
D. Breed breakdown

Three types of dairy cattle dominate the dairy cow inseminations carried out in New Zealand, as recorded on the LIC National Database: Holstein-Friesian, Jersey, and Holstein-Friesian/Jersey crossbreed.

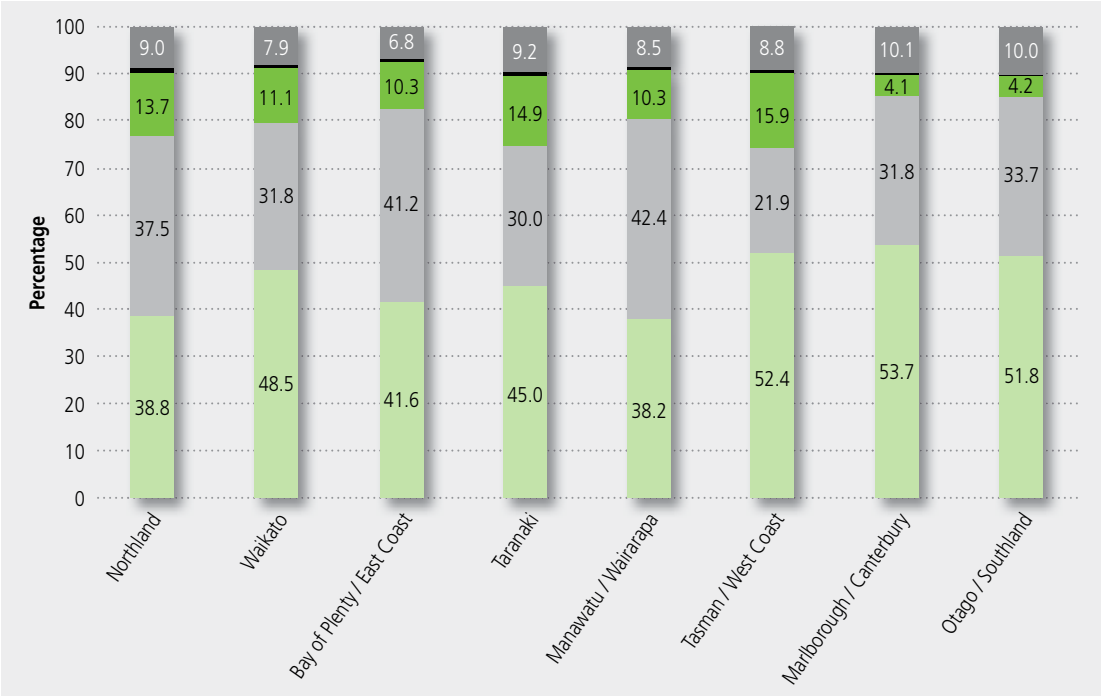
The Jersey breed dominated the national dairy herd until the late 1960s. By 1970, Holstein-Friesian was the dominant dairy breed in New Zealand, as a result of changes in farm management practices and farmers raising larger numbers of dairy calves for beef. Of the other breeds of cattle used to inseminate dairy cows, the main beef breed currently in use is Polled Hereford. Other beef breeds used to a lesser degree include Angus, Belgian Blue, and Simmental. Other breeds of dairy cattle present in smaller numbers in New Zealand include Milking Shorthorn, Guernsey and Brown Swiss. Holstein-Friesian/Jersey Crossbreed now makes up a large proportion of the national dairy herd.

The percentages of the major dairy breed categories for New Zealand and each region are shown in Graphs 3.2 and 3.3. Percentages are given for Holstein-Friesian, Jersey, Holstein-Friesian/Jersey crossbreed and Ayrshire cows with the remaining breeds and crossbreeds grouped into "Other". Holstein-Friesian is no longer the prevalent breed in Northland or Bay of Plenty/East Coast, but is still the prevalent breed in Manawatu/Wairarapa. Holstein-Friesian/Jersey crossbreed is the prevalent breed category in all regions except the Manawatu/Wairarapa. The Manawatu/Wairarapa region continues to have the highest percentage of Holstein-Friesian cows (42%) followed by Bay of Plenty/East Coast (41%). Tasman/West Coast has the highest proportion of Jerseys (16%) followed by Taranaki (15%). Marlborough/Canterbury has the highest proportion of Holstein-Friesian/Jersey crossbreeds (54%), followed by Tasman / West Coast (52%) and Otago/Southland (also at 52%).

Graph 3.2: Breed category percentages of cows for New Zealand in 2016/17



Graph 3.3: Breed category percentages of cows by region in 2016/17



4. Herd improvement

A. Use of herd testing

Herd testing enables farmers to collect information about individual cows in their herds. The information gained from herd testing is vital for effective herd management and decision making. Farmers are able to benchmark animal performance within herd, within region, and nationally.

Farmers currently have the choice of two herd testing service providers (CRV AmBreed and LIC), and are able to choose the frequency of testing. Data used in the following analysis includes figures from both herd test providers.

Herd testing involves the collection of individual milk samples from animals in the herd. A full herd test provides information on milk volumes, milkfat and protein yields, and somatic cell counts.

Herd testing provides an overall picture of the production of the herd, and enables the mastitis status to be monitored. More specifically, herd test information identifies low-producing cows (for culling or drying off), high producers (for breeding), and cows with mastitis (for therapy or culling).

- *66% of cows were herd-tested in 2016/17*

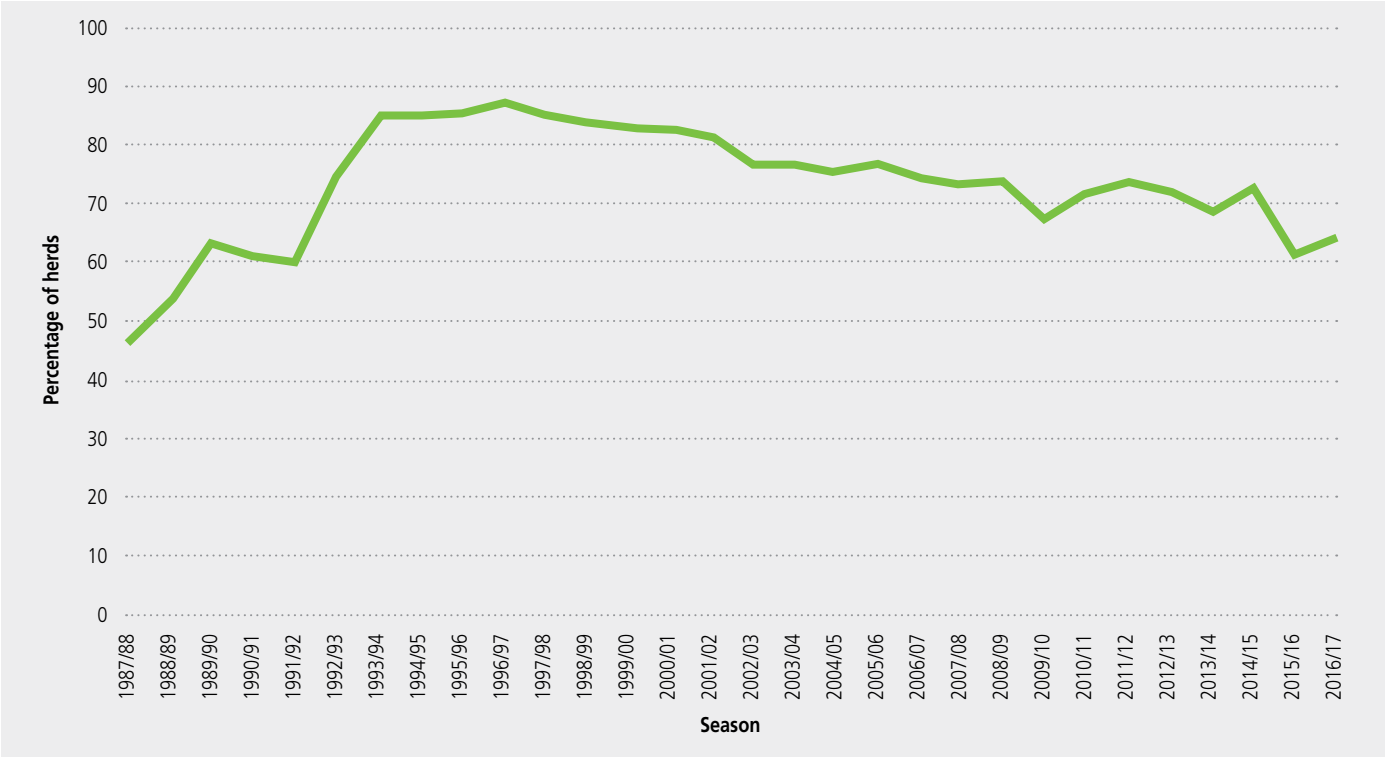
The percentage of total herds and the percentage of total cows using herd testing both increased in 2016/17. The percentage of herds, testing at 64.3% in 2016/17, was the second lowest on record (Table 4.1). A total of 3.21 million cows were herd-tested in 2016/17, up from 3.03 million in 2015/16.

Table 4.1: Trend in the use of herd testing services for the last 20 seasons

Season	Number of herds herd-tested	Total herds	% of total herds	Number of cows herd-tested (000)	Total cows (000)	% of total cows
1997/98	12,510	14,673	85.3	2,826	3,223	87.7
1998/99	12,059	14,362	84.0	2,819	3,289	85.7
1999/00	11,521	13,861	83.1	2,806	3,269	85.8
2000/01	11,472	13,892	82.6	2,942	3,486	84.4
2001/02	11,113	13,649	81.4	2,974	3,693	80.5
2002/03	10,113	13,140	77.0	2,855	3,741	76.3
2003/04	9,772	12,751	76.6	2,842	3,851	73.8
2004/05	9,306	12,271	75.8	2,811	3,868	72.7
2005/06	9,082	11,883	76.4	2,846	3,832	74.3
2006/07	8,692	11,630	74.7	2,791	3,917	71.2
2007/08	8,405	11,436	73.5	2,871	4,013	71.5
2008/09	8,589	11,618	73.9	3,040	4,253	71.5
2009/10	7,870	11,691	67.3	2,812	4,397	64.0
2010/11	8,409	11,735	71.7	3,186	4,529	70.4
2011/12	8,673	11,798	73.5	3,362	4,634	72.6
2012/13	8,585	11,891	72.2	3,426	4,784	71.6
2013/14	8,188	11,927	68.7	3,294	4,923	66.9
2014/15	8,724	11,970	72.9	3,654	5,018	72.8
2015/16	7,316	11,908	61.4	3,030	4,998	60.6
2016/17	7,557	11,748	64.3	3,206	4,861	65.9

The trend in the percentage of total herds using herd testing shows a modest increase from the previous season (Graph 4.1).

Graph 4.1: Trend in the percentage of herds testing for the last 30 seasons



The regional uptake of herd testing services in 2016/17 is shown in Table 4.2, where the number of cows tested refers to all cows tested at least once in the season. Wairarapa and Taranaki had the highest percentage of herds using herd testing (70%). Taranaki had the highest percentage of cows herd tested (73%). The East Coast recorded the lowest percentage of cows herd tested (37%).

Table 4.2: Use of herd testing by region in 2016/17

Farming Region	*Herds tested*	*Total herds*	*Percentage of total herds*	*Cows tested*	*Total cows*	*Percentage of total cows*	*Average herd size tested*	*Average herd size*
Northland	521	882	59.1	178,582	269,123	66.4	343	305
Auckland	251	395	63.5	71,958	104,425	68.9	287	264
Waikato	2,229	3,379	66.0	773,665	1,117,411	69.2	347	331
Bay of Plenty	349	576	60.6	120,674	191,491	63.0	346	332
Central Plateau	278	486	57.2	154,793	271,083	57.1	557	558
Western Uplands	58	87	66.7	28,517	44,129	64.6	492	507
East Coast	5	9	55.6	2,191	5,976	36.7	438	664
Hawkes Bay	43	73	58.9	21,753	45,687	47.6	506	626
Taranaki	1,158	1,657	69.9	343,739	473,110	72.7	297	286
Manawatu	358	542	66.1	150,481	212,816	70.7	420	393
Wairarapa	312	443	70.4	110,413	160,675	68.7	354	363
Nelson/Marlborough	152	228	66.7	49,753	85,153	58.4	327	373
West Coast	225	379	59.4	91,410	155,655	58.7	406	411
North Canterbury	546	873	62.5	427,025	672,398	63.5	782	770
South Canterbury	179	311	57.6	140,388	232,678	60.3	784	748
Otago	281	439	64.0	176,100	256,497	68.7	627	584
Southland	612	989	61.9	364,353	563,017	64.7	595	569
New Zealand	**7,557**	**11,748**	**64.3**	**3,205,795**	**4,861,324**	**65.9**	**424**	**414**

Note: *Table includes figures from both herd test providers*

B. Herd test averages

The lactation yield figures in this section are for herd-tested cows. Seasonal and breed averages (parts i and iii) are calculated on lactation yields for herds tested four or more times during the season. Monthly averages (part ii) are calculated on lactation yields for herds tested at least once during the season, and only cows that lactated for 100 days or more were included in the herd test averages. These figures are different to the average milksolids figures given in Chapters 2 and 3 (national and regional dairy statistics, respectively), which were based on all herds supplying a dairy company (regardless of whether herd testing was used) and represented the average production per cow as supplied to the dairy company.

Days-in-milk (herd testing) information is the number of days from the start of lactation to the calculated end of lactation. The start of lactation is four days from calving (with a maximum of 60 days between the estimated start of lactation and the first herd test). The end of lactation is the last herd test date plus 15 days. The inclusion of herds with fewer than four tests reduces the calculated average lactation length: therefore, the number of days-in-milk, calculated using this method, does not necessarily reflect the average lactation length of dairy cows.

The days-in-milk (production) figure is the number of days from the estimated start of lactation to the estimated end of lactation (reported since 1997/98). The results are derived from seasonal supplier tanker pick-up information, adjusted for calving spread. The days-in-milk (production) methodology provides a more accurate measure of the average lactation length of dairy cows than the herd-testing methodology.

i) Seasonal averages

- *North & South Canterbury have the highest milkfat, protein and milksolids production (kg/cow)*
- *West Coast has the highest milkfat, protein and milksolids percentages*

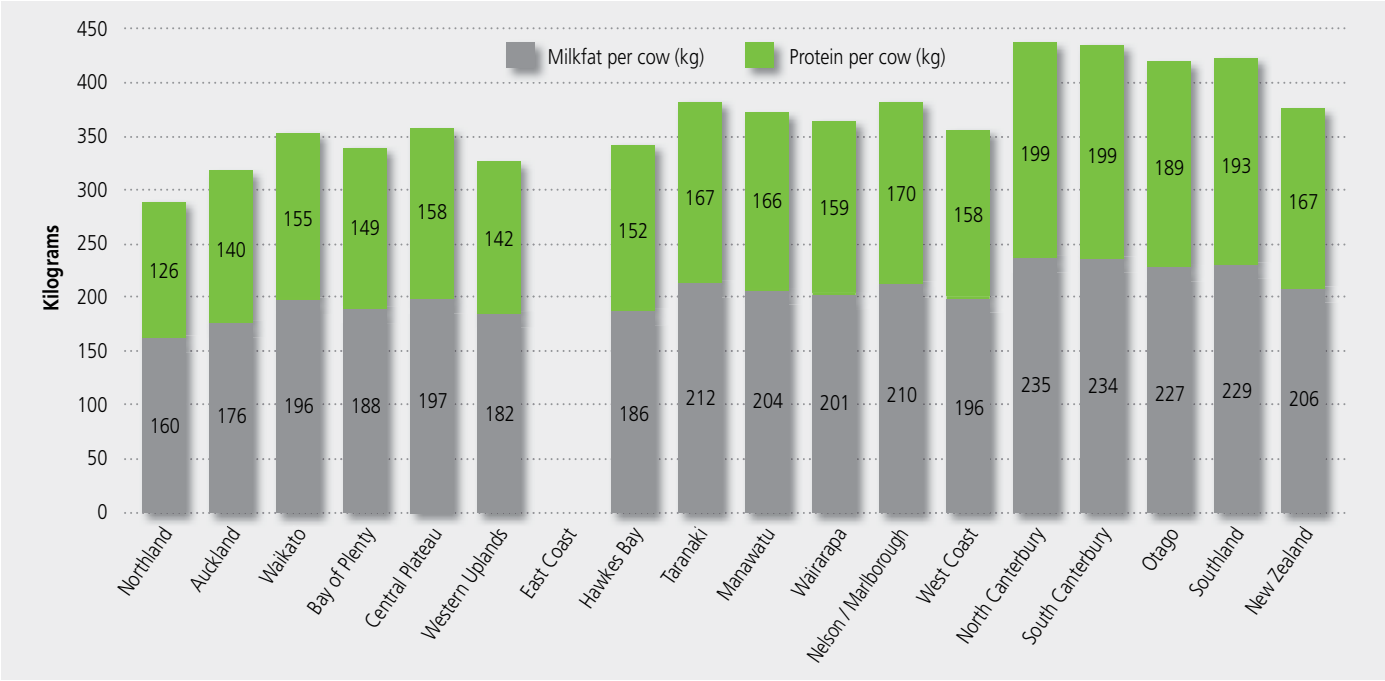
The average per-cow statistics for each region are summarised in Table 4.3. North Canterbury recorded the highest per cow milk volume (5,130 litres), milkfat (235 kg), protein (199 kg) and milksolids (434 kg), of cows herd tested, followed closely by South Canterbury. West Coast recorded the highest percentage for milkfat (5.04%), protein (4.07%) and milksolids (9.11%). Herds in Southland recorded the lowest average somatic cells (157,000 cells/ml), while herds in East Coast had the highest average (301,000 cells/ml).

Table 4.3: Season herd test averages per cow by region in 2016/17

Region	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Milksolids (kg)	Milksolids (%)	Days in milk (herd testing)	Days in milk (production)	Somatic cell count (000 cells/ millilitre)
Northland	3,331	160	4.81	126	3.78	286	8.60	202	276	229
Auckland	3,741	176	4.69	140	3.73	315	8.43	210	280	220
Waikato	4,060	196	4.84	155	3.82	352	8.66	233	279	177
Bay of Plenty	3,973	188	4.74	149	3.75	337	8.49	225	269	201
Central Plateau	4,153	197	4.74	158	3.80	355	8.54	219	276	183
Western Uplands	3,617	182	5.03	142	3.93	324	8.96	238	278	224
East Coast	-	-	-	-	-	-	-	-	266	301
Hawkes Bay	3,983	186	4.68	152	3.82	338	8.50	226	272	221
Taranaki	4,211	212	5.02	167	3.96	378	8.98	232	271	186
Manawatu	4,377	204	4.67	166	3.78	370	8.45	228	279	214
Wairarapa	4,096	201	4.92	159	3.89	361	8.80	231	275	210
Nelson/Marlborough	4,415	210	4.76	170	3.84	380	8.61	236	269	176
West Coast	3,879	196	5.04	158	4.07	353	9.11	228	268	186
North Canterbury	5,130	235	4.59	199	3.87	434	8.46	231	282	165
South Canterbury	5,087	234	4.60	199	3.91	433	8.51	234	280	174
Otago	4,817	227	4.70	189	3.93	416	8.64	235	276	174
Southland	4,898	229	4.67	193	3.93	422	8.61	232	273	157
New Zealand	**4,323**	**206**	**4.77**	**167**	**3.87**	**374**	**8.64**	**229**	**276**	**183**

The 2016/17 milkfat and protein lactation regional averages for herd-tested cows (Graph 4.2) show some variability in figures among regions, with milkfat production ranging from 160 (Northland) to 235 kg per cow (North Canterbury) and protein production from 126 (Northland) to 199 kg per cow (North and South Canterbury).

Graph 4.2: Average milkfat and protein production per cow by region in 2016/17



- *Herd test averages increase in 2016/17*

Milk production (litres) per cow for 2016/17 increased slightly on the previous season (Table 4.4). Milksolids increased from 369 kilograms in 2015/16 to 374 in 2016/17. The percentage of milksolids also increased from 8.57% (2015/16) to 8.64% (2016/17).

The average herd somatic cell count decreased to 183,000 cells/millilitre for 2016/17 – the fourth consecutive season that it has been below 190,000 cells/millilitre. Average days in milk at 276 in 2016/17 was the same as the previous season and the highest in the last twenty seasons – slightly higher than in 2010/11 and 2011/12, indicating a favourable autumn which allowed farmers to milk longer.

Table 4.4: Trend in the national herd test averages for the last 20 seasons

Season	Milk (litres)	Milkfat (kg)	Milkfat (%)	Protein (kg)	Protein (%)	Milksolids (kg)	Milksolids (%)	Days in milk (herd testing)	Days in milk (production)	Somatic cell count (000 cells/ millilitre)
1997/98	3,373	158	4.67	119	3.52	277	8.21	209	266	195
1998/99	3,189	147	4.51	113	3.44	260	8.15	208	266	200
1999/00	3,601	169	4.69	130	3.58	299	8.30	221	263	193
2000/01	3,706	173	4.68	134	3.59	307	8.28	224	268	196
2001/02	3,791	176	4.64	138	3.61	314	8.28	227	268[a]	210
2002/03	3,736	175	4.68	138	3.66	313	8.38	219	-	213
2003/04	3,871	184	4.75	142	3.64	326	8.42	224	265	220
2004/05	3,812	181	4.75	140	3.66	321	8.42	225	265	229
2005/06	3,951	186	4.72	146	3.68	332	8.40	227	266	213
2006/07	4,014	191	4.85	150	3.76	341	8.50	230	267	232
2007/08	3,987	187	4.68	148	3.70	334	8.38	225	252	246
2008/09	4,043	190	4.70	150	3.72	340	8.42	228	266	253
2009/10	4,097	194	4.73	154	3.76	348	8.48	227	260	235
2010/11	4,101	194	4.73	154	3.75	348	8.48	229	274	232
2011/12	4,409	210	4.77	167	3.80	378	8.56	235	275	204
2012/13	4,386	207	4.72	166	3.79	373	8.51	227	258	204
2013/14	4,480	212	4.74	170	3.80	383	8.54	229	266	187
2014/15	4,379	209	4.78	168	3.84	378	8.63	226	273	182
2015/16	4,311	204	4.73	165	3.84	369	8.57	225	276	187
2016/17	4,323	206	4.77	167	3.87	374	8.64	229	276	183

- Not available

[a] *Average excludes Northland, Taranaki and Wellington/Hawkes Bay*

ii) Monthly averages

- *Peak milk in October*

The seasonal average figures presented in Table 4.5 are calculated using national monthly herd test averages, and are therefore affected by the number of samples processed. Statistics for May, June, and July are based on far fewer cows than the statistics for the other months, as only a few herds (generally winter milk herds) test in these months. Differences in climate between regions (which in turn can affect the mating period), available feed, and cow condition are reflected in differing months of peak production.

All cows herd tested in each month were included, provided they were tested at least once during the season (Table 4.5). Average peak cow production occurs between August and October, with most regions peaking in September.

Table 4.5: Monthly herd test averages by region in 2016/17

Average litres of milk per cow per day

	2016							2017					Season
Farming region	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*average*
Northland	16.52	16.75	19.52	19.82	17.90	17.01	15.70	12.43	10.87	12.10	10.96	14.62	15.23
Auckland	18.11	17.61	18.52	20.42	18.50	18.80	16.68	14.05	12.06	12.30	11.71	15.36	16.20
Waikato	16.73	17.15	20.80	21.77	20.08	18.95	17.95	15.38	13.59	12.62	11.20	12.74	16.72
Bay of Plenty	14.00	18.27	20.02	21.56	20.40	18.87	17.74	15.32	13.03	11.16	10.86	14.54	16.38
Central Plateau	8.96	17.31	19.17	21.90	22.28	19.44	19.53	16.70	14.84	13.32	11.97	13.08	17.53
Western Uplands	.	.	16.85	19.47	18.36	17.84	15.89	14.53	12.92	11.10	8.52	8.08	14.42
East Coast	.	.	19.63	20.60	17.65	16.84	14.61	12.28	.	8.71	9.08	22.10	14.25
Hawkes Bay	12.72	.	16.36	20.94	22.27	19.38	16.98	13.19	13.36	12.97	10.00	12.23	16.43
Taranaki	17.69	17.28	21.31	22.37	21.80	19.42	18.32	16.59	15.44	13.24	11.05	12.88	17.31
Manawatu	15.97	17.51	21.26	22.80	22.72	20.20	19.29	17.88	16.48	14.64	12.08	12.91	18.01
Wairarapa	16.24	19.79	18.08	22.01	21.71	18.85	18.10	15.86	15.07	13.34	10.53	11.67	16.70
Nelson/Marlborough	.	17.46	19.54	23.59	22.61	20.80	19.30	17.19	15.17	13.98	10.77	10.57	17.41
West Coast	.	8.45	.	22.18	21.91	18.61	17.31	14.56	13.40	11.86	10.39	9.42	15.89
North Canterbury	18.98	22.13	20.22	26.28	26.30	23.96	22.73	21.17	19.29	16.87	13.81	12.75	20.58
South Canterbury	21.22	18.12	23.77	26.21	25.33	22.51	22.44	19.38	19.32	15.14	12.41	11.90	19.69
Otago	13.22	17.00	33.12	25.01	24.61	22.40	20.62	18.86	17.92	15.72	13.01	11.60	19.06
Southland	18.15	11.59	18.61	25.57	25.44	23.12	21.78	19.10	18.54	16.38	13.88	12.02	19.58
New Zealand[1]	**16.79**	**17.60**	**20.23**	**22.55**	**22.74**	**20.18**	**19.40**	**16.95**	**15.70**	**13.95**	**12.14**	**12.44**	**17.81**

Average kg of milkfat per cow per day

	2016							2017					Season
Farming region	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*average*
Northland	0.79	0.80	0.91	0.91	0.84	0.83	0.76	0.66	0.61	0.67	0.63	0.78	0.77
Auckland	0.82	0.79	0.83	0.93	0.84	0.88	0.80	0.72	0.65	0.68	0.66	0.84	0.80
Waikato	0.83	0.82	0.97	1.01	0.94	0.92	0.86	0.80	0.74	0.71	0.66	0.76	0.86
Bay of Plenty	0.70	0.86	0.97	0.98	0.93	0.88	0.84	0.76	0.68	0.64	0.63	0.74	0.82
Central Plateau	0.53	0.85	0.87	1.02	1.02	0.93	0.91	0.85	0.78	0.75	0.70	0.74	0.89
Western Uplands	.	.	0.83	0.92	0.86	0.90	0.76	0.76	0.70	0.62	0.54	0.52	0.76
East Coast	.	.	0.91	0.89	0.86	0.72	0.63	0.64	.	0.48	0.55	0.94	0.71
Hawkes Bay	0.70	.	0.73	0.95	0.95	0.88	0.78	0.68	0.69	0.69	0.58	0.72	0.81
Taranaki	0.85	0.84	0.98	1.05	1.03	0.98	0.92	0.89	0.83	0.76	0.68	0.77	0.91
Manawatu	0.79	0.82	0.95	1.02	1.02	0.94	0.89	0.87	0.83	0.75	0.68	0.71	0.88
Wairarapa	0.82	0.91	0.95	1.02	1.01	0.92	0.90	0.83	0.80	0.75	0.64	0.68	0.87
Nelson/Marlborough	.	0.81	0.90	1.08	1.03	0.98	0.92	0.88	0.79	0.80	0.65	0.64	0.90
West Coast	.	0.57	.	1.03	1.00	0.92	0.87	0.79	0.74	0.71	0.65	0.63	0.85
North Canterbury	0.91	1.07	0.99	1.16	1.14	1.07	1.04	0.99	0.95	0.90	0.78	0.73	1.00
South Canterbury	1.01	0.87	1.07	1.17	1.09	0.99	1.01	0.94	0.95	0.83	0.73	0.72	0.97
Otago	0.73	0.79	1.02	1.14	1.08	1.02	0.97	0.93	0.91	0.83	0.75	0.71	0.95
Southland	0.84	0.68	0.89	1.13	1.12	1.06	1.01	0.95	0.92	0.87	0.80	0.72	0.98
New Zealand[1]	**0.82**	**0.84**	**0.94**	**1.04**	**1.03**	**0.96**	**0.92**	**0.86**	**0.82**	**0.77**	**0.71**	**0.73**	**0.90**

Average kg of protein per cow per day

Farming region	2016 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Jan	Feb	Mar	Apr	May	Season average
Northland	0.63	0.65	0.74	0.75	0.67	0.65	0.61	0.49	0.44	0.52	0.49	0.61	0.60
Auckland	0.68	0.64	0.67	0.75	0.68	0.71	0.65	0.54	0.48	0.52	0.51	0.65	0.63
Waikato	0.67	0.67	0.78	0.82	0.75	0.73	0.69	0.61	0.55	0.54	0.50	0.58	0.67
Bay of Plenty	0.61	0.72	0.74	0.80	0.74	0.71	0.67	0.58	0.51	0.48	0.48	0.60	0.64
Central Plateau	0.40	0.68	0.72	0.82	0.83	0.74	0.74	0.65	0.59	0.57	0.53	0.58	0.69
Western Uplands	.	.	0.66	0.73	0.69	0.69	0.62	0.59	0.53	0.47	0.40	0.39	0.59
East Coast	.	.	0.69	0.73	0.68	0.61	0.54	0.48	.	0.36	0.42	0.78	0.56
Hawkes Bay	0.53	.	0.62	0.79	0.82	0.73	0.64	0.52	0.53	0.54	0.46	0.56	0.65
Taranaki	0.68	0.71	0.80	0.85	0.83	0.77	0.73	0.69	0.64	0.58	0.51	0.59	0.71
Manawatu	0.62	0.67	0.78	0.84	0.84	0.76	0.73	0.70	0.66	0.60	0.53	0.56	0.71
Wairarapa	0.66	0.77	0.73	0.83	0.82	0.73	0.70	0.64	0.62	0.58	0.49	0.53	0.68
Nelson/Marlborough	.	0.66	0.75	0.89	0.85	0.78	0.74	0.68	0.62	0.61	0.50	0.50	0.71
West Coast	.	0.42	.	0.86	0.85	0.73	0.69	0.61	0.58	0.54	0.51	0.49	0.67
North Canterbury	0.75	0.84	0.80	0.98	0.98	0.91	0.88	0.84	0.80	0.73	0.64	0.60	0.84
South Canterbury	0.81	0.69	0.85	0.99	0.95	0.85	0.87	0.78	0.80	0.67	0.58	0.58	0.81
Otago	0.60	0.65	1.23	0.94	0.93	0.85	0.80	0.76	0.75	0.69	0.60	0.57	0.79
Southland	0.73	0.47	0.74	0.96	0.96	0.88	0.85	0.77	0.78	0.72	0.65	0.58	0.81
New Zealand[1]	**0.66**	**0.68**	**0.76**	**0.85**	**0.85**	**0.77**	**0.75**	**0.68**	**0.64**	**0.60**	**0.56**	**0.58**	**0.72**

Average somatic cell count (000 cells per millilitre)

Farming region	2016 Jun	Jul	Aug	Sep	Oct	Nov	Dec	2017 Jan	Feb	Mar	Apr	May	Season average
Northland	239	253	220	191	207	182	206	240	278	261	297	267	229
Auckland	228	214	199	195	191	167	201	279	250	254	282	230	220
Waikato	228	232	201	162	155	145	152	161	192	204	235	248	177
Bay of Plenty	239	315	187	190	185	163	167	194	211	247	262	288	201
Central Plateau	406	256	214	183	157	179	151	181	181	210	206	256	183
Western Uplands	.	.	250	204	220	172	205	197	187	258	293	313	224
East Coast	.	.	335	194	258	243	253	277	.	389	411	369	301
Hawkes Bay	213	.	163	227	192	178	185	196	270	196	248	318	221
Taranaki	336	279	284	164	170	157	166	168	193	200	240	260	186
Manawatu	278	268	244	192	191	182	200	198	214	228	258	269	214
Wairarapa	221	214	310	192	183	183	179	195	212	242	268	250	210
Nelson/Marlborough	.	154	186	144	142	158	145	164	183	194	235	252	176
West Coast	.	517	.	173	149	159	162	182	204	213	233	228	186
North Canterbury	240	192	327	167	162	150	144	150	142	163	194	218	165
South Canterbury	209	154	243	200	164	176	151	153	154	175	215	230	174
Otago	429	170	541	194	167	173	158	161	159	178	183	214	174
Southland	298	231	258	164	153	151	143	145	150	162	164	202	157
New Zealand[1]	**248**	**238**	**220**	**174**	**166**	**159**	**161**	**172**	**185**	**200**	**220**	**238**	**183**

[1] *Volume weighted averages*

iii) Breed category averages

- *Holstein-Friesian cows produce highest litres and milksolids (kg) production*

Herd test statistics by breed category (Table 4.6) include cows herd tested four or more times during the season.

On average, Holstein-Friesian cows produced a higher volume of milk than other breeds. This season they also produced the highest protein (kg) and milksolids (kg). Jerseys have the highest milkfat and protein percentages. For all breeds except Jerseys, six-year-old cows produced more milksolids (kg) than any other age group.

A crossbreed is defined as having at most 13/16 of any one breed. For example, a Holstein-Friesian/Jersey crossbreed may be 13/16 Holstein-Friesian, 2/16 Jersey and 1/16 Ayrshire.

Table 4.6: Herd test averages by breed category and cow age in 2016/17

Holstein-Friesian

Age	*Cows tested*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milksolids (kg)*	*Milkfat (%)*	*Protein (%)*	*Milksolids (%)*
2	179,826	223	3,571	158.6	135.2	293.8	4.50	3.80	8.30
3	137,192	218	4,315	190.1	163.1	353.2	4.46	3.79	8.25
4	119,197	218	4,741	209.8	178.2	388.0	4.48	3.77	8.25
5	94,310	217	4,898	216.8	183.7	400.5	4.48	3.77	8.25
6	71,026	216	4,935	218.9	184.0	402.9	4.48	3.74	8.22
7	56,255	214	4,875	214.9	179.8	394.7	4.46	3.70	8.16
8	49,181	211	4,711	210.8	173.7	384.5	4.52	3.71	8.23
9	31,009	209	4,539	202.8	165.9	368.7	4.51	3.67	8.18
10+	30,019	204	4,202	185.4	152.0	337.4	4.46	3.63	8.09
Total	**768,015**	**217**	**4,407**	**195.2**	**164.9**	**360.1**	**4.48**	**3.76**	**8.24**

Jersey

Age	*Cows tested*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milksolids (kg)*	*Milkfat (%)*	*Protein (%)*	*Milksolids (%)*
2	46,886	225	2,603	146.8	108.0	254.8	5.67	4.16	9.83
3	40,822	221	3,069	175.6	129.8	305.4	5.76	4.24	10.00
4	38,684	220	3,345	190.1	141.4	331.5	5.72	4.24	9.96
5	32,697	219	3,459	194.9	145.7	340.6	5.68	4.23	9.91
6	25,472	217	3,481	193.9	145.5	339.4	5.61	4.19	9.80
7	21,898	218	3,405	193.7	143.1	336.8	5.73	4.22	9.95
8	17,005	215	3,341	189.9	139.9	329.7	5.72	4.20	9.92
9	11,609	213	3,216	183.9	134.3	318.3	5.76	4.19	9.95
10+	13,079	208	3,002	170.4	124.4	294.8	5.71	4.15	9.86
Total	**248,152**	**219**	**3,169**	**179.5**	**133.0**	**312.5**	**5.70**	**4.21**	**9.91**

Holstein-Friesian/Jersey crossbreed

Age	*Cows tested*	*Days in milk*	*Milk (litres)*	*Milkfat (kg)*	*Protein (kg)*	*Milksolids (kg)*	*Milkfat (%)*	*Protein (%)*	*Milksolids (%)*
2	286,888	223	3,245	161.6	129.7	291.3	5.04	4.02	9.06
3	237,648	219	3,939	194.5	157.7	352.2	5.00	4.02	9.02
4	199,071	218	4,277	210.8	170.6	381.4	4.99	4.01	9.00
5	163,723	217	4,426	217.9	175.6	393.5	4.98	3.99	8.97
6	122,883	216	4,442	218.8	175.4	394.2	4.98	3.97	8.95
7	97,742	215	4,382	216.3	172.0	388.4	4.99	3.95	8.94
8	70,432	214	4,270	211.8	167.3	379.1	5.01	3.94	8.95
9	42,223	211	4,100	205.2	159.6	364.8	5.05	3.91	8.96
10+	39,754	207	3,851	190.3	148.2	338.5	4.99	3.87	8.86
Total	**1,260,364**	**218**	**4,002**	**197.9**	**158.8**	**356.7**	**5.00**	**3.99**	**8.99**

Ayrshire

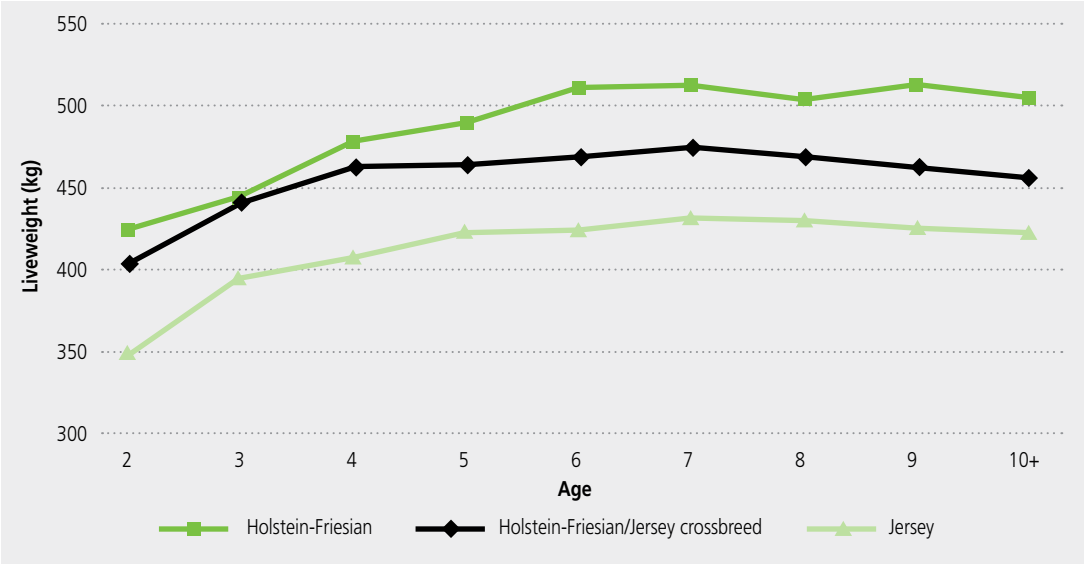
Age	Cows tested	Days in milk	Milk (litres)	Milkfat (kg)	Protein (kg)	Milksolids (kg)	Milkfat (%)	Protein (%)	Milksolids (%)
2	2,806	233	3,306	146.4	118.9	265.4	4.45	3.60	8.05
3	2,355	226	3,793	168.6	138.1	306.7	4.48	3.65	8.13
4	2,049	227	4,172	185.1	152.1	337.2	4.46	3.65	8.11
5	1,806	227	4,353	191.2	158.9	350.1	4.42	3.66	8.08
6	1,524	227	4,474	196.6	162.7	359.4	4.43	3.65	8.08
7	1,205	220	4,282	188.4	155.7	344.1	4.43	3.64	8.07
8	889	223	4,279	189.8	156.1	345.9	4.46	3.66	8.12
9	687	218	4,043	177.1	146.8	324.0	4.40	3.64	8.04
10+	905	214	3,807	165.3	137.3	302.6	4.37	3.62	7.99
Total	**14,226**	**226**	**3,980**	**175.7**	**144.6**	**320.3**	**4.44**	**3.64**	**8.08**

Holstein-Friesians have the highest average liveweight across all ages for the breeds shown in Table 4.7. In contrast, Jerseys have the lowest average liveweight at all ages. Liveweight by age and breed is illustrated in Graph 4.3.

Table 4.7: Liveweight by age and breed category of cow in 2016/17

	Holstein-Friesian		Jersey		Holstein-Friesian/Jersey crossbreed	
Age	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows	Average liveweight (kg)	Number of cows
2	425	9,282	346	3,660	403	17,830
3	445	1,642	395	448	440	3,512
4	479	1,120	408	322	463	2,539
5	490	883	423	246	464	1,988
6	512	658	425	236	470	1,692
7	514	622	432	221	476	1,187
8	505	491	430	150	469	704
9	514	214	426	101	463	513
10+	506	208	423	96	456	439
Weighted Avg	**471**		**403**		**447**	

Graph 4.3: Liveweight by age and by breed category of cow in 2016/17



C. Artificial Breeding (AB) statistics

- *3.53 million cows to AB in 2016/17*

All artificial inseminations are recorded on the LIC Herd Improvement Database. Table 4.8 provides a summary of cows mated to AB for the last nine seasons. The percentage of cows to AB at 72.7% in 2016/17 was up on the previous season (71.1%) and similar to 2014/15 season (Graph 4.4). The number of cows to AB decreased on the previous season to 3.53 million, although the numbers in Central Plateau, Canterbury and Southland increased. The number of yearlings to AB increased (8%) to 177,170 from 163,864 in the previous season (Table 4.8).

Table 4.8: Trend in Artificial Breeding use for the last nine seasons by region: Cows and yearlings to AB

Cows to AB

Region	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*
Northland	171,472	168,427	171,390	180,615	192,066	190,785	188,887	178,521	175,397
Auckland	73,708	70,604	70,730	73,516	76,013	74,961	75,070	68,754	69,918
Waikato	816,985	803,113	817,660	837,380	867,180	843,758	835,426	792,672	782,259
Bay of Plenty	142,908	135,087	138,554	136,183	137,806	139,262	141,394	134,733	127,063
Central Plateau	129,853	128,561	132,040	143,101	160,005	157,294	164,093	168,407	177,653
Western Uplands	21,781	20,508	25,415	25,136	28,427	28,256	28,163	25,143	25,764
East Coast	3,163	1,343	714	1,474	2,240	2,025	2,450	2,703	2,283
Hawkes Bay	29,426	28,480	32,338	34,433	36,878	38,851	40,145	34,375	32,076
Taranaki	381,876	379,318	389,668	392,236	396,646	395,722	396,760	371,247	358,147
Manawatu	138,830	131,907	141,879	151,327	160,485	155,417	159,631	155,641	150,140
Wairarapa	129,383	124,670	128,243	133,934	133,086	135,131	130,870	120,007	114,472
Nelson/Marlborough	67,270	64,028	67,256	68,986	68,423	65,670	65,629	63,613	61,112
West Coast	103,470	98,785	96,423	96,049	98,182	103,085	107,056	105,142	98,711
North Canterbury	365,250	374,378	411,344	455,981	502,449	524,567	539,260	549,647	566,958
South Canterbury	128,466	130,043	141,565	154,917	171,235	183,195	184,241	187,341	187,901
Otago	147,975	158,855	170,412	175,922	180,320	178,088	192,118	189,911	189,665
Southland	315,849	334,520	366,399	381,678	367,641	379,911	404,233	405,102	414,283
New Zealand	**3,167,665**	**3,152,627**	**3,302,030**	**3,442,868**	**3,579,082**	**3,595,978**	**3,655,426**	**3,552,959**	**3,533,802**

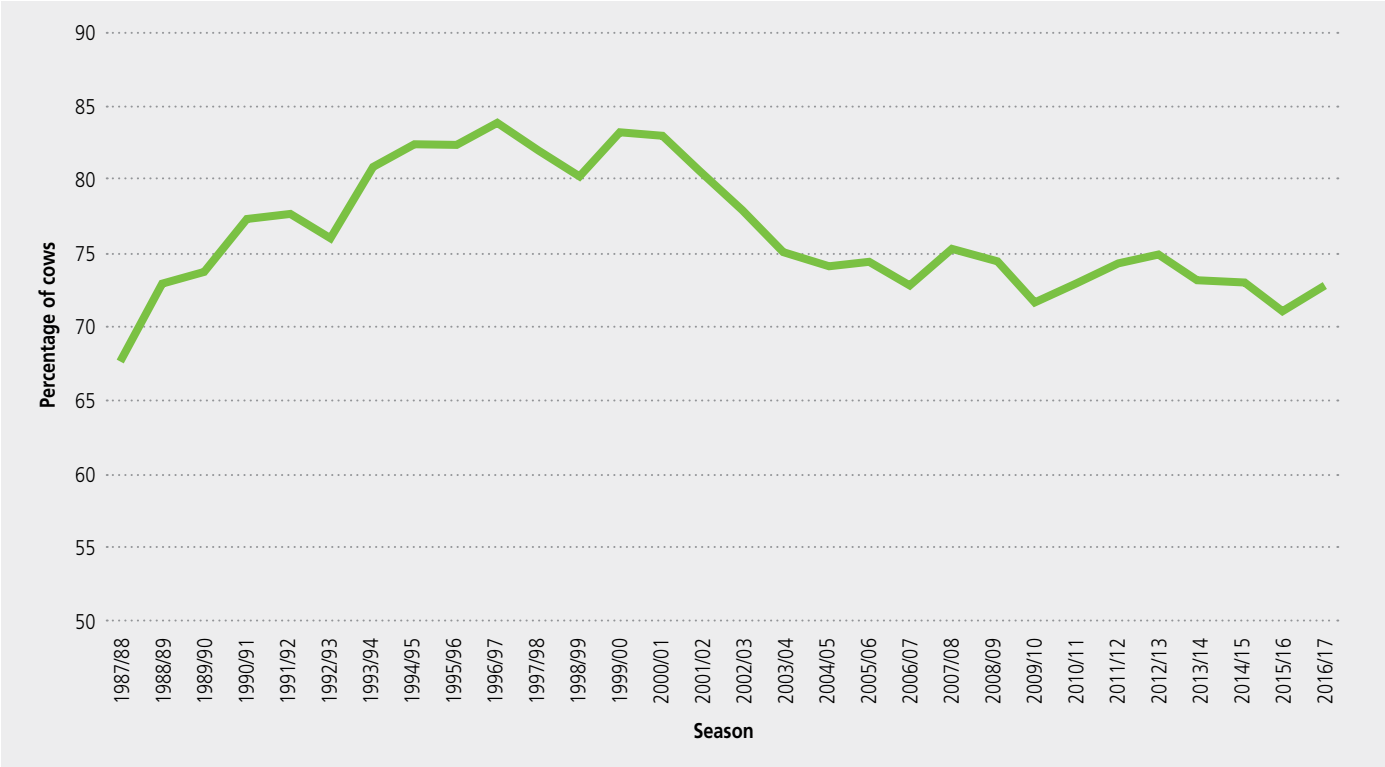
% Cows to AB

Region	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*
Northland	64.0	62.0	62.3	64.6	67.2	67.0	66.2	63.7	65.2
Auckland	64.9	64.5	63.9	67.1	67.9	67.6	65.8	61.8	67.0
Waikato	74.0	71.7	72.0	73.5	75.5	72.4	71.2	68.8	70.0
Bay of Plenty	73.9	70.0	72.1	71.1	71.4	70.5	70.4	67.8	66.4
Central Plateau	58.2	55.3	55.8	59.8	64.8	62.4	62.6	62.9	65.5
Western Uplands	63.8	55.5	63.9	64.2	67.5	63.2	60.9	53.8	58.4
East Coast	76.7	24.1	15.1	30.7	45.7	43.6	52.2	45.9	38.2
Hawkes Bay	67.8	62.0	69.3	73.7	77.2	80.2	82.1	70.5	70.2
Taranaki	80.3	79.3	80.0	81.0	80.9	80.2	79.9	76.2	75.7
Manawatu	70.2	65.0	66.6	71.3	74.7	70.7	72.6	70.4	70.5
Wairarapa	78.4	75.6	77.9	80.3	78.9	79.8	77.4	72.2	71.2
Nelson/Marlborough	82.3	77.0	79.3	81.7	79.4	74.1	74.8	74.0	71.8
West Coast	74.0	68.8	66.4	65.4	66.5	68.6	68.8	66.5	63.4
North Canterbury	82.1	78.8	80.4	81.5	82.7	79.7	79.9	79.7	84.3
South Canterbury	78.3	73.9	76.8	80.2	78.4	78.4	76.1	78.0	80.8
Otago	81.1	79.9	80.1	76.2	76.1	70.8	72.8	72.4	73.9
Southland	75.5	73.0	75.7	75.5	69.1	69.0	70.5	70.4	73.6
New Zealand	**74.5**	**71.7**	**72.9**	**74.3**	**74.8**	**73.0**	**72.8**	**71.1**	**72.7**

Yearlings to AB

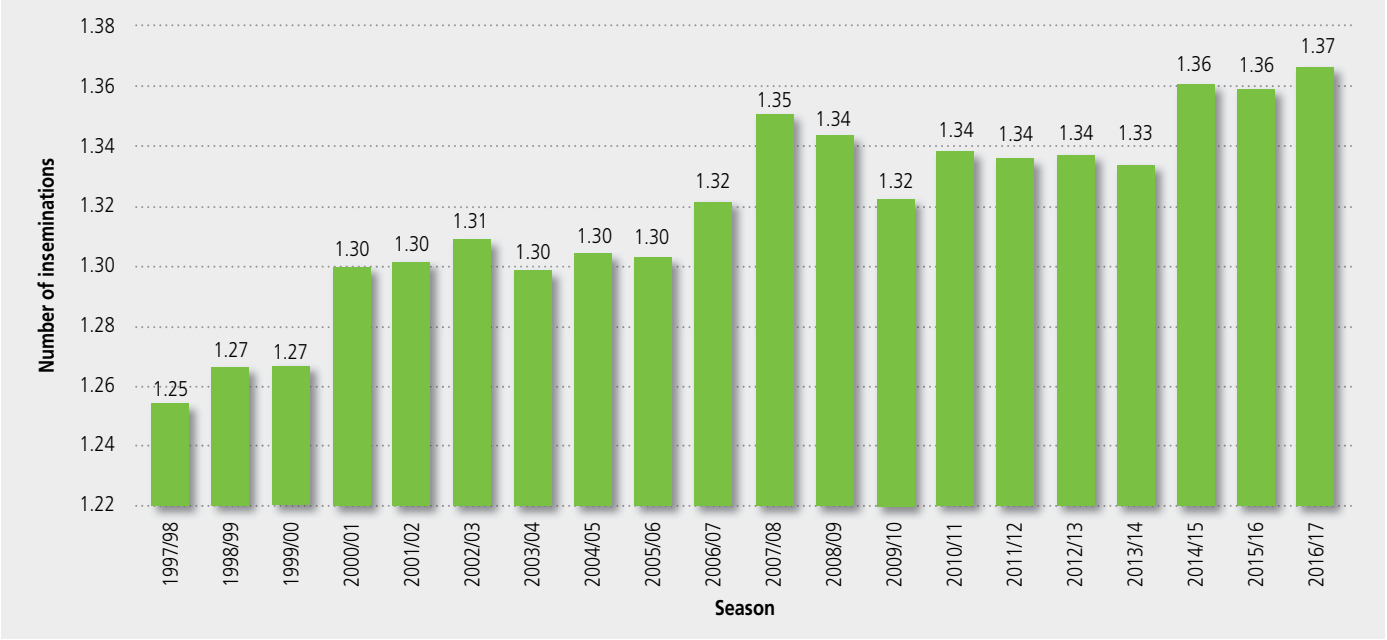
Region	*2008/09*	*2009/10*	*2010/11*	*2011/12*	*2012/13*	*2013/14*	*2014/15*	*2015/16*	*2016/17*
Northland	10,796	8,816	8,744	9,637	10,377	11,876	11,160	8,912	9,665
Auckland	3,336	2,588	3,073	3,170	2,994	3,622	3,754	2,593	2,706
Waikato	22,557	15,505	18,676	23,609	26,144	28,667	25,827	18,358	18,685
Bay of Plenty	10,495	7,116	7,871	7,461	8,373	9,375	9,411	8,032	7,205
Central Plateau	3,944	2,917	2,704	4,118	4,533	5,343	6,798	3,833	4,439
Western Uplands	853	782	1,048	1,577	2,066	2,344	1,697	2,106	1,779
East Coast	3	7	2	0	0	60	69	60	126
Hawkes Bay	2,037	1,010	1,986	2,025	3,725	2,955	2,532	1,441	1,609
Taranaki	6,775	4,822	5,191	6,458	7,651	7,920	6,652	4,292	3,800
Manawatu	6,215	4,137	4,717	6,341	7,119	8,575	8,850	5,482	6,352
Wairarapa	5,044	4,150	4,055	4,537	4,721	5,792	5,172	4,630	4,649
Nelson/Marlborough	4,651	2,499	4,006	4,826	4,874	5,012	4,082	3,210	3,597
West Coast	4,265	3,580	3,706	4,481	3,760	5,201	4,269	3,573	4,569
North Canterbury	25,831	18,911	29,168	36,916	43,063	48,312	47,250	36,328	42,882
South Canterbury	14,669	11,395	14,808	18,151	23,201	25,707	25,731	17,724	19,428
Otago	13,599	13,043	15,754	16,392	16,974	20,490	20,306	16,918	17,326
Southland	25,210	18,209	22,947	27,266	29,161	35,522	37,415	26,372	28,353
New Zealand	**160,280**	**119,487**	**148,456**	**176,965**	**198,736**	**226,773**	**220,975**	**163,864**	**177,170**

Graph 4.4: Trend in the percentage of cows to Artificial Breeding for the last 30 seasons



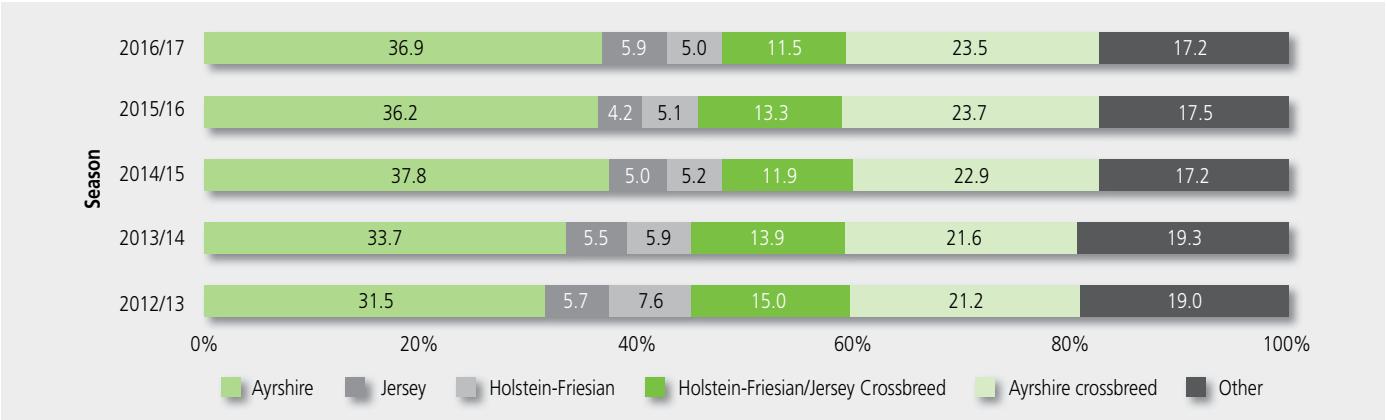
In 2016/17 the average number of inseminations per cow (1.37) (recorded on the LIC Herd Improvement Database) was slightly higher than the previous two seasons (Graph 4.5).

Graph 4.5: Average number of inseminations per cow for the last 20 seasons

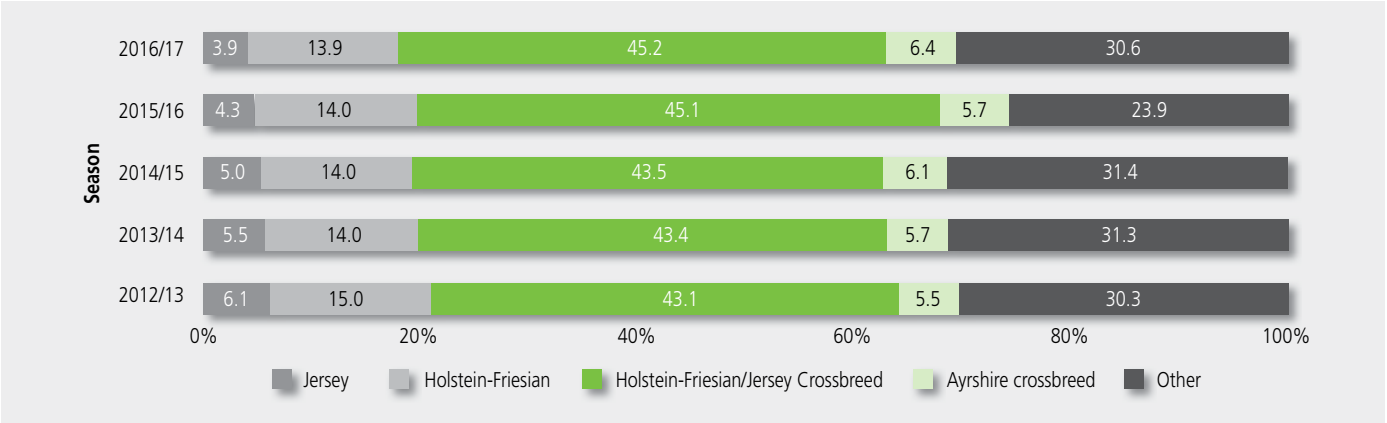


The use of Ayrshire, Holstein-Friesian and Jersey semen over different cow breeds for the past five seasons is shown in the graphs below. Ayrshire semen use over Ayrshire cows is 37% (Graph 4.6). Holstein-Friesian/Jersey Crossbreed semen is used predominantly over Holstein-Friesian/Jersey crosses (Graph 4.7). The use of Jersey semen illustrated in Graph 4.8 is predominately over Jersey cows. Holstein-Friesian semen use is spread evenly across many breeds. The use of Holstein-Friesian semen over Holstein-Friesian/Jersey Crossbreed cows continues to increase (Graph 4.9).

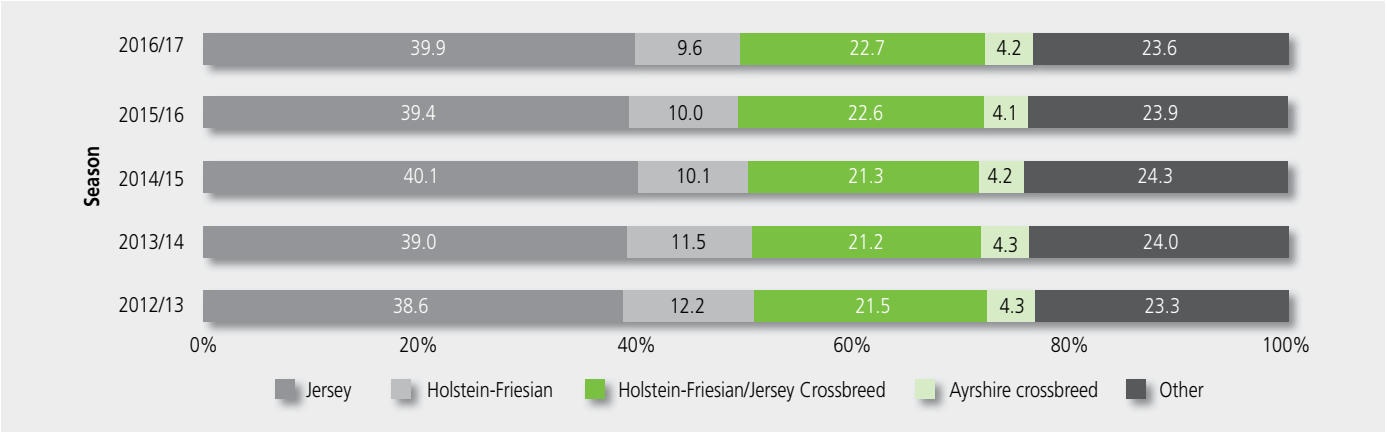
Graph 4.6: Ayrshire semen usage (%) over breed category for the last five seasons



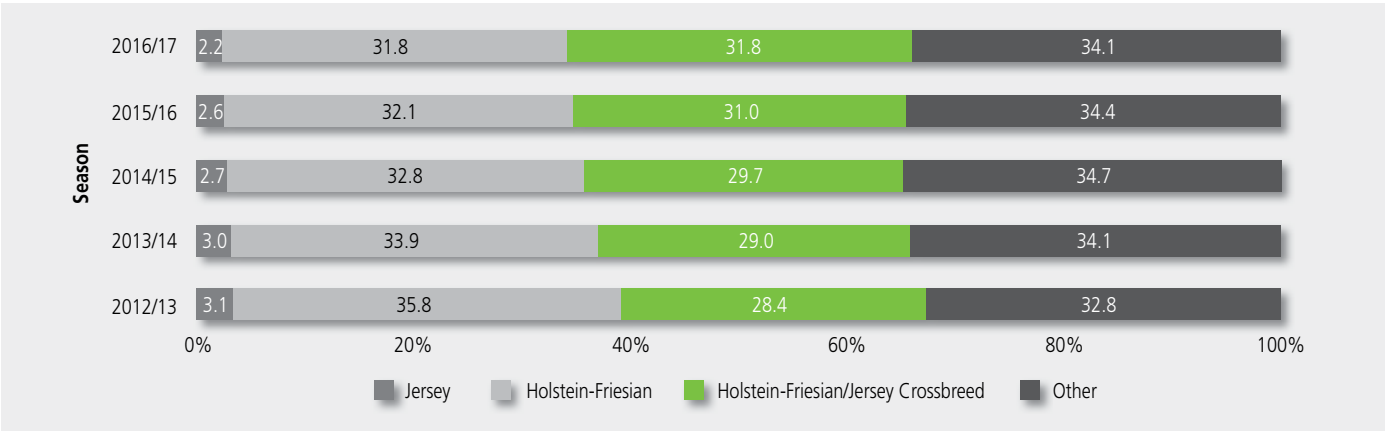
Graph 4.7: Holstein-Friesian/Jersey Crossbreed semen usage (%) over breed category for the last five seasons



Graph 4.8: Jersey semen usage (%) over breed category for the last five seasons

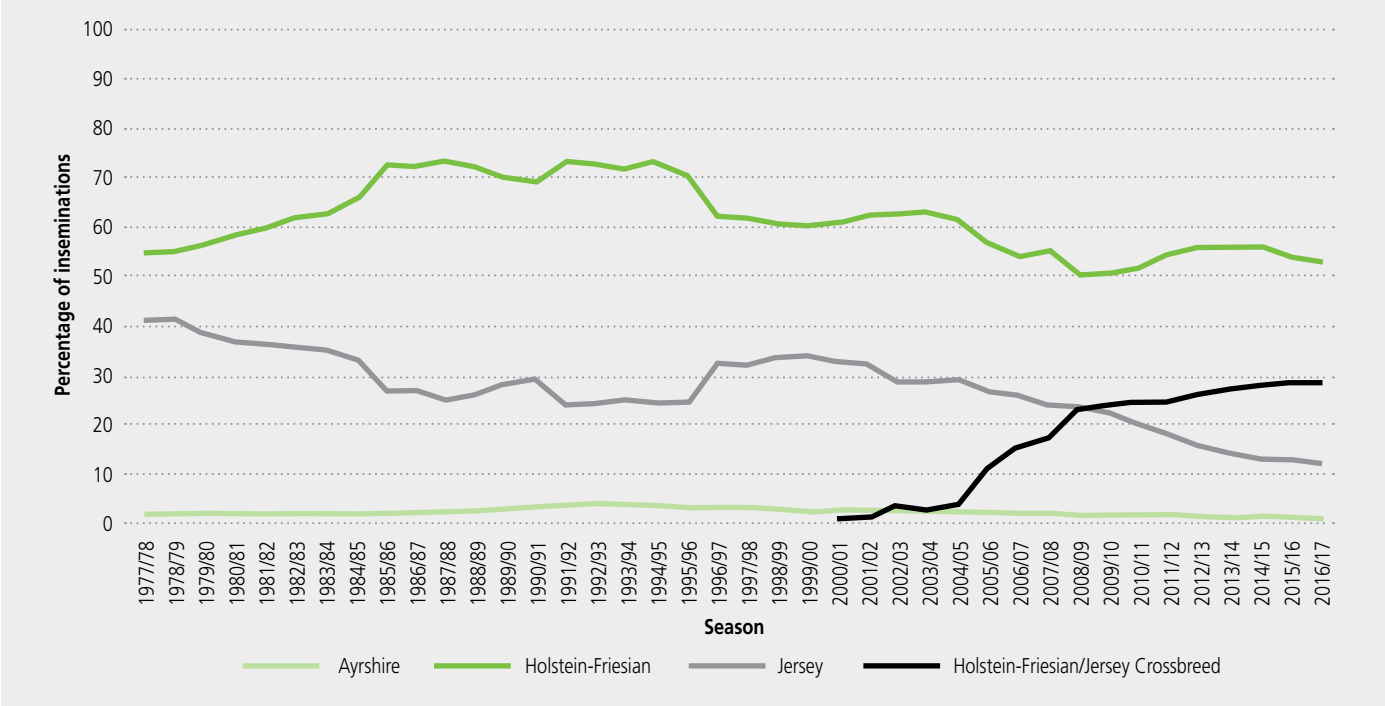


Graph 4.9: Holstein-Friesian semen usage (%) over breed category for the last five seasons



The percentage of inseminations for each breed category (Holstein-Friesian, Jersey, Holstein-Friesian/Jersey Crossbreed, and Ayrshire), as recorded on the LIC Herd Improvement Database, is shown in Graph 4.10. The percentage of inseminations for all the major breeds dropped slightly compared with the previous season.

Graph 4.10: Trend in the percentage of inseminations of each breed category for the last 40 seasons



D. Herd Reproduction

Reproductive performance is a key determinant of farm productivity. The 6-week in-calf rate is the best overall measure of herd reproductive performance and is used to compare performance between herds and to monitor national performance.

The not-in-calf rate at end of mating is important at a herd level, but is not suitable for comparison between herds due to differences in length of mating period.

Actual 6-week in-calf rate (Detailed Fertility Focus Reports) is calculated for herds with sufficient early aged pregnancy test records (at least 80% of cows in the herd, and at least 80% of all pregnancy test results are less than or equal to 122 days pregnant, or non-pregnant).

The 6-week in-calf rate for herds without sufficient early aged pregnancy test records is estimated from calving and mating data (Intermediate Fertility Focus Reports).

The statistics in this section are for LIC MINDA recording herds only.

There has been a trend towards more early aged pregnancy testing and thus more actual results are available from Detailed Fertility Focus Reports, since the launch of the DairyNZ InCalf programme in 2008/09. The number of herds with detailed reports has increased from 354 in 2008/09 to 3,857 in 2016/17 (Table 4.9).

The mean actual 6-week in-calf rate at 65.6% is slightly lower than previous seasons. The mean estimated 6-week in-calf rates are 2-3% lower than the mean actual 6-week in-calf rate, but a similar trend is evident.

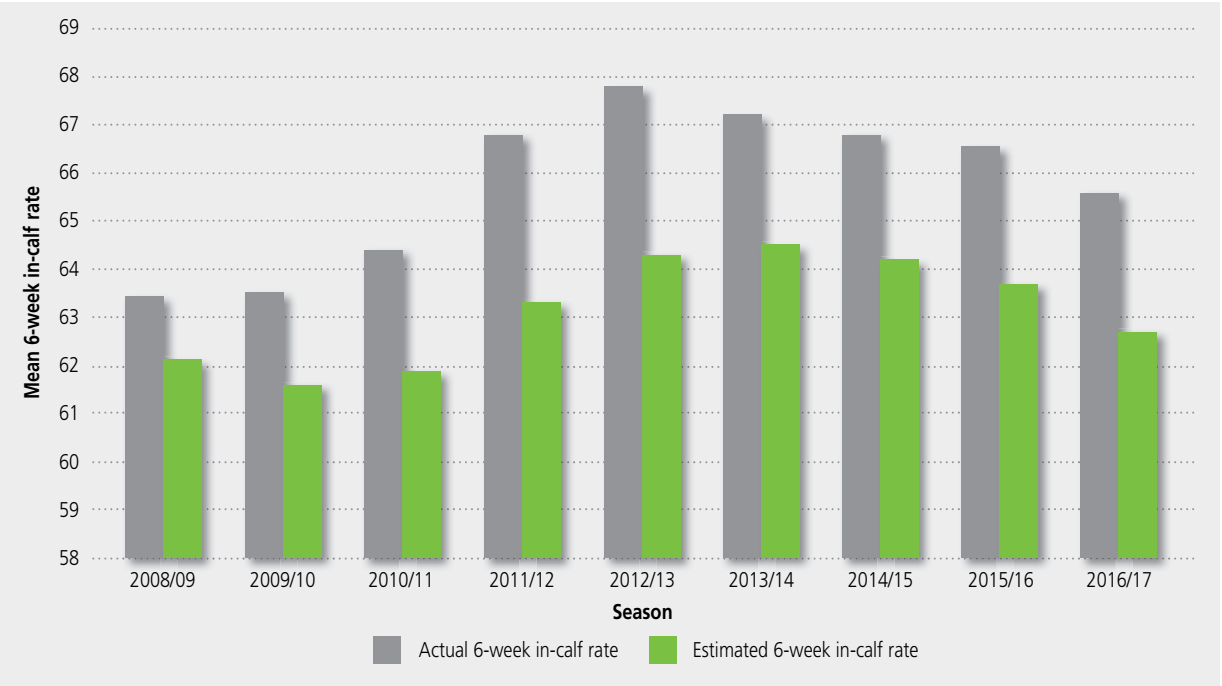
The mean 3-week submission rate and mean conception rate in 2016/17 are also lower compared with previous seasons. Conception rates are not available for Intermediate Fertility Focus Reports.

Table 4.9: Mean herd reproductive performance since 2008/09

	Actual				Estimated		
Mating season	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Mean 3-week submission rate (%)**	**Mean conception rate (%)**	**Number of herds**	**Mean 6-week in-calf rate (%)**	**Mean 3-week submission rate (%)**
2008/09	354	63.4	78.5	50.1	4,872	62.1	72.7
2009/10	712	63.5	77.5	51.0	4,749	61.6	72.2
2010/11	982	64.4	78.7	50.7	4,090	61.9	72.6
2011/12	1,341	66.8	80.7	52.2	4,051	63.3	76.0
2012/13	1,862	67.8	81.6	52.9	4,034	64.3	76.6
2013/14	2,363	67.2	80.8	52.5	3,874	64.5	76.5
2014/15	2,895	66.8	81.1	52.6	3,918	64.2	76.2
2015/16	3,646	66.5	80.0	52.4	4,778	63.7	75.0
2016/17	3,857	65.6	77.9	51.6	4,427	62.7	72.1

Note: *Results for 2008/09 and 2009/10 are based on the first version of the Fertility Focus Report software. Results from 2010/11 onwards are from an improved version.*

Graph 4.11: Mean actual and estimated 6-week in-calf rate since 2008/09



Note: *Results for 2008/09 and 2009/10 are based on the first version of the Fertility Focus Report software. Results from 2010/11 onwards are from the improved version.*

Mean actual 6-week in-calf rate by region ranged between 62.8% (Hawkes Bay / Manawatu / Wairarapa) and 68.5% (West Coast / Nelson / Marlborough) in 2016/17 (Table 4.10). Most regions recorded a decrease over the previous season – the exception being Northland / Auckland.

Table 4.10: Mean 6-week in-calf rate by farming region for the last three seasons.

	Actual						Estimated					
	2014/15		2015/16		2016/17		2014/15		2015/16		2016/17	
Farming region	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)
Northland / Auckland	119	62.7	179	63.4	193	64.6	329	60.2	522	61.1	485	60.5
Waikato / Western Uplands	816	67.4	983	67.7	1065	66.1	1,137	64.6	1,529	63.9	1,370	62.3
BoP / Central Plateau / East Coast	242	65.6	325	65.1	335	64.6	369	64.3	422	64.0	398	62.5
Hawkes Bay / Manawatu / Wairarapa	276	63.7	323	64.0	341	62.8	341	62.3	380	62.3	352	61.6
Taranaki	223	68.7	308	67.7	308	67.1	887	65.3	1,020	64.7	973	63.8
West Coast / Nelson / Marlborough	97	68.0	137	69.2	139	68.5	249	64.3	306	65.1	297	64.5
North & South Canterbury	566	67.7	691	66.3	735	65.5	227	65.4	242	64.3	218	63.4
Otago / Southland	556	67.2	700	66.8	740	65.8	379	64.2	357	63.2	323	63.8

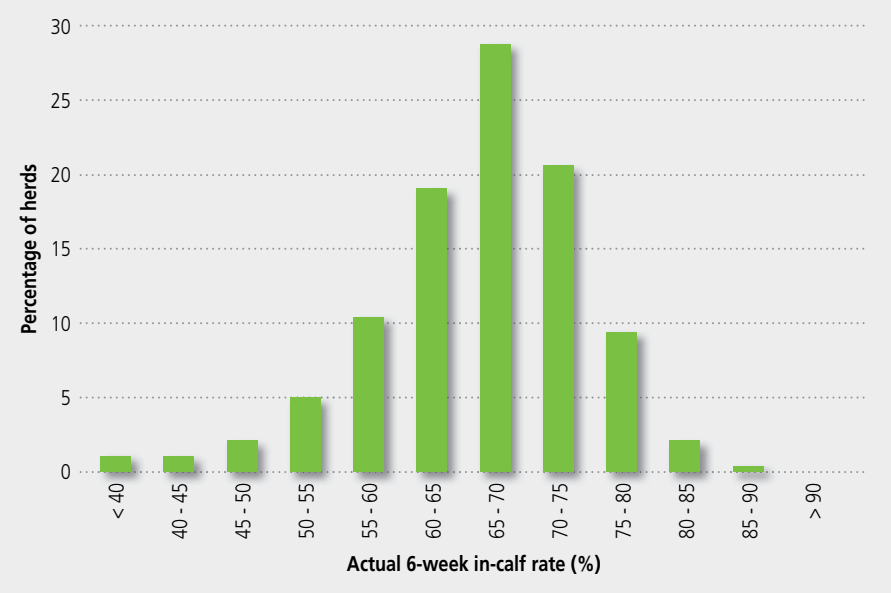
Note: *Results reported in this table are from an improved version of the Fertility Focus Report software and will differ from earlier publications.*

In 2016/17, 50% of herds had an actual 6-week in-calf rate of 67% or higher and 10% had an in-calf rate of 75% or higher (Table 4.11). Ten per cent of herds had 6-week-in-calf rate of 55% or lower.

Table 4.11: Actual 6-week in-calf rate in 2016/17

	Number of herds	Median	Top 10%	Top 25%	Bottom 25%	Bottom 10%
6-week in-calf rate	3,857	67	>75	>71	<61	<55

Graph 4.12: Distribution of actual 6-week in-calf rate in 2016/17

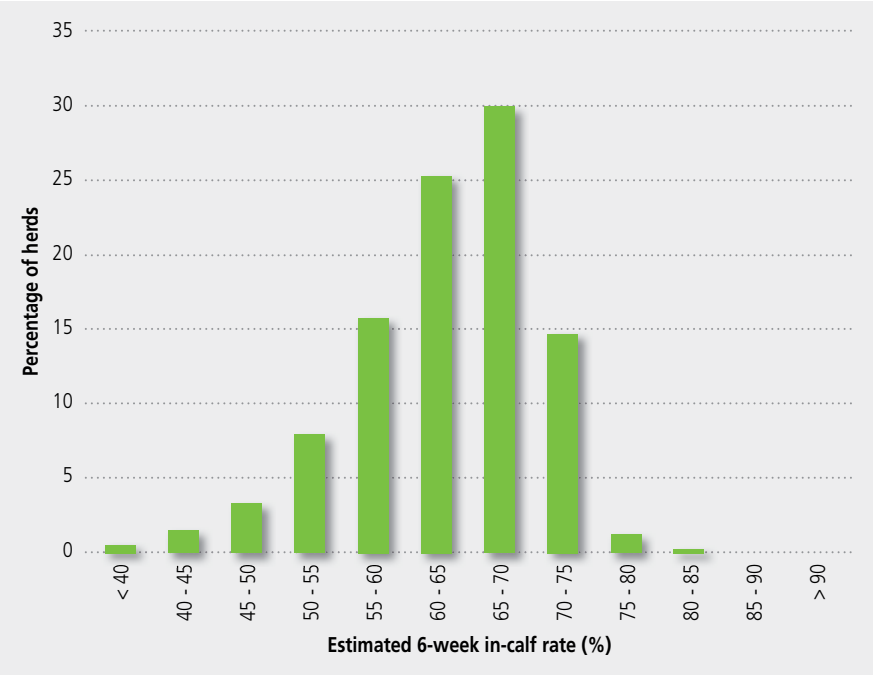


The distribution of estimated 6-week in-calf rates is tighter than the actual results reflecting that estimates tend towards the mean. This is because estimates for low performing herds tend to be overestimated, while estimates for high performing herds tend to be underestimated. In 2016/17, 50% of herds had an estimated 6-week in-calf rate of 64% or higher and 10% of herds had an estimated 6-week in-calf rate of 71% or higher (Table 4.12). Ten per cent of herds had an in-calf rate of 53% or lower.

Table 4.12: Estimated 6-week in-calf rate in 2016/17

	Number of herds	Median	Top 10%	Top 25%	Bottom 25%	Bottom 10%
6-week in-calf rate	4,427	64	>71	>68	<59	<53

Graph 4.13: Distribution of estimated 6-week in-calf rate in 2016/17



E. Calving

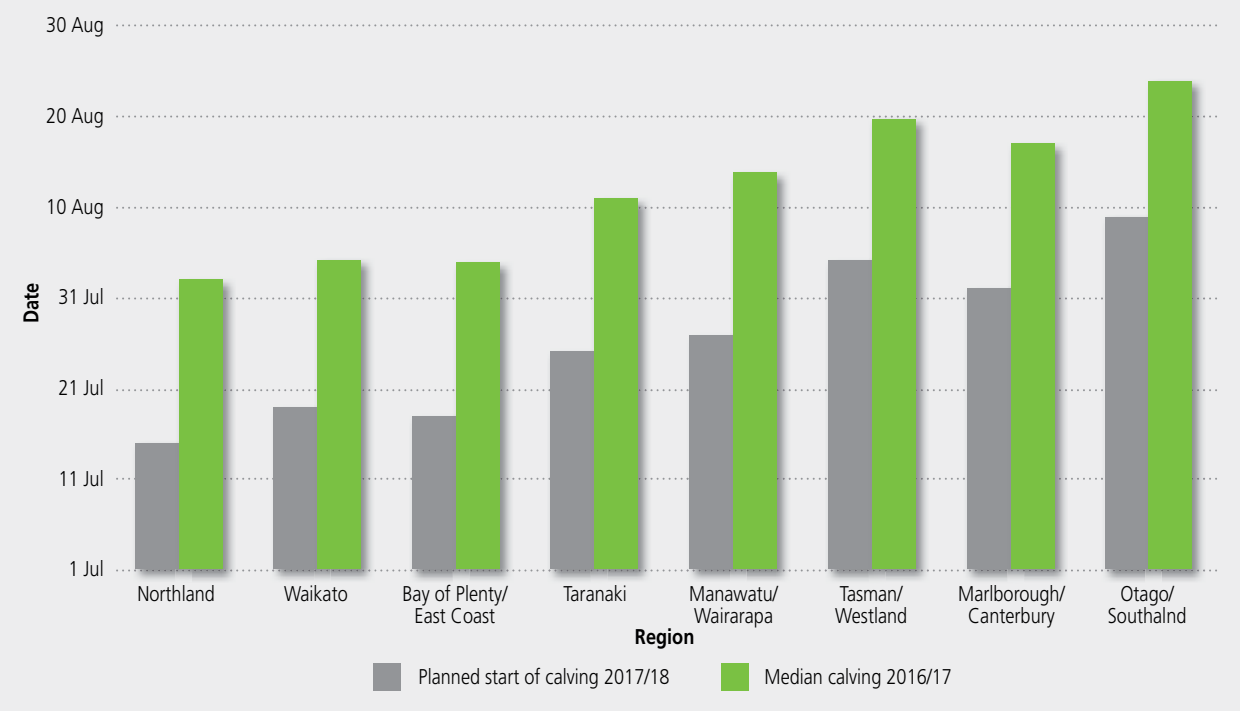
i) Planned start of calving and median calving dates

The trend in calving dates within and between regions is best shown by the "planned start of calving" date. The planned start of calving date is 282 days from the date that mating is started in the herd. The farmer has control over, and the ability to change, the start of mating.

Mating and calving information is recorded on the LIC Herd Improvement Database for approximately 85% of all herds.

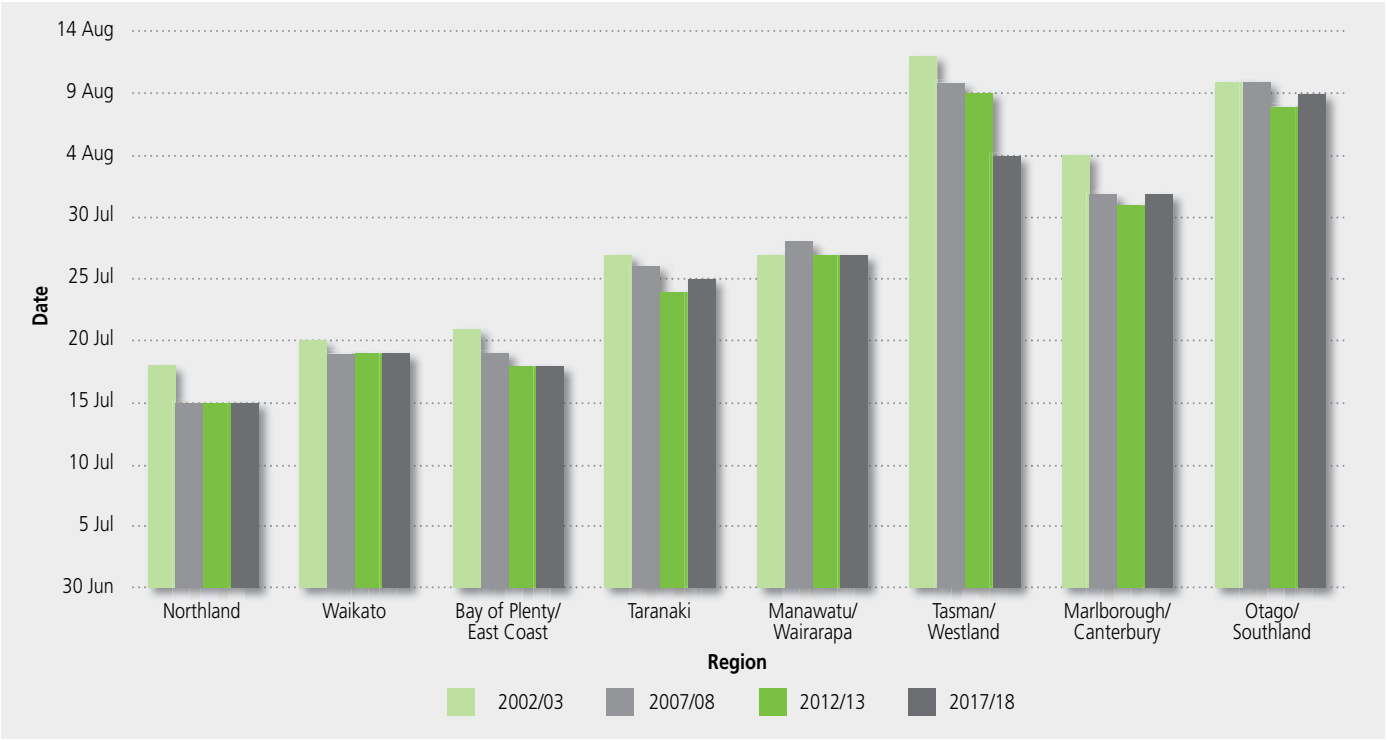
The median calving date (the date that occupies the middle position after the dates are arranged in ascending order) is used as an indicator of actual calving spread. The forecast planned start of calving and actual median calving dates for cows (excluding first calvers) for the 2016/17 season are shown in Graph 4.14.

Graph 4.14: Planned start of calving and median calving dates for cows (excluding first calvers) by region



The planned start of calving for five-yearly intervals since 2000/01 is shown in Graph 4.15. The trend is for an earlier planned start of calving for Tasman / Westland. Other regions have a similar planned start of calving compared with five and ten years ago.

Graph 4.15: Trend in planned start of calving dates for cows (excluding first calvers) by region



ii) Calving interval

The calving interval for a herd tested cow is the number of days between her calving date in the current season and her calving date in the preceding season. No interval is calculated for first-calving heifers. The average calving interval is based on all recorded calving dates for herd tested cows calving during the period from 1 June to 30 November. All records where pregnancy was terminated were excluded.

Table 4.13: Mean calving interval by breed since 2000/01

	All breeds		*Holstein-Friesian*		*Jersey*		*Friesian/Jersey Cross*		*Ayrshire*	
Season	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*	*Average number of days*	*Number of records*
2000/01	368.2	2,075,300	368.4	1,120,489	368.4	355,463	367.7	491,090	369.3	25,941
2001/02	368.3	2,093,134	368.7	1,091,334	367.8	363,278	367.7	526,610	369.7	25,572
2002/03	368.4	2,109,651	368.6	1,068,842	368.3	365,913	368.0	562,974	369.4	24,175
2003/04	369.0	2,181,103	369.4	1,067,677	368.2	375,598	368.6	620,523	368.9	23,642
2004/05	369.5	2,210,747	370.1	1,040,243	368.8	383,759	369.0	666,562	370.6	23,169
2005/06	367.8	2,241,175	368.2	1,013,546	367.7	390,971	367.4	706,441	368.2	23,129
2006/07	368.9	2,260,512	369.3	1,002,099	369.0	387,357	368.2	739,493	370.4	22,785
2007/08	369.9	2,349,042	370.4	985,422	369.7	366,954	369.5	853,422	371.0	21,239
2008/09	370.1	2,359,392	371.0	953,577	368.9	359,509	369.5	891,949	371.9	19,948
2009/10	368.7	2,477,122	369.1	972,118	368.3	361,329	368.5	980,435	369.3	16,745
2010/11	368.6	2,628,672	369.2	1,000,637	368.2	364,664	368.2	1,088,976	370.5	19,719
2011/12	368.3	2,807,333	368.5	1,030,006	368.0	370,877	368.2	1,213,169	369.1	20,164
2012/13	368.8	2,927,817	368.7	1,323,053	368.4	370,796	368.7	1,323,053	369.5	20,643
2013/14	368.4	3,054,915	368.8	1,051,940	368.2	366,500	368.2	1,427,255	369.8	20,337
2014/15	368.4	3,087,517	368.9	1,037,413	367.8	350,376	368.1	1,478,464	368.9	18,949
2015/16	369.5	3,063,466	370.0	1,002,362	368.5	327,521	369.4	1,515,761	370.0	17,358

F. Animal Evaluation

The genetic merit of New Zealand dairy cows and sires is estimated using statistical methods which allow simultaneous evaluation of cows and sires of all breeds, using all recorded relationships. The structure of the national herd reveals large numbers of crossbred cows, and large numbers of herds with mixed breeds. For this reason the national evaluation system is designed to compare animals irrespective of breed, both nationally and within herd, to assist farmers to select the most profitable animals for the future.

There are two types of evaluations calculated for New Zealand dairy animals:

1. Trait evaluations are estimates of an animal's genetic merit (Breeding Values) for individual traits including milkfat, protein, volume, liveweight, somatic cell, fertility, body condition score and residual survival. There are also estimates of an animal's lifetime productive ability (Production Values) for milkfat, protein, volume and liveweight.
2. Economic evaluations combine an animal's individual trait evaluations to estimate its comparative ability to convert feed into profit, through breeding replacements (Breeding Worth) and lifetime production (Production Worth).

For each economic index, Economic Values are calculated for the relevant traits. For Breeding Worth, the Economic Values represent the net income per unit of feed from breeding replacements with a one unit genetic improvement in the trait. For Production Worth, the Economic Values represent the net income per unit of feed from milking cows with a one unit improved productive ability in the trait. In each case the base unit of feed is 5 tonnes of dry matter in average quality pasture.

The profit-related traits are combined into a single economic index. For example,

Breeding Worth	**=**	**Milkfat BV**	**x**	**$EV (Milkfat)**	**+**
		Protein BV	**x**	**$EV (Protein)**	**+**
		Milk BV	**x**	**$EV (Milk)**	**+**
		Liveweight BV	**x**	**$EV (Liveweight)**	**+**
		Somatic Cell BV	**x**	**$EV (Somatic cell)**	**+**
		Fertility BV	**x**	**$EV (Fertility)**	**+**
		Residual Survival BV	**x**	**$EV (Residual Survival)**	

where: BV = Breeding Value for each trait
$EV = Economic Value for each trait for breeding replacements

Production Worth is calculated using Production Values for the 3 production traits and liveweight, multiplied by the respective economic values.

Animal Evaluation ranks animals in terms of their expected profit per unit of feed consumed. Breeding Worth (BW) and Production Worth (PW) are based on future price predictions for milk components.

The economic values for 2017 are presented below (Table 4.14). The economic values are reviewed annually and therefore may change from year to year. More recently, the movement in EVs has been highly influenced by the fluctuation in milk price.

Table 4.14: Economic values used from 15 February 2017

	Milkfat ($/kg)	*Protein ($/kg)*	*Milk ($/kg)*	*Liveweight ($/kg)*	*Somatic Cell ($/score)*	*Fertility ($/%)*	*Body Cond. Score ($/score)*	*Residual Survival ($/day)*
Breeding Worth	1.90	6.63	-0.088	-1.31	-37.09	6.41	94.41	0.123
Production Worth	1.90	6.63	-0.086	-1.31	-	-	-	-

The information for all Animal Evaluation statistics was sourced from cows and sires recorded on the LIC Database as at 20 May 2017. The evaluations were conducted with reference to a genetic base of cows born in 2005.

i) Sire Evaluations

Table 4.15 shows the Breeding Values (BV) and Breeding Worth (BW) by breed, of all bulls born in 2012, first proven in the 2016/17 season with a BW Reliability of 75% or greater. Reliability of BW is reported on a scale from 0% to 99%. 0% is the case where there are no performance records for any related animal used in the bull's evaluation. 99% is the case where the bull has a very large number of performance-recorded daughters.

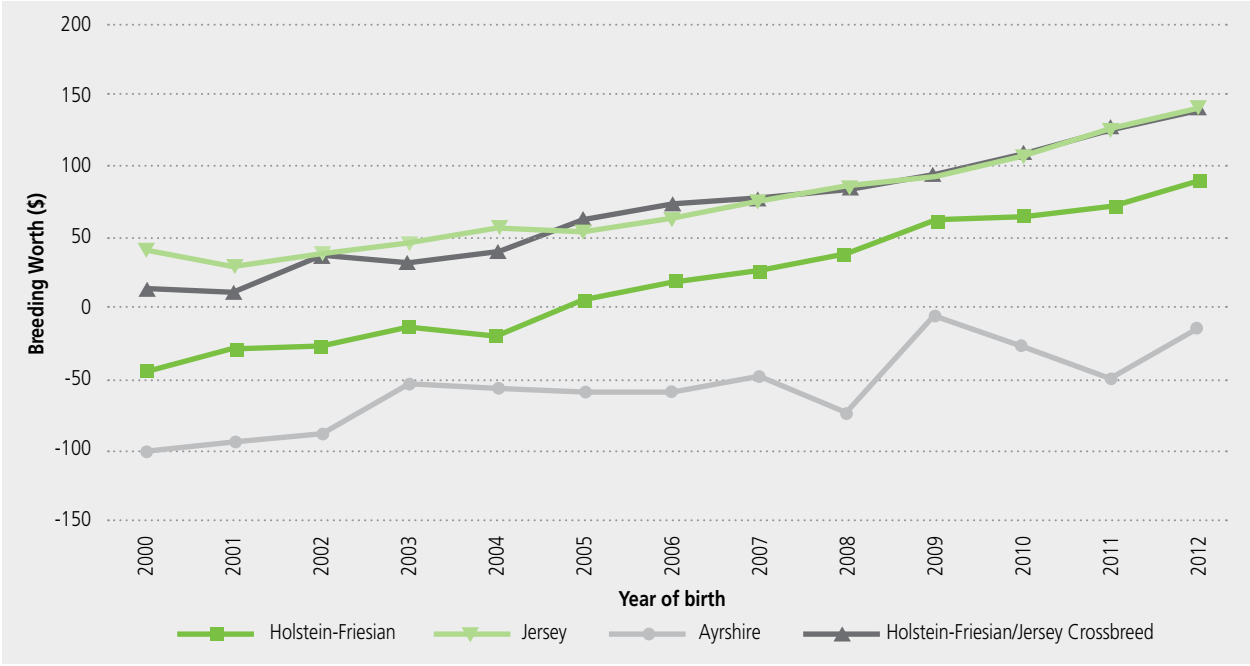
Table 4.15: Average Breeding Values and Breeding Worth of 2012 born bulls (BW reliability of 75% or greater)

Breed category	Milk Fat BV	Protein BV	Milk Volume BV	Liveweight BV	Somatic Cell BV	Fertility BV	Body Condition Score BV	Residual Survival BV	Breeding Worth	Number of Bulls
Ayrshire	-0.7	1.3	147.5	-6.6	-0.3	-2.7	-0.1	16.5	-13.2	2
Friesian	20.7	26.5	772.1	42.5	0.0	0.7	0.0	-14.3	92.0	141
Jersey	6.1	-3.1	-498.1	-55.5	-0.2	2.8	0.1	-21.6	138.9	74
Cross	18.2	14.7	213.7	-6.9	-0.1	2.0	0.0	-14.0	138.8	85

(Evaluation date: 20 May 2017)

The genetic trend of all proven dairy bulls is shown in Graph 4.16.

Graph 4.16: Genetic trend of proven dairy bulls by year of birth (BW reliability of 75% or greater)



(Evaluation date: 20 May 2017)

Young bulls are initially selected for use in Artificial Breeding based on the genetic merit of their sire and dam and/or genomic indices. These young sires are then progeny tested to estimate their Breeding Worth more accurately via the performance of their daughters. Each year some progeny tested bulls are returned to service for use as proven sires.

Table 4.16 shows the number of sires, by birth year and breed category, for which the Reliability of the BW was at least 75%. The information in this table is updated every year for all age groups to include older bulls that have now been proven in New Zealand.

Table 4.16 Number of Sires by birth year and breed category (reliability of BW 75% or greater, includes overseas bulls)

Year of birth	Number of sires	Friesian	Jersey	Ayrshire	Cross	Other breeds
2000	463	243	123	27	65	5
2001	484	221	151	30	74	8
2002	492	248	148	21	72	3
2003	485	239	142	33	69	2
2004	483	229	137	25	91	1
2005	457	195	150	18	91	3
2006	483	217	155	27	82	2
2007	312	148	96	21	44	3
2008	328	135	105	18	68	2
2009	328	148	104	14	61	1
2010	300	146	77	16	59	2
2011	339	165	94	10	70	0
2012	302	141	74	2	85	0
Grand Total	**5256**	**2475**	**1556**	**262**	**931**	**32**

(Evaluation date: 20 May 2017)

ii) Cow Evaluations

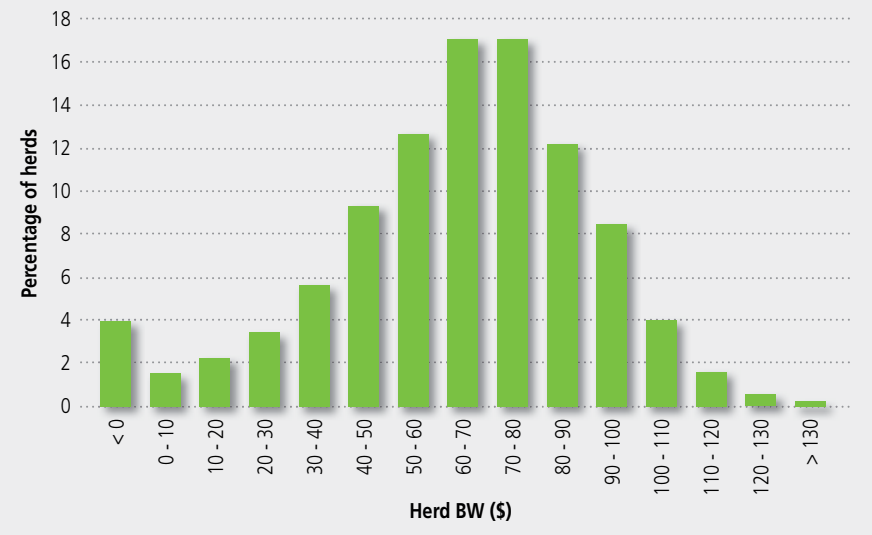
The Breeding Worth for herds presented below (Table 4.17 and Graph 4.17) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2016/17 season. Table 4.17 shows that 50% of these herds had a BW of 64 or above and 25% of these herds had a BW of 80 or above.

Table 4.17: Herd Breeding Worth in 2016/17

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Herd BW	64	> 102	> 95	> 80	< 45	< 19	< 2

(Evaluation date: 20 May 2017)

Graph 4.17: Distribution of Herd Breeding Worth in 2016/17



(Evaluation date: 20 May 2017)

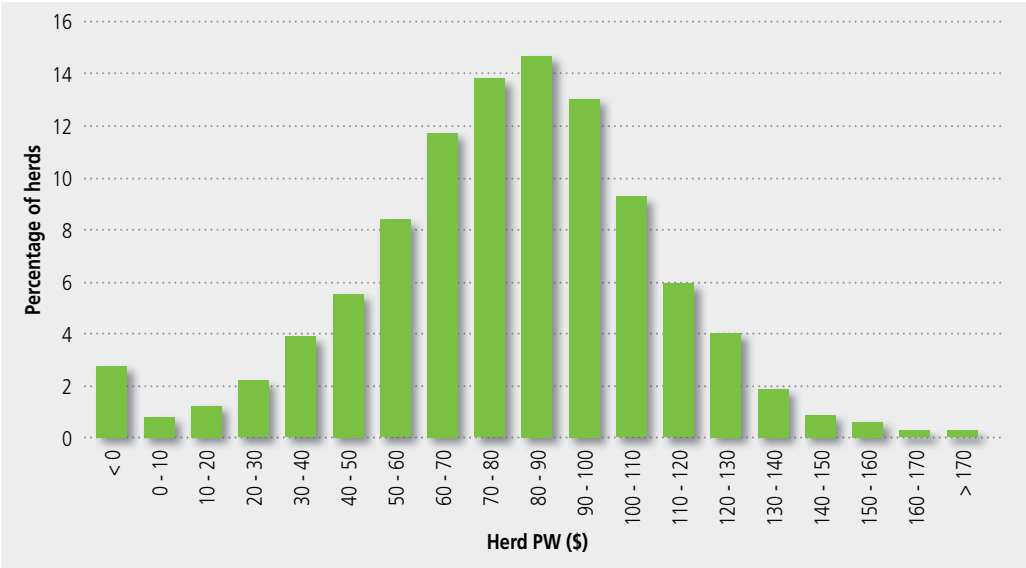
The Production Worth (PW) for herds presented below (Table 4.18 and Graph 4.18) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2016/17 season. Table 4.18 shows that 50% of these herds had a PW of 78 or above and 25% of these herds had a PW of 96 or above.

Table 4.18: Herd Production Worth in 2016/17

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Herd PW	78	> 124	> 113	> 96	< 57	< 33	< 16

(Evaluation date: 20 May 2017)

Graph 4.18: Distribution of Herd Production Worth in 2016/17



(Evaluation date: 20 May 2017)

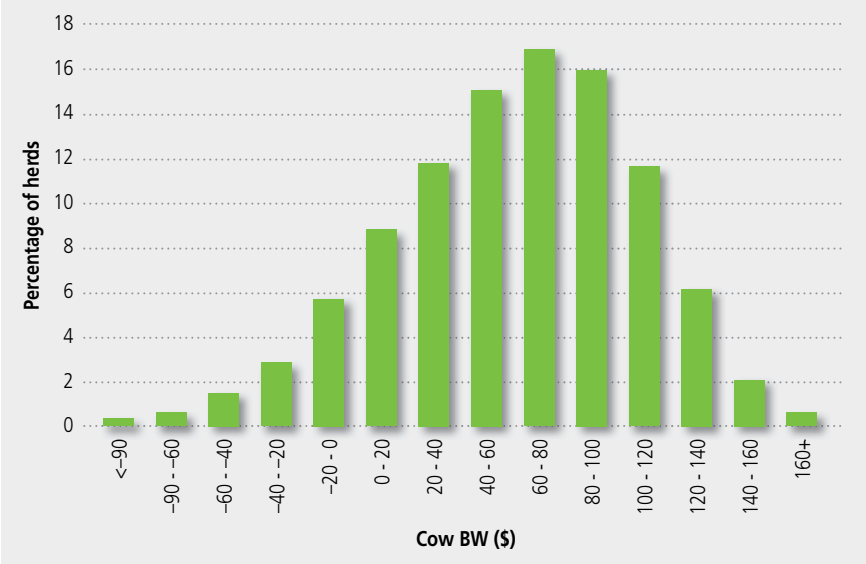
The Breeding Worth (BW) for cows presented below (Table 4.19 and Graph 4.19) is based on all cows of the users of herd testing services, in herds with at least 80 cows, and signed up for herd testing in the 2016/17 season. Table 4.19 shows that 50% of these cows had a BW of 63 or above and that 25% of these cows had a BW of 94 or above.

Table 4.19: Cow Breeding Worth in 2016/17

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Cow BW	63	> 132	> 118	> 94	< 28	< –6	< –28

(Evaluation date: 20 May 2017)

Graph 4.19: Distribution of Cow Breeding Worth in 2016/17



(Evaluation date: 20 May 2017)

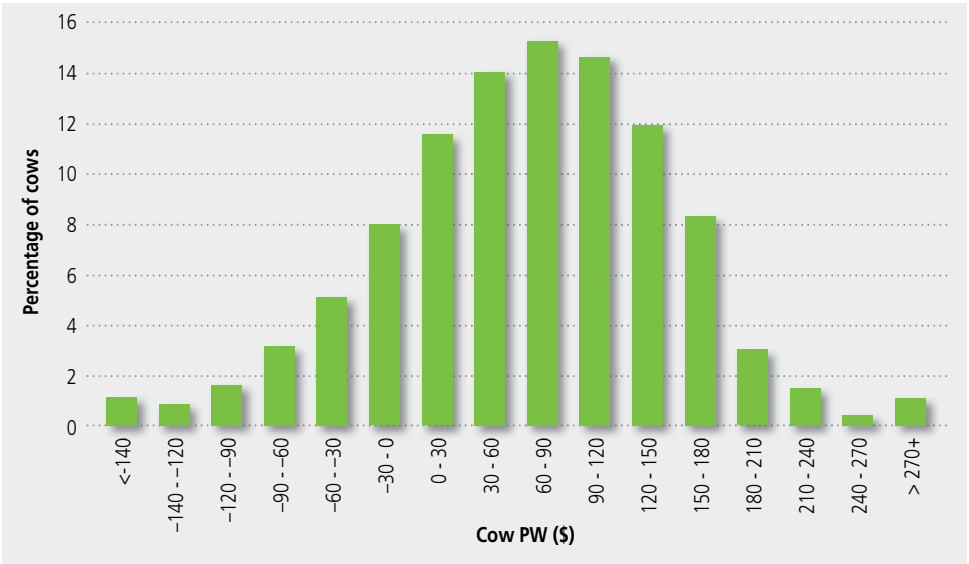
The Production Worth (PW) for cows presented below (Table 4.20 and Graph 4.20) is based on cows of the users of herd testing services, in herds with at least 80 cows, in the 2016/17 season. Table 4.20 shows that 50% of these cows had a PW of 76 or above and that 25% of these cows had a PW of 131 or above.

Table 4.20: Cow Production Worth in 2016/17

	Median	Top 5%	Top 10%	Top 25%	Bottom 25%	Bottom 10%	Bottom 5%
Cow PW	76	> 215	> 182	> 131	< 19	< –35	< –70

(Evaluation date: 20 May 2017)

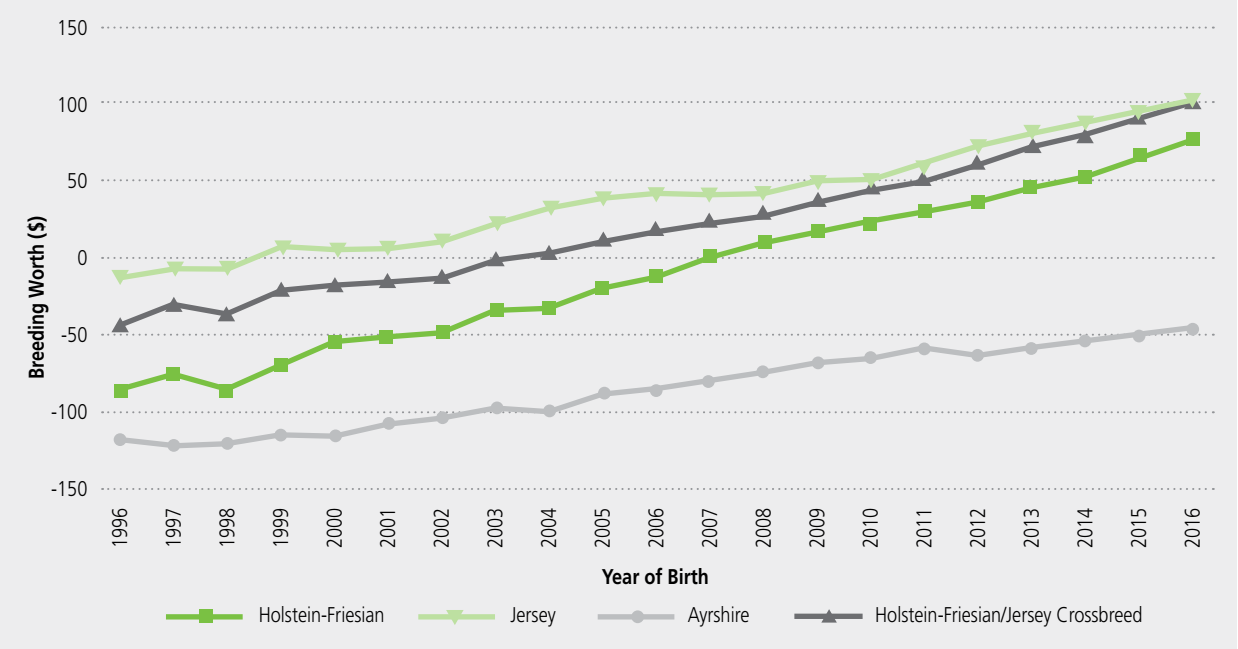
Graph 4.20: Distribution of Cow Production Worth in 2016/17



(Evaluation date: 20 May 2017)

The genetic trend for cows is based on all cows (alive or dead) recorded on the LIC Database in the 2016/17 season. Also included are the estimated BW and PW for replacement stock (2015 and 2016 born animals). All evaluations can be compared across breeds. The genetic trend for BW by breed is presented in Graph 4.21. The Breeding Worth for all breed categories has increased over time.

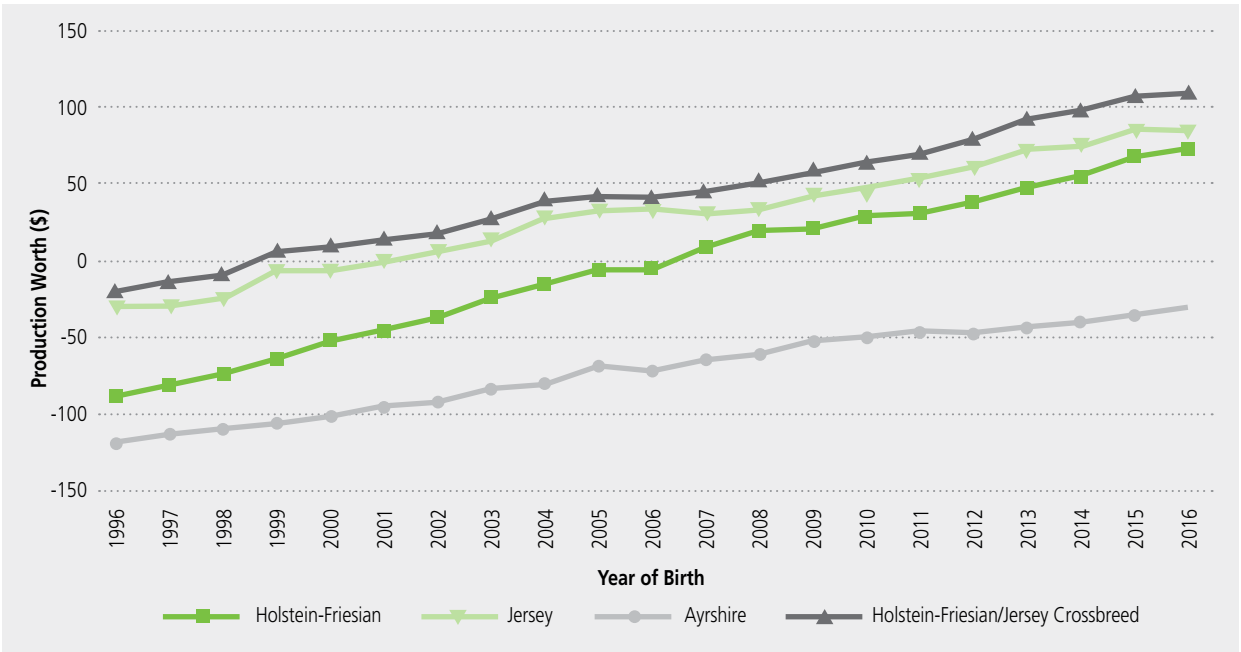
Graph 4.21: Trend in Breeding Worth for all cows



(Evaluation date: 20 May 2017)

The trend for PW by breed is presented in Graph 4.22. Holstein-Friesian/Jersey crossbreds have maintained a higher PW over other breeds, caused by the effects of heterosis (hybrid vigour) in the crossbreds.

Graph 4.22: Trend in Production Worth for all cows



(Evaluation date: 20 May 2017)

Table 4.21 shows the average BVs and BW by breed category, of all 2014 born cows. The Jersey cows had the highest average BW at 89.5. Holstein Friesian cows had the highest milkfat, protein, and milk volume BVs. All evaluations are comparable across breeds.

Table 4.21: Average Breeding Worth and Breeding Values of all cows by breed born in 2014.

Breed	BW $	Milkfat BV (kg)	Protein BV (kg)	Milk Volume BV (l)	Liveweight BV (kg)	Somatic Cell BV (score)	Fertility BV (%)	Body Cond. Score (score)	Residual Survival BV (days)	Cow Numbers
Holstein-Friesian	54	11.7	17.5	527	32.4	-0.01	0.7	0	-13	385,400
Jersey	89.5	2.7	-6	-515	-48.5	-0.11	1.3	0.06	-33	90,442
Ayrshire	-51.6	-7.6	-1.7	73	6.6	-0.24	-4	-0.09	106	5,655
HF/J Crossbred	81.3	9.7	8.2	73	-4.4	-0.04	1.1	0.02	-25	494,144
Guernsey	-199	-24.5	-18.8	-486	26.1	0.1	-5.2	-0.07	4	84
Milking Shorthorn	-162.3	-29.6	-15.8	-322	22.5	-0.12	-2	0.03	81	261
Brown Swiss	-179.6	-20.3	-8	-208	56.7	-0.36	-9.1	0.02	138	93
Other	61.3	5.8	6.2	31	-2.2	-0.13	0.2	0.01	2	74,163
Weighted Average	69.8	9.4	10.2	185.8	5.5	-0.04	0.9	0.01	-18.6	1,050,242

(Evaluation date: 20 May 2017)

Survivability is measured by the percentage of cows that have a lactation recorded for consecutive years. In the 2016/17 season, survivability was lower than the previous few years for most age groups. The value in the "2-3 years" column is the percentage of cows that were milking as two-year-olds in the 2015/16 season and are now milking as three-year-olds in the 2016/17 season. Table 4.22 shows that for the 2016/17 season the highest percentage of survival is in animals aged 3-4 years (84.5%), followed by animals aged 2-3 years (84.1%).

Table 4.22: Survivability percentages since 1996/97

	Percentage (%) of age group surviving to next lactation						
Season	2-3 years	3-4 years	4-5 years	5-6 years	6-7 years	7-8 years	8-9 years
1996/97	84.9	85.1	84.8	81.6	78.2	74.2	69.0
1997/98	85.9	86.7	85.6	81.9	77.7	73.9	68.3
1998/99	84.5	86.1	85.8	83.0	80.0	75.5	70.5
1999/00	84.1	86.2	85.8	82.8	80.7	76.3	70.8
2000/01	85.3	86.7	86.5	83.2	80.1	76.5	71.7
2001/02	85.6	88.4	86.8	84.3	80.8	77.1	73.5
2002/03	85.7	85.9	86.6	83.8	80.8	76.0	71.2
2003/04	85.2	86.9	86.0	83.0	78.7	74.8	69.4
2004/05	85.7	87.3	86.7	82.7	79.7	74.6	69.6
2005/06	85.0	87.5	87.6	84.2	79.7	76.7	70.6
2006/07	84.8	87.8	88.2	84.7	79.5	74.9	71.2
2007/08	84.0	87.6	87.2	84.1	80.0	74.9	69.5
2008/09	86.8	87.7	87.5	83.4	80.2	76.1	70.7
2009/10	87.0	87.2	86.3	82.2	77.6	72.9	67.3
2010/11	86.2	87.2	86.0	81.1	76.8	71.2	65.7
2011/12	87.3	87.7	86.8	81.5	76.8	72.2	65.6
2012/13	87.6	89.2	87.9	82.7	77.9	71.6	66.1
2013/14	87.6	87.4	86.3	82.0	77.2	71.5	64.3
2014/15	86.9	85.7	84.7	80.8	75.7	70.5	64.1
2015/16	87.0	87.1	84.2	79.5	74.9	69.1	62.9
2016/17	84.1	84.5	83.4	78.9	74.2	69.1	63.2

5. Prices received

A. Milk prices

Up until the end of the 2000/01 season, dairy farmers received payment from the New Zealand Dairy Board through a system of advance and final payouts via dairy companies. Seasonal supply dairy companies passed on the Dairy Board advance payout to their suppliers, in addition to a margin based on dairy company efficiency, product mix and investment policies; together known as the total payout.

The introduction of the Dairy Industry Restructuring Act 2001 opened the way for New Zealand's largest dairy companies, Kiwi Co-operative Dairy Company (Kiwi) and New Zealand Dairy Group (NZDG) to merge with the Dairy Board to form Fonterra. Further, the Act allowed the smaller dairy companies, such as Tatua and Westland, to remain separate co-operatives. Consequently, the historic payment system became redundant. Tatua and Westland have now established commercial arrangements for sale of dairy products.

Payments to seasonal supply farmers are based on the "A+B±C" system, which incorporates payments for milkfat (A) and protein (B) with adjustments for milk volume (C). The payment system for winter milk supply varies between companies. Some winter milk payment systems are based on the milk volume only, whereas other payment systems are similar to seasonal supply payment systems, which incorporate components of milkfat, protein, and volume.

- *$6.47 average dairy company payout*

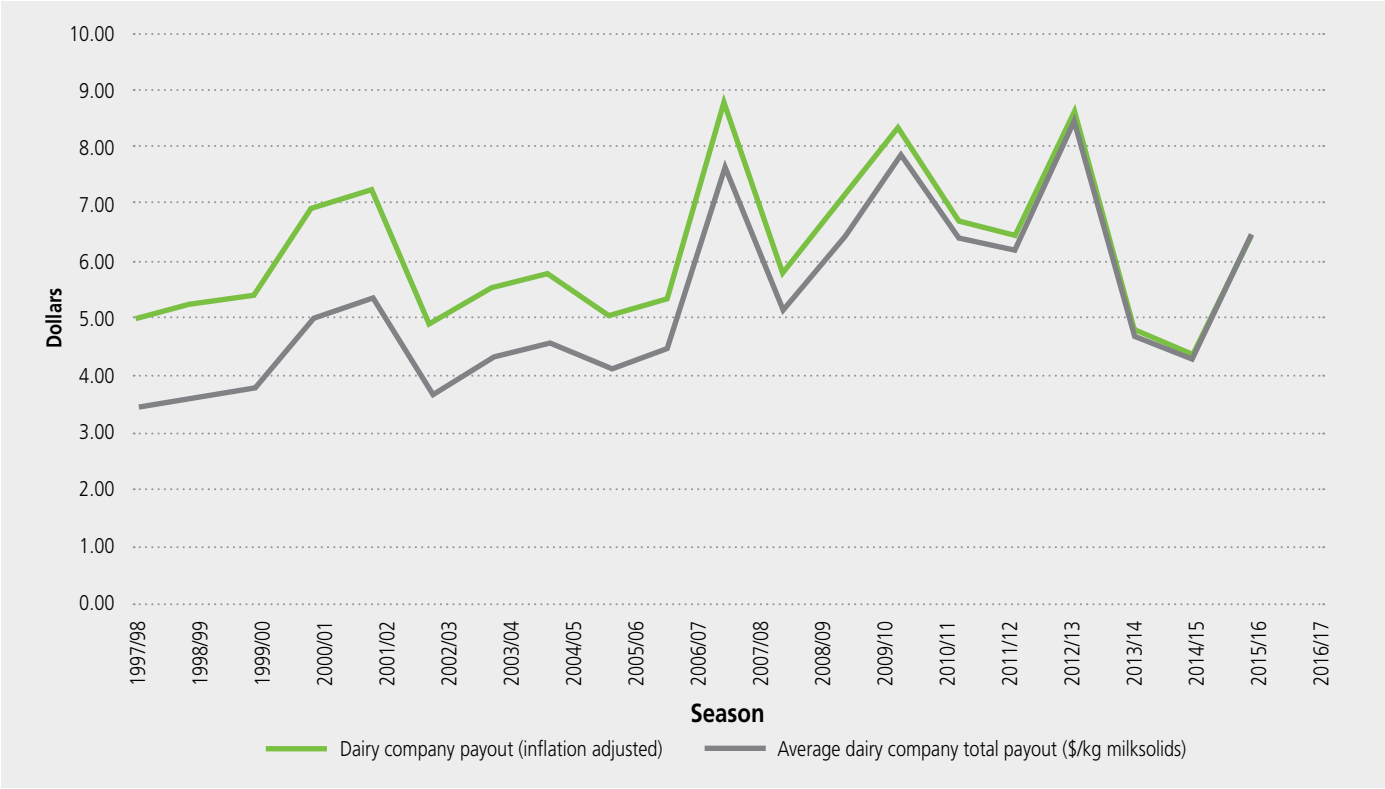
The weighted average dairy company total payout (per kilogram of milksolids) received by dairy farmers from seasonal supply milk is shown in Table 5.1 (weightings are based on the number of herds supplying each dairy company). The average payout is given in both nominal and inflation-adjusted dollars using the Consumers Price Index. The average dairy company payout of $6.47 per kg milksolids in 2016/17 was markedly higher than the previous 2 seasons and close to the decade average milk payout of $6.36.

Table 5.1: Trend in prices received for milksolids for the last 20 seasons

Season	Average Dairy Company total payout ($/kg milksolids)	Dairy Company payout (inflation-adjusted)[a]
1997/98	3.42	5.02
1998/99	3.58	5.28
1999/00	3.78	5.46
2000/01	5.01	7.01
2001/02	5.35	7.29
2002/03	3.66	4.91
2003/04	4.25	5.57
2004/05	4.58	5.84
2005/06	4.10	5.03
2006/07	4.46	5.36
2007/08	7.67	8.87
2008/09	5.14	5.83
2009/10	6.37	7.11
2010/11	7.89	8.36
2011/12	6.40	6.72
2012/13	6.18	6.44
2013/14	8.47	8.69
2014/15	4.69	4.79
2015/16	4.30	4.37
2016/17	6.47	6.47

[a] *Weighted to give real dollar values using the Consumers Price Index for the end of the June quarter. Sourced from Statistics New Zealand; Excludes dairy company retentions and deduction for DairyNZ Levy.*
Note: *from 2009/10 average dairy co-operative payout is from Fonterra, Tatua, and Westland. This includes Fonterra dividend payments.*

Graph 5.1: Trend in milksolids payout to dairy farmers for the last 20 seasons



B. Dairy farm land prices

- *Dairy farm land price per hectare increases 3.5%*

Prior to 2011/12 Table 5.2 used data from Quotable Value (QV) on a calendar year. Dairy farm land sales are now based on data provided by the Real Estate Institute of New Zealand (REINZ) on a seasonal basis. Raw data provided by REINZ have been weighted by the number of farms in each region. The farms sold are considered to be economic units.

The weighted average sale price of dairy farms decreased to $4.81 million in 2016/17 from the previous season's high of $5.38 million (Table 5.2). Farms sold were 18 hectares smaller on average than sales in 2015/16. The weighted average sale price per hectare of $37,835 increased 3.5% on the previous season.

Table 5.2: Trend in dairy land sale values since 2009/10

Season	Number of dairy farms sold	Weighted average sale price ($)	Inflation Adjusted average sale price ($)	Weighted average land area (ha)	Weighted average sale price/ha ($)	Inflation adjusted average sale price/ha ($)	Weighted average sale price/KgMS ($)	CPI
2009/10	90	4,113,264	4,588,591	130	31,653	35,311	39	1,099
2010/11	143	4,119,017	4,364,663	126	32,735	34,687	38	1,157
2011/12	157	4,514,365	4,738,537	139	32,376	33,984	41	1,168
2012/13	197	4,375,251	4,561,274	130	33,557	34,984	36	1,176
2013/14	312	5,174,010	5,308,231	142	36,369	37,312	42	1,195
2014/15	244	5,228,018	5,341,292	132	39,577	40,435	44	1,200
2015/16	192	5,381,697	5,475,485	169	36,557	37,194	39	1,205
2016/17	217	4,808,676	4,808,676	151	37,835	37,835	40	1,226

Source: *Real Estate Institute of New Zealand (REINZ), Statistics New Zealand, DairyNZ*
Note: *Number of dairy farms sold is for a season (01-Jun to 31-May) and excludes support blocks and non-economic units. Figures have been weighted by the number of dairy farms in each region.*

6. Disease Control

A. Tuberculosis (Tb) control

Control of M. bovis (Tb) over the agricultural industry is managed by TBfree New Zealand, whose primary objective is to manage Tb to reduce the number of infected herds and to prevent Tb vector free areas becoming vector risk areas. The status of a vector area is determined by the prevalence of wild animals (e.g., possums and ferrets) that are considered a source of infection.

The number of infected dairy herds in 2016/17 was 35. The number of Tuberculous dairy cattle increased to from 27 in 2015/16 to 112 in 2016/17.

The West Coast had the greatest number of infected herds (23) while Waikato had 52% of the Tb dairy cattle in 2016/17.

Table 6.1: Tuberculosis (Tb) testing and results in 2016/17

Region	*Vector Status*	*Number of infected Dairy herds at 30 June 2017*	*Number of Dairy Cattle Primary Tested in 2016/17*	*Number of tuberculous[a] dairy cattle*
Northland	Free	0	76,364	0
Auckland	Free	0	29,672	0
Waikato	Free	7	705,398	58
	Risk	0	55,773	0
Bay of Plenty	Free	0	70,303	0
	Risk	0	5,400	0
Gisborne	Free	0	2,482	0
Hawke's Bay	Free	0	8,240	0
	Risk	1	30,983	1
Taranaki	Free	0	123,596	0
Manawatu/Wanganui	Free	0	101,391	1
	Risk	0	17,978	0
Wellington	Free	0	15,152	0
	Risk	1	61,453	1
North Island	Free	7	1,132,598	59
	Risk	2	171,587	2
North Island	**Total**	**9**	**1,304,185**	**61**
Marlborough	Free	0	2,931	0
	Risk	0	2,536	0
Tasman/Nelson	Free	1	17,983	12
	Risk	0	13,935	0
West Coast	Free	0	8,732	0
	Risk	23	213,836	36
Canterbury	Free	0	294,859	0
	Risk	1	123,203	2
Otago	Free	0	86,839	0
	Risk	1	140,482	1
Southland	Free	0	209,033	0
	Risk	0	48,669	0
South Island	Free	1	620,377	12
	Risk	25	542,661	39
South Island	**Total**	**26**	**1,163,038**	**51**
New Zealand	Free	8	1,752,975	71
	Risk	27	714,248	41
New Zealand	**Total**	**35**	**2,467,223**	**112**

Sourced from TBfree New Zealand

[a] *Tuberculous animals include lesioned reactor cattle and lesioned cull cattle*

Appendix 1: Farming regions and districts

The following map shows the six LIC regions and the farming regions used in all analyses presented in this report. The list of districts, which follow local authority boundaries, within each region is also given.

1 Northland
- Far North
- Whangarei
- Kaipara

2 Auckland
- Rodney
- North Shore
- Waitakere
- Auckland
- Manukau
- Papakura
- Franklin

3 Waikato
- Thames/Coromandel
- Hauraki
- Waikato
- Matamata/Piako
- Hamilton
- Waipa
- Otorohanga
- South Waikato

4 Bay of Plenty
- Western Bay of Plenty
- Tauranga
- Whakatane
- Kawerau
- Opotiki

5 Central Plateau
- Rotorua
- Taupo

6 Western Uplands
- Waitomo
- Ruapehu

7 East Coast
- Gisborne
- Wairoa

8 Hawkes Bay
- Hastings
- Napier
- Central Hawkes Bay

9 Taranaki
- New Plymouth
- Stratford
- South Taranaki

10 Manawatu
- Wanganui
- Rangitikei
- Manawatu
- Palmerston North
- Horowhenua
- Kapiti
- Porirua
- Upper Hutt
- Lower Hutt
- Wellington

11 Wairarapa
- Tararua
- Masterton
- Carterton
- South Wairarapa

12 Nelson/Marlborough
- Tasman
- Nelson
- Marlborough
- Kaikoura

13 West Coast
- Buller
- Grey
- Westland

14 North Canterbury
- Hurunui
- Waimakariri
- Christchurch
- Banks Peninsula
- Selwyn
- Ashburton

15 South Canterbury
- Timaru
- Mackenzie
- Waimate

16 Otago
- Waitaki
- Central Otago
- Queenstown/Lakes
- Dunedin
- Clutha

17 Southland
- Southland
- Gore
- Invercargill