

Supply Chain - Overview

A detailed study of harness activity between 1995 and 2006 has provided a realistic approximation of the harness supply chain. Based on this analysis, we estimate the 2006 crop will have the following profile:

	<u>Total</u>	<u>Colt</u>	<u>Filly</u>			
Mares Served	4,070					
Live Foals	2,865 70%					
Registered Foals (Estimate)	2,779 97%	1,365 49%	1,414 51%			
Total Imports - all ages	<u>12</u>	<u>2</u>	<u>10</u>			
Pool of horses potentially available to race	2,792	1,367	1,424			
Exports - Never Raced	<u>(230)</u>	<u>(142)</u>	<u>(88)</u>			
Pool from which core NZ racing stock drawn	2,562	1,225 48%	1,336 52%			
<u>Milestones</u>	<u>Yes</u>	<u>%</u>	<u>No</u>	<u>%</u>	<u>Attrition prior to Milestone</u>	<u>%</u>
Registered with a Trainer	1,626	63%	936	37%	936	37%
Trialed or Raced	1,387	54%	1,175	46%	238	9%
Raced Once	1,182	46%	1,380	54%	205	8%
Raced 5 or more times	945	37%	1,617	63%	237	9%
Raced 10 or more times	752	29%	1,810	71%	193	8%
Raced 20 or more times	469	18%	2,093	82%	284	11%
Raced 30 or more times	300	12%	2,262	88%	168	7%
					300	12%
			Sub-total		2,562	100%

The supply chain analysis also indicates:

- Between 1995 and 2006 there has been a progressive decline in the annual number of registered foals from 3,554 to 2,865 foals.
- 70% of this decrease has occurred since 2003.
- Over this same period there has been no significant change in imports or exports.
- Notwithstanding the decline in the foal crop:
 - Annual starts per starter increased from 7.5 to approximately 8.6;
 - Lifetime starts per starter increased from 18.1 to approximately 21.7;
 - The number of horses racing has trended upwards since 2002, from 3,200 to approximately 3,400.
- As the number of horses entering the supply chain has reduced, these trends evidence an increase in the longevity of the racing careers of those horses racing and an increase in the frequency of starts.

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- This outcome is consistent with a number of initiatives implemented by HRNZ over the same period, designed to improve horse utilization. These are commented on more fully later in this paper.
- Assuming the number of registered foals, imports and exports remains at 2006 levels; and after allowing for the impact of wastage in the supply chain based on current industry practices and outcomes, a further decline of 168 starters per foal crop is projected.
- A reduction of 168 starters per crop, with no further increase in the starts/starter of the remaining starters, would progressively cause a reduction of approximately 400 starters and 3,540 starts annually by around 2012/13. This represents a 12% reduction on current annual starts.
- If however, the remaining starters race for longer and/or more often (i.e. improved utilization); the impact on annual starts could to some extent be mitigated. In order to maintain total starts at current levels, the remaining population would need to increase their annual starts from 8.6 to 9.7, representing a lifetime start increase from 21.7 to 24.7.
- While this is higher than has previously been achieved in New Zealand, it compares to average annual starts in Australia of approximately 11.3.

Key differences between the Thoroughbred and Harness Supply Chains

While both the thoroughbred and harness codes face the same issue of a declining foal crop negatively impacting future starter numbers, there are a number of key differences between each codes' supply chain:

- The harness breeding industry is predominantly South Island based, is less capital intensive (bloodstock values and access to stallions via AI) and has lower cost structures.
- While there is some offshore demand for NZ bred yearlings, prices paid at national yearling sales largely reflect their domestic racing potential and are on average substantially lower than thoroughbred prices.
- The role of commercial breeders is less substantial than in the thoroughbred industry - with a significant portion of production being bred to race.
- Importation of racing stock is negligible.
- Approximately 7% of the harness foal crop is exported before being raced compared to 21% of the thoroughbred crop.

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- Approximately 15% of the harness foal crop is exported after having raced compared to 6% of the thoroughbred crop. However, prior to export, the harness horses have on average raced 19.8 times compared to thoroughbred's 10.9 times.
- A greater percentage of thoroughbreds are exported at an early stage of their racing career, representing a lost opportunity to New Zealand racing. In contrast, a significant portion of harness exports are well tried horses, being sold to markets such as the US as "go around" horses at lesser meetings. While the export of these horses does represent supply chain leakage, it is arguably also part of a culling process that in turn releases industry capital and facilitates reinvestment.
- Exports therefore represent less significant leakage from the harness supply chain.
- The majority of harness horses are trained on private properties and therefore maintaining industry training infrastructure is a less relevant issue for the harness code.
- Training is less impacted by training track conditions and is not reliant on the availability of suitably skilled track riders. Many trainers are drivers who often lead multiple horses off a sulky.
- While there is no physical injury research similar to the Perkin's thoroughbred study available for harness, anecdotally harness horses suffer fewer injuries – suggesting their training and racing regimes are less likely to result in injury.
- Anecdotally, harness horses are also more versatile in the distances they can race over at various stages of their preparation. They are therefore less dependant on race programming at specific distances to get a race start.
- Harness horses race on all weather tracks that are reasonably consistent. Over the past decade most of the major tracks have been upgraded to improve their surfaces and camber and to improve safety. 61% of all race meetings are held at five key racecourses and 76% are held at the top ten racecourses.
- Harness horses race 60% more often than thoroughbreds; often back-up more quickly and/or require shorter spells.

These supply chain differences combine to reduce the impact foal crop reductions have on the harness code compared to the thoroughbred code. They also cause some of the initiatives discussed in the thoroughbred paper to be less relevant to the harness code, such as initiatives to reduce wastage by improving training centre infrastructure.

Initiatives to Increase Starters and Starts

The supply chain analysis has confirmed there is a high positive correlation between the size of the foal crop and the number of starters subsequently available to race from two years later.

As in the thoroughbred industry, initiatives to increase starter numbers could include direct breeder incentives (such as breeder bonuses or rebates) or indirect market initiatives that stimulate owner demand which in turn trigger increased supply through improved price signals.

Breeder and Importer Incentives

Breeder and Importer incentives were analysed in detail in the April thoroughbred paper. The conclusions reached in this paper are believed to be equally applicable to the harness code, being:

- Broad based direct payments to breeders are unlikely to cost effectively stimulate production and increase the size of the New Zealand foal crop while import incentives are likely to be counterproductive in that they could also further reduce domestic production.
- Over the medium to long term an increase in supply can only sustainably occur if there is an increase in demand and therefore initiatives that stimulate demand are believed to be more likely to be successful – albeit they may take longer to work through the supply chain.

[The possible exception identified in the thoroughbred paper for further analysis was some form of “Breed to Race” bonus designed to stimulate demand by making the racing aspect of the breed to race equation more attractive. As a high percentage of harness horses are raced by their breeders, such an initiative may not be cost effective. This will nevertheless be analysed further.]

Increased Stakes & Reduced Owner Costs

HRNZ has a strategic objective of increasing returns to owners via higher race stakes. Over the past two years average race payments have increased by 24% in real terms.

While some clubs voluntarily abolished nomination, acceptance and driver fees some years ago, in 2006 HRNZ removed the rule enabling fees to be charged (other than for Group and Listed races), thereby reducing the cost to an owner of racing a horse.

These initiatives seek to arrest the decline and hopefully increase both the number of starters and the starts per starter by providing owners with a greater financial incentive to retain and race a horse in New Zealand and/or keep a horse in work for longer.

While the trends suggest these initiatives have positively impacted horse utilization over the past two years, the full effect is not expected to be achieved until the post 2006 foal crops fully work their way through the supply chain, following an industry response to these improved economic incentives.

Unfortunately, over the past twelve months the cost of racing a horse has also increased significantly – largely due to spiraling fuel and feed costs. The latter has been exacerbated by environmental conditions and the dairy boom. The long term impact of this is as yet uncertain, but likely to be negative.

Utilisation Initiatives

HRNZ has implemented a number of initiatives aimed at increasing the number of starts per starter – i.e. improve the utilization of the existing resource:

- While programming has not been completely centralized, HRNZ works closely with clubs to develop a program which matches horse availability, based on HRNZ maintained data.
- The rules relating to nominations and setting race cards have been made more flexible to improve utilisation. For example:
 - A nominated horse that fails to make a field is able to transfer its nomination to any other programmed race at that meeting it is eligible for.
 - Programs can be modified after nominations have been received.
 - A range of special condition races (sometimes exempt from handicap) are regularly programmed to match a race with available horses. These reference factors such as stakes won, number of wins, recent form etc and therefore “cut-across” rating classifications. Such races may also include Claiming horses.
 - Preferential Draws.
- The handicapping system has been changed to create a number of opportunities for horses to prolong their racing career. These include:
 - Handicap exempt/penalty free races.
 - Discretionary handicaps.
 - Two year old win exemptions.
 - Resetting two year old ratings at three to eliminate lesser wins.
 - Three year old win exemptions.
 - A junior driver win exemption.
 - Resetting of handicap upon gait conversion.
- An outcome of NZ Racing Board’s internationalization strategy has been the introduction of additional meetings offering relatively low stakes on Tuesdays (minimum \$4,000). This has created a lower racing tier that attracts and caters for

horses with limited ability. A consequence has however been to increase the percentage of races with a field size of eight or less since, from approximately 7% of races run in 2006, to over 10% in the current season.

- The harness jewels initiative which, while having an over-arching profiling objective, has been structured to provide an incentive for horses to start more often during the season in order to accumulate sufficient stakes to qualify for one of the jewels race fields.

These programming and handicapping initiatives have created more opportunities for a horse to race and have reduced the potential for “bottle-necks” within rating classifications that could limit a horses ability to get a start or curtail its racing career because it is unable to be placed competitively.

The thoroughbred paper identified potential bottlenecks in the maiden and R70 grades and sought to explore initiatives to increase the participation of horses within these grades. Many of the above harness initiatives have a similar focus.

For example, while some harness races are limited to non-winners, special condition races are regularly programmed targeting horses with limited ability (on either side of this non-winner classification) to provide this segment of horses with an extended opportunity to continue racing.

Tracks

As noted above, over the past ten years most major harness race tracks have been significantly upgraded to improve the racing surface; improve safety and reduce horse injuries.

The industry is not reliant on the infrastructure available at strategic training centres and therefore the opportunity to undertake cost benefit assessments of available equipment and technologies that have a focus or application in the early detection and/or prevention of injuries that reduce participation, will be limited compared to the thoroughbred code where in the main, training occurs at shared facilities.

Notwithstanding this, there will be opportunities for harness horses to have access to and benefit from some thoroughbred initiatives in areas where there is a significant horse populations in both codes, such as Pukekohe, Cambridge and Canterbury. Infrastructure that provides a dual code benefit is more likely to have a positive cost benefit.

Review of the 1995 – 2005 Crops

Overview

In this exercise, we have analysed data extracts obtained from HNZ for the foal crops born between 1995 and 2005. These extracts included data up to 15 May 2008 and therefore were not representative of a full season for 2007-08.

The progeny from the 1995 crop are now autumn twelve year olds and therefore most have finished their racing careers. In contrast, the progeny from the 2005 crop are now autumn two year olds, with the majority of their racing careers ahead of them.

By analyzing data by foal crop, this review will consider a series of “vertical” cross-sections of the racing population. This crop by crop analysis is consistent with supply chain production.

Based on data extracted as at 15 May 2008, the 1998 crop can be categorized as follows:

	<u>Total</u>	<u>Colt</u>	<u>Filly</u>			
Mares Served	4,473					
Live Foals	3,246 73%					
Registered Foals	3,143	1,544 49%	1,599 51%			
Total Imports - all ages	<u>12</u>	<u>2</u>	<u>10</u>			
Pool of horses potentially available to race	3,155	1,546	1,609			
Exports - Never Raced	<u>(230)</u>	<u>(142)</u>	<u>(88)</u>			
Pool from which core NZ racing stock drawn **	2,925	1,404 48%	1,521 52%			
<u>Milestones</u>	<u>Yes</u>	<u>%</u>	<u>No</u>	<u>%</u>	<u>Attrition prior to Milestone</u>	<u>%</u>
Registered with a Trainer	1,856	63%	1,069	37%	1,069	37%
Trialed or Raced **	1,584	54%	1,341	46%	272	9%
Raced Once **	1,350	46%	1,575	54%	234	8%
Raced 5 or more times	1,079	37%	1,846	63%	271	9%
Raced 10 or more times	859	29%	2,066	71%	220	8%
Raced 20 or more times	535	18%	2,390	82%	324	11%
Raced 30 or more times	343	12%	2,582	88%	192	7%
					343	12%
			Sub-total		2,925	100%

**Included in the above were 481 horses that raced 9,533 times before being exported - an average of 19.8.

This summary reflects the following classification decisions and assumptions:

- To be classified as an import, a horse must have been imported into New Zealand and remained in New Zealand as at 15 May 2008. There were only twelve 1998

- born horses that met this criteria, ten of which were fillies. While these horses may not all have been imported for the purpose of racing and indeed only five of the twelve did race, they have all been included in the pool of potential race horses rather than making an arbitrary assumption that could not be substantiated.
- Horses that have been exported before having raced in New Zealand and have remained exported as at 15 May 2008 have been classified separately. Horses that raced in New Zealand and were subsequently exported have been included within the core pool of New Zealand racing stock - as commented on below.
 - The majority of exported unraced horses were colts. As a result, 52% of the remaining 2,925 horses (being the core pool of NZ racing stock) were fillies.
 - There were 481 horses that were exported after having raced in New Zealand and remain exported. While these exports do represent “leakage” from the core pool of racing stock, they nevertheless started 9,533 times before being exported at an average of 19.8 starts per starter. This was only marginally below the average starts per starter of 20.9 for the entire foal crop.
 - The reason for this is that while some of the previously raced horses that were exported were young better performed horses with significant future racing potential, a large number were at a later stage in their career and were exported to places such as the USA, to race as “go around” horses at lesser meetings. Many of these older horses would have been approaching the end of their New Zealand careers and therefore their sale for export does not automatically represent a reduction in participation. Often such sales facilitate an owner exiting a horse with limited future racing potential and acquiring a new racing prospect.
 - In the 1998 crop 86 of the 481 previously raced horses that were exported raced less than five times, 166 raced less than 10 times and 287 raced less than 20 times. The remaining 197 horses raced at or above the average number of starts of the entire 1998 crop before being exported.
 - This group of 481 horses may also include horses that are currently campaigning in Australia that will eventually be re-imported to New Zealand.
 - It is possible (even likely) that some horses will be put into work with a trainer without HNZ being notified. The data for the milestone “Registered with a Trainer” should therefore be viewed as being approximate only.

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The equivalent analysis for the 1995 – 2005 crops is summarized as follows:

Milestones	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Current Age	12yo	11yo	10yo	9yo	8yo	7yo	6yo	5yo	4yo	3yo	2yo	1yo
Mares Served	5,147	4,939	5,083	4,473	4,262	4,296	4,879	4,853	4,856	4,676	4,226	4,070
Live Foals	3,674	3,623	3,393	3,246	2,990	3,134	3,410	3,379	3,363	3,215	2,918	2,865
Foaling Percentage	71%	73%	67%	73%	70%	73%	70%	70%	69%	69%	69%	70%
Registered Foals	3,554	3,509	3,256	3,143	2,885	3,038	3,296	3,288	3,241	3,100	2,830	
Percentage of Live Foals	97%	97%	96%	97%	96%	97%	97%	97%	96%	96%	97%	
Total Imports	19	19	19	12	21	10	12	17	11	6	9	++
Net Exports (Unraced)	227	240	227	230	213	170	182	187	156	147	75	++
Core pool of NZ racing stock	3,346	3,288	3,048	2,925	2,693	2,878	3,126	3,118	3,096	2,959	2,764	++
Colts %	49.6%	50.1%	47.3%	48.0%	49.8%	49.2%	49.5%	48.0%	49.8%	49.6%	50.8%	±
Fillies %	50.4%	49.9%	52.7%	52.0%	50.2%	50.8%	50.5%	52.0%	50.2%	50.4%	49.2%	±
Never registered with a trainer	1,316	1,270	1,090	1,069	901	1,076	1,131	1,158	1,203	1,305	2,008	--
Registered with Trainer	2,030	2,018	1,958	1,856	1,792	1,802	1,995	1,960	1,893	1,654	755	++
Raced	1,389	1,403	1,336	1,350	1,334	1,268	1,446	1,357	1,230			++
Raced 1-4 times	325	322	263	271	258	256	302	319	314			±
Raced 5-9 times	253	251	235	220	199	201	261	249	326			±
Raced 10-19 times	314	322	310	324	332	289	320	357	346			±
Raced 20-29 times	215	208	221	192	173	205	244	223	174			++
Raced 30+ times	282	300	307	343	372	317	319	209	70			++
Total Starts	25,195	26,485	27,456	28,267	28,888	25,787	26,840	21,289	14,357			++
Average Starts	18.1	18.9	20.6	20.9	21.7	20.3	18.6	15.7	11.7			++
Net Exports (Raced)	582	543	471	484	440	386	447	324	207	76	7	++
Exported Horses Starts	10,371	9,626	9,060	9,642	8,898	7,876	7,510	4,747	1,829	429	17	++
Average	17.8	17.7	19.2	19.9	20.2	20.4	16.8	14.7	8.8	5.6	2.4	++

Given the latter crops are at relatively early stages of their racing careers and only nine months data for the current racing season is available, it is expected that some of the latter milestones (as shaded) will continue to change and converge towards the outcomes in earlier seasons. The direction of the expected change is noted along side each.

Notwithstanding this, it can be seen from this table that:

- The 1995 and 1996 crops were very similar in most respects.
- Between 1997 and 1999 the number of mares mated reduced by 677 leading to a decline of 624 registered foals (from 3,509 to 2,885) however, as the average starts per starter increased from 18.9 to 21.7, the total number of race starts in fact increased by 9%.
- Between 2000 and 2003 the number of mares mated increased by 594 leading to an increase of 356 registered foals (from 2,885 to 3,241). While the oldest of these horses are now only 7yo's, it appears that the number of lifetime starts per starter could remain above 21.7 and therefore the total number of race starts from these crops may also increase.
- However, between 2003 and 2006 the number of mares mated again declined by 786 leading to a decline of 498 live foals. The number of registered foals will reduce accordingly. Absent a further increase in the number of lifetime starts per

starter, this would be expected to result in a reduction of the total number of starts per crop.

- In summary, between 1995 and 2006 the number of mares mated annually has fluctuated twice. It initially reduced from 5,147 to 4,296 between 1995 and 2000 before increasing to a peak of 4,856 in 2003. Since 2003 there has been a steady decline back to 4,070 in 2006. Accordingly, between 1995 and 2006 the number of mares mated has reduced by 1,077, leading to a reduction in the number of registered foals of approximately 775 per crop. The most significant portion of this reduction has occurred between 2004 and 2006.

Race Starters and Starts – By Foal Crop

As at 15 May 2008 the total number of starters and starts for the 1995 – 2004 crops was as follows:

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	
Starters											
2yo	220	215	241	233	214	242	273	236	258	262	
3yo	740	791	717	757	769	773	877	778	842		++
4yo	908	951	932	950	966	902	1,038	1,017	935		++
5yo	647	676	670	678	661	655	737	658	-		++
6yo	340	351	372	389	390	342	405	-	-		++
7yo	164	163	186	208	211	157	-	-	-		++
8yo	66	67	98	78	96	-	-	-	-		++
9yo	22	32	37	37	-	-	-	-	-		++
10yo	11	13	18	-	-	-	-	-	-		++
10yo+	3	5	-	-	-	-	-	-	-		++
Individual Horses	1,389	1,403	1,336	1,350	1,334	1,268	1,446	1,357	1,230	810	++
Starts											
2yo	749	775	848	756	716	832	898	820	865	885	
3yo	4,608	4,752	4,526	4,824	5,477	5,337	5,668	5,413	5,770		++
4yo	7,762	8,352	8,116	8,730	8,887	8,080	9,216	8,918	7,722		++
5yo	6,244	6,481	6,757	6,662	6,729	6,622	7,385	6,138	-		++
6yo	3,329	3,367	3,729	4,133	4,120	3,412	3,673	-	-		++
7yo	1,649	1,613	1,958	1,913	2,044	1,504	-	-	-		++
8yo	577	638	969	885	915	-	-	-	-		++
9yo	210	365	382	364	-	-	-	-	-		++
10yo	62	106	171	-	-	-	-	-	-		++
10yo+	5	36	-	-	-	-	-	-	-		++
Total Starts	25,195	26,485	27,456	28,267	28,888	25,787	26,840	21,289	14,357	885	++
Starts/Starter											
2yo	3.4	3.6	3.5	3.2	3.3	3.4	3.3	3.5	3.4	3.4	
3yo	6.2	6.0	6.3	6.4	7.1	6.9	6.5	7.0	6.9		++
4yo	8.5	8.8	8.7	9.2	9.2	9.0	8.9	8.8	8.3		++
5yo	9.7	9.6	10.1	9.8	10.2	10.1	10.0	9.3			++
6yo	9.8	9.6	10.0	10.6	10.6	10.0	9.1				++
7yo	10.1	9.9	10.5	9.2	9.7	9.6					++
8yo	8.7	9.5	9.9	11.3	9.5						++
9yo	9.5	11.4	10.3	9.8							++
10yo	5.6	8.2	9.5								++
10yo+	1.7	7.2									++
Total	18.1	18.9	20.6	20.9	21.7	20.3	18.6	15.7	11.7		++

As many horses race for more than one season, the total number of individual starters from each crop is not the sum of the starters in each age class.

Again, the cells where the outcomes will change (potentially significantly) with further racing in the current and future seasons have been shaded.

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Between the 1995 and 1999 crops the number of individual starters from each crop was relatively stable however the number of starts per starter gradually increased resulting in an increase in the total number of starts.

From 2000 onwards this level of activity appears to have been maintained with the exception of a small upwards spike for the 2001 crop which has to date had a higher number of individual starters in each age class that have raced.

Importantly, between 1995 and 2004 the number of 2, 3, 4 and 5yo starters has been stable and/or trended slightly upwards.

From the above data, the age mix of starters and starts by season, averaged across the 04/05 – 06/07 seasons can be summarized as follows:

Averaged over 04/05 - 06/07 Seasons					
Age	Starters	%	Starts	%	Starts/Starter
2	252	7%	857	3%	3.4
3	832	24%	5,617	19%	6.7
4	986	29%	8,738	30%	8.9
5	684	20%	6,912	24%	10.1
6	374	11%	3,888	13%	10.4
7	202	6%	1,972	7%	9.8
8+	127	4%	1,246	4%	9.8
	3,456	100%	29,230	100%	8.5

The average number of starts of 29,230 is greater than the total number of starts for any of the individual crops that make up this racing population. This supports the conclusion that the number of starts per starter for the crops that are currently racing is trending upwards.

It can also be seen from the earlier table that the average lifetime starts per starter peaks at approximately 21.7. This compares to the average per season starts over the last three seasons of 8.5, suggesting the average racing career of a horse that races is 2.6 seasons. This is consistent with the ratio of the average per season starters of 3,456 and the total number of starters in each of the 1997 - 2000 crops starters of 1,300 - 1,350 – also being a ratio of approximately 2.6.

It is too early to observe the impact of the decline in the foal crop that has occurred since 2004 as most of this decline occurred in the 2005 and 2006 crops, the oldest of which are currently only 2yo's.

When the starters and starts data is split between fillies and colts (see below), the trends for each remain similar however, there is a marked difference between the proportion of starters and starts for each compared to the proportion of the population they each represent.

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Fillies make up 50% - 52% of the pool of potential race horses and 48% - 49% of the horses in work with trainers and yet make up only 43% - 45% of the number of individual starters and 39% - 44% of the total number of starts. As a consequence, the average lifetime starts for fillies is notably lower than for colts.

<u>Fillies</u>	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Starters										
2yo	94	99	99	94	88	100	117	99	102	108
3yo	320	316	319	333	333	350	399	329	357	++
4yo	386	393	411	440	416	405	464	464	410	++
5yo	272	264	292	295	271	283	313	301	-	++
6yo	138	127	153	159	152	134	171	-	-	++
7yo	63	51	66	74	80	59	-	-	-	++
8yo	19	18	30	28	31	-	-	-	-	++
9yo	6	13	7	6	-	-	-	-	-	++
10yo	-	3	2	-	-	-	-	-	-	++
10yo+	1	1	-	-	-	-	-	-	-	++
Individual Horses	591	598	590	614	563	571	644	612	530	364
% of Total	43%	43%	44%	45%	42%	45%	45%	45%	43%	45%
Starts										
2yo	329	341	337	311	274	334	413	338	347	388
3yo	1,972	1,951	2,003	2,107	2,326	2,363	2,651	2,238	2,425	++
4yo	3,086	3,333	3,726	3,936	3,892	3,695	4,052	3,800	3,314	++
5yo	2,326	2,585	2,933	2,872	2,840	2,842	3,317	2,783	-	++
6yo	1,377	1,169	1,387	1,637	1,682	1,439	1,473	-	-	++
7yo	552	497	614	699	754	626	-	-	-	++
8yo	143	151	309	243	297	-	-	-	-	++
9yo	48	147	49	54	-	-	-	-	-	++
10yo	-	32	16	-	-	-	-	-	-	++
10yo+	1	13	-	-	-	-	-	-	-	++
Total Starts	9,834	10,219	11,374	11,859	12,065	11,299	11,906	9,159	6,086	388
% of Total	39%	39%	41%	42%	42%	44%	44%	43%	42%	44%
Starts/Starter										
2yo	3.5	3.4	3.4	3.3	3.1	3.3	3.5	3.4	3.4	3.6
3yo	6.2	6.2	6.3	6.3	7.0	6.8	6.6	6.8	6.8	++
4yo	8.0	8.5	9.1	8.9	9.4	9.1	8.7	8.2	8.1	++
5yo	8.6	9.8	10.0	9.7	10.5	10.0	10.6	9.2	-	++
6yo	10.0	9.2	9.1	10.3	11.1	10.7	8.6	-	-	++
7yo	8.8	9.7	9.3	9.4	9.4	10.6	-	-	-	++
8yo	7.5	8.4	10.3	8.7	9.6	-	-	-	-	++
9yo	8.0	11.3	7.0	9.0	-	-	-	-	-	++
10yo	#DIV/0!	10.7	8.0	-	-	-	-	-	-	++
10yo+	1.0	13.0	-	-	-	-	-	-	-	++
Total	16.6	17.1	19.3	19.3	21.4	19.8	18.5	15.0	11.5	++
% of Total	92%	91%	94%	92%	99%	97%	100%	95%	98%	

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<u>Colts</u>	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
<u>Starters</u>										
2yo	126	116	142	139	126	142	156	137	156	154
3yo	420	475	398	424	436	423	478	449	485	-
4yo	522	558	521	510	550	497	574	553	525	-
5yo	375	412	378	383	390	372	424	357	-	-
6yo	202	224	219	230	238	208	234	-	-	-
7yo	101	112	120	134	131	98	-	-	-	-
8yo	47	49	68	50	65	-	-	-	-	-
9yo	16	19	30	31	-	-	-	-	-	-
10yo	11	10	16	-	-	-	-	-	-	-
10yo+	2	4	-	-	-	-	-	-	-	-
Individual Horses	798	805	746	736	771	697	802	745	700	446
% of Total	57%	57%	56%	55%	58%	55%	55%	55%	57%	55%
<u>Starts</u>										
2yo	420	434	511	445	442	498	485	482	518	497
3yo	2,636	2,801	2,523	2,717	3,151	2,974	3,017	3,175	3,345	-
4yo	4,676	5,019	4,390	4,794	4,995	4,385	5,164	5,118	4,408	-
5yo	3,918	3,896	3,824	3,790	3,889	3,780	4,068	3,355	-	-
6yo	1,952	2,198	2,342	2,496	2,438	1,973	2,200	-	-	-
7yo	1,097	1,116	1,344	1,214	1,290	878	-	-	-	-
8yo	434	487	660	642	618	-	-	-	-	-
9yo	162	218	333	310	-	-	-	-	-	-
10yo	62	74	155	-	-	-	-	-	-	-
10yo+	4	23	-	-	-	-	-	-	-	-
Total Starts	15,361	16,266	16,082	16,408	16,823	14,488	14,934	12,130	8,271	497
% of Total	61%	61%	59%	58%	58%	56%	56%	57%	58%	56%
<u>Starts/Starter</u>										
2yo	3.3	3.7	3.6	3.2	3.5	3.5	3.1	3.5	3.3	3.2
3yo	6.3	5.9	6.3	6.4	7.2	7.0	6.3	7.1	6.9	-
4yo	9.0	9.0	8.4	9.4	9.1	8.8	9.0	9.3	8.4	-
5yo	10.4	9.5	10.1	9.9	10.0	10.2	9.6	9.4	-	-
6yo	9.7	9.8	10.7	10.9	10.2	9.5	9.4	-	-	-
7yo	10.9	10.0	11.2	9.1	9.8	9.0	-	-	-	-
8yo	9.2	9.9	9.7	12.8	9.5	-	-	-	-	-
9yo	10.1	11.5	11.1	10.0	-	-	-	-	-	-
10yo	5.6	7.4	9.7	-	-	-	-	-	-	-
10yo+	2.0	5.8	-	-	-	-	-	-	-	-
Total	19.2	20.2	21.6	22.3	21.8	20.8	18.6	16.3	11.8	1.1
% of Total	106%	107%	105%	106%	101%	102%	100%	104%	101%	

As these two tables highlight that colts typically race longer and/or have more starts than fillies, it follows that any decline in the number of colts racing will have a greater impact than a decline in the number of fillies.

Frequency of Racing

The racing frequency profile of the 1,350 individual starters from the 1998 crop can be re-formatted as follows:

Racing Frequency Profile of 1998 Crop

	<u>Individual Horses</u>	<u>Total Starts</u>	<u>Average Starts</u>	<u>% of Total Starts</u>	<u>Cummulative Percentage</u>	<u>Cummulative Horses</u>
Raced 30 or more Times	343	16,904	49.3	59.8%	59.8%	343
Raced 20-29 Times	192	4,619	24.1	16.3%	76.1%	535
Raced 10-19 Times	324	4,592	14.2	16.2%	92.4%	859
Raced 5-9 Times	220	1,523	6.9	5.4%	97.8%	1,079
Raced 1-4 Times	271	629	2.3	2.2%	100.0%	1,350
	1,350	28,267	20.9	100.0%		

This table highlights the pyramid structure of the starter population and the reliance the current level of racing activity (29,000+ starts per annum) has on a relatively small

number of horses from each crop that race in excess of 30 times. For example, from the 1998 crop:

- 343 horses representing only 11.7% of the core pool of NZ racing stock raced 16,904 times representing 59.8% of the total race starts of that entire crop.
- 535 horses representing only 18.3% of the core pool of NZ racing stock raced 21,523 times representing 76.1% of the total race starts of that entire crop.
- 859 horses representing only 29.4% of the core pool of NZ racing stock raced 26,115 times representing 92.4% of the total race starts of that entire crop.

The Wastage Profile of the 1995 – 2004 Crops

We have sought to quantify the wastage profile of each crop at specific points along the supply chain, based upon age class and racing frequency.

Approach 1 – Age Class

The following table tracks the progression of horses from the 1998 crop as they commence racing; are exported and/or cease racing - from age 2 through to age 6+.

Horses from the 1998 Crop that Raced				Cease Racing	% of Age Class	% of Total
	Exports	Attrition	Closing			
First Raced at 2	233	10	38	185	23	10%
Raced at 2 & 3	185					
First Raced at 3	<u>572</u>					
Total Raced at 3	757	119	109	529	90	12%
Raced at 2 & 4	15		(15)			
Raced at 3 & 4	529					
First Raced at 4	<u>406</u>					
Total Raced at 4	950	152	240	558	230	24%
Raced at 2 or 3 & 5	19		(19)			
Raced at 4 & 5	558					
First Raced at 5	<u>101</u>					
Total Raced at 5	678	117	219	342	219	32%
Raced at 2, 3 or 4 & 6+	10		(10)			
Raced at 5 & 6+	342					
First Raced at 6+	<u>38</u>					
	390	83	307	0	307	79%
Totals	<u>1,350</u>	<u>481</u>	<u>869</u>	<u>869</u>		<u>100%</u>

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The “Attrition” column calculates the initial reduction in horses from one season to the next. However, as a small number of horses race again after missing a season, the “Cease Racing” column attempts to adjust for this.

A number of observations can be drawn from this table:

- While the number of horses that race as two year olds is relatively low, only 10% of these horses fail to race again at three.
- The fact that very few horses that race at two cease racing, implies that very few of these horses have suffered a physical event that prevents them from doing so.
- This does not suggest that racing at two in itself improves longevity, as the ability to race at two is very much determined by the physical and mental maturity of the horse. It does however suggest that horses mature enough to race at two appear more likely to race beyond this season – and possibly for longer.
- 134 (57.5%) of the horses that raced at two, raced at 4 or older.
- 42.4% of the total horses that raced commenced at three (10% cease).
- 59.6% of the total horses that raced commenced at two or three (13% cease).
- The rate horses cease racing increases between the 2yo and 4yo seasons and then plateaus. This probably reflects an increase in both voluntary and involuntary events leading to retirement from racing.

The participation profile of the 1998 crop can be summarized as follows:

1998 Crop	First Race	Export	Cease Racing	Total Raced
2yo	233	10	23	233
3yo	572	119	90	757
4yo	406	152	230	950
5yo	101	117	219	678
6yo+	38	83	307	390
	1,350	481	869	

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Similarly, the profile for all crops from 1998 to 2003 is as follows:

	1998	1999	2000	2001	2002	2003
<u>First Race</u>						
2yo	233	214	242	273	236	260
3yo	572	592	564	645	589	627
4yo	406	402	341	390	436	343
5yo	101	89	99	111	96	-
6yo+	38	37	22	27	-	-
	1,350	1,334	1,268	1,446	1,357	1,230
<u>Export</u>						
2yo	10	23	9	17	14	13
3yo	119	89	80	98	85	97
4yo	152	147	124	159	154	97
5yo	117	115	112	144	71	-
6yo+	83	65	61	29	-	-
	481	439	386	447	324	207
<u>Ceased Racing</u>						
2yo	23	6	17	18	24	20
3yo	90	105	107	118	99	164
4yo	230	256	244	248	322	839
5yo	219	204	236	239	588	-
6yo+	307	324	278	376	-	-
	869	895	882	999	1,033	1,023
<u>Total Raced</u>						
2yo	233	214	242	273	236	260
3yo	757	769	773	877	779	844
4yo	950	966	902	1,038	1,018	936
5yo	678	661	655	737	659	-
6yo+	390	389	339	405	-	-
	1,350	1,334	1,268	1,446	1,357	1,230

Approach 2 – Frequency of Racing Milestones

Given a high percentage of each crops' race starts are made by a small number of horses with longevity, the following analysis has been undertaken on the 1998 crop. Similar outcomes occur for all crops reviewed.

The overview of the 1998 crop identifies a number of milestones associated with the training and racing frequency as follows:

	<u>Total</u>		<u>Colt</u>	<u>Filly</u>		
Pool from which core NZ racing stock drawn	2,925		1,404	1,521		
			48%	52%		
<u>Milestones</u>	<u>Yes</u>	<u>%</u>	<u>No</u>	<u>%</u>	<u>Attrition prior to Milestone</u>	<u>%</u>
Registered with a Trainer	1,856	63%	1,069	37%	1,069	37%
Tried or Raced	1,584	54%	1,341	46%	272	9%
Raced once	1,350	46%	1,575	54%	234	8%
Raced 5 or more times	1,079	37%	1,846	63%	271	9%
Raced 10 or more times	859	29%	2,066	71%	220	8%
Raced 20 or more times	535	18%	2,390	82%	324	11%
Raced 30 or more times	343	12%	2,582	88%	192	7%
					343	12%
			Sub-total		2,925	100%

The data for the groups of horses that fall into each milestone segment has been extracted and reviewed. The following comments are limited to milestones where observations of interest can be made.

Horses Never Registered with Trainer

1,069 horses representing approximately 37% of the core pool of NZ racing stock were never registered with HNZ as having a trainer. [This compares to 32% in the thoroughbred code.]

The horses that make up this segment of the 1998 crop had the following characteristics:

		<u>%</u>	<u>Filly</u>	<u>Colt</u>	<u>Filly</u>	<u>Colt</u>
Never with a Trainer	1,069	100%	614	455	57%	43%
Unnamed	179	17%	83	96	46%	54%
Named	890	83%	531	359	60%	40%
Broodmare to Stud	164	15%	164	0	100%	0%
% of Fillies to Stud					27%	

- While fillies make up 52% of the core pool of NZ racing stock (after exports), they make up 57% of this segment. If the incidence of conformation issues and physical events that prevent horses from racing are the same for colts and fillies, this could again suggest that some of the fillies in this segment were not placed with a trainer for other than physical reasons – e.g. possibly the perceived lack of commercial opportunity.
- 17% of this segment remains unnamed suggesting that for all effective purposes these horses have exited the supply chain.
- Not surprisingly, fillies represent a high percentage (60%) of the horses that have been named - presumably reflecting their potential to go to stud.
- However, only 27% of all fillies within this segment have gone to stud. This could suggest the balance were not viewed as commercially viable breeding propositions.

[Further analysis of this segment would be useful. We need to ascertain the percentage of horses that did not go into work for economic/financial reasons rather than physical or conformation faults. This would identify whether there is an untapped pool of horses that in the future could partially fill a gap created by the falling foal crop. – Discuss with HNZ.]

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Horses Registered with Trainer – Never Tried or Raced

278 horses representing approximately 9.5% of the core pool of NZ racing stock were registered with a trainer but never either trialed or raced. [This compares to 7% in the thoroughbred code.]

This segment of the 1998 crop had the following characteristics:

		<u>%</u>	<u>Filly</u>	<u>Colt</u>	<u>Filly</u>	<u>Colt</u>
With Trainer - Never Tried or Raced	278	100%	157	121	56%	44%
Named	278	100%	157	121	56%	44%
Broodmare to Stud	68	24%	51	17	75%	25%
% of Fillies to Stud					32%	

- The percentage of fillies in this segment at 56% was significantly above the proportion of horses in work with a trainer that were fillies of 48.9%. This could suggest that owners quit fillies sooner.
- Only 32% of all fillies within this segment have been retired to stud. This possibly suggests that the balance were not viewed as commercially viable breeding propositions.

All Horses that have Raced

1,350 horses representing approximately 46% of the core pool of NZ racing stock have raced at least once in a flat race. [This compares to 50% in the thoroughbred code.]

This segment had the following characteristics:

		<u>%</u>	<u>Filly</u>	<u>Colt</u>	<u>Filly</u>	<u>Colt</u>
With Trainer - Raced	1,350	100%	614	736	45%	55%
Trialed	1,342	99%	611	731	46%	54%
Times Trialed	6,812		3,067	3,745	45%	55%
Trial Winner	732	54%	311	421	42%	58%
Trials Won	1,450		605	845	42%	58%
Trial Place Getter	981	73%	450	531	46%	54%
Trial Placings	2,487		1,114	1,373	45%	55%
Times Raced	28,267		11,859	16,408	42%	58%
Race Winner	846	63%	361	485	43%	57%
Races Won	2,610		1,021	1,589	39%	61%
Race Place Getter	936	69%	407	529	43%	57%
Race Placings	4,864		1,952	2,912	40%	60%
Broodmare to Stud	331	25%	331	0	100%	0%
% of Fillies to Stud					54%	

- While the number of fillies and colts that trialed was similar to their respective proportions of horses with a trainer, the number that raced and the extent of their respective participation was quite different. Colts trialed and raced much more often than fillies and relatively more colts raced than fillies. Colts also won trials and races more often than fillies.
- 54% of the fillies that raced have to date gone to stud.

Possible Impact of Reduced Foal Crop

As noted above, since 2004 the number of mares mated annually has reduced resulting in a reduction in the foal crop of approximately 500 live foals.

Historically very few horses have been imported to race. We believe it is realistic to assume that this is unlikely to materially change in the foreseeable future.

The export of horses with significant ability that attract large overseas offers is effectively demand driven export and unlikely to be significantly impacted by a reduction of the foal crop.

The export of horses with only average ability, whose opportunity to earn sufficient stakes in New Zealand is limited, is more likely to be supply driven as owners become prepared to sell these horses at a price that enables markets such as the USA to acquire them as “go around” horses. A drop in the foal crop could delay the decision to sell.

It is therefore unlikely that a reduction in the foal crop will have a pro-rata impact on the number of starters and starts of that crop.

Based on the above supply chain data, we have prepared a framework to estimate the impact of a reduction in the foal crop. This framework initially assumes:

- The numbers of imports and un-raced exports remain unchanged;
- The number of raced exports reduces proportionately with the foal crop;
- The number of lifetime starts per starter is set at 21.7, being the [minimum] number currently being achieved.

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Projected Racing Frequency of 2006 Crop

	<u>Total</u>	<u>Colt</u>	<u>Filly</u>
Mares Served	4,070		
Live Foals	2,865 70%		
Registered Foals (Estimate)	2,779 97%	1,365 49%	1,414 51%
Total Imports - all ages	<u>12</u>	<u>2</u>	<u>10</u>
Pool of horses potentially available to race	2,792	1,367	1,424
Exports - Never Raced	<u>(230)</u>	<u>(142)</u>	<u>(88)</u>
Pool from which core NZ racing stock drawn	2,562	1,225 48%	1,336 52%

<u>Milestones</u>	<u>Yes</u>	<u>%</u>	<u>No</u>	<u>%</u>	<u>Attrition prior to Milestone</u>
Registered with a Trainer	1,626	63%	936	37%	936
Tried or Raced	1,387	54%	1,175	46%	238
Raced Once	1,182	46%	1,380	54%	205
Raced 5 or more times	945	37%	1,617	63%	237
Raced 10 or more times	752	29%	1,810	71%	193
Raced 20 or more times	469	18%	2,093	82%	284
Raced 30 or more times	300	12%	2,262	88%	168
					300
			Sub-total		2,562

	<u>Individual Horses</u>	<u>Total Starts</u>	<u>Average Starts</u>	<u>% of Total Starts</u>	<u>Cummulative Percentage</u>
Raced 30 or more Times	300	15,345	51.1	59.8%	59.8%
Raced 20-29 Times	168	4,193	24.9	16.3%	76.1%
Raced 10-19 Times	284	4,168	14.7	16.2%	92.4%
Raced 5-9 Times	193	1,383	7.2	5.4%	97.8%
Raced 1-4 Times	237	571	2.4	2.2%	100.0%
	1,182	25,660	21.7	100.0%	
Current Annual Starts	1,350	29,200			
Potential Reduction	(168)	(3,540)			
Lifetime Starts Per Starter		(3.0)			
Annual Starts Per Starter		(1.2)			

This suggests that a foal crop of 2,865 live foals will result in 1,182 starters, being 168 less than the 1998 outcome. Given the majority of exports are colts; this reduction would consist of more colts than fillies and as noted above, on average colts have more starts than fillies.

If future foal crops were to remain at this level; and assuming no increase in the starts/starter of these crops, then based on the current estimate of 21.7 lifetime starts per starter, this could (in a worse case scenario) eventually equate to a reduction of 3,540 starts annually. This reduction would progressively occur each year as an increasing number of starters are drawn from smaller foal crops and a reducing number are drawn from bigger foal crops.

From the data derived in this paper it is estimated that a foal crop of approximately 3,200 will result in 1,350 individual starters who on average race for 8.5 times per season for 2.6 seasons. This represents 3,456 starters and 29,200 starts per season – being the approximate profile of the 2004/05 – 2006/07 season average as summarized above.

Similarly it is estimated that a foal crop of approximately 2,800 will result in $(1,350 - 168) = 1,182$ individual starters who if on average continue to race for 2.6 seasons, will equate to 3,073 starters per season – a difference of approximately 400 starters.

If however, as a response to there being a reduced number of starters the remaining starters race for longer (i.e. more than an average of 2.6 seasons) or more often (i.e. more than an average of 8.5 starts per year or 21.7 lifetime starts) the impact on annual starts could be mitigated to some extent.

In order for the total number of annual starts to be maintained at or increased above the 29,200 level, a mix of some or all of the following would need to occur:

- The average number of lifetime starts for the remaining horses would have to increase from 21.7 to approximately 24.7. This equates to 1.2 starts per season assuming an average racing career of 2.6 years;
- Some of the existing horses expected to be voluntarily retired would need to continue to race for longer *[Fewer horses would mean that some of these horses would be more competitive. Discuss how the rating system might encourage this];*
- More horses would need to be imported and/or fewer exported. This could be triggered if ownership demand in New Zealand reaches a point of under-supply. *[Assumes restrictions on importation will be removed however the likely increased costs resulting from greater quarantine requirements will have an adverse impact on the importation of lower cost/value potential racing stock and broodmares];*
- Steps would need to be taken to reduce the number of horses that would be expected to have their racing career interrupted or ended by an involuntary event. *[Leads into a key focus on MSI and respiratory injuries.] [Discuss thoroughbred research]*
- Steps would need to be taken to better understand the segment of approximately 33% of the foal crop that is never registered with a trainer and; if possible, reduce this segment, thereby increasing the racing population. *[Further research]*